

SQRE4T15/SQRE4T15B EXHAUST SYSTEM

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دیجیتال خودرو

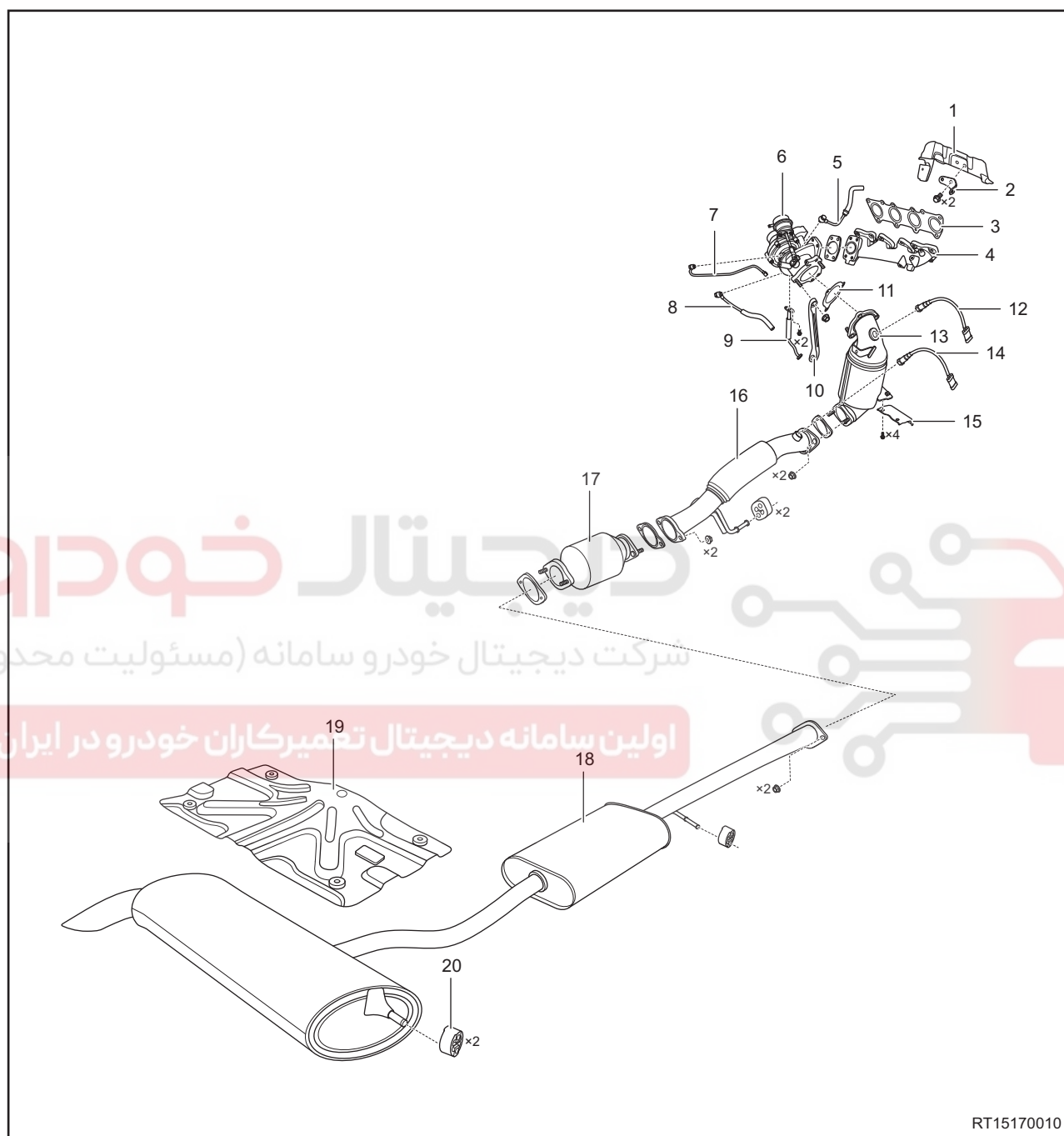
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description (1.5 TCI + 6MT)



RT15170010

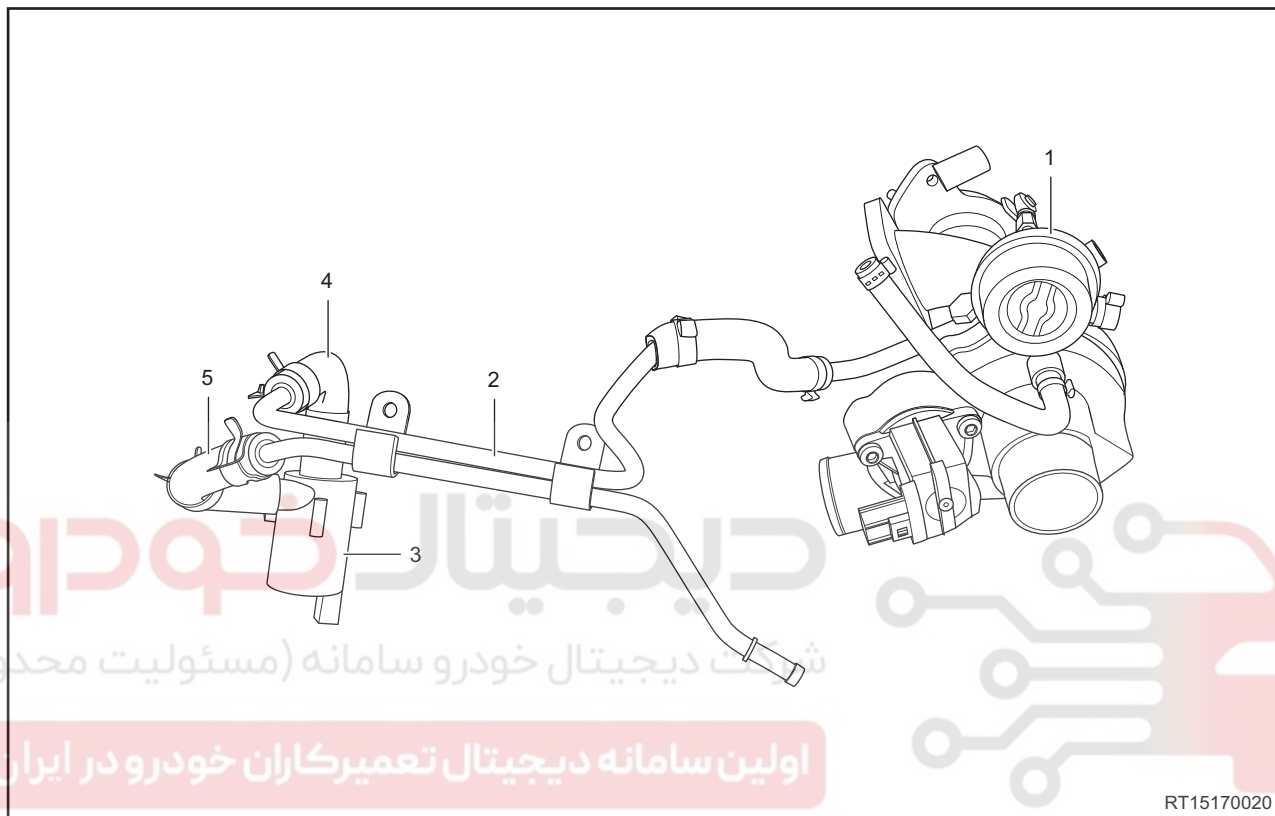
18

1 - Exhaust Manifold Heat Insulator	2 - Turbocharger Bracket
3 - Exhaust Manifold Gasket	4 - Exhaust Manifold Assembly
5 - Water Outlet Pipe Assembly	6 - Turbocharger
7 - Water Inlet Pipe Assembly	8 - Oil Inlet Pipe
9 - Oil Return Pipe	10 - Turbocharger Bracket II
11 - Gasket	12 - Upstream Oxygen Sensor

18 - SQRE4T15/SQRE4T15B EXHAUST SYSTEM

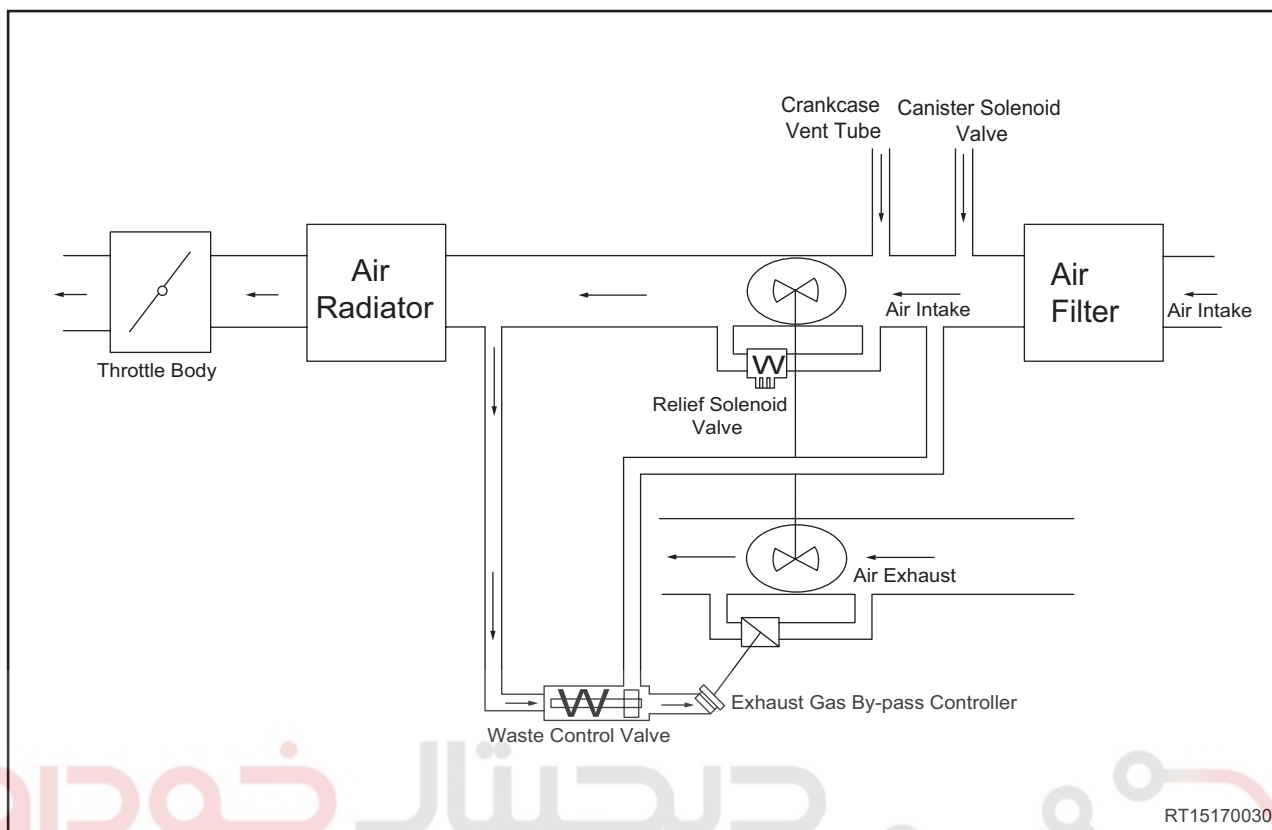
13 - Precatalytic Converter Assembly	14 - Downstream Oxygen Sensor
15 - Precatalytic Converter Assembly Mounting Bracket	16 - Front Pipe Assembly
17 - Main Catalytic Converter Assembly	18 - Muffler Assembly
18 - Muffler Heat Insulator	20 - Rubber Hanger Block

