Koolmesh®
— TAILOR MAKE YOUR SOLUTION

App User Manual

User Guide v2.2

Contents

Introduction

Koolmesh is an advanced lighting control solution based on Bluetooth SIG Mesh technology. Bluetooth Mesh is the only low power wireless technology in all modern smartphones, tablets, making it the only mainstream and future proof low power radio technology in the world.

Koolmesh technology can be integrated into fixtures, LED-drivers, LED-modules, switches, sensors, and different kinds of control modules creating an optimal solution in terms of easy installation and functionality with minimal additional hardware and deployment costs. Koolmesh-ready products that are produced by Koolmesh partners and are 100% compatible with Koolmesh's native products

Koolmesh technology provides a mesh network where all the intelligence of the system is replicated in every node.

The Koolmesh app works as one of the user interfaces in Koolmesh lighting control solution: as the commissioning tool as well as a remote gateway which allows commissioning agents, contractors, installers, and facility managers to configure, control and manage lighting infrastructures based on qualified Bluetooth mesh.

APP User Tips

When you see an *i* icon in the Koolmesh mobile app, you can click on it to view an explanation of the feature (*i* refers to information).
● This black dot in the User Manual generally corresponds to the *i* in the app, explaining the app's features.
※ Represents something that users tend to overlook.
Case 1, case 2, case 3, etc. represent classic cases that are commonly applied.

App Installation

The Koolmesh app works with iOS as well as Android which are free to download from Apple App Store and Google Play. Or users can download via scan below QR-code.

Bluetooth 5.0 SIG mesh

HYTRONIK Koolmesh

iOS

Android

for iOS

for Android

Smartphone app for both iOS & Android platform

Create Account

Users can access the login page after installation.

1.When you try to log in, a window will pop up asking you to allow your mobile phone's Bluetooth and turn on Bluetooth to access the Koolmesh app.

2.First-time users need to create an account, fill in the user's name and email, get verification code, create password with a minimum of eight digits, and accept the terms and conditions as requested (see figure 1.1). If users forget the password, they can click "Forgot password?" to recover it, and the Koolmesh app will send the password to a valid email address.(see figure 1.2)

3.After the account is registered, log in to the Koolmesh app. A window will pop up asking to "Get your current location to calculate the sunrise, sunset, and light intensity at your latitude, and our sensor devices will adjust accordingly." Please allow it. After that, you can continue the operation by selecting "Basic Setup Mode" or "Advance Setup Mode".

4.If users already have an account, please log in directly with the existing account .(see figure 1.3)

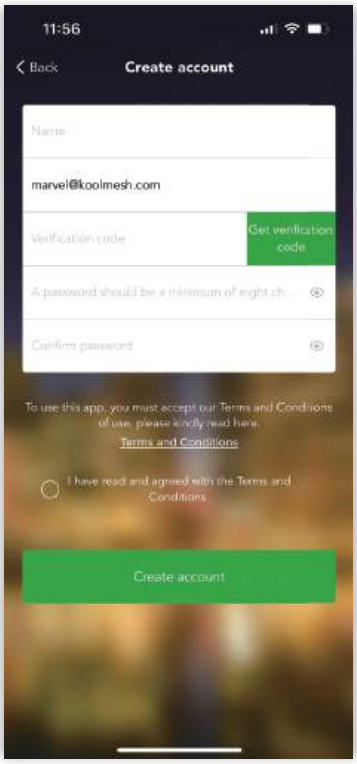

Figure 1.1 *Create account*

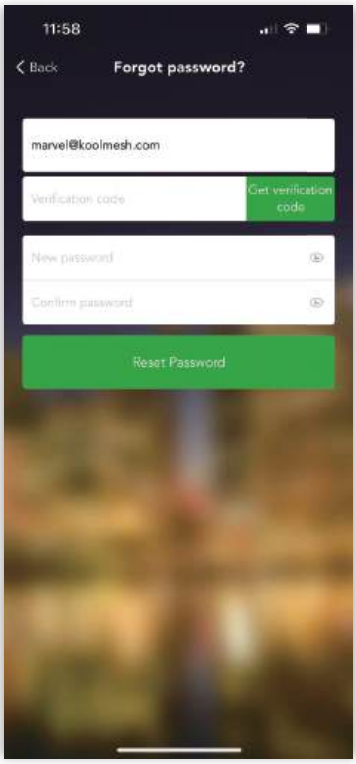

Figure 1.2 *Retrieve password*

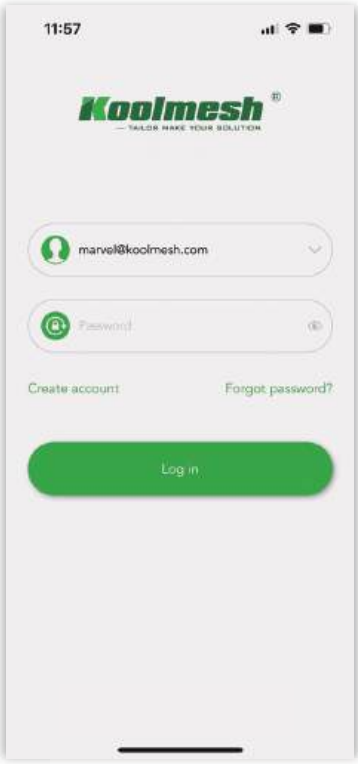

Figure 1.3 *Log in*

- Each account can be accessed by one user each time.

Example: When installer A goes to a parking lot where there is no internet access to do the commissioning, installer A still can do all the commissioning off-line, and all the settings will be saved to the local. When internet connection resumes, the preset settings will be synchronized to the server automatically. Under normal situations (have internet access), if there is another installer B log in to Koolmesh who is using the same account with installer A and installer A would be forced to log out when installer B logs in to the Koolmesh app at the same time. Therefore, if installer A would like to continue the commissioning, then installer A needs to log in again to the koolmesh app. However, installer A can do off-line commissioning and would not be forced to log out even though installer B logged in to the koolmesh app using the same account with installer A when there is no internet access. Under this situation, installer A continues to do all the commissioning. But when installer A finish the commissioning and go back to office or somewhere have internet access and found that installer A been forced log out because installer B log in with same account. When installer A logs in to the Koolmesh again it will turn out that some of the commissioning is somehow missing. That is because when there was no internet, installer A has no access knowing that it has been forced to log out. So those commissioning after installer B log in will be missing.

Change E-email and Password

Users can change their exciting E-email, account password, delete account and Koolmesh app's language which including ten languages, they are English, 简体中文, 繁体中文, Deutsch, Svenska, Français, Italiano, Polski, Čeština, Español, and Русский, by click in the top right corner of the setting page.

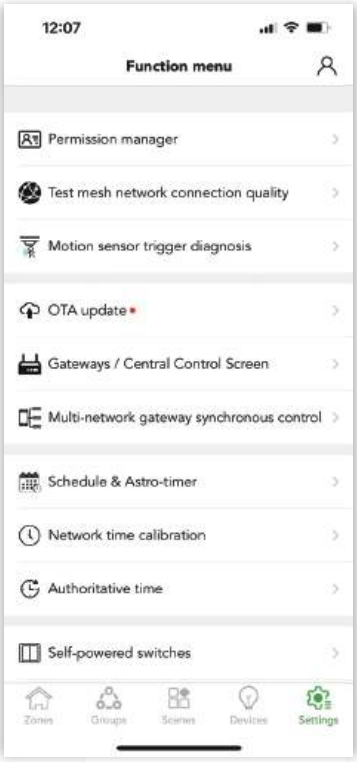

Figure 2.1 *Setting page-1*

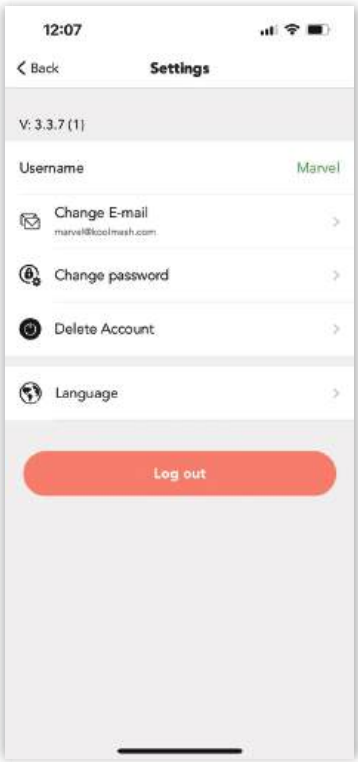

Figure 2.2 *Setting page-2*

Network

1.1 Create and manage networks

If you are a first-time user and first taking devices into use, devices need to be added to a network and zone first, and users can follow guidelines in the app.

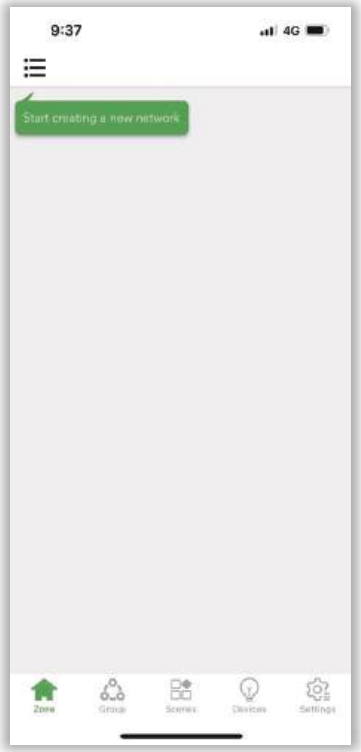

Figure 3.1 *Zone page*

Figure 3.2 *Zone page*

1. Create a network by clicking ☰ on the left corner of the zone (see figure 3.1) and create a network by clicking ⊕.

2. Create a project and name it, like “Demo” (see figure 3.2).

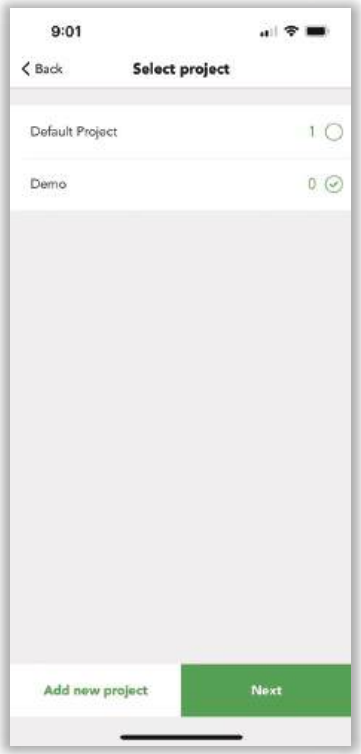

Figure 3.3 *Select project*

Figure 3.4 *Add network*

3. Select identity and “add”. (see figure 3.4).

※ Installers have almost the same permission as administrators, except they can't delete other installers or users in the network.

Administrators own the highest permission, who can transfer the ownership to others and can add and delete both installers and users, also can assign permission to users.

1.2 How to manage network

After creating a network, users can check all the network information and project information and manage the network. In Koolmesh app, one project can have multi networks. In the top left corner of the zone page, users can click ☰ to review all the projects and networks being created under this account, also can change the project name (see figure 3.5), switch between projects and networks, manage or delete the network, even create a new network, and get a shared network.

1. Click ✎ for project management. (see figure 3.7.1)
   In project management users can change the name of the project in “My networks”. (see figure 3.7.2)

   Users can share the project by clicking”Share Project” and can define the new user type according to their needs.(see figure 3.7.3)

   Users can hide some of the projects by clicking “Hide” if there are too many project items, making it easier for them to operate.(see figure 3.7.4)

   Users can choose to unhide by clicking ✎ and choose “Cancel Hide”,then the hidden items will be revealed. (see figure 3.7.5-3.7.6)

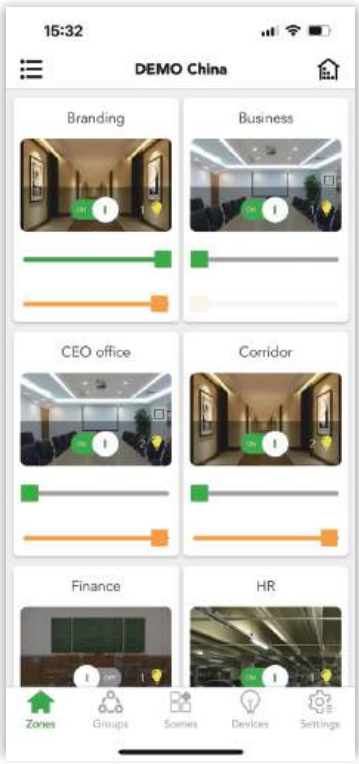

Figure 3.5 *Home page*

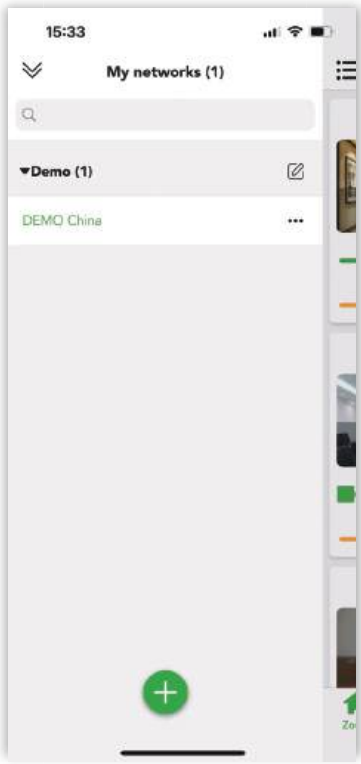

Figure 3.6 *My networks*

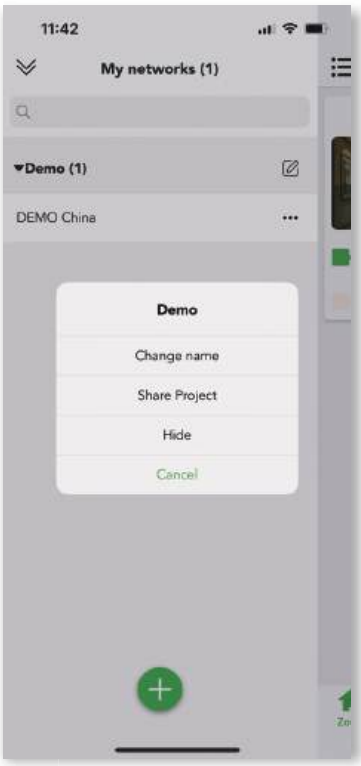

Figure 3.7.1 *Project*

Figure 3.7.2 *Change name*

Figure 3.7.3 *Share project*

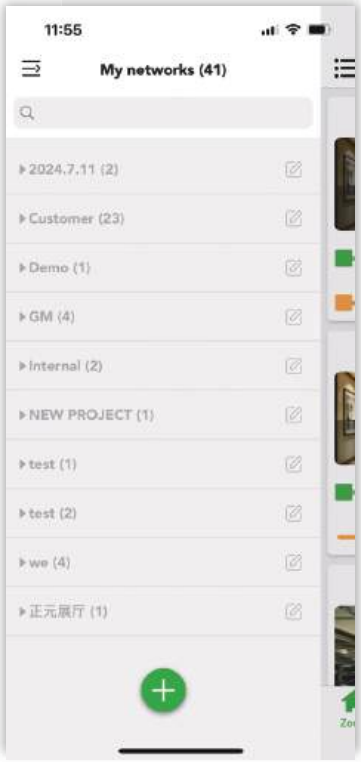

Figure 3.7.4 *Hide project*

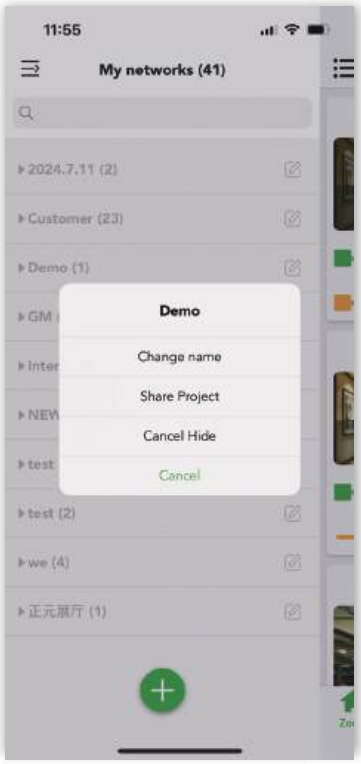

Figure 3.7.5 *Cancel Hide-1*

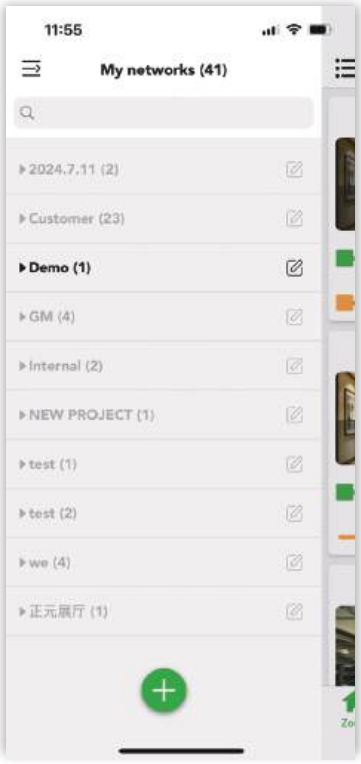

Figure 3.7.6 *Cancel Hide-2*

2.Click ••• for network management.(see figure 3.8.1)
In “network management” users can set the remark of the network in “My networks”.(see figure 3.8.2)

There are two small icons in the upper right corner in the network management setting page.
Clicking enable users to get a shared network via scanning QR code or Key in a network sharing key.
Clicking enable users to delete the network via key in the Koolmesh account password. If there are devices in the network, after deleting the network, Koolmesh app will no longer be able to control these devices.

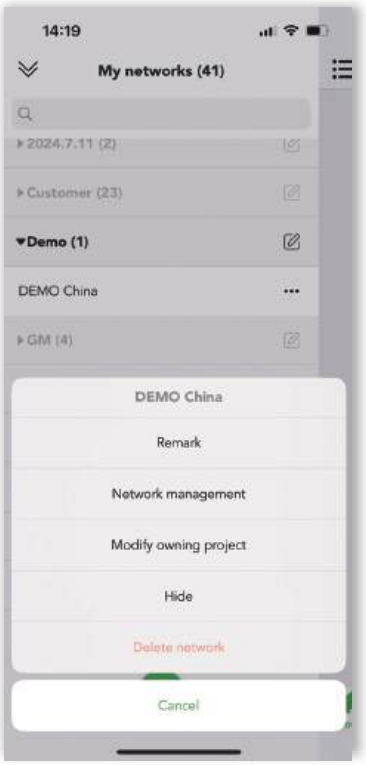

Figure 3.8.1 *Network*

Figure 3.8.2 *Set Remark*

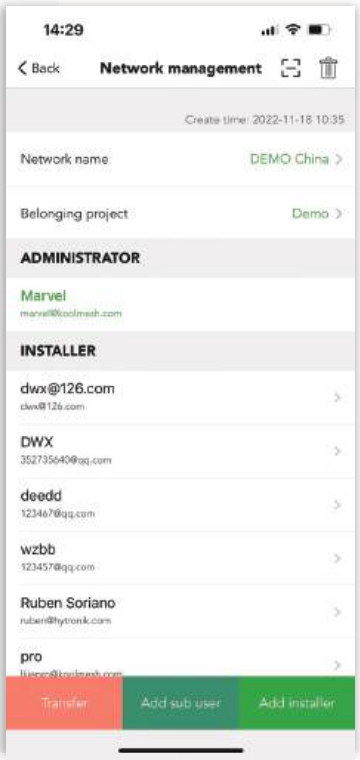

Figure 3.9.1 *Network mangement*

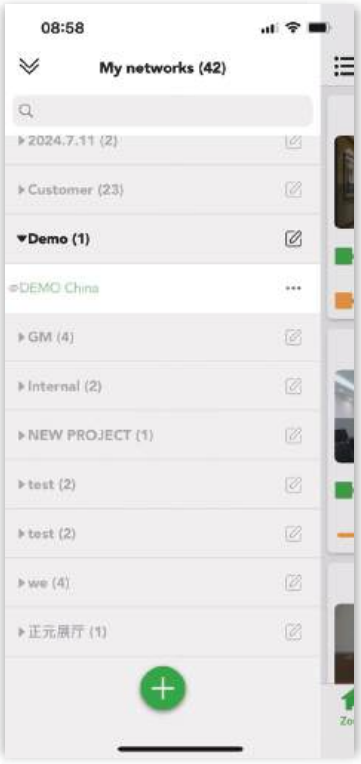

Figure 3.9.2 *Hide network*

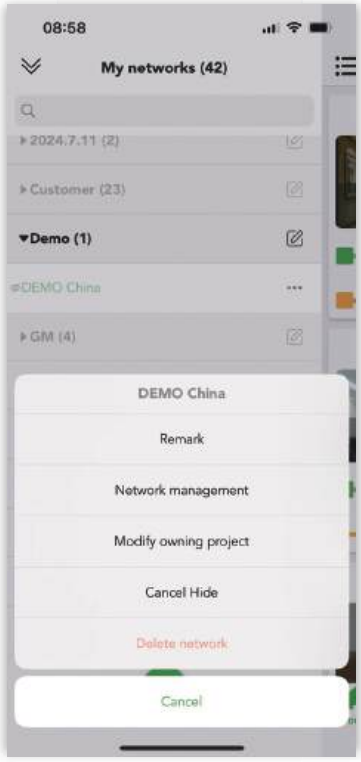

Figure 3.9.3 *Cancel Hide-1*

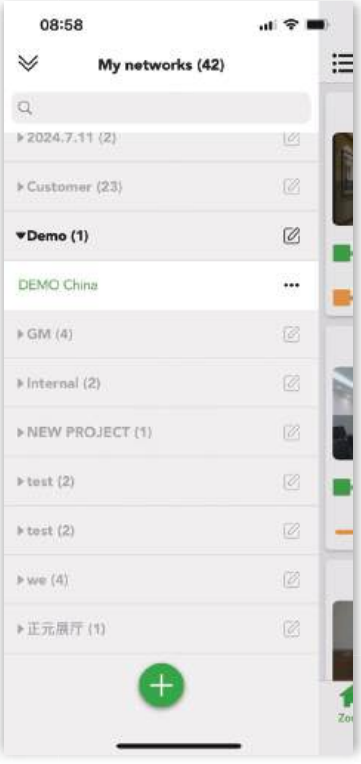

Figure 3.9.4 *Cancel Hide-2*

They can also share the network by transferring the ownership of this network to another account or adding new installers or adding new sub-users (see figure 3.9.1).More detailed setting please refer to the Permission manger section.

If there are too many networks ,or users don't want others to see this network,they can hide some of them, making it easier for them to operate.(see figure 3.9.2)

Users can click ••• and choose "Cancel Hide",then the hidden items will be revealed.(see figure 3.9.3-3.9.4)

In "modify owning project" Koolmesh will list out all the projects being created under this account, so users can modify the network from project A to project B which enables users to manage the network conveniently. Users also can create a new project and modify the certain project if needed.

Example: network "Koolmesh" under project "Koolmesh office"

If users would like to change network "demo" from project "Demo" to project "Koolmesh office", then users can click demo's ••• to use "modify owning project" and select "Koolmesh office" and done to finish the modification.

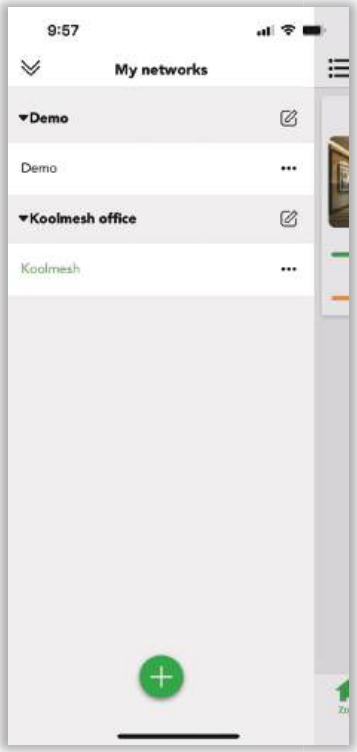

Figure 3.10 *Modify project*

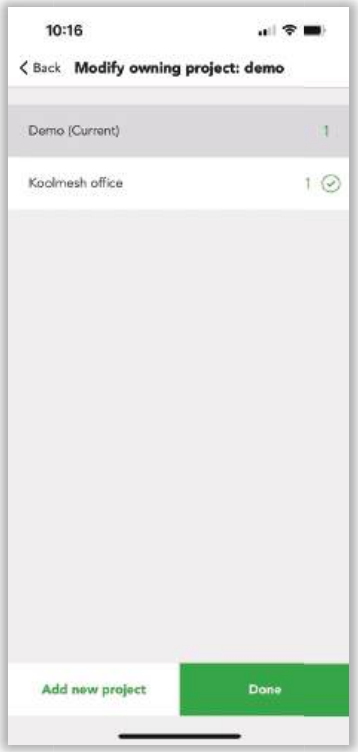

Figure 3.11 *Modify network*

Figure 3.12 *Modification done*

Create and manage zone

Users need to create a zone after finishing network and project creation, and users can create a zone by following the guideline. A network can have multi zones and every device must be included in one zone but can exist in different groups. Users can name the zone and select the cover picture from Koolmesh App defaults. Or click to take the photos on their own or select the picture from their album and “done” to create a zone, like “office”. (see figure 4.1)

Figure 4.1 *Create a new zone*

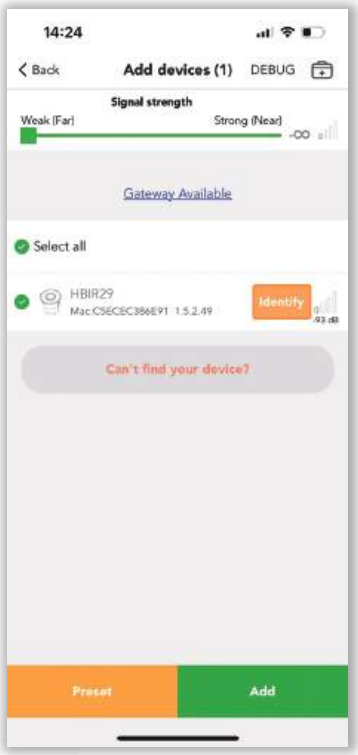

Figure 4.2 *Add device-1*

Figure 4.3 *Add device-1*

After it is finished, users can add the device as instruction. Generally, Koolmesh app will search all the Koolmesh-enabled devices around them and list all the devices by Bluetooth signal from strongest to weakest (see figure 4.2).

