

Do we need an isolated or a non-isolated DC DC charger?

The answer comes down to whether or not the Starter and House batteries share a common ground.

If starter battery and storage battery have common negative (example: if everything is grounded to the chassis) then the non-isolated version of the Orion-Tr Smart is suitable. If they're not grounded the same then use the isolated version.

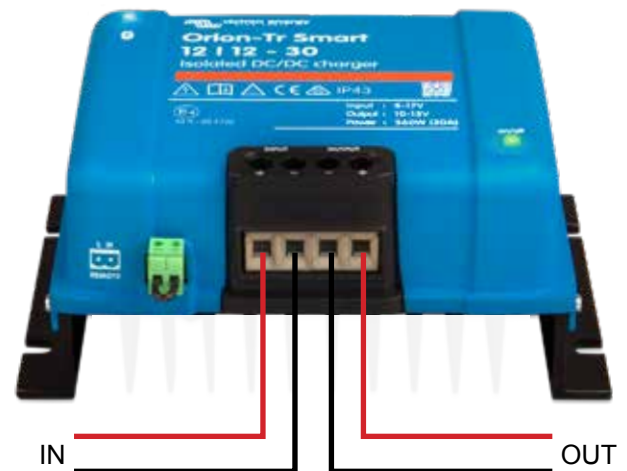
99% of applications will not require electrical isolation between starter and house battery meaning the non-isolated DC-DC is fine. However, there are instances where the isolated model is required and benefits include:

- The house battery is protected from the starter one. If there is an electrical failure like a short-circuit in the input (starter battery), that will not be reflected in the output (house battery). If you have very sensitive instruments such as medical devices, we would recommend an isolated DC-DC.
- The house battery is electrically isolated and magnetically coupled to the starter one. That permits some sort of protection against conductive interference that could come from the grounding, such as the one coming from poor alternator. If you have high quality communication instruments (like radios) connected to your house battery and you require reliable performance without interference, we would recommend an isolated DC-DC.

NON-Isolated



Isolated



The example above shows a non-isolated charger.

An example of this kind is the Victron Energy ORI121236140 Orion-Tr Smart 12/12-30A Non-Isolated DC-DC charger. It has three connections, one for the input positive, one for the output positive, and one for the common negative.

To use this both the source and destination battery must share the same negative. On boats it is mandatory for all the batteries to share the same negative. In a van or RV it is normal for both batteries to share the chassis as the common negative. So for most applications non-isolated is the one to use.

The example above shows an isolated charger.

This could be the Victron Energy ORI121236120 Orion-Tr Smart 12/12-30A Isolated DC-DC charger.

There are four connections, two in and two out. The negatives are not common. This is a fairly specialised application and for most purposes there is no need to use an isolated charger.

One place where it might be useful is in a vehicle being towed. Because of voltage drop at the connection between the two vehicles, the towing vehicle chassis may not be exactly at the same potential as the one being towed, so they are not sharing exactly the same negative. In this case the isolated charger is appropriate.