

*Flexible and simple 2.4Ghz low  
energy wireless mesh networking  
lighting control*

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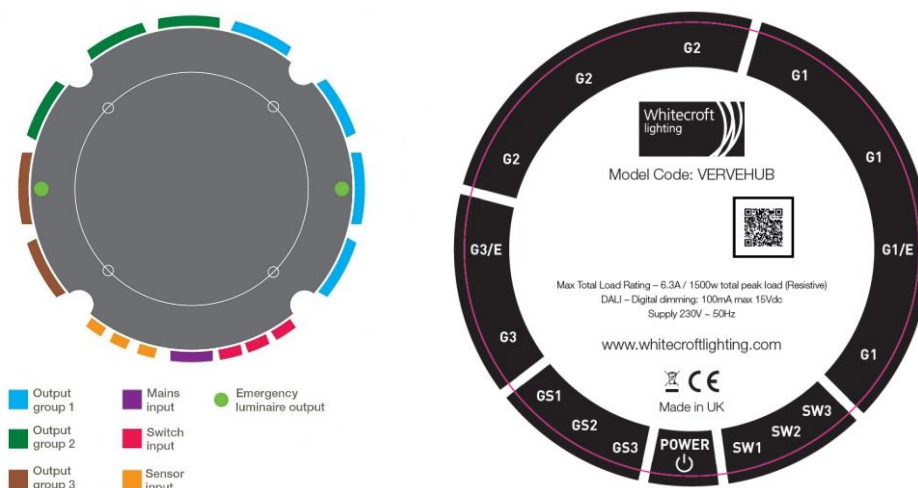
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## Welcome to VERVE

VERVE is the next generation of Whitecroft Lighting's lighting control. VERVE takes lighting control from the domain of specialist engineers and makes it available to installers and end users without compromising on functionality.

In this guide the various aspects of using VERVE will be explained, from the physical installation to the commissioning and tuning of the system. Please note, this release of the guide is written to be used with **Version 1.3(93) iOS and Version 1.3(92) Android** of the Whitecroft Lighting VERVE app and may have inconsistencies with future versions and thus should not be used as reference to those versions.

The VERVE LCM (Lighting Control Module) has 9 DALI controlled luminaire ports. These can be configured into groups of 4 (1-4 / Group 1), 3 (5-7 / Group 2), and 2 (8-9 / Group 3), with ports 2 & 8 available as non-DALI emergency outputs using the auto commissioning or relay control. The outputs can also be configured to allow for individual control of each of the 9 outputs, which is explained in **DALI commissioning**. There are also 3 sensor inputs and 3 latching or retractive switch inputs. The ports for the luminaire connections are available in either a Wieland or Wago configuration.



The unit utilises 2.4Ghz low energy wireless networking to communicate with other units, creating a wireless mesh that can be used for corridor linking or emergency features, as well as to connect to other smart devices, to customize each devices configuration. All the setup for this unit can be done easily and effortlessly through the VERVE app, available on both IOS and Android.

Out of the box, VERVE comes pre-configured with each of the sensor and switch inputs set to control all of the lamp output groups, with sensors controlling the lamps through presence commands on a twenty minute timeout, and switches broadcasting on/off and dim commands, allowing for basic functionality and testing.

# Installing VERVE

## Mechanical Installation:

The VERVE LCM is designed for surface and drop-rod installation. All mountings are located on the outside of the enclosure to reduce installation time.

Four M4 mounts are provided at the base of the enclosure for surface mounting. Removing the inner rings of the supports will allow for M8 drop rod mounting to be used. The unit should be mounted in an orientation, as to provide suitable fixing and cable access. The LCM must be mounted flat and true to avoid distortion or damage to the enclosure and/or any internal components.

When securing the LCM in place in a ceiling, ensure that the label of the unit is facing downward so the status LED is visible. Doing otherwise may affect the communication ability of the LCM. **DO NOT** mount the LCM vertically.

The total weight load bearing capabilities of the unit when installed correctly, including plugs and cabling, is 20kg. Exceeding this may cause damage to the unit. All cables should be dressed and tied to avoid any unnecessary strain on the sockets.

### 2.4Ghz low energy wireless mesh communications:

There are several aspects that may impair the 2.4Ghz low energy wireless mesh communications between VERVE LCM's. It might be a requirement to re-position LCM's during the commissioning and setup process to optimise the 2.4Ghz low energy wireless mesh communications and improve the signal path between LCM's. The recommended distance between LCM's which are meshed in a communication network is 8 meters.

The VERVE LCM communicates and creates mesh networks via 2.4Ghz low energy wireless mesh with other VERVE LCM's. These are radio signals which are electromagnetic waves, hence the signal becomes weaker the further it travels, the range is limited. The radio coverage is further decreased by specific materials found in the direction of the propagation. While radio waves can penetrate a wall, they are dampened more than on a direct line-of-sight path (LoS).

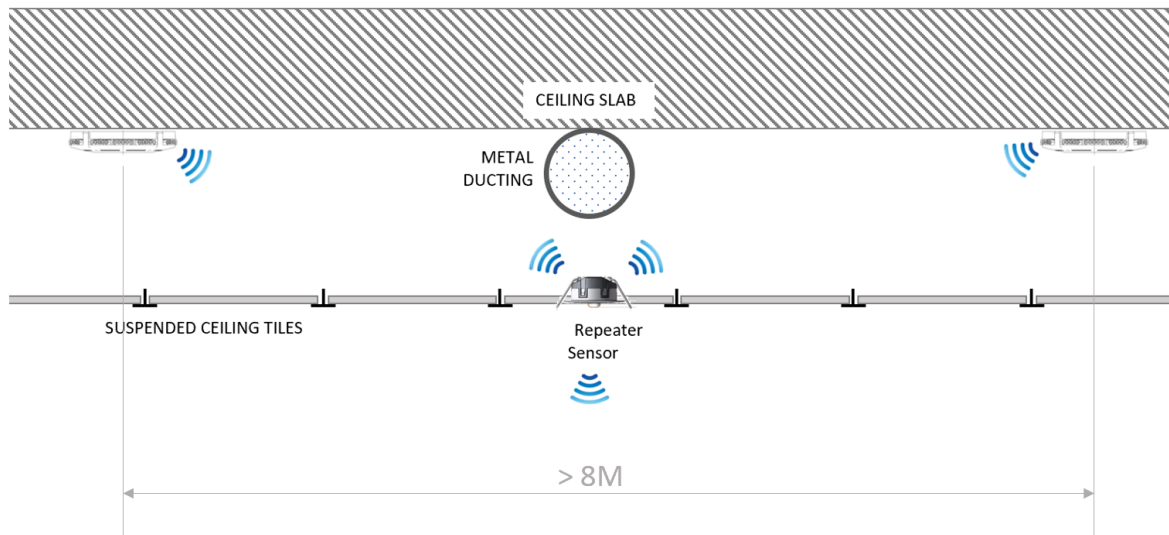
### Restrictions and barriers:

Objects made of metal, such as metallic separation walls and metal inserted ceilings, wall reinforcements and the metal foil of heat insulations, reflect electromagnetic waves and thus create what is known as radio shadow and are barriers to signal path. Fire-safety walls (and curtain barriers), elevator shafts, staircase, air ducting (and HVAC units) and RSJ's can be considered as barriers, as well as metal pan ceiling tiles

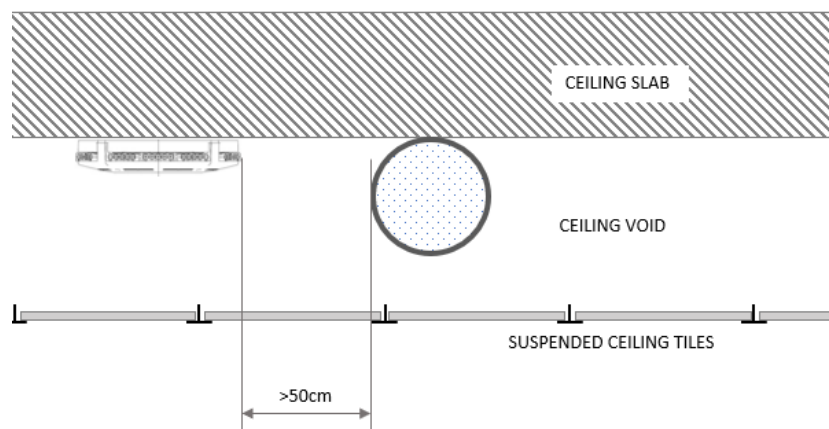
### Material range reduction

- |  |          |
|--|----------|
| • Wood, plaster, glass uncoated, without metal | 0 - 10%  |
| • Brick, press board                           | 5 - 35%  |
| • Ferro concrete                               | 10 - 90% |
| • Metal, aluminium lining                      | 70 - 90% |

Avoid barriers when installing 2.4Ghz low energy wireless mesh wireless networks by repositioning the 2.4Ghz low energy wireless mesh transmitting and/or receiving unit away from the radio shadow, or by using a repeater unit (GS480 2.4Ghz low energy wireless mesh repeater sensor).



It is recommended to keep a clearance distance around the LCM of >50cm to ensure the 2.4Ghz low energy wireless mesh communications are not restricted.



