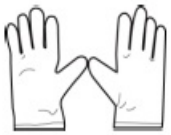
CUTTING EDGE POWER CEP400 MPPT Charge Controller User Manual

Contents

CUTTING EDGE POWER CEP400 MPPT Charge Controller

Warnings and Tools Icon Chart

Icons	Name	Description
	High Voltage	High voltage device. Installation should be performed by an electrician.
	High Temperature	This device will produce heat. Mount device away from other items.
	Environmental Hazard	Electronic Equipment. Do not put in landfill.
	Wire Cutter	A wire cutter is needed for cutting and stripping wires prior to c onnection.
	Multimeter	A multimeter is needed for testing equipment and verifying pol arity of cables.
	Anti-static Glove	Anti-static gloves are recommended to prevent controller damage caused by static electricity.
	Electrical Tape	Electrical tape is recommended to safely insulate spliced or ba re wires.
	Screwdriver	A common size screwdriver is needed to attach wires to the co ntroller.

Safety Tips

- Review this manual thoroughly before attempting installation.
- Beware of any nearby electrical equipment that may interfere with installing this device.
- Solar panels can generate high voltages and currents, make sure your solar panels are completely covered

from sunlight during installation. It is recommended that installation be performed by a qualified electrician.

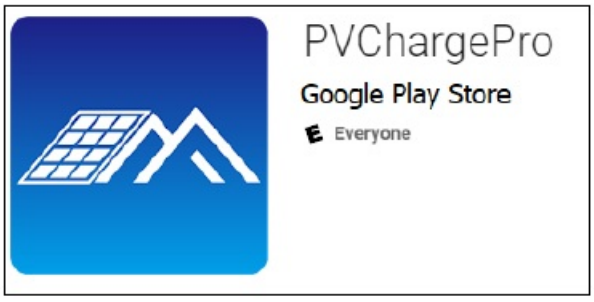
- Connecting wires to this device can generate sparks, please wear proper insulation gear while installing this device.
- To avoid damage to the battery or controller, use proper fuses in wiring. Please do not hesitate to contact the professions if you need help with fuse sizing.
- Always keep children away from this device.
- Be certain to use the correct gauge of wire, see below for a table of recommended wire size for various current loads.

Solar Input Current	**5A**	**10A**	**20A**	**30A**	**40A**	**60A**
Wire Cross Section Area (mm^2)	1.5	2.5	5	8	10	12
Wire AWG	12	12	10	10	10	8

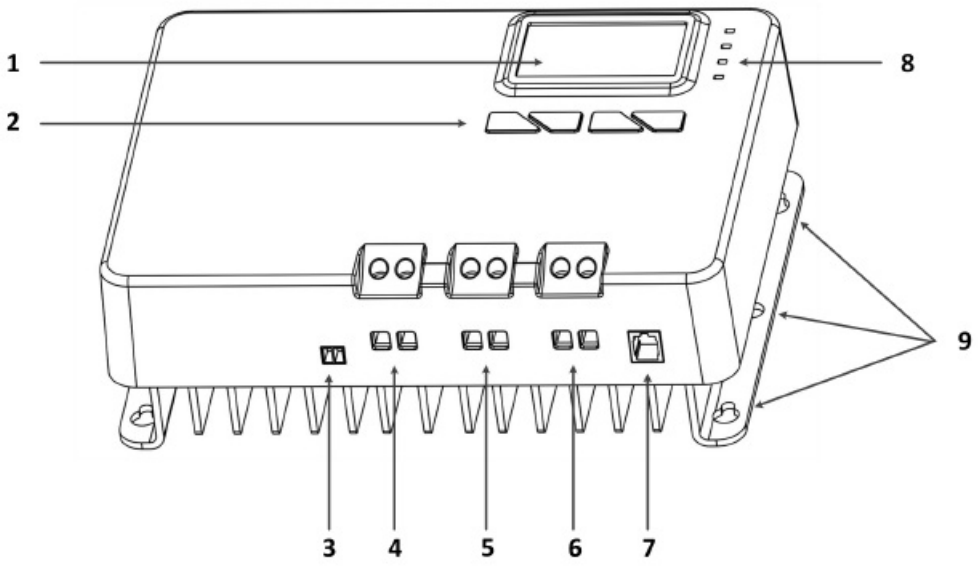
Product Features

Thank you for choosing our products. This MPPT solar charge controller is a device for solar charge regulation and direct current output load control. This device is mainly used in small and medium sized off-grid solar power systems.
These MPPT charge controllers have features as follows:

- By continuously checking solar panel power output changes, the controllers employ multiple MPPT charge algorithms in combination to boost charging efficiency in different weather and temperature conditions.
- Built-in buffer, allows max 25% exceeding rated power input.
- Charging modes available for most common deep-cycle battery types in the market, including AGM (sealed lead acid batteries), GEL, Flooded, and Lithium.
- Auto recognition of 12V/24V battery system voltage by M2440N model; auto recognition of 12V/24V/36V/48V battery system voltage by M4860N model. Lithium battery excluded from this feature.
- Supports recording of system running data including power generated and power utilized for up to 300 days, compatible with monitoring App through IOS and Android.
- Provides multiple load control mode options for light based, time based and manually adjusted scenarios. Low no-load loss.
- Industrial grade design with reverse polarity protection for solar panels, battery and load.

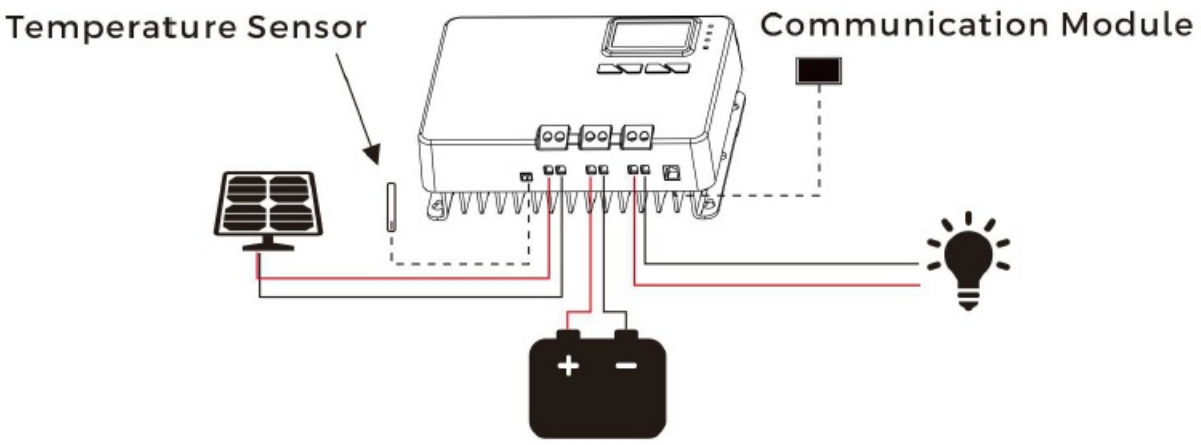


Device Diagram



#	Description	#	Description
1	LCD Display Screen	6	DC Load Terminals
2	Function Key ([SET], [UP], [DOWN], [ESC])	7	RS485 Communication Port
3	External Temperature Sensor Terminal	8	LED Indicator (PV, BAT, LOAD, FAULT)
4	Solar Terminals	9	Installation Mounting Holes
5	Battery Terminals		

Wire Connection Sequences



1. Connect the positive battery wire followed by the negative battery wire.
2. Make sure your solar panels are fully covered to prevent electrical shock.
   Connect the positive solar array output wire followed by the negative solar array output wire.
3. Connect DC load wires to the DC load output (if applicable).

4. Connect the external temperature sensor to its terminal shown above.
5. Connect the mobile application module to the communication port (if applicable).

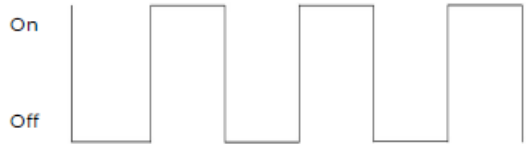
LED Light Signal Interpretation Chart

LED Name	LED Display	Signal Indication
PV	Off	Solar Input Not Charging *PV LED is generally off during nighttime.
	Double Flash	Solar Input Charge Detected
	Single Flash	Solar Input Reverse Polarity
	Steady On	MPPT Charge Mode
	Fast Flash	Equalize or Boost Charge Mode
	Slow Flash	Float Mode
BATTERY	Single Flash	Battery Input Reverse Polarity
	Fast Flash	Battery Over Voltage
	Slow Fast	Battery Over Discharged
	Steady On	Battery On
LOAD	Off	No DC Load Connected/Load Off
	Fast Flash	DC Load Short Circuit
	Steady On	DC Load On
FAULT	Off	No Errors
	Steady On	System Error – Check Error Code

