Daintree
EZ CONNECT

Daintree® EZ Connect

User Manual | V4.0

Easy & *quick* installation

No major *rewiring*

Wireless

App Based commissioning

No *batteries* to replace

GE current
a Daintree company

Daintree® EZ Connect
User Manual | V4.0

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Compatibility

WHS20 sensor
LNA Kit

EZ Connect App
Self-powered wireless dimmer switch (ZBT-S1AWH)

Pre-Commissioned Operation

When lighting fixtures are first installed in the ceiling, according to installation instructions and electrically energized, the integral WIT100 sensors or LNA kit will begin operating.

Since the fixtures will not yet have been commissioned, they will act independently in a **Standalone Mode** of operation (known as Daintree One). The fixture will adjust its light level according to its own sensor and its behavior will not be affected by the behavior of any neighboring fixtures.

This is the simplest mode of operation and will provide only a basic level of lighting control until the commissioning process has been performed. Such control may not meet state or local code building and therefore may not be adequate for long term fixture control needs.

There are three possible operating states that the fixture may assume during standalone operation. These are:

1. **Standby State** – Lighting level is fixed at 0% and can automatically transition to **Background State** if of occupancy is detected beneath the fixture.
2. **Background State** – Lighting level is at a pre-programmed level (50%) and can transition automatically to either a **Task State** (100% lighting level) or **Standby State** (0% lighting level) depending on whether occupancy is detected.
3. **Task State** – Lighting level is at a pre-programmed level (100%) and can transition to a **Background State** (50% lighting level) depending on whether occupancy is detected. The fixture will stay in **Task State** for as long as occupancy is detected.

The state **(Standby, Background, & Task)** changes that will occur based on occupancy detected by the integrated sensor are illustrated in Figure 1.

A fixture will light up from **Standby State (0%)** to **Background State (default 50%)** immediately when occupancy is detected by the sensor. If occupancy continues to be detected under that fixture for a period equal to or greater than a pre-defined **Settling Time (default of 5 seconds)**, the fixture will illuminate further to **Task State (default 100%)**.

A fixture that is in **Task State** will transition back to **Background State** if no occupancy is detected for a time greater than or equal to **Hold Time (default 10 minutes)**. And a fixture that is in Background State will transition back to a Standby State if no occupancy is detected for a time greater than or equal to the **Group Hold Time (default 10 minutes)**.

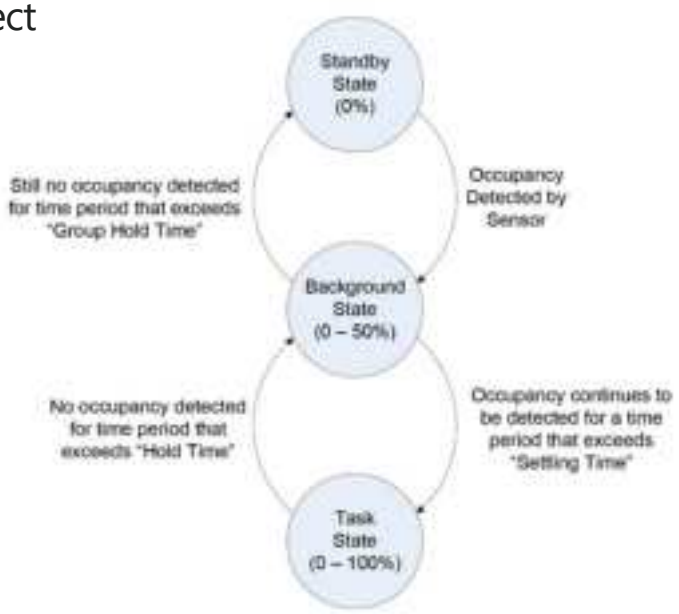


Figure 1. (EXAMPLE) State Changes in the **Standalone Mode** of Operation (Pre-Commissioned)

Commissioned Operation

After the fixtures are installed, the next step in the commissioning process is to connect fixtures logically together into room-based zones (groups).

Operating modes

A room can be programmed to operate in either Automatic Mode or in Vacancy-Detection Mode. In both modes of operation, fixtures can transition to any one of four different operating states.

These states are:

1. **OFF State** – Lighting level is fixed at 0% and can only be turned on (to **Task State**) using a manual switch.
2. **Standby State** – Lighting level is fixed at 0% and can automatically transition to **Background State** if occupancy is detected or transition to an **OFF State** if the network is commissioned in Vacancy-Detection Mode and no occupancy is detected.
3. **Background State** – Lighting level is at a user programmed level (50% is default) and can transition automatically to either a **Task State** or **Standby State** (0% lighting level) depending on whether occupancy is detected underneath that specific fixture in the room-based network.
4. **Task State** – Lighting level is at a user programmed level (100% is default) and can automatically transition to **Background State** if no occupancy is detected underneath that fixture.

The significant difference between these two operating modes has to do with the ability of the room lights to transition from a Standby State (0% level) to an OFF State (0% level).

Automatic Mode: When the room is programmed to operate in Automatic Mode, then the room lighting cannot automatically transition from a Standby state (0% level) to an OFF State (0% level). Only manual control from a switch will allow this state change.

