# SLIM-PPX-DALI

Device Manual

*Made in Italy*

# FEATURES

- CONVERTER ProtoPixel-to-DALI and ProtoPixel-to-0/1÷10V
- Input: 230 Vac @50/60 Hz
- Remote control: ProtoPixel App© (WiFi and Bluetooth)
- Local Control: N.O. Push Button
- Signal converter from ProtoPixel to DALI
- Signal converter from ProtoPixel to 0/1-10V
- Possibility to control DALI or 0/1-10V devices via the ProtoPixel App©
- Provides power supply to the DALI bus
- Extended temperature range
- 100% Functional test

# PRODUCT DESCRIPTION

SLIM-PPX-DALI is a protocol converter and can be used as ProtoPixel to DALI or ProtoPixel to 0/1-10V signal converter. The device receives a command signal from the ProtoPixel App© and converts it into a DALI (DT6 and DT8) digital commando or 0-10V or 1-10V analog command. SLIM-PPX-DALI can be controlled remotely via ProtoPixel App© or locally via N.O. (Normally Open) pushbutton.

The ProtoPixel App© can be downloaded free of charge from the Apple App Store (iOS 16 or later) and the Google Play Store (Android OS 11 or later).

⇢ For the most up-to-date manual, please visit our website www.dalcnet.com or scan the QR Code.
⇢ For the correct functioning of the ProtoPixel App©, visit the Protopixel website:
https://www.protopixel.io/solutions/products

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# PRODUCT CODE

| CODE | POWER SUPPLY | REMOTE CONTROL | LOCAL COMMAND | OUTPUT COMMAND |
|---|---|---|---|---|
| **SLIM-PPX-DALI** | 230 Vac @50/60 Hz | ProtoPixel App© | N° 1 N.O. pushbutton | DALI (DT6/DT8)[1] or Analog signal 0/1-10V |

*Table 1: Product Code*

# PROTECTION AND DETECTION

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

| CODE | DESCRIPTION | TERMINAL | PRESENT |
|---|---|---|---|
| **IFP** | Input Fuse Protection [2] | AC IN | ✔ |
| **OVP** | Over Voltage Protection [2] | AC IN | ✔ |

*Table 2: Detection and Protection functionalities*

# REFERENCE STANDARDS

SLIM-PPX-DALI follows 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 |
| **EN 61347-1** | Lamp Controlgear – Part 1: General and safety requirement |
| **EN 61347-2-11** | Lamp Control gear – Part 2-11: Particular requirement for miscellaneous electronic circuits used with luminaires |

*Table 3: Reference standards*

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[1] Address management (DALI variant) depends on the configuration of the ProtoPixel module.
[2] Protections refer to the control logic of the board.

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# TECHNICAL SPECIFICATIONS

| Description | Name | Values | | Unit of Measure | Note |
|---|---|---|---|---|---|
| | | **Min** | **Max** | | |
| **INPUT (AC IN)** | | | | | |
| Nominal Supply Voltage | $V_{IN}$ | 230 | | Vac | - |
| Supply Voltage range | $V_{IN-RNG}$ | 100 ÷ | 240 | Vac | - |
| Mains frequency | $f_{MAINS}$ | 50 or | 60 | Hz | - |
| Nominal power @230V[3] | $P_{NOM}$ | 3 | | W | Maximum |
| Standby power absorption | $P_{STBY}$ | < 0.5 | | W | - |
| **OUTPUT (DALI)** | | | | | |
| Output Current | $I_{OUT\_DALI}$ | 30 | | mA | - |
| Output Voltage | $V_{OUT\_DALI}$ | 14 | | V | - |
| **OUTPUT (0-10/1-10)** | | | | | |
| 0-10V Current (Sink or Source) | $I_{OUT\_0-10V}$ | 10 | | mA | - |
| 1-10V Current (Sink or Source) | $I_{OUT\_1-10V}$ | 10 | | mA | - |
| **ENVIRONMENTAL** | | | | | |
| WiFi Frequency connection[4] | $f_{WIFI}$ | 2.4 | | GHz | 802.11b/g/n |
| Operating Frequency[4] | $f_{OP}$ | 2412 ÷ | 2484 | MHz | - |
| Maximum Emitted Power[4] | $P_{WIFI-max}$ | 9 | | dBmW | - |
| Storage temperature | $T_{STORE}$ | -40 ÷ | +60 | °C | Minimum values defined by design |
| Working Ambient temperature | $T_A$ | -25 ÷ | +60 | °C | |
| Connector type | $C_{TYPE}$ | Push-in Terminals | | - | - |
| Wiring Section | $WS_{SOLID}$ | 0.5 ÷ | 1.5 | mm² | Defined by design |
| | $WS_{STRAND}$ | 20 ÷ | 16 | AWG | |
| Strip length | $WS_{STRIP}$ | 10 | | mm | - |
| Protection class | $IP_{CODE}$ | IP20 | | - | - |
| Casing Material | MC | plastic | | - | - |
| Packaging units (pieces/units) | PU | 1 | | pcs | - |
| Mechanical Dimensions | - | L | H | D | - |
| | MD | 136 | 29 | 21 | mm |
| Packaging Dimensions | PD | 147 | 34 | 29 | mm | - |
| Weight | W | 62 | | g | Including packaging |

