

SOL20P12LFP-56B1N

Solar & PoE Battery Charger

USER'S MANUAL



Mstronic Co., Ltd.

Features:

- Dual Input, from solar panel and PoE (Solar First) to charge 12V battery,
- Dual outputs: 56V PoE output on RJ45 (front) and 12VDC on terminal block (rear)
- PoE Output support 802.3at/bt handshake
- Support Gigabit Ethernet
- DIN Rail Mountable

Applications:

- Remote Power Systems; Surveillance, Sensors
- Wireless Station; AP/Client/Repeaters
- UPS Systems; Lighting, Fences, Gates

Protection:

- Battery Polarity Reverse Protection
- Battery Over Charge Protection
- Battery Over Discharge Protection
- Solar Panel Polarity Reverse Protection
- Solar Panel Over Charge Protection
- Output Short Circuit Protection
- Output Over Voltage Protection
- POE Output Short Circuit Protection
- Externally fused with a standard replaceable fuse

Panel Description:

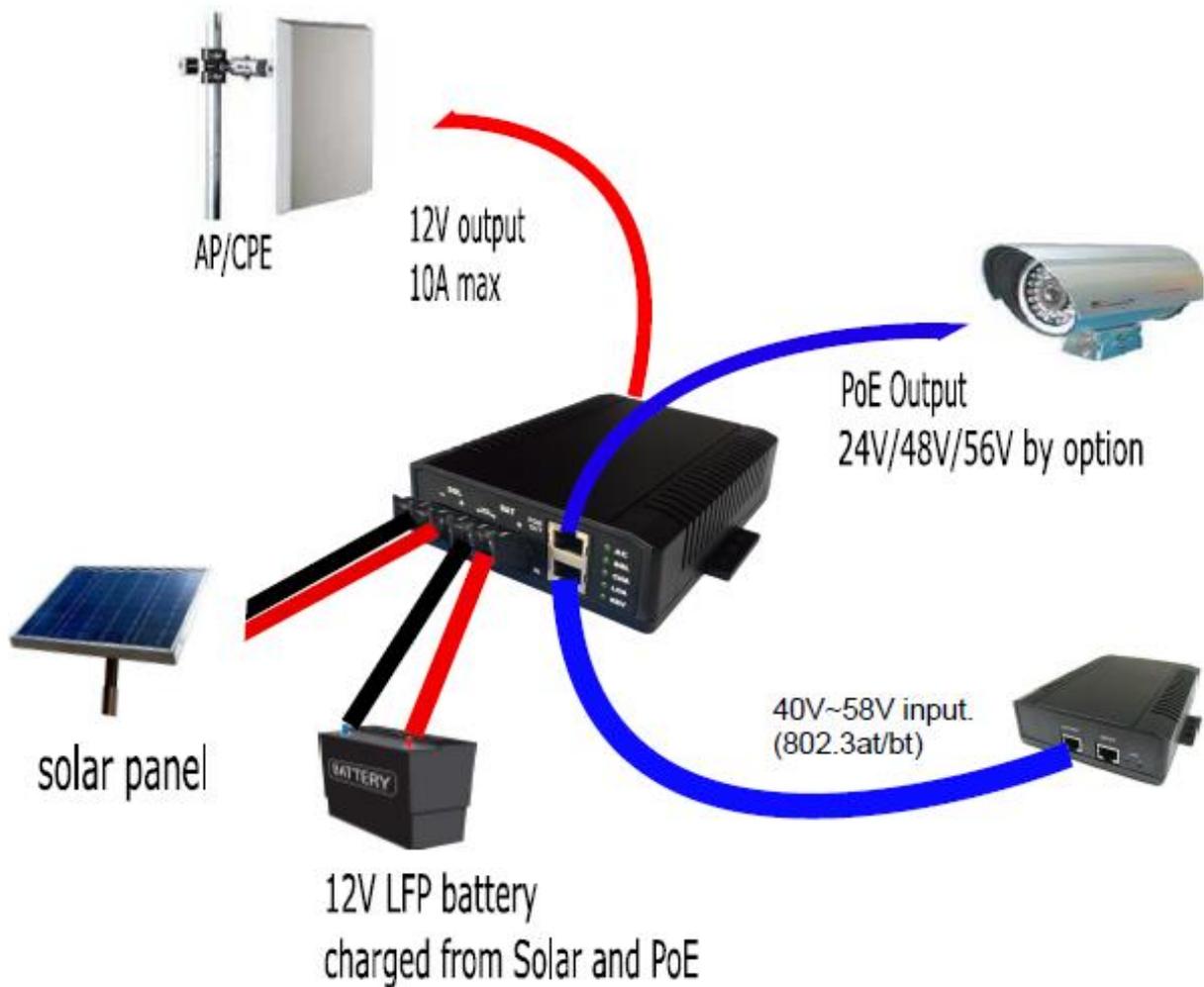


Item	Name	Descriptions
1	POE :	<u>PoE power input indicator</u> : the LED lights when the PoE input jack (the lower jack) has 40V~58V input. (802.3at/bt)
2	SOL :	<u>Solar power input indicator</u> : the LED lights when SOL terminal is connecting to a solar panel and the solar panel input voltage is over 12V.
3	CHA :	<u>Charging indicator</u> : the LED lights when BAT terminal is connected to battery and charging
4	LOA :	<u>Loading indicator</u> : the LED lights when the rear panel output terminal is connecting to a device and offering power. The LED always on when power ready.
5	REV :	<u>Battery polarity reverse indicator</u> : the LED lights when the battery polarities are reversed. (detail description see Sec. 5.1)
6	IN :	<u>PoE Input Jack</u> : the lower RJ45 jack, used for PoE input. Allowed input voltage 40~58V
7	OUT :	<u>PoE Output Jack</u> : the upper RJ45 jack, used for PoE output; Output voltage depends on what model you selected.
8	FUSE	<u>Fuse</u> : for output over current protection, limiting the battery output current <= 20A.
9	SOL :	<u>Solar Panel Terminal</u> : used to connect the solar panel.
10	BAT :	<u>Battery terminal</u> : used to connect the battery.
11	LOA :	<u>Load Terminal</u> : for wire size 12~16AWG, the output voltage is the same as battery voltage.

Operation Guide

1. Connect the battery to the **BAT** terminal. Make sure the polarities are correctly connected. Sequentially connect the solar panel to **SOL** terminal and connect POE source to **PoE** input (lower) jack.
