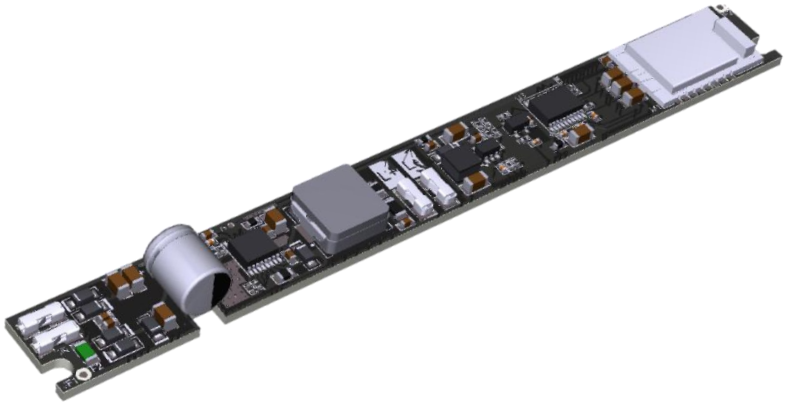
MINITRACK-1CC-CASAMBI-HC

User Manual

Made in Italy



FEATURES

- CASAMBI CONSTANT-CURRENT LED DRIVER
- WHITE and MONOCHROME Light Control
- Power supply (VIN): 48 Vdc (SELV)
- Output (L): at Constant Current for dimmable Spotlights and LED modules
- Hybrid Dimming, current selection range (350 ÷ 1350)mA
- Remote control: via Bluetooth Low Energy (BLE) with CASAMBI mobile app
- Device configuration via CASAMBI mobile application, parameters can be set:
  - Dimming Curve
  - Constant Current output level
  - Maximum current (via dedicated fixture)
- Suitable for use in Dry locations
- Soft ON/OFF and brightness dimming
- Extended temperature range
- 100% Functional test - 5 years warranty

PRODUCT DESCRIPTION

MINITRACK-1CC-CASAMBI-HC is a 1-channel Hybrid modulated Constant Current (CC) LED controller. It can be supplied by a 48 Vdc constant voltage from an external SELV power supply and can be controlled remotely via Bluetooth Low Energy (BLE). Hybrid modulation consists of a smart selection between Amplitude Modulation (AM) and Pulse-Width Modulation (PWM), depending on the current delivered by the output stage: typically, the AM modulation operates for high output currents, instead of PWM modulation that applies for lower currents. The controller is suitable for driving LED loads such as Spotlight and white, single-colour, LED modules at constant current. MINITRACK-1CC-CASAMBI-HC can deliver a maximum output current of 1.35 A and has the following detections and protections: open-circuit and short-circuit detection, over-voltage and under-voltage protections, reverse polarity protection and input fuse protection.

Through the CASAMBI mobile application and smartphones equipped with Bluetooth technology, it is possible to configure multiple parameters, including maximum output current, adjustment curve and maximum/minimum brightness levels. CASAMBI mobile application can be downloaded free of charge from the Apple APP Store and Google Play Store

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

PRODUCT CODE

CODE	POWER SUPPLY	LED OUTPUTS	REMOTE CONTROL	APP CONFIG.
MINITRACK-1CC-CASAMBI-HC	48 Vdc	1 x 1.35 A [1]	Bluetooth Low Energy (BLE)	CASAMBI mobile app

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]	VIN	✓
OVP	Over Voltage Protection[2]	VIN	✓
UVP	Under Voltage Protection[2]	VIN	✓
RVP	Reverse Voltage Polarity[2]	VIN	✓

Table 2: Detection and Protection functionalities

REFERENCE STANDARDS

MINITRACK-1CC-CASAMBI-HC complies with the regulations listed 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

[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 section.
[2] Protections refer to the control logic of the board.

