INTAKE AND EXHAUST

CONTENTS

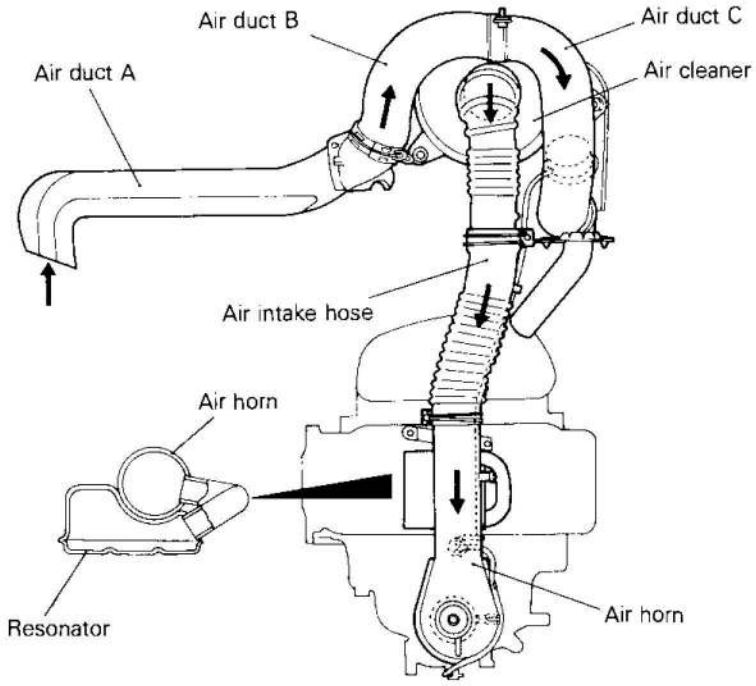
E15AA--

GENERAL INFORMATION

E15BAAG

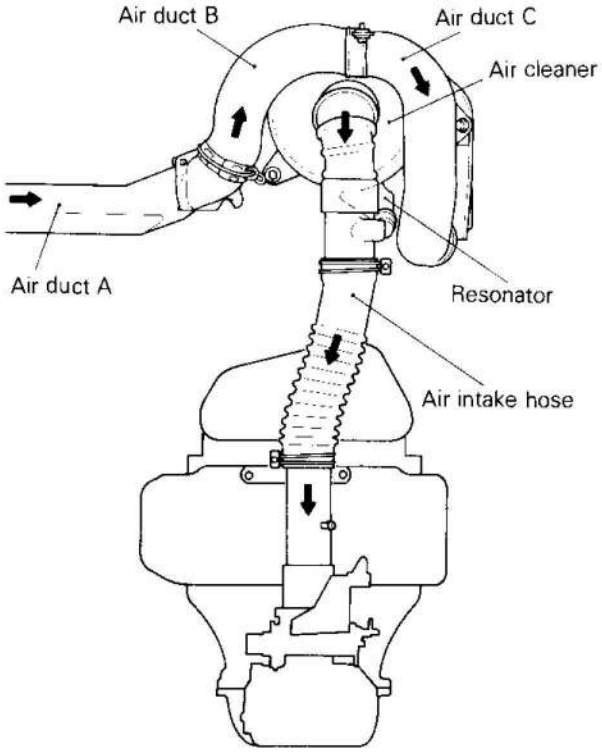
All models are equipped with dry type air cleaners. A resonator is installed on all models except 4G32 and 4G33, to prevent resonance in induction system.
An air flow sensor and intake air temperature sensor are installed for MPI air cleaner.
The exhaust system is divided into the front exhaust pipe and main muffler, between which a catalytic converter is installed on FBC and MPI vehicles.

Petrol-powered vehicles without M.P.I. (4G63, G63B)



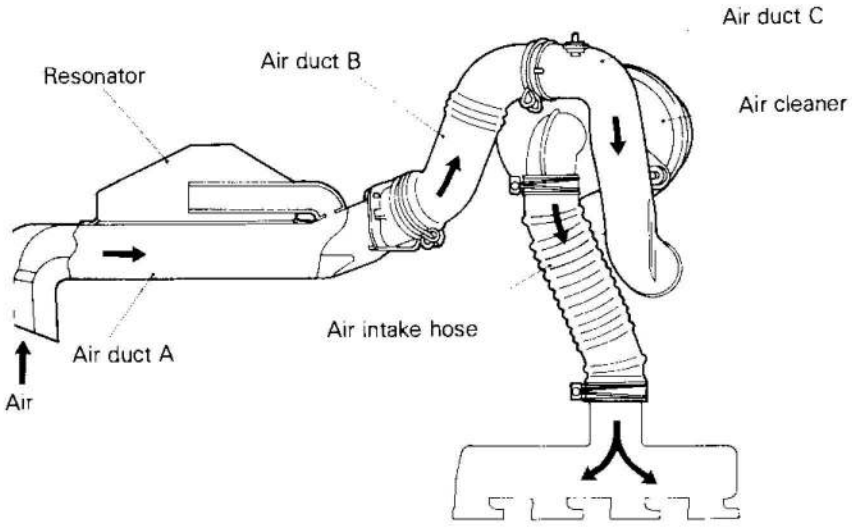
31N062

Petrol-powered vehicles with M.P.I. (4G64, G64B)



05G0022

Diesel-powered vehicles



D1N013

SPECIFICATIONS

GENERAL SPECIFICATIONS

E15CA—

<Vehicles built up to May 1994>

VEHILCES FOR EUROPE

Items	Petrol-powered vehicles		Diesel-powered vehicles
	Without M.P.I.	With M.P.I.	
Air filter			
Type	Dry type	Dry type	Cyclone type
Heated air intake	Vacuum motor type	–	–
Element	Unwoven cloth type	Unwoven cloth type	Filter paper type
Exhaust system			
Front exhaust pipe	Single or dual type*	Dual type	Single type
Muffler	Expansion resonance type	Expansion resonance type	Expansion resonance type
Coupling	Spherical coupling or flat coupling*	Flat coupling	Spherical coupling
Suspension system	Rubber hangers	Rubber hangers	Rubber hangers

NOTE
* indicates 4G63 (Mini-bus) and G63B.

VEHICLES FOR GENERAL EXPORT

Items	Petrol-powered vehicles	Diesel-powered vehicles
Air filter		
Type	Dry type (cyclone type)*	Cyclone type
Heated air intake	Vacuum motor type*	–
Element	Filter paper type	Filter paper type
Exhaust system		
Front exhaust pipe	Single type	
Muffler	Expansion resonance type	
Coupling	Spherical coupling	
Suspension system	Rubber hangers	

NOTE
* indicates vehicles for Gulf countries. Optional for other vehicles.

VEHICLES FOR AUSTRALIA

Items	Petrol-powered vehicles		Diesel-powered vehicles
	Without M.P.I.	With M.P.I.	
Air filter			
Type	Cyclone type	Cyclone type	Cyclone type
Heated air intake	Vacuum motor type	–	–
Element	Filter paper type	Filter paper type	Filter paper type
Exhaust system			
Front exhaust pipe	Single*1 or dual*2 type	Dual type	Single type
Muffler	Expansion resonance type	Expansion resonance type	Expansion resonance type
Coupling	Spherical*1 or flat*2 coupling	Flat coupling	Spherical coupling
Suspension system	Rubber hangers	Rubber hangers	Rubber hangers

NOTE
(1) *1 indicates Van (4G63 engine) [Vehicles built up to September 1988].
(2) *2 indicates Van (4G63 engine) [Vehicles built from October] and Mini-bus.

<Vehicles built from June 1994>

VEHICLES FOR EUROPE

Items	Petrol-powered vehicles		Diesel-powered vehicles
	Without M.P.I.	With M.P.I.	
Air filter			
Type	Dry type (cyclone type)*	Dry type (cyclone type)*	Cyclone type
Heated air intake	Vacuum motor type	–	–
Element	Unwoven cloth type (Filter paper type)*	Unwoven cloth type (Filter paper type)*	Filter paper type
Exhaust system			
Front exhaust pipe	Single type		Single type
Muffler	Expansion resonance type		Expansion resonance type
Coupling	Spherical coupling and flat coupling		Spherical coupling
Suspension system	Rubber hangers		Rubber hangers

NOTE
* indicates optional

VEHICLES FOR GENERAL EXPORT

Items	Petrol-powered vehicles			Diesel-powered vehicles
	4G92	4G63 (Van)	4G63 (Mini-bus)	
Air filter				
Type	Dry type (cyclone type)*1	Cyclone type	Dry type (cyclone type)*3	Cyclone type
Heated air intake	Vacuum motor type*2	–	Vacuum motor type*1	–
Element	Filter paper type (Unwoven cloth type)*2	Filter paper type	Filter paper type (Unwoven cloth type)*1	Filter paper type
Exhaust system				
Front exhaust pipe	Single type			Single type
Muffler	Expansion resonance type			Expansion resonance type
Coupling	Spherical coupling and flat coupling			Spherical coupling
Suspension system	Rubber hangers			Rubber hangers

NOTE
(1) *1 indicates optional
(2) *2 indicates vehicles with FBC. Optional for other vehicles.
(3) *3 indicates vehicles for Gulf countries. Optional for other vehicles.

VEHICLES FOR AUSTRALIA

Items	Petrol-powered vehicles		Diesel-powered vehicles
	Without M.P.I.	With M.P.I.	
Air filter			
Type	Cyclone type	Cyclone type	
Heated air intake	Vacuum motor type	–	
Element	Filter paper type	Filter paper type	
Exhaust system			
Front exhaust pipe	Single type		Single type
Muffler	Expansion resonance type		Expansion resonance type
Coupling	Spherical coupling and flat coupling		Spherical coupling
Suspension system	Rubber hangers		Rubber hangers

SERVICE SPECIFICATIONS

E15CB--

Items		Specifications
Standard value		
Distortion of the cylinder head installation surface	mm (in.)	Less than 0.15 (0.006)
Turbocharger super charge pressure	kPa (kg/cm^2, psi)	Approx. 70 – 86 (0.70 – 0.80, 10 – 12)
Operation starting pressure of waste gate actuator	kPa (kg/cm^2, psi)	Approx. 77 (0.77, 11)
Limit		
Distortion of the installation surface	mm (in.)	0.2 (0.008)

TORQUE SPECIFICATIONS

E15CC--

Items	Nm	kgm	ft.lbs.
Water outlet fitting to intake manifold*1	17 – 20	1.7 – 2.0	12 – 14
Intake manifold to cylinder head*2	15 – 20	1.5 – 2.0	11 – 14
Distributor to intake manifold	10 – 13	1.0 – 1.3	7 – 9
Delivery pipe to intake manifold*	10 – 13	1.0 – 1.3	7 – 9
Ignition coil to intake manifold*	12 – 15	1.2 – 1.5	9 – 11
Intake manifold stay to intake manifold*	18 – 25	1.8 – 2.5	13 – 18
Surge tank to intake manifold*	15 – 20	1.5 – 2.0	11 – 14
Surge tank stay to surge tank	15 – 20	1.5 – 2.0	11 – 14
Throttle body assembly to surge tank*			
Vehicles built up to June 1989	10 – 13	1.0 – 1.3	7 – 9
Vehicles built from July 1989	15 – 22	1.5 – 2.2	11 – 16
Air intake pipe to rocker cover*	10 – 12	1.0 – 1.2	7.2 – 8.6
Connector clamp bracket assembly to rocker cover*	12 – 15	1.2 – 1.5	9 – 11
Fuel high pressure hose and delivery pipe*	25 – 35	2.5 – 3.5	18 – 25
Exhaust manifold to cylinder head*2	15 – 20	1.5 – 2.0	11 – 14
Inlet fitting to intake manifold	10 – 13	1.0 – 1.3	7 – 9
Oil pipe flare bolt	16 – 24	1.6 – 2.4	12 – 17
Oil pipe to intake manifold	8 – 10	0.8 – 1.0	6 – 7
Oil pipe eye bolt	14 – 19	1.4 – 1.9	10 – 14
Waste gate actuator to intake manifold	15 – 22	1.5 – 2.2	11 – 16
Turbocharger to exhaust manifold	50 – 70	5.0 – 7.0	36 – 51
Oil return pipe to turbocharger	8 – 10	0.8 – 1.0	6 – 7
Heat protector (B) to exhaust manifold	8 – 10	0.8 – 1.0	6 – 7
Heat protector (C) to exhaust fitting			
Vehicles built up to October 1987	12 – 15	1.2 – 1.5	8.7 – 11
Vehicles built from November 1987	27 – 33	2.7 – 3.3	20 – 23
Exhaust fitting to turbocharger	50 – 70	5.0 – 7.0	36 – 51
Heat protector (A) to turbocharger	8 – 10	0.8 – 1.0	6 – 7
Engine bracket and exhaust manifold to cylinder head			
Vehicles built up to October 1987	12 – 15	1.2 – 1.5	8.7 – 11
Vehicles built from November 1987	27 – 33	2.7 – 3.3	20 – 23
Heat cowl to exhaust manifold	8 – 10	0.8 – 1.0	5.8 – 7.2

NOTE
* : 4G64 – 8 valve (M.P.I.)
*1: Except 4G63 – 16 valve
*2: Except 4G92 and 4G63 – 16 valve

Items	Nm	kgm	ft.lbs.
Air pipe assembly to exhaust manifold	20–30	2.0–3.0	18–22
Air pipe assembly to exhaust manifold*	70–100	7.0–10.0	51–72
Air pipe assembly to air pipe stay	10–13	1.0–1.3	7.2–9.4
Air pipe stay to exhaust manifold			
Vehicles built up to October 1987	12–15	1.2–1.5	8.7–11
Vehicles built from November 1987	27–33	2.7–3.3	20–23
Reed valve to reed valve stay	10–13	1.0–1.3	7.2–9.4
Oxygen sensor to exhaust manifold	40–50	4.0–5.0	29–36
Front exhaust pipe to exhaust manifold			
Single exhaust pipe (petrol-powered vehicles)*1	25–35	2.5–3.5	18–25
Single exhaust pipe (diesel-powered vehicles)	30–40	3.0–4.0	22–29
Dual exhaust pipe	40–55	4.0–5.5	29–40
Front exhaust pipe bracket	20–30	2.0–3.0	14–22
Front exhaust pipe to under catalytic converter*2	50–70	5.0–7.0	36–50
Under catalytic converter to main muffler*2	30–40	3.0–4.0	22–29
Front exhaust pipe to main muffler	20–30	2.0–3.0	14–22
Fuel vapor separator and vapor hose and pipe assembly to intake manifold	19–28	1.9–2.8	14–20
Thermo valve to intake manifold (upper)	20–35	2.0–3.5	14–25
Engine coolant temperature sensor to intake manifold	20–40	2.0–4.0	14–29
Engine coolant temperature gauge unit to intake manifold	10–12	1.0–1.2	7–9
EGR valve to intake manifold			
4G92	17–22	1.7–2.2	12–16
4G63, 4G64	17–26	1.7–2.6	12–19
EGR valve to inlet fitting	15–20	1.5–2.0	11–14
Intake manifold stay			
4G92	27–34	2.7–3.4	20–25
4G63, 4G64	12–15	1.2–1.5	9–11
Vacuum pipe assembly to intake manifold	8–12	0.8–1.2	5.8–8.9
Thermo valve to intake manifold (lower)			
Single joint type	20–50	2.0–5.0	14–36
Except single joint type	20–40	2.0–4.0	14–29
Kick-down cable bracket to intake manifold	12–15	1.2–1.5	9–11
Intake manifold to cylinder head*3	17–22	1.7–2.2	12–16
Water outlet fitting to cylinder head*4	17–22	1.7–2.2	12–16
Heat protector to exhaust manifold	12–15	1.2–1.5	9–11
Secondary air pipe			
Reed valve side	50–60	5.0–6.0	36–43
Exhaust manifold side	70–100	7.0–10.0	51–72

NOTE
*: G63B
*1: Vehicles with spherical coupling exhaust pipe
*2: Except 4G92 (Hong Kong)
*3: 4G92, 4G63 and 4G64 – 16 valve
*4: 4G63 and 4G64 – 16 valve

Items	Nm	kgm	ft.lbs.
Exhaust manifold attaching nut A			
4G92	15–20	1.5–2.0	11–14
4G63 and 4G64 – 16 valve	25–30	2.5–3.0	18–22
Exhaust manifold attaching nut B	27–33	2.7–3.3	20–24
Inlet fitting to intake manifold	10–13	1.0–1.3	7–9
EGR pipe	15–20	1.5–2.0	11–14
Water pipe to turbocharger	34–49	3.5–5.0	25–36
Front exhaust pipe to exhaust manifold*1	40–60	4.0–6.0	29–43
Front exhaust pipe to under catalytic converter*2	30–40	3.0–4.0	22–29
Under catalytic converter to main muffler*2	50–70	5.0–7.0	36–50

NOTE
*1: Vehicles with flat coupling exhaust pipe.
*2: 4G92 (Hong Kong)

SEALANT AND ADHESIVE

Items	Specified sealant and adhesive	Remarks
Engine coolant temperature gauge unit	3M ATD Part No. 8660 or equivalent	Semi drying sealant
Engine coolant temperature sensor Thermo switch	3M Nut Locking Part No. 4171 or equivalent	Drying sealant
Water outlet fitting	Mitsubishi Genuine Parts No. MD970389 or equivalent	Semi drying sealant

TROUBLESHOOTING

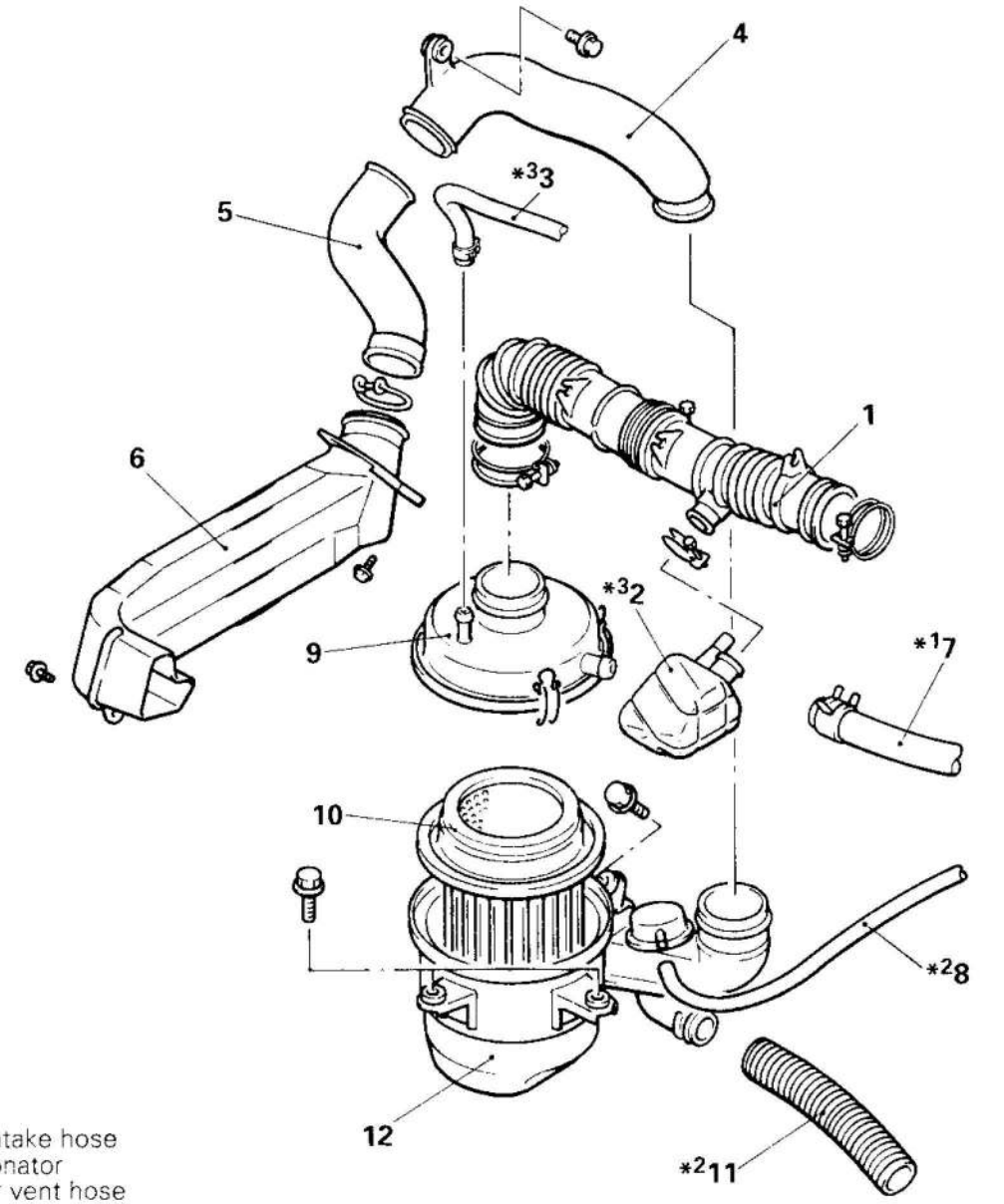
E15EAAB

Symptom	Probable cause	Remedy	Reference page
Exhaust gas leakage	Loose joints	Retighten	15–24, 25
	Broken pipe or muffler	Repair or replace	15–24, 25
Abnormal noise	Broken separator in muffler	Replace	15–24, 25
	Broken rubber hangers	Replace	15–24, 25
	Interference of pipe or muffler with vehicle body	Correct	15–24, 25
	Broken pipe or muffler	Repair or replace	15–24, 25

AIR CLEANER

E150A--

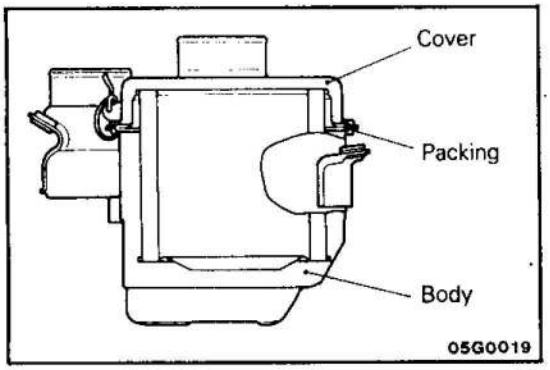
REMOVAL AND INSTALLATION [Petrol-powered vehicles (except M.P.I.)]



