PROJECTA

P/No. SC520, SC540

MPPT Solar Charge Controller

5 STAGE CHARGING 12/24/48V MULTI-CHEMISTRY

SC520

SC540

Pictured: SC520

RECYCLE

1. Safety Tips

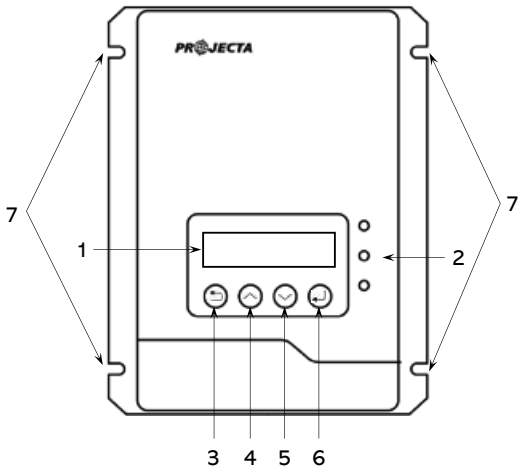
- Please ensure the instructions are read prior to any installation.
- Keep instructions in a safe place for future reference.
- Do not expose to rain, snow or liquids of any type, SC520 and SC540 are designed for indoor use only.
- Beware of any nearby electrical equipment that may interfere with installing this device. Do not connect any AC sources to the controller as it may cause a fire/explosion and will permanently damage the device.
- Always check the battery polarities before making a connection. The positive terminal of a battery goes into BAT+ and the negative into BAT-.
- The controller is not designed to run without a battery voltage reference. In the event of replacing /servicing the battery, always disconnect the solar input first (or fully cover the panels), then replace/ service the battery.
- Solar panels can generate high voltages and currents, make sure your solar panels are completely covered from sunlight during installation.
- Keep this product out of reach of children.
- Always install fusing or circuit breakers on the input positive and output positive circuits.
- Connecting wires to this device can generate sparks, please wear proper insulation gear while installing this device.
- This controller is a negative grounded (positive switching) type.
- Always take the total length of wire into consideration and use the correct wire size, see below for a table of recommended wire size for various current loads.
- Lead acid batteries can be dangerous. Ensure no sparks or flames are present when working near batteries.

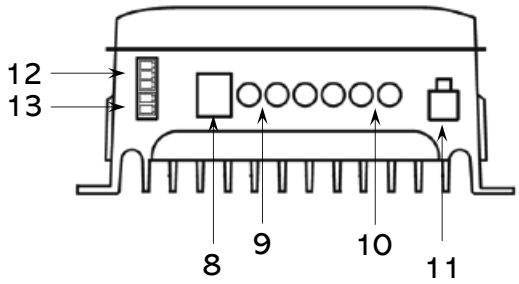
Maximum Cable Distance	Solar Input Current				Wire AWG & Cross Section Area
	10A	20A	30A	40A	
2m	12AWG 4mm^2	10AWG 6mm^2	10AWG 6mm^2	8AWG 10mm^2	
3m	12AWG 4mm^2	10AWG 6mm^2	8AWG 10mm^2	6AWG 16mm^2	
5m	10AWG 6mm^2	8AWG 10mm^2	6AWG 16mm^2	6AWG 16mm^2	
7m	10AWG 6mm^2	6AWG 16mm^2	6AWG 16mm^2	—	

2. Product Features

- 5 Stage charging ensures the battery is charged to the optimum level.
- Advanced MPPT technology to improve charging efficiency in different weather and temperature conditions.
- Tempered glass screen with sturdy aluminium housing.
- Selectable battery chemistry types, including AGM, GEL, WET and Lithium.
- Auto recognition of 12V/24V/48V battery system voltage.
- Protects your battery from discharge at night. Under low light or no light conditions, the solar panel voltage could be less than the battery voltage. The controller contains circuitry which prevents current flowing back from the battery and into the solar panel.
- Multi charging protections against reverse polarity, over-voltage and over-temperature.
- With the use of a battery temperature sensor (optional), the controller will compensate charging voltages when the battery temperature becomes too high (For Lead acid only).
- Supports remote display via Bluetooth® for monitoring additional parameters, such as charging watt-hours, charging current and solar input voltage.

