CCU Specification

CCU Mechanics

The CCU will be mounted on the lighting pole with bracket

4 core cable with one 4 pin plug is used for power cable & RS485

IP / IK Ratings Overall - IP65, IK 09 Cable plug IP67 Antenna IP54

The casing material is aluminum alloy Size = 170mm*100mm*80mm

CCU has two cable assemblies

1. The 4-pole RS-485 connector
2. Ethernet Cable to connect with Server Software Directly

The antenna is screw fixed on LCU , its packed separately during transportation

The RS485 cable can withstand a pull force of 44N.

The RS485 female Connector can withstand a push force of 25N.

CCU Electronics

The supply voltage is 9~32V DC

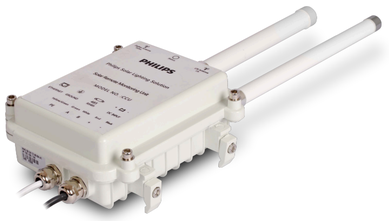
The following wires are present for both input/output:

- DC input+
- DC input -
- RS485 +
- RS485 GND

The CCU complies with 2kV/1kA surge regulation

When data send and receive, the power dissipation is lower than 1000mW

When the CCU is standby, power dissipation is lower than 500mW



CCU General Specification

The network deployment shall be such that the number of LCUs in direct communications range of the CCU is at least 4, Recommended Network size is 40 LCU's / CCU.

The ZIGBEE communication range of the CCU to LCU is 200m when the CCU antenna is placed on a pole near the top.

The CCU forms a gateway between RMS and the ZIGBEE network (segment)

The CCU encrypts/decrypts ZIGBEE messages based on a single network key

The CCU collects Solar system information from the LCU's and sends them to RMS in compressed form.

The CCU keeps track of the communication with the LCU's, and reports a failing LCU in case of LCU failure.

The CCU makes sure all LCU's receive the command by retrying the LCU's who

The protocol has provisions to control a group of lamps using ZIGBEE command Groups of LCU's can be accessed by RMS using only one command

Alarms are automatically sent to RMS

The CCU will act as time server for all the LCU's in its network, daily time synchronization.

When replace an existing CCU by a new one, RMS can transfer all relevant data to the new CCU

The CCU is able to set and retrieve the value of parameters stored in NVRAM of the LCU

CCU Connectivity

GPRS/ 2G/3G/4G SIM card

100BaseT Ethernet

IPv4 is supported

CCU Enviornment

The CCU ambient temperature range =-10°C to +65°C

non-condensing at Relative humidity 5%~95%

CCU Security

The validity of CCU will be verified before it sends any commands to CCU or communicates to RMS

CCU support the control right switch for maintain usage

Backup plan after breakdown

CCU needs to verify the validity of RMS before take commands from it

Commands from RMS are anti-replay attack

RMS Specification

Functional Specification

Track solar system running status, display all necessary value like solar panel voltage, charging current, battery voltage.

Remote data downloading and power consumption summary

Equipment management: Input, modify, delete , inquire on CCU, LCU

User management like login access control level setting, user group definition

Display/Send system warning information: Panel charging error, Battery over-voltage, battery low –voltage, luminaire failure.

Display CCU communication signal strength, status

Data backup manually or automatically

Daily log recording for System ,user, hardware

Real time adjustment automatically or manually with RTC

Check system operation status regularly, send warning message if need. User can set the checking schedule and equipment ID. And all inquired data can be saved to server.

Automatic system time synchronization. Daily, or when users log in the system User can abort the operation when the real operation takes longer than expectation

Activities status or progress is visible

RMS Security Specification

128 Bit AES Ecrypted Zigbee Communication

Mutual authentication between RMS and CCU and integrity of the transmitted information.

Advanced data management of back-end: fine-grained role based access control on data unit level

Database security with integrated encryption/decryption module

Non functional Specification

Operation system: Windows NT/2000/XP/Vista-IE6.0+/Win7,screen resolution 1024x768 or better

Software content: Menu, Commands shortcut, main user interface, Equipment list

Remote visit and management via Web

Can be upgraded remotely

If RMS is Offline, system will continue running as scheduled.

http://www.lighting.philips.com.cn
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PHILIPS

