

PURPOSE : INFORMATION	ISSUE NO. : MSB-11E13_17-001	DATE : 2011-06-20
SUBJECT : 4N1 ENGINE TROUBLESHOOTING	<MODEL> <M/Y>	
GROUP : FUEL SUPPLY/ AS&G SYSTEM (ENGINE AND EMISSION CONTROL)	(EUR) See following 2. Applicable Manuals table.	

1. Description:

It is ascertained that a problem may arise if an error occurs in the starter active signal circuit between the starter relay and the engine ECU. To deal with this problem, the starting and AS&G systems troubleshooting procedures under Symptom Procedures have been changed in the applicable Workshop Manuals. This Service Bulletin contains the modified descriptions.

2. Applicable Manuals:

Manual/Model	<M/Y>	Pub. No.	Title (Info-ID)	Attached Sheet
2011 LANCER/LANCER SPORTBACK Workshop Manual CD-ROM (CY0A/CX0A)	11	CG1E11E1-CD (English)	Gr.17: Inspection Procedure 2: Starting Impossible (starter not operative) (M177-00-320-04400-01)	Attached sheet 2
		CG1F11E1-CD (French) CG1G11E1-CD (German) CG1S11E1-CD (Spanish) CG1I11E1-CD (Italian)	Gr.17: Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1> (M177-00-280-06500-01)	Attached sheet 3
2011 OUTLANDER Workshop Manual CD-ROM (CW0W)	11	CGXE11E2-CD (English)	Gr.17: Inspection Procedure 2: Starting Impossible (starter not operative) (M177-00-320-05500-01)	Attached sheet 4
		CGXF11E2-CD (French) CGXG11E2-CD (German) CGXS11E2-CD (Spanish) CGXI11E2-CD (Italian)	Gr.17: Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) (M177-00-280-07600-01)	Attached sheet 5
2011 ASX Workshop Manual CD-ROM (GA0W)	11	CGWE11E2-CD (English)	<Vehicles without AS&G system> Gr.13B: Inspection Procedure 4: The Starter is Impossible to Operate (M133-60-280-48100-01)	Attached sheet 6
		CGWF11E2-CD (French) CGWG11E2-CD (German) CGWS11E2-CD (Spanish) CGWI11E2-CD (Italian)	<Vehicles with AS&G system> Gr.17: Inspection Procedure 2: Starting Impossible (starter not operative) (M177-00-320-03300-01)	Attached sheet 7
			<Vehicles with AS&G system> Gr.17: Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1> (M177-00-280-03200-01)	Attached sheet 8

There may be some attached sheets not included in this Service Bulletin because they are not applicable to your market. Their sheet numbers are not listed in the above table.

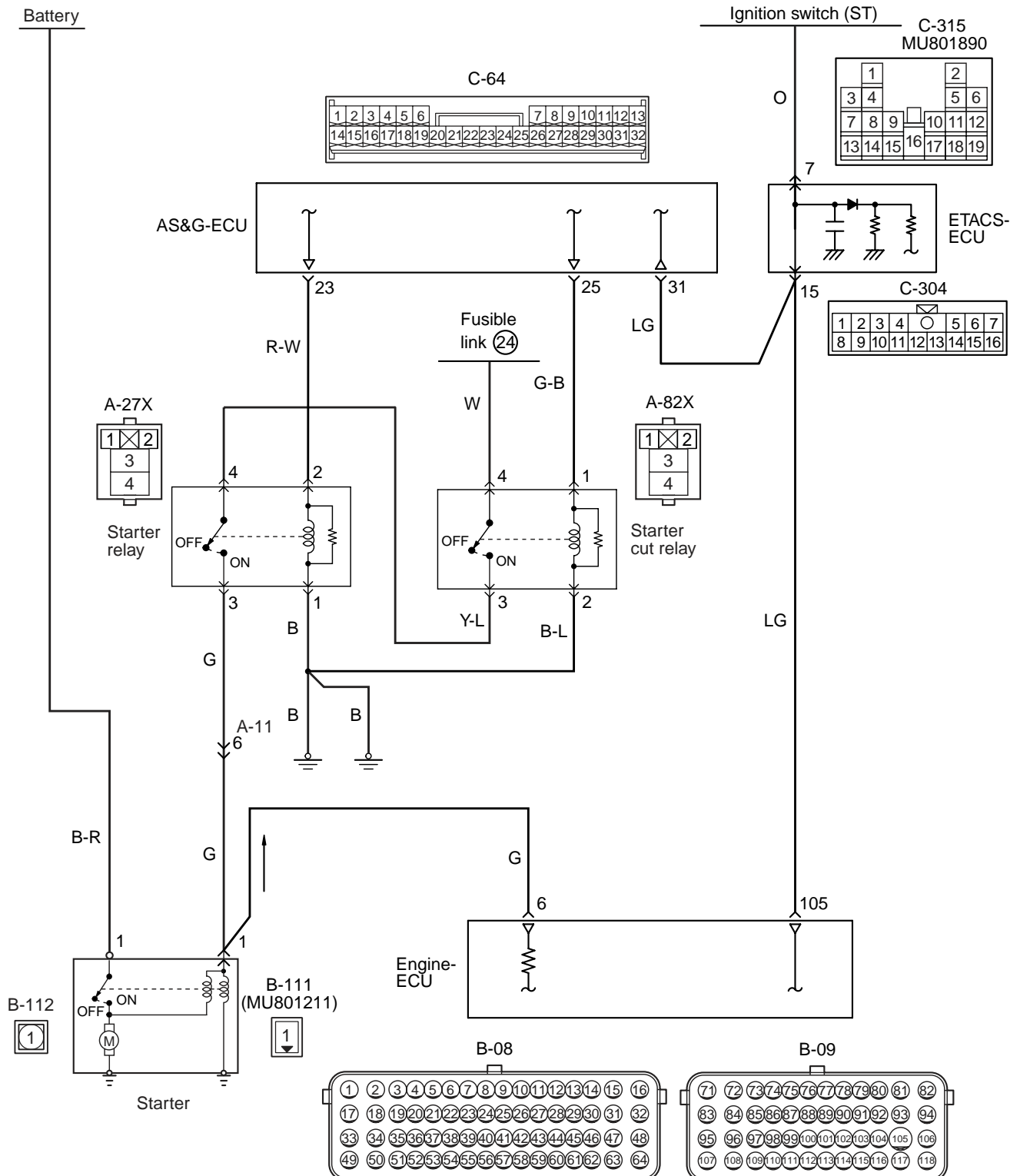
3. Details:

See Attached sheets 2 to 8.

Inspection Procedure 2: Starting Impossible (starter not operative)

Inspection Procedure 2: Starting Impossible (starter not operative)

Starting system circuit <4A9>



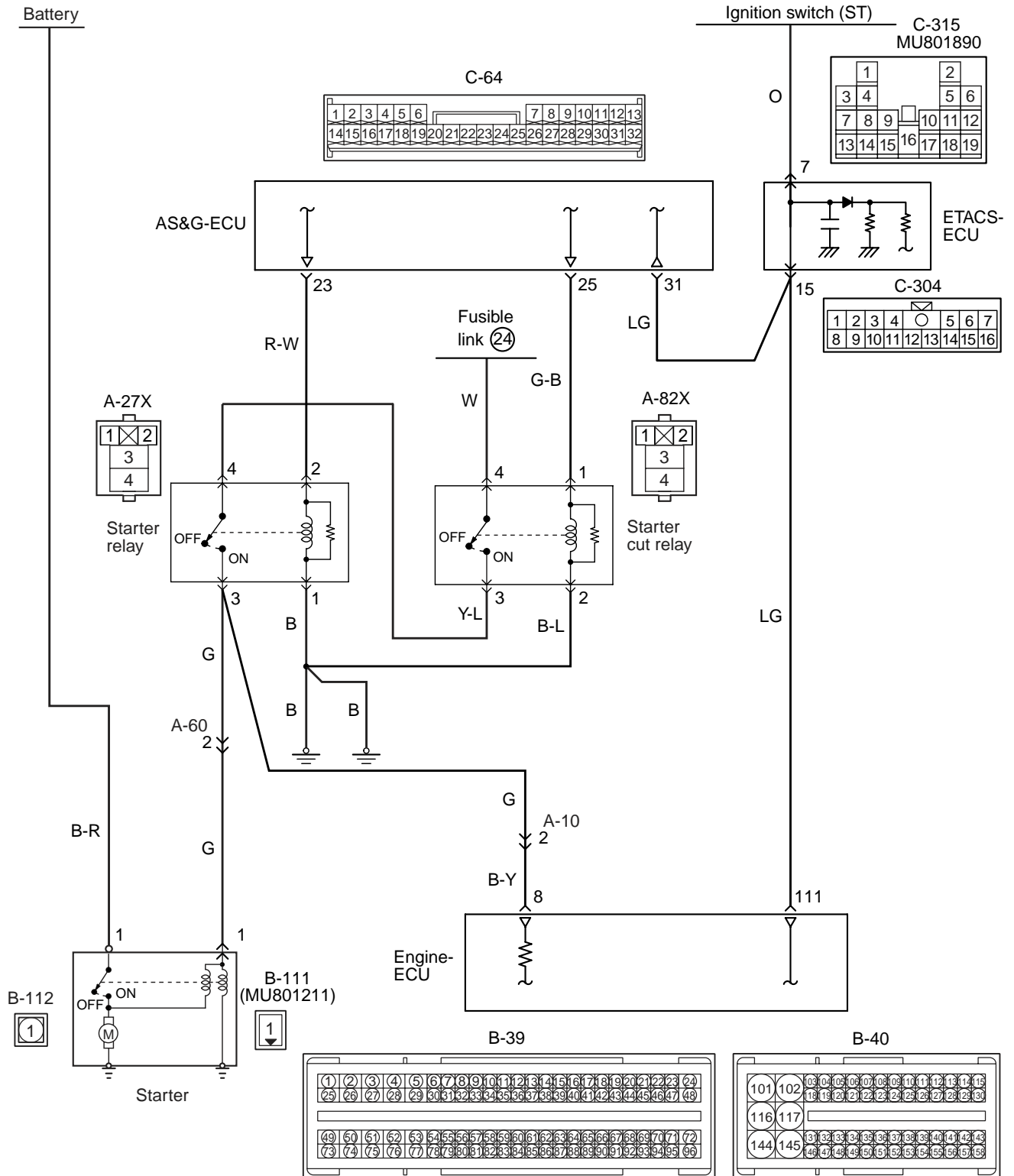
Wire colour code

B: Black LG: Light green G: Green L: Blue W: White Y: Yellow SB: Sky blue BR: Brown O: Orange GR: Grey
 R: Red P: Pink V: Violet PU: Purple SI: Silver

