

GROUP 13B

MULTIPOINT FUEL INJECTION (MPI) <Vehicles for Hong Kong and Singapore>

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GENERAL INFORMATION

M1131000102376

The Multipoint Fuel Injection System consists of sensors which detect the engine conditions, the engine-A/T-ECU which controls the system based on signals from these sensors, and actuators which operate under the control of the engine-A/T-ECU.

FUEL INJECTION CONTROL

The injector drive times and injection timing are controlled so that the optimum air/fuel mixture is supplied to the engine to correspond to the continually-changing engine operation conditions. A single injector is mounted at the intake port of each cylinder. Fuel is sent under pressure from the fuel tank by the fuel pump, with the pressure being regulated by the fuel pressure regulator. The fuel thus regulated is distributed to each of the injectors.

Fuel injection is normally carried out once for each cylinder for every two rotations of the crankshaft. The firing order is 1-3-4-2. This is called sequential fuel injection. The engine-A/T-ECU provides a richer air/fuel mixture by carrying out "open-loop" control

THROTTLE VALVE OPENING CONTROL

This system electronically controls the opening of the throttle valve. The engine-A/T-ECU detects the amount of travel of the accelerator pedal via the accelerator pedal position sensor, and controls the

IDLE SPEED CONTROL

The idle speed is kept at the optimum speed by controlling the amount of air that passes through the throttle valve in accordance with changes in idling conditions and engine load during idling. The engine-A/T-ECU drives the throttle valve control servo to keep the engine running at the pre-set idle target speed in accordance with the engine coolant

IGNITION TIMING CONTROL

The power transistor located in the ignition primary circuit turns ON and OFF to control the primary current flow to the ignition coil. This controls the ignition timing in order to provide the optimum ignition timing

SELF-DIAGNOSIS FUNCTION

- When an abnormality is detected in one of the sensors or actuators related to emission control, the engine warning lamp (check engine lamp) illuminates as a warning to the driver.
- When an abnormality is detected in one of the sensors or actuators, a diagnosis code corresponding to the abnormality is output.

The engine-A/T-ECU carries out activities such as fuel injection control, idle speed control and ignition timing control. In addition, the engine-A/T-ECU is equipped with several diagnosis modes which simplify troubleshooting when a problem develops.

when the engine is cold or operating under high load conditions in order to maintain engine performance. In addition, when the engine is warm or operating under normal conditions, the engine-A/T-ECU controls the air/fuel mixture by using the oxygen sensor signal to carry out "closed-loop" control in order to obtain the theoretical air/fuel mixture ratio that provides the maximum cleaning performance from the three way catalyst.

actuation of the throttle valve control servo, which is mounted on the throttle body, in order to attain the target throttle valve opening that has been predetermined in accordance with driving conditions.

temperature and A/C and other electrical load. In addition, when the A/C switch is turned off and on while the engine is idling, the throttle valve control servo adjusts the throttle valve passes through air amount according to the engine load conditions to avoid fluctuations in the engine speed.

with respect to the engine operating conditions. The ignition timing is determined by the engine-A/T-ECU from the engine speed, intake air volume, engine coolant temperature and atmospheric pressure.

- The RAM data inside the engine-A/T-ECU that is related to the sensors and actuators can be read by means of the M.U.T.-III. In addition, the actuators can be force-driven under certain circumstances.

OTHER CONTROL FUNCTIONS**1. Fuel Pump Control**

Turns the fuel pump relay ON so that current is supplied to the fuel pump while the engine is cranking or running.

2. A/C Relay Control

Turns the compressor clutch of the A/C ON and OFF.

3. Oil Control Valve Control

The engine-A/T-ECU effects duty cycle control on the engine oil control valve, in accordance with the engine speed. This regulates the supply of engine oil to the intake rocker shaft, which switches the cams.

4. Fan Motor Control

The revolutions of the radiator fan and condenser fan are controlled in response to the engine coolant temperature and vehicle speed.

5. Alternator Output Current Control

Prevents alternator output current from increasing suddenly and idle speed from dropping at times such as when the headlamp are turned on.

6. Purge Control Solenoid Valve Control

(Refer to [P.17-40](#), GROUP 17 – Engine And Emission Control – Evaporative Emission Control System).

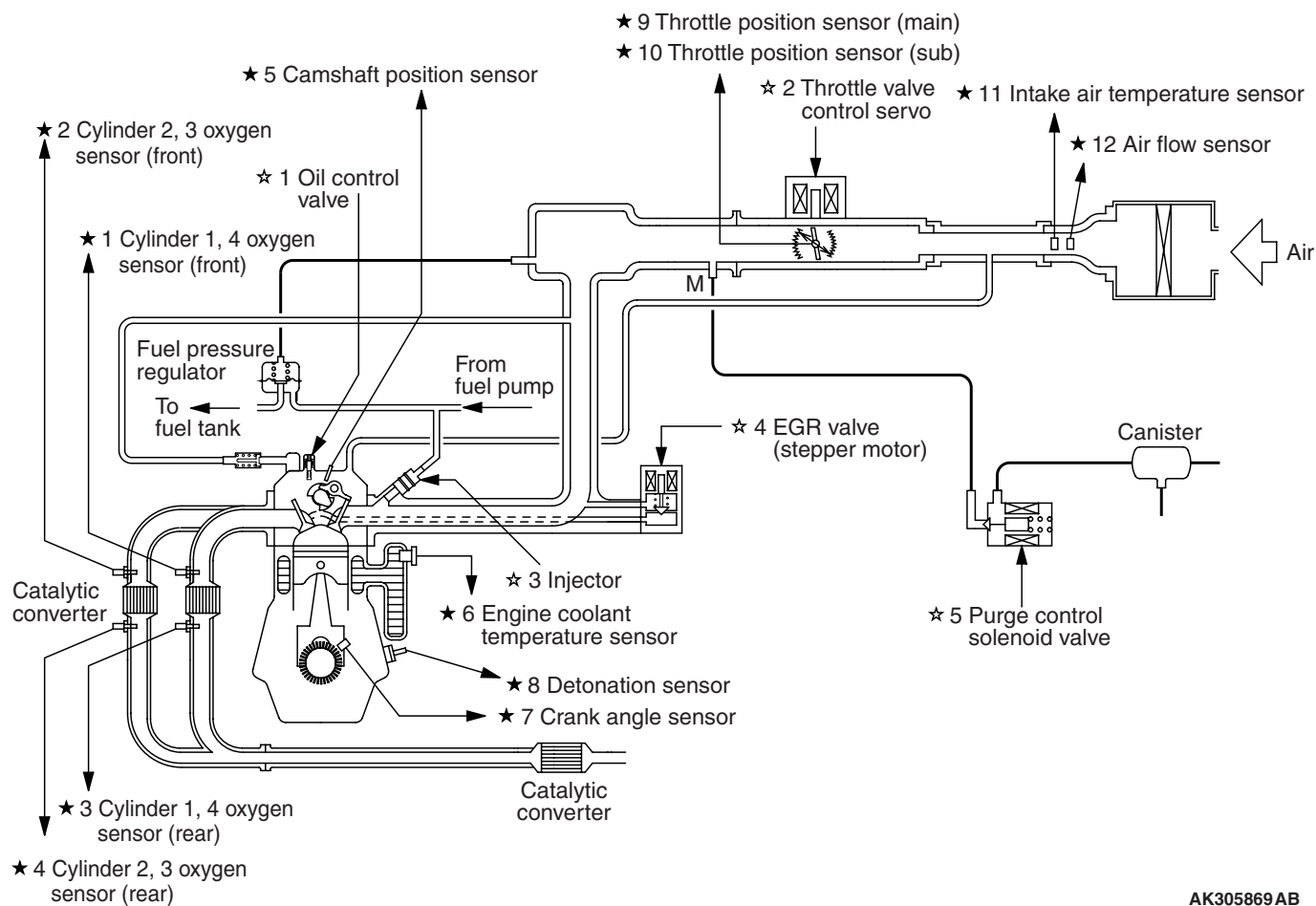
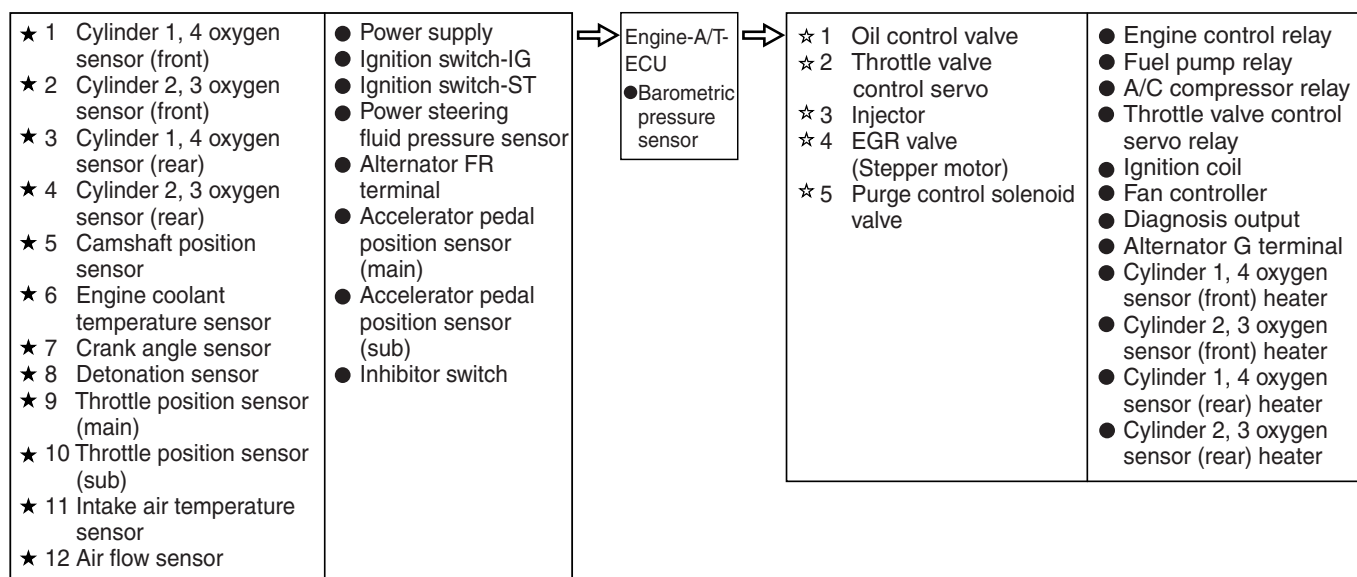
7. EGR Control Solenoid Valve Control

[Refer to [P.17-43](#), GROUP 17 – Engine And Emission Control – Exhaust Gas Recirculation (EGR) System].

GENERAL SPECIFICATIONS

Items		Specifications
Throttle body	Throttle bore mm	60
	Throttle position sensor	Hall element type
	Throttle valve control servo	DC motor type, having broshes
Engine-A/T-E CU	Identification No.	E6T41891
Sensors	Air flow sensor	Heat sensitizing type
	Barometric pressure sensor	Semiconductor type
	Intake air temperature sensor	Thermistor type
	Engine coolant temperature sensor	Thermistor type
	Oxygen sensor	Zirconia type
	Accelerator pedal position sensor	Hall element type
	Inhibitor switch	Contact switch type
	Camshaft position sensor	Magneto resistance element type
	Crank angle sensor	Magneto resistance element type
	Detonation sensor	Piezoelectric type
	Power steering fluid pressure sensor	Semiconductor type
	Throttle position sensor	Hall element type
Actuators	Engine control relay type	Contact switch type
	Fuel pump relay type	Contact switch type
	Injector type and number	Electromagnetic type, 4
	Injector identification mark	HDA305E
	Throttle valve control servo relay	Contact switch type
	Oil control valve	Duty cycle type solenoid valve
	EGR valve	Stepper motor
	Purge control solenoid valve	Duty cycle type solenoid valve
Fuel pressure regulator	Regulator pressure kPa	328

MULTI-POINT FUEL INJECTION SYSTEM DIAGRAM



SERVICE SPECIFICATIONS

M1131000301043

Items		Specifications
Intake air temperature sensor resistance kΩ	-20°C	13 – 17
	0°C	5.3 – 6.7
	20°C	2.3 – 3.0
	40°C	1.0 – 1.5
	60°C	0.56 – 0.76
	80°C	0.30 – 0.45
Engine coolant temperature sensor resistance kΩ	-20°C	14 – 17
	0°C	5.1 – 6.5
	20°C	2.1 – 2.7
	40°C	0.9 – 1.3
	60°C	0.48 – 0.68
	80°C	0.26 – 0.36
Oxygen sensor output voltage (at racing) V		0.6 – 1.0
Oxygen sensor heater resistance (at 20°C) Ω	front	4.5 – 8.0
	rear	11 – 18
Fuel pressure kPa	Vacuum hose disconnection	325 – 335 at curb idle
	Vacuum hose connection	Approximately 256 at curb idle
Injector coil resistance (at 20°C) Ω		10.5 – 13.5
Throttle valve control servo coil resistance (at 20°C) Ω		0.3 – 80
Oil control valve (at 20°C) Ω		6.9 – 7.9

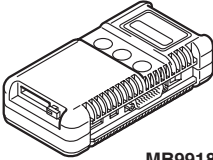
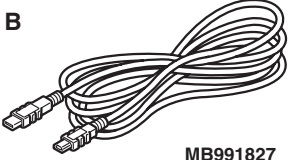
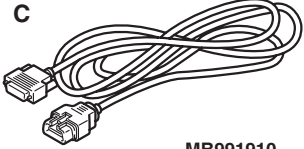
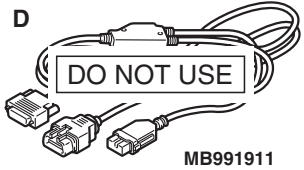
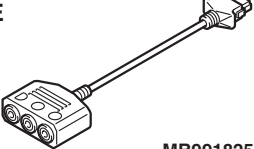
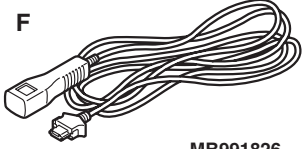


SEALANT



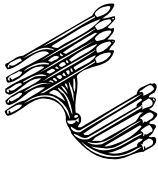

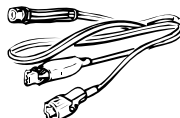
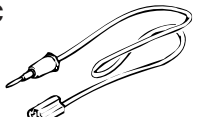

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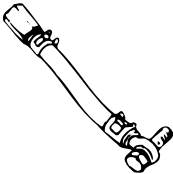


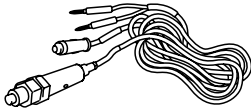
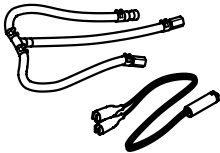
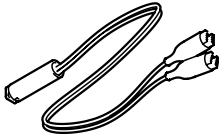
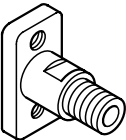
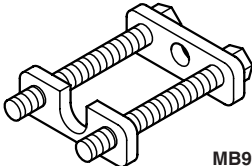
Item	Specified sealant	Remark
Engine coolant temperature sensor threaded portion	3M Nut Locking Part No. 4171 or equivalent	Drying sealant

SPECIAL TOOLS

M1131000601550

Tool	Number	Name	Use
<p>A</p>  <p>MB991824</p> <p>B</p>  <p>MB991827</p> <p>C</p>  <p>MB991910</p> <p>D</p>  <p>MB991911</p> <p>E</p>  <p>MB991825</p> <p>F</p>  <p>MB991826</p> <p>MB991955</p>	<p>MB991955</p> <p>A: MB991824</p> <p>B: MB991827</p> <p>C: MB991910</p> <p>D: MB991911</p> <p>E: MB991825</p> <p>F: MB991826</p>	<p>M.U.T.-III sub assembly</p> <p>A: Vehicle communication interface (V.C.I.)</p> <p>B: M.U.T.-III USB cable</p> <p>C: M.U.T.-III main harness A (Vehicles with CAN communication system)</p> <p>D: M.U.T.-III main harness B (Vehicles without CAN communication system)</p> <p>E: M.U.T.-III measurement adapter</p> <p>F: M.U.T.-III trigger harness</p>	<ul style="list-style-type: none"> • Reading diagnosis code • MPI system inspection • Measurement of fuel pressure <p>⚠ CAUTION</p> <p>For vehicle with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.</p>
 <p>MB991348</p>	MB991348	Test harness set	Measurement of voltage during troubleshooting
	MB991709	Test harness	<ul style="list-style-type: none"> • Measurement of voltage during troubleshooting • Inspection using an oscilloscope

Tool	Number	Name	Use
	MB991316	Test harness (4-pin, square)	<ul style="list-style-type: none"> • Measurement of voltage during troubleshooting • Inspection of oxygen sensor (front)
	MD998464	Test harness (4-pin, square)	<ul style="list-style-type: none"> • Measurement of voltage during troubleshooting • Inspection of oxygen sensor (rear)
 MB991658	MB991658	Test harness	<ul style="list-style-type: none"> • Measurement of voltage during troubleshooting • Inspection using an oscilloscope • Inspection of data list
<p>A</p>  <p>B</p>  <p>C</p>  <p>D</p>  <p>MB991223AB</p>	<p>MB991223</p> <p>A: MB991219</p> <p>B: MB991220</p> <p>C: MB991221</p> <p>D: MB991222</p>	<p>Harness set</p> <p>A: Test harness</p> <p>B: LED harness</p> <p>C: LED harness adapter</p> <p>D: Probe</p>	<ul style="list-style-type: none"> • Check at the ECU terminals A: Connector pin contact inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

Tool	Number	Name	Use
	MD998709	Adaptor hose	Measurement of fuel pressure
	MD998742	Hose adaptor	
 MB991637	MB991637	Fuel pressure gauge set	
 MB991981	MB991981	Fuel pressure gauge set	
 MB992076	MB992076	Injector test set	Checking the spray condition of injectors
 MB991607	MB991607	Injector test harness	
 MD998741	MD998741	Injector test adaptor	
 MB991976	MB991976	Injector test holder assembly	

TROUBLESHOOTING

DIAGNOSIS TROUBLESHOOTING FLOW

Refer to [P.00-5](#), GROUP 00 – How to Use Troubleshooting/Inspection Service Points.

DIAGNOSIS FUNCTION

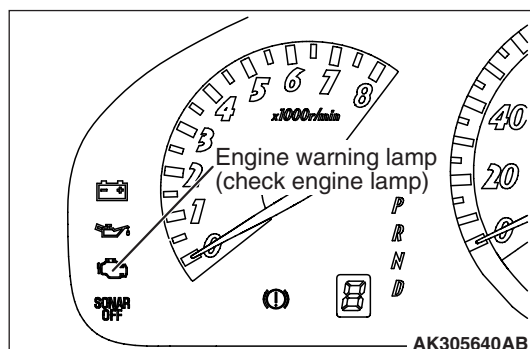
ENGINE WARNING LAMP (CHECK ENGINE LAMP)

M1131155501486

M1131150000999

If an abnormality occurs in any of the following items related to the Multipoint Fuel Injection (MPI) system, the engine warning lamp will illuminate.

If the lamp remains illuminated or if the lamp illuminates while the engine is running, check the diagnosis code output.



ENGINE WARNING LAMP INSPECTION ITEMS

Code No.	Diagnosis item
–	Engine-A/T-ECU
P0075	Oil control valve system
P0100	Air flow sensor system
P0105	Barometric pressure sensor system
P0110	Intake air temperature sensor system
P0115	Engine coolant temperature sensor system
P0120	Throttle position sensor (main) system
P0130	Cylinder 1, 4 oxygen sensor (front) system
P0135	Cylinder 1, 4 oxygen sensor (front) heater system
P0136	Cylinder 1, 4 oxygen sensor (rear) system
P0141	Cylinder 1, 4 oxygen sensor (rear) heater system
P0150	Cylinder 2, 3 oxygen sensor (front) system
P0155	Cylinder 2, 3 oxygen sensor (front) heater system
P0156	Cylinder 2, 3 oxygen sensor (rear) system
P0161	Cylinder 2, 3 oxygen sensor (rear) heater system
P0170	Abnormal fuel system (cylinder 1, 4)
P0173	Abnormal fuel system (cylinder 2, 3)
P0201	No. 1 injector system
P0202	No. 2 injector system
P0203	No. 3 injector system
P0204	No. 4 injector system
P0220	Accelerator pedal position sensor (main) system

Code No.	Diagnosis item
P0225	Throttle position sensor (sub) system
P0300	Ignition coil (power transistor) system
P0325	Detonation sensor system
P0335	Crank angle sensor system
P0340	Camshaft position sensor system
P0403	Exhaust gas recirculation control system
P0551	Power steering fluid pressure sensor system
P0606	Microcomputer malfunction
P0630	Vehicle identification number (VIN) malfunction
P0638	Throttle valve control servo circuit range/performance problem
P1121	Throttle valve control servo power system
P1122	Throttle valve control servo connector system
P1221	Throttle valve position feedback system
P1223	Communication line system with the throttle valve controller
P1225	Accelerator pedal position sensor (sub) system

NOTE:

- When the electronic-controlled throttle valve system is stopped by the fail-safe function, the engine warning lamp (check engine lamp) is illuminated.

METHOD OF READING AND ERASING DIAGNOSIS CODES

Refer to [P.00-5](#), GROUP 00 – How to Use Troubleshooting/Inspection Service Points.

DIAGNOSIS USING DIAGNOSIS 2 MODE

1. Switch the diagnosis mode of the engine control unit to DIAGNOSIS 2 mode using the M.U.T.-III.
2. Carry out a road test.
3. Take a reading of the diagnosis code and repair the problem location.
4. Turn the ignition switch to OFF and then back to ON again.

NOTE: By turning the ignition switch to OFF, the engine-A/T-ECU will switch the diagnosis mode from DIAGNOSIS 2 mode to DIAGNOSIS 1 mode.

5. Erase the diagnosis codes.

INSPECTION USING M.U.T.-III DATA LIST AND ACTUATOR TESTING

1. Carry out inspection by means of the data list and the actuator test function, if there is an abnormality, check and repair the chassis harness and components.
2. After repairing, re-check using the M.U.T.-III and check that the abnormal input and output have returned to normal as a result of the repairs.
3. Erase the diagnosis code memory.
4. Remove the M.U.T.-III, and then start the engine again and carry out a road test to confirm that the problem has disappeared.

FREEZE FRAME DATA

When the engine-A/T-ECU detects a malfunction and stores a diagnosis code, it also stores a current status of the engine. This function is called "Freeze frame data". By analyzing this "Freeze frame" data with the M.U.T.-III, an effective troubleshooting can be performed.

The display items of freeze frame data are shown below.

DISPLAY ITEM LIST

Item No.	Data		Unit
21	Engine coolant temperature sensor		°C
22	Crank angle sensor		r/min
24	Vehicle speed		km/h
81	Long-term fuel compensation (cylinder 1, 4)		%
82	Short-term fuel compensation (cylinder 1, 4)		%
83	Long-term fuel compensation (cylinder 2, 3)		%
84	Short-term fuel compensation (cylinder 2, 3)		%
87	Calculation load value		%
88	Fuel control condition (cylinder 1, 4)	Open loop	OL
		Closed loop	CL
		Open loop owing to drive condition	OL-DRV.
		Open loop owing to system malfunction	OL-SYS.
89	Fuel control condition (cylinder 2, 3)	Open loop	OL
		Closed loop	CL
		Open loop owing to drive condition	OL-DRV.
		Open loop owing to system malfunction	OL-SYS.
–	Diagnosis code during data recording		–

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

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
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 (main)	<ul style="list-style-type: none"> Controls the throttle valve position through the use of the throttle position sensor (sub) signal. Renders the amount of accelerator pedal travel as being approximately one-half the normal opening angle. Prohibits the operation of the engine speed feedback control. Cuts off fuel when the engine speed exceeds 3,000 r/min. Suppresses the engine output by stopping the electronic-controlled throttle valve system if the throttle position sensor (sub) is also malfunctioning.
Throttle position sensor (sub)	<ul style="list-style-type: none"> Controls the throttle valve position through the use of the throttle position sensor (main) signal. Renders the amount of accelerator pedal travel as being approximately one-half the normal opening angle. Cuts off fuel when the engine speed exceeds 3,000 r/min. Suppresses the engine output by stopping the electronic-controlled throttle valve system if the throttle position sensor (main) is also malfunctioning.
Accelerator pedal position sensor (main)	<ul style="list-style-type: none"> Detects the amount of the accelerator pedal travel through the use of the accelerator pedal position sensor (sub) signal, but rendering it only as being approximately one-half the normal opening angle. Cuts off fuel when the engine speed exceeds 3,000 r/min. Suppresses the engine output by stopping the electronic-controlled throttle valve system if the accelerator pedal position sensor (sub) is also malfunctioning.
Accelerator pedal position sensor (sub)	<ul style="list-style-type: none"> Detects the amount of the accelerator pedal travel through the use of the accelerator pedal position sensor (main) signal, but rendering it only as being approximately one-half the normal opening angle. Cuts off fuel when the engine speed exceeds 3,000 r/min. Suppresses the engine output by stopping the electronic-controlled throttle valve system if the accelerator pedal position sensor (main) is also malfunctioning.
Engine coolant temperature sensor	Controls as if the engine coolant temperature is 80°C. (This control will be continued until the ignition switch is turned to the "LOCK" (OFF) position even though the sensor signal returns to normal.)
Camshaft position sensor	<ul style="list-style-type: none"> The control condition before the fail is determined is continued. After 4 seconds pass from when the malfunction is detected, the fuel is shut off. (After the ignition switch is turned to ON position, the No.1 cylinder top dead center is no detected at all.)
Detonation sensor	The ignition timing is set having enough time against knocking.
Ignition coil (incorporating power transistor)	Cuts off the fuel supply to cylinders with an abnormal ignition.
Alternator FR terminal	Does not control the output of the alternator according to an electrical load. (works as a normal alternator)

Malfunctioning item	Control contents during malfunction
Throttle valve position feedback	<ul style="list-style-type: none"> • Suppresses the engine output by stopping the electronic-controlled throttle valve system.
Throttle valve control servo	<ul style="list-style-type: none"> • Suppresses the engine output by stopping the electronic-controlled throttle valve system.
Throttle valve control microcomputer	<ul style="list-style-type: none"> • Suppresses the engine output by stopping the electronic-controlled throttle valve system.
Communication between throttle valve control microcomputer and engine control microcomputer	<ul style="list-style-type: none"> • Renders the amount of accelerator pedal travel as being approximately one-half the normal opening angle. • Cuts off fuel when the engine speed exceeds 3,000 r/min.

INSPECTION CHART FOR DIAGNOSIS CODE

M1131151001928

Code No.	Diagnosis item	Reference page
P0075	Oil control valve circuit	P.13B-17
P0100	Air flow sensor system	P.13B-22
P0105	Barometric pressure sensor system	P.13B-27
P0110	Intake air temperature sensor system	P.13B-28
P0115	Engine coolant temperature sensor system	P.13B-33
P0120	Throttle position sensor (main) system	P.13B-39
P0130	Cylinder 1, 4 oxygen sensor (front) system	P.13B-44
P0135	Cylinder 1, 4 oxygen sensor (front) heater system	P.13B-49
P0136	Cylinder 1, 4 oxygen sensor (rear) system	P.13B-54
P0141	Cylinder 1, 4 oxygen sensor (rear) heater system	P.13B-59
P0150	Cylinder 2, 3 oxygen sensor (front) system	P.13B-65
P0155	Cylinder 2, 3 oxygen sensor (front) heater system	P.13B-70
P0156	Cylinder 2, 3 oxygen sensor (rear) system	P.13B-76
P0161	Cylinder 2, 3 oxygen sensor (rear) heater system	P.13B-81
P0170	Abnormal fuel system (cylinder 1, 4)	P.13B-87
P0173	Abnormal fuel system (cylinder 2, 3)	P.13B-88
P0201	No. 1 injector system	P.13B-90
P0202	No. 2 injector system	P.13B-94
P0203	No. 3 injector system	P.13B-98
P0204	No. 4 injector system	P.13B-102
P0220	Accelerator pedal position sensor (main) system	P.13B-106
P0225	Throttle position sensor (sub) system	P.13B-111
P0300	Ignition coil (power transistor) system	P.13B-116
P0325	Detonation sensor system	P.13B-120
P0335	Crank angle sensor system	P.13B-123

Code No.	Diagnosis item	Reference page
P0340	Camshaft position sensor system	P.13B-131
P0403	Exhaust gas recirculation control system	P.13B-139
P0500	Vehicle speed signal system	P.13B-143
P0513	Immobilizer malfunction	P.13B-143
P0551	Power steering fluid pressure sensor system	P.13B-144
P0603	EEP ROM system	P.13B-150
P0606	Microcomputer malfunction	P.13B-150
P0622	Alternator FR terminal system	P.13B-151
P0630	Vehicle identification number (VIN) malfunction	P.13B-154
P0638	Throttle valve control servo circuit range/performance problem	P.13B-155
P1121	Throttle valve control servo power system	P.13B-158
P1122	Throttle valve control servo connector system	P.13B-163
P1221	Throttle valve position feedback system	P.13B-166
P1223	Communication line system with the throttle valve controller	P.13B-169
P1225	Accelerator pedal position sensor (sub) system	P.13B-170
P1603	Battery backup circuit malfunction	P.13B-175
U1073	Bus off	P.13B-177
U1102	ABS-ECU time-out	P.13B-177
U1108	Combination meter time-out	P.13B-179
U1110	A/C-ECU time-out	P.13B-180
U1117	Immobilizer-ECU time-out	P.13B-182

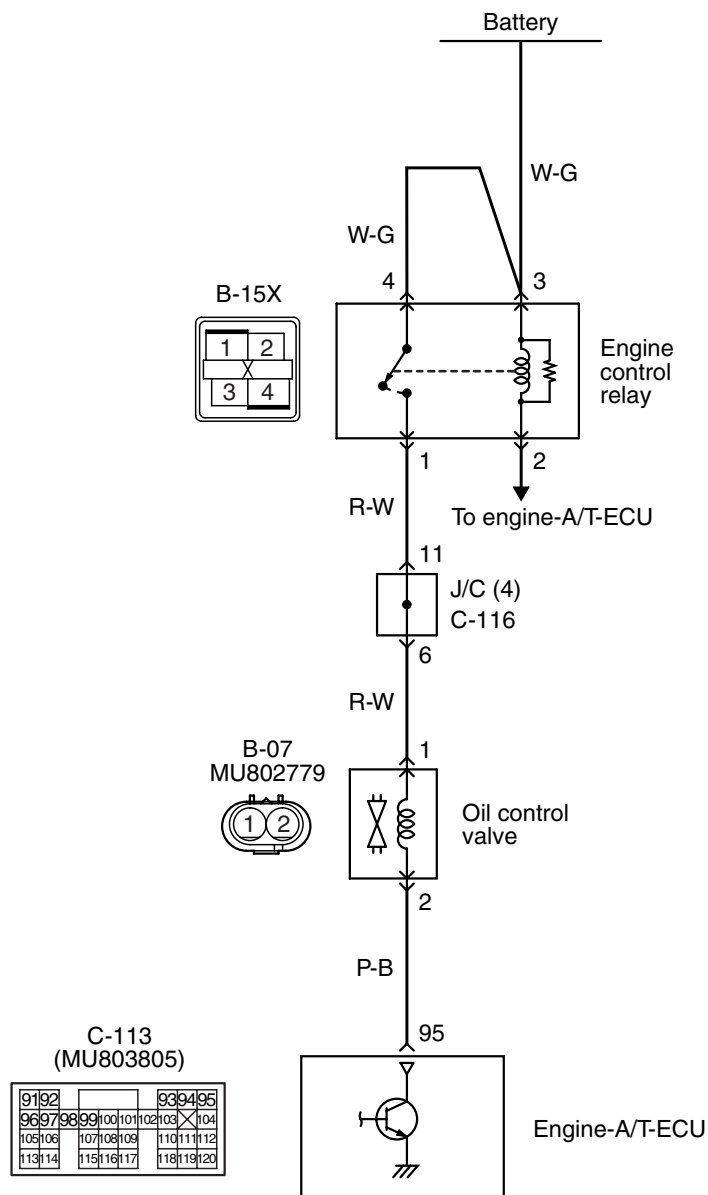
NOTE:

- Do not replace the engine-A/T-ECU until a through terminal check reveals there are no short/open circuit.
- Check that the engine-A/T-ECU earth circuit is normal before checking for the cause of the problem.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code No. P0075: Oil Control Valve Circuit

Oil control valve 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

OPERATION

- Power is supplied to the oil control valve (terminal No. 1) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 95) makes the power transistor in the unit be in ON position, and that makes currents go on the oil control valve (terminal No. 2).

FUNCTION

- The oil control valve switches the cams to operate the MIVEC in the low-speed or high-speed mode in accordance with the signals from the engine-A/T-ECU.

TROUBLE JUDGMENT**Check Condition**

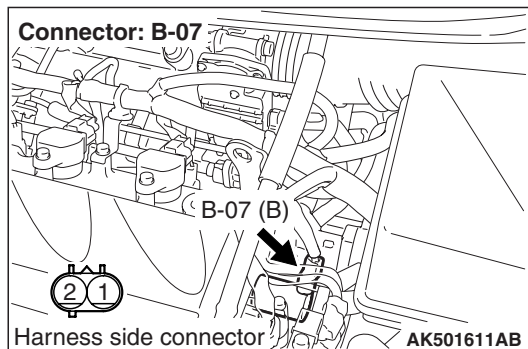
- The oil control valve does not operate. (i.e. when the ignition switch is in ON position or the engine runs at the idle speed and so on)

Judgment Criterion

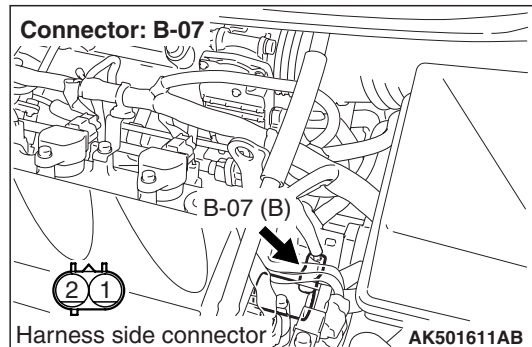
- The oil control valve drive terminal voltage of the engine-A/T-ECU is not normal for 2 seconds or more.

PROBABLE CAUSE

- Failed oil control valve
- Open/short circuit in oil control valve circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-07 oil control valve connector****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Repair or replace.**STEP 2. Check oil control valve itself.**

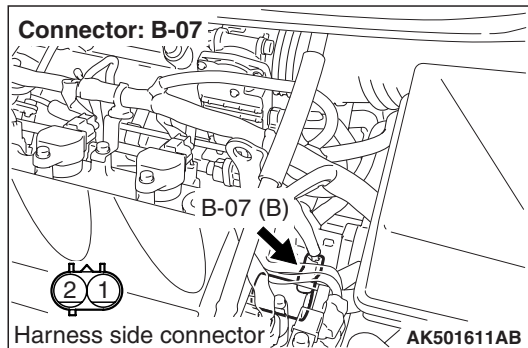
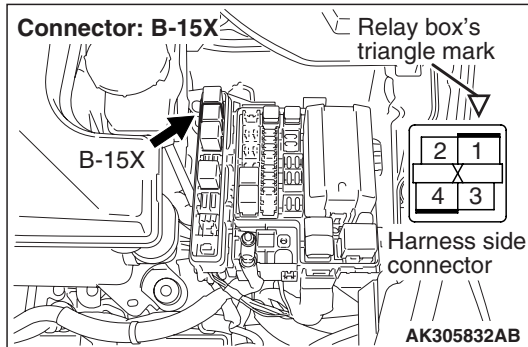
- Check oil control valve itself (Refer to P.13B-292).

Q: Is the check result normal?**YES :** Go to Step 3 .**NO :** Replace oil control valve.**STEP 3. Perform voltage measurement at B-07 oil control valve connector.**

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

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

STEP 4. Connector check: B-15X engine control relay connector



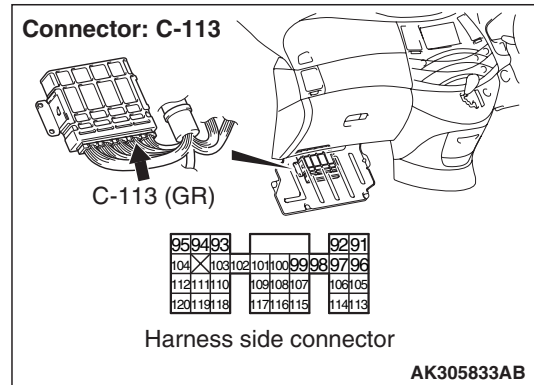
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-07 (terminal No. 1) oil control valve connector and B-15X (terminal No. 1) engine control relay connector.

- Check power line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-113 engine-A/T-ECU connector.



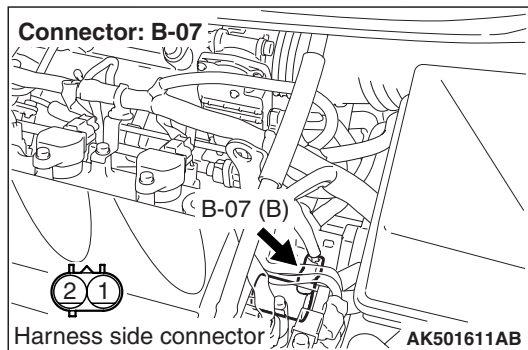
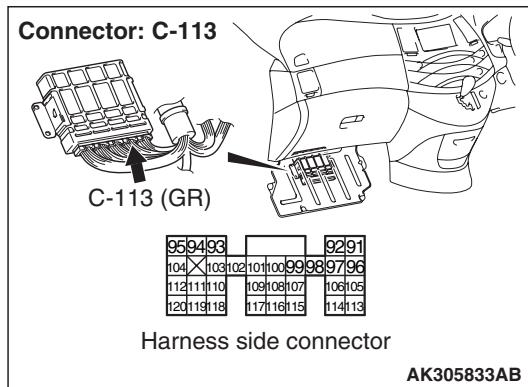
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 95 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 7 .

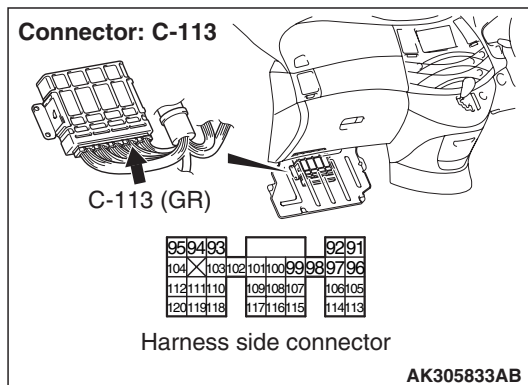
NO : Go to Step 6 .

STEP 6. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Check and repair harness between B-07 (terminal No. 2) oil control valve connector and C-113 (terminal No. 95) engine-A/T-ECU connector.

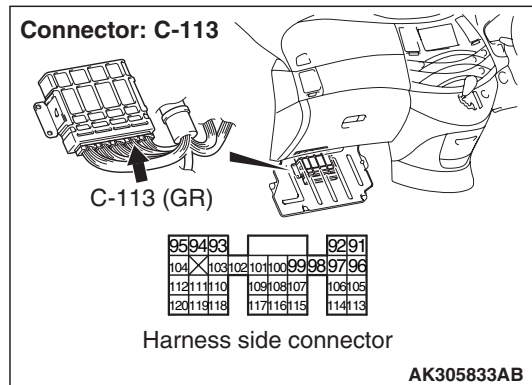
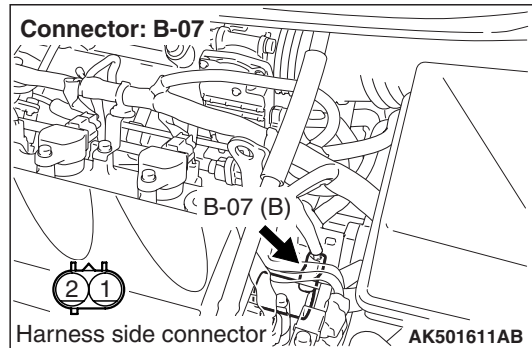
- Check output line for open/short circuit.

NO : Repair or replace.

STEP 7. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 8 .

NO : Repair or replace.

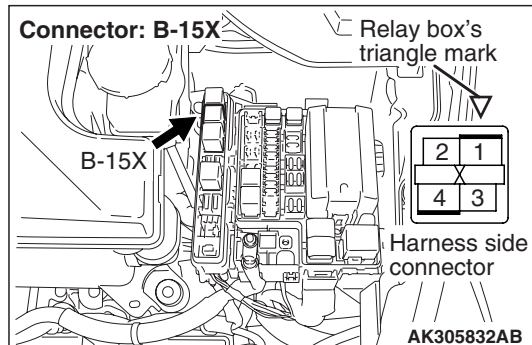
STEP 8. Check harness between B-07 (terminal No. 2) oil control valve connector and C-113 (terminal No. 95) engine-A/T-ECU connector.

- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 9 .

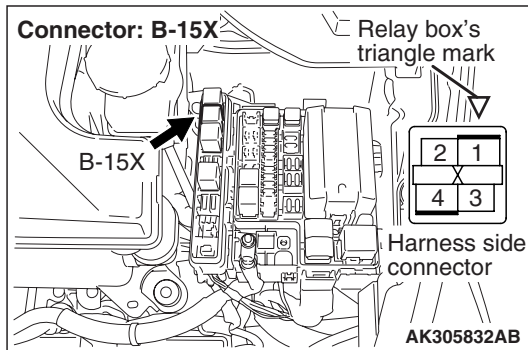
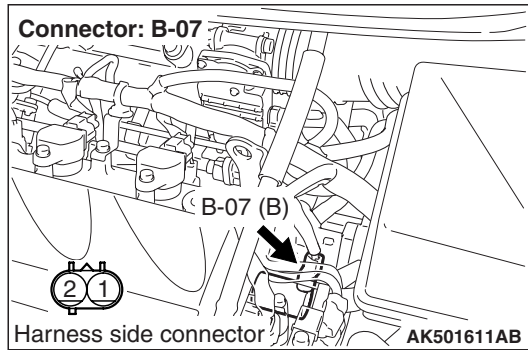
NO : Repair or replace.

STEP 9. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Go to Step 10 .

NO : Repair or replace.

STEP 10. Check harness between B-07 (terminal No. 1) oil control valve connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

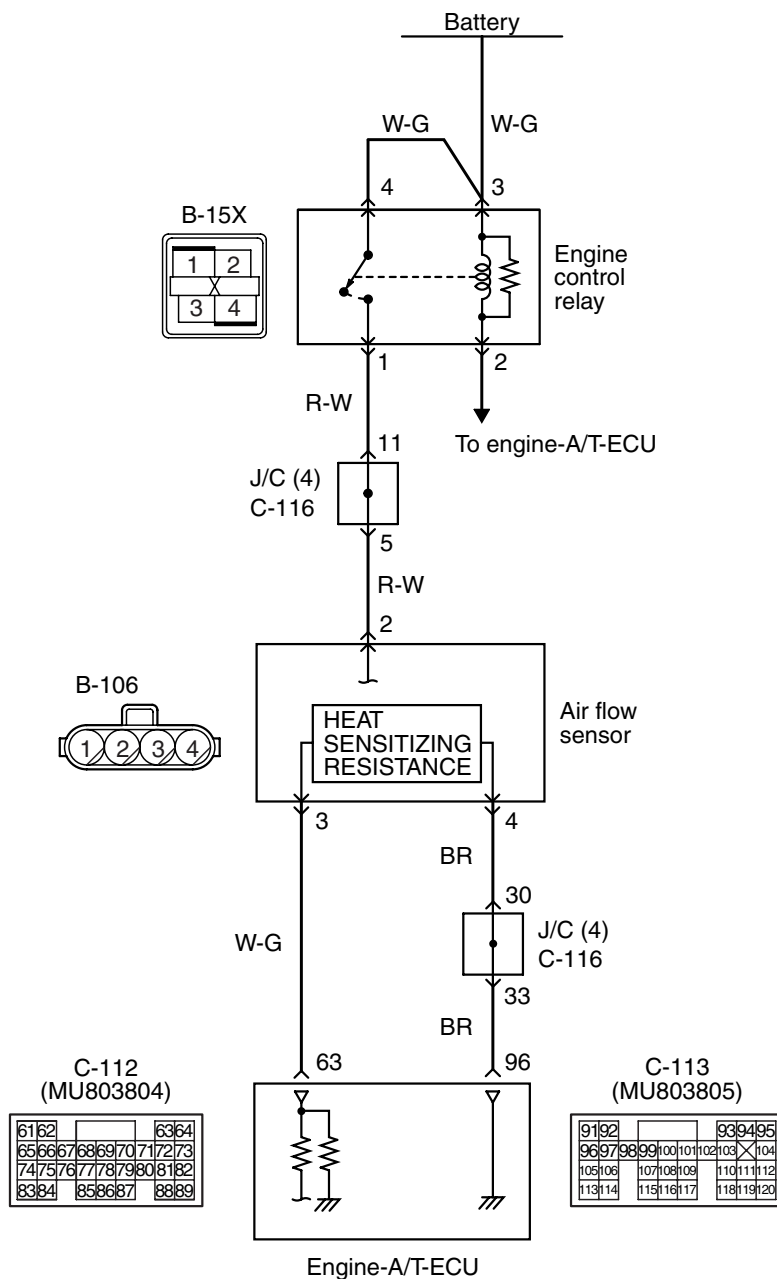
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0100: Air Flow Sensor System

Air flow sensor circuit



OPERATION

- Power is supplied by the engine control relay (terminal No. 1) to the air flow sensor (terminal No. 2), and the air flow sensor (terminal No. 4) is earthed through the engine-A/T-ECU (terminal No. 96).
- The air flow sensor (terminal No. 3) outputs a sensor signal, which is input into the engine-A/T-ECU (terminal No. 63).

FUNCTION

- The air flow sensor outputs amperage that varies in accordance with the intake air volume.
- The engine-A/T-ECU uses the amperage output by the air flow sensor and the engine speed signal in order to determine the basic injection duration of the injector.

TROUBLE JUDGMENT

Check Condition

- After 3 seconds have passed since the ignition switch was turned to ON position.

Judgment Criteria

- Air flow sensor output voltage has continued to be 0.2 V or less for 2 seconds.

or

- Air flow sensor output voltage has continued to be 4.9 V or more for 2 seconds.

PROBABLE CAUSE

- Failed air flow sensor
- Open/short circuit in air flow sensor circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

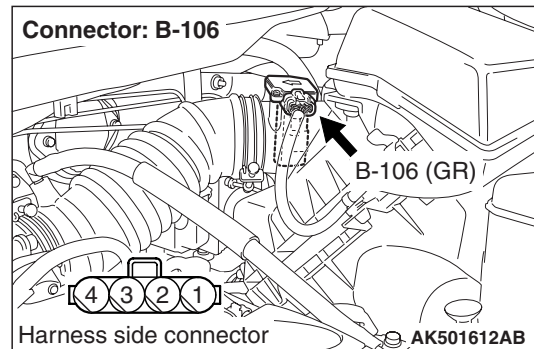
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-106 air flow sensor connector

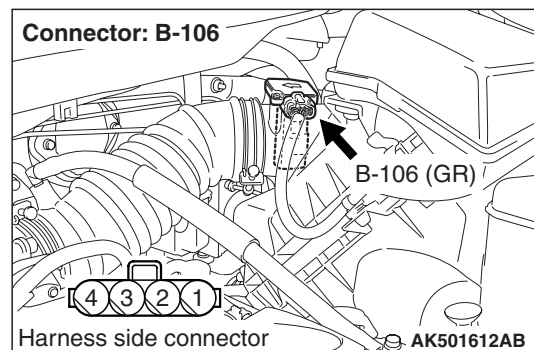


Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform voltage measurement at B-106 air flow sensor connector.



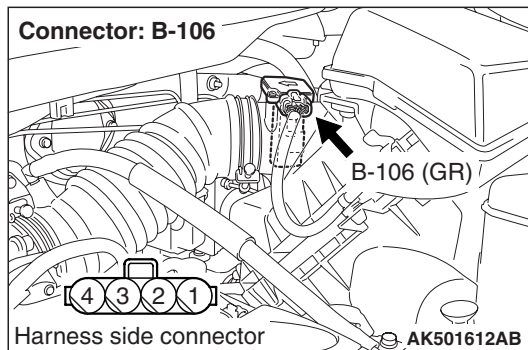
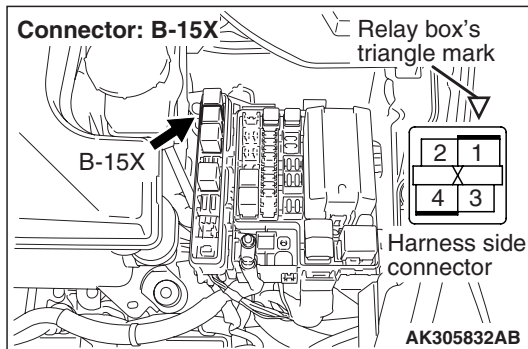
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 2 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

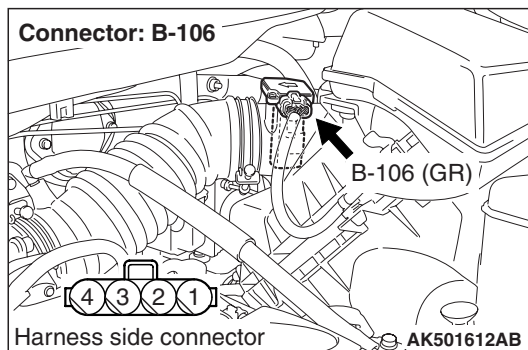
STEP 4. Connector check: B-15X engine control relay connector

Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-106 (terminal No. 2) air flow sensor connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Check resistance measurement at B-106 air flow sensor connector.

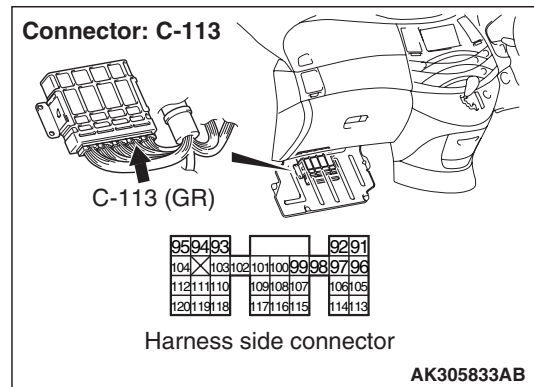
- Disconnect and measure at harness side.
- Resistance between terminal No. 4 and earth.

OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 9 .

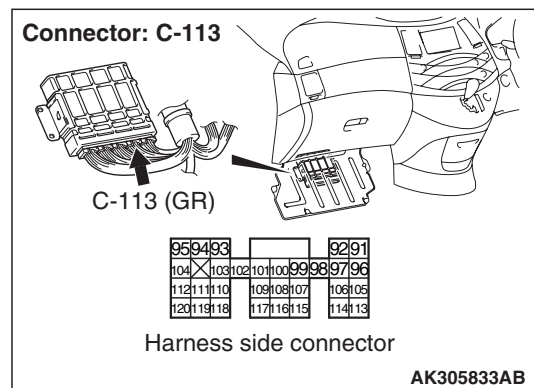
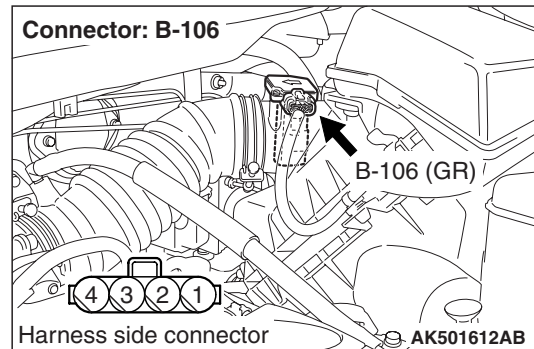
NO : Go to Step 6 .

STEP 6. Connector check: C-113 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-106 (terminal No. 4) air flow sensor connector and C-113 (terminal No. 96) engine-A/T-ECU connector.

NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair.

STEP 8. M.U.T.-III data list

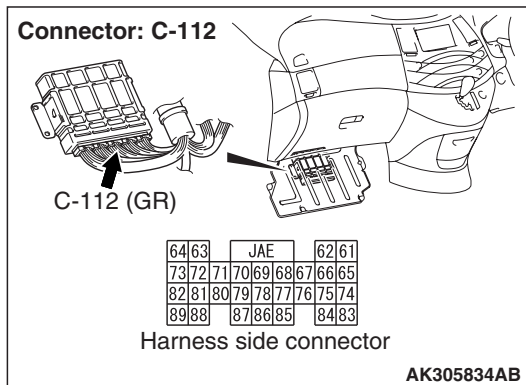
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 9. Connector check: C-112 engine-A/T-ECU connector.

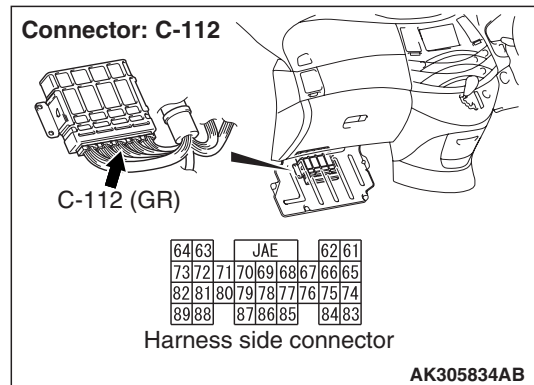
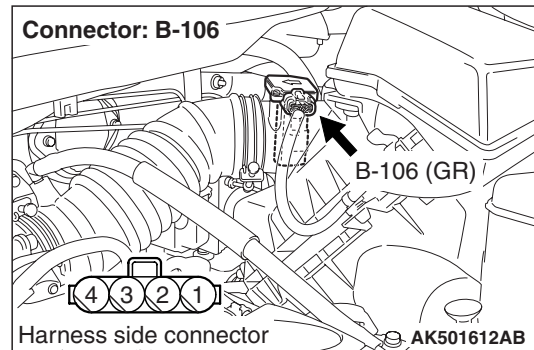


Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair or replace.

STEP 10. Check harness between B-106 (terminal No. 3) air flow sensor connector and C-112 (terminal No. 63) engine-A/T-ECU connector.



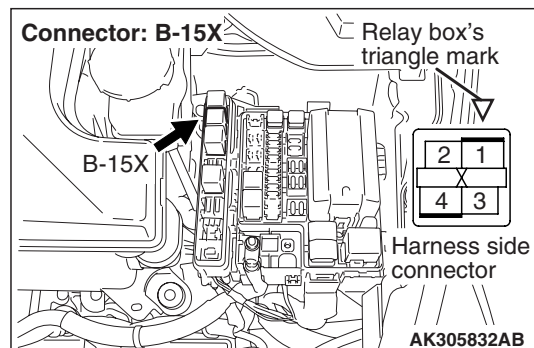
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. Connector check: B-15X engine control relay connector

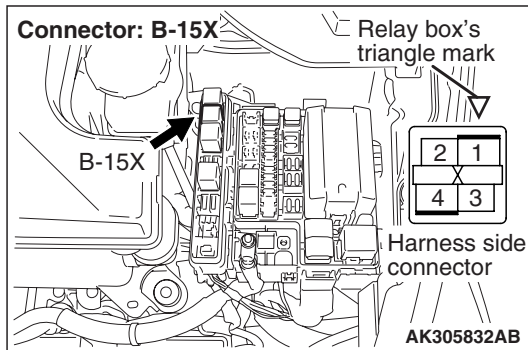
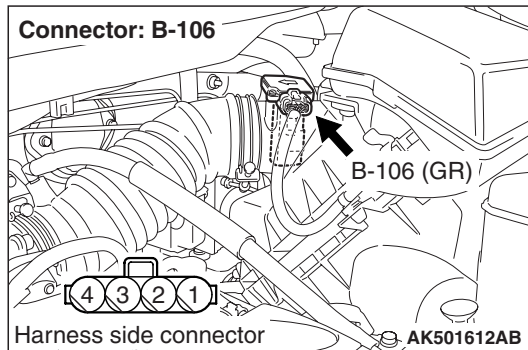


Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Check harness between B-106 (terminal No. 2) air flow sensor connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair.

STEP 13. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace air flow sensor. Then go to Step 14

STEP 14. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0105: Barometric Pressure Sensor System

FUNCTION

- The barometric pressure sensor converts the barometric pressure into a voltage signal and inputs the signal to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU corrects the fuel injection amount, etc.

TROUBLE JUDGMENT

Check Conditions

- 2 seconds later after the ignition switch has been in ON position or the engine has started up.
- The battery voltage is 8 V or more.

Judgment Criteria

- The sensor output voltage is 4.5 V or more (barometric pressure of above 114 kPa or equivalent) for 4 seconds.

or

- The sensor output voltage is 0.2 V or less (barometric pressure of below 53 kPa or equivalent) for 4 seconds.

PROBABLE CAUSE

- Failed barometric pressure sensor

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

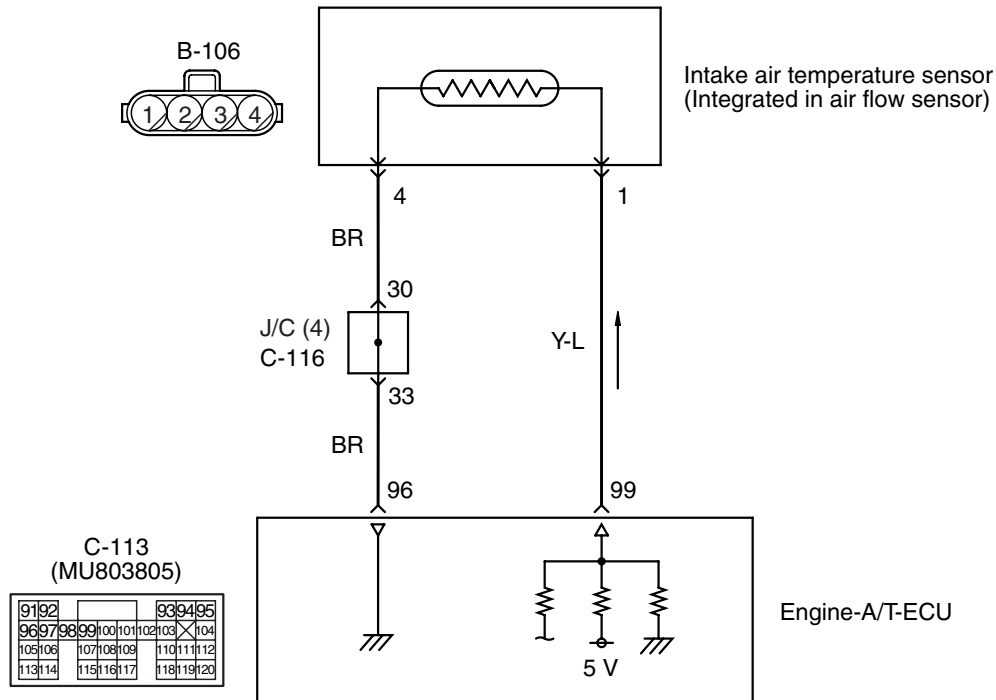
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0110: Intake Air Temperature Sensor System

Intake air temperature 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

AK305820AB

OPERATION

- A power voltage of 5 V is applied to the intake air temperature sensor output terminal (terminal No. 1) of the air flow sensor connector from the engine-A/T-ECU (terminal No. 99).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 96) from the air flow sensor (terminal No. 4).

FUNCTION

- The intake air temperature sensor converts the intake air temperature into a voltage and inputs the voltage signal to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU corrects the fuel injection amount, etc.
- The intake air temperature sensor is a kind of resistor, which has characteristics to reduce its resistance as the intake air temperature rises. Therefore, the sensor output voltage varies with the intake air temperature, and becomes lower as the intake air temperature rises.

TROUBLE JUDGMENT

Check Condition

- 2 seconds later after the ignition switch has been in ON position or the engine has started up.

Judgment Criteria

- The sensor output voltage is 4.6 V or more (intake air temperature of below -40°C or equivalent) for 4 seconds.

or

- The sensor output voltage is 0.2 V or less (intake air temperature of above 120°C or equivalent) for 4 seconds.

PROBABLE CAUSE

- Failed intake air temperature sensor
- Open/short circuit in intake air temperature sensor circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

- Item 13: Intake air temperature sensor

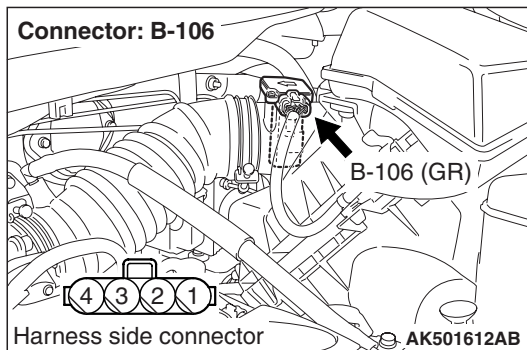
OK: At ambient temperature (atmospheric temperature) or equivalent.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-106 air flow sensor connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check intake air temperature sensor itself.

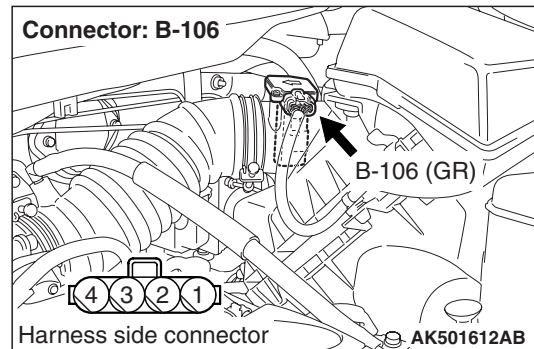
- Check intake air temperature sensor itself (Refer to [P.13B-287](#)).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace air flow sensor.

STEP 4. Perform resistance measurement at B-106 air flow sensor connector.



- Disconnect connector, and measure at harness side.

- Voltage between terminal No. 4 and earth.

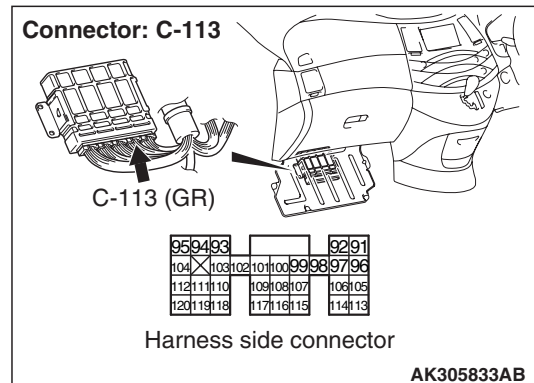
OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector

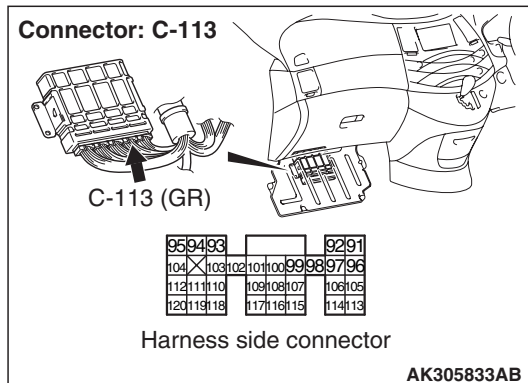
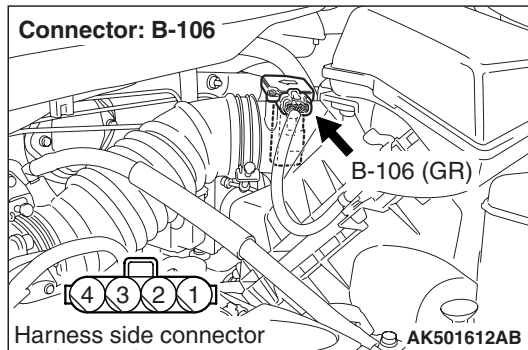


Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check harness between B-106 (terminal No. 4) air flow sensor connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III data list

- Item No. 13: Intake air temperature sensor

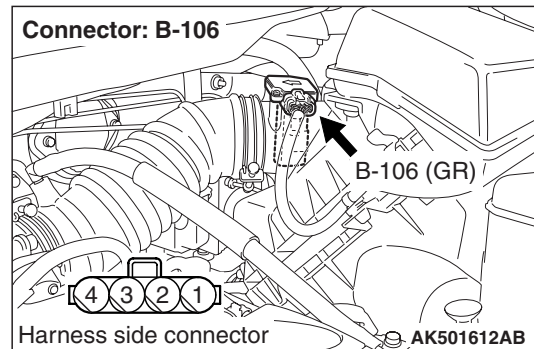
OK: At ambient temperature (atmospheric temperature) or equivalent.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 8. Perform voltage measurement at B-106 air flow sensor connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

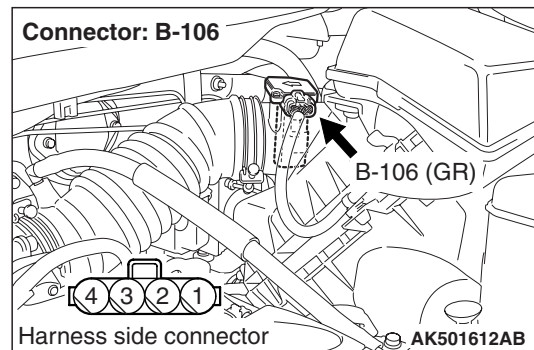
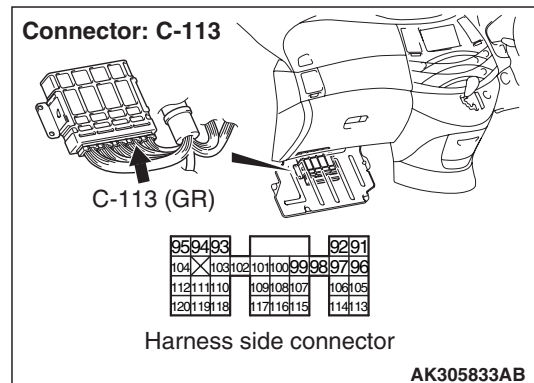
OK: 4.5 – 4.9 V

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Go to Step 9 .

STEP 9. Perform voltage measurement at C-113 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Disconnect B-106 air flow sensor connector.
- Ignition switch: ON
- Voltage between terminal No. 99 and earth.

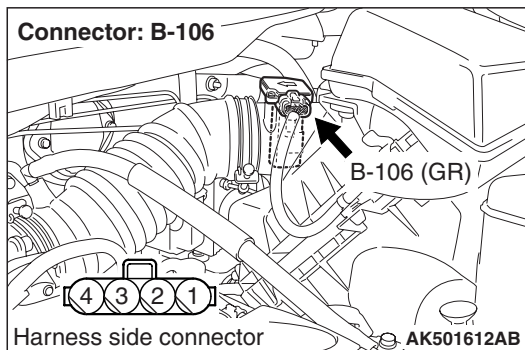
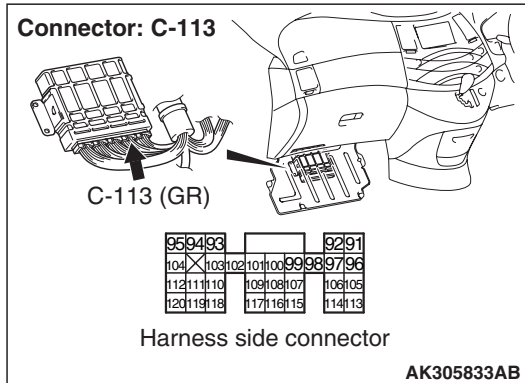
OK: 4.5 – 4.9 V

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 11 .

**STEP 10. Connector check: C-113
engine-A/T-ECU connector**



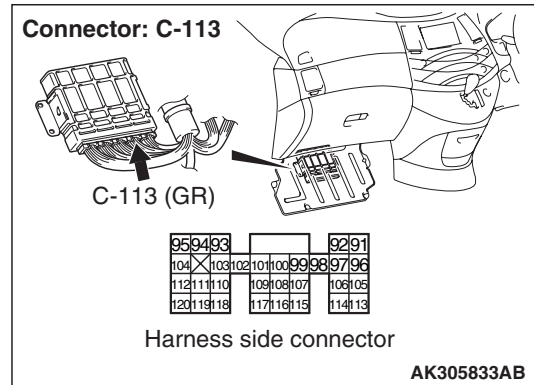
Q: Is the check result normal?

YES : Check and repair harness between B-106 (terminal No. 1) air flow sensor connector and C-113 (terminal No. 99) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

**STEP 11. Connector check: C-113
engine-A/T-ECU connector**



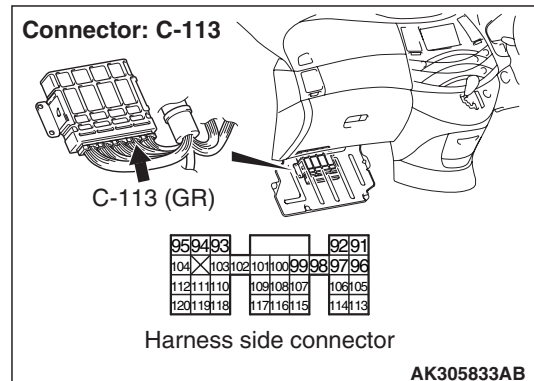
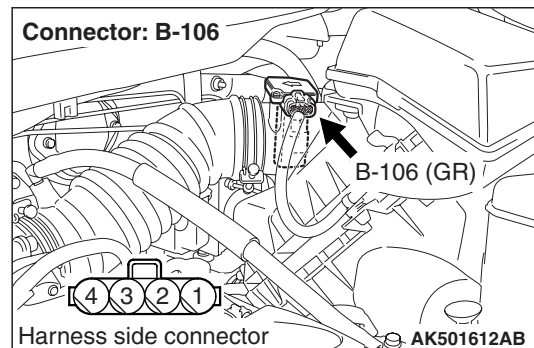
Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Check harness between B-106 (terminal No. 1) air flow sensor connector and C-113 (terminal No. 99) engine-A/T-ECU connector.

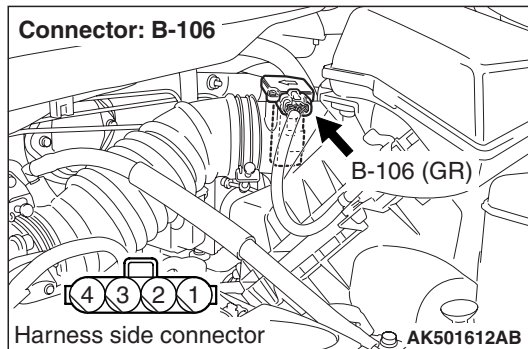
- Check output line for short circuit.



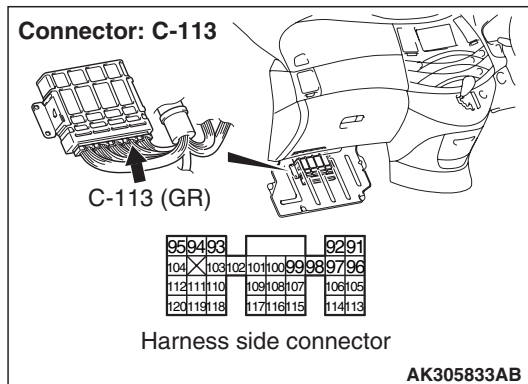
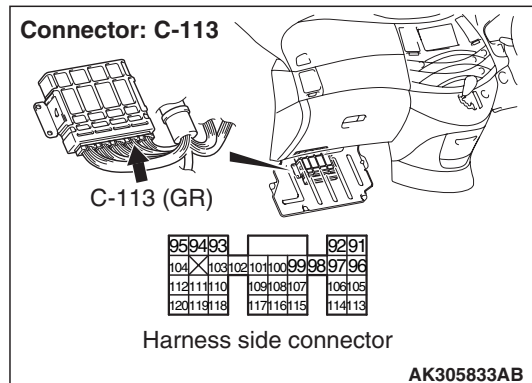
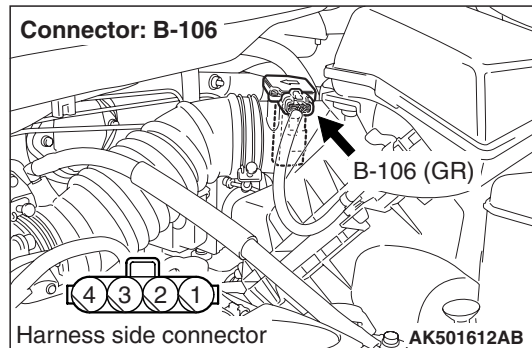
Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 13. Perform voltage measurement at B-106 air flow sensor connector.

- Use special tool test harness (MB991709) to connect only terminal No. 1 and No. 4, and then measure at pick-up harness.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

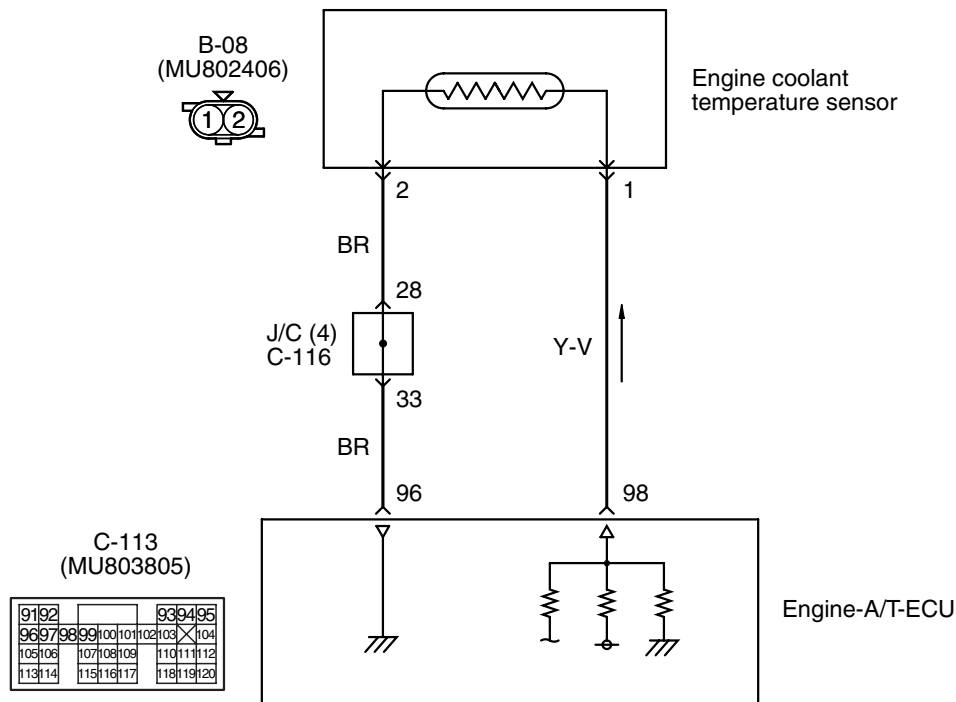
OK:Ambient temperature at -20°C : 3.8 – 4.4 VAmbient temperature at 0°C : 3.2 – 3.8 VAmbient temperature at 20°C : 2.3 – 2.9 VAmbient temperature at 40°C : 1.5 – 2.1 VAmbient temperature at 60°C : 0.8 – 1.4 VAmbient temperature at 80°C : 0.4 – 1.0 V**Q: Is the check result normal?****YES :** Go to Step 7 .**NO :** Go to Step 14 .**STEP 14. Connector check: C-113 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 15 .**NO :** Repair or replace.**STEP 15. Check harness between B-106 (terminal No. 1) air flow sensor connector and C-113 (terminal No. 99) engine-A/T-ECU connector.**

- Check output line for damage.

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

Code No. P0115: Engine Coolant Temperature Sensor System

Engine coolant temperature sensor circuit



AK305821 AB

OPERATION

- A power voltage of 5 V is applied to the engine coolant temperature sensor output terminal (terminal No. 1) from the engine-A/T-ECU (terminal No. 98).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 96) from the engine coolant temperature sensor (terminal No. 2).

FUNCTION

- The engine coolant temperature sensor converts the engine coolant temperature into a voltage signal, and inputs the voltage to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU controls the fuel injection amount and the fast idle speed when the engine is cold state.

- The engine coolant temperature sensor is a kind of resistor, which has characteristics to reduce its resistance as the engine coolant temperature rises. Therefore, the sensor output voltage varies with the engine coolant temperature, and becomes lower as the engine coolant temperature rises.

TROUBLE JUDGMENT

Check Condition

- 2 seconds later after the ignition switch has been in ON position or just after the engine has started up.

Judgment Criteria

- The sensor output voltage is 4.6 V or more (engine coolant temperature of below -40°C or equivalent) for 4 seconds.

or

- The sensor output voltage is 0.1 V or less (engine coolant temperature of above 140°C or equivalent) for 4 seconds.

Check Condition

- After the engine has started up.

Judgment Criteria

- The sensor output voltage rises 1.6 V or more (engine coolant temperature below 40°C or equivalent) from 1.6 V or less (engine coolant temperature above 40°C or equivalent).
- Then the sensor output voltage has continued to be 1.6 V or more for 5 minutes.

PROBABLE CAUSE

- Failed engine coolant temperature sensor
- Open/short circuit in engine coolant temperature sensor circuit or loose connector contact
- Failed engine-A/T-ECU

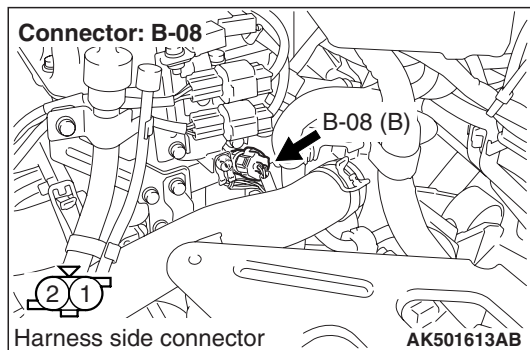
DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III data list**

- Item 21: Engine coolant temperature sensor

OK:**Engine cold state: At ambient temperature (atmospheric temperature) or equivalent.****Engine hot state: At 80 – 120°C****Q: Is the check result normal?**

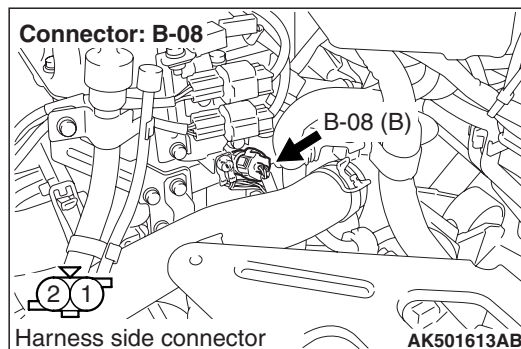
YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-08 engine coolant temperature sensor connector**Q: Is the check result normal?**

YES : Go to Step 3 .

NO : Repair or replace.

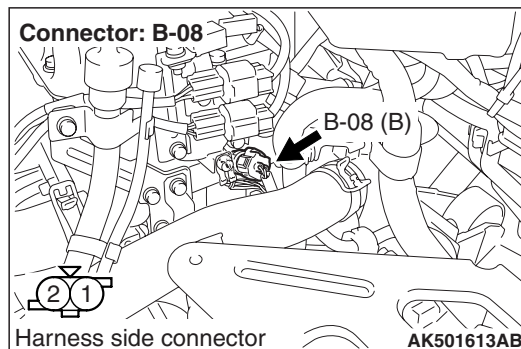
STEP 3. Perform resistance measurement at B-08 engine coolant temperature sensor connector.

- Disconnect connector, and measure at sensor side.
- Resistance between terminal No. 1 and No. 2.

OK:**Engine coolant temperature at -20°C: 14 – 17 kΩ****Engine coolant temperature at 0°C: 5.1 – 6.5 kΩ****Engine coolant temperature at 20°C: 2.1 – 2.7 kΩ****Engine coolant temperature at 40°C: 0.9 – 1.3 kΩ****Engine coolant temperature at 60°C: 0.48 – 0.68 kΩ****Engine coolant temperature at 80°C: 0.26 – 0.36 kΩ****Q: Is the check result normal?**

YES : Go to Step 4 .

NO : Replace engine coolant temperature sensor.

STEP 4. Perform resistance measurement at B-08 engine coolant temperature sensor connector.

- Disconnect connector and measure at harness side.
- Voltage between terminal No. 2 and earth.

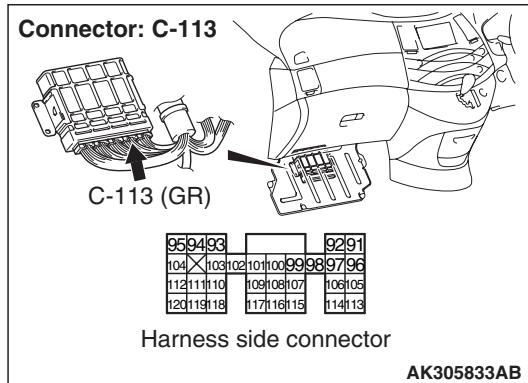
OK: 2 Ω or less**Q: Is the check result normal?**

YES : Go to Step 8 .

NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector

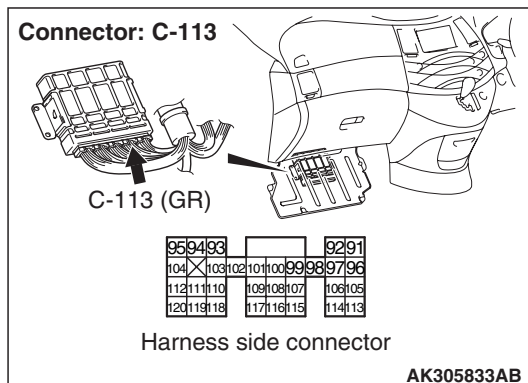
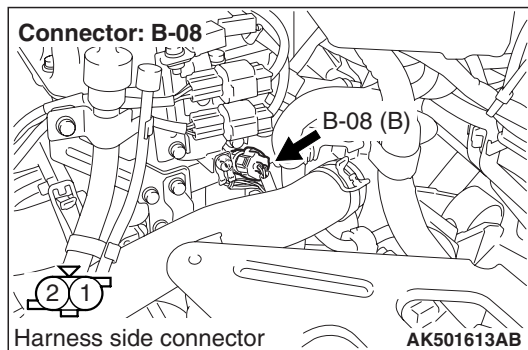
Q: Is the check result normal?



YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check harness between B-08 (terminal No. 2) engine coolant temperature sensor connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III data list

- Item 21: Engine coolant temperature sensor

OK:

Engine cold state: At ambient temperature (atmospheric temperature) or equivalent.

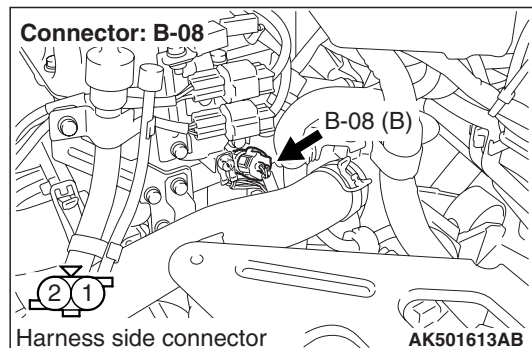
Engine hot state: At 80 – 120 °C

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

STEP 8. Perform voltage measurement at B-08 engine coolant temperature sensor connector.



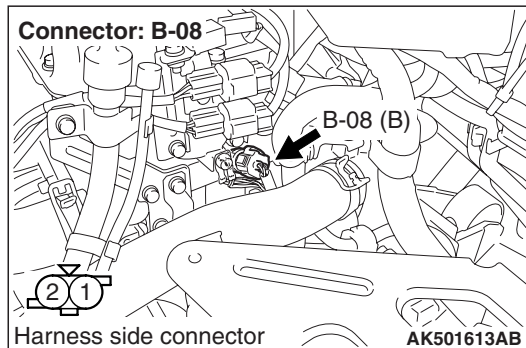
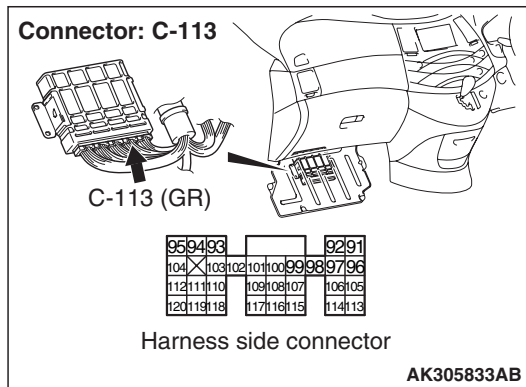
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: 4.5 – 4.9 V

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Go to Step 9 .

STEP 9. Perform voltage measurement at C-113 engine-A/T-ECU connector.

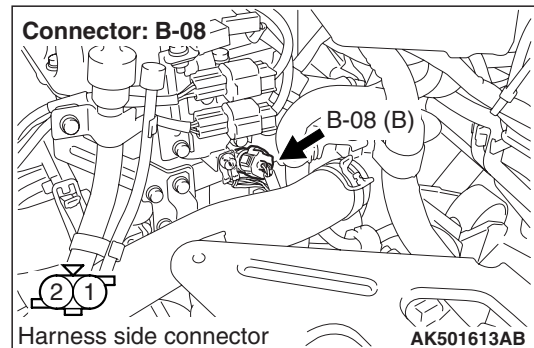
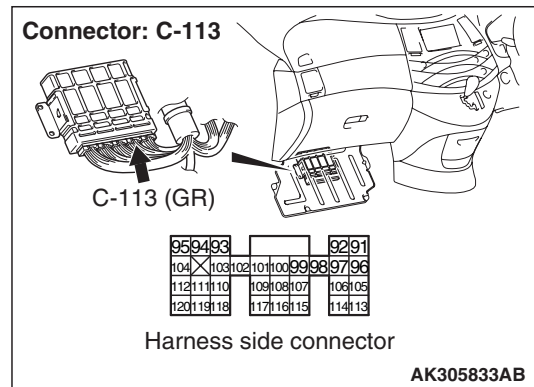
- Measure engine-A/T-ECU terminal voltage.
- Disconnect B-08 engine coolant temperature sensor.
- Ignition switch: ON
- Voltage between terminal No. 98 and earth.

OK: 4.5 – 4.9 V

Q: Is the check result normal?

YES : Go to Step 10 .

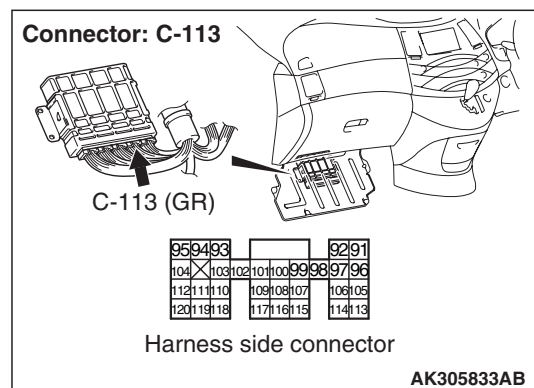
NO : Go to Step 11 .

STEP 10. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Check and repair harness between B-08 (terminal No. 1) engine coolant temperature sensor connector and C-113 (terminal No. 98) engine-A/T-ECU connector.

- Check output line for open circuit.

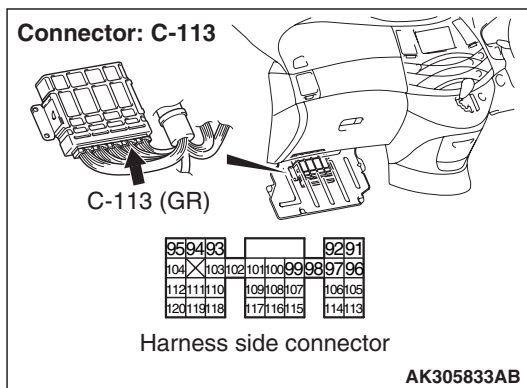
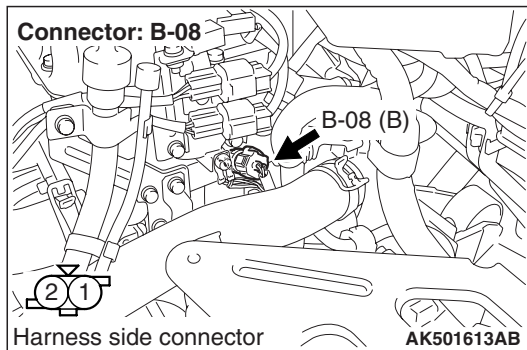
NO : Repair or replace.

STEP 11. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Check harness between B-08 (terminal No. 1) engine coolant temperature sensor connector and C-113 (terminal No. 98) engine-A/T-ECU connector



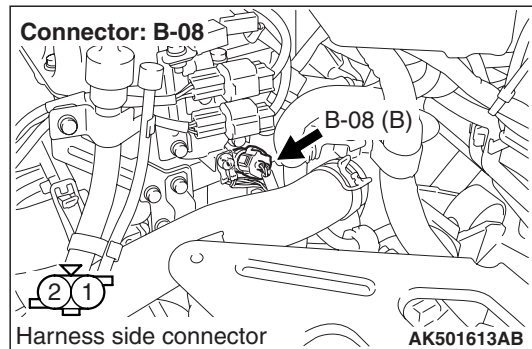
- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 13. Perform voltage measurement at B-08 engine coolant temperature sensor connector.



- Use special tool test harness (MB991709) to connect connector, and measure at pick-up harness.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK:

Engine coolant temperature at -20°C: 3.9 – 4.5 V

Engine coolant temperature at 0°C: 3.2 – 3.8 V

Engine coolant temperature at 20°C: 2.3 – 2.9 V

Engine coolant temperature at 40°C: 1.3 – 1.9 V

Engine coolant temperature at 60°C: 0.7 – 1.3 V

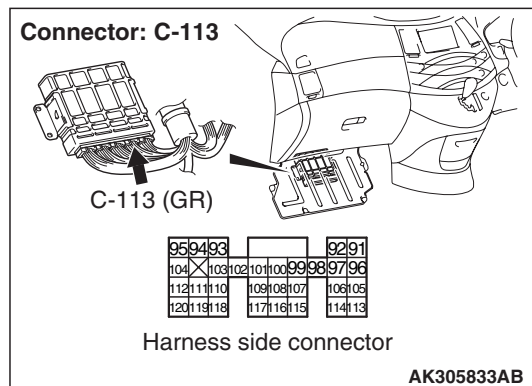
Engine coolant temperature at 80°C: 0.3 – 0.9 V

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Go to Step 14 .

STEP 14. Connector check: C-113 engine-A/T-ECU connector

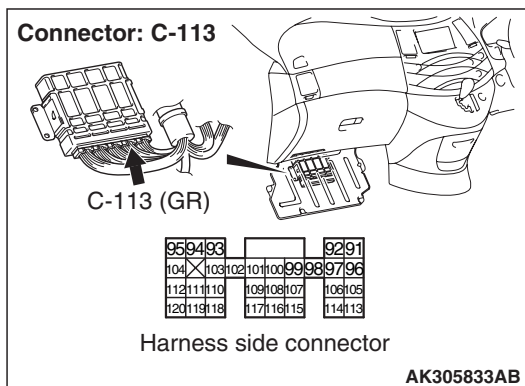
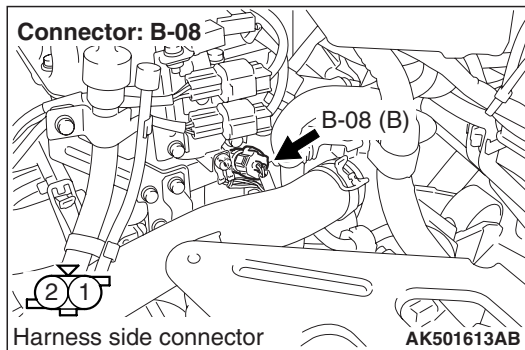


Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair or replace.

STEP 15. Check harness between B-08 (terminal No. 1) engine coolant temperature sensor connector and C-113 (terminal No. 98) engine-A/T-ECU connector.



- Check output line for damage.

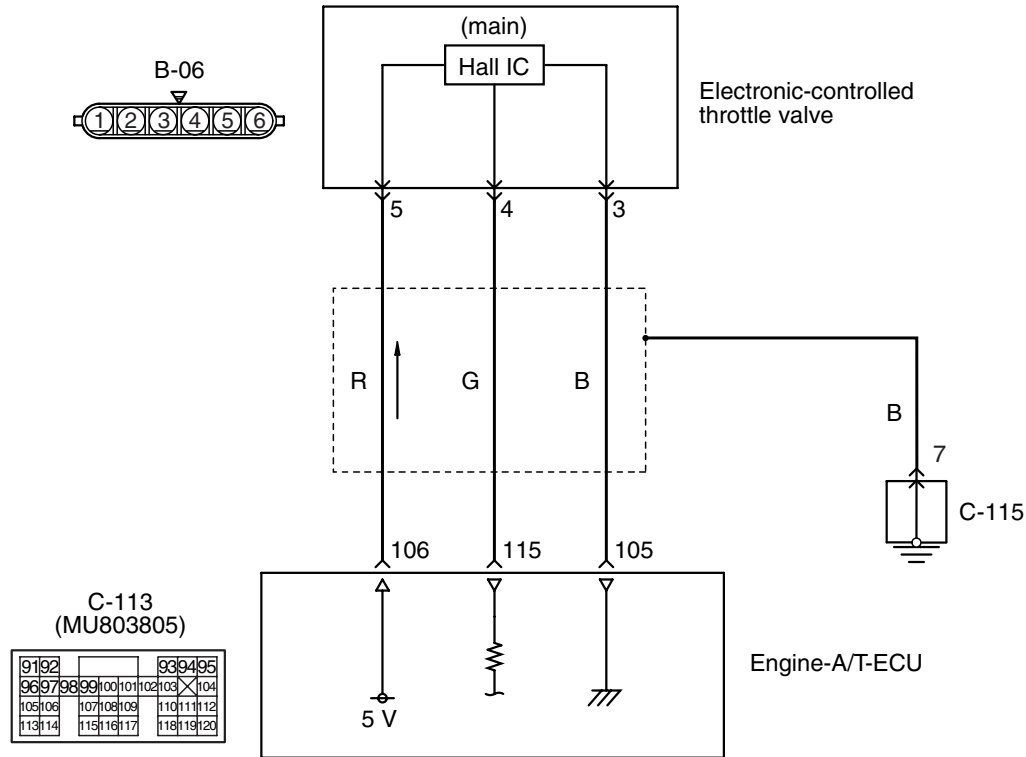
Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

Code No. P0120: Throttle Position Sensor (Main) System

Throttle position sensor (main) 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

AK305822AB

OPERATION

- A power voltage of 5 V is applied to the electronic-controlled throttle valve (terminal No. 5) from the engine-A/T-ECU (terminal No. 106).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 105) from the electronic-controlled throttle valve (terminal No. 3).
- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 115) from the electronic-controlled throttle valve output terminal (terminal No. 4).

FUNCTION

- The throttle position sensor converts the throttle valve position into voltage and inputs it into the engine-A/T-ECU.

- The engine-A/T-ECU controls the throttle valve position.

TROUBLE JUDGMENT

Check Condition

- Ignition switch is in ON position.

Judgment Criteria

- Throttle position sensor (main) output voltage is 0.3 V or less.

or

- Throttle position sensor (main) output voltage is 4.8 V or more.

Check Conditions

- Ignition switch is in ON position.
- Throttle position sensor (main) output voltage is between 0.2 and 4.8 V.

- Throttle position sensor (sub) output voltage is between 2.2 and 4.8 V.

Judgment Criteria

- Throttle position sensor (main) output voltage is 2.5 V or more and throttle position sensor (sub) output voltage is 4.2 V or less.

or

- When throttle position sensor (main) output voltage is 2.5 V or less, voltage obtained with the formula given below is 0.3 V or more:

Throttle position sensor (main) output voltage –
[throttle position sensor (sub) output voltage – 2 V]

PROBABLE CAUSE

- Failed throttle position sensor
- Open/short circuit in throttle position sensor (main) circuit or loose connector contact
- Harness damage in throttle position sensor (sub) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 79: Throttle position sensor (main)

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Go to Step 3 .

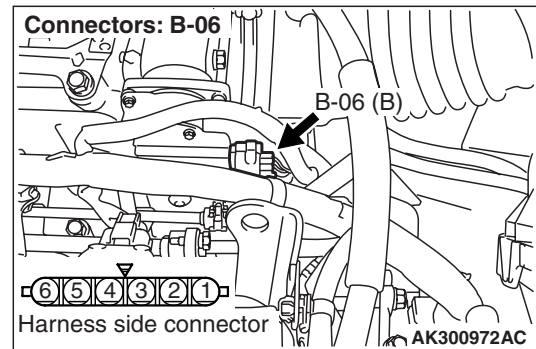
STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 14: Throttle position sensor (sub)

Q: Is the check result normal?

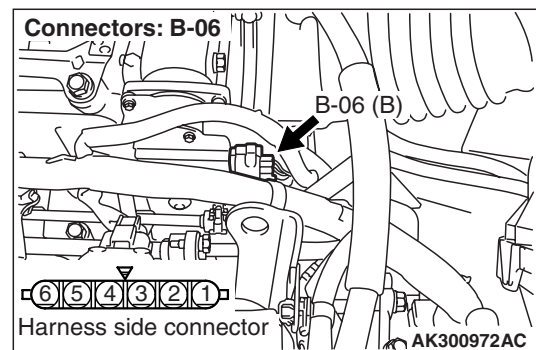
YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Check throttle position sensor (sub) system (Refer to Code No.P0225 [P.13B-111](#))

STEP 3. Connector check: B-06 electronic-controlled throttle valve connector**Q: Is the check result normal?**

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at B-06 electronic-controlled throttle valve connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 5 and earth.

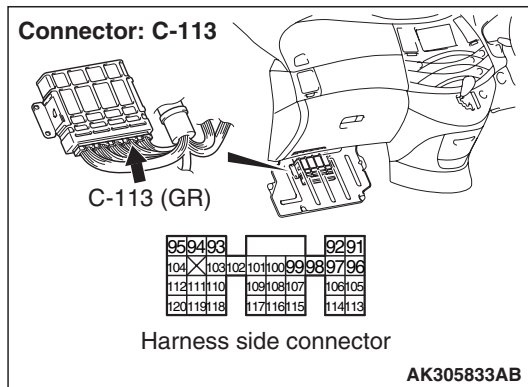
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector

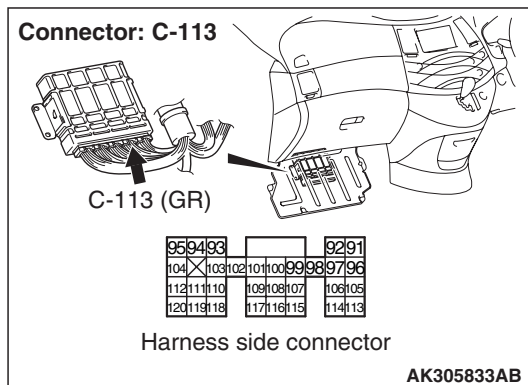
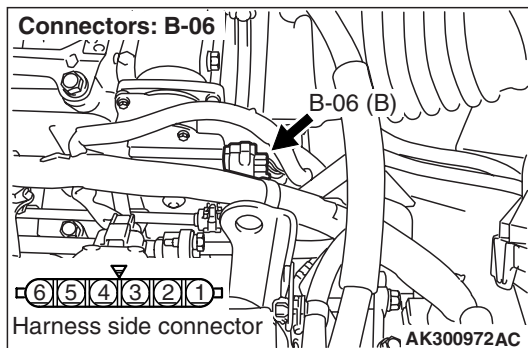


Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check harness between B-06 (terminal No. 5) electronic-controlled throttle valve connector and C-113 (terminal No. 106) engine-A/T-ECU connector.



- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III date list

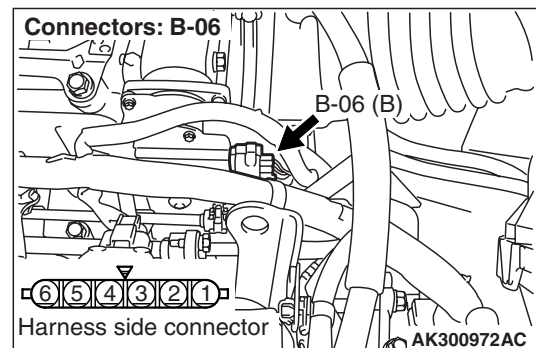
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 79: Throttle position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 8. Perform resistance measurement at B-06 electronic-controlled throttle valve connector.



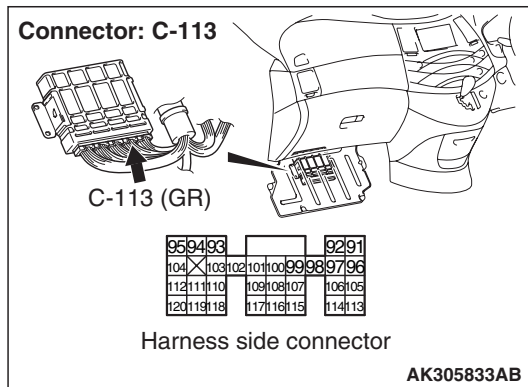
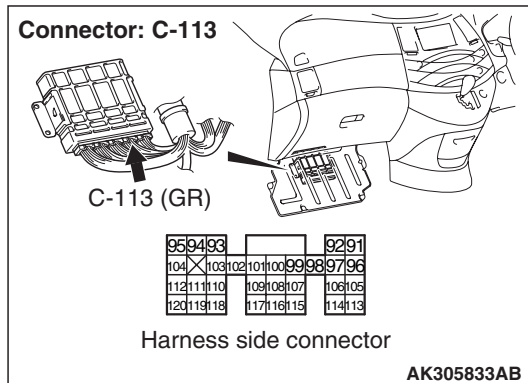
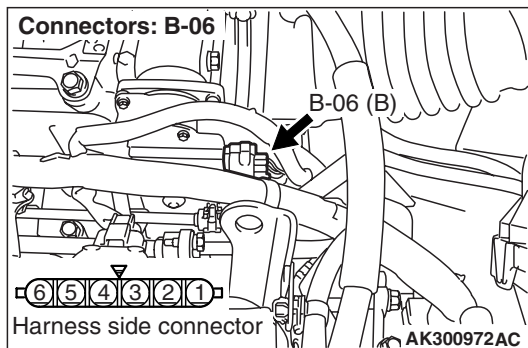
- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 3 and earth.

OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 12 .

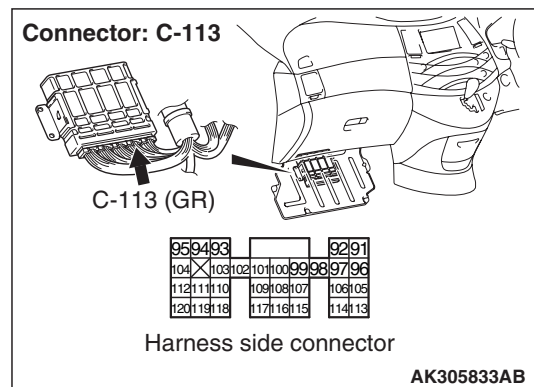
NO : Go to Step 9 .

