

Chapter 20

NAME _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. What is the meaning of the various colors of wiring?

2. Why does a vehicle submerged in water NOT represent a shock risk to first responders?

3. What steps should be followed when dealing with an incident involving a hybrid electric vehicle?

4. Why should a first responder “double cut” the 12-volt power cable?

5. What is the difference between an offensive and defensive first responder attack?

Answer Key

Testname: EV1SHORT20

- Black—12-volt cable. Not a shock hazard but can power airbags and pretensioners.
 - Red—12 volts
 - Blue—42 volts. Not a shock hazard but could maintain an arc if the circuit is opened. Blue is used for some electric power steering systems and mild hybrid vehicles, such as a belt-alternator starter (BAS) system.
 - Yellow—42 volts. Not a shock hazard but could maintain an arc if the circuit is opened (cut). Usually used for electric power steering.
 - Orange—Identifies a circuit that has 60 volts or higher. Shock hazard could cause severe burns or death

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- If a hybrid electric vehicle is submerged, the system main (high-voltage) relays cut off high voltage to all systems except the batteries themselves. The relays are opened by the circuit that monitors any electrical connection between the high-voltage system and the body (ground).

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- STEP 1 Identify the vehicle as soon as possible to determine if it is an electric or a hybrid electric vehicle.

STEP 2 Disable the vehicle by performing the following:

- Remove the ignition key or fob.
- Move the key or fob at least 15 feet away from the vehicle in case it is a smart key that can keep the vehicle powered up if near the vehicle.
- Verify that the "READY" light is off (if equipped).
- Place the transmission in PARK or Neutral.
- Approach the vehicle from the side; avoid walking in the front or rear of the vehicle if possible.

STEP 3 Stabilize the vehicle. Chock the wheels and set the parking brake if possible.

STEP 4 Access the occupants. Use normal removal procedures as required such as:

- Pull the steering column forward and away from the occupant.
- Cut the front pillar.
- Remove (peel) the roof.
- Door removal/displacement. Doors can be removed by conventional rescue devices such as hand, electric, and hydraulic tools.
- Dashboard displacement.
- Rescue lift airbags. Responders should not place cribbing or rescue lift airbags under the high-voltage power cables, exhaust system, or fuel system.

STEP 5 Turn the ignition off. Turning the ignition off and moving the key or key fob away from the vehicle will disable the high-voltage system.

STEP 6 Disconnect or cut the 12-volt battery cables.

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- The double cut method is preferred using insulated cutters. A double cut method means that after making the first cut on a battery cable, then move about 2 inches and make another cut so cables will not make contact if jarred. When the 12 volts are cut, the high-voltage system is depowered and no high voltage should be in any of the orange cables except at the battery pack itself.

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- OFFENSIVE FIRE ATTACK -Flooding the high-voltage battery pack, located in the cargo area, with large amounts of water at a safe distance will effectively control the HV battery pack fire by cooling the adjacent NiMH battery modules to a point below their ignition temperature.

DEFENSIVE FIRE ATTACK -If the decision has been made to fight the fire using a defensive attack, the fire attack crew should pull back a safe distance and allow the NiMH battery modules to burn out. During this defensive operation, fire crews may utilize a water stream or fog pattern to protect exposures or to control the path of smoke.

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