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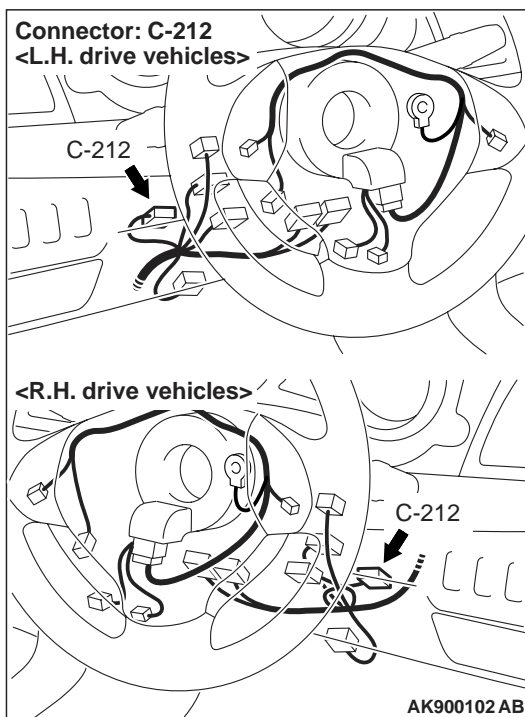
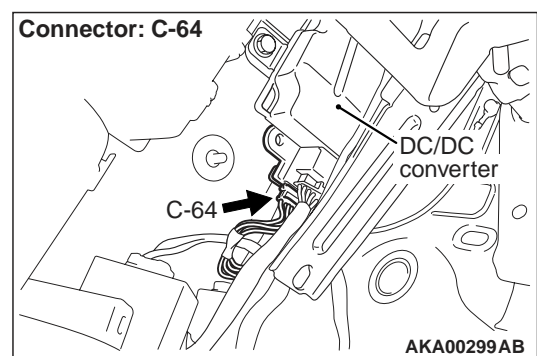
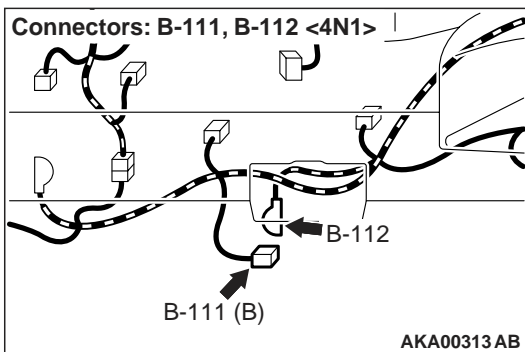
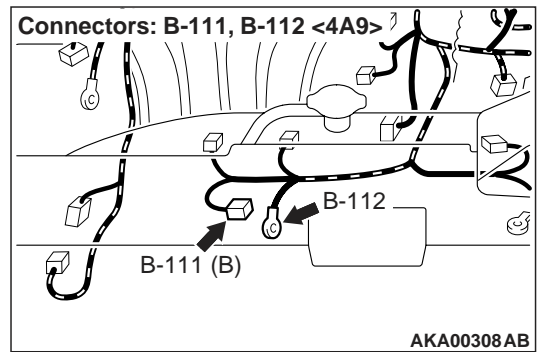
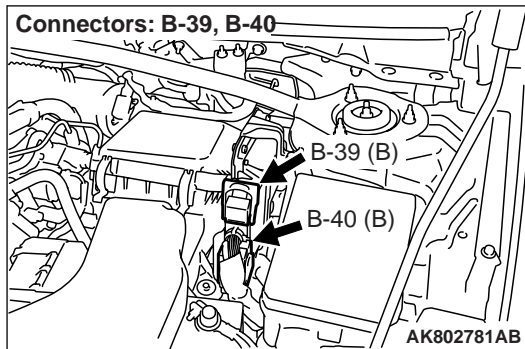
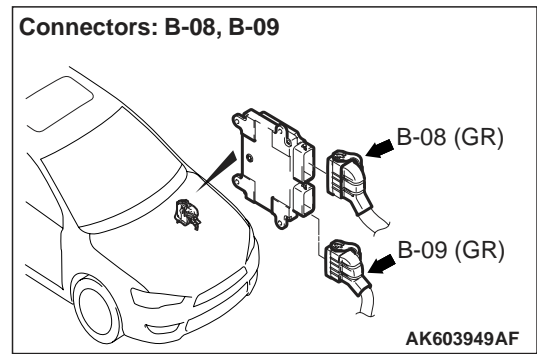
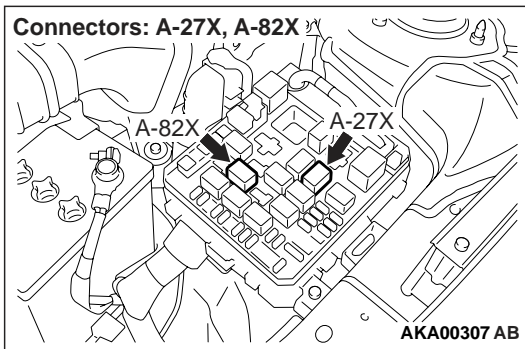
Inspection Procedure 2: Starting Impossible (starter not operative)

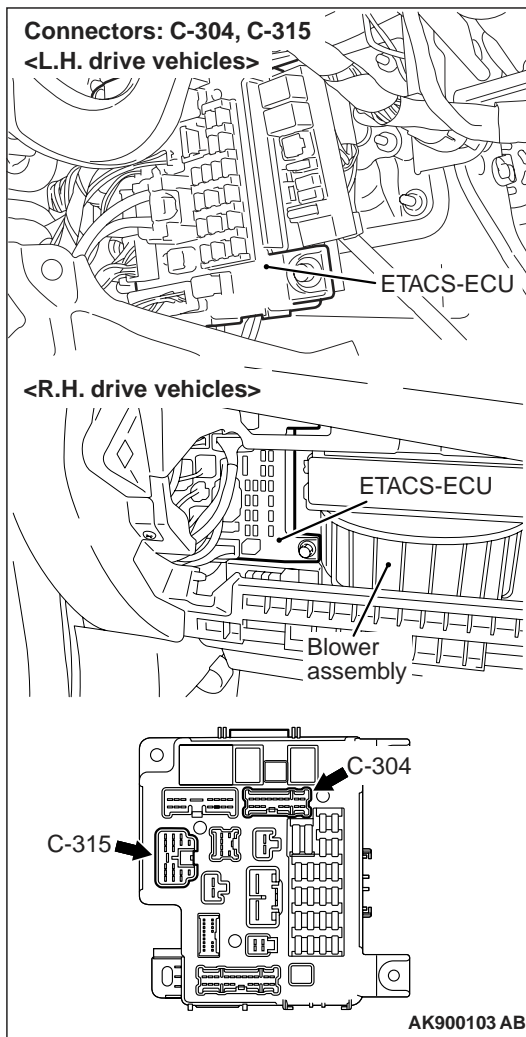
Starting system circuit <4N1>



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Inspection Procedure 2: Starting Impossible (starter not operative)



Inspection Procedure 2: Starting Impossible (starter not operative)**OPERATION**

- The ignition switch-ST signal is inputted into the AS&G-ECU (terminal No. 31) from the ETACS-ECU (C-304 ETACS-ECU connector terminal No. 15).
- The battery voltage is supplied to the starter cut relay (terminal No. 4) from the battery.
- The AS&G-ECU (terminal No. 25) turns ON the power transistor in the unit, and then makes the current flow into the starter cut relay terminal No. 1) to turn ON the relay.
- When the starter cut relay is turned ON, the battery voltage is supplied to the starter relay (terminal No. 4) from the starter cut relay (terminal No. 3).
- The AS&G-ECU (terminal No. 23) turns ON the power transistor in the unit, and then make the current flow into the starter relay (terminal No. 2) to turn ON the relay.
- When the starter cut relay and starter relay are turned ON, the battery voltage is supplied to the starter (B-111 starter connector terminal No. 1)

from the starter relay (terminal No. 3).

- The starter cut relay (terminal No. 2) and the starter relay (terminal No. 1) are earthed to the vehicle body.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the malfunction of the starter or starter system circuits. If the engine-ECU or the OSS-ECU stores the diagnosis code, the engine start should be restricted.

PROBABLE CAUSES

- Failed battery
- Failed clutch interlock switch
- Open/short circuit or harness damage in clutch interlock switch circuit, or loose connector contact
- Failed starter cut relay
- Failed starter relay
- Failed starter motor
- Open/short circuit or harness damage in ignition switch-ST circuit, or loose connector contact
- Open/short circuit or harness damage in starter

Inspection Procedure 2: Starting Impossible (starter not operative)

- cut relay circuit, or loose connector contact
- Failed ETACS-ECU
- Open/short circuit or harness damage in starter relay circuit, or loose connector contact
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check battery**

- Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?**YES :** Go to Step 2.**NO :** Replace the battery.**STEP 2. M.U.T.-III diagnosis code**

- Confirm the diagnosis code is set from the engine-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of the engine-ECU (Refer to GROUP 13A – Troubleshooting – Inspection Chart for Diagnosis Code <4A9>, Refer to GROUP 13C – Troubleshooting – Inspection Chart for Diagnosis Code <4N1>).

NO : Go to Step 3.**STEP 3. M.U.T.-III data list**

- Item 7: Clutch interlock switch

OK:**ON (Clutch pedal: Fully depressed)****OFF (Clutch pedal: Released)****Q: Is the check result normal?****YES :** Go to Step 4.**NO :** Perform the troubleshooting of the DTC P0833: Clutch interlock switch circuit.**STEP 4. M.U.T.-III data list**

- Item 1: Starter switch
- Clutch pedal: Fully depressed

OK:**ON (Ignition switch: ST)****OFF (Ignition switch: ON)****Q: Is the check result normal?****YES :** Go to Step 13.**NO :** Go to Step 5.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 5. Perform voltage measurement at C-315 ETACS-ECU connector by back probing.

- Do not disconnect connector.
- Clutch pedal: Fully depressed
- Ignition switch: ST
- Voltage between terminal No. 7 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-212 ignition switch connector and C-315 ETACS-ECU connector

Q: Are the check results normal?

YES : Go to Step 7.

NO : Repair or replace the connector.

STEP 7. Check ignition switch itself.

- Check ignition switch itself (Refer to GROUP 54A – Ignition Switch – Inspection – Ignition Switch Continuity Check).

Q: Is the check result normal?

YES : Check and repair harness between C-212 (terminal No. 5) ignition switch connector and C-315 (terminal No. 7) ETACS-ECU connector.

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

NO : Replace the ignition switch.