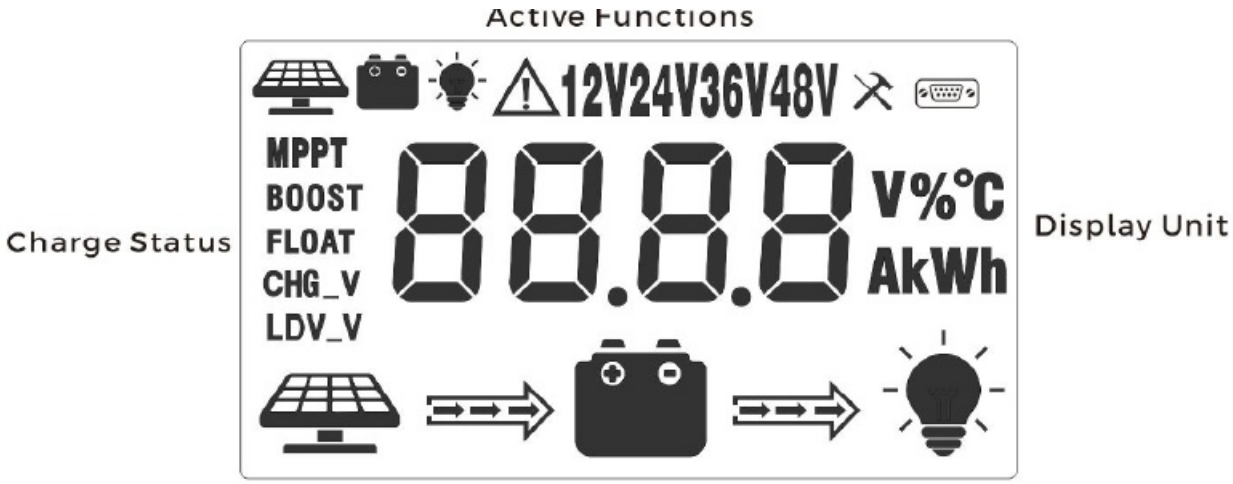
Check the Fault light to spot if a system error may be present.

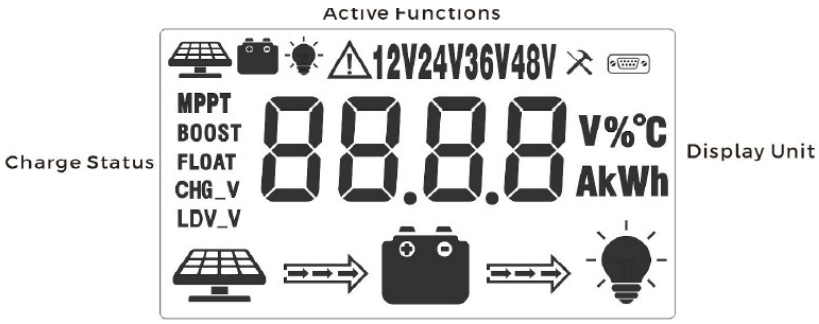
LED Flash Rhythm Chart

LCD Display Interface Overview

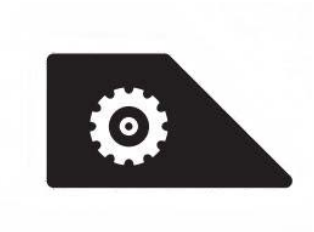
Flash Status	Indication	Description
Steady On		LED light on.
Off		LED light off.
Fast Flash		LED light blinks at frequency of 2Hz (twice every second).
Slow Flash		LED light blinks at frequency of 0.5Hz (once every two seconds).
Single Flash		LED light blinks for 0.1 second after every 2 seconds.
Double Flash		LED light blinks for 0.1 second twice after every 4 seconds.

