

# TECHNICAL INSTRUCTIONS

FOR

## SAFETY RECALL K0K Phase 1

(Phase 2 vehicles will be covered in a separate TI)

POTENTIAL LOSS OF MOTIVE POWER WHILE DRIVING

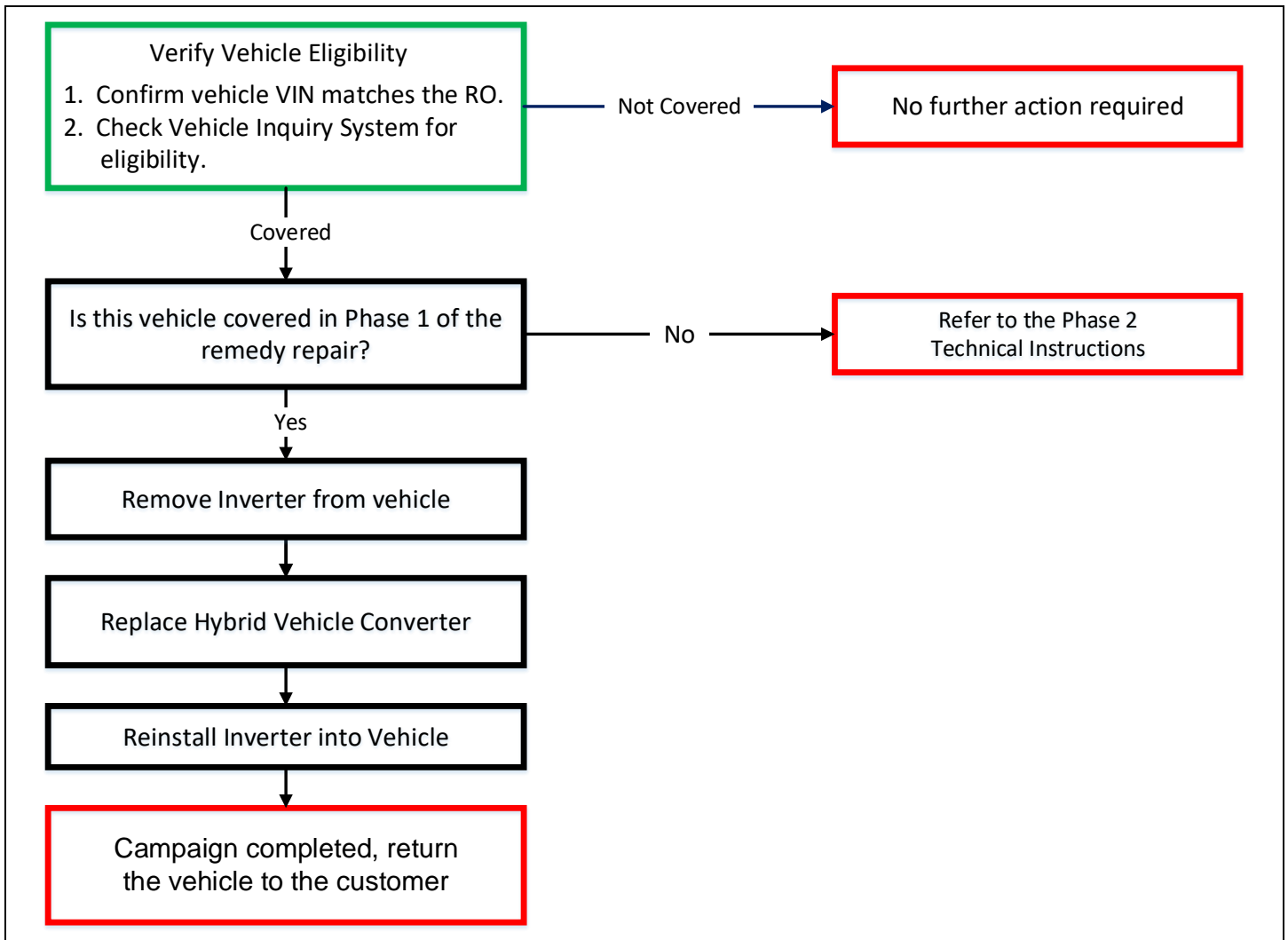
CERTAIN 2018-2019 PRIUS C

The repair quality of covered vehicles is extremely important to Toyota. All dealership technicians performing this recall are required to successfully complete the most current version of the E-Learning course "Safety Recall and Service Campaign Essentials". To ensure that all vehicles have the repair performed correctly; technicians performing this recall repair are required to currently hold at least one of the following certification levels:

- Expert Technician (Hybrid)
- Master Technician
- Master Diagnostic Technician

It is the dealership's responsibility to select technicians with the above certification level or greater to perform this recall repair. Carefully review your resources, the technician skill level, and ability before assigning technicians to this repair. It is important to consider technician days off and vacation schedules to ensure there are properly trained technicians available to perform this repair at all times.

## I. OPERATION FLOW CHART



## II. IDENTIFICATION OF AFFECTED VEHICLES

1. CHECK VEHICLE FOR CAMPAIGN ELIGIBILITY
  - a. Compare the vehicles VIN to the VIN listed on the Repair Order to ensure they match.
  - b. Check the TIS Vehicle Inquiry System to confirm the VIN is involved in this Campaign, and that it has not already been completed.

Note: TMNA warranty will not reimburse dealers for repairs completed on vehicles that are not affected or were previously completed, even by another dealer.

2. CONFIRM VEHICLE IS INCLUDED IN PHASE 1
  - a. Using the TIS Vehicle Inquiry System, confirm that this vehicle is included in Phase 1 of this Safety Recall. If this vehicle is included in Phase 2, refer to the separate instructions for Phase 2.

### III. PREPARATION

#### A. PARTS

Part Number	Part Description	Quantity
04009-08152	CONVERTER KIT, HYBRID VEHICLE *	1
*The kit above includes the following parts:		
Part Number	Part Description	Quantity
04899-52011	CASE SUB-ASSY, W/CONVERTER	1
	SEAL, MASKING, NO.1	1
	BOLT, WASHER BASED HEAD HEXAGON	4
	NUT	4
04899-47060	PLUG, INVERTER DRAIN W/SHEET, NO.1	1
	PLUG, INVERTER DRAIN W/SHEET, NO.2	1
	GROMMET, INVERTER UNION	2
	BOLT, STUD	2 (Will not be used)

The Hybrid Vehicle Converter Kit is on MAC. See page 11 for MAC release directions.

#### B. TOOLS & EQUIPMENT


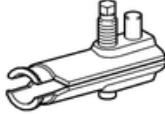

• Techstream	• Standard Hand Tools	• Torque Wrench
• Safety Glasses	• DVOM (CAT III rated)	• HEV Workstation

#### C. MATERIALS

- Toyota Super Long Life Coolant – 1.6 liters (1.6 US qts, 1.4 Imp. Qts)
- Toyota Genuine Seal Packing 1282B, Three Bond 1282B or equivalent: 08826-00100
- Thermal Grease: 08887-02809 (Quantity 2)

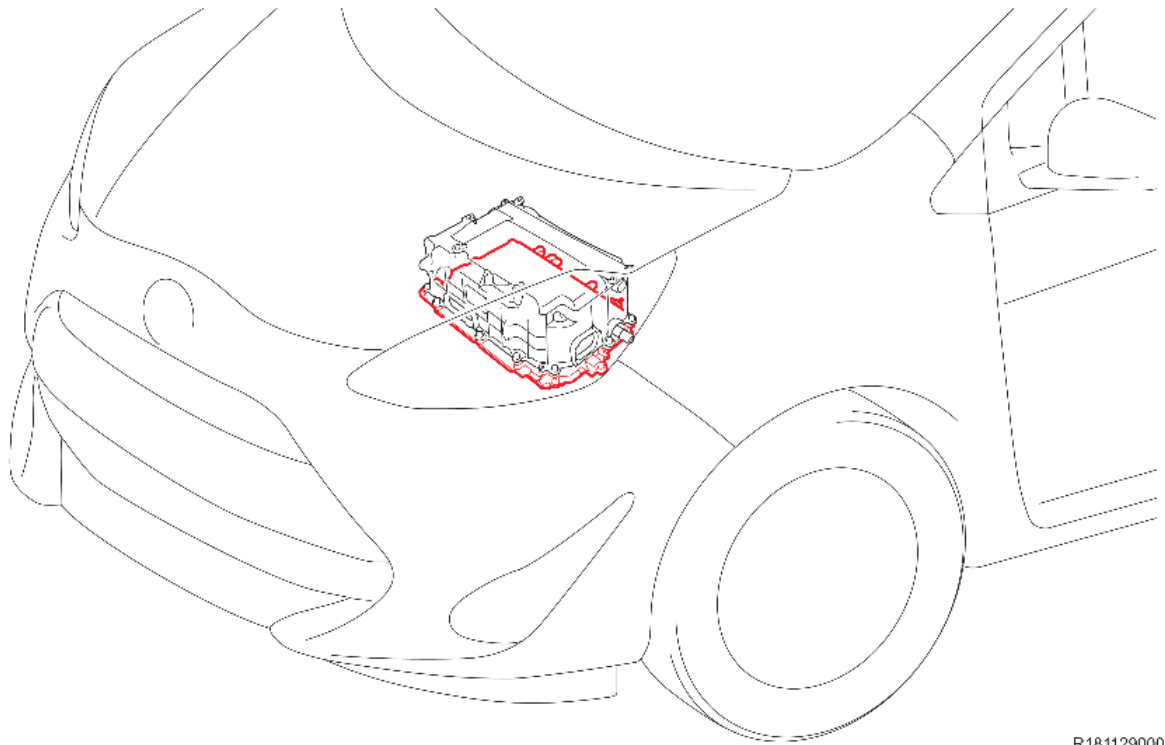
#### D. CAMPAIGN TOOLS

The following tools will be provided to each dealership for this campaign:

Desktop Anti-Static Mat Set	Inverter Separator Tool	Squeegee
		

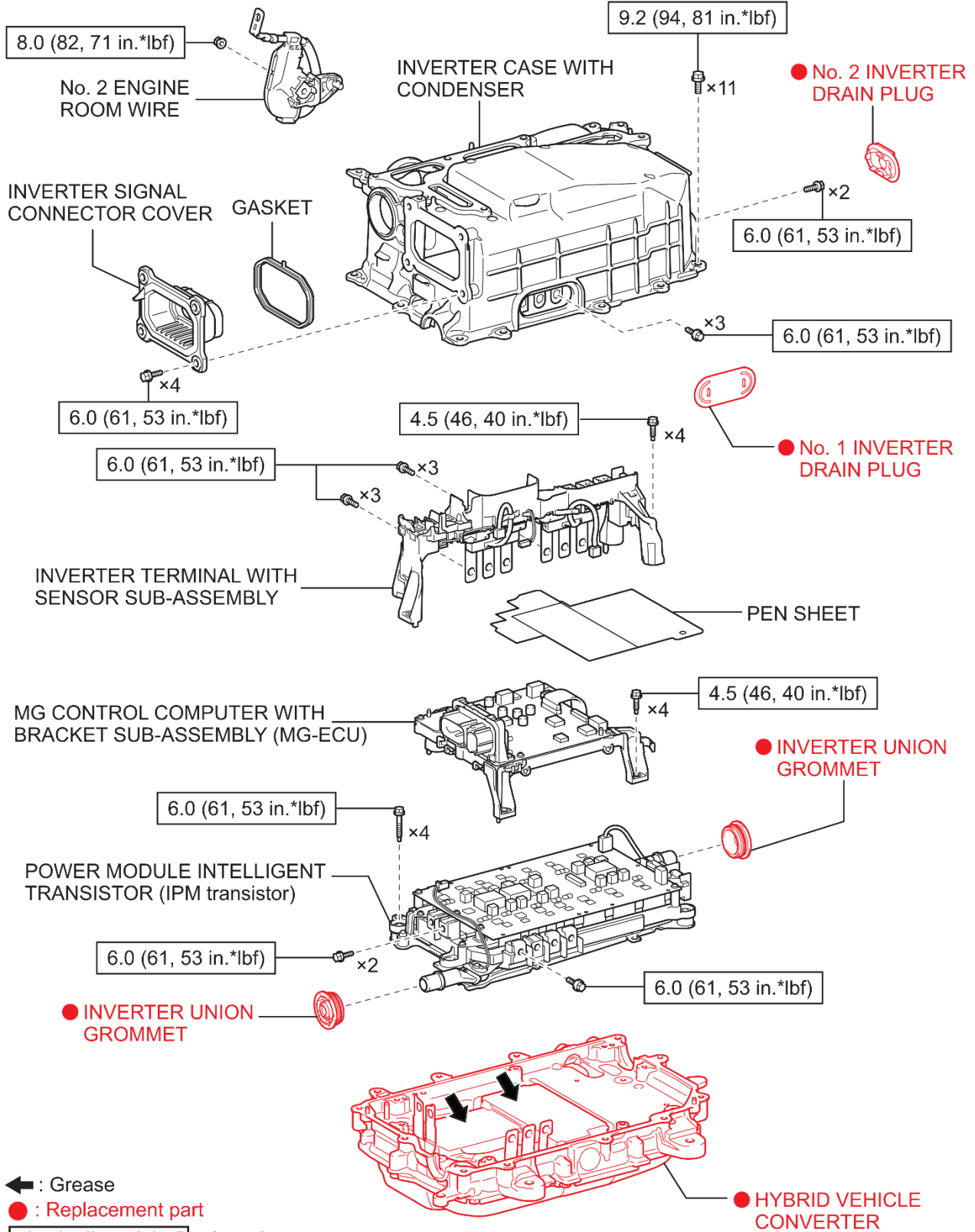
#### IV. BACKGROUND

Due to a manufacturing issue, a component may stop performing its function of converting power from the hybrid vehicle battery for use by certain vehicle systems. If this occurs, warning lights will illuminate, audible chimes will sound, and messages will be displayed on the instrument panel. If the vehicle continues to be operated, it could lose motive power. Loss of motive power while driving at higher speeds could increase the risk of a crash.



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# V. COMPONENTS



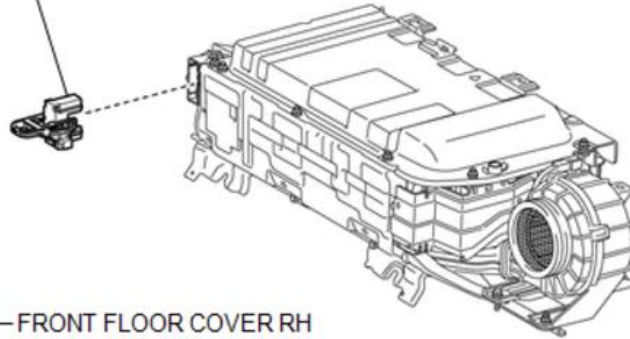
← : Grease

● : Replacement part

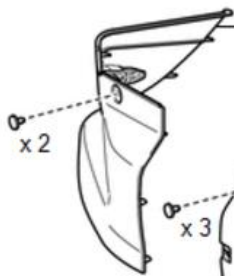
**N\*m (kgf\*cm, ft.\*lbf)** : Specified torque

