



# LI POWER

## DCDC MPPT Solar Charger User Manual

Version A1.1

## **1.0 General Safety Instruction**

### **1.1 Safety Instruction**

As dangerous voltages and high temperature exist within the charger, only qualified and authorized maintenance personnel are permitted to open and repair it. Please make sure charger is turned off before open and repair it.

This manual contains information concerning the installation and operation of the charger. All relevant parts of the manual should be read prior to commencing the installation. Please follow the local stipulation meantime.

Any operation against safety requirement or against design, manufacture, safety standard, will be out of the manufacturer warranty.

### **1.2 General Precaution**

#### **1.2.1**

To avoid fire and electric shock, make sure all cables selected with right gauge and being connected well. Smaller diameter and broken cable are not allowed to use. Adding fuse on cable as protection is always recommended.

#### **1.2.2**

Never place unit directly above batteries, gases from a battery will corrode and damage charger.

#### **1.2.3**

Do not place battery over charger.

## **1.3 Precaution regarding battery operation**

### **1.3.1**

Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.

### **1.3.2**

The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of a battery.

### **1.3.3**

Do not put the metal tool on the battery, spark and short circuit might lead to explosion.

### **1.3.4**

REMOVE all personal metal items such as rings, bracelets, necklaces, and watches while working with batteries. Batteries can cause short-circuit current high enough to make metal melt, and could cause severe burns.

## 2.0 Description of main functions

### 2.1 General Description

DCDC MPPT Solar charger could draw power from smart alternator (For LX and LIX series) or from smart alternator as well as from solar panel (For LPX and LPDX series), to perform a proper charging for service battery while you are driving or parking. Upon charging from solar panel (For LPX and LPDX series), Max Power Point Tracking (MPPT) built inside could maximize the charging from PV at any environment.

DCDC MPPT Solar charger is compatible with Smart Alternator (Euro 6) which delivers a variable output when they are not needed. It can maintain the charging with a stable output in this situation, free from rpm or speed, to assure your battery getting a fully charging in a shortest time. Upon connecting with PV (For LPX and LPDX series), it will offer a maintenance charging to your starter battery to eliminate the engine starting problem.

DCDC MPPT Solar charger featured IP65 design with metal die cast casing allows it to maintain the output under the harshest environments in high ambient temperature.

- Dual inputs from alternator and solar panel (PV input function is available to LPX and LPDX series only)
- Compatible with smart alternator – Euro 6
- Assure the full charging of service battery avoiding harmful sulphate crystals on the lead plate and stratification of battery acid
- TBB premium II multiple stages charging algorithm for lead acid battery
- Built-in automatic temperature and voltage compensated battery charging
- Battery isolation of starter battery and service battery
- Max Power Point Tracking (MPPT) technology with 30% more energy harvest (For LPX and LPDX series)
- Die cast metal structure for better performance under high temperature

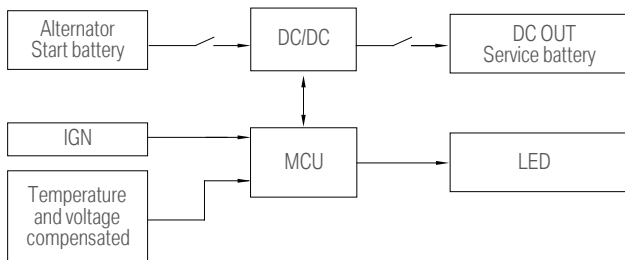


DCDC MPPT Solar charger is categorized as below 4 series:

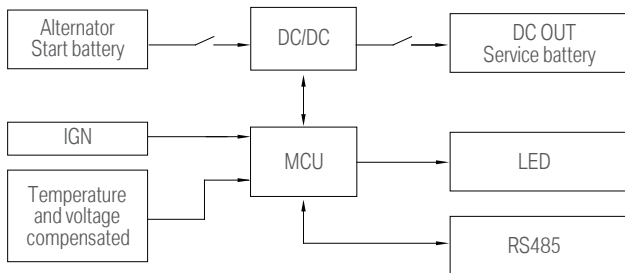
1. Item number: LP1230 Featured as a converter charger with no PV input, not compatible with RS485.
2. Item number: LPX1230 Featured as a converter charger with PV input, not compatible with RS485.
3. Item number: LPDX1230 Featured as a converter charger with PV input, compatible with RS485.
4. Item number: LIX1230 Featured as a converter charger with no PV input, compatible with RS485