*Table 4: Technical specification*

## Tc POINT POSITIONING

The figure below shows the positioning 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 LED output connector.



*Figure 1: $T_c$ point position*

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[3] Maximum value, dependent on ventilation conditions.
[4] The parameters are derived from the configuration of ProtoPixel module.

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# INSTALLATION

**ATTENTION!** *Installation and maintenance must always be conducted in the absence of voltage.*
*Before continuing with the connection of the device to the power supply, make sure that the mains voltage of the power source is disconnected from the system. The power supply must be protected. The product must be protected by a suitably sized circuit breaker.*

*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.*

# WIRING DIAGRAM

The following paragraphs show the diagrams of the dimmer's wiring to the BUS control, 0/1-10V Analog Output, and the supply voltage. It is recommended to follow these steps to install the product safely:

1. 0/1-10V Analog Output wiring: connect the 0/1-10V Analog input positive wire of the controlled device to the "OUT" terminal with the "+" symbol, and the Analog input common wire to the "OUT" terminal with the "-" symbol.
2. DALI BUS wiring: connect the DA data bus signals to the "DALI" terminals with the "DA" symbols.
3. Power Supply wiring: connect the 230 Vac @ 50 Hz mains power supply to the "AC IN" terminals respecting the Phase-Live (L) and Neutral-Neutral (N) convention to terminals "L" and "N" respectively.
4. Remote control pairing: power ON the SLIM-PPX-DALI and follow the pairing instructions provided on ProtoPixel App©.
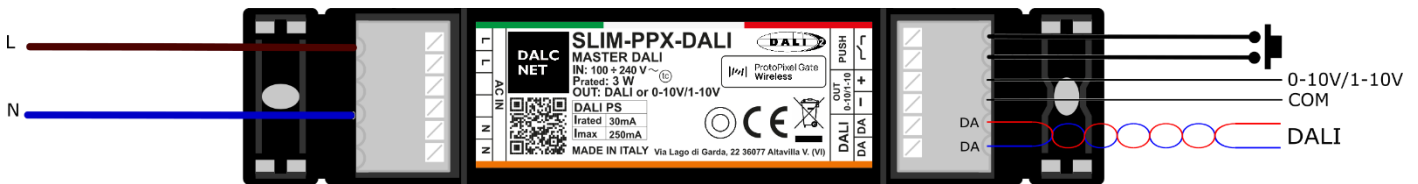


*Figure 2: Wiring diagram*

Like any other product with WiFi or Bluetooth control, be sure not to place the product inside a metal case or placed near large metal structures. The metal will significantly obstruct the radio signal, which is crucial for the proper functioning of the device.

## DALI BUS WIRING

SLIM-PPX-DALI can control remotely other devices via DALI digital bus by a simple two-wire cable (untwisted and unshielded). The control is conducted by SLIM-PPX-DALI, which provides commands to the devices in the DALI network and, if necessary, power supply to the network itself.