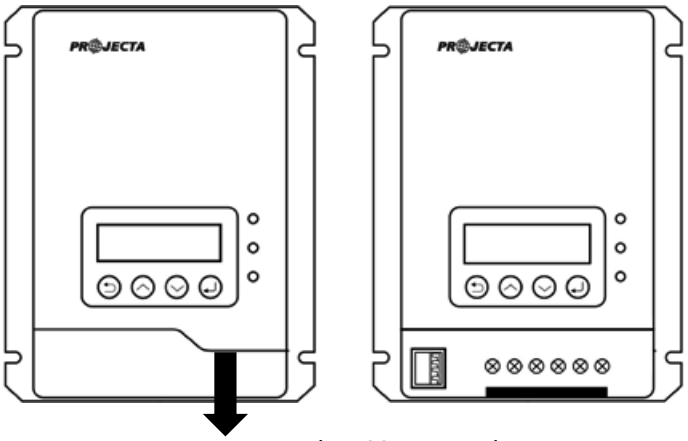
3. Device Diagram



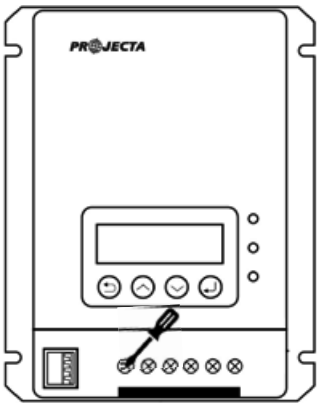


#	Description	#	Description
1	LCD Display Screen	8	RS485 Communication Port
2	LED Indicator (PV, CHARGE, FAULT)	9	Solar Input Terminals
3	Cancel/Return Button	10	Battery Terminals
4	Increase/ Previous Button	11	External Temperature Sensor Port
5	Decrease/ Next Button	12	EPO Contacts Port
6	Enter/ Select Button	13	Output Dry Contacts Port
7	Installation Mounting Holes		

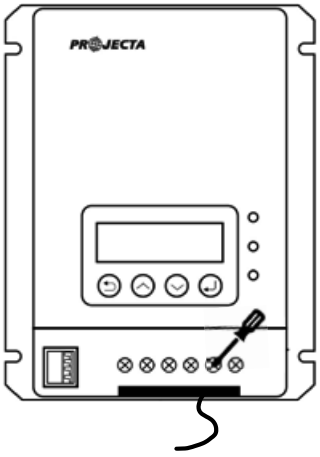
4. Wiring Instructions



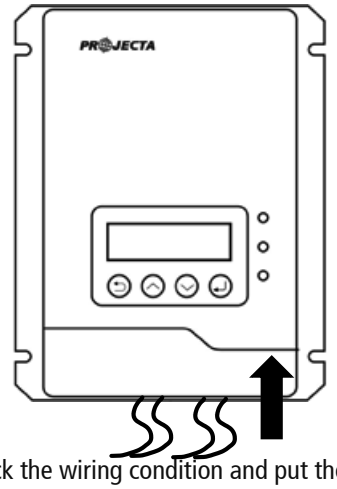
1 & 2: Remove the wiring cover plate, and put it aside..