TECHNICAL SPECIFICATIONS

Description	Name	Values			Unit of Measure	Note
		Min		Max		
POWER SUPPLY (VIN terminal)						
Nominal Supply Voltage	V_{IN}		48		Vdc	-
Supply Voltage range	V_{IN-RNG}	45.6	÷	50.4	Vdc	-
Efficiency at full load	E_{FF}		> 95		%	-
Standby power absorption	P_{STBY}		< 0.5		W	-
OUTPUT (L terminal)						
Output Current	I_{OUT}		350, 500, 700, 900, 1050, 1200, 1350		mA	Choice via Fixture selection (refer to Table 7)
Output Current (max)	-	45≤T_A<60	35≤T_A<45	T_A<35 °C	°C	-
	$I_{OUT-max}$	1050	1200	1350	mA	-
Output Voltage	V_{OUT}	2	÷	43	V	-
Rated Power Output	P_{OUT}		See Table 5		W	Rated @T_A<35 °C.
Load type	L_{TYPE}		Resistive LED		-	Defined by design
DIMMING						
Hybrid Modulation working	-	I_{OUT} ≤ I_{TH}		I_{OUT} > I_{TH}	-	-
	HM	PWM*		AM	-	*Fixed to Flicker-free frequency
Modulation Current threshold	I_{TH}		300		mA	-
Dimming Curve	C_{DIM}		Logarithmic, Linear		-	Choice via Fixture parameter
Dimming Resolution	Res_{DIM}		1176		Step	Defined by design
Dimming range	RNG_{DIM}	<1	÷	100	%	-
BLUETOOTH (CASAMBI BLE SoC module)						
Operating Frequencies	f_{OP}	2402	÷	2480	MHz	Of CASAMBI BLE SoC module
Maximum Emitted Power	P_{BT-max}	-	-	8	dBm	Over Bluetooth transmission
Bluetooth version	BT_{VER}		BLE 4.0/5.0, BT mesh		-	Bluetooth Low Energy (BLE)
Communication protocol	CP		CASAMBI		-	-
ENVIRONMENTAL						
Storage temperature	T_{STORE}	-40	÷	+60	°C	Minimum values defined by design
Working Ambient temperature	T_A	-10	÷	+60	°C	Minimum values defined by design
Connectors type	C_{TYPE}		SMT Poke-In Slim Wire		-	-
Wiring Section	WS_{SOLID}	0.25	÷	0.5	mm^2	Defined by design
	WS_{STRAND}	24	÷	20	AWG	
Wire Strip length	WS_{STRIP}		6		mm	-
Packaging units (pieces)	PU		1		pcs	-
Mechanical Dimensions	-	L	H	D	-	-
	MD	125	10	9	mm	
Weight	W		12		g	-

Table 4: Technical specifications

	Supply Voltage	Output Current [mA] ± 5%						
		350	500	700	900	1050	1200	1350
Rated Power Output (P_{OUT})	@48 Vdc	15.5 W	21.5 W	30.1 W	38.7 W	45.15 W	51.6 W	58.5 W
Note: values rated with working ambient temperature T_A<35 °C.								

Table 5: Rated Power Output for each current set

T_C 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.

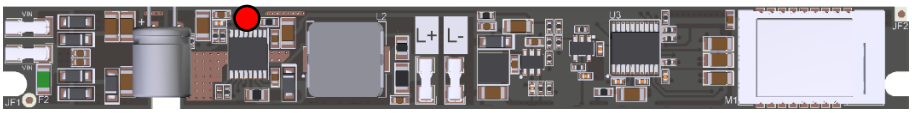


Figure 1: T_c point position

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 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 controller's connection to the remote control, the load and the supply voltage. It is recommended to follow these steps to install the product safely:

1. Safety first: ensure the Power Supply is disconnected before starting the installation.
2. Electrical connections: connect the electrical wires to the terminals of the device following the next instructions.
   a. Load wiring: connect the LED load positive wire to the "L+" terminal and the negative wire to the "L-" terminal.
   b. Power wiring: connect a 48 Vdc constant voltage SELV power supply to the VIN terminals (polarity independent).
3. Check the connections: verify that all connections are tightly secured and that there are no exposed copper wires.
4. Mechanical closing: install the MINITRACK-1CC-CASAMBI-HC inside a plastic track driver housing.
5. Remote control pairing: reconnect the Power Supply and power ON the device, follow the pairing instructions provided on CASAMBI mobile app.
6. Final check: ensure that the device is functioning correctly and that all connections are secure.
   Note: the installer is responsible for verifying the installation.