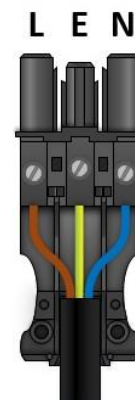
## Electrical Installation:

### Input power connection:

Power is applied to the LCM via a 3-pole Wieland GST18i3 female connector\*. Input power to the unit must be 230V AC 50Hz  $\pm 10\%$ . The input power cable must be a 3-core cable providing live, neutral and earth to each LCM and should be adequately insulated and rated for the supply current and voltage.

\*Wago connector configuration using the WINSTA MIDI 770-103 is also available.

The total current rating of the device is 6.3A. The total supply current should not be exceeded, and the unit should be externally fused by means of a suitably rated Miniature Circuit Breaker (MCB).

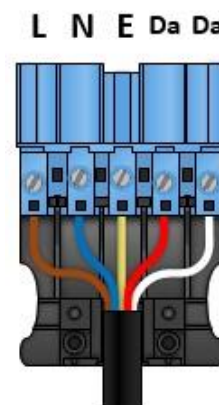


### Luminaire ports:

Connection to the luminaires is achieved using a 5 pole Wieland GST18i5 blue male plug\*. At minimum live, neutral and earth pins should be connected between the LCM and the load.

Dimming is provided via pins 4 (DA) and 5 (DA). These cables must in-turn be connected to the correct terminals on the ballast.

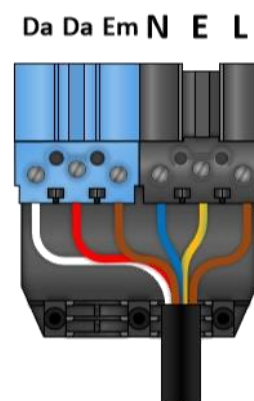
\*Wago connector configuration using WINSTA MIDI 770-1115 is also available.



### Emergency-enabled luminaire ports:

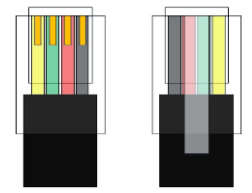
The two emergency ports (2&8) require 6 pole Wieland GST18i6 male plugs to connect to the load. At minimum live, neutral and earth pins should be connected between the LCM and the load.

If remote emergency test instigation of non-DALI emergency drivers is required, the fourth pin (EM) should also be appropriately connected to the load. DALI emergency fittings should be connected to the switched live, and to the DALI pair via pins 5 (DA) and 6 (DA) to receive emergency reports from the ballast. These cables must in-turn be connected to the correct terminals on the ballast.



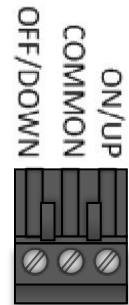
**Sensor inputs:**

The three sensor ports use FCC68 4/4 RJ11 terminations to connect to the GS400 sensor. The cables are wired like for like on each end and pre-made cables are available from Whitecroft Lighting.

**Switch inputs:**

Latching or retractive switches connect to the switch inputs via a 3 pole 5mm pitch plug. Two-way retractive switches should be wired between Common (terminal 2) and Off/Down (terminal 1) and on/Up (terminal 3). The switch input may also be configured for use as an emergency test key switch input.

The switch inputs are volt-free and should not be connected to any external voltage.





## The VERVE App

The VERVE app, powered by Whitecroft Lighting allows for direct, easy setup and adjustment to the system, allowing the user to fine-tune the configuration to the individual application requirements. The app is available for free on both the Android and iOS app stores. It can be found by searching “Whitecroft Lighting” in either store.

The app has built in security and encryption to ensure that the system is not tampered with by any unauthorised persons. Users are given a permission level set by the supervisor of a building. These permissions determine what level of access a user has, to view buildings or to be able make changes to the configuration of the system. These permissions can be changed at any time.

### **App permissions**

When the app is started for the first time, a request will be issued allowing the app to access the devices location. This is a requirement of the 2.4Ghz low energy wireless mesh functionality in the app.

The app will also request access to the contacts on the user, which will allow the user to export the emergency and configuration reports to email from their contacts.

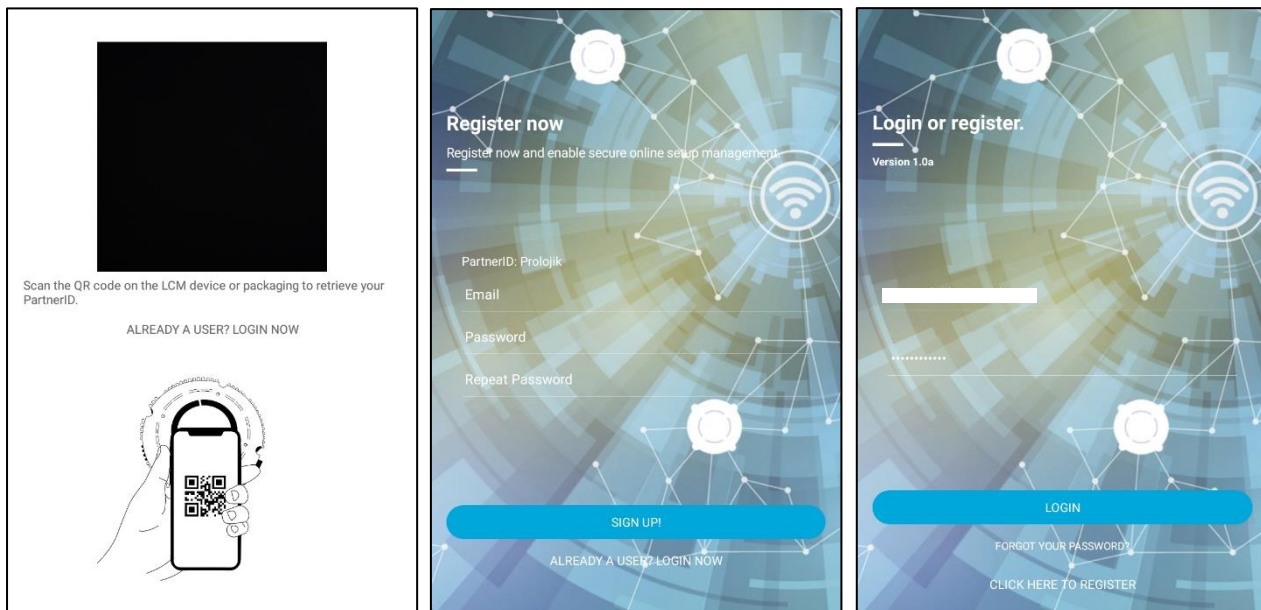
A request to access the user’s calendar, which is used to create emergency test reminders, should the user wish to set them up.

The camera function is also required to scan the QR code used in the skinning of the app.

### **User details**

When the app is first launched, the user is presented with a screen prompting them to scan a QR code. This QR code is used to skin the app to the version appropriate for the user. The QR code can be found on the label of the LCM. If the user does not have an LCM to hand, the QR code is also available at [www.whitecroftlighting.com](http://www.whitecroftlighting.com)

Upon launching the app, the log-in menu will appear, prompting the user to enter their email and password. If the user does not have an account, the “register new user” option at the bottom of the screen should be selected. This will open a new page prompting the user to enter their credentials. The organisation entry of the registration is used to skin the app to the version appropriate for the distributor.



Once these details have been submitted, an email confirmation will be sent to the email address used in the registration as well as a confirmation of the chosen password.\* Once the confirmation link in the automated response has been followed, the new account is ready to be logged into in the app.

\*If a confirmation email is not received, be sure to check the spam folder.

In the app, there are 5 main steps to setting up your custom VERVE LCM, which are:

- **Building**
  - **Permissions & Floors**
  - **Clusters**
  - **LCM identification**
  - **LCM configuration**
- } **Infrastructure**
- } **LCM setup**

# Using the App

## Version menu:

Swiping right when in the app will bring out the version menu, which allows the user to navigate to different options and menus in the app as well as showing the version of the app currently running.

### *Sync Data:*

The sync data function is used to upload any changes or progress made by the user, so they are available on other devices.

### *Building List:*

This takes the user to the list of all the buildings they have access to. This access is provided by the building installer.

### *Duration Test Reminders:*

When the data of a duration test is saved, the user is prompted to create a reminder for the next test that needs to be done. This reminder is specific to the LCM the test was completed on.

The list available through the side menu shows the current schedule for future test reminders. Each LCM will give details of the building, floor, and cluster the LCM is in. Selecting an LCM from the list will take the user to the relevant cluster. The amount of time before an upcoming test the user is prompted about can be altered in the *My Profile* page.

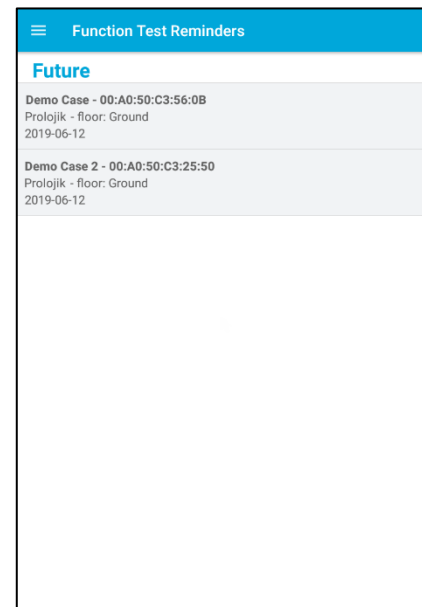
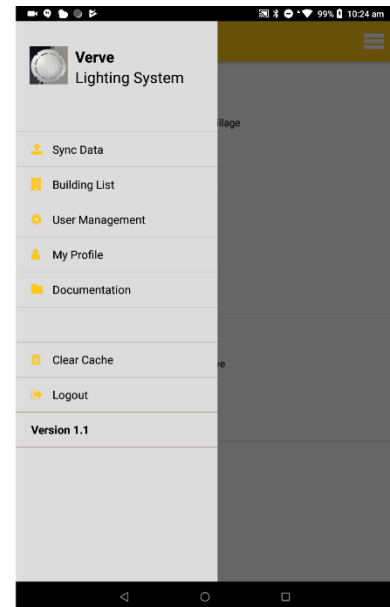
### *Function Test reminders:*

When the data of a function test is saved, the user is prompted to create a reminder for the next test. This reminder is specific to the LCM the test was completed on.

