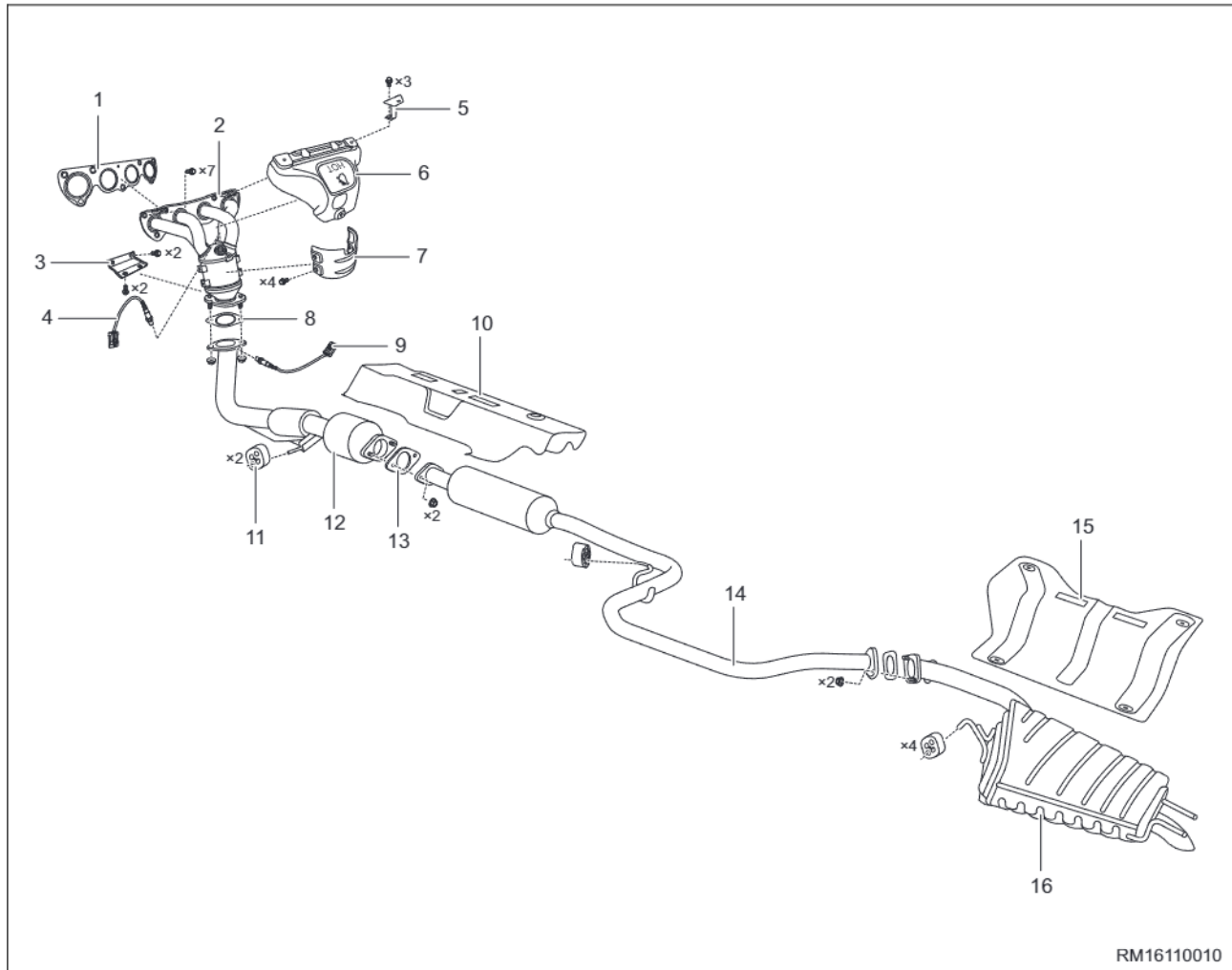

SQRE4G16 EXHAUST SYSTEM

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GENERAL INFORMATION

Description



RM16110010

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1 - Exhaust Manifold Gasket	2 - Exhaust Manifold Assembly
3 - Exhaust Manifold Bracket	4 - Upstream Oxygen Sensor
5 - Oxygen Sensor Bracket	6 - Exhaust Manifold Heat Insulator
7 - Precatalytic Converter Heat Insulator	8 - Gasket
9 - Downstream Oxygen Sensor	10 - Passage Heat Insulator Assembly
11 - Diamond Shaped Hanger Block	12 - Main Catalytic Converter Assembly
13 - Gasket	14 - Front Muffler Assembly
15 - Rear Muffler Heat Insulator Assembly	16 - Rear 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. Engine control module adjusts the air-fuel ratio of combustible gas mixture to control vehicle emissions and achieve optimal fuel economy according to feedback signals of oxygen sensor and combining with other sensor signals.



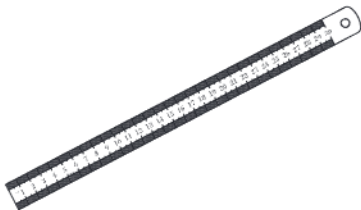
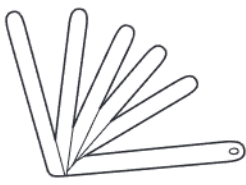
Specifications

Torque Specifications

Description	Torque (N·m)
Exhaust Manifold Heat Insulator Fixing Bolt	8 + 3
Coupling Nut Between Exhaust Manifold Assembly and Main Catalytic Converter Assembly	45 ± 5
Coupling Bolt Between Exhaust Manifold Assembly and Exhaust Manifold Bracket	20 + 5
Exhaust Manifold Assembly Fixing Nut	20 + 5
Precatalytic Converter Heat Insulator Fixing Bolt	8 + 3
Coupling Nut Between Main Catalytic Converter Assembly and Front Muffler Assembly	45 ± 5
Coupling Nut Between Front Muffler Assembly and Rear Muffler Assembly	45 ± 5
Upstream Oxygen Sensor	40 - 60
