PHILIPS

Ledinaire

Small effort. Big savings.

Ledinaire EcoSet Application Manual
For Office applications

Content

1. Ledinaire EcoSet introduction

Ledinaire EcoSet enabled products provide an easy-to-set-up and simple-to-use wireless lighting controls. Aimed to elevate energy savings in office applications, the core components of the EcoSet system are LED luminaires and an external AC powered sensor. A remote controller is required for grouping of the system components in office application and an optional dimming wall switch is available for end users to tune to personalized lighting levels. Overall, the system offers (a) energy savings by dimming via motion & daylight control and (b) a comfortable lighting experience for end-users via wireless grouping technology (c) easy to install using remote controller.

Wireless grouping is done by using a remote controller to manually assign a sensor-luminaire group.

1.1. System offering

Ledinaire EcoSet Office Products

Ledinaire panel EcoSet

Ledinaire office sensor EcoSet

Ledinaire wall switch EcoSet

Ledinaire remote controller EcoSet

2. Office system components

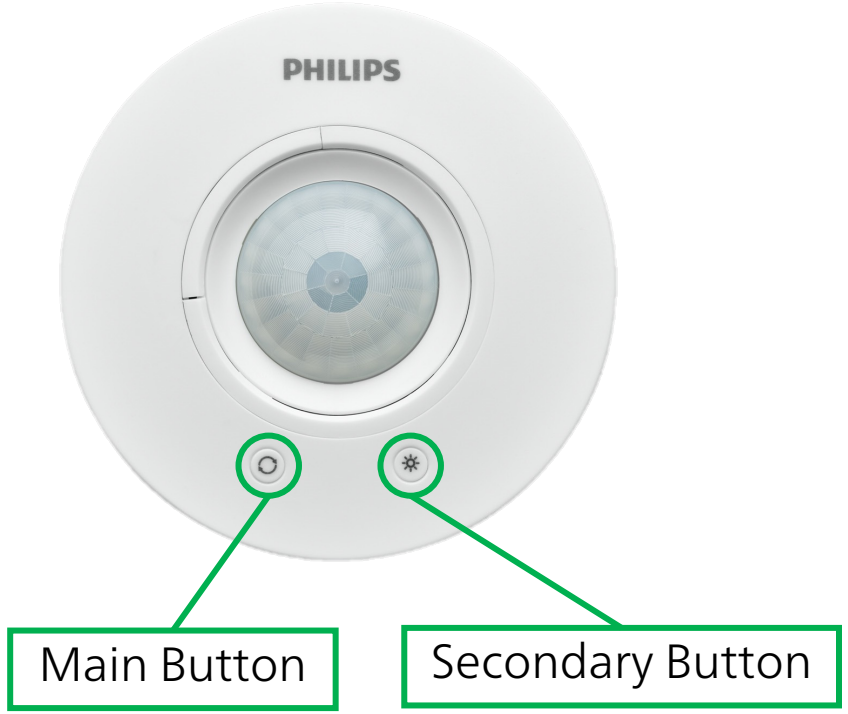
Wireless Luminaire:

Ledinaire EcoSet panels have an integrated wireless module which communicates with the Wireless sensor and other luminaires. When connected to the same sensor, luminaires react as a group.

2. Office system components

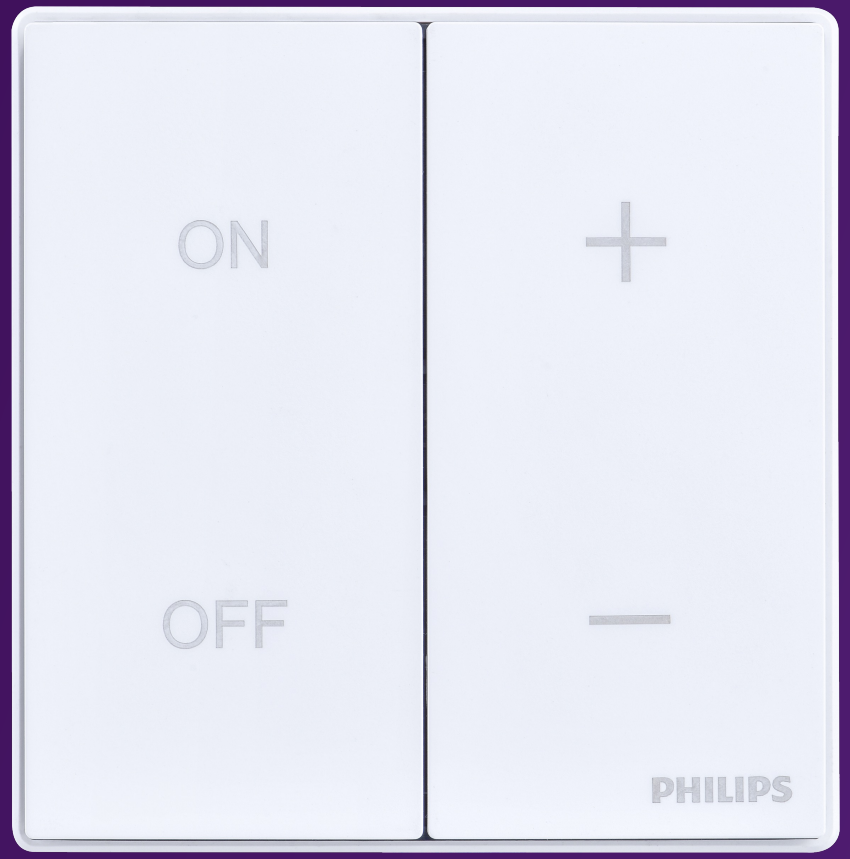
Wireless Sensor:

The wireless AC powered office sensor primarily incorporates a motion & daylight sensor coupled with a wireless RF module. It controls the lighting behaviour of an assigned group of luminaires. Multiple parameters such as hold time, background level and mode of operation are adjustable via dip switches on the rear of the sensor.



