KICKASS®
OUTBACK PROOF GEAR

20 AMP DC-DC CHARGER WITH MPPT SOLAR CONTROLLER

USER MANUAL

KADCDC20A-CAR

V1.0

⚠ WARNINGS

- **To avoid injury or damage to your vehicle ensure the instructions are read carefully and understood.**
- **Batteries can produce harmful vapour and explosive gases when being charged.**
- **Ensure batteries are mounted and stored in an area with good ventilation.**
- **As this Charger has powerful output current, circuit protection such as fuses or circuit breakers must be installed as near as possible to the batteries - refer to wiring diagrams in this manual for correct fitting.**

This manual will give you all of the essential information you need to own and operate your new KickAss 20 AMP - DC-DC Charger with MPPT Solar Controller.

The purpose & features of the KickAss 20 AMP - DC-DC Charger with MPPT Solar Controller:

- **Can charge multiple battery types:**
  Whether your battery is GEL, AGM, WET, CALCIUM or Lithium $LiFePO_4$.

- **Prevent your auxiliary battery from draining your start battery:**
  Built-in voltage sensing will ensure your start battery charges your auxiliary battery when the vehicle is running. It will then disconnect the start battery from the auxiliary battery when the vehicle is not running.

- **Ensure your auxiliary battery is being fully charged and maintained:**
  Most modern vehicles (especially those manufactured after 2010) do not provide the correct voltages and charge control to safely and completely charge your auxiliary battery. The Charger overcomes this issue by boosting the charge voltage to an optimal output level while ensuring your auxiliary battery is safely charged via its multi-stage charge algorithm.

- **When your vehicle is not charging, charge from the inbuilt MPPT solar controller:**
  Maximum power point tracking is the most efficient type of solar controller and allows you obtain the maximum amount of charge from your solar panels. When your vehicle is not doing the charging, the built-in MPPT solar controller will let your solar panels do the work.

Stay safe and protect your assets with these protective features:

- **Short circuit protection**
  The Charger will not turn on unless the batteries are connected correctly.

- **Reverse polarity protection**
  If you connect positive and negative the wrong way around the Charger will show a fault.

- **Over voltage protection**
  If the Charger detects voltages connected to its inputs or outputs that are too high it will shut down.

- **Over temperature protection**
  The Charger will lower its output current if it senses that the unit will overheat.

- **Temperature compensation:**
  The included temperature sensor will measure the battery temperature and adjust current accordingly to prevent overcharging.

For more technical details, specifications & videos please visit kickassproducts.com.au

SPECIFICATIONS

Charger model	KADCDC20A-CAR
Alternator Input voltage range	9-32V DC
Input current	<20mA
Efficiency	App. 93%
Max output current	Input 5-32V DC 20A
Minimum auxilliary battery voltage	WET,GEL,AGM,CAL, 9V LifePO4 0V
Input fuse rating	50A
Output fuse rating	50A
Maximum output power	300W
Solar Panel Input voltage	10-32V DC
Solar Input Maximum Current	27A
Ambient operating temperature	-20 deg C to +80 deg C
Dimensions	151*121*44mm
Weight	870g

