iLamp

Operating Manual
iLamp Street Lights

Version 1.0

ABOUT THIS MANUAL

This operating manual is suitable for iLamp street lights listed below.

Product Family

▶ BASIC

▶ TRAFFIC LIGHT

Please read this operating manual thoroughly before using the system.

This operating manual should provide the operator of the system with information that is necessary for being able to use the system optimally.

Regular cleaning, care and maintenance in accordance with this manual will increase the effectiveness and operability of the system over the entire service life.

Installation and service may be done only by qualified persons. Work in accordance with locally applicable safety standards and regulations.

For additional support please contact: service@iLamp.com

DISCLAIMER:
Improper installation can lead to material damages and personal injuries.

iLamp assumes no guarantee or liability for losses, damages or costs resulting from incorrect installation, improper operation or incorrect use and maintenance.

INDEX

1. OVERVIEW

1.1   General

iLamp offers stand-alone solar street lights equipped with advanced LED and photovoltaic technology. The smart street lighting control solution offers self-learning energy management and customized light profiles. The design of the street lights is unique and esthetically appealing. iLamp street lighting systems are highly efficient, require very low maintenance, offer a long life and help improve environment.
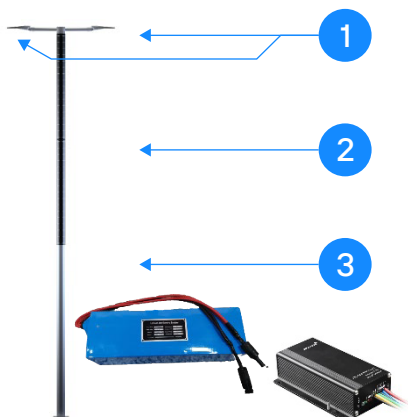
1.2   Main Components

A. BASIC
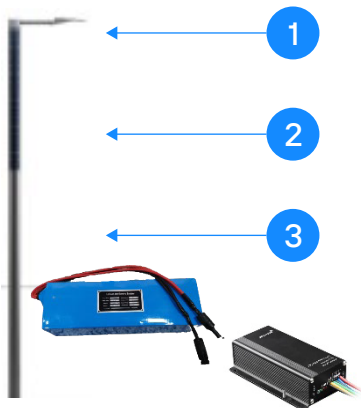
Basic Single

1.   Lighthead with high performance LED

2.   Vertical PV module

3.   Pole - batteries and controller inside

Basic Double

1.   2 Lightheads with high performance double LEDs

2.   Vertical PV module

3.   Pole - batteries and controller inside

Basic Single High Power

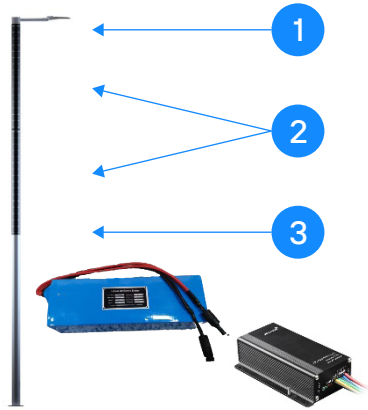1. Lighthead with high performance LED

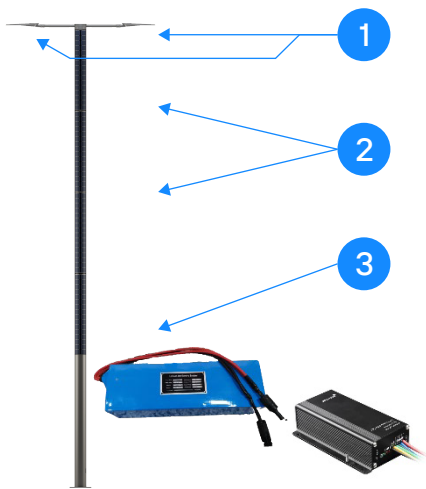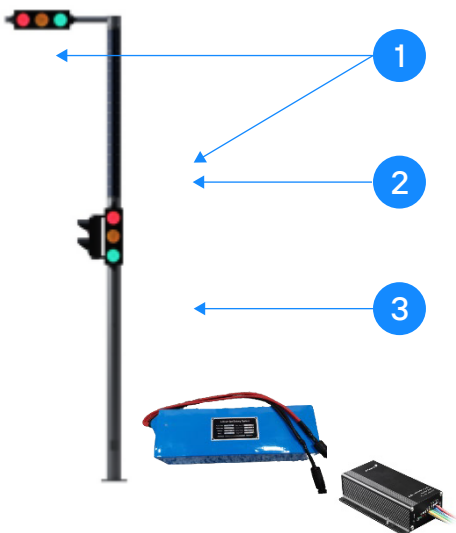2. 2 Vertical PV modules

