General Information

The electric powertrain system uses high voltage circuits and an organic solution (lithium-ion) contained battery module. Improper handling may cause serious injury such as electrocution. When working on or around the electric powertrain system, pay attention to the following precautions.

Preparation items

- Protective items (insulated gloves or rubber gloves, protective goggles, protective shoes)
- ABC fire extinguisher (available for both oil fires and electric fires)
- Shop towels (for wiping off the electrolyte)
- Insulating tape

Precautions when Working on High Voltage Areas

⚠CAUTION
Be careful not to let the electrolyte get into your eyes or contact your skin. Doing so may cause loss of your eyesight or skin damage. If electrolyte gets into your eyes or comes into contact with your skin, immediately flush with a large amount of water and seek medical attention.

- Wear insulated gloves or rubber gloves, protective goggles, and protective shoes whenever you inspect or service the electric powertrain system.
- Always inspect protective equipment for holes, tears, or other damage.
- Keep uniform pockets free of items, especially tools and metallic objects. Items may fall out and fall on to exposed high-voltage parts, creating a hazard.
- As a safety warning, attach a sign saying, WORKING ON HIGH-VOLTAGE PARTS. DO NOT TOUCH! to the steering wheel.
- Be sure to shut off the electrical circuits and isolate the electric powertrain system and related parts before servicing the electric powertrain system. (Refer to "Turning Off and ON Power to the High Voltage Circuit" below)
- The high voltage cables and their covers are identified by orange coloring. The caution labels are attached to high voltage and other related parts.
- When the procedure is marked with ⚠, always use insulated tools, and wrap the items with insulating tape.
- Do not touch bare wires that could carry a high-voltage. If you must touch them, put on insulated gloves, and measure the voltage between the body grounds. If the voltage is above the 12 volt battery voltage, insulate the part with insulating tape before performing an operation to prevent shorting the battery module.
- When insulating a high voltage area with insulating tape, be sure to cover it thoroughly.
- After disconnecting the high voltage terminals, busbars, etc., insulate the parts with insulating tape.
- Check around the battery module for electrolyte leaks and adhesion before starting your work. If you encounter a leak, you must wear insulated protective equipment (protective eyeglasses, insulated gloves, insulated shoes, and insulating tools) as it may cause electrical shock.
- Organic electrolyte is poisonous. If ingested, get medical attention immediately.
- Keep sparks and flames away from the battery module, leaking electrolyte from the battery is flammable. Always work in a well ventilated area.
- Strong impact (i.e., dropping the high voltage battery, collision damage) may cause electrolyte leaks, internal short circuits and heat increase resulting in fire. Avoid impact to the high voltage battery.
- Do not disassemble the battery module when doing a repair or replacement procedure.
- Seal the replaced battery module and any shop towels or rags used to wipe the electrolyte in a P.P. (Polypropylene) bag, and keep it in a well-ventilated area away from sparks and flames. Make sure to dispose these items according to local regulations.
- Inspect all high voltage related parts near the battery module for electrolyte. If you find electrolyte, you must replace the part(s).

Updating Control Units

NOTE:

- When updating control units, use the most current version of the HDS software and interface device. Check any official service information website for more information about updating control units.
- High temperature in the motor compartment might cause the motor control module to become too hot to run the update. If the motor has been running before this procedure, open the hood and cool the motor compartment.

The following control units can be updated.

- Motor control module (built into the PCU)
- Battery condition monitor module
- Battery Charge Control Module
- Battery Charger

ECU Reset

1. Connect the HDS.

2. Select ELECTRIC POWERTRAIN system, and then select ECU RESET.

NOTE: Consider the need to do ECU RESET carefully because all DTC data, freeze data, and learned values stored in each control unit of the electric powertrain system, which are MOTOR CONTROL MODULE, BATTERY CHARGE CONTROL MODULE, and BATTERY CONDITION MONITOR MODULE, are erased by doing ECU RESET.

