



Interlight Thing App manual

Table of Content

TABLE OF CONTENT	2
1. INTRODUCTION	4
THE PURPOSE OF THIS DOCUMENT IS TO PROVIDE A STEP-BY-STEP GUIDE TO USE THE THINQ LIGHTING CONTROL APP CALLED THINQ2.0.....	4
1.1 RELEASE OF THINQ SOFTWARE.....	4
1.2 PREREQUISITES FOR USING THE THINQ APP	4
1.3 SYSTEM REQUIREMENTS.....	4
2. OS SETTINGS FOR CORRECT OPERATION	5
2.1 IPHONE.....	5
2.2 ANDROID	6
2.3 TURNING OFF WIFI (ONLY FOR SOME DEVICES).....	7
3. GETTING STARTED	8
3.1 BASIC INTRODUCTION OF THINQ LIGHTING CONTROL SYSTEM.....	8
3.2 CREATING YOUR FIRST SITE	9
3.3 ADDING GROUPS TO YOUR FIRST SITE	9
3.4 QUICK GROUPING TO ADD LARGE AMOUNTS OF NODES TO GROUPS.....	11
4. CREATING BASIC LIGHTING CONTROL SETTINGS	12
5. DEFINING AUTOMATIC SENSOR CONTROL SETTINGS	13
5.1 ENABLING AUTOMATIC PRESENCE DETECTION	14
5.2 GROUP LINKING.....	16
5.2.1 How to make “Neighboring groups”?	17
5.2.2 How to make “Corridor Hold” links:	18
5.2.3 How to set the neighboring light level	18
5.2.4 How to create multi group membership using neighboring.....	19
5.2.5 Testing the correct working of the automatic lighting control settings	19
5.2.6 Disabling false triggering sensor.....	20
5.2.7 Enabling Daylight Harvesting.....	20
5.2.8 Handling nodes without their own Light sensor.....	22
5.2.9 Setting advanced Daylight harvesting configuration	23
5.3 COMBINING AUTOMATIC PRESENCE SENSING AND DAYLIGHT HARVESTING.....	25
6. MAPPING NODES ON A PICTURE	27
7. HOW TO REPLACE A NODE	29
7.1 HOW TO HANDLE GROUPS WITH ONLY ONE NODE.....	30
8. SCENE SETTING	30
9. WALL SWITCH	32
9.1 WALL SWITCH ACTIONS EXPLAINED	35
9.2 COMBINING WALL SWITCH CONTROL AND AUTOMATIC PRESENCE CONTROL	36
10. ADDING LABELS TO GROUPS	37
11. DALI SUB-ADDRESSING	39
11.1 ASSIGNING SUB NODES TO PARTITIONS	40
11.2 ADDING PARTITIONS TO GROUPS	41
11.3 UNDO ADDRESSING.....	41
12. SECURITY SETTINGS	42
12.1 SECURING A SITE	42
12.2 AUTHORIZING A SECOND PHONE FOR SECURED SITE	44
12.3 UNLOCKING A SITE	46
12.4 ADDING NODES TO A SECURED SITE.....	47

12.5 REMOVING NODES FROM A (SECURED) SITE	48
12.6 CHANGE PASSWORD	48
13. CHECK INSTALLATION	50
14. CONFIGURING NODE CAPABILITIES	50
14.1 SETTING SENSOR SENSITIVITY	52
15. APP SETTINGS	53
15.1 ENABLING IN-APP LOGGING	53
15.2 SELECTING THE BLE VERSION THE APP OPERATES IN	53
15.3 DISPLAYING RSSI AND BLE VERSION OF NODES	54
15.4 SETTING NUMBER OF BLINKS WHEN IDENTIFYING A LUMINAIRE OR GROUP	55
15.5 ENABLE LOGGING INTO A FILE	55
FINDER IN MAC OSX	56
ITUNES ON WINDOWS	56
15.6 CLEAR APP DATA	57
15.7 SYNCHRONIZING DATA BETWEEN THE THINQ APP AND NODES	58
15.8 RESET TIPS	58
15.9 FIRMWARE STACK AND APP VERSION	58
15.9.1 Error feedback.....	59
16. INTEGRATING WITH LOCAL ROOM CONTROLLER VIA “VOLT FREE” CONTACT.....	60
17. COMMISSIONING A SITE WITH MULTIPLE PHONES	61
17.1 SYNCING SITES, GROUPS, AND LIGHTING CONTROL SETTINGS BETWEEN PHONES VIA THE NODES	61
17.2 SYNCHRONIZING DATA BETWEEN THE THINQ APP AND NODES	62
17.3 AUTHORIZING A PHONE TO ACCESS A SECURED SITE.....	63
18. MANAGING SITE PROPERTIES	63
18.1 REMOVE SITE FROM THE APP	63
18.2 DISSOLVE A SITE	64
19. POWER CYCLE RESET.....	65
19.1 RESET SECURITY SETTING ONLY	65
19.2 FULL FACTORY RESET	68
20. DEMO MODE	70
21. NETWORK LIMITATION	71
21.1 MESH LIMITATIONS.....	71
21.2 LIGHTING CONTROL LIMITATIONS	72
22. ERROR MESSAGES AND FAULT FINDING	72
23. NAVIGATING THROUGH THE APP.....	73
24. TROUBLESHOOTING	74
24.1 VERSION MISMATCH.....	74
24.2 EXPORT (BACKUP) SITE DATA.....	75
24.3 RESOLVING COMMON ISSUES	76
24.4 HOW TO HANDLE A NETWORK WITH INCOMPATIBLE VERSIONS.....	76

1. Introduction

The purpose of this document is to provide a step-by-step guide to use the Thingq lighting control app called Thingq2.0.

Thingq offers a reliable, intuitive, and robust lighting control solution, supporting lighting projects with more than 10.000 nodes. We made it possible to deliver lighting control and beyond lighting applications as one solution at every scale.

The Thingq 2.0 wireless, plug and play app delivers maximum control of your lighting system. It enables anyone to commission the whole lighting control system seamlessly in the shortest period imaginable. Thingq 2.0 lighting control solution does not require any gateways.

There is an increasing number of lighting manufacturers who offer THINQ enabled luminaires. Alternatively, the THINQ enabled standalone sensors provided by our partners can be combined with a luminaire from any brand, if it supports dimming via DALI or 0-10V.

Providing you with the broadest set of beyond lighting applications, once you have installed an THINQ lighting control system, you have created the backbone infrastructure for your Smart Building. By only adding a gateway to the system you can support a wide range of applications.

For more information, please contact: info@koopman.nu.

1.1 Release of THINQ software

This document is matching THINQ app release: 17/08/2022(BLE COMMS: 85)

1.2 Prerequisites for using the Thingq App

- Luminaires and nodes are Thingq enabled and are powered on.
- There is a Pathway between every Node in the network.
- Thingq app is installed on your mobile phone or tablet.
- An Thingq Gateway is not required for lighting control applications; they are only required for beyond lighting features. Please go to Thingq.nl or contact info@koopman.nu for more information.

1.3 System requirements

The Thingq Lighting Control App is available for Android and iOS, the minimum system requirements are:

- IOS version: 13.0, iPhone 8 or higher
- Android version: 9 or higher, the following Android devices have been tested and are confirmed to work correctly:

Brand	Model
Samsung	Galaxy S9 Galaxy S9+ Galaxy S10 Galaxy A40 Galaxy S7 Edge
Nokia	Nokia 3.1 plus Nokia 7
Google pixel	3a XL
Vivo	Y30

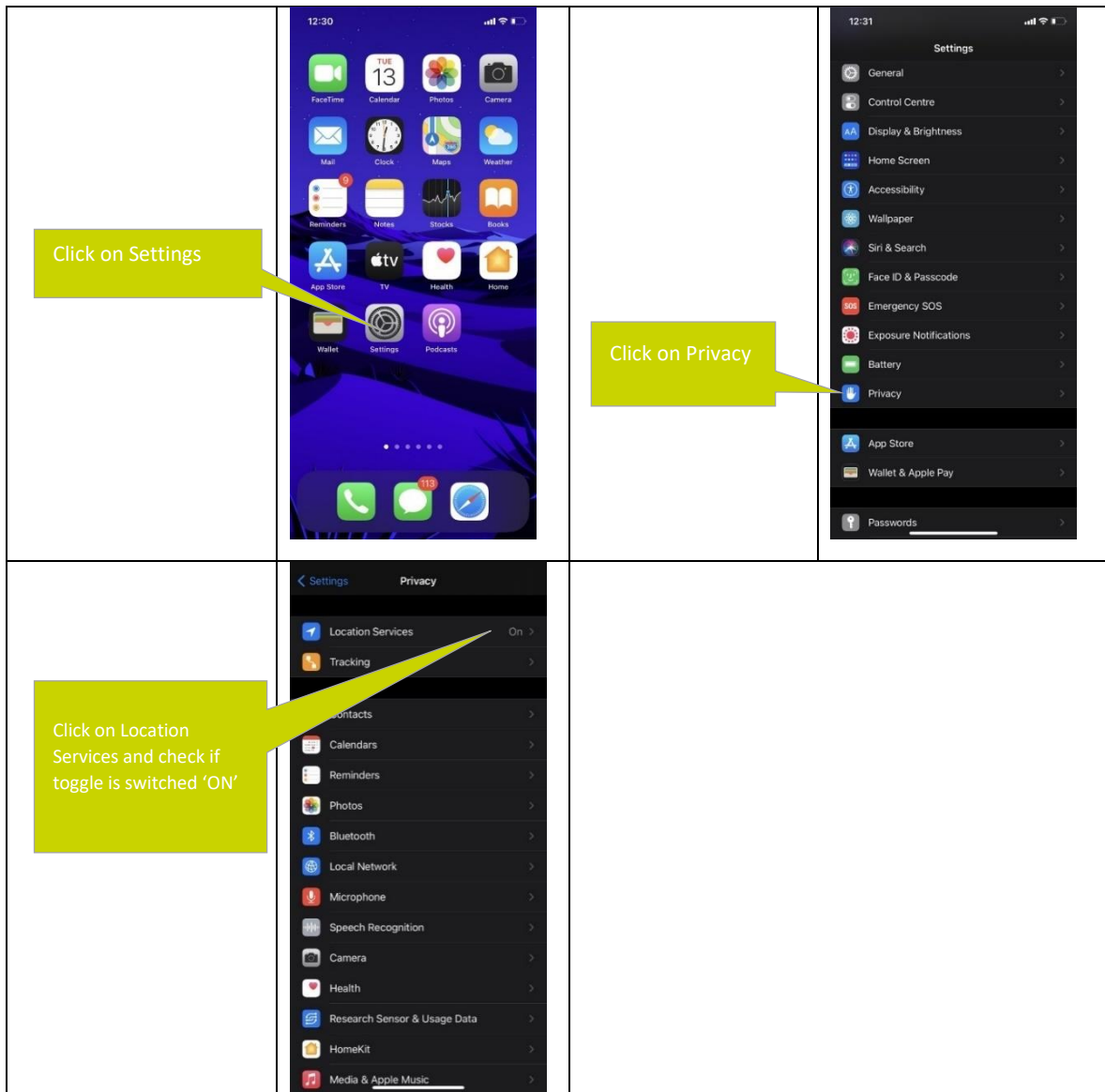
- To configure enOcean™ Wall switches the phone should support NFC, a phone without NFC support cannot be used with wall switches. It does support all other functionalities.

2. OS settings for correct operation

For correct operation of the Thingq lighting control application, ensure the following settings are set correctly:


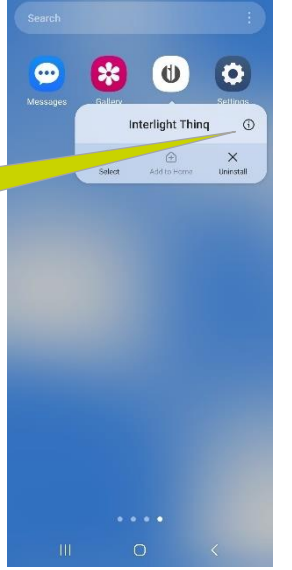
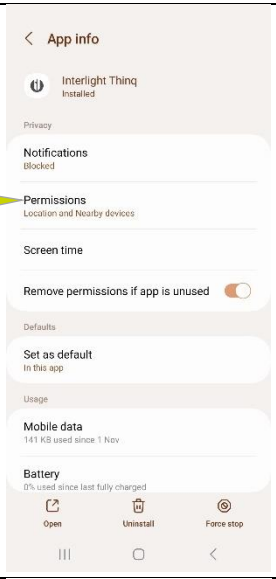
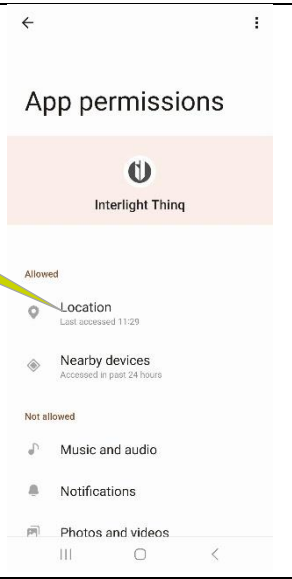
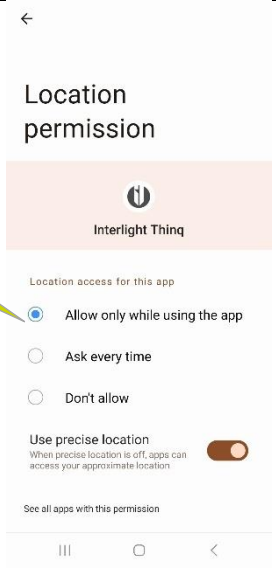
- Ensure Bluetooth is turned on and no other paired Bluetooth devices are turned on
- Ensure location services are enable for the Thingq Lighting Control App (Thingq uses Bluetooth communication to directly communicate with the Nodes in a way that can also be used to determine location, which is why this security setting needs to be enabled).

2.1 iPhone

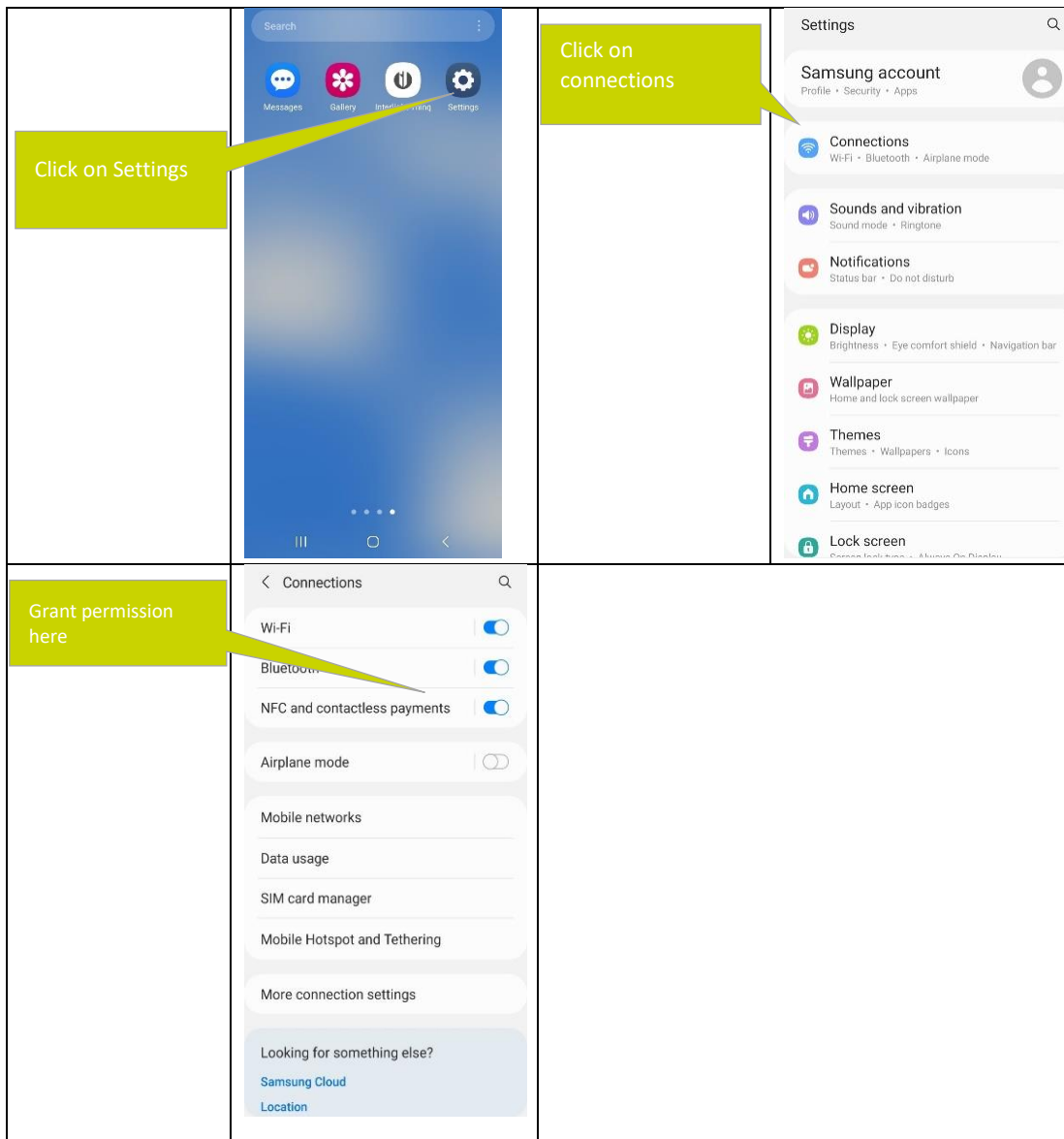


iPhone - the iPhone's NFC function is enabled or disabled by the apps that requires it.

2.2 Android Setting permissions

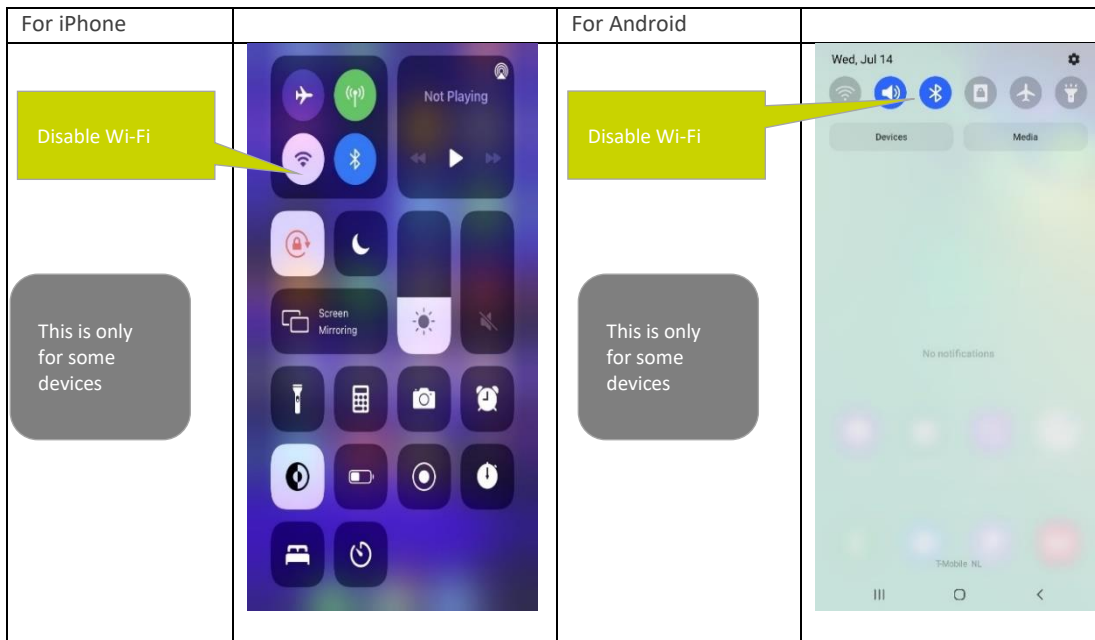
<p>Press and hold on the Thing App</p>		<p>Click on the App Info</p>	
<p>Click on permissions.</p>		<p>Click on Location.</p> <p>You can grant when you install the app!</p>	
<p>Grant permission</p>			

Enabling NFC



2.3 Turning off Wifi (only for some devices)

For some devices turning off WiFi can improve Bluetooth comms performance (only in incidental cases)



3. Getting started

3.1 Basic introduction of Thing Lighting Control System

The Thing Lighting Control System is built around Nodes, each Node contains a copy of the Thing Lighting Control Software and a Wireless Radio Module to communicate with the other Nodes in the system. A Node can have many different forms, any Device that is sold as being Thing enabled will be a Node, a Node could be:

- A Driver containing a radio chip with the Thing Software.
- A Luminaire with or without build-in sensors
- A sensor module designed to build-in to a luminaire to make that luminaire a Node.
- A standalone sensor containing a radio chip with the Thing Software that is connected to one or more Luminaires over for example Dali or 0-10V.

Thing is a Decentralized Lighting Control System which means there is no concept of master and/or slave:

- All Nodes in the system are equal and jointly make the decisions that make the system work correctly.
- Every Node contains only the relevant information for that Node to make the decisions that Node needs to make; this means no Node contains all information regarding the lighting control settings for the system.

For two Nodes to communicate with each other they do not have to be in direct radio range of each other, if the Nodes can find other Nodes that can forward the message to the relevant Node the network will find a way to deliver the message.

The Thing app communicates directly to the Network over Bluetooth to the Nodes that are in radio range of the mobile phone, if any settings are changed that are relevant to other Nodes in the network, the network will ensure these settings will be delivered to the relevant Nodes.

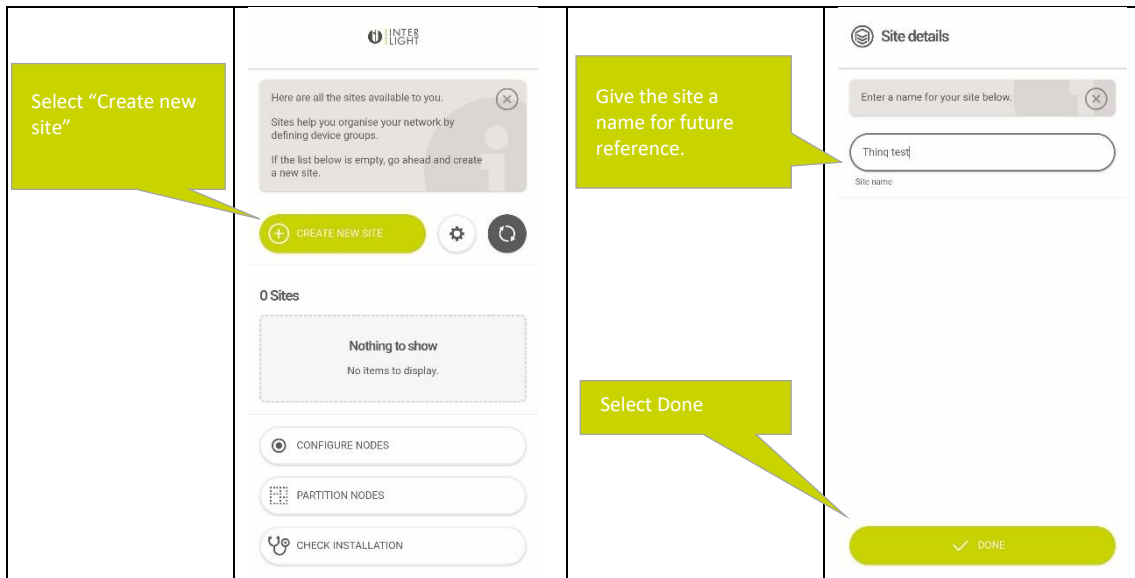
Thing Nodes are organised into Groups, Nodes within one Group act in coordination with each other:

- When one Node in a group detects presence through its presence sensor, all Nodes in the Group will turn on, see Chapter 5
- A Wall switch is always linked to one Group and one Group only, any command from the wall switch will be send to all Nodes in the Group, see chapter 9
- When a lighting Scene is selected the Scene will be applied to all Nodes in the Group, however different Nodes can be defined a different output in a Scene, see chapter 8
- Daylight harvesting is turned on or off for an entire Group, however each Node with its own Light sensor will individually control its output based on its own Light sensor, see section [5.2.7](#)

Groups are organized in a Site, all Nodes within one Site contain the same Security Settings, locking a Site will therefore stop the Node within one Site to communicate to Nodes outside the Site and visa-versa. Access to Users can only be granted or removed on Site level, if you want to exclude access to a certain part of the network to certain Users and not to another part of the Network, the Nodes in the two parts of the Network should belong to different Sites. For further reference, see chapter 0.

3.2 Creating your first site

When starting to commission a building containing Thing Nodes, the first thing is to create a Site that will contain the Groups and Nodes that you want to commission.

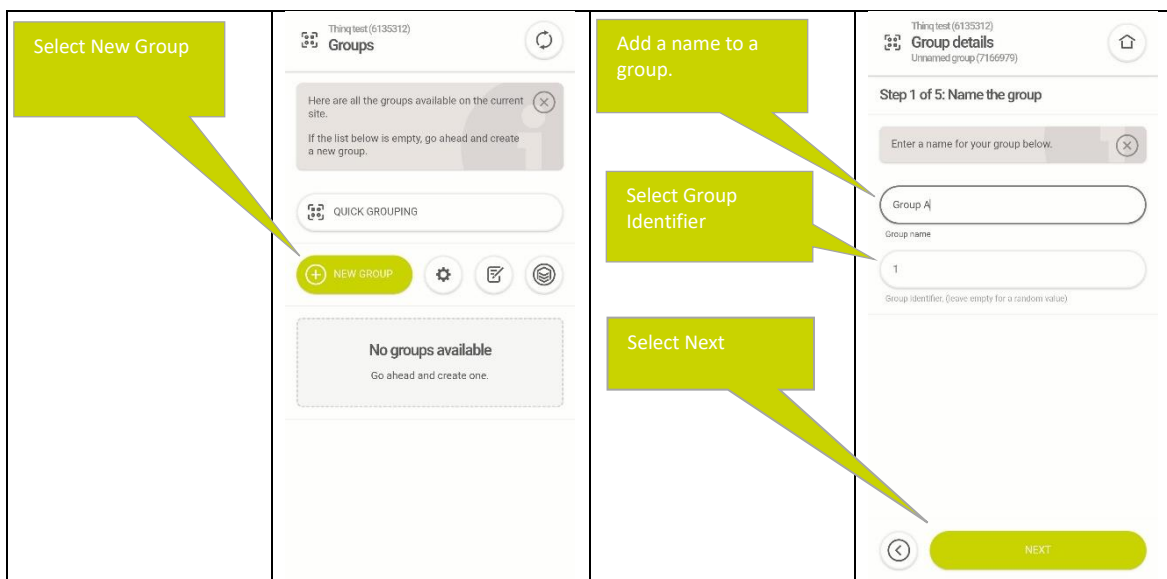


The Site will be empty after creation, to add nodes to the Site, you have to create one or more Groups and add Nodes to the Groups.

3.3 Adding Groups to your first Site

Before adding a group, we need to know exactly what identifier is. The identifier is an option to give a group a unique. Number. This so in the instance you use the same name twice, they both will be unique entities. You only need to choose it yourself if using the SDK, otherwise can use a random number. Shown after creation is Group-A with the identifier 1

After the site creation, create Group or Groups by pushing on the site shown.





Nodes order is determined as follows: nodes that are in the group are on the top of the list, then nodes that are not in the current group. Within those two groups the nodes are sorted on RSSI value.

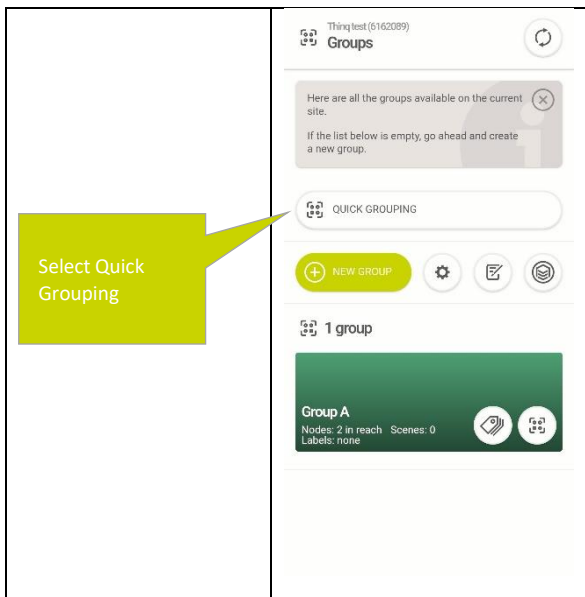
You have now added a Group to your Site and added some Nodes to your first Group, the next step will be to set the light settings for your Group.

In the next section we will explain another helpful feature which is called Quick Grouping.

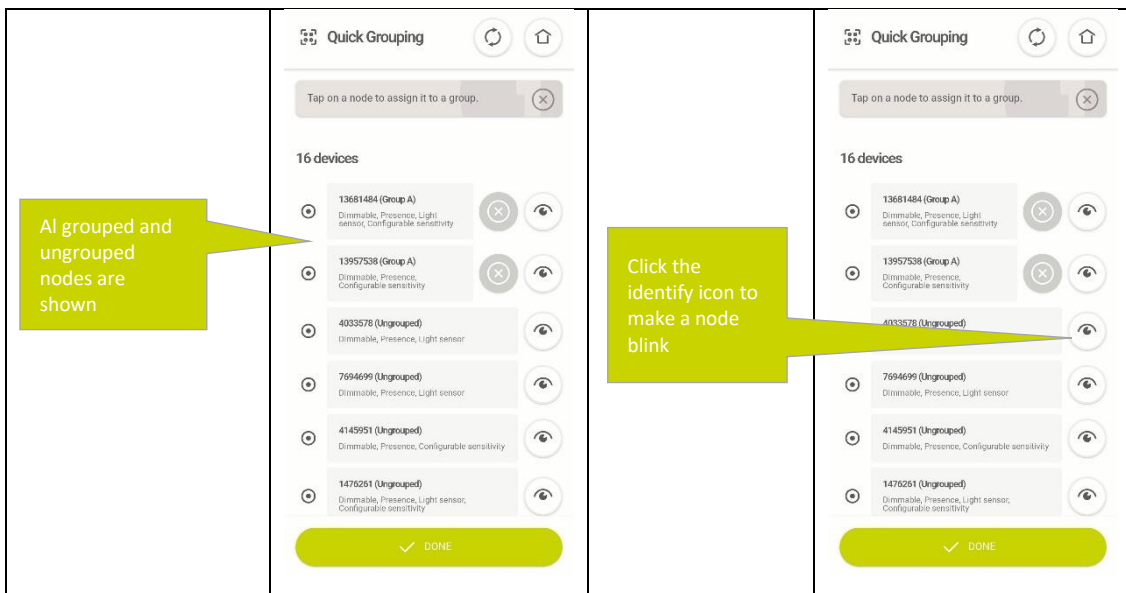
3.4 Quick Grouping to add large amounts of nodes to groups

Quick Grouping is a way to add nodes very quick to different groups. Nodes are sorted on their distance from the phone based on their radio strength (RSSI value).