STEP 9. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 10 .**NO :** Repair or replace.**STEP 10. Check harness between B-06 (terminal No. 3) electronic-controlled throttle valve connector and C-113 (terminal No. 105) engine-A/T-ECU connector.**

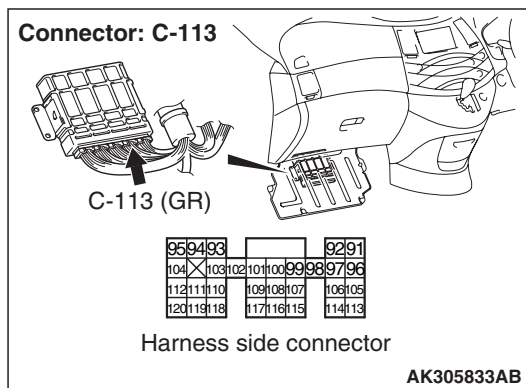
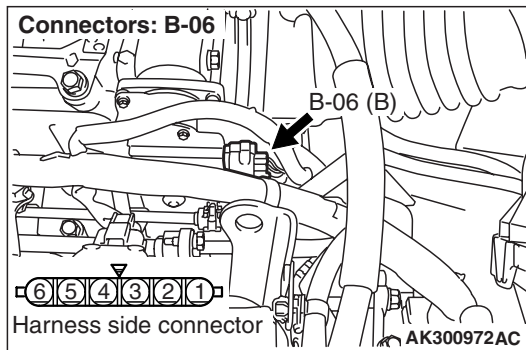
- Check earthing line for open circuit and damage.

Q: Is the check result normal?**YES :** Go to Step 11 .**NO :** Repair.**STEP 11. M.U.T.-III date list**

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 79: Throttle position sensor (main)

Q: Is the check result normal?**YES :** Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).**NO :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**STEP 12. Connector check: C-113 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 13 .**NO :** Repair or replace.

STEP 13. Check harness between B-06 (terminal No. 5) electronic-controlled throttle valve connector and C-113 (terminal No. 106) engine-A/T-ECU connector.



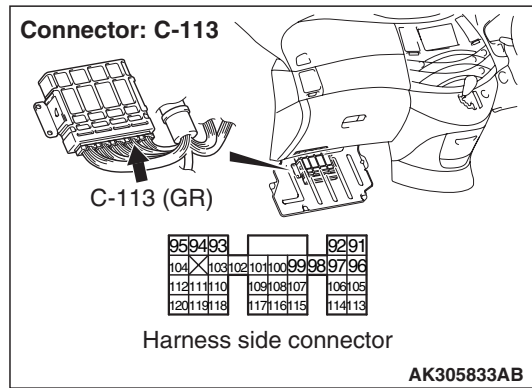
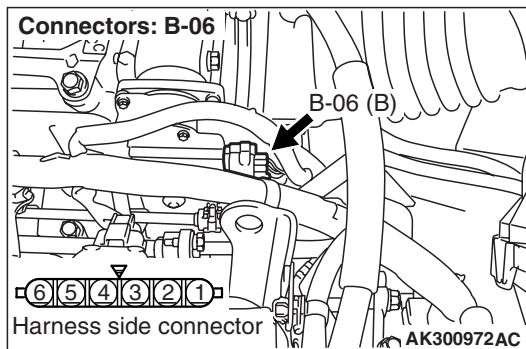
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Check harness between B-06 (terminal No. 4) electronic-controlled throttle valve connector and C-113 (terminal No. 115) engine-A/T-ECU connector.



- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. M.U.T.-III date list

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 79: Throttle position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace throttle body assembly. Then go to Step 16 .

STEP 16. M.U.T.-III diagnosis code.

- Reconfirmation of diagnosis code.

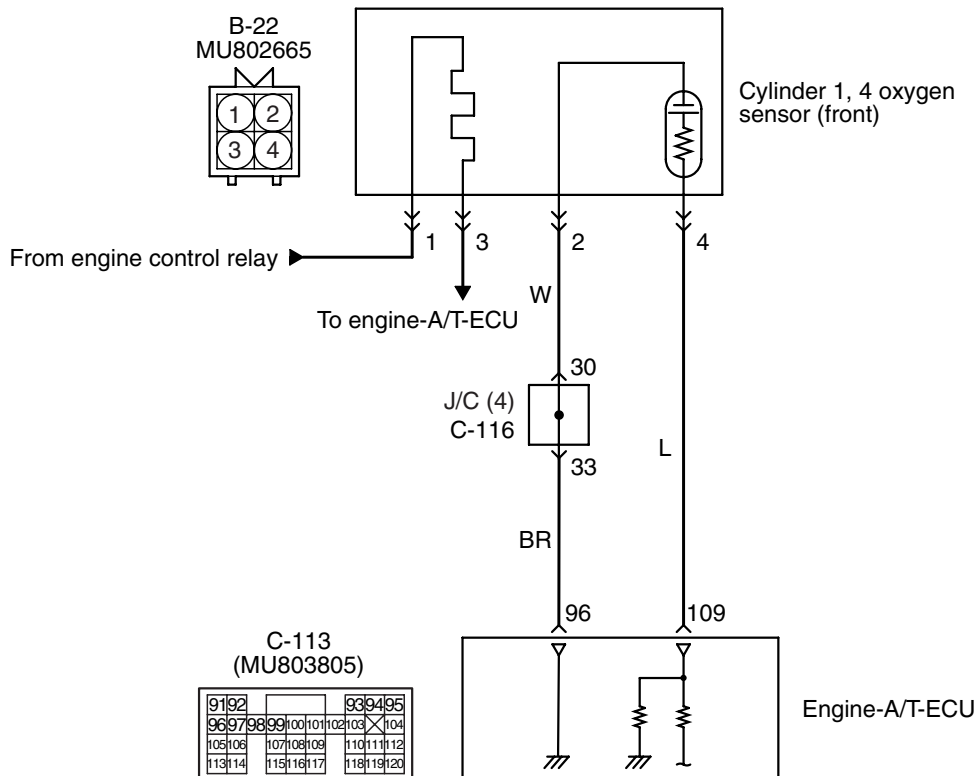
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0130: Cylinder 1, 4 Oxygen Sensor (Front) System

Cylinder 1, 4 oxygen sensor (front) 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

AK501575AB

OPERATION

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 109) from the cylinder 1, 4 oxygen sensor (front) output terminal (terminal No. 4).
- The cylinder 1, 4 oxygen sensor (front) (terminal No. 2) is earthed with the engine-A/T-ECU (terminal No. 96).

FUNCTION

- The cylinder 1, 4 oxygen sensor (front) converts the concentration of oxygen in the exhaust emission into a voltage and inputs the signal to the engine-A/T-ECU.

- When the air-fuel ratio is richer than the theoretical air-fuel ratio, the cylinder 1, 4 oxygen sensor (front) outputs a voltage of about 1 V. When it is leaner than the theoretical air-fuel ratio, it outputs a voltage of about 0 V.
- In response to the signal, the engine-A/T-ECU controls the fuel injection amount so that the air-fuel ratio can be equivalent to the theoretical air-fuel ratio.

TROUBLE JUDGMENT

Check Conditions

- Above 3 minutes later after the engine has started up.
- The engine coolant temperature is approximately 80°C or higher.

- The engine speed is 1, 200 r/min or more.
- During the run at the constant speed on the flat road.
- Volumetric efficiency is 25% or more.

Judgment Criterion

- When a power voltage of 5 V is applied to the cylinder 1, 4 oxygen sensor (front), the sensor output voltage is 4.5 V or more.

PROBABLE CAUSE

- Failed cylinder 1, 4 oxygen sensor (front)
- Open/short circuit in cylinder 1, 4 oxygen sensor (front) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

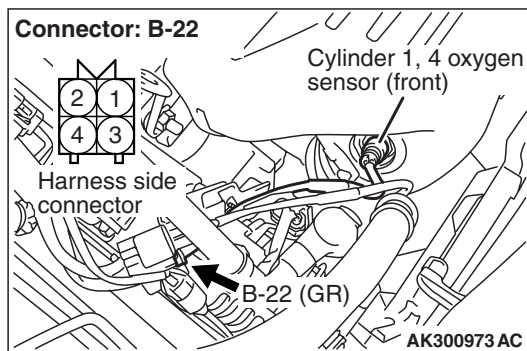
- Refer to Data List Reference Table [P.13B-260](#).
a. Item 11: Cylinder 1, 4 oxygen sensor (front)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-22 cylinder 1, 4 oxygen sensor (front) connector

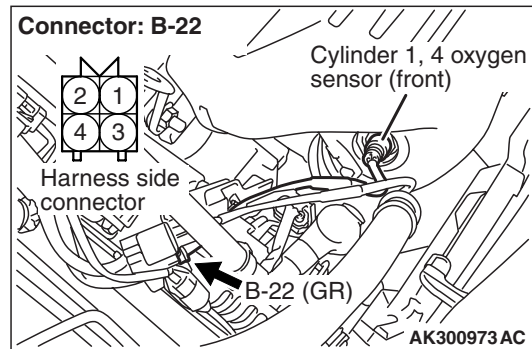


Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform resistance measurement at B-22 cylinder 1, 4 oxygen sensor (front) connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

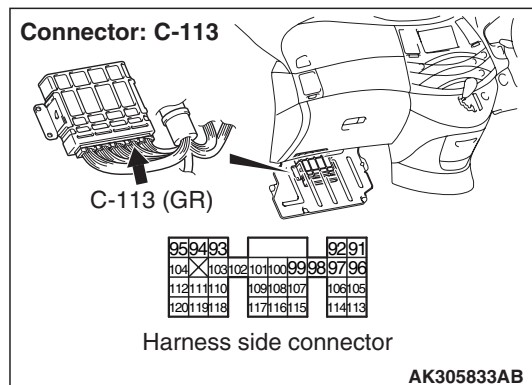
OK: 2 Ω or less

Q: Is the check result normal?

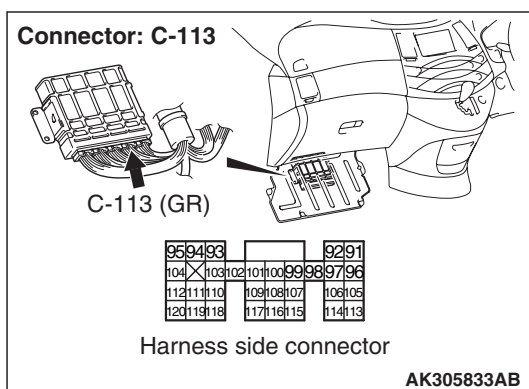
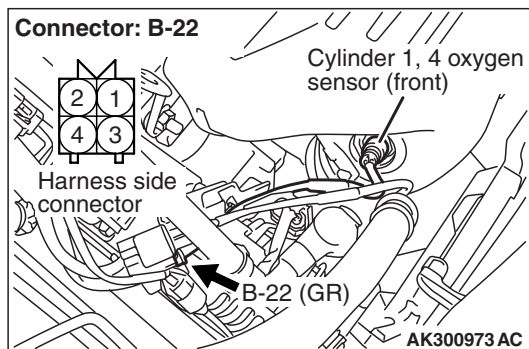
YES : Go to Step 7 .

NO : Go to Step 4 .

STEP 4. Connector check: C-113 engine-A/T-ECU connector



STEP 5. Check harness between B-22 (terminal No. 2) cylinder 1, 4 oxygen sensor (front) connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .
NO : Repair.

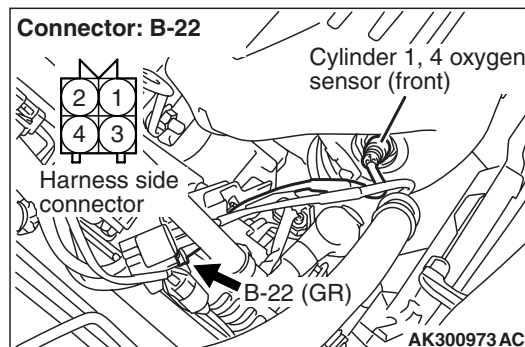
STEP 6. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 11: Cylinder 1, 4 oxygen sensor (front)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).
NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 7. Perform voltage measurement at B-22 cylinder 1, 4 oxygen sensor (front) connector.



- Use special tool test harness (MB991316) to connect connector, and measure at pick-up harness.
- Engine: After warm-up
- Transmission: P range
- Voltage between terminal No. 4 and earth.

OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?

YES : Go to Step 10 .
NO : Go to Step 8 .

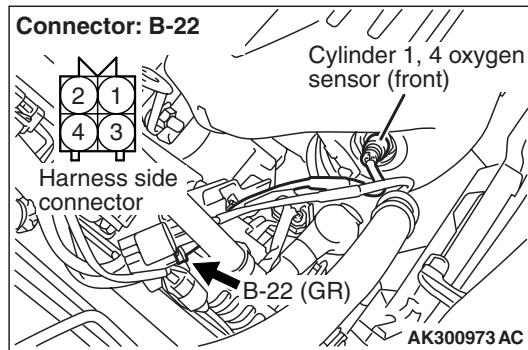
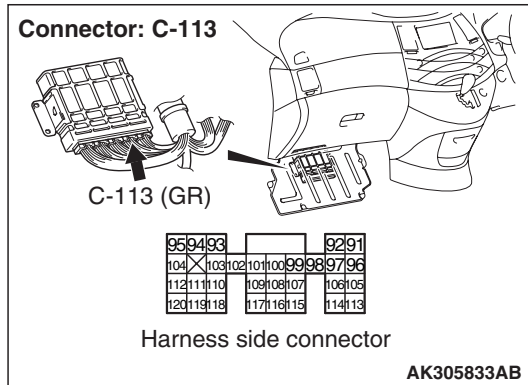
STEP 8. Check cylinder 1, 4 oxygen sensor (front) itself.

- Check cylinder 1, 4 oxygen sensor (front) itself (Refer to [P.13B-289](#)).

Q: Is the check result normal?

YES : Go to Step 9 .
NO : Replace cylinder 1, 4 oxygen sensor (front).

STEP 9. Connector check: C-113 engine-A/T-ECU connector



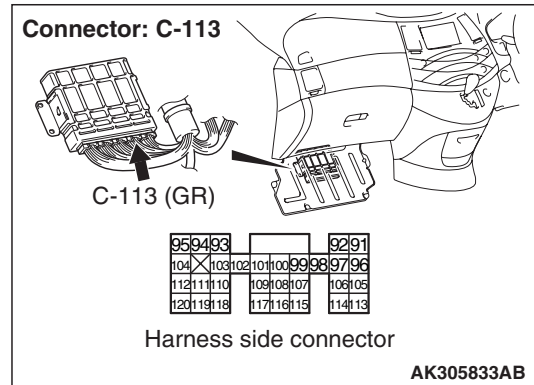
Q: Is the check result normal?

YES : Check and repair harness between B-22 (terminal No. 4) cylinder 1, 4 oxygen sensor (front) connector and C-113 (terminal No. 109) engine-A/T-ECU connector.

- Check output line for damage.

NO : Repair or replace.

STEP 10. Perform voltage measurement at C-113 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Transmission: P range
- Engine: After warm-up
- Voltage between terminal No. 109 and earth.

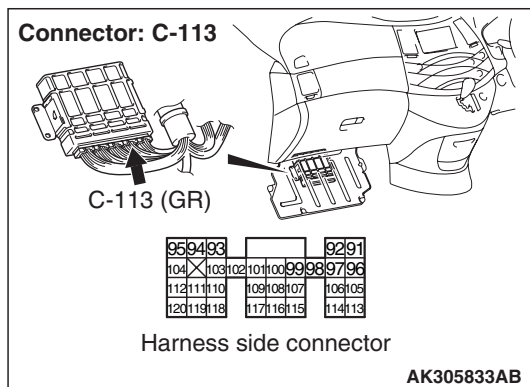
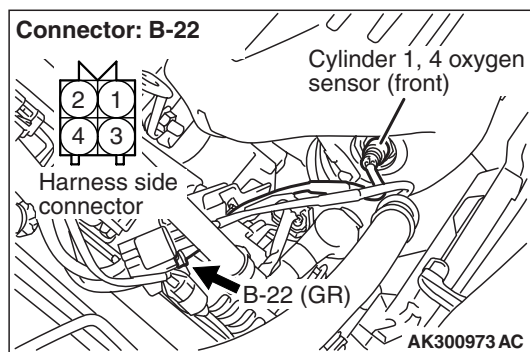
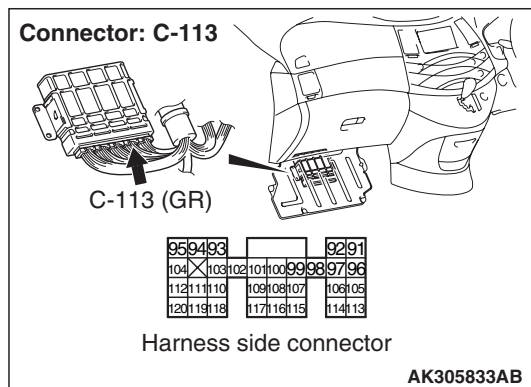
OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Go to Step 11 .

**STEP 11. Connector check: C-113
engine-A/T-ECU connector****STEP 12. Connector check: C-113
engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 6 .**NO :** Repair or replace.**Q: Is the check result normal?**

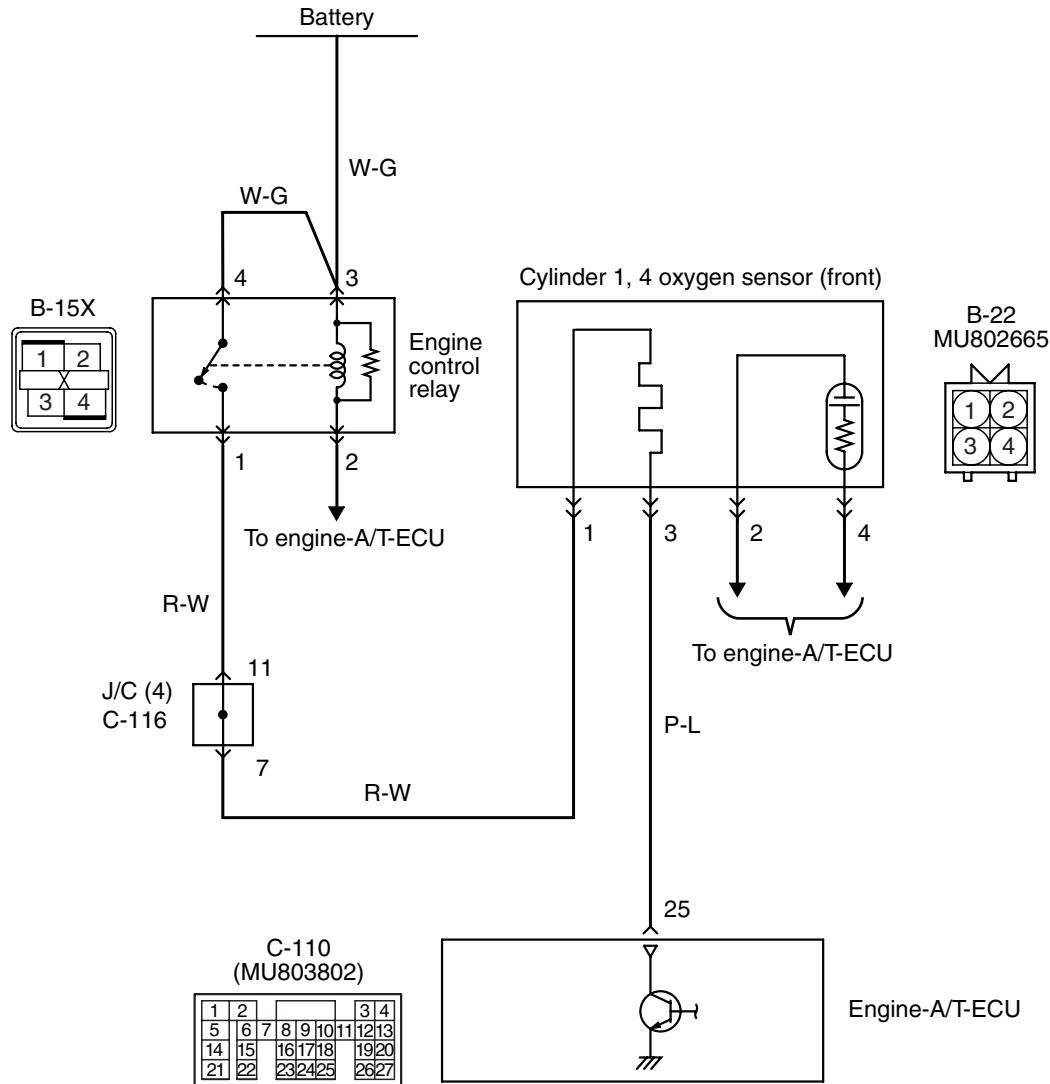
YES : Check and repair harness between B-22 (terminal No. 4) cylinder 1, 4 oxygen sensor (front) connector and C-113 (terminal No. 109) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

Code No. P0135: Cylinder 1, 4 Oxygen Sensor (Front) Heater System

Cylinder 1, 4 oxygen sensor (front) heater 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

AK305824AB

OPERATION

- Power is supplied to the heater power terminal (terminal No. 1) of the cylinder 1, 4 oxygen sensor (front) connector from the engine control relay (terminal No. 1).
- The heater (terminal No. 3) of the cylinder 1, 4 oxygen sensor (front) connector is controlled by the power transistor in the engine-A/T-ECU (terminal No. 25).

FUNCTION

- The power supply to the cylinder 1, 4 oxygen sensor (front) heater is controlled by the ON/OFF control of the power transistor in the engine-A/T-ECU.
- Heating the cylinder 1, 4 oxygen sensor (front) heater enables the cylinder 1, 4 oxygen sensor (front) to provide good response even when the exhaust emission temperature is low.

TROUBLE JUDGMENT**Check Conditions**

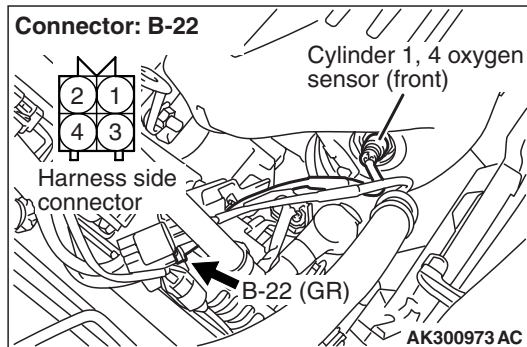
- Engine coolant temperature is 20°C or higher.
- While cylinder 1, 4 oxygen sensor (front) heater is on.
- Engine speed is approximately 50 r/min or more.
- Battery positive voltage is 11 – 16 V.

Judgment Criterion

- Cylinder 1, 4 oxygen sensor (front) heater current has continued to be 0.2 A or less, or 7.5 A or more for 4.3 seconds.

PROBABLE CAUSE

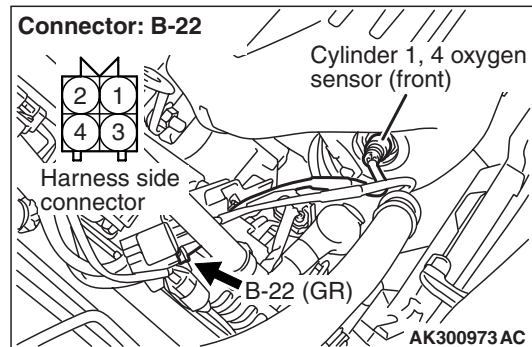
- Failed cylinder 1, 4 oxygen sensor (front) heater
- Open/short circuit in cylinder 1, 4 oxygen sensor (front) heater circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-22 cylinder 1, 4 oxygen sensor (front) connector**

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Perform resistance measurement at B-22 cylinder 1, 4 oxygen sensor (front) connector.

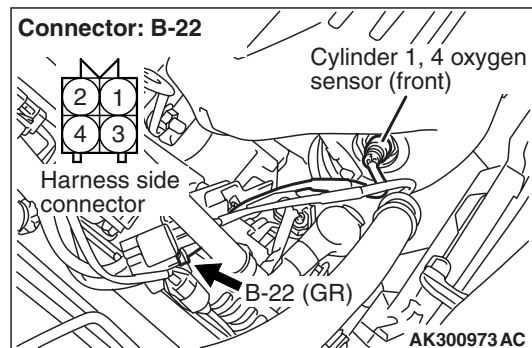
- Disconnect connector, and measure at sensor side.
- Resistance between terminal No. 1 and No. 3.

OK: 4.5 – 8.0 Ω

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace cylinder 1, 4 oxygen sensor (front).

STEP 3. Perform voltage measurement at B-22 cylinder 1, 4 oxygen sensor (front) connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

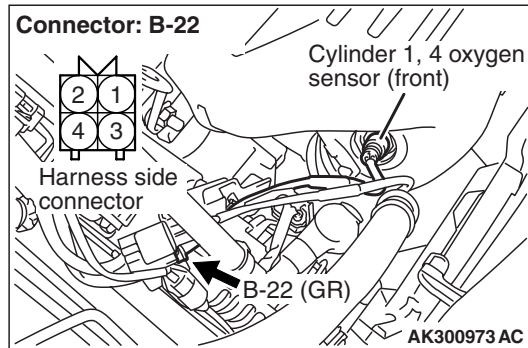
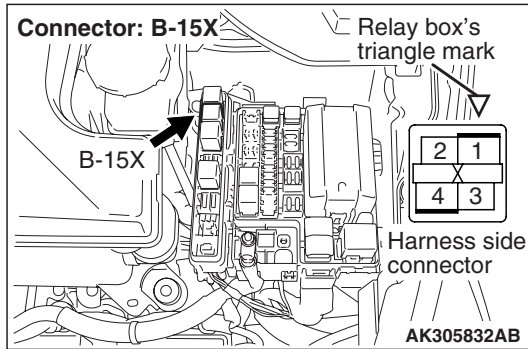
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: B-15X engine control relay connector



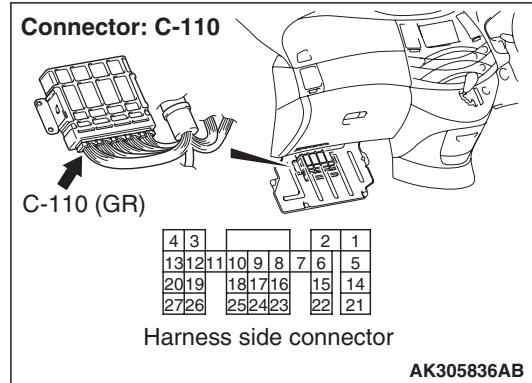
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-22 (terminal No. 1) cylinder 1, 4 oxygen sensor (front) connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-110 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 25 and earth.

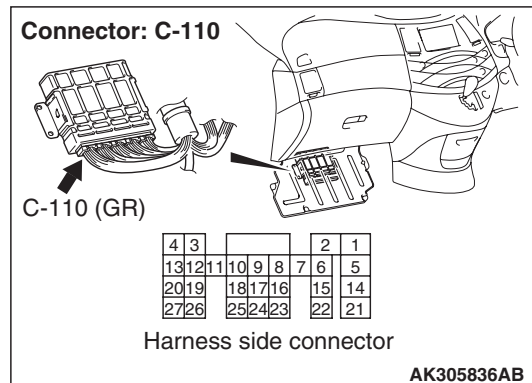
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 6 .

STEP 6. Connector check: C-110 engine-A/T-ECU connector

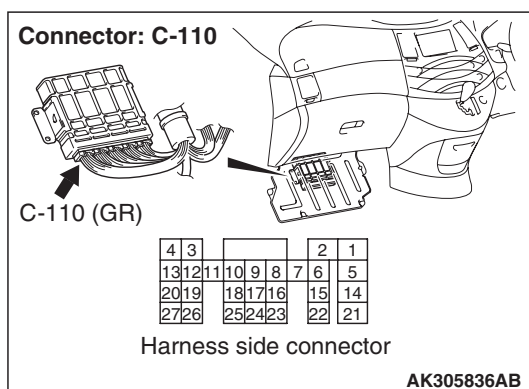
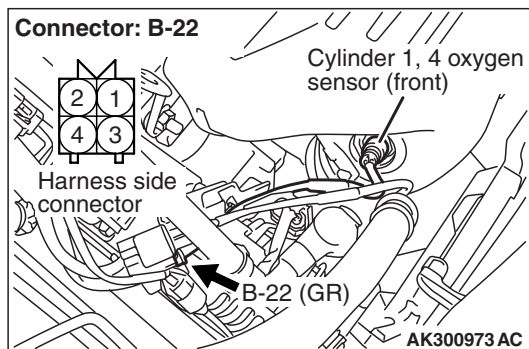


Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-22 (terminal No. 3) cylinder 1, 4 oxygen sensor (front) connector and C-110 (terminal No. 25) engine-A/T-ECU connector.



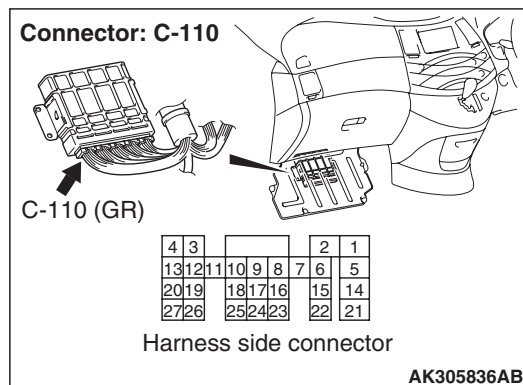
- Check earthing line for open/short circuit.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector

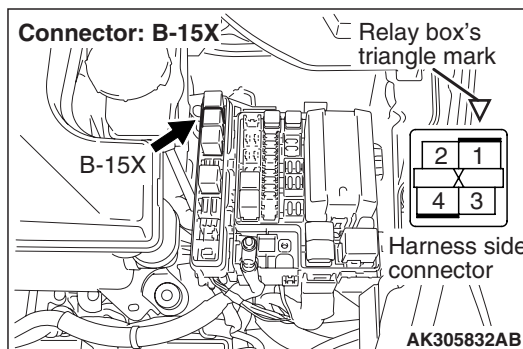
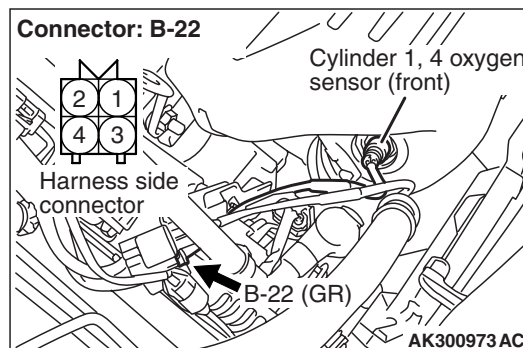


Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-22 (terminal No. 1) cylinder 1, 4 oxygen sensor (front) connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness check intermediate connector C-116, and repair if necessary.

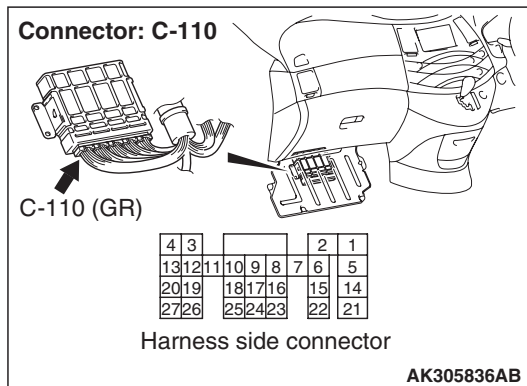
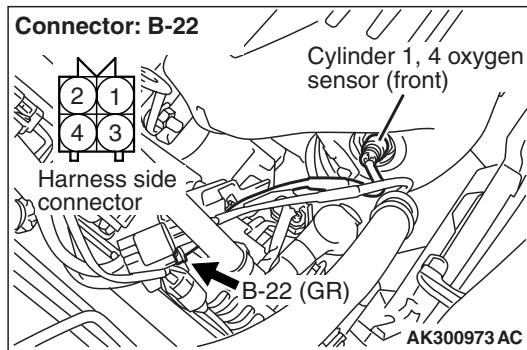
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Check harness between B-22 (terminal No. 3) cylinder 1, 4 oxygen sensor (front) connector and C-110 (terminal No. 25) engine-A/T-ECU connector.



- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

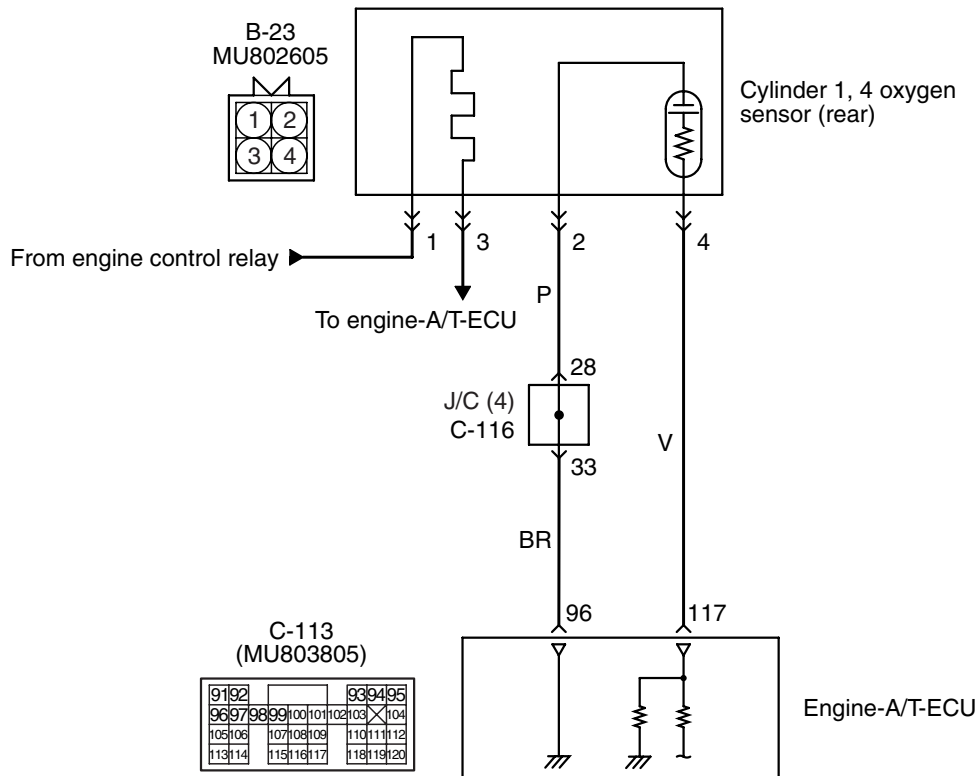
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0136: Cylinder 1, 4 Oxygen Sensor (Rear) System

Cylinder 1, 4 oxygen sensor (rear) 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

AK501576AB

OPERATION

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 117) from the cylinder 1, 4 oxygen sensor (rear) output terminal (terminal No. 4).
- The cylinder 1, 4 oxygen sensor (rear) (terminal No. 2) is earthed with engine-A/T-ECU (terminal No. 96).

FUNCTION

- The cylinder 1, 4 oxygen sensor (rear) converts the concentration of oxygen in the exhaust emission into a voltage and inputs the signal to the engine-A/T-ECU.

- When the air-fuel ratio is richer than the theoretical air-fuel ratio, the cylinder 1, 4 oxygen sensor (rear) outputs a voltage of about 1 V. When it is leaner than the theoretical air-fuel ratio, it outputs a voltage of about 0 V.
- Based on this signal, the engine-A/T-ECU corrects the deviation in the signal that is output by the cylinder 1, 4 oxygen sensor (rear).

TROUBLE JUDGMENT

Check Conditions

- Above 3 minutes later after the engine has started up.
- The engine coolant temperature is approximately 80°C or higher.
- The engine speed is 1, 200 r/min or more.
- During the run at the constant speed on the flat road.

- Volumetric efficiency is 25% or more.

Judgment Criterion

- When a power voltage of 5 V is applied to the cylinder 1, 4 oxygen sensor (rear), the sensor output voltage is 4.5 V or more.

PROBABLE CAUSE

- Failed cylinder 1, 4 oxygen sensor (rear)
- Open/short circuit in cylinder 1, 4 oxygen sensor (rear) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

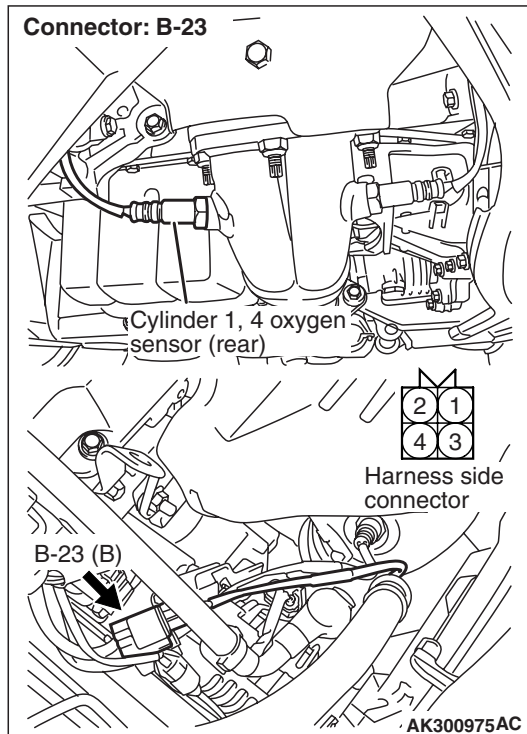
- Refer to Data List Reference Table [P.13B-260](#).
a. Item 59: Cylinder 1, 4 oxygen sensor (rear)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-23 cylinder 1, 4 oxygen sensor (rear) connector

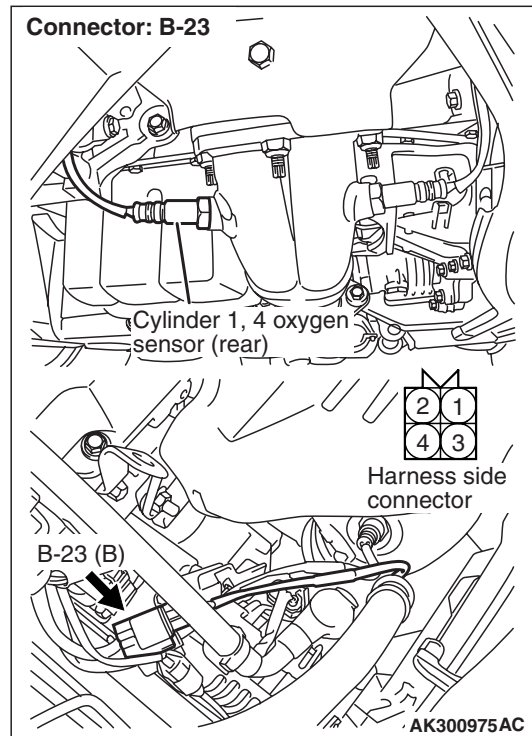


Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform resistance measurement at B-23 cylinder 1, 4 oxygen sensor (rear) connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

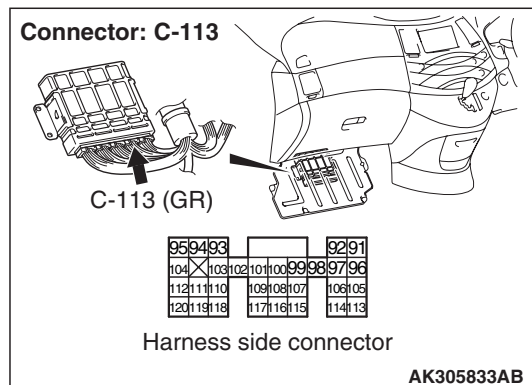
OK: 2 Ω or less

Q: Is the check result normal?

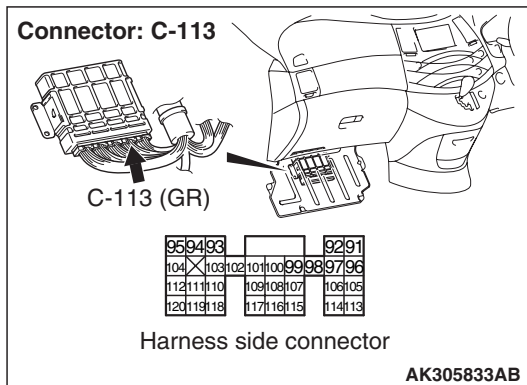
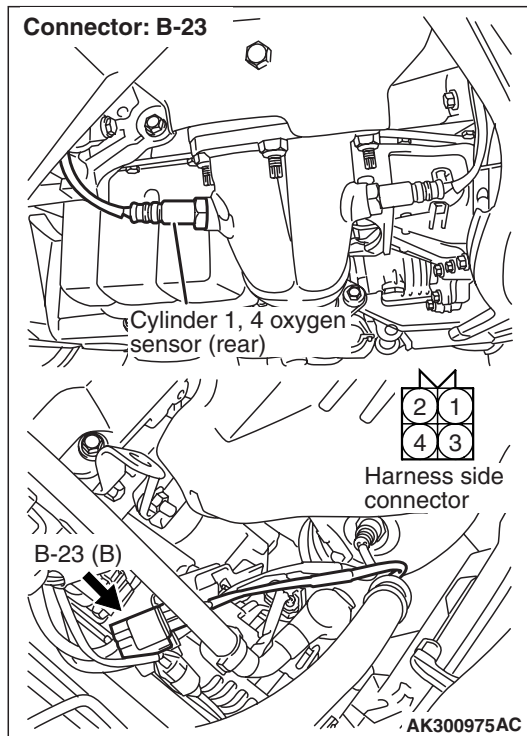
YES : Go to Step 7 .

NO : Go to Step 4 .

STEP 4. Connector check: C-113 engine-A/T-ECU connector



STEP 5. Check harness between B-23 (terminal No. 2) cylinder 1, 4 oxygen sensor (rear) connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. M.U.T.-III data list

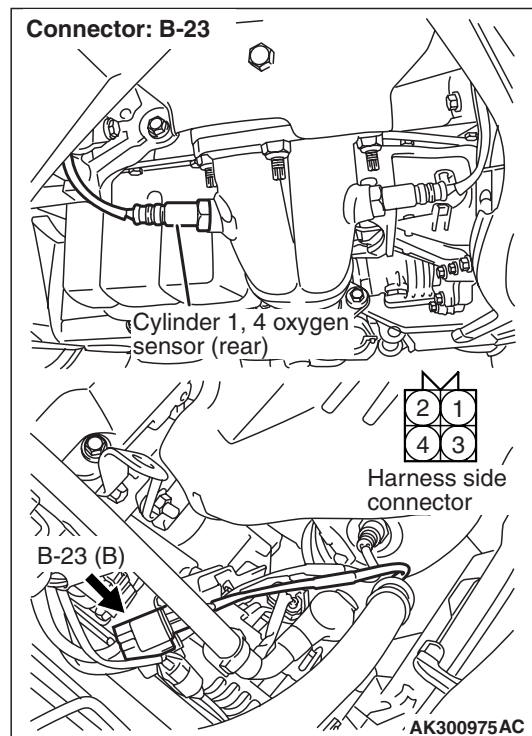
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 59: Cylinder 1, 4 oxygen sensor (rear)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 7. Perform voltage measurement at B-23 cylinder 1, 4 oxygen sensor (rear) connector.



- Use special tool test harness (MD998464) to connect connector, and measure at pick-up harness.
- Engine: After warm-up
- Transmission: P range
- Voltage between terminal No. 4 and earth.

OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 8 .

STEP 8. Check Cylinder 1, 4 oxygen sensor (rear) itself.

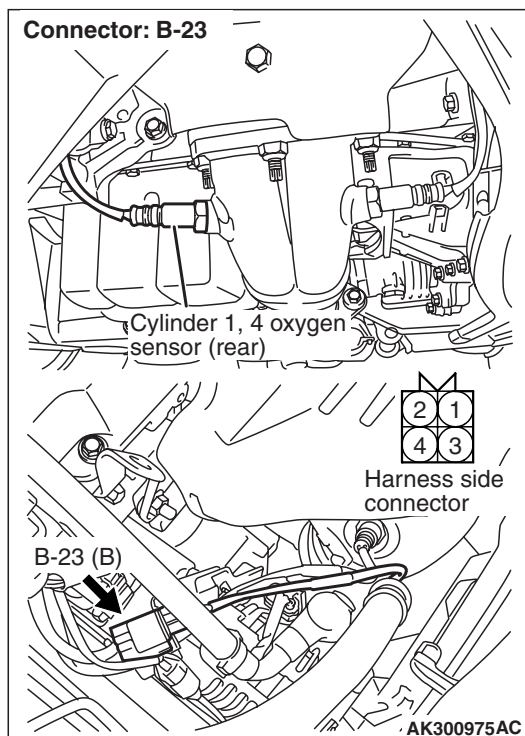
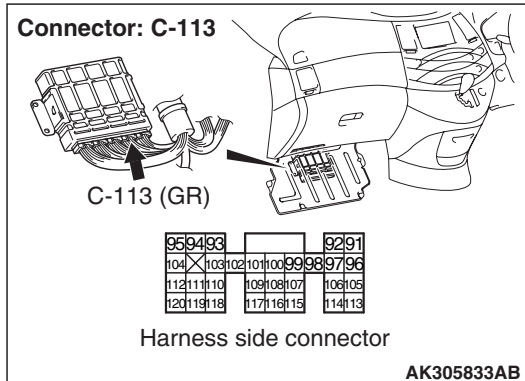
- Check cylinder 1, 4 oxygen sensor (rear) itself (Refer to P.13B-289).

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Replace cylinder 1, 4 oxygen sensor (rear).

STEP 9. Connector check: C-113 engine-A/T-ECU connector



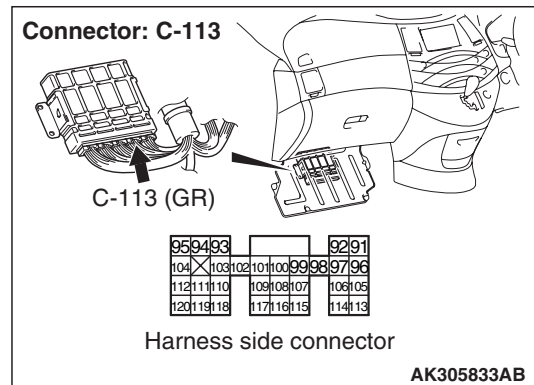
Q: Is the check result normal?

YES : Check and repair harness between B-23 (terminal No. 4) cylinder 1, 4 oxygen sensor (rear) connector and C-113 (terminal No. 117) engine-A/T-ECU connector.

- Check output line for damage.

NO : Repair or replace.

STEP 10. Perform voltage measurement at C-113 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Transmission: P range
- Engine: After warm-up
- Voltage between terminal No. 117 and earth.

OK:

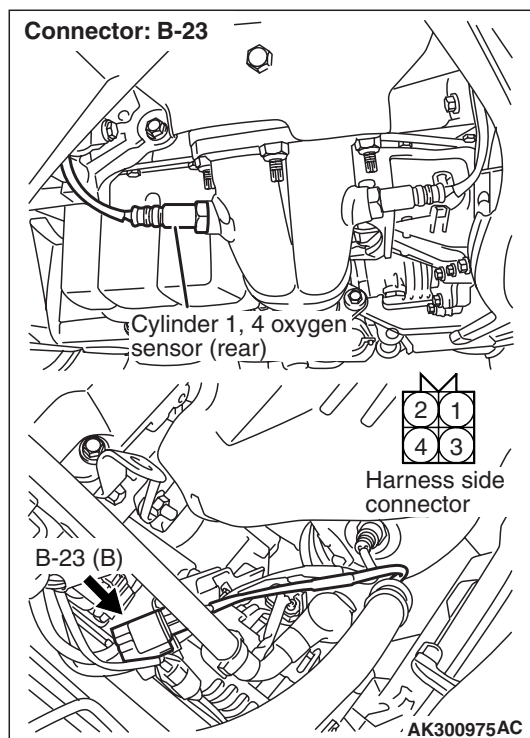
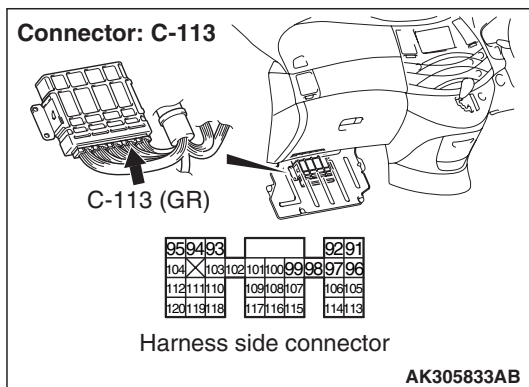
When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Go to Step 11 .

STEP 12. Connector check: C-113 engine-A/T-ECU connector



Q: Is the check result normal?

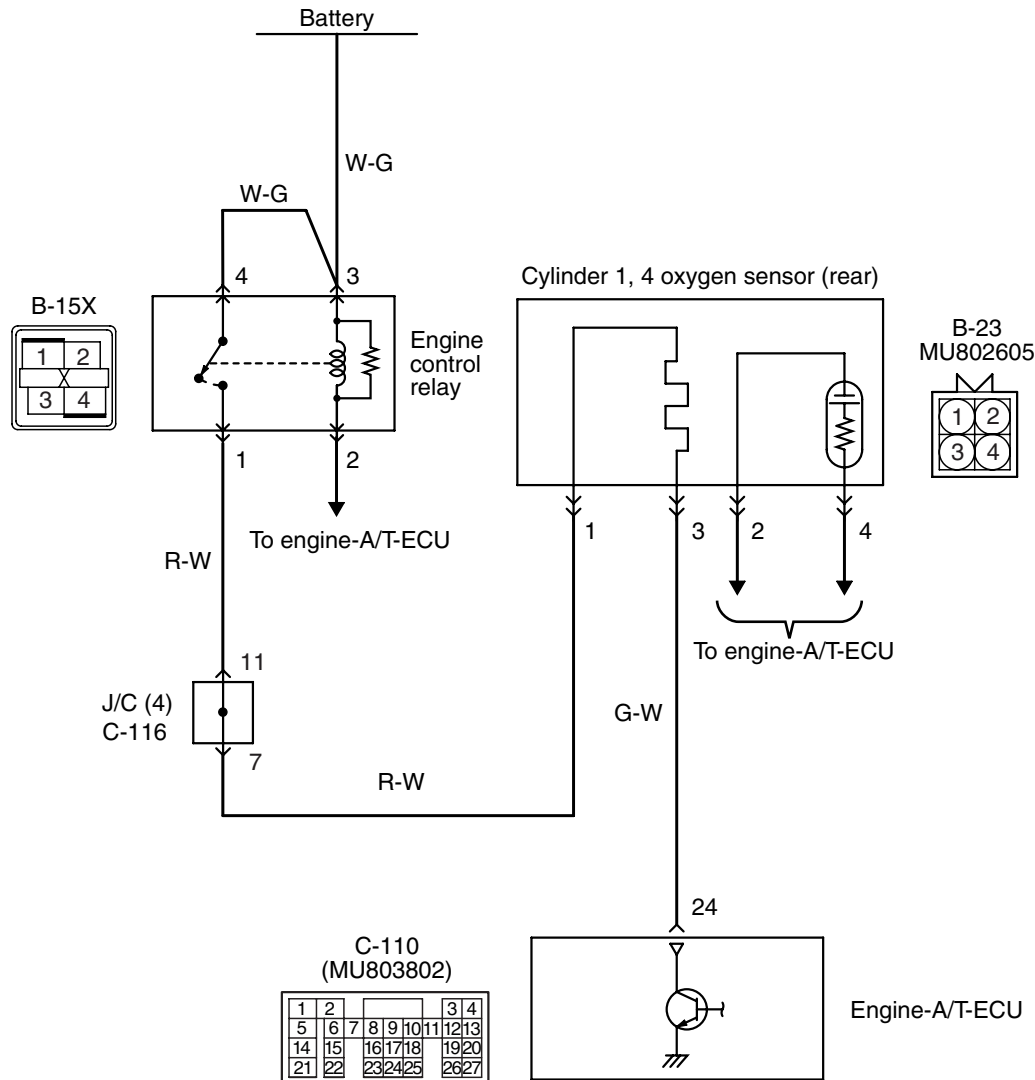
NO : Repair or replace.

- Check output line for open circuit.

NO : Repair or replace.

Code No. P0141: Cylinder 1, 4 Oxygen Sensor (Rear) Heater System

Cylinder 1, 4 oxygen sensor (rear) heater 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

AK305826AB

OPERATION

- Power is supplied to the heater power terminal (terminal No. 1) of the cylinder 1, 4 oxygen sensor (rear) connector from the engine control relay (terminal No. 1).
- The heater (terminal No. 3) of the cylinder 1, 4 oxygen sensor (rear) connector is controlled by the power transistor in the engine-A/T-ECU (terminal No. 24).

FUNCTION

- The power supply to the cylinder 1, 4 oxygen sensor (rear) heater is controlled by the ON/OFF control of the power transistor in the engine-A/T-ECU.
- Heating the cylinder 1, 4 oxygen sensor (rear) heater enables the cylinder 1, 4 oxygen sensor (rear) to provide good response even when the exhaust emission temperature is low.

TROUBLE JUDGMENT**Check Conditions**

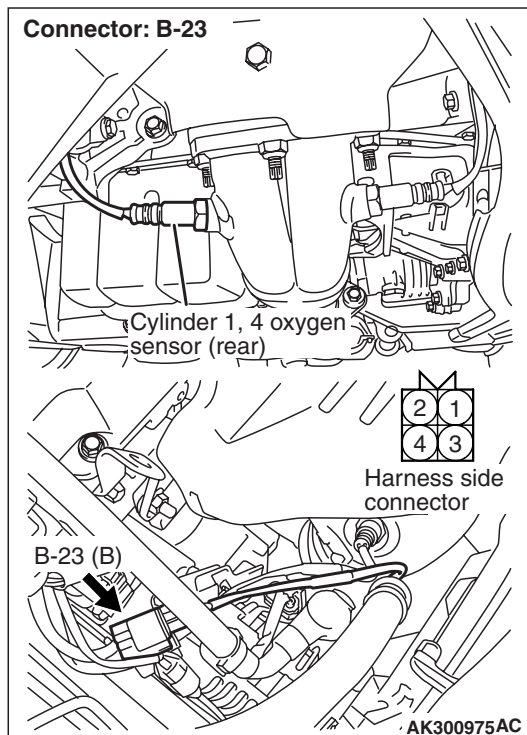
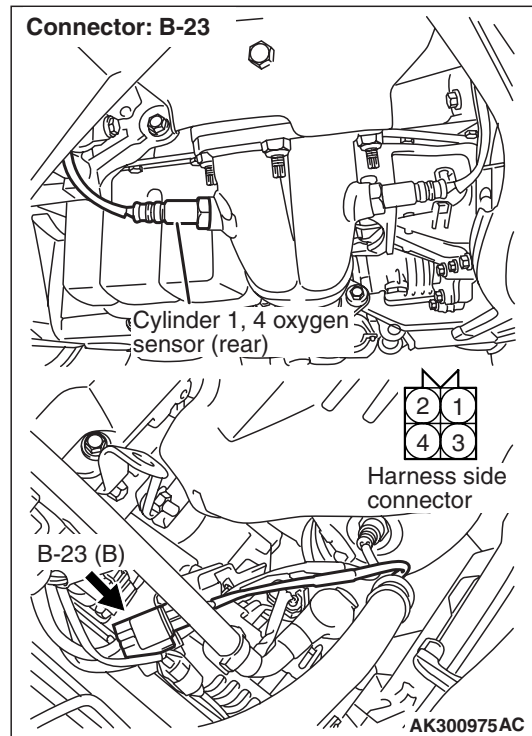
- Engine coolant temperature is 20°C or higher.
- While cylinder 1, 4 oxygen sensor (rear) heater is on.
- Engine speed is 50 r/min or more.
- Battery positive voltage is 11 – 16 V.

Judgment Criterion

- Cylinder 1, 4 oxygen sensor (rear) heater currents have continued to be 0.2 A or less, or 7.5 A or more for 4.3 seconds.

PROBABLE CAUSE

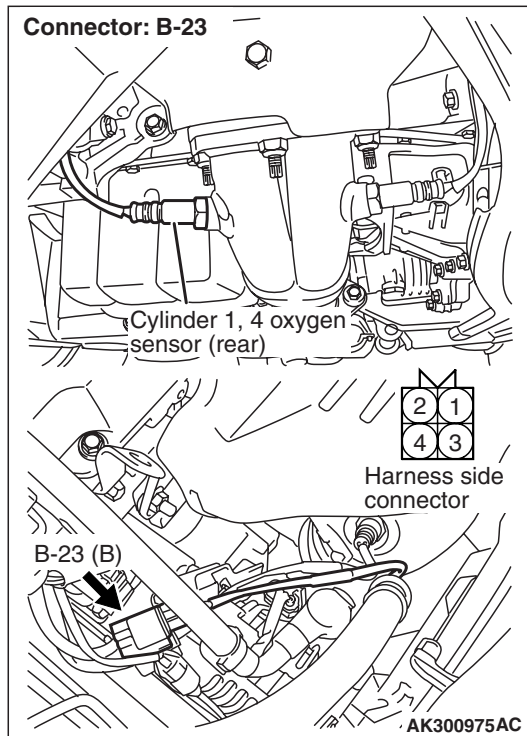
- Failed cylinder 1, 4 oxygen sensor (rear) heater
- Open/short circuit in cylinder 1, 4 oxygen sensor (rear) heater circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-23 cylinder 1, 4 oxygen sensor (rear) connector****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Repair or replace.**STEP 2. Perform resistance measurement at B-23 cylinder 1, 4 oxygen sensor (rear) connector.**

- Disconnect connector, and measure at sensor side.
- Resistance between terminal No. 1 and No. 3.

OK: 11 – 18 Ω **Q: Is the check result normal?****YES :** Go to Step 3 .**NO :** Replace cylinder 1, 4 oxygen sensor (rear).

STEP 3. Perform voltage measurement at B-23 cylinder 1, 4 oxygen sensor (rear) connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

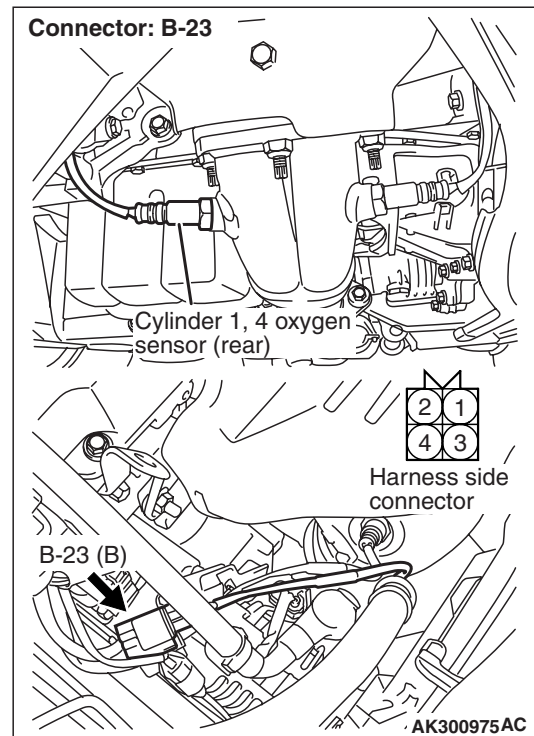
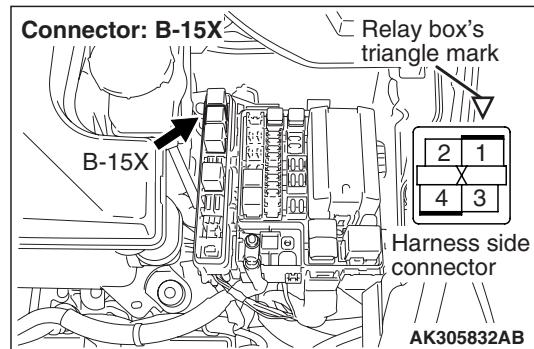
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: B-15X engine control relay connector

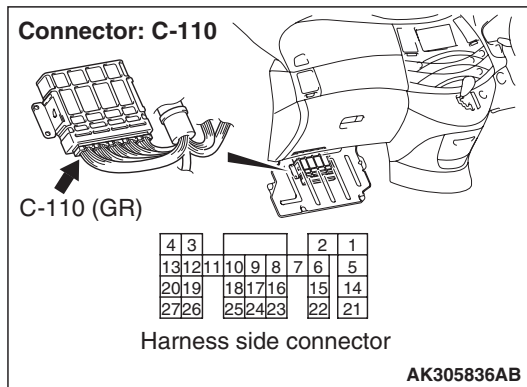


Q: Is the check result normal?

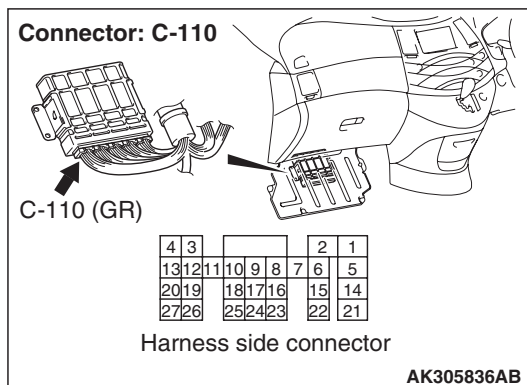
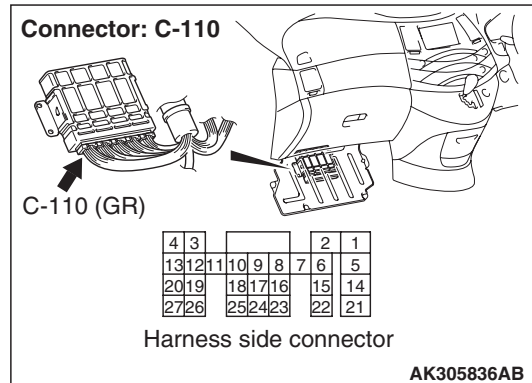
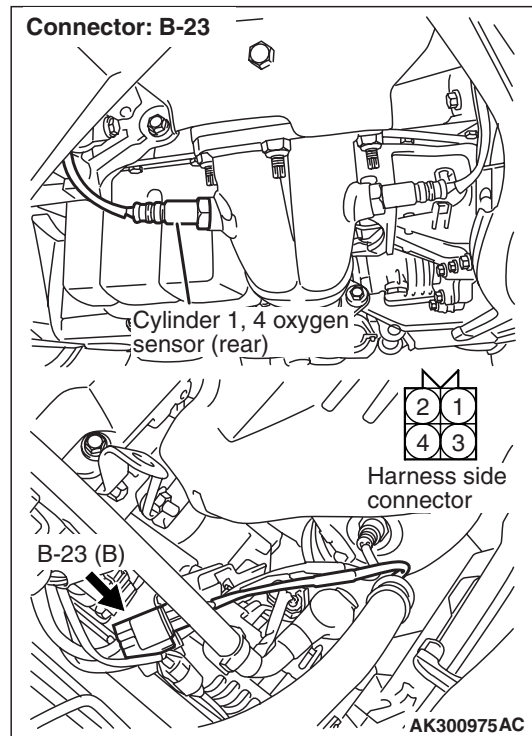
YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-23 (terminal No. 1) cylinder 1, 4 oxygen sensor (rear) connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-110 engine-A/T-ECU connector.

- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 24 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 8 .**NO :** Go to Step 6 .**STEP 6. Connector check: C-110 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 7 .**NO :** Repair or replace.**STEP 7. Check harness between B-23 (terminal No. 3) cylinder 1, 4 oxygen sensor (rear) connector and C-110 (terminal No. 24) engine-A/T-ECU connector.**

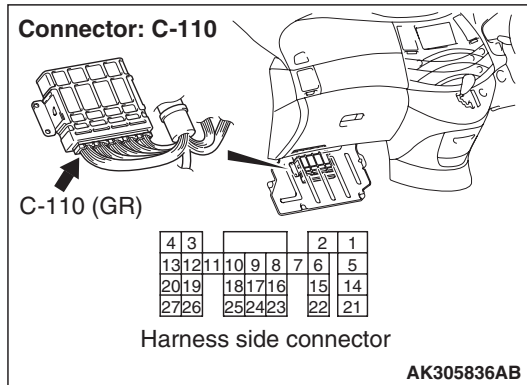
- Check earthing line for open/short circuit.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector

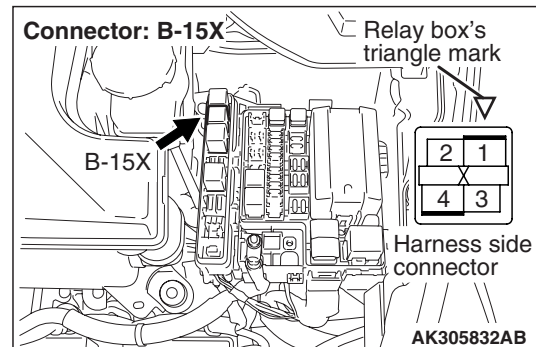
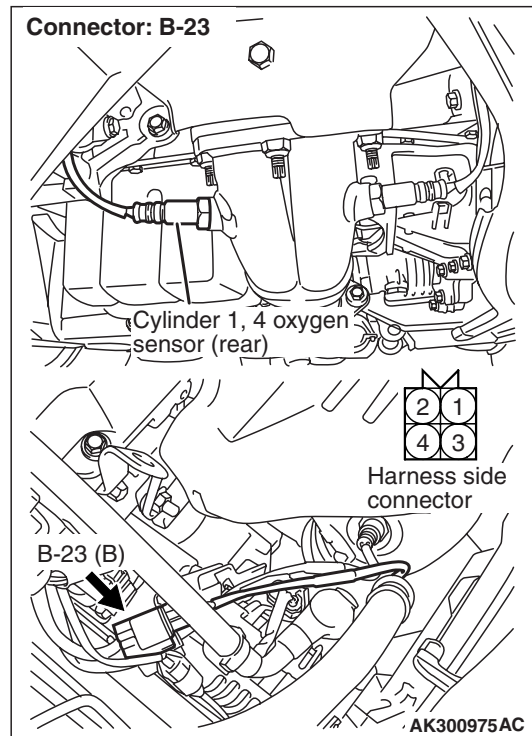


Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-23 (terminal No. 1) cylinder 1, 4 oxygen sensor (rear) connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness intermediate connector C-116, and repair if necessary.

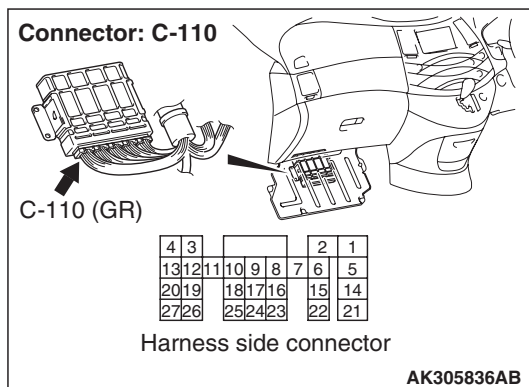
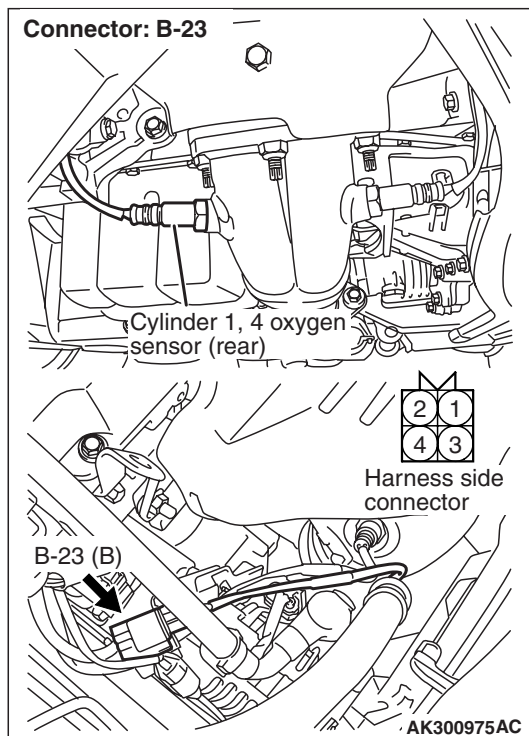
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Check harness between B-23 (terminal No. 3) cylinder 1, 4 oxygen sensor (rear) connector and C-110 (terminal No. 24) engine-A/T-ECU connector.



- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

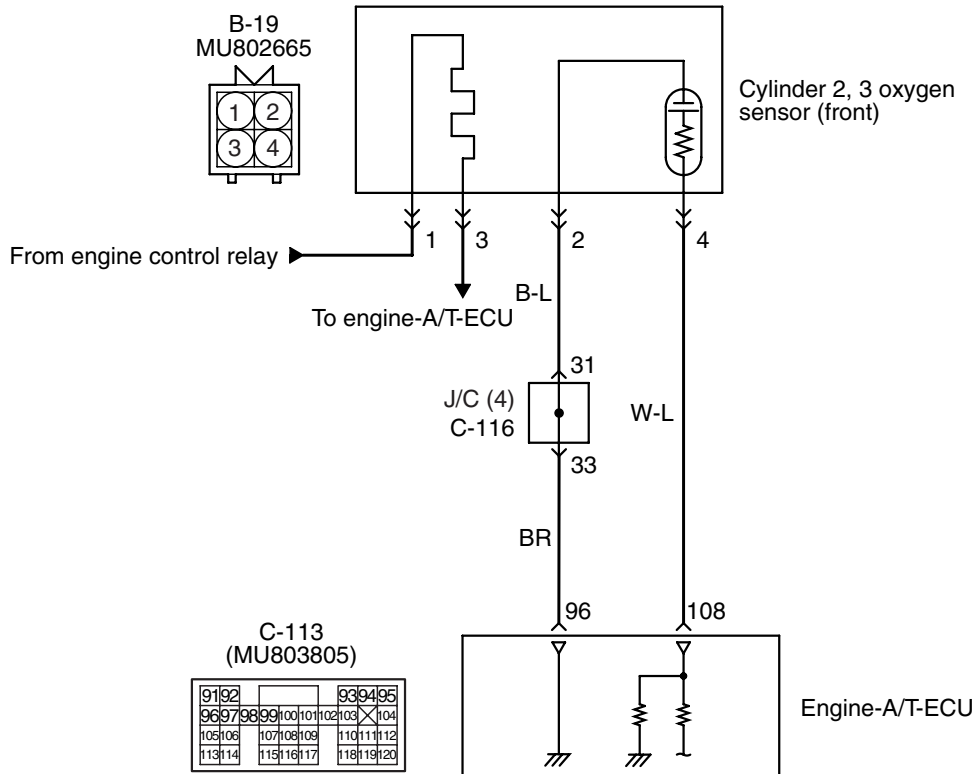
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0150: Cylinder 2, 3 Oxygen Sensor (Front) System

Cylinder 2, 3 oxygen sensor (front) 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

AK501577AB

OPERATION

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 108) from the cylinder 2, 3 oxygen sensor (front) output terminal (terminal No. 4).
- The cylinder 2, 3 oxygen sensor (front) (terminal No. 2) is earthed with engine-A/T-ECU (terminal No. 96).

FUNCTION

- The cylinder 2, 3 oxygen sensor (front) converts the concentration of oxygen in the exhaust emission into a voltage and inputs the signal to the engine-A/T-ECU.

- When the air-fuel ratio is richer than the theoretical air-fuel ratio, the cylinder 2, 3 oxygen sensor (front) outputs a voltage of about 1 V. When it is leaner than the theoretical air-fuel ratio, it outputs a voltage of about 0 V.
- In response to the signal, the engine-A/T-ECU controls the fuel injection amount so that the air-fuel ratio can be equivalent to the theoretical air-fuel ratio.

TROUBLE JUDGMENT

Check Conditions

- Above 3 minutes later after the engine has started up.
- The engine coolant temperature is approximately 80°C or higher.
- The engine speed is 1, 200 r/min or more.

- During the run at the constant speed on the flat road.
- Volumetric efficiency is 25% or more.

Judgment Criterion

- When a power voltage of 5 V is applied to the cylinder 2, 3 oxygen sensor (front), the sensor output voltage is 4.5 V or more.

PROBABLE CAUSE

- Failed cylinder 2, 3 oxygen sensor (front)
- Open/short circuit in cylinder 2, 3 oxygen sensor (front) circuit or loose connector contact
- Failed engine-A/T-ECU

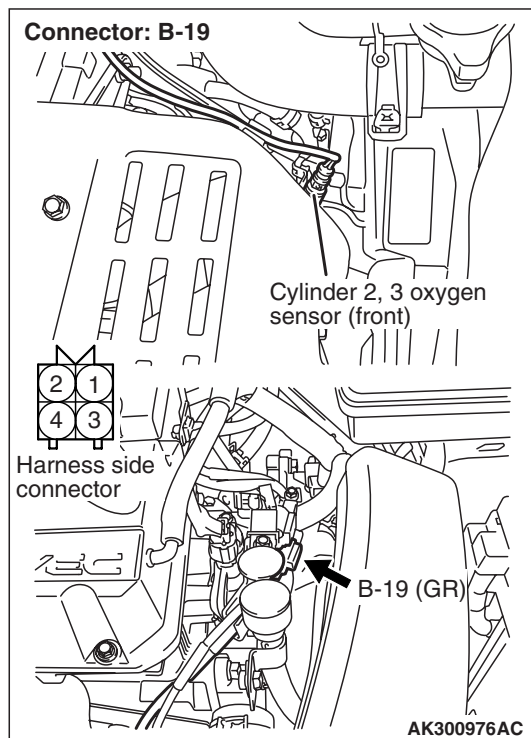
DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 39: Cylinder 2, 3 oxygen sensor (front)

Q: Is the check result normal?

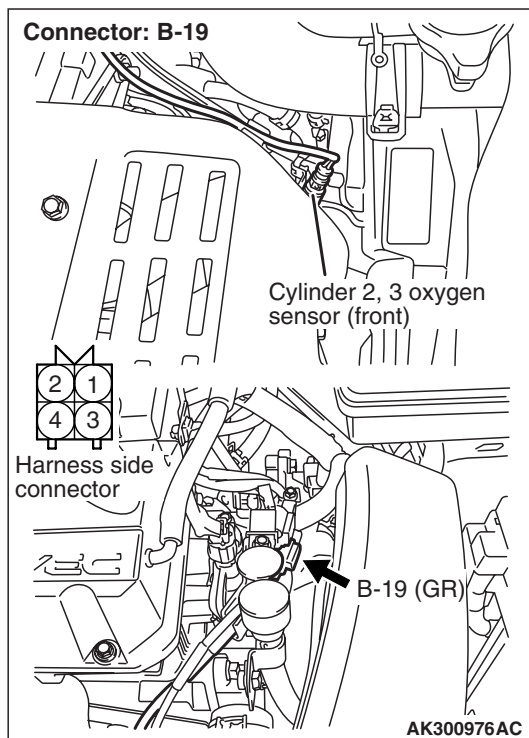
YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-19 cylinder 2, 3 oxygen sensor (front) connector**Q: Is the check result normal?**

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform resistance measurement at B-19 cylinder 2, 3 oxygen sensor (front) connector.

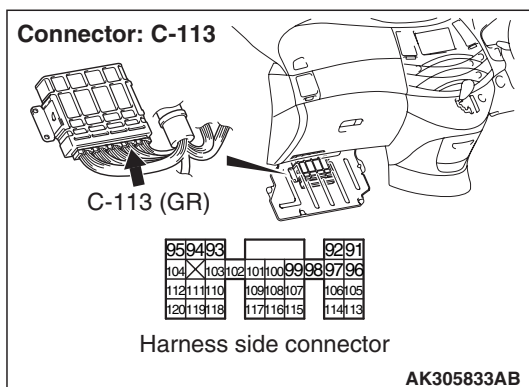
- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 7 .

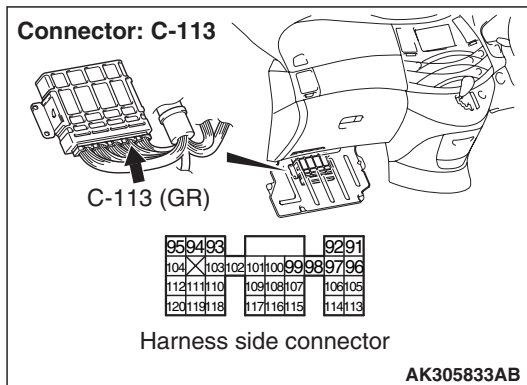
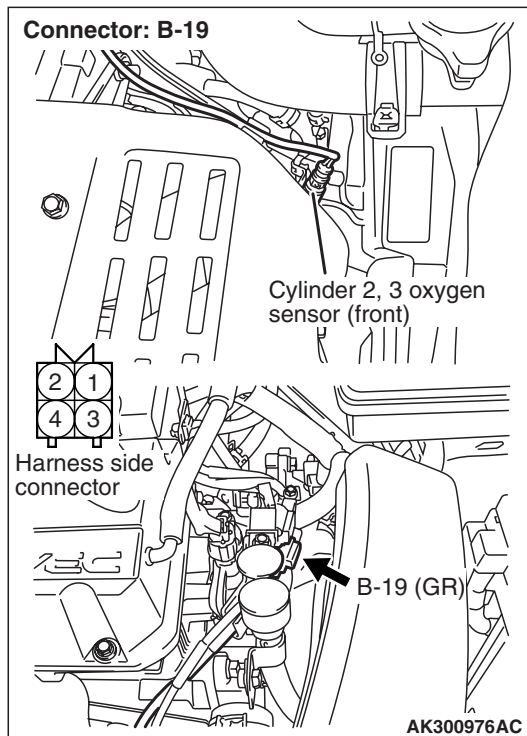
NO : Go to Step 4 .

STEP 4. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 5 .

NO : Repair or replace.

STEP 5. Check harness between B-19 (terminal No. 2) cylinder 2, 3 oxygen sensor (front) connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. M.U.T.-III data list

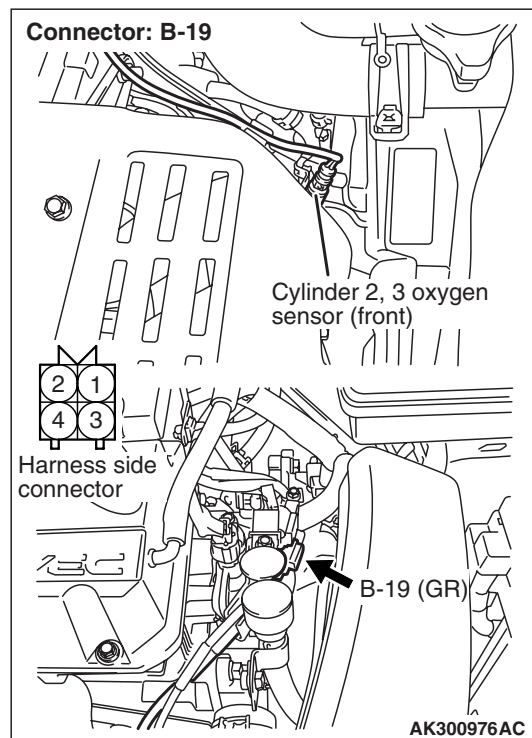
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 39: Cylinder 2, 3 oxygen sensor (front)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 7. Perform voltage measurement at B-19 cylinder 2, 3 oxygen sensor (front) connector.



- Use special tool test harness (MB991316) to connect connector, and measure at pick-up harness.
- Engine: After warm-up
- Transmission: P range
- Voltage between terminal No. 4 and earth.

OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

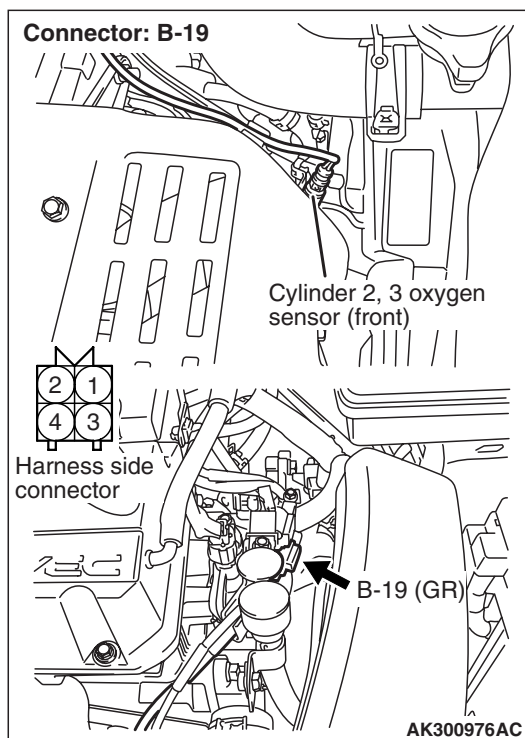
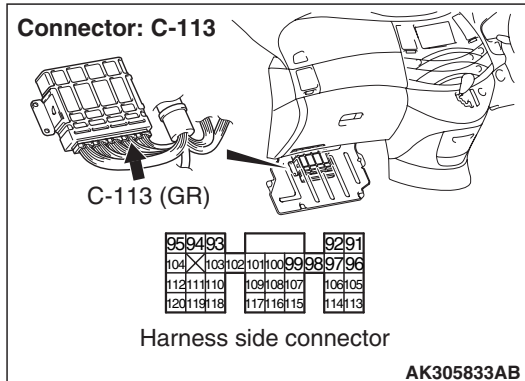
Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 8 .

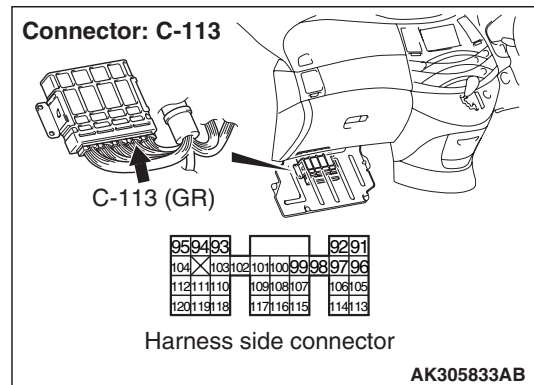
STEP 8. Check cylinder 2, 3 oxygen sensor (front) itself

- Check cylinder 2, 3 oxygen sensor (front) itself (Refer to P.13B-289).

Q: Is the check result normal?**YES :** Go to Step 9 .**NO :** Replace cylinder 2, 3 oxygen sensor (front).**STEP 9. Connector check: C-113 engine-A/T-ECU connector****Q: Is the check result normal?**

YES : Check and repair harness between B-19 (terminal No. 4) cylinder 2, 3 oxygen sensor (front) connector and C-113 (terminal No. 108) engine-A/T-ECU connector.

- Check output line for damage.

NO : Repair or replace.**STEP 10. Perform voltage measurement at C-113 engine-A/T-ECU connector.**

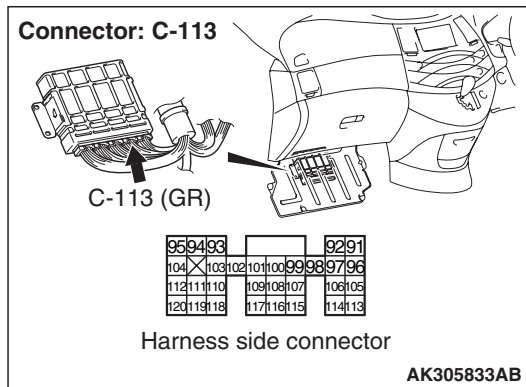
- Measure engine-A/T-ECU terminal voltage.
- Transmission: P range
- Engine: After warm-up
- Voltage between terminal No. 108 and earth.

OK:

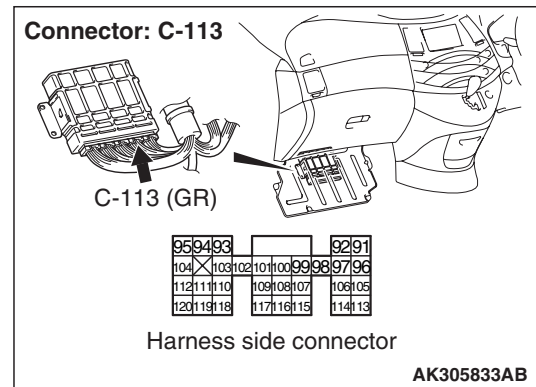
When the engine is 2,500 r/min, the output voltage should 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?**YES :** Go to Step 12 .**NO :** Go to Step 11 .

**STEP 11. Connector check: C-113
engine-A/T-ECU connector**



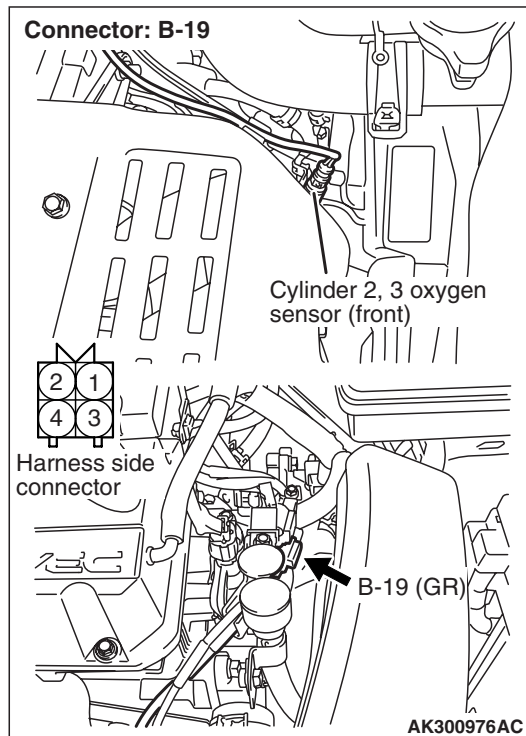
**STEP 12. Connector check: C-113
engine-A/T-ECU connector**



Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.



Q: Is the check result normal?

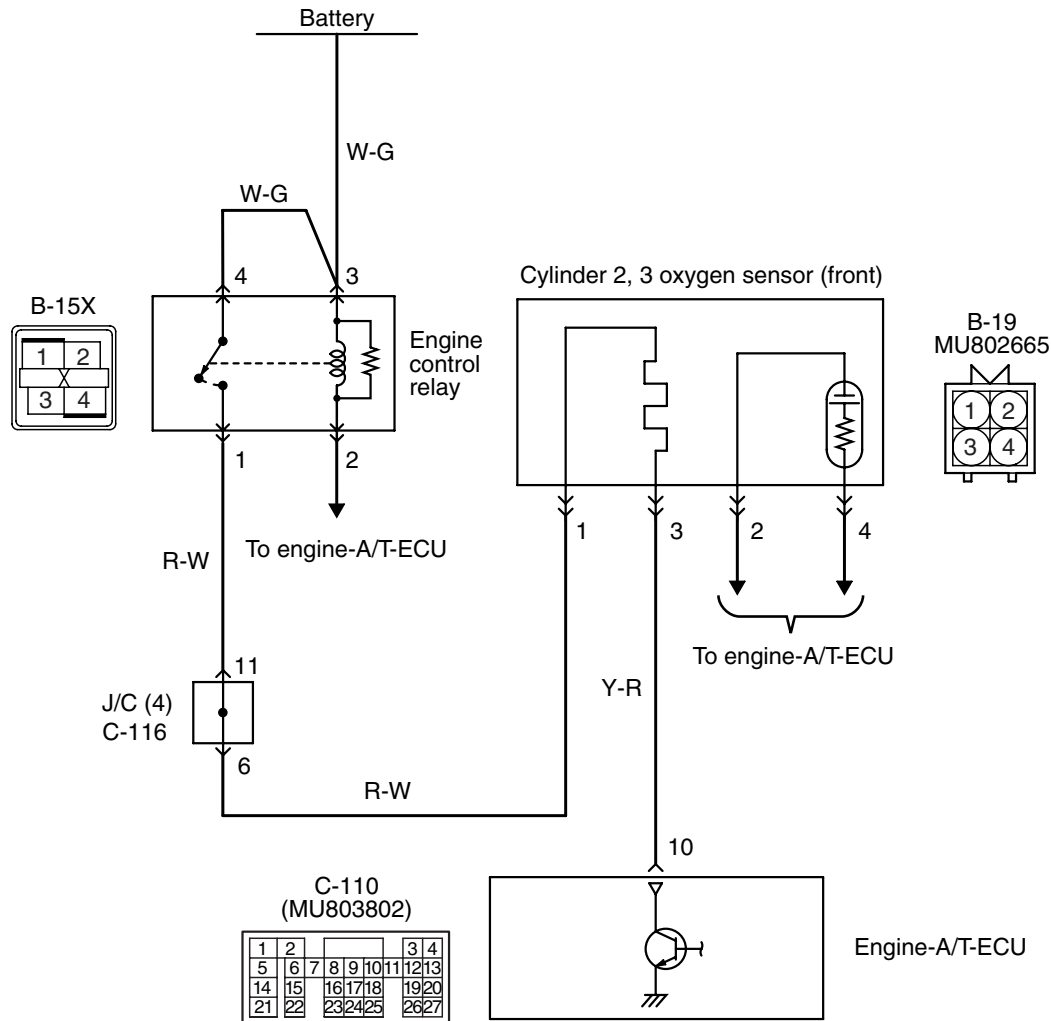
YES : Check and repair harness between B-19 (terminal No. 4) cylinder 2, 3 oxygen sensor (front) connector and C-113 (terminal No. 108) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

Code No. P0155: Cylinder 2, 3 Oxygen Sensor (Front) Heater System

Cylinder 2, 3 oxygen sensor (front) heater circuit



AK305828AB

OPERATION

- Power is supplied to the heater power terminal (terminal No. 1) of the cylinder 2, 3 oxygen sensor (front) connector from the engine control relay (terminal No. 1).
- The heater (terminal No. 3) of the cylinder 2, 3 oxygen sensor (front) connector is controlled by the power transistor in the engine-A/T-ECU (terminal No. 10).

FUNCTION

- The power supply to the cylinder 2, 3 oxygen sensor (front) heater is controlled by the ON/OFF control of the power transistor in the engine-A/T-ECU.
- Heating the cylinder 2, 3 oxygen sensor (front) heater enables the cylinder 2, 3 oxygen sensor (front) to provide good response even when the exhaust emission temperature is low.

TROUBLE JUDGMENT

Check Conditions

- Engine coolant temperature is 20°C or higher.
- While cylinder 2, 3 oxygen sensor (front) heater is on.
- Engine speed is approximately 50 r/min or more.
- Battery positive voltage is 11 – 16 V.

Judgment Criterion

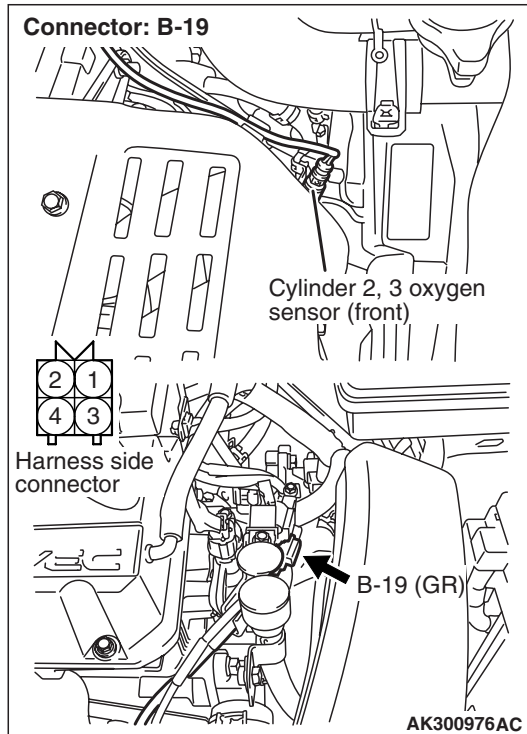
- Cylinder 2, 3 oxygen sensor (front) heater currents has continued to be 0.2 A or less, or 7.5 A or more for 4.3 seconds.

PROBABLE CAUSE

- Failed cylinder 2, 3 oxygen sensor (front) heater
- Open/short circuit in cylinder 2, 3 oxygen sensor (front) heater circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-19 cylinder 2, 3 oxygen sensor (front) connector

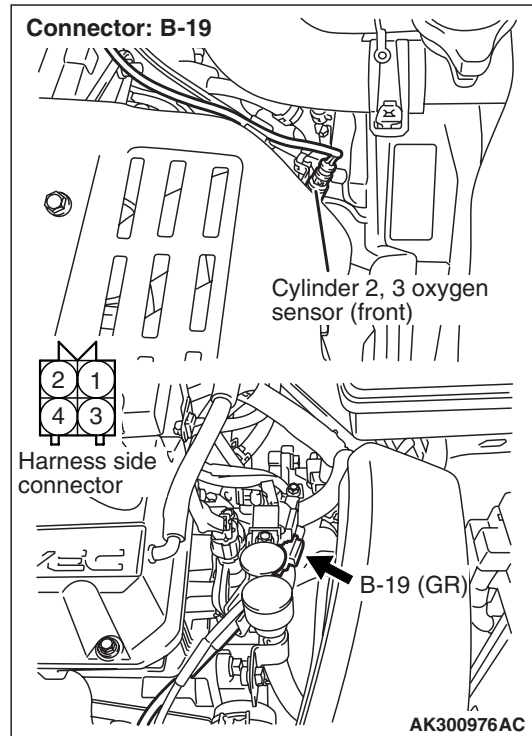


Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Perform resistance measurement at B-19 cylinder 2, 3 oxygen sensor (front) connector.



- Disconnect connector, and measure at sensor side.
- Resistance between terminal No. 1 and No. 3.

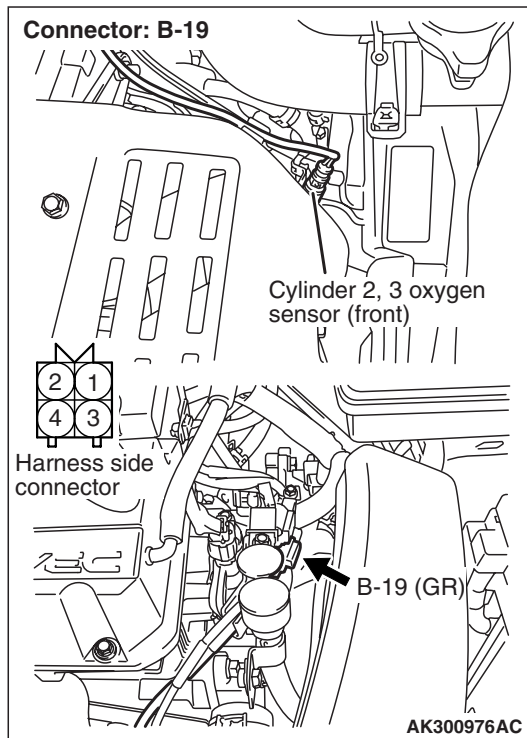
OK: 4.5 – 8.0 Ω

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace cylinder 2, 3 oxygen sensor (front).

STEP 3. Perform voltage measurement at B-19 cylinder 2, 3 oxygen sensor (front) connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

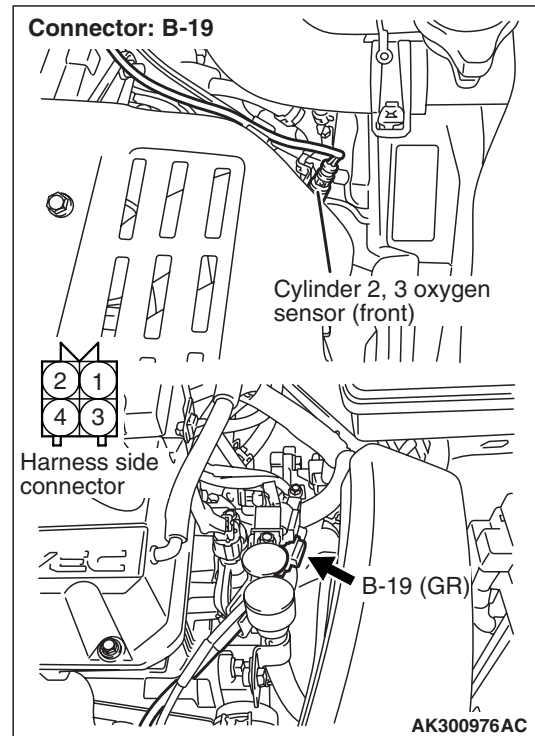
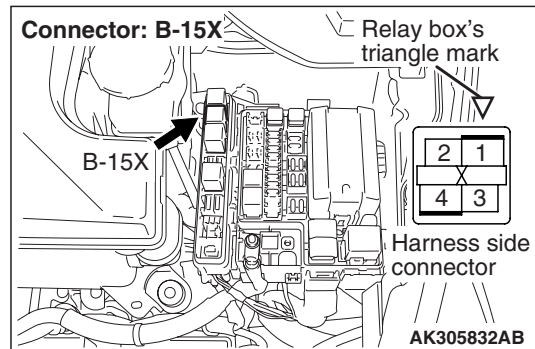
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: B-15X engine control relay connector



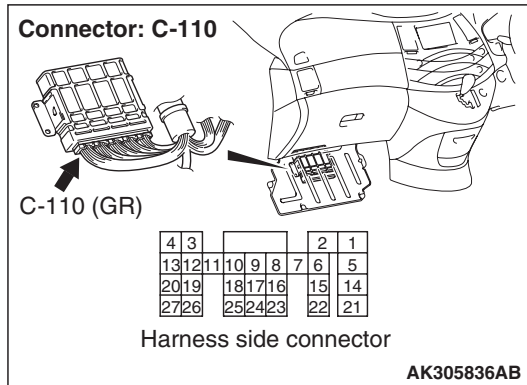
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-19 (terminal No. 1) cylinder 2, 3 oxygen sensor (front) connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-110 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 10 and earth.

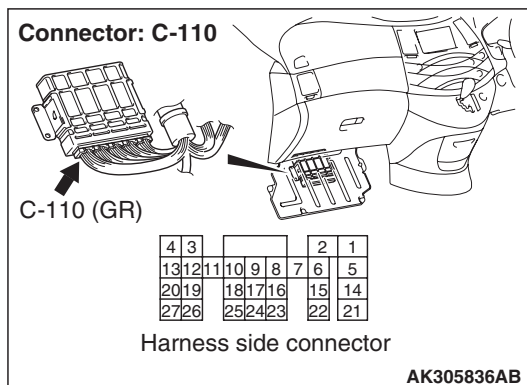
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 6 .

STEP 6. Connector check: C-110 engine-A/T-ECU connector

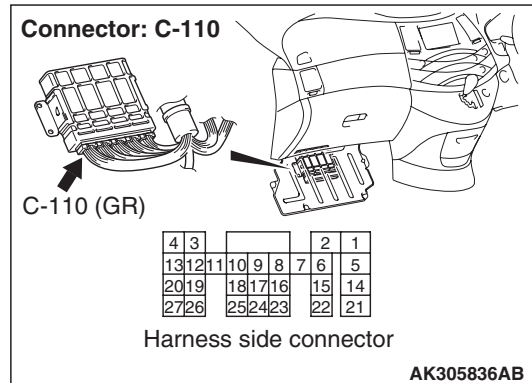
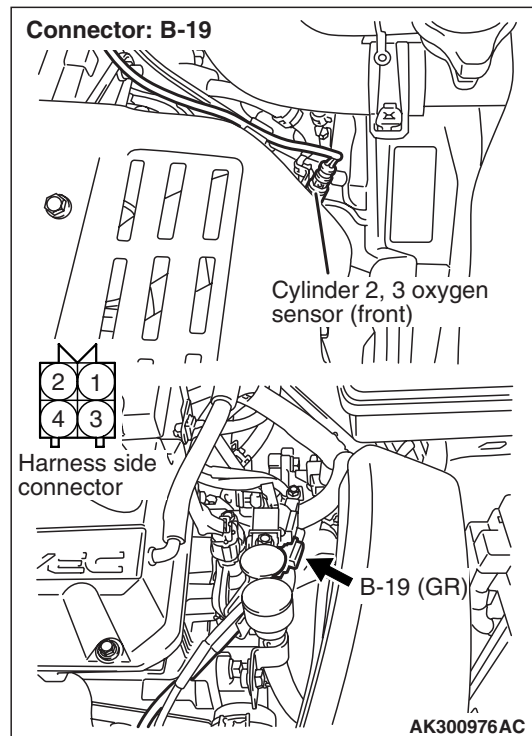


Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-19 (terminal No. 3) cylinder 2, 3 oxygen sensor (front) connector and C-110 (terminal No. 10) engine-A/T-ECU connector.

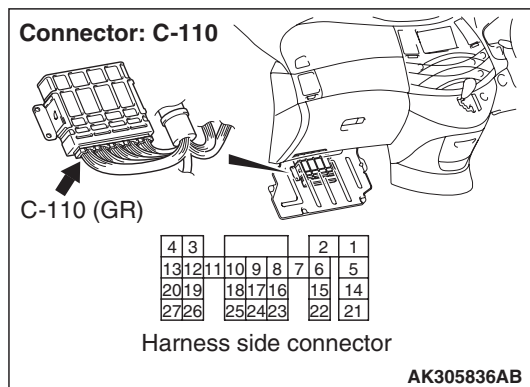
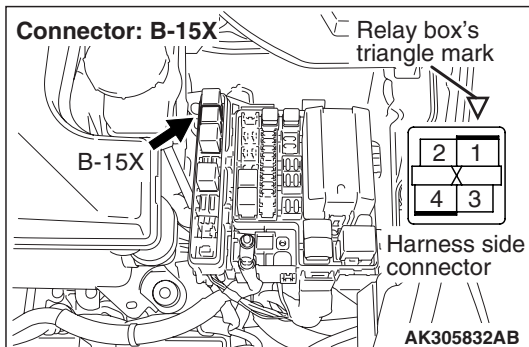
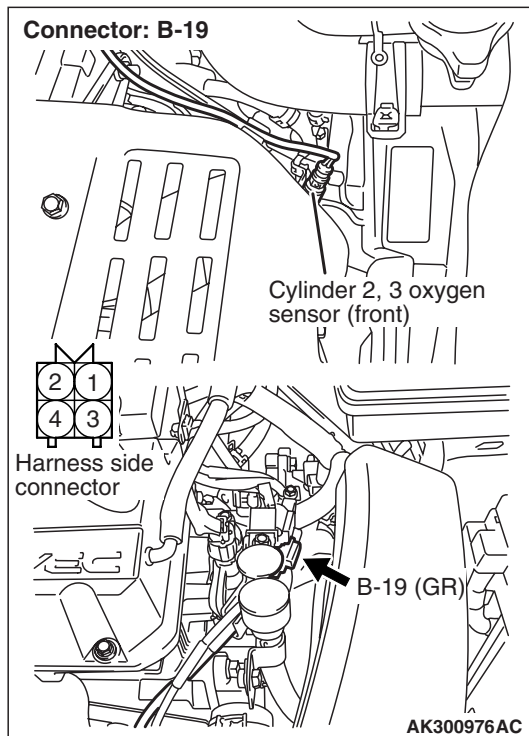


- Check earthing line for open/short circuit.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

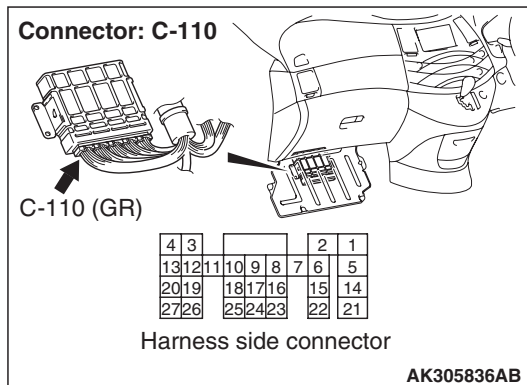
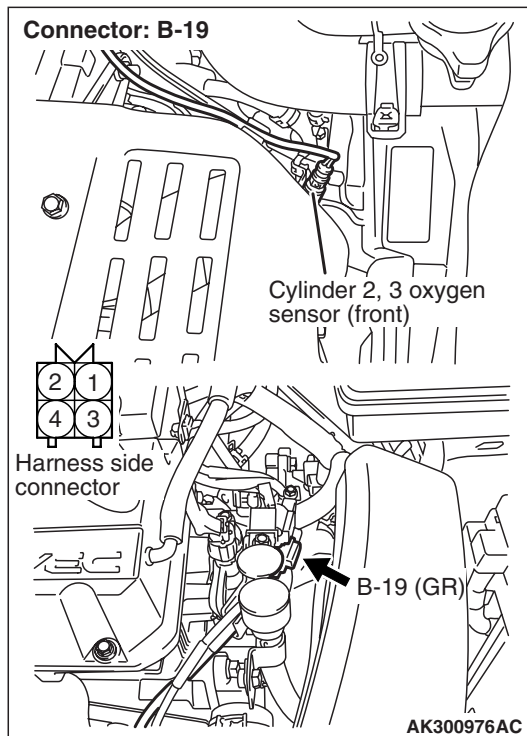
NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 9 .**NO :** Repair or replace.**STEP 9. Check harness between B-19 (terminal No. 1) cylinder 2, 3 oxygen sensor (front) connector and B-15X (terminal No. 1) engine control relay connector.****NOTE:** Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

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

STEP 10. Check harness between B-19 (terminal No. 3) cylinder 2, 3 oxygen sensor (front) connector and C-110 (terminal No. 10) engine-A/T-ECU connector.



- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

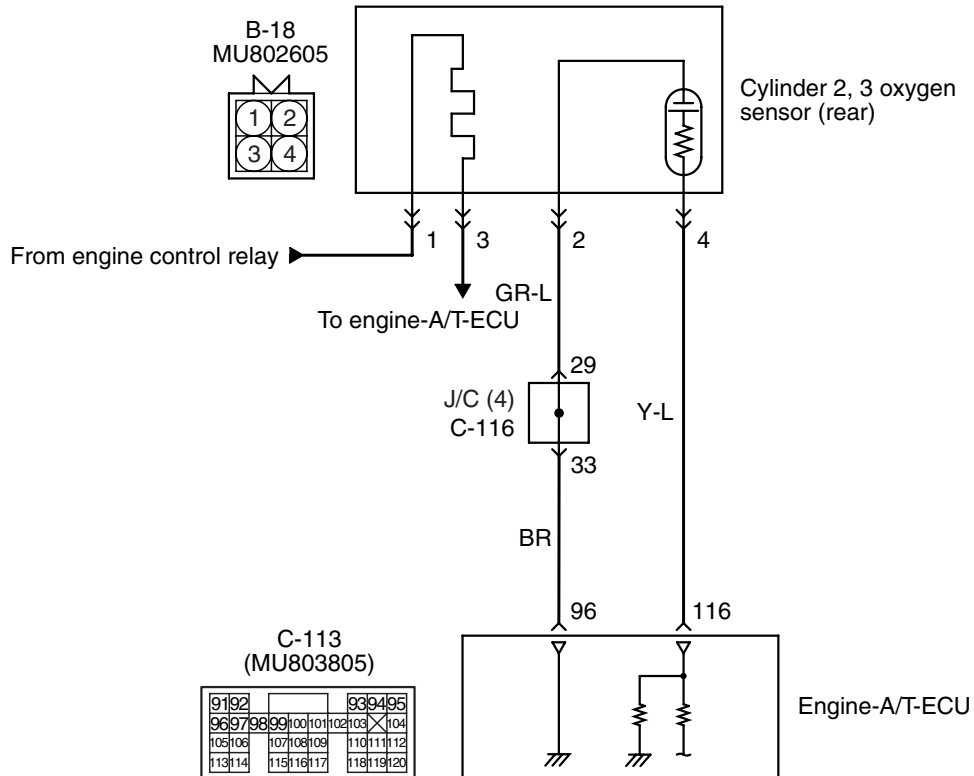
Q: Is the diagnosis code?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0156: Cylinder 2, 3 Oxygen Sensor (Rear) System

Cylinder 2, 3 oxygen sensor (rear) 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

AK501578AB

OPERATION

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 116) from the cylinder 2, 3 oxygen sensor (rear) output terminal (terminal No. 4).
- The cylinder 2, 3 oxygen sensor (rear) (terminal No. 2) is earthed with engine-A/T-ECU (terminal No. 96).

FUNCTION

- The cylinder 2, 3 oxygen sensor (rear) converts the concentration of oxygen in the exhaust emission into a voltage and inputs the signal to the engine-A/T-ECU.

- When the air-fuel ratio is richer than the theoretical air-fuel ratio, the cylinder 2, 3 oxygen sensor (rear) outputs a voltage of about 1 V. When it is leaner than the theoretical air-fuel ratio, it outputs a voltage of about 0 V.
- Based on this signal, the engine-A/T-ECU corrects the deviation in the signal that is output by the cylinder 2, 3 oxygen sensor (front).

TROUBLE JUDGMENT

Check Conditions

- Above 3 minutes later after the engine has started up.
- The engine coolant temperature is approximately 80°C or higher.
- The engine speed is 1, 200 r/min or more.
- During the run at the constant speed on the flat road.

- Volumetric efficiency is 25% or more.

Judgment Criterion

- When a power voltage of 5 V is applied to the cylinder 2, 3 oxygen sensor (rear), the sensor output voltage is 4.5 V or more.

PROBABLE CAUSE

- Failed cylinder 2, 3 oxygen sensor (rear)
- Open/short circuit in cylinder 2, 3 oxygen sensor (rear) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

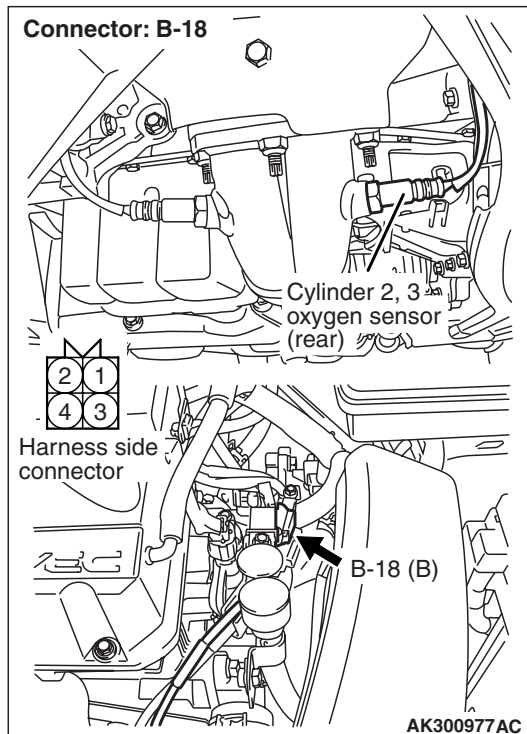
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 69: Cylinder 2, 3 oxygen sensor (rear)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-18 cylinder 2, 3 oxygen sensor (rear) connector

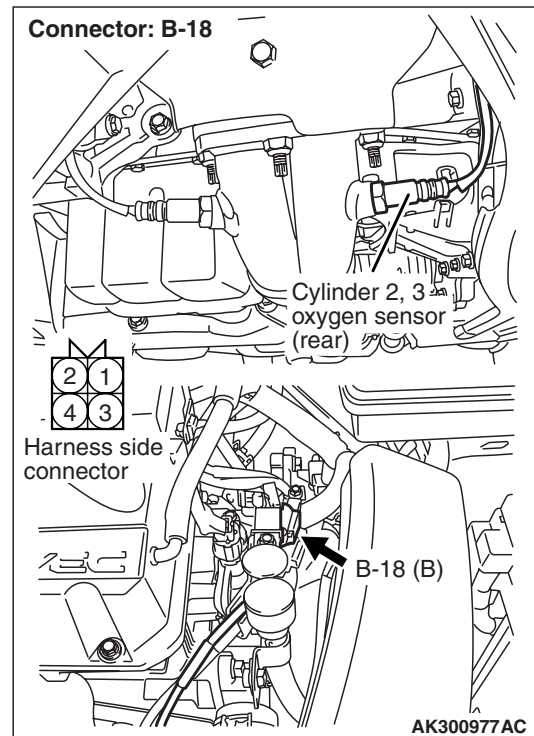


Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform voltage measurement at B-18 cylinder 2, 3 oxygen sensor (rear) connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

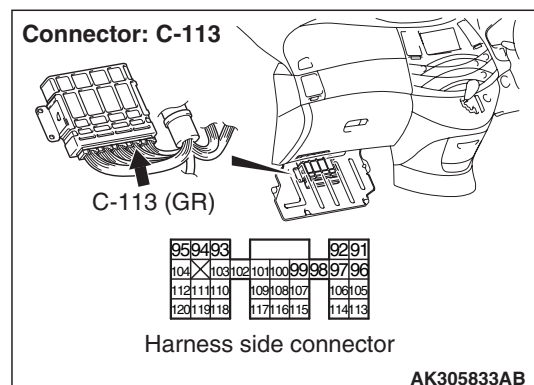
OK: 2 Ω or less

Q: Is the check result normal?

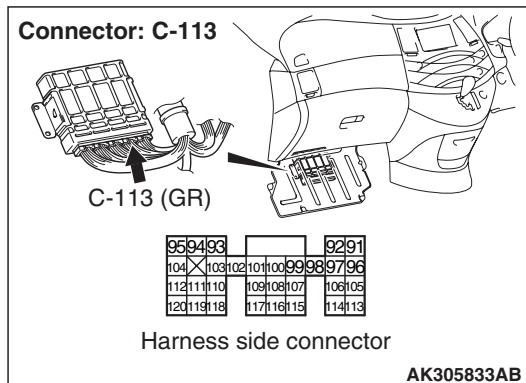
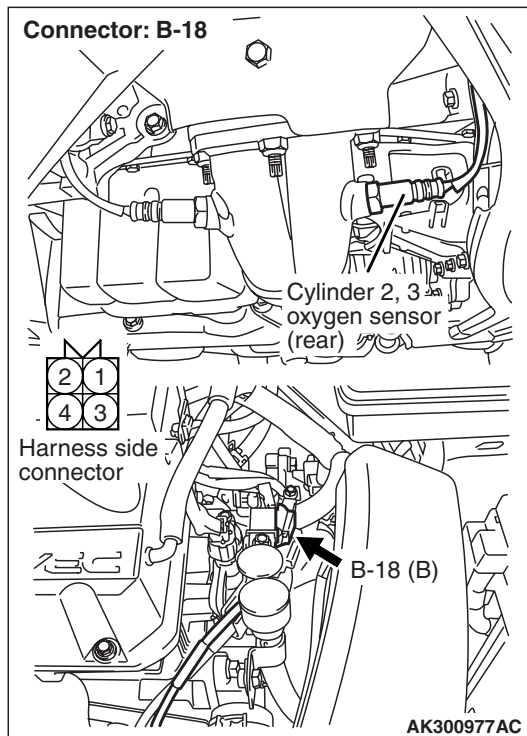
YES : Go to Step 7 .

NO : Go to Step 4 .

STEP 4. Connector check: C-113 engine-A/T-ECU connector



STEP 5. Check harness between B-18 (terminal No. 2) cylinder 2, 3 oxygen sensor (rear) connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. M.U.T.-III data list

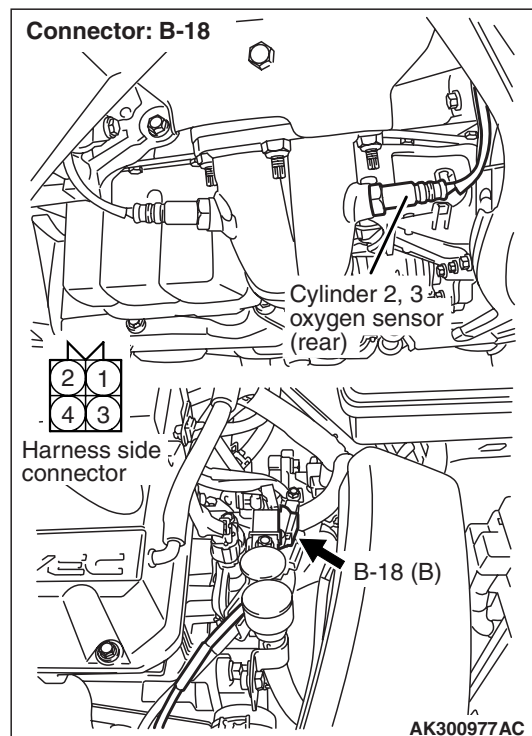
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 69: Cylinder 2, 3 oxygen sensor (rear)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 7. Perform voltage measurement at B-18 cylinder 2, 3 oxygen sensor (rear) connector.



- Use special tool test harness (MD998464) to connect connector, and measure at pick-up harness.
- Transmission: P range
- Engine: After warm-up
- Voltage between terminal No. 4 and earth.

OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 8 .

STEP 8. Check cylinder 2, 3 oxygen sensor (rear) itself

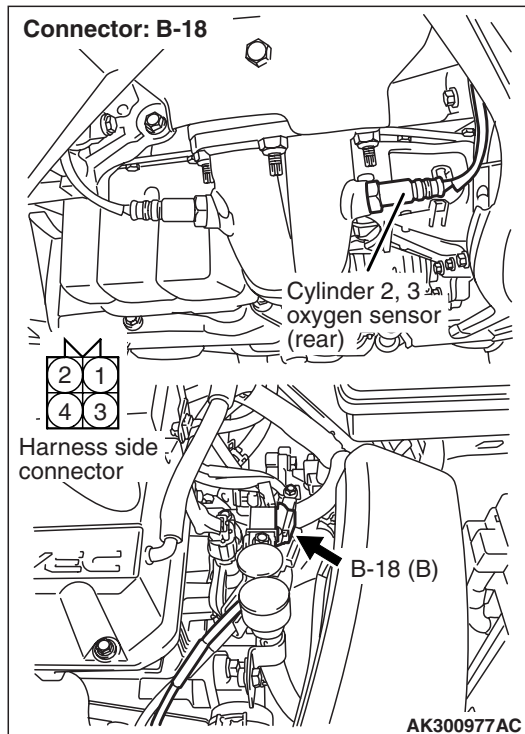
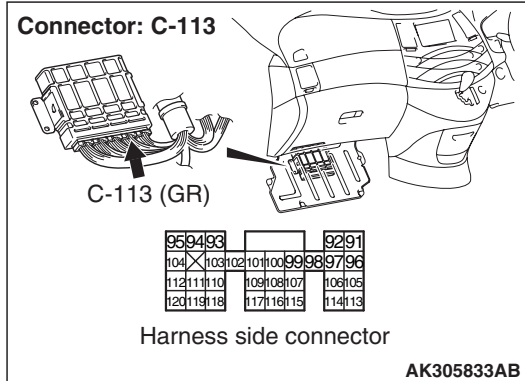
- Check cylinder 2, 3 oxygen sensor (rear) itself (Refer to P.13B-289).

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Replace cylinder 2, 3 oxygen sensor (rear).

STEP 9. Connector check: C-113 engine-A/T-ECU connector



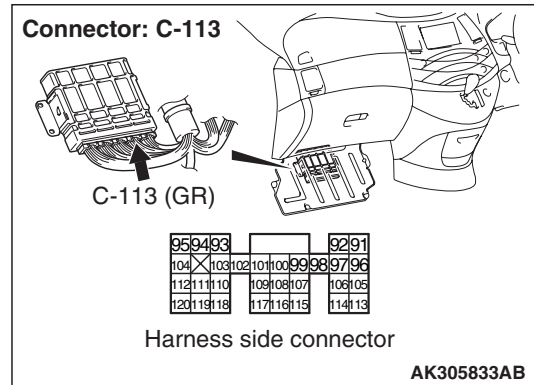
Q: Is the check result normal?

YES : Check and repair harness between B-18 (terminal No. 4) cylinder 2, 3 oxygen sensor (rear) connector and C-113 (terminal No. 116) engine-A/T-ECU connector.

- Check output line for damage.

NO : Repair or replace.

STEP 10. Perform voltage measurement at C-113 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Transmission: P range
- Engine: After warm-up
- Voltage between terminal No. 116 and earth.

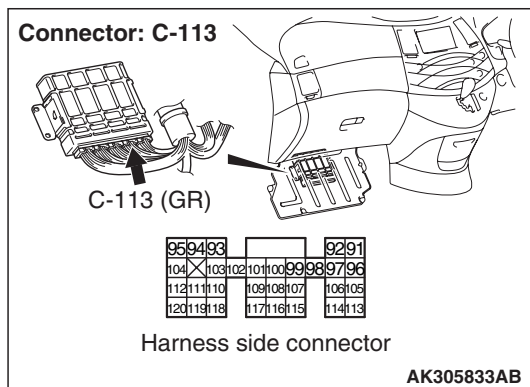
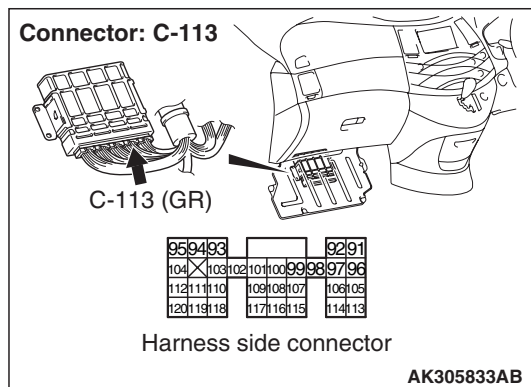
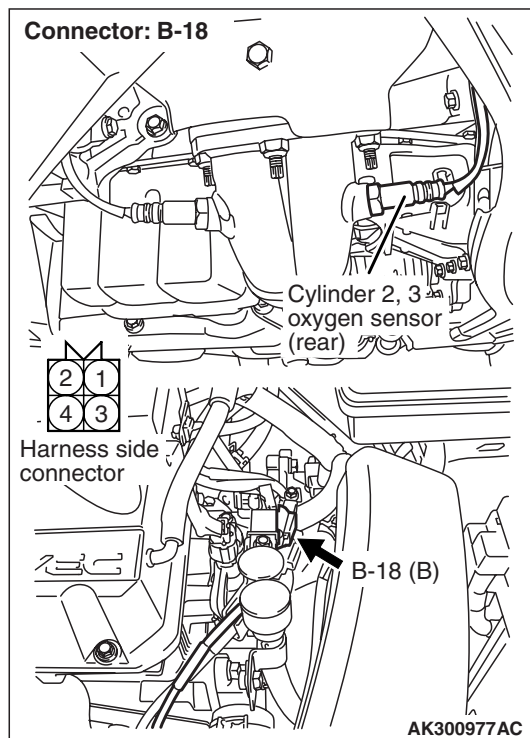
OK:

When the engine is 2,500 r/min, the output voltage should repeat 0.4 V or less to 0.6 – 1.0 V alternately.

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Go to Step 11 .

**STEP 11. Connector check: C-113
engine-A/T-ECU connector****STEP 12. Connector check: C-113
engine-A/T-ECU connector****Q: Is the check result normal?****YES** : Go to Step 6 .**NO** : Repair or replace.**Q: Is the check result normal?**

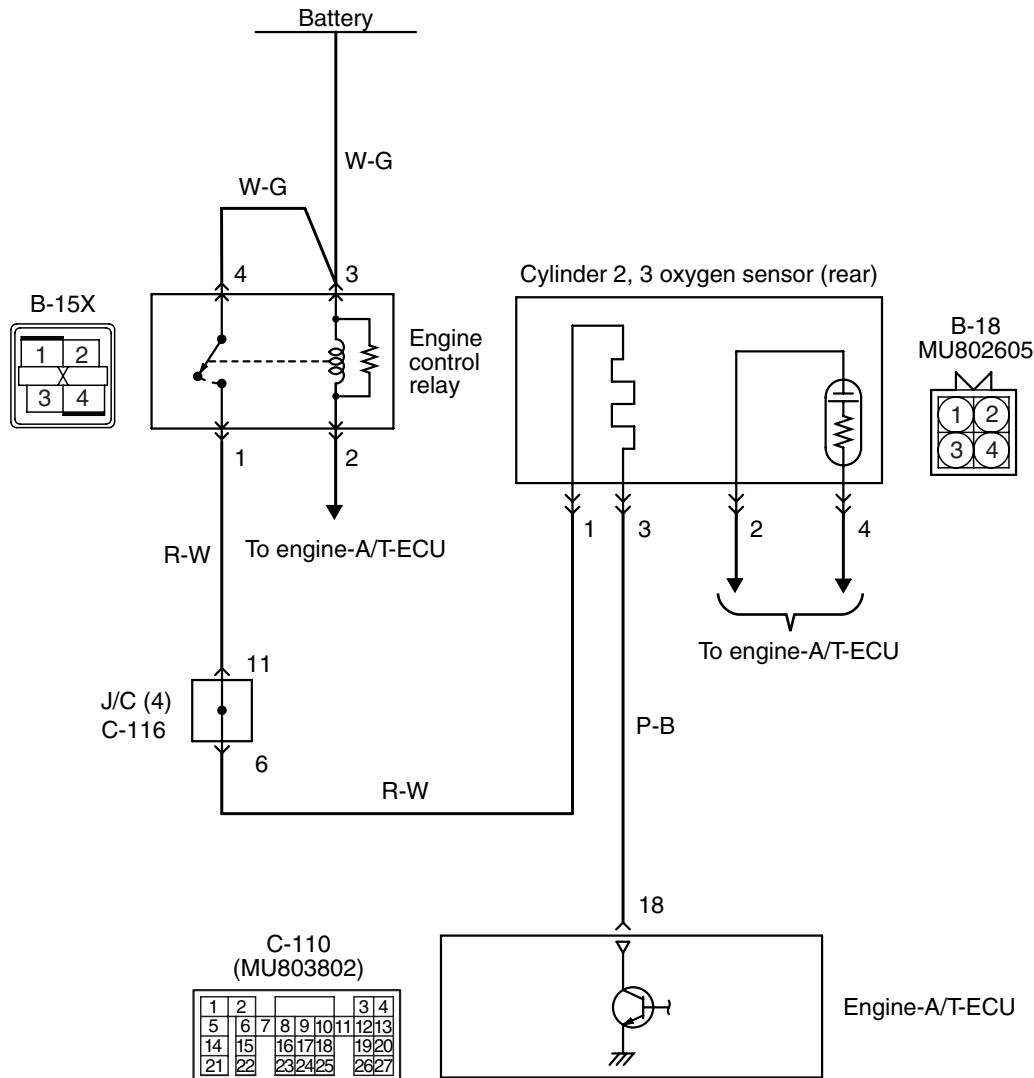
YES : Check and repair harness between B-18 (terminal No. 4) cylinder 2, 3 oxygen sensor (rear) connector and C-113 (terminal No. 116) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

Code No. P0161: Cylinder 2, 3 Oxygen Sensor (Rear) Heater System

Cylinder 2, 3 oxygen sensor (rear) heater 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

AK305830AB

OPERATION

- Power is supplied to the heater power terminal (terminal No. 1) of the cylinder 2, 3 oxygen sensor (rear) connector from the engine control relay (terminal No. 1).
- The heater (terminal No. 3) of the cylinder 2, 3 oxygen sensor (rear) connector is controlled by the power transistor in the engine-A/T-ECU (terminal No. 18).

FUNCTION

- The power supply to the cylinder 2, 3 oxygen sensor (rear) heater is controlled by the ON/OFF control of the power transistor in engine-A/T-ECU.
- Heating the cylinder 2, 3 oxygen sensor (rear) heater enables the cylinder 2, 3 oxygen sensor (rear) to provide good response even when the exhaust emission temperature is low.

TROUBLE JUDGMENT**Check Conditions**

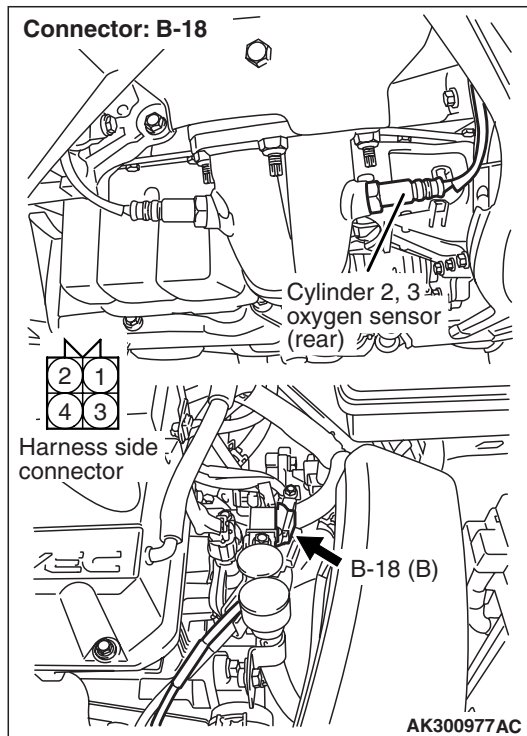
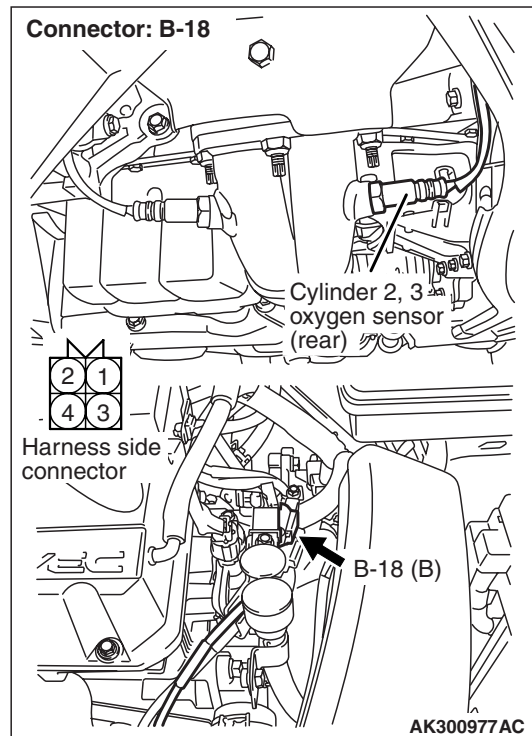
- Engine coolant temperature is 20°C or higher.
- While cylinder 2, 3 oxygen sensor (rear) heater is on.
- Engine speed is approximately 50 r/min or more.
- Battery positive voltage is 11 – 16 V.

Judgment Criterion

- Cylinder 2, 3 oxygen sensor (rear) heater currents have continued to be 0.2 A or less, or 7.5 A or more for 4.3 seconds.

PROBABLE CAUSE

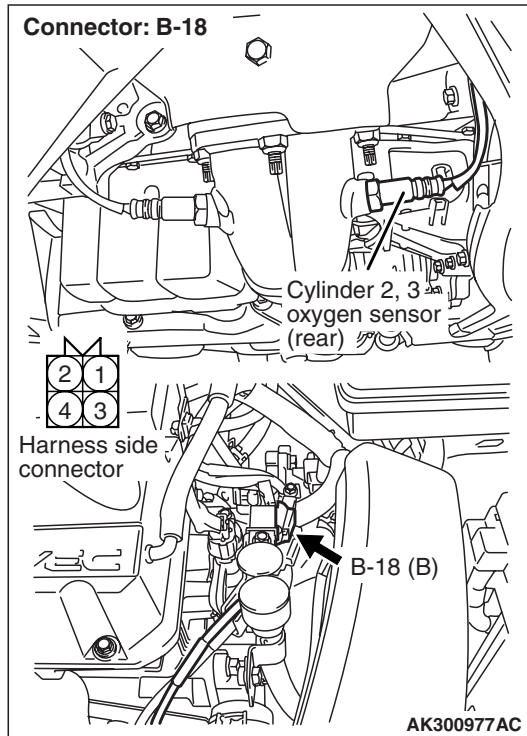
- Failed cylinder 2, 3 oxygen sensor (rear) heater
- Open/short circuit in cylinder 2, 3 oxygen sensor (rear) heater circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-18 cylinder 2, 3 oxygen sensor (rear) connector****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Repair or replace.**STEP 2. Perform resistance measurement at B-18 cylinder 2, 3 oxygen sensor (rear) connector.**

- Disconnect connector, and measure at sensor side.
- Resistance between terminal No. 1 and No. 3.

OK: 11 – 18 Ω **Q: Is the check result normal?****YES :** Go to Step 3 .**NO :** Replace cylinder 2, 3 oxygen sensor (rear).

STEP 3. Perform voltage measurement at B-18 cylinder 2, 3 oxygen sensor (rear) connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

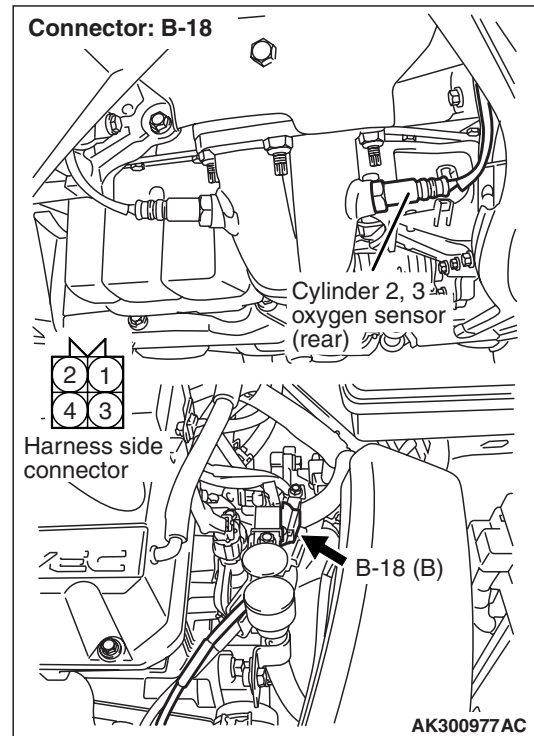
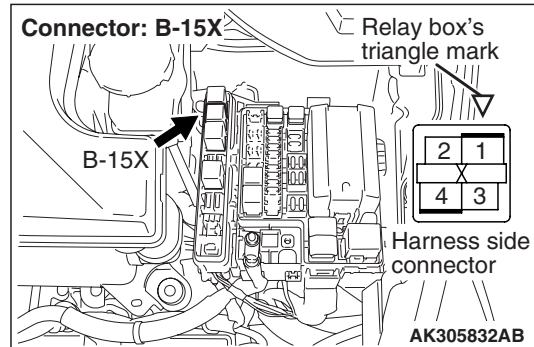
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: B-15X engine control relay connector

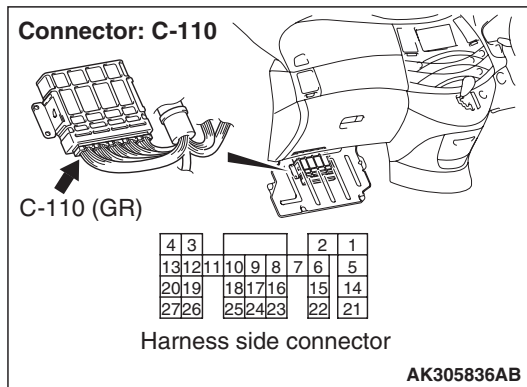


Q: Is the check result normal?

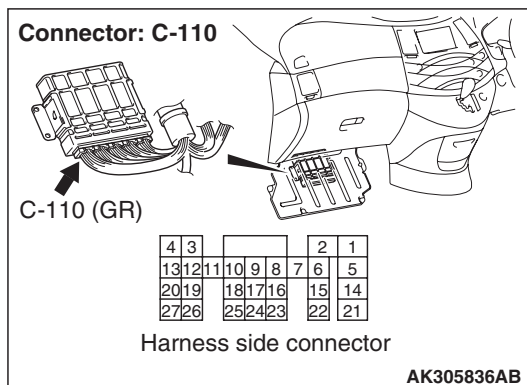
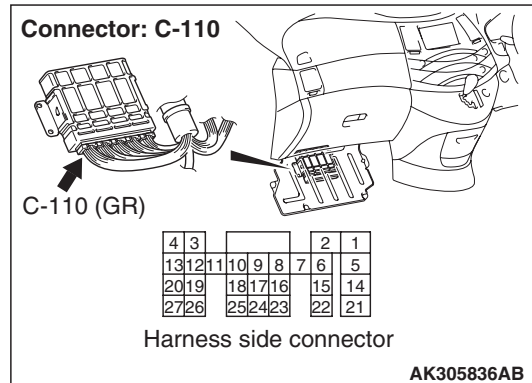
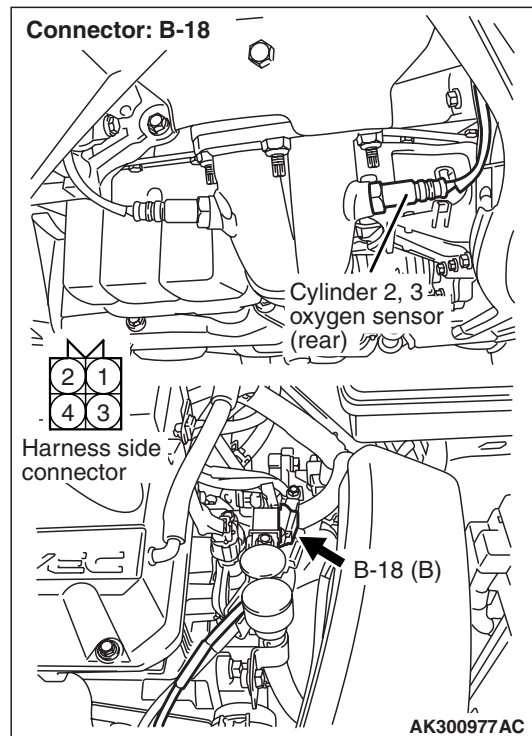
YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-18 (terminal No. 1) cylinder 2, 3 oxygen sensor (rear) connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-110 engine-A/T-ECU.

- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 18 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 8 .**NO :** Go to Step 6 .**STEP 6. Connector check: C-110 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 7 .**NO :** Repair or replace.**STEP 7. Check harness between B-18 (terminal No. 3) cylinder 2, 3 oxygen sensor (rear) connector and C-110 (terminal No. 18) engine-A/T-ECU connector.**

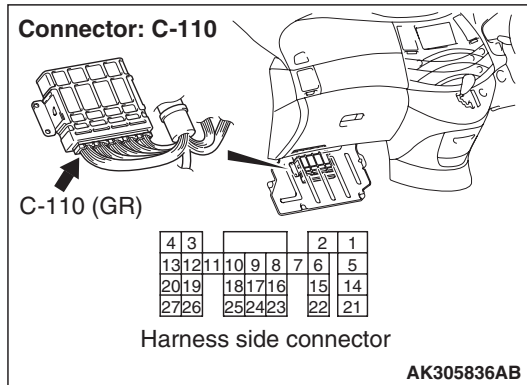
- Check earthing line for open/short circuit.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector

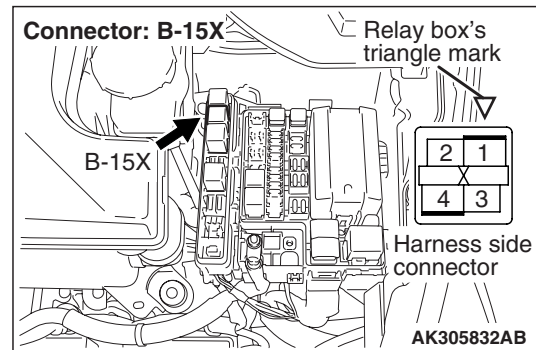
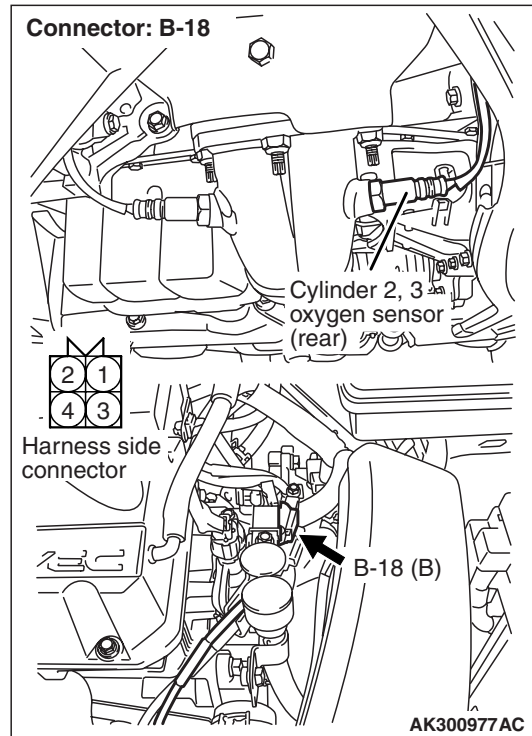


Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-18 (terminal No. 1) cylinder 2, 3 oxygen sensor (rear) connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

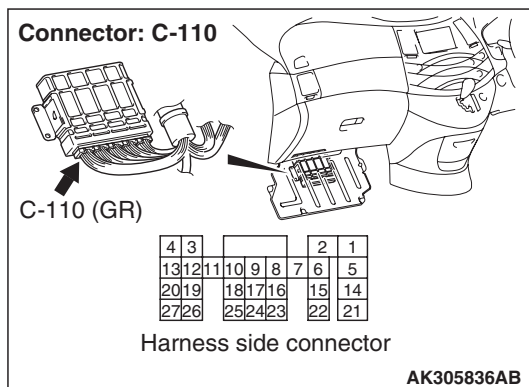
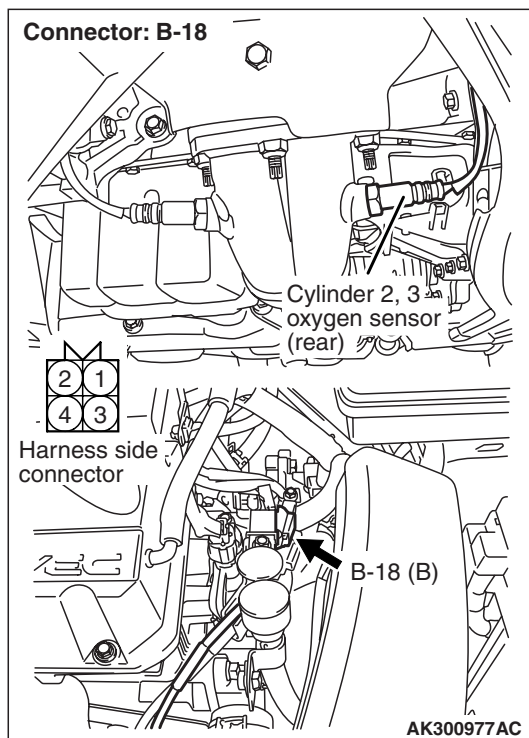
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Check harness between B-18 (terminal No. 3) cylinder 2, 3 oxygen sensor (rear) connector and C-110 (terminal No. 18) engine-A/T-ECU connector.



- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0170: Abnormal Fuel System (Cylinder 1, 4)

OPERATION

- Refer to Code No. P0201: No. 1 Injector System [P.13B-90](#).
- Refer to Code No. P0204: No. 4 Injector System [P.13B-102](#).

FUNCTION

- If the fuel system goes out of order, the fuel correction value will become larger.
- The engine-A/T-ECU checks whether the fuel trim value is within a specified range.

TROUBLE JUDGMENT

Check Condition

- In learning the air-fuel ratio

Judgment Criteria

- The correction value of fuel injection amount is too low for 5 seconds or more.

or

- The correction value of fuel injection amount is too high for 5 seconds or more.

PROBABLE CAUSE

- Failed fuel supply system
- Failed cylinder 1, 4 oxygen sensor (front)
- Failed intake air temperature sensor
- Failed engine coolant temperature sensor
- Failed air flow sensor
- Failed barometric pressure sensor
- Air drawn in from intake hose and inlet manifold
- Exhaust leak from exhaust manifold
- Contamination of throttle body (throttle valve portion)
- Failed No. 1 or No. 4 injector
- Failed purge control solenoid valve
- Failed EGR valve
- Failed fuel pressure
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

- Q: Is any other diagnosis code than P0170 output?**
YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).
NO : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor
 - b. Item 13: Intake air temperature sensor
 - c. Item 21: Engine coolant temperature sensor

Q: Are the check results normal?

YES : Go to Step 3 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3: M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 25: Barometric pressure sensor

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 4. Check throttle body (throttle valve portion) for contamination.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 5. Check for intake of air from intake hose and inlet manifold.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. Check for leakage of exhaust emission from exhaust manifold.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 11: Cylinder 1, 4 oxygen sensor (front)

Q: Is the check result normal?**YES** : Go to Step 8 .**NO** : Check cylinder 1, 4 oxygen sensor (front) system (Refer to Code. No. P0130 [P.13B-44](#)).**STEP 8. Check No. 1 and No. 4 injector itself.**

- Check No. 1 and No. 4 Injector itself (Refer to [P.13B-291](#)).

Q: Is the check result normal?**YES** : Go to Step 9 .**NO** : Replace injector.**STEP 9. Check purge control solenoid valve itself.**

- Check purge control solenoid valve itself (Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System– Purge Control Solenoid Valve [P.17-42](#)).

Q: Is the check result normal?**YES** : Go to Step 10 .**NO** : Replace purge control solenoid valve.**STEP 10. Check EGR valve itself.**

- Check EGR valve itself (Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (stepper motor) Check [P.17-44](#)).

Q: Is the check result normal?**YES** : Go to Step 11 .**NO** : Replace EGR valve (stepper motor).**STEP 11. Fuel pressure measurement.**

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

Q: Is the check result normal?**YES** : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**NO** : Repair.**Code No. P0173: Abnormal Fuel System (Cylinder 2, 3)****OPERATION**

- Refer to Code No. P0202 No. 2 Injector System [P.13B-94](#).
- Refer to Code No. P0203 No. 3 Injector System [P.13B-98](#).

FUNCTION

- If the fuel system goes out of order, the fuel correction value will become larger.
- The engine-A/T-ECU checks whether the fuel trim value is within a specified range.

TROUBLE JUDGMENT**Check Condition**

- In learning the air-fuel ratio

Judgment Criteria

- The correction value of fuel injection amount is too low for 5 seconds or more.

or

- The correction value of fuel injection amount is too high for 5 seconds or more.

PROBABLE CAUSE

- Failed fuel supply system
- Failed cylinder 2, 3 oxygen sensor (front)
- Failed intake air temperature sensor
- Failed engine coolant temperature sensor
- Failed air flow sensor
- Failed barometric pressure sensor
- Air drawn in from intake hose and inlet manifold
- Exhaust leak from exhaust manifold
- Contamination of throttle body (throttle valve portion)
- Failed No. 2 or No. 3 injector
- Failed purge control solenoid valve
- Failed EGR valve
- Failed fuel pressure
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

- Q: Is any other diagnosis code than P0173 output?**
YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).
NO : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor
 - b. Item 13: Intake air temperature sensor
 - c. Item 21: Engine coolant temperature sensor

- Q: Are the check results normal?**
YES : Go to Step 3 .
NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3: M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 25: Barometric pressure sensor

- Q: Is the check result normal?**
YES : Go to Step 4 .
NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 4. Check throttle body (throttle valve portion) for contamination.

- Q: Is the check result normal?**
YES : Go to Step 5 .
NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 5. Check for intake of air from intake hose and inlet manifold.

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

STEP 6. Check for leakage of exhaust emission from exhaust manifold.

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

STEP 7. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 11: Cylinder 1, 4 oxygen sensor (front)

- Q: Is the check result normal?**
YES : Go to Step 8 .
NO : Check cylinder 1, 4 oxygen sensor (front) system (Refer to Code. No. P0130 [P.13B-44](#)).

STEP 8. Check No. 2 and No. 3 injector itself.

- Check No. 2 and No. 3 Injector itself (Refer to [P.13B-291](#)).

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

STEP 9. Check purge control solenoid valve itself.

- Check purge control solenoid valve itself (Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System– Purge Control Solenoid Valve [P.17-42](#)).

- Q: Is the check result normal?**
YES : Go to Step 10 .
NO : Replace purge control solenoid valve.

STEP 10. Check EGR valve itself.

- Check EGR valve itself (Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (stepper motor) Check [P.17-44](#)).

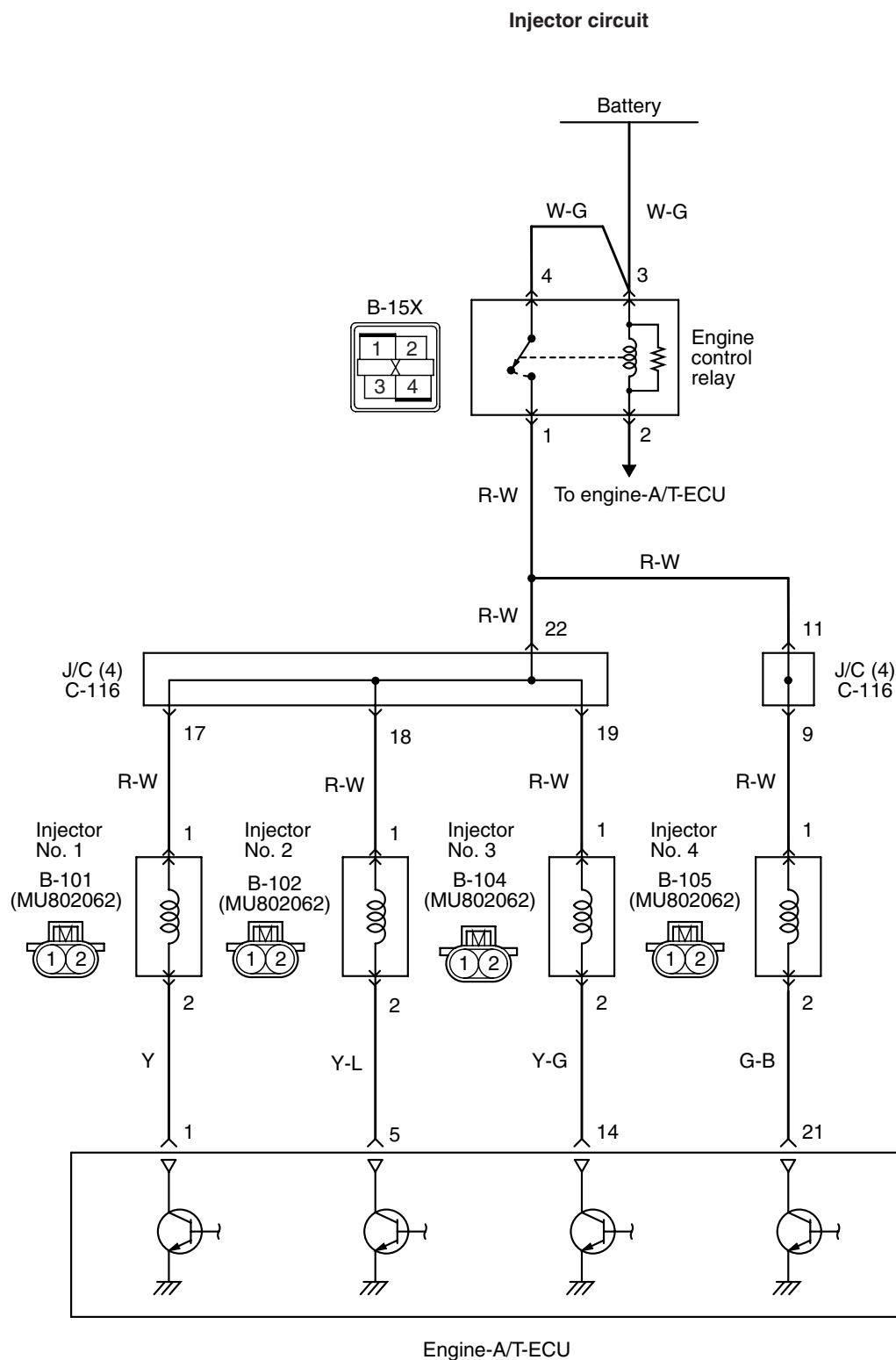
- Q: Is the check result normal?**
YES : Go to Step 11 .
NO : Replace EGR valve (stepper motor).

STEP 11. Fuel pressure measurement.

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

- Q: Is the check result normal?**
YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).
- NO :** Repair.

Code No. P0201: No. 1 Injector System



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

OPERATION

- Power is supplied to the injector (terminal No. 1) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 1) makes the power transistor in the unit be in ON position, and that makes currents go on the injector (terminal No. 2).

FUNCTION

- The engine-A/T-ECU controls the power supply interval of the injector.
- The fuel injection amount of the injector depends on the power supply interval.

TROUBLE JUDGMENT

Check Conditions

- Engine speed is between 50 and 1000 r/min.
- Throttle position sensor (main) output is 1.15 V or less.
- Injector operation (by carrying out actuator test) is not in progress.

Judgment Criterion

- Injector coil surge voltage (battery positive voltage + 2 V) has not been detected for 4 seconds.

PROBABLE CAUSE

- Failed No. 1 injector
- Open/short circuit in injector circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III actuator test

- Item 01: No. 1 injector

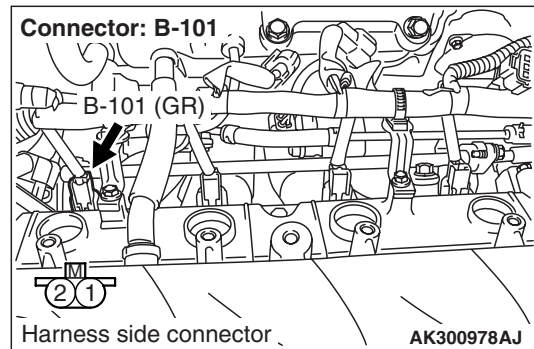
OK: Idling state varies.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-101 No. 1 injector connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check No. 1 injector itself.

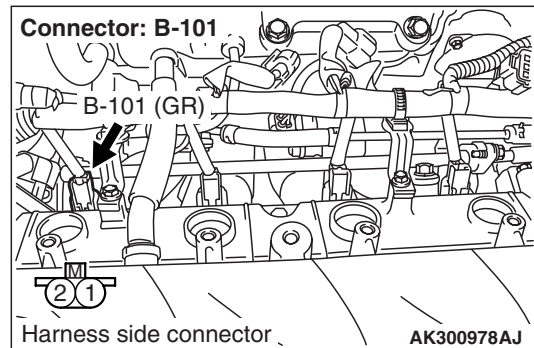
- Check No. 1 Injector itself (Refer to [P.13B-291](#)).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace No. 1 injector.

STEP 4. Perform voltage measurement at B-101 No. 1 injector connector.



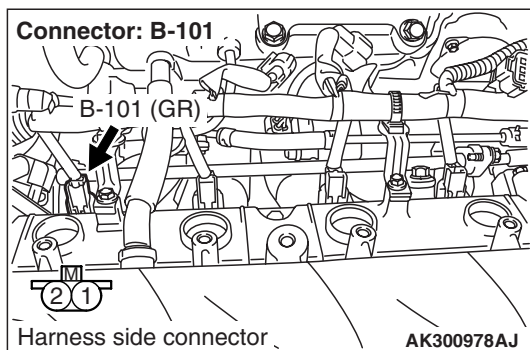
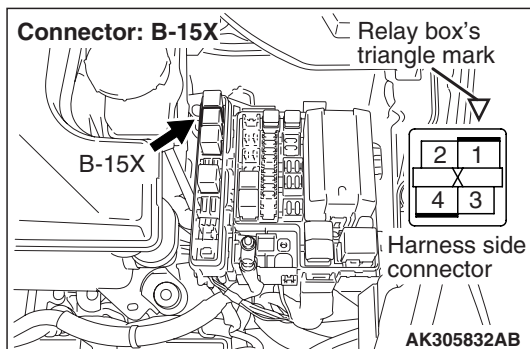
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

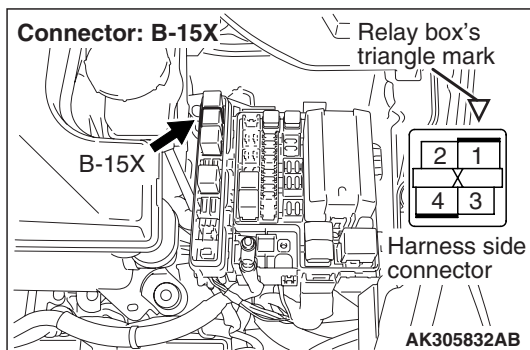
NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-15X (terminal No. 1) engine control relay connector and B-101 (terminal No. 1) No. 1 injector connector.

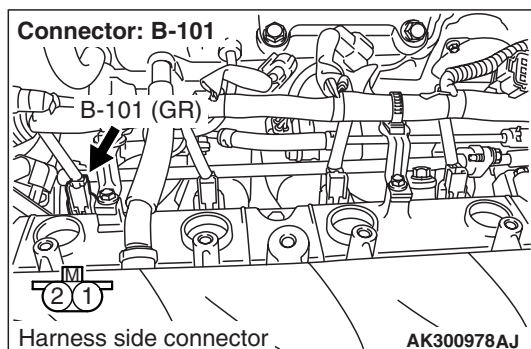
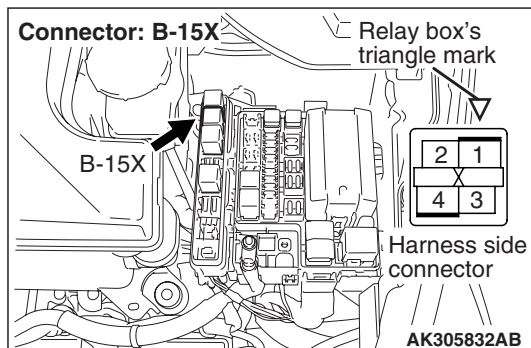
- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 6. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-15X (terminal No. 1) engine control relay connector and B-101 (terminal No. 1) No. 1 injector connector.

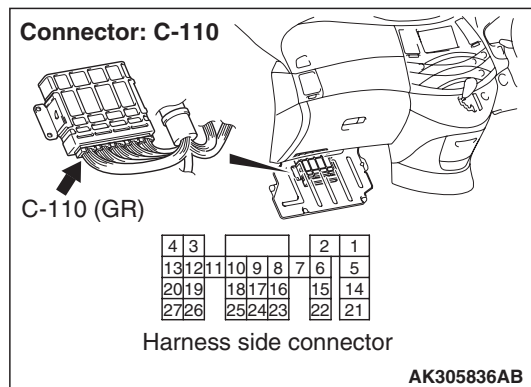
NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 8 .

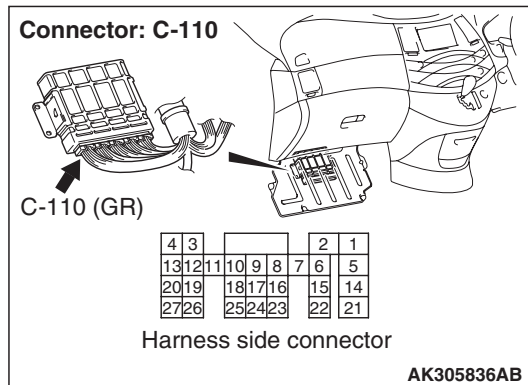
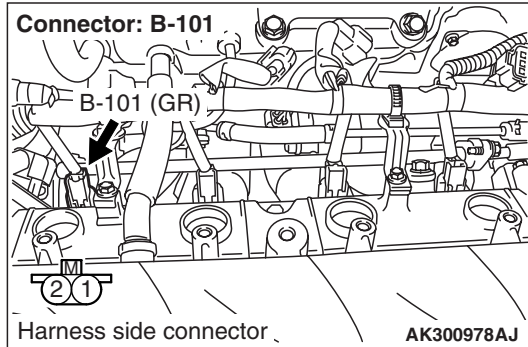
NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-101 (terminal No. 2) No. 1 injector connector and C-110 (terminal No. 1) engine-A/T-ECU connector.



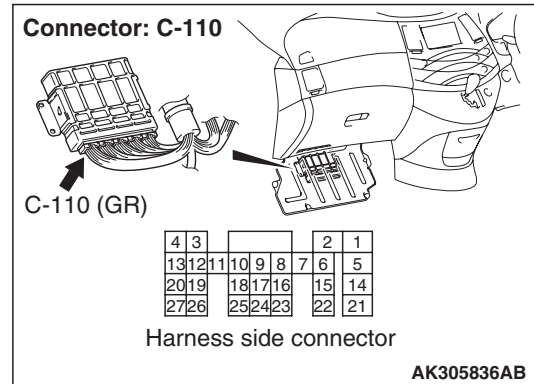
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Perform signal wave pattern measurement at C-110 engine-A/T-ECU connector (Using an oscilloscope).



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

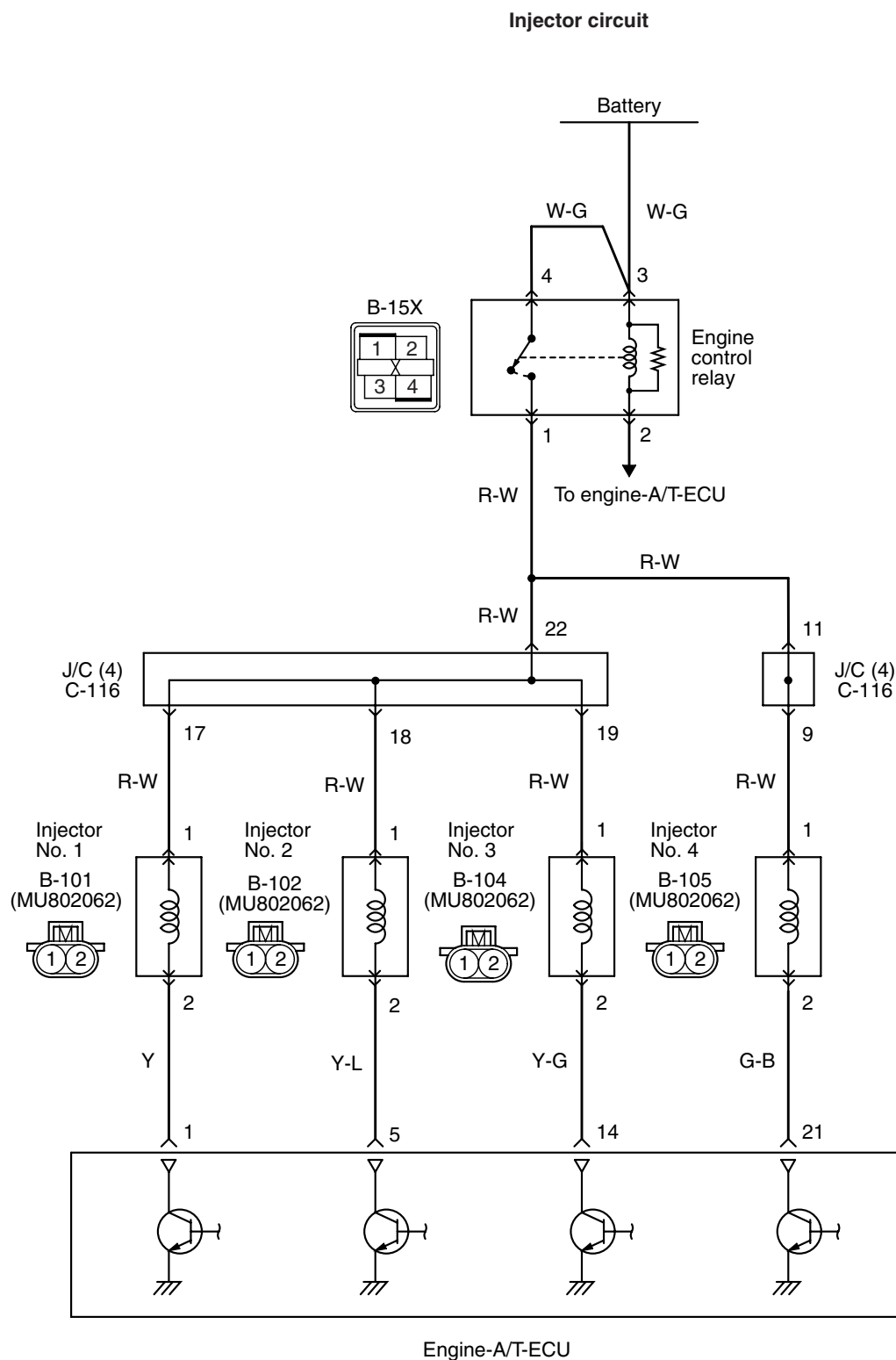
OK: Waveforms should be display on inspection procedure using an oscilloscope (Refer to [P.13B-276](#)).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

Code No. P0202: No. 2 Injector System



C-110
(MU803802)

1	2			3	4
5	6	7	8	9	10
11	12	13	14	15	16
17	18	19	20	21	22
23	24	25	26	27	

OPERATION

- Power is supplied to the injector (terminal No. 1) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU connector (terminal No. 5) makes the power transistor in the unit be in ON position, and that makes currents go on the injector (terminal No. 2).

FUNCTION

- The engine-A/T-ECU controls the power supply interval of the injector.
- The fuel injection amount of the injector depends on the power supply interval.

TROUBLE JUDGMENT

Check Conditions

- Engine speed is between 50 and 1000 r/min.
- Throttle position sensor (main) output is 1.15 V or less.
- Injector operation (by carrying out actuator test) is not in progress.

Judgment Criterion

- Injector coil surge voltage (battery positive voltage + 2 V) has not been detected for 4 seconds.

PROBABLE CAUSE

- Failed No. 2 injector
- Open/short circuit in No. 2 injector circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III actuator test

- Item 02: No. 2 injector

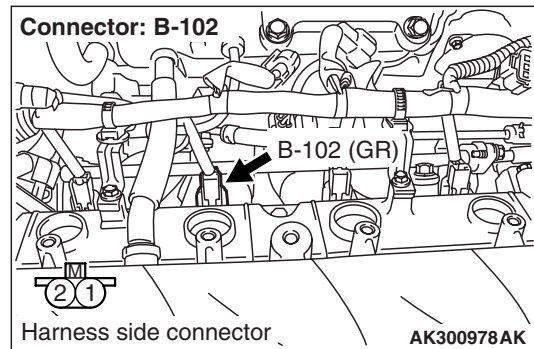
OK: Idling state varies.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-102 No. 2 injector connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check No. 2 injector itself.

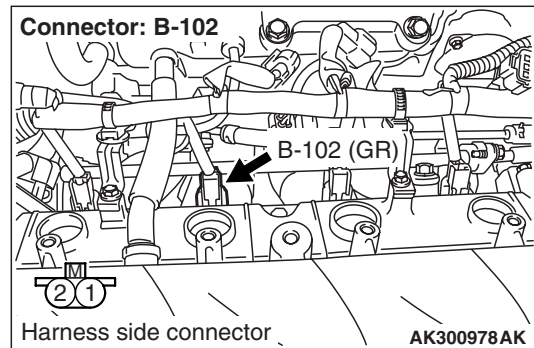
- Check No. 2 Injector itself (Refer to [P.13B-291](#)).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace No. 2 injector.

STEP 4. Perform voltage measurement at B-102 No. 2 injector connector.



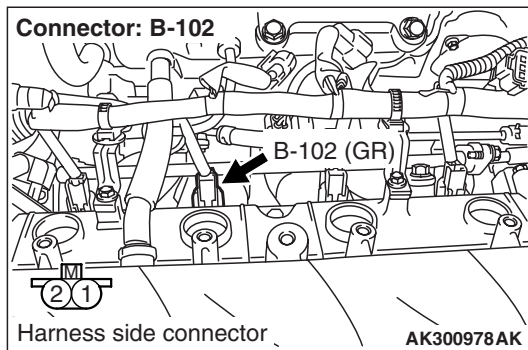
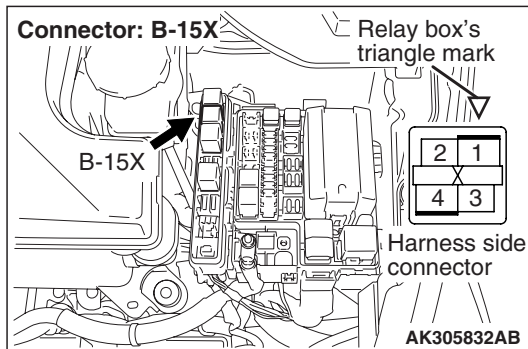
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

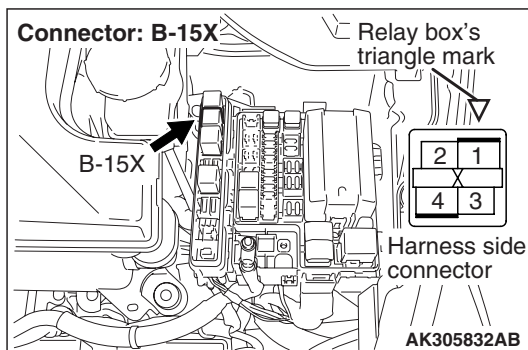
NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-15X (terminal No. 1) engine control relay connector and B-102 (terminal No. 1) No. 2 injector connector.

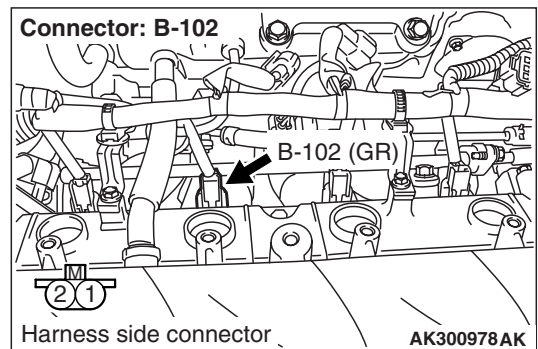
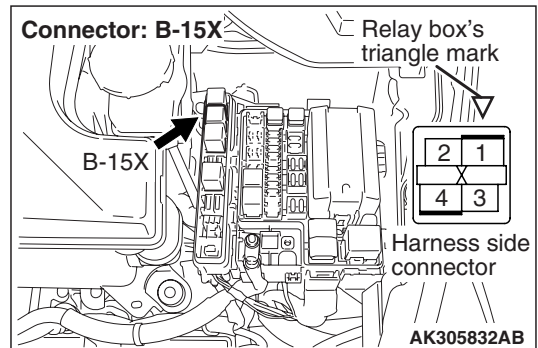
- Check power supply line for open/short circuit and damage.

NO : Repair or replace.

STEP 6. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-15X (terminal No. 1) engine control relay connector and B-102 (terminal No. 1) No. 2 injector connector.

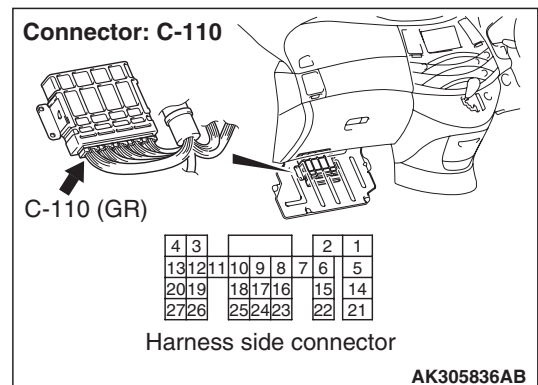
NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 8 .

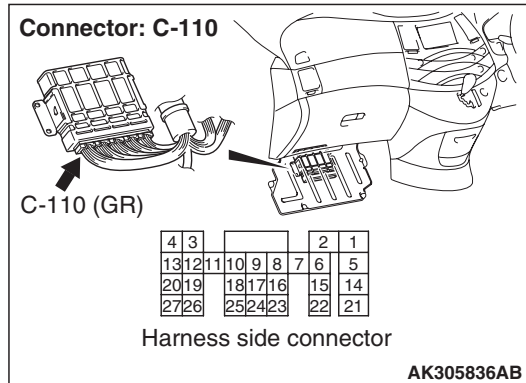
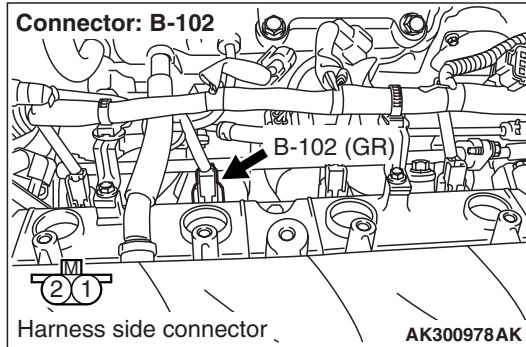
NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-102 (terminal No. 2) No. 2 injector connector and C-110 (terminal No. 5) engine-A/T-ECU connector.



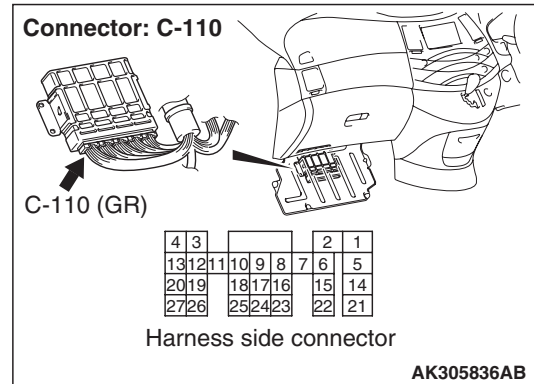
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Perform signal wave pattern measurement at C-110 engine-A/T-ECU connector (Using an oscilloscope).



- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 5 and earth.

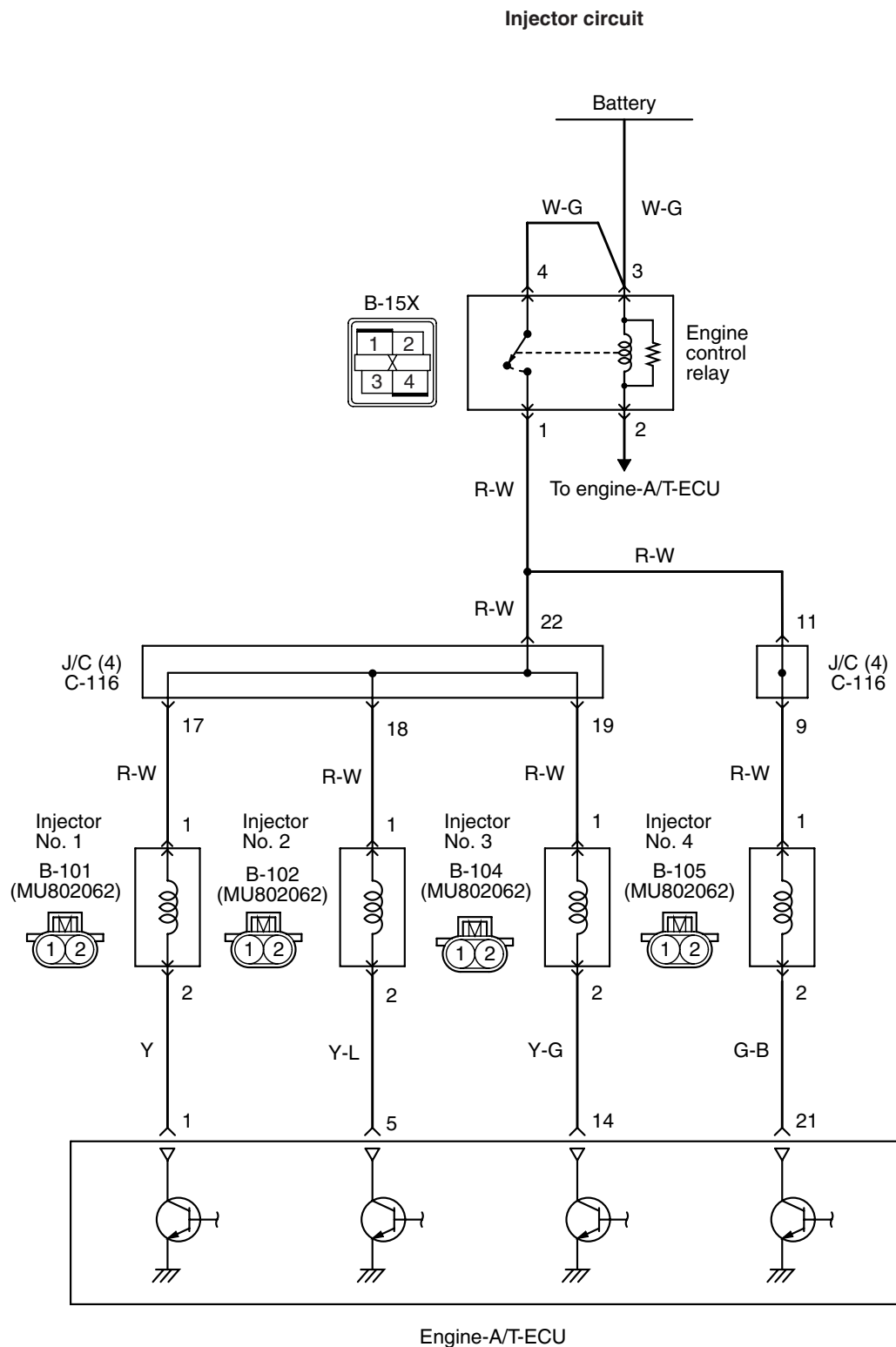
OK: Waveform should be display on inspection procedure using an oscilloscope (Refer to P.13B-276).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

Code No. P0203: No. 3 Injector System



C-110
(MU803802)

1	2			3	4
5	6	7	8	9	10
11	12	13	14	15	16
17	18	19	20	21	22
23	24	25	26	27	

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

OPERATION

- Power is supplied to the injector (terminal No. 1) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 14) makes the power transistor in the unit be in ON position, and that makes currents go on the injector (terminal No. 2).

FUNCTION

- The engine-A/T-ECU controls the power supply interval of the injector.
- The fuel injection amount of the injector depends on the power supply interval.

TROUBLE JUDGMENT

Check Conditions

- Engine speed is between 50 and 1000 r/min.
- Throttle position sensor (main) output is 1.15 V or less.
- Injector operation (by carrying out actuator test) is not in progress.

Judgment Criterion

- Injector coil surge voltage (battery positive voltage + 2 V) has not been detected for 4 seconds.

PROBABLE CAUSE

- Failed No. 3 injector
- Open/short circuit in No. 3 injector circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III actuator test

- Item 03: No. 3 injector

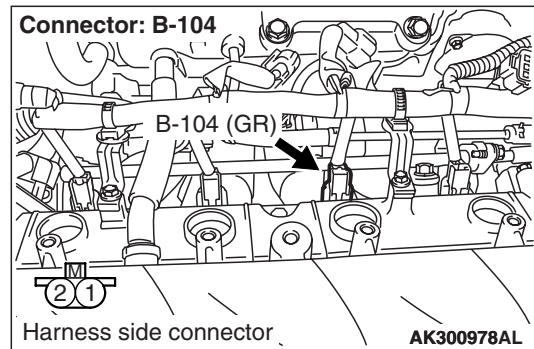
OK: Idling state varies.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-104 No. 3 injector connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check No. 3 injector itself.

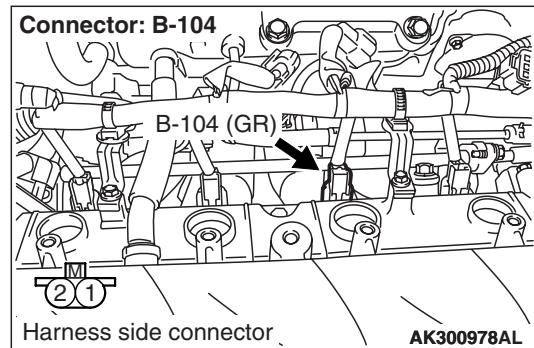
- Check No. 3 Injector itself (Refer to [P.13B-291](#)).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace No. 3 injector.

STEP 4. Perform voltage measurement at B-104 No. 3 injector connector.



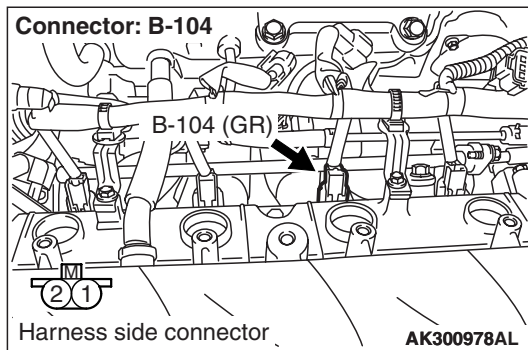
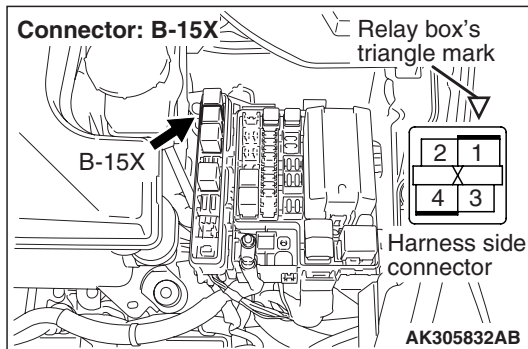
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

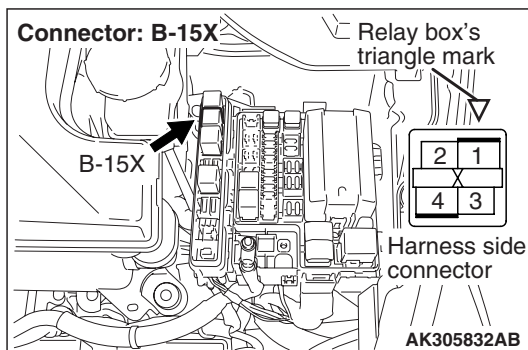
NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-15X (terminal No. 1) engine control relay connector and B-104 (terminal No. 1) No. 3 injector connector.

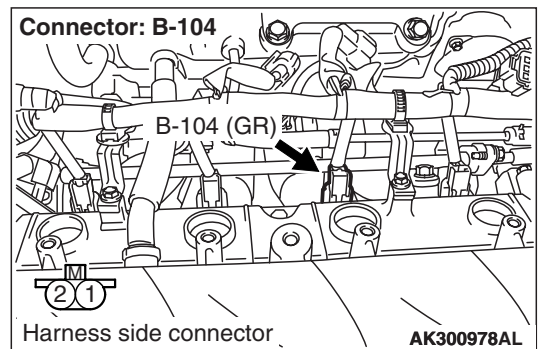
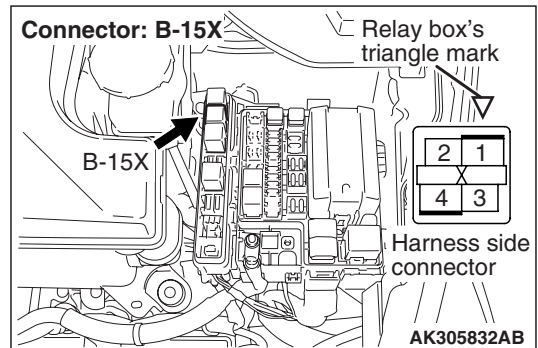
- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 6. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-15X (terminal No. 1) engine control relay connector and B-104 (terminal No. 1) No. 3 injector connector.

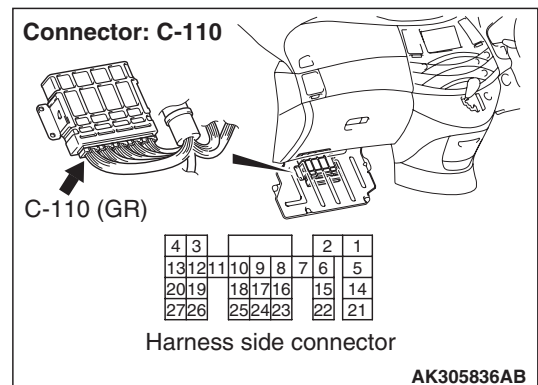
NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 8 .

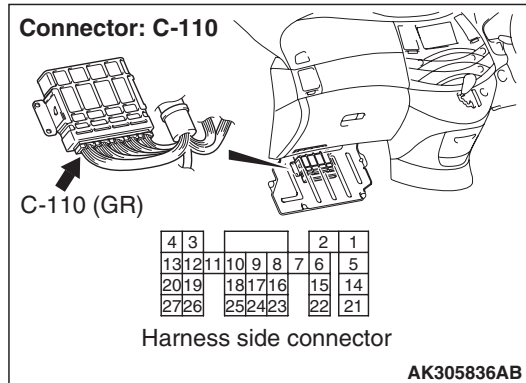
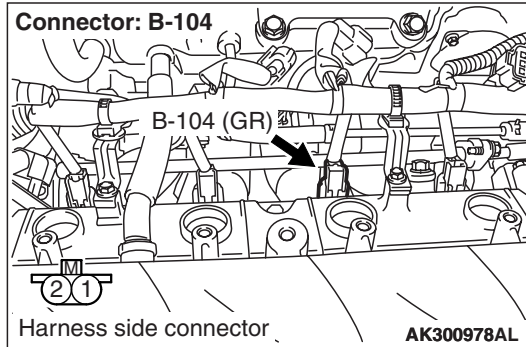
NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-104 (terminal No. 2) No. 3 injector connector and C-110 (terminal No. 14) engine-A/T-ECU connector.



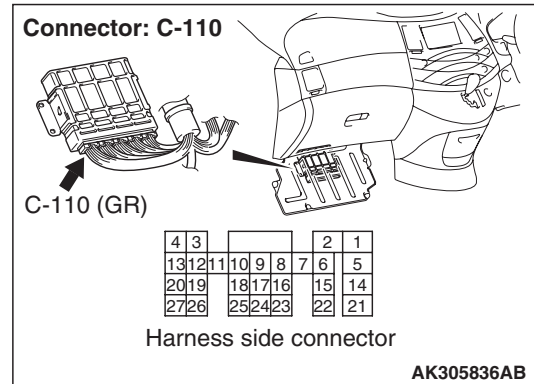
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Perform signal wave pattern measurement at C-110 engine-A/T-ECU connector (Using on oscilloscope).



- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 14 and earth.

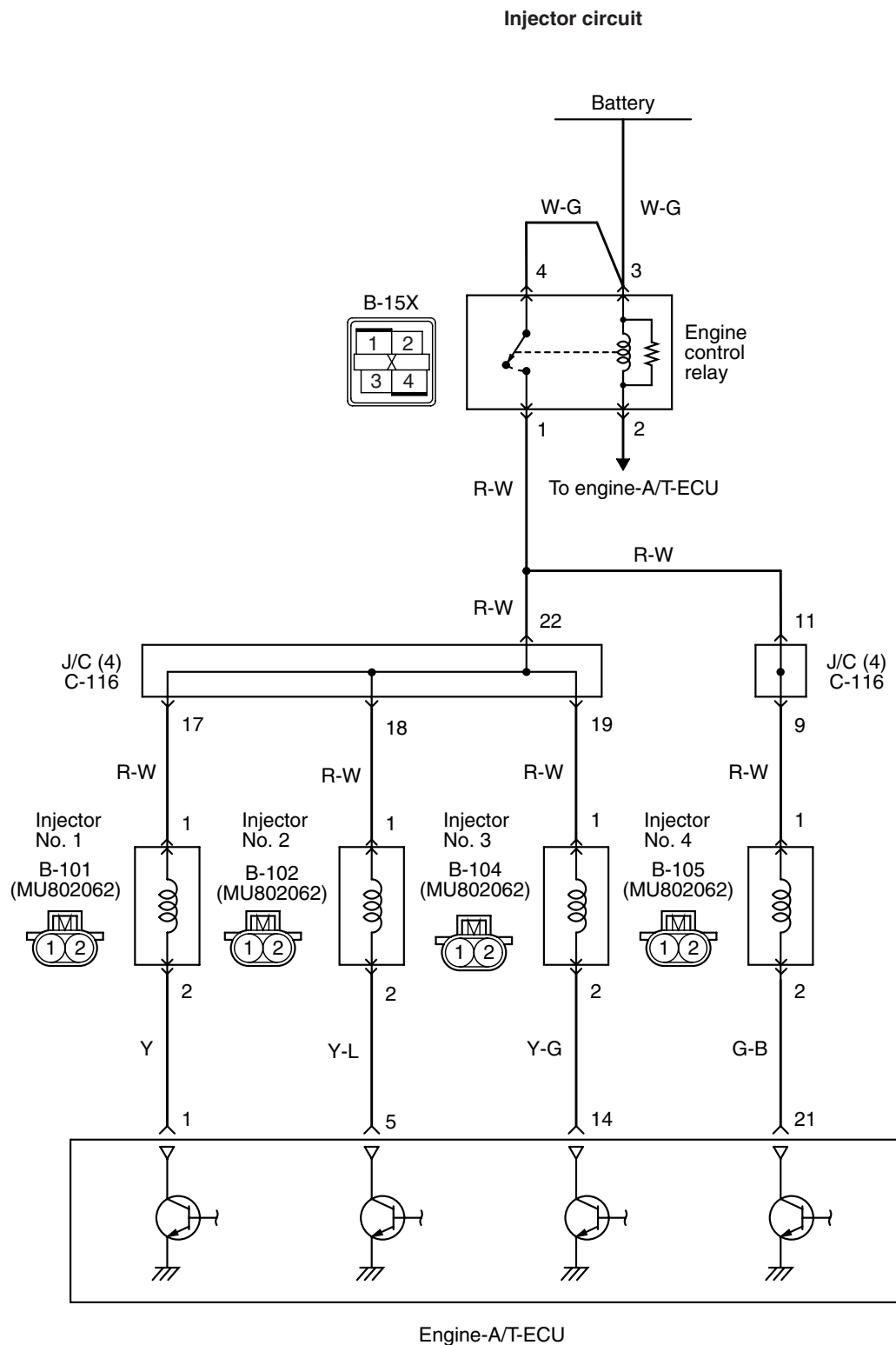
OK: Waveform should be display on inspection procedure using an oscilloscope (Refer to P.13B-276).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

Code No. P0204: No. 4 Injector System



C-110
(MU803802)

1	2			3	4
5	6	7	8	9	10
11	12	13	14	15	16
17	18	19	20	21	22
23	24	25	26	27	

OPERATION

- Power is supplied to the injector (terminal No. 1) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 21) makes the power transistor in the unit be in ON position, and that makes currents go on the injector (terminal No. 2).

FUNCTION

- The engine-A/T-ECU connector controls the power supply interval of the injector.
- The fuel injection amount of the injector depends on the power supply interval.

TROUBLE JUDGMENT

Check Conditions

- Engine speed is between 50 and 1000 r/min.
- Throttle position sensor (main) output is 1.15 V or less.
- Injector operation (by carrying out actuator test) is not in progress.

Judgment Criterion

- Injector coil surge voltage (battery positive voltage + 2 V) has not been detected for 4 seconds.

PROBABLE CAUSE

- Failed No. 4 injector
- Open/short circuit in No. 4 injector circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III actuator test

- Item 04: No. 4 injector

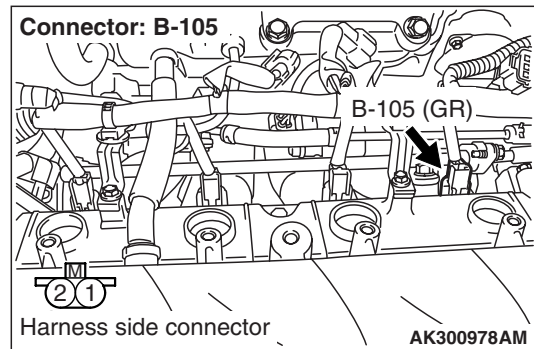
OK: Idling state varies.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-105 No. 4 injector connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check No. 4 injector itself.

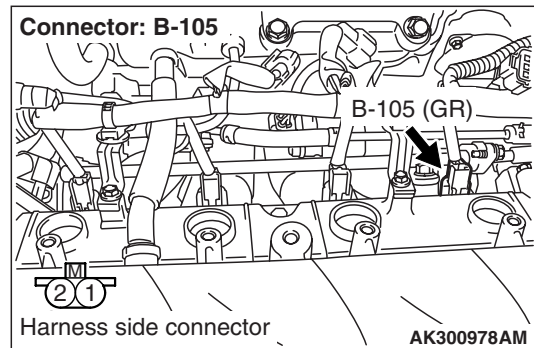
- Check No. 4 Injector (Refer to [P.13B-291](#)) itself.

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace No. 4 injector.

STEP 4. Perform voltage measurement at B-105 No. 4 injector connector.



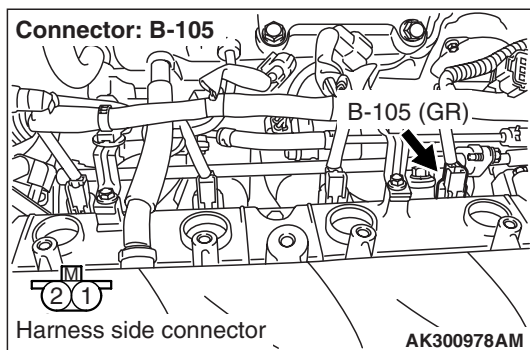
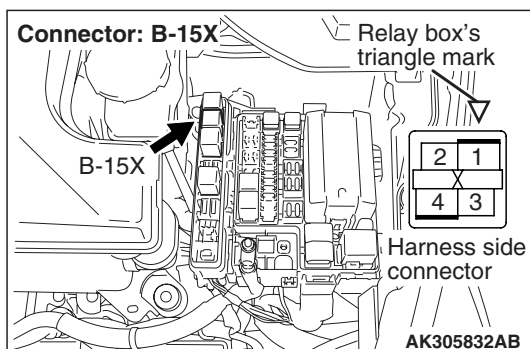
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

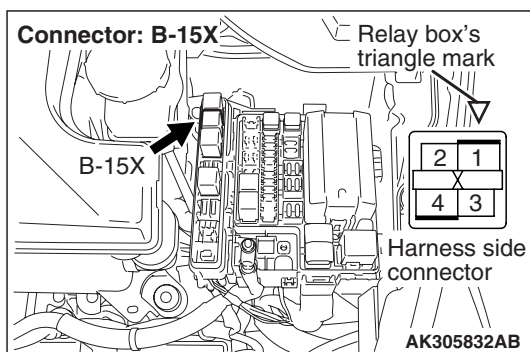
NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-15X (terminal No. 1) engine control relay connector and B-105 (terminal No. 1) No. 4 injector connector.

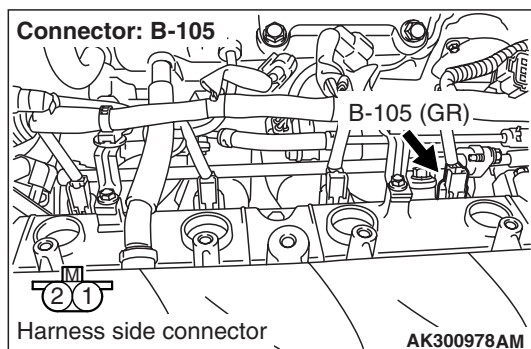
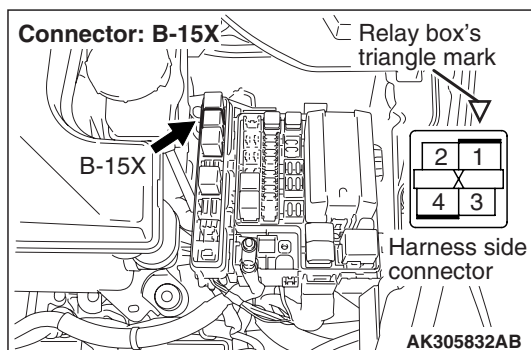
- Check power supply line for open/short circuit and damage.

NO : Repair or replace.

STEP 6. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Go to Step 7.

NO : Repair or replace.

STEP 7. Check harness between B-15X (terminal No. 1) engine control relay connector and B-105 (terminal No. 1) No. 4 injector connector.

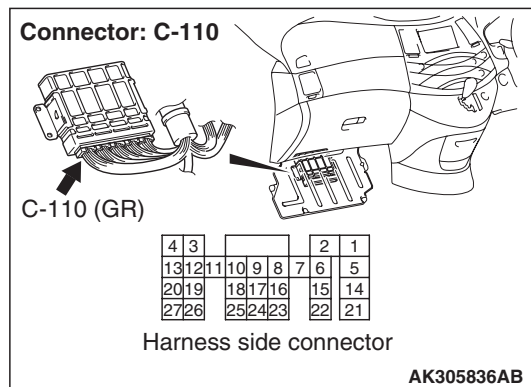
NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 8 .

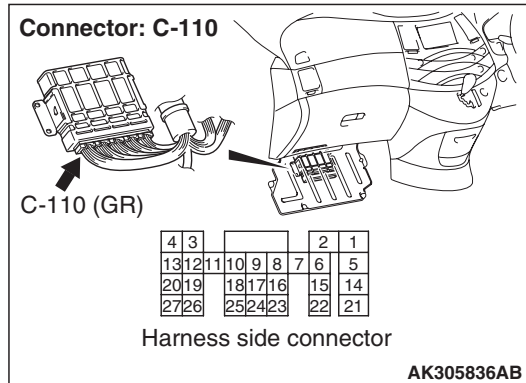
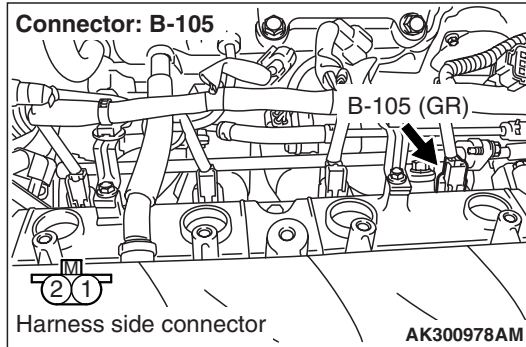
NO : Repair.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-105 (terminal No. 2) No. 4 injector connector and C-110 (terminal No. 21) engine-A/T-ECU connector.



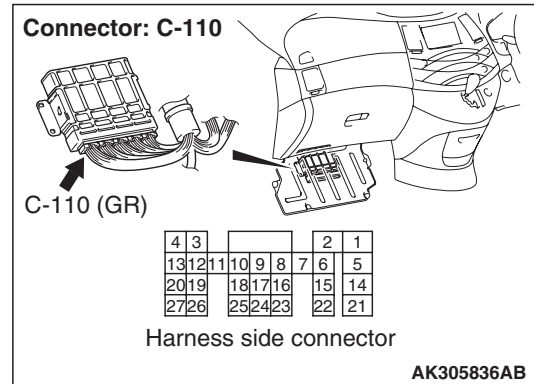
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Perform signal wave pattern measurement at C-110 engine-A/T-ECU connector (Using an oscilloscope).



- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 21 and earth.

OK: Waveform should be display on inspection procedure using an oscilloscope (Refer to P.13B-276).

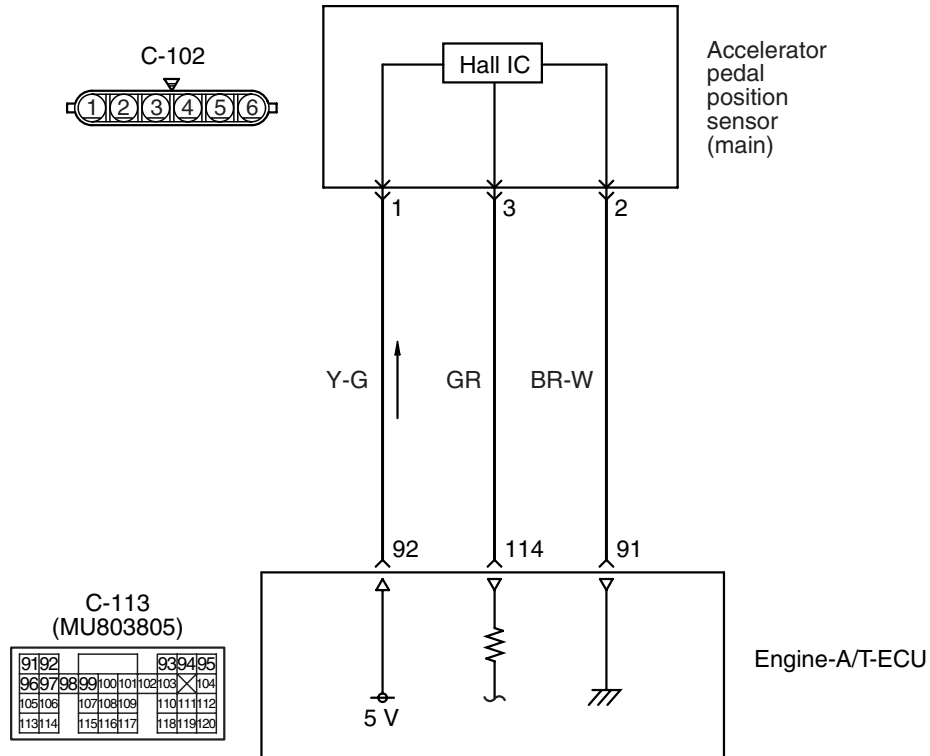
Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

Code No. P0220: Accelerator Pedal Position Sensor (Main) System

Accelerator pedal position sensor (main) 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

AK305838AB

OPERATION

- A power voltage of 5 V is applied to the accelerator pedal position sensor (terminal No. 1) from the engine-A/T-ECU (terminal No. 92).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 91) from the accelerator pedal position sensor (terminal No. 2).
- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 114) from the accelerator pedal position sensor output terminal (terminal No. 3).

FUNCTION

- The accelerator pedal position sensor (main) outputs voltage which corresponds to the accelerator pedal depression.
- The engine-A/T-ECU checks whether the voltage is within a specified range.

TROUBLE JUDGMENT**Check Condition**

- Ignition switch is in ON position.

Judgment Criteria

- Accelerator pedal position sensor (main) output voltage is 0.6 V or less.

or

- Accelerator pedal position sensor (main) output voltage is 4.8 V or more.

Check Conditions

- Ignition switch is in ON position.
- Accelerator pedal position sensor (main) output voltage is between 0.5 and 4.5 V.
- Accelerator pedal position sensor (sub) output voltage is between 0.5 and 4.5 V.

Judgment Criteria

- When the variation in the accelerator pedal-opened degree is small, the voltage obtained through the following equation is 1 V or more.

[Accelerator pedal position sensor (sub) output voltage +0.3 V – Accelerator pedal position sensor (main) output voltage]

or

- When the variation in the accelerator pedal-opened degree is small, the voltage obtained through the following equation is 1 V or more.

[Accelerator pedal position sensor (main) output voltage +0.3 V – Accelerator pedal position sensor (sub) output voltage]

PROBABLE CAUSE

- Failed accelerator pedal position sensor
- Open/short circuit in accelerator pedal position sensor (main) circuit or loose connector contact
- Harness damage in accelerator pedal position sensor (sub) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 78: Accelerator pedal position sensor (main)

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Go to Step 3 .

STEP 2. M.U.T.-III data list

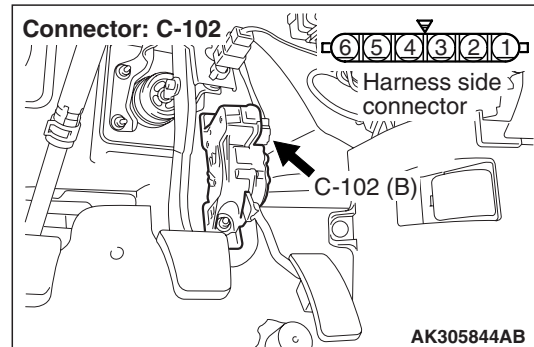
- Refer to Data List Reference Table [P.13B-260](#).
 - Item 77: Accelerator pedal position sensor (sub)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Check accelerator pedal position sensor (sub) system (Refer to Code No. P1225 [P.13B-170](#)).

STEP 3. Connector check: C-102 accelerator pedal position sensor connector

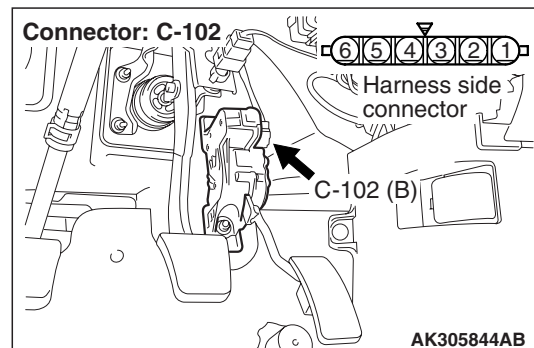


Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at C-102 accelerator pedal position sensor connector.



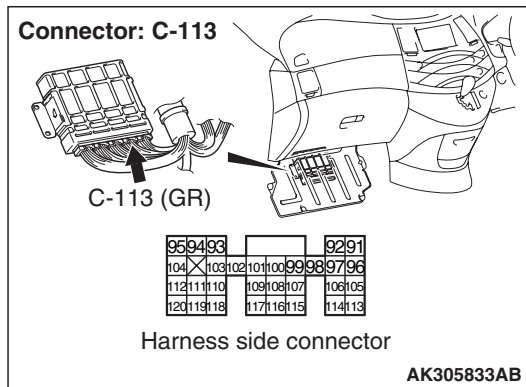
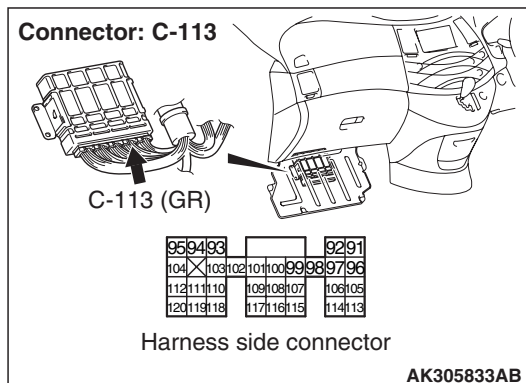
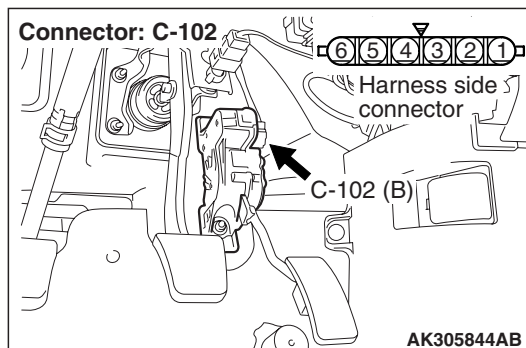
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 8 .

