

# **iTECHWORLD**

## **The Power Expert**

**DC-DC 40A**

**Intelligent Battery Charger**

**USER GUIDE**



# SAFETY PRECAUTIONS

For safe operation and ideal performance, the iTECHDCDC40 Intelligent Battery Charger must be installed and operated correctly.

Please carefully read, understand, and follow all instructions and guidelines in this User Guide.

iTechworld recommends that the iTECHDCDC40 charger to be installed by a certified technician.

Failure to follow these instructions may result in damage to the unit, property, death, or serious injury.

## **Disclaimer:**

While iTechworld has taken every precaution to ensure the accuracy of the contents of this user guide, iTechworld assumes no responsibility for any errors or omissions.

**FURTHERMORE, ALL SPECIFICATIONS AND FUNCTIONALITY MAY CHANGE AT ANY TIME WITHOUT NOTICE.**

1. **WARNING:** People with physical disabilities, visual, sensory, or mental impairments (including children) should not use this device. Children should be supervised to ensure they do not play with battery chargers.
2. **DANGER:** Do not disassemble or modify the charger, doing so may result in a risk of electrical shock, fire, death, or serious injury.
3. **DANGER EXPLOSION HAZARD:** Do not use the charger in an environment where flammable fumes or gases are present (such as gas bottles, petrol engines or lead acid battery compartments)
4. **DANGER:** This charger is only suitable for battery types listed in the manual. Do not use it for other purposes.
5. **WARNING:** Please select the correct battery charging profile applicable to the auxiliary battery. If the incorrect battery charging profile is selected, it may cause damage to your auxiliary battery or result in fire. If you are unsure of the correct battery charging profile to use, please consult your battery's manufacturer.

6. **WARNING:** Please use the fuses and wires recommended in this user guide, otherwise, it may result in damage to the charger, risk of electrical shock, fire, death, or serious injury.
7. **WARNING:** Ensure that the selected battery charging profile's charge voltage does not exceed the battery's recommended maximum charging voltage. If you are unsure of the maximum charging voltage of your battery, please consult your battery's manufacturer.
8. **WARNING:** Ensure that the continuous output current of the charger does not exceed the battery's recommended maximum charging current. If you are unsure of the maximum charging current of your battery, please consult your battery's manufacturer.
9. **Warning:** When using the charger to charge a lithium battery, ensure that it contains an inbuilt battery management system (BMS) that features under and over voltage protection with cell balancing. Failure to do so may result in fire, death, or serious injury.
10. **DANGER:** Never smoke or allow a spark or flame in vicinity of battery or engine. This may cause the battery to explode
11. **LIMITATIONS OF USE:** Do not use in connection with life support systems or other medical equipment or devices.

# Product Function

## **Introduction:**

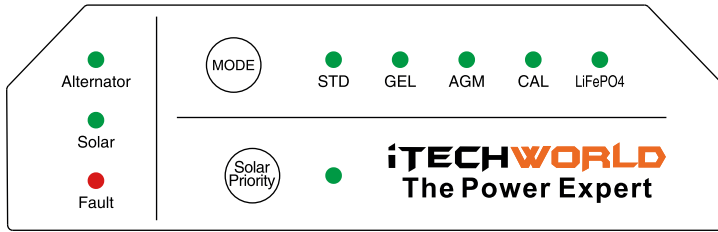
The iTECHDCDC40 charger is suitable for charging all common types of automotive or recreational lead acid and LiFePO<sub>4</sub> Lithium 12-volt batteries. The iTECHDCDC40 can operate on 12- or 24-volt alternators and unregulated 12-volt nominal solar input. The iTECHDCDC40 features a Maximum Power Point Tracking (MPPT) solar regulator. This allows for the maximum power to be harvested from the connected solar panels, which increases charging efficiency. The iTECHDCDC40 has been designed with high efficiency in mind, this allows the charger to be compact and suitable for limited space installations. Furthermore, the iTECHDCDC40 is also designed to isolate the auxiliary battery from the cranking battery, this is to avoid over-discharging the cranking battery.

