

APPLICATION GUIDE

Wireless Flex Dimming G2

WFD2 0-10V Adapter



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1. Introduction

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

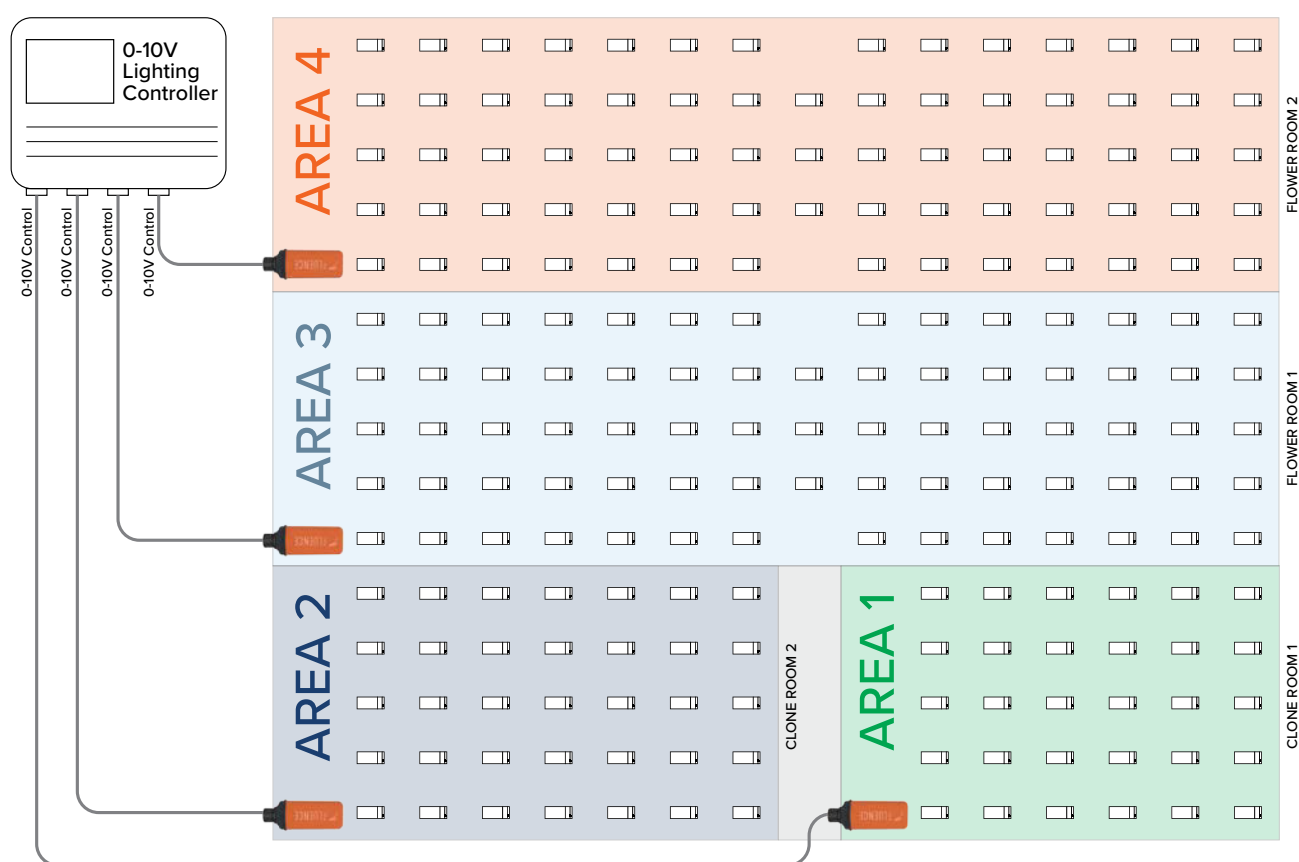
This document describes the following items:

- An instruction to properly install Wireless Flex G2 0-10V Adapters 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 0-10V Adapters are located correctly for proper communication.
 - Instructions to install the Wireless Flex G2 0-10V Adapter parts.
- Characteristics of the Wireless Flex G2 0-10V Adapter (and Receiver) and how to use them to control light level and spectrum.

1.1 Floorplan

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

- Distance between Wireless Flex G2 0-10V Adapter 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 0-10V Adapter should not exceed 199 units.
- The selected Zigbee channels for each of the Wireless Flex G2 0-10V Adapters 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 0-10V Adapter



Example of a typical application:

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

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 0-10V Adapter and a user-defined group of luminaires up to 199 units.

