

DC TO DC CHARGERS – DO I NEED ONE? WHAT IS MY ALTERNATIVE?

WILL MY THUMPER CHARGE THROUGH THE PROVIDED CHARGE KIT IF I HAVE A LOW ALTERNATOR OUTPUT / OR / A LOAD SENSITIVE ALTERNATOR?

The information provided below is in the experience and opinion of Home of 12 Volt – Mount Barker. The information has been provided as a guide to help consumers and retailers understand the difference between various systems and what alternatives are available outside the use of DC chargers. Home of 12 Volt understands that people have a difference of opinion and ultimately the end choice of a system is entirely at the choice of the consumer.

The idea behind a DC to DC charger

Many current model vehicles are now released with very low alternator outputs, which in turn is making it hard to charge any aftermarket “secondary battery systems” that are fitted.

These particular vehicle’s alternator output is suitable for the charging of the main battery and the running of the basic electronics in that vehicle; however, the alternator voltage is usually so low (usually < 13.7-13.8 Volts) this means that any second battery that is installed in the vehicle will not receive a high enough charge rate to reach full capacity.

The idea behind a DC to DC charger is to allow for vehicles with either a “low alternator output” or “load sensitive alternator” to demand the load from the alternator in order to allow for the second battery to charge to 100%. The idea is great... however, due to lack of knowledge provided about these systems we have found that many people are misled to purchase a DC – DC charger when in fact they are not required, or they may not be the best option for the particular situation at hand.

How do you know if you actually need a DC charger?

Firstly, it is important to test the voltage output of your vehicle’s alternator to see whether you in fact need a DC – DC charger.

If your vehicle is producing > 13.7-13.8 Volts then the majority of the time purchasing a DC – DC charger would in fact limit your charge rate to the second battery. If your vehicle produces > 13.7-13.8 Volts then in most cases you would simply need to run a heavy charge line (min of 6mm) to the location of the second battery to minimise voltage drop, meaning the DC-DC charger would not be required in this instance.

If the vehicles voltage output is less < 13.7-13.8 Volts then you may reconsider the option of DC-DC charger.

Please consider – If you choose to fit a 100 AH AGM Battery to the vehicle; This battery has the capability to charge at a full rate of 30Amps per hour ~ Meaning your charge time would be approx 3 – 4 hours from the vehicle. HOWEVER, if you installed a DC – DC charger that is rated at 20Amps in this instance, then you would immediately REDUCE the charge rate to the battery and ultimately INCREASE the charge time to approx 4 – 5 hours from the vehicle due to limiting the amps available through the charger.

DC-DC chargers are only approx 60% efficient. This means in order to produce approx 20Amps, the DC-DC charger will need to load the vehicle’s alternator by approx 35Amps to produce this 20Amps. This is a very heavy continuous load on the alternator, which should try to be avoided if and when possible.

In some situations DC-DC chargers cannot be avoided and they are in fact the best option. However, in Home of 12 Volt’s experience over the years, over 95 % of vehicles are better suited without the use of DC-DC chargers.

There are usually alternative options:

What are my other options – other than the DC charger?

Firstly check the following:

- a) Is the voltage output of the vehicle lower <13.7 volts?
**Remember to test the vehicle's voltage output after several minutes of running to make sure the alternator has engaged*
** If the voltage is above > 13.8 Volts then NO – you do not need a DC charger (please refer to b)*

- b) Does the vehicle have a load sensitive alternator?
**Does the voltage decrease once the main battery has reached 13.7volts+?*

These indicators above can help determine three things:

- 1) If the vehicle needs / can be “chipped” in order to increase the alternators voltage output
or
- 2) If the vehicle simply needs a continuous solenoid instead of a voltage sensitive solenoid
or
- 3) If the vehicle in fact requires a DC to DC charger

Point 1 - “Chipping the vehicle”

This is a great option for vehicles which have low alternator outputs.

There is now a small chip/fuse available for certain vehicles – also known as an “Alternator booster diode”. This chip/fuse simply replaces the ALT-S fuse (if the vehicle has one) and will ultimately increase the voltage output of the vehicle by approx 0.5volt.

Usually this increase will bring the voltage of the alternator to 13.8+ volts, which will allow you to successfully charge your secondary battery.

- If the vehicle still has a “load sensitive alternator” then you will still need to consider a continuous solenoid.

Points 2 & 3 – Continuous solenoids / Voltage sensitive solenoid / DC chargers?

