CARTEK
MOTORSPORT ELECTRONICS

BATTERY ISOLATOR GT

USER GUIDE AND INSTRUCTIONS JULY 2016

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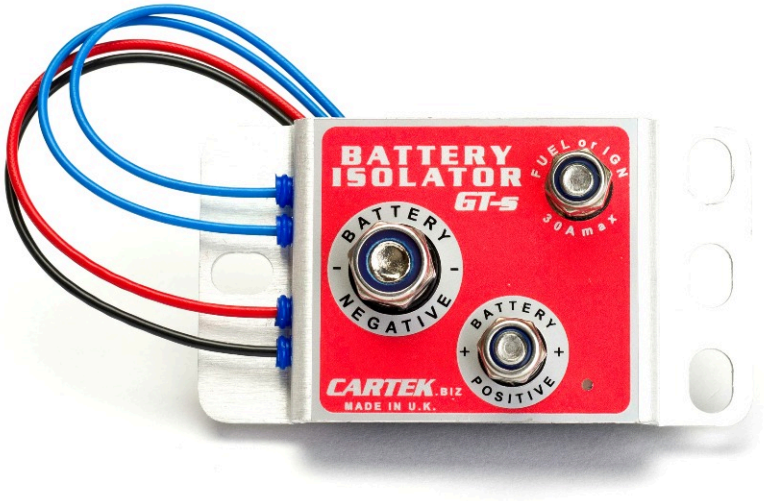
CARTEK MOTORSPORT ELECTRONICS

INTRODUCTION



The **CARTEK Battery Isolator GT** is a fully electronic 'master/kill switch' system designed specifically for race car applications. This device contains no moving parts and the solid construction provides very high resistance to shock, vibration, water and dirt. Using the latest MOSFET technology this Battery Isolator provides safe, spark-free isolation of the vehicle's battery and engine electrics.

Meets FiA safety regulations.

PRINCIPLE OF OPERATION

The unit contains two isolating/switching circuits. The first breaks the connection between the negative side of the vehicle's battery from chassis/earth, thereby disconnecting the battery from all of the car's electrical systems, while the second cuts electrical power to the engine ECU or ignition system forcing the engine to stop and electrical power generation by the alternator to cease.

Alternator run-down protection is incorporated.

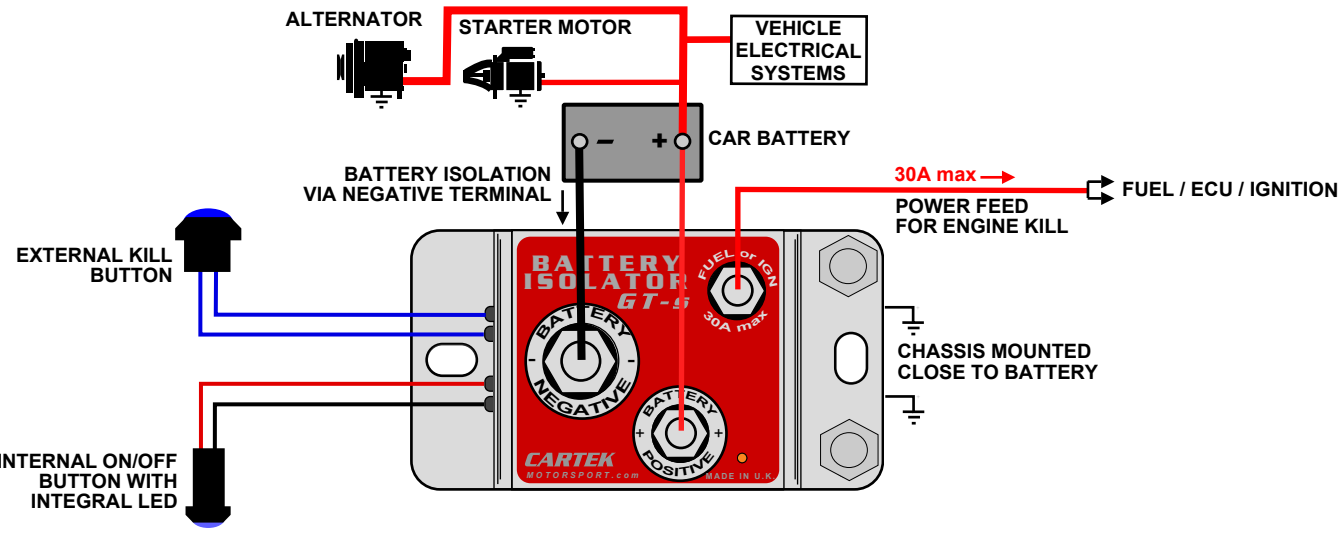
The electronic isolation circuits are controlled by a microprocessor and incorporate various safety systems including over-temperature and over-current monitoring. The microprocessor also monitors the kill switches/buttons for instant activation while eliminating false triggering. The unit will therefore instantly trigger into isolation mode when any of the kill buttons are struck or on detection of any break in switch wiring circuits such as during an accident.

