ENGINE ELECTRICAL

CONTENTS

CHARGING SYSTEM

GENERAL

OUTLINE OF CHANGE

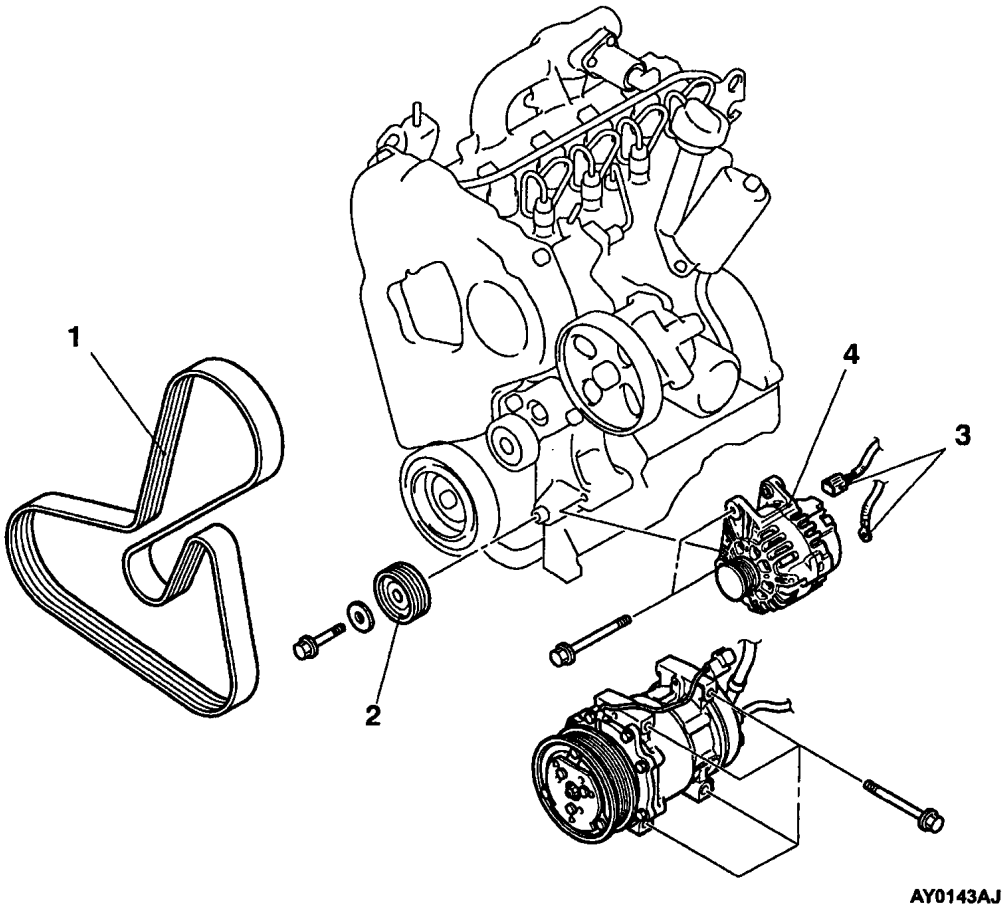
The following service procedures have been added due to the introduction of the F9Q engine vehicles.

ALTERNATOR <F9Q>

REMOVAL AND INSTALLATION

Pre-removal Operation
- Under Cover Removal
- Intercooler Air Hose Removal (Refer to GROUP 15 - Intercooler.)

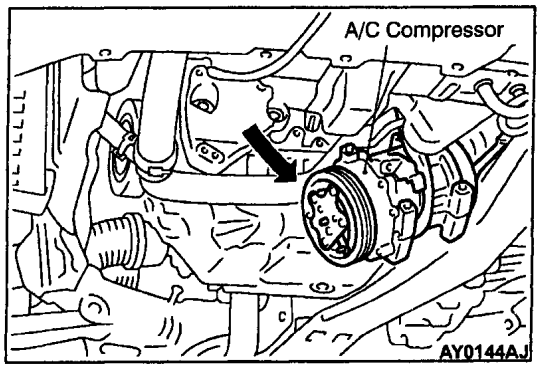
Post-installation Operation
- Intercooler Air Hose Installation (Refer to GROUP 15 - Intercooler.)
- Under Cover Installation



Removal steps

1. Drive belt
2. Idler pulley
   - A/C Compressor mounting bolt
3. Alternator connector
4. Alternator

◀A▶



REMOVAL SERVICE POINT

◀A▶ ALTERNATOR REMOVAL

Put the A/C compressor aside so that enough space to remove the alternator can be secured.