Read, Write, and Clear Procedure of Battery Condition Monitor Module Data

1. Connect the HDS.

2. Select ELECTRIC POWERTRAIN system.

3. Select HV BATTERY/BATTERY ECU REPLACEMENT.

4. Select HV BATTERY ECU REPLACEMENT or HV BATTERY REPLACEMENT according to the following table.

Component	Before Replacement	After Replacement
Battery Condition Monitor Module A	HV Battery ECU Replacement >> READ DATA	HV Battery ECU Replacement >> WRITE DATA
Battery Condition Monitor Module B		
Battery Module Assembly or IPU assembly	—	HV Battery Replacement >> REPLACE THE HV BATTERY

NOTE: When replacing the battery condition monitor module, read the battery condition monitor module data from the original battery condition monitor module so the battery history can be recorded to the HDS. This data is used when writing the battery condition monitor module data after replacing the battery condition monitor module.

IPU Inspection During Regular Maintenance

When prompted by the Maintenance Minder, you must inspect the front, middle and rear undercovers protecting the IPU. If any of the covers are visually damaged, remove the undercover and inspect the IPU case bottom of the IPU. If damages are found, the IPU must be replaced. However, if there is only paint damage to the bottom of the IPU case, apply a rust inhibitor such as Rust-Oleum Automotive Professional Undercoating, 248656. Follow the manufacturer's instructions on recommended preparation and application.

IPU Inspection After a Collision

Thoroughly inspect the IPU for exterior damages. If damages are found, the IPU must be replaced. However, if there is only paint damage to the bottom of the IPU case, apply a rust inhibitor such as Rust-Oleum Automotive Professional Undercoating, 248656. Follow the manufacturer's instructions on recommended preparation and application. In addition, if the vehicle was involved in an collision severe enough where the SRS airbags deployed and/or has structural damages, you must inspect the IPU for any leaks. Refer to the procedure, IPU leak test.

Collision Shut-off History Clear Command

When the battery condition monitor module A receives a collision detection signal (CDS) from the SRS unit, the battery condition monitor module A updates the collision shutoff history, and stores it in the nonvolatile memory located inside the module. The battery condition monitor module A stops supplying power to the high-voltage circuits disrupting the control signal to be sent to the high-voltage contactor inside the battery module the next time the system is being turned on. To resume power supply to the high-voltage circuits, the collision shutoff history needs to be cleared. Do the following procedures to clear the collision shutoff history.

1. Inspect the IPU for damages and leaks as described in the above section, IPU Inspection After a Collision. If no damages or leaks are found, go to step 2.

2. Check the battery high voltage wires (orange coated) for damage. If any damage is found, replace the damaged wire harness or component, then go to step 3.

3. Connect the HDS.

4. Make sure the HDS communicates with the vehicle and ELECTRIC POWERTRAIN system. If it doesn't, go to the DLC circuit troubleshooting.

5. Select ELECTRIC POWERTRAIN system.

6. Clear the DTC.

Other Precautions

- The expected life span of the high voltage battery can be affected if the vehicle is not used for a long time. To reduce this risk, perform the charging procedure within at least 12 months.
- High temperature may damage the battery module. When drying paint in a heated paint booth, make sure the temperature does not exceed 149 °F (65 °C).
- If the way how the hose should be installed is not shown in the procedure, install it in the same condition as before removal, and make sure that the hose clamps do not interfere with surrounding parts.

Turning Off and On Power to the High Voltage Circuit

The following procedure should be done before you work on or near any energized high voltage components. Follow the procedure exactly. Otherwise, you may be injured or may damage equipment.

⚠WARNING

- The power cables carry high voltage when the electric powertrain system is energized. To avoid serious injury from electrical shock, do not turn on the system with the power cables disconnected.
- Wear insulated gloves and use insulated tools to protect you from electrical shock. When removing or installing high voltage items, always use them. Wrap the high voltage items with insulating tape after removing. Please be careful when you see ⚠ on the illustration.

NOTE:

- How to read the torque specifications Symbols.
- Secure the service plug in a safe location to prevent other personnel from installing the service plug while the vehicle is being repaired or serviced.
- If the service plug is damaged, replace it.