Solar LED Lighting Systems

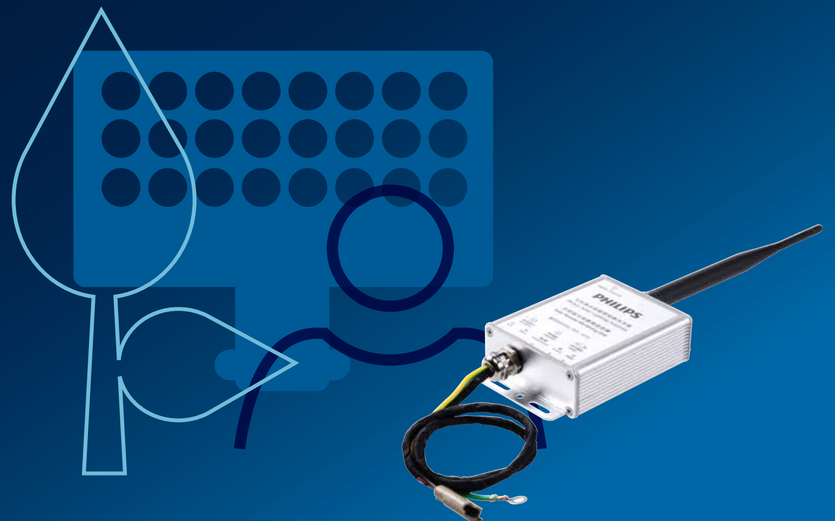
Remote Monitoring Units

Remote Monitoring Units

Make solar lighting system smart and controllable

Philips Solar Remote Monitoring Unit

Philips Solar Remote Monitoring Units (RMU) is a breakthrough solution for Off-Grid solar street lighting. It records system operation data, which can be used for energy reporting, environment and sustainable report, system state-of-the-health; RMU enables real-time remote control, updating dimming profile , remote programming and upgrading. The friendly user interface of software is easy for you to manage solar lights remotely.



RMU system function block

Solar RMU system allow users to connect with solar system data remotely and monitoring the system working status remotely.

LCU
· Data acquiring from Solar charge controller
· Send information to CCU
· Collects fault information from Solar charge controller
· Routes RF packets

CCU
It is the gateway between Field and Server.
Also Has in inbuilt LCU
Data translation/buffer · Data receiving/handover · Request acknowledge · Real time clock Encryption/decryption of RF packets Routes RF packets

RMS
· Data logging
· Data monitoring
· Data export
· User access
· Logging monitoring
· Fault detection/warning · Clock

RMU system comprises of

Lighting Control Unit (LCU)
an outdoor luminaire controller and solar information connection distribution device based on ZigBee communication, it gets data and sends commands to solar charge controller via RS485 port.

Central Control Unit (CCU)
A GRPS / 4G device that acts as communication gateway between the LCU and RMS to send/receive ZIGBEE packets

Remote Monitoring Software (RMS)
solar control software running on a server or cloud of servers it controls multiple segments through GPRS connec-tion.

Each segment is controlled by one or more CCUs, which forms the gateway to the ZigBee network based on e.g. IEEE 802.15.4. Each solar system contains an LCU which is part of this ZigBee network, and allows solar web software to read or collect solar data.

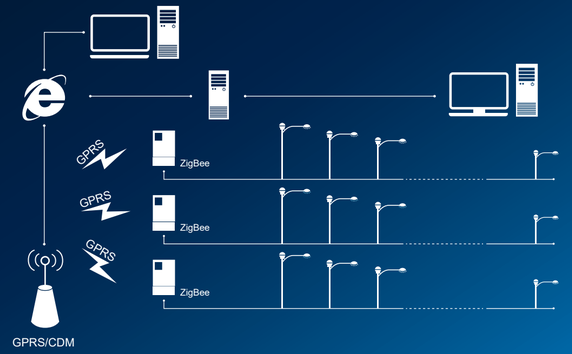
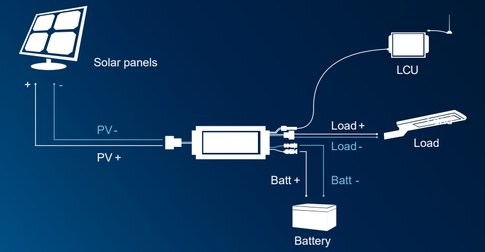


Diagram of typical solar lighting system with RMU



LCU Specification

LCU Mechanics

The LCU will be mounted on the lighting pole with bracket
4 core cables with one 4 pin plug are used for Lead wires (power cable, RS485 wires), plug&play design
IP / IK Ratings Overall - IP65, IK 09 Cable plug IP67
Antenna - IP54
The casing material is aluminum alloy,
size=65mmx85mmx25mm The antenna is screw fixed on LCU , its packed separately during transportation
The RS485 cable can withstand a pull force of 44N.
The RS485 female Connector can withstand a push force of 25N. Brackets are supplied along with LCU

LCU Electronics

The supply voltage is 9-32V DC The following wires are present:

- DC input +
- DC input -
- RS485 +
- RS485 GND

The LCU complies with 2kV/1kA surge regulation
When data send and receive, the power dissipation :
lower than 300mW LCU standby power dissipation :
lower than 200mW

LCU Software

Software interface protocol comply with Philips iMPPT Charge controller
LCU can be reset to factory settings remotely
The Dimming Profile can be cleared and set remotely
Regular logs: the solar information logging time can be adjusted from 1mins to 1hours (such as every 10mins, or 30mins)
LCU's can send their logs distributed over time The solar data read interval can be cleared and set remotely
Max ZigBee transmission distance 200m
Get solar system running status via RS485 port on solar Charge controller and feed the status back to CCU
Get Solar system components data like charging current, battery voltage, load current via RS485 port on solar Charger and feedback to CCU Send Real time information to CCU

LCU Enviornment

The CCU ambient temperature range =-10°C to +65°C non-condensing at Relative humidity 5%-95%

LCU Security

Broadcast Zigbee messages are encrypted using a network key
LCU's only take commands from registered CCU
LCU is hardware tamper-resistant
Commands from CCU are anti-replay attack