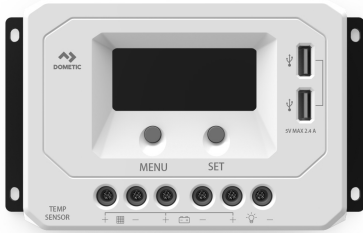


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ENERGY & LIGHTING

SUN POWER



SC1230-PWM

EN

30 A Solar Charge Controller

Installation and Operating Manual 3

Please read this instruction manual carefully before installation and first use, and store it in a safe place. If you pass on the product to another person, hand over this instruction manual along with it.

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1 Explanation of symbols



WARNING!

Safety instruction: Failure to observe this instruction can cause fatal or serious injury.



CAUTION!

Safety instruction: Failure to observe this instruction can lead to injury.



NOTICE!

Failure to observe this instruction can cause material damage and impair the function of the product.

**NOTE**

Supplementary information for operating the product.

2 General safety instructions

The manufacturer accepts no liability for damage in the following cases:

- Damage to the product resulting from mechanical influences and excess voltage
- Alterations to the product without express permission from the manufacturer
- Use for purposes other than those described in the operating manual

The declaration of conformity can be requested from the manufacturer (contact information on the back).

Note the following basic safety information when using electrical devices to protect against:

- Electric shock
- Fire hazards
- Injury

2.1 General safety

**WARNING!**

- Only use the device as intended.
- Disconnect the device
 - Before cleaning and maintenance
 - After use
 - Before changing a fuse
- The device may not be used if the device itself or connection cables are visibly damaged.
- This appliance may only be repaired by qualified personnel. Inadequate repairs may cause serious hazards.
- This appliance can **not** be used by children as well as by persons with diminished physical, sensory or mental capacities or a lack of experience and knowledge.
- **Electrical devices are not toys.**
Always keep and use the device out of the reach of children.
- Children must be supervised to ensure that they do not play with the appliance.

**NOTICE!**

- Check the manufacturer's data for your battery and ensure that the maximum voltage of the solar charge controller does not exceed the manufacturer's recommended charging voltage.
- Do not use the solar charge controller to charge non-rechargeable batteries.
- Be sure to connect the battery before exposing the solar panel to the sun.
- Before using the device for the first time, check that the voltage specification on the rating plate matches that of the power supply.
- Store the device in a dry and cool place.

2.2 Safety when installing the device

**WARNING!**

- The electrical installation may only be connected by qualified personnel and only in accordance with the national regulations. Incorrect connection may cause severe hazards.
- Take the precautions necessary to ensure that children cannot interfere with operation. Dangerous situations may occur which cannot be recognised by children.

**NOTICE!**

- Do not expose the device to a heat source (direct sunlight, heating etc.). Avoid additional heating of the device in this way.

Electrical cables

**CAUTION!**

- Lay the cables so that they cannot be tripped over or damaged.

**NOTICE!**

- If cables have to be fed through metal walls or other walls with sharp edges, use ducts or bushings to prevent damage.
- Do not lay cables which are loose or bent next to electrically conductive material (metal).
- Do not pull on the cables.
- Do not lay AC cables and DC cables in the same duct.
- Fasten the cables securely.

2.3 Operating the device safely



WARNING!

- All lead acid batteries produce harmful and explosive gases. The battery should be mounted in a well ventilated area, as far as possible from any ignition source. Do not smoke when in the vicinity of the battery under charge.



NOTICE!

- Do not disconnect any cables when the device is still in use.

3 Scope of delivery

- SC1230-PWM solar charge controller
- Installation and operating manual

4 Intended use

The SC1230-PWM solar charge controller (ref. no. 9600005819) can be installed in motorhomes or caravans to be connected to solar panels to charge house batteries.

The device may only be used inside the vehicle.

5 Technical description

The SC1230-PWM solar charge controller enables mobile power supply from solar panels for 12 V^{DC}/24 V^{DC} devices and two USB devices. The devices can be simultaneously supplied with power while the 12 V^{DC}/24 V^{DC} battery is being charged.

The solar charge controller ensures that the power supplied by your solar panels is at the right voltage to charge your home or auxiliary battery. The solar charge controller is PWM controlled. It is an intelligent 3 stage solar controller.