Removal steps

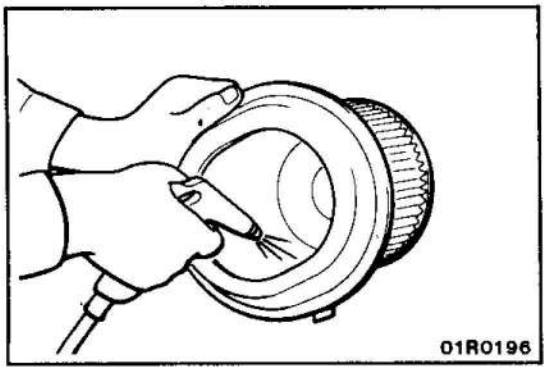
1. Air intake hose
2. Resonator
3. Inner vent hose
4. Air duct C
5. Air duct B
6. Air duct A
7. Secondary air hose
8. Vacuum hose
9. Air cleaner cover
10. Air cleaner element
11. Heat duct
12. Air cleaner body

NOTE
(1) Reverse the removal procedures to reinstall.
(2) *1 : Vehicles with a secondary air pipe
(3) *2 : Vehicles with a hot air control valve
(4) *3 : Vehicles built from June 1994

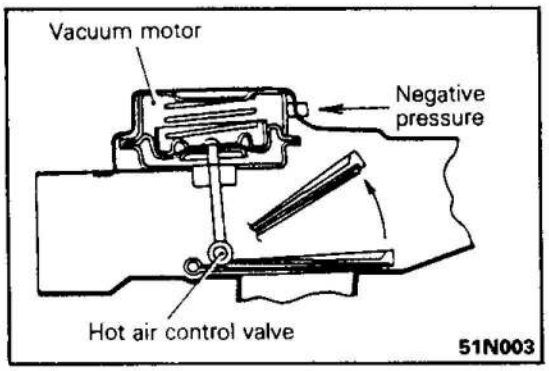


INSPECTION E150CAC

- Check the air cleaner body, cover or packing for deformation, corrosion or damage.
- Check the air duct for damage.



- Check the air cleaner element for clogging, contamination or damage.
  If element is slightly clogged, remove dust by blowing air from inside of element.

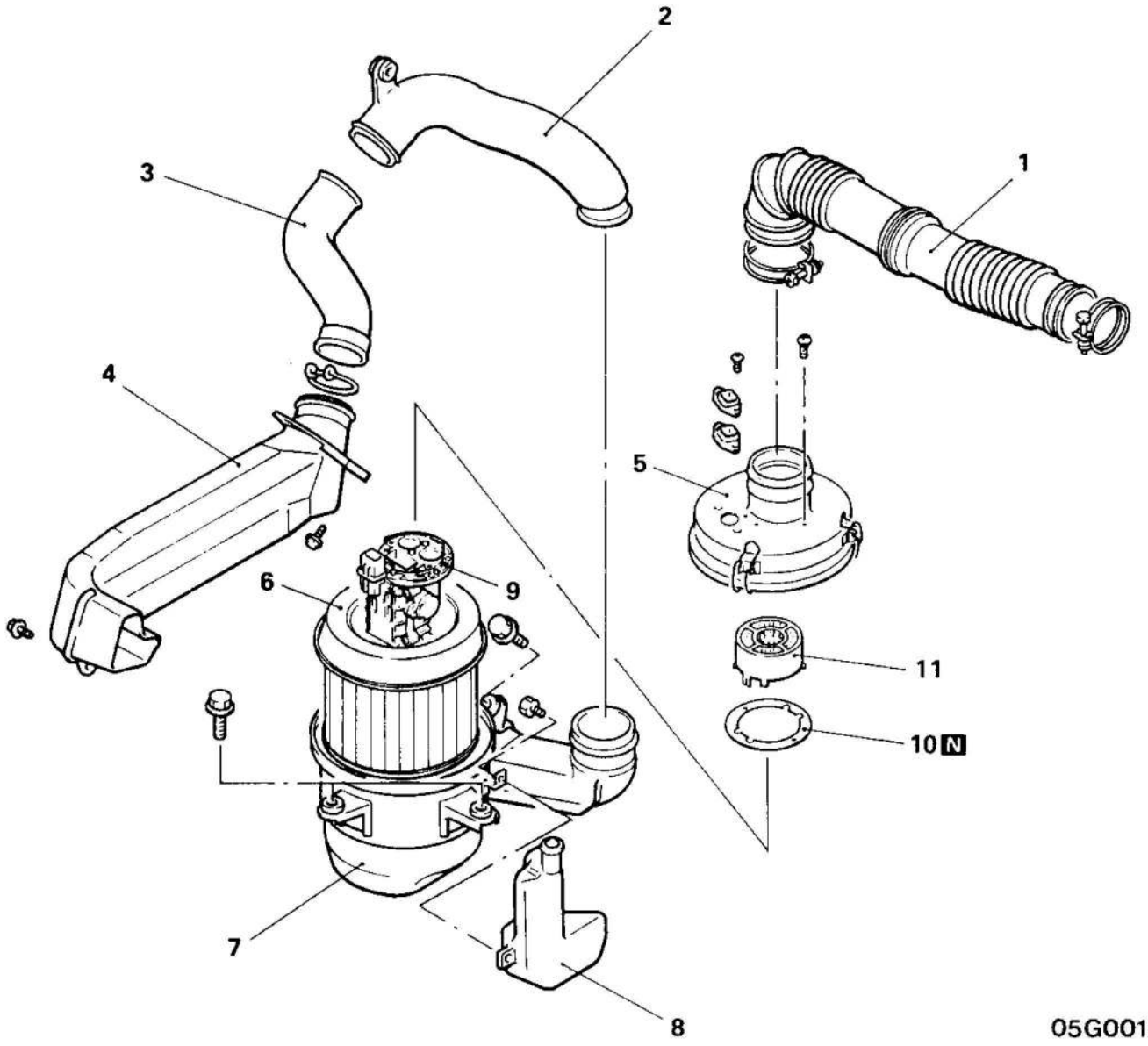


CHECKING OF THE HOT AIR CONTROL VALVE

Check to ensure that when negative pressure is applied to nipple of vacuum motor, valve operates as indicated by arrow.

REMOVAL AND INSTALLATION [Petrol-powered vehicles (with M.P.I.)]

E150A--



Removal steps

1. Air intake hose
2. Air duct C
3. Air duct B
4. Air duct A
5. Air cleaner cover
6. Air cleaner element
7. Air cleaner body
8. Resonator
◆◆ 9. Air flow sensor
10. Air flow sensor gasket
11. Noise reduction filter

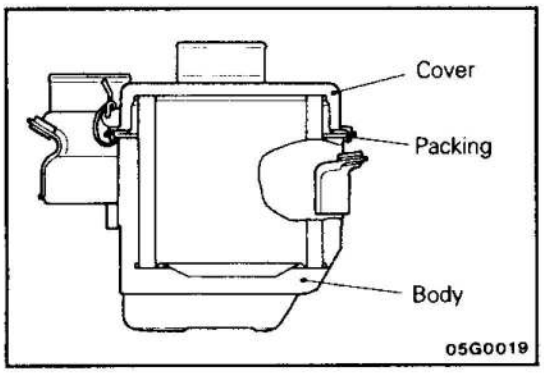
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) N : Non-reusable parts

SERVICE POINTS OF REMOVAL E150BAC

9. REMOVAL OF AIR FLOW SENSOR

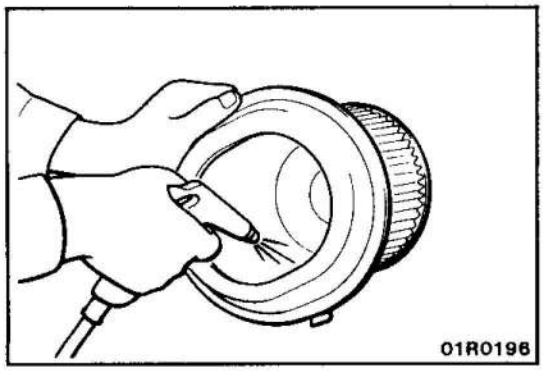
Remove air flow sensor from air cleaner case.

Caution
Do not pull air flow sensor harness, because its grommet is fitted in air cleaner case.



INSPECTION E150CAG

- Check the air cleaner body, cover or packing for deformation, corrosion or damage.
- Check the air duct for damage.



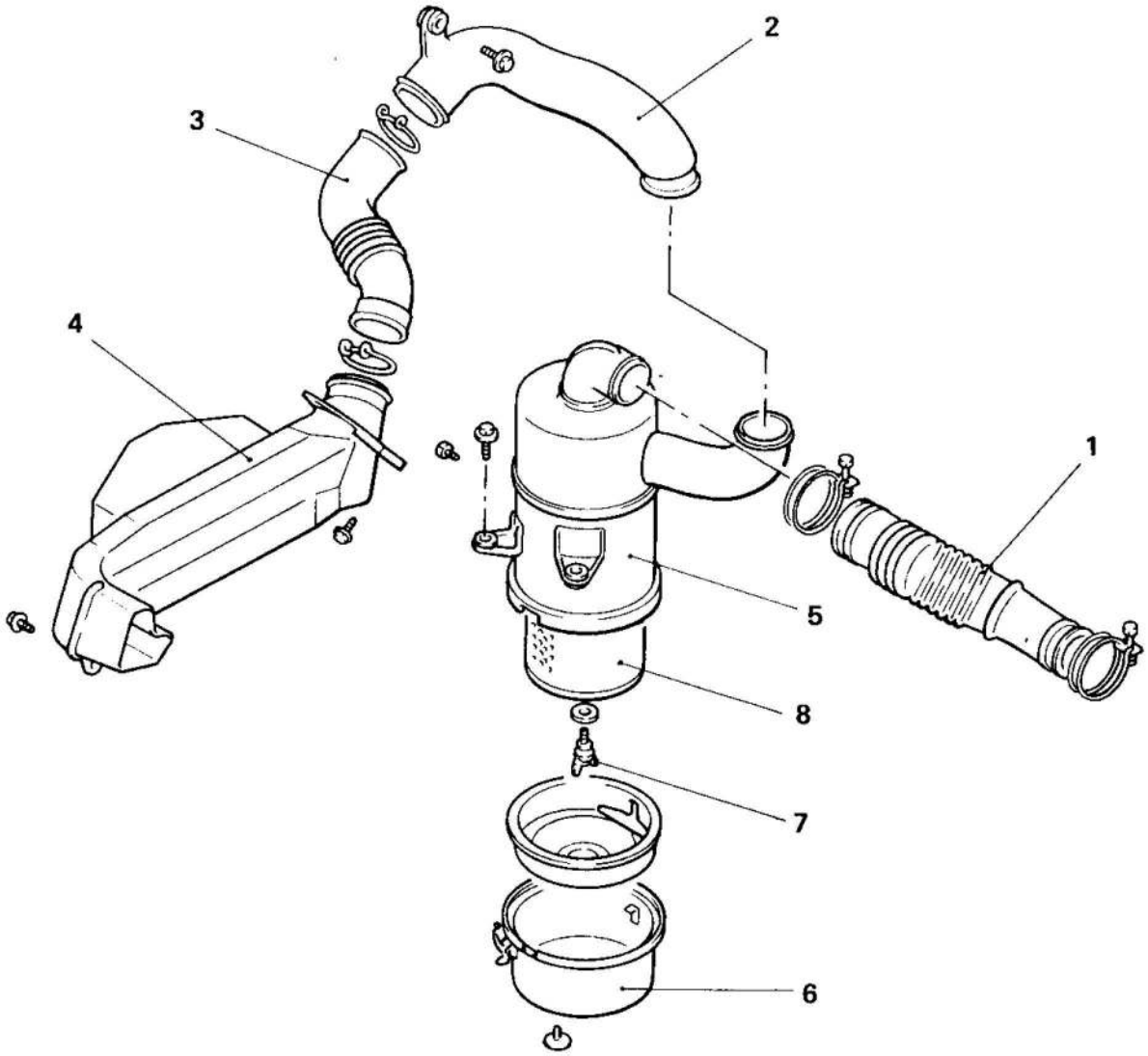
- Check the air cleaner element for clogging, contamination or damage.
  If element is slightly clogged, remove dust by blowing air from inside of element.
- Check the air cleaner for clogging, contamination or damage.

CHECKING OF THE AIR FLOW SENSOR

For inspection of air flow sensor, refer to GROUP 13 FUEL –Checking of the air flow sensor

REMOVAL AND INSTALLATION (Diesel-powered vehicles)

E150A---

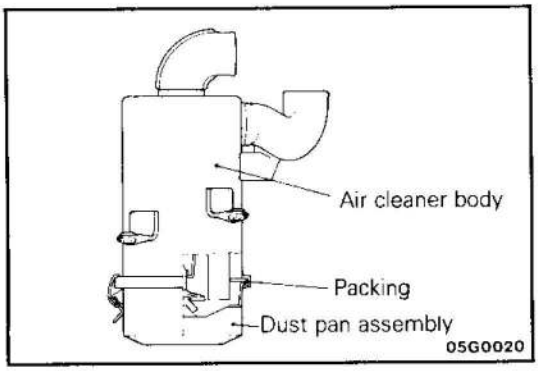


05G0018

Removal steps

1. Air intake hose
2. Air duct C
3. Air duct B
4. Air duct A
5. Air cleaner assembly
6. Dust pan assembly
7. Wing bolt
8. Air cleaner element

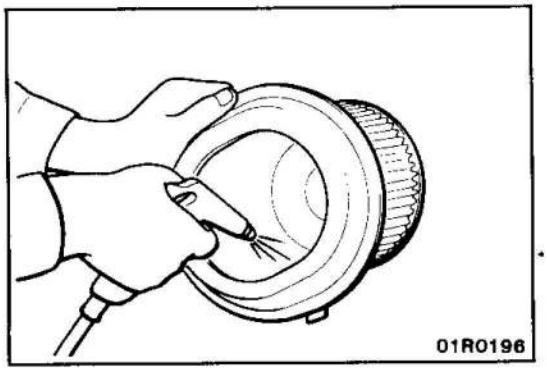
NOTE
Reverse the removal procedures to reinstall.



INSPECTION

E150CAG

- Check the air cleaner body, cover or packing for deformation, corrosion or damage.
- Check the air duct for damage.



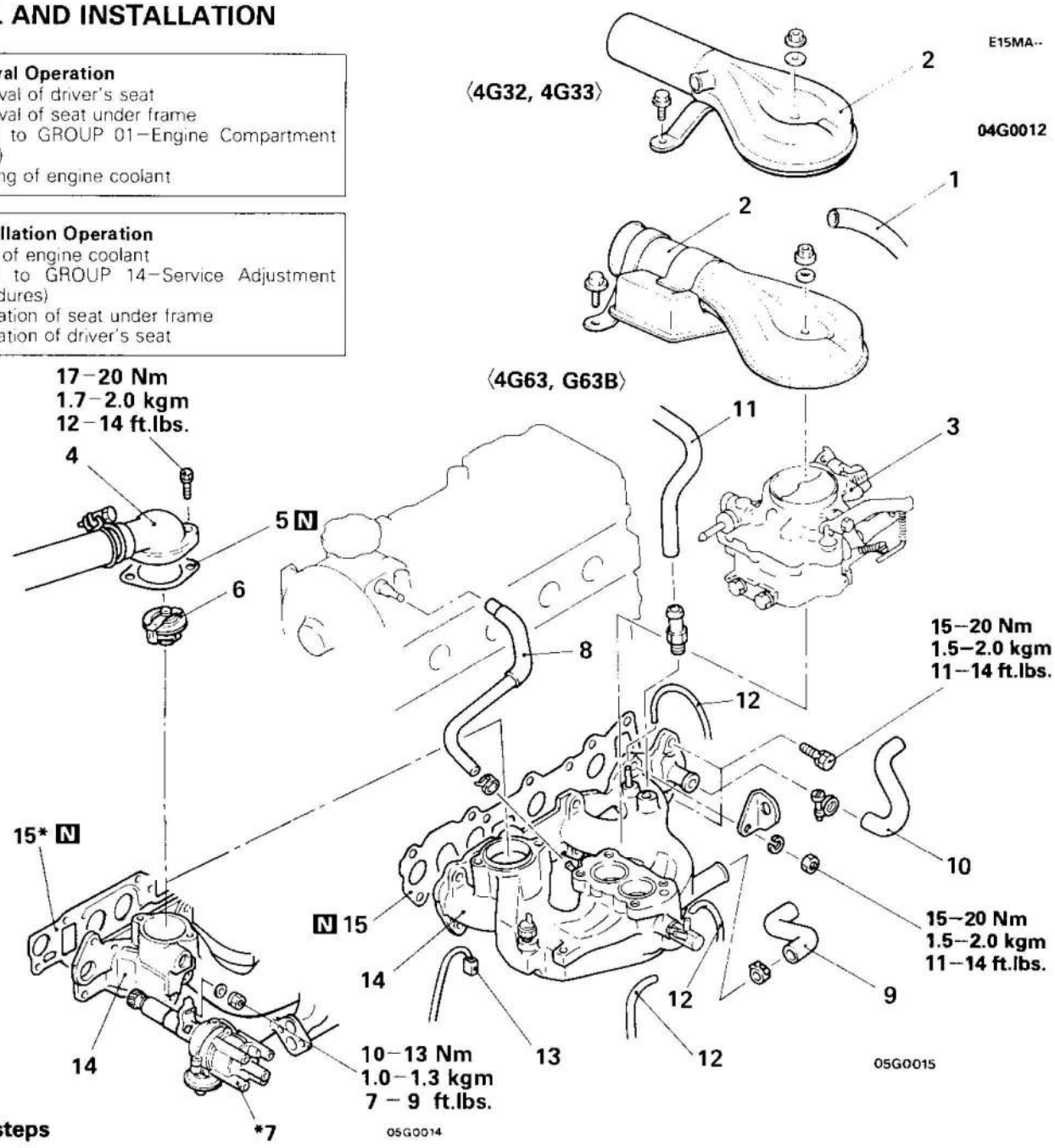
- Check the air cleaner element for clogging, contamination or damage.
  If element is slightly clogged, remove dust by blowing air from inside of element.

