

JUMP STARTING SERIES I PRIUS HIGH VOLTAGE BATTERY

INTRODUCTION

The first model Prius 1997 to 1999, designated NHW10, has a vertically mounted high voltage battery located behind the rear passenger seat and accessed from the rear luggage compartment. This battery is supplied with an inverter capable of charging the high voltage Nickel Metal Hydride (NiMH) battery from 12 volt source. To ensure sufficient capacity this 12 volt source should be a large capacity 12 volt battery. The small “on board” 12 volt auxiliary battery will be drained excessively should it be used for this operation.

The later Prius 2000 to 2004 models do not have this inverter and their high voltage batteries cannot be jump started in this way.

Reason for Jump Starting

It is most unlikely that the vehicle will ever require the high voltage battery charged in this way. Normal every day driving will ensure that this battery does not run flat. The Hybrid Electronic Control unit (ECU) located in the high voltage battery compartment ensures that the Nickel Metal Hydride battery does not drop below a critical state of charge. However, if the vehicle is left sitting for many months the state of charge of this battery may drop below a critical level, through self discharge, resulting in it having insufficient charge to turn the engine over. As it is not possible to coast, push or tow start the Prius, due to transmission design, it is recommended that the petrol engine be run for at least 20 minutes every month to maintain a satisfactory level of charge in the NiMH battery pack.

Method of Jump Starting NiMH Battery

An unacceptable state of charge of the Hybrid battery is indicated if any or all of the following should take place:

1. The hybrid battery warning sign is displayed on the top instrument panel display.
2. The engine cannot be turned over when the ignition key is turned to the cranking (starting) position when the transmission is in PARK.
3. A display of an “exclamation mark” within a triangle below the battery sign appears in the centre display (see photo below).



Hybrid Battery
Warning Sign

Centre Display - Showing Hybrid Battery warning sign

An inverter, located on the top right hand side of the hybrid battery, is used to boost a 12 volt source to approximately 300 volts for charging the NiMH battery (see photo below).



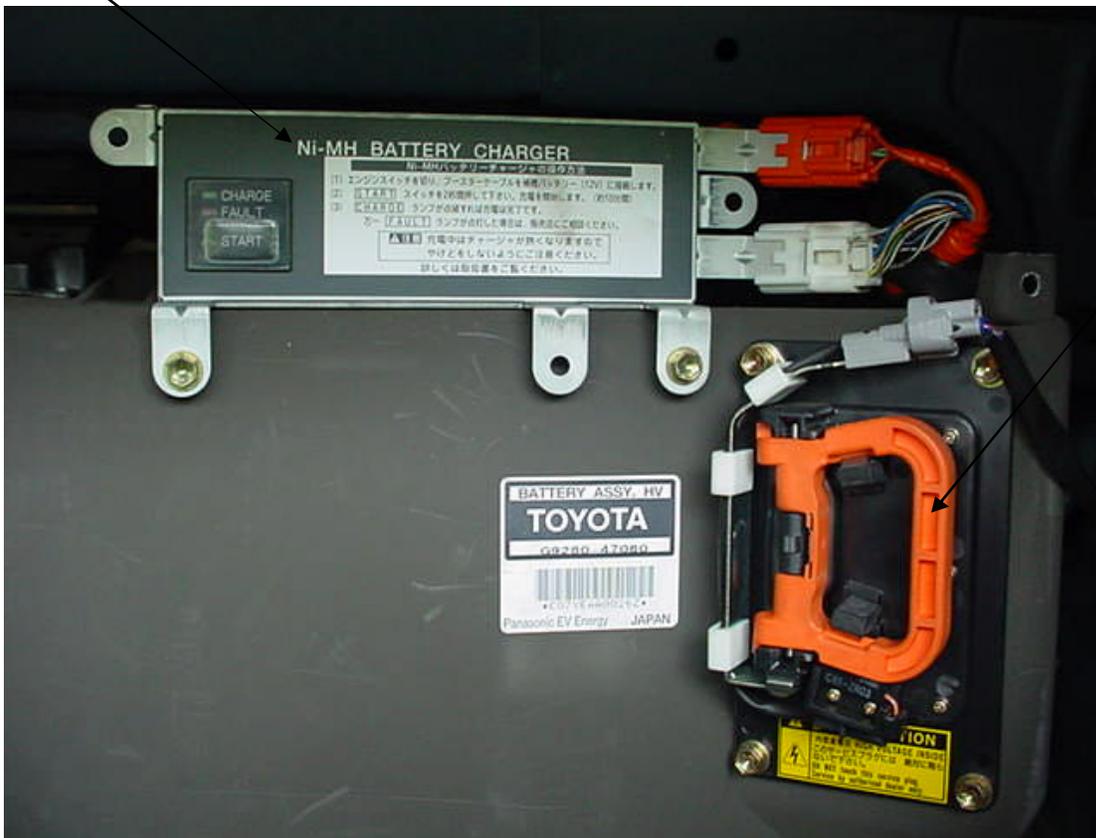
Inverter

Rear Luggage Compartment Rear Panel Removed - Showing 12 volt to 300 volt inverter



View of Inverter with rear luggage compartment panel in place

Important: All orange wiring connections and circuit breaker are HIGH VOLTAGE and should never be touched by inexperienced personnel. This voltage is sufficient to cause death.



Close up view of Inverter and High Voltage Circuit Breaker located on hybrid battery pack

Jump Starting Procedure

To “jump start” the high voltage battery, proceed as follows:

1. Ensure that the ignition key is removed from the ignition.



Photo showing ignition key removed from the ignition prior to “jump starting” the high voltage battery

2. Remove the panel on the left hand side of the rear luggage compartment covering the auxiliary 12 volt battery.
3. Disconnect the negative (earth) terminal of the auxiliary 12 volt battery.



Photo showing negative terminal disconnected from 12 volt battery

Important: It is necessary to disconnect this terminal otherwise this battery will be excessively drained by the “jump starting” current taken by the inverter.

4. Obtain a large capacity 12 volt battery and connect the positive terminal of this battery to the positive terminal of the 12 volt auxiliary battery in the vehicle.
5. Connect the negative terminal of the high capacity 12 volt battery to the boot lock striker plate (this is a good chassis earth connection).



Earth connection on striker plate



Photo showing large capacity battery connected to the 12 volt auxiliary battery positive terminal and striker plate for luggage compartment lid (boot lid).

IMPORTANT : Take extreme care to ensure that the battery polarity is correct.

6. With the ignition still **OFF** push the **START** button on the inverter. The high voltage battery should now receive a charge from the large capacity 12 volt battery via the inverter. After 10 minutes the high voltage battery should contain sufficient charge to start the vehicle.
7. If the high voltage battery does not require charging there will be no effect when the **START** button on the inverter is depressed.

R J McLeod, Senior Lecturer, Automotive Engineering, **OTAGO POLYTECHNIC**, NEW ZEALAND
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