2. Make sure the battery is properly connected to the unit. If no battery is connected, then the voltage at **BAT** terminal will no voltage.
3. The solar panel cannot be used stand alone without battery connected.
4. When a solar panel and PoE input are connected to the charger, if the voltage of solar panel is higher than 15V, then solar panel is always the main power source of the charger.
5. When charge from solar panel, as the battery full and turn to floating stage, the **CHA** light will start flash.
6. When battery connect to **BAT** terminal and with valid voltage, then the **LOA** indicator will always light on even no load connected.
7. **LOA** It can be two parallel outputs on the rear panel, make sure the total draw is not over the limit.
8. The V- of PoE input, Solar input, and battery(-) are not the same grounding, must be properly isolated.

- 9. After connecting the battery, if only PoE is used to provide battery charging power, it must be noted that the power provided by PoE must be greater than the charging demand power (must be greater than 35W)



Electrical specifications

1. INPUT

1.1 Two Input Source:

A. Solar Panel : 18V~25V (or instead by DC14.4V connect front panel terminal)

B. POE : 802.3at 35W, 802.3bt 75W/90W, DC IN

2. OUTPUT

2.1

Output 1 (front panel RJ45)	Output 2 (rear panel Terminal)
56V/0.625A (45+/78-) (regulated)	12V/10A (as Bat. Volt.)

2.2 Battery Charge Current:

A. Solar Panel: depends on the solar panel, 20A max,

B. POE: fixed current, 2.6A max.

3. Battery Types:

12V LFP26650 LiFePO4 Battery (200Wh ~ 800Wh) (spec as last page.)

4. POE : IEEE-Specified Power Allocations, Single-Signature PD

PSE (Single-Signature PD)*(1)	Load Terminal Watts*(2)
802.3at 35W(PSE)/25W(PD)	19.7W max.
802.3bt 75W(PSE)/62W(PD)	51.1W max.
802.3bt 90W(PSE)/71.3W(PD)	62W max.
DC by 112W Output	73W max.

*(1) According to the 802.3bt specification, the power at the PD input is fixed

*(2) After deducting internal loss and efficiency, the output power value is obtained

PD CLASS	PSE OUTPUT POWER	ALLOCATED CABLING LOSS	PD INPUT POWER

7	75W	13W	62W
8	90W	18.7W	71.3W

4.1 When charging from PoE, you must note that the power provided by PoE must be greater than the power required for charging.