Two functional buttons exist on the front face: the left one is main button is used for grouping. The secondary button on the right is used to enable/disable sensing functions. An LED indicator is integrated for feedback and a retractable shield to reduce the motion detection field.

2. Office system components



Wall Switch:

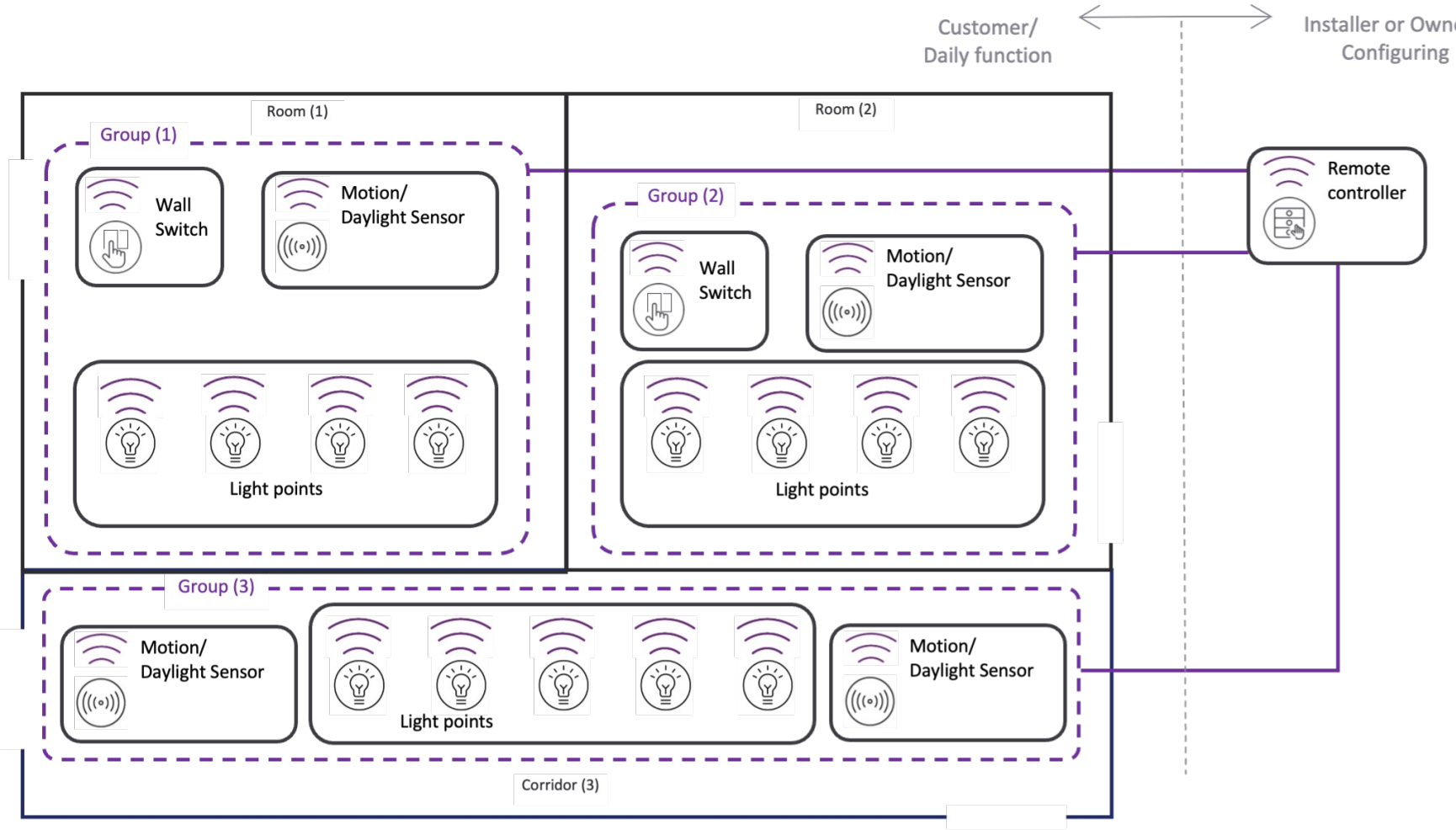
The Ledinaire wall switch EcoSet is a 4-button dimmer & on/off switch for daily use in office application. Powered by battery, it can be easily added to the system and mounted on the wall or on a desk.

2. Office system components

Remote Controller:

The Ledinaire remote controller EcoSet is a mandatory tool for setting up an office application. It is used for creating and modifying groups. It communicates to all system components via Bluetooth and can be further used to adapt group settings.