To connect SLIM-PPX-DALI to the DALI network, simply connect the bus cables to the "DA" terminals of the "DALI" terminal: as different topologies are possible, it is not necessary to observe the polarity of the "DA+" and "DA-" signals of the bus when connecting.

### DALI CABLING TOPOLOGIES

The DALI protocol supports several cabling topologies, i.e. Bus-wiring, shown as an example in Figure 3.

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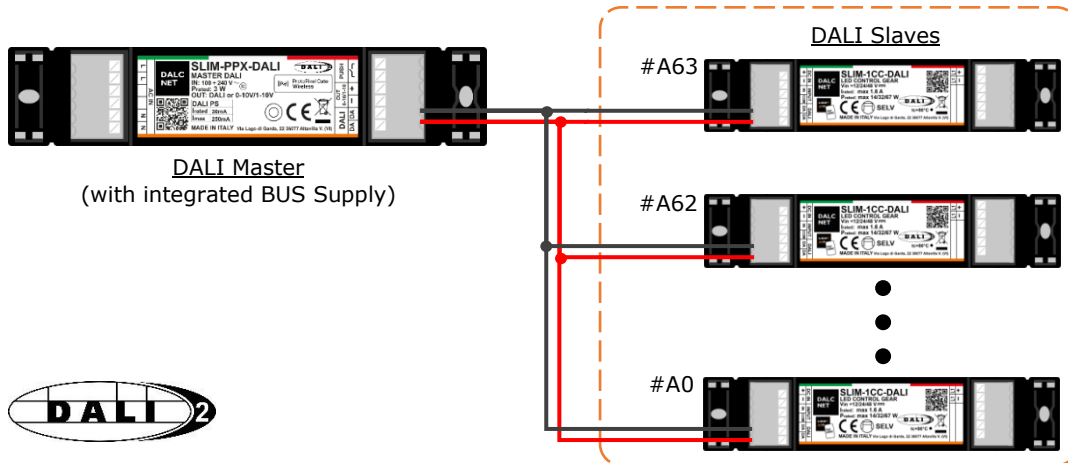
*Figure 3: Remote Control Connection Topology, Bus-wiring*

The DALI-2 protocol supports up to 64 Control Gear slave devices connected with different wiring topologies shown in Figure 4: Bus-wiring, Star-wiring, Tree-wiring, or Line-wiring. Other topologies are excluded.
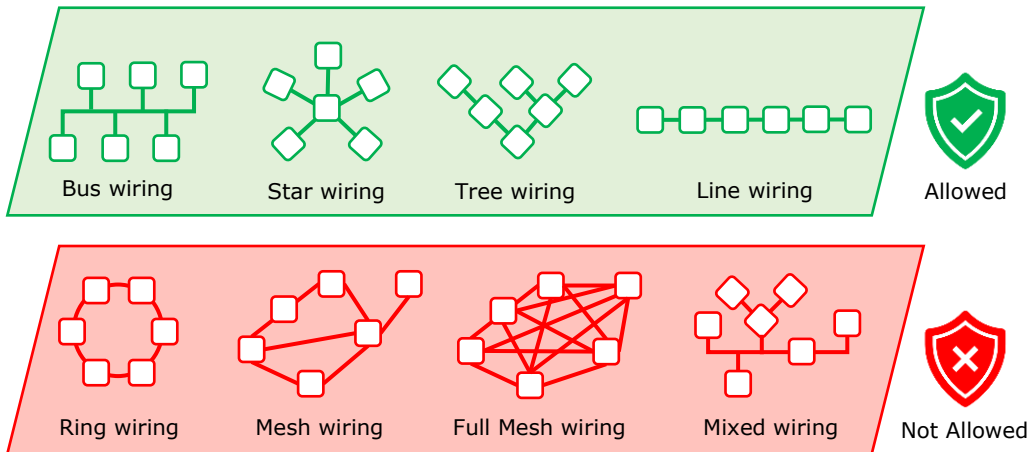


*Figure 4: DALI wiring Topologies*

## POWER SUPPLY WIRING

SLIM-PPX-DALI can be powered by 230 Vac @ 50Hz mains voltag. Once the 0/1-10V signal and remote control (DALI bus) are connected, connect the AC power supply respecting the Live (L) and Neutral (N) conventions to the "L" and "N" terminals of the AC IN terminal.