Connection Between Turbocharger and Electric Water Pump



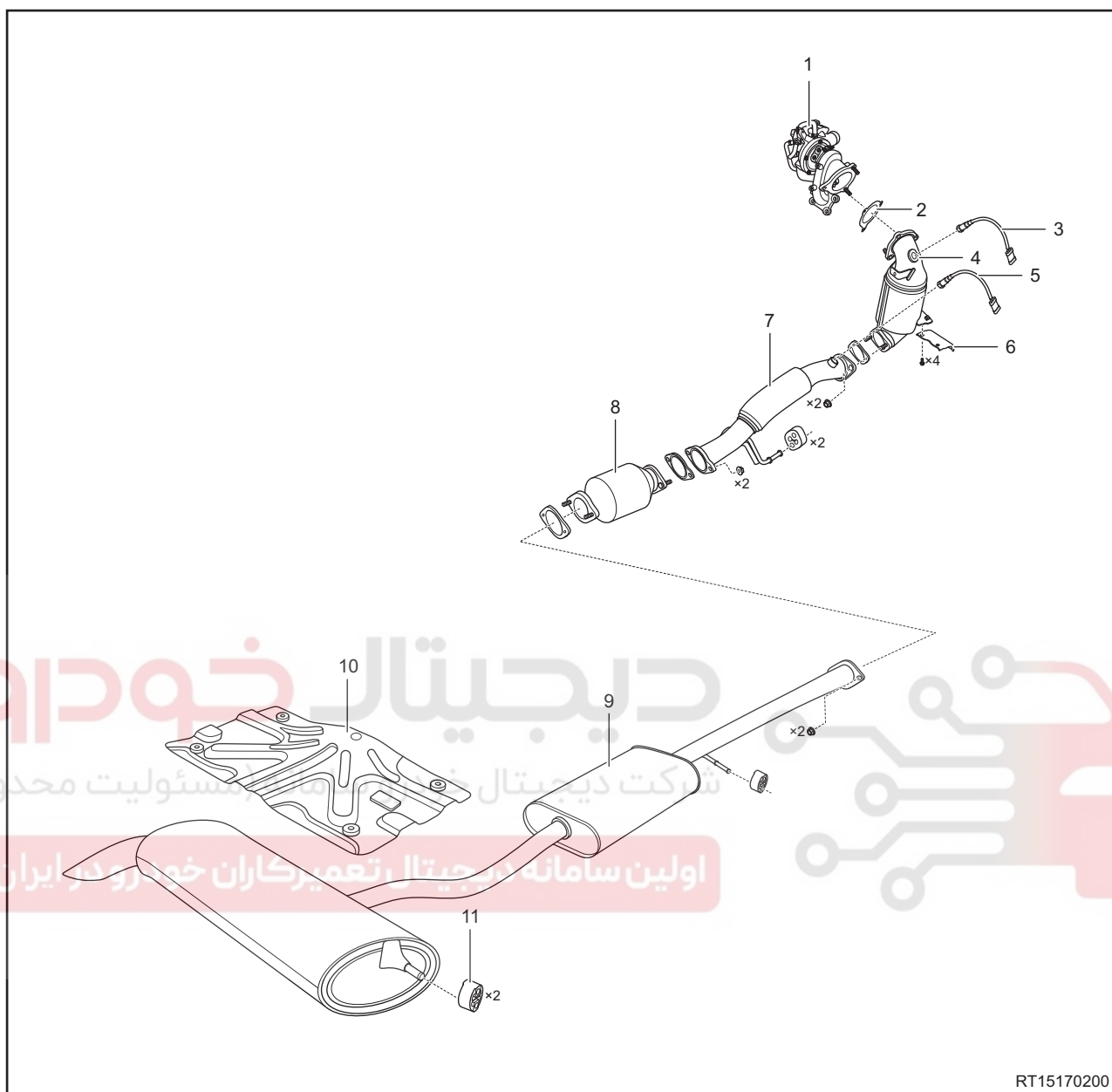
1 - Turbocharger Assembly	2 - Turbocharger Water Outlet Pipe
3 - Electric Water Pump	4 - Electric Water Pump Inlet Pipe
5 - Electric Water Pump Outlet Pipe	

Turbocharger Operation



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.

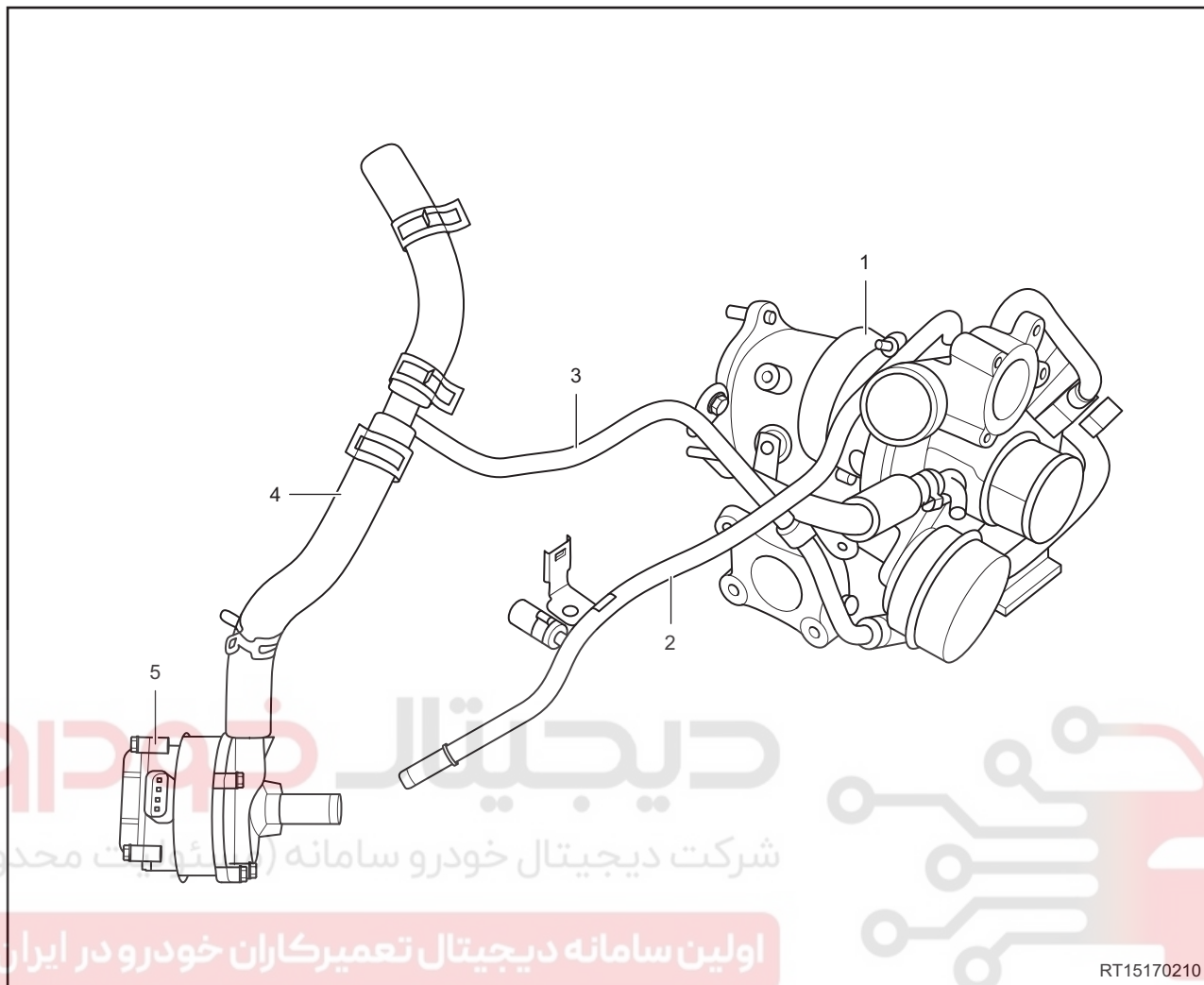
Description (1.5 TCI + DCT)