Solar charge controller

The solar charge controller has the following functions:

- PWM controlled
- Three stage charging (Bulk, Boost/Equalize, Float)
- Battery types selectable: Sealed, Gel, and Flooded
- LCD display dynamically displaying operating data and working condition
- Two USB output ports (maximum output 2.4 A) as power supply charge for electronic equipment

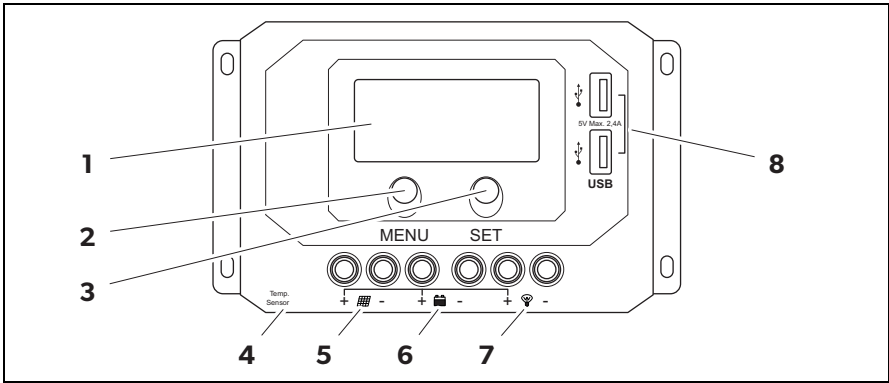
The solar charge controller has the following protective functions:

- Incorrect polarity protections for solar module and battery
- Battery overvoltage protection
- Battery overheating protection
- Battery over-discharge protection
- Load overload protection
- Load short circuit protection
- Controller overheating protection

Battery temperature sensor (available as an accessory)

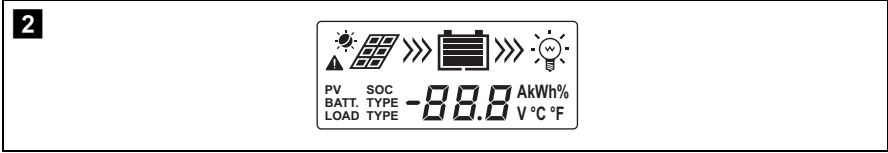
The battery temperature sensor allows the solar charge controller to continuously adjust charge voltage based on measured battery temperature. Temperature compensation of charge voltage assures that the battery receives the proper charge voltage as battery temperature changes during normal operation.

5.1 Connecting and operating elements



No. in fig. 1	Description	
1	Display	
2	MENU button	<ul style="list-style-type: none"> - Browse interface - Set parameters
3	SET button	<ul style="list-style-type: none"> - Load ON/OFF - Clear errors - Enter into Set mode - Save data
4	Temperature sensor port	
5	Solar panel terminals	
6	Battery terminals	
7	Load terminals	
8	USB output ports	

5.2 Display elements



Source	Display	Description
PV with menus solar voltage (V), solar current (A), solar power (kWh)		Day
		Night
		No charging
		Charging
BATT. with menus battery voltage (V), battery current (A) battery temperature (°C/°F)		Battery capacity, in charging
	BATT.TYPE	Battery type
LOAD with menus load current (A), load power (kWh), load mode		Load on
		Load off