The list available through the side menu shows the current schedule for future test reminders. Each LCM will give details of the building, floor, and cluster the LCM is in. Selecting an LCM from the list will take the user to the relevant cluster. The amount of time before an upcoming test the user is prompted about can be altered in the *My Profile* page.

### *User Management:*

The user management menu is an administration page, where organisation admins can view and manage the installers within their organisation.



*My Profile:*

The profile page allows user to customize their app experience. It allows users to configure the inactivity logout settings, which will automatically log out of the app after a certain period of inactivity has occurred, and the emergency test reminder advance notice.

From here the user can also update their partner ID, which determines how the app is skinned and is read from a QR code. The user can also change their log in password from this page.

*Documentation:*

The documentation page gives a list of reference documents, specific to the Partner ID of the user:

- Terms and Conditions
- Privacy Policy
- User Guide
- Wiring Diagram

*Clear data:*

This feature allows the user to remove all data relevant to the user from the device being used. This includes all building listings and user data, including passwords. This may be required when the device is being given to another user and a blank slate is desired.

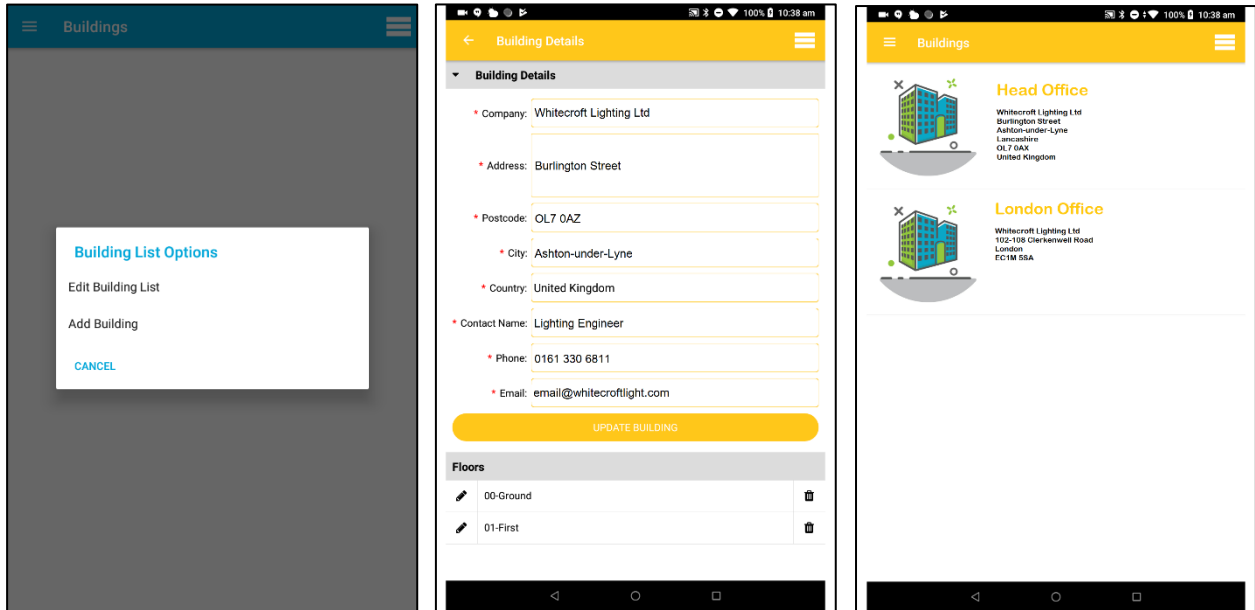
## Site infrastructure:

### *Buildings:*

Once the app had been started and the user has logged in, they will be presented with the building's menu. Any buildings the user has permission and access to, will appear in the menu.

To create a new building, open the options ≡ menu in the top right, 'Add Building' filling in all required fields for the building to be saved online. These can be changed later after the building is created.

If the app is in offline mode, the buildings available will be the ones created or previously loaded on that device.



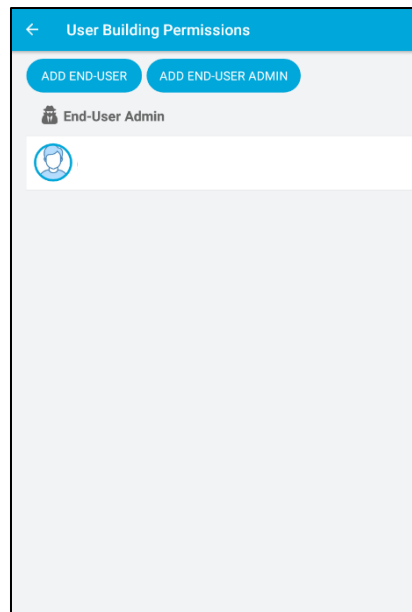
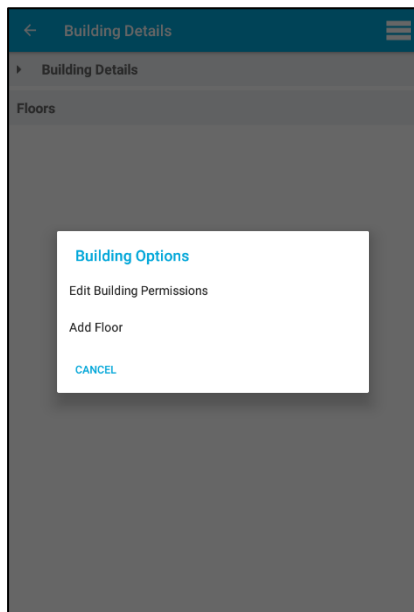
If buildings are not appearing, open the main ≡ menu in the top-left of the screen and select 'Sync Data', which will download all building information the user has access to.

The list of buildings can be filtered to remove unwanted listings by navigating to the options ≡ menu in the top right and selecting 'Edit Building List', where they can be hidden from the list.


\*While the app requires the user to have access to the internet in order to log in, once this has been done, the user can continue using the app offline; though any changes made in this mode will not be saved to the cloud and will have to be uploaded at a later date in order to be recalled on another device.

### *Permissions & Floors:*

Within the building, individual floors can be set up to allow for easy distinction of networks between different areas of a building.



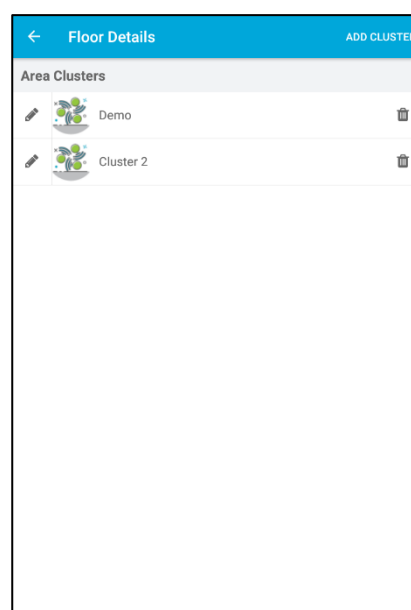
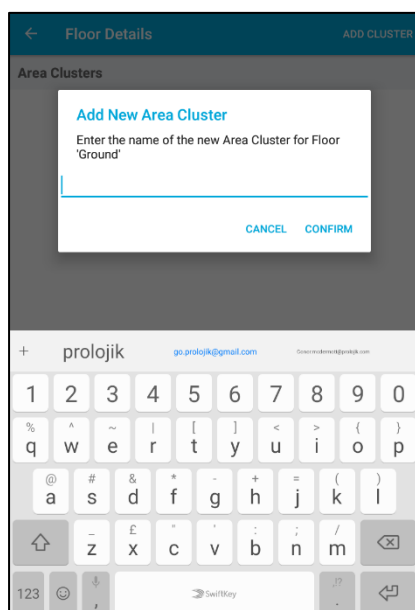
User permissions are defined as either a regular user ('End-User'), who can control the lighting using the app, by emulating switches and sensors and recall scenes. Or an admin user ('End-User Admin'), who can make changes to the configuration of the system.

To set the permissions of users within the selected building, navigate to the options  menu in the top right and select '*Edit Building Permissions*'. Additional users can be added using the email associated with their Whitecroft Lighting VERVE account and can be defined as either an 'End-User' or 'End-User Admin'.

Admin users can invite other registered users to the building.