Before users add the device, users need to “start" to add the device to the zone and rename as they want. If the firmware of device is not the latest version, like “HBHC25 ". when user select the device, Koolmesh app will pop up that “The device has a new firmware version (upgradable via OTA update)” (see figure 4.3). Users can choose “update” then Koolmesh app will link to the nearby devices to “start updating”. After finished, user can continue the device adding, like “HBHC25 " to zone “Hallway” and rename as “Hallway 2(HBHC25)”. Users also can add multiple devices if they have a large network. Just be aware that users need to rename the devices one by one and to “identify” every device before adding.

All the zones created by users have been listed out on the “Zone” Setting but not including those zones without a device, like zone “Hallway” “Office”(see figure 4.4). Click to the “zone management”, then users can review all the zones including the zones without device, like zone “warehouse”(see figure 4.5). In the “zone management” users can click the cover of the zone they would like to edit which can rename and change the photo of the zone, like “Hallway”(see figure 4.6). If users would like to remove the zone, then need to remove all the devices first. The zone “warehouse” can be deleted directly because there is no device in it.

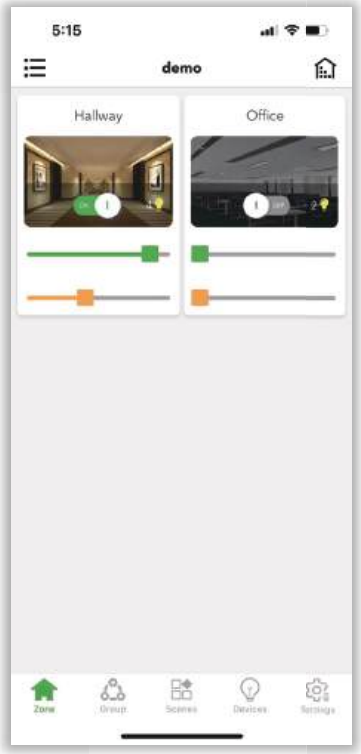

Figure 4.4 *Zone*

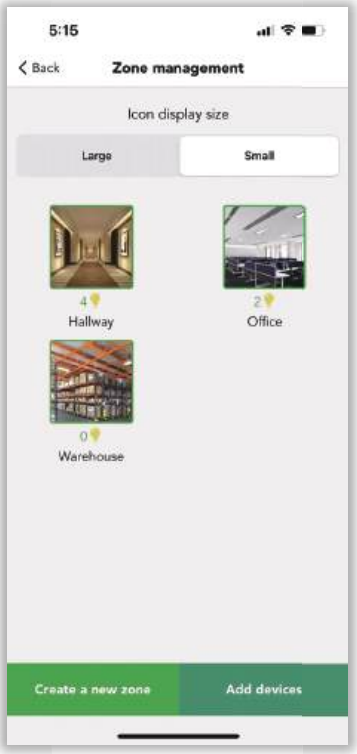

Figure 4.5 *Zone management*

Figure 4.6 *Edit zone*

Group

Grouping is a method of organizing device icons in the Groups tab that includes Luminaire groups and Emergency groups.This can make it easier to set all the devices (especially if you have a large network). Groups can be considered physical collections of devices in an area (e.g. all devices in a row or in one room). Users can name groups and set common dim levels or color temperature for all devices in the same group. Single device can exist in many different groups but will only exist in one zone.

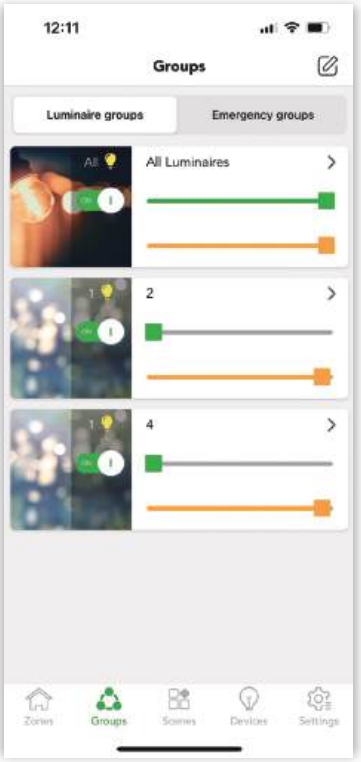

Figure 5.1 *Groups*

Click in the right up corner of the Group page to “Create a new group” which can include any devices, or “Add emergency group” which is for emergency devices only. Emergency grouping enables users to set function test and duration test at a zone level or group level in different time .Then name and select the luminaries to finish the creation .(see figure 5.1)

In the “Luminaire groups management” page, users can long press on the cover of any one of the groups to hide groups and edit and remove it.

Hide groups

means other users and installers can’t see this group in the Group page if users hide it unless they long press on the cover of any one of the groups to show the group.

Figure 5.2 *Groups management*

Scene

Scenes allow you to create and recall lighting situations. A scene can control any variation of luminaires in the network. Luminaires can be used in multiple scenes, but single luminaire cannot exist in more than 16 scenes at the same time. The number of scenes created in a single mesh network is without limitation. In the system, there are 3 default generic scenes that the users can directly use, they are “All off”, “All 50% brightness”, “All on”. These 3 default scenes are applied to all the luminaires in the network.

Scene will never activate itself automatically. There are three ways in the Koolmesh system to activate the scene function.

1. By manual control:
   1) Users can activate the scene in the scene page by just clicking on the scene picture.
   2) They can activate the scene through the Push switch (need to be configured).
   3) They also can activate the scene through Hytronik BLE touch panel HBP02 (Need to be configured).
   4) The Koolmesh app also supports the Enocean switch (BLE version), the users can activate the scene through the Enocean switch (need to be configured).

2. By the motion sensors:
   The scene can be activated by the motion sensor. Once the movements are detected by the motion sensor, then it will activate the scene automatically. Users need to set up the motion sensor first.

3. By the schedule:
   Users can set up a schedule to activate a scene at a certain time of day.

Users can “create a new scene” by clicking⊕ on the top right corner. Users can edit the existing scene by clicking on the top left corner or just long press on the scene cover. After long pressing on the scene cover, Users can add or remove devices from the scene, create time-based scene and animation scene, edit the scene, change its name, or remove (delete) the scene.

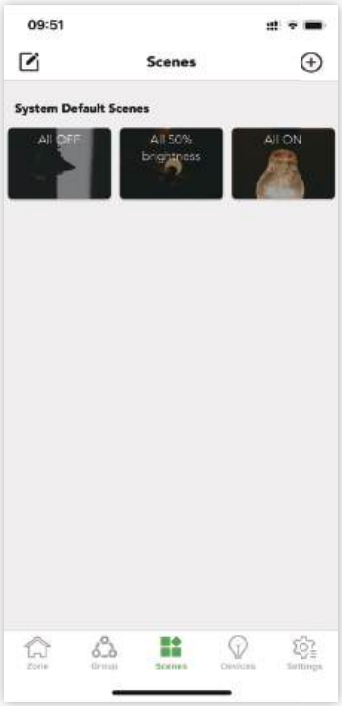

Figure 6.1 *Scenes*

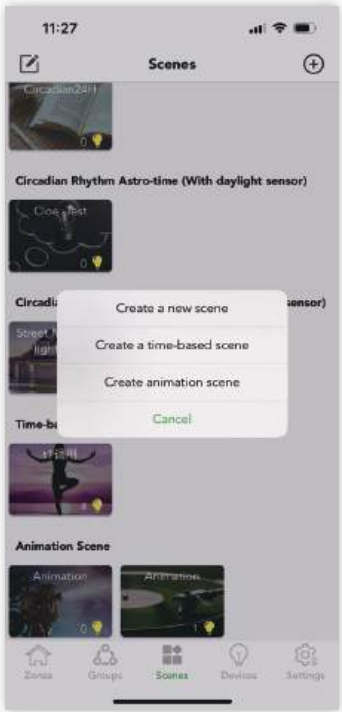

Figure 6.2 *Create scenes*

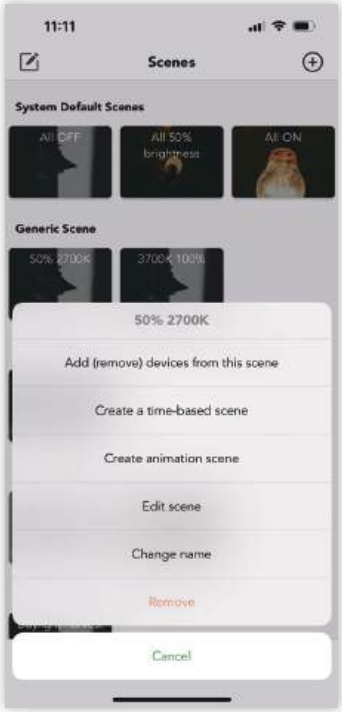

Figure N6.3 *Type of scenes*

Type of scenes

There are 7 types of scenes that can be created in the Koolmesh app. Users can create scenes depending on their requirements. Five of these have 8 variants for popular applications (see figure 6.3). The other two types are the Time-based scene and the Animation scene, which are more suitable for advanced users or special applications.

Figure 6.3 *Type of scenes*

Figure 6.4 *Lux on/off scene*

1. Generic Scene

This is a very simple lighting scenario (usually containing several luminaires adjusted to different dimming levels and/or color temperatures) that you wish to be able to recall. Users just need to set a fixed brightness level and color temperature to luminaires.

2. Lux On/Off Control (Daylight Threshold) Scene

The luminaries turn on and off depending on the lux level setting. The scene's output is always defined by the dimming level(s) of the luminaires selected within the scene. The daylight sensor will keep measuring the ambient lux level. Users need to define the daylight threshold value, if they need the daylight sensor to turn off the luminaires, then they will need to define the Lux off value as well.
There are many options in the scene (see figure 6.4).

- **Daylight sensor usage strategy:**

  If a dedicated sensor is selected and a daylight sensor is in the luminaire. The scene will run based on the lux reading from this dedicated sensor instead of using the external daylight sensor. If the dedicated daylight sensor is disabled, the scene will run based on lux reading from the external daylight sensor instead.

- **Daylight Threshold:**

  The target value set by the users. When the ambient lux is less than it, the daylight sensor will turn on the luminaires and remain the output until the ambient lux exceeds the lux off value. Users can define the measuring time: when the ambient lux continuously less than daylight threshold value for how long, then the luminaires will be turned on.

- **Daylight sensor prior to motion sensor (Lux off):**

  When the ambient lux is strong enough and exceeds the "Lux off value", then the luminaires will be turned off by the daylight sensor. If this function is disabled, when the daylight threshold scene is activated, then the luminaires will not be turned off by the daylight sensor.

- **Lux off value:**

  The target value set by the users, when the ambient lux level is more than this, the daylight sensor will turn off the luminaires. Users can define the measuring time: when the ambient lux continuously more than lux off value for how long, then the luminaires will be turned off.

Case 1: how to create a daylight threshold scene by using a schedule?

Requirements: client wants the luminaires to be on at morning 8:00, then the daylight sensor needs to control the luminaries. When the natural light is not sufficient to 300 lux. Then the luminaires need to be turned on until the natural light is sufficient to meet 500 lux, then the daylight sensor will turn off the luminaires.

1). Create a Lux On/Off Control (Daylight Threshold) Scene (see figure 6.5).
2). Create an 8:00 am schedule to recall this scene (see figure 6.6-6.7).

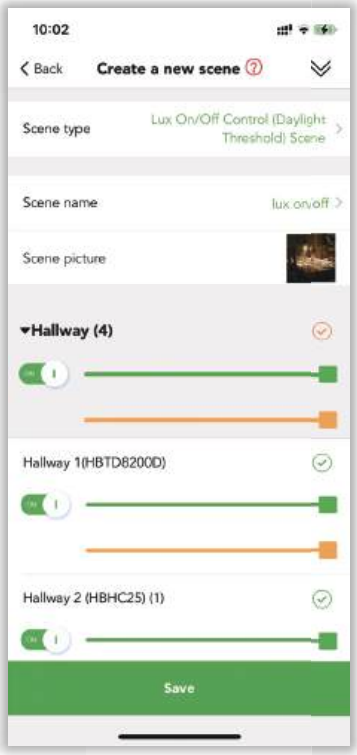

Figure 6.5 *Create scene*

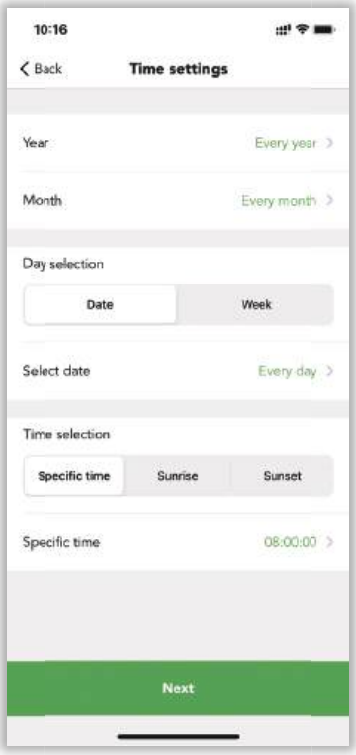

Figure 6.6 *Time setting in schedule*

Figure 6.7 *Add schedule*

3. Daylight Harvest Scene

Daylight harvest scenes utilize information provided by daylight sensors to automatically adjust the scene lighting level based on the amount of light available.
There are two types of daylight harvest in the Koolmesh system: open loop and closed loop.

3.1 Open loop:

The luminaire's output percentage is depended on natural light lux level. Daylight Sensors should not be affected by any light from the luminaires in the network. Only Photocell Advanced enabled sensors can distinguish the natural lights and artificial lights.

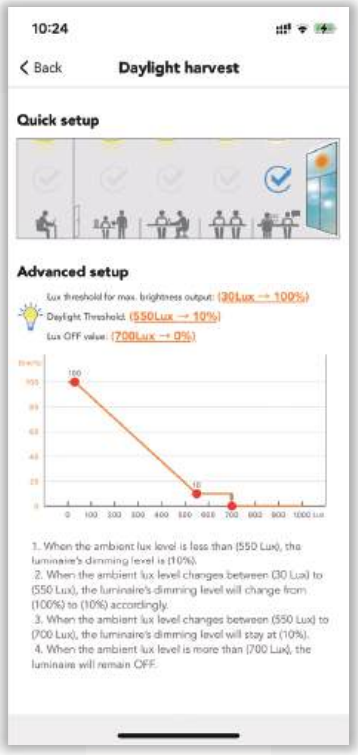

Figure 6.8 *Daylight harvest setup*

- **Daylight harvest profile**

  Koolmesh system provide two ways to setup the daylight harvest profile (see figure 6.8).

  a. Quick setup

  Users do not need to know what's the exact value of each option but just need to quickly click on the picture to select the preset profile according to distance between their luminaire's location and the outside window. The quick setup will be very useful for the users who do not need to have very accurate settings but will save a lot of time for them. When they select the preset profile, they also can change the detail value in the below Advanced setup.

  b. Advanced setup

  It is more accurate and powerful for the users, they can adjust the dimming output according to the lux level. For example, when the ambient lux level is less than 30 lux, the luminaire's dimming level is 100%. When the ambient lux level changes between 30 lux to 550 lux, the luminaries' dimming level will change from 100% to 10% accordingly. When the ambient lux level changes between 550 lux to 700 lux, the luminaries' dimming level will stay at 10%. When the ambient lux level is more than 700 lux, the luminaries will remain off. Users can change the value by dragging the red coordinate points in the diagram.

- **Daylight sensor usage strategy** (see figure 6.9)

  If a dedicated sensor is selected and a daylight sensor is in the luminaire. The scene will run based on the lux reading from this dedicated sensor instead of using the external daylight sensor. If the dedicated daylight sensor is disabled, the scene will run based on lux reading from the external daylight sensor instead (need to choose the control object of this daylight sensor).

Figure 6.9 *Open loop*

- **Measuring time**

  Users can define the measuring time. For how late luminaries will turn on/off before ambient lux continuously detected lower/higher than daylight threshold value.

- **Daylight sensor prior to motion sensor (Lux off)**

  When the ambient lux is strong enough and exceeds the “Lux off value”, then the luminaires will be turned off by the daylight sensor. If this function is disabled, when the daylight threshold scene is activated, then the luminaires will not be turned off by the daylight sensor but will dim down to a small low level.

- **Full range dimming**

  This is the valid dimming range when the device is running this scene.
  On: range from device min. Brightness level to device max. brightness level.
  Off: range from device min. brightness level to scene brightness level.

Case 2:

In an office application, users want to recall a daylight harvest scene (open loop) when the motion sensor detects the movements, if no movements were detected, then the luminaires will go into a 10% brightness stand-by status. They want the hold time of the daylight harvest scene to be about 1 hour, and stand-by time is around 10 minutes. To make the whole office luminaires' brightness be united, they want to use a dedicated daylight sensor as the main daylight sensor of the whole zone. The motion sensor auto control is a big requirement from the customers, they always want the motion sensor to control the luminaries at the first place, then they can interrupt the auto control by the push switch for a while, they prefer to switch back to auto control after the stand-by time (10 minutes).

For the daylight harvest scene, when the ambient lux level changes between 30 lux to 300 lux, the luminaries' dimming level will change from 100% to 30% accordingly. When the ambient lux level is less than 30 lux, the luminaries' dimming level is pinned to 100%. When the ambient lux level changes between 300 lux to 600 lux, the luminaire’s dimming level will stay at 30%. When the ambient lux level is more than 600 lux, the luminaries will remain off status. And they also want the daylight sensor to turn on the light when ambient lux continuously less than 300 lux for 10s, turn off the light when ambient lux continuously more than 600 lux for 5 minutes. Which means even there is movement is detected, the motion sensor triggers the daylight harvest scene but when the ambient lux level is sufficient to 600 lux for more than 5 minutes, then the luminaires will be turned off by the daylight sensor, and no matter if the movements are keeping detected, unless the ambient lux level is less than 600 lux again, then the luminaires will turn on again. This is called “daylight sensor prior to motion sensor (lux off)” in the Koolmesh system. Because the whole zone is using the same settings, the client prefers to use the bulk commissioning function to batch set the motion sensor parameters and luminaires settings.

Step 1. Create a daylight harvest scene (open loop). The scene setting see figure 6.11, figure 6.12. Do not need to create a 10% brightness generic scene. We have a default one in the scene tab.

Step 2. Go to bulk commissioning, select “set motion sensor parameters in batch volume”. Create a new profile and change the settings (see figure 6.13-6.19). Sync to all the relevant sensors.

Step 3. Select “set luminaire parameters in batch volume”. Create a new profile and change the settings accordingly. Sync to all the relevant luminaires (see figure 6.20-6.24).

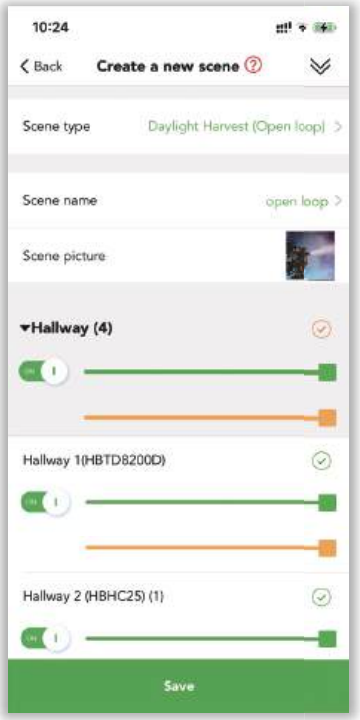

Figure 6.10 *Create scene*

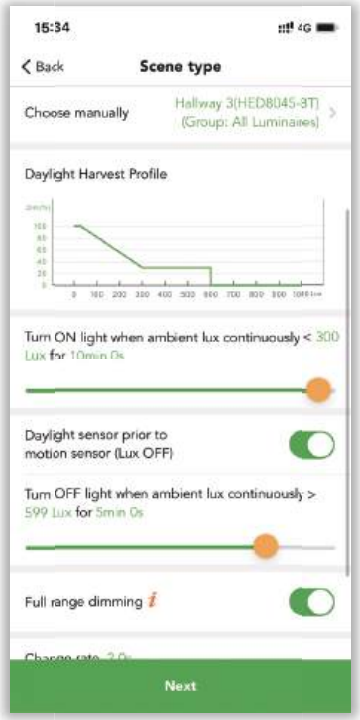

Figure 6.11 *Scene setting*

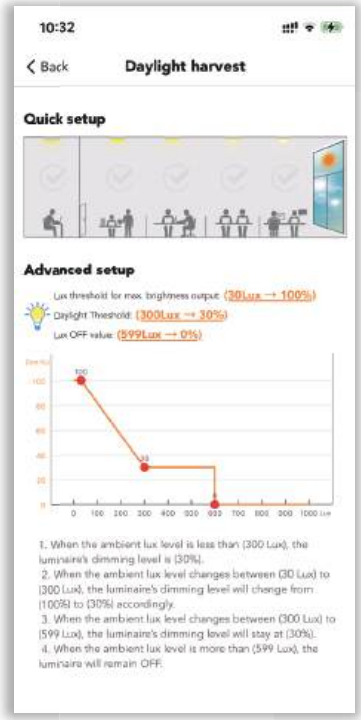

Figure 6.12 *Scene setting*

Figure 6.13 *Bulk commissioning*

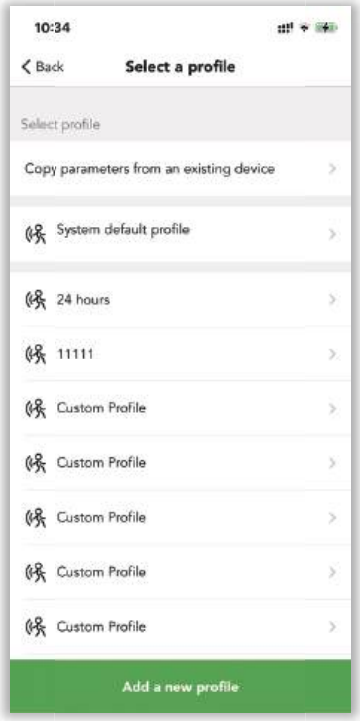

Figure 6.14 *Add new profile*

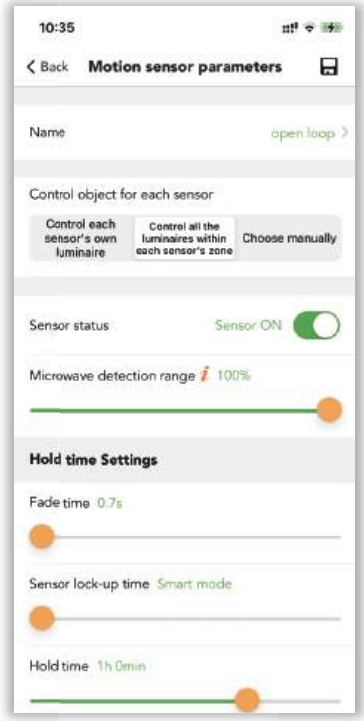

Figure 6.15 *Parameters setting*

Figure 6.16 *Parameters setting*

Figure 6.17 *Parameters setting*

Figure 6.18 *Scene saved*

Figure 6.19 *Syncing*

Figure 6.20 Add new profile

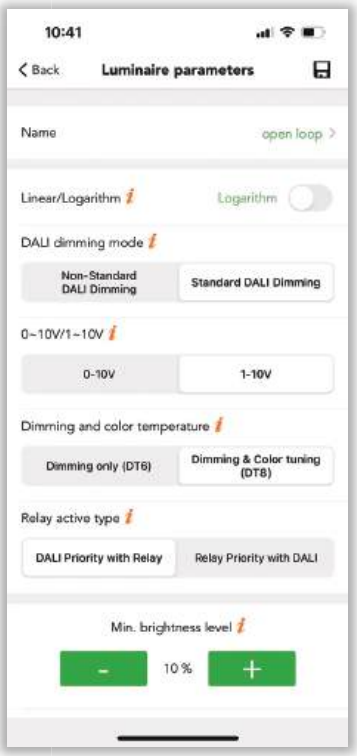

Figure 6.21 Parameters setting

Figure 6.22 Parameters setting

Figure 6.23 Save

Figure 6.24 Syncing

3.2 Closed loop:

The combination of luminaire's brightness output and ambient lux level will be approximately equal to the pre-set target lux value,target lux level is specified. The sensor actively adjusts the luminaires in the active scene to try to reach and maintain that lux level via a feedback loop (by observing the results of its own changes). Sensors are affected by light from the luminaires in the scene.