3. Pole - batteries and controller inside

Basic Double High Power

1. 2 Lightheads with high performance double LEDs

2. 4 Vertical PV modules

3. Pole - batteries and controller inside

B. TRAFFIC LIGHTS

1. 2 Traffic lights with high performance LED

2. 1 Vertical PV modules

3. Pole - batteries and controller inside

1.3 Technical Specifications

For technical specifications of each iLamp please refer to the data sheet of the
respective model. Data sheets are available upon request from your distributor.

1.4 Assembling

- **Inspection**

Upon receipt, inspect the package and contents for damage. Verify the contents are
complete. If damage is found it should be noted on the bill of lading and a claim should be
filed with the shipping company. Keep all packaging for inspection by the shipping company.

- **Unpacking**

1. Move the shipping pallet to a firm, level surface in an open area.
2. Inspect for visible signs of shipping damage.
3. Use a nail-puller to carefully remove the nails and open the boxes.

- **Components**
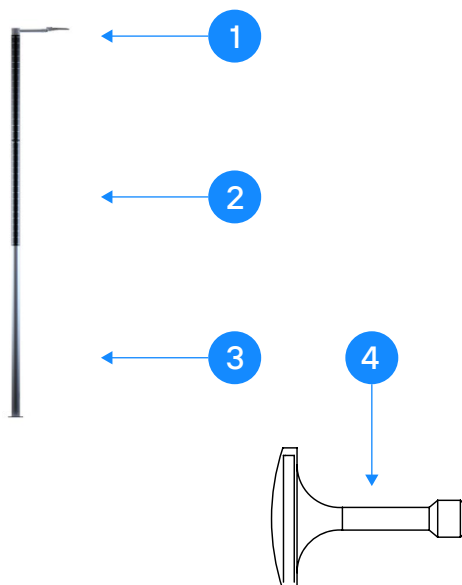
1. Headlight with high performance LED

2. Vertical PV-Module incl Mono crystalline silicon cells

3. Mast silvermetallic assembled incl batteries Pole

4. Door Key with safety screw

1 Pre-Installation Requirements

Flange plate

When getting ready to perform site preparation and installation, please note the following:

1.a Excavate soil to preparate the foundation frame. The dimensions of excavation will depend on the location and the type of bolts to be used, e.g. frame with M20 threaded bolts.

1.b Fill excavation with concrete and press frame into fresh concrete. The bolts must be protruding approximately 100 mm for the proper mounting of the light pole. Please note that the curing time of concrete varies with local weather conditions.

1.c After the concrete is hardened, apply screw nuts to all 4 bolts and then slothole washers. The screw nuts are used for the vertical alignment of the pole.

1.d Mount the light pole by threading bolts into the flange plate. Align vertically with the screw nuts underneath the flange plate.

1.e Secure the light pole with the remaining slothole washers and screw nuts.
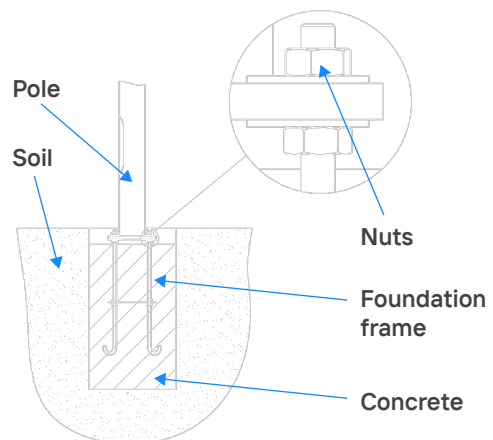
Schematic View
(details in appendix)

2 Pole base fixation

Lifting

Nuts fasten

ℹ️ Using some of the apertures on the pole and a strong rope, lift it with a crane or a forklift and fasten the nuts to fix the pole to the base.

⚠️ **WARNING. The weight of the pole is 186Kg.**
Make sure that you use an appropiate lifter and ropes.

