PIXEL-TILE-300-RGBW-12V

Device Manual

Made in Italy

FEATURES

- SPI PIXEL-TO-PIXEL LED module
- N°100 Digital RGBW LEDs (IC LED type: SK6805)
- Power supply (DC IN): 12 Vdc
- Output (OUT): value equal to input voltage
- Remote control via BUS (SPI)
- Extended temperature range
- 100% Functional test

PRODUCT DESCRIPTION

PIXEL-TILE-300-RGBW-12V is an SPI pixel-to-pixel LED-module with N°100 digital (programmable/addressable) RGBW LEDs, which can be supplied by a SELV constant voltage 12 Vdc power supply. The LED-module is suitable to be driven by an SPI LED-controller at constant voltage.
The maximum absorbed current for each PIXEL-TILE-300-RGBW-12V is 3 A. It is possible to connect multiple PIXEL-TILE-300-RGBW-12V in series[1] or with parallel power supply[2].

⇢ For the most up-to-date manual, please consult our website www.dalcnet.com.

PRODUCT CODE

CODE	POWER SUPPLY	CURRENT ABSORPTION	N° OF LEDs	BUS CONTROL
PIXEL-TILE-300-RGBW-12V	12 VDC	3 A (max)	100	SPI

Table 1: Product Code

REFERENCE STANDARDS

STANDARD	TITLE
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547	Equipment for general lighting purposes – EMC immunity requirement

Table 2: Reference standards

[1] The maximum number of PIXEL-TILE-300-RGBW-12V modules connected in series depends to the maximum total current absorption of 7 A and to the maximum number of digital LEDs manageable by the pixel-to-pixel LED Controller.
[2] The maximum number of PIXEL-TILE-300-RGBW-12V modules connected in with parallel power supply depends only to the maximum number of digital LEDs manageable by the pixel-to-pixel LED Controller.

TECHNICAL SPECIFICATIONS

Description	Name	Values			Unit of Measure	Note
		Min	Typ	Max		
INPUT (V+, DI, V-)						
Nominal Supply Voltage	V_{IN}		12		Vdc	-
Supply Voltage range	V_{IN-RNG}	10.8	÷	13.2	Vdc	-
Current absorption (max)	I_{max}	-	-	3	A	-
Current absorption, White (max)	I_{W-max}	-	-	1375	mA	Rated @T_A<25 °C
Current absorption, RGB (max)	$I_{RGB-max}$	-	-	1735	mA	Rated @T_A<25 °C
Current absorption single colour (max)	-	RED	GREEN	BLUE	-	-
	I_{SC-max}	690	690	690	mA	Rated @T_A<25 °C
Allowed current absorption for series wiring (max)	I_{S-max}	-	-	7	A	Rated on 1st Input connector of the series
Rated Power Absorption	$P_{IN@12V}$		36		W	Rated @T_A<35 °C
OUTPUT (V+, DO, V-)						
Output Voltage	V_{OUT}		= V_{IN}		-	-
Load type	L_{TYPE}		Digital LED Module		-	Defined by design
IC LED type	IC_{TYPE}		SK6805		-	Defined by design
Colour Rendering Index (White)	CRI		80		-	-
Colour temperature (White)	CT	2800	÷	3200	K	-
Brightness (White)	B_W	2312.5	÷	3175	mcd	-
Brightness (RGB)	B_{RED}	580	÷	1050	mcd	-
	B_{GREEN}	1387.5	÷	1950	mcd	-
	B_{BLUE}	280	÷	515	mcd	-
Wavelength (RGB)	WL_{RED}	615	÷	625	nm	-
	WL_{GREEN}	525	÷	535	nm	-
	WL_{BLUE}	460	÷	470	nm	-
ENVIRONMENTAL						
Storage temperature	T_{STORE}	-40	÷	+60	°C	Minimum values defined by design
Working Ambient temperature	T_A	-10	÷	+45	°C	Minimum values defined by design
Max Temperature @T_c point	T_C	-	-	+67	°C	-
Connector Type[3]	CON_{TYPE}		SMD PCB terminal block		-	-
Wiring Section	WS_{SOLID}	0.2	÷	0.75	mm^2	Using solid conductor, defined by design
	WS_{STRAND}	24	÷	18	AWG	
Strip length	WS_{STRIP}	7	÷	9	mm	-
Fixing Holes Diameter	FH		Ø M3		-	-
Packaging units (pieces/units)	PU		1		pcs	-
Mechanical Dimensions	MD	L	H	D	mm	-
		300	300	6.05		
Weight	W		325		g	-

