

## GROUP 27C

# ELECTRONIC CONTROL AWD

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## GENERAL INFORMATION

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- Electronic control AWD has been adopted to ensure the on-road performance, achieve lighter and smaller body, and realize better fuel economy.
- The electronic control AWD controls the torque of the electronic control coupling located between the propeller shaft and rear differential. This strategy is enabled by varying the torque distribution to the front and rear wheels from the status closer to the front wheel drive to the status closer to the direct coupling AWD and realizes the optimal drive force according to the various driving conditions.

### AIMS OF DEVELOPMENT

Lightweight and simple construction of the electronic control AWD achieves good fuel efficiency and provides enjoyment of selecting the drive mode.

### FUNCTION

- The adoption of the electronic control coupling satisfies both of the tight corner braking phenomenon\* and traction performance.

*NOTE: \*Tight corner braking indicates the following condition. When the AWD vehicle turns sharply on a pavement at low speed (ex. parallel parking), the rotational radius of the front and rear wheels differs, and this difference can no longer be compensated by the tire slippage. At this time, the driver feels as if the brake was applied.*

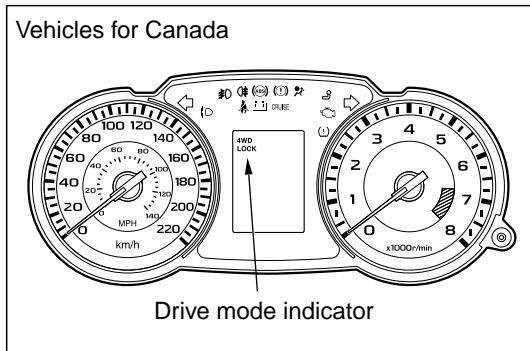
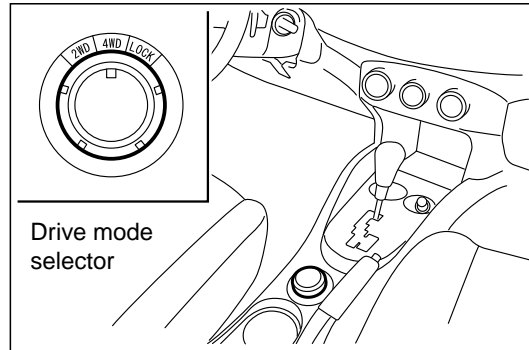
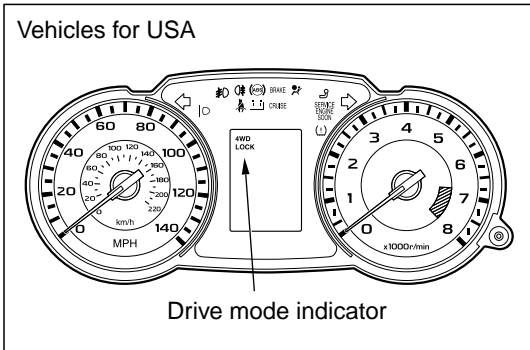
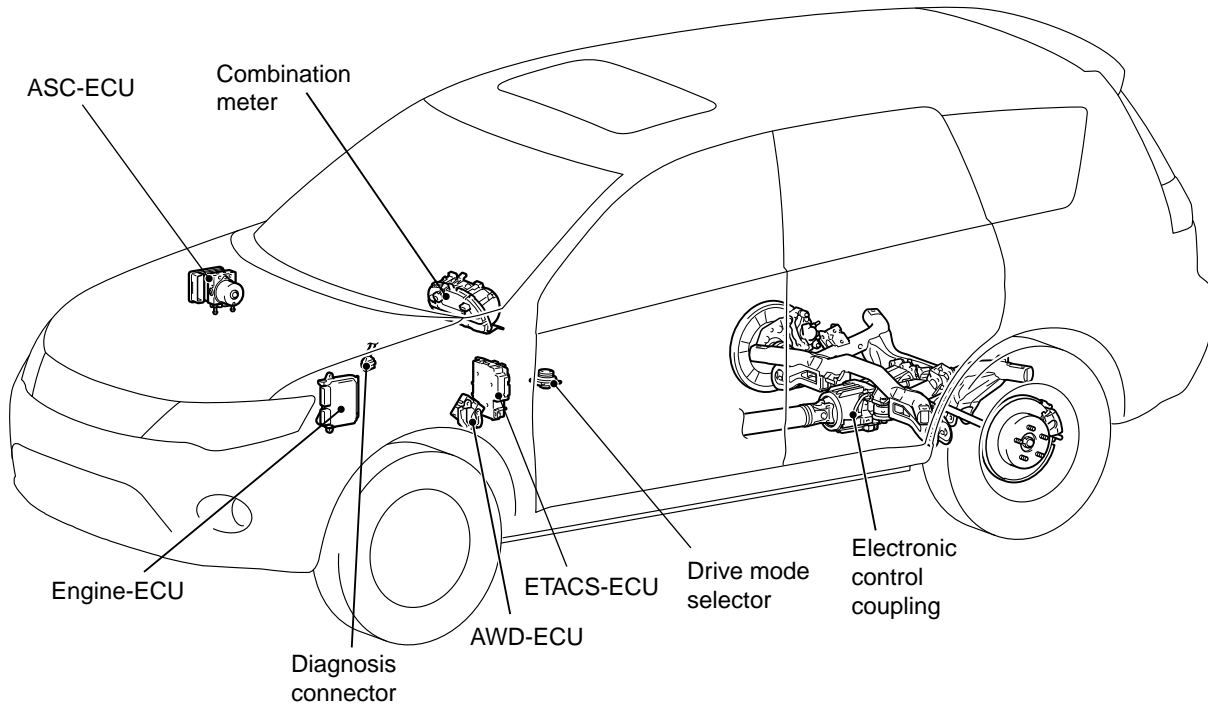
- The electronic control AWD receives the signals of the throttle position and vehicle speed via CAN\* communication protocol, detects the vehicle driving condition and operation of the driver, and distributes the proper torque to the rear wheels.

*NOTE: \*: For more information about CAN (Controller Area Network), refer to GROUP 54C.*

- Under severe driving condition, the system is protected by minimizing the limitation force of the differential.
- During high-speed driving, the fuel efficiency is improved by reducing the limitation force of the differential.
- The following drive modes are available according to the drivers' preference to provide the enjoyment of selecting functions.

Drive mode	Control content	Appeal points
FWD	Minimizes the limitation force of the differential.	High fuel efficiency mode which enables smoother turning performance of the FF vehicle
AWD	Increases the limitation force of the differential according to the different rotation speed of the front and rear wheels and the throttle position.	Universal mode which automatically distributes the drive force to the rear wheels as necessary
LOCK	Further increases the limitation force of the differential compared to the AWD mode.	Mode which has an excellent driving performance when driving on rough road or in stuck situation and enables the powerful driving

CONSTRUCTION DIAGRAM



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System component and function

Parts name	Functional description
Engine ECU	Sends the following signals required by AWD-ECU via CAN communication.

Parts name	Functional description
	<ul style="list-style-type: none"> <li>▪ Engine torque signal</li> <li>▪ Throttle position signal</li> <li>▪ Engine speed signal</li> </ul>
ASC-ECU	<p>Sends the following signals required by AWD-ECU via CAN communication.</p> <ul style="list-style-type: none"> <li>▪ ABS sensor signal (wheel speed signal) [4 wheels]</li> <li>▪ ABS operation signal</li> <li>▪ AWD limitation torque signal</li> </ul>
Drive mode selector	Sends the drive mode switch signal [FWD/AWD/LOCK] to AWD-ECU.
ETACS-ECU	<ul style="list-style-type: none"> <li>▪ Receives the drive mode switch signal [FWD/AWD/LOCK] from AWD-ECU and flashes the indicators (AWD operation indicator and LOCK indicator) in the combination meter.</li> <li>▪ Flashes the indicators (AWD operation indicator and LOCK indicator) in the combination meter in case of failure.</li> </ul> <p>Controls diagnostic function (Compatible with M.U.T.-III).</p>
AWD-ECU	<p>Calculates the optimum differential limitation force judging from the vehicle condition and present drive mode based on the signals from each ECU and switch, and controls the current value flown to the electronic control coupling.</p> <p>Controls the indicators (AWD operation indicator and LOCK indicator) in the combination meter.</p> <p>Controls the self-diagnostic function and fail-safe function.</p> <p>Controls diagnostic function (Compatible with M.U.T.-III).</p>
Electronic control coupling	Transmits the torque corresponding to the current value controlled by AWD-ECU to the rear wheels.
Drive mode indicator ▪ AWD operation indicator ▪ LOCK indicator	<p>Integrated in the combination meter, and indicates the selected drive mode (Not displayed in FWD mode).</p> <ul style="list-style-type: none"> <li>▪ When the AWD operation indicator and LOCK indicator flash alternately, the system automatically enters the front wheel drive mode to protect the drive system components, and the drive mode changeover with the drive mode selector becomes unavailable.</li> <li>▪ When the drive system generates heat, the AWD operation indicator flashes.</li> <li>▪ The indicator lamp operation signal from AWD-ECU is sent to the combination meter via ETACS-ECU using CAN communication.</li> </ul>
Diagnosis connector	Outputs the diagnosis code and establishes the communication with M.U.T.-III.

## SERVICE PRECAUTIONS

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### TOWING

- The vehicle must be towed by a tow truck with all four wheels raised. If a vehicle is towed with only the front or rear wheels are raised, the drive system components may be damaged or the vehicle may jump out of a tow truck (cart).
- Even if the drive mode selector is switched to "FWD," the vehicle cannot be towed with only the

front or rear wheels raised. The vehicle must be towed by a tow truck with all four wheels raised.

**WHEEL AND TIRE**

Normally, all four tires must be same in size, in type, and in brand, except for when a spare tire is temporarily used. If a wheel or tire with incorrect size is installed or tire pressure is excessively out of the specified value, the electronic control AWD system will not operate correctly. In addition, drive system components may be damaged.

**DRIVING ON SANDY OR SLUSHY ROAD**

As the vehicle is intended for on-road use, long-time driving on a sandy or slushy road must be avoided. When the vehicle is driven on a sandy or slushy road

for a long time, the fail-safe function of the electronic control AWD system tends to enter the protective control mode which switches the control from AWD to FWD gradually in order to protect the drive system, and the indicators ("AWD" and "LOCK") tends to illuminate.

**SPEED MEASUREMENT**

When using the chassis dynamometer to measure the speed, always measure with 4 wheels in free state. If the speed is measured with front wheels or rear wheels fixed, drive system components may be damaged.

**SERVICE SPECIFICATIONS**

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Item	Standard value
Electronic control coupling solenoid resistance $\Omega$ [20 °C (68°F)]	2.2 - 4.0
Electronic control coupling stud bolt length mm (in)	22.3 - 25.1 (0.88 - 0.99)

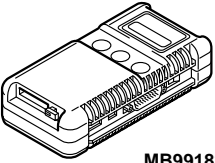
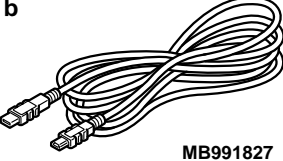
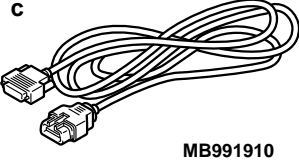
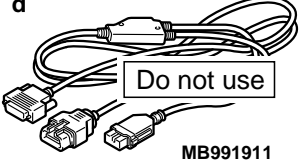
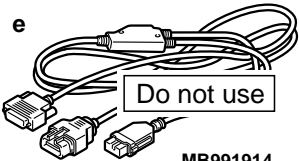
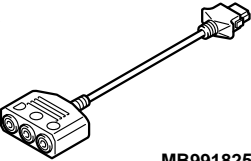
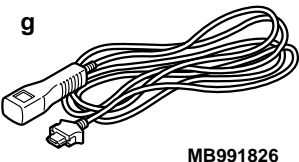
**SEALANT**

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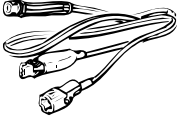
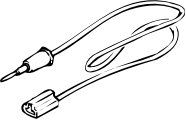

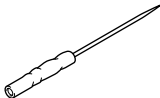
Item	Specified sealant
Differential carrier and electronic control coupling mounting part	3M™ AAD Part No.8672, 8679, 8678, 8661, 8663 or equivalent

SPECIAL TOOL

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Tool	Tool number and name	Supersession	Application
<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>MB991914</p> <p>f</p>  <p>MB991825</p> <p>g</p>  <p>MB991826</p> <p>YB9919580000</p>	<p>MB991958</p> <p>A: MB991824</p> <p>B: MB991827</p> <p>C: MB991910</p> <p>D: MB991911</p> <p>E: MB991914</p> <p>F: MB991825</p> <p>G: 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 main harness C (for Daimler Chrysler models only)</p> <p>F: M.U.T.-III Adapter Harness</p> <p>G: M.U.T.-III Trigger Harness</p>	<p>MB991824-KIT</p> <p><i>NOTE: G: MB991826</i></p> <p><i>M. U. T. -III Trigger Harness is not necessary when pushing V. C. I. ENTER key.</i></p>	<p>Check of the electronic control AWD (the diagnosis code display, service data display, freeze frame data display, actuator test with M.U.T.-III)</p> <p><b>CAUTION</b></p> <p>For vehicles 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>

**ELECTRONIC CONTROL AWD  
DIAGNOSIS**

Tool	Tool number and name	Supersession	Application
<p>a </p> <p>b </p> <p>c </p> <p>d  <span style="border: 1px solid black; padding: 2px;">Do not use</span></p> <p style="text-align: center;">YB9912230000</p>	<p>MB991223 Harness set A: MB991219 Test harness B: MB991220 LED harness C: MB991221 LED harness adapter D: MB991222 Probe</p>	<p>MB991223</p>	<p>Continuity check and voltage measurement at the AWD-ECU wiring harness connector</p>
 <p style="text-align: center;">YB992006AA01</p>	<p>MB992006 Extra fine probe</p>	<p>General service tool</p>	

**DIAGNOSIS**

**STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING**

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Refer to GROUP 00 - Troubleshooting Contents P. 00-6.

**PRECAUTIONS FOR DIAGNOSIS**

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- After troubleshooting, and removing/installing of the electronic control AWD system components, check the diagnosis code using M.U.T.-III. If a diagnosis code is set, erase it and check again that no diagnosis code is set.
- Before performing a troubleshooting, check that all four wheels and tyres are same in size. The electronic control AWD system will function correctly only when all four wheels and tyres are same in size.
- If any abnormality occurs in the electronic control AWD system, it flashes the indicators (AWD and AWD LOCK) in the combination meter alternately to inform of the abnormality.
- When the vehicle is used under some severe operational conditions (such as a long-time driving

in AWD on a sandy road, slushy road or road with deep snows or towing or long hill-climbing), the electronic control AWD system illuminates the drive system fluid temperature warning lamp in the combination meter in order to protect the electronic control coupling fluid temperature, at the same time it flashes the indicator (AWD or LOCK) corresponding to the selected drive mode to inform of the abnormality.

- The electronic control AWD system is equipped with the fail-safe function which prohibits AWD control and shifts to FWD control if any abnormality occurs in the system. If there is a risk that the vehicle behaviour suddenly changes, the gradual shifting to FWD control is chosen.

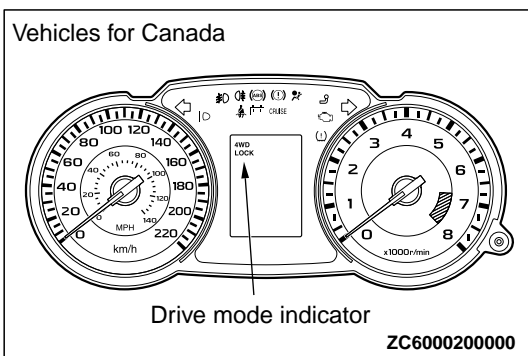
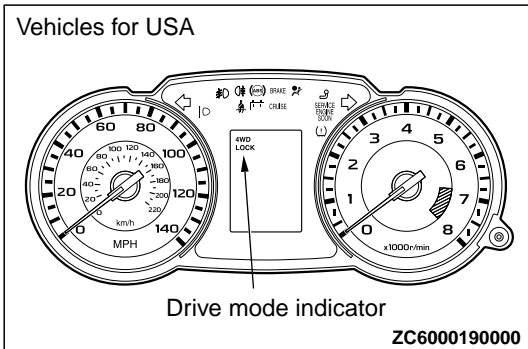


## CHECK OF DRIVE MODE INDICATORS (AWD/ LOCK)

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Check that the AWD/LOCK indicators illuminate as follows:

1. Switch the drive mode selector to the LOCK mode.
2. When the ignition switch is turned ON, the AWD/LOCK indicators illuminate.
3. After the engine starts, the AWD/LOCK indicators go off.
4. Otherwise, check the diagnosis code.



## DIAGNOSTIC FUNCTION

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### HOW TO READ DIAGNOSIS CODE

Refer to GROUP 00 - Diagnostic Function .

### HOW TO ERASE DIAGNOSIS CODE

Refer to GROUP 00 - Diagnostic Function .

## DIAGNOSIS CODE CHART

### CAUTION

On troubleshooting, if the ignition switch is turned ON while disconnecting connector(s), diagnosis code(s) associated with other system may be set.

On completion, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

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Diagnosis code No.	Diagnostic item	Reference page
C1078	Tire with incorrect diameter equipped	P.27C-10
C1456	Wiring harness or coupling coil overcurrent failure	P.27C-13
C145A	Wiring harness or coupling coil short circuit failure	P.27C-17
C145D	Wiring harness or coupling open circuit failure	P.27C-21

Diagnosis code No.	Diagnostic item	Reference page
C145F	Coupling overload	P.27C-25
C1460	Drive mode selector circuit failure	P.27C-27
C2100	Abnormal battery voltage (too low)	P.27C-31
C2101	Abnormal battery voltage (too high)	P.27C-35
C211C	Abnormal IG1 power supply low voltage	P.27C-39
C211D	Abnormal IG1 power supply high voltage	P.27C-42
C211E	Abnormal power supply voltage (too low)	P.27C-45
C211F	Abnormal power supply voltage (too high)	P.27C-48
C2208	AWD-ECU internal error	P.27C-52
U0001	Bus-off error	P.27C-56
U0100	Engine CAN time-out	P.27C-58
U0121	ABS CAN time-out	P.27C-62
U0141	ETACS CAN time-out	P.27C-64
U0401	Engine CAN data error	P.27C-66
U0415	ABS CAN data error	P.27C-69
U113C	Wheel speed sensor data error	P.27C-72

## DIAGNOSTIC TROUBLE CODE PROCEDURES

### DTC C1078: Tire with incorrect diameter equipped

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#### CAUTION

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

#### OPERATION

If the vehicle is driven with a tire with incorrect diameter (high-pressure type spare tire or flat tire) installed to either wheel in the AWD mode, AWD-ECU controls the coupling in high torque. If this is the case, the coupling temperature may rise to cause a seizure.

#### DTC SET CONDITIONS

If the following conditions are met, AWD-ECU gradually reduces the AWD control torque to the specified torque, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C1078.

- \*AWD selector switch: AWD/LOCK

- \*If the vehicle is driven with abnormal tire pressure or tires of different brands, DTC No. C1078 is set and the mode is switched to the AWD AUTO mode.
- \*If the difference in rotation speed between the front and rear wheels exceeds a specific value continuously, the DTC No. C1078 is set, the AWD/LOCK indicators flash alternately, and the mode is switched to the 2WD mode.

#### TROUBLESHOOTING HINTS

##### Current trouble

- \*Tire with incorrect diameter (high-pressure type spare tire or flat tire) equipped
- \*Improper adjusted tire pressure

**Past trouble**

- \*Tire with incorrect diameter (high-pressure type spare tire or flat tire) has been installed.

- \*The tire pressure has been adjusted due to improper tire pressure.

**DIAGNOSIS**

- \*MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- \*MB991824: Vehicle Communication Interface
- \*MB991827: M.U.T.-III USB Cable
- \*MB991910: M.U.T.-III Main Harness A

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**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

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**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Drive the vehicle straight with throttle opening angle of approximately 50% or less, and constant vehicle speed of 30 km/h or higher for 1 minute or longer.
- (3) Check if the DTC is set.

**Q:Is the DTC No. C1078 set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

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**STEP 3. Tire check**

**Q:Are all installed wheels and tires same in size?**

**YES:** Go to Step 4.

**NO:** Install the same size wheels and tires. Then go to Step 4.

---

**STEP 4. Tire pressure check**

Check that the tire pressure of the installed tires agrees with the tire pressure specified on the tire pressure label.

**Q:Is the tire pressure normal?**

**YES:** Go to Step 5.

**NO:** Adjust the tire pressure. Then go to Step 5.

---

**STEP 5. Check whether the DTC is reset.**

Drive the vehicle straight with throttle opening angle of approximately 50% or less, and constant vehicle speed of 30 km/h or higher for 1 minute or longer.

**Q:Is the DTC No. C1078 set?**

**YES:** Go to Step 6.

**NO:** This code is set because the tire pressure was improper or a tire with incorrect diameter is installed.

**STEP 6. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 16: FL wheel speed sensor
- Item 17: FR wheel speed sensor
- Item 18: RL wheel speed sensor
- Item 19: RR wheel speed sensor

**Q:Is the check result normal?**

**YES:** The trouble can be an intermittent malfunction.  
(Refer to GROUP 00 – How to cope with Intermittent Malfunction P.00-15.)

**NO:** Troubleshoot the ABS system. (Refer to GROUP 35B – Troubleshooting P.35B-9.) Then go to Step 7.

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**STEP 7. Check whether the DTC is reset.**

Drive the vehicle straight with throttle opening angle of approximately 50% or less, and constant vehicle speed of 30 km/h or higher for 1 minute or longer.

**Q:Is the DTC No. C1078 set?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 8.

**NO:** This diagnosis is complete.

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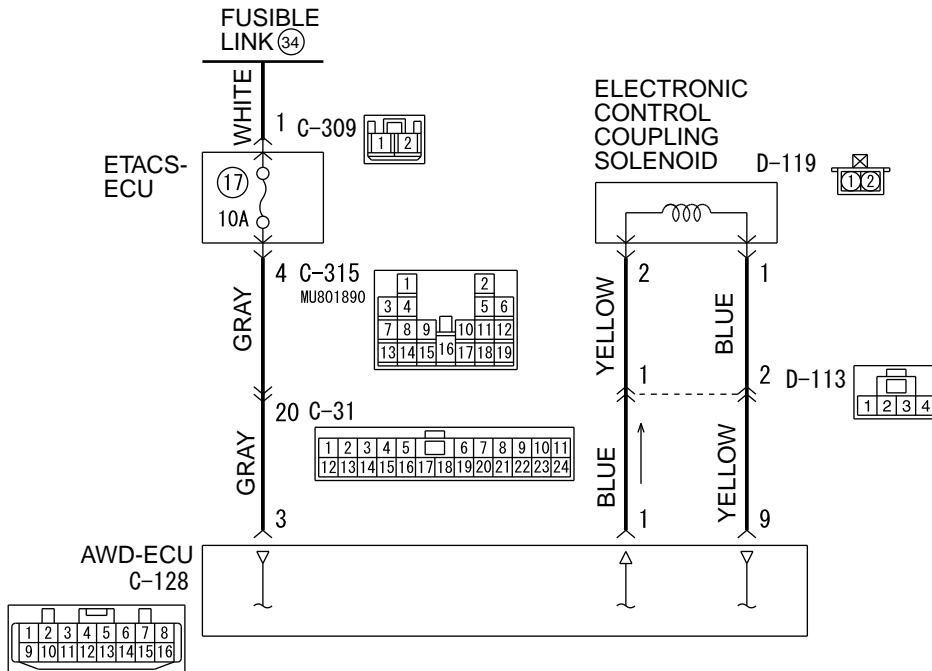
**STEP 8. Check whether the DTC is reset.****Q:Is the DTC No. C1078 set?**

**YES:** Diagnose again from Step 1.

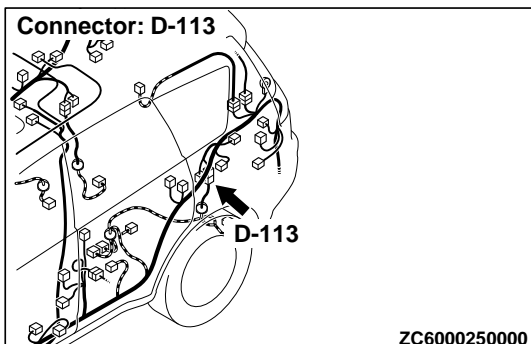
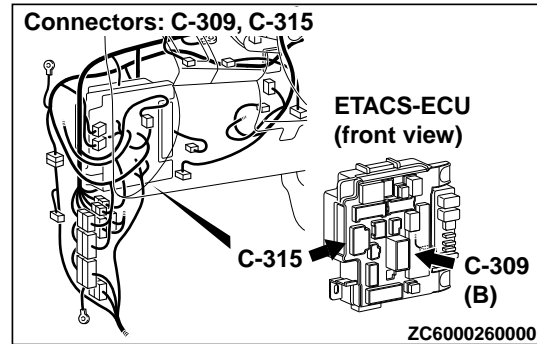
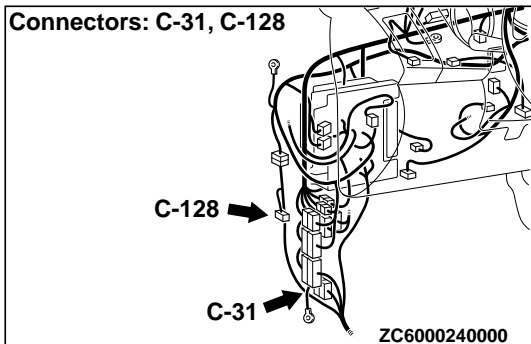
**NO:** This diagnosis is complete.

