TRACY® INDUSTRY
GENERAL INSTALLATION INSTRUCTIONS

ELECTRICAL CONFIGUATION

This document provides general information for electrical configuration and installation of TRACY® INDUSTRY LIGHTING SOLUTION.

NOTICE:
ALL LOCAL BUILDING CODES AND REGULATIONS MUST BE FOLLOWED AT ALL TIMES WHEN INSTALLING THE LIGHTING SOLUTION.

1 Introduction to the TRACY® panel

The aluminum core of the TRACY® panel is used as electrical conductor. Pay close attention to the polarity of the TRACY® panels:

- Bottom of aluminum profile is positive conductor.
- Top of aluminum profile negative conductor.

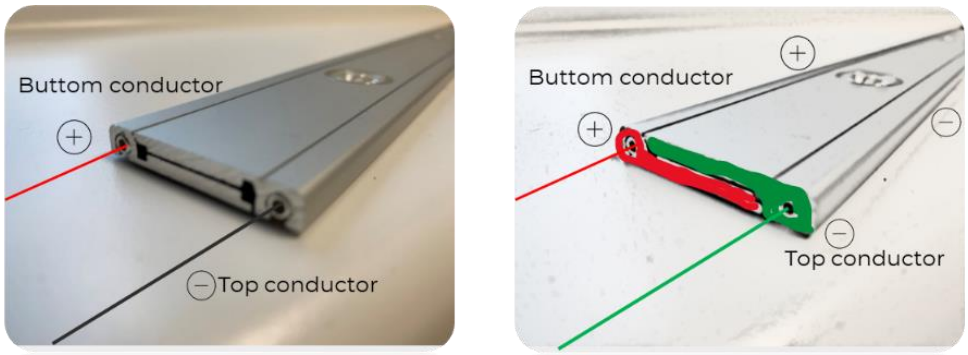


Figure 1 Polarity of TRACY® panel

On the backside of each panel, a label indicates the polarity of each side (left/right) of the panel:

Figure 2 Label on backside of panel indicates polarity of each side of the panel.

1.1 Electrical schematic of TRACY® panel

The light emitting diodes (LEDs) are configurated in a parallel configuration within TRACY® panel. Below is an illustration of a panel with two spots (LEDs):

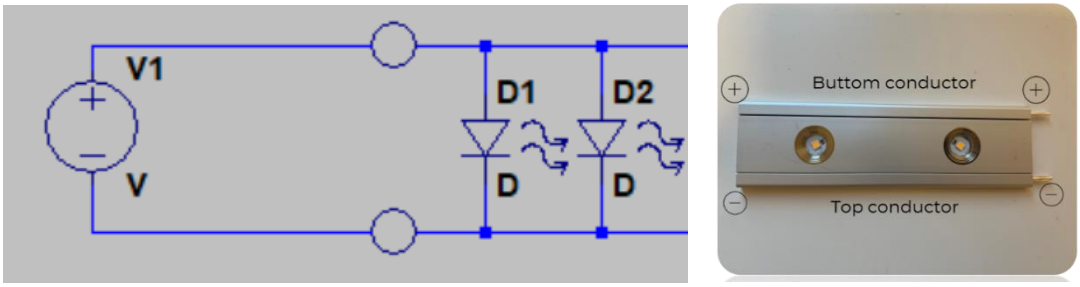


Figure 3 Schematics of TRACY® panel – example with two LEDs.

The TRACY® panel shall be used with DC current of 12V or 24V depending on specific type of panel. See the datasheet for details and specs printed on backside of the panel.

1.2 Verifying the specifications of a TRACY® panel

The specifications for a specific TRACY® panel are printed on the back side on each panel. The picture below is an example of such specification.

Figure 4 Example of printed specifications on backside of a TRACY® panel

From the printed specifications, the following information are available:

- Maximum rated power pr spot/ Maximum rated power pr panel
- CRI and CCT rating
- Max rated current (A) pr spot / Max rated current (A) pr panel
- Maximum rated voltage
- Lumen pr spot/ Lumen pr panel (at maximum power)
- Article number (product number)
- Serie number

1.3 Lumen from the spots in the TRACY® panel

The lumen (amount of light) emitted from each spot (LED) is determined by the drive power. As an example, Figure 4 lists that each spot will emit 400 Lumen at 4.9W (max rating) per spot, and the total panel with 3 spots will emit a total of 1200 Lumen with 14.7W of power total to the panel.

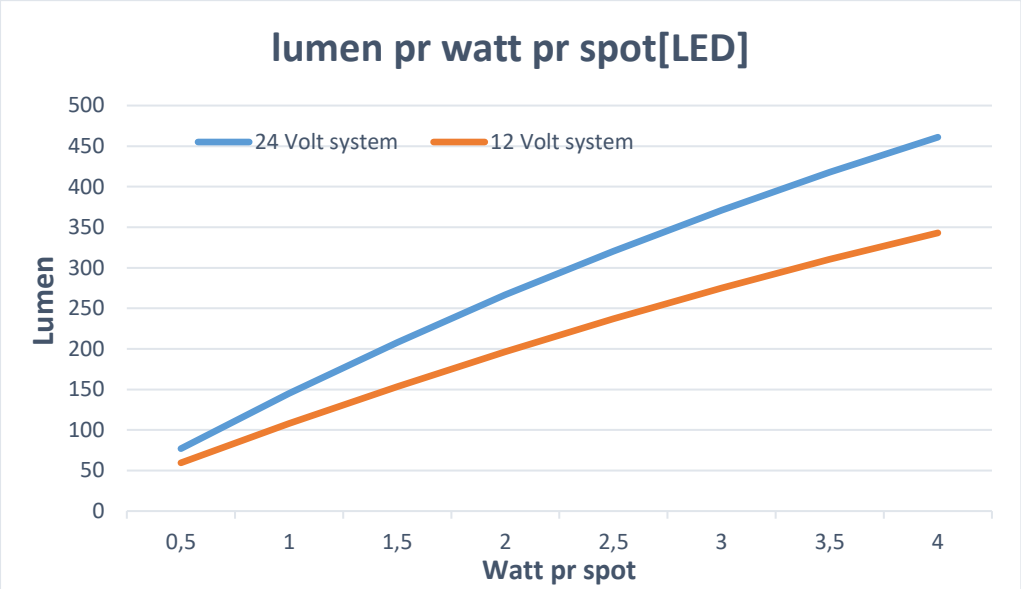


Figure 5 Lumen pr Watt emitted from each spotlight (LED) – Typical data.

Figure 5 shows the relationship between drive power pr spot vs emitted Lumen. Typical data for 12V and 24V systems are shown.

Note: The data in Figure 5 are typical data and indication only – consult the datasheet for the specific TRACY® panel as Lumen will, e.g., vary slightly with type of selected optics and color temperature.

