OUTLANDER

WORKSHOP MANUAL

FOREWORD

This Workshop manual contains procedures for service mechanics, including removal, disassembly, inspection, adjustment, reassembly and installation. Use the following manuals in combination with this manual as required.

TECHNICAL INFORMATION MANUAL
INZE03E1
WORKSHOP MANUAL
BODY REPAIR MANUAL
BNZE03E1

PARTS CATALOGUE
B606R503A_

All information, illustrations and product descriptions contained in this manual are current as at the time of publication. We, however, reserve the right to make changes at any time without prior notice or obligation.

MITSUBISHI MOTORS CORPORATION

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IN ORDER TO PREVENT VEHICLES FROM FIRE

"Improper installation of electrical or fuel related parts could cause a fire. In order to retain the high quality and safety of the vehicle, it is important that any accessories that may be fitted or modifications/ repairs that may be carried out which involve the electrical or fuel systems, MUST be carried out in accordance with MMC's information/Instructions".

ENGINE OILS

Health Warning

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

Recommended Precautions

The most effective precaution is to adapt working practices which prevent, as far as practicable, the risk of skin contact with mineral oils, for example by using enclosed systems for handling used engine oil and by degreasing components, where practicable, before handling them.
Other precautions:

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Avoid contaminating clothes, particularly underpants, with oil.
- Do not put oily rags in pockets, the use of overalls without pockets will avoid this.
- Do not wear heavily soiled clothing and oil-impregnated foot-wear. Overalls must be cleaned regularly and kept separately from personal clothing.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.
- Obtain First Aid treatment immediately for open cuts and wounds.
- Wash regularly with soap and water to ensure all oil is removed, especially before meals (skin cleansers and nail brushes will help). After cleaning, the application of preparations containing lanolin to replace the natural skin oils is advised.
- Do not use petrol, kerosine, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin after work.
- If skin disorders develop, obtain medical advice without delay.

4. Attach a three-way joint to the vacuum hose between the fuel pressure regurator and the air intake plenum, and connect a vacuum gauge.
5. Start the engine and check that idle speed is within the standard valve.

   Standard value: 750 ± 100 r/min
6. Check the intake manifold vacuum.

   Limit: Minimum 60 kPa
7. Turn off the ignition switch.
8. Remove the vacuum gauge and the three-way joint, and then connect the vacuum hose.
9. Remove the engine tachometer or the MUT-II.

LASH ADJUSTER CHECK

M1111002900336

If an abnormal noise (knocking) that seems to be coming from the lash adjuster is heard after starting the engine and dose not stop, carry out the following check.

NOTE:

- *The abnormal noise which is caused by a problem with the lash adjusters is generated after the engine is started, and will vary according to the engine speed. However, this noise is not related to the actual engine load.*

Because of this, if the noise dose not occur immediately after the engine is started, if it dose not change in accordance with the engine speed, or if it changes in accordance with the engine load, the source of the noise is not the lash adjusters.

- *If there is a problem with the lash adjusters, the noise will almost never disappear, even if the engine has been run at idle to let it warm up.*

The only case where the noise might disappear is if the oil in the engine has not been looked after properly and oil sludge has caused the lash adjusters to stick.

1. Start the engine.
2. Check that the noise occurs immediately after the engine is started, and that the noise changes in accordance with changes in the engine speed.

   If the noise dose not occur immediately after the engine is started, or if it dose not change in accordance with the engine speed, the problem is not being caused by the lash adjusters, so check for some other cause of the problem. Moreover, if the noise dose not change in accordance with the engine speed, the cause of the problem is probably not with the engine (In these cases, the lash adjusters are normal).
3. While the engine is idling, check that the noise level does not change when the engine load is varied (for example, by shifting from N to D).

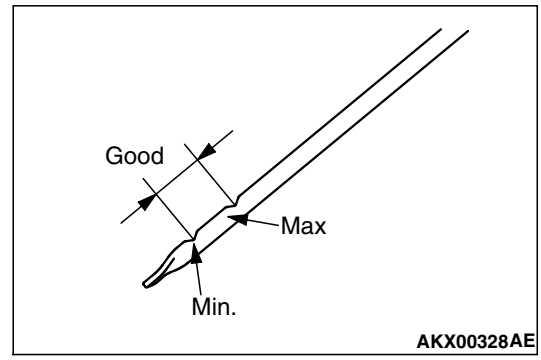
   If the noise level changes, the cause of the noise is probably parts striking because of worn crankshaft bearings or connecting rod bearings (In such cases, the lash adjusters are normal).
4. After the engine has warmed up, run it at idle and check if any noise can be heard.

   If the noise has become smaller or disappeared, oil sludge could make the lash adjusters stick. Clean the lash adjusters (Refer to GROUP 11D – Rocker Arms and Camshaft – Rocker Arms and Camshaft Inspection P.11B-33). If not improved, go to step 5.
5. Bleed air from the lash adjusters (Refer to P.11A-11).
6. If the noise has not disappeared even after the air bleeding, clean the lash adjusters (Refer to GROUP 11D – Rocker Arms and Camshaft – Rocker Arms and Camshaft Inspection P.11B-33).

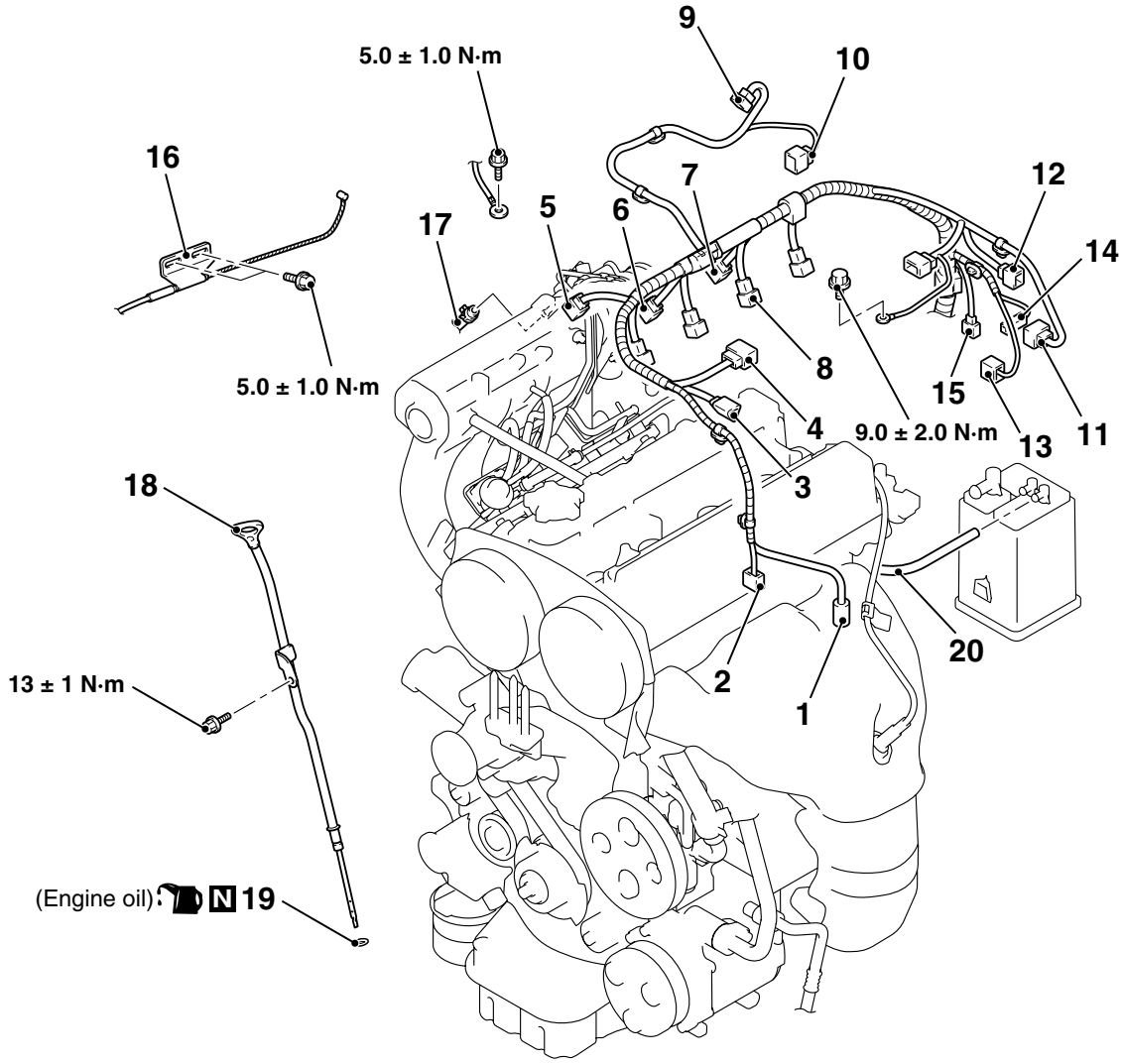
<LASH ADJUSTER AIR BLEEDING>

NOTE:

- *If the vehicle is parked on a slope fir a long period of time, the amount of oil inside the lash adjuster will decrease, and air may get into the high pressure chamber when starting the engine.*
- *After parking the vehicle for long periods, the oil drains out of the oil passage, and it takes time for the oil to be supplied to the lash adjuster, so air can get into the high-pressure chamber.*
- *If either of the above situations occur, the abnormal noise can be eliminated by bleeding the air from inside the lash adjusters.*



1. Check the engine oil and replenish or replace the oil if necessary.



AC300545 AB

Removal steps

1. A/C compressor connector
2. Power steering fluid pressure switch connector
3. Crank angle sensor connector
4. Ignition coil connectors
5. Detonation sensor connector
6. Purge control solenoid valve connector
7. EGR control solenoid valve connector
8. Injector connectors
9. Throttle position sensor connector
10. Idle speed control servo connector
11. Camshaft position sensor connector

Removal steps (Continued)

12. Oxygen sensor connector
13. Engine coolant temperature sensor connector
14. Engine coolant temperature gauge unit connector
15. Capacitor connector
16. Accelerator cable connection
17. Brake booster vacuum hose connection
18. Engine oil level gauge and guide assembly
19. O-ring
20. Canister vacuum hose connection

GROUP 11B

ENGINE OVERHAUL

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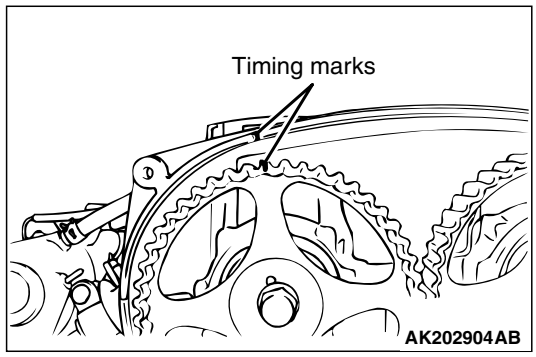
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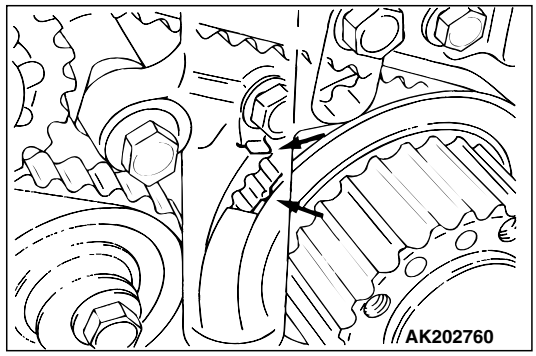
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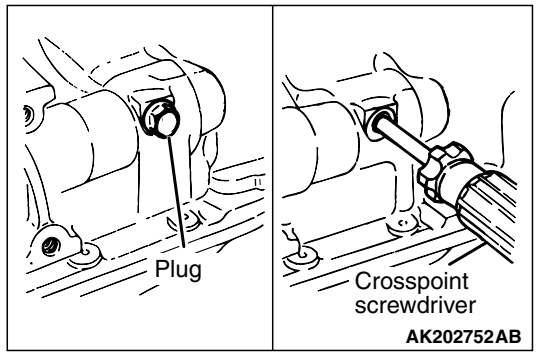


2. Align the timing mark on the intake camshaft sprocket with that on the rocker cover.

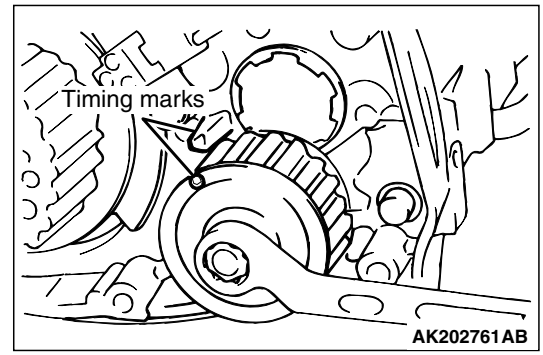
   NOTE: The intake camshaft will be turned slightly clockwise from where the timing marks are aligned by the force of the valve springs and stay there.



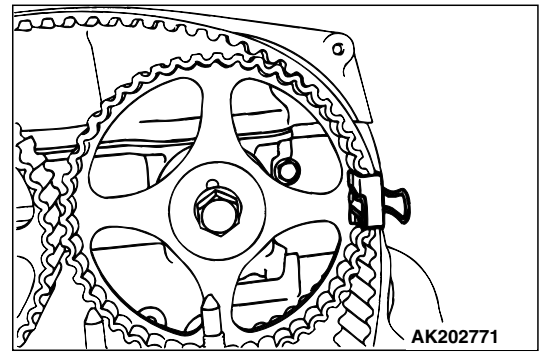
3. Bring the timing mark on the crankshaft sprocket to a point one sprocket tooth away from the mating timing mark in the counterclockwise direction like in the operation with the exhaust camshaft sprocket.



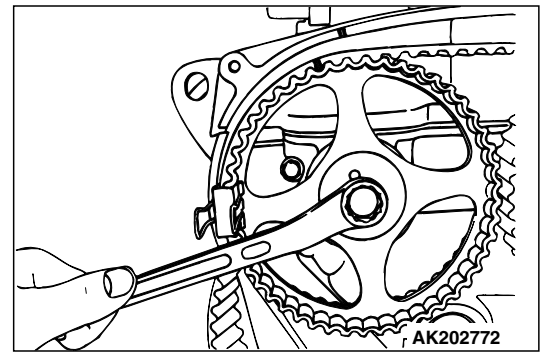
4. Align the timing mark on the oil pump sprocket with that on the cylinder block.
   (1) Remove the plug from the cylinder block.
   (2) Insert a crosspoint screwdriver with a shank diameter of 8 mm through the plug hole. If it can be inserted 60 mm or more, the sprocket is in the correct phase. If the insertion depth is up to 20 – 25 mm, the screwdriver is blocked by the counterbalancer shaft. Then turn the oil pump sprocket one turn and realign the timing marks. Then check that the screwdriver can be inserted 60 mm or more. Keep the screwdriver inserted until installation of timing belt is finished.



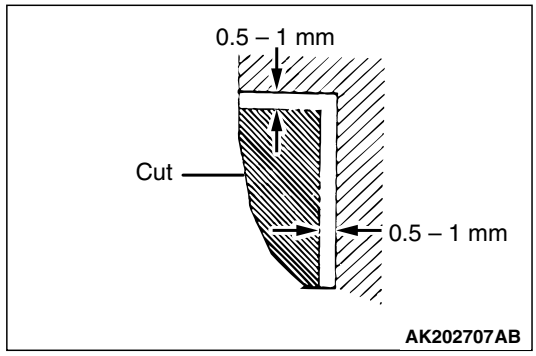
   (3) Turn the oil pump sprocket counterclockwise by one sprocket tooth.



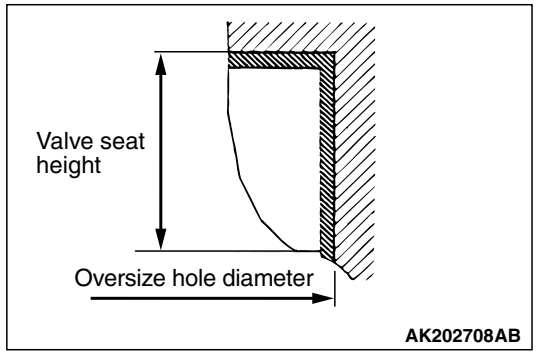
5. Install the timing belt on the exhaust camshaft sprocket, and hold it in place with a paper clip at the point indicated in the drawing.



VALVE SEAT REPLACEMENT



1. Cut inside of the valve seat to be replaced until its wall becomes thin enough for removal, then remove the valve seat.



2. Rebore the valve seat hole in the cylinder head to a diameter matched to the diameter of the selected oversize valve seat.

   Intake valve seat hole diameters:
   0.3 oversize: 35.30 – 35.33 mm
   0.6 oversize: 35.60 – 35.63 mm

   Exhaust valve seat hole diameters:
   0.3 oversize: 33.30 – 33.33 mm
   0.6 oversize: 33.60 – 33.63 mm

3. Before fitting the valve seat, cool it in liquid nitrogen to prevent damage to its hole in the cylinder head due to interference.
4. Resurface the valve seat. See the VALVE SEAT RECONDITIONING section.

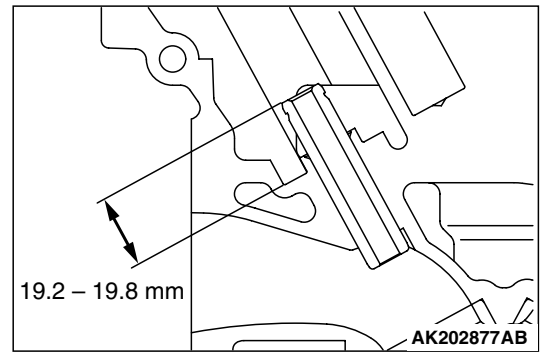
VALVE GUIDE REPLACEMENT

1. Force out the valve guide toward the cylinder block using a press.

⚠ CAUTION
Do not use a replacement valve guide of the same size as the removed one.

2. Machine the valve guide hole in the cylinder head to the size matched to the selected oversize valve guide.

   Valve guide hole diameters
   0.05 oversize: 12.05 – 12.07 mm
   0.25 oversize: 12.25 – 12.27 mm
   0.50 oversize: 12.50 – 12.52 mm



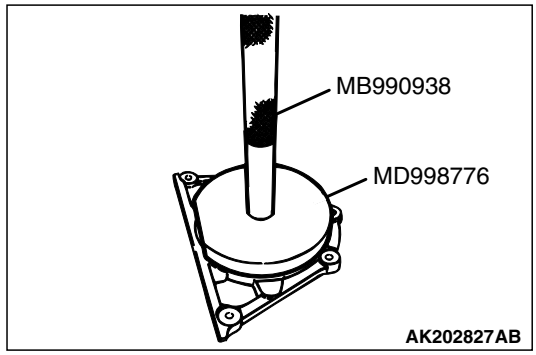
3. Press-fit the valve guide until it remains protruded above the cylinder head by the amount indicated in the drawing.

   NOTE:
   1. Press the valve guide from above the cylinder head.
   2. The valve guides for the intake valves are different in length from those for the exhaust valves (45.5 mm for intake valves; 50.5 mm for exhaust valves)

4. After installing the valve guide, insert a new valve in it to check for smooth movement.

Limit: 0.4 mm

>>D<< REAR OIL SEAL INSTALLATION

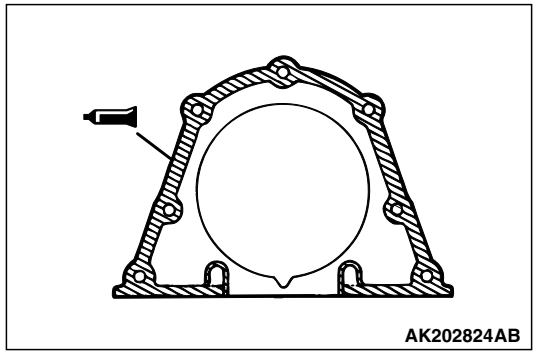


Use the special tools to press-fit the rear oil seal in the rear oil seal case.

- Handle (MB990938)
- Crankshaft rear oil seal installer (MD998776)

>>E<< REAR OIL SEAL CASE INSTALLATION

1. Remove completely old FIPG remaining on the rear oil seal case and cylinder block.



2. Apply a bead of FIPG to the surface of the rear oil seal case as shown in the drawing.

   Specified sealant:
   Mitsubishi Genuine Part No.MD970389 or equivalent

3. Install the oil seal into the cylinder block after applying an appropriate amount of engine oil to the entire circumference of its lip portion.
4. Install the rear oil seal case by tightening its bolts to 11 ± 1 N·m.

INSPECTION

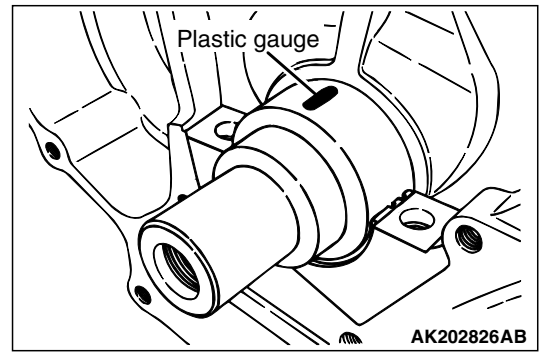
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CRANKSHAFT OIL CLEARANCE (PLASTIC GAUGE METHOD)

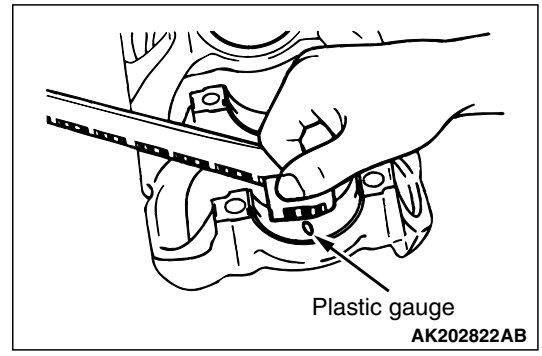
This plastic gauge method is recommended as a simplest way of measuring the crankshaft oil clearance.

Measure the crankshaft oil clearance using a plastic gauge as follows:

1. Wipe off oil from the crankshaft journal surface and the crankshaft bearing inner surface.
2. Install the crankshaft.



3. Cut a piece of plastic gauge whose length is equivalent to the width of the bearing and place it on the crankshaft journal in parallel with its axis.
4. Install the crankshaft bearing cap carefully and tighten the bolts to the specified torque of 25 ± 2 N·m + 90° to 100°.
5. Remove the bolts, then remove the crankshaft bearing cap carefully.



6. Measure the largest width of the crushed plastic gauge using the ruler printed on the bag of the plastic gauge.

   Standard value: 0.02 – 0.04 mm

   Limit: 0.1 mm

CYLINDER BLOCK

1. Visually check the cylinder block for scratches, rust, and any other corrosion. Also check it for cracks using a flaw detecting penetrant.

   If any defect is evident, replace the cylinder block.

Item No.	Data		Unit
88	Fuel control condition	Open loop	OL
		Closed loop	CL
		Open loop owing to drive condition	OL-DRV.
		Open loop owing to system malfunction	OL-SYS.
		Closed loop based on one oxygen sensor	CL- H02S
87	Calculation load value		%
	Diagnosis code during data recording		-

NOTE: If malfunctions have been detected in multiple systems, store one malfunction only, which has been detected first.

READINESS TEST STATUS

The engine-ECU monitors the following main diagnosis items, judges if these items are in good condition or not, and the stores its history. this history can be read out by using MUT-II. (If the ECU has judged a item before, the MUT-II displays "Complete").

In addition, if diagnosis codes are erased or the battery cable is disconnected, this history will also be erased (the memory will be reset).

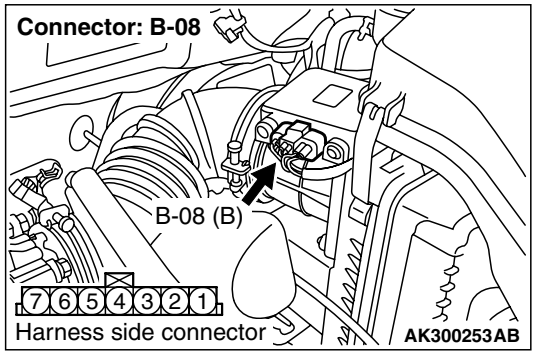
- Catalyst: P0420
- Oxygen sensor: P0130
- Oxygen sensor heater: P0135, P0141

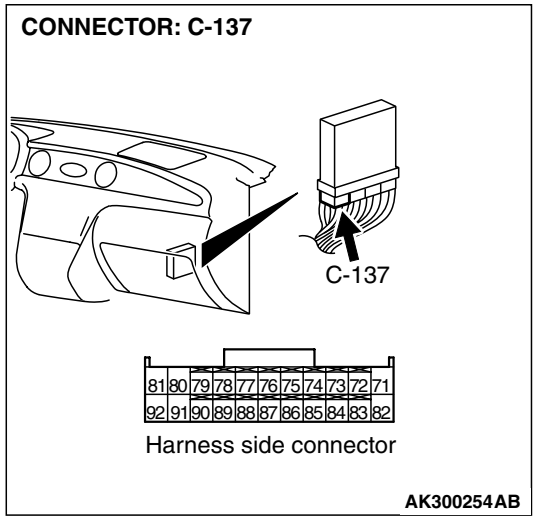
FAIL-SAFE FUNCTION REFERENCE TABLE

When the main sensor malfunctions are detected by the diagnosis function, the vehicle is controlled by means of the pre-set control logic to maintain safe conditions for driving.

Malfunctioning item	Control contents during malfunction
Air flow sensor	1. Uses the throttle position sensor signal and engine speed signal (crank angle sensor signal) to take reading of the basic injector drive time and basic ignition timing from the pre-set mapping. 2. Fixes the idle speed control servo in the appointed position so idle control is not performed.
Intake air temperature sensor	Controls as if the intake air temperature is 25°C.
Barometric pressure sensor	Controls as if the barometric pressure is 101 kPa.
Throttle position sensor	No increase in fuel injection amount during acceleration due to the throttle position sensor signal.
Engine coolant temperature sensor	Controls as if the engine coolant temperature is 80°C.
Camshaft position sensor	Injectors fuel into the cylinders in the order 1-3-4-2 with irregular timing. (After the ignition switch is turned to the "ON" position, the No. 1 cylinder top dead centre is not detected at all)
Oxygen sensor (front)	Air/fuel ratio feedback control (closed loop control) is not performed.
Oxygen sensor (rear)	Performs the feedback control (closed loop control) of the air/fuel ratio by using only the signal of the oxygen (front) installed on the front of the catalytic converter.
Detonation sensor	Fixes the ignition timing as that for regular gasoline.

STEP 18. Check harness between B-08 (terminal No. 2) air flow sensor connector and C-137 (terminal No. 85) engine-ECU connector.

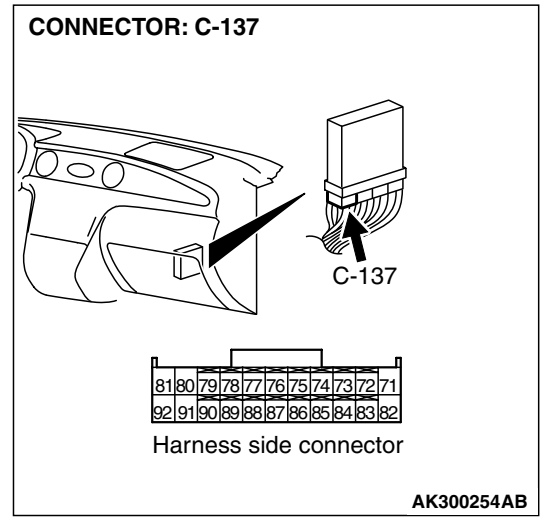




- Check output line for short circuit and damage.

Q: Is the check result normal?
YES : Replace air flow sensor.
NO : Repair.

STEP 19. Measure voltage at C-137 engine-ECU connector.

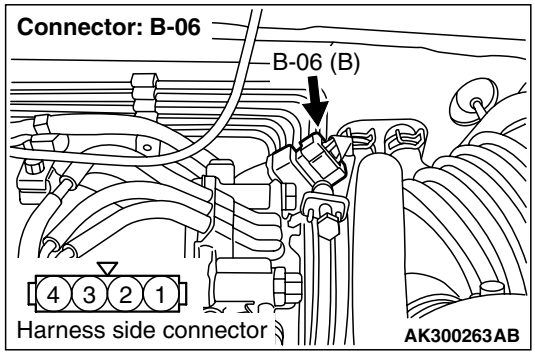


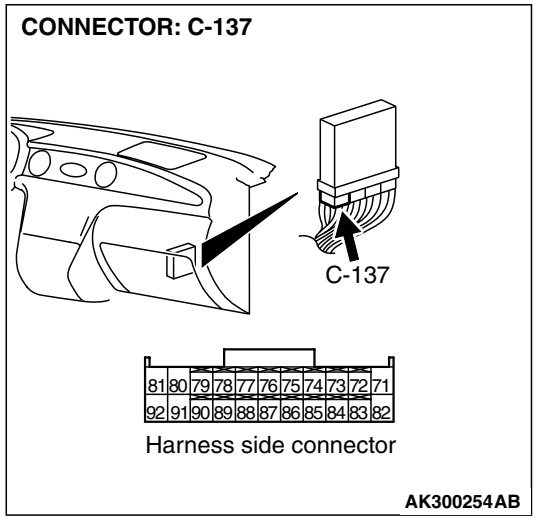
- Measure engine-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 85 and earth.

OK:
Altitude 0m: 3.8 – 4.2 V
Altitude 600m: 3.5 – 3.9 V
Altitude 1,200m: 3.3 – 3.7 V
Altitude 1,800m: 3.0 – 3.4 V

Q: Is the check result normal?
YES : Go to Step 21 .
NO : Go to Step 20 .

STEP 8. Check harness between B-06 (terminal No. 1) throttle position sensor connector and C-137 (terminal No. 81) engine-ECU connector.





- Check power supply line for short circuit.

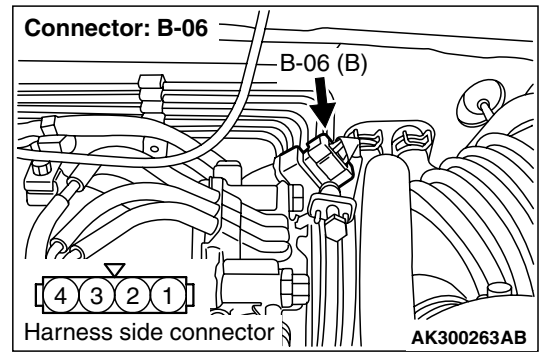
Q: Is the check result normal?
YES : Go to Step 9 .
NO : Repair.

STEP 9. MUT-II data list

- Refer to Data list reference table P.13A-287.
  a. Item 14: Throttle position sensor

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6).
NO : Replace engine-ECU.

STEP 10. Measure resistance at B-06 throttle position sensor connector.

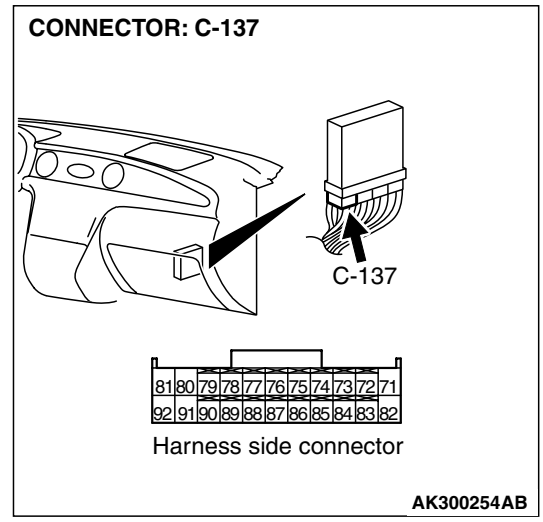


- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 4 and earth.

OK: 2 Ω or less

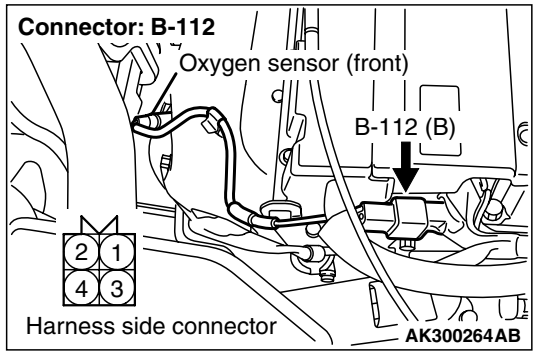
Q: Is the check result normal?
YES : Go to Step 13 .
NO : Go to Step 11 .

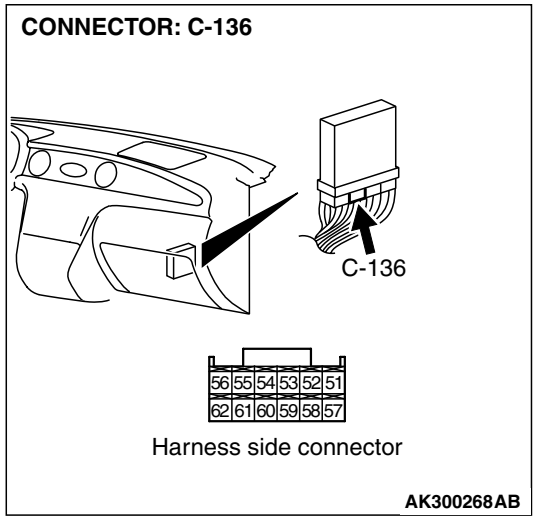
STEP 11. Connector check: C-137 engine-ECU connector



Q: Is the check result normal?
YES : Go to Step 12 .
NO : Repair.

STEP 10. Check harness between B-112 (terminal No. 3) oxygen sensor (front) connector and C-136 (terminal No. 60) engine-ECU connector.





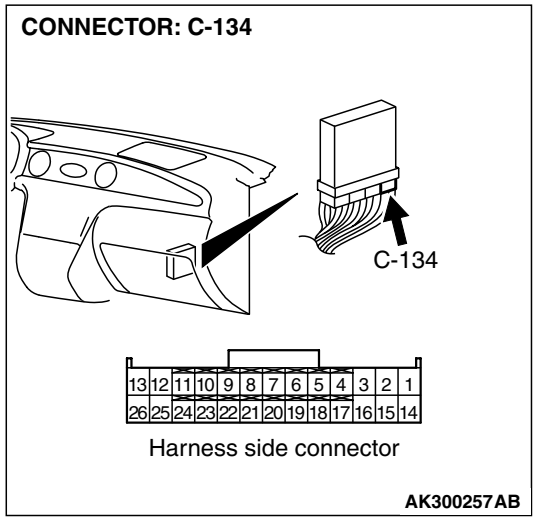
- Check earthing line for damage.

Q: Is the check result normal?
YES : Go to Step 11 .
NO : Repair.

STEP 11. Check the trouble symptoms.

Q: Does trouble symptom persist?
YES : Replace engine-ECU.
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6).

STEP 10. Measure signal waveform at C-134 engine-ECU connector (Use oscilloscope).



- Engine: Idling
- Transmission: Neutral
- Voltage between terminal No. 1 and earth.

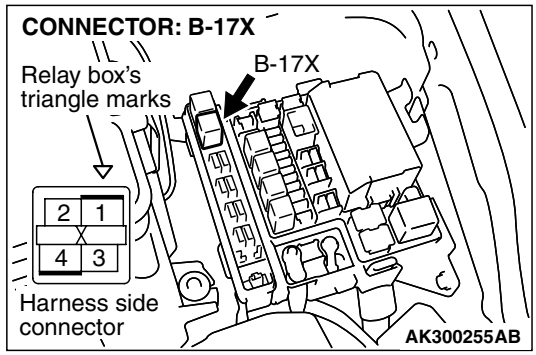
OK: Waveforms should be display on Inspection procedure using an oscilloscope (Refer to P.13A-298).

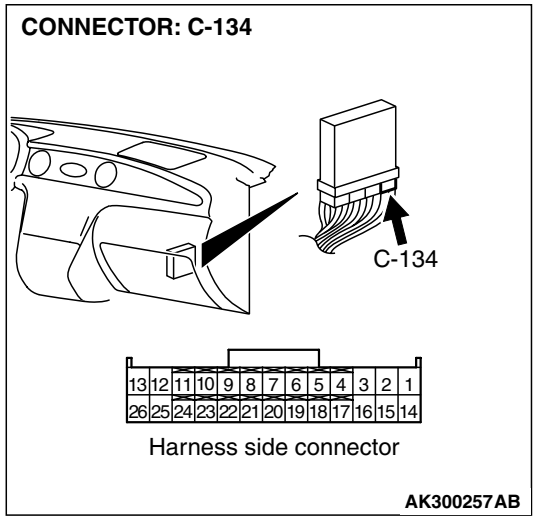
Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6).

NO : Replace engine-ECU.