Downstream Oxygen Sensor	40 - 60

11 Tools

General Tools

Precision Ruler	 RCH0000063
Feeler Gauge	 RCH0000060

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
Excessive exhaust noise	Exhaust pipe (loose connection)	11-4
	Exhaust manifold assembly (damaged or leaked)	11-6
	Main catalytic converter assembly (damaged or leaked)	11-9
	Front muffler assembly (damaged or leaked)	11-11
	Rear muffler assembly (damaged or leaked)	11-13
	Exhaust pipe gasket (damaged)	-
Excessive exhaust temperature	Exhaust manifold assembly (blocked)	11-6
	Main catalytic converter assembly (blocked)	11-9
	Incorrect ignition timing in ignition system	-
	Inadequate gas mixture combustion	-
Exhaust pipe leakage	Exhaust pipe gasket (damaged)	-
	Exhaust manifold assembly (damaged or leaked)	11-6
	Main catalytic converter assembly (damaged or leaked)	11-9
	Front muffler assembly (damaged or leaked)	11-11
	Rear muffler assembly (damaged or leaked)	11-13

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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 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 is heard from the joints.



ON-VEHICLE SERVICE

Exhaust Manifold Assembly

Removal

⚠ WARNING

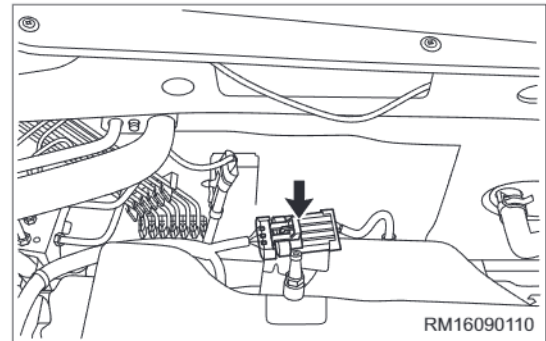
- The temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

👁 CAUTION

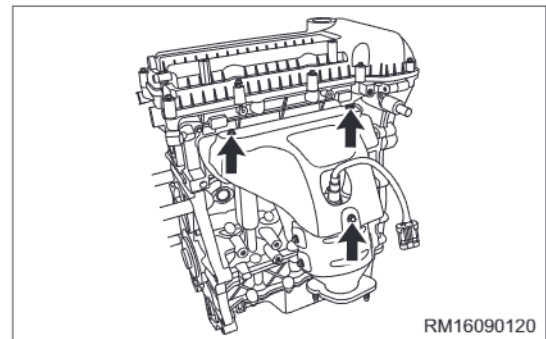
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

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1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the exhaust manifold heat insulator.
 - a. Take off and disconnect the upstream oxygen sensor connector (arrow) from bracket.



