

FEATURES

- ◆ RS485 to SPI converter for RUNNING-LIGHT-CASAMBI
- ◆ Power supply (DC IN): 5-12-24-48 Vdc
- ◆ Output (OUT): voltage value equal to input voltage
- ◆ RGB, RGBW and Tunable White (TW) Digital-LED strip light control
- ◆ Remote control: via BUS interface
- ◆ Suitable for use in Dry locations
- ◆ Extended temperature range
- ◆ 100% Functional test – 5 years warranty

PRODUCT DESCRIPTION

PIXEL-REPEATER is an RS485 to SPI converter for pixel-to-pixel LED control on digital (programmable/addressable) LED strip, which can be powered by a SELV constant voltage ($5 \div 48$) Vdc power supply. The converter is suitable for driving Digital-LED RGB/RGBW/TW strips at constant voltage and can be controlled remotely via the BUS interface of RUNNING-LIGHT-CASAMBI controller. PIXEL-REPEATER can deliver a maximum output current of 7 A and has the following protections: over-voltage and under-voltage protections, reverse polarity protection and input fuse protection.

Through the PIXEL-REPEATER module is possible to duplicate the dynamic effects coming from RUNNING-LIGHT-CASAMBI controller to a pixel-to-pixel Digital-LED strip placed at a distance up to 250 m from the controller.

→ For the up-to-date manual, please consult our website www.dalcnet.com or scan the QR Code on product label.



PRODUCT CODE

CODE	POWER SUPPLY	LED OUTPUTs	N° of OUTPUTs	REMOTE CONTROL
PIXEL-REPEATER	5-12-24-48 VDC	7 A (max) ¹	N°1 SPI Digital-LED strip	BUS (up to 250 m)

Table 1: Product Code

PROTECTION AND DETECTION

The following table shows the types of incoming and outgoing protection/detection present on the device.

ACRONYM	DESCRIPTION	TERMINAL	PRESENT
IFP	Input Fuse Protection ²	DC IN	✓
OVP	Over Voltage Protection ²	DC IN	✓
UVP	Under Voltage Protection ²	DC IN	✓
RVP	Reverse Voltage Polarity ²	DC-IN	✓

Table 2: Detection and Protection functionalities

¹ The maximum total output current depends on the operating conditions and ambient temperature of the system. For the correct configuration, check the maximum power that can be delivered in the [§Technical Specifications](#) and in the [§Thermal Characterization](#) sections.

² Protections refer to the control logic of the board.

REFERENCE STANDARDS

PIXEL-REPEATER complies with the regulations shown in the table below.

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 3: Reference standards

TECHNICAL SPECIFICATIONS

Description	Name	Values			Unit of Measure	Note	
		Min		Max			
POWER SUPPLY (DC IN terminal)							
Nominal Supply Voltage	V _{IN}	5	12	24	48	Vdc	-
Supply Voltage range	V _{IN-RNG}	5	÷		48	Vdc	-
Efficiency at full load	E _{FF}	> 95			%	-	
Standby power absorption	P _{STBY}	< 0.5			W	-	
OUTPUT (OUT terminal)							
Output Voltage	V _{OUT}	= V _{IN}			-	-	
Output Current (max)	I _{OUT-max}	7			A	-	
Rated Power Output	P _{OUT}	@5V	@12V	@24V	W	Rated @T _A <35 °C.	
		35	84	168			
Load type	L _{TYPE}	SPI Digital-LED strip			-	Defined by design	
Maximum addressable LEDs	IC _{ADDR_max}	2000			-	-	
Resolution	RES	8			bit	16 million colours	
BUS CONTROL IN (BUS terminal)							
BUS type	BUS _{TYPE}	RS485			-	-	
Maximum wiring distance	BUS _{WD-max}	250			m	-	
ENVIRONMENTAL							
Storage temperature	T _{STORE}	-40	÷	+60	°C	Minimum values defined by design	
Working Ambient temperature	T _A	-10	÷	+60	°C	-	
Max Temperature @T _c point	T _C	-	-	+80	°C	-	
Connector Type	CON _{TYPE}	Push-in terminals			-	-	
Wiring Section	WS _{SOLID}	0.5	÷	1.5	mm ²	Defined by design	
	WS _{STRAND}	20	÷	16	AWG		
Strip length	WS _{STRIP}	10			mm	-	
Protection class	IP _{CODE}	IP20			-	-	
Casing Material	MC	PC/ABS			-	Polycarbonate/ABS	
Packaging units (pieces/units)	PU	1			pcs	-	
Dimensions		L	H	D		-	
	MD	71.7	21	15.5	mm	Case	
	PD	135	100	-	mm	Packaging envelope	
Weight	W	22			g	Including packaging	

Table 4: Technical specification

T_c POINT POSITION

The figure below shows the position of the maximum temperature point (T_c point, highlighted in red) reached by the electronics inside the enclosure. It is located on the front side (Top) near the output terminal.