3 PV-Module insertion

PV-Module

Connectors
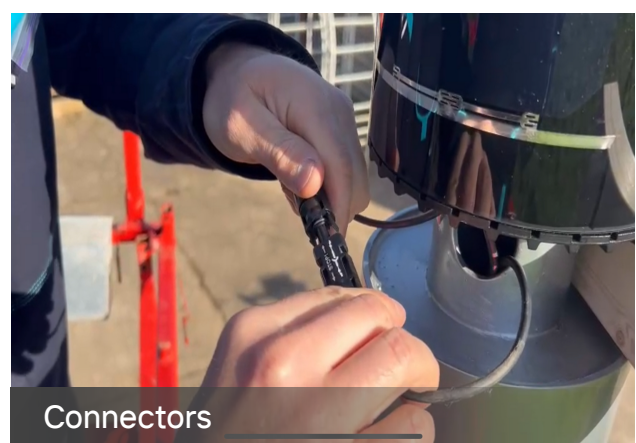
ℹ️ With the help of two people, install the PV-Module on the pole. Before finishing, connect the cables and hide them inside the pole (Make sure that red goes to red, black goes to black).Turn the PV-Module until it snaps in.

⚠️ **Be careful to not scratch the special glass of the module.**

4 Headlight installation

Connectors

Screws fasten

Again with the help of minimum two people and from a high position, one person should hold the headlight meanwhile the other connect the LED unit. When finished, insert the cables into the inner part of the pole, and slide the headlight inside the pole carefully. At the end fasten the screws.

Note: The second cable is intended for later installations of the upgrade version "Radio Unit". For some models, it will not be connected.

5 Fuse connection

Open door

Take out the fuse and remove the tape
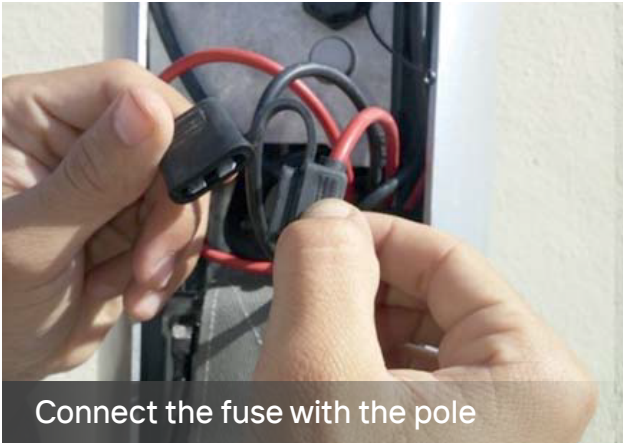
Connect the fuse with the pole

ℹ️ Open the pole door with the supplied Pole Door Key

6 Activation & Settings

USB Cable

PhocosLink Software

ℹ️ Connect the controller to your computer using the RS485 to USB connector. Launch the PhocosLink Software, choose the device and Connect.
For further settings follow the instructions of the PhocosLink Software.

2. SAFETY

To reduce the risk of injury to persons or property damage, follow the important safety instructions.

LED Unit:

• Do not look directly at lit LEDs.

• The LED unit is covered by safety glass achieving high IK standards. We recommend to avoid crashing since particles may fall down.

PV Module:

• The PV module has a glass body with high IK degree of protection. However, we recommend to avoid any damages to the glass.

Pole:

• Ensure that the pole is properly grounded. The pole is designed for high wind loads. In order to avoid damages, make sure that the street light is not exposed to wind loads higher than specified in the data sheet.

• Electrical work on the street light may be carried out only by qualified persons. When working on the electrical system, the fuse must be removed from the pole. Please refer to the installation manual for details.
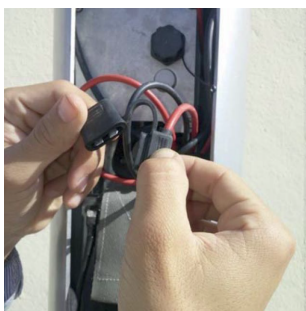
2. OPERATION

3.1 Positioning the Light

In order to improve the lighting design based on the light distribution of the floor (according to your IES file), recommend that the following information and explanations are carefully read.

The vertical design of the PV module with a 360-degree surface of solar cells allows to pick up direct and indirect sunlight. There is no geographic positioning to the south required. Even the northern facing solar cells deliver energy.