Load Connection

MINITRACK-1CC-CASAMBI-HC has 1 output channel that can be driven e.g. for spotlight LED modules.
The following connection diagram (Figure 2) allows to drive 1 white or single-colour LED load, on output channel L.

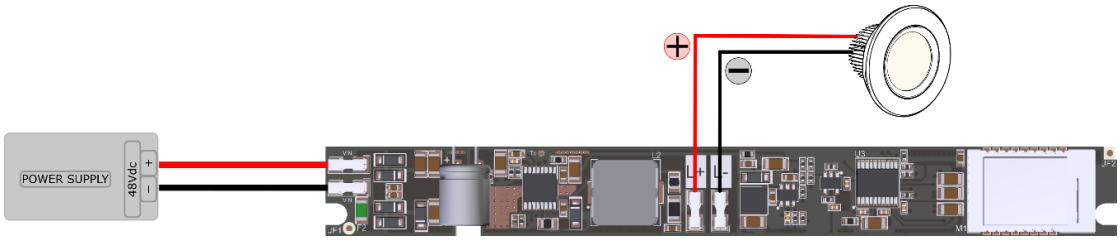


Figure 2: Connection diagram for White or Single-Colour LED load

Power Supply Connection

MINITRACK-1CC-CASAMBI-HC can be powered by a 48 Vdc constant voltage SELV power supply. Once the load is connected, wire the DC power supply to the "VIN" terminals (polarity independent).

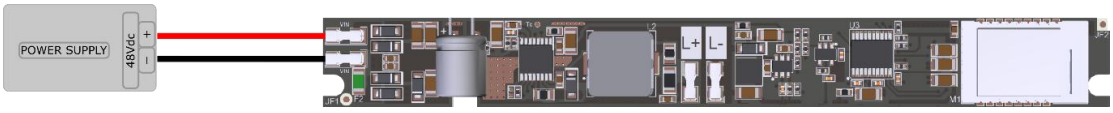


Figure 3: Power Supply Connection Diagram

To avoid overvoltages that can potentially reduce the useful life of the electronic components, MINITRACK-1CC-CASAMBI-HC must be switched OFF upstream of the DC power supply, i.e. by removing voltage from the DC power supply.

FLICKER PERFORMANCE

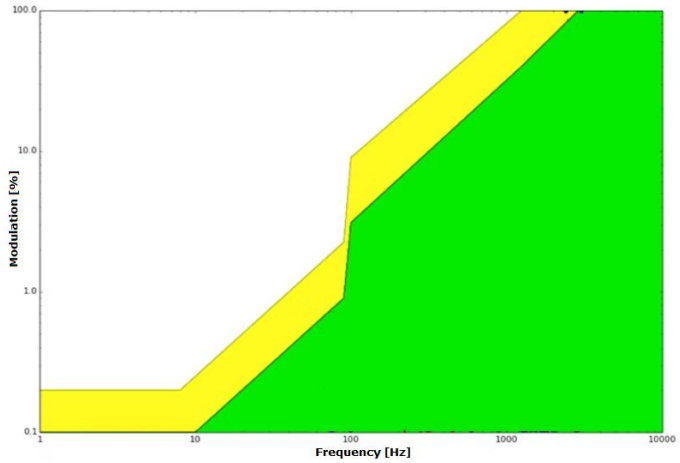


Figure 4: Flickering Perception Threshold

Thanks to the Hybrid modulation, the MINITRACK-1CC-CASAMBI-HC effectively reduces the occurrence of the Flicker phenomenon. Depending on an individual's sensitivity and the nature of their activities, flickering can affect one's well-being, even if the changes in luminance are beyond the threshold detectable by the human eye.

The graph shows the phenomenon of Flickering in function at the frequency, measured throughout the dimming range.
The results show the low-risk zone (yellow) and the no-effect zone (green), defined by IEEE 1789-2015[3].