IGNITION SYSTEM

GENERAL

OUTLINE OF CHANGE

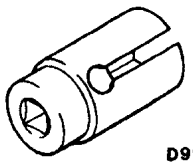
On vehicles with the 4G93-GDI engine, an ignition failure sensor has been added.

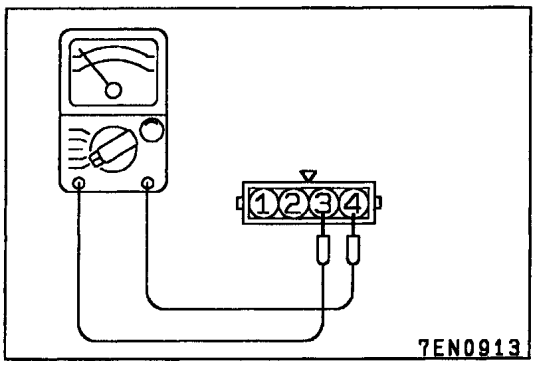
SERVICE SPECIFICATIONS

IGNITION FAILURE SENSOR

Items	4G93-GDI, 4G92-MPI
Resistance Ω	0.1 or less

SPECIAL TOOL

Tool	Number	Name	Use
 D998773	MD998773	Detonation sensor wrench	Detonation sensor removal and installation



ON-VEHICLE SERVICE

IGNITION FAILURE SENSOR CHECK

NOTE
An analog-type circuit tester should be used.

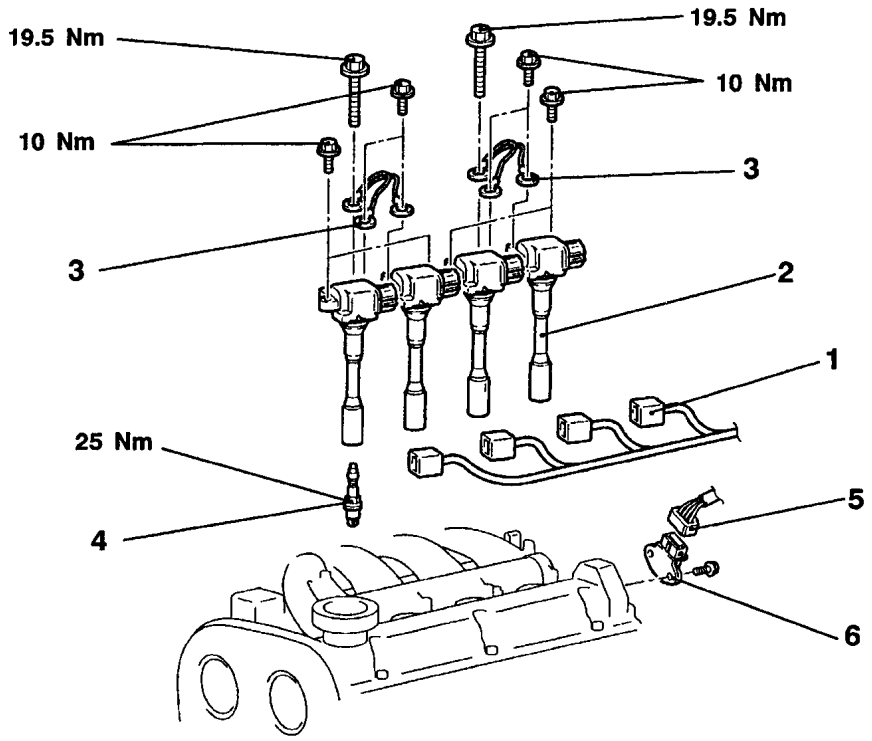
Check that the resistance between terminals 3 and 4 is at the standard value.

