

VOLUNTARY CAMPAIGN BULLETIN

SUBJECT: Hybrid ECU Replacement

DATE: 01-26-2015

CAMPAIGN NO.: AA030

AFFECTED MODELS: Certain 2013-2015 Model Year COE Trucks equipped with a J05 engine

IMPORTANT:

Verify the vehicle requires the work to be performed by referencing the vehicle by VIN within the Hino Warranty System (DCS).

CONDITION:

Hybrid vehicles may sometimes produce a perceptible level of vibration when the engine is activated. The following procedure provides instruction for replacement of the HV ECU with an enhanced ECU which delays the initial combustion until after the engine reaches a certain speed.

SUBJECT VEHICLES:

Certain 2013-2015 Model Year COE (Cab Over Engine) trucks with J05 engine that were assembled at the Hamura, Japan plant.

NOTICE: Refer to the appropriate Vehicle Identification Number (VIN) list to determine vehicle eligibility.

BEFORE YOU BEGIN:

- Read and understand all instructions and procedures before you begin the work.
- Read and follow all **WARNINGS** and **NOTICES** set forth in this publication. These alerts help to avoid damage to components, serious personal injury, or both.
- Park the vehicle on a level and solid surface and apply the parking brake.
- Place the gear shift lever in "Neutral" or "N".
- Confirm the starter switch is in the off (LOCK) position, and the key is removed.
- Wear safety glasses to prevent eye injuries.
- Place wheel chocks in front of and behind all wheels.

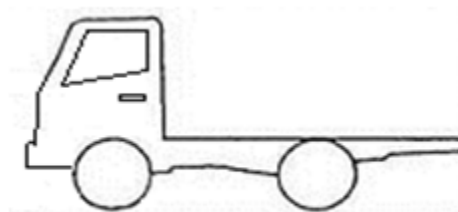
PARTS:

PART NUMBER	DESCRIPTION	QUANTITY
G910037051	CONTROLLER ASSY (2015MY)	1
G910037041	CONTROLLER ASSY (2014MY)	1
G910037032	CONTROLLER ASSY (2013MY)	1
G912137010	GASKET	1
7539735010	CLIP (ORANGE)	3
7549535010	CLIP (BLUE)	2

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VEHICLE PREPARATION:

1. Park the vehicle on level ground.



2. Confirm the engine is stopped, the ignition switch is in the off (LOCK) position, and the key is removed.



3. Apply the parking brake.



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4. Chock all of the wheels.



HYBRID VEHICLE SERVICE PRECAUTIONS

WARNING: NEVER allow any technician who has not received COE hybrid vehicle training from Hino Motor Sales USA, INC. to work on the Hino hybrid HV System. The hybrid HV system contains a high voltage battery and high voltage circuits. Improper handling of these components can result in serious injury or death due to electrical shock. Ensure that all work is performed correctly and follows closely the procedures set forth within this publication.

1. Technicians performing maintenance or repair on the HV system must have previously received training on the Hino COE Hybrid system.
2. Create a safety zone and surround the work area with orange cones to notify people in the area that high voltage service is being performed. During work on the HV system, prominently display warning signs on all sides of the vehicle which state "Caution High Voltage Work, Do Not Touch this Vehicle!" or words with similar language.



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3. ALWAYS REMOVE any loose hanging badges, jewelry, bracelets, belts, wrist watches, or any metal item prior to service of the HV system.

4. ALWAYS wear Hybrid specific, high voltage insulating gloves (Class 0 1000V), safety glasses, and insulated shoes when performing maintenance or repair of the HV system.



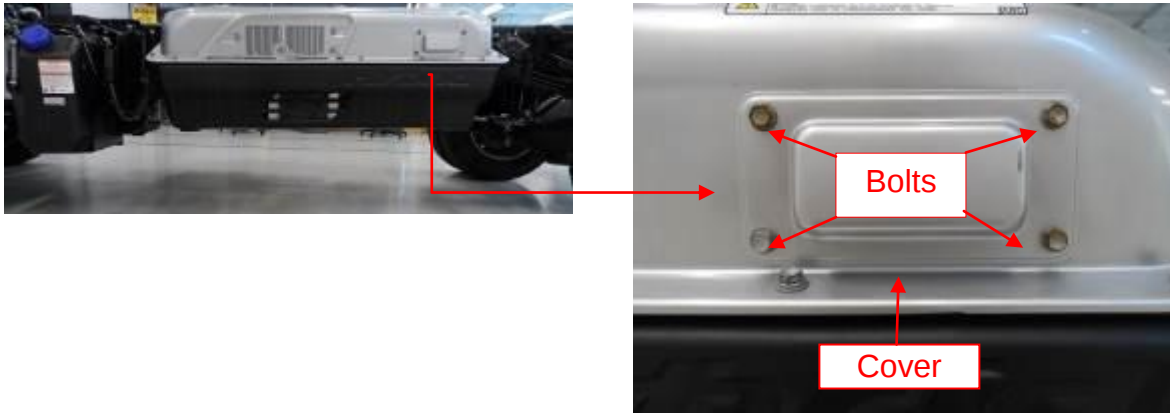
5. NEVER use insulating gloves that have expired. Prior to each use of the insulating gloves, confirm that the certification date, stamped on the gloves, is within 6 months of the current usage date. The gloves need to be recertified after every six months of use by an approved facility. Check the gloves for cracks, tears, or damage by rolling the gloves to check for air leaks. Do not use any leaking gloves.

CAUTION: The leather portion of the glove must be worn over the red rubber portion of the glove.



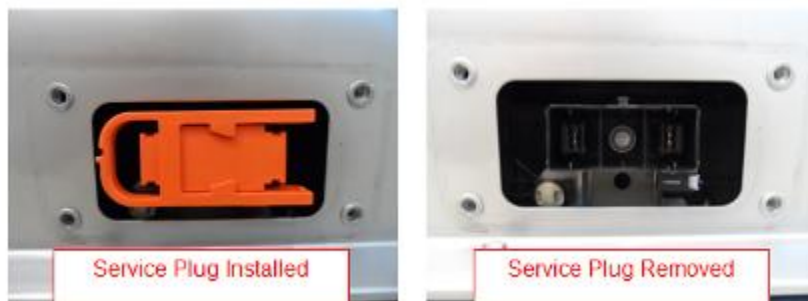
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6. Remove the 4 bolts and the service plug cover. Retain the bolts for reinstallation.



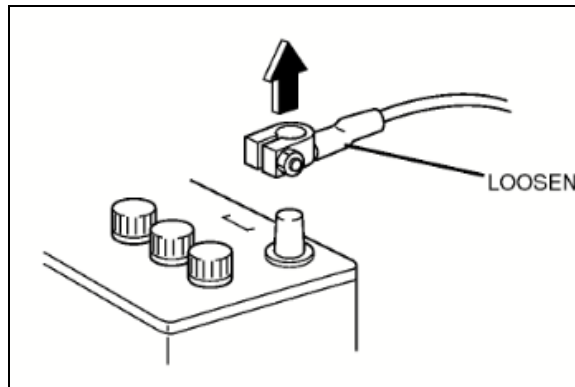
7. Confirm that the ignition switch is in the off (LOCK) position and the key is removed. The HV system service plug must be removed whenever the HV system is being serviced. See the illustration below. **ALWAYS** wait a minimum of seven (7) minutes after the service plug has been removed before beginning service on the HV system to allow the system time to power down fully. Place the service plug in a secure location, which is out of sight, to prevent someone from accidentally connecting it to the vehicle while service is being performed. For safety, reinstall the service plug cover and retaining bolts while the service plug is removed for service of the HV system.

