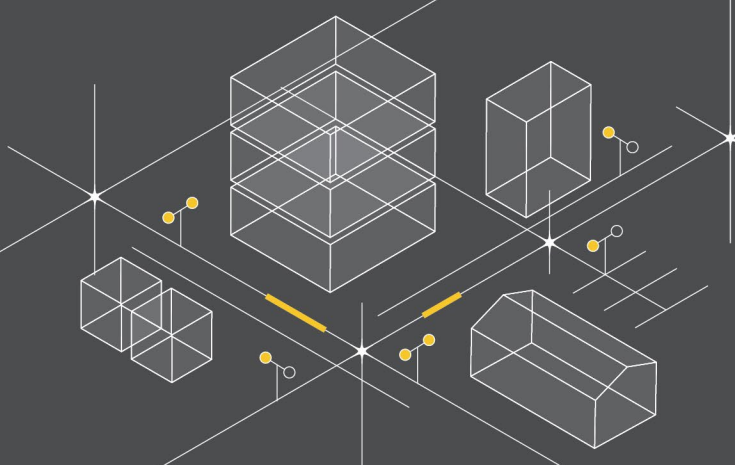
inteliLIGHT®

city-centric smart street lighting

inteliLIGHT®

Deployment Manual



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2. Introduction

2.1 Legal Notice

2.2 Trademarks

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2.3 Important Notes

The information in this document is subject to change without prior notice. Flashnet assumes no responsibility for any errors that may appear in this document. Information and technical data given in this document correspond to the current Flashnet status at the time of writing. Flashnet reserves the right to change any data or procedures without giving notice. Check with your Flashnet representative for possible changes or updated versions of this description. This document is intended for persons who have attended the corresponding installation training. It is assumed here, e.g., that the reader is familiar with all the naming conventions and abbreviations used in the Flashnet inteliLIGHT® system.

2.4 Certifications

"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation"

Warning (part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Information to the User (Part 15.105 (b))

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To comply with FCC radiation exposure limits for general population, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

2.5 Symbols

ELECTRICAL HAZARD AND/OR HAZARD TO LIFE

Warning against hazardous voltage. Non-observance of this warning may lead to severe injury or even death. Instructions marked with this symbol must only be carried out by persons who are:

- qualified according to the local electrical installation and safety regulations, furthermore
- Are authorized and appointed by the customer.

POTENTIALLY DANGEROUS SITUATION

Non-observance of this warning may lead to hardware malfunction, material damage or injury.

TO NOTICE

Draws attention to important information:

- To prevent disturbances.
- To inform about practical hints.

2.6 Abbreviations and Definitions

IoT - Internet of Things

LPWAN - Low Power Wide Area Network

LoRa™ is a long range, low power radio frequency communication technology that brings the Internet of Things concept a step closer to large scale adoption in terms of technical capabilities and cost effectiveness. Its outstanding features: low power, long range, high immunity and spread spectrum are surpassed only by the ease of interoperability and the careful design of its security features.

LoRaWAN™ is a Low Power Wide Area Network (LPWAN) specification. LoRaWAN™ targets key requirements of Internet of Things such as secure bi-directional communication, mobility and localization services. It provides seamless interoperability among smart things without the need of complex local installations and gives back the freedom to the user, developer and businesses, enabling the rollout of Internet of Things.

Narrow-Band IoT (NB-IoT) is a narrowband RF communication technology specially designed for the Internet of Things (IoT). It connects devices more simply and efficiently on already established mobile networks and handles small amounts of infrequent 2-way data, securely and reliably. The special focus of this standard is on very low power consumption, excellent penetration coverage and lower component costs, deployed in GSM and LTE regulated frequencies.

LTE-M is a low power wide area (LPWA) technology standard published by 3GPP. It supports IoT through lower device complexity and extended coverage, while allowing the reuse of the LTE installed base. Supported by all major mobile equipment, chipset and module manufacturers, LTE-M networks will co-exist with 2G, 3G, and 4G mobile networks and benefit from all the security and privacy features of carrier-grade networks.

Sigfox is a cellular style communication technology that provides low power, low data rate and low communication costs for Internet of Things and M2M applications. Sigfox employs Ultra-Narrow Band (UNB) technology, which enables very low transmitter power levels to be used while still being able to maintain a robust data connection, using unlicensed ISM radio bands. The network topology has been designed to provide a scalable, high-capacity network, with very low energy consumption, while maintaining a simple and easy to rollout star-based cell infrastructure.

2.7 Glossary

2.7.1 Area

It is a **geographically delimited administration area** that can cover the whole project, or it can be divided into several segments, depending on the management needs. For example, a smart lighting installation in a city can be divided into neighborhoods and managed by different staff. In this case the city area would be the parent/ root area and the neighborhoods would be sub-areas.

i	**Note**: Each project must have at least one area assigned, defined as a maximum geographical span of an installation (parent/ root area).
i	**Note**: Several root areas can exist at the same time, each with its own sub-areas, but a sub-area cannot have other sub-areas.

2.7.2 Objects

An object is any **individual item** enrolled in CMSv3. Example: **a streetlight controller**, **a cabinet controller**, **a lamp**, a **pole** or **a sensor** are all objects, and their records are individually kept in an **inventory**.

> **Note**: CMSv3 allows the management of a, **virtually**, **unlimited number of objects**.

2.7.3 Object Types

Object Types are used to define and group categories of objects with common attributes. For example, Object Type "**streetlight controllers"** will group several **individual objects: "controller A", "controller B", "controller C"**. **Lamps**, **poles**, **environmental sensors or temperature sensors** are also examples of possible Object Types.

Object Types are divided into 2 categories, depending on their capability to exchange information with CMSv3 software:

- **Non-smart objects** – are inert objects that cannot transmit or receive any data and can only be inventoried with descriptive attributes. E.g., pole height, pole material, pole color etc.
- **Smart objects** – are electronic devices equipped with a communication module that can transmit information, receive and execute commands and can be scheduled to perform actions depending on specific conditions. E.g., a smart streetlight controller that can read energy consumption, detect lamp failure and accept control/scheduling commands (schedule the streetlight to dim to 50% after midnight when traffic decreases in intensity).

> **Note**: CMSv3 allows users to define **any number of custom object types**.

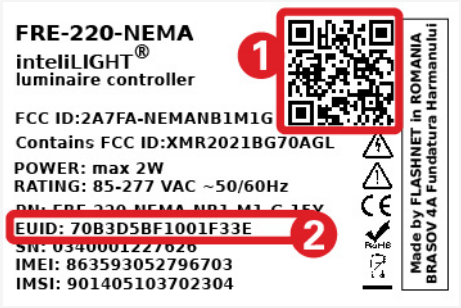
> **Note**: Beside the user defined object types, CMSv3 also recognizes all objects imported via a TALQ gateway.

2.7.4 Controller

An inteliLIGHT® luminaire controller, designed to manage streetlamps.

