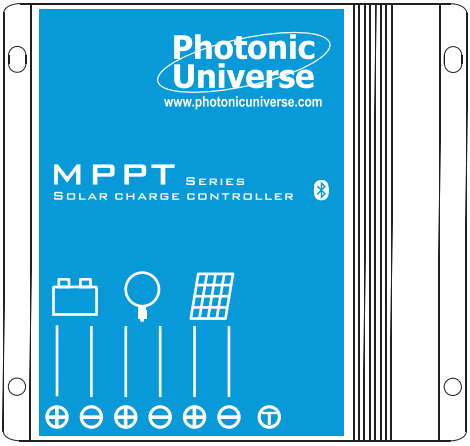
LUX WP series

Bluetooth Communication

MPPT solar charge controller

10A/15A/20A



User Manual

CE, UKCA, Rohs, ISO9001:2015
Subject to change without notice

Solar charge controller LUX WP series User Manual

Dear Clients,

Thank you for selecting the **LUX WP** series solar controller. Please take time to familiarise yourself with this user manual, as it will help you take full advantage of the controller's features. This manual provides important information for installing, using, and programming the solar controller. Read this manual in full before installing or connecting the solar controller.

1.Functions

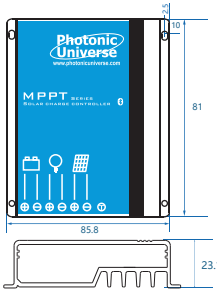
The **LUX WP** series intelligent MPPT solar controller is programmable , waterproof and well-suited for a wide range of solar systems. The charging efficiency of this controller is higher than a traditional PWM controller, helping to get the most out of the solar panel.

The controller comes with the following features and advantages:

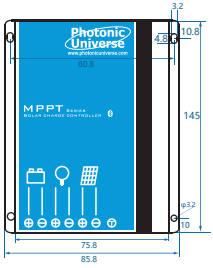
- Innovative Maximum Power Point Tracking (MPPT) technology, tracking efficiency >99.9%
- High charge conversion efficiency up to 96.5%
- Adjustable 5-stage timer for load output
- Uses high performance, ultra-low power consumption Bluetooth dedicated chip
- Works with Bluetooth 5.0 and BLE technology
- Suitable for Gel, Liquid, AGM and Lithium battery
- Four stage charging: MPPT, boost, equalization, float
- 0℃ charging Protection (Lithium)
- When BMS power off because of LVD, it can activate the system automatically
- Day/Night threshold can adjust automatically
- Waterproof IP67, strong and durable aluminum case
- Full automatic electronic protection function

2.Dimensions

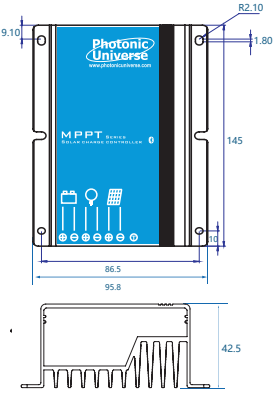
Unit: mm



LUX1012WP-BT



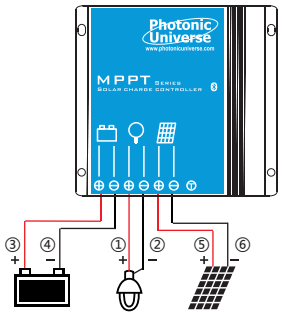
LUX1524WP-BT



LUX2024WP-BT

3.Installation

The following diagram provides an overview of the terminals. Please make sure to follow the proper order of connection.



1. Connect the load first with the corresponding red (positive) and black (negative) cables. These connections are optional.
2. Connect the battery (via a fuse) with the corresponding positive and negative cables. The load should turn on.
3. Connect the panel with the corresponding positive and negative cables. The controller should start charging.
4. Confirm the LED display status using the table in section **8.1**. For any problems use the section **8.2**.

Make sure the wire length between battery and controller is as short as possible. Recommended wire size: 2.5mm² for 10A, 4.0mm² for 15A and 20A.

4.Starting up the controller

4.1 Self Test

As soon as the controller is powered, it starts a self test routine. After this, the LED display will change to normal operation.

4.2 System Voltage

The controller can be used with Lithium, AGM, Liquid and Gel batteries, but the factory default setting is suitable for Gel battery. It is your responsibility to check and ensure that these settings are correct for your battery, otherwise they must be amended.