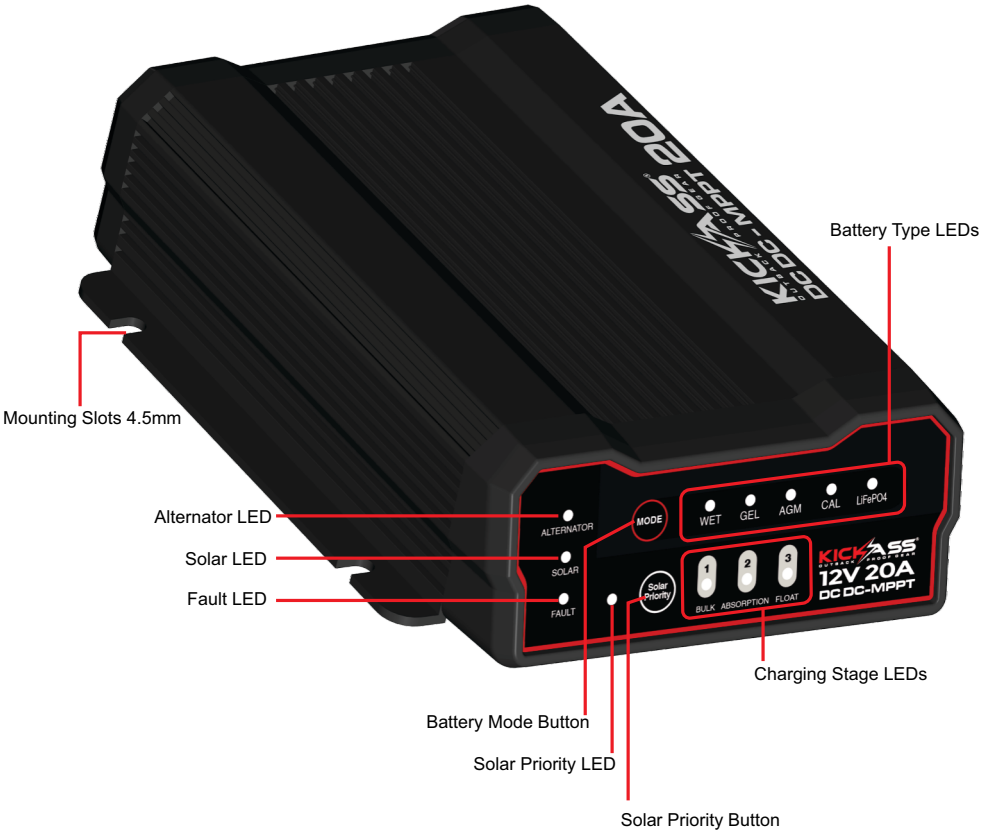
BATTERY TYPE SPECIFICATIONS

Types of batteries	WET,GEL,AGM,CAL		LifePO4	
Battery capacity range	80-500Ah		50-500Ah	
Integrated isolator cut in / cut out voltage	CUT IN 13.2V	CUT OUT 12.6V	CUT IN 26.4V	CUT OUT 25.2V
Integrated isolator (ignition override on)	CUT IN 12.2V	CUT OUT 10.5V	CUT IN 24.4V	CUT OUT 21.0V
Time delay function	30 seconds delay before the charger will cut in or out.			
Certifications				
IP rating	Ip66			

KICKASS constantly improves and innovates its products and we may from time to time discontinue or update product specifications without notice. For the latest product information and specifications, please visit KICKASS.com.au

PRODUCT OVERVIEW

KADCDC20A-CAR



INSTALLATION GUIDE

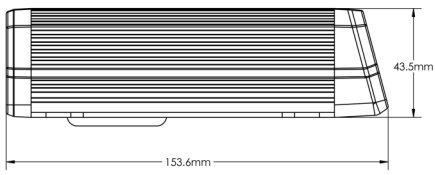
SAFETY FIRST!

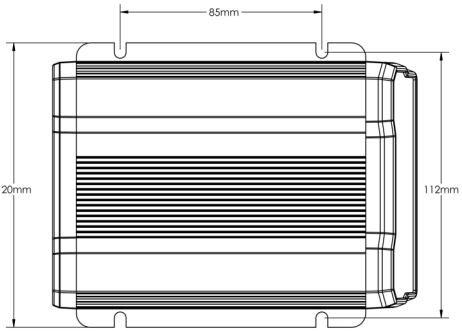
- The KickAss Charger has been engineered to charge 12 Volt GEL, AGM, WET, CALCIUM or Lithium $LiFePO_4$ only. Do not use this charger for any other purpose or with any other battery types.
- Do not attempt to charge known faulty, damaged, frozen or broken batteries.
- Ensure charger is close to battery, however never mount the charger directly on the battery.
- Ventilation is very important in battery charging, always ensure battery positioning is in a well ventilated area to allow charging gases to dissipate.
- Keep sparks or flames away from batteries being charged as they could emit explosive gases.
- Always check the batteries and charging system periodically to ensure no faults occur.
- Ensure all cabling is secure and cannot be cut, broken or short circuited.
- Battery acid is corrosive. If acid comes into contact with skin or eyes, please seek medical advice.
- Never connect this charger to mains supply.
- We recommend fitting a 50-75 amp fuse on both the input and output sides of the charger such as the SKU: KAMAXIFHAND or SKU: KAFUSECOVER-KIT to protect cables from short circuits etc.

MOUNTING

It is most important to mount your KickAss Charger as close as possible to your auxiliary battery and be sure to keep your charger away from sources of heat. eg. Turbos and exhaust pipes. This will ensure maximum performance out of your charger.