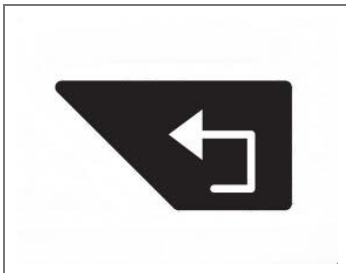
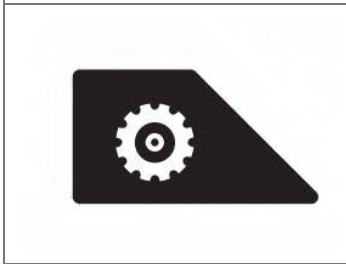
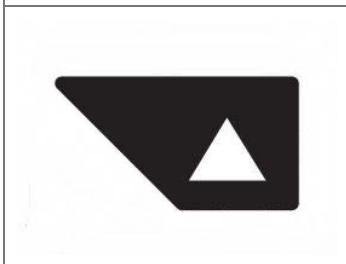
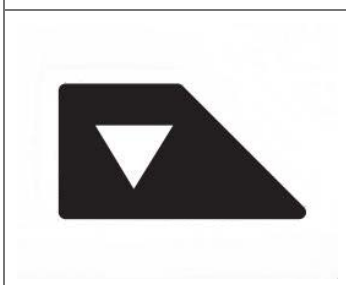
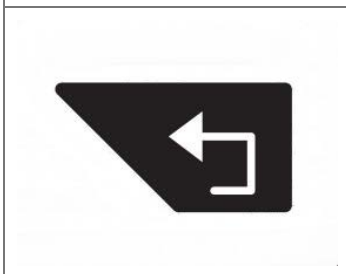
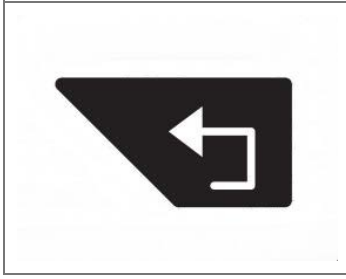
LED Display Interface



Display Section	Display Layout
Charge Status	
Charge Mode & Parameter	
Active Functions	

Key Functionality Chart

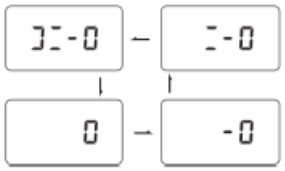
Function Key	System Mode	Input	Input Function
	View Mode	Short Press	Enter SET mode
	View Mode	Short Press	View Previous Page
	View Mode	Short Press	View Next Page

	View Mode	Short Press	DC Load On/Off (Manual Control Program Only)
Function Key	**System Mode**	**Input**	**Input Function**
	**Set Mode**	**Long Press**	**Save Data & Exit SET Mode**
		**Short Press**	**Next Setting**
	**Set Mode**	**Short Press**	**Increase Parameter Value**
	**Set Mode**	**Short Press**	**Decrease Parameter Value**
	**Set Mode**	**Short Press**	**Exit SET Mode Without Saving**

LED Display Rules & Cycles

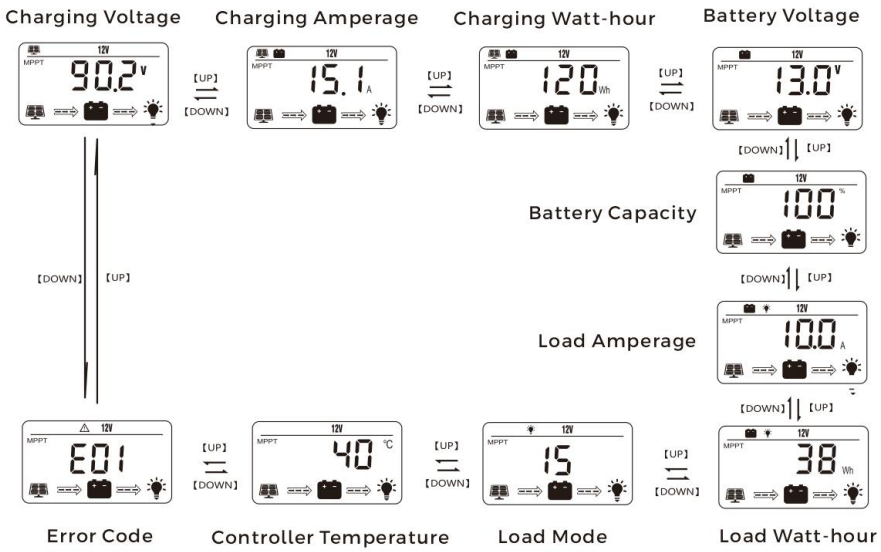
Pre start-up display cycle when the MPPT controller turns on, this usually last several seconds while controller detects operating environment.