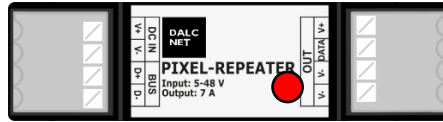


Figure 1: T_c point position

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 PIXEL-REPEATER's BUS connection to the controller, the load and the supply voltage. It is recommended to follow these steps to install the product safely:

1. **Load wiring:** connect the Digital-LED strip signal to the "OUT" terminal, the power supply positive wire to the "V+" symbol, the negative wire to the "V-" symbol, and the Data-IN wire to the "DATA" symbol.
2. **BUS wiring:** connect the BUS signals from the controller to the "BUS" terminal using one twisted-pair shielded cable, wiring the D- (Data-B) signal to the "D-" symbol, the D+ (Data-A) to the "D+" symbol, and the COM (Common) signal to one of the "V-" terminals through the cable shield (recommended for signal balancing).
3. **Power Supply wiring:** connect a 5 Vdc, 12 Vdc, 24 Vdc or 48Vdc constant voltage SELV power supply (depending on the nameplate data of the LED load) to the "V+" and "V-" terminals of the DC IN terminal.



PIXEL-EXTENDER device can be powered by a dedicated DC power supply. Make sure that the rating data of the power source comply with the nameplate.

BUS terminal is a RS485 interface and one twisted-pair shielded cable shall be used. RS485 shielded cable can be used too.

Keep the distances from the device to the unshielded portion of twisted pair as short as possible.

Terminals with the symbol V- are internally connected to the same electrical potential.

In case of one twisted-pair shielded cable (no Common wire) connecting the controller device to the PIXEL-REPEATER, wire the twisted pair to the D+ and D- signals on BUS terminals. COM signal can be connected through the cable shield to improve signal balance on the BUS.

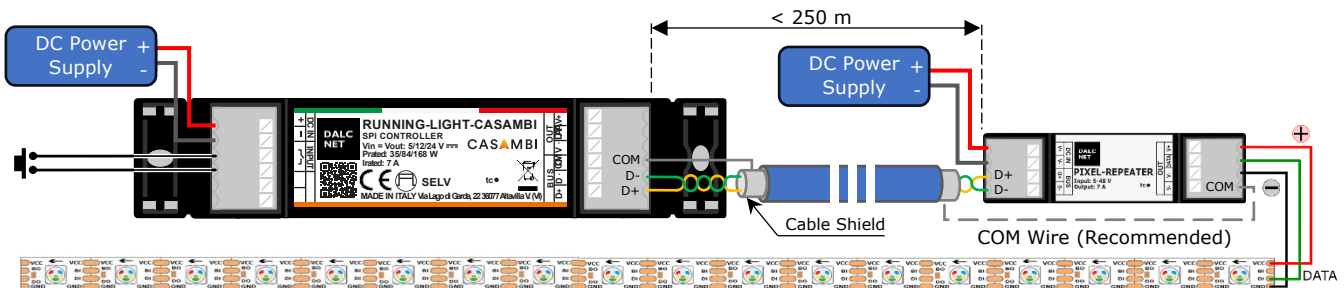


Figure 2: PIXEL-EXTENDER wiring diagram



For higher Load current ($> 7A$) it is recommended to use the following connection diagram, bypassing the V+ and V- signals of the OUT terminal and connecting the Digital-LED strip Supply Voltage terminals directly to the Power Supply.

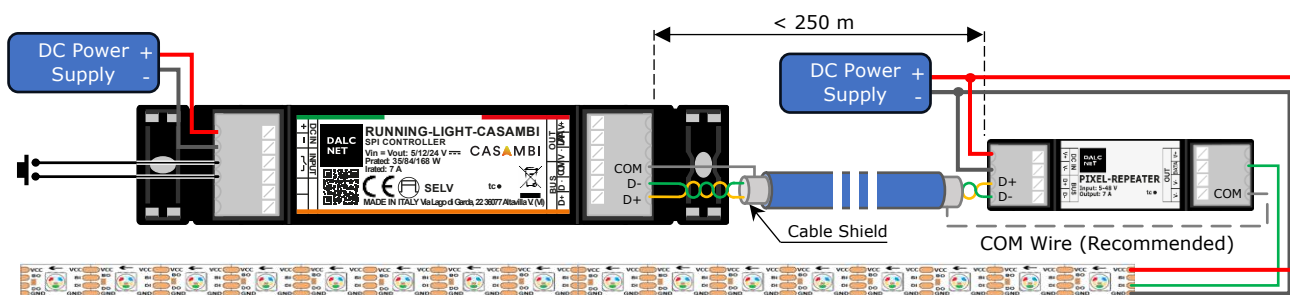


Figure 3: PIXEL-EXTENDER wiring diagram (> 7A)