Table 3: Technical specification

[3] The SMD terminal block is compatible with the Wago 2060-953/028-000 PCB pluggable board-to-board connector.

T_C Point Positioning

The figure below shows the positioning of the maximum temperature point (*T_C point*, highlighted in red) reached by the electronic board. It is located on the front side (Top) in the centre of the LED module.

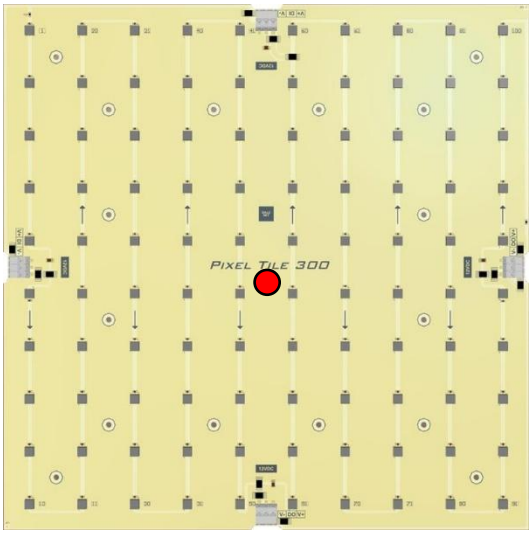

Figure 1: T_C point position

INSTALLATION

ATTENTION! *Installation and maintenance must always be carried out in the absence of voltage. Before proceeding with the connection of the device to the power supply, make sure that the voltage of the power source is disconnected from the system.*

The device should only be connected and installed by qualified personnel. All applicable regulations, legislation, standards, and building codes must be adhered to. Incorrect installation of the device may cause irreparable damage to the device and connected loads.

The following paragraphs show the diagrams of the LED-module connection to the remote control and the supply voltage. It is recommended to follow these steps to install the product safely:

1. Remote Control wiring: connect the SPI data bus signals to one of the "DI" terminals (located on the top and left side). To connect multiple panels in series, connect one of the "DO" output terminals (located on the bottom and right side) to the "DI" terminal of the next module.
2. Power Supply wiring: connect a 12 Vdc constant voltage SELV power supply to the "V+" and "V-" terminals.