Vacancy-Detection Mode: When the room is programmed to operate in Vacancy-Detection Mode, a fixture can transition automatically from a Standby state (0% level) to an OFF state (0% level) if occupancy is not detected by any fixture in that room network for a pre-programmed Grace Time. Once this grace period has been exceeded, the lighting will go to an OFF State and remain this way regardless of whether occupancy is detected. The only way to turn the lights back on again is to manually switch to a Task Level using a wirelessly paired compatible wall switch. The system will again operate automatically provided occupancy continues to be detected. Of course, a switch can still be used to manually put the fixtures into an OFF State when operating in Vacancy Detection Mode.

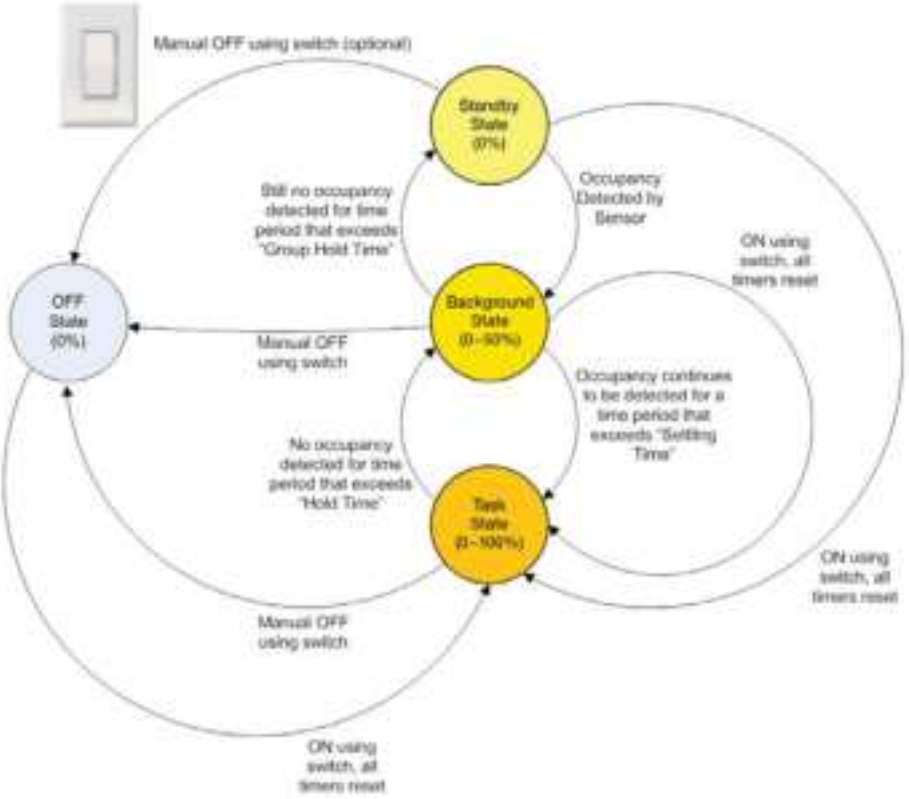


Figure 2: (EXAMPLE) State Changes in **Automatic Mode** after commissioning

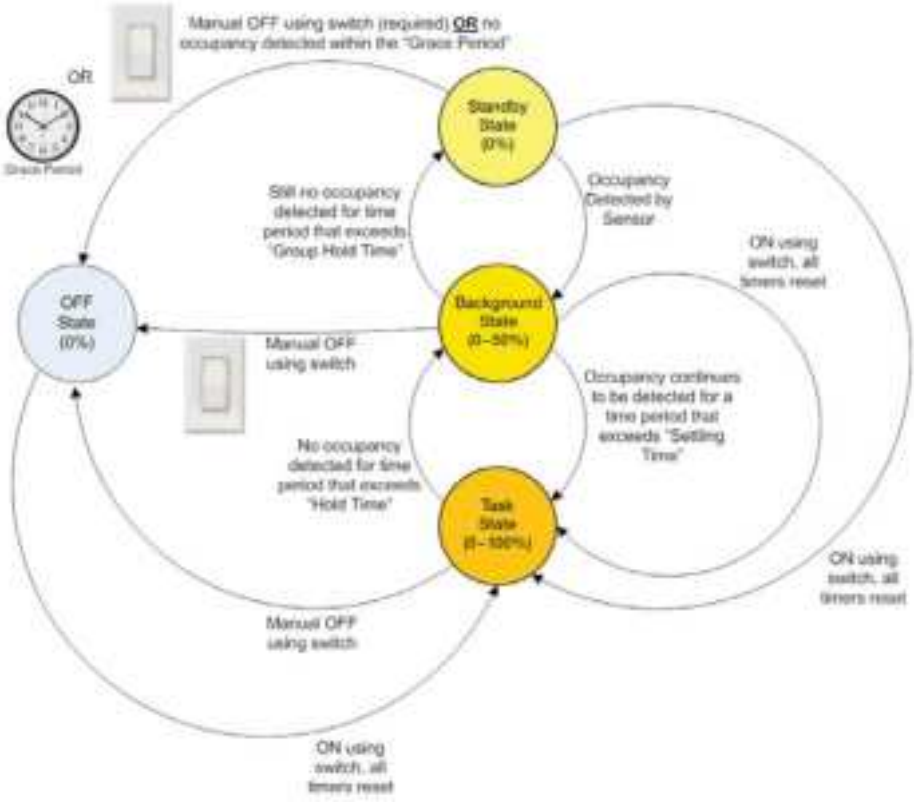


Figure 3: (EXAMPLE) State Changes in **Vacancy-Detection Mode** after commissioning

Summary of Operating Parameters: WIT100 Indoor Sensor (Controls Catalog Logic TT)

Settling Time

The time (measured in sec) that occupancy must be detected for a fixture to transition from **Background state** to **Task state**.

