

CHRYSLER



Aspen



DODGE
Durango



HYBRID

***Emergency Response
Guide***

Foreword

The ***Chrysler Aspen and Dodge Durango Hybrid Emergency Response Guide*** provides an overview of the Aspen and Durango hybrid vehicles.

This guide has been developed to make essential information available to emergency responders to help ensure that emergency rescue situations involving occupants of Aspen and Durango hybrid vehicles can be handled as safely as possible.

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About These Vehicles

– **Introduction** – The Chrysler Aspen hybrid and Dodge Durango hybrid vehicles, introduced in the 2009 model year, are gasoline-electric vehicles.



The basic features of the Aspen and Durango hybrids are the same as the traditional Aspen and Durango models. The Aspen and Durango hybrids use a conventional internal combustion engine along with a high voltage transmission with integrated electric motors for propulsion.

The internal combustion engine and fuel system operate in the same manner as traditional Aspen and Durango models. The 12-volt electrical system operates similar to a standard 12-volt system. The 12-volt electrical system on the Aspen and Durango hybrids does not include an alternator.

Vehicle Identification

– **Distinguishing Characteristics** – With the exception of the high voltage electrical system, the Aspen and Durango hybrid vehicles are similar in design to the traditional Aspen and Durango models. Distinguishing characteristics that may help to identify a hybrid model include a:

- "Hybrid" badge located on each side of the vehicle, and on the rear liftgate.



- "Hybrid" logo molded into the air cleaner cover.



- unique instrument cluster with hybrid power gauge.



Collisions can damage or destroy hybrid vehicle labels/badges making identification difficult to determine. In such cases it may be necessary for rescue personnel to visually inspect for the presence of high voltage system parts (see the list of high voltage hybrid components on page 6, and a diagram showing high voltage hybrid component locations on page 7).

High voltage parts are marked with a high voltage warning label. All high voltage wiring on Aspen and Durango hybrid vehicles is colored bright orange.

– **Hybrid Identification Using the VIN** – The vehicle identification number (VIN) may be used to determine if the Chrysler Aspen or Dodge Durango is a hybrid model. A number "1" in the 6th position of the VIN indicates that a Chrysler Aspen or Dodge Durango is a hybrid model.

High Voltage Hybrid System

– **Operation** – The Aspen and Durango hybrid models use an internal combustion engine, a high voltage battery pack, and a transmission with integrated electric motors to power and propel the vehicle. The Aspen and Durango hybrids are full hybrid vehicles, making them capable of electric-only propulsion.

The Aspen and Durango hybrids are powered at low speeds and in reverse by the high voltage battery pack. The internal combustion engine powers the vehicle at normal driving speeds. The internal combustion engine and the high voltage battery pack will power the vehicle during hard acceleration. The internal combustion engine is also used to recharge the high voltage battery.

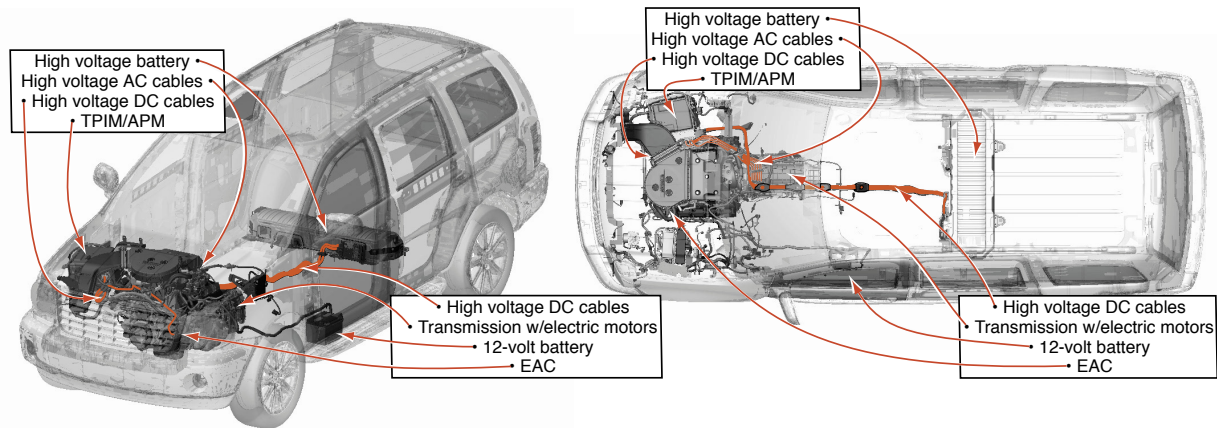
When the vehicle is stopped, the internal combustion engine and the transmission with integrated electric motors may shut down, while the rest of the hybrid system remains operational.

