



■ Features

- Can be connected to both PV、battery and load
- Supports multiple battery types
- MPPT with up to 99.9% efficiency
- Support solar panel 2 in series/more in parallel
- Complete charge and discharge protection mechanism
- Natural cooling
- 3 years warranty

■ Applications

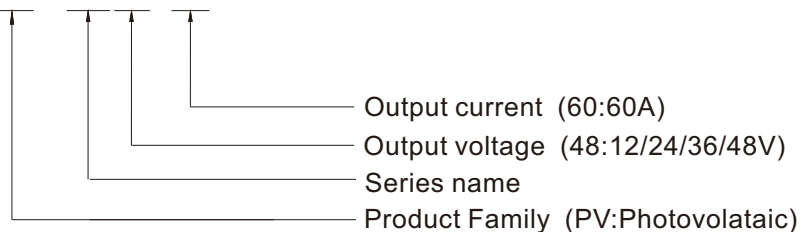
- Home photovoltaic
- Power for farms and ranches
- Communication base station
- Power for rural
- Island photovoltaic

■ Description

The PV-ML series is an MPPT solar controller that uses maximum power point tracking technology to optimize the power output of solar panels in real time. It automatically monitors changes in light conditions to ensure maximum energy extraction in all environments, increasing charging efficiency by 20% to 30%. The charger is widely used in home, commercial and portable solar systems and is compatible with a variety of battery types to ensure that users can charge quickly and efficiently, and promote the wider application of clean energy.

■ Model Encoding

PV - ML48 - 60










SPECIFICATION

MODEL		PV-ML48-60		
OUTPUT	BATTERY TYPE	Lead-acid / Li-ion / User Defined		
	RATED BATTERY VOLTAGE	12V/24V/36V/48Vdc Auto		
	NO LOAD POWER CONSUMPTION	1.2W		
	BATTERY VOLTAGE RANGE	9~70Vdc		
	RATED LOAD VOLTAGE	Equal to battery voltage 12V/24V/36V/48V		
	RATED CHARGING CURRENT	60A		
	RATED LOAD CURRENT	20A		
	MAX. CAPACITIVE LOAD	10000uF max		
	LOAD WORKING MODE	Light control, Light control + Time control, Manual control (default), Debugging mode, Normal open		
	MPPT CHARGING MODE	Buck		
INPUT	MAX. VOLTAGE OF OPEN CIRCUIT	150V(25℃) 145V(-25℃)		
	MPPT VOLTAGE RANGE	Battery voltage +2V ~120V		
	FREQUENCY RANGE	800W/12VBattery; 1600W/24VBattery; 2400W/36VBattery; 3200W/48VBattery;		
	MAX. CHARGING CONVERSION EFFICIENCY	≤98%		
	MPPT TRACKING EFFICIENCY	>99%		
PROTECTION	OVER DISCHARGE	11.1V*N(N=1 for 12V Battery, N=2 for 24V Battery, N=3 for 36V Battery, N=4 for 48V Battery)		
	OVER DISCHARGE RESET	12.6V*N(N=1 for 12V Battery, N=2 for 24V Battery, N=3 for 36V Battery, N=4 for 48V Battery)		
	OVER VOLTAGE	Protection type : Shut down, clamping by zener diode		
	BATTERY REVERSE CONNECTION	Protected internal reverse detection, No damage, re-power on to recover after fault condition is removed		
	PHOTOVOLTAIC INPUT REVERSE-CONNECTION	Protected internal reverse detection, No damage, re-power on to recover after fault condition is removed		
	REVERSE CHARGING	The internal circuit detects the current, Shut down, re-power on to recover after fault condition is removed		
FUNCTION	COMMUNICATION	RS232, RS485		
ENVIRONMENT	WORKING TEMP.	-35 ~ +45℃		
	WATERPROOF LEVEL	IP32		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
SAFETY & EMC	SAFETY STANDARDS		EN 62109-1:2010	
	EMC EMISSION	Parameter	Standard	Test Level / Note
		Conducted	EN IEC 61000-6-3	Class A
		Radiated	EN IEC 61000-6-4	Class B
	EMC IMMUNITY	Parameter	Standard	Test Level / Note
		ESD	EN 61000-4-2	Level 3, 8KV air ; Level 2, 4KV contact
		RF field susceptibility	EN 61000-4-3	Level 2, 3V/m
		EFT	EN 61000-4-4	Level 1, 0.5KV
		Surge	EN 61000-4-5	Level 1, 0.5KV Line-Line
		Conducted	EN 61000-4-6	Level 2, 3V
		Magnetic Field	EN 61000-4-8	Level 2, 3A/m
OTHERS	DIMENSION	3.6Kg		
	PACKING	285*205*93mm		

