

## Wireless Flex G2

0-10V System

 **signify**  
**interact**



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# 1. Introduction

Thank you for choosing **Fluence Wireless Flex G2** 0-10V System!

The Wireless Flex G2 System is used to drive the light output of luminaires via control voltages of 0-10V at the inputs of the Wireless Flex G2 Transmitter Dongles. These Transmitter Dongles broadcast the dim settings to the luminaires. The Wireless Flex G2 System comprise of two components, transmitter dongle and receiver dongle.

These luminaires receive these dim settings either via a matching Wireless Flex G2 Receiver Dongle, or they have an internal receiver board.

## 1.1 Overview

This document describes the following items:

- An instruction to properly install the orange Wireless Flex G2 Transmitter Dongles and avoid potential issues that could impact product reliability and performance. It includes:
  - Advice to determine if additional hardware is required.
  - Guidelines for ensuring that Wireless Flex G2 Transmitter Dongles are located correctly for proper communication.
  - Instructions to install the Wireless Flex G2 Transmitter Dongles parts.
- Transfer characteristics of the Wireless Flex G2 0-10V Transmitter and Receiver Dongles and how to use them to control light level and spectrum.
- An instruction to properly install the white Wireless Flex G2 Receiver Dongles on the luminaires.

## 2. Hardware

### 2.1 Basic operation of the Wireless Flex G2 System

The Fluence Wireless Flex G2 system is an easy-to-use system that provides a highly flexible system to control the luminaires in your greenhouse. This system comprises one (1) Wireless Flex G2 Transmitter Dongle and a user-defined group of luminaires up to 199 units.

The Fluence Wireless Flex G2 Transmitter Dongle is the interface between external 0-10V control signals, and the selected luminaires assigned to the group. It converts the 0-10V control signal into a wireless digital signal and, when applicable, changing of the light spectrum.

Compartments requiring different light levels, light spectra or lighting can be controlled individually via separate groups, each using its own Fluence Wireless Flex G2 Transmitter Dongle.

All luminaires within the group have transceivers - either integrated or via an add-on Wireless Flex G2 Receiver Dongle - that together create a mesh network in which the control signals are propagated. Therefore, the system becomes very robust.



Luminaires and the Fluence Wireless Flex G2 Transmitter Dongle can be assigned to and removed from a group via an app on a mobile device, enabling to (re-)configure the group upon the outline of the area that needs to be lit. This procedure is described in a separate document: the Commissioning Guide.

## 3. Installation of the Wireless Flex G2 Transmitter Dongle

### 3.1 Intro

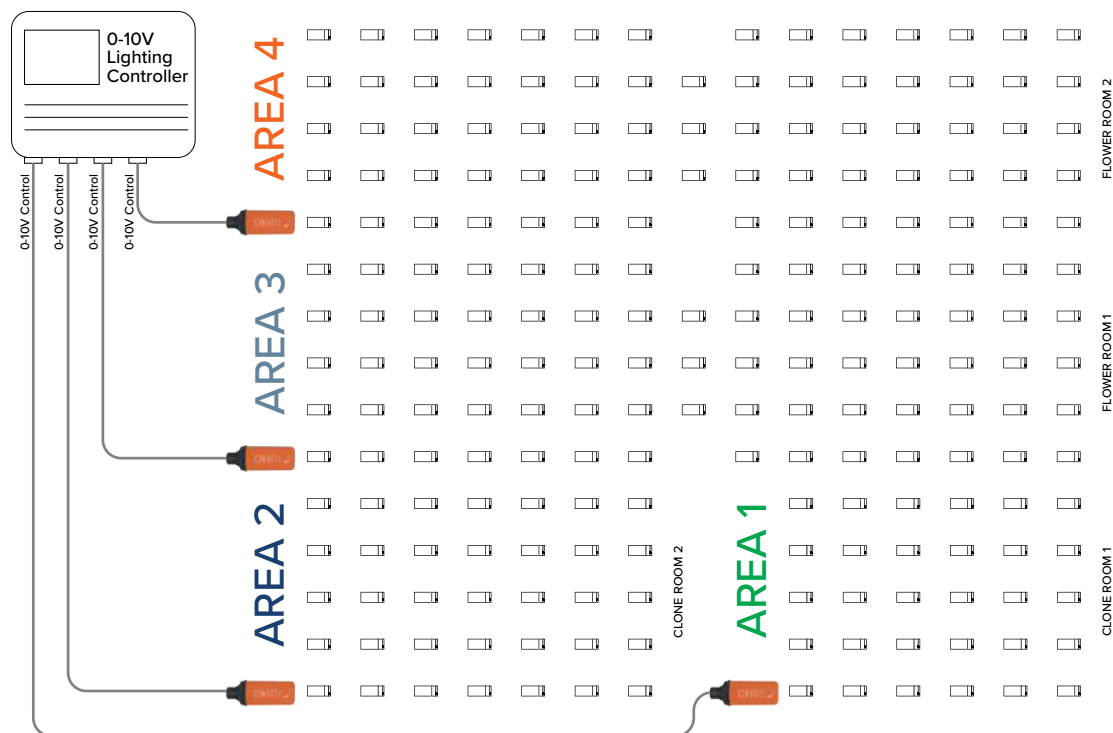
This part exclusively describes the installation of the Fluence Wireless Flex G2 Transmitter Dongle.