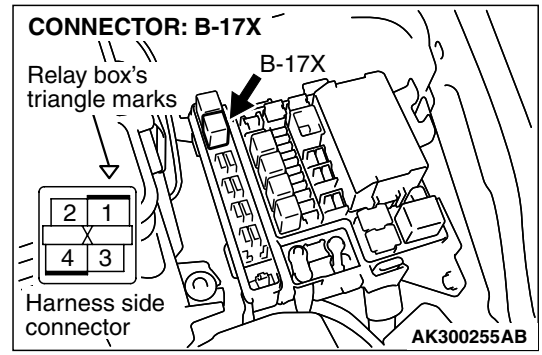
STEP 4.Connector check: B-17X engine control relay connector and B-134 engine-ECU connector

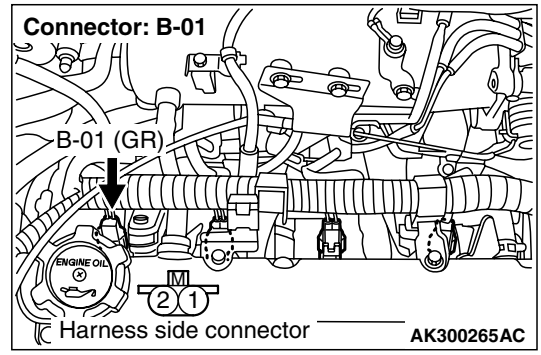




Q: Is the check result normal?
YES : Go to Step 5 .
NO : Repair.

STEP 5.Check harness between B-17X (terminal No. 1) engine control relay connector and B-01 (terminal No. 1) No.1 injector connector.

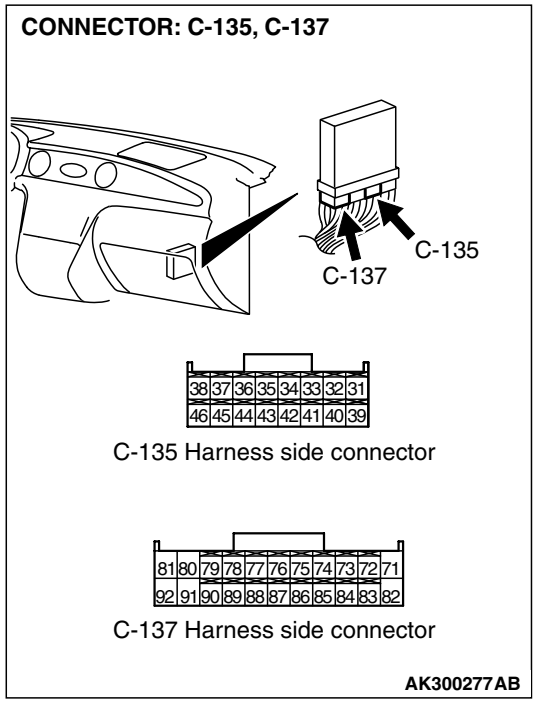




- Check power supply line for damage.

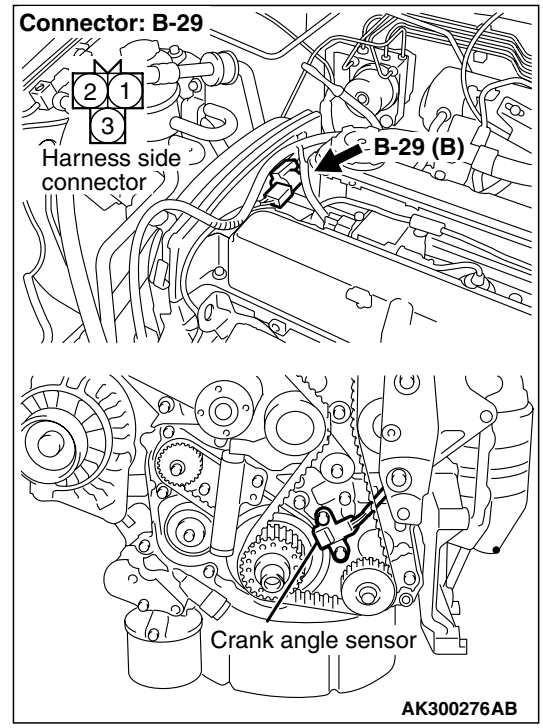
Q: Is the check result normal?
YES : Go to Step 6 .
NO : Repair.

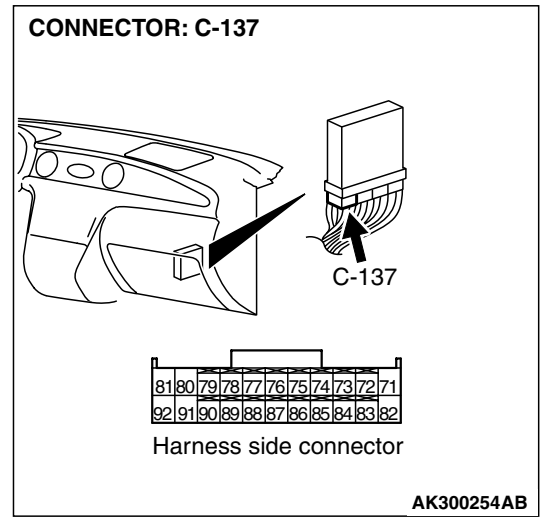
STEP 17. Connector check: C-135 and C-137 engine-ECU connectors



Q: Is the check result normal?
YES : Go to Step 18 .
NO : Repair.

STEP 18. Check harness between B-29 (terminal No. 2) crank angle sensor connector and C-137 (terminal No. 89) engine-ECU connector.

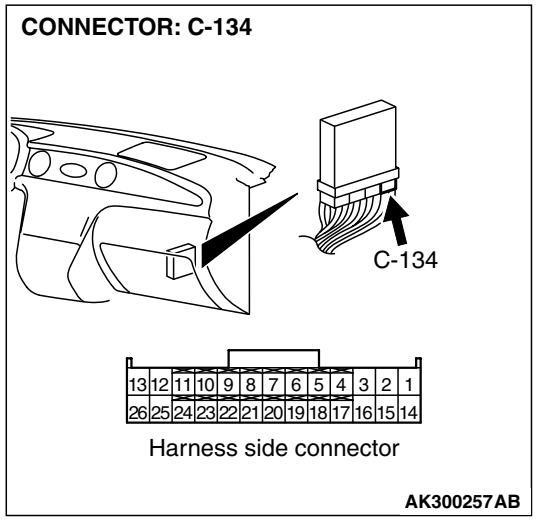


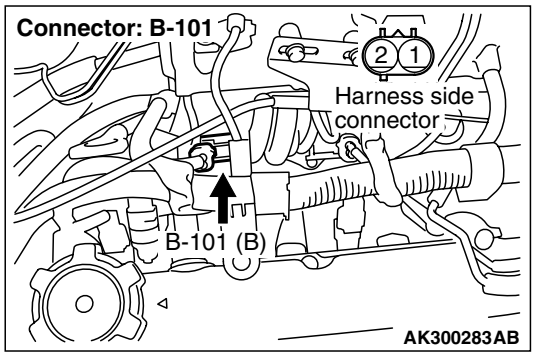


- Check output line for damage.

Q: Is the check result normal?
YES : Go to Step 19 .
NO : Repair.

STEP 7. Connector check: C-134 engine-ECU connector





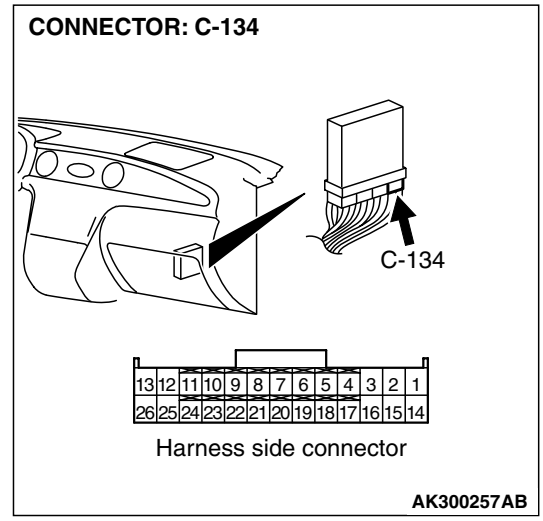
Q: Is the check result normal?

YES : Check and repair harness between B-101 (terminal No. 1) purge control solenoid valve connector and C-134 (terminal No. 9) engine-ECU connector.

- Check output line for open and short circuit.

NO : Repair.

STEP 8. Connector check: C-134 engine-ECU connector



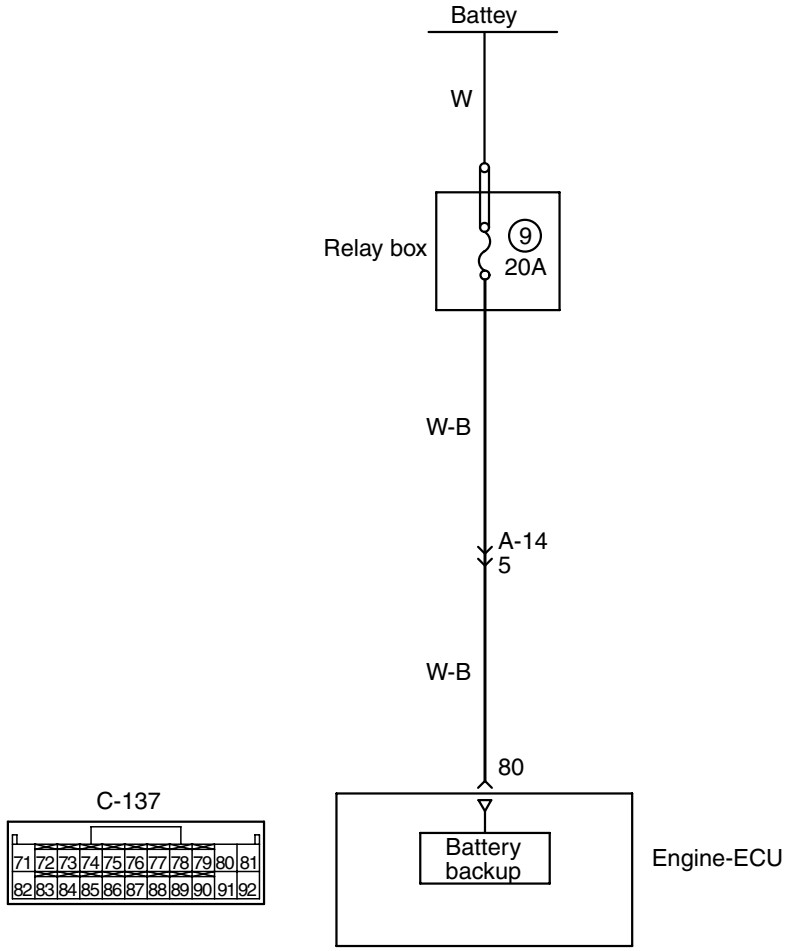
Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

Code No. P1603: Battery Backup Line System

Battery backup circuit



Wire colour code
B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray
R: Red P: Pink V: Violet

AK300297 AB

OPERATION
- Power is directly supplied to the engine-ECU (terminal No. 80) from the battery.

FUNCTION
- The engine-ECU is check the open circuit of battery backup line.

TROUBLE JUDGMENT

Check Condition
- Ignition switch: ON

Judgment Criterion
- The battery backup line voltage 6 V or less.

PROBABLE CAUSE
- Open/short circuit in battery backup line circuit or loose connector contact
- Failed engine-ECU

COMMENT ON TROUBLE SYMPTOM

- Engine-ECU has detected failed sensor or failed actuator. Or failure is possibly caused by short circuit or other faults.

PROBABLE CAUSE

- Short circuit in between engine warning lamp and engine-ECU circuit.
- Failed engine-ECU

DIAGNOSIS PROCEDURE

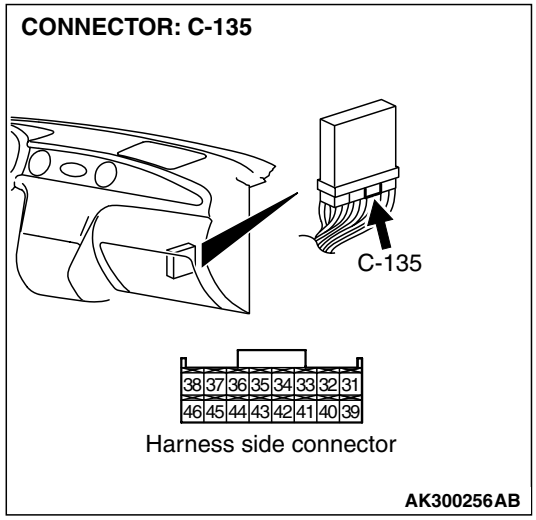
STEP 1: MUT-II self-diag code

Q: Diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to P.13A-12.)

NO : Go to Step 2 .

STEP 2: Connector check: C-135 engine-ECU connector

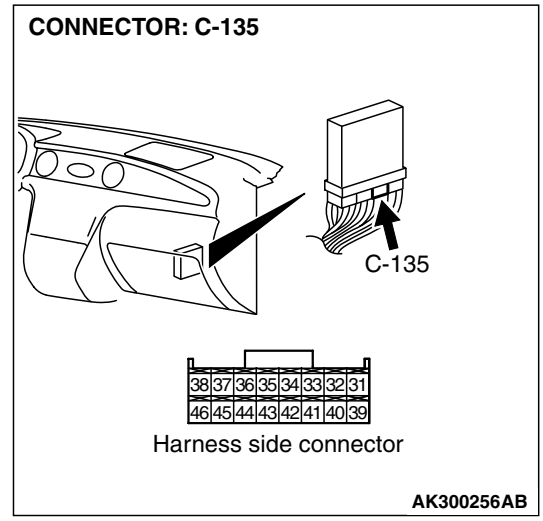


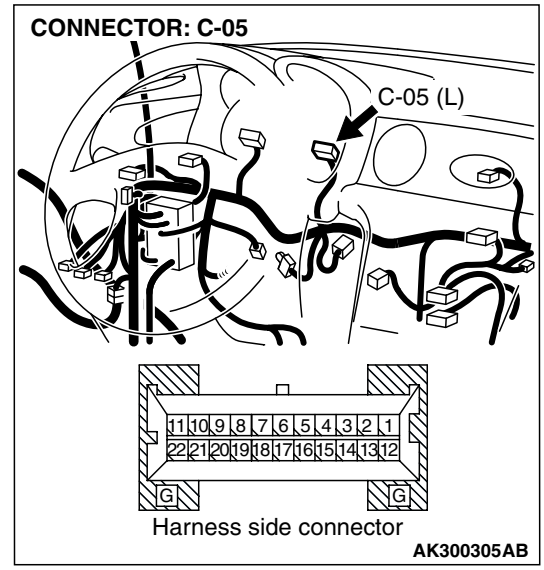
Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair

STEP 3: Measure voltage at C-135 engine-ECU connector.





- Disconnect connector, and measure at the harness side.
- Ignition switch: ON
- Voltage between terminal No. 36 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Check intermediate connector C-105, and repair if necessary. If intermediate connector is normal, check and repair harness between C-05 (terminal No. 14) combination meter connector and C-135 (terminal No. 22) engine-ECU connector.

- Check output line for short circuit.

Inspection Procedure 10. The Engine Stalls when Decelerating

COMMENT ON TROUBLE SYMPTOM

- Engine stall on deceleration is possibly caused by insufficient air intake, improper air-fuel ratio due to failed exhaust gas recirculation system or other faults.

PROBABLE CAUSE

- Failed idle speed control system
- Failed ignition system
- Failed emission control system
- Throttle valve fouled
- Failed engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. MUT-II self-diag code

Q: Diagnosis code set?
YES : Inspection chart for diagnosis code (Refer to P.13A-12).
NO : Go to Step 2 .

STEP 2. MUT-II data list

- Refer to Data list reference table P.13A-287.
  a. Item 14: Throttle position sensor

Q: Is the check result normal?
YES : Go to Step 3 .
NO : Check throttle position sensor system (Refer to Code No. P0120 P.13A-48).

STEP 3. MUT-II data list

- Item 45: Idle speed control servo position

  OK: Idle speed control servo drops to 0 – 2 Steps at deceleration (engine at 1,000 r/min or higher).

Q: Is the check result normal?
YES : Go to Step 4 .
NO : Check idle speed control servo system (Refer to Code No. P0505 P.13A-156).

STEP 4. Check EGR control solenoid valve itself.

- Check EGR control solenoid valve itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System P.17-15].

Q: Is the check result normal?
YES : Go to Step 5 .
NO : Replace EGR control solenoid valve.

STEP 5. Check EGR valve itself.

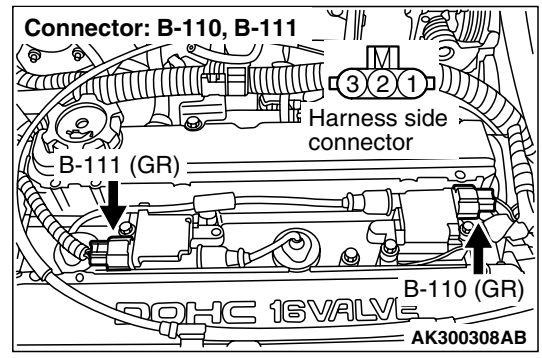
- Check EGR valve itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System P.17-14].

Q: Is the check result normal?
YES : Go to Step 6 .
NO : Replace EGR valve.

STEP 6. Check throttle body (throttle valve portion) for contamination.

Q: Is the check result normal?
YES : Go to Step 7 .
NO : Clean throttle body (throttle valve portion) (Refer to P.13A-306).

STEP 7. Connector check: B-110 and B-111 ignition coil connectors



Q: Is the check result normal?
YES : Go to Step 8 .
NO : Repair.

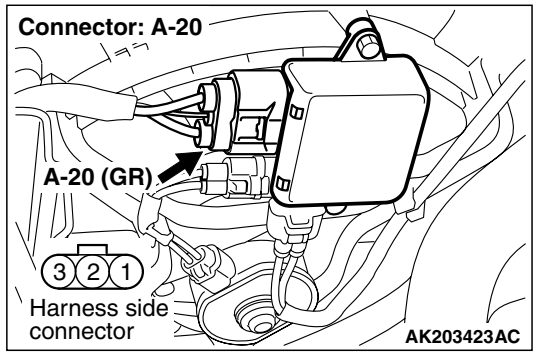
STEP 8. Check ignition coil spark.

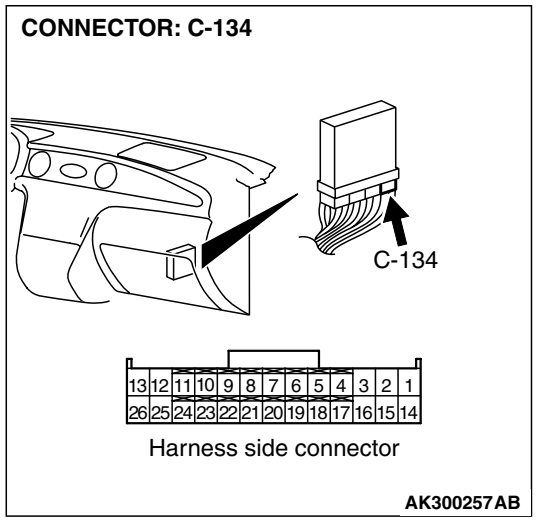
Q: Is the check result normal?
YES : Replace engine-ECU.
NO : Go to Step 9 .

STEP 9. Check spark plug.

Q: Is the check result normal?
YES : Go to Step 10 .
NO : Replace spark plug.

STEP 6. Check harness between A-20 (terminal No. 2) fan controller connector and C-134 (terminal No. 21) engine-ECU connector.





NOTE: Before checking harness, check intermediate connector A-14, and repair if necessary.

- Check output line for open circuit.

Q: Is the check result normal?
YES : Replace fan controller.
NO : Repair.

Inspection Procedure 22: Poor A/C Performance

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by short /overcharged A/C refrigerant, failed A/C control system, failed fan control system or other faults.

PROBABLE CAUSE

- Short or overcharged A/C refrigerant
- Failed A/C compressor relay
- Failed fan controller
- Failed A/C-ECU
- Failed engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. MUT-II self-diag code

Q: Diagnosis code set?
YES : Inspection chart for diagnosis code (Refer to P.13A-12).
NO : Go to Step 2 .

OPERATION

- The battery voltage is applied to the fan control relay (terminal No. 1) from the engine control relay (terminal No. 1) and is earthed to the vehicle body from the fan control relay (terminal No. 3).
- The battery voltage is applied to the fan control relay (terminal No. 4).
- When the fan control relay is in "ON" position, the battery voltage is supplied to the fan controller (terminal No. 3) from the fan control relay (terminal No. 2).

FUNCTION

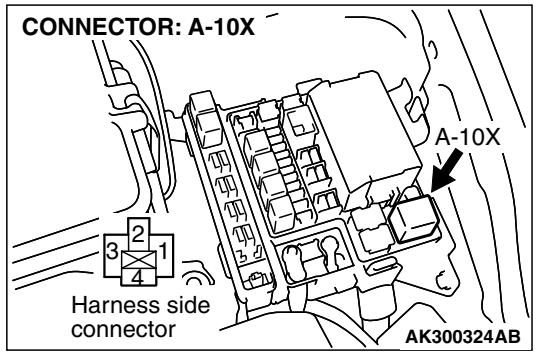
- When the engine control relay is in "ON" position, the fan control relay is also simultaneously placed in "ON" position. Accordingly, the battery voltage is supplied to the fan controller.

PROBABLE CAUSE

- Failed fan control relay
- Failed fan controller
- Failed radiator fan motor
- Failed condenser fan motor
- Open/short circuit in fan control relay circuit or loose connector contact
- Failed engine-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: A-10X fan control relay connector



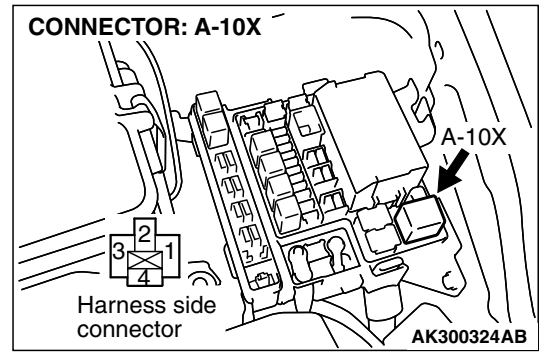
Q: Is the check result normal?
YES : Go to Step 2 .
NO : Repair.

STEP 2. Check fan control relay.

- Check fan control relay (Refer to GROUP 14 – On–vehicle Service P.14-16).

Q: Is the check result normal?
YES : Go to Step 3 .
NO : Replace fan control relay.

STEP 3. Measure resistance at A-10X fan control relay connector.

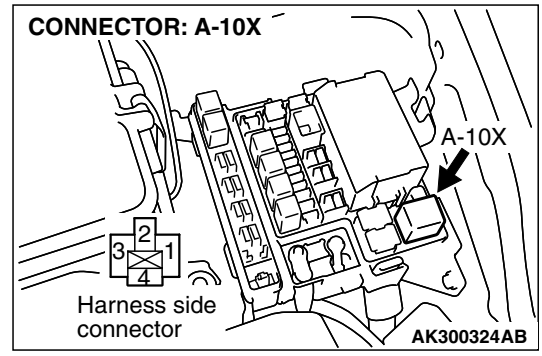


- Remove relay and measure at relay box side.
- Resistance between terminal No. 3 and earth.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 4 .
NO : Check and repair harness between A-10X (terminal No. 3) fan control relay connector and body earth.
- Check earthing line for open circuit and damage.

STEP 4. Measure voltage at A-10X fan control relay connector.



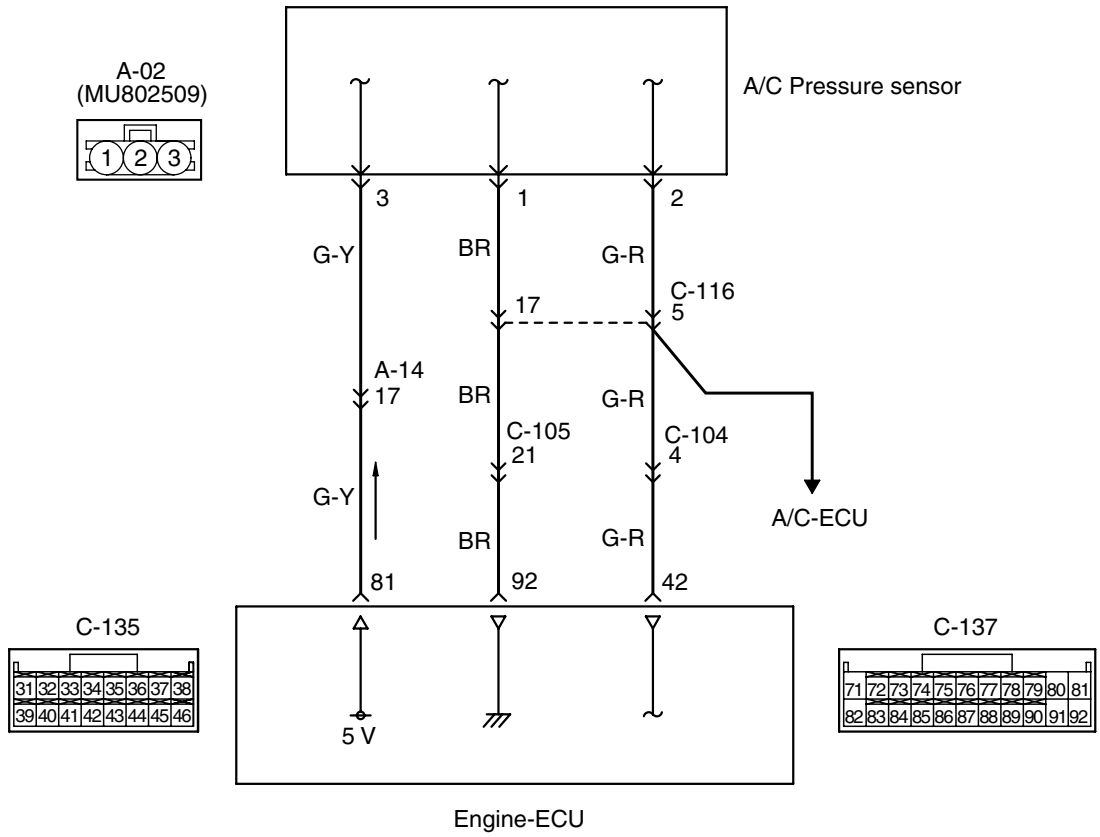
- Remove relay and measure at relay box side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 6 .
NO : Go to Step 5 .

Inspection Procedure 29: A/C Pressure Sensor System

A/C Pressure sensor circuit



Wire colour code
B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Gray
R: Red P: Pink V:Violet

AK300339 AB

OPERATION

- A power voltage of 5 V is applied to the A/C pressure sensor power terminal (terminal No. 3) from the engine-ECU (terminal No. 81) and is earthed to the engine-ECU (terminal No. 92) from the A/C pressure sensor (terminal No. 1).
- The sensor signal is inputted to the engine-ECU (terminal No. 42) from the A/C pressure sensor output terminal (terminal No. 2).

FUNCTION

- The A/C pressure sensor detects the A/C refrigerant pressure and inputs the pressure signal to the engine-ECU. The engine-ECU uses the signal for ON/OFF control of the magnet clutch of the A/C compressor.

PROBABLE CAUSE

- Failed A/C pressure sensor
- Open/short circuit in A/C pressure sensor circuit or loose connector contact
- Failed engine-ECU

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
13 *5	Intake air temperature sensor	Ignition switch: "ON" or engine running	Intake air temperature: –20°C	–20°C	Code No. P0110	P.13A-33
			Intake air temperature: 0°C	0°C		
			Intake air temperature: 20°C	20°C		
			Intake air temperature: 40°C	40°C		
			Intake air temperature: 80°C	80° C		
21 *5	Engine coolant temperature sensor	Ignition switch: "ON" or engine running	Coolant temperature: –20°C	–20°C	Code No. P0115	P.13A-40
			Coolant temperature: 0°C	0°C		
			Coolant temperature: 20°C	20°C		
			Coolant temperature: 40°C	40°C		
			Coolant temperature: 80°C	80°C		
22 *5	Crank angle sensor	• Engine: Cranking • Tachometer: Connected	Compare engine speed on tachometer with the value displayed on MUT-II	Matched	–	–
		Engine: Idle operation	Coolant temperature: –20°C	1,100 – 1,300 r/min		
			Coolant temperature: 0°C	1,100 – 1,300 r/min		
			Coolant temperature: 20°C	1,100 – 1,300 r/min		
			Coolant temperature: 40°C	940 – 1,140 r/min		
			Coolant temperature: 80°C	650 – 850 r/min		
24 *5	Vehicle speed sensor	Drive 40 km/h		Approximately 40 km/h	Code No. P0500	P.13A-153
44 *5	Ignition advance	• Engine: After warm-up • Install timing light (for use to measure actual ignition timing)	Idle operation	2 – 18 deg	–	–
			2,500 r/m	18 – 38 deg		

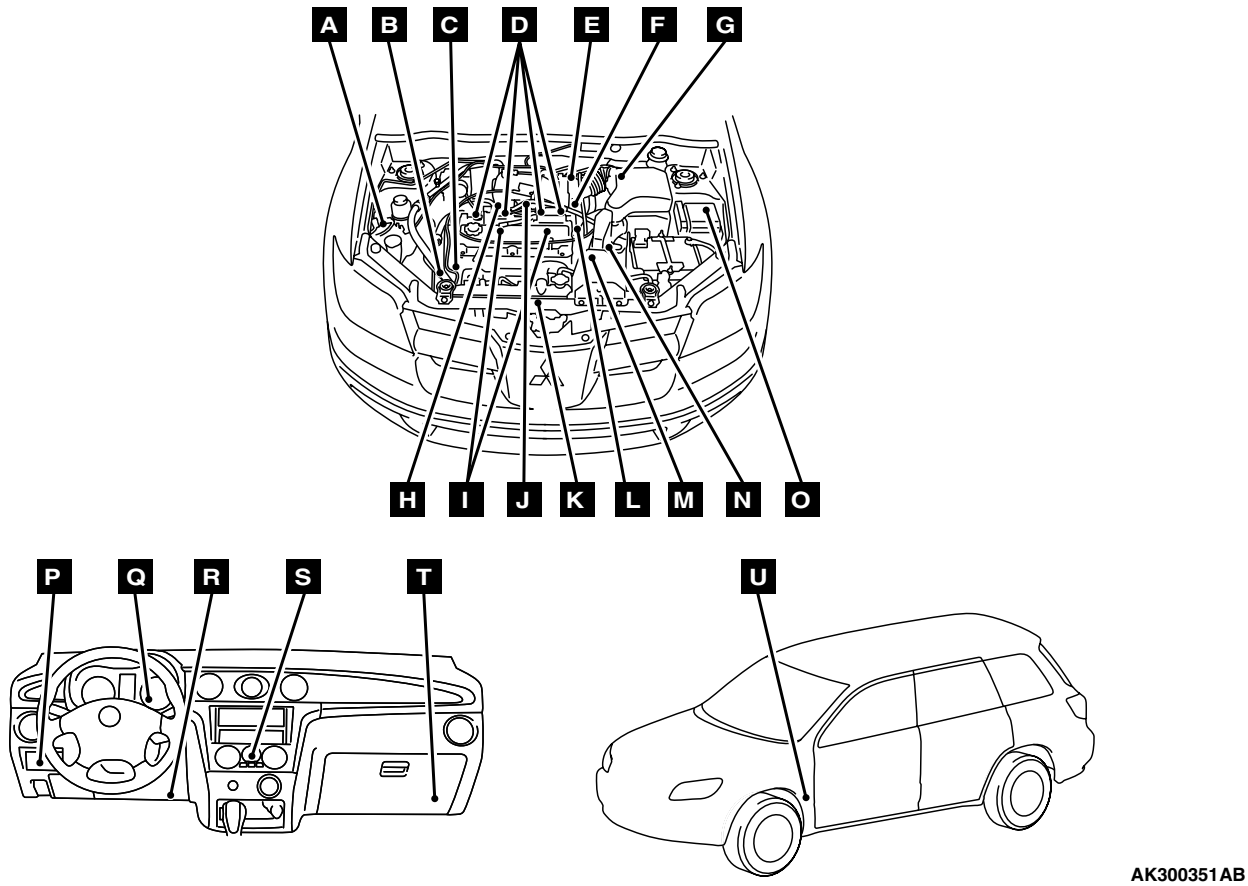
(7) Connect the fuel pump assembly <2WD> or the fuel tank pump and gauge assembly <4WD> connector.

(8) Install the service hole cover and rear seat assembly (Refer to GROUP 52A, Rear Seat Assembly Removal and Installation P.52A-25).

COMPONENT LOCATION

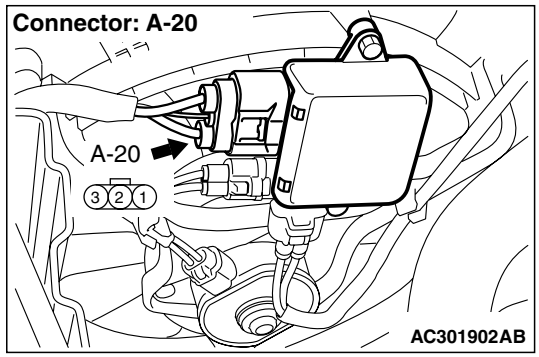
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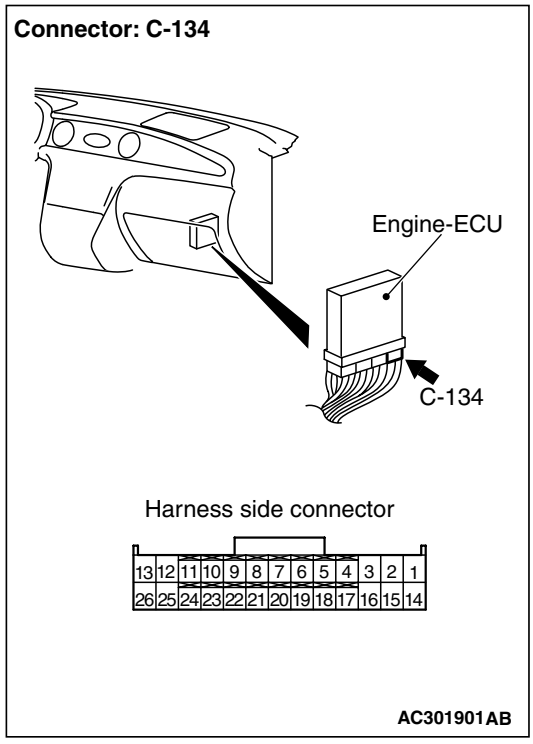
Name	Symbol	Name	Symbol
Air flow sensor (with intake air temperature sensor and barometric pressure sensor)	G	Engine-ECU	T
		Engine warming lamp (check engine lamp)	Q
A/C relay	O	Fuel pump relay (1) and (2)	P
A/C switch	S	Idle speed control servo	F
A/C pressure sensor	A	Ignition coil	I
Camshaft position sensor	L	Injector	D
Crank angle sensor	C	Oxygen sensor (front)	K
Detonation sensor	H	Oxygen sensor (rear)	U
Diagnosis connector	R	Power steering fluid pressure switch	B
EGR control solenoid valve	J	Purge control solenoid valve	J
Engine control relay	O	Throttle position sensor	E
Engine coolant temperature sensor	M	Vehicle speed sensor	N



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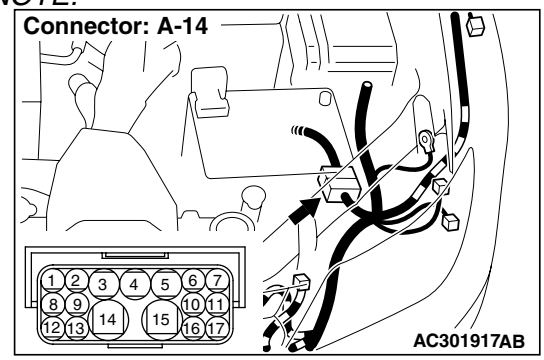
STEP 16. Check the wiring harness between fan controller A-20 (terminal 2) and engine-ECU C-134 (terminal 21).





(1) Check the output line for short or open circuit.

NOTE:



Prior to the wiring harness inspection, check front wiring harness (LH) and control wiring harness combination connector A-14, and repair if necessary.

Q: Is the check result normal?

YES : Go to Step 17.