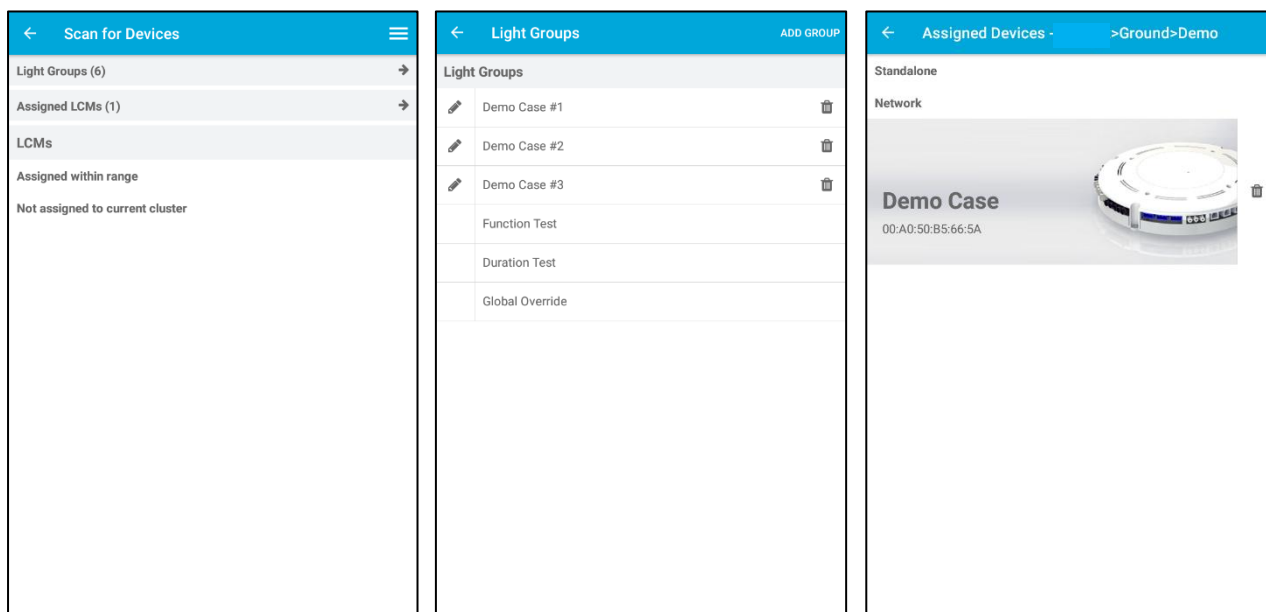
#### Clusters:

Within a floor, a user can create and define separate clusters which will act as isolated networks. A cluster might be set up to be an individual room or a corridor with connecting rooms and can hold up to VERVE LCM devices, each with a capability of supporting 9 luminaires.



When in a cluster, a user can view the light groups being used by the networked devices. Between three and nine groups per LCM, depending on the commissioning method used, are added to the list for each new LCM assigned to the cluster in network mode, one for each of the output groups. By default, three groups exist in a cluster: Function test, Duration test, and Global override. The user can add their own custom lighting groups as well as rename the existing ones.

The cluster also contains a list of all the devices assigned to the cluster, whether they be out of range or unpowered, for record purposes.

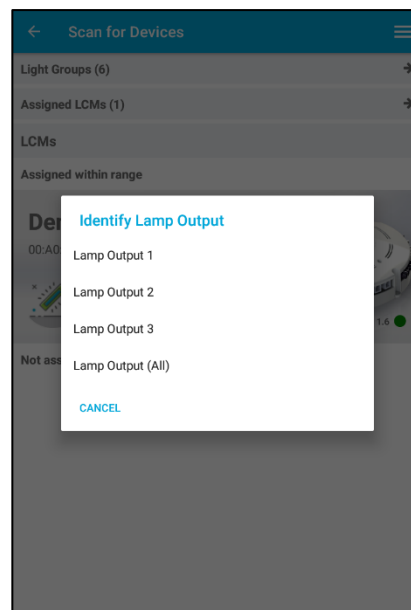


### LCM identification:

Once a cluster has been selected, a screen will appear listing the available devices in range\*. These will be separated into LCMs that are already part of the current cluster and LCMs that are in another cluster or are unassigned. Each of the devices will have two entries, the hardware version (HW), and the firmware version (FW). Further information on hardware and firmware versions can be found on the Whitecroft Lighting website.

\*If no devices are shown, ensure the user device has 2.4Ghz low energy wireless mesh enabled.


Each of the LCMs in the cluster menu has an identify option, reached through the lightbulb icon on the LCM listing. This will flash the luminaires connected to the device, enabling the user to pick out an LCM and determine which lights are connected to it. The user can also elect to identify a single of the three lamp output groups to determine how the luminaires have been grouped. The remaining icons are used for **User control** of the inputs/outputs of the selected LCM, from the mobile device instead of user a physical input.




Of the devices assigned to a cluster, each will also have an indication as to whether it is in network or standalone mode. Network LCMs share lighting groups, allowing the inputs of a device affect the luminaires of another, without the need for a physical connection between the two. Standalone devices are part of the cluster but do not communicate with any other LCMs, except for status reporting purposes.

### **DALI emergency reporting:**

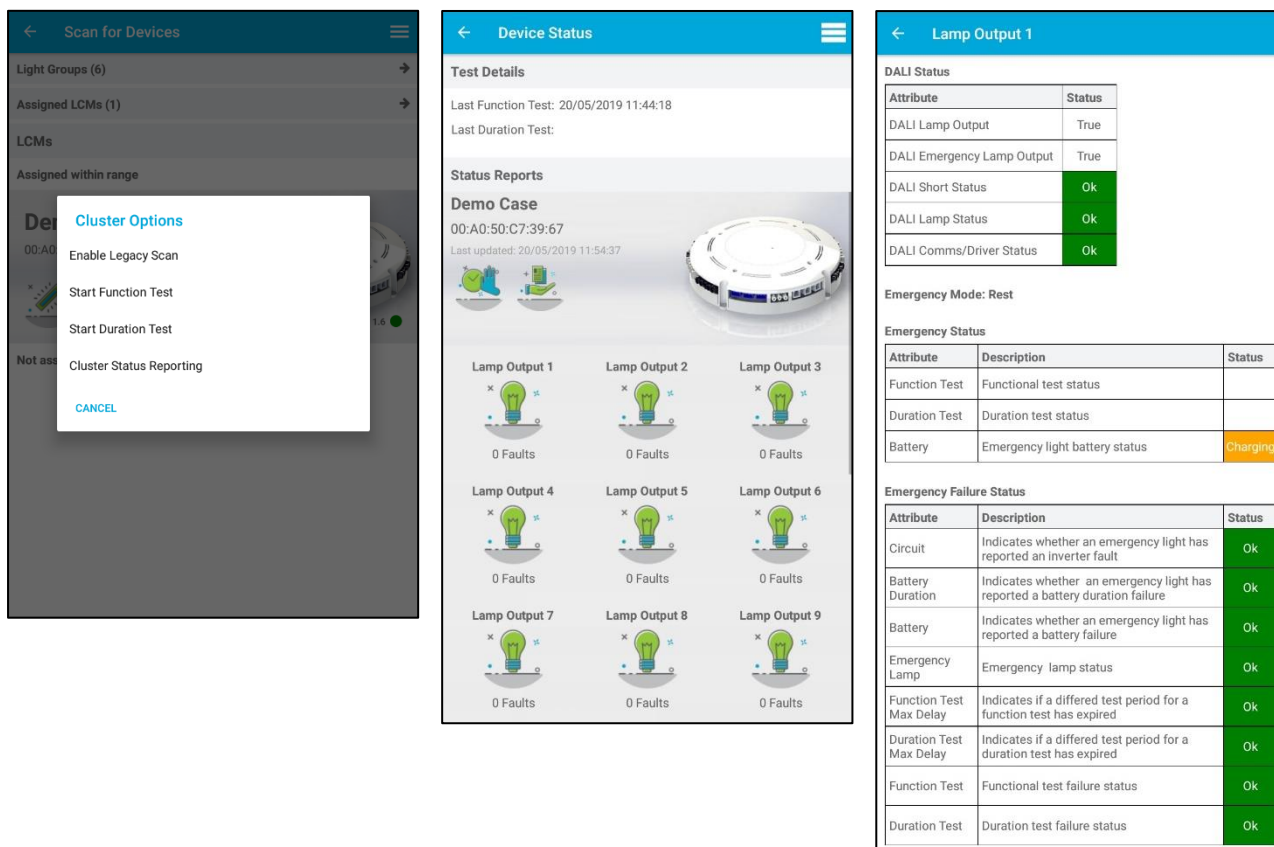
Each of the VERVE units reports on the status of the luminaires on all ports every 60 seconds, including the results of the last emergency function and duration test. These details can be retrieved on a cluster by cluster basis onto a mobile device using the app and then the results exported to the user's email.

Both emergency function and duration tests can be run either directly through the app, through the options  menu in the scan for devices page, which is reached after logging into the app and navigating through the building/floor/cluster menus to reach the desired network. They can also be triggered by a physical input to an LCM, such as a latching key switch set to control the '*Function Test*' lighting group.

Emergency tests commands will be sent to all the LCMs in the relevant cluster and therefore LCMs must be assigned to the cluster in question, which is done on the device page when paired with the LCM, before they will act on the command

To read the results of the previous test, navigate to the options  menu in the top right of the scan page and select 'Cluster Status Reporting'. This will list the status each of the lamp output ports for all the LCMs in the cluster and the result of the last test done to each of them. Note that in order to achieve reporting, the luminaires connected to the LCM must use DALI drivers and the light groups must be configured as *DALI* in the control option and have the *emergency* function selected in the **Lamp config**.





The user will be required to log in to the app to retrieve the test results. Function test results need to be collected every month, with duration test results once a year, to fulfil emergency test legal requirements. The reports can be saved in the app and exported via email. When a report is saved, it is added to the report history of the LCM, which can then be reviewed again later. Notifications will be sent from the app to remind the user when test results need to be taken; these reminders are set when saving the current report.