RT15170200

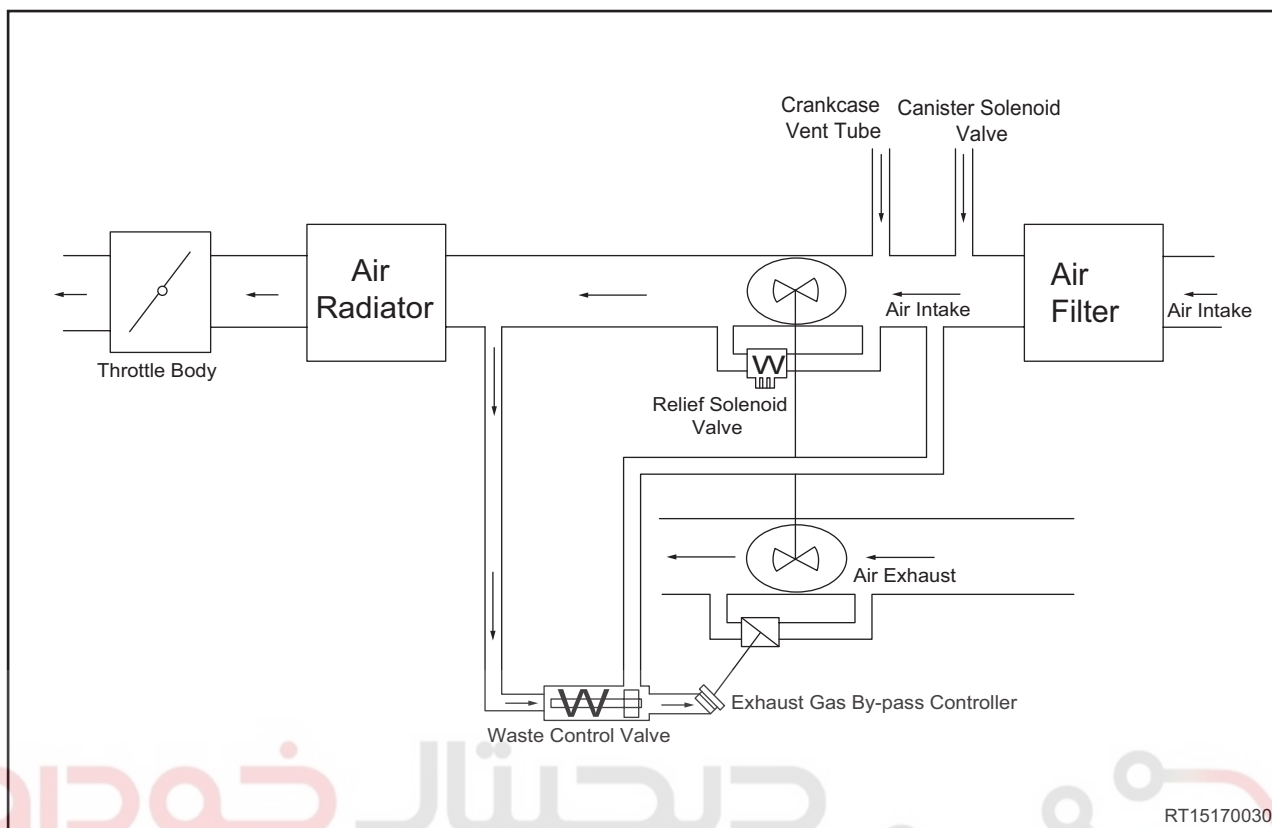
1 - Turbocharger Assembly	2 - Precatalytic Converter Mounting Gasket
3 - Upstream Oxygen Sensor	4 - Precatalytic Converter Assembly
5 - Downstream Oxygen Sensor	6 - Precatalytic Converter Mounting Bracket
7 - Front Exhaust Pipe Assembly	8 - Main Catalytic Converter Assembly
9 - Muffler Assembly	10 - Muffler Heat Insulator

Connection Between Turbocharger and Electric Water Pump



1 - Turbocharger Assembly	2 - Turbocharger Water Outlet Pipe Set
3 - Turbocharger Water Inlet Pipe Set	4 - Electric Water Pump Outlet Pipe
5 - Electric Water Pump Assembly	

Turbocharger Operation



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

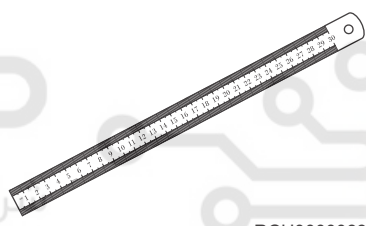
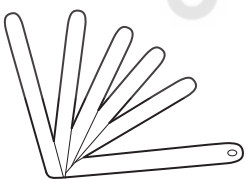
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Description	Torque (N·m)
Exhaust Manifold Heat Insulator Fixing Bolt	8 + 3
Exhaust Manifold Fixing Nut	20 + 5
Coupling Nut Between Exhaust Manifold Assembly and Turbocharger Assembly	33 ± 3
Precatalytic Converter Assembly Fixing Bracket Bolt	20 ± 5
Upstream Oxygen Sensor	45 ± 5
Downstream Oxygen Sensor	45 ± 5
Coupling Bolt Between Precatalytic Converter Assembly and Front Exhaust Pipe Assembly	45 ± 5
Coupling Nut Between Main Catalytic Converter Assembly and Front Exhaust Pipe Assembly	45 ± 5
Coupling Nut Between Main Catalytic Converter Assembly and Front Muffler Assembly	45 ± 5

Description	Torque (N·m)
Coupling Nut Between Front Muffler Assembly and Rear Muffler Assembly	45 ± 5
Turbocharger Bracket Fixing Bolt	23 ± 3.5
Turbocharger Heat Insulator Fixing Bolt	9 ± 1.5
Turbocharger Heat Insulator II Fixing Bolt	8 + 3
Turbocharger Fixing Bolt	20 + 5
Exhaust By-pass Control Solenoid Valve Fixing Bolt	3 + 2
Exhaust By-pass Control Solenoid Valve Bracket Fixing Bolt	8 + 3
Electric Water Pump Assembly Fixing Bolt	8 + 3
Electric Water Pump Bracket Fixing Bolt	8 + 3

Tools

General Tools

Precision Straightedge	 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)	18-34
	Exhaust manifold assembly (damaged or leaked)	18-11
	Main catalytic converter assembly (damaged or leaked)	18-36
	Muffler assembly (damaged or leaked)	18-37
	Exhaust pipe gasket (damaged)	-
Excessive exhaust temperature	Exhaust manifold assembly (blocked)	-
	Main catalytic converter assembly (blocked)	-
	Precatalytic converter assembly (blocked)	-
	Incorrect ignition timing in ignition system	-
	Inadequate gas mixture combustion	-
Exhaust pipe leakage	Exhaust pipe gasket (damaged)	-
	Exhaust manifold assembly (damaged or leaked)	18-11
	Main catalytic converter assembly (damaged or leaked)	18-36
	Muffler assembly (damaged or leaked)	18-37

18 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 joint between exhaust manifold and cylinder head, and joint between turbocharger and cylinder head is prohibited. Judging standard is that engine does not shudder and no "poof" sound is heard from joints.

ON-VEHICLE SERVICE

Exhaust Manifold Assembly (1.5 TCI + 6MT)

Removal

WARNING

- 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

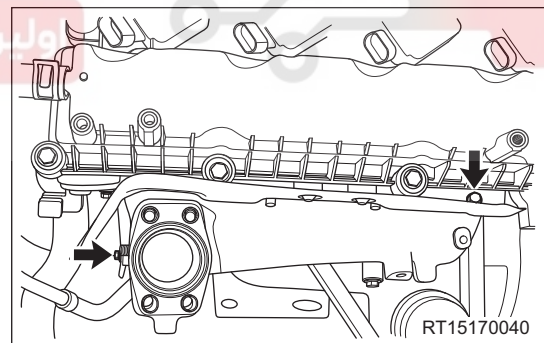
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the precatlytic converter assembly (See page 18-31).
5. Remove the turbocharger assembly (See page 18-16).
6. Remove the exhaust manifold assembly.

- a. Remove 2 fixing bolts (arrow) from exhaust manifold heat insulator.

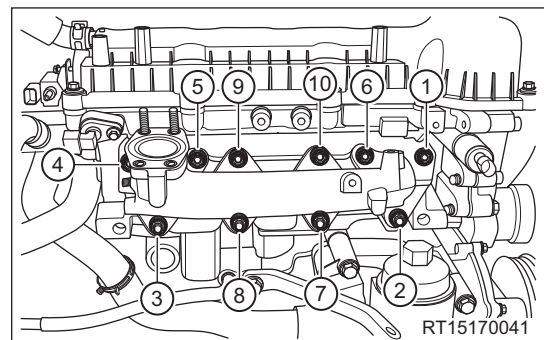
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

- b. Remove the exhaust manifold heat insulator assembly.



- c. Remove 10 exhaust manifold fixing nuts in order shown in illustration, and remove nut gaskets.

(Tightening torque: $33 + 3 \text{ N}\cdot\text{m}$)

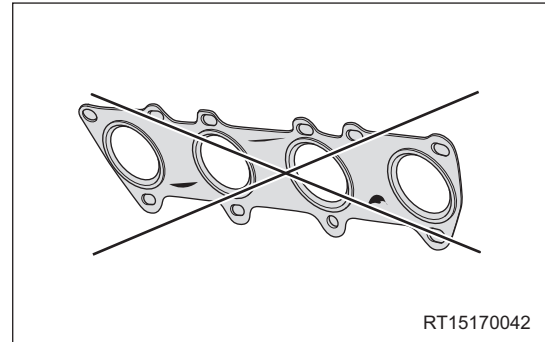


- d. Remove the exhaust manifold assembly.

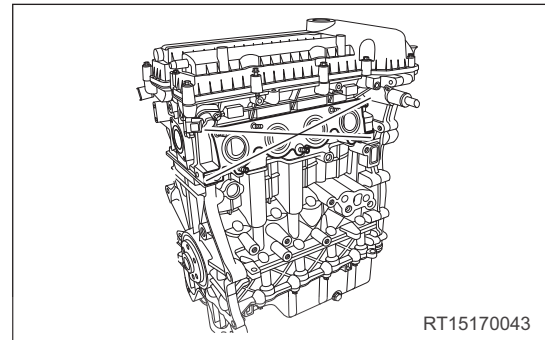
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Inspection

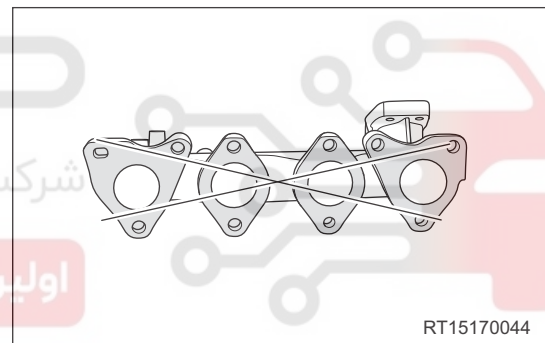
1. Check the exhaust manifold gasket. There should be no scratches or roughness. Otherwise, replace it.



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. Measure warpage on surface of exhaust manifold assembly with a precision ruler and a feeler gauge. If warpage on the surface is greater than 0.1 mm, replace it.

**Installation**

Installation is in the reverse order of removal.

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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 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.

Turbocharger Heat Insulator Assembly (1.5 TCI + 6MT)

Removal

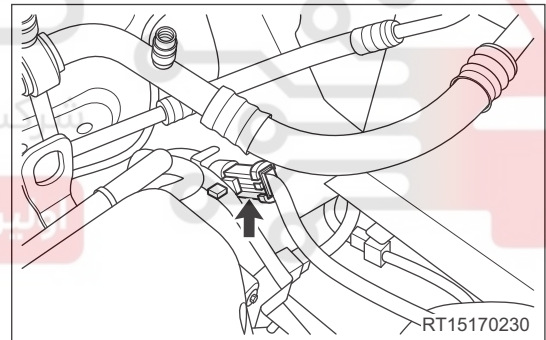
⚠ WARNING

- 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.