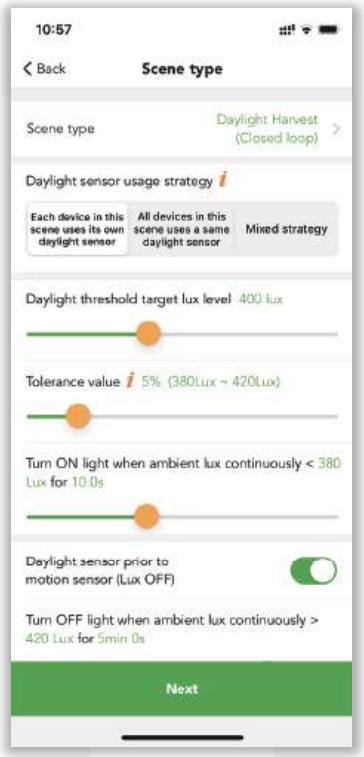

Figure 6.20 *Closed loop*

- **Daylight sensor usage strategy**

  If a dedicated sensor is selected and a daylight sensor is in the luminaire. The scene will run based on the lux reading from this dedicated sensor instead of using the external daylight sensor. If the dedicated daylight sensor is disabled, the scene will run based on lux reading from the external daylight sensor instead. (Need to choose the control object of this daylight sensor).

- **Daylight threshold target lux level**

  The combination of luminaire's brightness output and ambient lux level will be approximately equal to the pre-set target lux value. For example, if the target lux level is 400 lux, then the luminaires brightness output plus the ambient lux needs to be 400 lux.

- **Tolerance value**

  e.g., if the daylight sensor setting is set as 500 lux, and the tolerance lux is set to 50 lux, the valid range will be from 450 lux to 550 lux.

- **Measuring time**

  Users can define the measuring time. For how late luminaries will turn on/off before ambient lux continuously detected lower/higher than daylight threshold value.

- **Daylight sensor prior to motion sensor (Lux off)**

  When the ambient lux is strong enough and exceeds the "Lux off value", then the luminaires will be turned off by the daylight sensor. If this function is disabled, when the daylight threshold scene is activated, then the luminaires will not be turned off by the daylight sensor but will dim down to a small low level.

- **Full range dimming**

  This is the valid dimming range when the device is running this scene.
  On: range from device min. Brightness level to device max. brightness level.
  Off: range from device min. brightness level to scene brightness level.

- Start and stop target lux auto-config

When users finish the creation of Daylight harvest (close loop), then this daylight harvest scene will be listed out on the Scene page where users can long press the cover of this scene to “Start target lux auto-config” or “Stop target lux auto-config”. There are “quick learn (ambient) ”,” learn 24H " and “customize time”.

Start target lux auto config: above have mentioned the combination of luminaire’s brightness output and ambient lux level will be approximately equal to the pre-set target lux value (luminaire’s brightness output + ambient lux level ≈ Daylight threshold target lux level). Therefore, the logic of “start lux auto-config” is when the ambient lux level is lowest / darkest （≈0）, then the luminaire’s brightness will be brightest to achieve the target lux level, which means when user “start lux auto-config” (let us take “learn 24H” as an example), then the system will learn the brightest of luminaire within following 24H, after finish the learning, then system will set this lux level as Daylight threshold target lux (Daylight threshold target lux level≈luminaire’s brightness output when the ambient lux level is darkest).

Please be aware that if users implement “Start target lux auto-config” function, then the “Daylight threshold target lux level” user set in the daylight harvest (close loop) scene will be no more valid, the system will take the learning value as “Daylight threshold target lux level”. Koolmesh team recommends users to “learn 24H” when using the “Start target lux auto-config” function.

Figure 6.20.1 *Closed loop*

Figure 6.20.2 *Closed loop*

Figure 6.20.3 *Closed loop*

Case 3: How to trigger a daylight harvest scene (closed loop) with a manual push switch?

In real life applications, some clients do not want to use the motion sensor function but will use the daylight sensor as the main control. So, they prefer to trigger or recall the scene through the manual Push switch. For example, the client had 2 stand-alone sensors HBHC25 to work with 2 dimmers HBTD8200D to achieve the daylight harvest (closed loop) function. They want the daylight threshold target level to be set at 400 lux, if the ambient lux is less than 400 lux for more than 1 minute, then the luminaires need to be turned on, if the ambient lux level is more than 400 lux for 5 minutes, then the luminaries will be turned off by the daylight sensor. They want to manually trigger the scene through the Push switch. Although in the same zone, they want the HBHC25 daylight sensor that next to the window to control 2 dimmers. another HBHC25 will only control its own luminaries.

Step 1. Create a daylight harvest scene (closed loop). Set the daylight sensor usage strategy to "Mix strategy". Then choose the HBHC25 that is next to the window and then set the control object to the whole zone. The other HBHC25 will only follow its own daylight data. Then set the daylight threshold target level to 400 lux.

Figure 6.21 *Mixed strategy*

Figure 6.22 *Mixed strategy*

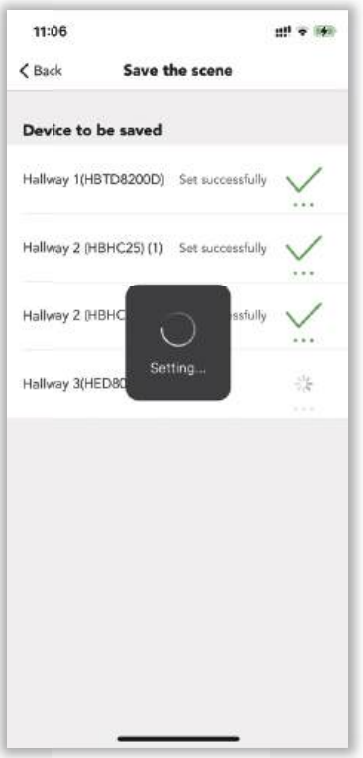

Figure 6.23 *Save the scene*

Figure 6.24 *Push switches*

Step 2. In any of the 4 devices Push switch settings, set the control object to the whole zone. Set the “double press” function to trigger the scene.

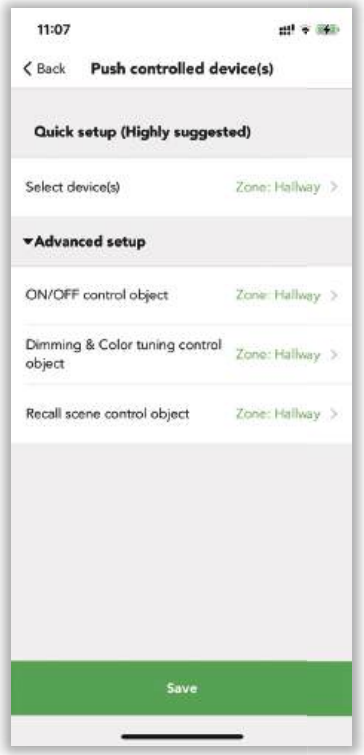

Figure 6.25 *Push controlled device*

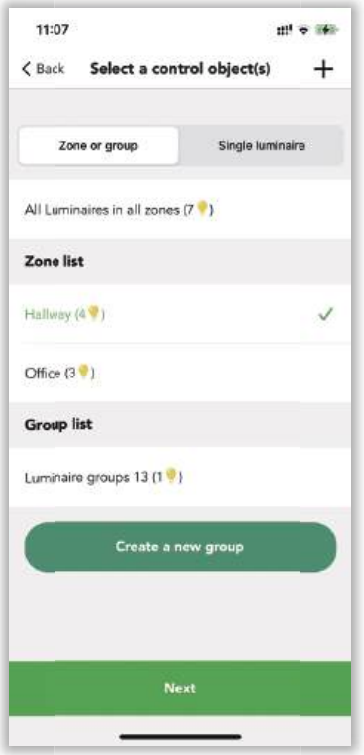

Figure 6.26 *Select control object*

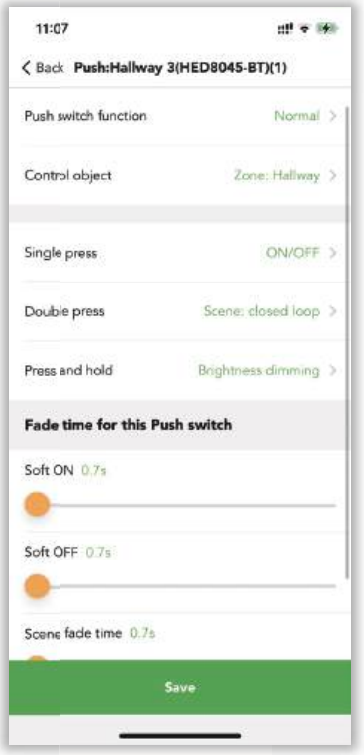

Figure 6.27 *Push setting*

4. Circadian Rhythm Scene

Automatically adjust luminaires' output base on the pre-set target lux level or dimming level and color temperature over the course of the day or from the sunrise to sunset. So apparently there are two factors that can distinguish the circadian rhythm scene: daylight sensor involved or not and time.

There are four types of circadian rhythm scenes in the Koolmesh system: 24 hours circadian rhythm (with daylight sensor), 24 hours circadian rhythm (without daylight sensor), Astro-time circadian rhythm (with daylight sensor), Astro-time circadian rhythm (without daylight sensor). All the circadian rhythm scene needs to have the correct time setting unless the curve will not execute correctly. Which means in the mesh network, at least to have one device that has the real time clock integrated inside to provide the real time for the whole network. So, after power failure, the circadian rhythm scene can perform normally.

4.1 24 hours circadian rhythm (with daylight sensor):

Automatically adjust luminaire's output based on the preset lux level and color temperature over the course of the day. There are many settings inside the scene.

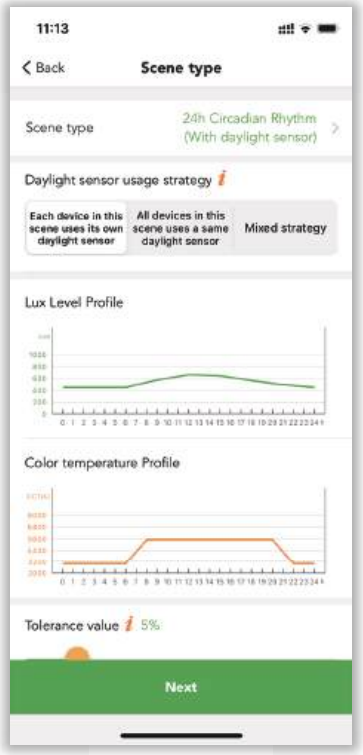

Figure 6.28 *HCL with daylight sensor*

- **Daylight sensor usage strategy**

  If a dedicated sensor is selected and a daylight sensor is in the luminaire. The scene will run based on the lux reading from this dedicated sensor instead of using the external daylight sensor. If the dedicated daylight sensor is disabled, the scene will run based on lux reading from the external daylight sensor instead.

- **Lux level profile**

  Users can define the profile name by themselves. They also can long press and hold the "Shift" button (↑ ↓) to move the entire profile upwards or downwards as a whole. Users can long press on the diagram to add a new coordinate point to the lux curve, they can adjust it in the diagram or just tap on the coordinate then on the top left to quickly insert the lux value and time. They also can zoom in to achieve more precise setup. Triple-tap on the screen to enter full screen mode. If the previous setting on the diagram is not what they want, they can use the undo button or tap on the coordinate and choose the delete option on the bottom left corner. After the scene is saved, this lux profile will be saved to this account and next time when users create a new scene, they can just go the import profile option, to quick select the relevant profile, Koolmesh system also pre-set two default profile: office profile and health profile for the users' reference.

- **Color temperature profile**

  Same setting as the lux profile, just replace the lux level to the CCT level.

- **Tolerance value**

  For example, when the tolerance value is set to 10%, the lux value on the circadian rhythm profile has a tolerance range from -10% to + 10%.

Figure 6.29 *HCL with daylight sensor*

- **Daylight sensor prior to motion sensor (Lux off)**

  When the ambient lux is strong enough and exceeds the "Lux off value", then the luminaires will be turned off by the daylight sensor. If this function is disabled, when the daylight threshold scene is activated, then the luminaires will not be turned off by the daylight sensor but will dim down to a small low level.

- **Measuring time**

  Users can define the measuring time. For how late luminaries will turn on/off before ambient lux continuously detected lower/higher than daylight threshold value.

- **Full range dimming**

  This is the valid dimming range when the device is running this scene.
  On: range from device min. Brightness level to device max. brightness level.
  Off: range from device min. brightness level to scene brightness level.

Case 4: How to implement the 24 hours circadian rhythm scene (with daylight sensor) combined with time-based scene into a classroom application?

Requirement: from sunrise, the luminaries need to run the 24 hours circadian rhythm when the motion sensor detects the movement (presence). But during noon, when the students are sleeping in the classroom, the luminaries need to be off from 12:00 to 14:00. When the teacher is presenting a PPT during a class, the teacher can interrupt the circadian rhythm scene by Push Switch, to dim down the lights as they need. But the luminaries need to switch back to the circadian rhythm scene automatically after the Presentation is over. So, when the next class is coming, the luminaries should follow the circadian scene as usual. When no movements are detected after the hold time, the luminaries need to be dimmed down to 10% brightness for the stand-by status. Here clients suggest that the hold time will be 20 minutes, and stand-by time should be 10 minutes. After 21:00 PM, there will be a security person who needs to walk through all the classrooms to ensure everything is okay. When the motion sensor was activated, then the luminaires should be at full brightness for 20 minutes and then into a 10% brightness stand-by status for 10 minutes. Here, we can use a time-based scene to make the hold time scene to be decided by the motion sensor triggered time.

Step 1. Create a 24-hour circadian rhythm scene (with daylight sensor). For the daylight sensor usage strategy, clients can decide by themselves. If each luminaire has an individual daylight sensor, then they can choose "each device in this scene uses its own daylight sensor". If they want to make the whole classroom luminaires' brightness and color temperature more united, then they can choose an external daylight sensor as the main daylight sensor.

Step 2. For the lux curve setting, because from 12:00 to 14:00, the whole classroom luminaires need to be turned off. So, clients need to modify the curve to be 0 lux during the 2 hours (see figure 6.30). Then set the CCT curve as they want (see figure 6.31). Due to it's a classroom application, even though the ambient lux level is enough, the client does not want the daylight sensor to turn off the luminaires. So, they disable the "daylight sensor prior to motion sensor (lux off)" (see figure 6.33). Which means even the ambient lux is enough, but the motion sensor still can recall the circadian rhythm scene and the luminaires will hold on to a very low output.

Figure 6.30 *Lux setting*

Figure 6.31 *CCT setting*

Figure 6.32 *Settings*

Figure 6.33 *Lux disabled*

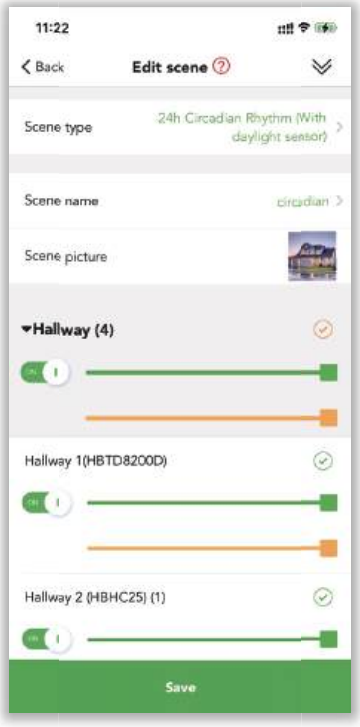

Figure 6.34 *Save the scene*

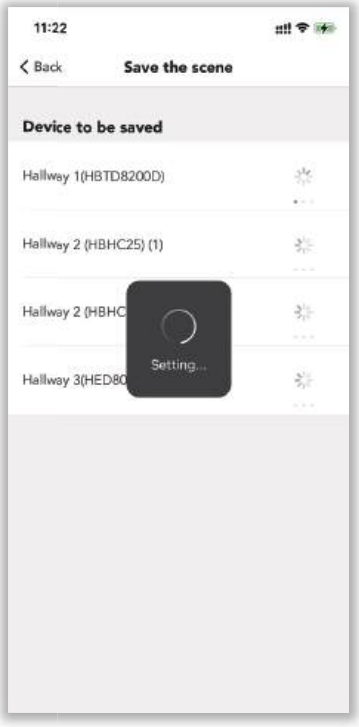

Figure 6.35 *Save the scene*

Step 3. For the 100% brightness scene and 10% brightness scene, we have the two default scenes in the app, so clients do not need to create, but if they are preferring other scenes or other brightness, they need to create the scene first.

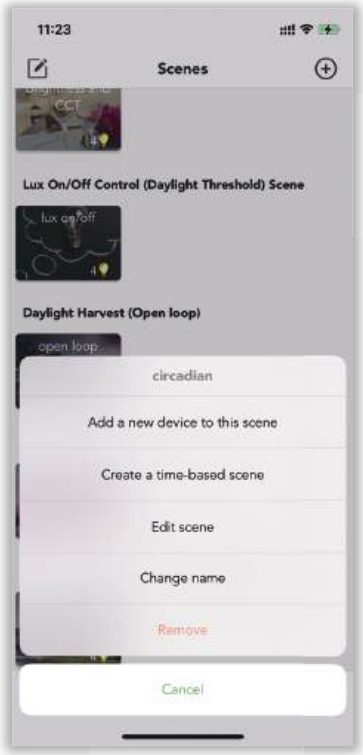

Figure 6.36 *Create time-based scene*

Step 4. Long press on the "circadian" scene to access the time-based scene tab (see figure 6.36). Then for the first scene, please select the "circadian" scene, and define the time to sunrise (see figure 6.37). For the second scene, choose the "100% brightness" scene and define the time to 21:00 (see figure 6.38). Save the scene.

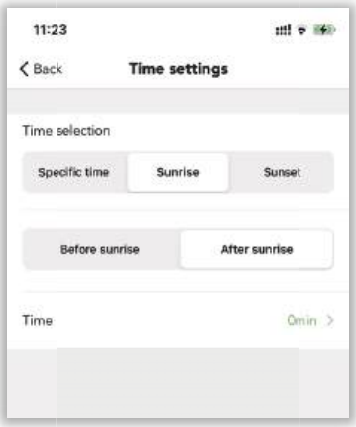

Figure 6.37 *First scene*

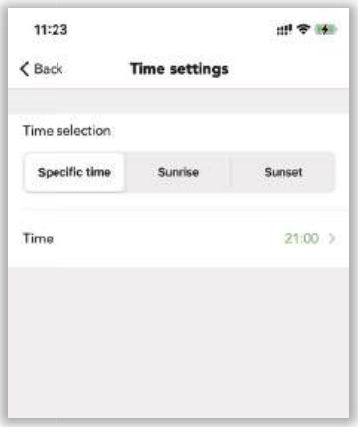

Figure 6.38 *Second scene*

Figure 6.39 *Time-based scene*

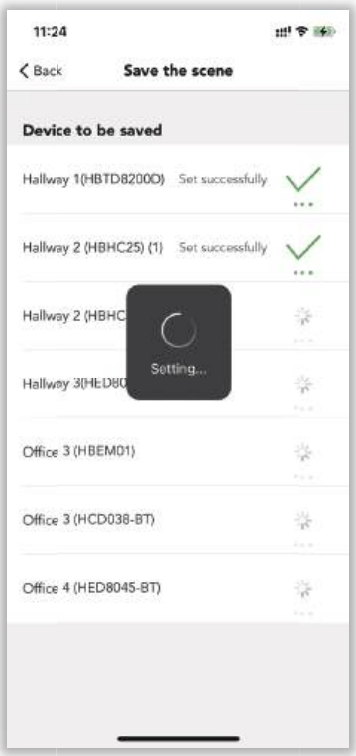

Figure 6.40 *Save the scene*

Figure 6.41 *Scenes overview*

Step 5. Go to bulk commissioning, select “set motion sensor parameters in batch volume”. Create a new profile and change the settings. Set the hold time to 20 mins, set the hold time scene to the “time-based scene”. Set the stand-by time to 10 mins, set the stand-by time scene to “10%brightness” scene. Set the sensor mode to “auto”. Set the mode in priority to “manual prior to sensor”. Sync to all the relevant sensors.

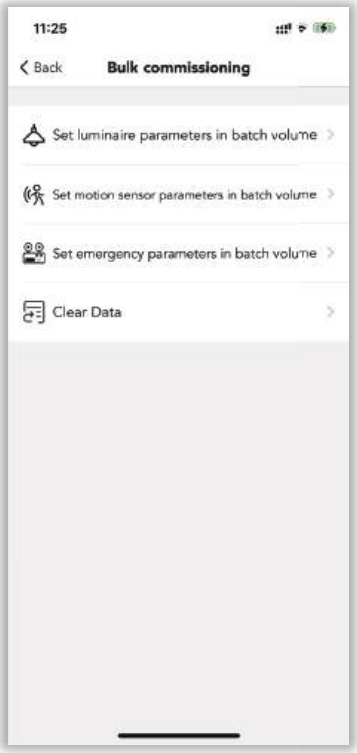

Figure 6.42 *Bulk commissioning*

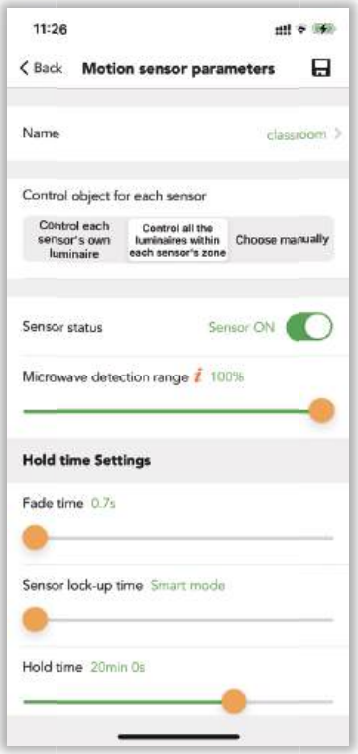

Figure 6.43 *Sensor settings*

Figure 6.44 *Sensor settings*

Figure 6.45 *Manual prior to sensor*

Figure 6.46 *Select target device*

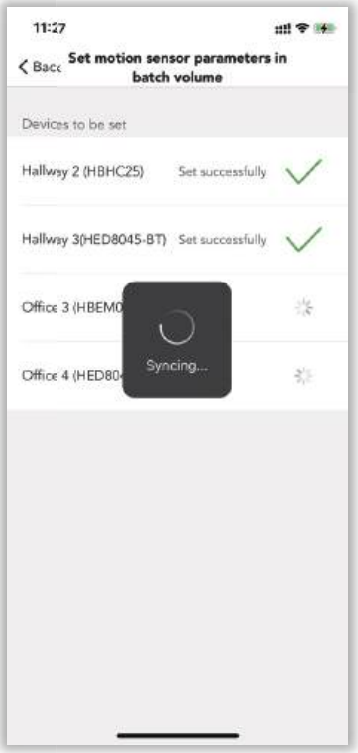

Figure 6.47 *Syncing*

Step 6. Still in the bulk commissioning, select “set luminaires parameters in batch volume”, create new profile and change the settings, but need to modify the “how to quit manual override” option, as mentioned in the case, teachers can interrupt the circadian scene by Push switch, after the presentation is over, the luminaires need to be switch back to the circadian rhythm scene automatically. sync to all the relevant luminaires. The default is “quit after hold time (20 mins in this case)”. They also can quit after a specific time or count down time. Here we suggest quitting after “count-down” 30 mins (see figure 6.49). Action after quitting manual override to set as “recall a scene after time expires”. Then recall the “circadian” scene again. So, when the teacher finishes the PPT (30 mins), the luminaires will switch back the circadian rhythm scene automatically.