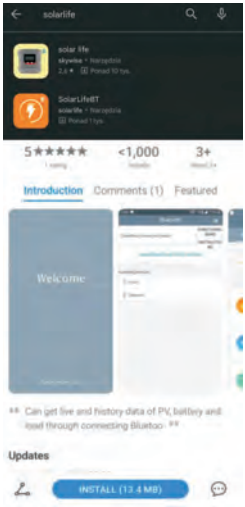
When the controller is set to Lithium battery, the charging target voltage and charging recovery voltage can be set according to the user requirements.

If the battery voltage on start-up is 10V-15V , the controller infers a 12V system when the controller is set to Gel, Liquid or AGM battery. If the battery voltage is not within the normal operating range (10 to 15V) at start-up, please refer to **8.2 Faults & Alarms**.

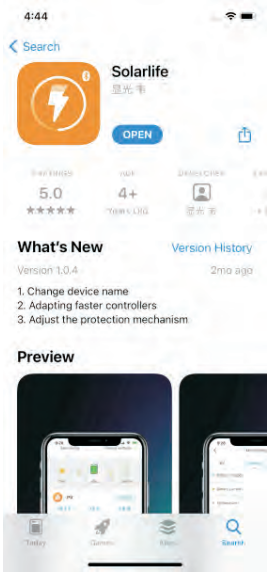
5.App installation

Search for "solarlife BT" in Google play or "solarlife" in Apple store and download and install it. For detailed instruction and settings, please read the Bluetooth APP user manual.

Android APP



iOS APP



6.BlueTooth

The controller has Bluetooth communication function, the Bluetooth module of the controller can be connected to a mobile phone after installing the APP.

The APP can view the real-time working status of the controller and set parameters, including device and battery parameters. For detailed operation, please read the "Bluetooth APP instructions".

6.1 Charging Voltage (Liquid/ GEL/AGM)

When choosing Liquid, GEL or AGM for battery type, the parameters of boost, equalization and float charging voltage can be set by the mobile phone APP. The range of parameters is provided below.

The following voltage parameters are given as reference values for a 12V system at 25℃ (multiply x2 for 24V).

Charging stage	Charging voltage range	Default charging voltage
Boost	14.0~14.8V	14.5V
Equalisation	14.0~15.0V	14.8V
Float	13.0~14.5V	13.7V

6.2 Charging Voltage Parameters(Lithium)

When choosing the lithium battery type, the overcharge protection and overcharge recovery voltage of lithium battery can be set by the mobile phone APP.

Overcharge protection voltage (CVT): 10.0-17.0V

Overcharge recovery voltage (CVR): 9.2-16.8V

(Overcharge Recovery Voltage+1.5V)≥Lithium Overcharge Protection Voltage≥(Overcharge Recovery Voltage+0.2V)

The required accuracy of PCM shall be at least 0.2V. If the deviation is higher than 0.2V, the manufacturer will assume no liability for any system malfunction caused by this.

6.3 Low Voltage Disconnect (LVD)

When the battery voltage drops below the LVD voltage, the controller will disconnect the load to prevent deep discharge of the battery. If this occurs, the battery should be well charged before resuming use.

1. Lithium Battery

LVD range: 9.0~15.0V (default: 9.0V).

2. Gel, Liquid and AGM Battery

The low voltage protection of the controller can be divided into two types:

battery voltage control and capacity control.

a. Battery voltage control

Low voltage disconnect setting range:
10.8~11.8V (default: 11.2V).

b. Battery capacity control

Low voltage disconnect setting range: Soc1~Soc5

Soc	Low voltage protection range
Soc1	11.0~11.6V
Soc2	11.1~11.7V
Soc3	11.2~11.8V
Soc4	11.4~11.9V
Soc5	11.6~12.0V

6.4 Low Voltage Reconnect (LVR)

If the low voltage disconnect is triggered, the controller will restore load connection only when the battery voltage increases above the LVR voltage.

1. Lithium Battery

LVR range: 9.6~16.0V.

2. Gel, Liquid and AGM Battery

LVR range: 11.4~12.8V.

The low voltage recovery voltage (LVR) should be higher than the low voltage disconnect voltage (LVD) by at least 0.6V. If you want to change LVD, you should first change LVR.

6.5 0℃ Charging (Lithium)

"0℃ Chg" can be set to "Yes", "Slow" or "No" . When the controller detects that the ambient temperature is higher than 0℃, the charging function is normal. When the ambient temperature drops below 0℃:

- If the "0℃ Chg" is set to "Yes", the charging function is normal.
- If the "0℃ Chg" is set to "Slow", the maximum charging current will be limited to 20% of the rated current.
- If the "0℃ Chg" is set to "No", the controller will not charge the battery.

