

## SQR484F EXHAUST SYSTEM

|                                |             |                                          |              |
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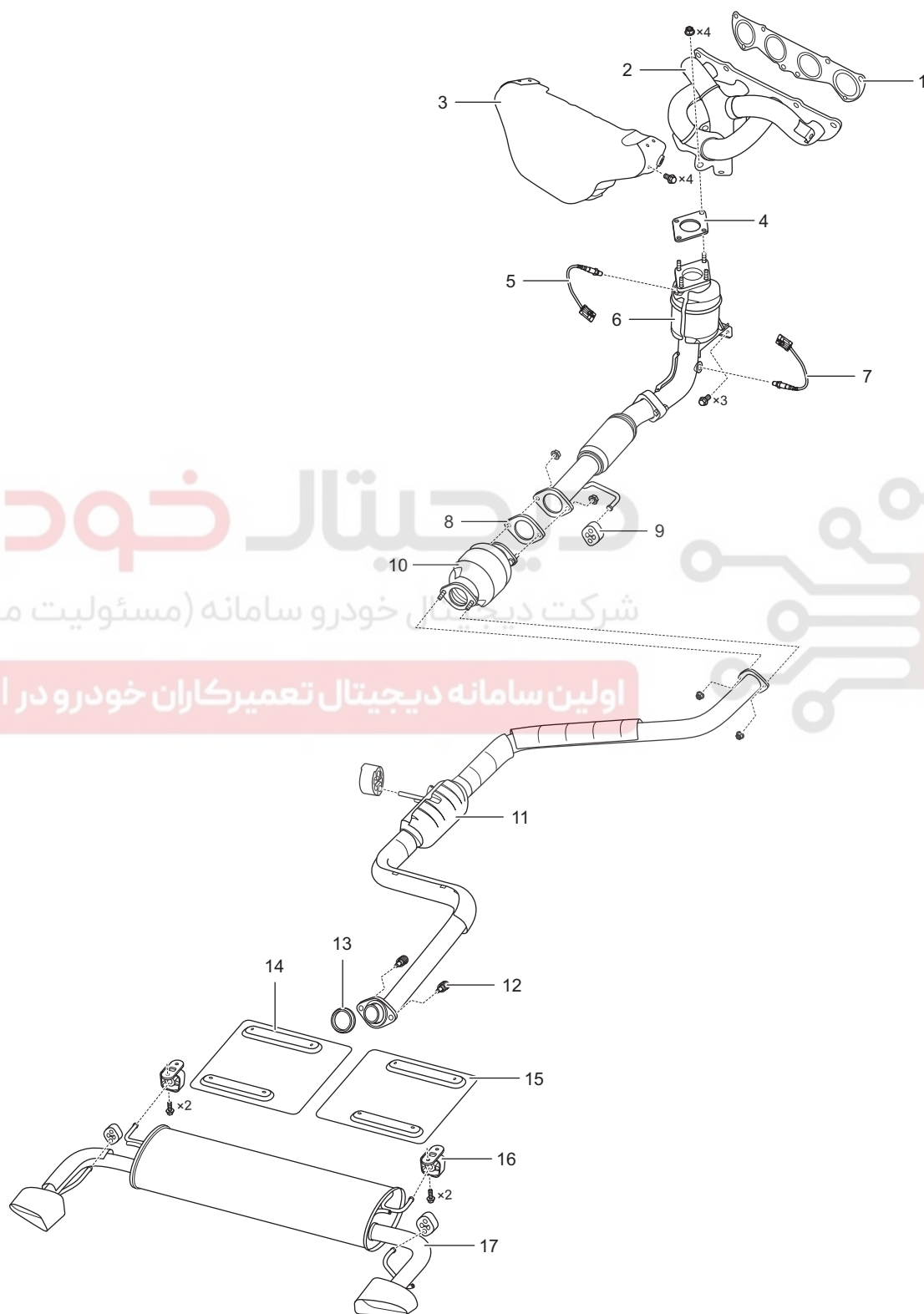
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## GENERAL INFORMATION

### Description



## 16 - SQR484F EXHAUST SYSTEM

|                                         |                                            |
|-----------------------------------------|--------------------------------------------|
| 1 - Exhaust Manifold Assembly Gasket    | 2 - Exhaust Manifold Assembly              |
| 3 - Exhaust Manifold Heat Insulator     | 4 - Precatalytic Converter Assembly Gasket |
| 5 - Upstream Oxygen Sensor              | 6 - Precatalytic Converter Assembly        |
| 7 - Downstream Oxygen Sensor            | 8 - Gasket                                 |
| 9 - Diamond Shaped Hanger Block         | 10 - Main Catalytic Converter Assembly     |
| 11 - Center Pipe Assembly               | 12 - Spring Bolt                           |
| 13 - Sphere Flange Grommet              | 14 - Muffler Assembly Heat Insulator I     |
| 15 - Muffler Assembly Heat Insulator II | 16 - Hanger Block III Assembly             |
| 17 - Muffler Assembly                   |                                            |