The Isolator also incorporates an LED which displays status as well as fault codes.

CARTEK Battery Isolators are designed for **SAFETY** and **RELIABILITY**.

SPECIFICATION

Typical installation

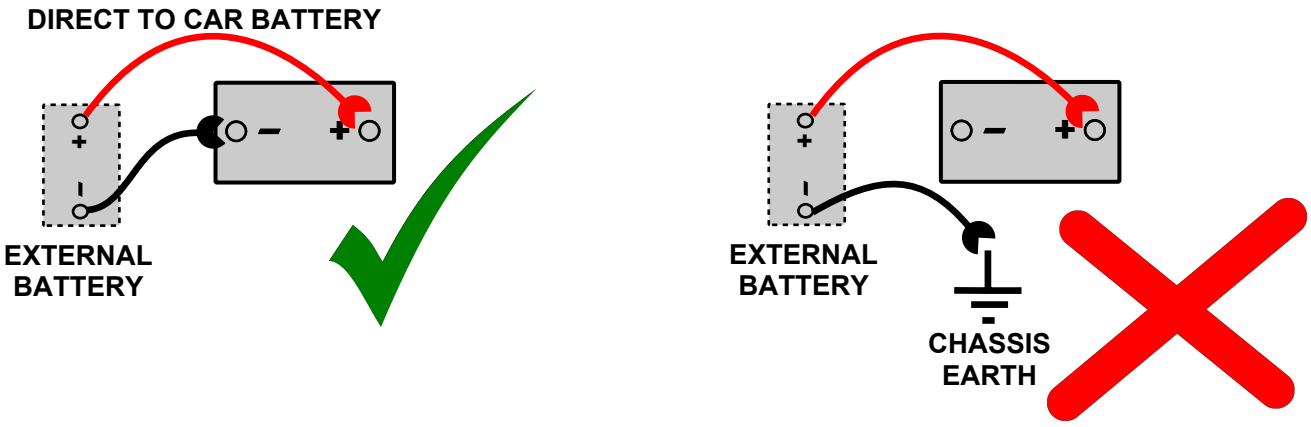


Technical Details

Size:	L = 92mm, W = 50mm.
Weight:	140g.
Battery negative terminal:	M8 stud.
Positive power terminals:	M6 stud.
Operational Voltage:	7v - 18v.
Current consumption:	50mA ON, 7mA OFF
Battery negative switching current:	600A cranking, 2000A surge
Positive power switching current:	30A.
Operating temperature:	-10°C - +85°C.
Storage temperature:	-40°C - +125°C

SAFETY NOTES

- Please read through the Instructions thoroughly before installing on your race car. If not installed correctly then damage may occur to the Battery Isolator.
- The Battery Isolator **MUST** be fully connected before starting the engine. If the terminal marked 'FUEL or IGN' is not properly connected when the engine is running then damage to the Battery Isolator may occur. (Cars without alternators do not apply).
- Do not use the CARTEK Internal Button for any other application, it is designed specifically for use with CARTEK Battery Isolators **ONLY**.
- It should be noted that this device does consume a very small amount of power even when switched OFF. If the car is fitted with a small capacity battery then it is recommended that the battery be disconnected if the vehicle is not to be used for a long period of time.
- The Battery Isolator must be removed if any electric welding is being carried out on the car.
- When using a battery charger or an external starter/booster battery then it is important to connect both terminals directly to the car battery. **DO NOT CONNECT THE NEGATIVE LEAD OF THE CHARGER OR EXTERNAL BATTERY TO THE CHASSIS. THIS MAY CAUSE DAMAGE TO THE BATTERY ISOLATOR.**



MOTORSPORT IS DANGEROUS.
THIS PRODUCT IS DESIGNED FOR MOTORSPORT USE ONLY AND SHOULD NOT BE USED ON ROAD/STREET VEHICLES OR ON PUBLIC HIGHWAYS.
NO WARRANTY IS MADE OR IMPLIED REGARDING ANY CARTEK PRODUCTS TO PROTECT USERS FROM INJURY OR DEATH.
USER ASSUMES ALL RISKS.

