



DC-DC & MPPT SOLAR CHARGER

25 Amp, 4 Stages Automatic Switchmode



P/No. DSC1225、DSC1225A

Instruction Manual

Please read user manual carefully before use.

1. WARNINGS

- ◆ Use of an attachment not recommended or sold by the DC-DC & MPPT Solar charger may result in a risk of fire, electric shock, or injury to persons
- ◆ Explosive gases may escape from the battery during charging. Prevent flames and sparks and provide adequate ventilation.
- ◆ Before charging, read the instructions.
- ◆ Specialized for charging 12V lead acid and lithium ion with LiFePO₄ battery.
- ◆ Do not attempt to charge non-rechargeable batteries.
- ◆ When charging, batteries can emit explosive gases, therefore it is essential to prevent flames and sparks.
- ◆ Do not operate charger with damaged cord - replace the cord immediately.
- ◆ Make sure that cables used have sufficient cable area, see CABLE DIMENSIONS.
- ◆ Never charge a frozen battery.
- ◆ Corrosive substances may escape from the battery during charging and damage delicate surfaces. Store and charge in a suitable area.
- ◆ Fit fuses as close to the batteries as possible to protect the cable in case of short circuit.
- ◆ This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.
- ◆ Young children should be supervised to ensure that they do not play with the appliance.

2. FEATURES

This is a fully automatic battery charger with 4 charge stages.

Automatic charging protects your battery from being overcharged.

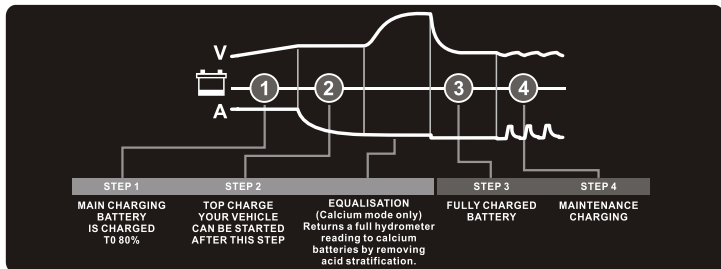
The DC-DC charger is purposely designed for charging auxiliary batteries.

It includes all the features needed to maintain the auxiliary battery to its optimum condition and to prolong the battery life.

4-stage charging is a very comprehensive and accurate charging process that gives your battery longer life and better performance compared to using traditional chargers.

4-stage chargers are suitable for most battery types including GEL, AGM, WET, Calcium and Lithium-ion with LiFePO₄ batteries. They may also help restore drained and sulphated battery.

The 4 stages are: Bulk; Absorption; Float. and Pulse.



	GEL	AGM	WET	CALCIUM	LITHIUM	LIMIT
1 BULK	*Constant Current up to:					
	14.1V	14.4V	14.7V	15.4V	14.4V	
2 ABSORPTION	Constant voltage until current drops to 3.8A					30 minutes
	14.1V	14.4V	14.7V	15.4V	14.4V	
3 FLOAT	13.7V				13.3V	10 days Charge cycle restarts if voltage drops
4 PULSE	GEL: 12.6V- 14.1V, 25-2A AGM: 12.6V- 14.4V, 25-2A WEL: 12.6V- 14.7V, 25-2A CALCIUM: 12.6V- 15.4V, 25-2A LITHIUM: 12.6V- 14.4V, 25-2A					Charge cycle restarts if voltage drops
Equalisation (Calcium mode only)	3.8A Constant Current Charge up to 16V					then hold 1 hour (5 hours timeout)

NOTE: Please ensure the correct type of battery to be charged. (especially for the lithium-ion with LiFePO₄ battery)

STEP 1 Bulk (Constant Current)

Charging with maximum current until approximately 80 % battery capacity.

STEP 2 Absorption (Constant Voltage)

Charging with declining current to maximize up to 100% battery capacity.

STEP 3 Float

The Float stage maintains the battery at 100% charge without overcharging or damaging the battery. This means the charger can be left connected to the battery indefinitely.

STEP 4 Pulse

Maintaining the battery at 95 – 100% capacity. The charger monitors the battery voltage and gives a pulse when necessary to keep the battery fully charged.

The battery charger has a 4-step fully automatic charging cycle. The cycle is repeated infinitely. If the terminal voltage drops below a lower limit, the charger automatically goes back to the beginning of the charging curve.

3. SWITCHMODE TECHNOLOGY

The DC-DC & MPPT Solar charger converts your vehicle's 12VDC/24VDC alternator power to the voltage level allowing your batteries to be fully charged, prolonging battery life and reliability with the latest synchronous switching technology.