**DTC C1456: Wiring harness or coupling coil overcurrent failure**

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D7G27M000A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

The current flowing the coupling coil is monitored, and if it exceeds the specified value, the system is deactivated.

**DTC SET CONDITIONS**

If the following conditions are met when the system is in operation (always), AWD-ECU switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C1456.

- Electronic control coupling solenoid current monitor value: 6 A or more (deviated from the normal current value range)

**TROUBLESHOOTING HINTS****Current trouble**

- Damaged harness wires and connector (Short to earth between AWD-ECU and the electronic control coupling solenoid)
- AWD-ECU internal error
- Short circuit in the coupling coil

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent electronic control coupling failure (solenoid failure)

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Use scan tool MB991958 to activate the electronic control coupling to the maximum AWD control torque. (Refer to Actuator Test Table P.27C-89.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C1456 set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

**STEP 3. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 04: Coupling current command value
- Item 05: Coupling current monitor value

**Q: Is the check result normal?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.)

**NO:** Go to Step 4.

**STEP 4. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- D-113 electronic control coupling solenoid connector
- C-31 intermediate connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 5.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 10.

**STEP 5. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the D-113 electronic control coupling solenoid connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 10.

**STEP 6. Resistance measurement between electronic control coupling solenoid connector terminals**

Disconnect the D-119 connector, and measure the resistance value between the connector terminals on the electronic control coupling side.

**Standard value: 2.2 - 4.0 ohm**

**Q: Is the measured resistance value within the standard value range?**

**YES:** Go to Step 7.

**NO:** Replace the electronic control coupling. (Refer to P. 27C-94.) Then go to Step 10.

**STEP 7. Voltage measurement at the AWD-ECU connector**

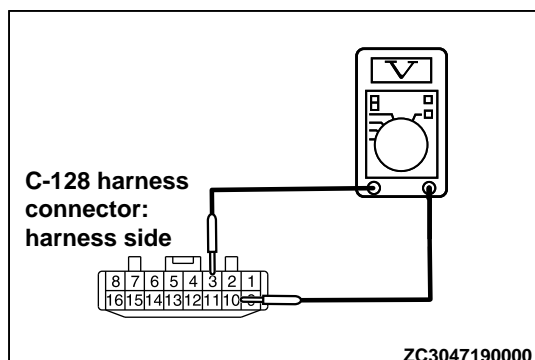
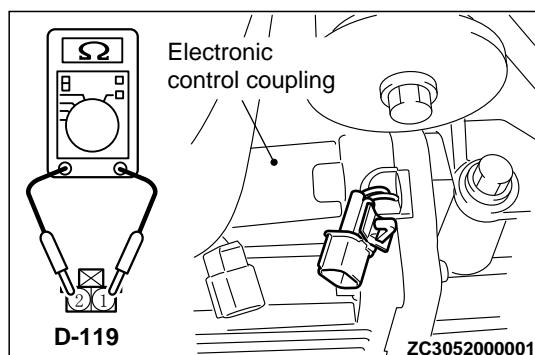
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3/4 and No. 10.

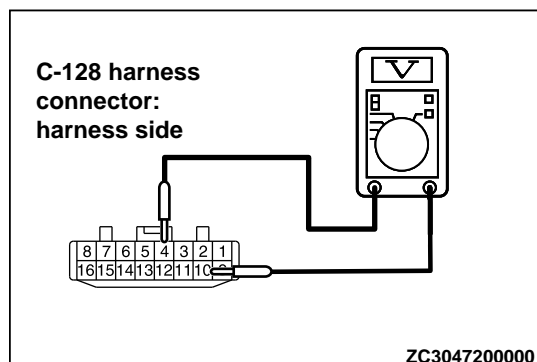
**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 8.



**STEP 8. Wiring harness check**

*NOTE: Prior to the wiring harness inspection, check the C-315 ETACS-ECU connector, and repair if necessary.*

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 9.

**NO:** Repair the wiring harness. Then go to Step 10.

**STEP 9. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Use scan tool MB991958 to activate the electronic control coupling to the maximum AWD control torque. (Refer to Actuator Test Table P.27C-89.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C1456 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 10.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

**STEP 10. Check whether the DTC is reset.****Q:Is the DTC No. C1456 set?**

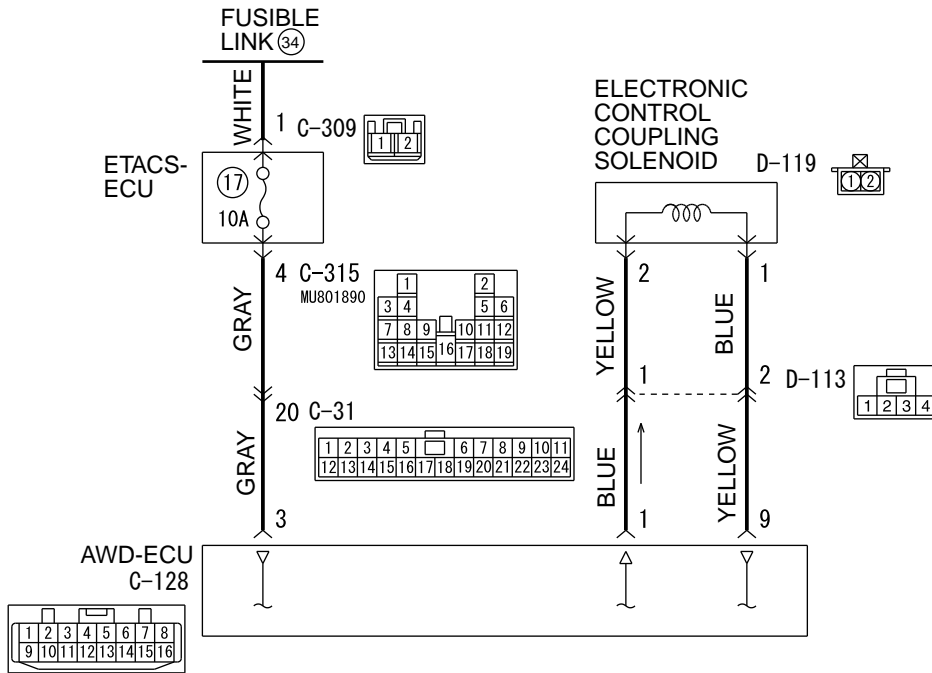
**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

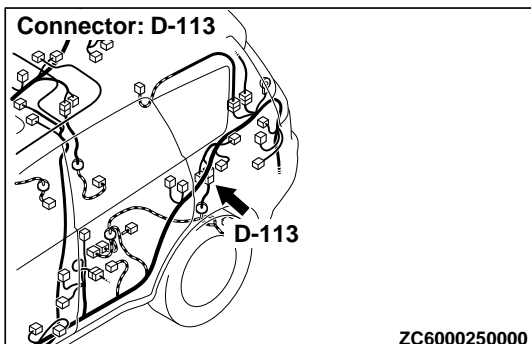
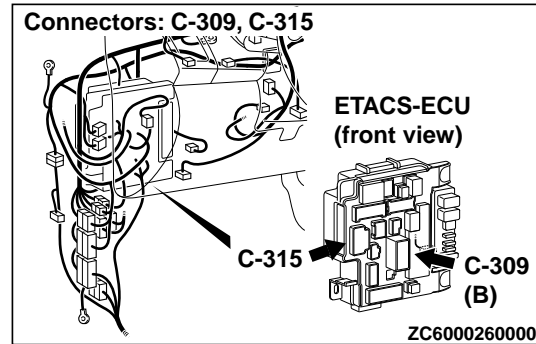
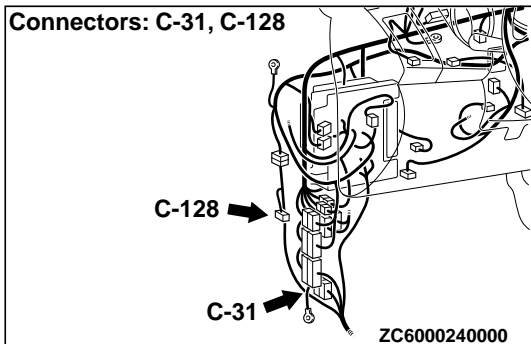


**DTC C145A: Wiring harness and coupling coil short circuit failure**

M12704100014USA0000010000



D7G27M000A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

If the current flowing the electronic control coupling solenoid coil is larger than the command value from AWD-ECU, the system is deactivated.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C145A.

- Sets the specified current command value to the electronic control coupling solenoid
- Drive current value of the electronic control coupling solenoid: Deviated from the normal current range

**TROUBLESHOOTING HINTS****Current trouble**

- Short circuit inside the electronic control coupling solenoid
- Wiring harness or connector failure (short circuit between the electronic control coupling solenoid terminals)
- Damaged wiring harness and connectors
  - Short to earth between AWD-ECU and the electronic control coupling solenoid
- AWD-ECU internal error

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent electronic control coupling failure (solenoid failure)

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 0 N·m to 100 N·m in 10 N·m steps. (Refer to Actuator Test Table P.27C-89.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C145A set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

**STEP 3. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 04: Coupling current command value

•Item 05: Coupling current monitor value

**Q: Is the check result normal?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.)

**NO:** Go to Step 4.

**STEP 4. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- D-113 electronic control coupling solenoid connector
- C-31 intermediate connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 5.

**NO:** Repair the connector (s) or terminal (s). Then go to Step 10.

**STEP 5. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the D-113 electronic control coupling solenoid connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 10.

**STEP 6. Resistance measurement between electronic control coupling solenoid connector (coupling side) terminals**

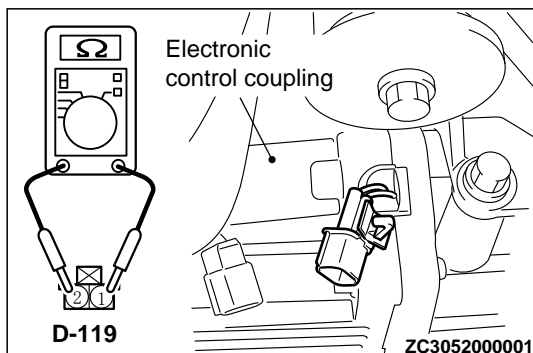
Disconnect the D-119 connector, and measure the resistance value between the connector terminals on the electronic control coupling side.

**Standard value: 2.2 - 4.0 ohm**

**Q: Is the measured resistance value within the standard value range?**

**YES:** Go to Step 7.

**NO:** Replace the electronic control coupling. (Refer to P. 27C-94.) Then go to Step 10.



**STEP 7. Voltage measurement at the AWD-ECU connector**

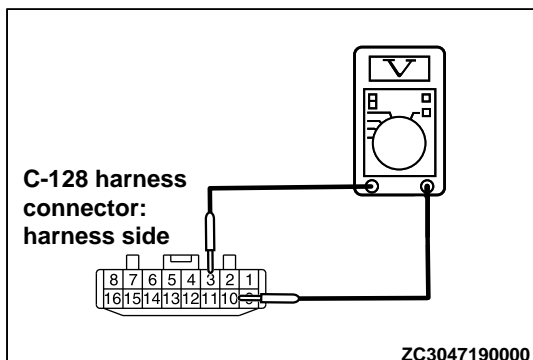
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3/4 and No. 10.

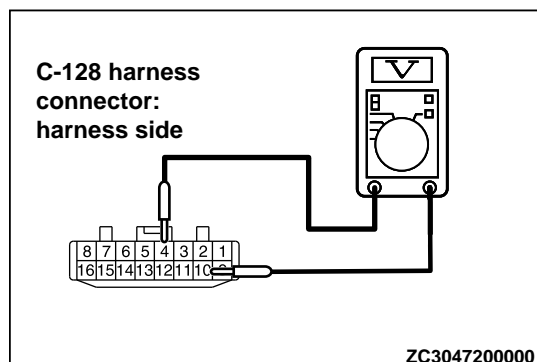
**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 8.



**STEP 8. Wiring harness check**

*NOTE: Prior to the wiring harness inspection, check the C-315 ETACS-ECU connector, and repair if necessary.*

- Wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1)

Check the wiring harness above for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 9.

**NO:** Repair the wiring harness. Then go to Step 10.

**STEP 9. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 0 N·m to 100 N·m in 10 N·m steps. (Refer to Actuator Test Table P.27C-89.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C145A set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 10.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

**STEP 10. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 0 to 100 N·m (0 to 73 ft-lb) in 10 N·m (7.4 ft-lb) steps. (Refer to Actuator Test Table P.27C-89.)
- (4) Check if the DTC is set.

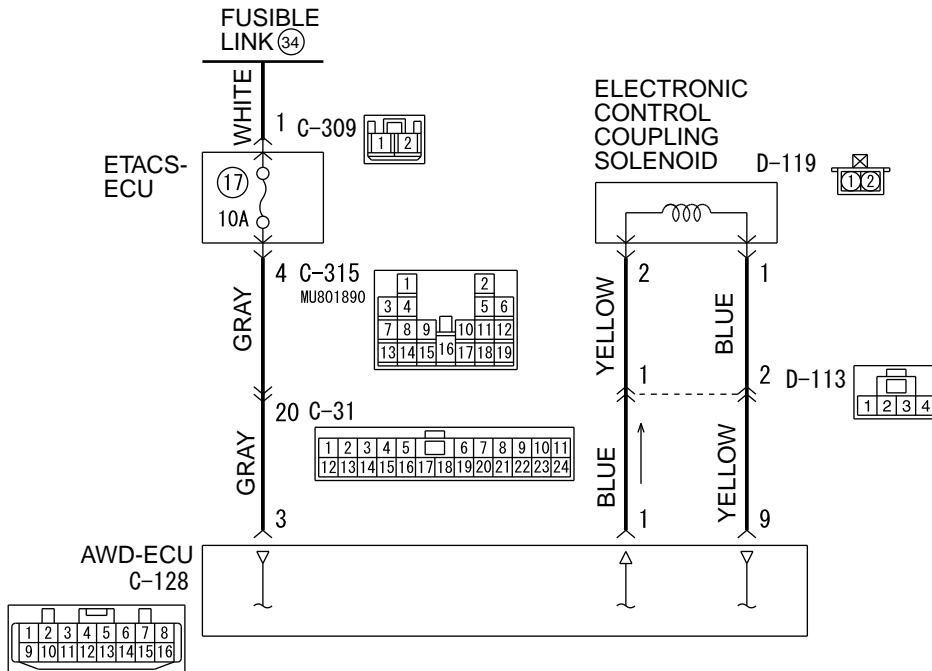
**Q:Is the DTC No. C145A set?**

**YES:** Diagnose again from Step 1.

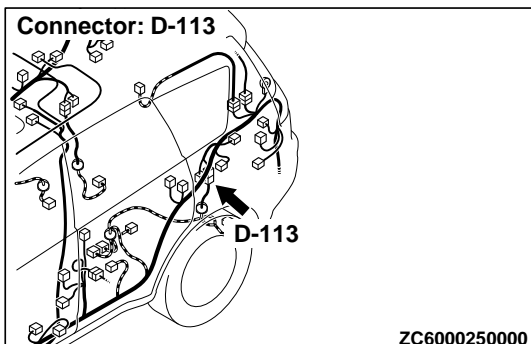
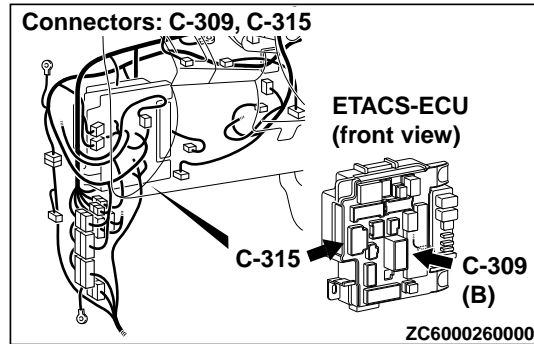
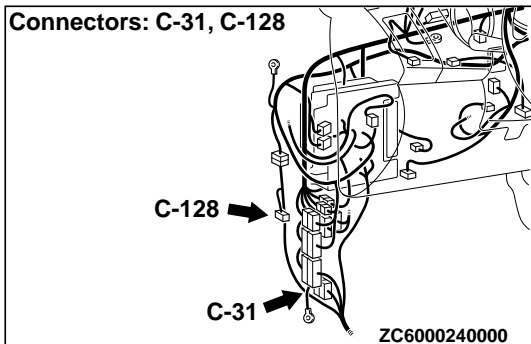
**NO:** This diagnosis is complete.

**DTC C145D: Wiring harness and coupling coil open circuit failure**

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D7G27M000A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

If the current flowing in the electronic control coupling solenoid coil is smaller than the command value from AWD-ECU, the system is deactivated.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C145D.

- Sets the specified current command value to the electronic control coupling solenoid
- Drive current value of the electronic control coupling solenoid: Deviated from the normal current range

**TROUBLESHOOTING HINTS****Current trouble**

- Open circuit inside the electronic control coupling solenoid
- Damaged wiring harness and connectors
  - Short to earth or open circuit between the battery and AWD-ECU
  - Short to power supply or open circuit between AWD-ECU and the electronic control coupling solenoid
  - Short to earth between AWD-ECU and the electronic control coupling solenoid
- AWD-ECU internal error

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent electronic control coupling failure (solenoid failure)

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 600 to 730 N·m (443 to 538 ft-lb) in 10 N·m(7.4 ft-lb) steps. (Refer to Actuator Test Table P. 27C-89.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C145D set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

---

**STEP 3. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 04: Coupling current command value
- Item 05: Coupling current monitor value

**Q:Is the check result normal?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.)

**NO:** Go to Step 4.

---

**STEP 4. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- D-113 electronic control coupling solenoid connector
- C-31 intermediate connector

**Q:Are the connectors and terminals in good condition?**

**YES:** Go to Step 5.

**NO:** Repair the connector (s) or terminal (s). Then go to Step 10.

---

**STEP 5. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the D-113 electronic control coupling solenoid connector for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 10.

---

**STEP 6. Resistance measurement between electronic control coupling solenoid connector (coupling side) terminals**

Disconnect the D-119 connector, and measure the resistance value between the connector terminals on the electronic control coupling side.

**Standard value: 2.2 - 4.0 ohm**

**Q:Is the measured resistance value within the standard value range?**

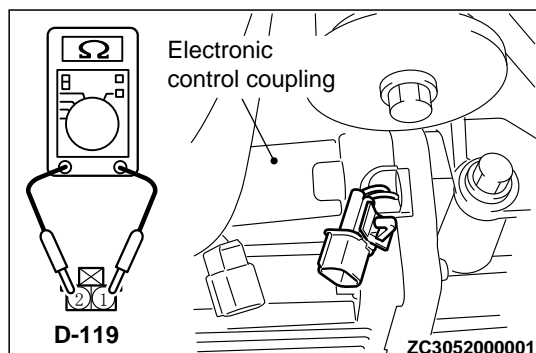
**YES:** Go to Step 7.

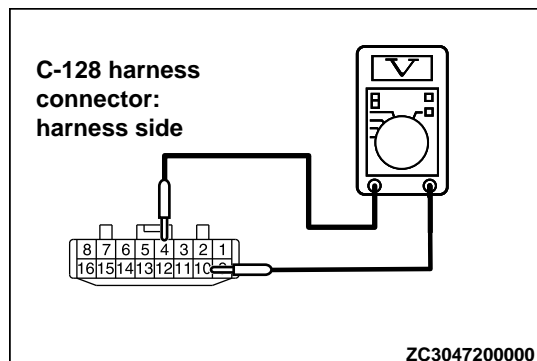
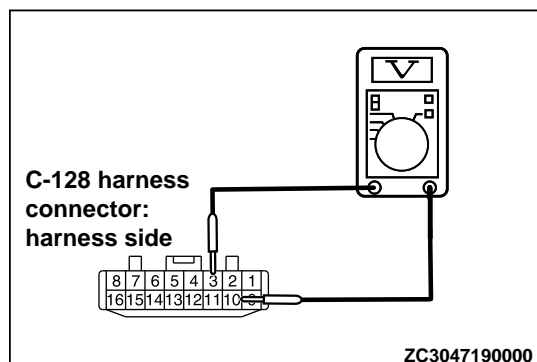
**NO:** Replace the electronic control coupling. (Refer to P.27C-94.) Then go to Step 10.

---

**STEP 7. Voltage measurement at the AWD-ECU connector**

(1) Disconnect the C-128 AWD-ECU connector.





- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 8.

### STEP 8. Wiring harness check

*NOTE: Prior to the wiring harness inspection, check the C-315 ETACS-ECU connector, and repair if necessary.*

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 9.

**NO:** Repair the wiring harness. Then go to Step 10.

### STEP 9. Check whether the DTC is reset.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 600 to 730 N·m (443 to 538 ft-lb) in 10 N·m (7.4 ft-lb) steps. (Refer to Actuator Test Table P. 27C-89.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C145D set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 10.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

### STEP 10. Check whether the DTC is reset.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 2 seconds.



- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling from 600 to 730 N·m (443 to 538 ft-lb) in 10 N·m (7.4 ft-lb) steps. (Refer to Actuator Test Table P. 27C-89.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C145D set?**

**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

---

## DTC C145F: Coupling Overload

---

M12704100016USA0000010000

**⚠ CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

### OPERATION

If AWD-ECU determines that the vehicle is used under some severe operational conditions (such as a long-time driving in AWD on a sandy road, slushy road or road with deep snows or towing or long hill-climbing), AWD-ECU detects the overload to the coupling. If abnormal overload is detected, AWD-ECU interrupts the system to prevent it from being damaged.

### DTC SET CONDITIONS

If the following conditions are met, AWD-ECU gradually switches the control from AWD to FWD, makes the drive system fluid temperature warning lamp illuminate, and sets the DTC No. C145F.

- AWD selector switch: AWD
- When the load to the electronic control coupling is large, the mode is switched to the FWD mode.

### TROUBLESHOOTING HINTS

#### Current trouble

- The driving conditions are severe.
- Electronic control coupling failure (clutch slippage)
- AWD-ECU malfunction
- Abnormality in ABS wheel speed signal
- Abnormality in torque command value from the ASC-ECU

#### Past trouble

- The past driving conditions were severe.
- Electronic control coupling intermittent failure (clutch slippage)
- Abnormality in ABS wheel speed signal
- Abnormality in torque command value from the ASC-ECU

### DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

---

#### STEP 1. Scan tool MB991958 CAN bus diagnostics

Use scan tool MB991958 to diagnose the CAN bus lines.

#### Q: Is the check result normal?

**YES:** Go to Step 4.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

---

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q:Is the DTC No. C145F set?****YES:** Go to Step 3.**NO:** This diagnosis is complete.

---

**STEP 3. Scan tool MB991958 DTC of other systems**

Check the following service data. (Refer to P.27C-87.)

- Item 07: CAN system (ABS/ASC)
- Item 16: FL wheel speed sensor
- Item 17: FR wheel speed sensor
- Item 18: RL wheel speed sensor
- Item 19: RR wheel speed sensor

**Q:Is the DTC set?****YES:** Troubleshoot the ABS system. (Refer to GROUP 35B – Troubleshooting P. 35B-9.)**NO:** Go to Step 4.

---

**STEP 4. Scan tool MB991958 actuator test**

Perform the actuator test for the following items. (Refer to P. 27C-89.)

- Item 01: AWD coupling control torque

**Q:Does the electronic control coupling transfer the torque correctly?****YES:** Go to Step 5.**NO:** Replace the electronic control coupling. (Refer to P.27C-94.) Then go to Step 6.

---

**STEP 5. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

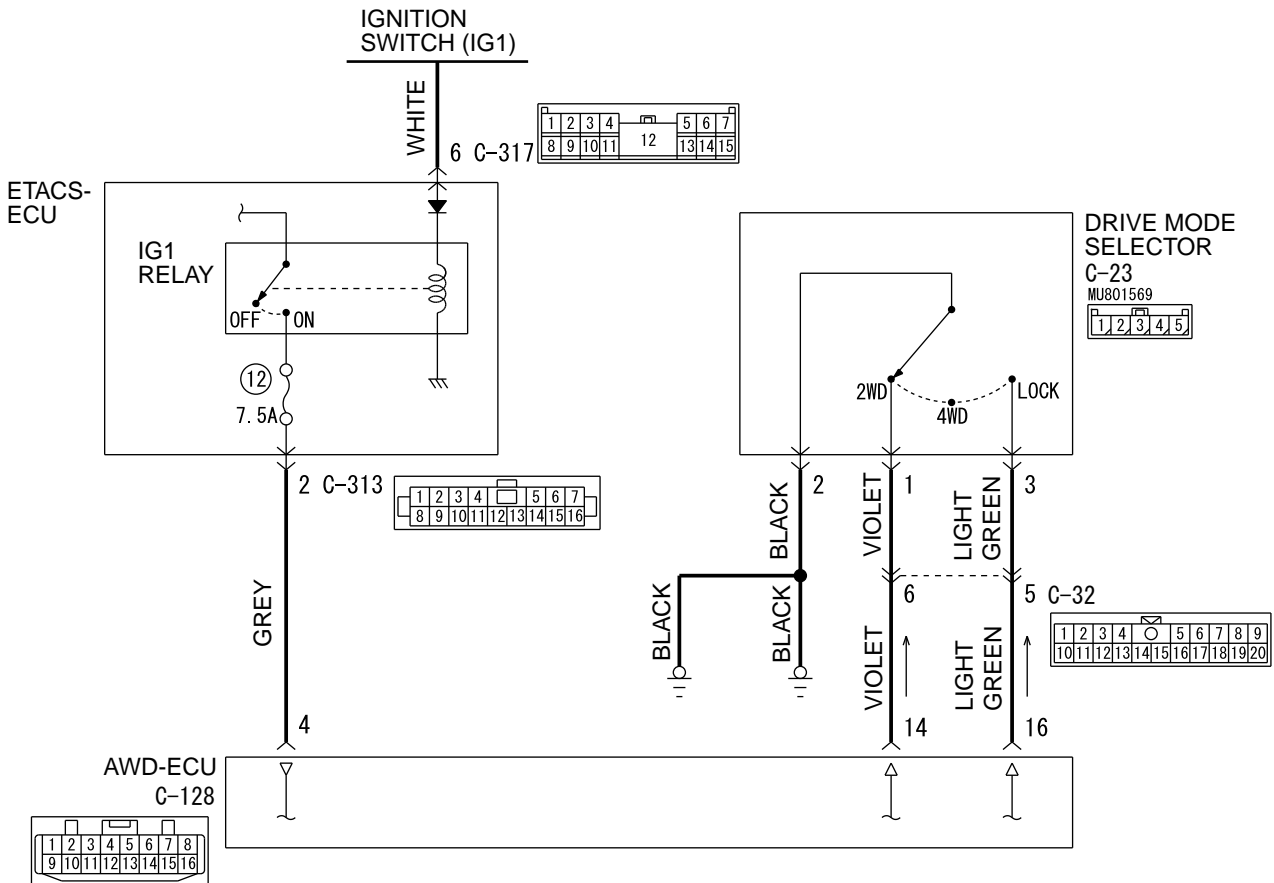
**Q:Is the DTC No. C145F set?****YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 6.**NO:** The code may be set because of some severe operational conditions such as a long-time high speed driving or long hill-climbing in AWD condition.