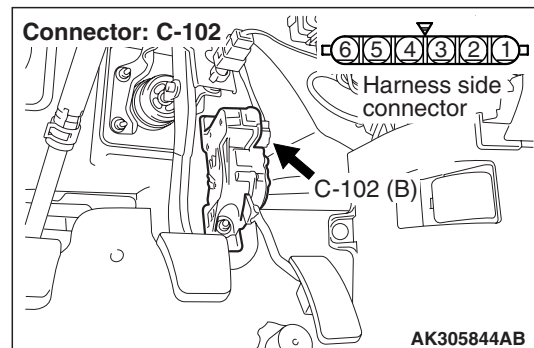
NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 6 .**NO :** Repair or replace.**STEP 6. Check harness between C-102 (terminal No. 1) accelerator pedal position sensor connector and C-113 (terminal No. 92) engine-A/T-ECU connector.**

- Check power supply line for open/short circuit.

Q: Is the check result normal?**YES :** Go to Step 7 .**NO :** Repair.**STEP 7. M.U.T.-III data list**

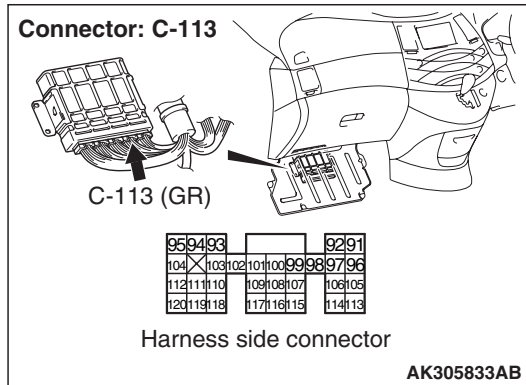
- Refer to Data List Reference Table [P.13B-260](#).
 - Item 78: Accelerator pedal position sensor (main)

Q: Is the check result normal?**YES :** Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).**NO :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**STEP 8. Perform resistance measurement at C-102 accelerator pedal position sensor connector.**

- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.
2 Ω or less

Q: Is the check result normal?**YES :** Go to Step 12 .**NO :** Go to Step 9 .

STEP 9. Connector check: C-113 engine-A/T-ECU connector

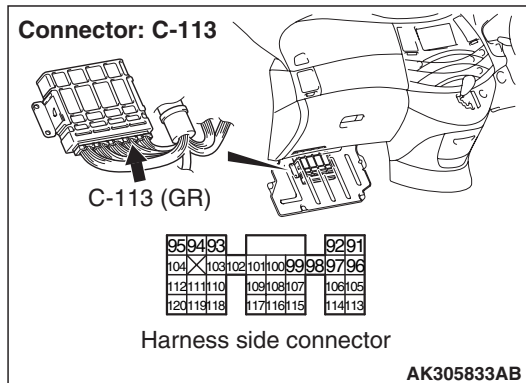
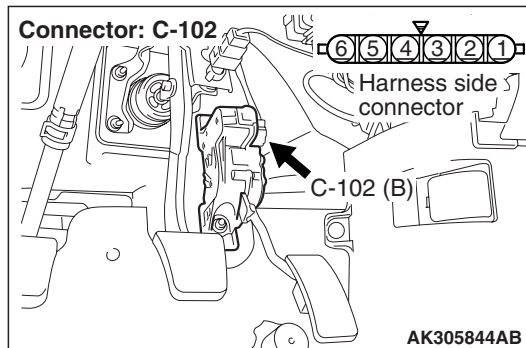


Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair or replace.

STEP 10. Check harness between C-102 (terminal No. 2) accelerator pedal position sensor connector and C-113 (terminal No. 91) engine-A/T-ECU connector.



- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III data list

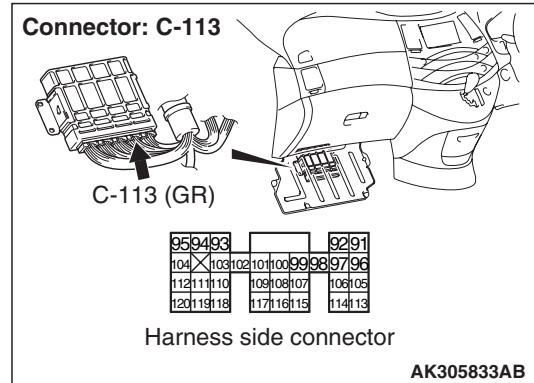
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 78: Accelerator pedal position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 12. Connector check: C-113 engine-A/T-ECU connector

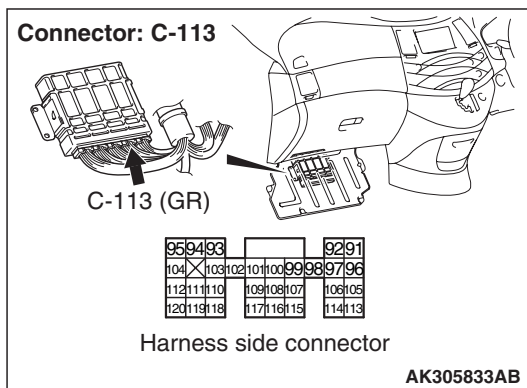
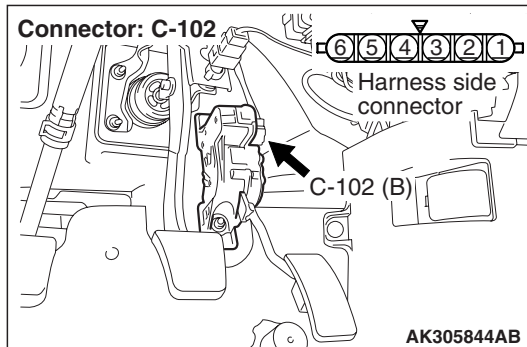


Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair or replace.

STEP 13. Check harness between C-102 (terminal No. 1) accelerator pedal position sensor connector and C-113 (terminal No. 92) engine-A/T-ECU connector.



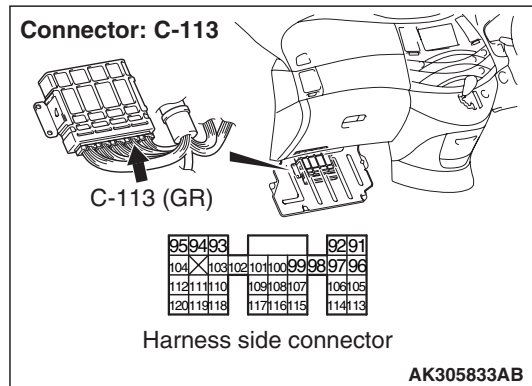
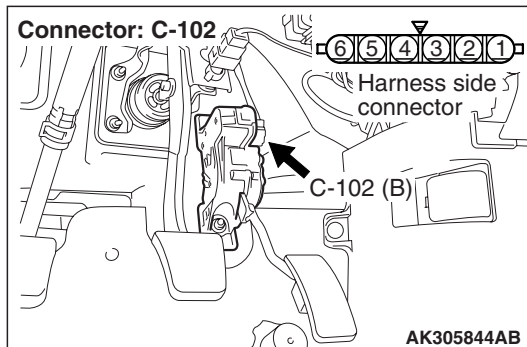
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Check harness between C-102 (terminal No. 3) accelerator pedal position sensor connector and C-113 (terminal No. 114) engine-A/T-ECU connector.



- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 78: Accelerator pedal position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace accelerator pedal assembly. Then go to Step 16 .

STEP 16. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

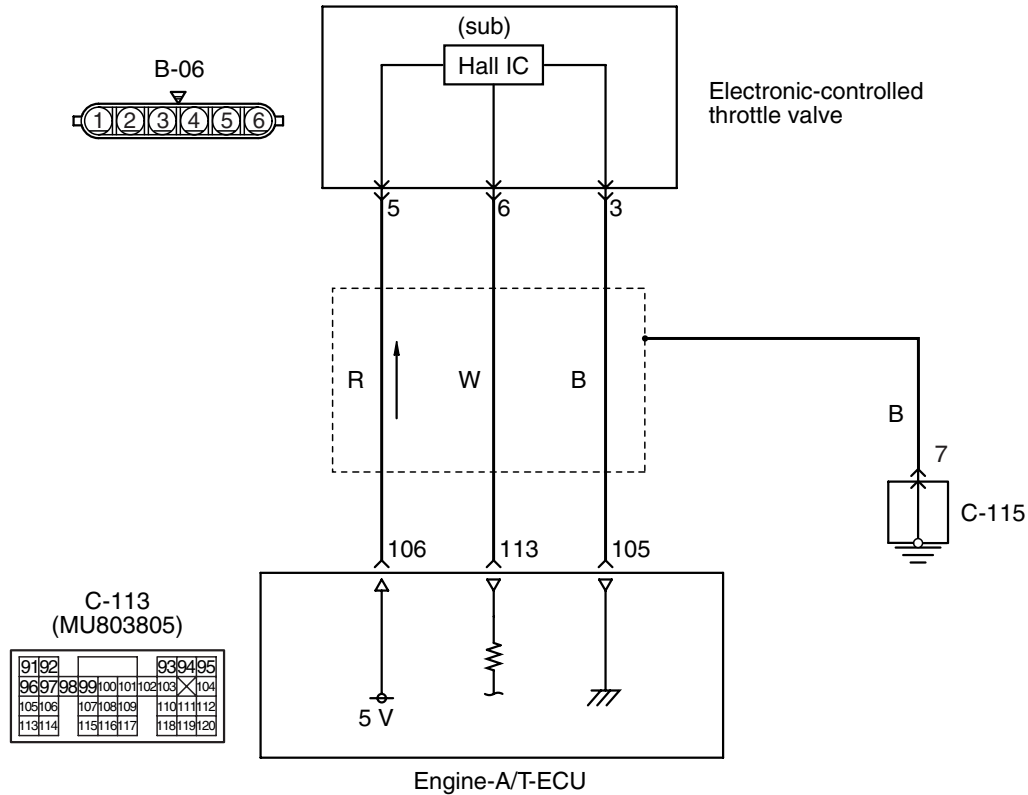
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0225: Throttle Position Sensor (Sub) System

Throttle position sensor (sub) 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

AK305839AB

OPERATION

- A power voltage of 5 V is applied to the electronic-controlled throttle valve (terminal No. 5) from the engine-A/T-ECU (terminal No. 106).
- A power voltage is earthed to the engine-A/T-ECU (terminal No. 105) from the electronic-controlled throttle valve (terminal No. 3).
- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 113) from the electronic-controlled throttle valve (terminal No. 6).

FUNCTION

- The throttle position sensor converts the throttle valve position into voltage and inputs it into the engine-A/T-ECU.

- The engine-A/T-ECU controls the throttle valve position.

TROUBLE JUDGMENT

Check Condition

- Ignition switch is in ON position.

Judgment Criteria

- Throttle position sensor (main) output voltage is 2.2 V or less.

or

- Throttle position sensor (sub) output voltage is 4.8 V or more.

Check Conditions

- Ignition switch is in ON position.
- Throttle position sensor (main) output voltage is between 0.2 and 4.8 V.

- Throttle position sensor (sub) output voltage is between 2.2 and 4.8 V.

Judgment Criteria

- Throttle position sensor (main) output voltage is 2.5 V or more and throttle position sensor (sub) output voltage is 4.2 V or less.

or

- When throttle position sensor (main) output voltage is 2.5 V or less, voltage obtained with the formula given below is 0.3 volt or more:

Throttle position sensor (main) output voltage

$$-[\text{Throttle position sensor (sub) output voltage} - 2 \text{ V}]$$

PROBABLE CAUSE

- Failed throttle position sensor
- Open/short circuit in throttle position sensor (sub) circuit or loose connector contact
- Harness damage in throttle position sensor (main) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 14: Throttle position sensor (sub)

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Go to Step 3 .

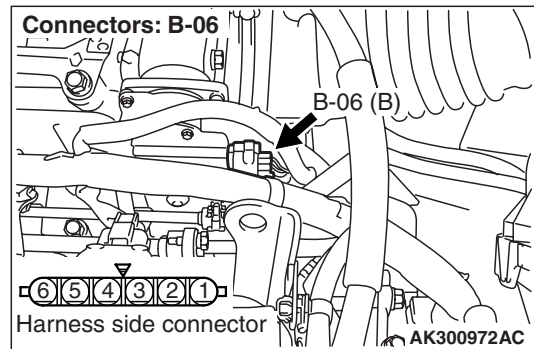
STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 79: Throttle position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

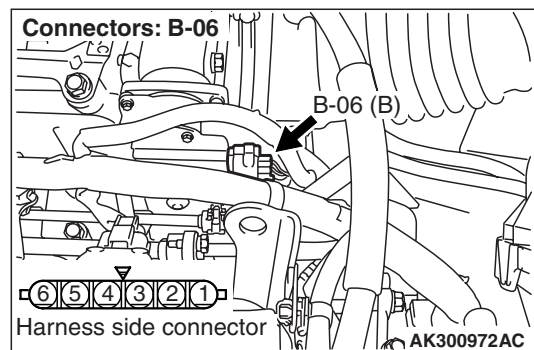
NO : Check throttle position sensor (main) system (Refer to Code No. P0120 [P.13B-39](#)).

STEP 3. Connector check: B-06 electronic-controlled throttle valve connector

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at B-06 electronic-controlled throttle valve connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 5 and earth.

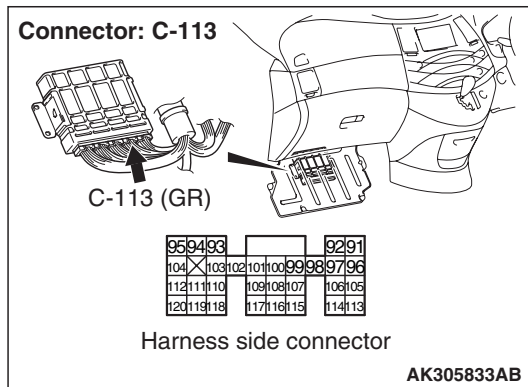
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector

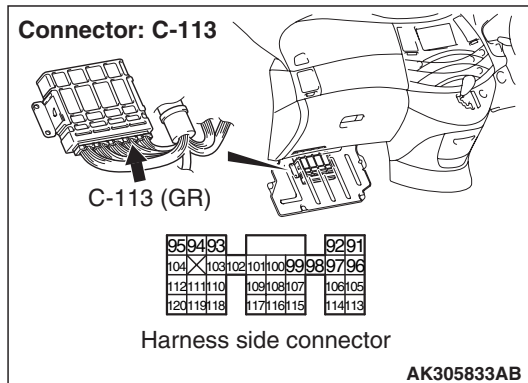
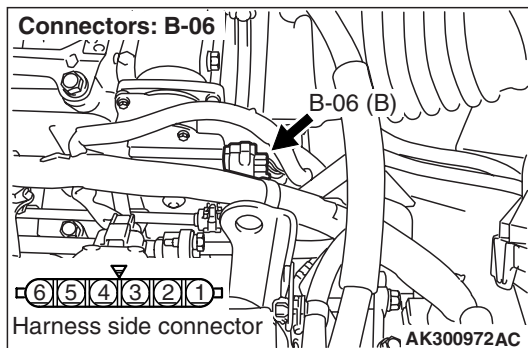


Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check harness between B-06 (terminal No. 5) electronic-controlled throttle valve connector and C-113 (terminal No. 106) engine-A/T-ECU connector.



- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III data list

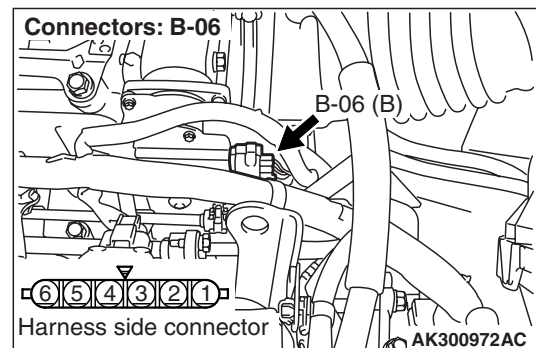
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 8. Perform resistance measurement at B-06 electronic-controlled throttle valve connector.



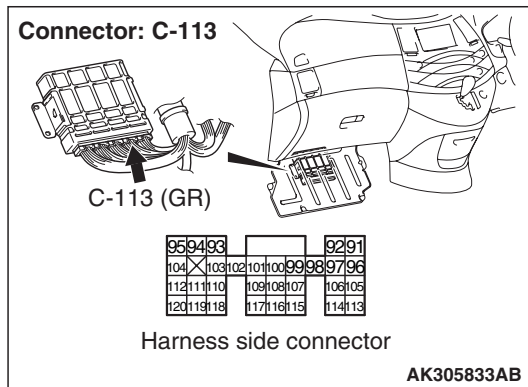
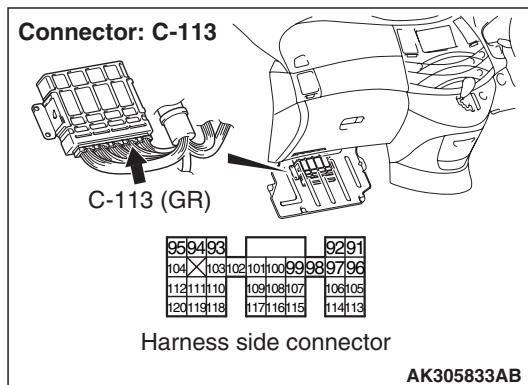
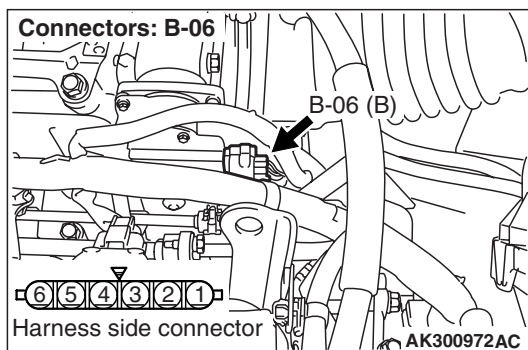
- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 3 and earth.

OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 12 .

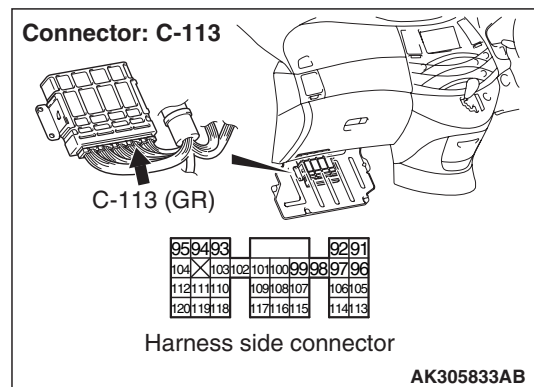
NO : Go to Step 9 .

STEP 9. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 10 .**NO :** Repair or replace.**STEP 10. Check harness between B-06 (terminal No. 3) electronic-controlled throttle valve connector and C-113 (terminal No. 105) engine-A/T-ECU connector.**

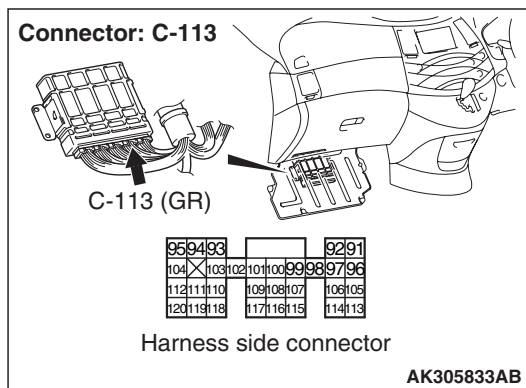
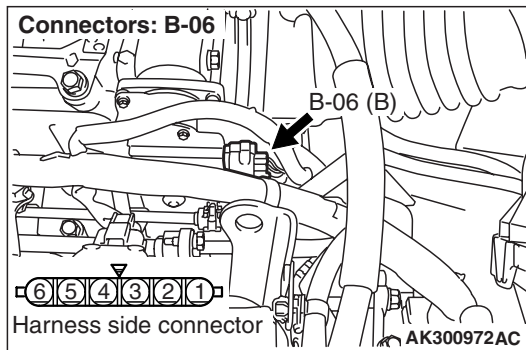
- Check earthing line for open circuit and damage.

Q: Is the check result normal?**YES :** Go to Step 11 .**NO :** Repair.**STEP 11. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)

Q: Is the check result normal?**YES :** Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).**NO :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**STEP 12. Connector check: C-113 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 13 .**NO :** Repair or replace.

STEP 13. Check harness between B-06 (terminal No. 5) electronic-controlled throttle valve connector and C-113 (terminal No. 106) engine-A/T-ECU connector.



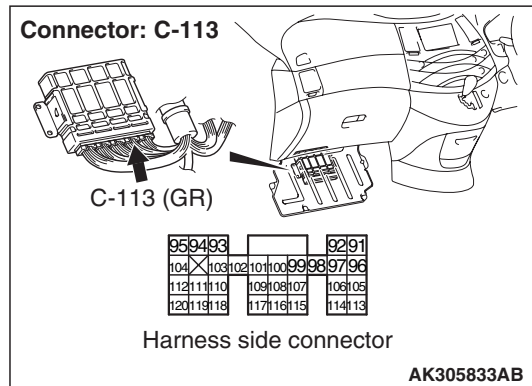
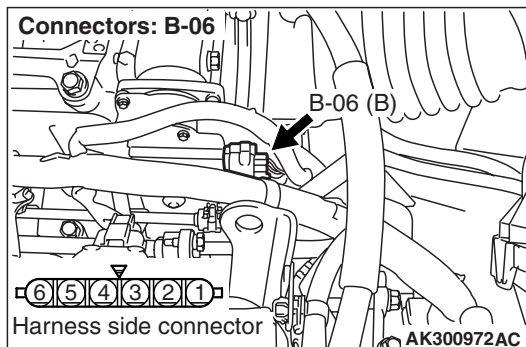
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Check harness between B-06 (terminal No. 6) electronic-controlled throttle valve connector and C-113 (terminal No. 113) engine-A/T-ECU connector.



- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 14: Throttle position sensor (sub)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace throttle body assembly. Then go to Step 16 .

STEP 16. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

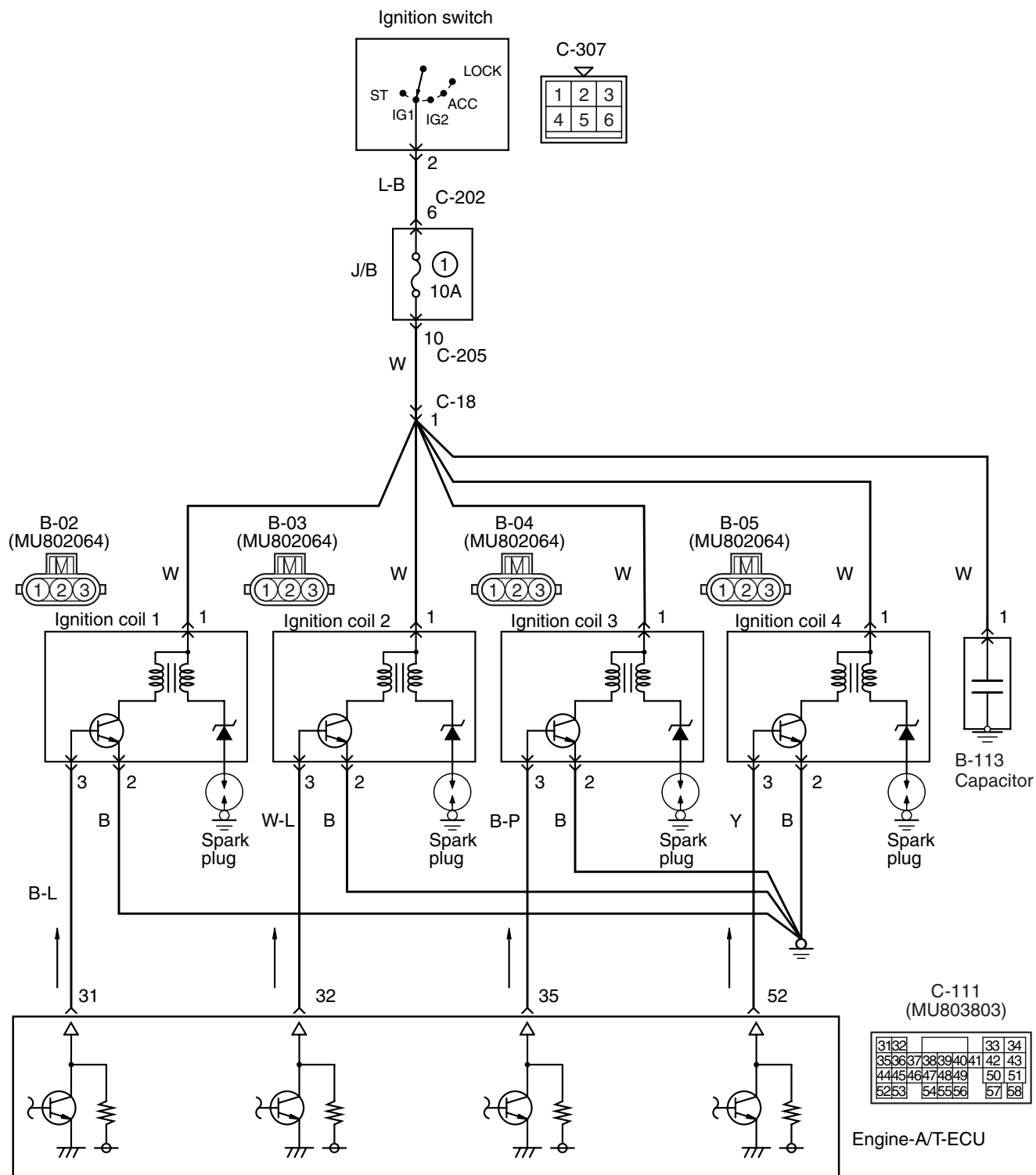
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0300 Ignition Coil (Power Transistor) System

Ignition 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

OPERATION

- The battery voltage is applied to the ignition coil (terminal No. 1) from the ignition switch and is earthed to the vehicle body from the ignition coil (terminal No. 2).
- A power voltage of 12 V is applied to the ignition coil output terminal (terminal No. 3) from the engine-A/T-ECU (terminal No. 31, No. 32, No. 35 and No. 52).

FUNCTION

- When the engine-A/T-ECU makes the power transistor in the unit be in OFF position, the battery voltage in the unit is applied to the power transistor unit, and that makes the power transistor unit be in ON position. The engine-A/T-ECU makes the power transistor in the unit be in ON, and that makes the power transistor unit be in OFF position.
- In response to the signal from the engine-A/T-ECU, the power transistor unit is in ON position. The primary current is going to the ignition coil. When the power transistor unit is in OFF position, the primary current is interrupted and high voltage is generated in the secondary coil.

TROUBLE JUDGMENT

Check Condition

- Engine speed is approximately 4,000 r/min or less.

Judgment Criterion

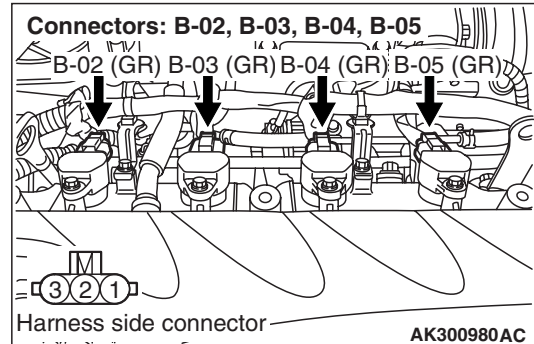
- The determination signal for the open circuit is continuously output from the confirmation signal circuit for the ignition built in the engine-A/T-ECU.

PROBABLE CAUSE

- Failed ignition coil
- Open/short circuit in ignition primary circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-02, B-03, B-04 and B-05 ignition coil connectors



Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Check ignition coil itself.

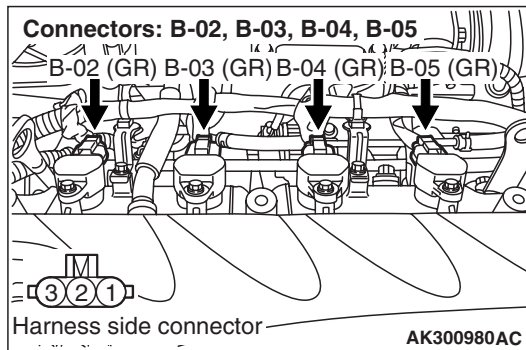
- Check ignition coil itself (Refer to GROUP 16 – Ignition System – On-vehicle Service – Ignition coil check [P.16-29](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace ignition coil.

STEP 3. Perform resistance measurement at B-02, B-03, B-04 and B-05 ignition coil connectors.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

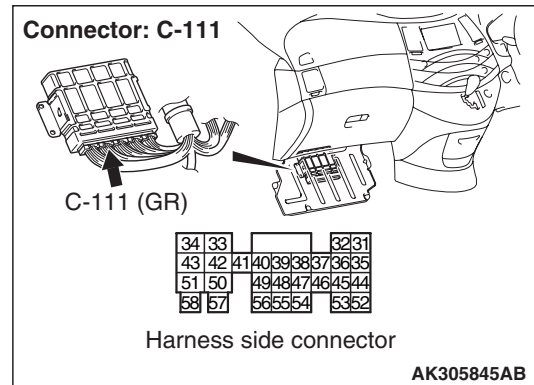
OK: 2Ω or less

Q: Is the check result normal?

YES : Go to Step 4 .

- NO :**
- Check and repair harness between ignition coil connector and body earth.
 - a. Check and repair harness between B-02 (terminal No. 2) No. 1 ignition coil connector and body earth.
 - b. Check and repair harness between B-03 (terminal No. 2) No. 2 ignition coil connector and body earth.
 - c. Check and repair harness between B-04 (terminal No. 2) No. 3 ignition coil connector and body earth.
 - d. Check and repair harness between B-05 (terminal No. 2) No. 4 ignition coil connector and body earth.
 - Check earthing line for open circuit and damage.

STEP 4. Connector check: C-111 engine-A/T-ECU connector

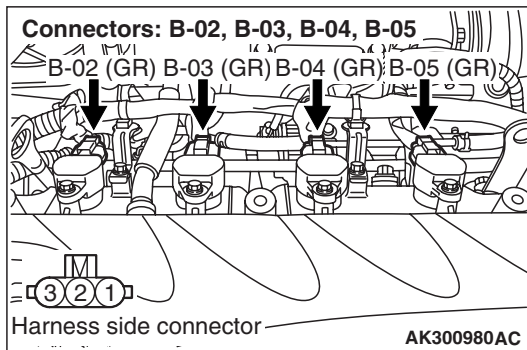
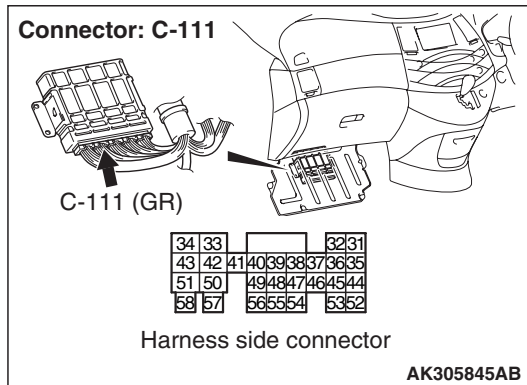


Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair or replace.

STEP 5. Check harness between ignition coil connector and engine-A/T-ECU connector.



- Check and repair harness between B-02 (terminal No. 3) No. 1 ignition coil connector and C-111 (terminal No. 31) engine-A/T-ECU connector.
- Check and repair harness between B-03 (terminal No. 3) No. 2 ignition coil connector and C-111 (terminal No. 32) engine-A/T-ECU connector.
- Check and repair harness between B-04 (terminal No. 3) No. 3 ignition coil connector and C-111 (terminal No. 35) engine-A/T-ECU connector.
- Check and repair harness between B-05 (terminal No. 3) No. 4 ignition coil connector and C-111 (terminal No. 52) engine-A/T-ECU connector.
 - Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

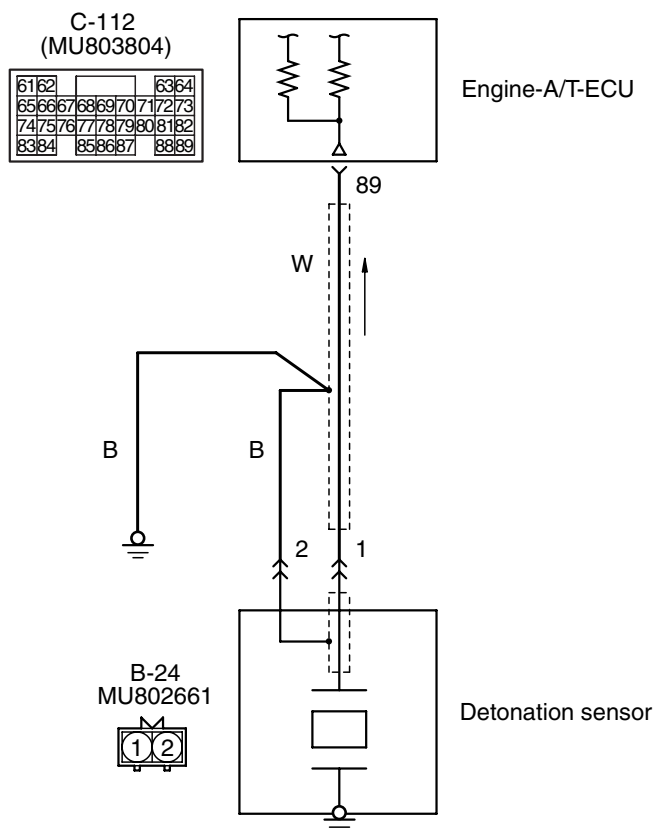
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0325: Detonation Sensor System

Detonation 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

AK305840AB

OPERATION

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 89) from the detonation sensor (terminal No. 1).

FUNCTION

- The detonation sensor detects the vibration of the cylinder block caused by detonation waves, and inputs a signal to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU provides controls to retard the ignition timing when the detonation occurs.

TROUBLE JUDGMENT**Check Conditions**

- After 2 seconds have passed since the engine starting sequence was completed.
- Volumetric efficiency is 40% or more.

Judgment Criterion

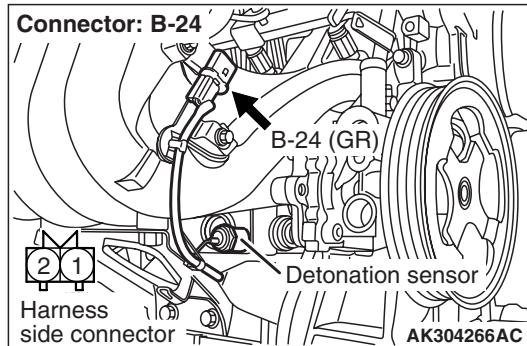
- Change of detonation sensor output voltage (detonation sensor peak voltage in each 1/2 turn of the crankshaft) has not been 0.06 V or more in the last consecutive 200 periods.

PROBABLE CAUSE

- Failed detonation sensor
- Open/short circuit in detonation sensor circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-24 detonation sensor connector

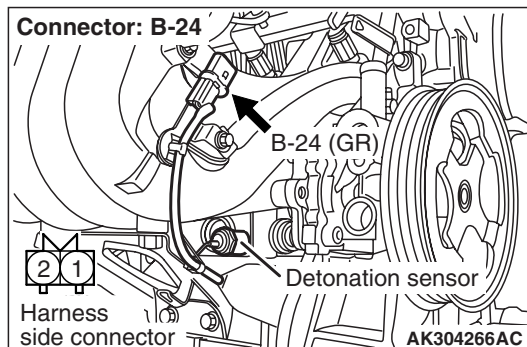


Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Perform resistance measurement at B-24 detonation sensor connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

OK: 2 Ω or less

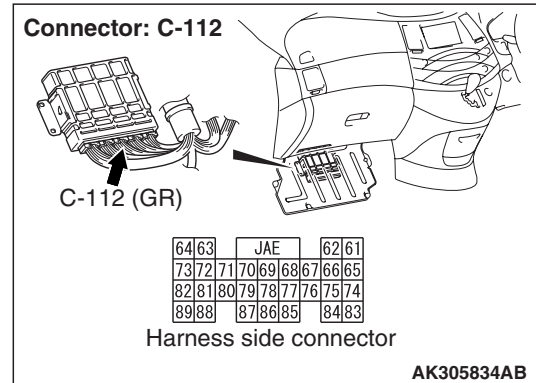
Q: Is the check result normal?

YES : Go to Step 3 .

NO : Check and repair harness between B-24 (terminal No. 2) detonation sensor connector and body earth.

- Check earthing line for open circuit and damage.

STEP 3. Connector check: C-112 engine-A/T-ECU

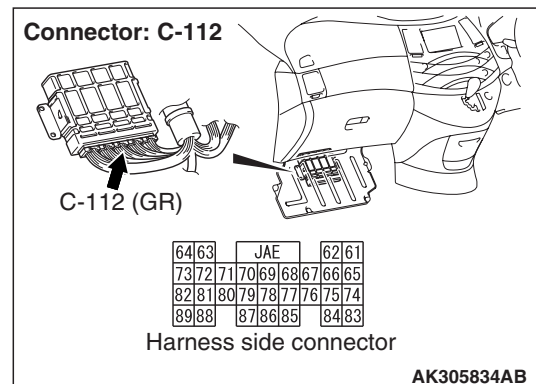
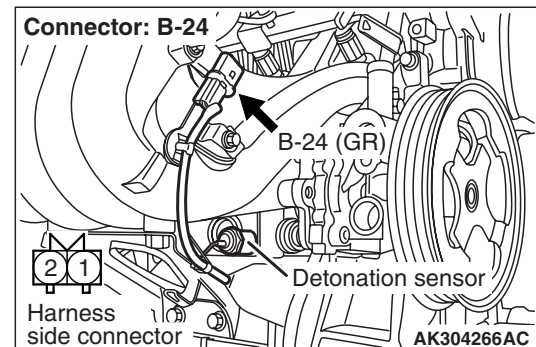


Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Check harness between B-24 (terminal No. 1) detonation sensor connector and C-112 (terminal No. 89) engine-A/T-ECU connector.



- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair.

STEP 5. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace detonation sensor. Then go to Step 6 .

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 6. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

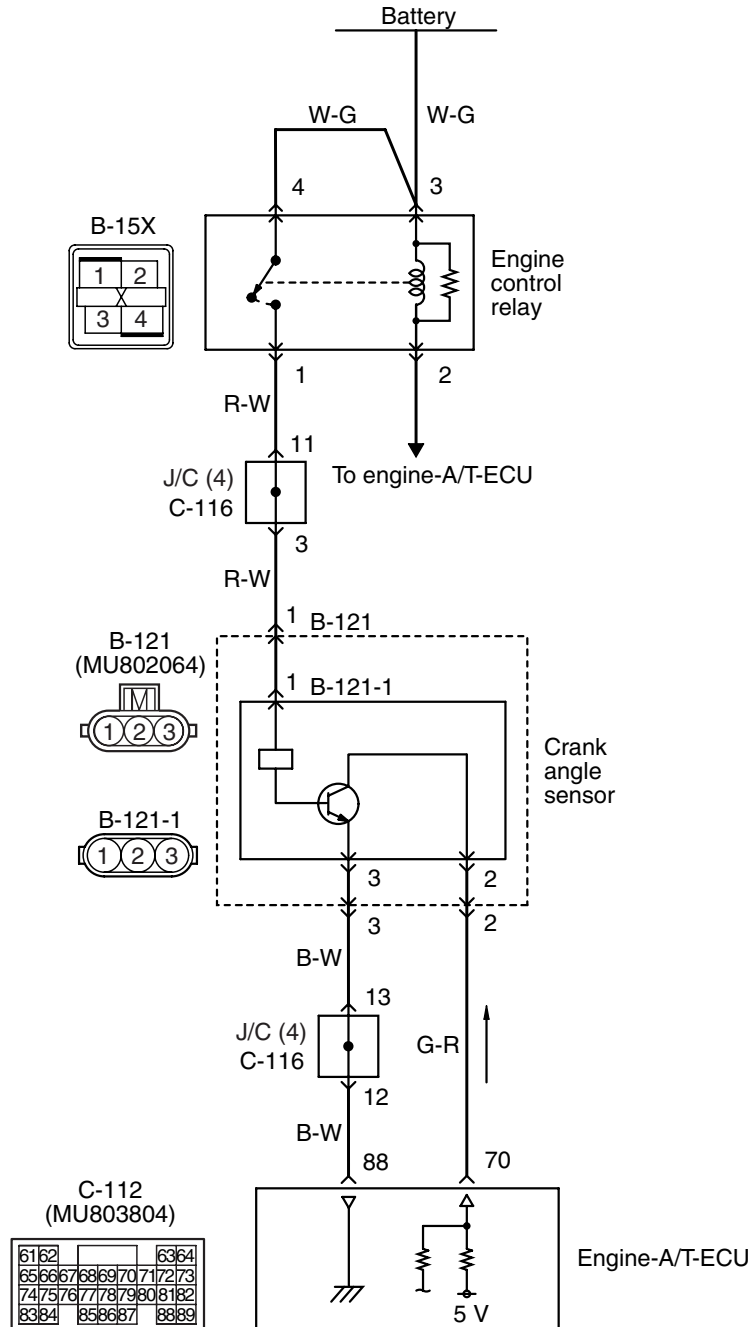
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0335: Crank Angle Sensor System

Crank angle 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

OPERATION

- Power is supplied to the crank angle sensor (terminal No. 1) from the engine control relay (terminal No. 1) and is earthed to the engine-A/T-ECU (terminal No. 88) from the crank angle sensor (terminal No. 3).
- A power voltage of 5 V is applied to the crank angle sensor output terminal (terminal No. 2) from the engine-A/T-ECU (terminal No. 70).

FUNCTION

- The crank angle sensor detects the crank angle (position) and inputs a pulse signal to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU controls the injector, etc.

TROUBLE JUDGMENT**Check Condition**

- While engine is being cranked.

Judgment Criterion

- Crank angle sensor output voltage has not been changed (no pulse signal has been input) for 4 seconds.

PROBABLE CAUSE

- Failed crank angle sensor
- Open/short circuit in crank angle sensor circuit or loose connector contact
- Failed engine-A/T-ECU

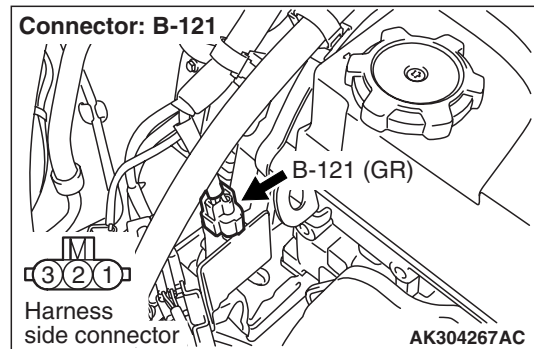
DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 22: Crank angle sensor

Q: Is the check result normal?

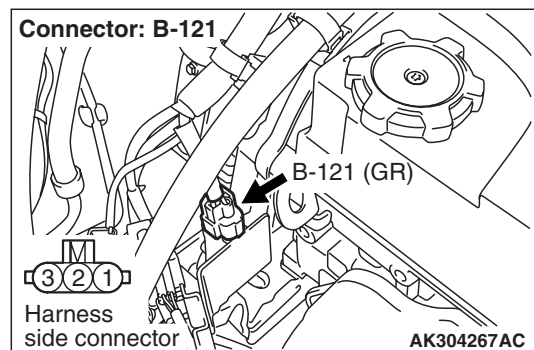
YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-121 crank angle sensor intermediate connector**Q: Is the check result normal?**

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Perform voltage measurement at B-121 crank angle sensor intermediate connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 2 and earth.

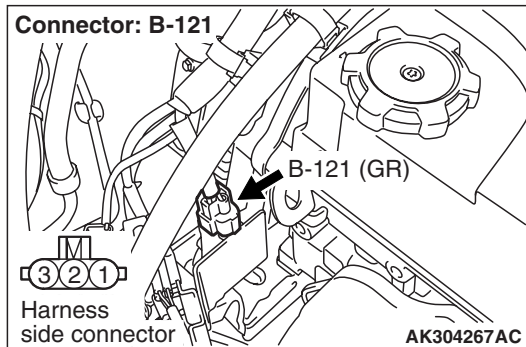
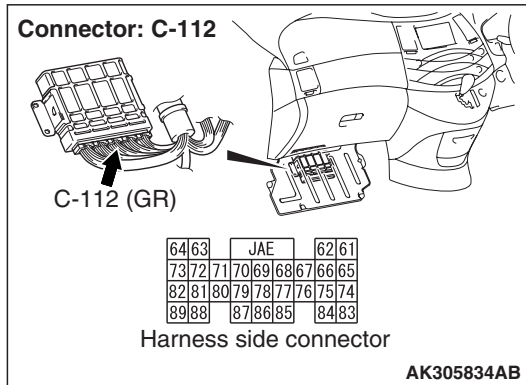
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Go to Step 4 .

STEP 4. Perform voltage measurement at C-112 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Disconnect B-121 crank angle sensor intermediate connector.
- Ignition switch: ON
- Voltage between terminal No. 70 and earth.

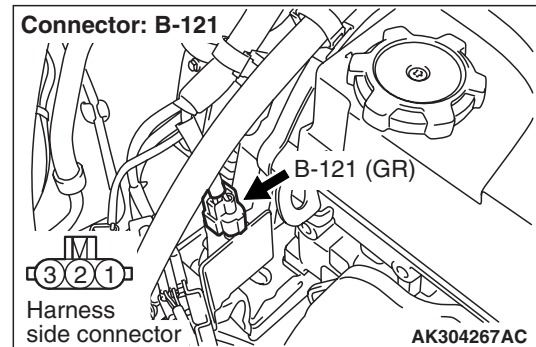
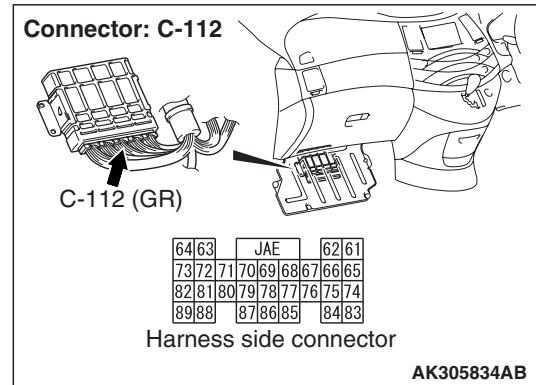
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 6 .

STEP 5. Connector check: C-112 engine-A/T-ECU connector



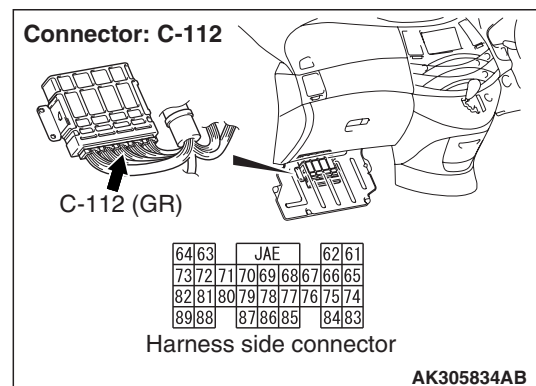
Q: Is the check result normal?

YES : Check and repair harness between B-121 (terminal No. 2) crank angle sensor intermediate connector and C-112 (terminal No. 70) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

STEP 6. Connector check: C-112 engine-A/T-ECU connector

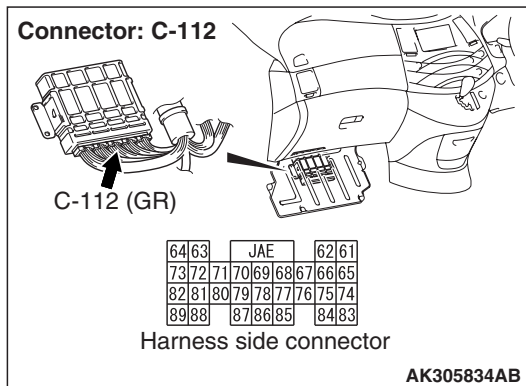
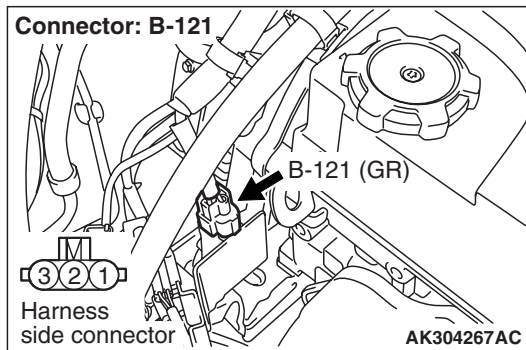


Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Check harness between B-121 (terminal No. 2) crank angle sensor intermediate connector and C-112 (terminal No. 70) engine-A/T-ECU connector.



- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair.

STEP 8. M.U.T.-III data list

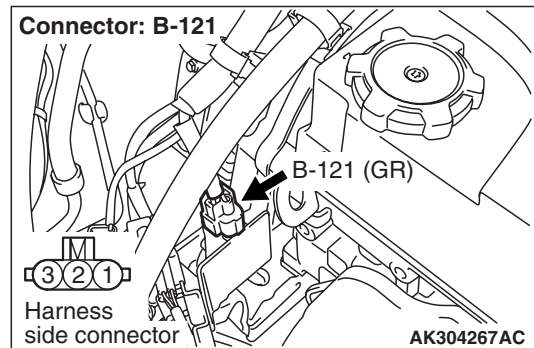
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 22: Crank angle sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A– Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 9. Perform voltage measurement at B-121 crank angle sensor intermediate connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 1 and earth.

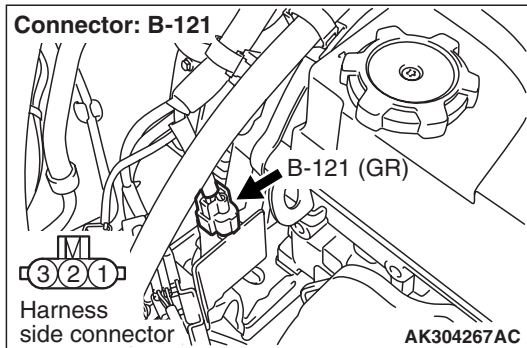
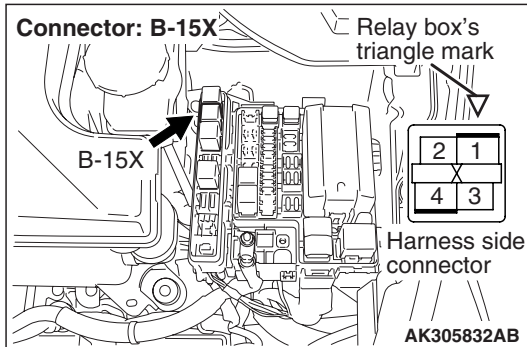
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Go to Step 10 .

STEP 10. Connector check: B-15X engine control relay connector



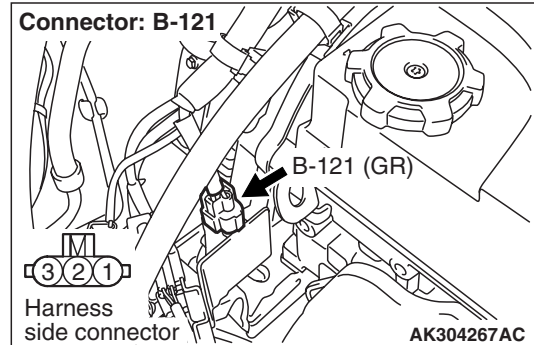
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-121 (terminal No. 1) crank angle sensor intermediate connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 11. Perform resistance measurement at B-121 crank angle sensor intermediate connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 3 and earth.

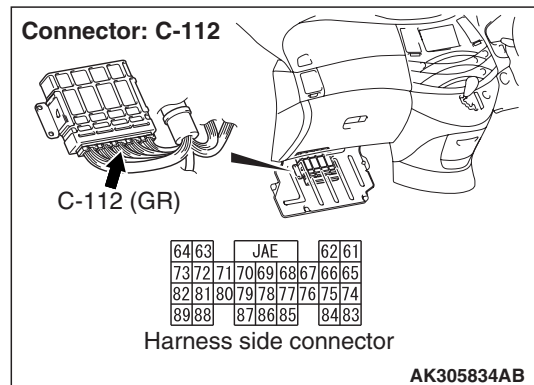
OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Go to Step 12 .

STEP 12. Connector check: C-112 engine-A/T-ECU connector

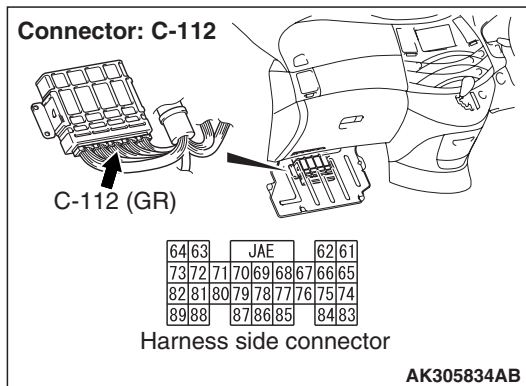
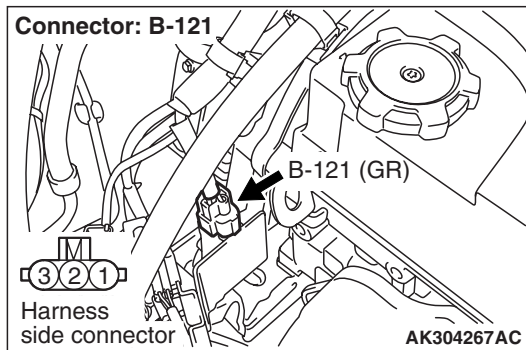


Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair or replace.

STEP 13. Check harness between B-121 (terminal No. 3) crank angle sensor intermediate connector and C-112 (terminal No. 88) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

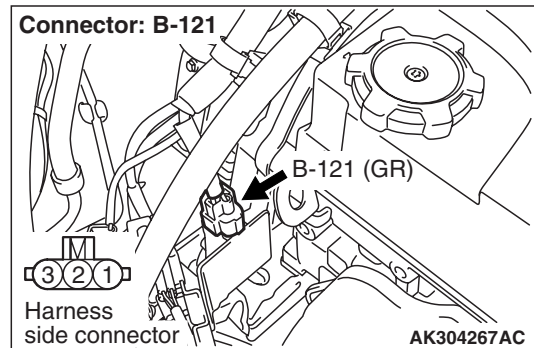
- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair.

STEP 14. Perform output wave pattern measurement at B-121 crank angle sensor intermediate connector (Using an oscilloscope).



- Use special tool test harness (MB991658) to connect connector, and measure at pick-up harness.
- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 2 and earth.

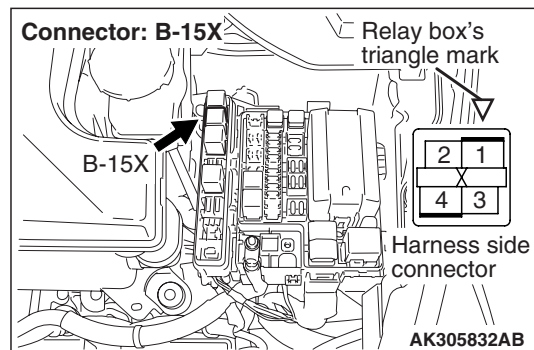
OK: Waveforms should be displayed on inspection procedure using an oscilloscope (Refer to [P.13B-276](#)), its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 15 .

STEP 15. Connector check: B-15X engine control relay connector

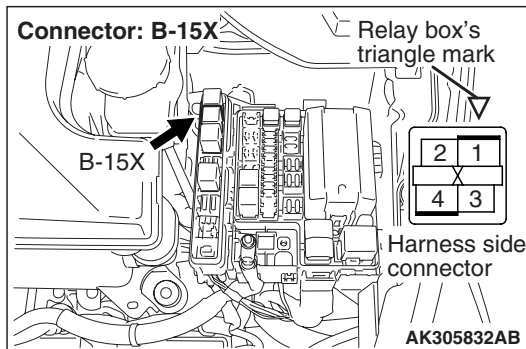
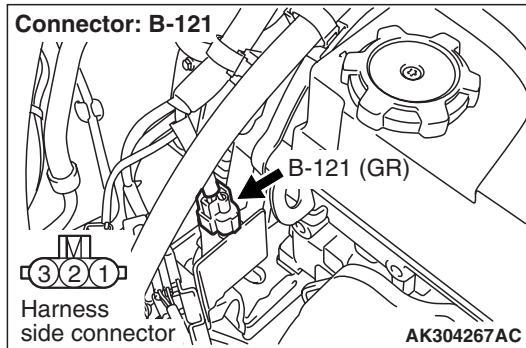


Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair or replace.

STEP 16. Check harness between B-121 (terminal No. 1) crank angle sensor intermediate connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

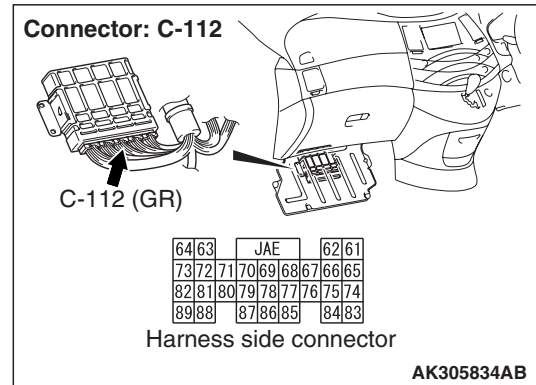
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Repair.

STEP 17. Connector check: C-112 engine-A/T-ECU connector

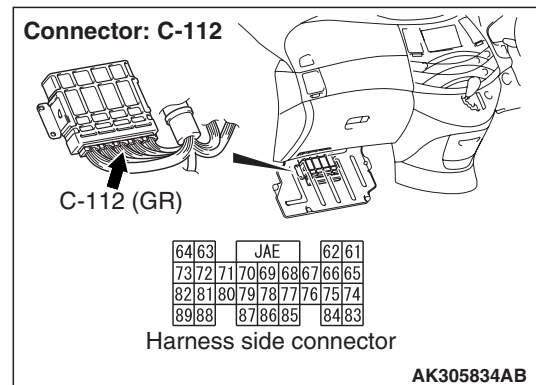
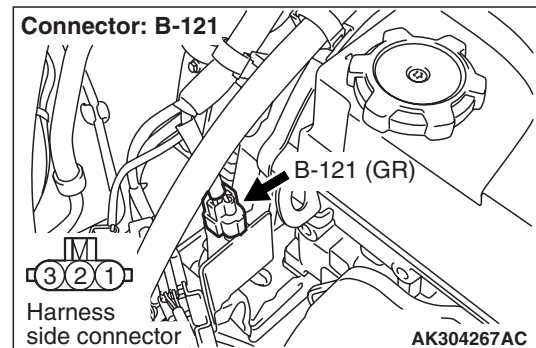


Q: Is the check result normal?

YES : Go to Step 18 .

NO : Repair or replace.

STEP 18. Check harness between B-121 (terminal No. 2) crank angle sensor intermediate connector and C-112 (terminal No. 70) engine-A/T-ECU connector.



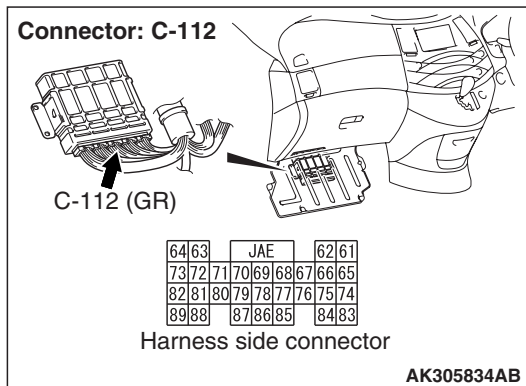
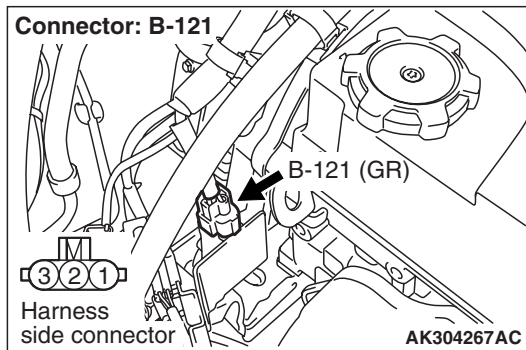
- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 19 .

NO : Repair.

STEP 19. Check harness between B-121 (terminal No. 3) crank angle sensor intermediate connector and C-112 (terminal No. 88) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

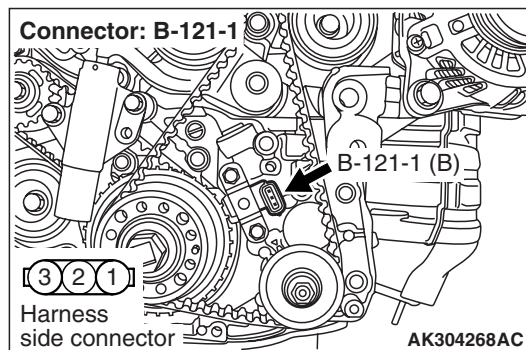
- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 20 .

NO : Repair.

STEP 20. Connector check: B-121-1 crank angle sensor connector

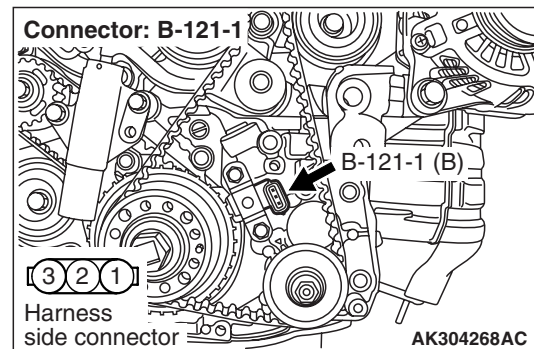
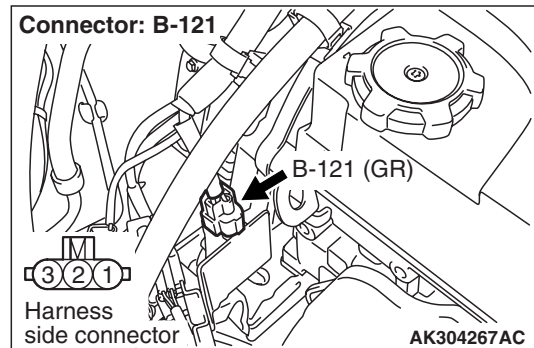


Q: Is the check result normal?

YES : Go to Step 21 .

NO : Repair or replace.

STEP 21. Check harness between B-121 crank angle sensor intermediate connector and B-121-1 crank angle sensor connector.



- Check power supply line open/short circuit and damage.
- Check output line open/short circuit and damage.
- Check earthing line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 22 .

NO : Replace the timing belt cover.

STEP 22. Check the crankshaft sensing blade.

Q: Is the check result normal?

YES : Go to Step 23 .

NO : Replace the crankshaft sensing blade.

STEP 23: M.U.T.-III data list

- Refer to Data list reference table [P.13B-260](#).
 - a. Item 22: Crank angle sensor

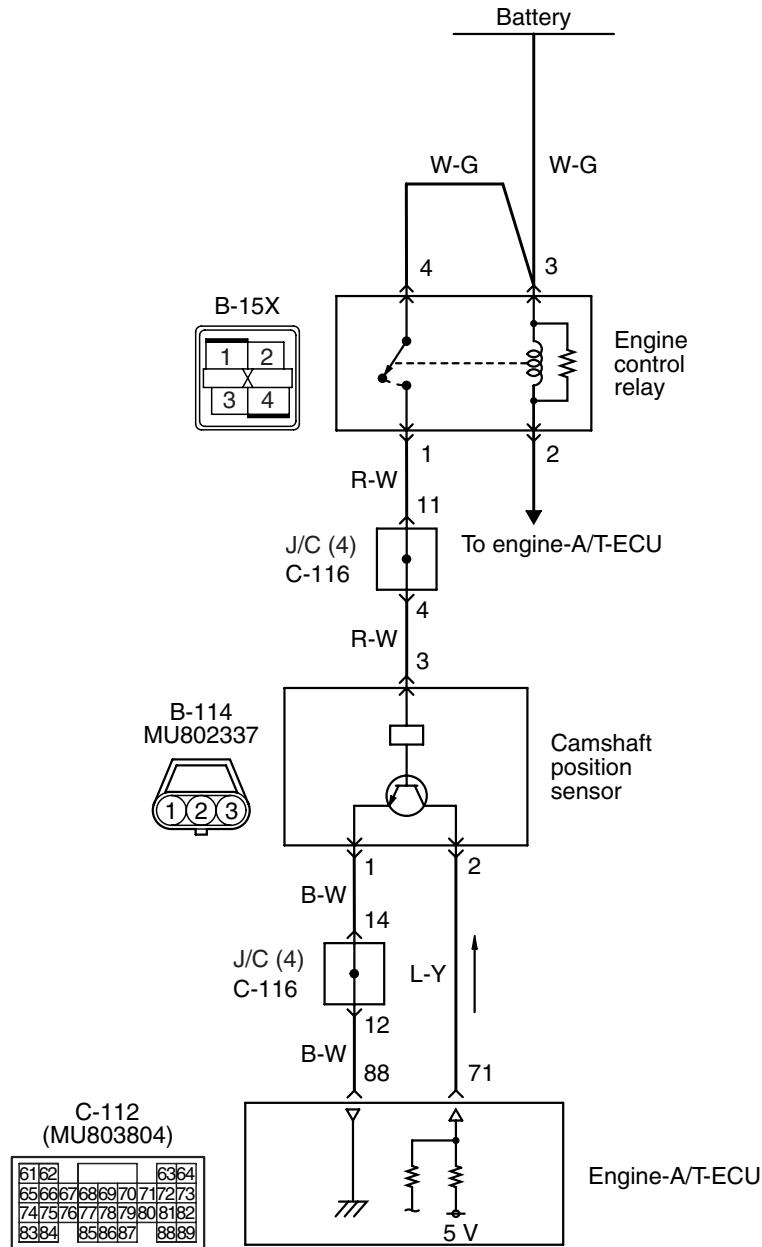
Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace crank angle sensor.

Code No. P0340: Camshaft Position Sensor System

Camshaft position 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

OPERATION

- Power is supplied to the camshaft position sensor (terminal No. 3) from the engine control relay (terminal No. 1) and is earthed to the engine-A/T-ECU (terminal No. 88) from the camshaft position sensor (terminal No. 1).
- A power voltage of 5 V is applied to the camshaft position sensor output terminal (terminal No. 2) from the engine-A/T-ECU (terminal No. 71).

FUNCTION

- The camshaft position sensor detects the top dead centre on the compression stroke of the No. 1 cylinder and inputs a pulse signal to the engine-A/T-ECU.

TROUBLE JUDGMENT**Check Condition**

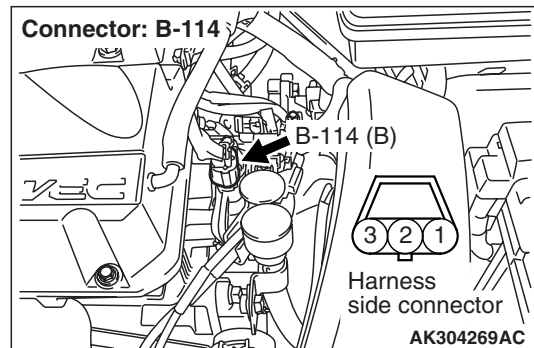
- While engine is being cranked or operated.

Judgment Criterion

- Camshaft position sensor output voltage has not been changed (no pulse signal is has been input) for 4 seconds.

PROBABLE CAUSE

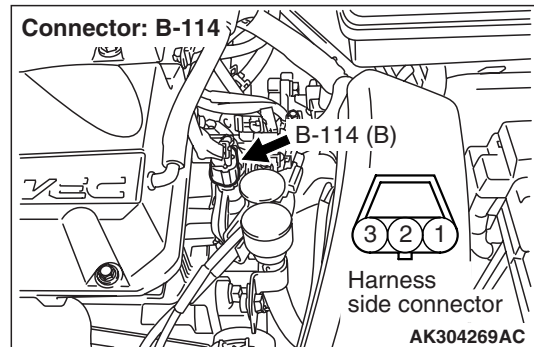
- Failed camshaft position sensor
- Open/short circuit in camshaft position sensor circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-114 camshaft position sensor connector**

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Perform voltage measurement at B-114 camshaft position sensor connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

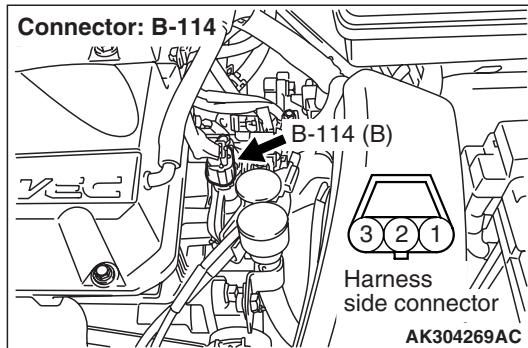
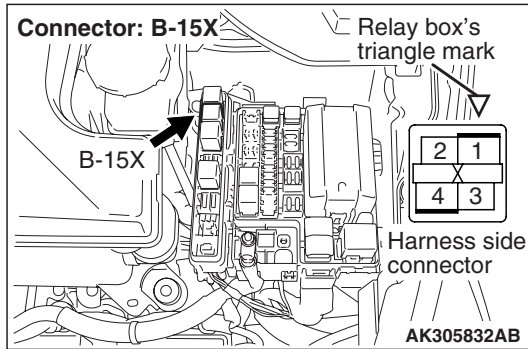
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Go to Step 3 .

STEP 3. Connector check: B-15X engine control relay connector



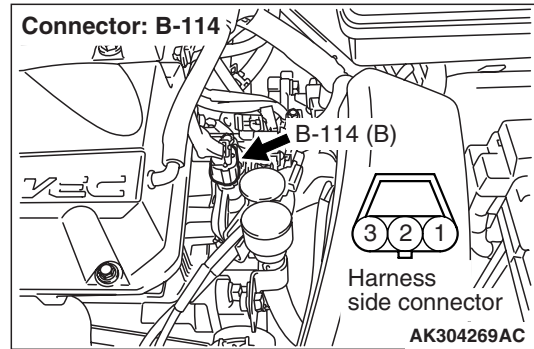
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-114 (terminal No. 3) camshaft position sensor connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 4. Perform voltage measurement at B-114 camshaft position sensor connector.



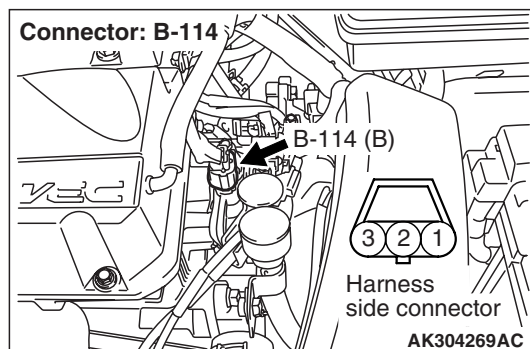
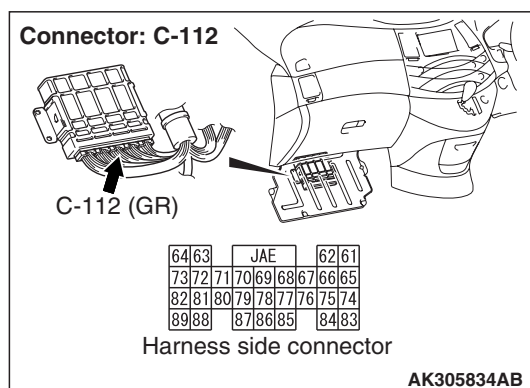
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 2 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 5 .

STEP 5. Perform voltage measurement at C-112 engine-A/T-ECU connector.

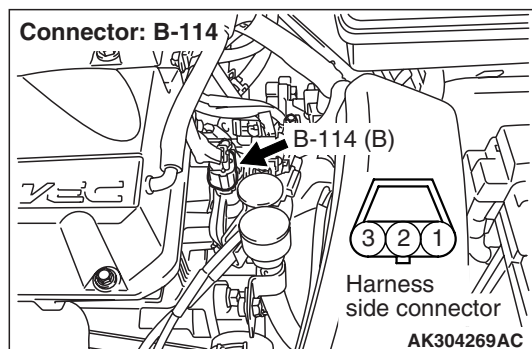
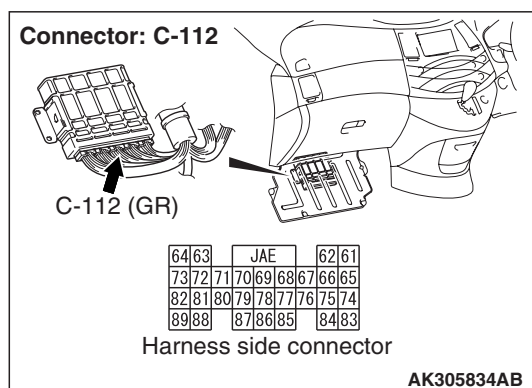
- Measure engine-A/T-ECU terminal voltage.
- Disconnect B-114 camshaft position sensor connector.
- Ignition switch: ON
- Voltage between terminal No. 71 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 6 .

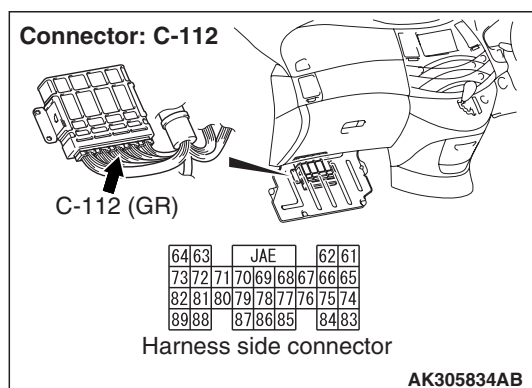
NO : Go to Step 7 .

STEP 6. Connector check: C-112 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Check and repair harness between B-114 (terminal No. 2) camshaft position sensor connector and C-112 (terminal No. 71) engine-A/T-ECU connector.

- Check output line for open circuit.

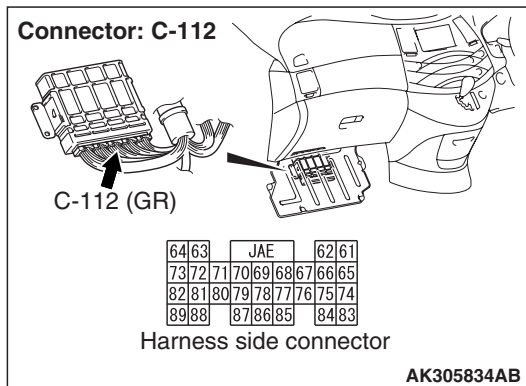
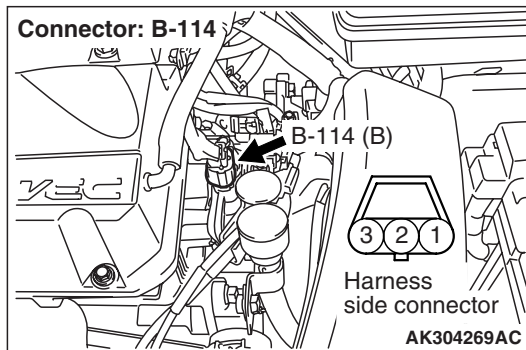
NO : Repair or replace.

STEP 7. Connector check: C-112 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 8 .

NO : Repair or replace.

STEP 8. Check harness between B-114 (terminal No. 2) camshaft position sensor connector and C-112 (terminal No. 71) engine-A/T-ECU connector.



- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

STEP 9. M.U.T.-III diagnosis code

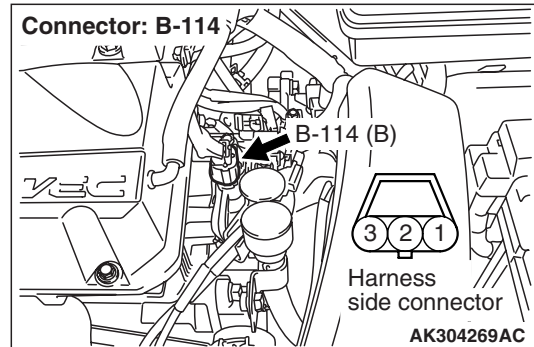
- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 10. Perform resistance measurement at B-114 camshaft position sensor connector.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 1 and earth.

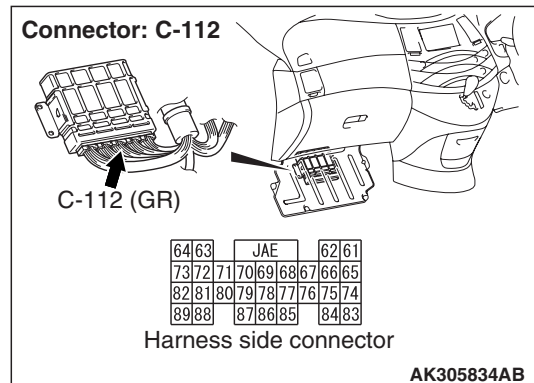
OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Go to Step 11 .

STEP 11. Connector check: C-112 engine-A/T-ECU connector

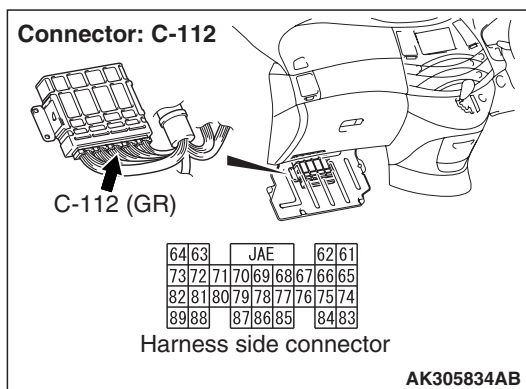
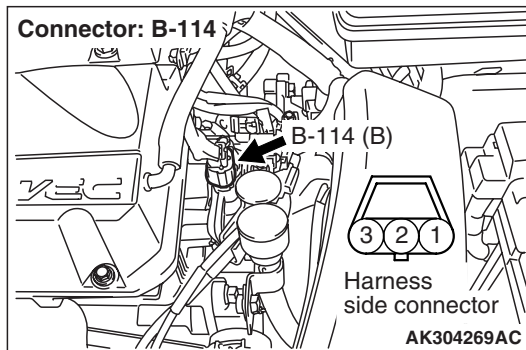


Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Check harness between B-114 (terminal No. 1) camshaft position sensor connector and C-112 (terminal No. 88) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

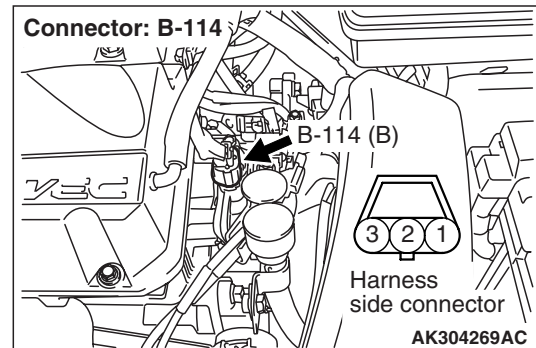
- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

STEP 13. Perform output wave pattern measurement at B-114 camshaft position sensor connector (Using an oscilloscope).



- Use special tool test harness (MB991709) to connect connector, and measure at pick-up harness.
- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 2 and earth.

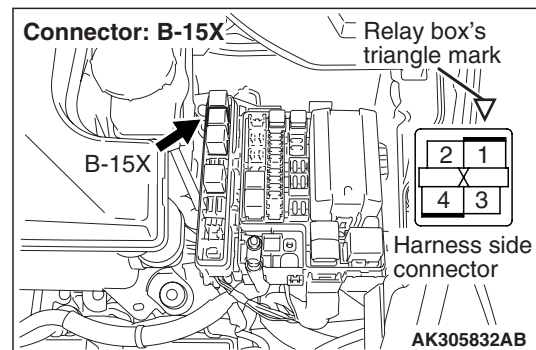
OK: Waveforms should be displayed on inspection procedure using an oscilloscope (Refer to P.13B-276), its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Go to Step 14 .

STEP 14. Connector check: B-15X engine control relay connector.

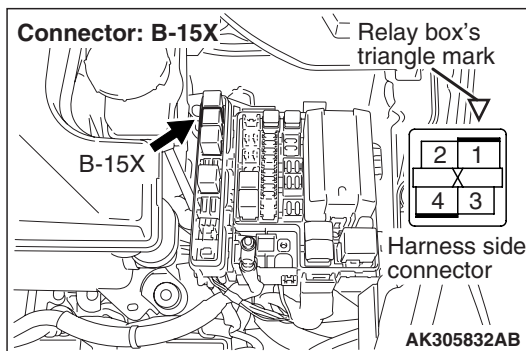
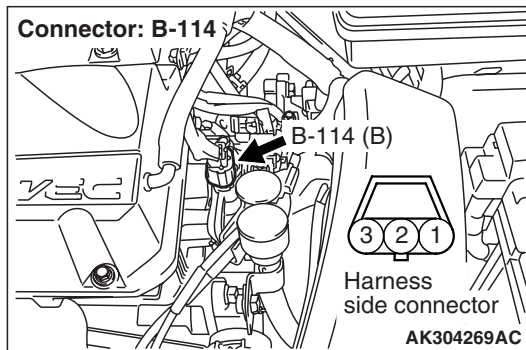


Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair or replace.

STEP 15. Check harness between B-114 (terminal No. 3) camshaft position sensor connector and B-15X (terminal No. 1) engine control relay connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

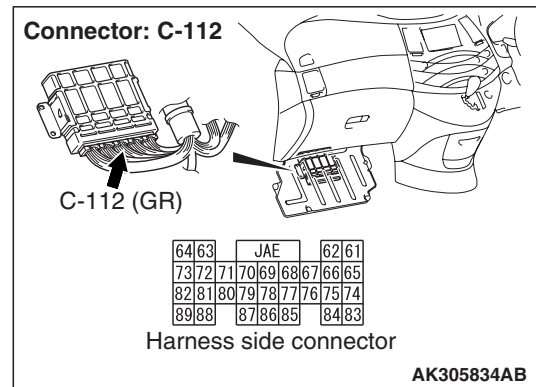
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair.

STEP 16. Connector check: C-112 engine-A/T-ECU connector

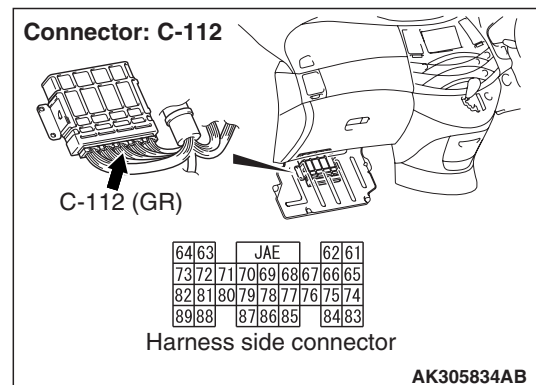
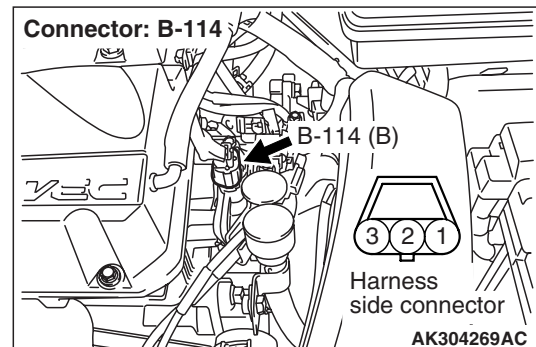


Q: Is the check result normal?

YES : Go to Step 17 .

NO : Repair or replace.

STEP 17. Check harness between B-114 (terminal No. 2) camshaft position sensor connector and C-112 (terminal No. 71) engine-A/T-ECU connector.



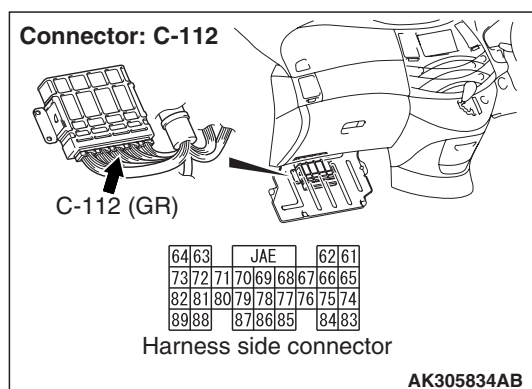
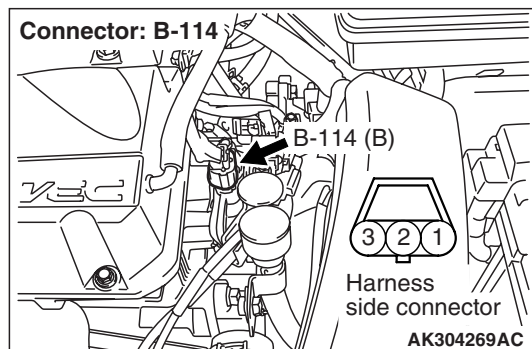
- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 18 .

NO : Repair.

STEP 18. Check harness between B-114 (terminal No. 1) camshaft position sensor connector and C-112 (terminal No. 88) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 19 .

NO : Repair.

STEP 19. Check camshaft position sensing cylinder.

Q: Is the check result normal?

YES : Go to Step 20 .

NO : Replace camshaft position sensing cylinder.

STEP 20. M.U.T.-III diagnosis code

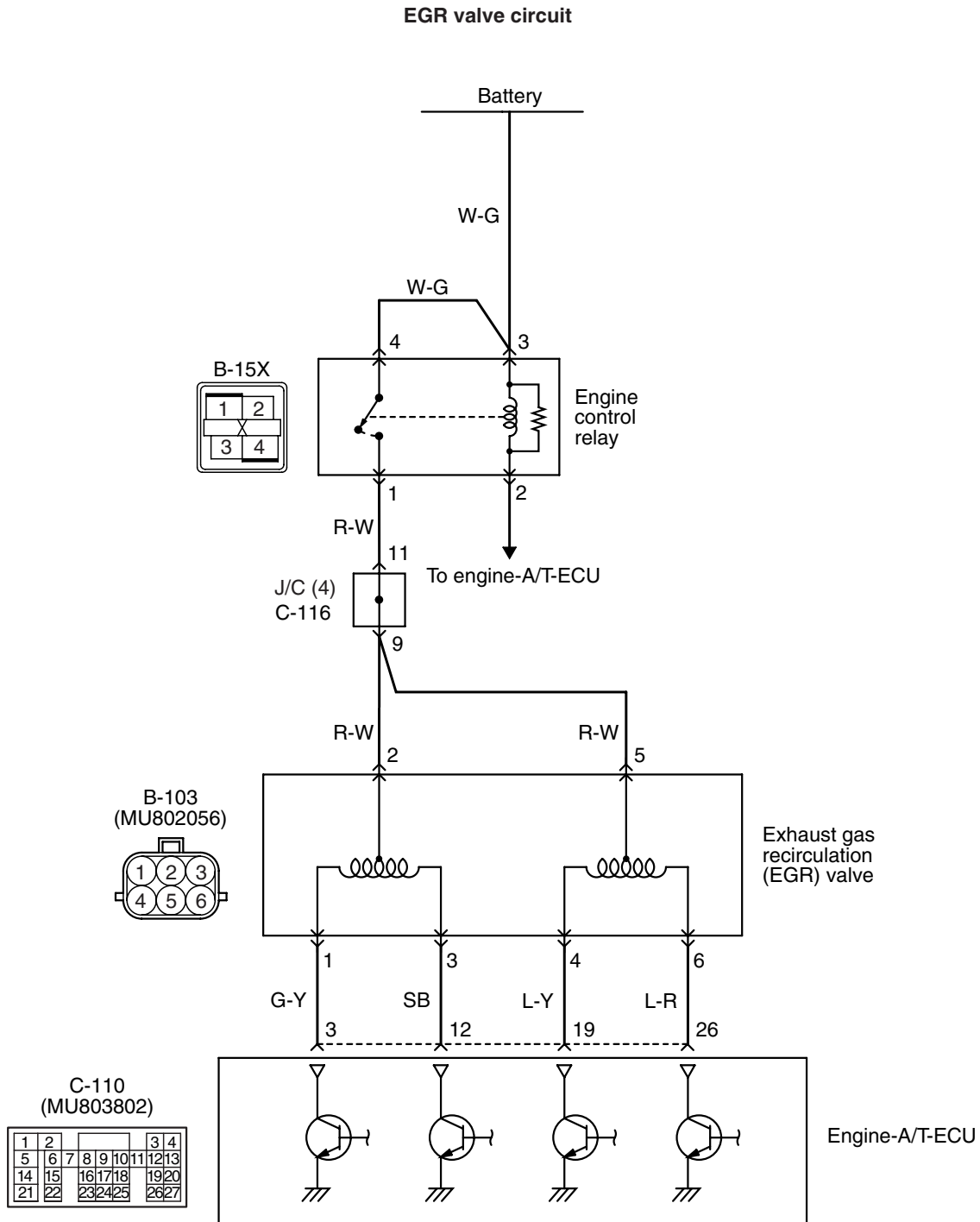
- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace camshaft position sensor.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0403: Exhaust Gas Recirculation Control System



AK305843AB

OPERATION

- Power is supplied to the EGR valve (terminal No. 2 and No. 5) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 3, No. 12, No. 19 and No. 26) makes the power transistor in the unit be in ON, and that makes currents go on the EGR valve (terminal No. 1, No. 3, No. 4 and No. 6).

FUNCTION

- Based on the signal from engine-A/T-ECU, the EGR valve (stepper motor) controls the EGR rate.

TROUBLE JUDGMENT**Check Conditions**

- When the ignition switch is turned to ON position from OFF position.

or

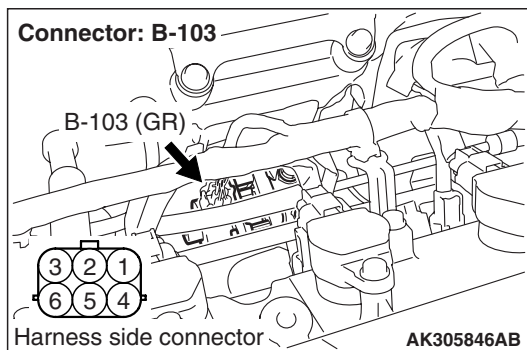
- EGR valve is in operation after the engine starting process is completed.

Judgment Criterion

- Off-surge voltage is not generated from motor coil while the EGR valve motor is running.

PROBABLE CAUSE

- Failed EGR valve
- Open/short circuit in EGR valve circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-103 EGR valve connector****Q: Is the check result normal?**

YES : Go to Step 2 .

NO : Repair or replace.

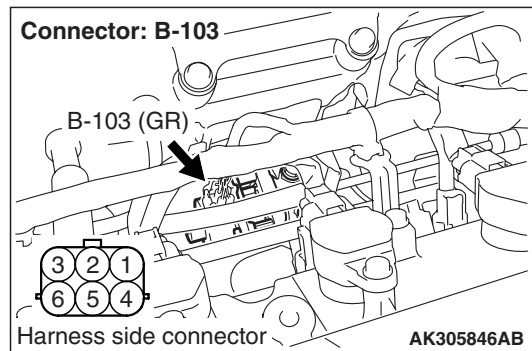
STEP 2. Check EGR valve itself.

- Check EGR valve itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (stepper motor) Check P.17-44.

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace EGR valve (stepper motor).

STEP 3. Perform voltage measurement at B-103 EGR valve connector.

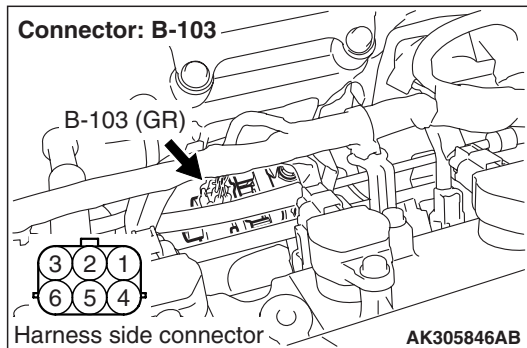
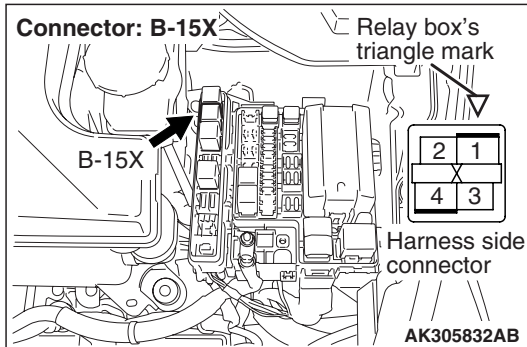
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 2, No. 5 and earth.

OK: System voltage**Q: Is the check result normal?**

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: B-15X engine control relay connector



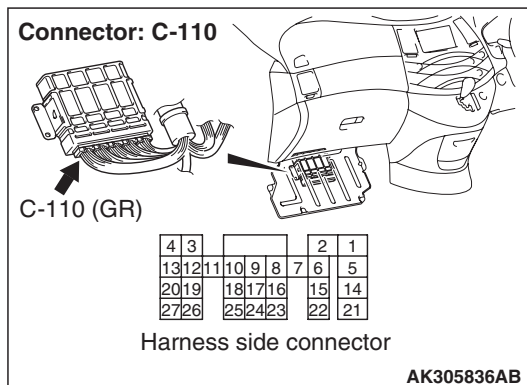
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-103 (terminal No. 2, No. 5) EGR valve connector and B-15X (terminal No. 1) engine control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at C-110 engine-A/T-ECU.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 3, No. 12, No. 19,

No. 26 and earth.

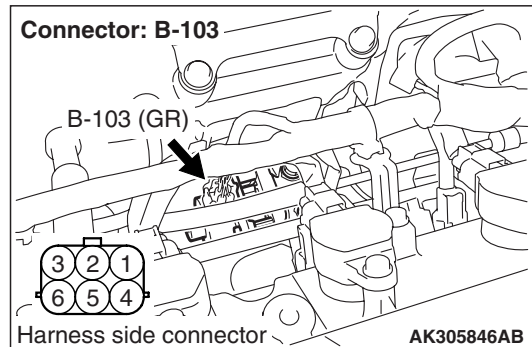
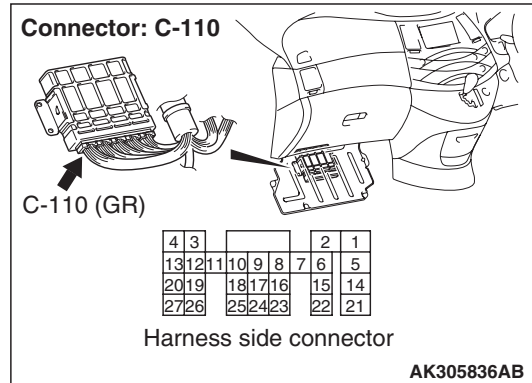
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Go to Step 6 .

STEP 6. Connector check: C-110 engine-A/T-ECU

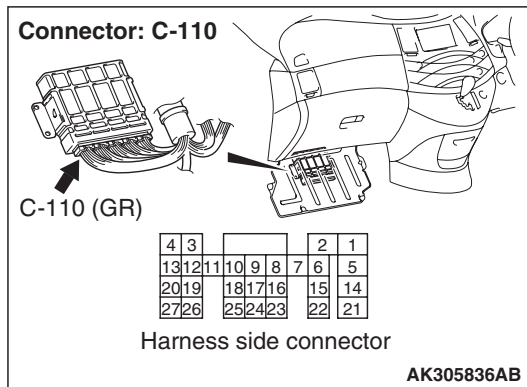
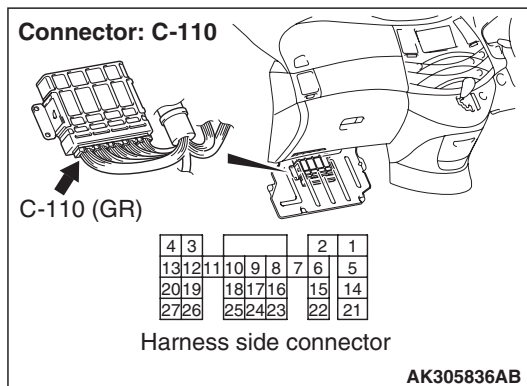
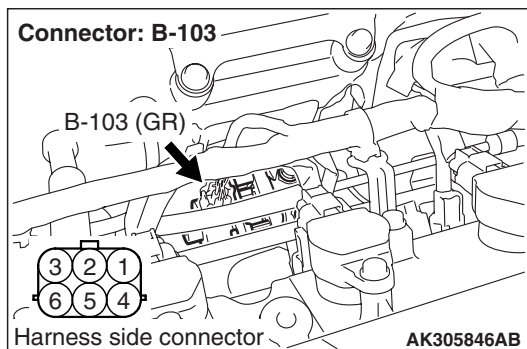


Q: Is the check result normal?

YES : Check and repair harness between B-103 EGR valve and C-110 engine-A/T-ECU connector

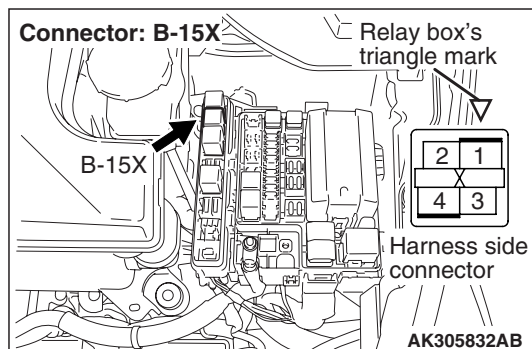
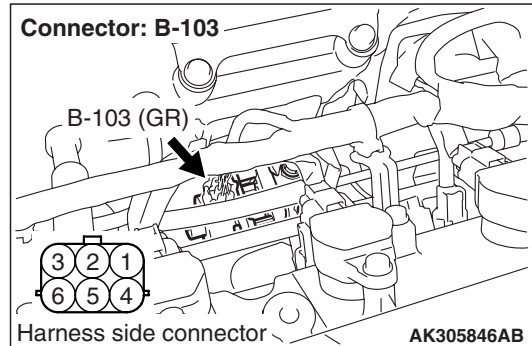
- Check harness between B-103 (terminal No. 1) EGR valve and C-110 (terminal No. 3) engine-A/T-ECU connector
 - Check harness between B-103 (terminal No. 3) EGR valve and C-110 (terminal No. 12) engine-A/T-ECU connector
 - Check harness between B-103 (terminal No. 4) EGR valve and C-110 (terminal No. 19) engine-A/T-ECU connector
 - Check harness between B-103 (terminal No. 6) EGR valve and C-110 (terminal No. 26) engine-A/T-ECU connector
- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 7. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?****YES** : Go to Step 8 .**NO** : Repair or replace.**STEP 8. Check harness between B-103 EGR valve and C-110 engine-A/T-ECU.**

- Check harness between B-103 (terminal No. 1) EGR valve and C-110 (terminal No. 3) engine-A/T-ECU connector
- Check harness between B-103 (terminal No. 3) EGR valve and C-110 (terminal No. 12) engine-A/T-ECU connector
- Check harness between B-103 (terminal No. 4) EGR valve and C-110 (terminal No. 19) engine-A/T-ECU connector

- Check harness between B-103 (terminal No. 6) EGR valve and C-110 (terminal No. 26) engine-A/T-ECU connector
- Check output line for damage.

Q: Is the check result normal?**YES** : Go to Step 9 .**NO** : Repair.**STEP 9. Check harness between B-103 (terminal No. 2, No. 5) EGR valve connector and B-15X (terminal No. 1) engine control relay connector.****NOTE:** Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Repair.

Code No. P0500: Vehicle Speed Signal System

FUNCTION

- Receives the signal from the output shaft speed sensor used for the A/T control and converts it to the vehicle speed signal, and then inputs it to the engine control system and the speedometer.

TROUBLE JUDGMENT

Check Conditions

- After 2 seconds pass from when the engine has completed the starting.
- The engine speed is 2, 500 – 4, 000 r/min.
- Under the high load operation.

Judgment Criterion

- The sensor output voltage does not vary for 4 seconds. (The pulse signal is not input.)

PROBABLE CAUSE

- Failed output shaft speed sensor
- Open/short circuit, in the output shaft speed sensor circuit or loose connector contact.
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III other system diagnosis codes

- Confirm whether the diagnosis codes are output from A/T system.

Q: Is the diagnosis code output for A/T system?

YES : A/T system check (Refer to GROUP 23 – Diagnosis Code Classified Table [P.23A-17.](#))

NO : Go to Step 2.

STEP 2. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9.](#))

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5.](#))

Code No. P0513: Immobilizer Malfunction

OPERATION

- The signals are sent and received between engine-A/T-ECU and immobilizer-ECU.

FUNCTION

- Engine-A/T-ECU monitors the communication condition with the immobilizer-ECU. When an abnormality in communication is engine-A/T-ECU prevents engine start.

TROUBLE JUDGMENT

Check Condition

- Ignition switch is in ON position.

Judgment Criterion

- Communication error between engine-A/T-ECU and the immobilizer-ECU.

PROBABLE CAUSE

- Failed harness and connector
- Failed immobilizer-ECU
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III other system diagnosis code

- Reconfirmation whether diagnosis code is output from immobilizer-ECU.

Q: Is the diagnosis code set?

YES : . Perfrom the troubleshooting of immobilizer-ECU (refer to GROUP 54A – Ignition Switch – Check Chart for Diagnosis Code [P.54A-12.](#))

NO : . Go to Step 2 .

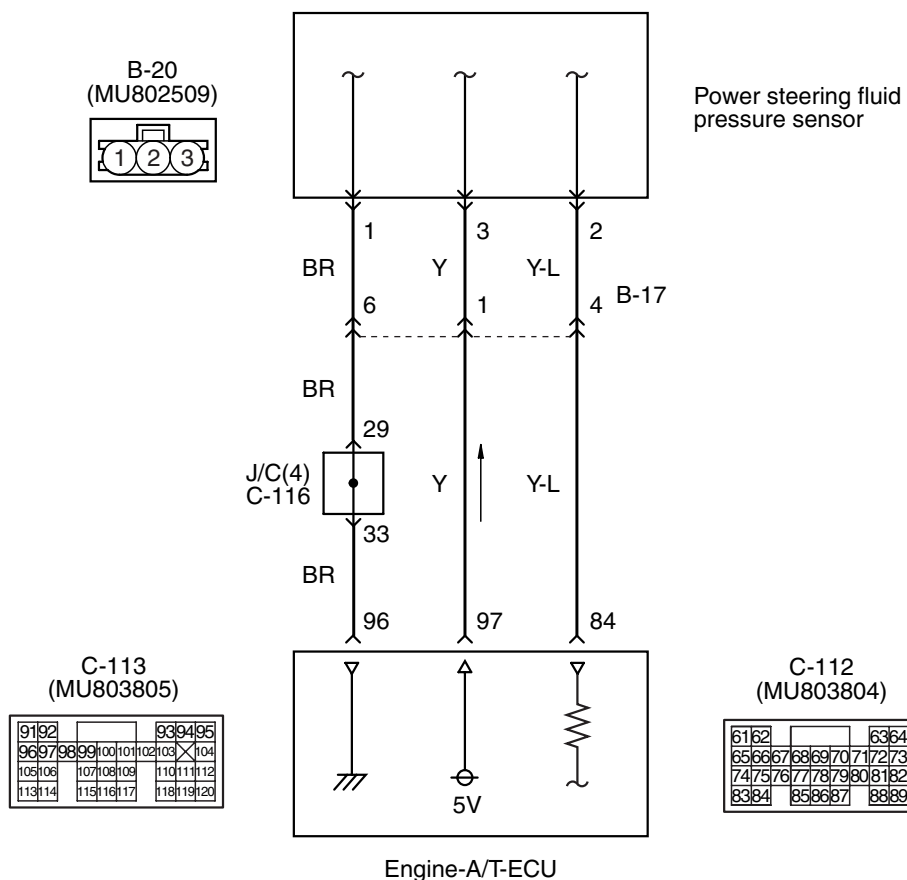
STEP 2. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : . Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : . Check end.