STEP 8. Connector check: C-304 and C-315 ETACS-ECU connectors, C-64 AS&G-ECU connector, B-09 <4A9> or B-40 <4N1> engine-ECU connector

Q: Are the check results normal?

YES : Go to Step 9.

NO : Repair or replace the connector.

STEP 9. Continuity check on C-304 and C-315 ETACS-ECU connectors.

- Disconnect connectors, and check at ETACS-ECU side.
- Continuity check between terminal No. 7 (C-315) and terminal No. 15 (C-304).

OK: Continuity

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the ETACS-ECU.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 10. Check harness between C-304 (terminal No. 15) ETACS-ECU connector and C-64 (terminal No. 31) AS&G-ECU connector.

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

Q: Is the check result normal?

YES : Go to Step 11.

NO : Repair the damaged harness wire.

STEP 11. Check harness between C-304 (terminal No. 15) ETACS-ECU connector and B-09 (terminal No. 105) <4A9> or B-40 (terminal No. 111) <4N1> engine-ECU connector.

- Check signal line for short circuit.

Q: Is the check result normal?

YES : Go to Step 12.

NO : Repair the damaged harness wire.

STEP 12. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 13. Connector check: A-82X starter cut relay connector and A-27X starter relay connector

Q: Are the check results normal?

YES : Go to Step 14.

NO : Repair or replace the connector.

STEP 14. Check the starter cut relay itself and starter relay itself.

- Check the starter cut relay itself and starter relay itself (Refer to GROUP 16 – Starting System – On-vehicle Service – Starter Relay Continuity Check).

Q: Are the check results normal?

YES : Go to Step 15.

NO : Replace the starter cut relay and/or starter relay.

STEP 15. Perform resistance measurement at A-82X starter cut relay connector.

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 2 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 16.

NO : Check and repair harness between A-82X (terminal No. 2) starter cut relay connector and body earth.

- Check earthing line for open circuit and damage.

Inspection Procedure 2: Starting Impossible (starter not operative)**STEP 16. Perform resistance measurement at A-27X starter relay connector.**

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 1 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 17.

NO : Check and repair harness between A-27X (terminal No. 1) starter relay connector and body earth.

- Check earthing line for open circuit and damage.

STEP 17. Check harness between battery and A-82X (terminal No. 4) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

STEP 18. Connector check: C-64 AS&G-ECU connector

Q: Is the check result normal?

YES : Go to Step 19.

NO : Repair or replace the connector.

STEP 19. Check harness between C-64 (terminal No. 25) AS&G-ECU connector and A-82X (terminal No. 1) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 20.

NO : Repair the damaged harness wire.

STEP 20. Check harness between A-82X (terminal No. 3) starter cut relay connector and A-27X (terminal No. 4) starter relay connector.

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

Q: Is the check result normal?

YES : Go to Step 21.

NO : Repair the damaged harness wire.

STEP 21. Check harness between C-64 (terminal No. 23) AS&G-ECU connector and A-27X (terminal No. 2) starter relay connector.

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

Q: Is the check result normal?

YES <4A9> : Go to Step 24.

YES <4N1> : Go to Step 22.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 22. Connector check: B-39 engine-ECU connector

Q: Is the check result normal?

YES : Go to Step 23.

NO : Repair or replace the connector.

STEP 23. Check harness between A-27X (terminal No. 3) starter relay connector and B-39 (terminal No. 8) engine-ECU connector.

NOTE: Befor checking harness, check intermediate connector A-10 and repair if necessary.

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

Q: Is the check result normal?

YES : Go to Step 24.

NO : Repair the damaged harness wire.

STEP 24. Connector check: B-111 and B-112 starter connector

Q: Are the check results normal?

YES : Go to Step 25.

NO : Repair or replace the connector.

STEP 25. Check harness between A-27X (terminal No. 3) starter relay connector and B-111 (terminal No. 1) starter connector.

NOTE: Befor checking harness, check intermediate connector A-11 <4A9>, A-60 <4N1> and repair if necessary.

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

Q: Is the check result normal?

YES <4A9> : Go to Step 26.

YES <4N1> : Go to Step 28.

NO : Repair the damaged harness wire.

STEP 26. Connector check: B-08 engine-ECU connector

Q: Is the check result normal?

YES : Go to Step 27.

NO : Repair or replace the connector.

STEP 27. Check harness between B-111 (terminal No. 1) starter connector and B-08 (terminal No. 6) engine-ECU connector.

- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 28.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 28. Check harness between battery and B-112 (terminal No. 1) starter connector.

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

Q: Is the check result normal?

YES : Go to Step 29.

NO : Repair the damaged harness wire.

STEP 29. Check starter motor operation.

- Check starter motor operation (Refer to GROUP 16 – Starting System – Starter Motor Assembly – Starter Motor Assembly Inspection <4A91-A/T, 4A92>, <4N1>).

Q: Is the check result normal?

YES : Go to Step 12.

NO : Replace the starter motor.

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

⚠ CAUTION

If the following services are performed, the backup data should be deleted. Do not perform these services without carrying out the check described in Step 2.

- In case the cable is disconnected from the battery terminal
- In case the connector is disconnected from the engine-ECU

FUNCTION

If the specified conditions are satisfied, the AS&G-ECU should send the engine stop request signal to the engine-ECU via CAN. When receiving the signal, the engine-ECU should stop the engine.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the failed AS&G system. The AS&G-ECU, however, can possibly prohibit the auto stop, depending on the vehicle status or the ambient conditions.

PROBABLE CAUSES

- Deteriorated battery
- Failed AS&G system
- Short circuit in starter active signal circuit, or loose connector contact
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE

STEP 1. Confirm the vehicle status and the ambient conditions.

- Confirm the vehicle status or the ambient conditions to check whether the auto stop should be carried out or not.

Q: Are the conditions for prohibiting the auto stop satisfied?

YES : Check end.

NO : Go to Step 2.

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

- Check the data lists of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Data List Reference Table).
- Item 435: Last battery deteriorated odometer
- Item 436: 2nd last battery deteriorated odometer
- Item 437: 3rd last battery deteriorated odometer

OK: 0 km (Ignition switch: ON)

Q: Are the all items displayed as "0 km"?

YES : Go to Step 3.

NO : Write the check result and go to Step 3.

STEP 3. M.U.T.-III diagnosis code

Confirm the diagnosis code is set from the following ECU.

- AS&G-ECU
- Engine-ECU
- ASC-ECU
- Combination meter
- EPS-ECU
- A/C-ECU
- ETACS-ECU

Q: Is the diagnosis code set?**YES <Diagnosis code is set from the AS&G-ECU> :**

Perform the troubleshooting of the AS&G-ECU (Refer to).

YES <Diagnosis code is set from the engine-ECU> :

Perform the troubleshooting of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Inspection Chart for Diagnosis Code).

YES <Diagnosis code is set from the ASC-ECU> :

Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the combination

meter> : Perform the troubleshooting of the combination meter (Refer to GROUP 54A – Combination Meter – Diagnosis Code Chart).

YES <Diagnosis code is set from the EPS-ECU> :

Perform the troubleshooting of the EPS-ECU (Refer to GROUP 37B – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the A/C-ECU> :

Perform the troubleshooting of the A/C-ECU (Refer to GROUP 55A – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the ETACS-ECU> :

Perform the troubleshooting of the ETACS-ECU (Refer to GROUP 54A – ETACS – Diagnosis Code Chart).

NO : Go to Step 4.

STEP 4. M.U.T.-III data list

- Item 10: Seat belt fasten status

OK:

Fastened (Driver's seat belt: Fastened)

Not fastened (Driver's seat belt: Not fastened)

NOTE: If the driver's seat belt is unfastened, the AS&G indicator/display in the combination meter should blink.

Q: Is the check result normal?

YES : Go to Step 5.

NO : Perform the troubleshooting of the seat belt reminder function circuit (Refer to GROUP 54A – Combination Meter – Symptom Procedures – Seat Belt Reminder Function Does Not Work Normally).

STEP 5. M.U.T.-III data list

- Item 4: Engine hood

OK:

Close (Hood: Closed)

Open (Hood: Opened)

NOTE: If the engine hood is opened, the AS&G indicator/ display in the combination meter should blink.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Perform the troubleshooting of the engine hood latch switch circuit (Refer to GROUP 54A – ETACS – Input Signal Procedures – The hood latch switch signal is not received).

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

- Refer to Data List Reference Table.
 - Item 6: Clutch monitoring switch (upper)
 - Item 7: Clutch interlock switch (bottom)
 - Item 8: Neutral position switch
 - Item 14: Brake vacuum sensor
 - Item 16: Atmospheric pressure

Q: Are the check results normal?

YES : Go to Step 7.

NO : Perform the troubleshooting for the item that has an abnormal value.

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

- Refer to Data List Reference Table.
 - Item 18: Accelerator pedal position

Q: Is the check result normal?

YES : Go to Step 8.

NO : Perform the troubleshooting of the accelerator pedal position sensor (Refer to GROUP 13C – Troubleshooting – Inspection Chart for Diagnosis Code).

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

- Refer to Data List Reference Table.
 - Item 17: Vehicle speed

Q: Is the check result normal?

YES : Go to Step 9.

NO : Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Troubleshooting – Diagnosis Code Chart).

STEP 9. M.U.T.-III data list

- Item 15: Ambient temperature

OK: At ambient temperature (atmospheric

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

temperature) or equivalent

Q: Is the check result normal?

YES : Go to Step 10.

NO : Perform the troubleshooting of the ambient temperature sensor (Refer to GROUP 55A – Troubleshooting – Diagnosis Code Procedures – Ambient Temperature Sensor System).

STEP 10. M.U.T.-III data list

- Check the data lists of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Data List Reference Table).
- Item 7: 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 11.

NO : Perform the troubleshooting of the engine coolant temperature sensor (Refer to GROUP 13C – Troubleshooting – Inspection Chart for Diagnosis Code).

STEP 11. Make certain the check result.

NOTE: If the situation falls under any of the following items, go to "YES" whether or not the check result in Step 2.

- a. After a malfunction occurs, the negative (–) cable is disconnected from the battery once.
- b. After a malfunction occurs, the connector is disconnected from the engine-ECU once.
- c. The odometer shown on the combination meter is beyond 262,140 km.

Q: Is the check result in Step 2 other than "0 km"?

YES : Go to Step 12.

NO : Go to Step 15.

STEP 12. M.U.T.-III data list

1. Disconnect the negative (–) cable from the battery (this can delete backup data).
2. Charge the battery (Refer to GROUP 54A – Battery – On-vehicle Service – Charging).
3. As soon as the battery is charged, leave the engine idling and turn off lamps and all accessories.
4. Check the data lists of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Data List Reference Table).
 - Item No. 455: Battery full-charge mode flag

OK: The display status "ON" is changed to "OFF"

within approximately 10 minutes.