DIMENSIONS





WIRING SIZE

To make sound electrical connections, the battery cable should be the correct size and the correct terminals should be crimped or soldered.

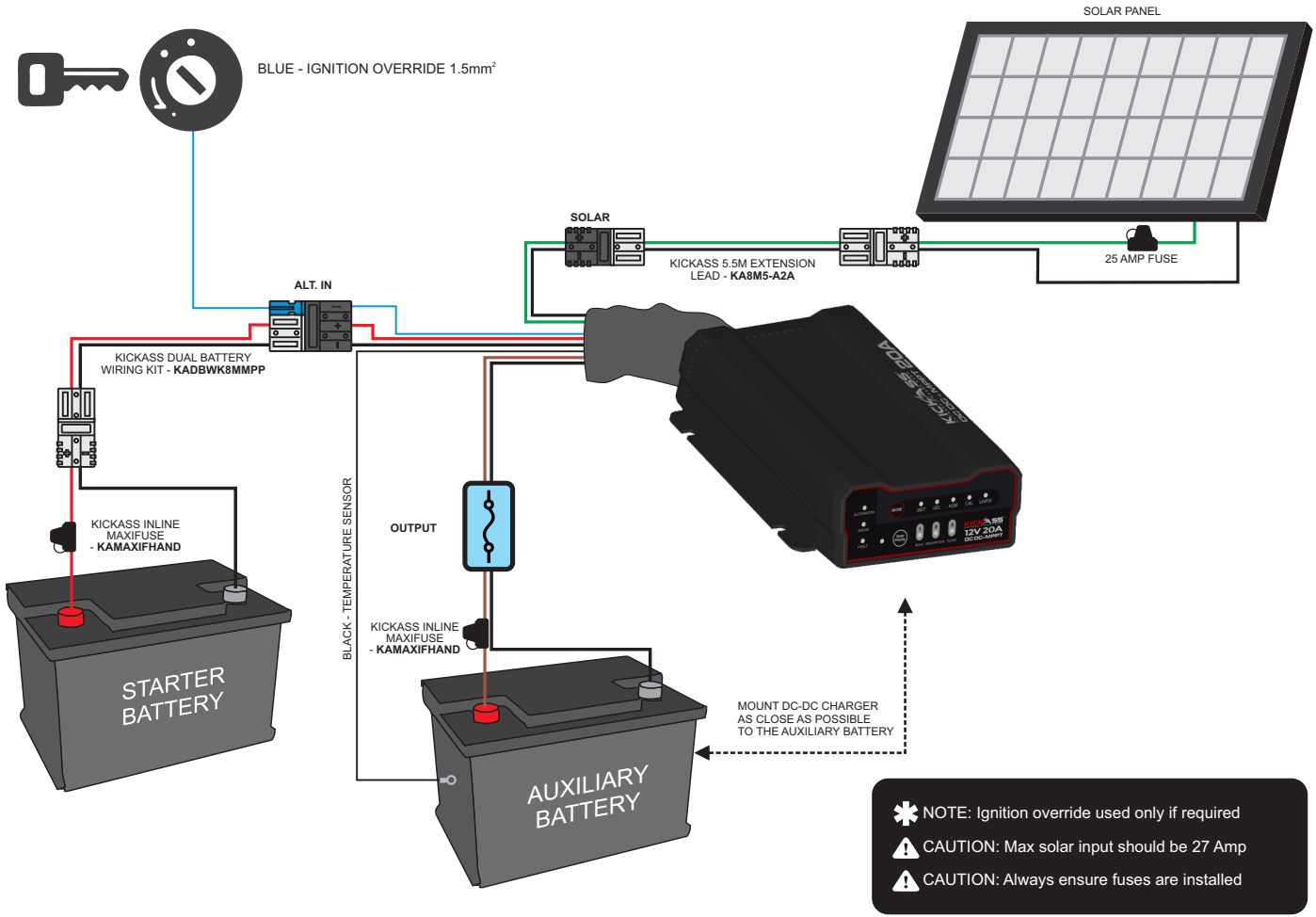
WIRES	CABLE SIZE
Alternator output cable (red)	8mm^2 (8 B&S)
Solar input cable (green)	8mm^2 (8 B&S)
Output cable (brown)	8mm^2 (8 B&S)
Common ground (black)	8mm^2 (8 B&S)
Ignition override (blue)	1.5mm^2
External LED indicator (brown)	1.5mm^2