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SERVICE PLUG GRIP

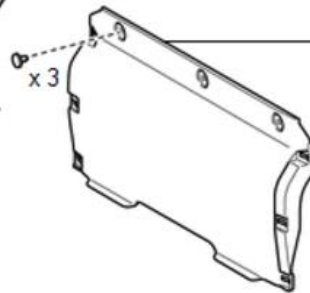


FRONT FLOOR COVER RH



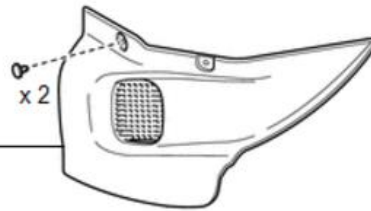
x 2

FRONT CENTER FLOOR COVER

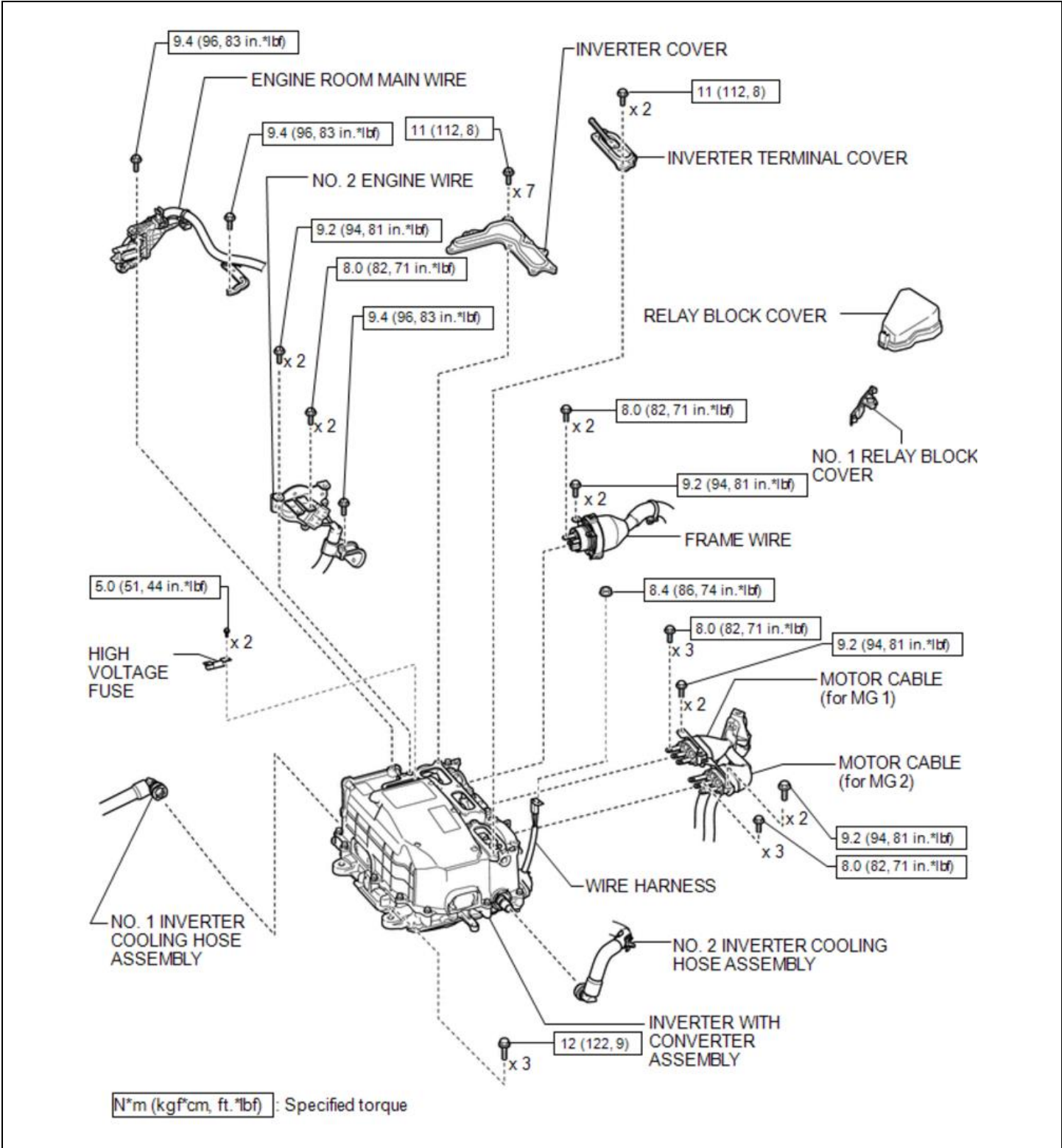


x 3

FRONT FLOOR COVER LH



x 2



## VI. SAFETY PRECAUTIONS

### CAUTION:

This vehicle has a hybrid control system that operates at voltages of up to 650 V. An organic electrolyte containing carbonic acid esters as its main component is used as the electrolyte for the HV battery. Be sure to follow the instructions in this manual to handle the system correctly. Failure to do so may result in serious injury or electrocution.

- (a) Technicians must undergo special training to be able to service and inspect the high-voltage system.
- (b) All high-voltage wire harnesses and connectors are colored orange. Do not carelessly touch these wires or components.
- (c) When there is a problem with the wire harness or connector of a high-voltage circuit, repairs to the harness or connector should not be attempted. Replace damaged or malfunctioning high voltage cables or connectors.
- (d) Before inspecting or servicing the high-voltage system, be sure to follow all safety measures, such as wearing insulated gloves and removing the service plug to prevent electrocution. Carry the removed service plug in your pocket to prevent other technicians from accidentally reconnecting it while you are servicing the vehicle.

### NOTICE:

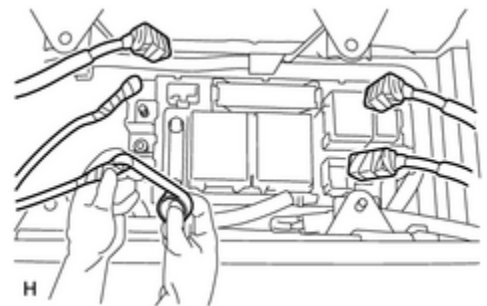
After removing the service plug grip, do not turn the power switch on (READY), unless instructed by the repair manual because this may cause a malfunction.

- (e) After removing the service plug grip, wait 10 minutes before touching any of the high-voltage connectors and terminals.

### HINT:

Waiting for at least 10 minutes is required to discharge the high-voltage capacitor inside the inverter with converter assembly.

- (f) Before using insulated gloves, be sure to check them for cracks, tears and other types of damage by following the manufactures recommendations.
- (g) When servicing the vehicle, do not carry metal objects like mechanical pencils or rulers that can be dropped accidentally and cause a short circuit.
- (h) Before touching a bare high-voltage terminal, wear insulated gloves and use a tester to make sure that the terminal voltage is 0 V.



- (i) After disconnecting or exposing a high-voltage connector or terminal, insulate it immediately using insulating tape.
- (j) Bolts and nuts for high-voltage terminals should be tightened firmly to the specified torque. Both insufficient and excessive torque can cause failure.
- (k) Use the "CAUTION: HIGH VOLTAGE DO NOT TOUCH" sign to notify other technicians that the high-voltage system is being inspected and/or repaired.
- (l) After servicing the high-voltage system and before reinstalling the service plug, check again that you have not left a part or tool inside, that the high-voltage terminals are firmly tightened, and that the connectors are correctly connected.



- (m) When performing work involving high-voltage wires, use either a tool wrapped with vinyl insulation tape or an insulated tool.
- (n) When installing hybrid control system components such as the HV battery, make sure that the polarity of all connections is correct.

**CAUTION:**

- Do not touch any bare cables that may have high-voltage. If a cable must be touched or if accidental contact is possible, wear insulated gloves and insulate the cable using insulating tape.
  - Visually check the HV battery and the immediate area for any electrolyte leakage. Do not touch any leaked liquid because it could be organic electrolyte that contains carbonic acid esters.
  - The electrolyte is flammable. Keep all ignition sources such as open flame and hot objects away from the electrolyte.
  - Electrolyte leaks may cause acute poisoning if a high concentration of the vapor from the organic solvent is inhaled. In case of inhalation, move the affected person to a place with ample fresh air and let them lie quietly. Seek medical care.
  - In case of skin contact with the electrolyte, wash the area thoroughly with soap and plenty of water, and seek medical care. Immediately remove any contaminated clothing. Prolonged contact with the electrolyte may cause skin irritation.
  - If the electrolyte comes in contact with your eyes, call out loudly for help. Do not rub your eyes. Immediately flush them with a large amount of water for at least 15 minutes and seek medical care.
  - If electrolyte is swallowed, seek medical care immediately. Do not induce vomiting, unless instructed by the doctor.
- (1) Wear insulated or rubber gloves, goggles, and safety shoes.
  - (2) Check the HV battery and immediate area for any electrolyte leakage.

**CAUTION:**

- Do not touch any leaked liquid because it could be the organic electrolyte that contains carbonic acid esters. If contact is unavoidable, wipe the fluid off using a cloth while wearing rubber gloves, goggles and an organic solvent mask. Do not leave electrolyte-contaminated cloths unattended. Place contaminated cloths in an appropriate airtight container and dispose of them according to local regulations.
- (3) Do not touch any bare cables that could be high voltage cables. If a cable must be touched or if accidental contact is possible, follow the following instructions: 1) wear insulated gloves and goggles, 2) measure the voltage between the cable and body ground using an electrical tester, and 3) insulate the cable using insulating tape.
  - (4) If damage to any of the high-voltage components and cables is suspected, cut the high-voltage circuit using the procedure below.

**CAUTION:**

Do not touch any bare cables that may have high-voltage. If a cable must be touched or if accidental contact is possible, wear insulated gloves and insulate the cable using insulating tape.

**CAUTION:**

- Before returning the HV battery, make sure to perform recovery inspection.
- Before returning the hybrid vehicle supply stack sub-assembly, make sure to perform recovery inspection.
- Accidents such as electric shock may result if the HV battery or a hybrid vehicle supply stack sub-assembly is disposed of improperly or abandoned. Therefore, make sure to return all HV batteries or hybrid vehicle supply stack assemblies through an authorized collection agent.
- To reduce the risk of fire, the HV battery or hybrid vehicle supply stack assembly must not be stored in an area where it will be exposed to fire or high temperatures.

## VII. REQUIRED VIDEO E-MODULE

Before the Hybrid Vehicle Converter replacement can begin, it is required that each technician watch a video that details some key points of repair process. Completion of the video is also necessary to receive the parts kit to perform the repair.

When you select the link below, you will need to log into the Learning Center to view the video. If you have not logged into this website before, try the following login:

User Name: (your SPIN number)

Password: (your dealer code)

If you have problems logging into the Learning Center System, please contact the following:

- TMNA Dealer: 877-353-2459
- GST Dealer: 800-933-3416
- SET Dealer: 800-982-6057

The following video will demonstrate some of the key points of this repair. It is not intended to be step-by-step directions. The Repair Manual will provide the actual directions for disassembly and reassembly of the inverter. When performing this repair, pay attention to these key points discussed in this video:

### [REQUIRED VIDEO: Toyota Safety Recall K0K Video](#)

Credit for the video will automatically be given once you reach the end of the video.



**Be sure to watch the video before ordering the parts, as the parts will not be released until proof of video completion is received**

Note: Watching the video is only required ONCE for each technician that will perform this repair. This video is not necessary for any Certification requirements.

## VIII. PARTS ORDERING

Once the technician has completed watching the required Toyota Safety Recall K0K Video, it will be necessary for the Parts Department to send an email to get the Manual Allocation Control (MAC) released on the Hybrid Vehicle Converter Kit (04009-08152). Please send an email to the appropriate address below:

TMNA dealers: Quality\_Compliance@Toyota.com

GST dealers: gstpartssupport@gstoyota.com

SET dealers: setpartstechnical@jmfamily.com

Email subject: K0K Release

Email Contents:

- 04009-08152
- Dealer Code
- VIN #
- Order reference # (TMNA & SET only)
- Name of Technician performing the repair (we will verify completion of the Recall Video)

## IX. REMOVE INVERTER FROM VEHICLE

### 1. REMOVE INVERTER ASSEMBLY

a. Use the following Repair Manual link to remove the inverter from the vehicle.

