INFORMATION

MAINTENANCE

SUPPORT

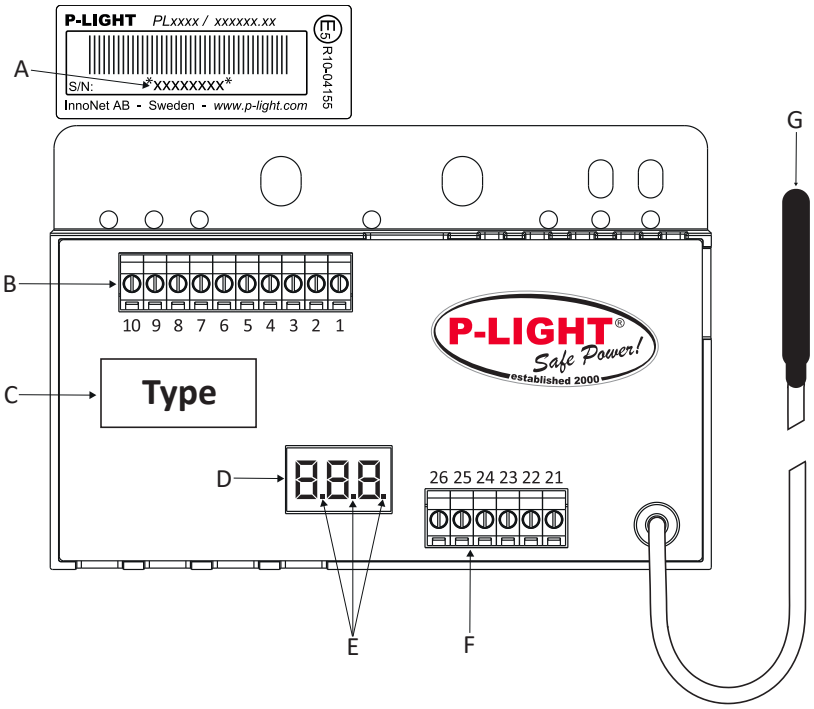
CHECKING

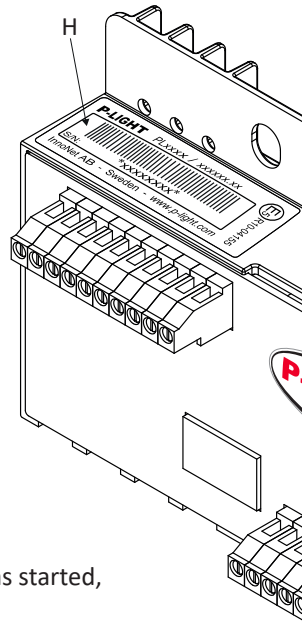
P-LIGHT Check

We recommend that you use this folder together with P-LIGHT's troubleshooting protocol, which is easily downloaded at support.p-light.com

See our website – support.p-light.com – for support and technical information

P-LIGHT Control unit





Explanation

A. Serial number (on identification label)
B. Terminal blocks 1-10
C. Model label
D. Display
E. Dots, indicates when it has started, (wandering blink).
F. Terminal blocks 21-26
G. Temperature sensor
H. identification label

Important and Warranty

- P-LIGHT provides a 1-year product warranty. In

the event of a warranty issue, InnoNet's complaint procedures must be followed.

- The warranty is only valid when original spare parts and batteries are used.

- Service and maintenance are performed

Important to know when working with P-LIGHT

- Use the correct cable dimensions.

- All connected equipment must be connected as shown in the instructions.

- No equipment may be connected directly to the batteries.

- In order to avoid galvanic corrosion, hot dip galvanized bolt joints.

- Check the seal and tighten the M8 screws for the cover by hand. Max 8-10 Nm to avoid damaging the plastic washer and sealing strip.

- Check cable glands to make sure they are tightened and sealed. Unused cable glands must be plugged. For example, plug, bolt or the like.

- In the case of welding or any other type of work that may damage electronics or batteries, these must always be disconnected before work commences!

If, for some reason it is necessary to bypass the P-LIGHT® controller, the wires on terminals "4" and "5", as well as "6" and "7", must be connected together.

Documents and facts can be found on our support website support.p-light.com.support.p-light.com.

General facts about batteries and charging

... when installing additional electrical equipment on vehicles and towed vehicles

Vehicles are charged from the generator and the starter battery is charged while driving.

Problems may occur if you connect an additional battery pack to power other equipment on vehicles and towed vehicles which will be charged from the vehicle.

Charging tends to take a long time and the batteries don't are not fully charged.

The starter batteries in the vehicle primarily receive most of the charge and long cables cause voltage drops that lead to slow and inefficient charging.

The vehicle's start/stop system does not provide continuous charging.