Exhaust system is used to control the engine exhaust, reducing vehicle emissions by precatalytic converter and main catalytic converter, and eliminating exhaust noise by muffler. When exhaust system discharges exhaust gas, the oxygen sensor monitors oxygen content in the exhaust gas. The engine control module adjusts the air-fuel ratio of flammable gas mixture to control vehicle emissions and achieve optimal fuel economy according to feedback signals of the oxygen sensor and combining with other sensor signals.

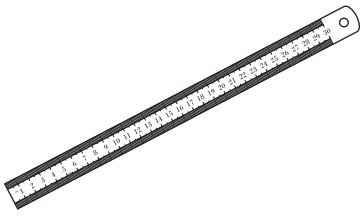
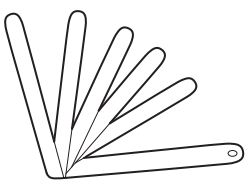
## Specifications

### Torque Specifications

| Description                                                                                                    | Torque (N·m) |
|----------------------------------------------------------------------------------------------------------------|--------------|
| Exhaust Manifold Heat Insulator Fixing Bolt                                                                    | 23 ± 2       |
| Coupling Nut Between Exhaust Manifold Assembly and Precatalytic Converter Assembly                             | 50 ± 5       |
| Exhaust Manifold Assembly Fixing Nut                                                                           | 23 ± 2       |
| Coupling Nut Between Precatalytic Converter Upper Body Assembly and Precatalytic Converter Lower Body Assembly | 50 ± 5       |
| Left Coupling Bolt Between Precatalytic Converter Assembly Bracket and Cylinder Block                          | 23 ± 2       |
| Right Coupling Bolt Between Precatalytic Converter Assembly Bracket and Cylinder Block                         | 50 ± 5       |
| Coupling Nut Between Precatalytic Converter Lower Body Assembly and Main Catalytic Converter Assembly          | 50 ± 5       |
| Upstream Oxygen Sensor                                                                                         | 40 - 60      |
| Downstream Oxygen Sensor                                                                                       | 40 - 60      |
| Coupling Nut Between Main Catalytic Converter Assembly and Center Pipe Assembly                                | 50 ± 5       |
| Coupling Spring Bolt Between Center Pipe Assembly and Muffler Assembly                                         | 50 ± 5       |
| Muffler Assembly Left Hanger Block III Assembly Fixing Bolt                                                    | 50 ± 5       |
| Muffler Assembly Right Hanger Block III Assembly Fixing Bolt                                                   | 50 ± 5       |

## Tools

### General Tools

|                 |                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------|
| Precision Ruler | <br>RCH0000063 |
| Feeler Gauge    | <br>RCH0000060 |

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## DIAGNOSIS & TESTING

### Problem Symptoms Table

**HINT:**

Use the table below to help determine the cause of problem symptoms. Check each suspected area in sequence. Repair or replace the faulty components, or adjust as necessary.

| Symptom                       | Suspected Area                                        | See page |
|-------------------------------|-------------------------------------------------------|----------|
| Excessive exhaust noise       | Exhaust pipe (loose connection)                       | -        |
|                               | Precatalytic converter assembly (damaged or leaked)   | 16-10    |
|                               | Main catalytic converter assembly (damaged or leaked) | 16-13    |
|                               | Center pipe assembly (damaged or leaked)              | 16-15    |
|                               | Muffler assembly (damaged or leaked)                  | 16-17    |
|                               | Exhaust manifold assembly (broken or leaked)          | 16-17    |
| Excessive exhaust temperature | Precatalytic converter assembly (blocked)             | 16-10    |
|                               | Main catalytic converter assembly (blocked)           | 16-13    |
|                               | Incorrect ignition timing in ignition system          | -        |
|                               | Inadequate gas mixture combustion                     | -        |
| Exhaust pipe leakage          | Exhaust pipe gasket (damaged)                         | -        |
|                               | Exhaust pipe (damaged)                                | -        |

### Exhaust System Gas Leakage Inspection

Method to check gas leakage in exhaust system joints:

Warm up engine for a while, and check for gas leakage in the exhaust system joints. A certain amount of gas leakage at the exhaust pipe joint is allowed, but gas leakage at the joint between exhaust manifold and cylinder head is prohibited. The judging standard is that engine does not shudder and no "poof" sound can be heard at the joints.