The Fluence Wireless Flex G2 0-10V Adapter 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 for dimming 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 0-10V Adapter.

All luminaires within the group have transceivers - either integrated or via an add-on Wireless Receiver module - 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 0-10V Adapter 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

3.1 Introduction

This part exclusively describes the installation of the Fluence Wireless Flex G2 0-10V Adapter.

The Wireless Flex G2 0-10V Adapter 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 Preparation and positioning

Consider the following attention points before installing:

1. The Wireless Flex G2 0-10V Adapter should be located within 50 feet (15.24m) of the first luminaire or Wireless Receiver of the group it controls.
 - The Wireless Flex G2 0-10V 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 0-10V Adapter in a mechanically vulnerable location.
 - Protect the Wireless Flex G2 0-10V Adapter from accidentally being bumped or breaking.
3. The Wireless Flex G2 0-10V Adapter must be mounted horizontally or pointing downwards.
 - To prevent water from being collected in the connector when the Wireless Flex G2 0-10V Adapter is not installed.
4. Avoid metal parts close to the Wireless Flex G2 0-10V Adapters.
 - Metal parts, bars or wiring may affect the signal of the Wireless Flex G2 0-10V Adapters and therefore reduce its range.
 - Never mount the Wireless Flex G2 0-10V Adapters in a metal box!

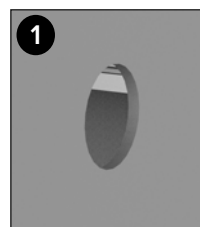
3.3 Mounting

When an appropriate location has been selected, the Wireless Flex G2 0-10V Adapter must be mounted.

The packing includes an additional rubber grommet.

For mounting the Wireless Flex G2 0-10V Adapter 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



Position the connector - the locking key inside the connector indicates the front/top of the adapter – and fasten the nut (2).



Important

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

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 0-10V Adapter.



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 0-10V Adapter – and fasten the nut.



Important

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

3.4 Electrical Connections

The function of the wires is assigned as follows:

Wire Assignments

Wire Color	Function	Value
Pink	Ground	GND
Black	Supply Voltage	+ 12 Volt (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.

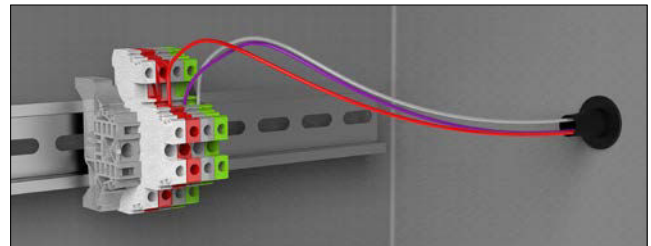
The connector comes with pre-assembled wires with a length of approximately 18 inches (457 mm).



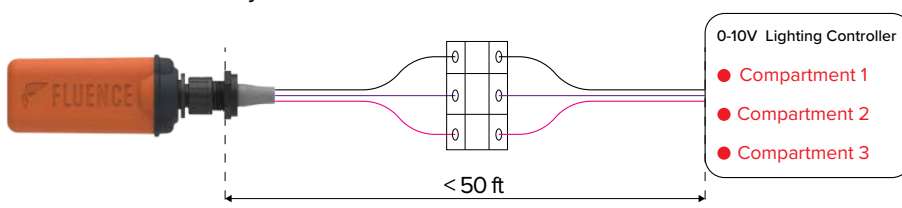
Important

Make sure that the power supply has a limited output power.
A powered Wireless Flex G2 0-10V Adapter will indicate a flashing LED on top of its casing.

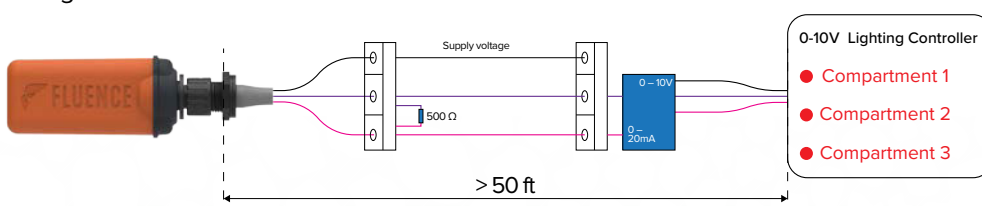
To provide a reliable connection, it is advisable to use a connection block as shown in the picture to the right.