DUAL INPUT OPERATION

The DC-DC & MPPT Solar charger Dual has 2 inputs. The Service battery will be charged from the alternator, solar panel, or both in combination. The solar panel adjusts itself to the Starter battery voltage. The Starter battery will be charged and maintained directly by the solar panel if the Service battery is fully charged.

SOLAR MPPT

The DC-DC & MPPT Solar charger utilises sophisticated MPPT (Maximum Power Point Tracking) solar regulator technology. MPPT maximises the power generated from the solar panels to the auxiliary battery.

IGNITION CONNECTION

The DC-DC & MPPT Solar charger can be wired to the vehicle's ignition allowing it to operate only when the ignition is turned on. The ignition connection also activates the lower input voltage operation to suit vehicles with smart (variable voltage) alternators.

TEMPERATURE COMPENSATION

The DC-DC & MPPT Solar charger is supplied with a 2 metre temperature sensor. The sensor monitors the battery temperature and adjusts (compensates) the charger's output to prevent overcharging. This is ideal for batteries used in warmer climates or environments.

4. PROTECTIVE FEATURES

Spark-Free Protection

The DC-DC & MPPT Solar charger will not start charging the battery (no output) unless the load is securely connected. It prevents the output leads from sparking due to accidental short circuit and makes the charger safer to use around batteries.

Reverse Connection Protection

Reverse connection on input and output terminals does not damage DC-DC & MPPT Solar charger internal circuit. The DC-DC & MPPT Solar charger detects reverse connection condition and indicates whether input or output connection is reversed.

Over and Under Voltage Protection

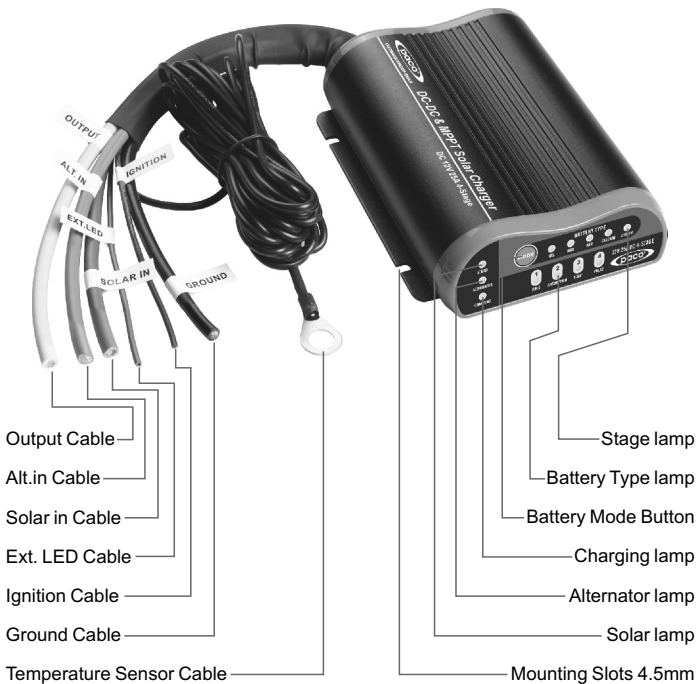
The charger will automatically shut down if there is an over voltage or under voltage problem.

Over Temperature Protection

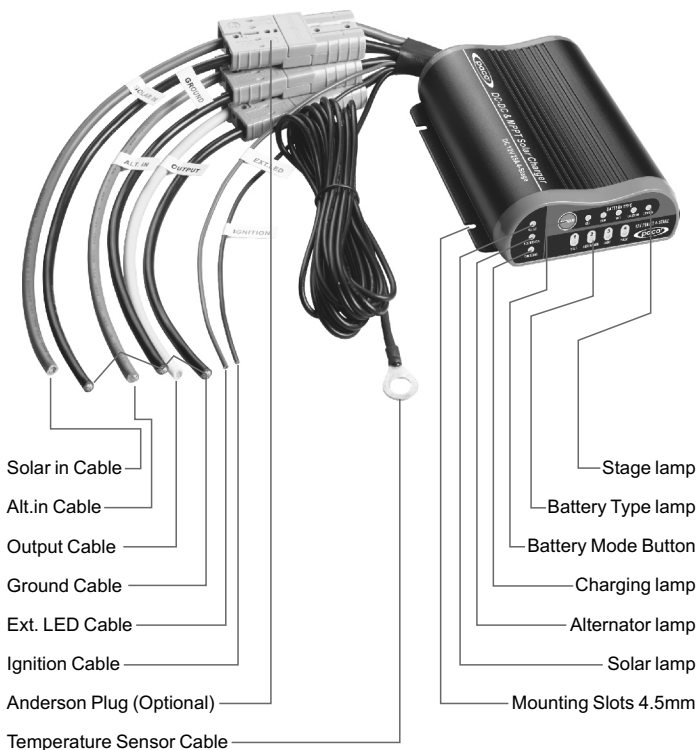
The charger will lower its output current if the temperature of the unit begins to overheat.