The Wireless Flex G2 Transmitter Dongle is supplied with a feed through connector with five wires and a rubber grommet for mounting in the electrical enclosure or junction box.

### 3.2 Floorplan

It can be very convenient to create a floorplan upfront considering the design rules as indicated in 3.1 plus some basic rules as indicated in the Commissioning Guide:

- Distance between Wireless Flex G2 Transmitter Dongle and luminaires, and distance between adjacent luminaires must be within the specified range. See Chapter 3.2.
- The maximum numbers of luminaires connected to each Wireless Flex G2 Transmitter Dongle should not exceed 199 units.
- The selected Zigbee channels for each of the Wireless Flex G2 Transmitter Dongles should not be the same as the adjacent one. (This later will be assigned during commissioning; however, it will be handy to designate them upfront in the floorplan. Choose either Zigbee Channel 11, 20 or 25.)
- Consider the distance between controller and Fluence Wireless Flex G2 Transmitter Dongle.



#### **Example of a typical application:**

Each compartment has a Wireless Flex G2 module and controls the power and spectrum of all luminaires of its dedicated area.

### 3.3 Preparation and positioning

Consider the following attention points before installing:

1. The Wireless Flex G2 Transmitter Dongle should be located within 50 feet (15.24m) of the first luminaire or Wireless Receiver of the group it controls.
  - The Wireless Flex G2 Transmitter Dongle should have an unobstructed line-of-site connection to the first luminaire of the group.
  - A group of luminaires should cover only one area or compartment; also, these must be within the range of adjacent luminaires to create a robust mesh network.
2. Do not mount the Wireless Flex G2 Transmitter Dongle in a mechanically vulnerable location.
  - Protect the Wireless Flex G2 Transmitter Dongle from accidentally being bumped or breaking.
3. The Wireless Flex G2 Transmitter Dongle must be mounted horizontally or pointing downwards.
  - To prevent water from being collected in the connector when the Wireless Flex G2 Transmitter Dongle is not installed.
4. Avoid metal parts close to the Wireless Flex G2 Transmitter Dongles.
  - Metal parts, bars or wiring may affect the signal of the Wireless Flex G2 Transmitter Dongles and therefore reduce its range.
  - **Never mount the Wireless Flex G2 Transmitter Dongles inside a metal box!**

### 3.4 Mounting

When an appropriate location has been selected, the Wireless Flex G2 Transmitter Dongle must be mounted.

The packing includes an additional rubber grommet.