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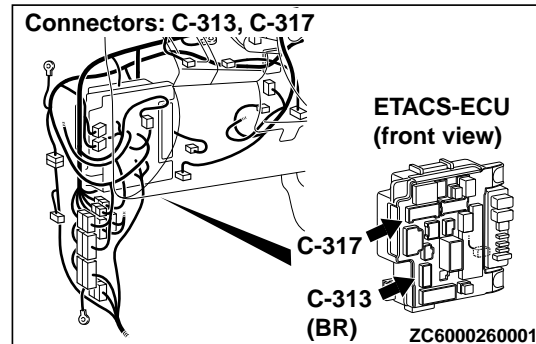
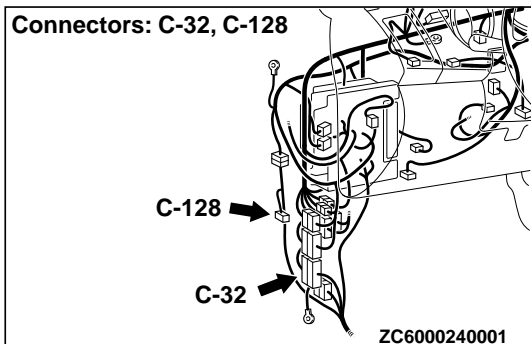
**STEP 6. Check whether the DTC is reset.****Q:Is the DTC No. C145F set?****YES:** Diagnose again from Step 1.**NO:** This diagnosis is complete.

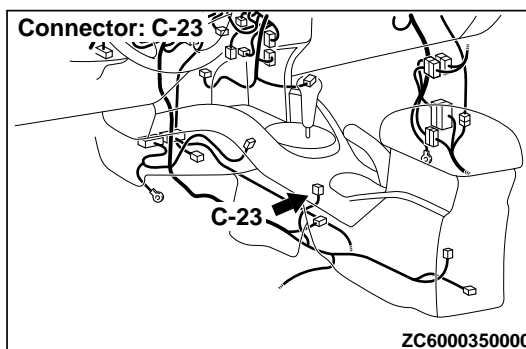
**DTC C1460: Drive mode selector circuit failure**

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D7G27M001A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

If switching the drive mode selector to FWD or LOCK do not change the drive mode at all, AWD-ECU detects the drive mode selector internal circuit failure, and switches from AWD AUTO mode in order to prevent system damage.

**DTC SET CONDITIONS**

If the following conditions are met, AWD-ECU switches the control from AWD mode to AWD AUTO mode, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C1460.

- Drive mode selector internal short
- IG1 voltage: 7 V or more

**TROUBLESHOOTING HINTS****Current trouble**

- Drive mode selector internal short
- Short to earth between AWD-ECU and the drive mode selector
- AWD-ECU malfunction

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent malfunction of drive mode selector

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 15 seconds.
- (3) Check that the meter display is correct when the drive mode selector is switched to each position (FWD, AWD, and LOCK).

(4) Check if the DTC is set.

**Q: Is the DTC No. C1460 set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

---

**STEP 3. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 10: FWD SW
- Item 11: LOCK SW

**Q: Is the check result normal?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.)

**NO:** Go to Step 4.

---

**STEP 4. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-23 Drive mode selector connector
- C-32 intermediate connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 5.

**NO:** Repair the connector (s) or terminal (s). Then go to Step 10.

---

**STEP 5. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-23 drive mode selector connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 10.

---

**STEP 6. Resistance measurement between the drive mode selector connector terminals**

Disconnect the C-23 connector, and measure the resistance value between the connector terminals on the drive mode selector side. (Refer to P.27C-94.)

**Standard value: Continuity exists (2  $\Omega$  or less).**

**Q: Is the measured resistance value within the standard value range?**

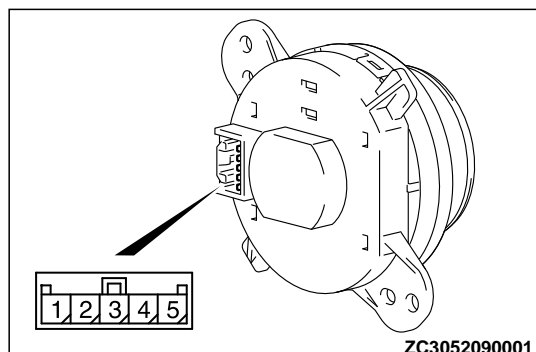
**YES:** Go to Step 7.

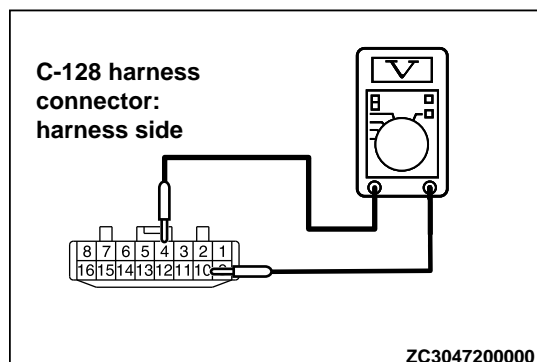
**NO:** Replace the drive mode selector. (Refer to P.27C-93.) Then go to Step 10.

---

**STEP 7. Voltage measurement at the AWD-ECU connector**

(1) Disconnect the C-128 AWD-ECU connector.





- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 8.

---

### STEP 8. Wiring harness check

- \*Wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector
- \*Wiring harness between the C-128 AWD-ECU connector and the C-317 ETACS-ECU connector

Check the wiring harness above for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 9.

**NO:** Repair the wiring harness. Then go to Step 10.

---

### STEP 9. Check whether the DTC is reset.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 15 seconds.
- (3) Check that the meter display is correct when the drive mode selector is switched to each position (FWD, AWD, and LOCK).
- (4) Check if the DTC is set.

**Q: Is the DTC No. C1460 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 10.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

---

### STEP 10. Check whether the DTC is reset.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position and hold there for 15 seconds.
- (3) Check that the meter display is correct when the drive mode selector is switched to each position (FWD, AWD, and LOCK).
- (4) Check if the DTC is set.

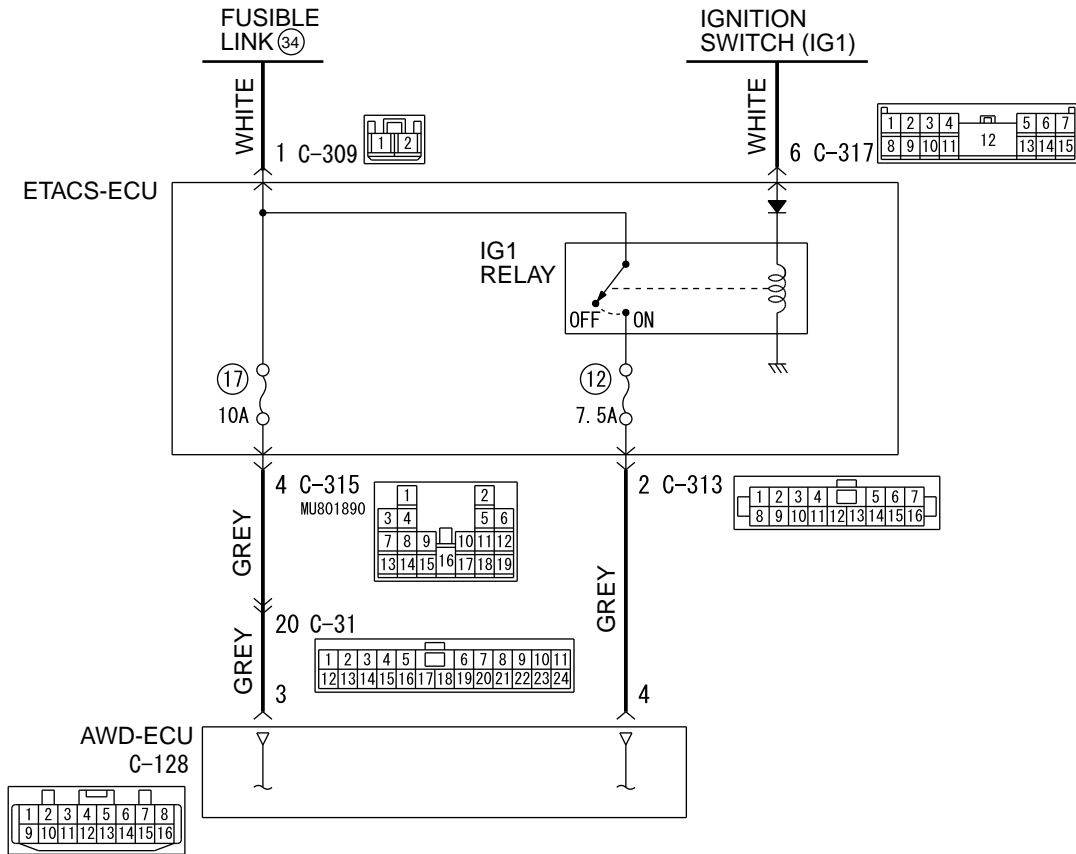
**Q: Is the DTC No. C1460 set?**

**YES:** Diagnose again from Step 1.

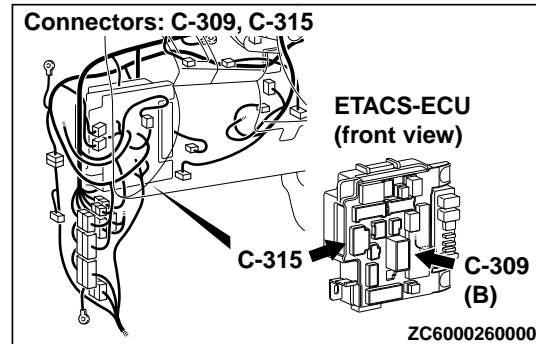
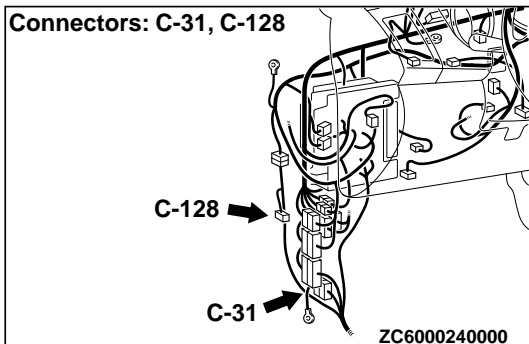
**NO:** This diagnosis is complete.

**DTC C2100: Abnormal battery voltage (Too low)**

M12704100018USA0000010000



D7G27M002A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

AWD-ECU detects a power supply voltage abnormal drop, and if any abnormality occurs, it interrupts the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C2100.

- IG1 voltage: Less than 8 V
- Voltage between the battery and ETACS-ECU: Less than 8 V
- Engine speed: more than 1500 r/min

- Damaged wiring harness and connectors
- Short to earth or open circuit between the battery and AWD-ECU

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

**TROUBLESHOOTING HINTS****Current trouble****DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Battery voltage check**

Check the battery voltage.

**Q:Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Charge or replace the battery.

**STEP 2. Voltage measurement at the ETACS-ECU connector**

- (1) Disconnect the C-309 ETACS-ECU connector.
- (2) Measure the voltage between the C-309 harness side connector terminal No. 1 and the body earth.

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

**YES:** Go to Step 11.

**NO:** Go to Step 3.

**STEP 3. Wiring harness check**

Check the wiring harness between the battery and the C-309 ETACS-ECU connector for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 4.

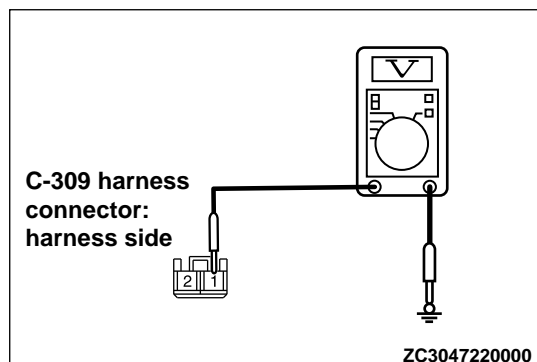
**NO:** Repair damage or other problem in the wiring harness. Then go to Step 11.

**STEP 4. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 6.





**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 5.

**STEP 5. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Start the engine, and continue to run at 1500 r/min or more.
- (4) Check if the DTC is set.

**Q: Is the DTC No. C2100 set?**

**YES:** Go to Step 6.

**NO:** This diagnosis is complete.

**STEP 6. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-309, C-315 ETACS-ECU connector
- C-31 intermediate connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 11.

**STEP 7. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-315 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 8.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 11.

**STEP 8. Voltage measurement at the AWD-ECU connector**

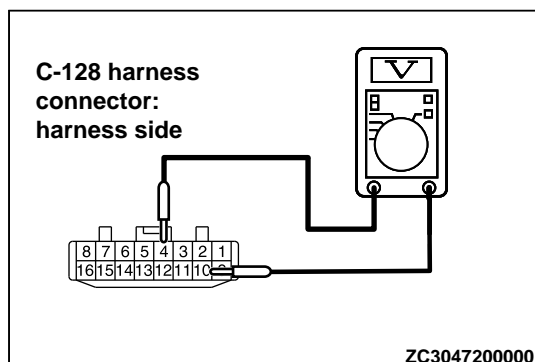
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 11.



**STEP 9. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 10.

**NO:** Repair the wiring harness. Then go to Step 11.

---

**STEP 10. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Start the engine, and continue to run at 1500 r/min or more.
- (4) Check if the DTC is set.

**Q: Is the DTC No. C2100 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 11.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

---

**STEP 11. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Start the engine, and continue to run at 1500 r/min or more.
- (4) Check if the DTC is set.

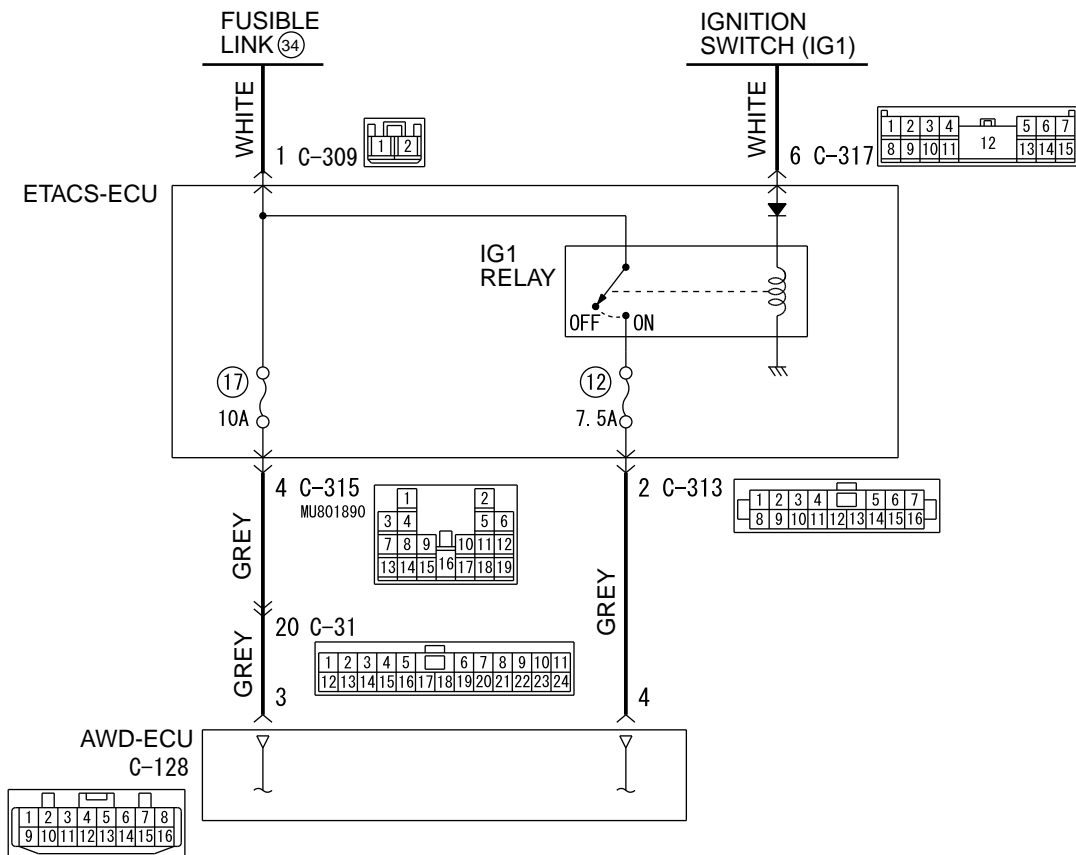
**Q: Is the DTC No. C2100 set?**

**YES:** Diagnose again from Step 1.

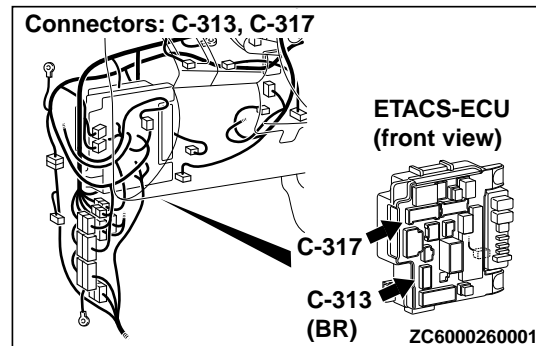
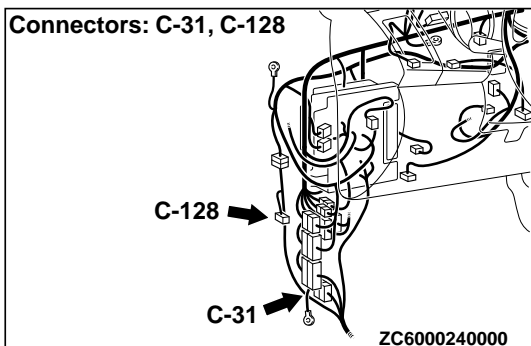
**NO:** This diagnosis is complete.

**DTC C2101: Abnormal battery voltage (Too high)**

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D7G27M002A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

AWD-ECU detects a power supply voltage abnormal increase, and if any abnormality occurs, it interrupts the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C2101.

- IG1 voltage: More than 17 V
- Voltage between the battery and ETACS-ECU: More than 17 V

**TROUBLESHOOTING HINTS****Current trouble**

- Damaged wiring harness and connectors

- High-voltage short-circuit between the battery and AWD-ECU
- Malfunction of alternator or other power supply systems

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Malfunction of alternator or other power supply systems

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Battery voltage check**

Check the battery voltage.

**Q:Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Charge or replace the battery.

**STEP 2. Voltage measurement at the ETACS-ECU connector**

- (1) Disconnect the C-309 ETACS-ECU connector.
- (2) Measure the voltage between the C-309 harness side connector terminal No. 1 and the body earth.

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

**YES:** Go to Step 11.

**NO:** Go to Step 3.

**STEP 3. Wiring harness check**

Check the wiring harness between the battery and the C-309 ETACS-ECU connector for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 4.

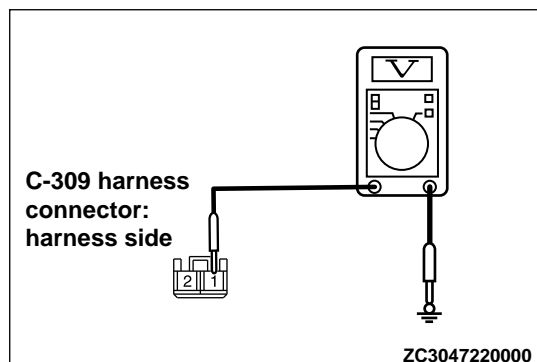
**NO:** Repair damage or other problem in the wiring harness. Then go to Step 11.

**STEP 4. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 6.



**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 5.

**STEP 5. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the alternator is correctly operated. (Refer to GROUP 16 - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C2101 set?**

**YES:** Go to Step 6.

**NO:** This diagnosis is complete.

**STEP 6. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-309, C-315 ETACS-ECU connector
- C-31 intermediate connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 11.

**STEP 7. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-315 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 8.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 11.

**STEP 8. Voltage measurement at the AWD-ECU connector**

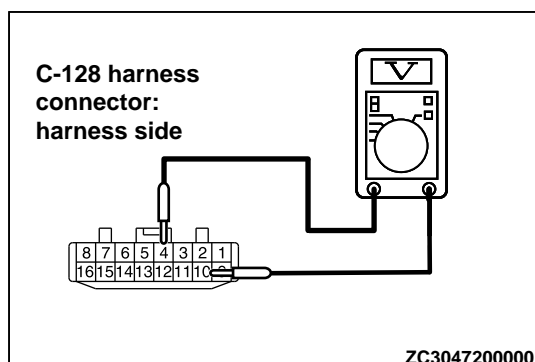
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 11.



**STEP 9. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?****YES:** Go to Step 10.**NO:** Repair the wiring harness. Then go to Step 11.

---

**STEP 10. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the alternator is correctly operated. (Refer to GROUP 16 - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C2101 set?****YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 11.**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

---

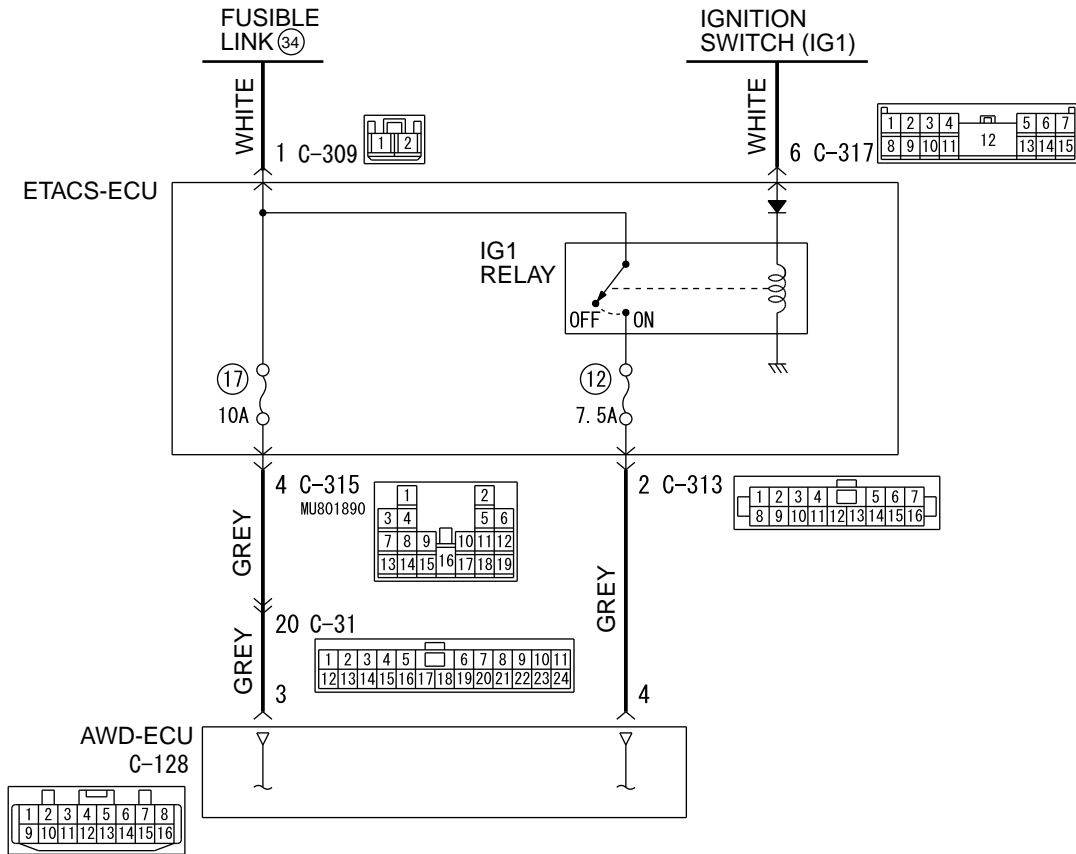
**STEP 11. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the alternator is correctly operated. (Refer to GROUP 16 - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

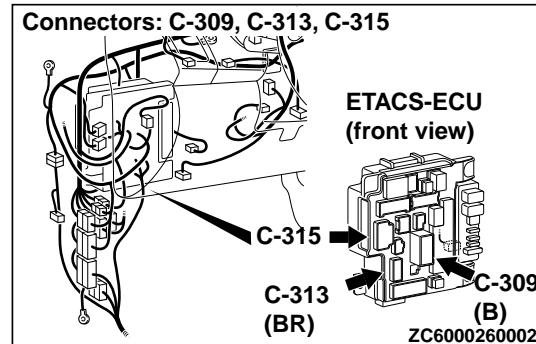
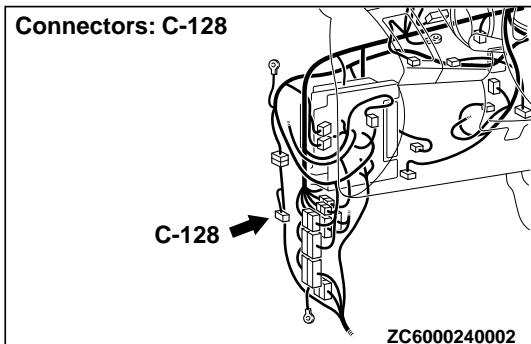
**Q: Is the DTC No. C2101 set?****YES:** Diagnose again from Step 1.**NO:** This diagnosis is complete.