DIMMING CURVES

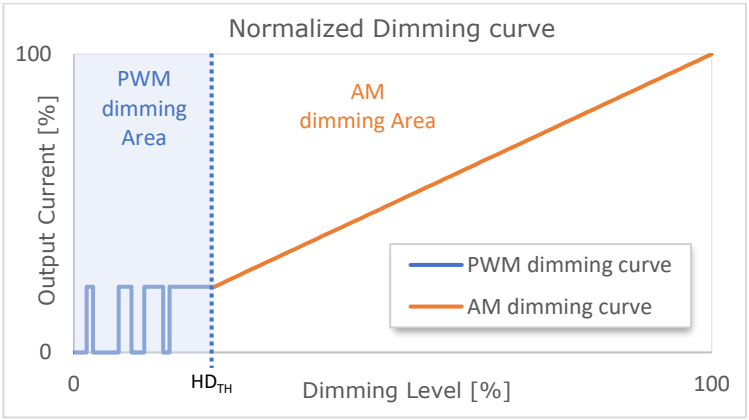


Figure 5: Normalized Dimming curve

For high currents over the Hybrid Dimming Threshold (HD_{TH}), AM modulation allows to effectively regulate the brightness of the LED load. While the PWM modulation ensures a significant reduction in the occurrence of the flickering phenomenon in the lower current range.

Figure 5 shows the Normalized dimming curve supported by the MINITRACK-1CC-CASAMBI-HC controller.

[3] Institute of Electrical and Electronics Engineers (IEEE). *IEEE std 1789: Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers.*

MECHANICAL DIMENSIONS

Figure 6 details the mechanical measurements and the overall dimensions [mm] of the electronic board.

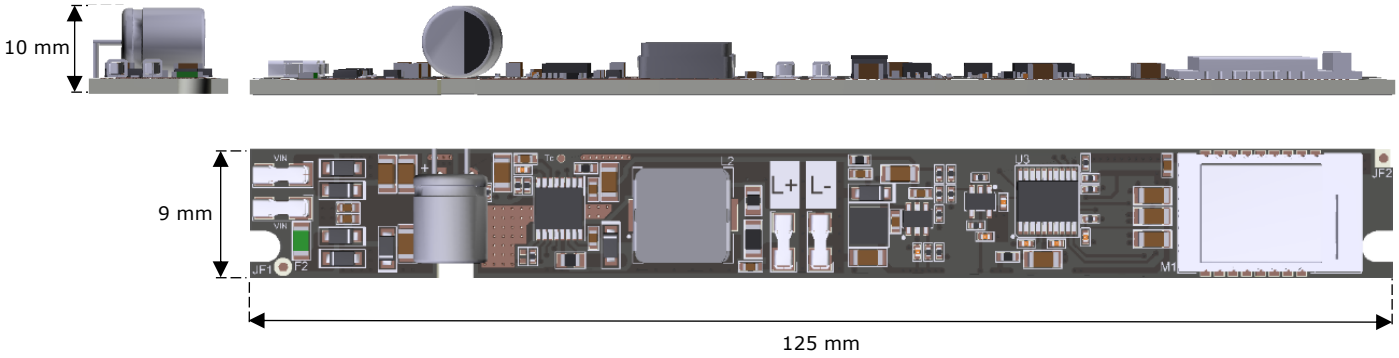


Figure 6: Mechanical dimensions

TECHNICAL NOTES

INSTALLATION

WARNING! Installation and maintenance should always be conducted in the absence of DC voltage.
Before continuing 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 conducted by qualified personnel in compliance with current regulations.

The product is suitable for use in dry places, away from sources of moisture. Installation and use must take place in a dry environment.

The product must be installed inside a dielectric material casing for track lighting with proper connections to the Power Supply and Bus connectors.

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 (e.g. via smartphone, BLE).

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 LOAD

The device must be powered only with SELV power supplies with limited current at 48 Vdc constant voltage, short-circuit protection and suitably sized power according to the specifications wrote down in the product data sheet. No other types of power supply are allowed.

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 work 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.

To avoid overvoltage that can potentially reduce the useful life of the electronic components the device must be switched OFF upstream of the SELV Power Supply connected to the dimmer, i.e. by removing voltage from the SELV Power Supply.

The manufacturer recommends ensuring a cumulative leakage current of less than 3.5 mA on the control circuit.