When positioning an iLamp Street Light, identify any shade-causing obstructions such as trees, neighboring buildings and other objects. Try to find places with maximum direct sunlight.

Please see below how to position the Street Light in order to avoid superfluous shading.
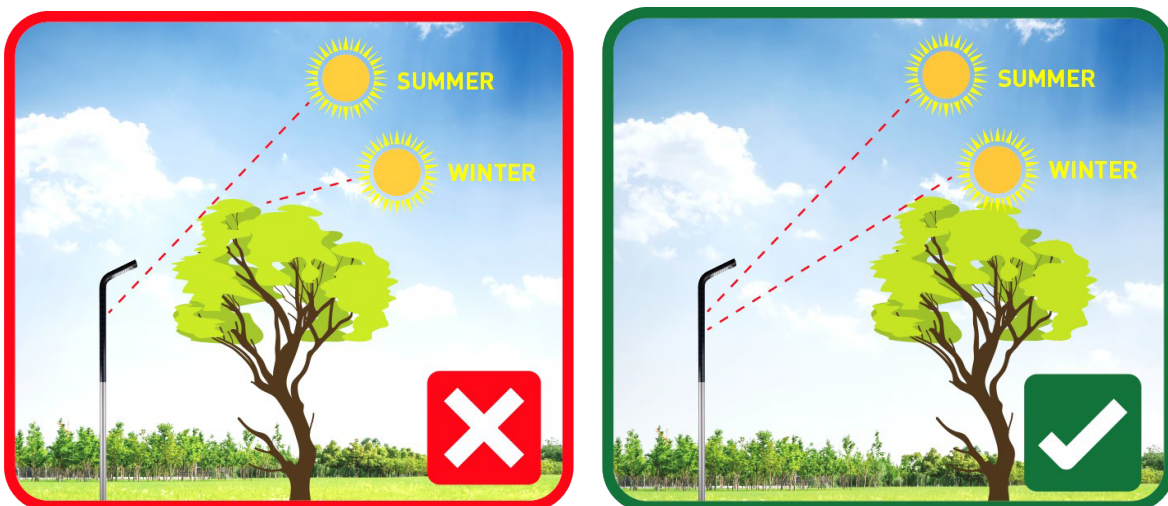
The pictures take SHEMS as examples.

In case of shading, energy production of the Street Light will be reduced. The integrated controller will automatically adapt the output according to the available energy.

3.2 Lighting Profile

An efficient and reliable solar lighting system requires a smart energy management. The iLamp Street Light has a very powerful LED unit to provide bright lighting conditions. Technically and economically it is not appropriate to provide 100% of power and light throughout the night. iLamp Streets Light can therefore be customized and dimmed. If more light (e.g. traffic on the road) or less light is required, the light profile can be adjusted accordingly.

3.3 Managing Lighting

In order to assure proper operation, the setup of the iLamp Solar Street Light cannot be modified without PhocosLink Software. This prevents unauthorized access to the Street Lights.

PhocosLink Software

Controller

iLamp Street Lights are delivered with "standard factory" settings.

The light profiles of iLamp Street Lights can be customized to reflect different lighting needs. Settings to be changed include brightness values and brightness thresholds for switching on/off.

Changing the settings of lighting will have an impact on the complete function of the Street Light. iLamp recommends that all amendments shall be done by authorized staff only. iLamp assumes no liability for damages which have originated from an improper use, faulty installation or maintenance.

For details on managing light profile, please refer to the instructions of the PhocosLink Software.

3.4 Energy Management

Energy management is not matured in the beginning of the Street Light's life-time. During operation the Street Light is "learning" the specific conditions of the individual location (i.e. behavior of the sun and operation of the batteries with respect to temperature, life-time and GPS position).

Dependent on the individual position and the angle of the sun to the solar module, the energy production will vary. Normally the iLamp Street Lights should have the maximum energy output during morning and evening hours when the sun hits the iLamp solar module under an optimal angle.

Even during cloudy weather situations there is some energy production (up to 150 Wh on rainy days).

When the light profile exceeds the available energy (due to e.g., excessive energy consumption, low energy generation in rainy conditions), the profile will be automatically adjusted downwards in order to prevent the batteries from damage.