Turning Off the Service Plug

1. Connect the HDS.

2. Select ELECTRIC POWERTRAIN system.

3. Check the DTC and note it if any DTCs are stored.

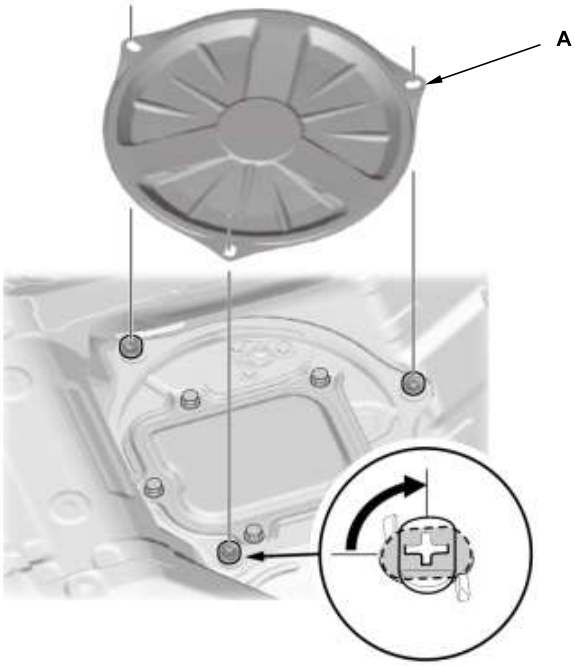
4. Turn the vehicle to the OFF (LOCK) mode, and keep the remote away from the vehicle.

5. Do the 12 volt battery negative terminal disconnection procedure.

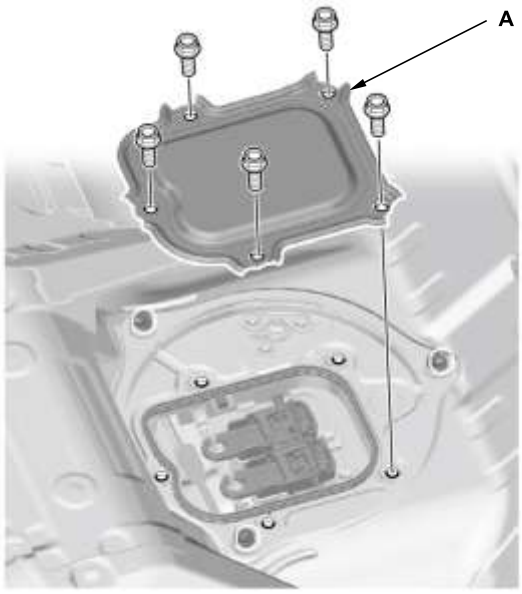
6. Disconnect the connector (telematics control unit).

7. Remove the rear seat cushion.

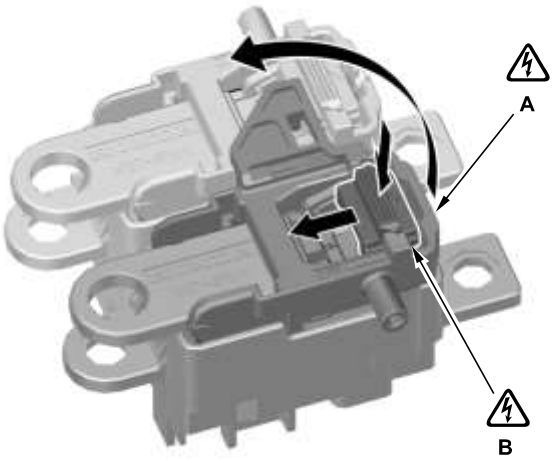
8. Remove the service plug hole cap (A).