[HYBRID / BATTERY CONTROL: INVERTER WITH CONVERTER: REMOVAL;](#)

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## X. DISASSEMBLE HYBRID VEHICLE CONVERTER

### 1. DISASSEMBLE HYBRID VEHICLE CONVERTER

a. Use the following Repair Manual link to disassemble the inverter assembly.

[HYBRID / BATTERY CONTROL: ELECTRIC VEHICLE CONVERTER: DISASSEMBLY;](#)

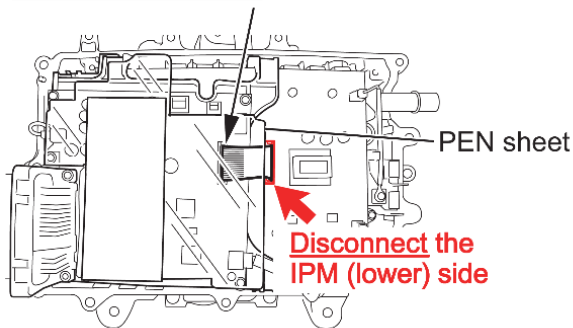
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**Note: Disassembly of the inverter assembly is necessary to separate the Hybrid Vehicle Converter. Follow the Repair Manual link to reference the necessary instructions, but please refer to the TIPS listed below to insure these key points are completed correctly during disassembly.**

[Video: Remove Inverter Case](#)

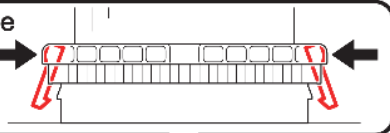
## DISASSEMBLY TIPS FOR MG-ECU

**DO NOT** disconnect the MG-ECU (upper) side

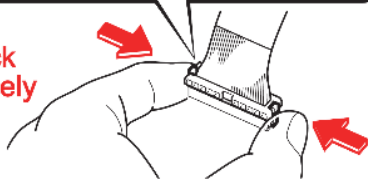


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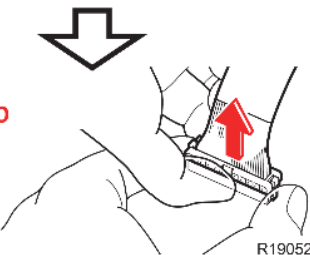
Disengage the lock claws



Point 1  
Disengage lock claws completely



Point 2  
Pull straight up strongly

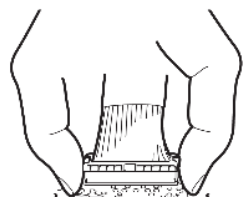


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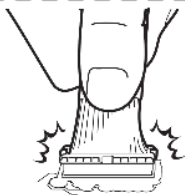
**NG**



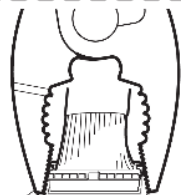
DO NOT apply force laterally



DO NOT touch circuit-board



DO NOT pull harness



DO NOT use tools

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**DO NOT** disconnect the flat cable of the MG-ECU (the upper side with the PEN sheet) since it may be broken. Make sure to disconnect the IPM side (the lower side).

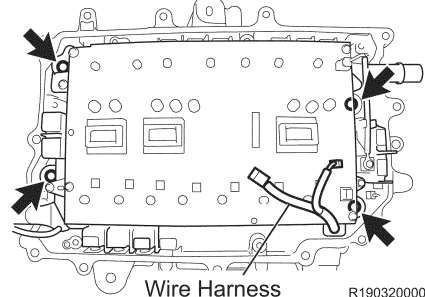
- The white resin connector of the flat cable is engaged very firmly, and pulling it lightly is not enough to disconnect the white resin connector even if the lock claws are disengaged. Make sure to pull the white resin connector straight up strongly after disengaging the lock claws.
- **DO NOT** pull up the white resin connector without releasing the lock claws.

- **DO NOT** jiggle and apply force to the white resin connector when pulling it up since the lock claws of the white resin connector may be broken.
- **DO NOT** touch or apply force to the electronic components of the circuit board when disconnecting the white resin connector.
- **DO NOT** pull the harness.
- **DO NOT** use tools.

[Video: Disassembly Tips for MG-ECU](#)

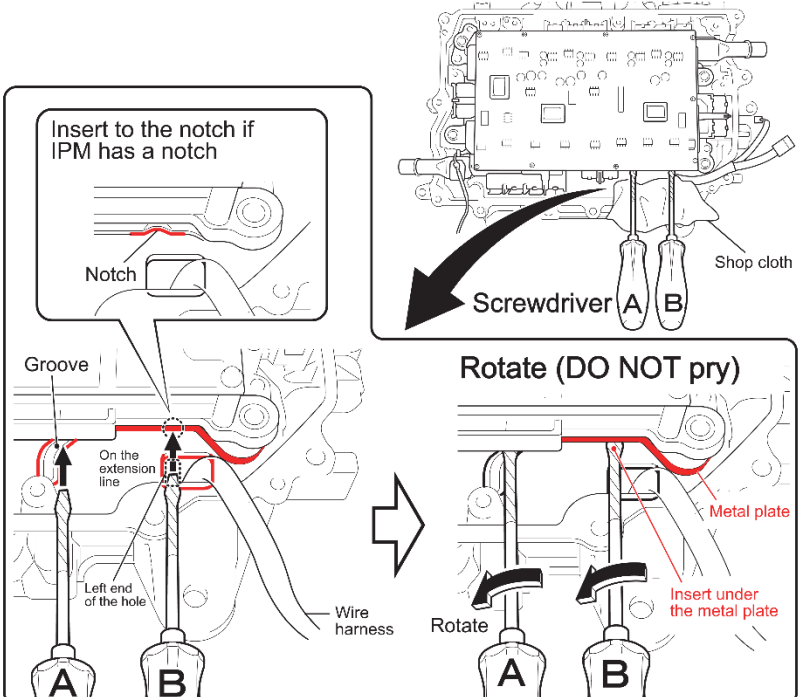
## DISASSEMBLY TIPS FOR IPM

The connection between the power module intelligent transistor (IPM transistor) and the hybrid vehicle converter are attached to each other with thermal grease. This grease will make it difficult to separate the two components. Make sure to follow the instructions below to avoid breakage of the IPM transistor.

<p><b>Double-check bolts are removed</b></p>  <p style="text-align: center;">Wire Harness <span style="float: right;">R1903200008E01</span></p>	<ul style="list-style-type: none"> <li>• <b>Double-check that the 4 bolts of the IPM transistor are removed.</b></li> </ul>
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Place a piece of shop cloth for protection and insert 2 screwdrivers wrapped in protective tape into the positions below.

- Screwdriver A: Between IPM transistor and the groove of the hybrid vehicle converter
- Screwdriver B: Between the notch of IPM transistor (on the extension line from the left end of the wire harness hole) and flat surface of the hybrid vehicle converter (Some IPM transistors have a notch and the others do not.)

 <p style="text-align: right; font-size: small;">R1905210004AR01</p>	<ul style="list-style-type: none"> <li>• <b>DO NOT pry with screwdrivers as the IPM transistor may be broken. Make sure to rotate the screwdrivers to release the connection.</b></li> <li>• <b>DO NOT insert the screwdrivers into the positions other than instructed as the IPM transistor may be broken.</b></li> </ul> <p style="color: blue; text-decoration: underline;">Video: <a href="#">IPM Disassembly Tips</a></p>
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## I. REASSEMBLY OF ELECTRIC VEHICLE CONVERTER

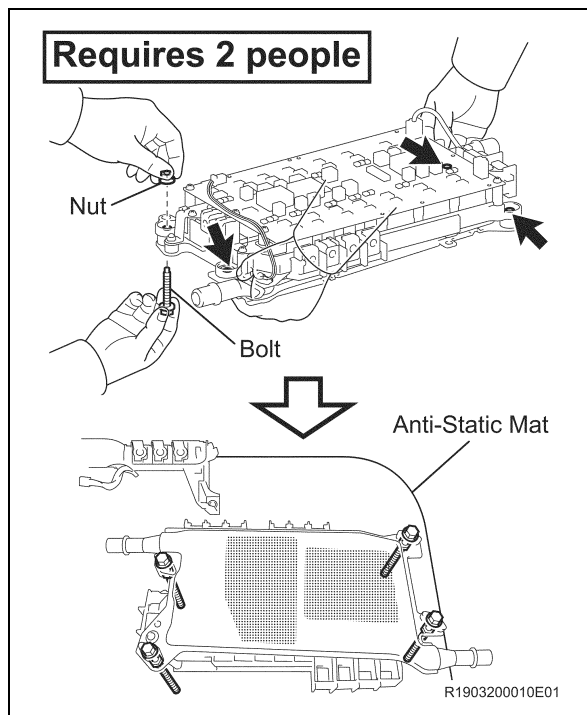
### 1. REASSEMBLE THE ELECTRIC VEHICLE CONVERTER

b. Use the following Repair Manual link to reassemble the Electric Vehicle Converter.

