SBC-5926
12V In-Car Charger
Dual Input (Solar MPPT & DC)

Operation manual

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the battery charger. Read through the manual and pay special attention to the markings and labels of the charger, battery and equipment connected to the battery system.

Pay special attention to these two types of notices used in this manual.

WARNING:
Failure to heed this warning may cause injury to persons and damage to Equipment.

CAUTION:
Failure to observe this warning may result in damage to equipment and improper functioning of the Charger.

WARNING:

- *The charger is **not** designed for any life saving application.*
- *The charger is designed for in-door use. Protect the charger from ingress of water.*
- *This charger is made to charge **only** properly sized lead acid batteries and Lithium Fe PO4 (LFP).*
- *Don't recharging non-rechargeable batteries.*
- *Charging other types of battery or under-sized lead acid batteries may cause fire or explosion.*
- *Install the charger in accordance with all local codes.*
- *Do not use the charger if it has been dropped or damaged.*
- *Do not remove casing of the charger, there is no user -serviceable parts inside.*
- *Do not charge the battery on boats. Remove the battery and charge on shore.*
- *Never attempt to charge a frozen battery.*
- *Never attempt to charge a damaged battery.*
- *Wear protective goggles and turn your face away when connecting or disconnecting the battery.*
- *Never place the charger on top of a battery.*
- *Never smoke, use an open flame, or create sparks near battery or charger during normal charging operation as batteries may give out explosive gas.*
- *Do not charge batteries in an enclosure (box- in) due to possible explosion of entrapped explosive gas.*
- *Use of accessory not recommended may cause risk of fire, electric shock.*
- *Disconnect the mains supply before connecting or disconnecting the links to the battery.*
- *If the charger does not work properly or if it has been damaged, unplug all DC connections.*

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Introduction

Especially designed for the Euro 6 vehicles
This unit is designed only for internal mounting and be in door away from direct sunlight, heat and rain. Do NOT install this unit in the vehicle engine bay, allow at least 80mm of all round space for ventilation. The SBC-5926 is designed to address to the issues of wide swing of output voltages from the smart alternator, braking regenerative EURO 5/6 vehicles in fully charging the house battery. It is suitable for use with all old alternator system and distant house battery. The unit is encased in a refined aluminum casting feels like a well built casing for good heat dissipation and tough environment.

This is a fully automatic Dual Input, Solar & Alternator-battery, DC-DC charger for charging the 12V deep cycle lead acid batteries and Lithium Fe Po4 battery. The built in Solar charge controller is of Maximum Power Point Tracking (MPPT) technology which maximizes the PV power from your solar panels to your house battery.

The digital control and auto-select design of SBC-5926 make it automatically adapt to 12V or 24V input alternator/ battery system, and with the Solar power (solar panel of 14.5V to 30V voc with under 400Watt) to charge the 12V deep cycle house battery.

With the 12V Input alternator/battery system, the house battery will be charged by both the Solar and alternator simultaneously to ensure sufficient charging power to the house battery.

With the 24V Input Alternator/ battery system, the house battery will be either charged from the engine while underway, or via the solar panels when stationary.

Multistage Charging Process
This is a select (battery type) and forget charger designed for fast and accurate recharge of your deep cycle house battery. The smart multistage charging enables the charger to be connected permanently to your battery banks without the worry of over charging or drying out the electrolyte.
Also with both inputs permanently connected, you can be rest assured of charging your batteries whenever you are on the move or when the sun shines on your solar panel.

Lead Acid Based Battery
A 3 Stage Bulk, Absorption & Float charging profile with maximum constant charging current at the Bulk Stage and a Constant Voltage with decreasing charging charging at the Absorption Stage and a reduced voltage Float Charge for maintenance when battery is full.

LiFePO4 (LFP) Battery
A 2 Stage charging is specially for the LiFePO4 battery and charging current stops at the end of Absorption Stage.

Features

- Car battery with Alternator Input and Solar Input.
- Suitable for 12V or 24V standard and variable Voltage or Smart Alternator.
- Suitable for standard Lead Acid, AGM, Gel, Calcium and Lithium Fe PO4 battery.
- 3 Stage charge for Lead Acid battery.
- Specific 2 Stage charge for LiFePO4 battery.
- Wide DC input range 9-32V without solar connection.
- Auto /Manual /Off settings of Ignition Control for charging.
- Low Voltage Disconnect Protection for Starting Battery in all conditions & battery system.
- Self Recoverable Protections for:
  Input Under Voltage, Output Over Voltage, Over Load, Over Temperature.

Supplied Accessories

- Remote LED Indicator Module (with 2M cable) like the unit front panel.
- 4 heavy duty electrical eye connectors
- One plastic wire guide
- Double side sticker tape for the Remote Indicator Module .