2.7.5 EUID

A product unique ID code, assigned by Flashnet in the manufacturing process **(2)**.



2.7.6 QR code

It is a type of matrix barcode that includes product identifying and descriptive information **(1)**.

2.7.7 Enrollment

Enrollment is the process of assigning GPS coordinates to an object, and thus creating its **Pinpoint** for displaying and visualizing on the map.

2.7.8 Pinpoint

A pinpoint is an **installation location**, with exact GPS coordinates, that can include **multiple objects**, both smart and non-smart. For example: a streetlight controller, an environmental sensor together with the lamp and the pole they are installed on, are all represented on the map with a single **pinpoint**. Besides de-cluttering the map view, the pinpoint can aggregate similar parameters, for example can calculate how much energy is consumed at that location by adding up the sensor energy consumption with the controller energy consumption.

2.8 Health, Safety and Environment

2.8.1 Personnel for Installation and Service

Only qualified and trained personnel may install and service inteliLIGHT® equipment. Components and associated equipment may only be installed and maintained by persons who:

- Are aware of the electrical & height hazards and of the need to pay increased attention to any operations with the system's components and deployment.
- Are authorized to perform electrical works in low voltage installations and observe the local regulations for electrical installation.
- Have been properly trained by Flashnet representatives.
- Are authorized and appointed by the customer.

The customer has to:

- Provide the maintenance personnel a copy of the applicable manuals and instructions.
- Make sure that the hereby instructions have been thoroughly read and understood.

2.8.2 Safety Notes and Instructions

The general regulations for safety and accident prevention apply to the installation and service of all the parts of an electrical device. All the components of the inteliLIGHT® system have been designed and tested in accordance with the applicable safety regulations. In order to guarantee safe operation, the installation and maintenance personnel must observe the instructions and warning notes of this Manual. Before installing and using any inteliLIGHT® component, read carefully all the instructions and save them for later use.

Because of the life-threatening hazard of working with powered electrical devices, the inteliLIGHT® components and associated equipment may be connected to or disconnected from the mains voltage only by personnel who are qualified according to the local safety regulations and who are authorized and appointed by the customer.

- Follow all the warnings and instructions on the products.
- The inteliLIGHT® components and associated equipment are to be installed, serviced and repaired by qualified and authorized personnel only. Make sure that only authorized personnel have access to powered inteliLIGHT® components.
- Calibration, maintenance and repairing the equipment while it's still connected to power are strictly forbidden. Capacitors may even still be charged after all voltage sources have been interrupted. Connection points can also carry dangerous voltage, use extreme care even after powering off the device.
- Electrical circuit boards may only be serviced, repaired and calibrated by Flashnet authorized personnel. Do not attempt to service these products yourself. Components carrying hazardous voltage become accessible after opening the housing of an inteliLIGHT® unit and associated equipment.
- Make sure that only fuses of proper type and rating are used. Using repaired fuses or short-circuiting the fuse holder is not allowed!
- Avoid using inteliLIGHT® components nearby any liquid and never spill liquids on them.
- Do not place inteliLIGHT® components on an unstable cart, stand or table. Avoid falling of the components and of any other mechanical shocks.
- Product case's slots and openings are provided for ventilation. To ensure reliable operation of the products and to protect them from overheating, these openings must not be blocked or covered. Avoid placing the products on a bed, sofa, rug, or similar surfaces.
- Unplug inteliLIGHT® components from the power mains immediately and refer to the Flashnet representative if any of the following situations are observed:
    - When the power cord or plug is damaged or frayed.
    - If any liquid has been spilled onto the product.
    - If the circuit board or the product itself have been exposed to rain or water.
- In case of fire in electrical equipment use CO2 fire extinguishers only. Never use water or powder to extinguish burning electrical equipment.

2.8.3 Cleaning

In general cleaning of inteliLIGHT® tangible products is not mandatory. If for any reason, the devices need to be cleaned, do not use liquid or aerosol cleaners and use damp cloth.

FRE-220-NEMA, FRE-220-ZHAGA, FRE-220-P StreetLight Control End Nodes have durable casing, with dust and water-resistant design.

FRE-220-M StreetLight Control End Nodes does not have water resistant design and are to be embedded in streetlights.

FRCM Lighting Panel Control and Monitoring Units have durable casing, are not dust and water resistant and are to be installed in power supply cabinets / feeder pillars / lighting panels.

	Prior the cleaning, power must be shut off and non water resistant inteliLIGHT® devices needs to be disconnected! Due to certain electric components, connection points may carry dangerous voltage even after shutting down the mains power.

2.8.4 Disposal

Old electrical and electronic equipment marked with this symbol can contain substances hazardous to human beings and the environment. Never dispose these items together with unsorted municipal waste (household waste).

In order to protect the environment and ensure the correct recycling of old equipment as well as the reutilization of individual components, use either public collection or private collection, follow local laws and regulations.

2.9 Unboxing

inteliLIGHT® StreetLight Control End Nodes and FRCM Lighting Panel Control and Monitoring Units are shipped in cardboard boxes. Inspect packaging immediately upon receipt of goods for evidence of damage during transport. If the package is severely damaged or water stained, request that the carrier's agent be present when opening. Save the packaging for further use.

After unpacking, inspect it thoroughly for hidden damage and loose components or fittings.

	To avoid electric shock, do not apply power to the system if there is any sign of shipping damage to any part of the outer cover.
	Observe precautions for handling, electrostatic sensitive device!
	If the contents are incomplete, if there is mechanical damage or defect, or if the system does not work properly, notify Flashnet Sales Department at sales@flashnet.ro.

2.10 Contact Information

Information on inteliLIGHT® may be obtained via the following sources:

SC Flashnet SA
Address: No. 4A, Fundatura Harmanului Street, Brasov, 500240, Romania
Phone: +40(0)268-333-766
Fax: +40(0)268-334-331
Email: info@flashnet.ro
Web: www.flashnet.ro, www.intelilight.eu

For any additional information, troubleshooting or problems that are not covered by this manual, please contact Flashnet Support Department at support@flashnet.ro.

