DC- DC & SOLAR BATTERY CHARGER

Dual Input DC 25Amp & 50Amp, 5 Stages Automatic Switchmode

Instruction Manual

Please read user manual carefully before use.

P/No. SVDC1225, SVDC1225A, SVDC1250, SVDC1250A

1. WARNINGS

- Use of an attachment not recommended or sold by the SVDC1225 / SVDC 1250 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 5 charge stages.

Automatic charging protects your battery from being overcharged.

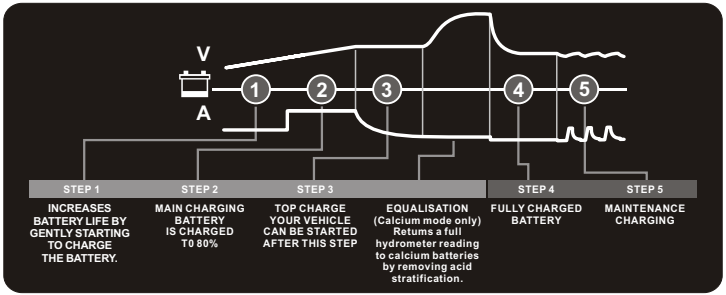
The DC-DC charger is purposely designed for charging auxiliary batteries.

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

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

5-stage chargers are suitable for most battery types including GEL, AGM, WET, CALCIUM and Lithium-ion with $LiFePO_4$ batteries. They may also help restore drained and sulphated better.

The 5 stages are: Soft Start, Bulk,Absorption, Float and Pulse



	GEL	AGM	WET	CALCIUM	LITHIUM	LIMIT
1 SOFT START	**25% Current until 11v**					
2 BULK	*Constant Current up to:					
	14.1V	14.4V	14.7V	15.4V	14.4V	
3 ABSORPTION	Constant voltage until current drops to15%					30 minutes
	14.1V	14.4V	14.7V	15.4V	14.4V	
4 FLOAT	13.7V				13.3V	10 days Charge cycle restarts if voltage drops
5 PULSE	During 12.6V-14.1V the current control at 100%~10%	During 12.6V-14.4V the current control at 100%~10%	During 12.6V-14.7V the current control at 100%~10%	During 12.6V-15.4V the current control at 100%~10%	During 12.6V-14.4V the current control at 100%~10%	Charge cycle restarts if voltage drops
Equalisation (Calcium mode only)	15% 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 $LiFePO_4$** battery)

STEP 1 SOFT START
A preliminary charge processes that gently introduces power to the battery. This protects the battery and increases battery life.

STEP 2 Bulk (Constant Current)
Charging with maximum current until approximately 80 % battery capacity.

STEP 3 Absorption (Constant Voltage)
Charging with declining current to maximize up to 100% battery capacity.

STEP 4 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 5 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 5-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 SVDC1225 / SVDC1250 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 SVDC1225 / SVDC1250 allows obtain power from the solar panel and the alternator simultaneously. The battery charger draw as much power as possible from the solar input and then supplements the deficiency from the alternator input until the maximum rated output is reached. Thus achieving maximum utilization of green power.

SOLAR MPPT
The SVDC1225 / SVDC1250 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 SVDC1225 / SVDC1250 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.

POWER SUPPLY (CONSTANT VOLTAGE OF 13.8 VOLTS)
This sets the charger in power supply mode giving a constant voltage of 13.8VDC. This mode is best used where appliances are drawing power from the battery, for example like a Fridge. Although the charger is designed to work with a battery connected, it can also work without a battery.

TEMPERATURE COMPENSATION
The SVDC1225 / SVDC1250 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 SVDC1225 / SVDC1250 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 making the charger safer to use around batteries.

Reverse Connection Protection
Reverse connection on input and output terminals does not damage SVDC1225 / SVDC1250 internal circuit. The SVDC1225 / SVDC1250 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