- b. Remove 3 fixing bolts (arrow) from exhaust manifold heat insulator, and remove the downstream oxygen sensor bracket. (Tightening torque: 8 + 3 N·m)



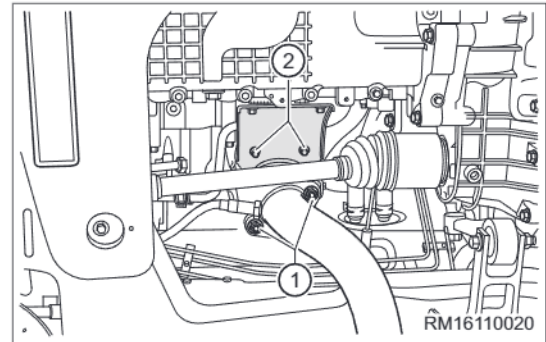
- c. Remove the exhaust manifold heat insulator.

5. Remove the exhaust manifold assembly.

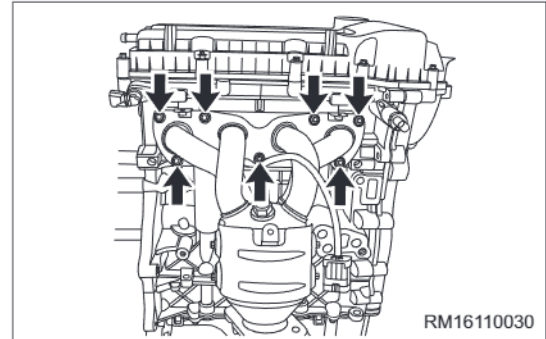
- a. Remove 2 coupling nuts (1), then disconnect the connection between exhaust manifold assembly and main catalytic converter assembly, and take off the gasket from connecting part.

(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)

- b. Remove 2 coupling bolts (2) between exhaust manifold assembly and exhaust manifold bracket.

(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)

- c. Remove 7 fixing nuts (arrow) from exhaust manifold assembly.

(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)

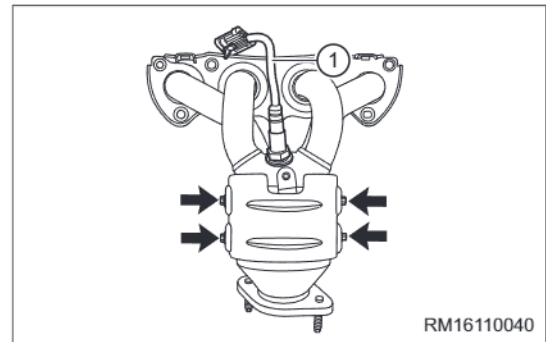
- d. Remove the exhaust manifold assembly, and take off the exhaust manifold assembly gasket.

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6. Remove the upstream oxygen sensor (1) from exhaust manifold assembly.

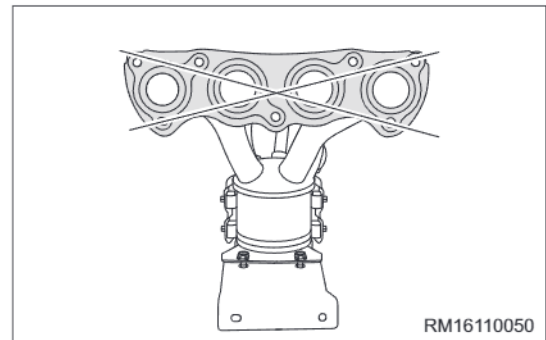
(Tightening torque: $40 - 60 \text{ N}\cdot\text{m}$)

7. Remove 4 fixing bolts (arrow) from precatalytic converter heat insulator, and take off the precatalytic converter heat insulator from exhaust manifold assembly.