The device has been designed to work with resistive LED loads 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 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 load types in the same output channel.

BLUETOOTH LOW ENERGY (BLE) WARNINGS AND MOBILE APP NOTES

The BLE antenna is located inside the device, near the right side of the board.

BLE typically has 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 BLE devices. Position devices to minimize these obstacles.

Other electronic devices, especially those operating on the 2.4 GHz frequency (like Wi-Fi routers), can interfere with BLE signals. Keep BLE devices away from such sources of interference.

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

BLE is 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 to optimize battery life.

BLE technology works optimally with non-metallic materials. Therefore, it is not recommended to sourround the device by metal objects or reflective surfaces when using BLE communication.

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.

To guarantee the best performances and the full use of functions, make sure to download on your device the last release of CASAMBI mobile app.

Whenever CASAMBI mobile app requires an upgrade of the profile installed in the LED Dimmers, follow the instruction to do it. This allows you to stay always up to date and benefit of new functions released.

Functionality test are done on all dimmers to ensure the right working. In case the device is still paired to "Dalcnet network", you are asked to unpair it by following the instructions on CASAMBI mobile app and in §Unpairing device from CASAMBI Network section.

LEGAL NOTES

TERMS OF USE

Digimax 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.
UK CA	All products are manufactured in compliance with UK Regulations and conform to UK safety, health, and environmental requirements for products sold in the UK, as reported in the UK Conformity Assessed.
	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.

Table 6: Device's symbols

CASAMBI

CASAMBI is the official application through which it is possible to configure, in addition to the functions of the MINITRACK-1CC-CASAMBI-HC, also all the different CASAMBI products equipped with BLE technology.

CASAMBI mobile app can be downloaded free of charge from the Apple App Store and Google Play Store.

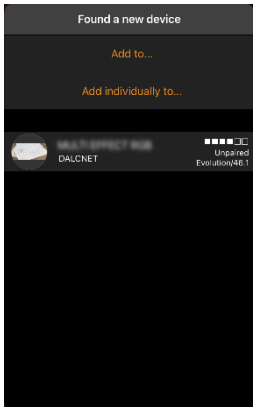
GET IT ON Google Play

Available on the App Store

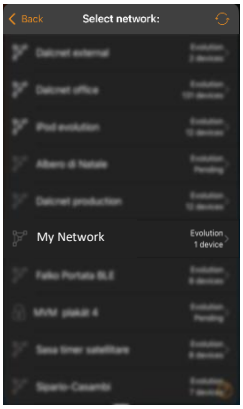
DEVICE SETTINGS

PAIRING DEVICE TO CASAMBI NETWORK

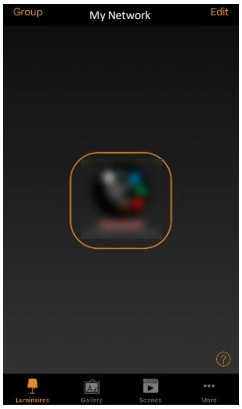
The first time you turn ON a MINITRACK-1CC-CASAMBI-HC device, it will appear in the "Found a new device" section with the default profile preloaded. Perform the following procedure to pair the device to a CASAMBI Network.



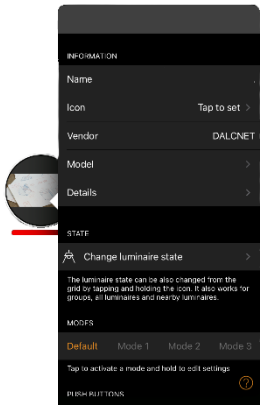
1. Open the CASAMBI mobile app and Power ON the device. The device to be paired will appear.
2. Select *Add to…* to open the list of available networks.



3. Select the network to pair the device with.



4. Once the device has been inserted in the Network, the default profile will be loaded.



5. Double tap on the profile icon to show the device configuration.

UNPAIRING DEVICE FROM CASAMBI NETWORK

If MINITRACK-1CC-CASAMBI-HC is already connected to a known network and/or you wish to associate it with a new network, you need to unpair from the current Network first: please tap the device icon from *Nearby Devices* section, select *Unpair*, and confirm. The unpair process will be started. After the unpairing, the device can be paired to a new Network by following the instructions on §Pairing device to CASAMBI Network section.