■ LED Indicators

①	①--- PV array indicator	Charging mode
②	②--- BAT indicator	Battery status
③	③--- LOAD indicator	Load status
④	④--- ERROR indicator	Abnormality indication

➤ PV array indicator:

No.	Graph	Indicator state	Charging state
①	 BULK	Steady on	MPPT charging
②	 ACCEPTANCE	Slow Flash (On 1s, Off 1s, cycle 2s)	Boost charging
③	 FLOAT	Single Flash (On 0.1s, Off 1.9s, cycle 2s)	Floating charging
④	 EQUALIZE	Fast Flash (On 0.1s, Off 0.1s, cycle 2s)	Equalizing charging
⑤	 CURRENT-LIMITED	Double Flash (On 0.1s, Off 0.1s, On 0.1s, Off 1.7s, cycle 2s)	Current Limited Charging
⑥		Off	Night

➤ BAT indicator:

Indication State	Battery state
Steady On	Battery Voltage Normal
Slow Flash (On 1s, Off 1s, cycle 2s)	Battery Over-Discharge
Fast Flash (On 0.1s, Off 0.1s, cycle 0.2s)	Battery Overvoltage

➤ LOAD indicator:

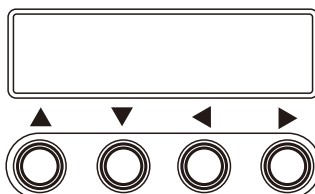
Indication State	Load state
Off	Load turned off
Fast Flash (On 0.1s, Off 0.1s, cycle 0.2s)	Load overloaded/ short-circuited
Steady On	Load functioning normally

➤ ERROR indicator:

Indicator state	Abnormality indication
Off	System operating normally
Steady on	System malfunctioning

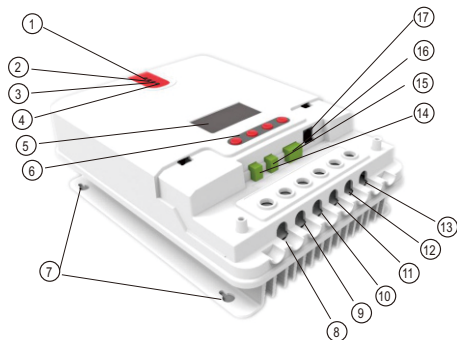
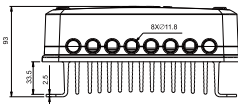
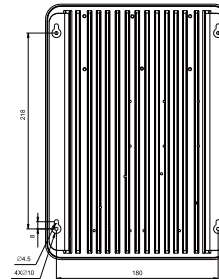
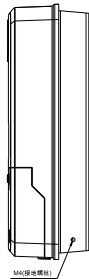
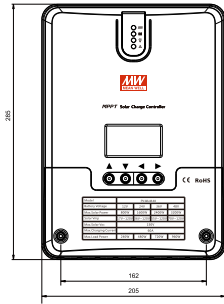
■ Key Operations

▲ Up	Page up; increase the parameter value in setting
▼ Down	Page down; decrease the parameter value in setting
◀ Return	Return to previous menu (exit without saving)
▶ Confirm	Enter into sub-menu; set/ save Turn on/ off loads (in manual mode)

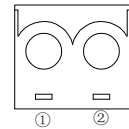


Mechanical Specification

(单位: mm, 误差 ± 1mm)

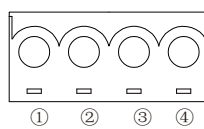


15 Battery Sampling



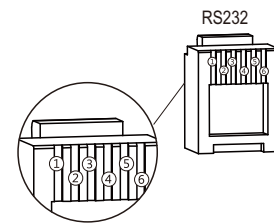
No.	Definition
①	-
②	+

16 RS485



No.	Definition	Parallel operation
①	12V	
②	GND	Black
③	D-	Yellow
④	D+	Red

17 Controller communication port RJ12 (6-pin)



No.	Definition
①	Transmitting terminal TX
②	Receiving terminal RX
③	Power supply grounding/ signal grounding
④	Power supply grounding/ signal grounding
⑤	Power supply positive
⑥	Power supply positive

Product appearance and interfaces

No.	Item	No.	Item
①	Charging indicator	⑩	Battery "-" interface
②	Battery indicator	⑪	Load "-" interface
③	Load indicator	⑫	Battery "+" interface
④	Abnormality indicator	⑬	Load "+" interface
⑤	LCD screen	⑭	External temperature sampling interface
⑥	Operating keys	⑮	Battery voltage compensation interface
⑦	Installation hole	⑯	RS485 communication interface
⑧	Solar panel "+" interface	⑰	RS232 communication interface
⑨	Solar panel "-" interface		