Figure 6.48 *Quit options*

Figure 6.49 *Luminaire settings*

Figure 6.50 *Save settings*

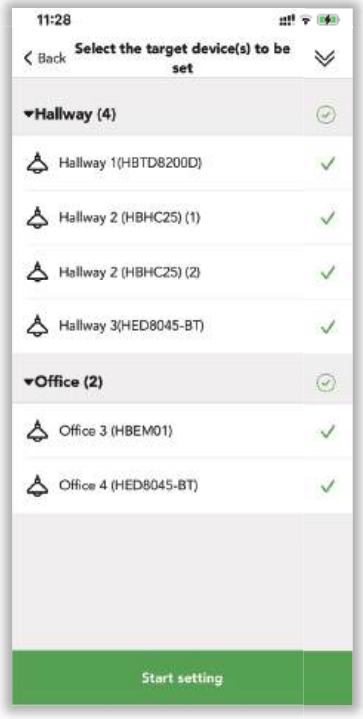

Figure 6.51 *Select target device*

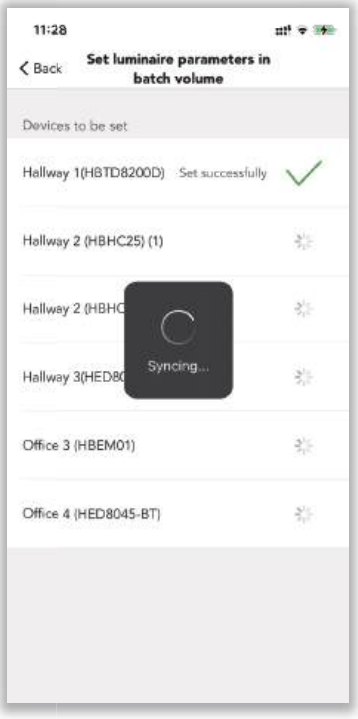

Figure 6.52 *Syncing*

4.2 24 hours circadian rhythm (without daylight sensor)

In this scene, there is no daylight sensor involved. The luminaire's brightness output and color temperature will be adjusted automatically based on the pre-set brightness level profile and color temperature profile. The brightness level profile and color temperature profile setting please refer to the "24 hours circadian rhythm (with daylight sensor)".

5.1 Astro-time circadian rhythm (with daylight sensor)

Same settings as the "24 hours circadian rhythm (with daylight sensor)". But just change the time from the whole 24 hours to sunrise- sunset time. The sunrise and sunset time are automatically calculated by the app based on the geographic location of the project.

5.2 Astro-time circadian rhythm (without daylight sensor)

In this scene, there is no daylight sensor involved. The luminaire's brightness output and color temperature will be adjusted automatically based on the pre-set brightness level profile and color temperature profile. The brightness level profile and color temperature profile setting please refer to the "24 hours circadian rhythm (with daylight sensor)". But just change the time from the whole 24 hours to sunrise- sunset time. The sunrise and sunset time are automatically calculated by the app based on the geographic location of the project.

6. Time-based scene

A time-based scene can be used to achieve a different dim level of a scene or activate different lighting scenarios depending on when the time-based scene is activated. A time-based scene has the advantage over a Schedule that it can be triggered at random time, therefore only activating scenes when needed. Time-based scenes are primarily designed to be used in conjunction with motion sensors.

Users can edit the existing scene by clicking on the top left corner or just long press on the scene cover. Then it will pop up some options including the "create a time-based scene". So, to make the time-based scene working normally, users need to create at least one scene to access the function, after clicking on the "create a time-based scene". There will be a new interface, users can name and define the scene pictures as the normal scene. Then they can define the first time and first scene, in the time setting, the time can be a specific time, or can be the sunrise or sunset time if the location permission is allowed. Then select the existing scene from the list. Repeat the same process for the second, for the third…etc.

For example, time 9:00 to recall a 100% brightness scene, 10:00 to recall a 50% brightness scene. 12:00 to recall a 10% brightness scene, so when the users activated the motion sensor (the motion sensor setting needs to be configured first, hold time scene or stand-by time scene need to be the "time-based scene") at 9:00. It will run at 100% brightness automatically. If the users activate the motion sensor at 10:00, then it will run the 50% brightness scene automatically. If the users activate the motion sensor at 12:00, then it will run the 10% brightness scene automatically.

After "setting" is finished, click on the "save" button. And this time-based scene will be displayed on the scene tab.

7. Animation scene

An animation scene is created to loop through different scenes at a set sequence and pace.

Case 5: In a lighting store, there's a showcase used to present LED light products. The owner wants the luminaires in the showcase to automatically display different light colors and brightness levels. This can be achieved by setting an animation scene on the Koolmesh app.

Step 1. Create the desired scenes and add them in a loop in the desired sequence. In this case, you can have three generic scenes: 8% brightness at 2700K -> 50% brightness at 2700K -> 3700K at 100% brightness .(see figure R1.25 Animation-1, -2)

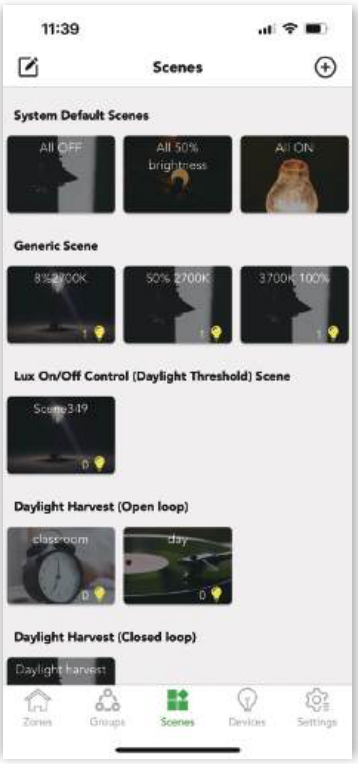

Figure R1.25 *Animation-1*

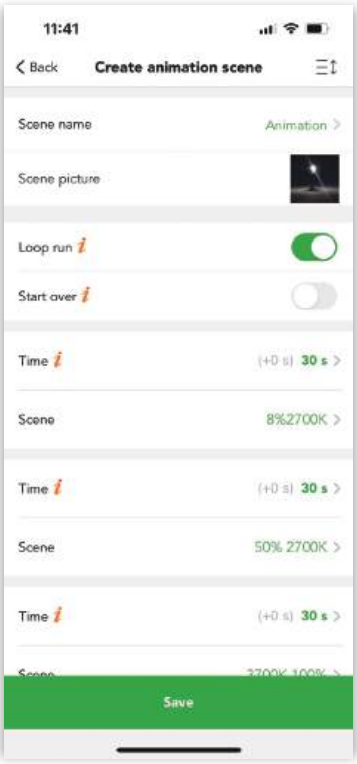

Figure R1.25 *Animation-2*

Step 2 Determine the fade time and dwell time.(see figure R1.26)

Step 3. Trigger the scene

※Users can change the loop playback sequence by clicking on the ☰↕ icon at the top right corner of the screen, when the icon turns into ⊗ you can long press and slide the ☰ icon by each scene to shift the scene sequence. (see Figure R1.27)

※Maximum 10 sub-scenes can be added in an animation.

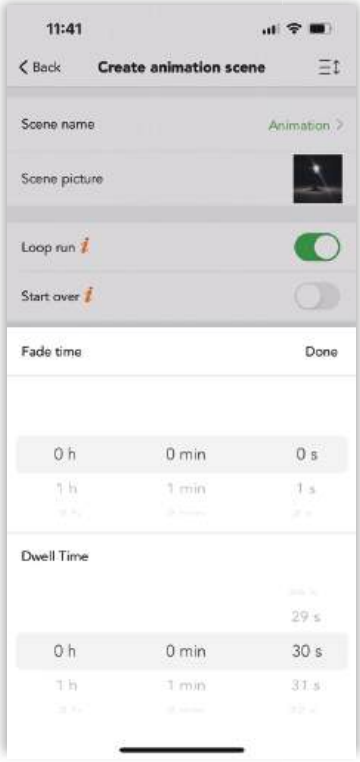

Figure R1.26 *Fade time and Dwell time*

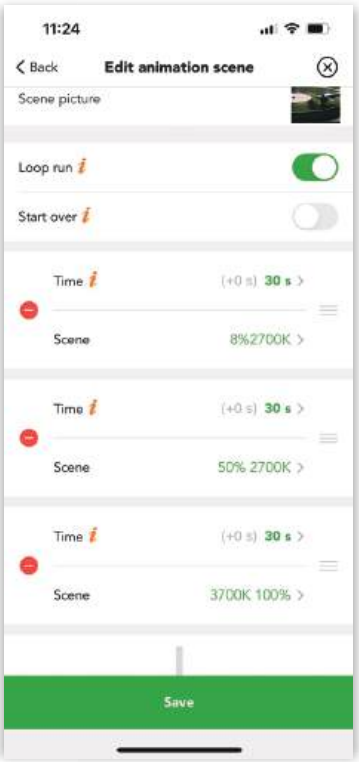

Figure R1.27 *Animation-loop*

● **Loop run**: When turned on, the animation scene will continuously play, looping back to the first scene after reaching the last one. When turned off, the animation will stop and remain in the last scene's state after completion.

● **Start over**: When turned on, if the animation scene is triggered again (manually or by a sensor) while already running, it will restart from the first scene. When turned off, the animation scene will continue without interruption.

● **Time**: Each scene will first fade to its initial state during the fade time, run during the dwell time, and then fade to the next scene. This process will repeat for each scene in the sequence.

Devices

In the Devices Setting, Koolmesh app lists out all the devices by zone under this network; users can modify all the parameters for every device. Users can click " " to check if they connect the right luminaire or click the luminaire which they would like to set, like "sales office 1(HBEM8200D)". When users would like to change the parameters then users need to click "sales office 1(HBEM8200D)" (see figure 7.1), app will link to all the parameters automatically (see figure 7.2.1).

Figure 7.1 *Devices-1*

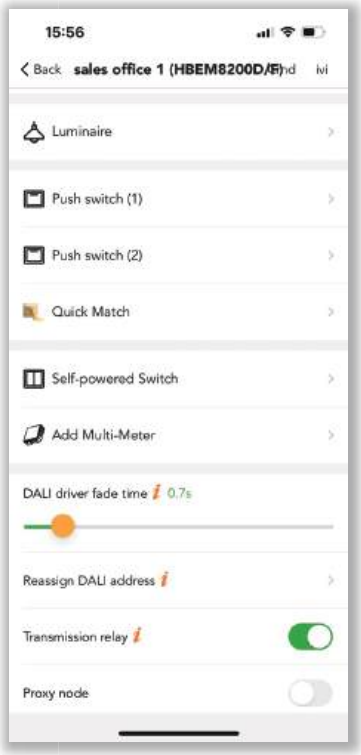

Figure 7.2.1 *Paramaters settings*

Luminaire Motion sensor and Daylight sensor can refer to related sections.

Modification time:when user has initiated or modified any parameter of the device, it will show "Modification time: ……" under each device in the Device list.(see figure 7.1)

- **DALI driver fade time**

When the fade time is less than 0.7 seconds, the minimum fade time is limited by different DALI drivers, so the actual minimum fade time of the driver shall prevail. At the same time, it should be noted that if the set value is too small, it may cause the lamp to flicker during the dimming process. Please set a reasonable value according to your needs.

- **Reassign DALI address**

If you have changed the DALI driver, or the driver has been modified by other DALI Master, you need to re-assigned the DALI address before it can be used normally.

- **Integrated bus power supply**

When you add a device, it may contain an integrated bus power supply(see figure 7.2.2). Which means the product contains an integrated bus power supply. And the defaults are different for different products, before turning it on, please ensure the maximum bus power supply current provided by other components in the luminaire shall be at most 250mA, otherwise it may cause DALI to not work properly.Please attention,not all products have this feature, please consult your sales for details.

Figure 7.2.2 *Paramaters settings*

- **Transmission relay**

It means every device can receive and transmit the Bluetooth signal. When there are many nodes in the network and the nodes are densely distributed, then user can turn on this function to make the network transmission become more smoothly. The default setting in the Koolmesh app is to turn on this function. We recommend users to turn on this function to speed up the transmission.

- **Post commission identify**

Users can disable the identification feature to prevent the users in other netwoks from using the “can’t find your device?” and “identity” function, and thus avoid flashing lights in normal use.

Example: In a bank or other public institution with high security requirements, if a user from other networks cannot find the device he wants to add, he can use the "can't find your device?" function in the app to find devices from other networks and confirm them with the "identity" function before adding them. At this time, the lights of the bank or public institution will be recognized and flicker, which is obviously not what the user wants to see. In this case, the user can avoid this by disabling this feature.

Add device procedure and prompts

Two ways to add the devices:
1. Users can click ⊕ in the top right corner to add the device
2. Directly click “Add devices”.

Preset identify, motion sensor, and push
Normally, there is a default setting for all the Koolmesh-ready products when users add the device to the network successfully, then it takes some time to initialize the Preset default setting meaning Koolmesh-ready products will work as the default setting after adding to the network. Users can change the Preset settings by clicking the orange Preset button（see figure R1.15）

It’s optional to disable the default setting to save time on site for commissioning, especially when there is a large-scale project and has lots of devices. Users can turn off “Preset Identify Enable”, “Preset motion sensor function” and “Preset push function”（see figure R1.16 ）

By default setting, all the three presets are turned on, and the motion sensor and push are preset to control zone（see figure R1.17 ）

※When users turn off the Preset to save time in adding devices, they will need to manually configure all the parameters afterward when needed. Once preset, users can still manually reset them if necessary; the system will remember the first-time presetting and proceed the same when new devices are to be added.）

Figure R1.15 *Add new device*

Figure R1.16 *Add new device-2*

Figure R1.17 *Add new device-3*

- **Preset motion sensor function**

ON means that the device with motion sensor is added, the sensor can start to work and control the area where the device is located. OFF means that the motion sensor of the device will not be enabled after adding the device.
Preset control zone: after adding the device, the motion sensor can control all lights in the zone.
Preset control self: after adding the device, the motion sensor can control the device itself.

※When the control object is zone, regardless of whether the product is single channel or dual channel, all lights will be on, and when the control object is the device itself and the device is dual channel, only one channel will be on.

- **Preset push function**

ON means that the device with Push is added, and Push can control the current area. lf it is turned off, Push will not be enabled.
Preset control zone: after adding the device, single clicks and long presses of the Push button can control all lights in the device's zone, and the automatic push recognition feature (Quick Match)can be used.
Preset control self: After adding the device, single clicks and long presses of the Push button can control the device's own light (if the device has multiple lights, only the first light will be controlled), and the automatic push recognition feature (Quick Match) cannot be used.

- **Bind virtual device**

When choosing a zone for the newly added device in the Koolmesh app, if there is a floorplan design from the Koolmesh WEB platform with virtual devices assigned, the app will pop up blue prompts on the top “There are unbound virtual devices in the zone you selected. Do you want to prebind the virtual devices first?”, users can click on it to bind and replace new device name with the virtual device name. (see figure R1.18- R1.19)

- **Synchronize configuration profile**

If there’s any configuration profile configured in the zone, the app will pop up “An existing configuration file is available for the zone where the new device is being added. Should the configuration file be synchronized with the new device?” lf yes, then users can click Confirm to proceed Start synchronizing and Daylight sensor setting.(see figure R1.20- R1.22)

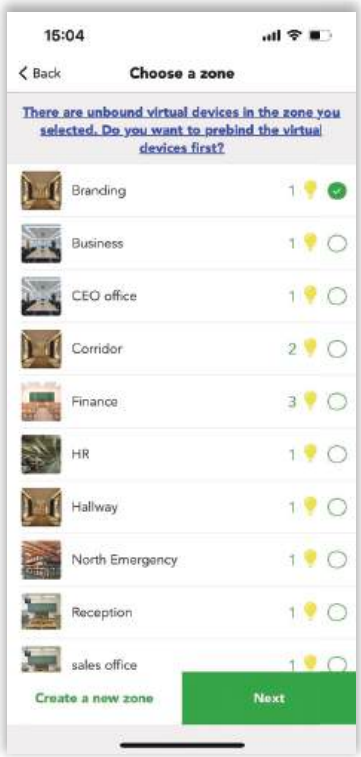

Figure R1.18 Prebind virtual device-1

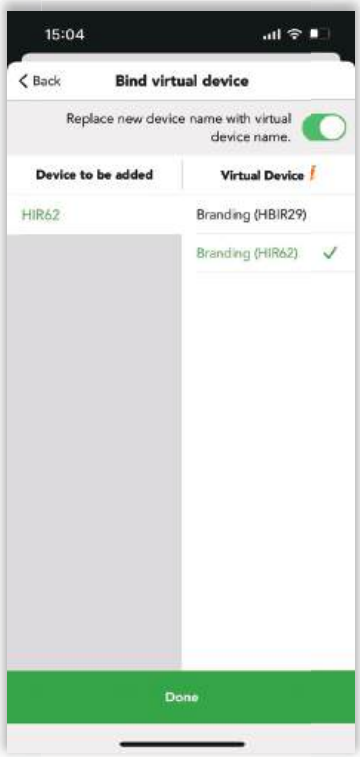

Figure R1.19 Prebind virtual device-2

Figure R1.20 Prebind virtual device-3

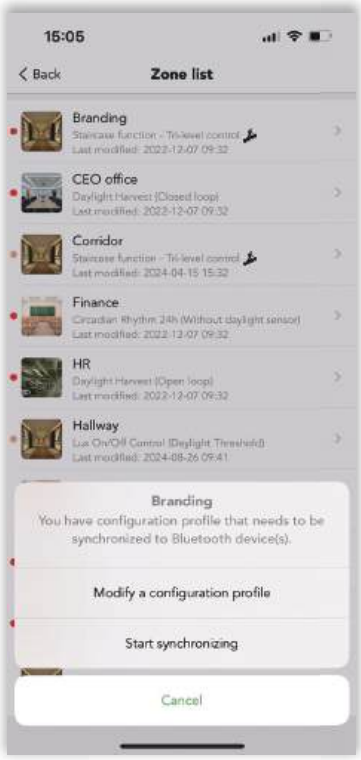

Figure R1.21 Sync configuration

Figure R1.22 Set daylight sensor

※ The device quantity in one network is dependent on the installation environment, users need to make sure every single device in the network is in the range that Bluetooth can be covered. But one device can only be added to one network at a time. When a device is adding to network A already and user would like to change it to network B. Then users can reset the device from network A first and add it to network B or users can search the device by “can’t find your devices” in Other Network by using network B and select the device but need to “re-power the device” before adding. This function is mainly to guarantee the safety of devices.

Example: Like “Office 4(HED8045-BT)”, change it from network “Koolmesh” to network “demo”.
Users can reset “Office 4(HED8045-BT)” first (how to reset device please refer to “ Two ways to reset the device”) under network “Koolmesh” and adding HED8045-BT (how to add device please refer to “ Two ways to add the advice”) under network “demo”. Or users can add the device directly by “can’t find your devices?” by using network “demo”, then find HED8045-BT in “Other Network" which list out all the devices by Bluetooth signal from strongest to weakness (see figure 7.3). After “identify” to double confirm and “start”. Under this situation, users need to re-power HED8045-BT as requested to finish adding (see figure 7.4). If not, Koolmesh app will have an error message that "setup failed, please try again" (see figure 7.5).

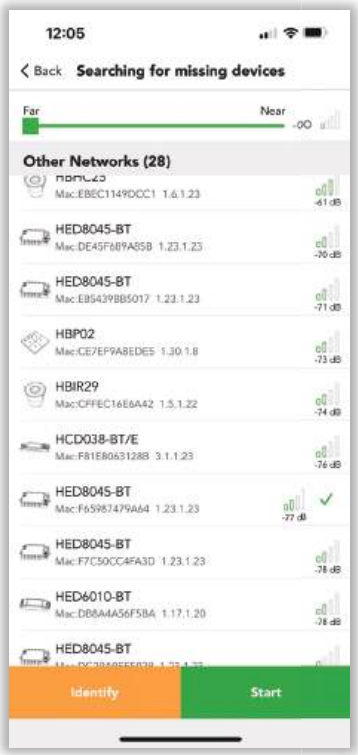

Figure 7.3 *Devices-2*

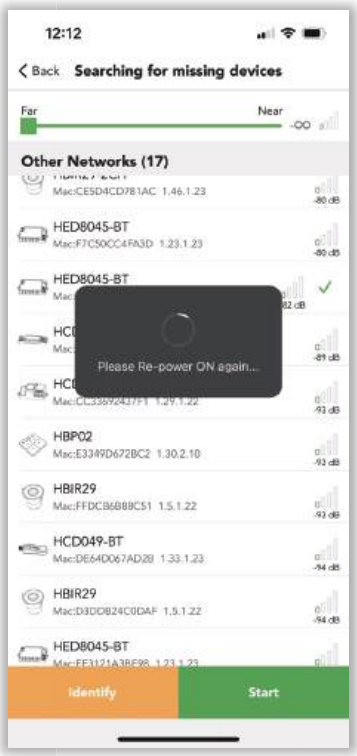

Figure 7.4 *Devices-3*

Figure 7.5 *Setup failed*

Two ways to reset the device:

1. Users can select the device which they would like to reset and slide to the left side to “reset” (see figure 7.6).
2. Click ··· to reset, like “Branding (HBIR29)1” (see figure 7.7).

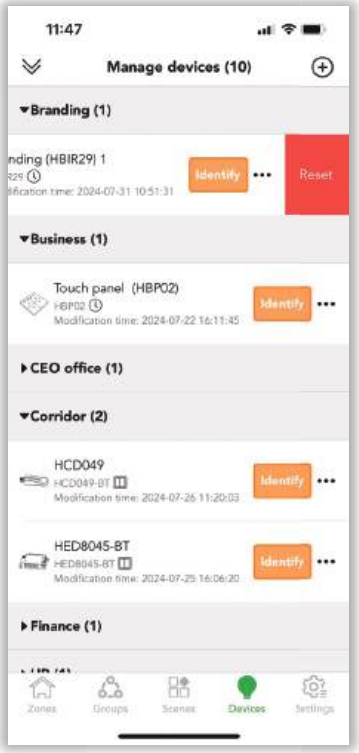

Figure 7.6 *Reset-1*

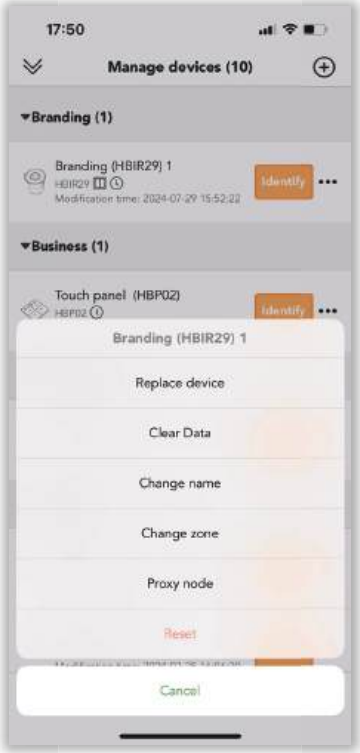

Figure 7.7 *Reset-2*

Figure 7.8 *Replace device*

※ Adding device and deleting device need to be connected via Bluetooth directly, so users can’t add and delete the device via remote control.

※ The quantity of devices in a network should be greater than or equal to the quantity of user.

Example: In Koolmesh app, there always have one device connect with the Koolmesh app to receive the command and then transport the message to other devices by Bluetooth signal when users using the Bluetooth to connect the device directly. So, when there is only one device in the network, then the second user cannot control the device after login. Because after user login, Koolmesh app will connect the device directly by Bluetooth automatically. But if there is only one device then when the second user login to the same network and cannot connect to the any one of device. Under this situation, second user have not access to control the device. Like user connect the device Hallway 2(HBHC25), there have 6 devices in the network which means can have max 6 accounts in this network to control the devices at the same time.

- **Replace device**

Replace device only can apply on the same model device when user would like to do maintenance then user can directly copy all the parameter from currently device to the new one. They don’t need to set the parameter again.

Example: Like “Hallway 1(HBTD8200D)”, if users would like to do the maintenance or replace the failure one, they need to strip out the old device and wiring to the new one first. After it is finished, on the “Manage devices” of Devices page, users can select the failure device they would like to replace and click to “Replace device” to search for the new device. After searching, users can use “identify” to double check if it is the correct device users would like to replace (see figure 7.8). If it is the correct device, then users can “start updating” to finish replacing.

- **Clear data**

Clear data will clear the scenes and schedules on the device and restore the modified parameter settings. Only the zone and group relationships are preserved.

- **Change name**

Users can change the devices name as they want

- **Proxy node**

Proxy node allow users to connect the device with Bluetooth directly which enable users to check the all the device's information. The default setting is connecting the Koolmesh app with the strongest Bluetooth signal device which means what is connected may be not the nearest from the user's position (especially when they have a large network), then users can use this function to change which devices to connect Bluetooth directly (see figure 7.9.1).
Example 1:
If users would like to check the hardware programming time of the devices, then users need to connect the device via Bluetooth instead of gateway first. Because connect with Bluetooth means Koolmesh app receive all the information from device, but if users connect with gateway means users receive all the information from server which does not allow to check the information of device itself, that is why user needs to connect Bluetooth to check the hardware programming time. Then click the device users would like to check like "CEO HBHC25", in the device setting page, users can directly click the position of the hardware version to check the details (see figure 7.9.2).
Example 2:
When installer A does commission on site where they have no internet access. After finishing, installer A logs out the app and goes back somewhere that has internet access which will find that all the commissioning has been covered by the server. Under this situation, installer A can go back on site to use "Proxy node" to check the commissioning via connecting the Bluetooth directly with the device.
Example 3:
If Koolmesh app connects with the strongest Bluetooth device "CEO HBHC25", but users would like to connect with "Office 4(HED8045-BT)", then users need to select device "Office 4(HED8045-BT)" and click ••• to "Proxy node".