2.11 Revision History

Date	Version	Author	Description
August 8, 2015	1.0	Tudor Iacobescu, Ovidiu Vrabie, Marius Popescu	1st edition
…			
April 8, 2021	2.0	Ovidiu Vrabie	2nd edition
February 8, 2022	2.2	Ovidiu Vrabie, Ciprian Botezatu	Update inteliLIGHT® Mobile App (CMSv3)

2.12 Scope

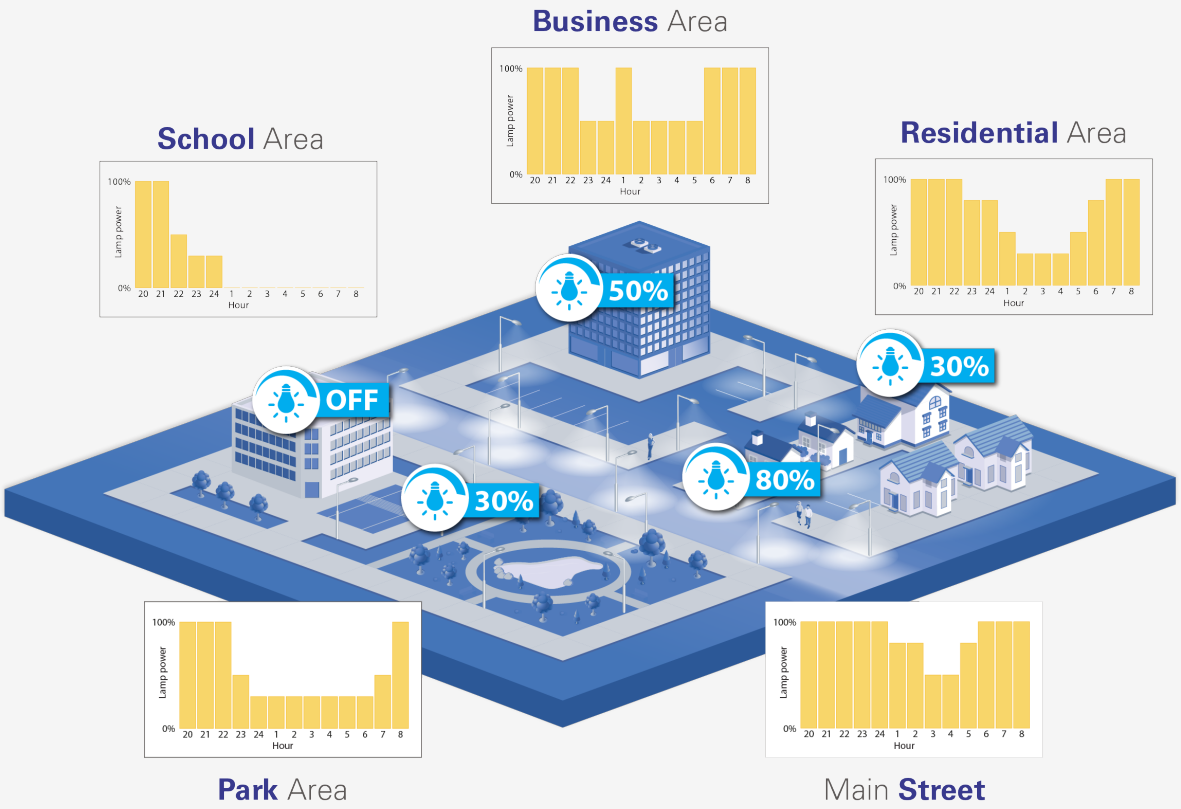
This manual, part of inteliLIGHT® Deployment Manual series, addressed to system integrators, describes how to deploy inteliLIGHT® FRE-220 StreetLight Control End Node(s), including different communication technologies as LoRaWAN™, Sigfox, NB-IoT, LTE Cat M1, GSM and form factors as FRE-220-NEMA, FRE-220-M, FRE-220-P and FRCM Lighting Panel Control and Monitoring Unit(s). Named devices are also called end nodes, modules, sensors or controllers. FREs are to be installed on or embedded in streetlights, FRCMs in power supply cabinets / feeder pillars / lighting panels.

Each inteliLIGHT® deployment is unique. Before deploying software and/or hardware elements we recommend preparing a **deployment plan** with deadlines, in order to determine the optimum use of components, to maximize range, coverage, network performance and to minimize deployment costs. Already existing documents as site survey questionnaire, system architecture, hardware brochures, technical drawings, wiring diagrams, permissions, local laws and regulations may give a good starting point.

3. System Overview

inteliLIGHT® is a street lighting remote control management system that offers detailed, individual lamp control of every fixture in the city. Up to 85% energy savings can be achieved through **dimming** and **smart**

scheduling. Additionally, **real-time grid monitoring** and **advanced maintenance and optimization tools** can further cut operational costs with up to 42%. inteliLIGHT® is a turn-key solution, easy to implement, without additional infrastructure investments or extensive civil works and starts saving money immediately after first controllers are installed.



Communication Technology Agnostic

To make sure that the system is flexible and adaptable to any customer and specific project conditions, we have adapted inteliLIGHT® controllers to use several IoT communication technologies: LonWorks® PLC, LoRaWAN™, NB-IoT, Sigfox, GSM, using one open communications protocol or combine them in hybrid implementations to meet the project's needs. This generates unprecedented implementation options, but also allows lightning-fast deployments and commissioning in case of existing public network coverage.

Grid Awareness

inteliLIGHT® provides in-depth grid awareness and real-time feedback of any change occurring along the grid, together with detailed electrical parameters: Wh, VARh, V, W, A, VAR, PF and frequency. Raw data is transformed into actionable information through a system of advanced reports and automatic notifications.

Autonomous Operation & Smart Scheduling

Street lighting fixtures operate autonomously using smart scheduling algorithms based on astronomical calendar, photoelectric or motion detectors. Furthermore, in order to cover specific events or lighting requirements, the system supports time-limited scheduled overrides of the initial lighting program and even real-time operator commands. Furthermore, if the communication fails for any reason, the inteliLIGHT® controllers are smart enough to continue operating the lamps autonomously, while trying to reestablish a live connection.

ON/OFF Remote Control

Any kind of streetlight or connected device up to 400W can be controlled using inteliLIGHT®: lamps with electronic or electromagnetic ballasts, architectural lighting fixtures and even other unrelated devices. The software allows individual or grouped control, manually or based on smart schedules.

Dimming the Streetlights

inteliLIGHT® controllers allow dimming for any LED streetlight using 0-10 or DALI control interface. Whenever pedestrian traffic decreases, dimming the lights is a way to reduce energy consumption and increase lamp lifetime. You will not only save money, but also reduce light pollution and CO2 emissions.