## **Key Features:**

- Suitable for charging all common types of automotive or recreational 12-Volt lead acid batteries, such as Standard Lead Acid, Gel, AGM, and Calcium, or LiFePO<sub>4</sub>(Lithium Iron/Ferro Phosphate) Chemistry 12-Volt Lithium batteries.
- 40A MPPT Solar Regulator
- Dual input from both solar and alternator
- Charging efficiency of up to 95%
- Excellent performance in harsh environments
- IP67 rated, for resistance to dust, water, and shock damage.
- Smart alternator compatible
- In-built Low-Voltage, Over-Voltage, Over-Temperature and Reverse Polarity Protection



## 2.1 Display Panel:



## 2.2 Battery Charging Profile

To change the battery charging profile, Press and hold the “Mode” button for at least 3 seconds then release. The battery type indicator will advance one LED to the right, please note that the next battery type indicator will not illuminate until the “Mode” button is released. Please note it may take up to 2 minutes after any changes for the charger to start charging.

## 2.3 Solar Priority

The iTECHDCDC40 is set up with alternator priority as default, as the power from solar can be very unstable, and the charging efficiency can be impacted. However, if you prefer solar charging regardless of its charging efficiency, or your auxiliary battery has a very small load connected and you want to use solar charging as much as possible, you can enable the “Solar Priority” function, the iTECHDCDC40 will now always select input power from the Solar in connector if the solar input power is above the minimum required power. Please note it may take up to 2 minutes after any changes for the charger to start charging.

To turn “Solar Priority” **ON**, please press and hold the “Solar Priority” button for at least 3 seconds then release, the “Solar Priority” indicator will now illuminate.

To turn “Solar Priority” **OFF**, press and hold the “Solar Priority” button for at least 3 seconds then release, the “Solar Priority” indicator will turn off.

**2.4 LED Charge Indicator**

Alternator /Solar LED	Battery Type LED	Charging Stage
Short flash (Approx. 1 flash a second)	Solid Green	Bulk or Absorption
Long Flash (Approx. 1 flash every 2 seconds)	Solid Green	Float

**2.5 Unit Operation**

When the iTECHDCDC40 is connected, all LED indicators may light up like shown on 2.1 Display Panel, this is normal operation, the charger is initialising and may take up to 2 minutes to start charging.

The iTECHDCDC40 will go into standby mode if the input voltages are below cut off voltage, (please note the iTECHDCDC40 will continue to charge the auxiliary battery for up to 2 minutes before going into standby), this is indicated by the charge input and battery type indicator LEDs blinking momentarily at the same time, once charging voltages have risen above the cut in voltage, it will take up to 2 minutes for the charger to “wake” and begin to charge.

The iTECHDCDC40 will start to charge from solar input if the panel supply voltage is above 16Volts and outputting at least 25watts(1.5-2Amps).

iTECHDCDC40 Operation		
Input	Turn on	Turn Off
12V Standard Alternator	>13.2V	<12.8V
24V Standard Alternator	>26.2V	<25.6V
12V Smart Alternator (Blue ignition cable connected)	>12.0V	<11.8V
24V Smart Alternator (Blue ignition cable connected)	>24.0V	<23.6V

## 2.6 Fault LED Indicators

Alternator LED	Solar LED	Battery Type LED	Fault LED	Trouble	Solution
Solid GREEN	-	Solid GREEN	-	Low voltage detected at Alternator input	Check main cranking battery voltage
-	Solid GREEN	Solid GREEN	-	Low voltage detected at Solar input	Check solar input voltage
Solid GREEN	Solid GREEN	Solid GREEN	-	Low voltage detect at Alternator or Solar input	Check both main cranking battery and solar input voltage
-	-	GREEN Flashing	Solid RED	Overvoltage detected at output	Check auxiliary battery voltage & cable connections
GREEN Flashing	-	-	Solid RED	High voltage detected at Alternator input	Check main cranking battery voltage
-	GREEN Flashing	-	Solid RED	High voltage detected at Solar input	Check solar input voltage
-	-	-	Solid RED	Over temperature	Let the unit cool down, relocate charger to somewhere with better ventilation