- Minimum value: 0 sec.
- Maximum value: 300 sec.
- Default value: 5 sec.

Hold Time

The time (measured in minutes) that occupancy must NOT be detected for a fixture to transition from **Task state** back to **Background state**.

- Minimum value: 1 min.
- Maximum value: 30 min.
- Default value: 10 min.

Group Hold Time

The time (measured in minutes) that any fixture in a room or zone of fixtures must NOT detect occupancy for the entire group of fixtures to transition from **Background state** to **Standby state**.

- Minimum value: 0 min.
- Maximum value: 15 min.
- Default value: 10 min.

Grace time

When the room is programmed to operate in **Vacancy-Detection Mode**, a fixture can transition automatically from a **Standby state (0% level)** to an **OFF state (0% level)** if occupancy is **NOT** detected by any fixture in that room for a pre-programmed Grace Time.

- Minimum value: 15 secs.
- Maximum value: 30 secs.
- Default value: 20 secs.

Partial Off/Standby

The output power level in Standby state – in percentage of the full power.

- Default is 0.
- Range is 0-50.

Background Level

The output power level in Background state – in percentage of the full power.

- Minimum value: 0%.
- Maximum value: 50%.
- Default value: 50%.

Task Level

The output power level in Task state – in percentage of the full power.

- Minimum value: 0%.
- Maximum value: 100%.
- Default value: 100%.

DLH Enabled

This parameter enables the Daylight Harvesting functionality.

- Minimum value: 0 (disabled)
- Maximum value: 1 (enabled)
- Default value: 1

Operating Mode

This parameter switches between Automatic and Vacancy modes.

- Minimum value: 0 (Automatic)
- Maximum value: 1 (Vacancy)
- Default value: 0

Sensitivity

The sensitivity of the motion sensor.

- Minimum value: 0%
- Maximum value: 120%
- Default value: 80%

Occupancy Indicator

This parameter switches between Indicator OFF (0) Indicator ON (1) mode.

- Default is 1

DLH Enabled

This parameter enables the Daylight Harvesting functionality.

- Default is 1

Summary of Operating Parameters: WHS20 High Bay Sensor (Controls Catalog Logic: DF)

Name	Description	Minimum Value	Maximum Value	Default Value
Settling Time	The time (measured in sec) that occupancy must be detected for a fixture to transition from Background state to Task state.	0 sec	300 sec	5 sec
Hold Time	The time (measured in minutes) that occupancy must NOT be detected for a fixture to transition from Task state back to Background state.	0 min	60 min	10 min
Group Hold Time	The time (measured in minutes) that any fixture in a room or zone of fixtures must NOT detect occupancy for the entire of fixtures to transition from Background state to Standby state.	0 min	60 min	10 min
Grace Time	Set to 0 for Automatic-Detection mode. Otherwise, the room is programmed to operate in Vacancy-Detection Mode, and the fixture will transition from the Standby state to the OFF state if occupancy is NOT detected within the Grace Time (measured in seconds).	0 sec	30 sec	0 sec
Partial Off/Standby	The output power level in Standby state – in percentage of the full power.	0%	100%	0%
Background Level	The output power level in Background state – in percentage of the full power.	0%	100%	50%
Task Level	The output power level in Task state – in percentage of the full power.	0%	100%	100%
Daylight Harvesting	This parameter enables the Daylight Harvesting functionality.	0 (disabled)	1 (enabled)	1 (enabled)
Low Ambient Output	The light level above which daylight harvesting dimming will start, given as a percentage of the fixture's own light output.	10%	500%	250%
High Ambient Output	The light level above which daylight harvesting dimming will start, given as a percentage of the fixture's own light output.	0 (off)	1 (min dimming)	0 (off)
Occupancy Sensitivity	The sensitivity of the motion sensor. between 1 (lowest) and 5 (highest).	0 (disabled)	5 (highest)	5 (highest)
Occupancy Indicator	This parameter switches between Indicator OFF (0) Indicator ON (1) mode.	0 (disabled)	1 (enabled)	1 (enabled)

Sensitivity & Motion Detection

Refer to the sensor spec sheet for sensitivity range and setting options.