Reporting & Maintenance Scheduling

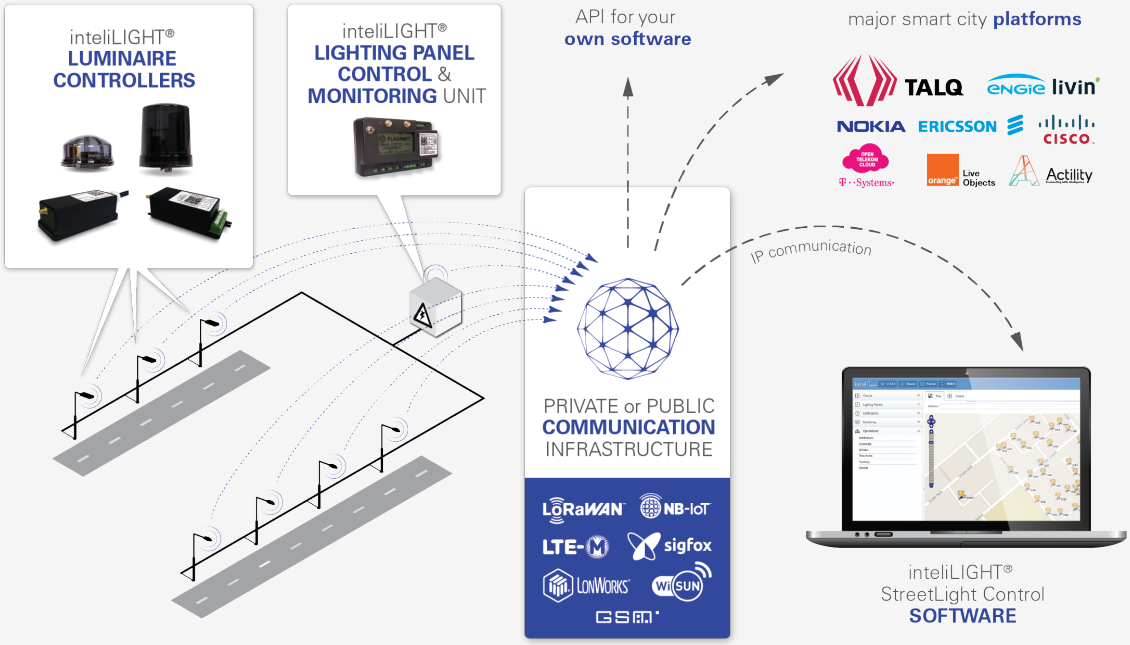
The inteliLIGHT® servers receive, prioritize and compile information from all over the lighting grid. inteliLIGHT® Streetlight Control Software offers advanced analytic tools, failure reporting, customizable maintenance planning and spare parts management tools to improve lighting uptime and street lighting overall satisfaction.

Smart City Platform

With inteliLIGHT®, it is now easier than ever to integrate hardware and software from different suppliers, using different equipment and communication technologies into the same street lighting CMS (Central Management System).

Also, it creates the possibility to integrate unrelated sensors and systems, leading to unique central management of combined utilities and smart city synergies. Besides managing city-specific sensors and IoT devices, the inteliLIGHT® Software allows API integrations with most major smart city management platforms.

3.1 System Architecture



3.2 User Side **Hardware** Components

3.2.1 **FRE-220-NEMA** luminaire controller

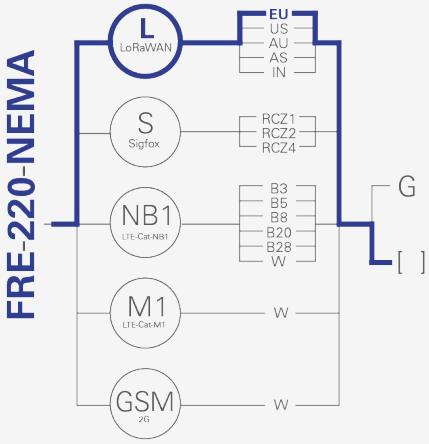
- **NEMA socket** connected (ANSI C136.41).
- Enables **individual remote management** of streetlight lamps with electronic driver up to 400W (ON/ OFF/ Dimming).
- Specially designed and **optimized for LPWA networks**.
- **Autonomous operation** based on predefined schedules, light level sensor and adaptive lighting.
- **Adaptive lighting** capabilities based on digital input for motion sensing.
- **Bandwidth efficient** with minimal communication requirements.
- **Dedicated high-security memory** for encryption keys storage.
- Wide range of **electrical parameters monitoring**: V, W, A, VAR, Wh, VARh and PF.
- **Advanced data synchronization** and notification mechanism.
- **Battery operated RTC**, protected against unforeseen communication failure.
- **External infrared interface** for local configuration.
- Integrated **light level sensor**.
- **Over the Air** (OTA) firmware update.
- Designed **lifetime: 10+ years**.

	FRE-220-NEMA
Lamp Type	LED, CF, HID with electronic driver
Maximum lamp power	400W (optional up to 750W) *
Functions / Operation mode	ON / OFF / Dimming
Dimming range	1%-100% (depending on lamp control gear)
Control interface	0-10V/ 1-10V, DALI
Power supply	85- 260VAC / 50Hz-60Hz
External interface	infrared
Available connectivity options	LoRaWAN, Sigfox, NB-IoT (LTE-Cat-NB1), NB-IoT (fallback 2G),LTE-M (LTE-Cat-M1), GSM (2G)
Internet protocol version	IPv4/IPv6 (only for cellular communication technologies)
Inter-node mesh communication	Optionally available, with motion sensor add-on
Last gasp	Optional (only for LoRaWAN)
Firmware update	IR (infrared) / OTA (over the air)
GPS	Optional
Security	Encrypted communication based on security keys
Surge protection	10kA
Internal scheduling memory	128 events (daily / weekdays / weekends / fixed date /exceptions)
Average power consumption	0.5W
Maximum power consumption	2W
Precision Real Time Clock (RTC)	Battery operated
Real-time lamp operation	Yes
Digital input	1x dry contact (for PIR sensor, photocell sensor, open doorsensor etc.)
IP rating	IP66
Operating temperature range	-25°C to +65°C
Weight	220 ± 5 g
Dimensions (diameter x height)	83 x 77.5 mm
Mounting	7pin NEMA socket (ANSI C136.41)
Compliant standards	CE, RoHS, EN 61000-3-2(2014), EN 61547(2009), EN 60068-2-1(2007), EN 60068-2-2(2007), Prequalified according to ETSI EN 300 220
Certifications	CE, FCC- in progress

* The controller can be used for luminaires over 750W together with an external contactor, and with limited functionalities (no dimming, no measurements).

Product codes:

Communication technology	Regional setting	includes GPS



4. Communication, Network and Application Server Setup

Controllers are preset, added to the FC, the Network and Application Server operated by inteliLIGHT® and are ready for operation upon delivery, except for special cases. Setup of inteliLIGHT® network and application Server is done by Flashnet Support Department.

For any additional information, troubleshooting or problems that are not covered by this manual, contact Flashnet Support Department at **support@flashnet.ro**.

5. Hardware Setup

5.1 Before Beginning the Installation

Before begin installation check the following:

- Ensure that a deployment plan has been prepared
- Make sure that the network is operational and supports the planned number of end nodes to be installed
- Make certain that you have access link and login credentials, username and password to inteliLIGHT® StreetLight Control software
- Become familiar with hardware components.