## 2.2 Principle Diagram

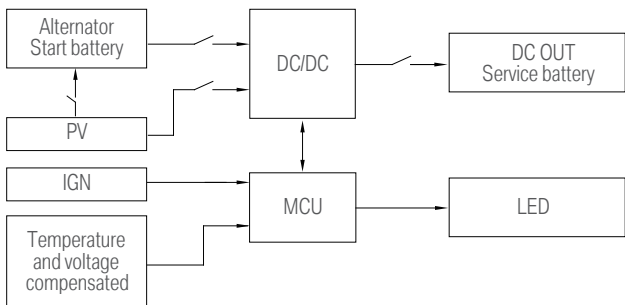
### 2.2.1 LX1230 Principle Diagram



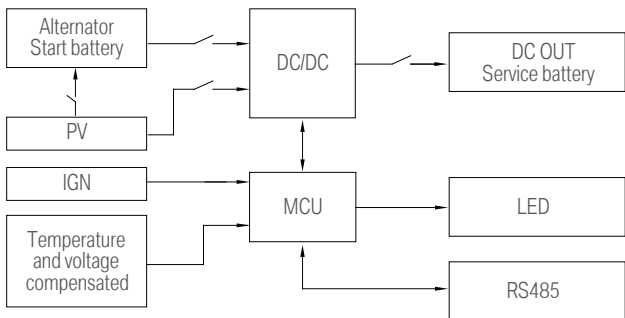
### 2.2.2 LIX1230 Principle Diagram



### 2.2.3 LPX1230 Principle Diagram



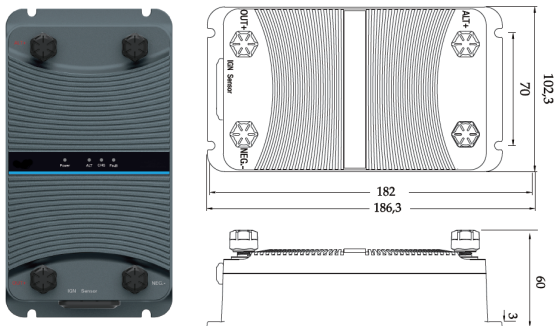
### 2.2.4 LPDX1230 Principle Diagram



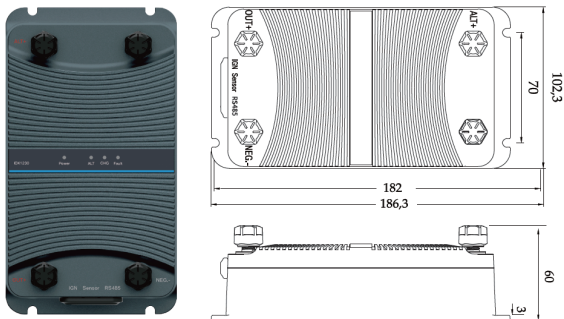
## 3.0 Structure

### 3.1 Terminal and panel definition

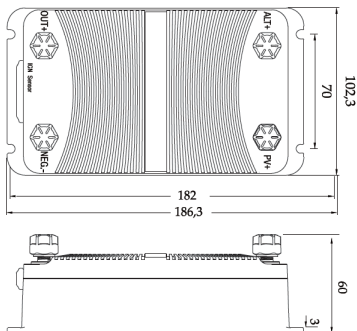
#### 3.1.1 LX1230 Connectors and Terminals



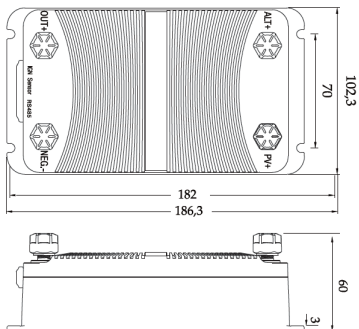
#### 3.1.2 LIX1230 Connectors and Terminals



### 3.1.3 LPX1230 Connectors and Terminals



### 3.1.4 LPDX1230 Connectors and Terminals



### 3.1.5 Connectors or Terminals Description

NO.	Definition	Description
1	ALT+	Alternator IN + 、 Start battery +
2	PV+	PV IN + (For LPX and LPDX series)
3	OUT+	Service battery +
4	NEG.-	Common Negative PV -(For LPX and LPDX series), Alternator/Starter battery - , Service battery -
5	IGN	Ignition feedback wire (Red wire connecting IGN+,black wire connecting IGN-.)
6	Sensor	temperature and voltage compensated battery charging
7	RS485	Communication - RS485(For LIX and LPDX series)

## 4.0 Preparation and Configuration

### 4.1 Material list

The unit is packed with following materials. Please confirm the series number on charger is same to that on outer carton.