Every iLamp Street Light can store statistical data on energy management for many years. Once you connect your PhocosLink Software to the Street Light the data is uploaded to your computer.

For details on how to analyze energy production and consumption, please refer to the instructions of the PhocosLink Software.

The following chart shows how the Street Light adjusts its provided energy (measured in Watt hours) to the specific conditions of its location during the first month of installation.

The graphs represent two locations with different conditions – the green graph constantly sunny conditions with 400Wh, the blue graph constantly poor solar conditions with 200Wh per day, independently of the charge level.
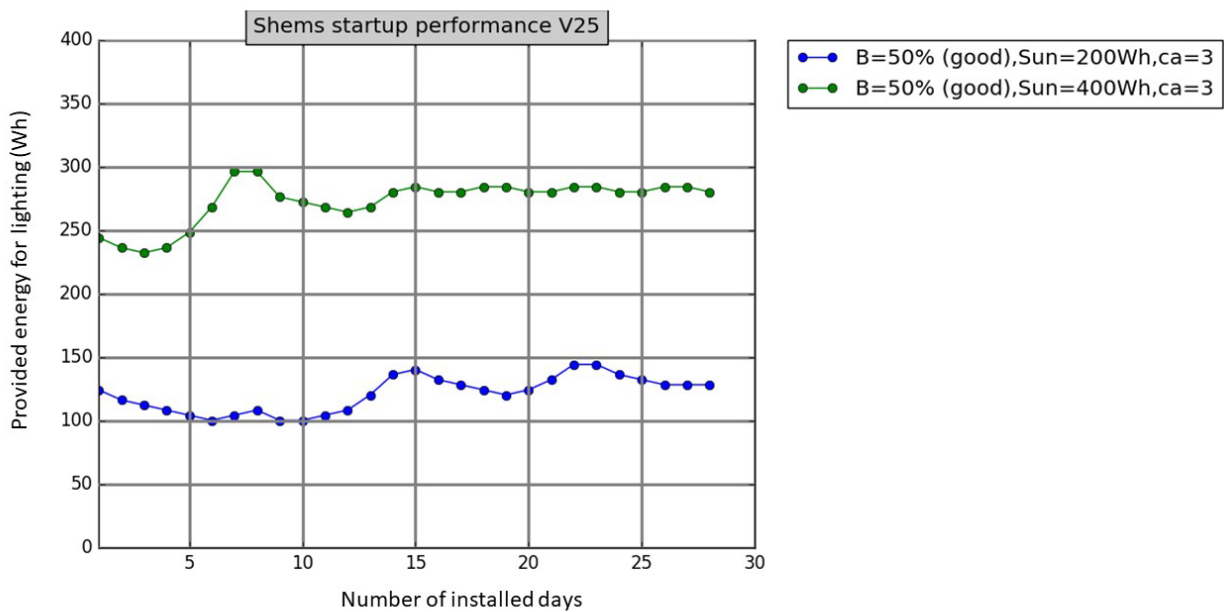
During the first days of this "learning" process, luminosity will normally decrease and then fluctuate. Between 10 to 15 days the Street Light will be well balanced in energy production and lighting.

4. CLEANING AND MAINTENANCE

Repair and maintenance work not specified in this section may only be carried out by authorized personnel or appointed by iLamp and its affiliated companies.

4.1 Inspection

General inspection: Check for any loose or damaged parts of the Street Light.

We recommend that you download the Energy Report via thePhocosLink Software regularly (please refer to the manual of PhocosLink Software). Should the Street Light be exhibiting decreased output compared to its normal output, then cleaning may help.

4.2 Maintenance / Cleaning

iLamp Street Lights do not require extensive maintenance. Simple cleaning helps to ensure the Street Light has optimal lighting performance.

PV Module:

Due to the vertical PV module and the special glass coating the iLamp Street Light does not need to be cleaned as frequently as common solar street lights.

If the surface is so dirty that daylight cannot reach the glass, you will need to clean the glass with warm soapy water and a soft cloth. Otherwise, the illuminance will be automatically adjusted according to the available energy.

Regular surface cleaning of the PV module helps to ensure the Street Light has optimal lighting performance.

LED Unit:

If necessary, the surface of the glass pane can be cleaned with warm soapy water and a soft cloth.