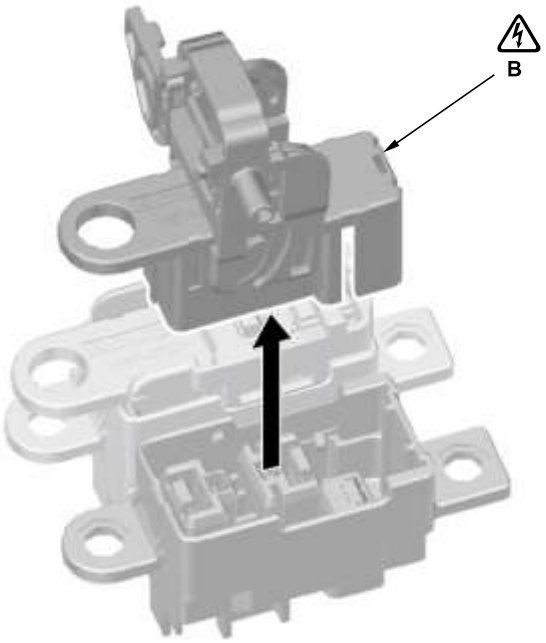
9. Remove the service plug hole lid (A).



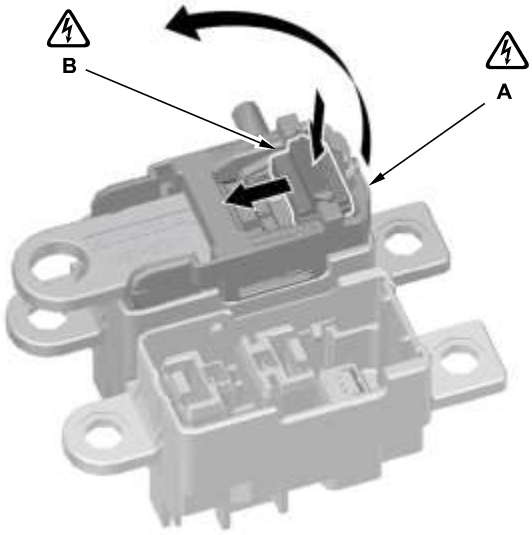
10. Raise the lever (A) while pushing and sliding the tab (B) in the direction of the arrow.



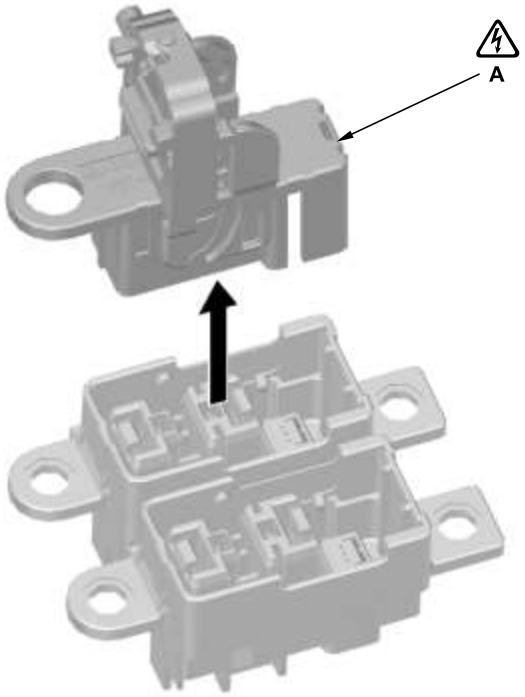
11. Remove the service plug B.



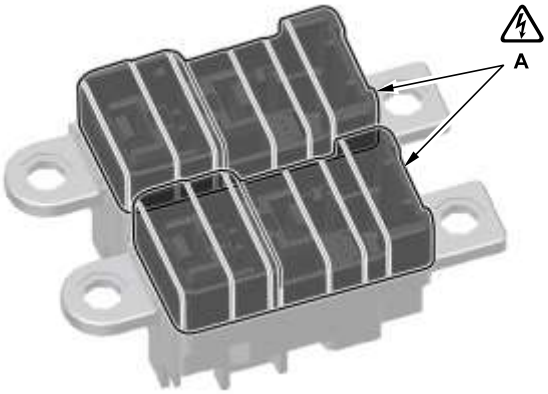
12. Raise the lever (A) while pushing and sliding the tab (B) in the direction of the arrow