INTAKE MANIFOLD [PETROL-POWERED VEHICLES BUILT UP TO MAY 1994 (EXCEPT M.P.I.)]

REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of driver's seat
- Removal of seat under frame (Refer to GROUP 01–Engine Compartment Work.)
- Draining of engine coolant

Post-installation Operation
- Filling of engine coolant (Refer to GROUP 14–Service Adjustment Procedures)
- Installation of seat under frame
- Installation of driver's seat



Removal steps

1. Breather hose
2. Air horn
3. Carburetor
4. Water outlet fitting
5. Water outlet fitting gasket
6. Thermostat
7. Distributor
8. Purge control valve hose
9. Water hose
10. Heater hose
11. Brake booster vacuum hose
12. Vacuum hose
13. Connection of water temperature gauge unit to wiring harness connector
14. Intake manifold
15. Intake manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".
(4) N : Non-reusable parts
(5) * : Indicates 4G63 and G63B.

SERVICE POINTS OF REMOVAL E15MBAC

3. REMOVAL OF CARBURETOR

Refer to GROUP 13–Removal, Installation and Inspection of carburetor.

4. REMOVAL OF WATER OUTLET FITTING

Refer to GROUP 14–Removal, Installation and Inspection of thermostat.

INSPECTION E15MBBA

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

INTAKE MANIFOLD

1. Check for damage or cracking of any part.
2. Check for obstruction of the negative pressure (vacuum) outlet port, and for obstruction of the water passage or gas passage.

SERVICE POINTS OF INSTALLATION E15MBCA

12. INSTALLATION OF VACUUM HOSES

Refer to GROUP 17–Service Adjustment Procedures.

7. INSTALLATION OF DISTRIBUTOR

Refer to GROUP 16–Ignition System.

INTAKE MANIFOLD [PETROL-POWERED VEHICLES BUILT UP TO MAY 1994 (WITH M.P.I.)]

E15MA--

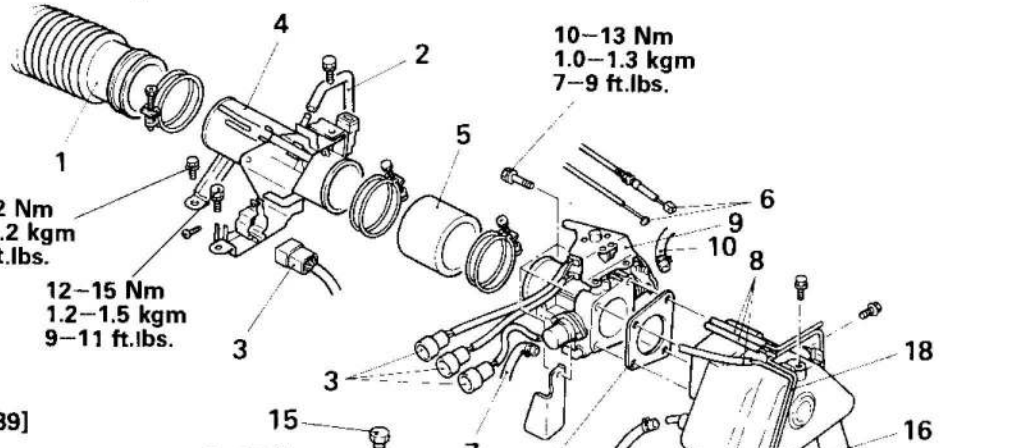
REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of driver's seat
- Removal of seat under frame (Refer to GROUP 01 – Engine Compartment Work.)
- Draining of engine coolant

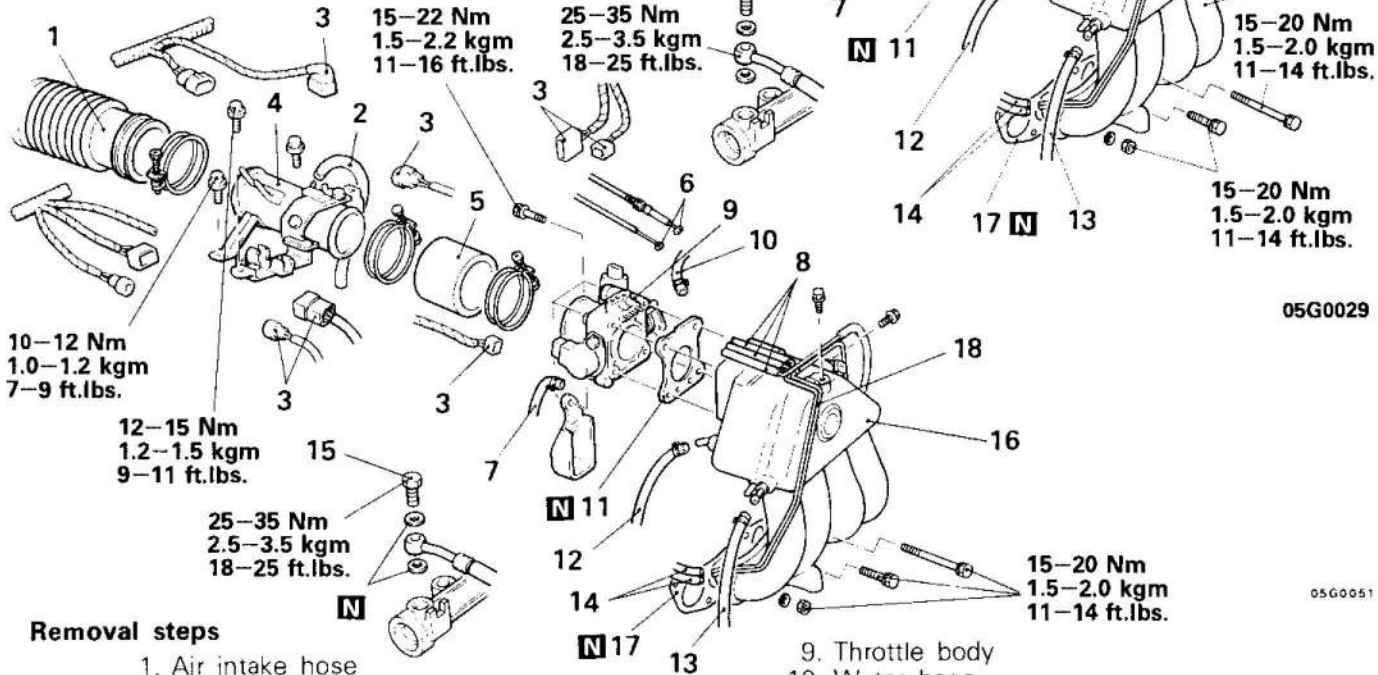
Post-installation Operation
- Filling of engine coolant (Refer to GROUP 14 – Service Adjustment Procedures)
- Installation of seat under frame
- Installation of driver's seat
- Adjustment of accelerator cable (Refer to GROUP 13 – Service Adjustment Procedures)
- Inspection of fuel pressure (Refer to GROUP 13 – Service Adjustment Procedures)

Surge Tank

[Vehicles built up to June 1989]



[Vehicles built from July 1989]



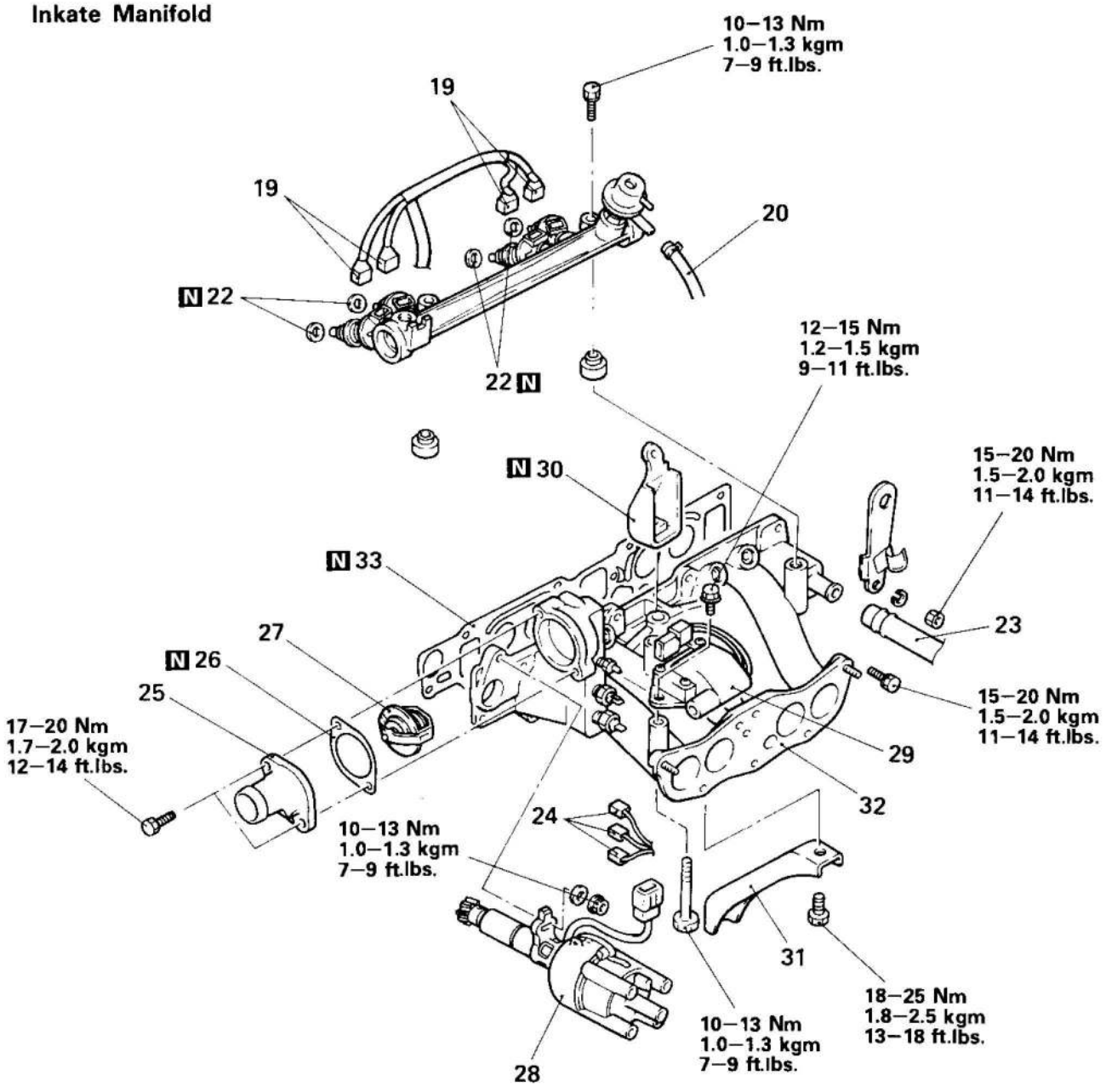
05G0029

05G0051

Removal steps

1. Air intake hose
2. Breather hose
3. Wiring harness connector
4. Air intake pipe
- ◆◆ 5. Air hose
6. Accelerator cable and kick-down cable (vehicles with automatic transmission)
7. Water hose
- ◆◆ 8. Vacuum hose connection
9. Throttle body
10. Water hose
11. Gasket
12. P.C.V.hose
13. Brake booster vacuum hose
- ◆◆ 14. Vacuum hose connection
- ◆◆ 15. Fuel high pressure hose connection
16. Surge tank assembly
17. Surge tank gasket
18. Vacuum hose and pipe

Inkate Manifold



Removal steps

19. Fuel injector harness connector
20. Fuel high pressure hose connection
◆◆ ◆◆ 21. Delivery pipe, fuel injector and pressure regulator
◆◆ 22. Insulator
23. Heater hose
24. Wiring harness connector
25. Water outlet fitting
26. Water outlet fitting gasket
27. Thermostat
28. Distributor
29. Ignition coil
30. Surge tank stay
31. Intake manifold stay
32. Intake manifold
33. Intake manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".
(4) N : Non-reusable parts

SERVICE POINTS OF REMOVAL E15MBAD

15. DISCONNECTION OF FUEL HIGH PRESSURE HOSE

Relieve pressure in the fuel pipe line to prevent fuel outflow. (See GROUP 13–Service Adjustment Procedures)

Caution
Cover fuel pipe line with rag after relieving pressure as certain pressure may still remain.

21. REMOVAL OF DELIVERY PIPE, FUEL INJECTOR AND PRESSURE REGULATOR

Remove delivery pipe with fuel injector and pressure regulator on.

Caution
Do not drop injector when removing delivery pipe.

INSPECTION E15MBBB

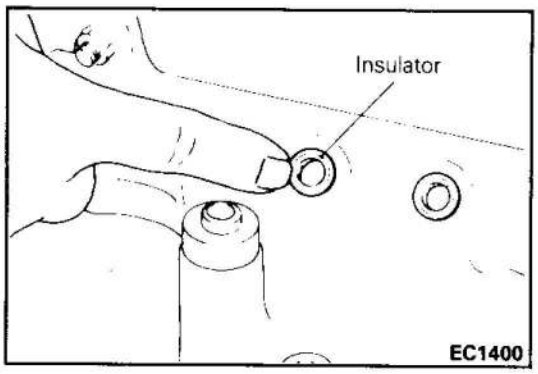
Check the following points; replace the part if a problem is found.

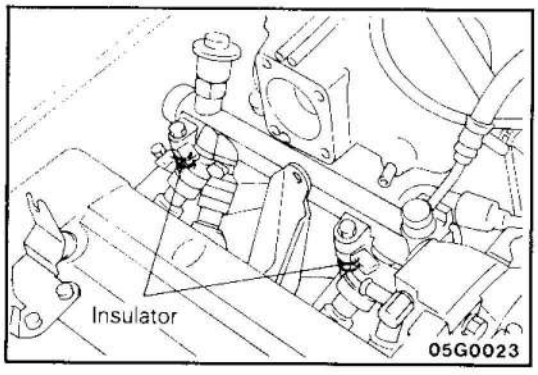
INSPECTION OF SURGE TANK

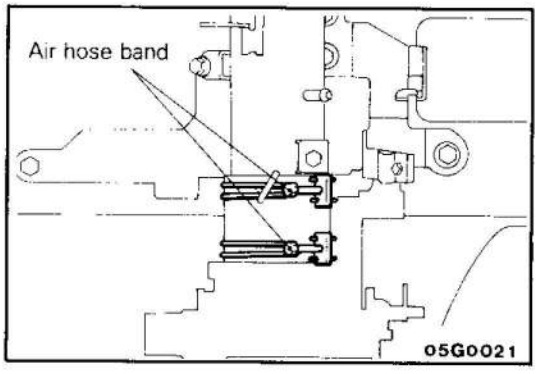
1. Check surge tank for defect or cracks. Replace if defective or cracked.
2. Check load (negative pressure) of drain port. Check cooling water and jet air passages for clogging. Clean if required.

INTAKE MANIFOLD

1. Check for damage or cracking of any part.
2. Check load (negative pressure) of drain port. Check cooling water and jet air passages for clogging. Clean if required.







SERVICE POINTS OF INSTALLATION E15MBCB

22. INSTALLATION OF INSULATOR

Insert insulators (4) into intake manifold.

21. INSTALLATION OF DELEVERY PIPE, FUEL INJECTOR AND PRESSURE REGULATOR

Ensure that insulators are correctly inserted into delivery pipe hole.

14./8. CONNECTION TO VACUUM HOSE

Refer to GROUP 17 EMISSION CONTROL–Service Adjustment Procedures

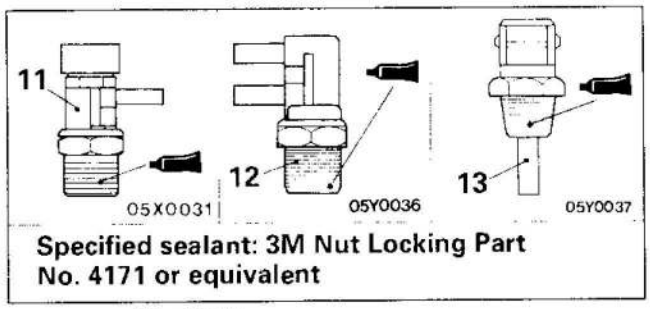
5. INSTALLATION OF AIR HOSE

When installing air hose, tighten with the air hose band bolt about 45° against the horizontal surface.

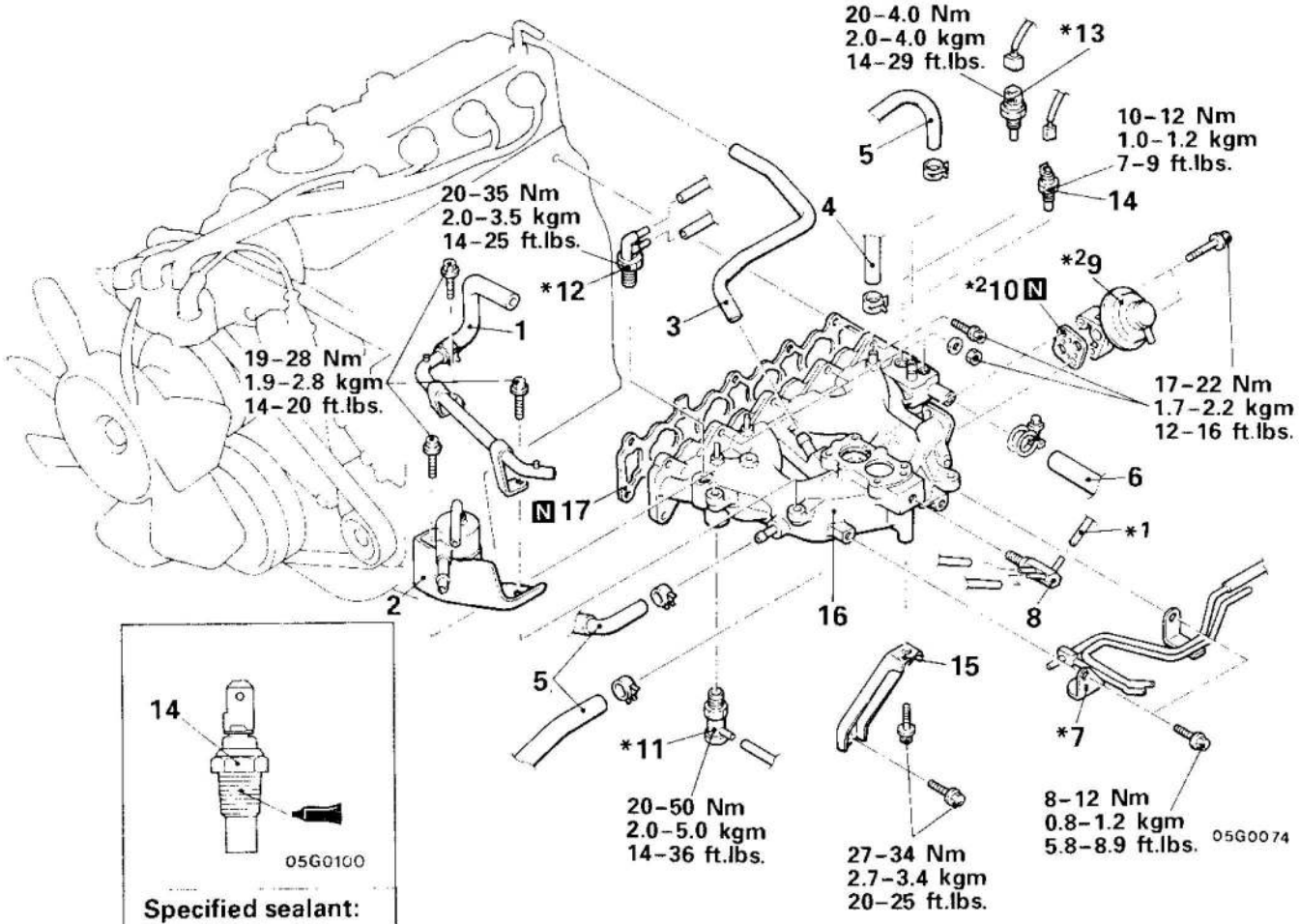
INTAKE MANIFOLD (4G92)

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Carburetor Assembly Removal and installation
(Refer to GROUP 13 - Carburetor.)