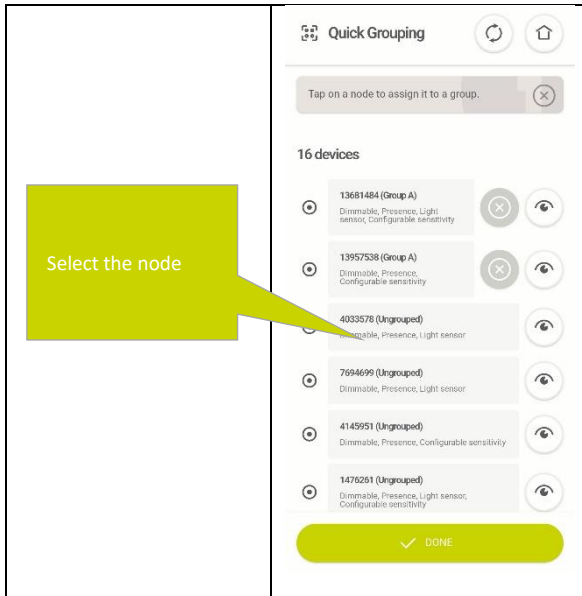
Quick grouping is currently only available for secured sites, we advise to add nodes to a site first and then securing the whole site.



After selecting Quick Grouping wait for the spinner to stop. All nodes will be displayed sorted on RSSI value.



And the node will flash x times based on the settings, see section 0.

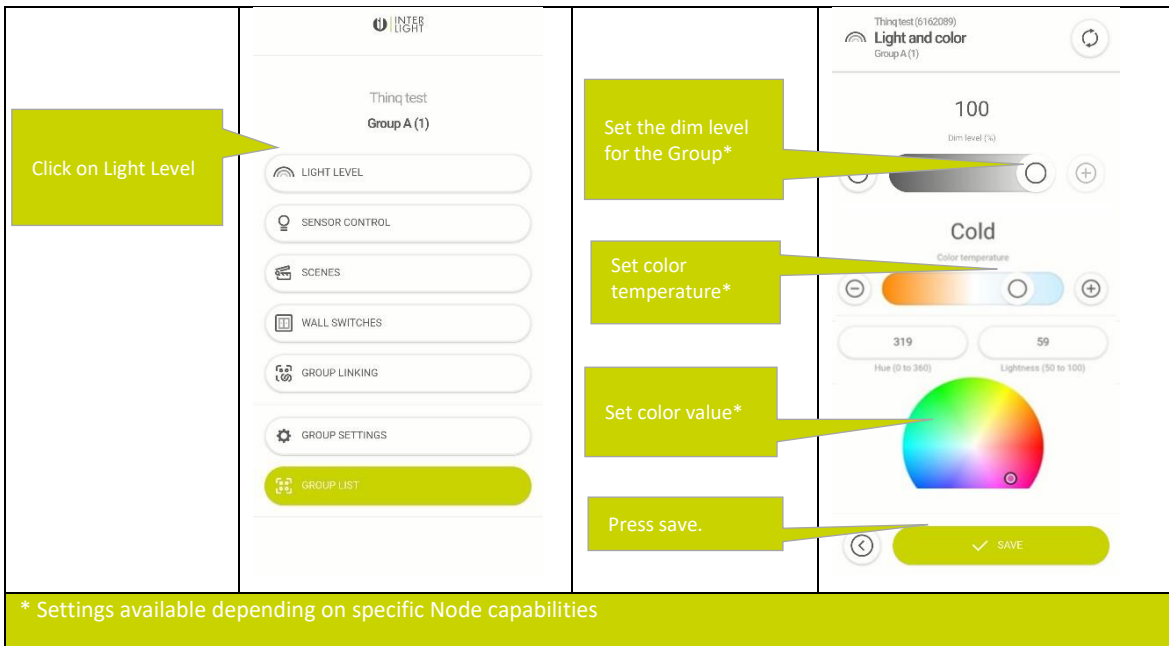
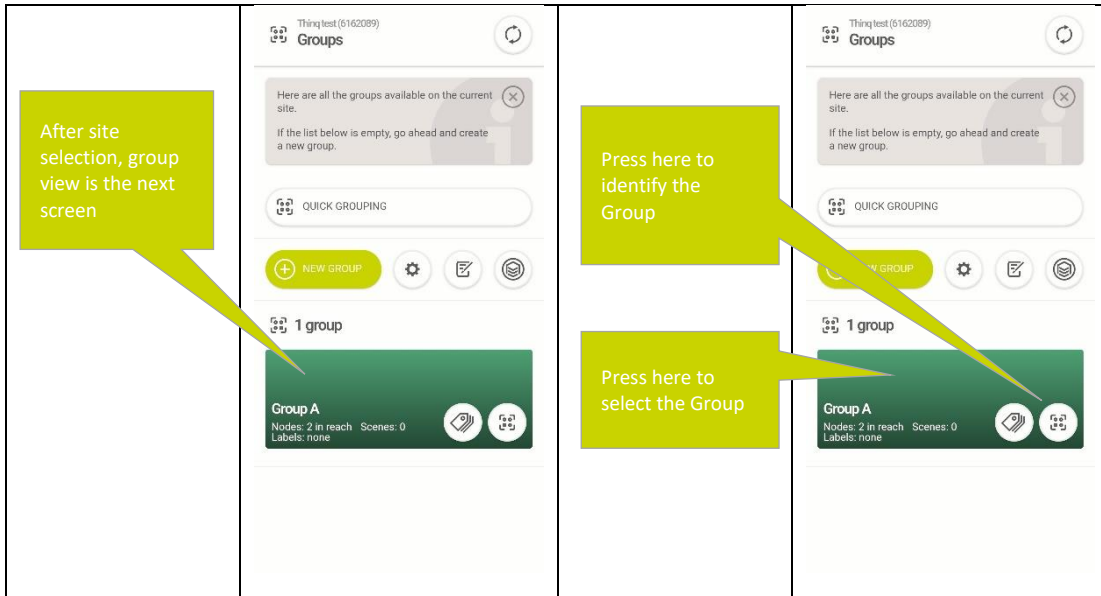


Next is the list of the the available groups and when we select the group the node will be added.



4. Creating basic lighting control settings

To change the basic Light settings of your newly defined group take the following actions:



Note that the lighting control options shown can differ based on the capabilities of the Nodes in Group. The Thingq Lighting Control App will show the most advanced capabilities of any Node in the Group. All Nodes in the group will receive the same settings, if a Node does not support a certain setting, the Node will ignore that setting. If you want to make different Lighting settings for individual Nodes in a Group, see the section 8 which explains the usage of Scenes.

5. Defining Automatic Sensor Control Settings

There are two types of Automatic Control in an Thingq Lighting Control System:

- Automatic presence detection, which turn the lights in a group on/off based on presence.
- Daylight harvesting, which in-/decreases the light level of the Nodes in a Group based on the amount of Ambient Light present.

Both settings are set on Group level and are only offered in a Group if at least one of the Nodes in the Group has the right sensor integrated (a Presence sensor for automatic presence detection and a Light sensor of Daylight Harvesting).

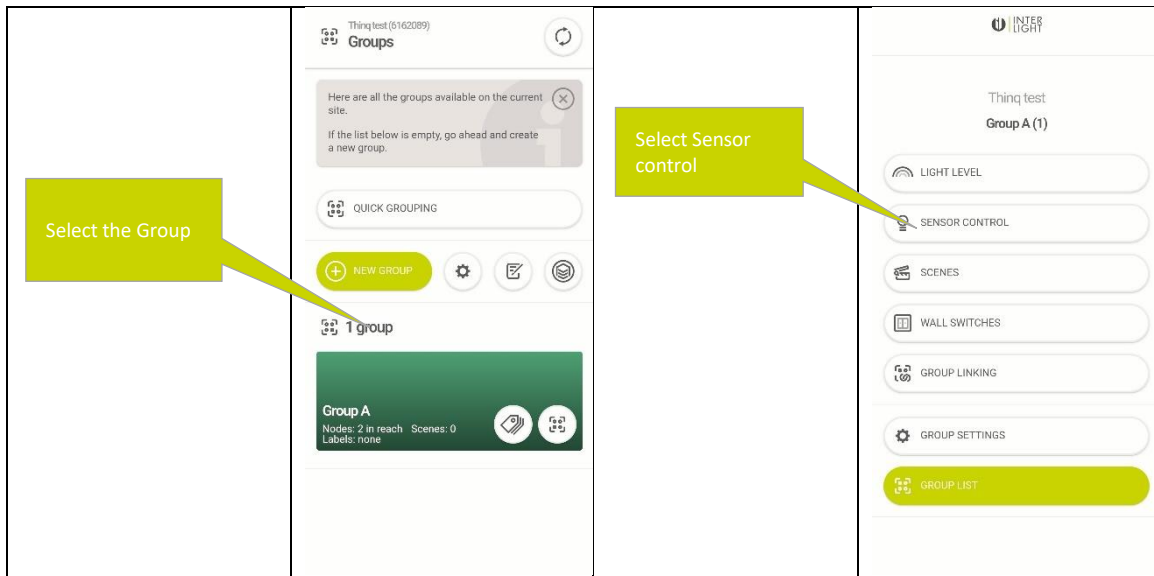
5.1 Enabling Automatic Presence detection

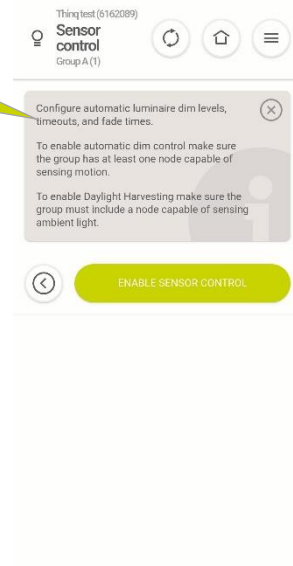
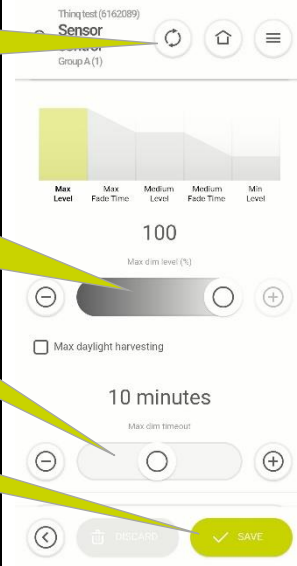
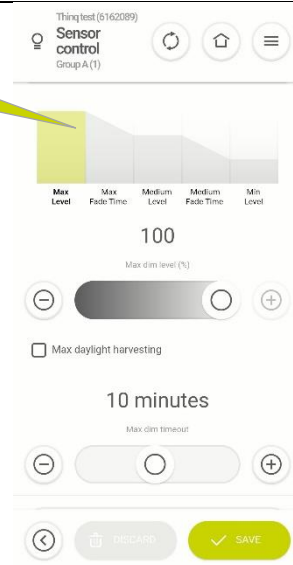
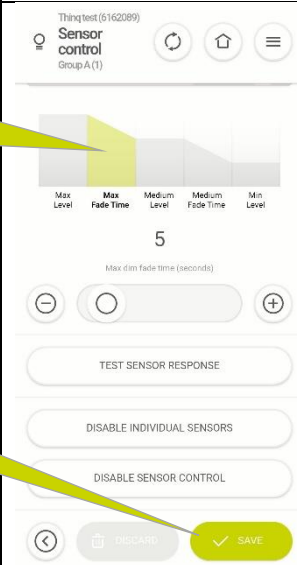
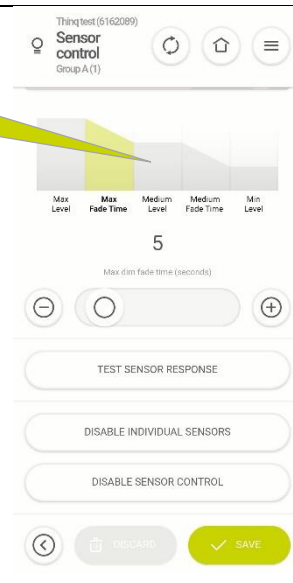
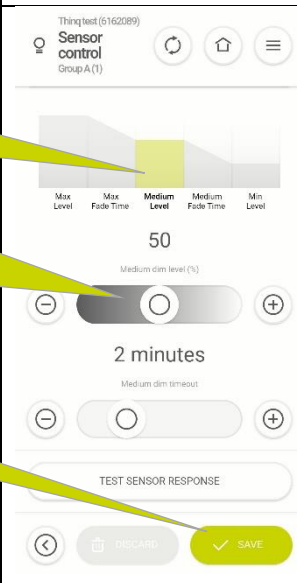






Presence based lighting control enables reducing the amount of energy used by the lighting by switching the lighting on and off based on the presence of humans. For Presence based lighting control to work, at least one Node in a Group needs to have a Presence sensor integrated. If at any point presence is detected by any Presence sensor integrated into any Node belonging to a Group all Nodes in the group will turn their light output to Max-light, after this the luminaires will go through several states gradually decreasing their light output until Min-light is reached, once the Nodes reach Min-light they will maintain this output level forever or until one of the Nodes in the Group detect Presence again. The states of the Group between Max Light and Min light are as follows:

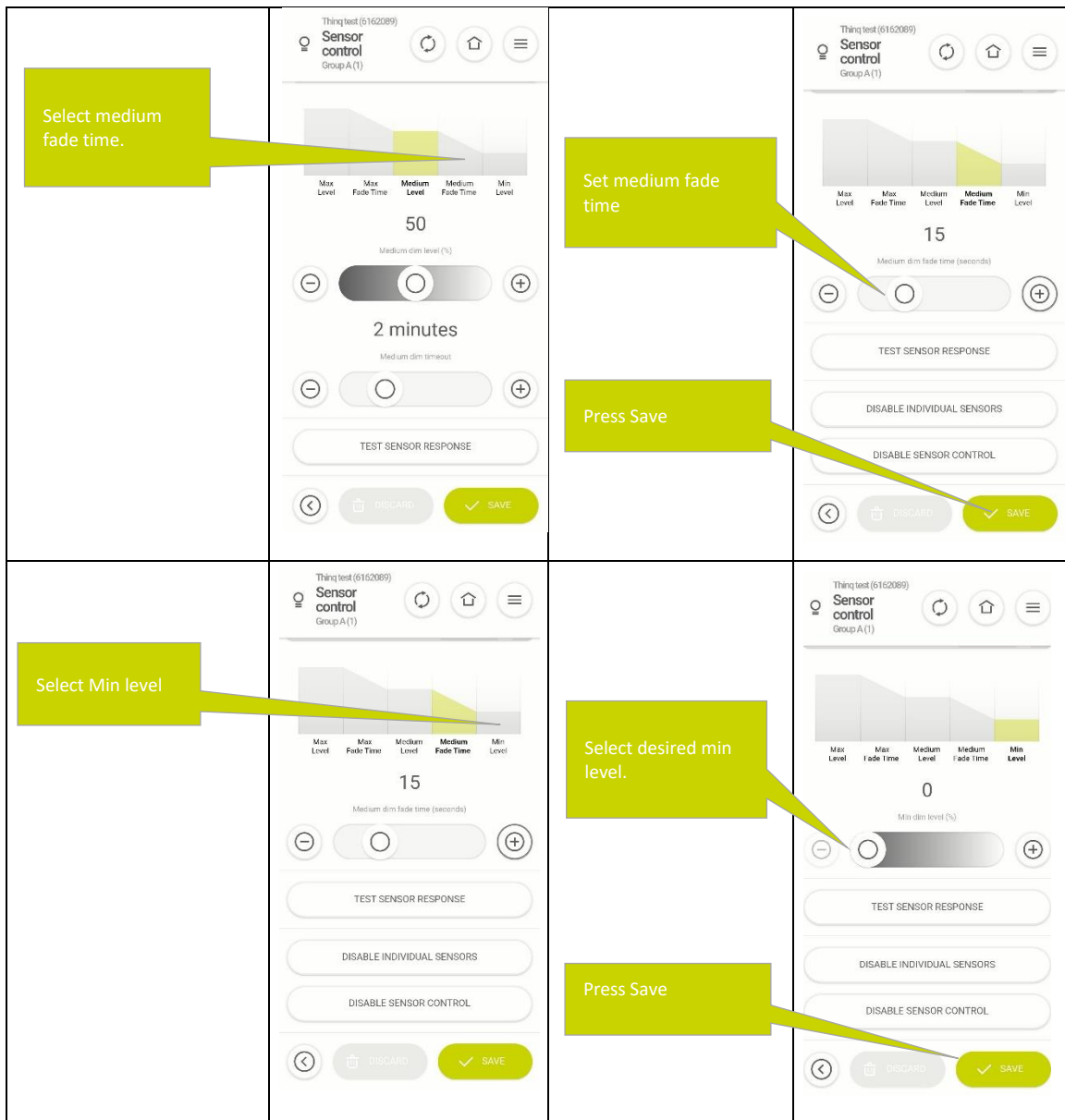
Output of luminaires	Duration
Max Light	MaxLight Duration
Dimming from MaxLight gradually toward MediumLight	MaxLightFadeTime
MediumLight	MediumLightDuration
Dimming from MediumLight gradually toward MinLight	MediumLightFadeTime
Min Light	Forever

If at any time during the Dimming steps the Presence Sensor of any Node in the Group is triggered all Nodes in the Group immediately return to Max-Light. If any Node in the Group detects presence while already at Max-Light the counter for Max-Light Duration for the entire group is reset.

How to set the Automatic Sensor Control settings in the Thingq Lighting Commissioning App:



<p>Select Enable Sensor Control</p>		<p>Wait until refresh icon stops spinning.</p>	
<p>Select max fade time.</p> <p>While on the lighting control page the group previews the light level for the current stage. For the lighting control to become active you must exit the page</p>		<p>Set required dim level of luminaire for Maxlight</p>	
<p>Select medium light</p>		<p>Set Maxlight duration</p>	
<p>Select max fade time.</p>		<p>Select Save to save settings</p>	
<p>Select max fade time.</p>		<p>Press Save</p>	
<p>Select medium light</p>		<p>Select Medium light level.</p>	
		<p>Set Medium time out, set to 0 to skip Medium light level.</p>	
		<p>Press Save</p>	



5.2 Group Linking

In Automatic Presence Detection Groups can be linked to each other in two ways:

- Neighboring groups: When any of the groups is activated, the other linked groups will be activated simultaneously and vice versa (the relationship is symmetric). This feature can for example be used in long corridors to light the pathway ahead or in large open plan offices to light surrounding groups.
- Corridor hold: When a Presence Sensor linked to a Node one of linked Groups is triggered, the main groups will be activated, but not the other way around. (The relationship is asymmetric). This functionality can for example be used to keep the lights in the hallway on as long as one of the adjacent rooms is in use.

In both cases a group triggered by another group will turn off after its max light timer expires.

See section [21.2](#) for the maximum number of Groups that can be linked.

5.2.1 How to make “Neighboring groups”?

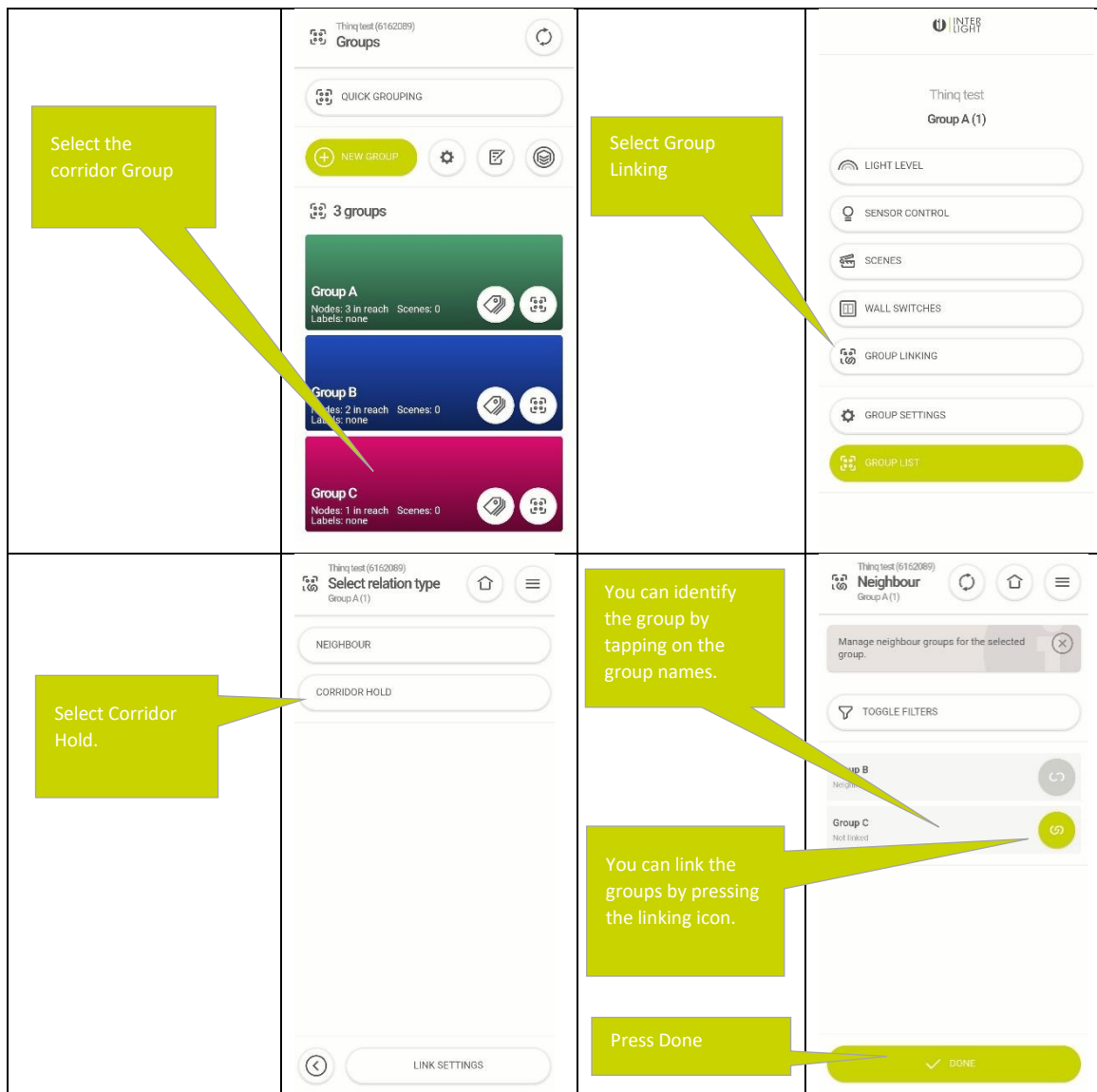
<p>Select one of the Groups.</p>		<p>Select Group linking</p>	
<p>Select Neighbour</p>		<p>Identify Groups by tapping on the Group names.</p> <p>Link the groups by pressing the green 'linking' icon.</p>	
<p>Shows its linked and you can remove it by tapping on the grey linking button.</p>		<p>Click on Done</p>	

When you trigger one of the sensors in any of the linked groups, this Group will turn on to Neighbor light level and visa versa. To set the light level the luminaires will turn to when there is activity in a neighboring group but not in a Group itself see section [5.2.3](#)

5.2.2 How to make “Corridor Hold” links:
To setup a corridor hold:

- go to the group that you want to turn on when presence is detected in other groups
- then add corridor hold link to the other groups

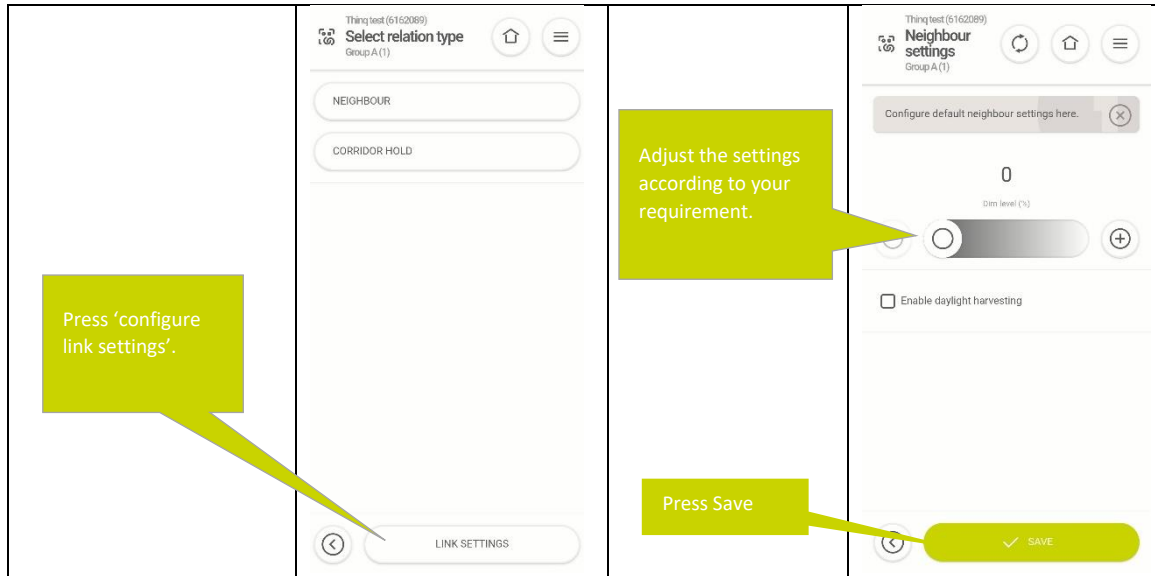
Presence in any of the other groups will now tun the lights in group you created the links from on. To set the light level the luminaires will turn when there is activity in a linked group but not in a Group itself see [5.2.3](#)



5.2.3 How to set the neighboring light level

The neighboring light level defines the light level a Group will go to if there is no presence detected by any sensors in the group itself and presence is detected in any Group that is set as a neighbor or that is set to send a turn on signal to this group in a corridor hold relations.

To set the neighbor link level use:

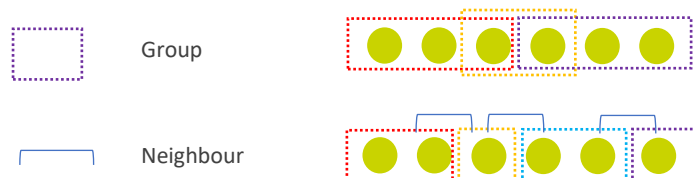


5.2.4 How to create multi group membership using neighboring

The Thingq lighting control system does not support multiple group membership, it is found that in practice this be too confusing and error prone. However, by using the Neighboring function the behavior that typically is targeted by multiple group membership can still be achieved.

See the following example where one would like create overlapping Groups in a corridor to get a smooth lighting ahead of the path ware ahead.

The first example shows how one would typically achieve this by using multiple group membership, the second example shows how the same effect can be achieved by using neighboring groups.



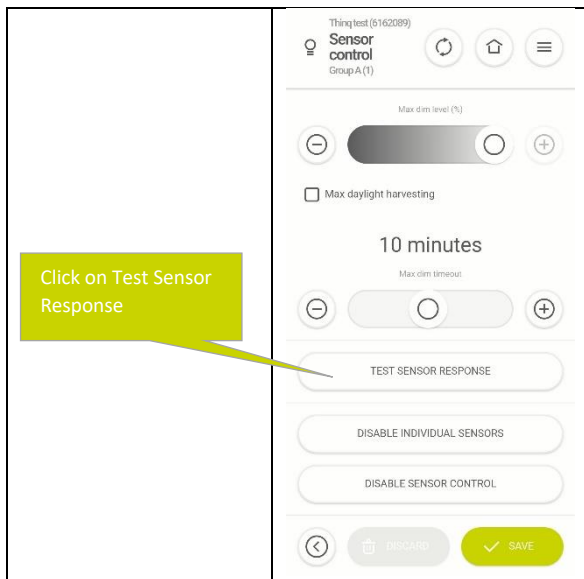
5.2.5 Testing the correct working of the automatic lighting control settings

How to test a motion sensor response?

You can test the motion sensors response by pressing “Test Sensor Response”.

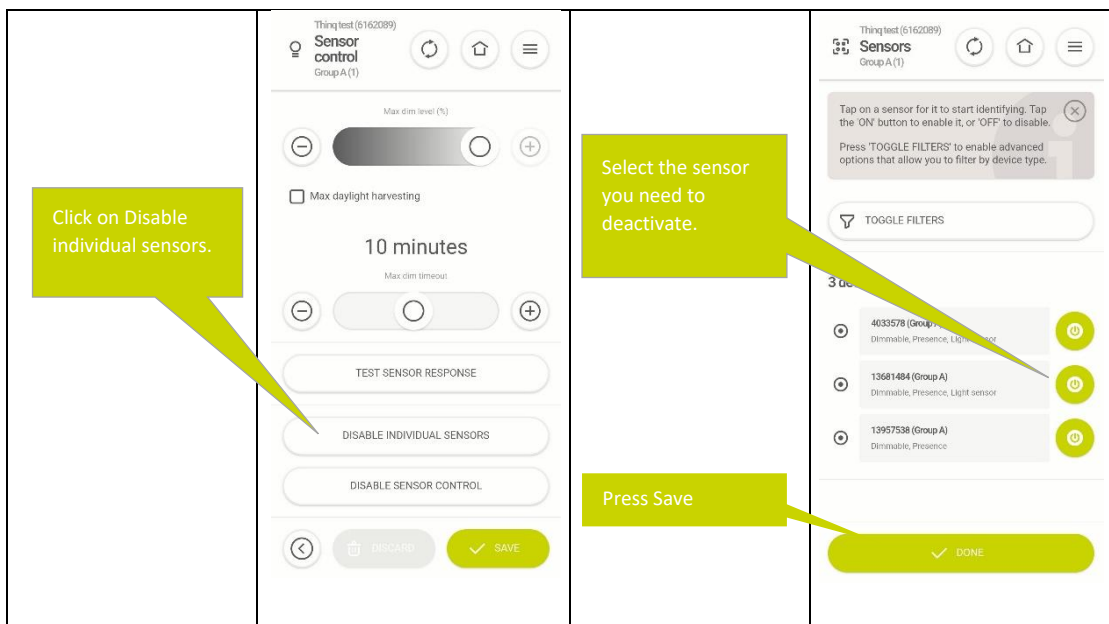
You get the following message, luminaires will not respond to motion for the next 10 seconds and will go to min light afterwards

Then the luminaires switch off until one of the sensors detects a movement. When after 10 seconds no motion was detected, once a sensor detected a motion, luminaires switch to the Max light level.



5.2.6 Disabling false triggering sensor

In some cases environmental factors might trigger a sensor, for example if a sensor is placed next to a hot air vent. In such cases you can disable the sensor of a node To disable a motion sensor simply press “Disable Individual Sensors” and select the sensor you need to deactivate.



5.2.7 Enabling Daylight Harvesting

Daylight harvesting enables you to reduce the amount of energy used by your lighting by dimming the light level of Nodes when sufficient ambient light is present to maintain a sufficient light level in the room. For Daylight Harvesting to be enabled at least one Node in a Group must be equipped with a Light sensor.

Daylight Harvesting in the Thingq System is based on a closed loop control system which means that the sensor is expected to measure the same area as the Node it is controlling is Lighting. For detailed mounting instructions on how to best mount an Thingq Node with a building Light sensor please consult the manual of the Thingq Node you would like to install.

For Daylight Harvesting to work the Light sensor first needs to be calibrated, during the calibration process the following happens:

- The user uses the Thingq Lighting Control App to set the light level for all Nodes in a Group to the desired light level (one could use an external Lux meter to verify the desired light level)

- Once the desired light level is reached the Light sensors will calibrate itself and measure the amount of light they register in the desired state
- If Daylight harvesting is active the Nodes in the Group will in / decrease their Light output to ensure the Light sensor reading is as close as possible to the reading during calibration.

For an optimal result it is recommended to perform the calibration when no external light is present (including natural daylight), by either performing the calibration after sunset or with the curtains closed.

Every Node in a Group with Daylight Harvesting active which has its own Light Sensor will take its reading for its individual sensor during calibration and control its own Light Output to ensure the reading of its own Light Sensor is as close as possible to the value during calibration.