Figure 7.9.1 *Proxy node*

Figure 7.9.2 *Hardware programming time*

Luminaires

Luminaires that are added to the network will be displayed in the luminaires section in the function menu page. It will show each luminaire belonging to which zone or group with the device name. users can click on the luminaires icon to access the luminaires settings.

At the top is the luminaires status bar, users can adjust the luminaires brightness or CCT here (see figure 8.1).

Figure 8.1 *Luminaire settings*

- **Linear/logarithm**

  It's two different dimming methods. Normally the dimming profile should be in line with the dimming pattern of LED drivers. E.g., if the drivers prefer the linear dimming, then we will adjust it to linear by default.

- **Load type**

  This is dependent on the driver type, if the driver supports dimming and color changing or it's DT8 driver, the users need to choose Dimming & color tuning (DT8). Otherwise, users should choose dimming only (DT6).

- **Brightness level range**

  The maximum and minimum brightness levels determine the adjustable brightness range of his luminaires. The system brightness level range is 1%-100%, default setting is 10% to 100%. Users can adjust the range by themselves (see figure 8.2).

- **Color temperature range**

  The maximum and minimum color temperature determine the adjustable brightness range of his luminaires. The system color temperature range is 2000K-8000K, default setting is 2700K to 6500K. Users can adjust the range by themselves (see figure 8.3).

Figure 8.2 *Brightness level*

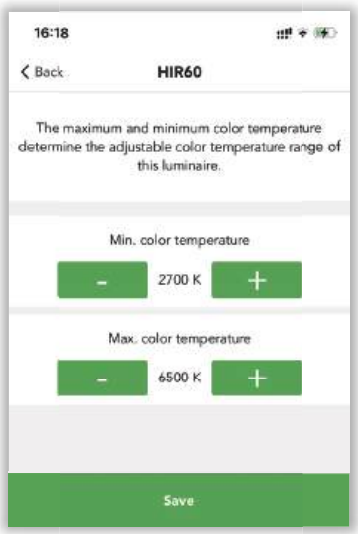

Figure 8.3 *Color temperature*

Figure 8.4 *Power-on status*

- **Power-on status**

Koolmesh system gives the users options to decide what's the status of the luminaires when they are powered on. Users can choose to keep lights off, or brightness level and color temperature manually adjusted before powering down or recall this scene or stay at a defined brightness level and color temperature.

The following settings will work when users disable "automatically send sensor signal when power is restored" in the motion sensor section; If users enable "automatically send sensor signal when power is restored" in the motion sensor section, then the following setting will no longer work, the power-on status is controlled by motion sensor.
For any products which have the motion detection function (sensors, Bluetooth drivers plug in with sensor head).
If users enable "automatically send sensor signal when power is restored" in the motion sensor section.
After power resumed, the sensor will send out a virtual motion command to the driver to recall the hold time scene automatically, which means the client does not need to walk around to trigger the motion sensor to activate the hold time scene.
If users choose to "keep lights off", the luminaires will remain off when powered on, regardless of their status before being switched off.

e.g., if the luminaires were manually changed the dimming to 10%, then after hold time, the luminaires quit the manual mode. The motion sensor starts to work and recalls an 80% brightness scene. Suddenly the luminaires are powered off when encountering a power failure during the scene period. After the power is resumed, the luminaires will stay off when power is resumed.

If users choose "brightness level and color temperature manually adjusted before power down", Then luminaires will recover to the same dimming level and color temperature which were previously in use before the luminaires were powered off. But there is a limitation, the system only can remember the manually changed dimming level and CCT, will not recover the "scene".

e.g., if the luminaires were manually change the dimming to 10%, then after hold time, the luminaires quit the manual mode. the motion sensor starts to work and recall an 80% brightness scene. Suddenly the luminaires are powered off when encountering a power failure during the scene. After the power was resumed, the luminaires will recover to the last time manually modified status 10% brightness but not the scene.

Figure 8. 5 *Power-on status-2*

If users choose "recall this scene". Then the luminaires will run the pre-set scene when the power resumed.
e.g., if user recall a daylight harvest scene by push switch and set 80% brightness scene as power on status. Suddenly the luminaires are powered off when encounter a power failure during the dalight harvest scene. After the power was resumed, the luminaires will run the 80% brightness.

If users choose "stay at a defined brightness level and color temperature". Then users need to define the brightness and color temperature here (see figure 8.5). After the power resumed, the luminaires will stay at the defined brightness and color temperature.

- **Manual control**

Any changes users manually made from the app, push switch, Bluetooth panel, Enocean switch, and the gateway will let the sensors or luminaires into the manual control mode. E.g., users change the luminaires brightness through the app, change the sensor settings, change the scene settings etc.…

How to quit manual override ?

In order to let the luminaires or sensors switch back the auto mode from manual control mode. In the Koolmesh system we provide these options for users to choose.

1. Do not quit automatically, so the luminaires or sensors will stay in manual control mode forever.
2. Quit after hold time. After hold time, the luminaires or sensors will switch back to the auto mode. E.g., if the hold time is 10 mins, then after 10 mins, it will quit the manual control mode.
3. Quit after stand-by time. After stand-by time, the luminaires or sensors will switch back to the auto mode. E.g., if the stand-by time is 5mins, then after 5 mins, it will quit the manual control mode.
4. Quit after a specific time.
   Users can define a specific time to quit the manual control mode. E.g., 2:00am. (see figure 8.7)
5. Quit after count-down time. We also provide a count-down method for the users. If the users know what time they want to stay in the manual control mode, they can use this option. For example, in an office, the maintenance team will usually take 1 hour to quickly check the whole office luminaires status. So, once they process the checking, they will switch all the luminaires to 100% brightness through the push switch, users can set the count-down time to 1 hour (see figure 8.8). After 1 hour the maintenance team finished their work, the luminaires will switch back to the auto mode and will run the dedicated scene automatically.

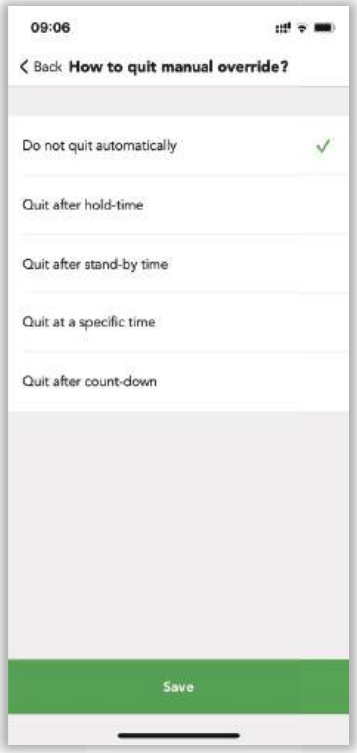

Figure 8.6 *Quit mode-1*

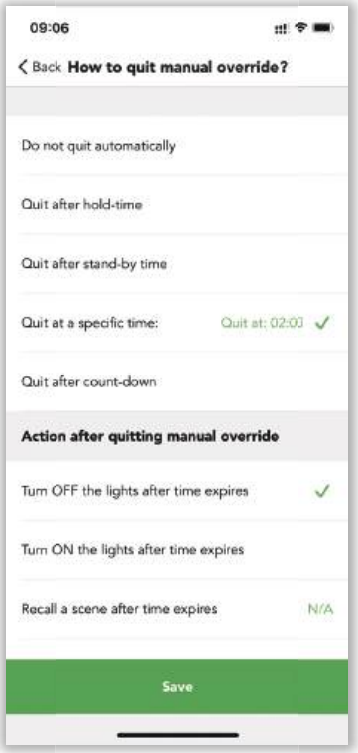

Figure 8.7 *Quit mode-2*

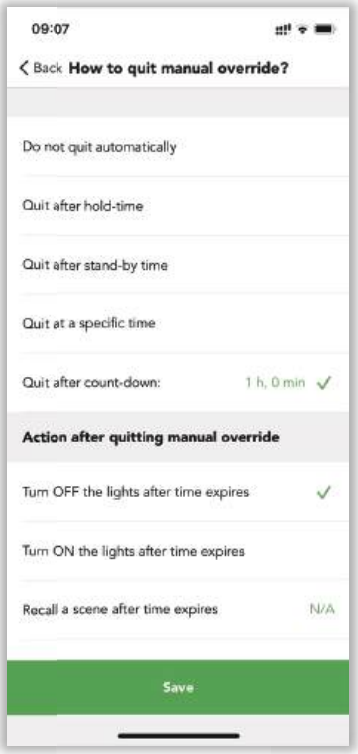

Figure 8.8 *Quit mode-3*

Motion sensor

All the added motion sensors should be found under the motion sensor section in the function menu page. Motion sensor is the most important part of the Koolmesh system. It is the core of auto-control. In this motion setting, users can define a lot of settings related to the motion sensor including the tri-level control.

After clicking on the “motion sensor”, it will display a list of all the sensors that are in different zones (see figure 9.1). When the motion sensor is activated by the movement, then there is a red dot under the human icon that will flash one time. On the right will display which zone or group or luminaires are controlled by this motion sensor.

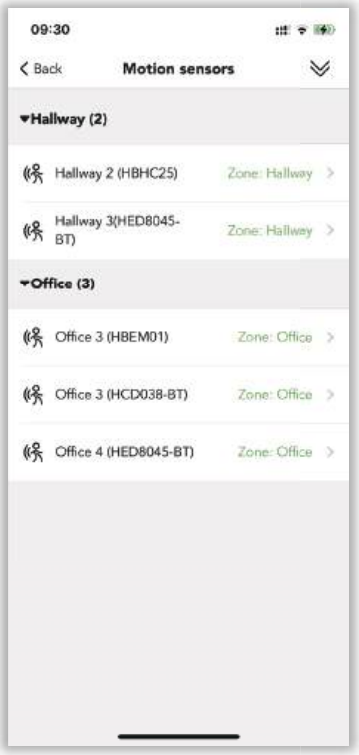

Figure 9.1 *Motion sensors*

Figure 9.2 *Sensor settings-1*

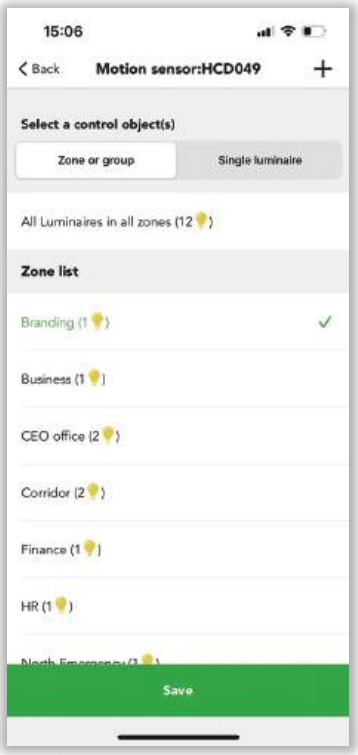

Figure 9.3 *Control object setting*

- **Control object**

  Select which object you would like this motion sensor to control, e.g., a luminary, a group, or a zone.

- **Sensor status**

  On: means the motion detection function is on, motion sensor will work as normal.
  Off: means disabled the motion detection function. Motion sensors will not work in any conditions.
  If the motion sensor is a Microwave sensor, then in the Koolmesh app you can adjust the detection range of the sensor, but this function is not available for the PIR sensors.

- **Sensor types differ in detection technology**

4 types of motion sensors differ in motion detection technology. 2 types can be recognized from what is shown under the “Sensor status” on the sensor setting page in the Koolmesh app.

1)Microwave (HF) sensor
2)PIR sensor
3)True occupancy sensor
There will be “True occupancy sensor detection range”, “ True occupancy sensor static sensitivity”, and “True occupancy sensor dynamic sensitivity” adjustable under the “Sensor status”. (see figure R1.23)
4)Dual-sense sensor
This technology combines both HF and PIR together, providing 4 optional detection modes.(see figure R1.24)
4.1 HF only
4.2 PIR only
4.3 Either HF or PIR – When either detector is triggered, the motion is considered valid, and the light will turn on. This is for maximizing the detection capability.
4.4 Both HF & PIR – Only when both detectors are triggered, the motion is considered valid, and the light will turn on. This is for maximizing the detection accuracy and decreasing the detection capability to prevent the sensor from false trigger by heat source, air conditioner, ventilation vans, elevators etc.

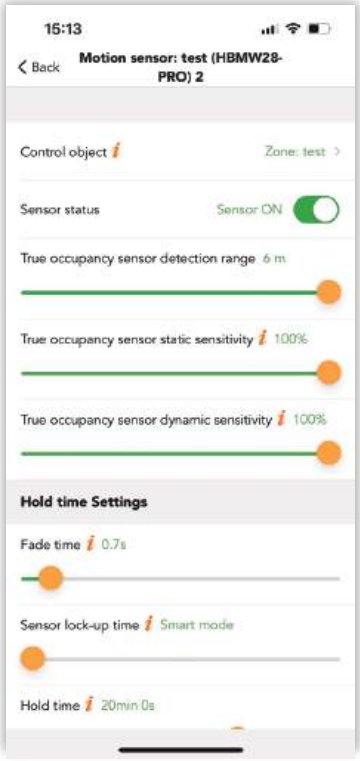

Figure R1.23 *Motion detection type-True occupancy sensor*

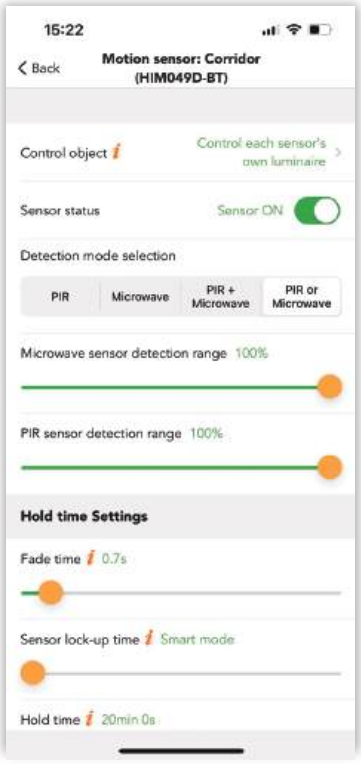

Figure R1.24 *Motion detection type-Dual sense*

- **Hold time settings**

  A part of the tri-level control, users need to define the hold time and hold time scene. There are also some options under this section.

- **Fade time**

  The time it takes the luminaires to transition from the initial status to the hold time scene status. (Brightness and CCT).

- **Sensor lock-up time**

  The interval between two motion signal commands. For example, if the motion sensor was activated and it will activate the hold time scene for the hold time like 20 mins, so during the 20 mins, if the motion sensor is still being activated, it will keep sending out the motion command to the relevant nodes but those command will not be executed by the nodes. So, this will increase the network congestion and will decrease the network stability. Users can use this option to reduce the useless motion commands by setting the interval time. The default is smart mode that it's the half of the hold time if the hold time less than 6mins; but if users are using smart mode and hold time more than 6mins, then the longest lock-up time is 3mins. For example, if the hold time is 1H, then the longest lock-up time is 3mins. Users can adjust the time by themselves. But we highly recommend using the smart mode.

- **Hold time**

  When the movements were detected by the motion sensor and activate the hold time scene. The hold time scene will last for the hold time, after the hold time expires, it will activate the stand-by time and stand-by time scene. When the motion sensor keeps detecting the movements, then the hold time scene will never expire. It will refresh the hold time until the last movement was detected and keep the hold time scene for a new period of hold time, after it's expired it will activate the stand-by time and stand-by scene. The hold time cannot be zero but can be infinity.

- **Hold time scene**

  The scene will be activated during the hold time; the scene needs to be selected from the existing scenes or click inside to create a new scene.

- **Stand-by time settings:**

  A part of the tri-level control, users need to define the stand-by time and stand-by time scene.

- **Fade time**

  The time it takes the luminaires to transition from the hold time scene status to the stand-by time scene status. (Brightness and CCT).

- **Stand-by time**

  After the hold time and hold time scene expired, it will activate the stand-by time scene and will last for stand-by time, then the luminaires will turn off. Stand-by time can be zero and can be infinity.

- **Stand-by time scene**

  The scene will be activated during the stand-by time; the scene needs to be selected from the existing scenes or click inside to create a new scene.

- **Sensor mode**

Auto: after the sensor is triggered, the scene is automatically called. The luminaires will be turned off after expiration of hold time & stand-by time.

Semi-auto: the sensor is only activated on the manually press of a Push switch, or via touch panel, or via Enocean switch, or via the app. The luminaires keep being on in the presence and turn off automatically after expiration of hold time & stand-by time (absence detection mode).

- **Mode in priority**

Manual prior to sensor: the sensor will not interrupt the manual override mode.
Sensor prior to manual: when the sensor is triggered, it will quit manual override mode. Then activate a scene according to the sensor settings.

- **Enable staircase function**

If it's on, when entering a floor, the luminaires on this floor will go to full ON, while the neighboring upper and lower stairs will go to dimming level according to the scene pre-set.

Figure 9.4 *Sensor settings-2*

- **Sensor LED indicator**

If it's on, the motion sensor LED indicator will keep flashing when the motion sensor powers on; if it's off, then the motion sensor LED indicator will turn off. This function is available for parts of Koolmesh-ready products from Hytronik, only for those sensors that have an LED indicator, like the HBIR29-BT.

- **Automatically send sensor signal when power is restored**

This function needs to conjoin the "Power-on status" in the Luminaires section, which decides the status of luminaires after power restored. If it's on then the sensor will send out a virtual motion command to the driver to recall the hold time scene automatically after power restored, which means users do not need to walk around to trigger the motion sensor to activate the hold time scene. If it's off then the sensor will not send out a virtual motion command to recall the hold time scene after power restored, it depends on the "power-on status" in the luminaires section.

Example: In some applications, users want the luminaires off after power is restored, especially at midnight. If there is a motion sensor involved in all user's settings, then users need to turn off the "Automatically send sensor signal when power is restored" and select "keep light off" for the Power-on status in Luminaires section. Otherwise, the luminaires will run tri-level after the power is restored which may lead to unnecessary complaint from neighbors.

Control hierarchy

The control hierarchy allows manual lighting control and automatic lighting control to work together. Manual control is any physical action, like selecting a scene by tapping on the scene icon in the app, pushing a switch, push button, or Bluetooth touch panel, or Enocean switch. Automated control is, for example, commands generated by motion sensors and schedule. There are three parts of control in the Koolmesh system: motion sensor auto control, manual control, and schedule control.

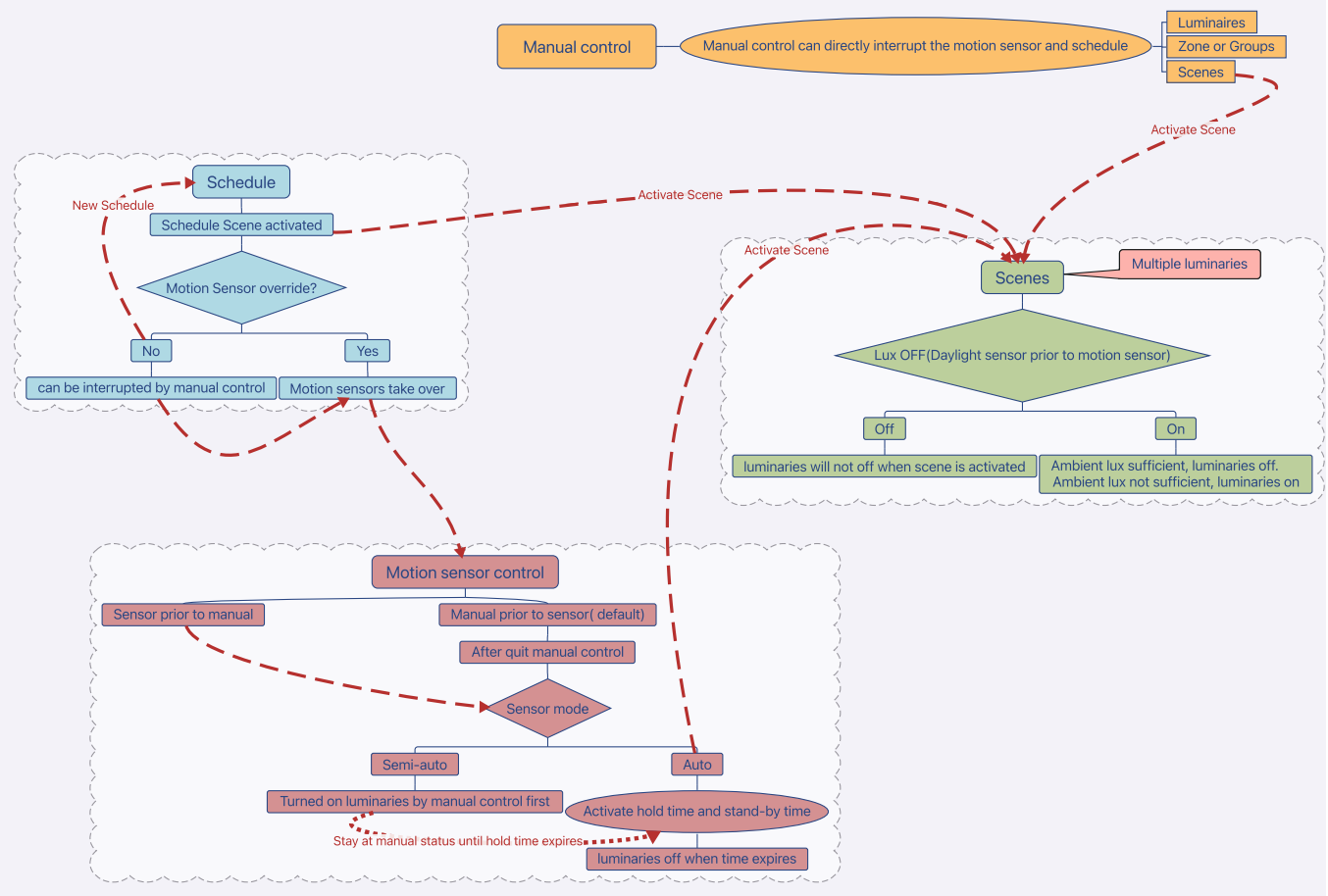

Figure 10.1 *Control logic*

- **Motion sensor auto mode**
  The behavior of the motion sensor, it can be divided into two different modes in the Koolmesh system: auto mode and semi-auto mode.

  Auto
  After the sensor is triggered, the scene is automatically called. The luminaires will be turned off after expiration of hold time & stand-by time.

  Semi-auto
  The sensor is only activated on the manual press of a Push switch, or via touch panel, or via Enocean switch, or via the app. The luminaires keep being on in the presence and turn off automatically after expiration of hold time & stand-by time (absence detection mode).

- **Manual control**
  Action from App, Push switch, Bluetooth touch panel and Enocean switch.

- **Schedule control**
  Users can create a schedule based on the date, week, time, or sunrise sunset time to recall a specific scene.

Sensor mode and mode priority

- **Sensor auto + sensor prior to manual control**

  When there is no schedule involved, the motion sensor will be the highest priority in the system. When the motion sensor is triggered, it will make the luminaires into the hold time scene immediately no matter if the luminaires are in what status. For example, when users dim down the brightness through the Push switch, then when they trigger the motion sensor, the luminaires will recall the hold time scene immediately. After hold time, if there is a stand-by time scene, it will also activate the stand-by time scene, after stand-by time, the luminaires will turn off.

- **Sensor auto + manual prior to sensor control**
  When there is no schedule involved, the manual control will be the highest priority in the system. When the motion sensor is triggered, it will automatically run the hold time scene and stand-by time scene. But if the users use the app, push switch, Bluetooth touch panel or Enocean switch changed the luminaires status (brightness and CCT). Then the luminaires will go to manual control status. Users can decide how long the manual control needs to be implemented. They can define how to quit manual control in two ways, first is in the luminaires setting, in the “how to quit manual override”. There are 5 options for the users to choose. They can decide to quit or not quit or how long time to quit (automatically quit). The other one is in the push setting; they can define the single press or double press function to “sensor take over”. When the users single press or double press on the Push switch, then the luminaires will switch back to the auto mode (manual quit).

- **Semi-auto + sensor prior to manual control**

  When there is no schedule involved, the motion sensor is only activated on the manual press of a Push switch, or via touch panel, or via Enocean switch, or via the app. Which means only when the users turn on the luminaires, then the motion sensor is activated. Then users trigger the motion sensor, it will activate the hold time scene and stand-by time scene. If no movements are detected, then the luminaires will go off. Users need to manually turn on the luminaires again to make the motion sensor work again.