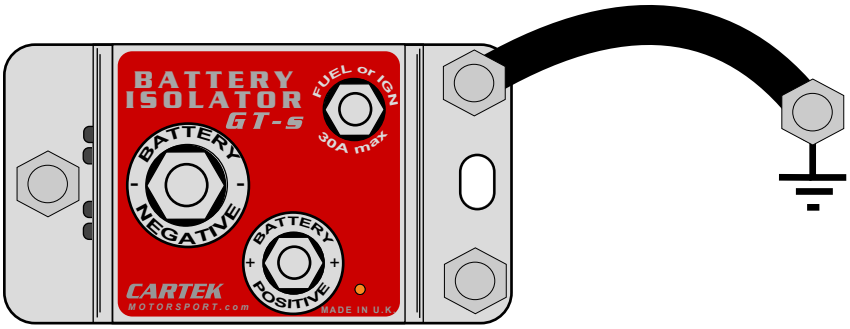
INSTALLATION

Step 1. FITTING

The Isolator should be mounted directly to the vehicle's metal chassis close to the vehicle's battery but away from any high temperature sources.

The Isolator should be mounted securely with unpainted screws/bolts to provide good electrical contact with the chassis.

If mounting directly to a metal chassis is not possible then an 'earth' cable can be used to connect the metal casing of the Battery Isolator to a suitable point on the chassis or engine block.



INSTALLATION

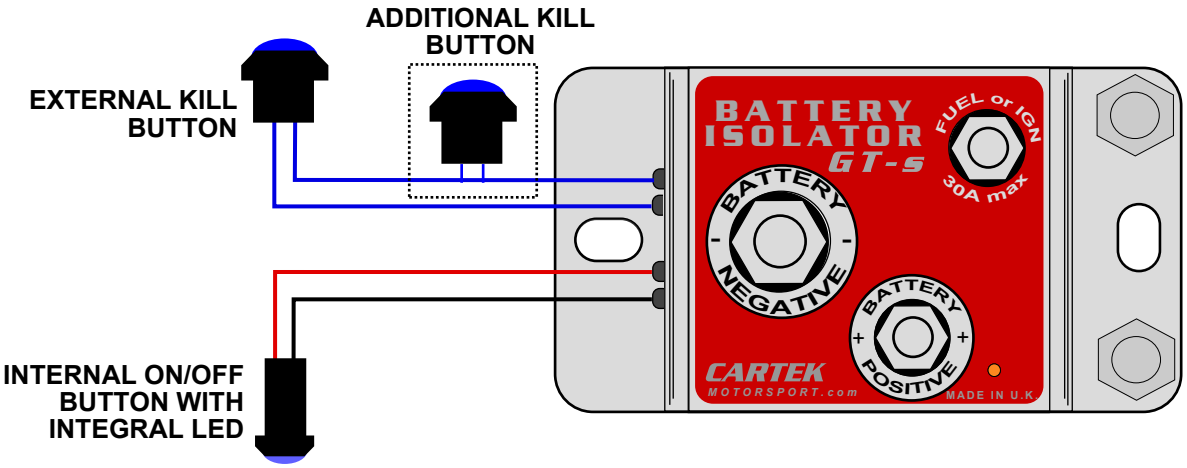
Step 2. SWITCH CONNECTIONS

The Battery Isolator can be controlled by any number of on-off/kill switches although the usual configuration is one internal on-off button and one external kill button.

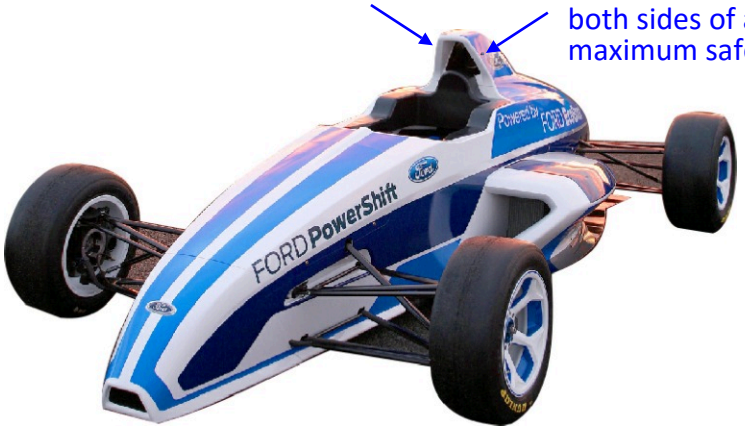
The internal switch needs to be of a latching type, either toggle or pushbutton, such that the ON position makes the circuit while the OFF position breaks the circuit. When using the CARTEK internal pushbutton switch with integrated LED, it is important to observe the polarity of the wires, i.e. Red to Red, Black to Black.

The external kill switch should be of the non-latching, momentary action, normally-closed (NC) type and connected across the two Blue wires of the external switch circuit. If required, multiple kill switches/devices can be incorporated by connecting in series. If only a single internal on-off switch is to be used with no external switch then the external circuit needs to be complete by joining the two Blue wires together. If any wire connection becomes broken due to fatigue or accident then the Battery Isolator will automatically switch OFF killing the engine and disconnecting the battery.

WARNING: Do not test the Internal Button by passing power through it, this will damage it. It will only work correctly when connected to the a CARTEK Battery Isolator.