CAUTION: NEVER turn the ignition switch to the “ON” position any time the service plug is removed. This can result in damage to the vehicle’s electrical system and create fault codes.



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8. Disconnect the negative terminal of the 12 volt battery.



9. While performing service, ensure that the work area is clear of all loose metal objects such as socket extensions, bolts, nuts, etc. which could cause HV circuits to short circuit if dropped. **ALWAYS** use the Hybrid Insulated Tool kit (No. HDT-195HVST) provided when working with HV circuits or terminals. **NEVER** use other tools.

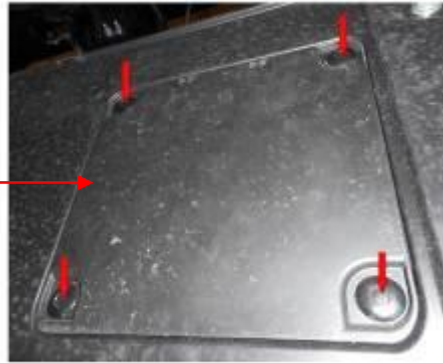


10. High voltage circuit harnesses are colored **ORANGE**. **NEVER** touch the connections of these high voltage circuits unless required to do so.

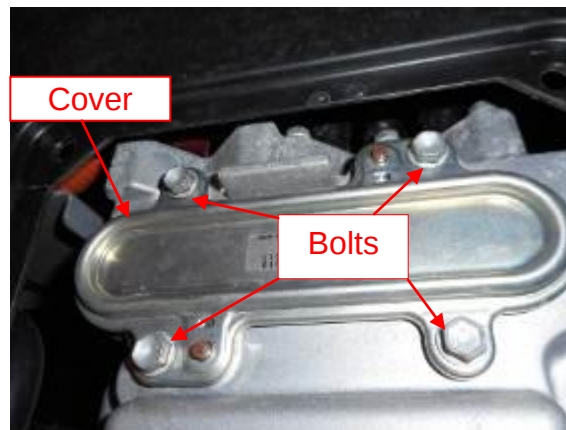


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11. Remove the 4 push pin retainers from underneath the Hybrid battery unit and retain for reinstallation.



12. Remove the 4 retaining bolts and the terminal inspection cover and retain for reinstallation.



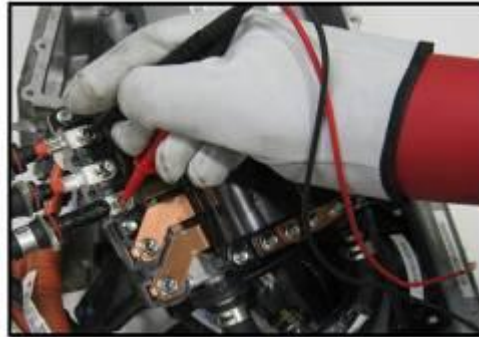
13. ALWAYS wear the hybrid-specific insulating gloves before touching any high voltage circuit, and verify that the voltage on that circuit is at 0V (zero voltage) using a Megger Meter. The meter is shown in the photograph to the right. The Megger Meter must be able to generate up to 1000V DC and deliver a resistance value in Mega ohms.



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14. Ground the Megger Meter to the inverter case. Verify that the meter operates properly on a 12V system prior to performing any high voltage checks. This will ensure proper operation of the meter.

NEVER use two hands to check voltage readings. Using only one hand (the one hand rule), check each terminal within the inverter opening for any voltage on the 5 terminals. The Megger Meter should indicate .01 volts or less on each terminal and circuit.



WARNING: NEVER proceed with this service campaign if any voltage is present on the HV circuits. Verify that all steps, above, have been performed as directed. If all steps were performed as directed, connect the HV service plug and the 12 volt battery. Use the Hino DXII to check for any DTC's (Diagnostic Trouble Codes) and follow the diagnostics in the Workshop Manual as needed.

REPAIR PROCEDURE

WARNING: Be certain that all steps of the Hybrid Vehicle Service Precautions procedure, specified above, have been completed prior to performing this Repair Procedure. Failure to properly perform the HV system service disconnect, and complete all steps of the procedure, can result in personal injury or death due to electrical shock.

NOTICE: Hino COE Hybrids are offered in both single cab and crew cab form. The photographs throughout this procedure will depict a single cab vehicle, but the removal and installation procedure for crew cab vehicles will be similar.

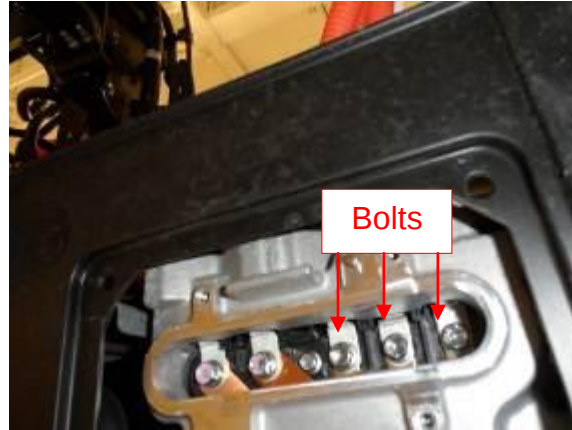
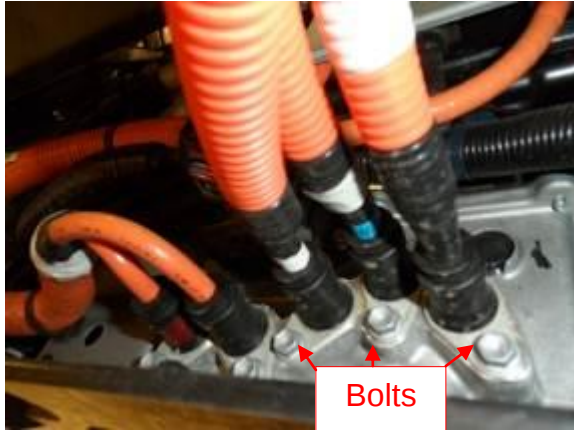
DISASSEMBLY PROCEDURE

1. Remove the 6 bolts retaining the U, V, and W cables to the inverter and retain for reinstallation. Remove the U, V, and W cables from the inverter.

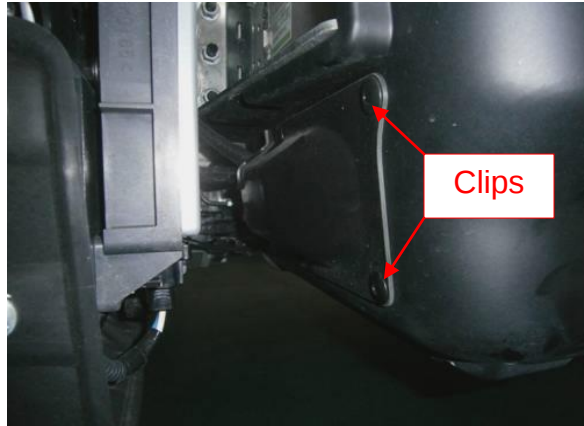
WARNING: ALWAYS use the insulated tools and insulated gloves during this step. Such use is required. Failure to wear high voltage safety gloves may result in personal injury or death due to electrical shock.

