NB-IoT NEMA SLC-N-500-NB

Fig. 1 - NB-IoT NEMA SLC-N-500-NB

Overview

NB-IoT is a low-power WAN (LPWAN) communication technology with promising prospects. It has been widely used in various fields of the Internet of Things. It can be seen that the NB-IoT communication module occupies an important position in the Internet of Things industry.

NB-IoT NEMA Smart Light Controller (SLC) as shown in **Fig. 1** is a remote- control device for HID or LED luminaires equipped with ANSI C136.41 NEMA receptacle. The controller connects with a cellular NB-IoT network directly. This in turn connects with the remote management platform for management and control as shown in **Fig. 2**. The controller is exceptionally suitable for various terrains and environments and comes with built-in tilt sensor and Global Positioning System (GPS).

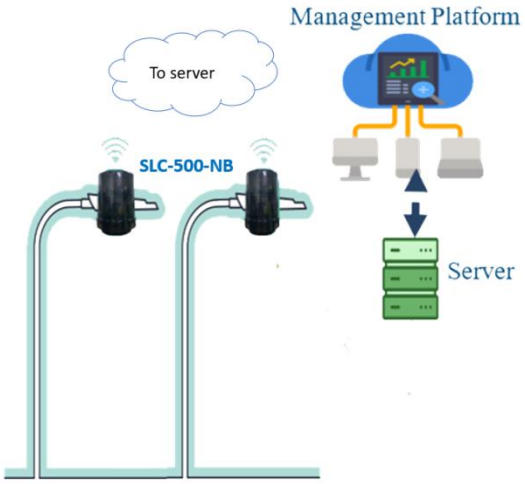


Fig. 2 – Smart Street Light Implementation

Features

- NEMA interface, compatible with standard ANSI C136.41
- Built-in standard NB-IoT communication module to realize long-distance transmission, low-power operation, large-capacity networking, and high-reliability communication
- Connects to supporting cellular networks and supports remote control such as on/off, dimming, status monitoring of the streetlight etc.
- Built-in electric energy metering chip with 1% accuracy
- Built-in with tilt sensor to detect the uprightness of lamp post
- Built-in GPS positioning chip for auto-mapping of streetlight positioning
- Built-in light sensor for environment-based turning on/off of streetlights based on brightness level
- Built-in RTC for onboard scheduled dimming
- Monitored parameters includes voltage, power, current, energy consumption, power factor, temperature and frequency, etc.
- Option for built-in real-time clock, can store device energy consumption data per day
- Service life- > 5 years

Electrical & Hardware Parameters

Input Voltage	110Vac~277VAC	Short Circuit Protection	No
Rated Voltage	230VAC	Over-Temperature Protection	Yes
Operating Voltage	105- 440 VAC (support for standard voltage 120V~ 277V and high voltage 120V ~480V	Housing Material	Polycarbonate
Power Frequency	47Hz to 63Hz	IP Protection	IP66
Maximum Output Power	500W	MTBF	>200K hours
Output Power	Class 5 (Typ. 21dbm)	Receiving Sensitivity	-135 dBm
Maximum Load Current	4A	Operating Temperature	-40℃ to +70℃
Standby Power Consumption	<2W	Storage Temperature	-40℃ to +85℃
NB-IoT Frequency	B2/B4/B5/B12/B13	Dimensions（L*W*H）	89mm*89mm*120mm
Dimming Output	• 0V-10V @ 27mA(max), PWM, DALI optional	Weight	0.3kg
Metering Accuracy	<1%	Maximum Ambient Temperature	80℃
ANSI standard	C136.41 NEMA 7-pin Smart City ready	Security	TLS/AES
OTA Support	Yes	Field firmware upgrades	Yes
THD	<10%	Safety Standard	CE
Tilt Sensor & GPS	Yes	Surge Protection	320J, 6KV/3KA (option for 405~440J)
Overload Protection	Yes	Electro Magnetic Compliance	EN55015, EN55022, FCC

Fault Alerts and Resulting Operations

Fault Alert	Conditions	Resulting Operations	Notes
Over Temperature	＞95℃±2℃	Reports fault alert, shutdown, recovers	NEMA SLC internal

		to pre-shutdown condition[1] @ temperature < 90℃±2℃	temperature, not environment temperature
Under Temperature	< -25℃±2℃	Reports fault alert, no shutdown, removes fault alert @ temperature > -25℃±2℃	NEMA SLC internal temperature, not environment temperature
Open Circuit (at Output)	Power < 5W±1W	Reports fault alert @ Power < 5W±1W, no shutdown, removes fault alert @ > 5W±1W	
Over Power	> 520W±5W or > 4.2A±200mA	Reports fault alert, shutdown, resets[2], then recovers。	
Over Voltage	> 285V±3V	Reports fault alert, shutdown, recovers to pre-shutdown condition @ < 280V±3V	
Under Voltage	< 95V±3V	Reports fault alert, shutdown, recovers to pre-shutdown condition @ > 100V±3V	

Note: 1. State before shutdown: Working state of the product when no alarm is generated, if the product fails at 50% dimming, it will be restored to this state after the failure is removed.