13. Remove the service plug A.



14. Wrap the service plug base (A) with insulating tape.



15. Do the 12 volt battery negative terminal reconnection procedure.

16. Turn the vehicle to the ON mode.

17. Select ELECTRIC POWERTRAIN system.

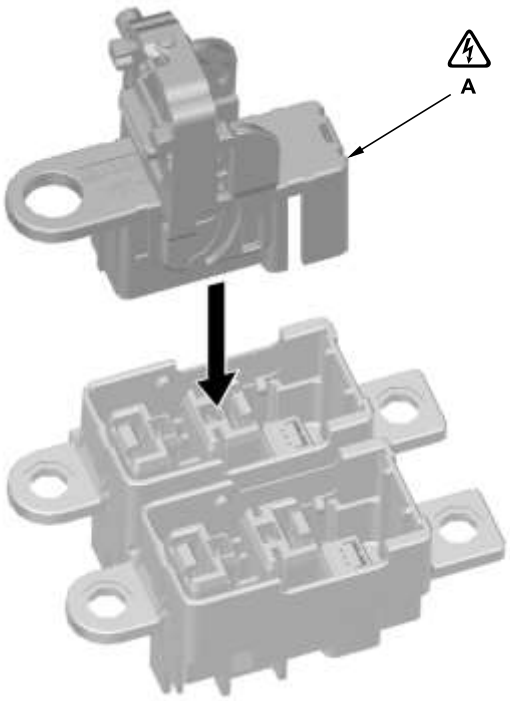
18. Select DATA LIST and check that V1 VOLTAGE (VV1INV) is 30 V or less.

    NOTE: If V1 VOLTAGE (VV1INV) higher than 30V, wait until it becomes 30V or less.

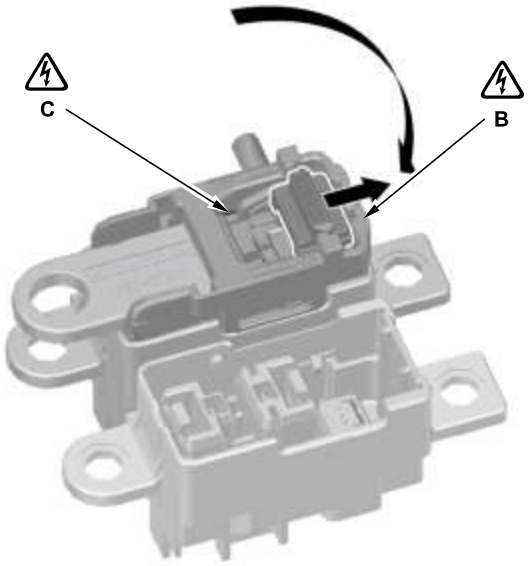
19. Do the 12 volt battery negative terminal disconnection procedure.

Turning On the Service Plug

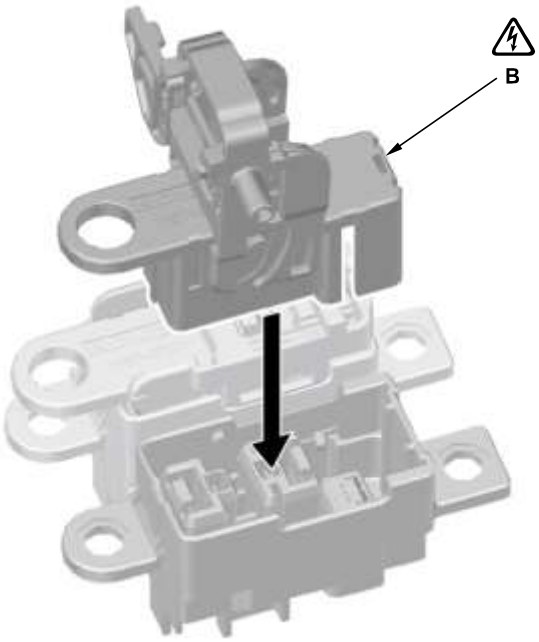
1. Insert the service plug A as shown.