5.2 Manpower, Materials and Equipment

To install one of inteliLIGHT® FRE-220 StreetLight Control End Node with no claim of being exhaustive you will need:

	Quantity	FRE-220-NEMA
Manpower		
electrician at each installation team	1 person	✓
boom lift (truck) operator	1 person	✓
Tools		
multimeter	1 pc	✓

	Quantity	FRE-220-NEMA
probe voltage tester/screwdriver	1 pc	✓
insulated cross screwdriver set	1 set	✗
insulated straight screwdriver set	1 set	✗
plier set	1 set	✗
tubular wrench set	1 set	✗
crimping tool	1 pc	✗
cordless drill	1 pc	✗
metal drill bit of 18 mm	1 pc	✗

Electric and other materials

electric cable	NA	✗
terminal strip of 3mm for 6+6 connections	1 pc	✗
flexible cable protection tube	50 cm	✗
cable gland of 18/14 mm	1 pc	✗
crimp terminal connectors	6 pc	✗

Other equipment

boom lift truck	1 pc	✓
Android handheld device (smartphone) for controller registration	1 pc	✓

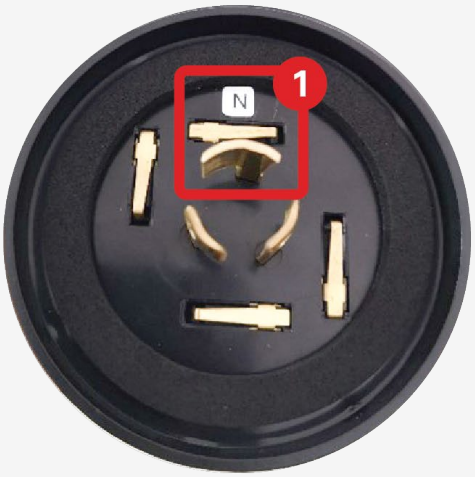
5.3 Physical Installation

	Power must be turned off prior to installing any type of inteliLIGHT® device!
	Radio antennas must always be positioned upwards!
	There should be no obstruction preventing natural light from reaching the ambient light sensor (photocell). Notification applicable to devices with inbuilt light sensor only!

5.3.1 FRE-220-NEMA

NEMA sockets are **twist** and **lock** connectors (ANSI C136.41 standard). To install, you need to correctly match the controller pins into the lamp socket (usually located on the top of the streetlight):

1. Identify controller's **North pin (1)**, which is slightly larger than the other pins and is marked with a "**N**" label
2. Identify the lamp socket's **North pinhole (3)**, right under **North sign** (N, NORTH, ▲ etc.) **(2)**
3. Place the controller with its **North pin** matching lamp's **North pinhole** and twist to the right.



NEMA controller base

NEMA lamp socket (example)

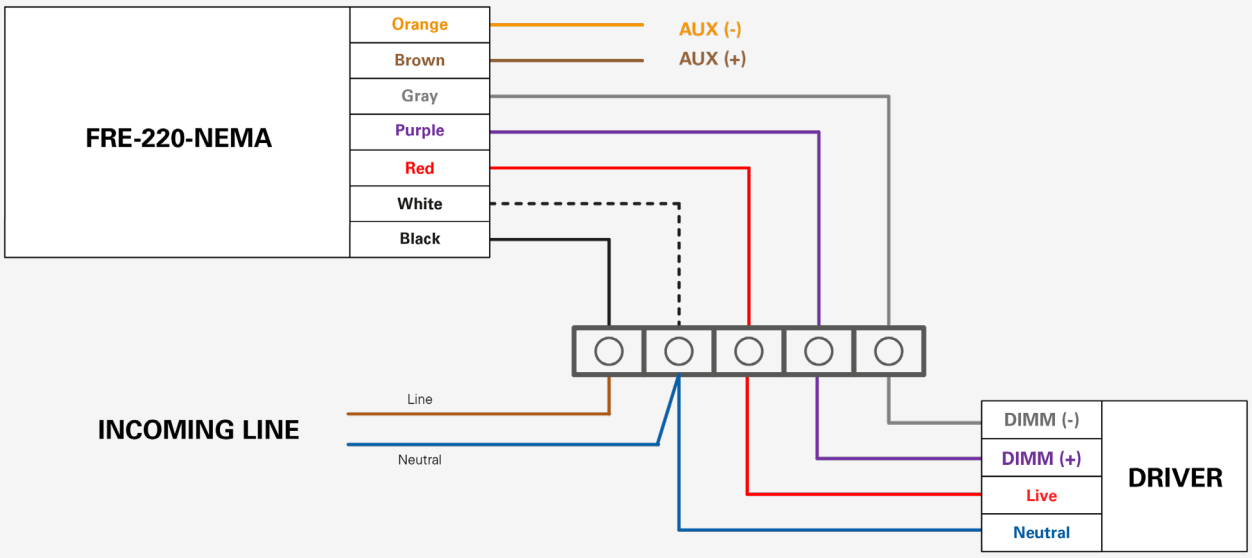
5.4 Electrical Connections

Power must be turned off prior to installing any type of inteliLIGHT® device!

5.4.1 FRE-220-NEMA

System integrators should not deal with electrical connections, as the casing of FRE-220-NEMA is NEMA 7 pin type with twist lock (ANSI C136.41 standard).

Streetlight manufacturers may follow the below instructions, to connect NEMA 7 pin sockets to LED drivers:



6. Commissioning Devices/ Enrollment

The process of commissioning devices is called enrollment in **inteliLIGHT® StreetLight Control (**CMSv3**).** It consists in assigning GPS coordinates and creating **Pinpoints** for visualization on the map and thus activating controllers and system functionalities.

Enrollment can be achieved with:

1. inteliLIGHT® StreetLight Control **(**CMSv3) desktop application:
   - Bulk **Automatic Provisioning** for all GPS equipped controllers**.**
   - Individually by adding the controller directly **on the map interface**.

2. inteliLIGHT® Mobile App, on-site for each individual controller:
   - By **scanning controller's QR Code** or **searching its EUID code**.
   - By **adding it on the map interface**.

i	**Note**: in order to transmit data or follow commands, controllers need to be properly installed on the streetlamps and the communications infrastructure must be correctly configured and operate in normal parameters.
i	**Note:** for the controllers to work properly, they need to be constantly powered, otherwise they will not be able to communicate with the software and an offline error will appear.

6.1 Adding objects to inventory

> **Note**: in order to enroll devices, they first need to be added to inventory.