Specified sealant: 3M Nut Locking Part No. 4171 or equivalent



Specified sealant: 3M ATD Part No. 8660 or equivalent

Removal steps

1. Vapor hose and pipe assembly
2. Fuel vapor separator
3. PCV hose
4. Brake booster vacuum hose connection
5. Water hose
6. Heater hose
7. Vacuum pipe assembly
8. Vacuum connector joint
9. EGR valve
10. EGR gasket
- ◆◆ 11. Thermo valve
- ◆◆ 12. Thermo valve
- ◆◆ 13. Engine coolant temperature sensor
- ◆◆ 14. Engine coolant temperature gauge unit
- ◆◆ 15. Intake manifold stay
16. Intake manifold
17. Intake manifold gasket

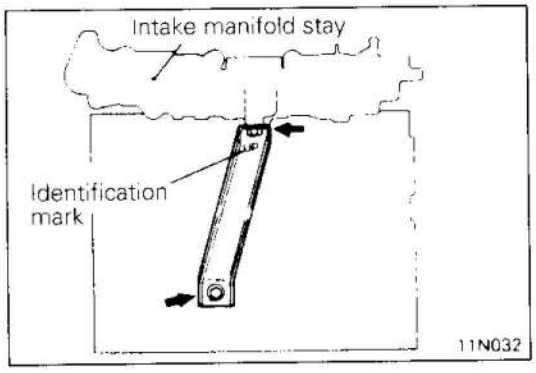
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts
(4) * : Vehicles with FBC
(5) *1 : Vehicles with power steering
(6) *2 : Vehicles with EGR system

INSPECTION E15MBBA

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

INTAKE MANIFOLD

1. Check for damage or cracking of any part.
2. Check for obstruction of the negative pressure (vacuum) outlet port, and for obstruction of the water passage or gas passage.



SERVICE POINTS OF INSTALLATION

15. INSTALLATION OF INTAKE MANIFOLD STAY

(1) Install the intake manifold stay so that the identification mark is facing towards the intake manifold.
(2) After provisionally tightening the bolts at both ends, check to be sure that the stay is secure against the boss, and then tighten to the specified torque.

14. INSTALLATION OF ENGINE COOLANT TEMPERATURE GAUGE UNIT

Apply the specified sealant around the thread of engine coolant temperature gauge unit and install on the intake manifold.

Specified sealant: 3M ATD Part No. 8660 or equivalent

13. INSTALLATION OF ENGINE COOLANT TEMPERATURE SENSOR/12. 11. THERMO VALVE

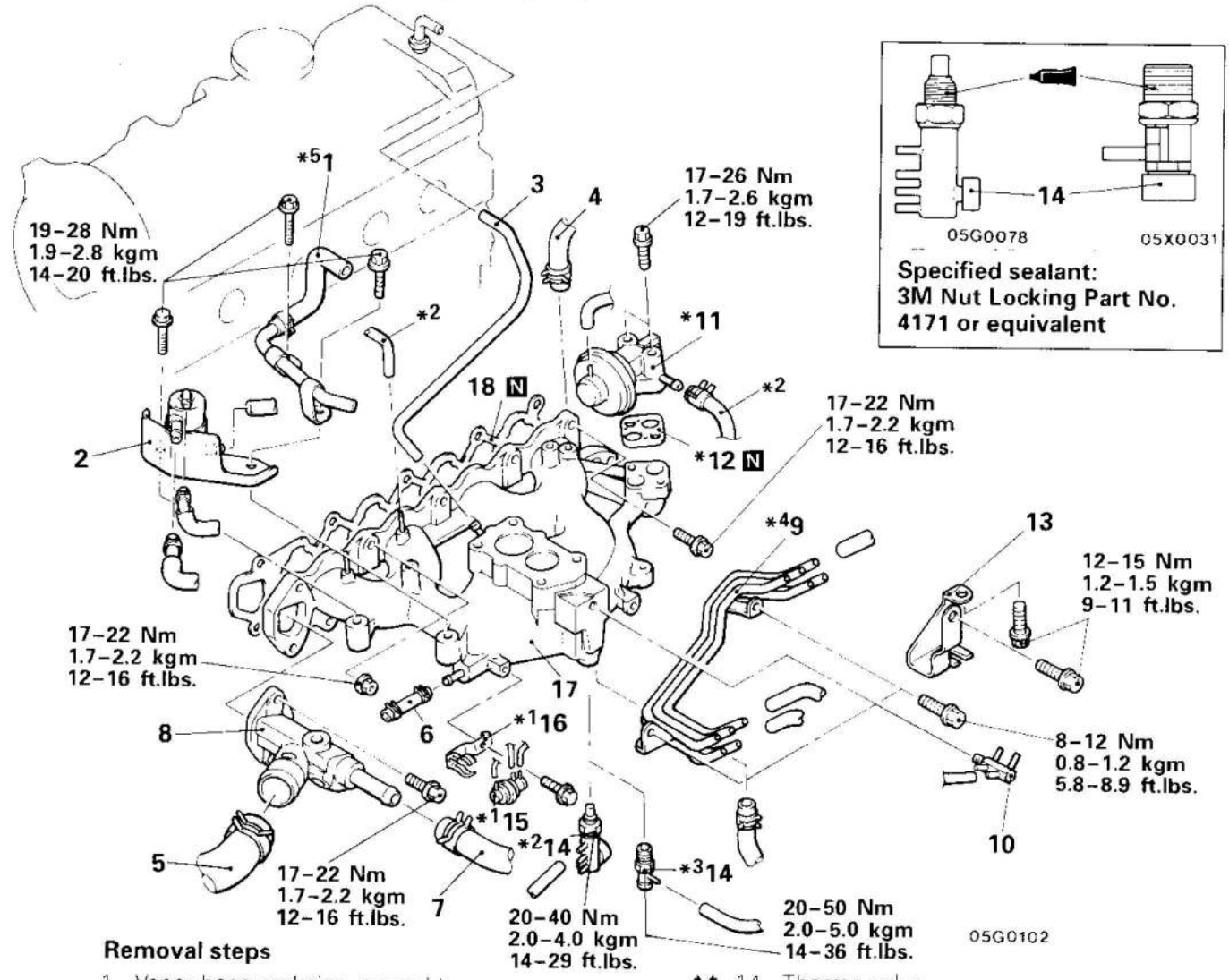
Apply the specified sealant around the thread of engine coolant temperature sensor, thermo valve and install on the intake manifold.

Specified sealant: 3M Nut Locking Part No. 4171 or equivalent

INTAKE MANIFOLD [4G63 – 16 VALVE (EXCEPT M.P.I.)]

REMOVAL AND INSTALLATION

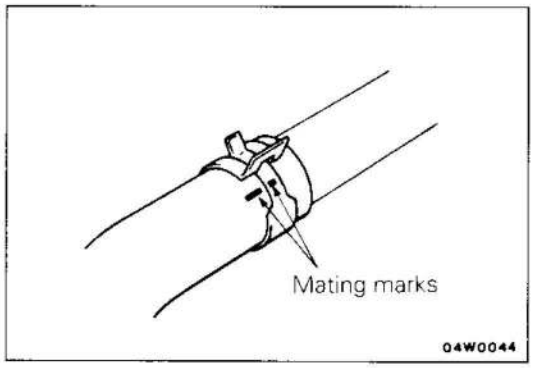
Pre-removal and Post-installation Operation
- Carburetor Assembly Removal and installation (Refer to GROUP 13 – Carburetor.)



Removal steps

1. Vapor hose and pipe assembly
2. Fuel vapor separator
3. PCV hose
4. Brake booster vacuum hose connection
5. ◆◆ ◆◆ Radiator hose connection
6. Water hose connection
7. Heater hose connection
8. ◆◆ Water outlet fitting
9. Vacuum pipe assembly
10. Vacuum conector joint
11. EGR valve
12. EGR valve gasket
13. Kick-down cable bracket (Vehicles with automatic transmission)
14. ◆◆ Thermo valve
15. Vacuum control valve
16. Vacuum control valve bracket
17. Intake manifold
18. Intake manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".
(4) N : Non-reusable parts
(5) * : Vehicles with EGR system
(6) *1 : Except vehicles for Europe with FBC and Australia – A/T
(7) *2 : Vehicles for Europe with FBC and Australia
(8) *3 : Vehicles for GCC
(9) *4 : Except vehicles for General Export
(10) *5 : Except vehicles for Europe with FBC



SERVICE POINTS OF REMOVAL

5. DISCONNECTION OF RADIATOR HOSE

After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.

INSPECTION E15MBBA

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

INTAKE MANIFOLD

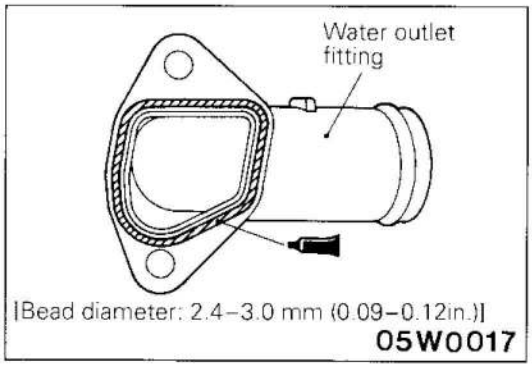
1. Check for damage or cracking of any part.
2. Check for obstruction of the negative pressure (vacuum) outlet port, and for obstruction of the water passage or gas passage.

SERVICE POINTS OF INSTALLATION

14. INSTALLATION OF THERMO VALVE

Apply the specified sealant around the thread of thermo valve and install on the intake manifold.

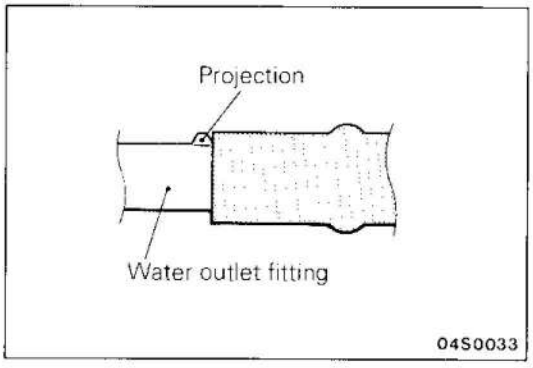
Specified sealant: 3M Nut Locking Part No. 4171 or equivalent



8. INSTALLATION OF WATER OUTLET FITTING

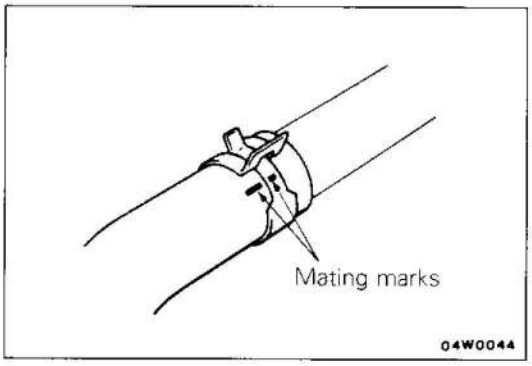
1. Use a gasket scraper or wire brush to clean all foreign materials from the surface of the gasket.
2. Apply an even amount of specified sealant to the surface of the gasket.

   Specified sealant:
   Mitsubishi Genuine Parts No.
   MD970389 or equivalent
3. Before the sealant has dried (within 15 minutes), install the water outlet fitting.
   Do not apply sealant to any places other than where necessary.



5. CONNECTION OF RADIATOR HOSE

1. Insert each hose as far as the projection of the water outlet fitting or water inlet fitting.

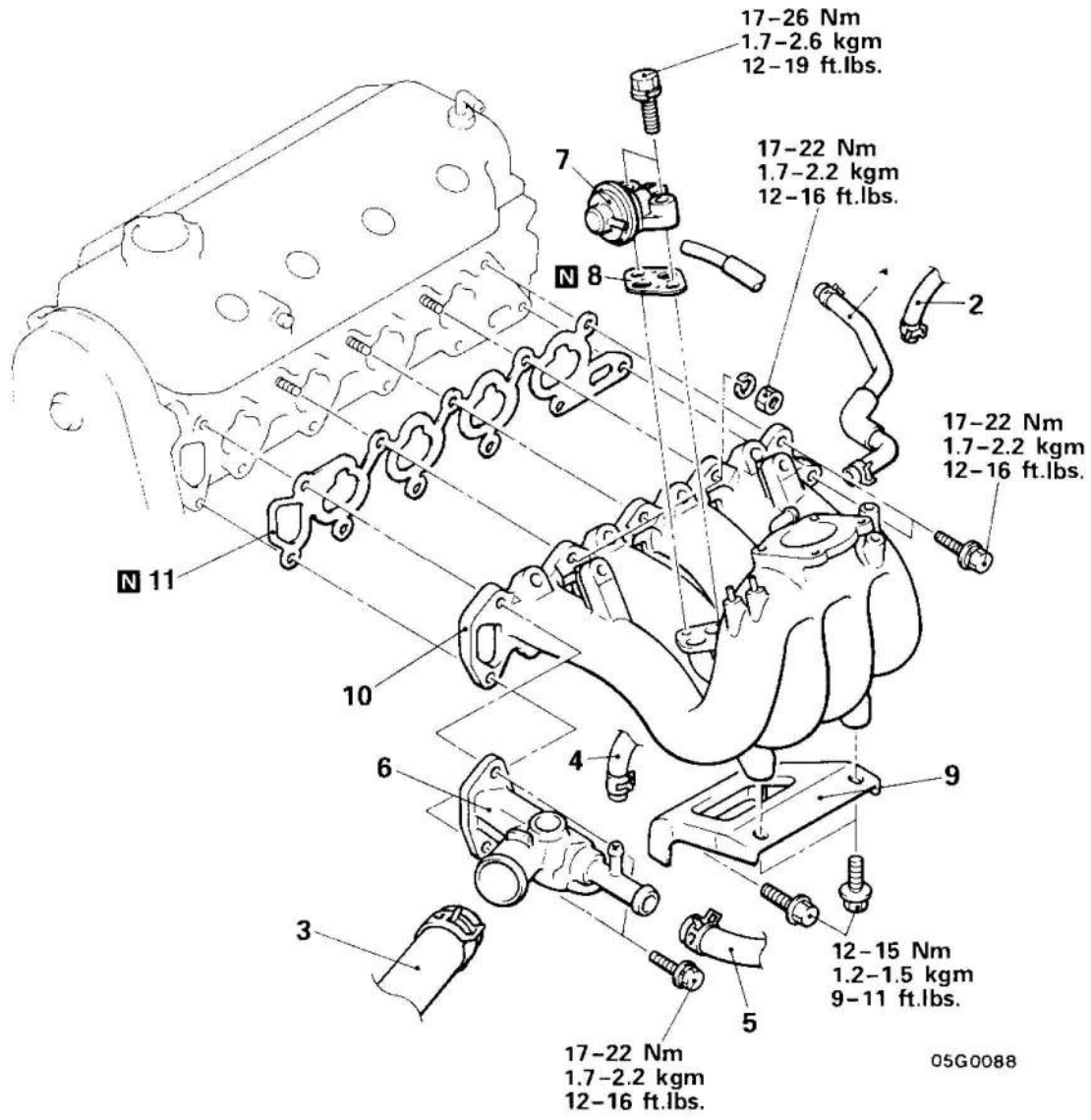


2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

INTAKE MANIFOLD [4G63 AND 4G64 – 16 VALVE (WITH M.P.I.)]

REMOVAL AND INSTALLATION

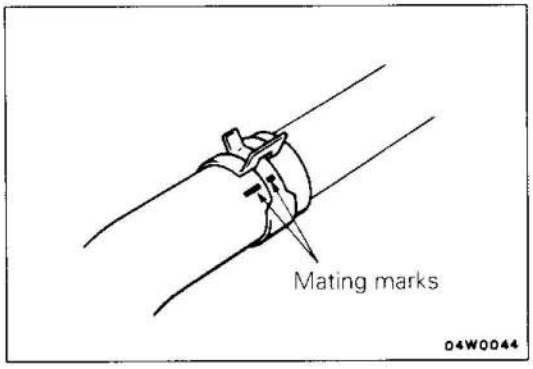
Pre-removal and Post-installation Operation
- Injector Removal and Installation (Refer to GROUP 13 – Injector.)
- Throttle Body Removal and Installation (Refer to GROUP 13 – Throttle Body.)



Removal steps

1. PCV hose
2. Brake booster vacuum hose connection
3. Radiator hose connection
4. Water hose connection
5. Heater hose connection
6. Water outlet fitting
7. EGR valve
8. EGR valve gasket } (Vehicles with EGR system)
9. Intake manifold stay
10. Intake manifold
11. Intake manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".
(4) N : Vehicles with EGR system.



SERVICE POINTS OF REMOVAL

3. DISCONNECTION OF RADIATOR HOSE

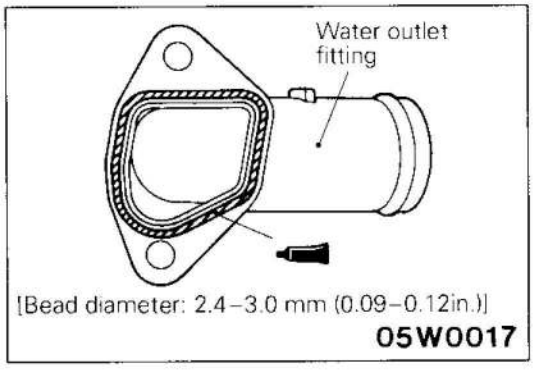
After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.

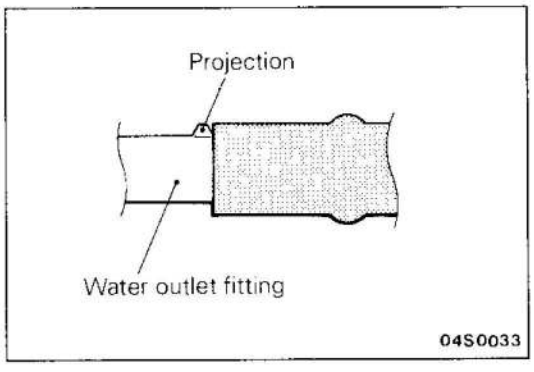
INSPECTION

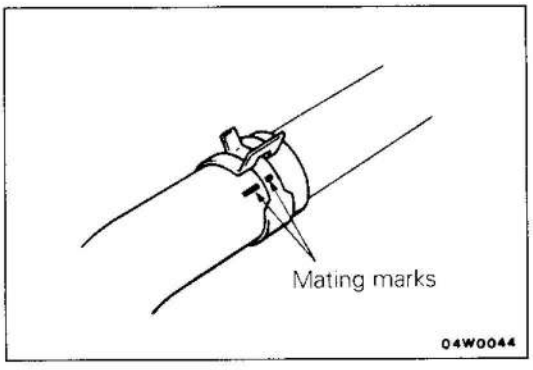
Check the following points; replace the part if a problem is found.

INTAKE MANIFOLD

1. Check for damage or cracking of any part.
2. Check for obstruction of the negative pressure (vacuum) outlet port, and for obstruction of the water passage or gas passage.







SERVICE POINTS OF INSTALLATION

6. INSTALLATION OF WATER OUTLET FITTING

1. Use a gasket scraper or wire brush to clean all foreign materials from the surface of the gasket.
2. Apply an even amount of specified sealant to the surface of the gasket.