- **Semi-auto + manual prior to sensor control**

  When there is no schedule involved, the motion sensor is only activated on the manual press of a Push switch, or via touch panel, or via Enocean switch, or via the app. After the users manually turn on the luminaires, then activate the motion sensor, the motion sensor will not recall the hold time scene due to “manual prior to sensor control”. It will stay in the manual control. For example, if the users use the push switch to turn on the luminaires and trigger the motion sensor, then the luminaires will stay at this manual brightness and CCT for hold time (default is hold time, depending on “how to quit manual override” setting). After hold time, then the stand-by time scene will be recalled, after stand-by time, the luminaires will go off. Apparently in this case, the luminaires will never run the hold time scene, but it will recall the stand-by time scene after hold time expires.

Permission manager

In this section, users can have a full overview of the whole network about the permission management. It will list out all the relevant accounts no matter what identities they are. For example, users can see who is the admin of this network, who is the installer. When this network was created . enable users to get a shared network via scanning code or key in a network sharing key. enable users to delete the network via key in the Koolmesh account password. They can also transfer the ownership of this network to another account. Adding new installers or adding new sub-users are allowed in this section.

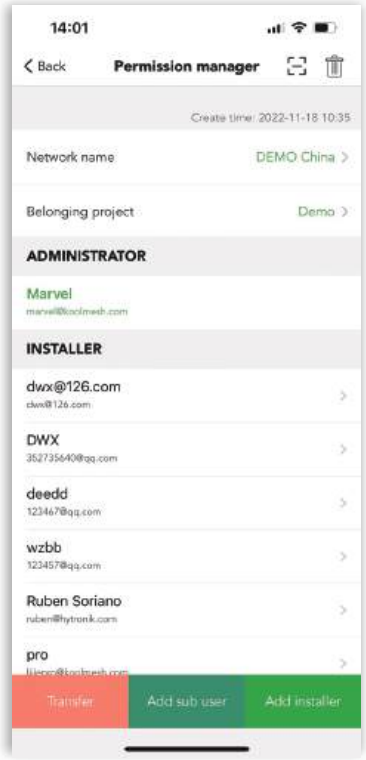

Figure 11.1 *Permission manager*

- **Administrator**

1) Highest privileges which can delete and share the network.
2) Have the ownership of the network but can transfer the ownership to another account as well.
3) Can add and delete sub-users and installers also assign privileges to sub-users.
4) Can use and modify all the parameter of the devices.
5) Change the account type of installers and sub-users.

※ One mesh network will only have one Administrator account but can have many installers and sub-users.

- **Sub-user**

1) Sub-users may be able to use all the profile of the device if permissions have been assigned by the administrator.
2) They can neither transfer nor add installers or sub-users.
3) They can delete the network from their own account, but the network will still exist in the accounts of administrators, installers, and other sub-users.

- **Installer**

1)Can share the network to other accounts, users can also delete the network from their own account, but the network will still exist in the accounts of administrators, installers, and other sub-users.
2) Can use the all the profile of the device.
3) Can add new installers but can't delete other installers.

All the authorization processes are protected by the Koolmesh protocol, and all the encryption keys are generated randomly, and are unrepeated (as detailed above). All the account data is encrypted and saved, with backup on the cloud servers.

Example 1:If the user is the administrator of the network, then the user can invite installer A to do the commissioning. In the settings page,Users can click "permission manager" to "add installer", then the Koolmesh app will generate a QR code and an encrypted, randomized key (remains open and valid for 1 hour). So, installer A can use the Koolmesh App to scan this QR code or key in the encrypted randomized key to get access to the same network. (see figure 11.2.1)After finished, installer A will appear on the "INSTALLER" list. When installer A finishes the commissioning, then users can delete installer A from this network by clicking or changing the installer A account type to sub-user which the permission needs to authorize by user in the "User setting" page.(see figure 11.2.2)Or installer A can delete the network by click , then installer A will have no more access to the network.(see figure 11.2.3)

Figure 11.2.1 *Add installerr*

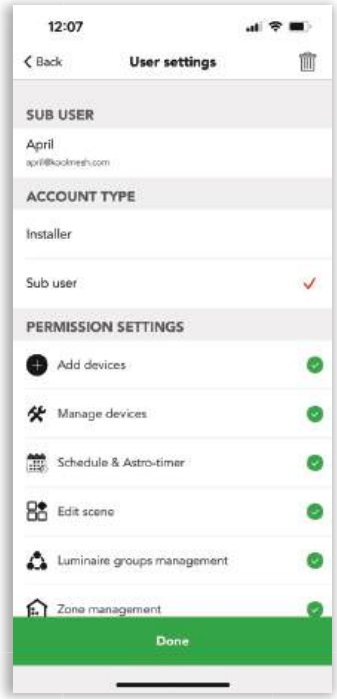

Figure 11.2.2 *Change account type*

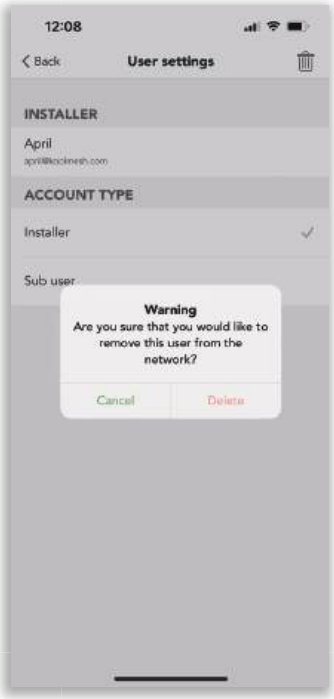

Figure 11.2.3 *Delete network*

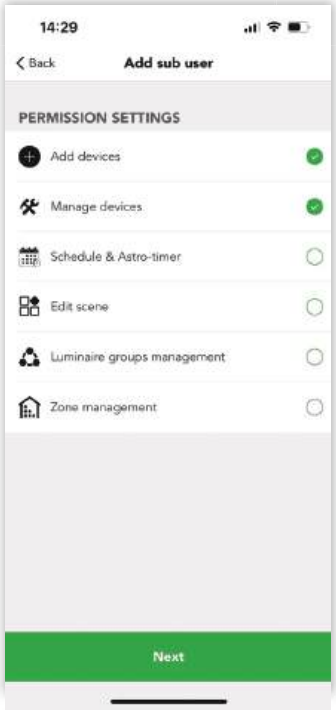

Figure 11.3.1 *Add sub user-1*

Figure 11.3.2 *Add sub user-2*

Figure 11.4 *Transfer*

Example 2: If the administrator would like to invite another sub-user A. In the settings page,Users can click “permission manager” to “add sub-user”, and assign the permissions in the “PERMISSION SETTING”.(see figure 11.3.1),then the Koolmesh app will generate a QR code and an encrypted, randomized key (remains open and valid for 1 hour). So, sub-user A can use the Koolmesh App to scan this QR code or key in the encrypted randomized key to get access to the same network.(see figure 11.3.2)

Example 3: If installer A does commissioning on site and creates the network which selects the identity as “Administrator”. Under this situation, after installer A finished all the installation and commissioning, installer A can transfer the ownership via “Transfer”, then installer A can key in the password of the account,then the installer or the sub-user who scans the QR code can access the network and get the ownership,installer A will have no access to the network. (see figure 11.4)

Test mesh network connection quality

Most of the users have no idea about how far the communication distance between nodes is. In most situations, it is hard for Koolmesh to put an exact number on the range of a specific application. This is impacted by dozens of factors, like attenuation by walls, ceilings, and furniture. The only way to check out the actual performance is often to experiment with the application in a real-world setting. So “test mesh network connection quality” enables users to test their network and node connection quality to make sure all the nodes are under the range of Bluetooth can cover.

Users can add the device to the network and click “test mesh network connection quality”, then the system will list out all the devices in the network by zone. It is an alternative for users to test some of the devices or “start” to test all the devices in the network. Maintaining 90%-100% connectivity at the project level is strongly recommended for every mesh lighting control network (see figure 12.1) .

Motion sensor trigger diagnosis

This feature helps for motion sensor diagnosis and troubleshooting.People need to leave the scene during the diagnosis to simulate an environment without people. User can set the “Start ready time” to leave enough time for people to leave the place.
“Diagnosis time” is suggested to set above 1hour but must ensure no people around during the set time.(see figure R1.13)

※ During the use, user must stay on the page and cannot exit the app. And the device should not be powered off during the whole process to avoid data errors.

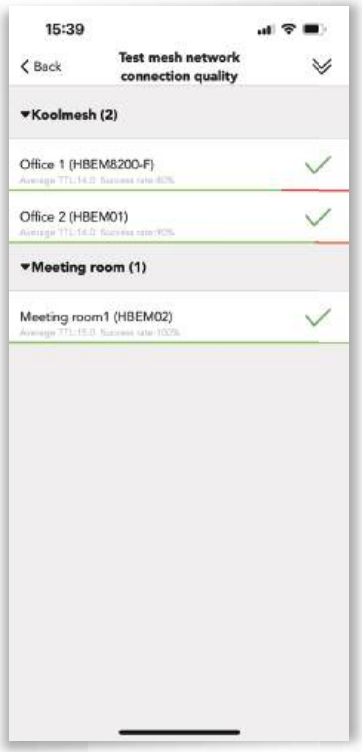

Figure 12.1 *Mesh quality*

Figure R1.13 *Diagnosis*

Over the Air (OTA) update

To improve using experience, Koolmesh also supports Over-the-air upgrade function which enables users to maintain and update the firmware of the device. ● This means there is a new version firmware of devices that can be updated and Koolmesh will list out all the devices that need to be updated in the OTA page. Users can select the device which would like to do OTA upgrades and “start updating”. Normally if the devices are working fine and without any bugs, then Koolmesh recommends that users do not need to do the OTA upgrade unless the new firmware fixes the bugs or adds new functions. There’s a release note Release note and an information icon ⓘ that notify what has been upgraded in each version of the firmware.(see figure 12.4)But users need to be aware that the OTA function does not support upgrades through the gateway.

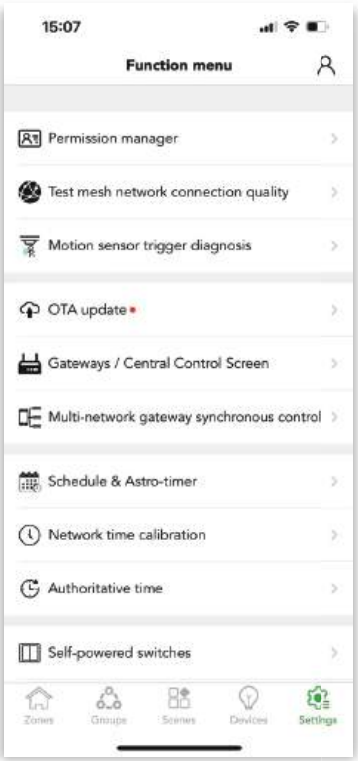

Figure 12.2 *OTA-1*

Figure 12.3 *OTA-2*

Figure 12.4 *Release*

Gateways/Central control screen

By using a gateway which enables controlling the luminaires remotely. For example, turn on or turn off the luminaires, change the scene settings. It can remotely configure the network devices via Koolmesh app, or Koomesh Pro and iot.koolmesh.com (web platform). E.g., “quit manual control”. The gateway can collect the local mesh network data by connecting to the mesh network, then it can upload the data to the Koolmesh cloud service by connecting the internet. It provides the ability to check the sensors or luminaires status through the web platform.

- **Add a gateway**

  If users would like to connect the mesh network via a gateway, then users can click “Add a gateway”, then the Koolmesh app will search all the Koolmesh-enabled gateway via the Bluetooth signal from strongest to weakness. Users can choose the gateway they would like to connect to. Before adding, users need to key in WIFI name and password to enable the gateway to get access to the user's internet. After finishing, users can check the gateway on the “gateway list”.(see figure 13.1-13.3)

  When user is adding new device, they can see “Gateway Available” in the Add device page if there’s a Gateway available to be added to the network, they can simply click on it to proceed adding gateway.(see figure 13.4)

Figure 13.1 *Add gateway*

Figure 13.2 *Gateway configuration*

Figure 13.3 *Gateway list*

Figure 13.4 *Gateway Available*

Figure 13.5.1 *Function*

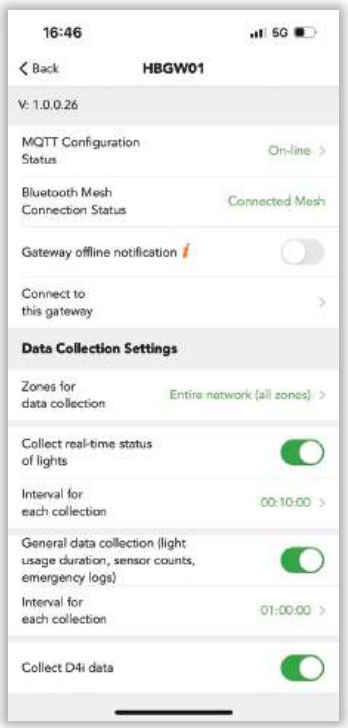

Figure 13.5.2 *More*

Click on any of the gateways, users are able to check “more”,which includes MQTT configuration status,bluetooth mesh connection status .Users can turn on or turn off the “Gateway offline notification” to determine whether to send an email notification when the gateway is offline for half an hour.(see figure 13.5.1-13.5.2)

- **Data Collection Settings**

In the “Data Collection Settings”, users can choose the gateway for the zones’ data collection. e.g.,gateway1 collect the data of zone Branding and Business,gateway2 collect the data of zone CEO office, Corridor,Finance and HR.(see figure 13.5.3-13.5.6)

Users can also collect data by”real-time status of lights”, and data about light usage duration, sensor counts, emergency logs by ‘General data collection’,and D4i data by “Collect D4i data”.But if these functions are disabled, no data will be received.Users can define the interval time for each collection as they like.

Users can also “set time’’ (using when the time of gateway is wrong) or “restart” (using when the gateway control is abnormal), “change name” and “connect to this gateway” also “delete” it. Users can check the overview that how many mobile phones are connecting with this gateway right below the gateway icon.Also,the status of gateway like on-line or off-line. The gateway is connecting with the mesh network or not. If the gateway is dis-connecting with the mesh network but on-line that means gateway can ‘t connect with the mesh network, then users need to check the status of devices. (see figure 13.5.1)

※ **Ways to reset gateway**

1) Delete the gateway in app directly but need to make sure the status of gateway is on-line.
2) Connect a mouse with the gateway USB interface (better connect the Blue one), then right click 5 times of the mouse quickly to reset the gateway.

※After resetting the gateway, users need to wait until the digital clock appears in their gateway’s mini screen, then users have one minute to add the gateway.

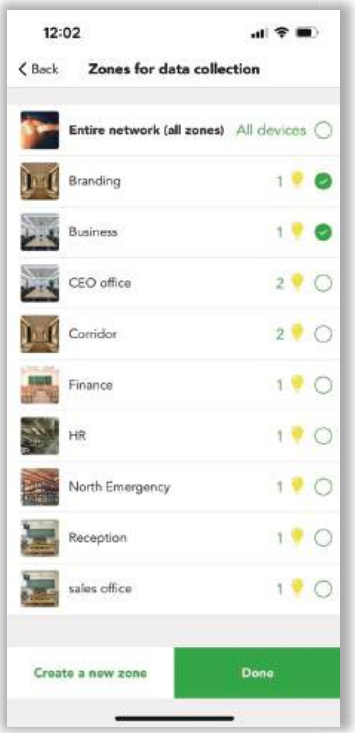

Figure 13.5.3 *Zone for gateway1-1*

Figure 13.5.4 *Zone for gateway1-2*

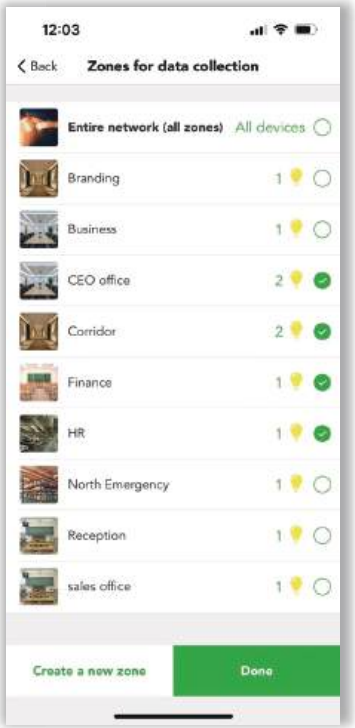

Figure 13.5.5 *Zone for gateway2-1*

Figure 13.5.6 *Zone for gateway2-2*

Central control screen

The central control screen is a gateway with a screen added, in addition to the basic functions of the gateway, users can also perform simple operations through the central control screen, such as turning on and off lights, activate scenes, etc. Users can click on “Add a central control screen” in the lower right corner ,or directly click the QR code icon in the upper right corner to scan the QR code on the central control screen ,to add it to the network.(see figure 13.6)

We can also check “More” and change name of the central control screen,which is the same as the gateway part.

Figure 13.6 *Add central control screen*

Figure 13.7 *Function*

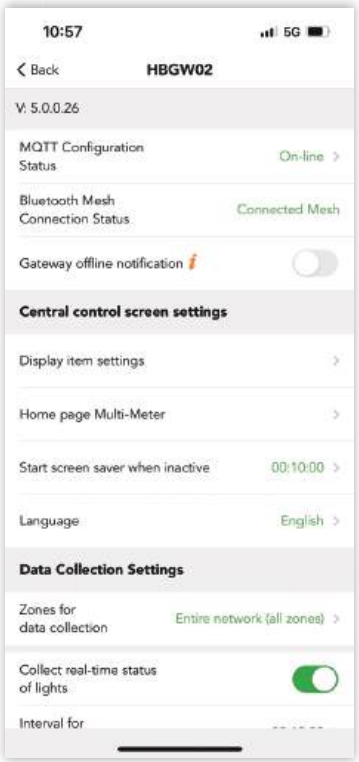

Figure 13.8 *More*

- **Central control screen settings**

In the “Display item settings”,users can choose the zones,groups,scenes and luminaires which they would like to present on the central control screen,makes the operation more conveniently.(see figure 13.9-13.10)

When there is a multi-meter added in the network, the temperature, humidity and illuminance of the control zone can be displayed on the home page of the central control screen.Users can change the control object of the multi-meter according to their needs.(see figure 13.11)

Users can set the screen saver time by clicking “Start screen saver when inactive” according to their needs.(see figure 13.12)

Users can also select the language to be displayed on the central control screen,so far there are 10 languages to choose from, they are English, 简体中文, 繁体中文, Deutsch, Svenska, Français, Italiano, Polski, Čeština, Español, and Русский.(see figure 13.13)

- **Data Collection Settings**

This part in central control screen is the same as gateway,more details please reffer to the gateway part.

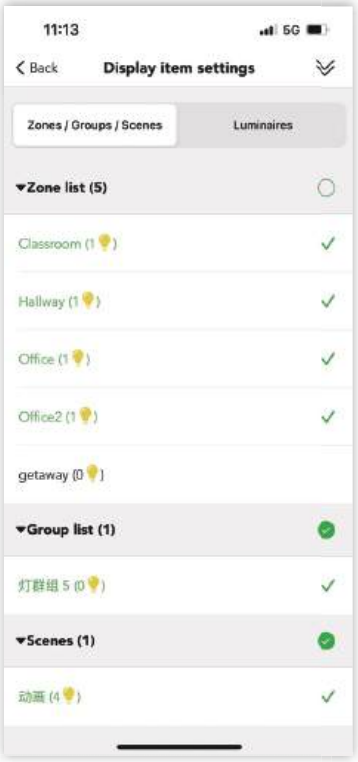

Figure 13.9 *Display zones/Groups/Scenes*

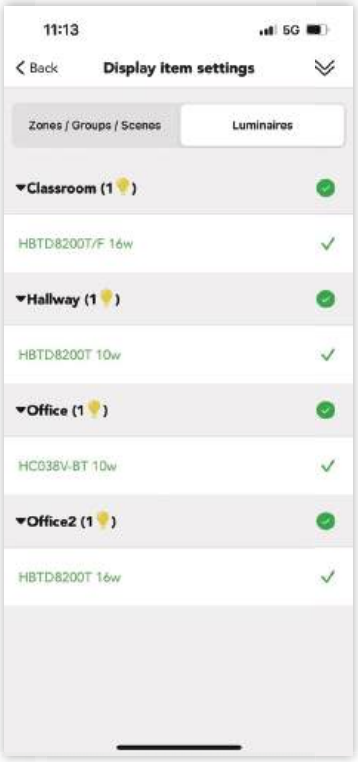

Figure 13.10 *Display Luminaires*

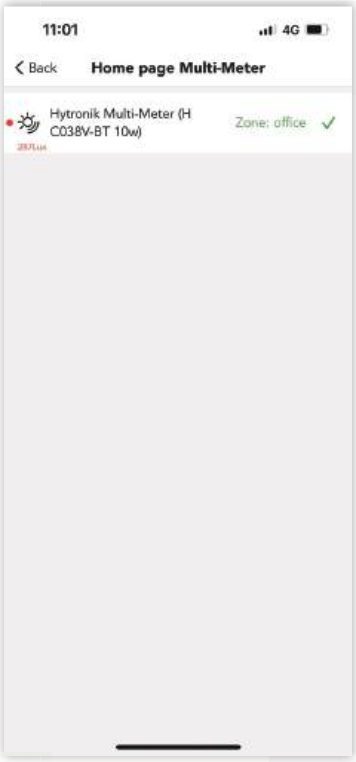

Figure 13.11 *Home page Multi-Meter*

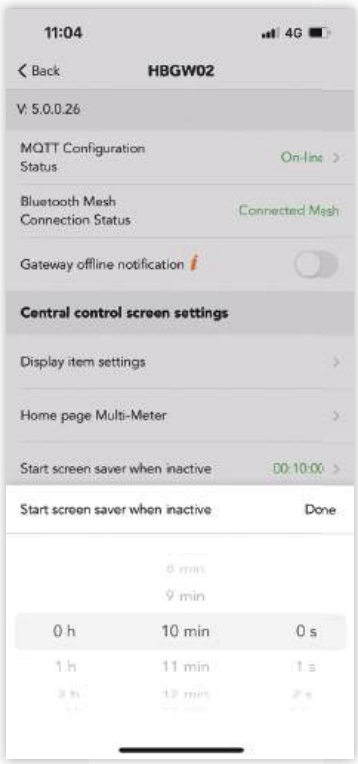

Figure 13.12 *Screen saver*

Figure 13.13 *Language*

- **Automatic bridge gateway**

  If this function is enabled, when your mobile phone is under the Bluetooth communication range to any Bluetooth mesh devices, then it will automatically connect to this device then it will control the whole mesh network. But if the mobile phone is out of the Bluetooth communication range to any Bluetooth mesh device, then the Koolmesh App will connect to the mesh network through the gateway. If this function is disabled, when the mobile phone is out of the Bluetooth communication range to any mesh devices, then users need to manually choose the gateway to connect to the mesh network.

- **Simulation gateway**

  This function enables users to connect to the mesh network by a simulation gateway (your phone) when users don't implement a gateway on site. Mostly when users have issues while doing the commissioning on site and can't figure it out by themselves. Then users can use this function and the Koolmesh technical team can access users' networks (after users shared the network to us) to check the issue and solve it instantly. In the period of using this function, users need to make sure the phone is in the range of Bluetooth can be covered otherwise it will fail to be connected.