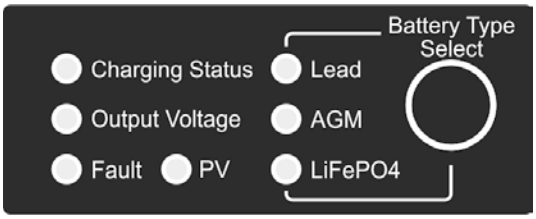
Installation Procedure

Cautions:
This unit is designed only for internal mounting and be in door away from direct sunlight, heat and rain.
Do NOT install this unit in the vehicle engine bay, allow at least 80mm of space at both ends for ventilation.
We recommend wiring by a qualified automobile electrician to ensure local safety and on-board standard are followed

1. We recommend mounting the unit in a vertical position whenever possible with the terminal end facing downwards to provide best cooling effect.
2. Connect a 12V battery to the output to check the unit's LED and try out the settings.
3. There is no need to go for the 8 pins connectors at the initial stage.
4. It is a good practice to have a fuse installed close to the house battery.

Battery Type Selection

1. Press and hold the only Set Button for about 5 seconds until the LED flashes.
2. Light quick presses will move the LED from Lead--> AGM--> LiFePO4--> Lead.
3. Stop at the chosen battery type and wait till LED stops flashing to confirm your selection.



Setting the Ignition Control

The charger is factory preset with Ignition Control in OFF MODE.
It means the charger will start charging the house battery when Input and Output connections are made. This may drain the car's starting battery if car is switched off for some time when connected to a loaded house battery.

** ***We strongly recommend to set the Ignition Control to AUTO-ON MODE for EURO 6 car due to wide swing of the smart alternator's charging voltage, see section Safeguarding the starting battery by LVD.***

To Set Ignition Control of the charger to AUTO-ON

Connect the Ignition Pin (in Fig.2: Terminals & 8 Pin Connectors diagram) to the car's hot wire (that is the wire that has a positive dc 9 to 32V when car's ignition is turned on).
The charger only operates when the car is running, and charger stops charging once ignition is off.

To Set Ignition Control of the charger to Manual ON-OFF operation

You can wire up a push switch with one end to the +Vin Pin and the other to Ignition Pin, see Fig.2 Terminals & 8 Pin Connectors diagram. Shorting both pins will turn on the charger, disconnect will turn off the charger.

Cancellation of the Ignition Control ON mode

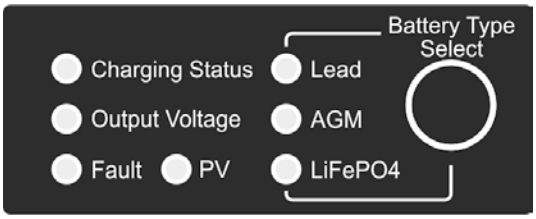
The Ignition Control Mode will stay with the charger once it has been activated even if the charger is taken out from the system and re-installed in another car. That is once the Ignition Control Mode has been activated, charger will only be turned on when there is a positive voltage (+9V to +32V) at the +Vin Pin, otherwise the charger stays in off mode.

Reset charger to factory default state with Ignition Control in deactivated mode, such that the charger will start charging the house battery as soon as input and output connections are made.

To cancel the Ignition Control do the following 3 steps:
1. Disconnect any wire to the Ignition Pin in the charger.
2. Press and hold Set Button for about 15 seconds until 3 battery type LED flash.
3. Release button to complete the deactivation of the Ignition Control Mode.

Indicators and Controls

FIG. 1 showing 7 LEDs indicators and one SET button



Charging Status LED for LEAD ACID Battery - 3 Stages

Charging status LED	Charging stage
Fast flashes	Bulk charge
Slow flashes	Absorption
Solid	Float

Charging Status LED for Lithium Fe PO4 Battery - stages

Charging status LED	Charging stage
Fast flashes	Bulk charge
Slow flashes	Absorption

Output Voltage LED

This LED shows the voltage level at the V OUT terminal, it is the battery voltage when there is no Load connected to the battery.

LED status	**Battery Voltage Level**
Fast Flashes	Battery Voltage lower than 12.5V
Slow Flashes	Battery Voltage between 12.5V and 13.6V
Solid	Battery Voltage higher than 13.6V

Single DC Input Operation

Without the Solar Input, the charger can operates with a DC Source from 9V to 32V to charge the 12V house battery.