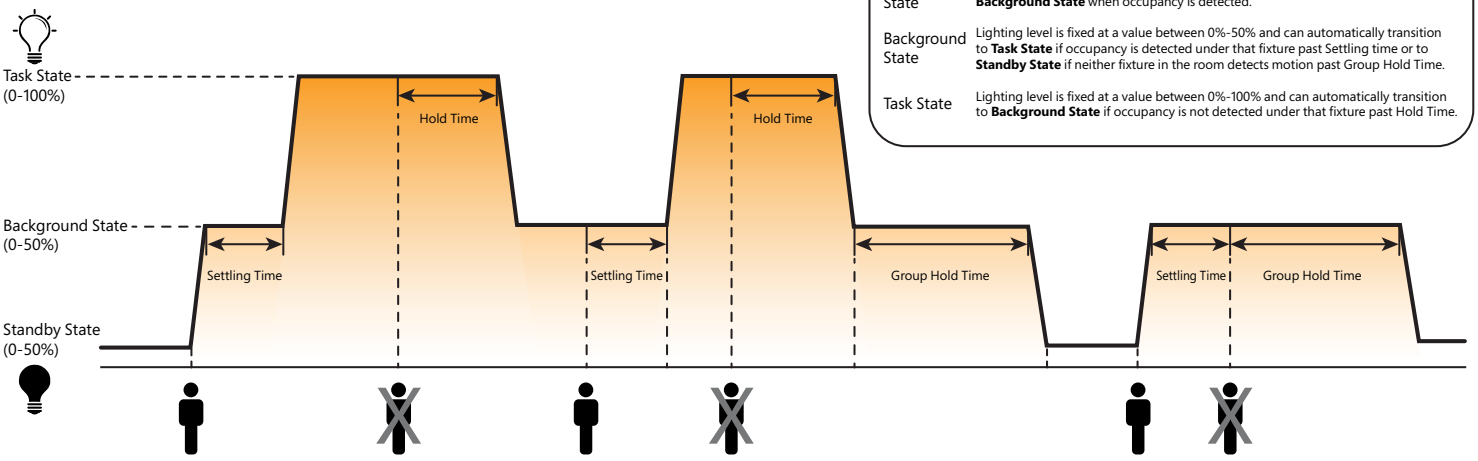
Daylight Harvesting (DLH) Feature

The Daintree WIT100 sensor has a integral daylight sensor. This enables the lighting to be turned off in fixtures that detect that adequate natural lighting is available to light the area without the need for artificial lighting. DLH is enabled or disabled for the entire room or zone, however, each fixture will act independently according to its own daylight sensor. Therefore, it will be normal to find only some fixtures turned off when DLH is enable. It is important to note that the fixtures do not transition to another state when DLH causes that fixture to turn off. For the WIT100 Indoor Sensor (Controls catalog logic: TT), the threshold ambient light level required to turn a fixture off is preset at 500 lux. For the WHS20 High Bay Sensor (Controls catalog logic: DF), the ambient light threshold can be set as a percentage of the fixture's own light output using the Low Ambient Threshold parameter.

Daintree® EZ Connect – AUTO ON/OFF

LEGEND

- **Off State** – Lighting level is fixed at 0% and can only be turned on (to Task State) using a manual switch
- Standby State: Lighting level is fixed at a value between 0-50% and can automatically transition to **Background State** when occupancy is detected.
- Background State: Lighting level is fixed at a value between 0%-50% and can automatically transition to **Task State** if occupancy is detected under that fixture past Settling time or to **Standby State** if neither fixture in the room detects motion past Group Hold Time.
- Task State: Lighting level is fixed at a value between 0%-100% and can automatically transition to **Background State** if occupancy is not detected under that fixture past Hold Time.

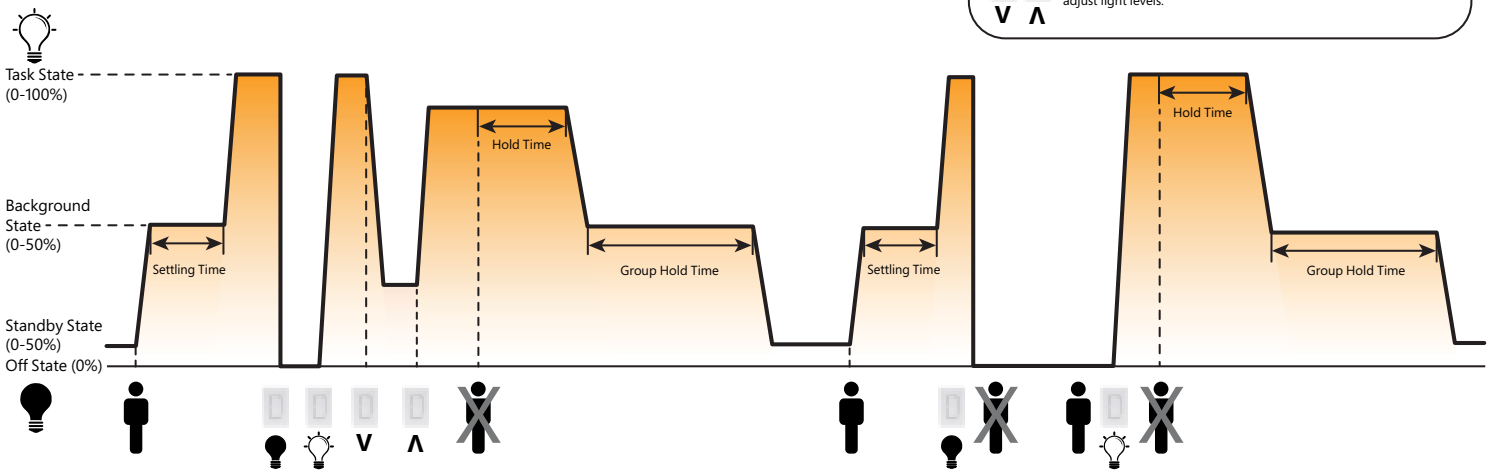


- The user enters the space after an extended vacancy, all fixtures will be at the **Standby State** level (configuration range 0% to 50%).
- As at least one sensor detects motion, it will bring all lights in the room at the **Background State** (range 0% - 50%). If the person walks through the space and does not settle in any specific area beyond the **Settling Time**, all fixtures will remain at the **Background Level**.
- If the person remains in one specific location beyond the **Settling Time**, all fixtures that keep detecting motion will go to **Task State** (range 0%-100%), while the others will remain at **Background State**.
- If the user exits the room, lights that were at **Task State** will maintain that output for a **Hold Time** period. If no motion detected past this time, the lights will go to **Background State**.
- While in **Background State** If there is no motion detected by any fixture beyond the **Group Hold Time**, all fixtures will transition to **Standby State**.