## ON-VEHICLE SERVICE

### Exhaust Manifold Assembly

#### Removal

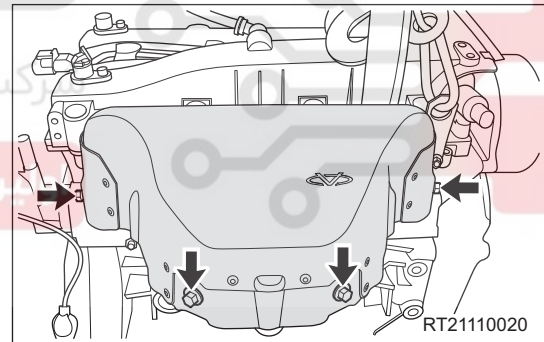
##### WARNING

- The temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running, otherwise, there is a risk of scald injury.

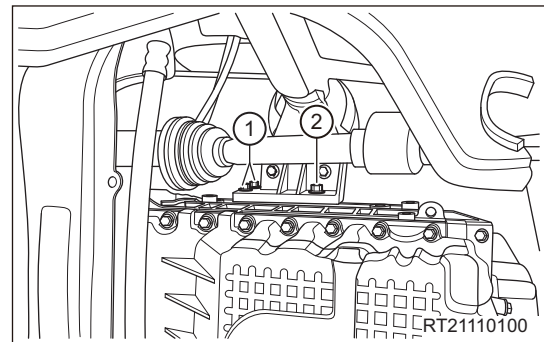
##### CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

- Turn off all the electrical equipment and ignition switch.
- Disconnect the negative battery cable.
- Remove the engine trim cover assembly (See page 14-9).
- Remove the exhaust manifold heat insulator.
  - Remove 4 fixing bolts (arrow) from the exhaust manifold heat insulator.  
(Tightening torque:  $23 \pm 2 \text{ N}\cdot\text{m}$ )

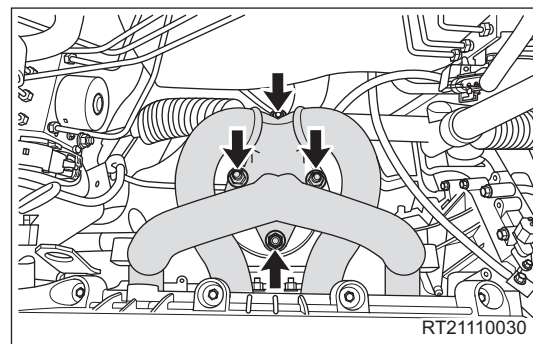


- Remove the exhaust manifold heat insulator.
- Remove the exhaust manifold assembly.
    - Remove 2 left coupling bolts (1) and right coupling bolt (2) between precatlytic converter assembly bracket and cylinder block.  
(Tightening torque for left coupling bolt:  $23 \pm 2 \text{ N}\cdot\text{m}$ )  
(Tightening torque for right coupling bolt:  $50 \pm 5 \text{ N}\cdot\text{m}$ )

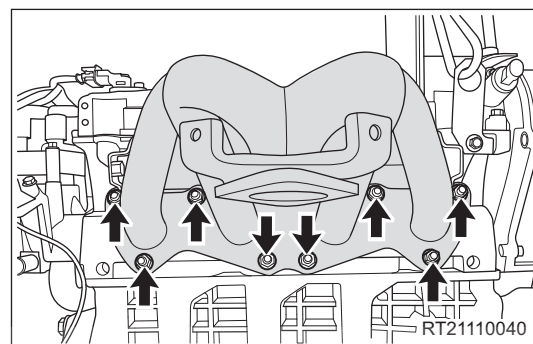


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- b. Remove 4 coupling nuts (arrow), disconnect the connection between exhaust manifold assembly and precatalytic converter assembly, and take off the gasket in the connecting part.  
(Tightening torque:  $50 \pm 5$  N·m)



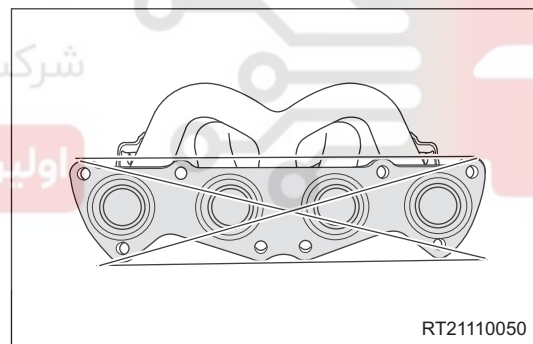
- c. Remove 8 fixing nuts (arrow) from the exhaust manifold assembly.  
(Tightening torque:  $23 \pm 2$  N·m)