Note:

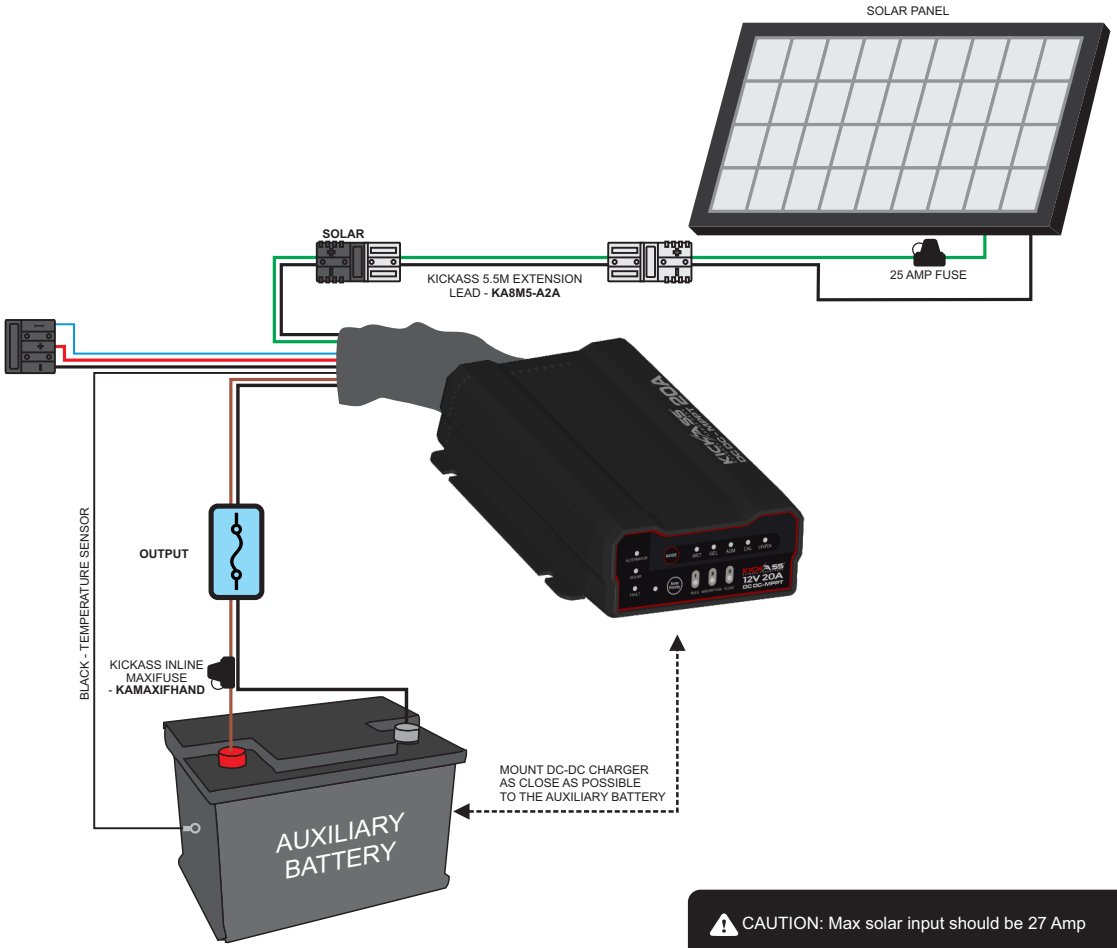
The above recommendation is for cable length up to 8 meters.

For more information or assistance, see installation videos at kickassproducts.com.au

WIRING DIAGRAM - KADCDC20A-CAR



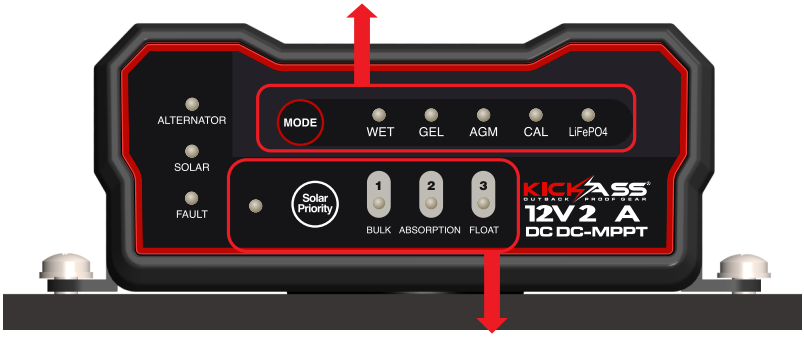
WIRING DIAGRAM - SOLAR PANEL ONLY



CHOOSING THE BATTERY TYPE

The battery type setting must be confirmed during device installation. When the auxiliary battery is connected, press and hold the Mode button for 2-4 seconds then releaase to change the battery type setting. The selected battery type will be saved as the new default.