### LCM configuration:

Once a device has been selected, a screen will appear showing the details of the selected unit, including the hardware and software versions and the cluster mode settings of the LCM. At the top (Android) or bottom (IOS) of the screen, three headings will be visible: Device, Setup, and Control.

Any changes made to the configuration must be **Uploaded to the LCM** before they will take effect. Also, when first setting up the LCM to use DALI type luminaires, DALI commissioning must be carried out to address the ballasts so they can be properly communicated with. DALI commissioning can be carried out in one of two ways: Auto or manual commissioning. These options are explained further in the **DALI commissioning** section.

#### *Time to Live (Ttl) count:*

When an LCM receives a message, it passes that message on to the other LCMs in the cluster, who each repeat this process. To stop the same message flooding the network, a message count is given to each new message and is decremented every time the message is passed on from an LCM. When this counter reaches 0, the message is no longer perpetuated by the LCM. The time to live count is the initial count used in this process. By default, the time to live count is set to 5, but can be changed to compensate for large, sparse clusters.

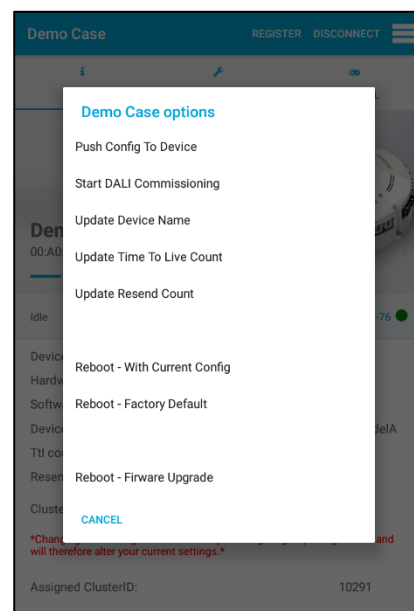
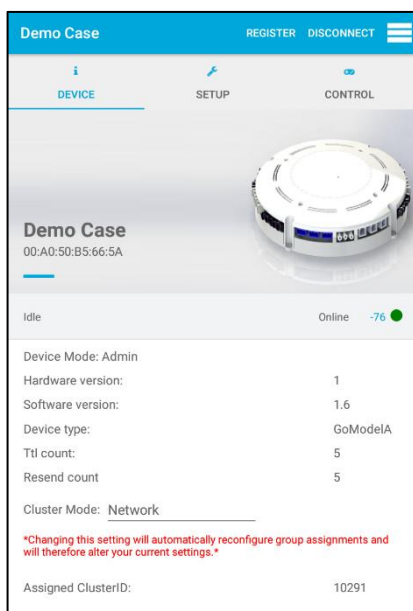
#### *Resend count:*

The resend count is the number of times a single message will be transmitted by an LCM. Sending multiple copies of a message helps ensure that it is received by another LCM. Increasing this count can help with cluster functionality where 2.4Ghz low energy wireless mesh conditions are less than ideal i.e. thick walls, metal supports. By default, the resend count is set to 5.

#### *Cluster Mode:*

When an LCM is assigned to a cluster, it can be in one of two states: network or standalone. Network mode will allow the LCM to respond to commands made by the inputs physically connected to other LCMs and vice versa. Standalone mode isolates the function of the LCM to its own inputs and outputs, while still allowing it to respond to emergency functions and reporting.

N.B. When altering the network mode of an LCM, changing it from network to standalone may have undesired effects on the config and function of other LCMs in the cluster as the lighting groups associated with the removed LCM will no longer be present in the cluster. Setting an LCM to standalone mode, returns the groups bindings to their default configuration.



### Group binding:

Output grouping allows for control over multiple LCMs in a cluster. Any lamp output set to the group will receive commands from any input set to control that group, regardless of whether the input is wired to that LCM or not.

When an LCM is added to a cluster, 3 control groups, representing the 3 lamp output groups, will be added to the cluster. These control groups can be renamed and assigned to hold any group of inputs and outputs across the cluster network. If an LCM that is running firmware 2.0 or higher is added to the cluster, 9 light groups will be added to the cluster for each of the addressable outputs configured in the **DALI commissioning**. These extra groups can only be configured for DALI control; while the first 3 groups can be configured for relay control, doing so will still affect all the outputs specified in the **VERVE configuration**.

A list of the current lighting groups in each cluster can be reached from within the LCM scan menu. Selecting the *lighting groups* heading will bring up a list of all the active lighting groups. By default, these will be listed using the name of the LCM followed by 1/2/3 to represent each output group. Selecting a group will allow the user to rename it to allow for easier identification.

Switches or sensors are also able to control more than one group. This means a switch or sensor in a room, can control the lights for that room, while also triggering the lights for an adjacent corridor.

N.B. When connecting to an LCM, if a group is listed as “*group doesn’t exist*” it is because it is using a group from another cluster that does not exist in the current cluster.

### Lamp config:

Each of the lamp outputs groups can be individually configured through the app to achieve the desired function. The following characteristics can be controlled through the config menu.

#### *Presence:*

Enabling this setting will cause the lights in the selected group to turn on when a sensor linked to the group detects a person in range.

#### *Absence:*

Enabling this setting will cause the lights in the selected group to turn off when a sensor linked to the group has not detected a person in range for a predetermined time, set by the Timeout setting proceeding the absence selection.

#### *Timeout:*

The timeout setting allows the user to set the amount of time the lights will remain on after a sensor has triggered the lights, before turning off.

#### *Control method:*

The output type of the lamp determines how the luminaires in that group will be switched and dimmed.

To enable dimming functions on a DALI fitting, the output must be set as a DALI type, as a non-DALI fitting will be limited to switching via relay. As this setting applies to the entire output group (see **output configuration**), different types of fittings (DALI/non-DALI) should not be used in a single group.

#### *Emergency feedback:*

If the fitting an emergency type, the emergency option needs to be selected so the fitting receives the correct DALI commands and for the app to report on the full emergency status of the fitting.

#### *Daylight dimming:*

Enabling the daylight dimming setting allows the output of the lamps to be altered when an associated sensor detects sufficient light from an external source. This function is used to maintain a constant light level in an area. The light level to be used as a set point for each sensor is configured in the **Lamp Daylight Control** menu under the control tab.

#### *Occupied light level:*

The occupied light level setting sets how bright the lights will come on during normal function of being triggered by a sensor or a switch.

**Lamp output 1**

Group: Demo Case #1 - Relay or Dali

Set the control group within the device cluster

Turn on when presence detected: ☒  
Activate the lighting when the sensor detects movement

Turn off when absence detected: ☒  
Deactivate lighting after the period set by Timeout

Timeout (mins)  
Number of minutes after last activity that lights timeout  
10

Control method: Dali  
Configure the control to Relay or DALI

Is emergency: ☒  
Toggle for emergency driver

Adjust for daylight: ☐  
Regulate light output to maintain a constant light level

Light level when occupied (%)  
100

Light level when unoccupied (%)  
0

Light level when set-back (%)  
20

Warning timeout (mins)  
Number of minutes after last activity that lights dim to warning level  
0

Minimum Daylight Level  
Sets the minimum daylight level  
10

**Scene Settings**

Scene 1 Light Level  
100

Scene 2 Light Level  
75

Scene 3 Light Level  
50

Scene 4 Light Level  
25

Scene 5 Light Level  
1

Scene 6 Light Level  
0

*Unoccupied light level:*

The unoccupied light level setting determines at what level the lights will come on when switched off or the timeout is reached. This will usually be set to zero, only being altered for areas where a minimum level of light is always required.

*Setback light level:*

The Setback light level setting determines how bright to set the lights after the setback timer has reached a certain point, set by the slider below, before the full timeout triggers the lights to the passive level. This allows an occupant to trigger the lights via a switch or sensor, without having to do so in the dark.

*Minimum daylight level:*

The minimum daylight level is used to achieve a dimming setback. Where multiple rows of luminaires are required to dim at different levels, a minimum level can be set for luminaires further from the detecting sensor, so the required level of light is still achieved.

*Scene settings:*

There are six unique scenes that can be set for each group of luminaires. The sliders determine the level that the light will be set to when that scene is recalled. Once set, scenes are recalled using a PC310 remote in conjunction with a GS400 sensor by pressing the appropriate button on the remote while pointing at a sensor that is configured to receive infrared messages, or through the **User control** features in the app.

When a scene is recalled by interacting with a sensor that is configured to receive infrared remote messages, it will recall the scenes to all the lighting groups it is assigned to.

N.B. To use scene recalls using the app, the lamp output must be linked to sensor 1 of the LCM selected. Also, when a scene is recalled, daylight regulation for those luminaires is disabled until they return to normal function by turning off/on again, either via timeout or switch.

**Emergency output config:**

To create status and emergency reports from a device, it must have the emergency output option selected. Only 1 DALI type emergency can be used per output group and adding more may cause the ballast health reports to fail.

If a non-DALI emergency is being used, this option is unselected and will leave function tests to run using the emergency relay on the LCM, rather than with DALI commands.

## Switch config:

The three switch listings can each be configured to reflect what type of switch is connected to the associated port on the VERVE as well as what lamp outputs it controls. A single switch can be used to trigger multiple lighting groups and multiple switches can be used to trigger a single lighting group.