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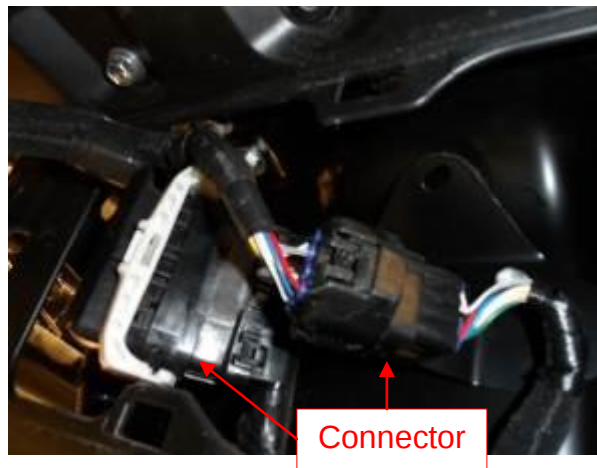
NOTICE: Only remove the U, V, and W cables. Do not remove the other 2 cables.



2. Remove the 2 clips that secure the connector cover to the side of the PCU (Power Control Unit) lower cover (towards the front of the vehicle). Retain the clips for reinstallation. Remove the cover.

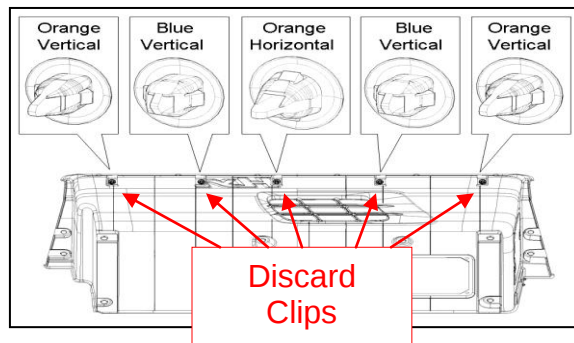
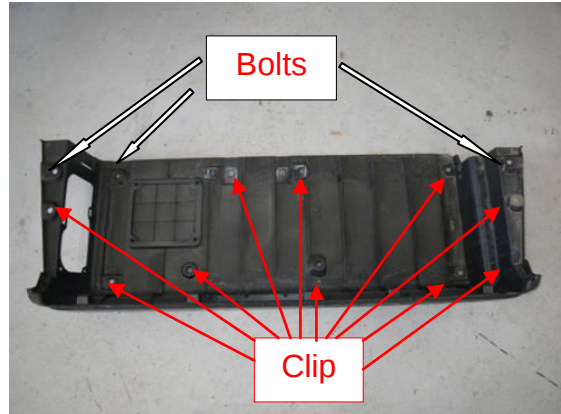
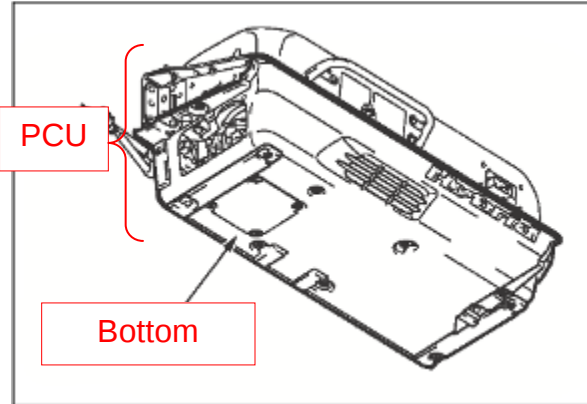


3. Disconnect the 2 wire connectors under the cover which was removed, above.



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4. Remove the 3 bolts and 10 clips which secure the bottom cover of the PCU. Retain the bolts and clips for reinstallation. Pull the bottom cover towards the outside of the vehicle to release the remaining clips from the outboard side of the PCU. Remove and discard the 3 orange and 2 blue clips which retain the cover to the outboard side of the PCU.

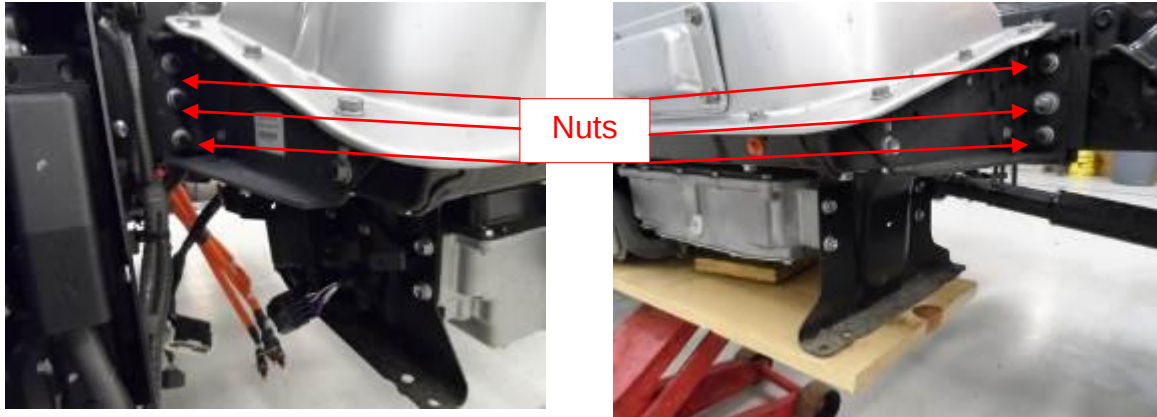


5. Support the PCU with a suitable jack and a piece of wood which will stabilize it. Once secure, remove the 6 nuts which secure the PCU to the frame and retain for reinstallation. Remove the PCU from the vehicle and have an assistant help set it on the ground.

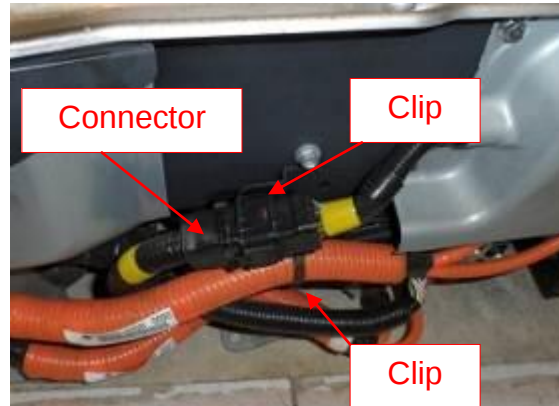
WARNING: NEVER attempt to lift or move the PCU without an assistant. The PCU is very heavy.