4.2 Under the PoE input condition, it will give priority to meet the needs of the load terminal. Second, meet the battery charging needs.

4.3 If PoE cannot meet the demand of the load terminal, the battery will change from charging to discharging the load terminal to meet the demand of the load terminal.

5. Protection:

5.1 Battery Polarity Reverse Protection:

If only battery connected to terminal, when the battery polarities were reversed, the model will stop output and REV indicator light on. When the battery be removed and re-connected to terminal, the function will be enable.

5.2 Battery Over Discharge Protection:

Cuts off the load when the battery voltage is lower than $10.5V \pm 0.2V$, and auto recover when the battery voltage returns to $12.2 V \pm 0.3V$

5.3 Battery Over Charge Protection:

Fuse control, over 20A, the fuse will be burnt.

5.4 Solar Panel Polarity Reverse Protection:

When solar panel polarity be reversed, the charger stop output, it won't damage the charger or end device

5.5 Solar Panel Over Charge Protection:

When charge current over 20A, the fuse will be burnt.

5.6 Output Short Circuit Protection:

When the rear output terminal or PoE output be short circuit, protection be active, the product stop output and auto-recover when the terminal back to normal connection.

5.7 Battery Output Current Limit:

The fuse will be burnt when battery output current over 20A

5.8 Load Output Voltage Limit:

The output voltage of the rear terminal is the same as battery.

5.9 Battery Charge Voltage : (POE Input)

$$E/Q = 14.5V \pm 0.1V$$

$$F/L = 13.5V \pm 0.2V$$

When the charger is in charging mode and charge current is more than 1.8A. charge voltage for battery is $14.5V \pm 0.1V$ when charge current is lower than 1.7A . charge voltage for battery is $13.5V \pm 0.2V$.

5.10 Battery Charger Voltage : (Solar input)

$$\text{Charge Voltage} = 14.7 V \pm 0.2V$$

(when use solar as the power source, it is not a continuous source, the charge voltage should be higher, to shorten the charge time.)

4. GENERAL DESCRIPTION

6.1	Operation Temperature:	-40 - +60 Degree
6.2	Storage Temperature:	-40 - +85 Degree
6.3	Operation Humidity:	5% - 90% non-condensing
6.4	Cooling:	Free air cooling
6.5	SIZE	150*118*40mm (L*W*H)

5. Pin out: @1000M

Pin	RJ-45 Input (Data & Power) Compliant to 802.3af/at		RJ-45 Output (Data & Power) Depends on individual models	
	Symbol	Description	Symbol	Description
1	(+/-)Vdc + BI_DA+	power(+/-)+Data Pair A+	BI_DA+	Data Pair A+
2	(+/-)Vdc + BI_DA-	power(+/-)+Data pair A-	BI_DA-	Data pair A-
3	(+/-)Vdc + BI_DB+	power(+/-)+Data Pair B+	BI_DB+	Data Pair B+
4	(+/-)Vdc + BI_DC+	power(+/-)+Data Pair C+	Vdc + BI_DC+	power(+)+Data Pair C+
5	(+/-)Vdc + BI_DC-	power(+/-)+Data Pair C-	Vdc + BI_DC-	power(+)+Data Pair C-
6	(+/-)Vdc + BI_DB-	power(+/-)+Data Pair B-	BI_DB-	Data Pair B-
7	(+/-)Vdc + BI_DD+	power(+/-)+Data Pair D+	Vdc - BI_DD+	power(-)+Data Pair D+
8	(+/-)Vdc + BI_DD-	power(+/-)+Data Pair D-	Vdc - BI_DD-	Power(-)+Data Pair D-

Note :

1. the model is isolated design,
LFP battery Spec.

Battery Management System (BMS)

The BMS will:

1. Disconnect or shut down the load whenever the voltage of a battery cell decreases to less than 2,5V.
2. Stop the charging process whenever the voltage of a battery cell increases to more than 4,2V.
3. Shut down the system whenever the temperature of a cell exceeds 50°C.