The default setting of the LCM is to have each switch control all the lighting groups associated with the LCM with a retractive (dimming) configuration. Due to the input emulation capabilities of the app, a switch can be set up to function even if there is no physical switch connected to the port. This allows a switch to be created that can *only* be switched using the app.

### *Latching switch:*

A latching switch is a switch which will hold the last position that it was set to (on/off). Setting the switches as a latching switch will allow the switch to simply turn the linked lamps on or off.

### *Retractive switch:*

A retractive switch is a switch that has a neutral default position that is returned to after every press. Setting the switch to a retractive switch will allow the lamp to be turned on or off as well as dimmed to a level by holding the switch.

N.B. Incorrectly setting the switch type may cause the switch to lose desired function.

## Sensor config:

Each sensor port can be configured to enable or disable certain features that are required by the connected sensor. A single sensor can be used to trigger multiple lighting groups and multiple sensors can be used to trigger a single lighting group.

The default setting of the LCM is to have each sensor trigger all the lighting groups associated with the LCM.

### *Movement sensor:*

Enabling the motions sensor capabilities of the sensor will allow it to trigger presence and absence in the lamps connected to it.

### *Daylight sensor:*

Enabling the daylight dimming function on the sensor allows for it to use a setpoint to regulate the light level output of its controlled lighting groups when near a natural light source to maintain a constant lux level. This setpoint is determined in the **Daylight dimming configuration**. In order to function, the daylight dimming must also be enabled in the **Lamp config** of the appropriate lamp output.

**Switch 1**

Is latching switch:  
Switch is latching

Is dimming switch:  
Switch is centre-biased retractive switch

Assigned Groups

Demo Case #1	<input checked="" type="checkbox"/>
Demo Case #2	<input type="checkbox"/>
Demo Case #3	<input type="checkbox"/>
Function Test	<input type="checkbox"/>
Duration Test	<input type="checkbox"/>
Global Override	<input type="checkbox"/>

**Sensor 1**

Movement sensor:  
Sensor activates on movement sensor

Daylight sensor:  
Sensor regulates lights to current level

Remote control sensor:  
Scene set recall with PC310 remote control

Assigned Groups

Demo Case #1	<input checked="" type="checkbox"/>
Demo Case #2	<input checked="" type="checkbox"/>
Demo Case #3	<input type="checkbox"/>
Function Test	<input type="checkbox"/>
Duration Test	<input type="checkbox"/>
Global Override	<input type="checkbox"/>

### Remote control sensor:

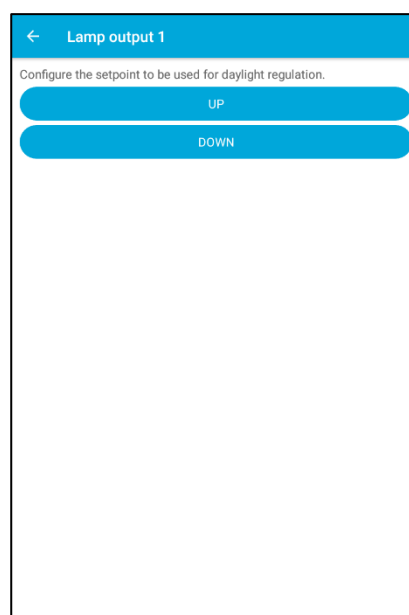
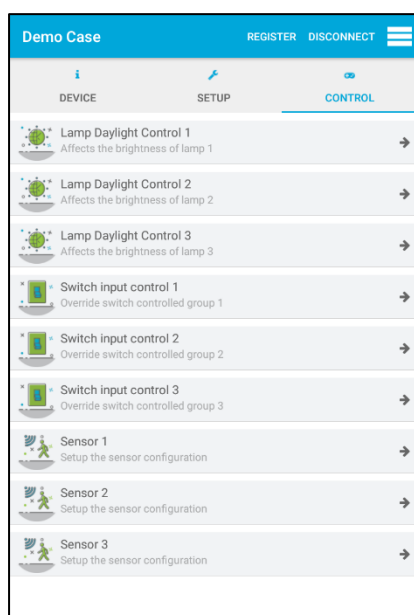
Enabling the infrared sensor capabilities will allow for the sensor to trigger scene recalls on the lamps connected to it.

### Daylight dimming configuration:


When the daylight dimming feature is enabled on a sensor and the lamp outputs corresponding to it, the level that the lights should regulate to has to be configured. To get an accurate reading of the light level, a luxmeter should be used at the required height, placed under the sensor that will be taking the reading.

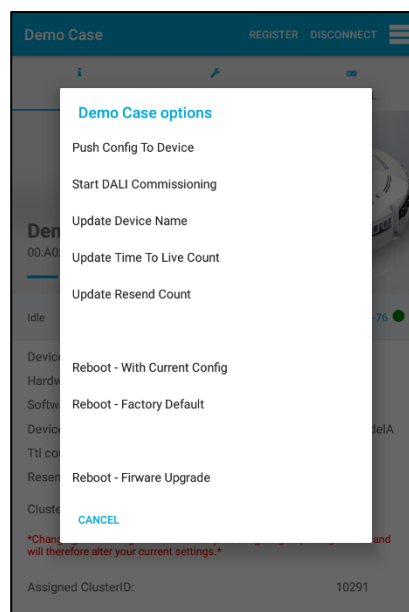
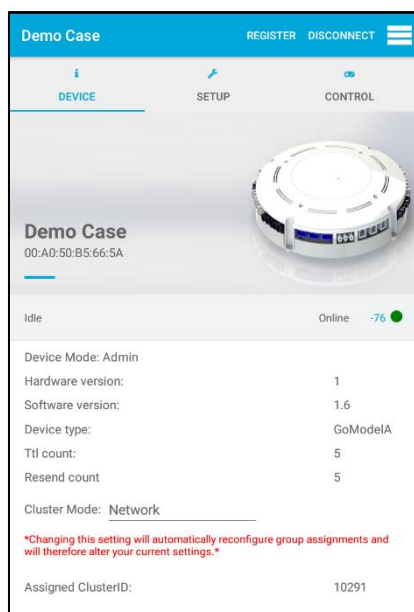
When taking a reading for the setpoint, all external light sources should be removed where possible. Then, using the UP/DOWN buttons, dim the luminaires controlled by that sensor to the desired level. After 20 seconds without further input, the current level will be used as the setpoint. Recommended light levels for different environments can be found online.

N.B The relevant config settings must be pushed to the LCM before the daylight setpoint can be configured.




### Updating the Device configuration:

Once the config has been set to the required settings, it must be saved to the LCM. To upload the config to the device, select the options  icon in the top right-hand corner of the screen while paired to the LCM and select the option 'Push Config to Device'. This will save the settings into the LCM, which can then be read from any device that connects to the LCM.



### DALI commissioning:

When the luminaires connected are using DALI drivers, they must be commissioned before any config will take effect. To do this, select the options  icon in the top right-hand corner of the screen while paired to the LCM and select the option “Begin DALI Commissioning”.

The user can then pick between auto or manual DALI commissioning. Auto DALI commissioning assigns the output's DALI short addresses to align with the 3 relay groups. \* This will cause each output group to switch off and on in turn to address each group of luminaires. Auto commissioning groups the outputs in the 1-4, 5-7, 8-9 configuration for control purposes and therefore the physical connection of the luminaires to the LCM should be considered when using this commissioning method.

\*When using the switched live to feed the maintained live input on a DALI emergency inverter, auto commissioning will not correctly assign the inverters to a group during the normal commissioning process. To resolve this, the user must use the *edit* function in the commissioning options and manually assign the emergencies to the individual groups. DALI emergency invertors must sit in their own group, i.e. one inverter per group.

Manual commissioning allows the user to assign each individual output to a DALI group so that each output can be individually configured and controlled. Manual commissioning requires the LCM to be running a firmware of 2.0 or higher. When commissioning begins, the LCM will search for all DALI drivers connected and assign them a short address\*. When a driver has been found, the luminaire connected to it will dim itself. Once no more fittings can be found, the commissioning menu will appear, in the form of a table. Selecting a lamp output will cause the corresponding fitting to flash on and off. The user can then assign the output to any of the light groups. A lamp output can only be a member of 1 light group, but multiple outputs can be assigned to the same light group. Once the user is finished commissioning, press the save button to upload the changes to the LCM. Once the grouping has been saved, the user can select one of the groups to flash all outputs assigned to it. To make changes to the configuration, press the edit button to continue making changes to the output assignment. As the user assigns the light group



for each lamp connected, the physical connection from the luminaires to the LCM does not affect the functionality.

\*The maximum number of DALI drivers that can be connected to 1 LCM when using manual commissioning is 16.

←
DALI Commissioning

### Identifying Lamp 1

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6	GROUP 7	GROUP 8	GROUP 9
LAMP 1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAMP 9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAVE

### Enabling wireless switches:

With the introduction of FW2.09, VERVE has achieved compatibility with EnOcean 2.4Ghz low energy wireless switches, removing the need to run cables to the LCM to make use of physical switches. The switches are paired with the corresponding switch input to achieve wireless control.

To pair a switch to the LCM, place a switch input plug, with both the on & off outer terminals connected to the central common terminal, into the desired switch input port. Once the plug is in place, enter the following sequence on the EnOcean switch:

- Press and hold the switch for 7 seconds.
- Press again for less than 2 seconds.
- Press and hold for 7 seconds.