Standard value: 0.1 Ω or less

IGNITION COIL <4G93-GDI>

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Engine Cover Removal and Installation
(Refer to GROUP 11A – Camshaft, Camshaft Oil Seal.)



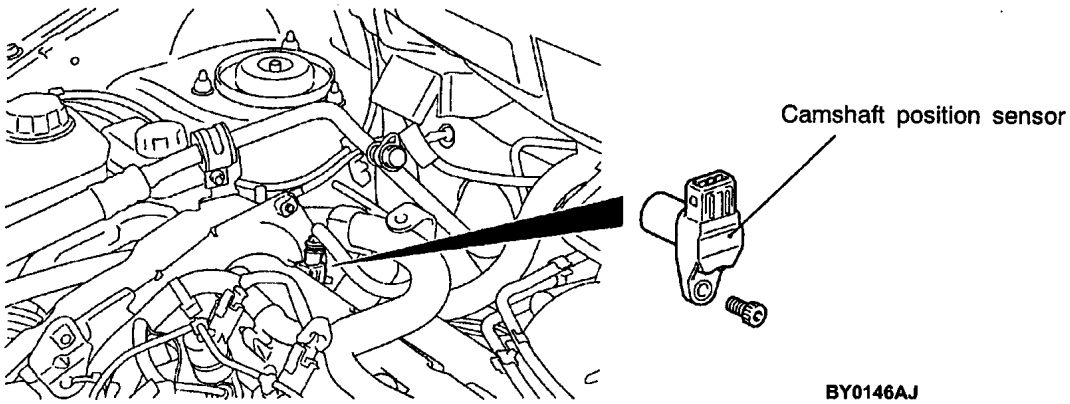
Ignition coil removal steps
1. Ignition coil connector
2. Ignition coil
3. Earth strap
4. Spark plug

Ignition failure sensor removal steps
5. Ignition failure sensor connector
6. Ignition failure sensor

CAMSHAFT POSITION SENSOR <F9Q>

REMOVAL AND INSTALLATION

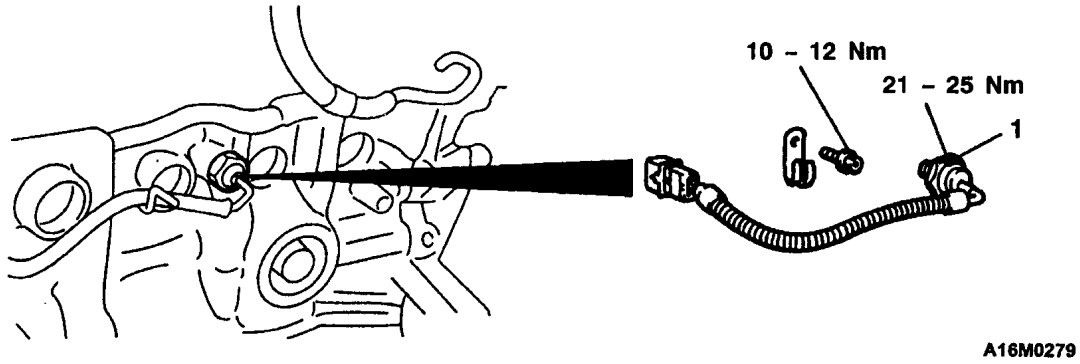
Pre-removal and Post-installation Operation
Engine hanger (Refer to GROUP 15 – Intake Manifold and Exhaust Manifold.)



DETONATION SENSOR <4G93-GDI>

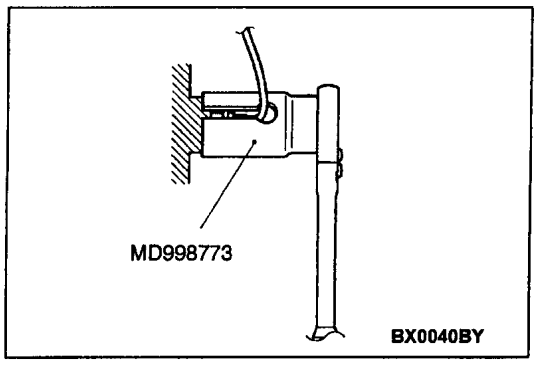
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Engine Cover Removal and Installation (Refer to GROUP 11A – Camshaft, Camshaft Oil Seal.)
- Intake Manifold Stay Removal and Installation (Refer to GROUP 15.)