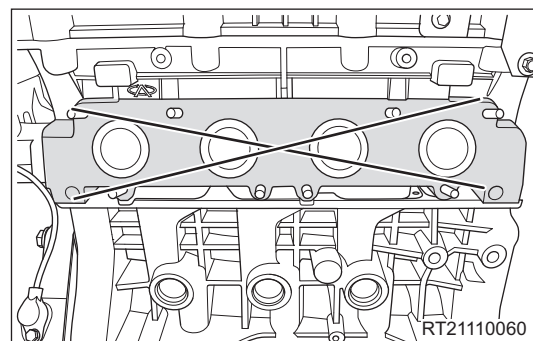
- d. Remove the exhaust manifold assembly, and remove the gasket from the exhaust manifold assembly.

**Inspection**

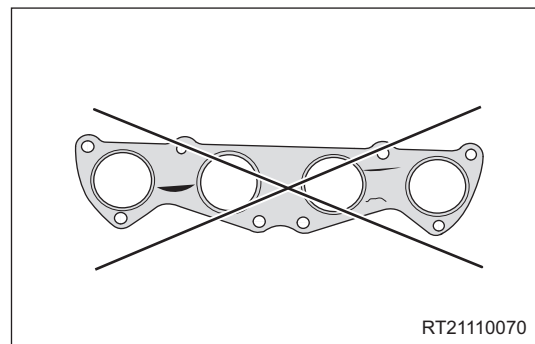
1. Measure warpage on the surface of exhaust manifold assembly with a precision ruler and a feeler gauge. If warpage on the surface is greater than 0.5 mm, replace it.



2. Measure warpage on the surface of cylinder head exhaust side with a precision ruler and a feeler gauge. If warpage on the surface is greater than 0.04 mm, replace it.



3. Check that there are no scratches and roughness on exhaust manifold gasket. Otherwise, replace it.



## Installation

Installation is in the reverse order of removal.

### CAUTION

- When installation is completed, check that there is no exhaust gas leakage between exhaust manifold assembly and cylinder head, precatalytic converter assembly.

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## Precatalytic Converter Assembly

### Removal

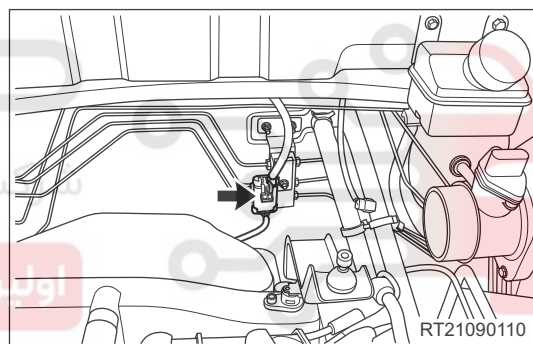
#### ⚠ WARNING

- The temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running, otherwise, there is a risk of scald injury.

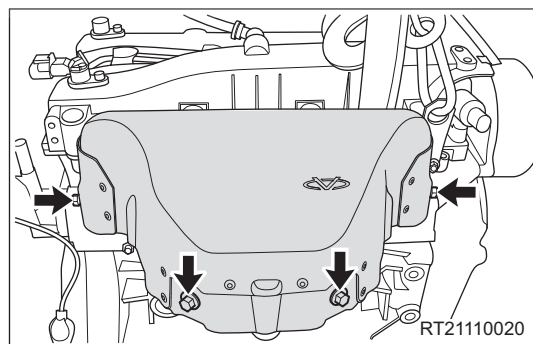
#### 👁 CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

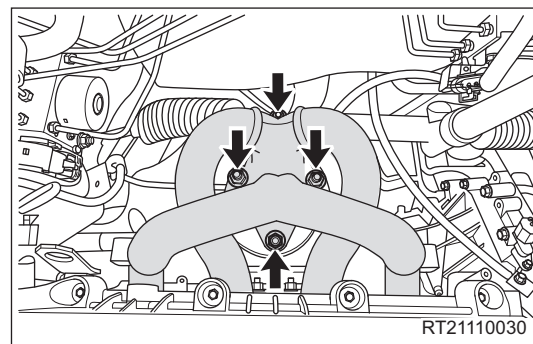
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 36-86).
4. Remove the precatalytic converter assembly.
  - a. Take off and disconnect the upstream oxygen sensor connector (arrow) from the bracket.