Daintree® EZ Connect – AUTO + Switch Control

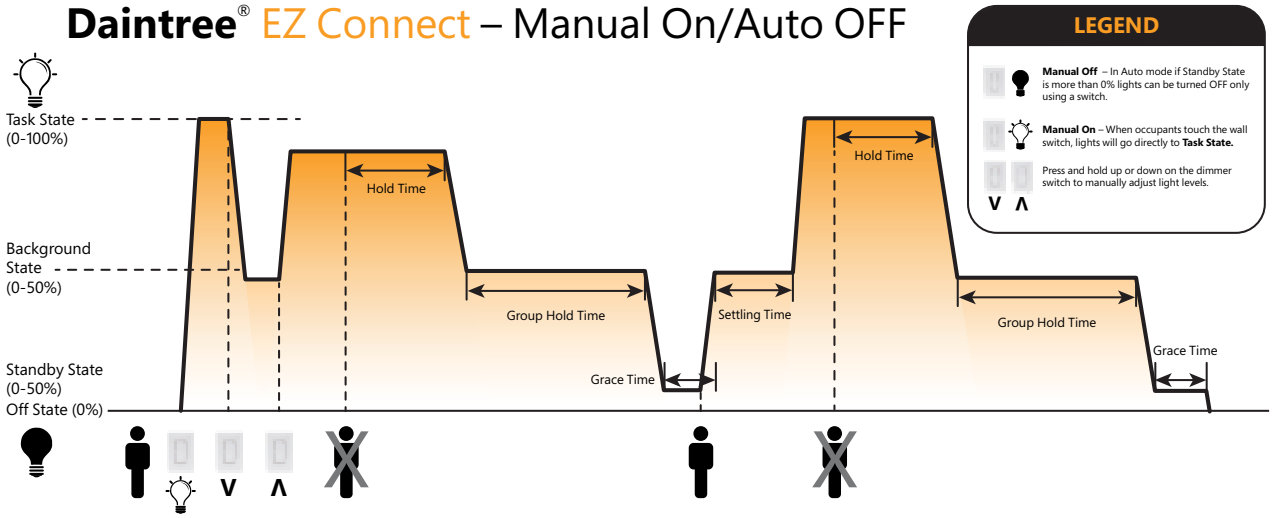
LEGEND

- **Manual Off** – In Auto mode if Standby State is more than 0% lights can be turned OFF only using a switch.
- **Manual On** Using the switch lights will go to **Task State** directly.
- Press and hold up or down on the dimmer switch to manually adjust light levels.



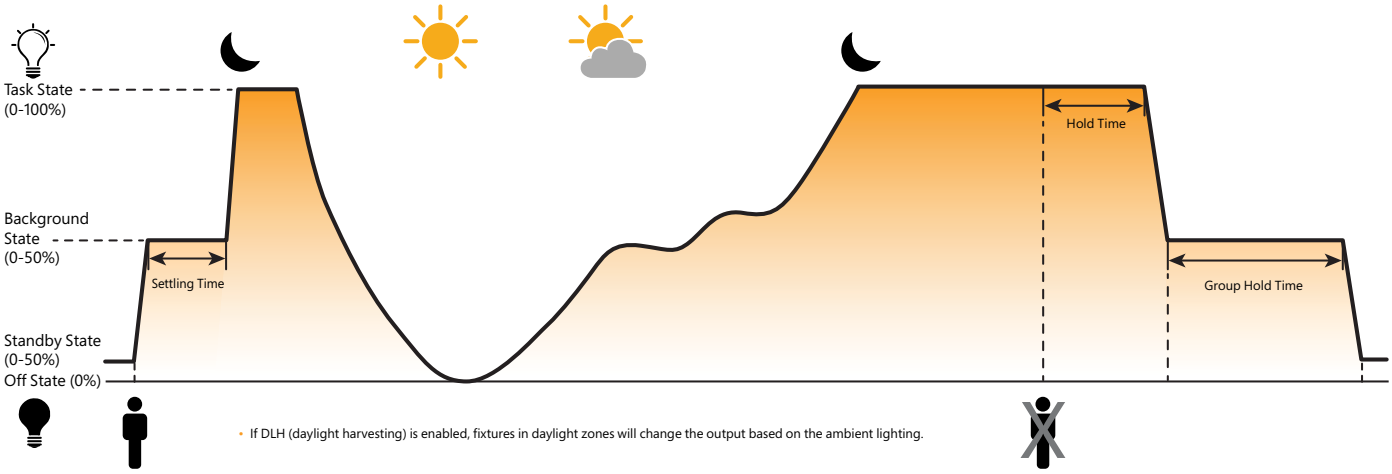
- When the lights are manually turn OFF they will go to **OFF State**, and the system will switch to Manual ON (Vacancy Mode) so next time the user enters the room, will need to manually turn lights ON via the switch and the system will change to Auto Mode.