3. Unscrew the terminals completely, before inserting any wiring leads.

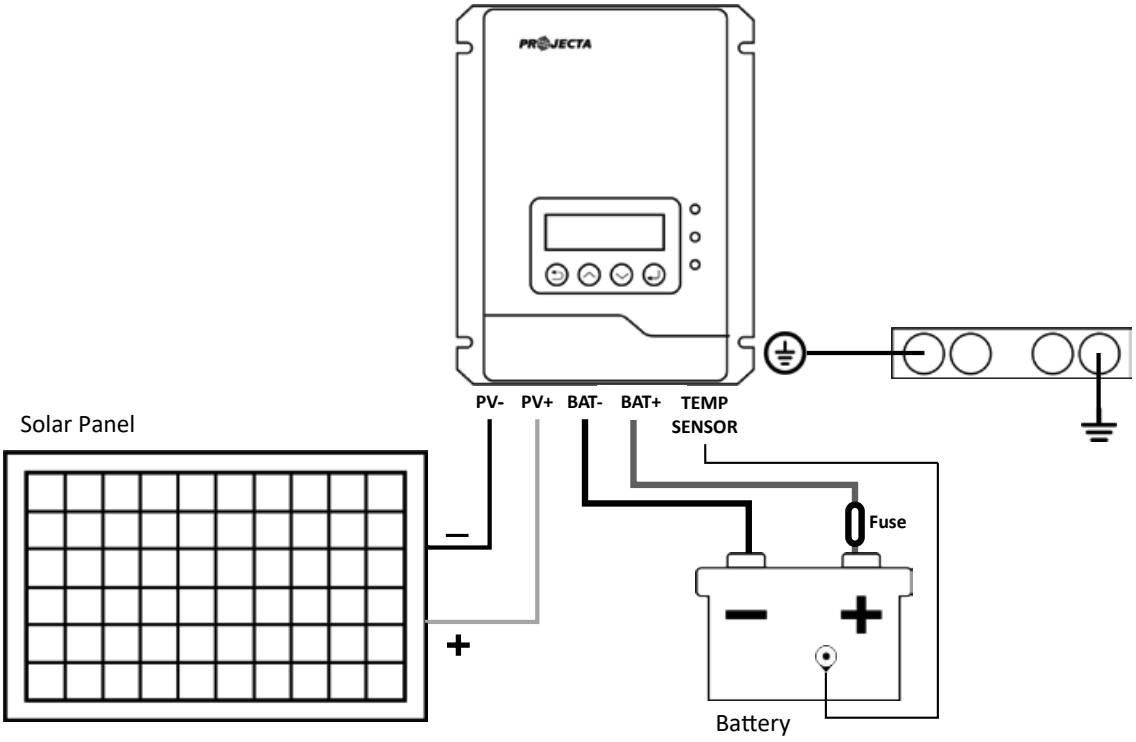


4. Insert the bare wire side of the cable to the terminal, and tighten the screws.



5. Check the wiring condition and put the wiring cover plate back.

5. Wiring Sequence



1. Connect the positive battery wire followed by the negative battery wire.
2. Connect the positive solar array input wire followed by the negative solar array input wire (make sure your solar panels are fully covered to prevent electrical shock).
3. Connect the external temperature sensor (optional) to its terminal shown above, and place the sensor on the side of a battery.

The controller is not designed to run without a battery voltage reference. In the event of replacing/servicing the battery, always disconnect the solar input or fully cover the panels, then remove/replace the battery.

6. Operation

6.1 Pre-operation Check

Please check the installation and wiring carefully before operation:

Step 1: Make sure the SC520/SC540 is installed correctly and steadily.

Step 2: Make sure the cable layout and distancing are meeting the requirements of all the equipment in the system.

Step 3: Make sure the ground wire is properly connected firmly and reliably.

Step 4: Make sure Battery and PV array circuit breakers (or fuses) are disconnected.

6.2 Power ON Test

Make sure the battery voltage and solar panel voltage are within the permissible range before turning on the breaker:

Step 1: Reconnect circuit breaker or fuse for the battery.

Step 2: Reconnect circuit breaker or fuse for the PV array.

Step 3: Set the parameters according to the setup wizard.

Step 4: Observe the LED light to check if the SC520/SC540 is working normally.

6.3 Power OFF

The SC520/SC540 will still contain residual power and heat after power OFF.

To avoid electric shock or burn risk, please cool down the SC520/SC540 for 5 minutes after power OFF.

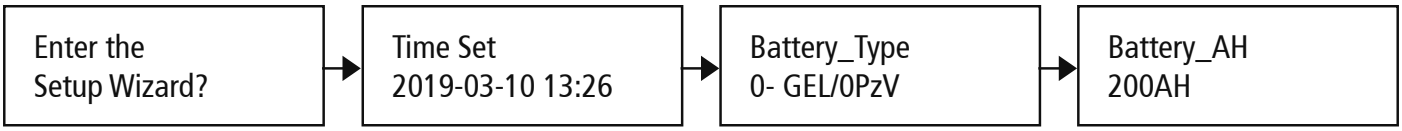
Then uninstall the SC520/SC540 with protective gloves:

Step 1: Turn off the circuit breaker for the solar panel.

Step 2: Turn off the circuit breaker for the battery.

6.4 System Initial Setup

Enter the Setup Wizard for initial setup when the SC520/SC540 is powered on for the first time or factory settings are restored. You can also reset the Setup Wizard through the Parameter Set interface.

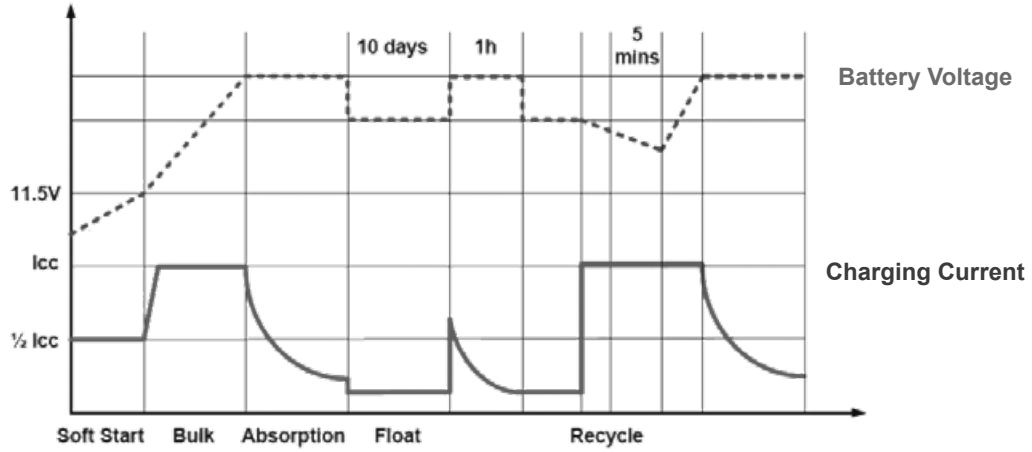


*if you don't want to change the default values, simply press to prompt , Confirm?

then press to confirm.

6.5 Charging Stages

The SC520/SC540 multi-staged algorithm is designed to charge the battery with high efficiency and reliability.



Soft Start(Stage 1) – The controller will deliver ½ rated current until the battery voltage is over 11.5VDC or 10-minute time-out, then turn to the Bulk(Boost) Stage.