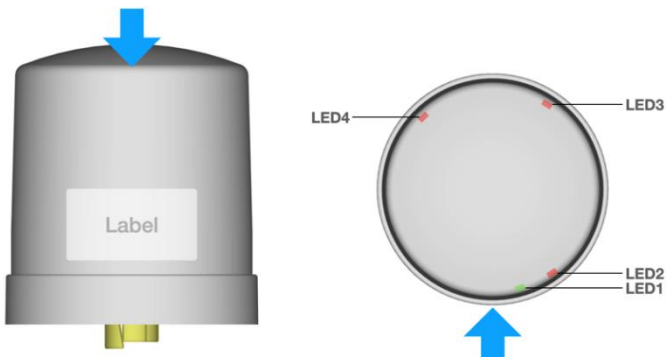
2. Restart: The product needs to be powered off and then powered on again.

3. Execution actions: All execution within 4 seconds

Smart Functions Details

Smart Function	Details
Dimming	Dimming control is carried out over NB-IoT with 0-10V output and PWM output. PWM outputs 0-100% at <2% accuracy, non-polarity
Energy Metering	Integrated with metering circuitry at 2% accuracy reading Input Voltage, Input Current, Active Power. Power Factor and Temperature. Performs electrical parameter read-back via NB-IoT.
Fault Reporting	Reports real-time fault conditions such as Open-Loop, Over-Voltage, Under-Voltage, Temperature, pole slanting etc.

LED Indications



LED	Color	Function indications

LED	Color	Function indications
LED1	Green	TX Indication, turn on 300ms when data is transmitting
LED2	Red	RX Indication, turn on 300ms when data is receiving
LED3	Red	MQTT broker server connection Indication 1, 1000ms ON/1000ms OFF: disconnected with MQTT broker server 2, 100ms ON/100ms OFF: Connected to MQTT broker server
LED4	Red	Cellular status Indication: 1, 64ms ON/800ms OFF: Unregistered network 2, 64ms ON/3000ms OFF: Registered network 3, 64ms ON/300ms OFF: Connected to TCP/HTTP network 4, OFF: Cellular not working

Dimensions

The overall dimensions of Hybrid NEMA SLC-500-HN are shown in Fig. 3.

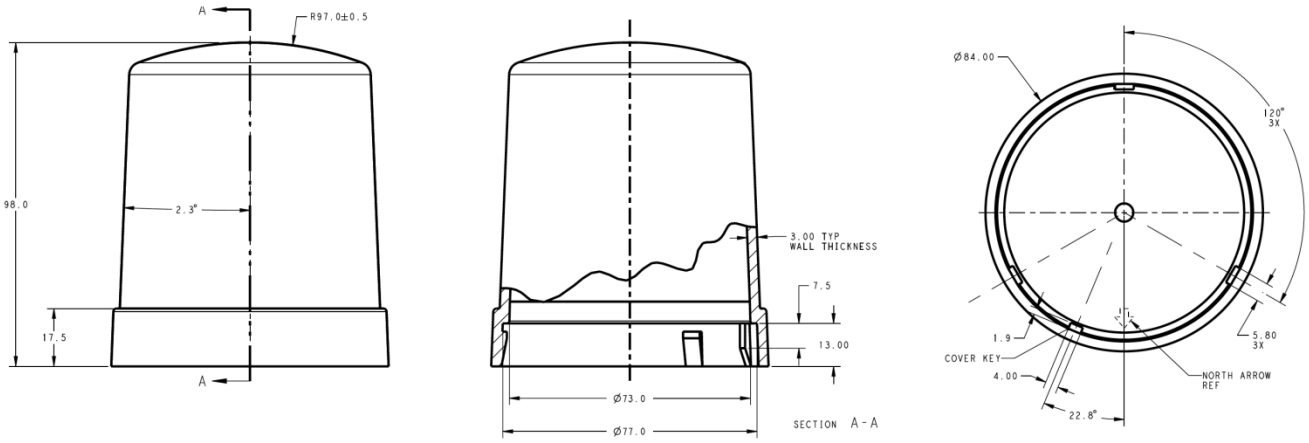
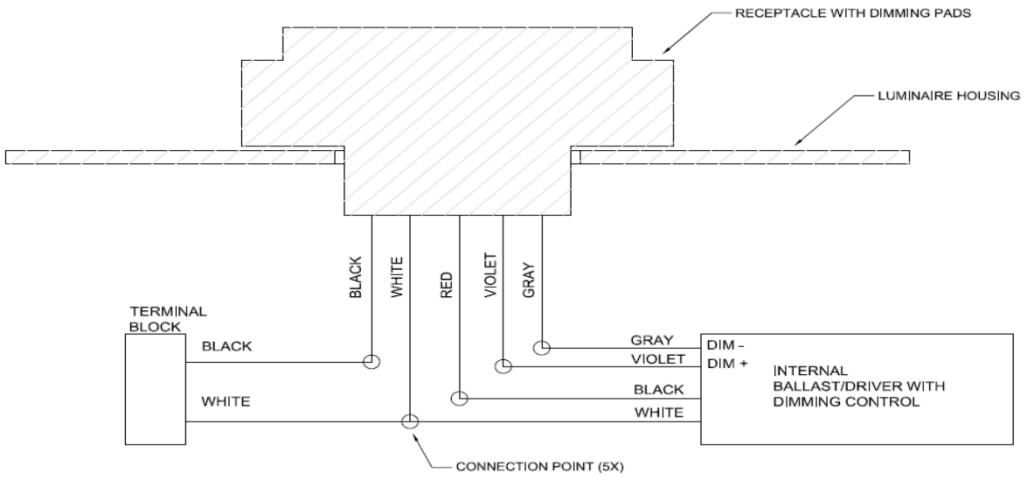