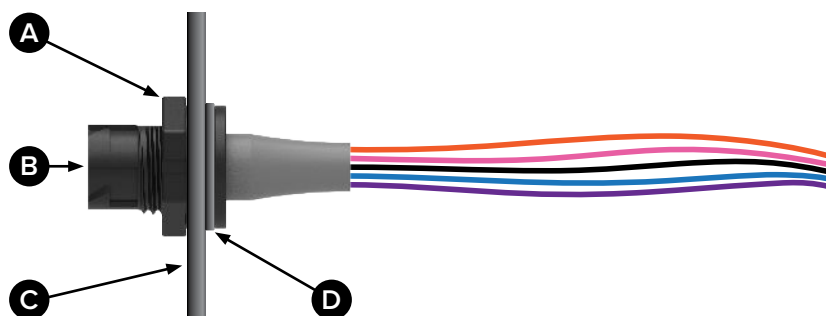
For mounting the Wireless Flex G2 Transmitter Dongle on a sheet metal or plastic enclosure with a wall thickness up to 3/16" or 5mm:

- 1 Drill a .75" or 19mm diameter hole in the enclosure wall (1).  
Deburr the hole at the inside of the cabinet.
- 2 Remove the locking nut from the connector.
- 3 Insert the connector – with rubber washer - from the inside of the cabinet. The grommet is not needed
- 4 Position the connector - the locking key inside the connector indicates the front/top of the adapter – and fasten the nut (2).



#### COMPONENTS

- A Nut
- B Connector housing
- C Cabinet wall
- D Rubber ring



#### Attention

Do not overtighten the nut, as it may damage the rubber washer and compromise the IP66 rating.

- 5 Next to the label is a tear-off QR code.

This may be helpful to make a floor plan with the location of each Wireless Flex G2 Transmitter Dongle.

Remove the tear-off portion of the product label and use it to mark the installation location on a site map for future reference..



#### Attention

The tear-off portion of the label must be removed prior to final installation.  
The tear-off portion could possibly detach and fall off over time if not removed.

### 3.4 Mounting (Continued)

In case pre punched knock-out holes are used, the diameter of the mounting hole will be ~0.875" (22 mm), which is too big to use the panel mount by itself.

In this case, the grommet included in the packing should be used.

- 1 Remove the locking nut and rubber washer from the connector.
- 2 Insert the grommet in the hole of the cabinet.
- 3 Insert the connector from the inside of the cabinet.
- 4 Position the connector - the locking key inside the connector indicates the front of the Wireless Flex G2 Transmitter Dongle – and fasten the nut.



#### Attention

Do not overtighten the nut, as it may damage the grommet.  
Note that using knock-out holes compromise the IP66 rating.

### 3.5 Electrical Connections

The function of the wires is assigned as follows:

#### Wire Assignments

| Wire Color | Function                              | Value             |
|------------|---------------------------------------|-------------------|
| Pink       | Common                                | Common            |
| Black      | Supply Voltage                        | +12V or +24V (DC) |
| Purple     | Control voltage of Spectrum Channel 1 | 0 ~ +10 Volt      |
| Orange     | Control voltage of Spectrum Channel 2 | 0 ~ +10 Volt      |
| Blue       | Control voltage of Spectrum Channel 3 | 0 ~ +10 Volt      |

The control voltages reference to GND terminal, i.e., the control voltages are applied between the pink and purple, pink and orange, and pink and blue cable.

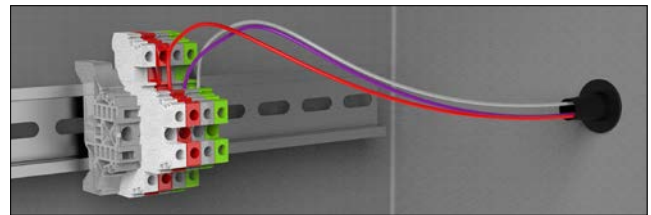
The connector comes with pre-assembled wires with a length of approximately 1.5 ft. It is strongly advised to connect the wires directly to the supply and 0-10V signals and not extend them to reduce the risk of damage, instability, and/or wrong setting.



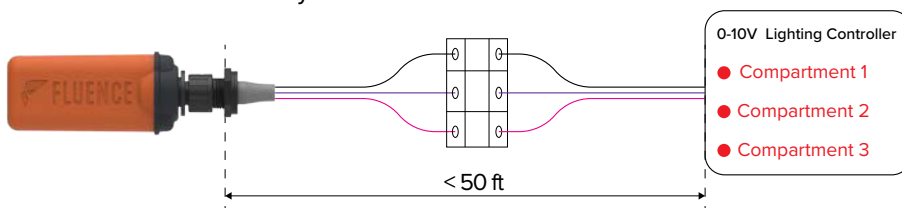
#### Attention

Make sure that the power supply has a limited output power.  
A powered Wireless Flex G2 Transmitter Dongle will indicate a flashing LED on top of its casing.

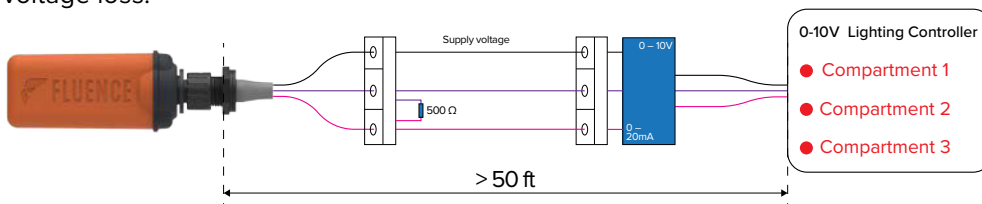
To provide a reliable connection, it is advisable to use a connection block as shown in the picture to the right.



In case the controller is located close or in the same enclosure as the Wireless Flex G2 Transmitter Dongle, it can be connected directly via the terminal block.



In case the distance between controller and Wireless Flex G2 Transmitter Dongle is longer, it is strongly recommended to use a 0-10V to 0-20mA converter. This will make the signal less susceptible to noise or voltage loss.



A mated connector provides protection against water ingress (IP66). Prevent the connector contacts to be exposed to reduce the risk of corrosion and short circuit.

Use a twisted or shielded cable and a resistor of 500 Ohms to convert the 0-20mA into 0-10V signal.

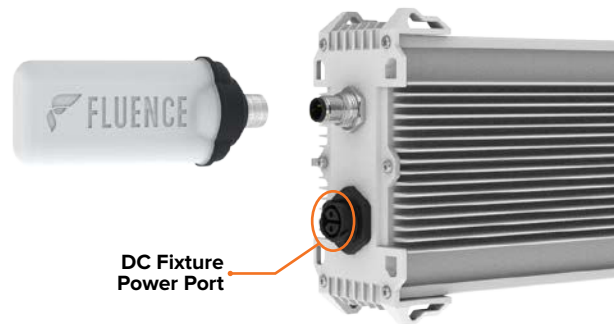
## 4. The Wireless Flex G2 Receiver Dongle

### 4.1 Installation

- 1 Remove the dust cap from the light fixture power supply port. The port is the 5-pin connector located on the DC end of the power supply next to the 2-pin DC fixture power port that connects to the luminaire.

Install a Wireless Flex G2 Receiver Dongle on the Fluence light fixture port as shown below.

Line up the pins and push in. Screw the locking ring clockwise until hand tight. To remove, unscrew the locking ring counterclockwise until it is loose and pull out.



#### Attention

Ensure that the cable for the DC Fixture Power Port is run away from the Wireless Flex Receiver. The cable should not come closer to the Receiver than the distance between the DC Fixture Power Port and the Port.



- 2 Remove the tear-off portion of the product label and use it to mark the installation location on a site map for future reference.



#### Attention

The tear-off portion of the label must be removed prior to final installation. The tear-off portion could possibly detach and fall off over time if not removed.

## 4.1 Installation (Continued)

- Repeat Steps 1-2 for each Fluence light fixture in the installation. Receivers can be installed at any point during or after light fixtures are installed.