SVDC1225 SVDC1250

Output Cable

Ext. LED Cable

Ignition Cable

Solar in Cable

Alt.in Cable

Ground Cable

Temperature Sensor Cable

Power supply lamp

Stage lamp

Battery Type lamp

Battery Mode Button

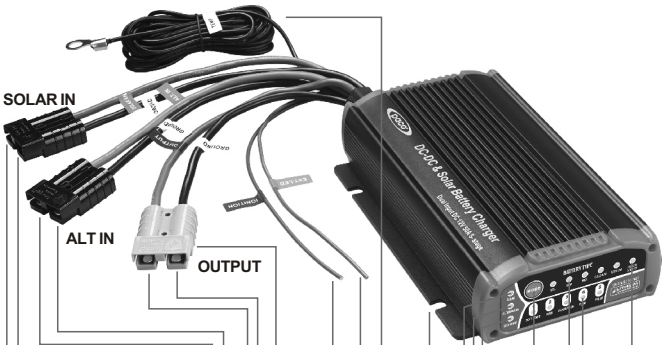
Charging lamp

Alternator lamp

Solar lamp

Mounting Slots 4.5mm

SVDC1225A SVDC1250A



Solar in (+) Cable

Ground (-) Cable

Alt.in (+) Cable

Ground (-) Cable

Output (+) Cable

Ground (-) Cable

Anderson Plug (Optional)

Ignition Cable

Ext. LED Cable

Temperature Sensor Cable

Power supply lamp

Stage lamp

Battery Type lamp

Battery Mode Button

Charging lamp

Alternator lamp

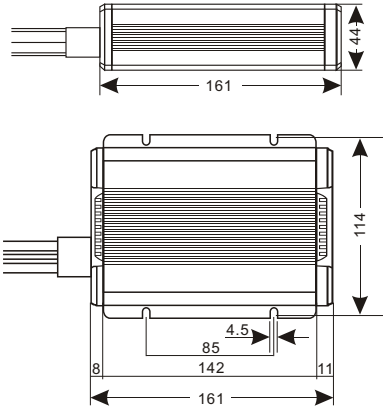
Solar lamp

Mounting Slots 4.5mm

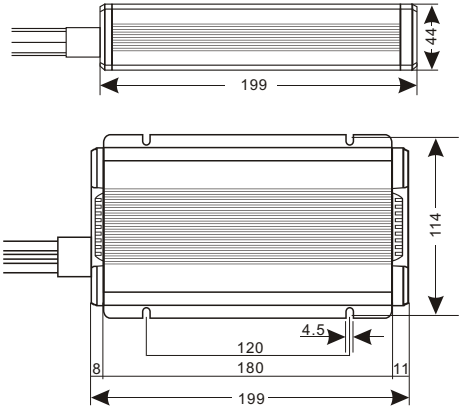
NOTE: Please ensure the correct type of battery to be charged (especially for the lithium-ion with $LiFePO_4$ battery)

6.DLMENSIONS

SVDC1225



SVDC1250



unit:mm

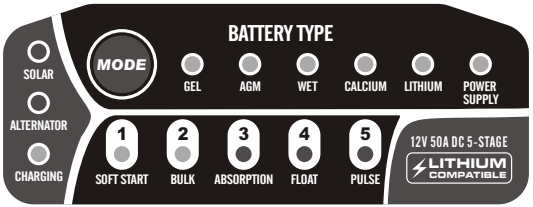
7. TECHNICAL SPECIFICATIONS

Operating Conditions		
Charger model	SVDC1225/SVDC1225A	SVDC1250/SVDC1250A
Solar Input Voltage Range	9-32Vdc	
Alternator Input Voltage Range	9-32Vdc	
Output Current	25A	50A
Input Current (No Load)	Charger Model<50mA	Charger Model<60mA
	Supply Model <80mA	
Efficiency	App.93%	
Back Drain on Auxiliary Battery	35mA, +/-5%	
External LED Output-Constant Current	6mA	
Minimum Start Voltage (Battery)	2V	
Input Fuse Rating	50A (Not supplied)	100A (Not supplied)
Output Fuse Rating	50A (Not supplied)	100A (Not supplied)
Maximum Output Power	375W	750W
Power Supply Output	13.8Vdc, 25A	13.8Vdc, 50A
Ambient temperature	-10℃ to +80℃ Output power is reduced automatically at high temperatures	
Dimension (L×W×H)	161×114×44mm	199×114×44mm
Weight	1.3kg	1.7kg
Charge Control		
Charger type	5-step fully automatic charging	
Soft Start	6.25A up to 11V	12.5A up to 11V