The high voltage hybrid system consists of the following components:

- High voltage battery
- High voltage cables (there are multiple sets of cables)
- Traction power inverter module (TPIM)/accessory power module (APM)
- Transmission with integrated electric motors
- Electric air conditioning compressor (EAC)

The high voltage battery is connected to the TPIM via high voltage cables that are orange in color. The TPIM also includes the high voltage-to-12-volt power converter (APM) and connects high voltage direct current (DC) to the EAC, and high voltage alternating current (AC) to the transmission, also via bright orange-colored high voltage cables. The EAC also has a high voltage connector that is orange colored.

– High Voltage Hybrid Components –



– **Safety Features** – In most accident situations an automatic shut-off of the high voltage system is triggered and the flow of energy from the high voltage system is disabled.

During this process the TPIM stops the high voltage generation in the transmission with integrated electric motors, commands the high voltage battery to open the main contactors, and begins discharging the high voltage capacitor in order to de-energize the high voltage system completely within five seconds after the vehicle comes to rest.

If the accident does not trigger an automatic shut-off of the high voltage system, de-energizing the high voltage system could take up to five minutes.

High Voltage System

– **Safety** – The high voltage system on an Aspen or Durango hybrid vehicle operates with up to 500-volts, which can be hazardous to the human body. Do not open or disassemble any high voltage component. In the event of damage to high voltage components or cables, do not touch any parts of the high voltage system. Turn the ignition off to power down the vehicle.

In situations where the high voltage system is not powered down, an electric shock hazard exists if high voltage cables are disconnected, cut, or high voltage components are opened. Cutting high voltage components while in a powered state may lead to arcing, arc flash, and serious or fatal injuries.

– **Warning Labels** – High voltage warning labels may be found in various locations. The high voltage battery, the EAC, the TPIM/APM, and the high voltage wiring are marked with high voltage warning labels. An example warning label is shown below. This is a representative example and may not appear exactly as those found on an Aspen and Durango high voltage system.



– **High Voltage Battery** – The high voltage battery pack is located under the second row passenger seats and runs the full length of the second row seats. The high voltage battery pack is enclosed in an aluminum case.



The battery is a high voltage nickel-metal hydride (NiMH) battery pack, consisting of 40 low voltage (7.2-volt) battery modules. The modules are connected in series to produce approximately 288 volts.

High Voltage Battery Pack Characteristics	
Battery pack voltage	288 volts
Number of NiMH battery modules in pack	40
NiMH battery module voltage	7.2 volts
NiMH battery pack dimensions	49 x 7.5 x 15.7 in (1246 x 190.7 x 398.1 mm)
NiMH battery pack weight	154.3 lb (70 kg)

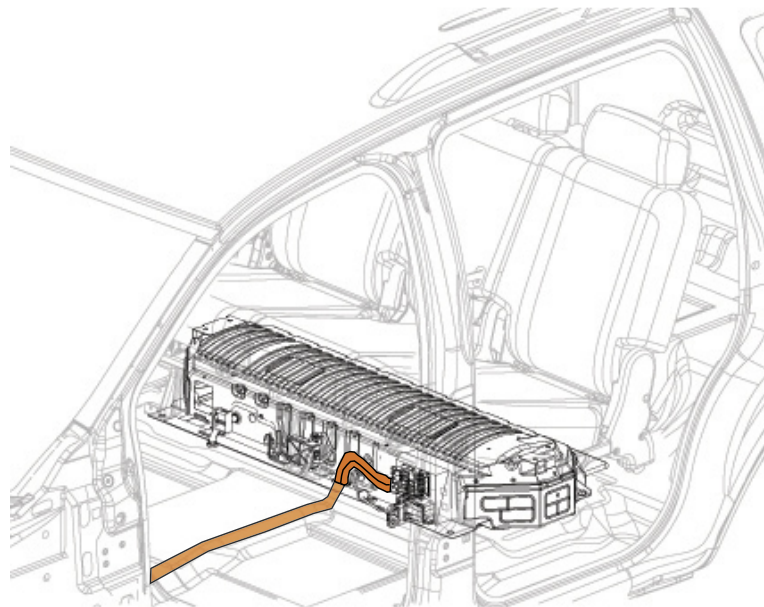
Each module is sealed in a plastic case. The battery modules contain toxic nickel hydroxide, NiMH alloy and a strong alkaline electrolyte, mainly potassium hydroxide. The electrolyte is absorbed into the battery cell plates and forms a gel that will not normally leak, even in a collision.