The default priority setting is ALTERNATOR. To change the Solar priority, press and hold the Solar Priority button for 2-4 seconds, then release, to set the the solar priority. The priority setting will be saved as the new default.



CHARGING STAGE PROFILE

STAGE	DESCRIPTION				
BULK	GEL 100% Current Until 14.1 V	AGM 100% Current Until 14.7 V	WET 100% Current Until 14.4 V	CALCIUM 100% Current Until 15.3 V	LifePO4 100% Current Until 14.5 V
ABSORPTION	Constant 14.1 V Until 2.6A	Constant 14.7 V Until 2.6A	Constant 14.4 V Until 2.6A	Constant 15.3 V Until 2.6A	Constant 14.5 V Until 2.6A
FLOAT	13.5V at 100% Current Max	13.4V at 100% Current Max	13.4V at 100% Current Max	13.6V at 100% Current Max	13.6V at 100% Current Max

NOTE:
When in FLOAT stage, the battery is fully charged. At float stage, when the battery voltage drops to 0.3V below the specified float voltage for the battery type connected, the charger will restart charging form the BULK stage.

UNDERSTANDING SOLAR, ALTERNATOR & CHARGING LIGHTS

Standby Mode
No inputs detected. Once the Aux battery has been connected and is within the detectable voltage range, the battery type LED will short flash to indicate the device is in standby mode and no input sources are detected

Battery type selection mode
Press and hold the Mode button for 2 ~ 4 seconds, upon releasing the button, the default battery type LED will cease to flash and remain solid. Press mode button repeatedly until required battery type LED is selected. Battery type setting is now programed and charger will return to Standby mode after a short time.

Standby Mode Alternator input detected
With no Solar connected or detected and the Alternator is the only available input source, the input LED will short flash to indicate input voltage is below the set cut-in voltage. Charger is still in Standby mode and has not begun to charge the battery.

Standby Mode Alternator and Solar inputs detected
Both input sources are detected but neither has reached the set cut in voltage range. By default Alternator input has priority and will provide power to charge the battery. Solar priority has not been selected and indicator LED is on.

Charging with Alternator or Solar only
Once the input source reaches the set cut-in voltage, charging will begin. The battery type LED will turn solid and the active charge stage LED will come on and remain solid, while the input source LED will continue to flash.

ALTERNATOR ONLY

SOLAR ONLY

Absorption Charge Stage

ALTERNATOR ONLY

SOLAR ONLY

Float stage

Input source LED will change to a long flash sequence when charging stage transfers to float. Battery is now fully charged.

ALTERNATOR ONLY

SOLAR ONLY

Charging with Alternator as priority (default)

Once the Alternator input voltage reaches the set cut-in voltage, charging can begin. The battery type LED will turn solid and the active charge stage LED will come on and remain solid, while the input source LED will continue to flash. Solar input LED will remain solid while source is available. The charger will transition through the different charging stages as previously shown, until the battery is full.

Charging with Solar as priority - Setting Solar Priority mode

The function of Solar Priority mode is to allow the charger to check for available solar input before choosing the alternator as the input source. To do this, the charger will assess the state of charge of the battery and decide if the available solar can effectively supply enough charge or choose the alternator as the best input source.

The Solar Priority function can be set at any time, once the Aux battery has been connected. To set Solar Priority, press and hold Solar Priority button for 2 ~ 4 seconds, then realse the button, to change the priority . The Solar Priority indicator LED will start to flash.

Lithium BMS Sleep Mode & Recovery Feature:

Most lithium batteries are built with a Battery Management System (BMS) inside to protect the battery from over charging, over discharging and extreme temperature changes.

One of the key functions of the BMS is to protect your battery by internally disconnecting the load[1] when voltage drops below specific parameters, this will then result in the battery entering into a “sleep” mode.