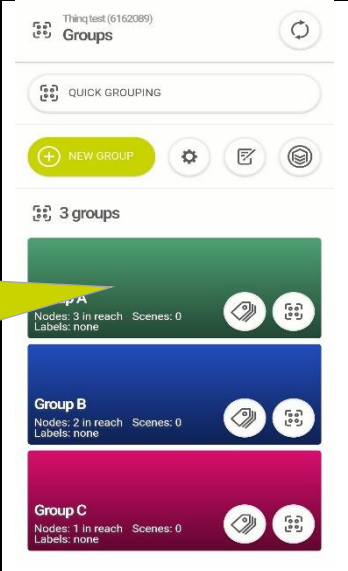
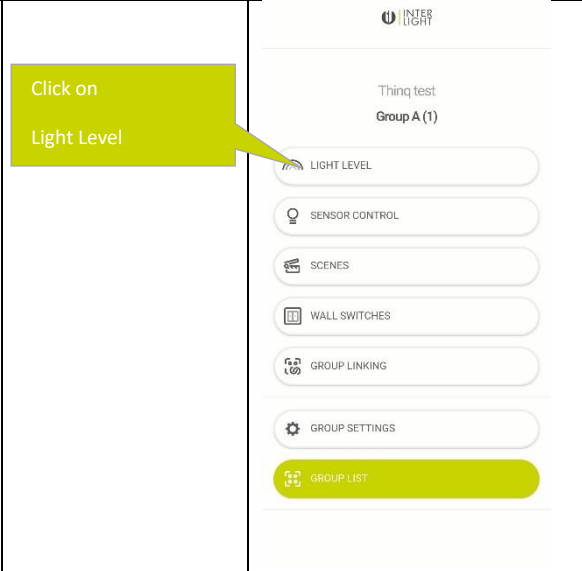

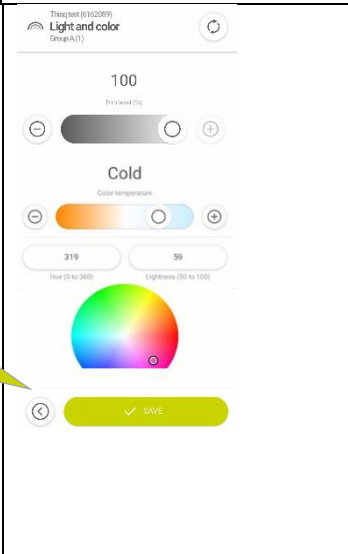
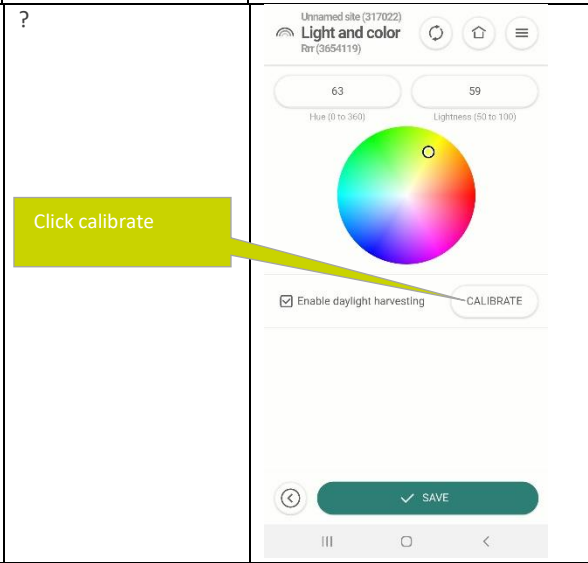
How to calibrate the light sensor?

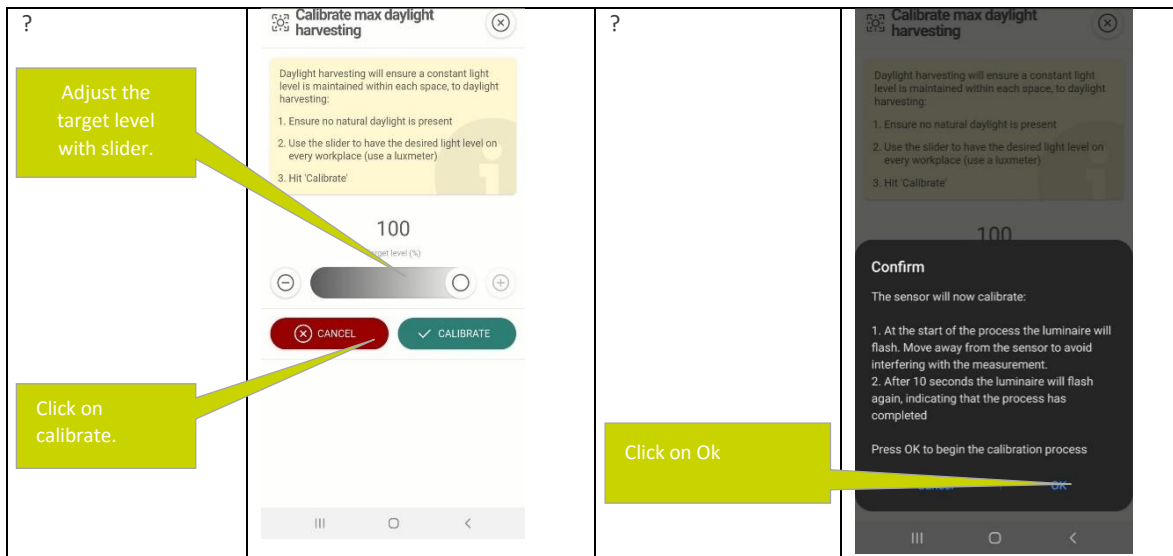
By enabling daylight harvesting, the luminaire adjusts the output to the level that is calibrated.

Make sure there is no ambient light (either close all curtains or perform the operation at night)

Dim the lights to a level that you get your desired light level under the luminaire (Thingq advises to use a standard lux meter lying on a desk to determine the correct light level)

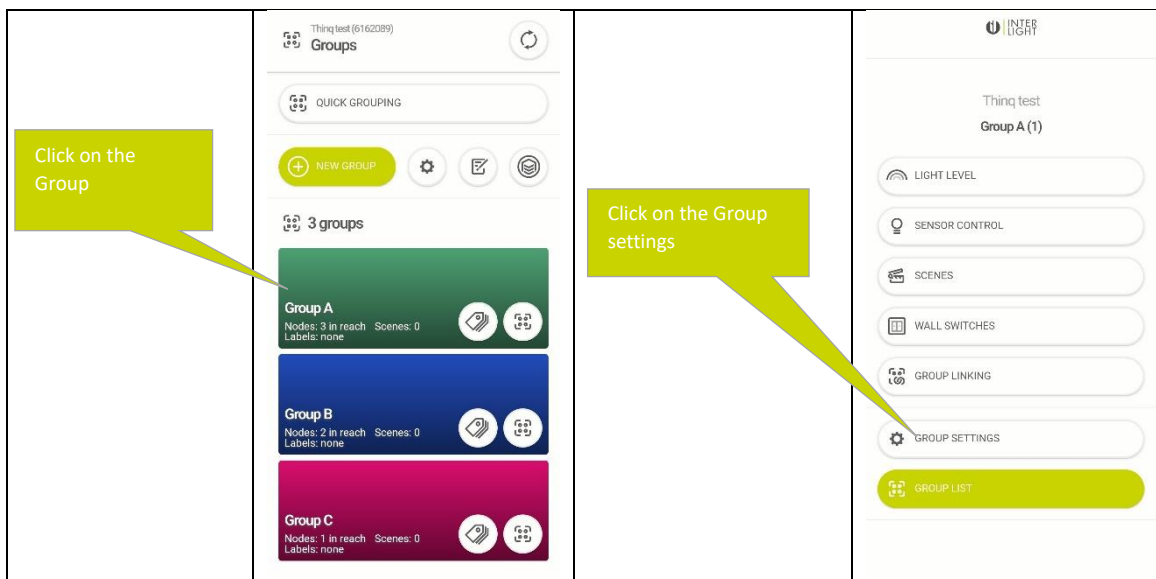
Steps to enable Daylight Harvesting are as follows:

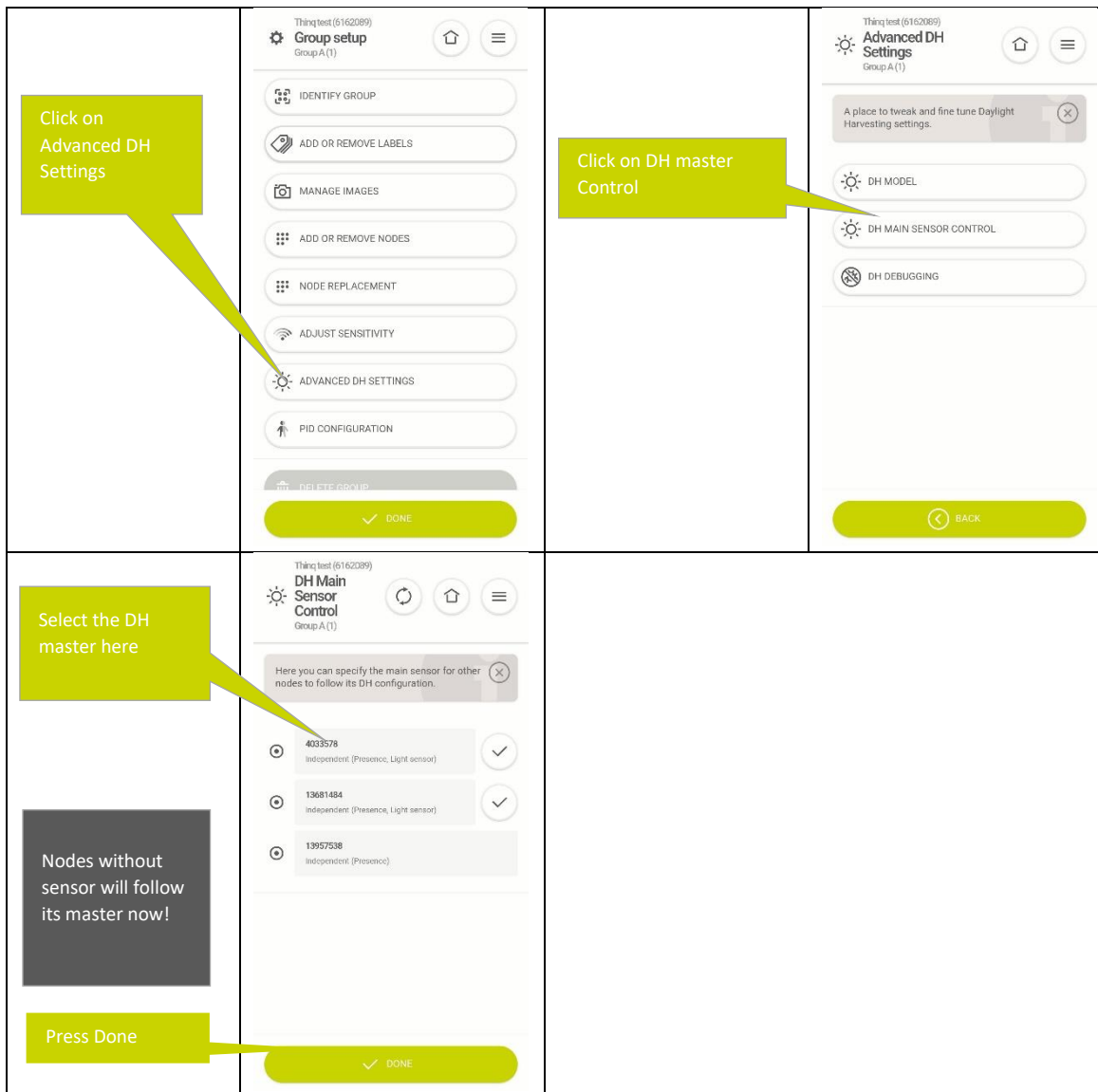
		
		



5.2.8 Handling nodes without their own Light sensor

If not all Nodes in a Group are equipped with a Light Sensor, the user can select one Node with a Light Sensor as a head node in the Daylight Harvesting Algorithm, all Nodes without Light Sensor in the Group will set their output equal to the output of the head node. All Nodes with their own Light Sensor will still set their output according to their own local Light Sensor.





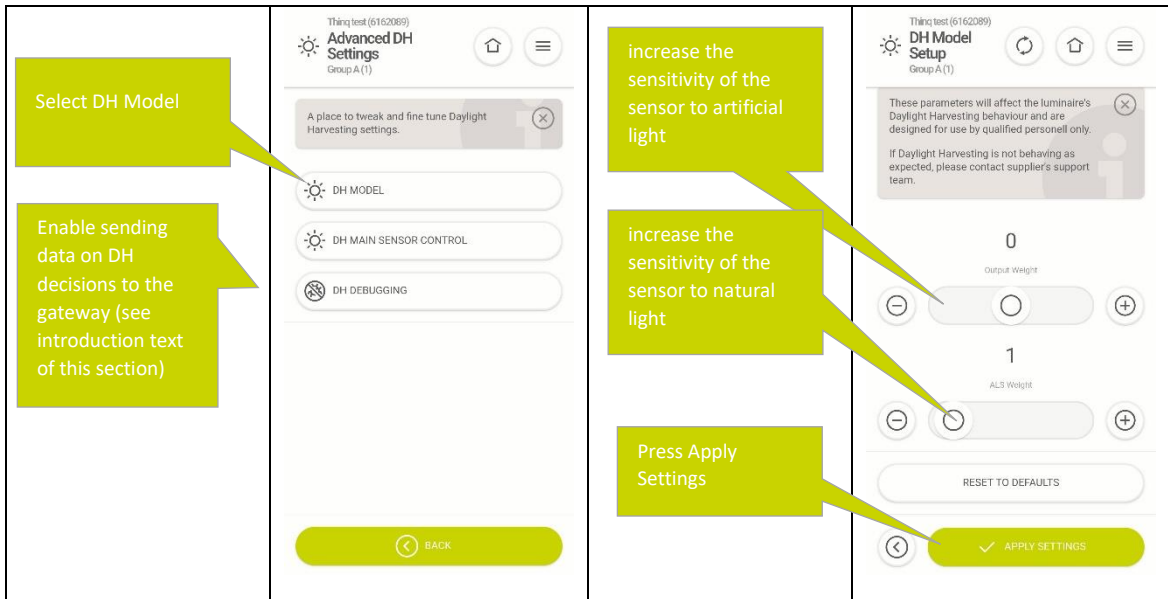
5.2.9 Setting advanced Daylight harvesting configuration

Daylight harvesting sensors are sensitive to exact environment they are placed in. Every sensor is calibrated but, in some circumstances, it might be needed to fine tune the sensor to the specific environmental circumstances. There are two main effects that the sensor can be tuned to:

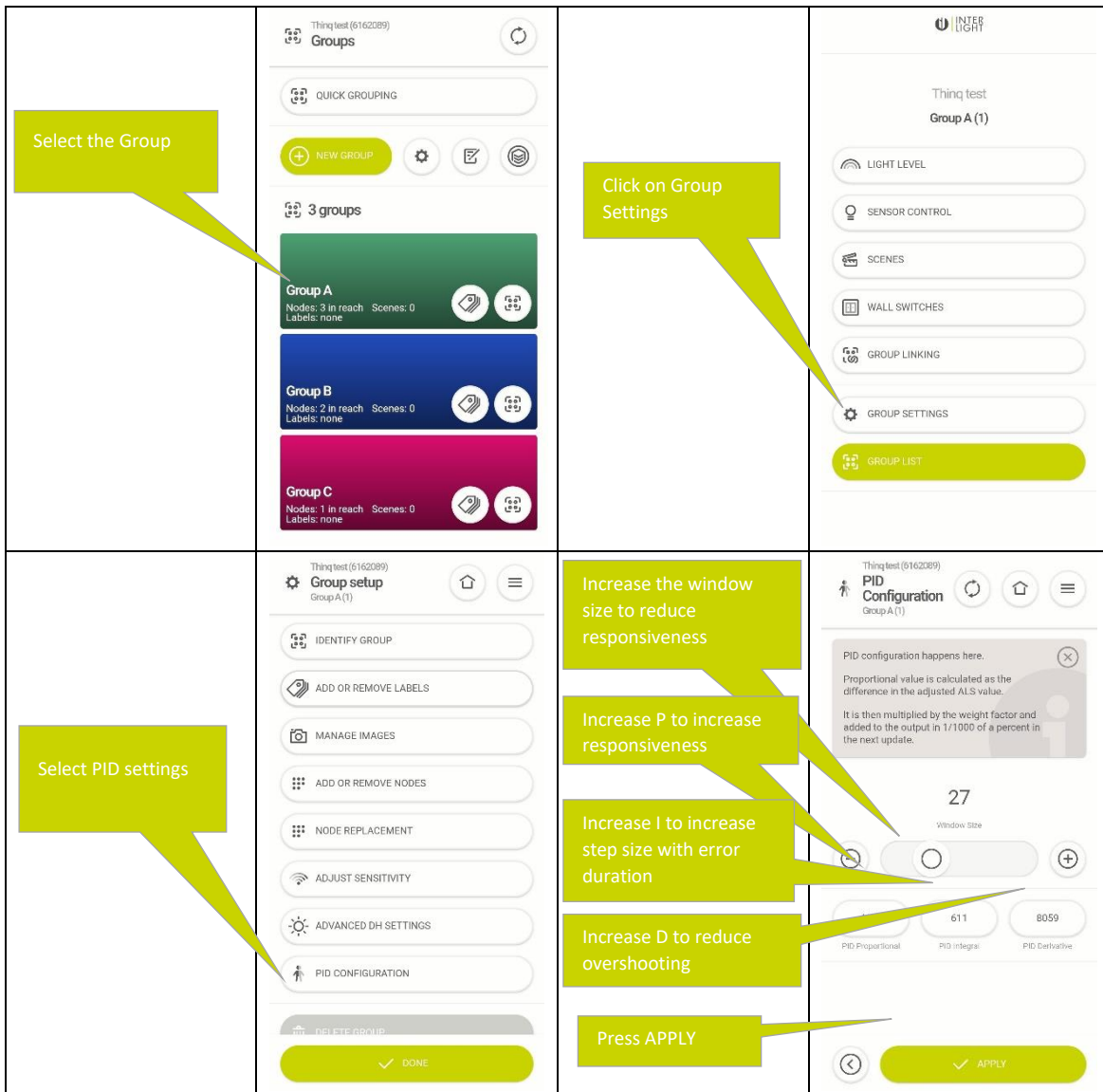
- Sensitivity to daylight versus artificial light
- Speed with which the system reacts to change

Many Light sensors are relatively more sensitive to artificial light than to daylight compared to a high-end luxmeter. This might cause the Nodes to decrease their output too much in case natural light is increased versus calibration. If you notice this effect, you can increase the weighting of artificial light by the sensor.

Although Daylight harvesting works very well in most common situation it is a complex process that depends on many specifics in the environment that can have an unexpected influence on its performance (like the reflective properties of the surface, or other light sources in the environment, the specific daylight harvesting sensor used in the manufacturers hardware, the exact light source used and its spectrum). In case this might ever happen for a specific node(s). Thing support can help analyse the issue by looking into the daylight algorithm and investigate why the DH algorithm is behaving the way it is. In order to do this they will ask you to turn DH debugging on for a specific node. Once this is enabled and a gateway is present in the network. The node will send all its information on its DH decisions to the gateway (they will appear in the gateway log on the gateway console), enabling us to help you understand why the node behaves the way it does.



In case the system responds too abrupt or too slow to changes in light levels the responsiveness can be adjusted as follows



5.3 Combining Automatic Presence Sensing and Daylight Harvesting

Automatic Presence Sensing and Daylight Harvesting can be combined, in this case the amount of light during Max-light is set determined using the Daylight harvesting algorithm. To enable Daylight harvesting in combination with Automatic Presence sensing, first enable Automatic Presence Sensing, then take the following steps:



After calibration the lightlevels are determined as follows:

- During max light every node will adjust its output such that the measured amount of light is equal to that measured during calibration
- When the group transitions from max light to medium light the system will take the final output during the max light and compare it to the output of max light during calibration, medium light will then be dimmed with the same percentage relative to the medium light level during calibration. For example: When max light during

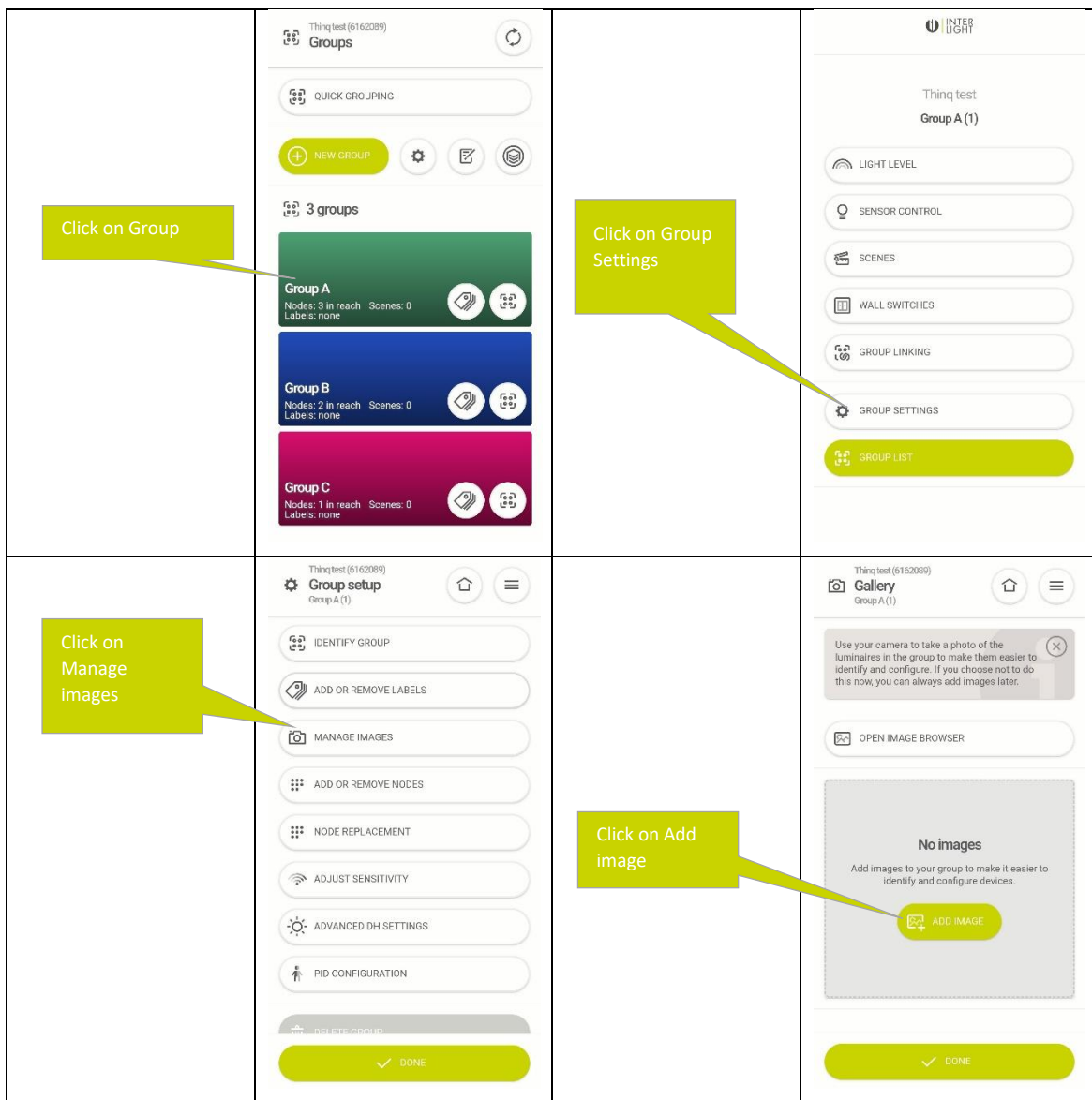
calibration was 80% and at the end of max light period it is 60%, max light was dimmed by 25% versus its calibrated lightlevel. If medium light was set to 40% during calibration it will now be set to 30% during the medium light duration

- For min light no daylight calibration takes place, it will simply use the output level specified during calibration and not take any active light measurement into account

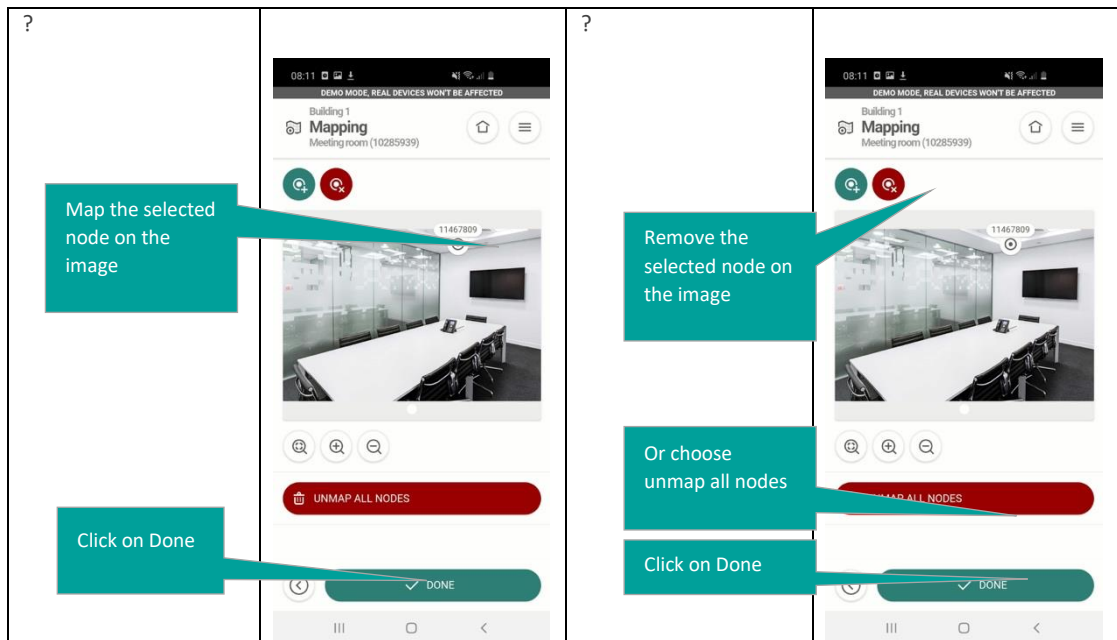
6. Mapping Nodes on a picture

To enable easy identification of Nodes within a Group the Nodes can be mapped on a photo or picture, once this mapping is completed users can identify the Nodes in the Group using their location on the photo or picture instead of having to remember the Node unique number.

To map the Nodes on a picture, take the following steps:



<p>Press to select an existing image from your phone gallery</p> <p>Press to take a new photo with your phone camera</p> <p>When you are done adding images (you can add multiple) press save</p>		<p>?</p> <p>Select place Nodes</p>	
<p>?</p> <p>Click on Add Nodes</p>		<p>?</p> <p>Select a node from the list.</p>	

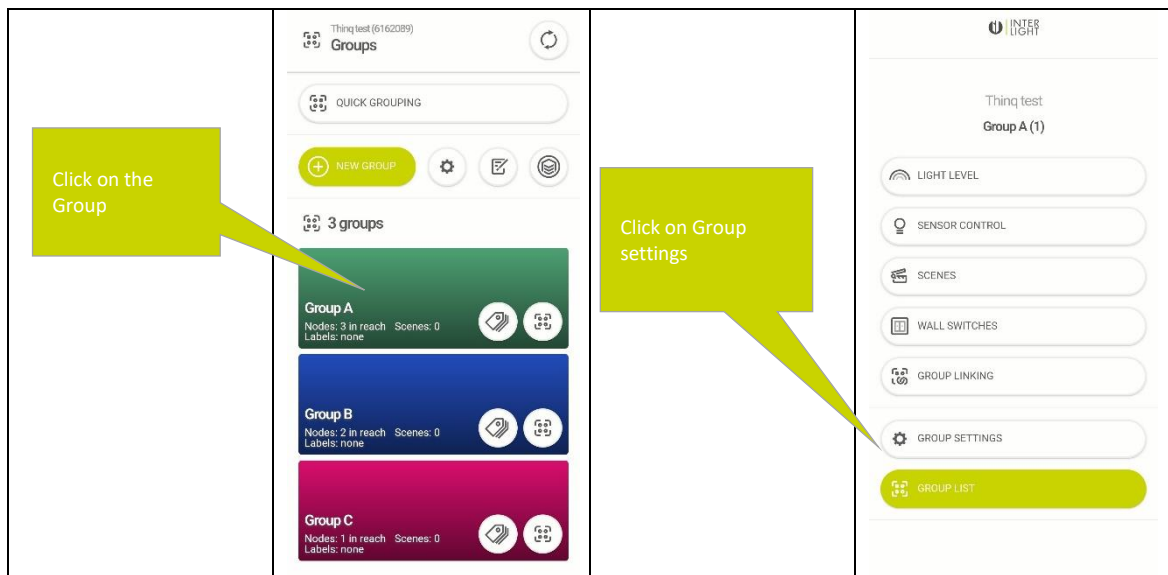


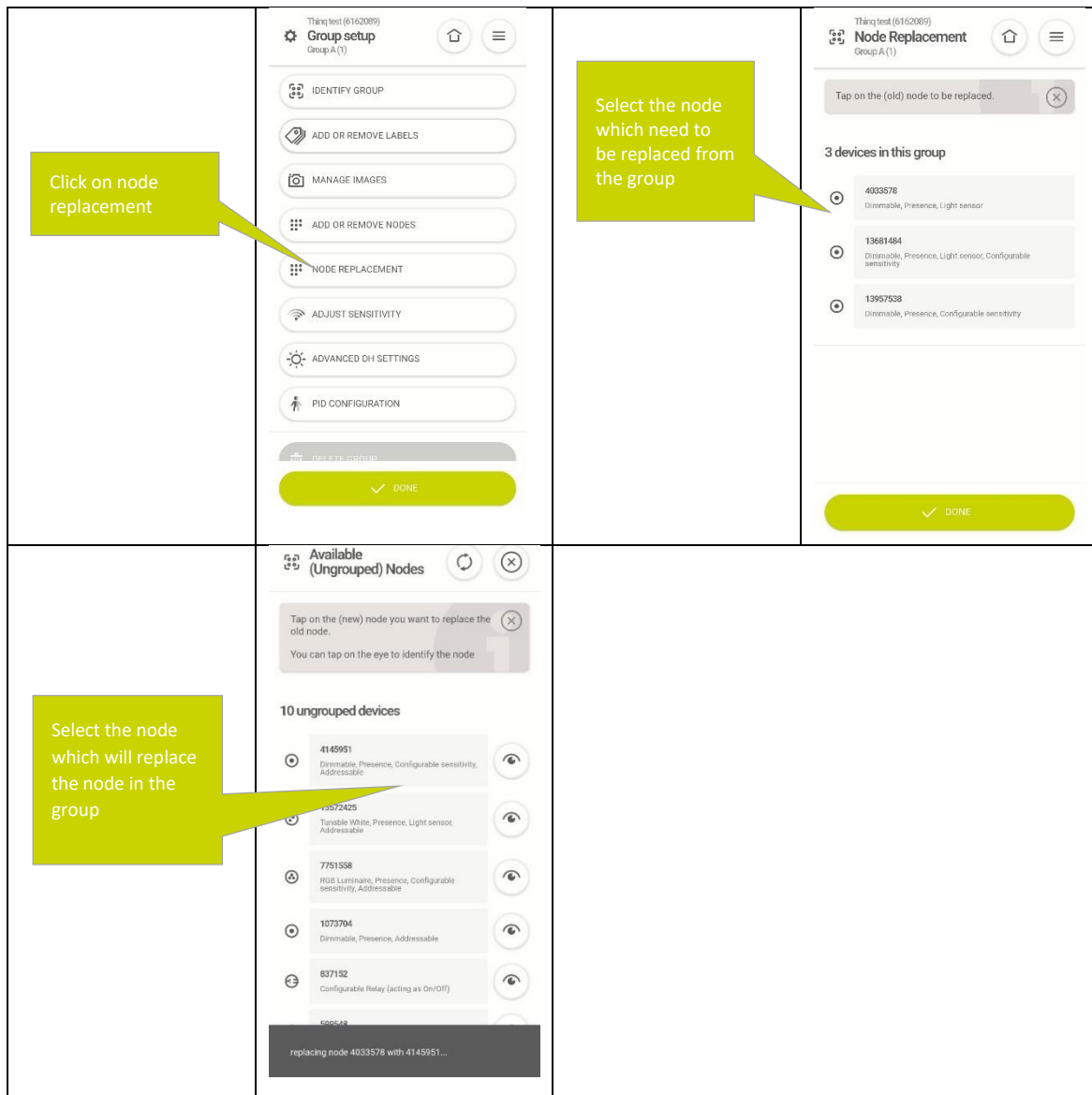
7. How to replace a node

Node replacement can be easily performed through the option “Node replacement” in group settings. Replacing starts with identifying the node that need to be replaced followed by identifying the node that will replace the node. This function works even if the old node is completely offline. The only pre-requisites are:

- There is at least one other node in the same group that is still online
- The app has either stored the settings from the node previously or can retrieve the settings from the cloud. (All group settings are synced automatically including Dali addressing and individual scene settings).