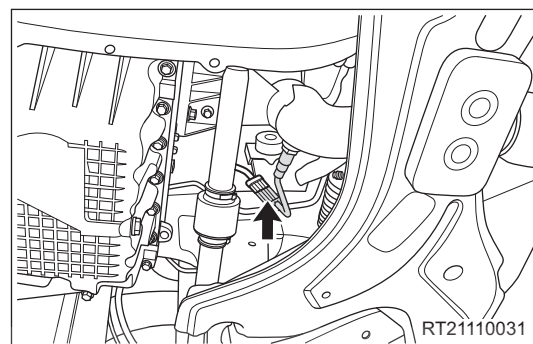
- b. Remove 4 fixing bolts (arrow) from the exhaust manifold heat insulator, and remove the exhaust manifold heat insulator.  
(Tightening torque:  $23 \pm 2$  N·m)



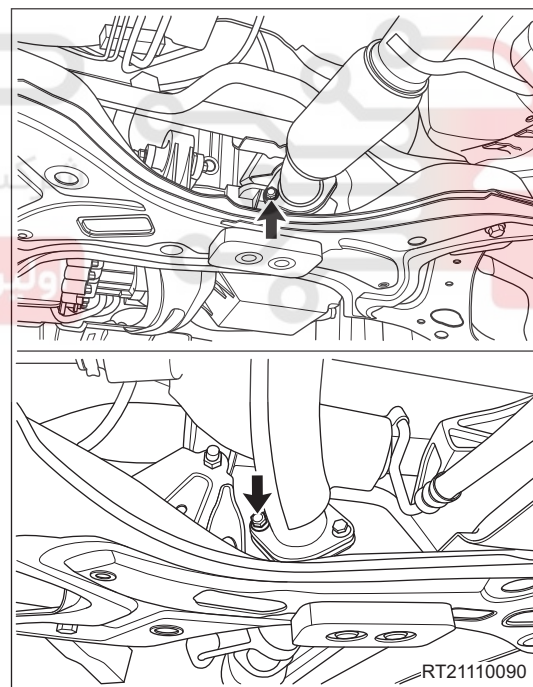
- c. Remove 4 coupling nuts (arrow), disconnect the connection between exhaust manifold assembly and precatytic converter assembly, and take off the gasket in the connecting part.  
(Tightening torque:  $50 \pm 5$  N·m)



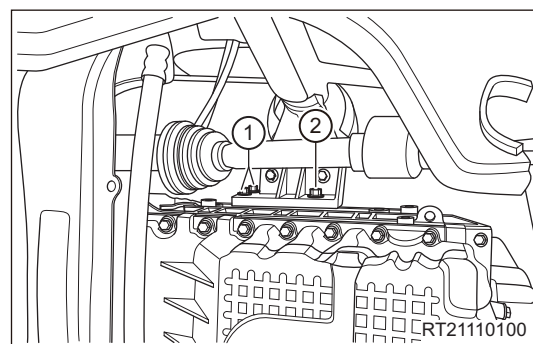
- d. Take off and disconnect the downstream oxygen sensor connector (arrow) from the bracket.



- e. Remove 2 coupling nuts (arrow) between precatytic converter upper body assembly and precatytic converter lower body assembly.  
(Tightening torque:  $50 \pm 5$  N·m)

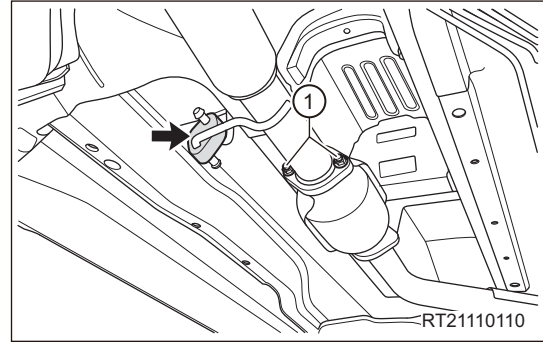


- f. Remove 2 left coupling bolts (1) and right coupling bolt (2) between precatytic converter assembly bracket and cylinder block.  
(Tightening torque for left coupling bolt:  $23 \pm 2$  N·m)  
(Tightening torque for right coupling bolt:  $50 \pm 5$  N·m)

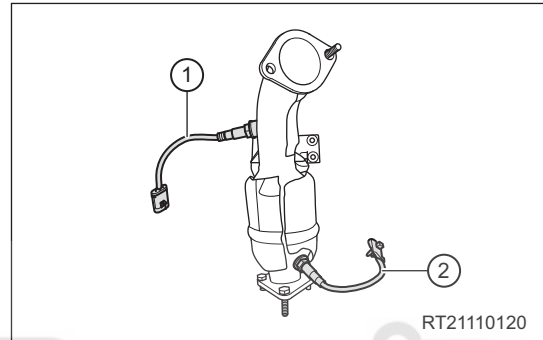


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- g. Remove the precatalytic converter upper body assembly.
- h. Remove 2 coupling nuts (1) between precatalytic converter lower body assembly and main catalytic converter assembly.  
(Tightening torque:  $50 \pm 5$  N·m)
- i. Remove the diamond shaped hanger block (arrow) between precatalytic converter lower body assembly and body hook.