New fuel-efficient engines are equipped with smart alternators that do not deliver constant power but a variable voltage. After a charging period, the voltage will be reduced and the charge slows down.

Furthermore, the energy produced by regenerative braking leads to voltage peaks. Battery packs connected in the traditional way will receive an inferior charge under these conditions and may be damaged by peak voltages.

This is eliminated when mounting the P-LIGHT as it acts as an accumulator and balances the outlets from the truck and drives the trailer's functions independently of the truck.

Built-in test program

P-LIGHT® comes equipped with its own test program for monitoring and fault tracing. In order for the test program to show all values, the truck's lighting must be switched on.

To access the menu, press and hold pushbutton 1 on the P-LIGHT® box for approx. 8-10 seconds. You can release the button when the program starts. A rolling menu is then shown on the controller's display. The program's version number is displayed first, followed by the voltage (V), in the following order.

Code Terminal	Benchmark
U4 Voltage on terminal 4 (Circuit 1 in)	min 24V
U6 Voltage on terminal 6 (Circuit 2 in)	min 24V
U8 Voltage on terminal 8	0V
UC Voltage out from the built-in charger/booster	approx. 28/20°C
U1 Voltage on terminal 1 (P-LIGHT® batteries)	ca 25V

A tripped MCB is indicated by the text "Err" alternating with "f x" where "x" is the MCB that has tripped.

Battery/Energy monitor

Terminals 5, 7, 9 and 10 have battery monitors to prevent deep discharge which will damage the batteries (also frost protection).

Midi och Maxi

Terminal 10 is switched off at 22,5V and others at 21V. All terminals open again when charging commences and the voltage exceeds 23.5V.

Maxi XL, Magnum och Hydro

Terminal 10 is switched off at 19V and others at 21V. All terminals open again when charging commences and the voltage exceeds 23.5V.

Terminal 10 also has an energy monitor in case of inactivity = Midi and Maxi 96h , Maxi XL, Magnum and Hydro 270h.
Terminal 10 then closes and opens again when the parking lights are switched on again through P-LIGHT (push button 1) or by the truck.

Error code on P-LIGHT, C11 and CC1

If the error code "C11" or "CC1" appears on the display, it means that the batteries have been deeply discharged with low battery voltage as a result. This may be due to both a fault in the charger, but also a large output demand without the battery having had time to recharge sufficiently while driving the vehicle.

If the battery voltage drops below the programmed limit, terminal 10 (AUX) switches off and then indicates "C11" on the display. Restarting requires 5 minutes of voltage on terminals 4 and 6 (truck connected and lighting on). If the voltage in the batteries after this time exceeds the programmed limit, terminal 10 (AUX) is activated again. It is important that the batteries have time to receive a proper charge again after this.

If the voltage does not exceed 24 V after 5 minutes, terminal 10 (AUX) remains off and "CC1" appears instead. This test is repeated each time voltage is connected to terminals 4 and 6 for at least 5 minutes. If the "CC1" indication does not clear after a few attempts, the charger or batteries are probably damaged. In this case, contact the appropriate workshop for inspection and possible replacement of the controller/batteries.

Programmable switching

Midi

Jumper between terminals 23 & 24 for at least 20 seconds.

A message then appears in the display, if you want to change, repeat the procedure.

AUT ON = ALWAYS switches on P-LIGHT® outputs 5 and 7 when the truck is switched off or disconnected.

AUT OFF = NEVER switches on P-LIGHT® outputs 5 and 7 when the truck is switched off or disconnected (Factory setting on delivery)

Maxi, Maxi XL, Magnum och Hydro

Håll tryckknapp 2 (option) intryckt i minst 20 sek.

A message then appears in the display, if you want to change, repeat the procedure.

AUT ON = ALWAYS switches on P-LIGHT® outputs 5 and 7 when the truck is switched off or disconnected.

AUT OFF = NEVER switches on P-LIGHT® outputs 5 and 7 when the truck is switched off or disconnected (Factory setting on delivery)

Miniature circuit breaker (MCB) functions

Terminals 5, 7, 9 and 10 have built-in MCBs.

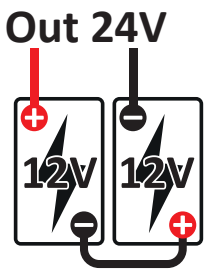
If any of the MCBs trip, this is shown on the display (on the controller) by an alternating message of "Err" and "F x", where "x" is the tripped MCB-ID. If the truck is disconnected, the circuit breaker fault is only displayed for 30 seconds after pressing the button, to save the battery. However, if the vehicle is connected, the message is displayed continuously.

NOTE: If a MCB trips, the supply must be disconnected (for 15-60 sec) in order for the MCB to reset. If the tripped circuit breaker has been caused by a short-circuit in a bulb, this must also be rectified.