Fig. 3 - NB-IoT NEMA SLC-N-500-NB Dimensions

Wiring and Installation



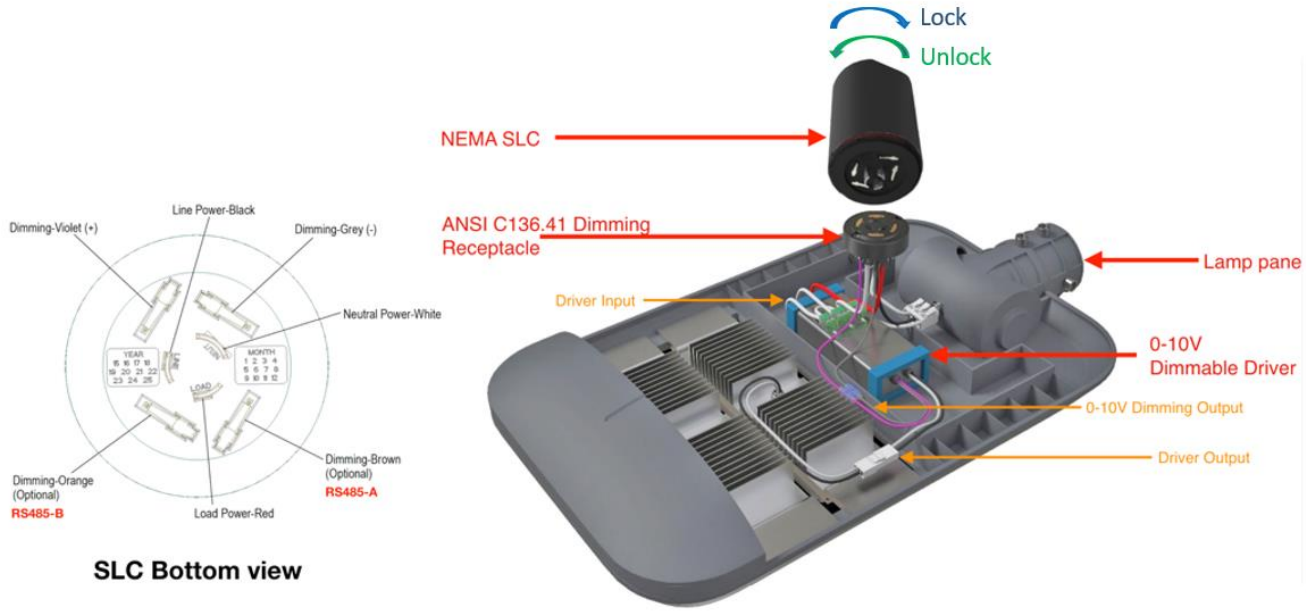


Fig. 4 – NB-IoT NEMA SLC-N-500-NB Installation Diagram

To lock the NEMA SLC onto the NEMA-enabled lamp, align the pins and mount the unit onto the NEMA adaptor in clockwise manner. To unlock, turn anti-clockwise.

Caution!

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

FCC Warning

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.

NOTE 1: 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.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Contact Information

For more information regarding the NB-IoT NEMA SLC-N-500-NB including pricing, and ordering please contact:

GridComm Pte Ltd www.gridComm-plc.com info@gridComm-plc.com