

GROUP 15

INTAKE AND EXHAUST

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GENERAL DESCRIPTION

M1151000100297

The exhaust pipe is divided into three parts.

INTAKE AND EXHAUST DIAGNOSIS

INTRODUCTION

M1151006900246

Intake leaks usually create driveability issues that are not obviously related to the intake system. Exhaust leaks or abnormal noise is caused by cracks, gaskets and fittings, or by when the exhaust pipe or muffler is damaged due to impacts during travel. The exhaust leaks from these sections and causes the exhaust noise to increase. There may be cases when the system contacts the body and vibration noise is generated.

TROUBLESHOOTING STRATEGY

M1151007000246

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an intake or exhaust system fault.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

SYMPTOM CHART

M1151007100243

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Exhaust Leakage	1	P.15-2
Abnormal Noise	2	P.15-3

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Exhaust Leakage

DIAGNOSIS

STEP 1. Start the engine. Have an assistant stay in the driver's seat. Raise the vehicle on a hoist. Have the assistant rev the engine while searching for exhaust leaks.

Q: Is the exhaust leaking?

YES : Go to Step 2 .

NO : The procedure is complete.

STEP 2. Check the gasket for cracks, damage.

Q: Is the gasket damaged?

YES : Replace the gasket, then go Step 1 .

NO : Go to Step 3 .

STEP 3. Check for loosening in each coupling section.

Q: Is there any loosening in each section?

YES : Tighten, then go to Step 1 .

NO : There is no action to be taken.

INSPECTION PROCEDURE 2: Abnormal Noise

DIAGNOSIS

STEP 1. Start the engine. Have an assistant stay in the drivers seat. Raise the vehicle on a hoist. Have the assistant rev the engine while searching for exhaust leaks.

Q: Is any abnormal noise generated?
YES : Go to Step 2 .
NO : The procedure is complete.

STEP 2. Check for missing parts in the muffler. Tap the muffler lightly to check for loose baffles, etc.

Q: Are there any missing parts in the muffler?
YES : Replace, then go to Step 1 .
NO : Go to Step 3 .

STEP 3. Check the hanger for cracks.

Q: Is the hanger cracked?
YES : Replace, then go to Step 1.
NO : Go to Step 4.

STEP 4. Check for interference of the pipes and muffler with the body.

Q: Are the pipes and muffler interfering with the body?
YES : Repair, then go to Step 1 .
NO : Go to Step 5 .

STEP 5. Check the heat protectors.

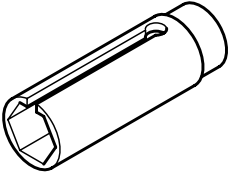
Q: Are any heat protectors loose or damaged?
YES : Tighten or replace, then go to Step 1 .
NO : Go to Step 6 .

STEP 6. Check the pipes, catalytic converters and muffler for damage.

Q: Are the pipes, catalytic converters and muffler damaged?
YES : Replace, then go to Step 1 (For the removal of the catalytic converter, refer to GROUP 17 [P.17-122](#)).
NO : There is no action to be taken.

SPECIAL TOOL

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TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
	MD998770 Oxygen sensor wrench	MD998770-01 or General service tool	Removal and installation of heated oxygen sensor