Power Grid
220-240 Vac
50/60 Hz
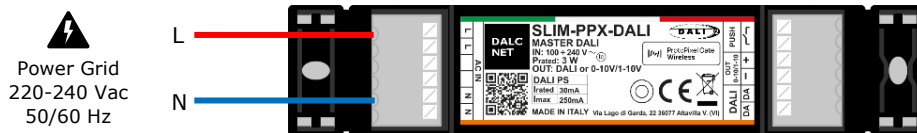
*Figure 5: Power connection diagram*

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## LOCAL COMMAND: PUSHBUTTON

SLIM-PPX-DALI provides one input for N.O. pushbutton, through which different operating parameters can be managed. Each action on the pushbutton can be managed from ProtoPixel App©.

## REMOTE CONTROL: DALI

DALI (Digital Addressable Lighting Interface) is a protocol developed by the DALI Alliance (DIIA) to allow the management, configuration and programming of LED lighting systems in digital mode: through a two-way communication process between devices and control units, it is possible to execute ON, OFF or dimmer commands, report faults or information of various kinds.
Based on a Master/Slave architecture, the DALI standard allows both single digital control of devices and programming in groups and/or broadcast.
In its second version, DALI-2 allows first full compatibility with the earlier protocol, and secondly brings numerous improvements compared to DALI-1:

1. Addition of lighting control devices: e.g. buttons, sensors, and LED drivers that were not included in the earlier version. In addition, to obtain DALI-2 certification, the new protocol requires the execution of functional and compliance tests by DIIA.
2. Introduction of the Multi Master architecture: with the regulation of the various lighting control devices, it is possible to send commands and signals to the DALI-2 bus from multiple sources, easing independent, immediate, and simultaneous data communication.
3. Development of functional and application standards: new extensions have been drawn up for DALI-2 devices, e.g. for emergency lighting or colour control, creating a new product standard for smart lighting and IoT systems called D4i.

### OPERATION MODE

The DALI protocol provides two configurations depending on the light characteristics to be obtained. Each profile is composed of a defined number of 8-bit channels, whose values can be set in the range (0 ÷ 254), each of which stands for a light characteristic (e.g. brightness, colour, temperature, etc.). SLIM-PPX-DALI supports both DT8 and DT6 profiles to provide adjustment of all light parameters allowed by the protocol.

## MECHANICAL DIMENSIONS

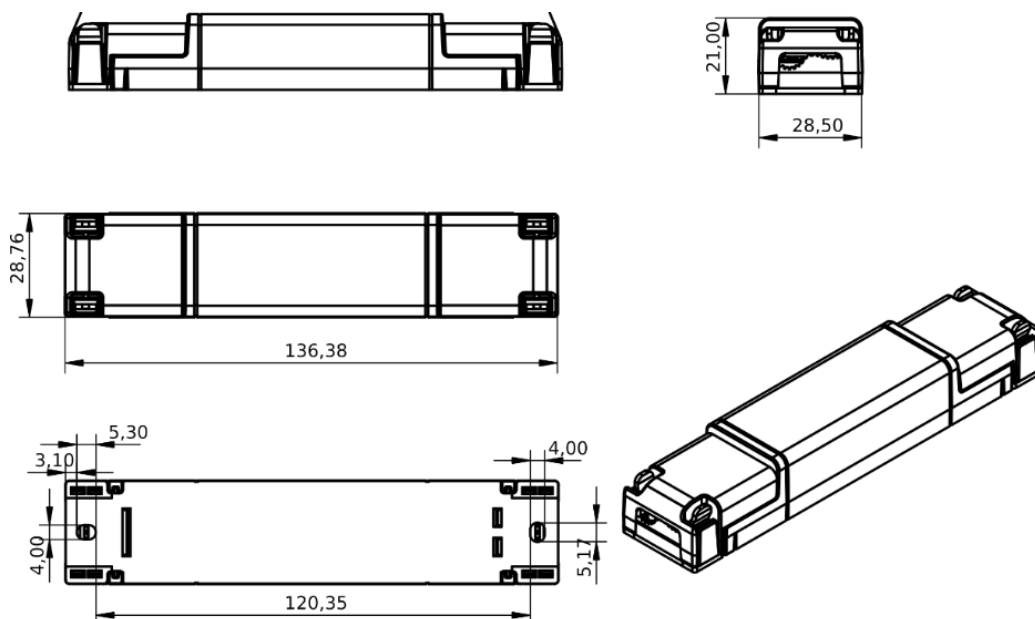Figure 6 details the mechanical measurements and the overall dimensions [mm] of the outer casing.