Max simultaneous output:
- Midi 50-60W
- Maxi, Maxi XL, Magnum and Hydro 270W.

Fuse id	Function
1	Terminal 1 (Battery)
5	Terminal (Out cct 1)
7	Terminal 7 (Out cct 2)
9	Terminal 9 (Out Option)
10	Terminal 10 (Out AUX)
C	Charger

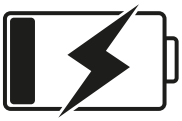
P-LIGHT Battery Pack



The P-LIGHT Battery pack is 24V with 2x series connected 12V batteries and is available from 18 to 200Ah. When connecting in series, the batteries should be of the same size, quality and age. Both batteries must be replaced at the same time.

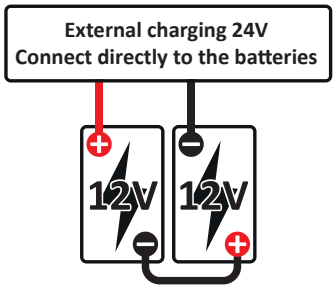
The P-LIGHT Battery is an extremely good AGM-type operating battery especially developed for and together with P-LIGHT as well as for the operation of equipment on vehicles and towed vehicles with many charging cycles that provide reliability and long life.

Charging



The P-LIGHT Battery Pack normally charged by a built-in intelligent charger in the P-LIGHT control unit/control units

External Charging



External charging should be cross-charged, this means connecting plus on one battery and minus on the other battery – then the charge goes through both batteries and are charged at the same time. Charging should be with A up to 30% of the size of the battery bank

For example, 18Ah with >5A, 45Ah with >12A, 150Ah with >45A and 200Ah with >60A charging.

NOTE! If the C11 or CC1 error code has been displayed and external charging is being done, the error code will appear again. Restarting the charger requires around 5 minutes of voltage on input terminals 4 and 6 of the controller (truck connected and lighting on).

Battery testing

Battery test equipment for e.g. CCA rating is for traditional starter batteries and is a way to measure cold start characteristics. The batteries developed for and together with P-LIGHT do not have these characteristics and therefore no measurement values for this type of health test. However, this test equipment can detect e.g. cell faults that create other battery problems. When the test is run, the battery must be fully charged.

Battery facts

Introduction

The battery volts tell you which voltage the battery is delivering and is charged with while the ampere hours, Ah, indicates about how much energy the battery contains. A battery consists of cells. One cell can emit a maximum of 2.14V, which means that in a 12V battery, for example, there are six cells.

The three most common types of batteries are wet, AGM and gel battery. These can also be divided into two classes depending on the area of use, starter or operating battery. A starter battery is made to provide a lot of energy for short periods while an operating battery is suitable for providing more even current for longer periods.

Wet batteries

The type of batteries that most people think of when it comes to a battery. The acid and electrolyte are in liquid form and move freely between the lead plates. The peculiarity of a wet battery is that the electrolyte, or battery water, needs to be refilled periodically. A wet battery can be used for both as starter and operation. It is often of slightly poorer quality and if they are not used or maintained correctly, the battery can emit a flammable gas. A wet battery should never be discharged more than 50% as they will then be damaged.

AGM batteries

What is special about AGM is that all the liquid, both the acid and the electrolyte, is bound in a weave located between the lead plates. As it contains no liquid, an AGM battery is maintenance-free, i.e. no liquid needs to be refilled. The cells are also encapsulated, which means that the battery is very safe. An AGM battery is perfect both as a starter and for operation. A well-maintained AGM can last for up to 600 charge cycles. An AGM battery must never be left uncharged, as it will be damaged.

Gel batteries

A gel battery is very similar to an AGM battery. They have the same properties, while what distinguishes them is that the liquid is not bound in a weave but is in gel form, and that a gel battery can be used a little more as it can use 60% of the battery before it needs recharging. It is also more suitable to use as an operating battery.

How to prevent deep discharge?

Use a battery monitor to avoid deep discharge of a battery. It disconnects the batteries before they discharge too much, which means that the batteries are not damaged.

What affects the life of a battery?

There are several things that affect life expectancy, i.e. the amount of sulphating, here is a list of some factors that affect life expectancy:

Temperature – Most batteries are made to operate at about +20C. A battery that is in +30C, e.g. in a machine room, is down to 50% life expectancy and at +40C there is only 30% of life expectancy left.

Depth of discharge – A battery should never be discharged completely. A wet battery should never be discharged more than 50% of its capacity.

The number of discharge cycles – A battery has a predetermined lifespan that is measured in charge cycles.

Installation quality – is the right cable being used? Charging with the right type of charger?

Charge control – Temperature affecting battery charging? Higher charger voltage required when cold.

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