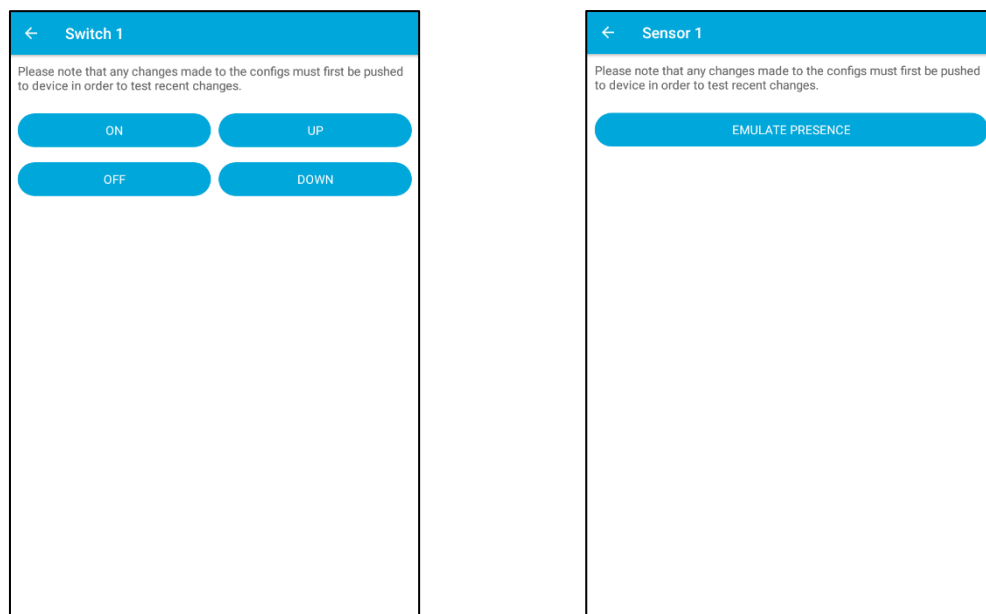
After releasing the last press of the sequence, the LED on the LCM should flash orange to indicate that it has paired with the switch. Remove the short-circuited plug from the input socket when the pairing is complete.

## Testing Config

Once the config has been set to the user's satisfaction and it has been pushed to the device, the inputs can be tested in the control tab at the top of the device screen.

The switch test menu is used to emulate the listed switch input. Depending on how the switch has been setup, the user will be able to toggle ON/OFF or dim all lamp outputs controlled by the switch.

The sensor test menu is used similarly to the switch test menu, in that it emulates the input to a sensor. Using the test menu, the user can emulate a presence action to ensure the correct luminaire outputs are being triggered.



### User control:

When an LCM is paired with, it is effectively removed from the communications of the rest of the cluster. Therefore, the control achieved in the testing of the LCM config would not be suitable for general use controls. To achieve this, the mobile device joins the cluster communications to send commands that act as inputs to control the lights.

The emulated controls are found in the scan page, which is reached after logging into the app and navigating through the building/floor/cluster menus to reach the desired network. Four icons sit on the banner to each LCM in the cluster, each representing a different input command:

- Identify



- Switch control



- Scene recalls



- Sensor control



These inputs copy the config of the LCM they are listed with, regardless of whether there is a peripheral connected to that input on the LCM.

#### *Switch control:*

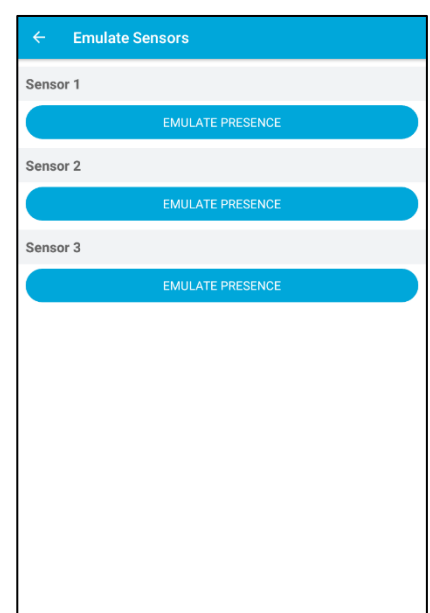
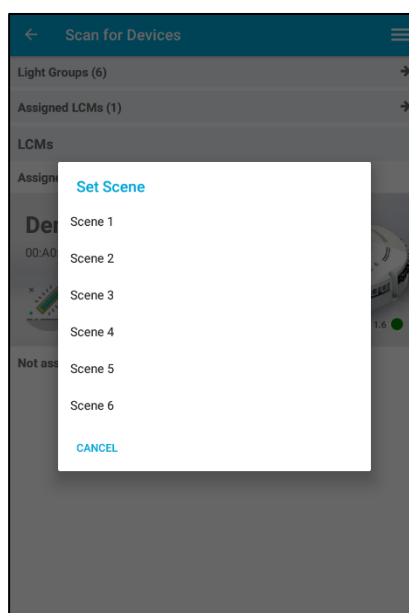
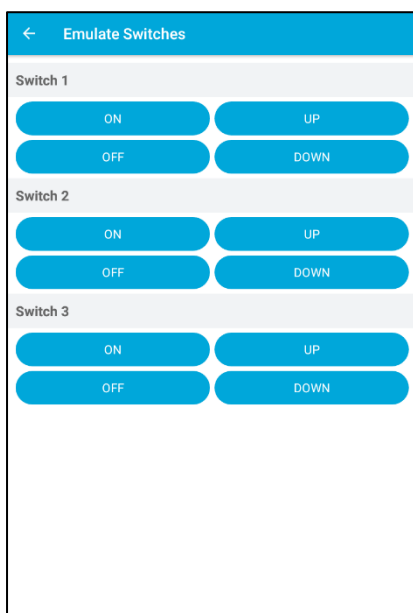
The switch controls mimic one of the switch inputs of the LCM and can be used to turn the appropriate lighting groups on/off or, if they are configured to allow such, dim up/down. Note that all the potential switch commands are listed even if the switch is configured to not support them (dimming on a latching switch) and thus would have no function.

#### *Scene recall:*

The scene control allows the user to mimic the commands of a PC310 remote and recall scenes. These recalls are targeted to sensor 1 of the LCM selected, thus will only trigger the scenes of outputs controlled by that sensor.

#### *Sensor control:*

The sensor control allows a user to send a presence command, imitating someone walking under the sensor, to trigger the lights connected to it. Depending on the sensor selected by the user, the appropriate sensor config will be triggered.



## Config sign-off:

One of the documents which can be created from within the Whitecroft Lighting VERVE app is the config sign-off sheet. This allows for the commissioning engineer to provide a checklist of all the configuration features of that system for record and review.

The config sign-off sheet is reached by swiping right from the left-hand side of the screen to open the version menu. To view the sign-off sheet for an LCM, the app must have pushed the config of that LCM within the same session of the app (without closing). The document gives a breakdown of all the config settings and group allocations for each input of an LCM, allowing each function to be checked off once it has been physically tested or witnessed.

Once the function of all the inputs has been confirmed, the documents can be signed and exported by email, which will be sent to the user filling in the form.

### Config Sign-off List

- > Roof > Mesh Range Test  
09-10-2019 09:21
- > Roof > Penthouse  
01-11-2019 12:26
- i d > Ground Floor > Config test  
04-11-2019 08:24

### Config Sign-off

**Summary**

Prolojik Limited > Ground Floor > Config test  
Carried out by: go.prolojik@gmail.com  
Carried out on: 2019-11-04

> Demo Case - 00:A0:50:C7:39:67

▼ Demo Case - Switch 1

Switch type: Retractive dimming switch

Test type	Associated groups	Result
Switch Off > On	Demo Case #1	<input checked="" type="checkbox"/>
Switch On > Off	Demo Case #1	<input checked="" type="checkbox"/>
Brighten lights	Demo Case #1	<input checked="" type="checkbox"/>
Dim lights	Demo Case #1	<input type="checkbox"/>

> Demo Case - Switch 2

> Demo Case - Switch 3

> Demo Case - Sensor 1

> Demo Case - Sensor 2

### Config Sign-off

> Demo Case - Switch 2

> Demo Case - Switch 3

> Demo Case - Sensor 1

> Demo Case - Sensor 2

> Demo Case - Sensor 3

Comments:

Witnessed By: e.g Joe Bloggs

Signed:

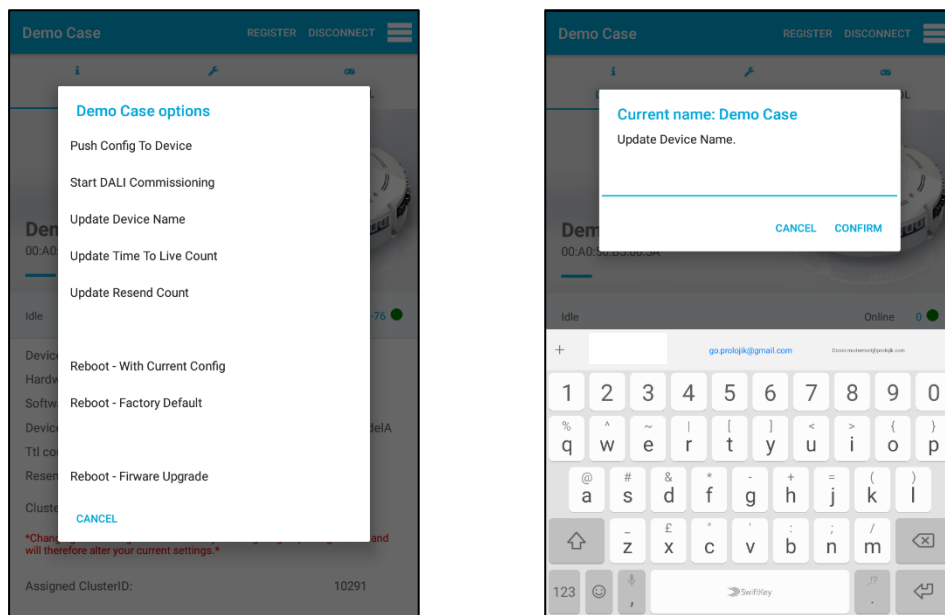
Please sign above the line

SIGN-OFF

# Admin Commands

## Changing the LCM name:

To change the name of the LCM to allow for it to be easily recognisable when searching for it in the future, go to the options ≡ menu while paired with the LCM and select 'Update Device Name'. In the window that opens, enter the desired name for the device and press enter. The name will now be updated and will appear in the menu when scanning for devices as well as any reports containing the LCM. The lighting groups associated with the LCM will also be updated to reflect the change.