Usually, controllers are automatically added in inventory upon product delivery, having some parameters already configured by our Technical Support department, according to product features and information provided by the customer during the pre-sale process (by filling the **inteliLIGHT® setup questionnaire**, for example):

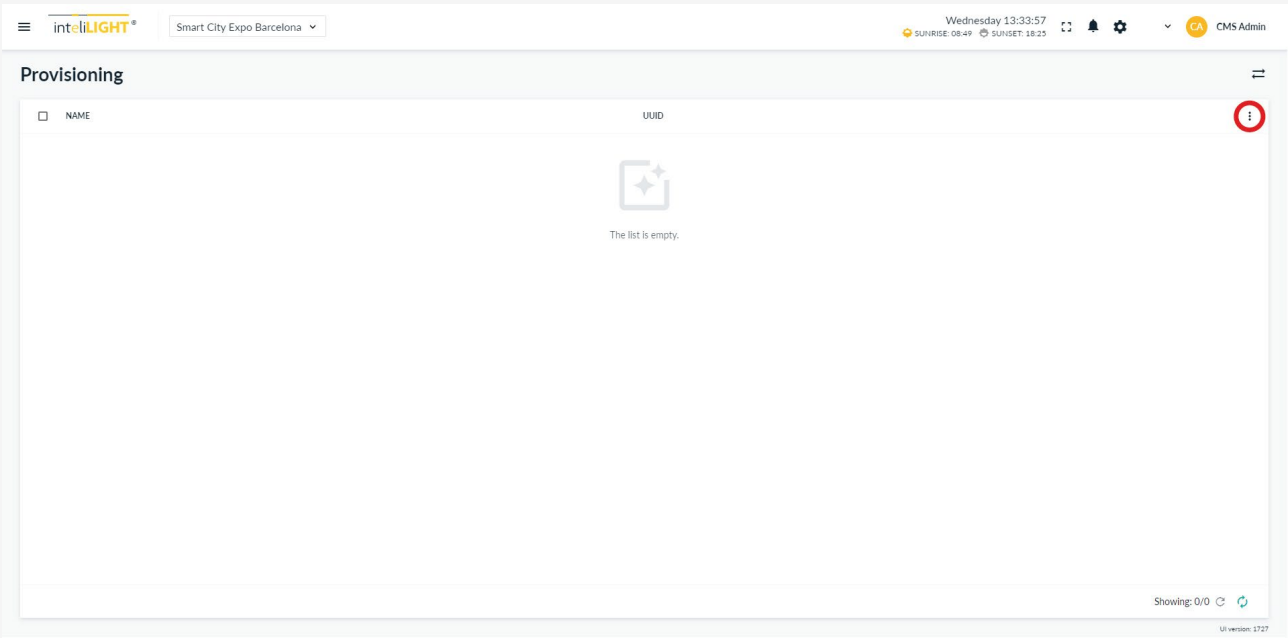
- **Area** (city, neighborhood etc.)
- **Controller type** (NEMA, Zhaga, pole mounted, embedded)
- **EUID**, controller unique ID
- **IMSI**, **IMEI** and other communication specific IDs

> **Note**: controllers that do not appear in inventory, need to be imported or added manually in inteliLIGHT® StreetLight Control desktop application in **Inventory** section.

6.2 Automatic Provisioning (desktop app)

It is the process of automatically creating corresponding **Pinpoints** for GPS equipped street lighting controllers or for other objects in inventory with correct GPS coordinates associated to them.

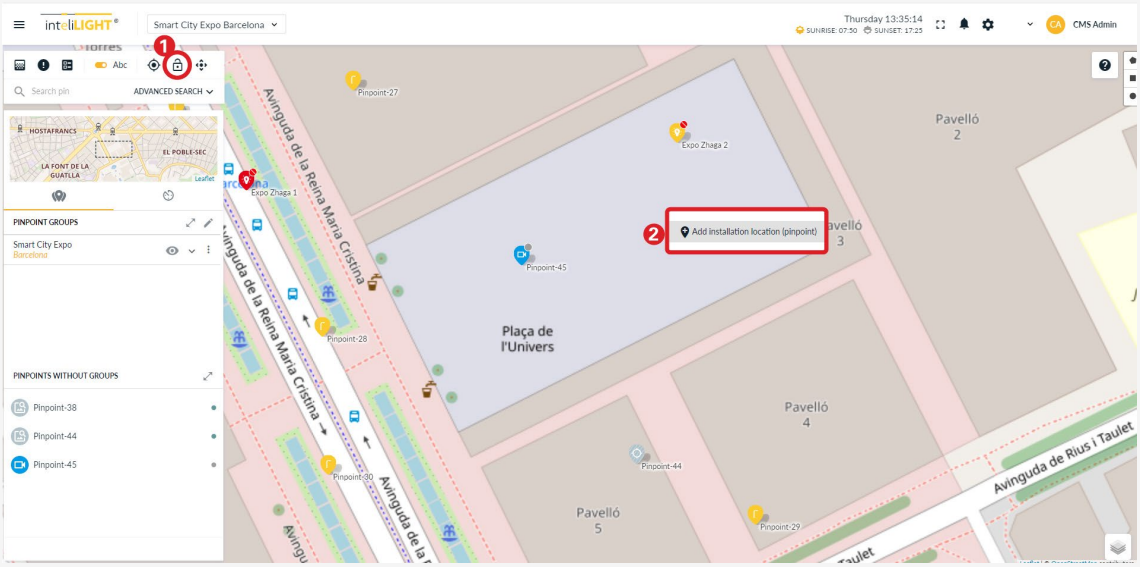
- Go to **Main Menu** / **inteliLIGHT** / **Automatic provisioning** /
- Select the controllers that need to be provisioned by clicking on the corresponding checkbox ☐
- Click options icon ⋮ "**Options**" icon in the top-right corner of the **Page content area** and select "Import objects from TALQ"
- After a few seconds all devices will be **displayed on the map**.



6.3 Enrollment on the **map interface** (desktop app)

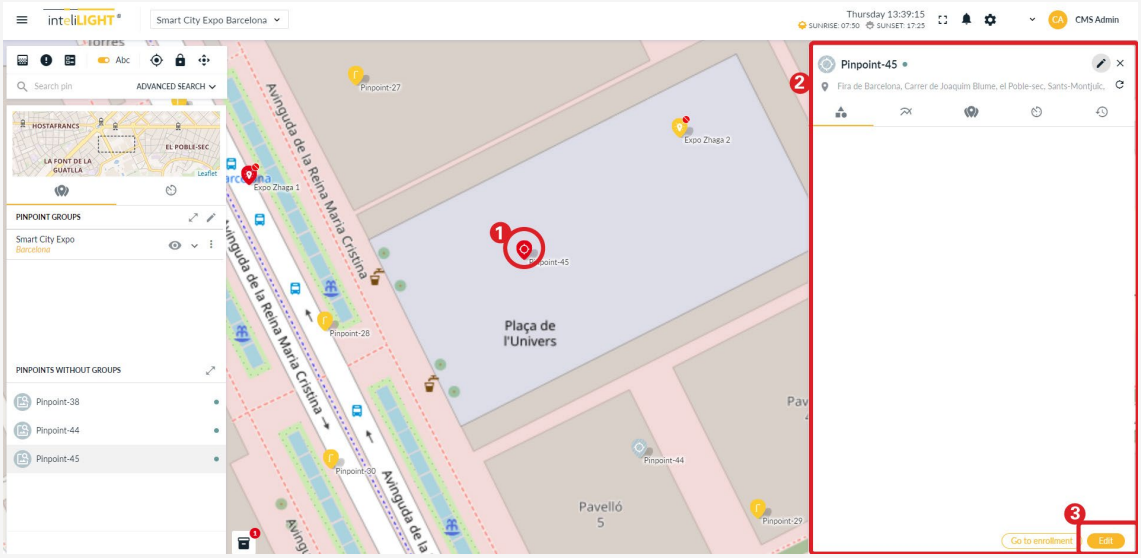
6.3.1 Add pinpoints on the map interface:

- Unlock the map by clicking "Click to Unlock" icon from **Map Controls (1).**
- **RIGHT CLICK** on the map, where you want the pinpoint to be positioned and choose "Add installation Location (pinpoint)" in the popup menu that will appear **(2)**.
- If position needs to be adjusted, after selecting the pinpoint with **LEFT CLICK**, while pressing **CTRL** key you can **DRAG** the pinpoint in the desired position.
- Lock the map by clicking "Click to Lock" icon from **Map Controls (1)**.