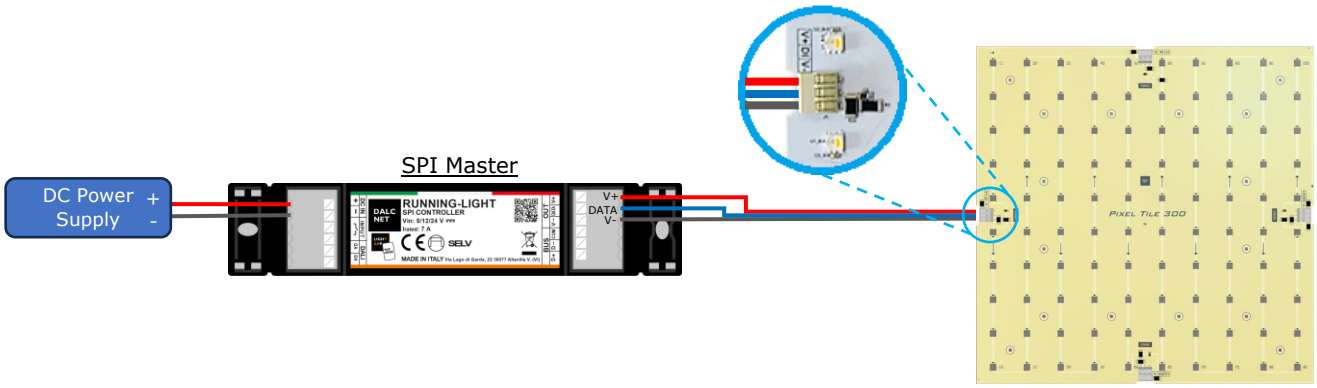

Figure 2: Wiring diagram

REMOTE CONTROL WIRING

PIXEL-TILE-300-RGBW-12V can be controlled via SPI digital bus. The control is carried out by means of a SPI Master, which provides commands to the devices in the SPI bus.

To connect PIXEL-TILE-300-RGBW-12V to the SPI bus, simply connect the bus cable to the "DI" terminals of the LED module: only serial bus-wiring topology is possible.

SPI WIRING TOPOLOGIES

The SPI protocol supports only the serial Bus-wiring shown as an example in Figure 3.