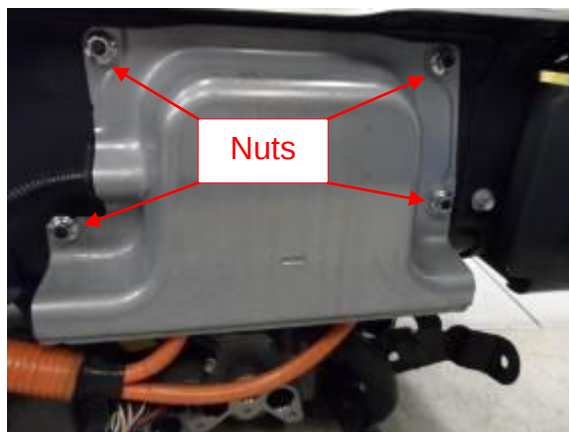
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6. Disconnect the wire connector on the inboard side of the PCU. Remove the connector clip from the PCU (black harness). Remove the wire harness clip from the PCU (orange harness).

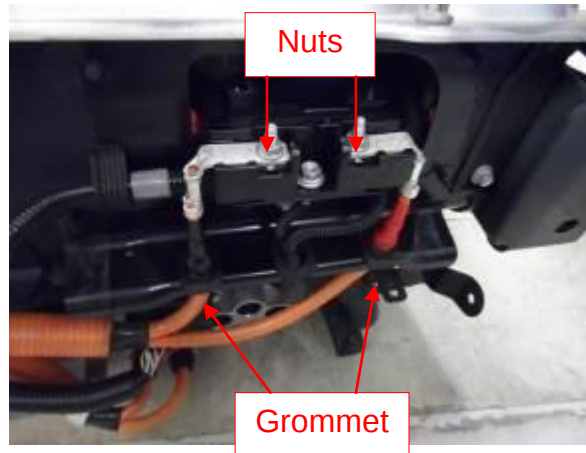


7. Remove the 4 nuts which secure the terminal cover to the PCU. Remove the terminal cover. Retain the nuts and cover for reinstallation.

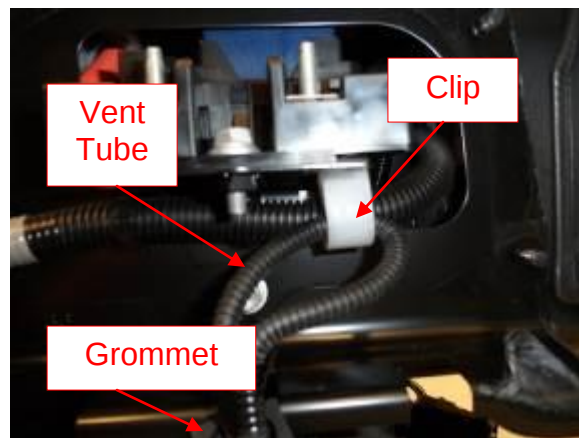


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8. Remove the 2 nuts securing the HV cables to the battery terminals and retain for reinstallation. Remove the cables and grommets from the PCU.



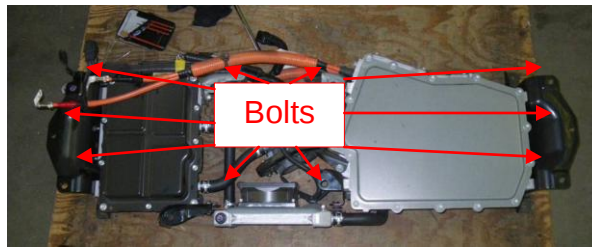
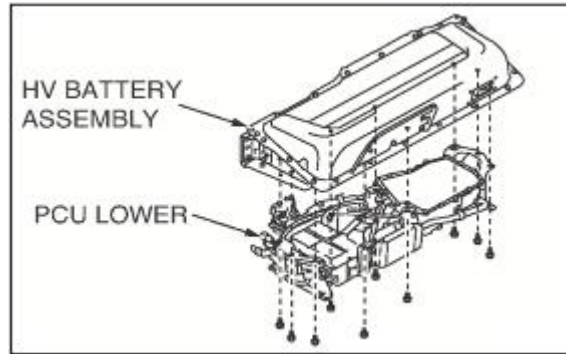
9. Remove the vent tube from the clip. Remove the vent tube and grommet from the PCU.



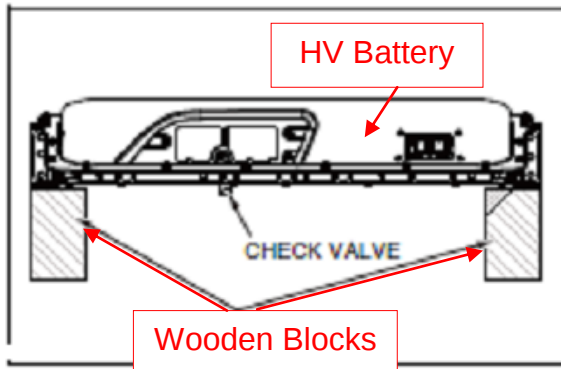
NOTICE: During this next step, do not remove the silver cover from the top of the HV battery assembly; removal is not required. The HV battery should not be tilted on a steep angle (or flipped over) to prevent the liquid gel inside of the battery cells from leaking out. Note that there is a check valve on the bottom of the battery which can be damaged by mishandling. Care must be taken not to damage the check valve when setting the battery down.

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10. This step requires separation of the HV battery assembly from the lower portion of the PCU. Prepare 2 blocks of wood to set the HV battery on after separation. From below the HV battery, Remove the 10 bolts which secure the lower portion of the PCU to the HV battery assembly and retain for reinstallation. These bolts have an integrated washer below the head of each bolt. With the help of an assistant, set the battery on the 2 previously prepared wooden blocks to ensure that the check valve, which sticks down below the battery, is not damaged when setting it down. See the illustration below. Retain the battery for reinstallation.



WARNING: ALWAYS use an assistant when lifting or moving the HV battery. The HV battery is very heavy.

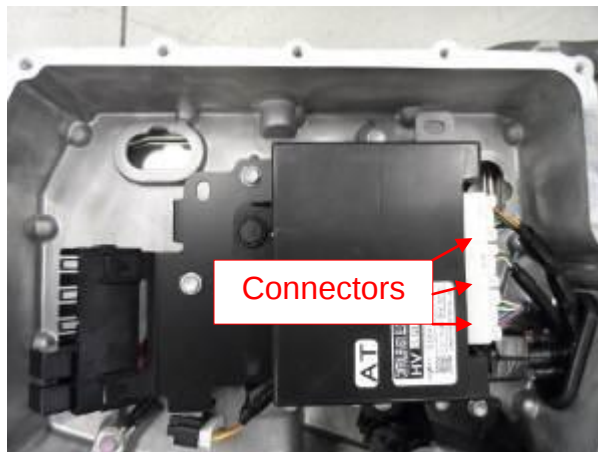


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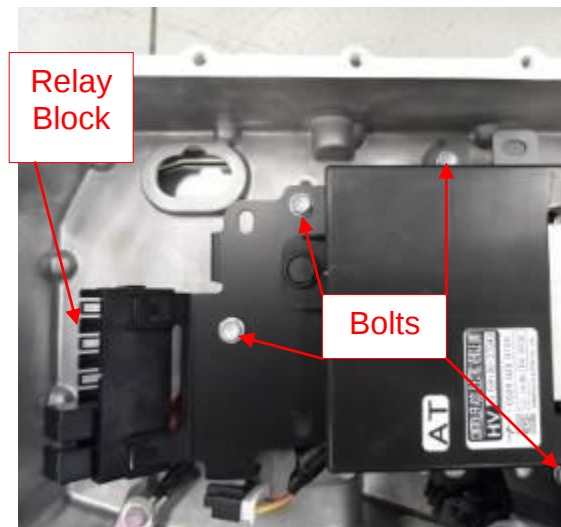
11. Remove the 15 bolts from the ECU box cover and retain for reinstallation. Remove the ECU box cover and discard the old ECU cover gasket.