Q: Is the check result normal?

YES : Turn the ignition switch to "ON" position after stopping the engine. Then go to Step 14.

NO : Go to Step 13.

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

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Data List Reference Table).
 - Item No. 434: Vehicle Consumption Current

OK:

- **When the headlamp is lit, the numerical value should increase by approximately 9 A. <Vehicles with halogen type headlamp>**
- **When the headlamp is lit, the numerical value should increase by approximately 6 A. <Vehicles with discharge type headlamp>**

Q: Is the check result normal?

YES : Replace the battery.

NO : Replace the battery current sensor.

STEP 14. Judge the battery life.

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13C – Troubleshooting – Data List Reference Table) and adjust the electrical load so that the displayed value should be 30 ± 2 A.
 - Item No. 434: Vehicle Consumption Current
3. Continue the conditions of Step 2 for 120 seconds and discharge the battery.
4. Run the engine for 10 seconds after the engine start and check on the battery deterioration with data lists of the engine-ECU.
 - Item No. 454: Battery degrade judgment flag

OK: OFF (Engine: Idle operation)

5. After checking that the data list item No. 454 of the engine-ECU is displayed, swiftly turn the ignition switch to "LOCK" (OFF) position and leave it for 10 seconds.
6. Repeat Steps 1-5 five times. Check that data list item No. 454 always shows "OFF".

Q: Is the check result normal?

YES : Recharge the battery because the battery is discharged during the check. (Refer to GROUP 54A – Battery – On-vehicle Service – Charging). After the battery is charged, go to Step 16.

NO : Replace the battery.

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

- Item 12: Idle stop enable (A/C-ECU)
- Item 13: Idle stop enable (engine-ECU)

OK: "Enable" is displayed

Q: Is the check result normal?

YES : Go to Step 16.

NO <"Disable" is displayed in item 12.> : The A/C-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the A/C-ECU (Refer to GROUP 55A – General Information).

NO <"Disable" is displayed in item 13.> : The engine-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the engine-ECU (Refer to GROUP 13C – General Information).

STEP 16. Connector check: B-39 engine-ECU connector and A-27X starter relay connector

Q: Are the check results normal?

YES : Go to Step 17.

NO : Repair or replace the connector.

STEP 17. Check harness between A-27X (terminal No. 3) starter relay connector and B-39 (terminal No. 8) engine-ECU connector.

NOTE: Before checking harness, check intermediate connector A-10 and repair if necessary.

- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

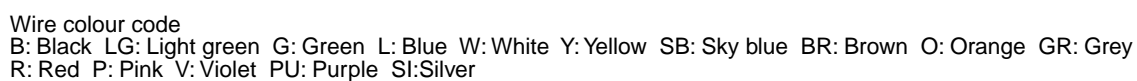
STEP 18. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

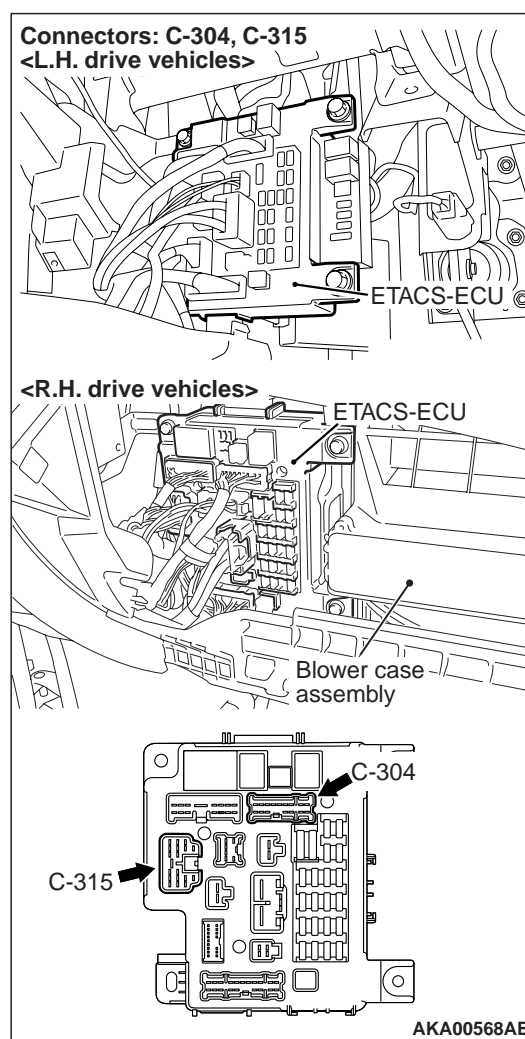
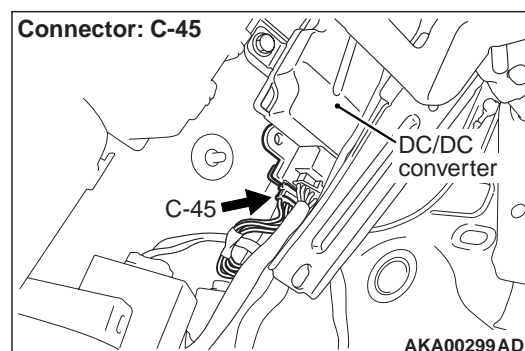
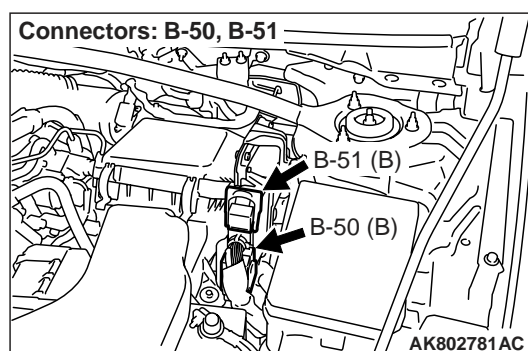
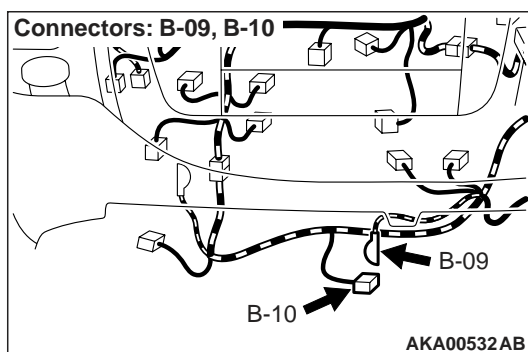
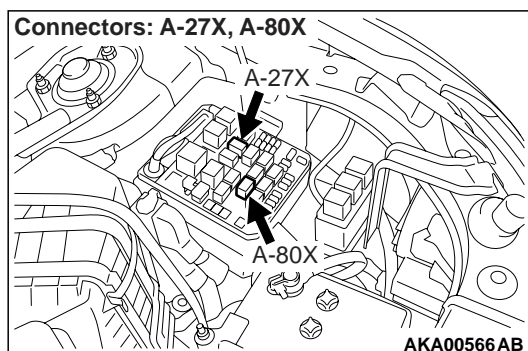
NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

Starting system circuit



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Inspection Procedure 2: Starting Impossible (starter not operative)



OPERATION 0

- The ignition switch-ST signal is inputted into the AS&G-ECU (terminal No. 31) from the ETACS-ECU (C-304 ETACS-ECU connector terminal No. 15).
- The battery voltage is supplied to the starter cut relay (terminal No. 4) from the battery.
- The AS&G-ECU (terminal No. 25) turns ON the power transistor in the unit, and then makes the current flow into the starter cut relay terminal No. 1) to turn ON the relay.
- When the starter cut relay is turned ON, the battery voltage is supplied to the starter relay (terminal No. 4) from the starter cut relay (terminal No. 3).
- The AS&G-ECU (terminal No. 23) turns ON the power transistor in the unit, and then make the current flow into the starter relay (terminal No. 2) to turn ON the relay.
- When the starter cut relay and starter relay are turned ON, the battery voltage is supplied to the starter (B-09 starter connector terminal No. 1) from the starter relay (terminal No. 3).
- The starter cut relay (terminal No. 2) and the

Inspection Procedure 2: Starting Impossible (starter not operative)

starter relay (terminal No. 1) are earthed to the vehicle body.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the malfunction of the starter or starter system circuits. If the engine-ECU or the OSS-ECU stores the diagnosis code, the engine start should be restricted.

PROBABLE CAUSES

- Failed battery
- Failed clutch interlock switch

- Open/short circuit or harness damage in clutch interlock switch circuit, or loose connector contact
- Failed starter cut relay
- Failed starter relay
- Failed starter motor
- Open/short circuit or harness damage in ignition switch-ST circuit, or loose connector contact
- Open/short circuit or harness damage in starter cut relay circuit, or loose connector contact
- Open/short circuit or harness damage in starter relay circuit, or loose connector contact
- Failed ETACS-ECU
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check battery**

- Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the battery.

STEP 2. M.U.T.-III diagnosis code

- Confirm the diagnosis code is set from the engine-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Inspection Chart for Diagnosis Code).

NO : Go to Step 3.

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

- Item 7: Clutch interlock switch

OK:

ON (Clutch pedal: Fully depressed)

OFF (Clutch pedal: Released)

Q: Is the check result normal?

YES : Go to Step 4.

NO : Perform the troubleshooting of the DTC P0833: Clutch interlock switch circuit.

STEP 4. M.U.T.-III data list

- Item 1: Starter switch

OK:

ON (Ignition switch: ST)

OFF (Ignition switch: ON)

Q: Is the check result normal?

YES : Go to Step 13.

NO : Go to Step 5.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 5. Perform voltage measurement at C-315 ETACS-ECU connector by back probing.

- Do not disconnect connector.
- Clutch pedal: Fully depressed
- Ignition switch: ST
- Voltage between terminal No. 7 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-210 ignition switch connector and C-315 ETACS-ECU connector

Q: Are the check results normal?

YES : Go to Step 7.

NO : Repair or replace the connector.

STEP 7. Check ignition switch itself.

- Check ignition switch itself (Refer to GROUP 54A – Ignition Switch – Inspection – Ignition Switch Continuity Check).

Q: Is the check result normal?

YES : Check and repair harness between C-210 (terminal No. 5) ignition switch connector and C-315 (terminal No. 7) ETACS-ECU connector.

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

NO : Replace the ignition switch.

STEP 8. Connector check: C-304 and C-315 ETACS-ECU connectors, C-45 AS&G-ECU connector, B-50 engine-ECU connector

Q: Are the check results normal?

YES : Go to Step 9.

NO : Repair or replace the connector.

STEP 9. Continuity check on C-304 and C-315 ETACS-ECU connectors.