[HYBRID / BATTERY CONTROL: ELECTRIC VEHICLE CONVERTER: REASSEMBLY;](#)  
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**Note:** Reassembly of the Electric Vehicle Converter, IPM, and inverter are covered in the Repair Manual. However, please refer to the key points listed below in the TIPS.

### IPM CLEANING TIPS



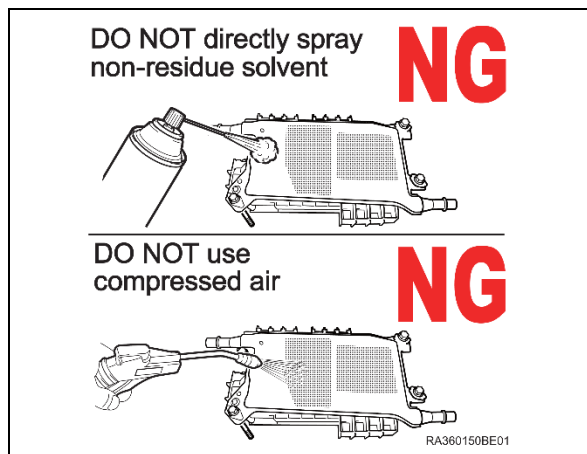
#### 1. PREPARE THE STAND FOR THE IPM

- Install the 4 bolts and 4 nuts included in the Campaign Tool kit to the IPM transistor so that the nut is on the circuit board side.

**Direction:** Insert the bolt from underneath when the circuit board is facing upward

- Place the IPM transistor, upside down, on the anti-static mat as shown in the illustration.

**Note:** The anti-static mat has been supplied to each dealership for this campaign.



#### 2. CLEAN THE THERMAL GREASE FROM THE IPM

- Using a shop cloth saturated with a non-residue solvent, wipe the thermal grease from the IPM.

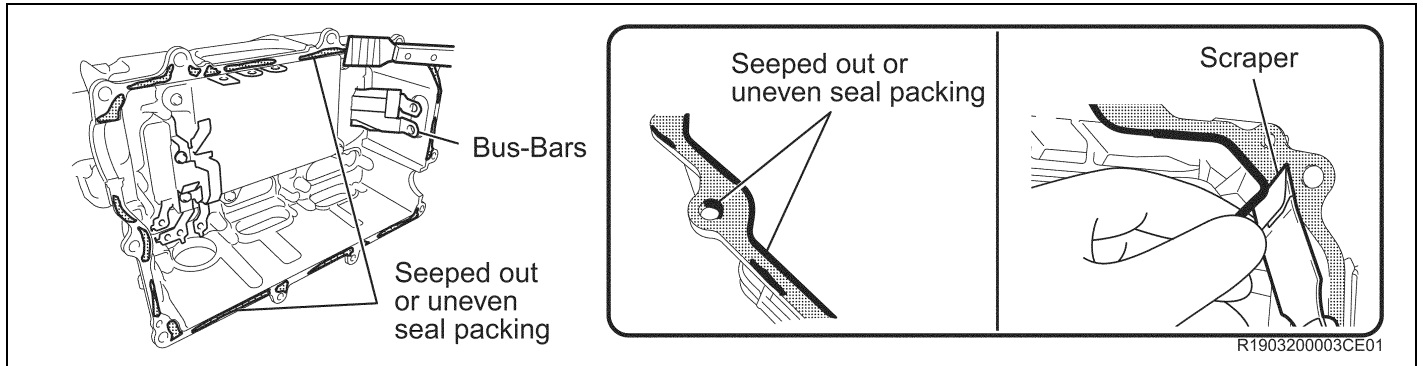
**Note:** It is not needed to remove the thermal grease and seal packing remaining on the ORIGINAL hybrid vehicle converter as it will be replaced.

## CASE CLEANING TIPS

### REMOVE SEAL PACKING FROM INVERTER CASE

Using a clean scraper, remove any seal packing which is uneven, has peeled off or seeped out from around the contact surface and bolt holes to reach the removal level shown below.

[Video: Case Cleaning Tips](#)



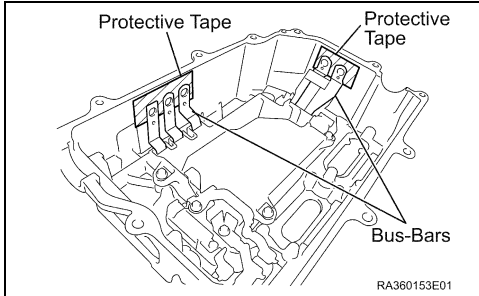
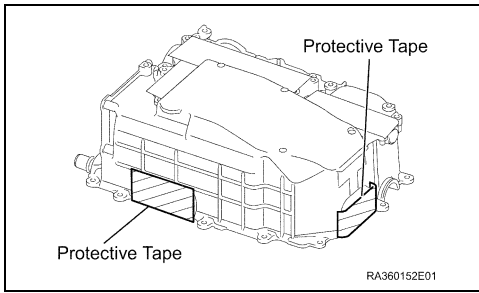
### Seal Packing Removal Requirements:

Location	Removal level
<p><b>Sealing surface</b> Remove any uneven seal packing</p>	<p>NOT required to remove thin seal packing on the flat surface</p>
<p><b>Holes</b> Remove any uneven seal packing</p>	<p>NOT required to remove thin seal packing</p>

- **DO NOT** drop any removed seal packing into the inverter case with condenser.
- **DO NOT** bend the bus-bars.
- If it feels smooth when you touch the surface, the seal packing is thin enough and it does not affect the sealing performance. There is no need to remove further.
- The thin seal packing inside the bolt holes can remain.
- It is unnecessary to take much time to remove completely. Reference the sample images of the removal level to remove the seal packing.

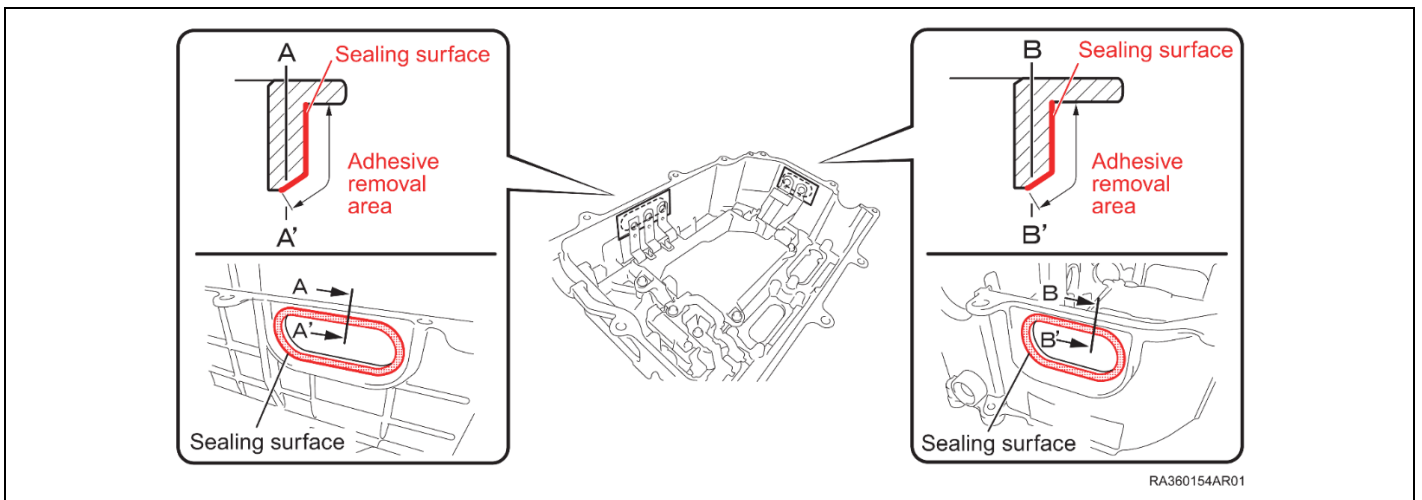


## INSTALLATION HOLE CLEANING TIPS

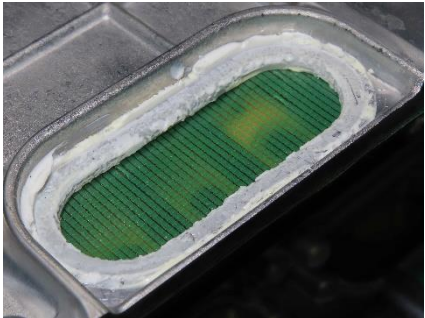
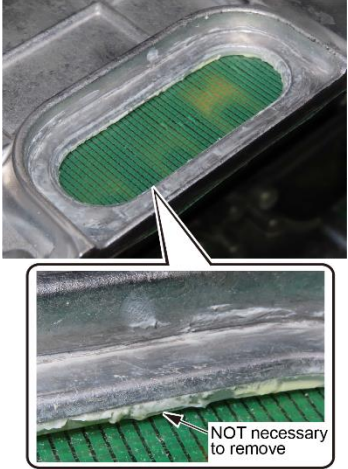


### 3. CLEAN INVERTER CASE INSTALLATION HOLES

- a. Remove the previously installed protective tape from the No. 1 and No. 2 inverter drain plugs.
- b. Apply protective tape to the installation holes of the No. 1 and No. 2 inverter drain plugs from the **inside of the inverter case**.
- c. Using a scraper, remove any adhesive which is uneven or has seeped out from the sealing surfaces of the drain plugs.
- d. Remove the tape inside the inverter when cleaning is completed.