*Figure 6: Mechanical Dimensions*

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# TECHNICAL NOTES

## INSTALLATION

**WARNING!** Installation and maintenance should always be conducted in the absence of AC voltage.
Before continuing with the installation, adjustment, and connection of the device to the power supply, make sure that the Supply Voltage is disconnected from the system.

The device may 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 conducted 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 BUS or Analog terminals.

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 or updates (e.g. via smartphone).

The SLIM-PPX-DALI has an integrated DALI power supply. Before connecting the SLIM-PPX-DALI to a DALI line, please make sure that no other DALI Power Supply is powering the bus.

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 AND OUTPUT

The device must be powered by mains voltage 230 Vac @ 50/60Hz. No other types of power are allowed.

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

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. Use double-insulated cables.

The BUS output of device has been designed to work with DALI slaves only. Connecting and powering unsuitable loads may cause the device to work outside of the specified design limits, voiding its warranty. In general, the operating conditions of the device should never exceed the specifications wrote down in the product data sheet.

The length and type of cables connecting to the bus (DALI or other) must comply with the specifications of the respective protocols and the regulations in force. They must be insulated from any wiring or non-SELV voltage parts. It is recommended to use double insulated cables.

ALL devices connected at the BUS terminal (DALI or other) must be SELV type (the device connected must be SELV or supplied by SELV Power Source).

The Analog output of device has been designed to work with 0/1-10V slave device only. Connecting and powering unsuitable loads may cause the device to work outside of the specified design limits, voiding its warranty. In general, the operating conditions of the device should never exceed the specifications wrote down in the product data sheet.

Observe the intended polarity between the Analog module and the device. Any polarity reversal can often damage the Analog modules.

The length of the cables connecting between the local commands (0-10V, 1-10V or other) and the product must be less than 25m. The cables must be properly dimensioned and must be insulated from any non-SELV wiring or voltage. It is recommended to use double insulated cables, if deemed appropriate also shielded.

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

The control signal connected to the Analog output terminal (0-10V, 1-10V or other) must be SELV type (the device connected must be SELV or supplied by SELV Power Source).

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## WI-FI AND BLUETOOTH WARNINGS

The Wi-Fi/Bluetooth antenna is located inside the device, near the top of case.

Wi-Fi and Bluetooth typically have a range of about 10 to 50 meters, depending on the environment and obstacles. Ensure your devices are within this range for reliable communication.

Walls, floors, and other physical barriers can significantly reduce the effective range and signal strength of Wi-Fi devices. Position devices to minimize these obstacles.

Ensure that all devices in your Wi-Fi network are compatible with each other and support the same Wi-Fi version. Incompatibilities can lead to communication issues.

Wi-Fi and Bluetooth are designed for low power consumption, but the battery life of your control devices (smartphone or tablet) can still be affected by factors like transmission frequency and data volume. Monitor and manage power settings on control devices to optimize battery life.

Wi-Fi and Bluetooth technologies work optimally with non-metallic materials. Therefore, it is not recommended to surround the device by metal objects or reflective surfaces and/or install the device inside metal or aluminium boxes or near metal structures when using Wi-Fi/Bluetooth communication. The metal will effectively block all radio signals which are critical to the product's operation.

For reliable communication, make sure that the top surface is not covered or that it is free of metal objects, wiring, or other electronic devices. Any impediments could affect the quality of communication.