◀A▶ ▶A◀ 1. Detonation sensor

Caution
Do not subject the detonation sensor to any shocks.



REMOVAL SERVICE POINT
◀A▶ DETONATION SENSOR REMOVAL

INSTALLATION SERVICE POINT
▶A◀ DETONATION SENSOR INSTALLATION

GLOW SYSTEM

GENERAL

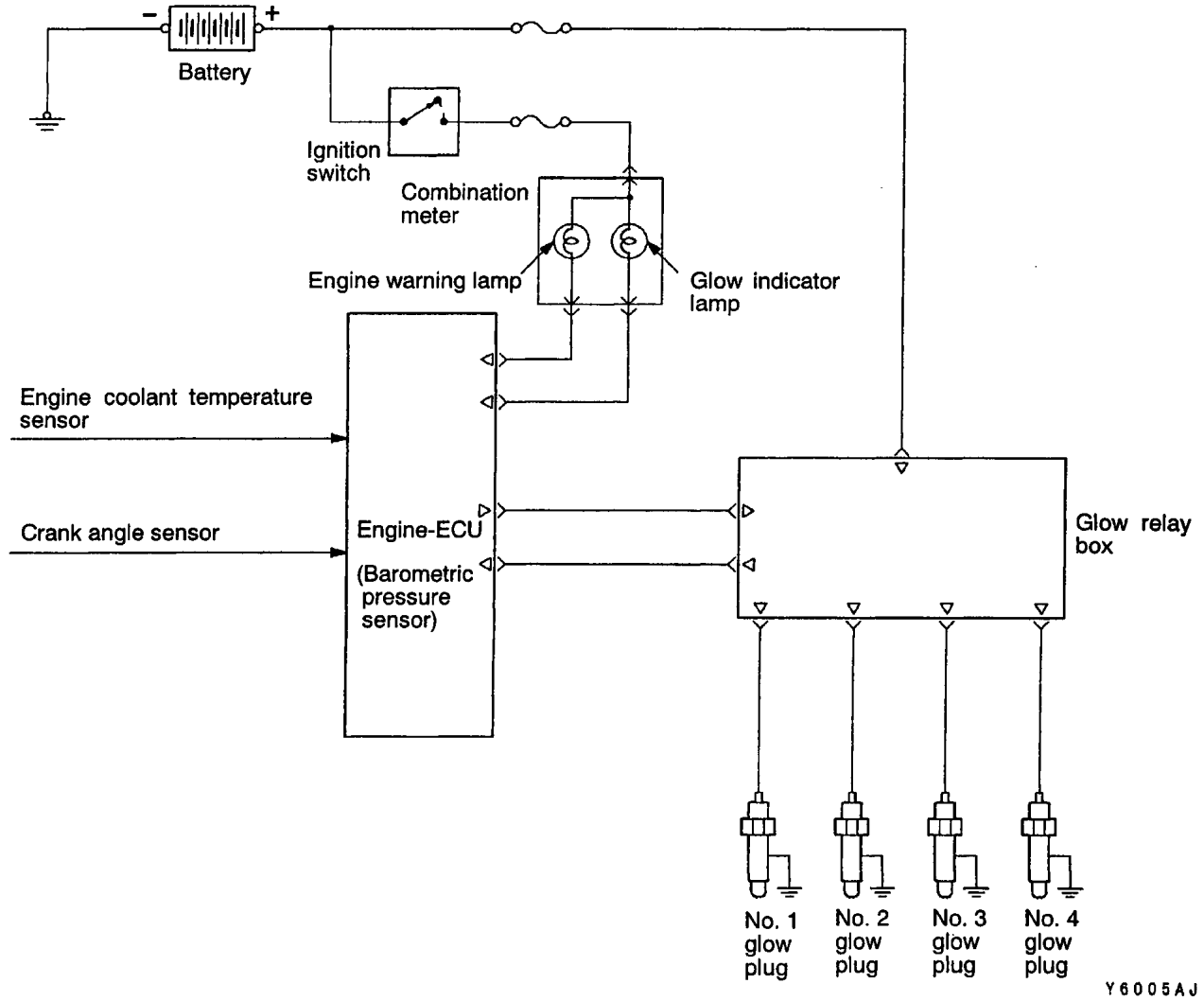
OUTLINE OF CHANGE

The following service procedures have been added to correspond to the adoption of the F9Q engine.