5. PRODUCT OVERVIEW

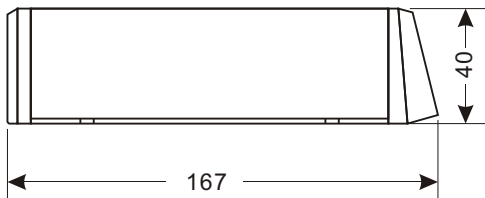
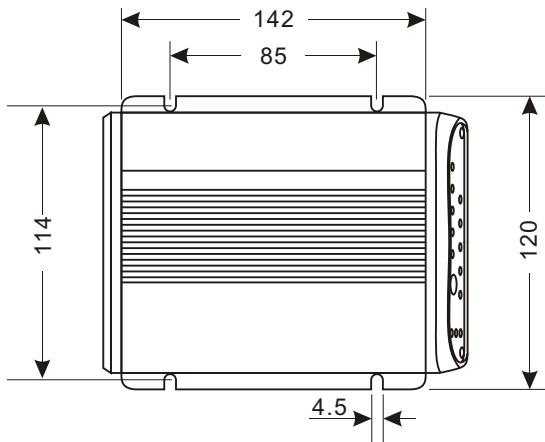
DSC1225



DSC1225A



NOTE: Please ensure the correct type of battery to be charged (especially for the lithium-ion with LiFePO_4 battery)



unit:mm

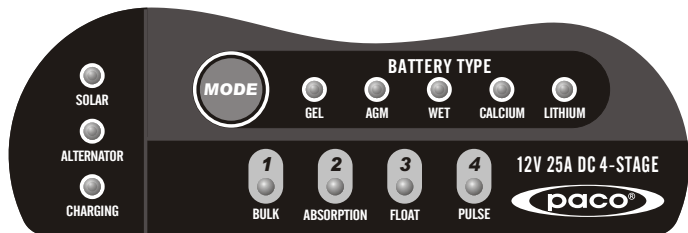
6. TECHNICAL SPECIFICATIONS

Operating Conditions		
Charger model	<input type="checkbox"/> DSC1225 <input type="checkbox"/> DSC1225A	
Maximum Solar Input Voltage	23Vdc	
Alternator Input Voltage	9-32Vdc	
Maximum Input Current	40A	
Input Current (No Load)	20mA	
Efficiency	App.95%	
Back Drain on Auxiliary Battery	10mA, +/-5%	
External LED Output-Constant Current	4mA	
Output Current	Input 9-11VDC:	20A
	Input 11-32VDC:	25A
Minimum Start Voltage (Battery)	2V	
Input Fuse Rating	50A (Not supplied)	
Output Fuse Rating	50A (Not supplied)	
Maximum Output Power	368W	
Solar Input Turn On Voltage	9V	
Ambient temperature	-10°C to +80°C Output power is reduced automatically at high temperatures	
Dimension (L×W×H)	150×120×40mm	
Weight	1kg	
Charge Control		
Charger type	4-step fully automatic charging	

Bulk: 20A at 9-11V DC, 25A at 11-32V DC	*Constant Current up to:				
	GEL	AGM	WET	CALCIUM	LITHIUM
	14.1V	14.4V	14.7V	15.4V	14.4V
Absorption	Constant voltage until current drops to 3.8A				
	GEL	AGM	WET	CALCIUM	LITHIUM
	14.1V	14.4V	14.7V	15.4V	14.7V
Float	13.7V				13.3V
	Also with pulse feature				
Pulse	GEL: 12.6V- 14.1V, 25-2A AGM: 12.6V- 14.4V, 25-2A WEL: 12.6V- 14.7V, 25-2A CALCIUM: 12.6V- 15.4V, 25-2A LITHIUM: 12.6V- 14.4V, 25-2A				
Equalisation (Calcium mode only)	3.8A Constant Current Charge up to 16V then hold 1 hour (5 hours timeout)				
Battery Range					
Deep Cycle	75-300Ah				
Types of Batteries	All types of 12 V lead-acid batteries GEL , AGM ,WET, Calcium, and Lithium				
Operating Model	12V Vehicle			24V Vehicle	
VSR Model-Default (Ignition Override Not Connected)	Turn on 13.2V	Turn off 12.6V	Turn on 26.4V	Turn off 25.2V	
Low Voltage Model- Ignition Override cable connected to ignition switch (Ignition on)	Turn on 12.2V	Turn off 11.6V	Turn on 24.4V	Turn off 23.3V	
Standards					
EMC	EN 61000, EN 55014 Class B				
IP Rating	IP67				

