

A nighttime photograph of a city street illuminated by Philips AmpLight streetlights. The street is lined with modern buildings and trees. Pedestrians are visible on the sidewalk, and cars are parked along the street. The streetlights are tall and slender, casting a warm glow. The Philips logo and 'AmpLight' text are overlaid on the top left of the image.

**PHILIPS**

AmpLight

**System Guide**

# AmpLight group management

# Table of Contents

System description. . . . . 3

    Benefits . . . . . 4

    Features. . . . . 4

Central dimming. . . . . 5

    Benefits. . . . . 5

    Features. . . . . 5

AmpLight Modules . . . . . 6

Coded mains . . . . . 8

Alarms . . . . . 10

Reports . . . . . 10

## System description

AmpLight group management is a cabinet-based solution for monitoring and control of road and street lights. It is designed for road authorities such as medium to large municipalities and highway authorities in need for a reliable street lighting control system that can be hosted on-premise.

The cabinet controller connects to a group of LED or conventional street lights and can be deployed in both retrofit and new-build scenarios. The cabinets are connected to the light management system through a cellular data connection or wired Ethernet. The light management software is enterprise-hosted, by the customer, leveraging the IT infrastructure and capabilities of the customer.

A group of luminaires can be controlled by installing an SCU (segment control unit), a surge guard and a battery module in a cabinet. Outdoor luminaires are connected by the electrical infrastructure to the cabinet.

The user can then control on/off times based on Astroclock (including trimming), photocell (when installed), or user specified times, remotely with a web application. In an emergency, the user can control the lights manually using the web application or SMS commands from a pre-configured mobile device. Communication between the SCU and a server hosting the application software is enabled via cellular network with SIM card installed in the SCU. Alternatively, the SCU can communicate with the server over wired LAN.

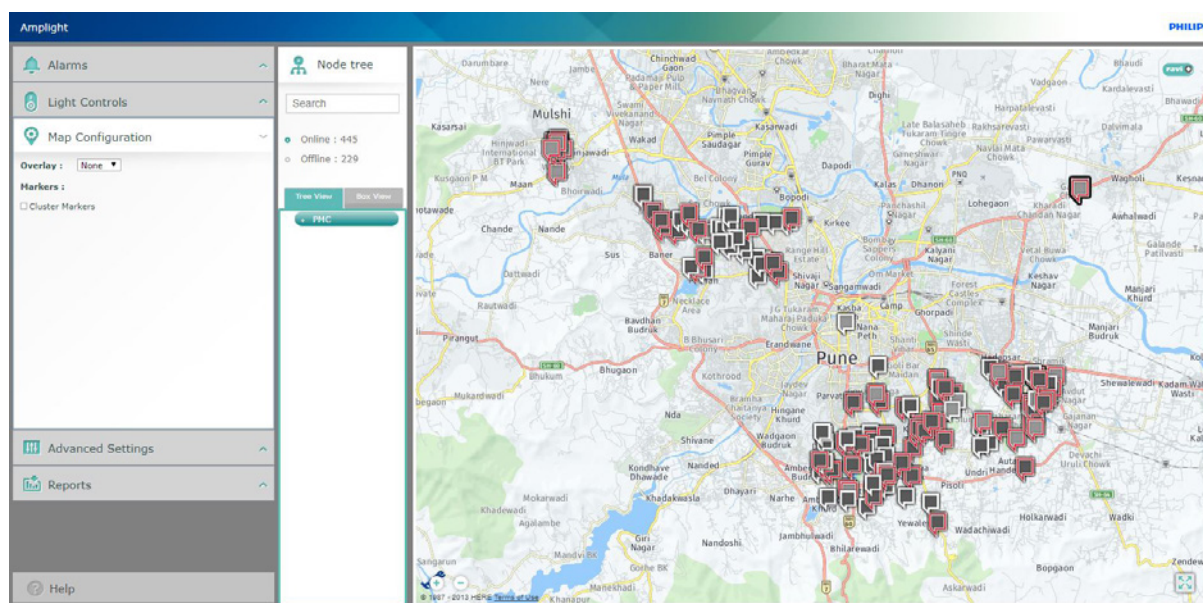
When an energy meter is installed, energy consumption is transferred to the AmpWeb server and is visible in the dashboard.

Consumption reports are available on a daily, monthly, quarterly, annual or a 3-year basis on overall project or cabinet level.

Different switch and dimming schedules can be programmed and assigned to specific dates in advance to save energy.

Critical alarms can be configured for notification via SMS text messages on a user's mobile device: a list of alarms is included in this document.

The switching operations of cabinet remains functional, even if the connectivity with the server is lost temporarily (about one to 2 days: after that there will be small drifts). In such cases, data is stored in the SCU up to 30 days and will transfer the data to server when connectivity is restored.