# 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.

# SYMBOLOGIES

| | |
|---|---|
| CE | All products are manufactured in compliance with European Directives, as reported in the EU Conformity Declaration. |
| (independent lamp controlgear symbol) | 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. |
| (crossed-out wheelie bin symbol) | At the end of its useful life the product described in this datasheet is classified as waste from electronic equipment, and cannot be disposed together with the municipal undifferentiated solid waste.<br>**Warning!** Incorrect disposal of this product may cause serious damage to the environment and human health. Please be informed about the correct disposal procedures for waste collecting and processing provided by local authorities. |

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# PROTOPIXEL APP

ProtoPixel App© is the official mobile app through which it is possible to configure, in addition to the functions of the SLIM-PPX-DALI, also all the different ProtoPixel© products.

ProtoPixel App© can be downloaded free of charge from the Apple App Store and Google Play Store.
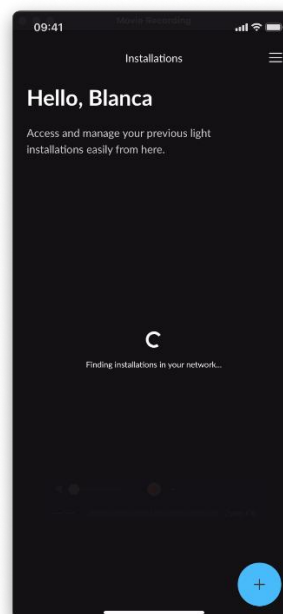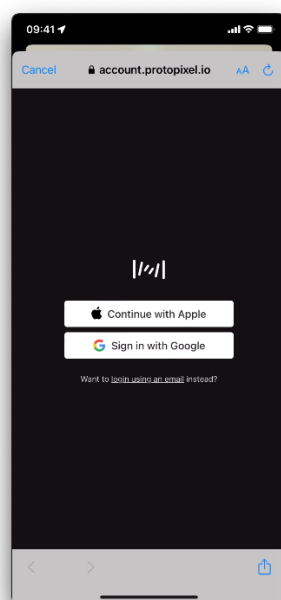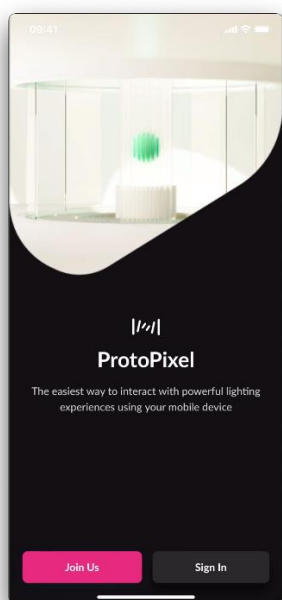
## CONTROL APP DESCRIPTION

ProtoPixel App© is the easiest way to interact with powerful lighting experiences using your mobile device. Visit the Protopixel website for more information: https://www.protopixel.io/solutions/products

## SYSTEM REQUIREMENTS

To use the ProtoPixel App©, you will need an Android device running Android11 (or later) or an iOS device running iOS16 (or later).

## GETTING STARTED

After downloading the app, you will need to create a ProtoPixel Account and log in.