*** Specifications are subjected to change without prior notice.**

7. HOW TO READ LED DISPLAY



LED Charge Indicators

Stage lamp	Solar lamp	Alternator lamp	Charging lamp	S1 lamp	S2 lamp	S3 lamp
Power off						
Normal mode	●	●	☀	●	●	●
Solar charging mode	●		☀	●	●	●
Alternator charging mode		●	☀	●	●	●
Solar input high voltage				●		●
Solar input reverse					●	
Alternator high voltage				●	●	
Alternator input reverse					●	●
Output fault mode				●		

Stage lamp	S4 lamp	GEL lamp	AGM lamp	WET lamp	Calcium lamp	Lithium lamp
Power off						
Normal mode	●	●	●	●	●	●
Solar charging mode	●	●	●	●	●	●
Alternator charging mode	●	●	●	●	●	●
Solar input high voltage		☀	☀	☀	☀	☀
Solar input reverse	●	☀	☀	☀	☀	☀
Alternator high voltage		☀	☀	☀	☀	☀
Alternator input reverse		☀	☀	☀	☀	☀
Output fault mode	●	☀	☀	☀	☀	☀

Note: ● : Solid ☀ : Flashing

8. FAULT CODES

There are error codes that may be displayed. These will be displayed in the following way:

Stage lamp	S1 lamp	S2 lamp	S3 lamp	S4 lamp	GEL lamp	AGM lamp	WET lamp
Solar input high voltage	●		●		☼	☼	☼
Solar input reverse		●		●	☼	☼	☼
Alternator high voltage	●	●			☼	☼	☼
Alternator input reverse		●	●		☼	☼	☼
Output fault mode	●			●	☼	☼	☼

Stage lamp	Calcium lamp	Lithium lamp	Cause	Remedy
Solar input high voltage	☼	☼	Overvoltage is detected at solar input	Check solar panel open circuit voltage
Solar input reverse	☼	☼	Solar input is reverse connected	Check solar input connection
Alternator high voltage	☼	☼	Overvoltage is detected at Alternator	Check vehicle battery voltage
Alternator input reverse	☼	☼	Alternator input is reverse connected	Check Alternator input connection
Output fault mode	☼	☼	Output battery is reverse connected	Check output cable connection
			Overvoltage is detected at output	Check auxiliary battery voltage
			Output open circuit or dead Battery	Check auxiliary battery voltage & cable connections

Note: ● : Solid ☼ : Flashing

9. INSTALLATION

MOUNTING

The rugged design of the DC-DC & MPPT Solar charger affords it to be mounted wherever best suits the application. By using advanced potting technology the unit is resistant to shock, vibration, dust and water allows for under-bonnet or in-vehicle installation. Clever 'side extrusions' incorporated within the enclosure allow the unit to be mounted to flat surfaces as close to the auxiliary battery as possible. It is advisable however to keep the charger as far away from exhausts, turbo's or any other high temperature components to ensure improved performance.

WIRING

To make sound electrical connections, battery cables will need to be made to the correct length. Cable lugs should be crimped or soldered to the stripped battery cable and then protected with the supplied heatshrink. Butt splices should be used for cable extension.

Recommended minimum cable dimensions in mm²

Cable	Size
Alternator Input Cable (Red)	8mm ² /AMG8
Solar Input Cable (Green)	8mm ² /AMG8
Output Cable (Grey)	8mm ² /AMG8
Common Ground (Black)	8mm ² /AMG8
Ignition Override (Blue)	1-1.5 mm ²
External LED (Pink)	1-1.5 mm ²

*Note the above recommendation is valid for cable length up to 12m.

(1). Disconnect the negative battery cable (Earth) from the vehicle's starting battery or disconnect power to the trailer. Note: To prevent the loss of vehicle electronic memories, radio presets & security codes, it is recommended that an "Electrical System Memory Protector" be used.

(2). Connect the Auxiliary Battery positive (+) terminal to the Output Cable (grey colour) from DC-DC & MPPT Solar charger. Fit a 50A fuse to the cable as close as possible to the Auxiliary Battery positive (+) terminal.

(3). Connect the Auxiliary Battery negative (-) terminal to the DC-DC & MPPT Solar charger Common Ground cable (black colour). Alternatively connect both Auxiliary Battery negative (-) terminals and DC-DC & MPPT Solar charger Common Ground cable to vehicle chassis ground.