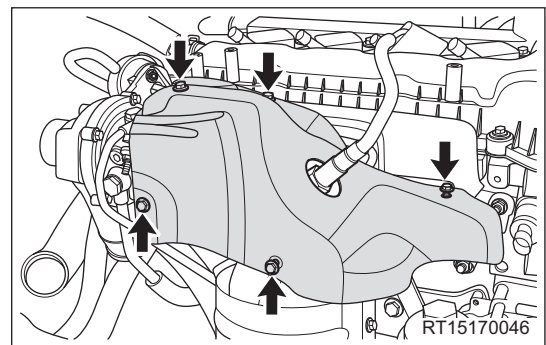
👁 CAUTION

- 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 engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the turbocharger heat insulator assembly.
 - a. Disconnect the upstream oxygen sensor connector (arrow).



- b. Remove 5 fixing bolts (arrow) from turbocharger heat insulator.
(Tightening torque: 8 + 3 N·m)



- c. Remove the turbocharger heat insulator assembly.

Installation

Installation is in the reverse order of removal.

Turbocharger Heat Insulator Assembly (1.5 TCI + DCT)

Removal

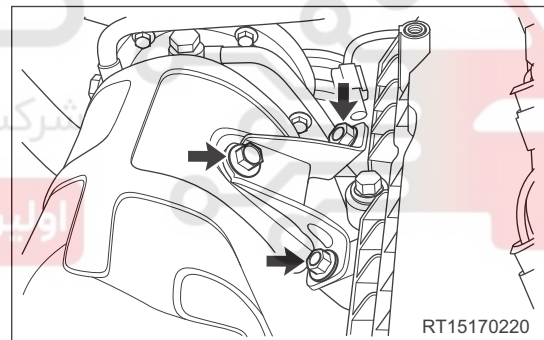
⚠ WARNING

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👁 CAUTION

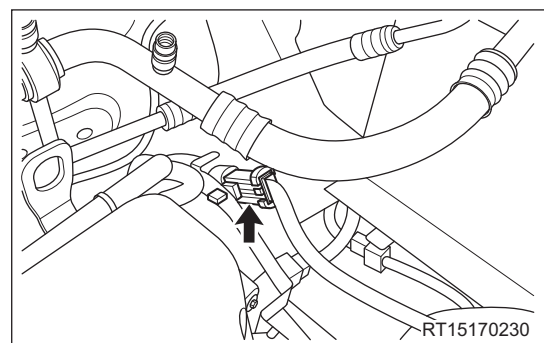
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the turbocharger fixing bracket.
 - a. Remove 3 fixing bolts (arrow) from turbocharger fixing bracket.
(Tightening torque: $23 \pm 3.5 \text{ N}\cdot\text{m}$)



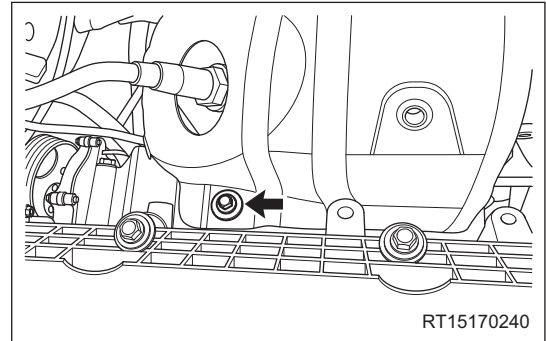
- b. Remove the turbocharger fixing bracket.

5. Remove the turbocharger heat insulator assembly.
 - a. Disconnect the upstream oxygen sensor connector (arrow).



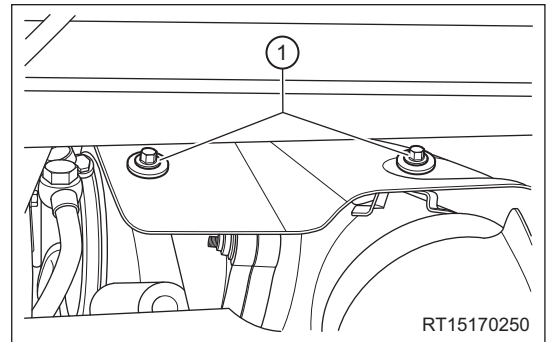
- b. Remove fixing bolt (arrow) from turbocharger heat insulator.

(Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)



- c. Remove 2 fixing bolts (1) from turbocharger heat insulator.

(Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)

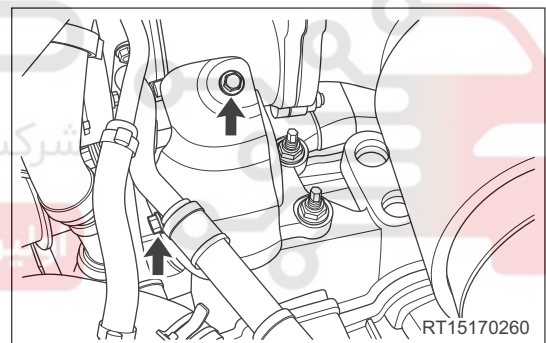


- d. Remove the turbocharger heat insulator assembly.

6. Remove the turbocharger heat insulator II.

- a. Remove 2 fixing bolts (arrow) from turbocharger heat insulator II.

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



- b. Remove the turbocharger heat insulator II.

Installation

Installation is in the reverse order of removal.

Turbocharger Assembly (1.5 TCI + 6MT)

Removal

WARNING

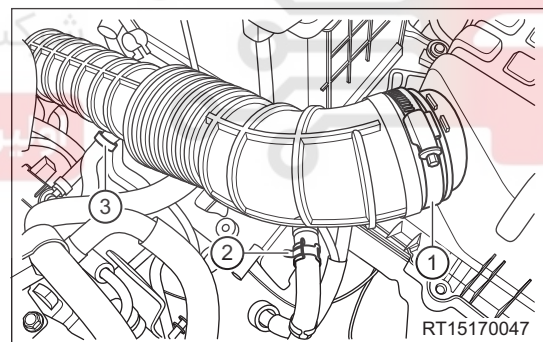
- Temperature of exhaust system is very high when engine is running. Before removal, make sure that engine has stopped running and exhaust system has cooled down sufficiently, otherwise, there is a risk of scald injury.

CAUTION

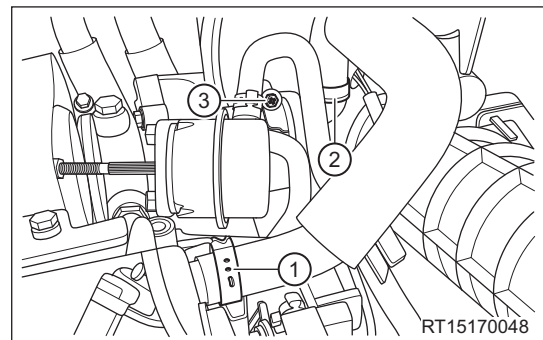
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the precatalytic converter assembly (See page 18-31).
5. Remove the turbocharger assembly.
 - a. Remove the intake hose assembly.

- i. Loosen worm clamp (1) and disconnect connection between air filter assembly and intake hose.
- ii. Loosen elastic clamp (2) and disconnect connection between fuel vapor hose and intake hose.
- iii. Loosen clamping ring (3) and disconnect connection between exhaust by-pass control solenoid valve hose and intake manifold.

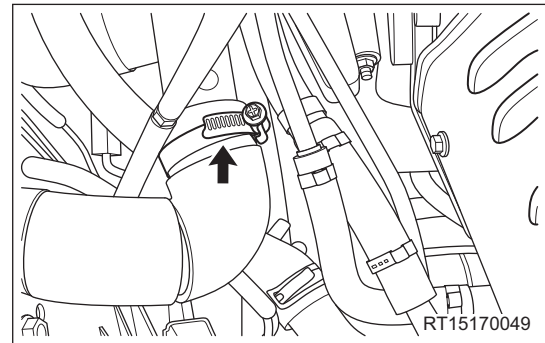


- iv. Loosen clamping ring (1) and disconnect connection between cylinder head cover and crankcase ventilation hose.
- v. Disconnect the heater assembly connector (2).
- vi. Loosen worm clamp (3) and disconnect connection between intake hose and turbocharger inlet port.

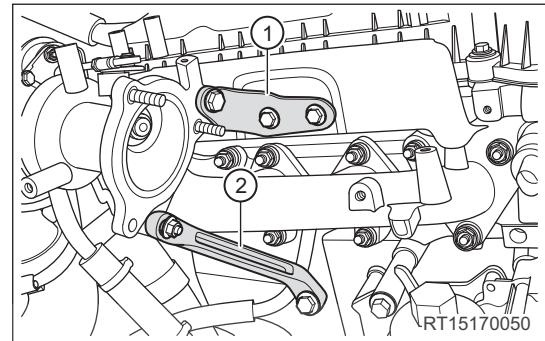


- vii. Remove the intake hose assembly.

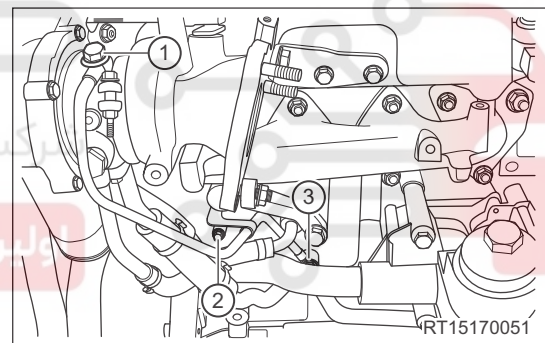
- b. Loosen worm clamp (arrow) and disconnect connection between turbocharger outlet port and intercooler inlet port.



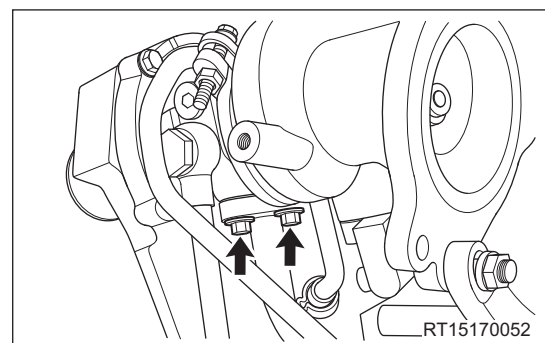
- c. Remove turbocharger brackets (1) and (2).
- Remove 3 fixing bolts from bracket (1).
(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)
 - Remove fixing bolt and nut from bracket (2).
(Tightening torque for nut: $33 \pm 3 \text{ N}\cdot\text{m}$; tightening torque for bolt: $42.5 \pm 2.5 \text{ N}\cdot\text{m}$)



- d. Remove the turbocharger oil inlet pipe assembly.
- Remove hollow bolt (1) between turbocharger oil inlet pipe and turbocharger assembly.
(Tightening torque: $20 + 3 \text{ N}\cdot\text{m}$)
 - Remove fixing bolt (2) from turbocharger oil inlet pipe bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)
 - Remove hollow bolt (3) between turbocharger oil inlet pipe and cylinder block assembly.
(Tightening torque: $20 + 3 \text{ N}\cdot\text{m}$)



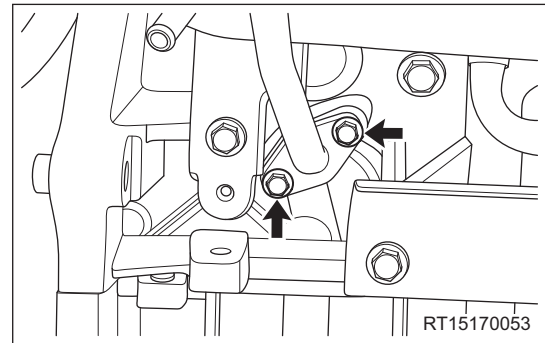
- e. Remove the turbocharger return pipe assembly.
- Remove 2 coupling bolts (arrow) between turbocharger return pipe and turbocharger assembly.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



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- ii. Remove 2 coupling bolts (arrow) between turbocharger return pipe and cylinder block assembly.