### Benefits

- Manage your KPIs whilst optimizing your total cost of ownership with automated failure reporting
- Real-time status feedback increasing maintenance efficiency
- Maximize your energy savings without compromising safety at night
- Retrofit – enable benefits of remote light management on existing infrastructure
- Central dimming – further optimize energy savings; reduced CO<sub>2</sub> footprint and light pollution.

### Features

- Map-based GUI with visual indication on status for day-to-day operations
- Asset information for cabinets and connected luminaires.
- Scheduled, Astronomical and photocell-based ON/OFF functionality.
- Critical alarms over SMS on user mobile device.
- Programming of schedules remotely and local; manual override operation.
- Hourly, daily and monthly energy graphs.
- Scheduled, central dimming with 12 levels.
- Detailed alarms for maintenance and troubleshooting.
- Remote cabinet monitoring and control via standard mobile SMS text service.
- Alarms in server dashboard, per email and per SMS in case of failures
- Detailed reports for alarms, meter readings, burn time, actions and lights in HTML or Excel formats delivered by email.
- Designed for and tested under harsh grid conditions.
- Supports multiple circuits from a cabinet.

## Central dimming

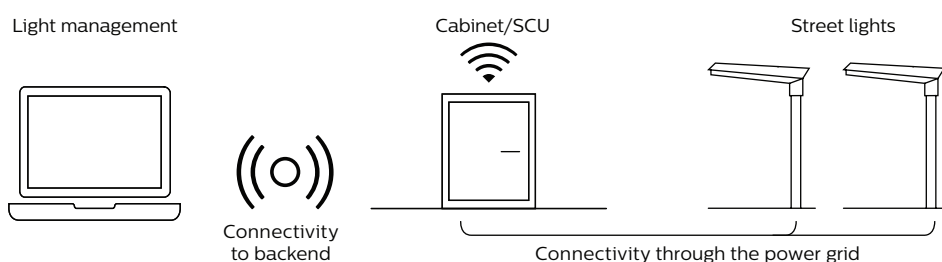
Central dimming uses coded mains to centrally broadcast dimming signals over mains wiring connected to a large set of luminaires. It overcomes limitations of voltage dimming (such as and conventional power line technology). Central dimming uses your existing infrastructure and leverages LED technology for lower light levels and faster dimming.

### Benefits

- Additional energy savings - up to 40%
- Better ROI - uses existing infrastructure
- Lower carbon footprint
- Secure and reliable
- No impact on the operating lifetime of the luminaires
- Broad luminaire support: 1–10 V or DALI
- Safety – full light whenever required

### Features

- Trouble-free central dimming (up to 40% energy savings, depending on dimming profile)
- Communicate dimming information from cabinet to luminaires
- Constant light output (irrespective of voltage fluctuation or line voltage drop)
- Supports both 1–10 V and DALI dimmable driver-based luminaires
- Transmits dimming information over long distances
- No bulky voltage step down transformers for dimming
- No signal interference from external sources, such as RF
- No disturbances to other devices in the grid, unlike Powerline
- Central or local (each luminaire) dimming override possible using an external trigger
- Flexible dimming level scheduling; 12 levels to choose (including 100% and OFF)
- 6 kV surge protection
- Continuous streaming of dimming information over mains
- Communication does not depend on luminaires (like in RF mesh and Powerline communication)



## Amplight Modules

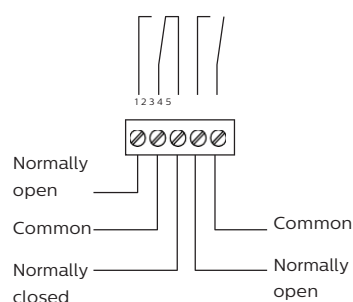
### SCU (Segment Control Unit)

- Main Amplight cabinet controller
- Interfaces like the switch, the RS485 and the current are built in the SCU. External modules may be required based on a case-to-case basis
- 1 to 3-phase mains input
- Cabinet door monitoring
- Mains voltage monitoring
- Photocell input
- Integrated GPRS
- USB for software flashing
- A-bus for power and communications with the other Amplight modules



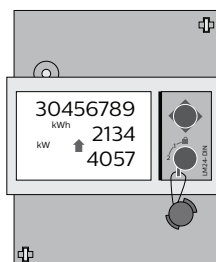
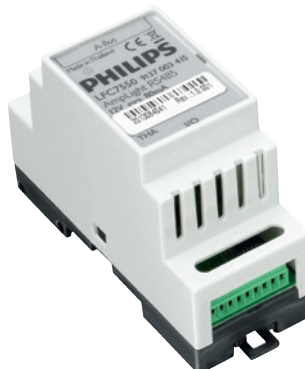
### Switch (optional)

Consists of two individually controllable relays. These relays are galvanically isolated and are used for switching minor loads on and off directly and three-phase or larger loads via an intermediate breaker.