Figure 13.11 *Simulation gateway-1*

Figure 13.12 *Simulation gateway-2*

Multi-network gateway synchronous control

For larger projects that have multiple networks, Koolmesh users can synchronously control these networks through Settings -> Multi-network gateway synchronous control（see figure R1.1 ）
They can dim the brightness, change color temperature, quick dimming for 10%, 50%, 75%, or 100%, sensor take over (quit manual), and All OFF.(see figure R1.3)

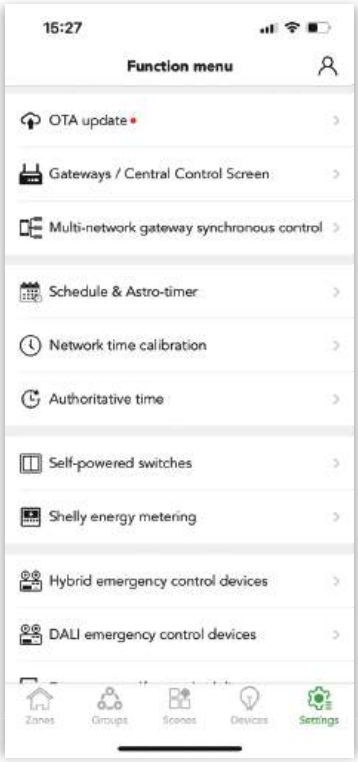

Figure R1.1 synchronous control

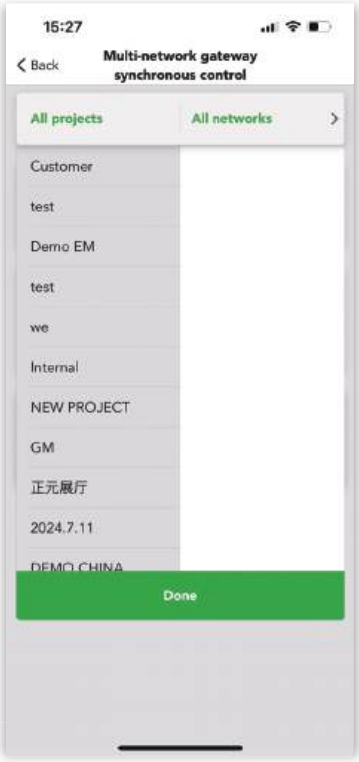

Figure R1.2.1 *choose project and network*

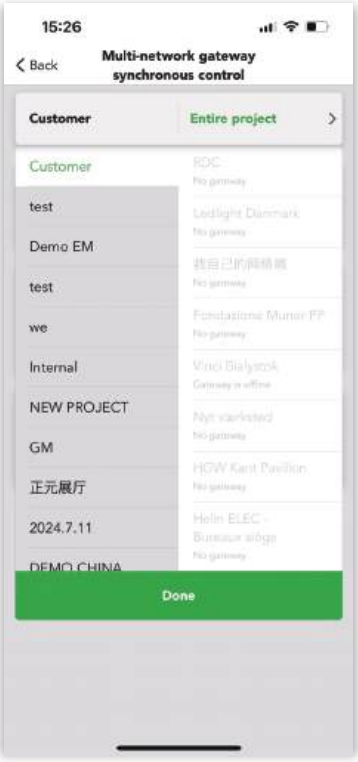

Figure R1.2.2 *choose project and network*

Figure R1.3 Multi-network gateway control

※ Users can select all projects and networks at once, can also select only the desired project and network; when selected a desired project, users can select to choose the entire project, or click to choose one network of the project. Noted that only those network(s) with a gateway can take effect. （see figure R1.2.1- R1.2.2)

Schedule & Astro-timer

Schedule & Astro-timer function is used to create one or more schedules that can be configured to activate a scene based on the time or date or week or specific time (can be a random hour) or sunrise/sunset times. For example, you can set meeting room luminaires to activate during office hours or set the living room to dim on/ off.

1. User can add a schedule by click "+" on the top right corner of the schedule page.
2. Name the schedule as users want and activate the status if users want this schedule to be valid.
3. Time setting can be year, month, week, date, or specific time (can be a random hour) or sunrise and sunset (the sunrise and sunset is calculated by the App according to the user's geo-location). And select a scene as user request (how to create a scene please refer to Scene section)
   Example:
   When users are out for traveling and don't want to set a certain schedule for everyday (to make sure of the security of the house). Then users can set two schedules, one is all luminaires 50% brightness light on in a random hour and another one is turn off the luminaires also in a random hour. Under this situation, luminaires will light on and turn off in a random hour for every day, like schedule Demo (see figure 14.2).
4. Turn on sensor override, after the schedule's scene is activated, when users trigger the motion sensor, then the schedule's scene will be interrupted by the motion sensor. Hold time scene will be activated. but turn off sensor override, if a pre-set scene of this schedule is running, then luminaires will no longer be controlled by the sensor, still will run the pre-set scene.
   Example:
   user set a schedule at 8:30 light on 50% for every day and turn on the sensor override
   The hold time scene of motion sensor is light on 100%, 10min; stand-by time scene is 10% and 5mins (how to set motion sensor please refer to Motion sensor section)
   Then when the time is 8:30, all luminaires will light on 50%, until when the motion sensor detects the presence, then all luminaires will go to 100% for 10 mins, when there is no presence detected, then all luminaires will go 10% for 5 mins. But if users turn off the sensor override, then all the luminaires will light on 50% even though there is presence.

Figure 14.1 *Add schedule*

Figure 14.2 *Schedule*

Figure 14.3 *Edit schedule*

All the schedules will be list out on the schedule page and user can click ••• to stop, edit and delete the schedule (see figure 14.3).

There is a “Check schedule” available on the Schedule page which can be used for troubleshooting. In real applications, especially users have a large network which includes different schedules. When users find the luminaires run in a way different from the preset schedule, then users can use this function to check if the luminaires are involved in the correct preset schedule or not(see figure 14.2).

Network time calibration

In this section enable users to check the network time and phone time,so users can synchronize both times by “sync to phone time” or “sync to Astro time” if needed.

Users need to allow Koolmesh app to access their location when first time login, after that, app will synchronize the local sunrise and sunset time automatically according to the geogrphic position. Under normal situations, it is unnecessary to “sync to Astro time” unless the location (time zone) of the device has been changed.

The Network time is from the devices in the network which means only when the devices connect with Bluetooth directly then the network time can have access to get the time from devices. If the user connected to the mesh network by gateway, then it will be failed to get the network time from devices.

※ Please do not modify the phone system time, it may cause data loss.

Authoritative time

User turns on this function means the entire network time will be based on this device when there is no mobile phone or gateway connection. (If the phone or gateway has connection, it will be based on the phone or gateway time instead).

Example: When you are traveling, set a scheduled timer light on 50% at 7:00 pm and turn off the light at 12:00 pm every day. If the user hasn't turned on this function, then every luminaire has a time deviation which may lead to some luminaires light on at 7:05 and turn off at 12:05; some luminaires light on 7:09 and turn off at 12:09. To keep the consistency, users can turn on this function to make sure all the luminaires in this network have the same time.

Figure 15.1 *Network time calibration*

Self-powered switches

Users can bind a self-powered switch as follows.First we should choose a device like Brand(HBIR29)1,then click the “Self-powered Switch" in the device settings page,then click ⊕to bind a self-powered switch and configure. Users can use camera to scan the QR-code on the self-powered switch or use the NFC function on the phone to bind the self-powered switch. Users can change the name of self-powered switch and delete it or inactive it. (see figure 22.1-22.4)

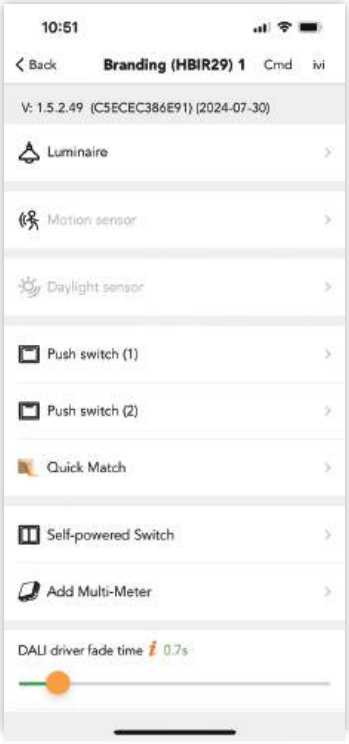

Figure 22.1 *Select device*

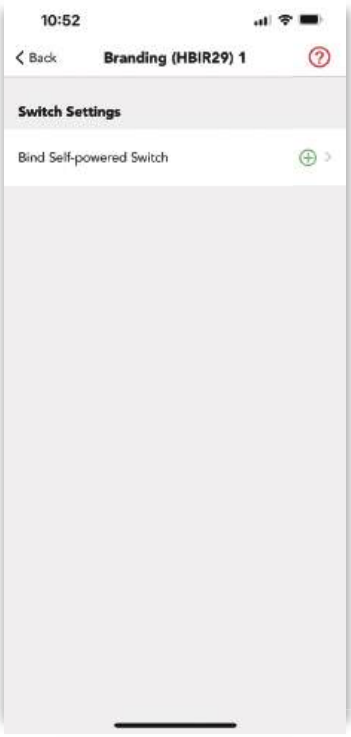

Figure 22.2 *Bind switch*

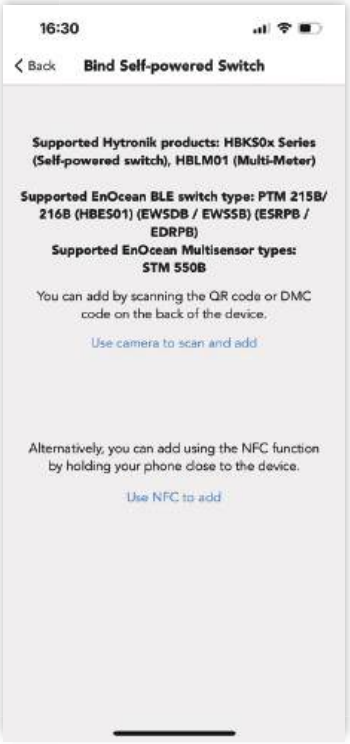

Figure 22.3 *Scan to add*

Figure 22.4 *Function*

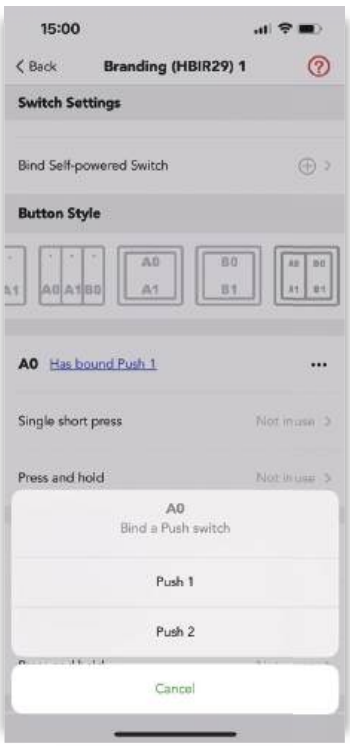

Figure 22.5 *Switch configuration-1*

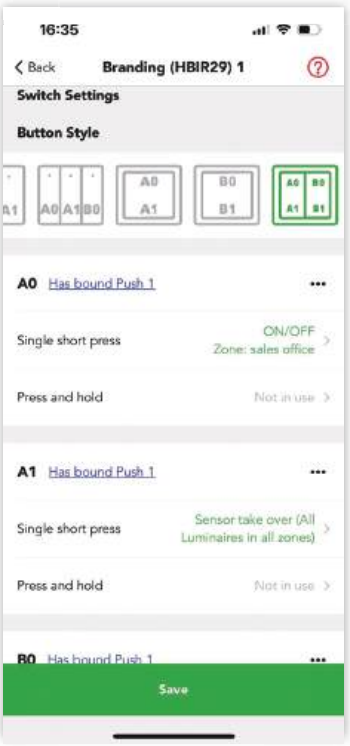

Figure 22.6 *Switch configuration-2*

Users can configure the push switch function by click" Has bound push 1",detail function configuration can refer to the push switches section. User needs to be aware that self-powered switch needs to bind push1 or push2 or push 3 before configuring the push switch. Like Branding (HBIR29) 1, A0 bind a push switch 1 to control sales office, A1 bind a push switch 2 to control all luminaires in all zones and so on.(see figure 22.5-22.6)
※Up to four self-powered switches can be connected to one device at the same time.

Example: combine push switches and self-powered switches into real application
The push switches of warehouse are only support to turn on/off the luminaires, it is very inconvenient and very energy consumption for users. So, user would like to upgrade the lighting system to wireless control and energy saving without re-layout all the cables (the original cable in the push switches is without "L"cables). Normally, what user need to do is change the original push switches to the Koolmesh app enable push switches from Hytronik if the original cables with "L". But under user's situation, there is without "L" cables in the push switches, then user can use a self-powered switch to bind the push switches to achieve energy saving. Then all users need to do is purchase self-powered switches and set all the parameters. How to bind a self-powered switch and setting push switches function please refer to self-powered switches section. Then users can upgrade the original lighting system to wireless control via self-powered switches.

※If a self-powered switch has been bound with a device before, then users need to unbind or delete it before bind to another device, otherwise it may fail to bind with the new device. In our app, if a self-powered switch is bond with a device, then there will be a notice which will remind user that it has been bound to another device. Users need to delete the original device that bind with the self-powered switch first. (see figure 22.7-22.8)

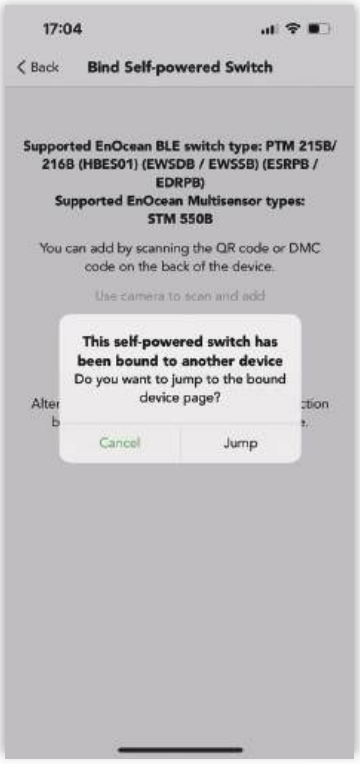

Figure 22.7 *Jump to unbound*

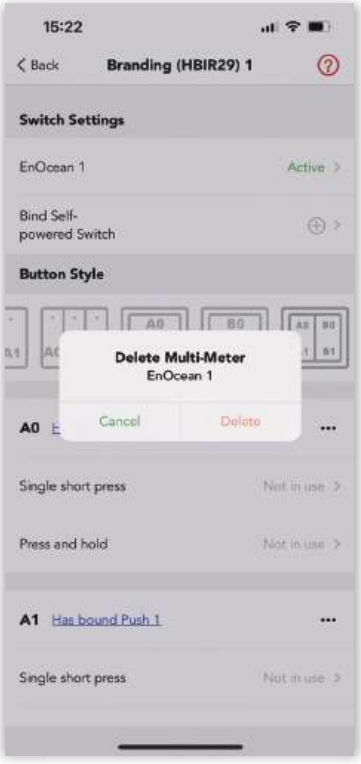

Figure 22.8 *Delete self-powered switch*

Shelly energy metering

In order to improve the accuracy of data statistics, users can choose to bind a shelly energy metering according to the difference of hard wiring, the shelly energy metering can collect and analyze the electricity consumption of the whole network or the whole zone or the whole group or just a single device, which can help users better collect and analyze data.

Currently, Koolmesh is compatible with the following shelly models:Shelly Plus 1PM,Shelly Plus 2PM,Shelly Pro 1PMV1,Shelly Pro Dual Cover PM ,Shelly Pro 2pmV1,Shelly Pro 3EM,Shelly Pro 4pm V2,Shelly Pro Dimmer,Shelly PM Mini Gen3,Shelly Pro EM-50.

When a shelly energy metering is connected, we can add it to the corresponding network and configure it through the following steps. (see figure N1.1-1.3.4)

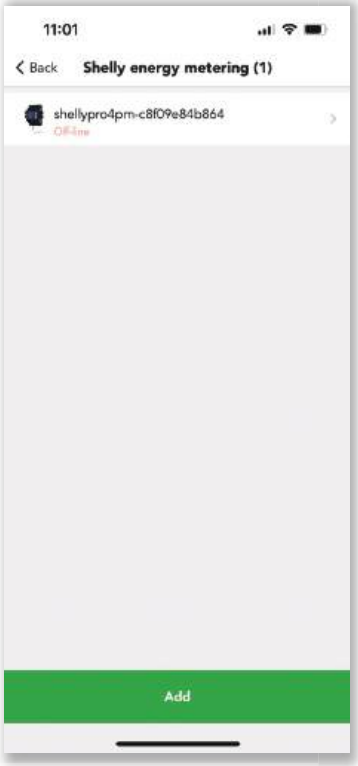

Figure N1.1 *Add shelly*

Figure N1.2 *Choose shelly*

Figure N1.3.1 *Configure shelly*

Figure N1.3.2 *Configure shelly*

Figure N1.3.3 *Configure shelly*

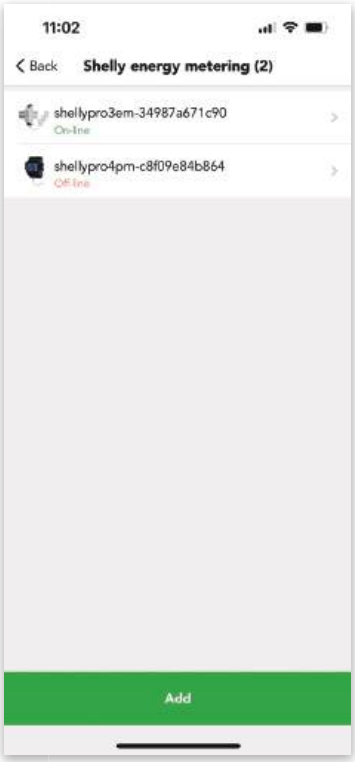

Figure N1.3.4 *Configure shelly*

We also need to select the corresponding statistical object according to the hard wiring, so that, click on the corresponding meter, we can see the energy consumption statistics of the selected object. (see figure N1.4.1-1.5)

Click 🗑 to delete the corresponding meter, but we must ensure that the meter is on-line.(see figure N1.6.1-1.6.2)
If you delete the meter in the off-line state, a prompt box will pop up on the interface"Failed to reset Shelly reset failed, do you want to force deletion? After deletion, you may need to manually reset the Shelly device."You can also choose force deletion, but the next time you want to add it to the network, you will not find the device, you need to manually reset to find it. Please refer to the following tips.
※If the Shelly has a switch function, make sure to short- circuit it or connect a physical switch and turn it on.
※If your Shelly energy metering device is not detected, please reset your Shelly first. Here are the reset methods:
1.If there is a reset button, hold it for10 seconds to reset.
2.Turn off the device power for more than 1 minute, and immediately flip the physical switch 5 times rapidly after restarting.
3.Turn the device's power switch on and off 5 times in a row.

Figure N1.4.1 *Choose object*

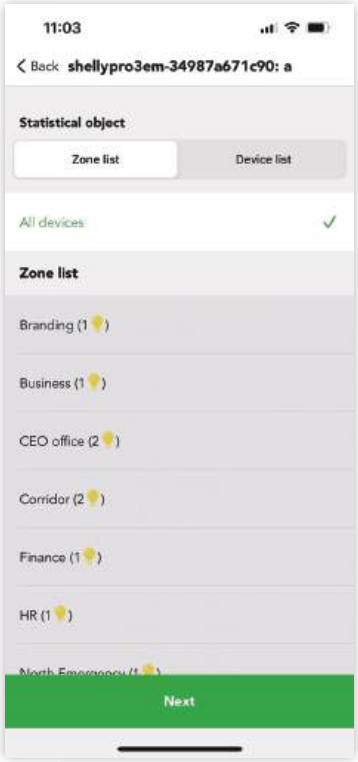

Figure N1.4.2 *Choose shelly*

Figure N1.5 *Energy meter*

Figure N1.6.1 *Delete shelly*

Figure N1.6.2 *Force delete*

Floor plan & staircase function

To improve the visual management and optimize the time management of designer and installer. Koolmesh also supports the floor plan and staircase function which enable designers to layer the floor plan and set all the profiles in advance in the office. All installers need to do is to synchronize the profile. Or installer can set all the profile on site to do the commissioning. In this section, Koolmesh app will list out all the zone and user can set it accordingly (see figure 17.1).

1. Modify a configuration profile which enable to create a new profile or select the profile from system default setting. Before user start to configure the profile, user need to click “change configuration profile” first. Like zone Hallway (see figure 17.2). Then there is [ ] which enable user to get a shared configuration profile via scan the QR code or key in the encrypted randomized key. There are 7 system default setting in Koolmesh app which enable user to choose according to their real application, but those profile with 🔒 means cannot edit or share and delete. For those profiles created by users can be edited/ shared and deleted (see figure 17.3)

   There are “copy this profile” and “bind this profile” at the bottom of Hallway page (see figure 17.4). Because the system default profile “Tri-level control (staircase function)” cannot be edit or share, then user can copy this profile and rename as user’s profile. After finished, user can share it to others user or installer. Or user can copy this profile and modify some of the parameters basic on the system default profile, then rename as user’s profile, then user can have a new profile. If all the profiles are still not applicable, then users also can “add a new profile” to create a new profile by themselves. Users also can use the system default profile directly and “bind to this profile”.

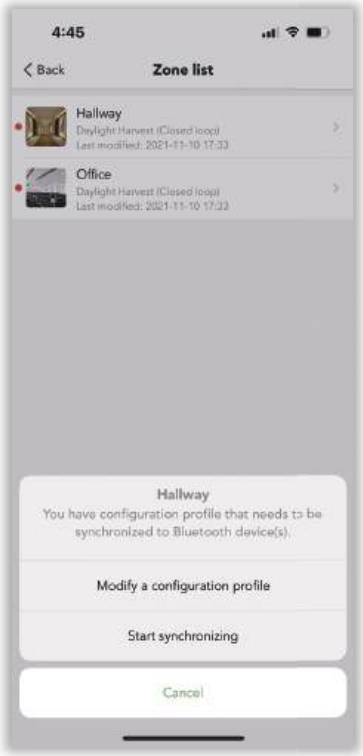

Figure 17.1 *Zone list*

Figure 17.2 *Modify profile*

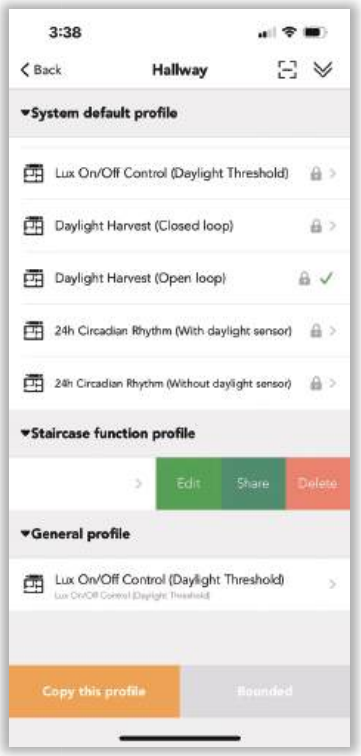

Figure 17.3 *Change profile*

2. Start synchronizing which enable user to take the profile into application. User can use “modify a configuration profile” to create a profile. But after finished the creation, user need to “start synchronizing”, otherwise the profile cannot be activated. This step is necessary even all the profile be created in the Web platform. The staircase function will be different from other system default profile when user start to synchronize, because the staircase function need user to assign the luminaires to each floor. But the others need user to choose daylight sensor to control the object.

   Example: take system default profile staircase function into real application

   User can select Tri-level control (staircase function) from System default profile and click “bind this profile “directly. After finished, user need to “start s synchronizing” layout the floor. Like if there 2 floors, then user need to assign the luminaire to the floor one by one. Office 3 to floor1, Office 4 to floor 2 and then save.

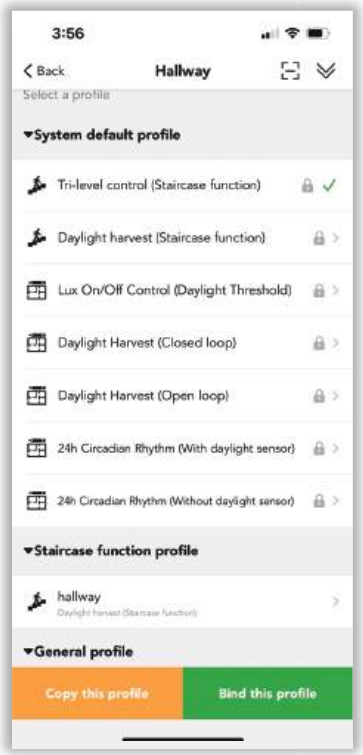

Figure 17.4 *Select a profile*

Figure 17.5 *Assign device(s)-1*

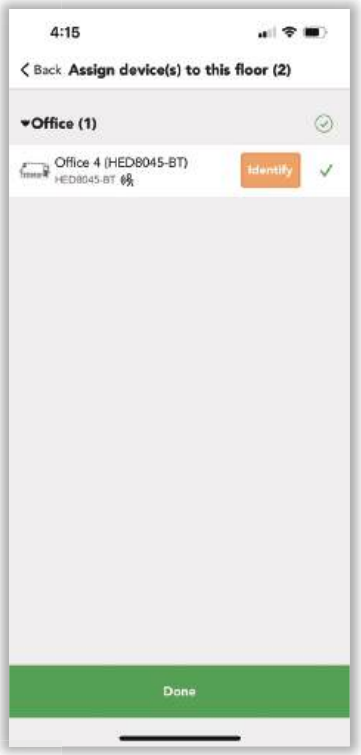

Figure 17.6 *Assign device(s)-2*

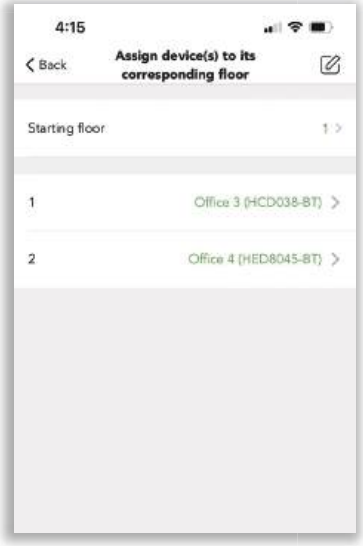

Figure 17.7 *Assign device(s)-2*

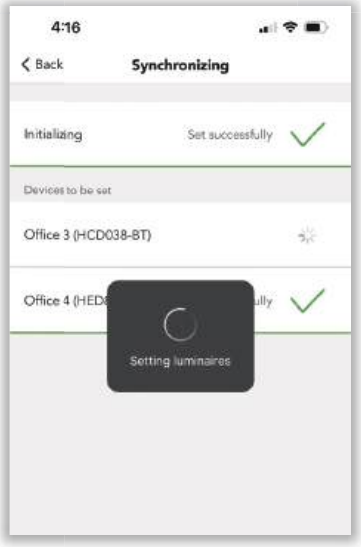

Figure 17.8 *Synchronizing*

Example: take system default profile Daylight harvest (closed loop) function into real application

User can select Daylight harvest (closed loop) from System default profile and click “bind this profile“ directly. After finished, user need to “start synchronizing” and set the control object of daylight sensor. User can choose each device use their own daylight sensor or all the devices use the same daylight sensor, if user choose all the devices use the same daylight sensor, then user need to set the control object.