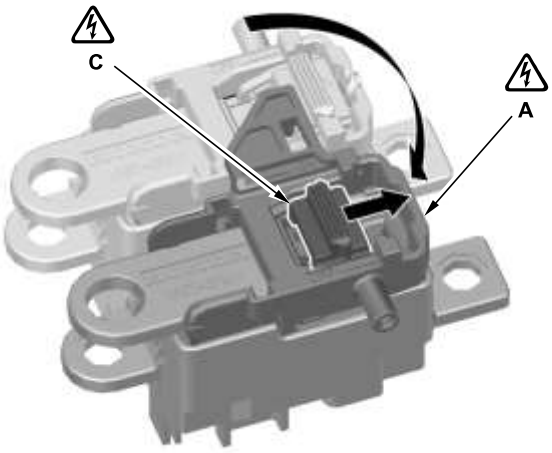
2. Lower the lever (B), and slide the tab (C) in the direction of the arrow while holding the lever, then lock the service plug A.



3. Insert the service plug B as shown.

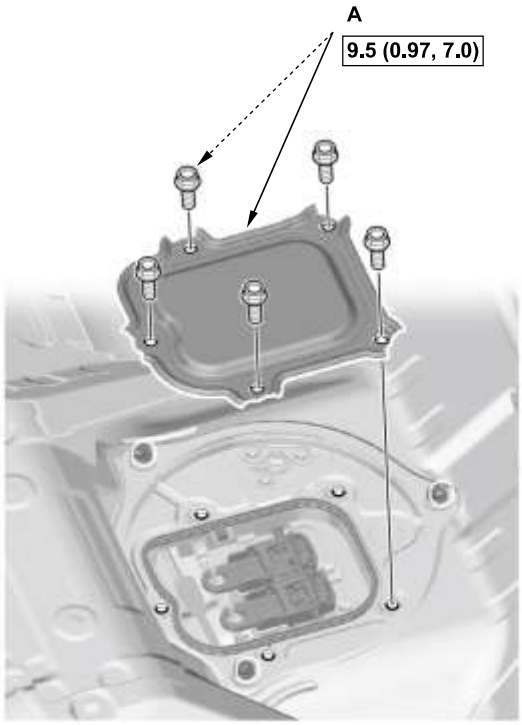


4. Lower the lever (A), and slide the tab (C) in the direction of the arrow while holding the lever, then lock the service plug B.

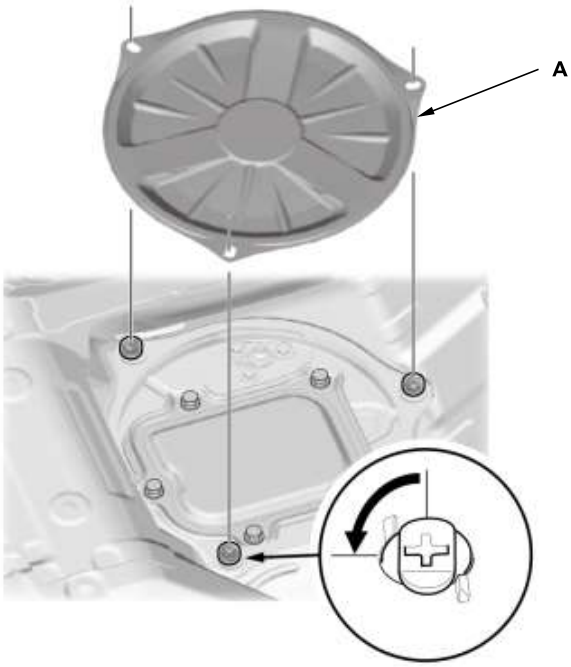


5. Install the service plug hole lid (A).

   NOTE:
   - Make sure that any rubber seal is seated correctly.
   - Make sure that there are no contaminants on the rubber seal.
   - Tighten the bolts for the lid to the specified torque.