GENERAL INFORMATION

The glow system reduces the time required for starting at low temperatures to provide a degree of starting and operation that is identical to petrol-engine vehicles by preheating the glow plugs at super-quick speed.
The engine-ECU controls both the time during which current is supplied to the glow plugs after the ignition switch is turned to the ON position and also the glow indicator lamp illumination time in accordance with the engine coolant temperature.
When the engine-ECU detects a malfunction, it sets a diagnosis code, which corresponds to that malfunction (related to the diesel fuel system).

SYSTEM DIAGRAM



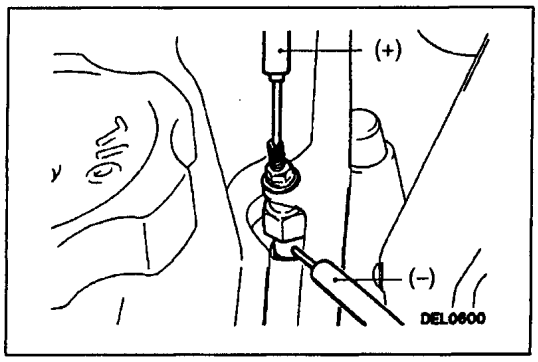
SERVICE SPECIFICATIONS

Item		Standard value
Voltage between glow plug lead and glow plug body V	Immediately after ignition switch is turned to ON (without starting the engine)	9 - 11 (Drops to 0 V after 0.5 - 16 seconds have passed)
	While engine is cranking	6 or more
	While engine is warming up	12 - 15 (Drops to 0 V if 10 - 60 seconds have passed since the engine was started)
Glow plug resistance Ω		0.6

ON-VEHICLE SERVICE

GLOW SYSTEM CHECK

1. Check that the battery voltage is 11 - 13 V.
2. Check that the engine coolant temperature is 40 °C or less.



3. Measure the voltage in the glow plug circuit for each cylinder.
   - No.1 glow plug circuit: Between the glow relay box connector terminal 5 and body earth
   - No.2 glow plug circuit: Between the glow relay box connector terminal 7 and body earth
   - No.3 glow plug circuit: Between the glow relay box connector terminal 3 and body earth
   - No.4 glow plug circuit: Between the glow relay box connector terminal 4 and body earth

   Standard value: 0.05 - 0.07 Ω (at 20 °C)

4. Measure the voltage immediately after the ignition switch is turned to ON (without starting the engine).

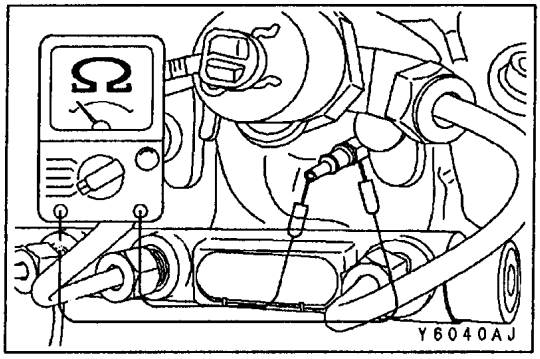
   Standard value:
   9 - 11 V (Drops to 0 V after 0.5 - 16 seconds have passed)

   In addition, check to be sure that the glow indicator lamp illuminates immediately after the ignition switch is turned to ON.

   NOTE
   The voltage generated time (continuity time) varies depending on the engine coolant temperature when the ignition switch is ON.

5. Measure the voltage while the engine is cranking.
   Standard value: 6 V or more
6. Start the engine and measure the voltage while the engine is warming up.
   The voltage will always drops to 0 V when 10 – 60 seconds have passed after starting the engine.
   Standard value: 12 - 15 V

   NOTE
   The voltage generated time (continuity time) varies depending on the engine coolant temperature when the ignition switch is ON.