### Adhesive Removal Requirements:

Sealing surface	Removal
Remove any uneven adhesive	NOT necessary to remove thin adhesive
	



## APPLY THERMAL GREASE TIP

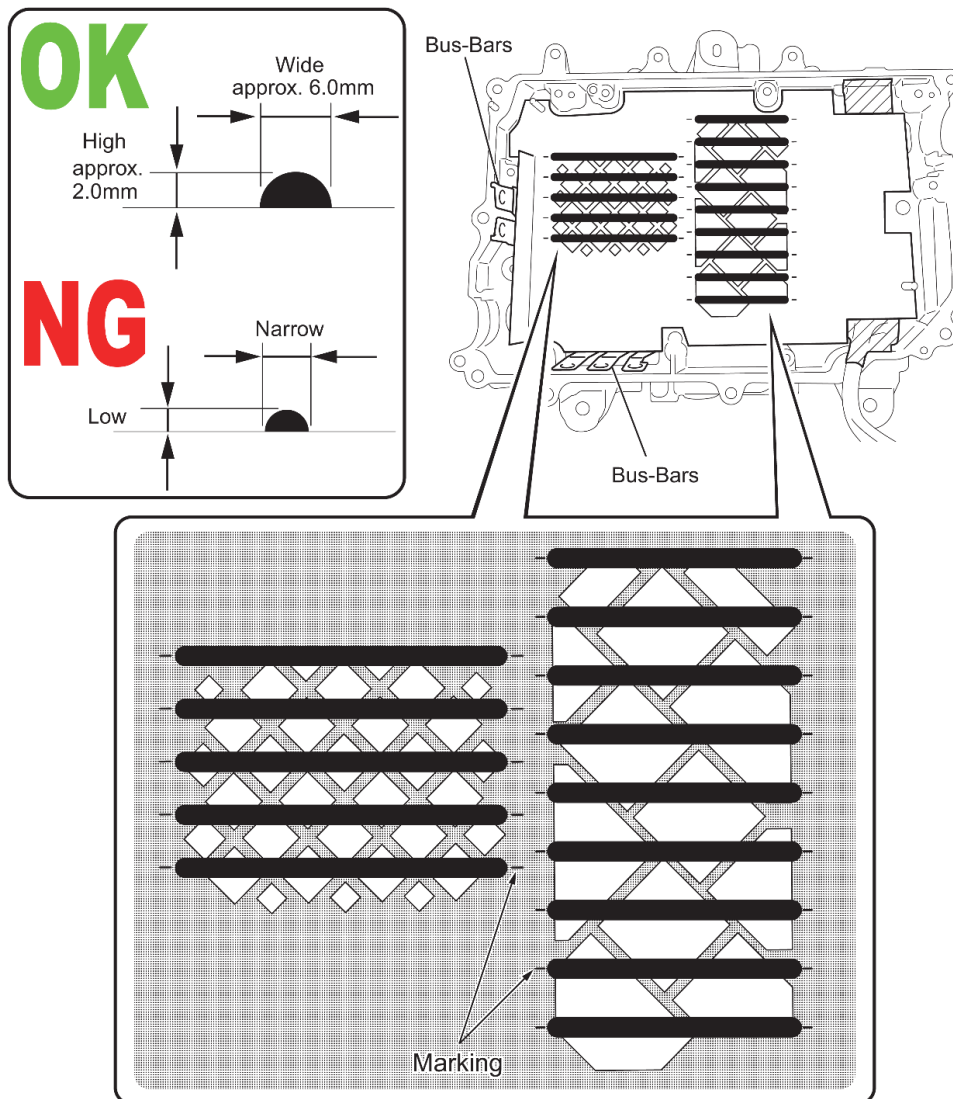
### INSTALL THE MASKING SEAL AND APPLY THERMAL GREASE

- Using the masking seal provided in the Hybrid Vehicle Converter Kit (04009-08152), apply it to the **NEW** Hybrid Vehicle Converter.
- Apply 14 lines of thermal grease (part no. 08887-02809) between the markings of the masking seal as shown in the illustration. It will take about 1.5 tubes of thermal grease to complete the 14 lines.



**Make sure to apply the Thermal Grease 6mm high and 2mm wide so that it will spread properly.**

[Video: Apply Thermal Grease](#)



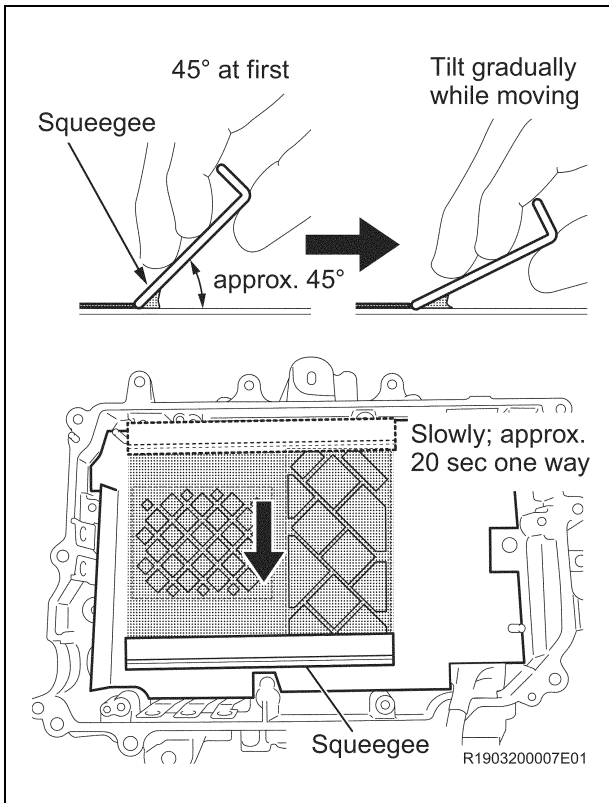
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## SPREAD THERMAL GREASE TIP

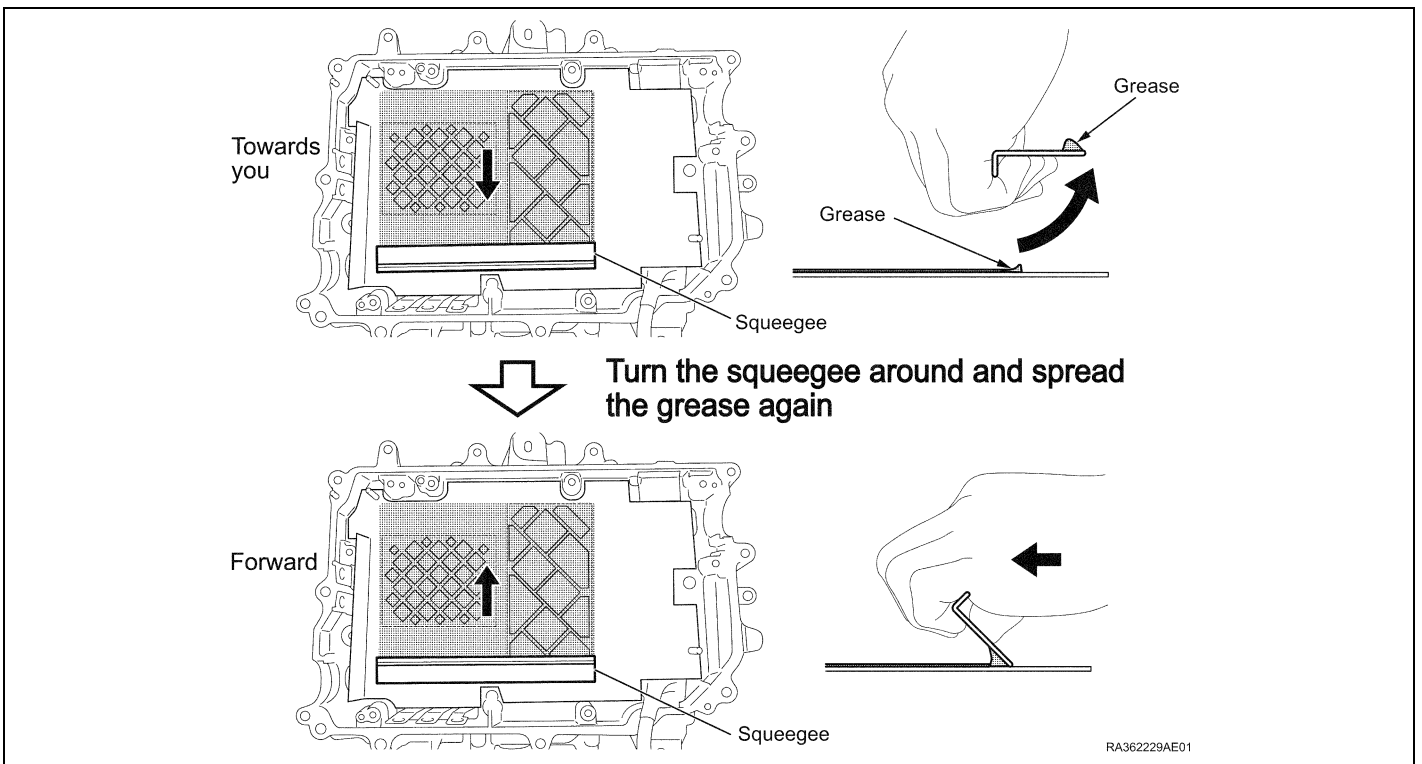
### SPREAD THE THERMAL GREASE

a. Using the squeegee provided with the campaign tool kit, slowly spread the thermal grease in the direction shown in the diagram below.