Bulk(Boost) Charge (Stage 2A) – Utilising MPPT technology, the controller will deliver maximum rated current until batteries rise to absorption level.

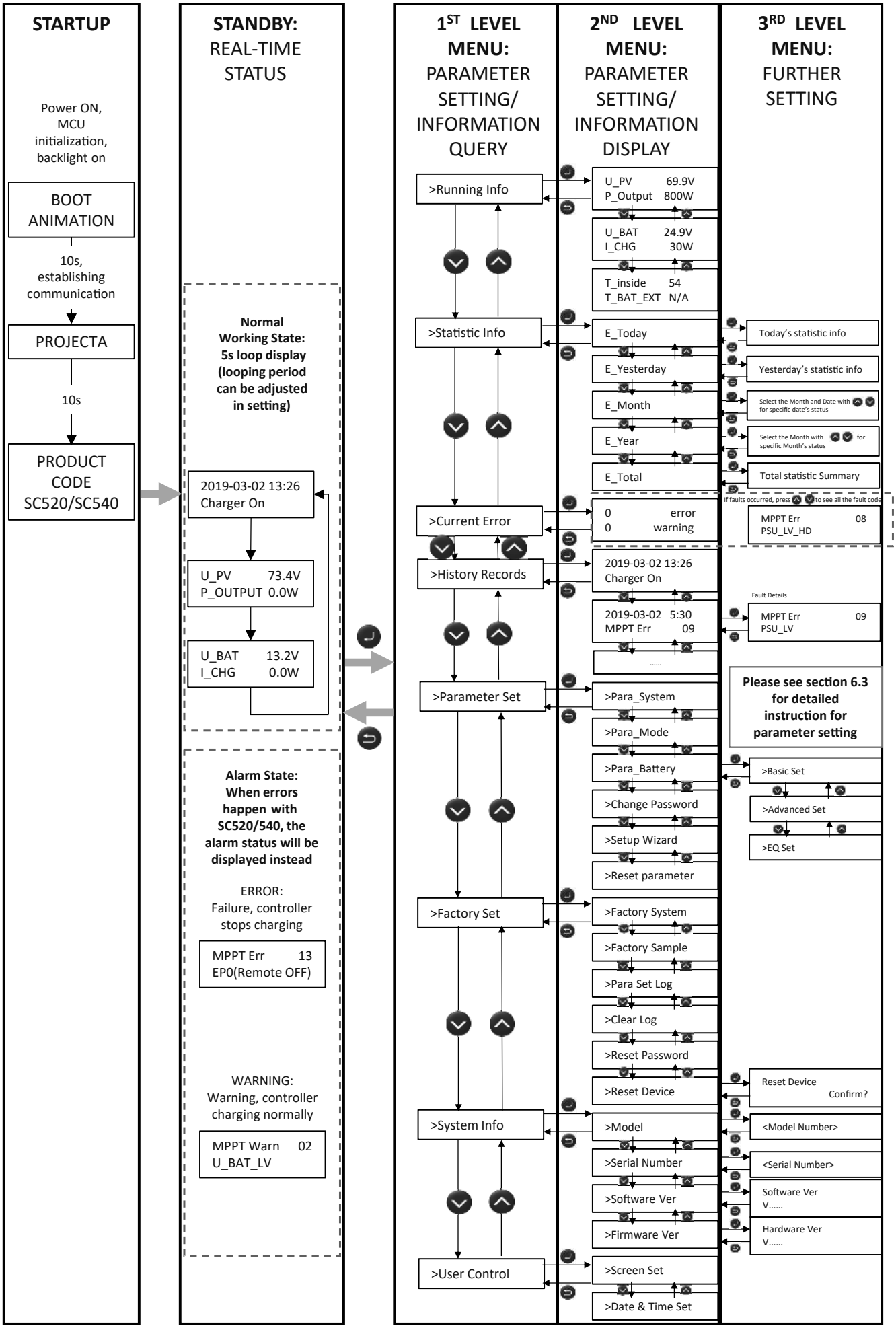
*Equalization Charge (Stage 2B) – Only applicable to Flooded,WET and AGM mode. Every 30 days, it will skip boost and automatically run equalization to rejuvenate the internal battery cells.

Absorption Charge (Stage 3) – the controller will deliver constant voltage based on the battery chemistry setting until the charge current is less than 3A, then the controller will turn to float charge mode.

Float Charge (Stage 4) – Only applicable to non-lithium batteries. When the battery is fully charged, it will reduce the voltage to float voltage setting as per chemistry select to keep the battery topped up.

Recycle Charge (Stage 5) – After 10 days of Float charge, the controller will return to bulk charge and charge the battery to set voltage point.

7. Menu Introduction



7.1 Start-Up

After power on, the LCD display will light up the backlight, show a boot animation and then display the following information in sequence.