6 Installing the solar charge controller

6.1 Mounting the solar charge controller

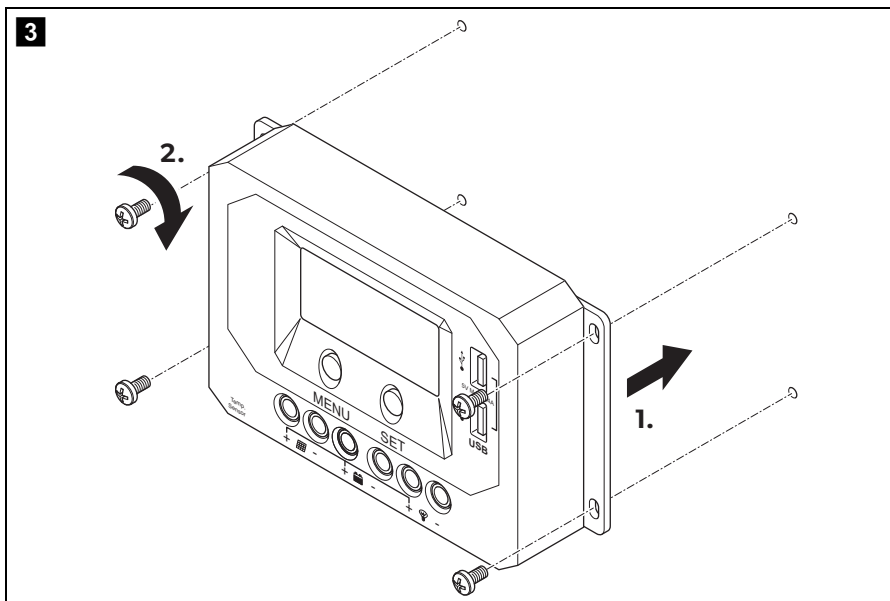
When selecting the installation location, note the following:

- The device must be installed vertically on a wall.
- The device must be installed on a level and sufficiently sturdy surface.
- The device must be installed in a location that is protected from moisture.
- Do not install the device in a dusty environment.
- There should be a space of 10 cm on all sides around the device.



NOTE

Before drilling any holes, make sure that no electrical cables or other parts of the vehicle can be damaged by drilling, sawing and filing.



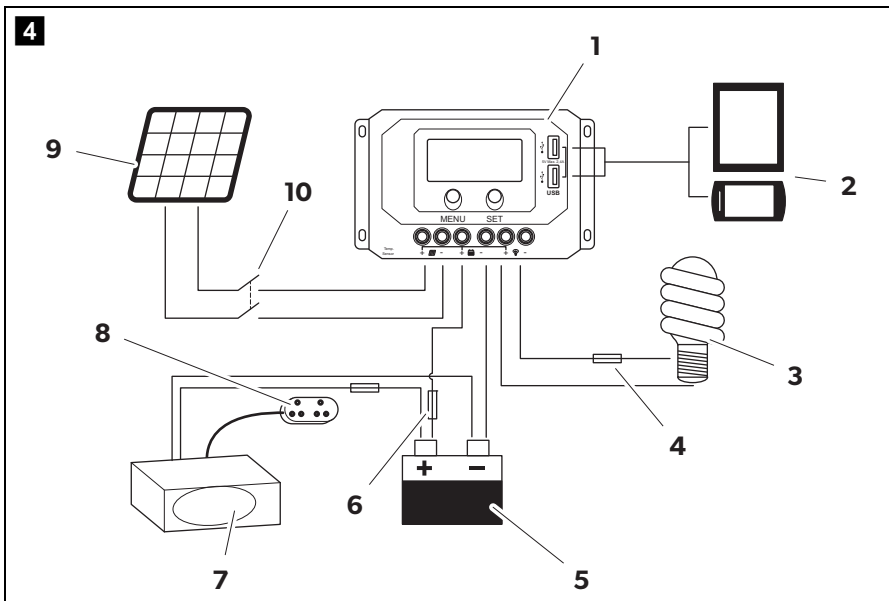
- Attach the device with 4 flat-headed screws.

6.2 Connecting diagram



WARNING!

- Always observe the following connection sequence. Overvoltage can damage the electronics of the device.
 - **Connecting the solar panel:** Connect the battery, then connect the solar panel, finally connect the load.
 - **Disconnecting the solar panel:** Disconnect the load, then disconnect the solar panel, finally disconnect the battery.
- Do **not** insert the fuse or turn on the breaker during the installation.
- Ensure that the battery clamps do not get in contact with each other.
- Make sure that the polarity is correct.



Key to connecting diagram

No. in fig. 4	Description
1	Solar charge controller
2	USB output ports
3	Load
4	Fuse
5	12 V --- /24 V --- battery
6	Fuse
7	Inverter
8	Fuse
9	Solar panel
10	Circuit breaker

- Lay all the necessary lines.
- Plan the distribution and fuse protection of the circuits carefully. The battery fuse should be installed as close to the battery as possible. The suggested distance is within 150 mm.
- Make sure that all lines are inserted and connected properly.
- Secure all lines with strain relief clamps.