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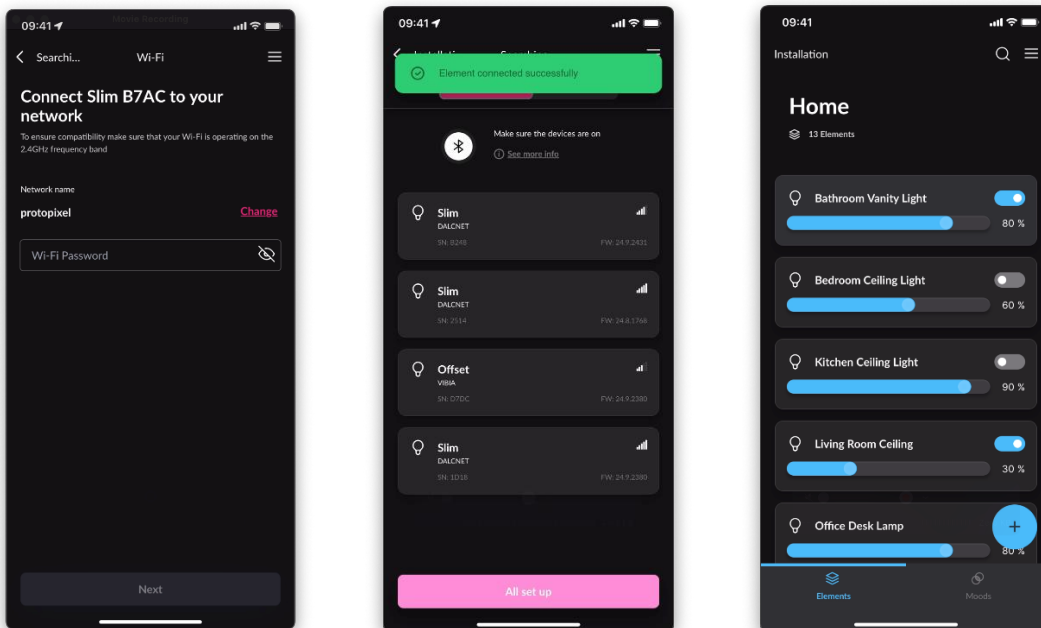Rev. **18/02/2025 -** Pg.**9/10**

## CREATE AN INSTALLATION

You will be prompted to grant WiFi and Bluetooth permissions. Simply tap on the + button, give a name to your Installation, and then the app will be start searching for nearby Dalcnet DALI Slim.
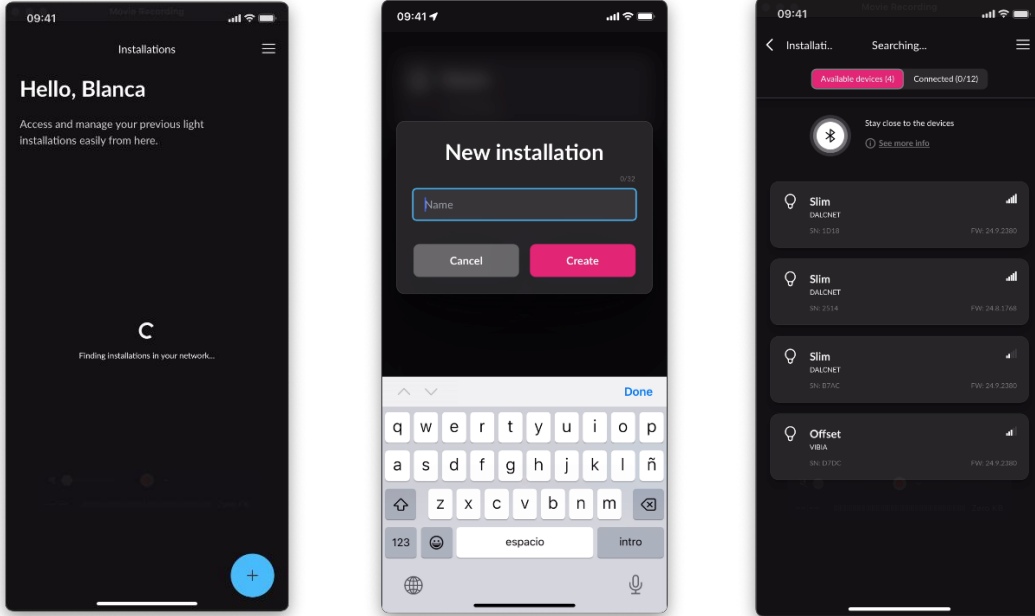
Once you spot nearby Dalcnet Slim Devices, tap one to identify it. The physical device will blink, helping you pinpoint it before connecting to your WiFi network. Then you can start adding all the elements you need to your new installation. After you added all the luminaires, you'll land on the main screen of your new installation. Here, you'll see various elements with their control options and a "+" button for creating new Spaces. You can also access all the Moods you've created in your installation by switching to the "Moods" tab.

## MORE INFO

Visit https://protopixel.zendesk.com/hc/en-us/categories/21349951384721-ProtoPixel-App