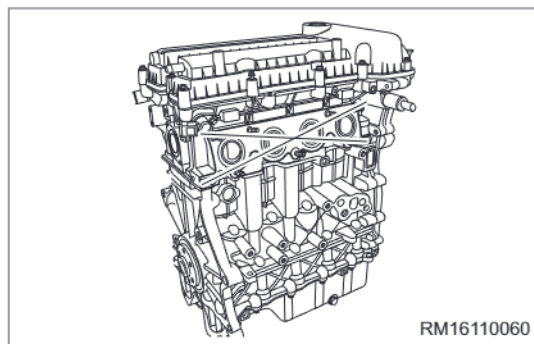
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

Inspection

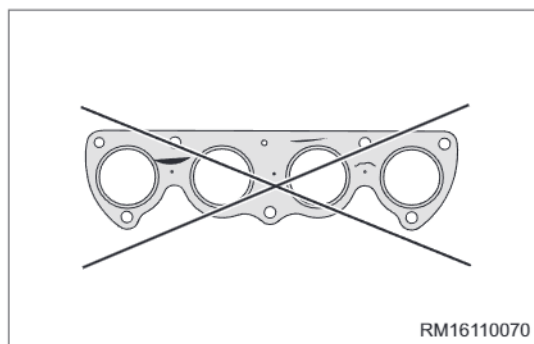
1. Measure warpage on the surface of exhaust manifold assembly with a precision ruler and a feeler gauge. If warpage on the surface is greater than 0.5 mm , replace it.



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



3. Check the exhaust manifold gasket. There should be no scratches or roughness. Otherwise, replace it.



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Installation

Installation is in the reverse order of removal.

CAUTION

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- If there is any crack or leakage in exhaust manifold assembly, replace it.
- Check that there is no exhaust gas leakage in the connecting part of upstream oxygen sensor.
- When installation is completed, check that there is no exhaust gas leakage between exhaust manifold assembly and cylinder head or main catalytic converter assembly.

Main Catalytic Converter Assembly

Removal

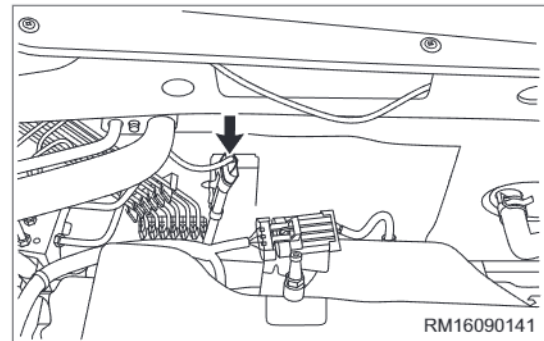
WARNING

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

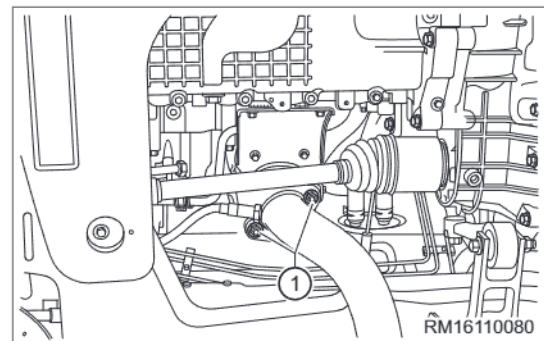
CAUTION

- 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 electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the main catalytic converter assembly.
 - a. Take off and disconnect the downstream oxygen sensor connector (arrow) from bracket.



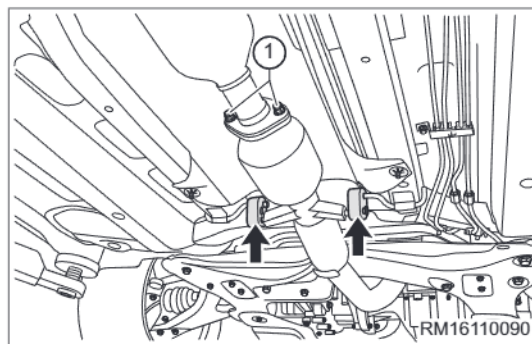
- b. Remove 2 coupling nuts (1), then disconnect the connection between exhaust manifold assembly and main catalytic converter assembly, and take off the gasket from connecting part.
(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)



- c. Remove 2 coupling nuts (1), then disconnect the connection between main catalytic converter assembly and front muffler assembly, and take off the gasket from connecting part.