CARTEK Battery Isolators allow for an external 'kill' button to be mounted on both sides of a race car for instant access and maximum safety.



INSTALLATION

Step 3. ENGINE KILL CONNECTION

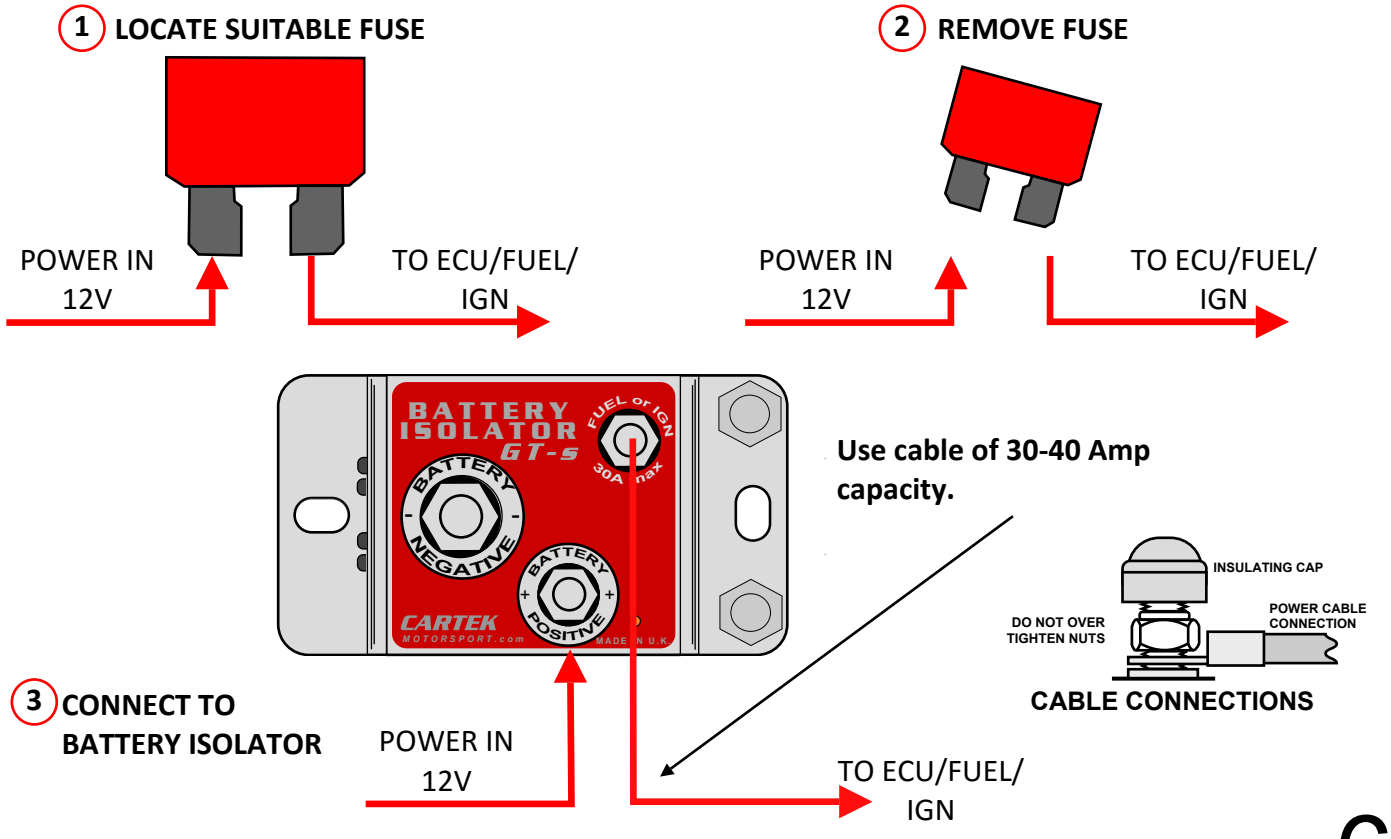
For cars equipped with an alternator, the Battery Isolator needs to kill the engine by cutting power to the engine ECU, Fuel system or Ignition system. One way to find a suitable point within the car's electrical system to kill the engine is to:

START ENGINE.
LOCATE FUSE FOR ECU OR IGNITION SYSTEM.
REMOVE FUSE TO CONFIRM SUITABILITY FOR KILLING ENGINE.

Once a suitable fuse is located then remove it permanently. The power input to this fuse can now be connected to the Battery Isolator terminal marked **BATTERY POSITIVE** and the output of the fuse connected to the terminal marked '**FUEL or IGN**'.

Note : The Battery Isolator can only handle 30-40 Amps through the terminal marked 'FUEL or IGN', any higher will cause the Battery Isolator to shut down to protect itself from over-current damage.