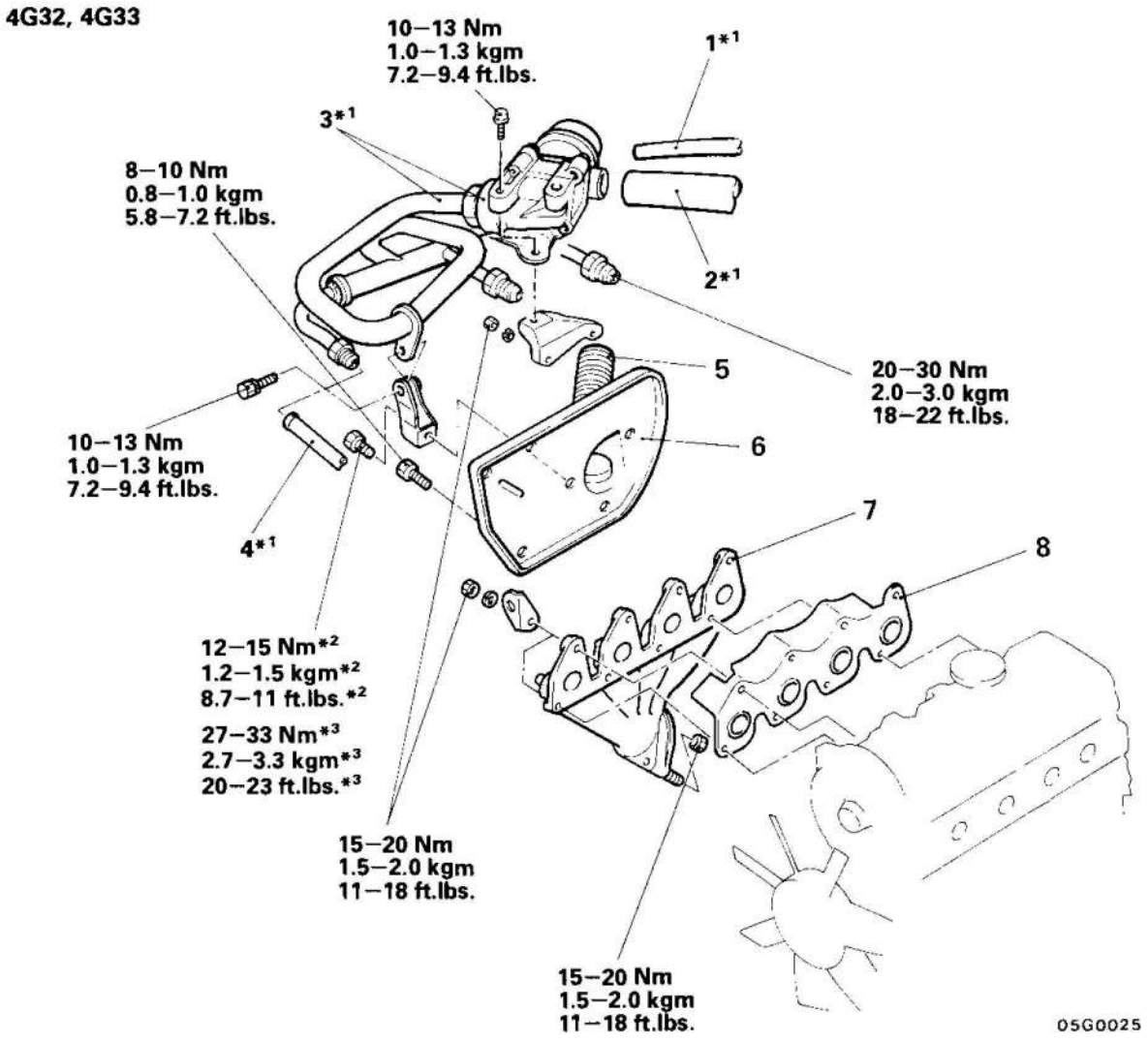
   Specified sealant:
   Mitsubishi Genuine Parts No.
   MD970389 or equivalent
3. Before the sealant has dried (within 15 minutes), install the water outlet fitting.
   Do not apply sealant to any places other than where necessary.

3. CONNECTION OF RADIATOR HOSE

1. Insert each hose as far as the projection of the water outlet fitting or water inlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

EXHAUST MANIFOLD (PETROL-POWERED VEHICLES BUILT UP TO MAY 1994)

REMOVAL AND INSTALLATION



Pre-removal Operation
- Removal of driver's seat (R.H.D.)
- Removal of seat under frame (Refer to GROUP 01–Engine Compartment Work.)

Post-installation Operation
- Installation of seat under frame
- Installation of driver's seat (R.H.D.)

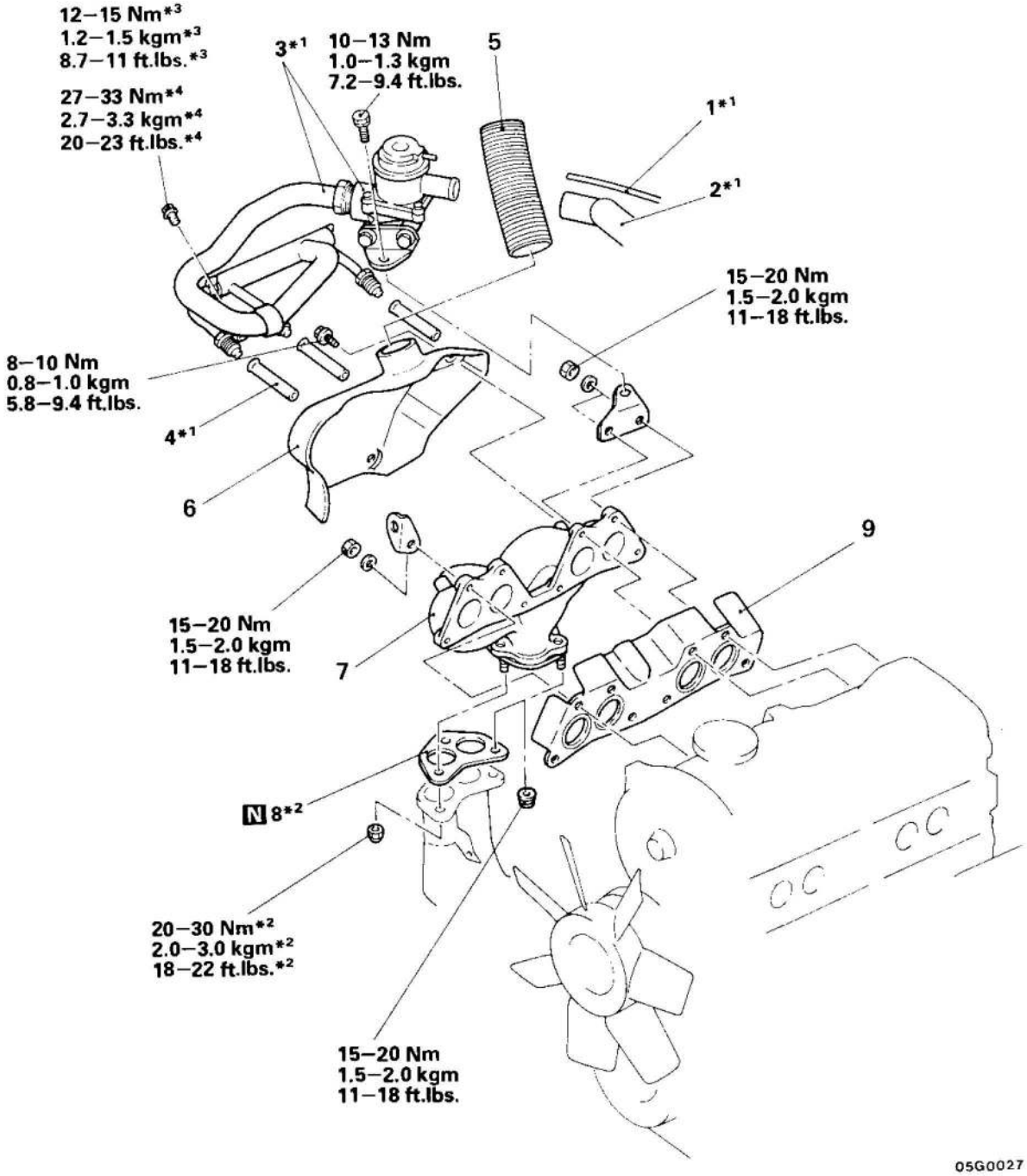
Removal steps

1. Vacuum hose
2. Air hose
3. Reed valve and air pipe
4. Air nozzle
5. Hot air duct
6. Heat cowl
7. Exhaust manifold
8. Exhaust manifold gasket

NOTE

(1) Reverse the removal procedures to reinstall.
(2) *1 : Vehicles for Europe.
(3) *2 : Vehicles built up to October 1987.
(4) *3 : Vehicles built from Nobember 1987.

4G63



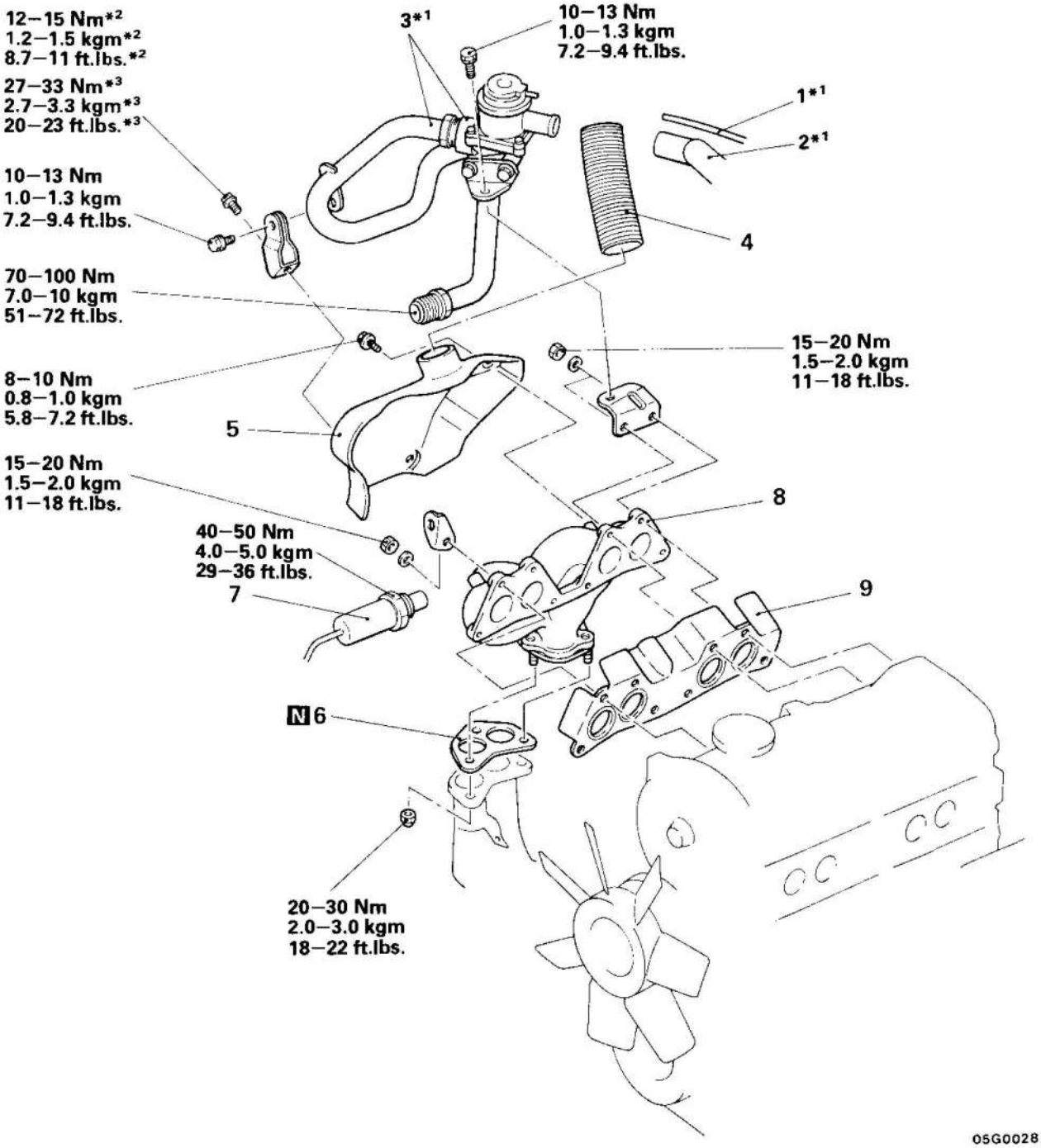
Removal steps

1. Vacuum hose
2. Air hose
3. Reed valve and air pipe
4. Air nozzle
5. Hot air duct
6. Heat cowl
7. Exhaust manifold
8. Gasket
9. Exhaust manifold gasket

NOTE

(1) Reverse the removal procedures to reinstall.
(2) N : Non-reusable parts
(3) *1 : Vehicles for Australia.
(4) *2 : Vehicles equipped with a dual type front exhaust pipe.
(5) *3 : Vehicles built up to October 1987.
(6) *4 : Vehicles built from November 1987.

G63B, G64B, 4G64



Removal steps

1. Vacuum hose
2. Air hose
3. Reed valve and air pipe
4. Hot air duct
5. Heat cowl
6. Gasket
7. Oxygen sensor
8. Exhaust manifold
9. Exhaust manifold gasket

NOTE

(1) Reverse the removal procedures to reinstall.
(2) N : Non-reusable parts
(3) *1 : G63B engine
(4) *2 : Vehicles built up to October 1987.
(5) *3 : Vehicles built from November 1987.

INSPECTION

E15NCAA

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

EXHAUST MANIFOLD

Check for damage or cracking of any part.

EXHAUST MANIFOLD GASKET

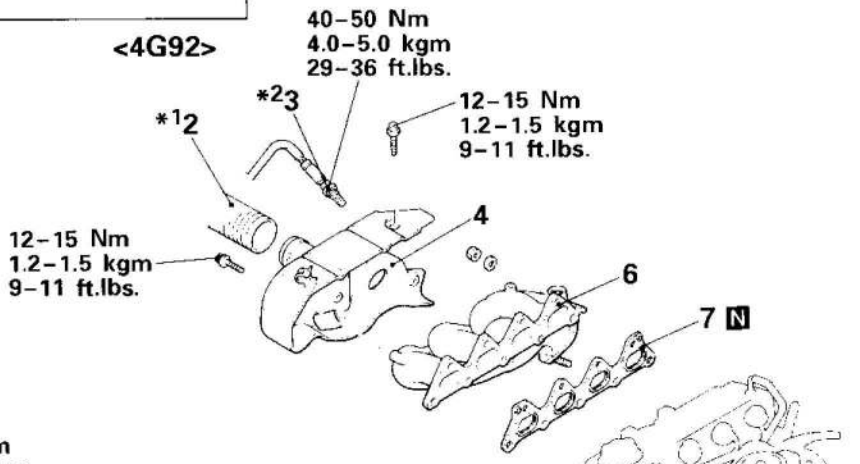
Check for flaking or damage of the gasket.

EXHAUST MANIFOLD (4G92, 4G63 AND 4G64 – 16 VALVE)

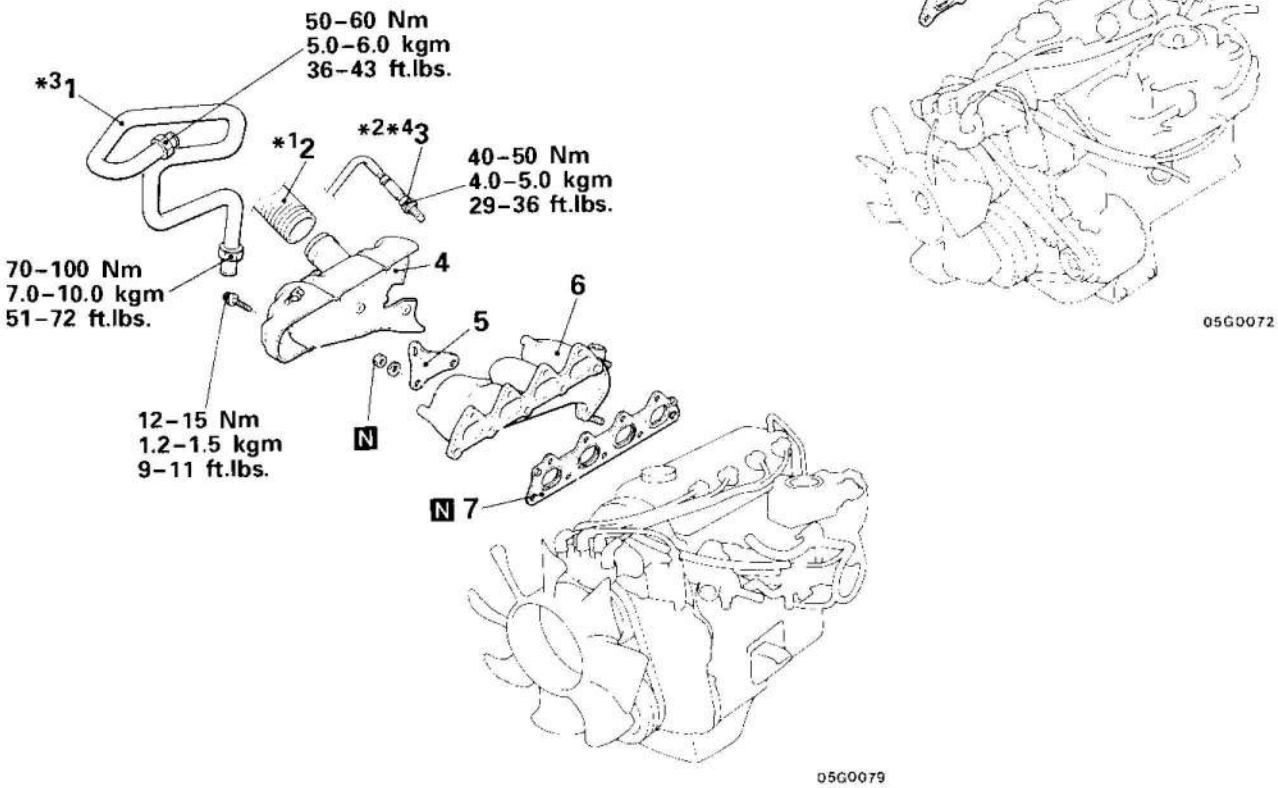
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Front exhaust pipe removal and installation (Refer to P.15-24.)
- Air intake hose removal and installation (Refer to P.15-6.)

<4G92>



<4G63, 4G64>



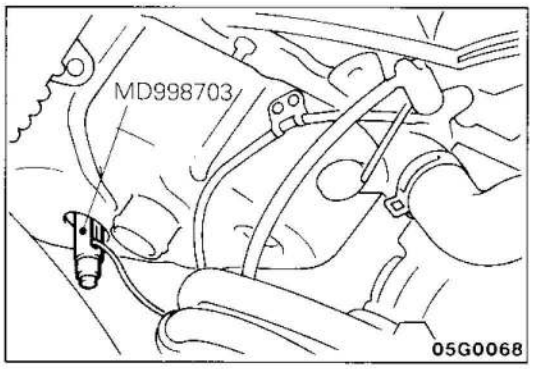
05G0072

05G0079

Removal steps

1. Secondary air pipe
2. Heat duct
3. ◆◆ Oxygen sensor
4. Heat protector
5. Engine hanger
6. ◆◆ Exhaust manifold
7. Exhaust manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".
(4) N : Non-reusable parts
(5) *1 : Vehicles with hot air control valve
(6) *2 : Vehicles with FBC
(7) *3 : Vehicles with secondary air supply system
(8) *4 : Vehicles for Australia with MPI



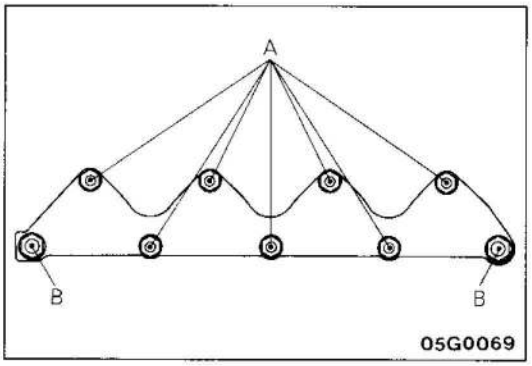
SERVICE POINTS OF REMOVAL

3. REMOVAL OF OXYGEN SENSOR

INSPECTION

EXHAUST MANIFOLD

Check for damage or cracking of any part.



