DC-DC CHARGER
WITH SOLAR INPUT

The MA21DCS and MA40DCS are sophisticated multi-stage chargers, utilising microprocessor control and solid state technology to charge most 12V AGM/Lead Acid, Gel, Calcium and LiFePO batteries.

- Heavy duty aluminium case and mounting brackets
- Encapsulated and sealed to IP65 for under bonnet applications
- Microchip monitoring and control
- Fully automatic high frequency multi stage charging
- Pulse mode technology that reduces oxidation, evens electrolyte consistency and minimises temperature equating to longer battery life
- Easy push button chemistry selection: Lead Acid/ AGM (including VRLA and conventional flooded batteries), Gel, Calcium and LiON (LiFePO4)
- LED indicators showing stage of charge
- Internal charger temperature monitoring and power output control
- Over charging, short circuit and over temperature protection
- Reverse polarity protection:
  1. Input reverse polarity protection
  2. Output reverse polarity protection
- Thermal overload protection
- Solar input overload protection
- Power cut memory function: once selected, the charger will remain on this battery type until it is changed
- MPPT solar charge control

MANUAL **MA21DCS · MA40DCS**

WARNING: To avoid any personal injury, please read the safety instructions below

SAFETY INSTRUCTIONS

This battery charger is not intended for use by children or infirm persons without supervision.

FOR AUTOMOTIVE AND RECREATIONAL VEHICLE 12V DEEP CYCLE BATTERY USE ONLY.

NOT TO BE USED WITH DRY CELL BATTERIES.

- During the charging process, do not use a naked flame near a battery. Batteries generate gasses during the charging process that may explode
- Never smoke or light cigarettes near a battery
- Do not place tools on top of a battery or allow tools to fall on the battery to prevent the chance of a short circuit and sparks
- Always wear eye protection when charging battery
- Ensure charging and testing is conducted in a well-ventilated area
- Inadequate ventilation may over-heat the charger and cause inefficient operation
- The ACID / FLUID within a battery is highly corrosive and poisonous. It can produce flammable and toxic gases when recharged and will explode if ignited. When working with batteries, always wear eye protection, remove jewellery and ensure the area is well ventilated. If spilt – it will cause severe burning to eyes, skin, clothing, and damage paintwork and corrode many metals. Ensure that power is disconnected from any appliance in the vicinity of the spill and immediately wash any area that has been affected with water. Seek medical attention.

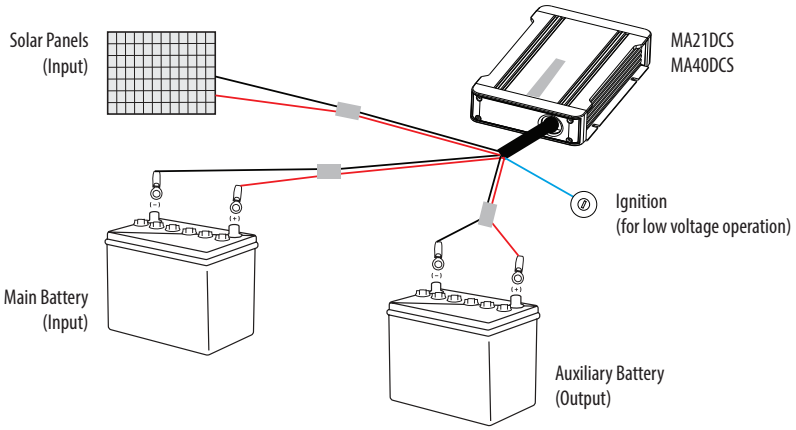
The warnings, cautions and instructions detailed in this instruction manual cannot cover all possible conditions and situations that may occur. Common sense and caution are factors which cannot be built into this product and must be supplied by the operator.

INSTALLATION OPTIONS / INSTRUCTIONS

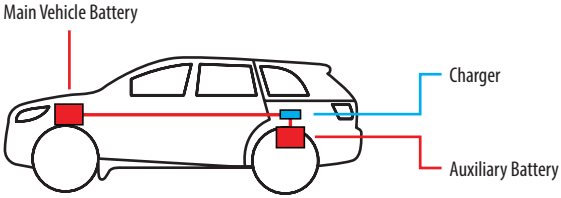
INSTALLING THE CHARGER

This unit is supplied with 50 Amp Anderson style connectors already connected to the battery charging output, the solar input and the battery input leads, ready to plug and play. **These connector housings are labelled for ease of installation**. More wiring and connectors will be required to connect these to your vehicle/panels etc. if they are not already fitted.