(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)

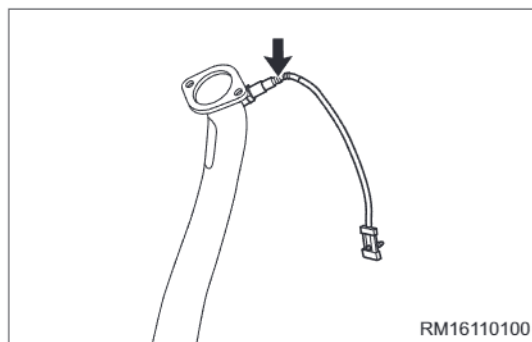
- d. Detach 2 diamond shaped hanger blocks (arrow) between main catalytic converter assembly and body hook.



- e. Remove the main catalytic converter assembly.

5. Remove the downstream oxygen sensor (arrow) from main catalytic converter upper body assembly.

(Tightening torque: $40 - 60 \text{ N}\cdot\text{m}$)



11 Installation

Installation is in the reverse order of removal.

CAUTION

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- If there is any crack or leakage in the main catalytic converter assembly, replace it.
- Check for exhaust gas leakage. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.
- Check that there is no exhaust gas leakage in the connecting part of downstream oxygen sensor.

Front Muffler Assembly

Removal

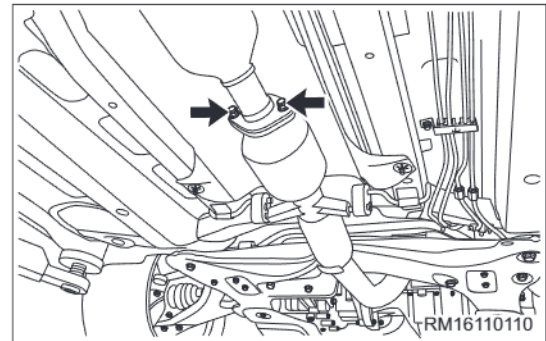
WARNING

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

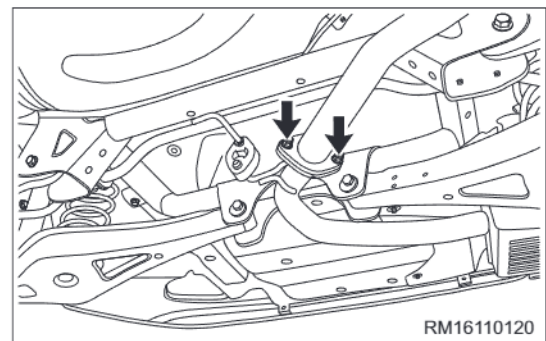
CAUTION

- When removing the front muffler assembly, an assistant is needed to hold it. During operation, prevent the front muffler assembly from dropping, which may cause an accident.
- 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.

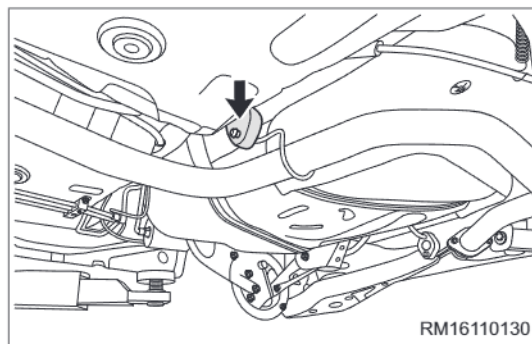
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Raise the vehicle to a proper height.
4. Remove the front muffler assembly.
 - a. Remove 2 coupling nuts (arrow), then disconnect the connection between front muffler assembly and main catalytic converter assembly, and take off the gasket from connecting part.
(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)