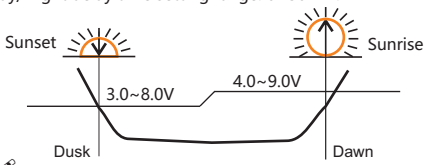
6.6 Day/Night Threshold, Day/Night Delay

The controller recognizes day and night based on the solar array open circuit voltage. This day/night threshold can be modified according to local light conditions and the solar array used.

Day/Night threshold setting range: 3.0~8.0V.

The actual time of turning on can be delayed by up to 30 minutes from the time the threshold was reached using the Day/Night delay setting (D/N delay).

Day/Night delay time setting range: 0~30min.



Day/Night threshold voltage of load disconnect is 1V higher than the setting data, meaning the load will disconnect when the solar voltage reaches 4.0~9.0V.

The controller will automatically adjust the day/night threshold. If the lowest solar voltage is higher than the day/night threshold, the load will have no output the first night, then 24 hours later the controller will automatically adjust the setting to produce output the following night.

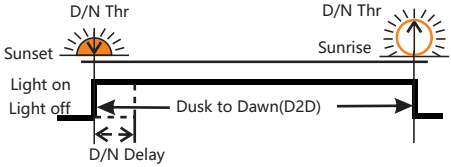
7. Load Output Timer Modes

LUX WP series controller has advanced day/night time control functions. The modes of lighting can be based on the user needs.

7.1 Standard(24H)

If "Time1" is set to "24H", the controller's load will always be powered on.

7.2 Dusk to Dawn (D2D)

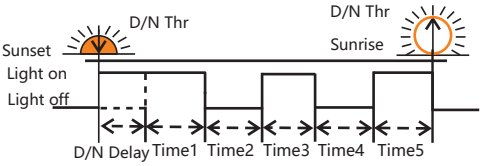


If "Time1" is set to "D2D", the controller works in dusk to dawn mode.

1.The dimming setting will still be active in this mode.

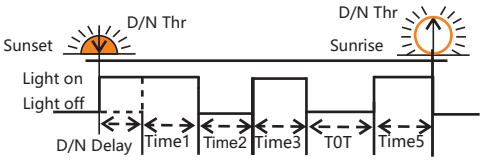
2. If "Time1" is set to D2D mode, "Time4" cannot be set to T0T mode.

7.3 Five-stage Night Mode



Time 1-5 and Dim 1-5 can be set individually to give variable load power throughout the night.

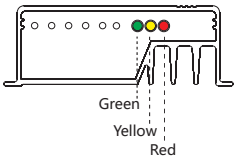
7.4 T0T mode (can set the load on time before dawn)



If "Time4" is set to "T0T", this mode is T0T mode. In this mode the controller will determine Time4 based on Time5 and the previous night's data on the time of sunrise.

While "Time4" is set to T0T mode, "Time1" cannot set to D2D mode.

8.LED indicators, Faults & Alarms



8.1 LED Display Explanation

LED	Status	Function
Green LED	On	Solar panel is correctly connected, but it is not actively charging
	Fast flash (0.1/0.1s)	MPPT charging
	Flash (0.5/0.5s)	Equal or Boost charging (Gel, Liquid or AGM)
	Slow flash (0.5/2s)	Float charging
Yellow LED	Off	Over voltage protection
	On	Battery is normal
	Slow flash (0.5/2s)	Battery voltage is low
	Fast flash (0.1/0.1s)	Low voltage protection
Red LED	Off	Normal working mode
	On	The output power is 0.
	Flash (0.5s/0.5s)	Over temperature
	Fast flash (0.1/0.1s)	Short circuit or over-current protection

8.2 Faults & Alarms

Fault	Status	Reason	Remedy
Loads are not powered	Low volt. protection	Low battery capacity	Recharge battery above LVR.
	Overcurrent, short circuit protection	Overload or load short-circuit	Switch off all loads, remove short-circuit, load will be reconnected after 1 minute.
	Over temp. protection	Controller temp. is too high	Controller will turn the system off until temperature is below 60 °C.
High voltage at battery terminal	Over voltage protection	Battery overvoltage >15.5V (Li: CVT+0.2V)	Check if other sources overcharge the battery. If not, the controller is damaged.
		Battery wires or battery fuse damaged, battery has high resistance.	Check battery wires, fuse and the battery.
Incorrect system voltage	All LED fast flashing	Battery voltage not in the right range	Charge or discharge the battery to correct the voltage
Battery is empty after a short time	Low voltage protection	Battery has low capacity	Change the battery
Battery not charging	Green LED is on	PV panel issue or reverse connection	Check the voltage and polarity of the solar panel connection

9. Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected *1	Protected	Protected *1
Short circuit	Protected *2	Protected *3	Switches off immediately
Over current	——	——	Switches off with a delay
Reverse Current	Protected	——	——
Under voltage	——	——	Switches off
Over temp.	The controller cuts off the load if the temperature reaches the set value.		