The steps for node replacement are as follows:





7.1 How to handle groups with only one node

If you have a group with a single node, group wide settings will not be automatically synced to the new node (no node to give the settings to the new node). In this case one will have to reset the group wide settings (such as lighting control settings or scene default values) to the node manually.

8. Scene Setting

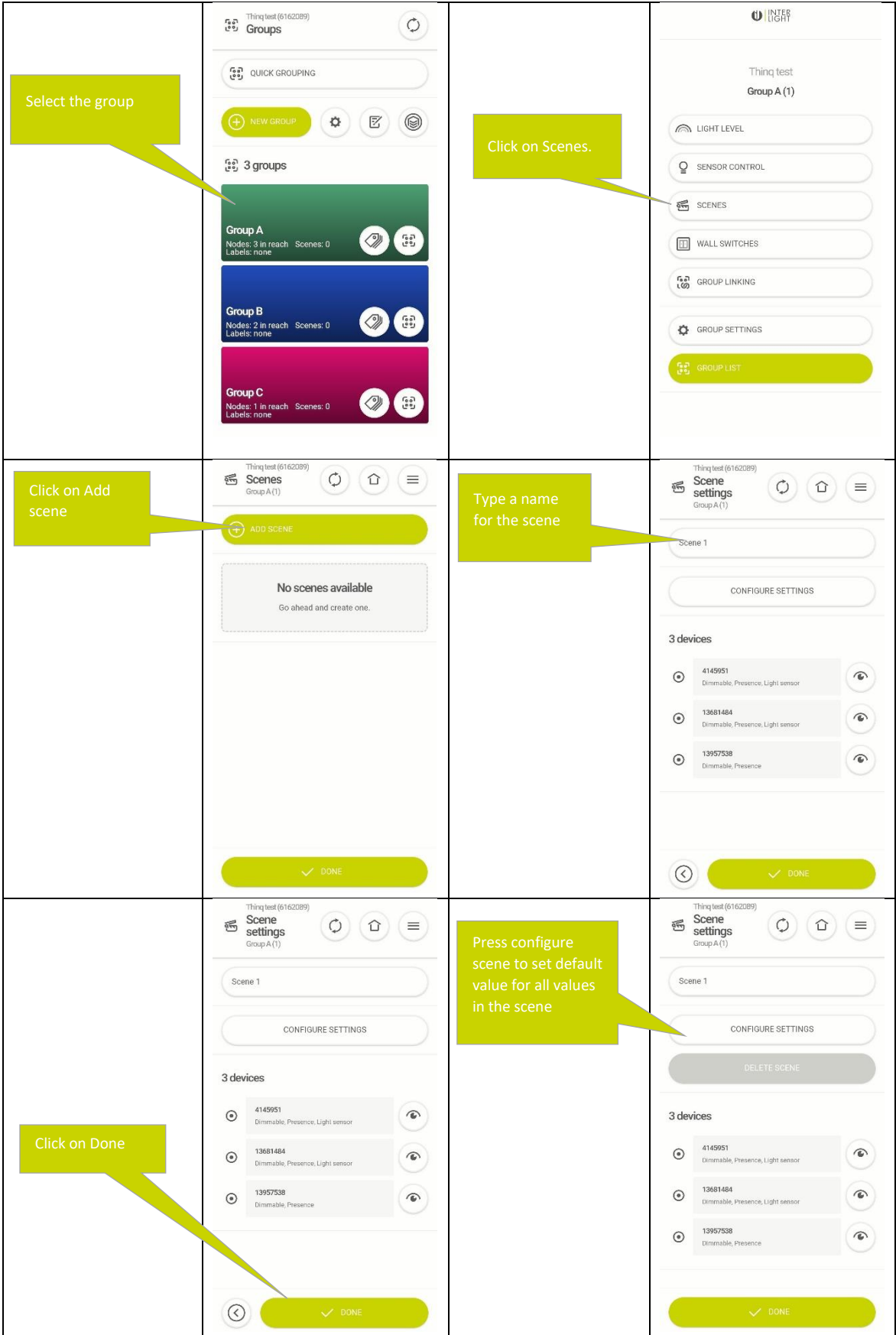
“Scenes” allow you to illuminate an area based on the lighting needs and activities you do there. In a Scene individual Light Output setting are defined for each Node in a Group, these can include (depending on the Node capability):

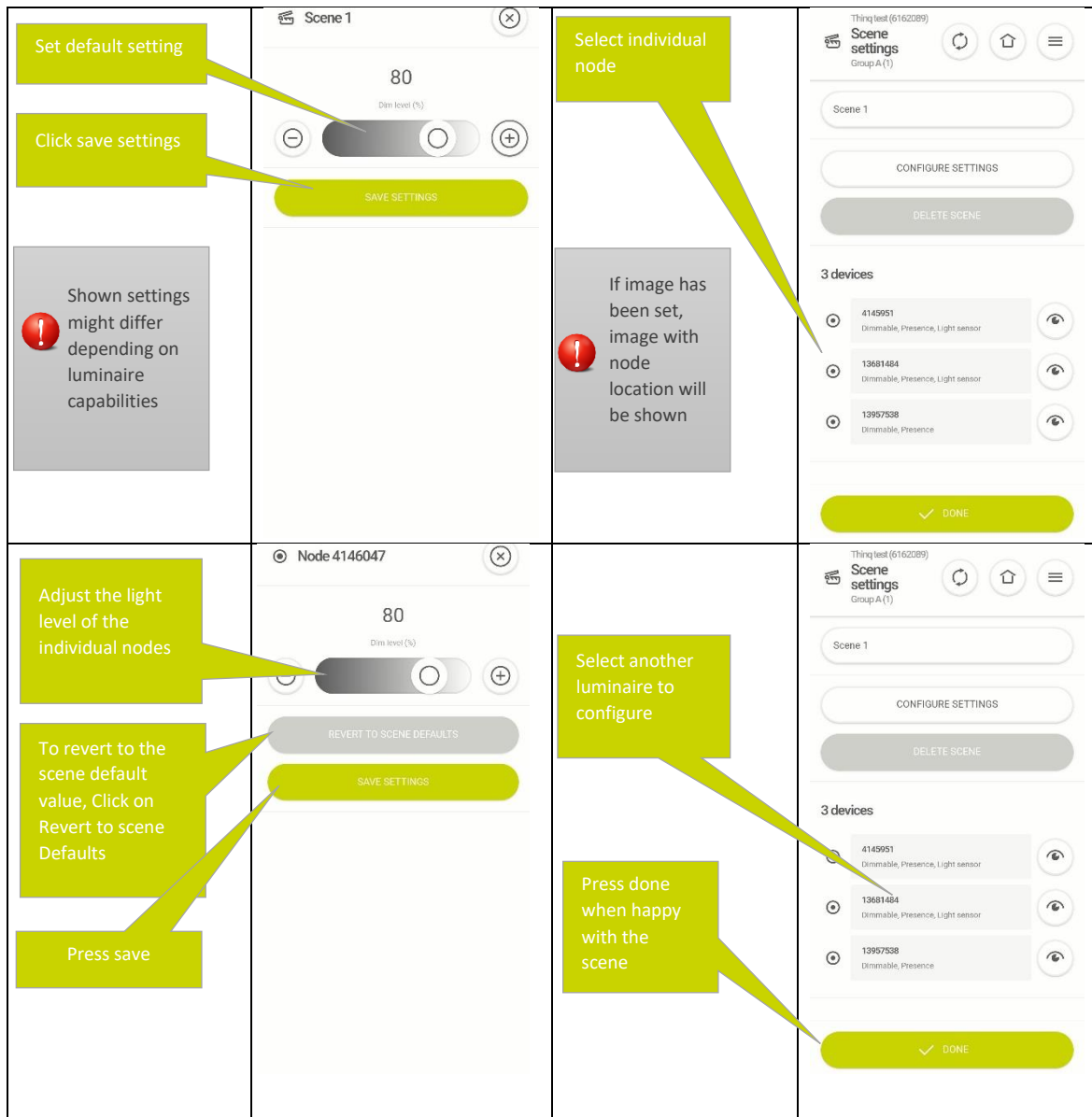
- Dim level
- Color temperature
- RGB color value

Pre-programmed Scenes can be recalled using a wall switch see Chapter 9. But pressing a second time on the recall scene button the light will go to the Max Level.

For the maximum number of scenes per Group see chapter 0

To define a Scene, use the following steps:





9. Wall Switch

Wall switch is the most used tool to control light. Thingq 2.0 integrated a wireless battery free wall switch in its lighting control solution.

With a wall switch you have a possibility to:

- switch ON/OFF the lights
- Dim Up/Down the lights
- Activate a scene,
- Cycle through the scenes,
- Control tunable white or RGB luminaires

The functions of the wall switch can be dynamically assigned to the buttons of the Wall switch.

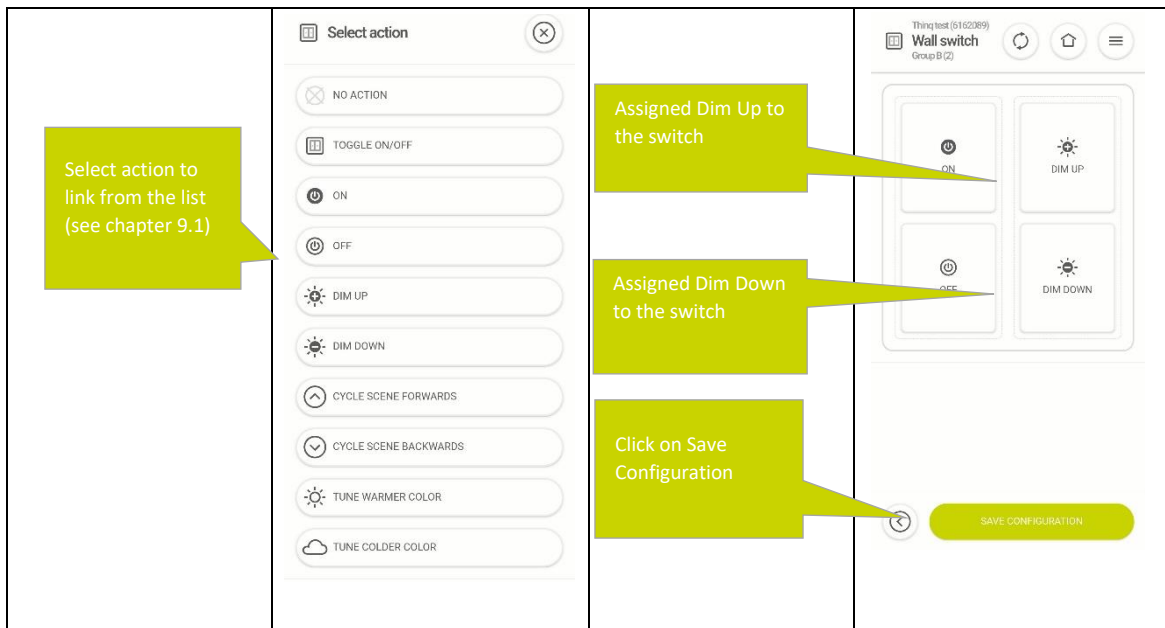
In order of the Wall switch to be compatible with the Thingq Lighting control system it needs to be an EnOcean Wall switch using the 2.4 Ghz. Bluetooth protocol (ZigBee based EnOcean wall switches will not work!).

For the maximum number of wall switches per group see Chapter [21.2](#)

All wall switches assigned to one group will have the same configuration in terms of assigning actions to buttons.



<p>Android</p> <p>Tap the wall switch to your phone. Move it around if it is not detected</p>		<p>Android</p> <p>Tap the wall switch again to your phone. Move it around if it is not detected</p>	
<p>iOS</p> <p>Follow the instructions mentioned. Hold the wall switch still until the process finishes</p>		<p>iOS</p> <p>You can now remove the wall switch</p>	
<p>Press the wall switch ones to confirm</p>		<p>Add actions to the wall switch buttons</p>	



9.1 Wall switch actions explained

No Action	
Toggle On/OFF	Turn On if currently off Turn OFF when currently on
On	<p>Cancels the effect of pressing off:</p> <ul style="list-style-type: none"> - Presence in this or neighbouring groups will turn the luminaires on again when automatic control is enabled (the button press itself will also count as a presence event) - If automatic control is not active the group will restore its default output.
OFF	<p>Turns all Nodes in the Group off:</p> <ul style="list-style-type: none"> - If Automatic control is activated: - Pressing off will activate min-light, otherwise it will put output to 0 on all channels - Will prevent presence detection in this or neighbouring groups to turn the lights in this group on <p>Any button press event is counted as a presence event (the wallswitch is assumed to be inside the same room as the Group, which means someone must be in the room). This logic leads to pressing the off button to activate the neighbouring groups if they were not already on.</p>
Dim Up	Increases Brightness of luminaires 1 step, will disable Daylight harvesting until manual control is reset (press off button)
Dim down	Decrease Brightness of luminaires 1 step, will disable Daylight harvesting until manual control is reset (press off button)
Cycle Scene forward	Move forward one scene in the list of scenes defined in chapter Scene Setting . The default scene (no scene selected) is also part of this list
Cycle Scene Backwards	Move backwards one scene in the list of scenes defined in chapter Scene Setting . The default scene (no scene selected) is also part of this list

Toggle Scene X	Activates scene X
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9.2 Combining wall switch control and automatic presence control

If the system is in Automatic lighting control, the wall switch can be used to temporarily overwrite the automatic lighting control values., the system will operate as follows.

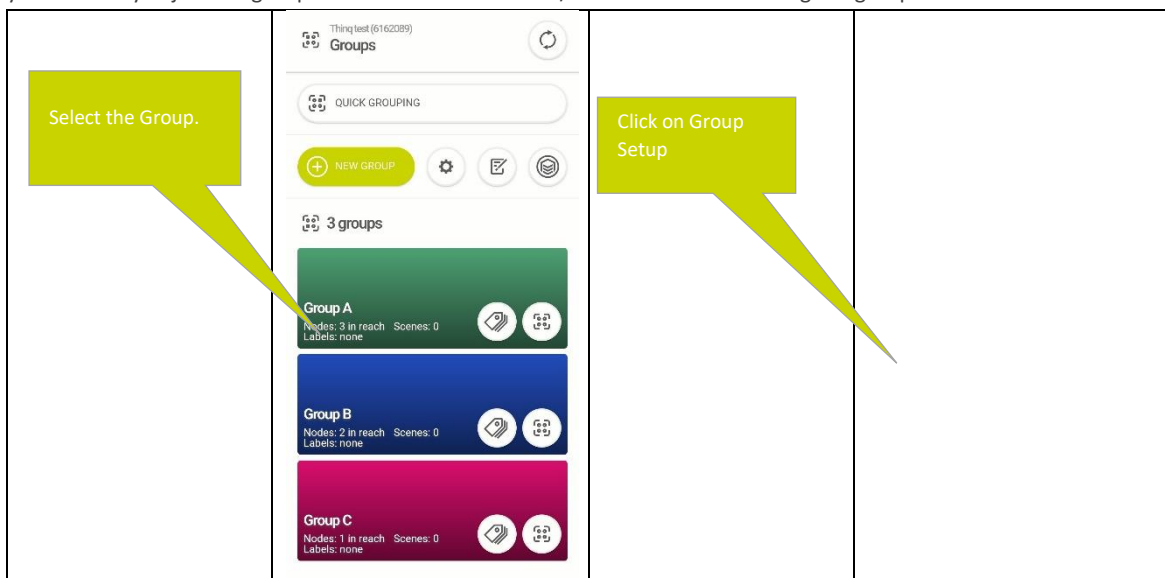
Action	Interaction with Automatic lighting control
Wall switch dim up/down	Will dim the light up/down versus the current light level and disable Daylight harvesting.
Scene selection	Will select the particular scene and disable daylight harvesting
Switch off	Will move to minlight state and disable sensors
Switch on	Will cancel switch off

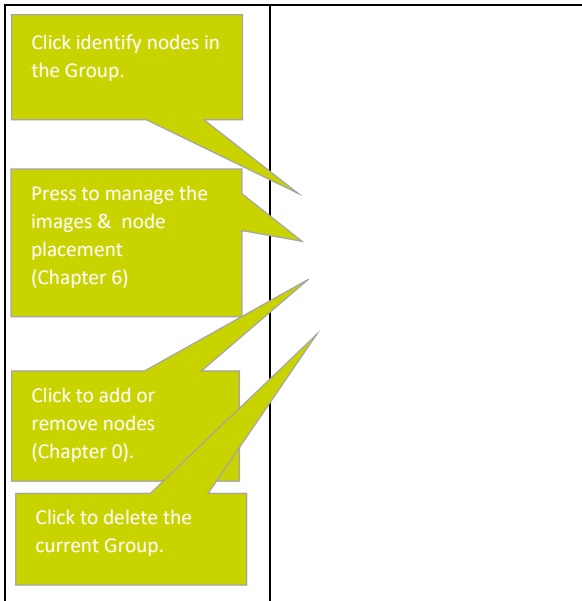
Any manual input through a wallswitch will be cancelled once the timeout from the last presence event reach the timeout for max light + timeout for medium light (see chapter [5.1](#)). At this time the room is consider unoccupied and is brought to the default state for the next visitor.

Every button press will always count as presence event in the automatic presence control logic, as it is assumed the wallswitch is in in the same room as the Nodes, this includes pressing the off button, which means pressing the off button will trigger the neighbouring groups to be triggered.

Adjusting Groups

If there are any changes in the Nodes that belong to a group or if the physical space in which the Nodes are installed changes, you can easily adjust the group definition in order to add/remove node or deleting the group:



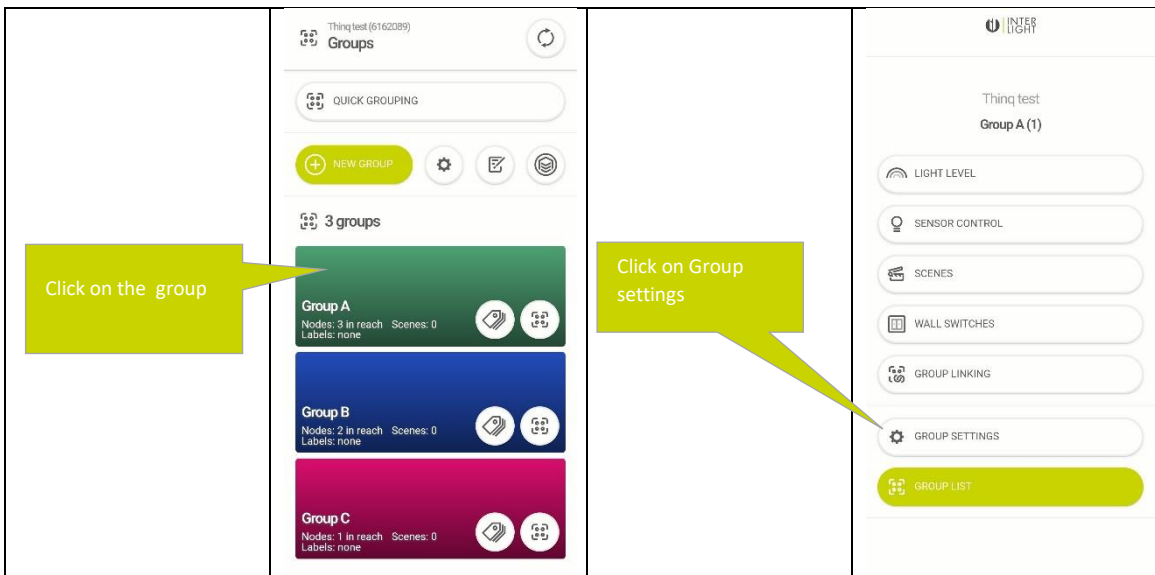


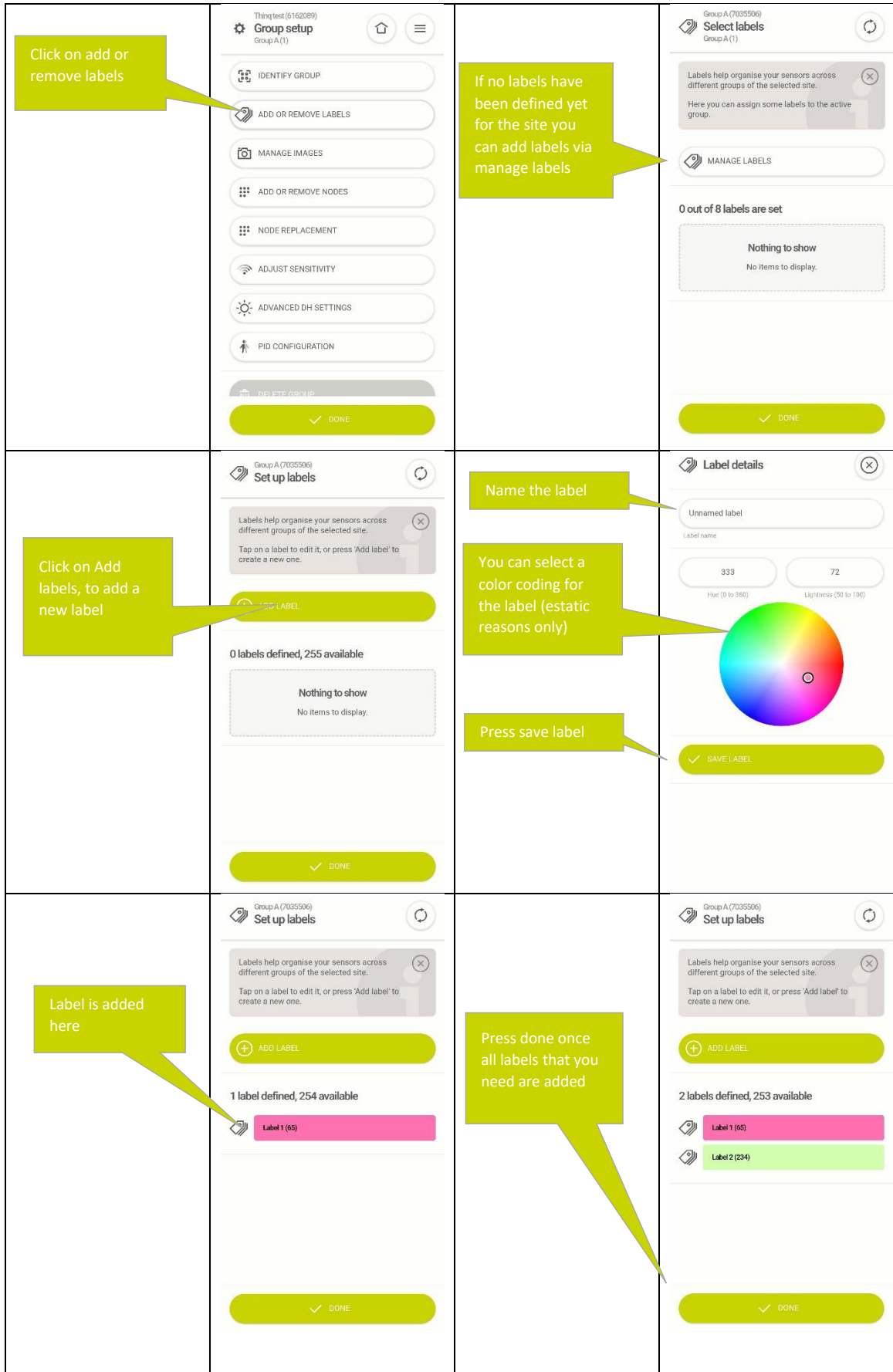
If Nodes are removed from a Group, they will also be removed from the linked site.

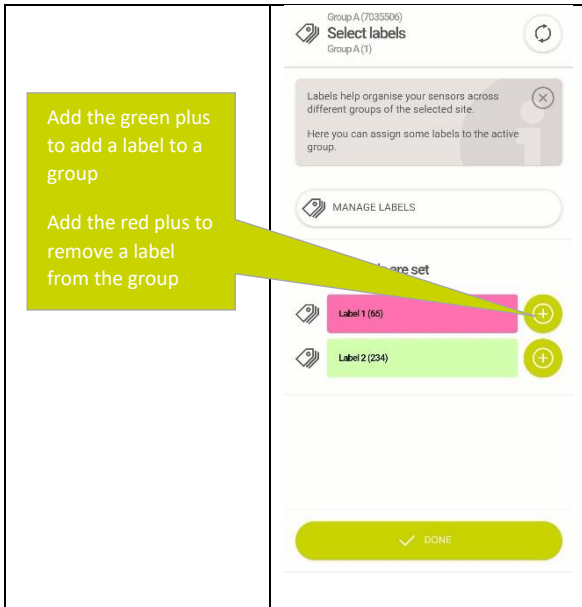
10. Adding labels to groups

Groups can be assigned a label; these labels can be used in the Thingq API to send a command or action to multiple groups at the same time.

Labels can be used flexible, and a group can have multiple labels. For example, one could use labels for the first and second floor and at the same time labels for meeting rooms and hallways. All groups would have two labels in this case, enabling you to either address all groups on a particular floor or all meeting rooms or all hallways.







11. Dali sub-adressing

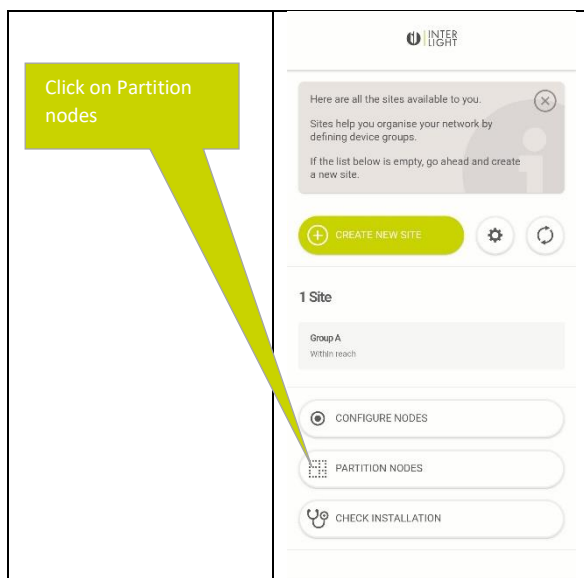
Thingq Nodes that are communicating with multiple Drivers over Dali can address these Driver individually. One Thingq Node can address multiple Dali Drivers and they can be assigned to a number of Partitions. Partitions will act the same as if each were a separate Thingq Node, which means:

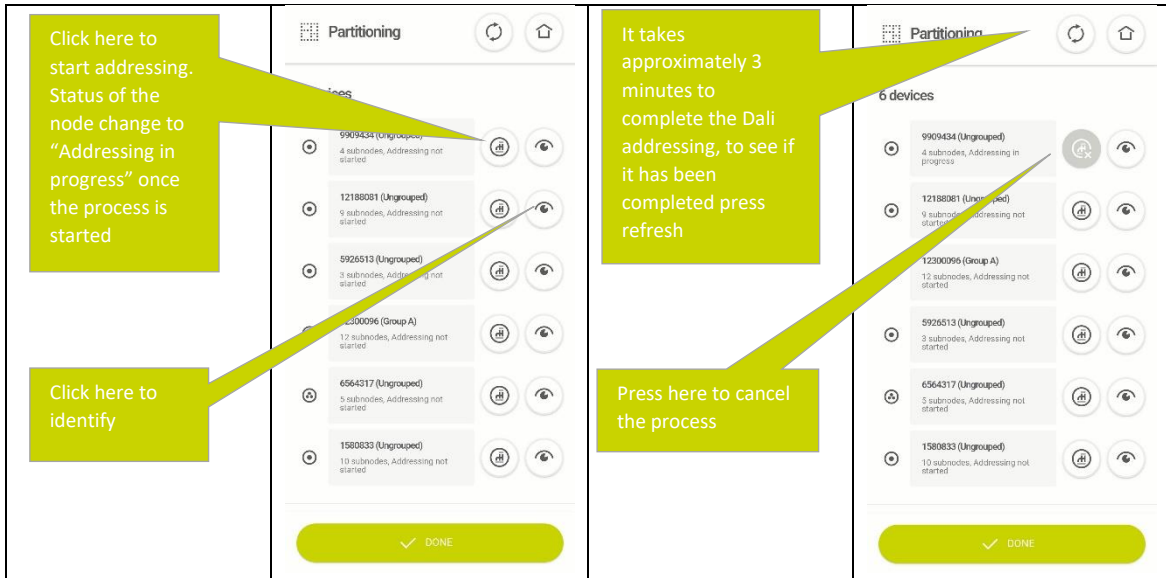
- They can be assigned to different Groups.
- Can be set to different Light Output level within one Scene.

Be aware that the hardware of a Node might be limited in the maximum number of Dali Drivers that can be connected to the Hardware, in this case the Thingq Lighting Control Software can not address more Drivers than the Hardware can handle, please consult the Hardware documentation of your Node to verify.