Daintree® EZ Connect – Manual On/Auto OFF



- In **Manual Mode**, if the room is vacated for a longer period of time the lights will go to **OFF State (0%).**
- When a user enters the room, lights will remain **OFF** and the user needs to press the switch to turn the lights **ON**. At this time lights will go directly to **Task State** and the system will behave similar as in **Auto Mode** as long as occupancy is detected.
- If the space is vacated beyond the **Hold Time** plus **Group Hold Time,** the lights will go to the **Standby State** (which can be any value between 0% to 50%) and will remain in this state for the **Grace Time** (15 sec to 30 sec).
- If motion is detected while in the **Grace Time,** lights will go to **Background State** and if motion persist beyond Settling time lights in that area will go to **Task State** while fixtures further away will remain in **Background State**.
- If no motion is detected past **Grace Time**, the lights will go to **OFF State** and if the user re-enters the space, will need to press the switch to turn lights **ON**.

Daintree® EZ Connect – Fixtures with Daylight Enabled



- If DLH (daylight harvesting) is enabled, fixtures in daylight zones will change the output based on the ambient lighting.

Nomenclature & Settings

NAME	DESCRIPTION	MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE
Settling Time	The time (measured in sec) that occupancy must be detected for a fixture to transition from Background state to Task state.	0 sec.	300 sec.	5 sec.
Hold Time	The time (measured in minutes) that occupancy must NOT be detected for a fixture to transition from Task state back to Background state.	1 min.	30 min.	10 min.
Group Hold Time	The time (measured in minutes) that any fixture in a room or zone of fixtures must NOT detect occupancy for the entire of fixtures to transition from Background state to Standby state.	0 min.	15 min.	10 min.
Grace Time	When the room is programmed to operate in Vacancy-Detection Mode, a fixture can transition automatically from a Standby state (0% level) to an OFF state (0% level) if occupancy is NOT detected by any fixture in that room for a pre-programmed Grace Time.	15 sec.	30 sec.	20 sec.
Partial Off/Standby	The output power level in Standby state – in percentage of the full power.	0%	50%	0%
Background Level	The output power level in Background state – in percentage of the full power.	0%	50%	50%
Task Level	The output power level in Task state – in percentage of the full power.	0%	100%	100%
DLH Enabled	This parameter enables the Daylight Harvesting functionality.	0 (Disabled)	1 (Enabled)	1 (Enabled)
Operating Mode	This parameter switches between Automatic and Vacancy modes.	0 (Automatic)	1 (Vacancy)	0 (Automatic)
Sensitivity	The sensitivity of the motion sensor.	0%	120%	80%
Occupancy Indicator	This parameter switches between Indicator OFF (0) Indicator ON (1) mode.	0 (Disabled)	1 (Enabled)	1 (Enabled)

Using the Daintree EZ Connect Commissioning App: Logging in

When the application is launched for the first time the user has to create a username and password.

After a successful authentication the homescreen appears, which shows the active rooms in the area. Rooms can be created, modified or deleted from this page.

Commissioning of nodes

Create a network

For creating a room, the user needs to tap on the "  " button, which will bring the user to the **"Add New Room"** page.

The user can name the room and select the communication channel. After the selection the user need to tap on the "  " button.

The "scanning for next device" message will appear and the application scans for available nodes. If a node is found the user can add that node to the room with the **"YES"** or ignore it with the **"NO"** button. (The node window can be swiped to left or right.) The maximum number of nodes (components) that can join a single room is 30, but the maximum number is in the thousands.

When all the requested nodes have been found or there are no remaining nodes, the user needs to press the "List view" button at the bottom of the screen, which will bring up the list view page with the selected nodes. There, additional nodes can be added or existing nodes can be removed. To finish the room creating the user needs to press the "create room" button at the bottom of the page.

Modify settings

After the room creation procedure has started the room's details and parameters will appear. The user here can choose among the "settings", Nodes" and "switches" tabs. In the "Nodes" tab there are the nodes which are the part of the room. Next to the nodes's address the spinning circle shows if the node has already joined to the network or still joining. The start next to the node's address shows which node is the leader. With the "Add New Node" button the user can add new nodes to this room as described above.

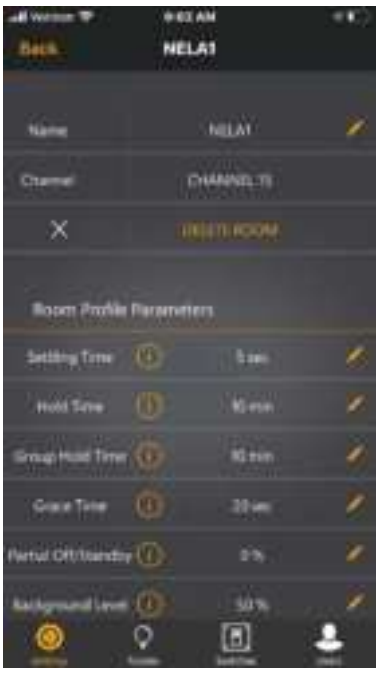
After all the nodes have joined to the room or zone, in the "Settings" tab the user can change the room's parameters. To change a specific parameter the user needs to tap on the parameter's value. An information box will appear with the minimum and maximum applicable values. To finish the change the user can tap away or press the "return" button on the keyboard. The user can choose from predefined profiles with the "SELECT PROFILE" button.