To unpair a device connected to an unknown Network (for which you don't have the credentials), please follow these steps:

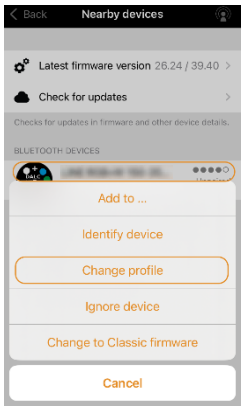
1. Tap the device icon from *Nearby Devices* section, select *Unpair*, and confirm.
2. During the unpair process, turn OFF the Power Supply connected to the MINITRACK-1CC-CASAMBI-HC.
3. Wait 1-2 seconds, then turn the Power Supply ON again.
4. After a while, on *Nearby Devices* section the device will be shown as unpaired.

Note: if the power supply is switched OFF and ON again quickly, unpair may not be done properly. Repeat the unpair sequence by allowing 1 or 2 more seconds to elapse between the moment you turn OFF and re-turn ON the Power Supply.

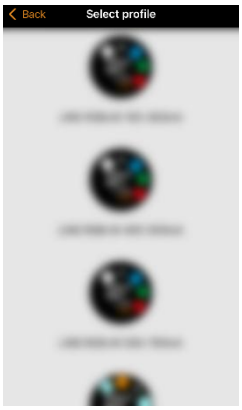
CHANGE PROFILE ON PAIRED DEVICE

Once the technical data of the load to be connected to the device have been verified, it is possible to load the dedicated Fixture/Profile on the controller according to the maximum current supported by the LED module. To change the Fixture on the MINITRACK-1CC-CASAMBI-HC, follow these steps.

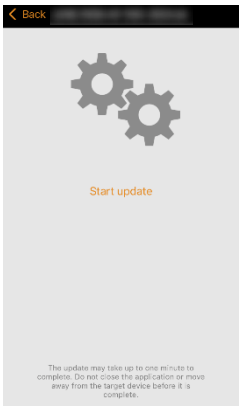
1. Power ON the device and open the CASAMBI© mobile app.
2. Select *Nearby Devices*.



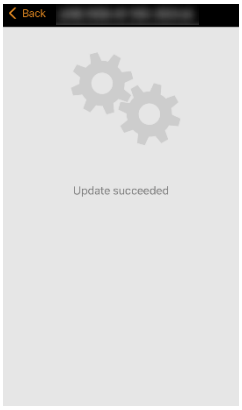
3. Tap on device's icon, then tap on *Unpair*.
4. Second tap on device's icon, then tap on *Change profile*.



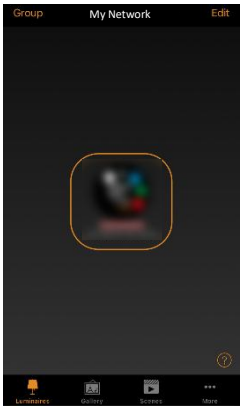
5. Select the desired profile (refer to Table 7).



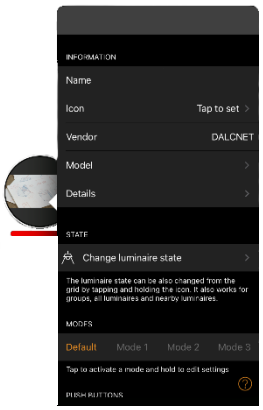
6. Tap *Start Update*.



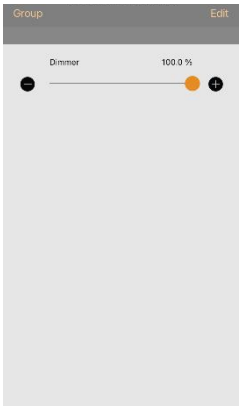
7. Wait for the profile to load correctly.
8. Back to *Nearby Devices* and select *Add to 'Network name'* to pair on the previous Network.



9. Once the device has been added to the Network, go back to *Luminaires* sheet and double tap on the profile icon to show the device configuration.