- Disconnect connectors, and check at ETACS-ECU side.
- Continuity check between terminal No. 7 (C-315) and terminal No. 15 (C-304).

OK: Continuity

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the ETACS-ECU.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 10. Check harness between C-304 (terminal No. 15) ETACS-ECU connector and C-45 (terminal No. 31) AS&G-ECU connector.

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

Q: Is the check result normal?

YES : Go to Step 11.

NO : Repair the damaged harness wire.

STEP 11. Check harness between C-304 (terminal No. 15) ETACS-ECU connector and B-50 (terminal No. 111) engine-ECU connector.

- Check signal line for short circuit.

Q: Is the check result normal?

YES : Go to Step 12.

NO : Repair the damaged harness wire.

STEP 12. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 13. Connector check: A-80X starter cut relay connector and A-27X starter relay connector

Q: Are the check results normal?

YES : Go to Step 14.

NO : Repair or replace the connector.

STEP 14. Check the starter cut relay itself and starter relay itself.

- Check the starter cut relay itself and starter relay itself (Refer to GROUP 16 – Starting System – On-vehicle Service – Starter Relay Continuity Check).

Q: Are the check results normal?

YES : Go to Step 15.

NO : Replace the starter cut relay and/or starter relay.

STEP 15. Perform resistance measurement at A-80X starter cut relay connector.

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 2 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 16.

NO : Check and repair harness between A-80X (terminal No. 2) starter cut relay connector and body earth.

- Check earthing line for open circuit and damage.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 16. Perform resistance measurement at A-27X starter relay connector.

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 1 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 17.

NO : Check and repair harness between A-27X (terminal No. 1) starter relay connector and body earth.

- Check earthing line for open circuit and damage.

STEP 17. Check harness between battery and A-80X (terminal No. 4) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

STEP 18. Connector check: C-45 AS&G-ECU connector

Q: Is the check result normal?

YES : Go to Step 19.

NO : Repair or replace the connector.

STEP 19. Check harness between C-45 (terminal No. 25) AS&G-ECU connector and A-80X (terminal No. 2) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 20.

NO : Repair the damaged harness wire.

STEP 20. Check harness between A-80X (terminal No. 3) starter cut relay connector and A-27X (terminal No. 4) starter relay connector.

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

Q: Is the check result normal?

YES : Go to Step 21.

NO : Repair the damaged harness wire.

STEP 21. Check harness between C-45 (terminal No. 23) AS&G-ECU connector and A-27X (terminal No. 2) starter relay connector.

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

Q: Is the check result normal?

YES : Go to Step 22.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 22. Connector check: B-51 engine-ECU connector**Q: Is the check result normal?****YES :** Go to Step 23.**NO :** Repair or replace the connector.

STEP 23. Check harness between A-27X (terminal No. 2) starter relay connector and B-51 (terminal No. 8) engine-ECU connector.

NOTE: Befor checking harness, check intermediate connector A-63 and repair if necessary.

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

Q: Is the check result normal?**YES :** Go to Step 24.**NO :** Repair the damaged harness wire.

STEP 24. Connector check: B-09 and B-10 starter connector**Q: Are the check results normal?****YES :** Go to Step 25.**NO :** Repair or replace the connector.

STEP 25. Check harness between A-27X (terminal No. 3) starter relay connector and B-09 (terminal No. 1) starter connector.

NOTE: Befor checking harness, check intermediate connector B-07 and repair if necessary.

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

Q: Is the check result normal?**YES :** Go to Step 26.**NO :** Repair the damaged harness wire.

STEP 26. Check harness between battery and B-10 (terminal No. 1) starter connector.

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

Q: Is the check result normal?**YES :** Go to Step 27.**NO :** Repair the damaged harness wire.

STEP 27. Check starter motor operation.

- Check starter motor operation (Refer to GROUP 16 – Starting System – Starter Motor Assembly – Starter Motor Assembly Inspection).

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

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

⚠ CAUTION

If the following services are performed, the backup data should be deleted. Do not perform these services without carrying out the check described in Step 2.

- In case the cable is disconnected from the battery terminal
- In case the connector is disconnected from the engine-ECU

FUNCTION

If the specified conditions are satisfied, the AS&G-ECU should send the engine stop request signal to the engine-ECU via CAN. When receiving the signal, the engine-ECU should stop the engine.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the failed AS&G system. The AS&G-ECU, however, can possibly prohibit the auto stop, depending on the vehicle status or the ambient conditions.

PROBABLE CAUSES

- Deteriorated battery
- Failed AS&G system
- Short circuit in starter active signal circuit, or loose connector contact
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE

STEP 1. Confirm the vehicle status and the ambient conditions.

- Confirm the vehicle status or the ambient conditions to check whether the auto stop should be carried out or not.

Q: Are the conditions for prohibiting the auto stop satisfied?

YES : Check end.

NO : Go to Step 2.

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

- Check the data lists of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Data List Reference Table).
- Item 435: Last battery deteriorated odometer
- Item 436: 2nd last battery deteriorated odometer
- Item 437: 3rd last battery deteriorated odometer

OK: 0 km (Ignition switch: ON)

Q: Are the all items displayed as "0 km"?

YES : Go to Step 3.

NO : Write the check result and go to Step 3.

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

STEP 3. M.U.T.-III diagnosis code

Confirm the diagnosis code is set from the following ECU.

- AS&G-ECU
- Engine-ECU
- ASC-ECU
- Combination meter
- A/C-ECU
- ETACS-ECU

Q: Is the diagnosis code set?**YES <Diagnosis code is set from the AS&G-ECU> :**

Perform the troubleshooting of the AS&G-ECU (Refer to).

YES <Diagnosis code is set from the engine-ECU> :

Perform the troubleshooting of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Inspection Chart for Diagnosis Code).

YES <Diagnosis code is set from the ASC-ECU> :

Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the combination

meter> : Perform the troubleshooting of the combination meter (Refer to GROUP 54A – Combination Meter – Diagnosis Code Chart).

YES <Diagnosis code is set from the A/C-ECU> :

Perform the troubleshooting of the A/C-ECU (Refer to GROUP 55 – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the ETACS-ECU> :

Perform the troubleshooting of the ETACS-ECU (Refer to GROUP 54A – ETACS – Diagnosis Code Chart).

NO : Go to Step 4.

STEP 4. M.U.T.-III data list

- Item 10: Seat belt fasten status

OK:

Fastened (Driver's seat belt: Fastened)

Not fastened (Driver's seat belt: Not fastened)

NOTE: If the driver's seat belt is unfastened, the AS&G indicator/display in the combination meter should blink.

Q: Is the check result normal?

YES : Go to Step 5.

NO : Perform the troubleshooting of the seat belt reminder function circuit (Refer to GROUP 54A – Combination Meter – Symptom Procedures – Seat Belt Reminder Function Does Not Work Normally).

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)**STEP 5. M.U.T.-III data list**

- Item 4: Engine hood

OK:

Close (Hood: Closed)

Open (Hood: Opened)

NOTE: If the engine hood is opened, the AS&G indicator/ display in the combination meter should blink.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Perform the troubleshooting of the engine hood latch switch circuit (Refer to GROUP 54A – ETACS – Input Signal Procedures – The hood latch switch signal is not received).

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

- Refer to Data List Reference Table.
 - Item 6: Clutch monitoring switch (upper)
 - Item 7: Clutch interlock switch (bottom)
 - Item 8: Neutral position switch
 - Item 14: Brake vacuum sensor
 - Item 16: Atmospheric pressure

Q: Are the check results normal?

YES : Go to Step 7.

NO : Perform the troubleshooting for the item that has an abnormal value.

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

- Refer to Data List Reference Table.
 - Item 18: Accelerator pedal position

Q: Is the check result normal?

YES : Go to Step 8.

NO : Perform the troubleshooting of the accelerator pedal position sensor (Refer to GROUP 13F – Troubleshooting – Inspection Chart for Diagnosis Code).

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

- Refer to Data List Reference Table.
 - Item 17: Vehicle speed

Q: Is the check result normal?

YES : Go to Step 9.

NO : Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Troubleshooting – Diagnosis Code Chart).

STEP 9. M.U.T.-III data list

- Item 15: Ambient temperature

OK: At ambient temperature (atmospheric

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

temperature) or equivalent

Q: Is the check result normal?

YES : Go to Step 10.

NO : Perform the troubleshooting of the ambient temperature sensor (Refer to GROUP 55 – Troubleshooting – Diagnosis Code Procedures – Ambient Temperature Sensor System).

STEP 10. M.U.T.-III data list

- Check the data lists of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Data List Reference Table).
- Item 7: 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 11.

NO : Perform the troubleshooting of the engine coolant temperature sensor (Refer to GROUP 13F – Troubleshooting – Inspection Chart for Diagnosis Code).

STEP 11. Make certain the check result.

NOTE: If the situation falls under any of the following items, go to "YES" whether or not the check result in Step 2.

- After a malfunction occurs, the negative (–) cable is disconnected from the battery once.
- After a malfunction occurs, the connector is disconnected from the engine-ECU once.
- The odometer shown on the combination meter is beyond 262,140 km.

Q: Is the check result in Step 2 other than "0 km"?

YES : Go to Step 12.

NO : Go to Step 15.

STEP 12. M.U.T.-III data list

1. Disconnect the negative (–) cable from the battery (this can delete backup data).
2. Charge the battery (Refer to GROUP 54A – Battery – On-vehicle Service – Charging).
3. As soon as the battery is charged, leave the engine idling and turn off lamps and all accessories.
4. Check the data lists of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Data List Reference Table).
 - Item No. 455: Battery full-charge mode flag

OK: The display status "ON" is changed to "OFF"

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

within approximately 10 minutes.

Q: Is the check result normal?

YES : Turn the ignition switch to "ON" position after stopping the engine. Then go to Step 14.

NO : Go to Step 13.

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

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Data List Reference Table).
 - Item No. 434: Vehicle Consumption Current

OK:

- **When the headlamp is lit, the numerical value should increase by approximately 9 A. <Vehicles with halogen type headlamp>**
- **When the headlamp is lit, the numerical value should increase by approximately 6 A. <Vehicles with discharge type headlamp>**

Q: Is the check result normal?

YES : Replace the battery.

NO : Replace the battery current sensor.

STEP 14. Judge the battery life.

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13F – Troubleshooting – Data List Reference Table) and adjust the electrical load so that the displayed value should be 30 ± 2 A.
 - Item No. 434: Vehicle Consumption Current
3. Continue the conditions of Step 2 for 120 seconds and discharge the battery.
4. Run the engine for 10 seconds after the engine start and check on the battery deterioration with data lists of the engine-ECU.
 - Item No. 454: Battery degrade judgment flag

OK: OFF (Engine: Idle operation)

5. After checking that the data list item No. 454 of the engine-ECU is displayed, swiftly turn the ignition switch to "LOCK" (OFF) position and leave it for 10 seconds.
6. Repeat Steps 1-5 five times. Check that data list item No. 454 always shows "OFF".