Remove nodes from a room

To remove a node from a room the user needs to navigate to the "Nodes" tab. The user can press the edit button which is located on the top-right corner then press the red button or swipe left on the node's address. The node can be deleted also if the user taps on the node's address and taps the "Reset node" button.

Delete entire room

To delete an entire room the user needs to navigate to the home page. The user can press the edit button which is located on the top-right corner then press the red button or swipe left on the room's name to delete the room. The room can be deleted from the Settings tab with the "DELETE ROOM" button.



Default settings

The Daintree EZ Connect app has pre-determined profile settings for many common room types. These settings can be used as a baseline for customizing based on the application space.

Commissioning of switches

Add / remove a switch

After the whole room has been successfully merged and set up, the user can add a switch to the room.

Adding a switch to a room means that the zone of fixtures will react to the switch short-long presses.

Switch data can be retrieved by

- Reading the QR Code of the switch label – this will fill up the ID and signature fields automatically.
- Adding the ID and the signature data manually

Right after adding the switch data the application asks the Commissioner to press the UP button.

By pressing the appropriate button the system will behave accordingly (up/down ways).

After the switch has been pressed, the application will react. If not, then the switch could not be added to the room. This may have the following reasons:

- The switch message was not connected to the room or zone – in this case, another press may solve this problem.
- The switch does not operate on the same channel as the system does. For harmonizing the channels, user has to change the channel setting of the switch, or the room, or both.

In case a switch will be moved to another room, or zone – it has to be removed.

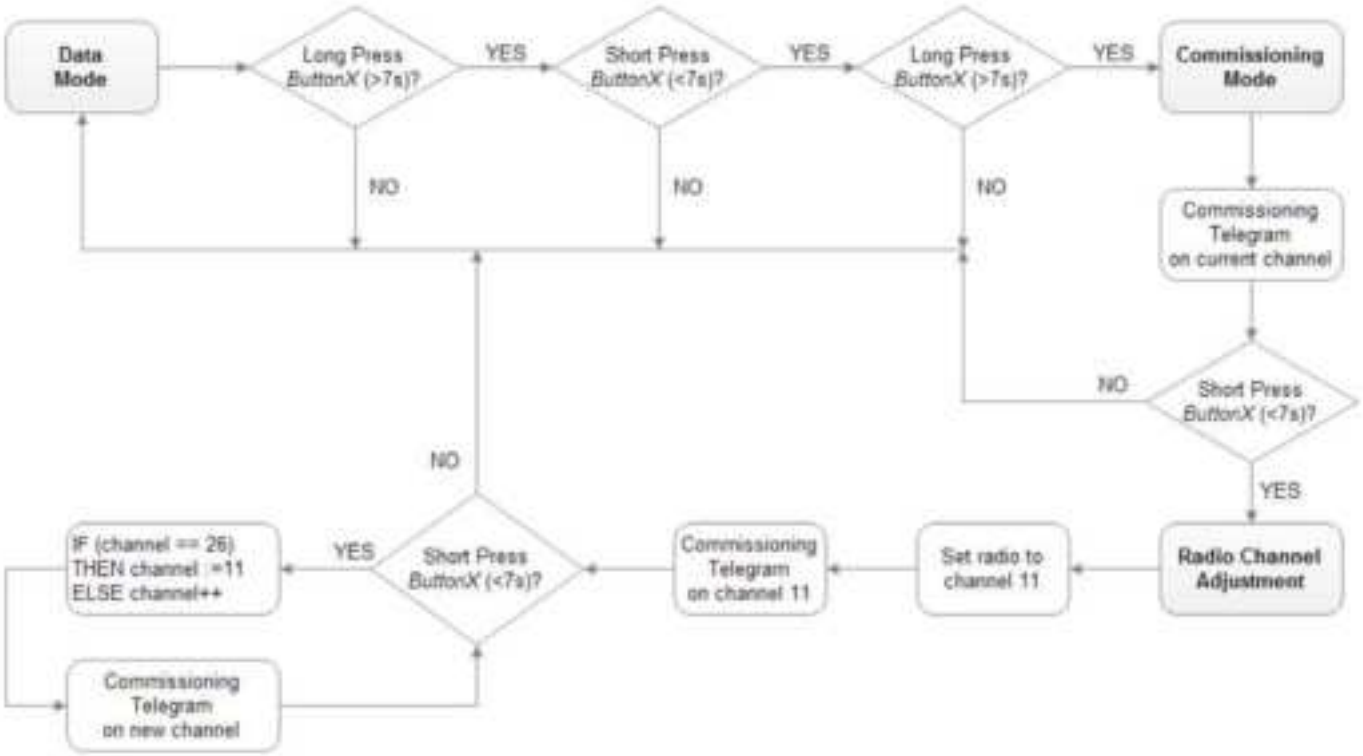
By clicking to the remove icon next to the appropriate switch – it will be removed.

Do not forget, that the switch has to be set to the appropriate channel prior to being added to a new room.

For ease of commissioning, all switches provided with the Daintree EZ Connect App will be pre-programmed to use channel 15 by default. Once the switch is reset using the programming instructions, it will default to channel 11. Please keep this in mind when you are commissioning, especially if you decide to program the switch to a different channel other than channel 15.