## \*\* IMPORTANT NOTE \*\*

- 1) LCM's can only be renamed prior to them being added into a cluster. DO NOT rename an LCM when it is already in a cluster
- 2) DO NOT duplicate any LCM name – LCM names must be unique

## Updating the firmware:

A feature of the VERVE app is to allow for updates to be loaded into LCMs without the need to remove them from the space they are installed in.

When new firmware is available, the LCM will highlight the FW version in **RED** and will show the text: **Firmware Update Available**



When connecting to the LCM the app will prompt you to upgrade the firmware.

Please follow the in-App messages to complete the FW upgrade.

The LCM will copy and import the configuration settings that were previously saved to it before the upgrade.

### **\*\* IMPORTANT NOTE \*\***

*FW versions below **FW V2.10** can **NOT** be upgraded via the app using an **iOS 13** or above device.*

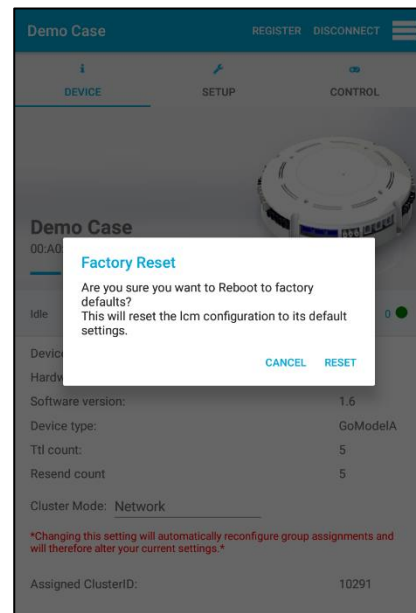
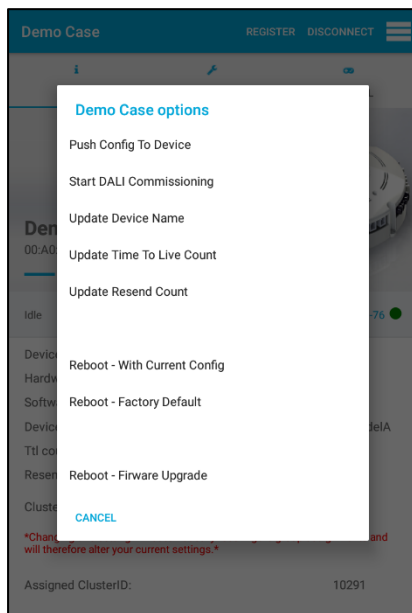
## Resetting the LCM/Default configuration:

If for any reason, the user wishes to return the device to its factory settings then they can initiate the reset by going to the options ≡ menu while paired with the LCM and selecting the 'Reboot – Factory Default'. The unit will then power cycle itself and when it restores power the LCM will have returned to its default configuration.

The default configuration of the LCM, before any configuration changes have been made, is:

- All switch inputs each control all the lamp outputs via the use of a two-way retractive switch, allowing the luminaires to be switched ON/OFF and dimmed.
- All sensor inputs control all the lamp outputs, through presence detection with a ten-minute timeout, and using an infrared PC310 remote.

**\*\*NOTE\*\*** – Performing a factory reset on a device will cause it to lose any configuration setting previously programmed into the unit, which may affect the function of other units if it was part of a network configuration.



## Troubleshooting

### **LED status:**

When the LCM is powered up the user will see an LED at the centre of the unit turn on. The behaviour of this LED gives an indication of the status of the unit or the action currently being performed. The LED output are as follows:

### **Blue solid:**

Normal LCM to LCM mode. LED will blink Green when it receives a valid data packet from another LCM.

### **Green flashing slow:**

The LCM is in discovery mode, waiting to be connected to a device.

### **Blue flashing fast:**

The LCM is connected to a Phone/Tablet through the app.

### **Slow flashing Green/Blue:**

The LCM is in DALI commissioning mode.

### **Flashing Purple:**

Identify call has been made to LCM by a user in the app.

### **Fast flashing Red/Green/Blue:**

LCM is in factory test mode. Connecting a peripheral device to the unit will bring it out of factory test mode.

### **Slow flashing Red:**

One or more of the DALI emergency fittings connected to the unit failed a DALI emergency function or duration test.

### **Fast flashing Red:**

There has been a DALI lamp failure on one of the DALI fittings connected to the unit.

### **Red Solid:**

A DALI short circuit is present on the DALI network bus.

### **Flashing White:**

The LCM is in over the air update mode, awaiting a new firmware file to be wirelessly uploaded to the device.

### **Device name length error:**

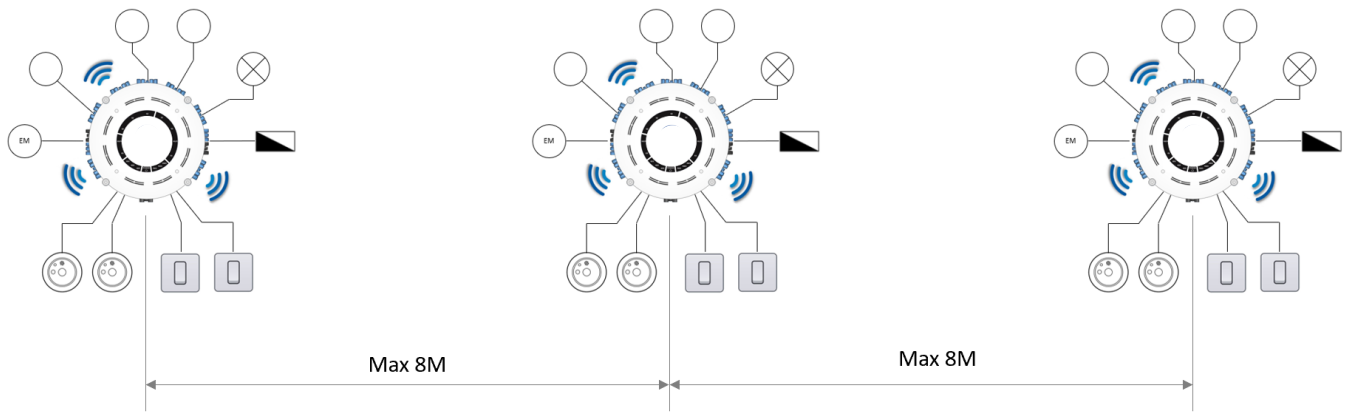
Due to the nature of 2.4Ghz low energy wireless mesh adverts, some devices may experience problems communicating with a VERVE device because the name of the Phone/Tablet being used to connect is too long. The maximum length a name can be, to function correctly with the VERVE app is 12 Characters.



## FAQs

**Q: Max distance between hubs?**

**A:** 8m.



*\*\* dependent on the installation environment and the additional services within the ceiling void.*

**Q: Max number of hubs to a system?**

**A:** 20 per cluster and multiple clusters.

**Q: Is there a max length of the switch input cable?**

**A:** We recommend keeping switch runs within 10m and segregated from mains.

**Q: Physically how many relays are within the hub, including E/M relays?**

**A:** 4.

**Q: What is the in-rush current rating of the relays?**

**A:** 10A.

**Q: Are the switch inputs and detector inputs true SELV?**

**A:** Sensors and switches are galvanically isolated from mains.

**Q: What are the different mounting heights of the detectors?**

**A:** Sensor operates at 2.5x ceiling height up to 7m.

**Q: Can we off set dim between channels?**

**A:** Yes, by setting minimum dim levels in the corresponding lamp configurations.

**Q: Can more than 1 x E/M luminaire be connected in parallel when utilising the central test and report solution?**

**A:** If independent reporting is required, only 1 EM per group can be used while ensuring the validity of the reports.

**Q: Can the user have an app which only acts as an override/recall scene but no access to configurator?**

**A:** Yes, if the site admin gives the user permissions for end-user control.

**Q: What is the maximum number of DALI drivers per LCM?**

**A: 16**

**Q: What is the parasitic power loss of the LCM?**

**A: 0.16W**

**Q: I have meshed LCM's but they do not seem to be communicating commands, how do I ensure messages are hopping to LCM's in my cluster**

**A:** Firstly, please check the installation. A) are the LCM's within required distance? B) do you have obstructions between LCM's which may be limiting the 2.4Ghz low energy wireless mesh signal? Also try installing 2.4Ghz low energy wireless mesh repeater sensors (GS480) to increase the mesh signals.