- Start applying the thermal grease with the angle of squeegee set at 45°, and gradually tilt while moving the squeegee so that the thermal grease can be applied entirely.
- Move squeegee slowly (approx. 20 seconds one way) as the viscosity of the thermal grease is high.
- DO NOT let the thermal grease adhere to bus-bars. If any thermal grease is adhered, remove it with a clean piece of shop cloth.
- Before performing the work, check that the thermal grease contacting area of the squeegee is not damaged.
- Apply the thermal grease smoothly and evenly to ensure proper heat transfer.



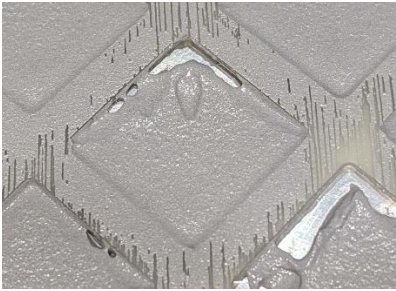



- b. Next, move the squeegee in the opposite direction to fill in any voids that may have occurred in the first application.
- c. Repeat steps a. through b. until the thermal grease is smooth and even.



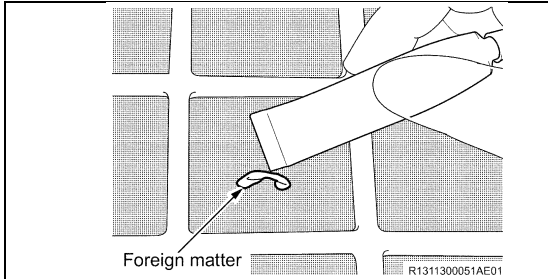
## CHECK THERMAL GREASE APPLICATION

Check the application using the following images to ensure the thermal grease is applied thoroughly.

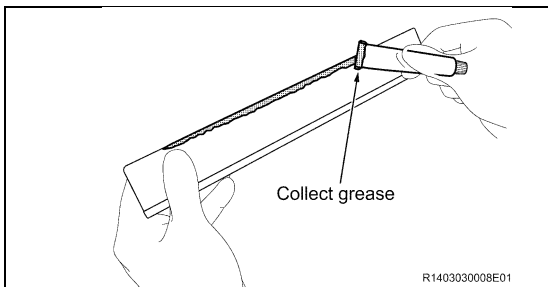
<b>OK</b>	<p>NO holes and complete coverage (Uneven surface is acceptable)</p> 	<p>Remove the masking seal and install the IPM transistor immediately</p>
		
<b>NG</b>	<p>Holes</p> 	<p>Move on to grease application correction (Go to the next page)</p>
	<p>Foreign matter</p> 	

## REPAIR THERMAL GREASE

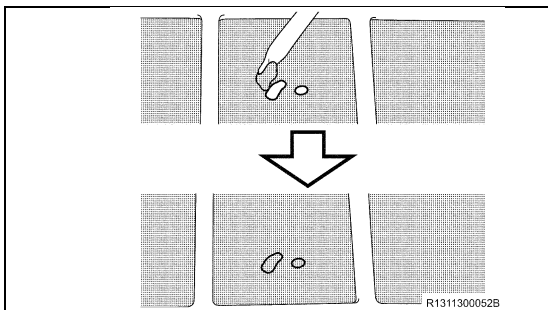
If needed, the following procedures can be used to repair the thermal grease application.



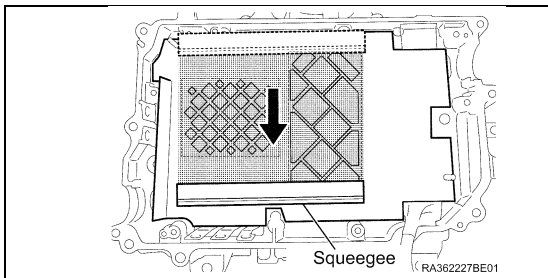
Remove any foreign matter found on the thermal grease using a clean tube of thermal grease.



Collect the thermal grease remaining on the squeegee or around the masking seal using a clean tube of thermal grease.



Apply the thermal grease collected to the areas with a shortage as smooth as possible.



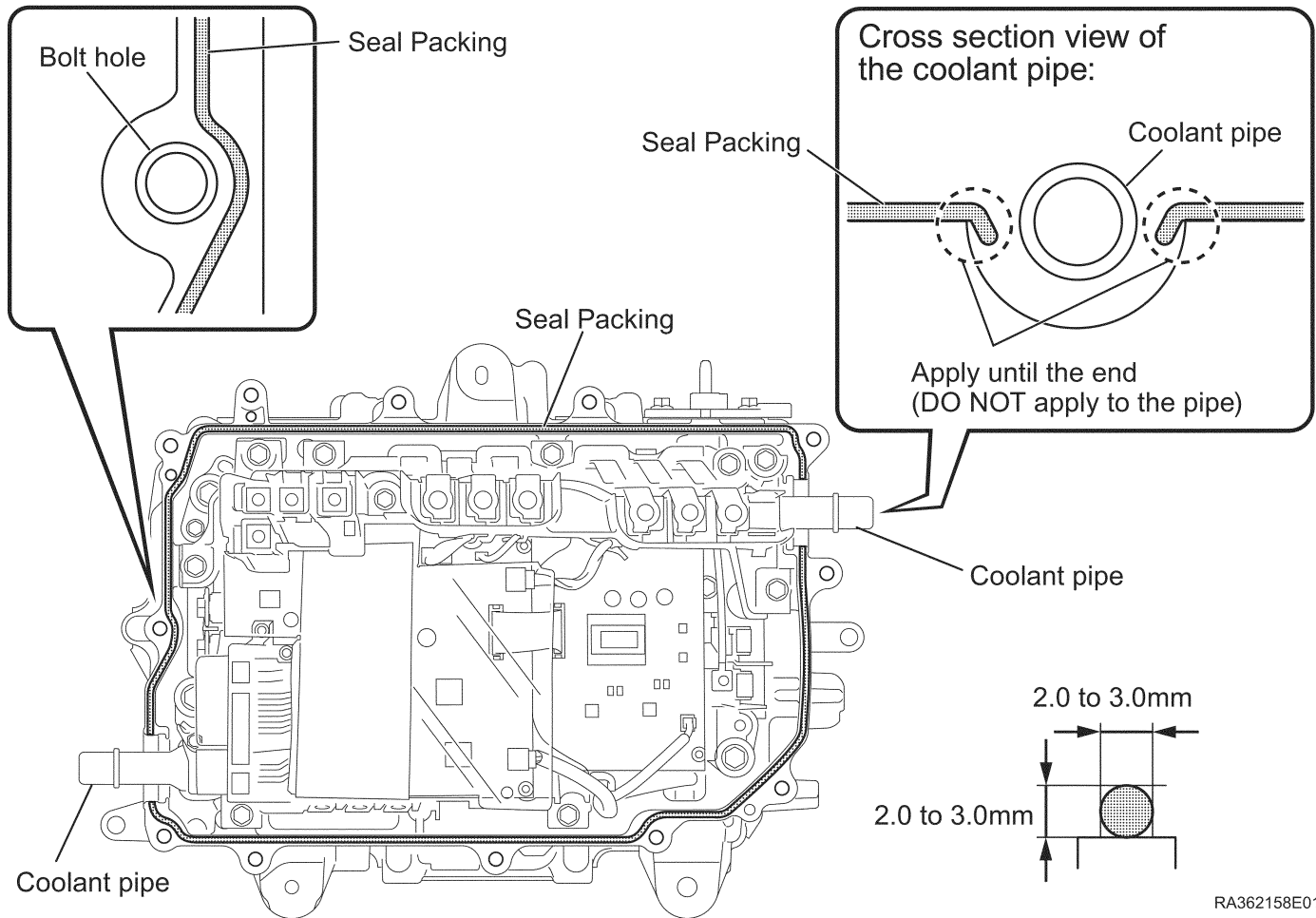
Use the squeegee as before to smooth the thermal grease.

After smoothing the thermal grease, remove the masking seal and install the IPM transistor to the hybrid vehicle converter immediately.