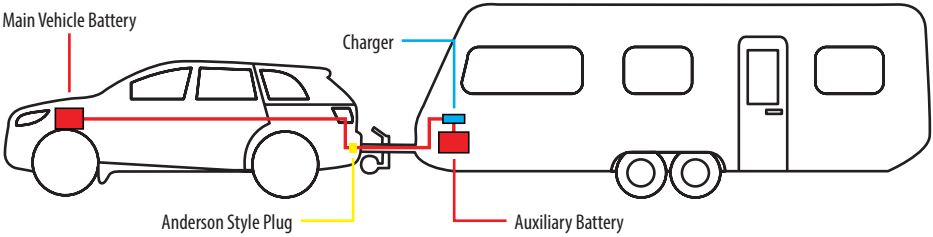
Any existing or additional cables used in the installation of this product needs to be suitable for the current and distance required. Matson recommends the use of 10mm2 cable for this purpose as a minimum.



SUGGESTED FITMENT TO VEHICLE ONLY



SUGGESTED FITMENT TO VEHICLE WITH CARAVAN



INSTALLATION OPTIONS / INSTRUCTIONS

- Choose a location to install the charger, ideally somewhere cool and dry for best performance. Under the bonnet will work, but try and maximise airflow around the charger, without too much water. Excessive heat will lower the charger output. It is also advisable to place the charger as close to the auxiliary battery as possible for best charging performance
- Ensure the charger is securely mounted. This can be in any orientation, inverted, vertical or horizontal, as required. If the unit is being installed in a harsh vibration area, like an engine bay, consider mounting over small rubber or high density foam pads
- Measure the distance from the starting battery to the charger; the distance between the charger and the auxiliary battery; the distance between the solar panel output and the charger. Source cable and terminations to suit. Matson recommends a minimum 10mm^2 good quality twin-core cable for this application.
- Ensure ALL cabling meets specification and will not be exposed to excessive heat / moving parts or abrasion
- Connect the auxiliary battery to the charger – make sure polarity (+ & -) are correct
- Connect the solar panels to the charger – make sure polarity (+ & -) are correct
- Connect the main battery to the charger - make sure polarity (+ & -) are correct
- It is recommended that a 25 Amp (MA21DCS) / 40 Amp (MA40DCS) circuit breaker or fuse be installed between the main battery and the charger, but is not essential
- Make sure all connections are tight

LOW OR VARIABLE VOLTAGE ALTERNATORS

If the vehicle is fitted with a low voltage or variable voltage alternator, the ignition sensing wire will need to be connected. This will allow the charger to continue to operate when it senses much lower voltages (as low as 10.8V) from the main battery, because it can sense the engine running.

Using 2mm automotive cable, connect the small ignition cable from the back of the charger to an ignition power source. This can be complicated and may require the assistance of an auto electrician or qualified installer. Once the charger senses ignition power it will start charging.

OPERATING THE CHARGER

CHARGER DISPLAY

1. DC BATTERY INPUT

Once correctly installed the MA21DCS needs the battery chemistry to be selected, then it will operate automatically with no further input.

- Start the vehicle and let it idle
- The charger will recognise that there is charge going into the main starting battery
- Once the main starting battery reaches 13.0V (11.5V if ignition sensor is installed), the MA21DCS will begin charging the auxiliary battery
- Change the battery chemistry setting to suit your application. The default setting is Lead Acid. Once selected, the charger will remember this as the new default setting, you do not need to change the setting again
- The charger will continue to operate until the vehicle is switched off (Ignition sensor connected) and/or the main starting battery drops to 12.4V

2. SOLAR INPUT

If a solar panel input is connected to the MA21DCS, it will automatically accept power from the panels once the engine has stopped running and the main battery has dropped to 12.4V.

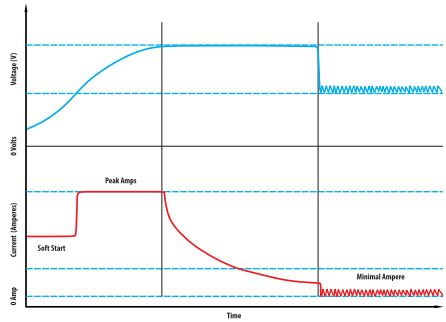
Minimum solar input voltage is 13.5V, maximum is 25V. No regulator is required between the charger and the panels if the panel output voltage is within those parameters.