Q: Is the check result normal?

YES : Recharge the battery because the battery is discharged during the check. (Refer to GROUP 54A – Battery – On-vehicle Service – Charging). After the battery is charged, go to Step 16.

NO : Replace the battery.

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out)

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

- Item 12: Idle stop enable (A/C-ECU)
- Item 13: Idle stop enable (engine-ECU)

OK: "Enable" is displayed

Q: Is the check result normal?

YES : Go to Step 16.

NO <"Disable" is displayed in item 12.> : The A/C-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the A/C-ECU (Refer to GROUP 55 – General Information).

NO <"Disable" is displayed in item 13.> : The engine-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the engine-ECU (Refer to GROUP 13F – General Information).

STEP 16. Connector check: B-51 engine-ECU connector and A-27X starter relay connector

Q: Are the check results normal?

YES : Go to Step 17.

NO : Repair or replace the connector.

STEP 17. Check harness between A-27X (terminal No. 2) starter relay connector and B-51 (terminal No. 8) engine-ECU connector.

NOTE: Before checking harness, check intermediate connector A-63 and repair if necessary.

- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

STEP 18. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

Inspection Procedure 4: The Starter is Impossible to Operate

Inspection Procedure 4: The Starter is Impossible to Operate

OPERATION

- The power source is supplied from the battery to the starter (B-113 terminal No. 1).
- The battery voltage is applied to the starter relay (terminal No. 4).
- When the ignition switch-ST signal is input to the engine-ECU (terminal No. 105), the engine-ECU (terminal No. 106) turns ON the power transistor inside the unit, and makes the current flow into the starter relay (terminal No. 2) to turn ON the relay.
- When the starter relay is turned ON, the current flows into the starter (B-112 terminal No. 1) from the starter relay (terminal No. 3) to drive the starter motor.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the malfunction of the starter or starter system circuits.

PROBABLE CAUSES

- Failed battery
- Failed ignition switch <Vehicles without KOS>
- Failed OSS-ECU <Vehicles with KOS>
- Failed starter relay
- Failed starter motor
- Open/short circuit or harness damage in starter system circuit or loose connector contact.
- Failed ETACS-ECU
- Failed engine-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check battery.**

- Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the battery.

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

- Item 40: Starter switch

OK:

ON (ignition switch: ST)

OFF (ignition switch: ON)

Q: Is the check result normal?

YES : Go to Step 19.

NO : Go to Step 3.

STEP 3. Connector check: B-10 engine-ECU connector**Q: Is the check result normal?**

YES : Go to Step 4.

NO : Repair or replace the connector.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 4. Perform voltage measurement at B-10 engine-ECU connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ST
- Voltage between terminal No. 111 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 12 <Vehicles without KOS>.

YES : Go to Step 14 <Vehicles with KOS>.

NO : Go to Step 5.

STEP 5. Connector check: C-403 and C-415 ETACS-ECU connectors

Q: Are the check results normal?

YES : Go to Step 6.

NO : Repair or replace the connector.

STEP 6. Perform voltage measurement at C-415 ETACS-ECU connector.

- Disconnect connector, and measure at harness side.
- Ignition switch: ST
- Voltage between terminal No. 7 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 11.

NO : Go to Step 7 <Vehicles without KOS>.

NO : Go to Step 9 <Vehicles with KOS>.

STEP 7. Connector check: C-309 ignition switch connector

Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair or replace the connector.

STEP 8. Check ignition switch itself.

- Check ignition switch itself (Refer to GROUP 54A – Ignition Switch – Inspection – Ignition Switch Check).

Q: Is the check result normal?

YES : Check and repair the harness between C-309 (terminal No. 5) ignition switch connector and C-415 (terminal No. 7) ETACS-ECU connector.

- Check power supply line for open/short circuit.

NO : Replace the ignition switch.

STEP 9. Connector check: C-14 OSS-ECU connectors

Q: Are the check results normal?

YES : Go to Step 10.

NO : Repair or replace the connector.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 10. Check harness between C-14 (terminal No. 23) OSS-ECU connector and C-415 (terminal No. 7) ETACS-ECU connector.

- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Perform troubleshooting of OSS System (Refer to GROUP 42B – Troubleshooting – Trouble Symptom Chart).

NO : Repair the damaged harness wire.

STEP 11. Continuity check on C-415 and C-403 ETACS-ECU connectors

- Disconnect connectors, and measure at ETACS-ECU side.
- Continuity check between terminal No. 7 (C-415) and No. 15 (C-403)

OK: Continuity

Q: Is the check result normal?

YES : Check and repair the harness between C-403 (terminal No. 15) ETACS-ECU connector and B-09 (terminal No. 111) engine-ECU connector.

- Check power supply line for open/short circuit.

NO : Replace the ETACS-ECU.

STEP 12. Connector check: C-309 ignition switch connector and C-403 and C-415 ETACS-ECU connectors

Q: Are the check results normal?

YES : Go to Step 13.

NO : Repair or replace the connector.

STEP 13. Check harness between C-309 (terminal No. 5) ignition switch connector and C-415 (terminal No. 7) ETACS-ECU connector.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 16.

NO : Repair the damaged harness wire.

STEP 14. Connector check: C-14 OSS-ECU connector and C-403 and C-415 ETACS-ECU connectors

Q: Are the check results normal?

YES : Go to Step 15.

NO : Repair or replace the connector.

STEP 15. Check harness between C-14 (terminal No. 23) OSS-ECU connector and C-415 (terminal No. 7) ETACS-ECU connector.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 16.

NO : Repair the damaged harness wire.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 16. Continuity check on C-415 and C-403 ETACS-ECU connectors

- Disconnect connectors, and measure at ETACS-ECU side.
- Continuity check between terminal No. 7 (C-415) and No. 15 (C-403)

OK: Continuity

Q: Is the check result normal?

YES : Go to Step 17.

NO : Replace the ETACS-ECU.

STEP 17. Check harness between C-403 (terminal No. 15) ETACS-ECU connector and B-09 (terminal No. 111) engine-ECU connector.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

STEP 18. M.U.T.-III data list

- Item 40: Starter switch

OK:

ON (ignition switch: ST)

OFF (ignition switch: ON)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

NO : Replace the engine-ECU.

STEP 19. Connector check: A-31X starter relay connector

Q: Is the check result normal?

YES : Go to Step 20.

NO : Repair or replace the connector.

STEP 20. Check starter relay itself.

- Check starter relay itself (Refer to GROUP 16 – Starting System – On-vehicle Service – Starter Relay Continuity Check).

Q: Is the check result normal?

YES : Go to Step 21.

NO : Replace the starter relay.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 21. Perform resistance measurement at A-31X starter relay connector.

- Remove relay, and measure at relay box side.
- Resistance between terminal No. 1 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 22.

NO : Check and repair harness between A-31X (terminal No. 1) starter relay connector and body earth.

- Check earthing line for open circuit and damage.

STEP 22. Connector check: B-09 engine-ECU connector

Q: Is the check result normal?

YES : Go to Step 23.

NO : Repair or replace the connector.

STEP 23. Check harness between B-09 (terminal No. 8) engine-ECU connector and A-31X (terminal No. 2) starter relay connector.

NOTE: Before checking harness, check intermediate connector A-16, and repair if necessary.

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

Q: Is the check result normal?

YES : Go to Step 24.

NO : Repair the damaged harness wire.

STEP 24. Perform voltage measurement at A-31X starter relay connector.

- Remove relay, and measure at relay box side.
- Ignition switch: ST
- Voltage between terminal No. 2 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 31.

NO : Go to Step 25 <Vehicles without OSS>.

NO : Go to Step 26 <Vehicles with OSS>.

STEP 25. Check harness between B-09 (terminal No. 18) engine-ECU connector and A-31X (terminal No. 2) starter relay connector.

NOTE: Before checking harness, check intermediate connectors C-236, A-17, and repair if necessary.

- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 30.

NO : Repair the damaged harness wire.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 26. Connector check: C-236 clutch interlock switch connector

Q: Is the check result normal?

YES : Go to Step 27.

NO : Repair or replace the connector.

STEP 27. Check clutch interlock switch.

- Check clutch interlock switch (Refer to GROUP 21A – Clutch Pedal – Inspection).

Q: Is the check result normal?

YES : Go to Step 28.

NO : Replace the clutch interlock switch.

STEP 28. Check harness between C-230 (terminal No. 2) interlock switch connector and A-31X (terminal No. 2) starter relay connector.

- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 29.

NO : Repair the damaged harness wire.

STEP 29. Check harness between B-09 (terminal No. 18) engine-ECU connector and C-230 (terminal No. 1) clutch interlock switch connector.

NOTE: Before checking harness, check intermediate connector A-17, and repair if necessary.

- Check power supply line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 30.

NO : Repair the damaged harness wire.

STEP 30. M.U.T.-III data list

- Item 413: Starter relay

OK:

ON (ignition switch: ST)

OFF (ignition switch: ON)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

NO : Replace the engine-ECU.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 31. Perform voltage measurement at A-31X starter 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 32.

NO : Check and repair harness between battery and A-31X (terminal No. 4) starter relay connector.

- Check power supply line for open/short circuit.

STEP 32. Connector check: B-112 starter connector

Q: Is the check result normal?

YES : Go to Step 33.

NO : Repair or replace the connector.

STEP 33. Perform voltage measurement at B-112 starter connector.

- Disconnect connector, and measure at 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 40.

NO : Go to Step 34.

STEP 34. Check harness between A-31X (terminal No. 3) starter relay connector and B-112 (terminal No. 1) starter connector.

NOTE: Before checking harness, check intermediate connector B-108, and repair if necessary.

- Check output line for open/short circuit.

Q: Is the check result normal?

YES : Go to Step 35 <Vehicles without OSS>.

YES : Go to Step 36 <Vehicles with OSS>.

NO : Repair the damaged harness wire.

STEP 35. Connector check: B-09 engine-ECU connector

Q: Is the check result normal?

YES : Check intermediate connector C-236, and repair if necessary. If intermediate connector is normal, check and repair harness between B-09 (terminal No. 18) engine-ECU connector and A-31X (terminal No. 2) starter relay connector.

- Check power supply line for damage.

NO : Repair or replace the connector.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 36. Connector check: C-236 clutch interlock switch

Q: Is the check result normal?

YES : Go to Step 37.

NO : Repair or replace the connector.

STEP 37. Check clutch interlock switch.