WARNING: The Battery Isolator MUST be fully connected before starting the engine. If the terminal marked 'FUEL or IGN' is not properly connected when the engine is running then damage to the Battery Isolator may occur. (Cars without alternators do not apply).



INSTALLATION

Step 4. FINAL CONNECTION

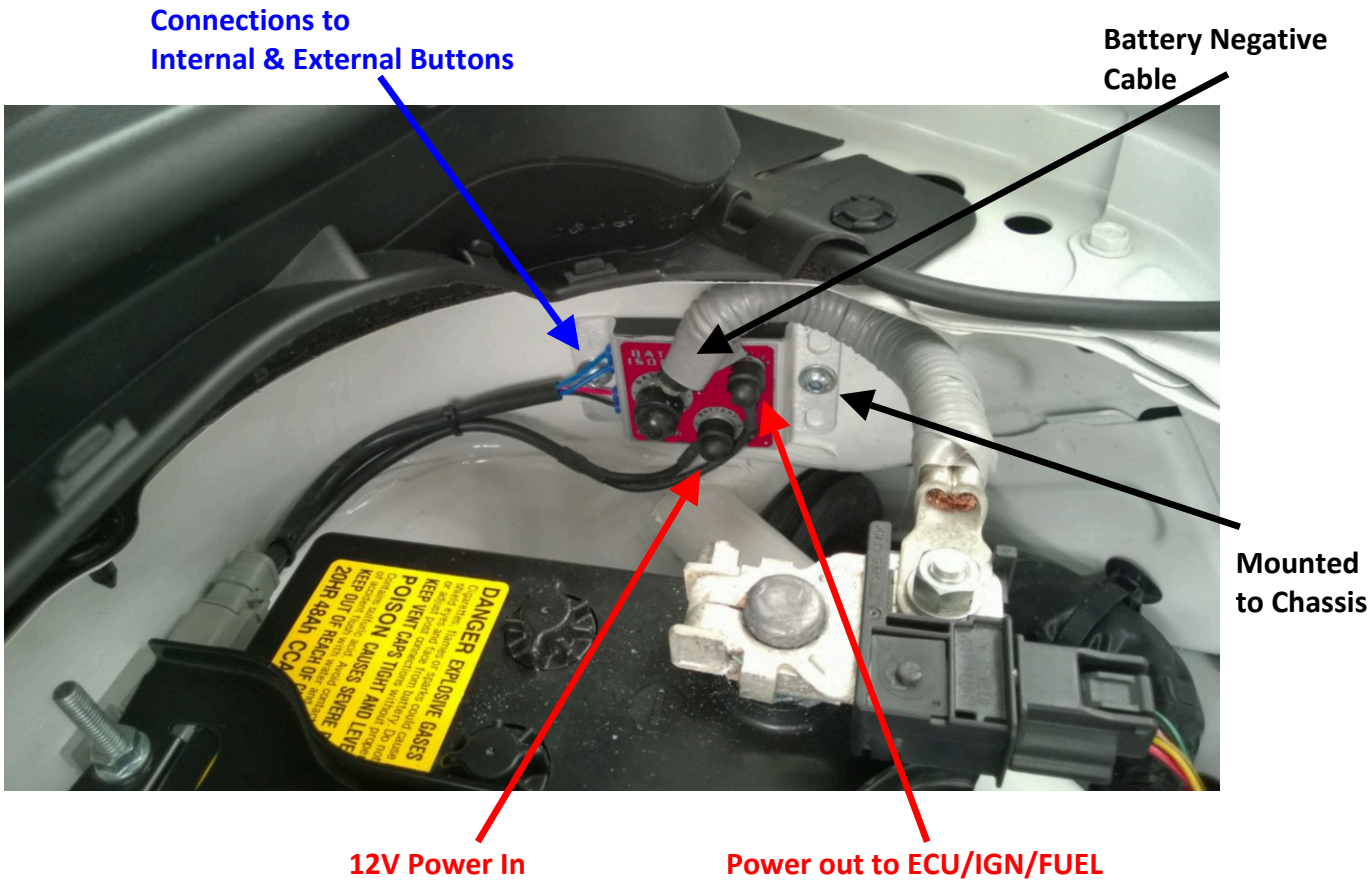
Once Steps 1,2 & 3 are completed a final connection should be made from the negative terminal of the vehicle battery to the Battery Isolator terminal marked BATTERY NEGATIVE. This connection should be made with cable of 100-200Amp capacity and by keeping as short as possible will offer maximum weight saving of the complete installation.

When making this final battery connection, the LED on the Battery Isolator will be seen to flash 3 times quickly and then extinguish. This is part of the power-up sequence of the Battery Isolator.

Once this final step is complete please check all connections before switching on.

When fitting or removing the Isolator always connect the battery last and disconnect first.