1.4 Connection - Modular system

The TRACY® panel is a modular system that can be configured in various lengths and designs using TRACY® T-splitter connector and TRACY® corner-connector. The panels can also be connected by pins to form a string. Pay close attention to the polarity of each panel when they are to be connected.

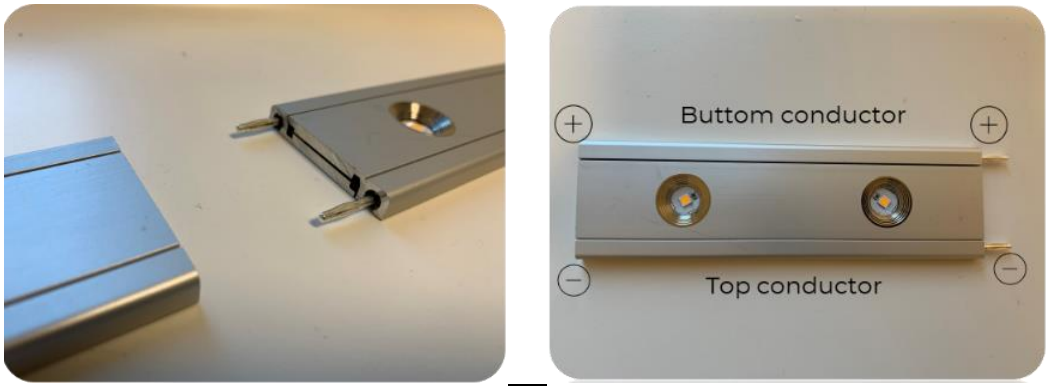


Figure 6 Connecting two panels with pins.

The pins can only be used with inserts screwed into the ends of the panel (see Figure 7). The TRACY® panel are normally shipped with the inserts pre-mounted. If no inserts are mounted, the specific end of panel can't be connected to other panels or fitted with any connectors.

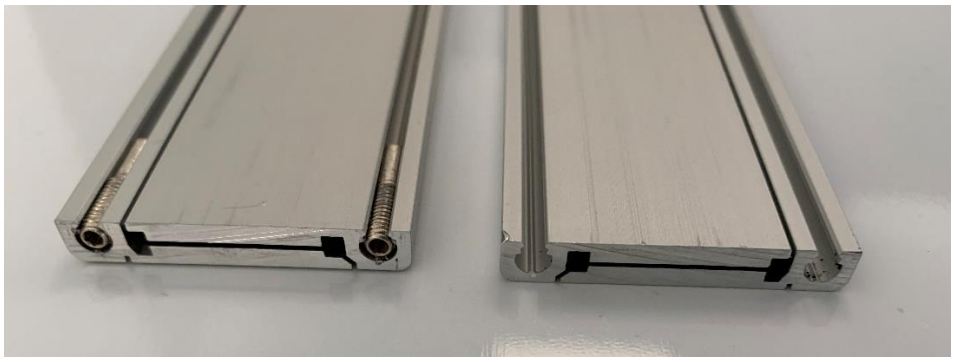


Figure 7 Left picture; with inserts mounted for pins. Right picture: no inserts (can't be connected to other panels).

Mount inserts manually if needed. See the following video on how to install inserts: https://youtu.be/6uU8t7LiH4I

1.5 Cable connectors

Indoor cable:
Pay close attention to the polarity of the white connector. Black wire is negative polarity:

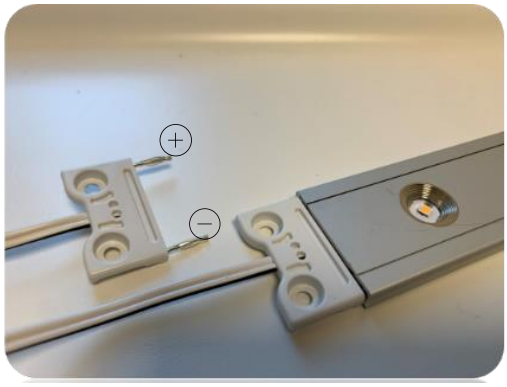


Figure 8 Indoor cable connector

Outdoor cable:
Pay close attention to the polarity of the black connector – Right pin on connector is negative polarity (LED iBond Logo shall be visible on top of connector).
Black wire is negative polarity and Red wire is positive polarity.

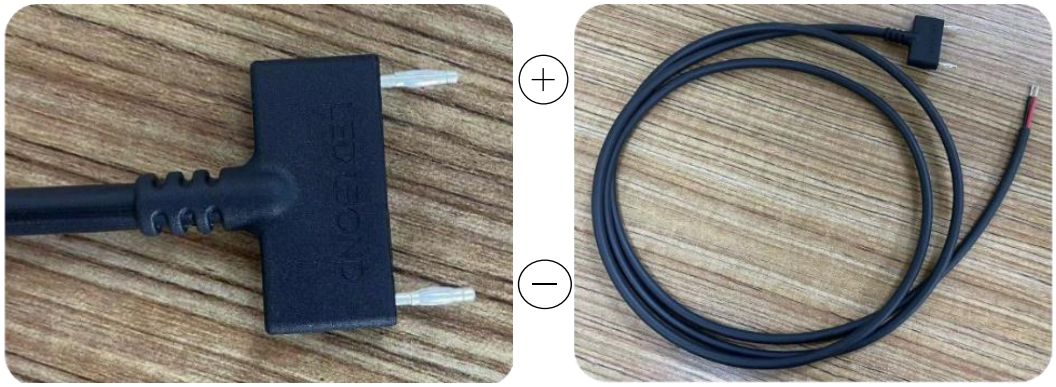


Figure 9 outdoor cable connector

Link cable that can be used to connect two panels. Also used for separated configuration – see section 5.2:

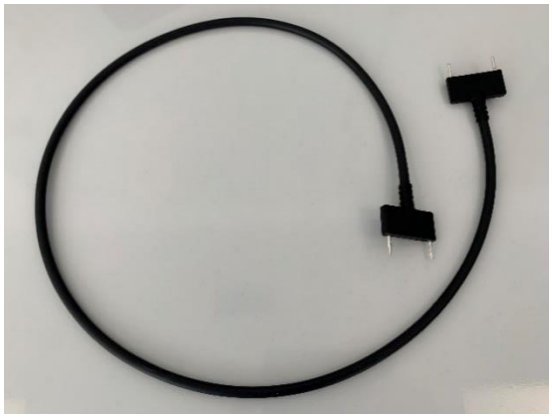


Figure 10 Link cable

1.6 Corner-connectors

The TRACY® panel is a modular system that can be configured in various lengths and configurations with the use of T-spitters and Corner connectors.