12. Disconnect the 3 connectors to the HV ECU.



13. Disconnect the 6 harness clips from the bottom of the ECU bracket. Remove the relay block from the ECU bracket. Remove the 4 bolts from the ECU bracket and retain for reinstallation. Remove the HV ECU and bracket assembly from the ECU box and discard the ECU and bracket assembly.

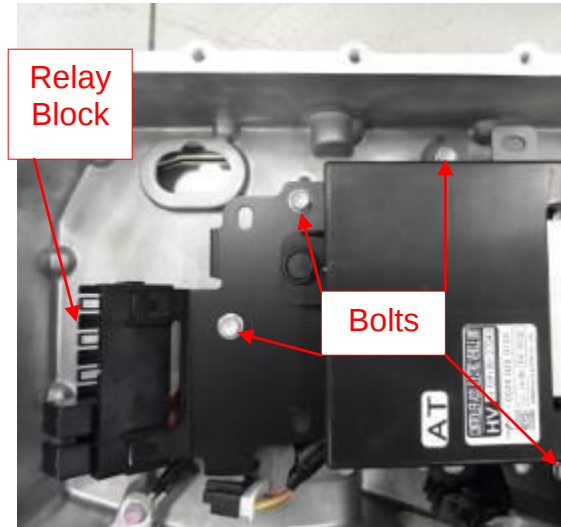


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ASSEMBLY PROCEDURE

1. Set the new HV ECU and bracket assembly into the ECU box. Connect the 6 harness clips to the bottom of the ECU bracket. Connect the relay block to the ECU bracket. Install the 4 bolts into the ECU bracket and tighten to the specified torque.

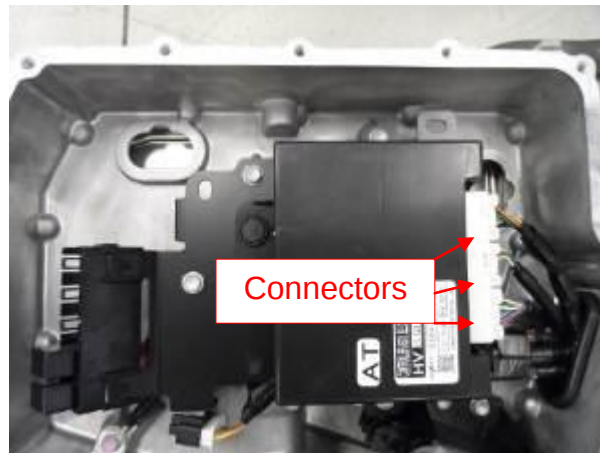
Specified Torque: 7 lb-ft (9 Nm)



ECU Part Numbers:

G910037051	CONTROLLER ASSY (2015MY)
G910037041	CONTROLLER ASSY (2014MY)
G910037032	CONTROLLER ASSY (2013MY and prior)

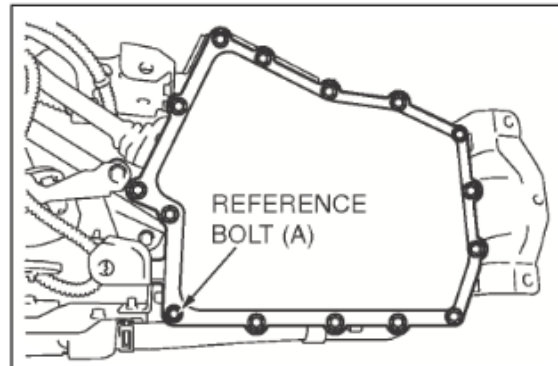
2. Connect the 3 connectors to the HV ECU.



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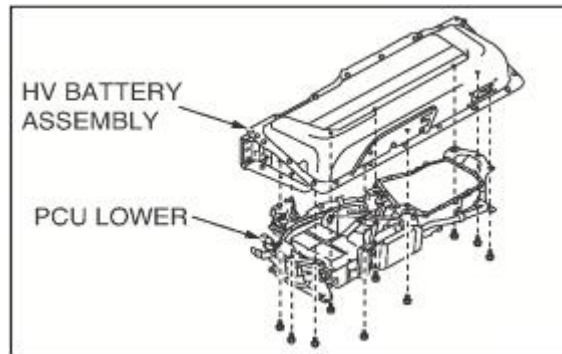
3. Install the ECU box cover using a new gasket. Install the 15 bolts into the ECU box cover. Tighten the bolts to the specified torque in a circular pattern beginning at reference bolt A.

Specified Torque: 7 lb-ft (9 Nm)

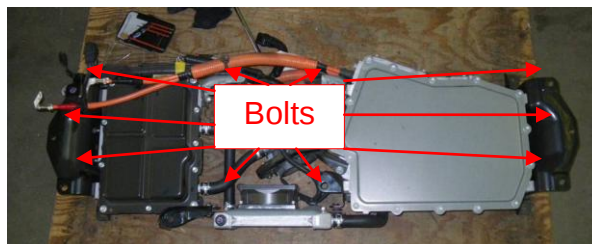


4. With the help of an assistant, set the HV battery assembly on top of the lower PCU. From the below the HV battery, install the 10 bolts which secure the lower portion of the PCU to the HV battery assembly. Tighten the bolts to the specified torque.

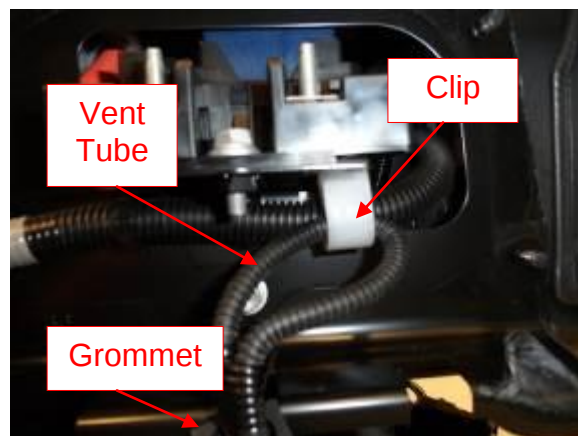
Specified Torque: 23 lb-ft (31 Nm)



WARNING: ALWAYS use an assistant when lifting or moving the HV battery. The HV battery is very heavy.



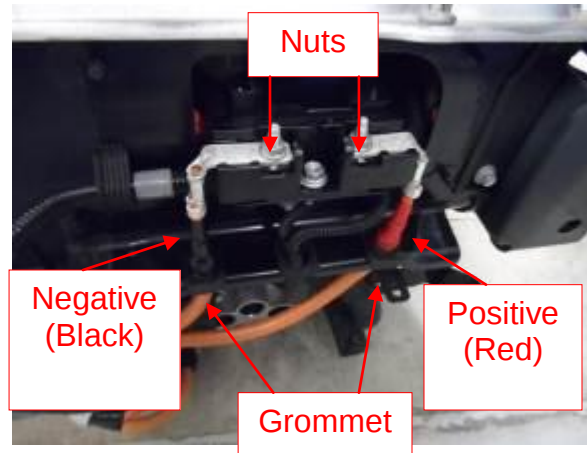
5. Place the vent tube inside of the clip. Install the grommet into the PCU bracket.