6.3 Connecting the solar charge controller



WARNING!

Make sure that all the connection and wiring is conducted by a qualified electrician.

Connecting to the battery



NOTE

Battery voltage less than 6 V will not be recognised by solar charge controller.

Always connect the battery first, in order to allow the solar charge controller to recognize the system voltage.

- ▶ Connect the battery as shown in the connecting diagram.
- ▶ Check if the display of the controller is on.

Connecting a 12 V --- /24 V --- device or inverter



NOTICE!

Connect the inverter or other load that has the largest start current to the battery rather than to the controller load terminals, if the inverter or other load is necessary.

- ▶ Connect the lead to the positive (+) and negative (-) terminal. Ensure that the connection is secure and tight.

Connecting the solar panel

- ▶ Connect the lead to the positive (+) and negative (-) terminal. Ensure that the connection is secure and tight.

Connecting the temperature sensor (available as an accessory)

The battery temperature sensor allows the solar charge controller to continuously adjust charge voltage based on measured battery temperature.

- ▶ Attach temperature sensor to the battery with tape, ensuring good contact.

7 Using the solar charge controller

7.1 Browsing the display

The display automatically cycles through the menus.

- Press the **MENU** button to switch from one menu to the next menu.

7.2 Setting the solar charge controller

Zero clearing the accumulative power

- Press the **MENU** button until you get to the PV solar power menu.
- Press and hold the **SET** button for 5 s.
- ✓ The value flashes.
- Press the **SET** button again to clear the value.

Setting the temperature unit

- Press the **MENU** button until you get to the BATT. temperature menu.
- Press and hold the **SET** button and to switch between °C and °F.

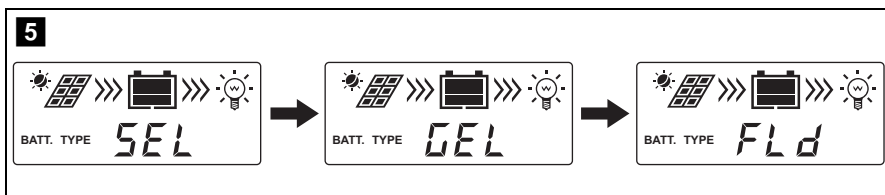
Setting the load mode

- Press the **MENU** button until you get to the LOAD mode menu.
- Press and hold the **SET** button for 5 s.
- ✓ The number flashes.
- Press the **MENU** button to set the parameter (see table below).
- Press the **SET** button again to confirm the number.

No.	Load menu 1	No	Load menu 2
100	Light ON/OFF	2n	Disabled
101	Load will be on for 1 hour since sunset	201	Load will be on for 1 hour before sunrise
102	Load will be on for 2 hours since sunset	202	Load will be on for 2 hours before sunrise
103 – 113	Load will be on for 3 to 13 hours since sunset	203 – 213	Load will be on for 3 to 13 hours before sunrise
114	Load will be on for 14 hours since sunset	214	Load will be on for 14 hours before sunrise
115	Load will be on for 15 hours since sunset	215	Load will be on for 15 hours before sunrise
116	Test mode	2n	Disabled
117	Manual mode (Default load ON)	2n	Disabled

Setting the battery type

- Press the **MENU** button until you get to the **BATT.** voltage menu.
- Press and hold the **SET** button for 5 s.











- Press the **MENU** button to switch between the battery types (**SEL**: Sealed (Default), **GEL**: Gel, **FLd**: Flooded).
- Confirm the battery type by pressing the SET button or waiting for 5 s.