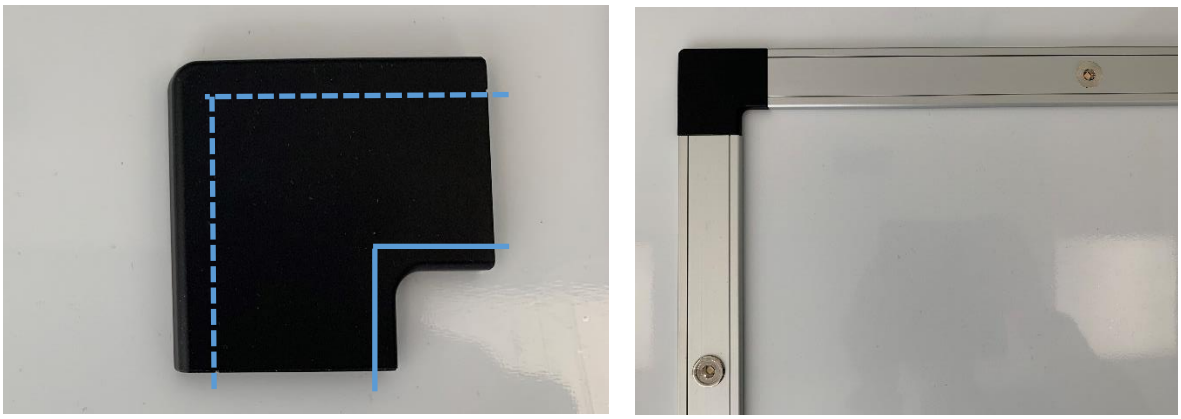


Figure 11 Corner-connector (product art 51506-M03). Blue lines indicate internal electrical connections seen from top (LED iBond logo on bottom side only).

1.7 T-splitter connector

The TRACY® panel is a modular system that can be configured in various lengths and configurations with the use of T-spitters and Corner connectors.

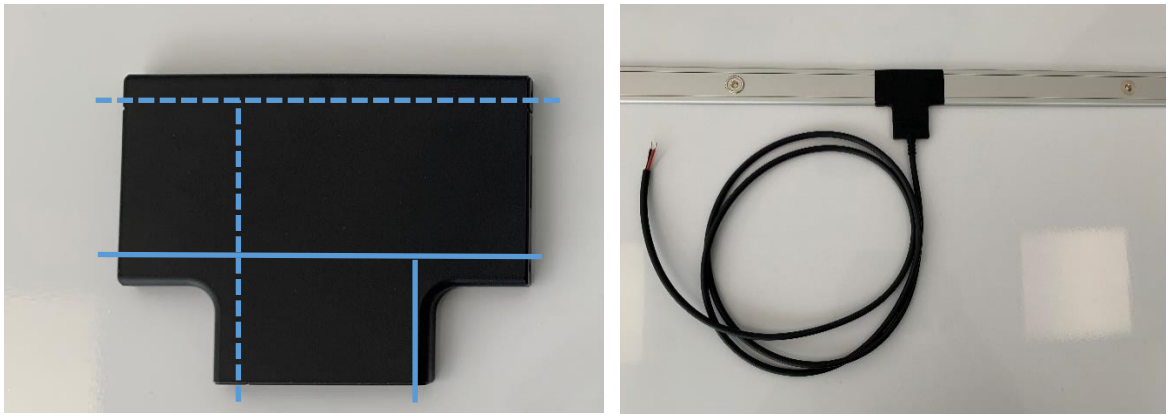


Figure 12 *T-splitter (product art 51506-M01). Blue lines indicate internal electrical connections seen from top (logo in bottom side only).*

Pay close attention to the polarity of the cable connector and the panels that are connected to the T-spitter.

Example:

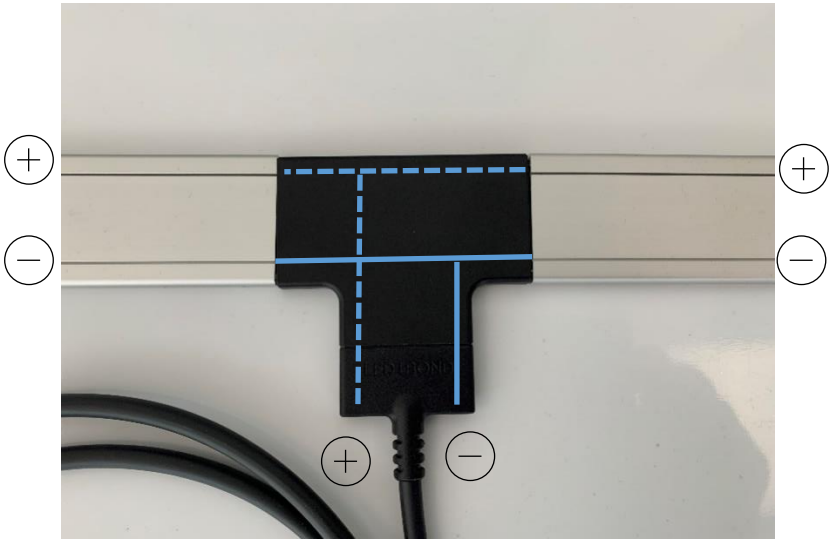


Figure 13 T-connector fitted with two panels and cable connector.

2 General design considerations

The TRACY® panel is a modular system that can be configured in various lengths and designs using TRACY® T-splitter connectors and TRACY® corner elements.

Below are some examples of various simple configurations:

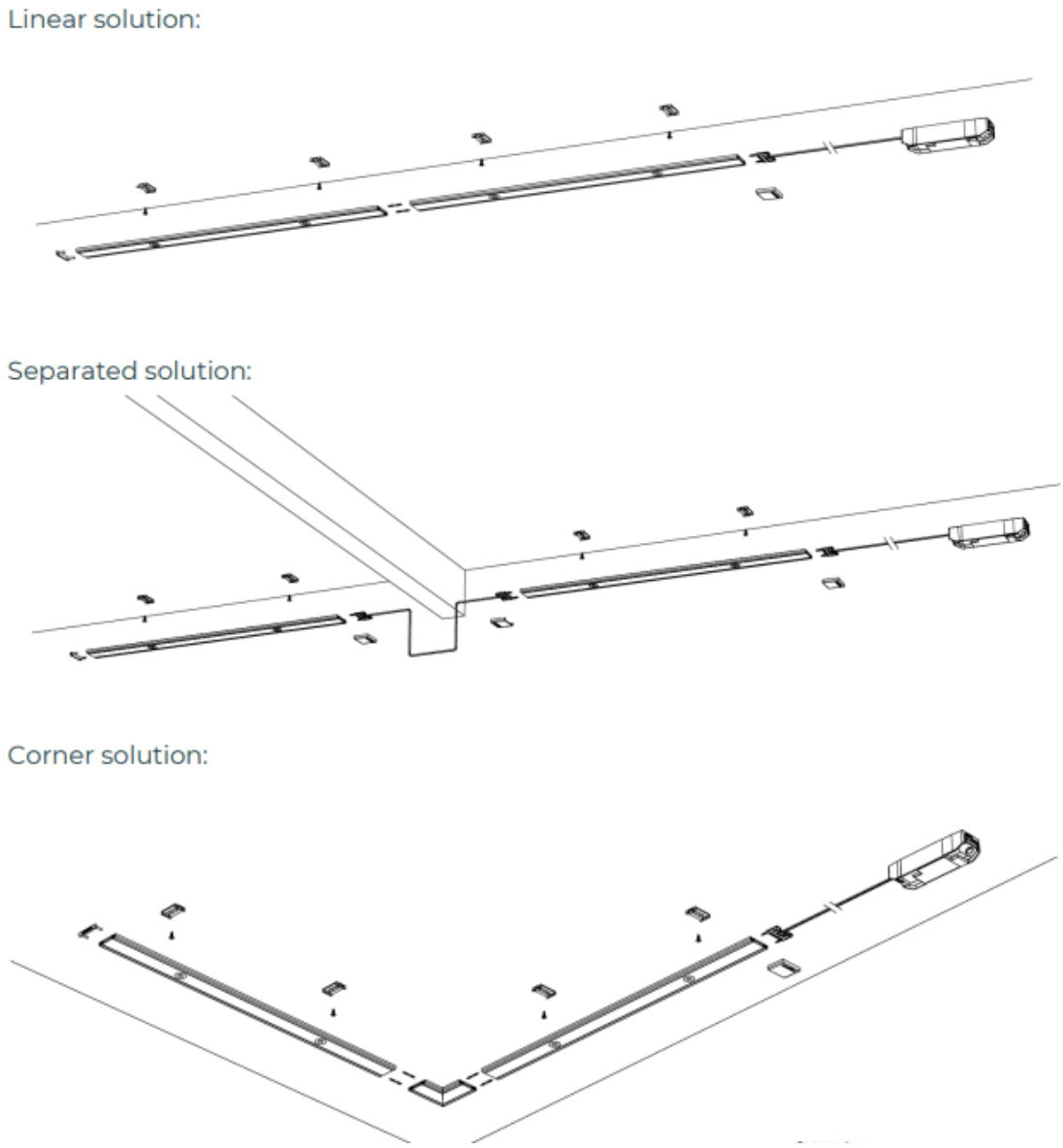


Figure 14 Top: linear configuration, Middle: Separated configuration using a link cable, Bottom: Corner configuration.

2.1 Linear solution - Example

Figure 15 is an illustration of a linear configuration consisting of several TRACY® panels connected to form a long linear string of spotlights. The sting is connected to a single power supply.

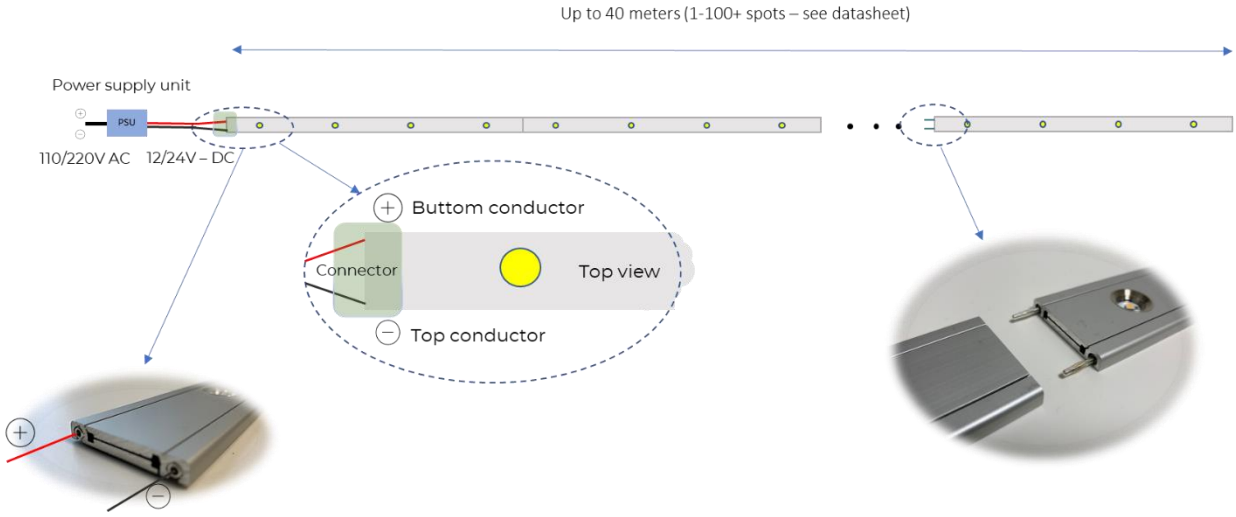


Figure 15 Linear configuration - example

When long length of TRACY® panels are connected, the electrical DC currents in the system can become quite large and max ratings must be observed when a design is completed.

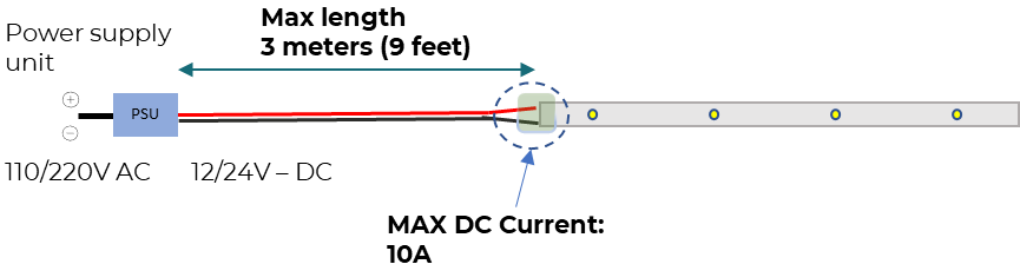
The TRACY® panels are either rated for 12V or 24V. Verify the correct required DC voltage against the specs for the specific panel (check printed label on backside of panel - see section 1.2).

2.2 WARNINGS – MAX RATINGS

The following two max ratings must be observed for any configuration:

1) The maximum DC current running through any TRACY® panel or connector to a panel must be less than 10A (MAX RATTING) at all times!

2) The length of the low voltage wires (DC) used between the power supply and the TRACY® panels must be less than 3 meters (9 feet).



NOTE: If TRACY® panels are connected in a parallel configuration using two cables (see section 5.4), the maximum rating of 10A are for each string of panels. The 10A limitation is per connector/panel sting.