AIR CLEANER**REMOVAL AND INSTALLATION**

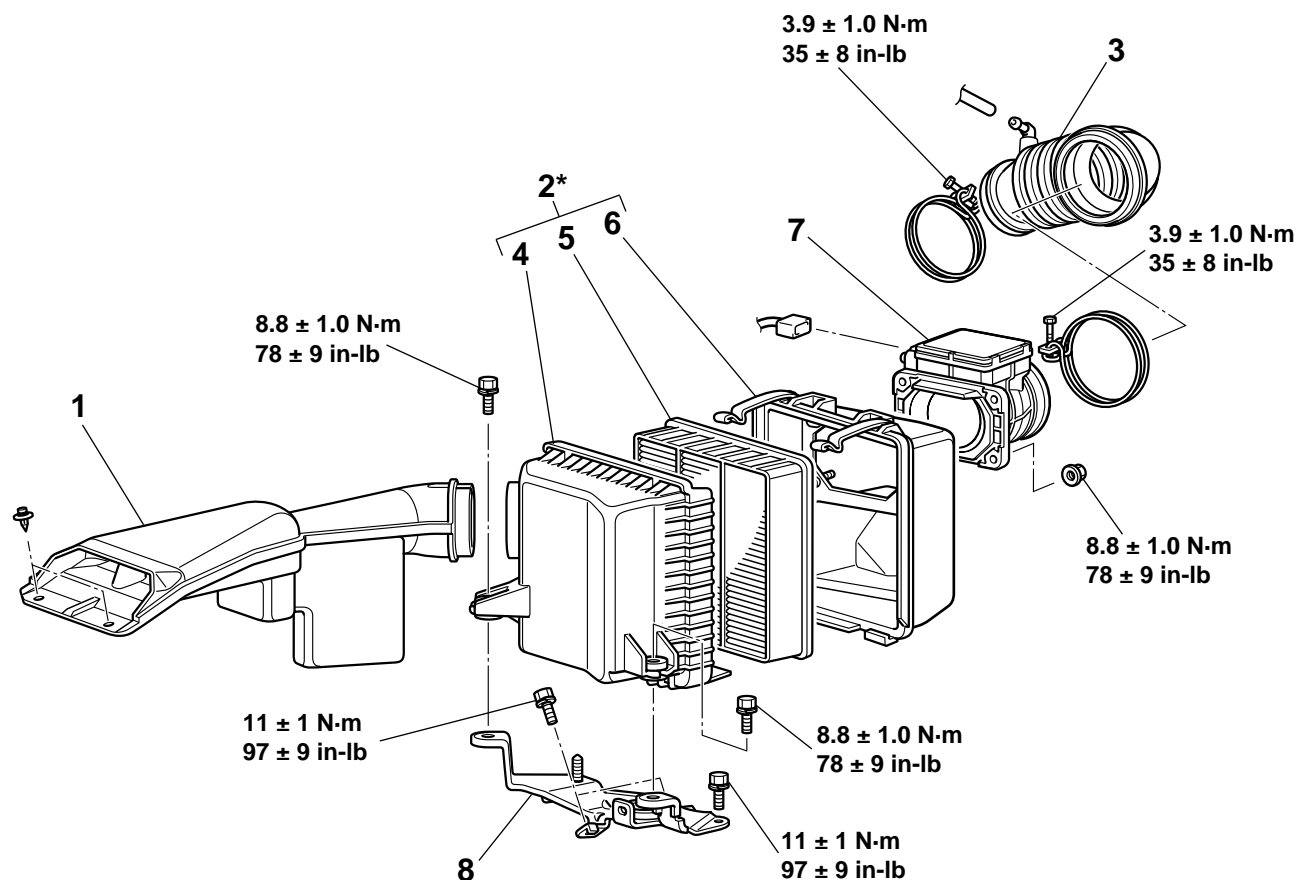
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CAUTION

Parts marked by * are made of recycled-paper mixed plastic material, so observe the following precautions.

1. Avoid any shock or load to these parts when removing and installing them.
2. Engage the case hinges securely when assembling these parts.

*NOTE: Parts marked by * are made of recycled-paper mixed plastic material. Dispose of according to state and local laws*



AC100298 AB

REMOVAL STEPS

1. AIR DUCT
2. AIR CLEANER ASSEMBLY
3. AIR INTAKE HOSE
4. AIR CLEANER BODY

REMOVAL STEPS (Continued)