6. Install the service plug hole cap (A).



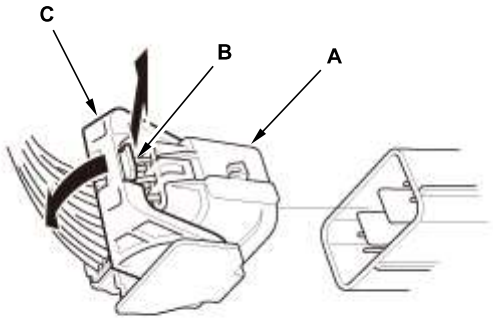
7. Install the rear seat cushion. (If necessary)

8. Connect the connector (telematics control unit).

9. Do the 12 volt battery negative terminal reconnection procedure.

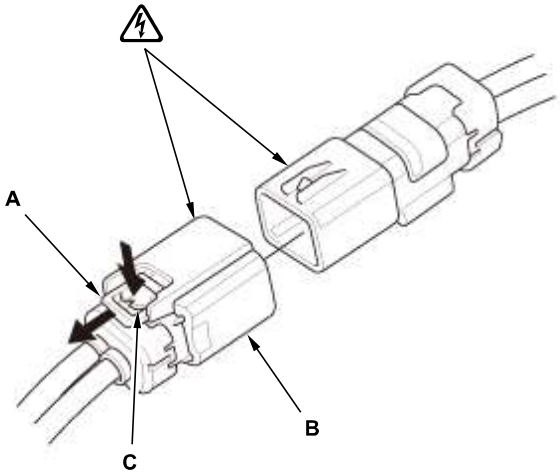
Disconnecting and Reconnecting the Connector
Lever-Locked Connector

1. Disconnect the connector (A) by releasing the lock (B) and sliding the lever (C) in the direction of the arrow.

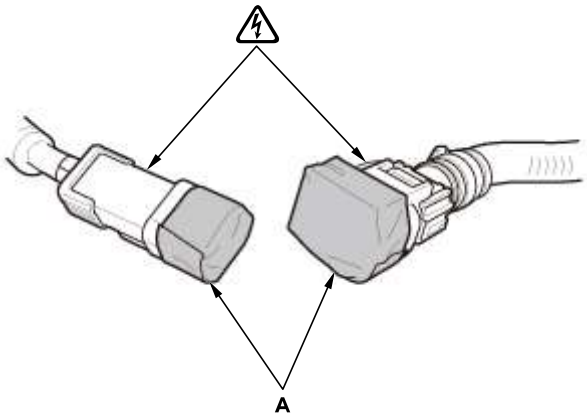


Slider-Locked Connector

1. Slide the slider (A) in the direction of the arrow, then disconnect the connector (B) while pushing the tab (C).



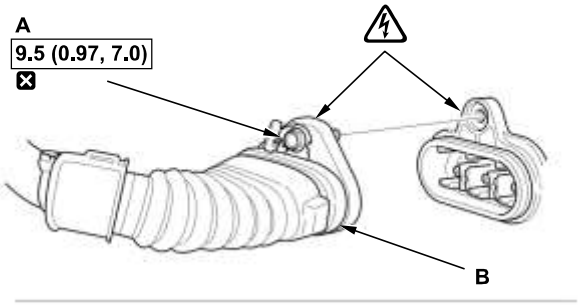
2. Wrap the connector with insulating tape (A).

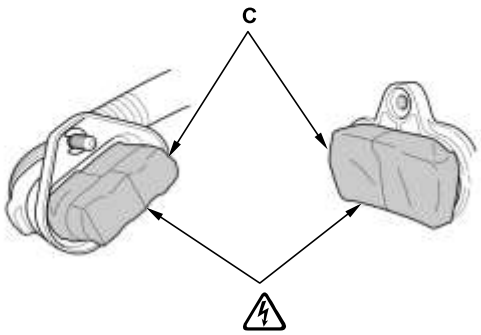


Power Cable Connector

1. Loosen the bolt (A), then disconnect the power cable connector (B).

   Wrap the connector with insulating tape (C).