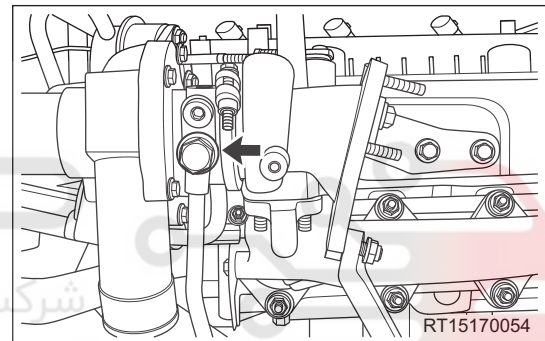
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



CAUTION

- During removal, prevent upper and lower gaskets and bolts from falling off. Gaskets and bolts cannot be reused.

- f. Remove the turbocharger water inlet pipe assembly.
- i. Remove hollow bolt (arrow) between turbocharger water inlet pipe and turbocharger assembly.
- (Tightening torque: $25 + 3 \text{ N}\cdot\text{m}$)

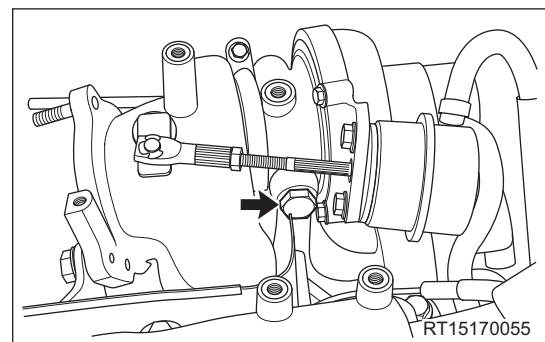


CAUTION

- During removal, prevent upper and lower gaskets from falling off. Gaskets cannot be reused.

18

- g. Remove the turbocharger water outlet pipe assembly.
- i. Remove hollow bolt (arrow) between turbocharger water outlet pipe and turbocharger assembly.
- (Tightening torque: $25 + 3 \text{ N}\cdot\text{m}$)



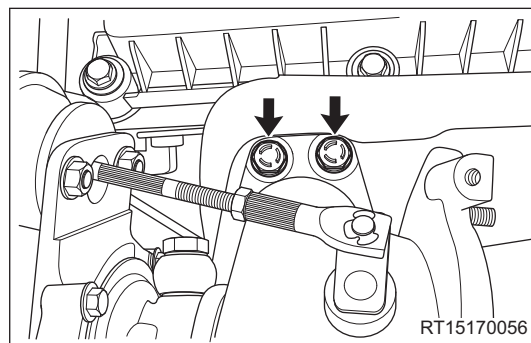
CAUTION

- During removal, prevent upper and lower gaskets from falling off. Gaskets cannot be reused.

h. Remove the turbocharger assembly.

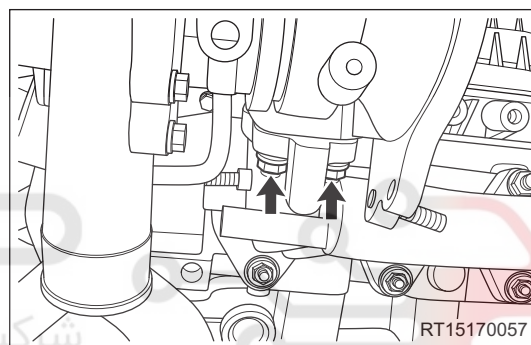
- i. Remove coupling nuts (arrow) between turbocharger assembly and exhaust manifold assembly.

(Tightening torque: $33 \pm 3 \text{ N}\cdot\text{m}$)



- ii. Remove coupling nuts (arrow) between turbocharger assembly and exhaust manifold assembly, and remove turbocharger assembly and gaskets.

(Tightening torque: $33 \pm 3 \text{ N}\cdot\text{m}$)

**Inspection**

1. Check turbine rotor for sticking.
2. Check turbine rotor for abnormal noise.
3. Check rotor vane for damage.
4. Check turbocharger for oil or water leakage.

Installation

Installation is in the reverse order of removal.

CAUTION

- If gasket is damaged, replace it, and clear foreign matters from joint part.
- Check for air leakage. If there is leakage, check if each nut or bolt is tightened. If damaged part is found, replace it.

Turbocharger Assembly (1.5 TCI + DCT)

Removal

⚠ WARNING

- 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.

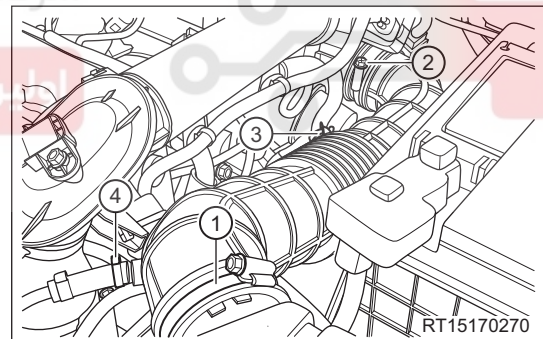
👁 CAUTION

- 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 engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the muffler assembly (See page 16-14).
5. Remove the precatlytic converter assembly (See page 18-31).
6. Remove the turbocharger assembly.

a. Remove the intake hose assembly.

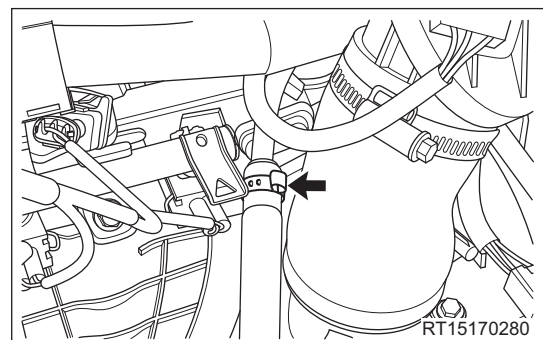
- i. Loosen worm clamp (1) and disconnect connection between intake hose and air filter assembly.
- ii. Loosen worm clamp (2) and disconnect connection between intake hose and turbocharger assembly.
- iii. Loosen elastic clamp (3) and disconnect connection between crankcase ventilation hose and intake hose.
- iv. Loosen elastic clamp (4) and disconnect connection between fuel vapor hose set and intake hose.



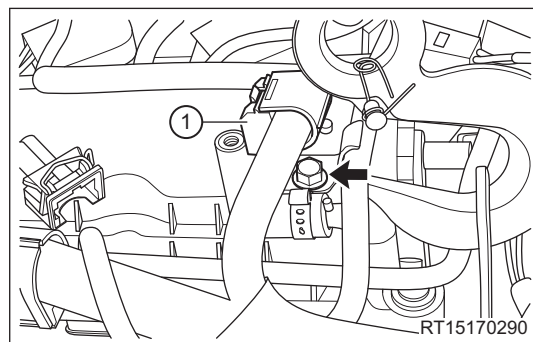
v. Remove the intake hose assembly.

b. Remove the turbocharger water outlet pipe set assembly.

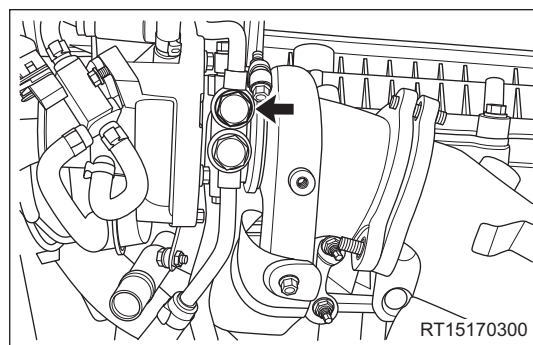
- i. Loosen clamping ring (1) and disconnect connection between intercooler water outlet pipe set and turbocharger water outlet pipe set.



- ii. Remove the engine wire harness fixing clip (1).
- iii. Remove fixing bolt (arrow) from turbocharger water outlet pipe set bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



- iv. Remove hollow bolt (arrow) between turbocharger water outlet pipe set and turbocharger assembly.
(Tightening torque: $25 + 5 \text{ N}\cdot\text{m}$)



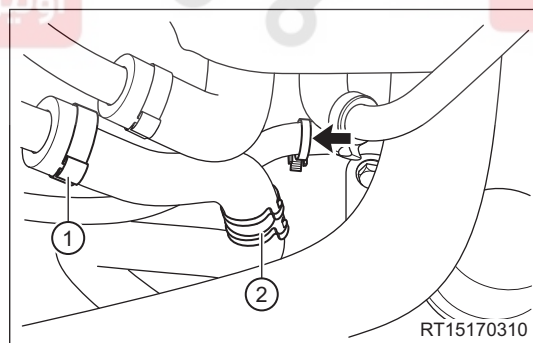
- v. Remove the turbocharger water outlet pipe set assembly.

CAUTION

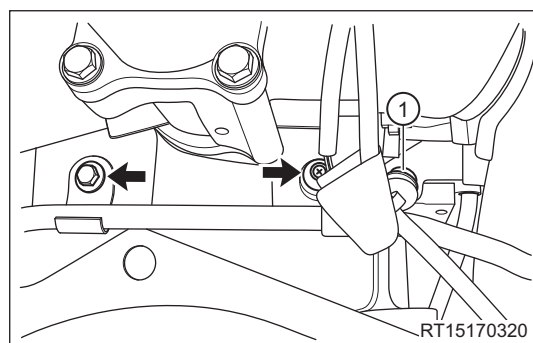
- During removal, prevent upper and lower gaskets of hollow bolt from falling off. Gaskets cannot be reused.

- c. Remove the turbocharger water inlet pipe set assembly.