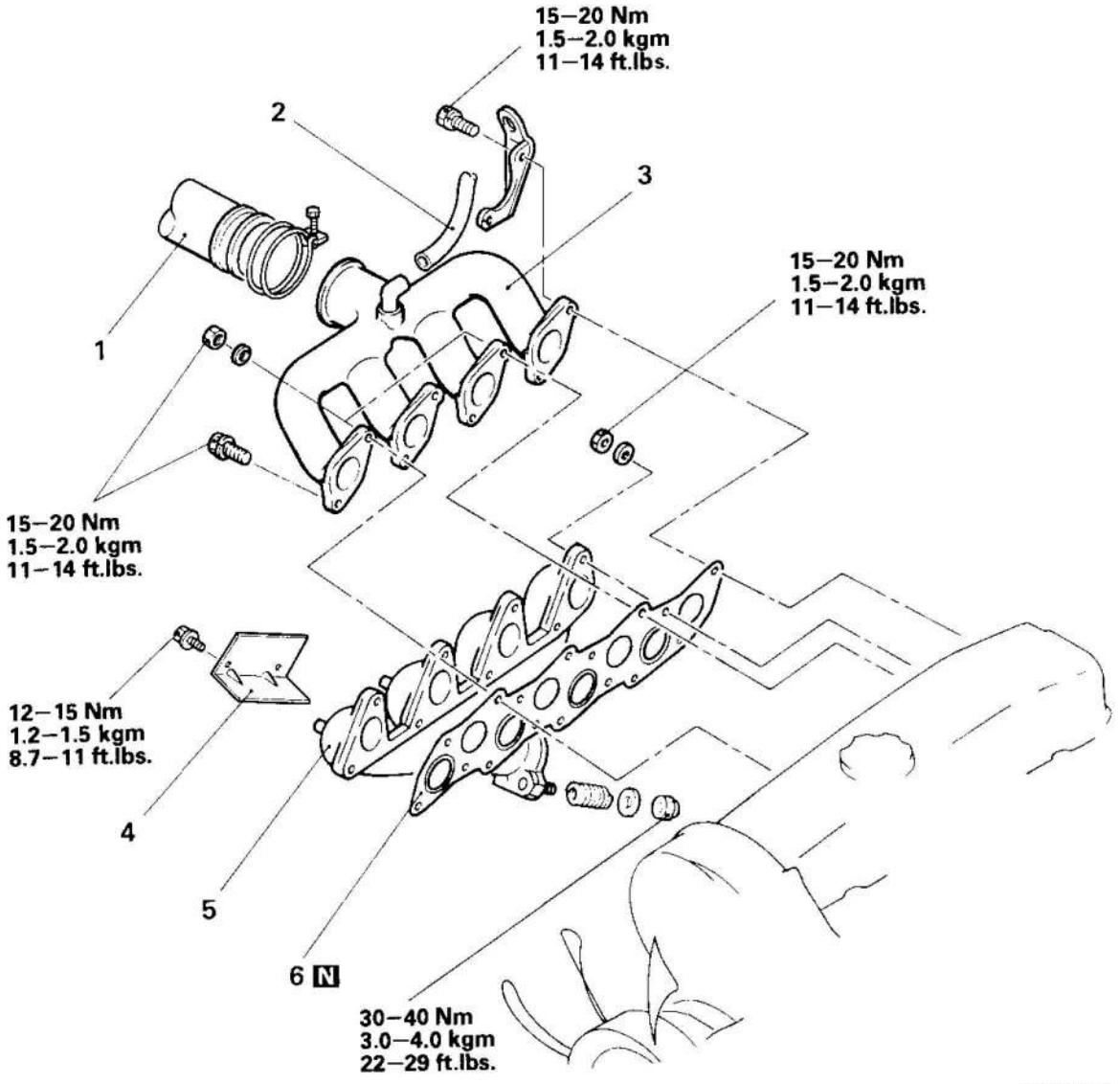
SERVICE POINTS OF INSTALLATION

6. INSTALLATION OF EXHAUST MANIFOLD

Engine items	Nut A Tightening torque	Nut B Tightening torque
4G92	15–20 Nm 1.5–2.0 kgm 11–14 ft.lbs.	27–33 Nm 2.7–3.3 kgm 20–24 ft.lbs.
4G63, 4G64	25–30 Nm 2.5–3.0 kgm 18–22 ft.lbs.	27–33 Nm 2.7–3.3 kgm 20–24 ft.lbs.

INTAKE AND EXHAUST MANIFOLD (DIESEL-POWERED VEHICLES) E15UA–A

REMOVAL AND INSTALLATION (VEHICLES WITHOUT A TURBOCHARGER)



05G0026

Pre-removal Operation
- Removal of driver's seat (R.H.D.)
- Removal of seat under frame (Refer to GROUP 01 GENERAL–Engine Compartment Work.)

Post-installation Operation
- Installation of seat under frame
- Installation of driver's seat (R.H.D.)

Removal steps
1. Air intake hose
2. Breather hose
3. Intake manifold
4. Heat protector (except Mini-bus for Europe)
5. Exhaust manifold
6. Intake and exhaust manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) N : Non-reusable parts

INSPECTION E15UCAA

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

INTAKE AND EXHAUST MANIFOLD

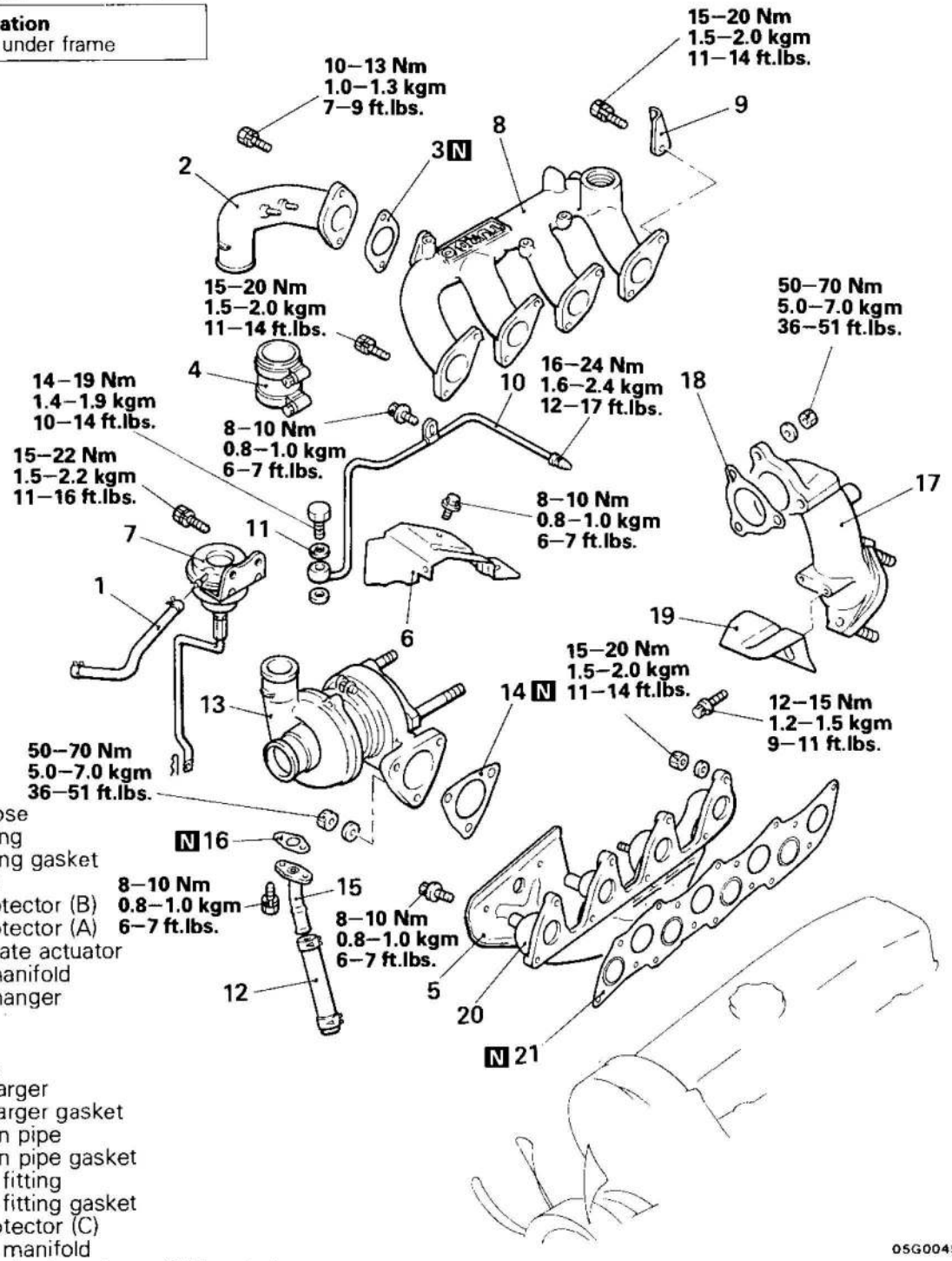
Check for damage or cracking of any part.

REMOVAL AND INSTALLATION (VEHICLES WITH A TURBOCHARGER BUILT UP TO JUNE 1993)

E15UA–B

Pre-removal Operation
- Removal of seat under frame (Refer to GROUP 01 GENERAL–Engine Compartment Work.)

Post-installation Operation
- Installation of seat under frame

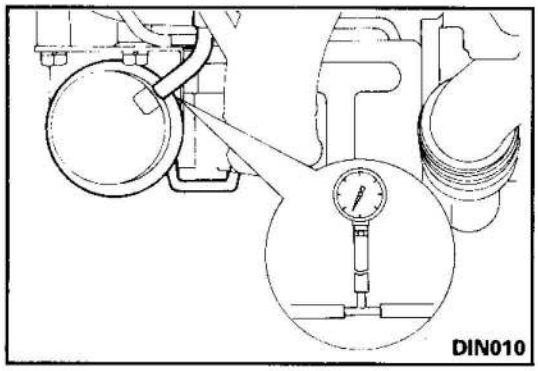


Removal steps

1. Boost hose
2. Inlet fitting
3. Inlet fitting gasket
4. Air hose
5. Heat protector (B)
6. Heat protector (A)
7. Waste gate actuator
8. Intake manifold
9. Engine hanger
- ◆◆ 10. Oil pipe
11. Gasket
12. Oil hose
13. Turbocharger
14. Turbocharger gasket
15. Oil return pipe
16. Oil return pipe gasket
17. Exhaust fitting
18. Exhaust fitting gasket
19. Heat protector (C)
20. Exhaust manifold
21. Intake and exhaust manifold gasket

NOTE

(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".
(3) N : Non-reusable parts


DIN010

INSPECTION E15UCAC

CHECKING TURBOCHARGER SUPER CHARGE PRESSURE

Caution
The driving test is conducted in a two seat vehicle at a place where high speed, full throttle driving is safe. The pressure gauge indicated values are to be read by a person in the passenger seat.

(1) Remove the hose from the waste gate actuator and install a pressure gauge to a two way connector placed between the hose and the nipple.
(2) Drive the vehicle at full throttle in second gear and measure super charge pressure with engine rpm above 3000.

Standard value: Approximately 70–86 kPa (0.70–0.86 kg/sm^2, 10–12 psi)

Caution
When turbocharger pressure is not with in the standard value, it should not be immediately assumed that there is a problem with the turbocharger, but the following checked first:
Turbo charge pressure high:
Waste gate actuator malfunction
Turbo charge pressure low:
Waste gate actuator malfunction
Turbo charger pressure leak
Turbo charger malfunction

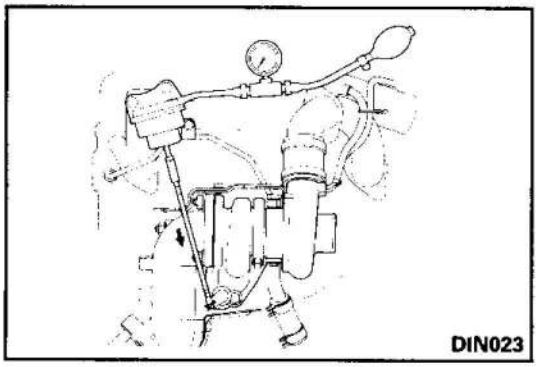
CHECKING THE WASTE GATE ACTUATOR

(1) Connect a hand pump (pressurizer type) to the waste gate actuator nipple, then slowly increase pressure until the waste gate actuator rod beings to move (about a 1 mm stroke) and check the pressure. Continue to apply pressure, checking to ensure that the rod moves smoothly.

Standard value: Approximately 77 kPa (0.77 kg/cm^2, 11 psi)

Caution
To prevent damage to the diaphragm, keep the pressure under 93 kPa (0.93 kg/cm^2, 14 psi).

(2) When the result differs greatly from the standard value, check the actuator and the waste gate valve, replacing if necessary.


DIN023

INTAKE AND EXHAUST MANIFOLD

Check for damage or cracking of any part.

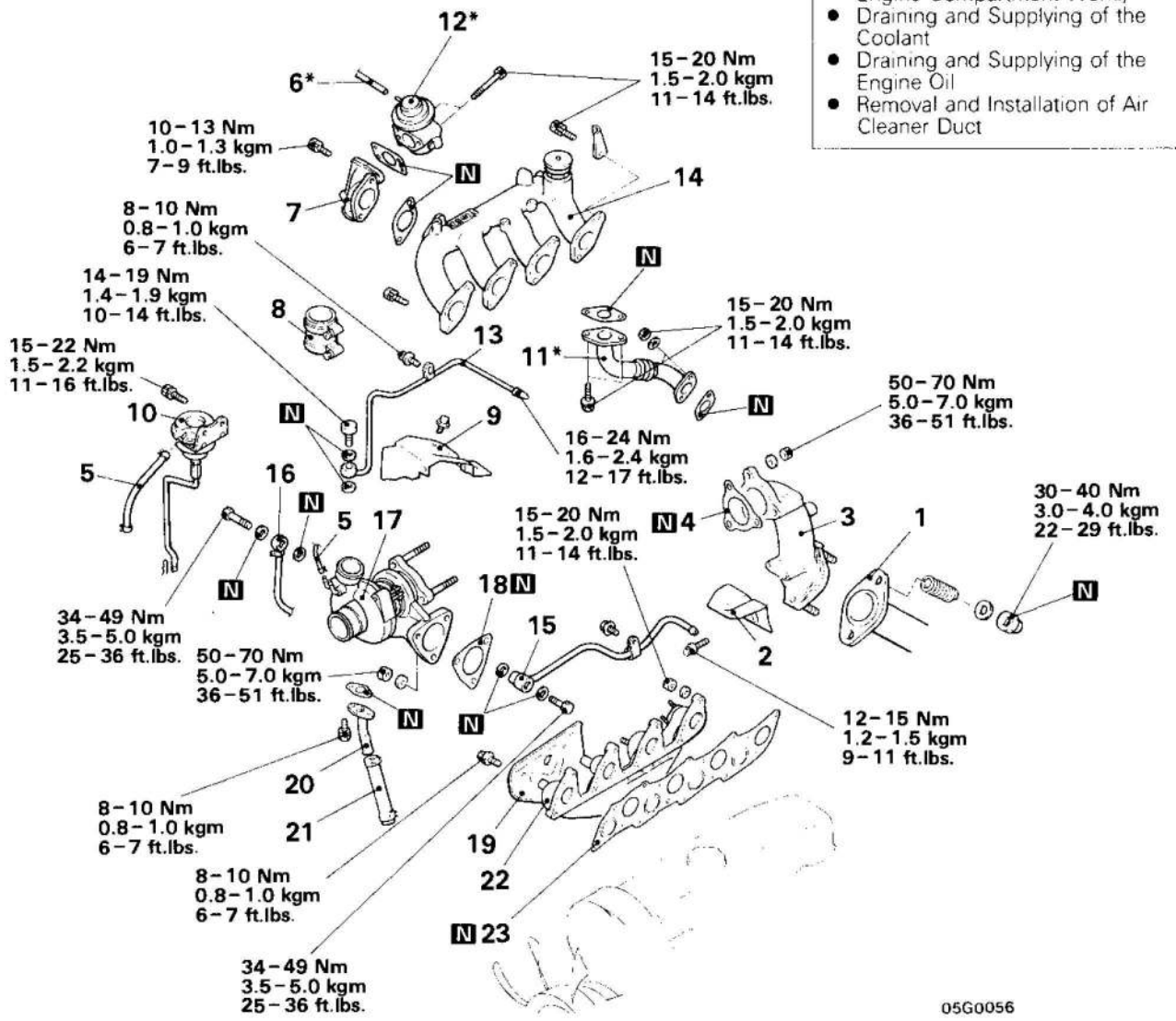
SERVICE POINTS OF INSTALLATION E15UDAA

10. INSTALLATION OF OIL PIPE

Install the oil pipe, then, before installing the eye bolt (on top of the turbocharger), fill the turbocharger with clean oil and check to ensure that the turbine compresser wheel rotates smoothly.

REMOVAL AND INSTALLATION (VEHICLES WITH A TURBOCHARGER BUILT FROM JULY 1993)

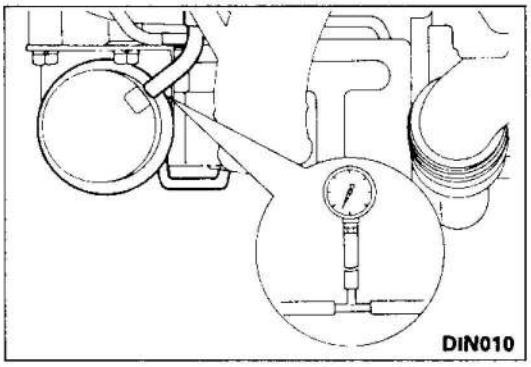
Pre-removal and Post-installation Operation
- Removal and Installation of Seat Under Frame (Refer to GROUP 01 GENERAL – Engine Compartment Work.)
- Draining and Supplying of the Coolant
- Draining and Supplying of the Engine Oil
- Removal and Installation of Air Cleaner Duct



Removal steps

1. Front exhaust pipe connection
2. Heat protector
3. Exhaust fitting
4. Exhaust fitting gasket
5. Boost hose
6. Vacuum hose
7. Inlet fitting
8. Air hose
9. Heat protector (A)
10. Waste gate actuator
11. EGR pipe
12. EGR valve
13. Oil pipe
14. Intake manifold
15. Water pipe A connection
16. Water pipe B connection
17. ◆◆ Turbocharger assembly
18. Turbocharger gasket
19. Heat protector (B)
20. Oil return pipe
21. Oil hose
22. Exhaust manifold
23. Intake and exhaust manifold gasket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".
(3) N: Non-reusable parts
(4) *: Vehicles with EGR system


DIN010

INSPECTION E15UCAC

CHECKING TURBOCHARGER SUPER CHARGE PRESSURE

Caution
The driving test is conducted in a two seat vehicle at a place where high speed, full throttle driving is safe. The pressure gauge indicated values are to be read by a person in the passenger seat.

(1) Remove the hose from the waste gate actuator and install a pressure gauge to a two way connector placed between the hose and the nipple.
(2) Drive the vehicle at full throttle in second gear and measure super charge pressure with engine rpm above 3000.