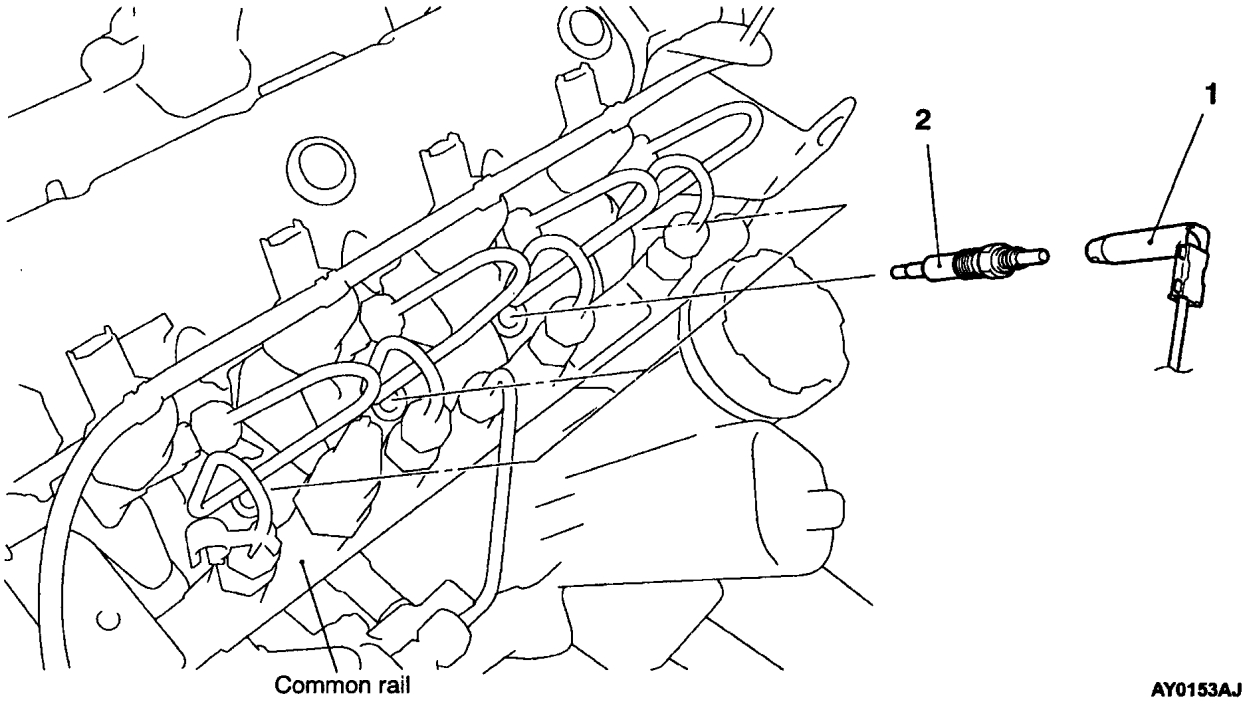


GLOW PLUG CHECK

1. Remove the glow plug leads.
2. Measure the resistance between the glow plug terminals and the body.
   Standard value: 0.6 Ω

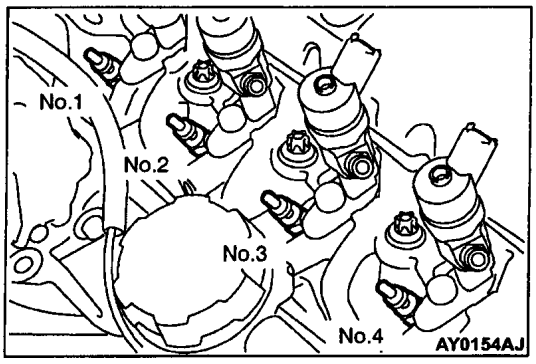
GLOW PLUG

REMOVAL AND INSTALLATION



Removal steps

1. Glow plug connector connection
◀A▶ 2. Glow plug



REMOVAL SERVICE POINT

◀A▶ GLOW PLUG (NO.1) REMOVAL

After removing the common rail, remove the glow plug (No.1). (Refer to GROUP 13D – Injection Pump and Nozzle)