- Converter Charger
- User's manual

### 4.2 Location

Please install the equipment in a location of Clean, Cool with good ventilation.

- Working temperature :  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$
- Storage temperature :  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

### 4.3 Wiring and Fuse recommendation

Please find the following recommended cable size as well as fuse. Fuse was recommended to be connected on cable connecting charger and service battery.

#### Fuse recommendation

Model	Rated current	Recommended fuse
LX1230,LIX1230,LPX1230, LPDX1230	30A	45A

#### Wiring recommendation

Model	Rated current	Recommended wire			
		1M	2M	5M	10M
LX1230,LIX1230,LPX1230, LPDX1230	30A	6 mm <sup>2</sup> or AWG9	10 mm <sup>2</sup> or AWG7	16 mm <sup>2</sup> or AWG5	25 mm <sup>2</sup> or AWG3

## 5.0 Installation and Connection



For the user operation safety, cut off the power before installation.



Please double check the battery voltage matching the model installed

### 5.1 General advice

Select a suitable place to install the converter charger, assuring the adequate ventilation to the charger metal body, free from excessive heat and vibration. The electronics are enclosed in a sealed housing. However, the converter charger is NOT designed to be installed in a location where water might short between terminals.

- All cables installed must be fused. The fuse should be installed as close as possible to the power source. Please refer to chapter 4.3 for recommended fuse rating.
- Connections from the battery must be fused close to the battery
- Using M5 to secure the charger in a solid surface

### 5.2 Connecting the power cable



Please assure the correct polarity upon connection. Reverse polarity will burn the fuse or damage the charger.



Upon installing this unit on Euro6 engine, please connect IGN feedback wire to alternator.

1. For safety, please always connect ground (NEG.-) first and then connect the service battery positive, starter battery positive and PV positive respectively (For LPX and LPDX series).
2. Connecting the negative power cable to the Converter Charger, and connecting the other end of negative cable to main battery negative or directly to the chassis, ensuring the solid contact.
3. Connecting the cable between terminals marked OUT+ on converter charger to the service battery positive. Check the in-line fuse is removed prior to connecting the cable and insert in afterwards.

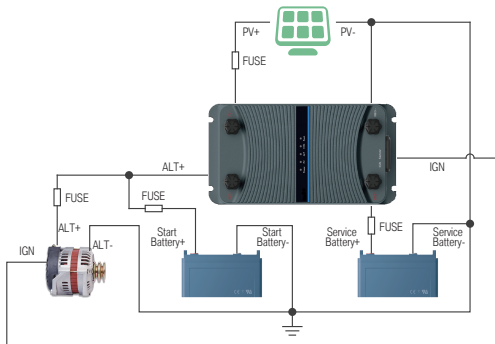


- Connecting the cable between terminals marked ALT+ on converter charger to the starter battery positive. Check the in-line fuse is removed prior to connecting the cable and insert in afterwards.
- Connecting the ignition wire, you could extend the wire, using AWG22.Red wire connecting IGN+,black wire connecting IGN-.
- Connecting the cable between terminals marked PV+ on converter charger to the PV positive. Check the in-line fuse is removed prior to connecting the cable and insert in afterwards(For LPX and LPDX series).

### 5.2.1 with both PV and Alternator input(suitable for LPX and LPDX series only)

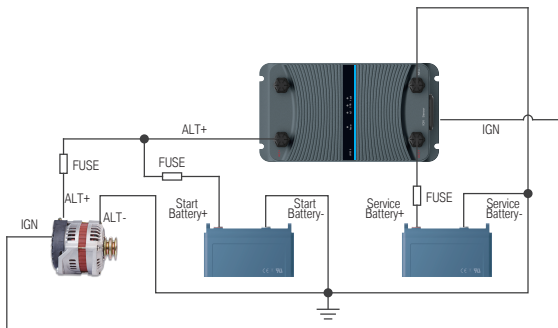


The Voc of this converter charger of PV input is 25Vdc(open circuit voltage). Please double check the solar panel you are going to install matching the maximum voltage of PV input.



- The service battery will be charged from alternator and solar panel in together.
- Service battery will be fully charged quickly and efficiently free from engine speed or alternator voltage
- The solar panel will charge battery at its maximum power point upon engine is off to maximize the energy harvest.
- The starter battery will be maintained by solar panel after service battery was charged.

### 5.2.2 With Alternator input



### 5.3 Connecting the battery compensation wire

- Please refer to following pictures of M8 connector, inside of which has built in temperature sensor and voltage sensor.
- Please connect it to the POSITIVE terminal of service battery.



