

Handling high voltage on hybrid vehicles

There have been a number of phone calls to the I-CAR Tech Centre asking about the proper procedures for disabling the high voltage systems on the Honda Insight and Toyota Prius hybrid vehicles. The disabling procedures are simple, but anyone who has not been properly trained, such as first responders, runs a risk of injury if the wrong circuits are touched. This article will discuss Toyota's and Honda's recommendations for disabling the high voltage electrical systems of these vehicles.

Toyota Prius

The 2001-2004 Toyota Prius powertrain consists of a gasoline engine, an electric motor/generator and a nickel-metal hydride battery.



Figure 1 - These gloves are rated to handle power lines without fear of shock. They are sometimes called lineman's gloves.

The Prius uses a 276-volt battery. For safety and ease of identification, any electrical cable that carries the 276-volt current is colored orange, similar to the Insight. Any orange-colored cable should be avoided until the high voltage electrical system has been disabled. Whenever touching any high voltage part of the Prius, insulated gloves

rated for 5,000 volts and certified to 1000 volts must be worn (see Figure 1).

To disable the high voltage electrical system:

1. Remove the ignition key.
2. Disconnect the 12-volt battery.
3. Wearing insulated gloves, remove any covers that will impede access to the high voltage service plug located in the hatchback area of the vehicle.
4. Pull the orange service plug lever from the 12 o'clock position down 90°.
5. Remove the orange service plug and place it in your pocket. Doing this will eliminate the chance that someone else will re-energize the high voltage system of the vehicle. Wait five minutes for the high voltage system to discharge.

If the rear of the vehicle cannot be accessed due to collision damage, the high voltage system of the Toyota Prius can be disabled from access points under the hood. One of those areas is a relay junction point located under the vehicle hood along the lower cowl panel (see Figure 2). Open the relay box and remove the relay closest to the driver's side of the vehicle.

Another disabling area is located above the left front wheel in the fuse box. Open the fuse box and remove the High Voltage (HV) fuse (see Figure 3). Performing any one of these three functions will disable the vehicle HV electrical system.



Figure 2-Removing this relay under the hood will also disable the high voltage system on the Toyota Prius.

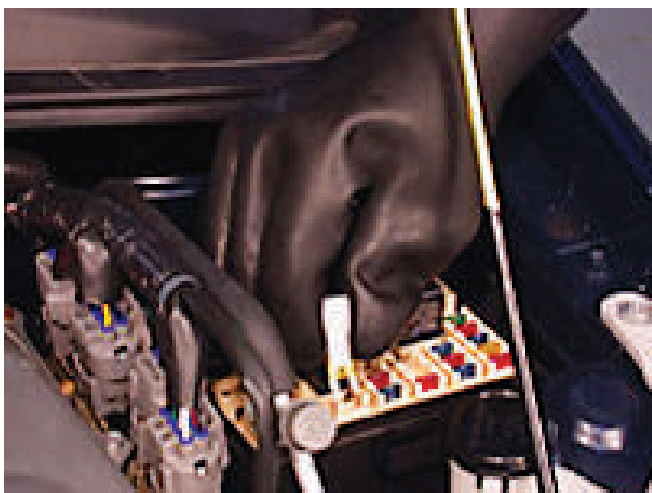


Figure 3-Removing the high voltage fuse from the fuse box will also disable the high voltage system on the Prius.

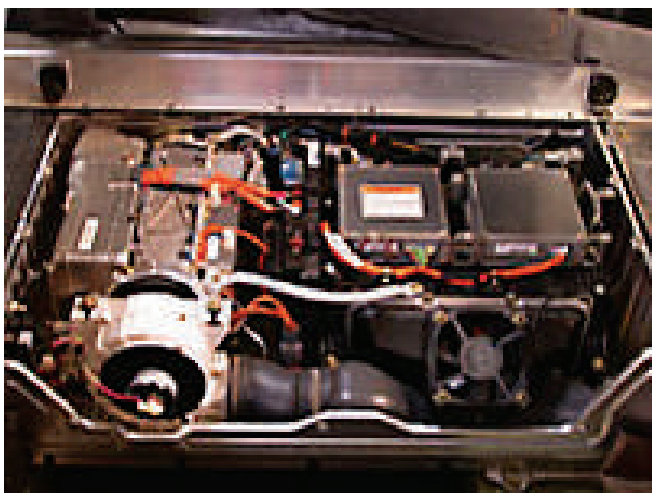


Figure 4-The orange-colored cables carry high voltage.

Honda Insight

The 2000-2004 Honda Insight powertrain consists of a gasoline engine, a 10-kilowatt electric motor/generator and a nickel-metal hydride battery. Honda refers to its hybrid system as Integrated Motor Assist (IMA).

Instead of a conventional 12-volt battery, the Insight uses a 144-volt battery. For safety and ease of identification, electrical cables that carry the 144-volt current are colored orange (see Figure 4). Toyota also uses orange-colored cables on the Prius. Any orange-colored cables should be avoided until the high voltage electrical system has been disabled.

1. Remove the Battery Module Switch cover plate located on top of the high voltage battery under the rear hatch carpet.
2. Remove the battery switch lock and turn the Battery Module Switch to the OFF position.
3. Replace the battery switch lock and Battery Module Switch cover plate. If the vehicle is in a repair facility, secure a tag to the switch cover plate stating the position of the high voltage battery switch. A label similar to "POWER OFF - DO NOT TOUCH" should alert people to not change the battery switch position.

Honda CIVIC

The 2004 Honda Civic high voltage system is disabled identical to the Honda Insight. The only difference between the Honda Civic and the Insight is the rear seat requires removal to access the high voltage cutoff switch.

In regard to a collision-damaged vehicle, first responders can disable these vehicles by turning the ignition to the OFF position and removing the key.

If a Toyota or Honda hybrid vehicle is in water, DO NOT attempt to disconnect the electrical system. Remove the vehicle from the water and then disconnect the high voltage electrical system. Following these vehicle makers' recommendations should help reduce the chance of personal injury.

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