# Installation

## **3.1 Install Location**

The iTECHDCDC40 charger has been designed for installation in a variety of locations on a vehicle, such as the chassis rail, engine bay and in the vehicle cabin. If the charger is mounded externally, please ensure that the charger does not become covered by a build-up of mud. If the charger is to be installed in the engine bay, try to locate the charger away from components that generate high heat (such as Turbochargers and exhaust manifolds) as this will greatly impact the performance of the charger and may cause the charger to overheat and shutdown.

If the charger is to be installed in the vehicle cabin, please ensure there is adequate ventilation around the charger, and that it is not installed in an enclosed space where airflow is restricted.

The temperature of the charger case can typically be 20-30 degrees Celsius above ambient temperature, it is normal for the charger to feel hot and for you to not be able to keep a finger on the surface for more than a couple of seconds as the case can exceed 60 degrees Celsius.

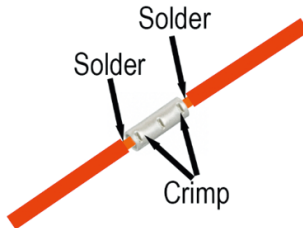
The iTECHDCDC40 charger should be installed as close as possible to the battery being charged (auxiliary battery), this allows for more efficient charging of your auxiliary battery. The iTECHDCDC40 can be mounted with 4 screws (Not included) there are cut outs on the heatsink of the charger where the screws can be affixed.

### 3.2 Selection of Cable Size


The iTechDCDC40 charger cables may not be long enough for your application. If the Anderson connectors need extending, please refer to the table below with the recommended wire sizes. You can select wires that are equal to or larger than the recommended sizes.

Input	Length	
Solar Positive (Green) Alternator Positive (Yellow) Aux.	<5M	<10M
Battery/Output Positive (Red) Ground (Black)	13mm <sup>2</sup> (8AWG)	20mm <sup>2</sup> (6AWG)
Ignition (Blue)	0.5mm <sup>2</sup> (20AWG)	0.5mm <sup>2</sup> (20AWG)

iTechworld recommends a suitably trained/ qualified person to perform the work, as failure to make a good connection may cause a short circuit which may lead to fire and/or damage to property.

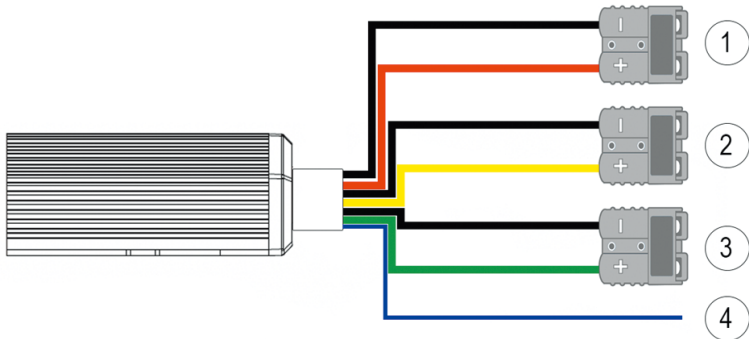


When extending the wires, it is recommended to use a soldered butt splice connectors this is to ensure that there is low resistance with the connections. It is best to crimp both sides of the connector, then solder both sides of the connector, once the connection has been made, ensure to use heat shrink to cover the connections to prevent short circuit.

Butt splice connector	BN8 for 10-8AWG	
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### 3.3 Wiring

Before any connections are made during installation, please disconnect the main cranking battery to prevent any short circuits, please note down any radio anti-theft codes before the battery is disconnected.