See the BMS datasheets for more features

Battery specification						
VOLTAGE AND CAPACITY	LFP-Smart 12,8/60	LFP-Smart 12,8/90	LFP-Smart 12,8/100	LFP-Smart 12,8/160	LFP-Smart 12,8/200	LFP-Smart 12,8/300
Nominal voltage	12,8V	12,8V	12,8V	12,8V	12,8V	12,8V
Nominal capacity @ 25°C*	60Ah	90Ah	100Ah	160Ah	200Ah	300Ah
Nominal capacity @ 0°C*	48Ah	72Ah	80Ah	130Ah	160Ah	240Ah
Nominal capacity @ -20°C*	30Ah	45Ah	50Ah	80Ah	100Ah	150Ah
Nominal energy @ 25°C*	768Wh	1152Wh	1280Wh	2048Wh	2560Wh	3840Wh
*Discharge current $\leq 1C$						
CYCLE LIFE (capacity $\geq 80\%$ of nominal)						
80% DoD	2500 cycles					
70% DoD	3000 cycles					
50% DoD	5000 cycles					
DISCHARGE						
Maximum continuous discharge current	120A	180A	300A	320A	400A	600A
Recommended continuous discharge current	$\leq 60A$	$\leq 90A$	$\leq 100A$	$\leq 160A$	$\leq 200A$	$\leq 300A$
End of discharge voltage	11V	11V	1000A	11V	11V	11V
OPERATING CONDITIONS						
Operating temperature	-20°C to +50°C (maximum charge current when battery temperature $< 0^\circ C$: 0,05C, i.e. 10A in case of a 200Ah battery)					
Storage temperature	-45°C to +70°C					
Humidity (non-condensing)	Max. 95%					
Protection class	IP 22					
CHARGE						
Charge voltage	Between 14V and 14,4V (14,2V recommended)					
Float voltage	13,5V					
Maximum charge current	180A	270A	300A	400A	500A	750A
Recommended charge current	$\leq 30A$	$\leq 45A$	$\leq 50A$	$\leq 80A$	$\leq 100A$	$\leq 150A$
OTHER						
Max storage time @ 25°C*	1 year					
BMS connection	Male + female cable with M8 circular connector, length 50cm					
Power connection (threaded inserts)	M8	M8	M8	M10	M10	M10
Dimensions (h \times w \times d) mm	240x285x132	249x285x160	249x293x168	317x335x228	297x425x265	347x425x265
Weight	12kg	16kg	18kg	33kg	42kg	51kg
*When fully charged						

PSE Spec.



LTC4291-1/LTC4292

4-Port IEEE 802.3bt PoE PSE Controller

FEATURES

- Four PSE Ports
 - Two Power Channels per Port
- Fully Compliant IEEE 802.3bt Type 3 and 4 PSE
 - Compliant Support for Type 1, 2, 3, and 4 PDs
- Low Power Path Dissipation per Channel
 - 150mΩ Sense Resistance
 - 30mΩ or Lower MOSFET $R_{DS(ON)}$
- Chipset Provides Electrical Isolation
 - Eliminates Optos and Isolated 3.3V Supply
- Very High Reliability Multipoint PD Detection
 - Connection Check Distinguishes Single-Signature and Dual-Signature PDs
- Continuous, Dedicated Per-Port Power and Current Monitoring
 - Per-Port Power Policing
- 1MHz I²C Compatible Serial Control Interface
- Pin or I²C Programmable PD Power Up to 71.3W
- Available in a 40-Lead 6mm × 6mm (LTC4292) and 24-Lead 4mm × 4mm (LTC4291-1) QFN Packages

APPLICATIONS

- PoE PSE Switches/Routers
- PoE PSE Midspans

DESCRIPTION

The LTC[®]4291-1/LTC4292 chipset is a 4-port power sourcing equipment (PSE) controller designed for use in IEEE 802.3bt Type 3 and 4 compliant Power over Ethernet (PoE) systems. The LTC4291-1/LTC4292 is designed to power compliant 802.3af, 802.3at, and 802.3bt PDs. The LTC4291-1/LTC4292 chipset delivers lowest-in-industry heat dissipation by utilizing low $R_{DS(ON)}$ external MOSFETs and 0.15Ω sense resistance per power channel. A transformer-isolated communication protocol replaces expensive opto-couplers and complex isolated 3.3V supply, resulting in significant BOM cost savings.

Advanced power management features include per-port 14-bit current monitoring, programmable current limit, and versatile fast shutdown of preselected ports. Advanced power management host software is available under a no-cost license. PD detection uses a proprietary multipoint detection mechanism ensuring excellent immunity from false PD identification. Autoclass and 5-event physical classification are supported. The LTC4291-1/LTC4292 includes an I²C serial interface operable up to 1MHz. The LTC4291-1/LTC4292 is pin or I²C programmable to negotiate PD delivered power up to 71.3W.

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Explanation : 4. POE : IEEE-Specified Power Allocations, Single-Signature PD