### RS 485 (optional)

- Contact rating: 5 A (NO) / 3 A (NC) @ 277 Vac resistive. 10 A (NO) @ 125 Vac resistive
- Communication modules for external power metering units
- Required for meters with RS485 connection



### Battery

If the main power fails, the Battery will instantaneously take over the power supply of the A Bus.

This enables the CPU to store data and send a main power failure alarm to the central server via GPRS/ SMS before it shuts down safely.

- Initial capacity of 950 mAh (7.4 V).
- Li-Polymer rechargeable, includes safety circuit





### Surge Guard

The Surge Guard is designed specifically for the LCN7700 Segment Control Unit, making this module able to withstand surge pulses up to  $\pm 6$  kV and burst pulses up to  $\pm 4$  kV.

- Four rated channels, each of which has a built-in thermal protection
- Withstands surge pulses up to  $\pm 6$  kV and burst pulses up to  $\pm 4$  kV



### Current (optional)

The Current is a highly reliable monitoring device designed for detecting asymmetrical earth leakage in electrical systems and for monitoring current changes in each phase of up to two three-phase circuits. It is used to detect and report under-current, over-current, lamp failures, and earth leakage alarms.

- Leakage current: Input range: 1 to 15 mA, rel. accuracy:  $\pm 0.3\%$  FSD, abs. accuracy  $\pm 5\%$  FSD
- Current sensor detection range: 5 to 65 A



### 3-Phase Coil

The AmpLight 3-Phase Coil / current-sensor can be used in combination with the AmpLight Current to measure the supplied mains currents, in order to monitor possible failures and unsafe situations. Power failures, cable breakages, street lamp failures are immediately reported to the central server.

- Transformer ratio 1000:1 (primary:secondary)
- Accuracy: 1.5%



### Leakage Coil

The AmpLight Leak Coil / current-sensor can be used in combination with the AmpLight Current to measure the leakage current, in order to monitor possible failures and unsafe situations.

Earth leakage are immediately reported to the central server.



## Coded mains

### Coded mains components in the control cabinet

The Coded Mains Transmitter and Transformer together send a digitally encoded dimming signal with an amplitude of 2 V or 2.6 V and a frequency of 150 Hz or 180 Hz over the mains wiring.

### Coded mains transmitter

The transmitter can receive dim signals over DALI interface or via 3 times dry contact interfaces from external controller.

A coded mains transmitter sends a 3-phase coded signal (dimming information) over the mains wiring, which is decoded in the luminaires.

- Input 120 to 277 Vac
- 6KV surge protection
- Emergency input



### Coded mains transformer (LL or LN)

- Max load: LL= 22 kVA; LN=45 kVA
- Built-in 6 kV surge protection
- Supports 380 to 480 V LL or 120 to 277 V LN load



### Coded mains components in the luminaire

#### Coded mains driver

Philips Xitanium Full Programmable LED drivers are specifically designed to deliver the highest performance, protection and configurability.

- Coded mains receiver function integrated in driver





### Coded mains receiver LN

(Optional for any 1–10 V/DALI driver)

Use the Coded Mains Receiver is available to translate Coded Mains to DALI or 1–10 V for standard luminaires with DALI or 1–10 V drivers.

- Built-in 6 kV surge protection
- Automatically detects the type of driver connected (DALI or 1–10V) and configures accordingly



### Coded mains receiver adaptor

(Optional for L-L 380 to 480 V)

- For luminaires working on 380 to 480 V line–line application, the Coded Mains receiver adaptor is used in conjunction with a Coded Mains receiver LN to step down the voltage from 380 to 480 Vac to 220 to 277 Vac.
- Designed to work with a coded mains receiver and no other connected devices to ensure performance of coded mains



## Alarms

The following list contains the alarms that are supported by AmpLight.

- Battery mode
- Battery not connected
- Battery shutdown
- Breaker/contactor error - no current on all circuits
- Burn time exceeded
- Cabinet door open
- Coded mains transformer connection error
- Coded mains transmitter dry contact activated
- Coded mains transmitter emergency override
- Coded mains transmitter HW error
- Communication is not available - per class
- Configuration Dispatch Failed
- Leakage Detected
- Light on, manually on or contactor hanging
- Light switching failed
- Main power failure
- Missing meter
- Missing module
- Module not responding
- Current error - above threshold - per phase
- Current error - below threshold - per phase
- Overvoltage error - per phase
- Photocell broken
- Switch module not working
- Undervoltage/No voltage error - per phase

## Reports

You can generate the following reports as HTML or Excel files:

- Meter reports
  - Detailed meter
  - Consumption report
  - Energy billing report
- Burn time report
- Action report
  - Alarm
  - Modules
  - Light commands
  - Photo cell
  - Light status
  - Reports
- Other
  - Lamp surveillance
  - Preventive lamp replacement
  - Critical lamp failure