Before we go any further - It is important to understand what the difference is between a “low alternator voltage output” and a “load sensitive alternator”:

Low alternator voltage output:

This is when the vehicle has a voltage output of less than <13.8volts when the vehicle is running and the alternator has engaged.

Please note: This does not necessarily mean that the vehicle has a “load sensitive alternator”

However, some vehicles DO have “low alternator voltage outputs” as well as “low sensitive alternators”.

Load sensitive alternators:

In basic terms – this situation is when the vehicle will charge at a higher rate until the main battery reaches fully charged – normally at around 13.8volts.

Once the main battery reaches fully charged at 13.8 volts, then the alternator will basically ‘shut down’ and only provide a minimal output to allow the main battery to remain at fully charge, whilst also running the vehicle’s basic electronic equipment (stereo, lighting, GPS system, etc).

What this usually means is that once the main battery is full, the alternator will no longer provide adequate voltage or amperage in order to charge a secondary ‘aftermarket’ battery, etc.

How can we trick a 'load sensitive alternator' into charging an 'aftermarket' secondary battery system?

The basic answer to this is by using a continuous solenoid instead of a voltage sensitive solenoid.

Voltage sensitive solenoid / relay "VSR"

These isolators will take priority in charging the main vehicle battery until the voltage of the main battery reaches approx 13.8 volts. Once the main battery is full at 13.8 volts, the 'voltage sensitive isolator(VSR)' will then begin to charge the secondary battery.

So where is the problem with this isolator?

** Keep in mind that with a LOAD SENSITIVE ALTERNATOR, once the main battery is fully charged, the alternator will shut down and will not provide an adequate level of charge to successfully charge a secondary battery. Therefore in cases where the vehicle has a LOAD SENSITIVE ALTERNATOR, the VSR is not the best option.

Continuous solenoid

This solenoid/isolator will begin to charge both the main battery and the secondary battery system as soon as the alternator is engaged.

Basically the continuous solenoid links both the main battery and secondary battery on the same line and allows them both to share the vehicles charge output. It essentially 'tricks' a LOAD SENSITIVE ALTERNATOR into thinking that both of the batteries are in fact the main battery – and therefore it will maintain the load output until both batteries reach fully charged at 13.8 volts.

In most cases where you have a vehicle with a LOAD SENSITIVE ALTERNATOR, fitting a continuous solenoid and a heavy charge line (min of 6mm automotive) then you will successfully charge your secondary battery from the vehicle without the need for a DC Charger.

In our experience at Home of 12 Volt, the following vehicles have had no problems with using the continuous solenoid/isolator system in replacement of using DC charger:

- Ford Ranger
- Ford Territory
- Mazda BT50
- Holden Colorado
- VW Amarok

The Thumper charging system

The Thumper charging system is a continuous solenoid system.

The isolator will link the main battery and the secondary battery (The Thumper) as soon as the ignition is switched on and the vehicle is running. This will allow for both batteries to charge off the alternator at the same time, which basically 'tricks' the alternator into thinking the main battery is flat until BOTH batteries reach fully charged at 13.8 Volt +

We at Home of 12 Volt fit approx 2,000 Thumper charging kits per year, as well as on-selling a further 4,000 kits Australia wide. In the past several years we can honestly say that we have only ever encountered ONE vehicle that has actually required the use of a DC charger for vehicle charging.

Our experience has proven that in every other case we have seen, the vehicle has in fact been better suited without the use of a DC charger.

Vehicle's which has proven to benefit from 'chipping the vehicle'

In the experience of Home of 12 Volt, we have seen firsthand the benefits in which the ALTS-chip can offer to certain vehicles. The ALTS chip can be fitted to any vehicle that has an ALTS fuse; usually these are rated between 7.5Amps – 10Amps.

The vehicles which have been the best results by chipping with an ALTS fuse are:

- Toyota Prado (usually 2007 model +)
- Toyota Hilux (usually 2007 model +)
- Toyota 100 series (late model 100series)
- Toyota 200 series

In summary, it is important to remember that every customer / retailer / installer has a different opinion and a different belief with what products should / should not be installed and why.

In the opinion of Home of 12 Volt, it is important to educate the customer / retailer / installer on the options available for a particular system and the reasons behind why one product may be chosen over another.

Allowing for the customer to have an educated understanding of the products available on the market will ultimately help the customer to make an informed decision on what we best suited the individual's wants and needs.