SPECIFICATIONS

	MA21DCS	MA40DCS
Charge Type	Multi-Stage	Multi-Stage
Input Voltage (V) DC	Battery 10.8 - 16.0	Battery 10.8 - 16.0
	Solar 13.5 - 25.0	Solar 13.5 - 25.0
Cut in/out Voltage with Ignition lead (V)DC	11.5 - 10.8	11.5 - 10.8
Cut in/out Voltage NO Ignition lead (V)DC	13.0 - 12.4	13.0 - 12.4
Output Current (A)	20	40
Minimum Start Voltage (V)DC	2	2
Soft Start Charging	Yes	Yes
Bulk Charge Voltages (V)DC		
Gel	14.3	14.3
AGM/Lead Acid	14.7	14.7
Calcium	15.3	15.3
LiFePO	14.4	14.4
Float Charge Voltage (V)DC	13.5	13.5
Float Charge Current (mA)	100	100
Suits battery capacity (AH)	18 - 250	40 - 400
Case Construction	Aluminium	Aluminium
Ingress protection (IP) rating	IP65	IP65
Max operating temp (Deg C)	70	70
Weight (Kg)	1	1
Dimensions (mm)	135 x 207 x 37	135 x 207 x 37
Min Recommended Cable Length Vs Size (Bigger is always better…)		
0 - 1 Metres	12AWG or 4mm^2	8AWG or 8mm^2
1 - 5 Metres	8AWG or 8mm^2	6AWG or 13mm^2
5 + Metres	6AWG or 13mm^2	4 AWG or 25mm^2

WARNING: Failure to use recommended wiring will severely impact on performance of DC to DC charger.

Charging algorithm will change according to battery type.



CHARGING VOLTAGES

	GEL	AGM / LEAD ACID	CALCIUM	LiON
BOOST	14.3V	14.0V	15.0V	14.0V
CHARGING	14.3V	14.7V	15.3V	14.4V
MAINTENANCE	13.5V	13.5V	13.5V	–

NOTE: *Battery manufacturers sometimes specify charging voltages.*
Not observing their charging instructions may void your battery warranty.

ADDITIONAL INFORMATION

DEEP CYCLE BATTERIES

It is expected that this charger will be used to charge a deep cycle type auxiliary battery.

Deep cycle batteries are designed to provide battery power to run items like fridges and lighting in caravans and campers.

It is generally accepted that the life of a deep cycle battery can be extended if it is not discharged below 50% of its full capacity. A fully charged 100 amp battery in good condition should offer 50 amp hours of power without impacting on its normal life expectancy.

Your average compressor style fridge uses up to 5 amps. Over a 24 hour period it should use approximately 30 amp hours. Therefore if the 100AH battery is operating only the fridge (and receives no additional charge) it ideally will require recharging after 48 hours.

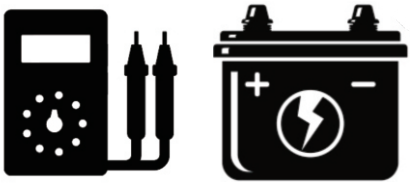
To replenish these 60 amp hours using a 20 amp DC-DC charger will require at least 4 hours of driving. The last 10-20% of battery charging is slow, the closer it gets to 100%, the slower it is. Undercharging a battery and discharging to below 50% can severely impact on life expectancy of most deep cycle batteries.

Approximate state-of-charge	Average specific gravity	Open circuit voltage 12V
100%	1.265	12.65
75%	1.225	12.45
50%	1.190	12.24
25%	1.155	12.06
0%	1.120	11.89

The readings are taken at room temperature of 26°C (78°F); the battery had rested for 24 hours after charge or discharge.

Voltage reading and specific gravity of electrolyte (lead acid batteries) can give an indication of your battery's state of charge.

FAULT FINDING



Charger won't indicate charging	Charger not connected to battery Check terminal connection Battery is not 12 V
Battery won't charge	Verify that all wiring meets specifications Check condition of batteries Check performance of alternator
Battery won't fully charge or hold charge	Battery that is over 3 years old; severely discharged (or previously been severely discharged); not regularly recharged; over-heated: low in electrolyte; undercharged; overcharged or sulphated may not accept or hold a charge. A good automotive store or battery outlet often offers a free or low cost in-store service to check condition of battery. Your battery may require replacement.

WARRANTY POLICY

Products developed and sold by Tridon Australia Pty Ltd come with a guarantee for the reasonable life of the product, for the purpose it is commonly used. This is in addition to the rights of the consumer under the Australian Consumer Law.

To be considered for warranty please take the product with proof of purchase to the store where you purchased the product or contact Tridon Australia

The warranty is given by: Tridon Australia, 21-25 Derby St, Silverwater, NSW 2128.
Tel: 1300 362 263.
Email: mail@tridon.com.au

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage incurred if the product fails when used for the purpose for which it was intended. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Tridon Australia will bear costs associated with claiming legitimate warranties. Proof of expenses incurred must be submitted to Tridon Australia Pty Ltd.