5. AIR CLEANER ELEMENT
6. AIR CLEANER COVER
7. AIR FLOW SENSOR ASSEMBLY
8. AIR CLEANER BRACKET

INTAKE MANIFOLD

REMOVAL AND INSTALLATION

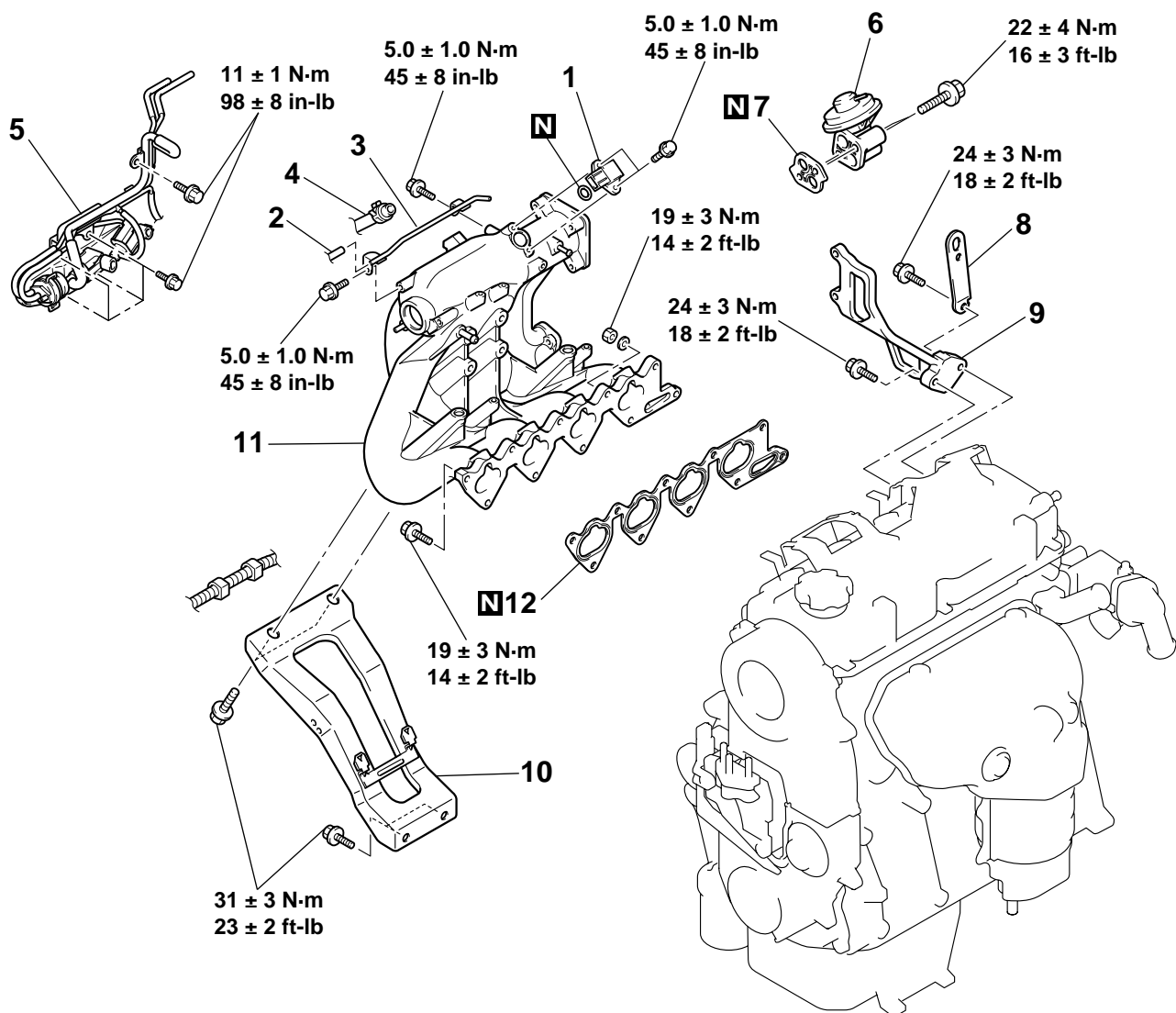
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Pre-removal Operation

- Fuel Discharge Prevention (Refer to GROUP 13A, On-vehicle Service [P.13Aa-17.](#))
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service [P.14-22.](#))
- Air Cleaner Removal (Refer to [P.15-4.](#))
- Throttle Body Removal (Refer to GROUP 13A, Throttle Body [P.13Aa-28.](#))
- Fuel Pressure Regulator, Delivery Pipe and Injector Assembly Removal (Refer to GROUP 13A, Injector [P.13Aa-26.](#))

Post-installation Operation

- Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service [P.14-22.](#))
- Accelerator Cable Adjustment (Refer to GROUP 17, On-vehicle Service [P.17-4.](#))
- Air Cleaner Installation (Refer to [P.15-4.](#))
- Fuel Pressure Regulator, Delivery Pipe and Injector Assembly Installation (Refer to GROUP 13A, Injector [P.13Aa-26.](#))
- Throttle Body Installation (Refer to GROUP 13A, Throttle Body [P.13Aa-28.](#))