In the unlikely event that the battery pack is overcharged, the modules vent hydrogen gas directly outside the vehicle through a vent located under the passenger side of the second row seat behind the high voltage battery cover.

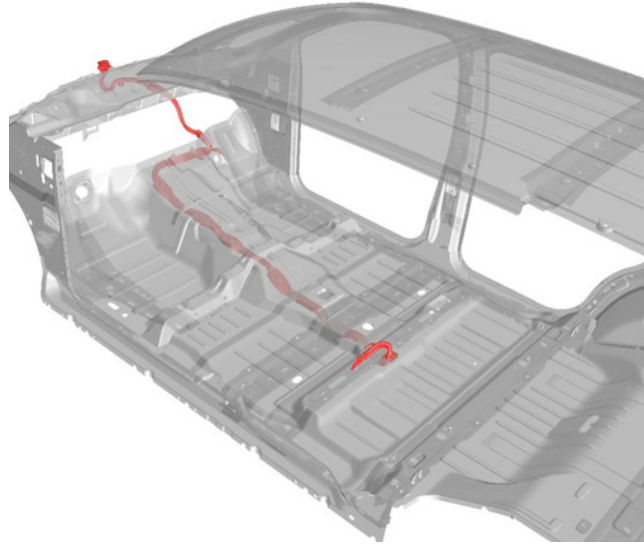
The air intake for the high voltage battery is located under the second row seat on the passenger side of the vehicle between the high voltage battery cover and the door trim.



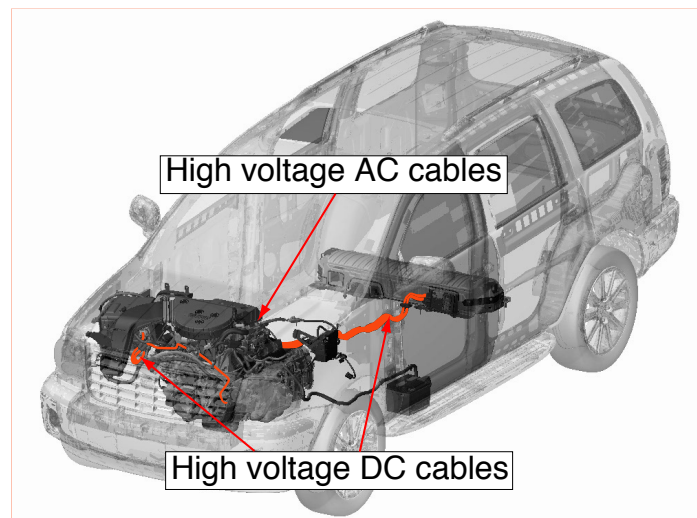
– **High Voltage Cables** – Electrical energy is transmitted between the high voltage battery and other high voltage system parts through high voltage cables. All high voltage cables are bright orange colored. Never cut or disconnect any high voltage cables.



The DC high voltage cables originate at the high voltage battery. The connection is located on the driver side of the vehicle on the front of the battery.



From the high voltage battery the DC cables are routed toward the middle of the vehicle, down through the floor pan, and then forward, on the underside of the vehicle, between the transmission and the floor, until just before the engine compartment. From there, the DC cables are routed towards the passenger-side of the vehicle and up to the TPIM.



Note that there are also AC high voltage cables and DC high voltage cables located in the engine compartment. The AC cables travel from the TPIM to the transmission. The DC cables travel from the TPIM to the EAC. Both the AC and the DC cables located in the engine compartment are orange in color.

Emergency Response Procedures

– **Disabling the System** – Following most accident situations there should be no high voltage hazard present. The high voltage system is designed and equipped with safety features that will disable the flow of energy in most accident situations.

Because the internal combustion engine and transmission with integrated electric motors shut down when the vehicle is stopped, but the hybrid system remains operational, always assume that the vehicle is powered up and that high voltage exists.