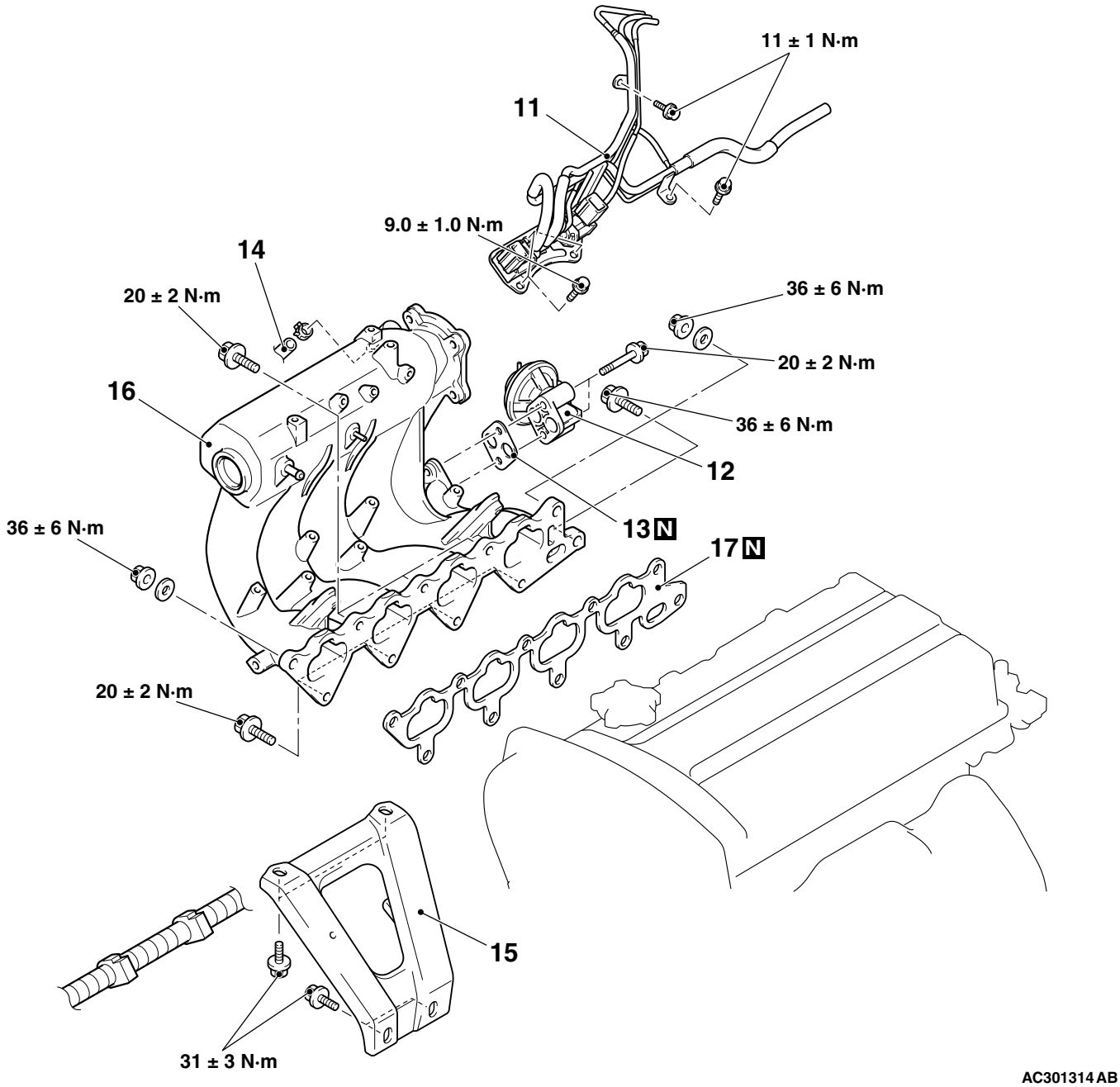
NO : Check the wiring harness between fan controller A-20 (terminal 2) and engine-ECU C-134 (terminal 21), and repair if necessary.

STEP 17. Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?

YES : An intermittent malfunction is suspected (Refer to GROUP 00, How to cope with intermittent malfunctions P.00-6).

NO : Replace the engine-ECU.



AC301314 AB

Removal steps

11. Vacuum hose and pipe assembly
12. EGR valve
13. EGR valve gasket
14. Brake booster vacuum hose connection

Removal steps (Continued)

15. Intake manifold stay
16. Intake manifold assembly
17. Intake manifold gasket

INSPECTION

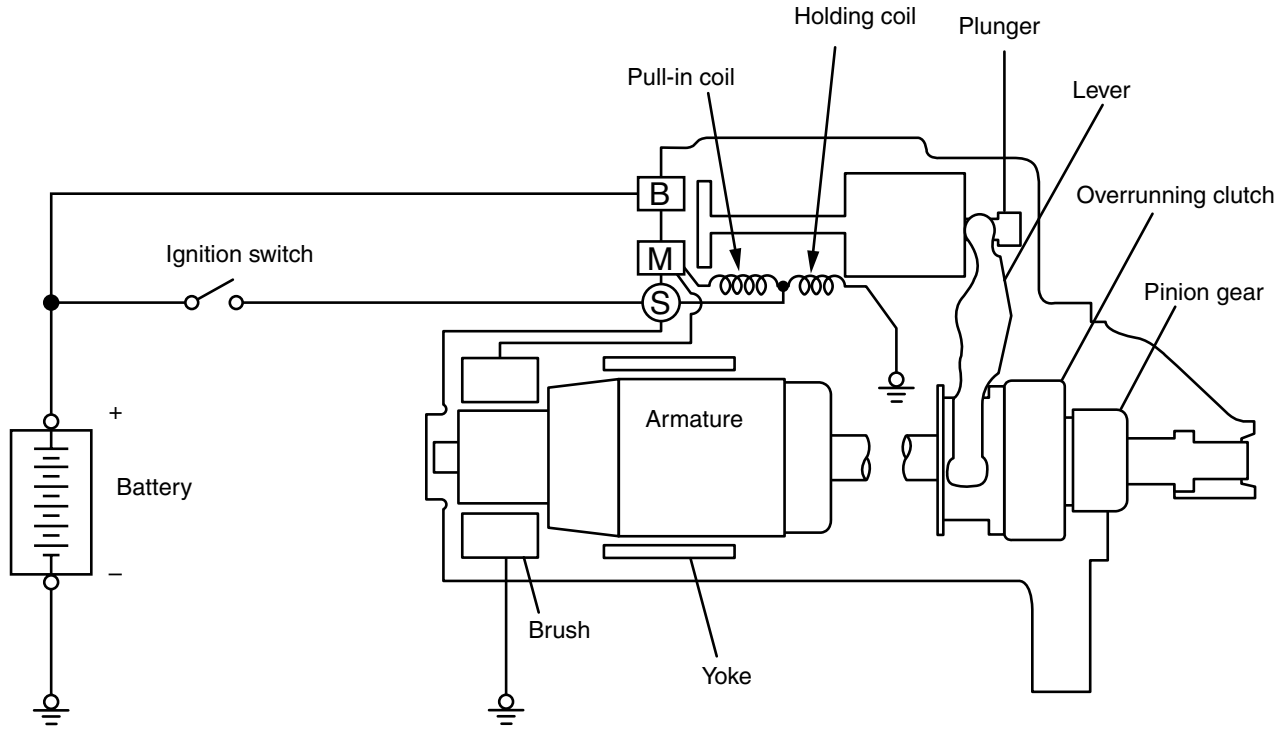
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Check the following points; replace the part if a problem is found.

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 or less
   Limit: 0.20 mm

SYSTEM DIAGRAM



AK202970 AB

STARTER MOTOR SPECIFICATIONS

Item	Specification
Type	Reduction drive with planetary gear
Rated output kW/V	1.4/12
Number of pinion teeth	8

SERVICE SPECIFICATIONS

M1162000300057

Item	Standard value	Limit
Pinion gap mm	0.5 – 2.0	–
Commutator run-out mm	0.05	0.1
Commutator diameter mm	29.4	28.8
Undercut depth mm	0.5	0.2

GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

ENGINE CONTROL 17-3

GENERAL INFORMATION 17-3

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SNAP RING (FOR ADJUSTMENT OF INPUT SHAFT REAR BEARING END PLAY AND OUTPUT SHAFT FRONT BEARING END PLAY)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
1.43	Green (2)	1.59	Yellow (2)
1.51	White (2)		

THRUST PLATE (FOR ADJUSTMENT OF INPUT SHAFT 5TH SPEED GEAR END PLAY)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
2.82	0	2.98	6
2.86	2	3.02	7
2.90	3	3.06	8
2.94	5	3.10	9

SNAP RING (FOR ADJUSTMENT OF OUTPUT SHAFT 3RD SPEED GEAR END PLAY)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
2.81	Green	2.97	Orange
2.85	White	3.01	Red
2.89	Yellow	3.05	Pink
2.93	Black	3.09	Blue

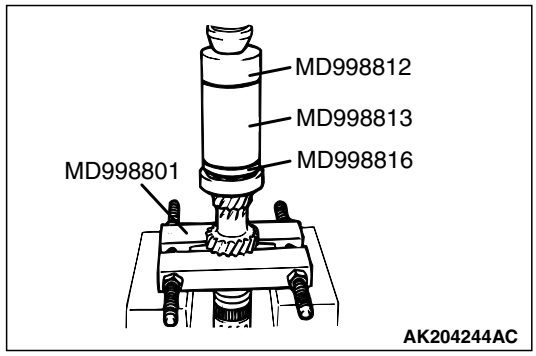
SNAP RING (FOR ADJUSTMENT OF OUTPUT SHAFT REAR BEARING END PLAY)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
2.31	Black (2)	2.55	Yellow
2.35	None	2.59	Black
2.39	Blue	2.63	Orange
2.43	Brown	2.67	Blue
2.47	Green	2.71	Brown
2.51	White		

SPACER (FOR ADJUSTMENT OF DIFFERENTIAL CASE PRELOAD) <F5M42>

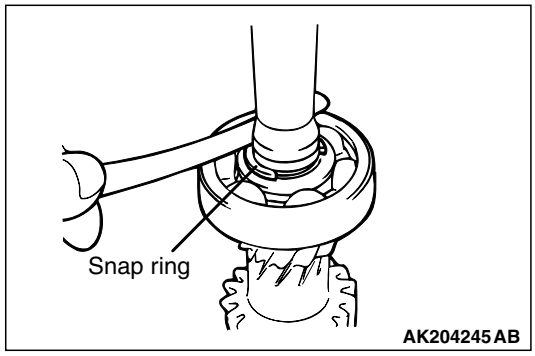
Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.71	71	1.01	01
0.74	74	1.04	04
0.77	77	1.07	07
0.80	80	1.10	J
0.83	83	1.13	D
0.86	86	1.16	K
0.89	89	1.19	L
0.92	92	1.22	G
0.95	95	1.25	M
0.98	98		

>>B<< BALL BEARING INSTALLATION



1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Using special tools, press install the ball bearing with the press.
   - Installer cap (MD998812)
   - Installer-100 (MD998813)
   - Installer adapter (30) (MD998816)

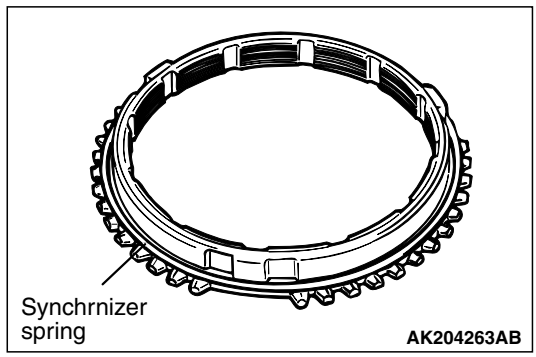
>>C<< SNAP RING INSTALLATION



1. Install the thickest snap ring that can be fitted in the snap ring groove of input shaft.
2. Make sure that the ball bearing end play meets the standard value.

   Standard value: 0 – 0.12 mm

>>D<< SYNCHRONIZER SPRING INSTALLATION

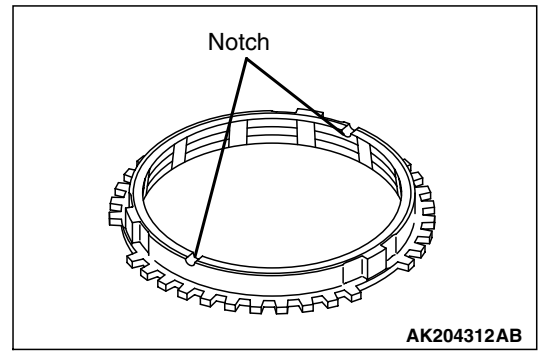


Install the synchronizer spring onto the synchronizer ring as shown.

>>E<< SYNCHRONIZER RING INSTALLATION

⚠ CAUTION

There are 3rd speed and 4th speed synchronizer rings, if the wrong one is installed it will effect the shift feeling.

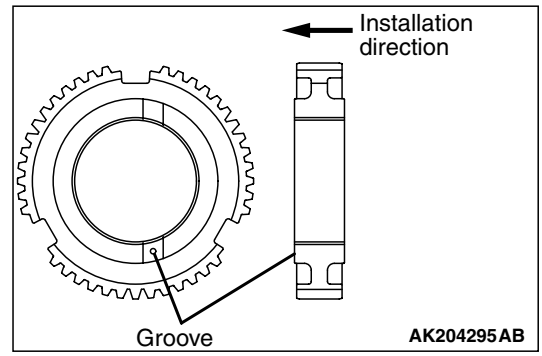


1. Ascertain whether or not there are identification notches on the synchronizer ring.

   Two notches: 3rd speed synchronizer ring

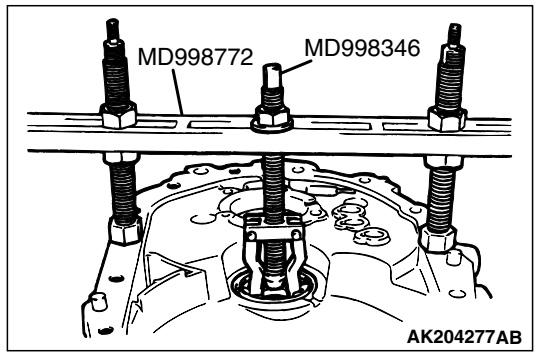
   No notches: 4th speed synchronizer ring
2. Install the synchronizer ring so that it completely fits over the machined cone of the gear.

>>F<< 3RD-4TH SPEED SYNCHRONIZER HUB INSTALLATION



1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Make sure that the synchronizer ring has been perfectly matched to the 3rd speed gear cone.
3. Check the installation direction of the 3rd-4th speed synchronizer hub, and put it on the input shaft.

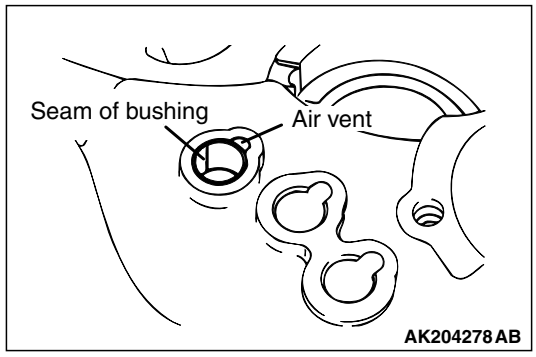
<<B>> OUTER RACE REMOVAL



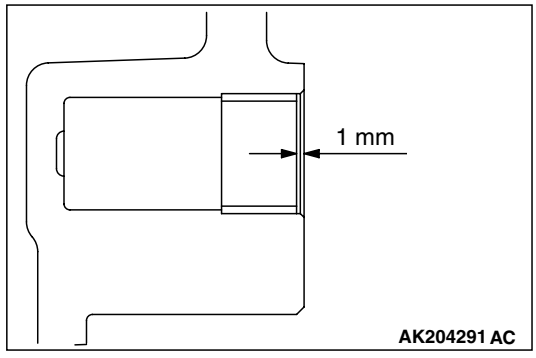
1. Set special tools as indicated in the figure.
   - Valve spring compressor (MD998772)
   - Bearing outer race remover (MD998346)
2. Turn the nut on special tool Bearing outer race remover (MD998346) to pull up on the tool and take out the outer race.

REASSEMBLY SERVICE POINTS

>>A<< BUSHING INSTALLATION

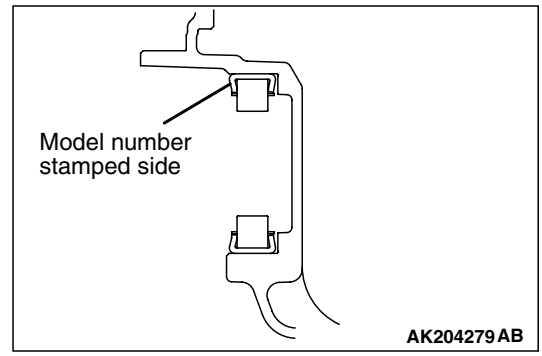


1. Press fit the bushing so the seam is away from the air vent.

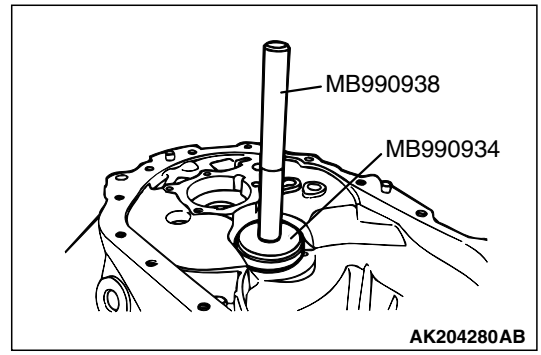


2. Be sure the bushing is fully seated as shown. It must be 1 mm below the housing surface.

>>B<< OUTER RACE INSTALLATION



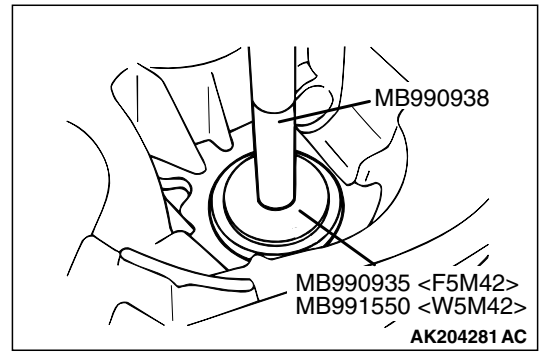
1. Check the installation direction of the outer race.
   Install the outer race so the side with the model number stamping can be seen.



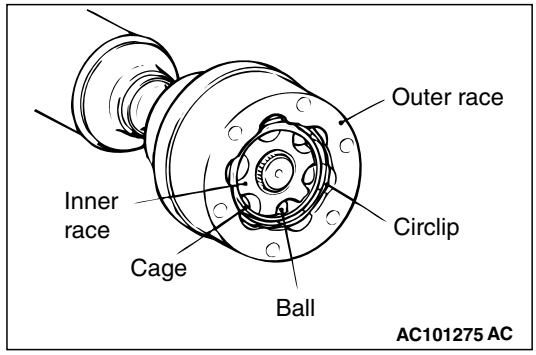
2. Using special tools, press fit the outer race into the clutch housing.
   - Handle (MB990938)
   - Installer adapter (MB990934)

>>C<< OUTER RACE INSTALLATION

1. Check the installation direction of the outer race.

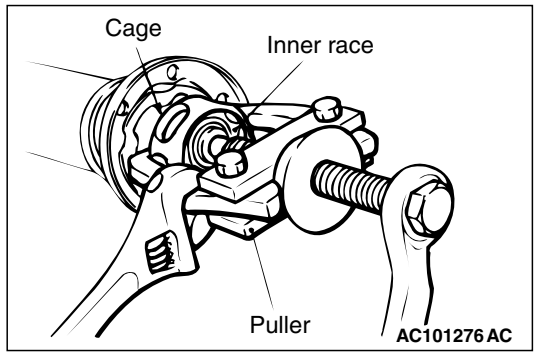


2. Using special tools, press fit the outer race into the clutch housing.
   - Handle (MB990938)
   - Installer adapter (MB990935)
   - Bearing outer race installer (MB991550)



2. Make mating marks on the outer race, cage and inner race, and then remove the circlip, outer race and ball.

   NOTE: . Note the positions of the balls so that they can be reinstalled in their original positions.



3. Remove the inner race with cage from the centre propeller shaft assembly by using a puller (commercially available).
4. Wipe off the grease and clean the outer race, inner race, cage and balls.

<<F>> DOJ BOOT REMOVAL

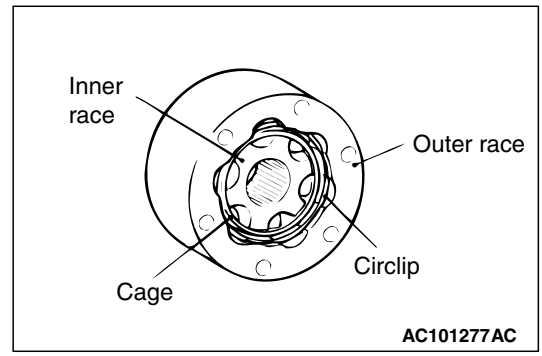
When the DOJ boot is reused, tape the spline part on the rear propeller shaft and then remove the DOJ boot.

REASSEMBLY SERVICE POINTS

>>A<< DOJ BOOT INSTALLATION

1. Install the boot band.
2. Wrap a plastic tape around the spline part on the centre propeller shaft and then install the DOJ boot.

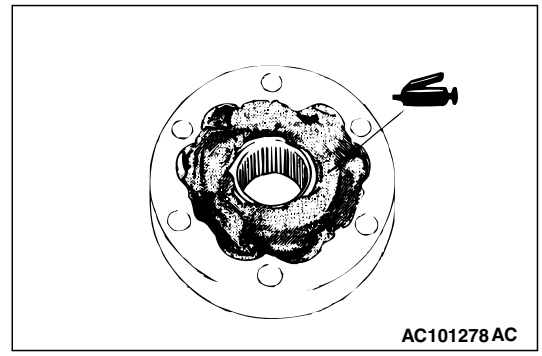
>>B<< DOJ ASSEMBLY INSTALLATION



1. Apply a thin coat of the specified grease to the ball grooves of the inner and outer races.

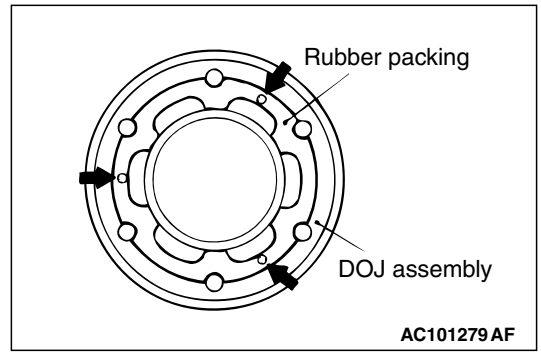
   Specified grease: Repair kit grease

2. Assemble the DOJ assembly as follows:
   (1) Assemble the outer race, cage, balls, and inner race with their mating marks aligned.
   (2) Install the circlip.



3. Apply specified grease to the DOJ assembly.

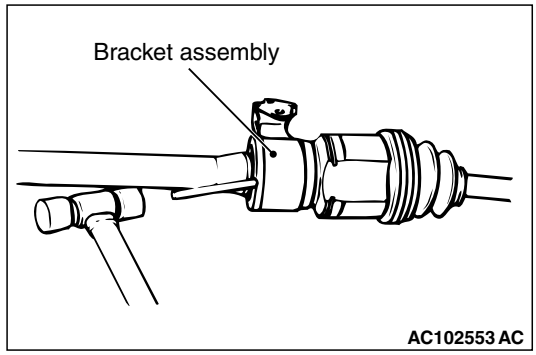
   Specified grease: Repair kit grease
   Amount to use: 95 ± 5 g



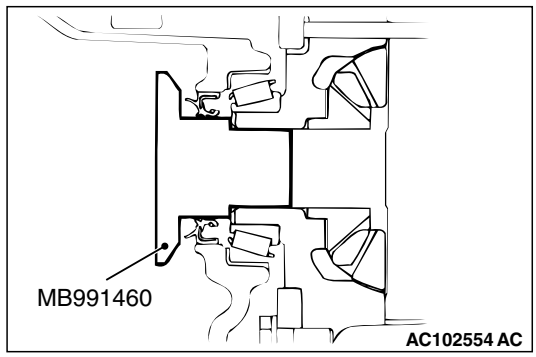
4. Apply a thin coat of specified adhesive to the groove side of DOJ assembly (shown by arrows in the figure) and install the rubber packing.

   Specified adhesive: 3M Stud Locking 4170 or equivalent

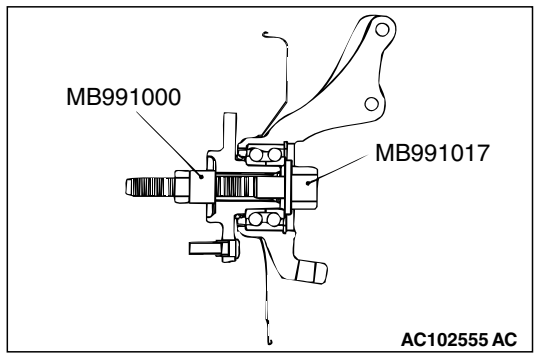
5. Set the groove side of DOJ assembly (for packing) toward the DOJ boot side and install them.



4. If the inner shaft is hard to remove from the transmission, strike the bracket assembly lightly with a plastic hammer and remove the inner shaft.



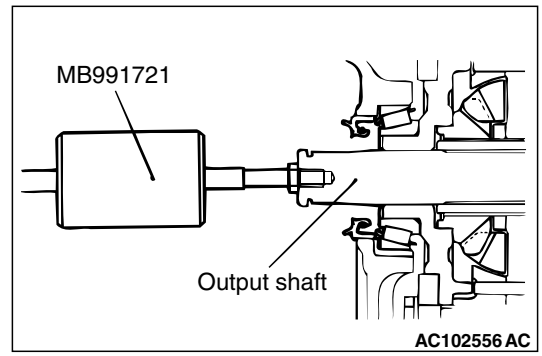
5. Use special tool plug (MB991460) to prevent the entry of foreign material into the transmission case.



⚠ CAUTION
Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft is removed. If, however, vehicle weight must be applied to the bearing in moving the vehicle, temporarily secure the wheel bearing by using the following special tools.
- **Spacer (MB991000)**
- **Front hub remover and installer (MB991017)**

<<D>> OUTPUT SHAFT <4WD> REMOVAL

⚠ CAUTION
When pulling the output shaft out from the transmission, be careful that the spline part of the output shaft does not damage the oil seal.



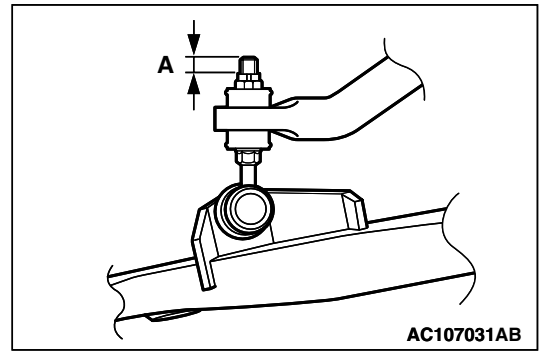
Use special tool sliding hammer (MB991721) to remove the output shaft.

INSTALLATION SERVICE POINTS

>>A<< OUTPUT SHAFT <4WD>/DRIVE SHAFT/ DRIVE SHAFT AND INNER SHAFT ASSEMBLY <2WD-RH> INSTALLATION

⚠ CAUTION
When installing the output shaft, the drive shaft or the drive shaft and inner shaft assembly, be careful that the spline part of the output shaft, the drive shaft or the drive shaft and inner shaft assembly do not damage the oil seal.

>>B<< SELF-LOCKING NUT INSTALLATION



Tighten the self-locking nut so that the protruding length of the stabilizer link protruding part meets its standard value (A).

Standard value (A): 9.4 ± 0.4 mm

SERVICE SPECIFICATIONS

M1271000300438

Item			Standard value	Limit
Rear axle total backlash mm			–	5
Wheel bearing rotation starting torque N·m			–	1.0
Wheel bearing end play mm			–	0.05
TJ boot assembly dimension mm			80 ± 3	–
Drive gear backlash mm			0.11 – 0.16	–
Drive gear runout mm			–	0.05
Differential gear backlash mm			0 – 0.076	0.2
Drive pinion turning torque N·m	Without oil seal		0.9 – 1.2	–
	With oil seal	Companion flange (oil seal contacting area) with anti-rust agent	1.0 – 1.3	–
		Companion flange (oil seal contacting area) with gear oil applied	0.5 – 0.6	–

LUBRICANTS

M1271000400219

Item	Specified lubricant	Quantity
Rear differential gear oil	Hypoid gear oil API classification GL-5 or higher SAE viscosity No. 90, 80W	0.55 L
Drive shaft BJ joint	Repair kit grease	75 ± 10 g
Drive shaft TJ joint	Repair kit grease	110 ± 10 g

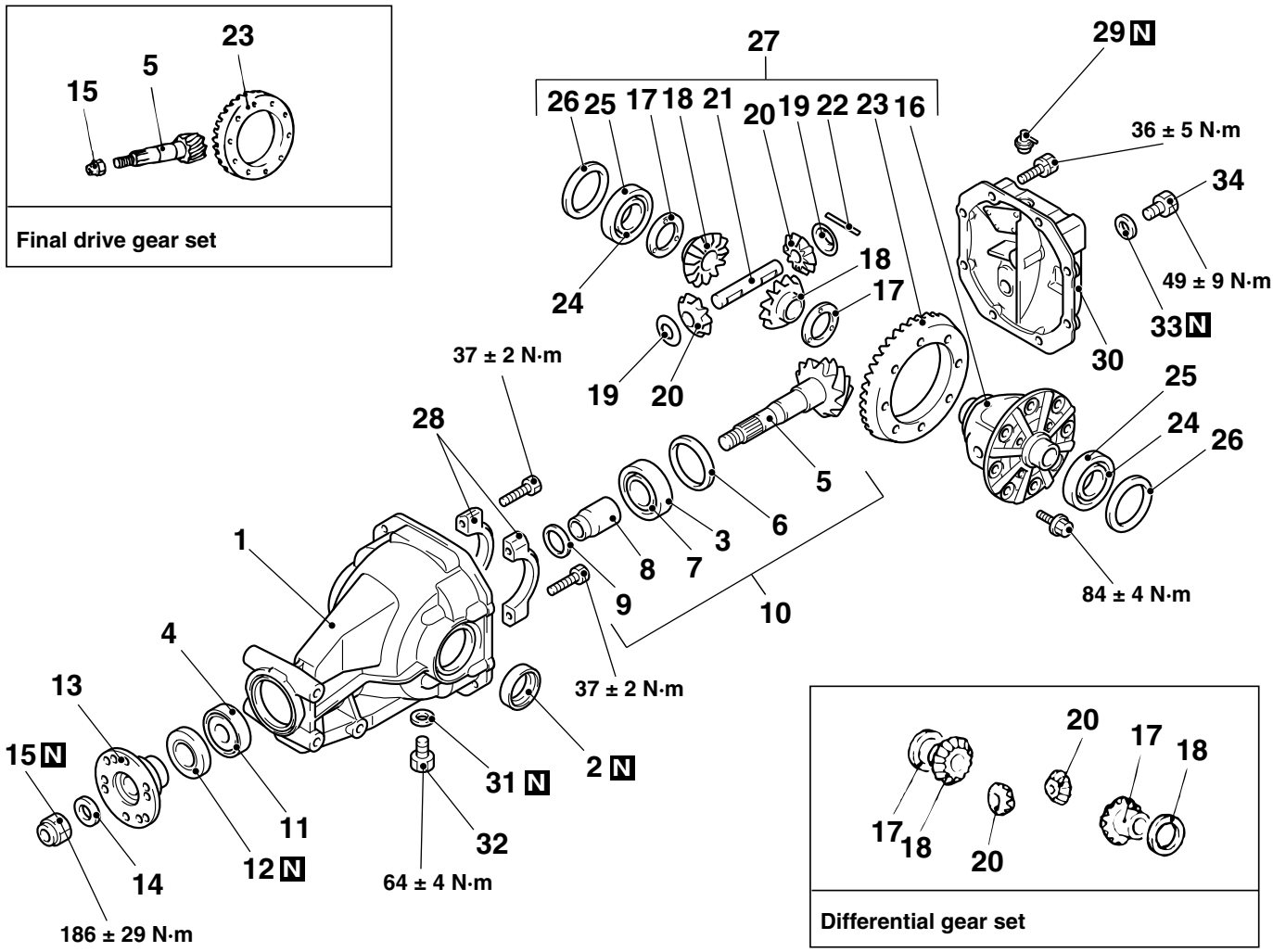
SEALANT AND ADHESIVE

M1271000500227

Item	Specified sealant and adhesive	Remark
Differential cover	3M ATD Part No. 8661 or equivalent	Semi-drying sealant
Drive gear and differential case mounting part	3M Stud Locking 4170 or equivalent	Anaerobic sealant

REASSEMBLY

M1272002300211



AC301213AB

Reassembly steps

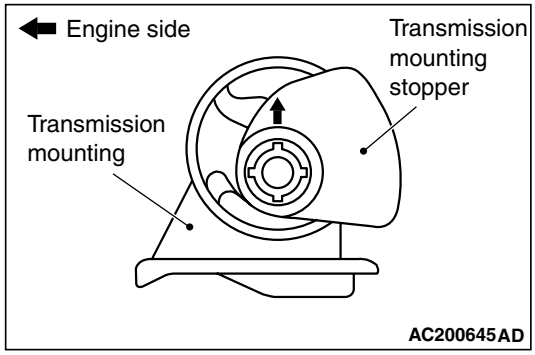
1. Differential carrier
- **>>A<<** 2. Oil seal
- **>>B<<** 3. Drive pinion rear bearing outer race
- **>>C<<** 4. Drive pinion front bearing outer race
- **>>D<<** • Drive pinion height adjustment
5. Drive pinion
6. Drive pinion rear shim (for adjusting drive pinion height)
7. Drive pinion rear bearing inner race
8. Drive pinion spacer
- **>>E<<** • Drive pinion turning torque adjustment
9. Drive pinion front shim (for adjusting drive pinion turning torque)
10. Drive pinion assembly
11. Drive pinion front bearing inner race
- **>>E<<** 12. Oil seal
13. Companion flange
14. Washer
15. Self-locking nut
16. Differential case

Reassembly steps (Continued)

- **>>F<<** • Differential gear backlash adjustment
17. Side gear spacer
18. Side gear
19. Pinion washer
20. Pinion gear
21. Pinion shaft
- **>>G<<** 22. Lock pin
- **>>H<<** 23. Drive gear
- **>>I<<** 24. Differential side bearing inner race
25. Differential side bearing outer race
26. Differential side bearing spacer
27. Differential case assembly
- **>>J<<** 28. Bearing cap
29. Vent plug
30. Differential cover
31. Packing
32. Drain plug
33. Gasket
34. Filler plug
- **>>J<<** • Final drive gear backlash adjustment

INSTALLATION SERVICE POINT

>>A<< TRANSMISSION MOUNTING STOPPER INSTALLATION

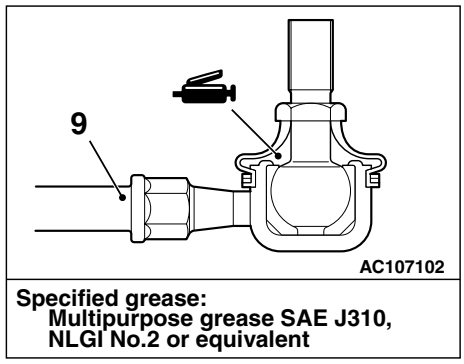


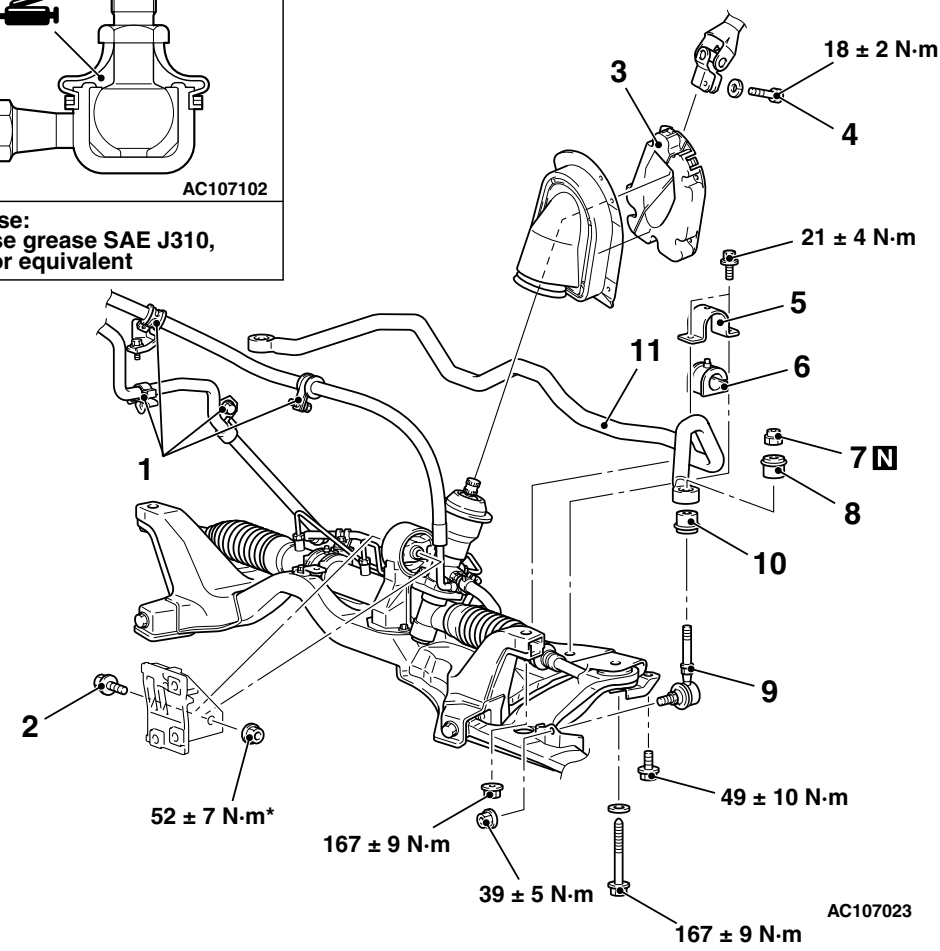
Install the transmission mounting stopper so that its arrow points upward.

INSPECTION

M1321001500136

- Check the transmission mounting insulator for cracks, separation or deformation.





			Removal steps				Removal steps (Continued)
		1.	Power steering hose clamp	<<A>>	>>A<<	6.	Bushing
		2.	Rear roll stopper connecting bolt		>>B<<	7.	Self-locking nut
		3.	Steering shaft cover			8.	Stabilizer rubber
		4.	Steering gear and joint connecting bolt	<<A>>		9.	Stabilizer link
						10.	Stabilizer rubber
<<A>>	>>A<<	5.	Fixture	<<A>>	>>A<<	11.	Stabilizer bar

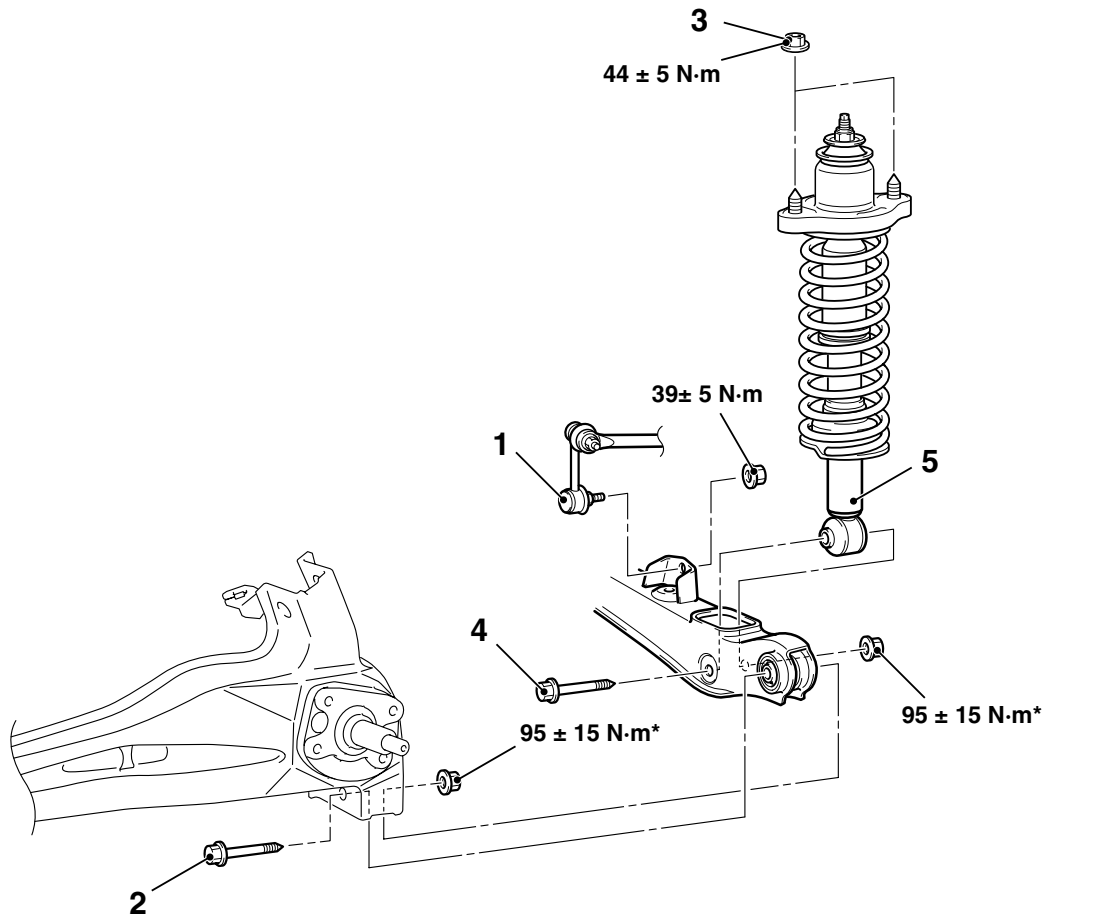
SHOCK ABSORBER ASSEMBLY

REMOVAL AND INSTALLATION

M1341002500238

⚠ CAUTION

***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**



AC107092 AB

Removal steps

1. Stabilizer link connection

<<A>> 2. Lower arm and trailing arm connection

3. Shock absorber mounting nut

Removal steps (Continued)

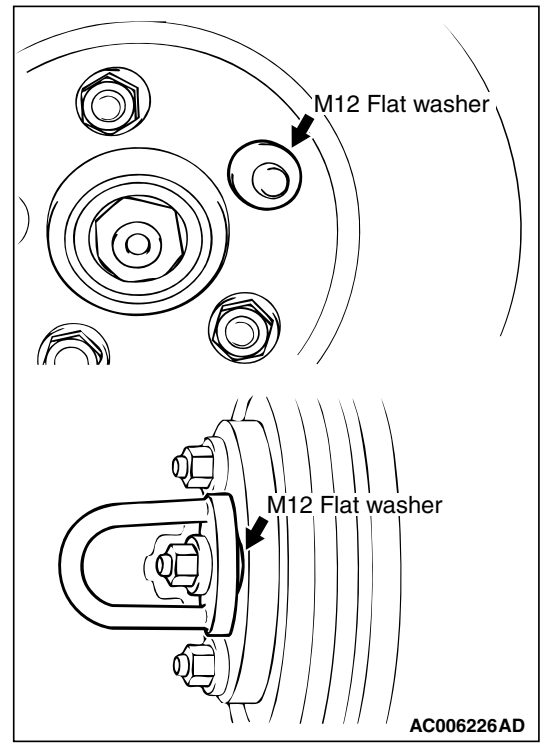
4. Shock absorber and lower arm connecting bolt

>>A<< 5. Shock absorber assembly

(4) If the axial play does not exceed the limit, dephase the brake disc and secure it. Then recheck the brake disc run-out.

⚠ CAUTION

- **After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.**



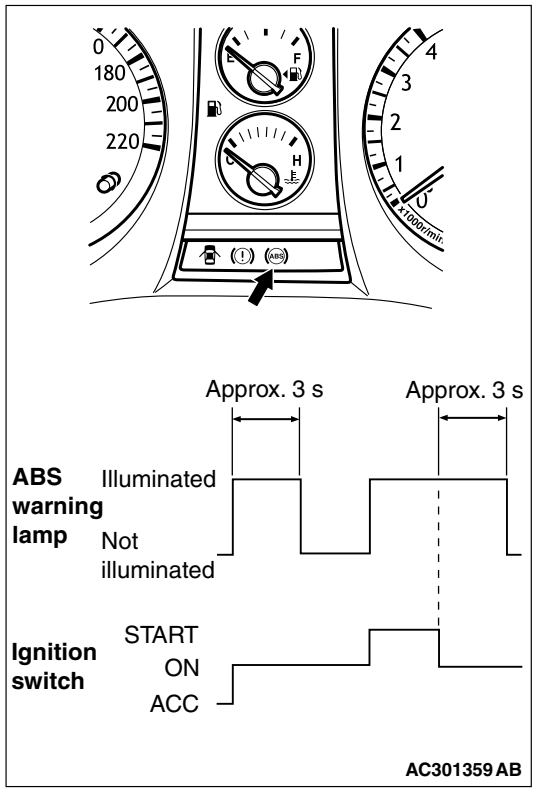
- **When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.**
- **Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m. When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.**

5. If the run-out cannot be corrected by changing the phase of the brake disc, replace the brake disc or grind it with the on-the-car type brake lathe ("MAD, DL-8700PF" or equivalent).

2. For road surfaces such as snow-covered roads and gravel roads, the braking distance for vehicles with ABS can sometimes be longer than that for other vehicles. Accordingly, advise the customer to drive safely on such roads by lowering the vehicle speed and not being too overconfident.
3. Diagnosis detection condition can vary depending on the diagnosis code. Make sure that checking requirements listed in the "Comment" are satisfied when checking the trouble symptom again.

ABS WARNING LAMP INSPECTION

M1352012000197



Check that the ABS warning lamp illuminates as follows.

1. When the ignition switch is turned to the "ON" position, the ABS warning lamp illuminates for approximately 3 seconds and then switches off.
2. When the ignition switch is turned to the "START" position, the ABS warning lamp remains illuminated.
3. When the ignition switch is turned from the "START" position back to the "ON" position, the ABS warning lamp illuminates for approximately 3 seconds and then switches off.

NOTE: The ABS waning lamp may remain on until the vehicle reaches a speed of several km/h. This is limited to cases where diagnosis code Nos. 21 to 24, 41 to 44, or 53 to 55 have been recorded because of a previous problem occurring. In this case, the ABS-ECU keeps the warning lamp illuminated until the problem corresponding to that diagnosis code can be detected.

4. If the illumination is other than the above, check the diagnosis codes.

DIAGNOSIS FUNCTION

M1352011200541

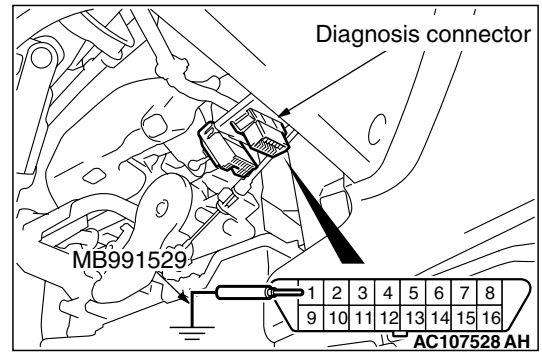
READING DIAGNOSIS CODES

When Using the MUT-II

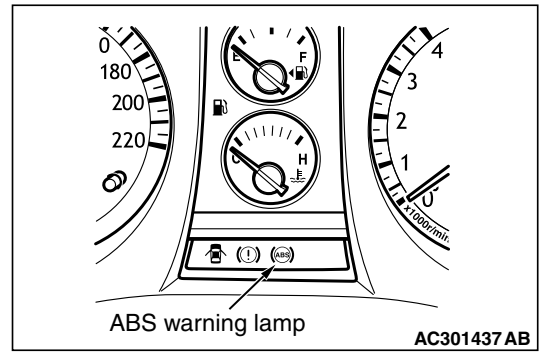
Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points P.00-6.

When Using the ABS Warning Lamp

1. Turn the ignition switch to the "LOCK" (OFF) position.

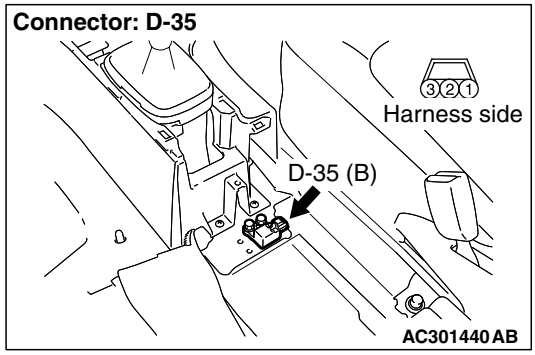


2. Use special tool diagnosis code check harness (MB991529) to earth terminal number 1 (diagnosis control terminal) of the diagnosis connector.
3. Turn the ignition switch to the "ON" position.

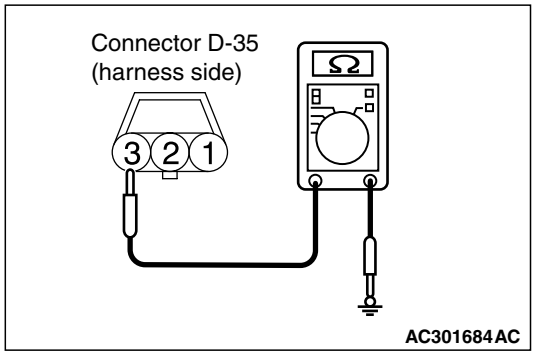


4. Read out a diagnosis code by observing how the warning lamp flashes.

STEP 4. Measure the resistance at G-sensor connector D-35.



(1) Disconnect G-sensor connector D-35, and check at the harness side.

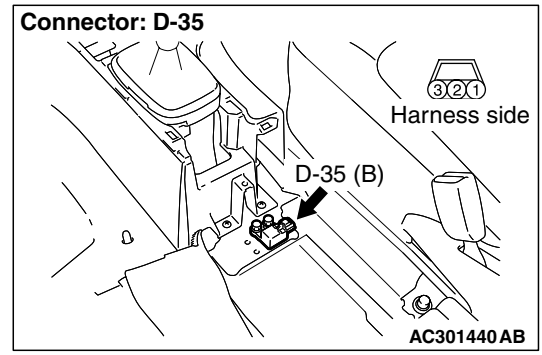


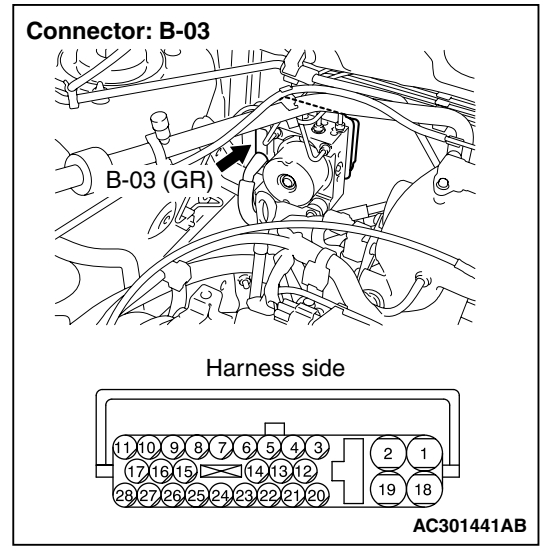
(2) Measure the resistance between terminal 3 and earth.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check the harness wire between G-sensor connector D-35 terminal 3 and ABS-ECU connector B-03 terminal 8.





Q: Is the harness wire between G-sensor connector D-35 terminal 3 and ABS-ECU connector B-03 terminal 8 damaged?
YES : Repair it and go to Step 8.
NO : Erase the diagnosis code memory, and recheck if any diagnosis code sets. If diagnosis code No.32 sets, replace the hydraulic unit (integrated with ABS-ECU) and then go to Step 8 .

ACTUATOR TEST REFERENCE TABLE

M1352011600527

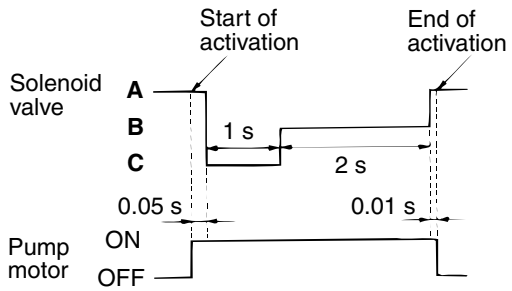
The MUT-II activates the following actuators for testing.

NOTE: If the ABS-ECU runs down, actuator testing cannot be carried out.

NOTE: Actuator testing is only possible when the vehicle is stationary.

ACTUATOR TEST SPECIFICATIONS

Activation pattern



NOTE
A: Hydraulic pressure increases
B: Hydraulic pressure holds
C: Hydraulic pressure decreases

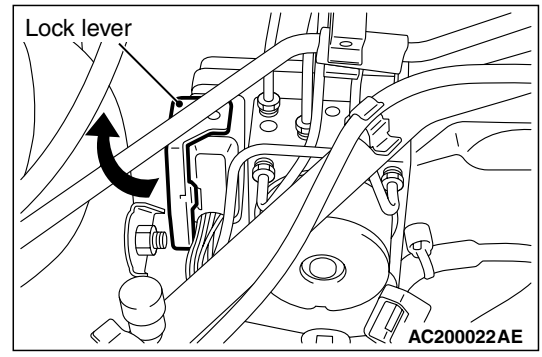
AC100172 AG

No.	Item	
01	Solenoid valve for front-left wheel	Solenoid valves and pump motors in the hydraulic unit (simple inspection mode)
02	Solenoid valve for front-right wheel	
03	Solenoid valve for rear-left wheel	
04	Solenoid valve for rear-right wheel	

CHECK AT ABS-ECU

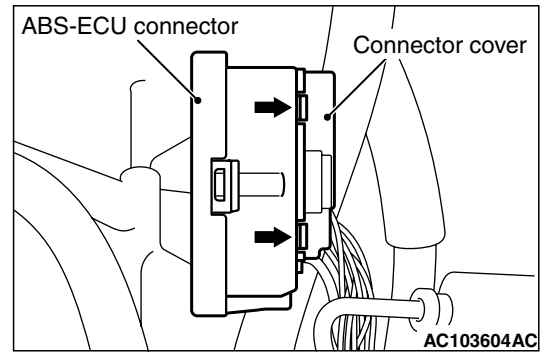
M1352011800554

Use the following steps to remove the connector cover and measure the terminal voltage.



AC200022 AE

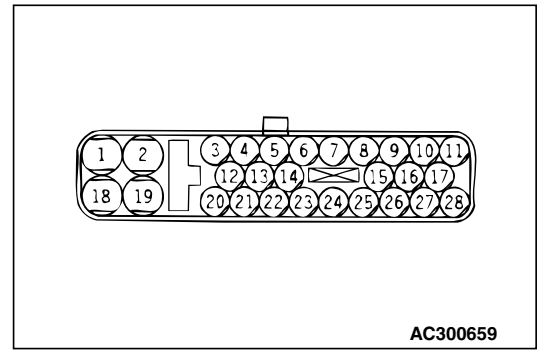
1. Move the lock lever of the ABS-ECU connector as shown in the illustration, and then disconnect the ABS-ECU connector.



AC103604 AC

2. Insert the flat-tipped screwdriver to the aperture (arrow area as shown in the illustration) between ABS-ECU connector and connector cover to disengage the claw and remove the connector cover.

TERMINAL VOLTAGE CHECK CHART



AC300659

1. Measure the voltages between earth terminal (2) or (18) and each respective terminal.
2. The terminal layouts are shown in the illustrations below.

NOTE: Do not measure terminal voltage for approximately three seconds after the ignition switch is turned to the "ON" position. The ABS-ECU performs the initial check during that period.

GROUP 37

POWER STEERING

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SEALANTS 37-4

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- STEERING ANGLE CHECK 37-7
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- REMOVAL AND INSTALLATION 37-35

WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

⚠ WARNING

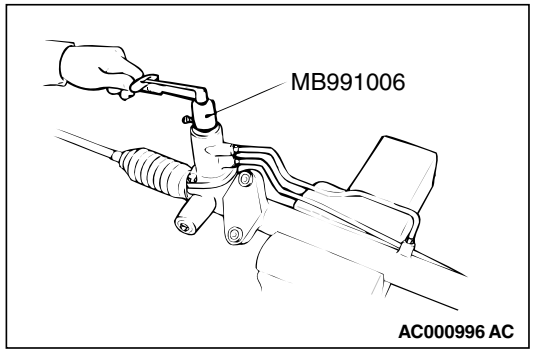
- ***Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).***
- ***Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.***
- ***MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.***

INSPECTION

M1372011000204

STEERING GEAR TOTAL PINION TORQUE CHECK

⚠ CAUTION
When holding the steering gear in a vice, secure its mounting positions. If it is secured in any other place, the gear housing may become deformed or damaged.



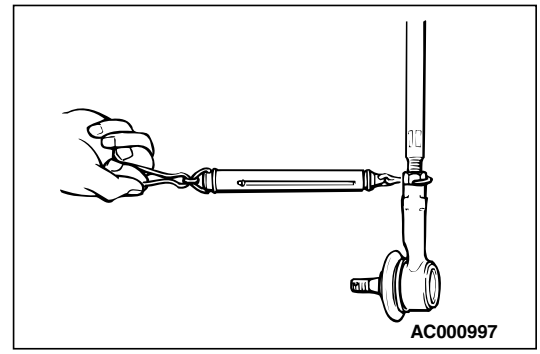
Using special tool preload socket (MB991006), rotate the pinion gear at the rate of one rotation in approximately 4 to 6 seconds to check the total pinion torque.

Standard value: 0.7 – 1.6 N·m
[Change in torque: 0.4 N·m or less]

NOTE: When measuring, remove the bellows from the rack housing. Measure the pinion torque through the whole stroke of the rack.
If the measured value is not within the standard range, first adjust the rack support cover, and then check the total pinion torque again.
If the total pinion torque cannot be adjusted to within the standard range by adjusting the rack support cover, check the rack support cover, rack support spring, rack support and replace any parts if necessary.

TIE ROD SWING RESISTANCE CHECK

1. Give 10 hard swings to the tie rod.



2. Measure the tie rod swing resistance [tie rod swing torque] with a spring balance.

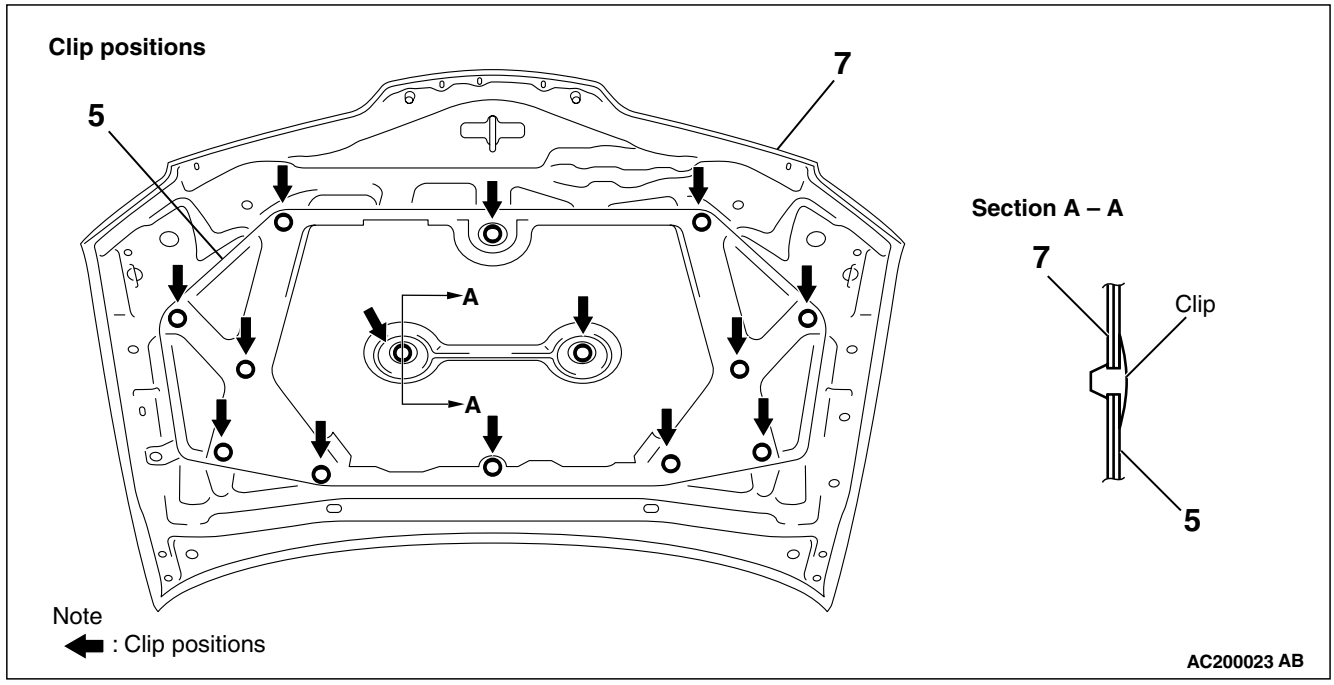
   Standard value: 6 – 19 N [1.5 – 4.9 N·m]

3. If the measured value exceeds the standard value, replace the tie rod.
4. If the measured value is below the standard value, the tie rod can be re-used if it swings smoothly without excessive play.

TIE ROD END BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with your finger.
2. If the dust cover is cracked or damaged, replace the tie rod end (Refer to P.37-22).

   NOTE: Cracks or damage of the dust cover may damage the ball joint. If it is damaged during service work, replace the dust cover (Refer to P.37-30).

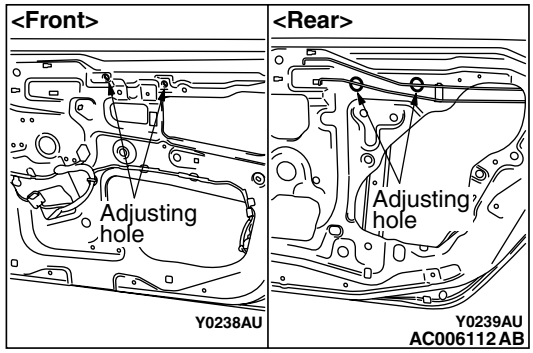

Clip positions
7
5
A
A
Section A – A
7
Clip
5
Note
: Clip positions
AC200023 AB

DOOR WINDOW GLASS ADJUSTMENT

M1423001000305

Check that the door glass moves while contacting the door glass channel when it is raised and lowered fully. If not, adjust the door window according to the following procedures.

1. Remove the door trim assembly (Refer to GROUP 52A, Door trim P.52A-13).
2. Remove the waterproof film. (Refer to P.42-37).



3. Loosen the door glass mounting screw via the adjusting hole with the door window glass fully closed, then lower the window glass a little.
4. Fully close the door window glass again and tighten the door glass mounting screw firmly via the adjusting hole.

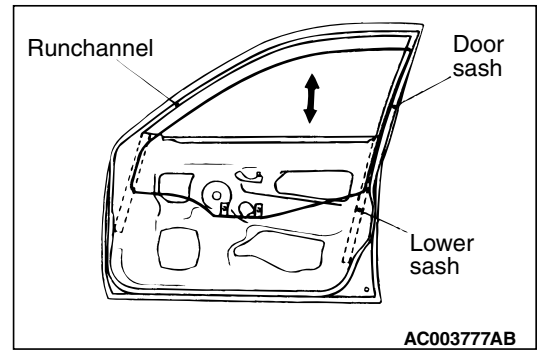
GLASS SLIDING MECHANISM CHECK AND ADJUSTMENT

M1429000900080

If the window glass automatically starts moving downwards at the wrong time while it is being raised, carry out the following adjustment or replacement procedures.

1. Remove the door trim assembly. (Refer to GROUP 52A, Door trim P.52A-13).
2. Remove the waterproof film. (Refer to P.42-37).
3. Remove the window regulator assembly from the door window glass, and then raise and lower the door window glass by hand to check the operation force.

   NOTE: Insert a cushion or similar object to prevent damage to the glass if it should happen to fall down.



4. If the door window glass does not move up and down smoothly, check or repair the following points.
   - Check the installation condition of the runchannel.
   - Repair any twisting in the door sash.
   - Check the installation condition of the lower sash or the centre sash.
5. If repair or adjustment is not possible, replace the door assembly.

Tailgate assembly removal steps
1. Bumper
2. Rear washer hose
3. Waterproof film
4. Tailgate wiring harness

<<A>> 5. Tailgate gas spring
6. Tailgate assembly

Tailgate assembly removal steps
- Headlining (Refer to GROUP 52A, Headlining P.52A-19).

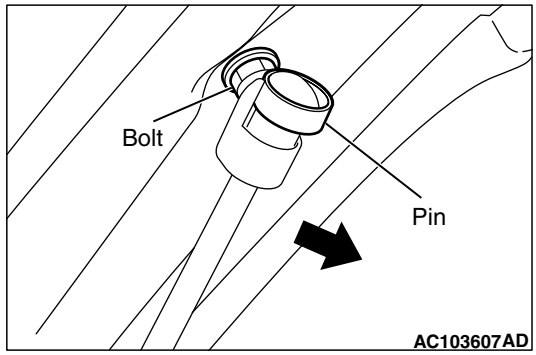
>>B<< 7. Tailgate hinge

Tailgate opening weatherstrip removal

>>A<< 8. Tailgate opening weatherstrip

REMOVAL SERVICE POINT

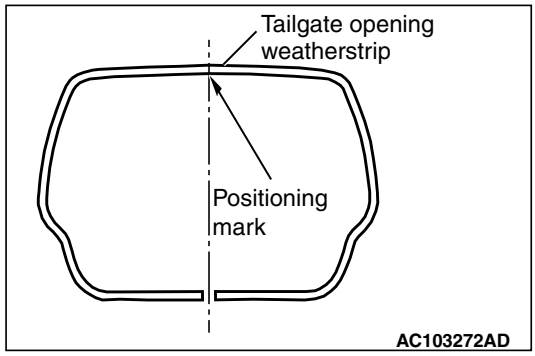
<<A>> TAILGATE GAS SPRING REMOVAL



As shown in the Figure, slide the pin upward, then remove the tailgate gas spring in the direction of the arrow to unscrew the bolt.

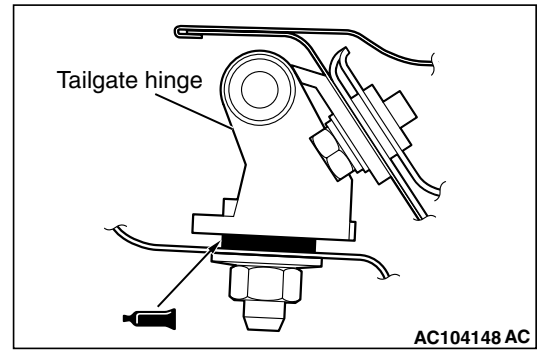
INSTALLATION SERVICE POINTS

>>A<< TAILGATE OPENING WEATHERSTRIP INSTALLATION



Assemble so the tailgate opening weatherstrip marking is at the centre of the body.

>>B<< TAILGATE HINGE INSTALLATION

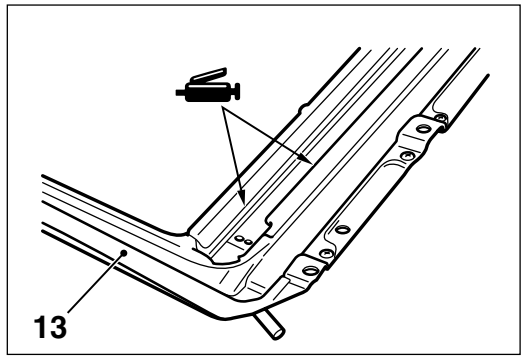


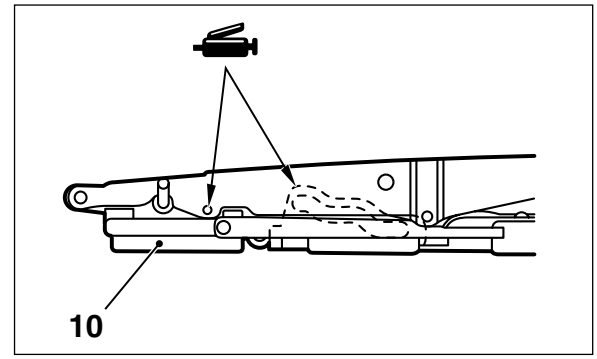
Apply the specified sealing agent to the tailgate hinge assembly surface to assembly the tailgate hinge.

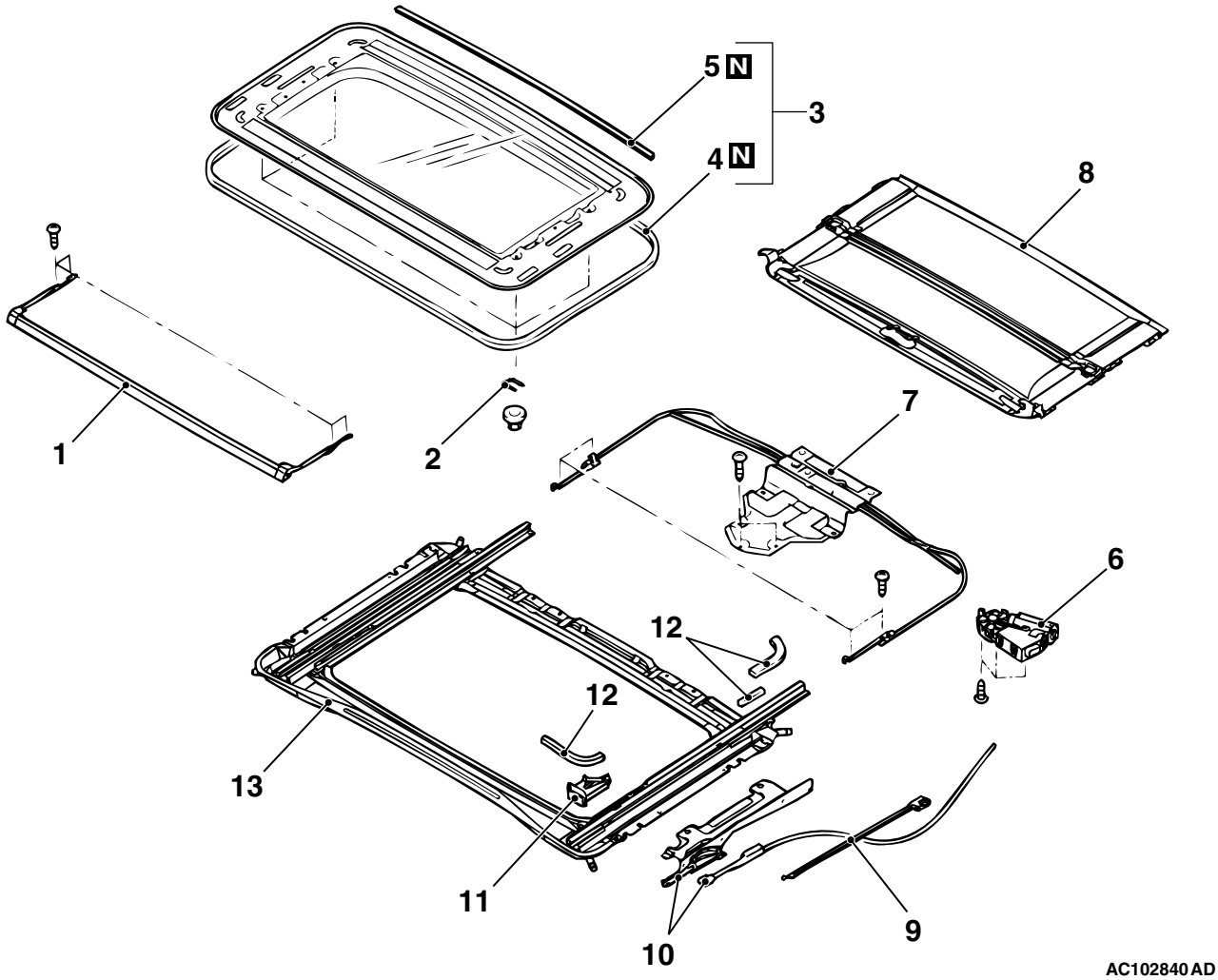
Specified Adhesive: 3M ATD Part No.8531 Heavy drip check sealer, 3M ATD Part No.8646 Automotive joint and seam sealer or equivalent

DISASSEMBLY AND ASSEMBLY

M1426001400250







AC102840 AD

Disassembly steps

1. Deflector assembly
- Decoration cover (Refer to P.42-63).
2. Adjusting plate
3. Roof lid glass assembly
4. Weatherstrip

>>A<< 5. Weatherstrip inner

6. Sunroof motor assembly

Disassembly steps (Continued)

7. Operating unit
8. Sun shade assembly
9. Lifter link
10. Guide assembly
11. Drip plate
12. Seal tape
13. Frame assembly

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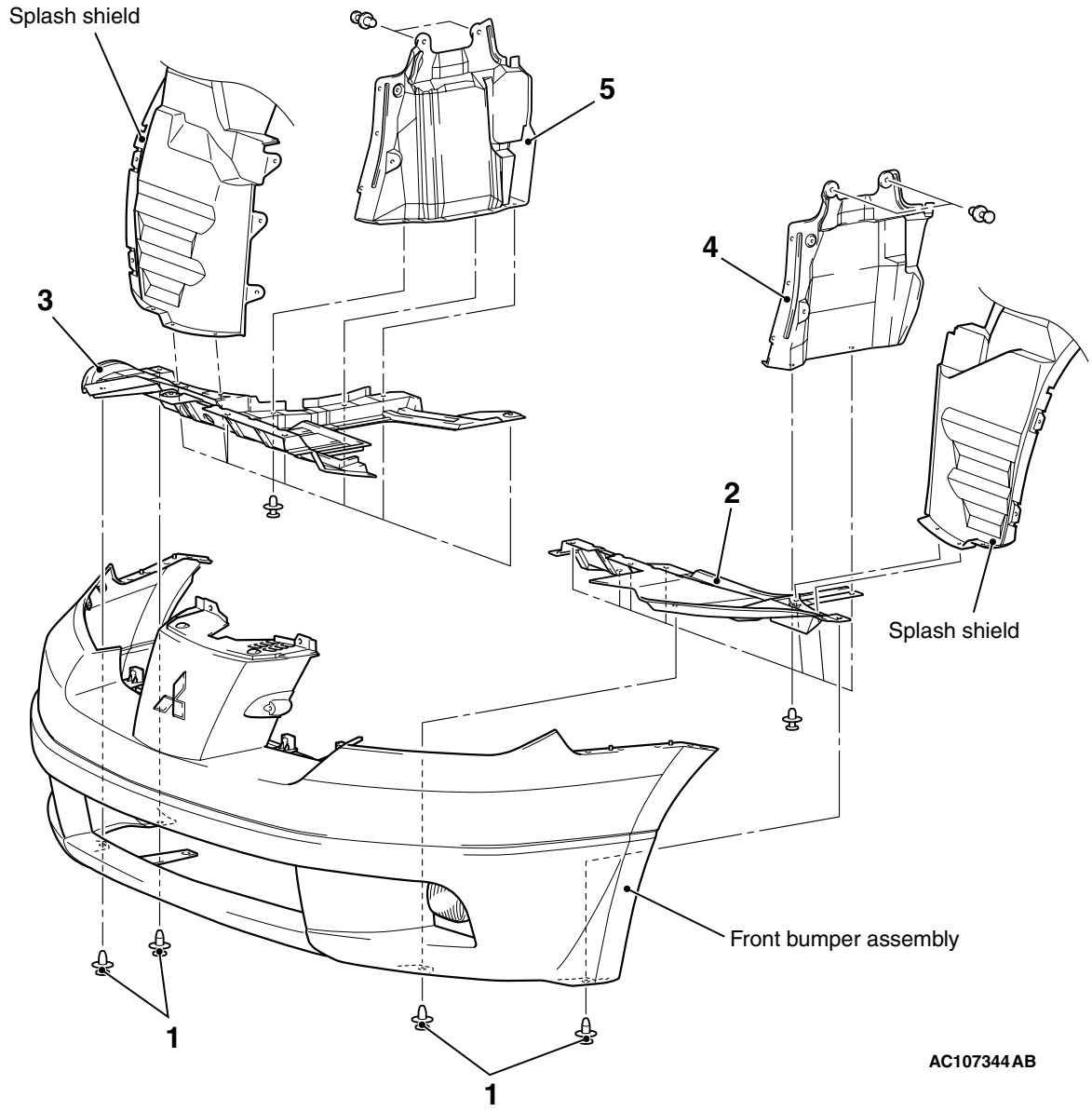
Removal steps
1. Front roof rail cover
2. Centre roof rail cover
3. Rear roof rail cover

Removal steps (Continued)
4. Roof rail
5. Front roof rail bracket
6. Centre roof rail bracket

UNDER COVER

REMOVAL AND INSTALLATION

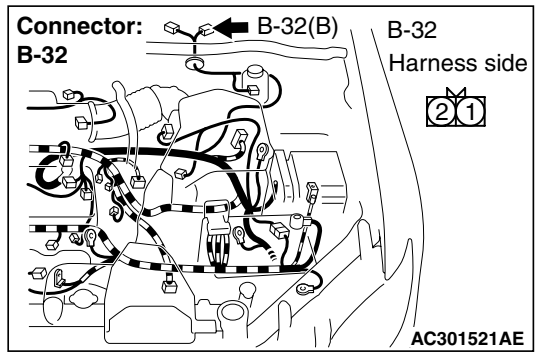
M1511019600108



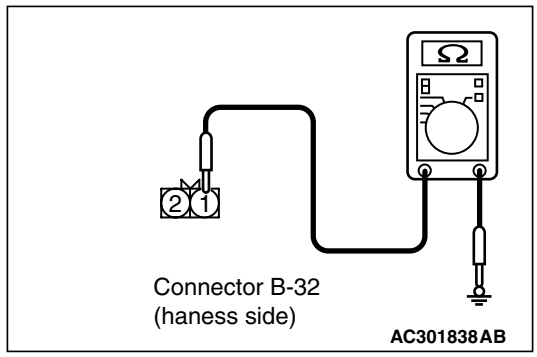
Removal steps
1. Front bumper assembly mounting clips
2. Front under cover (LH)

Removal steps (Continued)
3. Front under cover (RH)
4. Side under cover (LH)
5. Side under cover (RH)

STEP 15. Measure the resistance at B-32 wiper deicer connector.



(1) Disconnect the connector, and measure at the wiring harness side.



(2) Resistance between B-32 wiper deicer connector terminal No.1 and body earth

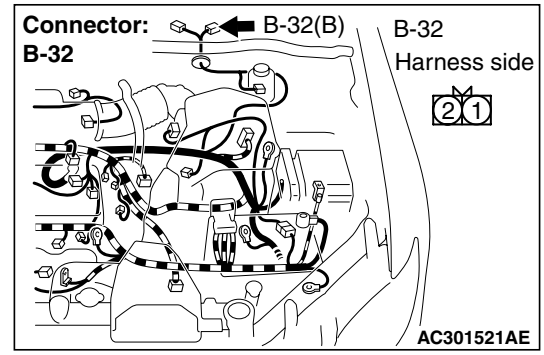
OK: 2 Ω or less

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-13).

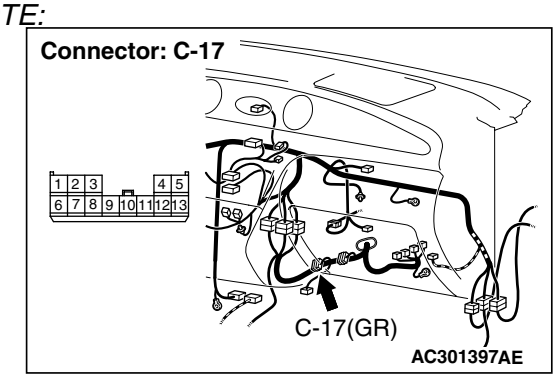
NO : Go to Step 16.

STEP 16. Check the wiring harness between B-32 wiper deicer connector terminal No.1 and body earth.



- Check the earth wires for open circuit.

NOTE:



Prior to the wiring harness inspection, check joint connector C-17, and repair if necessary.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-13).

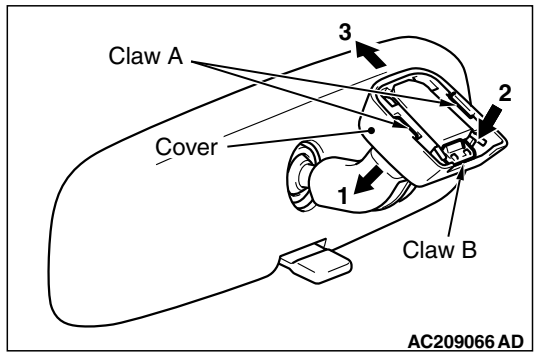
NO : Repair the wiring harness.

NOTES

INSIDE REAR VIEW MIRROR

M1521002600185

REMOVAL SERVICE POINTS



1. Disengage the claw A and lower the cover toward arrow 1 direction.
2. Push the claw B toward arrow 2 direction to unlock, and pull out the mirror toward arrow 3 direction.

Code No.	Diagnosis item	Reference Page
89	Side impact sensor (RH) communication error	P.52B-116
91*1	Side impact sensor (LH) voltage error	P.52B-118
92	G-sensor of side impact sensor (LH) failure	P.52B-120
93	Side impact sensor (LH) communication impossible	P.52B-102
94*1	Side impact sensor (RH) voltage error	P.52B-121
95	G-sensor of side impact sensor (RH) failure	P.52B-120
96	Side impact sensor (RH) communication impossible	P.52B-116

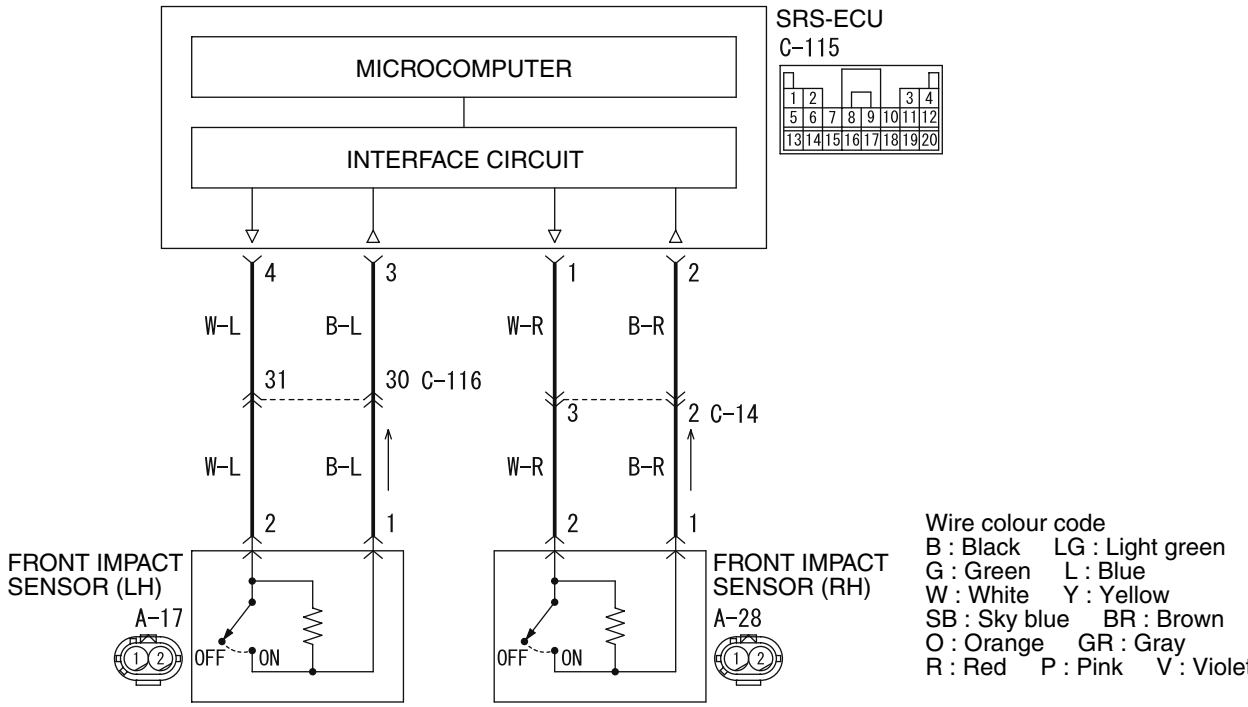
NOTE:

1. **1: If the vehicle condition returns to normal, the diagnosis code will be automatically erased, and the SRS warning lamp will return to normal.*
2. **2: However, if no diagnosis code resets, the SRS warning lamp will be switched off (The diagnosis code will be retained).*
3. *If the vehicle has a discharged battery, it will store the diagnosis code 41 or 42. When these diagnosis codes are read, check the battery.*

DIAGNOSTIC TROUBLE CODE PROCEDURES

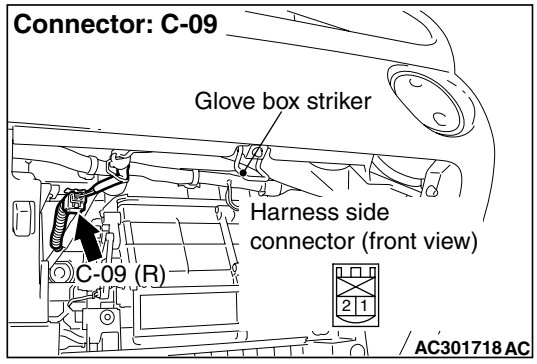
Code No.11: Front impact sensor short-circuited
Code No.12: One front impact sensor open-circuited
Code No.13: Two front impact sensor open-circuited

Front Impact Sensor Circuit

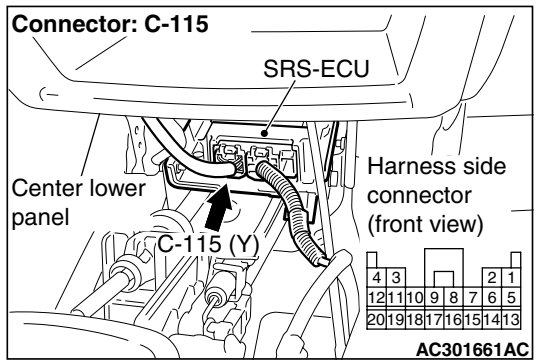


AC301793AB
W3Z02E04AA

STEP 2. Measure the resistance between SRS-ECU connector C-115 (terminal No.9 and 10) and the passenger's air bag module connector C-09 (terminal No.1 and 2).

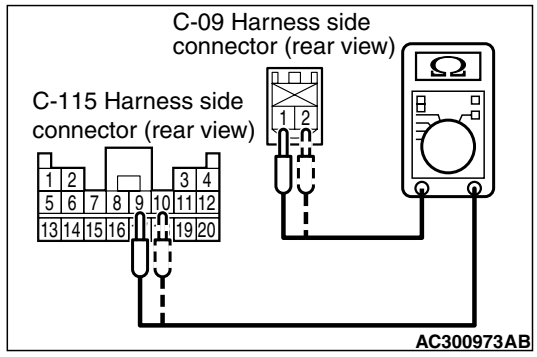


(1) Unclip passenger's air bag module connector C-09.



(2) Disconnect SRS-ECU connector C-115 and passenger's air bag module connector C-09.

⚠ CAUTION



Do not insert a test probe into the terminal from its front side directly as the connector contact pressure may be weakened.

(3) Measure the resistance between the following terminals.
- SRS-ECU connector C-115 terminal No.9 and the passenger's air bag module connector C-09 terminal No.1
- SRS-ECU connector C-115 terminal No.10 and the passenger's air bag module connector C-09 terminal No.2

OK: Less than 2 Ω

Q: Are the check results normal?

YES : Erase the diagnosis code memory, and check the diagnosis code. If diagnosis code 25 sets, replace the SRS-ECU (Refer to P.52B-140). Then go to Step 3 .

NO : Repair the harness wires between SRS-ECU connector C-115 (terminal No.9 and 10) and passenger's air bag module connector C-09 (terminal No.1 and 2). Then go to Step 3.

STEP 3. Recheck the diagnosis code.

Q: Is diagnosis code 25 set?

YES : Return to Step 1.

NO : The procedure is complete (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6).

OPERATION

- The SRS-ECU is powered from the ignition switch (IG1).
- The SRS-ECU power is supplied from two circuits. Even if one circuit is shut off, the air bag can inflate.

DIAGNOSIS CODE SET CONDITIONS

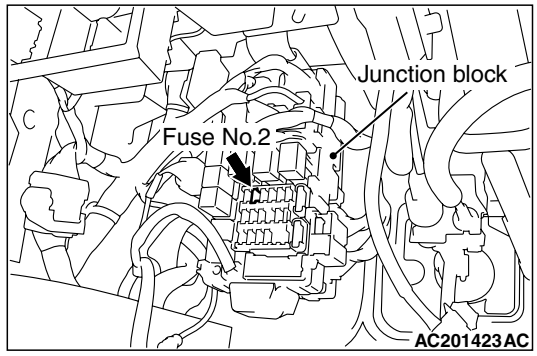
This diagnosis code is set if the voltage between the IG1 terminals (fuse No.2 circuit) and earth is lower than a predetermined value for a continuous period of 5 second or more. However, if the vehicle condition returns to normal, diagnosis code number 41 will be automatically erased, and the SRS warning lamp will switch off.

PROBABLE CAUSES

- Damaged wiring harnesses or connectors
- Malfunction of the SRS-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check junction block fuse number 2.



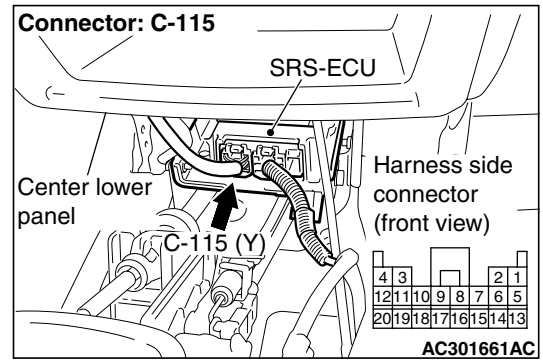
Q: Is the fuse burned out?

YES : Go to Step 4.

NO : Go to Step 2.

STEP 2. Measure the voltage at the SRS-ECU connector C-115.

(1) Disconnect the negative battery terminal.

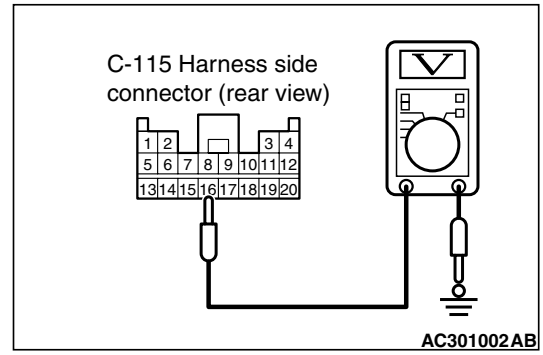


(2) Disconnect SRS-ECU connector C-115.

(3) Connect the negative battery terminal.

(4) Turn the ignition switch to the "ON" position.

⚠ CAUTION



Do not insert a test probe into the terminal from its front side directly as the connector contact pressure may be weakened.

(5) Measure the voltage between C-115 harness side connector terminal 16 and body earth.

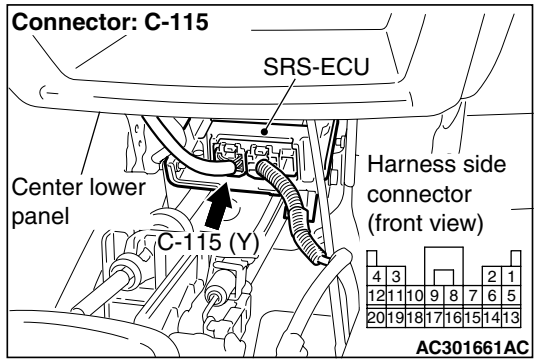
OK: 9 V or more.

Q: Is the check result normal?

YES : Erase the diagnosis code memory, and check the diagnosis code. If diagnosis code 41 sets, replace the SRS-ECU (Refer to P.52B-140). Then go to Step 10 .

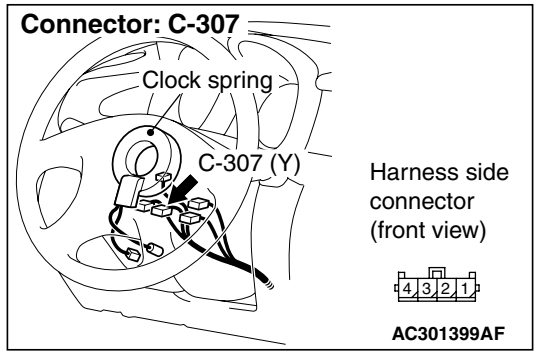
NO : Go to Step 3.

STEP 3. Check the driver's air bag module circuit at the SRS-ECU connector C-115.



(1) Disconnect SRS-ECU connector C-115.

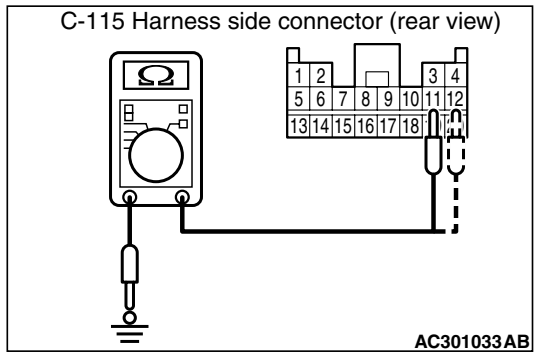
⚠ DANGER



To prevents the air bag from deploying unintentionally, disconnect the clock spring connector C-307 to short the squib circuit.

(2) Disconnect the clock spring connector C-307.

⚠ CAUTION



Do not insert a test probe into the terminal from its front side directly as the connector contact pressure may be weakened.

(3) Check for continuity between C-115 harness side connector terminals 11, 12 and body earth.

OK: Open circuit

Q: Is the check result normal?

YES : Erase the diagnosis code memory, and check the diagnosis code. If diagnosis code 62 sets, replace the SRS-ECU (Refer to P.52B-140). Then go to Step 4 .

NO : Repair the harness wires between SRS-ECU connector C-115 (terminal No.11 and 12) and clock spring connector C-307 (terminal No.3 and 4). Then go to Step 4.

STEP 4. Recheck the diagnosis code.

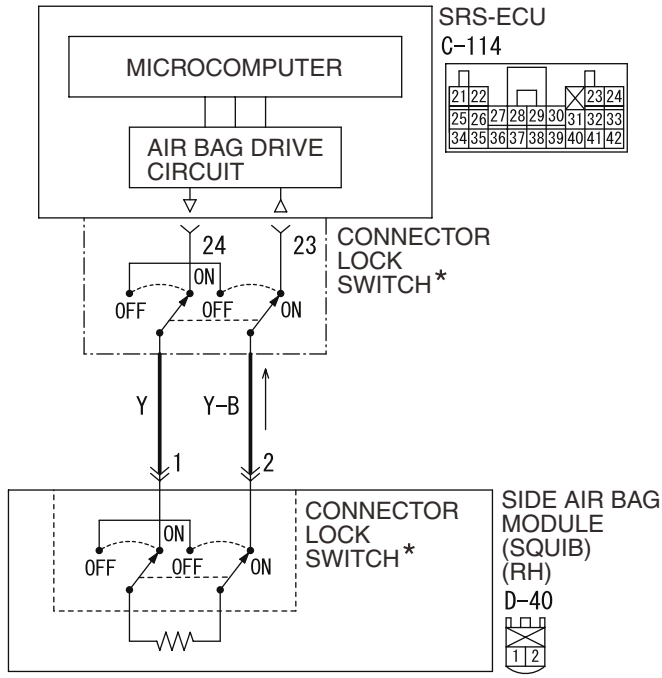
Q: Is diagnosis code 62 set?

YES : Return to Step 1.

NO : The procedure is complete (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6).

Code No.71: Side air bag module (squib) (RH) system (short-circuited between terminals of the squib circuit)

Side Air Bag Module (RH) (Squib) Circuit



NOTE
*: CONNECTOR COUPLED: ON
CONNECTOR UNCOUPLED: OFF

Wire colour code
B : Black LG : Light green
G : Green L : Blue
W : White Y : Yellow
SB : Sky blue BR : Brown
O : Orange GR : Gray
R : Red P : Pink V : Violet

AC301796AB
W3Z02E07AA

OPERATION

- The SRS-ECU judges how severe a collision is by detecting signals from the left and right side impact sensors. If the impact is over a predetermined level, the SRS-ECU outputs an ignition signal. At this time, if the side air bag safing G-sensor is on, the SRS side air bag will inflate.
- The ignition signal is input to the side air bag module to inflate the side air bag.

DIAGNOSIS CODE SET CONDITIONS

This diagnosis code is set if one side air bag squib (RH) wire shorted to the other.

PROBABLE CAUSES

- Improper engaged connector or defective short spring*
- Short between the side air bag module (RH) (squib) circuit terminals
- Damaged connector(s)
- Malfunction of the SRS-ECU

*NOTE: *: The squib circuit connectors integrate a "short" spring (which prevents the air bag from deploying unintentionally due to static electricity by shorting the positive wire to the earth wire in the squib circuit when the connectors are disconnected). Therefore, if connector C-114 or D-40 is damaged or improperly engaged, the short spring may not be released when the connector is connected.*

DIAGNOSIS PROCEDURE

STEP 1. Check the diagnosis code.

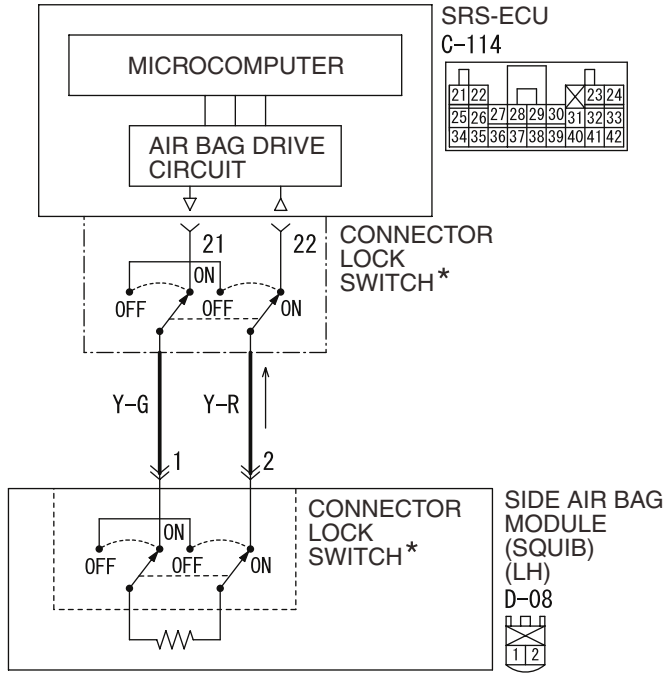
⚠ CAUTION
To prevent damage to MUT-II, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting MUT-II.

(1) Turn the ignition switch to the "ON" position.
(2) Check if the diagnosis code is set.
(3) Turn the ignition switch to the "LOOK" (OFF) position.

Q: Is diagnosis code 34 set?
YES : Go to Step 2.
NO : Go to Step 3.

Code No.85: Side air bag module (squib) (LH) system (short-circuited to the power supply)

Side Air Bag Module (LH) (Squib) Circuit



NOTE
*: CONNECTOR COUPLED: ON
CONNECTOR UNCOUPLED: OFF

Wire colour code
B : Black LG : Light green
G : Green L : Blue
W : White Y : Yellow
SB : Sky blue BR : Brown
O : Orange GR : Gray
R : Red P : Pink V : Violet

AC301797AB
W3Z02E08AA

OPERATION

- The SRS-ECU judges how severe a collision is by detecting signals from the left and right side impact sensors. If the impact is over a predetermined level, the SRS-ECU outputs an ignition signal. At this time, if the side air bag safing G-sensor is on, the SRS side air bag will inflate.
- The ignition signal is input to the side air bag module to inflate the side air bag.

DIAGNOSIS CODE SET CONDITIONS

This diagnosis code is set if the side air bag squib (LH) wire(s) are short-circuited to the power supply.

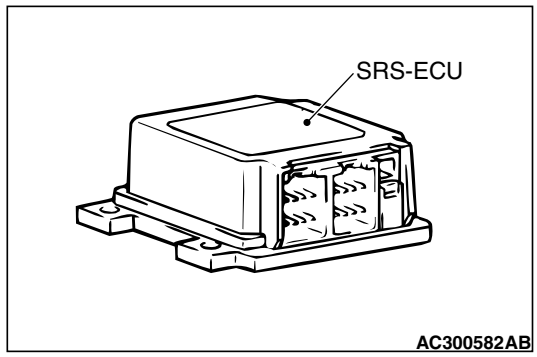
PROBABLE CAUSES

- Damaged wiring harnesses or connectors
- Short to the power supply in the side air bag module (LH) (squib) harness
- Malfunction of the SRS-ECU

SRS CONTROL UNIT (SRS-ECU)

⚠ WARNING

The SRS may not activate if the SRS-ECU is not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.



1. Check the SRS-ECU case and brackets for dents, cracks, deformation or rust.
2. Check the connector for damage, and check the terminals for deformation or rust.

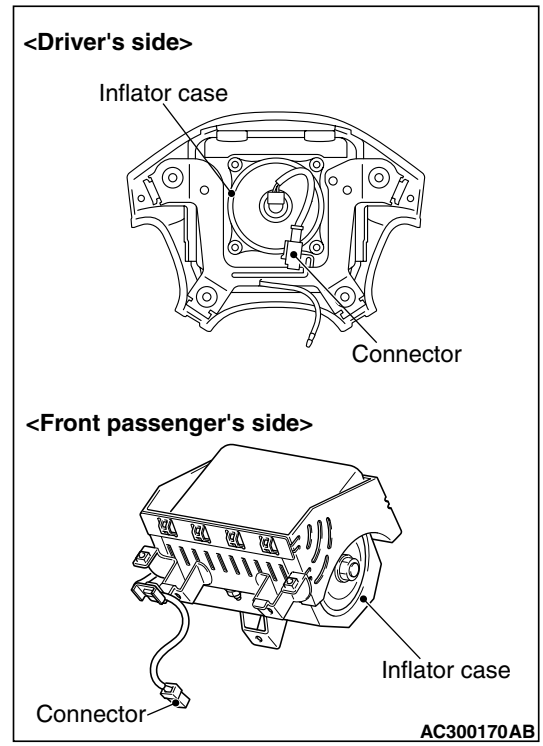
   Replace the SRS-ECU if it fails the visual checks above (Refer to P.52B-140).

AIR BAG MODULES, STEERING WHEEL AND CLOCK SPRING

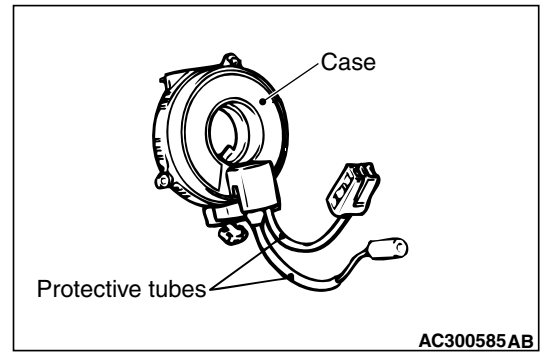
⚠ WARNING

The removed air bag module should be stored in a clean, dry place with the pad cover face up.

1. Remove the air bag module, steering wheel and clock spring (Refer to P.52B-141).
2. Check the pad cover for dents, cracks or deformation.



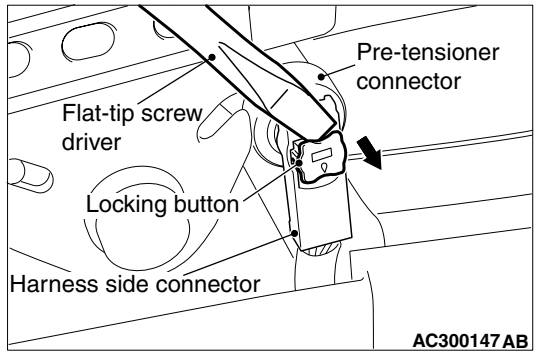
3. Check the connector for damage and deformed terminals, and check the harness for binding.
4. Check the air bag inflator case for dents, cracks or deformation.
5. Check the harness (built into the steering wheel) and connectors for damage, and check the terminals for deformation.



6. Check the clock spring connectors and protective tube for damage, and terminals for deformities.
7. Visually check the case for damage.

REMOVAL SERVICE POINTS

<<A>>PRE-TENSIONER CONNECTOR DISCONNECTION



1. Use a flat-tipped screwdriver to pull out forward and unlock the locking button of the harness-side connector.
2. Disconnect the pretensioner connector.

INSTALLATION SERVICE POINTS

>>A<< PRE-INSTALLATION INSPECTION

⚠ WARNING

When discarding the seat belt with pre-tensioner, operate the pre-tensioner as specified in the service procedure (Refer to P.52B-151).

1. Even new seat belt with pre-tensioner require inspection before installation.
2. Connect the negative battery cable.

⚠ CAUTION

Turn the ignition switch to the "LOCK" (OFF) position when connecting and disconnecting the MUT-II.

3. Connect the MUT-II to the diagnosis connector (16- pin).
4. Turn the ignition switch to the ON position.
5. Read a diagnosis code to refer to that the SRS is operating properly except an open in the seat belt with pre-tensioner circuit.
6. Turn the ignition switch to "LOCK" (OFF) position.

⚠ DANGER

Wait at least 60 seconds after the disconnection of the battery cable before any further job (Refer to P.52B-2).

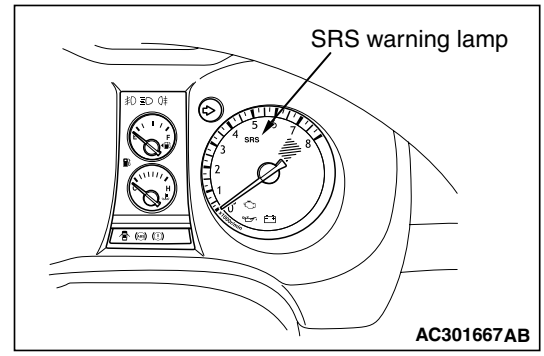
7. Disconnect the negative battery cable and insulate with tape.

>>B<< PRE-TENSIONER CONNECTOR CONNECTION

Connect the pretensioner connector then securely lock the locking button of the harness-side connector.

>> C<< POST-INSTALLATION INSPECTION

1. Connect the negative battery cable.
2. Turn the ignition key to "ON" position.



3. Does the SRS warning lamp illuminate for about 7 seconds, and then remain extinguished for at least 5 seconds after turning OFF?
4. If no, refer to troubleshooting (Refer toP.52B-8).

INSPECTION

M1524004200223

⚠ WARNING

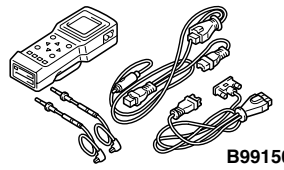
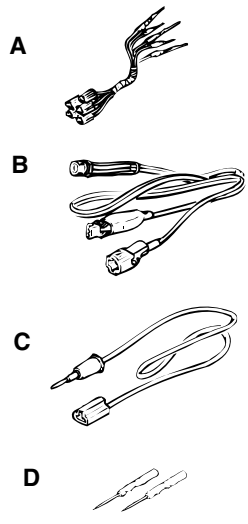
- ***If any component damage is found during the following inspection, replace the seat belt with pre-tensioner with a new one. Dispose of the old one according to the specified procedure (Refer to P.52B-151).***
- ***Never attempt to measure the circuit resistance of the seat belt pre-tensioner even if you are using the specified tester. If the circuit resistance is measured with a tester, accidental seat belt pre-tensioner operation will result in serious personal injury.***

1. Check the pre-tensioner deployment section for dents and deformation.
2. Check the harness and connector for damage and the terminals for deformation.

IGNITION SWITCH

SPECIAL TOOLS

M1543000601492

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	• Immobilizer system check • Encrypted code registration
 A B C D MB991223AC	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connect pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

INTRODUCTION

M1543009901230

IGNITION KEY REMINDER BUZZER

The ignition key reminder buzzer will sound under the following condition, and warn the driver to remove the ignition key.

- The driver's door is opened when the ignition switch is at "LOCK" (OFF) or "ACC" position without removing the ignition key.

However, the lamp reminder buzzer will take precedence over this function.

DOOR LOCK PREVENTION FUNCTION

If the key is left in the ignition switch while the driver's door opened or the assistant door opened, all door are automatically unlock to prevent locking the ignition key in the vehicle after door is locked.

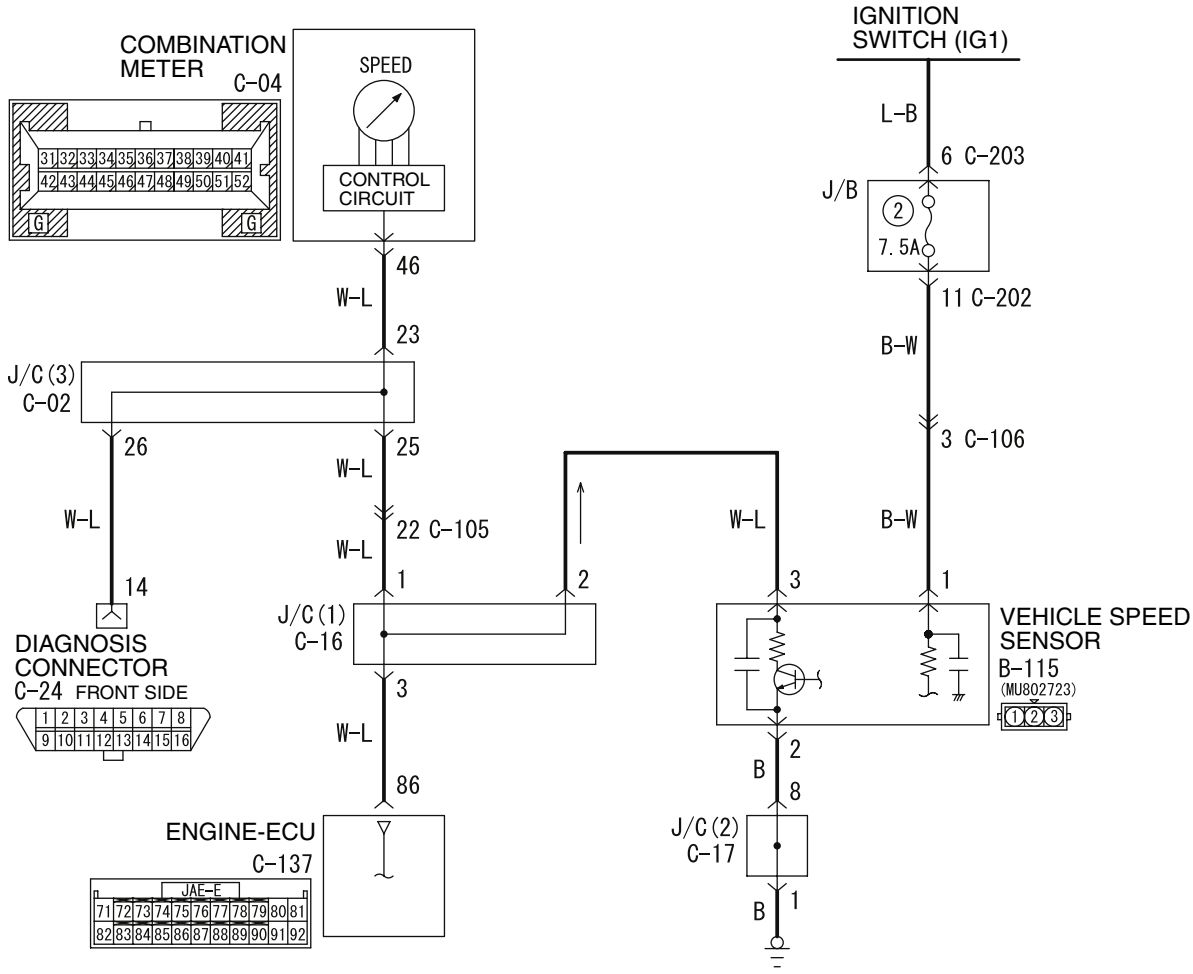
IMMOBILIZER SYSTEM

The immobilizer system consists of the ignition key, the immobilizer-ECU with key ring antenna, and the engine-ECU. The ignition key has a built-in transponder. Only the registered ignition key permits the engine to start, therefore, the engine can never be started by means of a forged key or by connecting the ignition wiring directly. The system is significantly safe and reliable against theft. In addition, the driver has only to turn the ignition switch to the "ON" position to activate the immobilizer system. If the requirements for starting the engine are not satisfied, the engine will be immobilized. If a registered ignition key is lost, all your ignition keys need to be registered again using MUT-II to ensure security (Refer to P.54A-17). An additional ignition key can be registered as follows (only if no ignition keys are lost):

- Using MUT-II (Refer to P.54A-17).

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Speedometer does not work (the other meters work.)



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W3Z14E01AA

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TECHNICAL DESCRIPTION (COMMENT)

The engine-ECU and its associated components, the combination meter assembly, the wiring harness, or the connector(s) may be defective.

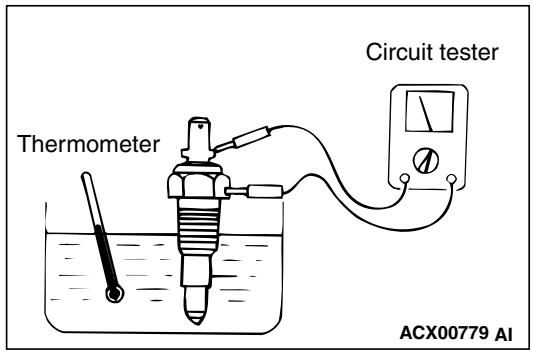
TROUBLESHOOTING HINTS

- Malfunction of the engine-ECU
- Malfunction of the combination meter assembly
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

M1543001500376

1. Drain the engine coolant. (Refer to GROUP 14- On-vehicle Service P.14-15.)
2. Remove the engine coolant temperature gauge unit.

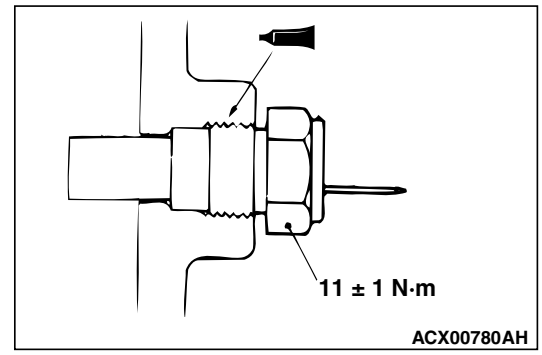


3. Put engine coolant temperature gauge unit into the hot water in specified temperature, and ensure that basic resistance is within standard value.

Standard value: 104 ± 13.5 Ω (at 70C°)

Reference value

Temperature (°C)	Resistance Ω
50	230
60	155
80	73



4. After inspection, apply specified sealant at threads of engine coolant temperature gauge unit, and tighten to the specified torque.

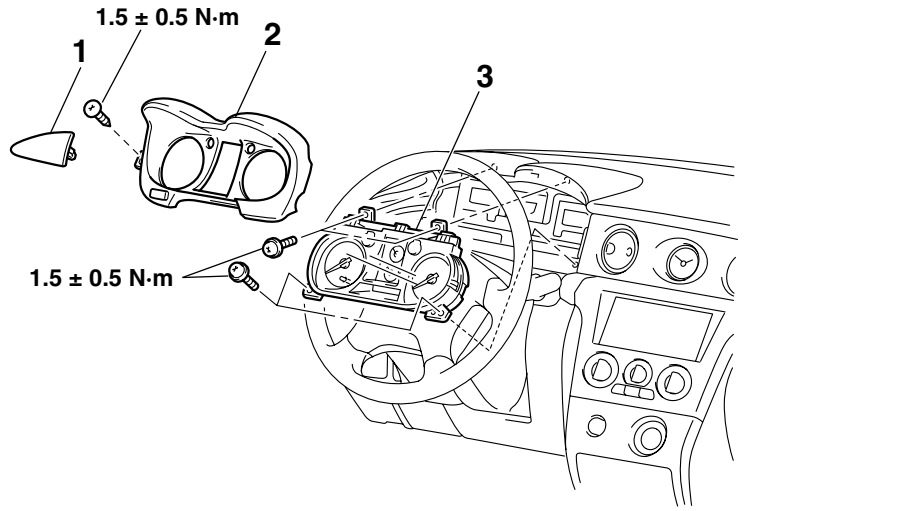
Semi-drying sealant: 3M 1215 or equivalent

5. Add engine coolant. (Refer to GROUP 14 - On-vehicle Service P.14-15.)

COMBINATION METER ASSEMBLY

REMOVAL AND INSTALLATION

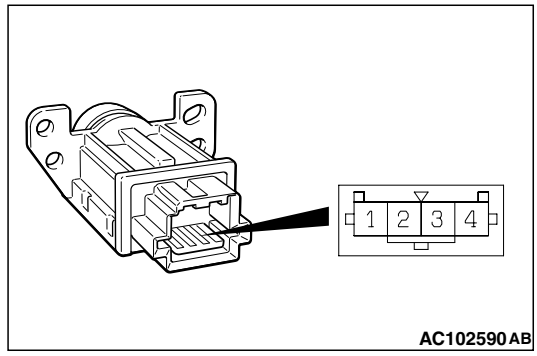
M1543021300017



INSPECTION

M1542011200771

HAZARD WARNING LAMP SWITCH CONTINUITY CHECK

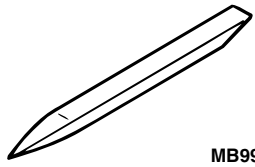


Switch position	Tester connection	Specified condition
Released	1 – 2	Open circuit
Pressed	1 – 2	Less than 2 ohms

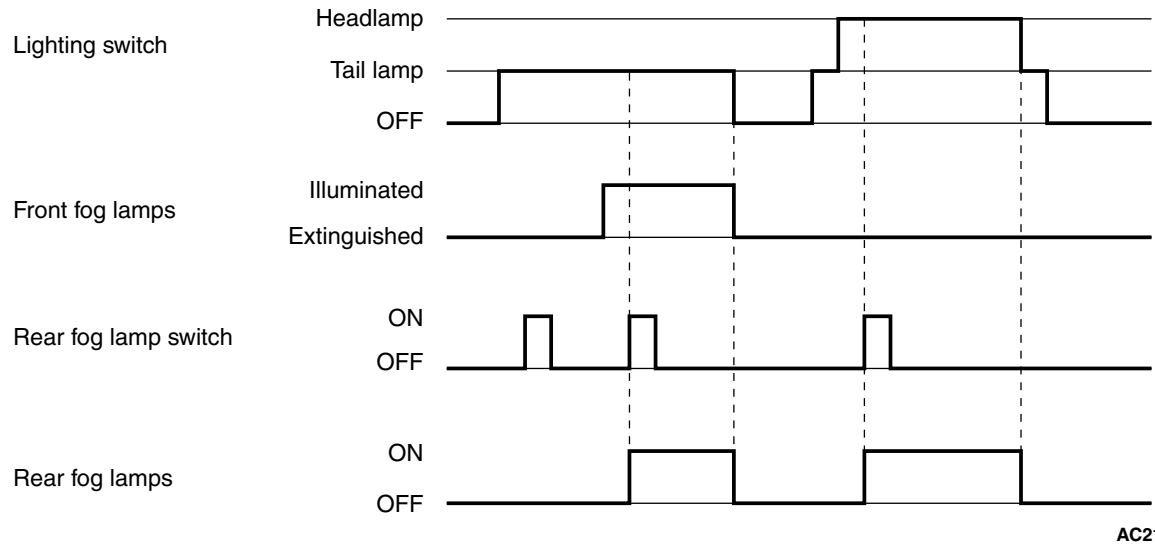
COLUMN SWITCH

SPECIAL TOOL

M1542000600753

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of column cover

Rear Fog Lamp Control Function <Vehicles with Rear Fog Lamp>

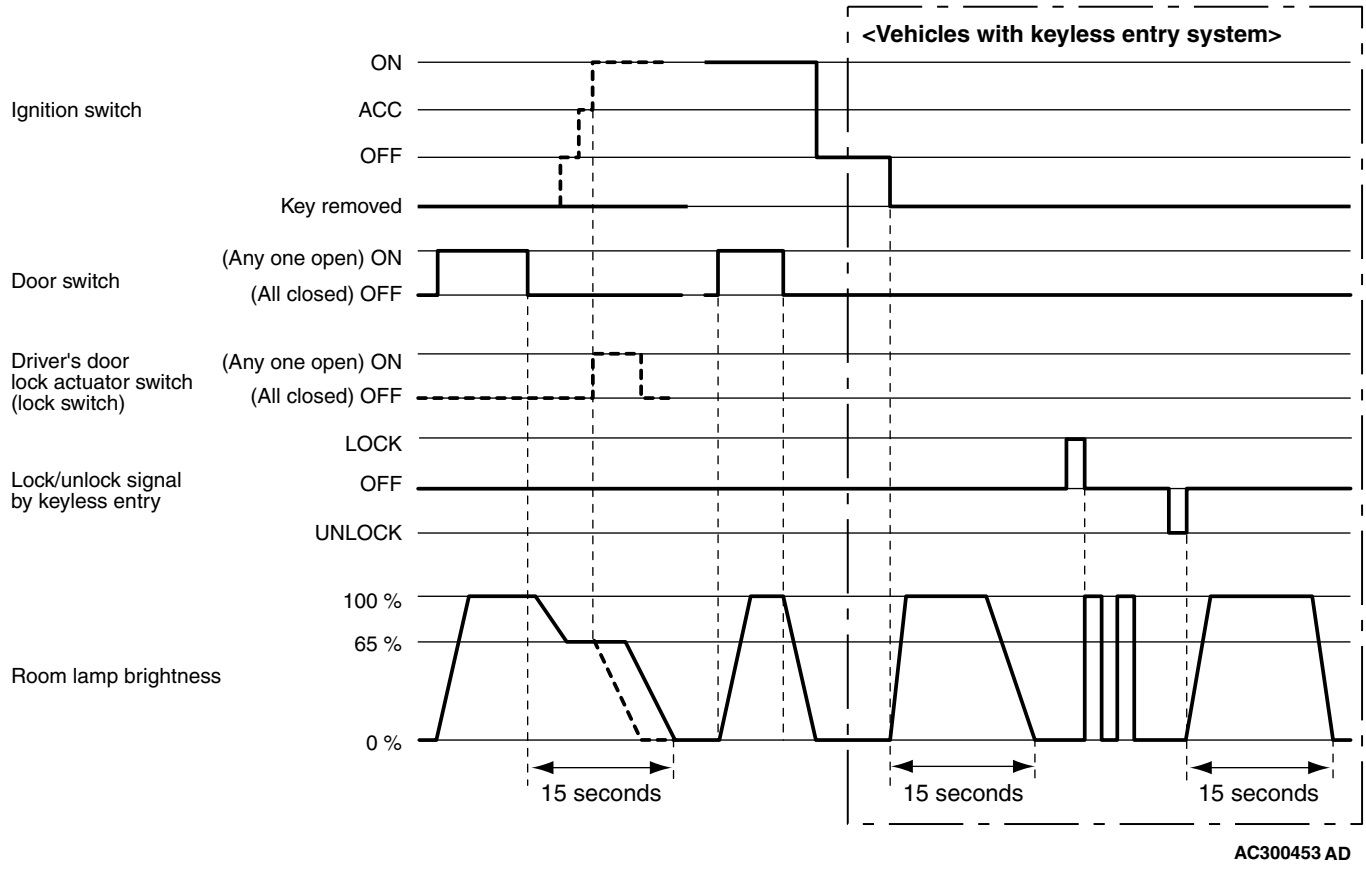


If the rear fog lamp switch is turned ON when the headlamp or the front fog lamp is turned ON, the rear fog lamp is switched ON and OFF alternatively.

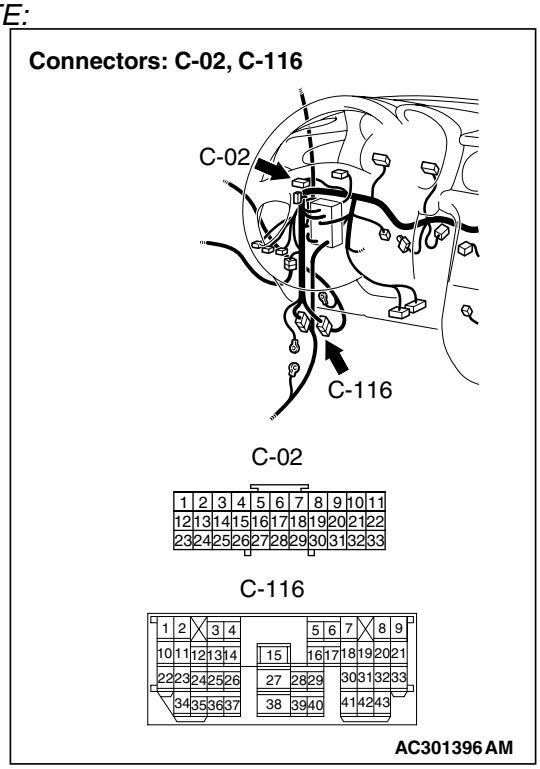
If the headlamp and the front fog lamp are turned OFF, the rear fog lamp is turned OFF at the same time.

Interior lamp

Dimmer interior lamp control function (the initial condition: 15 seconds)



NOTE:

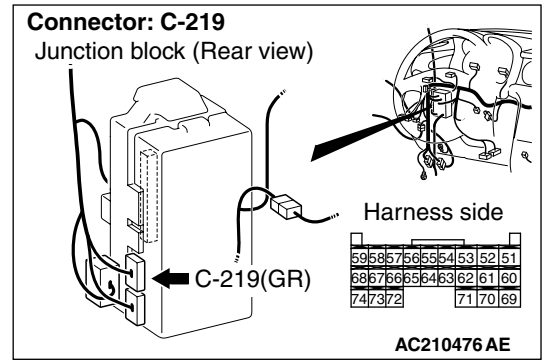


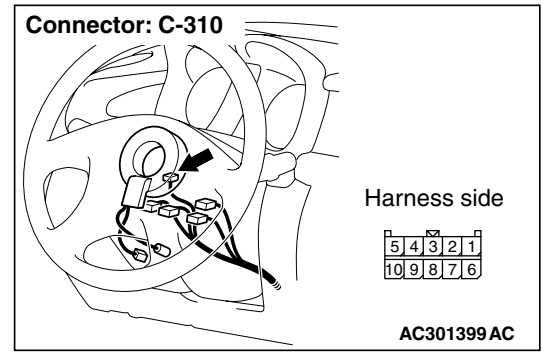
Prior to the wiring harness inspection, check joint connector C-02, intermediate connectors C-116 and C-218, and repair if necessary.

- Check the communication lines for open circuit.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the wiring harness.

Step 3. Check the wiring harness between C-310 column switch connector terminal No.2 and C-219 ETACS-ECU connector terminal No.68.





- Check the communication lines for open circuit.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

Step 4. Check whether the diagnosis code is reset.

When A-11X front-ECU connector is disconnected, check that diagnosis code No.21 is not reset. However, diagnosis code No.13 will be set at this time.

Q: Is diagnosis code No.21 set?
YES : Replace the front-ECU.
NO : Go to Step 5.

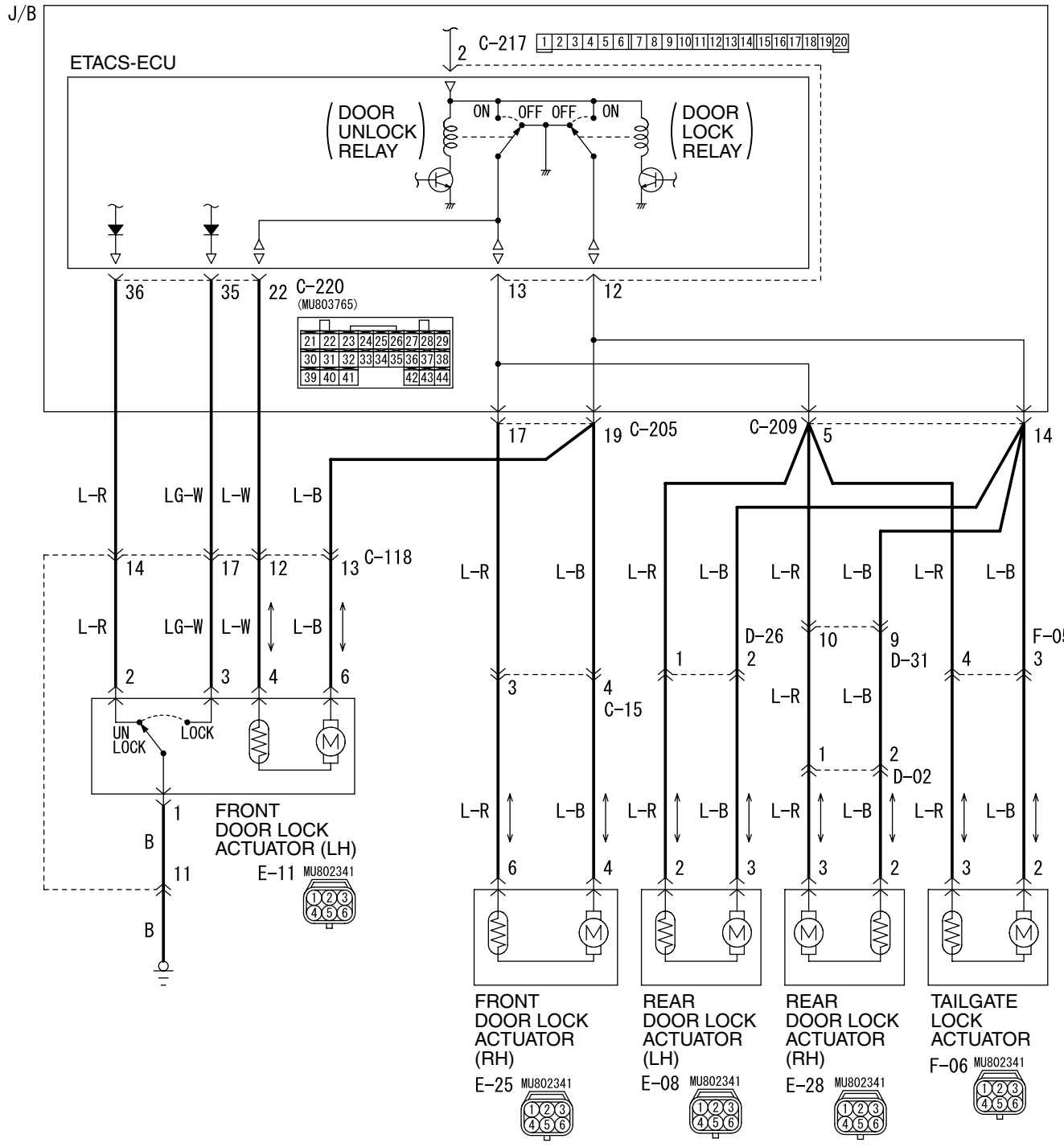
Step 5. Check whether the diagnosis code is reset.

When E-05 power window main switch connector is disconnected, check that diagnosis code No.21 is not reset.

Q: Is diagnosis code No.21 set?
YES : Replace the power window main switch.
NO : Go to Step 6.

INSPECTION PROCEDURE C-2: A Door or a Tailgate can not be Locked or Unlocked by the Central Door Locking System.

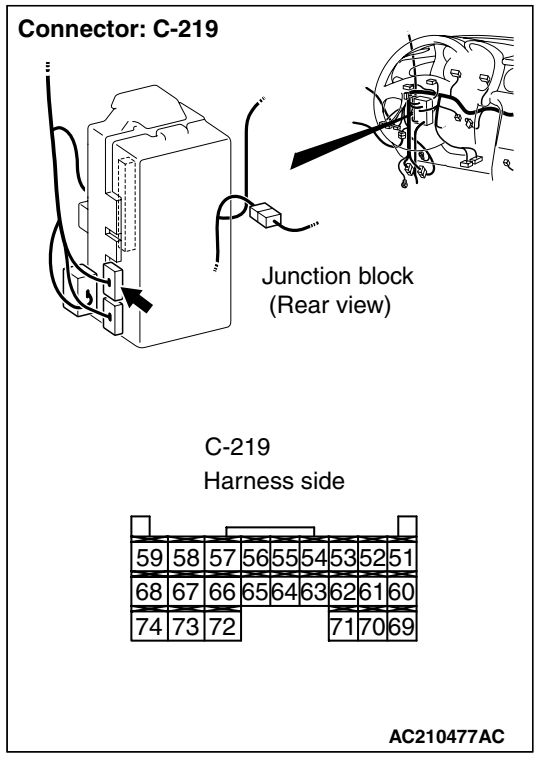
Central Door Lock Circuit

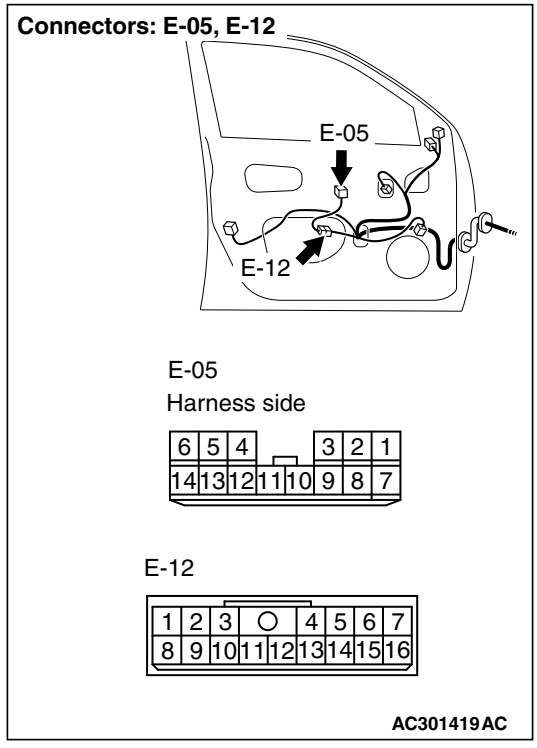


Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

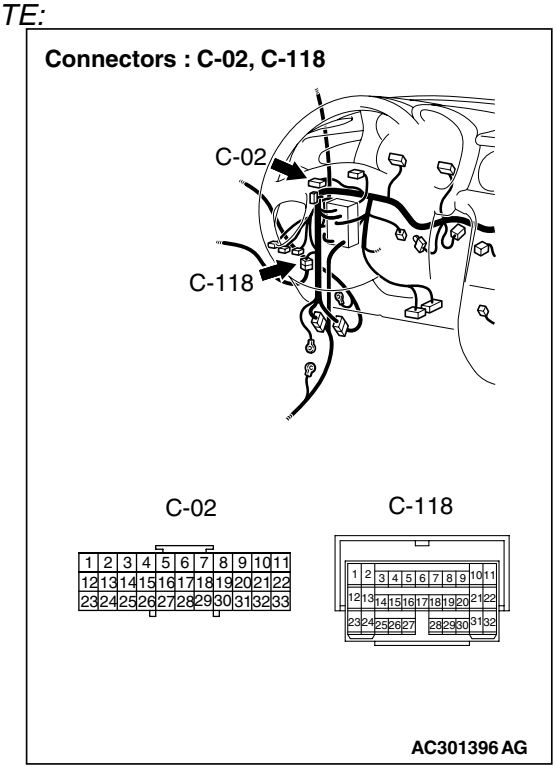
W3Z11E02AA

Step 13. Check the wiring harness between C-219 ETACS-ECU connector terminal No.59 and E-05 power window main switch connector terminal No.4.





NOTE:



Prior to the wiring harness inspection, check intermediate connectors C-118, E-12 and joint connector C-02, and repair if necessary.

- Check the communication lines for open circuit.

Q: Is the check result normal?
YES : Go to Step 14.
NO : Repair the wiring harness.

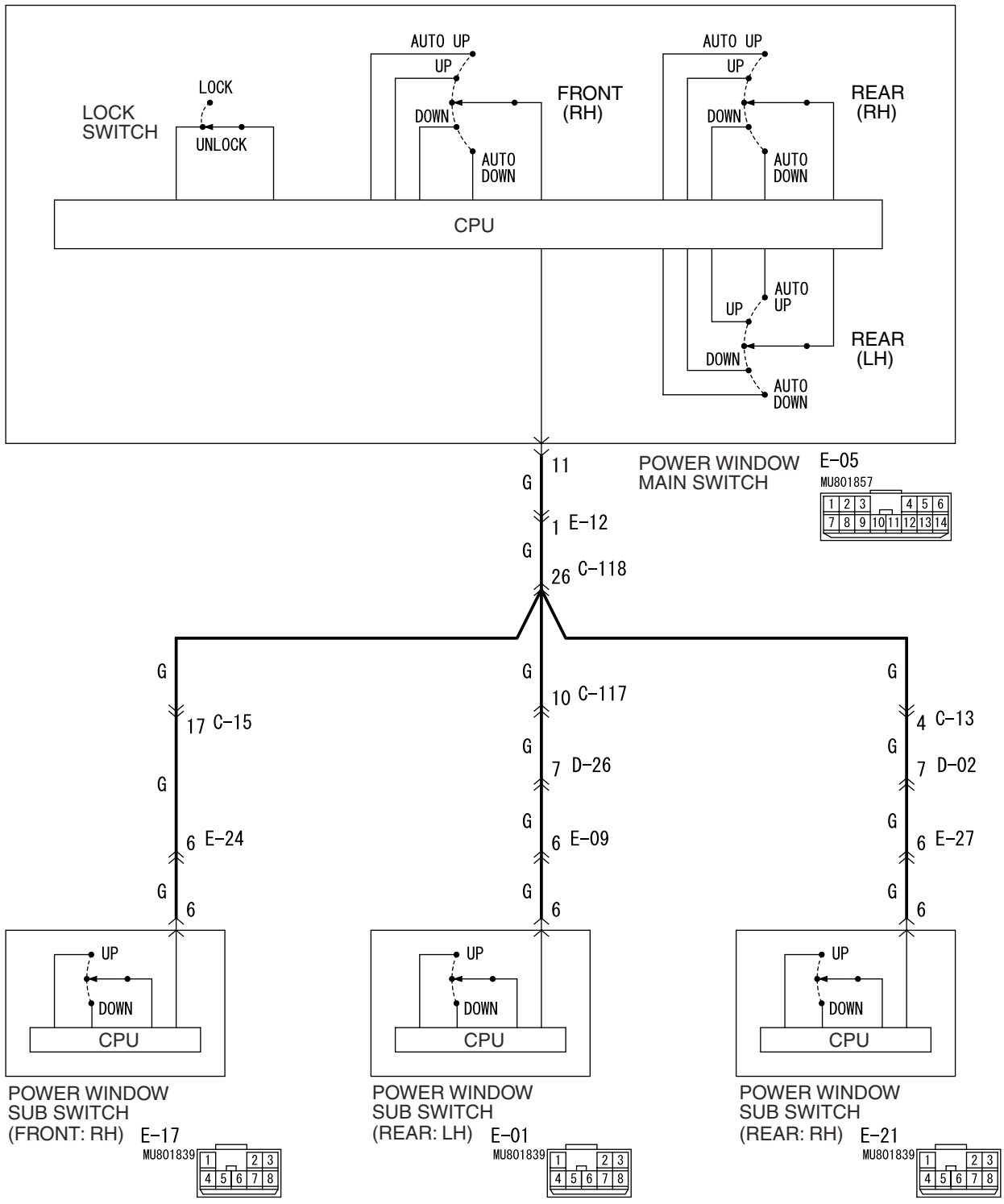
Step 14. Retest the system.

After the power window main switch is replaced, check that all the power windows work.
(1) Replace the power window main switch.
(2) Check that the all the power windows work.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the ETACS-ECU.

INSPECTION PROCEDURE D-4: Front and/or rear passenger's power window(s) do not work by means of the power window main switch.

Power Window Circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W3Z18E01AA

INSPECTION PROCEDURE E-4: The Timer Lock Function does not Work after the Doors have been Unlocked by the Keyless Entry System.

⚠ **CAUTION**
Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.

COMMENT ON TROUBLE SYMPTOM
If the keyless entry timer lock does not work normally, the input signal circuit(s) to the keyless entry transmitter or the ETACS-ECU may be defective.

POSSIBLE CAUSES
- Malfunction of the keyless entry transmitter
- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

Step 1. Check the operation of the keyless entry system.
Check that the keyless entry system works normally.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Refer to inspection procedure E-1 "Keyless entry system does not work P.54B-104."

Step 2. Retest the system.
Check that the timer lock works normally.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the ETACS-ECU.

Step 2. Pulse check

Check the input signals below which are related to the vehicle speed-dependent intermittent wiper.

System switch	Check conditions
Ignition switch (ACC)	When turned from LOCK (OFF) position to the ACC position
Vehicle speed signal (engine-ECU)	When the vehicle speed has reached 10 km/h or more

OK: The MUT-II sounds or the voltmeter needle fluctuates.

Q: Is the check result normal?

All the signals are received normally. : Go to Step 3.

The ignition switch (IG1) signal is not received. : Refer to inspection procedure N-1 "The ignition switch (ACC) signal is not received P.54B-219."

The vehicle speed signal (engine-ECU) is not received. : Refer to inspection procedure N-13 "The vehicle speed signal is not received P.54B-250."

Step 3. Check the SWS monitor customized function.

Use the SWS monitor customize function to confirm that "SPEED SEN WIP" is set to "W.FUNCTION".

⚠ CAUTION

The SWS monitor must be used in order to confirm and change that setting. Use the SWS monitor to confirm and/or change the customized function.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Use the SWS monitor customize function to set the "SPEED SEN WIP" to "W.FUNCTION" (Refer to GROUP 54C – Customize adjustment P.54B-273).

Step 4. Retest the system.

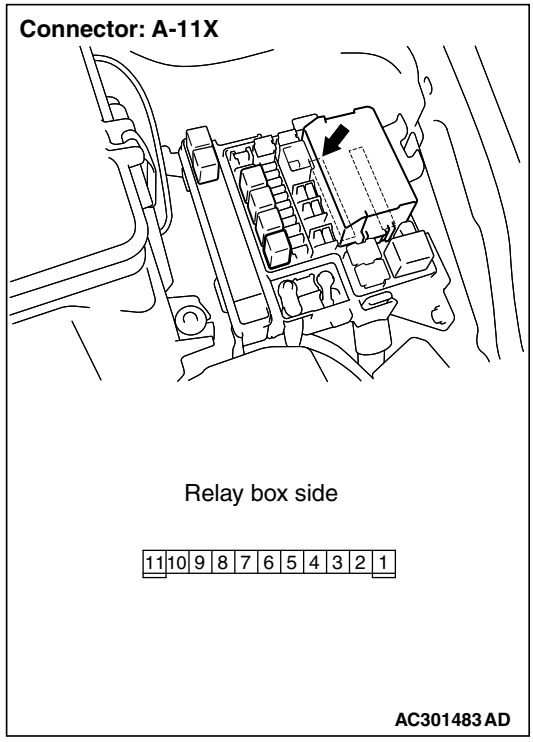
Check that the intermittent wiper interval depends on the vehicle speed.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

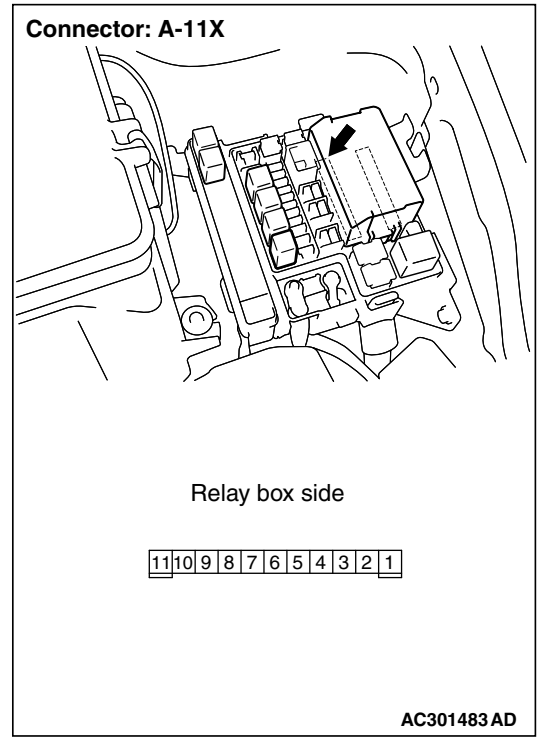
NO : Replace the ETACS-ECU.

Step 7. Connector check: A-11X front-ECU connector

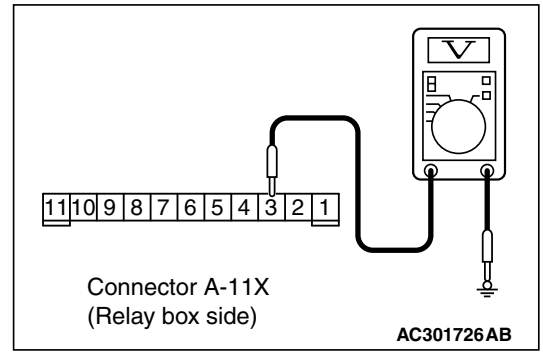


Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the connector.

Step 8. Measure the voltage at the A-11X front-ECU connector.



(1) Remove the front-ECU, and measure at the junction block side.
(2) Ignition switch: ACC



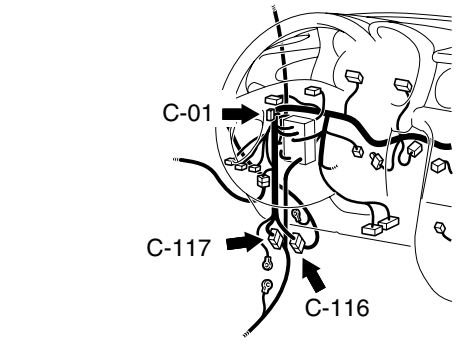
(3) Check the voltage between the A-11X front-ECU connector terminal No.3 and body earth.

OK: System voltage

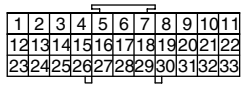
Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 9.

NOTE:

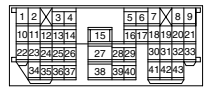
Connectors: C-01, C-116, C-117



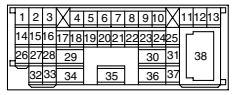
C-01



C-116



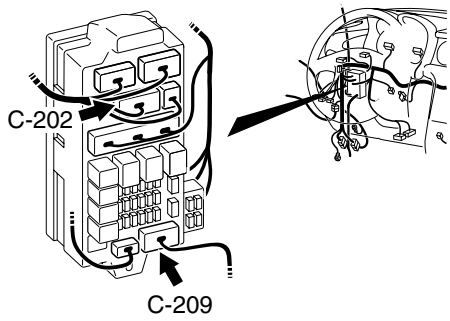
C-117



AC301396 AN

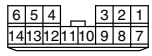
Connectors: C-202, C-209

Junction block (Front view)

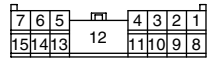


Harness side

C-202

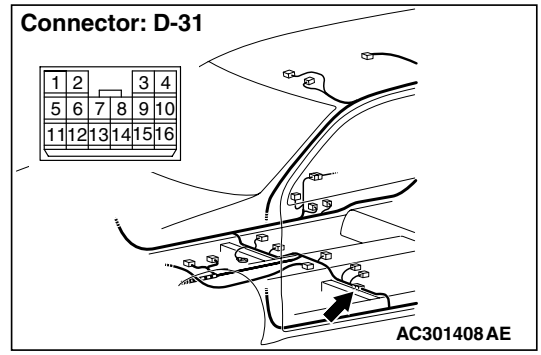


C-209



AC210475 AJ

Connector: D-31



AC301408 AE

Prior to the wiring harness inspection, check joint connector C-01 <right tail lamp>, intermediate connector C-116 <tail lamp and licence plate lamp>, C-117 <left tail lamp and licence plate lamp>, D-31 <right tail lamp>, F-09 <licence plate lamp>, junction block connector C-202 <right tail lamp> and C-209 <right tail lamp>, and repair if necessary.

- Check the output lines for open circuit.

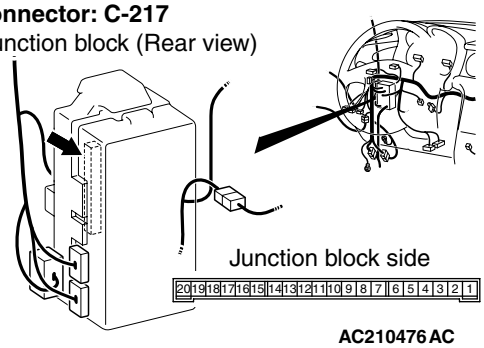
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

Step 7. Retest the system.

Check that the tail lamps, the position lamps and the licence plate lamps illuminate normally.

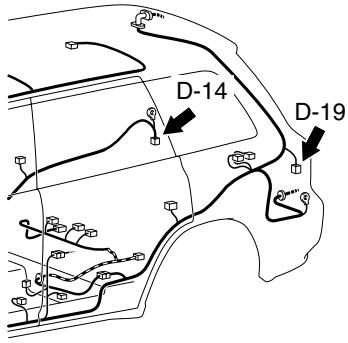
Q: Is the check result normal?
The lamps illuminate normally at both high and low beams. : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
When the tail lamps do not illuminate : Replace the rear combination lamp socket assembly.
When the position lamps do not illuminate : Replace the position lamp socket.
When the licence plate lamps do not illuminate : Replace the licence plate lamp socket.

Connector: C-217
Junction block (Rear view)



AC210476 AC

Connectors: D-14, D-19



Harness side

D-14



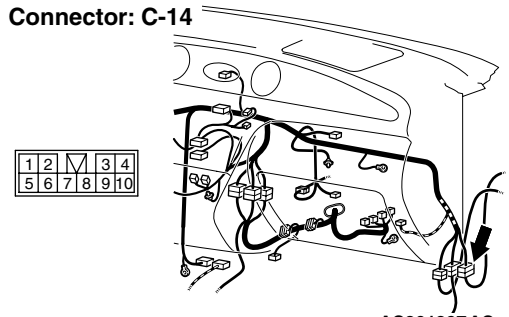
D-19



AC301411AB

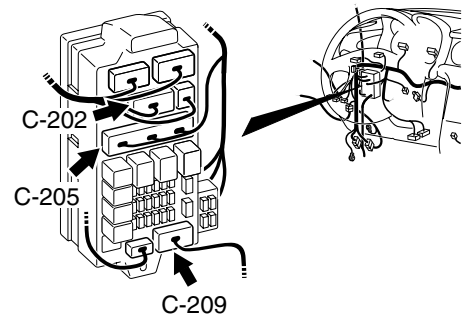
NOTE:

Connector: C-14



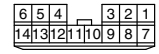
AC301397 AC

Connectors: C-202, C-205, C-209
Junction block (Front view)

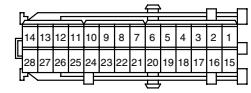


Harness side

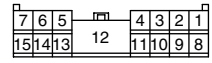
C-202



C-205

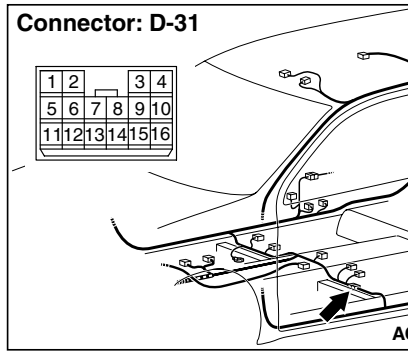


C-209



AC210475 AH

Connector: D-31



AC301408 AE

Prior to the wiring harness inspection, check intermediate connector C-14 <side RH>, C-116 <front or side LH> or D-31 <rear RH> and junction block connector C-202 <front and side>, C-209 <rear> or C-205 <turn-signal indicator lamp>, and repair if necessary.

- Check the output lines for open circuit.

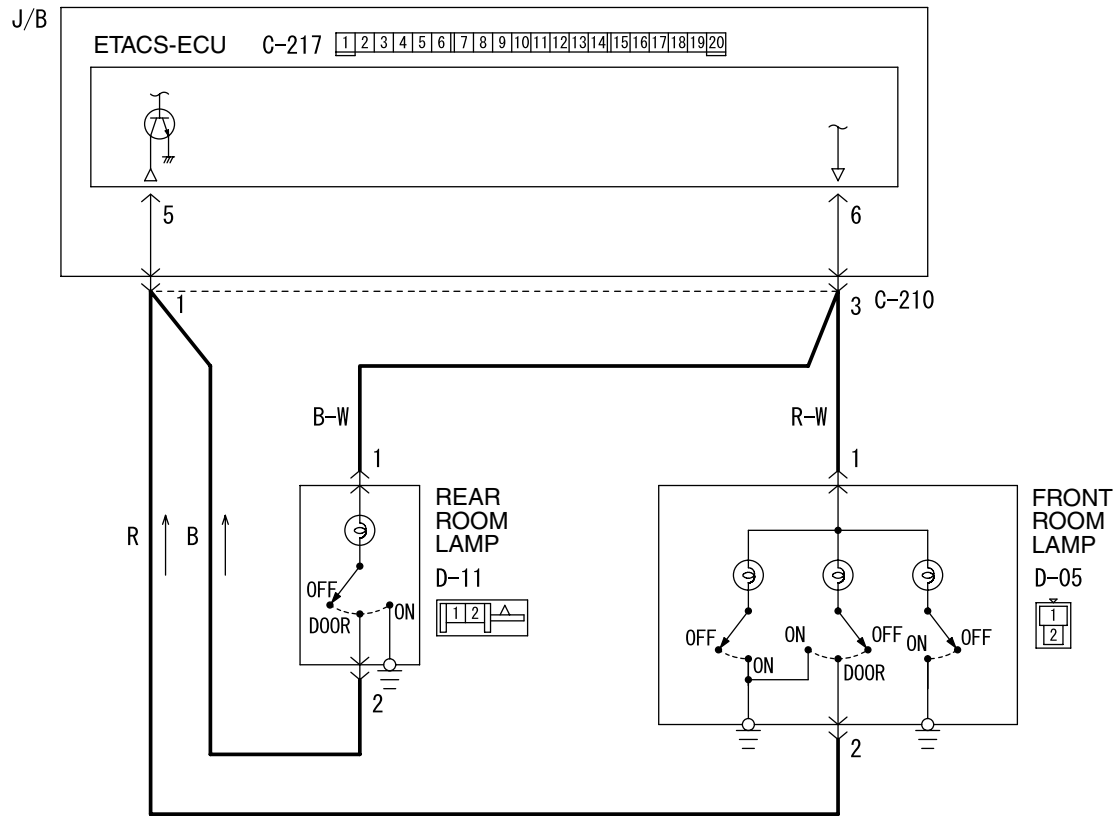
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

ROOM LAMP

INSPECTION PROCEDURE M-1: The front or rear room lamp does not illuminate or extinguish normally. <Vehicles without keyless entry system>

⚠ CAUTION
Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.

Room Lamp Circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W3Z10E21AA

COMMENTS ON TROUBLE SYMPTOM

The ETACS-ECU operates this function in accordance with the input signals below.

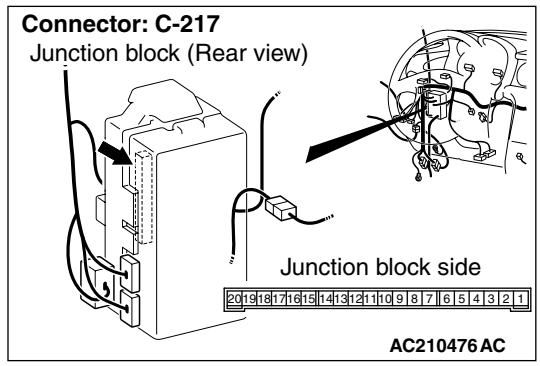
- Ignition switch (IG1)
- All of the door switches
- Driver's door lock actuator

If this function does not work normally, these input signal circuit(s) or the ETACS-ECU may be defective.

Possible causes

- Malfunction of the door switches
- Malfunction of the driver's door lock actuator
- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

Step 4. Connector check: C-217 ETACS-ECU connector

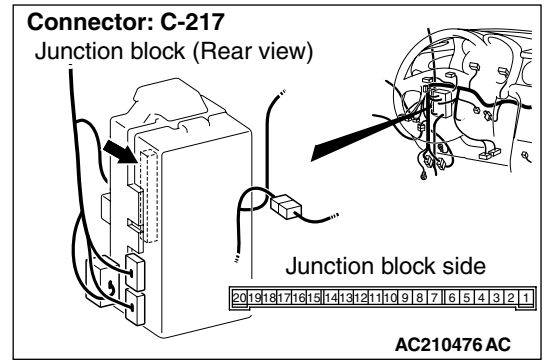


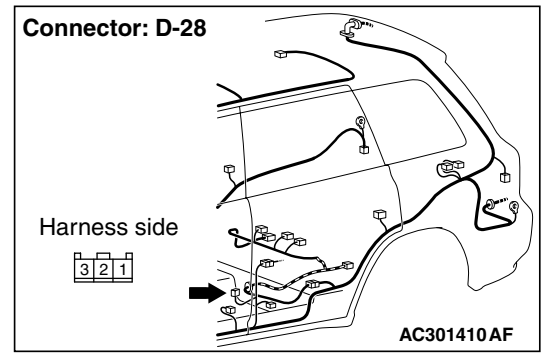
Q: Is the check result normal?

YES : Go to Step 5.

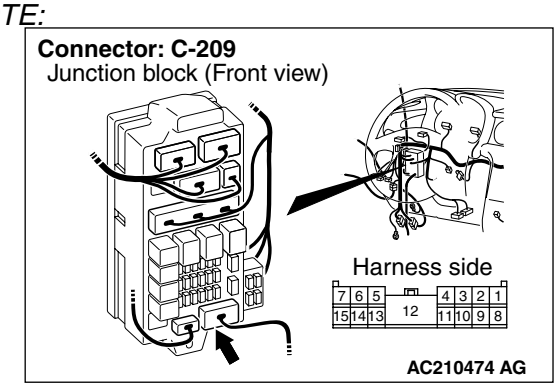
NO : Repair the defective connector.

Step 5. Check the wiring harness between D-28 front door switch (LH) connector terminal No.3 and C-217 ETACS-ECU connector terminal No.10.





NOTE:



Prior to the wiring harness inspection, check joint connector C-209, and repair if necessary.

- Check the input line for open circuit.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the wiring harness.

Step 6. Retest the system.

Check that the driver's door switch signal is received normally.

Q: Is the check result normal?

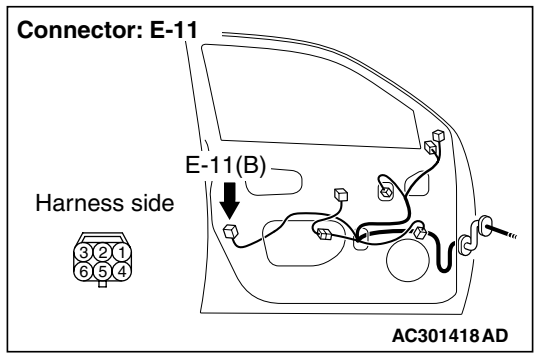
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the ETACS-ECU.

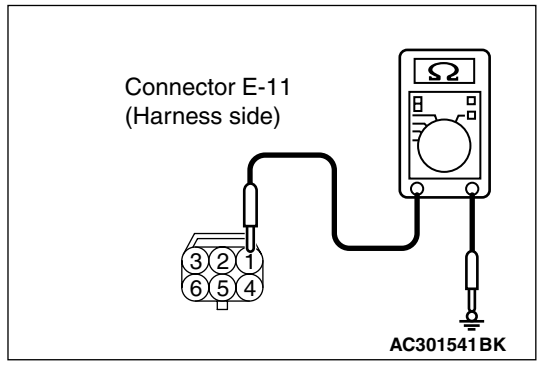
Step 2. Check the front door lock actuator (LH).
Refer to GROUP 42 – Door P.42-34.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Replace the front door lock actuator (RH).

Step 3. Measure the resistance at the E-11 front door lock actuator (LH) connector.



(1) Disconnect the connector, and measure at the wiring harness side.

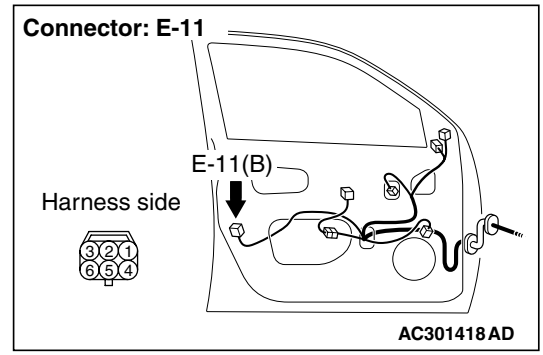


(2) Resistance between E-11 front door lock actuator (LH) connector terminal No.1 and body earth

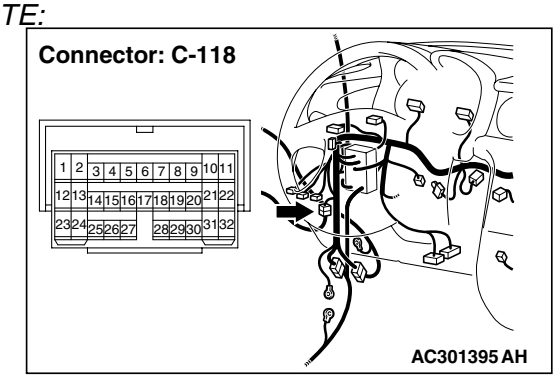
OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 5.
NO : Go to Step 4.

Step 4. Check the wiring harness between E-11 front door lock actuator (LH) connector terminal No.1 and body earth



NOTE:

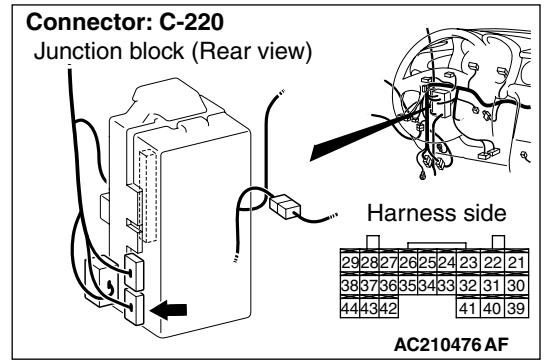


Prior to the wiring harness inspection, check intermediate connector C-118, and repair if necessary.

- Check the earth wires for open circuit.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Repair the wiring harness.

Step 5. Connector check: C-220 ETACS-ECU connector



Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

Terminal No.	Check items	Check conditions	Normal conditions
19	–	–	–
20	Battery power supply (for ECU)	Always	System voltage
21	Input from rear fog lamp switch	Rear fog lamp switch: ON	0 V
22	Output to central door locking (for unlocking the driver's door)	When the door lock actuators unlock the doors	System voltage
23	Rear washer output	When rear washer is operating	System voltage
24 to 28	–	–	–
29	Input of collision signal	–	–
30	Input to key reminder switch	Key reminder switch: ON (ignition key removed)	0 V
31 to 34	–	–	–
35	Input to driver's door lock actuator (lock switch)	Driver's door lock: Locked	0 V
36	Input to driver's door lock actuator (unlock switch)	Driver's door lock: Unlocked	0 V
37, 38	–	–	–
39	Input to inhibitor switch ("R" position)	Selector lever: R Ignition switch: ON	System voltage
40 to 44	–	–	–
51	Setting diagnosis code or sending input check signal	When diagnosis code is set (the MUT-II is connected or the diagnosis connector No.1 is earthed)	0 to 12 V (pulse signal)
		When input check signal is sent	0 V, 12 V (input signal is fluctuating)
52	–	–	–
53	Output to door-ajar indicator lamp	When door-ajar indicator lamp is on	0 V
54	Input from front fog lamp switch	Front fog lamp switch: ON	0 V
55	Input from hazard warning lamp switch	Hazard warning lamp switch: ON	0 V
56	Earth (for sensor)	Always	0 V
57, 58	–	–	–
59	SWS communication line	Always	0 to 12 V (pulse signal)
60 to 62	–	–	–
63	Input of vehicle speed signal	When the vehicle is being driven	0 to 12 V (pulse signal)
64, 65	–	–	–
66	Input from windshield intermittent wiper volume	Turn the ignition switch to the ACC position, and move the wiper volume from "Fast" to "Slow."	0 to 2.5 V
67	Input from diagnosis control	When MUT-II is connected	0 V
68	Input of SWS request signal	Always	0 to 12 V (pulse signal)
69	Output to ignition key cylinder illumination lamp	When ignition key cylinder illumination is on	2 V or less

FUNCTION DIAGNOSIS

The table below shows the service data and their normal condition, which are displayed during the "FUNCTION DIAG." The row "Normal conditions" shows values, which are shown when each operation is made.

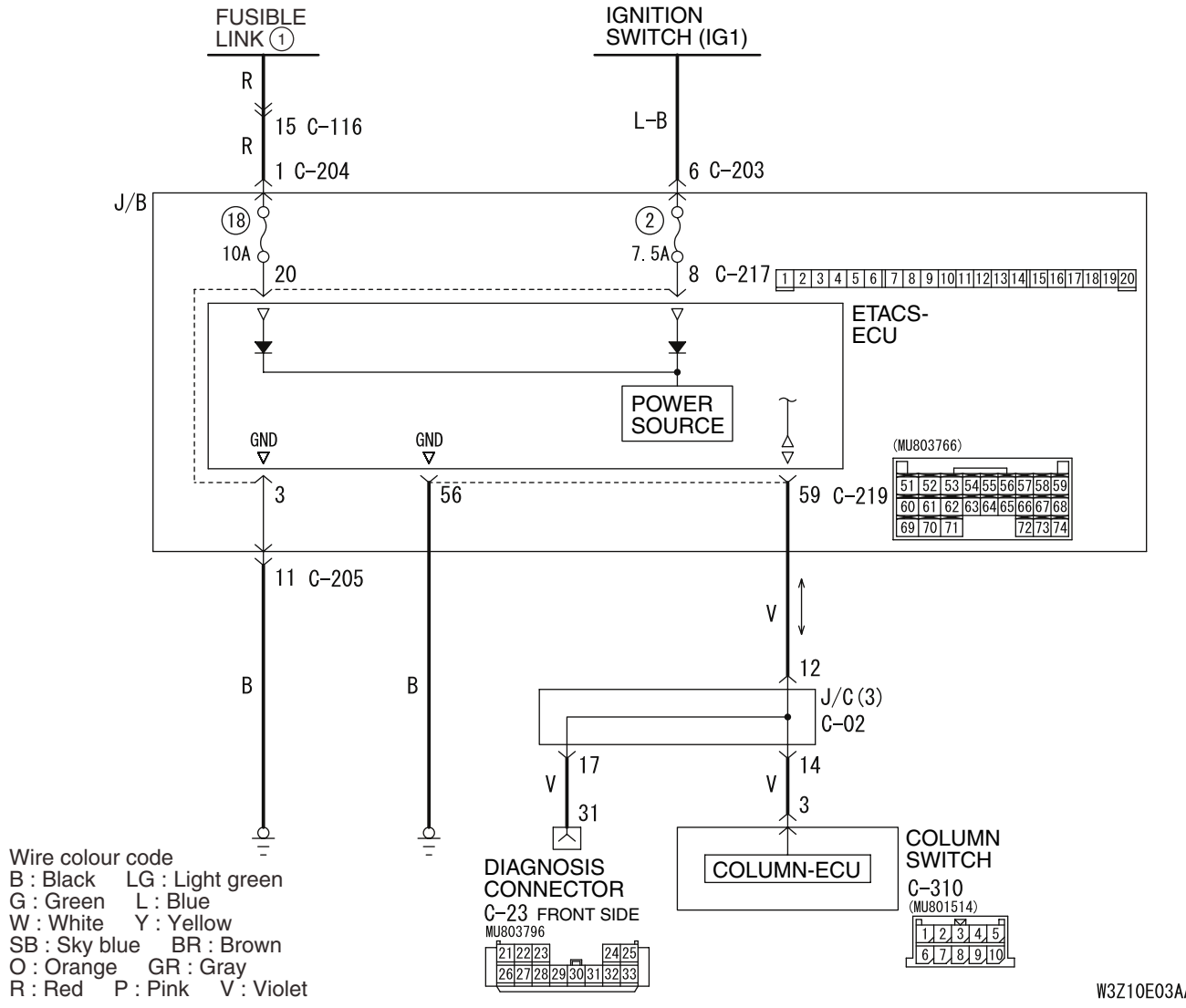
Wiper

Item	Input signals	Item No.	Display on MUT-II	Normal conditions
F.WIPER INT (intermittent)	Windshield intermittent wiper switch	05	INT WIPER SW	ON
	Windshield low-speed wiper switch	06	LO WIPER SW	OFF
	Windshield high-speed wiper switch	07	HI WIPER SW	OFF
	Wind shield mist wiper switch	08	MIST WIPER SW	OFF
	Windshield washer switch	09	FRONT WASH. SW	OFF
	Ignition switch (ACC)	31	IG SW(ACC)	ON
	Windshield intermittent wiper interval	37	WIPER INT TIME	The MUT-II displays intermittent wiper interval in response to the intermittent wiper control positions
	Response by the front-ECU	70	FRONT ECU ACK	NORMAL ACK or HI-BEAM ACK
F.WIPER LO (low speed)	Windshield intermittent wiper switch	05	INT WIPER SW	OFF
	Windshield low-speed wiper switch	06	LO WIPER SW	ON
	Windshield high-speed wiper switch	07	HI WIPER SW	OFF
	Wind shield mist wiper switch	08	MIST WIPER SW	OFF
	Windshield washer switch	09	FRONT WASH. SW	OFF
	Ignition switch (ACC)	31	IG SW(ACC)	ON
	Response by the front-ECU	70	FRONT ECU ACK	NORMAL ACK or HI-BEAM ACK

INSPECTION PROCEDURE A-3: Communication with the ETACS-ECU is not possible.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the power supply circuit, the earthing circuit and the communication circuit are normal.

Etacs-ECU Power Supply and SWS Communication Circuit



COMMENTS ON TROUBLE SYMPTOM

It is suspected that the power supply circuit to the ETACS-ECU is defective, or the wiring harness between the SWS monitor and the ETACS-ECU or their connector(s) is damaged. If the battery power supply circuit to the ECU (terminal No.20 of the ETACS-ECU) is damaged, also check the power supply circuit from the ignition switch (IG1) (terminal No.8 of the ETACS-ECU), and repair if necessary. If the earth circuit to the ECU (terminal No.3 of the ETACS-ECU) is defective, also check the earth circuit to the sensor (terminal No.56 of the ETACS-ECU), and repair if necessary.

TROUBLESHOOTING HINTS

- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

COMMENT ON TROUBLE SYMPTOM
If the central door locking system does not work at all, the front door lock actuator (LH) or the ETACS-ECU may be defective.

POSSIBLE CAUSES
- Malfunction of the front door lock actuator (LH)
- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

Step 1. ECU check on the SWS monitor
Check that the power supply and earth lines to the ETACS-ECU and the SWS communication lines are normal.
- Ignition switch: OFF

ECUS TO BE CHECKED
- ETACS ECU

OK: "OK" is displayed on the "ETACS ECU" menu.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Refer to Inspection Procedure A-3 "Communication with ETACS-ECU is impossible P.54C-34."

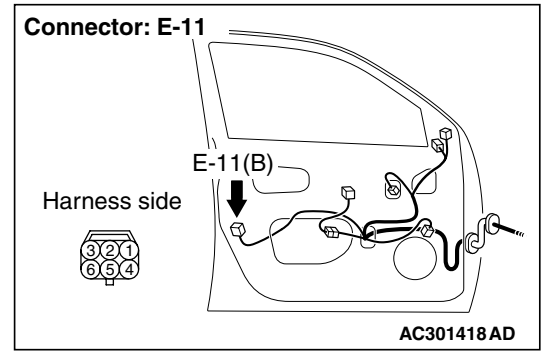
Step 2. Pulse check
Check the input signal from the driver's door lock actuator switch.

System switch	Check conditions
Driver's door lock actuator switch	When the driver's key cylinder or inside lock knob is unlocked or locked

OK: The MUT-II sounds or the voltmeter needle fluctuates.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Refer to inspection procedure N-14 "The driver's door lock actuator signal is not received P.54C-259."

Step 3. Connector check: E-11 front door lock actuator (LH) connector

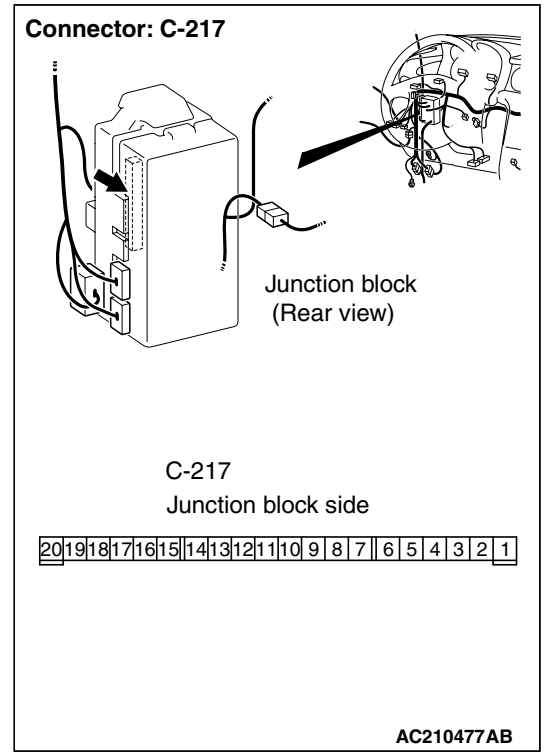


Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

Step 4. Check the front door lock actuator (LH).
Check that the front door lock actuator (LH) works normally. Refer to GROUP 42 – Door P.42-34.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the front door lock actuator (LH).

Step 5. Connector check: C-217 ETACS-ECU connector



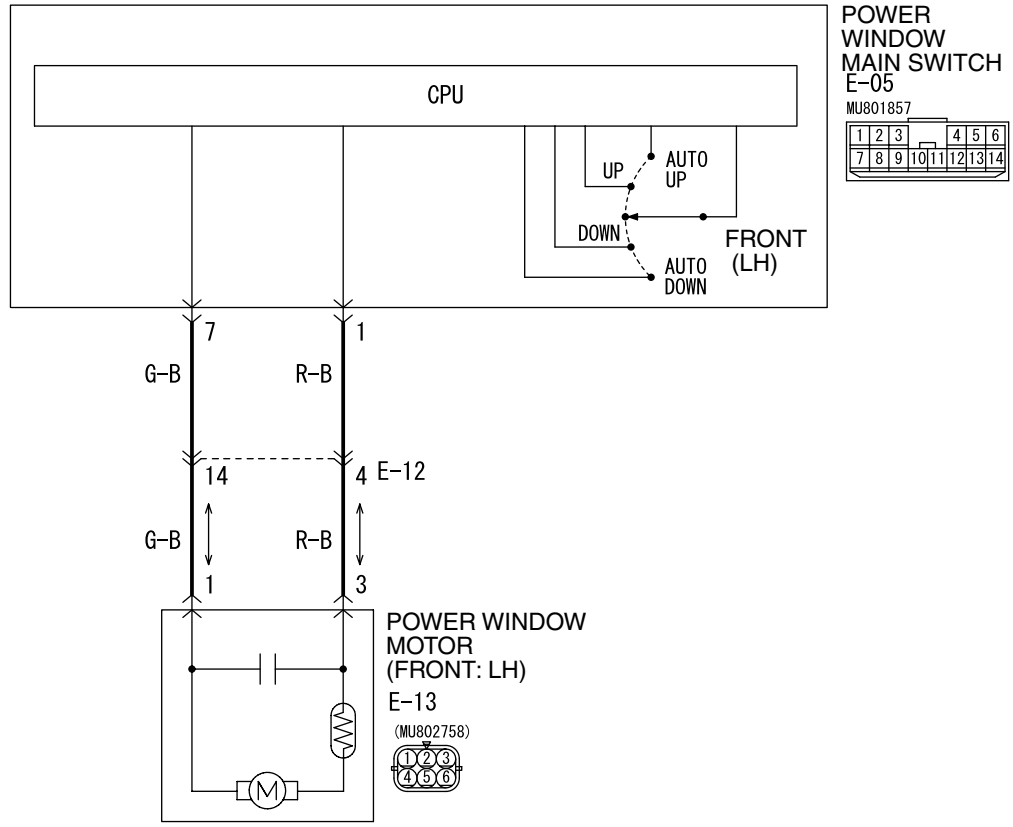
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

Step 4. Retest the system.
Check that the all the power windows work.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the power window main switch.

INSPECTION PROCEDURE D-2: Driver's power window does not work by means of the power window main switch.

Power Window (front: LH) Circuit

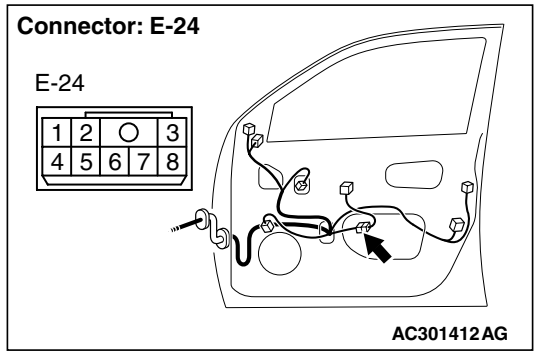


Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

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COMMENTS ON TROUBLE SYMPTOM
If the driver's power window does not work by means of the power window main switch, the power window main switch or the driver's door power window motor may be defective.

Possible causes
- Malfunction of the power window main switch
- Malfunction of the power window motor (front LH)
- Damaged harness wires and connectors

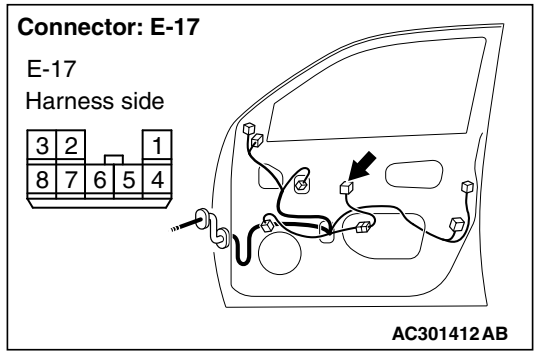


Prior to the wiring harness inspection, check intermediate connectors C-15, C-118, E-12 and E-24, and repair if necessary.

- Check the communication lines for open circuit.

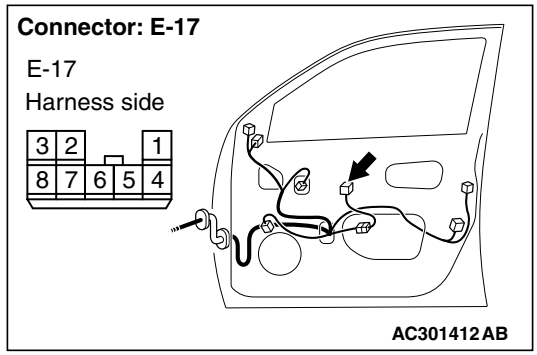
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Step 6. Connector check: E-17 power window sub switch (front LH) connector

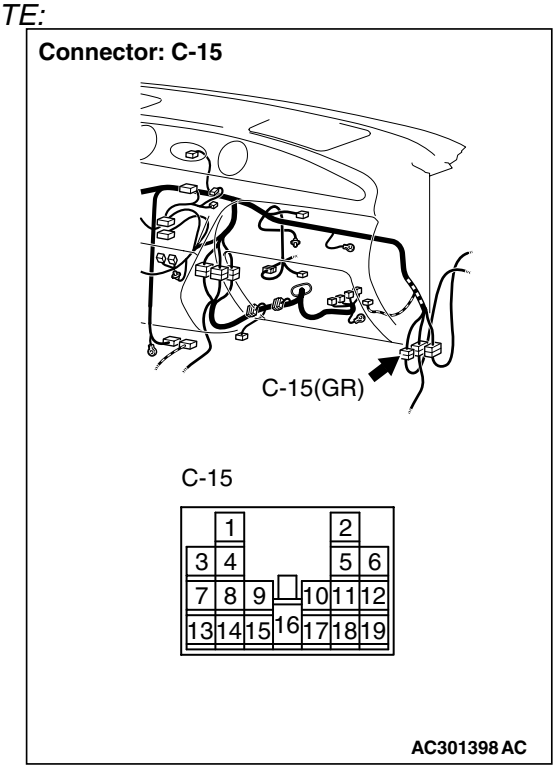


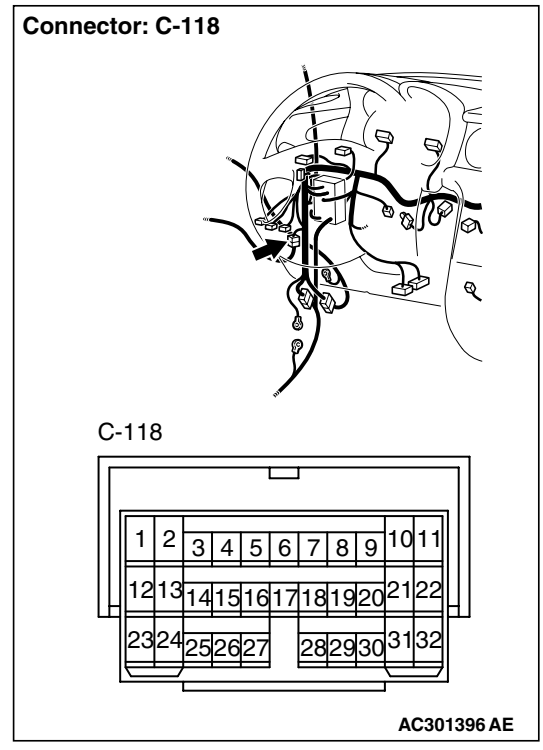
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the connector.

Step 7. Check the wiring harness from E-17 power window sub switch (front LH) connector terminal No.6 to the inserted probe.



NOTE:





Step 3. Retest the system.
Check that the encrypted code can be registered.

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the ETACS-ECU.

INSPECTION PROCEDURE E-4: The Timer Lock Function does not Work after the Doors have been Unlocked by the Keyless Entry System.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.

COMMENT ON TROUBLE SYMPTOM
If the keyless entry timer lock does not work normally, the input signal circuit(s) to the keyless entry transmitter or the ETACS-ECU may be defective.

POSSIBLE CAUSES
- Malfunction of the keyless entry transmitter
- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

Step 1. Check the operation of the keyless entry system.
Check that the keyless entry system works normally.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Refer to inspection procedure E-1 "Keyless entry system does not work P.54C-110."

Step 2. Retest the system.
Check that the timer lock works normally.

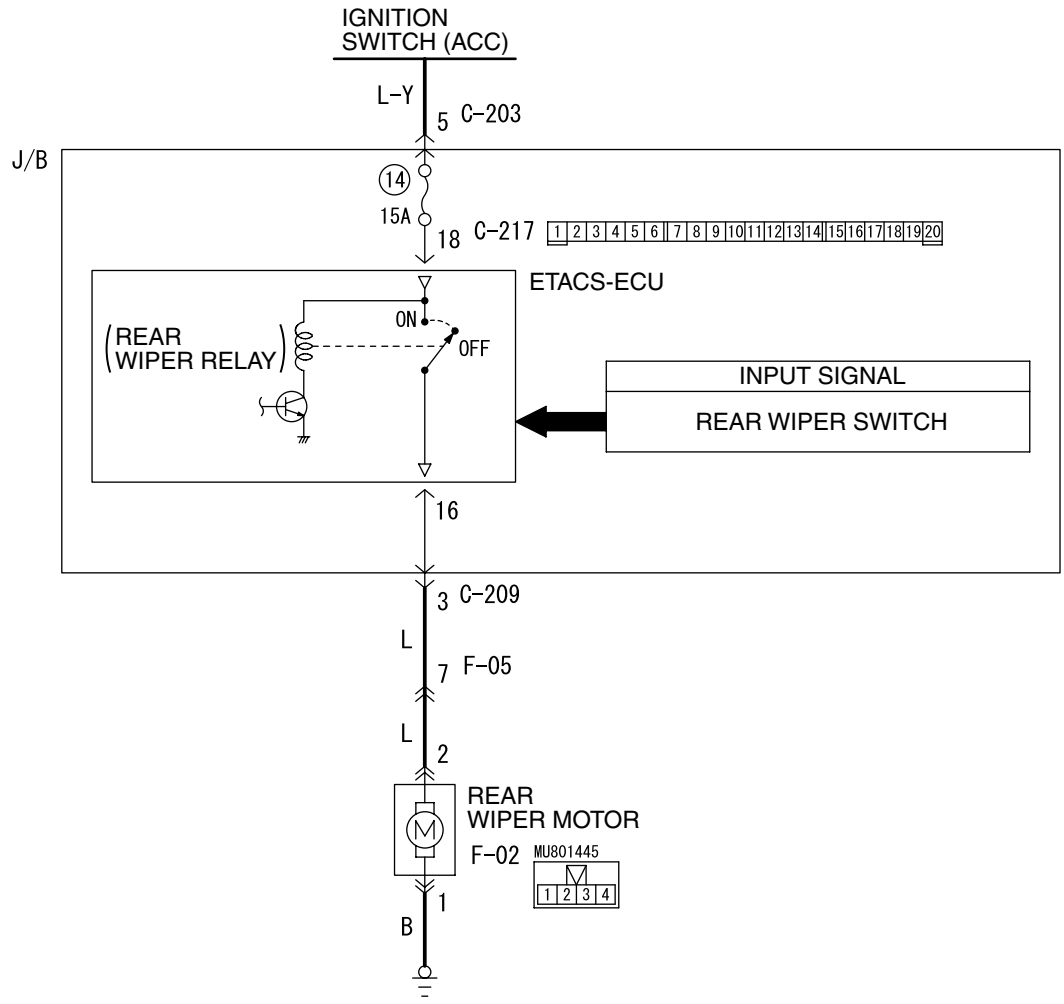
Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the ETACS-ECU.

REAR WIPER AND WASHER

INSPECTION PROCEDURE G-1: The rear wiper does not work at all.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the input and output signal circuits are normal.

Rear Wiper Drive Circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

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COMMENTS ON TROUBLE SYMPTOM

If the rear wiper does not work normally, the input signal circuits to the components below, the rear wiper motor or the ETACS-ECU may be defective.

- Ignition switch (ACC)
- Rear wiper switch

Possible causes

- Malfunction of the rear wiper motor
- Malfunction of the column switch
- Malfunction of the ETACS-ECU
- Damaged harness wires and connectors

Step 2. ECU check on the SWS monitor

Check that the power supply and earth lines to the ETACS-ECU and the SWS communication lines are normal.

- Ignition switch: OFF

ECUS TO BE CHECKED

- ETACS ECU

OK: "OK" is displayed on the "ETACS ECU" menu.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Refer to Inspection Procedure A-3 "Communication with ETACS-ECU is impossible P.54C-34."

Step 3. Check the data list by using the SWS monitor.

Check the SWS communication signal, which are related to the ignition key cylinder illumination lamp.