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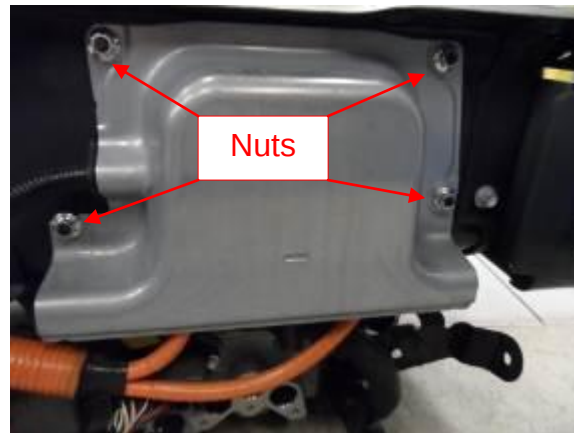
6. Note the proper placement of the positive and negative terminals in the photograph on the right. Install the 2 nuts which secure the HV cables to the battery terminals. Tighten the nuts to the specified torque. Install the cables and grommets into the PCU bracket.

Specified Torque: 7 lb-ft (9 Nm)

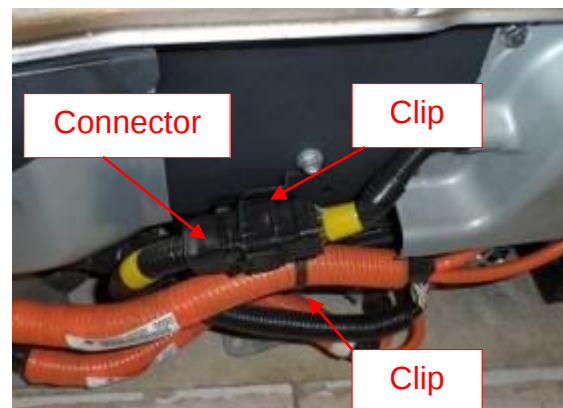


7. Install the terminal cover. Install the 4 nuts which retain the terminal cover to the PCU. Tighten the nuts to the specified torque.

Specified Torque: 7 lb-ft (9 Nm)



8. Connect the wire connector on the inboard side of the PCU. Install the connector clip into the PCU (black harness). Install the wire harness clip into the PCU (orange harness).

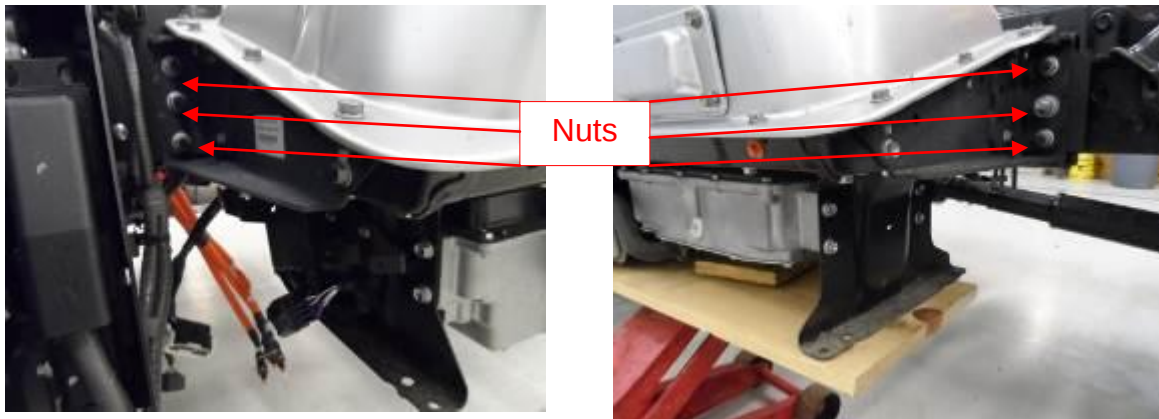


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9. With the help of an assistant, place the PCU onto a piece of wood supported by a suitable jack. Once secure, use the jack to lift the PCU up to the frame rail of the vehicle and align it to the 6 studs on the frame. Install the 6 nuts which retain the PCU to the frame. Tighten the nuts to the specified torque.

Specified Torque: 85 lb-ft (115 Nm)

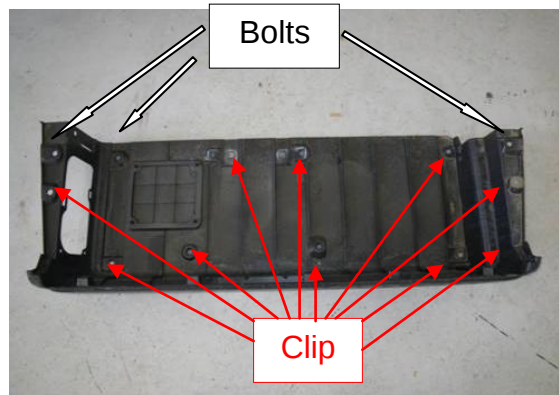
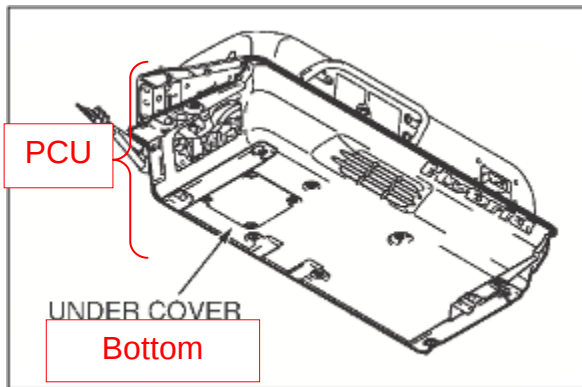
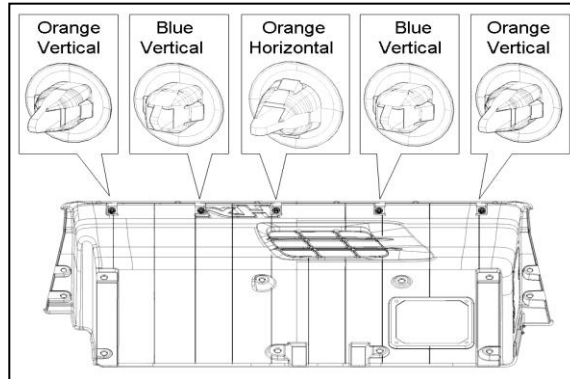
WARNING: ALWAYS use an assistant when lifting or moving the PCU. The PCU is very heavy.