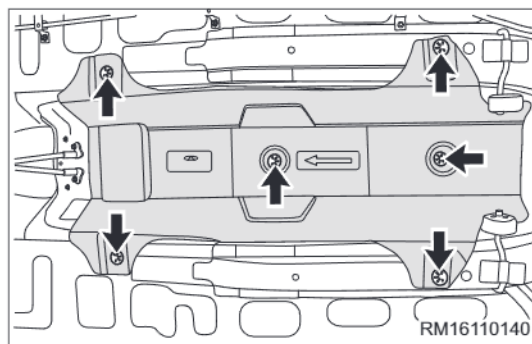
- b. Remove 2 coupling nuts (arrow), then disconnect the connection between front muffler assembly and rear muffler assembly, and take off the gasket from connecting part.
(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)



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



5. Remove the passage heat insulator assembly.
 - a. Remove 6 clamping pieces (arrow) from passage heat insulator assembly.



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- b. Remove the passage heat insulator assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- If there is any crack or leakage in the front muffler assembly, replace it.
- Keep sufficient space between front muffler assembly and vehicle body during installation.
- Check for exhaust gas leaks. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.

Rear Muffler Assembly

Removal

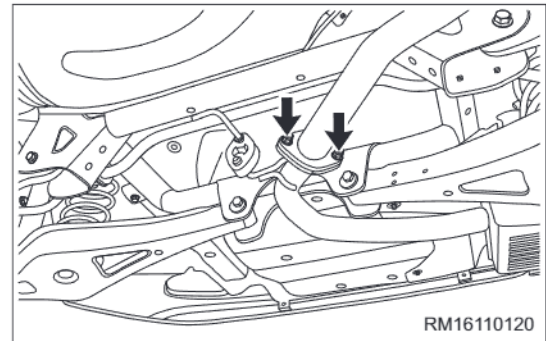
WARNING

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

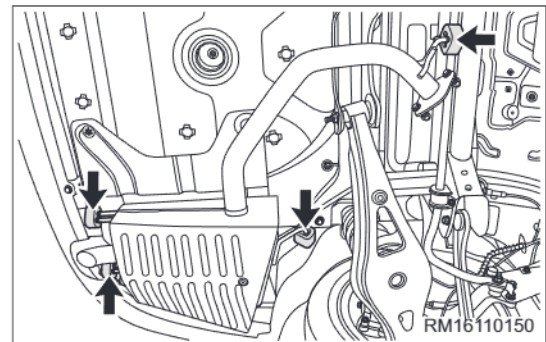
CAUTION

- When removing the rear muffler assembly, an assistant is needed to hold it. During operation, prevent the rear muffler assembly from dropping, which may cause an accident.
- 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 electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Raise the vehicle to a proper position.
4. Remove the rear muffler assembly.
 - a. Remove 2 coupling nuts (arrow), then disconnect the connection between rear muffler assembly and front muffler assembly, and take off the gasket from connecting part.
(Tightening torque: $45 \pm 5 \text{ N}\cdot\text{m}$)

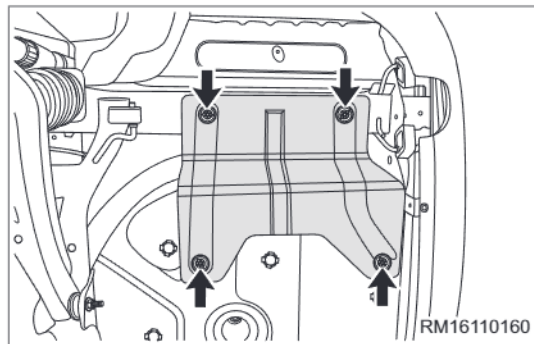


- b. Detach 4 diamond shaped hanger blocks (arrow) between rear muffler assembly and body hooks.



5. Remove the rear muffler heat insulator assembly.

- a. Remove 4 clamping pieces (arrow) from rear muffler heat insulator assembly.



- b. Remove the rear muffler heat insulator assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- If gasket is damaged, replace it, and remove foreign matters on joints and threads.
- If there is any crack or leakage in the rear muffler assembly, replace it.
- Check for exhaust gas leaks. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.