<Selected item> ETACS ECU

- Ignition switch: OFF
- Driver's door: open

Item No.	Item name	Normal conditions
Item 30	IG SW(IG1)	OFF
Item 32	DR DOOR SW	ON

OK: Normal conditions displayed for all the items

Q: Is the check result normal?

Normal conditions are displayed for all the items. <Vehicles without keyless entry system> : Go to Step 4.

Normal conditions are displayed for all the items. <Vehicles with keyless entry system> : Go to Step 5.

Normal condition is not displayed for item No.30. : Refer to inspection procedure N-2 "The ignition switch (IG1) signal is not received P.54C-226."

Normal condition is not displayed for item No.32. : Refer to inspection procedure N-4 "The driver's door switch signal is not received P.54C-232."

Step 4. Pulse check

Check the input signals below, which are related to the ignition key cylinder illumination lamp.

System switch	Check conditions
Key reminder switch	When the inserted ignition key is pulled out

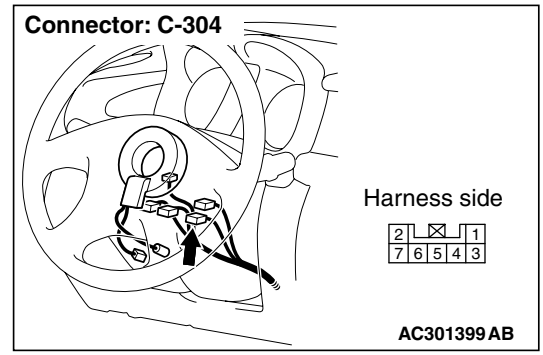
OK: The MUT-II sounds or the voltmeter needle fluctuates.

Q: Is the check result normal?

YES : Go to Step 5.

NO : Refer to inspection procedure N-11 "The key reminder switch signal is not received P.54C-249."

Step 5. Connector check: C-304 key reminder switch connector



Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the defective connector.

Step 6. Check the bulb of the ignition key cylinder illumination lamp.

Check the bulb of the ignition key cylinder illumination lamp.

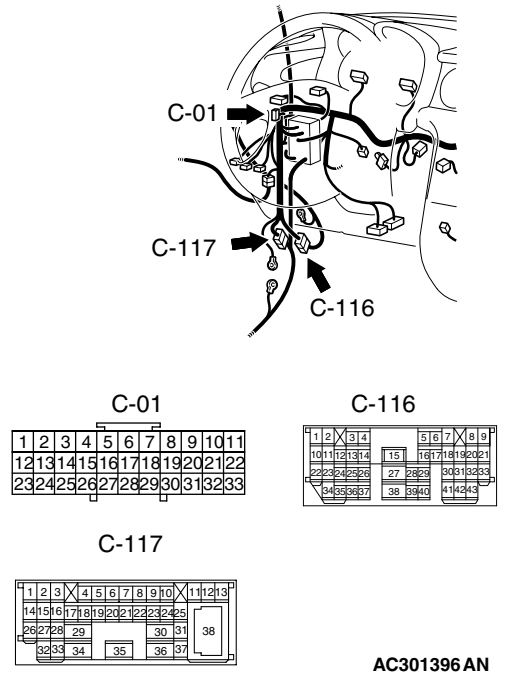
Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the bulb of the ignition key cylinder illumination lamp.

NOTE:

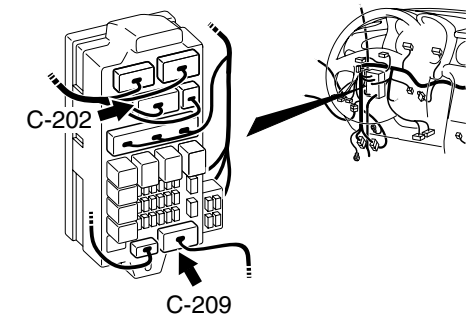
Connectors: C-01, C-116, C-117



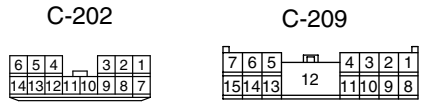
AC301396 AN

Connectors: C-202, C-209

Junction block (Front view)

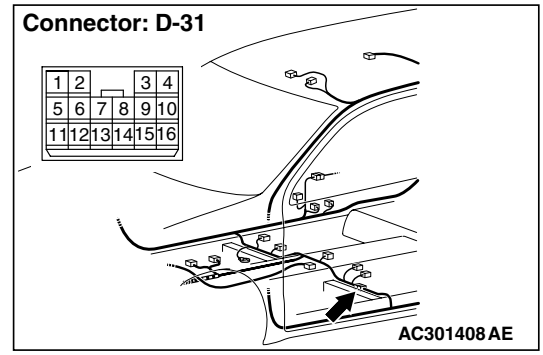


Harness side



AC210475 AJ

Connector: D-31



AC301408 AE

Prior to the wiring harness inspection, check joint connector C-01 <right tail lamp>, intermediate connector C-116 <tail lamp and licence plate lamp>, C-117 <left tail lamp and licence plate lamp>, D-31 <right tail lamp>, F-09 <licence plate lamp>, junction block connector C-202 <right tail lamp> and C-209 <right tail lamp>, and repair if necessary.

- Check the output lines for open circuit.

Q: Is the check result normal?

YES : Go to Step 7.

NO : Repair the wiring harness.

Step 7. Retest the system.

Check that the tail lamps, the position lamps and the licence plate lamps illuminate normally.

Q: Is the check result normal?

The lamps illuminate normally at both high and low beams. : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

When the tail lamps do not illuminate : Replace the rear combination lamp socket assembly.

When the position lamps do not illuminate : Replace the position lamp socket.

When the licence plate lamps do not illuminate : Replace the licence plate lamp socket.

DIAGNOSIS PROCEDURE

Step 1. Check that the tail lamps and headlamps operate.

Check that the tail lamps and headlamps illuminate normally.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the tail lamp(s) and headlamp(s). Refer to trouble symptom chart P.54C-20.

Step 2. ECU check on the SWS monitor

Check that the power supply and earth lines to the column switch (column-ECU), the ETACS-ECU and the front-ECU and the SWS communication lines are normal.

- Ignition switch: OFF

ECUS TO BE CHECKED

- COLUMN ECU
- ETACS ECU
- FRONT ECU

OK: "OK" is displayed for all the items

Q: Is the check result normal?

"OK" is displayed for all the items : Go to Step 3.

"NG" is displayed on the "COLUMN ECU" menu. : Refer to Inspection Procedure A-2 "Communication with column switch (column-ECU) is impossible P.54C-29."

"NG" is displayed on the "ETACS ECU" menu. : Refer to Inspection Procedure A-3 "Communication with ETACS-ECU is impossible P.54C-34."

"NG" is displayed on the "FRONT ECU" menu. : Refer to Inspection Procedure A-4 "Communication with front-ECU is impossible P.54C-38."

Step 3. Function diagnosis by using the SWS monitor

Check the SWS communication signal, which are related to the fog lamps.

<Selected item> LIGHTING - F.FOG LAMP

- Ignition switch: ON
- Lighting switch: "TAIL" or "HEAD"
- Front fog lamp switch: ON

Item No.	Item name	Normal conditions
Item 00	HEADLAMP SW	ON when the lighting switch is at HEAD
Item 01	TAIL LAMP SW	ON when the lighting switch is at TAIL or HEAD
Item 30	IG SW(IG1)	ON
Item 36	F.FOG LAMP	ON
Item 70	FRONT ECU ACK	NORMAL ACK or HI-BEAM ACK

OK: Normal conditions are displayed for all the items.

Q: Is the check result normal?

Normal conditions are displayed for all the items. : Go to Step 4.

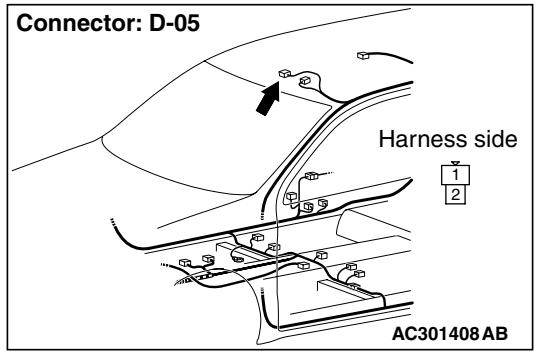
Normal condition is not displayed for item 00 or 01. : Refer to inspection procedure P-5 "The column switch (lighting and turn-signal lamp switch) signal is not received P.54C-234."

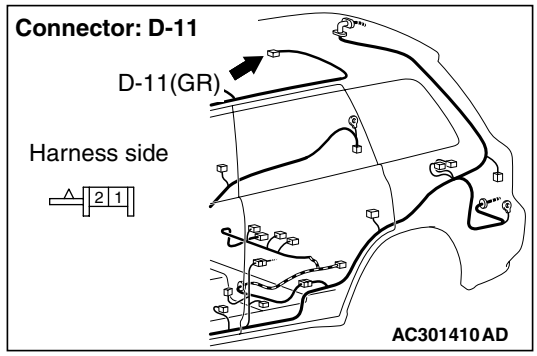
Normal condition is not displayed for item No.30. : Refer to inspection procedure P-2 "The ignition switch (IG1) signal is not received P.54C-226."

Normal condition is not displayed for item No.36. : Refer to inspection procedure P-10 "The front fog lamp switch signal is not received P.54C-244."

Normal condition is not displayed for item No.70. : Replace the front-ECU.

Step 4. Connector check: D-05 front room lamp connector, D-11 rear room lamp connector



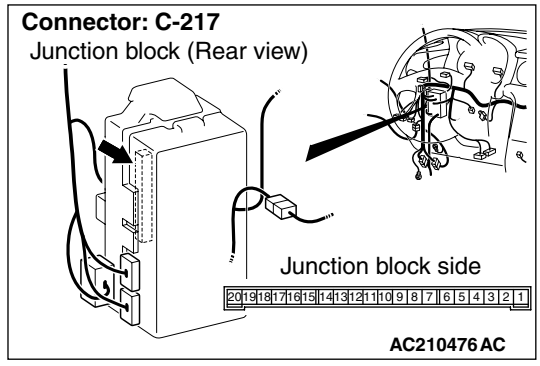


Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair the defective connector.

Step 5. Check the bulbs of the front and rear room lamps.
Check the bulbs of the front and rear room lamps.

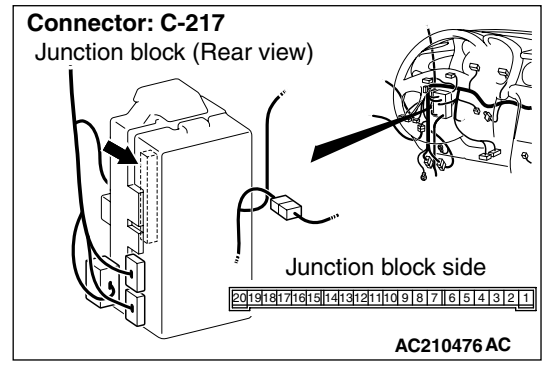
Q: Is the check result normal?
YES : Go to Step 6.
NO : Replace the front or rear room lamp bulb.

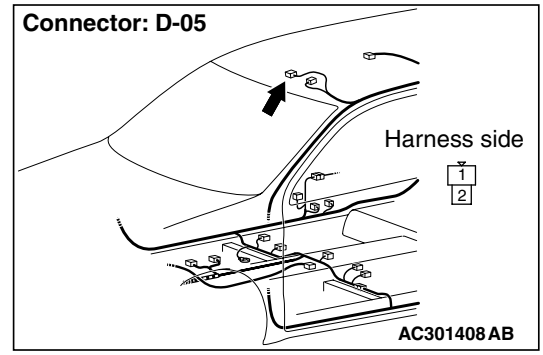
Step 6. Connector check: C-217 ETACS-ECU connector



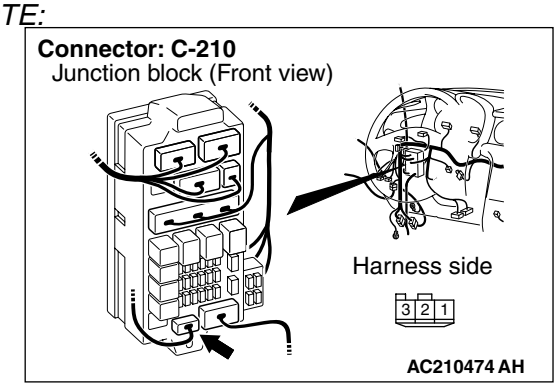
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

Step 7. Check the wiring harness from C-217 ETACS-ECU connector terminal Nos. 5 and 6 to D-05 front room lamp connector terminal Nos. 2 and 1.





NOTE:



Prior to the wiring harness inspection, check junction block connector C-210, and repair if necessary.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Step 6. Check the data list by using the SWS monitor.

<Selected item> ETACS ECU

- Driver's door: open

Item No.	Item name	Normal conditions
Item 32	DR DOOR SW	ON

OK: Normal condition is displayed.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

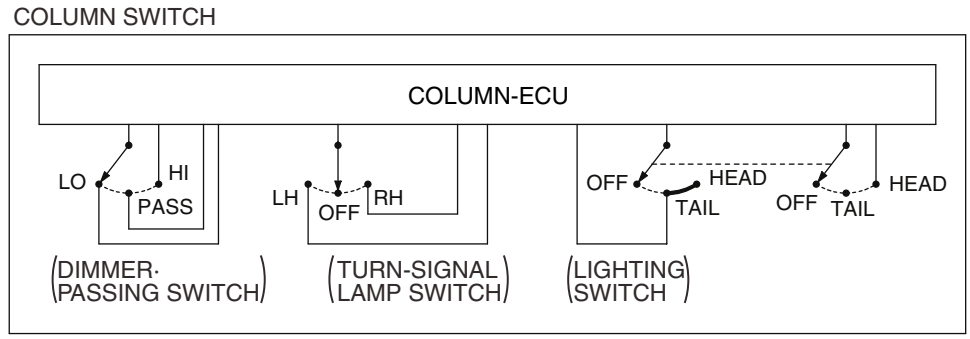
NO : Replace the ETACS-ECU.

INSPECTION PROCEDURE N-5: The column switch (lighting, turn-signal lamp and headlamp washer switch) signal is not received.

⚠ CAUTION

Whenever the ECU is replaced, ensure that the input signal circuit is normal.

Lighting Switch Input Circuit



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COMMENTS ON TROUBLE SYMPTOM

Input signal from the column switch (lighting, turn-signal lamp and headlamp washer switch) is used to operate the functions below. If the signal is abnormal, these functions will not work normally.

- Lamp reminder function
- Headlamp and tail lamp
- Headlamp automatic shutdown function
- Fog lamp
- Turn signal lamp
- Headlamp washer

Possible causes

- Malfunction of the column switch
- Damaged harness wires and connectors

DIAGNOSIS PROCEDURE

Step 1. Check the column switch connector.

Check that the wiper and washer switch connector, the lighting switch connector and the switch body connector are in good condition.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the defective connector.

Step 7. Pulse check

Check the input signal from the hazard warning lamp switch.

System switch	Check conditions
Hazard warning lamp switch	When the hazard warning lamp switch is turned from off to on

OK: The MUT-II sounds or the voltmeter needle fluctuates.

Q: Is the check result normal?

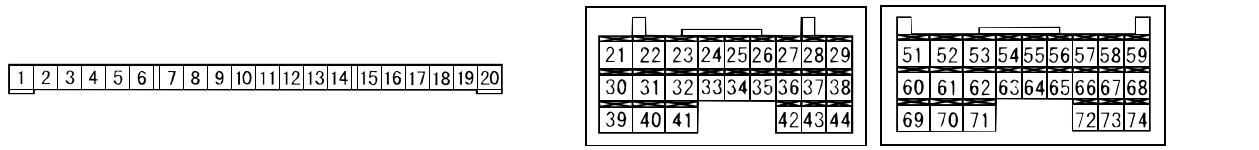
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the ETACS-ECU.

CHECK AT ECU TERMINAL

M1549001200607

ETACS-ECU

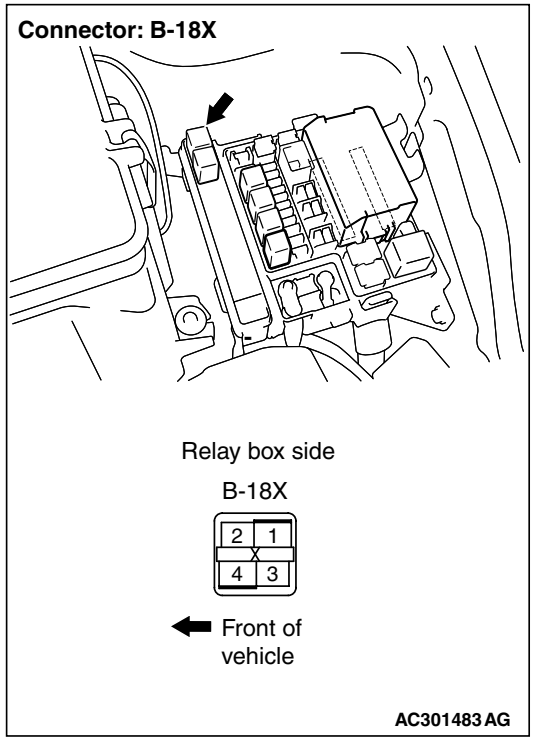


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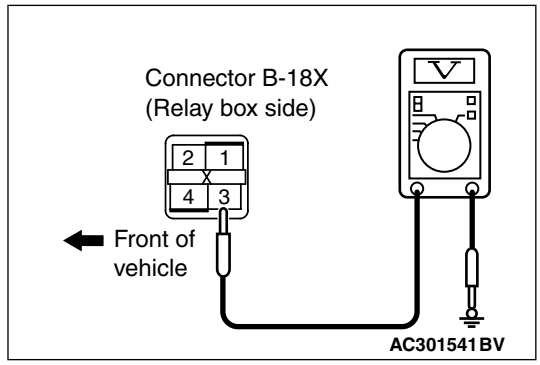
NOTE: Terminal numbers 1 to 20 can not be measured as the ETACS-ECU is mounted on the junction block directly. The values are for reference only.

Terminal No.	Check items	Check conditions	Normal conditions
1	Output to the power window relay	When the power windows are operative	System voltage
2	Power supply to the central door locking system (battery positive voltage)	Always	System voltage
3	Earth (for ECU)	Always	0 V
4	Ignition switch (ACC)	Ignition switch: ACC	System voltage
5	Output to room lamp	When the room lamp is on	2 V or less
6	Power supply to interior lamp (battery positive voltage)	Always (when the interior lamp off function is off)	System voltage
7	Input from all the door switches	One of the door switches: ON (door open)	0 V
8	Power supply from ignition switch (IG1)	Ignition switch: ON	System voltage
9	Output to right turn-signal lamps	When right turn-signal lamps are on	System voltage
10	Input from driver's door switch	Driver's door switch: ON (door open)	0 V
11	Power supply to hazard warning lamp (battery positive voltage)	Always	System voltage
12	Output to central door locking (for locking the doors)	When the door lock actuators lock the doors	System voltage
13	Output to central door locking (for unlocking the doors other than the driver's door)	When the door lock actuators unlock the doors	System voltage
14	Output to left turn-signal lamps	When the left turn-signal lamps are on	System voltage
15	–	–	–
16	Output to rear wiper	When rear wiper is operating	System voltage
17	Input of rear wiper automatic stop signal	When rear wiper is operating	System voltage
18	Power supply from ignition switch (ACC)	Ignition switch: ACC	System voltage

STEP 6. Measure the voltage at B-18X A/C compressor relay connector.



(1) Remove the relay, and measure at the relay box side.
(2) Turn the ignition switch to the "ON" position.

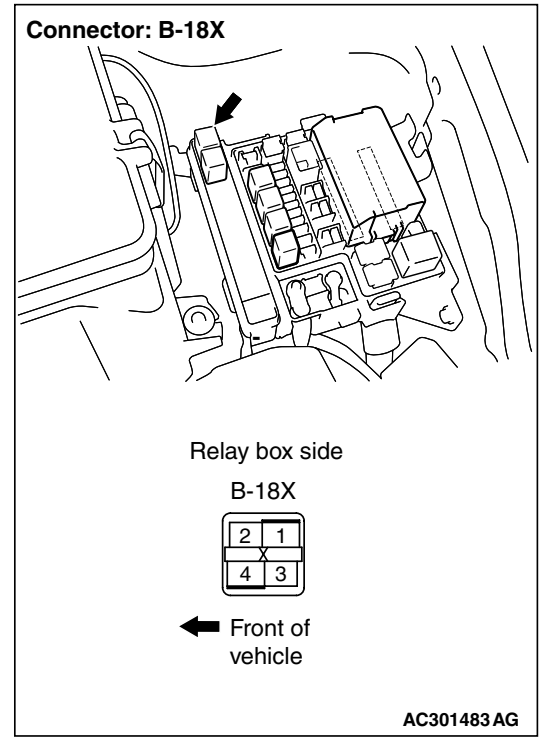


(3) Measure the voltage between terminal 3 and body earth.

OK: System voltage

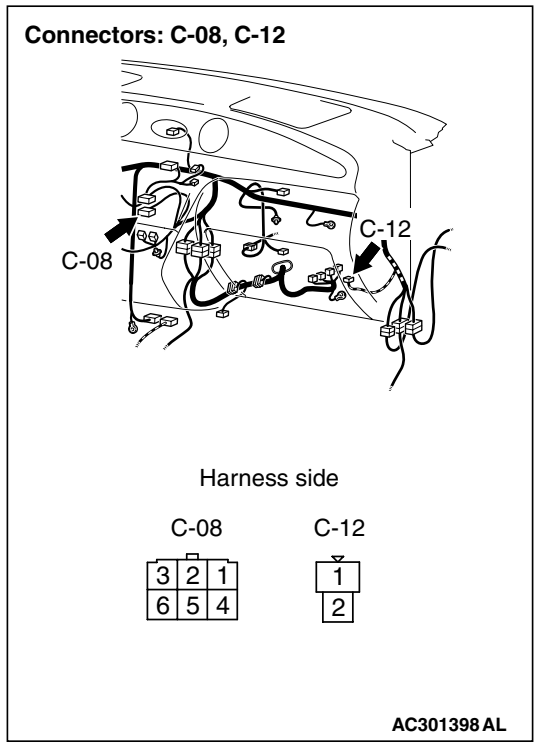
Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 7.

STEP 7. Connector check: B-18X A/C compressor relay connector



Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair or replace the connector.

STEP 20. Check the wiring harness between C-12 blower motor connector terminal No.1 and C-08 blower switch connector terminal No.6.



- Check the blower motor power supply line for open circuit.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00, How to Cope with Intermittent Malfunction P.00-6).

NO : Repair the wiring harness.

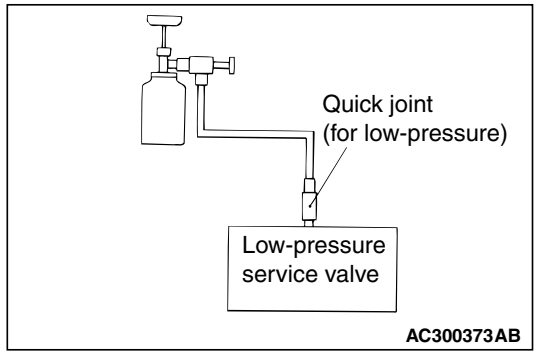
STEP 21. Check the blower fan and motor operation.

Refer to P.55A-64.

Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00, How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the blower motor.



7. Install the quick joint (for low-pressure) to the low-pressure service valve.

   NOTE: The low-pressure service valve should be connected to the suction hose.
8. Start the engine.
9. Operate the air conditioner and set at the lowest temperature (MAX. COOL).
10. Fix the engine speed at 1,500 r/min.
11. Tighten the handle of the adaptor valve (valve open), and replenish refrigerant while checking the quantity through the sight glass.
12. After replenishing is completed, turn the handle of the adaptor valve all the way back (valve close), and remove the quick joint.

    NOTE: When there is remainder of refrigerant in the service can, keep it for next use with the charge value and the valve of the adaptor valve being closed.

DISCHARGING SYSTEM

M1552013000086

Use the refrigerant recovery unit to discharge refrigerant gas front the system.

NOTE: Refer to the Refrigerant Recovery and Recycling Unit instruction Manual for operation of the unit.

REFILLING OF OIL IN THE A/C SYSTEM

M1552020000022

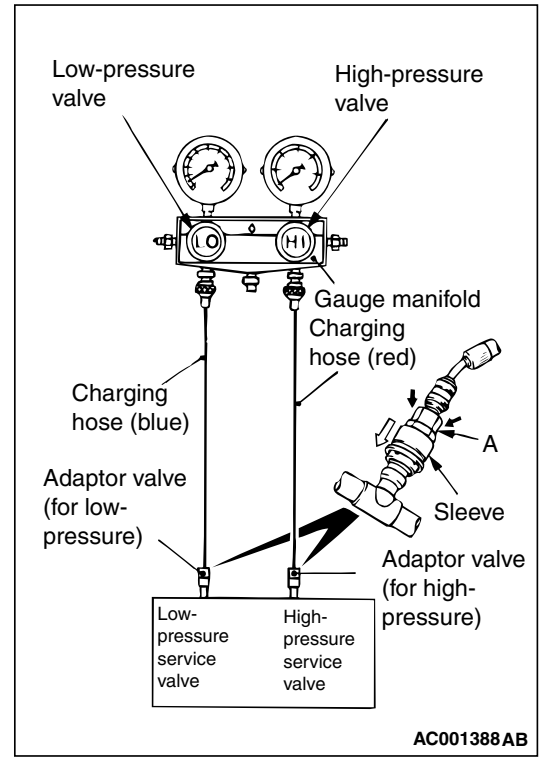
Too little oil will provide inadequate compressor lubrication and cause a compressor failure. Too much oil will increase discharge air temperature. When a compressor is installed at the factory, it contains 120 mL of compressor oil. While the A/C system is in operation, the oil is carried through the entire system by the refrigerant. Some of this oil will be trapped and retained in various parts of the system.
When the following system components are changed, it is necessary to add oil to the system to replace the oil being removed with the component.

Compressor oil: SUN PAG 56
Quantity
Evaporator: 60 mL
Condenser: 15 mL
Flexible suction hose: 10 mL
Receiver: 10 mL

PERFORMANCE TEST

M1552001400333

1. The vehicles to be tested should be in a place that is not in direct sunlight.



2. Close the high and low-pressure valve of the gauge manifold.
3. Connect the charging hose (blue) to the low-pressure valve and connect the charging hose (red) to the high-pressure valve of the gauge manifold.

⚠ CAUTION
- **To connect the quick joint, press section A firmly against the service valve until a click is heard.**
- **When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.**

4. Install the quick joint (for low-pressure) to the charging hose (blue), and connect the quick joint (for high-pressure) to the charging hose (red).

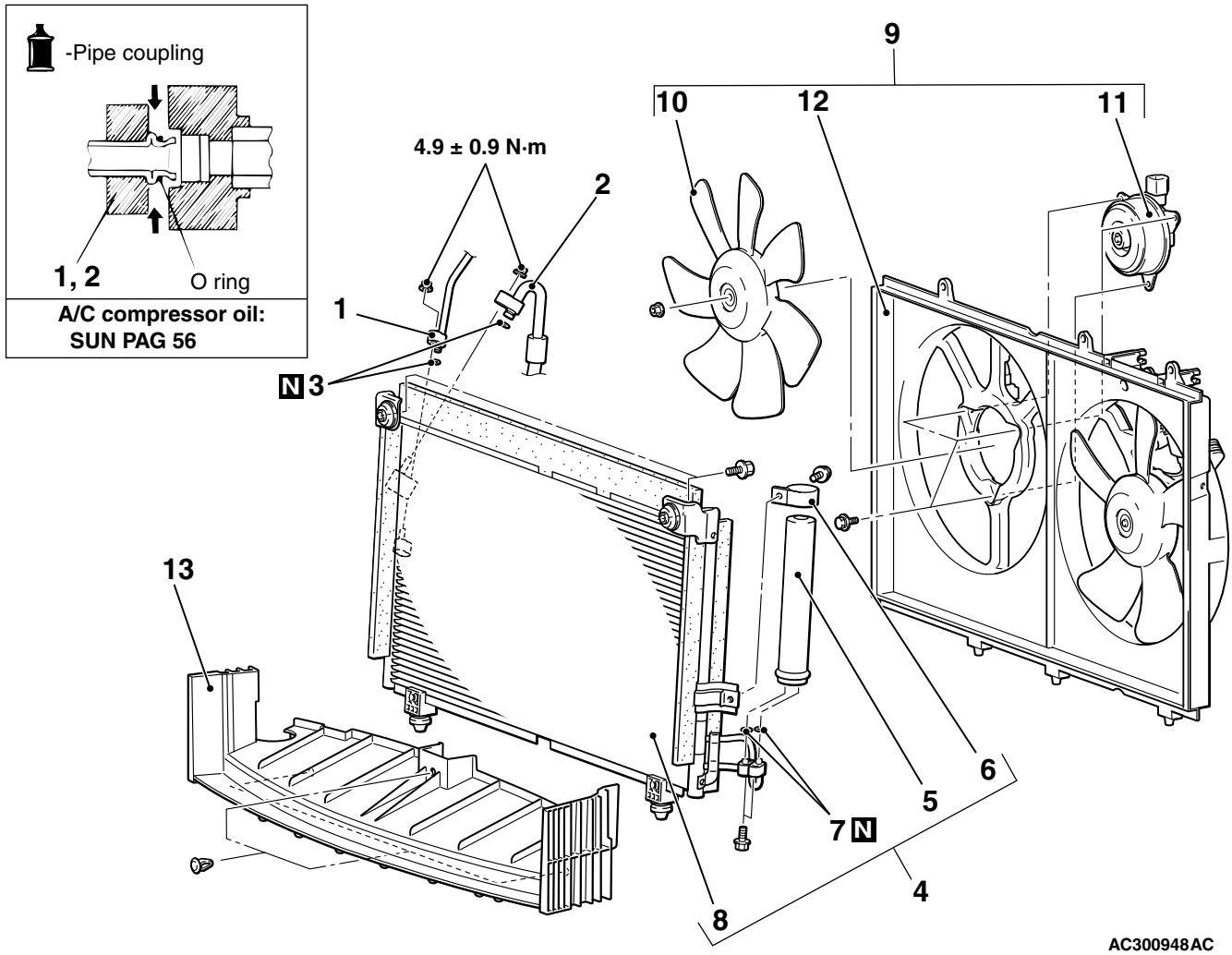
   NOTE: The high-pressure service valve is on the A/C pipe and the low-pressure service valve is on the suction hose.

CONDENSER AND CONDENSER FAN MOTOR

REMOVAL AND INSTALLATION

M1552006700351

Pre-removal and Post-installation Operation
- Refrigerant draining and Refilling (Refer to Charging P.55A-49 and Discharging P.55A-52).
- Air cleaner cover and air flow sensor assembly Removal and Installation (Refer to GROUP 14, Air cleaner P.15-3).



Condenser removal steps

<<A>> 1. Liquid pipe A connection
<<A>> 2. Flexible discharge hose connection
3. O ring
>>A<< 4. Condenser assembly
5. Receiver
6. Clamp
7. O ring
8. Condenser

Fan shroud assembly removal steps

9. Fan shroud assembly
10. Fan
11. Fan motor
12. Fan shroud

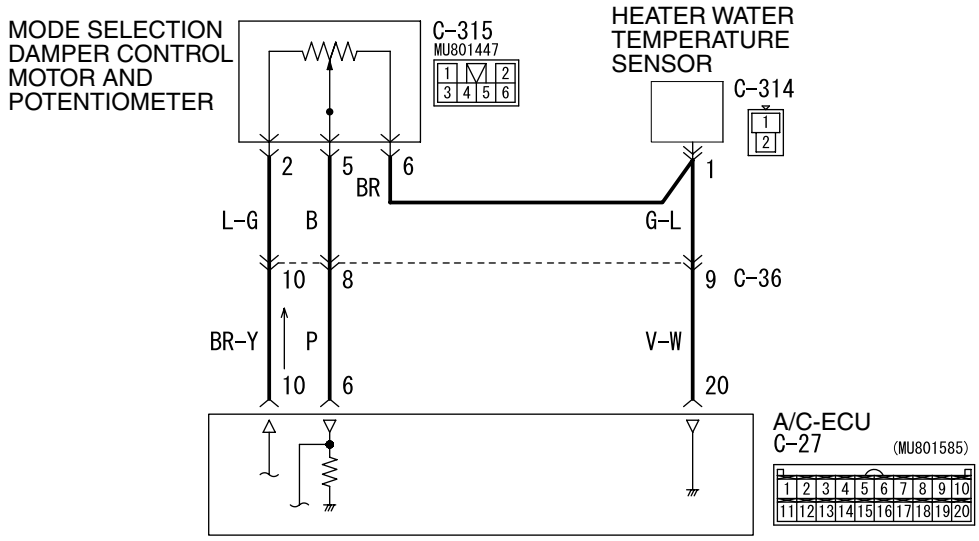
Air guide panel removal steps

- Front bumper (Refer to 51, Front bumper P.51-3).

13. Air guide panel

Diagnosis code 32: Mode selection damper control motor potentiometer system

Mode Selection Damper Control Motor Potentiometer Circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W3Z05E08AA

COMMENTS ON TROUBLE SYMPTOM

This code is set when the mode selection damper control motor potentiometer does not send any signal to the A/C-ECU due to short or open circuit.

Possible causes

- Malfunction of the mode selection damper control motor and potentiometer
- Malfunction of the auto air conditioner control panel (A/C-ECU)
- Damaged the wiring harness or connectors

DIAGNOSIS

Step 1. Check the mode selection damper control motor and potentiometer.

Refer to P.55B-70.

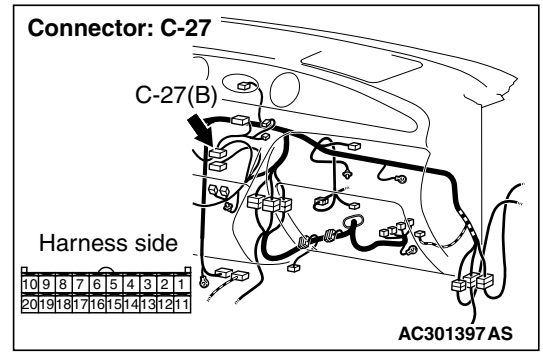
Q: Is the check result normal?

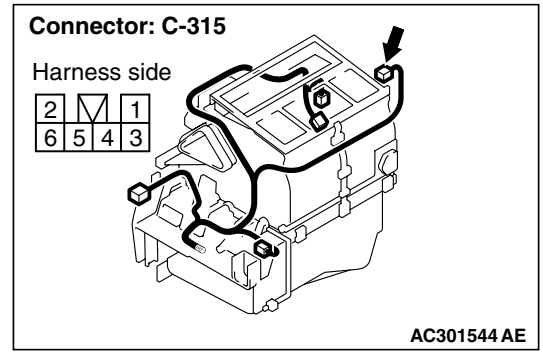
YES : Go to Step 2.

NO : Replace the mode selection damper control motor and potentiometer.

Step 2. Connector check: C-27 A/C-ECU connector and C-315 mode selection damper control motor and potentiometer connector

Q: Is the check result normal?

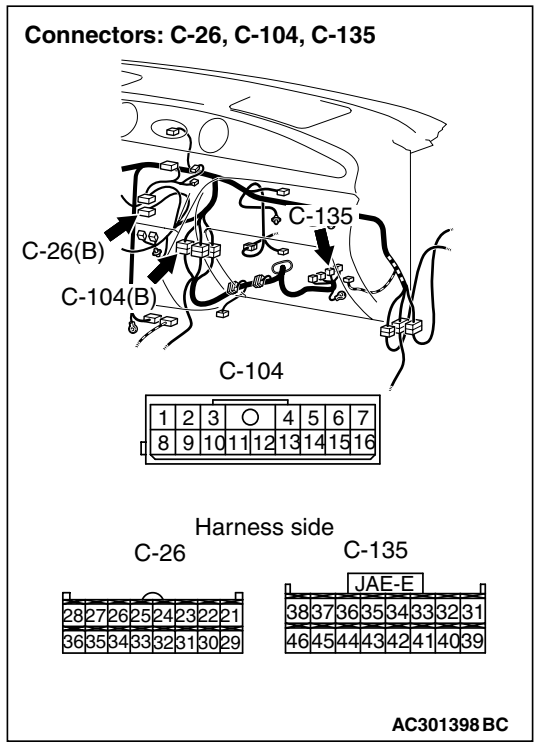




YES : Go to Step 3.

NO : Repair the connector.

STEP 28. Check the wiring harness between C-135 engine-ECU connector terminal No.45 and C-26 A/C-ECU connector terminal No.34.



NOTE: Prior to the wiring harness inspection, check intermediate connector C-104, and repair if necessary.

- Check the communication line for open circuit.

Q: Is the check result normal?
YES : Replace the A/C-ECU or engine-ECU.
NO : Repair the wiring harness.

INSPECTION PROCEDURE 3: A/C outlet air temperature cannot be set.

COMMENTS ON TROUBLE SYMPTOM

When the blower air temperature can not be changed even if the preset temperature is changed, the sensors, the air mixing damper control motor and potentiometer or the A/C-ECU may be defective.

Possible causes

- Malfunction of the A/C-ECU

DIAGNOSIS

Read diagnosis code by using the MUT-II.

Q: Is the diagnosis code set?
YES : Refer to diagnosis code chart P.55B-3.
NO : Replace the auto air conditioner control panel (A/C-ECU).

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