- i. Loosen clamping ring (1) and disconnect connection between turbocharger water inlet pipe set hose and intercooler assembly.
- ii. Loosen clamping ring (2) and disconnect connection between turbocharger water inlet pipe set and electric water pump outlet hose.
- iii. Remove the engine wire harness fixing clip (arrow).

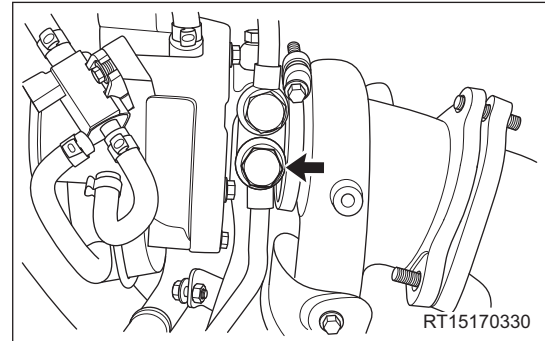


- iv. Remove the engine wire harness fixing clip (1).
- v. Remove 2 fixing bolts (arrow) from turbocharger water inlet pipe set bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



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- vi. Remove hollow bolt (arrow) between turbocharger water inlet pipe and turbocharger assembly.
(Tightening torque: $25 + 5 \text{ N}\cdot\text{m}$)

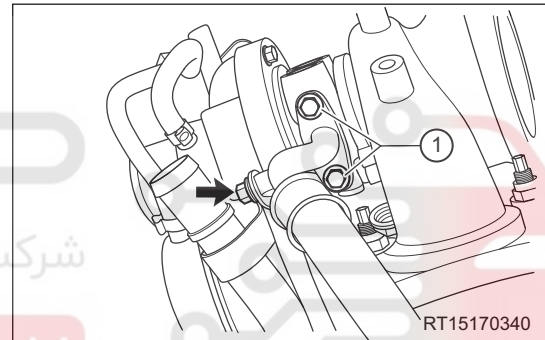


- vii. Remove the turbocharger water inlet pipe set assembly.

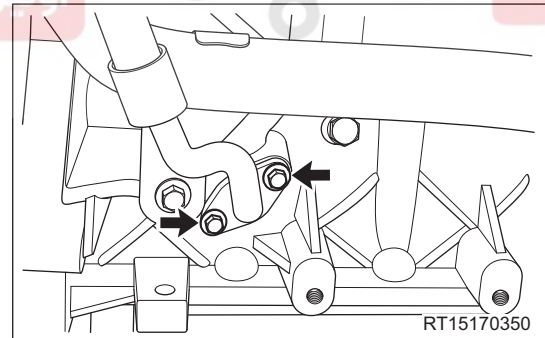
CAUTION

- During removal, prevent upper and lower gaskets of hollow bolt from falling off. Gaskets cannot be reused.

- d. Remove the turbocharger return pipe assembly.
- Remove fixing bolt (arrow) from turbocharger return pipe bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)
 - Remove 2 coupling bolts (1) between turbocharger return pipe and turbocharger assembly.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



- Remove 2 coupling bolts (arrow) between turbocharger return pipe and cylinder block assembly.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

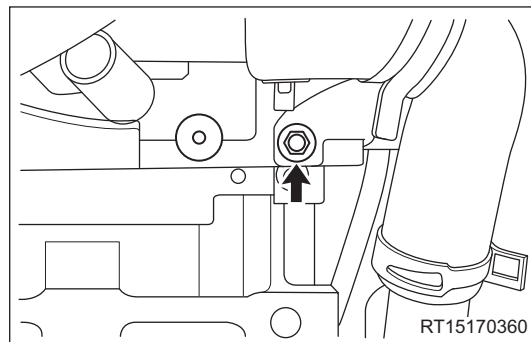


- iv. Remove the turbocharger return pipe assembly.

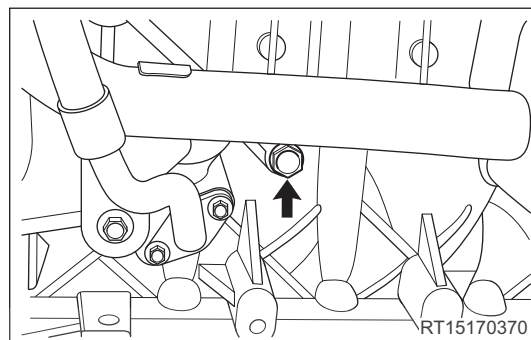
CAUTION

- During removal, prevent upper and lower gaskets and bolts from falling off. Gaskets and bolts cannot be reused.

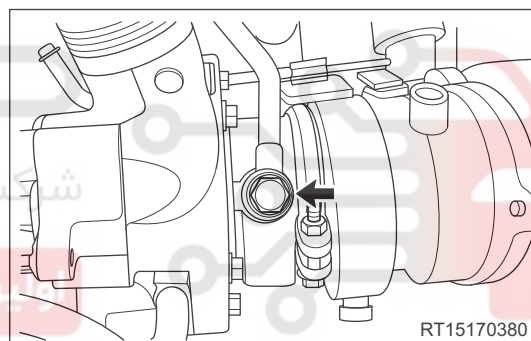
- e. Remove the turbocharger oil inlet pipe assembly.
- i. Remove fixing bolt (arrow) from turbocharger oil inlet pipe bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)



- ii. Remove hollow bolt (arrow) between turbocharger oil inlet pipe and cylinder block assembly.
(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)



- iii. Remove hollow bolt (arrow) between turbocharger oil inlet pipe and turbocharger assembly.
(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)



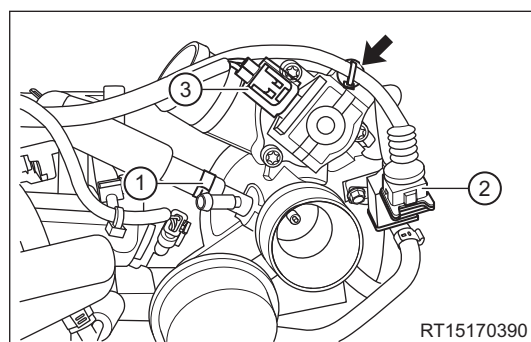
- iv. Remove the turbocharger oil inlet pipe assembly.

CAUTION

- During removal, prevent upper and lower gaskets of hollow bolt from falling off. Gaskets cannot be reused.

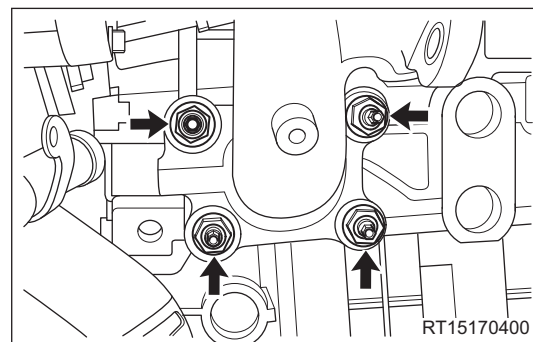
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- f. Remove the turbocharger assembly.
- i. Loosen clamping ring (1) and disconnect connection between crankcase vent tube and turbocharger assembly.
- ii. Disconnect the exhaust by-pass control solenoid valve connector (2).
- iii. Remove the engine wire harness fixing clip (arrow).
- iv. Disconnect the reduction control solenoid valve connector (3).



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- v. Remove 4 fixing nuts (arrow) from turbocharger.
(Tightening torque: $25 + 5 \text{ N}\cdot\text{m}$)



- vi. Remove the turbocharger assembly.

Inspection

1. Check turbine rotor for sticking.
2. Check turbine rotor for abnormal noise.
3. Check rotor vane for damage.
4. Check turbocharger for oil or water leakage.

Installation

Installation is in the reverse order of removal.

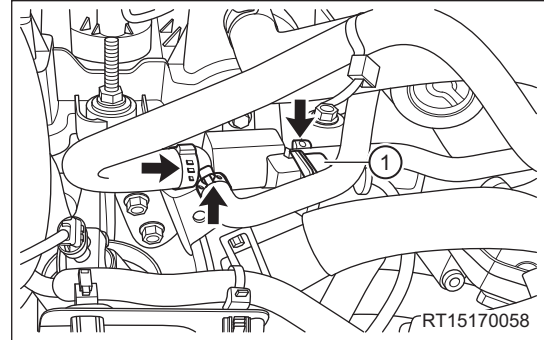
CAUTION

- If gasket is damaged, replace it, and clear foreign matters from joint part.
- Check for air leakage. If there is leakage, check if each nut or bolt is tightened. If damaged part is found, replace it.

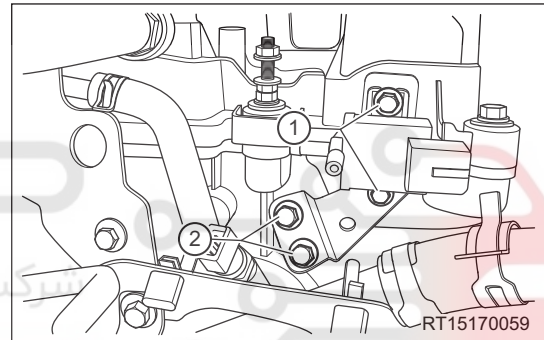
Exhaust By-pass Control Solenoid Valve and Bracket (1.5 TCI + 6MT)

Removal

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the exhaust by-pass control solenoid valve and bracket.
 - a. Disconnect the exhaust by-pass control solenoid valve connector (1).
 - b. Loosen clamping rings (arrow) and disconnect connection between exhaust by-pass control solenoid valve and 3 hoses.



- c. Remove 2 fixing bolts (1) from exhaust by-pass control solenoid valve.
(Tightening torque: 3 + 2 N·m)
- d. Remove 2 fixing bolts (2) between exhaust by-pass control solenoid valve bracket and cylinder head.
(Tightening torque: 8 + 3 N·m)



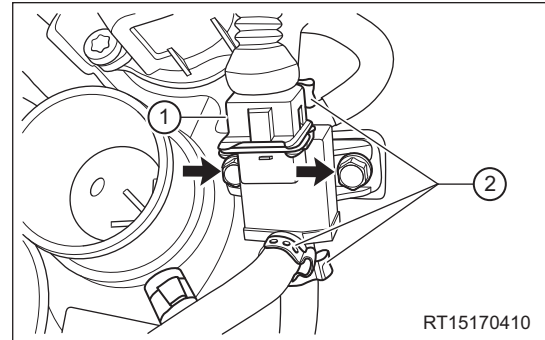
Installation

Installation is in the reverse order of removal.