## 6.0 Operation

### 6.1 Double Check

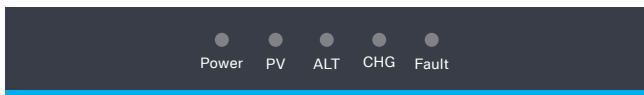
- Voltage of battery match the charger installed
- Right polarity of cable connection
- Voltage sensor was installed on positive terminal of battery
- Ignition wire (IGN) was installed

### 6.2 LED Description

#### 6.2.1 For LX and LIX series



#### 6.2.2 For LPX and LPDX series



LED	Color	Status	Description
Power	Green	Solid ON	Input normal
PV(For LPX and LPDX series)	Green	Solid ON	PV input normal, charging with MPPT
		Slow Flashing (once per second)	PV input normal but synchronized with alternator charging
		Quick Flashing (twice per second)	PV input overvoltage
ALT	Green	Solid ON	Alternator is charging, with normal input voltage
		Slow Flashing (once per second)	Alternator input normal but synchronized with PV charging(For LPX and LPDX series)
		Quick Flashing (twice per second)	Alternator input overvoltage
CHG	Green	Flashing	Battery charging
		Solid ON	Battery charged
		OFF	No charging
Fault	Red	Flashing	Battery overtemp, Converter Charger over temp
		Solid ON	Output overvoltage, short circuit








### 6.3 LED indicator at normal working status

● ON    ○ OFF    ⊗ Slow Flashing    ⊕ Quick Flashing

NO.	LED indicator status	Description
1		Only PV was connected, battery was being charged by PV at absorption stage (For LPX and LPDX series).
2		Only PV was connected, battery was being charged by PV at float stage. Starter battery was maintained by PV as well (For LPX and LPDX series).
3		Only alternator was connected, battery was being charged by alternator at absorption stage.
4		Only alternator was connected, battery was being charged by alternator at float stage.
5		Both alternator and PV were connected, battery was being charged by PV at absorption stage (For LPX and LPDX series).
6		Both alternator and PV were connected, battery was being charged by PV at float stage (For LPX and LPDX series).
7		Both alternator and PV were connected, battery was being charged by alternator at absorption stage (For LPX and LPDX series).
8		Both alternator and PV were connected, battery was being charged by alternator at absorption stage (For LPX and LPDX series).
9		Both alternator and PV were connected, battery was being charged by both alternator and PV at absorption stage (For LPX and LPDX series).
10		Both alternator and PV were connected, battery was being charged by both alternator and PV at float stage (For LPX and LPDX series).

## 6.4 LED indicator at abnormal status

● ON    ○ OFF    ⊗ Slow Flashing    ⊕ Quick Flashing

NO.	LED indicator status	Description
1		PV overvoltage (For LPX and LPDX series)
2		Alternator input over voltage
3		Internal over temp
4		Battery over temp
5		Output short circuit
6		Output overvoltage
7		Input voltage too low or converter charger failure

## 7.0 Specification

Model No.	LX1230	LIX1230	LPX1230	LPDX1230
<b>Electrical</b>				
Input nominal voltage	12 VDC			
Alternator input voltage range (Intelligent type)	12 - 16 VDC(Low Voltage Disconnect:11.6V)			
Alternator input voltage range (tradition type)	13.2 - 16 VDC(Low Voltage Disconnect:12.8V)			
Automatic activation - D+	yes			
PV Input voltage range	N/A	12 - 25 VDC(Low Voltage Disconnect:11.6V)		
Output nominal voltage	12 VDC			
Absorption voltage	AGM Battery: 14.4V; LFP Battery: 14.6V			
Float voltage	AGM Battery: 13.5V; LFP Battery: 13.8V			
Charge current (A)	30			
Efficiency	MAX 97%			
Temperature compensation	yes			
Voltage compensation	yes			
Charge algorithm	TBB premium II multi stage			
Protection	Battery charger over temperature; Battery over temperature; Over load; short circuit			
Operating temp	-20 °C -- +60 °C			
<b>Enclosure</b>				
Material & Color	Aluminum with anodized, flame proof plastic			
Battery connection	M8			
Protection category	IP65			
Weight	0.8 kg			
Dimensions (h*w*d)	60 mm x 102.3 mm x 186.3 mm			
<b>Standards</b>				
Safety	EN60335-1,EN60335-2-29			
Emission	EN55014-1,EN55014-2,EN61000-3-2,EN61000-3-3			
Communication	N/A	RS485	N/A	RS485

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