- Check clutch interlock switch (Refer to GROUP 21A – Clutch Pedal – Inspection).

Q: Is the check result normal?

YES : Go to Step 38.

NO : Replace the clutch interlock switch.

STEP 38. Check harness between C-236 (terminal No. 2) clutch interlock switch connector and A-31X (terminal No. 2) starter relay connector.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 39.

NO : Repair the damaged harness wire.

STEP 39. Connector check: B-09 engine-ECU connector

Q: Is the check result normal?

YES : Check and repair harness between B-09 (terminal No. 18) engine-ECU connector and C-230 (terminal No. 1) clutch interlock switch connector.

- Check power supply line for damage.

NO : Repair or replace the connector.

STEP 40. Check harness between battery and A-31X (terminal No. 4) starter relay connector.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Go to Step 41.

NO : Repair the damaged harness wire.

STEP 41. Check harness between A-31X (terminal No. 3) starter relay connector and B-112 (terminal No. 1) starter connector.

NOTE: Before checking harness, check intermediate connector B-108, and repair if necessary.

- Check output line for damage.

Q: Is the check result normal?

YES : Go to Step 42.

NO : Repair the damaged harness wire.

STEP 42. Connector check: B-113 starter terminal

Q: Is the check result normal?

YES : Go to Step 43.

NO : Repair or replace the terminal.

Inspection Procedure 4: The Starter is Impossible to Operate

STEP 43. Perform voltage measurement at B-113 starter terminal.

- Disconnect terminal, and measure at harness side.
- Voltage between terminal No. 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 44.

NO : Check and repair harness between battery and B-113 (terminal No. 1) starter terminal.

- Check power supply line for open/short circuit.

STEP 44. Check harness between battery and B-113 (terminal No. 1) starter terminal.

- Check power supply line for damage.

Q: Is the check result normal?

YES : Replace the starter.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

Inspection Procedure 2: Starting Impossible (starter not operative)

OPERATION

- The ignition switch-ST signal is inputted into the AS&G-ECU (terminal No. 31) from the ETACS-ECU (C-403 ETACS-ECU connector terminal No. 15).
- The battery voltage is supplied to the starter cut relay (terminal No. 4) from the battery.
- The AS&G-ECU (terminal No. 25) turns ON the power transistor in the unit, and then makes the current flow into the starter cut relay terminal No. 2) to turn ON the relay.
- When the starter cut relay is turned ON, the battery voltage is supplied to the starter relay (terminal No. 4) from the starter cut relay (terminal No. 3).
- The AS&G-ECU (terminal No. 23) turns ON the power transistor in the unit, and then make the current flow into the starter relay (terminal No. 2) to turn ON the relay.
- When the starter cut relay and starter relay are turned ON, the battery voltage is supplied to the starter (B-112 starter connector terminal No. 1) from the starter relay (terminal No. 3).
- The starter cut relay (terminal No. 1) and the starter relay (terminal No. 1) are earthed to the

vehicle body.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the malfunction of the starter or starter system circuits. If the engine-ECU or the OSS-ECU stores the diagnosis code, the engine start should be restricted.

PROBABLE CAUSES

- Failed battery
- Failed clutch interlock switch
- Open/short circuit or harness damage in clutch interlock switch circuit, or loose connector contact
- Failed starter cut relay
- Failed starter relay
- Failed starter motor
- Open/short circuit or harness damage in ignition switch-ST circuit, or loose connector contact
- Open/short circuit or harness damage in starter cut relay circuit, or loose connector contact
- Open/short circuit or harness damage in starter relay circuit, or loose connector contact
- Failed ETACS-ECU
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE**STEP 1. Check battery**

- Check battery (Refer to GROUP 54A – Battery – On-vehicle Service – Battery Test).

Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the battery.

STEP 2. M.U.T.-III diagnosis code

- Confirm the diagnosis code is set from the engine-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Inspection Chart for Diagnosis Code <4N1>, Refer to GROUP 13D – Troubleshooting – Inspection Chart for Diagnosis Code <4A9>).

NO <Vehicles without OSS> : Go to Step 4.

NO <Vehicles with OSS> : Go to Step 3.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 3. M.U.T.-III diagnosis code

- Confirm the diagnosis code is set from the OSS-ECU.

Q: Is the diagnosis code set?

YES : Perform the troubleshooting of the OSS-ECU (Refer to GROUP 42B – Troubleshooting – Diagnosis Code Chart).

NO : Go to Step 4.

STEP 4. M.U.T.-III data list

- Item 7: Clutch interlock switch

OK:

ON (Clutch pedal: Fully depressed)

OFF (Clutch pedal: Released)

Q: Is the check result normal?

YES : Go to Step 5.

NO : Perform the troubleshooting of the DTC P0833: Clutch interlock switch circuit.

STEP 5. M.U.T.-III data list

- Item 1: Starter switch
- Clutch pedal: Fully depressed

OK:

ON (Ignition switch: ST)

OFF (Ignition switch: ON)

Q: Is the check result normal?

YES : Go to Step 16.

NO : Go to Step 6.

STEP 6. Perform voltage measurement at C-415 ETACS-ECU connector by back probing.

- Do not disconnect connector.
- Clutch pedal: Fully depressed
- Ignition switch: ST
- Voltage between terminal No. 7 and earth.

OK: System voltage**Q: Is the check result normal?**

YES : Go to Step 11.

NO <Vehicles without OSS> : Go to Step 7.

NO <Vehicles with OSS> : Go to Step 9.

STEP 7. Connector check: C-309 ignition switch connector and C-415 ETACS-ECU connector
Q: Are the check results normal?

YES : Go to Step 8.

NO : Repair or replace the connector.

STEP 8. Check ignition switch itself.

- Check ignition switch itself (Refer to GROUP 54A – Ignition

Inspection Procedure 2: Starting Impossible (starter not operative)

Switch – Inspection – Ignition Switch Check).

Q: Is the check result normal?

YES : Check and repair harness between C-309 (terminal No. 5) ignition switch connector and C-415 (terminal No. 7) ETACS-ECU connector.

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

NO : Replace the ignition switch.

STEP 9. Connector check: C-14 OSS-ECU connector and C-415 ETACS-ECU connector

Q: Is the check result normal?

YES : Go to Step 10.

NO : Repair or replace the connector.

STEP 10. Check harness between C-14 (terminal No. 23) OSS-ECU connector and C-415 (terminal No. 7) ETACS-ECU connector.

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

Q: Is the check result normal?

YES : Perform the troubleshooting of the OSS-ECU (Refer to GROUP 42B – Troubleshooting <OSS-ECU> – Symptom Chart).

NO : Repair the damaged harness wire.

STEP 11. Connector check: C-403 and C-415 ETACS-ECU connectors, C-11 AS&G-ECU connector, B-10 <4N1> or B-27 <4A9> engine-ECU connector

Q: Are the check results normal?

YES : Go to Step 12.

NO : Repair or replace the connector.

STEP 12. Continuity check on C-403 and C-415 ETACS-ECU connectors.

- Disconnect connectors, and check at ETACS-ECU side.
- Continuity check between terminal No. 7 (C-415) and terminal No. 15 (C-403).

OK: Continuity

Q: Is the check result normal?

YES : Go to Step 13.

NO : Replace the ETACS-ECU.

STEP 13. Check harness between C-403 (terminal No. 15) ETACS-ECU connector and C-11 (terminal No. 31) AS&G-ECU connector.

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

Q: Is the check result normal?

YES : Go to Step 14.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 14. Check harness between C-403 (terminal No. 15) ETACS-ECU connector and B-10 (terminal No. 111) <4N1> or B-27 (terminal No. 105) <4A9> engine-ECU connector.

- Check signal line for short circuit.

Q: Is the check result normal?

YES : Go to Step 15.

NO : Repair the damaged harness wire.

STEP 15. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).

STEP 16. Connector check: A-22X starter cut relay connector and A-31X starter relay connector

Q: Are the check results normal?

YES : Go to Step 17.

NO : Repair or replace the connector.

STEP 17. Check the starter cut relay itself and starter relay itself.

- Check the starter cut relay itself and starter relay itself (Refer to GROUP 16 – Starting System – On-vehicle Service – Starter Relay Continuity Check).

Q: Are the check results normal?

YES : Go to Step 18.

NO : Replace the starter cut relay and/or starter relay.

STEP 18. Perform resistance measurement at A-22X starter cut relay connector.

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 1 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 19.

NO : Check and repair harness between A-22X (terminal No. 1) starter cut relay connector and body earth.

- Check earthing line for open circuit and damage.

Inspection Procedure 2: Starting Impossible (starter not operative)**STEP 19. Perform resistance measurement at A-31X starter relay connector.**

- Remove the relay, and measure at harness side.
- Resistance between terminal No. 1 and earth.

OK: Continuity (2 Ω or less)

Q: Is the check result normal?

YES : Go to Step 20.

NO : Check and repair harness between A-31X (terminal No. 1) starter relay connector and body earth.

- Check earthing line for open circuit and damage.

STEP 20. Check harness between battery and A-22X (terminal No. 4) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 21.

NO : Repair the damaged harness wire.

STEP 21. Connector check: C-11 AS&G-ECU connector**Q: Is the check result normal?**

YES : Go to Step 22.

NO : Repair or replace the connector.

STEP 22. Check harness between C-11 (terminal No. 25) AS&G-ECU connector and A-22X (terminal No. 2) starter cut relay connector.

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

Q: Is the check result normal?

YES : Go to Step 23.

NO : Repair the damaged harness wire.

STEP 23. Check harness between A-22X (terminal No. 3) starter cut relay connector and A-31X (terminal No. 4) starter relay connector.

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

Q: Is the check result normal?

YES : Go to Step 24.

NO : Repair the damaged harness wire.

STEP 24. Check harness between C-11 (terminal No. 23) AS&G-ECU connector and A-31X (terminal No. 2) starter relay connector.

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

Q: Is the check result normal?

YES <4N1> : Go to Step 25.

YES <4A9> : Go to Step 27.

NO : Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 25. Connector check: B-09 engine-ECU connector**Q: Is the check result normal?****YES :** Go to Step 26.**NO :** Repair or replace the connector.

STEP 26. Check harness between A-31X (terminal No. 3) starter relay connector and B-09 (terminal No. 8) engine-ECU connector.

NOTE: Befor checking harness, check intermediate connector A-16 and repair if necessary.

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

Q: Is the check result normal?**YES :** Go to Step 27.**NO :** Repair the damaged harness wire.

STEP 27. Connector check: B-112 and B-113 starter connector**Q: Are the check results normal?****YES :** Go to Step 28.**NO :** Repair or replace the connector.