6.3.2 Add devices to a pinpoint

- Select the pinpoint on the map **(1)** and the pinpoint's **Details popup** will appear in the right **(2)**.
- Click " Edit " button **(3)**, bottom right, and an "**Edit items enrollment for Pinpoint**" popup will appear, containing a table with all devices in the inventory, not yet enrolled.
- Select the item you want to add to that pinpoint, by clicking + "Add item" icon, in the right end of the corresponding row.
- Click " Save " button.



Keyboard shortcuts to manage pinpoints on the map:

- RIGHT CLICK on map to **ADD** a pinpoint
- CTRL (while pressed) + LEFT CLICK to **DRAG** an existing one
- LEFT CLICK on pinpoint adds item to **multi-selection**
- RIGHT CLICK on any pinpoint to **group selected**
- CHOOSE DRAWN ING TOOL from top right side of the screen and draw **area for multi-selection**
- CTRL + RIGHT CLICK to **DELETE** a pinpoint

6.4 Commissioning devices with inteliLIGHT® Mobile Application

6.4.1 Requirements for installation

1. A valid inteliLIGHT® StreetLight Control (CMSv3) **user account**. The account can be automatically generated upon product delivery or may be requested later from Flashnet's Technical Support department at support@flashnet.ro.

> **Note**: An admin account can create new users and manage their roles inside inteliLIGHT® StreetLight Control (CMSv3) desktop application in "Administration" section.

2. A **mobile device** (smartphone/ tablet) with:
   - at least Android 8 operating system
   - GPS sensor
   - internet connection
   - camera for scanning QR codes

> **Note**: It is recommended to use a security apps to protect the smartphones/ tablets.

3. The inteliLIGHT® Mobile App .**apk file**.

6.4.2 Installing the app

1. Download inteliLIGHT® Mobile App on your device from ….. or request it from our Technical Support department at support@flashnet.ro.
2. Install inteliLIGHT® Mobile App by tapping the downloaded .apk file. It can usually be found in smartphone's "Downloads" folder or, for newer Android versions, under "File manager > Installation files".

6.4.3 Getting Access

1. Open the application by tapping inteliLIGHT® Mobile App icon. It can usually be found in "Applications" screen, but you can also create a shortcut icon for a "Home screen".

2. In order for the application to properly work, it must be allowed to access camera (to scan QR codes), location (to correctly identify GPS coordinate) and files (to load application files). The first time the inteliLIGHT® Mobile App will be opened, you will be prompted to allow access.

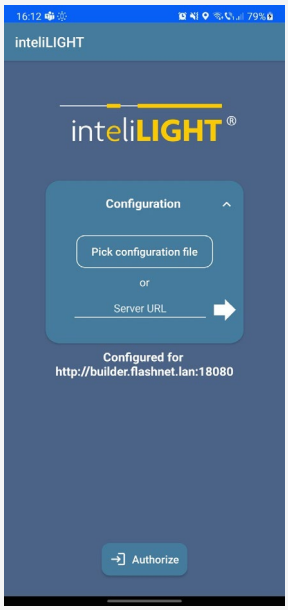
Note: Before logging in to the inteliLIGHT® Mobile App you have to make sure that you have valid credentials. Without a valid username and password, you won't be able to access the application.

3. The first page displayed after opening the application is the "Configuration" page. Here, the user needs to specify the **server URL** and then tap ➡ "Connect to server" icon.

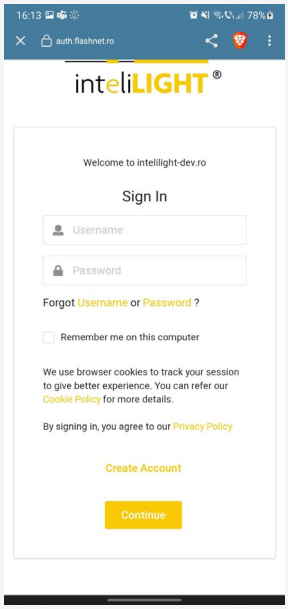
   The server URL is the web address where inteliLIGHT® StreetLight Control web application is accessed, and it is agreed with the customer during the pre-sale process. It can have a "**customer-name.flashnet.ro**" syntax, or it can be customized according to customer's preferences: "**customer.com**". If not sure which exactly it is, please contact our Technical Support department at support@flashnet.ro.

4. Alternatively, server configuration can be achieved by uploading a configuration file, by tapping "Pick configuration file" button. The file can be provided by our Technical Support department.

5. Tap → "**Authorize**" button in the bottom part of the screen, which will redirect to the "Sign in" page.



6. Fill in the credentials provided by Flashnet's Technical Support department and tap "Continue".



6.4.4 Understanding the interface

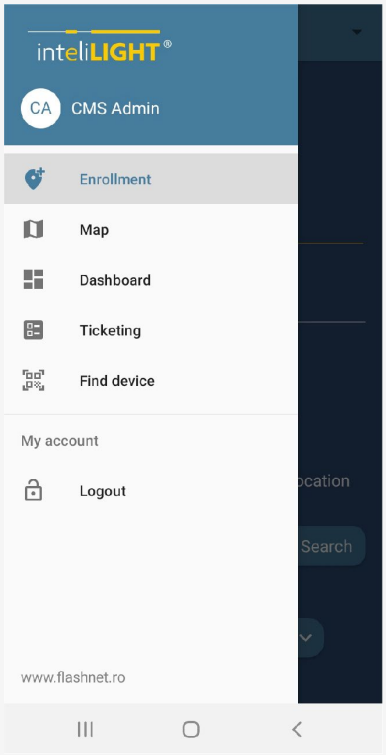
Header bar

It is the top, sticky bar that includes:

- ☰ inteliLIGHT® Mobile App - menu
- inteliLIGHT® logo
- ▾ Area selection dropdown

Menu

Tapping the menu icon in the header bar, in the top left area of the screen, opens a slide menu containing the following sections:

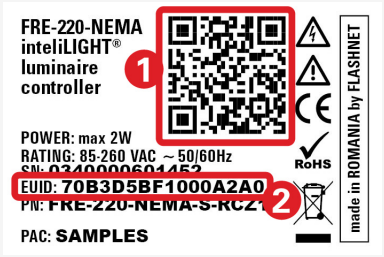


- Enrollment – allows the user to enroll new devices by scanning the product QR code, edit or delete existing enrolled devices
- Map – allows the user to view and edit all the pinpoints in a 500m radius of their GPS location
- Dashboard – provides access to system analytics: Energy savings, Device state, Dimming status, Ticketing severity and Tickets status
- Ticketing – allows the user to manage tickets and maintenance activities

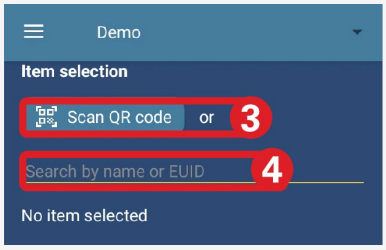
- Find device – allows maintenance staff to identify on-site enrolled devices by scanning the QR code
- Logout
- By taping anywhere outside the sliding menu closes the menu.