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REMOVAL STEPS

1. MANIFOLD DIFFERENTIAL
PRESSURE SENSOR
2. AUTO CRUISE VACUUM HOSE
CONNECTION
3. VACUUM PIPE
4. BRAKE BOOSTER VACUUM HOSE
CONNECTION
5. VACUUM HOSE AND PIPE
ASSEMBLY

REMOVAL STEPS (Continued)

6. EGR VALVE
7. EGR VALVE GASKET
8. ENGINE HANGER
9. THROTTLE BODY STAY
10. INTAKE MANIFOLD STAY
11. INTAKE MANIFOLD
12. INTAKE MANIFOLD GASKET

INSPECTION

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Check the following points; replace the part if a problem is found.

Intake Manifold Check

1. Check for damage or cracking of any part.
2. Clogging of the negative pressure (vacuum) outlet port, or clogging of the exhaust gas recirculation passages.
3. Using a straight edge and feeler gauge, check for distortion of the cylinder head installation surface.

Standard value: 0.15 mm (0.006 inch) or less

Limit: 0.20 mm (0.008 inch)

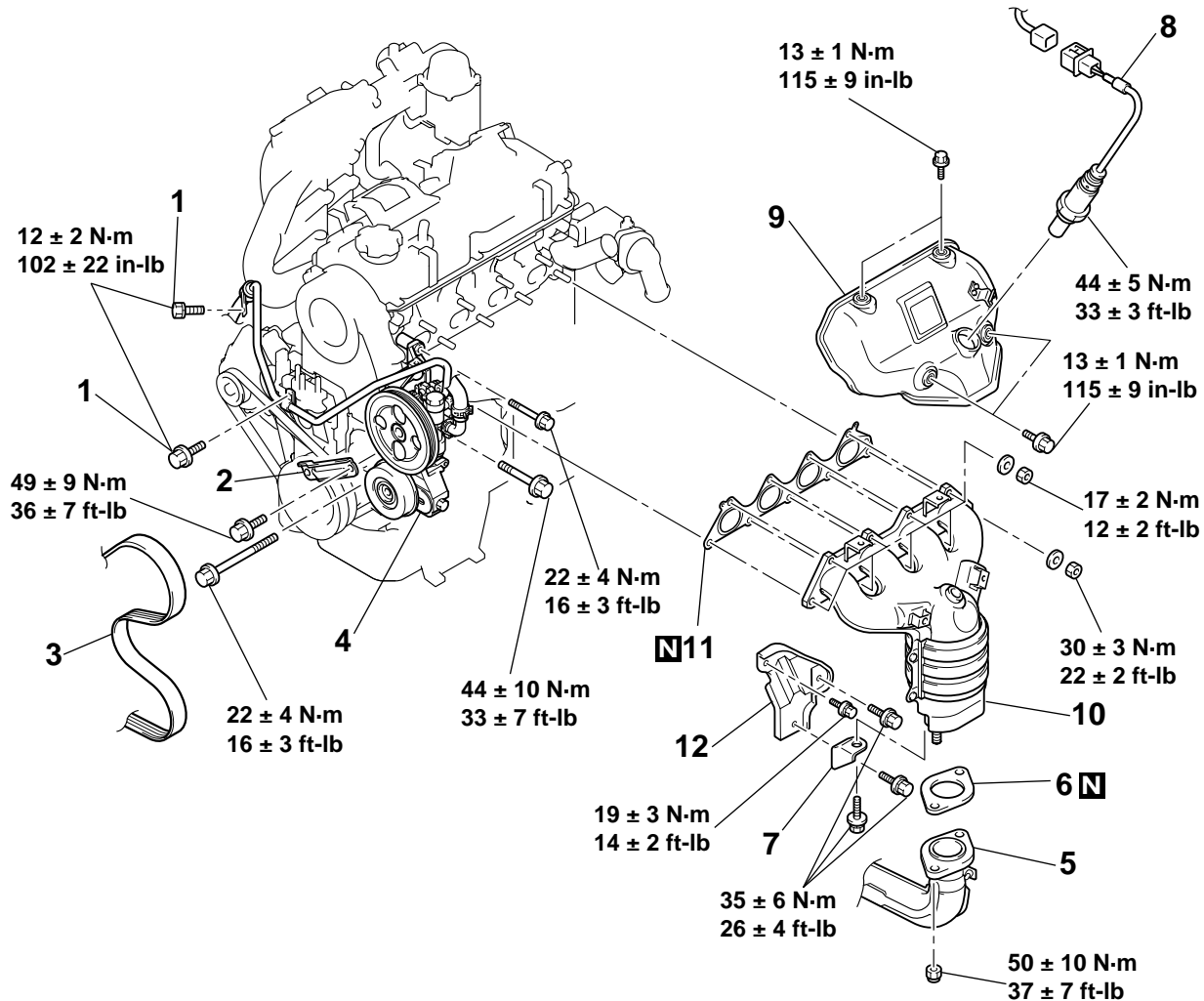
EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