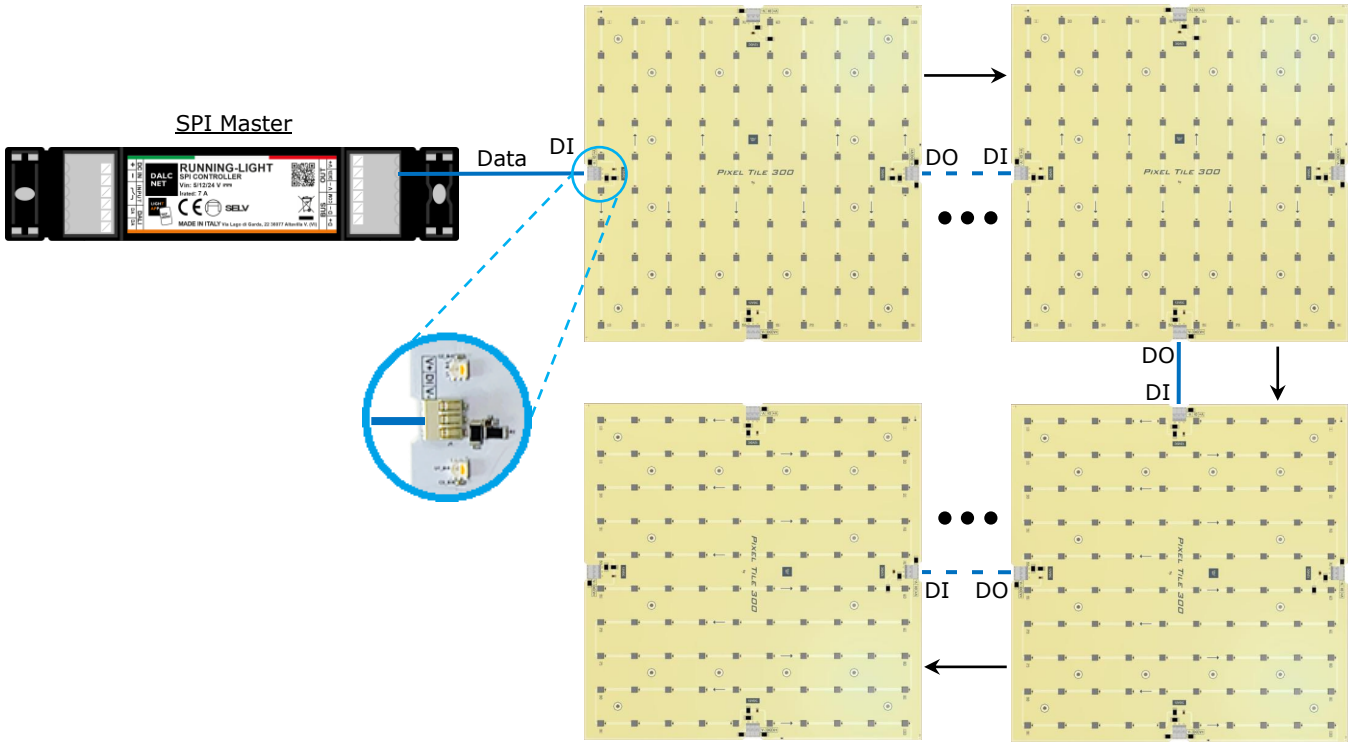

Figure 3: Remote Control Connection Topology, Bus-wiring

POWER SUPPLY CONNECTION

PIXEL-TILE-300-RGBW-12V can be powered by either a 12 Vdc constant voltage SELV power supply or a 12 Vdc power supply provided by the SPI Master device, by connecting the power supply to the "V+" and "V-" terminals.

SERIES WIRING

PIXEL-TILE-300-RGBW-12V can be connected in series via the side connectors supplied. The maximum number of modules that can be connected in series depends on the total current draw and the total number of digital LEDs that can be managed by the SPI Master device. To ensure that the product is working properly for series wiring, connect the 12 Vdc power supply (see Figure 4), turn on the power supply, and perform the following checks:

Ensure that the total current absorption on the first module connector in the series is less than 7 A.

Verify that all LEDs are receiving the correct power, checking on the last LED module in the series that the voltage measured on the output connector shown in the figure is within the range (10.8 ÷ 13.2)V.

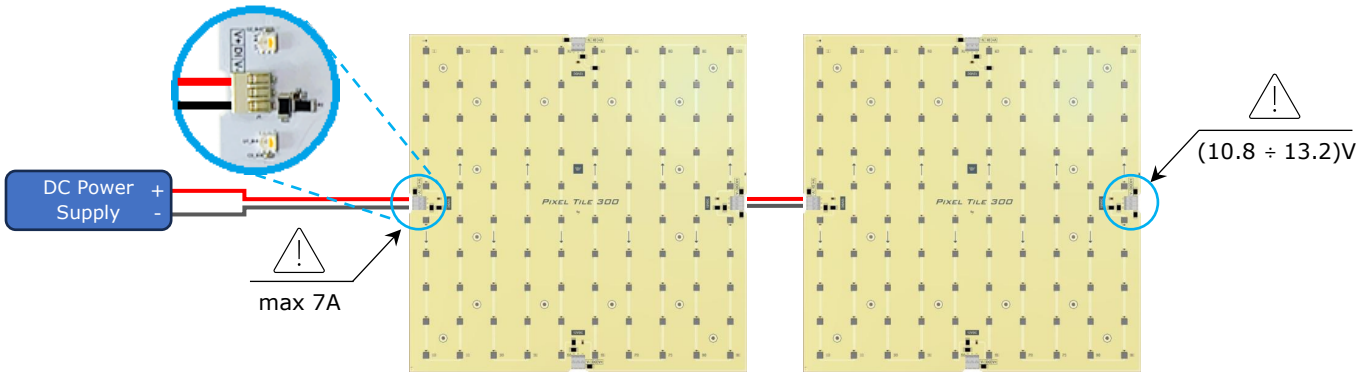

Figure 4: Power Supply, Series wiring diagram

PARALLEL WIRING

PIXEL-TILE-300-RGBW-12V can be connected in parallel by means side connectors. The maximum number of modules connectable in series depends only to the total number of digital LED that can be managed by the SPI Master device.