For SC520:

PROJECTA → (10s) → SC520

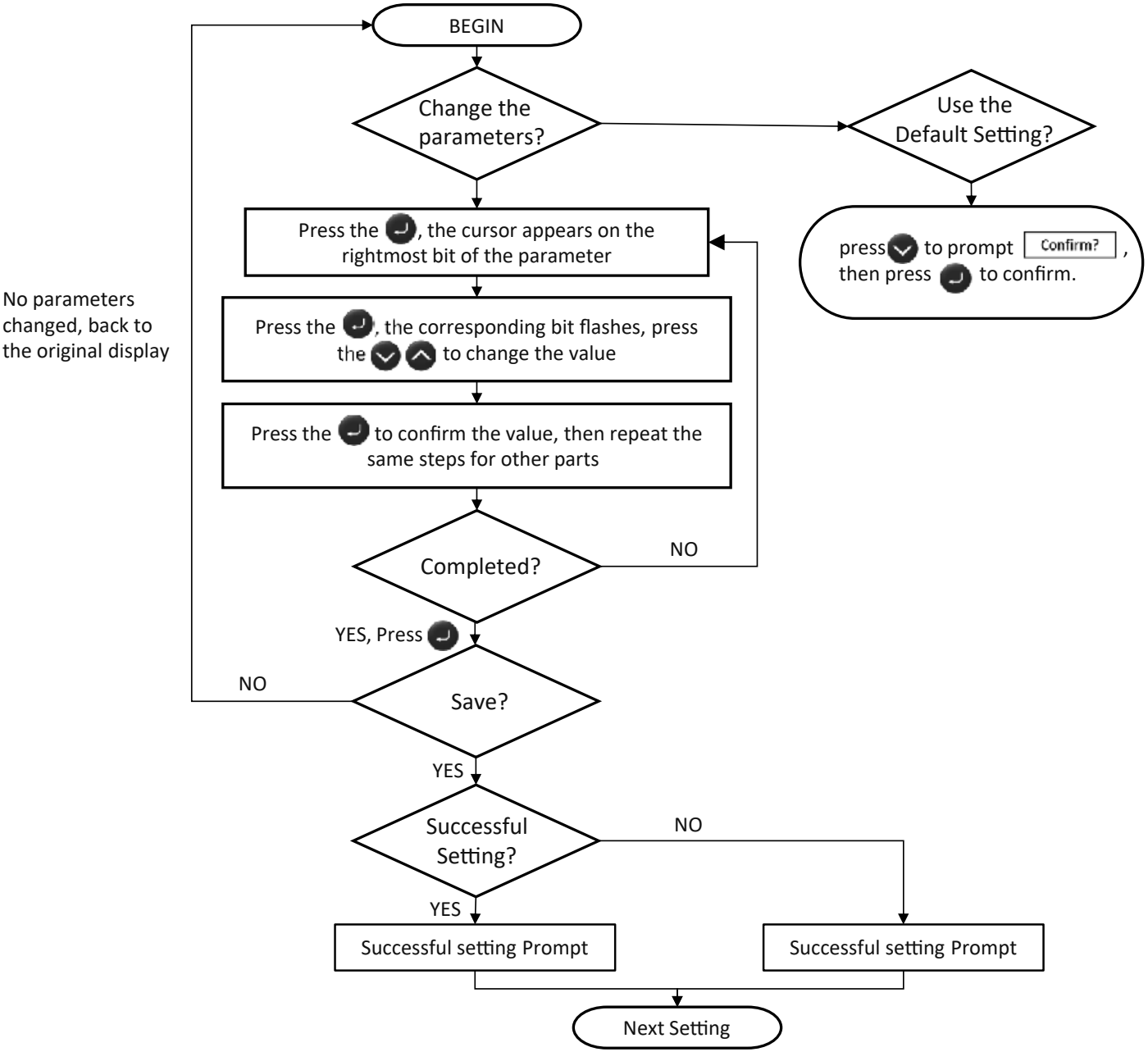
For SC540:

PROJECTA → (10s) → SC540

7.2 Real-Time Working Status

After the initial startup, if the controller is working normally, the display will show the real-time device working status.

*5s default display looping period, manually turning pages with ⌄⌃ will standby on the current page for 30s as default.



*Changing the Parameter Setting required the password, the initial password is "1000". The password can be adjusted in Factory Set interface.