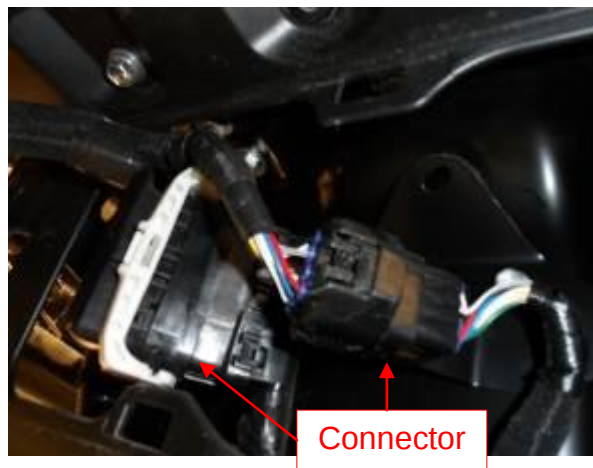
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10. Install the 3 orange clips (Part No. 7539735010) and the 2 blue clips (Part No. 7549535010) into the PCU bottom cover as shown in the illustration on the right. Clip the bottom cover into the outboard side of the PCU. Install the 10 clips and 3 bolts into the bottom cover which were previously removed. Tighten the bolts to the specified torque.

Specified Torque: 10 lb-ft (13 Nm)

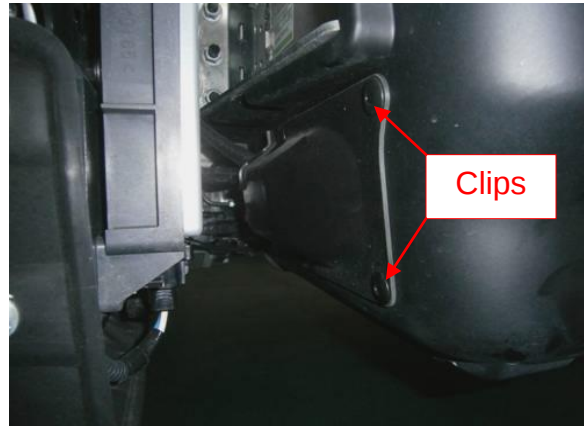


11. Connect the 2 wire connectors within the access hole on the PCU bottom cover which is towards the front of the vehicle.



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12. Install the connector cover at the front of the PCU bottom cover. Install the 2 clips into the cover which were previously removed.

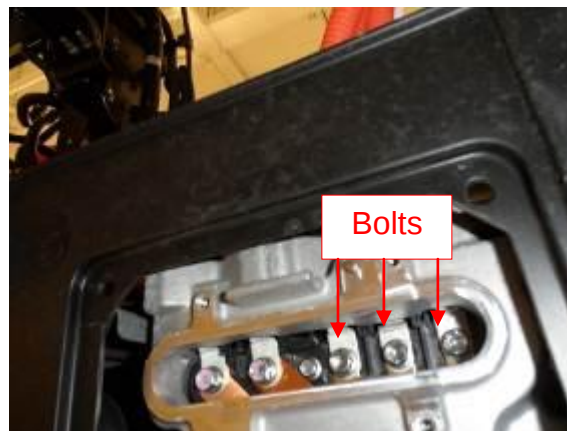
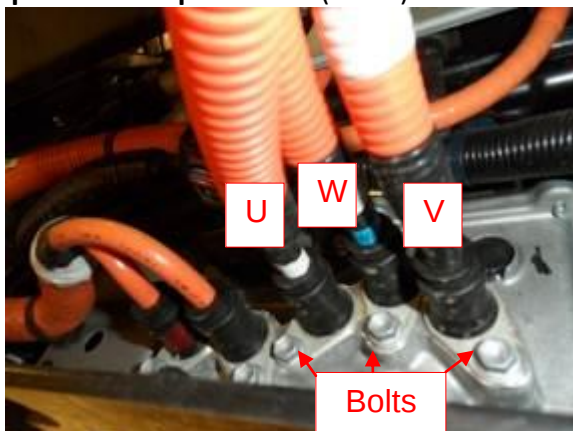


13. Install the U, W, and V cables into the inverter being certain to install them into the correct positions. Refer to the photograph, below, and the corresponding labels on each cable. Install the 6 bolts which retain the U, W, and V cables to the inverter and tighten them to the specified torque.

WARNING: ALWAYS use the insulated tools and insulated gloves during this step. Such use is required. Failure to wear high voltage safety gloves may result in personal injury or death due to electrical shock.

NOTICE: Tighten the cable side of each wire before tightening the terminal side.

Specified Torque: 7 lb-ft (9 Nm)

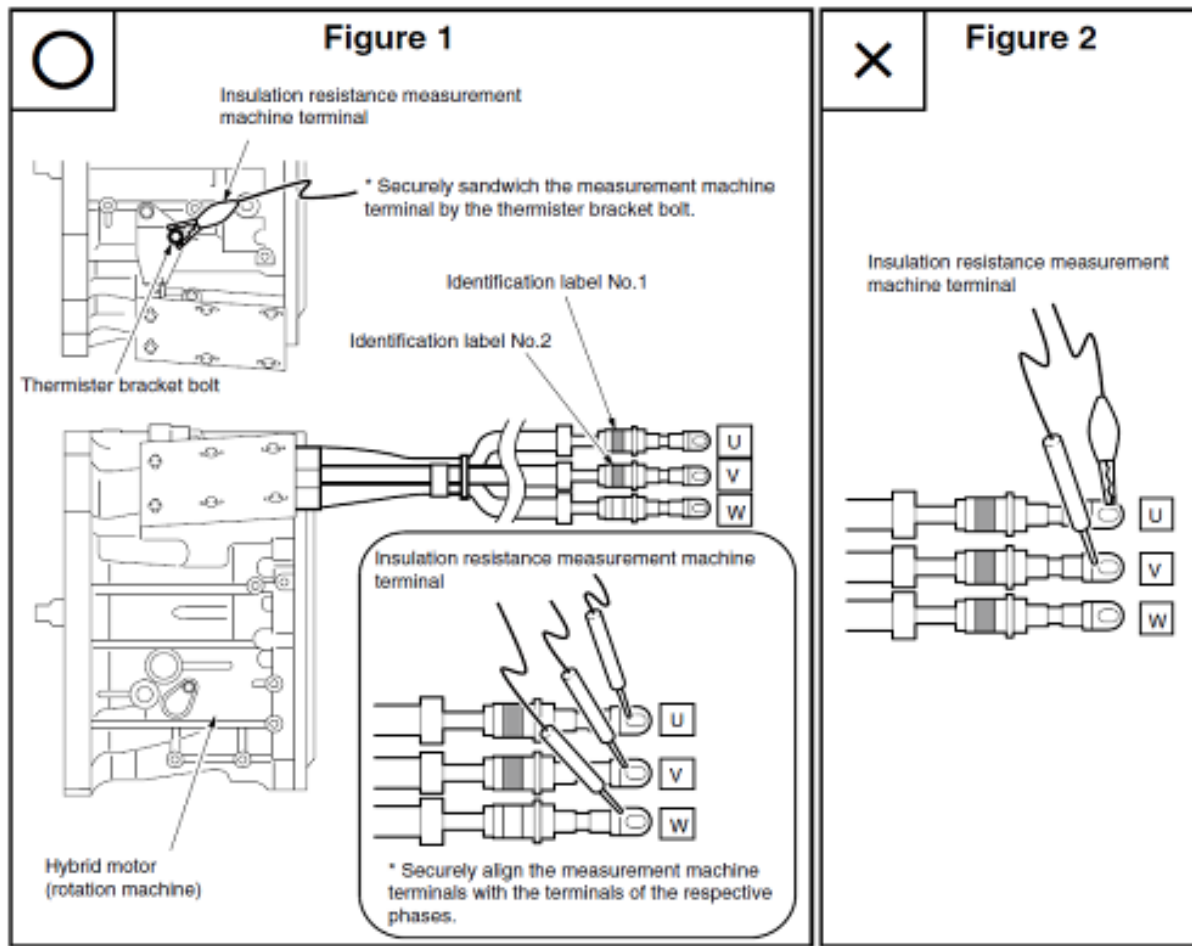
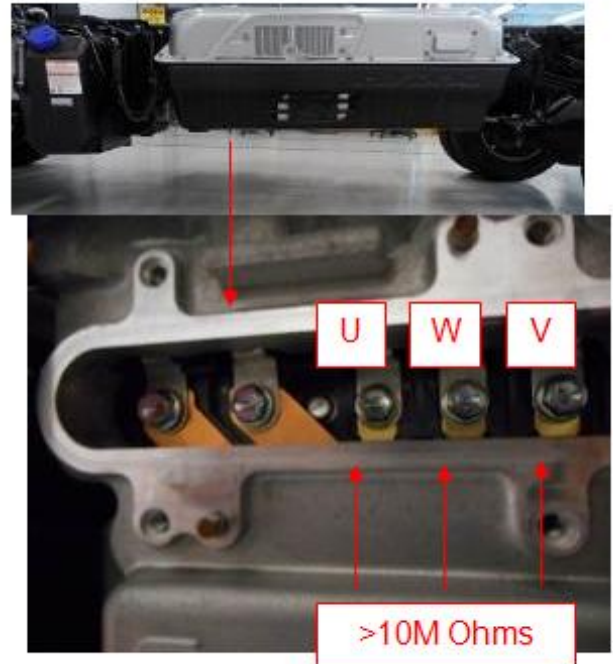