Safeguarding the starting battery by Low Voltage Disconnect (LVD)

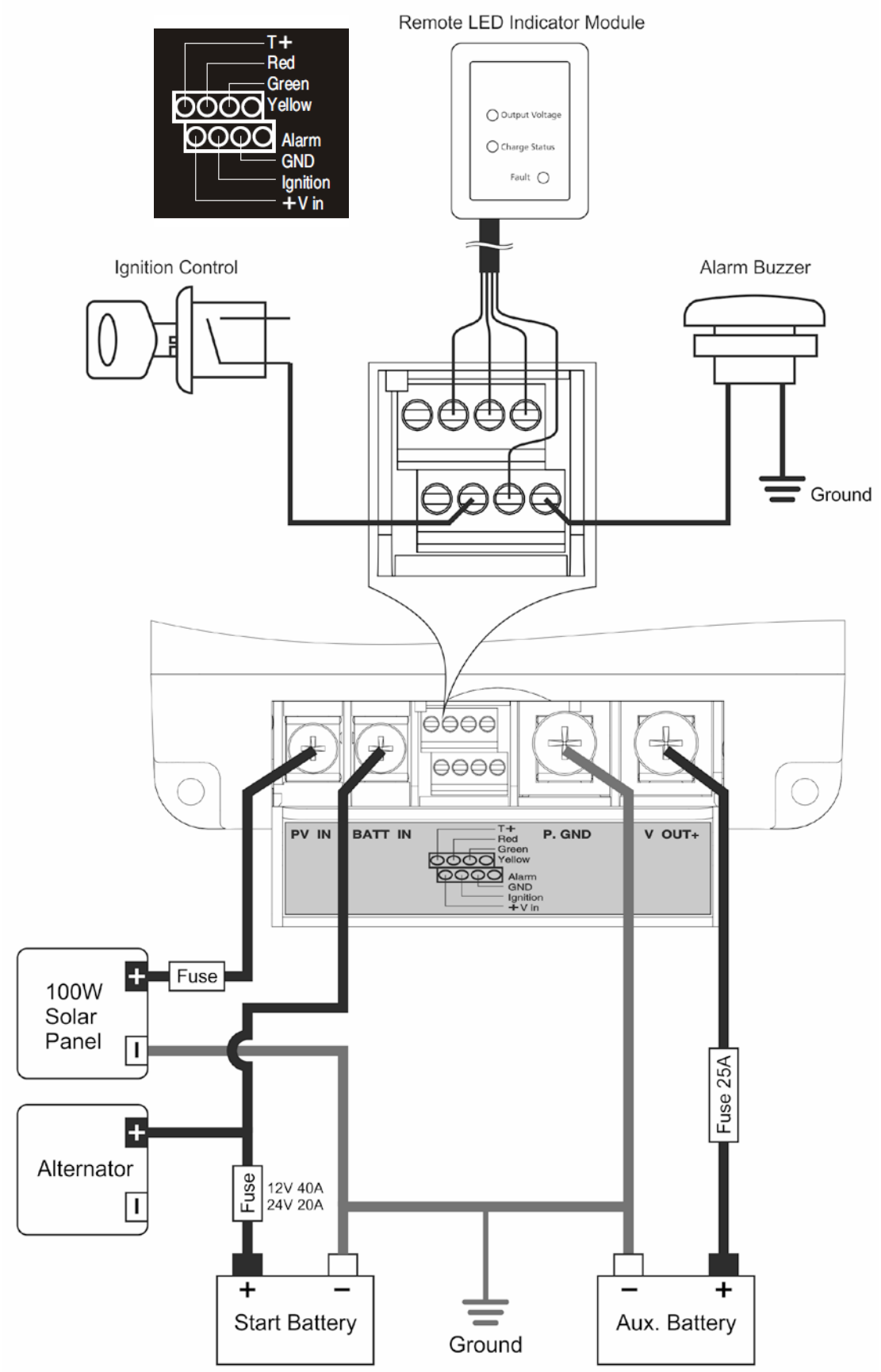
When Ignition Control Mode is deactivated, the charger will start charging when input and output are connected .The car's starting battery is prone to over discharge, so the normal available DC input voltage range (9 to 32V) will be automatically trimmed shown in the table below for better protection against over discharge.

Showing LVD & LVR (Low Voltage Recovery) with Output Status

System	**DC Input Voltage Level**	**DC Output (Charging) Status**
12V	BATT. V IN < 12.2V	OFF (Disconnect)
	BATT. V IN > 12.8V	ON (Reconnect)
24V	BATT. V IN < 24.4V	OFF (Disconnect)
	BATT. V IN > 25.6V	ON (Reconnect)

Connect & Wiring Diagram

Individual fuse/ breaker is required to be close to starting battery (charger input) and close to house battery (charger output wire). Fuse at the solar panel to the rating of the short circuit current of the solar panel.



Connection

After both input and output are connected, the charger will have output after 10Sec.