Code No. P0551: Power Steering Fluid Pressure Sensor System**Power steering fluid pressure sensor circuit**

AK305848 AB

CONDITION

- A power voltage of 5 V is applied to power steering fluid pressure sensor (terminal No. 3) from the engine-A/T-ECU (terminal No. 97).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 96) from the power steering fluid pressure sensor (terminal No. 1).

- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 84) from power steering fluid pressure sensor output terminal (terminal No. 2).

FUNCTION

- Detect the power steering oil pump load caused by the steering and input it into engine-A/T-ECU. Engine-A/T-ECU determines the power steering oil pump load through power steering fluid pressure sensor to perform the idle up control depending on the load.

TROUBLE JUDGMENT

Check Condition

- All the time after the microcomputer start.

Judgment Criteria

- Power steering fluid pressure sensor output voltage has continued to be 4.8 V or more for 5 seconds.

or

- Power steering fluid pressure sensor output voltage has continued to be 0.2 V or less for 5 seconds.

PROBABLE CAUSE

- Failed power steering fluid pressure sensor
- Failed power steering
- Open/short circuit in power steering fluid pressure sensor circuit or loose contact.
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#)
 - Item B4: Power steering fluid pressure sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#))

NO : Go to Step 2 .

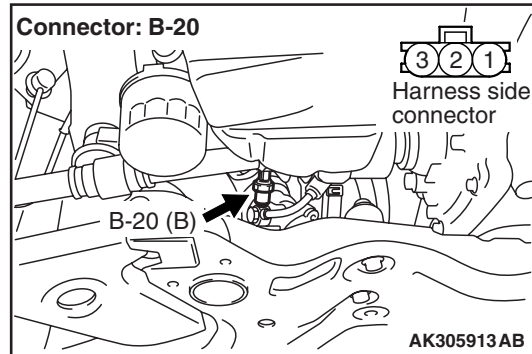
STEP 2. Check for stationary steering effort (Refer to [P.37-11](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair.

STEP 3. Connector check: B-20 power steering fluid pressure sensor connector

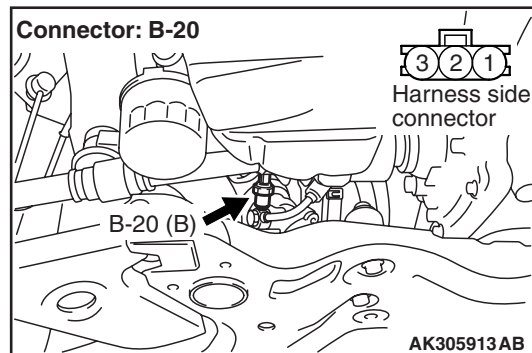


Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at B-20 power steering fluid pressure sensor connector.



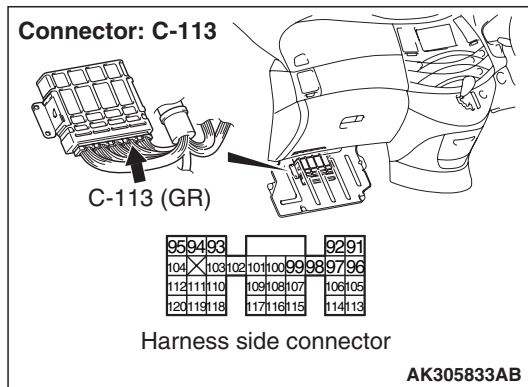
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Go to Step 5 .

STEP 5. Perform voltage measurement at C-113 engine-A/T-ECU connector.

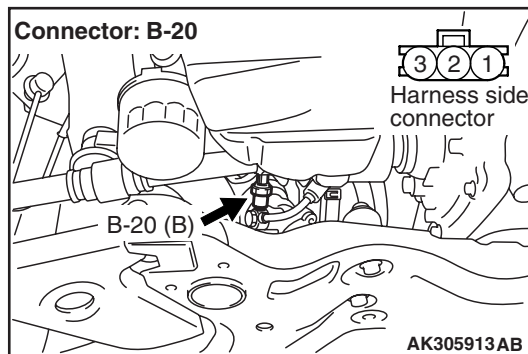
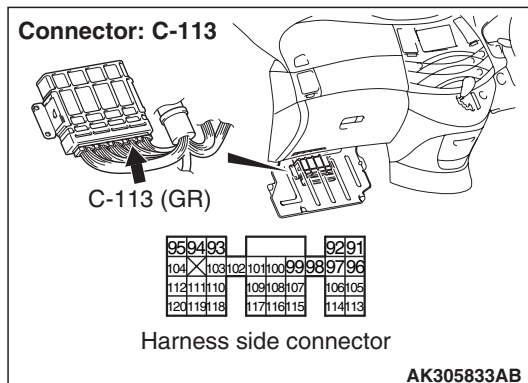
- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No.97 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Go to Step 7 .

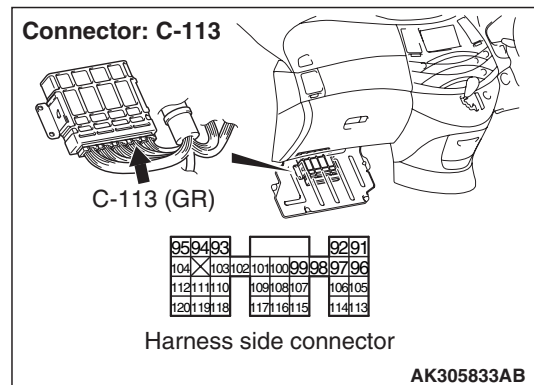
STEP 6. Connector check: C-113 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Check intermediate connector B-17, and repair if necessary. If intermediate connector is normal, check and repair harness between B-20 (terminal No. 3) power steering pressure sensor connector and C-113 (terminal No. 97) engine-A/T-ECU connector.

- Check power supply line for open circuit and damage.

NO : Repair or replace.

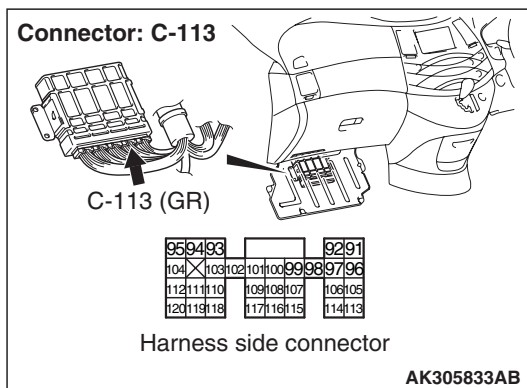
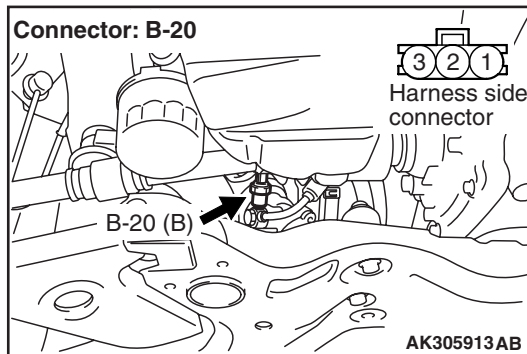
STEP 7. Connector check: C-113 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair or replace.

STEP 8. Check harness between B-20 (terminal No. 3) power steering fluid pressure sensor connector and C-113 (terminal No. 97) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

- Check power supply line for short circuit.

Q: Is the check result normal?

YES : Go to Step 9 .
NO : Repair.

STEP 9. M.U.T.-III data list

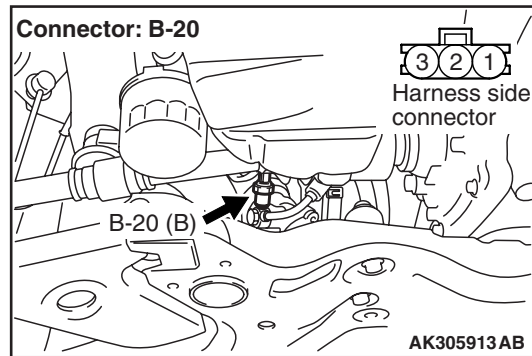
- Refer to Data List Reference Table [P.13B-260](#)
 - Item B4: Power steering fluid pressure sensor

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 10. Perform resistance measurement at B-20 power steering fluid pressure sensor



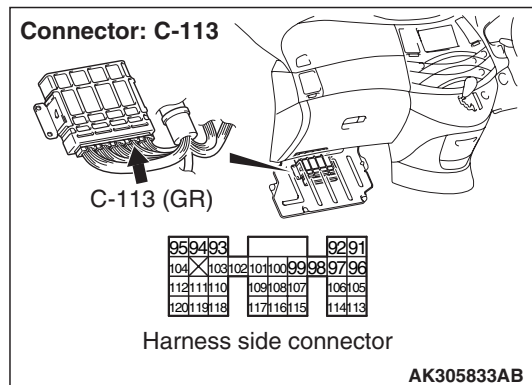
- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 1 and earth.

OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 13 .
NO : Go to Step 11.

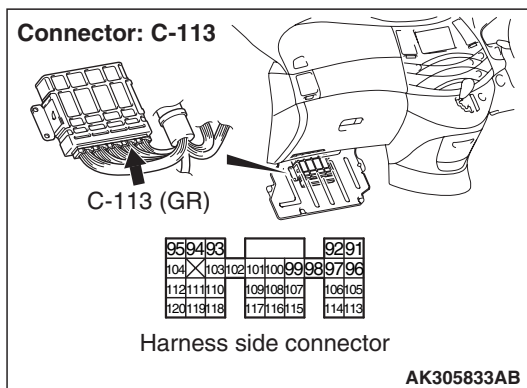
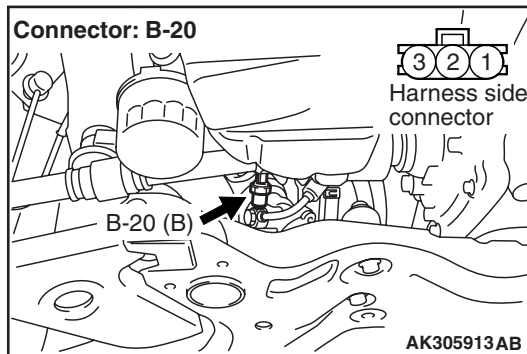
STEP 11. Connector check: C-113 engine-A/T-ECU connector



Q: Is the check result normal?

YES : Go to Step 12 .
NO : Repair or replace.

STEP 12. Check harness between B-20 (terminal No. 1) power steering fluid pressure sensor connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector B-17 and C-116, and repair if necessary.

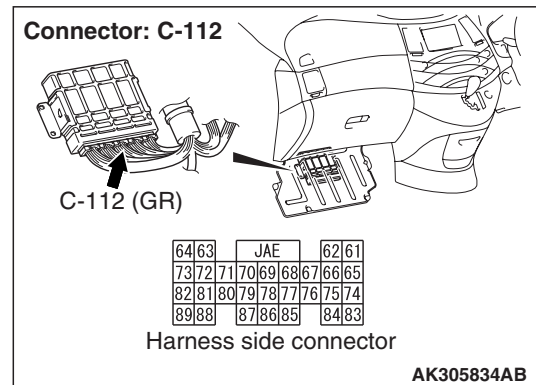
- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

STEP 13. Perform voltage measurement at C-112 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 84 and earth.

OK: 1 V or less (Steering wheel: Not operated)

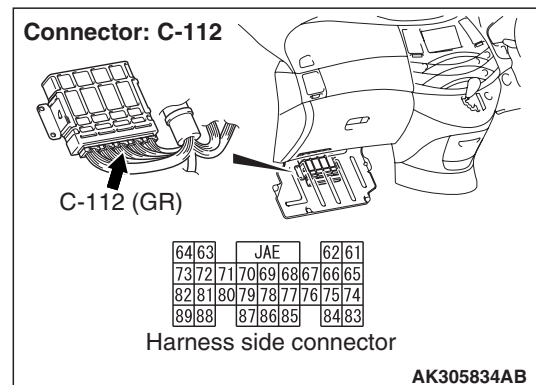
Voltage rises (Steering wheel: Operated)

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Go to Step 14 .

STEP 14. Connector check: C-112 engine-A/T-ECU connector

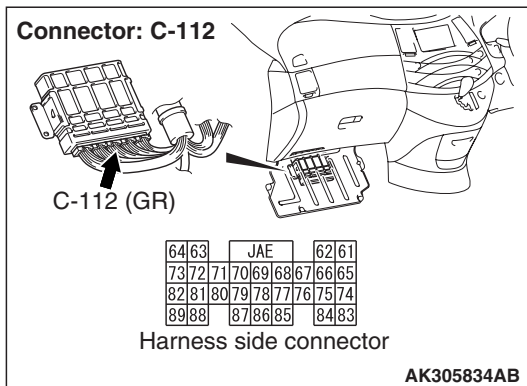
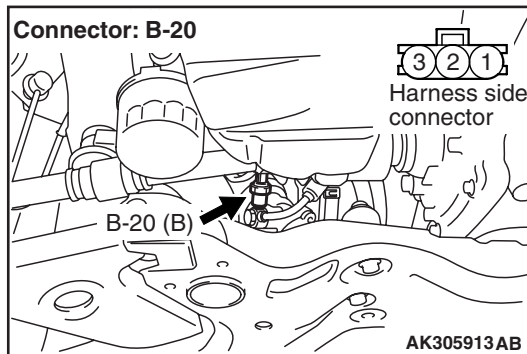


Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair or replace.

STEP 15. Check harness between B-20 (terminal No. 2) power steering fluid pressure sensor connector and C-112 (terminal No. 84) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

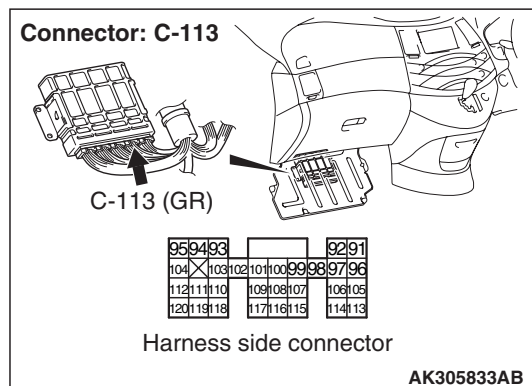
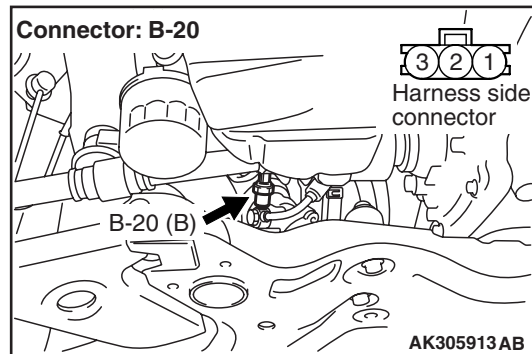
- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair.

STEP 16. Check harness between B-20 (terminal No. 3) power steering fluid pressure sensor connector and C-113 (terminal No. 97) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

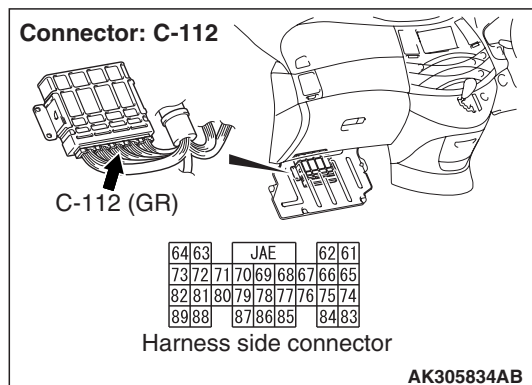
- Check power supply line for damage.

Q: Is the check result normal?

YES : Replace power steering fluid pressure sensor.

NO : Repair.

STEP 17. Connector check: C-112 engine-ECU engine-A/T-ECU connector



Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair or replace.

Code NO. P0603: EEP ROM MALFUNCTION

FUNCTION

- To check whether the information such as the idle learned value and so on is stored in the memory of the engine-A/T-ECU.

TROUBLE JUDGMENT**Check Condition**

- Ignition switch is in ON position.

Judgement Criterion

- The latest learned data that was flashed while the ignition switch was in OFF position are not stored correctly

PROBABLE CAUSE

- Failed the engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0606: Microcomputer Malfunction System

FUNCTION

- The engine-A/T-ECU check whether the micro-computer, which performs the drive control of the throttle valve, is normal.

TROUBLE JUDGMENT**Check Condition**

- Ignition switch is ON position.

Judgment Criterion

- Malfunction of the microcomputer.

Check Conditions

- Ignition switch is in ON position.
- Battery voltage is 6.3 V or more.

Judgment Criteria

- Throttle position sensor output voltage is 4.1 V or less.

or

- Malfunction of the main microcomputer basic voltage.

Check Conditions

- Ignition switch is ON position.

- Throttle position sensor (main) output voltage is between 0.4 and 4.8 V.

Judgment Criterion

- Malfunction of the throttle position sensor (main) input interface.

PROBABLE CAUSE

- Failed the engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

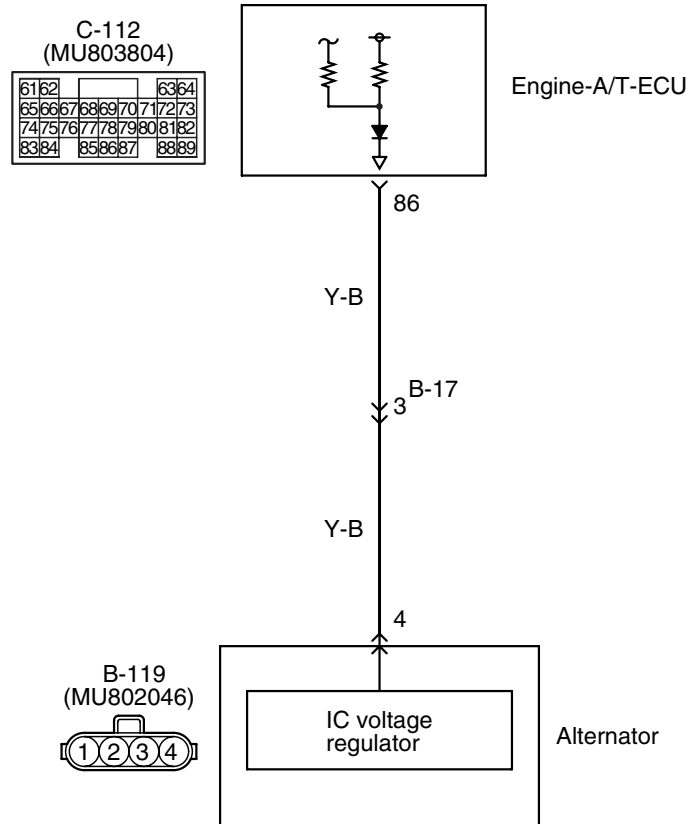
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P0622: Alternator FR Terminal System

Alternator 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 PU: Purple

AK305598AC

OPERATION

- The energized state of the alternator field coil is inputted from the alternator (terminal No. 4) to the engine-A/T-ECU (terminal No. 86).

FUNCTION

- A signal of the power supply duty ratio for the alternator field coil is inputted to the engine-A/T-ECU.
- In response to the signal, the engine-A/T-ECU detects the alternator output current and controls the idling speed according to the output current (electric load).

TROUBLE JUDGMENT

Check Condition

- Engine speed is 50 r/min or more.

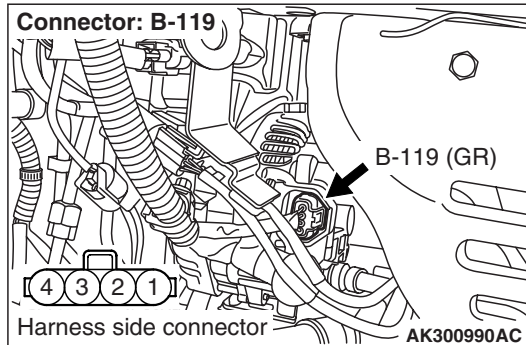
Judgment Criterion

- Input voltage from the alternator FR terminal is system voltage for 20 seconds.

PROBABLE CAUSE

- Failed alternator
- Open/short circuit in alternator FR terminal circuit or loose connector contact
- Failed engine-A/T-ECU

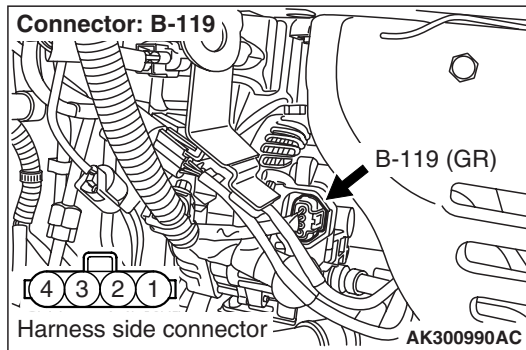
DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-119 alternator connector

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Perform voltage measurement at B-119 alternator connector.

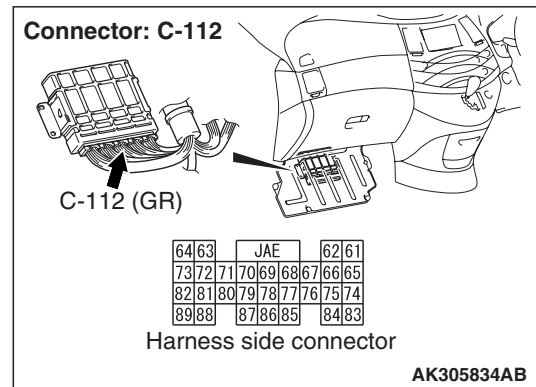
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 4 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

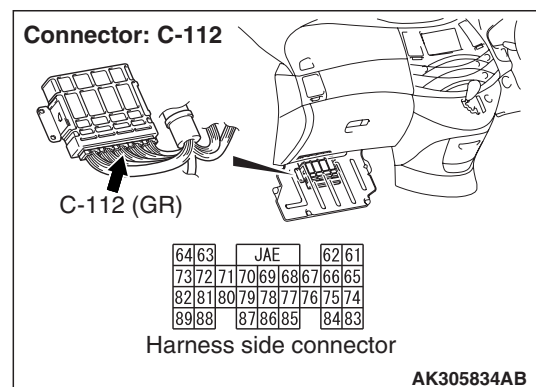
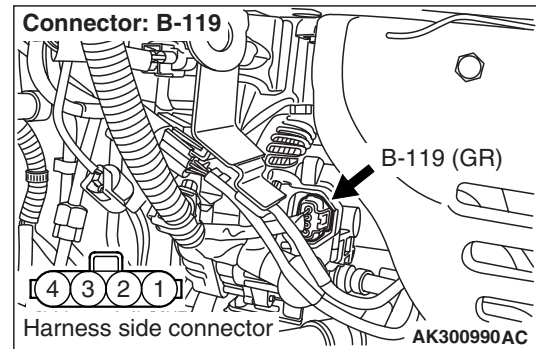
NO : Go to Step 3 .

STEP 3. Connector check: C-112 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Check harness between B-119 (terminal No. 4) alternator connector and C-112 (terminal No. 86) engine-A/T-ECU connector.

NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

- Check output line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair.

STEP 5. M.U.T.-III diagnosis code

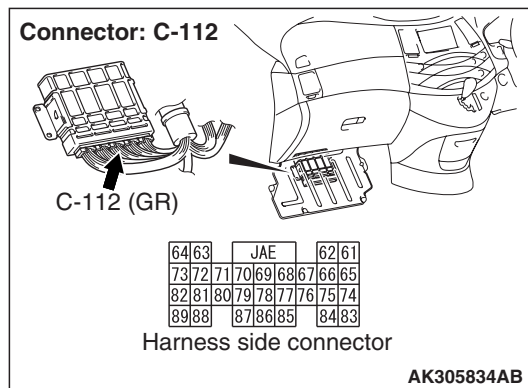
- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 6. Perform voltage measurement at C-112 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Engine: Idle after warm-up
- Transmission: P range
- Radiator fan: Inactive
- Voltage between terminal No. 86 and earth.

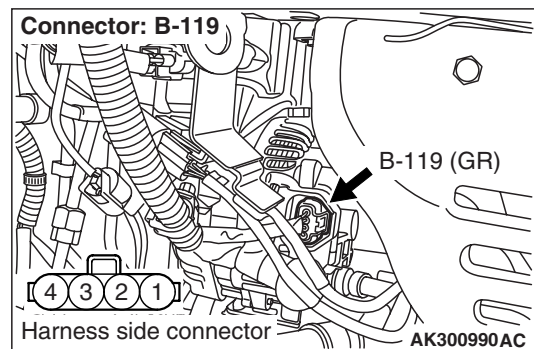
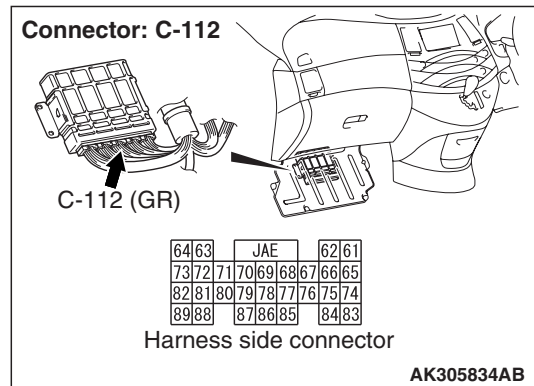
OK: Switching the headlamps to ON from OFF causes the voltage to fall.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Go to Step 5 .

STEP 7. Check harness between B-119 (terminal No. 4) alternator connector and C-112 (terminal No. 86) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair.

STEP 8. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace alternator.

NO : Intermittent malfunction (Refer to Group 00 – How to Use troubleshooting/Inspection Service Points [P.00-5](#)).

Code NO. P0630: VEHICLE IDENTIFICATION NUMBER (VIN) MALFUNCTION

FUNCTION

- An engine-A/T-ECU checks whether a vehicle identification number (VIN) is stored or not.

TROUBLE JUDGMENT**Check Conditions**

- Ignition switch is in ON position.
- EEP ROM is normal.

Judgement Criterion

- Vehicle identification number (VIN) not entered.

PROBABLE CAUSE

- Failed the engine-A/T-ECU

DIAGNOSIS

STEP 1. Entered vehicle identification number (VIN) confirmed.**Q: Is a vehicle identification number (VIN) entered?**

YES : Go to Step 2 .

NO : Go to Step 3 .

STEP 2. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A Ignition Switch Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 3. After a vehicle identification number (VIN) is entered, confirm the diagnosis code again.

- Procedure for entering vehicle identification number (VIN) [Refer to GROUP 00 – How to Perform Vehicle Identification Number (VIN) Writing [P.00-25](#)].
- After a vehicle identification number (VIN) is entered, confirm again the diagnosis code is outputted.

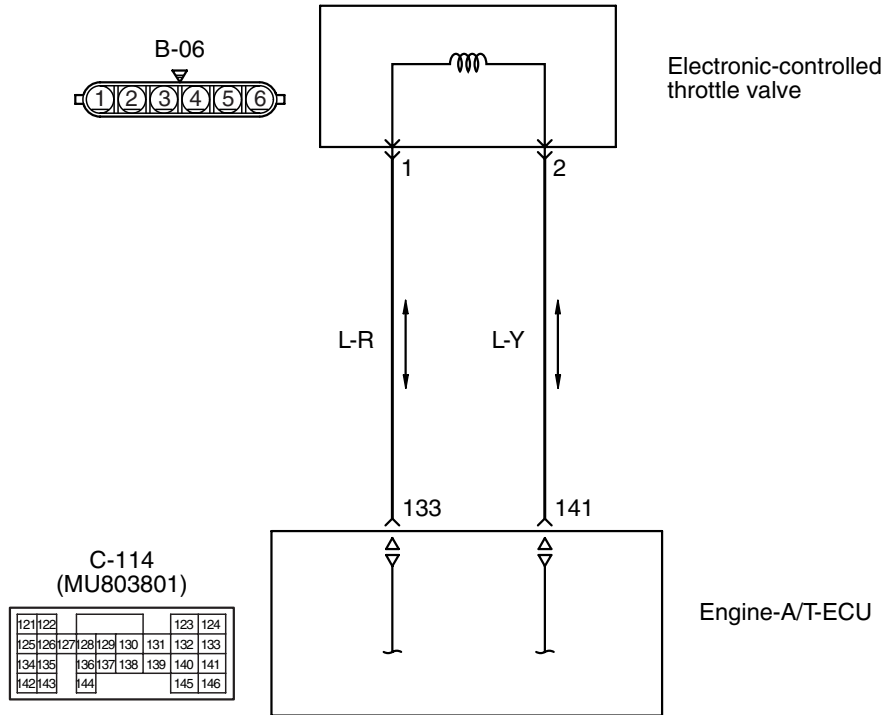
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P0638: Throttle Valve Control Servo Circuit Range/Performance Problem

Throttle valve control servo 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

AK305850AB

OPERATION

- The electric current from the engine-A/T-ECU (terminal No. 133 and No. 141) to the throttle valve control servo (terminal No. 1 and No. 2) is controlled.

FUNCTION

- Engine-A/T-ECU checks the electronic-controlled throttle system for abnormal conditions.

TROUBLE JUDGMENT

Check Conditions

- Battery positive voltage is 8.3 V or more.
- Ignition switch is in ON position.

Judgement Criteria

- The drive current of the throttle valve control servo is not normal.

or

- The temperature in the drive circuit of the throttle valve control servo is not normal.

Check Conditions

- Ignition switch is in ON position.
- Throttle position sensor (main) is normal.

Judgement Criterion

- Throttle position sensor (main) mid opening learning value is 4.0 V or more.

PROBABLE CAUSE

- Failed throttle valve return spring.
- Failed throttle valve operation.
- Failed throttle valve control servo.
- Open/short circuit in throttle valve control servo circuit or loose connector contact.
- Failed engine-A/T-ECU.

DIAGNOSIS

STEP 1. Check throttle body.

- Check whether the throttle valve return spring is normal.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Replace throttle body assembly.

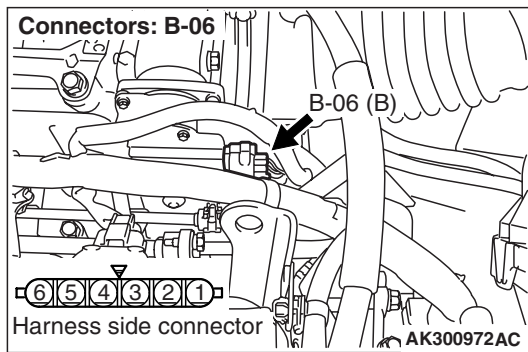
STEP 2. Check throttle valve control servo relay itself.

- Check throttle valve control servo (Refer to [P.13B-292](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

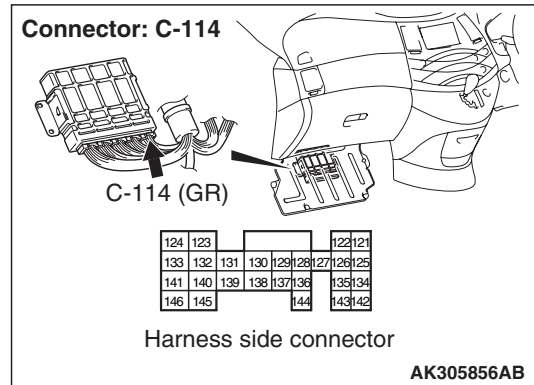
NO : Replace throttle body assembly.

STEP 3. Connector check: B-06 electronic-controlled throttle valve connector

Q: Is the check result normal?

YES : Go to Step 4 .

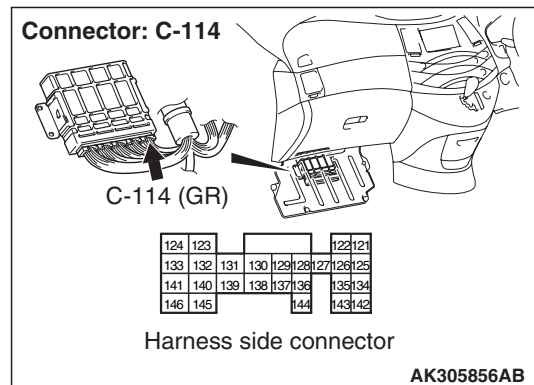
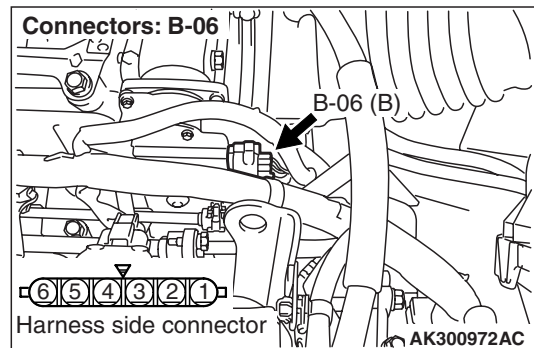
NO : Repair or replace.

STEP 4. Connector check: C-114 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair or replace.

STEP 5. Check harness between B-06 (terminal No. 2) electronic-controlled throttle valve connector and C-114 (terminal No. 141) engine-A/T-ECU connector.

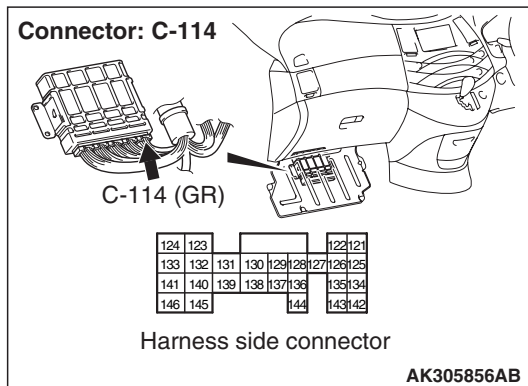
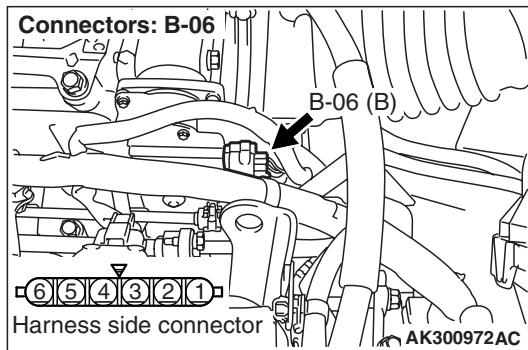
- Check output line for short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. Check harness between B-06 (terminal No. 1) electronic-controlled throttle valve connector and C-114 (terminal No. 133) engine-A/T-ECU connector.



- Check output line for short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. M.U.T.-III diagnosis code

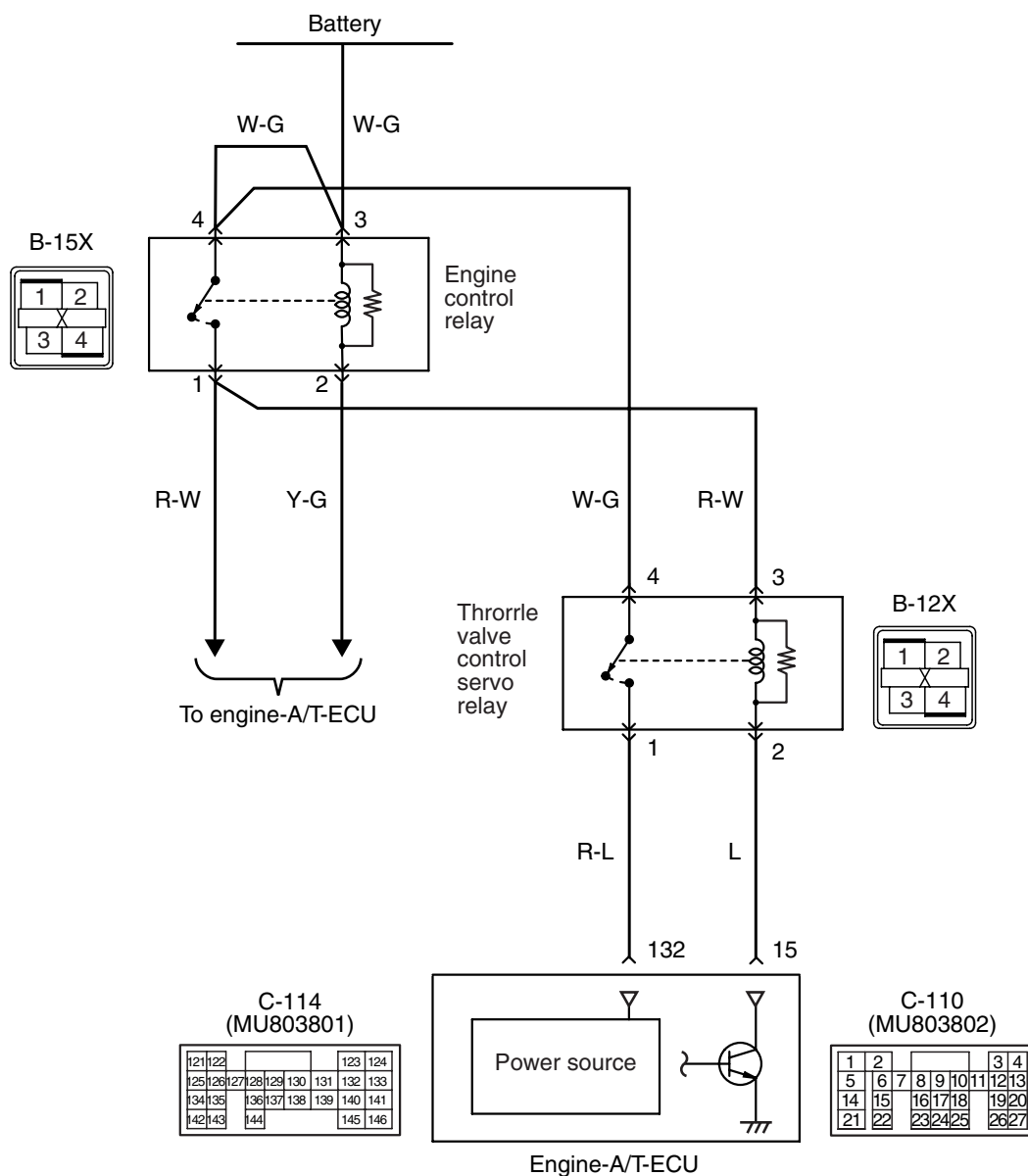
- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Throttle valve control servo power 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

AK305852AB

OPERATION

- Battery voltage is applied to the throttle valve control servo relay terminal (terminal No. 4).
- Battery voltage is applied to the throttle valve control servo relay terminal (terminal No. 3) from the engine control relay (terminal No. 1).

FUNCTION

- When the ignition switch ON signal is input into the engine-A/T-ECU, the engine-A/T-ECU turns ON the throttle valve control servo.

TROUBLE JUDGMENT

Check Condition

- Ignition switch is in ON position.

Judgement Criterion

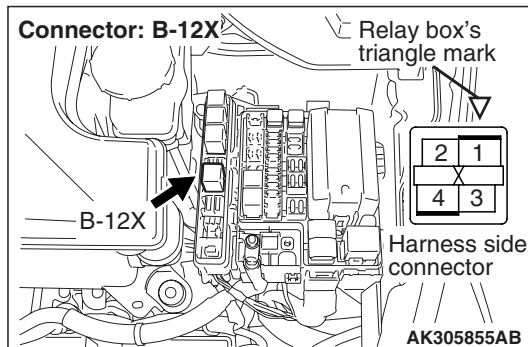
- The voltage to detect a short circuit to the earth is 4.0 V or less.

PROBABLE CAUSE

- Failed throttle valve control servo relay
- Open/short circuit in throttle valve control servo circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS

STEP 1. Connector check: B-12X throttle valve control servo relay connector



Q: Is the check result normal?

- YES :** Go to Step 2 .
NO : Repair or replace.

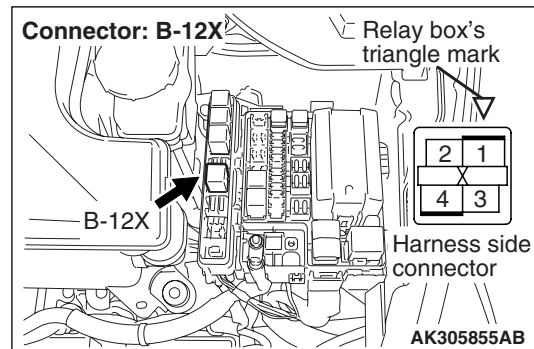
STEP 2. Check throttle valve control servo relay itself.

- Check throttle valve control servo relay itself (Refer to P.13B-287).

Q: Is the check result normal?

- YES :** Go to Step 3 .
NO : Replace throttle valve control servo relay.

STEP 3. Perform voltage measurement at B-12X throttle valve control servo relay connector.



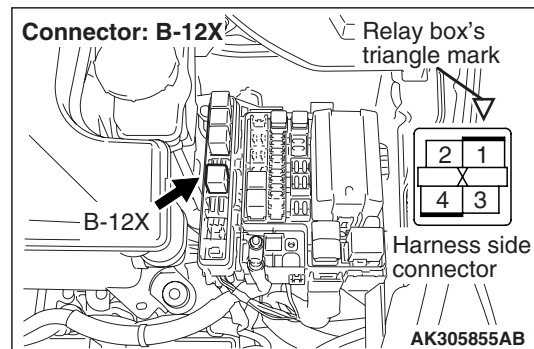
- Remove relay, and measure at relay box side.
- Voltage between terminal No. 4 and earth.

OK: System voltage

Q: Is the check result normal?

- YES :** Go to Step 4 .
NO : Check and repair harness between B-12X (terminal No. 4) throttle valve control servo relay connector and battery.
- Check power supply line for open/short circuit.

STEP 4. Perform voltage measurement at B-12X throttle valve control servo relay connector.

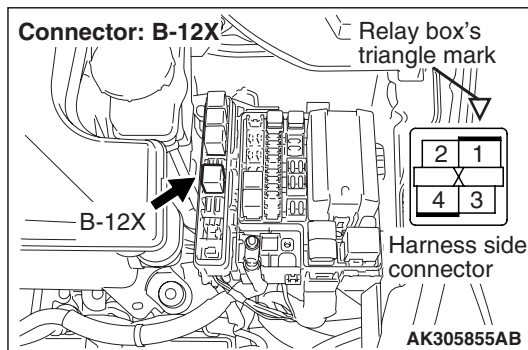
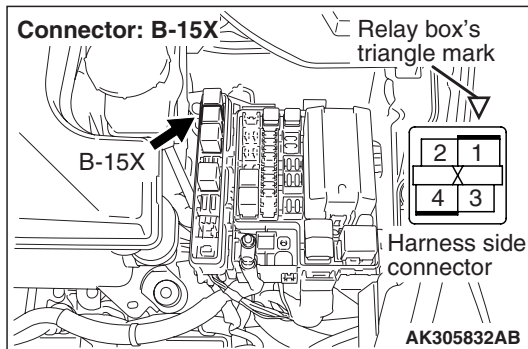


- Remove relay, and measure at relay box side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

OK: System voltage

Q: Is the check result normal?

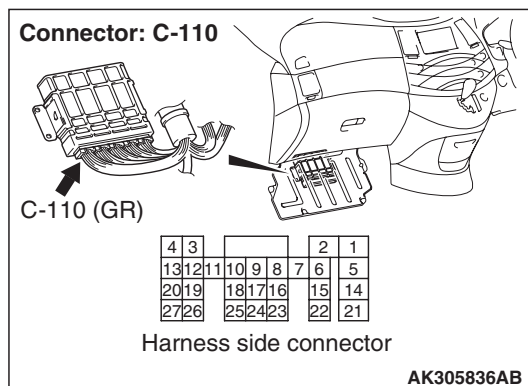
- YES :** Go to Step 6 .
NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector**Q: Is the check result normal?**

YES : Check and repair harness between B-15X (terminal No. 1) engine control relay connector and B-12X (terminal No. 3) throttle valve control servo relay connector.

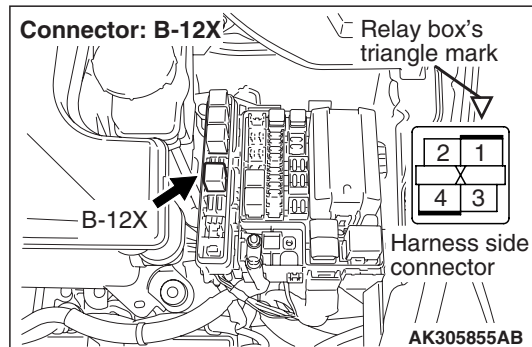
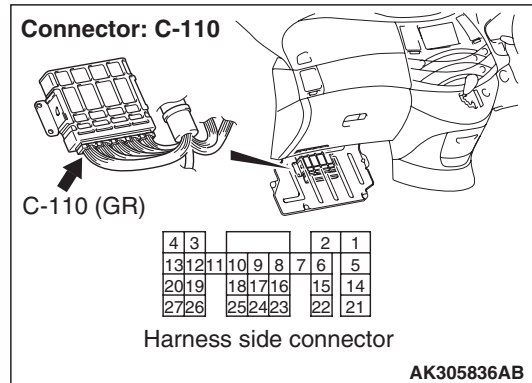
- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 6. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?**

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Perform voltage measurement at C-110 engine-A/T-ECU connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 15 and earth.

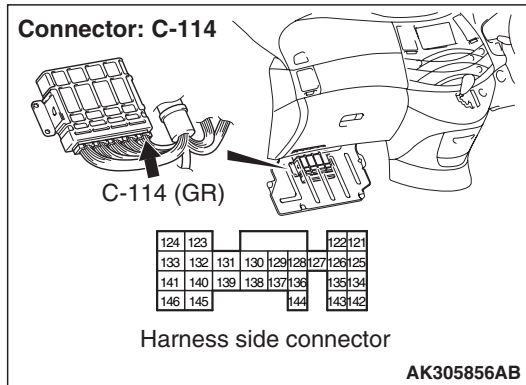
OK: System voltage**Q: Is the check result normal?**

YES : Go to Step 8 .

NO : Check and repair harness between B-12X (terminal No. 2) throttle valve control servo relay connector and C-110 (terminal No. 15) engine-A/T-ECU connector.

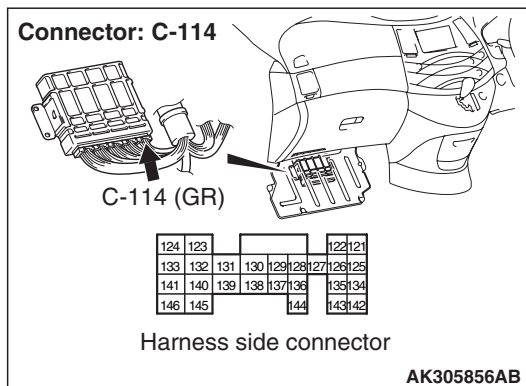
- Check earthing line for open/short circuit.

STEP 8. Connector check: C-114 engine-A/T-ECU connector



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

STEP 9. Perform voltage measurement at C-114 engine-A/T-ECU connector.

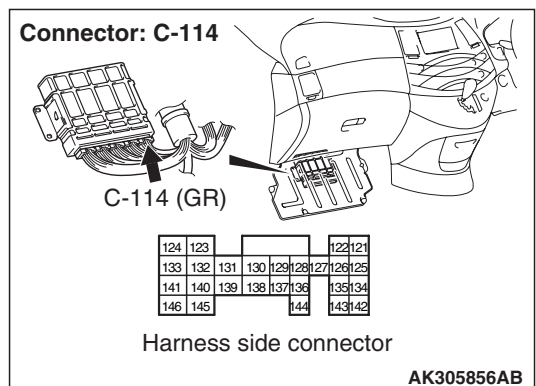
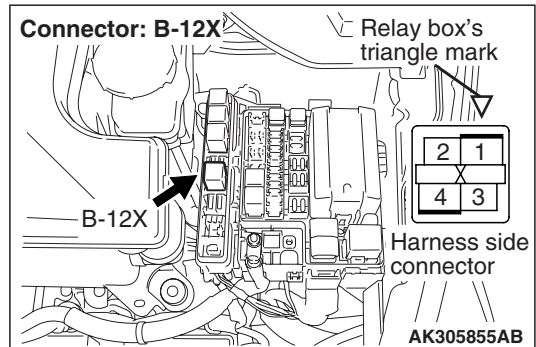


- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 132 and earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 12 .
NO : Go to Step 10 .

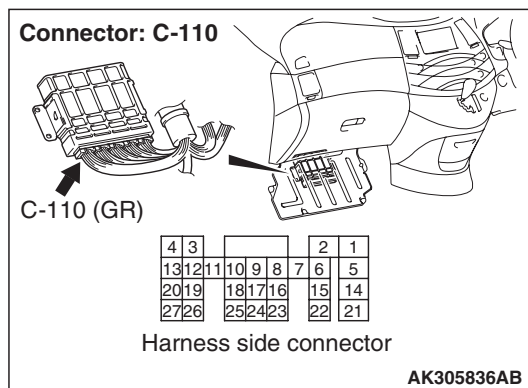
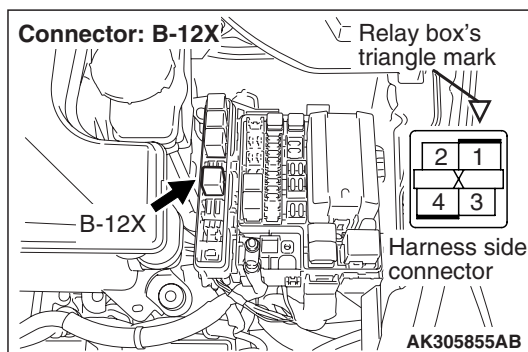
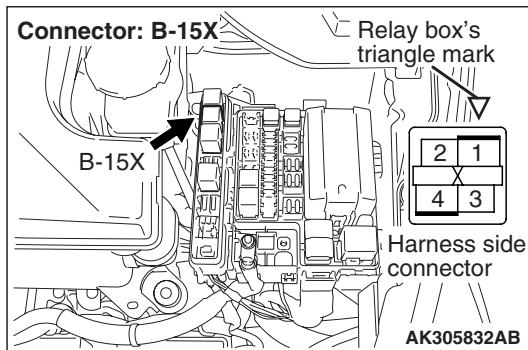
STEP 10. Check harness between B-12X (terminal No. 1) throttle valve control servo relay connector and C-114 (terminal No. 132) engine-A/T-ECU connector.



- Check output line for open/short circuit.

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

STEP 11. Check harness between B-15X (terminal No. 1) engine control relay connector and B-12X (terminal No. 3) throttle valve control servo relay connector.



- Check output line for damage.

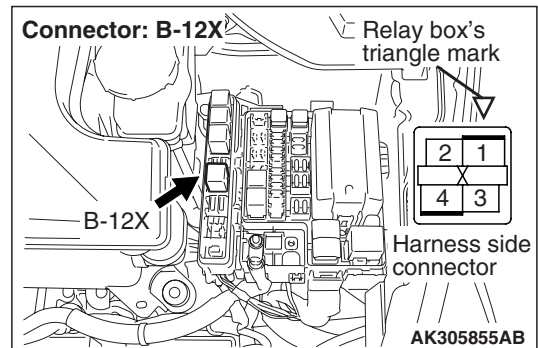
Q: Is the check result normal?

YES : Check and repair harness between B-12X (terminal No. 2) throttle valve control servo relay connector and C-110 (terminal No. 15) engine-A/T-ECU connector.

- Check earthing line for damage.

NO : Repair.

STEP 12. Check harness between B-12X (terminal No. 4) throttle valve control servo relay connector and battery.



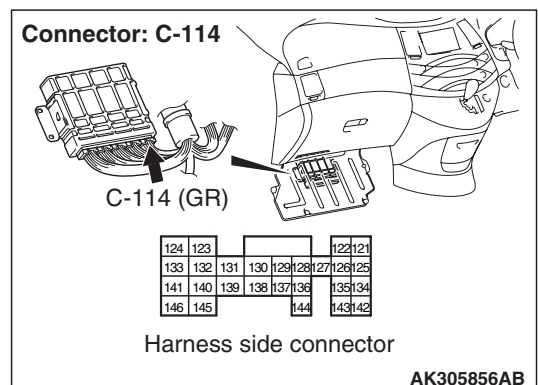
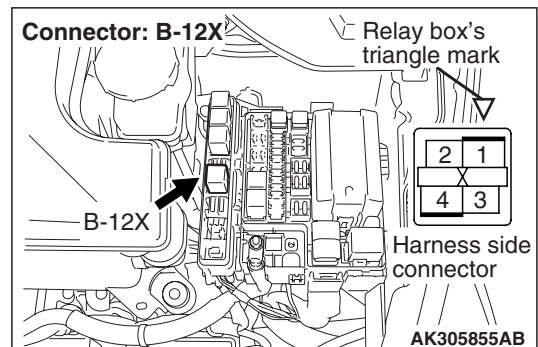
- Check power supply line for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 13 .

NO : Repair.

STEP 13. Check and repair harness between B-12X (terminal No. 1) throttle valve control servo relay connector and C-114 (terminal No. 132) engine-A/T-ECU connector.



- Check power supply line for damage.

Q: Is the harness connector in good condition?

YES : Go to Step 14 .

NO : Repair.

STEP 14. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code

Q: Is the diagnosis code set?

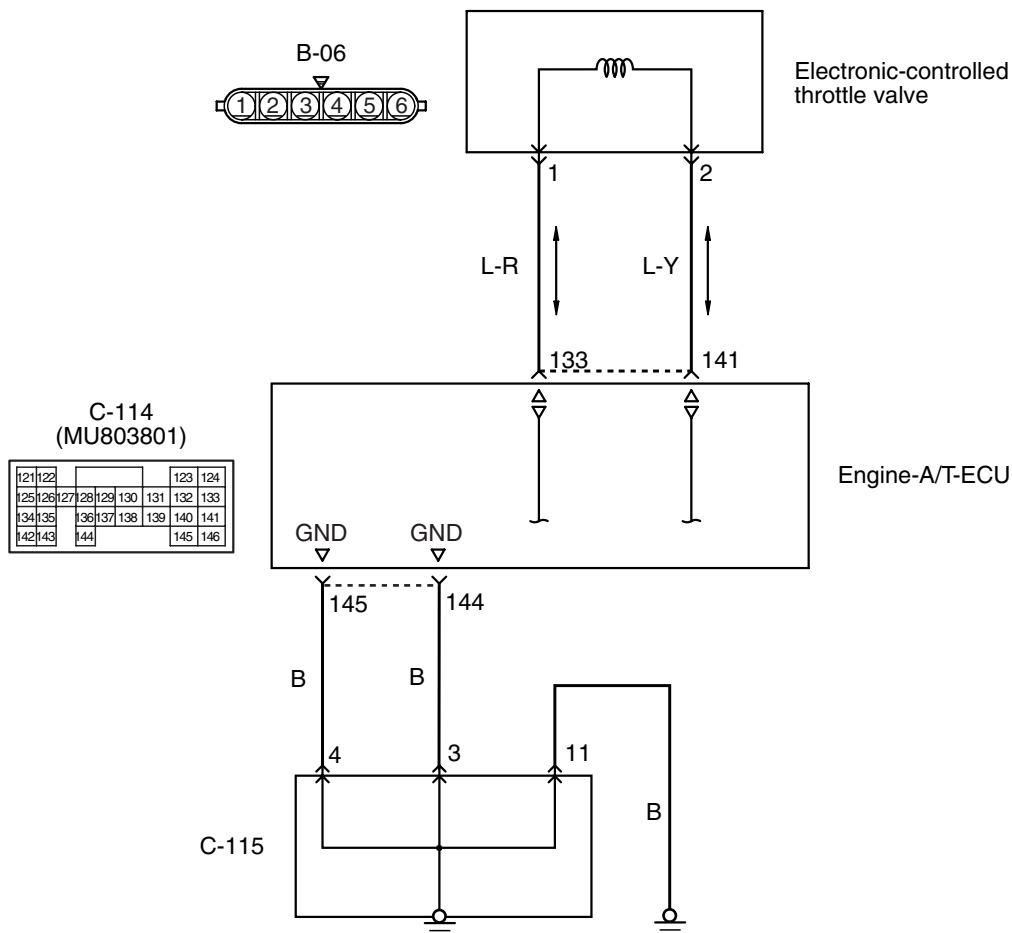
YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table

[P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P1122: Throttle Valve Control Servo Connector System

Throttle valve control servo 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

OPERATION

- The electric current from the engine-A/T-ECU (terminal No. 133 and No. 141) to the throttle valve control servo (terminal No. 1 and No. 2) is controlled.
- The engine-A/T-ECU (terminal No. 144 and No. 145) earths the voltage applied on the throttle valve control servo to the vehicle body.

FUNCTION

- The engine-A/T-ECU controls the throttle valve-opened degree by varying the direction and the amount in the electric current going through the servo coil.

TROUBLE JUDGMENT**Check Conditions**

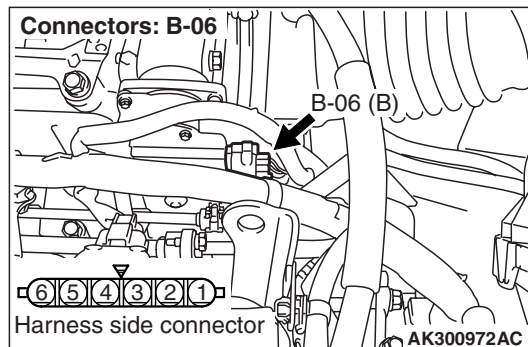
- Battery voltage is 8.3 V or more.
- Ignition switch is in ON position.

Judgment Criterion

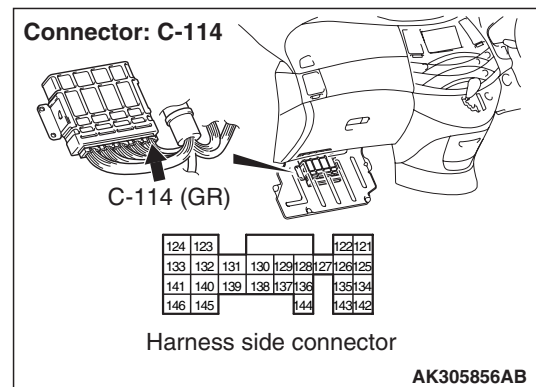
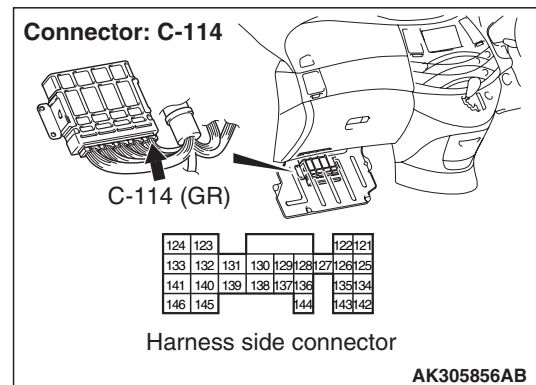
- The drive current of the throttle valve control servo is not normal.

PROBABLE CAUSE

- Failed throttle valve control servo
- Open/short circuit in throttle valve control servo circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: B-06
electronic-controlled throttle valve connector****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Repair or replace.**STEP 2. Check throttle valve control servo**

- Check throttle valve control servo (Refer to P.13B-292).

Q: Is the check result normal?**YES :** Go to Step 3 .**NO :** Replace throttle body assembly.**STEP 3. Connector check: C-114 engine-A/T-ECU
connector****Q: Is the check result normal?****YES :** Go to Step 4 .**NO :** Repair or replace.**STEP 4. Perform resistance measurement at
C-114 engine-A/T-ECU connector.**

- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 144 and earth, also between terminal No. 145 and earth.

OK: 2 Ω or less

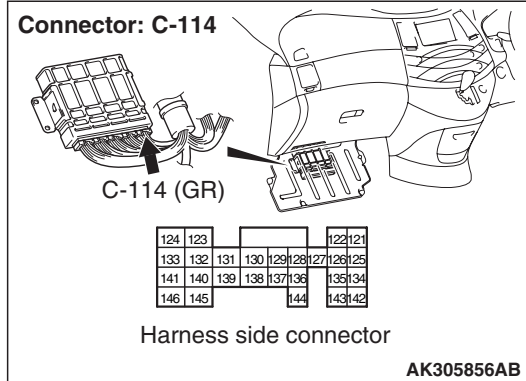
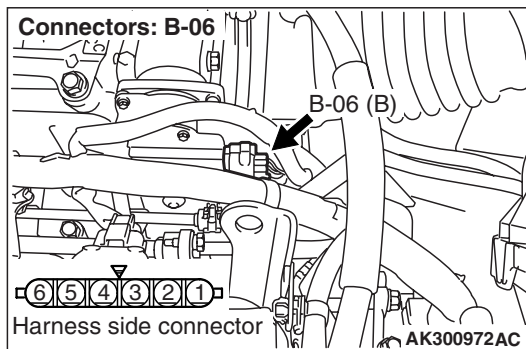
Q: Is the check result normal?

YES : Go to Step 5 .

NO : Check intermediate connector C-115 and repair if necessary. If intermediate connector is normal, check and repair harness between C-114 (terminal No. 144 and No. 145) engine-A/T-ECU connector and body earth.

- Check earthing line for open circuit and damage.

STEP 5. Check harness between B-06 (terminal No. 2) electronic-controlled throttle valve connector and C-114 (terminal No. 141) engine-A/T-ECU connector.



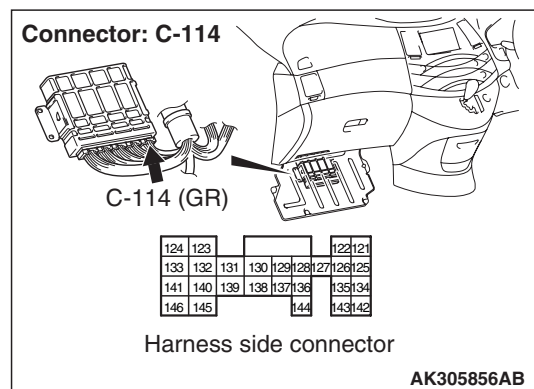
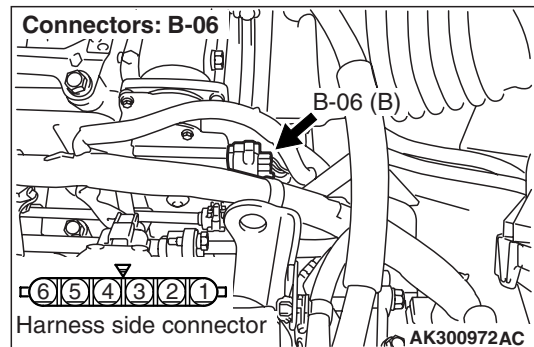
- Check output line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. Check harness between B-06 (terminal No. 1) electronic-controlled throttle valve connector and C-114 (terminal No. 133) engine-A/T-ECU connector.



- Check output line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 7. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

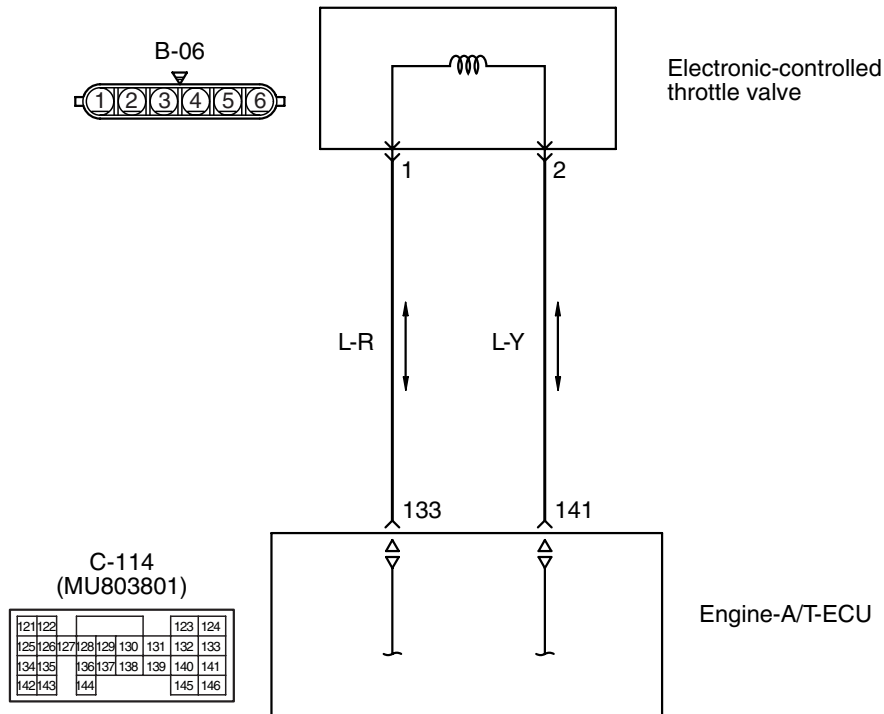
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P1221: Throttle Valve Position Feedback System

Throttle valve control servo 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

AK305850AB

OPERATION

- Controls the current that is applied from the engine-A/T-ECU (terminals No. 133, No. 141) to the electronic-controlled throttle valve (terminals No. 1, No. 2).

FUNCTION

- The engine-A/T-ECU controls the throttle valve-opened degree to become the designed open degree.

TROUBLE JUDGMENT**Check Conditions**

- Ignition switch is in ON position.
- Battery voltage is 8.3 V or more.

- While the electric currents are going through the throttle valve control servo.
- Throttle position sensor (main) output voltage is between 0.2 and 4.8 V.
- When the variation in the throttle valve-opened degree is small.

Judgment Criterion

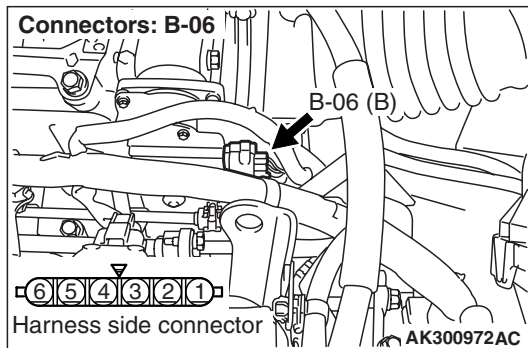
- The difference between the throttle position sensor (main) output voltage and the designed one is 0.5 V or more.

PROBABLE CAUSE

- Failed throttle valve operation
- Failed throttle valve control servo
- Open/short circuit in throttle valve control servo circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-06 electronic-controlled throttle valve connector



Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair or replace.

STEP 2. Check throttle valve control servo.

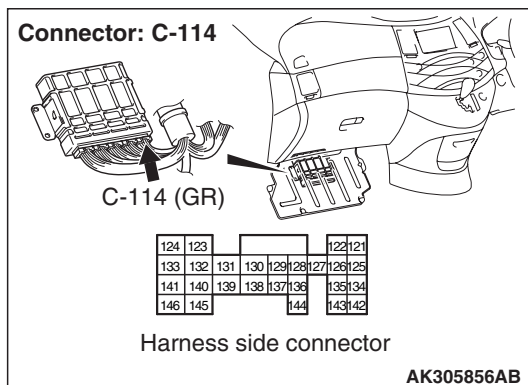
- Check throttle valve control servo (Refer to [P.13B-292](#)).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Replace throttle body assembly.

STEP 3. Connector check: C-114 engine-A/T-ECU connector

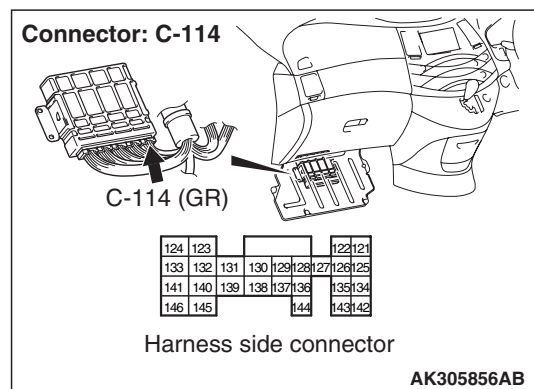
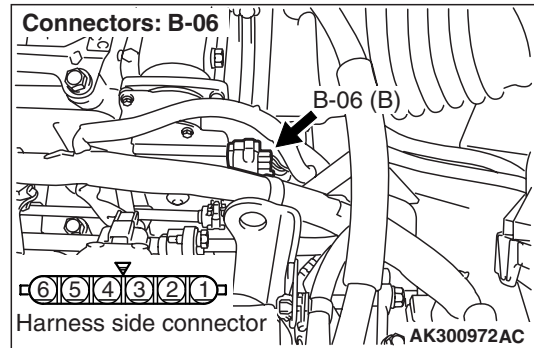


Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Check harness between B-06 (terminal No. 1) electronic-controlled throttle valve connector and C-114 (terminal No. 133) engine-A/T-ECU connector.



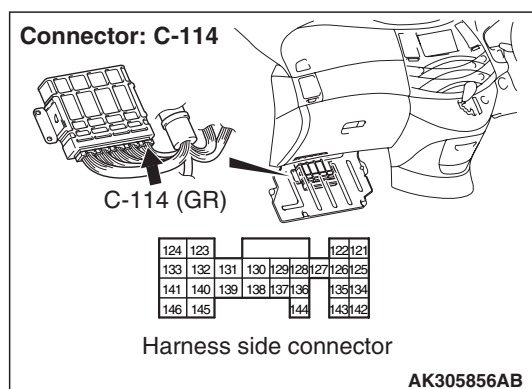
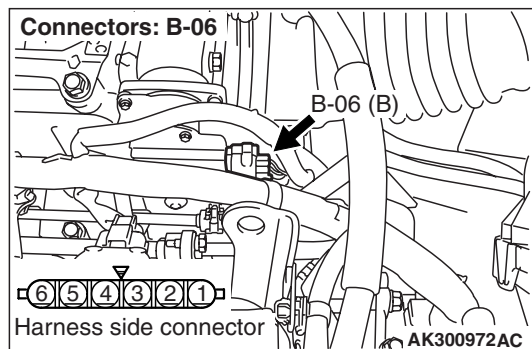
- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair.

STEP 5. Check harness between B-06 (terminal No. 2) electronic-controlled throttle valve connector and C-114 (terminal No. 141) engine-A/T-ECU connector.



- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair.

STEP 6. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P1223: Communication Line System with The Throttle Valve Controller

FUNCTION

- The engine-A/T-ECU checks whether the communication to the throttle valve controller is normal.

TROUBLE JUDGMENT

Check Conditions

- Battery voltage is 6.3 V or more.
- Not the communication error is from the throttle valve controller to the engine-A/T-ECU.

Judgment Criterion

- The communication error is from the engine-A/T-ECU to the throttle valve controller.

Check Conditions

- Battery voltage is 6.3 V or more.
- During not the engine cranking

Judgment Criterion

- The communication error is from the throttle valve controller to the engine-A/T-ECU.

PROBABLE CAUSE

- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

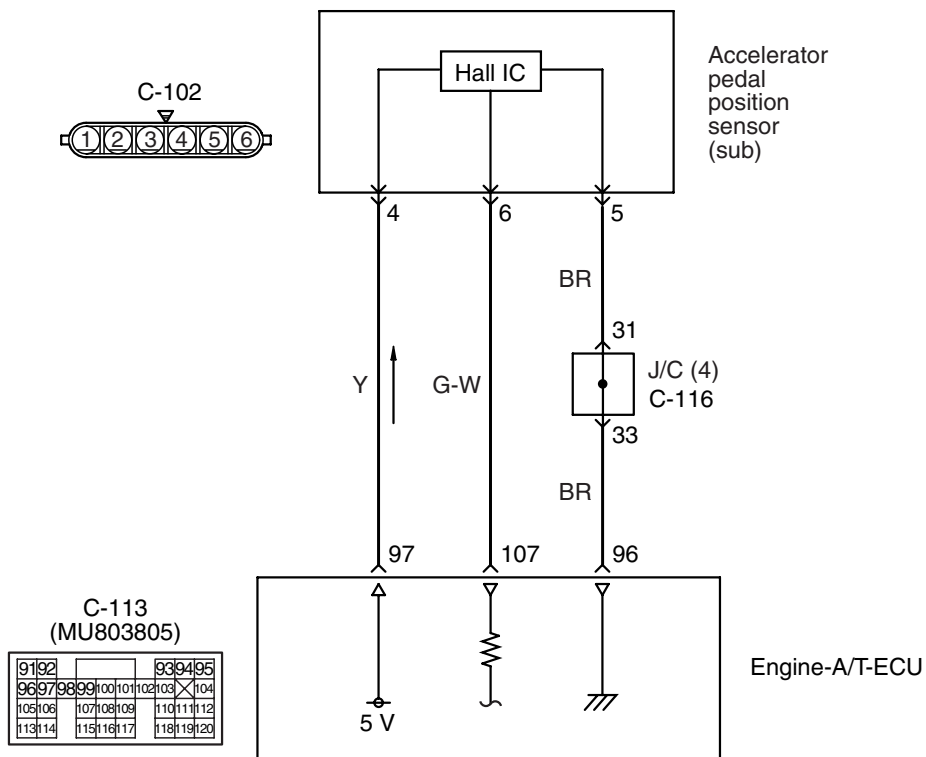
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Code No. P1225: Accelerator Pedal Position Sensor (Sub) System

Accelerator pedal position sensor (sub) 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

AK305854AB

OPERATION

- A power voltage of 5 V is applied to the accelerator pedal position sensor (terminal No. 4) from the engine-A/T-ECU (terminal No. 97).
- The power voltage is earthed to the engine-A/T-ECU (terminal No. 96) from the accelerator pedal position sensor (terminal No. 5).
- The sensor signal is inputted to the engine-A/T-ECU (terminal No. 107) from the accelerator pedal position sensor output terminal (terminal No. 6).

FUNCTION

- The accelerator pedal position sensor (sub) outputs voltage which corresponds to the accelerator pedal depression.
- The engine-A/T-ECU checks whether the voltage is within a specified range.

TROUBLE JUDGMENT

Check Condition

- Ignition switch is in ON position.

Judgment Criteria

- Accelerator pedal position sensor (sub) output voltage is 0.2 V or less.

or

- Accelerator pedal position sensor (sub) output voltage is 4.8 V or more.

Check Conditions

- Ignition switch is in ON position.
- Accelerator pedal position sensor (main) output voltage is between 0.5 and 4.5 V.
- Accelerator pedal position sensor (sub) output voltage is between 0.5 and 4.5 V.

Judgment Criteria

- When the variation in the accelerator pedal-opened degree is small, the voltage obtained through the following equation is 1 V or more.

[Accelerator pedal position sensor (sub) output voltage +0.3 V – Accelerator pedal position sensor (main) output voltage]

or

- When the variation in the accelerator pedal-opened degree is small, the voltage obtained through the following equation is 1 V or more.

[Accelerator pedal position sensor (main) output voltage +0.3 V – Accelerator pedal position sensor (sub) output voltage]

PROBABLE CAUSE

- Failed accelerator pedal position sensor
- Open/short circuit in accelerator pedal position sensor (sub) circuit or loose connector contact
- Harness damage in accelerator pedal position sensor (main) circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 77: Accelerator pedal position sensor (sub)

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Go to Step 3 .

STEP 2. M.U.T.-III data list

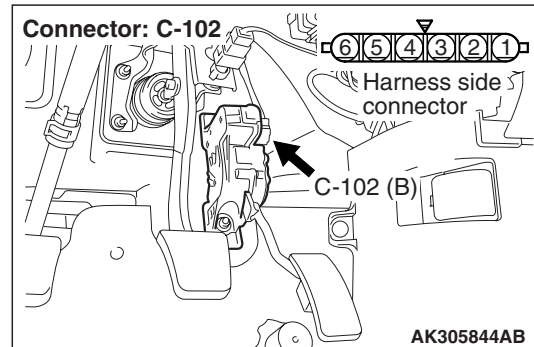
- Refer to Data List Reference Table [P.13B-260](#).
 - Item 78: Accelerator pedal position sensor (main)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Check accelerator pedal position sensor (main) system (Refer to Code No. P0220 [P.13B-106](#)).

STEP 3. Connector check: C-102 accelerator pedal position sensor connector

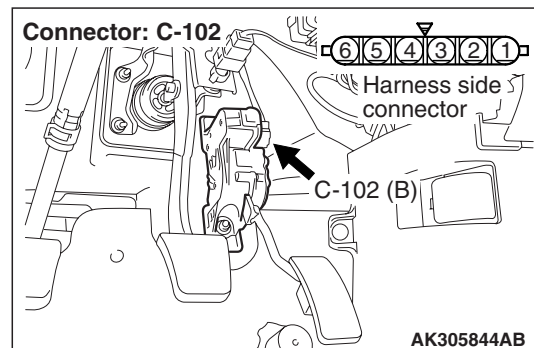


Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at C-102 accelerator pedal position sensor connector.



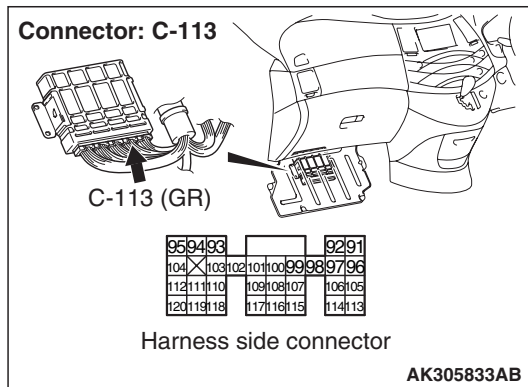
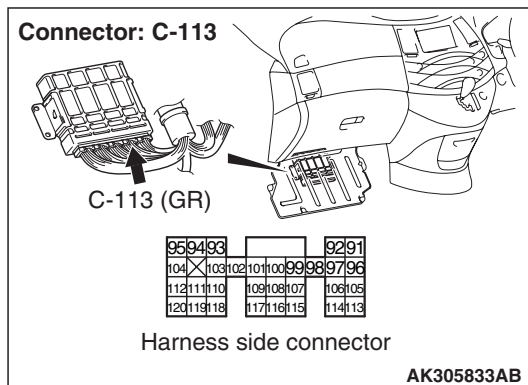
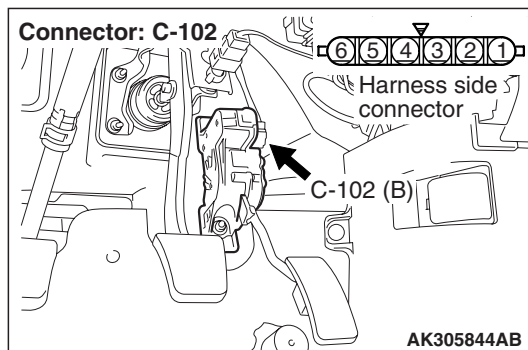
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 4 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 8 .

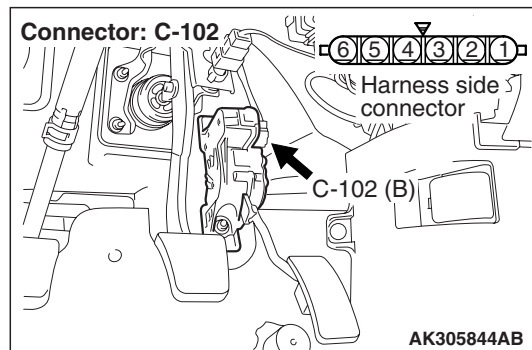
NO : Go to Step 5 .

STEP 5. Connector check: C-113 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 6 .**NO :** Repair or replace.**STEP 6. Check harness between C-102 (terminal No. 4) accelerator pedal position sensor connector and C-113 (terminal No. 97) engine-A/T-ECU connector.**

- Check power supply line for open/short circuit.

Q: Is the check result normal?**YES :** Go to Step 7 .**NO :** Repair.**STEP 7. M.U.T.-III data list**

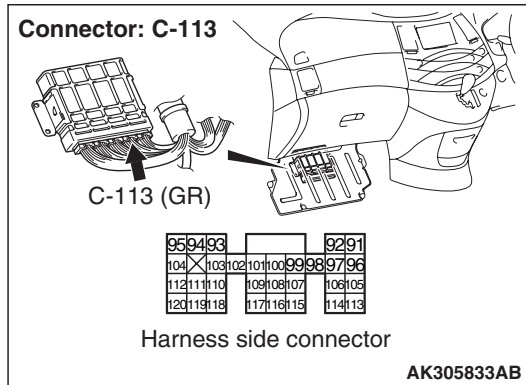
- Refer to Data List Reference Table [P.13B-260](#).
 - Item 77: Accelerator pedal position sensor (sub)

Q: Is the check result normal?**YES :** Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).**NO :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**STEP 8. Perform resistance measurement at C-102 accelerator pedal position sensor connector.**

- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 5 and earth.
2 Ω or less

Q: Is the check result normal?**YES :** Go to Step 12 .**NO :** Go to Step 9 .

STEP 9. Connector check: C-113 engine-A/T-ECU connector

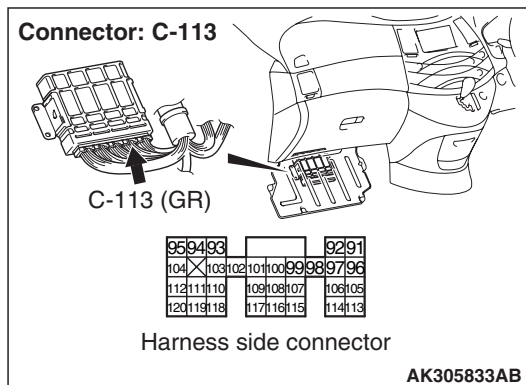
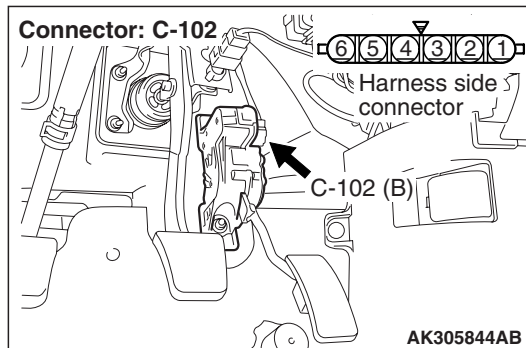


Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair or replace.

STEP 10. Check harness between C-102 (terminal No. 5) accelerator pedal position sensor connector and C-113 (terminal No. 96) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III data list

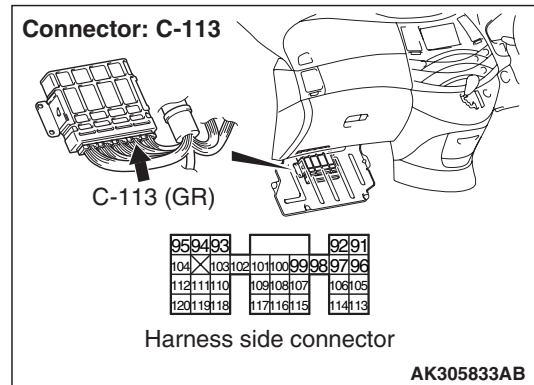
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 77: Accelerator pedal position sensor (sub)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 12. Connector check: C-113 engine-A/T-ECU connector

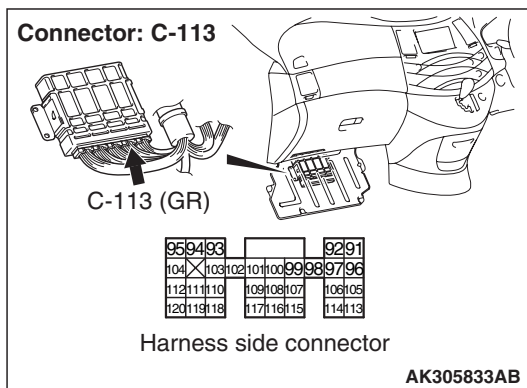
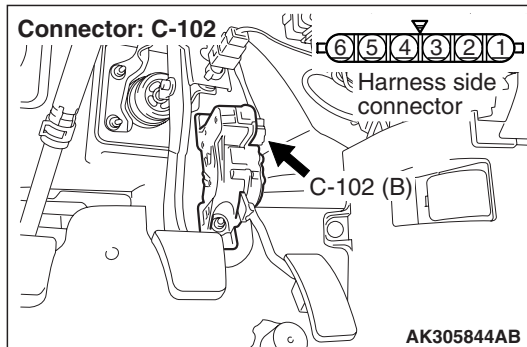


Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair or replace.

STEP 13. Check harness between C-102 (terminal No. 4) accelerator pedal position sensor connector and C-113 (terminal No. 97) engine-A/T-ECU connector.



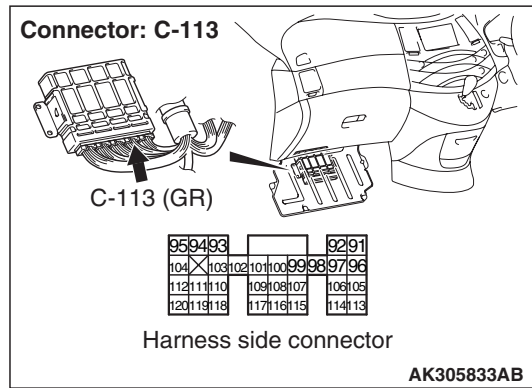
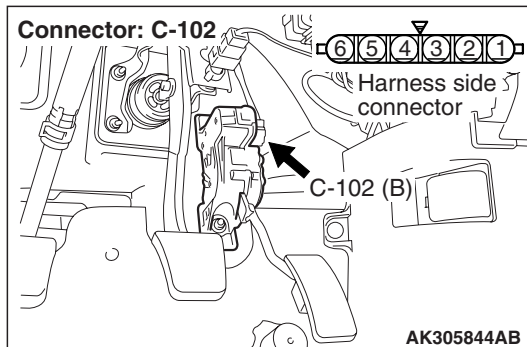
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Check harness between C-102 (terminal No. 6) accelerator pedal position sensor connector and C-113 (terminal No. 107) engine-A/T-ECU connector.



- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 77: Accelerator pedal position sensor (sub)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace accelerator pedal assembly. Then go to Step 16 .

STEP 16. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

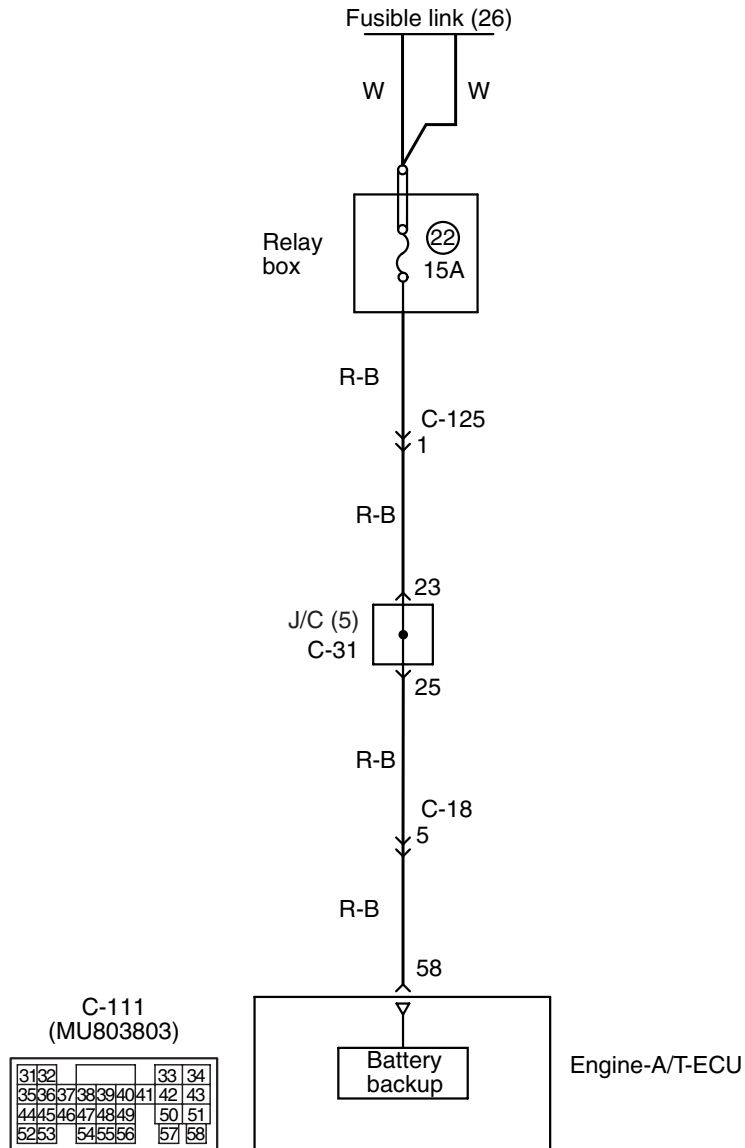
Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Code No. P1603: Battery Backup Circuit Malfunction

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

AK501579AB

OPERATION

- Power is directly supplied to the engine-A/T-ECU (terminal No. 58) from the battery.

FUNCTION

- The engine-A/T-ECU is check the open circuit of battery backup line.

TROUBLE JUDGMENT**Check Condition**

- Ignition switch is in ON position.

Judgment Criterion

- The information of the backup RAM, which was set when the previous ignition switch was in OFF position, is not stored.

PROBABLE CAUSE

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

DIAGNOSIS PROCEDURE**STEP 1. Check the battery condition.**

Q: Was the battery terminal removed just before reading the diagnosis code?

YES : Go to Step 2 .

NO : Go to Step 3 .

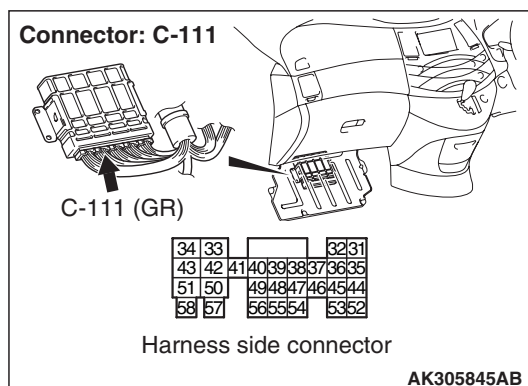
STEP 2. M.U.T.-III diagnosis code

- Temporarily place the ignition switch in LOCK (OFF) position, and 10 seconds after that, place it in ON position again.

Q: Is the diagnosis code P1603 set?

YES : Go to Step 3 .

NO : Check end.

STEP 3. Perform voltage measurement at C-111 engine-A/T-ECU connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 58 and earth.

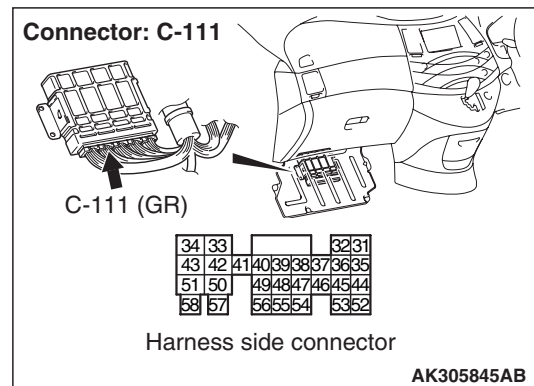
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Check intermediate connector C-18, C-31 and C-125, and repair if necessary. If intermediate connector is normal, check and repair harness between battery and C-111 (terminal No. 58) engine-A/T-ECU connector.

- Check power supply line for open/short circuit.

STEP 4. Connector check: C-111 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair or replace.

STEP 5. M.U.T.-III diagnosis code

- Reconfirmation of diagnosis code.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

Code No. U1073: Bus Off

⚠ CAUTION

If diagnosis code U1073 is output from engine-A/T-ECU, surely perform CAN busline diagnosis.

⚠ CAUTION

Replace ECU after certainly confirming that the communication circuits are normal.

TROUBLE JUDGMENT

Check Condition

- All the time

Judgment Criterion

- When the buss off error is detected.

COMMENT ON TROUBLE SYMPTOM

- The failure is possibly caused by malfunction of the harness and connector in CAN busline or by malfunction in engine-A/T-ECU.

PROBABLE CAUSE

- Failed harness and connector in CAN busline
- Failed engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III CAN bus diagnosis

- Using M.U.T.-III, perform CAN busline diagnosis.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Correct CAN busline (Refer to 54F – Diagnosis – Can Bus Diagnostics Chart [P.54F-13](#)), and then go to Step 3 .

Code No. U1102: ABS-ECU Time-out

⚠ CAUTION

If diagnosis code U1102 is output from engine-A/T-ECU, surely perform CAN busline diagnosis.

⚠ CAUTION

Replace ECU after certainly confirming that the communication circuits are normal.

TROUBLE JUDGMENT

Check Conditions

- While the cranking switch is in OFF position, or when 3 seconds pass after the cranking switch is in OFF from ON.

STEP 2. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.
1. Erase the diagnosis code being output.
 2. Ignition switch: LOCK (OFF) to ON
 3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, go to Step 3 .

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 3. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.
1. Erase the diagnosis code being output.
 2. Ignition switch: LOCK (OFF) to ON
 3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Go to Step 1 .

NO : Check end.

Judgment Criterion

- The signals cannot be received from ABS-ECU through CAN busline.

COMMENT ON TROUBLE SYMPTOM

Current malfunction

- The failure is possibly caused by malfunction of the harness and connector in CAN busline between engine-A/T-ECU and ABS-ECU, by malfunction in the power supply system of ABS-ECU, in ABS-ECU itself, in engine-A/T-ECU.

Past malfunction

- Focus on diagnosing malfunction of the harness and connector in CAN busline between engine-A/T-ECU and ABS-ECU as well as malfunction in the power supply system of ABS-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NOTE: In case of Past malfunction, M.U.T.-III CAN bus diagnosis cannot detect the failure even if there is malfunction in CAN bus, so that check CAN busline in the same way as Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)). The diagnosis codes being output to each ECU with CAN communication can narrow down the most suspected area. (Refer to GROUP54F – Diagnosis – CAN Bus Diagnostic Chart [P.54F-13](#)).

PROBABLE CAUSE

- Failed harness and connector in CAN busline
- Failed engine-A/T-ECU
- Failed ABS-ECU

DIAGNOSIS**STEP 1. M.U.T.-III CAN bus diagnosis**

- Using M.U.T.-III, perform CAN busline diagnosis.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Correct CAN busline (Refer to GROUP54F – Diagnosis – CAN Bus Diagnostic Chart [P.54F-13](#)), and then go to Step 6 .

STEP 2. M.U.T.-III other system diagnosis codes

- Confirm whether the diagnosis codes are output from ABS-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of ABS (Refer to GROUP 35B – Inspection Chart For Diagnosis Code [P.35B-7](#)).

NO : Go to Step 3 .

STEP 3. M.U.T.-III other system diagnosis codes

Confirm whether Diagnosis Code U1102: ABS-ECU time-out is output from the following ECU having CAN communication with ABS-ECU

- EPS-ECU
- Combination meter-ECU

Q: Is the diagnosis code set?

YES : . Go to Step 4 .

NO : . Go to Step 5 .

STEP 4. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.
2. Ignition switch: LOCK (OFF) to ON
3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace ABS-ECU, then go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and ABS-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 5. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.
2. Ignition switch: LOCK (OFF) to ON
3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and ABS-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 6. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.
2. Ignition switch: LOCK (OFF) to ON
3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Go to Step 1 .

NO : Check end.

Code No. U1108: Combination Meter Time-out

⚠ CAUTION

If diagnosis code U1108 is output from engine-A/T-ECU, surely perform CAN busline diagnosis.

⚠ CAUTION

Replace ECU after certainly confirming that the communication circuits are normal.

TROUBLE JUDGMENT

Check Conditions

- While the cranking switch is in OFF position, or when 3 seconds pass after the cranking switch is in OFF from ON.
- The battery voltage is 10 V or more.

Judgment Criterion

- The signals cannot be received from combination meter through CAN busline.

COMMENT ON TROUBLE SYMPTOM

Current malfunction

- The failure is possibly caused by malfunction of the harness and connector in CAN busline between engine-A/T-ECU and combination meter, by malfunction in the power supply system of combination meter, in combination meter itself, in engine-A/T-ECU.

Past malfunction

- Focus on diagnosing malfunction of the harness and connector in CAN busline between engine-A/T-ECU and combination meter as well as malfunction in the power supply system of combination meter (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NOTE: In case of Past malfunction, M.U.T.-III CAN bus diagnosis cannot detect the failure even if there is malfunction in CAN bus, so that check CAN busline in the same way as Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)). The diagnosis codes being output to each ECU with CAN communication can narrow down the most suspected area (Refer to GROUP 54F – Diagnosis – Can Bus Diagnostics Chart [P.54F-13](#)).

PROBABLE CAUSE

- Failed harness and connector in CAN busline
- Failed combination meter
- Failed engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III CAN bus diagnosis

- Using M.U.T.-III, perform CAN busline diagnosis.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Correct CAN busline (Refer to Group 54F – Diagnosis – CAN Bus Diagnostics Chart [P.54F-13](#)), and then go to Step 6 .

STEP 2. M.U.T.-III other system diagnosis code

- Confirm whether the diagnosis code is output from combination meter.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of combination meter (Refer to GROUP 54A – Combination Meter – Inspection Chart for Diagnosis Code codes [P.54A-55](#)).

NO : Go to Step 3 .

STEP 3. M.U.T.-III other system diagnosis code

Confirm whether diagnosis code U1108: combination meter time-out is output from the following ECU having CAN communication with combination meter

- ETACS-ECU

Q: Is the diagnosis code set?

YES : Go to Step 4 .

NO : Go to Step 5 .

STEP 4. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.
2. Ignition switch: LOCK (OFF) to ON
3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace combination meter, then go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and combination meter (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 5. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.
1. Erase the diagnosis code being output.
 2. Ignition switch: LOCK (OFF) to ON
 3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and combination meter (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#))

STEP 6. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.
1. Erase the diagnosis code being output.
 2. Ignition switch: LOCK (OFF) to ON
 3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Go to Step 1 .

NO : Check end.

Code No. U1110: A/C-ECU Time-out**⚠ CAUTION**

If diagnosis code U1110 is output from engine-A/T-ECU, surely perform CAN busline diagnosis.

⚠ CAUTION

Replace ECU after certainly confirming that the communication circuits are normal.

TROUBLE JUDGMENT**Check Conditions**

- While the cranking switch is in OFF position, or when 3 seconds pass after the cranking switch is in OFF from ON.
- The battery voltage is 10 V or more.

Judgment Criterion

- The signals cannot be received from A/C-ECU through CAN busline.

COMMENT ON TROUBLE SYMPTOM**Current malfunction**

- The failure is possibly caused by malfunction of the harness and connector in CAN busline between engine-A/T-ECU and A/C-ECU, by malfunction in the power supply system of A/C-ECU, in A/C-ECU itself, in engine-A/T-ECU.

Past malfunction

- Focus on diagnosing malfunction of the harness and connector in CAN busline between engine-A/T-ECU and A/C-ECU as well as malfunction in the power supply system of A/C-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NOTE: In case of Past malfunction, M.U.T.-III CAN bus diagnosis cannot detect the failure even if there is malfunction in CAN bus, so that check CAN busline in the same way as Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)). The diagnosis codes being output to each ECU with CAN communication can narrow down the most suspected area (Refer to GROUP 54F – Diagnosis – CAN Bus Diagnostics Chart [P.54F-13](#)).

PROBABLE CAUSE

- Failed harness and connector in CAN busline
- Failed A/C-ECU
- Failed engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III CAN bus diagnosis

- Using M.U.T.-III, perform CAN busline diagnosis.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Correct CAN busline (Refer to Group 54F – Diagnosis – CAN Bus Diagnostics Chart [P.54F-13](#)), and then go to Step 6 .

STEP 2. M.U.T.-III other system diagnosis code

- Confirm whether the diagnosis code is output from A/C-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of A/C-ECU (Refer to GROUP 54E Troubleshooting – Inspection Chart For Diagnosis Code [P.54E-25](#)).

NO : Go to Step 3 .

STEP 3. M.U.T.-III other system diagnosis codes

Confirm whether Diagnosis Code U1110 A/C-ECU time-out is output from the following ECU having CAN communication with A/C-ECU.

- ETACS-ECU

Q: Is the diagnosis code set?

YES : Go to Step 4 .

NO : Go to Step 5 .

STEP 4. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace A/C-ECU, then go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and A/C-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 5. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and A/C-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 6. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Go to Step 1 .

NO : Check end.

Code No. U1117: Immobilizer-ECU Time-out

CAUTION

If diagnosis code U1117 is output from engine-A/T-ECU, surely perform CAN busline diagnosis.

CAUTION

Replace ECU after certainly confirming that the communication circuits are normal.

TROUBLE JUDGMENT**Check Conditions**

- While the cranking switch is in OFF position, or when 3 seconds pass after the cranking switch is in OFF from ON.
- The battery voltage is 10 V or more.
- This engine is not run by a remote engine start.

Judgment Criterion

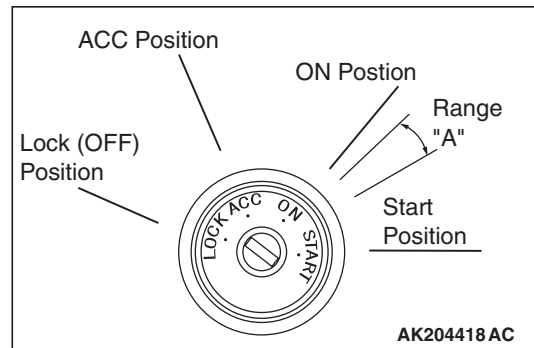
- Communication error between engine-A/T-ECU and the immobilizer-ECU.

COMMENT ON TROUBLE SYMPTOM**Current malfunction**

- The failure is possibly caused by malfunction of the harness and connector in CAN busline between engine-A/T-ECU and immobilizer-ECU, by malfunction in the power supply system of immobilizer-ECU, in immobilizer-ECU itself, in engine-A/T-ECU.

Past malfunction

- Focus on diagnosing malfunction of the harness and connector in CAN busline between engine-A/T-ECU and immobilizer-ECU as well as malfunction in the power supply system of immobilizer-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

CAUTION

When the ignition key is maintained within the range "A" (i.e., the ignition switch IG2 is in OFF position but the cranking does not start) for more than 1 second, engine-A/T-ECU stores diagnosis code U1117 (the past trouble).