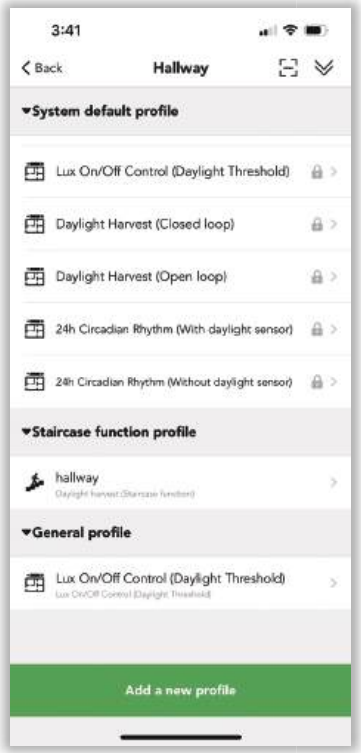

Figure 17.9 *Select a profile*

Figure 17.10 *Choose a daylight sensor*

Figure 17.11 *Start synchhronizing*

Bulk commissioning

To save more time when users are doing the commissioning, especially when users have a larger network, Koolmesh supports the function of bulk setting. In this section, users can set the luminaire or motion sensor or emergency devices in batch volume independently. For every independent part, Koolmesh has a default setting which the user can apply accordingly. If not, users also can copy the parameters directly from exciting devices or modify all the parameters (more settings can refer to Luminaires /motion sensor/ emergency sections). Also, users can clear data via bulk commissioning.

- **Set luminaire parameters in batch volume**

  Users can review the system default and all existing profiles for luminaires. Those profiles with 🔒 are created by others and cannot be deleted or edited, like “Customer profile” and “Dali dimmer”. For those profiles created by the user can be deleted by sliding to the left side. There are two ways to create and apply a new profile. More details about luminaire setting can refer to Luminaires setting.

① Copy parameters from an existing device and then “Choose” the device user would like to copy and “Next '' Luminaire parameters, user can rename the profile and change the parameters based on the existing profile. After that, users can click 💾 to save and “Next” to select the devices the user would like to apply and “start setting”. After it is finished, this profile can appear in the “Select a profile” page, like Hallway 2 (HBHC25) (2), copy Hallway 2 (HBHC25) (2) ‘s setting to apply on the office's luminaires “Office 4 (HED8045-BT)”, profile name as Hallway.

② Click “Add a new profile” to name the profile and set all the parameters of the luminaires and click “ 💾” to save and “Next” to select the devices user would like to apply and “start setting”. After it is finished, this profile can appear in the “Select a profile” page.

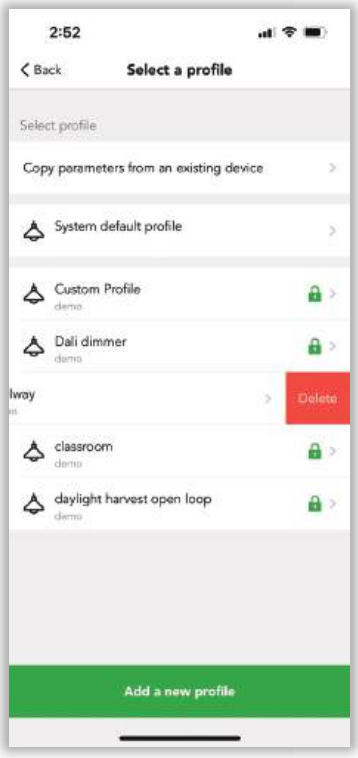

Figure 18.1 *Set in batch volume*

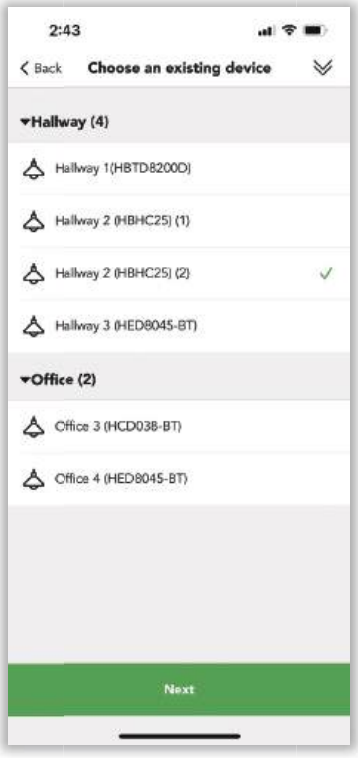

Figure 18.2 *Copy parameters*

Figure 18.3 *Parameters settings*

Figure 18.4 *Set target device*

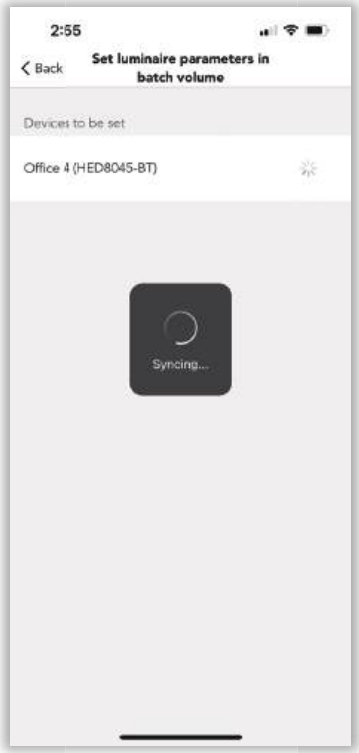

Figure 18.5 *Syncing*

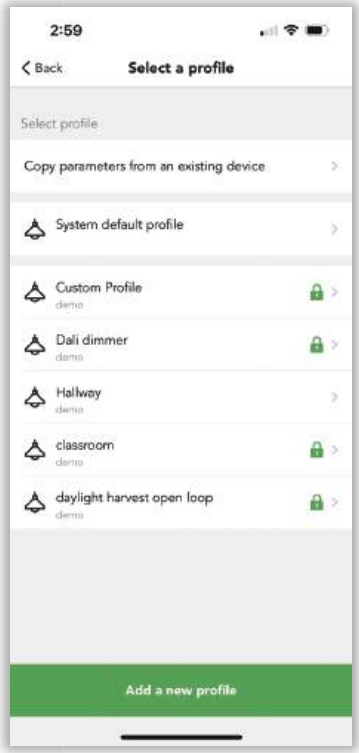

Figure 18.6 *Finished setting*

- **Set motion sensor parameters in batch volume**

  Setting process please refer to “Set luminaire parameters in batch volume”. But please be aware that the “Micro wave detection range” will only function on microwave sensor; The “Sensor range”, “Static sensitivity”, and “Motion sensitivity” will only function on true presence motion sensors.(see figure R1.4-R1.5)

  Set emergency parameters in batch volume please refer to “Set luminaire parameters in batch volume”.

- **Clear data**

  This function enables users to clear the data in batch volume, only clear the settings and remove the device from the current scene; all the zones and groups can be reserved.

Figure 18.7 *Device list*

Figure R1.4 *Bulk commissioning*

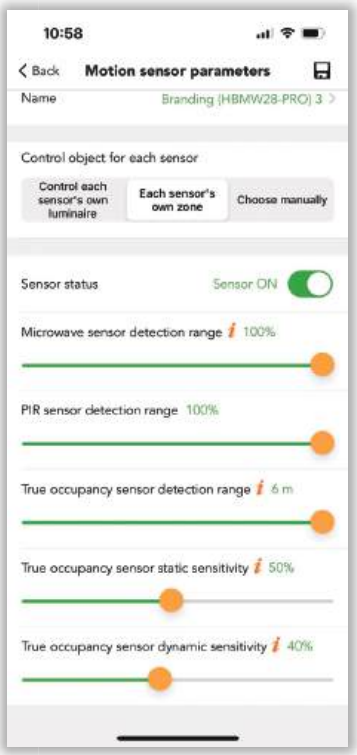

Figure R1.5 *motion sensor*

Device network relations

In this section, Koolmesh lists out all the devices by zone in the network which users can check all the status for every individual device. Which zone the devices belong to and the control object or control by which panel and push switch. Also enable users to change related parameters, all the parameters setting user can refer to the related section.

Figure 19.1 *Device list*

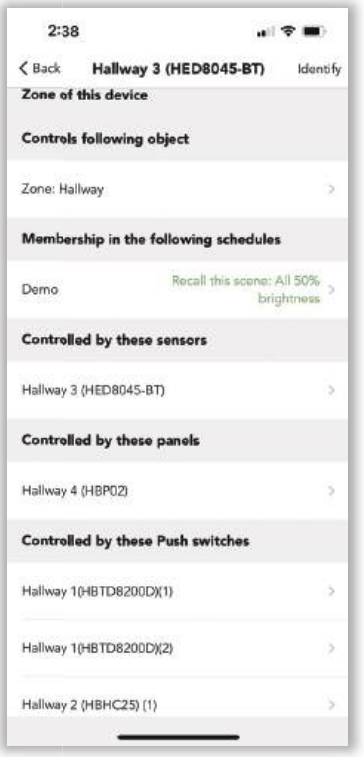

Figure 19.2 *Network relations check*

Daylight sensors/Multi-Meter

When configuring daylight sensor control for a zone, it is important to consider whether luminaires may need to be configured with daylight to optimize the achieved dimming conditions. User also can use a daylight sensor to control a large area, or every single luminary uses their own daylight sensor (please refer to the Scene section of daylight sensor usage strategy).

Koolmesh list out all the sensor with daylight function. Some products can distinguish natural and artificial light which means having two current lux values, one is current ambient lux another is current PirLux (natural value); like luminaire “Hallway 3 (HED8045-BT)”, 34 Lux is the current ambient lux; 56 Pirlux is the current natural value. But some products can only detect the ambient lux, like “Hallway 2(HBHC25)”(see figure 20.1). All these depend on the product features. If user would like to check the lux value, user needs to set the “control object” first, otherwise the lux value is not available, like “Office 3(HCD038-BT)”.

Figure 20.1 *Daylight sensors*

Figure 20.2 *Parameters setting*

- **Control object**

  Control object which enables user to select a single luminary or a group even a zone.

  Lux value is visible in the daylight sensor interface when users have set the control object (see figure 20.1) ; if the control object is empty, then users can see nothing in the daylight sensor interface,but can check the value in a specific daylight sensor interface,-like(CEO HBHC25) , which is convenient for users to check the lux value, without setting each control object .

  There is a reset button available which enable users to reset the value of calibration. When there is a big gap between current value and actual ambient lux, then users can use this button to reset the value.

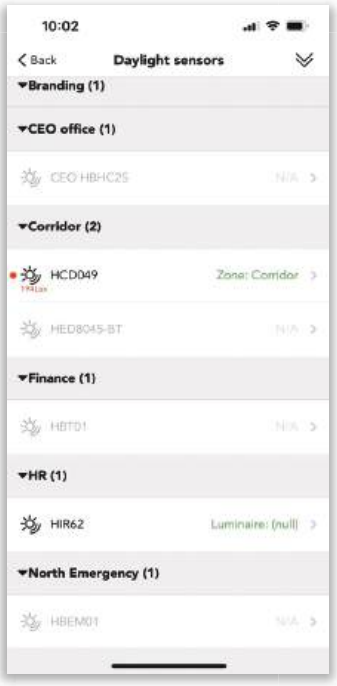

Figure 20.3 *Daylight sensors*

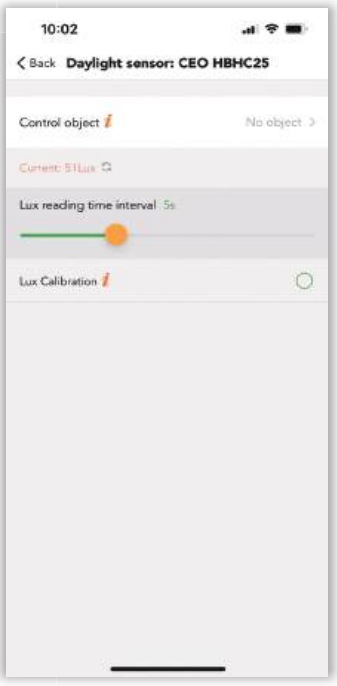

Figure 20.4 *Parameters setting*

- **Lux calibration**

Because the lux value received by the sensor is often not the same as the actual lux received on the surface below it, which means if users would like to maintain a specific amount of light on that object or surface, users need to calibrate the sensor lux value shown in the Koolmesh app. In order to reduce deviations, we don't use the original lux calibration method, and the following example is used for the current practice.

Example: In the office,the work area (desk surface) needs to be maintained in a specific amount of light like 500 Lux. In this case,users need to measure out the lux value of the desk surface. All users need to do is use a lux meter and put it on the desk right under the luminary and turn on the luminary(recommend in a dark environment). Users can make the desktop illuminance meter display as the target value by adjusting the brightness of the luminary, and then fills the lux value displayed on the APP in the Closed loop scene setting page as the target value .

Multi-Meter

Multi-meter is actually a multi-function sensor,it measures the temperature, humidity and lux vaule of the zone where the connected device is located.Users can bind a Multi-meter by clicking "Add Multi-meter'' in the device settings page, Users can use camera to scan the QR-code on the Multi-meter or use the NFC function on the phone to bind the Multi-meter. After finishing, users can rename the multi-meter,and can check the control object and the light level detected by sensor,and also the temperature and the humidity.The products that support being added by the device are shown in the below.(see figure 20.5)

Figure 20.5 *Add Multi-Meter-1*

Figure 20.6 *Add Multi-Meter-2*

Push switches

Within the push Switches section, Koolmesh-enabled push can be configured. Users can use push to control a single luminary or group/ zone to activate a scene, turn on/off or dim even sensor takeover function and not in use. There are two ways to set the push switches, they are quick match and manual selection (see figure 21.1).

In Koolmesh -enabled products, there are simulation push ports available for push switches, which means even if there is no physical push port in the product, users still can have push switches function and configure via Koolmesh app.
Eg: The hard wiring for push switch is unnecessary, user can use Enocean push switch and configure by app, then user can have the push switch function

1. Quick match

Users can single press the push switch that they want to configure to quickly match. Koolmesh app will automatically pop out the push parameter setting interface. This quick match enables the user to set the push in a fast way when there are several push switches or users not familiar with the push switch layout. After the Koolmesh app automatically pops out the push parameter setting interface, there is a number that the user can know whether it is push 1 or push 2(only for these with multi push function) like Hallway2 (HBHC25) (1), it is push 1; Hallway 2(HBHC25) (2), it is for push 2. The default setting for push is single press to control on/off, also long press to dimming.

- **Control object**:

  User needs to configure the luminaries; it can be zone and group or single luminaries. Also, the control object can be different according to different functions. There are quick setup and advanced setup which depend on the user 's application. For Quick setup, it is controlled by the whole area like the single luminary or group, or zone. But for advanced setup with more diversity for the control object, like the user can set the on/off control of the office, dimming & color tuning control Hallway, and Recall scene to control single luminary Hallway3(HED8045-BT).

- **Single press:**

  Users need to configure the single press function, like ON/OFF, OFF only, ON only and recall this scene (how to create scene please refer to Scene section), sensor take over even Not in use.

※ Sensor takes over means enter motion sensor mode. If the user setting the sensor takes over by single press when the scene is interrupted by manual control to dimming up. Then the user can use a single press to switch back to the motion sensor auto control.
When the user sets the hold time scene 70% light on for the 20 mins, stand-by scene 50% light on for 10 mins in a classroom. Then when the motion sensor detects the presence, luminaries will light on 70% but some of the teachers want the luminaries to go to 100%, so teachers dimming to 100% by press and hold (press and hold function needs to be configured brightness dimming). Under this situation, user can set sensor take over by single press. Then when teachers finished the lecture and single press (single press needed to be comigrated to sensor take over) to sensor take over. After that, when the motion sensor detects presence then it will run the hold time scene and stand-by time scene accordingly. Otherwise, all the luminaires will light on 100% continually.

- **Double press:**

  Users need to configure the double press function, like Not in use, OFF only, ON only and recall this scene (how to create scene please refer to Scene section), also sensor take over.

- **Press and hold:**

  Users need to configure the press and hold function, like Not in use, Brightness dimming, Color temperature tuning and Dimming speed.Users need to configure the press and hold function, like Not in use, Brightness dimming, Color temperature tuning, and Dimming speed. Adjust direction, choose among Toggle (press once to be up, press another one to be down), Up, or Down.(see figure R1.10)

- Fade time for the push switch also can be configured according to the real application.(see figure R1.11)

※ Synchronized adjustment is useful when a user has a larger network which can adjust all the luminaries to the same brightness and color temperature.

※Cumulative adjustment means when user having a larger network each luminaire will be adjusted individually in the same pace for their own brightness or color temperature.

2. Manual selection

Koolmesh app will present various pushes which list out by zone if you select the Manual selection. Users can select the push switch manually. This function needs the user to be very familiar with every single press switch. There is a number (1)/ (2) on every push switch which is the push port. Like Hallway1(HED8045-BT) (1), it is for push 1.

Push switch function is alternative by the user real application. The different functions will have different parameters to set. Normal function, user can refer to “Quick match”.

Sensor link function, user can refer to “motion sensor section” for all settings, but there is a limitation that when a user sets the motion sensor by sensor link function on Koolmesh app, the tri-level control of the hold time cannot be changed, like “Hallway 3 (HED8045-BT) (2)”

Example: Some projects are using on/off sensors if the user would like to upgrade the system to wireless control and dimming or recall scenes. Then user can use Koolmesh enabled products with push function to connect with push switch port which when sensor triggered then sensor will send the signal to push switch to transfer the signal. After

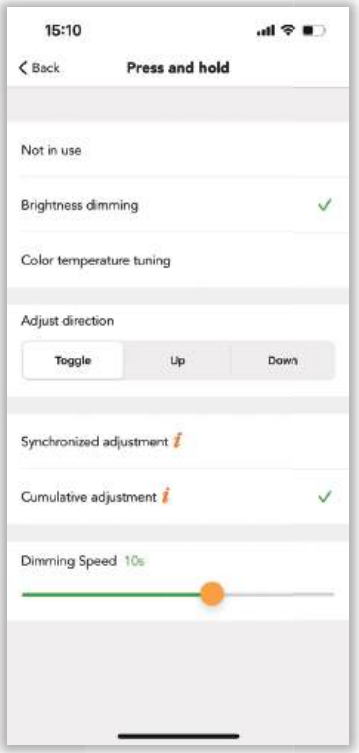

Figure R1.10 *Dimming Speed*

Figure R1.11 *Push fade time*

Figure 21.1 *Push switches*

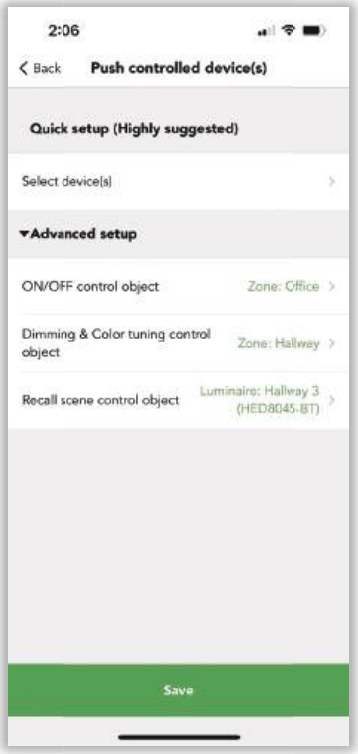

Figure 21.2 *Push controlled device(s)*

Figure 21.3 *Push settings*

Emergency self-test function, this function is only available when users' networks have emergency devices, details please refer to the Emergency manual.

Fire alarm function, user can refer to “motion sensor section” for all settings, but the difference is that “the sensor mode” and “mode in priority” can not be changed. And users need to set the “state without fire alarm” and “fire alarm trigger mode” according to their firm alarm system.

※ State without fire alarm: normal open and normal closed which means when it is in the usual situation, which status your fire alarm system is, users just need to make the option.
※ Fire alarm trigger mode: persistence or impulse whicn when there is fire alarm, which mode your fire alarm system is, users need to make the optinal baice on their frrm system.

Example: For larger scale projects, most of the users will have a fire alarm system in their applications. but most of the time, users cannot set the luminaries brightness and color temperature. However, users can use push switch ports to connect with their firm alarm system by Koolmesh enabled products and reset the brightness or color temperature and can even recall the scene. As long as the products have the push switch post physically .
(see figure 21.4.1-21.4.2)

Figure 21.4.1 *Firm alarm*

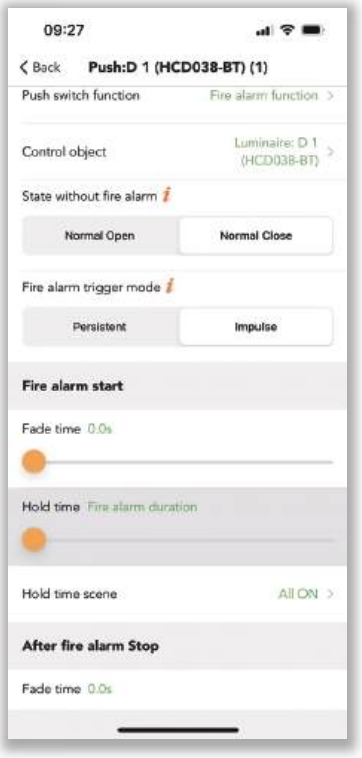

Figure 21.4.2 *Firm alarm*

Touch panels

It is a Bluetooth wall touch panel, which is designed to fit inside a junction box. The touch panel is very powerful, it not only offers on/off control, brightness dimming control, color tuning control; but also provides different scene (the quantity of the scene depends on the products features) buttons for users to freely set on their own. Additionally, the touch panel offers sensor take over key and clean mode (lock mode) with quite easy access.

There is also a real-time keeper inside the panel, which can keep the real time for up to 7-8 weeks against power failure/cut. This ensures perfect time synchronization to a whole Bluetooth network. The panel offers 3 ways of indication — LED indication, vibration upon touch & beeper. All these indication methods can be enabled/disabled in the app.

Koolemesh app will list out all the BLE panels by zone in the BLE panels setting page, user can click the panels to configure the settings. Like Hallway 4 (HBP02).(see figure 23.1-23.2）

- **Clean mode (lock-up time)**

  To avoid triggering the pre-setting in the panel, users can long press the screen locking function until there is “bi-bi” sound to lock the panel. Lock-up time can be set by user request. After the “bi-bi” sounds, the touch panel screen will be locked and does not respond to any touch.

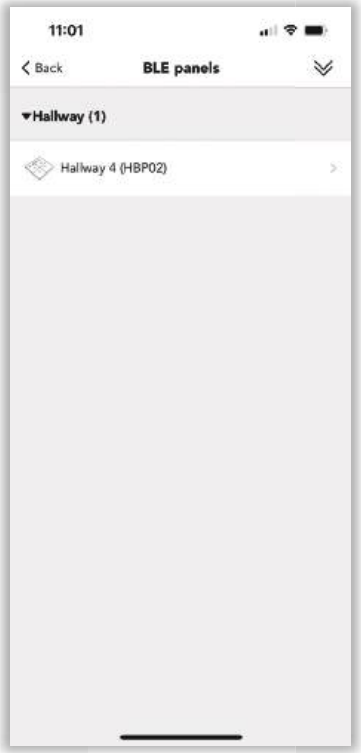

Figure 23.1 *Touch panels*

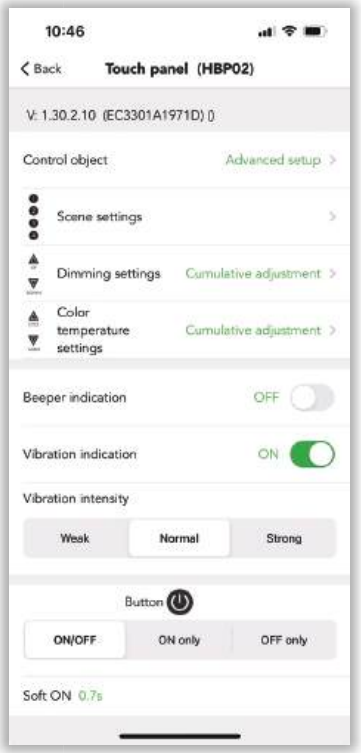

Figure 23.2 *Panel settings*

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