10. Hold tap on profile icon to show the profile settings.



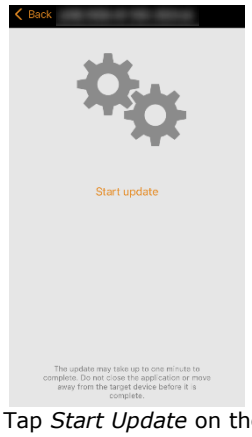
11. Inside the fixture configuration, the LED module brightness and Dimming curve can be set by provided sliders.

FIRMWARE UPDATE ON PAIRED DEVICE

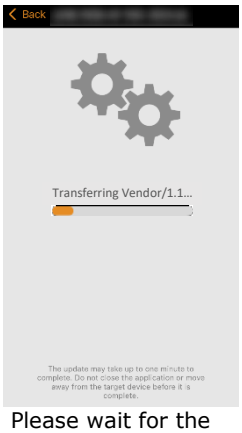
From CASAMBI mobile app it is possible to update the device's firmware. To check and load any update to the MINITRACK-1CC-CASAMBI-HC, follow these steps.

1. Power ON the device and open the CASAMBI mobile app.
2. Select *Nearby Devices*, *More* sheet, then tap the Meatball menu ⋯ and *Check for updates*.

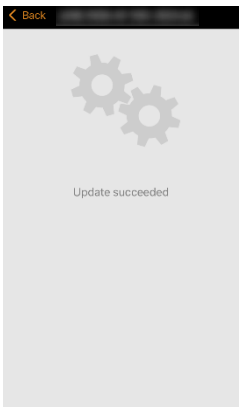
3. After checking for updates, if an update is available a small upward arrow will appear on device icon. Tap on device icon, then select *Update vendor firmware*.



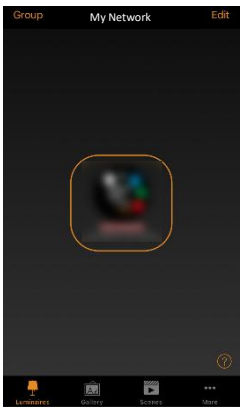
4. Tap *Start Update* on the next page. The transfer of the new Firmware will start.



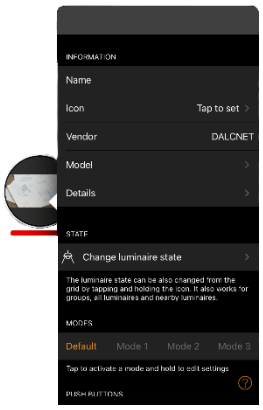
5. Please wait for the update, it may take up to three minutes or so.



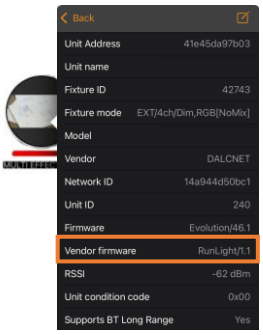
6. After the update and verification are successful, return to *Luminaires* sheet. Previous profile will be loaded.



7. Double tap on the profile icon to show the device configuration settings.



8. Tap on *Details* to show the device info.



9. The firmware version can be viewed under *Vendor Firmware* item.

PROFILES OVERVIEW: FIXTURES

MINITRACK-1CC-CASAMBI-HC supports the following fixtures (selectable by CASAMBI mobile app) that provide different device settings.

PROFILE NAME	PROFILE ID	DESCRIPTION
MINITRACK 1xDIM 350mA	**49550 (Default)**	**350 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 350 mA
MINITRACK 1xDIM 500mA	49551	**500 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 500 mA
MINITRACK 1xDIM 700mA	49552	**700 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 700 mA
MINITRACK 1xDIM 900mA	49553	**900 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 900 mA
MINITRACK 1xDIM 1050mA	49554	**1050 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 1050 mA
MINITRACK 1xDIM 1200mA	49555	**1200 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 1200 mA
MINITRACK 1xDIM 1350mA	49556	**1350 mA Hybrid Dimmer** One slider to dim the output, one slider to set Dimming curve (Logarithmic or Linear) Output current set: 1350 mA

Table 7: Profiles list