For the maximum number of partitions the Thingq Software can handle please see section [21.1](#)

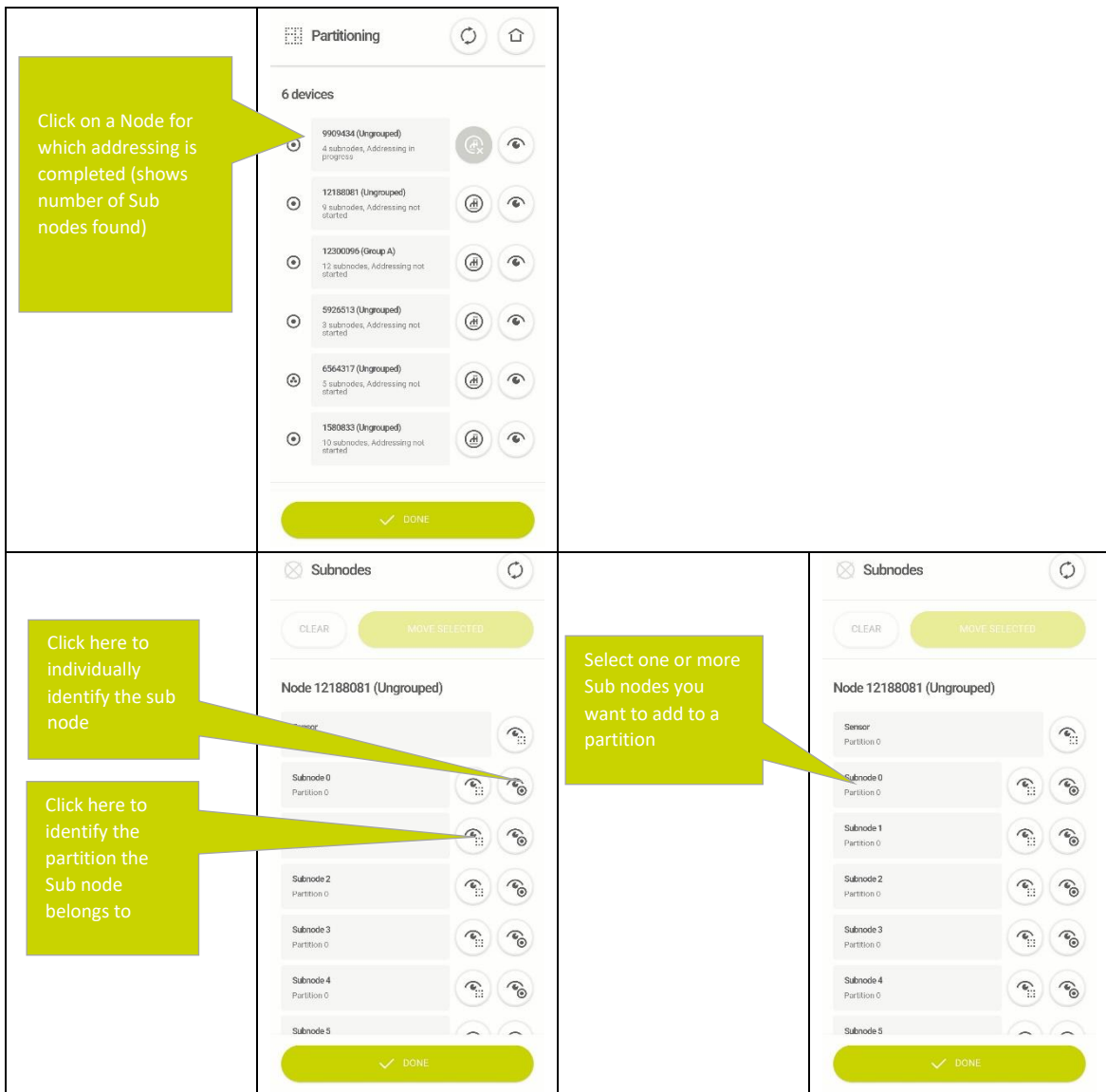
In case the limitation of the hardware and the Thingq software on the maximum number of Dali Drivers it can control the minimum of the two holds.

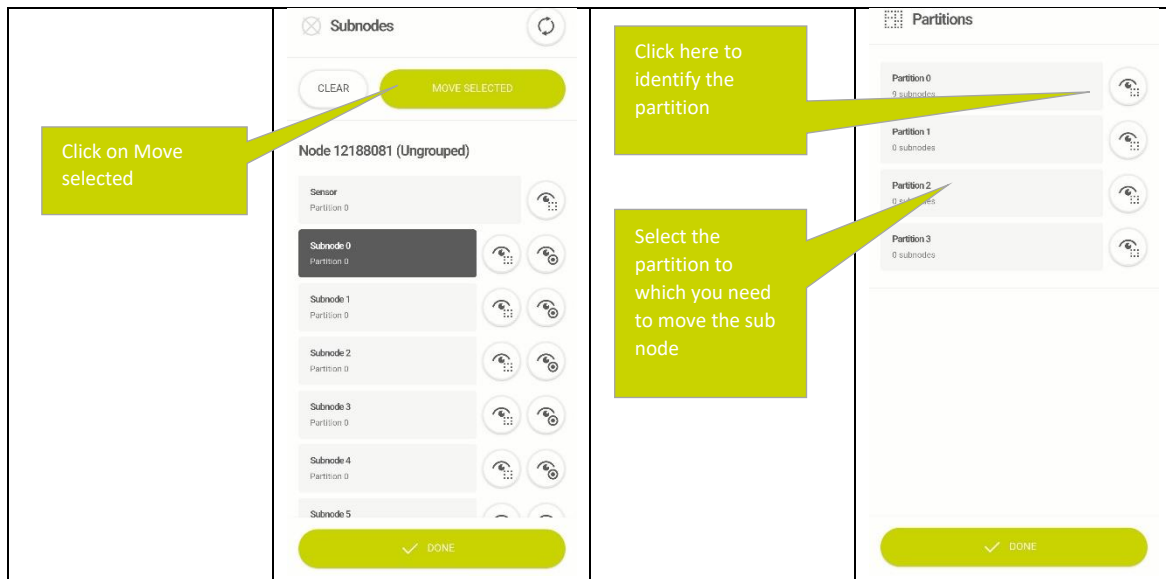




11.1 Assigning Sub nodes to partitions

Once a Dali Node has ran its addressing the found subnodes (Dali Drivers) can be added to different partitions as follows:

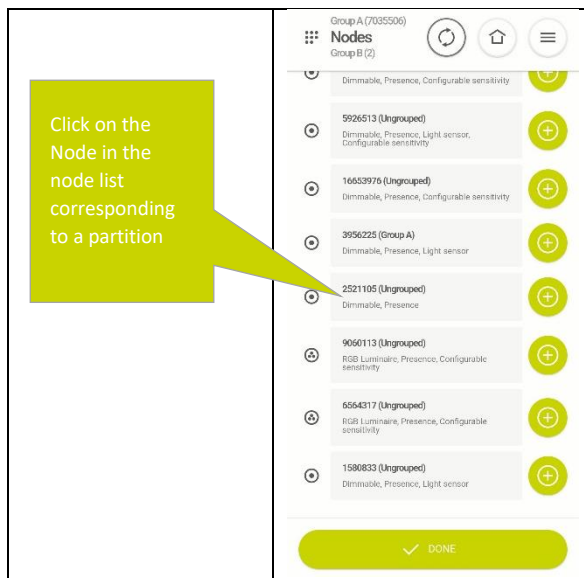




Please note that if you use Dali addressing on a node without its own sensor, the option to move the sensor will still appear, assigning the sensor to a different partition will have no effect.

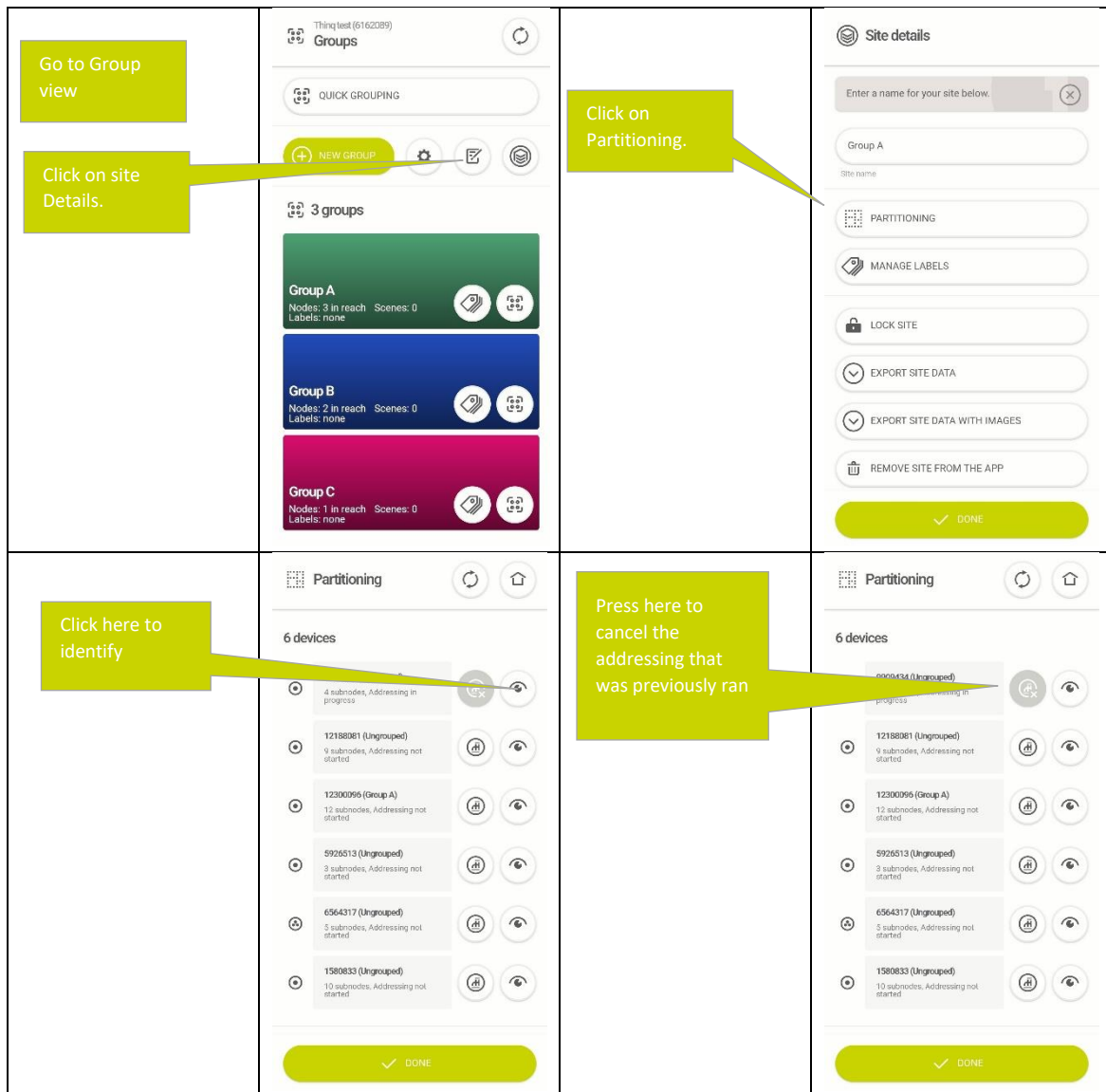
11.2 Adding partitions to groups

Once partitions are created, they are added as Nodes to the Node list in any other screen in the app can be used as such:



11.3 Undo addressing

If a Node was previously used to run addressing, but you would like to restore the node to acting as one node you can undo the partitioning as follows:



After undoing the addressing the nodes responding to the respective partitions are not automatically removed from the respective groups, they need to be removed manually. We recommend removing the nodes from the groups before undoing the addressing.

12. Security settings

The Thinq Lighting Control Software has a full end-to-end security and encryption system that secures your network from 3rd parties making any unauthorized changes. Security access control happens at Site level, this means that for any part of the network you want to give other users access to, you will have to create a different Site. Once a Site is secured on only authorized mobile phones and Nodes can connect to the network. Nodes in a secured Site can no longer communicate or forward messages from Nodes that do not belong to the same Site.

Nodes can only be added to a secured site by temporarily opening the site, adding the node(s) and then lock the site again, see section [12.4](#)


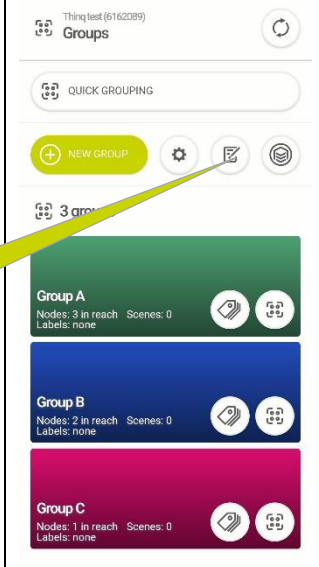

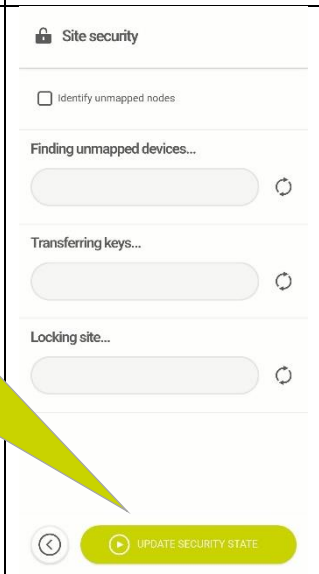
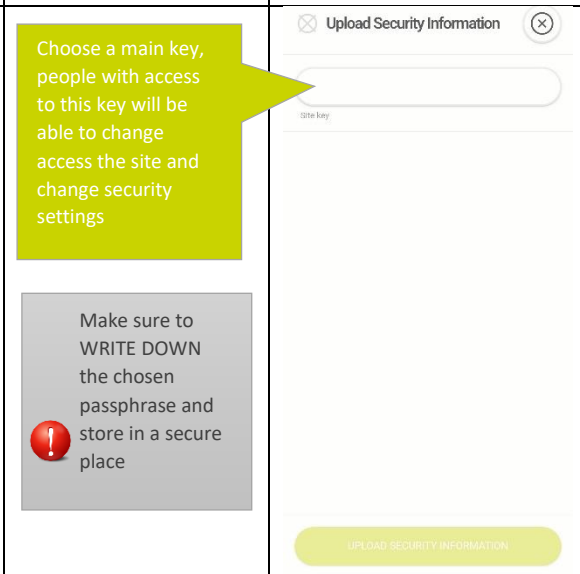
12.1 Securing a Site

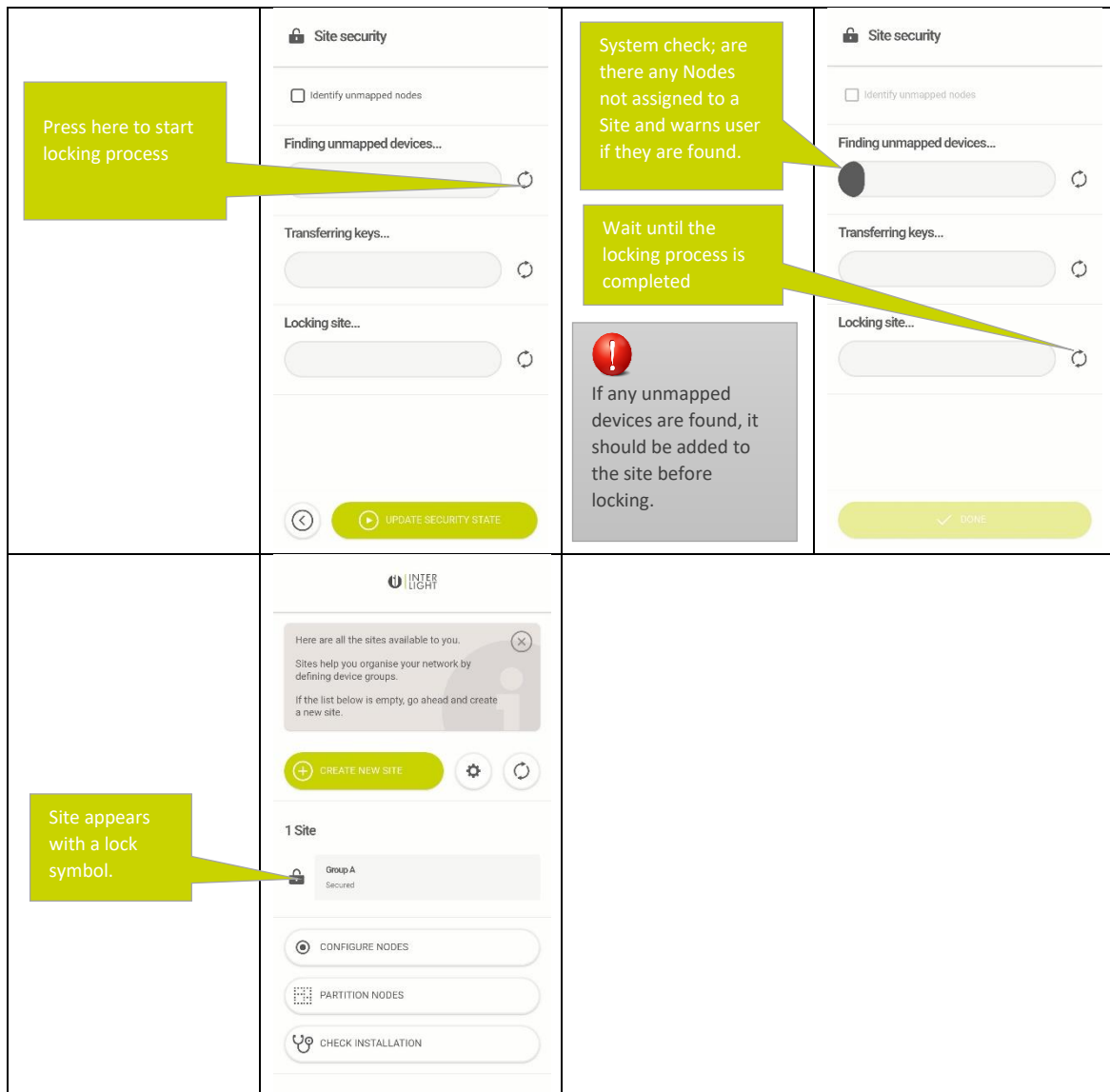
To enable security, you first have to create a Site, make sure:

- At least 2 nodes are in a site before locking it, adding nodes to a secured site requires minimal two nodes to be present to work.
- the network does not need to rely on any Nodes that are not part of the Site to communicate, as these connections will get lost

Once a site is locked it will lose connectivity to all gateway and therefore the nodes will go offline in the MQTT feed, the INT and not be reachable for the SDK. In order to reconnect the gateway to network, please enter the network settings on the gateway dashboard (You can find this information in the document named *Thing gateway manual*).

! An internet connection is required when locking a Site as the security credentials are backed-up to the Thing Cloud!

 <p>Click on site details.</p>	 <p>Click on Lock site</p>
 <p>Press Upload security settings to back up the security settings that will be set to the cloud and start the locking process</p>	 <p>Choose a main key, people with access to this key will be able to change access the site and change security settings</p>
 <p>Make sure to WRITE DOWN the chosen passphrase and store in a secure place</p>	



12.2 Authorizing a second phone for secured site

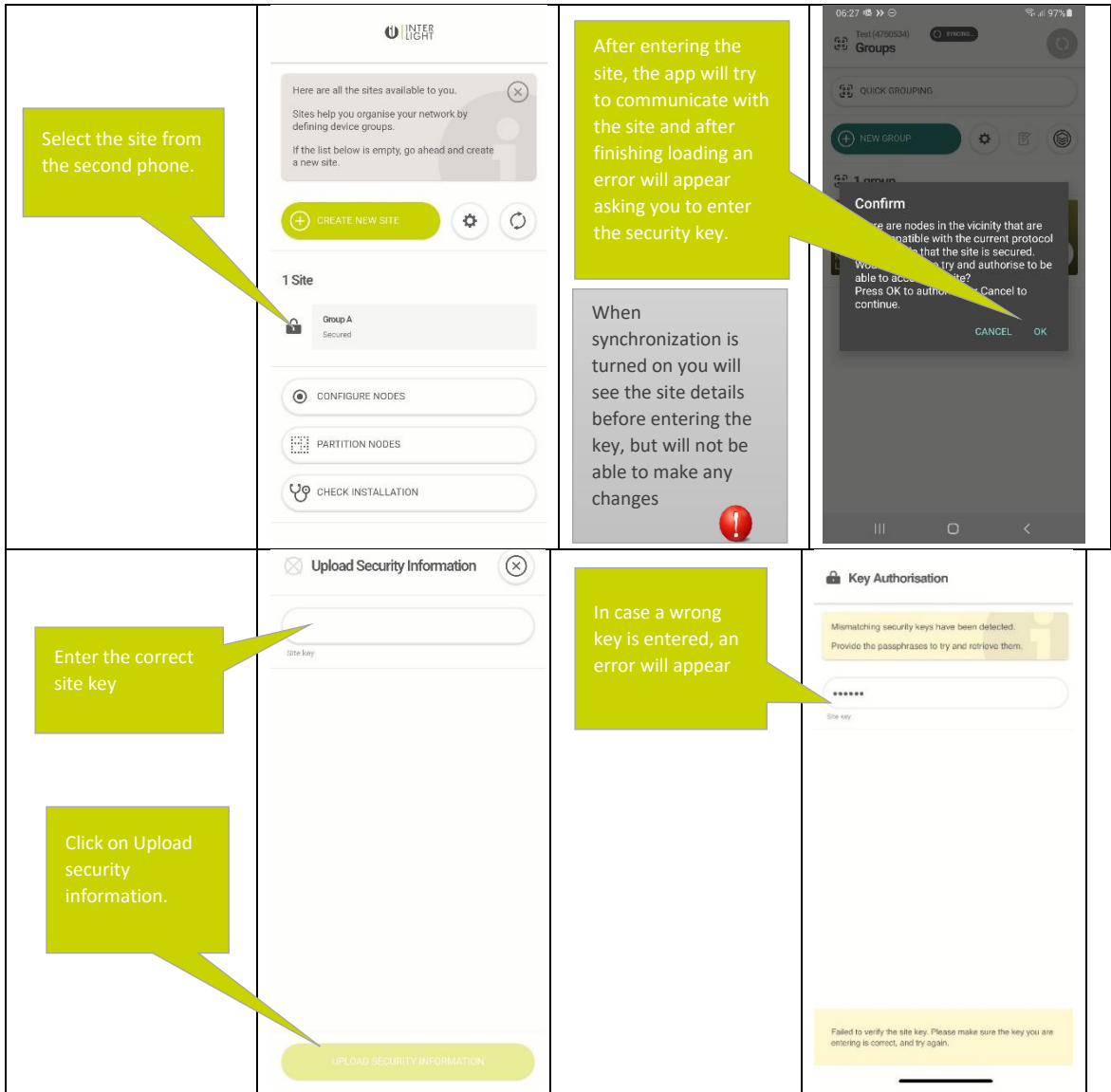
Once a Site is secured an additional phone can no longer access the Site, if a new Phone is attempting to connect to a secured Site it will be asked to enter the main phrase (as entered in the steps in [12.1](#)), once this information is entered the user can control the site as normal.

When provided with a master passphrase the user can also lock/unlock the site

To download the security credentials the phone needs to be connected to the internet when entering the passphrase

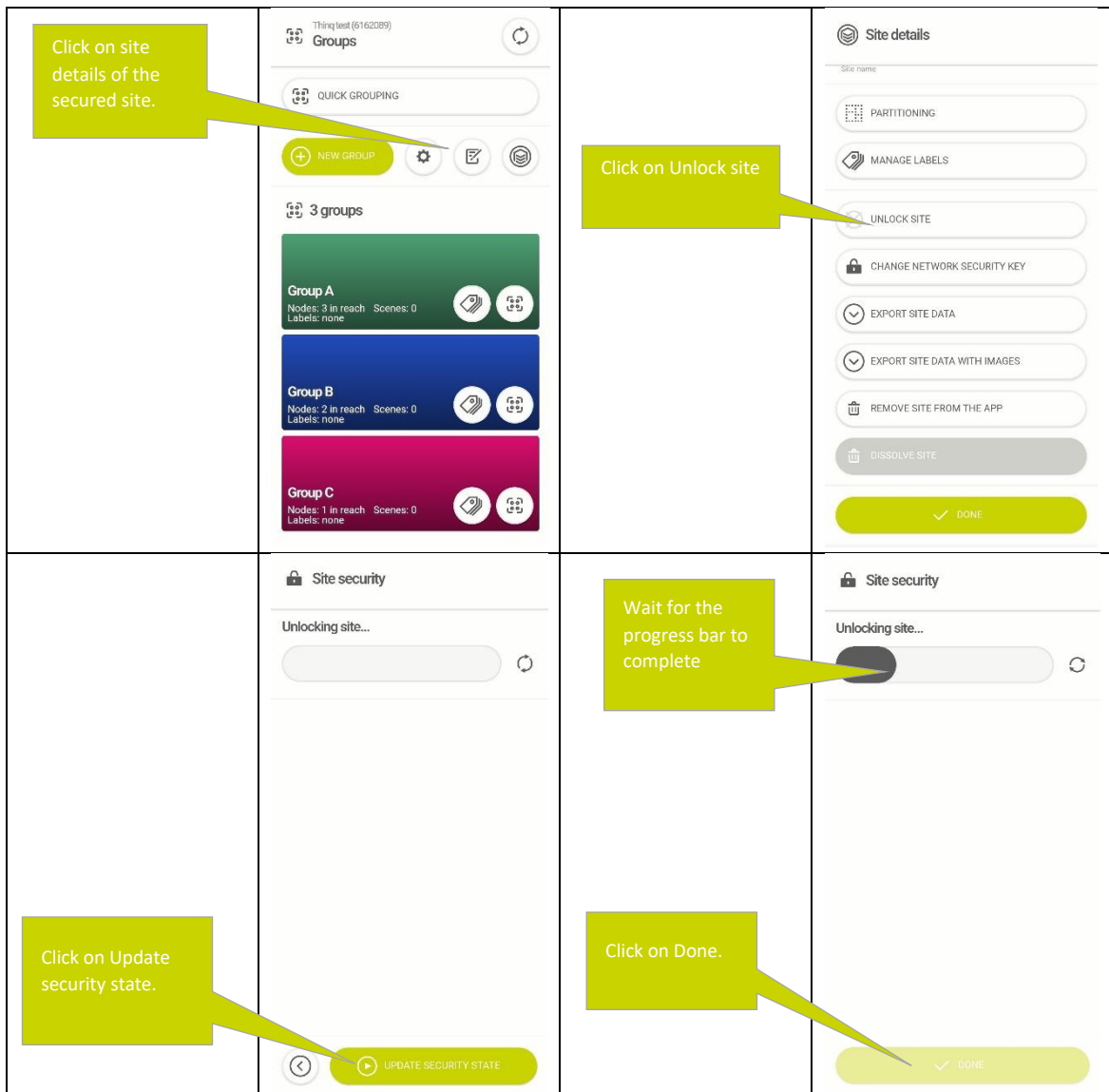
Master passphrase are to be asked at the role / person who secured the network and can share the passphrases

The request to enter the passphrase will appear after you enter the secured site and the spinner finishes loading. If synchronization is on, you are able to navigate through the site before entering the password, but would not be able to make any changes.



12.3 Unlocking a Site

To remove all security settings from a site you must first unlock the Site. After the security settings have been removed, any mobile phone with the Thing app can be used to control the Site again and any Thingq Node that is not part of a secured Site itself can forward and connect the messages on the Network again.



12.4 Adding nodes to a secured site

To add a node to a secured site, you first need to temporarily open the site.

<p>Select the Group.</p>		<p>Click on group settings</p>	
<p>Click on Add or remove nodes</p>		<p>Click on Temporarily open site</p>	
<p>Click on Open site</p>		<p>Network will be open for 10 minutes and will automatically close after this..</p> <p>Once the network is open you can add nodes as normal, however you can't remove nodes</p>	

When adding nodes to a secured site, they will load the security settings and reboot. After rebooting they will blink, it will take a while for the nodes to be fully operational after the reboot.

12.5 Removing nodes from a (secured) site

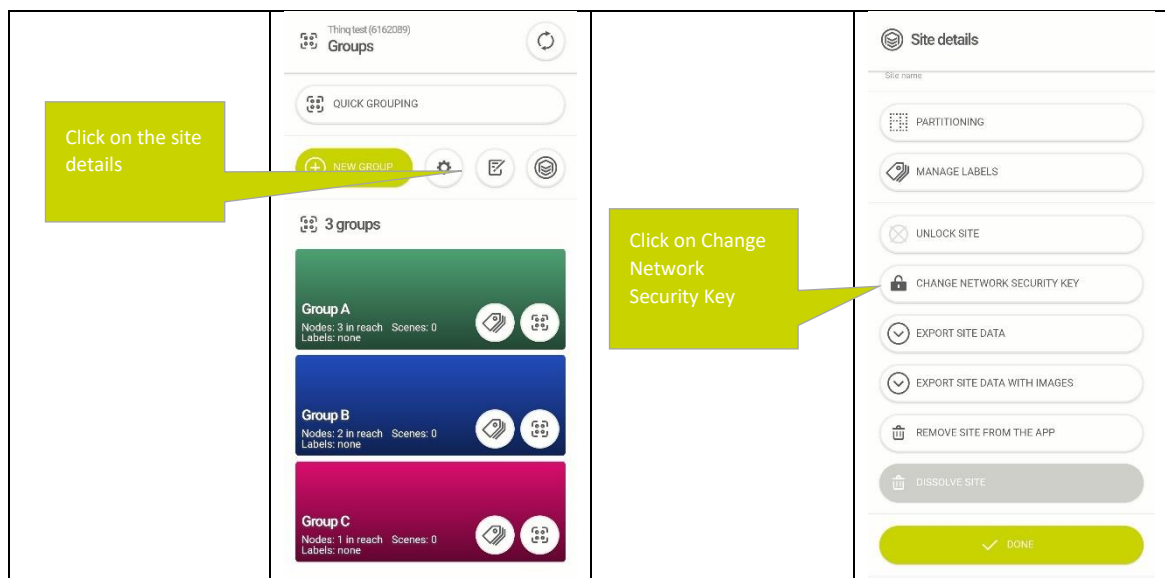
Nodes can be removed from a secured site as normal, there are however a few important things to consider:

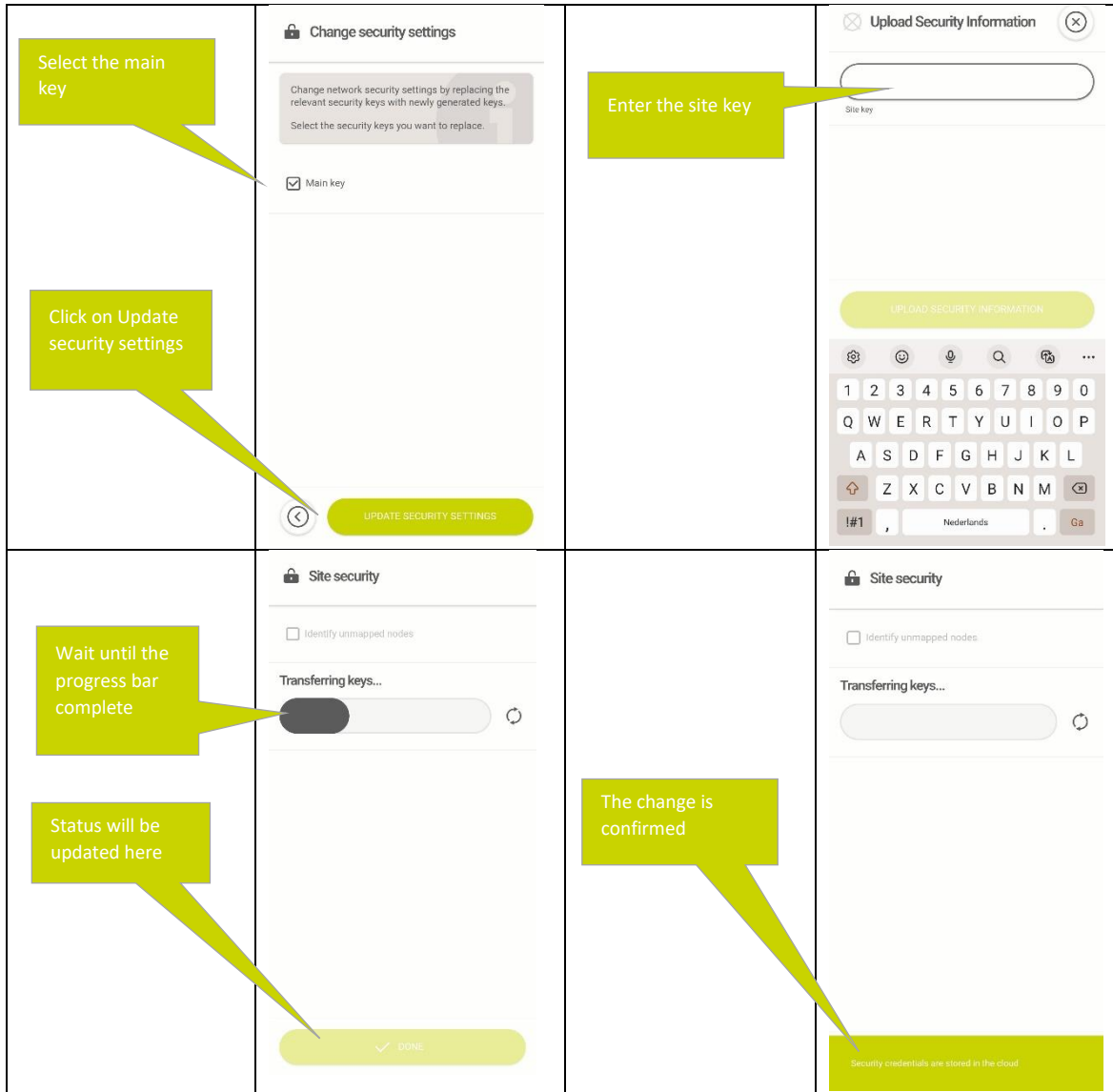
- If you remove a node belonging to a partition from a secured site (or any site really) all nodes corresponding to partitions of that same node will also be moved
- At least 2 nodes should remain in a secured site in order for the adding of new nodes to still work
- more if you remove a node from a site, it keeps the secured settings for about 10 minutes, so you can add it to another group quickly. after 10 minutes it will blink and revert to default settings, ready to be added to another site
- After rebooting itself. It can take a while before Bluetooth communications have been restored.