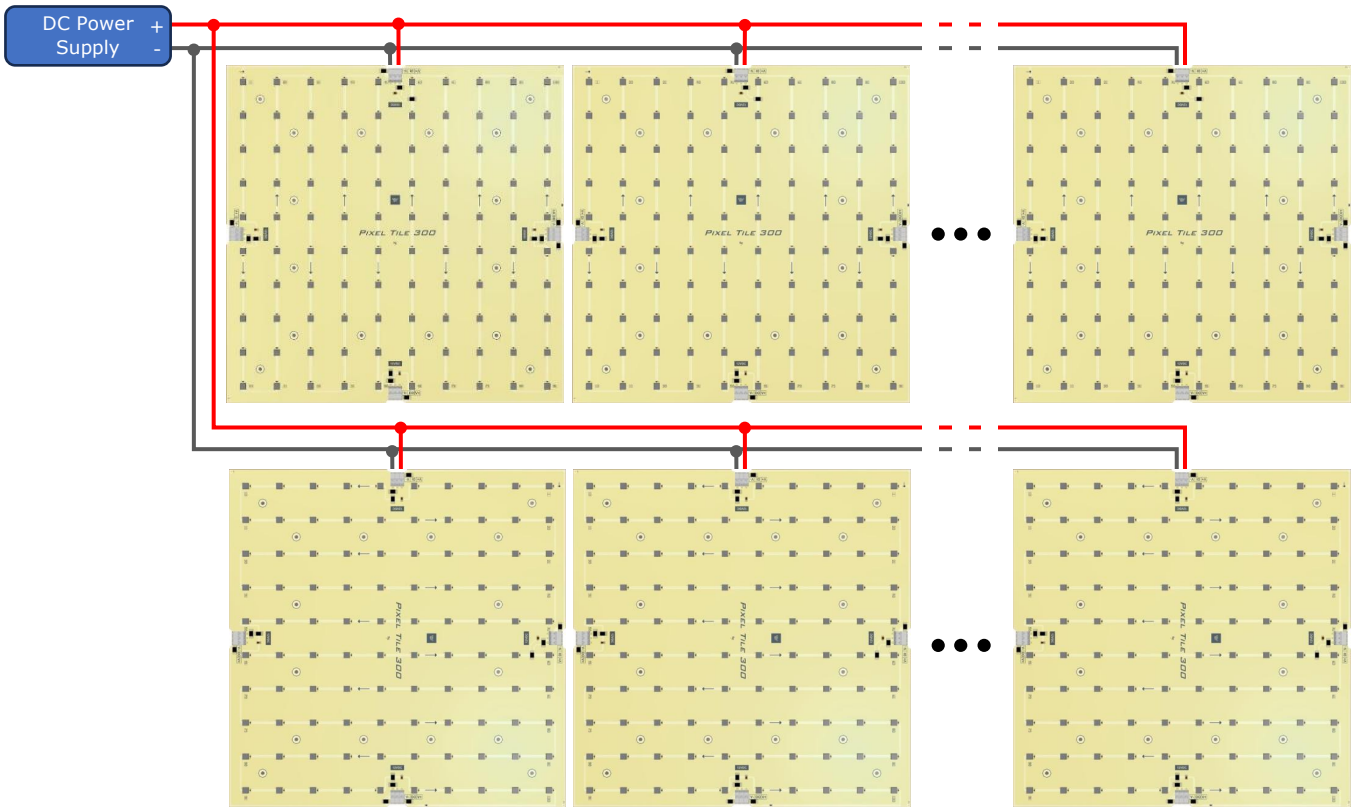

Figure 5: Power Supply, Parallel wiring diagram

MECHANICAL DIMENSIONS

Figure 6 details the center distance values between the holes, the mechanical measurements, and the overall dimensions [mm] of the product.