Interface		Display	Description	Default Setting	Setting Range
>Para System		SYS_Module_Addr	Systen Module Parallal Address	1	1~4
>Para_Mode		OutCtrl_CHG	External Control (Read Only)	0- Disable	0 - Disable 1 - Enable
		RlyCtrl_Config	Output dry contact configuration	0- Disable	0 - Disable 1 - Alarm Switch
		Silent_Mode_EN	Silent Mode	0-Disable	0-Disable 1-Enable
		Force_Charger	Forced Charge Mode	0-Disable	0- Disable 1- BAT_Level_12 2- BAT_Level_24 3- BAT_Level_48
		EPO_DRY_IN_EN	Remote Switch	0-Disable	0- Disable 1- Enable
>Para_Battery	>Basic Set	Battery_Type	Battery Type (Select 3,5,6 to unlock EQ Setting)	GEL/OPzV	0- GEL/ OPzV 1- AGM 2- Lead-Carbon 3- Flooded 4- Customize 5- Traction 6- OPZS 7- BMS
		Battery _AH	Battery Capacity	200Ah	20~2000Ah
	>Advanced Set	U_Absorp_CHG	Absorption Charge Voltage	14.1V	Refer to 9. Controller Specification for setting range
		U_Float_CHG	Float Charge Voltage	13.7V	Refer to 9. Controller Specification for setting range
		BAT_OV_Warn	Overvoltage Warning	12VDC: 14.9V 24VDC: 29.8V 48VDC: 59.6V	12VDC: (U_AVE_CHG +0.2)~17.0V 24VDC: (U_AVE_CHG +0.4)~34.0V 48VDC: (U_AVE_CHG +0.8)~68.0V
		CHG_MAX_Current	Maximum Charging Current (Reset this setting every time the battery capacity changed)	Rate_CHG_CUR	3~Rate_CHG_CUR (Max=40A)
		Min_Bulk_Time	Minimum Bulk Charge Time	120min	1~600min
		Max_Absorp_Time	Maximum Absorption Charge Time	8h	1~240h
		Auto_CHG_Cycle	Equalization Cycle Time	240h	24~2400h
		CHG_T_Compensate	Charging Temperature Compensation	0-Disable	0-Disable 1-Enable
		CHG_TEMP_Coef	Charging Temperature Compensation Coefficient Setting	12VDC: -18mV 24VDC: -36mV 48VDC: -72mV	12VDC: -30~0mV/°C 24VDC: -60~0mV/°C 48VDC: -120~0mV/°C
		BAT_OT_WARN_Gate	Battery Setting Over Temperature Warning	55°C	35~65°C

Interface		Display	Description	Default Setting	Setting Range
>Para_Battery	>EQ Set (Only for FLD, Traction and OPZS batteries)	EQ_Command	Equalization Charge	0-OFF	0-OFF 1-ON
		U_EQ_CHG	Equalization Charge Voltage	12VDC: 15.6V 24VDC: 31.2V 48VDC: 62.4V	12VDC: 15.5V~16.3V 24VDC: 31.0V~32.6V 48VDC: 62.0V~65.2V
		EQ_Sustain_Time	Equalization Charge Time	30min	30~90min
>Change Password		>Change Password	Change Password for Parameter Set Interface	1000	
>Setup Wizard		Refer to Section 6.4			
> Reset Parameter		Reset User_Para	Restore Default Settings		

7.4 User Control

The SC520/SC540 configuration can be adjusted according to customer needs, including system date & time, backlight and automatic page turning time.

Interface	Display	Description	Default Setting	Setting Range
>Screen Set	Backlight_KeepOn	Backlight Constant On	0-Disable	0-Disable 1-Enable
	Page_Turn_Auto	Real-time Status Automatic Page Turning Time	5s	3~30s
>Data & Time	System Time Setting			

8 Alarm Code

The SC520/SC540 has two alarm levels:

- Warning: the SC520/SC540 is still charging normally, but with warning alarm.

Example:

```
MPPT WARN    02
U_BAT_LV
```

- Fault: the SC520/SC540 has an error and charging stops.

Example:

```
MPPT Err     09
PSU_LV
```

8.1 Alarm Code Chart

Alarm Level	ID	Display	Description	Quick Troubleshooting
Fault	01	V_bus_OV	Solar input voltage has exceeded the controller's maximum rating	Lower the solar panel's total voltage connected to the controller
	02	U_BAT_OV	Battery output voltage has exceeded the controller's maximum rating	*Check whether there is an external voltage applied to the battery *Check the SC520/SC540 Battery setting is consistent with the battery configuration
	03	U_BAT_OV_HD		