Remember that a node that is Dali addressed, all nodes corresponding to different partitions linked to the same node share one radio chip and can therefore only be part of one site. If you remove one partition from the secured site, you should remove all partitions linked to that node

12.6 Change password

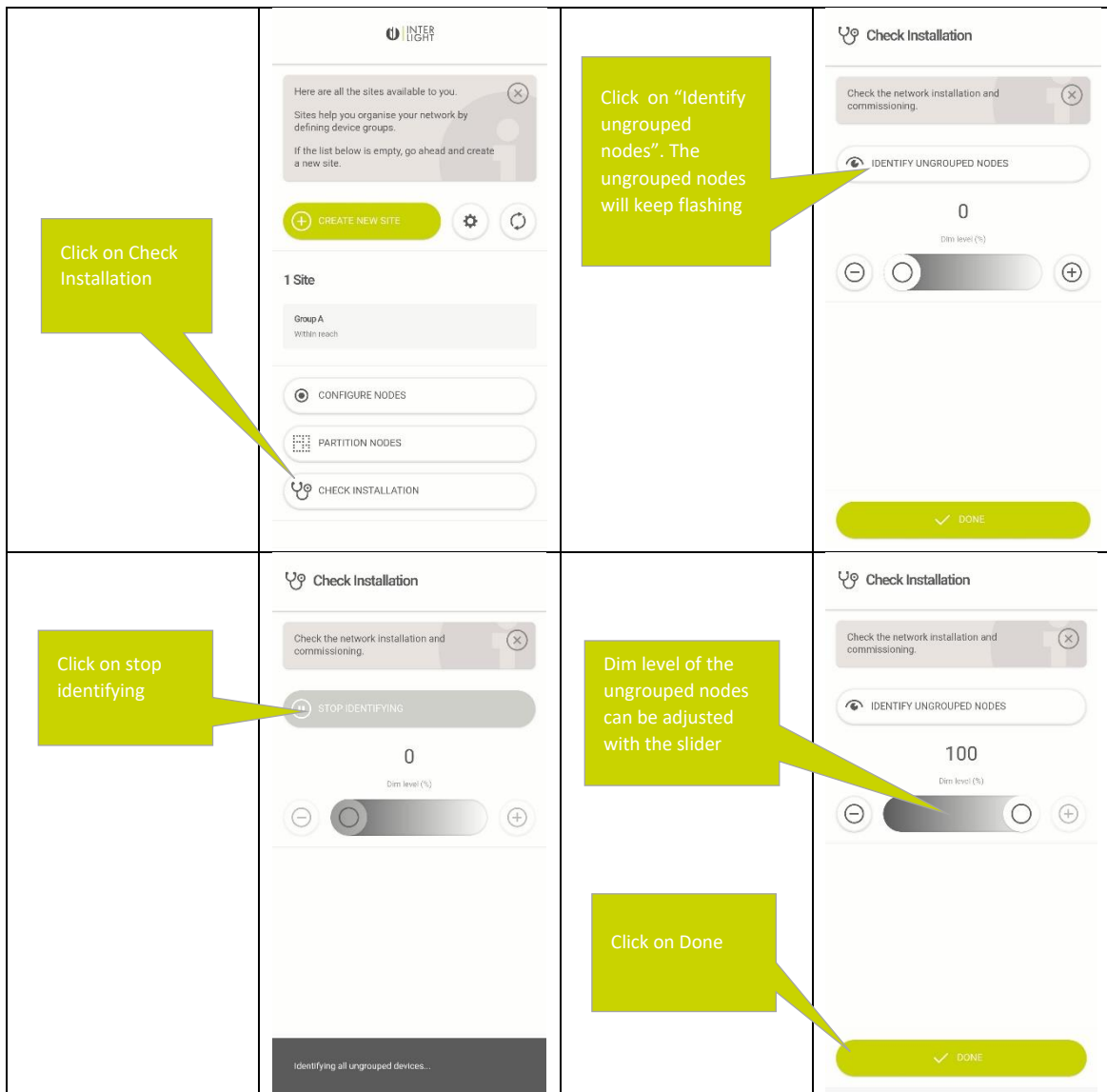
Changing the site password by replacing the security key of the secured network. Steps to replace the security key are as follows:





13. Check installation

The ungrouped nodes in the site can be identified here. To identify the ungrouped nodes follow the below steps:

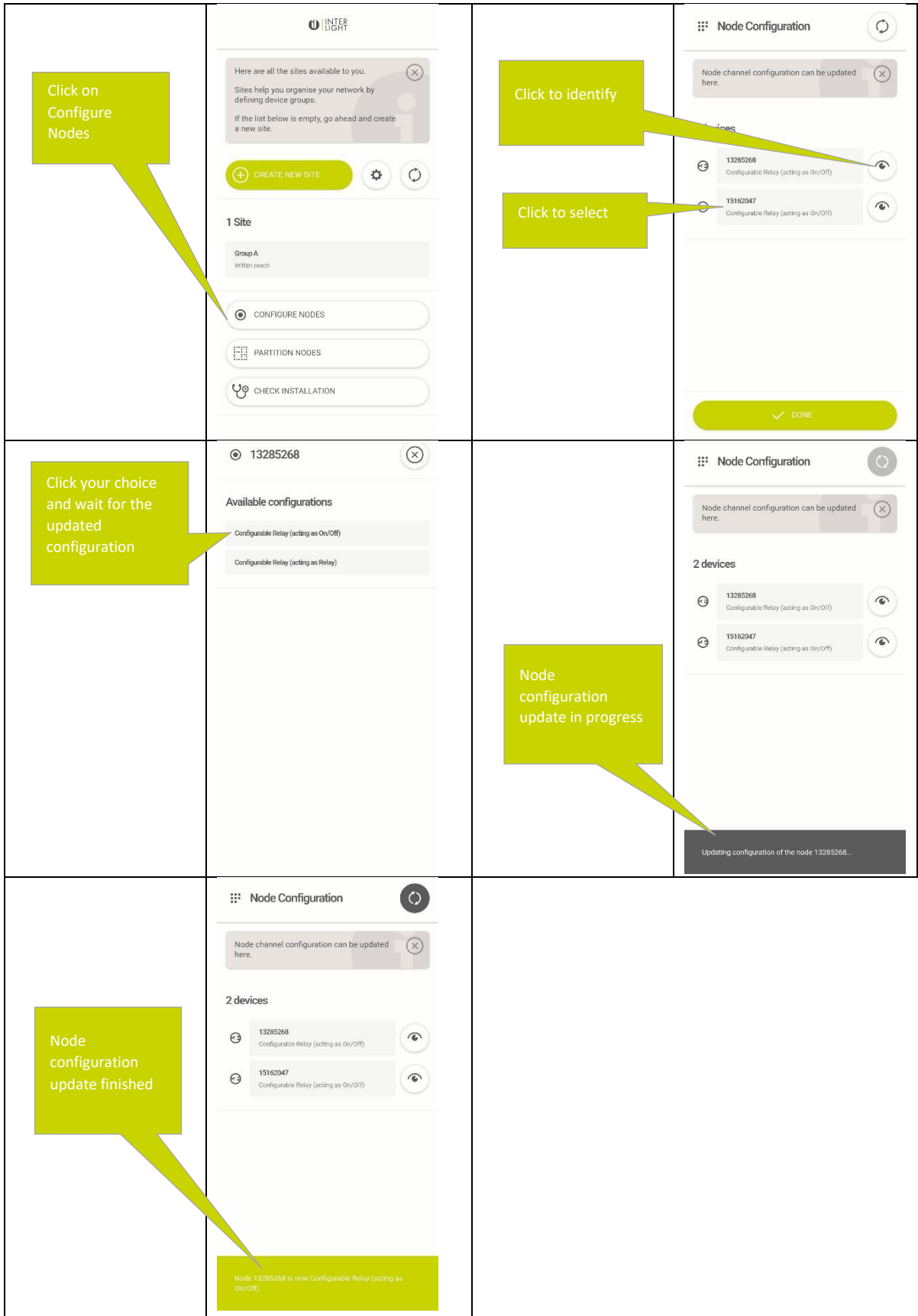


14. Configuring node capabilities

Some nodes can be configured to change their capabilities this includes:

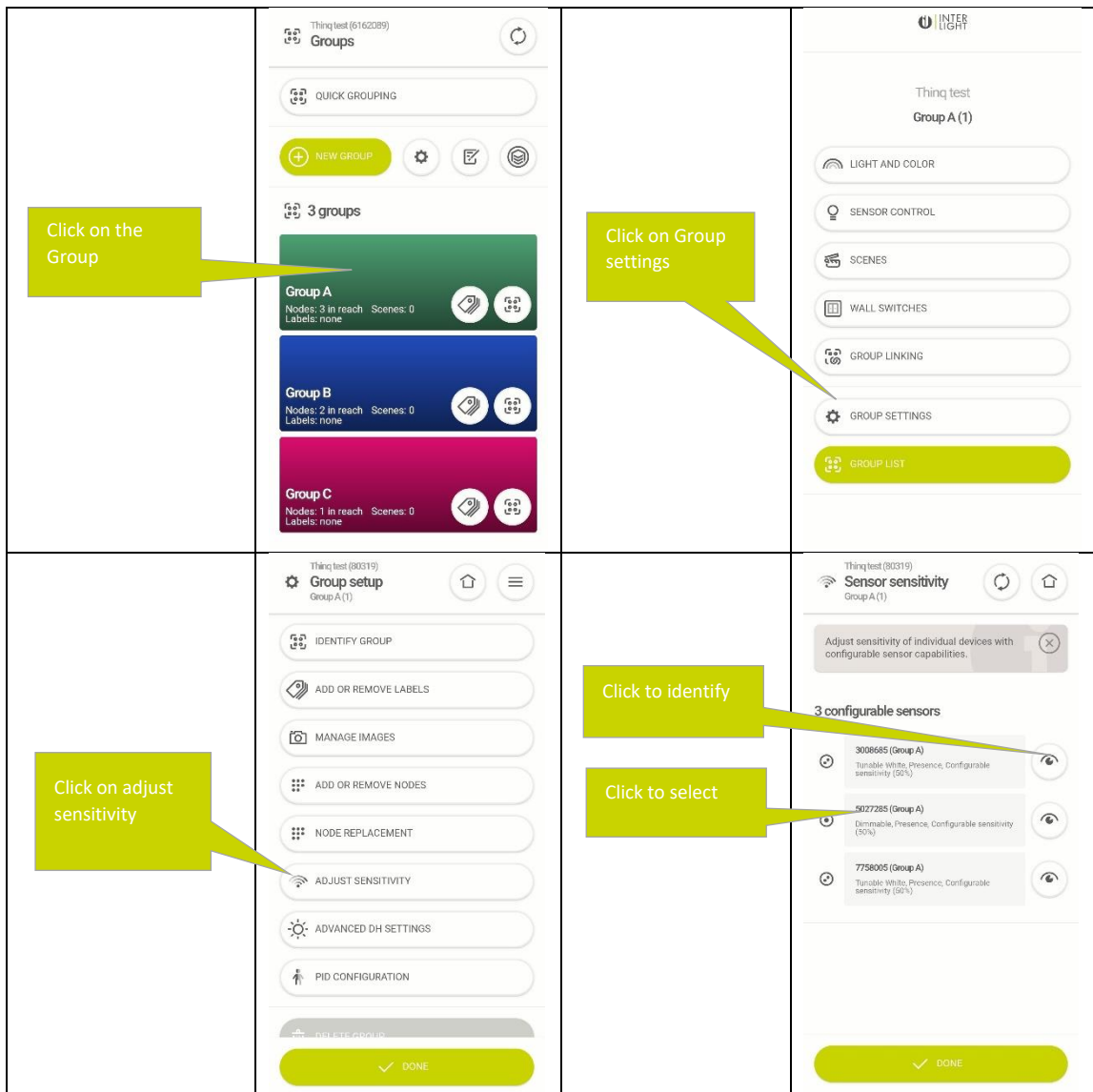
- Switching between tunable and dimmable
- Configuring relays to operate as volt free relay or an on/off luminaires

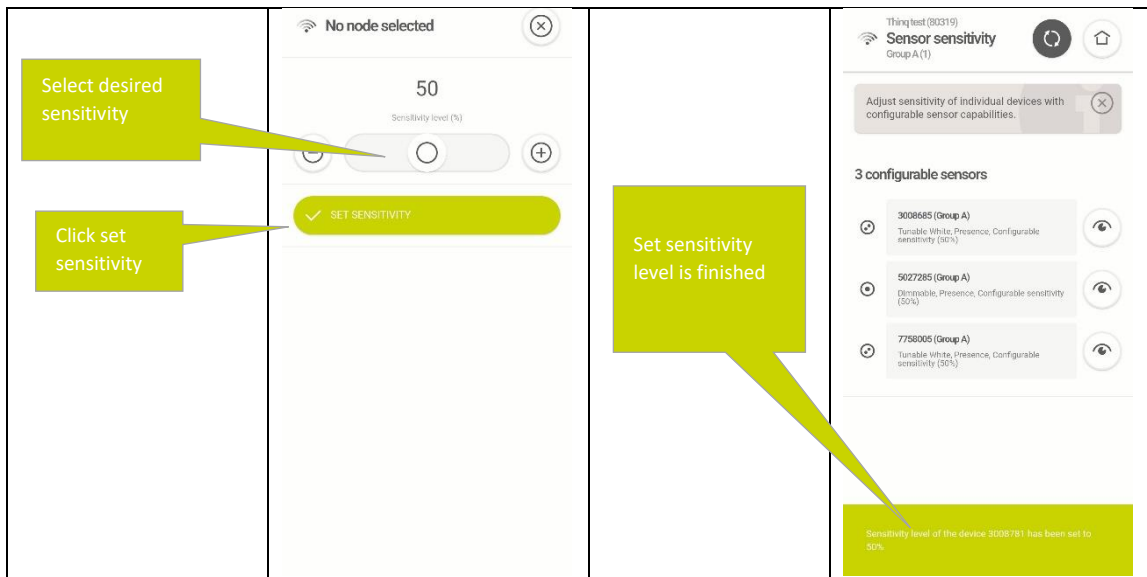
Not all nodes with these capabilities can be configured, it could be that the manufacturer decided to fix the capabilities of a node



14.1 Setting sensor sensitivity

Some sensors support the ability to set their sensitivity, a higher sensitivity means that smaller motions are still picked up, but increase the chance of false triggers. In general one wants to set the sensitivity to the highest value for which no false triggers occur in the installed environment.

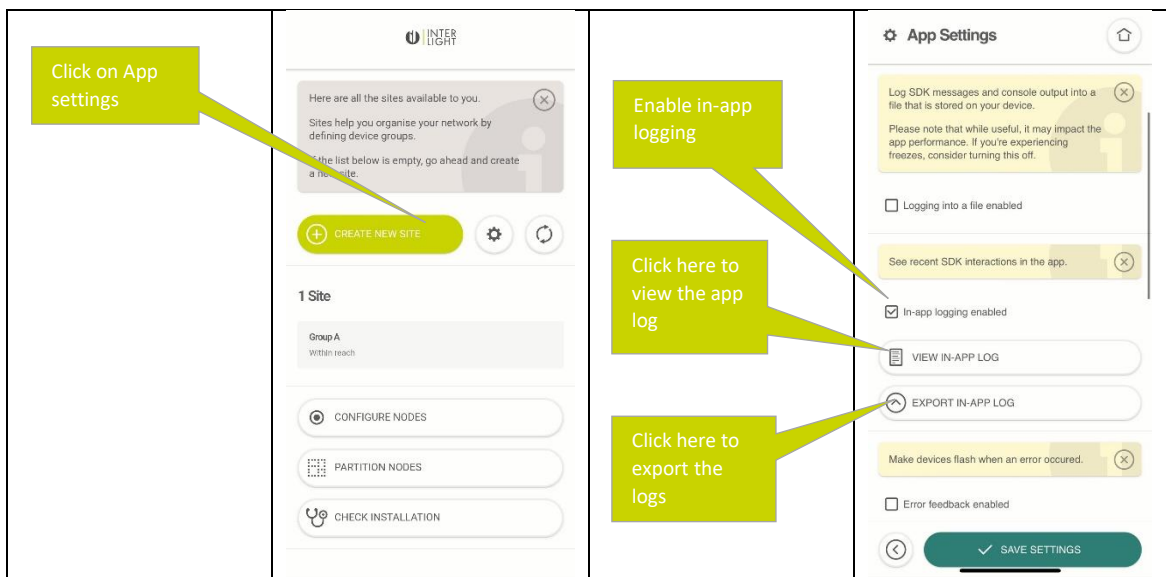




15. App settings

15.1 Enabling In-app Logging

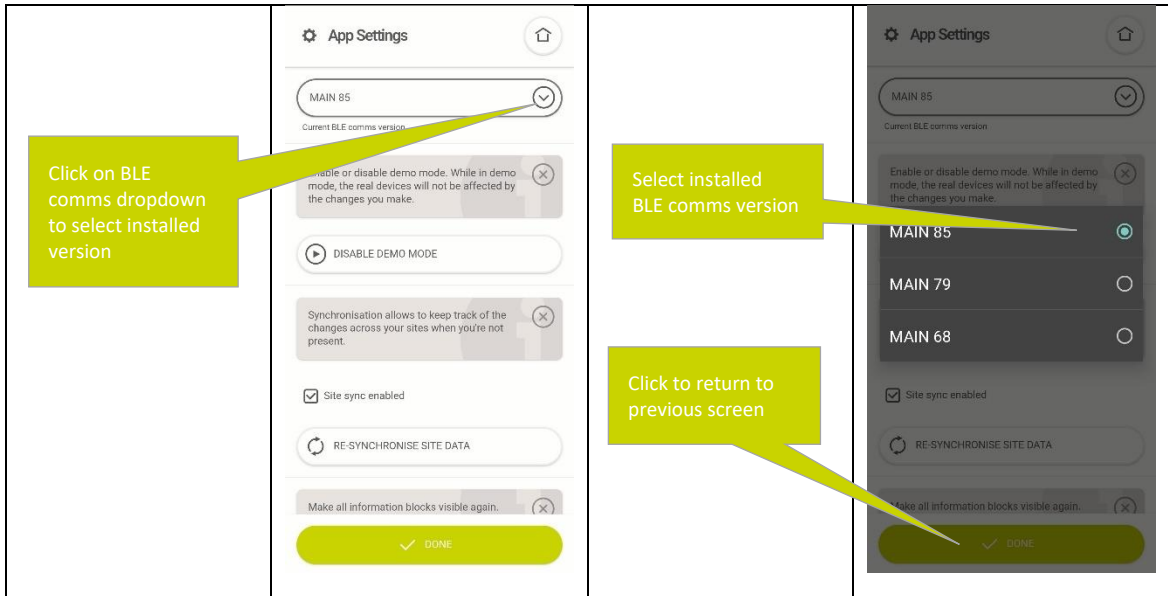
In the app by default In-app logging is disabled. This should be enabled to get the app log. The app log can be directly exported through the app. The steps to enable and export the app log are as follows:



‘How to’ instructions on exporting the log can be found in section 15.5 (via computer) and 24.1 (sending log via e-mail)

15.2 Selecting the BLE version the app operates in

The app can be configured to operate in backwards compatibility mode with previous BLE versions. The user can select the Version from the app. The steps are as follows:

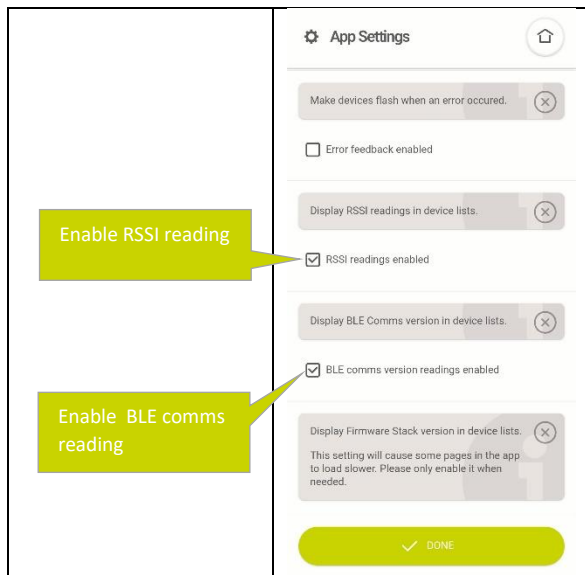


Back in the settings menu selected BLE version comms version will be displayed click save settings to keep the selection. The app can only communicate with nodes of one version at the time and nodes with different versions cannot communicate directly with each other. If the site has nodes with mixed version, all the nodes should be updated to a single version before proceeding.

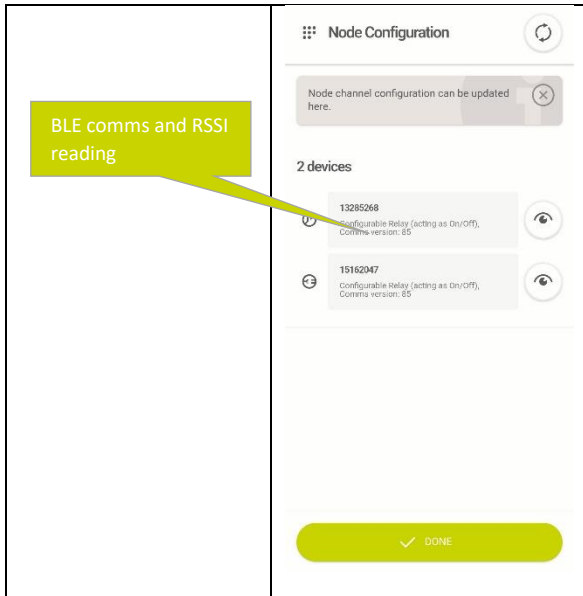
15.3 Displaying RSSI and BLE version of nodes

Global settings to be used during deployment of a site. Node and groups are sorted on their estimated on their radio strength called RSSI value. If you would like to better understand why certain nodes are higher in the list than others or why the communication with a particular node is unreliable one can display the RSSI values in the Thing app. An RSSI value can be between 40 and 90 plus, where the lowest value is the shortest distance to the node/highest radio quality.

The second setting is the BLE comms version which shows you which version of the software the nodes are operating on, which can be useful to figure out why a particular node is (not) showing up on the app.

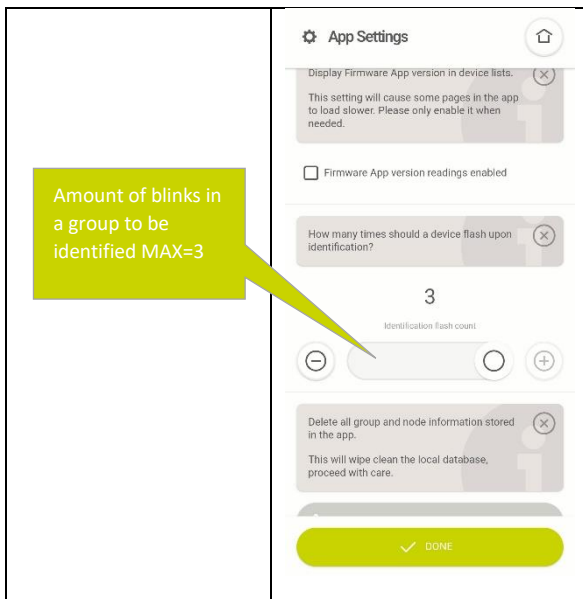


Once enabled, both values can be observed when a list of nodes is displayed.



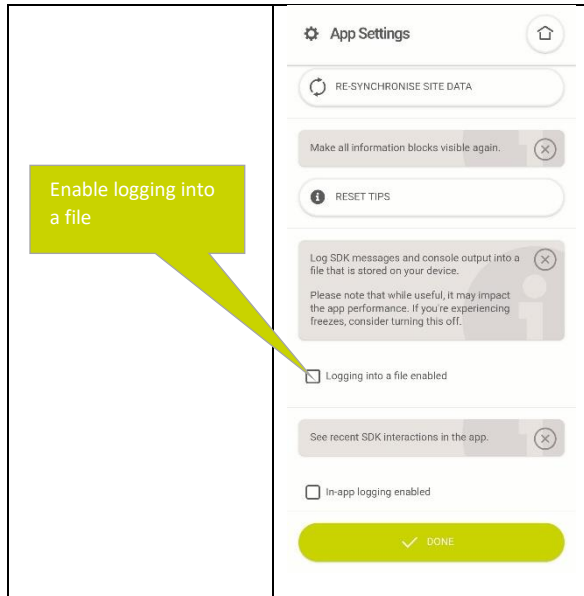
15.4 Setting number of blinks when identifying a luminaire or group

The next setting is used for group and node identify and it will flash the luminaire in configurable blinks.



15.5 Enable logging into a file

Logging into a file needs to be enabled in the App setting to get the logs. The steps are as follows:

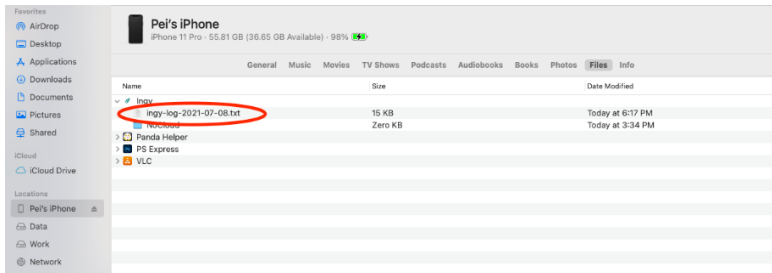


The log files can be imported from the phone by connecting it to the desktop. Steps to follow are:

Android : Open the file explorer, find the file on the file system and download it.

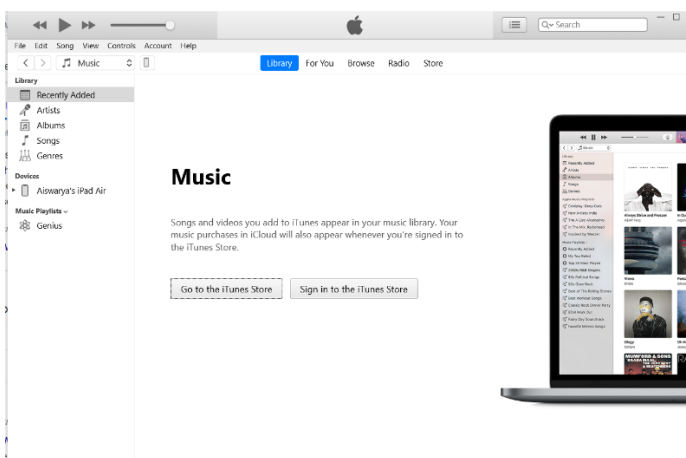
iPhone : Finder or iTunes can be used to import the files if you are on a windows system. Select the Thing app from the “File sharing” and download the logs.(Refer the screenshots below)

Finder in Mac OSX

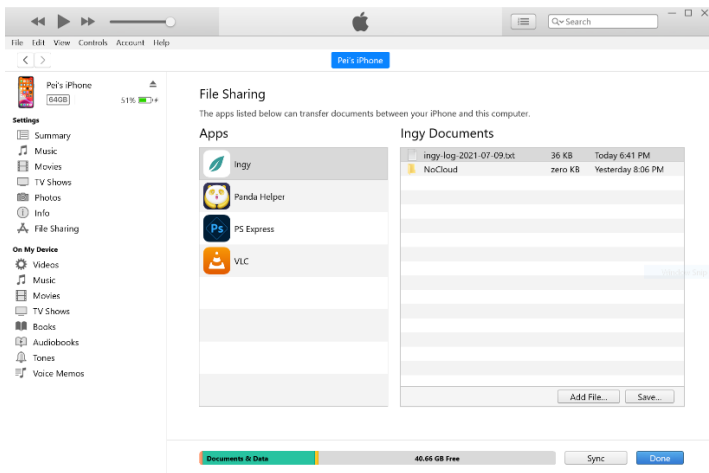


iTunes on Windows

Click on the phone symbol which is displayed right under *Account*.