Do not disassemble the LED unit unless absolutely necessary. Do not touch the LEDs at any time. Use a soft lint-free cloth dampened with water to clean lens. Do not use solvents to clean. Allow to dry completely before reenergizing.

Battery:

A decrease in illumination can be caused by reduced charging ability of the batteries. Please check the Energy Reports using the PhocosLink Software if the batteries need to be replaced. Individual light profiles and environmental conditions (such as extreme temperature) can affect the battery life.

Please follow the instructions for battery replacement carefully.

Important:

- Ensure that the Street Light is turned off and take out the fuse.
- Make sure that you are connecting the wires to the correct battery terminal.

PROCEDURE

1. Open the pole door.
2. Detach the fixation of the battery holder.
3. Detach the negative (black) battery cable.
4. Detach the positive (red) battery cable.
5. Pull out the battery band vertically to the top.
6. Take each battery out of the battery tray. Batteries are heavy, so grab from the bottom using both hands
7. When taking out the third battery, first take out the tape with the temperature sensor, and proceed like described above.
8. Place the first new battery in the battery tray and secure the battery with the battery holder.
9. Spray both terminal ends with an anti-corrosion solution.
10. Attach and tighten the positive battery cable (red).
11. Attach and tighten the negative battery cable (black).
12. Follow this procedure for the other batteries.
13. When placing in the third battery, use a tape to fix the battery's temperature sensor.
14. Ensure that all cable connections / hold downs are properly tightened.
15. Fasten the battery holder.
16. Close the pole door.
17. Recycle the used batteries properly.

5. WARRANTY

iLamp warranties, that its streetlights are free of any defects in workmanship or materials that might cause inadequate performance in proper conditions of use, installation and maintenance.

The guarantee on iLamp Street Lights is only applicable when the product is used within the operational limits.

The warranty does not cover any damages and malfunctions of the street lights which have their origin in:

- Accidents and vandalism
- Negligent, improper or inadequate use.
- Not following the use, installation and maintenance instructions given in the User Manual and in the Installation Manual of the street light.
- Modifications or repairing attempts that were not been held by authorized personnel by iLamp and its partner organizations.
- Damages due to surge, floods, plagues, earthquakes, third party's actions, or any other reasons different to the standard use conditions of the street lights and that are out of the control of iLamp or its partner organizations.
- Damages due to ambient temperature exceeding the operating temperature range specified in the technical data sheet
- Damages due to humidity exceeding 95% RH, or the maximum humidity levels corresponding to the IP rating of the particular part of the product.
- Damages of the battery due to exceeded number of cycles specified in the product data sheet.
- Damages of the battery due to activation exceeding a 4 months' period after delivery.
- Corrosion due to fire, accident, owner negligence, corrosion caused by sand, hail, airborne fallout, chemicals, salt, road hazards, stone damage; or surface paint deterioration (other than inside-out perforation).
- Damages caused by components of third parties that are not certified by iLamp.
- Not compliance of the current mandatory installation standards.
- Inadequate transport conditions.

The lighting level of the street level depends on the individual position (sun irradiation) and is therefore not covered by the guarantee.

Warranty claims have to be reported and returned to the local iLamp sales partner within 30 days after discovery, specifying at least the following written information:

- Serial number of the failed product
- Installation date and invoice date
- Detailed problem description

iLamp agrees only to repair or replace at its own expense, F.O.B. (E.X.W.), any part or parts of the product which fail during the warranty period, provided iLamp is notified of such failure within the applicable warranty period and given a reasonable time to make the repair or replacement.

iLamp reserves the right to require additional information or evidence. Further, iLamp reserves the right to inspect the product(s) claimed to be defective within a reasonable period of time after it receives the claim.

The warranty period for each part can be found below:

Pole (corrosion in normal use)	10 years
PV Module	10 years
Lead Acid Batteries	1 years
Lithium LiFePO4 Batteries	3 years
Electronic Parts (controller, cabing, LED unit)	5 years
Spare Parts	1 years

For details on the warranty conditions please refer to the "Warranty Certificate"

6. TROUBLE SHOOTING

6.1   No Light During Night

See assembly instruction page 5

See aquick guide service box page 24

Flowchart:

No light during night
↓
Check the fuse
— Not OK → Fix the fuse → LED is working?
↓ Not OK
Connect the service box & generate the report
↓
Check batteries voltage
↓ Not OK
Charger the batteries
↓
Check controller's connectors
↓
Remove batteries and check all battery connections
↓
Check PV cabelling — NO →
↓
LED is working?
↓ NO

