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Compatibility
- WHS20 sensor
- WIZ20 sensor
- LCA Kit
- WA200 Series Room Controllers (for use with WOS3 Ceiling Sensors)
- EZ Connect App
- Self-powered wireless dimmer switch (ZBT-S1AWH)
- WWD2 series wireless wall dimmer and scene switches

Pre-Commissioned Operation

When lighting fixtures are first installed in the ceiling, according to installation instructions and electrically energized, the Daintree EZ Connect Nodes 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 **Dwell 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).
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).

**Auto ON / Auto OFF Strategy:** 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.

**Manual ON / Auto OFF Strategy:** 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.

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**Figure 1.** (EXAMPLE) State Changes in the **Standalone Mode** of Operation (Pre-Commissioned)
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:
WHS20 High Bay Sensor (Controls Catalog Logic: DF), WIZ20 Integrated Indoor Sensors (Indoor Controls Catalog Logic: TT) and WA200 Series Room Controllers

Functionality of the app is segmented into 3 major categories: Dimming, Occupancy and Daylighting. These can be turned on and off with a toggle switch in the app. Functions have been segmented within those three (3) categories and can be accessed with a drop down menu within the app.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimming</td>
<td>Dimming functionality is always</td>
<td>Off</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>Task Level</td>
<td>The output power level in Task state – in percentage of the full power.</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Background Level</td>
<td>The output power level in Background state – in percentage of the full power.</td>
<td>0%</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Partial Off/Standby</td>
<td>The output power level in Standby state – in percentage of the full power.</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Occupancy Hold Time</td>
<td>Enables or Disables Occupancy Detection Functionality</td>
<td>Off</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>Group Hold Time</td>
<td>The time (measured in minutes) that occupancy must NOT be detected for a fixture to transition from Task state back to Background state.</td>
<td>1 Min.</td>
<td>60 Min.</td>
<td>10 Min.</td>
</tr>
<tr>
<td>Dwell Time</td>
<td>Time that has to be spent under a sensor to make it turn from Background State to Task State. (Previously called Settling Time)</td>
<td>0 Sec.</td>
<td>120 Sec.</td>
<td>5 Sec.</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>The sensitivity of the motion sensor.</td>
<td>1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Occupancy Indicator</td>
<td>This parameter switches between Indicator OFF (0) and Indicator ON (1) mode.</td>
<td>0 (disabled)</td>
<td>1 (enabled)</td>
<td>1 (enabled)</td>
</tr>
<tr>
<td>Daylight</td>
<td>This Parameter Enables or Disables Daylight Harvesting Functionality</td>
<td>Off</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>Low Ambient Threshold</td>
<td>The light level which daylight harvesting dimming will start, given as a percentage of the fixture's own light output. The high ambient threshold is set automatically by EZ Connect based on the low ambient threshold you select.</td>
<td>10%</td>
<td>800%</td>
<td>300%</td>
</tr>
<tr>
<td>High Ambient</td>
<td>Indicates whether the light should be turned off or remain on at its min dim output when the high ambient threshold is exceeded.</td>
<td>Off</td>
<td>On</td>
<td>On</td>
</tr>
</tbody>
</table>

Sensitivity & Motion Detection
Refer to the sensor spec sheet for sensitivity range and setting options.
Daylight Harvesting (DLH) Feature

The Daintree WIZ20 & WHS20 sensors are a combination occupancy sensor and photocell for daylight harvesting capabilities. 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 example, the WIZ20 Integrated Indoor Sensor (Controls catalog logic: TT) or WA200 series room controllers and WOS3 ceiling sensors, 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

- 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.
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.

If motion is detected while in the Grace Time, lights will go to Background State and if motion persists beyond Setting 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.

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.
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 "Add New Room" 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 "Add" 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 ZBT-S1AWH or WWD2 Series 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.

ZigBee channels and the corresponding radio frequencies (in MHz).

<table>
<thead>
<tr>
<th>Channel ID</th>
<th>Lower Frequency</th>
<th>Center Frequency</th>
<th>Upper Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>2404</td>
<td>2405</td>
<td>2406</td>
</tr>
<tr>
<td>12</td>
<td>2409</td>
<td>2410</td>
<td>2411</td>
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<td>2414</td>
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</tr>
<tr>
<td>26</td>
<td>2479</td>
<td>2480</td>
<td>2481</td>
</tr>
</tbody>
</table>
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.
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

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

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

### Switch handling

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

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

Dwell Time (previously called 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%.

Daylight Harvesting (DLH) Photosensor 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

Daylight Harvesting Photosensor Enabled
This parameter enables the Daylight Harvesting functionality.
  • Default is 1