[1] (Load includes any accessories and/or device/s drawing charge from the battery. Eg: fridges, pumps, food sealers, etc)

The KickAss DCDC MPPT Solar Battery Controller has a lithium battery recovery function. This function has been designed to recover lithium batteries from a sleep mode.

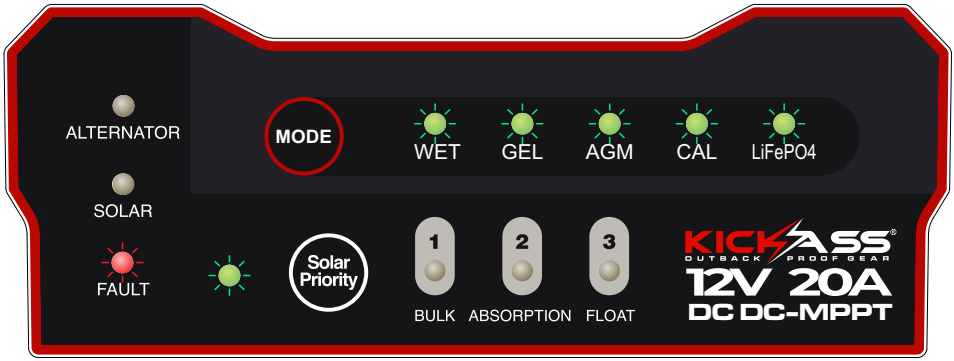
Lithium Battery Recovery Mode Procedure

First disconnect any load connected to the lithium battery. Secondly connect Alternator Input or Solar Input to the KickAss DCDC Charger with MPPT Solar Controller. Thirdly connect the output from the DCDC charger to the lithium battery. When the DCDC Charger with MPPT Solar Controller input charging voltage reaches the relevant cut in voltage, the DCDC Charger with MPPT Solar Controller will automatically try to activate the battery every minute. When DCDC Charger with MPPT Solar Controller attempts to activate the battery, if a open-circuit or short-circuit error is detected, the DCDC Charger with MPPT Solar Controller will enter standby mode until the next activation attempt. If the activation attempt is successful, DCDC Charger with MPPT Solar Controller will initiate the regular three stage charging sequence.

Once the DCDC Charger with MPPT Solar Controller indicates the battery has reach the FLOAT charge state, the battery has been fully recovered and loads reconnected.

FAULT CODES

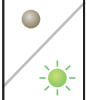
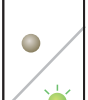
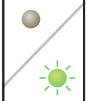
If the fault light is flashing, please refer to the fault codes below for diagnostics.
Note: Only the selected battery type LED will flash when the device detects a fault condition.



Alternator (green)	Solar (green)	Battery Type (green)	Solar Priority (Green)	Fault (red)	Fault	Solution
☀	●	●	●	☀	Over voltage detected at alternator input	Check alternator battery voltage
●	☀	●	●	☀	Over voltage detected at solar input	Check solar panel open circuit voltage
●	●	☀	●	☀	Over voltage detected at output	Check auxiliary battery voltage
●	●	●	●	☀	Over temperature	Let the unit cool down for some time or improve ventilation

TROUBLESHOOTING

The following table provides some additional fault finding advice should any potential issues arise with the system installation, or unexpected system behavior is identified afer normal operation.

Alternator (green)	Solar (green)	Battery Type (green)	Solar Priority (Green)	Fault (red)	System Behavior	Recommended Troubleshooting Procedure
					No voltage detected at alternator and solar input	▪ Check alternator and solar panel voltages. ▪ Check system wiring for potential connection issues.
					Low voltage detected at alternator input (Voltage is below cut-in range)	▪ Check alternator battery voltage. ▪ Check system wiring for potential connection issues. ▪ Check alternator operation.
					Low voltage detected at solar input (Voltage is below cut-in range)	▪ Check solar panel voltage. ▪ Check system wiring for potential issues.
					Low voltage detected at alternator or solar input (Voltage is below cut-in range)	▪ Check alternator battery voltage. ▪ Check system wiring for potential connection issues. ▪ Check alternator operation. ▪ Check solar panel voltage. ▪ Check system wiring for potential issues.

NEED HELP?

KickAss constantly updates frequently asked questions, troubleshooting, videos and specifications, please visit:

kickassproducts.com.au

for the most up to date information.

THANK YOU FOR CHOOSING

KICKASS®

DC-DC CHARGERS

For more information please visit us at:

kickassproducts.com.au