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Pre-removal and Post-installation Operation

- Under Cover Removal and Installation



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REMOVAL STEPS

- PRESSURE HOSE CLAMP BOLT
- POWER STEERING PUMP BRACKET STAY BOLT
- POWER STEERING PUMP AND A/C COMPRESSOR DRIVE BELT
- POWER STEERING OIL PUMP AND BRACKET ASSEMBLY
- FRONT EXHAUST PIPE CONNECTION

REMOVAL STEPS (Continued)

- FRONT EXHAUST PIPE GASKET
- EXHAUST MANIFOLD BRACKET B
- HEATED OXYGEN SENSOR
- HEAT PROTECTOR
- EXHAUST MANIFOLD
- EXHAUST MANIFOLD GASKET
- EXHAUST MANIFOLD BRACKET A

<<A>>

REMOVAL SERVICE POINT**<<A>> POWER STEERING OIL PUMP AND BRACKET
ASSEMBLY REMOVAL**

With the hose installed, remove power steering oil pump and bracket assembly.

NOTE: Tie the removed power steering oil pump and bracket assembly, with strings at a position where they will not interfere with the installation or removal of the exhaust manifold.

INSPECTION

M1151003400350

Check the following points; replace the part if a problem is found.

Exhaust Manifold Check

1. Check for damage or cracking of any part.
2. Using a straight edge and a feeler gauge, check for distortion of the cylinder head installation surface.

Standard value: 0.15 mm (0.006 inch) or less

Limit: 0.20 mm (0.008 inch)