If the max ratings for the DC current of 10A can't be fulfilled in a design configuration, the following options are possible:

- The power to each LED spot shall be reduced by limiting the maximum current to the system. This shall be done by limited the current in the power supply.
- The TRACY® panel configuration should be divided into subsystems with the use of more power supplies.
- The TRACY® panel configuration should be configurated as a parallel system (see Section 5.3 and 5.4)

2.3 Design example – electrical configuration

Image, we want to connect 10 pcs of TRACY® panels in a long string.

The panels (type 1800-3) have the specifications as shown in Figure 4:

According to the specifications, each panel has 3 spots. A string of 10 panels therefore contains a total of 30 spotlights.

The configuration shall be a string with one power supply as illustrated in Figure 15. Based on the specifications from Figure 4, we can calculate the following data:

- Total number of spots: 10 x 3 spots/panel = 30 spots total
- Maximum rated power: 10 panels x 14.7 W/panel = 147 W total
- Calculated DC current into string of panels at max power of 4.9 W pr spot: 10 panels x 1.26A/panel = 12.6A (WARNING – NOT ALLOWED)
- DC voltage: 11.65 (12V system)

The max current becomes 12.6A which exceeds the maximum rating of DC current which is 10A! - see section 2.2.

Consequently, the power to the string of panels must be reduced so the total current DC is less than 10A.

LED iBOND recommends that drive current for long-term operation is limited to max 75% of max power rating for the LED. For the example here, the max rating is 4.9 W per spot and max recommended maximum drive power therefore becomes 75%x4.9W = 3.7 W/spot.

Let us select a drive power of 3.7 W/spot and calculate consumption:

- Total power for total string of panels: 30 spots x 3.7 W = 111 W
- Total current* : 90W/11.65V = 9.53A

**Formular is based on ohms law: Current = power/Voltage (Power[W] = Current[A] x Voltage [V]).*

Since the drive current is only 9.53A in the example in Section 2.3, which is less than the maximum rating of 10A, the configuration is allowed.

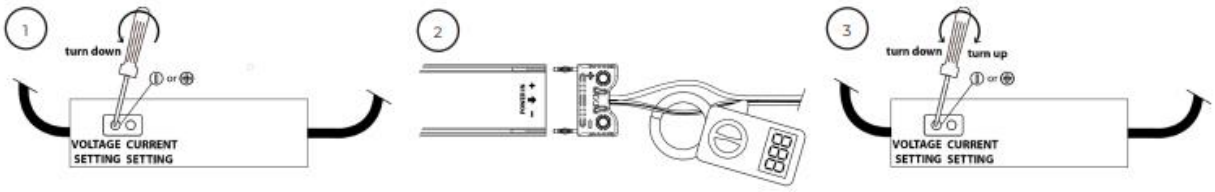
We can therefore select a 12V power supply that can deliver minimum 111W (e.g. a 150W rated power supply). Since the power supply can deliver more power than 111 W for this configuration, the power supply must be adjusted to set limits on the DC current. See section 2.4 below for adjustment procedure for the power supply.

2.4 Procedure for power supply configuration and adjustment

The power supply is “constant current” with voltage limitation and must be adjusted according to the specific configuration.

NOTICE: The initial adjustment must be done prior to connecting the AC power to the power supply. The procedure is the following:

1. Turn down voltage and current. Marked *Vo ADJ*. and *Io ADJ*. on the back of the power supply. All the way down! (Turn anti clockwise).
2. Connect the driver to string of TRACY® panels and measure the current with a current clamp instrument.
3. Adjust voltage to reach the desired current specified - if level can't be reached go to 4)
4. Adjust the current to the desired level. (See picture 3)
5. When the desired current is achieved, reduce the voltage to a minimum (limitation) without forcing the current to drop below desired level.



NOTE: If TRACY® panels are connected in a parallel configuration (see section 5.3 and 5.4) measure the total DC current from the power supply feeding both strings.

3 Range for number of spotlights and Total length

Table 1 gives an overview of the recommended range for number of spotlights in a single TRACY® configuration using one driver (75W or 150W rated). The table is an example and includes three levels of operation for the LEDs: low current (100 Lumen), mid current (200 Lumen), and high current (3-400 Lumen). High current is maximum recommended power for long term use.

Note This example is for a 24V system. Always consult the specific datasheet for the type of TRACY® panel in consideration.

TRACY PSU 75W

Driver current setting = Current per LED spot x no. of LED spots

Art. no. 30057

		CCT = 3000 K				CCT = 4000 K			
		IP20		IP46		IP20		IP46	
Operation	**Lumen**	**65°**	**115°**	**65°**	**105°**	**65°**	**115°**	**65°**	**105°**
LOW	100	1 - 91	1 - 105	1 - 85	1 - 100	1 - 97	1 - 112	1 - 91	1 - 106
Current per LED spot		0.034 A	0.036 A	0.037 A	0.031 A	0.032 A	0.028 A	0.034 A	0.029 A
MID	200	1 - 42	1 - 50	1 - 39	1 - 48	1 - 45	1 - 54	1 - 42	1 - 51
Current per LED spot		0.074 A	0.062 A	0.079 A	0.065 A	0.069 A	0.058 A	0.074 A	0.061 A
HIGH	300-400	1 - 26	1 - 23	1 - 24	1 - 22	1 - 28	1 - 25	1 - 26	1 - 23
Current per LED spot		0.118 A	0.134 A	0.128 A	0.143 A	0.110 A	0.125 A	0.119 A	0.133 A
		LED spot range							

TRACY PSU 150W

Art. no. 30058

		CCT = 3000 K				CCT = 4000 K			
		IP20		IP46		IP20		IP46	
Operation	**Lumen**	**65°**	**115°**	**65°**	**105°**	**65°**	**115°**	**65°**	**105°**
LOW	100	1 - 181	1 - 210	1 - 170	1 - 199	1 - 193	1 - 223	1 - 181	1 - 211
Current per LED spot		0.034 A	0.036 A	0.037 A	0.031 A	0.032 A	0.028 A	0.034 A	0.029 A
MID	200	1 - 84	1 - 100	1 - 78	1 - 95	1 - 90	1 - 107	1 - 84	1 - 101
Current per LED spot		0.074 A	0.062 A	0.079 A	0.065 A	0.069 A	0.058 A	0.074 A	0.061 A
HIGH	300-400	1 - 52	1 - 46	1 - 48	1 - 43	1 - 56	1 - 49	1 - 52	1 - 46
Current per LED spot		0.118 A	0.134 A	0.128 A	0.143 A	0.110 A	0.125 A	0.119 A	0.133 A
		LED spot range							

Table 1 Recommended number of spotlights in a single TRACY configuration using a 150W power supply. Note: 24V system.

Table 1 shows that a configuration can include up to more than 200 spotlights and the length of the string of panels can as a consequence also become large. It is recommended not to exceed more than 40-50 meters for a single configuration in the design.