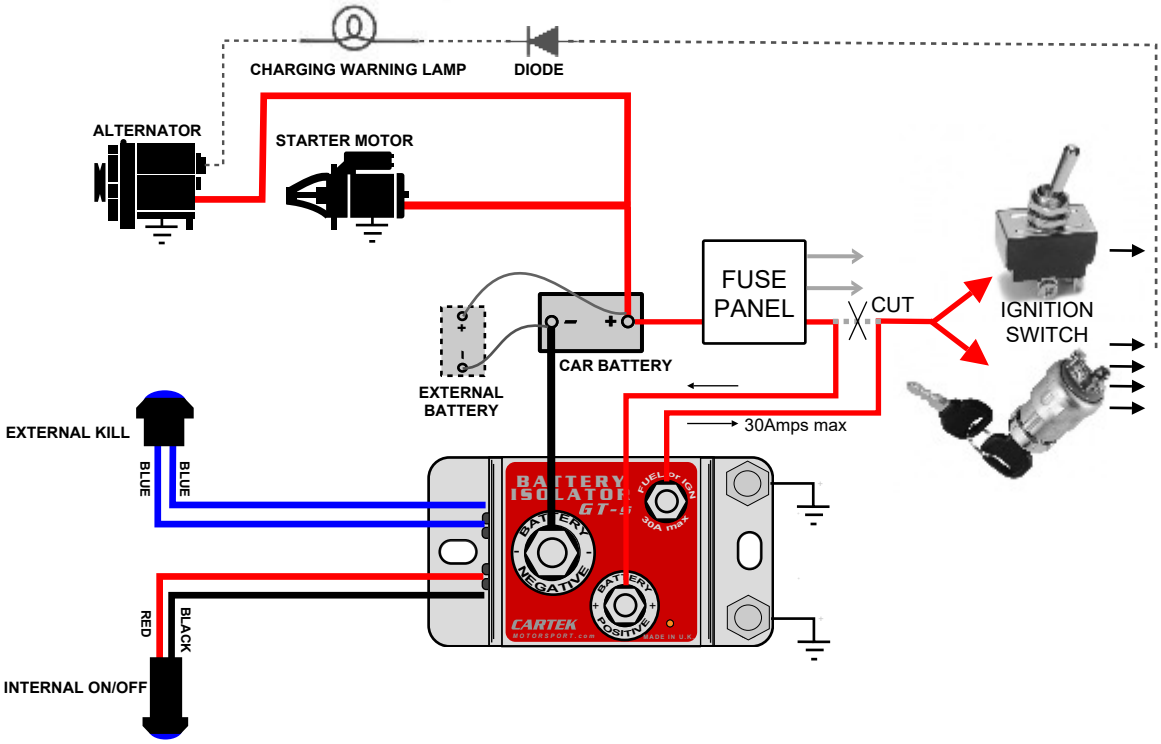
Here is an example of a completed installation:



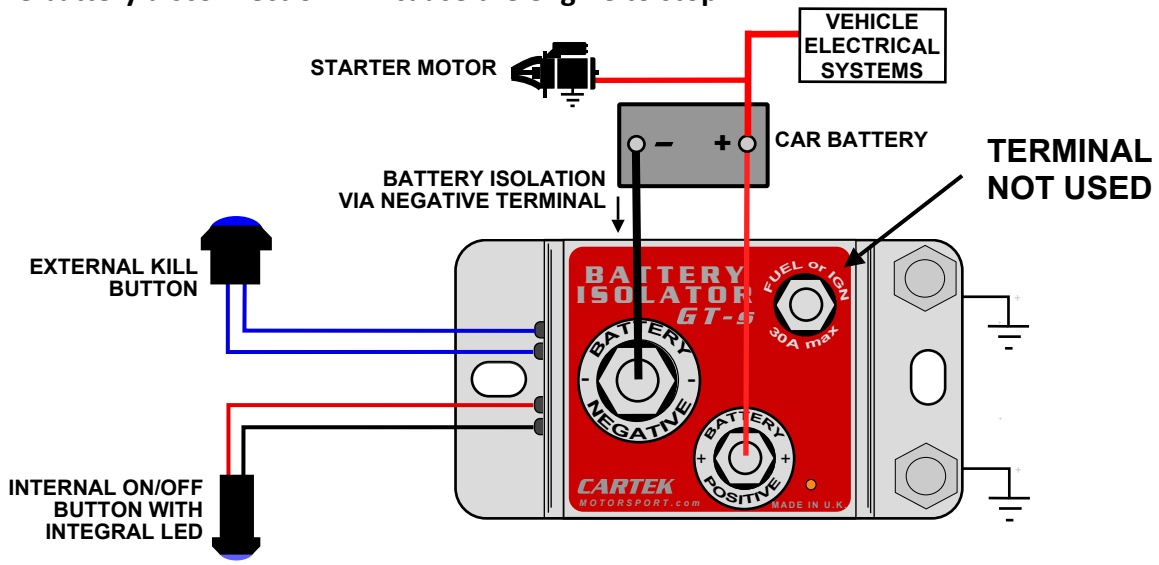
INSTALLATION

ADDITIONAL WIRING CONSIDERATIONS

If the alternator has an old style warning bulb (not LED) which is connected to the ignition switch then a diode must be placed in series as shown. e.g. 1N5819.