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

Bulk	25A up to 14.1V (GEL) 14.4(AGM) 14.7V(WET) 15.4V(CALCIUM) 14.4V(LITHIUM)		50A up to 14.1V (GEL) 14.4(AGM) 14.7V(WET) 15.4V(CALCIUM) 14.4V(LITHIUM)	
Absorption	Constant voltage until current drops to 3.8A		Constant voltage until current drops to 7.5A	
Float	13.7V Also with pulse feature (GEL, AGM, WET, CALCIUM)			
	13.3V Also with pulse feature (LITHIUM)			
Pulse	12.6V- 14.1V, 25-2.5A(GEL) 12.6V- 14.4V, 25-2.5A(AGM) 12.6V- 14.7V, 25-2.5A(WEL) 12.6V- 15.4V, 25-2.5A(CALCIUM) 12.6V- 14.4V,25-2.5A(LITHIUM)		12.6V- 14.1V, 50-5A(GEL) 12.6V- 14.4V, 50-5A (AGM) 12.6V- 14.7V, 50-5A(WEL) 12.6V- 15.4V, 50-5A(CALCIUM) 12.6V- 14.4V, 50-5A(LITHIUM)	
Equalisation (Calcium mode only)	3.8A Constant Current Charge up to 16V then hold 1 hour (5 hours timeout)		7.5A Constant Current Charge up to 16V then hold 1 hour (5 hours timeout)	
Battery Range				
Types of Batteries	GEL, AGM, WET, CALCIUM	LITHIUM	GEL, AGM, WET, CALCIUM	LITHIUM
Deep Cycle	75-300Ah	50-250Ah	150-600Ah	100-500Ah
Types of Batteries	All types of 12V lead-acid batteries (GEL, AGM, WET, CALCIUM) and LITHIUM batteries			
Operating Model				
	12V Vehicle		24V Vehicle	
VSR Model-Default (Ignition Override Not Connected)	Turn on 13.2V	Turn off 12.8V	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 10.5V	Turn on 24.4V	Turn off 23.2V
Time delay function	There is a 30 second delay before charger will cut in or cut out.			
Standards				
EMC	EN 61000, EN 55014 Class B			
IP Rating	IP67			

8. HOW TO READ LED DISPLAY



LED Charge Indicators

Stage lamp	Solar lamp	Alternator lamp	Charging lamp	S1 lamp	S2 lamp	S3 lamp	S4 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	S5 lamp	GEL lamp	AGM lamp	WET lamp	Calcium lamp	Lithium lamp	Supply 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**

9. 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	S5 lamp	GEL lamp	AGM lamp	WET lamp
Solar input high voltage		●		●		☀	☀	☀
Solar input reverse			●	●		☀	☀	☀
Alternator high voltage		●	●			☀	☀	☀
Alternator input reverse			●	●		☀	☀	☀
Output fault mode		●			●	☀	☀	☀
Output connect reverse			●	●		☀	☀	☀

Stage lamp	Calcium lamp	Lithium lamp	Supply 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	☀	☀		Overvoltage is detected at output	Check auxiliary battery voltage
				Output open circuit or dead Battery	Check auxiliary battery voltage & cable connections
Output connect reverse	☀	☀		Output battery is reverse connected	Check output cable connection

Note: ● **: Solid** ☀ **: Flashing**

10. INSTALLATION

MOUNTING

The rugged design of the SVDC1225 / SVDC1250 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 temperate 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 heat shrink. Butt splices should be used for cable extension.

Recommended minimum cable dimensions in mm^2

Cable	Size	
	SVDC1225	SVDC1250
Alternator Input Cable (Red)	$8mm^2$/AMG8	$10mm^2$/AMG8
Solar Input Cable (Green)	$8mm^2$/AMG8	$10mm^2$/AMG8
Output Cable (Grey)	$8mm^2$/AMG8	$10mm^2$/AMG8
Common Ground (Black)	$8mm^2$/AMG8	$10mm^2$/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 SVDC1225 / SVDC1250. Fit a 50A/100A fuse to the cable as close as possible to the Auxiliary Battery positive (+) terminal.

(3). Connect the Auxiliary Battery negative (-) terminal to the SVDC1225/ SVDC 1250 Common Ground cable (black colour). Alternatively connect both Auxiliary Battery negative (-) terminals and SVDC1225/ SVDC1250 Common Ground cable to vehicle chassis ground.

(4). Connect the Starter Battery positive (+) terminal to the SVDC1225 /SVDC 1250 Alternator Input cable (red colour). Fit a 50A /100A 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 SVDC1225 / SVDC1250 will only operate when the vehicle's ignition is turned on.

However, if solar panels are connected to SVDC1225/ SVDC1250, the charger 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 SVDC1225 / SVDC1250 Solar Input cable (green colour).
Fit a 50A/100A fuse to the cable as close as possible to the Solar Panel positive (+) terminal.