Exhaust By-pass Control Solenoid Valve (1.5 TCI + DCT)

Removal

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the exhaust by-pass control solenoid valve.
 - a. Disconnect the exhaust by-pass control solenoid valve connector (1).
 - b. Loosen clamping rings (2) and disconnect connection between 3 hoses and exhaust by-pass control solenoid valve.
 - c. Remove 2 fixing bolts (arrow) from exhaust by-pass control solenoid valve.
(Tightening torque: 3 + 2 N·m)



- d. Remove the exhaust by-pass control solenoid valve assembly.

Installation

Installation is in the reverse order of removal.

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Electric Water Pump Assembly and Bracket, Water Pipe (1.5 TCI + 6MT)

Removal

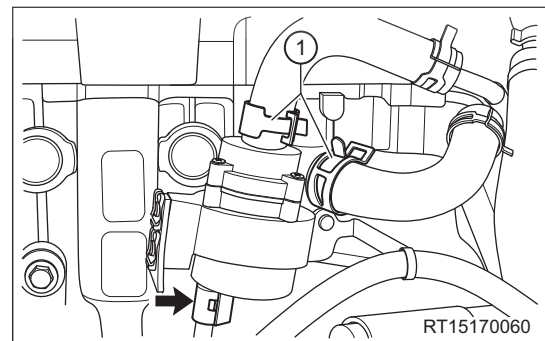
WARNING

- Be sure to ensure that engine cooling system is at low temperature before handling. If engine is in hot status, high-temperature and high-pressure coolant may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, immediately wash the affected area with water and seek medical attention if it is serious.

CAUTION

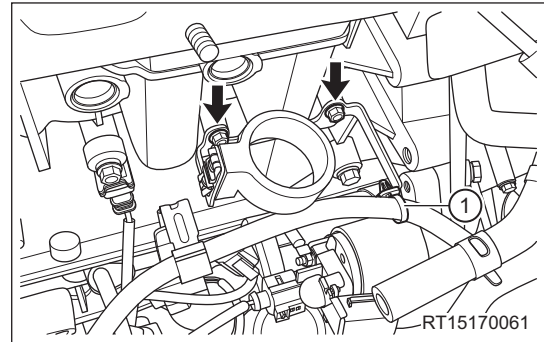
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the air filter assembly (See page 16-13).
5. Remove the battery assembly (See page 28-7).
6. Remove the battery tray (See page 28-9).
7. Remove the intake manifold assembly (See page 16-28).
8. Remove electric water pump assembly and bracket as well as water pipe.
 - a. Remove the electric water pump assembly.
 - i. Disconnect the electric water pump assembly connector (arrow).
 - ii. Loosen elastic clamps (arrow) from electric water pump assembly outlet pipe and inlet pipe separately, and remove outlet pipe and inlet pipe.
 - iii. Remove the electric water pump assembly.

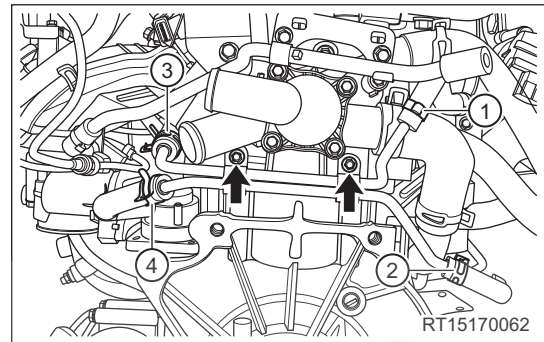


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- b. Remove the electric water pump bracket.
 - i. Remove the wire harness fixing clip (1).
 - ii. Remove 2 fixing bolts (arrow) from electric water pump bracket.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)
 - iii. Remove the electric water pump bracket.



- c. Remove the turbocharger cooling water pipe set.
 - i. Remove the intercooler inlet pipe II assembly (See page 16-15).
 - ii. Loosen clamping ring (1) and disconnect turbocharger water outlet hose.
 - iii. Loosen elastic clamp (2) and disconnect cooling water pipe I hose.
 - iv. Loosen elastic clamp (3) and disconnect electric water pump inlet hose.
 - v. Loosen elastic clamp (4) and disconnect electric water pump outlet hose.
 - vi. Remove fixing bolts (arrow) from turbocharger cooling water pipe set.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

**Installation**

Installation is in the reverse order of removal.

Electric Water Pump Assembly and Bracket, Water Pipe (1.5 TCI + DCT)

Removal

WARNING

- Be sure to ensure that engine cooling system is at low temperature before handling. If engine is in hot status, high-temperature and high-pressure coolant may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, immediately wash the affected area with water and seek medical attention if it is serious.

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 engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove electric water pump inlet and outlet pipes.

a. Loosen elastic clamp (1) and disconnect connection between electric water pump assembly and electric water pump outlet hose.

b. Loosen elastic clamp (2) and disconnect connection between electric water pump outlet hose and inlet pipe set.

c. Loosen elastic clamp (3) and disconnect connection between electric water pump inlet hose and electric water pump assembly.

d. Loosen clamping ring (4) and disconnect connection between electric water pump inlet hose and low temperature radiator outlet hose.

e. Remove electric water pump inlet and outlet pipe assemblies.

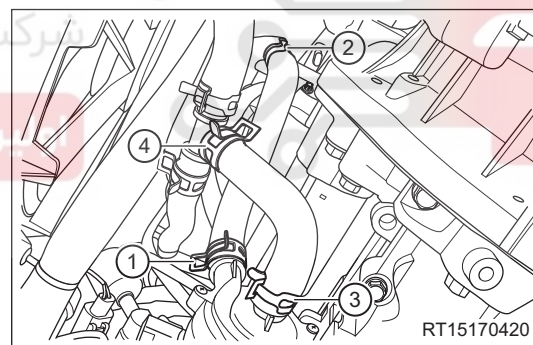
5. Remove the electric water pump assembly.

a. Disconnect the electric water pump assembly connector (1).

b. Remove fixing bolt (arrow) from electric water pump assembly.

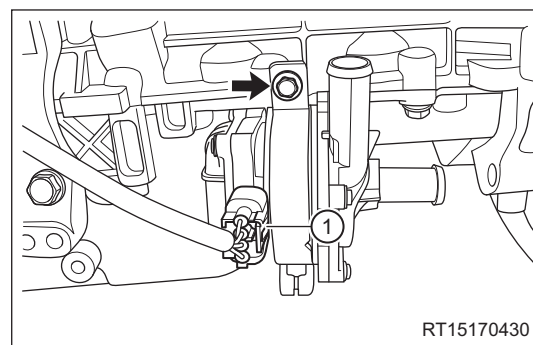
(Tightening torque: 8 + 3 N·m)

- c. Remove the electric water pump assembly.



RT15170420

18



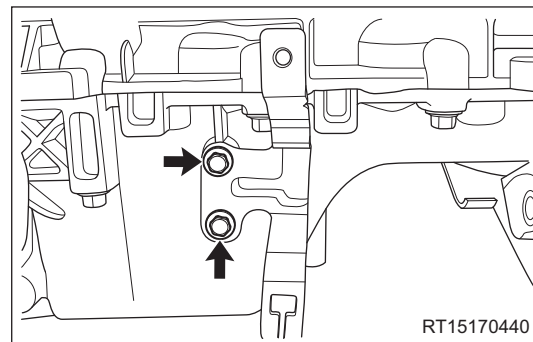
RT15170430

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6. Remove the electric water pump assembly mounting bracket.

- a. Remove 2 fixing bolts (arrow) from electric water pump assembly bracket.

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



- b. Remove the electric water pump assembly bracket.

Installation

Installation is in the reverse order of removal.

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Precatalytic Converter Assembly

Removal

WARNING

- 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.

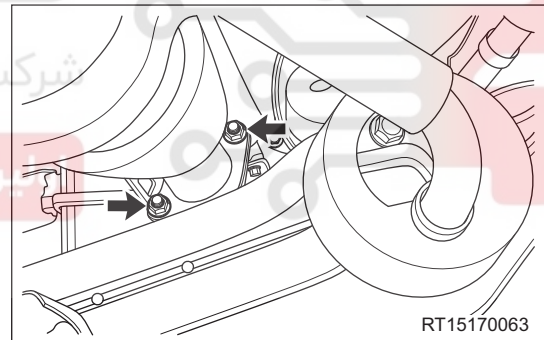
CAUTION

- 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 engine switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the turbocharger heat insulator assembly. (See page 18-13).
5. Remove the precatalytic converter assembly.

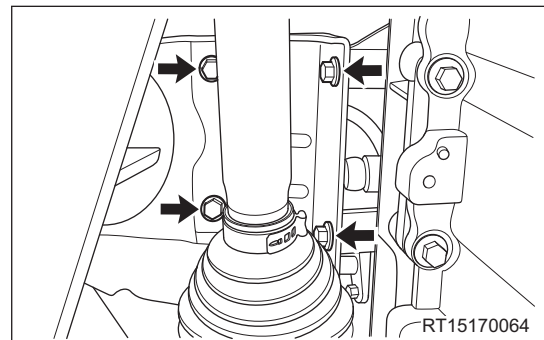
- a. Raise vehicle to a proper position.
- b. Remove 2 coupling nuts (arrow) between front exhaust pipe assembly and precatalytic converter assembly.

(Tightening torque: 45 ± 5 N·m)



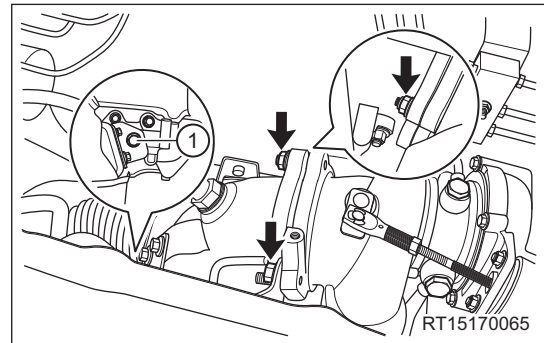
- c. Remove 4 fixing bolts (arrow) from precatalytic converter fixing bracket.