(4). Connect the Starter Battery positive (+) terminal to the DC-DC & MPPT Solar charger Alternator Input cable (red colour). Fit a 50A fuse to the cable as close as possible to the Starter Battery positive (+) terminal.

(5). If your vehicle has fixed voltage or temperature compensating alternator installed, leave the Ignition Override cable (blue colour) open.

If your vehicle has smart (variable voltage) alternator installed, the Ignition Override cable must be connected to the vehicle's ignition. The DC-DC & MPPT Solar charger will only operate when the vehicle's ignition is turned on.

However, if solar panels are connected to DC-DC & MPPT Solar charger, the IDC25 will operate and only draw power from solar panels (assuming vehicle's ignition is turned off).

Fit a 1-2A fuse to the cable as close as possible to the vehicle's ignition.

Consult the vehicle manufacturer for type of alternator installed in your vehicle.

(6). When 12V solar panels are present, connect the solar panel positive (+) terminal to the DC-DC & MPPT Solar charger Solar Input cable (green colour). Fit a 50A fuse to the cable as close as possible to the Solar Panel positive (+) terminal.

Then, connect the Solar Panel negative (-) terminal to the DC-DC & MPPT Solar charger Common Ground cable (black colour). Alternatively connect both Solar Panel negative (-) terminals and DC-DC & MPPT Solar charger Common Ground cable to vehicle chassis ground.

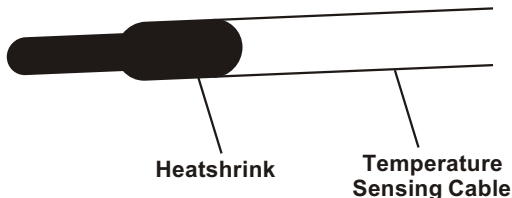
(7). The external LED wire provides 4mA constant current output. It can power an LED panel mount indicator with or without an internal resistor.

Leave External LED cable open if you do not need the external LED indication. If external LED indication is required, connect the positive (+) terminal of a LED Indicator to the External LED cable.

Then, connect the negative (-) terminal of LED indicator to the vehicle chassis ground.

(8). Cut/remove Temperature Sensing cable if temperature compensated battery charging is not required. Use supplied heatshrink to insulate the open end of Temperature Sensing cable.

If temperature compensated charging is required, attach the ring terminal of the Temperature Sensing cable to the auxiliary battery negative (-) terminal. For best results, attach the ring terminal to the auxiliary battery plastic surface with thermal conductive adhesive such as 3MTC-2810 or equivalent.



10. SELECTION OF AUXILIARY BATTERY TYPE

Press the Mode button on the front panel until all Battery Chemistry LEDs are flashing. There are 5 battery chemistries available: Gel, AGM, Wet, Calcium and Lithium -ion with LiFePO₄. Keep pressing the button momentarily until the Battery Chemistry LED you want is flashing. After you release the button, your selection is entered and saved. Your selection will be restored automatically even after the DC-DC & MPPT Solar charger is fully disconnected and reconnected. The default Battery Chemistry is AGM.