Alarm Level	ID	Display	Description	Quick Troubleshooting
Fault	04	Buck_Short Cut	Battery short circuit	Check and adjust the battery wiring
	05	I_Buck1_OC	The bulk stage charging current has exceeded the controller's maximum rating	Lower the maximum charging current setting in the parameter setting >Para_Battery >Advanced Set >CHG_MAX_Current
	07	T_Board_OT	The controller has exceeded the ambient temperature limit	Ensure the controller is placed in a well-ventilated area
	09	PSU_LV	The solar panel's power is too low	Check the configuration of the solar panels.
	10	PSU_LV_HD		
	11	Sam_HD_Fault	Sampling Failure	Please contact your dealer
	12	EEPROM_Fail	The read and write function of the controller is abnormal	
	13	EPO(Remote OFF)	The 2P phoenix terminal is not connected to the controller EPO.	Insert the 2P phoenix terminal into the EPO of the charger. If the fault alarm is still on, please contact your dealer
Warning	01	U_BAT_OV	The battery voltage has exceeded the maximum rating	Adjust the battery parameter setting to be consistent with the battery configuration
	02	U_BAT_LV	The battery voltage is too low	Check the battery configuration and wait for the battery to be charged to normal voltage range
	03	Cur_Limit	The charging current has exceeded the maximum rating	Check the battery parameter setting
	04	BAT_UnConnect	The connection between the battery and the controller failed.	Check the wiring and the circuit breaker between the battery and the controller
	06	T_BAT_OT	The surrounding temperature around the temperature sensor is too high	Check the sensor is not near a source of heat. Battery may be faulty if it is too hot
	08	TypeSet_Mismatch_Err	The controller model setting is not consistent with the controller configuration	Check and adjust the model setting
	14	NTC_Board_Fault	The NTC temperature sensor board inside the charger is faulty.	Please contact your dealer.

8.2 Battery Temperature Sensor

As an option, the unit provides a port to connect the external battery temperature sensor. If it is used, the unit will optimise the charging performance based on the battery temperature.

Controller Parameter	Specifications				
Model No.	SC520			SC540	
System Wiring Grounded	Negative Grounded				
Battery System Voltage	12/24/48VDC				
No-load Loss	1mA/12VDC, 3mA/24VDC. 5mA/48VDC				
Max Solar Input Voltage	<100Voc			<100Voc	
Rated Solar Charge Current	20A			40A	
Max Solar Input Power	300W/12V 600W/24V 1200W/48V			600W/12V 1200W/12V 2400W/48V	
Operating Temperature	-40°C~+70°C				
Net Weight	1.4kg				
Communication	RS485, Bluetooth®				
Controller Dimensions	205 x 160 x 68.5mm				
Dry Contact	30VDC/2A				
IP Rating	IP31				
Battery & Solar Connection Screw Tightness	1.2Nm				
Battery Voltages	Battery Parameters				
Battery Types	CUSTOM	GEL	LFP (Default)	AGM	WET
Bulk Charge Voltage	Default (LFP)	14.1V/28.2V/56.4V	14.2V/28.4V/56.8V	14.4V/28.8V/57.6V	14.7V/29.4V/58.8V
Bulk Charge Time-out	12 hours (then transition to absorption stage)				
Absorption Charge Voltage	Default (LFP)	14.1V/28.2V/56.4V	14.2V/28.4V/56.8V	14.4V/28.8V/57.6V	14.7V/29.4V/58.8V
Absorption Stage Time-out	10 hours (then transistion to float stage)				
Float Charge Voltage	Default (LFP)	13.5V/27.0V/54.0V	13.5V/27.0V/54.0V	13.5V/27.0V/54.0V	13.7V/27.4V/54.8V
Recycle Stage Return Voltage	Default (LFP)	12.8V/25.6V/51.2V	13.3V/26.6V/53.2V	12.8V/25.6V/51.2V	12.8V/25.6V/51.2V
Auto-Temperature Compensation	Default Setting: -3mV / °C / cell				

Custom Mode Setting			
Battery Voltage	12V	24V	48V
Customised Default Bulk Charge Voltage	14.2V	28.4V	54.0V
Customised Bulk Charge Voltage Setting Range	13.0~14.5V	26.0~29.0V	52.0~58.0V
Customised Default Float Charge Voltage	13.7V	27.4V	53.2V
Customised Float Charge Voltage Setting Range	13.0~14.0V	26.0~28.0V	52.0~56.0V