Then, connect the Solar Panel negative (-) terminal to the SVDC1225 /SVDC 1250 Common Ground cable (black colour). Alternatively connect both Solar Panel negative (-) terminals and SVDC1225/ SVDC1250 Common Ground cable to vehicle chassis ground.

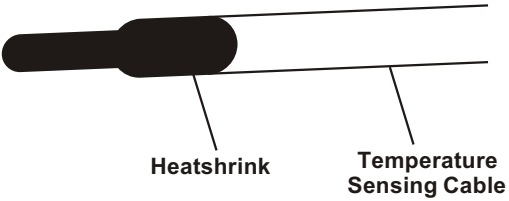
(7). The external LED wire provides 4mA constant current output. It can power an LED panel mount indicator with or without an internal resistor.

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 needed. 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 3M TC-2810 or equivalent.



11. 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 $LiFePO_4$. 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 SVDC1225 / SVDC1250 is fully disconnected and reconnected. The default Battery Chemistry is AGM.

12.TYPICAL WIRING INSTALLATION

(1).Full System

Figure 1: SVDC1225 / SVDC1250

WARNING!
- Max 32V input
- Do not connect two solar panels in series

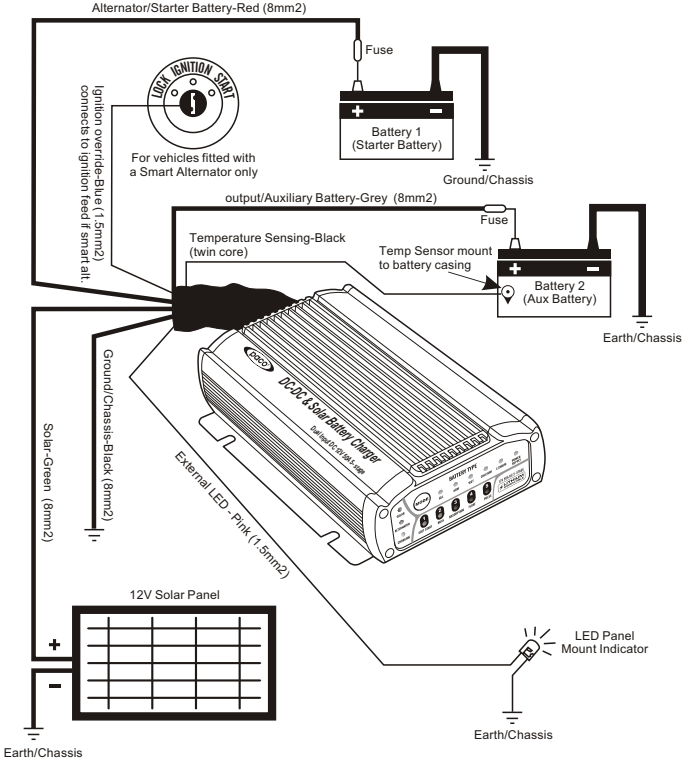
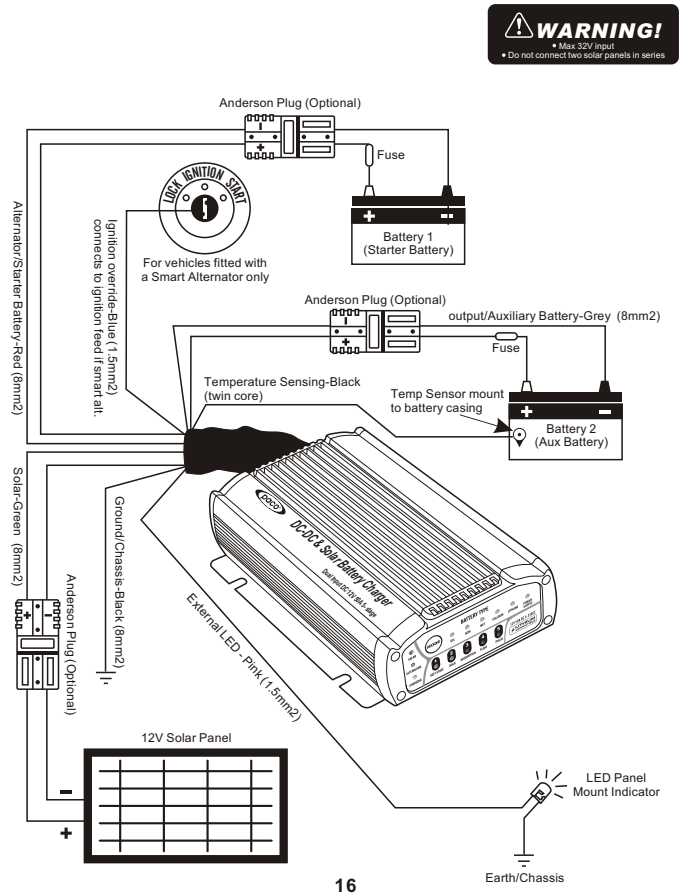