In case the controller is located close or in the same enclosure as the Wireless Flex G2 0-10V Adapter, it can be connected directly via the terminal block.



In case the distance between controller and Wireless Flex G2 0-10V Adapter 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. Performance

4.1 Transfer function

The Wireless Flex G2 0-10V Adapter can be used in different configurations:

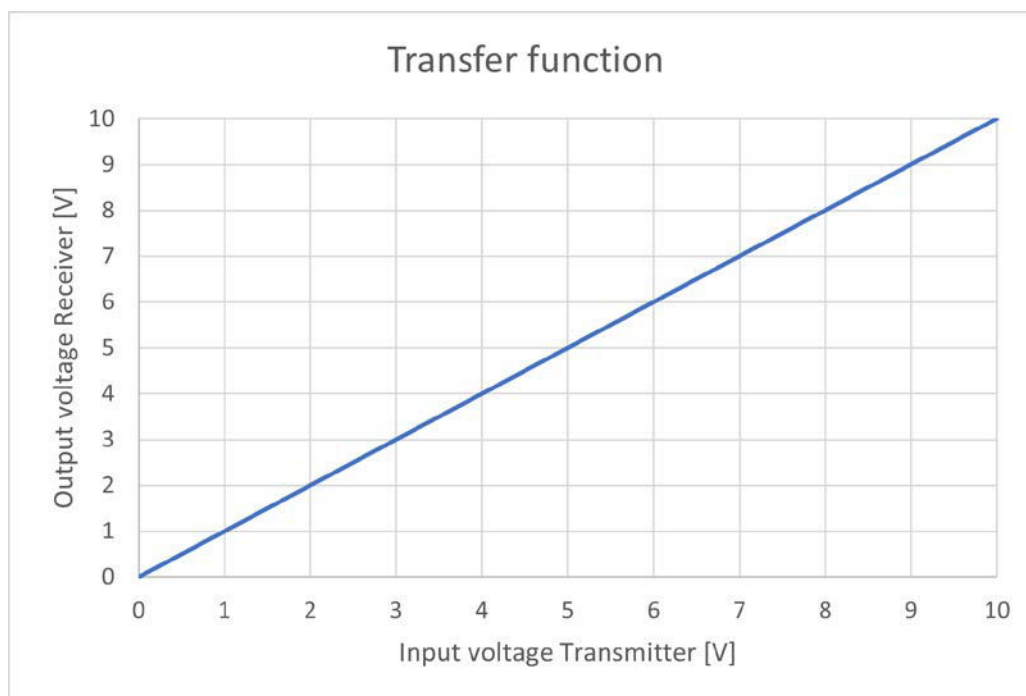
- The Wireless Flex G2 0-10V Adapter works in conjunction with the RAPTR2 platform, which luminaires comprise internal receivers
- The Wireless Flex G2 0-10V Adapter works in conjunction with the Wireless Flex G2 Receiver, which is attached to a luminaire with one or more 0-10V control inputs.

When connected to the RAPTR2 luminaires, the Wireless Flex G2 0-10V adapter 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, 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 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 0-10V Adapter and Receiver can replace the Generation 1 products (not vice versa), however they work with different protocols and commissioning apps therefore cannot be mixed.



Alert: Verify the dimming curve of the luminaire which the Wireless Flex Gen 2 Receiver is connected to. See URL t.b.f.

4.2 Channel assignment

The Wireless Flex G2 0-10V Adapter can drive up to three spectrum channels. Depending on the ability of the connected luminaire (directly or via the Wireless Flex G2 Receiver), 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.

4.3 Response time

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

The Wireless Flex G2 0-10V Adapter will not react to small voltage changes of less than 0.1 V, to avoid fluctuating lights.

5. Frequently Asked Questions

Q1. Should I cut or ground the wires of those channels that are not used for dimming 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 0-10V Adapter?

A2. It is advised to mount the control unit as close as possible to the Wireless Flex G2 0-10V Adapter 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. However, I only see the light becomes whiter. Why?

A3. When the control voltages (= power demand from the lamp) become too high, the lamp 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 0-10V Adapter?

A4. If possible, use twisted wire or shielded wire to minimize noise pickup.

6. References

Title	Remarks



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