If a long length is to be used, the designer should pay attention to balancing voltage drop – see Section 4

4 Balancing Voltage drop along a string of TRACY® panels

The resistance of the aluminum profile of the TRACY® panel, will cause a voltage drop along the string of panels if the length exceeds ~40-50 meter. For such a long length, the voltage drops will cause a decreasing light illumination from the spotlights along the string of strings TRACY® panels:

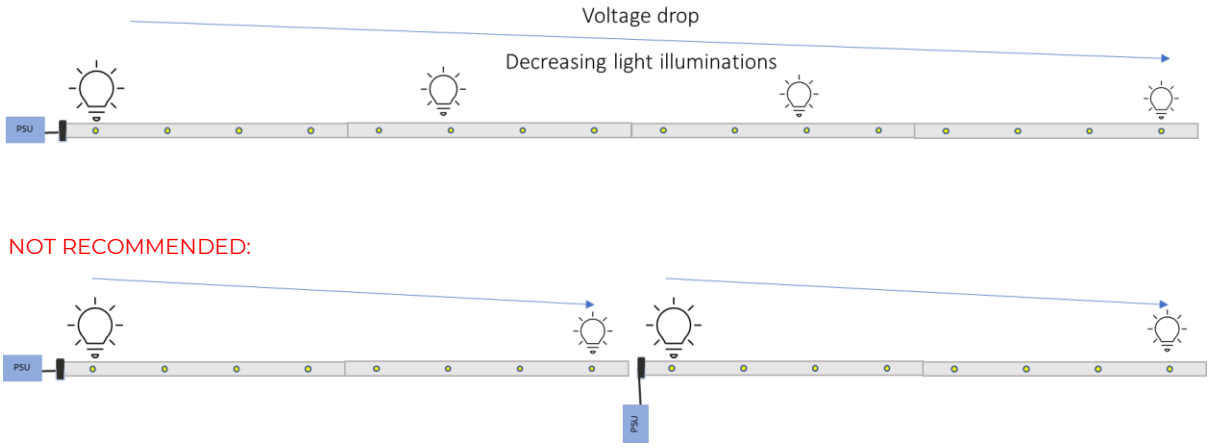


Figure 16 Voltage drop will occur along a long string of connected panels. Lower: Not recommended configuration.

Normally the drop is not visible unless the panels are placed right after each other as shown in Figure 16 (lower illustration) and length are very long (40-50 meters). In that configuration, a spotlight with high illumination is located right next to a spotlight with lower illumination. This difference is visible to the human eye and should be avoided in the design. The configuration is therefore NOT recommended.

Instead, the voltage drop and light illumination should be balanced using the following configurations:

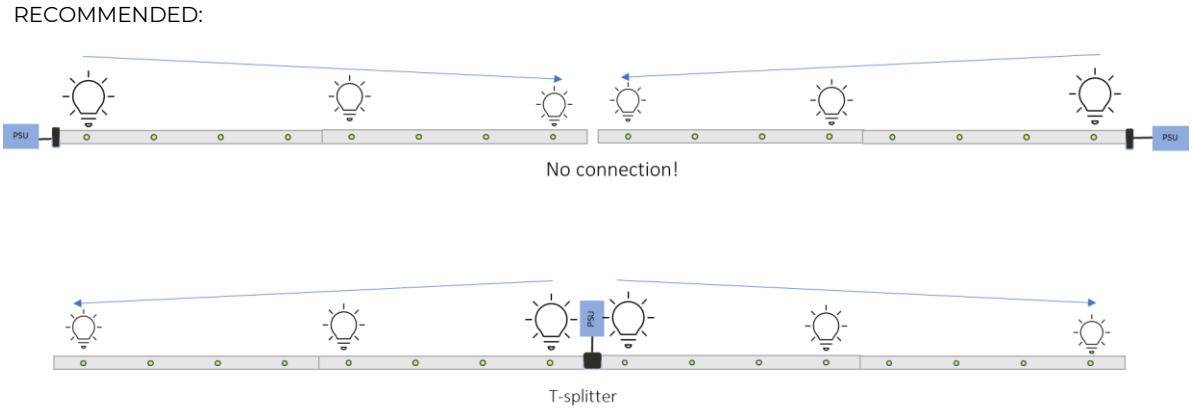


Figure 17 Recommended configuration for balancing voltage drop and illumination for long length.

5 Electrical configuration – options

The TRACY® panels can be configurated in various way. The typical options are:

a) Linear string
b) Separated configuration using link cable
c) Parallel configuration using T-splitter connector
d) Parallel configuration using two cable connectors