Batteries volt must be > 13.1V
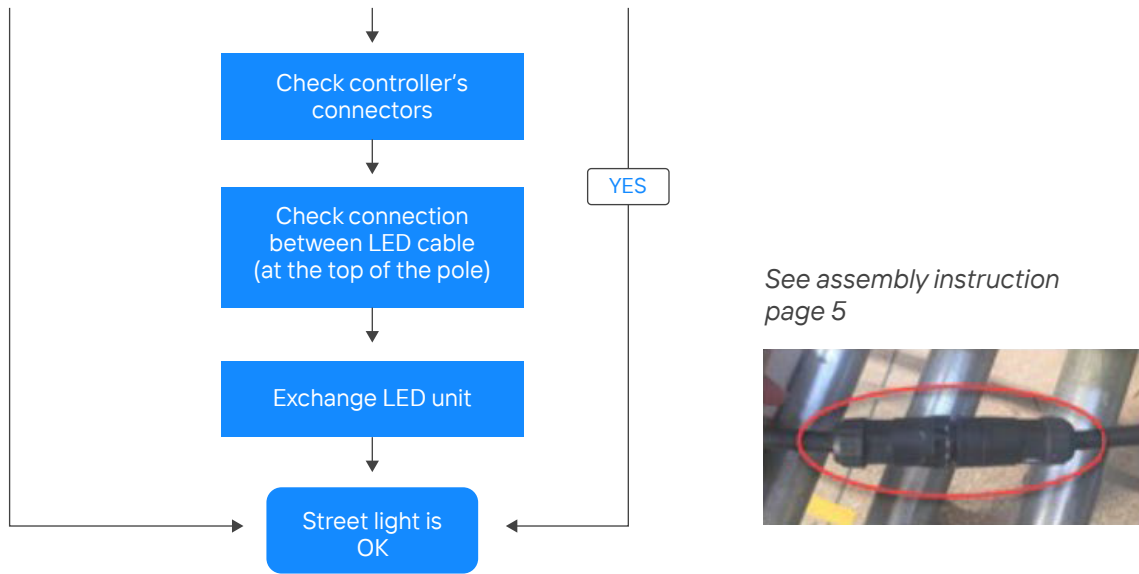
```
              ┌─────────────────────┐
              │ Check controller's  │
              │     connectors      │
              └─────────────────────┘
                         │
                         ▼                          YES
              ┌─────────────────────┐
              │   Check connection  │
              │   between LED cable │
              │ (at the top of the  │
              │       pole)         │
              └─────────────────────┘
                         │
                         ▼
              ┌─────────────────────┐
              │  Exchange LED unit  │
              └─────────────────────┘
                         │
                         ▼
              ┌─────────────────────┐
              │   Street light is   │
              │         OK          │
              └─────────────────────┘
```

See assembly instruction page 5

System State

Timestamp	TInt [°C]	TExt [°C]	ILoad [A]	VPv [V]	BT	VBat [V]	SOC [%]	IChr [A]	VChr [V]	CM	LO	LD	LSOC	N
17:01:34	26	24	0.0	7.6	LFP	13.413	75	2.2	14.100	-	×			