LED Screen Display Cycle



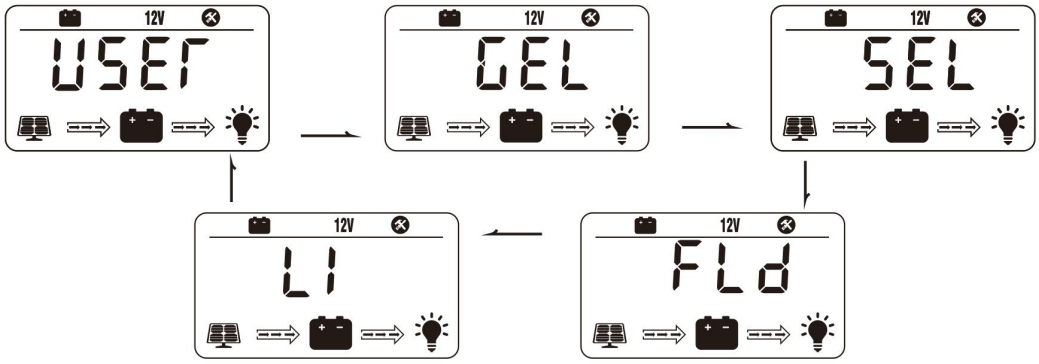
- The information pages in the screen will be automatically turning to the next page every 5 seconds and keep lasting. The user also can use up and down keys to cycle through different pages.
- The error code page will be displayed when an error is detected.

Setting Battery Mode
Enter SET mode by pressing the Setting key in any view page other than Load Mode.
Use the up and down arrow keys to select battery mode, then long press Setting key to save.



Abbreviations	Battery Types	Description
FLD	Flooded Battery	Auto-recognition with default parameters set for eac h type of batteries.
SEL	Sealed/AGM Battery	
GEL	Gel Battery	
LI	Lithium Battery	Some parameters can be customized.
Use	Advanced User Mode	Most parameters can be customized.

Special Cutting Edge Power Lithium Batteries programming:
If Cutting Edge Power lithium batteries are installed by the factory, we will program these settings for you.
In Lithium mode, short press the Setting key again to cycle through each parameter view. Use the up and down arrow key to adjust parameter value, then long press Setting key to save.
For Battery Type: Cutting Edge Power Lithium 3S 12V Batteries only:



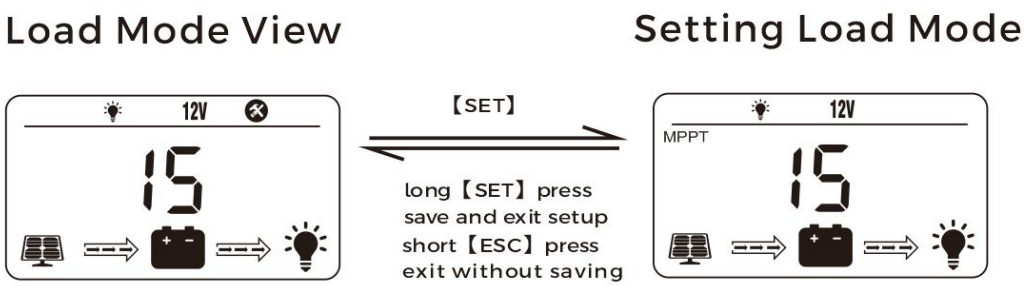
Advanced Battery Settings (Lighting Control mode)
Enter Load SET Mode by pressing the Setting key in Load Mode view only.
Use the arrow key to cycle through load modes before long pressing SET to save and exit. Short pressing SET will exit without saving.

Mode	Definition	Description
0	Daylight Auto-Control	DC load turns on when daylight is detected.
1~14	Daylight On/Timer Off	DC load turns on when daylight is detected. DC load turns off a ccording to timer.
15	Manual Mode	DC load turns on/off by pressing the Return key.
16	Testing Mode	DC load turns on and off in a quick succession.
17	Always On	DC load stays on.

Error Code Chart

Code	Error	Description & Quick Troubleshoot
E00	No Error	No action needed.
E01	Battery Over-discharged	Battery voltage is too low. DC load will be turned off until battery re-charges to recovery voltage.
E02	Battery Over-voltage	Battery voltage has exceeded controller limit. Check battery bank voltage for compatibility with controller.
E04	Load Short Circuit	DC load short circuit.
E05	Load Overload	DC load power draw exceeds controller capability. Reduce load size or upgrade to a higher load capacity controller.
E06	Overheating	Controller exceeds operating temperature limit. Ensure the controller is placed in a well-ventilated cool, dry place.
E08	Solar Over-amperage	Solar array amperage exceeds controller rated input amperage. Decrease the amperage of solar panels connected to the controller or upgrade to a higher rated controller.
E10	Solar Over-voltage	Solar array voltage exceeds controller rated input voltage. Decrease the voltage of solar panels connected to the controller.
E13	Solar Reverse Polarity	Solar array input wires connected with reverse polarity. Disconnect and re-connect with correct wire polarity.
E14	Battery Reverse Polarity	Battery connection wires connected with reverse polarity. Disconnect and re-connect with correct wire polarity.

*Please contact professions for technical support on additional troubleshooting.



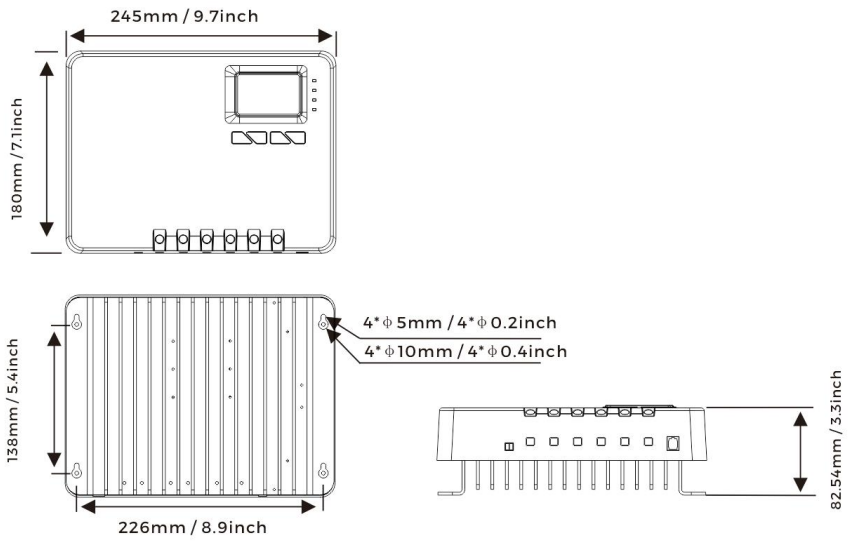
Controller Specification

The variable “n” is adopted as a multiplying factor when calculating parameter voltages, the rule for “n” is listed as: if battery system voltage is 12V, n=1; 24V, n=2; 36V, n=3; 48V, n=4.
For example, the equalize charge voltage for a 12V FLD (Flooded) battery bank is 14.8V*1=14.8V. The equalizing charge voltage for a 24V FLD (Flooded) battery bank is 14.8V*2=29.6V.

Parameter	**Value**	
Model No.	CEP400	
Battery System Voltage	12V/24V Auto (FLD/GEL/SLD) Manual (Li/User)	
No-load Loss	12ma (12V), 10ma (24V)	
Max Solar Input Voltage	<100Voc	
Rated Solar Charge Current	40A	
Max Solar Input Power	600W/12V 1200W/24V	
Light Control Voltage	5V*n	
Light Control Delay Time	10s	
Max Load Output Current	20A	
Operating Temperature	-35ºC ~ +45ºC	
IP Protection	IP32	IP32

Net Weight	2.0 kg			3.0 kg	
Communication Port	RS485				
Operating Altitude	≤ 3000 meters				
Controller Dimension	245*180*82.5 mm			280*210*90 mm	
Parameter	**Battery Parameters**				
Battery Types	FLD	SEL	GEL(default)	USER(adjustable)	LI (adjustable)
Equalize Charge Voltage	14.8V*n	14.6V*n	—	Default	—
Boost Charge Voltage	14.6V*n	14.4V*n	14.2V*n	Default: GEL	Default: 14.2V*n
Float Charge Voltage	13.8V*n			Default: GEL	—
Boost Charge Recovery Voltage	13.2V*n			Default: GEL	—
Over-discharge Recovery Voltage	12.6V*n			Default: GEL	—
Over-discharge Voltage	11.1V*n			Default: GEL	Default: 11.1V*n
AutoTemperature Compensation	-3mV/2V/°C			Default: GEL	—

Product Dimension



Documents / Resources

	**CUTTING EDGE POWER CEP400 MPPT Charge Controller** [pdf] User Manual CEP400 MPPT Charge Controller, CEP400, MPPT Charge Controller, Charge Controller, Controller