5.1 Linear configuration

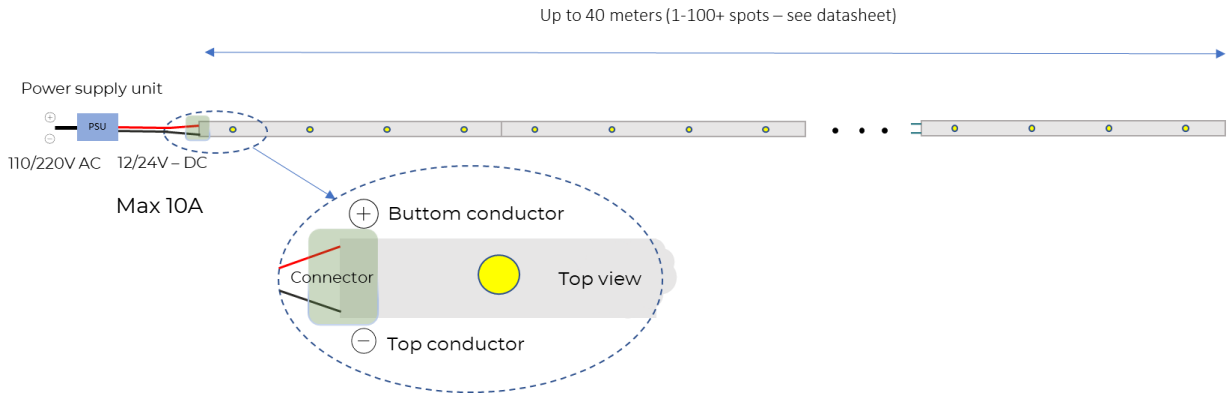


Figure 18 Linear configuration

5.2 Separated configuration using link cable

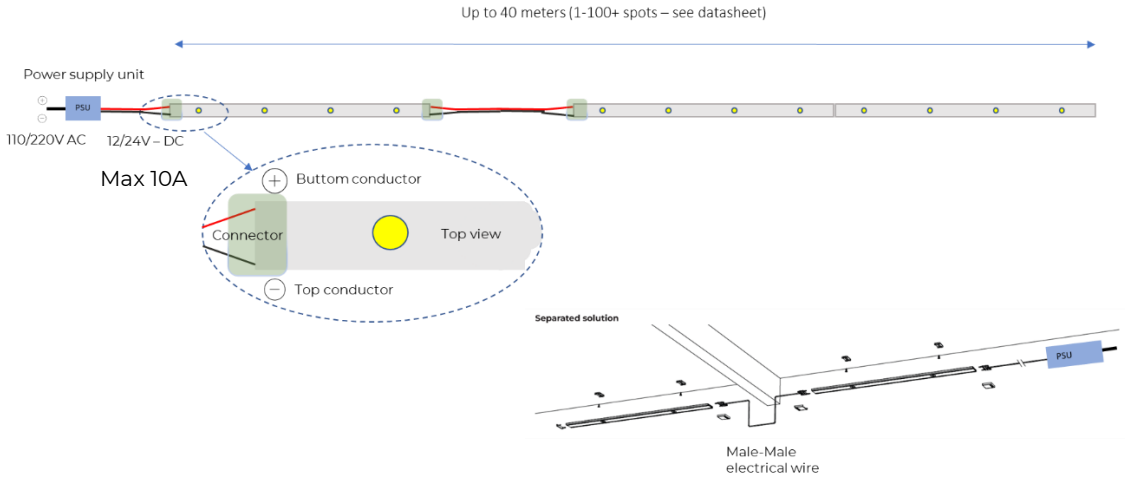


Figure 19 Separated configuration.

5.3 Parallel configuration using T-splitter connector

Maximum current into the T-connector is 10A. See section 2.2 for details.

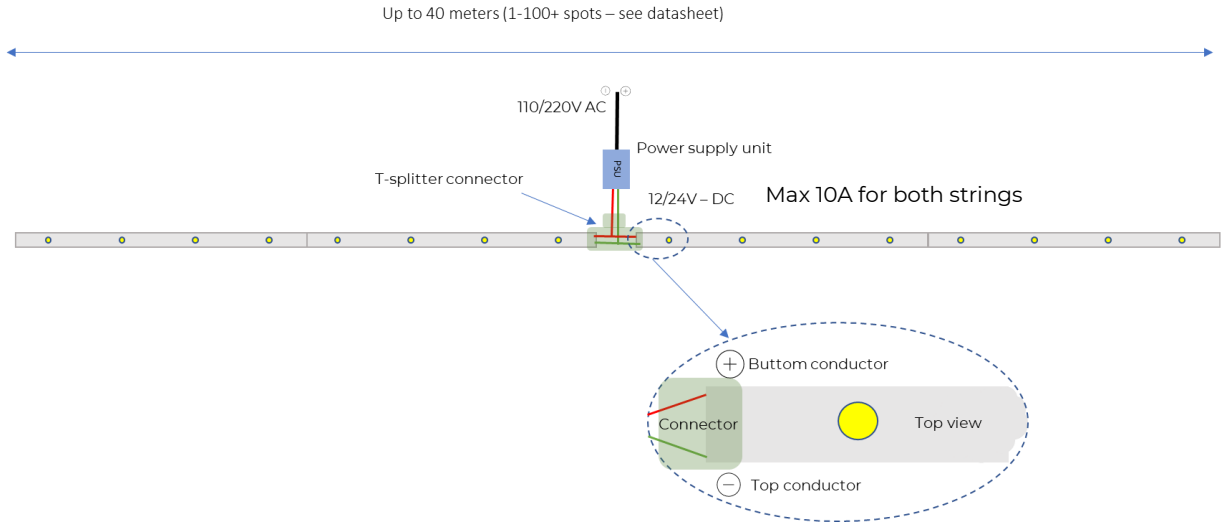


Figure 20 Parallel configuration using T-splitter connector.

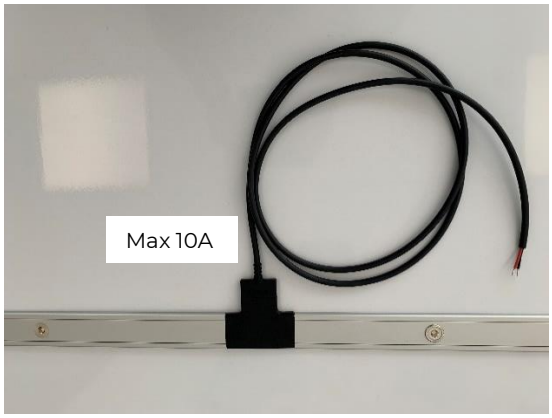


Figure 21 Parallel configuration using T-splitter connector.

5.4 Parallel configuration using two cable connectors

This parallel configuration is suitable when more than 10A DC is needed for the total system (maximum current into a panel is 10A. See section 2.2 for details).

With a parallel configuration using two cable connectors, the total current can be increased to 2x10A – 10A per connector.

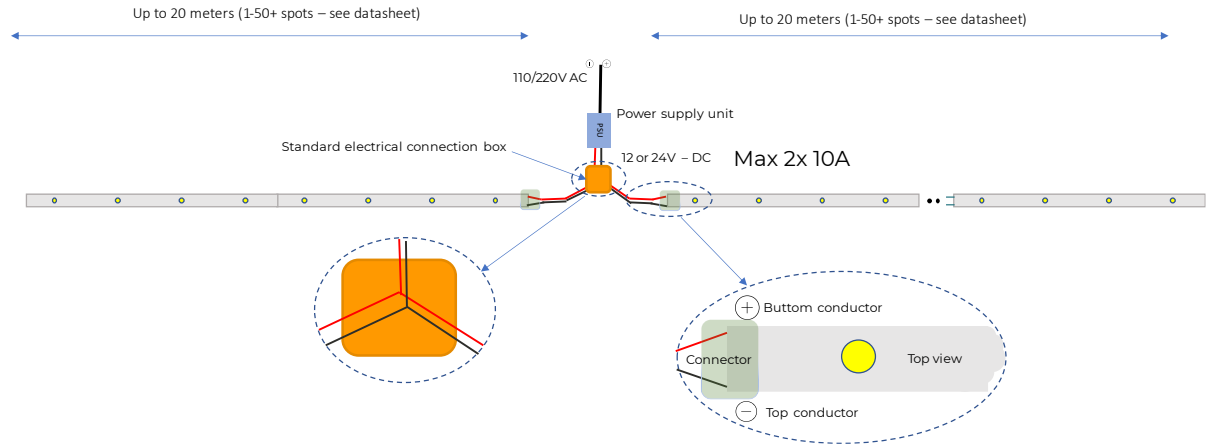


Figure 22 Parallel configuration using two cable connectors.