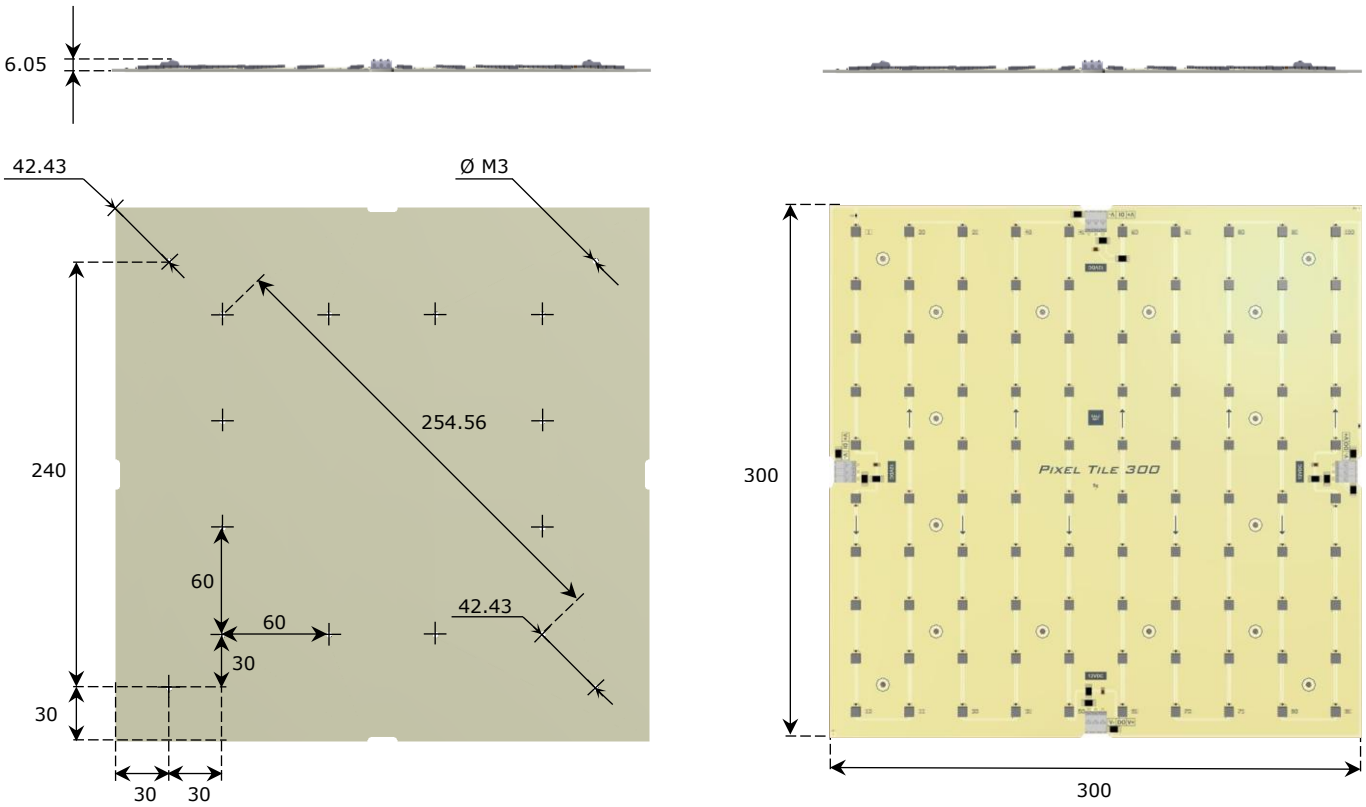

Figure 6: Mechanical dimensions

TECHNICAL NOTES

INSTALLATION

ATTENTION! Installation and maintenance should always be carried out in the absence of DC voltage.
Before proceeding with the installation, adjustment, and connection of the device to the power supply, make sure that the voltage is disconnected from the system.

The device should only be connected and installed by qualified personnel. All applicable regulations, legislation, standards, and building codes in force in the respective countries must be adhered to. Incorrect installation of the device may cause irreparable damage to the device and connected loads.

Maintenance must only be carried out by qualified personnel in compliance with current regulations.

The product must be installed inside an electrical box that is protected against overvoltage.

The external power supply must be protected. The product must be protected by a properly sized circuit breaker with overcurrent protection.

Keep 230 Vac (LV) circuits and non-SELV circuits separate from SELV safety ultra-low voltage circuits and any product connections. It is strictly forbidden to connect, for any reason, directly or indirectly, the 230 Vac mains voltage to the product (control terminals included).