THERMAL CHARACTERIZATION

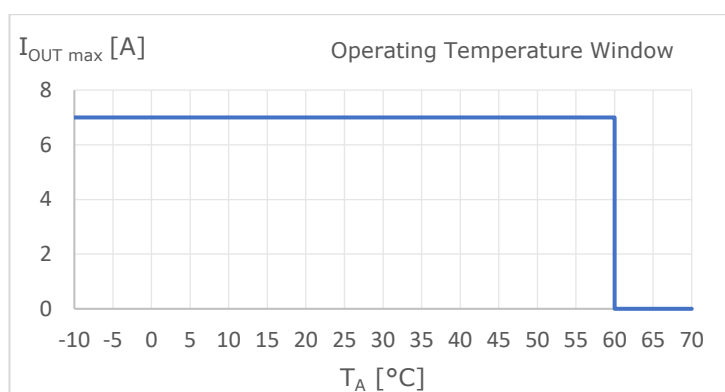


Figure 4: Operating Temperature Window

Figure 4 shows the maximum output current values that can be provided by the PIXEL-REPEATER as a function of the operating temperature³ (or ambient temperature, T_A) of the operation, summarized below:

$$\diamond \quad T_A = (-10 \div +60) \text{ } ^\circ\text{C} \quad \rightarrow \quad I_{OUT} \leq 7 \text{ A}$$

These maximum current (total) values can only be applied under proper ventilation conditions.

MECHANICAL DIMENSIONS

Figure 5 details the mechanical measurements and the overall dimensions [mm] of the outer casing.

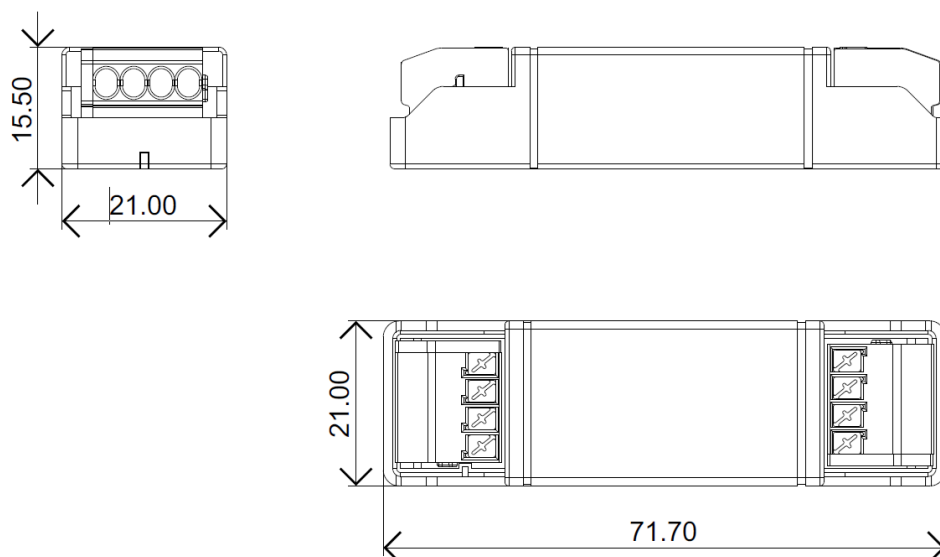


Figure 5: Mechanical dimensions

³ If the product is installed inside an electrical panel and/or junction box, T_A refers to the temperature inside the panel/box.

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 panel and/or junction 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).

The product must be installed in a vertical or horizontal position, i.e. with the faceplate/label/top cover facing up or vertically. No other positions are allowed. The bottom position, i.e. with the faceplate/label/top cover facing downwards, is not allowed.

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

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

For devices embedded within luminaires, the T_A ambient temperature range is a guideline to be carefully observed for the optimal operating environment. However, the integration of the device within the luminaire 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 SUPPLY 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.

 The device has been designed to work with Digital-LED loads only. Connecting and powering unsuitable loads 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 module and the device. Any polarity reversal results in no light emission and can often damage the LED modules.

It is recommended that the connection cables between the product and the LED module be less than 3m long. Cables must be properly sized and should be insulated from any non-SELV wiring or parts. It is recommended to use double-insulated cables. If you want to use connection cables between the product and the LED module longer than 3m, the installer must ensure the correct operation of the system. In any case, the connection between the product and the LED module must not exceed 30m.

It is not allowed to connect different types of loads in the same output channel.

BUS CONTROL

 The length and type of cables connecting to the buses must comply with the specifications of the respective protocols and current regulations. They must be isolated from any non-SELV wiring or live parts. It is recommended to use double-insulated cables.

The length and type of the connection cables at the extension BUS must be less than 250m and they should be isolated from every wiring or parts at voltage not SELV. To improve voltage balance at BUS side, the double insulated twisted-pair shielded cables shall be used, with shield connected to the V- signal and to the COM signal of controller device.

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

	All products are manufactured in compliance with European Regulations, as reported in the Declaration of Conformity.
	Independent lamp Controlgear: lamp controlgear consisting of one or more separate elements so designed that it can be mounted separately outside a luminaire, with protection according to the marking of the lamp controlgear and without any additional enclosure.
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.