- j. Remove the precatalytic converter lower body assembly.
5. Remove the upstream oxygen sensor (1) and downstream oxygen sensor (2) from the precatalytic converter upper body assembly.  
(Tightening torque: 40 - 60 N·m)

**Installation**

Installation is in the reverse order of removal.

**CAUTION**

- If gasket is damaged, replace it, and remove foreign matter on joints and threads.
- If there are any cracks or leakage in precatalytic converter assembly, replace as necessary.
- Check for exhaust gas leaks. If gas leaks, tighten defective area to prevent leaking. Replace damaged parts as necessary.
- Check that there is no exhaust gas leakage in upstream oxygen sensor connection.
- Check that there is no exhaust gas leakage in downstream oxygen sensor connection.

## Main Catalytic Converter Assembly

### Removal

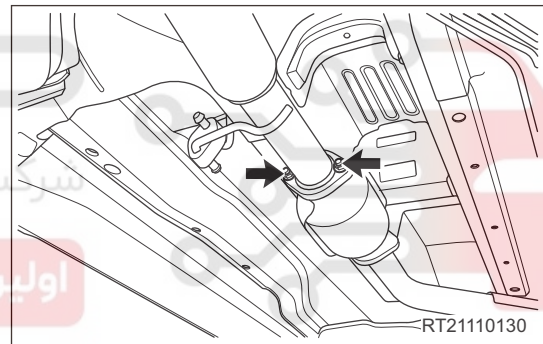
#### ⚠ WARNING

- The temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running, otherwise, there is a risk of scald injury.

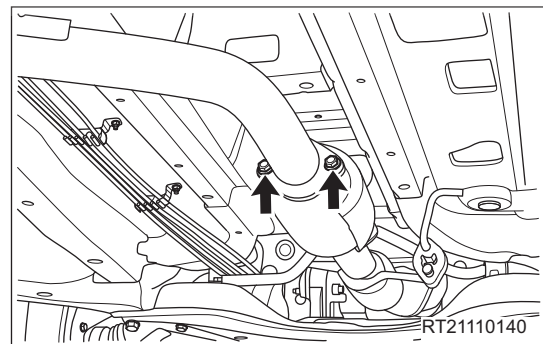
#### 👁 CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

- Turn off all the electrical equipment and ignition switch.
- Disconnect the negative battery cable.
- Raise the vehicle to a proper height.
- Remove the main catalytic converter assembly.
  - Remove 2 coupling nuts (arrow), disconnect the connection between main catalytic converter assembly and precatalytic converter lower body assembly, and take off the gasket in the connecting part.  
(Tightening torque:  $50 \pm 5 \text{ N}\cdot\text{m}$ )



- Remove 2 coupling nuts (arrow), disconnect the connection between main catalytic converter assembly and center pipe assembly, and take off the gasket in the connecting part.  
(Tightening torque:  $50 \pm 5 \text{ N}\cdot\text{m}$ )



- Remove the main catalytic converter assembly.

## Installation

Installation is in the reverse order of removal.

### CAUTION

- If gasket is damaged, replace it, and remove foreign matter on joints and threads.
- If there are any cracks or leakage in main catalytic converter assembly, replace as necessary.
- Keep sufficient distance between main catalytic converter assembly and body during installation.
- Check for exhaust gas leaks. If gas leaks, tighten defective area to prevent leaking. Replace damaged parts as necessary.