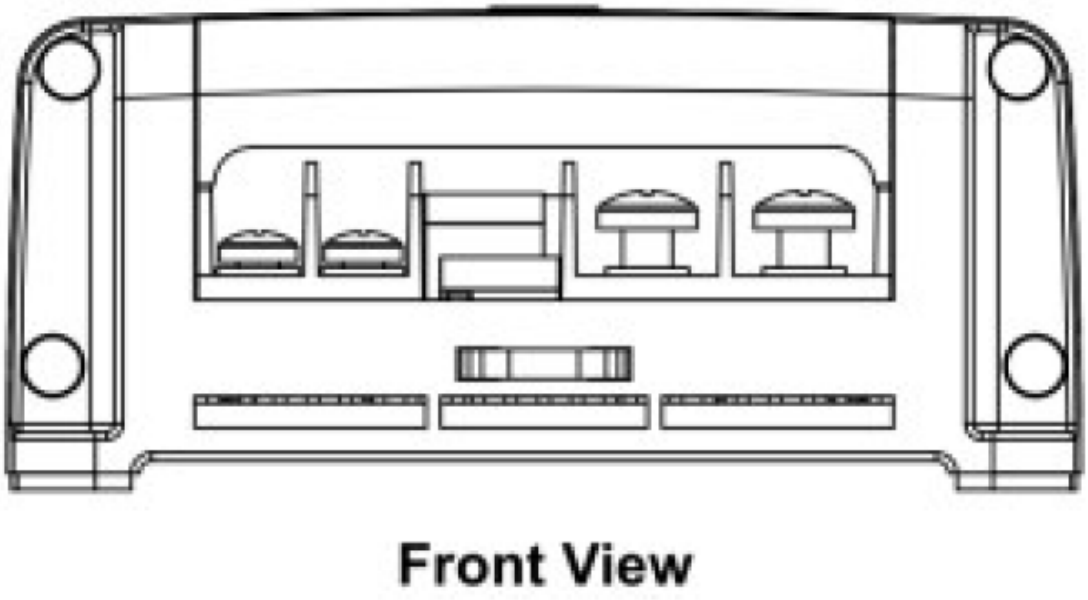
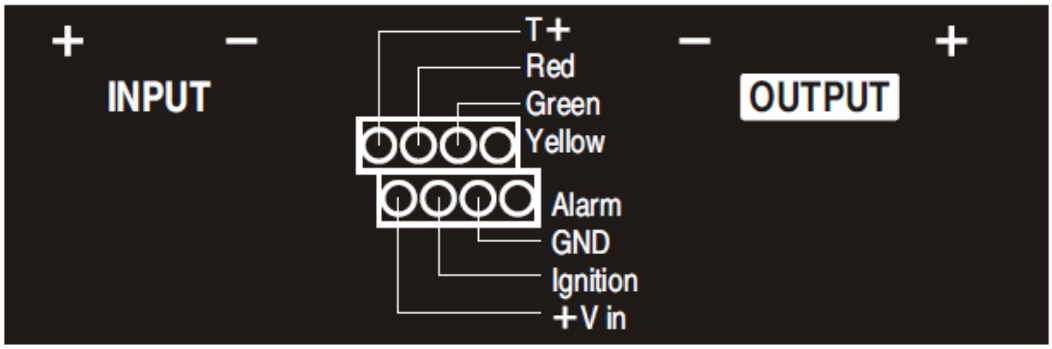


Fig.2 Terminals & 8PIN connectors



1 **+Vin:**
Voltage signal equals to input Voltage. Short this port to Ignition pin to enable ignition control of unit.

2 **Ignition:**
Connect this pin to ignition car ignition to make the charger operate in sync with vehicle ignition control.

3 **GND:**
Ground pin for remote module. Connect to remote control black wire.

4 **Alarm:**
Alarm output pin. Alarm output voltage equals to system input voltage.

5 **Yellow:**
Connect to remote module yellow wire.

6 **Green:**
Connect to remote module green wire.

7 **Red:**
Connection to remote module Red wire.

8 **T+:**
Not use

Specification

Rated output power	20A at 13.8VDC	
Efficiency	≥90%	
Input Voltage		
DC Input Voltage Range	9 - 16VDC (12VDC Input) / 18 - 32VDC (24VDC Input)	
Max. Solar Panel Open Circuit Voltage	30VDC	
Output (Charge) Voltage		
Battery Type	**Absorption**	**Float**
Lead	14.4V	13.3V
AGM	14.7V	13.6V
LiFePO4	14.8V	Stop
Size(L x W x H)mm	130 x 188 x 55mm	
Weight	Approx. 870g	
Recommended Cable Size		
Cable Length	Recommended SAE	
1 – 5 Meters	8AWG	
5 – 9 Meters	6AWG	

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