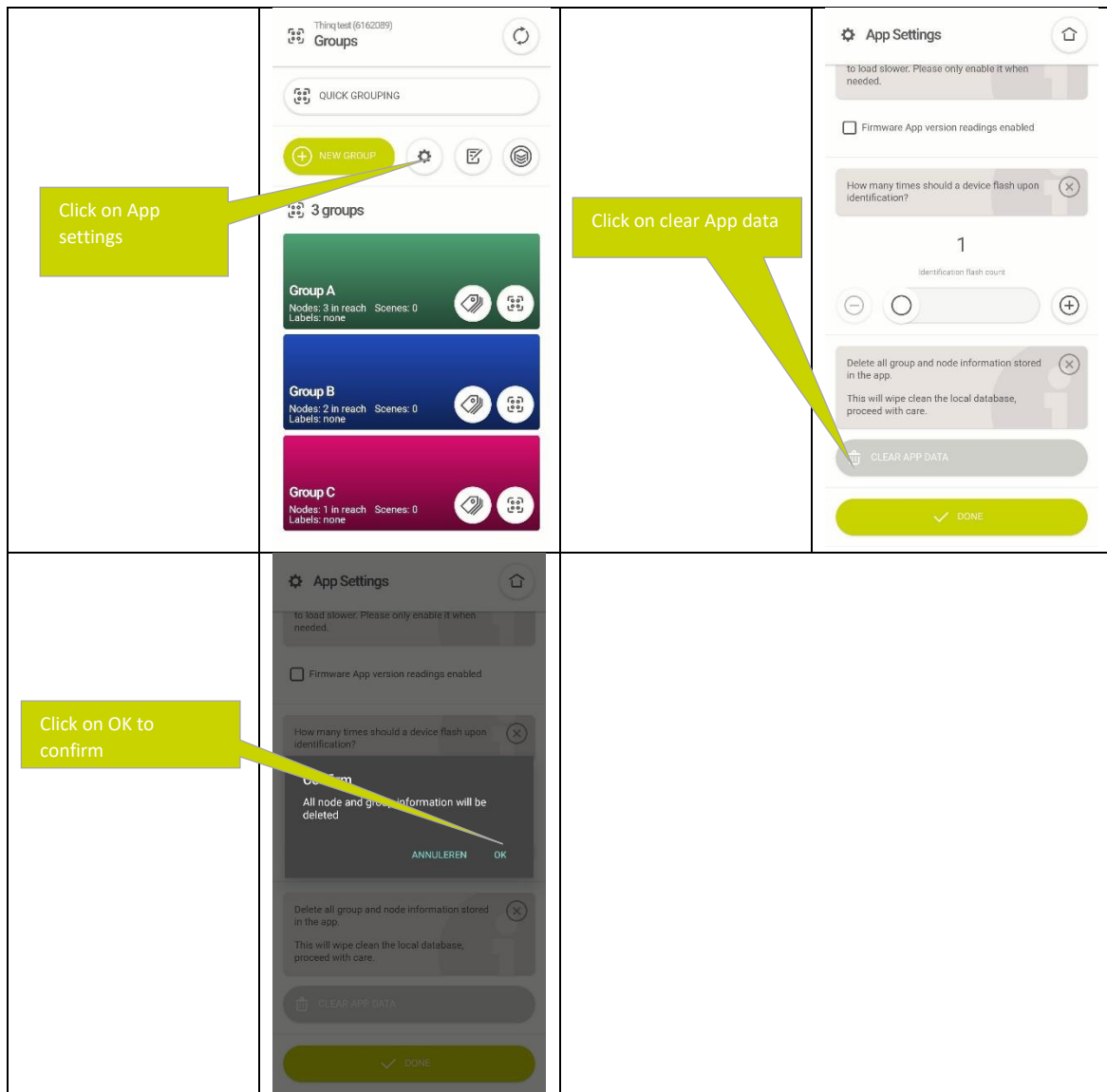


Click on File share and download the Thing file



15.6 Clear App data

By clearing the app data, the entire node and group information will be deleted from the app. This action will not affect any data on the nodes or in the cloud. If the app sees a site or node again, it will show all information stored in the cloud and in the node again. To clear the app data, follow the below steps:

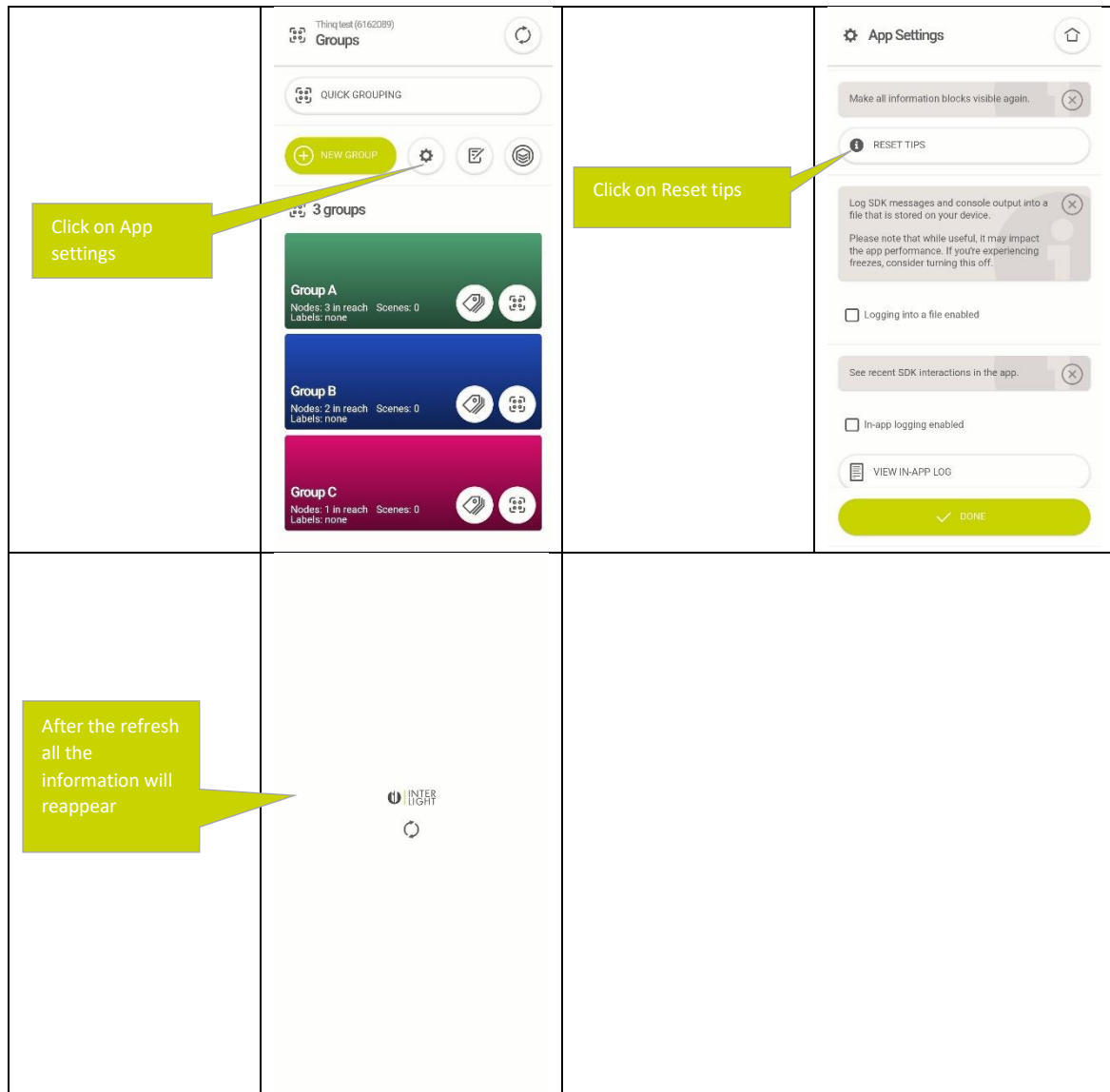


15.7 Synchronizing data between the Thing App and Nodes

See section 17.2 for the site sync enabled feature and re-synchronize site data

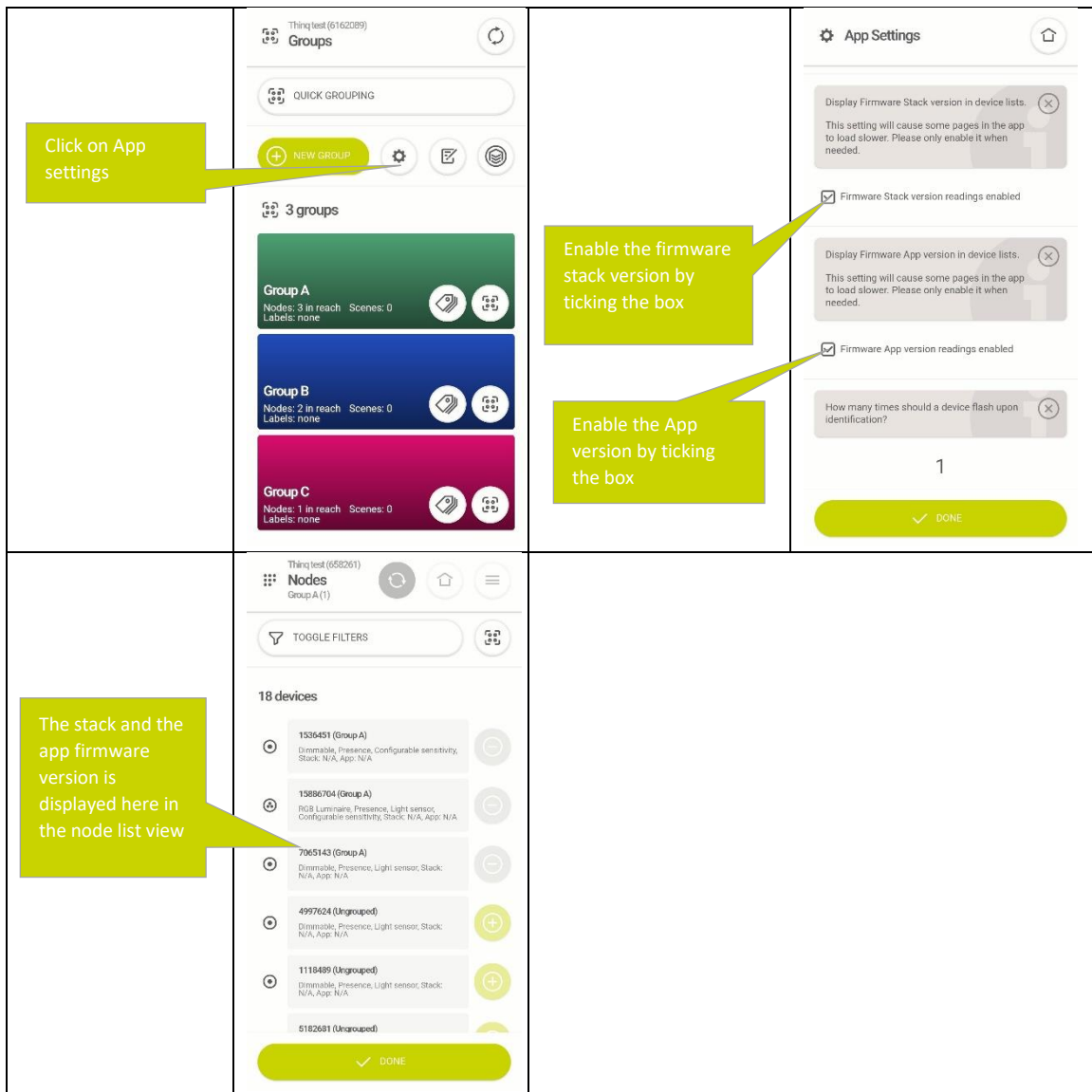
15.8 Reset Tips

Throughout the app you can see the helper boxes beside each button which explain what each function does. The information can be cleared by closing it but by resetting the tips they all appear again. To reset the tips follow the steps below:



15.9 Firmware stack and app version

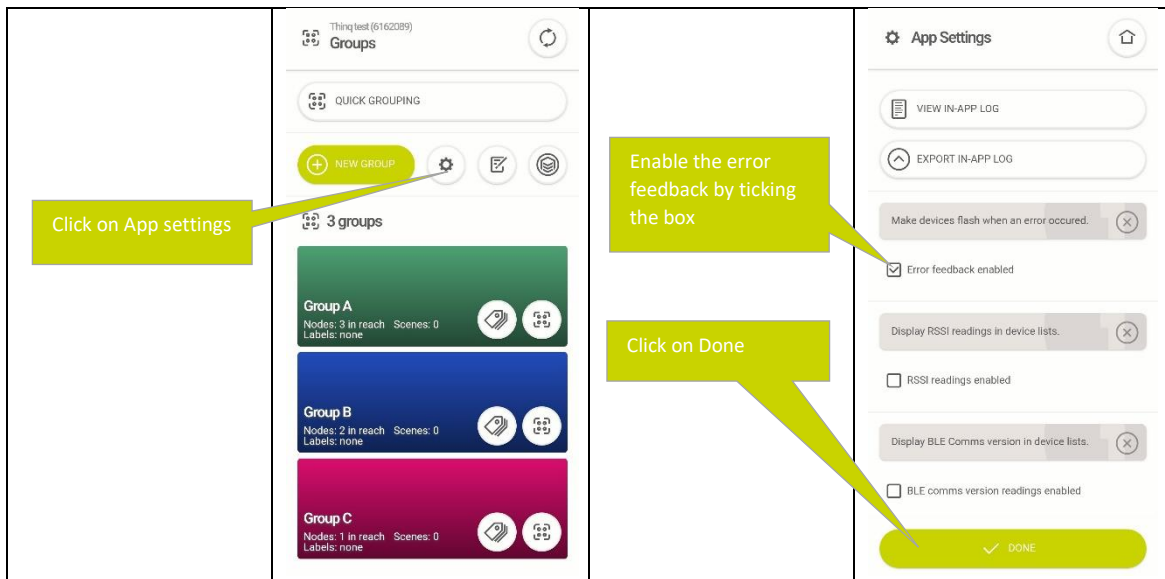
The display of the firmware and app version can be enabled from the app. It displays firmware stack version and app version in the device list. This setting will cause some pages in the app to load slower. So enable it only when its needed. To enable these follow the below steps:



15.9.1 Error feedback

While the lighting control system is operational and no gateway nor app is connected to a nodes there is no way to observe any errors happening in the system. If you suspect there are malfunctioning nodes in the network, for example their hardware is failing or their radio communication to other nodes is failing, you can enable flash on error feedback. If a node reaching any form of illegal state it will give a single flash. This can be used to find any fault nodes in the network.

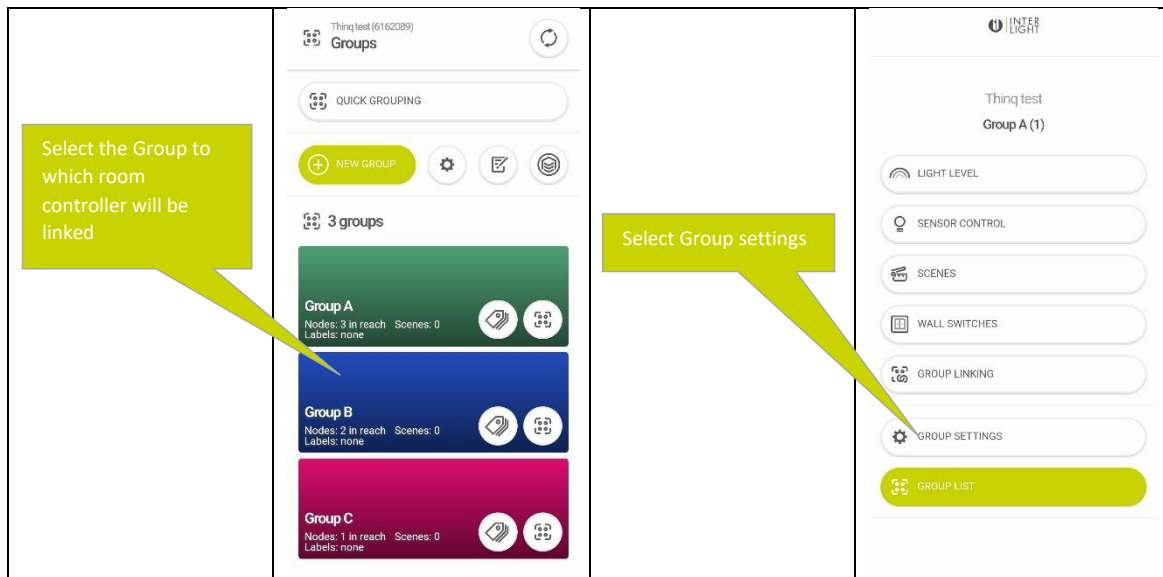
The error feedback can be enabled from the app so that the node will flash if there is an error in the firmware. The steps to enable the error feedback are below:

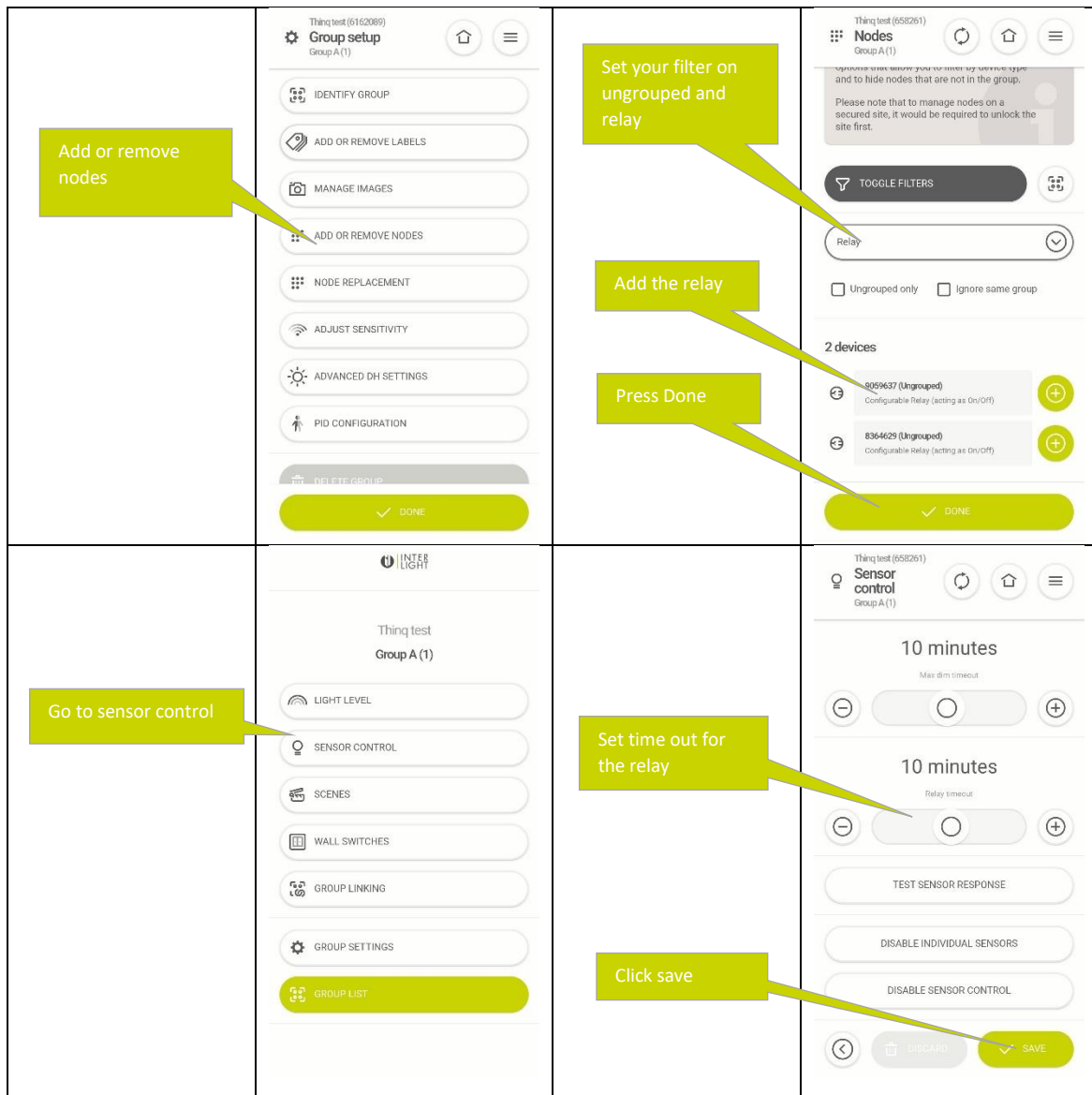


16. Integrating with local room controller via “volt free” contact

It is possible to integrate a Group directly with the room controller in a building via a volt-free contact on the room controller. This allows the Thingq system to inform the room controller of the current presence state of the room. Relays can be configured as on/off luminaires and vice versa see chapter [12](#).

To set this up add an Thingq relay to the room controller and configure the system as follows:





17. Commissioning a site with multiple phones

17.1 Syncing Sites, groups, and lighting control settings between phones via the nodes

Whenever a phone with the Thing App is near a Node it will immediately start syncing information on Sites and Groups that have been previously configured in the Network of which the Node is a member.

It is important to realise that synchronisation between the phone runs through the installed Nodes:

- Phone one will send the information to a Node and phone 2 will collect this information from the Node.
- Nodes will only store information that is relevant for their own operation

This means that for a Site or a Group to be visible on another phone, at least one Node needs to be added to the respective Node or Group.

If you want to work on one site with multiple phones in parallel:

- First create a site on one phone
- Add at least one Group and add one Node to this Group to the Site on that first Phone
- Wait for the Site to appear on any other phone
- Now you can add additional groups to the same Site using the other phones

It is not recommended to work on one Group with multiple phone simultaneous

When using a wall switch with less than 4 buttons, the wall switch will appear as having 4 buttons on a secondary phone synchronising with the site. The switch will remain functioning with the 2 assigned buttons.

17.2 Synchronizing data between the Thing App and Nodes

Phones can synchronise basic lighting control settings and grouping information directly from the node without needing an internet connection. However more advanced information like:

- Node names
- Photos

requires an internet connection to synchronise. As soon as a phone sees a site it will start synchronising information regarding the particular site with the cloud service. If this information is present, it will immediately start showing the site with the correct name and pictures that were set on another phone.

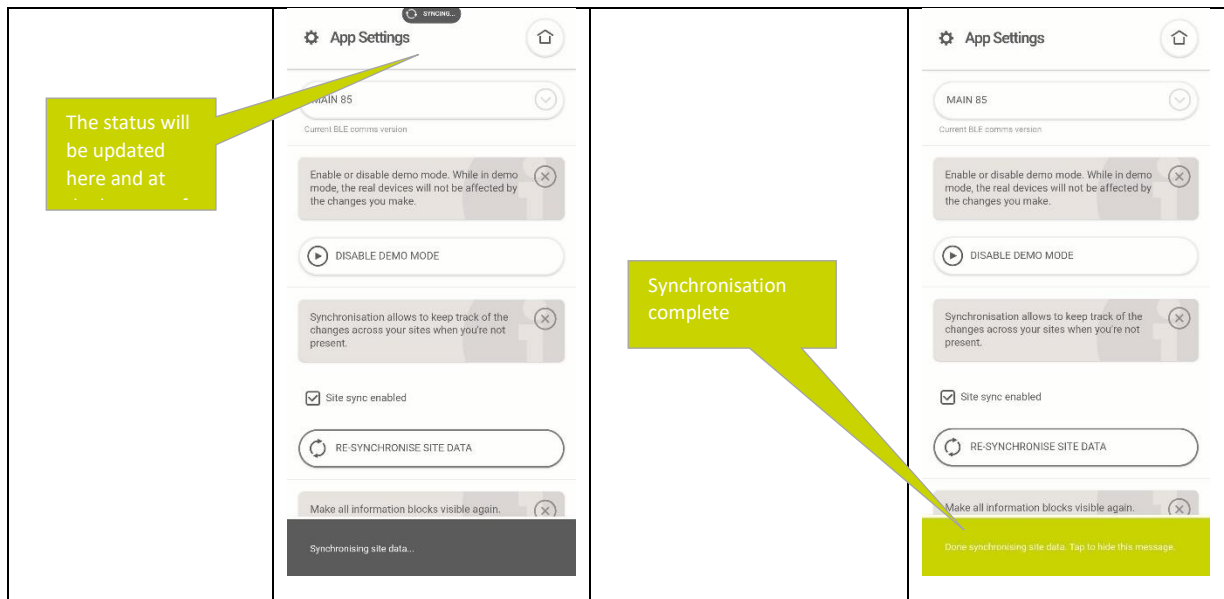
To enable the synchronisation follow the below steps:

Click on App setting

Tick the site sync enabled. This will synchronize group names, images, etc via the cloud to other phones working on the site.

Synchronisation happens automatically if for some reason you want to ensure full synchronisation happens, this button forces a full synchronisation

Click on okay to proceed



17.3 Authorizing a phone to access a secured site

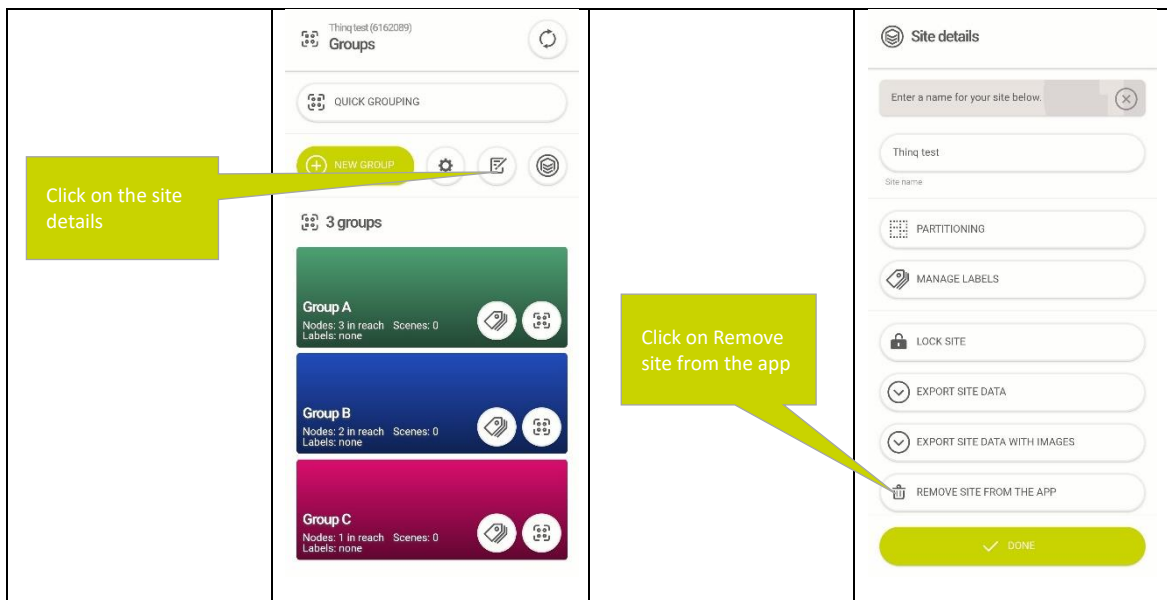
See section [12.2](#)

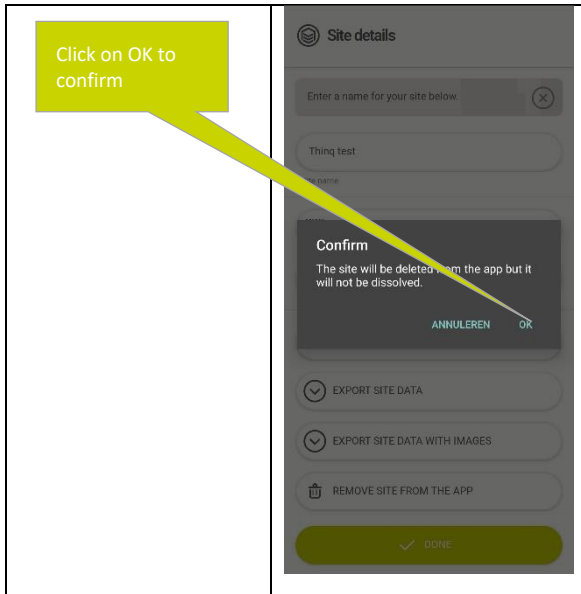
18. Managing site properties

18.1 Remove site from the app

If you want to remove a site from this particular phone, you can do this using the remove site for the app option.

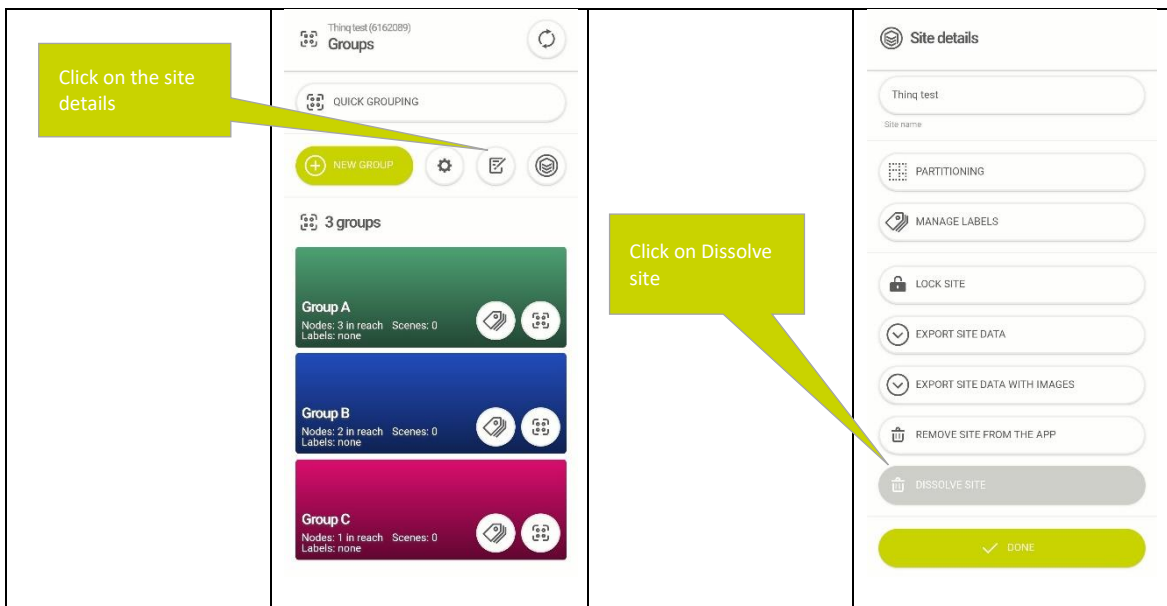
Removing the site will have no effect on the network nor on the data stored in the cloud, it will simply remove it from the phone. If the phone gets into the vicinity of the site again it will reappear in the app and synchronise all settings from the cloud.

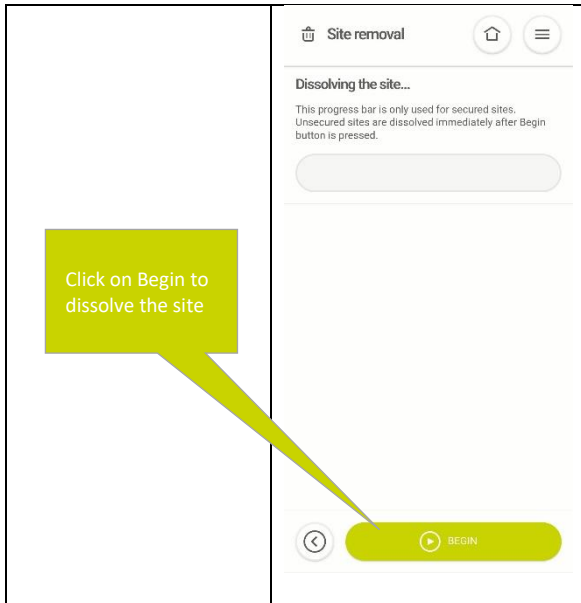




18.2 Dissolve a site

You can remove all nodes from a site and put all nodes back in uncommission state. This is called dissolving a site. A site created can be dissolved following the below steps:





The progress bar is only used for secured sites, for all other unsecured sites the site will be dissolved as soon as the begin button is pressed.

19. Power cycle reset

If at any point you lost the security settings of a node or are uncertain about its configuration there is a special power cycle reset sequence that will bring the node back into its virgin state.