2.1. System illustration

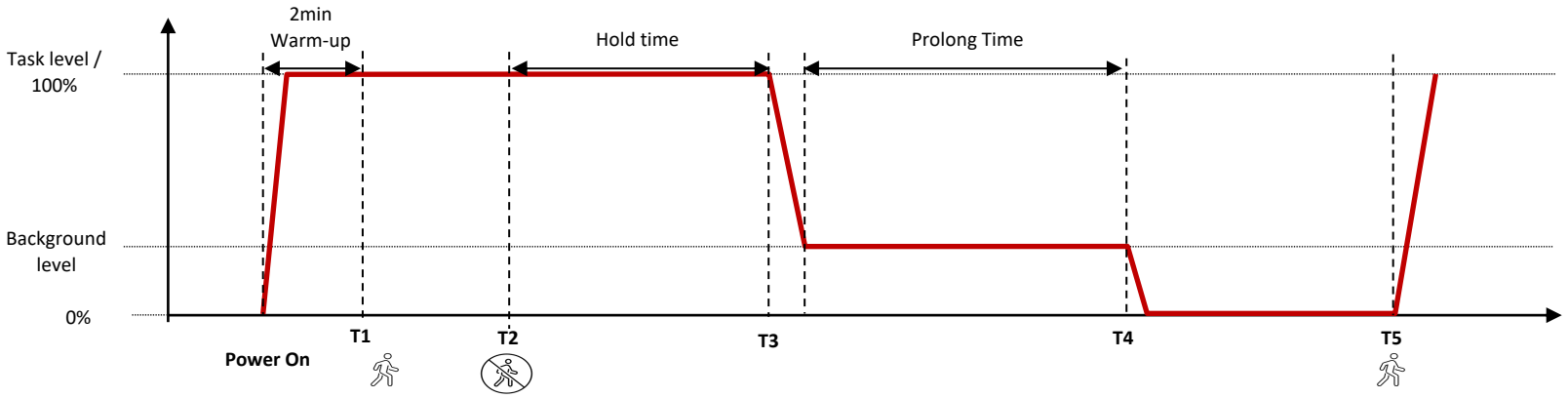


2.2. System parameters

Specification	Value
Group nodes max.	**50 nodes (where "nodes" refers to luminaires/sensors/wall switches)**
Hold time (mins)	3*/10/15/30
Background level (%) during motion detection	20*/30/50/70
Dim level (%) during daylight sensing	20/50*/75
Dimming range	20% - 100% (dimming step by 10%)
Lights off after prolong time (mins)	15
Dwell time (mins)	30
Modes	Normal mode* & Demo mode (10 seconds hold time)
Detection type	PIR
Sensing type	Motion detection & daylight sensing
Sensor Installation height	2.5 - 5m
Sensor detection range	Major detection: 5m radius @ 3m height Minor detection: 2m radius @ 3m height
* = default	

2.3. System operating behaviour

The illustration below shows the typical behaviour of the luminaire light controlled by the motion sensor when a group is created using the EcoSet remote controller.



- (T1 to T2) While there is motion detected the light level will remain at 100% / task level.
- **Hold time** (Time from T2 to T3): When motion is no longer detected, the light level will remain constant for the hold time, after which it will dim to the background level.
- **Background level**: The dimmed level when there's no motion detected after the hold time.
- **Prolong time** (Time from T3 to T4): Once the light level is at background level, if there is still no motion detected, the luminaire will transition to an off state, after the prolong time (15 mins).

2.4. System assumptions and dependencies

For office applications, a normal on/off wall power switch should be used, where already available, and considered to be added if not already available. The EcoSet system provides easy commissioning to quickly group luminaires by using the existing power on/off switch.

In this application, it is necessary for all desired luminaires and sensor(s) controlled by one power switch to be setup together in the same wireless group. A battery powered wall switch can be optionally used to provide wireless dimming and temporary on/off commands. However, this EcoSet wall switch cannot be used as the main switching element for installation steps. This is for flexible design-in and installation in renovation projects.

Note: System performance may be affected (control distance & delay time) by environmental interference (e.g., metal object shielding, wireless signal source, wall) or moving objects.

3. Setting up office spaces – creating & modifying groups

3.1. Prepare groups

Ensure power control for every group is arranged locally. Either have a method to disconnect locally or power them individually at group level as shown below:

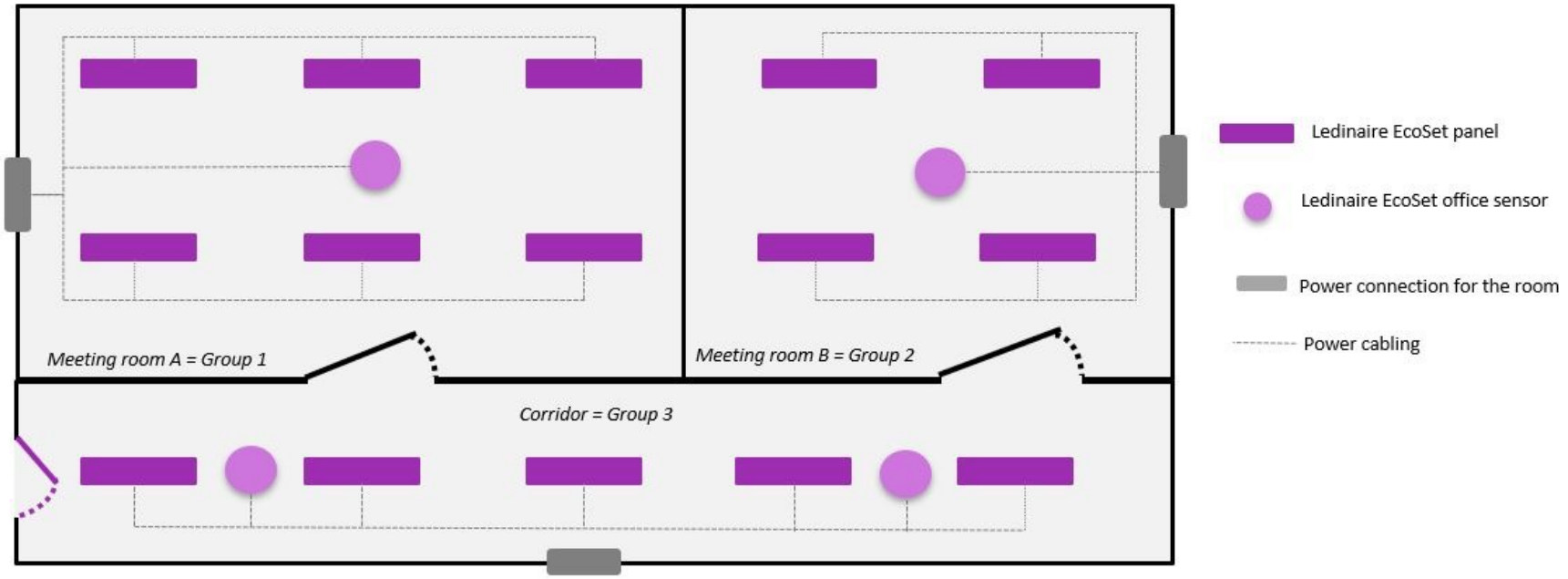


Figure 1 - Ensure powering for each group is independent

3.2. Insert Batteries in Remote Controller and Wall switch

Remote controller works with 2xAA batteries. Wall switch works with 1xCR2450 battery.

3.3. Configure Settings via dip Switches on the Sensor

Refer section 4.1 to configure sensor prior to installation on ceiling.

3.4. Creating a group

In office applications, the creation of groups follows the below process.

Open a new group

Press and hold the and COM buttons on the remote controller until the indicator LED comes on. The group channel remains open for 2 minutes allowing for next steps to be initiated.

The red LED indicator on remote controller stays on for 2 minutes.

3.4. Creating a group

In office applications, the creation of groups follows the below process.

Add luminaires in a group

When luminaires are powered while the group channel is open, the luminaires will auto search and join the group.

Note: Luminaires can be switched on before or after the group channel is opened in the previous step.
Luminaires go to a dimmed level within a few seconds then return to 100% light level after 50 seconds. The luminaires are now joined to the opened group.

Add sensors in a group

Press the  **Function Button** once on the sensor, the sensor will then search and join the opened group.

(**Note**: this can be done independently from the previous step.)
The Sensor LED will blink for the duration (1 minute) of the search

3.4. Creating a group

In office applications, the creation of groups follows the below process.

Add wall switch in a group

Press and hold the ON and + buttons for 5 to 10s on the wall switch.

The wall switch Will then search (duration 30s) and join the opened group.

Closing the group

Wait until the 2min grouping time elapses. The group is closed.
Wait for ~2 min when RED LED on the remote controller goes OFF automatically and group is closed.
To force close prior to 2 mins, long press the button until RED LED goes OFF.

Note: Ensure only one remote controller is opening a group in the application area at one time, this avoids any conflict in grouping.
Ensure to power on only the Ledinaire EcoSet luminaires which you want to be in the group when carrying out the grouping process.

3.5. Find target group by remote controller

A remote controller can create multiple groups and will memorise settings for the last 8 groups that have been created.

Follow the process below to find an existing target group.

Find the target group

Press the ´QUERY´ button
The current group of luminaires Will blink once.

Change the group(s) in remote controller.

Press the ´**CH**´ button once on the remote controller to switch the group to be controlled, from group 1 to 8.

3.6. Add luminaire/sensor/wall switch in an existing group

To add a luminaire/sensor/wall switch into an existing group, follow the process below:

Open an existing group

After identifying the target group (*see section 1.7*), press and hold the button until the LED indicator is illuminated to open the existing group. This group channel is then open for 2 min.
The LED indicator stays on during this time.

Add luminaire/sensor/wall switch

Follow the same operation on *section 3.1* to group new luminaires(s) /sensor(s)/wall switch(s).

Closing the group

Wait for ~2 min when RED LED on the remote controller goes OFF automatically and grouping times elapses.
To force close prior to 2 mins, long press the button until RED LED goes OFF.

4. Setting up office spaces – configuration

4.1. Set parameters via Dip Switches

Refer table to set dip switches for desired settings. Default settings are also indicated.

Hold time – Dip Switches 1&2
Hold time is the amount of time, starting from a motion detection event, whereby the luminaires remain at 100%. Once the Hold Time has elapsed the luminaires will dim to the background level.

Background level - – Dip Switches 3&4
Select the dimmed background level via sensor dip switches.

Mode of operation – Dip switch 7
Normal mode is for standard operation. Demo mode should only be used for demonstration purposes prior to installation. Note: Demo mode hold time is 10 seconds & is the default mode.

Parameter setting limitation
Sensor settings are active prior to adjustments made via the remote controller. Remote controller settings thereafter take priority.

• = OFF
Δ = ON
\- = ON or OFF

		1	2	3	4	5	6	7	8
Hold time	3min ± 18s	•	•	-	-	-	-	-	-
	10min ± 1min	•	Δ	-	-	-	-	-	-
	15min ± 1.5min	Δ	•	-	-	-	-	-	-
	30min ± 3min	Δ	Δ	-	-	-	-	-	-
Dim/Background Level	20% ± 2%	-	-	•	•	-	-	-	-
	30% ± 3%	-	-	•	Δ	-	-	-	-
	50% ± 5%	-	-	Δ	•	-	-	-	-
	70% ± 7%	-	-	Δ	Δ	-	-	-	-
Mode of operation	Normal*	-	-	-	-	-	-	•	-
	Demo	-	-	-	-	-	-	Δ	-

*** = Default value**

4.2. Set parameters via dip switches

Set Hold Time
Find the target group (following operation on *Section 3.2*).
Press 1/2/3/4 time, to select 3/10/15/30min times (respectively) on the Remote controller. *The LED indicator will blink 1/2/3/4 times corresponding to the hold time above.*
Press the **SEND** button to set the Hold Time to the current group.

Set dimmed background level.
Find the target group (follow operation on *Section 3.2*).
Press 1/2/3/4 time, to select 20%/30%/50%/70% background level (respectively) on the remote controller.
The LED indicator will blink 1/2/3/4 times corresponding to the levels mentioned above.
Press the SEND button to set background level to the current group.

Remote controller parameter impact on Sensor
Once the remote controller has been used to set Hold Time or dimmed background level, the sensor dip switch setting will be disabled in this group. If the group is reset and re-grouped, the luminaires will revert to the Sensor dip switch settings.

4.3. Daylight step dimming – enable/disable

The daylight function is triggered when the sensor detects the ambient light level is 2-3 times higher than the typical office application light (500 lux for a desk light with a sensor installation height of 3m). When the ambient light reaches this threshold, the luminaire will dim down to the preset daylight dim level. If the ambient light drops to 1-1.5 times the typical office application light, the luminaire(s) will return to 100% brightness.

To enable the daylight feature of the sensor, perform a long press (hold for 5-10 seconds) on the Sensing Button. The sensor indicator will blink 3 times to confirm, and LED indicator will remain ON for 1 minute. Follow the steps listed in section 4.5 for grouping luminaires for daylight control.

To disable the daylight feature, perform another long press (hold for 5-10 seconds) on the Sensing Button. The sensor indicator will blink 2 times.

4.4. Daylight step dimming - dim level setting

After enabling the sensor's daylight feature, you can adjust the daylight dim level i.e. the light level that sensor dims down to in case of excess daylight.

his dim level can be adjusted by a short press on Button. The default value is set to 50%. Each press will cycle through the following levels: 50% --> 20% --> 75% --> 50%. The sensor indicator Will flash twice when switching to 20%, three times when switching to 75%, and once when switching back to 50%.

Note: When motion is detected, the luminaires grouped to the sensor will light up at the default daylight level.

4.5. Daylight grouping

Once daylight function is enabled, you need to select luminaires that should respond to excess daylight. For instance, these can be luminaires located next to window.

a. To enable and start the daylight grouping feature, long press the button for 5-10 seconds. The sensor indicator will blink 3 times and the red LED indicator will remain ON for 1 minute.

b. During the sensor indicator ON time, long press the "TEST" and "COM" buttons on the remote controller (RC). The red LED on RC will remain ON for 2 minutes. The RC will receive the grouping message and select up to 5 luminaires that are not in the daylight group. This process can be repeated and when carried out again, luminaires that have previously joined the daylight group will blink once.

c. The 1st luminaire chosen by RC will make it blink 3 times and then dim down to set dim level (50% default). Press the "COM" button in case you want to choose the current selected luminaire to join the daylight group. Press the "TEST" button to move to the second luminaire in the cycle. The first luminaire will recover its light level. Repeat this process for all 5 selected luminaires.

d. Press the "SEND" button once to confirm that all chosen luminaires should join the daylight group and finish the grouping process. The chosen luminaire(s) will blink 3 times and return to their working level. All luminaires in the network will go back to the hold time start status for network synchronization.

4.6. Manual operation – dim up/down, on/off

Both the remote controller and wall switch can be used to manually control light level

Manual dim up/down

Press / on the remote controller, or +/ - button on the wall switch, all luminaires in the group will dim up/down one step by 10% light level.

Press / on the remote controller, or +/ - button on the wall switch, all luminaires in the group will dim up/down constantly in range 20%-100%.

Manual dimming System behaviour
Once the system light level has been manually changed, the system will temporarily disable sensing and dimming. The manually adjusted light level will remain for 30 mins, after this duration the sensing function will be enabled. The luminaire light level will revert to 100% if motion is detected, until the luminaire is powered off.

Next time the luminaire powers on, the light level goes back to 100%.

Manual on/off
Press ON/OFF on the remote controller, or ON/OFF button on wall switch, all luminaires in the group Will switch on/off.

Manual on/off system behaviour
If the luminaires are manually switched off, the luminaires will not automatically light on when motion is detected by the sensor. They will only react to a manual “on” command from the remote controller or wall switch.

4.7. Disable motion sensing via sensor

To disable the motion feature of the sensor, perform a long press (>10 seconds) on the Button. The sensor indicator will blink 5 times, and then flashes once every 30 seconds to indicate that the motion feature is disabled.

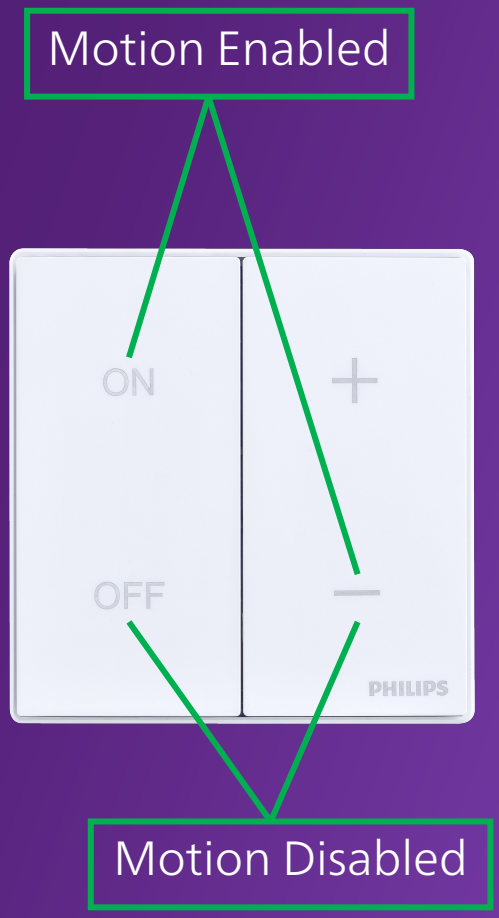
To enable the motion feature again, perform another long press (>10 seconds) on the Button. The sensor indicator will blink 4 times.

Note: *Only the motion-enabled sensors will react to motion detection and automatically dim the luminaires when there is no motion.*

4.8. Disable motion sensing via wall switch

To disable the sensor motion feature for all luminaires in the group, long press the "OFF" and "-" buttons on the wall switch. The luminaires will blink twice and then operate constantly at 100% light level until the luminaire is powered off & on again.

To enable the sensor motion feature for all luminaires in the group, long press the "ON" and "-" buttons on the wall switch. The luminaires will blink once and then the dimming function will be restored. Additionally, using the power switch on the luminaires will also enable the motion sensing feature.



5. Removing/resetting nodes

Removing luminaire(s) from an existing group will return the luminaire to factory settings, all parameter settings will go back to default.

5.1. Remove/reset a group of luminaires.

The luminaire(s) can be reset by a specific power cycling frequency. Start with the luminaires switched off at the mains supply switch. Switching ON 4 times in total, switch on for 10 seconds (min/max: 5 - 20 seconds), switch off for 5 seconds (min: 3 seconds). Upon the fourth on-cycle the luminaires will blink 5 times, confirming that reset has been successful. A new grouping procedure can then be started.

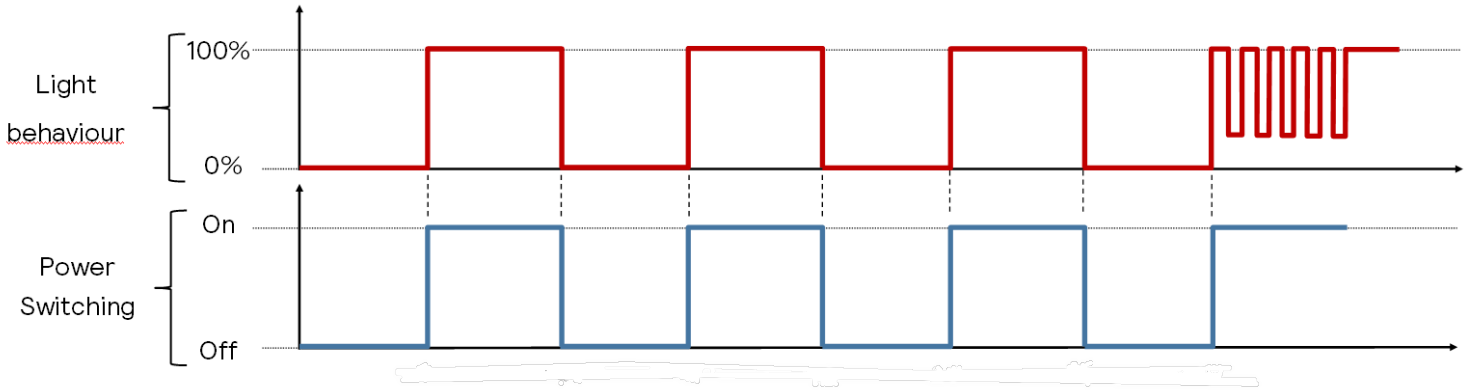
(**Note**: switching on/off using the EcoSet Wall switch will not work)
Figure below shows switching cycle and light behaviour.

5.2. Remove/reset office sensor

Press and hold the Function Button on the sensor for >10 seconds, until the red LED comes on. The indicator on the sensor will blink 5 times. The sensor is then reset.

5.3. Remove a wall switch

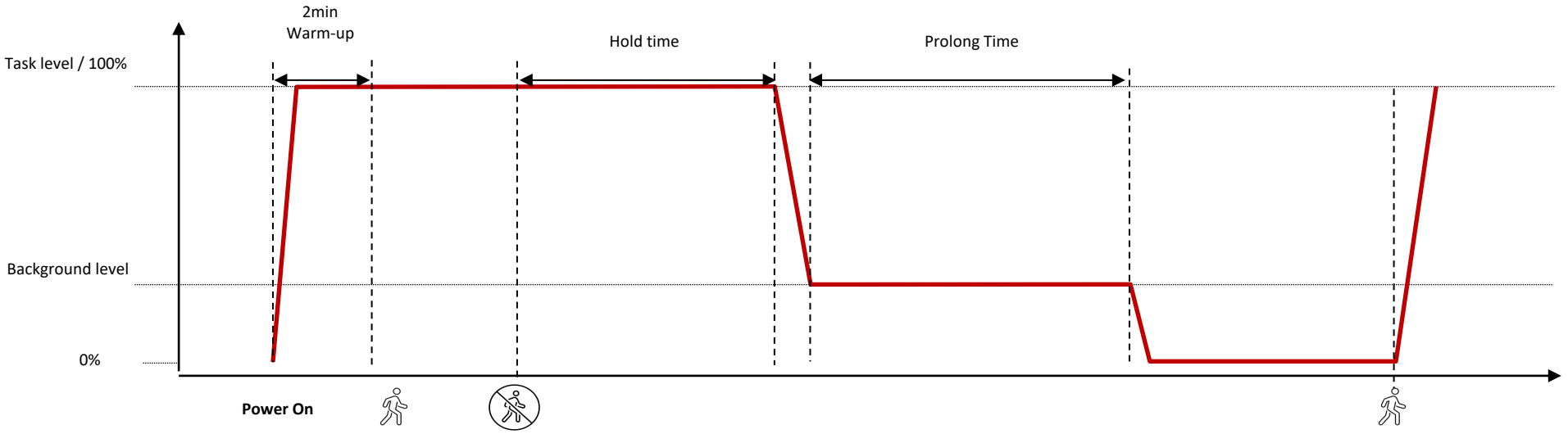
The wall switch does not need to be reset. It can directly switch to another group by following the same operation described in *Section 4.1*.



6. Office – system behavior after setup

- Out of the box – the luminaire continuously works at 100% light output when powered on until connection to a sensor is established. Grouping needs to be done via Ledinaire remote controller EcoSet.

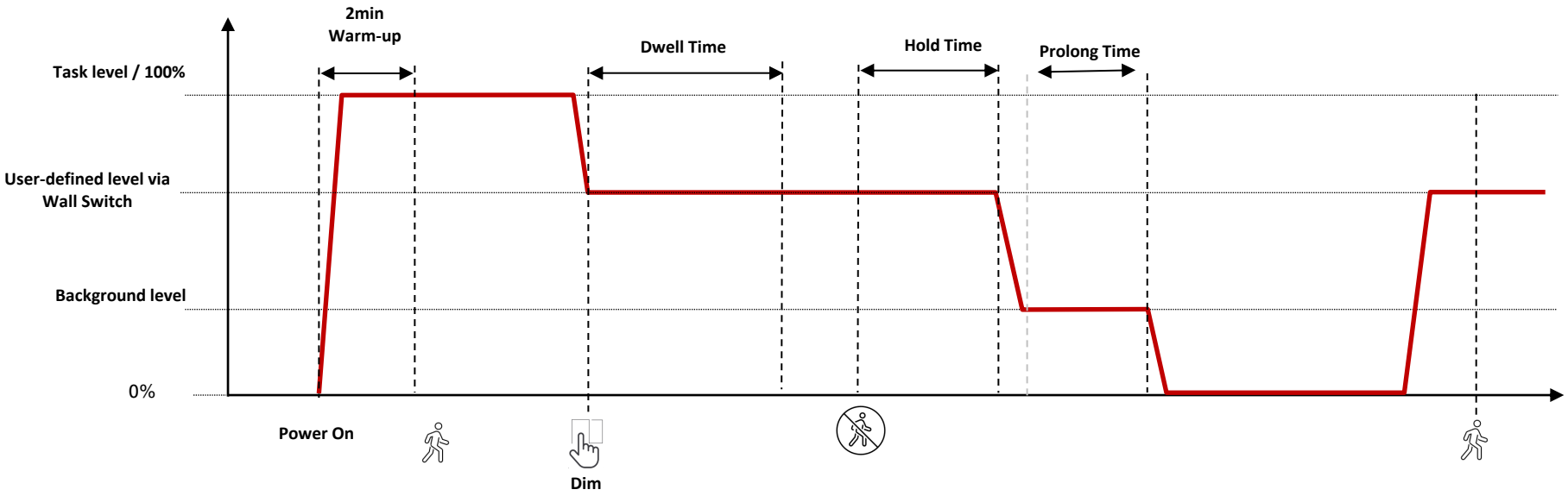
Figure 6.1.1. System sensing behaviour



- Luminaires will go to 100% light level when motion is detected.
- Luminaires will dim to the background level after the hold time where no motion has been detected.
- Luminaires will dim to an off state after 15 mins of Prolong Time where no motion has been detected.

6. Office – system behavior after setup

Figure 6.1.2. System sensing behaviour + Manual dimming control



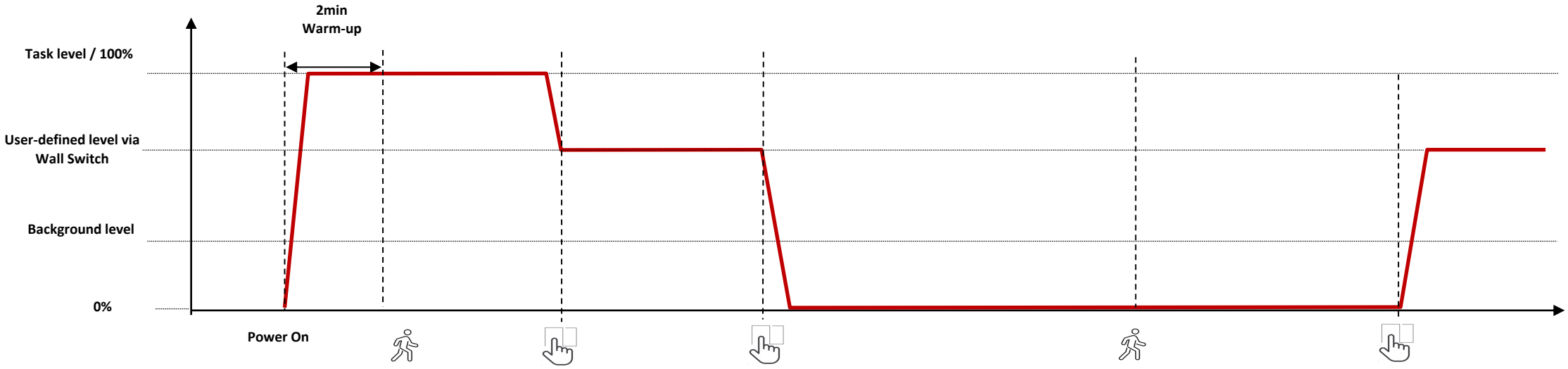
If a wall switch is used to change/dim the task light level, the system will keep the adjusted light level for an additional 30 minutes (dwell time), then the system returns to auto sensing control.

Note: Using the Wall switch to switch on will not initiate dwell time.

Where a group of luminaires have been dimmed by the user via the EcoSet Wall switch and autonomously dimmed to an off-state, they will return to the user-defined light level when motion is detected (refer *Figure 6.1.2*).

6. Office – system behavior after setup

Figure 6.1.3. System sensing behaviour control + Manual on/off control



Where a group of luminaires have been manually switched to an off state with the EcoSet Wall switch, they will not react to motion detection in this state.

The luminaire group therefore must be switched on via the EcoSet Wall switch or when the luminaires are power cycled, they will return to 100% light level.

7. Office – system behavior after power cycle

In case of power cycle of luminaires, the luminaires need 2 mins of warm up time before normal operation resumes. Within these 2 minutes, sensor or wall switch triggers will not work.

After 2 mins, the lights resume normal behaviour. Grouping functionality is maintained after power cycle unless reset process is activated.

8. Frequently asked questions

Where has a luminaire joined a sensor group; can it react from other sensors nearby?
A luminaire will not react to a sensor from a different group. Where a new group is opened and factory-set luminaires are the target, any luminaires in the vicinity which have already been grouped separately will not join the new group.

Can I use multiple sensors & switches in a group?
Yes. Multiple sensors & switches can join one group. It is advised to use a maximum of 50 wireless nodes in any one group, where node refers to any of the EcoSet wireless components.

If I open an existing group and add a luminaire, does the luminaire follow the same settings with existing luminaires?
The newly added luminaire will follow current settings of the Sensor. Therefore, if the newly added luminaire joins a group where settings are set by Remote controller; it's necessary to re-apply Remote controller settings to the whole group.

Which setting method has priority: remote controller or sensor?
Remote controller settings always have priority. Luminaires will continue to follow remote controller settings even after sensor settings have been updated. If there are two luminaires with different settings, it's recommended to address this in the following way.
1) Where the target group is in the memory of the remote controller then the remote controller settings can be applied to the whole group again or
2) where the target group is not in the memory of the remote controller, the luminaire and sensor in the group can be reset and a new group created. As a new group, by default, the luminaires will follow sensor settings.

8. Frequently asked questions

Can I use more than 5 luminaires in daylight grouping?
Yes. The automatic selection of 5 luminaires is used to make the selection process easier. Follow the same advice as standard grouping i.e, 50 wireless nodes in a sensor group. To activate more than 5 luminaires for daylight grouping repeat the daylight grouping as described in the instructions.

How can I reset the sensor to restart the grouping functionality?
To go to factory settings, press the button on the sensor >10 seconds, the indicator on the sensor will blink 5 times.

Can/should I use an existing wall power switch in collaboration with EcoSet system?
Yes. It is mandatory to use or implement a local wall power switch. This is recommended for multiple reasons a) the power switching is required for isolating groups at installation, especially where multiple or adjacent groups are intended to be used, b) for future re-grouping or troubleshooting a method of power cycling locally is needed, and c) consider further optimized energy savings where luminaires are completed powered off during >24hrs of office inactivity instead of in a standby state.

How can I reset the luminaires to factory settings?
Refer Section 5: it describes how to perform a reset of the hardware including sensors and luminaires.

When power cycling, the luminaire starts flickering before powering down during the process, is it reset?
Temporary flickering before power-down is possible when the switching cycle has been too short i.e., less than 5 seconds. Therefore, the luminaire may not be reset. Repeat the power cycling process again and increase the duration of the switching cycles.

8. Frequently asked questions

Is daylight calibration needed for daylight step-dimming?

No calibration needed as this is covered with the assumption of an average reflection coefficient for the office environment. This implies that in different environments the moment of dimming up and down might be at slightly different lux-levels but ensures simplicity of the required commissioning while still allowing daylight energy savings.

[1] Energy savings compared with regular same specification Ledinaire on/off LED luminaires, thanks to automated dimming and motion sensing.

November 2023