During installation, it is recommended to reserve adequate space around the device to facilitate its accessibility in case of future maintenance or updates.

Use in thermally harsh environments may limit the output power of the product.

The T_A ambient temperature range is a guideline to be carefully observed for the optimal operating environment. However, the integration of the device inside the enclosure must always ensure proper thermal management (e.g. correct mounting of the device, proper ventilation, etc.) so that the temperature at the T_C point does not exceed its maximum limit under any circumstances. Proper operation and durability are only guaranteed if the maximum temperature of the T_C point is not exceeded under the conditions of use.

POWER AND LOAD

The device must be powered only with SELV power supplies with limited current at constant voltage, short-circuit protection and suitably sized power according to the specifications indicated in the product data sheet. No other types of power supply are permitted.

Size the power of the power supply respect to the load connected to the device. If the power supply is oversized compared to the maximum current drawn, insert an overcurrent protection between the power supply and the device.

Connecting to an unsuitable power supply may cause the device to operate outside of the specified design limits, voiding its warranty.

In the case of power supplies equipped with earth terminals, it is mandatory to connect ALL the protection earth points (PE= Protection Earth) to a state-of-the-art and certified earthing system.

The power cables of the device must be correctly sized with reference to the connected load and must be isolated from any wiring or equal to non-SELV voltage. It is recommended not to exceed 10m of connection between the power source and the product. Use double-insulated cables. If you want to use connection cables between the power source and the product longer than 10m, the installer must ensure the correct operation of the system. In any case, the connection between the power supply and the product must not exceed 30m.

Observe the intended polarity between the LED-module and power supply. Any polarity reversal results in no light emission and can often damage the connected LED-modules.

The device has been designed to work with Digital LED-controller only and LED-modules/strip with IC LEDs type specified in the Table 3. Connecting and powering unsuitable controller and/or LED-module/strip with different IC LEDs type may cause the device to operate outside of the specified design limits, voiding its warranty. In general, the operating conditions of the device should never exceed the specifications indicated in the product data sheet.

Observe the intended polarity between the LED-modules series. Any polarity reversal results in no light emission and can often damage the LED-modules.

The series connection cables between the product, the other LED modules, and the SPI controller must be of an appropriate size and must be isolated from any non-SELV wiring or parts. We recommend using double-insulated cables. The connections between the product, the other LED modules and the SPI controller should not exceed 30m. In any case, the installer must ensure the correct functioning of the system.

It is not allowed to connect different types of LED-modules in the same output channel.

REMOTE CONTROL

The wiring cables at the sync BUS must be isolated from every wiring or parts at voltage not SELV. To improve disturbance immunity at BUS side, the SPI cable should not-cross any 230 Vac mains voltage wiring or radio-emitting sources.

LEGAL NOTES

TERMS OF USE

Dalcnet Srl (hereinafter referred to as "the Company") reserves the right to make changes to this device, in whole or in part, without prior notice to the customer. Such changes may affect technical aspects, functionality, design, or any other element of the device. The company is not required to notify you of such changes and that your continued use of the device will constitute your acceptance of the changes.

The company is committed to ensuring that any changes do not compromise the essential functionality of the device and that they comply with applicable laws and regulations. In the event of substantial changes, the company undertakes to provide clear and timely information on the same.

The customer is advised to periodically consult the www.dalcnet.com website or other official sources to check for any updates or changes to the device.

SYMBOLS

CE	All products are manufactured in compliance with European Regulations, as reported in the Declaration of Conformity.
SELV	"Very Low Safety Voltage" in a circuit isolated from the mains supply by insulation not less than that between the primary and secondary circuits of a safety isolation transformer according to IEC 61558-2-6.
	At the end of its useful life, the product described in this data sheet is classified as waste from electronic equipment and cannot be disposed of as unsorted municipal solid waste. **Warning!** Improper disposal of the product may cause serious harm to the environment and human health. For proper disposal, inquire about the collection and treatment methods provided by the local authorities.