**DTC C211C: Abnormal IG1 power supply low voltage**

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D7G27M002A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

AWD-ECU detects an IG1 power supply voltage abnormal drop, and if any abnormality occurs, it interrupts the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C211C.

- IG1 voltage: Less than 8 V
- Battery voltage: More than 9 V

**PROBABLE CAUSES****Current trouble**

- Malfunction of IG1 relay in ETACS-ECU

- Damaged wiring harness and connectors
- Short to ground or open circuit between the battery and AWD-ECU

**TROUBLESHOOTING HINTS**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent malfunction of ETACS-ECU (malfunction of IG1 relay)

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q:Is the DTC No. C211C set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

**STEP 3. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-309, C-313, C-317 ETACS-ECU connector

**Q:Are the connectors and terminals in good condition?**

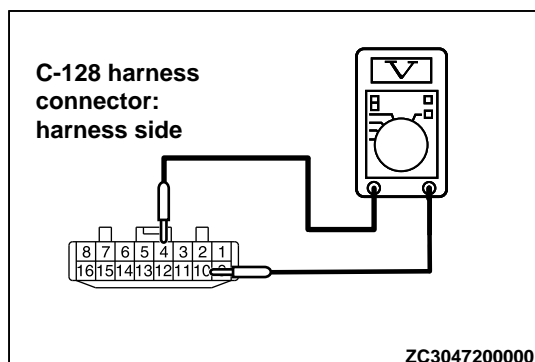
**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.





**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness.  
Then go to Step 8.

---

**STEP 5. Voltage measurement at the AWD-ECU connector**

(1) Disconnect the C-128 AWD-ECU connector.

(2) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 8.

**NO:** Go to Step 6.

---

**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 4) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.

---

**STEP 7. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

**Q: Is the DTC No. C211C set?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 8.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

---

**STEP 8. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

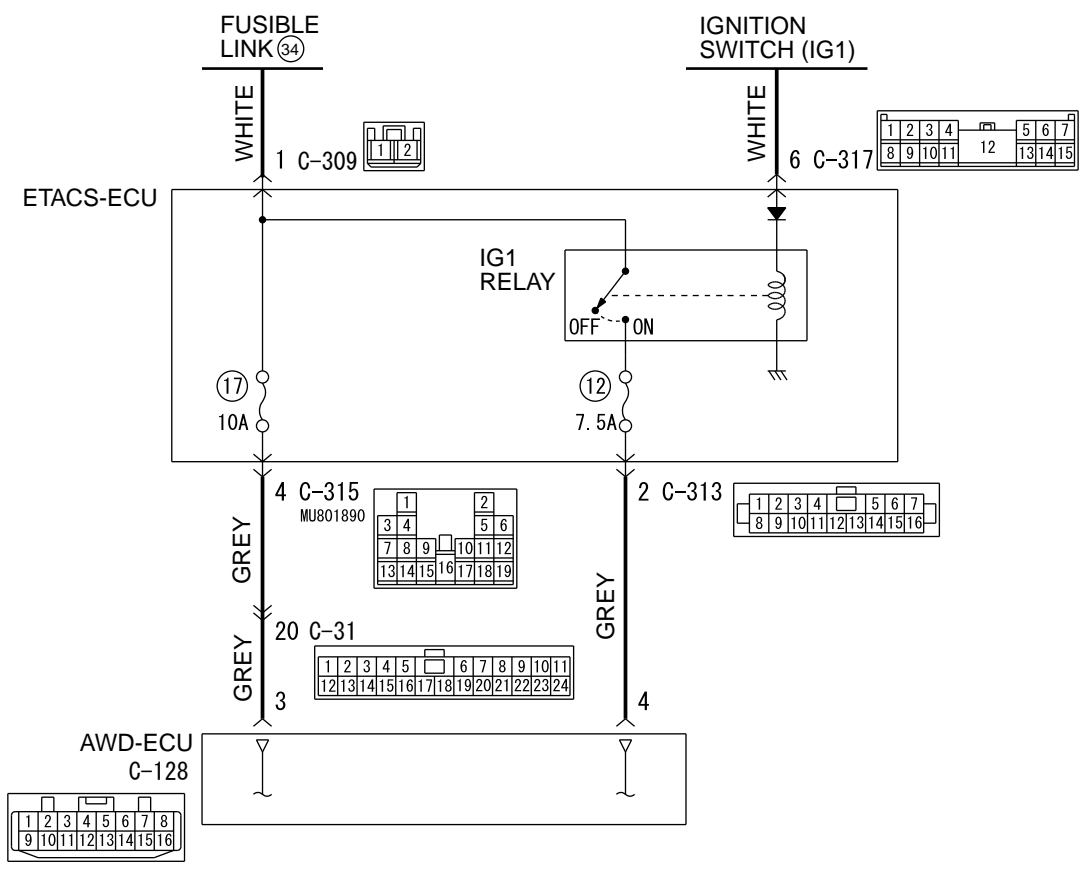
**Q: Is the DTC No. C211C set?**

**YES:** Diagnose again from Step 1.

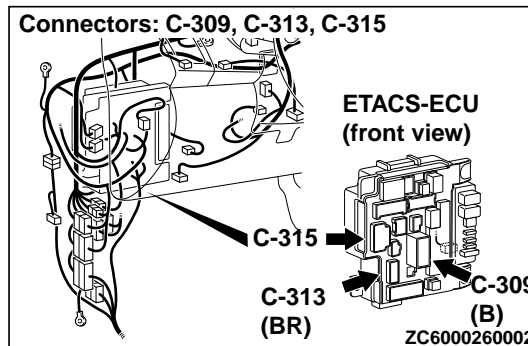
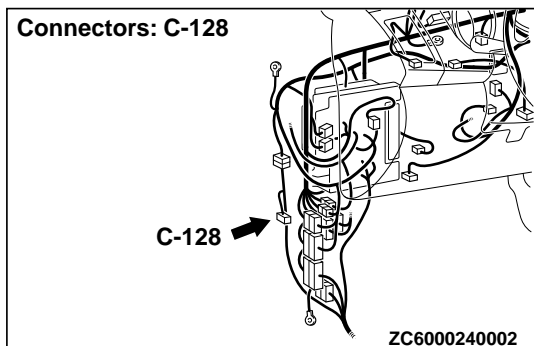
**NO:** This diagnosis is complete.

DTC C211D: Abnormal IG1 power supply high voltage

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D7G27M002A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

### OPERATION

AWD-ECU detects an IG1 power supply voltage abnormal increase, and if any abnormality occurs, it interrupts the system.

### DTC SET CONDITIONS

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C211D.

- IG1 voltage: More than 17 V
- Battery voltage: Less than 16 V

### TROUBLESHOOTING HINTS

Current trouble

- Malfunction of IG1 relay in ETACS-ECU
- Damaged wiring harness and connectors
- Short or open circuit between the battery and AWD-ECU
- Malfunction of alternator or other power supply systems

### Past trouble

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Intermittent malfunction of ETACS-ECU (malfunction of IG1 relay)
- Malfunction of alternator or other power supply systems

### DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

---

#### STEP 1. Scan tool MB991958 CAN bus diagnostics

Use scan tool MB991958 to diagnose the CAN bus lines.

#### Q:Is the check result normal?

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) On completion, go to Step 2.

---

#### STEP 2. Check whether the DTC is reset after repairing the CAN bus line.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

#### Q:Is the DTC No. C211D set?

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

---

#### STEP 3. Check the following connector:

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-309, C-313, C-317 ETACS-ECU connector

#### Q:Are the connectors and terminals in good condition?

**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 8.

**STEP 5. Voltage measurement at the AWD-ECU connector**

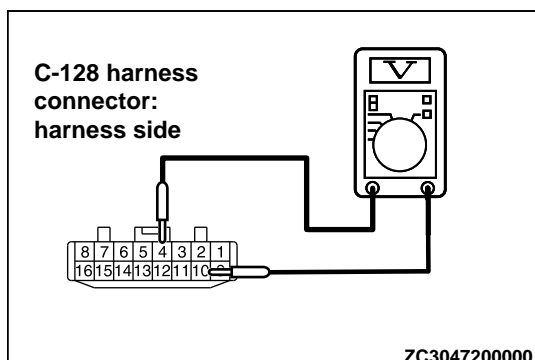
(1) Disconnect the C-128 AWD-ECU connector.

(2) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and No. 10.

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

**YES:** Go to Step 8.

**NO:** Go to Step 6.

**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 4) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.

**STEP 7. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

**Q: Is the DTC No. C211D set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 8.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

**STEP 8. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

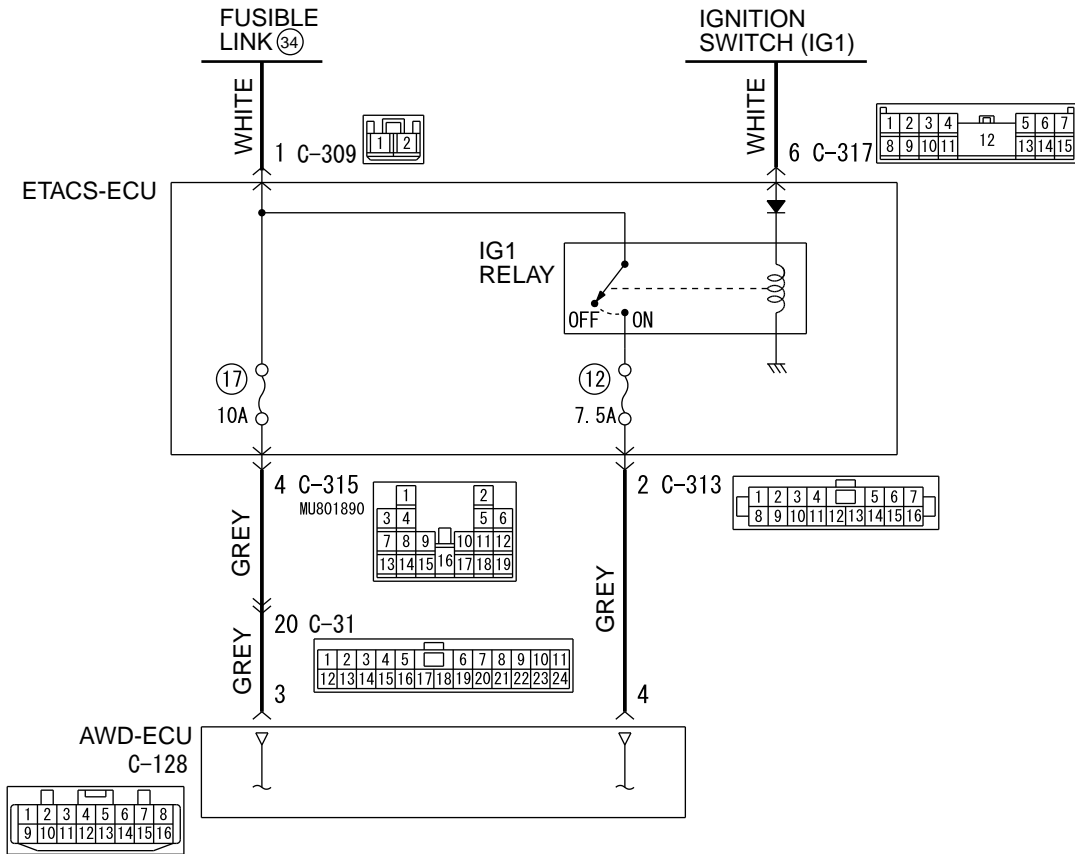
**Q: Is the DTC No. C211D set?**

**YES:** Diagnose again from Step 1.

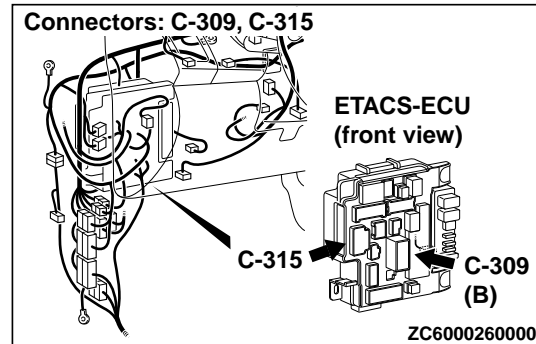
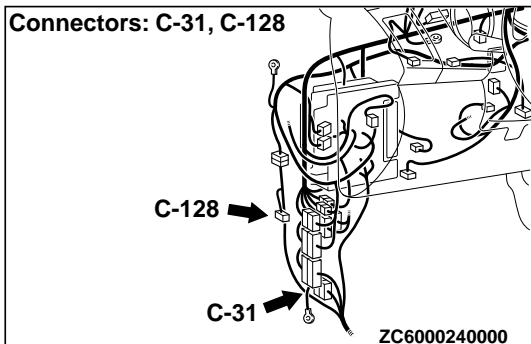
**NO:** This diagnosis is complete.

**DTC C211E: Abnormal power supply voltage (Too low)**

M12704100021USA0000010000



D7G27M002A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

- AWD-ECU detects a power supply voltage abnormal drop, and if any abnormality occurs, it interrupts the system.

•If any abnormality occurs in the AWD-ECU, the system is deactivated.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C211E.

- IG1 voltage: 7.5 V or more
- Abnormal voltage in the ECU

- Damaged wiring harness and connectors
- Short to ground or open circuit between the battery and AWD-ECU
- AWD-ECU malfunction

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

**TROUBLESHOOTING HINTS****Current trouble****DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q:Is the DTC No. C211E set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

**STEP 3. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-309, C-315 ETACS-ECU connector
- C-31 intermediate connector

**Q:Are the connectors and terminals in good condition?**

**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-315 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness.  
Then go to Step 8.

**STEP 5. Voltage measurement at the AWD-ECU connector**

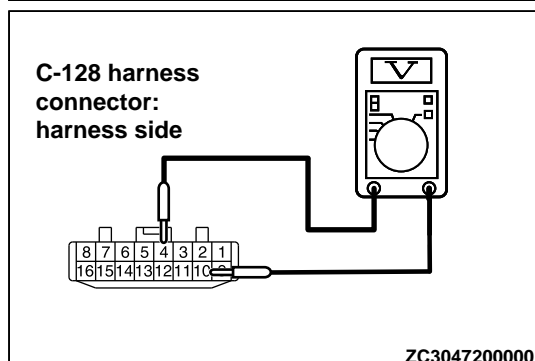
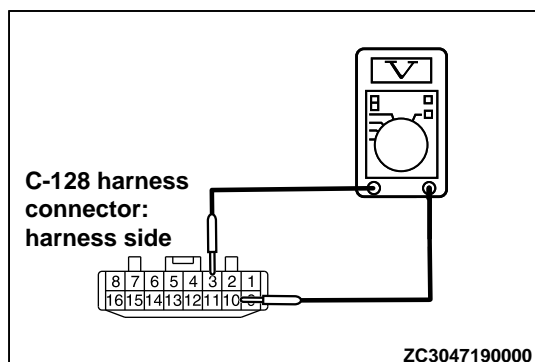
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3/4 and No. 10.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 8.

**NO:** Go to Step 6.



**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.

**STEP 7. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q: Is the DTC No. C211E set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 8.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

**STEP 8. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

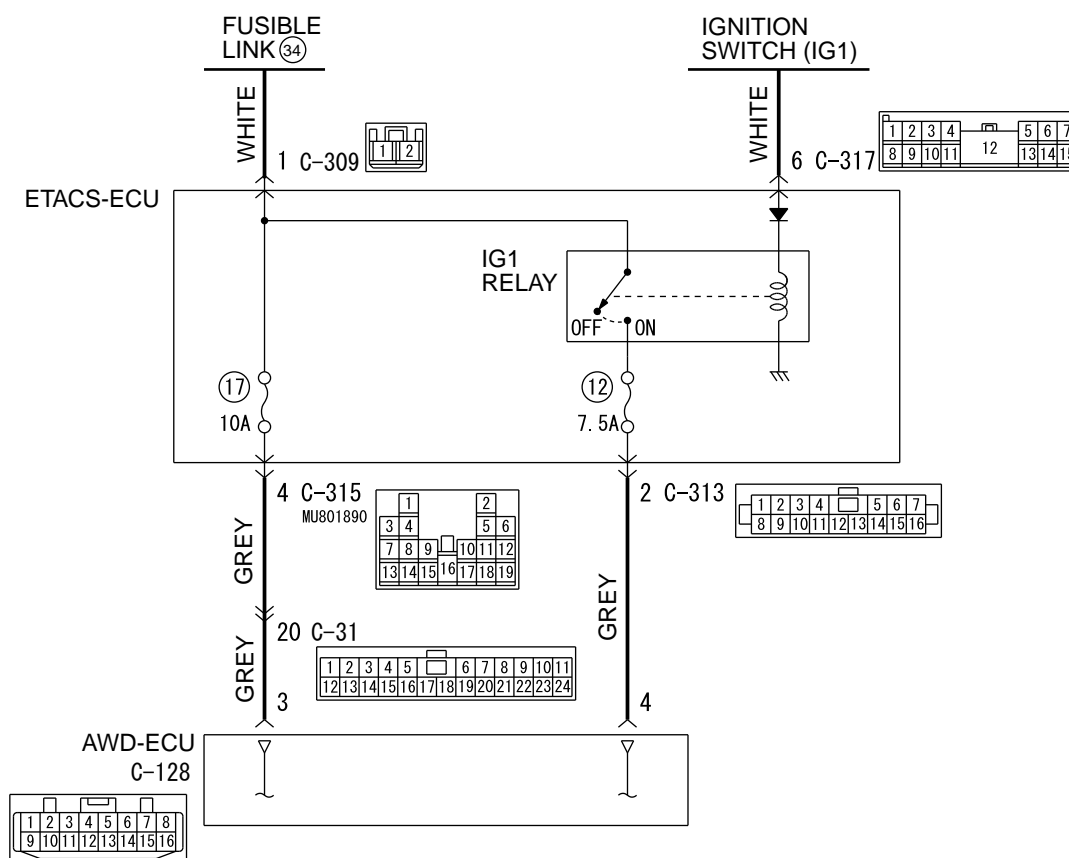
**Q: Is the DTC No. C211E set?**

**YES:** Diagnose again from Step 1.

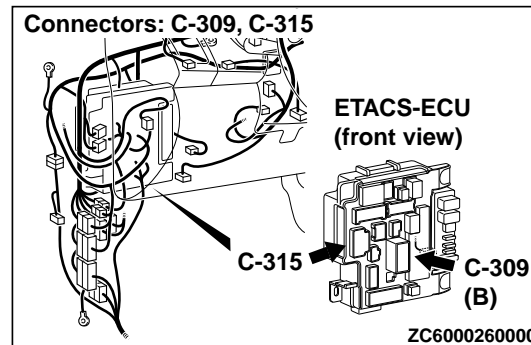
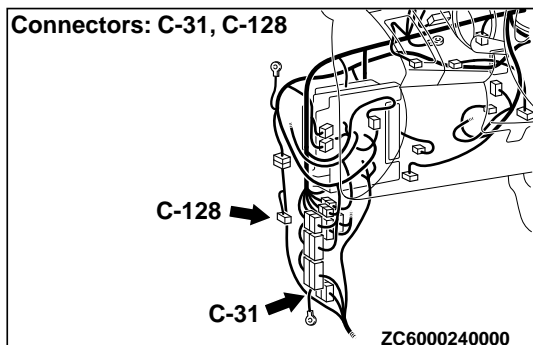
**NO:** This diagnosis is complete.

**DTC C211F: Abnormal power supply voltage (Too high)**

M12704100022USA0000010000







**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

AWD-ECU detects a power supply voltage abnormality, and if any abnormality occurs, it interrupts the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C211F.

- Power supply voltage: 17 V or more
- Battery power supply voltage (CAN line): Less than 16 V

**TROUBLESHOOTING HINTS**

**Current trouble**

- Damaged wiring harness and connectors
- Short to ground or open circuit between the battery and AWD-ECU
- Malfunction of alternator or other power supply systems

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- Malfunction of alternator or other power supply systems

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

- (3) Check if the alternator is correctly operated. (Refer to GROUP 16a - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

**Q:Is the DTC No. C211F set?****YES:** Go to Step 3.**NO:** This diagnosis is complete.**STEP 3. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

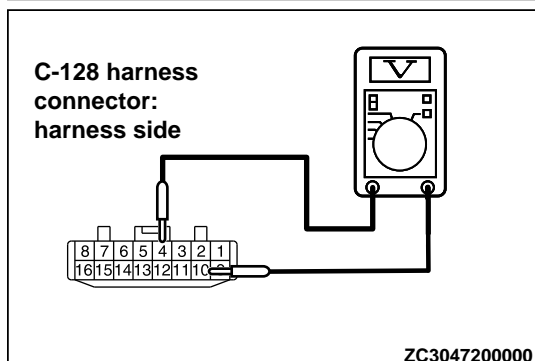
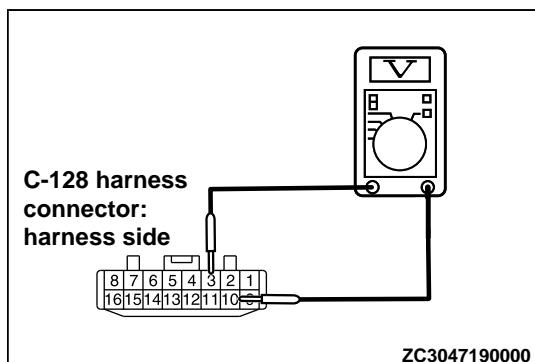
- C-128 AWD-ECU connector
- C-309, C-315 ETACS-ECU connector
- C-31 intermediate connector

**Q:Are the connectors and terminals in good condition?****YES:** Go to Step 4.**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-315 ETACS-ECU connector for damage or other problem.

**Q:Is the wiring harness in good condition?****YES:** Go to Step 5.**NO:** Repair damage or other problem in the wiring harness. Then go to Step 8.**STEP 5. Voltage measurement at the AWD-ECU connector**

- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3/4 and No. 10.

**OK: Battery voltage****Q:Is the check result normal?****YES:** Go to Step 8.**NO:** Go to Step 6.

---

**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.

---

**STEP 7. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the alternator is correctly operated. (Refer to GROUP 16a - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C211F set?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 8.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

---

**STEP 8. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the alternator is correctly operated. (Refer to GROUP 16a - On-vehicle Service, Generator Output Line Voltage Drop Test P.16a-6.)
- (4) Check if the DTC is set.