11. TYPICAL WIRING INSTALLATION

(1). Full System

Figure 1: DSC1225

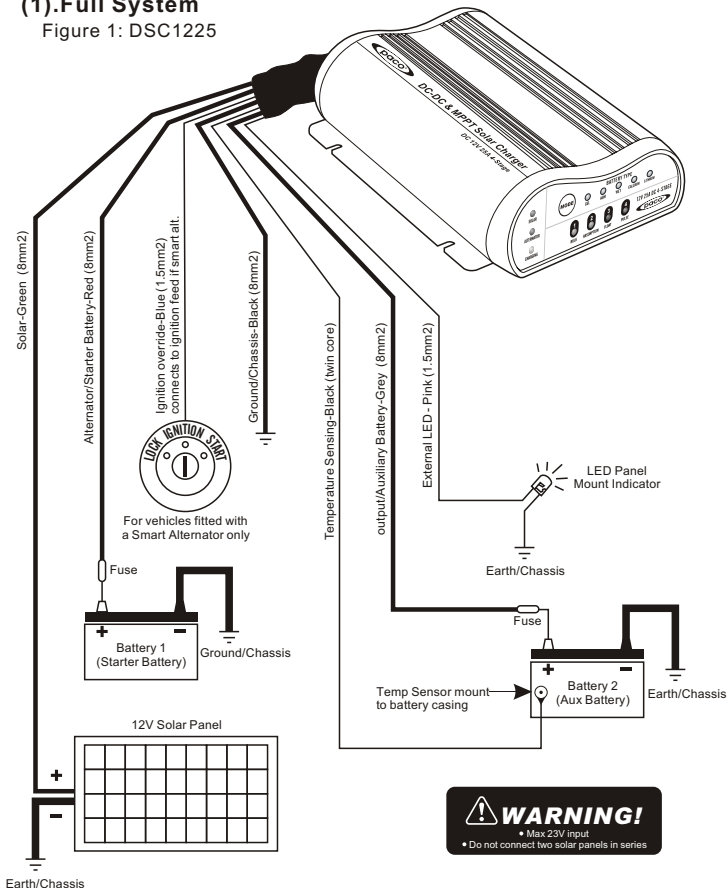
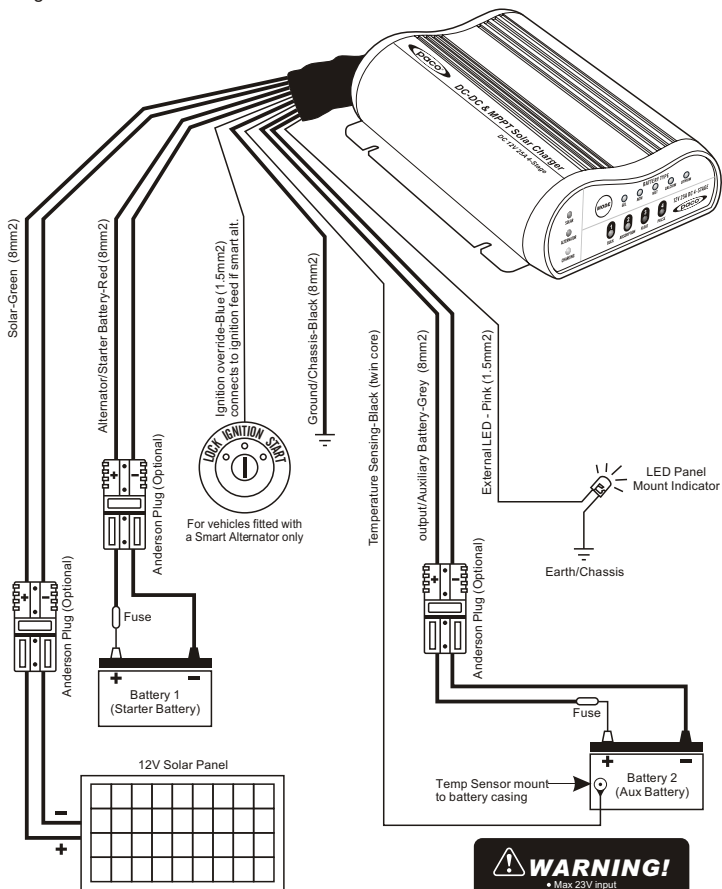


Figure 2: DSC1225A



(2). Alternator/Starter Battery Input Only

Figure 3: DSC1225

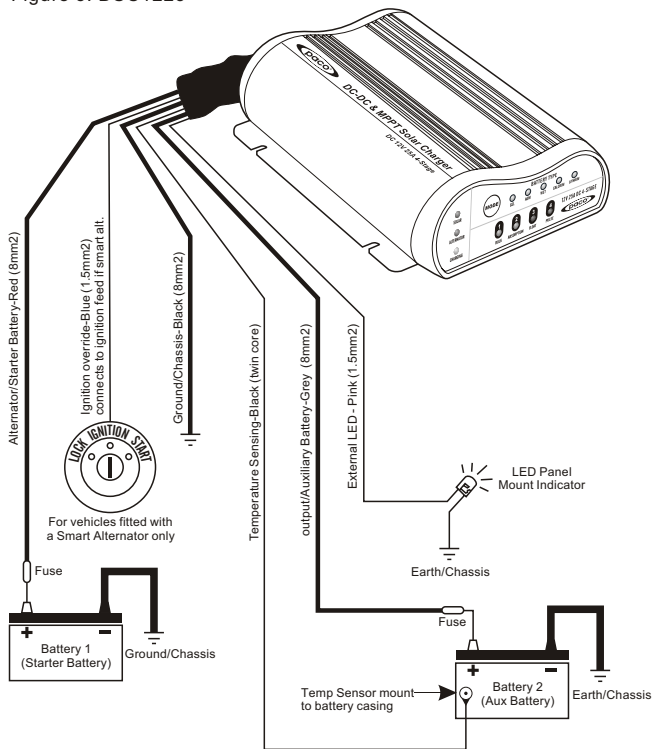
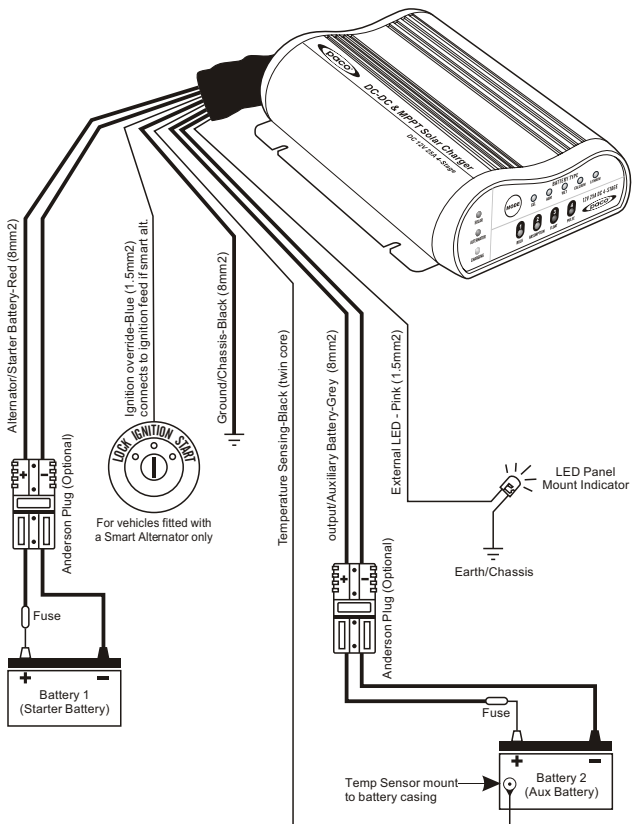