*1. Controller can protect itself, but load might be damaged.

*2.When the PV doesn't charge, the controller will not be damaged if short-circuit just happened in the PV array.

Warning: It is forbidden to short-circuit the PV array during charging .Otherwise, the controller may be damaged.

*3. Battery must be protected by a fuse.

Warning:
The combination of different error conditions may cause damage to the controller.

Always remove the error before you continue connecting the controller.

10. Safety Instructions and Liability Waiver

10.1 Safety

①The solar charge controller may only be used in PV systems in accordance with this user manual and with solar panels specifications in line with the requirements of this controller. No energy source other than solar panels may be connected to the solar charge controller.

②Batteries store a large amount of energy. Never short-circuit a battery under any circumstances. Always fit an in-line fuse or a circuit-breaker on the "+" wire between the battery and the controller, no more than 15cm from the battery terminal.

③Batteries can produce flammable gases. Avoid sparks and flames near the batteries. Make sure all connections are tight and the battery is fitted in a well ventilated area.

④Avoid touching or short circuiting wires or terminals. Be aware that the voltages on some terminals or wires can be several times greater than the battery voltage. Use isolated tools and only perform any work in a dry environment.

⑤Keep children away from batteries and the charge controller.

10.2 Liability Exclusion

The manufacturer shall not be liable for damages to the controller or battery caused by use other than as instructed in this manual, or if the battery manufacturer's recommendations are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorised person, unusual use, incorrect setup, or bad system design.

11.Technical Data

	Item		LUX1012WP-BT	LUX1524WP-BT	LUX2024WP-BT
Battery Parameters	Max Charging Current		10A	15A	20A
	System Voltage		12V	12V/24V automatic recognition	
	Max Input Solar Power		130W	200W/400W	260W/520W
	Max Voltage on Batt. Terminals		25V	35V	
	Battery Type		Lithium, Liquid, Gel, AGM (Programmable, default: Gel)		
	Liquid, Gel, AGM	MPPT Charging Volt.	<14.5V@25℃	<14.5/29V@25℃	
		Boost Voltage	14.0~14.8V @25℃	14.0/28.0~14.8/29.6V (Default: 14.5/29V @25℃)	
		Equalization Volt.	14.0~15.0V @25℃	14.0/28.0~15/30.0V (Def.: 14.8/29.6V @25℃ (Liquid, AGM)	
		Float Voltage	13.0~14.5V@25℃	13.0/26.0~14.5/29.0V (Default: 13.7/27.4V @25℃)	
		Low Volt. Disconnect	10.8~11.8V	10.8/21.6~11.8/23.6V (Default: 11.2/22.4V)	
		Reconnect Voltage	11.4~12.8V	11.4/22.8~12.8/25.6V (Default: 12.0/24.0V)	
		Overcharge Protect	15.5V	15.5/31.0V	
		Temp. Compensation	-4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float)		
	Lithium	Charging Volt. target	10.0~17.0V	10.0~32.0V (Lithium, Programmable)	
		Charging Volt. recovery	9.2~16.8V	9.2~31.8V (Lithium, Programmable)	
		Low Volt. disconnect	9.0~15.0V	9.0~30.0V (Lithium, Programmable)	
		Low Volt. reconnect	9.6~16.0V	9.6~31.0V (Lithium, Programmable)	
		0℃ Charge Protection	Yes, No, Slow (Default: Yes)		
Panel Parameters	Max Voltage on PV terminals		45V	55V *1	
	Dusk/Dawn detect volt.		3.0~8.0V	3.0~20.0V (Programmable)	
	Day/Night delay time		0~30Min (Programmable)		
	MPPT tracking range		(Battery Voltage + 1.0V) ~ Voc*0.9 *2		
	Max tracking efficiency		>99.9%		
Load	Output Current		10A	15A	20A
System Parameters	Max charge conversion		96.5%	97.5%	
	Self consumption		10mA	12mA	
	Dimensions		85.8 * 81 *23.1mm	85.8 * 145 * 30mm	95.8 * 145 * 42.5mm
	Weight		260g	600g	730g
	Ambient temperature		-35~+60℃		
	Ambient humidity		0~100%RH		
	Protection degree		IP67		
	Max Altitude		4000m		

***1. PV panel Voc can not exceed this value at any temperatures, otherwise it will damage the controller.**
***2. Voc means the open circuit voltage of the solar panel.**

v.7.5