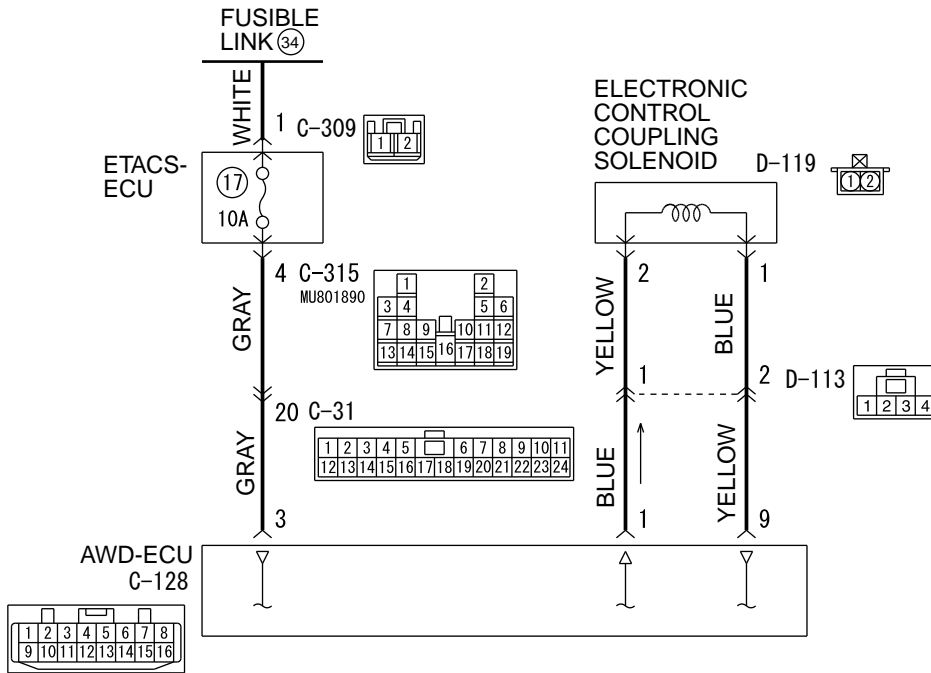
**Q: Is the DTC No. C211F set?**

**YES:** Diagnose again from Step 1.

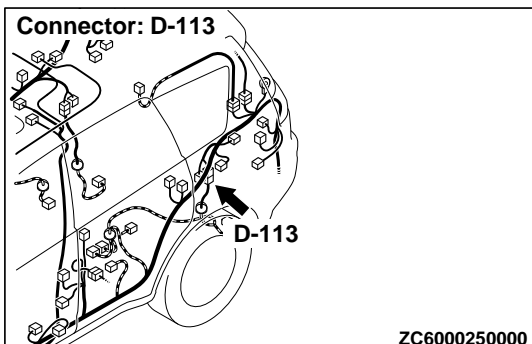
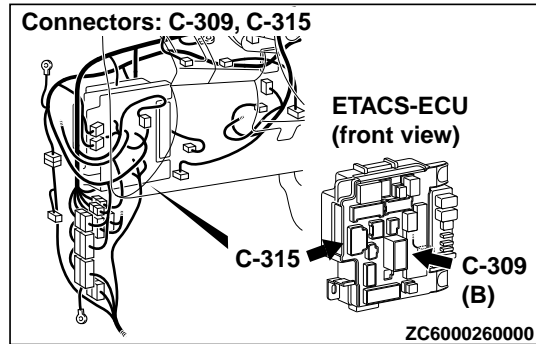
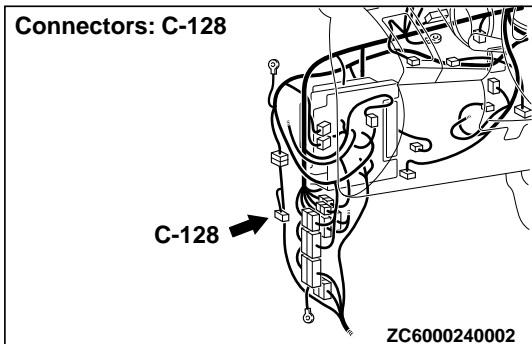
**NO:** This diagnosis is complete.

DTC C2208: AWD-ECU internal error

M12704100023USA0000010000



D7G27M000A00



**CAUTION**

If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

**OPERATION**

AWD-ECU monitors the coupling solenoid wiring harness abnormality and AWD-ECU internal error, and if any abnormality occurs, it deactivates the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is activated, AWD-ECU switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. C2208.

- Coupling solenoid voltage during primary check: 9V or more

**TROUBLESHOOTING HINTS**

**Current trouble**

- AWD-ECU internal error
- Damaged wiring harness and connectors
  - Short to ground between the battery and AWD-ECU
  - Short to power supply between AWD-ECU and the electronic control coupling solenoid

**Past trouble**

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

- AWD-ECU internal error

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) On completion, go to Step 2.

**STEP 2. Check whether the DTC is reset after repairing the CAN bus line.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position at least 3 times.
- (3) Use scan tool MB991958 to forcibly activate the electronic control coupling to 10 N·m (7 ft·lb), 360 N·m (265 ft·lb), and 730 N·m (538 ft·lb). (Refer to Actuator Test Table P. 27C-89.)
- (4) Check if the DTC is set.

**Q: Is the DTC No. C2208 set?**

**YES:** Go to Step 3.

**NO:** This diagnosis is complete.

**STEP 3. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 04: Coupling current command value

•Item 05: Coupling current monitor value

**Q:Is the check result normal?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.)

**NO:** Go to Step 4.

**STEP 4. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- D-113 electronic control coupling solenoid connector

**Q:Are the connectors and terminals in good condition?**

**YES:** Go to Step 5.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 10.

**STEP 5. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the D-113 electronic control coupling solenoid connector for damage or other problem.

**Q:Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 10.

**STEP 6. Resistance measurement between electronic control coupling solenoid connector terminals**

Disconnect the D-119 connector, and measure the resistance value between the connector terminals on the electronic control coupling side.

**Standard value: 2.2 - 4.0 ohm**

**Q:Is the measured resistance value within the standard value range?**

**YES:** Go to Step 7.

**NO:** Replace the electronic control coupling. (Refer to P.27C-94.) Then go to Step 10.

**STEP 7. Voltage measurement at the AWD-ECU connector**

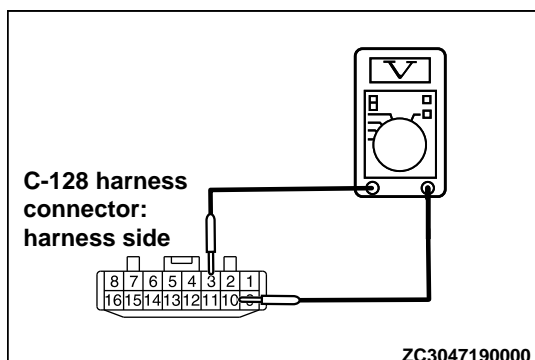
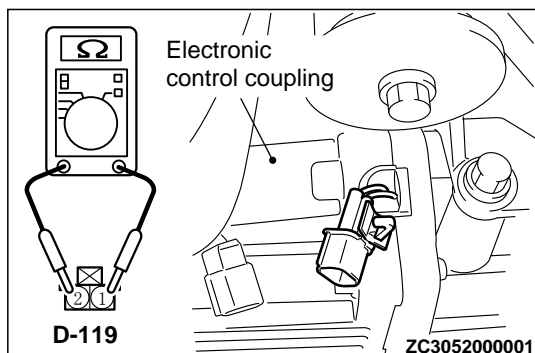
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the voltage between the C-128 wiring harness side connector terminals No. 3/4 and No. 10.

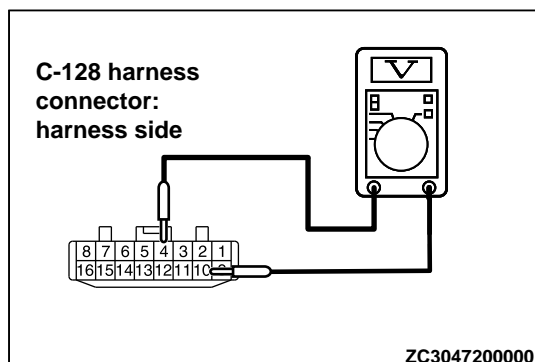
**OK: Battery voltage**

**Q:Is the check result normal?**

**YES:** Go to Step 9.

**NO:** Go to Step 8.





---

**STEP 8. Wiring harness check**

*NOTE: Prior to the wiring harness inspection, check the C-315 ETACS-ECU connector, and repair if necessary.*

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 3) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 9.

**NO:** Repair the wiring harness. Then go to Step 10.

---

**STEP 9. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position at least 3 times.
- (3) Check if the DTC is set.

**Q: Is the DTC No. C145D set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 10.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15.)

---

**STEP 10. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position at least 3 times.
- (3) Check if the DTC is set.

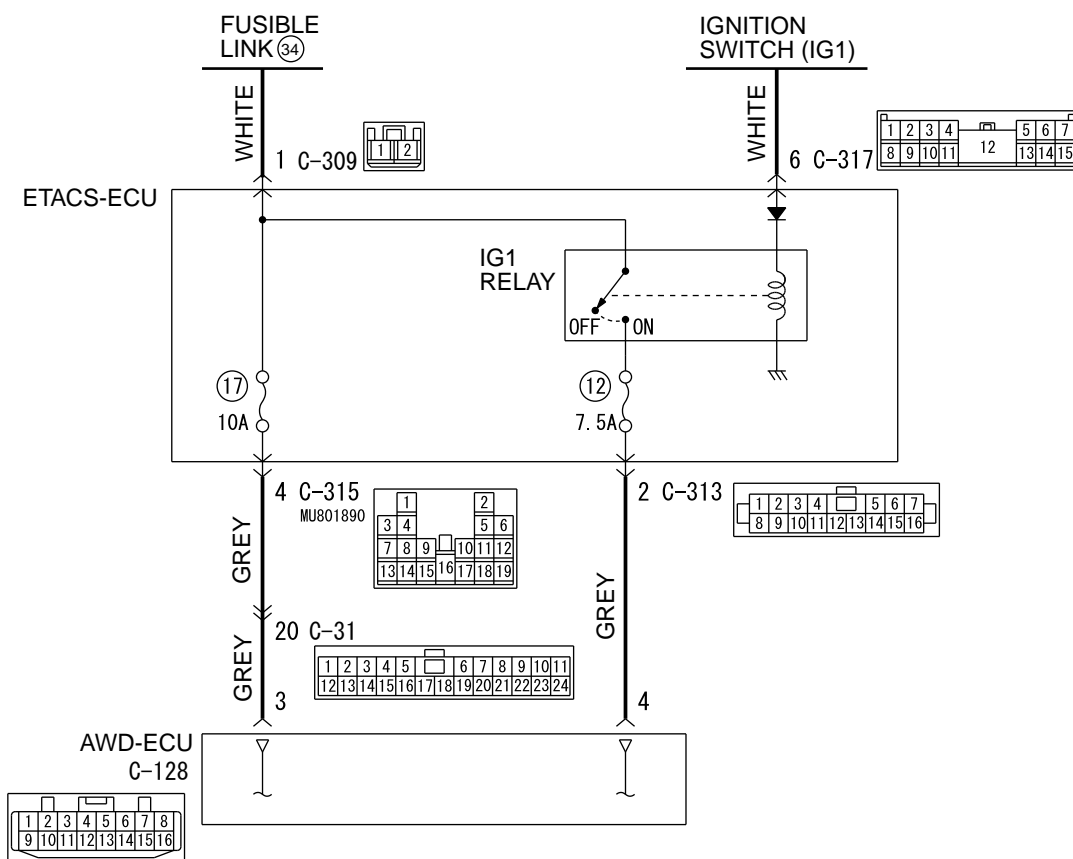
**Q: Is the DTC No. C145D set?**

**YES:** Diagnose again from Step 1.

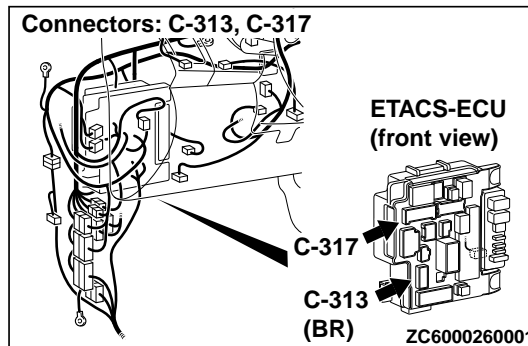
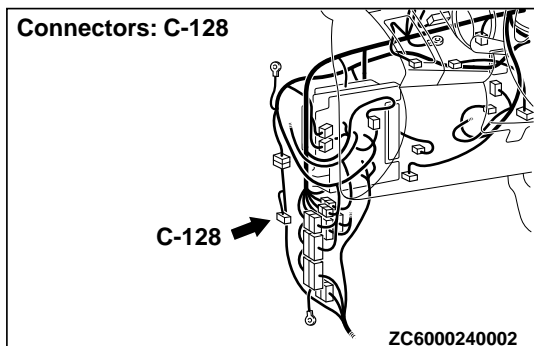
**NO:** This diagnosis is complete.

DTC U0001: Malfunction of bus-off

M12704100024USA0000010000



D7G27M002A00



**CAUTION**

•If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

•Before replacing the ECU, ensure that the communication circuit is normal.



---

## OPERATION

AWD-ECU monitors the CAN C-bus off interruption, and if any abnormality occurs, it interrupts the system.

## DTC SET CONDITIONS

If the following conditions are met when the system is in operation (always), AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U0001.

- IG1 voltage: 10 V or more
- When CAN C-bus off interruption is detected

## TROUBLESHOOTING HINTS

### Current trouble

- Wiring harness or connector failure of CAN bus line
- AWD-ECU malfunction

### Past trouble

- Intermittent wiring harness or connector failure

*NOTE: For diagnosis procedures, refer to "How to treat past trouble". (Refer to GROUP 00, How to Treat Past Trouble P. 00-17.)*

## DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

---

### STEP 1. Scan tool MB991958 CAN bus diagnostics

Use scan tool MB991958 to diagnose the CAN bus lines.

#### Q:Is the check result normal?

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P. 54D-17.) Then go to Step 2.

---

### STEP 2. Check the following connector:

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

#### Q:Are the connectors and terminals in good condition?

**YES:** Go to Step 3.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 5.

---

### STEP 3. Wiring harness check

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

#### Q:Is the wiring harness in good condition?

**YES:** Go to Step 4.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 5.

---

### STEP 4. Check whether the DTC is reset.

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q: Is the DTC No. U0001 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 5.

**NO:** The trouble can be an intermittent malfunction such as loose connector fit, wiring harness open circuit. (Refer to GROUP - How to Cope with Intermittent Malfunction P. 00-15.)

**STEP 5. Check whether the DTC is reset.**

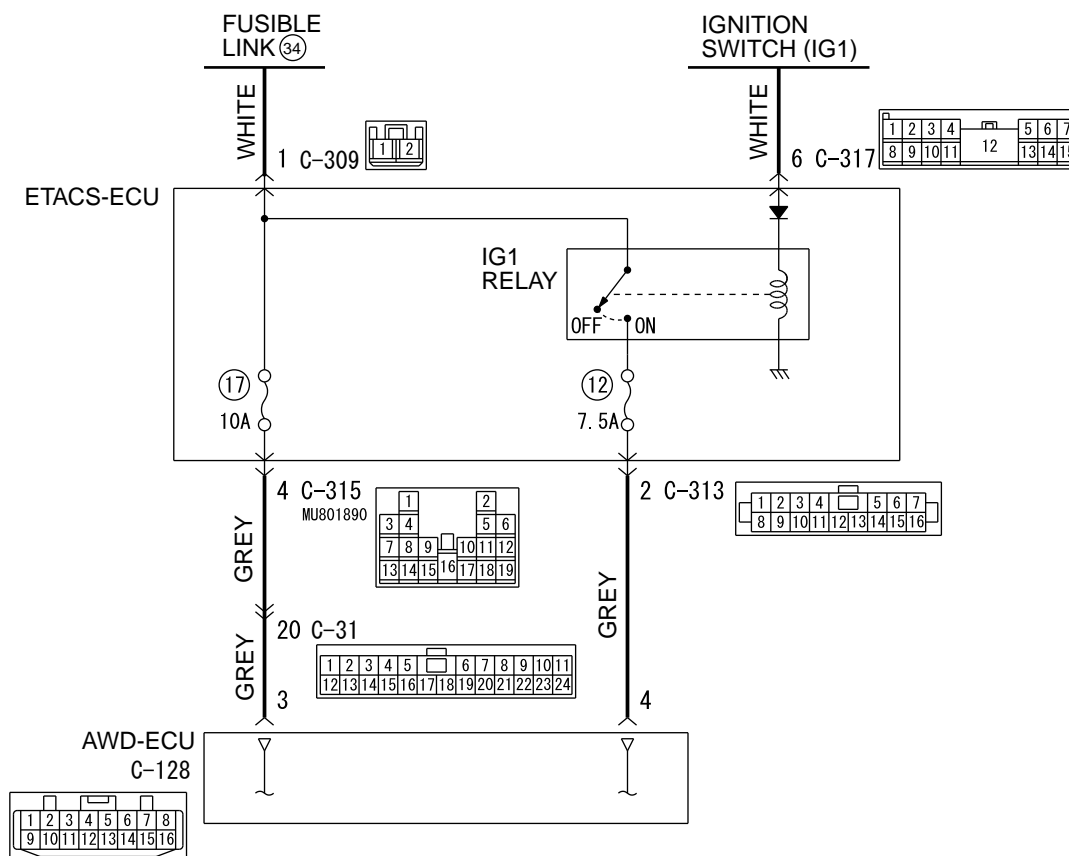
**Q: Is the DTC No. U0001 set?**

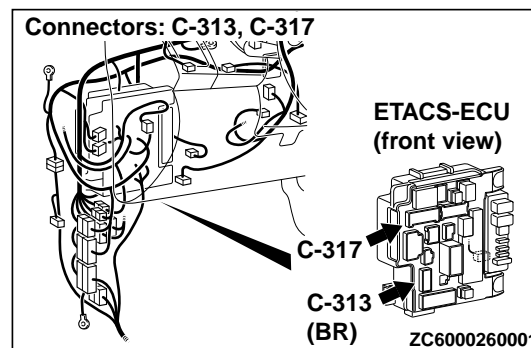
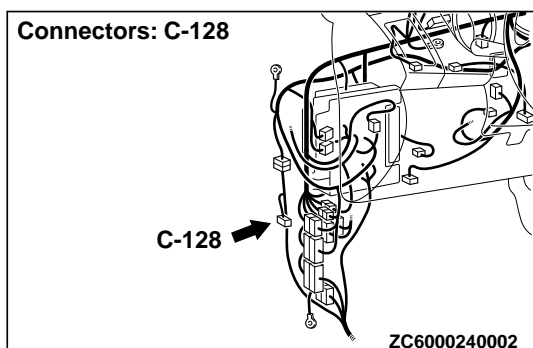
**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

**DTC U0100: Engine CAN time-out**

M12704100025USA0000010000





**CAUTION**

- If more than three minutes elapse after the ignition switch is turned ON without starting engine, AWD-ECU may set DTC U0100 as past trouble.
- If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the communication circuit is normal.

**OPERATION**

AWD-ECU temporarily limits the AWD functions if it has not received the signal from the engine-ECU.

**DTC SET CONDITIONS**

If the following conditions are met when the system is in operation (always), AWD-ECU gradually switches the control from AWD to AWD AUTO, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U0001.

- IG1 power supply voltage: 10 V or more
- Chassis No. signal, throttle angle signal, or engine speed signal cannot be received.

**TROUBLESHOOTING HINTS**

Current trouble

- Wiring harness or connector failure in the CAN bus lines between the engine ECU and AWD-ECU
- Engine ECU malfunction
- AWD-ECU malfunction

**Past trouble**

- Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics. Diagnose mainly wiring harness or connector failure in the CAN bus lines between the engine ECU and AWD-ECU, and malfunction in the power supply system for the engine ECU.

*NOTE: For a past trouble, you cannot find it by the scan tool MB991958 CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, check the CAN bus lines in the same manner as How to cope with intermittent malfunction (refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15). You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs. (Refer to GROUP 54D - CAN Bus Line Diagnostic Flow P.54D-10.)*

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

---

**STEP 2. Scan tool MB991958 DTC of other systems**

Check that the bus-off error DTC is set in the engine control system.

**Q:Is the DTC set?**

**YES:** Troubleshoot the engine control system. (Refer to GROUP 13Ab - Diagnostic Trouble Code Chart P.13Ab-44.)

**NO:** Go to Step 3.

---

**STEP 3. Scan tool MB991958 DTC of other systems**

Check if a DTC, which relates to the CAN communication-linked systems below, is set.

•Meter

U0100: Engine CAN time-out DTC

•ETACS

U0100: Engine CAN time-out DTC

•A/C

U0100: Engine CAN time-out DTC

**Q:Is the DTC set?**

**YES:** Go to Step 4.

**NO:** Go to Step 7.

---

**STEP 4. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

**Q:Is the DTC No. U0100 set?**

**YES:** Replace the engine control module. (Refer to GROUP 13Aa - Engine Control Module P.13Aa-37.) Then go to Step 8.

**NO:** A poor connection, open circuit or other intermittent malfunction in the CAN bus lines between the engine ECU and the AWD-ECU is suspected. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.) Then go to Step 5

---

**STEP 5. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

•C-128 AWD-ECU connector

•C-313, C-317 ETACS-ECU connector

**Q:Are the connectors and terminals in good condition?**

**YES:** Go to Step 6.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

---

**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair damage or other problem in the wiring harness.  
Then go to Step 8.

---

**STEP 7. Check whether the DTC is reset.**

**Q: Is the DTC No. U0100 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 8.

**NO:** A poor connection, open circuit or other intermittent malfunction in the CAN bus lines between the engine ECU and AWD-ECU is suspected. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15. )

---

**STEP 8. Check whether the DTC is reset.**

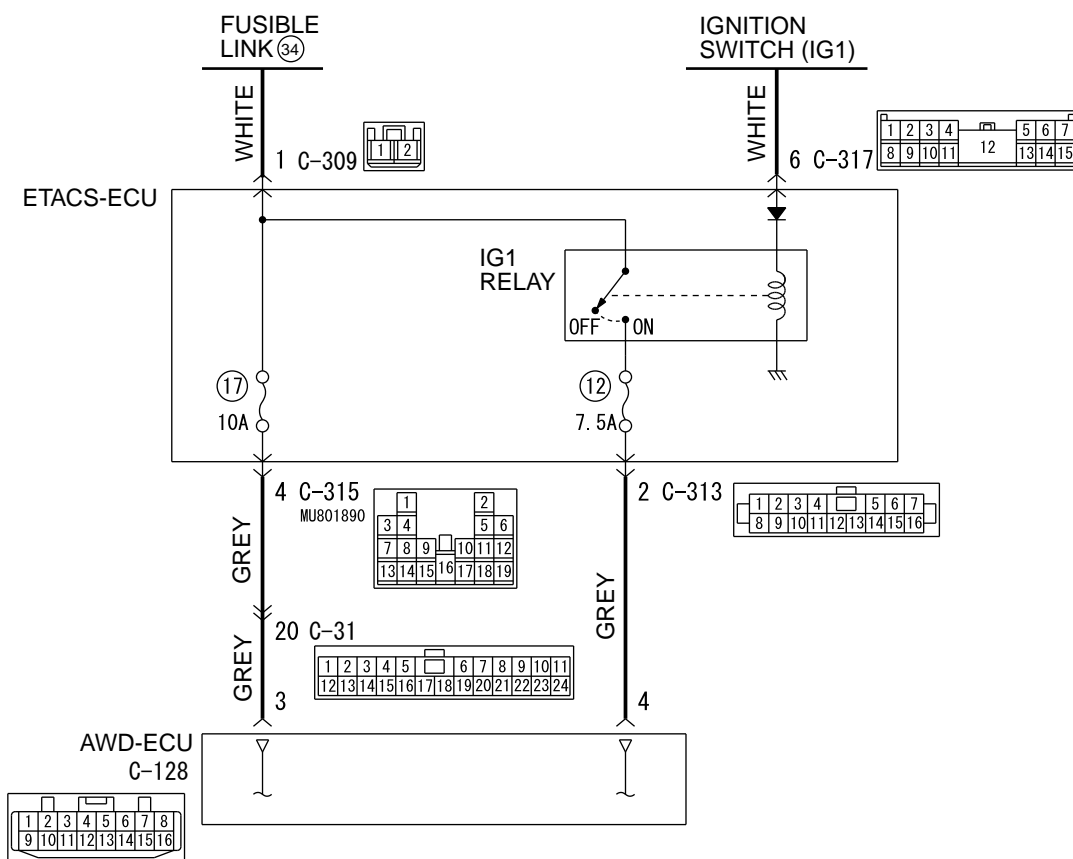
**Q: Is the DTC No. U0100 set?**

**YES:** Diagnose again from Step 1.

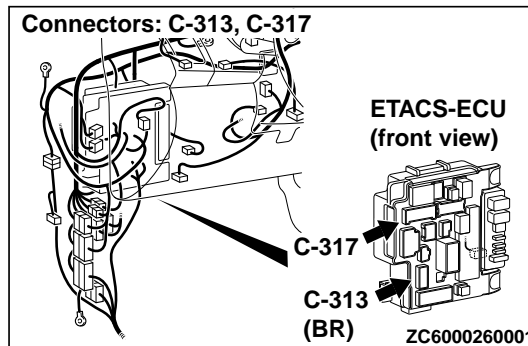
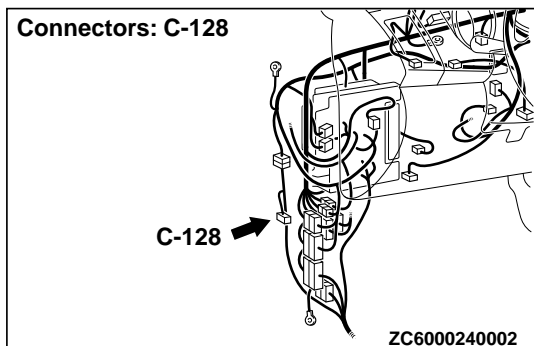
**NO:** This diagnosis is complete.

DTC U0121: ABS CAN time-out

M12704100050USA0000010000



D7G27M002A00



**CAUTION**

•If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

•Before replacing the ECU, ensure that the communication circuit is normal.

---

## OPERATION

AWD-ECU receives the data (such as ABS sensor signal, ABS operation signal) via the CAN bus lines. If it cannot receive such data, it interrupts the system.

## DTC SET CONDITIONS

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U0121.

- IG1 voltage: 10 V or more
- ABS signal (such as wheel speed signal) cannot be received.

## TROUBLESHOOTING HINTS

### Current trouble

- Wiring harness or connector failure between ASC-ECU and the stop lamp switch
- Malfunction of the ABS sensor
- Malfunction of the stop lamp switch
- ASC-ECU malfunction
- AWD-ECU malfunction

### Past trouble

- Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics.

## DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

---

### STEP 1. Scan tool MB991958 CAN bus diagnostics

Use scan tool MB991958 to diagnose the CAN bus lines.

#### Q:Is the check result normal?

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

---

### STEP 2. Scan tool MB991958 data list

Check the following service data. (Refer to P.27C-87.)

- Item 07: CAN system (ABS/ASC)

#### Q:Is the check result normal?

**YES:** Go to Step 3.

**NO:** Troubleshoot the ABS system. (Refer to GROUP 35B - Troubleshooting P.35B-9.)

---

### STEP 3. Check the following connector:

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

#### Q:Are the connectors and terminals in good condition?

**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 6.

---

### STEP 4. Wiring harness check

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

#### Q:Is the wiring harness in good condition?

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 6.