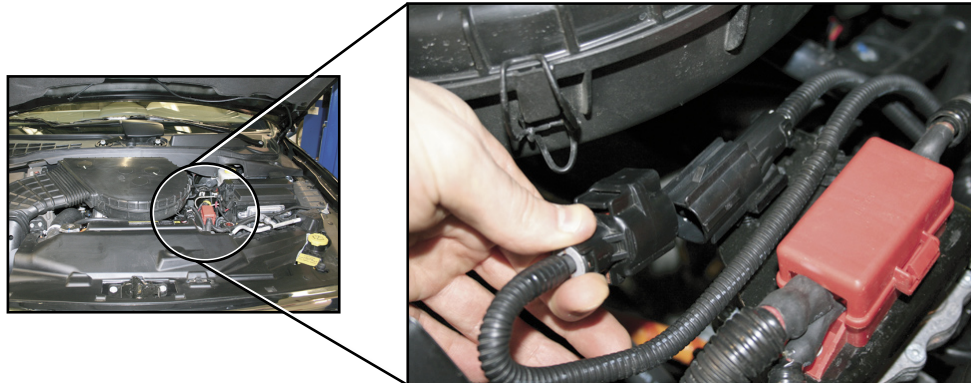
Disable the energy sources to reduce the risk of high voltage hazards and/or vehicle movement. Typically, turning the ignition OFF will shut the vehicle off and disable the gasoline fuel pump and the high voltage system.

To perform a manual shut-off:

1. Turn the ignition off. By turning the ignition off, the main contactors of the high voltage battery are opened and the discharge of the capacitors is initiated.



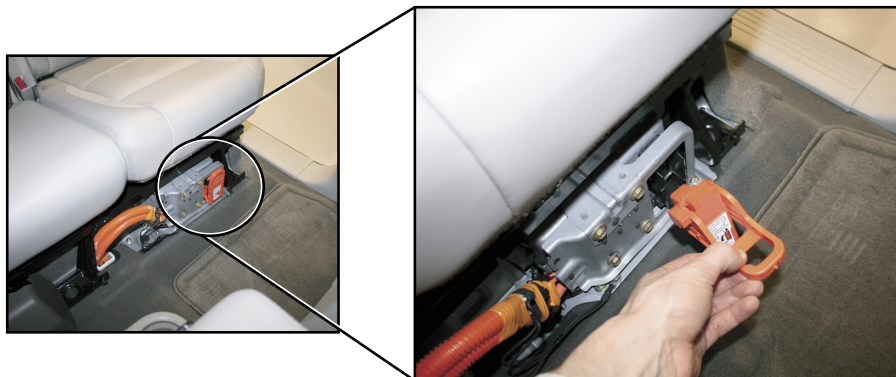
2. Disconnect or cut the 12-volt battery negative cable. The 12-volt battery is located beneath the vehicle. The 12-volt battery cables/low-voltage disconnect can be accessed in the engine compartment. The low-voltage disconnect is located adjacent to the air cleaner on the driver side of the engine. Depress the latch and pull to release the connector.



Disconnecting the 12-volt battery negative cable also disables the supplemental restraint system (SRS). The SRS may remain powered for up to two minutes after the vehicle is disabled.

After five minutes, the passive discharge of the high voltage system is completed.

If the emergency situation will not allow a manual shut-off of the high voltage system using the preceding steps, the Aspen and Durango hybrids are equipped with a high voltage system service disconnect.



The service disconnect is located on the driver side front of the high voltage battery module. The plastic disconnect is colored bright orange. By removing this disconnect the high voltage battery circuit is interrupted.

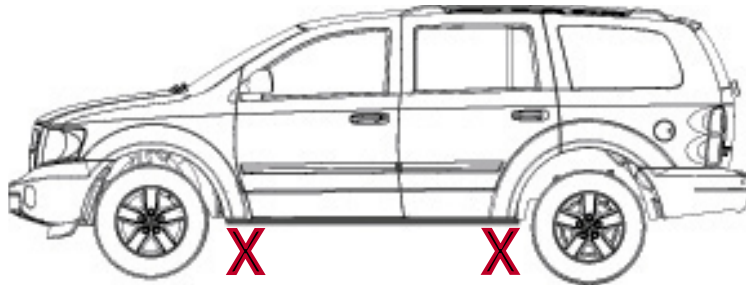
Even after disabling the high voltage system, the high voltage battery still contains dangerous high voltage. Never disassemble or remove the cover from a high voltage battery pack.

– **Stabilizing the Vehicle** – Similar to many conventional transmissions, the transmissions used in Aspen and Durango hybrid vehicles use a mechanical park pawl to lock the output shaft of the transmission when the shift selector is placed in PARK. This mechanism relies on an undamaged link between the driver’s shift selector and the transmission shift lever.



The park pawl will normally engage when the PARK position is selected and the vehicle speed is less than about 3 mph (4.8 km/h). After the park pawl is engaged, vehicle travel due to rolling is limited to no more than 6 in (150 mm). Chock the wheels to prevent any undesired vehicle travel.

Cribbing, if used, should be placed below the frame just under the A-pillar and C-pillar. Do not place cribbing under the high voltage cables, fuel system, or exhaust system.