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## Center Pipe Assembly

### Removal

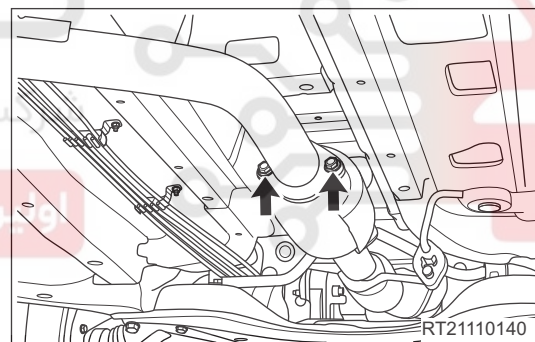
#### ⚠ WARNING

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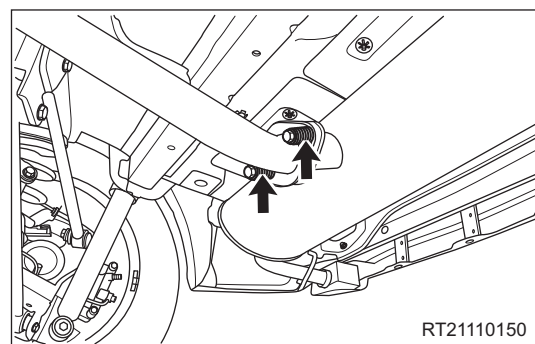
#### 👁 CAUTION

- When removing center pipe assembly, an assistant is needed to hold center pipe assembly. Prevent center pipe assembly from dropping to cause accidents during operation.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

- Turn off all the electrical equipment and ignition switch.
- Disconnect the negative battery cable.
- Raise the vehicle to a proper height.
- Remove the center pipe assembly.
  - Remove 2 coupling nuts (arrow), disconnect the connection between main catalytic converter assembly and center pipe assembly, and take off the gasket in the connecting part.  
(Tightening torque:  $50 \pm 5 \text{ N}\cdot\text{m}$ )

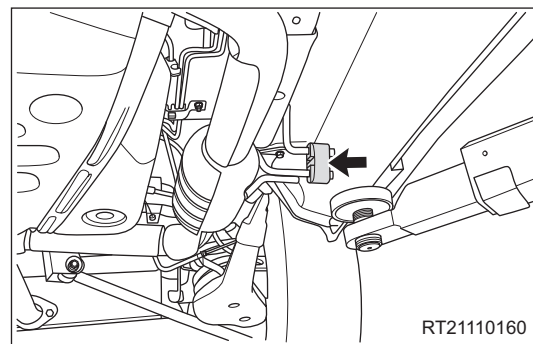


- Remove 2 spring bolts (arrow), disconnect the connection between center pipe assembly and muffler assembly, and take off the sphere flange grommet in the connecting part.  
(Tightening torque:  $50 \pm 5 \text{ N}\cdot\text{m}$ )



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- c. Detach the diamond shaped hanger block (arrow) between center pipe assembly and body hook.



- d. Remove the center pipe assembly.

## Installation

Installation is in the reverse order of removal.

### CAUTION

- If gasket is damaged, replace it, and remove foreign matter on joints and threads.
- If sphere flange grommet is damaged, replace it, and remove foreign matter on joints and threads.
- If there are cracks or leaks, replace the damaged parts.
- During installation, check that exhaust system components do not contact with muffler heat insulator I or vehicle underbody. Make sure that clearance between exhaust system components and muffler heat insulator I or vehicle underbody is more than 25 mm.
- Check for exhaust gas leaks. If gas leaks, tighten defective area to prevent leaking. Replace damaged parts as necessary.

## Muffler Assembly

### Removal

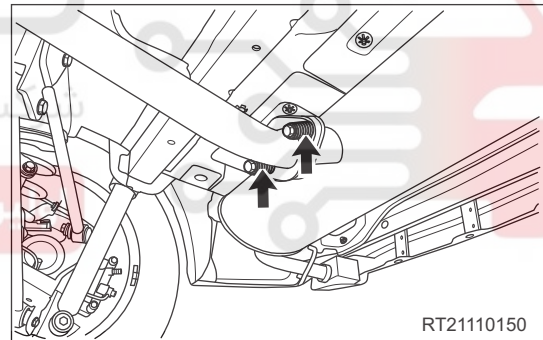
#### WARNING

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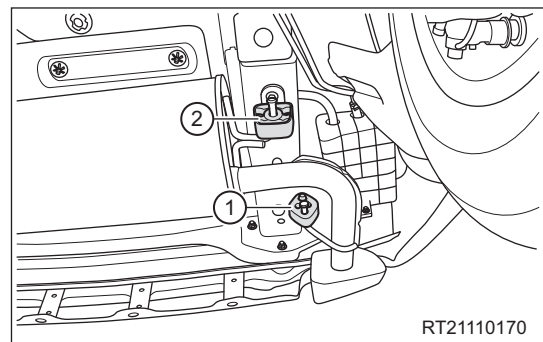
#### CAUTION