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14. An insulation test is required on the HV cables any time service is performed to confirm that no voltage leaks are present in the electrical insulation of the cables. Measure the insulation resistance from the U-Phase to ground, the W-Phase to ground, and the V-Phase to ground. Make certain that the insulation resistance is 10 Mega ohms or greater.

NOTICE: Never measure insulation resistance between each phase (U, W, V) terminal of three-phase cable connector side. See Figure 2, below.

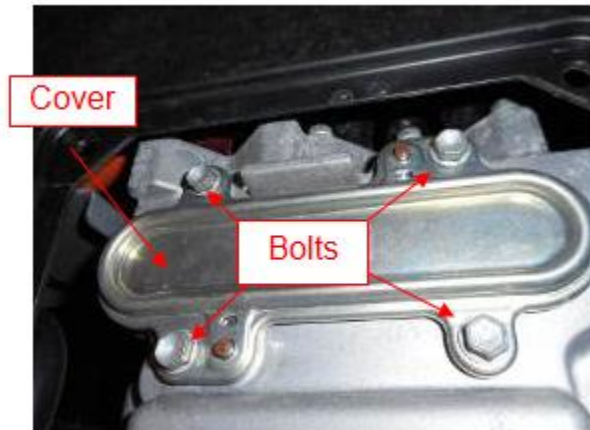
WARNING: ALWAYS use high voltage safety gloves during this step. Failure to wear high voltage safety gloves may result in personal injury or death due to electrical shock.



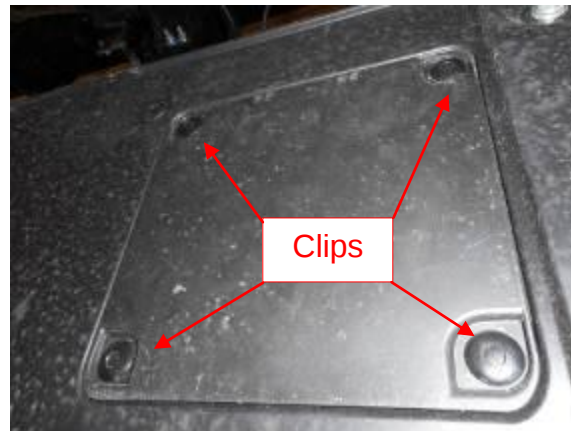
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15. Install the 4 retaining bolts and the terminal inspection cover. Tighten the bolts to the specified torque.

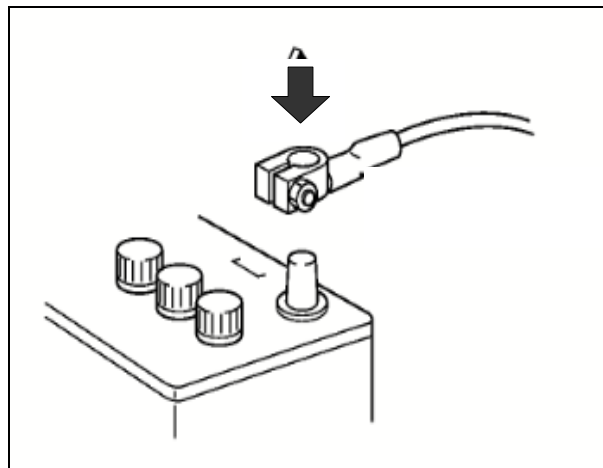
Specified Torque: 7 lb-ft (9 Nm)



16. Install the service cover using the 4 clips which were previously removed.



17. Connect the negative terminal of the 12 volt battery.

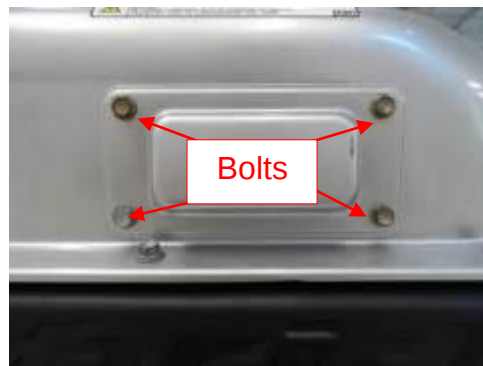


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NOTICE: Double check the torque of the HV circuit terminals, and verify that no loose parts or tools have been left behind prior to installing the service plug

18. Remove the service plug cover. Install the service plug into the HV battery. Ensure that the locking lever is fully engaged and is slid towards the rear of the vehicle. Install the 4 bolts into the service plug cover. Tighten the bolts to the specified torque. Proceed to the final inspection procedure, below.

Specified Torque: 7 lb-ft (9 Nm)



FINAL INSPECTION PROCEDURE

1. To complete this Service Campaign, review the bulletin and confirm the following:
 - All nuts and bolts have been tightened to their specified torque.
 - No malfunction warning indicators are illuminated on the instrument panel.
 - The vehicle has been road tested, and operation is normal.

CLAIM APPLICATION:

*** Reimbursable in accordance within the terms and policies of the Hino Truck limited warranties.**

HV-ECU Replacement:

a) Campaign No: AA030

b) Labor charge: 2.5 Hr.

c) Warranty code: 87350

d) Trouble code: 98

e) Operation code: 87301CRE

f) Original failed part: 9999999999