Figure 4: DSC1225A



(3).Solar Battery Input Only

Figure 5: DSC1225

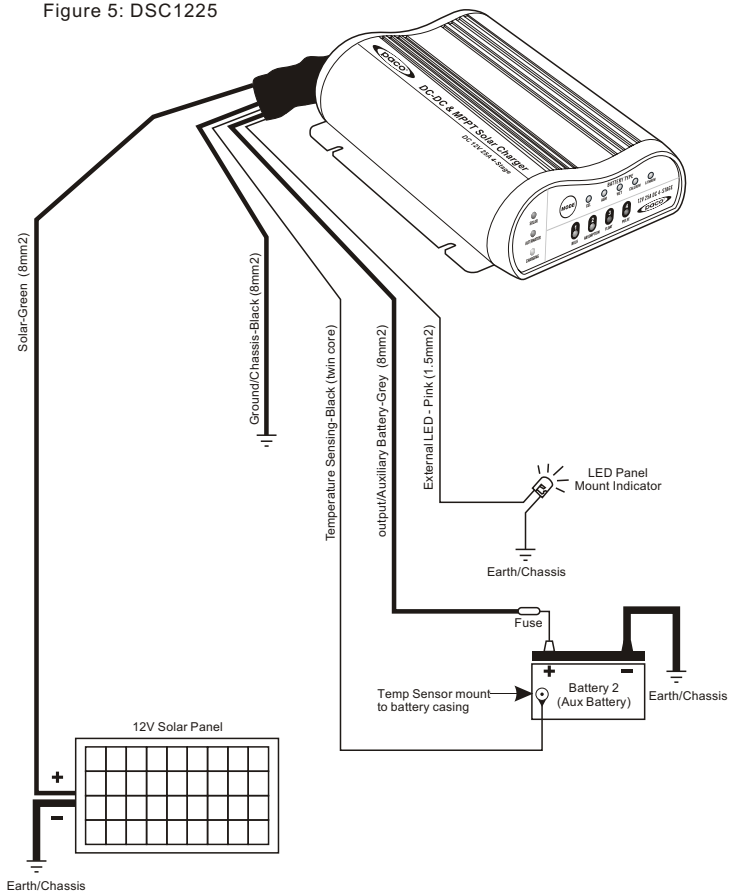
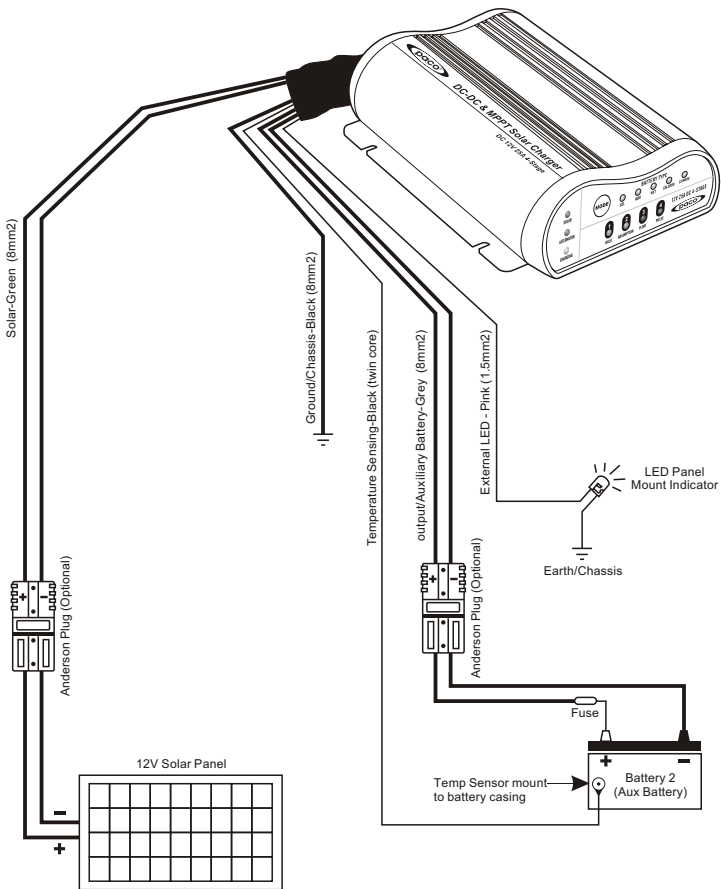