DC output from power supply is connected in a parallel configuration using two cable connectors according to the following illustration:

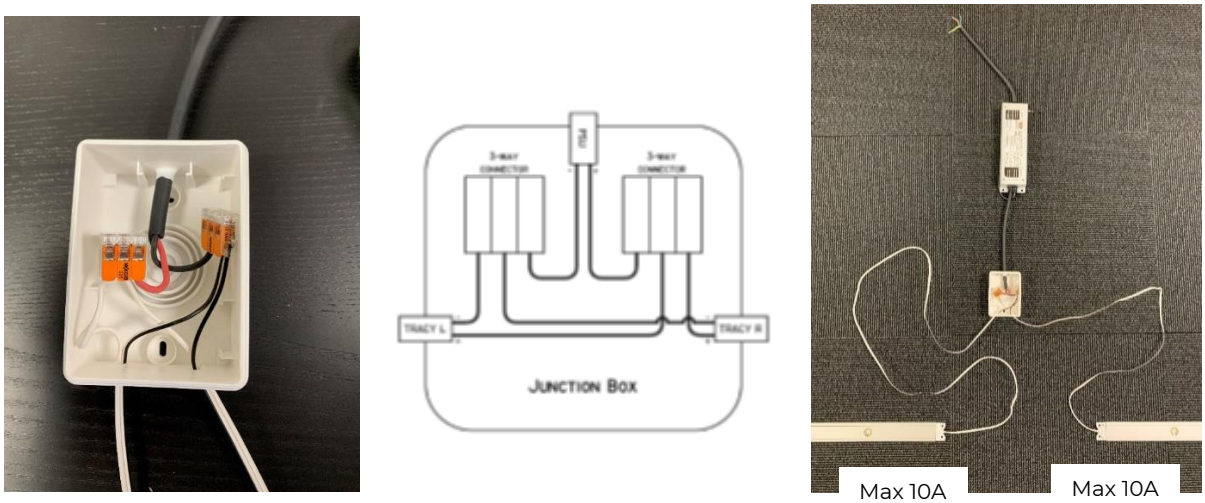


Figure 23 Parallel configuration using two cable connectors.

When the TRACY® strings are connected in parallel. Measure the total DC current from the power supply feeding both strings:

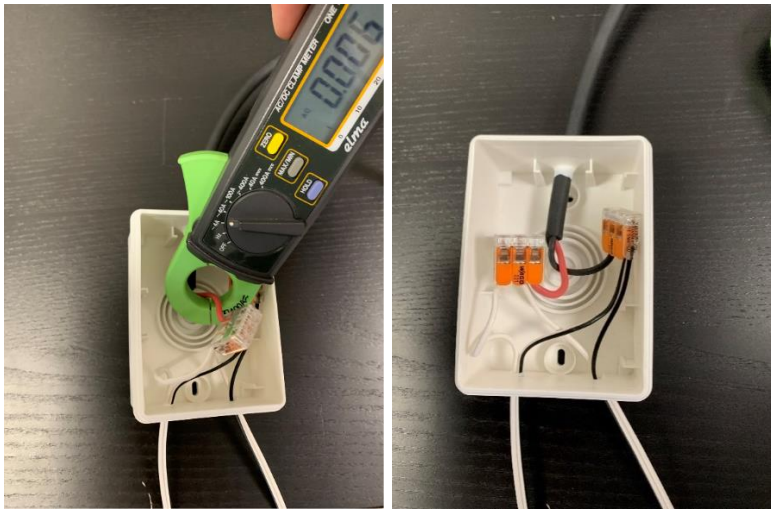


Figure 24 Measurement procedure of total current using a current clamp instrument. Measure on main DC from power supply.

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6 Electrical connection of power supply to power (AC/Input)

The typical power supplies come with pre-mounted cables on both the AC side (input power) and on the low voltage output side (DC).

Figure 25 Typical power supply with pre-mounted cables for both input and output.

On the AC side (input power) of the power supply, the power supply has a cable with three wires (Hot, Neutral, Ground) for 230V/110V input with a cross-section of 1 mm2 (3G1mm2). The connection from the 230V/110V AC cable network is to be made to this input cable using an external junction box. There is therefore no

limitation in choosing the decided cross-section for the AC cabling network suppling power to all the power supplies in the system.

Note: The connection of the DC cable to the LED panels is to be made using a junction box also. See Figure 23 as an example.

7 Light control solutions – options

The power supplies for the TRACY® panels have three different options for built-in control that can be used to adjustment of the light intensity:

Type of PSU	Light intensity	Adjustment
Type A	Fixed + On/off	Build-in potentiometer – adjusted at installation
Type B	Dimming (0-100%) + on/off	DC control signal (0-10V) or external potentiometer
Type C	Dimming (0-100%) + on/off	DALI Control (IT software) – wire bus required

See separate document for descriptions of LED iBond's solutions for light management and control.

8 Mounting & Installation

Pay attention to the positioning of mounting brackets:

- Place 100-150 mm from the ends of a string.
- Maximum spacing between two brackets is 800mm.

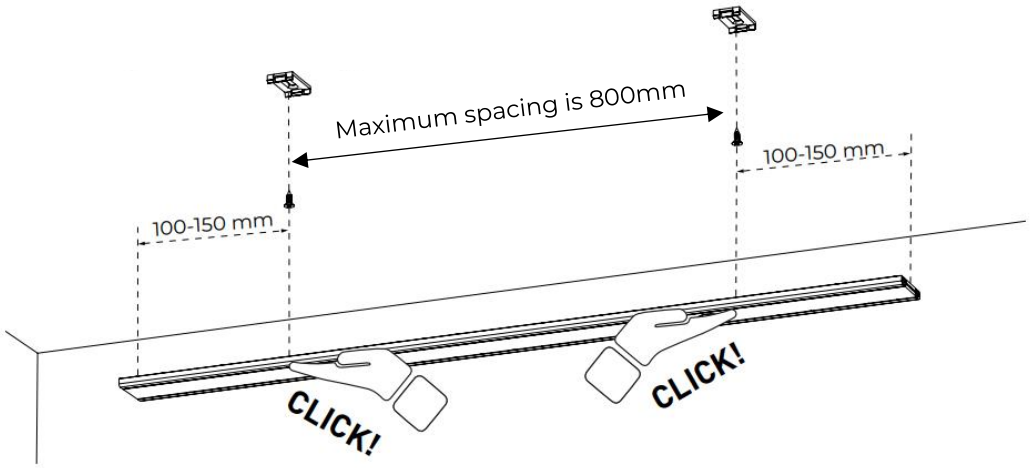

Figure 26 Mounting clips for panel

Find more information on mounting instructions: https://ledibond.com/btb/

Installation of TRACY® LED panels: https://youtu.be/WC1fHwuD0LI

How to mount brackets for TRACY® LED panels: https://youtu.be/UWqrI61ychk

How to click on TRACY® LED panels: https://youtu.be/_9W5qYUWZks

How to Interconnect TRACY® panels: https://youtu.be/CFgr9yR_jBs