Figure2:SVDC1225A / SVDC1250A



(2). Alternator/Starter Battery Input Only

Figure 3: SVDC1225/ SVDC1250

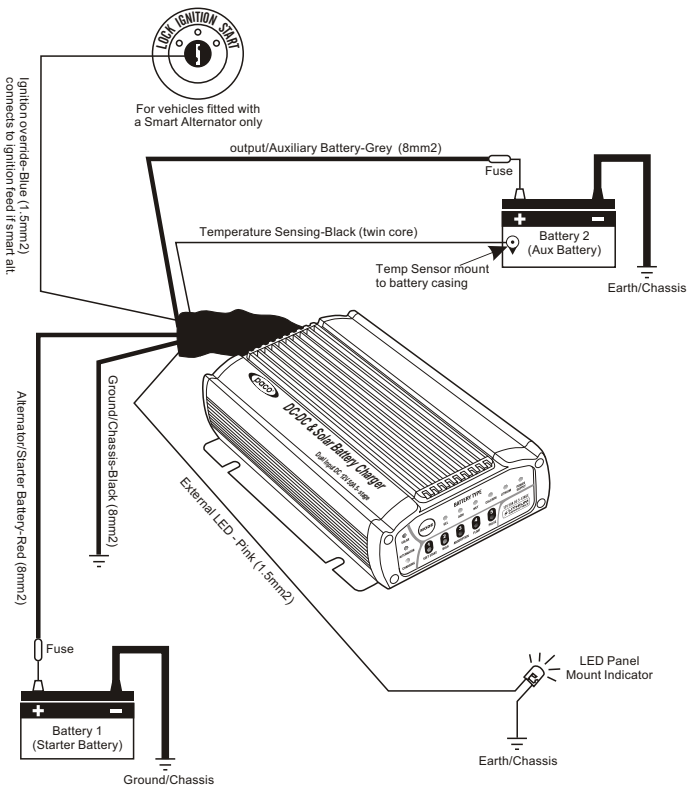
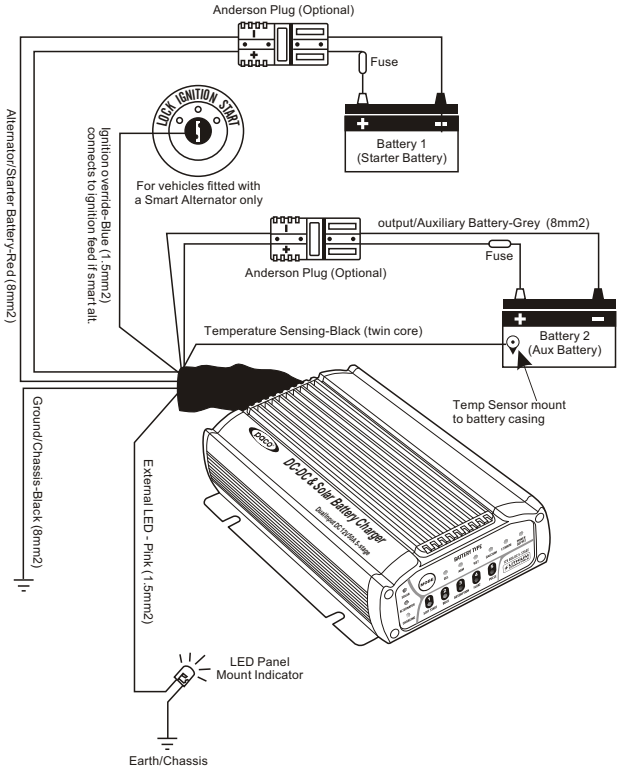