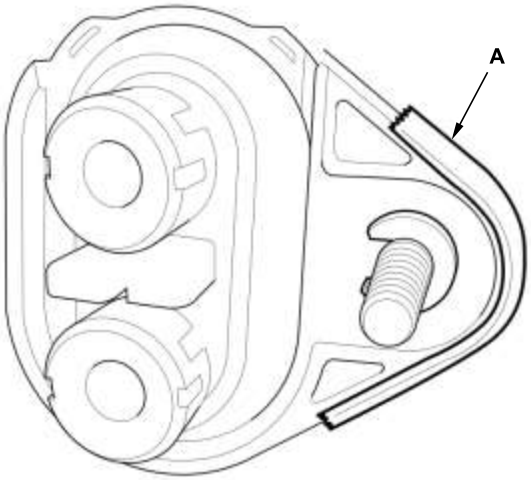


How to Replace the Cable Connector Bolt

Removal procedure

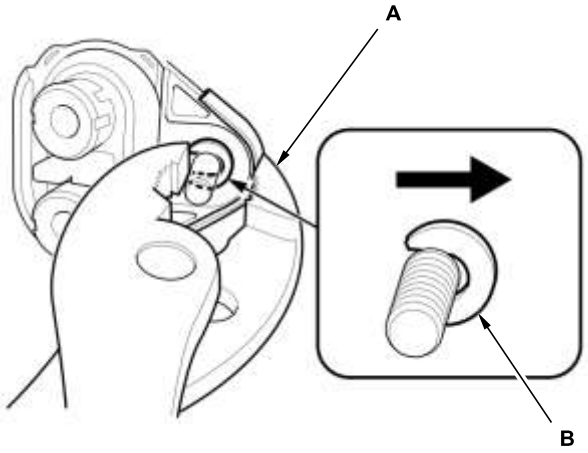
NOTE: Inspect the cable first. If there are any damages, scratches, or deterioration of the coating on the aluminum portion of the connector or plastic parts, replace the cable.

1. Apply protective tape to the connector (A) as shown.



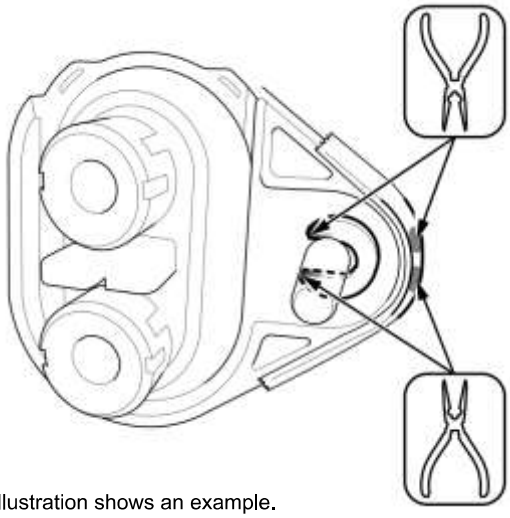
This illustration shows an example.

2. Using pliers (A), move the bolt clip (B) in the direction shown.



This illustration shows an example.

3. Put 2, long nose pliers onto the areas as shown and remove the bolt clip by gripping the pliers tightly. Then, remove the bolt.

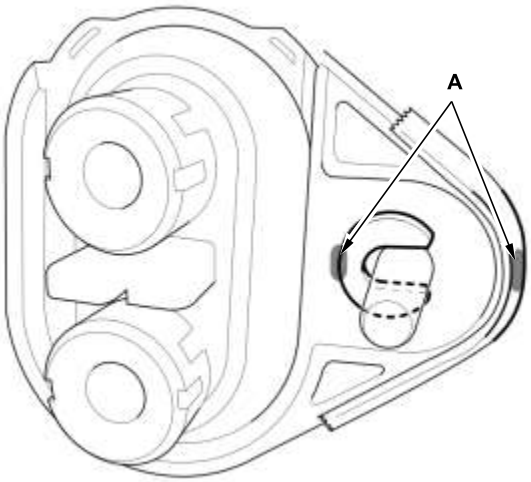


This illustration shows an example.

Installation procedure

1. Place the bolt clip as shown. Put pliers onto the areas (A) as shown and install the clip by gripping the pliers tightly.

   NOTE: Install the bolt clip into the bolt groove, not into the threads.



This illustration shows an example.