---

**STEP 5. Check whether the DTC is reset.**

(1) Erase the DTC.

(2) Turn the ignition switch from the LOCK (OFF) position to the ON position.

(3) Check if the DTC is set.

**Q: Is the DTC No. U0121 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 6.

**NO:** This diagnosis is complete.

---

**STEP 6. Check whether the DTC is reset.**

**Q: Is the DTC No. U0121 set?**

**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

---

**DTC U0141: ETACS CAN time-out**

M12704100051USA0000010000

**CAUTION**

- If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the communication circuit is normal.

**OPERATION**

AWD-ECU receives the data (such as drive mode display signal, failure information signal) from ETACS-ECU via the CAN bus lines. If it cannot receive such data, illuminates the AWD indicator.

**DTC SET CONDITIONS**

If the following conditions are met when the system is in operation (always), AWD-ECU flashes the AWD/ LOCK indicators alternately, and sets the DTC No. U0141.

- IG1 power supply voltage: 8 V or more
- The signal output from ETACS-ECU cannot be received.

**TROUBLESHOOTING HINTS**

Current trouble

- Wiring harness or connector failure in the CAN bus lines between ETACS-ECU and AWD-ECU
- Malfunction of ETACS-ECU
- AWD-ECU malfunction

**Past trouble**

▪ Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics. Diagnose mainly wiring harness or connector failure in the CAN bus lines between ETACS-ECU and AWD-ECU, and malfunction in the power supply system for ETACS-ECU.

*NOTE: For a past trouble, you cannot find it by the scan tool MB991958 CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, check the CAN bus lines in the same manner as How to Cope with Intermittent Malfunction (refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15). You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs. (Refer to GROUP 54D - CAN Bus Line Diagnostic Flow P. 54D-10.)*

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)



- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

---

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

---

**STEP 2. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 09: CAN system (ETACS)

**Q:Is the check result normal?**

**YES:** Go to Step 6.

**NO:** Go to Step 3.

---

**STEP 3. Scan tool MB991958 DTC of other systems**

Check if a DTC, which relates to the CAN communication-linked systems below, is set.

- Meter
  - U0141: ETACS CAN time-out DTC
- A/C
  - U0141: ETACS CAN time-out DTC
- Engine
  - U0141: ETACS CAN time-out DTC

**Q:Is the DTC set?**

**YES:** Go to Step 4.

**NO:** Go to Step 5.

---

**STEP 4. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q:Is the DTC No. U0141 set?**

**YES:** Replace ETACS-ECU. Then go to Step 6.

**NO:** A poor connection, open circuit or other intermittent malfunction in the CAN bus lines between ETACS-ECU and AWD-ECU is suspected. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

---

**STEP 5. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q:Is the DTC No. U0141 set?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 6.

**NO:** A poor connection, open circuit or other intermittent malfunction in the CAN bus lines between ETACS-ECU and

AWD-ECU is suspected. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

**STEP 6. Check whether the DTC is reset.**

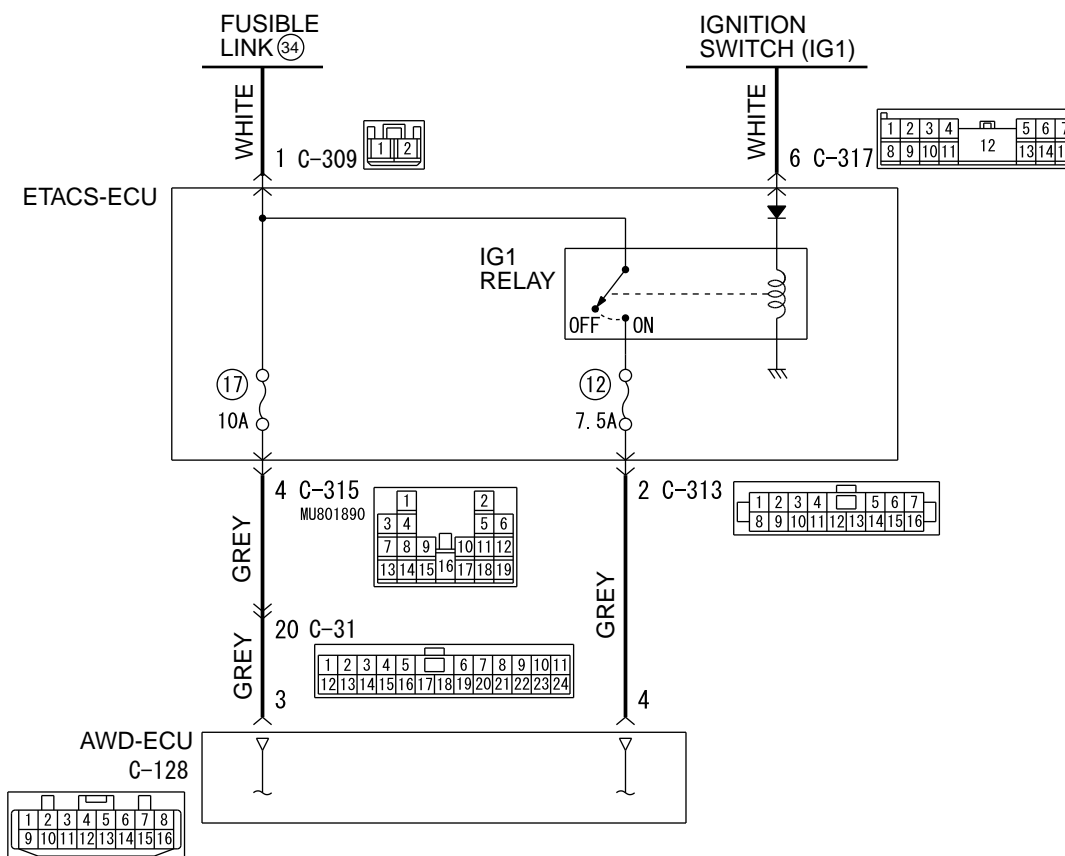
**Q: Is the DTC No. U0141 set?**

**YES:** Diagnose again from Step 1.

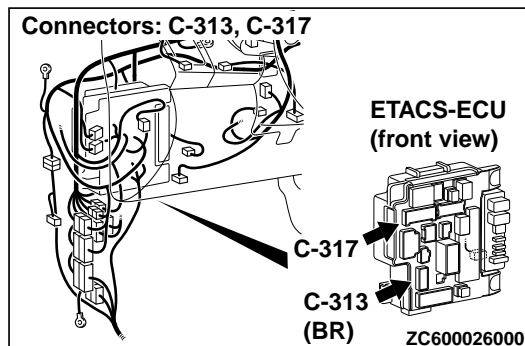
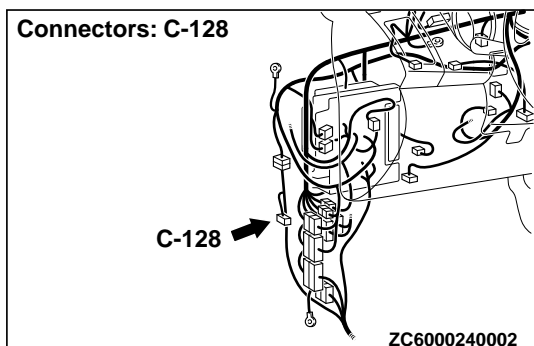
**NO:** This diagnosis is complete.

**DTC U0401: Engine CAN data error**

M12704100026USA0000010000



D7G27M002A00



**CAUTION**

- If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the communication circuit is normal.

**OPERATION**

AWD-ECU temporarily limits the AWD functions if an abnormality in the throttle opening angle signal is detected.

**DTC SET CONDITIONS**

If the following conditions are met when the system is in operation (always), AWD-ECU gradually switches the control from AWD to AWD AUTO, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U0401.

- IG1 voltage: 10 V or more
- Throttle opening angle signal: More than 100%

**TROUBLESHOOTING HINTS**

**Current trouble**

- Damaged wiring harness and connectors
- Malfunction of accelerator pedal position sensor
- Malfunction of crankshaft position sensor
- Engine ECU malfunction
- AWD-ECU malfunction

**Past trouble**

- Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics. Diagnose mainly wiring harness or connector failure between the engine ECU and the accelerator pedal position sensor or between the engine ECU and the crank angle sensor.

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

---

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

---

**STEP 2. Scan tool MB991958 DTC of other systems**

Check if a DTC related to the accelerator pedal position sensor system or the crank angle sensor system is set in the engine control system.

**Q: Is the DTC set?**

**YES:** Troubleshoot the engine control system. (Refer to GROUP 13Ab - Diagnostic Trouble Code Chart P.13Ab-44.)

**NO:** Go to Step 3.

---

**STEP 3. Scan tool MB991958 DTC of other systems**

Check if a DTC, which relates to the CAN communication-linked systems below, is set.

• Meter

U0401: DTC of engine-related failure information

**Q: Is the DTC set?**

**YES:** Go to Step 4.

**NO:** Go to Step 7.

---

**STEP 4. Check whether the DTC is reset.****Q: Is the DTC No. U0401 set?**

**YES:** Replace the engine control module. (Refer to GROUP 13Aa – Engine Control Module P.13Aa-37.) Then go to Step 8.

**NO:** A poor connection, open circuit or other intermittent malfunction between the engine ECU and the accelerator pedal position sensor, or between the engine ECU and the crank angle sensor is suspected. (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-15). Then go to Step 5.

---

**STEP 5. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 6.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

---

**STEP 6. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 8.

---

**STEP 7. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Depress the throttle pedal fully.
- (4) Check if the DTC is set.

**Q: Is the DTC No. U0401 set?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 8.

**NO:** A poor connection, open circuit or other intermittent malfunction between the engine ECU and the accelerator pedal position sensor, or between the engine ECU and the crank angle sensor is suspected. (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-15).

---

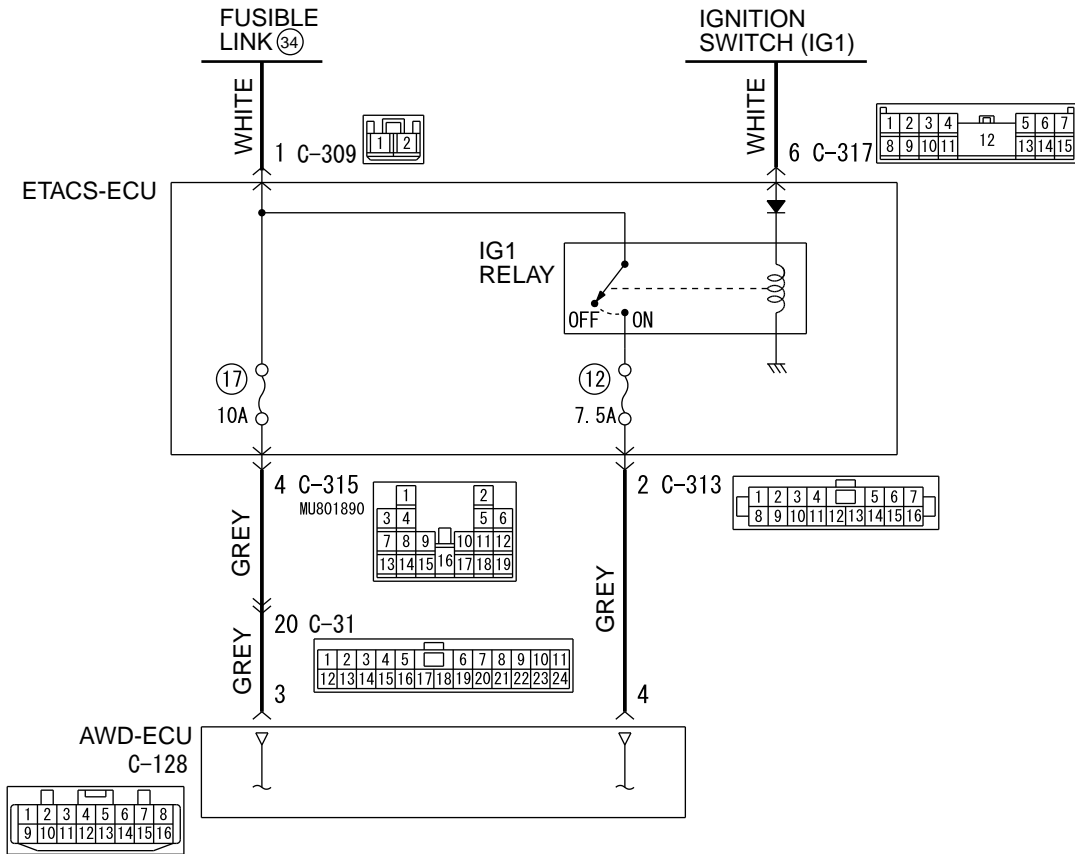
**STEP 8. Check whether the DTC is reset.****Q: Is the DTC No. U0401 set?**

**YES:** Diagnose again from Step 1.

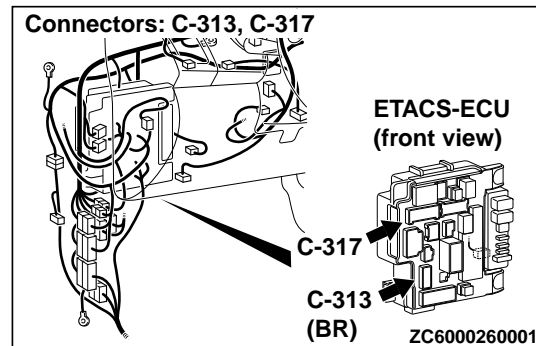
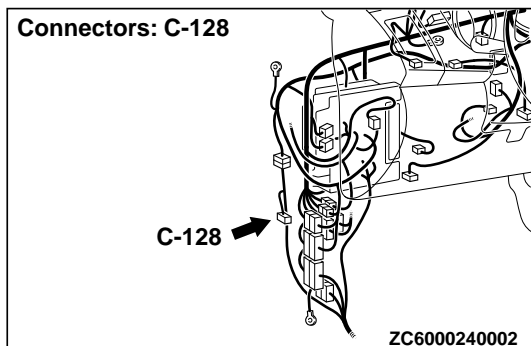
**NO:** This diagnosis is complete.

DTC U0415: ABS CAN data error

M12704100027USA0000010000



D7G27M002A00



**CAUTION**

•If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

•Before replacing the ECU, ensure that the communication circuit is normal.

**OPERATION**

AWD-ECU receives the data (such as wheel speed sensor signal) from ASC-ECU via the CAN bus lines. If it detects malfunction of the wheel speed signal, it interrupts the system.

**DTC SET CONDITIONS**

If the following conditions are met when the system is in operation (always), AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U0415.

- IG1 voltage: 10 V or more
- If the received wheel speed of one or more wheels reaches or exceeds the threshold value of 4000 r/min, or the received wheel speed of one or more wheels is SNA.

*NOTE: SNA (Signal not available)*

**TROUBLESHOOTING HINTS****Current trouble**

- Wiring harness or connector failure between ASC-ECU and the stop lamp switch
- Malfunction of the ABS sensor
- Malfunction of the stop lamp switch
- ASC-ECU malfunction
- AWD-ECU malfunction

**Past trouble**

- Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics.

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q:Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

**STEP 2. Scan tool MB991958 data list**

Check the following service data. (Refer to P.27C-87.)

- Item 07: CAN system (ABS/ASC)
- Item 16: FL wheel speed sensor
- Item 17: FR wheel speed sensor
- Item 18: RL wheel speed sensor
- Item 19: RR wheel speed sensor

**Q:Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Troubleshoot the ABS system. (Refer to GROUP 35B - Troubleshooting P.35B-9.)

**STEP 3. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

**Q:Are the connectors and terminals in good condition?**

---

**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 6.

---

**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 6.

---

**STEP 5. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q: Is the DTC No. U0415 set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 6.

**NO:** This diagnosis is complete.

---

**STEP 6. Check whether the DTC is reset.**

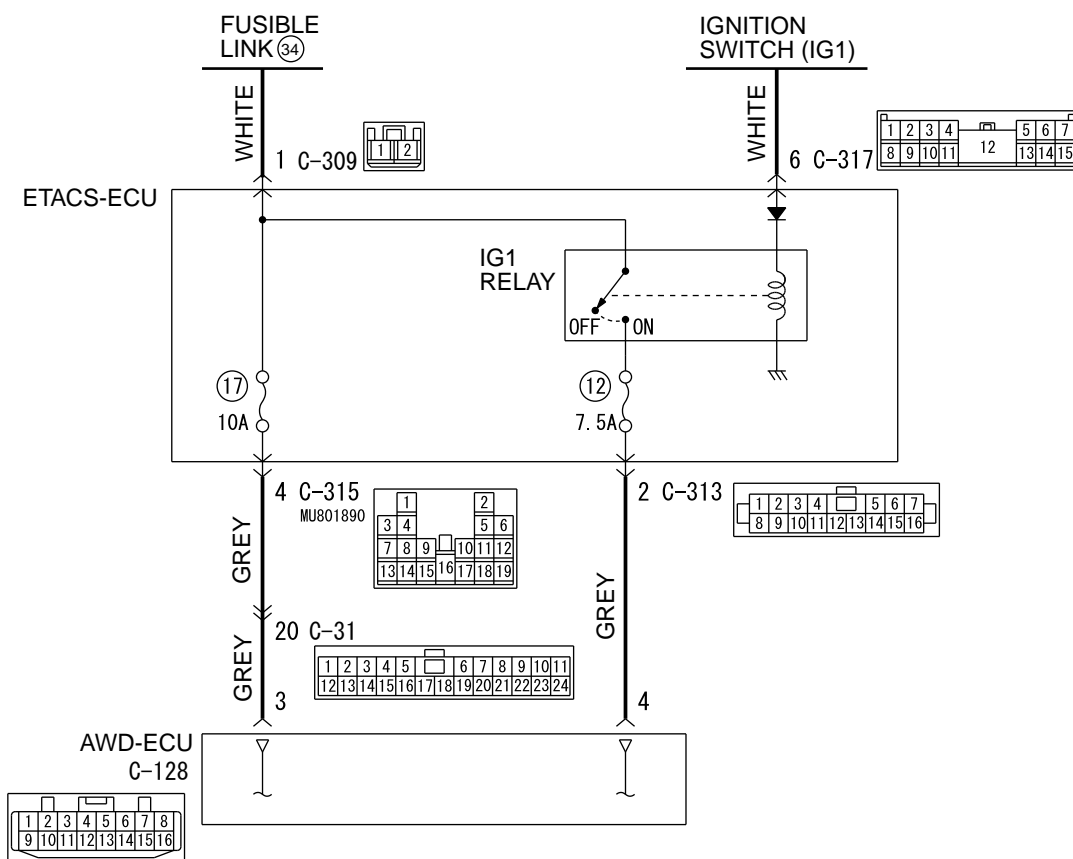
**Q: Is the DTC No. U0415 set?**

**YES:** Diagnose again from Step 1.

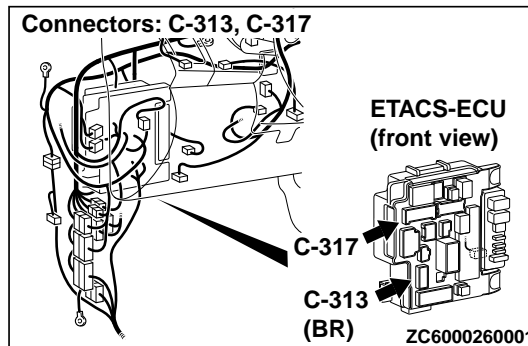
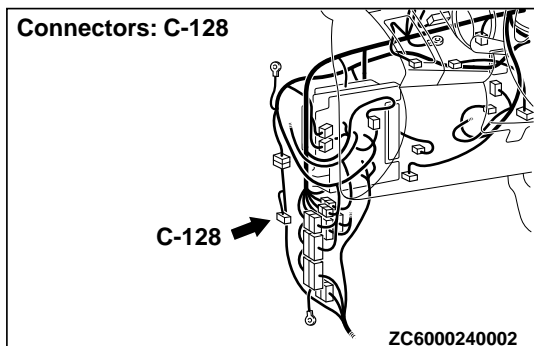
**NO:** This diagnosis is complete.

DTC U113C: Wheel speed sensor data error

M12704100028USA0000010000



D7G27M002A00



**CAUTION**

•If there is any problem in the CAN bus lines, an incorrect DTC may be set. Prior to this diagnosis, always diagnose the CAN bus lines.

•Before replacing the ECU, ensure that the communication circuit is normal.



### OPERATION

AWD-ECU receives the data (such as ABS sensor signal, ABS operation signal) via the CAN bus lines. If it cannot receive such data, it interrupts the system.

### DTC SET CONDITIONS

If the following conditions are met when the system is activated, AWD-ECU gradually switches the control from AWD to FWD, flashes the AWD/LOCK indicators alternately, and sets the DTC No. U113C.

- IG1 voltage: 8 V or more
- ABS signal (such as wheel speed signal) cannot be received.
- DTC No.C0120 ABS CAN time-out is not detected.

### TROUBLESHOOTING HINTS

Current trouble

- Wiring harness or connector failure between ASC-ECU and the stop lamp switch
- Malfunction of the ABS sensor
- Malfunction of the stop lamp switch
- ASC-ECU malfunction
- AWD-ECU malfunction

### Past trouble

- Refer to "How to treat past trouble" (GROUP 00 - How to Treat Past Trouble P.00-17) for proceeding the diagnostics. Diagnose mainly wiring harness or connector failure in the CAN bus lines between ASC-ECU and each ABS sensor, or between ASC-ECU and the stop lamp switch.

### DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

---

#### STEP 1. Scan tool MB991958 CAN bus diagnostics

Use scan tool MB991958 to diagnose the CAN bus lines.

#### Q:Is the check result normal?

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) Then go to Step 2.

---

#### STEP 2. Scan tool MB991958 DTC of other systems

Check the following service data. (Refer to P.27C-87.)

- Item 07: CAN system (ABS/ASC)
- Item 16: FL wheel speed sensor
- Item 17: FR wheel speed sensor
- Item 18: RL wheel speed sensor
- Item 19: RR wheel speed sensor

#### Q:Is the DTC set?

**YES:** Troubleshoot the ABS system. (Refer to GROUP 35B - Troubleshooting P.35B-9.)

**NO:** Go to Step 3.

---

#### STEP 3. Check the following connector:

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

#### Q:Are the connectors and terminals in good condition?

**YES:** Go to Step 4.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 6.

---

**STEP 4. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 5.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 6.

---

**STEP 5. Check whether the DTC is reset.**

- (1) Erase the DTC.
- (2) Turn the ignition switch from the LOCK (OFF) position to the ON position.
- (3) Check if the DTC is set.

**Q: Is the DTC No. U113C set?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 6.

**NO:** A poor connection, open circuit or other intermittent malfunction in the CAN bus lines between ASC-ECU and each ABS sensor, or between ASC-ECU and the stop lamp switch is suspected. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P. 00-15).

---

**STEP 6. Check whether the DTC is reset.**

**Q: Is the DTC No. U113C set?**

**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

## TROUBLE SYMPTOM CHART

M12704100029USA0000010000

**⚠ CAUTION**

During diagnosis, a DTC associated with other system may be set when the ignition switch is

turned on with connector(s) disconnected. On completion, confirm all systems for DTC(s). If DTC(s) are set, erase them all.

Trouble symptom	Inspection procedure	Reference pages or actions
Scan tool MB991958 cannot communicate with the electronic control AWD system.	1	P.27C-75
The switch position of the drive mode selector does not match with the indicator display in the combination meter.	2	P.27C-79
The tight corner braking phenomenon* appears with the drive mode selector in the FWD or AWD position. <i>NOTE: The vehicle is tuned so that the tight corner braking phenomenon appears at a certain level with the drive mode selector in the LOCK position.</i>	3	P.27C-84

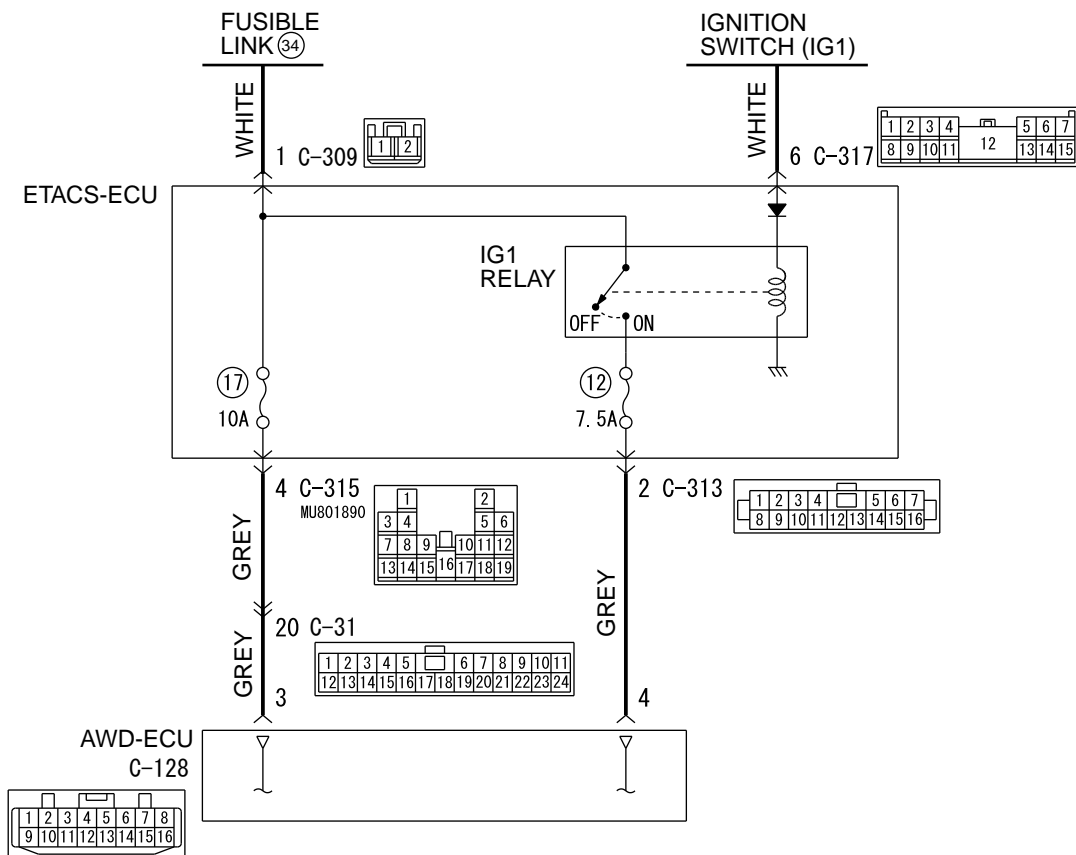
Trouble symptom	Inspection procedure	Reference pages or actions
No DTC is set even when the AWD/LOCK indicator lamps flash.	4	P.27C-86

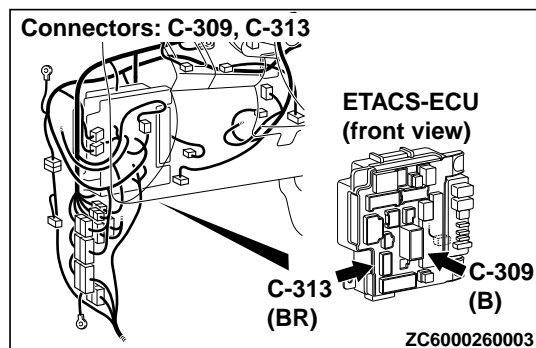
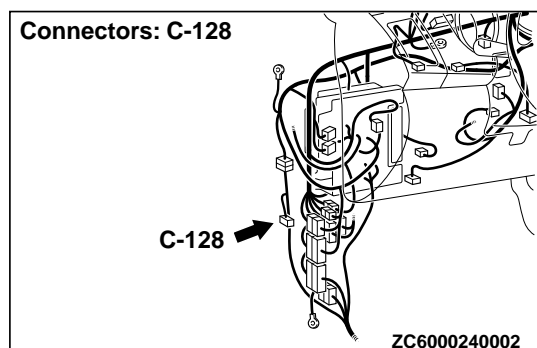
*NOTE: \*Tight corner braking phenomenon: When a AWD vehicle makes sharp cornering in a paved road at low speed (ex. parallel parking), there is a difference in turning radius between front and rear wheels. If such a difference can no longer be compensated by tire slippage, the vehicle behaves as if it is under braking.*

SYMPTOM PROCEDURES

**Inspection Procedure 1: Scan tool MB991958 cannot Communicate with the Electronic Control AWD System.**

M12704100031USA0000010000



**COMMENTS ON TROUBLE SYMPTOM**

If scan tool MB991958 cannot communicate with the electronic control AWD system, the CAN bus lines may have a problem. If the electronic control AWD system is not in operation (in case of no AWD operation), the AWD-ECU power supply circuit system or AWD-ECU may have a problem.

**TROUBLESHOOTING HINTS**

- Damaged wiring harness and connectors
- AWD-ECU malfunction

**DIAGNOSIS**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- MB991824: Vehicle Communication Interface
- MB991827: M.U.T.-III USB Cable
- MB991910: M.U.T.-III Main Harness A

**STEP 1. Scan tool MB991958 CAN bus diagnostics**

Use scan tool MB991958 to diagnose the CAN bus lines.

**Q: Is the check result normal?**

**YES:** Go to Step 2.

**NO:** Repair the CAN bus line. (Refer to GROUP 54D - CAN bus diagnostic chart P.54D-17.) On completion, go to Step 2.

**STEP 2. Check the following connector:**

Check the C-128 AWD-ECU connector for improper engagement, terminal damage or terminal drawn in the connector case.

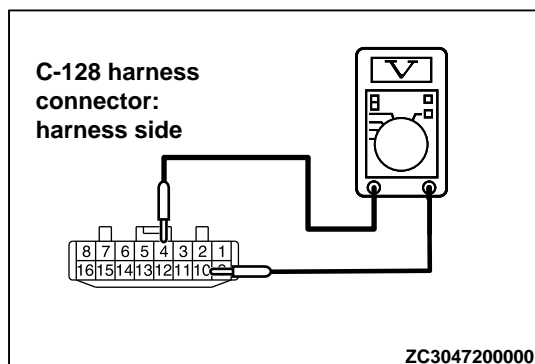
**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 3.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 8.

**STEP 3. Voltage measurement at the AWD-ECU connector**

- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Turn the ignition switch to the ON position.



- (3) Measure the voltage between the C-128 wiring harness side connector terminals No. 4 and the body earth.

**OK: Battery voltage**

**Q: Is the check result normal?**

**YES:** Go to Step 5.

**NO:** Go to Step 4.

#### STEP 4. Wiring harness check

*NOTE: Before the wiring harness inspection, inspect the C-313 and C-309 ETACS-ECU connectors, and repair if necessary.*

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 4) and the C-309 ETACS-ECU connector (terminal No. 1) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.

#### STEP 5. Resistance measurement at the AWD-ECU connector

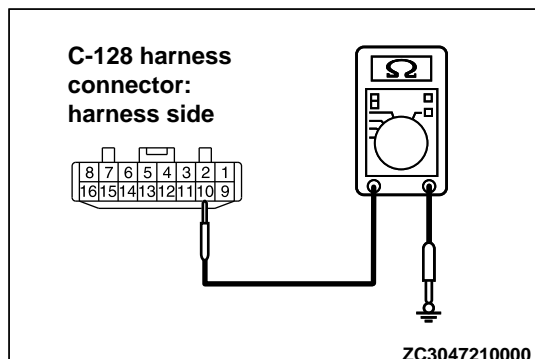
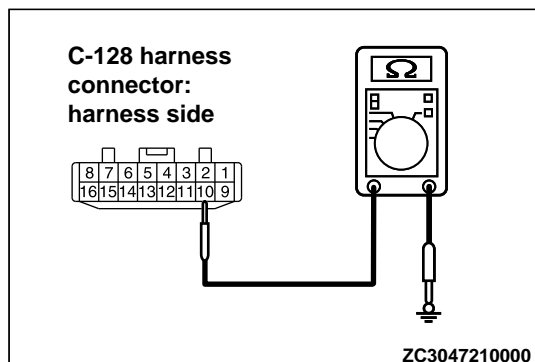
- (1) Disconnect the C-128 AWD-ECU connector.
- (2) Measure the resistance between the C-128 wiring harness side connector terminals No. 10 and the body earth.

**OK: 2 ohm or less**

**Q: Is the check result normal?**

**YES:** Go to Step 7.

**NO:** Go to Step 6.



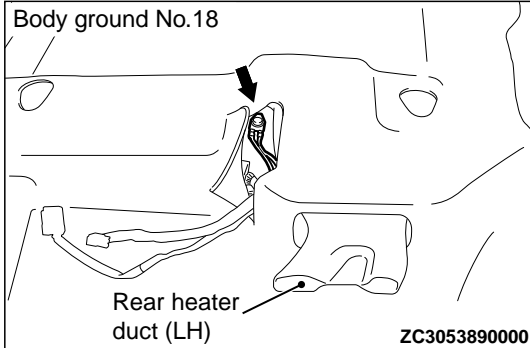
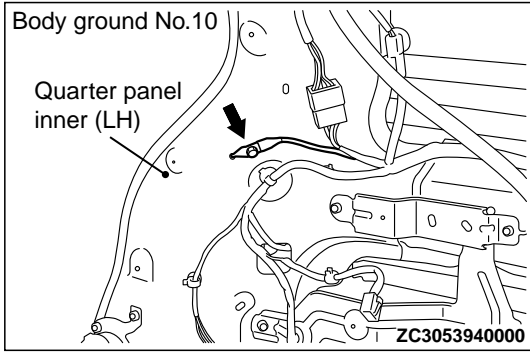
#### STEP 6. Wiring harness check

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 10) and the body earth (No. 9 or No. 18) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the wiring harness. Then go to Step 8.




---

**STEP 7. Retest the system.**

**Q: Does the malfunction occur again?**

**YES:** Replace AWD-ECU. (Refer to P. 27C-92.) Then go to Step 8.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction .)

---

**STEP 8. Check whether the DTC is reset.**

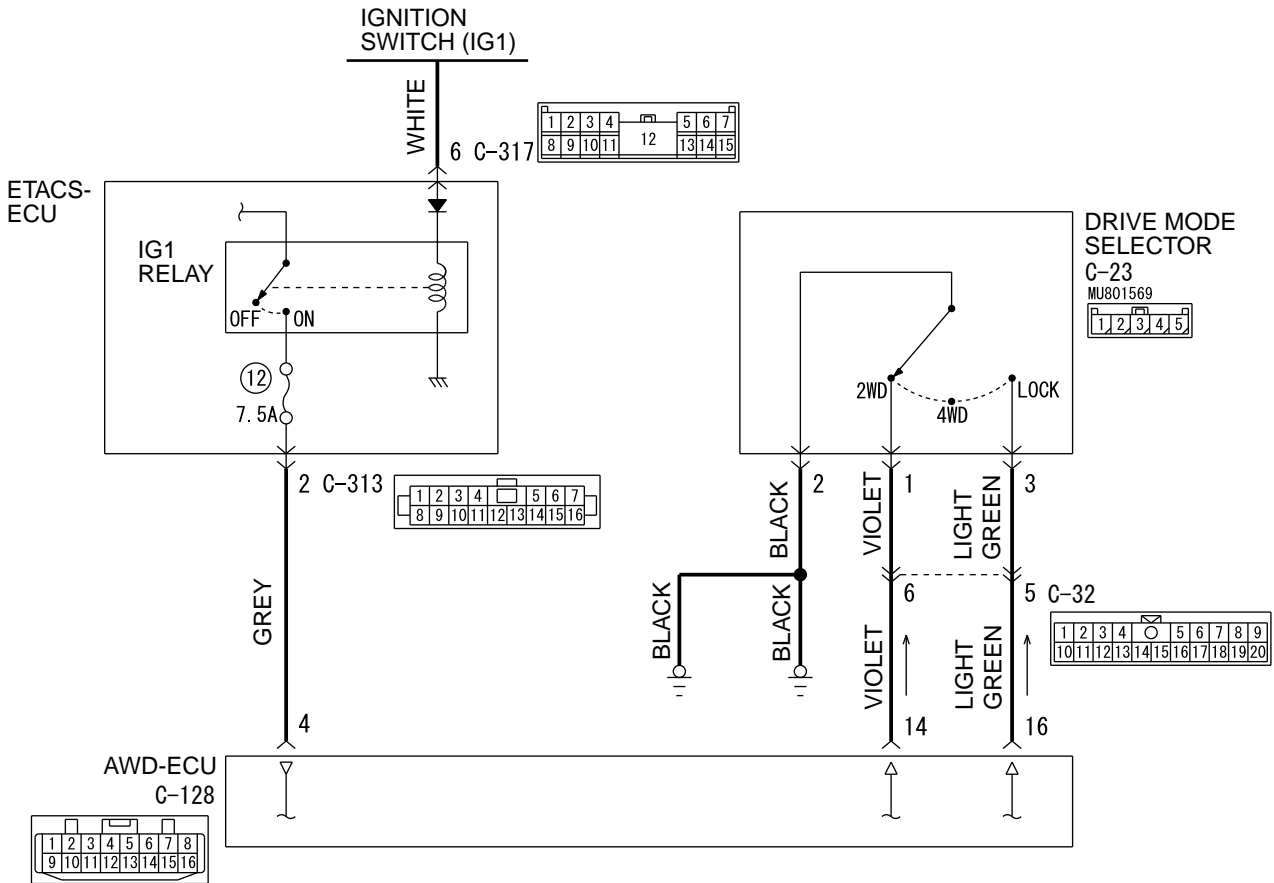
**Q: Does the malfunction occur again?**

**YES:** Diagnose again from Step 1.

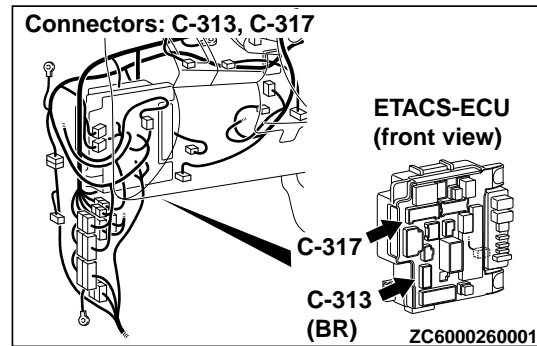
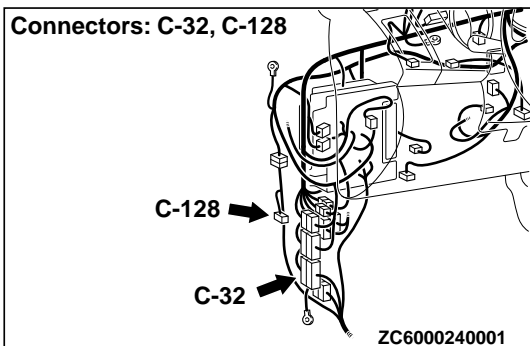
**NO:** This diagnosis is complete.

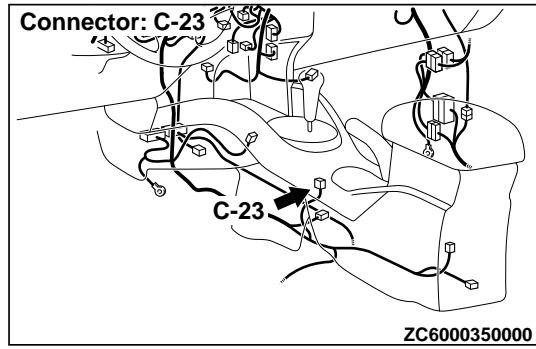
**Inspection Procedure 2: The Switch Position of the Drive Mode Selector does not Match with the Indicator Display in the Combination Meter.**

M12704100032USA0000010000



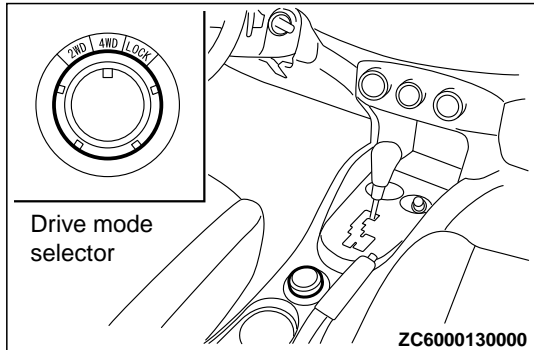
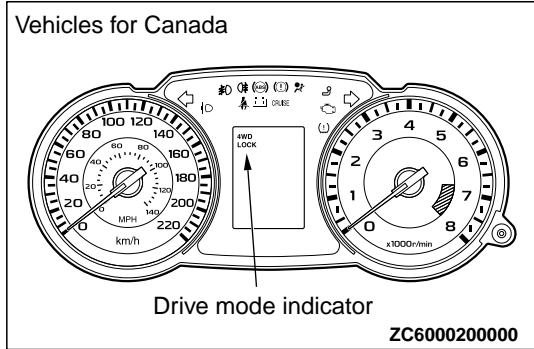
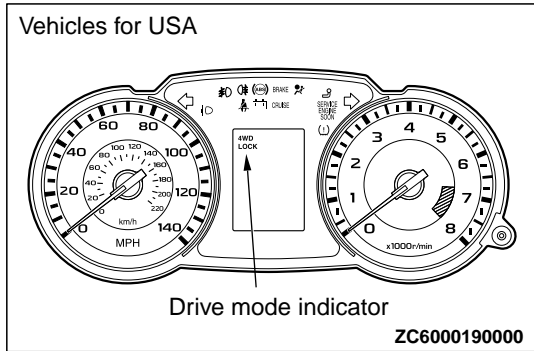
D7G27M001A00





**DRIVE MODE SELECTOR POSITION AND INDICATOR DISPLAY (NORMAL)**

Switch position	Indicator display
FWD (2WD)	-(Not illuminated)
AWD (4WD)	AWD
LOCK	AWD, LOCK





### COMMENTS ON TROUBLE SYMPTOM

- If the drive mode selector switch position and indicator display in the combination meter do not match, the drive mode selector, wiring harness connector between AWD-ECU and drive mode selector, wiring harness connector in the earth circuit for the drive mode selector, or AWD-ECU may have a problem.
- If high-pressure type spare tires are equipped, tire pressure is excessively out of the specified value, or tires with different sizes or different brands are equipped, AWD mode may be temporarily displayed even when the LOCK mode is selected.
  - High-pressure type spare tires are equipped, tire pressure is excessively out of the specified value, or tires with different sizes or different brands are equipped

### TROUBLESHOOTING HINTS

- Damaged wiring harness and connectors
- Malfunction of drive mode selector
- AWD-ECU malfunction

### DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

*NOTE: Be sure to ask the user if any of the probable causes is applicable before performing the diagnosis procedure.*

#### STEP 1. Check the following connector:

Check the C-23 drive mode selector connector and C-128 AWD-ECU connector for improper engagement, terminal damage or terminal drawn in the connector case.

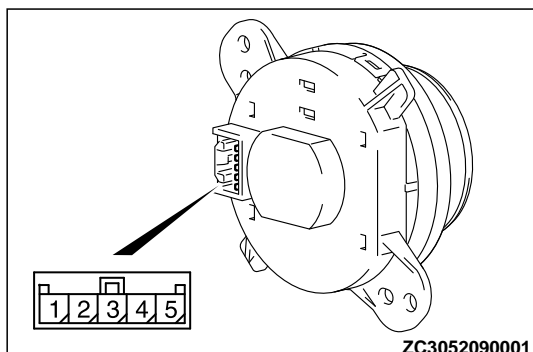
#### Q: Are the connectors and terminals in good condition?

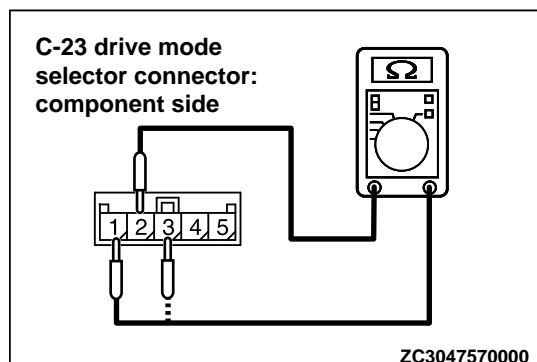
**YES:** Go to Step 2.

**NO:** Repair the connector (s) or terminal (s). Then go to Step 9.

#### STEP 2. Resistance measurement between the drive mode selector connector terminals

- (1) Remove the drive mode selector (Refer P.27C-93.)





(2) Measure the resistance between the following terminals.

Switch position	Terminal number	Normal conditions
FWD	1 - 2	Continuity exists (2 ohm or less).
AWD	-	No continuity
LOCK	2 - 3	Continuity exists (2 ohm or less).

**Q: Is the check result normal?**

**YES:** Go to Step 3.

**NO:** Replace the drive mode selector. Then go to Step 9.

### STEP 3. Wiring harness check

- Wiring harness between the C-128 AWD-ECU connector (terminal No. 16) and the C-23 drive mode selector connector (terminal No. 3)
- Wiring harness between the C-128 AWD-ECU connector (terminal No. 14) and the C-23 drive mode selector connector (terminal No. 1)

Check the wiring harness above for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 4.

**NO:** Repair the wiring harness. Then go to Step 9.

### STEP 4. Resistance measurement at the drive mode selector connector

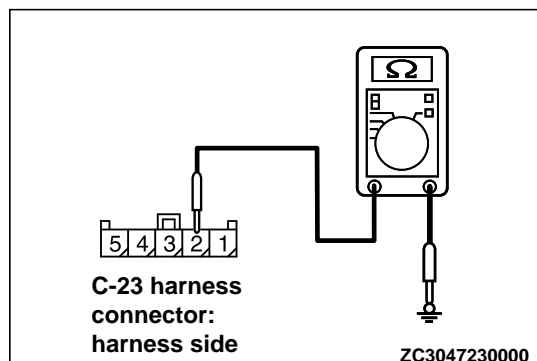
- (1) Disconnect the C-23 drive mode selector connector.
- (2) Measure the resistance between the C-23 wiring harness side connector terminal No. 4 and the body earth.

**OK: 2 ohm or less**

**Q: Is the check result normal?**

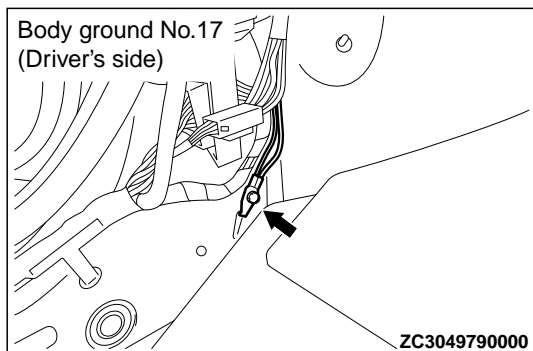
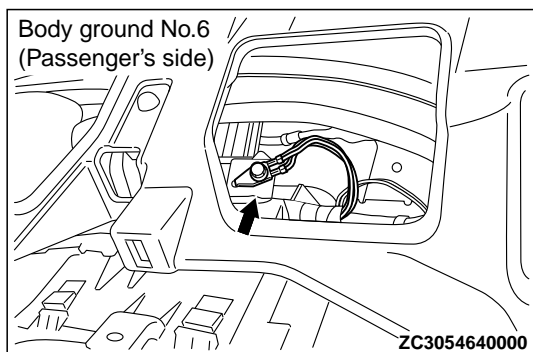
**YES:** Go to Step 8.

**NO:** Go to Step 5.



### STEP 5. Wiring harness check

*NOTE: Prior to the wiring harness inspection, check the C-32 joint connector, and repair if necessary.*



Check the wiring harness between the C-23 drive mode selector connector (terminal No. 2) and the body earth (No. 4 and No. 16) for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 6.

**NO:** Repair the wiring harness. Then go to Step 9.

---

**STEP 6. Check the following connector:**

Check the connectors below for improper engagement, terminal damage or terminal drawn in the connector case.

- C-128 AWD-ECU connector
- C-313, C-317 ETACS-ECU connector

**Q: Are the connectors and terminals in good condition?**

**YES:** Go to Step 7.

**NO:** Repair the connector(s) or terminal(s). Then go to Step 9.

---

**STEP 7. Wiring harness check**

Check the wiring harness between the C-128 AWD-ECU connector and the C-313 ETACS-ECU connector for damage or other problem.

**Q: Is the wiring harness in good condition?**

**YES:** Go to Step 8.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 9.

---

**STEP 8. Retest the system.**

**Q: Does the malfunction occur again?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 9.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

---

**STEP 9. Check whether the DTC is reset.**

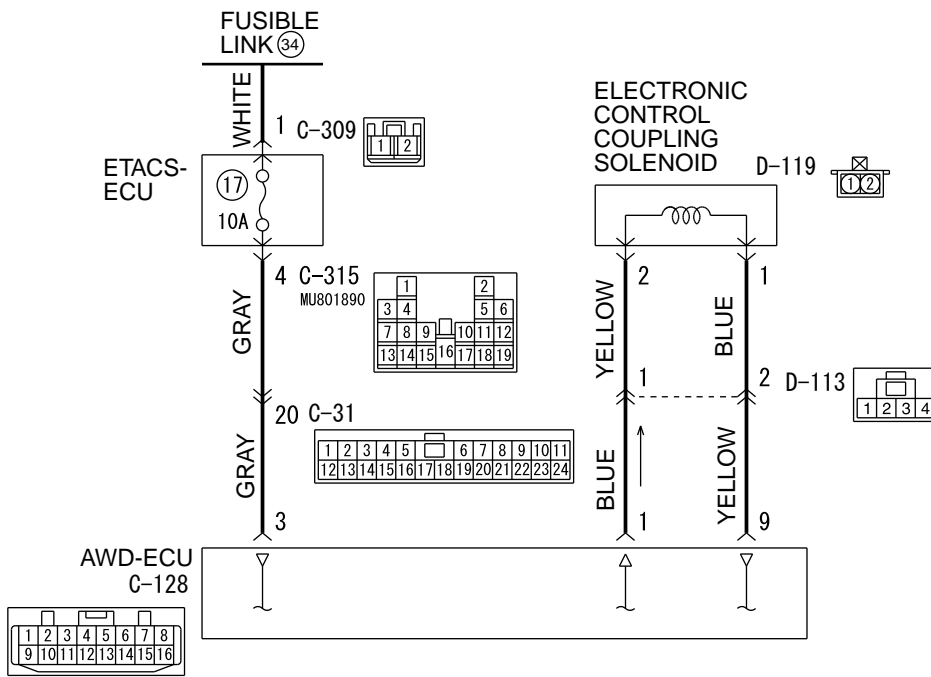
**Q: Does the malfunction occur again?**

**YES:** Diagnose again from Step 1.

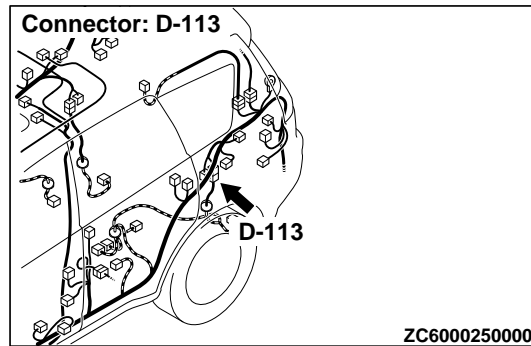
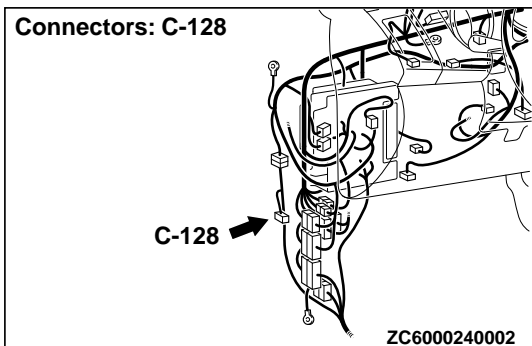
**NO:** This diagnosis is complete.