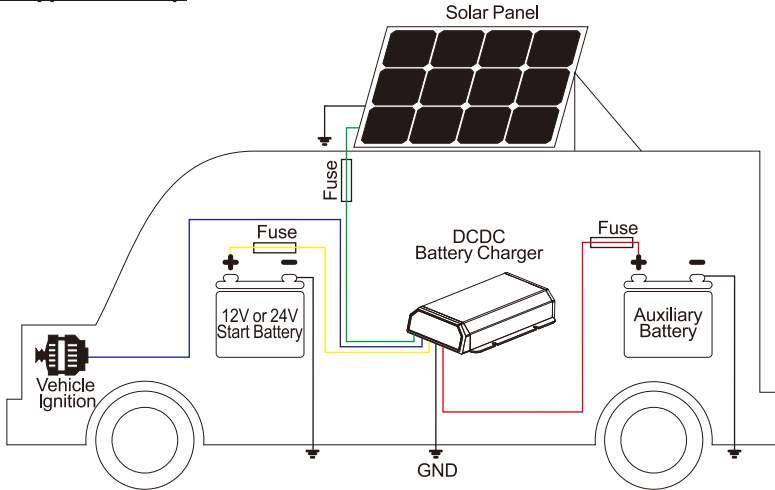


1. Output Anderson connector (Red and Black wires) goes to the battery being charged (the auxiliary battery)
2. Alternator Input Anderson connector (Yellow and Black wires) goes to the main cranking battery.
3. Solar Input Anderson connector (Green and Black wires) connects to an unregulated solar panel.
4. The ignition wire (Blue) is optional, it depends on the vehicle alternator type.

For standard alternators, leave this wire disconnected and please ensure that the wire is well insulated to ensure it does not short out.

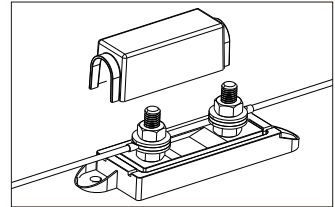
For vehicles with a smart alternator, please connect this wire to a switched ignition source (i.e., a point that supplies 12V only when the key is in the 'ON' position and disconnects when the key is in the 'OFF' position) usually this can be found in the vehicle's fuse box and a fuse tap can be used.

## 3.4 Typical Setup



## 3.5 Fuse Specifications

All recommended fuses should be connected in series in circuit, and as close as possible to power sources. Bolt down fuses is preferred as they ensure a low resistance connection. Blade type fuses are not recommended as they can result in a high resistance connection which can cause excess heat generation and may damage the fuse holder and/or the wiring. Self-resetting circuit breakers are not recommended as they may prematurely trip due to the heat generated by the large current flowing through the wires.



Please refer to the table below for the recommended fuses.

**(PLEASE NOTE FUSES ARE NOT SUPPLIED)**

Charger Output/Auxiliary Battery (Red wire)	60-70A
Solar input (Green wire)	60-70A (for 400W array) 30-40A (for 200W array)
Ignition (Blue wire)	3A

# Specifications

Operating Parameters					
Vehicle Input Voltage	9-32V				
Solar Input Voltage	9-32V				
Max Input Current	45A				
Input Fuse Rating	60A				
Continuous Output Current	Up To 40A				
Output Fuse Rating	60A				
Minimum Aux Battery Charge Start Voltage	4V				
Standby Current	<10 mA				
Battery Type	Standard Lead Acid, Gel, AGM, Calcium & LiFePO4				
Operating Temperature	-20°C to +80°C				
IP Rating	IP67				
Weight	950g				
Dimensions	188x127x39 mm				
Charge Control					
Charge Type	3 Stage				
Charging Profile	STD	GEL	AGM	Calcium	LiFePO4
Maximum Voltage	14.4V	14.1V	14.7V	15.3V	14.5V
Float Voltage	13.4V	13.5V	13.4V	13.6V	
Operating Mode					
Input	Turn On		Turn Off		
12V Standard Alternator	>13.2V		<12.8V		
24V Standard Alternator	>26.2V		<25.6V		
12V Smart Alternator (Blue ignition cable connected)	>12.0V		<11.8V		
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