– **High Voltage Battery Electrolyte** – The high voltage battery contains a strong alkaline electrolyte mainly composed of potassium hydroxide and water. Contact with this substance may cause burns. Thus, avoid contact to skin and eyes and do not ingest the material. Use appropriate protective equipment such as safety gloves and goggles in combination with protective clothing before approaching a high voltage battery that is broken open.

Neutralize electrolyte spills immediately. Ensure that the high voltage circuit has been disabled before neutralizing and cleaning up an electrolyte spill. Vinegar can be used to neutralize NiMH electrolyte spills.

In case of contact with the alkaline solution or particles from the high voltage battery, flush affected areas with plenty of water for at least 30 minutes. In case of eye contact, flush eye(s) with plenty of water for at least 30 minutes. Get medical treatment as soon as possible.

– **Situations Involving Fires** – In case of fire, a smothering agent such as dry sand may be used. Water can also be used to control a high voltage battery pack fire. However, be sure to use enough water to smother the fire. A Class C, or Type ABC multi-purpose fire extinguisher may also be used.

In case the high voltage battery is physically damaged during an accident, and the battery modules are penetrated, hydrogen may be released. This hydrogen gas may form explosive mixtures with the air in the vehicle. Open all doors or windows to vent the hydrogen to the outside. Keep open flames, sparks and sources of ignition away from the vehicle.

In case the vehicle is burning, the fire might incinerate the high voltage battery modules. The excessive heat may cause the modules to vent hydrogen, which might burn directly or form an explosive mixture in the vehicle interior.

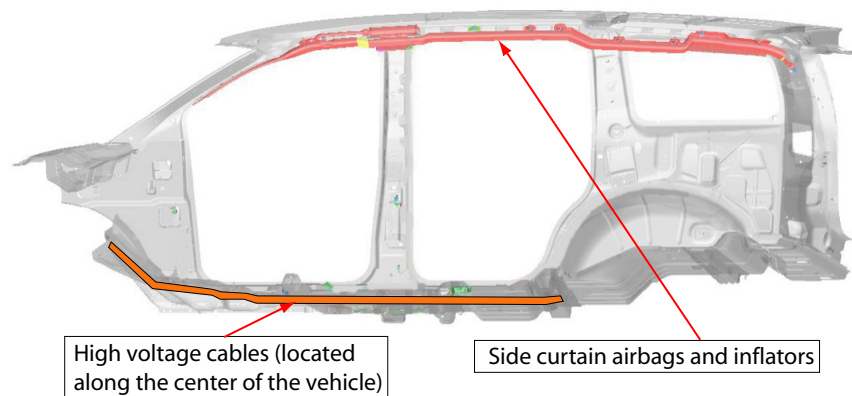
– **Submerged Vehicles** – In situations where a submerged vehicle is at a full standstill the only sources of high voltage in the vehicle are the high voltage battery and the high voltage capacitors in the high voltage components.

In situations where the vehicle is fully or partially submerged, or the high voltage battery is flooded with water, electrolysis may take place. In fresh water, mainly hydrogen and oxygen are produced, which may lead to an explosive mixture in the interior of the vehicle. In salt water, hydrogen and chlorine are produced, which may also lead to an explosive mixture.

Because chlorine can adversely affect the respiratory system and the eyes, special protective equipment, including a self-contained breathing apparatus, may be necessary.

– **Extrication** – When conducting extrication:

- visually inspect for high voltage warning labels or bright orange parts.
- avoid contact with high voltage cables. Do not cut or open any high voltage cables or parts.
- be aware of possible airbag and other restraints locations. Side curtain airbags and inflators are located in the roof rails. Avoid cutting near undeployed airbag and safety belt sensors/inflators.



Airbags may inflate a second time even after they have deployed. Even if an airbag appears to be fully deployed, it may be capable of a second deployment. Some airbags have two igniters. Depending on the severity of the collision, these may be designed to deploy simultaneously, milliseconds apart, or only one may deploy. Ensure that low voltage (12-volt system) is disconnected prior to performing extrication. Please reference "Disabling the System" for the proper procedure to disconnect low voltage (12-volt system).

– **No Towing Recommended** – Because there is no selectable “Neutral” position in the transfer case, towing the Aspen or Durango hybrid is not recommended. Disabled Aspen or Durango hybrid vehicles should be transported by flat bed only.

When winching a disabled Aspen or Durango hybrid on to a flat bed, be aware of high voltage component locations. Attach the winch to the frame of the vehicle in a manner that will avoid contact with any high voltage parts or cables.