NOTE: In case of Past malfunction, M.U.T.-III CAN bus diagnosis cannot detect the failure even if there is malfunction in CAN bus, so that check CAN busline in the same way as Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5). The diagnosis codes being output to each ECU with CAN communication can narrow down the most suspected area (Refer to GROUP 54F – Diagnosis – CAN Bus Diagnostics Chart P.54F-13).

PROBABLE CAUSE

- Failed harness and connector in CAN busline
- Failed immobilizer-ECU
- Failed engine-A/T-ECU

DIAGNOSIS

STEP 1. M.U.T.-III CAN bus diagnosis

- Using M.U.T.-III, perform CAN busline diagnosis.

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Correct CAN busline (Refer to Group 54F – Diagnosis – CAN Bus Diagnostics Chart [P.54F-13](#)), and then go to Step 6 .

STEP 2. M.U.T.-III other system diagnosis code

- Confirm whether the diagnosis code is output from immobilizer-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of immobilizer-ECU (Refer to GROUP 54A Ignition Switch – Check Chart for Diagnosis Code [P.54A-12](#)).

NO : Go to Step 3 .

STEP 3. M.U.T.-III other system diagnosis codes

Confirm whether Diagnosis Code U1117 immobilizer-ECU time-out is output from the following ECU having CAN communication with immobilizer-ECU.

- ETACS-ECU

Q: Is the diagnosis code set?

YES : Go to Step 4 .

NO : Go to Step 5 .

STEP 4. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace immobilizer-ECU, then go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and immobilizer-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 5. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, go to Step 6 .

NO : Intermittent malfunction in CAN busline between engine-A/T-ECU and immobilizer-ECU (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 6. M.U.T.-III diagnosis code

- Reconfirm whether the diagnosis code is output from engine-A/T-ECU.

1. Erase the diagnosis code being output.

2. Ignition switch: LOCK (OFF) to ON

3. Confirm whether the diagnosis code is output.

Q: Is the diagnosis code set?

YES : Go to Step 1 .

NO : Check end.

INSPECTION CHART FOR TROUBLE SYMPTOMS

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Items	Trouble symptom		Inspection procedure No.
Communication with M.U.T.-III is impossible	Communication with engine-A/T-ECU only is not possible		1
Engine warning lamp	The engine warning lamp does not illuminate right after the ignition switch is turned the "ON" position		2
	The engine warning lamp remains illuminating and never goes out		3
Starting	Starting impossible (No initial combustion)	The starter is impossible to operate.	4
	Starting impossible (Starter operative but no initial combustion)	The starter is operative and cranks the engine, but none of initial combustion is in the cylinders and the engine is not started.	5
	Starting impossible (Initial combustion but no complete combustion)	The initial combustion occurs, but the engine stalls soon due to the incomplete combustion.	6
	Improper starting (Long time to start)	It is long cranking to start the engine.	
Improper idling	Unstable idling (Rough idling, hunting)	The engine speed is not constant and changeable during the idling. Usually, the judgment can be based on the movement of the tachometer pointer, also on the vibration transmitted to the steering wheel, shift lever, vehicle body and so on.	7
	Improper idling speed	The proper idling speed is not satisfied.	
	Engine stalled during idling (Die out)	The engine stalls during the idling in no relation to the vehicle movement.	
Engine stalls	The engine stalls when starting the car (Pass out)	The engine stalls during the operation, or when the accelerator pedal is depressed from the idling.	8
	The engine stalls when decelerating	The engine stalls at the deceleration.	9

Items	Trouble symptom		Inspection procedure No.
Driving	Engine does not revolve up	The engine speed is not higher when the accelerator pedal is depressed.	10
	Hesitation, sag	The response of vehicle speed (engine speed) is delayed when the accelerator pedal is depressed, or the vehicle speed (engine speed) is temporarily dropped during the acceleration. These phenomena are called "hesitation" and the serious hesitation is called "sag".	11
	Poor acceleration	The engine cannot obtain the acceleration corresponding to the degree of throttle opening although the engine is smooth at the constant speed.	11
	Stumble	The engine speed increase is delayed when the accelerator pedal is initially depressed at the starting.	
	Surge	The vehicle body is repeated to vibrate jollity in the forward and backward directions at the constant speed or acceleration.	
	The feeling of impact or vibration when accelerating	The large impact feeling occurs at the acceleration.	12
	The feeling of impact or vibration when decelerating	The large impact feeling occurs at the deceleration.	13
	Knocking	Sharp sound like a hammer striking on the cylinder walls during the driving can be heard and wrongly affects the driving.	14
	Ignition timing offset	The basic ignition timing is deviated from the datum value.	15
Stopping	Run on (Dieseling)	The engine continues to run after the ignition switch is in "LOCK " (OFF) position.	16
Exhaust gas	Odor, white smoke, black smoke, high-concentration CO/HC during idling	The exhaust gas is extremely rank odor, white smoke or black smoke. The concentration of CO & HC is high during the idling.	17
Charging performance	Battery run down	The battery is soon rundown or the charging ability of battery is small.	18

Items	Trouble symptom		Inspection procedure No.
Cooling performance	Overheating	The temperature of engine cooling water is extremely high.	19
	Abnormal rotation of fan motor	The fan motor is abnormally rotated when the ignition switch is in "ON" position in no relation to the engine cooling water temperature.	20
A/C performance	Poor A/C performance	The temperature of air cooling from A/C is not efficient or very far from the target temperature	21

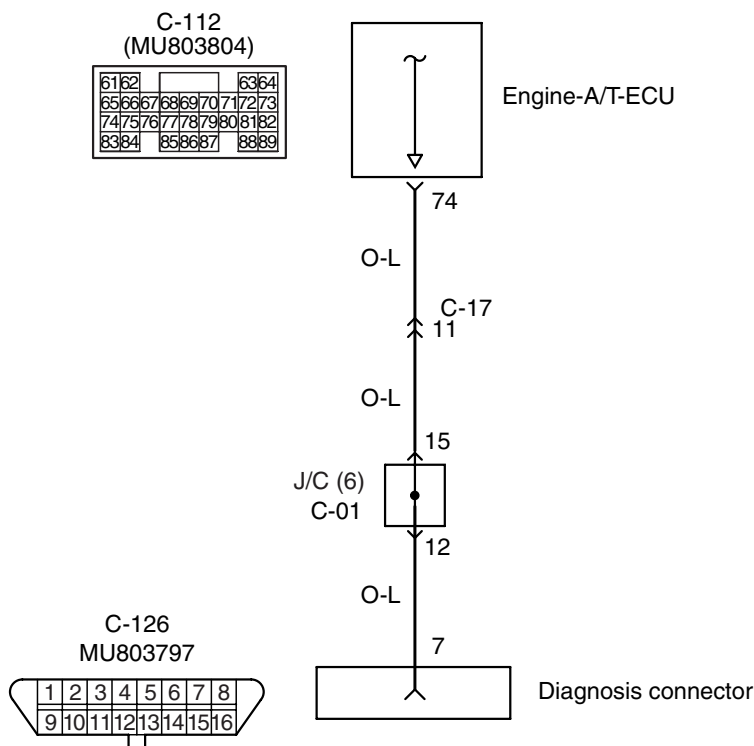
PROBLEM SYMPTOMS TABLE

Inspection procedure No.	Trouble symptom	Reference page
1	Communication with engine-A/T-ECU is not possible	P.13B-188
2	The engine warning lamp does not illuminate right after the ignition switch is turned the "ON" position	P.13B-190
3	The engine warning lamp remains illuminating and never goes out	P.13B-190
4	Starting impossible (No initial combustion)	P.13B-191
5	Starting impossible (Starter operative but no initial combustion)	P.13B-196
6	Starting impossible (Initial combustion but no complete combustion)	P.13B-198
	Starting impossible (Long time to start)	
7	Unstable idling (Rough idling, hunting)	P.13B-200
	Improper idling speed (Too high or too low)	
	Engine stalls during idling (Die out)	
8	The engine stalls when starting the car (pass out)	P.13B-203
9	The engine stalls when decelerating	P.13B-204
10	Engine does not revolve up	P.13B-205
11	Hesitation, sag	P.13B-206
	Poor acceleration	
	Stumble	
	Surge	
12	The feeling of impact or vibration when accelerating	P.13B-207
13	The feeling of impact or vibration when decelerating	P.13B-208
14	Knocking	P.13B-209
15	Ignition timing offset	P.13B-209
16	Run on (Dieseling)	P.13B-211
17	Odor, white smoke, black smoke, high-concentration CO/HC during idling	P.13B-211
18	Battery run down	P.13B-213
19	Overheating	P.13B-216
20	Abnormal rotation of fan motor	P.13B-217
21	Poor A/C performance	P.13B-220
22	Engine-A/T-ECU power supply, engine control relay, ignition switch-IG1 system	P.13B-221
23	Fuel pump system	P.13B-227
24	Fan control relay system	P.13B-235
25	A/C compressor relay system	P.13B-241
26	Ignition circuit system	P.13B-247
27	Purge control solenoid valve system	P.13B-253
28	Stop lamp switch system	P.13B-257

SYMPTOM PROCEDURES

Inspection Procedure 1: Communication with Engine-A/T-ECU is Not Possible.

Diagnosis connector 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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OPERATION

- There is data communication between diagnosis connector output terminal (terminal No. 7) and engine-A/T-ECU (terminal No. 74).

COMMENT ON TROUBLE SYMPTOM

- The failure possibly occurs when engine-A/T-ECU detects malfunction, or is caused by malfunction of open/short in the diagnosis connector circuit.

PROBABLE CAUSE

- Open/short circuit in engine-A/T-ECU power circuit
- Open/short circuit between engine-A/T-ECU and diagnosis connector
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

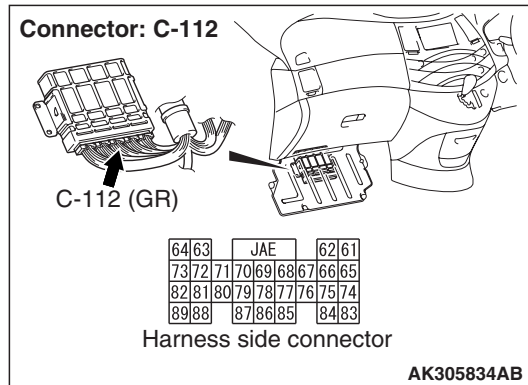
STEP 1. Check engine starting.

Q: Is engine starting possible?

YES : Go to Step 2 .

NO : Check engine-A/T-ECU power supply, engine control relay and ignition switch IG1 system (Refer to Inspection Procedure 22 [P.13B-221](#)).

STEP 2. Connector check: C-112 engine-A/T-ECU connector

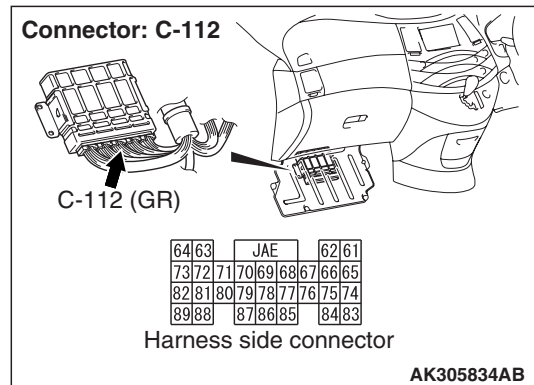
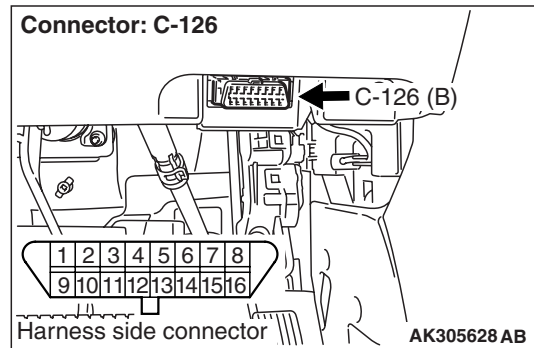


Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check harness between C-126 (terminal No. 7) diagnosis connector and C-112 (terminal No. 74) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connectors C-01 and C-17, and repair if necessary.

- Check communication line for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair.

STEP 4. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Inspection Procedure 2: The Engine Warning Lamp Does Not Illuminate Right after the Ignition Switch is Turned the ON Position

COMMENTS ON TROUBLE SYMPTOM

- The combination meter illuminates engine warning lamp for 5 seconds just after the ignition switch is in ON position.
- If engine warning lamp does not illuminate just after the ignition switch is in ON position, the failure is possibly caused by malfunction of engine warning lamp, open/short in the combination meter circuit and so on.

PROBABLE CAUSE

- Failed engine warning lamp
- Open/short circuit in combination meter circuit

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check the trouble symptom.**Q: Does the trouble system persist?**

YES : Replace combination meter assembly.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Inspection Procedure 3: The Engine Warning Lamp Remains Illuminating and Never Goes Out

COMMENT ON TROUBLE SYMPTOM

- Failure possibly occurs when engine-A/T-ECU detects malfunction, or is possibly caused by short circuit in combination meter circuit and so on.

PROBABLE CAUSE

- Short circuit in combination meter circuit

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#).)

NO : Go to Step 2 .

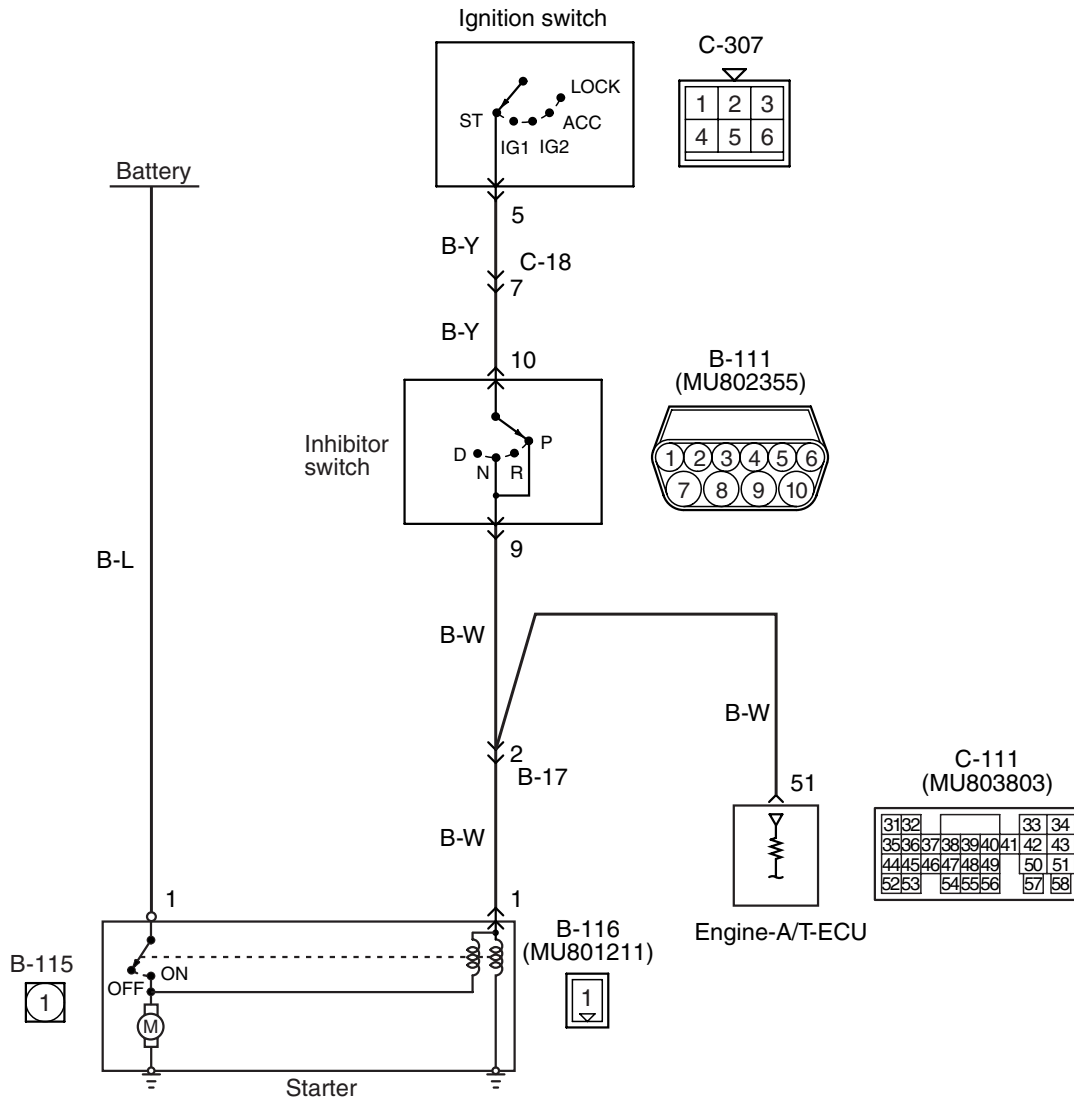
STEP 2. Check the trouble symptom.**Q: Does the trouble symptom persist?**

YES : Replace combination meter assembly.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Inspection Procedure 4: Starting Impossible (No Initial Combustion)

Starting impossible (no initial combustion)



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COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by malfunction of starter or starter-related circuits.

PROBABLE CAUSE

- Failed battery

- Failed inhibitor switch
- Failed starter motor
- Failed ignition switch
- Open/short circuit in starter-related circuits or loose connector contact

DIAGNOSIS PROCEDURE

STEP 1. Check battery voltage.

- Measure battery voltage at cranking.

OK: 8 V or more

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test P.54A-6).

STEP 2. M.U.T.-III data list

- Item 18: Cranking signal

OK:

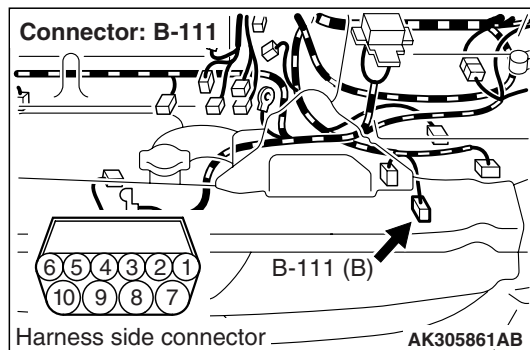
ON (Ignition switch: ST)

OFF (Ignition switch: ON)

Q: Is the check result normal?

YES : Go to Step 10 .

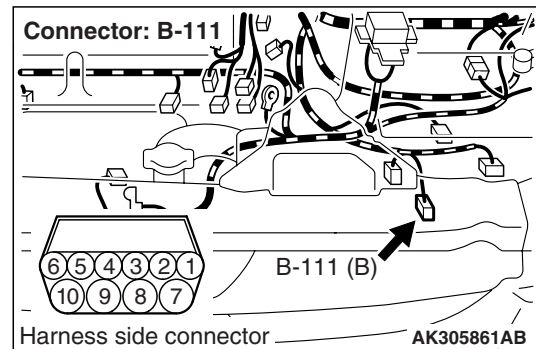
NO : Go to Step 3 .

STEP 3. Connector check: B-111 inhibitor switch connector

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Repair or replace.

STEP 4. Perform voltage measurement at B-111 inhibitor switch connector

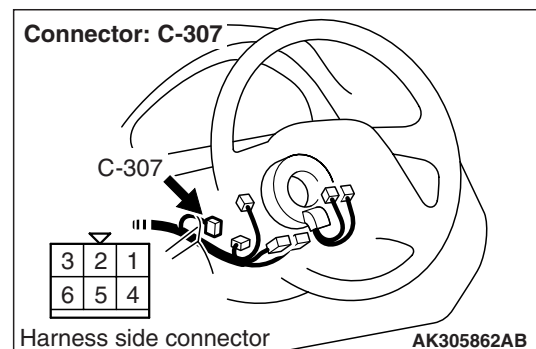
- Disconnect connector, and measure at the harness side.
- Ignition switch: ST
- Voltage between terminal No. 10 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Go to Step 5 .

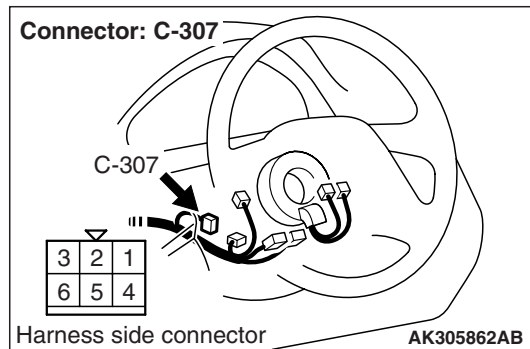
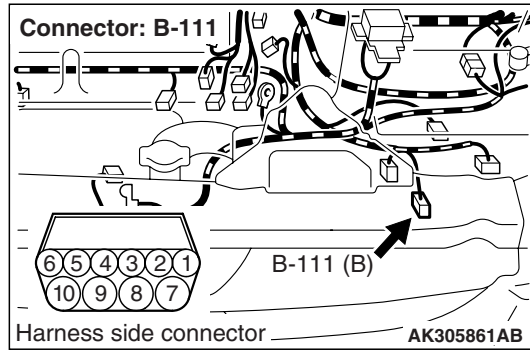
STEP 5. Connector check: C-307 ignition switch connector

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check ignition switch



- Check ignition switch (Refer to GROUP 54A – Ignition switch – Ignition Switch – Inspection P.54A-49).

Q: Is the check result normal?

YES : Check intermediate connector C-18 and repair if necessary. If intermediate connector is normal, check and repair harness between B-111 (terminal No. 10) inhibitor switch connector and C-307 (terminal No. 5) ignition switch connector.

- Check power supply line for open/short circuit.

NO : Replace ignition switch.

STEP 7. Check inhibitor switch itself.

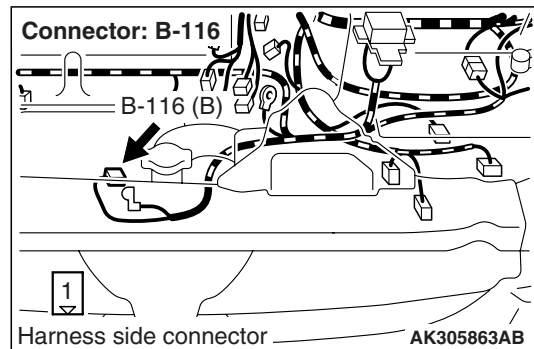
- Check inhibitor switch itself (Refer to GROUP 23A – On – vehicle Service – A/T Control Component Check – Inhibitor Switch Check P.23A-147).

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Replace inhibitor switch.

STEP 8. Connector check: B-116 starter connector

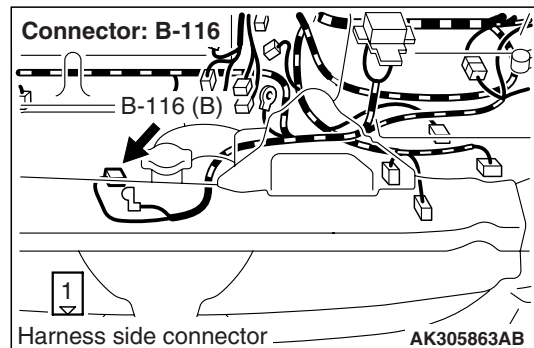
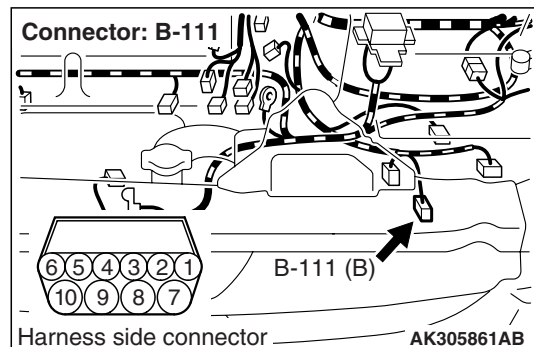


Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair or replace.

STEP 9. Check harness between B-111 (terminal No. 9) inhibitor switch connector and B-116 (terminal No. 1) starter connector



NOTE: Before checking harness, check intermediate connectors B-17 and repair if necessary.

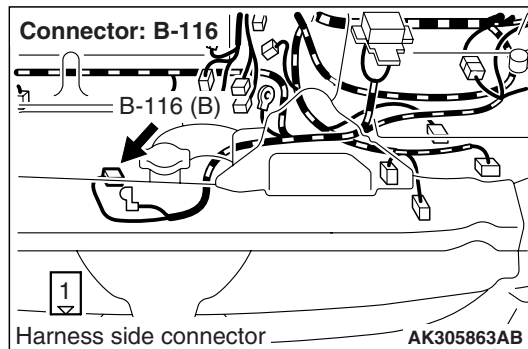
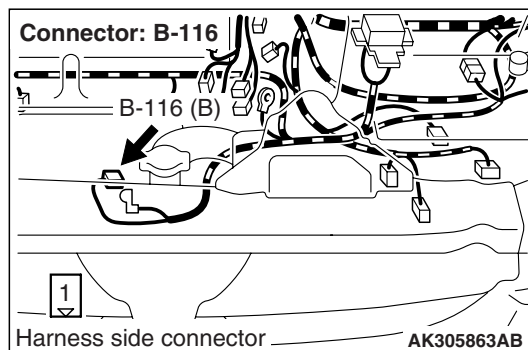
- Check output line for short circuit.

Q: Is the check result normal?

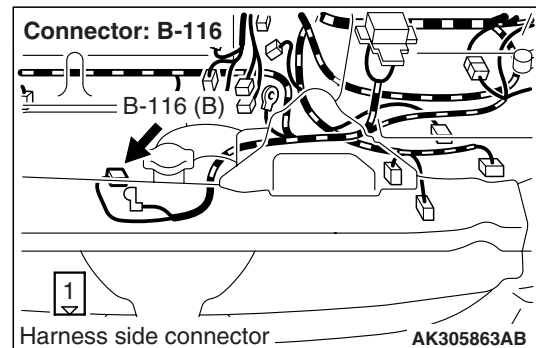
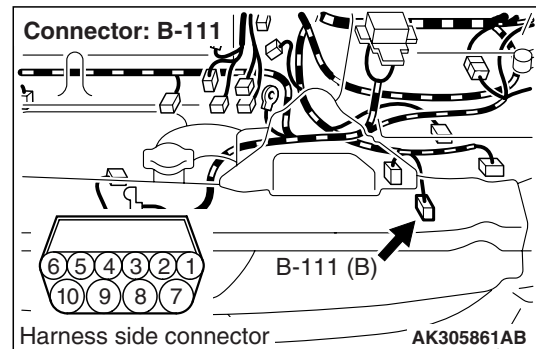
YES : Check and repair harness between B-111 (terminal No.9) inhibitor switch connector and C-111 (terminal No. 51) engine-A/T-ECU connector.

- Check output line for short circuit.

NO : Repair.

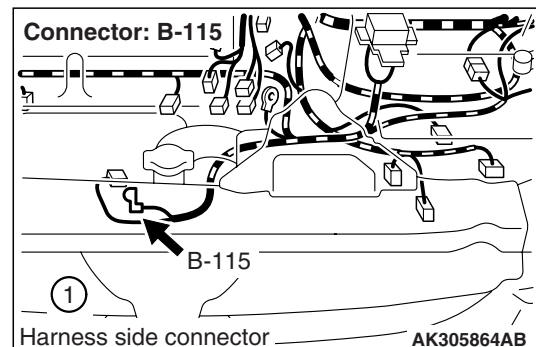
STEP 10. Check connector: B-116 starter connector**Q: Is the check result normal?****YES :** Go to Step 11 .**NO :** Repair or replace.**STEP 11. Perform voltage measurement at B-116 starter connector.**

- Disconnect connector, and measure at the harness side.
- Ignition switch: ST
- Voltage between terminal No. 1 and earth.

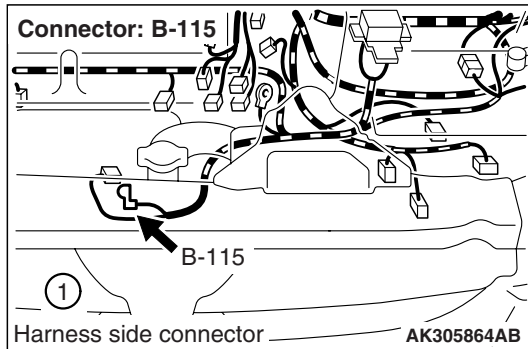
OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 13 .**NO :** Go to Step 12 .**STEP 12. Connector check: B-111 inhibitor switch connector****Q: Is the check result normal?**

YES : Check intermediate connectors B-17, and repair if necessary. If intermediate connectors are normal, check and repair harness between B-111 (terminal No. 9) inhibitor switch connector and B-116 (terminal No. 1) starter connector.

- Check output line for open circuit and damage.

NO : Repair or replace.**STEP 13. Connector check: B-115 starter connector****Q: Is the check result normal?****YES :** Go to Step 14 .**NO :** Repair or replace.

STEP 14. Perform voltage measurement at B-115 starter connector.



- Disconnect connector, and measure at the harness side.
- Voltage between terminal No. 1 and earth.

OK: System voltage

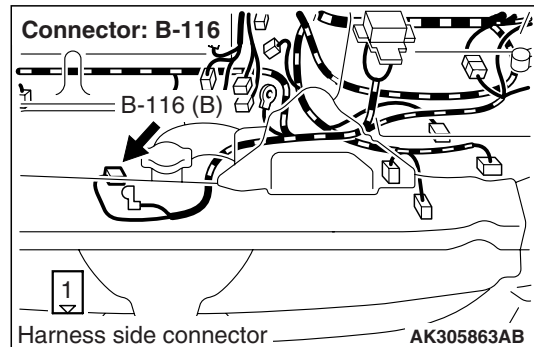
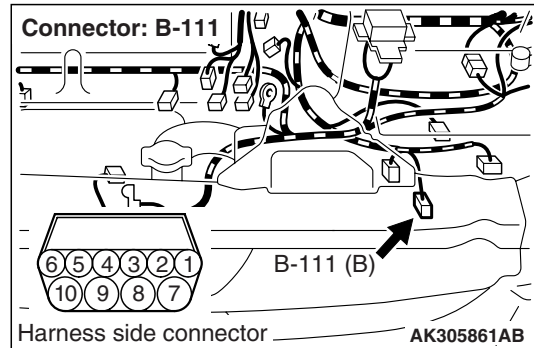
Q: Is the check result normal?

YES : Go to Step 15 .

NO : Check and repair harness between B-115 (terminal No. 1) starter connector and battery.

- Check power supply line for open/short circuit.

STEP 15. Check harness between B-111 (terminal No. 9) inhibitor switch connector and B-116 (terminal No. 1) starter connector.



NOTE: Before checking harness, check intermediate connectors B-17 and repair if necessary.

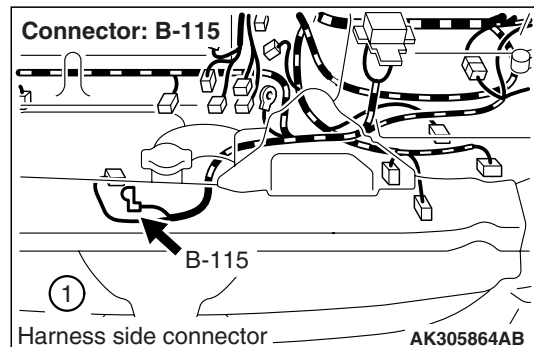
- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair.

STEP 16. Check harness between B-115 (terminal No. 1) starter connector and battery.



- Check power supply line for damage.

Q: Is the check result normal?

YES : Replace starter.

NO : Repair.

Inspection Procedure 5: Starting Impossible (Starter Operative but No Initial Combustion)

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed ignition circuit, fuel feed and so on.

PROBABLE CAUSE

- Failed battery
- Timing belt broken
- Contamination of throttle body (throttle valve portion)
- Failed ignition system
- Failed fuel system
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check battery voltage.

- Measure battery voltage at cranking.

OK: 8 V or more

Q: Is the check result normal?

YES : Go to STEP 2 .

NO : Check battery (Refer to GROUP 54 – Battery – On-vehicle Service – Battery Test [P.54A-6](#)).

STEP 2. Check engine -A/T-ECU communicates with M.U.T.-III.

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Check engine-A/T-ECU power supply, engine control relay and ignition switch IG1 system (Refer to Inspection Procedure 22 [P.13B-221](#)).

STEP 3. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis codes (Refer to [P.13B-15](#))

NO : Go to Step 4 .

STEP 4. M.U.T.-III actuator test

- Item 07: Fuel pump

OK: Operating sound of fuel pump can be heard.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Check fuel pump system (Refer to Inspection Procedure 23 [P.13B-227](#)).

STEP 5. Check timing belt for breakage.

- Engine: Cranking

OK: Camshaft rotates.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace timing belt.

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

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 7. M.U.T.-III data list

OK:

ON (Ignition switch: ST)

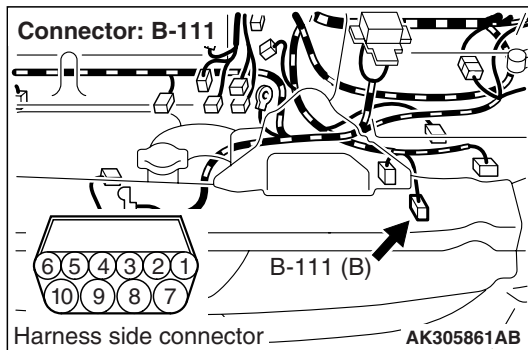
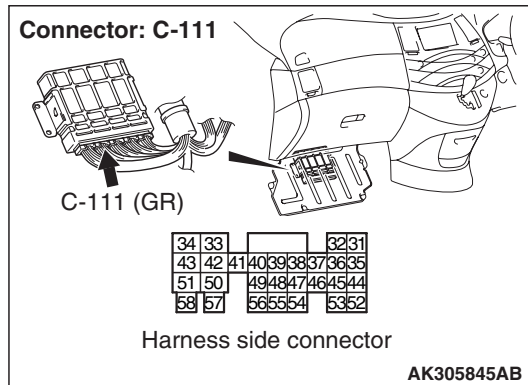
OFF (Ignition switch: ON)

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Go to Step 8 .

STEP 8. Connector check: C-111 engine-A/T-ECU connector



Q: Is the check result normal?

YES : Check intermediate connector B-17, and repair if necessary. If intermediate connector is normal, check and repair harness between B-111 (terminal No. 9) inhibitor switch connector and C-111 (terminal No. 51) engine-A/T-ECU connector.

- Check output line for open circuit.

NO : Repair or replace.

STEP 9. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
a. Item 22: Crank angle sensor

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Check crank angle sensor system (Refer to Code No. P0335 [P.13B-123](#)).

STEP 10. Check injector for operating sound.

- Check injector for operating sound (Refer to [P.13B-291](#)).

Q: Can operating sound be heard?

YES : Go to Step 11 .

NO : Check the injector system of the defective cylinder.

(Refer to Code No. P0201: No. 1 injector system [P.13B-90](#).)

(Refer to Code No. P0202: No. 2 injector system [P.13B-94](#).)

(Refer to Code No. P0203: No. 3 injector system [P.13B-98](#).)

(Refer to Code No. P0204: No. 4 injector system [P.13B-102](#).)

STEP 11. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Replace spark plug.

STEP 12. Check ignition coil spark.

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 13. Fuel pressure measurement.

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Replace engine-A/T-ECU

- Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, confirm the malfunction phenomenon again.

Q: Does the trouble symptom persist?

YES : Check for foreign matters (water, kerosene, etc.) in fuel and replace if necessary.

NO : Check end.

Inspection Procedure 6: Starting Impossible (Initial Combustion But No Complete Combustion), Improper Starting (Long Time to Start)

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by poor ignition, incorrect air-fuel ratio at cranking, improper fuel pressure and so on.

PROBABLE CAUSE

- Failed battery
- Failed ignition system
- Failed fuel system
- Failed air-fuel ratio control system
- Failed intake air system
- Failed exhaust gas cleaning system
- Contamination of throttle body (throttle valve portion)
- Timing belt in out of place
- Improper compression pressure
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check battery condition.

Q: Have the battery terminal been disconnected?

YES : After warm-up engine, idle for about 10 minutes.

NO : Go to Step 2 .

STEP 2. Check battery voltage.

- Measure battery voltage at cranking.

OK: 8 V or more

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Check battery (Refer to GROUP 54 – Battery – On-vehicle Service – Battery Test [P.54A-6](#)).

STEP 3. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis codes (Refer to [P.13B-15](#)).

NO : Go to Step 4 .

STEP 4. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor
 - b. Item 13: Intake air temperature sensor
 - c. Item 21: Engine coolant temperature sensor

Q: Are the check results normal?

YES : Go to Step 5 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 5. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 25: Barometric pressure sensor

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

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

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 7. M.U.T.-III actuator test

- Item 07: Fuel pump

OK: Operating sound of fuel pump can be heard.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Check fuel pump system (Refer to Inspection Procedure 23 [P.13B-227](#)).

STEP 8. Check air intake from intake hose and inlet manifold.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

STEP 9. Check injector for operating sound.

- Check injector for operating sound at engine cranking (Refer to [P.13B-291](#)).

Q: Can operating sound be heard?

YES : Go to Step 10 .

NO : Check the injector system of the defective cylinder.

(Refer to Code No. P0201: No.1 Injector System [P.13B-90](#).)

(Refer to Code No. P0202: No.2 Injector System [P.13B-94](#).)

(Refer to Code No. P0203: No.3 Injector System [P.13B-98](#).)

(Refer to Code No. P0204: No.4 Injector System [P.13B-102](#).)

STEP 10. Check timing marks of timing belt.**Q: Is the check result normal?**

YES : Go to Step 11 .

NO : Align timing marks.

STEP 11. Check spark plug.**Q: Is the check result normal?**

YES : Go to Step 12 .

NO : Replace spark plug.

STEP 12. Check ignition coil spark.**Q: Is the check result normal?**

YES : Go to Step 13 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 13. Check spray condition of injector.

- Check each injector for spray condition (Refer to [P.13B-291](#)).

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Replace injector.

STEP 14. Check compression pressure.

- Check compression pressure (Refer to GROUP 11A – On-vehicle Service – Compression Pressure Check [P.11A-14](#)).

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. Fuel pressure measurement.

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair.

STEP 16. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (stepper motor) Check [P.17-44](#)].

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Replace EGR valve (stepper motor).

STEP 17. Replace engine-A/T-ECU.

- Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, confirm the malfunction phenomenon again.

Q: Does the trouble symptom persist?

YES : Check for foreign matters (water, kerosene, etc.) in fuel and replace if necessary.

NO : Check end.

Inspection Procedure 7: Unstable Idling (Rough Idling, Hunting), Improper Idling Speed (Too High or too Low), Engine Stalls during Idling (Die Out)**COMMENT ON TROUBLE SYMPTOM**

- Probable causes can be widely found in ignition system, air-fuel ratio control system, throttle valve control system, fuel system, etc. A sudden engine stall is possibly caused by poor connector contact.

PROBABLE CAUSE

- Failed ignition system
- Failed fuel system
- Failed throttle valve control system
- Failed air-fuel ratio control system
- Failed intake air/exhaust system
- Failed exhaust gas cleaning system
- Contamination of throttle body (throttle valve portion)
- Timing belt in out of place
- Improper compression pressure
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check battery condition.**

Q: Has the battery terminal been disconnected?

YES : After warm-up engine, idle for about 10 minutes.

NO : Go to Step 2 .

STEP 2. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 3 .

STEP 3. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 12: Air flow sensor
 - Item 13: Intake air temperature sensor
 - Item 14: Throttle position sensor (sub)
 - Item 21: Engine coolant temperature sensor
 - Item 77: Accelerator pedal position sensor (sub)
 - Item 78: Accelerator pedal position sensor (main)
 - Item 79: Throttle position sensor (main)
 - Item B4: Power steering fluid pressure sensor

Q: Are the check results normal?

YES : Go to Step 4 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 4. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 25: Barometric pressure sensor

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 5. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 29: Inhibitor switch

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Check starting impossible (Refer to Inspection Procedure 4).

STEP 6. Check air intake from intake hose and inlet manifold.

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair.

STEP 7. Check timing marks of timing belt.

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Align timing marks.

STEP 8. Check throttle body (throttle valve portion) contamination.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 9. M.U.T.-III data list

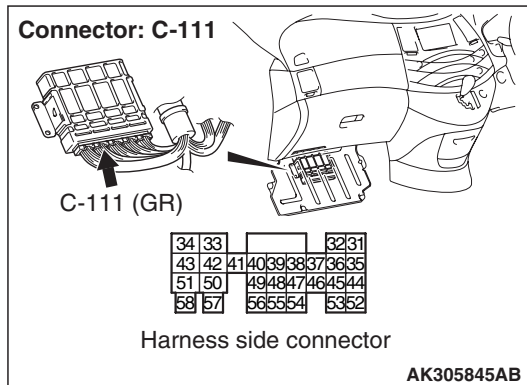
- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 11: Cylinder 1, 4 oxygen sensor (front)
 - b. Item 39: Cylinder 2, 3 oxygen sensor (front)
 - c. Item 59: Cylinder 1, 4 oxygen sensor (rear)
 - d. Item 69: Cylinder 2, 3 oxygen sensor (rear)

Q: Are the check results normal?

YES : Go to Step 10 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 10. Perform voltage measurement at C-111 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Engine: Idling after warm-up
- Transmission: P range
- Radiator fan: Not operating
- Voltage between terminal No. 45 and earth.

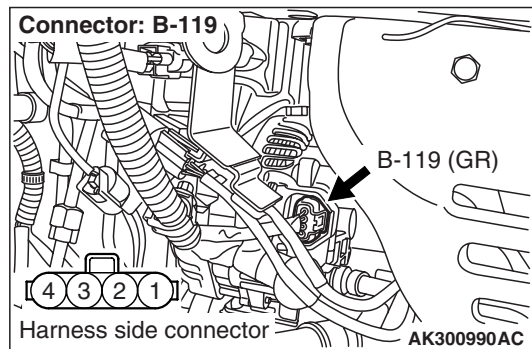
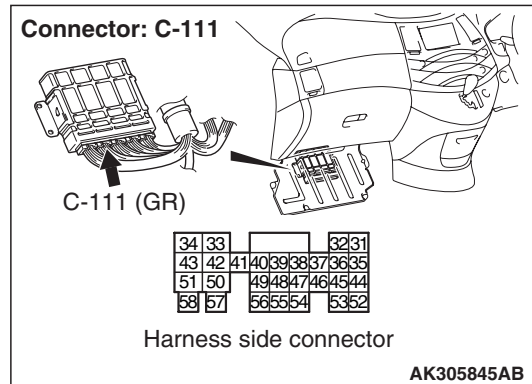
OK: Switching the headlamps to ON from OFF causes the voltage to increase.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Go to Step 11 .

STEP 11. Connector check: C-111 engine-A/T-ECU connector and B-119 alternator connector

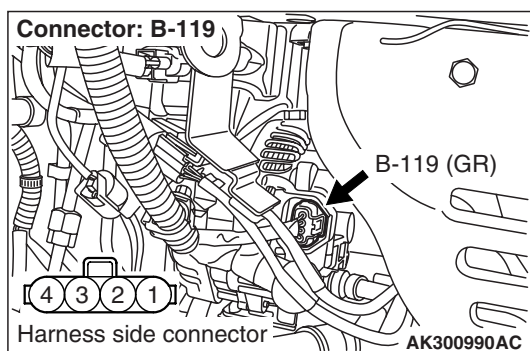
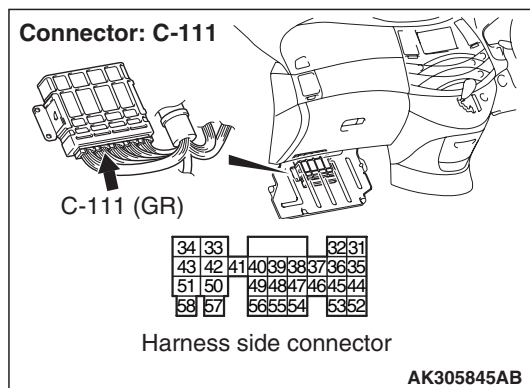


Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Check harness between C-111 (terminal No. 45) engine-A/T-ECU connector and B-119 (terminal No. 1) alternator connector.



NOTE: Before checking harness, check intermediate connector B-17, and repair if necessary.

- Check output line for open/short circuit and damage.

Q: Is the check result normal?

YES : Replace alternator and go to Step 13 .
NO : Repair.

STEP 13. Check the trouble system.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

STEP 14. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 15 .
NO : Replace spark plug.

STEP 15. Check ignition coil spark.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 16. Check purge control solenoid valve itself.

- Check purge control solenoid valve itself (Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System– Purge Control Solenoid Valve Check [P.17-42](#))

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Replace purge control solenoid valve.

STEP 17. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (Stepper Motor) Check [P.17-44](#)].

Q: Is the check result normal?

YES : Go to Step 18 .

NO : Replace EGR valve (stepper motor).

STEP 18. Check injector for spray condition.

- Check each injector for spray condition (Refer to [P.13B-291](#)).

Q: Is the check result normal?

YES : Go to Step 19 .

NO : Replace injector.

STEP 19. Check compression pressure.

- Check compression pressure (Refer to GROUP 11A – On-vehicle Service – Compression Pressure Check [P.11A-14](#)).

Q: Is the check result normal?

YES : Go to Step 20 .

NO : Repair.

STEP 20. Replace engine-A/T-ECU.

- Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered. And then, confirm the malfunction phenomenon again.

Q: Does the trouble system persist?

YES : Check for foreign matters (water, kerosene, etc.) in fuel and replace if necessary.

NO : Check end.

Inspection Procedure 8: The Engine Stalls when Starting the Car (Pass Out)

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by misfire due to failed spark plug, improper air-fuel ratio at accelerator pedal depression and so on.

PROBABLE CAUSE

- Failed ignition system
- Failed intake air system
- Failed exhaust gas cleaning system
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)
 - b. Item 77: Accelerator pedal position sensor (sub)
 - c. Item 78: Accelerator pedal position sensor (main)
 - d. Item 79: Throttle position sensor (main)

Q: Are the check results normal?

YES : Go to Step 3 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (Stepper Motor) Check [P.17-44](#)].

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace EGR valve (stepper motor).

STEP 4. Check air intake from intake hose and inlet manifold.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Repair.

STEP 5. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace spark plug.

STEP 6. Check ignition coil spark.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

Inspection Procedure 9. The Engine Stalls when Decelerating

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by insufficient air intake, improper air-fuel ratio due to failed exhaust gas recirculation system and so on.

PROBABLE CAUSE

- Failed throttle valve control system
- Failed ignition system
- Failed exhaust control system
- Contamination of throttle body (throttle valve portion)
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

- YES** : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).
- NO** : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table. [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)
 - b. Item 77: Accelerator pedal position sensor (sub)
 - c. Item 78: Accelerator pedal position sensor (main)
 - d. Item 79: Throttle position sensor (main)

Q: Are the check results normal?

- YES** : Go to Step 3 .
- NO** : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (Stepper Motor) Check [P.17-44](#)].

Q: Is the check result normal?

- YES** : Go to Step 4 .
- NO** : Replace EGR valve (stepper motor).

STEP 4. Check throttle body (throttle valve portion) for contamination.**Q: Is the check result normal?**

- YES** : Go to Step 5 .
- NO** : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 5. Check spark plug.**Q: Is the check result normal?**

- YES** : Go to Step 6 .
- NO** : Replace spark plug.

STEP 6. Check ignition coil spark.**Q: Is the check result normal?**

- YES** : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).
- NO** : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

Inspection Procedure 10: Engine Does Not Revolve Up

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed fuel system, throttle valve control system, ignition system and so on.

PROBABLE CAUSE

- Failed ignition system
- Failed fuel system
- Failed throttle valve control system
- Timing belt in out of place
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)
 - b. Item 77: Accelerator pedal position sensor (sub)
 - c. Item 78: Accelerator pedal position sensor (main)
 - d. Item 79: Throttle position sensor (main)

Q: Are the check results normal?

YES : Go to Step 3 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3. Check ignition coil spark.

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 4. Check timing marks of timing belt.

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Align timing marks.

STEP 5. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace spark plug.

STEP 6. Fuel pressure measurement.

- Fuel pressure measurement. (Refer to Fuel Pressure Test [P.13B-282](#)).

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Repair.

Inspection Procedure 11: Hesitation, Sag, Poor Acceleration, Stumble, Surge**COMMENT ON TROUBLE SYMPTOM**

- Failure is possibly caused by failed ignition system, air-fuel ratio control system, throttle valve opening control system, compression pressure and so on.

PROBABLE CAUSE

- Failed air-fuel ratio control system
- Failed ignition system
- Failed fuel system
- Failed intake air/exhaust system
- Failed exhaust gas cleaning system
- Failed throttle valve control system
- Improper compression pressure
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III diagnosis code**

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check injector for operating sound.

- Check injector for operating sound (Refer to [P.13B-291](#)).

Q: Can operating sound be heard?

YES : Go to Step 3 .

NO : Check the injector system of the defective cylinder.

(Refer to Code No. P0201: No. 1 Injector System [P.13B-90](#)).

(Refer to Code No. P0202: No. 2 Injector System [P.13B-94](#)).

(Refer to Code No. P0203: No. 3 Injector System [P.13B-98](#)).

(Refer to Code No. P0204: No. 4 Injector System [P.13B-102](#)).

STEP 3. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 13: Intake air temperature sensor
 - b. Item 14: Throttle position sensor (sub)
 - c. Item 21: Engine coolant temperature sensor
 - d. Item 77: Accelerator pedal position sensor (sub)
 - e. Item 78: Accelerator pedal position sensor (main)
 - f. Item 79: Throttle position sensor (main)

Q: Are the check results normal?

YES : Go to Step 4 .

NO : Perform the diagnosis code classified check Procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 4. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 25: Barometric pressure sensor

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 5. Check purge control solenoid valve itself.

- Check purge control solenoid valve itself (Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System– Purge Control Solenoid Valve Check [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace purge control solenoid valve.

STEP 6. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (Stepper Motor) Check [P.17-44](#)].

Q: Is the check result normal?

YES : Go to Step 7 .

NO : Replace EGR valve (stepper motor).

STEP 7. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 11: Cylinder 1, 4 oxygen sensor (front)
 - b. Item 39: Cylinder 2, 3 oxygen sensor (front)
 - c. Item 59: Cylinder 1, 4 oxygen sensor (rear)
 - d. Item 69: Cylinder 2, 3 oxygen sensor (rear)

Q: Are the check results normal?

YES : Go to Step 8 .

NO : Perform the diagnosis code classified check Procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 8. Check spark plug.**Q: Is the check result normal?**

YES : Go to Step 9 .

NO : Replace spark plug.

STEP 9. Check ignition coil spark.**Q: Is the check result normal?**

YES : Go to Step 10 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 10. Check throttle body (throttle valve portion) for contamination.**Q: Is the check result normal?**

YES : Go to Step 11 .

NO : Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 11. Fuel pressure measurement.

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair.

STEP 12. Check compression pressure.

- Check compression pressure (Refer to GROUP 11A – On-vehicle Service – Compression Pressure Check [P.11A-14](#)).

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Repair.

Inspection Procedure 12: The Feeling of Impact or Vibration when Accelerating

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by ignition leak with rise in spark plug-required voltage at acceleration, throttle valve control system and so on.

PROBABLE CAUSE

- Failed ignition system
- Failed throttle valve control system
- Contamination of throttle body (throttle valve portion)
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 14: Throttle position sensor (sub)
 - b. Item 77: Accelerator pedal position sensor (sub)
 - c. Item 78: Accelerator pedal position sensor (main)
 - d. Item 79: Throttle position sensor (main)

Q: Are the check results normal?

YES : Go to Step 3 .

NO : Perform the diagnosis code classified check procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 3. Check throttle body (throttle valve portion) for contamination.**Q: Is the check result normal?****YES :** Go to Step 4 .**NO :** Clean throttle body (throttle valve portion)
(Refer to [P.13B-282](#)).**STEP 4. Check spark plug.****Q: Is the check result normal?****YES :** Go to Step 5 .**NO :** Replace spark plug.**STEP 5. Check ignition coil spark.****Q: Is the check result normal?****YES :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**NO :** Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).**Inspection Procedure 13: The Feeling of Impact or Vibration when Decelerating****COMMENT ON TROUBLE SYMPTOM**

- Failure is possibly caused by insufficient air intake due to failed throttle valve control system.

PROBABLE CAUSE

- Failed throttle valve control system
- Contamination of throttle body (throttle valve portion)
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III diagnosis code****Q: Is diagnosis code set?****YES :** Inspection chart for diagnosis code (Refer to [P.13B-15](#)).**NO :** Go to Step 2 .**STEP 2. M.U.T.-III data list**

- Refer to Data List Reference Table [P.13B-260](#).
 - Item 14: Throttle position sensor (sub)
 - Item 77: Accelerator pedal position sensor (sub)
 - Item 78: Accelerator pedal position sensor (main)
 - Item 79: Throttle position sensor (main)

Q: Are the check results normal?**YES :** Go to Step 3 .**NO :** Perform the diagnosis code classified check Procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).**STEP 3. Check throttle body (throttle valve portion) contamination.****Q: Is the check result normal?****YES :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).**NO :** Clean throttle body (throttle valve portion)
(Refer to [P.13B-282](#)).

Inspection Procedure 14: Knocking

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed detonation control system, improper thermal value of spark plug and so on.

PROBABLE CAUSE

- Failed detonation sensor
- Failed detonation control system
- Failed ignition system
- Failed spark plug
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace spark plug.

STEP 3. Check ignition coil spark.

Q: Is the check result normal?

YES : Check detonation sensor system (Refer to Code No. P0325 [P.13B-120](#)).

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

Inspection Procedure 15: Ignition Timing Offset

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed crank angle sensor, camshaft position sensor, or timing belt in out of place and so on.

PROBABLE CAUSE

- Failed crank angle sensor
- Failed camshaft position sensor
- Timing belt in out of place
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

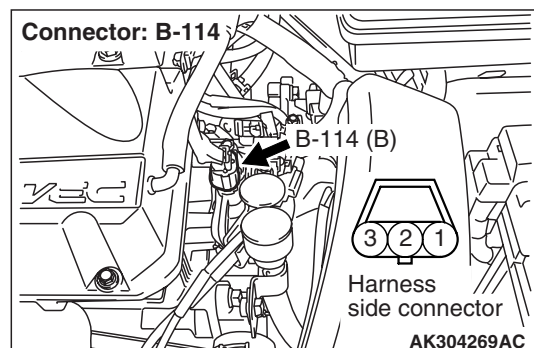
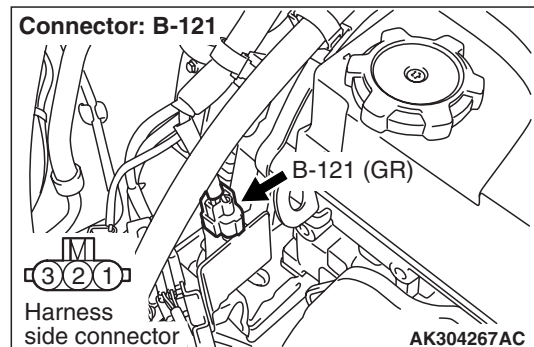
STEP 1. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Perform output wave pattern measurement of crank angle sensor and camshaft position sensor (Using an oscilloscope).



Crank Angle Sensor

- Use special tool test harness (MB991658) to connect B-121 crank angle sensor intermediate connector, and measure at pick-up harness.
- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 2 and earth.

Camshaft Position Sensor

- Use special tool test harness (MB991709) to connect B-114 camshaft position sensor connector, and measure at pick-up harness.
- Engine: Idling
- Transmission: P range
- Voltage between terminal No. 2 and earth.

OK: Output waveform timings of both sensors are the same as the check procedure (Refer to P.13B-276) using an oscilloscope.

Q: Is the check result normal?

- YES :** Go to Step 3 .
NO : Go to Step 4 .

STEP 3. Check the trouble symptom.**Q: Does the trouble symptom persist?**

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

STEP 4. Check crank angle sensor and camshaft position sensor mounted conditions.**Q: Is the check result normal?**

- YES :** Go to Step 5 .
NO : Repair.

STEP 5. Check timing marks of timing belt.**Q: Is the check result normal?**

- YES :** Go to Step 6 .
NO : Align timing marks.

STEP 6. Check crank shaft sensing blade.**Q: Is the check result normal?**

- YES :** Go to Step 7 .
NO : Replace crank shaft sensing blade.

STEP 7. Check camshaft position sensing cylinder.**Q: Is the check result normal?**

- YES :** Go to Step 8 .
NO : Replace camshaft position sensing cylinder.

STEP 8. Replace crank angle sensor.

- After replacing the crank angle sensor, re-check the trouble symptom.

Q: Does the trouble symptom persist?

- YES :** Go to Step 9 .
NO : Check end.

STEP 9. Replace camshaft position sensor.

- After replacing the camshaft position sensor, re-check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

Inspection Procedure 16: Run On (Dieseling)

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by leakage from injector.

PROBABLE CAUSE

- Failed injector
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check injector for spray condition.

- Check each injector for spray condition (Refer to [P.13B-291](#)).

Q: Does trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Replace injector.

Inspection Procedure 17: Odor, White Smoke, Black Smoke, and High-Concentration CO/HC during Idling

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by improper air-fuel ratio, deteriorated catalyst, failed ignition system, failed fuel system, improper compression pressure and so on.

PROBABLE CAUSE

- Failed air-fuel ratio control system
- Failed ignition system
- Failed fuel system
- Failed intake air/exhaust system
- Failed exhaust gas cleaning system
- Improper compression pressure
- Failed catalytic converter
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code

Q: Is diagnosis code set?

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check injector for operating sound.

- Check injector for operating sound (Refer to [P.13B-291](#)).

Q: Can operating sound be heard?

YES : Go to Step 3 .

NO : Check the injector system of the defective cylinder.

(Refer to, Code No. P0201: No. 1 injector system [P.13B-90](#))

(Refer to, Code No. P0202: No. 2 injector system [P.13B-94](#))

(Refer to, Code No. P0203: No. 3 injector system [P.13B-98](#))

(Refer to, Code No. P0204: No. 4 injector system [P.13B-102](#))

STEP 3. Check ignition timing.

- Check ignition timing (Refer to GROUP 11A – On-vehicle Service – Ignition Timing Check [P.11A-11](#)).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Check for offset ignition timing (Refer to Inspection Procedure 15 [P.13B-209](#)).

STEP 4. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 12: Air flow sensor
 - b. Item 13: Intake air temperature sensor
 - c. Item 21: Engine coolant temperature sensor

Q: Are the check results normal?**YES :** Go to Step 5 .**NO :** Perform the diagnosis code classified check Procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 5. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 25: Barometric pressure sensor

Q: Is the check result normal?**YES :** Go to Step 6 .**NO :** Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 6. Check air intake from intake hose and inlet manifold.**Q: Is the check result normal?****YES :** Go to Step 7 .**NO :** Repair.

STEP 7. Check for emission leakage from exhaust manifold.**Q: Is the check result normal?****YES :** Go to Step 8 .**NO :** Repair.

STEP 8. Check throttle body (throttle valve portion) for contamination.**Q: Is the check result normal?****YES :** Go to Step 9 .**NO :** Clean throttle body (throttle valve portion) (Refer to [P.13B-282](#)).

STEP 9. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 11: Cylinder 1, 4 oxygen sensor (front)
 - b. Item 39: Cylinder 2, 3 oxygen sensor (front)
 - c. Item 59: Cylinder 1, 4 oxygen sensor (rear)
 - d. Item 69: Cylinder 2, 3 oxygen sensor (rear)

Q: Are the check results normal?**YES :** Go to Step 10 .**NO :** Perform the diagnosis code classified check Procedure for the sensor that has shown an abnormal data value (Refer to Inspection Chart for Diagnosis Code [P.13B-15](#)).

STEP 10. Check Purge control solenoid valve itself.

- Check purge control solenoid valve itself (Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System – Purge Control Solenoid Valve Check [P.17-42](#)).

Q: Is the check result normal?**YES :** Go to Step 11 .**NO :** Replace purge control solenoid valve.

STEP 11. Check EGR valve (stepper motor) itself.

- Check EGR valve (stepper motor) itself [Refer to GROUP 17 – Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve (Stepper Motor) Check [P.17-44](#)].

Q: Is the check result normal?**YES :** Go to Step 12 .**NO :** Replace EGR valve (stepper motor).

STEP 12. Fuel pressure measurement.

- Fuel pressure measurement (Refer to Fuel Pressure Test [P.13B-282](#)).

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

STEP 13. Check positive crankcase ventilation valve itself.

- Check positive crankcase ventilation valve itself (Refer to GROUP 17 – Emission Control System – crankcase Emission Control System – Positive Crankcase Ventilation (PCV) Valve Check [P.17-40](#)).

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Replace positive crankcase ventilation valve.

STEP 14. Check spark plug.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Replace spark plug.

STEP 15. Check ignition coil spark.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Check ignition circuit system (Refer to Inspection Procedure 26 [P.13B-247](#)).

STEP 16. Check compression pressure.

- Check compression pressure (Refer to GROUP 11A– On-vehicle Service – Compression Pressure Check [P.11A-14](#)).

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Repair.

STEP 17. Check injector for spray condition.

- Check each injector for spray condition (Refer to [P.13B-291](#)).

Q: Does the trouble symptom persist?

YES : Go to Step 18 .

NO : Replace injector.

STEP 18. Replace catalytic converter.

- After replacing the catalytic converter, re-check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Check end.

Inspection Procedure 18: Battery Run Down

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed alternator, generation control circuit and so on.

PROBABLE CAUSE

- Failed battery
- Short circuit in alternator G terminal circuit
- Failed alternator
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check battery voltage.

- Measure battery voltage at cranking.

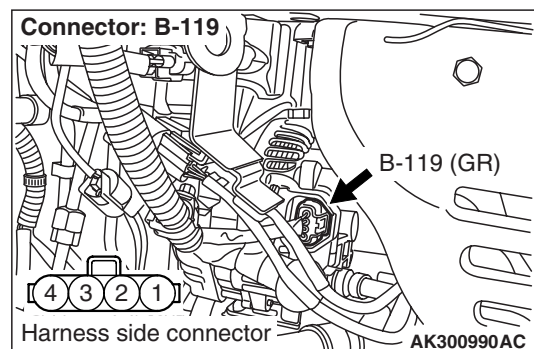
OK: 8 V or more

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test [P.54A-6](#)).

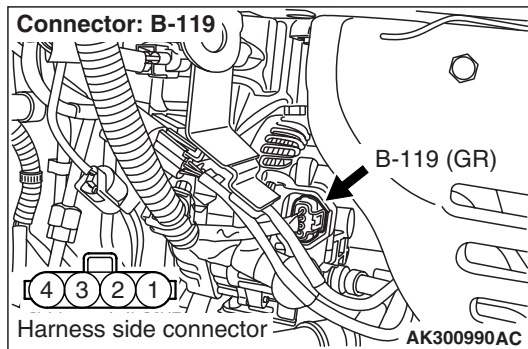
STEP 2. Connector check: B-119 alternator connector



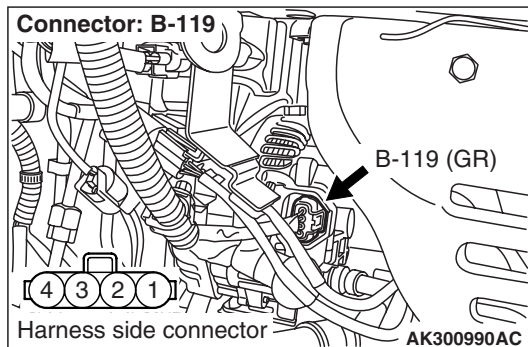
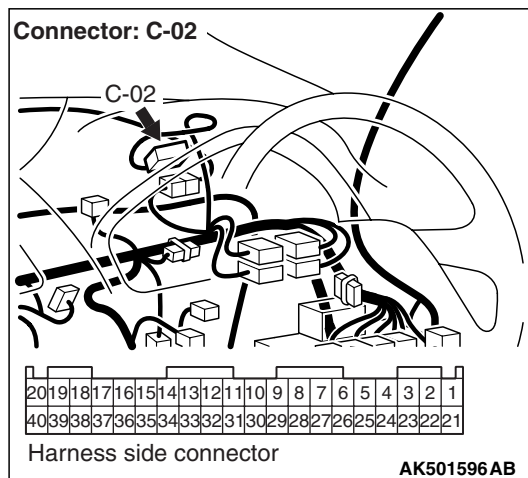
Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

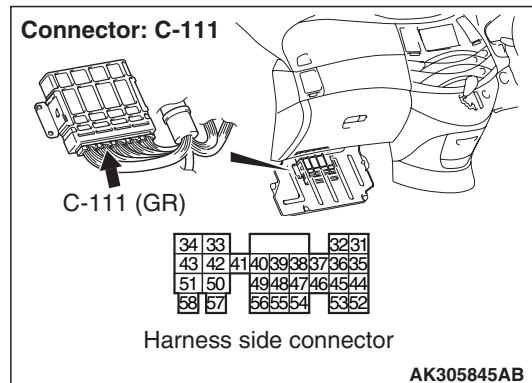
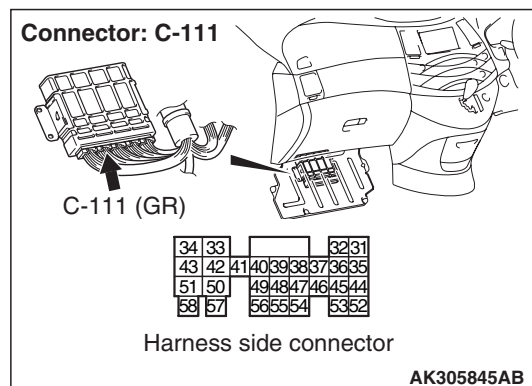
STEP 3. Perform voltage measurement at B-119 alternator connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 5 .**NO :** Go to Step 4 .**STEP 4. Connector check: C-02 combination meter connector****Q: Is the check result normal?**

YES : Check intermediate connectors A-19 and C-125, and repair if necessary. If intermediate connectors are normal, check and repair harness between B-119 (terminal No. 3) alternator connector and C-02 (terminal No. 35) combination meter connector.

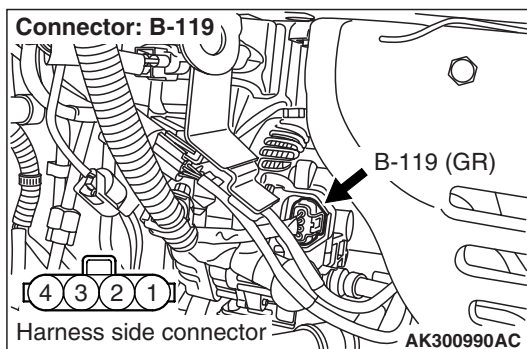
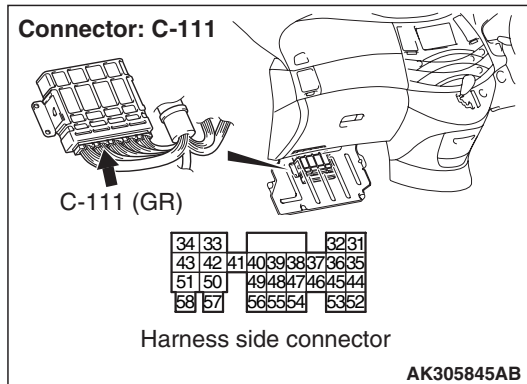
- Check power supply line for open/short circuit.

NO : Repair or replace.**STEP 5. Connector check: C-111 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 6 .**NO :** Repair or replace.**STEP 6. Perform voltage measurement at C-111 engine-A/T-ECU connector.**

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 45 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 8 .**NO :** Go to Step 7 .

STEP 7. Check harness between C-111 (terminal No. 45) engine-A/T-ECU connector and B-119 (terminal No. 1) alternator connector.



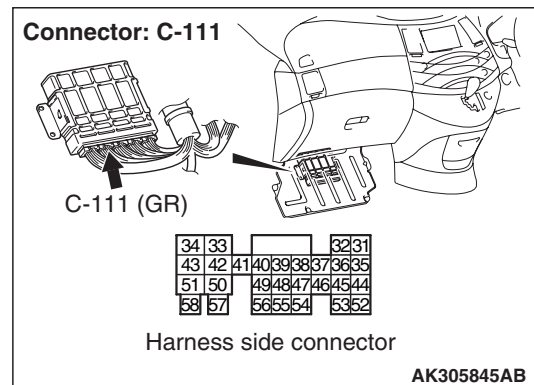
- Check output line for open/short circuit.

Q: Is the check result normal?

YES : replace alternator.

NO : Repair.

STEP 8. Perform voltage measurement at C-111 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Engine: Idling after warm-up
- Transmission: P range
- Radiator fan: Inactive
- Voltage between terminal No. 45 and earth.

OK: Switching the headlamps to ON from OFF causes the voltage to increase.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Replace alternator.

STEP 9. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

Inspection Procedure 19: Overheating

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by failed engine cooling system, fan controller, engine coolant temperature sensor and so on.

PROBABLE CAUSE

- Insufficient or deteriorated engine coolant
- Failed fan controller
- Failed engine coolant temperature sensor
- Failed thermostat
- Failed water pump
- Failed radiator core
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check engine coolant.

NOTE: If engine coolant level falls too early, check for leaky spots, and repair if necessary.

- Check engine coolant (Refer to GROUP 14 – On-vehicle Service – Engine Coolant Leak Check [P.14-18](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace or add engine coolant.

STEP 3. M.U.T.-III actuator test

- Item 21: Fan controller

OK: Fan motor rotating

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Check fan control relay system (Refer to Inspection Procedure 24 [P.13B-235](#)).

STEP 4. M.U.T.-III data list

- Item 21: Engine coolant temperature sensor

OK:

Engine cold state: At ambient temperature (atmospheric temperature) or equivalent.

Engine hot state: At 80 – 120°C

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Check engine coolant temperature sensor system (Refer to Code No. P0115 [P.13B-33](#)).

STEP 5. Check thermostat.

- Check thermostat (Refer to GROUP 14 – Thermostat – Thermostat Inspection [P.14-22](#)).

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Replace thermostat.

STEP 6. Check water pump.

- Check water pump.

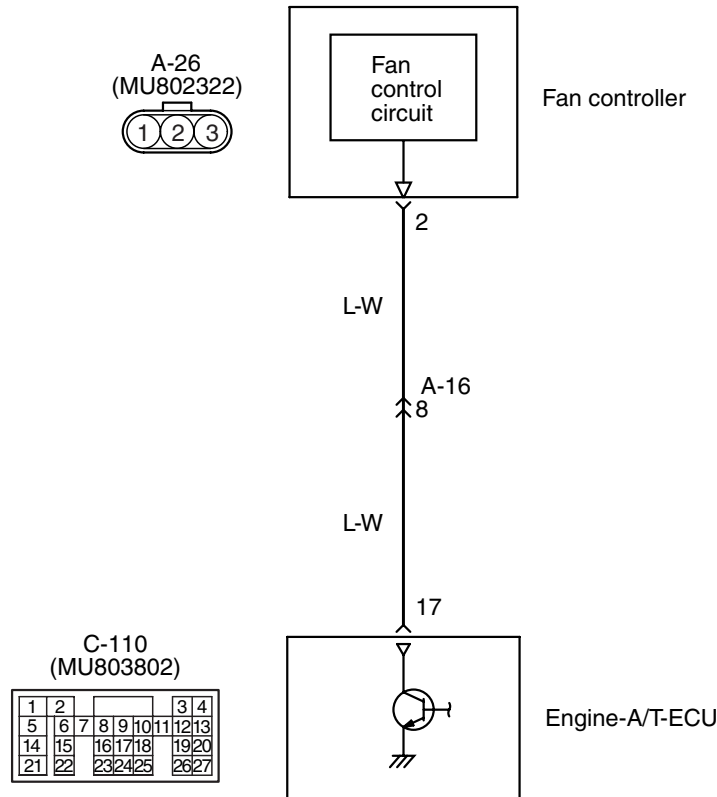
Q: Is the check result normal?

YES : Replace radiator.

NO : Replace water pump.

Inspection Procedure 20: Abnormal Rotation of Fan Motor

Fan controller (Radiator fan, A/C condensor fan) 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

AK305577 AC

OPERATION

- The control (duty) signal is inputted to the fan controller (terminal No. 2) from the engine-A/T-ECU (terminal No. 17).

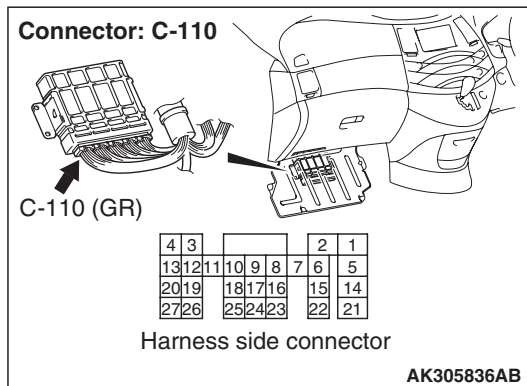
FUNCTION

- The engine-A/T-ECU inputs a duty signal suitable for the engine coolant temperature, vehicle speed and A/C switch position to the fan controller. In response to the signal, the fan controller controls the rotating speeds of the radiator fan and A/C condenser fan (The fan speed becomes higher as the average voltage of the terminal comes nearer to 5V).

PROBABLE CAUSE

- Failed fan controller
- Open/short circuit in fan controller circuit or loose connector contact
- Failed engine-A/T-ECU

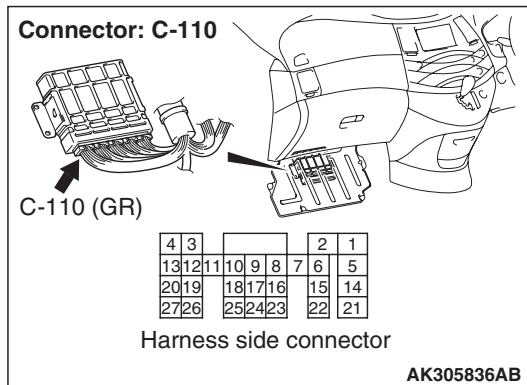
DIAGNOSIS PROCEDURE

STEP 1. Connector check: C-110 engine-A/T-ECU connector

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Check at C-110 engine-A/T-ECU connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Short-circuit terminal No. 17 to earth.

OK: Fan motor stops rotating.

Q: Is the check result normal?

YES : Go to Step 3 .

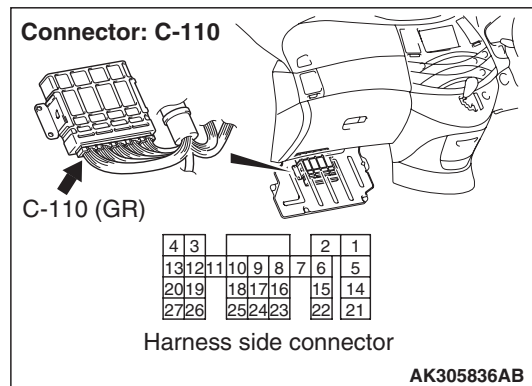
NO : Go to Step 4 .

STEP 3. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 4. Perform voltage measurement at C-110 engine-A/T-ECU connector.

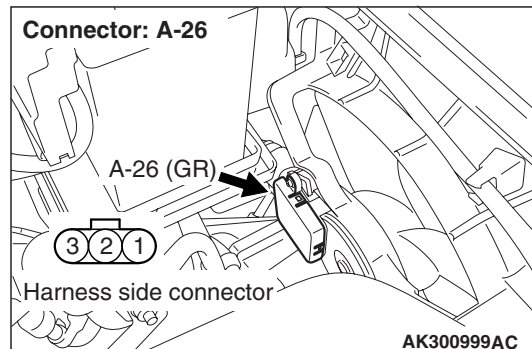
- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 17 and earth.

OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Replace fan controller.

NO : Go to Step 5 .

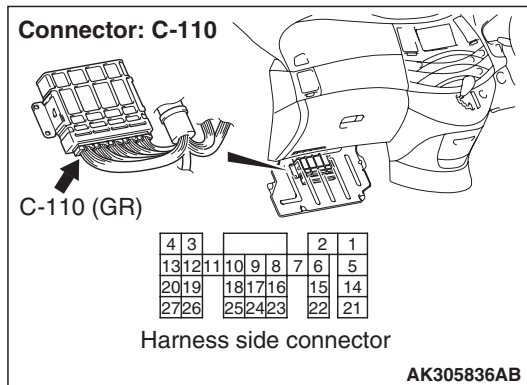
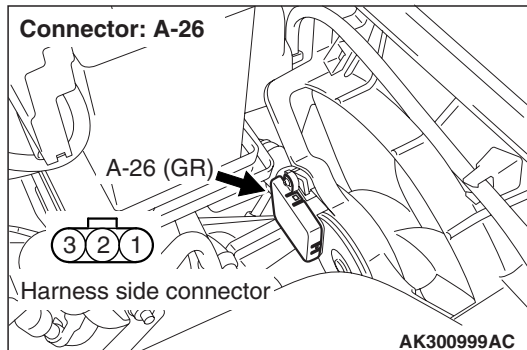
STEP 5. Connector check: A-26 fan controller connector

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Check harness between A-26 (terminal No. 2) fan controller connector and C-110 (terminal No. 17) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector A-16, and repair if necessary.

- Check output line for open circuit.

Q: Is the check result normal?

YES : Replace fan controller.

NO : Repair.

Inspection Procedure 21: Poor A/C Performance

COMMENT ON TROUBLE SYMPTOM

- Failure is possibly caused by short or overcharged A/C refrigerant, failed A/C control system, failed fan control system and so on.

PROBABLE CAUSE

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III diagnosis code**Q: Is diagnosis code set?**

YES : Inspection chart for diagnosis code (Refer to [P.13B-15](#)).

NO : Go to Step 2 .

STEP 2. Check A/C compressor magnetic clutch operation.

- Engine: Idling
- A/C set temperature:
Maximum Cool when temperature in cabin is 25°C or higher
Maximum Hot when temperature in cabin is 25°C or lower

OK:

Magnetic clutch active (when A/C is ON).

Magnetic clutch inactive (when A/C is OFF).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Go to Step 3 .

STEP 3. M.U.T.-III data list**a. Item 49: A/C relay**

- Engine: Idling
- A/C set temperature:
Maximum Cool when temperature in cabin is 25°C or higher.
Maximum Hot when temperature in cabin is 25°C or lower.

OK:

ON (when A/C is ON)

OFF (when A/C is OFF)

Q: Is the check result normal?

YES : Check A/C system (Refer to GROUP 55 – Troubleshooting check chart for trouble symptoms [P.55-47](#)).

NO : Check A/C compressor relay (Refer to Inspection Procedure 25 [P.13B-241](#)).

STEP 4. M.U.T.-III actuator test**a. Item 21: Fan controller**

OK: Fan motor rotates.

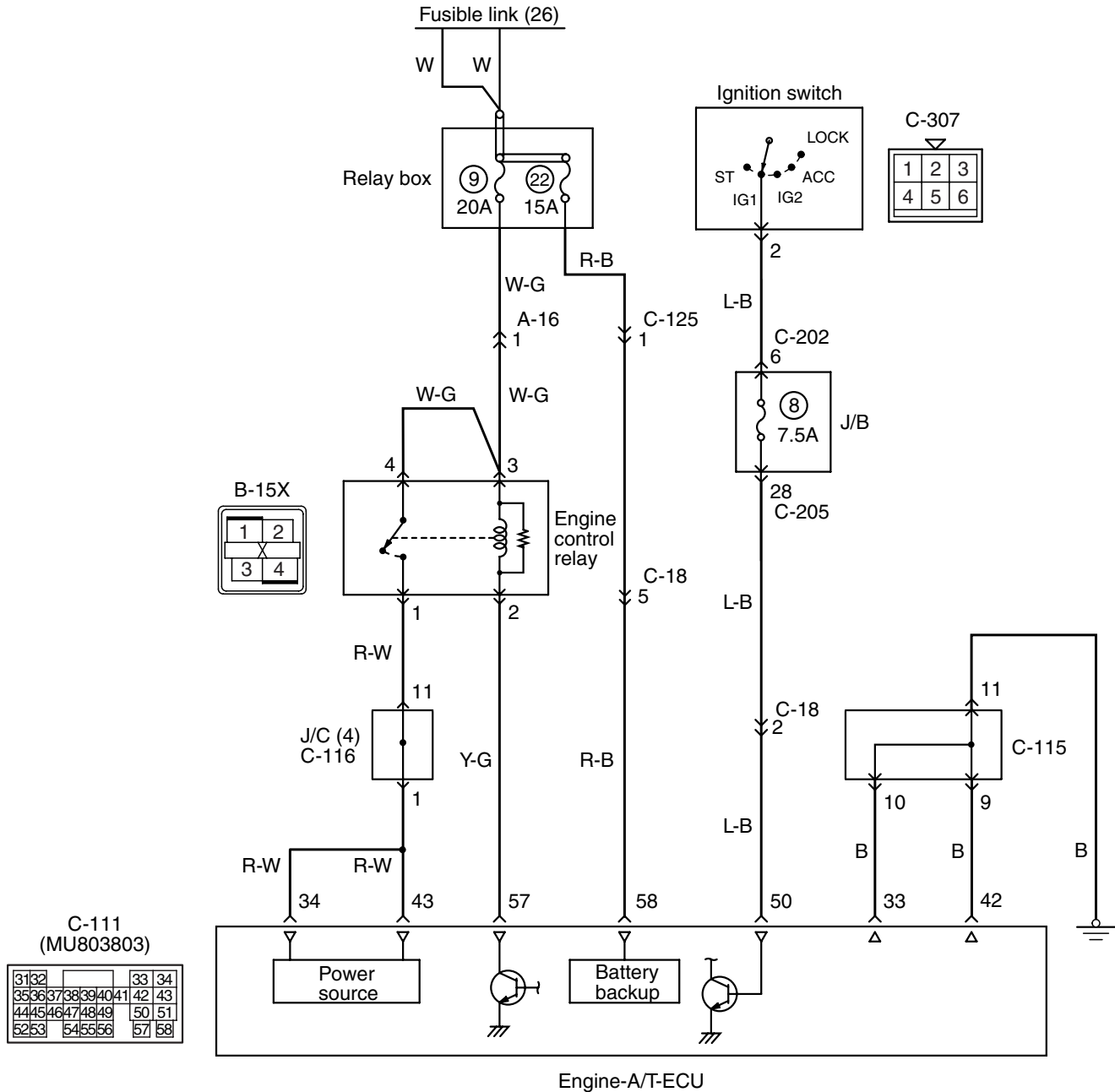
Q: Is the check result normal?

YES : Check charged amount of A/C refrigerant (Refer to GROUP 55 – On-vehicle Service – Check The Refrigerant Level Test [P.55-206](#)).

NO : Check fan control relay system (Refer to Inspection Procedure 24 [P.13B-235](#)).

Inspection Procedure 22: Engine-A/T-ECU Power Supply, Engine Control Relay, Ignition Switch-IG1 System

Power supply and ignition switch-IG 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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OPERATION

- The battery voltage is applied to the engine control relay (terminal No. 3 and 4).
- The engine-A/T-ECU (terminal No. 57) makes the power transistor in the unit be in ON position and makes currents go on the engine control relay coil, and that makes the relay be in ON position.

- When the engine control relay is in ON position, the battery voltage is supplied to the engine-A/T-ECU (terminal No. 34 and No. 43), sensor and actuator from the engine control relay (terminal No. 1).

FUNCTION

- When the ignition switch ON signal is input to the engine-A/T-ECU, the engine-A/T-ECU places the engine control relay in the ON position. Accordingly, the battery voltage is supplied to the engine-A/T-ECU, sensor and actuator.

PROBABLE CAUSE

- Failed engine control relay
- Failed battery
- Failed ignition switch
- Open/short circuit in engine control relay circuit or loose connector contact
- Open/short circuit in ignition switch-IG1 circuit or loose connector contact
- Open circuit in engine-A/T-ECU circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check battery voltage.

- Measure battery voltage at cranking.

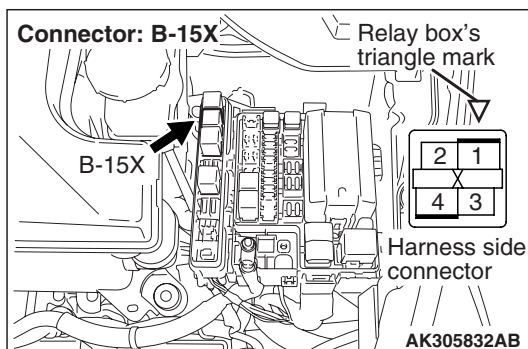
OK: 8 V or more

Q: Is the check result normal?

YES : Go to Step 2 .

NO : Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery test P.54A-6).

STEP 2. Connector check: B-15X engine control relay connector



Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

STEP 3. Check engine control relay itself.

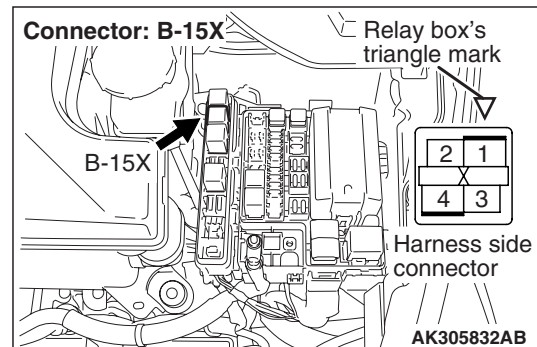
- Check engine control relay itself (Refer to P.13B-287).

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace engine control relay.

STEP 4. Perform voltage measurement at B-15X engine control relay connector.



- Remove relay, and measure at relay box side.
- Voltage between terminal No. 3 and earth, also between terminal No. 4 and earth.

OK: System voltage

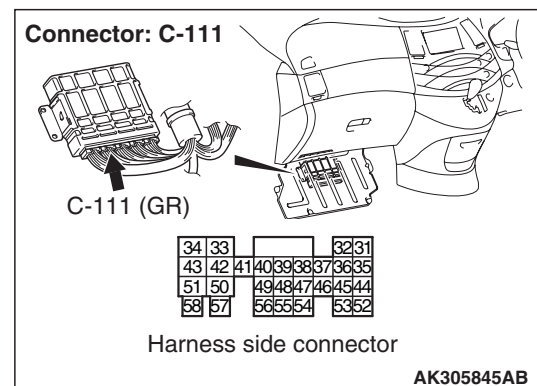
Q: Is the check result normal?

YES : Go to Step 5 .

NO : Check intermediate connector A-16, and repair if necessary. If intermediate connector is normal, check and repair harness between B-15X (terminal No. 3 and terminal No. 4) engine control relay connector and battery.

- Check power supply line for open/short circuit.

STEP 5. Connector check: C-111 engine-A/T-ECU connector

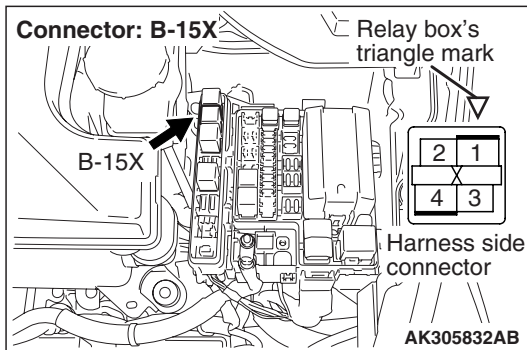
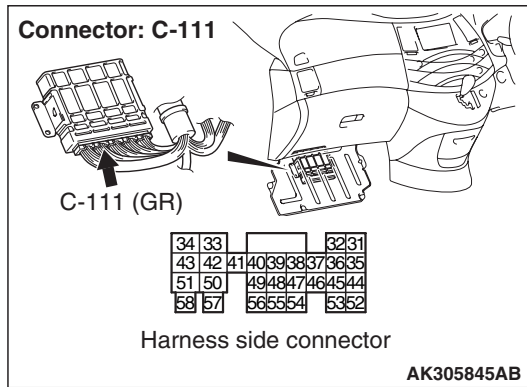


Q: Is the check result normal?

YES : Go to Step 6 .

NO : Repair or replace.

STEP 6. Perform voltage measurement at C-111 engine-A/T-ECU connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 34 and earth, also between terminal No. 43 and earth.

OK: System voltage

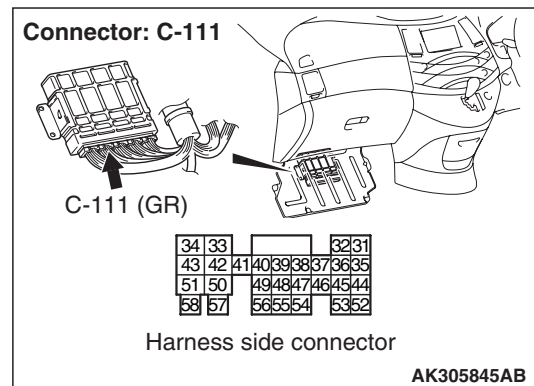
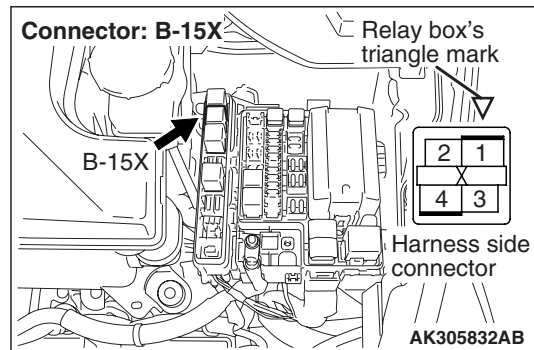
Q: Is the check result normal?

YES : Check and repair harness between B-15X (terminal No. 2) engine control relay connector and C-111 (terminal No. 57) engine-A/T-ECU connector.

- Check earthing line for short circuit.

NO : Go to Step 7 .

STEP 7. Check harness between B-15X (terminal No. 1) engine control relay connector and C-111 (terminal No. 34 and No. 43) engine-A/T-ECU connector.



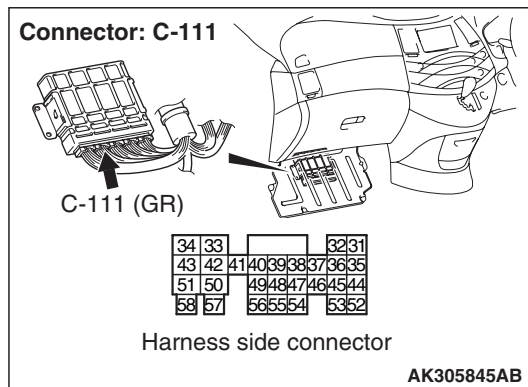
NOTE: Before checking harness, check intermediate connector C-116, and repair if necessary.

- Check power supply line for open/short circuit and damage.

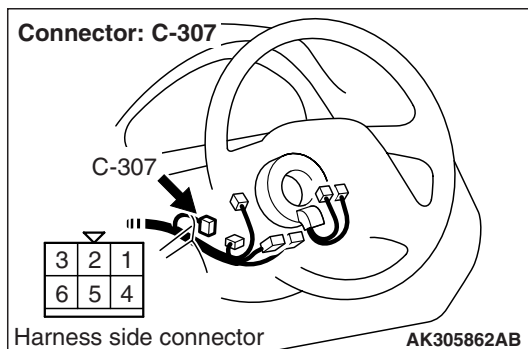
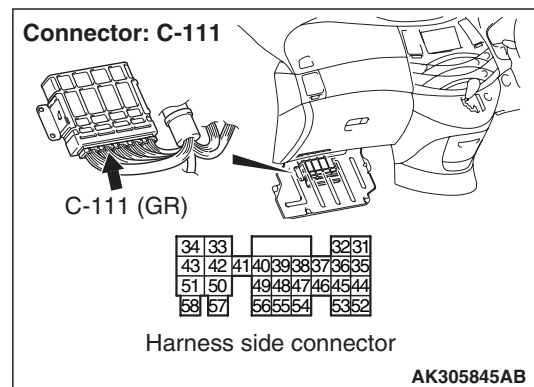
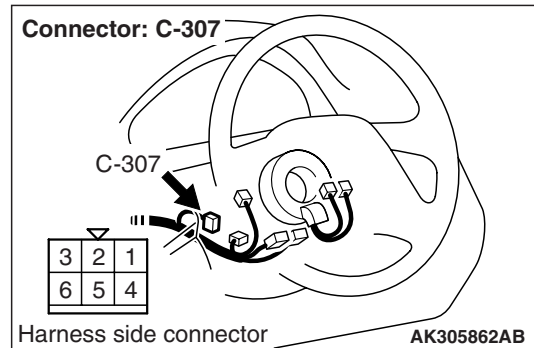
Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair.

STEP 8. Perform voltage measurement at C-111 engine-A/T-ECU connector.

- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 50 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 11 .**NO :** Go to Step 9 .**STEP 9. Connector check: C-307 ignition switch connector****Q: Is the check result normal?****YES :** Go to Step 10 .**NO :** Repair or replace.**STEP 10. Check ignition switch itself.**

- Check ignition switch itself (Refer to GROUP 54A – Ignition Switch – Ignition Switch – Inspection P.54A-49).

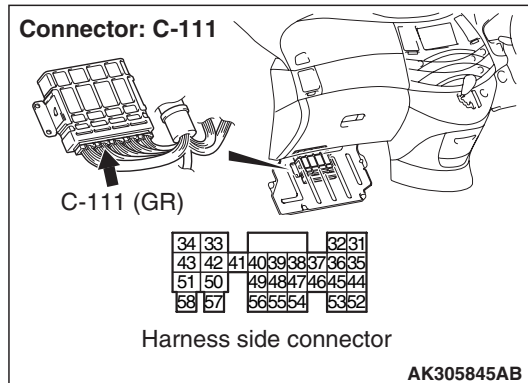
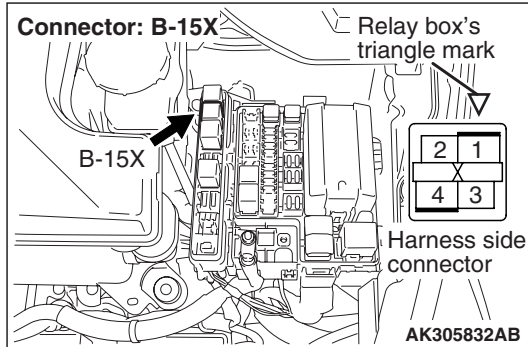
Q: Is the check result normal?

YES : Check intermediate connector C-18, C-205 and C-202, and repair if necessary. If intermediate connector is normal, check and repair harness between C-307 (terminal No. 2) ignition switch connector and C-111 (terminal No. 50) engine-A/T-ECU connector.

- Check output line for open/short circuit.

NO : Replace ignition switch.

STEP 11. Check harness between B-15X (terminal No. 2) engine control relay connector and C-111 (terminal No. 57) engine-A/T-ECU connector.



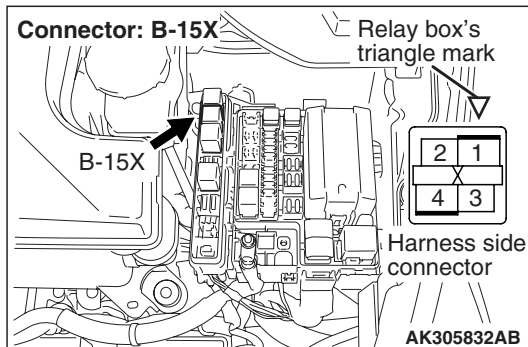
- Check earthing line for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair.

STEP 12. Check harness between B-15X (terminal No. 3 and No. 4) engine control relay connector and battery.



NOTE: Before checking harness, check intermediate connector A-16, and repair if necessary.

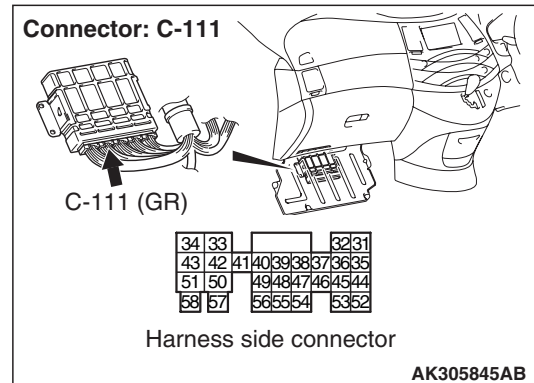
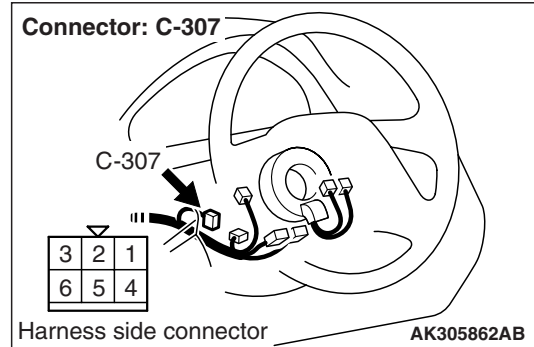
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair.

STEP 13. Check harness between C-307 (terminal No. 2) ignition switch connector and C-111 (terminal No. 50) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connectors C-18, C-205 and C-202 and repair if necessary.

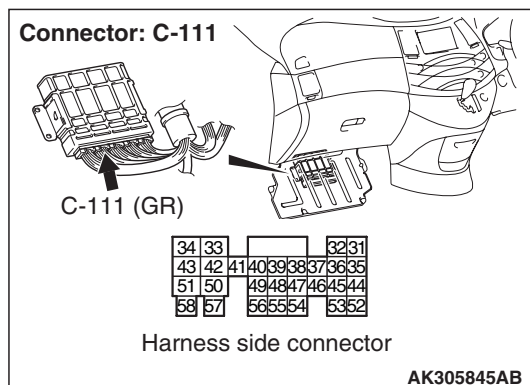
- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair.

STEP 14. Check harness between C-111 (terminal No. 33 and No. 42) engine-A/T-ECU connector and body earth.



NOTE: Before checking harness, check intermediate connector C-115 and repair if necessary.

- Check earthing line for damage.

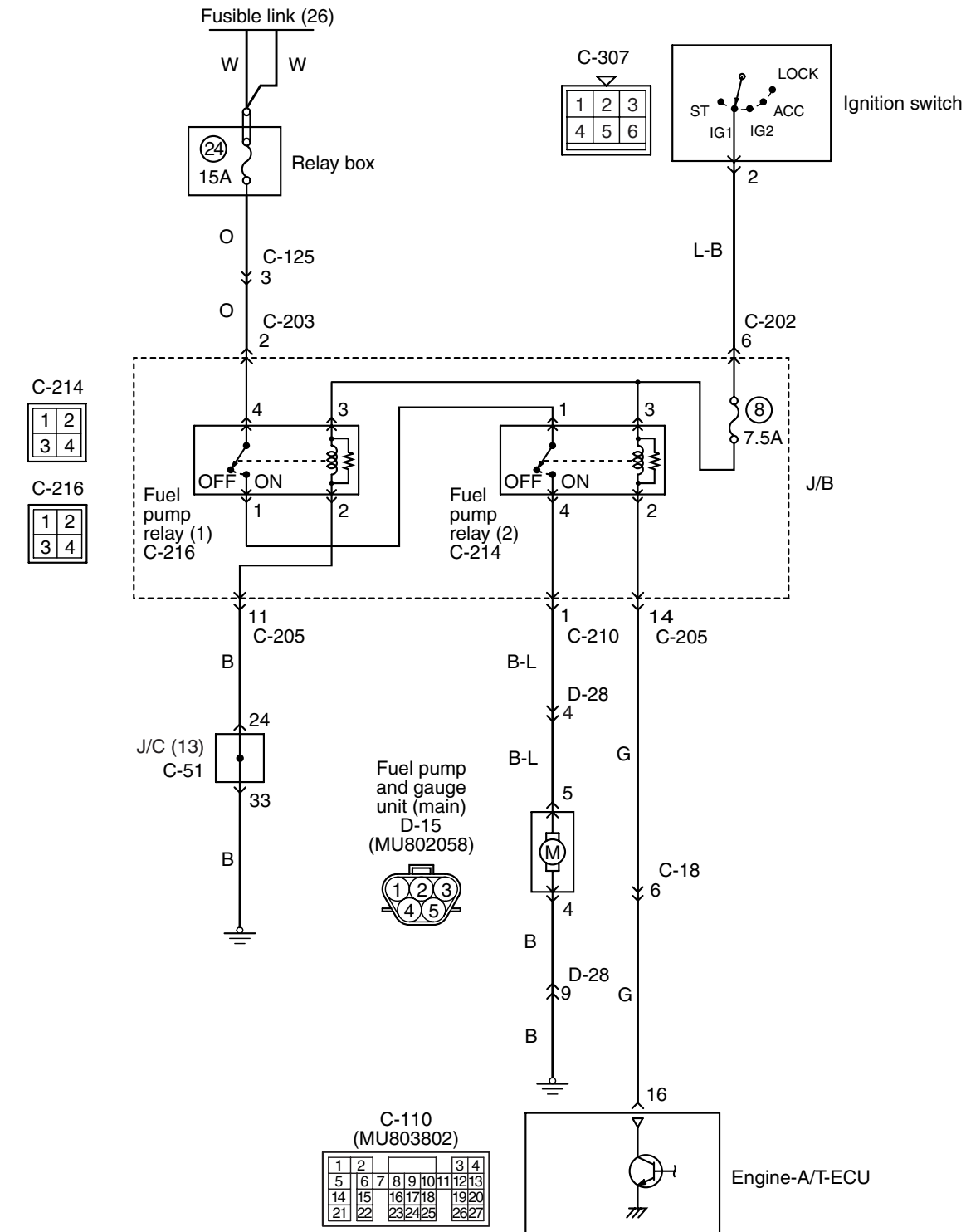
Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Repair.

Inspection Procedure 23: Fuel Pump System

Fuel pump and gauge unit (main) circuit



OPERATION

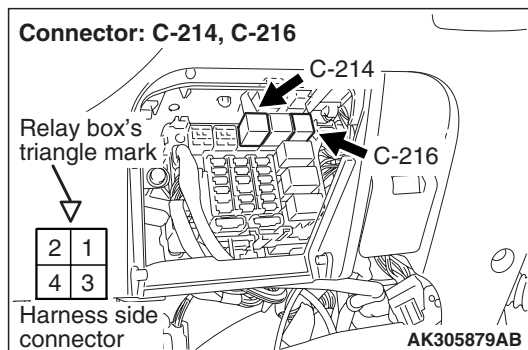
- The battery voltage is applied to the fuel pump relay (1) (terminal No. 3) from the ignition switch and is earthed to the vehicle body from the fuel pump relay (1) (terminal No. 2).
- The battery voltage is applied to the fuel pump relay (1) (terminal No. 4) and to the fuel pump relay (2) (terminal No. 1) from the fuel pump relay (1) (terminal No. 1).
- The battery voltage is applied to the fuel pump relay (2) (terminal No. 3) from the ignition switch. The engine-A/T-ECU (terminal No. 16) makes the power transistor in the unit be in ON position and makes currents go on the fuel pump relay (2) coil, and that makes the relay be in ON position.
- When the fuel pump relay (2) is in ON position, the battery voltage is supplied to the fuel pump (low pressure) from the fuel pump relay (2) (terminal No. 4).