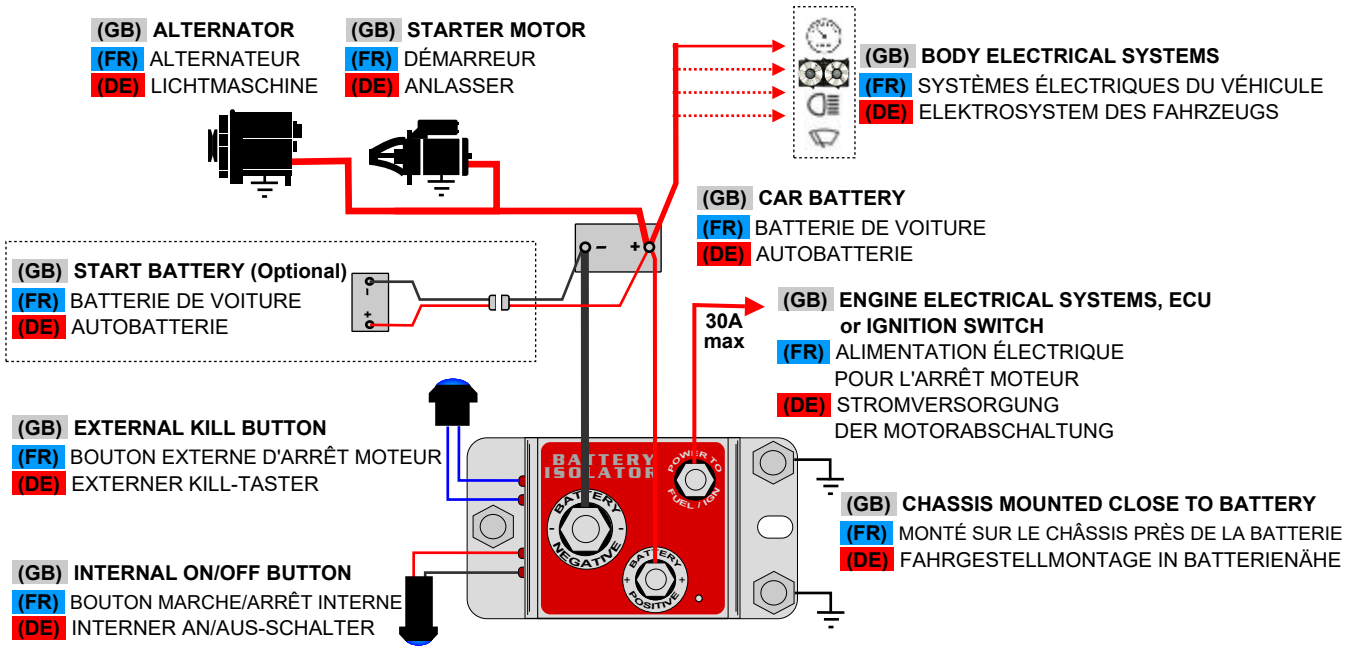


For cars not fitted with alternators it is not necessary to connect anything to the terminal marked FUEL or IGN as the battery disconnection will cause the engine to stop.