Figure 6: DSC1225A



12. FREQUENTLY ASKED QUESTIONS

Q.How do I know if the battery is charged?

A. The charger's FULLY STAGE LAMP will illuminate (solid). Alternatively use a Battery Hydrometer reading of 1.250 or more in each cell indicates a fully charged battery.

Q.I have connected the charger properly but the 'STAGE LAMP' does not come on?

A. In some cases batteries can be flattened to the point where they have very little or no voltage. This can occur if a small amount of power is used for a long time, for example a map reading light is left on for a week or more. 4-Stage chargers are designed to charge from as little as 12V charger 2.0 Volts. If the voltage is lower than 2.0 Volts, use a pair of booster cables to connect between two batteries to provide more than 2.0 Volts to the battery being charged. The charger can then start to charge the battery and the booster cables can be removed.

Q. Can I use the charger as a power supply?

A. 4-Stage chargers are designed to only supply power to the battery clips when they are connected correctly to a battery. This is to prevent sparks during connection to the battery or if connected incorrectly by mistake. This safety feature prevents the charger from being used as a 'Power Supply'. No Voltage will be present at the clips until connected to the battery.

Q.How can I know what stage the battery charger is in?

A. Below are the conditions that are displayed by the LAMP for each of the charge stages.

	Bulk	Absorption	Float	Pulse
Step Finish				

SAFETY

- ◆ The charger is designed for charging 12V lead-acid or lithium-ion batteries. Do not use the charger for any other purpose.
- ◆ Check the charger cables prior to use. Ensure that no cracks have occurred in the cables or in the bend protection. A charger with damaged cables must not be used. A damaged cable must be replaced by a professional representative.
- ◆ Never charge a damaged battery.
- ◆ Never charge a frozen battery.
- ◆ Never place the charger on top of the battery when charging.
- ◆ Always provide for proper ventilation during charging.
- ◆ Avoid covering the charger.
- ◆ A battery being charged could emit explosive gasses. Prevent sparks close to the battery. When batteries are reaching the end of their lifecycle internal sparks may occur.
- ◆ All batteries fail sooner or later. A battery that fails during charging is normally taken care of by the charger's advanced control, but some rare errors in the battery could still exist. Don't leave any battery during charging unattended for a long period of time.
- ◆ Ensure that the cabling does not jam or come into contact with hot surfaces or sharp edges.
- ◆ Battery acid is corrosive. Rinse immediately with water if acid comes into contact with skin or eyes, seek immediate medical advice.
- ◆ Batteries consume water during use and charging. For batteries where water can be added, the water level should be checked regularly. If the water level is low, add distilled water.
- ◆ This appliance is not designed for use by young children or people who cannot read or understand the manual unless they are under the supervision of a responsible person to ensure that they can use the battery charger safely. Store and use the battery charger out of the reach of children, and ensure that children cannot play with the charger.
- ◆ Connection to the mains supply must be in accordance with the national regulations for electrical installations.

CAUTION

ALWAYS PLACE THE DC-DC & MPPT SOLAR CHARGER
IN AN ENVIRONMENT WHICH IS:

- A. WELL VENTILATED.
- B. NOT EXPOSED TO DIRECT SUNLIGHT OR HEAT SOURCE.
- C. OUT OF REACH FROM CHILDREN.
- D. AWAY FROM WATER / MOISTURE, OIL OR GREASE.
- E. AWAY FROM ANY FLAMMABLE SUBSTANCE.
- F. SECURE NO RISK OF FALLING.