Figure4: SVDC1225A/ SVDC1250A



(3).Solar Battery Input Only

Figure 5: SVDC1225/ SVDC1250

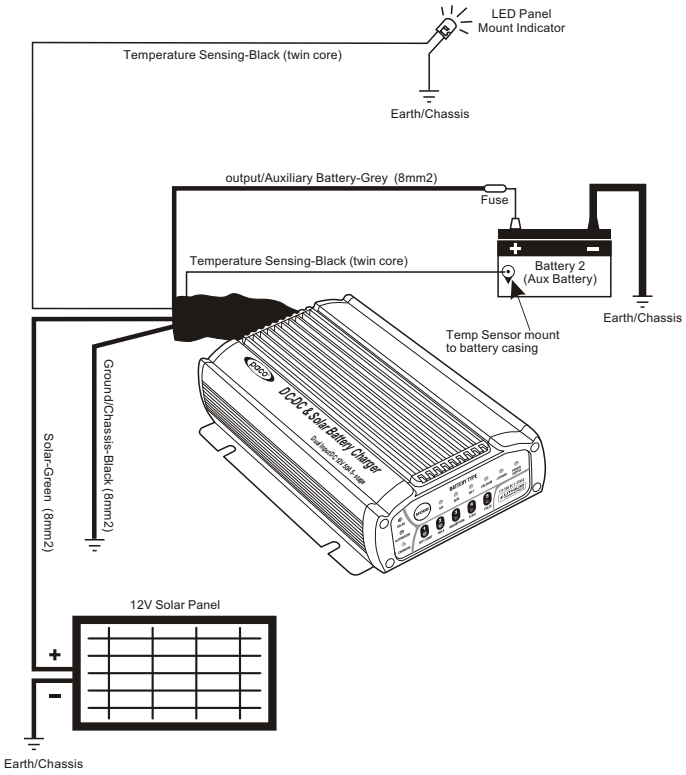
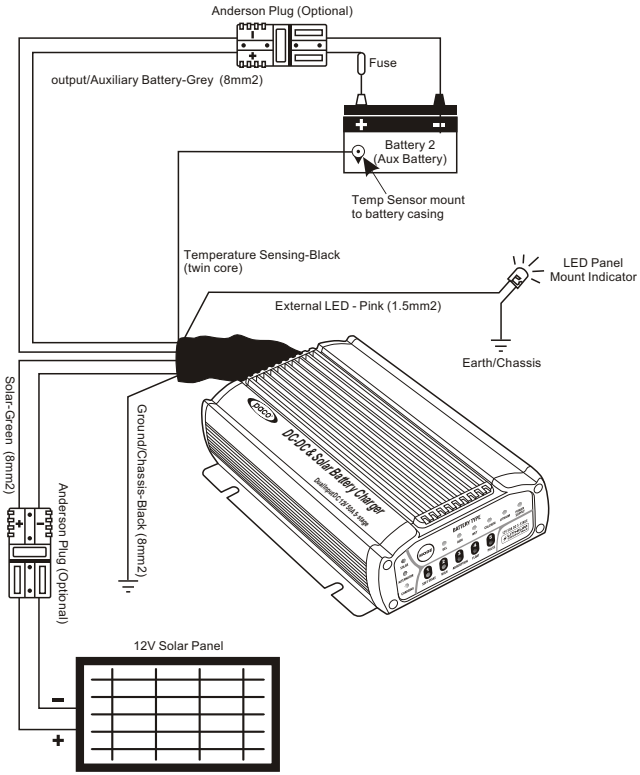


Figure 6: SVDC1225A/ SVDC1250A



13. 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 A 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. 5-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. Is the SVDC1225/ SVDC1250 waterproof?
A. The **SVDC1225/ SVDC1250** is designed to be dust and waterproof. Normal use including river crossings and light engine washing will not pose any problem. Direct high pressure washing of the **SVDC1225/ SVDC1250** unit or submersion for a period of time may cause some water damage and will not be covered under warranty.

Q. Can I use the charger as a power supply?
A. Yes, by selecting Power Supply mode you are able to use the charger as a power supply to run an appliance. Ensure the appliance being run is not greater than the charger's output current and where possible connect the charger to a battery, and the battery to the appliance. The charger may also be used to connect to a vehicle while changing the battery to maintain the vehicles computer and radio settings.

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.

	Soft Start	Bulk	Absorption	Float	Pulse
Step Finish	●	●	●	●	●

SAFETY

◆The charger is designed for charging 12V lead-acid or lithium-ion batteries and provide power supply mode giving a constant voltage of 13.8V to provide power for appliances. 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 damage 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 chargers advanced control, but some rare errors in the battery could still exist. Don't leave any battery during charging unattended for a longer period of time.
◆Ensure that the cabling does not jam or comes 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 SVDC1225 / SVDC1250 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.