Standard value: Approximately 70 – 86 kPa (0.70 – 0.86 kg/cm², 10 – 12 psi)

Caution
When turbocharger pressure is not with in the standard value, it should not be immediately assumed that there is a problem with the turbocharger, but the following checked first:

Turbo charge pressure high:
Waste gate actuator malfunction
Turbo charge pressure low:
Waste gate actuator malfunction
Turbo charger pressure leak
Turbo charger malfunction

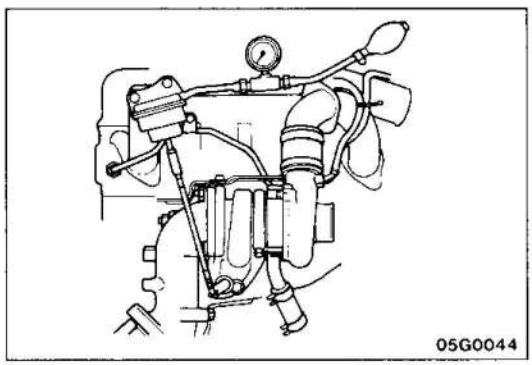
CHECKING THE WASTE GATE ACTUATOR

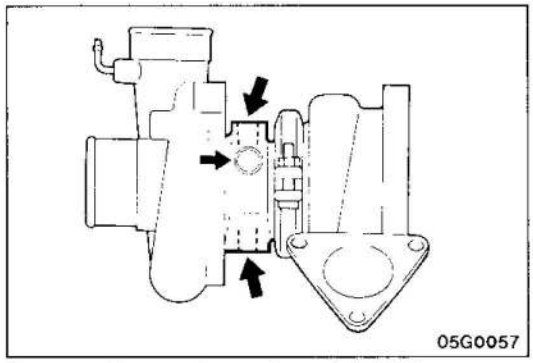
(1) Connect a hand pump (pressurizer type) to the waste gate actuator nipple, then slowly increase pressure until the waste gate actuator rod beings to move (about a 1 mm stroke) and check the pressure. Continue to apply pressure, checking to ensure that the rod moves smoothly.

Standard value: Approximately 77 kPa (0.77 kg/cm², 11 psi)

Caution
To prevent damage to the diaphragm, keep the pressure under 93 kPa (0.93 kg/cm², 14 psi).

(2) When the result differs greatly from the standard value, check the actuator and the waste gate valve, replacing if necessary.


05G0044


05G0057

INTAKE AND EXHAUST MANIFOLD

Check for damage or cracking of any part.

SERVICE POINTS OF INSTALLATION

17. INSTALLATION OF TURBOCHARGER ASSEMBLY

(1) Clean the alignment surfaces shown in the illustration.
(2) Supply clean engine oil through the oil pipe installation hole of the turbocharger assembly.

Caution
When cleaning, take care that no foreign material gets into the engine coolant or oil passages hole.

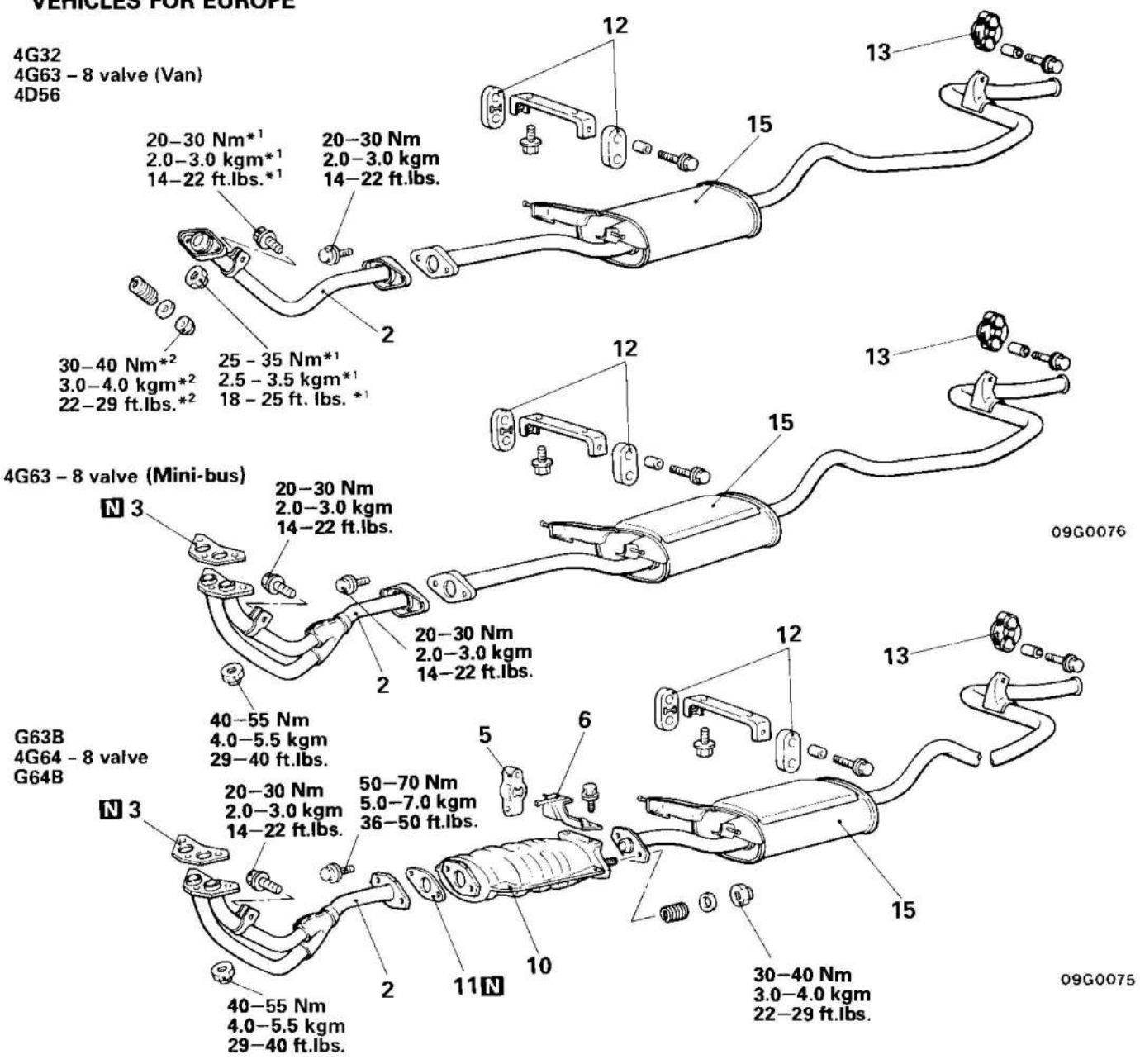
PWWE8608-N ADDED

EXHAUST PIPES AND MUFFLERS

REMOVAL AND INSTALLATION

E15RA--

VEHICLES FOR EUROPE



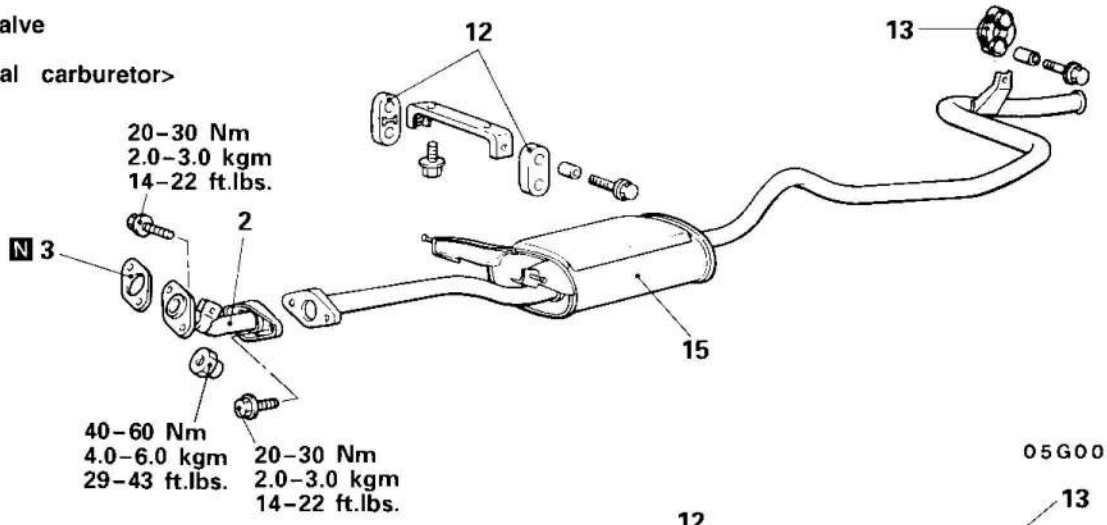
Removal steps

- ◆◆ 2. Front exhaust pipe
- 3. Gasket
- 5. Rubber hanger
- 6. Hanger bracket
- 10. Catalytic converter
- 11. Gasket
- 12. Rubber hanger
- 13. Rubber hanger
- ◆◆ 15. Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts
(4) *1 : Petrol-powered vehicles
(5) *2 : Diesel-powered vehicles

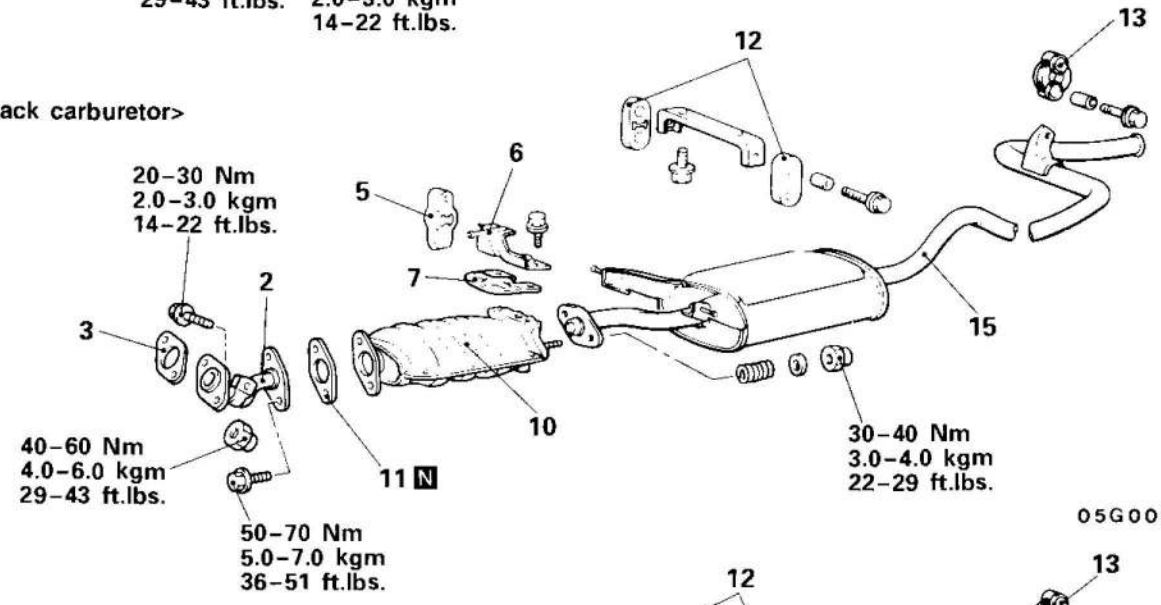
4G63 – 16 valve

<Conventional carburetor>



05G0094

<Feedback carburetor>



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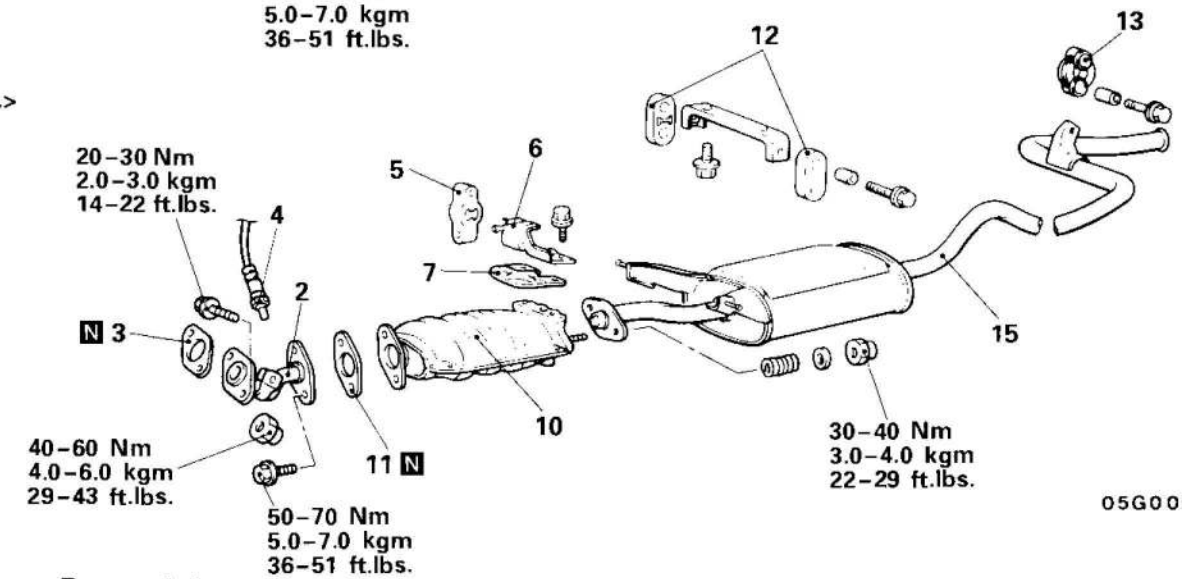


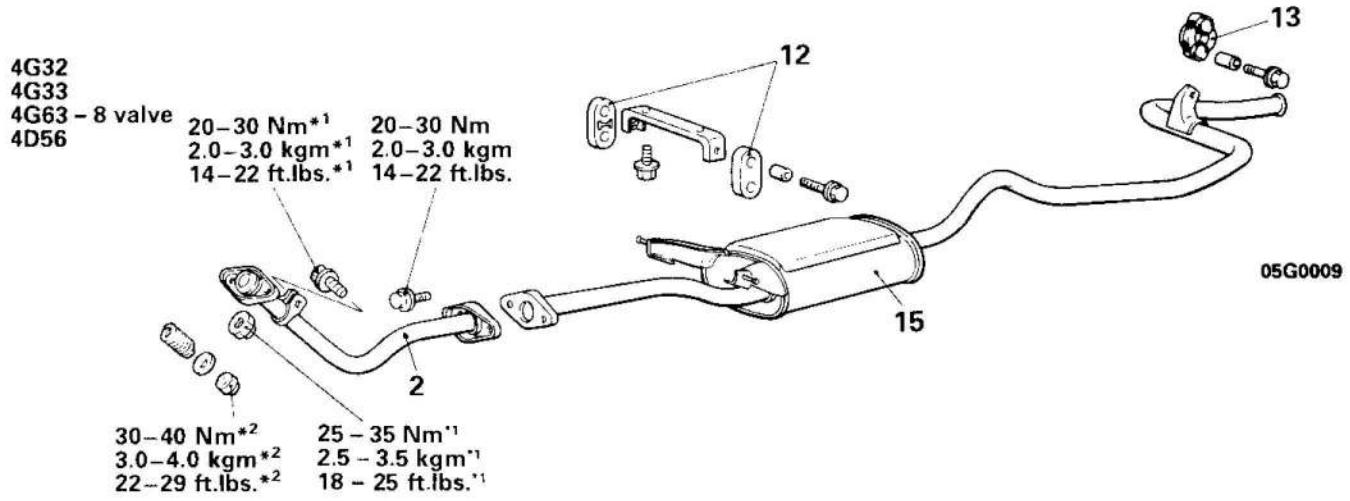
05G0096

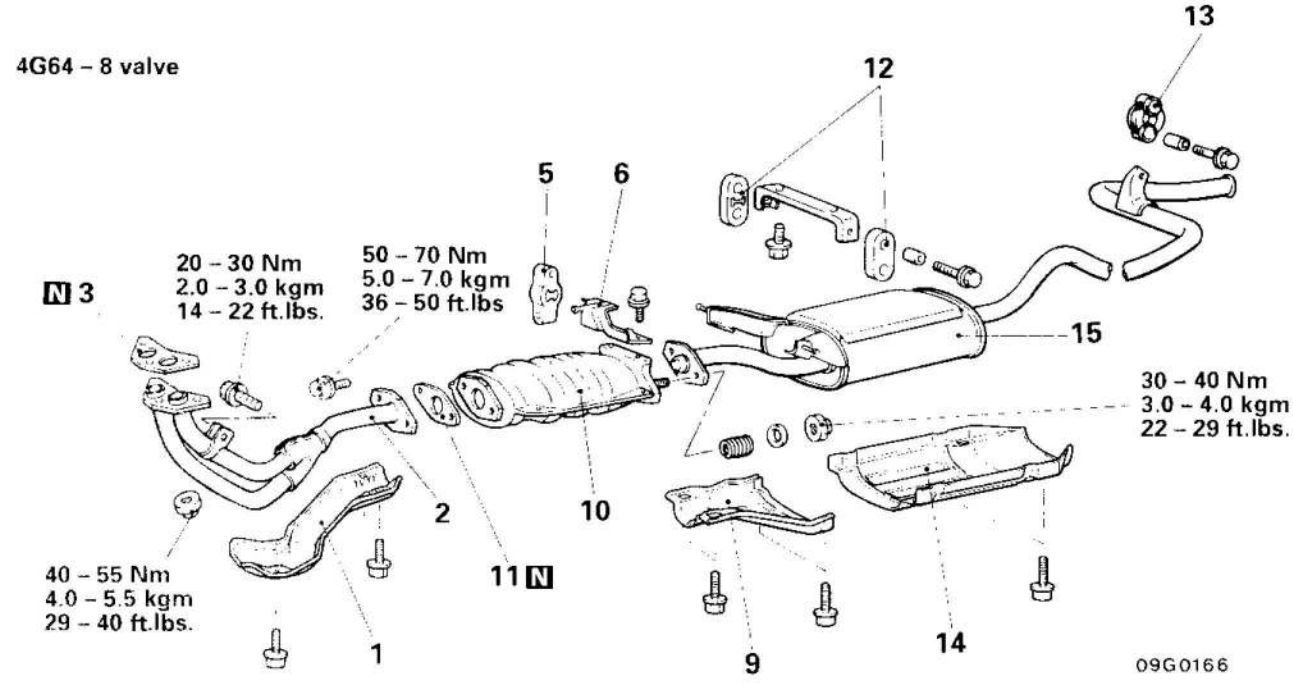
Removal steps

◆◆ 2. Front exhaust pipe
3. Gasket
4. Oxygen sensor
5. Rubber hanger
6. Hanger bracket
7. Heat protector
10. Catalytic converter
11. Gasket
12. Rubber hanger
13. Rubber hanger
◆◆ 15. Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts

VEHICLES FOR GENERAL EXPORT



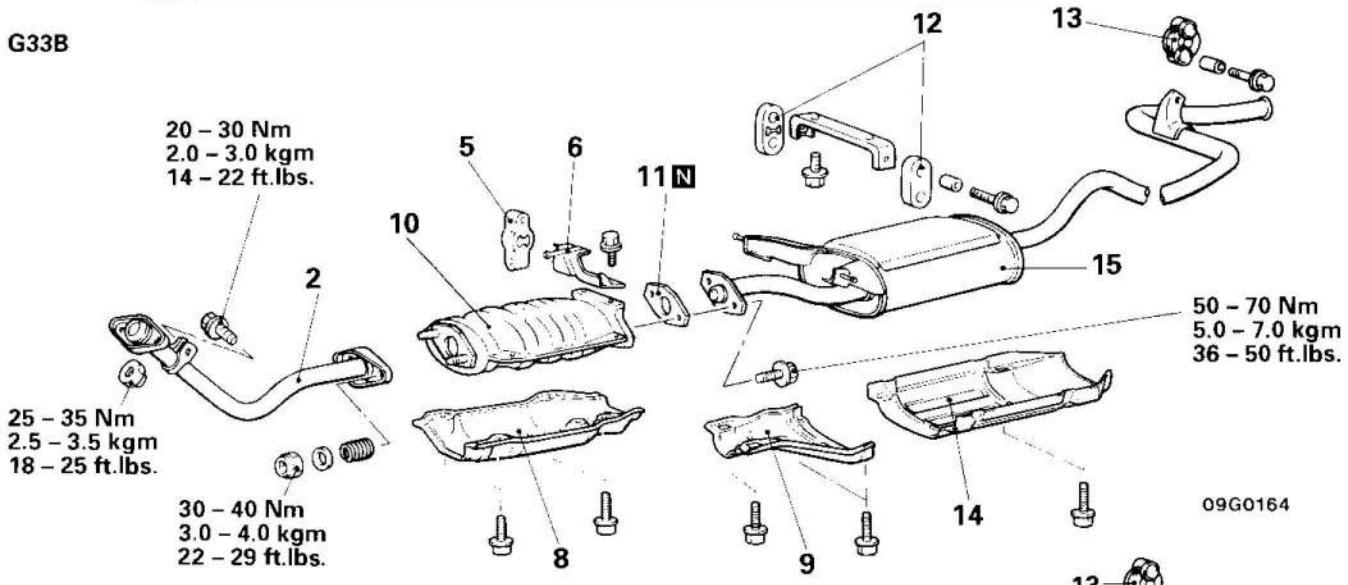


Removal steps

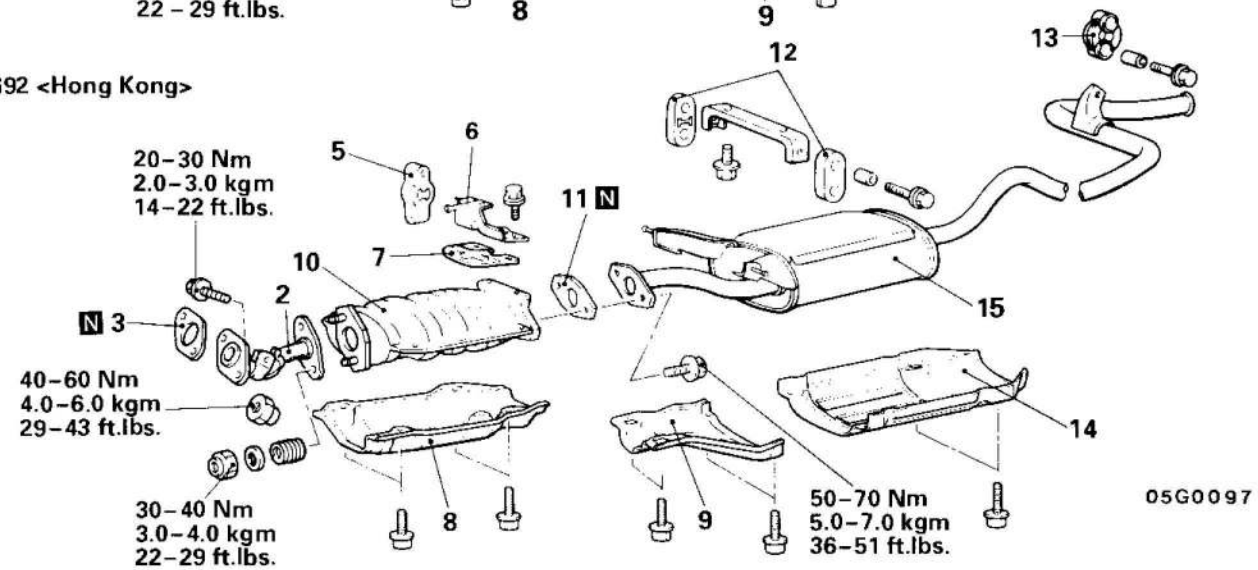
1. Heat protector
2. ◆◆ Front exhaust pipe
3. Gasket
5. Rubber hanger
6. Hanger bracket
9. Heat protector
10. Catalytic converter
11. Gasket
12. Rubber hanger
13. Rubber hanger
14. Protector
15. ◆◆ Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts
(4) *1 : Petrol-powered vehicles
(5) *2 : Diesel powered vehicles

G33B



4G92 <Hong Kong>



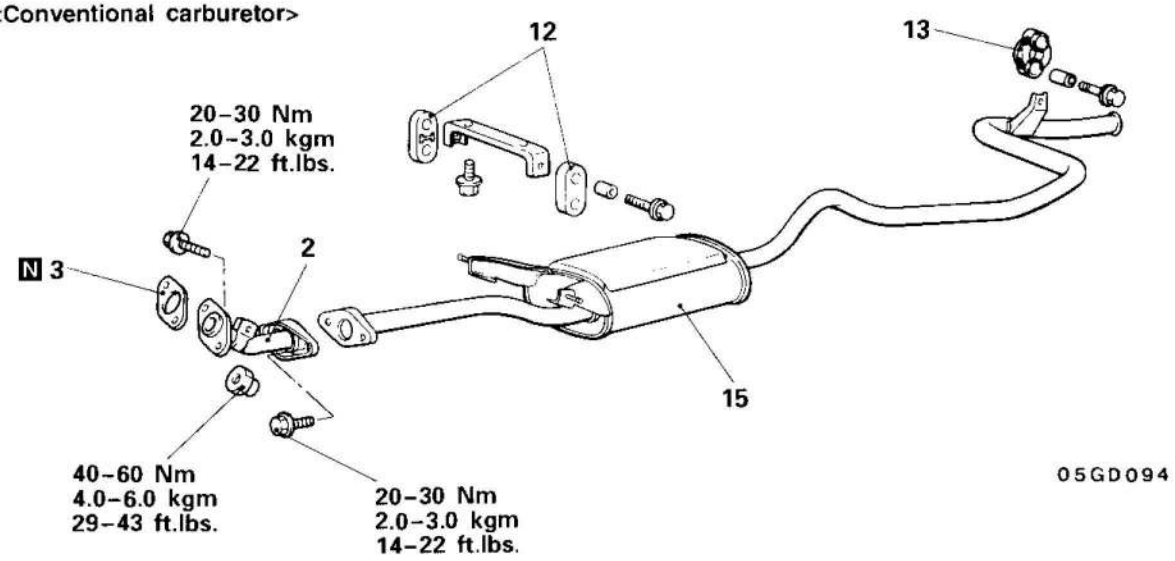
Removal steps

- ◆◆ 2. Front exhaust pipe
- 3. Gasket
- 5. Rubber hanger
- 6. Hanger bracket
- 7. Heat protector
- 8. Protector (Except for Hong Kong G33B)
- 9. Heat protector
- 10. Catalytic converter
- 11. Gasket
- 12. Rubber hanger
- 13. Rubber hanger
- 14. Protector
- ◆◆ 15. Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation"
(3) N : Non-reusable parts

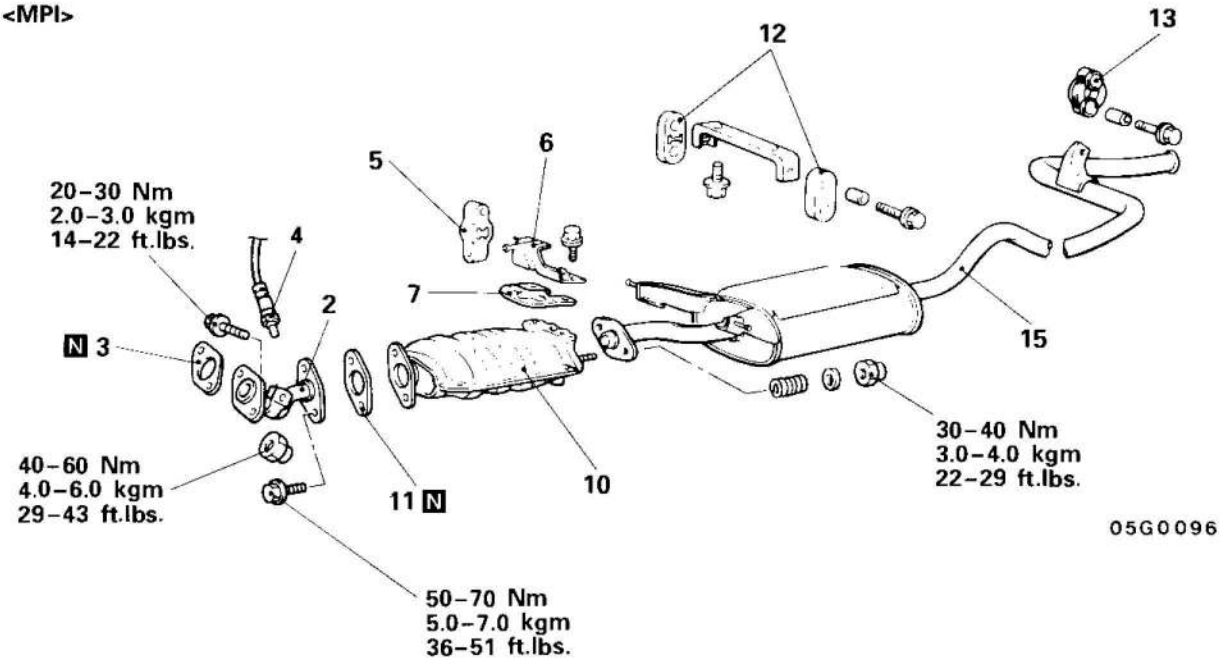
4G92 [Except for Hong Kong]
4G63 – 16 valve

<Conventional carburetor>



4G63 – 16 valve

<MPI>

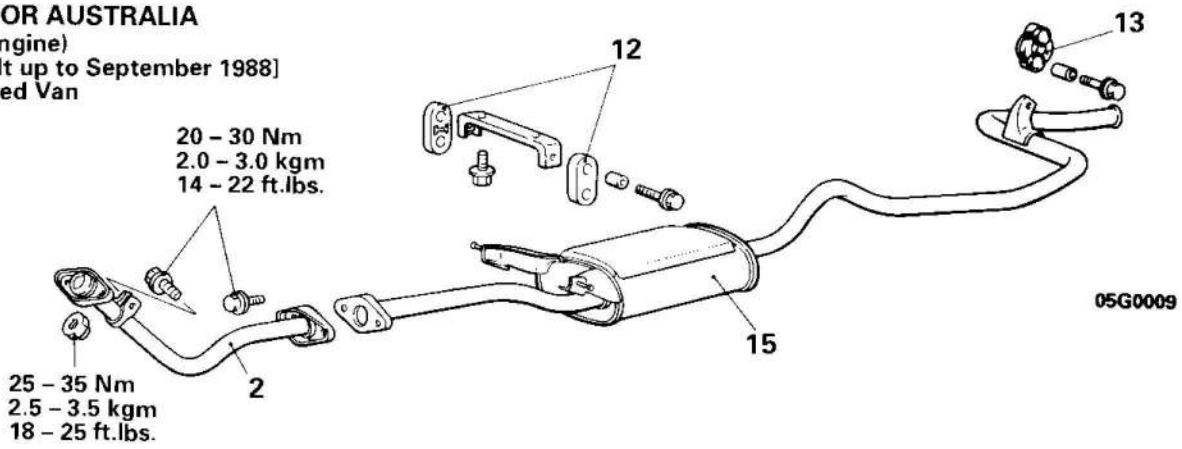


Removal steps

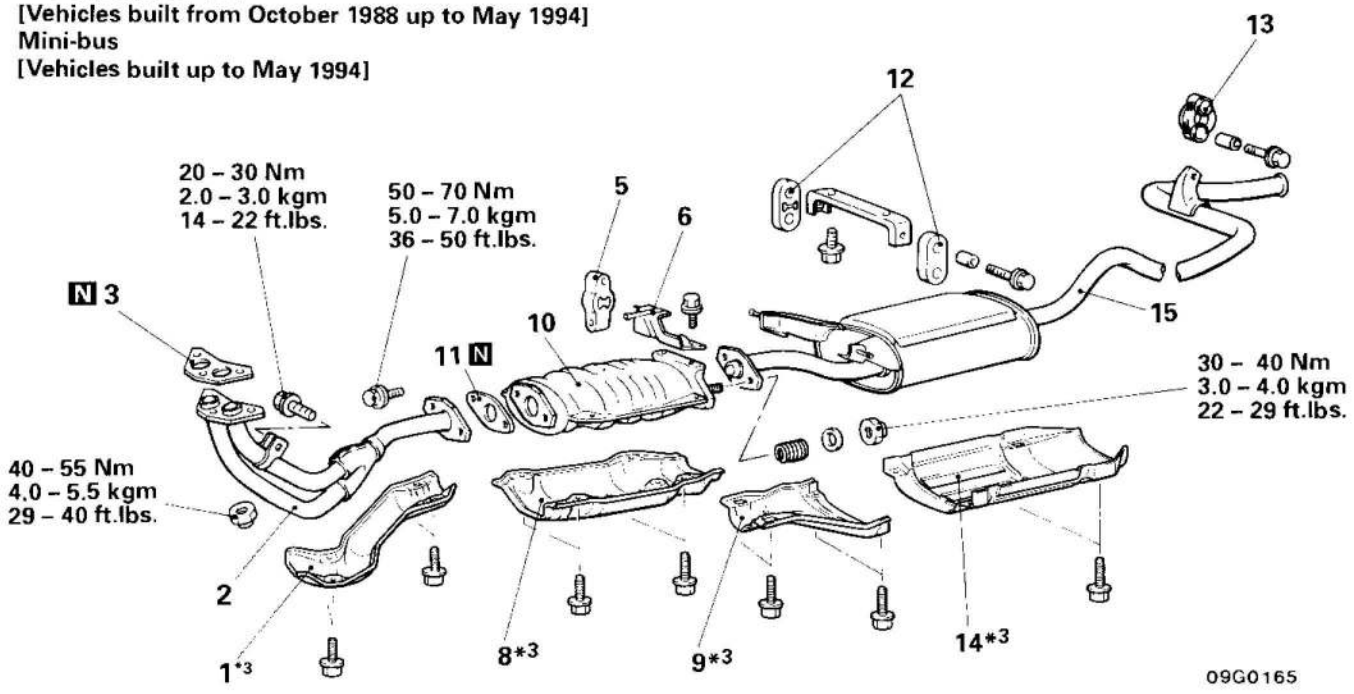
- ◆◆ 2. Front exhaust pipe
- 3. Gasket
- 4. Oxygen sensor
- 5. Rubber hanger
- 6. Hanger bracket
- 7. Heat protector
- 10. Catalytic converter
- 11. Gasket
- 12. Rubber hanger
- 13. Rubber hanger
- ◆◆ 15. Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts

VEHICLES FOR AUSTRALIA
VAN (4G63 engine)
[Vehicles built up to September 1988]
Diesel powered Van



Van (4G64 engine)
[Vehicles built up to September 1988]
Petrol powered Van
[Vehicles built from October 1988 up to May 1994]
Mini-bus
[Vehicles built up to May 1994]



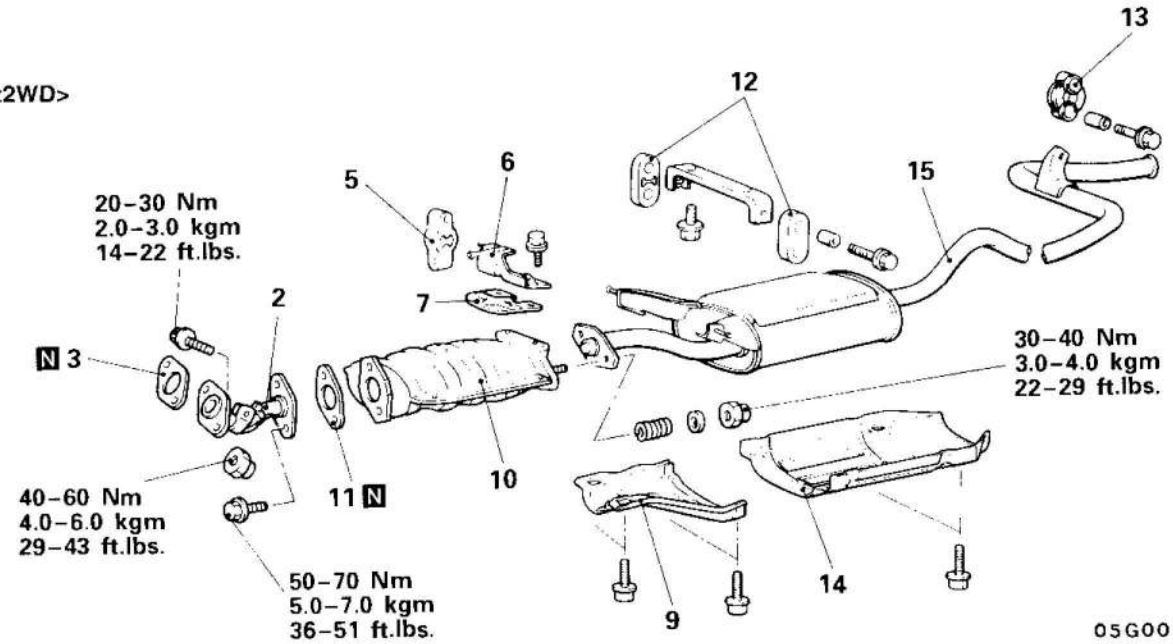
Removal steps

1. Heat protector
◆◆ 2. Front exhaust pipe
3. Gasket
5. Rubber hanger
6. Hanger bracket
8. Protector
9. Heat protector
10. Catalytic converter
11. Gasket
12. Rubber hanger
13. Rubber hanger
14. Protector
◆◆ 15. Main muffler

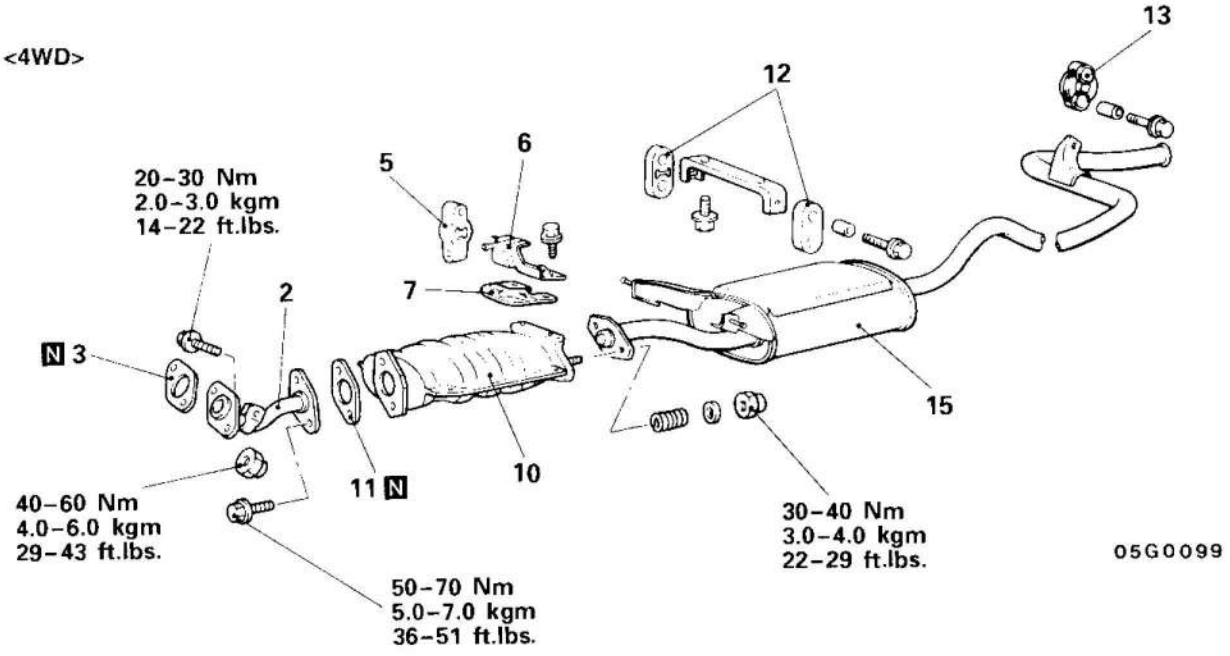
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation"
(3) N : Non-reusable parts
(4) *2 : 2WD

4G63 and 4G64 – 16 valve

<2WD>



<4WD>



Removal steps

- ◆◆ 2. Front exhaust pipe
- 3. Gasket
- 5. Rubber hanger
- 6. Hanger bracket
- 7. Heat protector
- 9. Heat protector
- 10. Catalytic converter
- 11. Gasket
- 12. Rubber hanger
- 13. Rubber hanger
- 14. Protector
- ◆◆ 15. Main muffler

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation".
(3) N : Non-reusable parts

INSPECTION E15RCAA

- Check the mufflers and pipes for corrosion or damage.
- Check rubber hangers for deterioration or damage.
- Check for gas leakage from mufflers or pipes.

SERVICE POINTS OF INSTALLATION E15RDAD

15. INSTALLATION OF MAIN MUFFLER /2. FRONT EXHAUST PIPE

After fully tightening front exhaust pipe and main muffler, check to be sure there is no contact with the chassis at any place and there is no twisted hanger.

NOTES