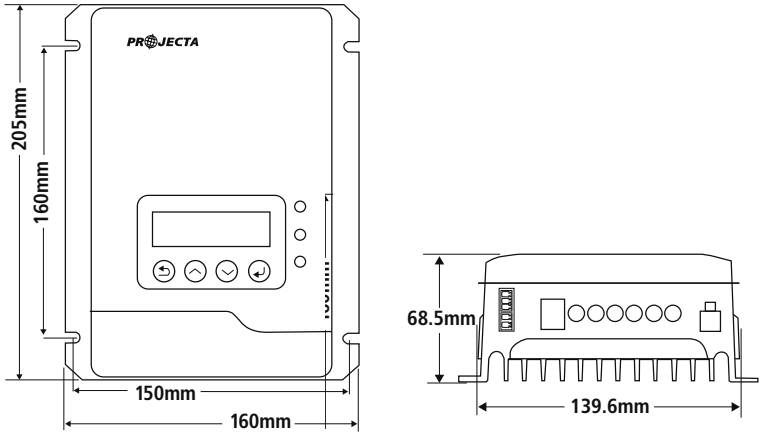
10. Controller Dimensions

SC520 & SC540

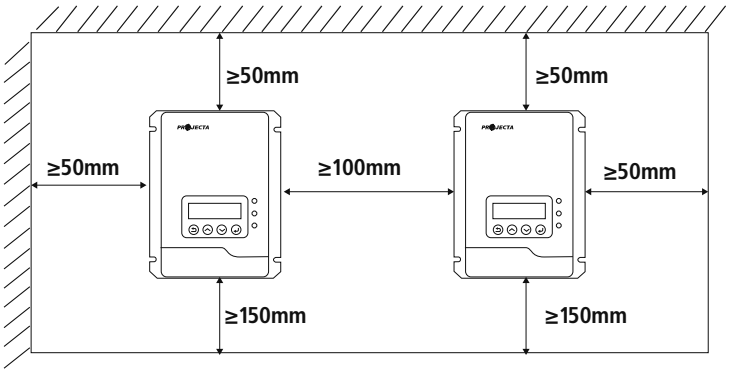
Product Dimensions: 205 x 160 x 68.5mm

Installation Area Dimensions: 160 x 150mm

Installation Hole Size: 5 x 5mm



11. Installation



Good ventilation can guarantee the normal operation of equipment. Please always guarantee there is enough clearance around SC520/SC540 upon installation. Please refer to following image for minimum clearance. Please choose a flat and clean surface for installation, mark the position for the 4 mounting point and use the 4 x M5 mounting screw sets supplied. Please tighten the screws properly and make sure all 4 screws are installed to avoid falling. Install the SC520/SC540 as close to the batteries as possible. This will reduce the potential for voltage drop and ensure maximum performance of the equipment.

12. When multiple SC540 or SC520 are wired in parallell with INTELLI-Grid or Compact

The address on the solar controllers needs to be set so the system knows there are two controllers.

Setting the ID Address of the SC540

The ID of SP100 can be set by buttons on front panel (See below)

BUTTON	FUNCTION
	Cancel the selection
	Display the previous level of menu
	Display the previous page
	Increase the value of the selected item
	Press the button for more than 2 seconds to scroll the page up
	Display the next page
	Decrease the value of the selected item
	Press the button for more than 2 seconds to scroll the page down
	Enter into this menu, displaying the next level
	Select and confirm the selection of a menu item

1. General setting process

Select the setting item and the press button

When there is a bar under setting item, press button or to select the required parameter

Then press button to confirm selection, the selected parameter will be blinking

Press button or to select the value

Press button to confirm the value. Press button Then press button

The message 'OK' will pop up, the setting is finished

2. Steps to set ID

2.1 Press button to enter into setting page when screen is at homepage

Picture 2.1

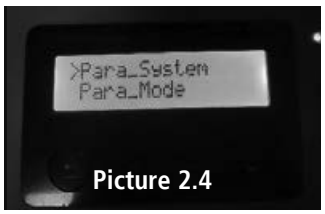
2.2 Press button or to select "Parameter Set" and then press button to confirm selection

Picture 2.2

2.3 Enter into pin 1000 (see Picture 2.3) and then press button to confirm selection

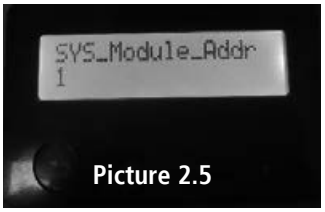
Picture 2.3

2.4 Select Para_System and then press to confirm selection



Picture 2.4

2.5 Then set ID at item "SYS_Module_Addr":
Set the first SP as 1, and the second SP as 2



Picture 2.5

WARRANTY STATEMENT

Brown & Watson International Pty Ltd ("BWI") of 1500 Ferntree Gully Road, Knoxfield, Vic., telephone (03) 9730 6000, fax (03) 9730 6050, warrants that all products described in its current catalogue will under normal use and service be free of failures in material and workmanship for a period of three (3) years from the date of the original purchase by the customer as marked on the invoice. This warranty does not cover ordinary wear and tear, abuse, alteration of products or damage caused by the purchaser.

To make a warranty claim the consumer must deliver the product at their cost to the original place of purchase or to any other place which may be nominated by either BWI or the retailer from where the product was bought in order that the warranty assessment may be performed. The consumer must also deliver the original invoice evidencing the date and place of purchase together with an explanation in writing as to the nature of the claim.

In the event that the claim is determined to be for a minor failure of the product then BWI reserves the right to repair or replace it at its discretion. In the event that a major failure is determined the consumer will be entitled to a replacement or a refund as well as compensation for any other reasonably foreseeable loss or damage.

This warranty is in addition to any other rights or remedies that the consumer may have under State or Federal legislation.

IMPORTANT NOTE

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Distributed by
AUSTRALIA
Brown & Watson International Pty. Ltd.
Knoxfield Victoria 3180
Phone: (03) 9730 6000
Fax: (03) 9730 6050
National Toll Free: 1800 113 443

NEW ZEALAND OFFICE
Griffiths Equipment Ltd.
19 Bell Avenue,
Mount Wellington,
Auckland 1060, New Zealand
Phone: (09) 525 4575

IS523
Issue 2 22.07.25