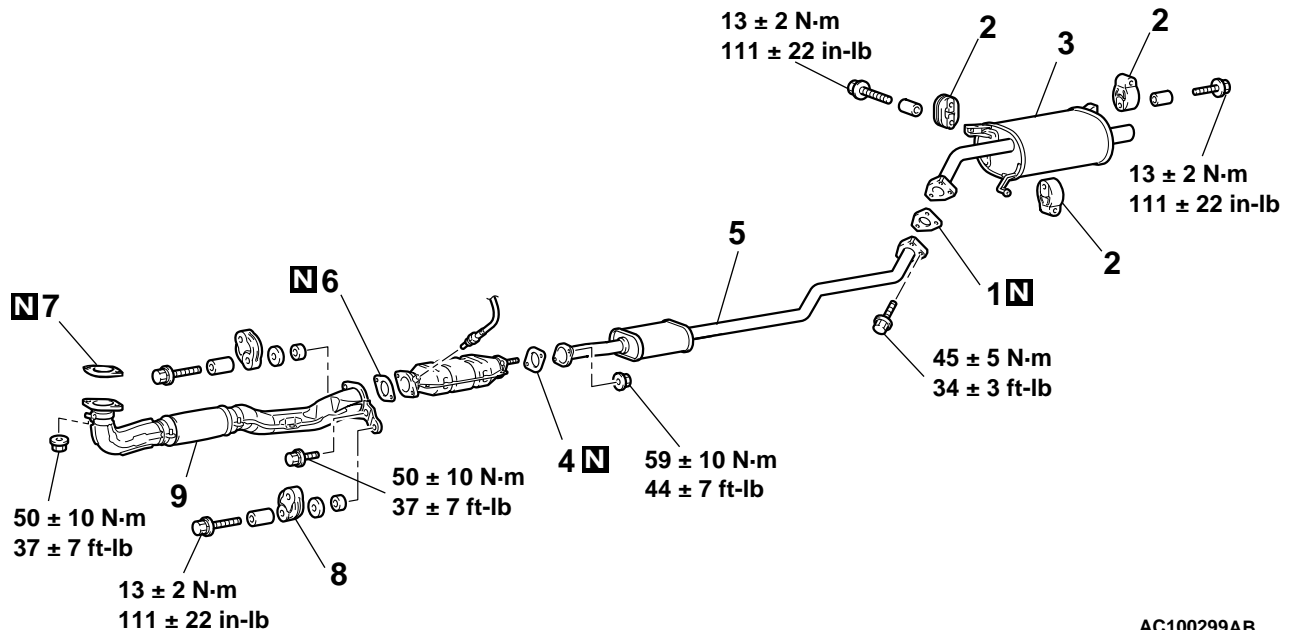
EXHAUST PIPE AND MAIN MUFFLER

REMOVAL AND INSTALLATION

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Pre-removal and Post-installation Operation

- Front Under Cover Removal and Installation



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MAIN MUFFLER REMOVAL STEPS

1. GASKET
2. HANGER
3. MAIN MUFFLER

CENTER EXHAUST PIPE REMOVAL STEPS

1. GASKET
4. GASKET
5. CENTER EXHAUST PIPE

FRONT EXHAUST PIPE REMOVAL STEPS

6. GASKET
7. GASKET
8. HANGER
9. FRONT EXHAUST PIPE

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1151006800249

ITEM		SPECIFICATION
Air cleaner		
Air cleaner bolt		8.8 ± 1.0 N·m (78 ± 9 in-lb)
Air cleaner bracket bolt		11 ± 1 N·m (97 ± 9 in-lb)
Air flow sensor nut		8.8 ± 1.0 N·m (78 ± 9 in-lb)
Air intake hose clamp bolt		3.9 ± 1.0 N·m (38 ± 8 in-lb)
Exhaust manifold		
Exhaust manifold bracket bolt	M8	19 ± 3 N·m (14 ± 2 ft-lb)
	M10	35 ± 6 N·m (26 ± 4 ft-lb)
Exhaust manifold nut	M8	17 ± 2 N·m (12 ± 2 ft-lb)
	M10	30 ± 3 N·m (22 ± 2 ft-lb)
Front exhaust pipe nut		50 ± 10 N·m (37 ± 7 ft-lb)
Heat protector bolt		13 ± 1 N·m (115 ± 9 in-lb)
Heated oxygen sensor		44 ± 5 N·m (33 ± 3 ft-lb)
Power steering pump bracket stay bolt		49 ± 9 N·m (36 ± 7 ft-lb)
Power steering oil pump attaching bolt	M8	22 ± 4 N·m (16 ± 3 ft-lb)
	M10	44 ± 10 N·m (33 ± 7 ft-lb)
Pressure hose clamp bolt		12 ± 25 N·m (102 ± 22 in-lb)
Exhaust pipe and main muffler		
Center exhaust pipe nut		59 ± 10 N·m (44 ± 7 ft-lb)
Front exhaust pipe bolt		50 ± 10 N·m (37 ± 7 ft-lb)
Front exhaust pipe nut		50 ± 10 N·m (37 ± 7 ft-lb)
Hanger bolt		13 ± 2 N·m (111 ± 22 in-lb)
Main muffler bolt		45 ± 5 N·m (34 ± 3 ft-lb)
Intake manifold		
EGR valve bolt		22 ± 4 N·m (16 ± 3 ft-lb)
Intake manifold bolt and nut		19 ± 3 N·m (14 ± 2 ft-lb)
Intake manifold stay bolt		31 ± 3 N·m (23 ± 2 ft-lb)
Manifold differential pressure sensor bolt		5.0 ± 1.0 N·m (45 ± 8 in-lb)
Throttle body stay bolt		24 ± 3 N·m (18 ± 2 ft-lb)
Vacuum hose and pipe assembly bolt		11 ± 1 N·m (98 ± 8 in-lb)
Vacuum pipe bolt		5.0 ± 1.0 N·m (45 ± 8 in-lb)

SERVICE SPECIFICATION

M1151000300280

ITEM	STANDARD VALUE	LIMIT
Manifold distortion of the installation surface mm (in)	0.15 (0.006) or less	0.20 (0.008)