FUNCTION

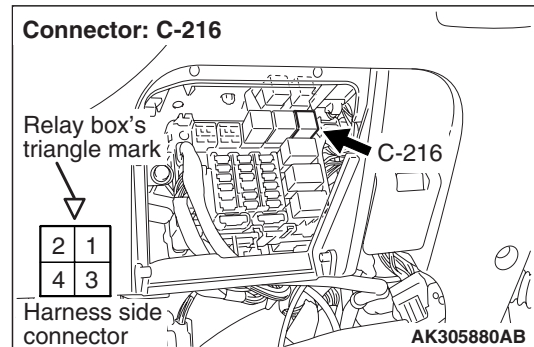
- When the ignition switch ON signal is input to the engine-A/T-ECU, the engine-A/T-ECU places the fuel pump relay in the ON position. Accordingly, the battery voltage is supplied to the fuel pump.

PROBABLE CAUSE

- Failed fuel pump relay
- Failed fuel pump
- Open/short circuit in fuel pump drive circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Connector check: C-216 fuel pump relay (1) connector and C-214 fuel pump relay (2) connector****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Repair or replace.**STEP 2. Check fuel pump relay.**

- Fuel pump relay, continuity check (Refer to P.13B-287).

Q: Is the check result normal?**YES :** Go to Step 3 .**NO :** Replace fuel pump relay.**STEP 3. Perform resistance measurement at C-216 fuel pump relay (1) connector.**

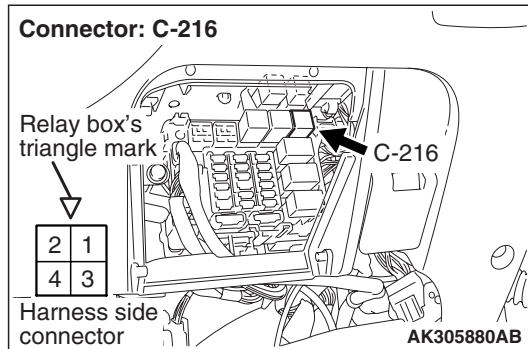
- Remove relay, and measure at junction block side.
- Resistance between terminal No. 2 and earth.

OK: 2 Ω or less**Q: Is the check result normal?****YES :** Go to Step 4 .

NO : Check intermediate connector C-205 and C-51, and repair if necessary. If intermediate connector is normal, check and repair harness between C-216 (terminal No. 2) fuel pump relay (1) connector and body earth.

- Check earthing line for open circuit and damage.

STEP 4. Perform voltage measurement at C-216 fuel pump relay (1) connector.



- Remove relay, and measure at junction block side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

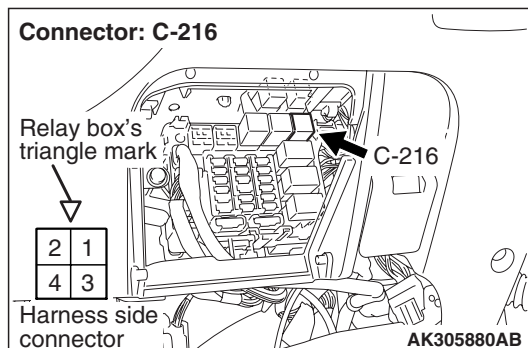
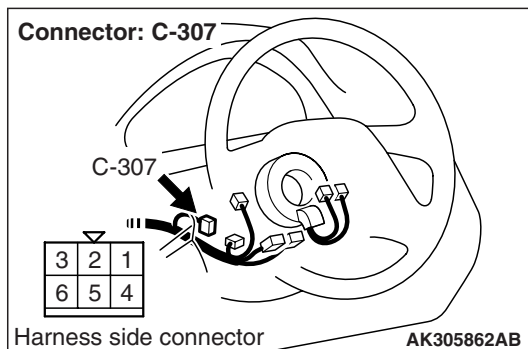
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Go to Step 5 .

STEP 5. Connector check: C-307 ignition switch connector



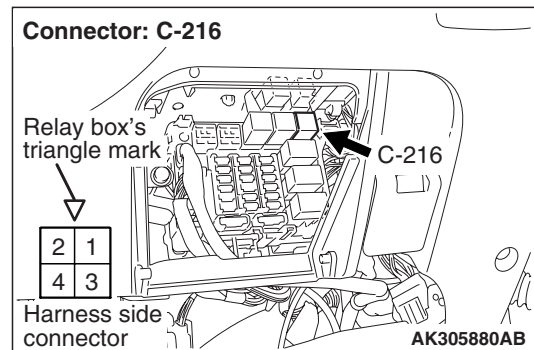
Q: Is the check result normal?

YES : Check intermediate connector C-202, and repair if necessary. If intermediate connector is normal, check and repair harness between C-216 (terminal No. 3) fuel pump relay (1) connector and C-307 (terminal No. 2) ignition switch connector.

- Check power supply line for open circuit and damage.

NO : Repair or replace.

STEP 6. Perform voltage measurement at C-216 fuel pump relay (1) connector.



- Remove relay, and measure at junction block side.
- Voltage between terminal No. 4 and earth.

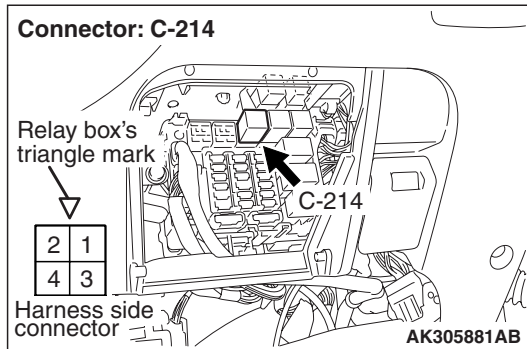
OK: System voltage

Q: Is the check result normal?

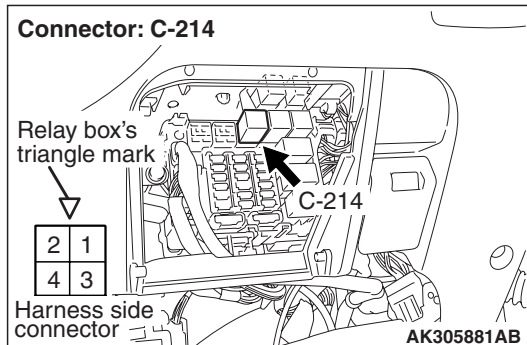
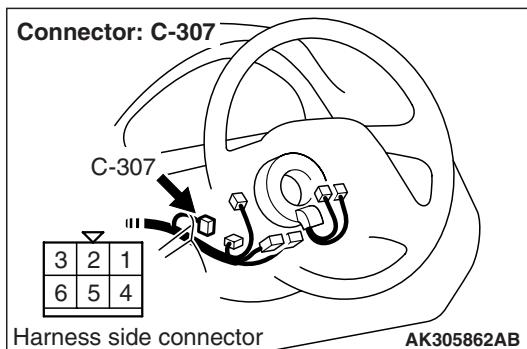
YES : Go to Step 7 .

NO : Check intermediate connectors C-125 and C-203, and repair if necessary. If intermediate connectors are normal, check and repair harness between C-216 (terminal No. 4) fuel pump relay (1) connector and battery.

- Check power supply line for open/short circuit.

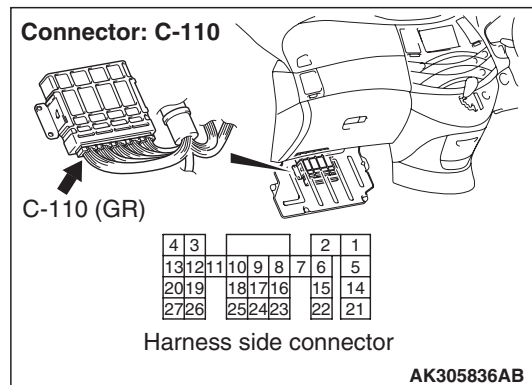
STEP 7. Perform voltage measurement at C-214 fuel pump relay (2) connector.

- Remove relay, and measure at junction block side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

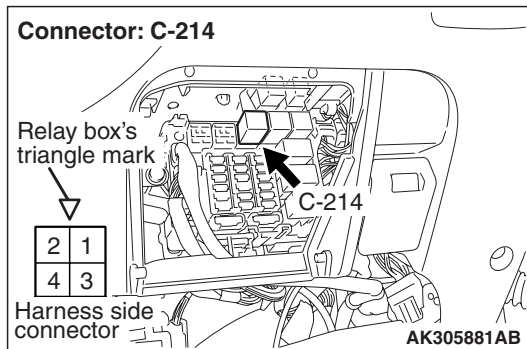
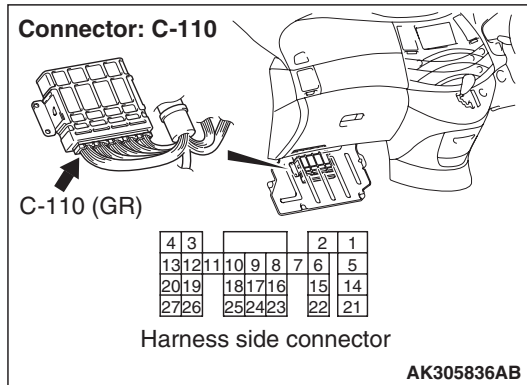
OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 9 .**NO :** Go to Step 8 .**STEP 8. Connector check: C-307 ignition switch connector****Q: Is the check result normal?**

YES : Check intermediate connector C-202, and repair if necessary. If intermediate connector is normal, check and repair harness between C-307 (terminal No. 2) ignition switch connector and C-214 (terminal No. 3) fuel pump relay (2) connector.

- Check power supply line for open circuit.

NO : Repair or replace.**STEP 9. Connector check: C-110 engine-A/T-ECU connector****Q: Is the check result normal?****YES :** Go to Step 10 .**NO :** Repair or replace.

STEP 10. Perform voltage measurement at C-110 engine-A/T-ECU connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 16 and earth.

OK: System voltage

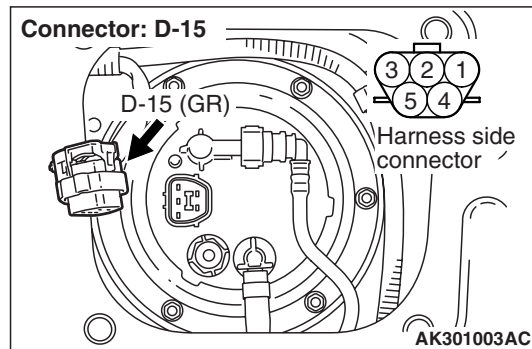
Q: Is the check result normal?

YES : Go to Step 11 .

NO : Check intermediate connectors C-18 and C-205, and repair if necessary. If intermediate connectors are normal, check and repair harness between C-214 (terminal No. 2) fuel pump relay (2) connector and C-110 (terminal No. 16) engine-A/T-ECU connector.

- Check earthing line for open/short circuit.

STEP 11. Connector check: D-15 fuel pump connector

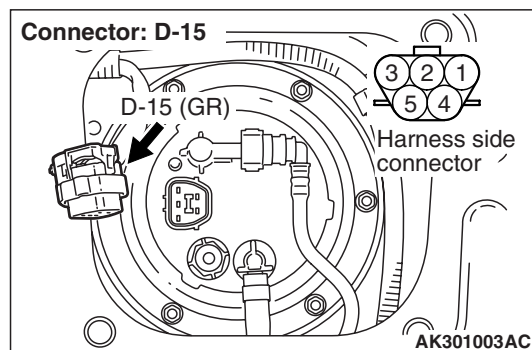


Q: Is the check result normal?

YES : Go to Step 12 .

NO : Repair or replace.

STEP 12. Perform voltage measurement at D-15 fuel pump connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Using a jumper wire, connect C-110 (terminal No. 16) engine-A/T-ECU connector and earth.
- Voltage between terminal No. 5 and earth.

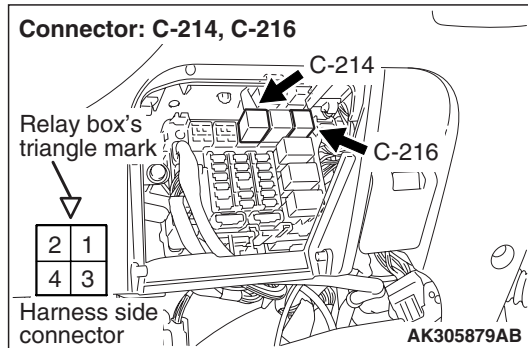
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Go to Step 13 .

STEP 13. Check harness between C-216 (terminal No. 1) fuel pump relay (1) connector and C-214 (terminal No. 1) fuel pump relay (2) connector.



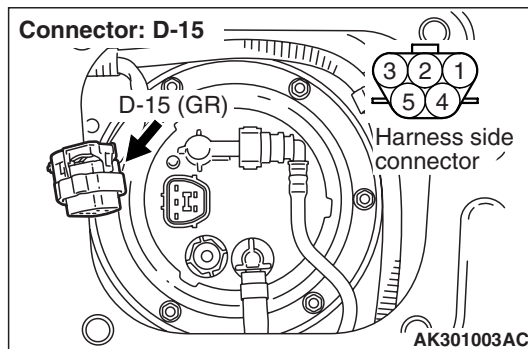
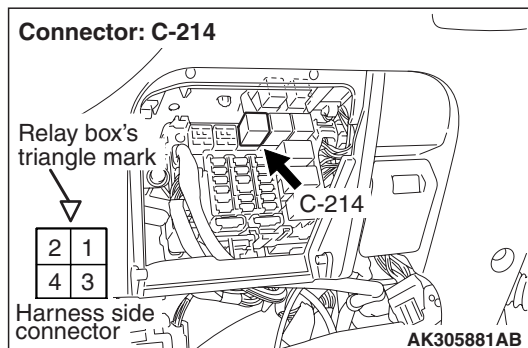
- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 14

NO : Repair.

STEP 14. Check harness between C-214 (terminal No. 4) fuel pump relay (2) connector and D-15 (terminal No. 5) fuel pump connector.



NOTE: Before checking harness, check intermediate connectors C-210 and D-28, and repair if necessary.

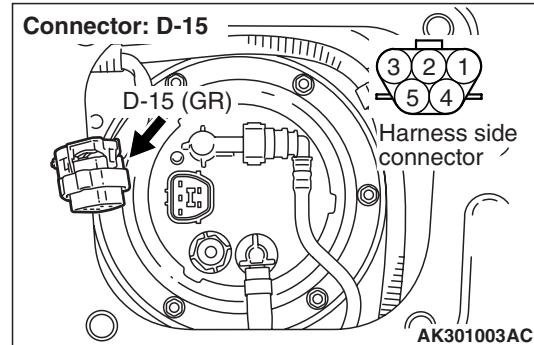
- Check power supply line for open/short circuit and damage.

Q: Is the check result normal?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table P.54A-9).

NO : Repair.

STEP 15. Perform resistance measurement at D-15 fuel pump connector.



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

OK: 2 Ω or less

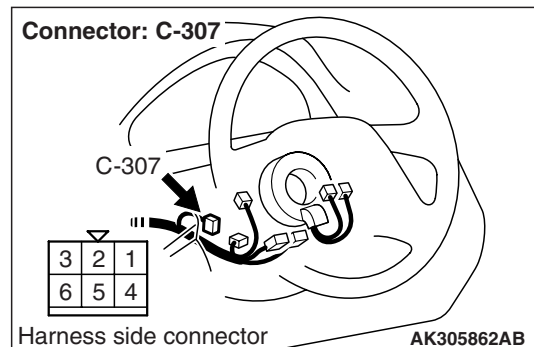
Q: Is the check result normal?

YES : Go to Step 16 .

NO : Check intermediate connector D-28, and repair if necessary. If intermediate connector is normal, check and repair harness between D-15 (terminal No. 4) fuel pump connector and body earth.

- Check earthing line for open circuit and damage.

STEP 16. Connector check: C-307 ignition switch connector

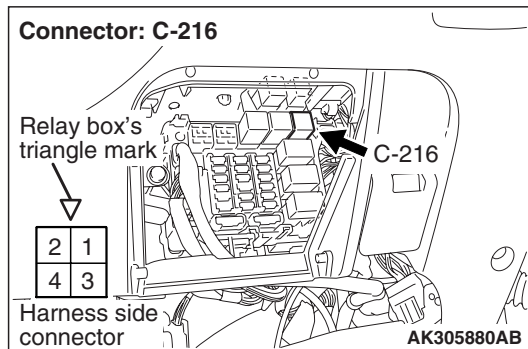
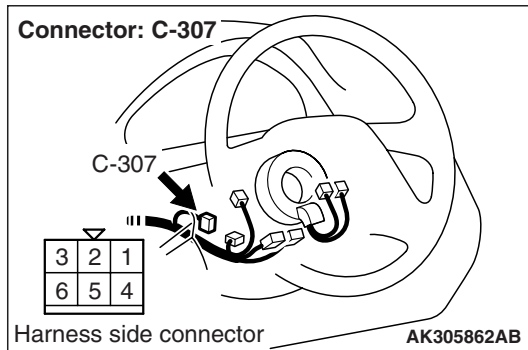


Q: Is the check result normal?

YES : Go to Step 17 .

NO : Repair or replace.

STEP 17. Check harness between C-307 (terminal No. 2) ignition switch connector and C-216 (terminal No. 3) fuel pump relay (1) connector.



NOTE: Before checking harness, check intermediate connector C-202, and repair if necessary.

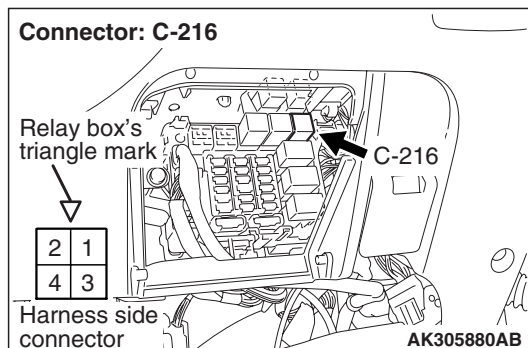
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 18 .

NO : Repair.

STEP 18. Check harness between battery and C-216 (terminal No. 4) fuel pump relay (1) connector.



NOTE: Before checking harness, check intermediate connectors C-203, C-125, and repair if necessary.

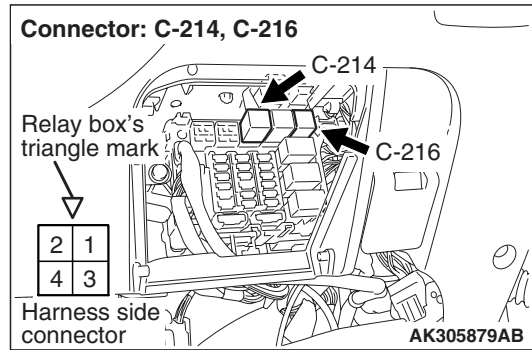
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 19 .

NO : Repair.

STEP 19. Check harness between C-216 (terminal No. 1) fuel pump relay (1) connector and C-214 (terminal No. 1) fuel pump relay (2) connector.



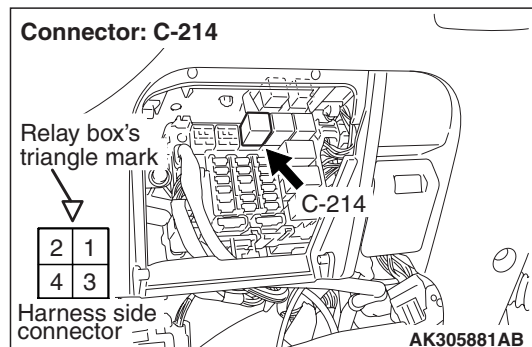
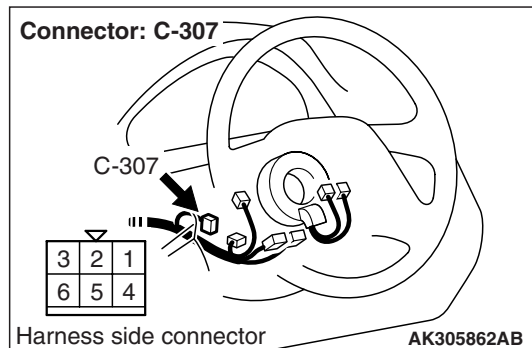
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 20 .

NO : Repair.

STEP 20. Check harness between C-307 (terminal No. 2) ignition switch connector and C-214 (terminal No. 3) fuel pump relay (2) connector.



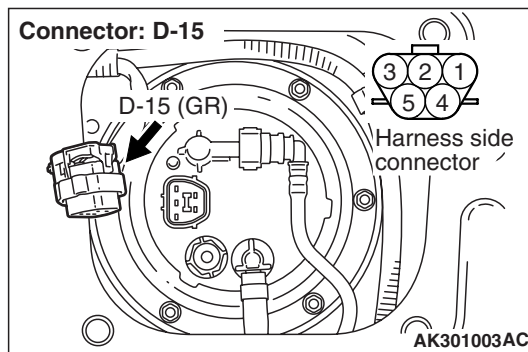
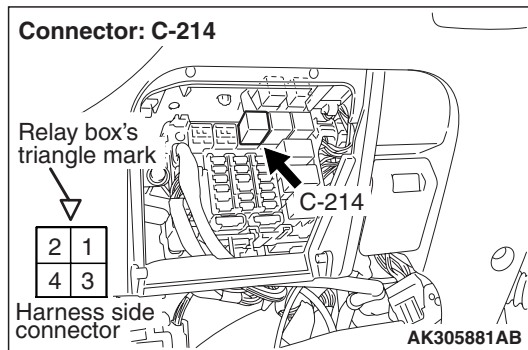
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 21 .

NO : Repair.

STEP 21. Check harness between C-214 (terminal No. 4) fuel pump relay (2) connector and D-15 (terminal No. 5) fuel pump connector.



NOTE: Before checking harness, check intermediate connectors D-28 and C-210, and repair if necessary.

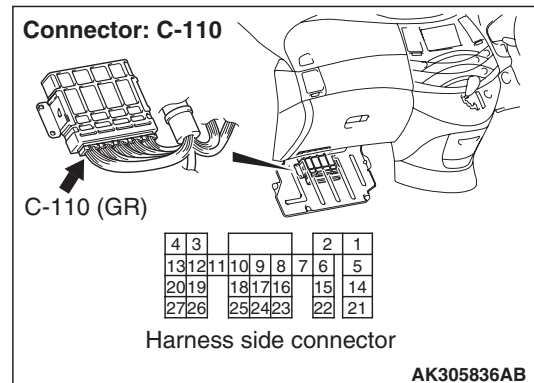
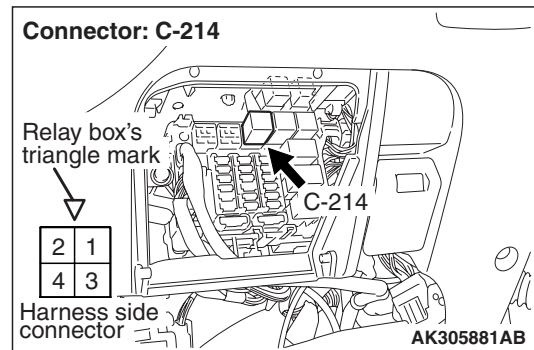
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 22 .

NO : Repair.

STEP 22. Check harness between C-214 (terminal No. 2) fuel pump relay (2) connector and C-110 (terminal No. 16) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connectors C-18 and C-205, and repair if necessary.

- Check earthing line for damage.

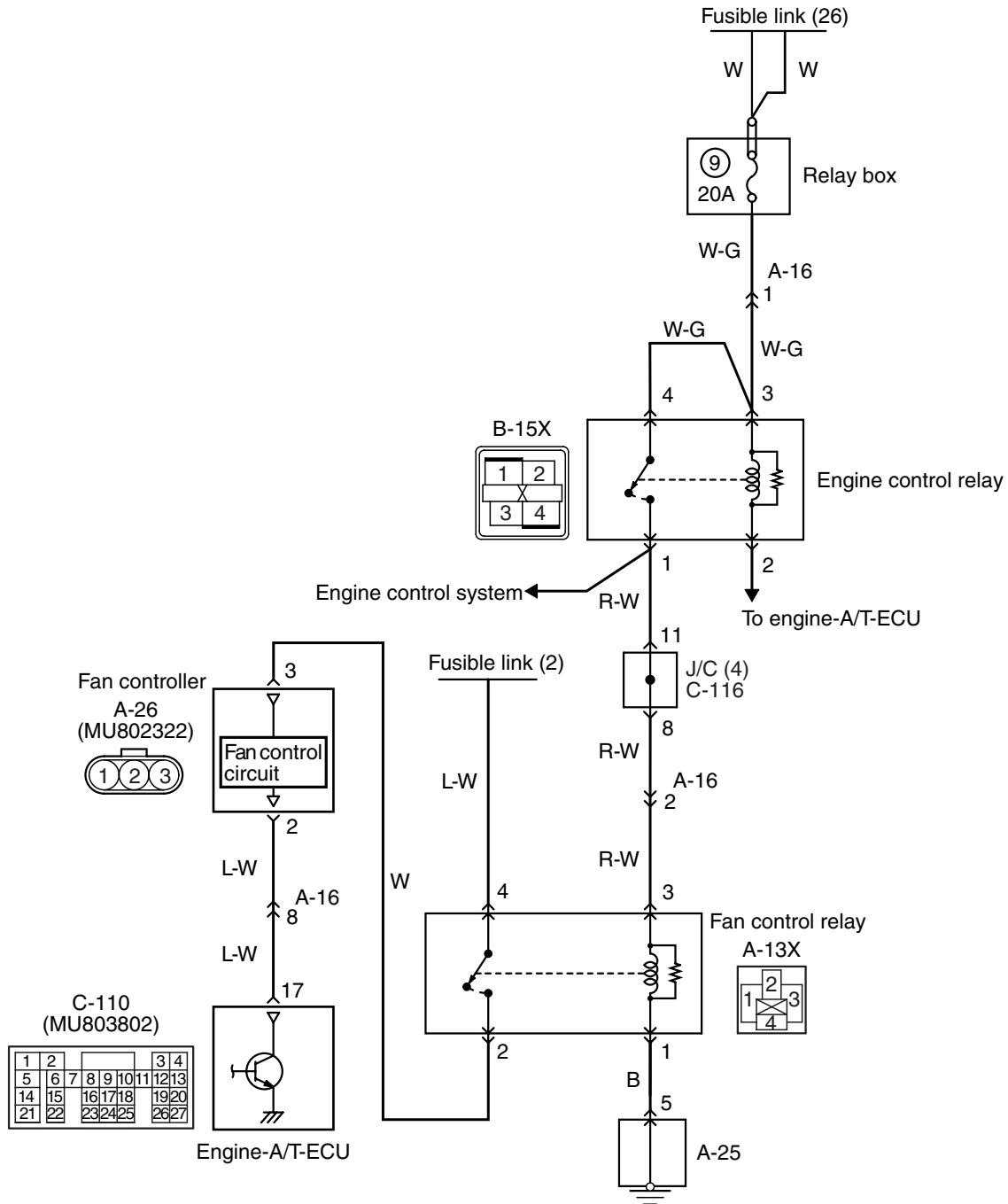
Q: Is the check result normal?

YES : Replace fuel pump.

NO : Repair.

Inspection Procedure 24: Fan Control Relay System

Fan control relay 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

AK305580AC

OPERATION

- The battery voltage is applied to the fan control relay (terminal No. 3) from the engine control

relay (terminal No. 1) and is earthed to the vehicle body from the fan control relay (terminal No. 1).

- 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

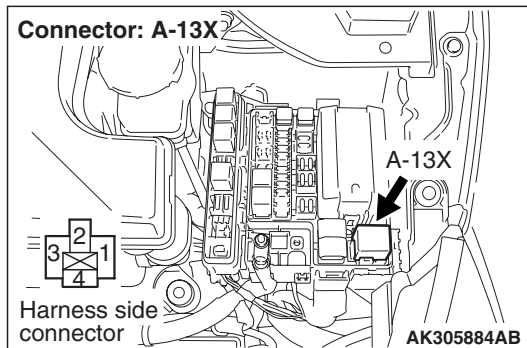
- When the engine control relay is in ON position, the fan control relay is also simultaneously placed in ON position. Accordingly, the battery voltage is supplied to the fan controller.

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-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: A-13X fan control relay connector



Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. Check fan control relay.

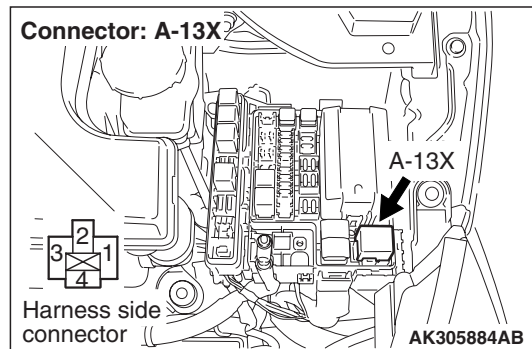
- Check fan control relay (Refer to GROUP 14 – On-vehicle Service – Fan Control Relay Continuity Check [P.14-20](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace fan control relay.

STEP 3. Perform resistance measurement at A-13X fan control relay connector.



- Remove relay and measure at relay box side.
- Resistance between terminal No. 1 and earth.

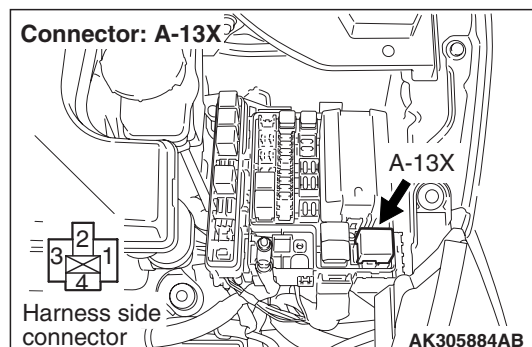
OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 4 .

- NO :**
- Check earth connector A-25, and repair if necessary. If earth connector is normal, check and repair harness between A-13X (terminal No. 1) fan control relay connector and A-25 (terminal No. 5) earth connector.
 - Check earthing line for open circuit and damage.

STEP 4. Perform voltage measurement at A-13X fan control relay connector.



- Remove relay and measure at relay box side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

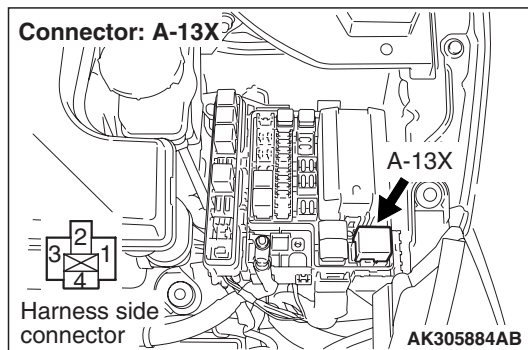
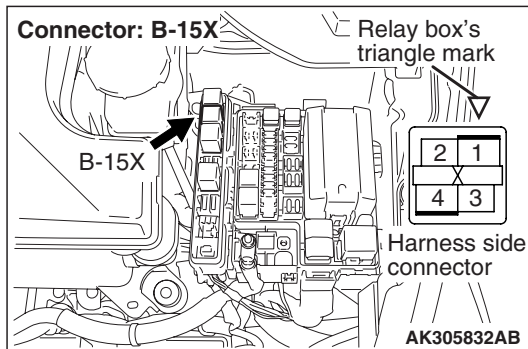
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector



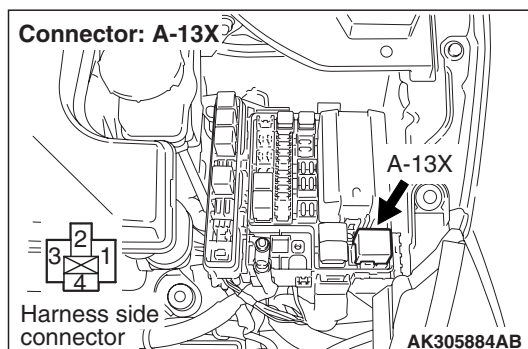
Q: Is the check result normal?

YES : Check intermediate connectors A-16 and C-116, and repair if necessary. If intermediate connectors are normal, check and repair harness between B-15X (terminal No. 1) engine control relay connector and A-13X (terminal No. 3) fan control relay connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 6. Perform voltage measurement at A-13X fan control relay connector.



- Remove relay, and measure at relay box side.
- Voltage between terminal No. 4 and earth.

OK: System voltage

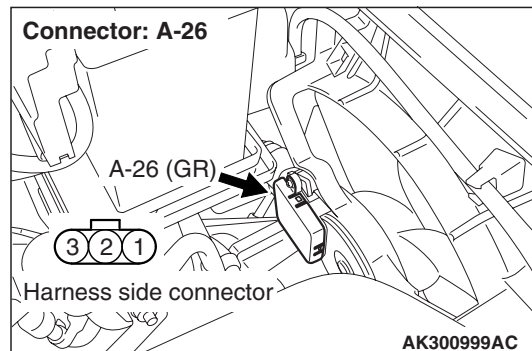
Q: Is the check result normal?

YES : Go to Step 7 .

NO : Check and repair harness between battery and A-13X (terminal No. 4) fan control relay connector.

- Check power supply line for open/short circuit.

STEP 7. Connector check: A-26 fan controller connector

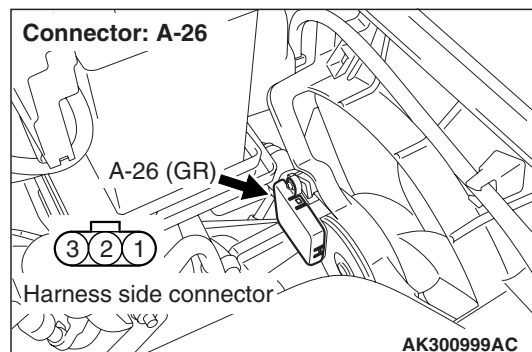


Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair or replace.

STEP 8. Perform voltage measurement at A-26 fan controller connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

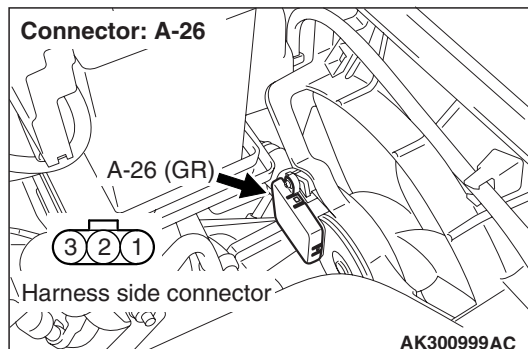
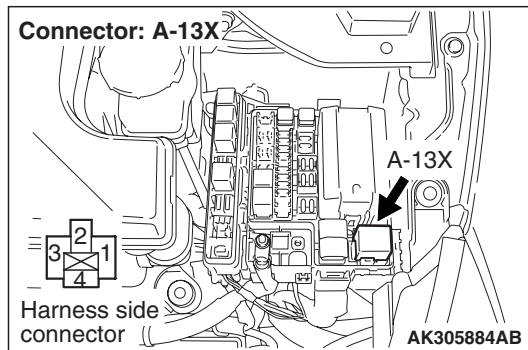
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Go to Step 9 .

STEP 9. Check harness between A-13X (terminal No. 2) fan control relay connector and A-26 (terminal No. 3) fan controller connector.



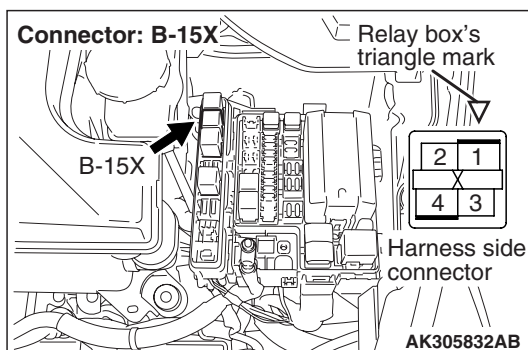
- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. Connector check: B-15X engine control relay connector

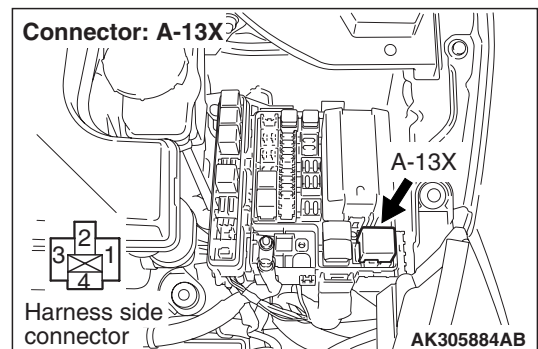
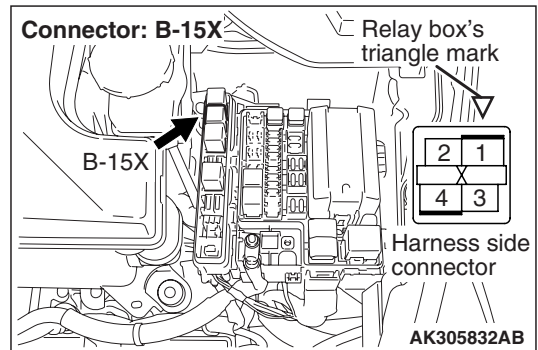


Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair or replace.

STEP 11. Check harness between B-15X (terminal No. 1) engine control relay connector and A-13X (terminal No. 3) fan control relay connector.



NOTE: Before checking harness, check intermediate connectors A-16 and C-116, and repair if necessary.

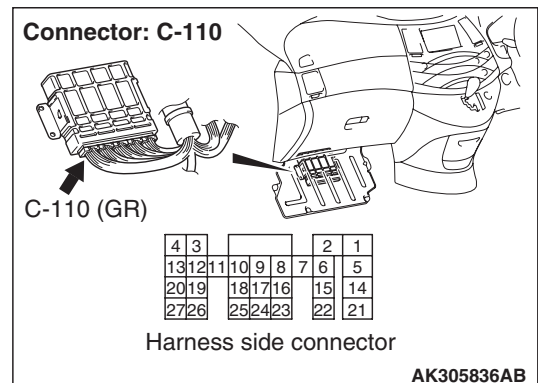
- Check power supply line for damage.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

NO : Repair.

STEP 12. Connector check: C-110 engine-A/T-ECU connector

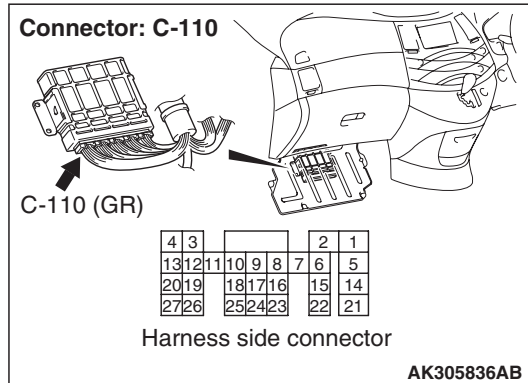


Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair or replace.

STEP 13. Fan motor drive test.



- Disconnect C-110 engine-A/T-ECU connector.
- Ignition switch: ON

OK: Fan motor rotates.

Q: Is the check result normal?

YES : Go to Step 14 .

NO : Go to Step 15 .

STEP 14. M.U.T.-III actuator test

- Item 21: Fan controller

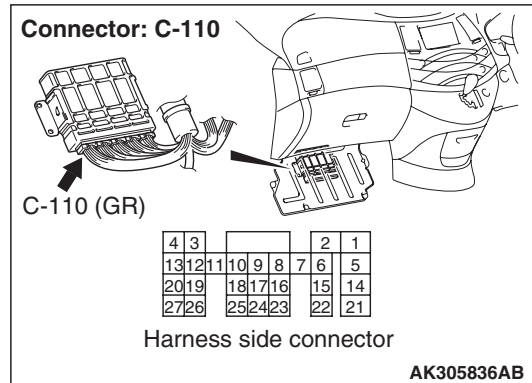
OK: Fan motor rotates.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 15. Perform voltage measurement at C-110 engine-A/T-ECU connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 17 and earth.

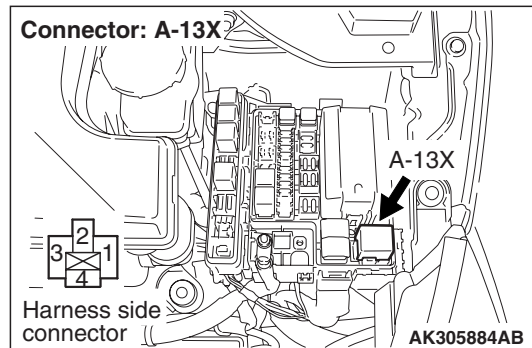
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Go to Step 18 .

STEP 16. Check harness between A-13X (terminal No. 4) fan control relay connector and battery.



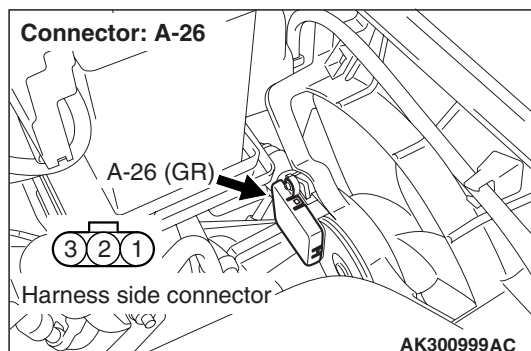
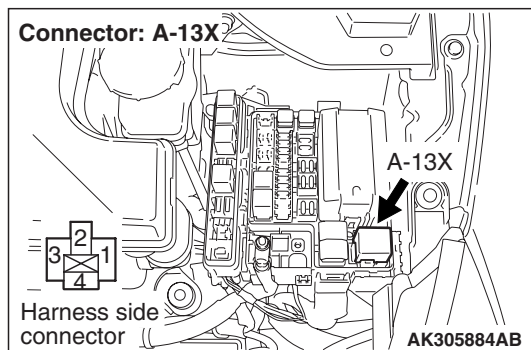
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 17 .

NO : Repair.

STEP 17. Check harness between A-13X (terminal No. 2) fan control relay connector and A-26 (terminal No. 3) fan controller connector.



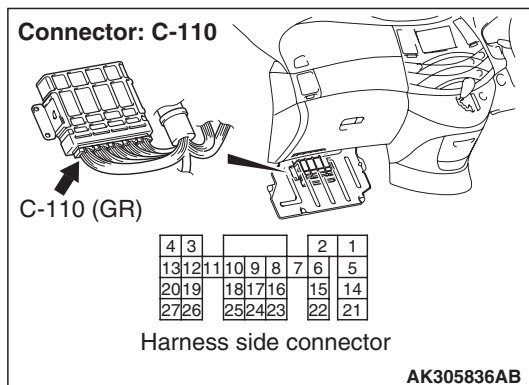
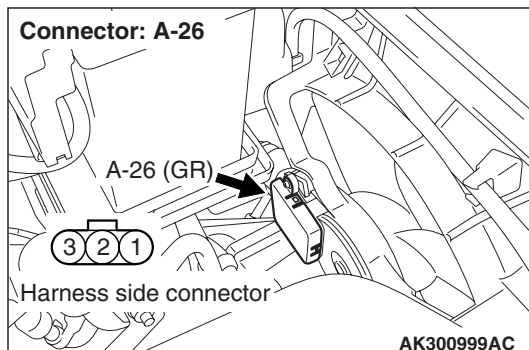
- Check power supply line for damage.

Q: Is the check result normal?

YES : Replace fan motor and fan controller.

NO : Repair.

STEP 18. Check harness between A-26 (terminal No. 2) fan controller connector and C-110 (terminal No. 17) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector A-16, and repair if necessary.

- Check earthing line for short circuit.

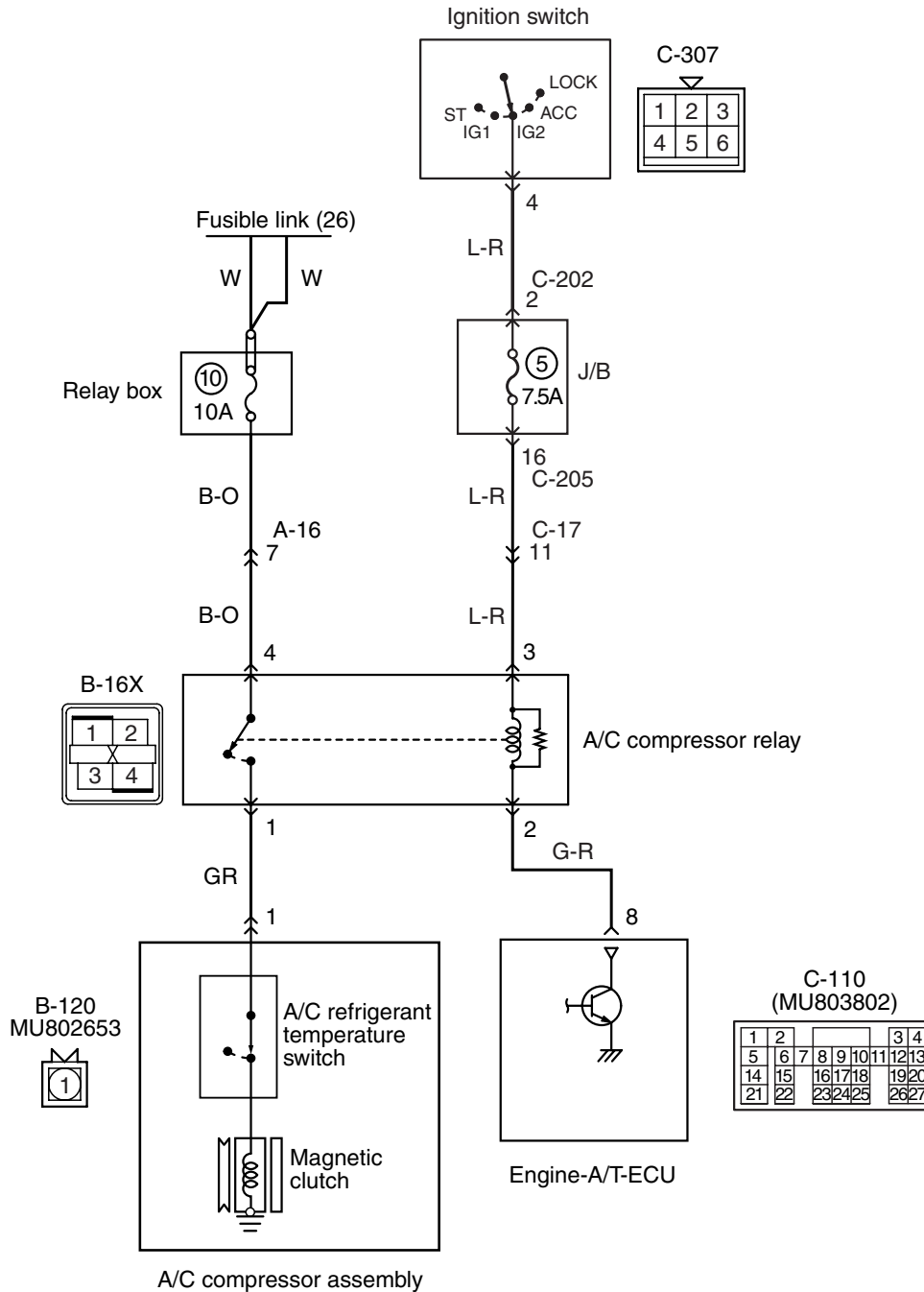
Q: Is the check result normal?

YES : Replace fan motor and fan controller.

NO : Repair.

Inspection Procedure 25: A/C Compressor Relay System

A/C compressor relay circuit



AK501581 AB

OPERATION

- The battery voltage is applied to the A/C compressor relay (terminal No. 4).

- The battery voltage is applied to the A/C compressor relay (terminal No. 3) from the ignition switch. The engine-A/T-ECU (terminal No. 8) makes the power transistor in the unit be in ON position and makes currents go on the A/C compressor relay coil, and that makes the relay be in ON position.
- When the A/C compressor relay is in ON position, the battery voltage is supplied to the A/C compressor (terminal No. 1) from the A/C compressor relay (terminal No. 1).

FUNCTION

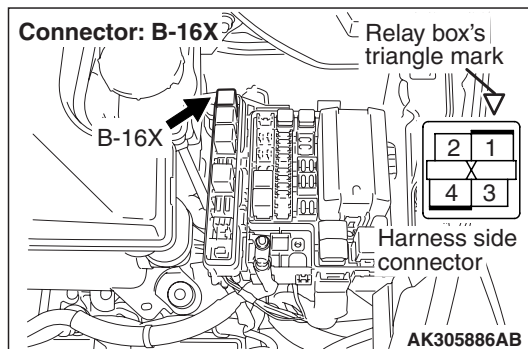
- When the A/C switch ON signal is input to the engine-A/T-ECU, the engine-A/T-ECU places the A/C compressor relay in the ON position. Accordingly, the battery voltage supplied to the A/C compressor operates the magnetic clutch.

PROBABLE CAUSE

- Failed A/C compressor relay
- Failed A/C compressor
- Open/short circuit in A/C compressor relay circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. Connector check: B-16X A/C compressor relay connector



Q: Is the check result normal?

YES : Go to Step 2 .

NO : Repair or replace.

STEP 2. A/C compressor relay check.

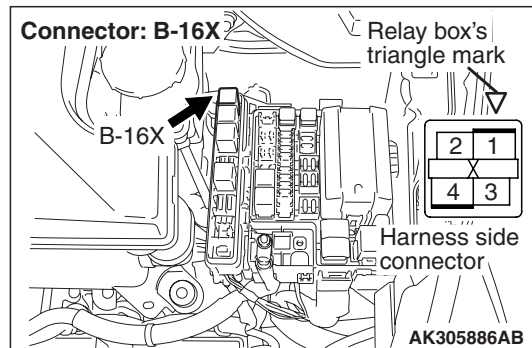
- Check A/C compressor relay (Refer to GROUP 55 – On-vehicle Service [P.55-208](#)).

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Replace A/C compressor relay.

STEP 3. Perform voltage measurement at B-16X A/C compressor relay connector.



- Remove relay, and measure at relay box side.
- Ignition switch: ON
- Voltage between terminal No. 3 and earth.

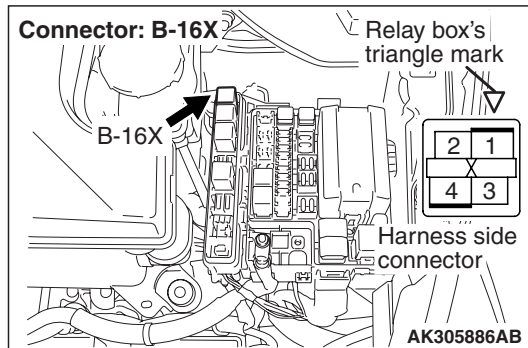
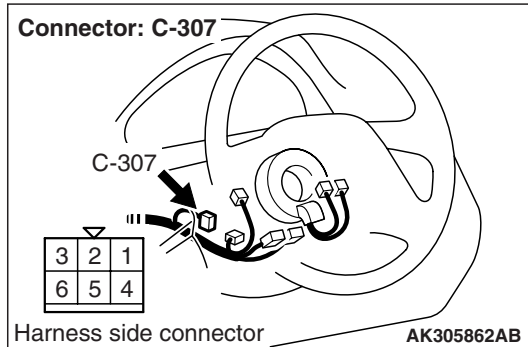
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5 .

NO : Go to Step 4 .

STEP 4. Connector check: C-307 ignition switch connector



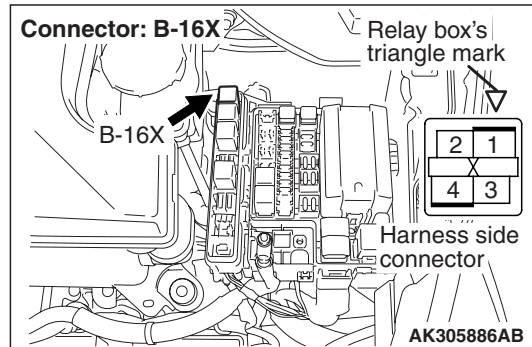
Q: Is the check result normal?

YES : Check intermediate connectors C-17, C-205 and C-202 and repair if necessary. If intermediate connectors are normal, check and repair harness between B-16X (terminal No. 3) A/C compressor relay connector and C-307 (terminal No. 4) ignition switch connector.

- Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 5. Perform voltage measurement at B-16X A/C compressor relay connector.



- Remove relay, and measure at relay box side.
- Voltage between terminal No. 4 and earth.

OK: System voltage

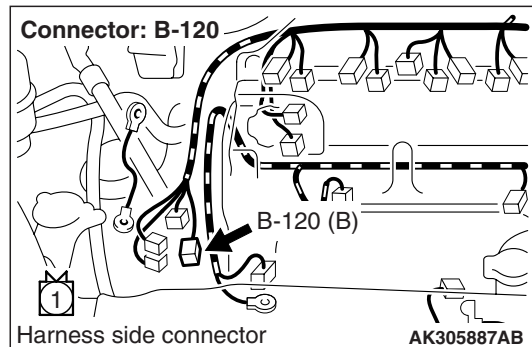
Q: Is the check result normal?

YES : Go to Step 6 .

NO : Check intermediate connector A-16, and repair if necessary. If intermediate connector is normal, check and repair harness between B-16X (terminal No. 4) A/C compressor relay connector and battery.

- Check power supply line for open/short circuit.

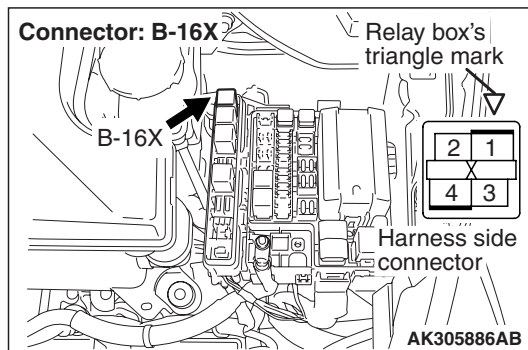
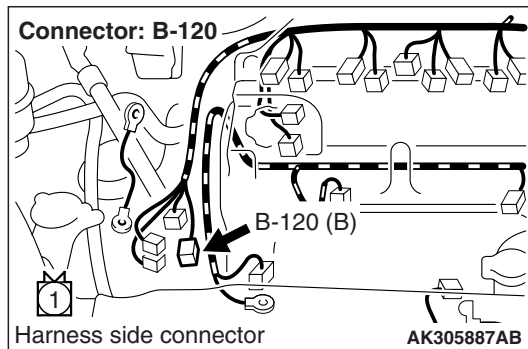
STEP 6. Connector check: B-120 A/C compressor assembly connector



Q: Is the check result normal?

YES : Go to Step 7 .

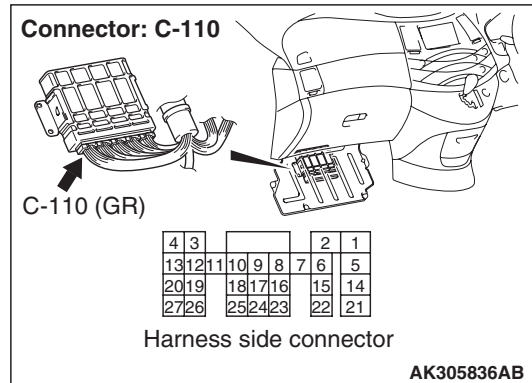
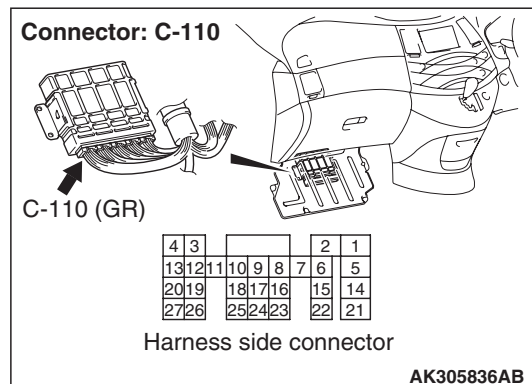
NO : Repair or replace.

STEP 7. Perform voltage measurement at B-120 A/C compressor assembly connector.

- Disconnect connector, and measure at harness side.
- Remove B-16X (terminal No. 1 and No. 4) A/C compressor relay and short-circuit of harness side connector.
- Voltage between terminal No. 1 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 8 .**NO :** Check and repair harness between B-120 (terminal No. 1) A/C compressor assembly connector and B-16X (terminal No. 1) A/C compressor relay connector.

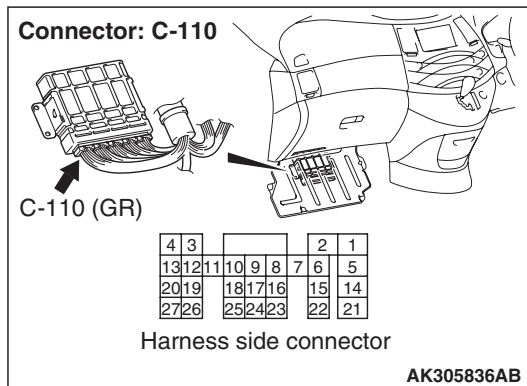
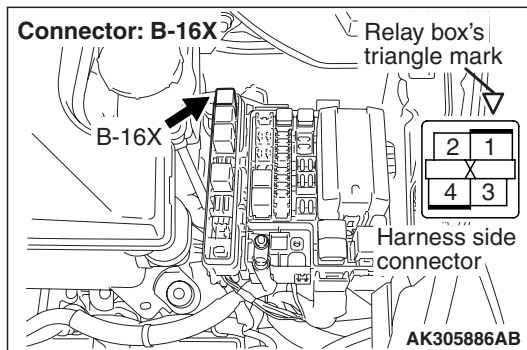
- Check power supply line for open/short circuit.

STEP 8. Connector check: C-110 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 9 .**NO :** Repair or replace.**STEP 9. Perform voltage measurement at C-110 engine-A/T-ECU connector.**

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 8 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 12 .**NO :** Go to Step 10 .

STEP 10. Check harness between B-16X (terminal No. 2) A/C compressor relay connector and C-110 (terminal No. 8) engine-A/T-ECU connector.



- Check earthing line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Repair.

STEP 11. M.U.T.-III data list

- Item 49: A/C relay
 - a. Engine: Idling
 - b. A/C set temperature:
 - Maximum Cool when temperature in cabin is 25°C or higher
 - Maximum Hot when temperature in cabin is 25°C or lower

OK:

ON (when A/C is ON)

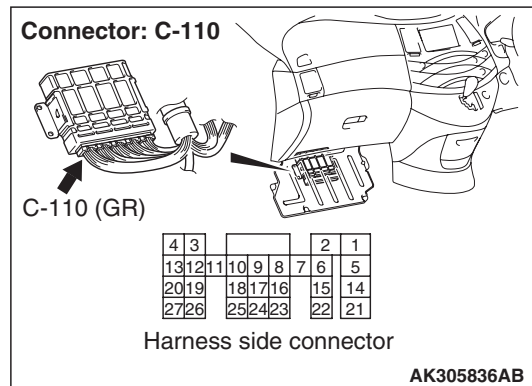
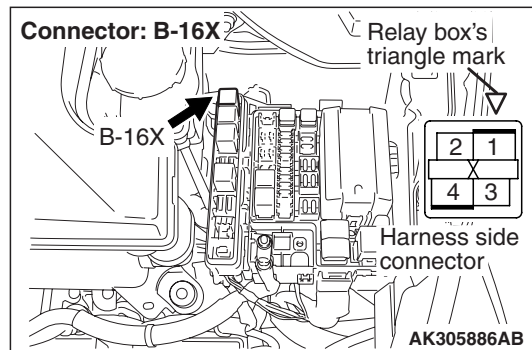
OFF (when A/C is OFF)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

STEP 12. Check harness between B-16X (terminal No. 2) A/C compressor relay connector and C-110 (terminal No. 8) engine-A/T-ECU connector.



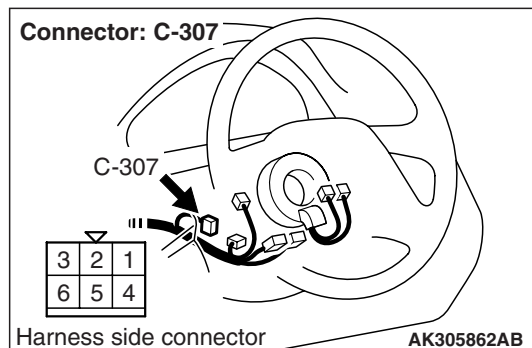
- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair.

STEP 13. Connector check: C-307 ignition switch connector

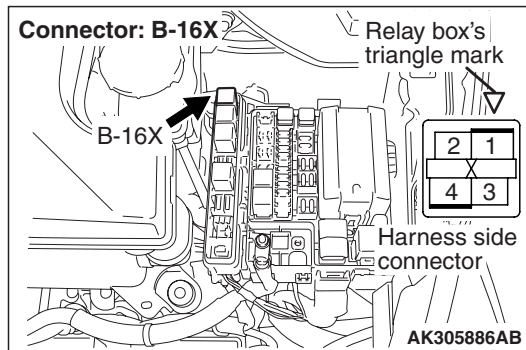
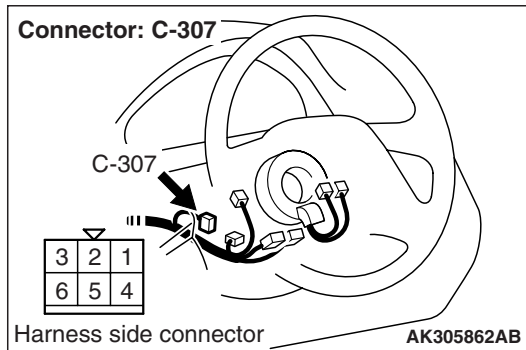


Q: Is the check result normal?

YES : Go to Step 14 .

NO : Repair or replace.

STEP 14. Check harness between C-307 (terminal No. 4) ignition switch connector and B-16X (terminal No. 3) A/C compressor relay connector.



NOTE: Before checking harness, check intermediate connectors C-17, C-205, and C-202 and repair if necessary.

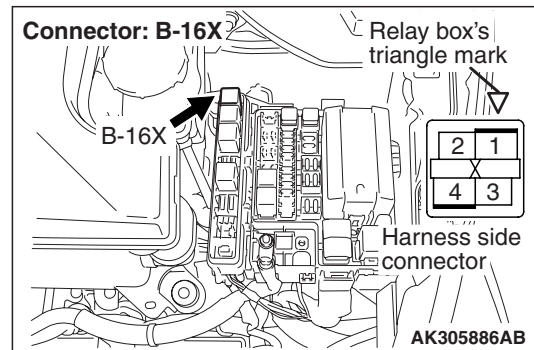
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 15 .

NO : Repair.

STEP 15. Check harness between battery and B-16X (terminal No. 4) A/C compressor relay connector.



NOTE: Before checking harness, check intermediate connector A-16, and repair if necessary.

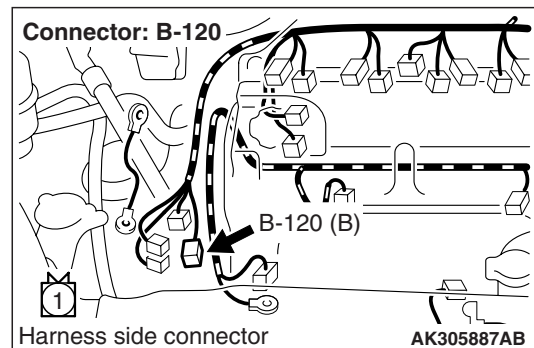
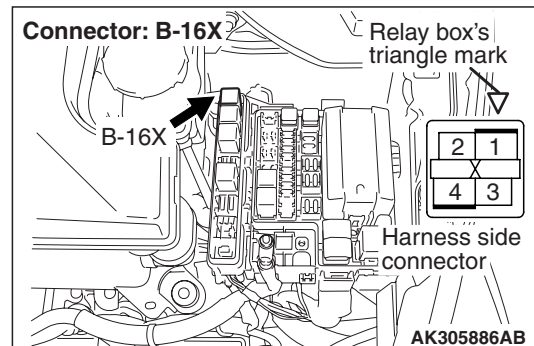
- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 16 .

NO : Repair.

STEP 16. Check harness between B-16X (terminal No. 1) A/C compressor relay connector and B-120 (terminal No. 1) A/C compressor assembly connector.



- Check power supply line for damage.

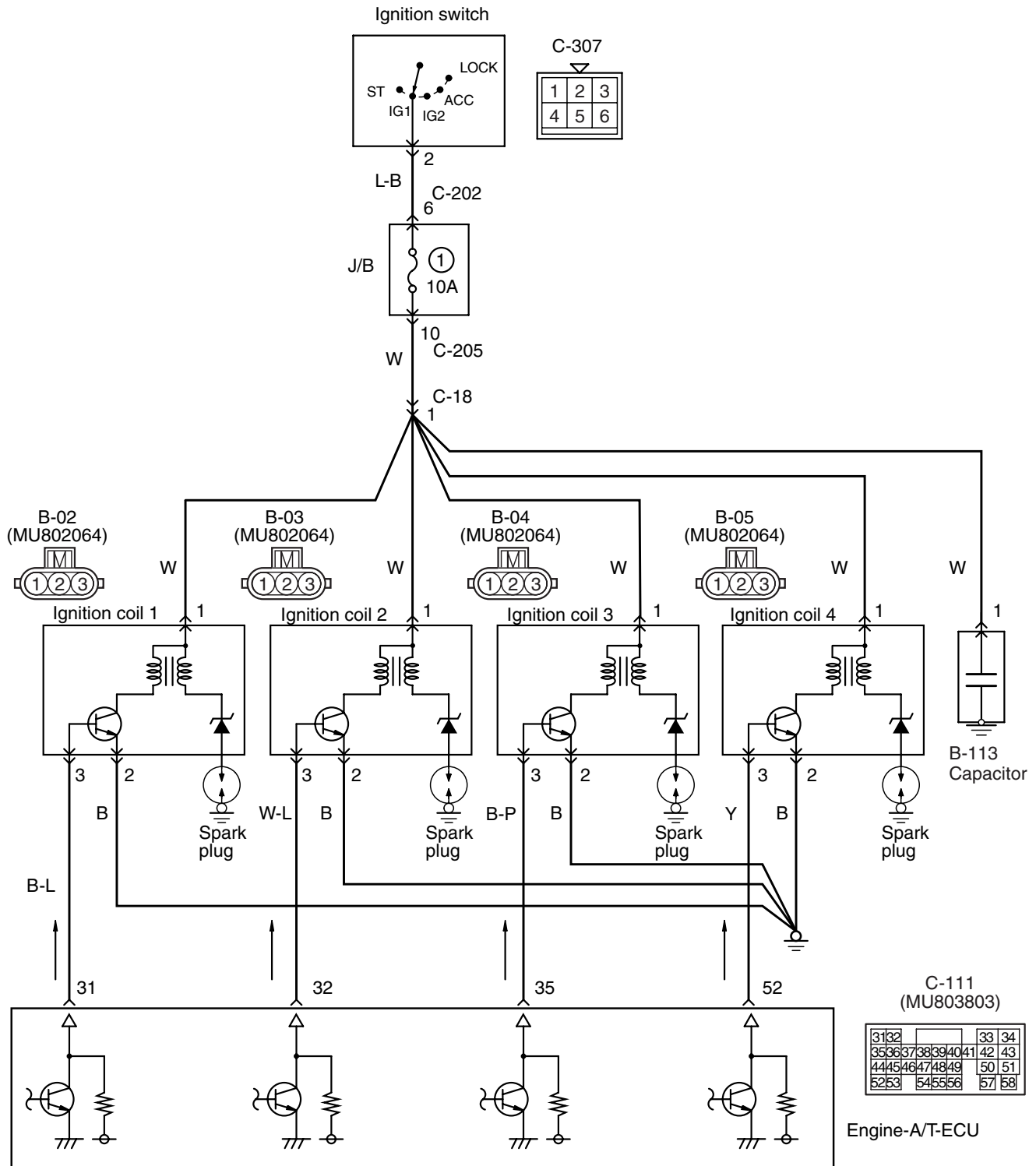
Q: Is the check result normal?

YES : Replace A/C compressor magnetic clutch.

NO : Repair.

Inspection Procedure 26: Ignition Circuit System

Ignition 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

OPERATION

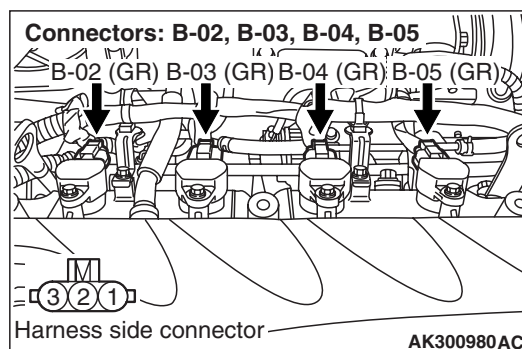
- The battery voltage is applied to the ignition coil (terminal No. 1) from the ignition switch and is earthed to the vehicle body from the ignition coil (terminal No. 2).
- A power voltage of 12 V is applied to the ignition coil output terminal (terminal No. 3) from the engine-A/T-ECU (terminal No. 31, No. 32, No. 35 and No. 52).

FUNCTION

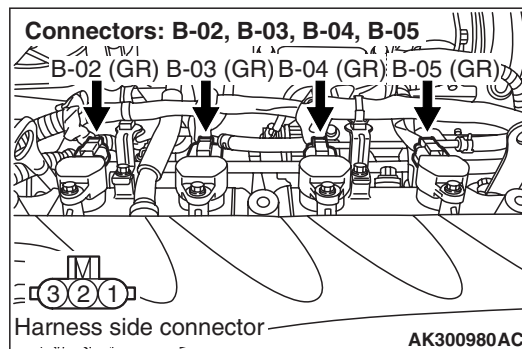
- When the engine-A/T-ECU makes the power transistor in the unit be in OFF position, the battery voltage in the unit is applied to the power transistor unit, and that makes the power transistor unit be in ON position. The engine-A/T-ECU makes the power transistor in the unit be in ON, and that makes the power transistor unit be in OFF position.
- In response to the signal from the engine-A/T-ECU, the power transistor unit is in ON position. The primary current is going to the ignition coil. When the power transistor unit is in OFF position, the primary current is interrupted and high voltage is generated in the secondary coil.

PROBABLE CAUSE

- Failed ignition coil
- Failed spark plug
- Open/short circuit in ignition primary circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check spark plug.****Q: Is the check result normal?****YES :** Go to Step 2 .**NO :** Replace spark plug.**STEP 2. Connector check: B-02, B-03, B-04 and B-05 ignition coil connectors****Q: Is the check result normal?****YES :** Go to Step 3 .**NO :** Repair or replace.**STEP 3. Check ignition coil itself.**

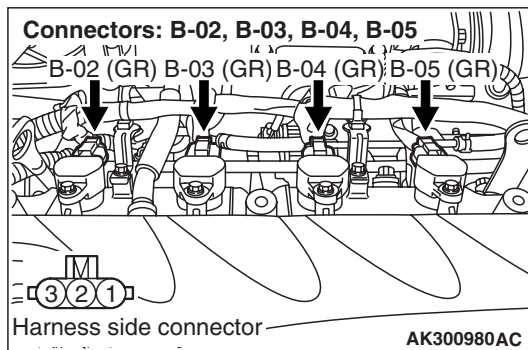
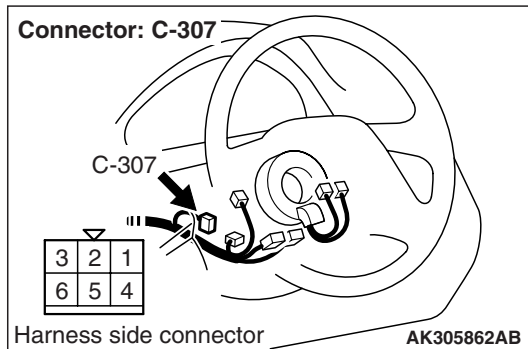
- Check ignition coil itself (Refer to GROUP 16 – Ignition System – On-vehicle Service – Ignition coil check P.16-29).

Q: Is the check result normal?**YES :** Go to Step 4 .**NO :** Replace ignition coil.**STEP 4. Perform voltage measurement at B-02, B-03, B-04 and B-05 ignition coil connectors.**

- Disconnect connector, and measure at harness 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 .

STEP 5. Connector check: C-307 ignition switch connector



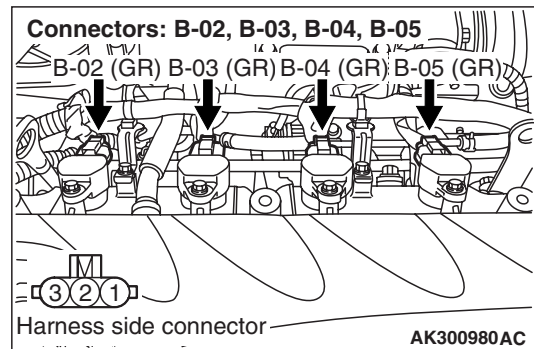
Q: Is the check result normal?

YES : Check intermediate connectors C-18, C-202 and C-205, and repair if necessary. If intermediate connectors are normal, check and repair harness between ignition switch connector and ignition coil connector

- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-02 (terminal No. 1) No. 1 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-03 (terminal No. 1) No. 2 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-04 (terminal No. 1) No. 3 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-05 (terminal No. 1) No. 4 ignition coil connector
 - Check power supply line for open/short circuit.

NO : Repair or replace.

STEP 6. Perform voltage measurement at B-02, B-03, B-04 and B-05 ignition coil connectors.



- Disconnect connector, and measure at harness side.
- Engine: Cranking
- Voltage between terminal No. 3 and earth.

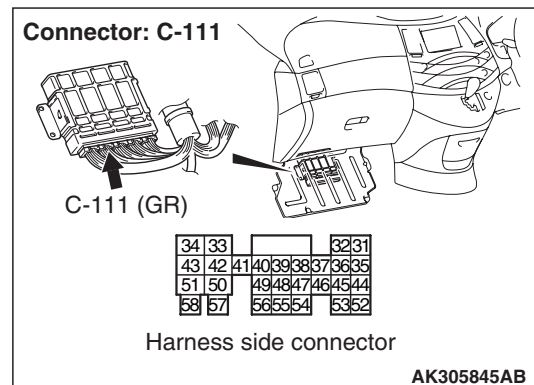
OK: 0.1 – 2.0 V

Q: Is the check result normal?

YES : Go to Step 11 .

NO : Go to Step 7 .

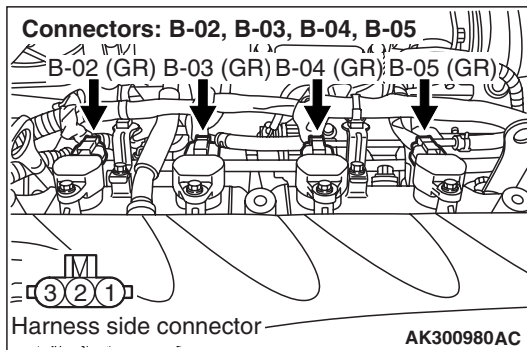
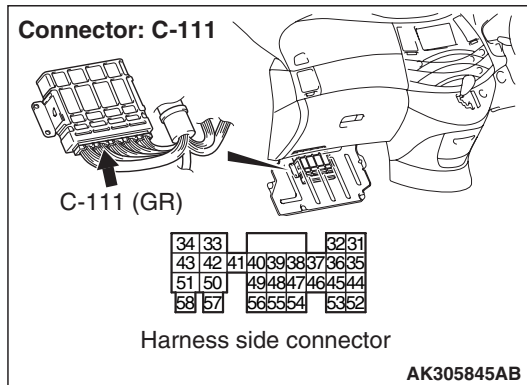
STEP 7. Connector check: C-111 engine-A/T-ECU connector



Q: Is the check result normal?

YES : Go to Step 8 .

NO : Repair or replace.

STEP 8. Perform voltage measurement at C-111 engine-A/T-ECU.

- Measure engine-A/T-ECU terminal voltage.
- Disconnect B-02, B-03, B-04 and B-05 ignition coil connectors.
- Engine: Cranking
 - a. Voltage between terminal No. 31 and earth (No. 1 Ignition coil).
 - b. Voltage between terminal No. 32 and earth (No. 2 Ignition coil).
 - c. Voltage between terminal No. 35 and earth (No. 3 Ignition coil).
 - d. Voltage between terminal No. 52 and earth (No. 4 Ignition coil).

OK: 0.1 – 2.0 V

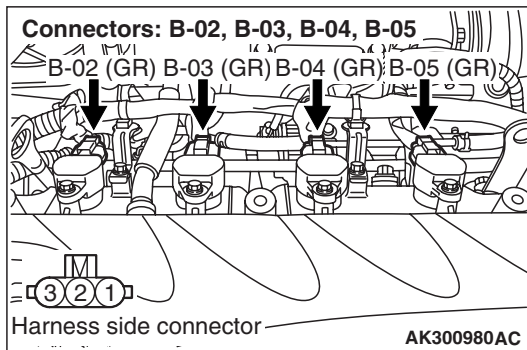
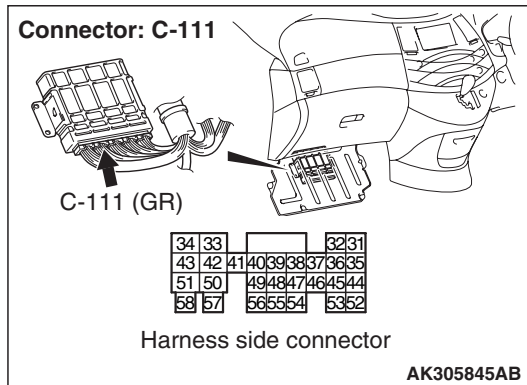
Q: Is the check result normal?

YES : Check and repair harness between ignition coil connector and engine-A/T-ECU connector

- a. Check and repair harness between B-02 (terminal No. 3) No. 1 ignition coil connector and C-111 (terminal No. 31) engine-A/T-ECU connector.
- b. Check and repair harness between B-03 (terminal No. 3) No. 2 ignition coil connector and C-111 (terminal No. 32) engine-A/T-ECU connector.
- c. Check and repair harness between B-04 (terminal No. 3) No. 3 ignition coil connector and C-111 (terminal No. 35) engine-A/T-ECU connector.
- d. Check and repair harness between B-05 (terminal No. 3) No. 4 ignition coil connector and C-111 (terminal No. 52) engine-A/T-ECU connector.
 - Check output line for open circuit.

NO : Go to Step 9 .

STEP 9. Check harness between ignition coil connector and engine-A/T-ECU connector.



- Check and repair harness between B-02 (terminal No. 3) No. 1 ignition coil connector and C-111 (terminal No. 31) engine-A/T-ECU connector.
- Check and repair harness between B-03 (terminal No. 3) No. 2 ignition coil connector and C-111 (terminal No. 32) engine-A/T-ECU connector.
- Check and repair harness between B-04 (terminal No. 3) No. 3 ignition coil connector and C-111 (terminal No. 35) engine-A/T-ECU connector.
- Check and repair harness between B-05 (terminal No. 3) No. 4 ignition coil connector and C-111 (terminal No. 52) engine-A/T-ECU connector.
 - Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

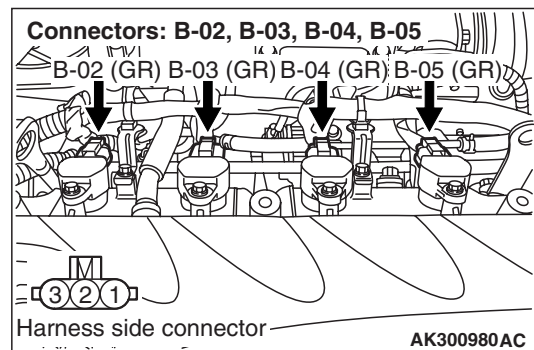
STEP 10. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

STEP 11. Perform resistance measurement at B-02, B-03, B-04 and B-05 ignition coil connectors.



- Disconnect connector, and measure at harness side.
- Resistance between terminal No. 2 and earth.

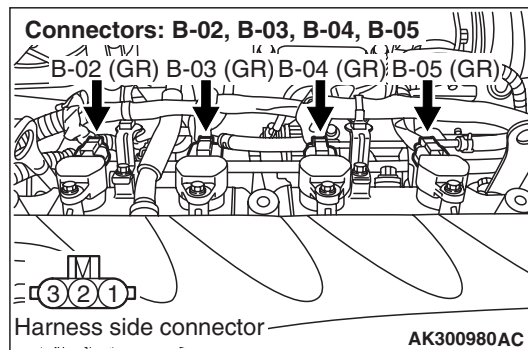
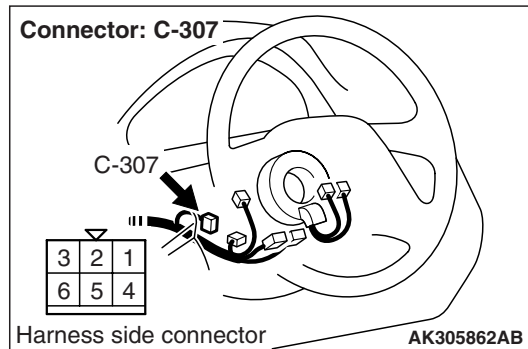
OK: 2 Ω or less

Q: Is the check result normal?

YES : Go to Step 12 .

NO : Check and repair harness between ignition coil connector and body earth

- Check and repair harness between B-02 (terminal No. 2) No. 1 ignition coil connector and body earth
- Check and repair harness between B-03 (terminal No. 2) No. 2 ignition coil connector and body earth
- Check and repair harness between B-04 (terminal No. 2) No. 3 ignition coil connector and body earth
- Check and repair harness between B-05 (terminal No. 2) No. 4 ignition coil connector and body earth
 - Check earthing line for open circuit and damage.

STEP 12. Check harness between ignition switch connector and ignition coil connector.

- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-02 (terminal No. 1) No. 1 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-03 (terminal No. 1) No. 2 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-04 (terminal No. 1) No. 3 ignition coil connector
- Check and repair harness between C-307 (terminal No. 2) ignition switch connector and B-05 (terminal No. 1) No. 4 ignition coil connector

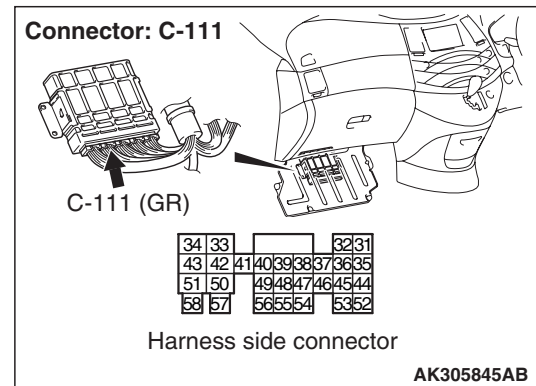
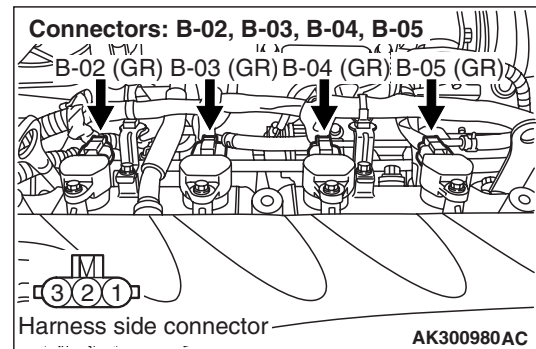
NOTE: Before checking harness, check intermediate connectors C-18, C-202 and C-205, and repair if necessary.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 13 .

NO : Repair.

STEP 13. Check harness between ignition coil connector and engine-A/T-ECU connector.

- Check and repair harness between B-02 (terminal No. 3) No. 1 ignition coil connector and C-111 (terminal No. 31) engine-A/T-ECU connector.
- Check and repair harness between B-03 (terminal No. 3) No. 2 ignition coil connector and C-111 (terminal No. 32) engine-A/T-ECU connector.
- Check and repair harness between B-04 (terminal No. 3) No. 3 ignition coil connector and C-111 (terminal No. 35) engine-A/T-ECU connector.
- Check and repair harness between B-05 (terminal No. 3) No. 4 ignition coil connector and C-111 (terminal No. 52) engine-A/T-ECU connector.
 - Check output line for damage.

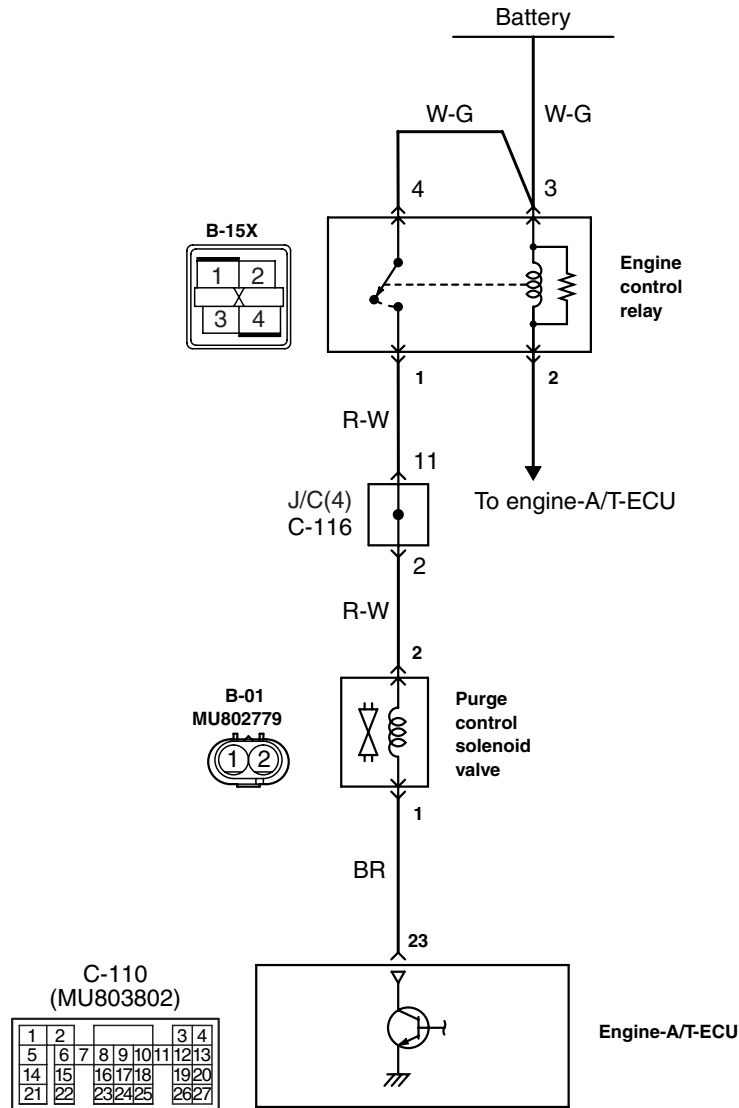
Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

Inspection Procedure 27: Purge Control Solenoid Valve System

Purge control solenoid valve 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

AK305564 AC

OPERATION

- Power is supplied to the purge control solenoid valve (terminal No. 2) from the engine control relay (terminal No. 1).
- The engine-A/T-ECU (terminal No. 23) makes the power transistor in the unit be in ON position, and that makes currents go on the purge control solenoid valve (terminal No. 2).

FUNCTION

- In response to the signal from the engine-A/T-ECU, the purge control solenoid valve controls the flow rate of the purge air to be introduced into the inlet manifold.

PROBABLE CAUSE

- Failed purge control solenoid valve
- Open/short circuit in purge control solenoid valve circuit or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-III actuator test**

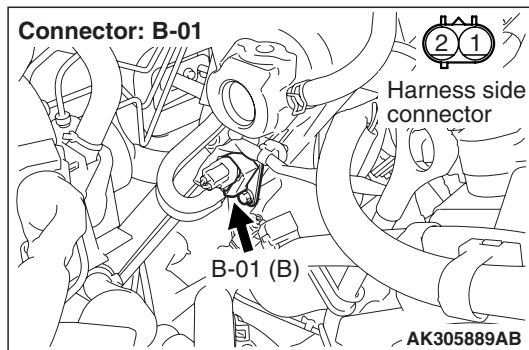
- Item 08: Purge control solenoid valve

OK: Operating sound can be heard and the valve vibrates

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Go to Step 2 .

STEP 2. Connector check: B-01 purge control solenoid valve connector

Q: Is the check result normal?

YES : Go to Step 3 .

NO : Repair or replace.

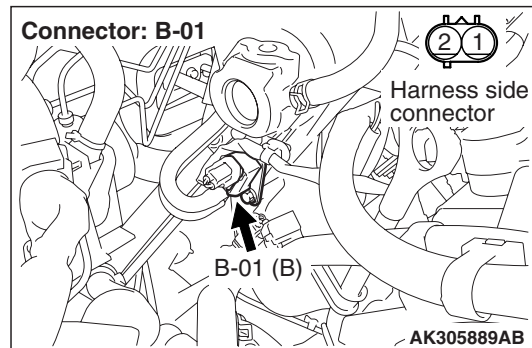
STEP 3. Check purge control solenoid valve itself.

- Check purge control solenoid valve itself [Refer to GROUP 17 – Emission Control System – Evaporative Emission Control System – Purge Control Solenoid Valve Check [P.17-42](#)]

Q: Is the check result normal?

YES : Go to Step 4 .

NO : Replace purge control solenoid valve.

STEP 4. Perform voltage measurement at B-01 purge control solenoid valve connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 2 and earth.

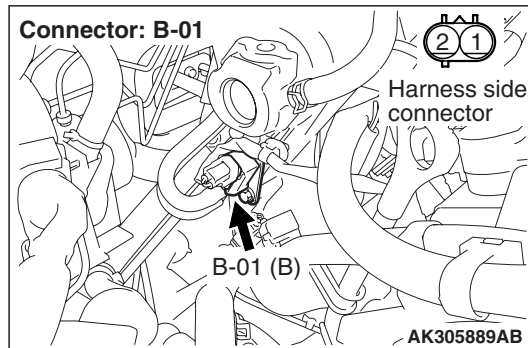
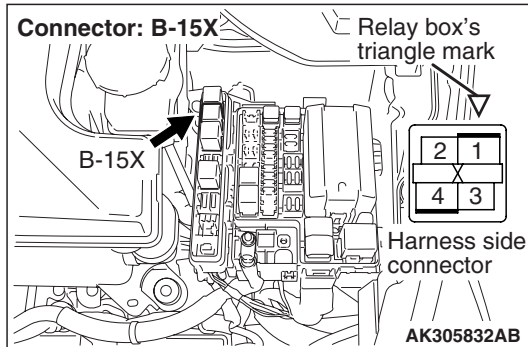
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6 .

NO : Go to Step 5 .

STEP 5. Connector check: B-15X engine control relay connector.



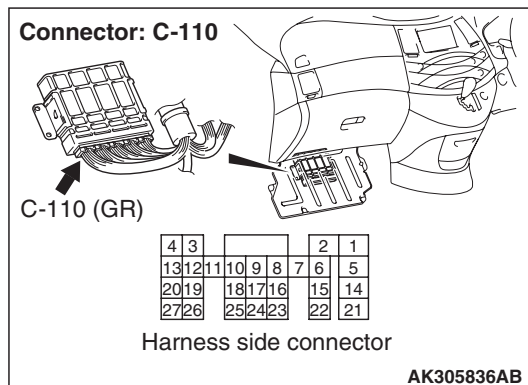
Q: Is the check result normal?

YES : Check intermediate connector C-116, and repair if necessary. If intermediate connector is normal, check and repair harness between B-01 (terminal No. 2) purge control solenoid valve connector and B-15X (terminal No. 1) engine control relay connector.

- Check power line for open/short circuit.

NO : Repair or replace.

STEP 6. Connector check: C-110 engine-A/T-ECU connector

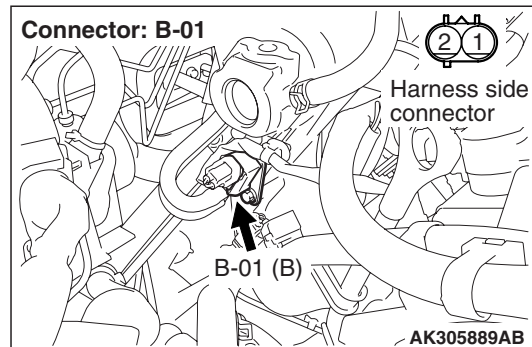
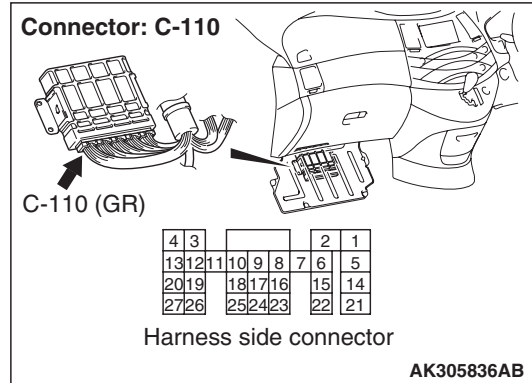


Q: Is the check result normal?

YES : Go to Step 7 .

NO : Repair or replace.

STEP 7. Perform voltage measurement at C-110 engine-A/T-ECU connector.



- Disconnect connector, and measure at harness side.
- Ignition switch: ON
- Voltage between terminal No. 23 and earth.

OK: System voltage

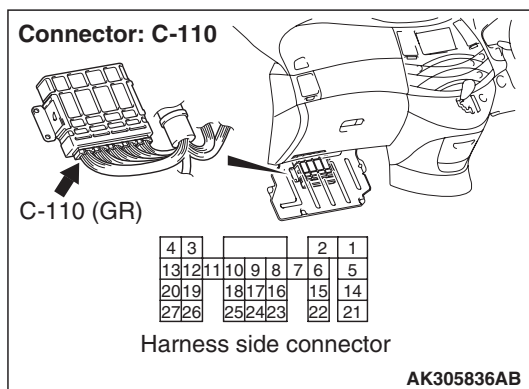
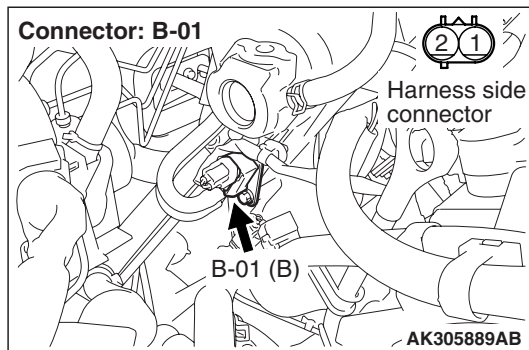
Q: Is the check result normal?

YES : Go to Step 8 .

NO : Check and repair harness between B-01 (terminal No. 1) purge control solenoid valve connector and C-110 (terminal No. 23) engine-A/T-ECU connector.

- Check output line for open circuit.

STEP 8. Check harness between B-01 (terminal No. 1) purge control solenoid valve connector and C-110 (terminal No. 23) engine-A/T-ECU connector.



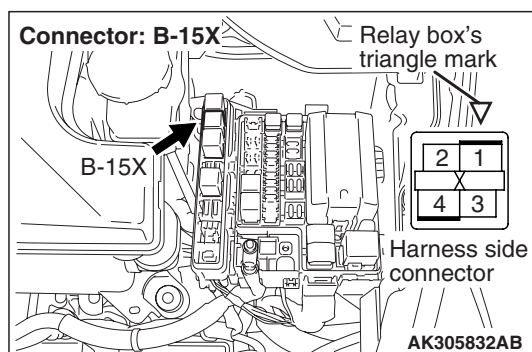
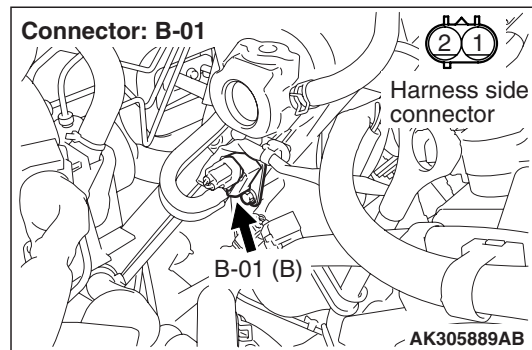
- Check earthing line for damage.

Q: Is the check result normal?

YES : Go to Step 9 .

NO : Repair.

STEP 9. Check harness between B-01 (terminal No. 2) purge control solenoid valve connector and B-15X (terminal No. 1) engine control relay connector.



- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 10 .

NO : Repair.

STEP 10. M.U.T.-III actuator test

- Item 08: purge control solenoid valve

OK: Operating sound can be heard and the valve vibrates.

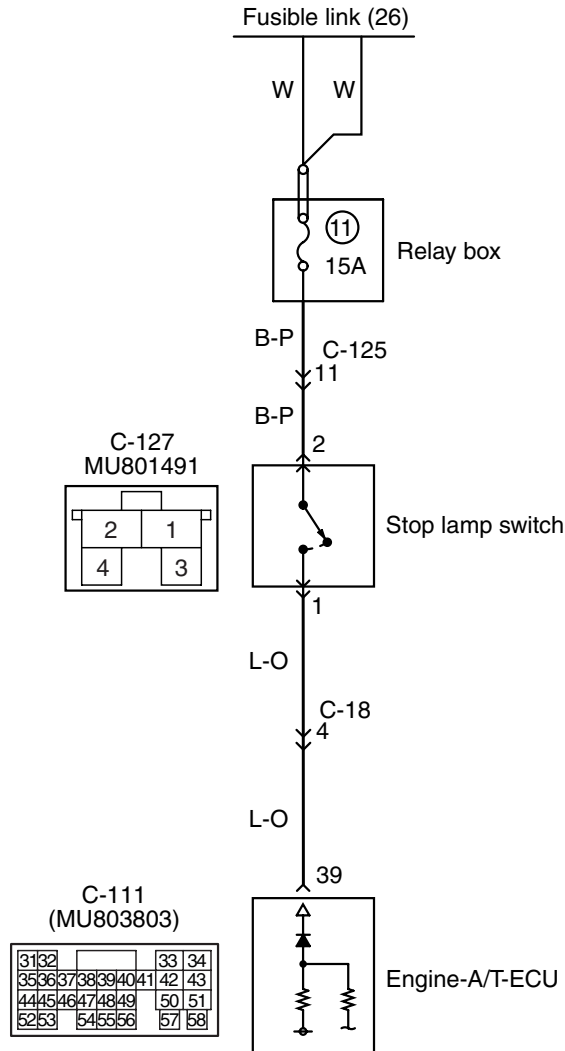
Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

Inspection Procedure 28: Stop Lamp Switch System

Stop Lamp Switch Circuit



AK501594AB

OPERATION

- The battery voltage is applied to the stop lamp switch (terminal No. 2).
- The stop lamp switch output terminal (terminal No.1) inputs the switch signal to the engine-A/T-ECU (terminal No. 39).

FUNCTION

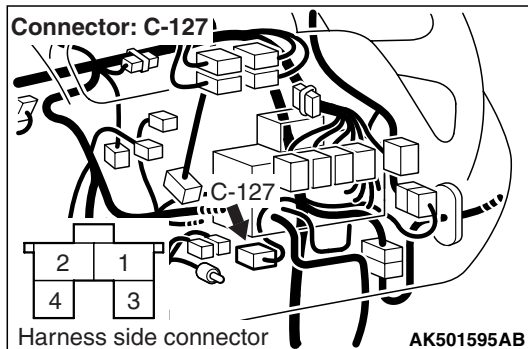
- The system checks whether the vehicle has the illuminating stop lamp or not, and inputs the signal to the engine-A/T-ECU. The engine-A/T-ECU knows the vehicle state through the stop lamp switch signal and carries out control of the each system.

POSSIBLE CAUSES

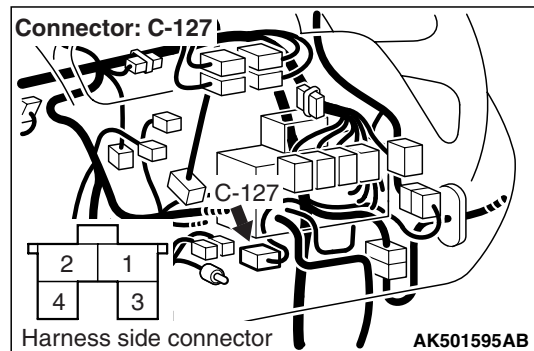
- Failed stop lamp switch
- Open/short circuit in stop lamp switch or loose connector contact
- Failed engine-A/T-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check for height of brake pedal.**

- Check for height of brake pedal (Refer to Group 35A – On-vehicle Service – Brake Pedal Check And Adjustment [P.35A-4](#)).

Q: Is the check result normal?**YES :** Go to Step 2 .**NO :** Adjust.**STEP 2. Connector check: C-127 stop lamp switch connector****Q: Is the check result normal?****YES :** Go to Step 3 .**NO :** Repair or replace.**STEP 3. Check the stop lamp switch.**

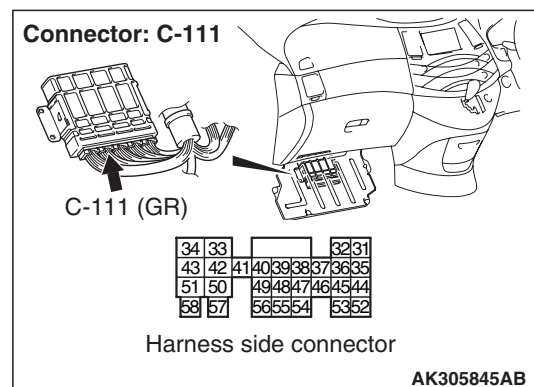
- Check the stop lamp switch (Refer to Group 35A – Brake Pedal Inspection [P.35A-14](#)).

Q: Is the check result normal?**YES :** Go to Step 4 .**NO :** Replace stop lamp switch.**STEP 4. Perform voltage measurement at C-127 stop lamp switch connector**

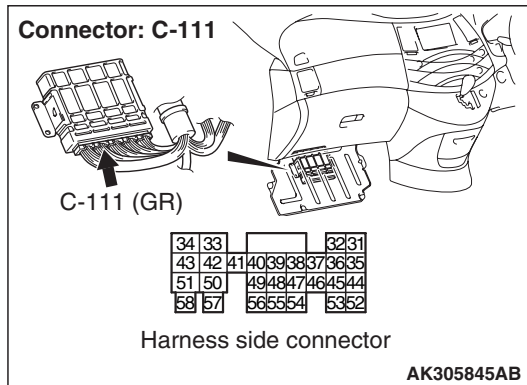
- Disconnect the connector and measure it at harness side.
- Voltage between terminal No. 2 and earth.

OK: System voltage**Q: Is the check result normal?****YES :** Go to Step 5 .**NO :** Check for the intermediate connector C-125, and repair if necessary. If intermediate connector is normal, check and repair harness between C-127 (terminal No.2) stop lamp switch connector and battery.

- Check power supply line open/short circuit supply.

STEP 5. Connector check: C-111 engine-A/T-ECU connector**Q: Is the check result normal?****YES :** Go to Step 6 .**NO :** Repair or replace.

STEP 6. Perform voltage measurement at C-111 engine-A/T-ECU connector.



- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between terminal No. 39 and the earth.

OK:

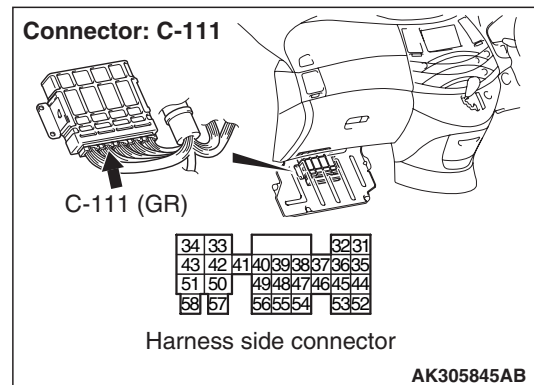
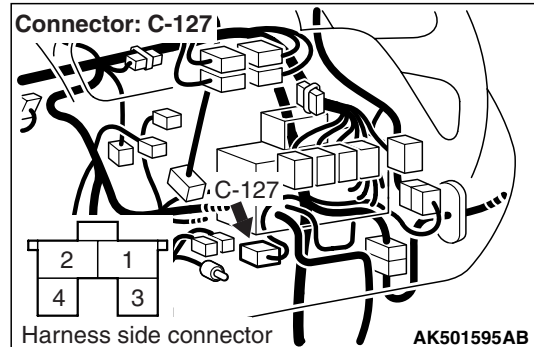
**System voltage (Brake pedal: Depressed)
1 V or less (Brake pedal: Released)**

Q: Is the check result normal?

YES : Go to Step 8 .

NO : Go to Step 7 .

STEP 7. Check harness between C-127 (terminal No. 1) stop lamp switch connector and C-111 (terminal No. 39) engine-A/T-ECU connector.



NOTE: Before checking harness, check intermediate connector C-18, and repair if necessary.

- Check output line open/short circuit.

Q: Is the check result normal?

YES : For a short circuit, check and repair harness and the connector for the stop lamp switch output signal.

NO : Repair.

STEP 8. M.U.T.-III data list

- Refer to Data List Reference Table [P.13B-260](#).
 - a. Item 67: Stop lamp switch

Q: Is the check result normal?

YES : Intermittent Malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

NO : Replace engine-A/T-ECU. After an engine-A/T-ECU is replaced, a vehicle identification number (VIN) is registered (Refer to GROUP 54A – Ignition Switch – Encrypted Code Registration Criteria Table [P.54A-9](#)).

Data List Reference Table

M1131152002076

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
11	Cylinder 1, 4 oxygen sensor (front)	Engine: After warm-up (leaner by deceleration, richer by acceleration)	Excessive deceleration from 4,000 r/min	200 mV or less	Code No. P0130	P.13B-44
			At excessive acceleration	600 – 1,000 mV		
		Engine: After warm-up (using oxygen sensor, check air-fuel ratio and control status by engine-A/T-ECU)	Idle operation	400 mV or less		
			2,500 r/min	⇔ 600 – 1,000 mV (altered)		
12	Air flow sensor *1	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Idle operation	2.0 – 4.0 g/s	–	–
			2,500 r/min	6.5 – 12.0 g/s		
			Acceleration	According to acceleration, flux is increased		
13	Intake air temperature sensor	Ignition switch: ON or engine running	Intake air temperature: –20°C	–20°C	Code No. P0110	P.13B-28
			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		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
14	Throttle position sensor (sub)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the electronic-controlled throttle valve connector, and the connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. Ignition switch: ON 	Fully close the throttle valve with your finger	2,200 – 2,800 mV	Code No. P0225	P.13B-111
			Fully open the throttle valve with your finger	4,000 mV or more		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 22	P.13B-221
18	Cranking signal (ignition switch-ST)	Ignition switch: ON	Engine: Stopped	OFF	Procedure No. 22	P.13B-221
			Engine: Cranking	ON		
21	Engine coolant temperature sensor	Ignition switch: ON or engine running	Coolant temperature: –20°C	–20°C	Code No. P0115	P.13B-33
			Coolant temperature: 0°C	0°C		
			Coolant temperature: 20°C	20°C		
			Coolant temperature: 40°C	40°C		
			Coolant temperature: 80°C	80°C		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
22	Crank angle sensor	<ul style="list-style-type: none"> Engine: Cranking Tachometer: Connected 	Compare engine speed on tachometer with the value displayed on M.U.T.-III	Matched	Code No. P0335	P.13B-123
			Engine: Idle operation	Coolant temperature: 1,300 – 1,500 r/min –20°C		
		Engine: Idle operation	Coolant temperature: 1,270 – 1,470 r/min 0°C			
			Coolant temperature: 1,230 – 1,430 r/min 20°C			
			Coolant temperature: 1,140 – 1,340 r/min 40°C			
			Coolant temperature: 600 – 800 r/min 90°C			
25	Barometric pressure sensor	Ignition switch: ON	Altitude: 0m	101 kPa	Code No. P0105	P.13B-27
			Altitude: 600m	95 kPa		
			Altitude: 1,200m	88 kPa		
			Altitude: 1,800m	81 kPa		
29	Inhibitor switch	Ignition switch: ON	Selector lever: P or N	P, N	Procedure No. 4	P.13B-191
			Selector lever: D, 2, L, or R	D, 2, L, R		
37	Volumetric efficiency	<ul style="list-style-type: none"> Engine coolant temperature: 85 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Idle operation	15 – 35%	–	–
			2,500 r/min	15 – 35%		
			Excessive acceleration	According to acceleration, volumetric efficiency is increased.		
39	Cylinder 2, 3 oxygen sensor (front)	Engine: After warm-up (leaner by deceleration, richer acceleration)	Excessive deceleration from 4,000 r/m	200 mV or less	Code No. P0150	P.13B-65
			At excessive acceleration	600 – 1,000 mV		
		Engine: After warm-up (using oxygen sensor, check air-fuel ratio and control status by engine-A/T-ECU)	Idle operation	400 mV or less		
			2,500 r/min	⇔ 600 – 1,000 mV (altered)		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
41	Injectors*2	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Idle operation	2.0 – 3.2 ms	—	—
			2,500 r/min	1.7 – 2.9 ms		
			Excessive acceleration	Increased		
44	Ignition advance	<ul style="list-style-type: none"> Engine: After warm-up Install timing light (for use to measure actual ignition timing) 	Idle operation	2 – 18°BTDC	—	—
			2,500 r/min	26 – 46°BTDC		
49	A/C relay	Engine: Idle operation after warm-up	A/C switch: OFF		Procedure No. 25	P.13B-241
			A/C switch: ON	A/C compressor is not driven		
				A/C compressor is driven		
59	Cylinder 1, 4 oxygen sensor (rear)	Engine: After warm-up	At excessive acceleration (during the increase in the engine speed)	600 – 1,000 mV	Code No. P0136	P.13B-54
67	Stop lamp switch	Ignition switch: ON	Brake pedal: Depressed	ON	Procedure No. 28	P.13B-257
			Brake pedal: Released	OFF		
68	EGR valve	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Idling	0 – 10 STEP	Code No. P0403	P.13B-139
			2,500 r/min	0 – 10 STEP		
69	Cylinder 2, 3 oxygen sensor (rear)	Engine: After warm-up	At excessive acceleration (during the increase in the engine speed)	600 – 1,000 mV	Code No. P0156	P.13B-76

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
77	Accelerator pedal position sensor (sub)	Ignition switch: ON	Release the accelerator pedal	400 – 1,000 mV	Code No. P1225	P.13B-170
			Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke		
			Depress the accelerator pedal fully	3,600 mV or more		
78	Accelerator pedal position sensor (main)	Ignition switch: ON	Release the accelerator pedal	900 – 1,200 mV	Code No. P0220	P.13B-106
			Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke		
			Depress the accelerator pedal fully	4,000 mV or more		
79	Throttle position sensor (main)	<ul style="list-style-type: none">Remove the intake air hose at the throttle bodyDisconnect the electronic-controlled throttle valve connector, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658.Ignition switch: ON	Fully close the throttle valve with your finger	300 – 700 mV	Code No. P0120	P.13B-39
			Fully open the throttle valve with your finger	4,000 mV or more		
		Engine: Idle operation after warm-up	No load	500 – 700 mV		
			A/C switch OFF → ON	Voltage rises		
			Shift lever: N range → D range			
B4	Power steering fluid pressure sensor	Engine: Idle operation	Steering wheel: Not operated	400 – 1,000 mV	Code No. P0551	P.13B-144
			Steering wheel: Operated	Voltage rises		
			Full lock	3,000 – 4,000 mV		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
12 ^{*3}	Air flow sensor ^{*1}	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Idle operation	2.0 – 4.0 gm/s	—	—
			2,500 r/min	6.5 – 12.0 gm/s		
			Acceleration	According to acceleration, flux is increased.		
13 ^{*3}	Intake air temperature sensor	Ignition switch: ON or engine running	Intake air temperature: –20°C	–20°C	Code No. P0110	P.13B-28
			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 ^{*3}	Engine coolant temperature sensor	Ignition switch: ON or engine running	Coolant temperature: –20°C	–20°C	Code No. P0115	P.13B-33
			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 ^{*3}	Crank angle sensor	<ul style="list-style-type: none"> Engine: Cranking Tachometer: Connected 	Compare engine speed on tachometer with the value displayed on M.U.T.-III	Matched	—	—
		Engine: Idle operation	Coolant temperature: –20°C	1,300 – 1,500 r/min		
			Coolant temperature: 0°C	1,270 – 1,470 r/min		
			Coolant temperature: 20°C	1,230 – 1,430 r/min		
			Coolant temperature: 40°C	1,140 – 1,340 r/min		
			Coolant temperature: 90°C	600 – 800 r/min		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
24 *3	Vehicle speed signal	Drive 40 km/h		Approximately 40 km/h	—	—
44 *3	Ignition advance	<ul style="list-style-type: none"> Engine: After warm-up Install timing light (for use to measure actual ignition timing) 	Idle operation	2 – 18 deg	—	—
			2,500 r/min	26 – 46 deg		
81 *3	Cylinder 1, 4 long-term fuel compensation	Engine: After warm-up, 2,500 r/min without any load (during closed loop)		–13 to 13%	Code No. P0170	P.13B-87
82 *3	Cylinder 1, 4 short-term fuel compensation	Engine: After warm-up, 2,500 r/min without any load (during closed loop)		–10 to 10%	Code No. P0170	P.13B-87
83 *3	Cylinder 2, 3 long-term fuel compensation	Engine: After warm-up, 2,500 r/min without any load (during closed loop)		–13 to 13%	Code No. P0173	P.13B-88
84 *3	Cylinder 2, 3 short-term fuel compensation	Engine: After warm-up, 2,500 r/min without any load (during closed loop)		–10 to 10%	Code No. P0173	P.13B-88
87 *3	Calculation load value	Engine: After warm-up	Idle operation	15 – 40%	—	—
			2,500 r/min	15 – 40%		
88 *3	Cylinder 1, 4 fuel control condition	Engine: After warm-up	2,500 r/min	Closed loop	—	—
			Acceleration	Open loop-drive condition		
89 *3	Cylinder 2, 3 fuel control condition	Engine: After warm-up	2,500 r/min	Closed loop	—	—
			Acceleration	Open loop-drive condition		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
8A *3	Throttle position sensor (main)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the electronic-controlled throttle valve connector, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. Ignition switch: ON 	Fully close the throttle valve with your finger	0 – 12%	Code No. P0120	P.13B-39
			Fully open the throttle valve with your finger	75 – 100%		
A1 *3	Cylinder 1, 4 oxygen sensor (front)	Engine: After warm-up (leaner by deceleration, richer by acceleration)	Excessive deceleration from 4,000 r/min	0.2 V or less	Code No. P0130	P.13B-44
			At excessive acceleration	0.6 – 1 V		
		Engine: After warm-up (using oxygen sensor, check air-fuel ratio and control status by engine-A/T-ECU)	Idle operation	0.4 V or less ⇔		
			2,500 r/min	0.6 – 1 V (altered)		
A2 *3	Cylinder 1, 4 oxygen sensor (rear)	Engine: After warm-up	At excessive acceleration (during the increase in the engine speed)	0.6 – 1 V	Code No. P0136	P.13B-54
A3 *3	Cylinder 2, 3 oxygen sensor (front)	Engine: After warm-up (leaner by deceleration, richer by acceleration)	Excessive deceleration from 4,000 r/min	0.2 V or less	Code No. P0150	P.13B-65
			At excessive acceleration	0.6 – 1 V		
		Engine: After warm-up (using oxygen sensor, check air-fuel ratio and control status by engine-A/T-ECU)	Idle operation	0.4 V or less ⇔		
			2,500 r/min	0.6 – 1 V (altered)		

Item No.	Inspection item	Inspection condition		Normal condition	Inspection procedure No.	Reference page
A4 *3	Cylinder 2, 3 oxygen sensor (rear)	Engine: After warm-up	At excessive acceleration (during the increase in the engine speed)	0.6 – 1 V	Code No. P0156	P.13B-76
0002 *4	Accelerator pedal fully closed position learning value	Engine: Idle operation		400 – 1,000 mV	—	—
000F *4	CAN communication A/C compressor torque	<ul style="list-style-type: none"> Engine: Idle operation after warm-up A/C switch: ON 		4.8 – 53.0 N·m	—	—
0040 *4	Shift information	Vehicle: stopped	R, N or P	R, N, P	—	—
		Vehicle: running	1st	1st	—	—
			2nd	2nd	—	—
			3rd	3rd	—	—
			4th	4th	—	—
0115 *4	Idle-up demand	Engine: Idle operation after warm-up	A/C switch: OFF	OFF	—	—
			A/C switch: ON	LOW, MID, HIGH	—	—
0117 *4	A/C compressor ON demand	Engine: Idle operation after warm-up	A/C switch: OFF	OFF	—	—
			A/C switch: ON	ON	—	—

⚠ CAUTION

When shifting the select lever to D range, the brakes should be applied so that the vehicle does not move forward

*NOTE: *1: On the new vehicle (mileage: 500 km or less), air flow sensor output value may be higher by approximately 10%.*

*NOTE: *2: On the new vehicle (mileage: 500 km or less), injector drive time may be longer by approximately 10%.*

*NOTE: *3: When service data in check mode is selected, the data is not displayed.*

*NOTE: *4: The data is displayed only if the service data in check mode is selected.*

Actuator Test Reference Table

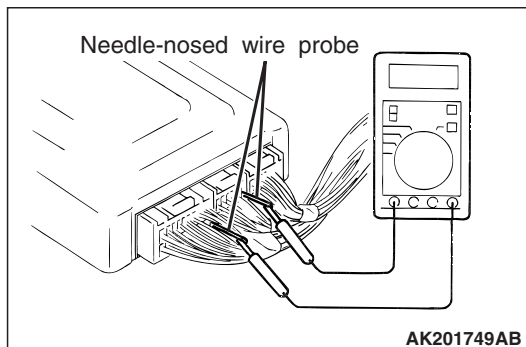
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Item No.	Inspection item	Drive content	Inspection conditions		Normal condition	Code No. /Inspection procedure No.	Reference page
01	Injector	Cut off No. 1 injector	Engine: After warm-up, idle operation (Cut off injectors sequentially to check for a cylinder that does not change engine in idle status.		Engine is changed (becomes unstable or stalled)	Code No. P0201	P.13B-90
02		Cut off No. 2 injector				Code No. P0202	P.13B-94
03		Cut off No. 3 injector				Code No. P0203	P.13B-98
04		Cut off No. 4 injector				Code No. P0204	P.13B-102
07	Fuel pump	Drive fuel pump to circulate fuel	Ignition switch: ON	Check for pump operating noise near fuel tank	Operating noise audible	Procedure No. 23	P.13B-227
08	Purge control solenoid valve	Switch solenoid valve from OFF to ON	Ignition switch: ON		When the valve is actuated, operating noise is audible	Procedure No. 27	P.13B-253
17	Basic ignition timing	Switch engine-A/T-ECU to ignition timing adjusting mode	<ul style="list-style-type: none"> • Engine: Idle operation • Install timing light 		5° BTDC	—	—
21	Fan controller	Actuate fan motor	<ul style="list-style-type: none"> • Ignition switch: ON • A/C switch: ON 		Fan motor is rotated	Procedure No. 20	P.13B-217
34	Throttle valve control servo	Stop the throttle valve control servo	Ignition switch: ON		Throttle valve is rotated	Code No. P0638	P.13B-155

CHECK AT THE ECU TERMINALS

M1131153500722

TERMINAL VOLTAGE CHECK CHART



1. Connect a needle-nosed wire probe to a voltmeter probe.
2. Insert the needle-nosed wire probe into each of the engine-A/T-ECU connector terminals from the wire side, and measure the voltage while referring to the check chart.

NOTE:

1. Make the voltage measurement with the engine-A/T-ECU connector connected.
2. You may find it convenient to pull out the engine-A/T-ECU to make it easier to reach the connector terminals.
3. The checks can be carried out off the order given in the chart.

CAUTION

Short-circuiting the positive (+) probe between a connector terminal and earth could damage the vehicle wiring, the sensor, engine-A/T-ECU or all of them. Be careful to prevent this!

3. If voltmeter shows any division from standard value, check the corresponding sensor, actuator and related electrical wiring, then repair or replace.

4. After repair or replacement, recheck with the voltmeter to confirm that the repair has corrected the problem.

Engine-A/T-ECU Connector Terminal Arrangement

Engine-A/T-ECU Connector

C-110	C-111	C-112	C-113	C-114
1 2 5 14 21	3 4 12 13 19 20 26 27	31 32 36 37 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57	61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122	123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

AK303309AD

Terminal No.	Check item	Check condition (Engine condition)	Normal condition
1	No. 1 injector	While engine is idling after having warmed up, suddenly depress the accelerator pedal.	From 9 – 13 V*, momentarily drops slightly
5	No. 2 injector		
14	No. 3 injector		
21	No. 4 injector		
3	EGR valve (A)	Ignition switch: Immediately after turning ON	5 – 8 V* (fluctuates for approximately 3 seconds)
12	EGR valve (B)		
19	EGR valve (C)		
26	EGR valve (D)		
8	A/C relay	<ul style="list-style-type: none"> Engine: Idle speed A/C switch: OFF → ON (A/C compressor is operating) 	System voltage → 1 V or less
10	Cylinder 2, 3 oxygen sensor heater (front)	Engine: Idling after warming up	2 – 5 V*
		Engine: 4,000 r/min or more	0 V
15	Throttle valve control servo relay	Ignition switch: ON → LOCK (OFF)	1 V or less → system voltage → 1 V or less
16	Fuel pump relay	Ignition switch: ON	System voltage
		Engine: Idling	1 V or less
17	Fan controller	Radiator and condenser fan is not operating	0 – 0.3 V*
		Radiator and condenser fan is operating	0.7 V* or more
18	Cylinder 2, 3 oxygen sensor heater (rear)	Engine: Idling after warming up	System voltage
		Engine: 4,000 r/min or more	0 V

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
23	Purge control solenoid valve	Ignition switch: ON		System voltage
		Running at 3,500 r/min while engine is warming up after having been started.		Decreases voltage
24	Cylinder 1, 4 oxygen sensor heater (rear)	Engine: Idling after warming up		System voltage
		Engine: 4,000 r/min or more		0 V
25	Cylinder 1, 4 oxygen sensor heater (front)	Engine: Idling after warming up		2 – 5 V*
		Engine: 4,000 r/min or more		0 V
31	Ignition coil – No. 1	Engine: 3,000 r/min		0.1 – 2.0 V*
32	Ignition coil – No. 2			
35	Ignition coil – No. 3			
52	Ignition coil – No. 4			
34	Power supply	Ignition switch: ON		System voltage
43				
45	Alternator G terminal	<ul style="list-style-type: none"> • Engine: Idling after warming up (radiator fan: OFF) • Headlamp: OFF → ON • Stop lamp: OFF → ON • Rear defogger switch: OFF → ON 		Voltage increases
50	Ignition switch – IG	Ignition switch: ON		System voltage
51	Ignition switch – ST	Engine: Cranking		8 V or more
57	Engine control relay (Power supply)	Ignition switch: LOCK (OFF)		System voltage
		Ignition switch: ON		1 V or less
58	Backup power supply	Ignition switch: LOCK (OFF)		System voltage
63	Air flow sensor	Engine: Gradually increase the speed.		Voltage increase in response to revving
70	Crank angle sensor	Engine: Cranking		0.4 – 4.0 V
		Engine: Idling		2.0 – 3.0 V
71	Camshaft position sensor	Engine: Cranking		2.0 – 4.8 V
		Engine: Idling		3.0 – 4.0 V
84	Power steering fluid pressure sensor	Engine: Idling after warning up	When steering wheel is Stationary	0.4 – 1.0 V
			When steering wheel is turned	Voltage rises
			Full lock	3.0 – 4.0 V
86	Alternator FR terminal	<ul style="list-style-type: none"> • Engine: Idling after warming up (radiator fan: OFF) • Headlamp: OFF → ON • Stop lamp: OFF → ON • Rear defogger switch: OFF → ON 		Voltage decreases

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
92	Power supply voltage applied to accelerator pedal position sensor	Ignition switch: ON		4.9 – 5.1 V
95	Oil control valve	Ignition switch: ON		System voltage
		Engine: warming up, 4,500 r/min		4.0 – 10 V*
97	Sensor impressed voltage	Ignition switch: ON		4.9 – 5.1 V
98	Engine coolant temperature sensor	Ignition switch: ON	When engine coolant temperature is –20°C	3.9 – 4.5 V
			When engine coolant temperature is 0°C	3.2 – 3.8 V
			When engine coolant temperature is 20°C	2.3 – 2.9 V
			When engine coolant temperature is 40°C	1.3 – 1.9 V
			When engine coolant temperature is 60°C	0.7 – 1.3 V
			When engine coolant temperature is 80°C	0.3 – 0.9 V
99	Intake air temperature sensor	Ignition switch: ON	When intake air temperature is –20°C	3.8 – 4.4 V
			When intake air temperature is 0°C	3.2 – 3.8 V
			When intake air temperature is 20°C	2.3 – 2.9 V
			When intake air temperature is 40°C	1.5 – 2.1 V
			When intake air temperature is 60°C	0.8 – 1.4 V
			When intake air temperature is 80°C	0.4 – 1.0 V
106	Power supply voltage applied to throttle position sensor	Ignition switch: ON		4.9 – 5.1 V
107	Accelerator pedal position sensor (sub)	Ignition switch: ON	Release the accelerator pedal	0.4 – 1.0 V
			Depress the accelerator pedal fully	3.6 V or more
108	Cylinder 2,3 oxygen sensor (front)	Engine: 2,500 r/min after warmed up (Check using a digital type voltmeter)		0.4 V or less ⇔ 0.6 – 1.0 V (Changes repeatedly)
109	Cylinder 1,4 oxygen sensor (front)	Engine: 2,500 r/min after warmed up (Check using a digital type voltmeter)		0.4 V or less ⇔ 0.6 – 1.0 V (Changes repeatedly)

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
113	Throttle position sensor (sub)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the electronic-controlled throttle valve connector, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool (MB991658). Ignition switch: ON 	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	4.0 V or more
114	Accelerator pedal position sensor (main)	Ignition switch: ON	Release the accelerator pedal	0.8 – 1.2 V
			Depress the accelerator pedal fully	4.0 V or more
115	Throttle position sensor (main)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the electronic-controlled throttle valve connector, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool (MB991658). Ignition switch: ON 	Fully close the throttle valve with your finger	0.3 – 0.7 V
			Fully open the throttle valve with your finger	4.0 V or more
116	Cylinder 2,3 oxygen sensor (rear)	Engine: Idling after warmed up (Check using a digital type voltmeter)		0.4 V or less ⇔ 0.6 – 1.0 V (Changes repeatedly)
117	Cylinder 1,4 oxygen sensor (rear)	Engine: Idling after warmed up (Check using a digital type voltmeter)		0.4 V or less ⇔ 0.6 – 1.0 V (Changes repeatedly)
132	Power supply voltage applied to throttle valve control servo	Ignition switch: ON		System voltage
133	Throttle valve control servo (+)	<ul style="list-style-type: none"> Ignition switch: ON Accelerator pedal: fully opened → fully closed 		Decreases slightly (approximately 2 V) from battery voltage.
141	Throttle valve control servo (–)	<ul style="list-style-type: none"> Ignition switch: ON Accelerator pedal: fully closed → fully opened 		Decreases slightly (approximately 2 V) from battery voltage.

NOTE: *:The average voltage is shown when an analog voltmeter is used (because the average voltage might not be shown stably when digital voltmeter is used).

**CHECK CHART FOR RESISTANCE AND
CONTINUITY BETWEEN TERMINALS**

1. Turn the ignition switch to LOCK (OFF) position.
2. Disconnect the engine-A/T-ECU connector.
3. Measure the resistance and check for continuity between the terminals of the engine-A/T-ECU harness-side connector while referring to the check chart.

NOTE:

1. When measuring resistance and checking continuity, a harness for checking contact pin pressure should be used instead of inserting a test probe.
2. Checking need not be carried out in the order given in the chart.

⚠ CAUTION

If the terminals that should be checked are mistaken, or if connector terminals are not correctly shorted to earth, damage may be caused to the vehicle wiring, sensors, engine-A/T-ECU and/or ohmmeter. Be careful to prevent this!

4. If the ohmmeter shows any deviation from the standard value, check the corresponding sensor, actuator and related electrical wiring, and the repair or replace.
5. After repair or replacement, recheck with the ohmmeter to confirm that the repair or replacement has corrected the problem.

Engine-A/T-ECU Harness Side Connector Terminal Arrangement**Engine-A/T-ECU Harness Side Connector**

C-114	C-113	C-112	C-111	C-110
124 123 132 133 141 146	128 129 130 131 136 137 142 143 144	121 122 125 126 134 135 142 143 144	63 64 67 68 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87	3 4 13 31 32 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56

AK303310AD

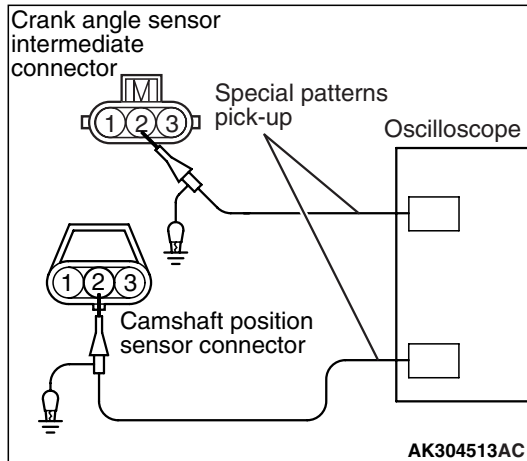
Terminal No.	Inspection item	Normal condition (Check condition)
1 – 34	No. 1 injector	10.5 – 13.5 Ω (At 20°C)
5 – 34	No. 2 injector	
14 – 34	No. 3 injector	
21 – 34	No. 4 injector	
3 – 34	EGR valve (A)	20 – 24 Ω (at 20°C)
12 – 34	EGR valve (B)	
19 – 34	EGR valve (C)	
26 – 34	EGR valve (D)	
10 – 34	Cylinder 2, 3 oxygen sensor heater (front)	4.5 – 8.0 Ω (at 20°C)
25 – 34	Cylinder 1, 4 oxygen sensor heater (front)	
18 – 34	Cylinder 2, 3 oxygen sensor heater (rear)	11 – 18 Ω (at 20°C)
24 – 34	Cylinder 1, 4 oxygen sensor heater (rear)	
23 – 34	Purge control solenoid valve	30 – 34 Ω (At 20°C)

Terminal No.	Inspection item	Normal condition (Check condition)
33 – Body earth	ECU earth	Continuity (2 Ω or less)
42 – Body earth		
144 – Body earth		
145 – Body earth		
34 – 95	Oil control valve	6.9 – 7.9 Ω (at 20°C)
96 – 98	Engine coolant temperature sensor	14 – 17 k Ω (When coolant temperature is –20°C)
		5.1 – 6.5 k Ω (When coolant temperature is 0°C)
		2.1 – 2.7 k Ω (When coolant temperature is 20°C)
		0.9 – 1.3 k Ω (When coolant temperature is 40°C)
		0.48 – 0.68 k Ω (When coolant temperature is 60°C)
		0.26 – 0.36 k Ω (When coolant temperature is 80°C)
96 – 99	Intake air temperature sensor	13 – 17 k Ω (When intake air temperature is –20°C)
		5.3 – 6.7 k Ω (When intake air temperature is 0°C)
		2.3 – 3.0 k Ω (When intake air temperature is 20°C)
		1.0 – 1.5 k Ω (When intake air temperature is 40°C)
		0.56 – 0.76 k Ω (When intake air temperature is 60°C)
		0.30 – 0.45 k Ω (When intake air temperature is 80°C)
133 – 141	Throttle actuator control motor	0.3 – 100 Ω (at 20°C)

INSPECTION PROCEDURE USING OSCILLOSCOPE

The output signals of the sensors and the conditions of the actuation signals of the actuators can be inspected visually by observing the waveforms on the oscilloscope.

CAMSHAFT POSITION SENSOR AND CRANK ANGLE SENSOR Measurement Method



1. Disconnect the camshaft position sensor connector and connect the special tool Test harness (MB991709) in between (All terminals should be connected).

Standard Wave Pattern

2. Connect the oscilloscope special pattern pickup to camshaft position sensor terminal No. 2.
3. Disconnect the crank angle sensor intermediate connector and connect the special tool Test harness (MB991658) in between.
4. Connect the oscilloscope special patterns pickup to crank angle sensor terminal No. 2.

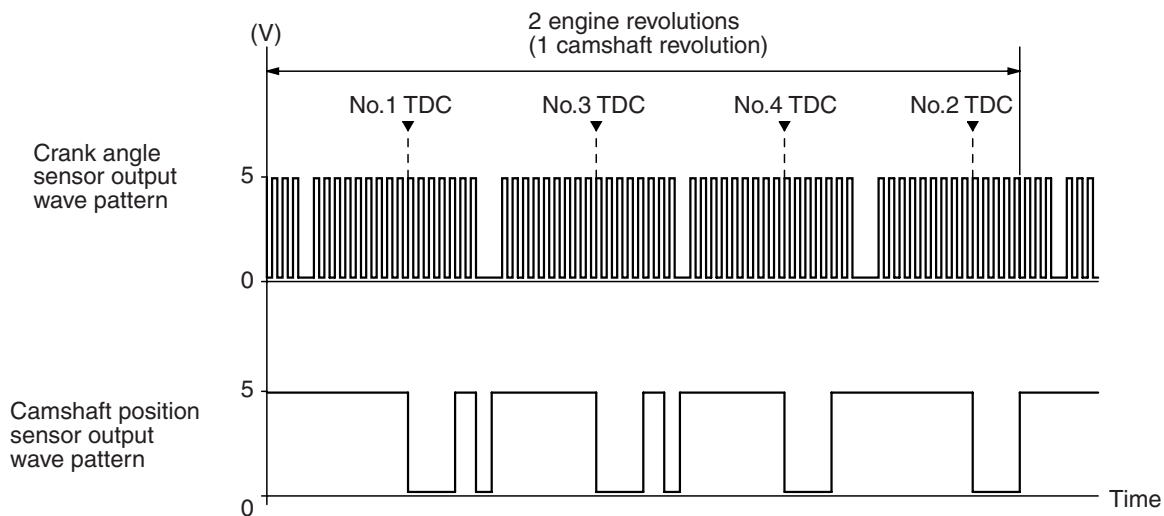
Alternate Method (Test harness not available)

1. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 71 (When checking the camshaft position sensor signal wave pattern).
2. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 70 (When checking the crank angle sensor signal wave pattern).

Standard Wave Pattern

Observation condition

Function	Special patterns
Pattern height	Low
Pattern selector	Display
Engine speed	Idle



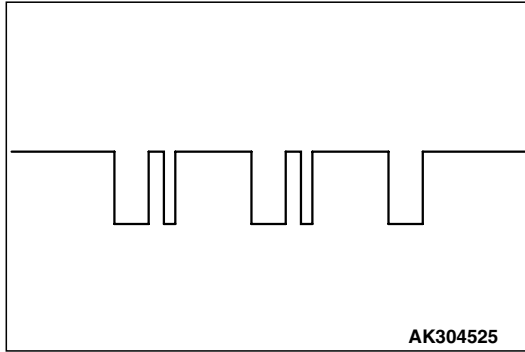
TDC: Top dead centre

AK304514 AB

Wave Pattern Observation Points

Check that cycle time becomes shorter when the engine speed increases.

Examples of Abnormal Wave Patterns



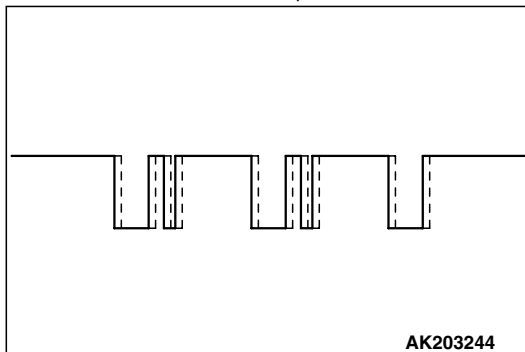
Example 1

Cause of problem

Sensor interface malfunction

Wave pattern characteristics

Rectangular wave pattern is output even when the engine is not started.



Example 2

Cause of problem

Loose timing belt

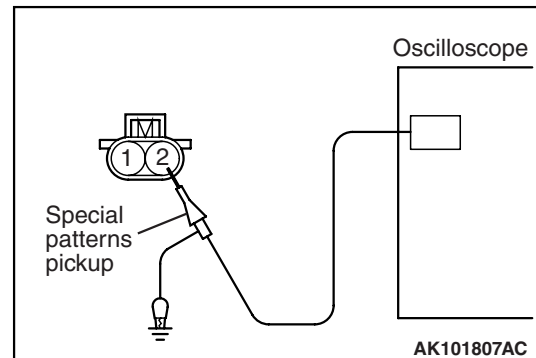
Abnormality in sensor disk

Wave pattern characteristics

Wave pattern is displaced to the left or right.

INJECTOR

Measurement Method



1. Disconnect the injector connector, and then connect the special tool Test harness set (MB991658) in between (All terminals should be connected).
2. Connect the oscilloscope special patterns pickup to terminal No. 2 of each injector connector in turn.

Alternate Method (Test harness not available)

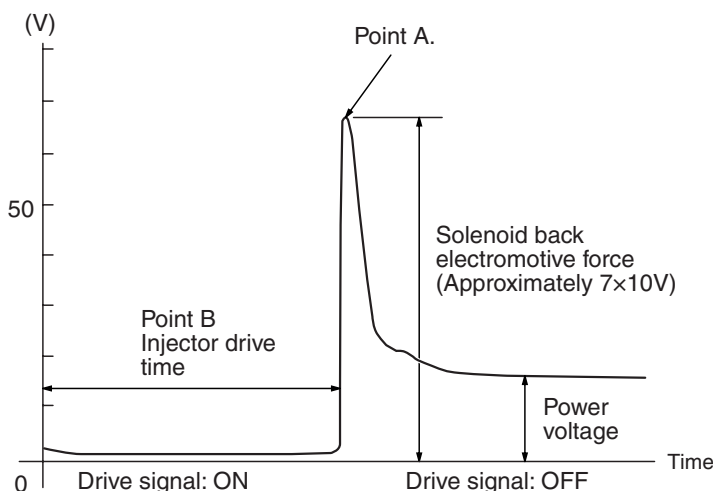
1. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 1 (When checking the No. 1 cylinder).
2. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 5 (When checking the No. 2 cylinder).
3. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 14 (When checking the No. 3 cylinder).
4. Connect the oscilloscope special patterns pickup to engine-A/T-ECU terminal No. 21 (When checking the No. 4 cylinder).

Standard Wave Pattern

Observation conditions

Function	Special patterns
Pattern height	Variable
Variable knob	Adjust while viewing the wave pattern
Pattern selector	Display
Engine	Idle

Standard wave pattern



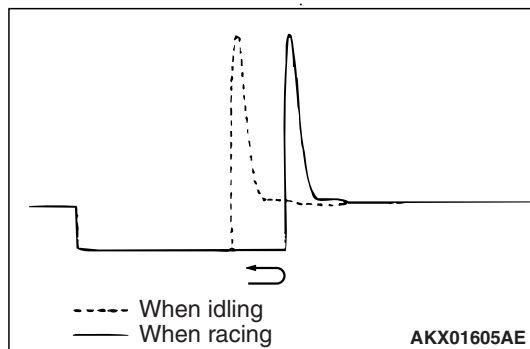
AK305803AB

Wave Pattern Observation Points

Point A: Height of solenoid back electromotive force

Contrast with standard wave pattern	Probable cause
Solenoid coil back electromotive force is low or doesn't appear at all.	Short in the injector solenoid all.

Point B: Injector drive time

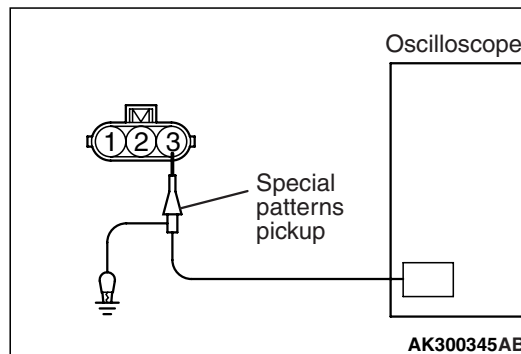


The injector drive time will be synchronized with the M.U.T.-III tester display.

- When the engine is suddenly raced, the drive time will be greatly extended at first, but the drive time will soon match the engine speed.

IGNITION COIL AND POWER TRANSISTOR

Measurement Method



- Disconnect the ignition coil connector, and connect the special tool Test harness (MB991658) in between (All terminals should be connected).
- Connect the oscilloscope special patterns pickup to terminal No. 3 of each ignition coil connector in turn.

Alternate Method (Test harness not available)

1. Connect the oscilloscope probe to engine-A/T-ECU terminal No. 31. (When checking the number 1 cylinder.)
2. Connect the oscilloscope probe to engine-A/T-ECU terminal No. 32. (When checking the number 2 cylinder.)
3. Connect the oscilloscope probe to engine-A/T-ECU terminal No. 35. (When checking the number 3 cylinder.)

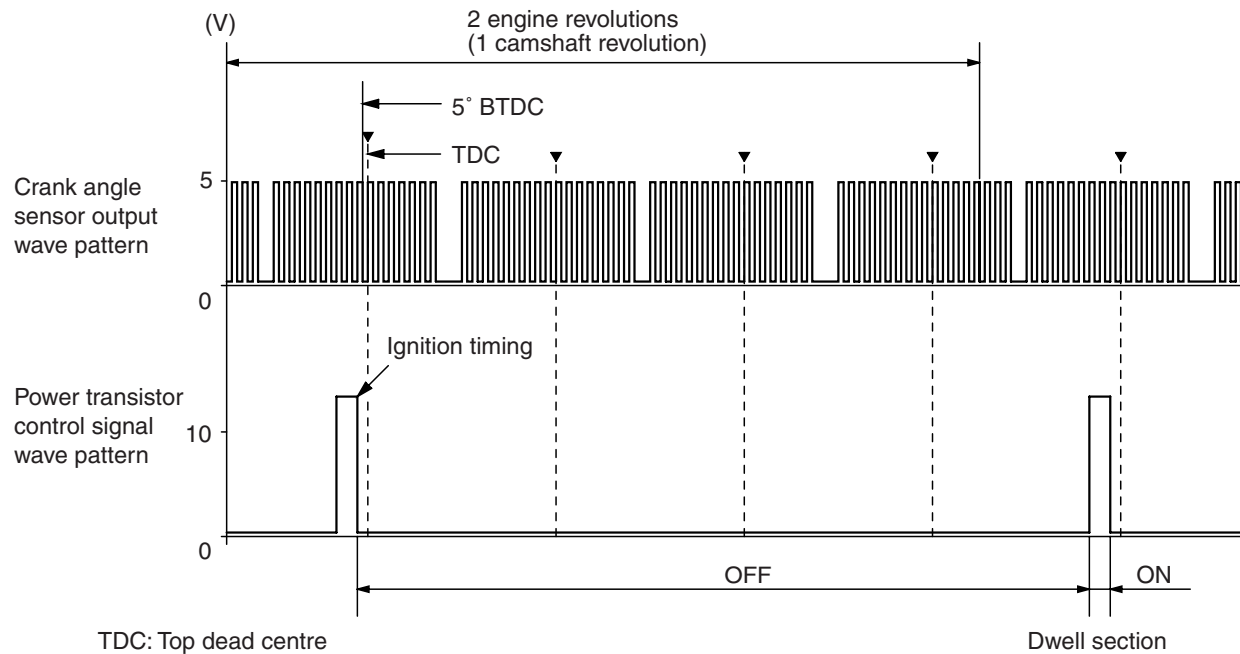
4. Connect the oscilloscope probe to engine-A/T-ECU terminal No. 52. (When checking the number 4 cylinder.)

Standard Wave Pattern

Observation condition

Function	Special patterns
Pattern height	Low
Pattern selector	Display
Engine	Idle

Standard wave pattern

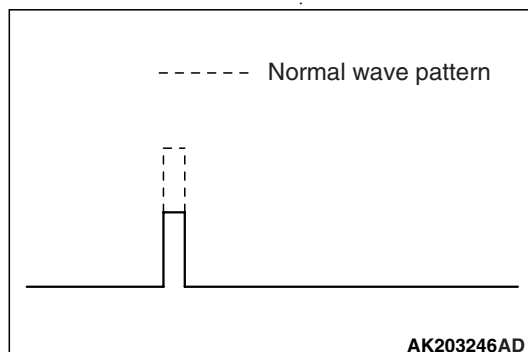


AK305797AB

Wave Pattern Observation Points

Point: When the engine speed increases, verify that the power transistor control signal (ignition timing) advances.

Examples of Abnormal Wave Patterns



Example

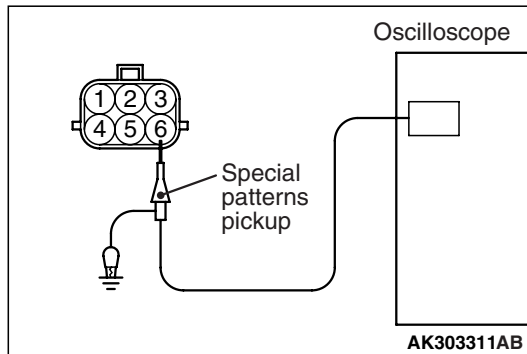
Cause of problem

Open-circuit in ignition primary circuit

Wave pattern characteristics

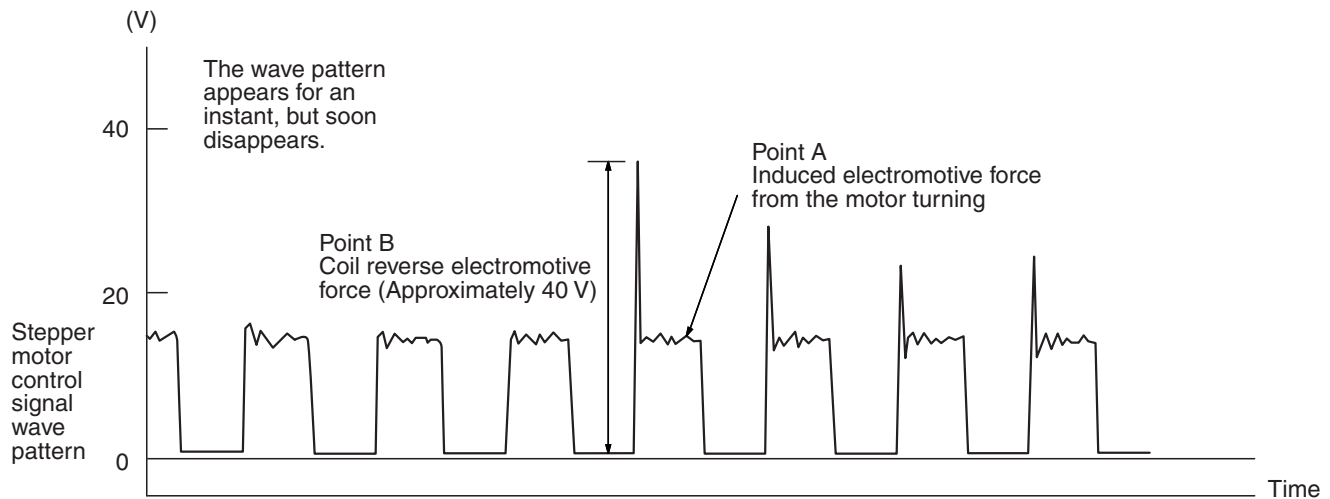
Voltage value is too low.

EGR VALVE (STEPPER MOTOR) Measurement Method



1. Disconnect the EGR valve connector, and connect the special tool test harness (MB991658) in between.
2. Connect the oscilloscope probe to the EGR valve-side connector terminal No. 1, terminal No. 3, terminal No. 4 and terminal No. 6 respectively.

Standard wave pattern



AK305868AB

Wave pattern Observation Points

Check that the standard wave pattern appears when the EGR control servo is operating.

Point A: Presence or absence of induced electromotive force from the motor turning. (Refer to the abnormal wave pattern.)

Contrast with standard wave pattern	Probable cause
Induced electromotive force does not appear or is extremely small.	Motor is malfunctioning

Alternate Method (Test Harness not Available)

1. Connect the oscilloscope probe to engine-A/T-ECU terminal No. 3, connection terminal No. 12, connection terminal No. 19, and connection terminal No. 26 respectively.

Standard Wave Pattern

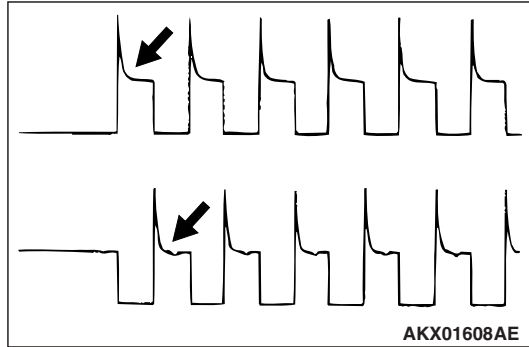
Observation condition

Function	Special patterns
Pattern height	High
Pattern selector	Display
Engine	Ignition switch: OFF → ON

Point B: Height of coil reverse electromotive force

Contrast with standard wave pattern	Probable cause
Coil reverse electromotive force does not appear or is extremely small.	Short in the coil

Examples of Abnormal Wave Patterns



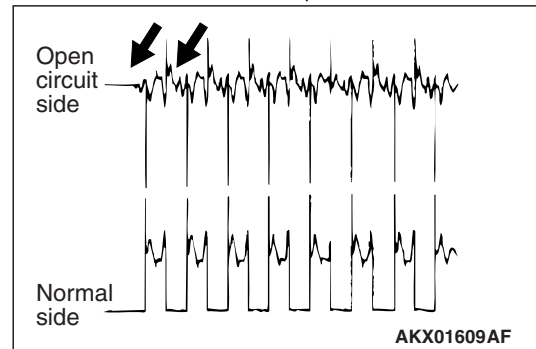
Example 1

Cause of problem

Sensor interface malfunction. (Motor is not operating)

Wave pattern characteristics

Induced electromotive force from the motor turning dose not appear.



Example 2

Cause of problem

Open circuit in the line between the EGR valve and the engine-A/T-ECU.

Wave pattern characteristics

Current is not supplied to the motor coil on the open circuit side. (Voltage dose not drop to 0 V.)

Furthermore, the induced electromotive force

ON-VEHICLE SERVICE

THROTTLE BODY (THROTTLE VALVE
AREA) CLEANING

M1131001000729

1. Remove the air intake hose from the throttle body.
2. Remove the throttle body assembly.

CAUTION

- Do not spray the cleaning fluid directly to the throttle valve.
 - Make sure the cleaning fluid does not enter the motor from the bypass line. Also make sure it does not enter the sensor through the shaft.
3. Spray cleaning fluid on a clean cloth.
 4. Wipe off the dirt around the throttle valve with the cloth sprayed with cleaning fluid.
 5. Install the throttle body assembly.
 6. Attach the air intake hose.

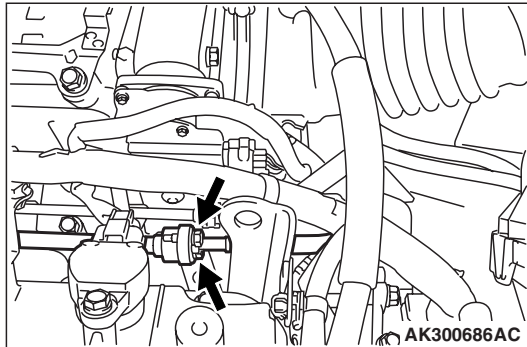
FUEL PRESSURE TEST

M1131001900863

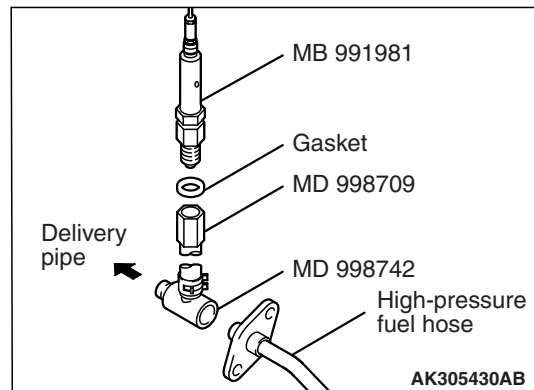
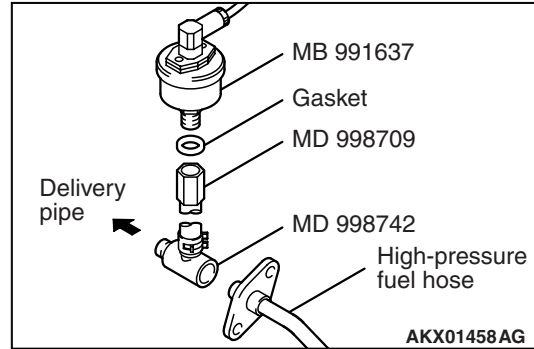
1. Release residual pressure from the fuel pipe line to prevent fuel gush out (Refer to P.13B-284).

CAUTION

Cover the hose connection with rags to prevent splash of fuel that could be caused by some residual pressure in the fuel pipe line.



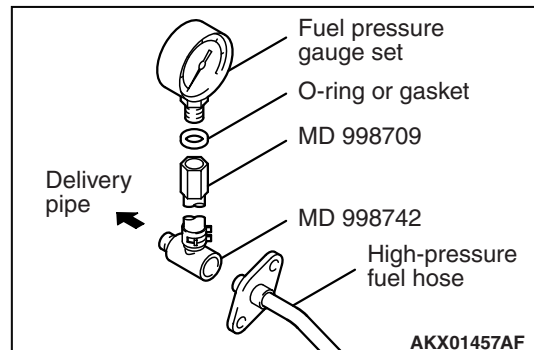
2. Disconnect the high-pressure fuel hose at the delivery pipe side.



3. Assemble the fuel pressure measurement tools as follows.

<When using the fuel pressure gauge set (special tool)>

- a. Remove the union joint and bolt from the special tool adaptor hose (MD998709) and attach the special tool hose adaptor (MD998742) to the adaptor hose.
- b. Via a gasket, install the special tool fuel pressure gauge set (MB991637 or MB991981) into the special tool that has already assembled as described in (a) above.

**<When using the fuel pressure gauge>**

- a. Remove the union joint and bolt from special tool adaptor hose (MD998709) and attach the special tool hose adaptor (MD998742) to the adaptor hose.

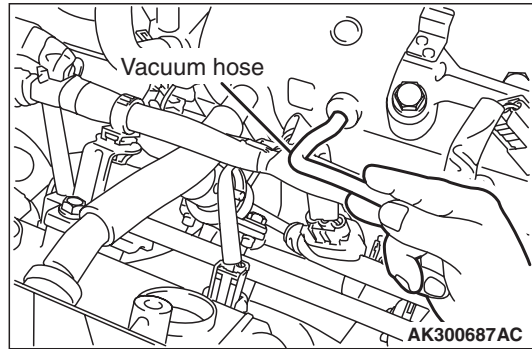
- b. Via a suitable O-ring or gasket, install the fuel pressure gauge to the special tool that has already assembled as described in (a) above.
4. Install the assembled fuel pressure measurement tools between the fuel rail and high-pressure fuel hose.

⚠ CAUTION

To prevent damage to the M.U.T.-III, always turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the M.U.T.-III.

5. Connect the M.U.T.-III to the diagnosis connector.
6. Turn the ignition switch to ON position (But do not start the engine).
7. Select "Item No. 07" from the M.U.T.-III actuator test to drive the fuel pump. Check that there are no fuel leaks from any parts.
8. Finish the actuator test or turn the ignition switch to LOCK (OFF) position.
9. Start the engine and run at idle.
10. Fuel pressure measurement while the engine is running at idle.

Standard value: Approximately 256 kPa at curb idle



11. Disconnect the vacuum hose from the fuel pressure regulator and measure fuel pressure with the hose end closed by a finger.

Standard value: 325 – 335 kPa at curb idle

12. Check to see that fuel pressure at idle does not drop even after the engine has been raced several times.
13. Racing the engine repeatedly, hold the fuel return hose lightly with fingers to feel that fuel pressure is present in the return hose.

NOTE: If the fuel flow rate is low, there will be no fuel pressure in the return hose.

14. If any of fuel pressure measured in steps 10 to 13 is out of specification, troubleshoot and repair according to the table below.

Symptom	Probable cause	Remedy
<ul style="list-style-type: none"> Fuel pressure too low Fuel pressure drops after racing No fuel pressure in fuel return hose 	Clogged fuel filter	Replace fuel filter
	Fuel leaking to return side due to poor fuel regulator valve seating or settled spring	Replace fuel pressure regulator
	Low fuel pump delivery pressure	Replace fuel pump
Fuel pressure too high	Binding valve in fuel pressure regulator	Replace fuel pressure regulator
	Clogged fuel return hose or pipe	Clean or replace hose or pipe
Same fuel pressure when vacuum hose is connected and when disconnected	Damaged vacuum hose or Clogged nipple	Replace vacuum hose or clean nipple

15. Stop the engine and check change of fuel pressure gauge reading. Normal if the reading does not drop within 2 minutes. If it does, observe the rate of drop and troubleshoot and repair according to the table below.

Symptom	Probable cause	Remedy
Fuel pressure drops gradually after engine is stopped	Leaky injector	Replace injector
	Leaky fuel regulator valve seat	Replace fuel pressure regulator
Fuel pressure drops sharply immediately after engine is stopped	Check valve in fuel pump is held open	Replace fuel pump

16. Release residual pressure from the fuel pipe line (Refer to P.13B-284).

CAUTION

Cover the hose connection with rags to prevent splash of fuel that could be caused by some residual pressure in the fuel pipe line.

17. Remove the fuel pressure gauge and special tool from the delivery pipe.

18. Replace the O-ring at the end of the fuel high pressure hose with a new one. Furthermore, apply engine oil to the new O-ring before replacement.

19. Fit the fuel high pressure hose over the delivery pipe and tighten the bolt to specified torque.

Tightening torque: 5 ± 1 N·m

20. Check for any fuel leaks by following the procedure in step 7.

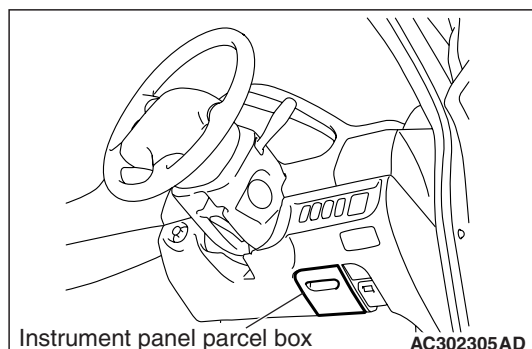
21. Disconnect the M.U.T.-III.

FUEL PUMP RELAY DISCONNECTION (HOW TO REDUCE PRESSURIZED FUEL LINES)

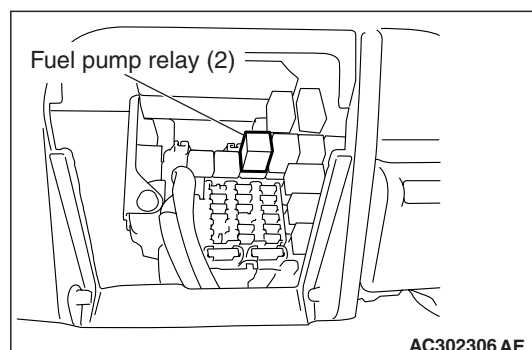
M1131000900763

WARNING

When removing the fuel pipe, etc., release fuel pressure to prevent fuel spray.



1. Remove the instrument panel parcel box (Refer to GROUP 52A – Instrument Panel P.52A-2).

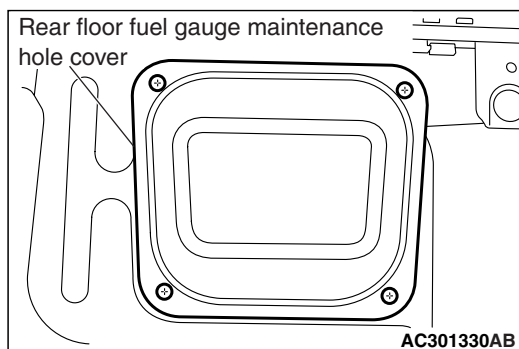


2. Remove the fuel pump relay (2) in the the junction block.
3. Crank the engine for at least two seconds.
4. If the engine is not started, turn the ignition switch to the "LOCK (OFF)" position.
5. If the engine is started, turn the ignition switch to the "LOCK (OFF)" position after the engine stopped.
6. Install the fuel pump relay (2).
7. Install the instrument panel parcel box (Refer to GROUP 52A – Instrument Panel P.52A-2).

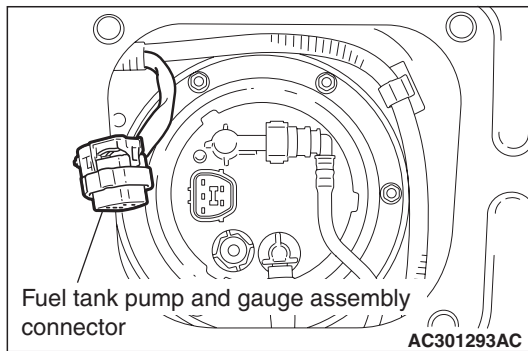
FUEL PUMP OPERATION CHECK

M1131002001275

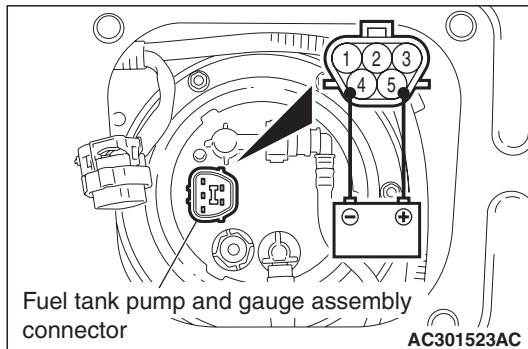
1. Remove the fuel tank cap.
NOTE: As the fuel pump is an in-tank type, the fuel pump sound is hard to hear. Then check the sound from the tank inlet.
2. Check the operating of the fuel pump by M.U.T.-III to force-drive the fuel pump.
3. If the fuel pump will not operate, check by using the following procedure. If normal, check the fuel pump drive circuit.
 - (1) Turn the ignition switch to the "LOCK" (OFF) position.
 - (2) Remove the second seat assembly, the rail cover outer and the rail cover inner. (Refer to GROUP 52A, Second Seat Assembly Removal and Installation P.52A-27).
 - (3) Remove the rear scuff plate (Refer to GROUP 52A, Trim Removal and Installation P.52A-10), and turn up the floor mat.



- (4) Remove the rear floor fuel gauge maintenance hole cover (LH).



- (5) Disconnect the fuel tank pump and gauge assembly connector.



- (6) When the fuel pump drive connector (Fuel tank pump and gauge assembly side) is attached directly to the battery, check if the sound of the fuel pump operation can be heard. If no operating sound is heard, replace the fuel tank pump (Refer to GROUP 13D, Fuel Pump Module Disassembly and Assembly [P.13D-9](#)).

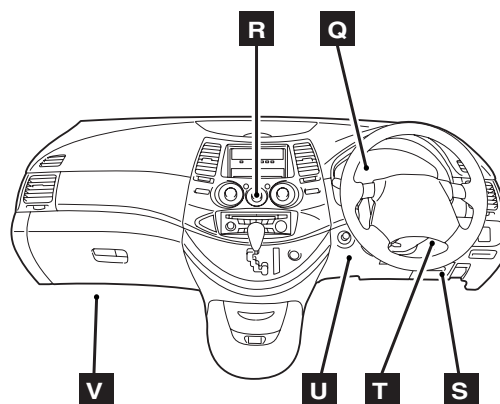
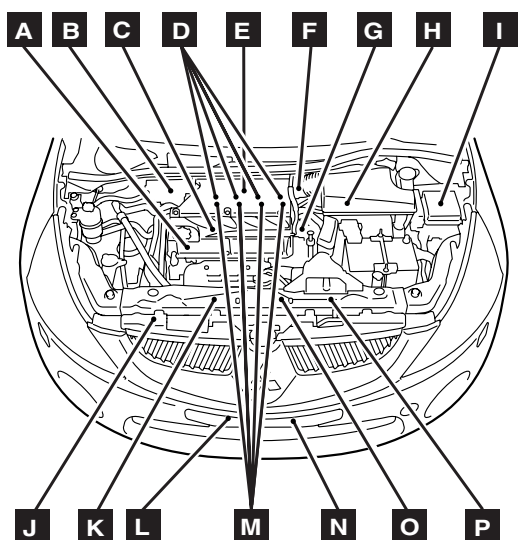
NOTE: . As the fuel pump is an in-tank type, the fuel pump sound is hard to hear. Then check the sound from the tank inlet.

- (7) Connect fuel tank pump and gauge assembly connector.
- (8) Install the rear floor fuel gauge maintenance hole cover (LH).
- (9) Return the floor mat and install the rear scuff plate. (Refer to GROUP 52A, Trim Removal and Installation [P.52A-10](#)).
- (10) Install the rail cover outer, the rail cover inner and the second seat assembly. (Refer to GROUP 52A, Second Seat Assembly Removal and Installation [P.52A-27](#)).
4. Install the fuel tank cap.

COMPONENT LOCATION

M1131002101108

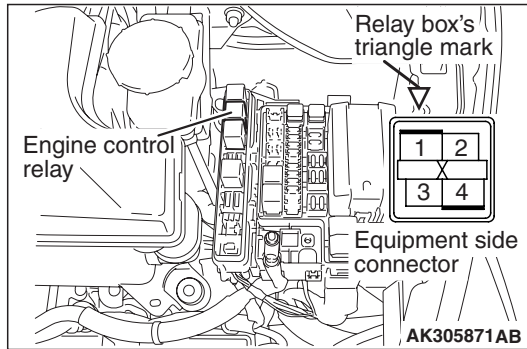
Name	Symbol	Name	Symbol
Accelerator pedal position sensor	S	Engine-A/T-ECU (with barometric pressure sensor)	V
		Engine control relay	I
A/C compressor relay	I	Engine coolant temperature sensor	G
A/C switch	R	Engine warning lamp (check engine lamp)	Q
Air flow sensor (with intake air temperature sensor)	H	Fuel pump relay (1) and (2)	T
Camshaft position sensor	G	Ignition coil	M
Crank angle sensor	J	Inhibitor switch	P
Cylinder 1, 4 oxygen sensor (front)	K	Injector	D
Cylinder 1, 4 oxygen sensor (rear)	L	Oil control valve	G
Cylinder 2, 3 oxygen sensor (front)	O	Power steering fluid pressure sensor	A
Cylinder 2, 3 oxygen sensor (rear)	N	Purge control solenoid valve	B
Detonation sensor	C	Throttle position sensor	F
Diagnosis connector	U	Throttle valve control servo	F
EGR valve	E	Throttle valve control servo relay	I



AK305870AB

ENGINE CONTROL RELAY CONTINUITY CHECK

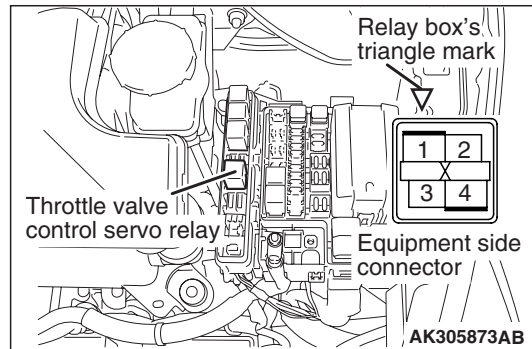
M1131050000527



Tester Connection Terminal	Battery Voltage	Normal State
2 - 3	No Voltage	Continuity
1 - 4	No Voltage	No continuity
	Voltage (Connect positive (+) terminal of battery to terminal No. 3 and negative (-) terminal of battery to terminal No. 2.)	Continuity

THROTTLE VALVE CONTROL SERVO RELAY CONTINUITY CHECK

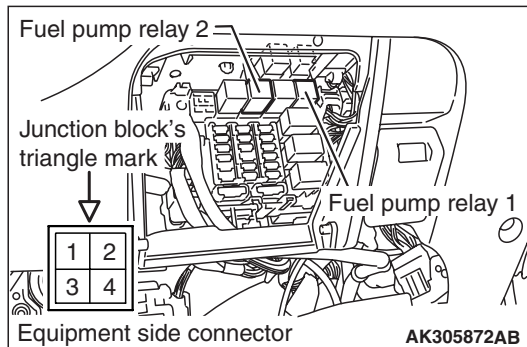
M1131053500071



Tester Connection Terminal	Battery Voltage	Normal State
2 - 3	No Voltage	Continuity
1 - 4	No Voltage	No continuity
	Voltage (Connect positive (+) terminal of battery to terminal No. 3 and negative (-) terminal of battery to terminal No. 2.)	Continuity

FUEL PUMP RELAY CONTINUITY CHECK

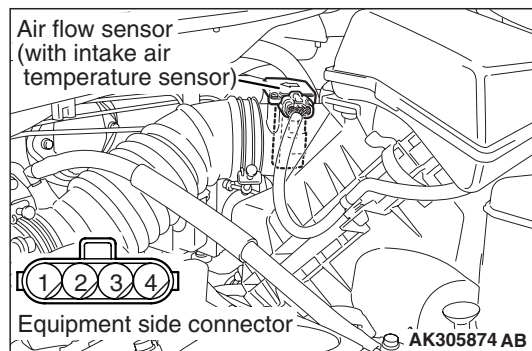
M1131033000524



Tester Connection Terminal	Battery Voltage	Normal State
2 - 3	No Voltage	Continuity
1 - 4	No Voltage	No continuity
	Voltage (Connect positive (+) terminal of battery to terminal No. 3 and negative (-) terminal of battery to terminal No. 2.)	Continuity

INTAKE AIR TEMPERATURE SENSOR CHECK

M1131002800773



1. Disconnect the air flow sensor connector.
2. Measure resistance between terminals No. 1 and No. 4.

Standard value:

13 - 17 kΩ (at -20°C)

5.3 - 6.7 kΩ (at 0°C)

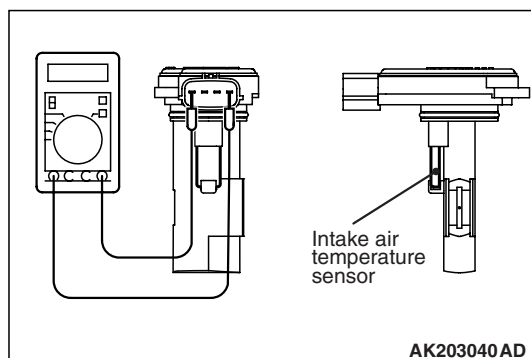
2.3 - 3.0 kΩ (at 20°C)

1.0 - 1.5 kΩ (at 40°C)

0.56 - 0.76 kΩ (at 60°C)

0.30 - 0.45 kΩ (at 80°C)

3. Remove the air flow sensor.



4. Measure resistance while heating the sensor using a hair drier.

Normal condition:

Temperature (°C)	Resistance (kΩ)
Higher	Smaller

5. If the value deviates from the standard value or the resistance remains unchanged, replace the air flow sensor assembly.
6. Install the air flow sensor and tighten it to the specified torque.

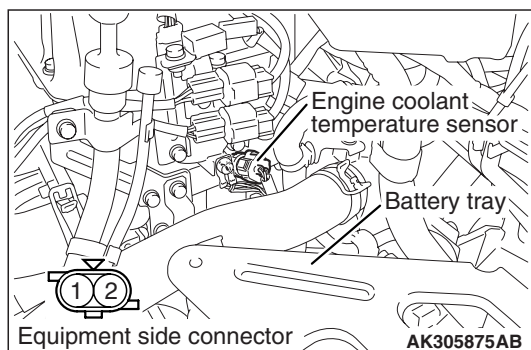
Tightening torque: 1.8 ± 0.6 N·m

ENGINE COOLANT TEMPERATURE SENSOR CHECK

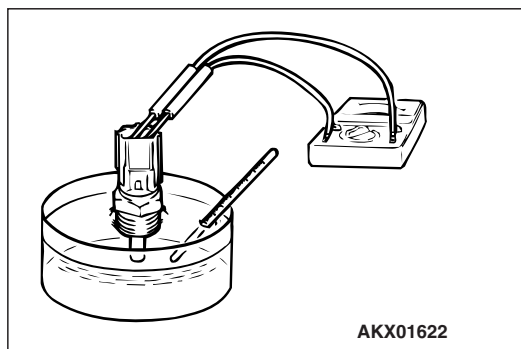
M1131003100733

CAUTION

Be careful not to touch the connector (resin section) with the tool when removing and installing.



1. Remove the engine coolant temperature sensor.



2. With temperature sensing portion of engine coolant temperature sensor immersed in hot water, check resistance.

Standard value:

14 – 17 kΩ (at -20°C)

5.1 – 6.5 kΩ (at 0°C)

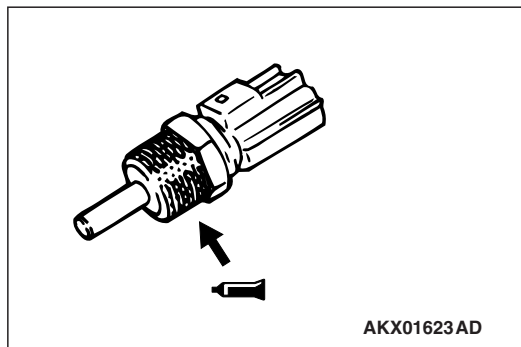
2.1 – 2.7 kΩ (at 20°C)

0.9 – 1.3 kΩ (at 40°C)

0.48 – 0.68 kΩ (at 60°C)

0.26 – 0.36 kΩ (at 80°C)

3. If the resistance deviates from the standard value greatly, replace the sensor.



4. Apply sealant to threaded portion.

Specified sealant:

3M NUT Locking Part No. 4171 or equivalent

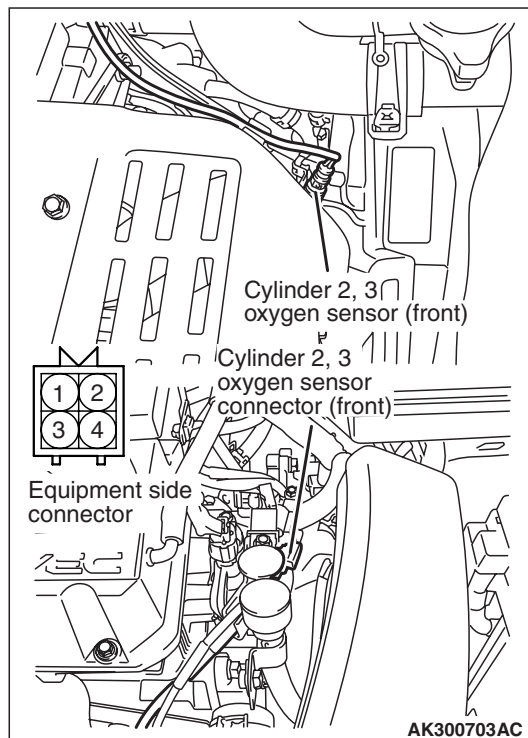
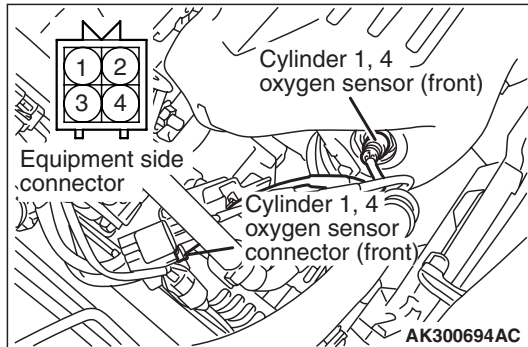
5. Install the engine coolant temperature sensor and tighten it to the specified torque.

Tightening torque: 30 ± 9 N·m

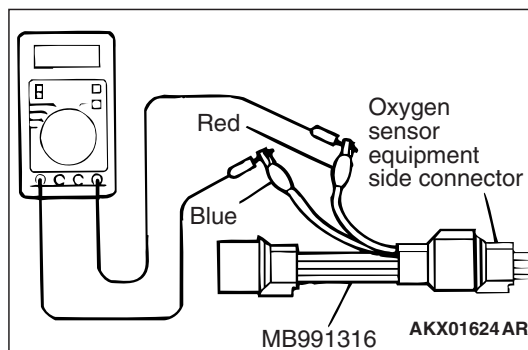
OXYGEN SENSOR CHECK

M1131005000970

OXYGEN SENSOR (FRONT)

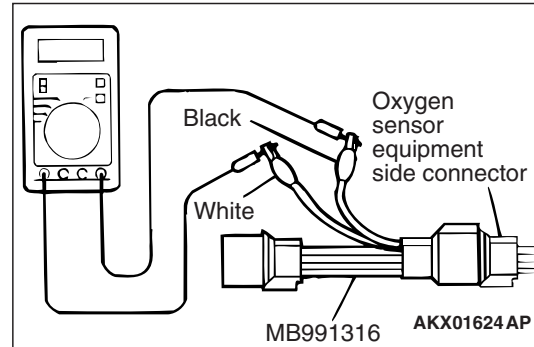


1. Disconnect the oxygen sensor connector and connect the special tool Test harness (MB991316) to the connector on the oxygen sensor side.



2. Make sure that there is continuity ($4.5 - 8.0 \Omega$ at 20°C) between terminal No. 1 (red clip of special tool) and No. 3 (blue clip of special tool) on the oxygen sensor connector.

3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until engine coolant is 80°C or higher.
5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.



6. Connect a digital voltage meter between terminal No. 2 (black clip of special tool) and No. 4 (white clip of special tool).
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

Standard value:

Engine	Oxygen sensor output voltage	Remarks
When racing the engine	0.6 – 1.0 V	If you make the air-fuel ratio rich by racing the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

CAUTION

- Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.
- Be careful the heater is broken when voltage of beyond 8V is applied to the oxygen sensor heater.

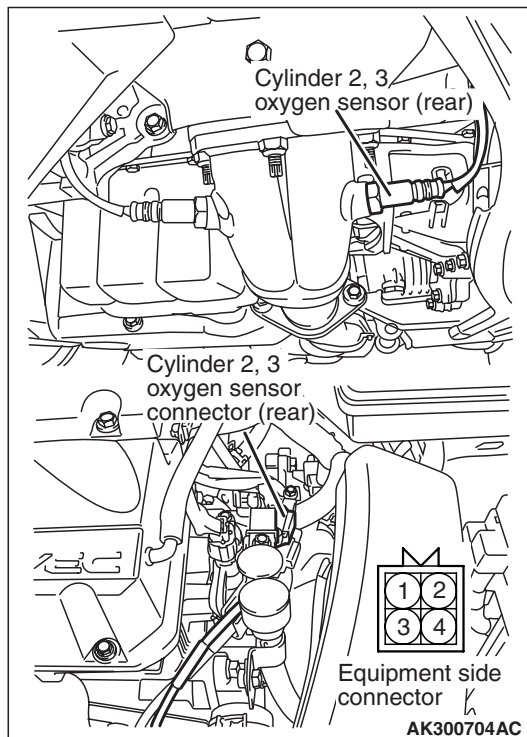
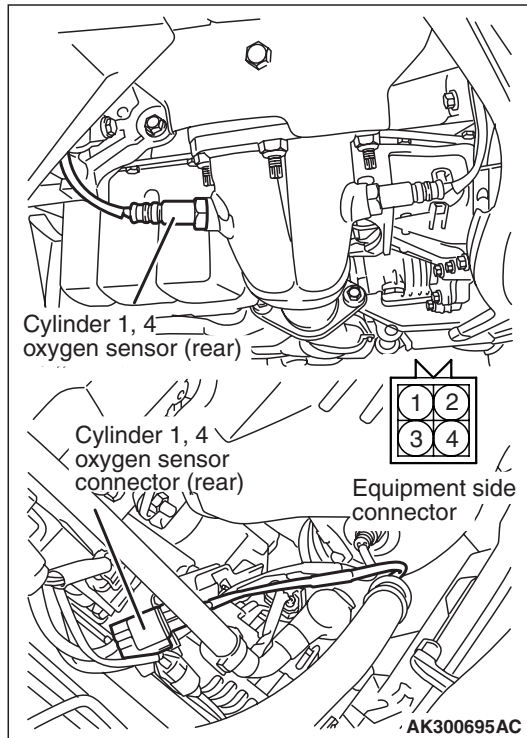
NOTE: If the sufficiently high temperature (of approximate 400°C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No. 1 (red clip of special tool) and the terminal No. 3 (blue clip of special tool) of the oxygen sensor with a (+) terminal and (-) terminal of 8 V power supply respectively, then check again.

8. If the voltage is deviates from standard value, replace the oxygen sensor.

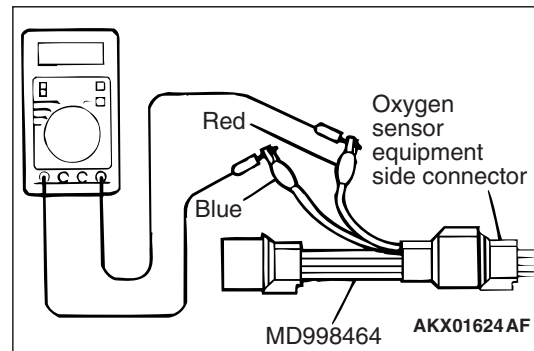
NOTE: For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Manifold.

P.15-7.

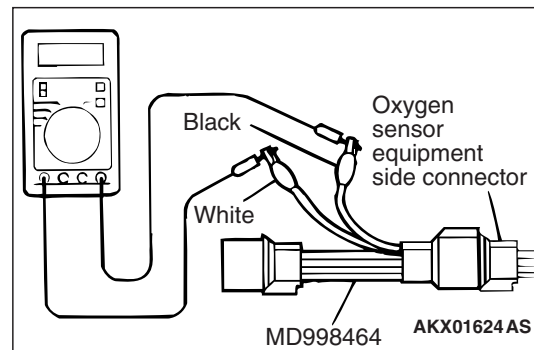
OXYGEN SENSOR (REAR)



1. Disconnect the oxygen sensor connector and connect the special tool Test harness (MD998464) to the connector on the oxygen sensor side.



2. Make sure that there is continuity ($11 - 18 \Omega$ at 20°C) between terminal No.1 (red clip of special tool) and No. 3 (blue clip of special tool) on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until engine coolant is 80°C or higher.
5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.



6. Connect a digital voltage meter between terminal No.2 (black clip of special tool) and No. 4 (white clip of special tool).
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

Standard value:

Engine	Oxygen sensor output voltage	Remarks
When racing the engine	0.6 – 1.0 V	If you make the air-fuel ratio rich by racing the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

⚠ CAUTION

- Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.
- Be careful the heater is broken when voltage of beyond 12 V is applied to the oxygen sensor heater.

NOTE: If the sufficiently high temperature (of approximate 400 °C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No.2 and the terminal No. 1 of the oxygen sensor with a (+) terminal and (-) terminal of 12 V power supply respectively, then check again.

8. If the voltage is deviates from standard value, replace the oxygen sensor.

NOTE: For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Pipe and Main Muffler P.15-9.

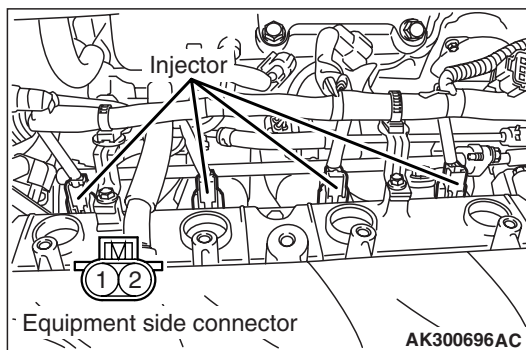
INJECTOR CHECK

M1131005201234

CHECK THE OPERATION SOUND

⚠ CAUTION

Beware that the operation sounds of other injectors can be heard even if the injector that is being inspected might not be operating.



1. Use a stethoscope to listen to the operation sound (clicking) of the injectors while the engine is idling or cranking.
2. Verify that the operation sound increases with the engine speed.

NOTE: . If the operating sound cannot be heard, inspect the injector actuation circuit.

MEASUREMENT OF RESISTANCE BETWEEN TERMINALS

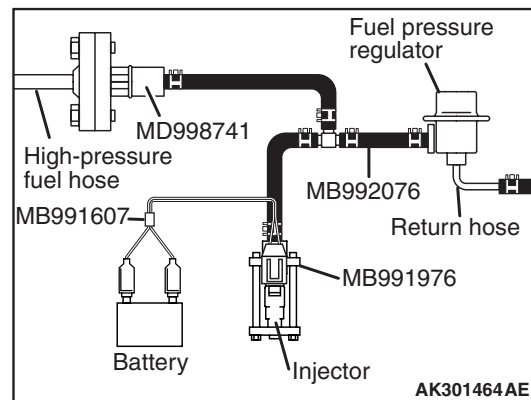
1. Disconnect the injector connector.
2. Measure the resistance between terminals.

Standard value: 10.5 – 13.5 Ω (at 20°C)

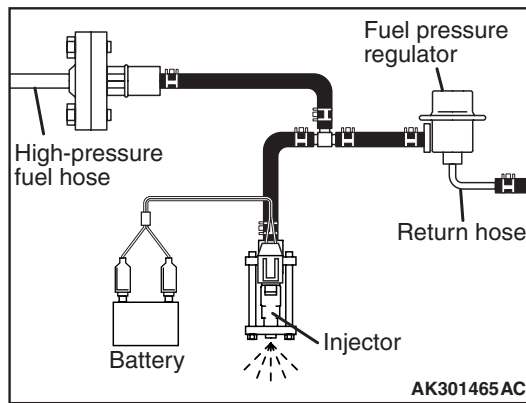
3. If the resistance is deviates from the standard value, replace the injector.
4. Connect the injector connector.

CHECK THE INJECTION CONDITION

1. Following the steps below, bleed out the residual pressure within the fuel pipe line to prevent flow of the fuel (Refer to P.13B-284).
2. Remove the injector.



3. Assemble the following special tools as shown in Fig.
 - Injector test set (MB992076)
 - Injector test harness (MB991607)
 - Injector test adaptor (MD998741)
 - Injector test holder assembly (MB991976)
4. Connect the M.U.T.-III to the diagnosis connector.
5. Turn the ignition switch to ON position (But do not start the engine).
6. Select "Item No. 07" from the M.U.T.-III actuator test to drive the fuel pump.



7. Activate the injector and check the atomized spray condition of the fuel.

The condition can be considered satisfactory unless it is extremely poor.

8. Stop the actuation of the injector, and check for leakage from the injector nozzle.

Standard value: 1 drop or less per minute

9. Without the fuel pump operation, operate the injector to draw the fuel out.
10. If the spraying is extremely poor or the fuel leakage from the injector nozzle deviates from the standard value, replace the injector.
11. Disconnect the M.U.T.-III.

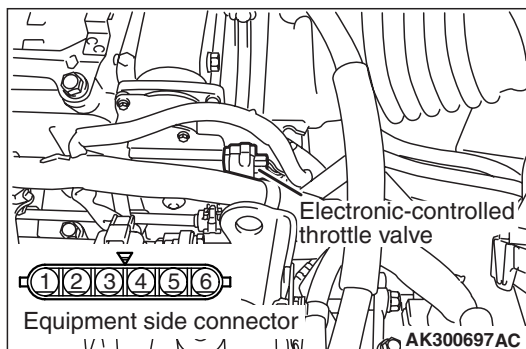
THROTTLE VALVE CONTROL SERVO CHECK

M1131051000166

OPERATION CHECK

1. Remove the air intake hose from the throttle body.
2. Turn the ignition switch to ON position.
3. Operate the accelerator pedal and confirm that the throttle valve is opening and closing accordingly.

CHECK THE COIL RESISTANCE



1. Disconnect the electronic-controlled throttle valve connector.

2. Measure the resistance between terminals No. 1 and No. 2 at the electronic-controlled throttle valve connector.

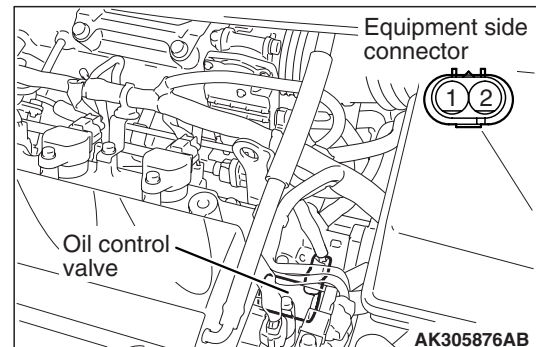
Standard value: 0.3 – 100 Ω (at 20°C)

3. If the resistance is outside the standard value, replace the throttle body assembly.

OIL CONTROL VALVE CHECK

M1131053200144

OPERATION CHECK



1. Disconnect the oil control valve connector.

CAUTION

To prevent the coil from burning, keep the duration of the voltage application as short as possible.

2. Apply battery voltage to the terminals of the connector at the oil control valve, and make sure the oil control valve makes a clicking sound.

MEASUREMENT OF RESISTANCE BETWEEN TERMINALS

1. Disconnect the oil control valve connector.
2. Measure the resistance between the terminals of the connector at the oil control valve.

Standard value: 6.9 – 7.9 Ω (at 20°C)

3. If the resistance is outside the standard value, replace the oil control valve.

INJECTOR

REMOVAL AND INSTALLATION

M1131007101426

CAUTION

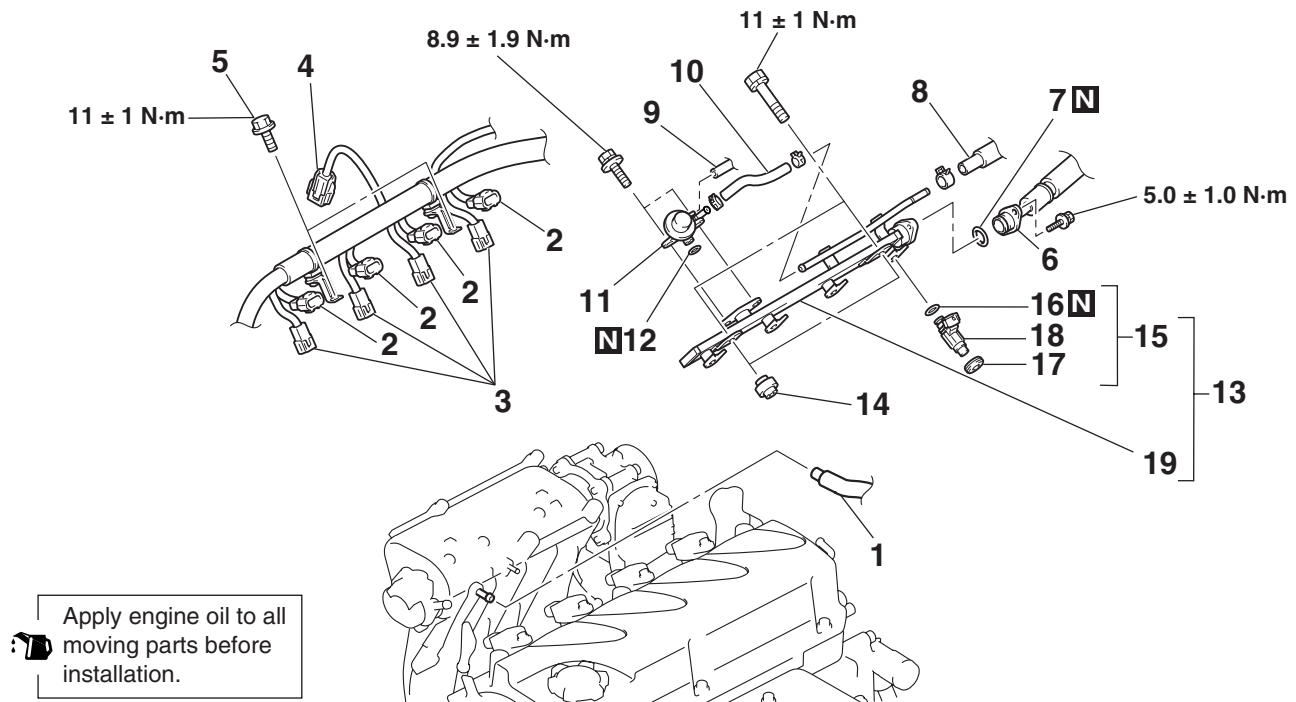
When the fuel injector replacement is performed, use the M.U.T.-III to initialize the learning value (Refer to GROUP 00, Precautions Before Service – Initialization Procedure for Learning Value in MPI Engine P.00-24).

Pre-removal Operation

- Fuel Discharge Prevention (Refer to P.13B-284).
- Engine Cover Removal (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-17).

Post-installation Operation

- Engine Cover Installation (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-17).
- Fuel Leakage Inspection.



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Removal steps

- PCV hose connection
- Ignition coil connector
- Fuel injector connector
- EGR valve connector
- Rocker cover bracket installation bolts
- >>B<< Fuel high-pressure hose connection
- O-ring
- Fuel return hose connection
- Emission control equip hose connection
- Fuel injector hose

Removal steps (Continued)

- >>B<< 11. MPI delivery pipe pressure regulator
12. O-ring
- <<A>> 13. Fuel delivery pipe and fuel injector assembly
14. Fuel injector insulator
- >>B<< 15. Fuel injector assembly
16. O-ring
17. Fuel injector insulator
- >>A<< 18. Fuel injectors
19. Fuel delivery pipe

REMOVAL SERVICE POINT

<<A>> FUEL DELIVERY PIPE AND FUEL INJECTOR ASSEMBLY REMOVAL

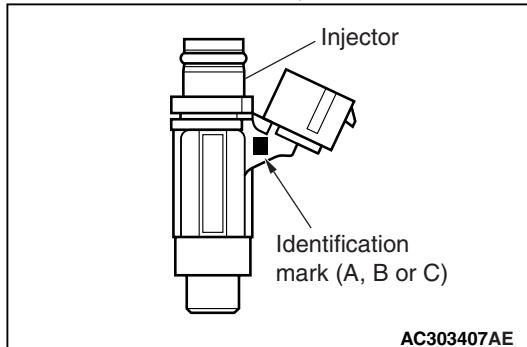
⚠ CAUTION

Do not drop the injector.

Remove the fuel delivery pipe with the fuel injector assembly attached to it.

INSTALLATION SERVICE POINTS

>>A<< FUEL INJECTORS INSTALLATION

⚠ CAUTION

The fuel injectors are classified into A, B and C by the injection quantity. When replacing one of fuel injectors, use a same identification mark fuel injector as the other fuel injectors.

- When replacing the fuel injectors of all cylinders, use the same identification mark fuel injectors.

>>B<< FUEL INJECTOR ASSEMBLY/MPI DELIVERY PIPE PRESSURE REGULATOR/FUEL HIGH-PRESSURE HOSE INSTALLATION

⚠ CAUTION

Do not let the engine oil get into the delivery pipe will be damaged.

1. Apply a drop of new engine oil to the O-ring.
2. Turn the fuel injector assembly to the right and left to install to the fuel delivery pipe. Repeat for fuel high-pressure hose. Be careful not to damage the O-ring. After installing, check that the item turns smoothly.
3. If it does not turn smoothly, the O-ring may be trapped, remove the item, re-install it into the fuel delivery pipe and check again.
4. Tighten the MPI delivery pipe pressure regulator and fuel high-pressure hose to the specified torque.

Tightening torque:

$8.9 \pm 1.9 \text{ N}\cdot\text{m}$ <MPI delivery pipe pressure regulator>

$5.0 \pm 1.0 \text{ N}\cdot\text{m}$ <Fuel high-pressure hose>

THROTTLE BODY ASSEMBLY

REMOVAL AND INSTALLATION

M1131007701310

CAUTION

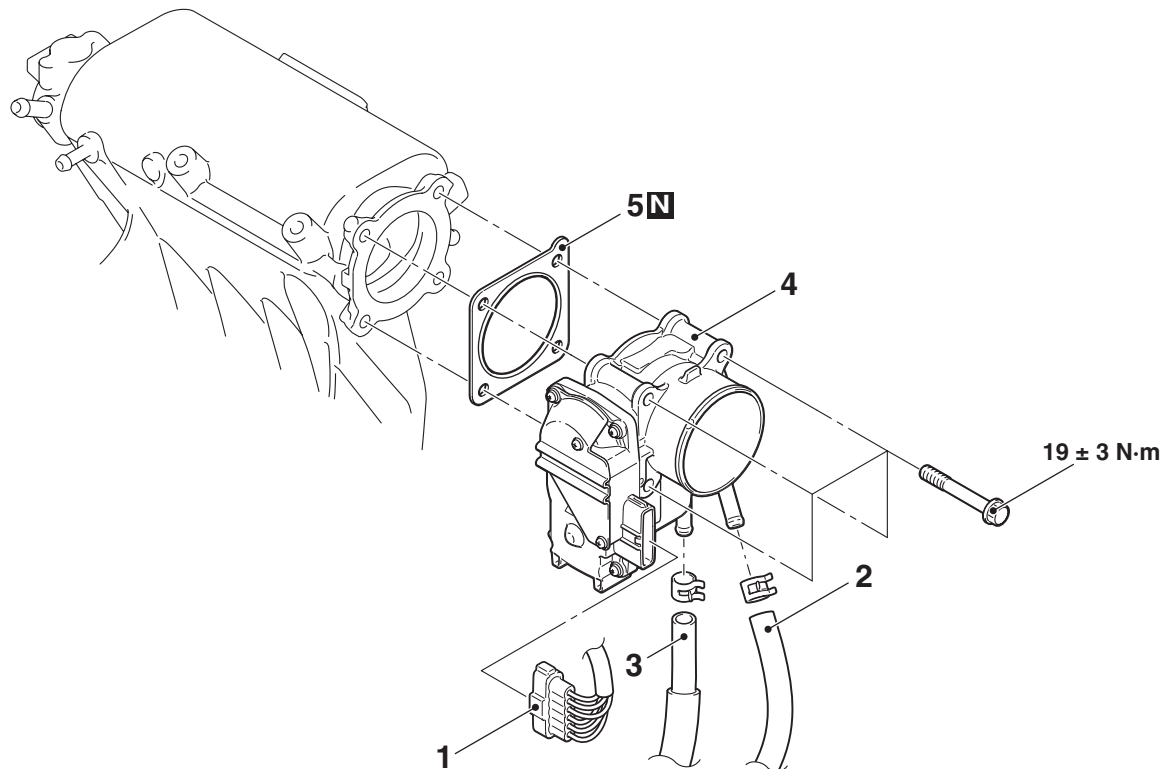
- When the throttle body assembly replacement is performed, use the M.U.T.-III to initialize the learning value (Refer to GROUP 00, Precautions Before Service – Initialization Procedure for Learning Value in MPI Engine P.00-24).
- Do not loosen the fixing screws for the resin cover of throttle body assembly. If the screws are loosened, the sensor incorporated in the resin cover becomes misaligned and the throttle body can not work normally.

Pre-removal Operation

- Engine Cover Removal (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-17).
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service – Engine Coolant Replacement P.14-18).
- Air Cleaner Removal (Refer to GROUP 15, Air Cleaner P.15-3).

Post-installation Operation

- Air Cleaner Installation (Refer to GROUP 15, Air Cleaner P.15-3).
- Engine Coolant Supplying (Refer to GROUP 14, On-vehicle Service – Engine Coolant Replacement P.14-18).
- Engine Cover Installation (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-17).



AC304161AE

Removal steps

- >>B<<
- Initialization (Installation only)
1. Throttle position sensor connector
 2. Water return hose connection

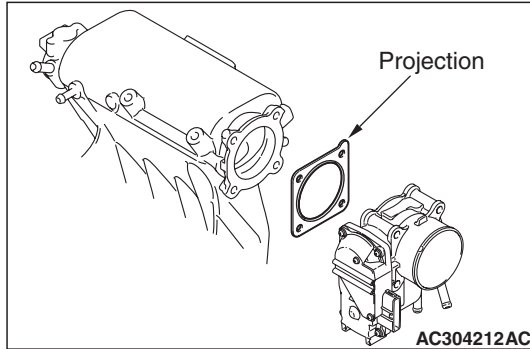
Removal steps (Continued)

- >>A<<
3. Water feed hose connection
 4. Throttle body assembly
 5. Throttle body gasket

INSTALLATION SERVICE POINTS

>>A<< THROTTLE BODY GASKET
INSTALLATION**⚠ CAUTION**

Poor idling etc. may result if the throttle body gasket is installed incorrectly.



Install the throttle body gasket as its protrusion is in the direction shown.

>>B<< INITIALIZATION

When the throttle body is installed, removed or replaced, initialize the electronic-controlled throttle valve system according to the procedure below beforehand.

Turn the ignition switch to the ON position, and back to the "LOCK" (OFF) position. Then hold it in this position for approximately 10 seconds or more.

ENGINE-A/T-ECU

REMOVAL AND INSTALLATION

M1131033400555

CAUTION

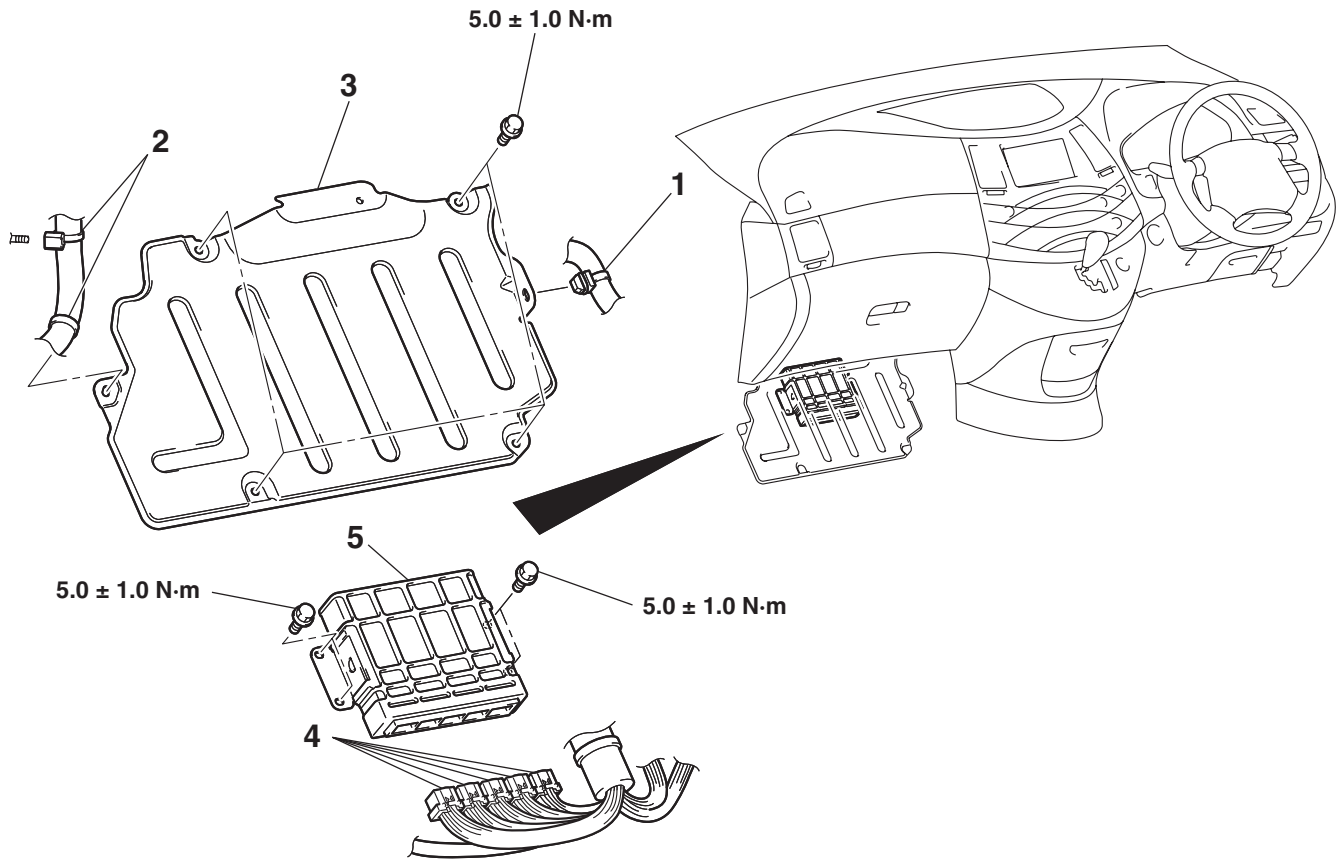
Always register the ignition key(s) when the engine-A/T-ECU is replaced (Refer to GROUP 54A, On-vehicle Service - Immobilizer ID Code Registration [P.54A-40](#)).

Pre-removal Operation

- Front Scuff Plate (LH), Cowl Side Trim (LH) Removal (Refer to GROUP 52A Trims [P.52A-10](#)).
- Console Side Cover (LH) Removal (Refer to GROUP 52A, Floor Console assembly [P.52A-9](#)).

Post-installation Operation

- Console Side Cover (LH) Installation (Refer to GROUP 52A, Floor Console assembly [P.52A-9](#)).
- Front Scuff Plate (LH), Cowl Side Trim (LH) Installation (Refer to GROUP 52A Trims [P.52A-10](#)).



AC301810AC

>>A<<

Removal steps

- Initialization (Installation only)
- Turn up the floor mat. <Front passenger's side>
- 1. Wiring harness clamp connection
- 2. Wiring harness clamp connection
- 3. Bracket
- 4. Engine-A/T-ECU connector
- 5. Engine-A/T-ECU

INSTALLATION SERVICE POINT

>>A<< INITIALIZATION

When the engine-A/T-ECU is replaced, initialize the electronic-controlled throttle valve system according to the procedure below beforehand.

Turn the ignition switch to the ON position, and back to the "LOCK" (OFF) position. Then hold it in this position for approximately 10 seconds or more.