6.4.5 Scan QR code

inteliLIGHT® Mobile App can identify inteliLIGHT® luminaire controllers by scanning their unique QR code, printed on the controller's label **(1)**:



To scan a controller QR code, go to: Menu / Enrollment.

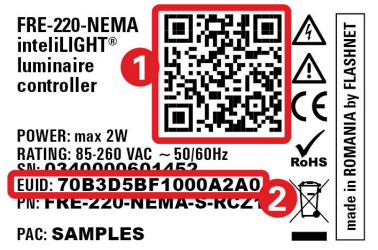


- Tap " Scan QR code " button **(3)** and point the camera towards the QR code. If the controller is already added to inventory, it will retrieve its name and EUID.

6.4.6 Search a controller

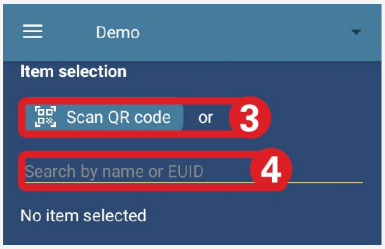
Alternatively, you can select the device by searching its **name** or **EUID**:

- The controller's name is assigned in the process of adding to the inventory and is usually customized according to customer preferences.
- The EUID is the product's unique ID code, assigned by Flashnet in the manufacturing process and it cannot be changed **(2)**.



To search a controller by its name or EUID, go to: ☰ Menu / Enrollment.

- Tap the search field **(4)** and writing at least 4 characters of controller's name or of its EUID.



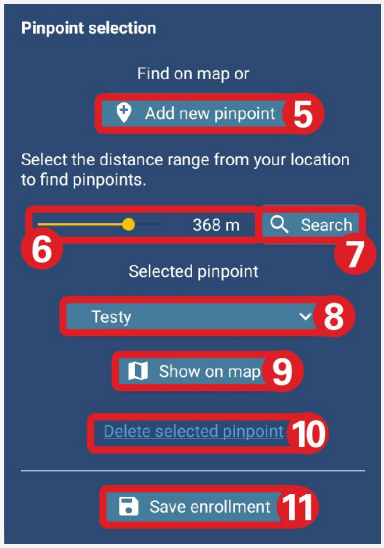
6.4.7 Edit controller info

Once the controller is identified either by **scanning the QR code** or by **searching its EUID** in ☰ Menu / Enrollment screen, new options will become available:

- " Edit " – where you can change controller's name and, if applicable, its IMSI and IMEI codes
- " Gallery " – where you can add a picture, taken right there, on the spot.

6.4.8 Assign a Pinpoint

After the controller has been selected, either by **scanning the QR code** or by **searching its EUID**, you can assign either an **existing pinpoint** or **create a new pinpoint** on the spot.



Create a new Pinpoint

To create a new Pinpoint:

- tap " Add new pinpoint " **(5)** and it will take you to a new Pinpoint's detail screen:

- The address and GPS coordinates will be pre-filled for your position.

Note: inteliLIGHT® Mobile Application registers GPS coordinates at the scan location.

- Fill in Pinpoint's name and description and tap " Save " button, in the bottom, right part of the screen.
- After saving you will be returned to the Enrollment screen, this time, with the newly created pinpoint already selected **(8)**.

Assign an existing pinpoint

Alternatively, you can also, choose an existing pinpoint:

- Tap "Selected pinpoint" dropdown **(8)** and choose the existing pinpoint you want to assign.

Note: if the selected controller has already been assigned a pinpoint " Add new pinpoint " **(5)** and " Selected pinpoint " dropdown **(8)** will be grayed out the bottom " Save enrollment " button will be replaced with a " Delete enrollment " button.

To view the pinpoint on the map:

- Tap " Show on map " button **(9)** and, if needed, you can adjust its map position by long tapping the pinpoint (holding it down for 2 seconds) and dragging it to the desired position. To return to Enrollment screen, tap back.
- By default, the map displays pinpoints on a radius of 500 meters around your position. You can adjust the radius, between 0 and 500 meters, by dragging the slider **(6)** and then tapping " Search " button **(7)**.
- If needed, you can **Delete selected pinpoint** **(10)**, but first, you need to make sure that respective pinpoint has no assigned devices.

To finish the enrollment process:

- Tap " Save enrollment " button **(11)**, in the bottom part of the screen. The button becomes visible only when both controller and pinpoint have been selected.

Delete an enrollment

When you want to break the link between a pinpoint and a controller, go to: Menu / Enrollment:

- Select that controller by either **scanning the QR code** or by **searching its EUID**.
- Tap " Delete enrollment " button at the bottom of the screen.

7. Boot Up

The last step of deployment consists of boot up and operation.

7.1 Powering Up Controllers

Power up end nodes by keeping yourself to the below safety instructions.

	Before powering up the inteliLIGHT® controller, double-check wiring, make sure that all connections are safe, properly isolated and there are no uninsulated cable ends.
	Keep in a safe distance any tools and/or metallic parts from inteliLIGHT® devices, else short circuit may happen, and dangerous voltage points may be reached. That could result in a fire or electrical shock!
	Due to certain electric components, connection points may carry dangerous voltage even after shutting down the mains power.

7.2 Visual Indicators

Check LEDs located on the end nodes to verify boot sequence (find details below).

7.2.1 FRE-220-NEMA

FRE-220-NEMA has a light sensor, a usual LED which serves as visual indicator in the middle and an IR (infrared) LED under the transparent plastic cover. Aside from the different form factor, visual indicators have to be interpreted:

1. If the LED is flashing **green** – boot sequence complete, hardware checked, but communication is not established yet with the network
2. If the LED is permanently **green** – boot sequence complete, hardware checked, and communication is established with the network
3. If the LED flashes **orange** three times – boot sequence complete, hardware checked, and the controller is operating in light sensor based automatic operation mode
4. If LED is permanently **red** – there is a hardware error; begin replacement/warranty procedures

8. Operation

For detailed operation instructions study inteliLIGHT® StreetLight Control (CMSv3) software manual.

	Acquire inteliLIGHT® StreetLight Control software manual, by contacting Flashnet Support Department at **support@flashnet.ro**.