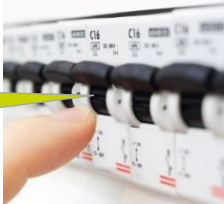





The system supports two ways of power cycle reset, for both it holds that:

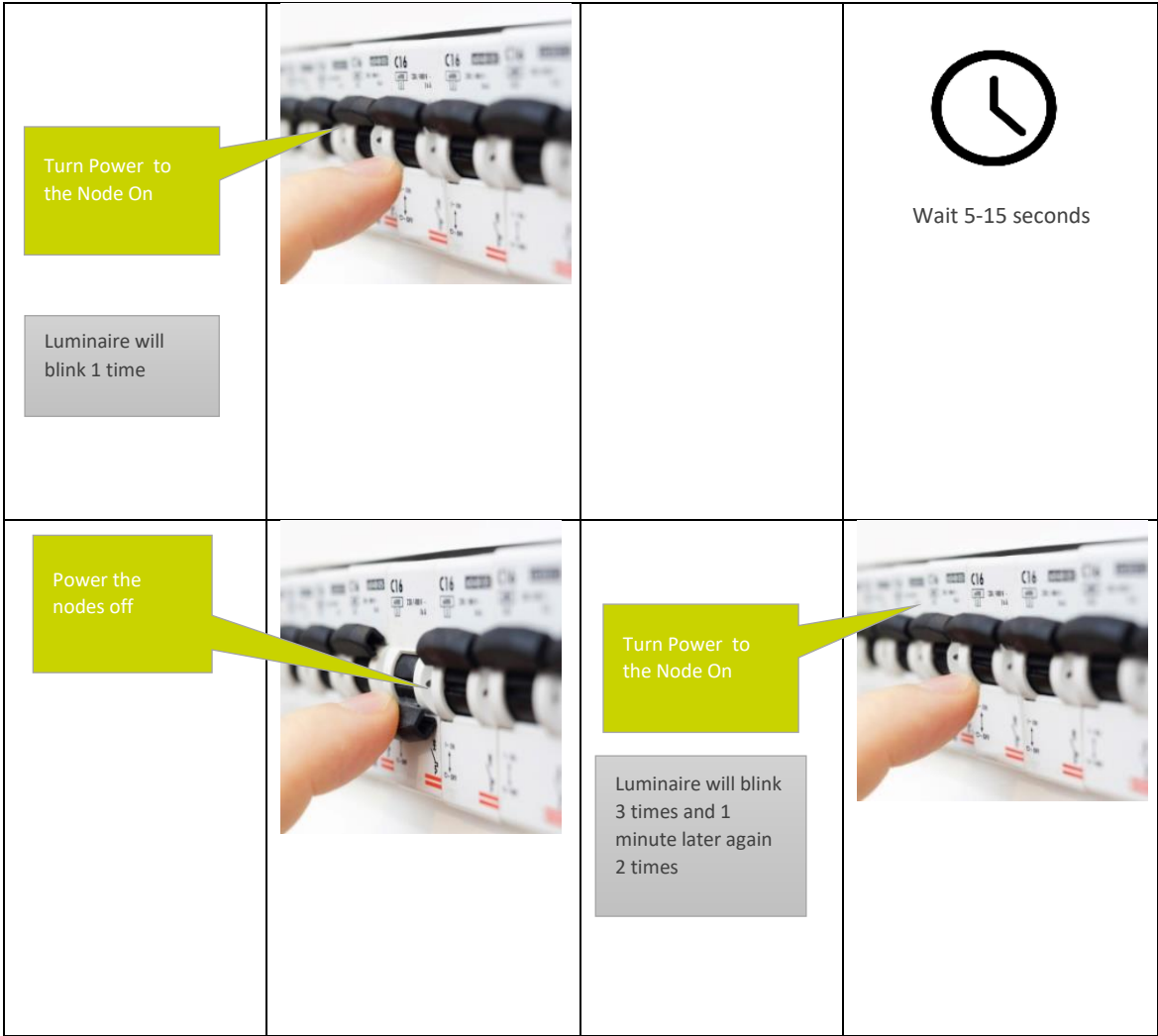
- If the expected blink does not occur during any of the cycles, you should start the cycles from the start
- If the blinks do occur, you know your timing is right
- Wait times are counted from the moment you switch the luminaire on
- Some hardware designs take 1-2 seconds to turn off after power is switched off, if this is the case these seconds should be subtracted from the specified wait time

19.1 Reset security setting only

The following steps will remove all security settings from a Node:



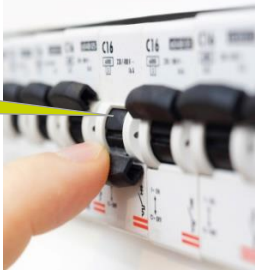


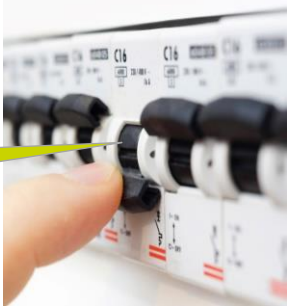
- If the Node is part of a Site and not all Nodes in the Site are reset, the Nodes that are not reset will keep their security settings (and will no longer be able to communicate with those that have not been reset)
- After the reset is performed anyone with the Thinq app can configure the Nodes again







<p>Turn Power to the Node ON</p> <p>Luminaire will not blink</p>			 <p>Wait 5-15 seconds</p>
<p>Power the nodes off</p>		<p>Turn Power to the Node On</p> <p>Luminaire will blink 1 time</p>	
	 <p>Wait 5-15 seconds</p>	<p>Power the nodes off</p>	

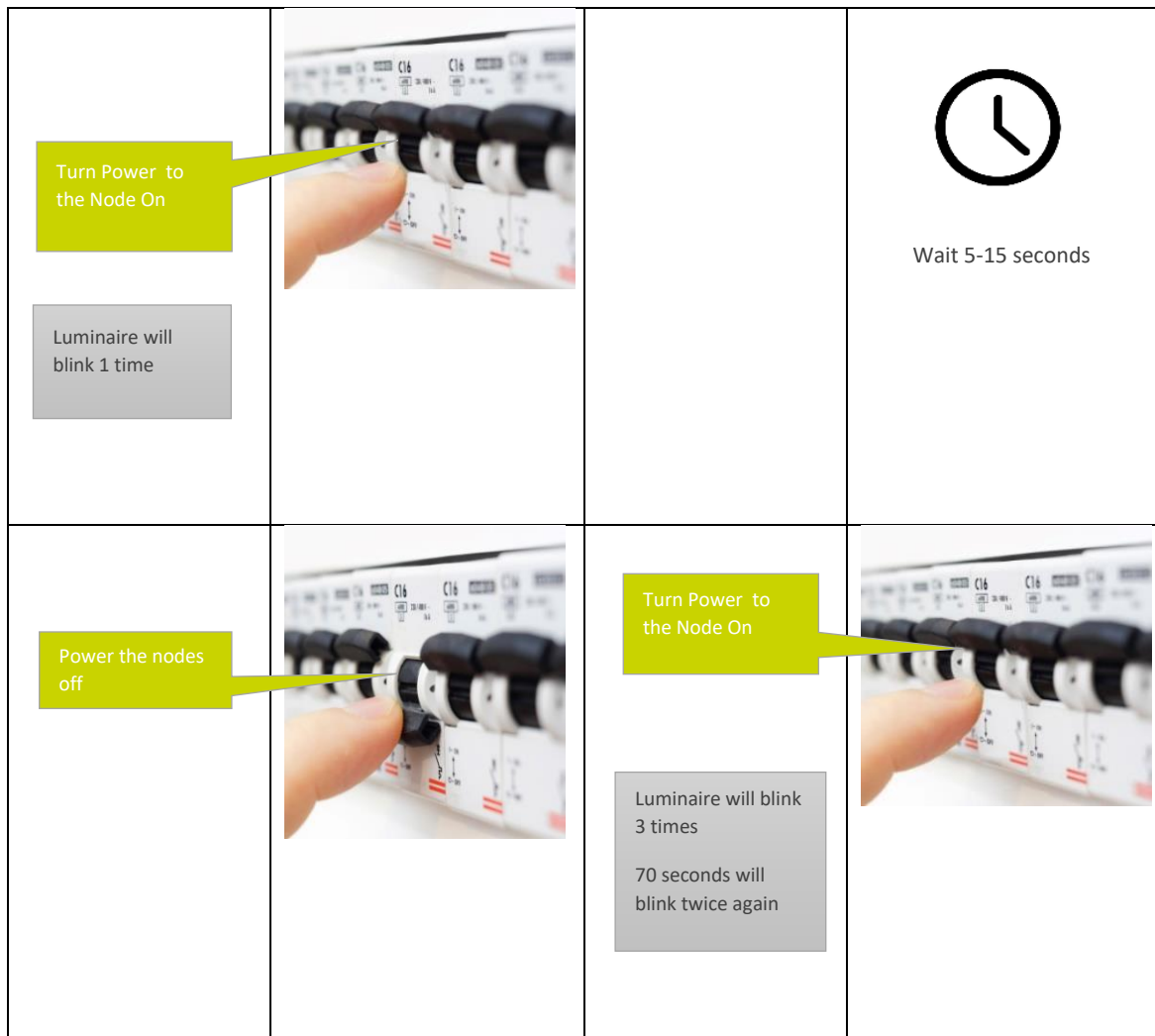


19.2 Full factory reset

This will erase all settings from the node and place it back in factory default (as if it was a new node). The process below must be followed.

<p>Turn Power to the Node ON</p> <p>Luminaire will not blink</p>			 <p>Wait 5-15 seconds</p>
<p>Power the nodes off</p>		<p>Turn Power to the Node On</p> <p>Luminaire will blink 1 time</p>	
	 <p>Wait 5-15 seconds</p>	<p>Power the nodes off</p>	

<p>Turn Power to the Node On</p> <p>Luminaire will blink 1 time</p>			 <p>Wait 5-15 seconds</p>
<p>Power the nodes off</p>		<p>Turn Power to the Node On</p> <p>Luminaire will blink 1 time</p>	
	 <p>Wait 5-15 seconds</p>	<p>Power the nodes off</p>	

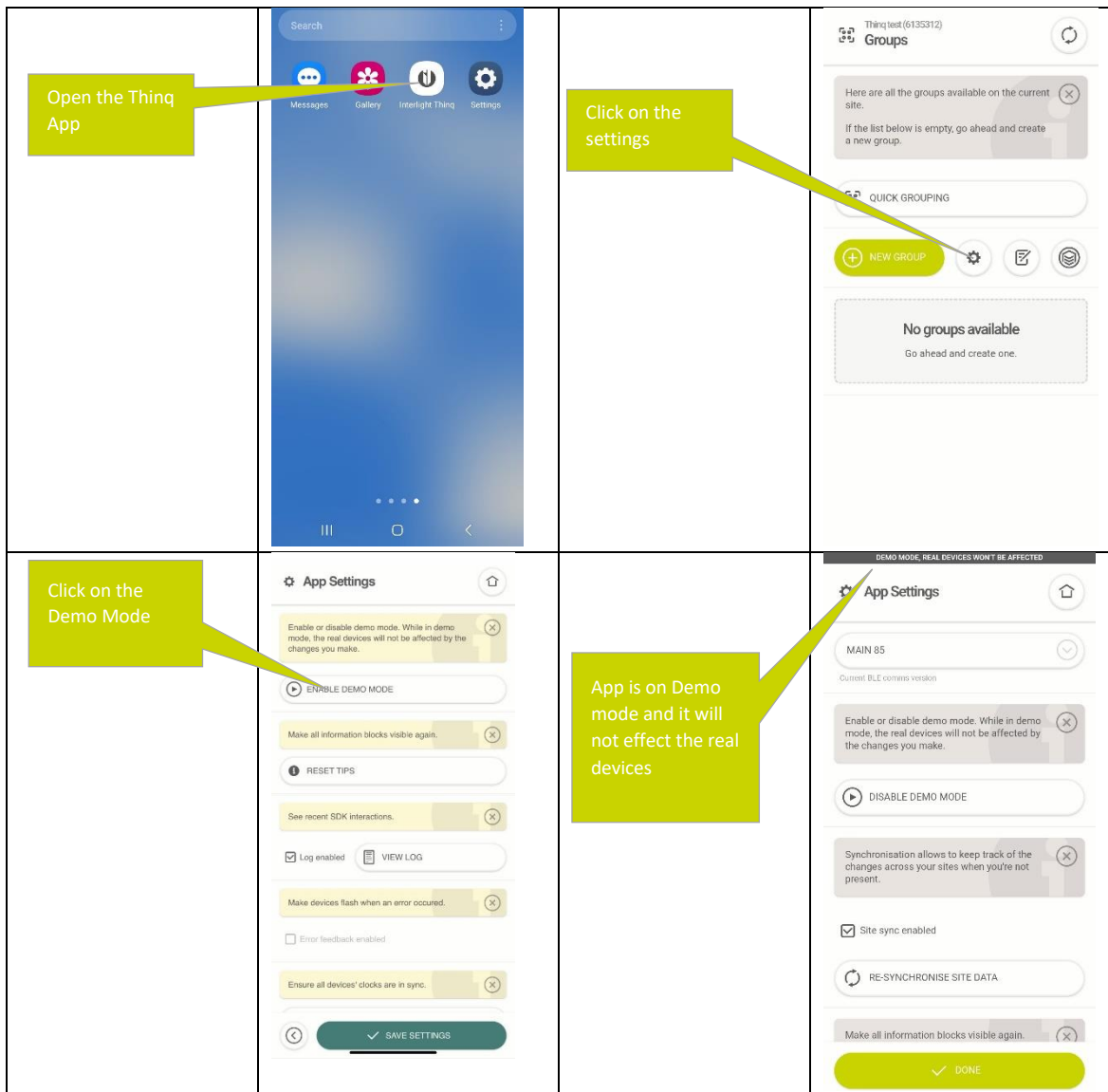


20. Demo Mode

Demo mode can be used to demonstrate the application or to explore the application without having any Nodes available. The app will simulate a random set of Nodes with different capabilities that allows you to explore the apps capabilities.

All functions except security locking can be used in demo mode

While in Demo mode the app cannot be used to control real Nodes. Demo mode can be (de)activated as follows:



21. Network limitation

21.1 Mesh limitations

The Radio Network underlying the Thing Network has virtual no limitations in terms of network size or configuration. The following limitations hold, but they should not be of any concern for any lighting application:

- There can be a maximum of 1000 Nodes in direct radio range of each other at any time:
 - o This only relates to direct radio range, Nodes that are reached via another Node do not count
 - o The 1000 Nodes relate to the number of other Nodes in range of a particular Node, you can have two clusters of each 800 Nodes that partly overlap, as long as no singly node has more than 1000 nodes in direct radio range
- The bandwidth of the Network should under all circumstance be sufficient to support any lighting control scenario. To illustrate the Thing system could comfortably handle a scenario like:
 - o 10.000+ nodes in a network
 - o All Nodes in a dense square building, 6m2 per Node
 - o Assume radio signal can penetrate two floors up and down
 - o Average 5 Nodes per Group (the less Nodes per group, the more groups, the more traffic as each Group needs to synchronise presence data)
 - o Average 3 hops required to spread a message across a group (virtual impossible with Groups with only 5 Nodes)

- 20 second timeout per group (the shorter the timeout the more often Nodes need to resend presence information)
- Continues presence in all groups
- Heavy interference from other radio sources on all network channels

Even under such scenario the network load would be at less than 50% on peak connecting Nodes

21.2 Lighting control limitations

Max number of Scenes per Group	7
Max number of Groups that can be linked to a Group <ul style="list-style-type: none"> - Neighbours count as 1 for both Groups - Groups that trigger a Corridor count as 1 for the corridor but not the other way around 	8
Max number of Sites that can be detected within one Mesh (secured sites per definition are on their own mesh)	8
Max number of partitions per Thing Dali Node	4
Max number of subnodes per Thing Dali Node	16
Max number of Gateways that can be linked to a Secured Site through the App (via the cloud interface this number is unlimited)	8
Max number of Switches per group	4
Max number of nodes per Site or Mesh	No limit

22. Error messages and fault finding

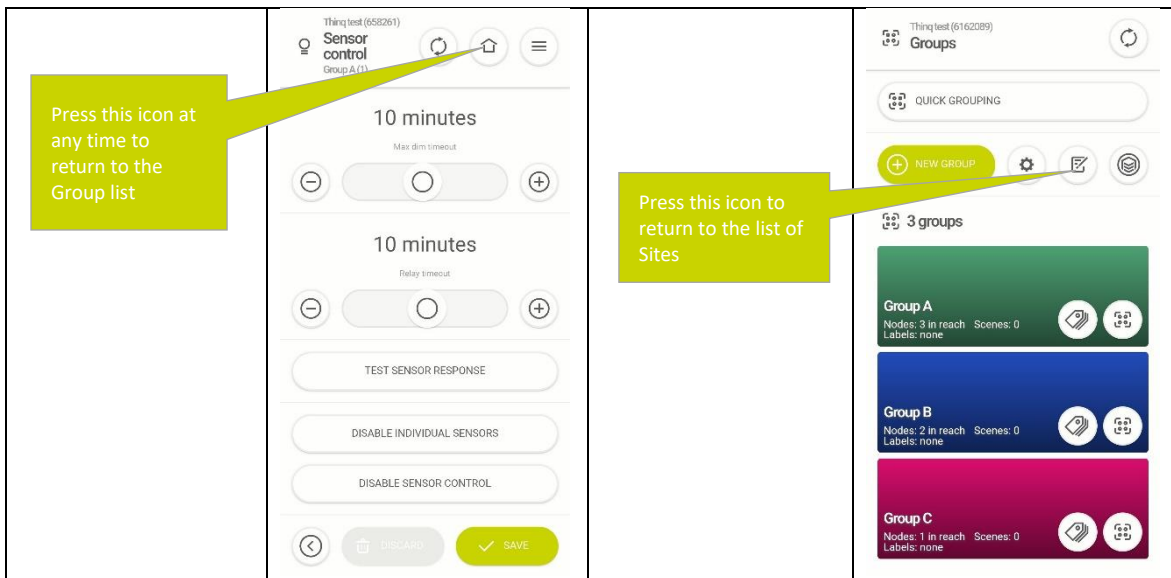
The shown messages are the messages that can show up in the app.

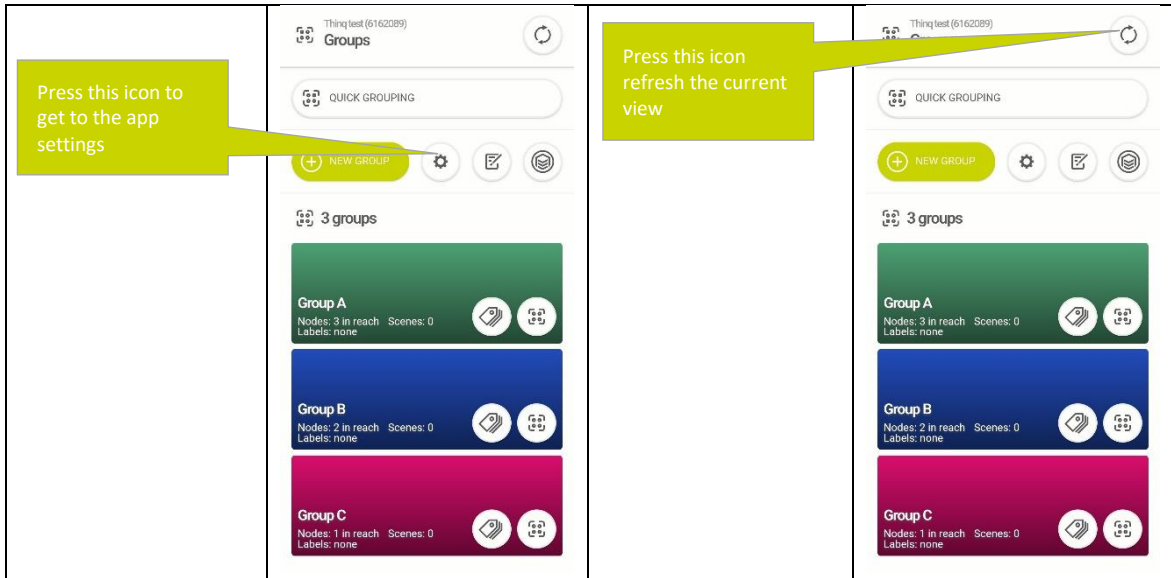
Message Text	Shown when?	What to do
Not all information was received and may be outdated. Please refresh to get the current information	Generic error message shown when a comms operation times out	Refresh and retry
No valid site id provided (expected number)	Accessing a site that has no id or doesn't exist (should never appear under normal circumstances)	Refresh and retry
No valid site provided (expected object)	Manipulating/Accessing a site that doesn't exist (should never appear under normal circumstances)	Refresh and retry
Not connected to the internet. Please check your connection and try again.	No internet connection	Check if the phone connected to a good internet connection
Failed to retrieve security data, please check your connection and try again.	Failing to retrieve site security details from AWS	Check the internet connection
Failed to upload keys, not connected to the internet.	Uploading security details with no internet connection	Check the internet connection
Failed to upload security keys.	Uploading security details with no internet connection	Check the internet connection
Failed to upload keys, request timed out.	Uploading security details with spotty internet connection	Check the internet connection

Failed to verify the site key. Please make sure the key you are entering is correct, and try again	Failing to verify security details	Enter the correct site key and retry
Failed to collect unmapped nodes (expected number)	Querying unmapped nodes returns something that is not a number	Retry
Security update sequence aborted	Cancelling a sequence step during locking/unlocking a site	Retry locking the site.
"Command is not supported in the current branch/version configuration	Executing a command that doesn't exist in the selected SDK	Install the App version with which the command is executable
Unexpected error while applying mesh key	Failing to apply security settings during site locking/unlocking	Unlock the site and lock again
Unexpected error while querying security state	Failing to determine sites security state	Unlock the site and lock again
Unexpected error while querying security key version	Failing to determine security key version	Unlock the site and lock again
Received invalid security key version	Failing to validate security key version	Unlock and lock the site again
Failed to secure site, please try again (expected new key version to be higher than the current)	Security key versions do not match	Retry

23. Navigating through the app

Here are some pointers on *where* to find *what*.





24. Troubleshooting

The Thingq Application contains a build in log file that shows the inner operation of the app, which can be used for initial debugging and fault finding.

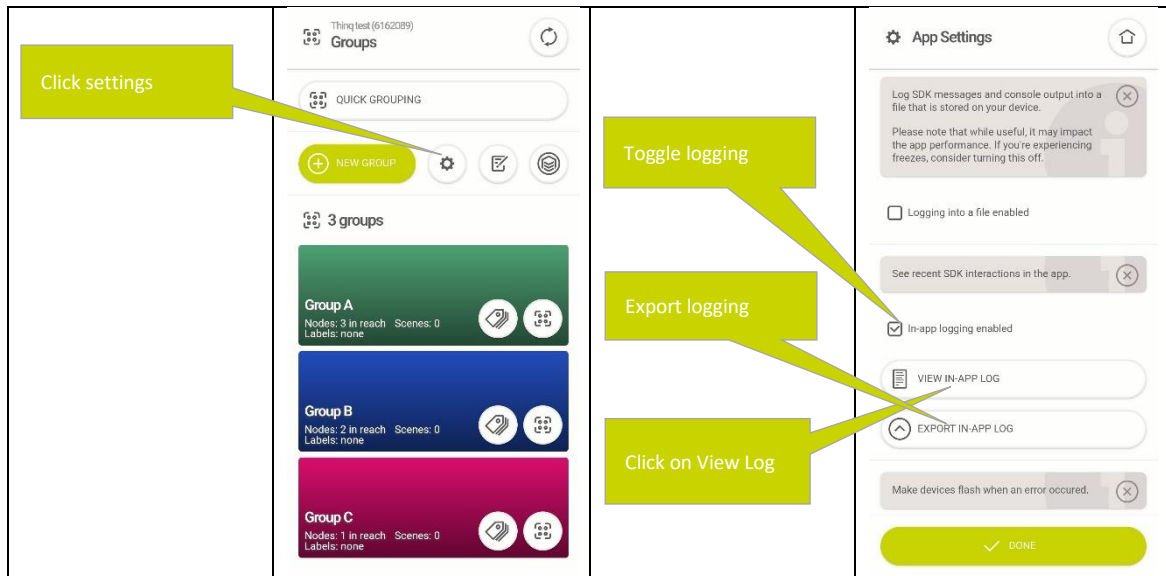
24.1 Version Mismatch

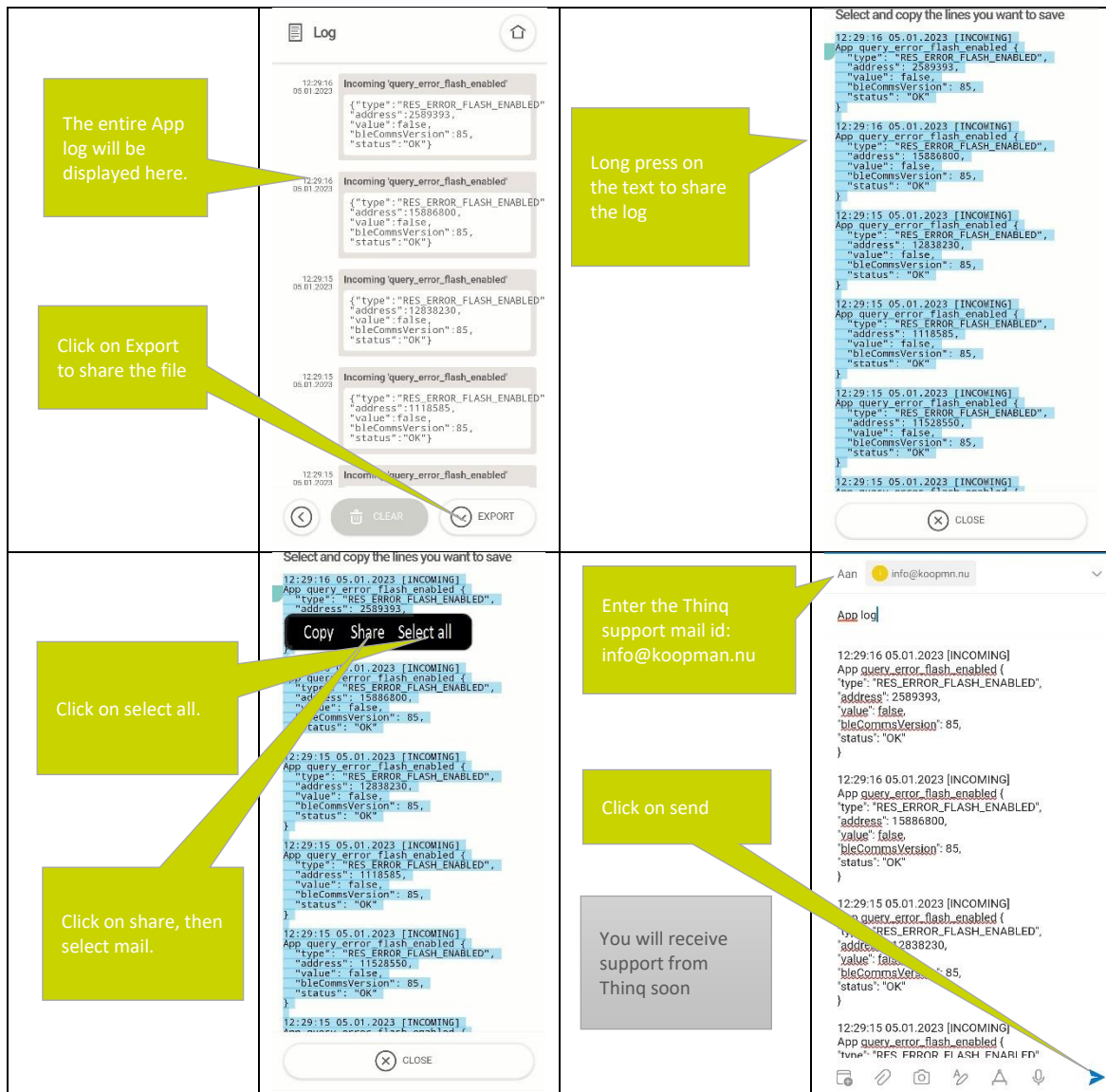
Version mismatch in App log refers that the app and firmware are of different versions. Update the app version with the help of Thingq support.

Communication between App and the nodes

There should be incoming and outgoing communication between the app and the node.

To access the app log, follow the steps in settings first tick Log enabled before you can view logs. After enabling logging, you first need to do what whatever went wrong, and continue to reproduce the fault / finding.

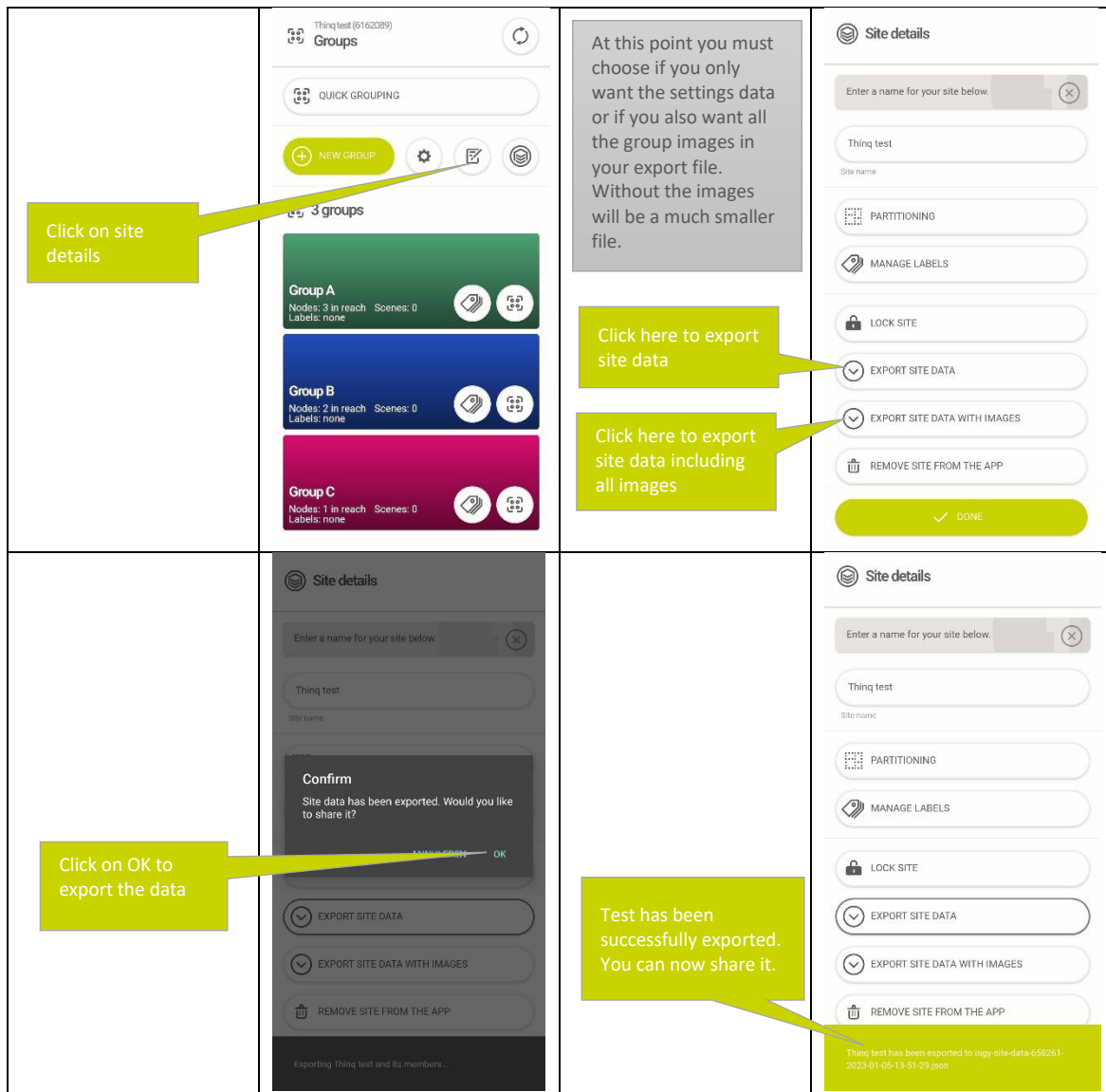




24.2 Export (backup) site data

Site data can be exported (make backup from alle settings) from the app. Follow the below steps to export the data:

NOTE: The export file is a JSON file. At the end of the process, you will be asked if you want to share it, click on 'OK' and use e-mail to send it to the intended person. This file can be used to restore settings via the gateway connected to this site. If you click on cancel and later you want to share this file to restore a site, you need to make this export again, e-mail it before you update the site.



Note : However after the restore the network security state will not be restored

24.3 Resolving common issues

No Nodes nor any Site appears in the app

Verify that the mobile phone is correctly configured, and the app has the right permissions. Take care that nodes are powered up.

24.4 How to handle a network with incompatible versions

When there are nodes with incompatible versions, first thing is to bring a gateway to the site.

The gateway must be connected to a Sink device that can see the nodes.

Through this connected gateway you can OTAP the network to the correct version, please contact info@koopman.nu for assistance during this procedure.



THINQ