- When removing center pipe assembly, an assistant is needed to hold muffler assembly. Prevent muffler assembly from dropping to cause accidents during operation.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Raise the vehicle to a proper height.
4. Remove the muffler assembly.
  - a. Remove 2 spring bolts (arrow), disconnect the connection between muffler assembly and center pipe assembly, and take off the sphere flange grommet in the connecting part.  
(Tightening torque:  $50 \pm 5 \text{ N}\cdot\text{m}$ )

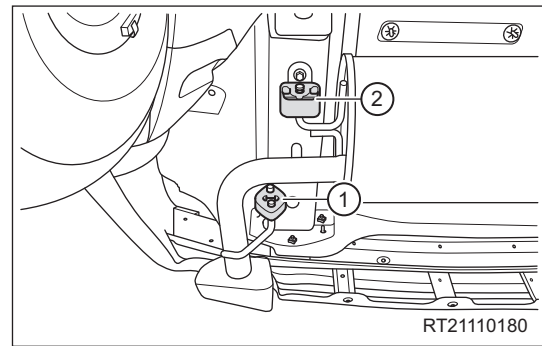


- b. Detach the diamond shaped hanger block (1) between left side of muffler assembly and body hook.
- c. Detach the hanger block III (2) between left side of muffler assembly and body hook.



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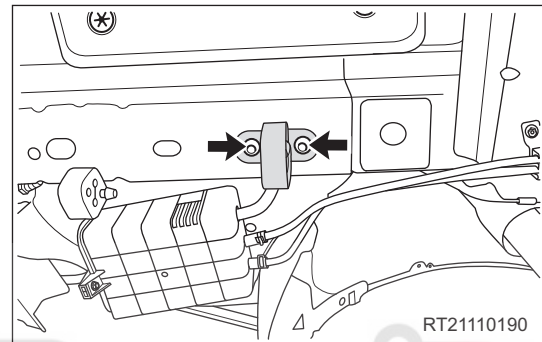
- d. Detach the diamond shaped hanger block (1) between right side of muffler assembly and body hook.
- e. Detach the hanger block III assembly (2) between right side of muffler assembly and body hook.



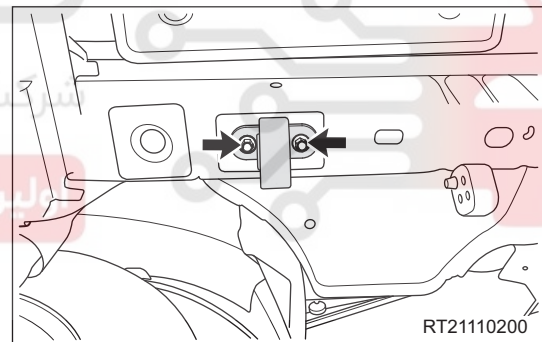
- f. Remove the muffler assembly.

## 5. Remove the hanger block III assembly.

- a. Remove 2 fixing bolts (arrow) from hanger block III assembly on the left side of muffler assembly. (Tightening torque:  $50 \pm 5$  N·m)
- b. Remove the hanger block III assembly from the left side of muffler assembly.

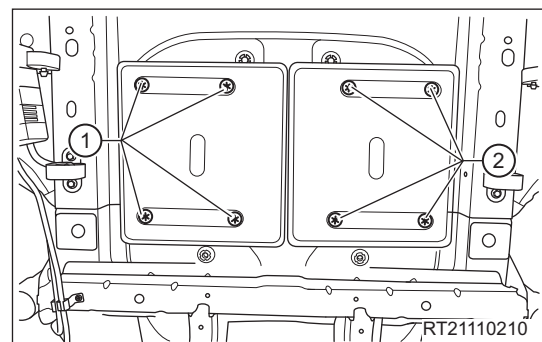


- c. Remove 2 fixing bolts (arrow) from hanger block III assembly on the right side of muffler assembly. (Tightening torque:  $50 \pm 5$  N·m)
- d. Remove the hanger block III assembly from the right side of muffler assembly.



## 6. Remove the muffler assembly heat insulator.

- a. Remove 4 clamping pieces (1) from the muffler assembly heat insulator I, and remove the muffler assembly heat insulator I.
- b. Remove 4 clamping pieces (2) from the muffler assembly heat insulator II, and remove the muffler assembly heat insulator II.



## Installation

Installation is in the reverse order of removal.

### CAUTION

- If sphere flange grommet is damaged, replace it, and remove foreign matter on joints and threads.
- If there are cracks or leaks, replace the damaged parts.
- During installation, make sure that clearance between tailpipe of muffler pipe and bumper on the rear body is more than 30 mm.
- Check for exhaust gas leaks. If gas leaks, tighten defective area to prevent leaking. Replace damaged parts as necessary.

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