For constraint areas a special Adapter, M12, 3pin, 90° is available. This will reduce the height of a mounted Wireless Flex G2 Receiver Dongle as shown to the right.



### Attention

Only use original Fluence accessories to connect the Wireless Flex G2 Receiver Dongle, otherwise its function can be degraded, and its warranty may void.

## 4.2 Powering the luminaire

After powering up the luminaire with a new Wireless Flex G2 Receiver Dongle, the following can be observed:

- The light will go to 100% level.
- The blue LED on top of the Wireless Flex G2 Receiver Dongle starts blinking fast.

The frequency of the blinking indicates if the Wireless Flex G2 0-10 Receiver is open for commissioning (fast blinking) or part of a group (slow blinking). Please refer to the Commissioning Guide for more information.



### Attention

The Wireless Flex G2 Receiver Dongle is intended for use with selected Fluence luminaires. Also, in case needed, the Receiver only must be connected using original Fluence accessories and adapters.

## 5. Performance

### 5.1 Transfer function

The Wireless Flex G2 Transmitter Dongle can be used in different configurations:

- The Wireless Flex G2 Transmitter Dongle works in conjunction with the RAPTR2 platform, which luminaires comprise internal receivers
- The Wireless Flex G2 Transmitter Dongle works in conjunction with the Wireless Flex G2 Receiver, which is attached to a luminaire with one or more 0-10V control inputs.

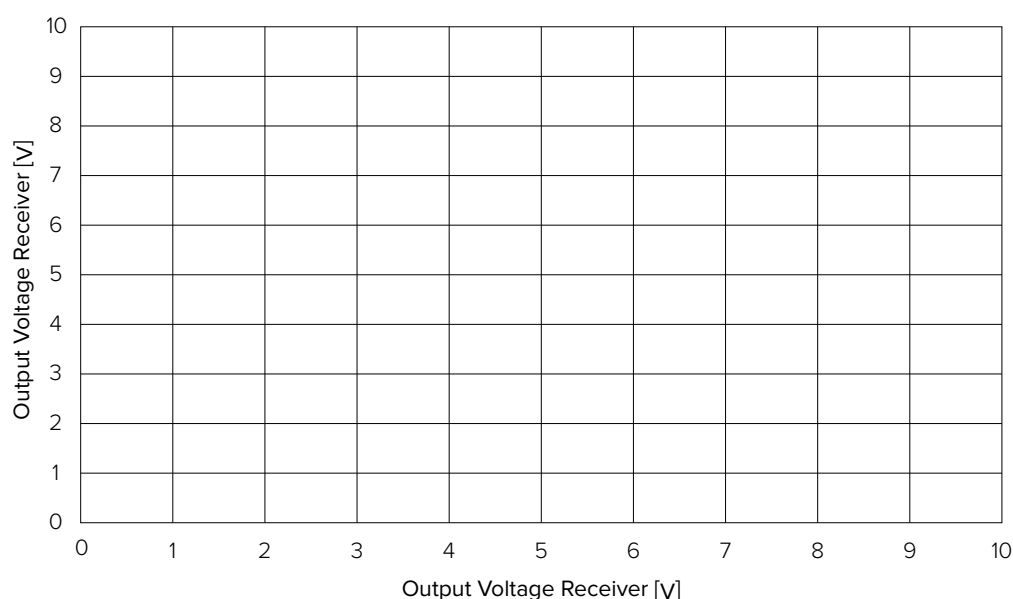
When connected to the RAPTR2 luminaires, the Wireless Flex G2 Transmitter Dongle directly determines the light level based on the control voltages as applied.

Please refer to the Application Guide of the RAPTR2 luminaire.

When connected to the Wireless Flex G2 Receiver Dongle, it transfers the 0-10V control voltages to the corresponding luminaire input via digitized wireless communication. The control characteristics will be dependent on the luminaire on which this Wireless Flex G2 Receiver Dongle is installed. Please refer to the control characteristics in the documentation of the luminaire via the QR code of the Installation Guide.

The Wireless Flex G2 Transmitter and Receiver Dongle can replace the Generation 1 products (not vice versa), however they work with different protocols and commissioning apps therefore cannot be mixed.

#### Transfer Function



#### Attention

Verify the dimming curve of the luminaire which the Wireless Flex G2 Receiver Dongle is connected to.

## 5.2 Channel assignment

The Wireless Flex G2 Transmitter Dongle can drive up to three spectrum channels. Depending on the ability of the connected luminaire (directly or via the Wireless Flex G2 Receiver Dongle), the lamp defines the number of spectrum channels and the color assigned to each spectrum channel.

A luminaire which can dim one spectrum channel will use Channel 1 only.

## 5.3 Response time

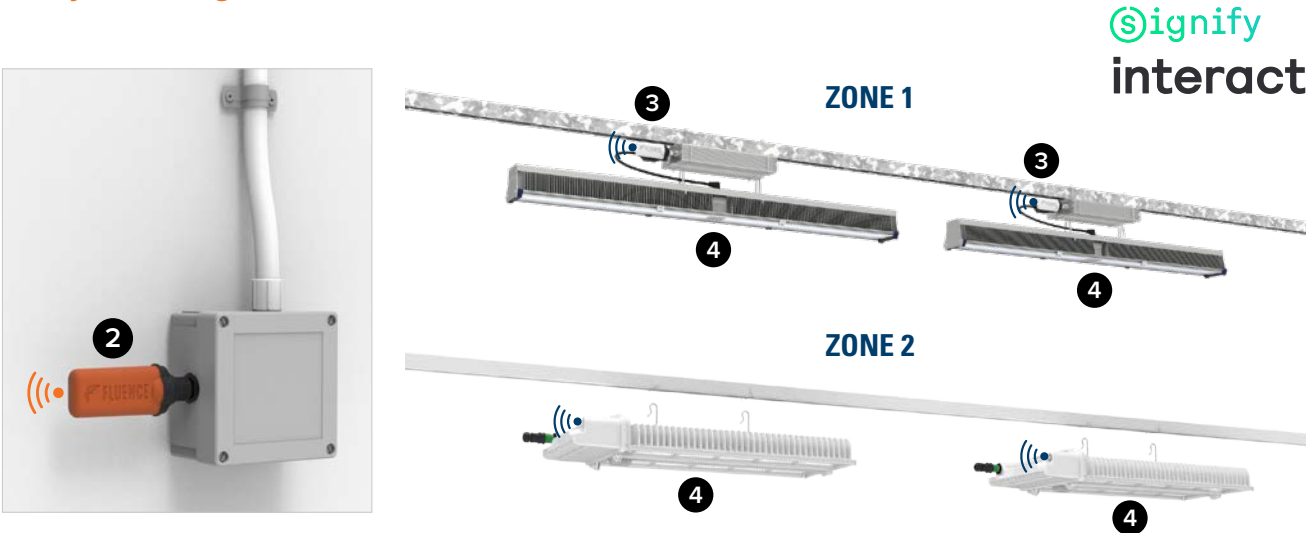
During normal operation, the Wireless Flex G2 0-10V System will react within one second to changes of the 0-10V control voltages and transmits the new setting. Similarly, the Wireless Flex G2 Receiver Dongle will have a comparable reaction time.

The Wireless Flex G2 0-10V System will not react to small voltage changes of less than 0.1 V, to avoid fluctuating lights. However, in this condition the Wireless Flex G2 Transmitter Dongle will transmit this setting every 100 seconds to the Receiver or luminaire.

With stable control voltages at the inputs of the Wireless Flex G2 Transmitter Dongle, the luminaire may respond to this setting within 100 seconds after a power cycle.

# 6. Product Information

## 6.1 System Diagram



### COMPONENTS

- 1 Any Lighting Controller with an industry standard 0-10 V DC output and 12V or 24V DC power source (not shown)
- 2 Wireless Flex G2 Transmitter Dongles (1 required per zone)
- 3 Wireless Flex G2 Receiver Dongles (1 per power supply/light fixture)
- 4 Fluence Light Fixture

## 6.2 Ordering Codes

| 12NC           | Description                          |
|----------------|--------------------------------------|
| 9124 017 02398 | WIRELESS FLEX G2, TRANSMITTER DONGLE |
| 9124 017 01919 | WIRELESS FLEX G2, RECEIVER DONGLE    |
| 9124 017 02592 | WFD Adapter, M12, 3pin, 90°          |

## 7. Frequently Asked Questions

- Q1.** Should I cut or ground the wires of the Wireless Flex G2 Transmitter Dongle for those spectrum channels that are not used for of the luminaire?
- A1.** The wires can be connected to Ground (pink wire). Do not cut them as they may be required for future applications.
- Q2.** What is the maximum cable length between the control unit and the Wireless Flex G2 Transmitter Dongle?
- A2.** It is advised to mount the control unit as close as possible to the Wireless Flex G2 Transmitter Dongle with a maximum of 50ft (15.4 m).  
Keep the signal wiring separate from the (mains power) cables. In case longer distances are required, consider using 0 -20mA signals instead (see Chapter 3.4)
- Q3.** I use the Wireless RAPTR 2 - T48 luminaire with two spectrum channels and want to boost the light by increasing the control voltages at the inputs of the Wireless Flex G2 Transmitter Dongle. But I only see the light become whiter. Why?
- A3.** When the control voltages (= power demand from the luminaire) become too high, the luminaire will reduce its light output based on a predefined priority, i.e., white over red. This choice is based on what is the least damaging for the crop. Please refer to the Application Guide of the RAPTR 2 luminaire for the behavior.
- Q4.** What kind of cable should I use when extending the distance between computer and Wireless Flex G2 Transmitter Dongle?
- A4.** If possible, use twisted wire or shielded wire to minimize noise pickup.
- Q5.** I see a light flashing on top when I power the Wireless Flex G2 Transmitter Dongle and Receiver Dongle. What does it mean?
- A4.** The light flashing indicates two things:
1. The device is working (correctly)
  2. The status of the commissioning. Fast blinking indicates that the device has not been commissioned, slow blinking indicates that the device has been commissioned (i.e., assigned to a group).

## 8. Compliance

The Wireless Flex G2 system has been tested for and complies with the following international standards:

|                |                                                                 |
|----------------|-----------------------------------------------------------------|
| Safety         | IEC 62368-1                                                     |
| EMC            | EN 55011 (CISPR11); IEC 61000-6-1; IEC 61000-6-3; IEC 61000-4-2 |
| RF             | ETSI EN 300 328 V2.2.2; FCC part 15 Subpart C 15.247            |
| Environmental  | IEC 63000 (ROHS)                                                |
| Approval marks | CE, UKCA, FCC                                                   |

### CALIFORNIA PROPOSITION 65 WARNING

This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### REACH Art. 33 Declaration

With respect to the individual parts or components that complete the product mentioned above, we have requested our suppliers provide us with information on the related REACH substances. Based on our own current knowledge and the information received from our suppliers, Signify can provide you with the following information concerning Substances of Very High Concern (SVHC) in our products, as required by article 33 of REACH.

Based on our current knowledge and supplier information, the following SVHC with a threshold level of 0.1% by weight of an article is present in our articles:

| SVHC | CAS Number | Comment                           |
|------|------------|-----------------------------------|
| Lead | 7439-92-1  | Indicated to be present in Diodes |

As this list of Substances of Very High Concern will be updated regularly, we refer to the website for the most recent information.

## 9. References

| Title                                      | Remarks                                                                                            |
|--------------------------------------------|----------------------------------------------------------------------------------------------------|
| Wireless Flex G2 0-10V Commissioning Guide | Describes how to create groups of luminaires or receivers and one adapter via a mobile device app. |
|                                            |                                                                                                    |
|                                            |                                                                                                    |
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