**Inspection Procedure 3: The Tight Corner Braking Phenomenon\* Appears with the Drive Mode Selector in the FWD or AWD Position.**

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D7G27M000A00



**NOTE:**

**\*\*Tight corner braking phenomenon:** When a AWD vehicle makes sharp cornering in a paved road at low speed (ex. parallel parking), there is a difference in turning radius between front and rear wheels. If such a difference can no longer be compensated by tire slippage, the vehicle behaves as if it is under braking.

**\*The vehicle is tuned so that the tight corner braking phenomenon appears at a certain level with the drive mode selector in the LOCK position.**

---

### COMMENTS ON TROUBLE SYMPTOM

If the tight corner braking phenomenon occurs with the drive mode selector being on the FWD position, the electronic control coupling may have a problem. If the tight corner braking phenomenon occurs only with the drive mode selector being on the AWD position, the data received by AWD-ECU from each ECU, the electronic control coupling, or AWD-ECU may have a problem.

### TROUBLESHOOTING HINTS

- Malfunction of electronic control coupling
- Malfunction of data transmitted from ABS system
- Malfunction of data transmitted from the engine control system
- AWD-ECU malfunction

### DIAGNOSIS

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
  - MB991824: Vehicle Communication Interface
  - MB991827: M.U.T.-III USB Cable
  - MB991910: M.U.T.-III Main Harness A

---

#### STEP 1. Check for the tight corner braking phenomenon occurrence during driving on a flat road

Check if the tight corner braking phenomenon occurs during driving on a flat road with the drive mode selector being on the FWD or AWD position.

#### Q: Does the tight corner braking phenomenon occur?

**YES:** Go to Step 2.

**NO:** Go to Step 5.

---

#### STEP 2. Wiring harness check

Check the wiring harness between the C-128 AWD-ECU connector (terminal No. 1) and the D-113 electronic control coupling solenoid connector (terminal No. 1) for damage or other problem.

#### Q: Is the wiring harness in good condition?

**YES:** Go to Step 3.

**NO:** Repair damage or other problem in the wiring harness. Then go to Step 7.

---

#### STEP 3. Scan tool MB991958 data list

Check the service data for the items below. (Refer to P. 27C-87.)

- Item 16: FL wheel speed sensor
- Item 17: FR wheel speed sensor
- Item 18: RL wheel speed sensor
- Item 19: RR wheel speed sensor
- Item 26: Throttle position

#### Q: Does the service data meet the standard value range?

**YES:** Go to Step 5.

**NO:** Perform the troubleshooting of the ABS system (refer to GROUP 35B - Troubleshooting P. 35B-9) or the troubleshooting of the engine control system (refer to GROUP 13Ab - Diagnostic Trouble Code Chart P. 13Ab-44). Then go to Step 4.

**STEP 4. Check for the tight corner braking phenomenon occurrence during driving on a flat road**

Check if the tight corner braking phenomenon occurs during driving on a flat road with the drive mode selector being on the FWD position.

**Q: Does the tight corner braking phenomenon occur?**

**YES (Coil current is 0 A):** Measure the coil current when the tight corner braking occurs. If the coil current measures 0 A, replace the electronic control coupling (Refer to P.27C-94). Then go to Step 5.

**YES (Coil current is other than 0 A):** Measure the coil current when the tight corner braking occurs. If the coil current is other than 0 A, go to Step 5.

**NO:** Go to Step 6.

**STEP 5. Retest the system.****Q: Does the malfunction occur again?**

**YES:** Replace AWD-ECU. (Refer to P.27C-92.) Then go to Step 6.

**NO:** The trouble can be an intermittent malfunction. (Refer to GROUP 00 - How to Cope with Intermittent Malfunction P.00-15.)

**STEP 6. Retest the system.****Q: Does the malfunction occur again?**

**YES:** Replace the electronic control coupling. (Refer to P.27C-94.) Then go to Step 7.

**NO:** This diagnosis is complete.

**STEP 7. Check whether the DTC is reset.****Q: Does the malfunction occur again?**

**YES:** Diagnose again from Step 1.

**NO:** This diagnosis is complete.

**Inspection Procedure 4: No DTC is set even when the AWD/LOCK Indicator Lamps Flash.**

M12704100034USA0000010000

**COMMENTS ON TROUBLE SYMPTOM**

- In case that the AWD/LOCK indicator flashes but no DTC is set, the AWD-ECU power supply circuit system may have a problem.
- If the AWD-ECU power supply voltage is approximately 6.5 V or less when the system is in operation (always), the CPU of AWD-ECU automatically shuts down. At this time, if the AWD control is in operation, it switches to the FWD

control. AWD-ECU cannot set the DTC because the CPU shuts down. In addition, the combination meter determines the AWD-ECU time-out, and flashes both AWD and LOCK indicators.

**PROBABLE CAUSES**

- Damaged wiring harness and connectors
- AWD-ECU malfunction

**DIAGNOSIS**

- \*MB991958: Scan Tool (M.U.T.-III Sub Assembly)
- \*MB991824: Vehicle Communication Interface
- \*MB991827: M.U.T.-III USB Cable
- \*MB991910: M.U.T.-III Main Harness A

Inspection Procedure 1: Scan tool MB991958 cannot communicate with the Electronic Control AWD System. Refer to ECU power supply circuit system check P.27C-75.

**DATA LIST REFERENCE TABLE**

M12704100035USA0000010000

M.U.T.-III can read the following items among various control data (input data from each ECU and switch) used by the electronic control AWD system.

**SYSTEM IS NORMAL.**

Item No.	Check item	Check condition	Normal condition	
01	Vehicle speed (AWD calculated value)	Perform a test run of the vehicle.	The speedometer display and the M.U.T.-III display almost agree with each other.	
02	Ignition power supply voltage	Ignition switch: ON	0 - 16 V	
03	Coupling torque	Ignition switch: ON	0 - 1200 N·m (0 - 885 ft·lb)	
04	Coupling current (command value)	*Drive mode selector: AWD *Perform a test run of the vehicle.	The current changes between 0 and 5 A. (Command value and actual value agree with each other.)	
05	Coupling current (monitor value)	*Drive mode selector: AWD *Perform a test run of the vehicle.	The current changes between 0 and 5 A. (Command value and actual value agree with each other.)	
06	Coupling temperature	Perform a test run of the vehicle.	0 - 200°C (0 - 392° F)	
07	CAN system (ABS/ASC)	Ignition switch: ON	When ASC-ECU data is correctly received	OK
			When ASC-ECU data reception error occurs	No reception

**ELECTRONIC CONTROL AWD  
DIAGNOSIS**

Item No.	Check item	Check condition	Normal condition	
08	CAN system (engine)	Ignition switch: ON	When engine-ECU data is correctly received	OK
			When engine-ECU data reception error occurs	No reception
09	CAN system (ETACS)	Ignition switch: ON	When ETACS-ECU data is correctly received	OK
			When ETACS-ECU data reception error occurs	No reception
10	FWD SW	Ignition switch: ON	Drive mode selector: FWD	OFF/ON
11	LOCK SW	Ignition switch: ON	Drive mode selector: LOCK	OFF/ON
15	AWD mode	Ignition switch: ON	Shifting in progress	-
			AWD LOW	
			AWD HIGH	
			FWD	
			Neutral	
16	FL wheel speed sensor	Perform a test run of the vehicle. Check that there is difference between the right wheel speed and the left wheel speed when the vehicle turns.		The speedometer display and the M.U.T.-III display almost agree with each other.
	FR wheel speed sensor			
	RL wheel speed sensor			
	RR wheel speed sensor			
21	Engine speed	Perform a test run of the vehicle.		The tachometer display and the M.U.T.-III display almost agree with each other.
23	Ignition position	<ul style="list-style-type: none"> <li>▪LOCK</li> <li>▪OFF</li> <li>▪ACC</li> <li>▪ON</li> <li>▪START</li> </ul>		-
24	Engine torque	Perform a test run of the vehicle.		The torque changes between 0 and 300 N·m (0 - 221 ft·lb).
26	Throttle position	Ignition switch: ON	Release the accelerator pedal.	Approximately 0%
			Gradually depress the accelerator pedal.	0 - 100%



Item No.	Check item	Check condition	Normal condition
		Fully depress the accelerator pedal.	Approximately 100% (within 100%)
28	Limited torque	-	0 - 2500 N·m (0 - 1844 ft-lb)

### SYSTEM SHUT-DOWN

M.U.T.-III display data does not agree with the actual data when AWD-ECU deactivates the AWD control function by the fail-safe function.

### ACTUATOR TEST TABLE

M.U.T.-III can be used to forcibly activate the electronic control coupling and indicators (AWD indicator and LOCK indicator) in the combination meter according to the following items.

**NOTE:**

- \*If AWD-ECU is deactivated by the fail-safe function, no actuator test can be performed.
- \*As for the item No. 01, the chassis dynamometer is used to check the AWD torque. A simple AWD status check method, however, can be applied by

M12704100036USA0000010000

*checking whether a tight corner braking phenomenon appears during driving.*

**CAUTION**

**When the item No. 01 is checked, the speed difference between front and rear wheels must be 5 km/h (3 mph) or lower. If the speed difference exceeds 5 km/h (3mph), AWD-ECU changes from the actuator test mode to the normal control mode.**

### Actuator test specifications

Item No.	Check item	Driven component	Operating duration
01	AWD coupling control torque	Drive the electronic control coupling with the control torque of 0 N·m to 730 N·m (0 to 538 ft-lb).	Maximum 10 seconds
02	AWD mode	AWD LOCK	Maximum 1 minute
		AWD	Maximum 1 minute
		FWD	Maximum 1 minute

### FREEZE FRAME DATA REFERENCE TABLE

M.U.T.-III can be used to read the freeze frame data (the driving status when the failure occurs) at each diagnosis code detection.

M12704100037USA0000010000

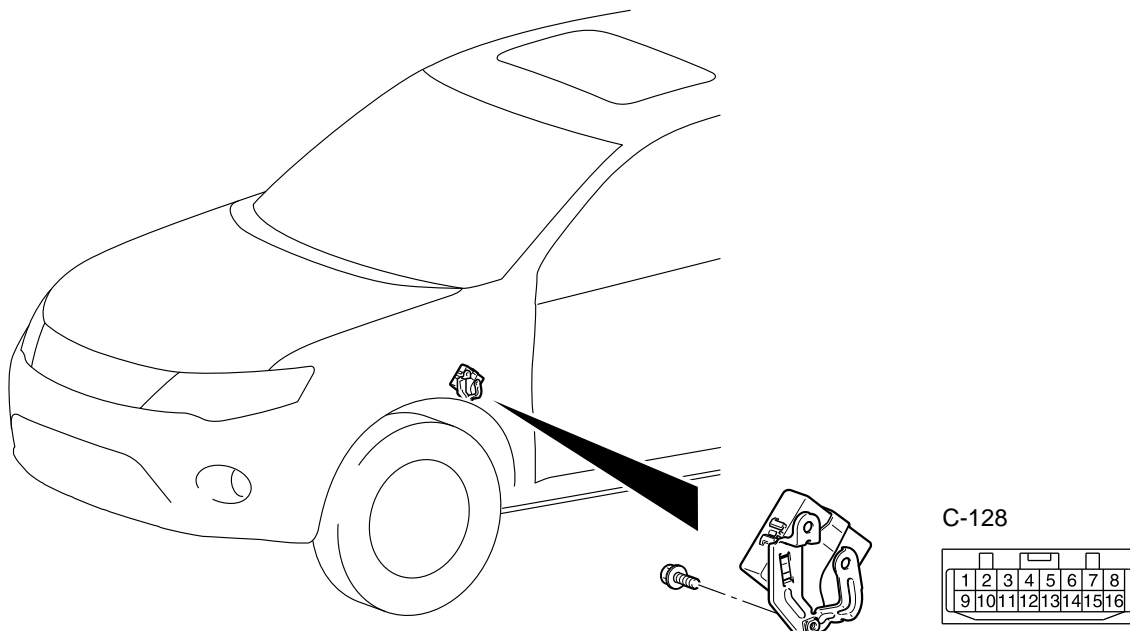
### FREEZE FRAME DATA SPECIFICATIONS

Item No.	Item	Data display
01	Odometer	Km (mph)

Item No.	Item	Data display
02	Ignition cycle	-
03	Coupling torque	N·m (ft-lb)
04	Current trouble accumulative time	min
06	Coupling temperature	°C (°F)
07	CAN communication (ABS/ASC) error flag	OFF/ON
08	CAN communication (engine) error flag	OFF/ON
09	CAN communication (ETACS) error flag	OFF/ON
15	AWD mode	FWD AWD AWD LOCK
16	FL wheel speed sensor	xxxx km/h (mph)
17	FR wheel speed sensor	xxxx km/h (mph)
18	RL wheel speed speed sensor	xxxx km/h (mph)
19	RR wheel speed sensor	xxxx km/h (mph)

## CHECK AT ECU TERMINALS

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ZC3051060000

Terminal No.	Check item	Check condition	Normal condition
1	Current command value of electronic control coupling solenoid	<ul style="list-style-type: none"> <li>▪ Drive mode selector: AWD</li> <li>▪ Perform a test run of the vehicle.</li> </ul>	0 to 5 A

Terminal No.	Check item	Check condition	Normal condition	
3	Electronic control coupling solenoid power supply	Always	Battery voltage	
4	Ignition power supply voltage	Ignition switch: ON	Battery voltage	
		Ignition switch: OFF	0 V	
9	Electronic control coupling solenoid current monitor value	<ul style="list-style-type: none"> <li>▪ Drive mode selector: AWD</li> <li>▪ Perform a test run of the vehicle.</li> </ul>	0 to 5 A	
10	Earth	Always	0 V	
14	Drive mode selector FWD signal	Ignition switch: ON	Drive mode selector: FWD	0 V
			Drive mode selector: AWD or LOCK	Battery voltage
16	Drive mode selector LOCK signal	Ignition switch: ON	Drive mode selector: LOCK	0 V
			Drive mode selector: FWD or AWD	Battery voltage

## ON-VEHICLE SERVICE

### CHECK OF ELECTRONIC CONTROL COUPLING

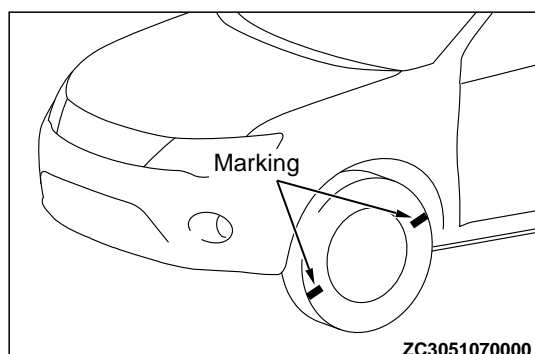
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#### SIMPLE OPERATION CHECK OF ELECTRONIC CONTROL COUPLING

1. Raise the vehicle.
2. Mark the front and rear tires for easy identification of tire rotation.
3. Adjust the parking brake lever to the normal conditions. (Refer to GROUP 36 - On-vehicle Service, Parking Brake Lever Stroke Check and Adjustment P.36-11.)
4. Pull the parking brake pedal by two notches.

*NOTE: Activating the parking brake slightly prevents the drive force transferring to the rear wheels by a friction in the electronic control coupling. If the following FWD mode is checked without the parking brake activation, the drive force is transferred to the rear wheels by a friction in the electronic control coupling.*

5. Start the engine, and move the shift lever into the D position.
6. Depress the accelerator pedal gradually, and maintain the vehicle speed at approximately 10 km/h (6.0 mph).
7. Switch the drive mode selector to the FWD mode, and check that the rear wheels are under FWD control. (At this time, the AWD/LOCK indicators in the combination meter do not illuminate.)



8. Stop the engine.
9. Start the engine again, and move the shift lever into the D position.
10. Depress the accelerator pedal gradually, and maintain the vehicle speed at approximately 10 km/h (6.0 mph).

**CAUTION**

**The following checks in the AWD mode must be completed within one minute in total to protect the AWD drive system components and parking brake.**

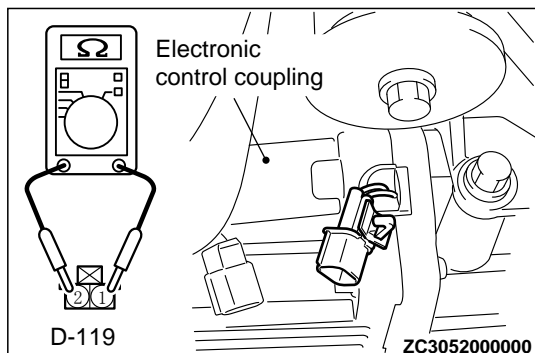
11. Switch the drive mode selector to the AWD mode, and check that the rear wheels are rotating. (At this time, the AWD indicator in the combination meter illuminates.)

After the above checks are completed, if the rear wheel rotation satisfies the above conditions, it is judged that the electronic control coupling operates correctly. If the rear wheel rotation does not satisfy the above conditions, replace the electronic control coupling. (Refer to P.27C-94.)

### RESISTANCE MEASUREMENT BETWEEN ELECTRONIC CONTROL COUPLING SOLENOID CONNECTOR TERMINALS

Disconnect the D-119 connector, and measure the resistance value between the connector terminals on the electronic control coupling side. If the measured resistance value is out of the standard value range, replace the electronic control coupling. (Refer to P.27C-94.)

**Standard value: 2.2 - 4.0 ohm**

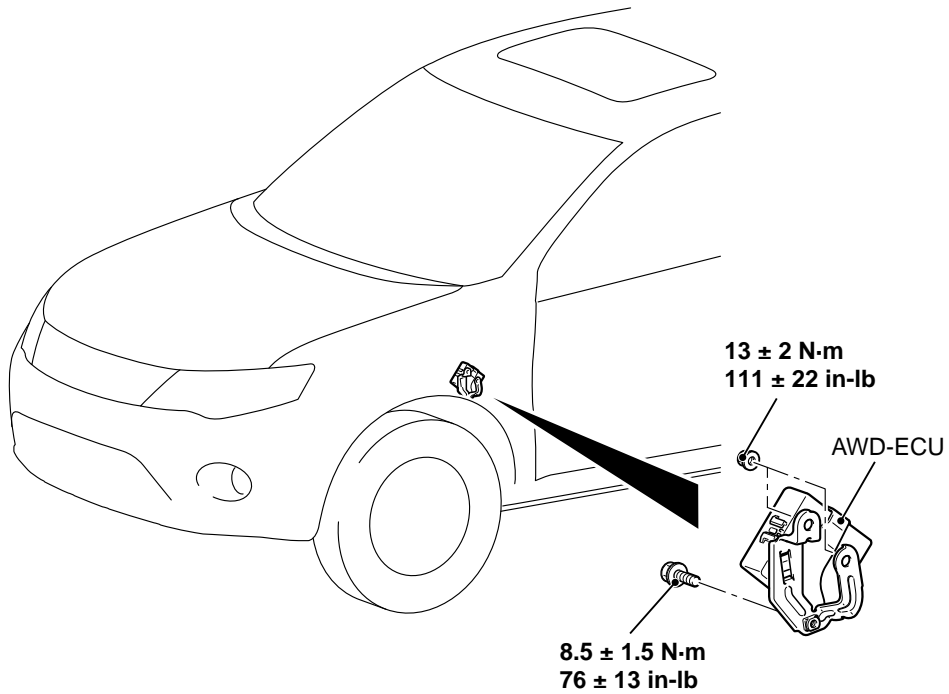


### AWD-ECU

## REMOVAL AND INSTALLATION

#### Pre-removal and post-installation operation

Removal and installation of the bottom cover assembly and glove box (Refer to GROUP 52A - Instrument Panel Assembly .)



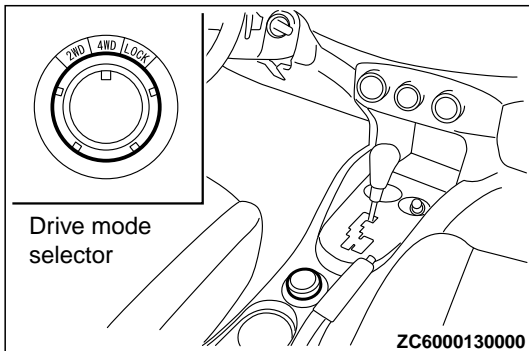
ZC3061930000

## DRIVE MODE SELECTOR

### REMOVAL AND INSTALLATION

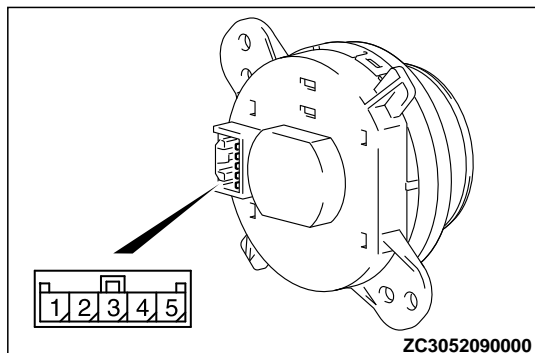
M12704100044USA0000010000

Refer to GROUP 52A - Instrument Panel Assembly .



DRIVE MODE SELECTOR CHECK

M12704100045USA0000010000

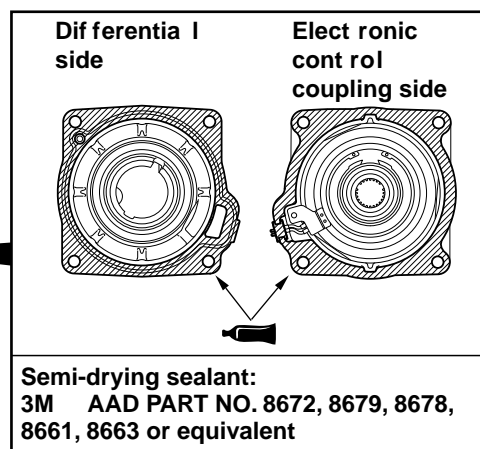
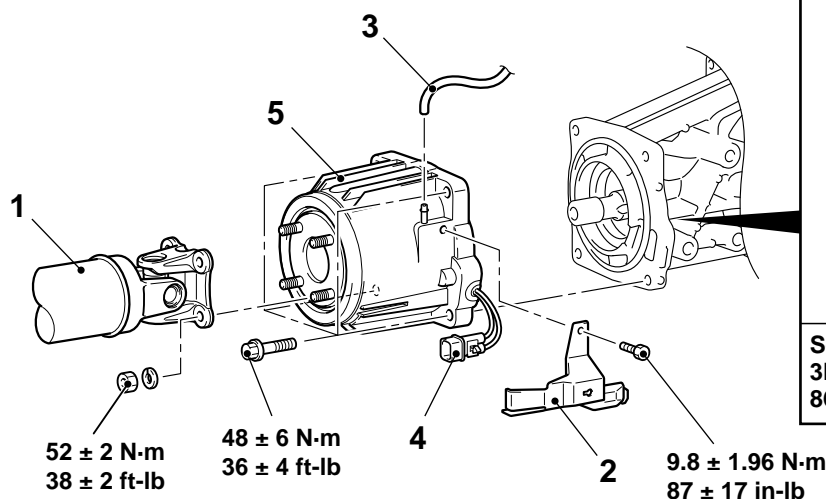


Switch position	Terminal number	Normal conditions
FWD	1 - 2	Continuity exists (2 ohm or less).
AWD	-	No continuity
LOCK	2 - 3	Continuity exists (2 ohm or less).

ELECTRONIC CONTROL COUPLING

REMOVAL AND INSTALLATION

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ZC6004980000

**Removal steps**

1. Propeller shaft assembly (Refer to GROUP 25 - Propeller Shaft P.25-5.)
2. Cover
3. Vacuum hose connection
4. Connector connection
- A 5. Electronic control coupling

## INSTALLATION SERVICE POINTS

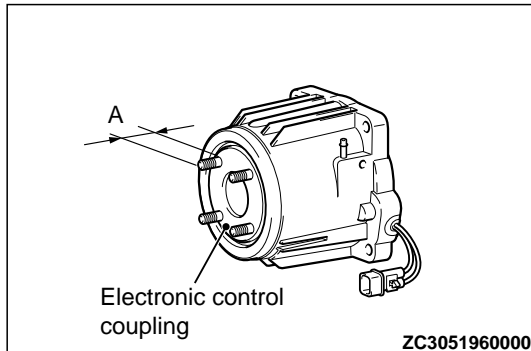
### A ELECTRONIC CONTROL COUPLING INSTALLATION

1. Check that the length of the electronic control coupling stud bolt (A) is within the standard value range.

**Standard value: 22.3 - 25.1 mm (0.88 - 0.99 inch)**

2. If it exceeds either of the limits, clean the threads for the electronic control coupling and replace the stud bolt.

**Tightening torque: 15 ± 3 N·m (11 ± 2 ft-lb)**



27C-96

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MEMO