## APPLICATION OF SEAL PACKING TIP

Apply seal packing 128B in a continuous line to the inverter case at the locations shown in the diagram below. The bead should be 2.0 to 3.0 mm in diameter. Be sure to keep the seal packing off the coolant pipes.

[Video: Application of Seal Packing](#)



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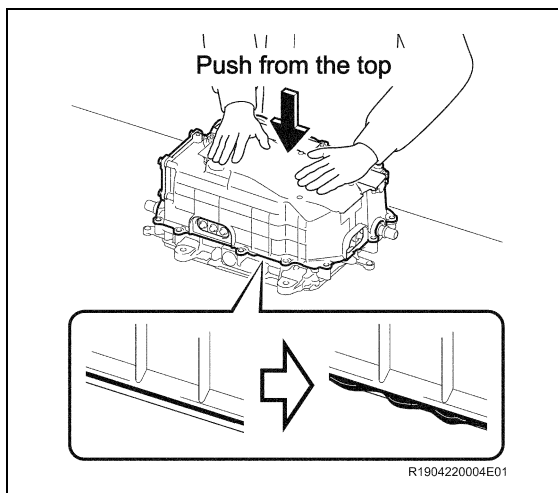
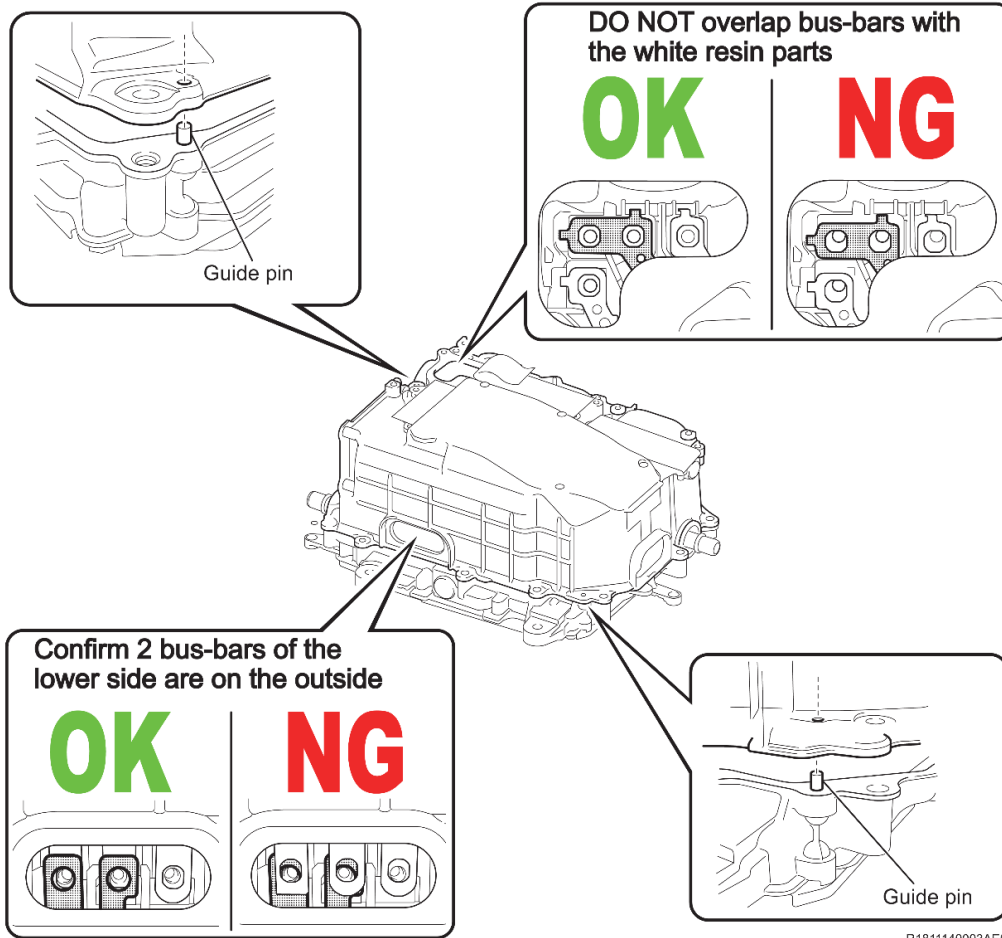


## CASE ASSEMBLY TIP

a. Assemble the inverter case with the NEW Hybrid Vehicle Converter

- Confirm the bus-bars of the hybrid vehicle converter are on the outside.
  - Be sure to align the guide pins.

Confirm that the bus-bars do not overlap the white resin parts of the inverter terminals.

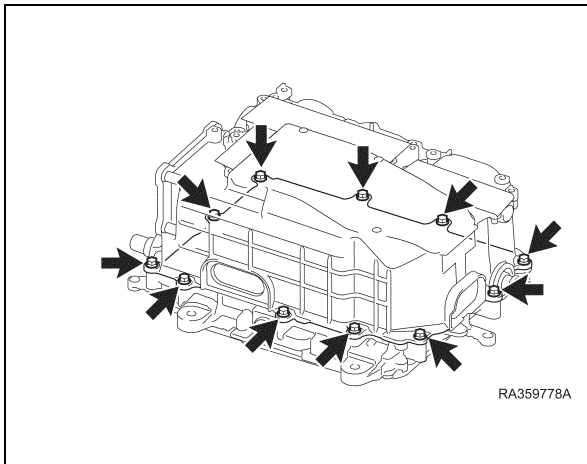
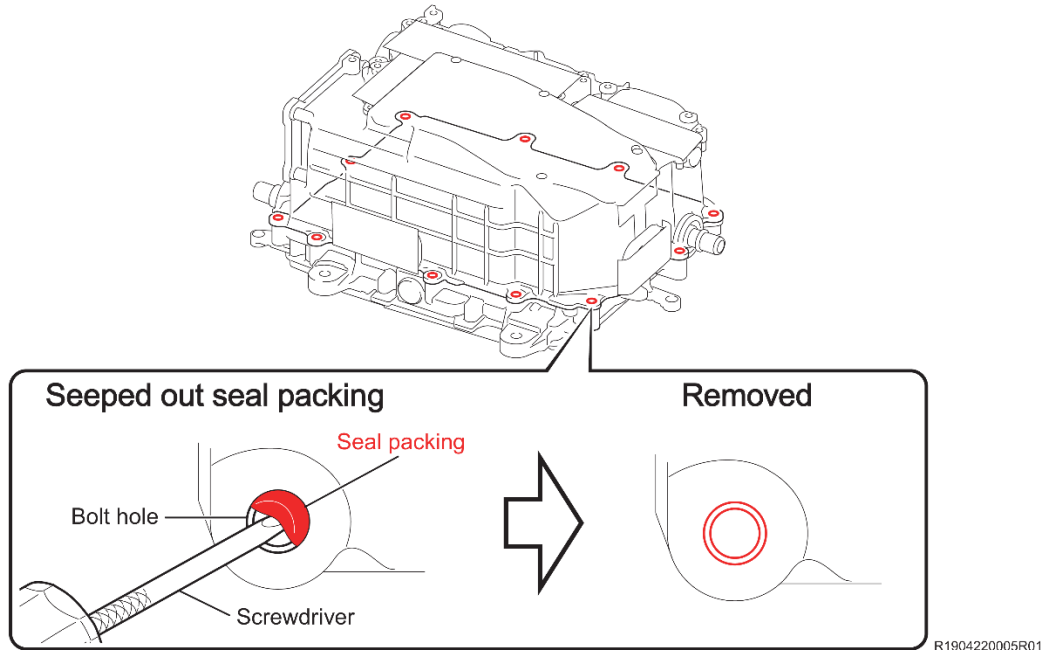


a. Push the inverter case with condenser from the top to compress the seal packing on the sealing surface.

**DO NOT push excessively hard, for example pressing with your full body weight. Excessive force may cause deformation of the hybrid converter bottom surface.**

## FINAL ASSEMBLY TIPS

Check the 11 bolt holes of the inverter case for any seal packing that may have seeped into the holes. If any seal packing is found in any hole, remove it with a screwdriver.



b. Install the 11 bolts to spread the seal packing.

**Torque: 5.0 N\*m (51 kgf\*cm, 44 in.\*lbf)**

**NOTE:**

**Temporarily tighten the bolts with 5.0 N·m to spread the seal packing applied.**

a) Fully tighten the 11 bolts.

**Torque: 9.2 N\*m (94 kgf\*cm, 81 in.\*lbf)**

## ◀ VERIFY REPAIR QUALITY ▶

Confirm the following points before returning the vehicle to the customer.

- Confirm that the 12v battery is charging when the vehicle is in the READY mode.
- Confirm inverter coolant level is correct and no leaks are present.

If you have any questions regarding this update, please contact your regional representative.

### 10. APPENDIX

#### A. PARTS DISPOSAL

As required by Federal Regulations, please make sure all recalled parts (original parts) removed from the vehicle are disposed of in a manner in which they will not be reused, ***unless requested for parts recovery return.***

#### B. CAMPAIGN DESIGNATION DECORDER