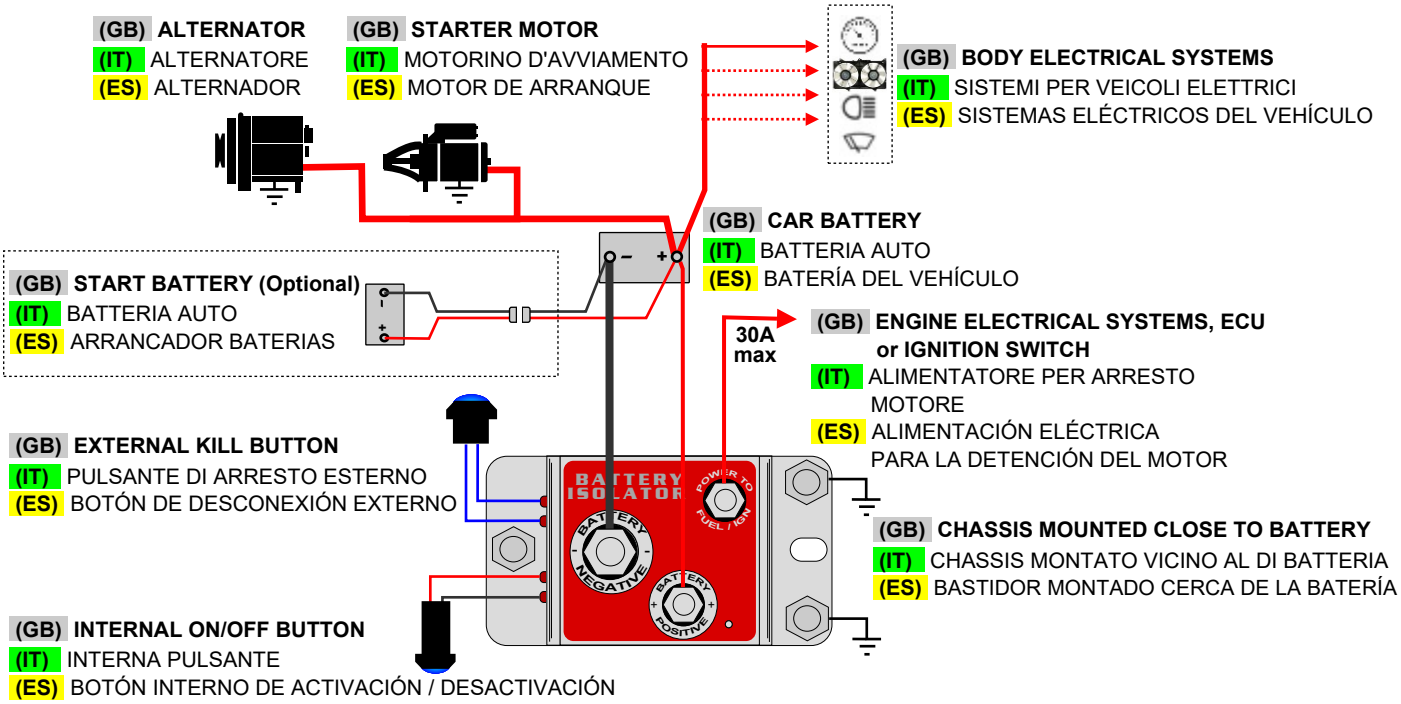


INSTALLATION - MULTILINGUAL

(GB) Installation diagram (FR) Installation des connexions (DE) Installationsanschlüsse



(GB) Installation diagram (IT) Collegamenti per installazione (ES) Conexiones de instalación



FAULT DIAGNOSIS

Once fully installed, the Isolator is switched ON by activating the internal ON-OFF switch/button. On activation the Isolator performs a system check before electrical power is switched on. If any fault is detected then the Isolator will remain in the OFF state and display the fault status via the LED in a sequence of flashes:

1 flash - **External kill button pressed or circuit broken.**
If the External Kill Button has not been activated then check the wiring between the Battery Isolator and the button. One way to confirm a fault with this wiring is to join the two Blue wires together close to the Battery Isolator thereby bypassing the external kill button and associated wiring.

2 flashes - **Maximum temperature exceeded.**
The Battery Isolator will automatically switch OFF if maximum temperature is exceeded. This may occur after prolonged engine cranking or if the Battery Isolator is mounted close to a source of heat e.g. engine, coolant pipes, exhaust, radiator fan, etc.

4 flashes - **Maximum current in <u>POSITIVE</u> circuit exceeded.**
Do not use the power output terminal marked FUEL or IGN to feed power to a main fuse box unless the total current draw by all electrical circuits is guaranteed to be lower than 40Amps. The purpose of this output is simply to stop the engine.

8 flashes - **Maximum current in <u>NEGATIVE</u> circuit exceeded.**
Check for a short circuit from battery positive to chassis such as faulty Alternator or Starter Motor.

Once the fault is remedied the Isolator can be reset by switching OFF the internal switch/button then switching ON again. The unit will also be fully reset by disconnecting from the vehicle battery and reconnecting.

Causes of Errors

1. Make sure there is only one cable attached to the negative terminal of the battery and that this cable connects to the Battery Isolator and nowhere else. There must be no cable between the negative terminal of the battery and chassis.

2. If the Battery Isolator does not switch ON when the internal button is pressed to the ON position then observe any flashing LED error code and identify the fault from the list above. If the Battery Isolator does not switch ON and does not display any error code then check the connections between battery and Battery Isolator and make sure the battery is fully charged.

3. If the Battery Isolator is left in the ON state and the battery drops to a voltage lower than 11 Volts then the Battery Isolator will turn itself OFF after 90mins to reduce current draw and help protect the battery. Note, this will not occur when the engine is running or when the car is being driven as the alternator should maintain a battery voltage higher than 13 Volts.

4. Note that even when the Battery Isolator is in the OFF state the integrated LED may be seen dimly illuminated. This is normal.