(Tightening torque: 20 ± 5 N·m)

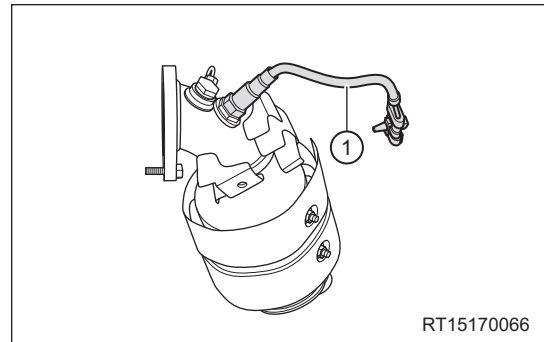


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- d. Remove coupling bolt (1) between precatalytic converter and exhaust manifold.
(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)
- e. Remove coupling nuts (arrow) between precatalytic converter and turbocharger to disconnect them.
(Tightening torque: $20 + 5 \text{ N}\cdot\text{m}$)

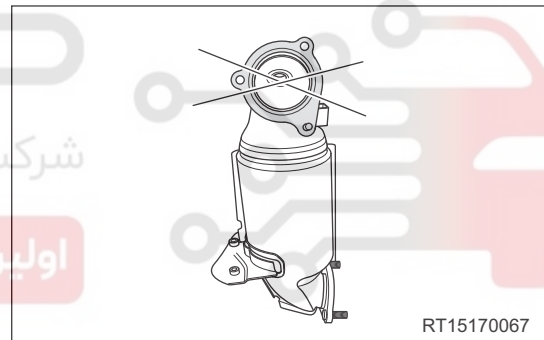


6. Remove the upstream oxygen sensor assembly (1).
(Tightening torque: $40 - 60 \text{ N}\cdot\text{m}$)

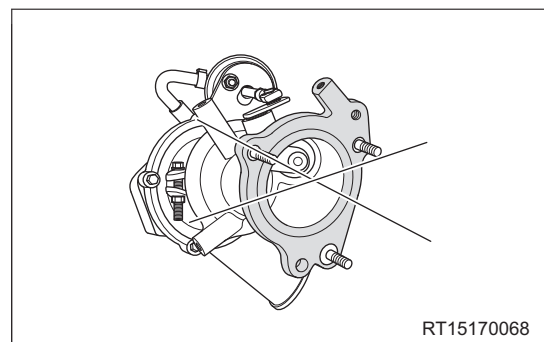


Inspection

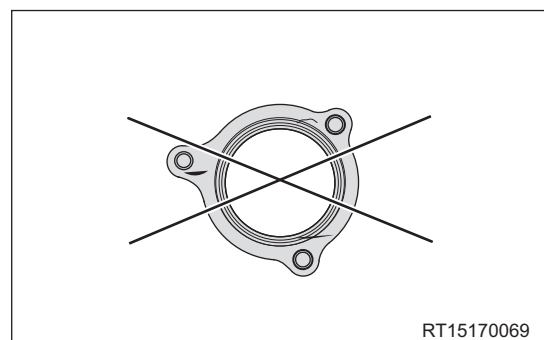
1. Measure joint surface between precatalytic converter and turbocharger with a precision ruler and a feeler gauge. If warpage on surface is greater than 0.5 mm, replace them.



2. Measure joint surface between turbocharger assembly and precatalytic converter with a precision ruler and a feeler gauge. If warpage on surface is greater than 0.04 mm, replace them.



3. Check the connecting washer. There should be no scratches or roughness, otherwise, replace it.



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 precatalytic converter assembly, replace it.
- Check that there is no exhaust gas leakage in connecting part of upstream oxygen sensor.
- When installation is completed, check that there is no exhaust gas leakage between precatalytic converter assembly and turbocharger or front exhaust pipe assembly.

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Front Exhaust Pipe Assembly

Removal

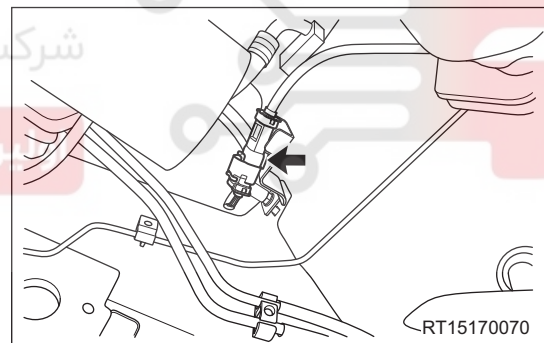
WARNING

- 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

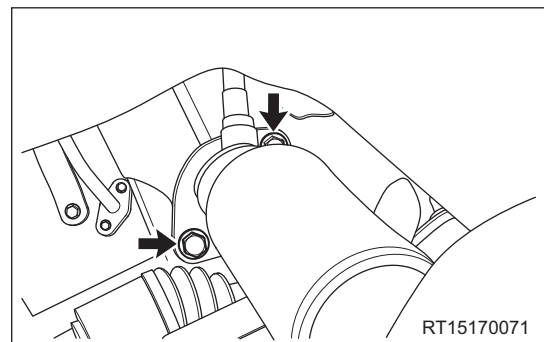
- When removing front exhaust pipe assembly, an assistant is needed to hold it. During operation, prevent the front exhaust pipe assembly from dropping, which may cause an accident.
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Raise vehicle to a proper height.
4. Remove the front exhaust pipe assembly.
 - a. Take off and disconnect downstream oxygen sensor connector (arrow) from bracket.



- b. Remove 2 coupling nuts (arrow), then disconnect connection between front exhaust pipe assembly and precatalytic converter assembly, and take off gasket from connecting part.

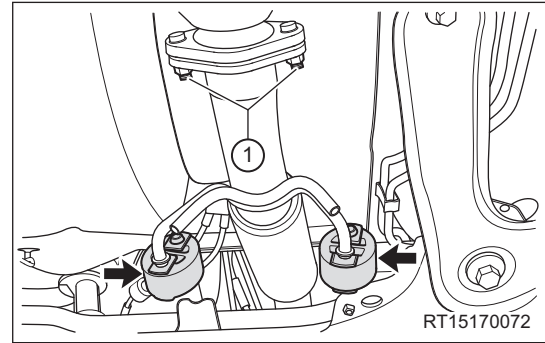
(Tightening torque: 45 ± 5 N·m)



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

(Tightening torque: 45 ± 5 N·m)

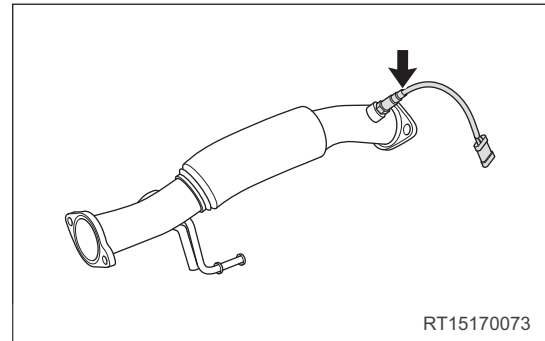
- d. Detach 2 diamond shaped hanger blocks (arrow) between front exhaust pipe assembly and body hook.



- e. Remove the front exhaust pipe assembly.

5. Remove downstream oxygen sensor (arrow) from front exhaust pipe 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 matters on joints and threads.
- Check for exhaust gas leak. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.
- Check that there is no exhaust gas leakage in connecting part of downstream oxygen sensor.

Main Catalytic Converter Assembly

Removal

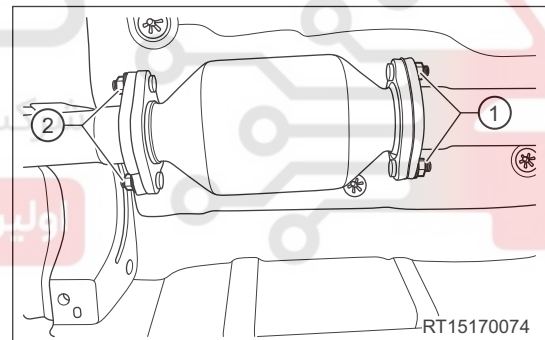
WARNING

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



18

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 main catalytic converter assembly, replace it.
- Check for exhaust gas leaks. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.

Muffler Assembly

Removal

WARNING

- 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.

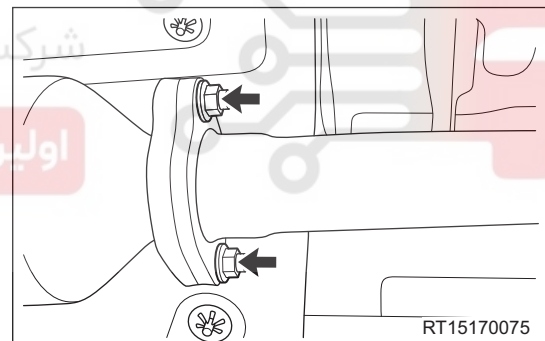
CAUTION

- When removing muffler assembly, an assistant is needed to hold it. During operation, prevent the 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.

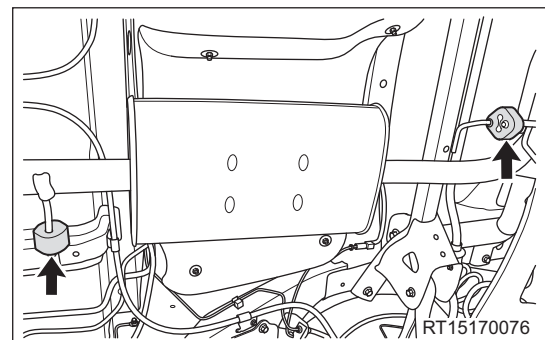
1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Raise vehicle to a proper position.
4. Remove the muffler assembly.

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

(Tightening torque: 45 ± 5 N·m)

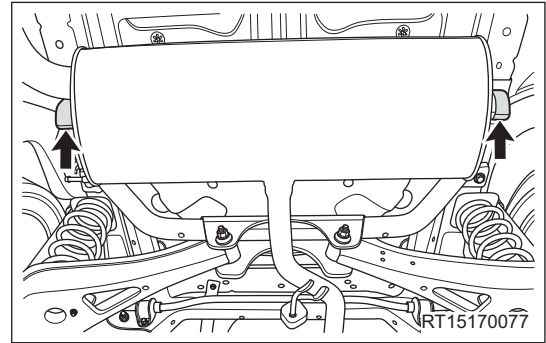


- b. Detach 2 diamond shaped hanger blocks (arrow) between muffler assembly and body hooks.



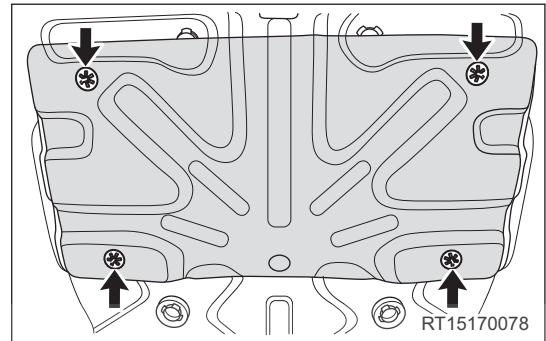
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- c. Detach 2 diamond shaped hanger blocks (arrow) between rear muffler assembly and body hooks.



5. Remove the muffler heat insulator.

- a. Remove 4 clamping pieces (arrow), and take off muffler heat insulator.



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 muffler assembly, replace it.
- Check for exhaust gas leaks. If gas leaks, tighten the malfunctioning part to prevent leakage. Replace damaged parts as necessary.