Change switch channel settings

To change the channel settings of the switch please do the following pattern with the buttons:



The default channel settings of the switches is the 11th.

It is advised to use the following channels: 15, 20, 25, 26. Using different channels may conflict with present WiFi solutions.

Node details

Identify

In Room view the nodes can be identified by touching the “lamp” icon area.

Right after pressing the identification area the node will start blinking – therefore the user can identify the exact location.

Factory reset

In case of a node will be recommissioned, or the whole commission procedure will be restarted, nodes have to be reset to factory defaults. By resetting, the node will forget all settings the user made – such as:

- Parameters, profile settings
- Network data (PanID, Network name)
- Switches it has managed

After the node has been reset, it will do a unique blinking pattern, then operate as a standalone node. It can be commissioned again if necessary.

Firmware upgrade

Firmware image on the nodes can be updated manually one-by-one per node.

By updating a node firmware it is intended to keep all the commissioning information it has been set to.

User has to click to the "Firmware" button, then the list of the available firmware images will be seen.

OTA is going via BLE communication so keep the distance between the node and the phone – do not move further away from the node under updating – that may cause the abortion of the OTA procedure. In case the OTA has been aborted by any reasons, it can be restarted manually.

Once one node has been updated, it is possible to automatically copy this version to the rest of the nodes by pressing the "Share Firmware" button.

Additional users

By updating a node firmware it is intended to keep all the commissioning information it has been set to. Additional Users can be added to access the commissioning tool. The shared user needs to have downloaded and have access to the Daintree EZ Connect app prior to invitation is sent to the user. Simply click the "Invite another user" or "team" button and enter the email address of the members you would like to invite. The email needs to match the account that the user used for login of the Daintree EZ Connect platform.

Troubleshooting guide

Commissioning / decommissioning

ID	Description	Primary Cause	Action
TR-000-001	After resetting an entire room the room still contains a certain number of nodes.	The reset command did not received by all the nodes.	Do the reset again – after a few cycles the room will disappear.
TR-000-002	Joining nodes keep joining.	Network failure.	Reset them, then restart the commissioning.
TR-000-003	Joining nodes keep joining.	Maximum number of nodes in a room or zone is 30.	Remove the rest of the nodes if there are more than 30.
TR-000-004	Joining procedure works, but slow.	The used 802.15.4 channel maybe overloaded.	Recommission the room on a different channel.
TR-000-005	Reset node keeps join to the previous room or zone. (it was commissioned to)	Neighboring rooms or zones are operating on the same channels.	Move the new room or zone to a different channel.
TR-000-006	Two nodes can be seen in a single room.	Commissioning error.	Reset the entire room and recommission the nodes.
TR-000-007	Application stucks into “scanning next device” view.	BLE advertisement message scanning error.	Restart the application and continue the commissioning by adding additional nodes if needed.
TR-000-008	Application stucks into “configuring device” view.	Communication error.	Try to reconnect.
TR-000-009	Application stucks into “creating room” view.	Communication error.	Swipe out the application and try again.
TR-000-010	“Current” network name appears.	Commissioning error.	Reset the room.

Parameter settings

ID	Description	Primary Cause	Action
TR-000-001	After parameters are not synchronized properly if the user does not wait between parameter.	The room or zone has to propagate the previously set parameters properly before the new ones.	User must wait at least 5 seconds between parameter settings.
TR-001-002	Not all the nodes behave according to the parameters been set.	The parameter settings must be set after the last node has been successfully joined to the room or zone.	Wait until the last node joins the room or zone.
TR-001-003	Not all the nodes behave according to the parameters been set.	The parameters are not synchronized with a joiner node — if the parameters have been added before a joiner joined.	In case of a new node is joined, the parameters shall be set again.

Switch handling

ID	Description	Primary Cause	Action
TR-002-001	Switch pressing does not have effect	Radio interference	Press again.
TR-002-002	Switch QR code cannot be read by the application.	The application is sensitive for cam-noise and distance.	Zoom to the picture, hide all other disturbing parts
TR-002-003	Cannot switch more zones with a single switch.	The zones shall operate on the same channel.	Modify the channels to the right value
TR-002-004	Cannot add switch to the room or zone – the label can be read, but the room or zone does not react to the switch.	The switch must be operating on a different channel than the room or zone does.	Harmonize the channels of the room or zone and the switch to the same value.
TR-002-005	Previously added switch cannot be found in switches view	Switch handling problem in application	Try to open that view again

Node-related

ID	Description	Primary Cause	Action
TR-003-001	Cannot find a node	The BLE advertisement message are not propagated by neighbor nodes.	Move closer to the node.
TR-003-002	OTA error	The OTA functionality works for the second try.	Try again, it works for the 2nd try.
TR-003-003	"Secure handshake error" message arrived	Communication problem during the connection to a node	Re-establish the connection
TR-003-004	"Connection timeout" message arrived	Communication problem during the connection to a node	Re-establish the connection
TR-003-005	"Error while reading credentials" message arrived	Communication problem during the connection to a node	Re-establish the connection
TR-003-006	"Invalid counter error" message arrived	Communication problem during the connection to a node	Re-establish the connection
TR-003-007	Node forgot commissioning information after OTA	OTA has been done between incompatible nonvolatile versioned images	Recommissioning is needed
TR-003-007	Node OTA has been aborted	Communication error	Restart OTA

CTRL037 (Rev 06/18/21)

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