7.3 Protective functions of the solar charge controller

Protection	Conditions	Status
Solar module reverse polarity	The solar module can be reversed, when the battery is connected correctly.	The controller is not damaged
Battery reverse polarity	The battery can be reversed, when the solar module is not connected.	
Battery overvoltage	The battery voltage reaches to the OVD (over voltage/disconnect voltage point)	Stop charging
Battery overdischarge	The battery voltage reaches to the LVD (above low voltage/reconnect voltage point)	Stop discharging
Battery overheating	Temperature sensor is higher than 65 °C	Output is OFF
	Temperature sensor is less than 55 °C	Output is ON
Solar charge controller overheating	Temperature sensor is higher than 85 °C	Output is OFF
	Temperature sensor is less than 75 °C	Output is ON
Load overload	Load current ≥ 2.5 times rated current	Output is OFF.
	1.02 to 1.05 times, 50 s,	Clear the fault: Restart the controller or wait for one night-day cycle (night time >3 hours).
	1.05 to 1.25 times, 30 s	
	1.25 to 1.35 times, 10 s	
1.35 to 1.5 times, 2 s		
Damaged temperature sensor	The temperature sensor is short-circuited or damaged	Charging or discharging at 25 °C

8 Troubleshooting

If you are unable to rectify the fault, get in touch with a specialist workshop.

Display	Fault	Possible cause	Suggested remedy
	The Display is off during daytime when sunshine falls on solar modules properly.	Solar panel disconnected	Confirm that solar module wire connections are correct and tight.
	Wire connection is correct, display is off.	Battery voltage is lower than 9 V	Check the voltage of battery. At least 9 V voltage is required to activate the solar charge controller.
		PV voltage is less than battery voltage	Check the PV input voltage which should be higher than battery's voltage.
 	Display is flashing.	Battery over voltage	Check if the battery voltage is higher than over voltage/disconnect voltage point, and disconnect the solar panel.
 	Display is flashing.	Battery over discharged	When the battery voltage is restored to or above low voltage/reconnect voltage point, the load will recover
 	Display is flashing.	Battery overheating	The solar charge controller will automatically turn the system off. But while the temperature declines to be below 50 °C, the solar charge controller will resume work.
 	Display is flashing.	Over load or short circuit	Reduce the number of electric equipments or check carefully loads connection.

9 Maintaining and cleaning the product

- Place the packaging material in the appropriate recycling waste bins wherever possible.



If you wish to finally dispose of the product, ask your local recycling centre or specialist dealer for details about how to do this in accordance with the applicable disposal regulations.

10 Warranty

The statutory warranty period applies. If the product is defective, please contact the manufacturer's branch in your country (see the back of the instruction manual for the addresses) or your retailer.

For repair and guarantee processing, please include the following documents when you send in the device:

- A copy of the receipt with purchasing date
- A reason for the claim or description of the fault

11 Disposal

- Place the packaging material in the appropriate recycling waste bins wherever possible.



If you wish to finally dispose of the product, ask your local recycling centre or specialist dealer for details about how to do this in accordance with the applicable disposal regulations.

12 Technical data

	SC1230-PWM
Ref. no.:	9600005819
Nominal system voltage:	12/24 V $\overline{=}$, Auto
Battery input voltage range:	9 V to 32 V
Rated charge/discharge current:	30 A at 55 °C
Max. PV open circuit voltage:	50 V
Battery type:	Sealed (Default)/Gel/Flooded
Equalize charging voltage:	Sealed:14.6 V/Gel: No/Flooded:14.8 V
Boost charging voltage:	Sealed:14.4 V/Gel:14.2 V/Flooded:14.6 V
Float charging voltage:	Sealed/Gel/Flooded:13.8 V
Low voltage reconnect voltage:	Sealed/Gel/Flooded:12.6 V
Low voltage disconnect voltage:	Sealed/Gel/Flooded:11.1 V
Self-consumption:	≤9.2 mA/12 V ≤11.7 mA/24 V
Temperature compensation coefficient:	-3 mV/°C/ 2 V at 25 °C
Charge circuit voltage drop:	≤0.29V
Discharge circuit voltage drop:	≤0.16V
LCD temperature range:	-20 °C to +70 °C
Working environment temperature:	-25 °C to +55 °C
Relative humidity:	95%, N.C.
Enclosure:	IP30
Grounding:	Common positive
USB output:	5V DC/2.4 A (total)
Dimensions (W x H x D) in mm:	181 x 100.9 x 59.8
Terminals:	16 mm ² /6AWG
Weight:	0.55 kg

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