6.2 Weak Light Performance

```
┌─────────────────────────┐
│  Weak light during night │
│      /blinking LED       │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│         Connect          │
│   the service box &      │
│   generate the report    │
└─────────────────────────┘
            │
            ▼
        ◇ Check
          battery        ──────── NO ──────┐
          voltage ◇                        │
            │                              │
         Not OK                            │
            │                              │
            ▼                              │
        ◇ Check                            │
          battery  ──────── NO ───┐        │
          charging ◇              │        │
            │                     │        │
         Not OK                   │        │
            │                     │        │
            ▼                     │        │
        ◇ Check                   │        │
  Not OK  street light            │        │
 ◄─────── position ◇              │        │
   │        │                     │        │
   │       OK                     │        │
   │        │                     │        │
   ▼        ▼                     │        │
┌────────┐ ┌───────────────┐      │        │
│ Remove │ │Remove batteries│     │        │
│the light│ │and check all  │     │        │
│and avoid│ │battery        │     │        │
│ shadow  │ │connections    │     │        │
└────────┘ └───────────────┘      │        │
            │                     │        │
            ▼                     │        │
┌─────────────────────────┐       │        │
│   Clean the PV module    │       │        │
└─────────────────────────┘       │        │
            │                     │        │
            ▼                     ▼        ▼
┌─────────────────────────┐
│     Street light is      │◄──────────────
│           OK             │
└─────────────────────────┘
```
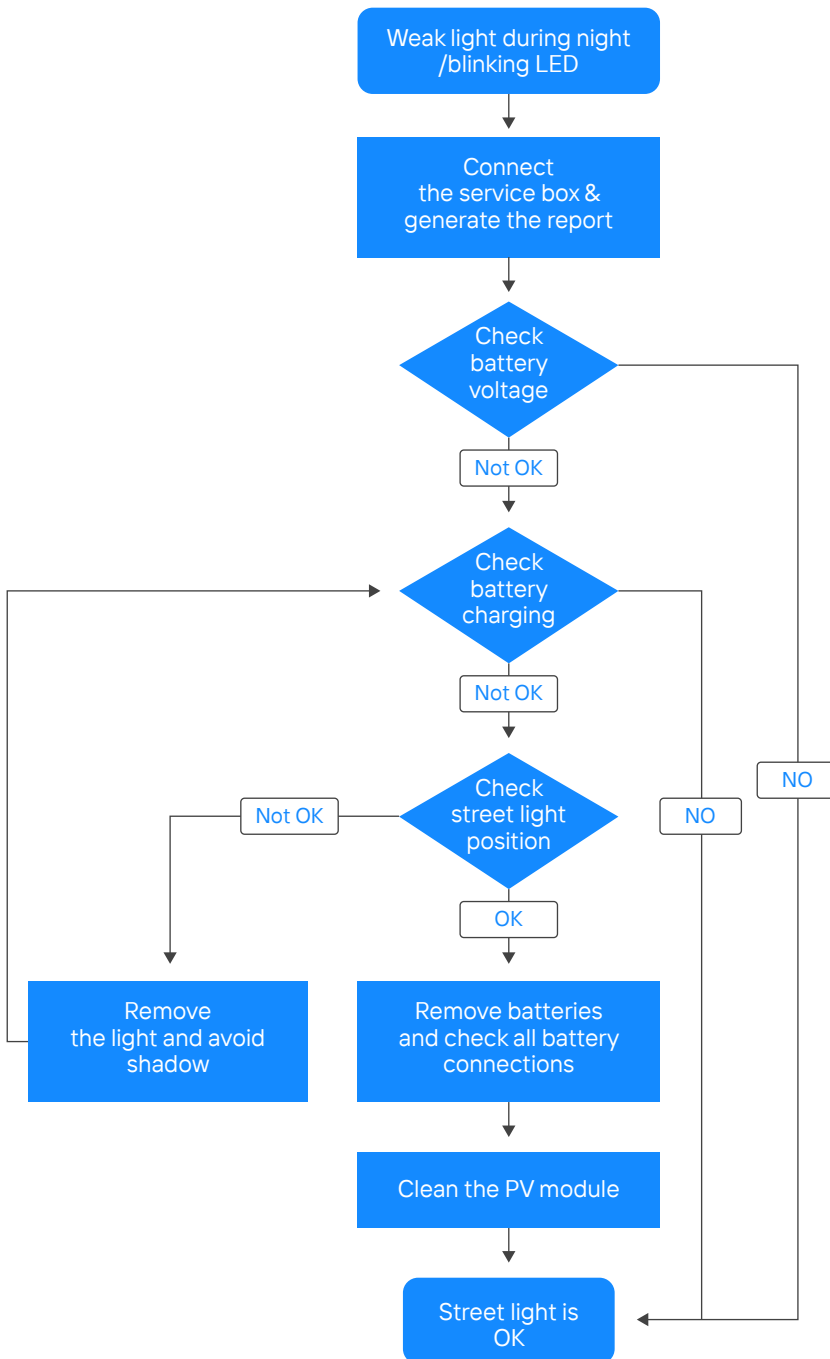
Battery

Type:	LiFePO4
Voltage:	13.413 V
SOC:	75 %
Charge Current:	2.2 A
End of Charge Voltage:	14.100 V

- *Batteries' voltage must be > 12V.*
- *Batteries' charging current must be > 1A.*