STEP 28. Check harness between A-31X (terminal No. 3) starter relay connector and B-112 (terminal No. 1) starter connector.

NOTE: Befor checking harness, check intermediate connector B-108 <4N1>, A-17 <4A9> and repair if necessary.

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

Q: Is the check result normal?**YES <4N1> :** Go to Step 31.**YES <4A9> :** Go to Step 29.**NO :** Repair the damaged harness wire.

STEP 29. Connector check: B-26 engine-ECU connector**Q: Is the check result normal?****YES :** Go to Step 30.**NO :** Repair or replace the connector.

STEP 30. Check harness between B-112 (terminal No. 1) starter connector and B-26 (terminal No. 6) engine-ECU connector.

- Check output line for short circuit.

Q: Is the check result normal?**YES :** Go to Step 31.**NO :** Repair the damaged harness wire.

Inspection Procedure 2: Starting Impossible (starter not operative)

STEP 31. Check harness between battery and B-113 (terminal No. 1) starter connector.

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

Q: Is the check result normal?

YES : Go to Step 32.

NO : Repair the damaged harness wire.

STEP 32. Check starter motor operation.

- Check starter motor operation (Refer to GROUP 16 – Starting System – Starter Motor Assembly – Starter Motor Assembly Inspection <4N1>, <4A9>).

Q: Is the check result normal?

YES : Go to Step 15.

NO : Replace the starter motor.

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

⚠ CAUTION

If the following services are performed, the backup data should be deleted. Do not perform these services without carrying out the check described in Step 2.

- In case the cable is disconnected from the battery terminal
- In case the connector is disconnected from the engine-ECU

FUNCTION

If the specified conditions are satisfied, the AS&G-ECU should send the engine stop request signal to the engine-ECU via CAN. When receiving the signal, the engine-ECU should stop the engine.

COMMENTS ON TROUBLE SYMPTOM

- The failure could possibly be caused by the failed AS&G system. The AS&G-ECU, however, can possibly prohibit the auto stop, depending on the vehicle status or the ambient conditions.

PROBABLE CAUSES

- Deteriorated battery
- Failed AS&G system
- Short circuit in starter active signal circuit, or loose connector contact
- Failed AS&G-ECU

DIAGNOSIS PROCEDURE

STEP 1. Confirm the vehicle status and the ambient conditions.

- Confirm the vehicle status or the ambient conditions to check whether the auto stop should be carried out or not.

Q: Are the conditions for prohibiting the auto stop satisfied?

YES : Check end.

NO : Go to Step 2.

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

- Check the data lists of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Data List Reference Table).
- Item 435: Last battery deteriorated odometer
- Item 436: 2nd last battery deteriorated odometer
- Item 437: 3rd last battery deteriorated odometer

OK: 0 km (Ignition switch: ON)

Q: Are the all items displayed as "0 km"?

YES : Go to Step 3.

NO : Write the check result and go to Step 3.

STEP 3. M.U.T.-III diagnosis code

Confirm the diagnosis code is set from the following ECU.

- AS&G-ECU
- Engine-ECU
- ASC-ECU
- Combination meter
- EPS-ECU
- A/C-ECU
- ETACS-ECU

Q: Is the diagnosis code set?**YES <Diagnosis code is set from the AS&G-ECU> :**

Perform the troubleshooting of the AS&G-ECU (Refer to).

YES <Diagnosis code is set from the engine-ECU> :

Perform the troubleshooting of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Inspection Chart for Diagnosis Code).

YES <Diagnosis code is set from the ASC-ECU> :

Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Diagnosis Code Chart).

YES <Diagnosis code is set from the combination

meter> : Perform the troubleshooting of the combination meter (Refer to GROUP 54A – Combination Meter – Diagnosis Code Chart).

YES <Diagnosis code is set from the EPS-ECU> :

Perform the troubleshooting of the EPS-ECU (Refer to GROUP 37 – Diagnosis Code Chart).

YES <Diagnosis code is set from the A/C-ECU> :

Perform the troubleshooting of the A/C-ECU (Refer to GROUP 55 – Troubleshooting – Diagnosis Code Chart).

YES <Diagnosis code is set from the ETACS-ECU> :

Perform the troubleshooting of the ETACS-ECU (Refer to GROUP 54A – ETACS – Diagnosis Code Chart).

NO : Go to Step 4.

STEP 4. M.U.T.-III data list

- Item 10: Seat belt fasten status

OK:

Fastened (Driver's seat belt: Fastened)

Not fastened (Driver's seat belt: Not fastened)

NOTE: If the driver's seat belt is unfastened, the AS&G indicator/display in the combination meter should blink.

Q: Is the check result normal?

YES : Go to Step 5.

NO : Perform the troubleshooting of the seat belt reminder function circuit (Refer to GROUP 54A – Combination Meter – Symptom Procedures – Seat Belt Reminder Function Does Not Work Normally).

STEP 5. M.U.T.-III data list

- Item 4: Engine hood

OK:**Close (Hood: Closed)****Open (Hood: Opened)**

NOTE: If the engine hood is opened, the AS&G indicator/display in the combination meter should blink.

Q: Is the check result normal?**YES :** Go to Step 6.

NO : Perform the troubleshooting of the engine hood latch switch circuit (Refer to GROUP 54A – ETACS – Input Signal Procedures – The hood latch switch signal is not received).

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

- Refer to Data List Reference Table.
 - Item 6: Clutch monitoring switch (upper)
 - Item 7: Clutch interlock switch (bottom)
 - Item 8: Neutral position switch
 - Item 14: Brake vacuum sensor
 - Item 16: Atmospheric pressure

Q: Are the check results normal?**YES :** Go to Step 7.

NO : Perform the troubleshooting for the item that has an abnormal value.

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

- Refer to Data List Reference Table.
 - Item 18: Accelerator pedal position

Q: Is the check result normal?**YES :** Go to Step 8.

NO : Perform the troubleshooting of the accelerator pedal position sensor (Refer to GROUP 13B – Troubleshooting – Inspection Chart for Diagnosis Code).

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

- Refer to Data List Reference Table.
 - Item 17: Vehicle speed

Q: Is the check result normal?**YES :** Go to Step 9.

NO : Perform the troubleshooting of the ASC-ECU (Refer to GROUP 35C – Troubleshooting – Diagnosis Code Chart).

STEP 9. M.U.T.-III data list

- Item 15: Ambient temperature

OK: At ambient temperature (atmospheric

Inspection Procedure 5: AS&G System Abnormal (auto stop not carried out) <4N1>

temperature) or equivalent

Q: Is the check result normal?

YES : Go to Step 10.

NO : Perform the troubleshooting of the ambient temperature sensor (Refer to GROUP 55 – Troubleshooting – Diagnosis Code Procedures – Ambient Temperature Sensor System).

STEP 10. M.U.T.-III data list

- Check the data lists of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Data List Reference Table).
- Item 7: 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 11.

NO : Perform the troubleshooting of the engine coolant temperature sensor (Refer to GROUP 13B – Troubleshooting – Inspection Chart for Diagnosis Code).

STEP 11. Make certain the check result.

NOTE: If the situation falls under any of the following items, go to "YES" whether or not the check result in Step 2.

- After a malfunction occurs, the negative (–) cable is disconnected from the battery once.
- After a malfunction occurs, the connector is disconnected from the engine-ECU once.
- The odometer shown on the combination meter is beyond 262,140 km.

Q: Is the check result in Step 2 other than "0 km"?

YES : Go to Step 12.

NO : Go to Step 15.

STEP 12. M.U.T.-III data list

1. Disconnect the negative (–) cable from the battery (this can delete backup data).
2. Charge the battery (Refer to GROUP 54A – Battery – On-vehicle Service – Charging).
3. As soon as the battery is charged, leave the engine idling and turn off lamps and all accessories.
4. Check the data lists of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Data List Reference Table).
 - Item No. 455: Battery full-charge mode flag

OK: The display status "ON" is changed to "OFF"

within approximately 10 minutes.

Q: Is the check result normal?

YES : Turn the ignition switch to "ON" position after stopping the engine. Then go to Step 14.

NO : Go to Step 13.

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

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Data List Reference Table).
 - Item No. 434: Vehicle Consumption Current

OK:

- **When the headlamp is lit, the numerical value should increase by approximately 9 A. <Vehicles with halogen type headlamp>**
- **When the headlamp is lit, the numerical value should increase by approximately 6 A. <Vehicles with discharge type headlamp>**

Q: Is the check result normal?

YES : Replace the battery.

NO : Replace the battery current sensor.

STEP 14. Judge the battery life.

1. Turn the ignition switch to "ON" position (But do not start the engine).
2. Check the data lists of the engine-ECU (Refer to GROUP 13B – Troubleshooting – Data List Reference Table) and adjust the electrical load so that the displayed value should be 30 ± 2 A.
 - Item No. 434: Vehicle Consumption Current
3. Continue the conditions of Step 2 for 120 seconds and discharge the battery.
4. Run the engine for 10 seconds after the engine start and check on the battery deterioration with data lists of the engine-ECU.
 - Item No. 454: Battery degrade judgment flag

OK: OFF (Engine: Idle operation)

5. After checking that the data list item No. 454 of the engine-ECU is displayed, swiftly turn the ignition switch to "LOCK" (OFF) position and leave it for 10 seconds.
6. Repeat Steps 1-5 five times. Check that data list item No. 454 always shows "OFF".

Q: Is the check result normal?

YES : Recharge the battery because the battery is discharged during the check. (Refer to GROUP 54A – Battery – On-vehicle Service – Charging). After the battery is charged, go to Step 16.

NO : Replace the battery.

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

- Item 12: Idle stop enable (A/C-ECU)
- Item 13: Idle stop enable (engine-ECU)

OK: "Enable" is displayed

Q: Is the check result normal?

YES : Go to Step 16.

NO <"Disable" is displayed in item 12.> : The A/C-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the A/C-ECU (Refer to GROUP 55 – General Information).

NO <"Disable" is displayed in item 13.> : The engine-ECU would possibly output the auto stop prohibition signal. Recheck the auto stop prohibition signal of the engine-ECU (Refer to GROUP 13B – General Information).

STEP 16. Connector check: B-09 engine-ECU connector and A-31X starter relay connector

Q: Are the check results normal?

YES : Go to Step 17.

NO : Repair or replace the connector.

STEP 17. Check harness between A-31X (terminal No. 3) starter relay connector and B-09 (terminal No. 8) engine-ECU connector.

NOTE: Before checking harness, check intermediate connector A-16 and repair if necessary.

- Check output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the damaged harness wire.

STEP 18. Check the trouble symptom.

Q: Does the trouble symptom persist?

YES : Replace the AS&G-ECU.

NO : Intermittent malfunction (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions).