

INSPECTION PROCEDURE 10: Early or Late Shifting in All Gears**COMMENT**

If all shift points are early or late while driving, the cause is probably a malfunction of the output shaft speed sensor, TP sensor or a solenoid valve.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Malfunction of the output shaft speed sensor
- Malfunction of the TP sensor
- Malfunction of each solenoid valve
- Abnormal line pressure
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Using scan tool MB991958, check data list item 23: Output Shaft Speed Sensor.**⚠ CAUTION**

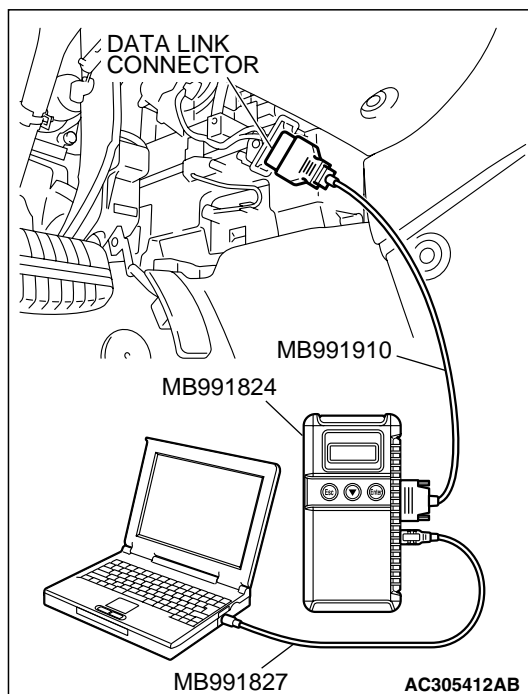
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

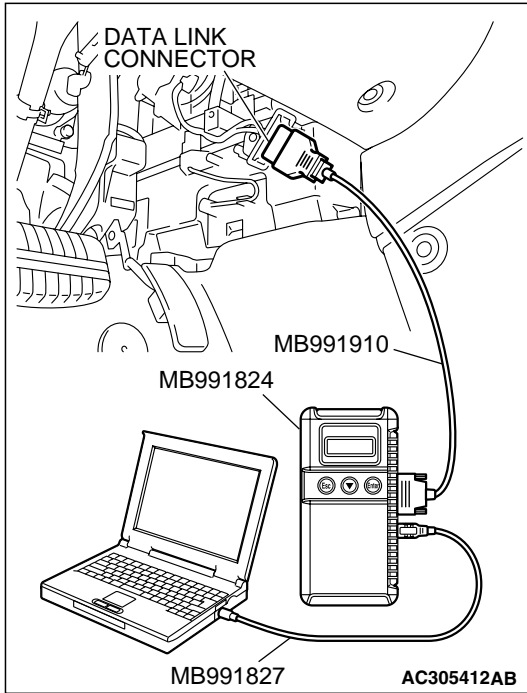
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the data reading mode.
 - Item 23: Output Shaft Speed Sensor.
 - When driving at constant speed of 50km/h (31mph), the display should be "1,400 – 1,700 r/min" (Gear range: 3rd gear).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : Go to Step 2.

NO : Refer to [P.23A-90](#), DTC 23: Output shaft speed sensor system.





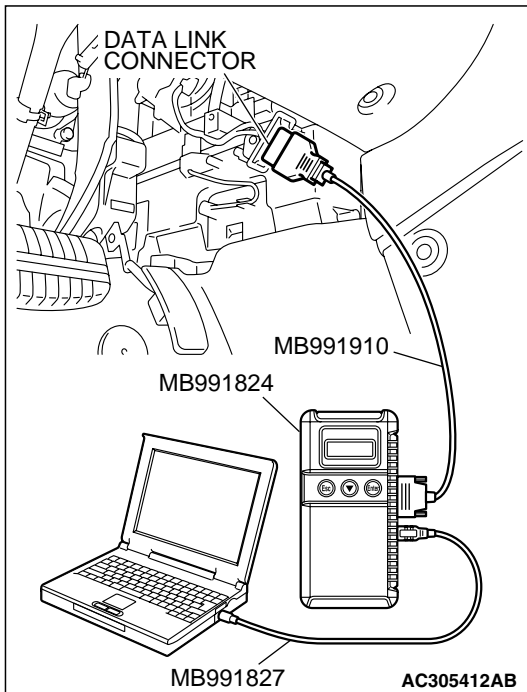
STEP 2. Using scan tool MB991958, check data list item 11: TP Sensor.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode.
 - Item 11: TP Sensor.
 - With the throttle valve in idle position, voltage should measure between 300 and 700 mV.
 - With the throttle valve in full-open position, voltage should measure 4,000 mV or more.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 300 and 700 mV at idle, and 4,000 mV or more at the full-open position?

YES : Go to Step 3.

NO : Check the TP sensor. Refer to GROUP13A <2.4L Engine>, Diagnostic Trouble Code Procedures [P.13A-159](#), [P.13A-169](#), DTCs P0122, P0123: TP Sensor System or refer to GROUP13B <3.8L Engine>, Diagnostic Trouble Code Procedures [P.13B-162](#), [P.13B-172](#), DTCs P0122, P0123: TP Sensor System. Then check the symptom.



STEP 3. Using scan tool MB991958, check data list.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the data reading mode for following items.
 - a. Item 31: Low-Reverse Solenoid Valve Duty Percent
 - b. Item 32: Underdrive Solenoid Valve Duty Percent
 - c. Item 33: Second Solenoid Valve Duty Percent
 - d. Item 34: Overdrive Solenoid Valve Duty Percent
 - Check that the values shown below are displayed when each data list item is entered.

| DRIVING CONDITION | DATA LIST ITEM | | | |
|--|----------------|------|------|------|
| | 31 | 32 | 33 | 34 |
| Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 0% | 0% | 100% | 100% |
| Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 100% | 0% | 0% | 100% |
| Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 100% | 0% | 100% | 0% |
| Driving at constant speed of 50 km/h (31 mph) in 4th gear | 100% | 100% | 0% | 0% |

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

Q: Are the solenoid valves operating properly?

YES : Go to Step 4.

NO : Go to Step 6.

STEP 4. Adjust the line pressure.

Adjust the line pressure. Refer to [P.23A-42](#), Line Pressure Adjustment. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 5.

STEP 5. Disassemble and clean the valve body.

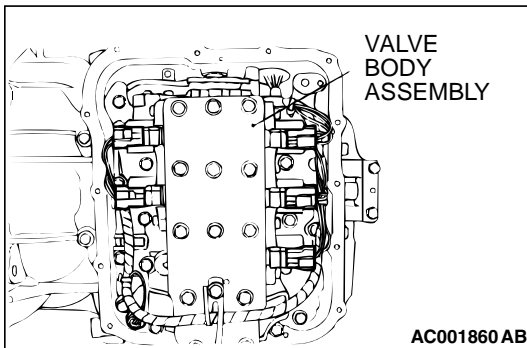
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 7.



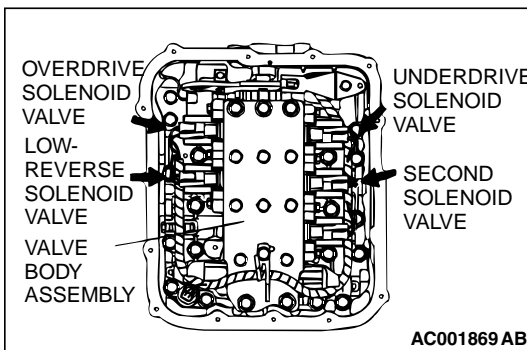
STEP 6. Replace each solenoid valve.

Replace the faulty solenoid valve with a new one.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 7.



STEP 7. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 11: Early or Late Shifting in Some Gears

COMMENT

If some of the shift points are early or late when driving, the cause is probably a malfunction of the valve body, or it is due to the characteristics of the INVECS-II system but is not an abnormality.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Using scan tool MB991958, check actuator test item 14: INVECS-II Cancel Command.

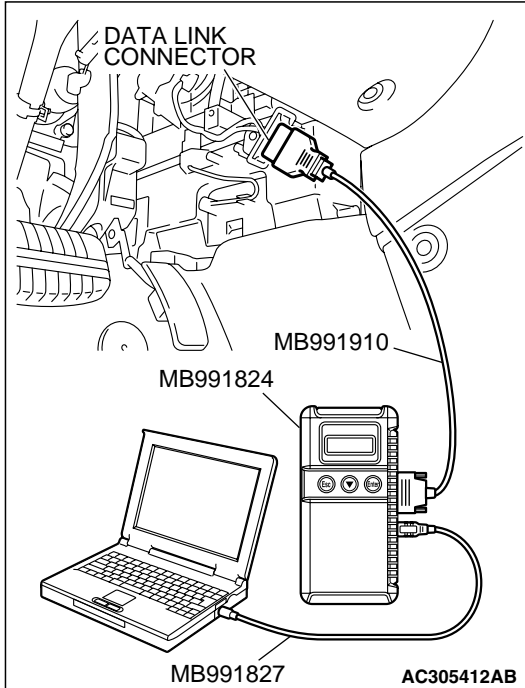
⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to the actuator test mode.
 - Item14: INVECS-II Cancel Command.
 - Drive the vehicle and confirm the gear shifting correspond to the standard shift line of the shift pattern diagram. Refer to P.23A-3.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Does the gear shifting correspond to the standard shift line of the shift pattern diagram?

- YES :** The symptom is due to characteristics of the INVECS-II system, but is not abnormal.
- NO :** Go to Step 2.



STEP 2. Check the shift points.

Q: Are the shift points early or late only when transmission fluid is -29°C (84°F) or less (early), or 125°C (257°F) or more (late)?

- YES :** The symptom is due to characteristics of the INVECS-II system, but is not abnormal.
- NO :** Go to Step 3.

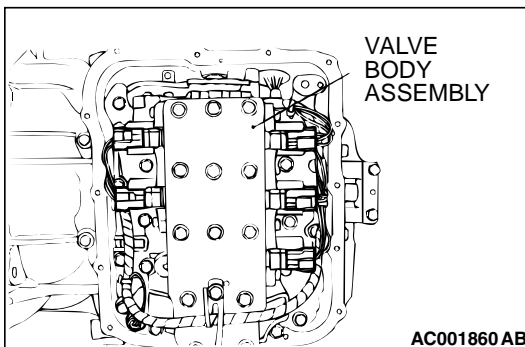
STEP 3. Disassemble and clean the valve body.

Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body P.23B-80.

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

- YES :** The procedure is complete.
- NO :** Go to Step 4.



STEP 4. Replace the PCM.

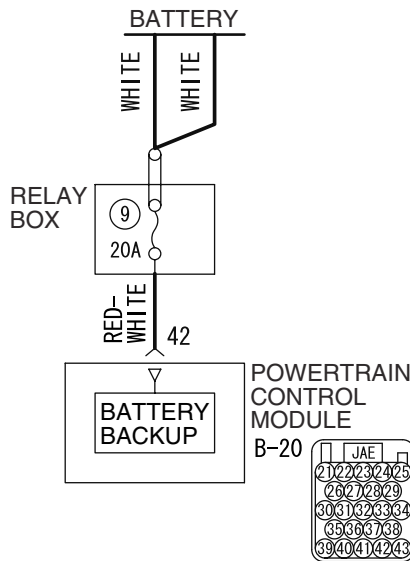
Q: Is the symptom eliminated?

YES : The procedure is complete.

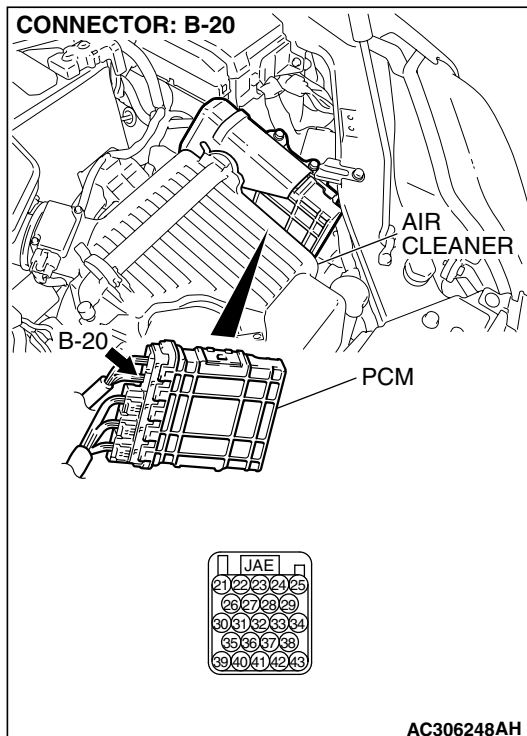
NO : Start over at Step 1.

INSPECTION PROCEDURE 12: No Diagnostic Trouble Codes (Does not Shift)

Backup Power Supply System Circuit



W4P13M01AA
AC210058AC



CIRCUIT OPERATION

PCM (terminal number 42) receives battery positive voltage from the battery.

COMMENT

If shifting does not occur while driving and no diagnostic trouble codes are output, a malfunction of the transmission range switch, or PCM may exist.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Malfunction of the transmission range switch
- Damaged harness, connector
- Malfunction of the PCM

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Check the vehicle acceleration.

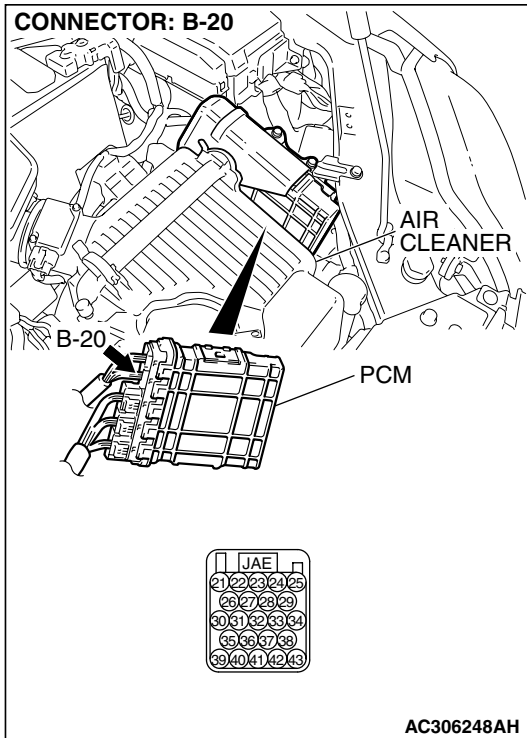
Q: Does the vehicle accelerate poorly (transaxle stays in 3rd gear) when starting from a stop with the selector lever in "D" range?

YES : Go to Step 2.

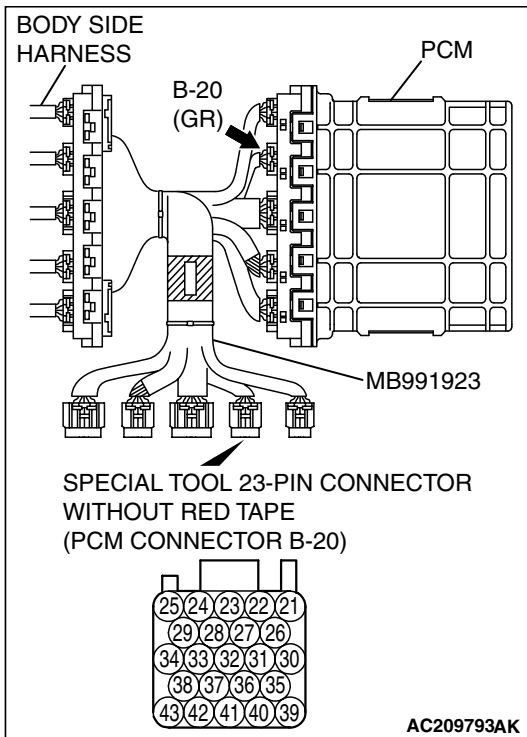
NO : Go to Step 5.

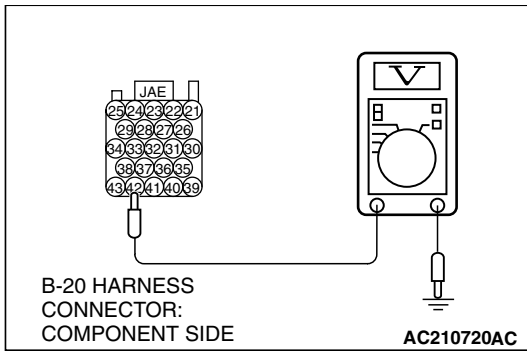
STEP 2. Measure the backup power supply voltage at PCM connector B-20 by using check harness special tool MB991923.

(1) Disconnect all the connectors from the PCM.



- (2) Connect special tool MB991923 (check harness) between the PCM and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.

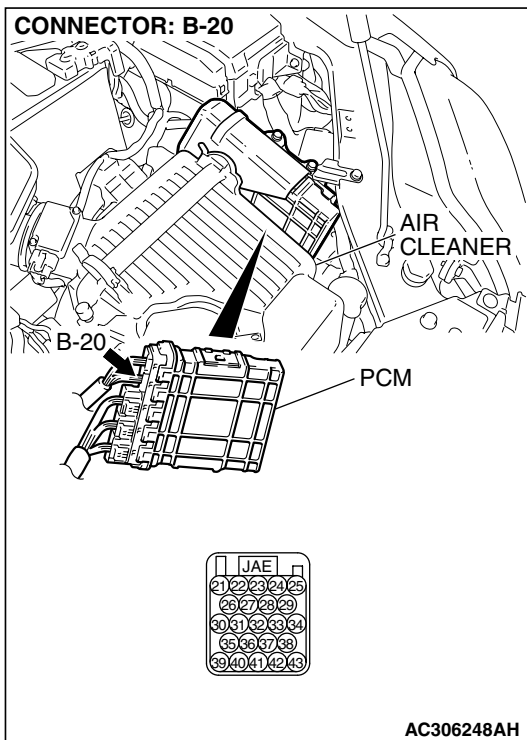




- (4) Measure the voltage between terminal 42 and ground.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

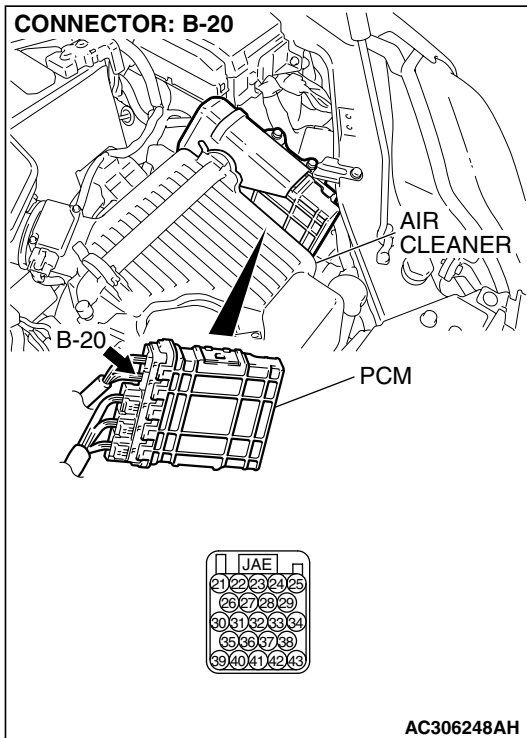
- YES :** Go to Step 5.
- NO :** Go to Step 3.



STEP 3. Check PCM connector B-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is the connector in good condition?

- YES :** Go to Step 4.
- NO :** Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#). Then retest the system.



STEP 4. Check the harness for open circuit between PCM connector B-20 terminal 42 and battery.

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair or replace the harness wire.

STEP 5. Using scan tool MB991958, check data list item 61: Transmission Range Switch.

CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

(1) Connect scan tool MB991958 to the data link connector.

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

(3) Set scan tool MB991958 to the data reading mode.

- Item 61: Transmission Range Switch.

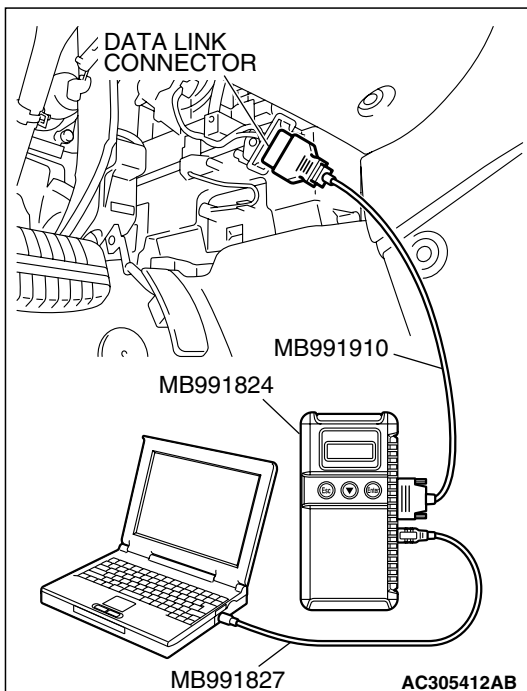
- Move the selector lever to "P," "R," "N," "D" positions and confirm that the selected transmission range match the positions shown on scan tool MB991958.

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

Q: Is the switch operating properly?

YES : Check for the symptom. If the symptom is not eliminated, replace the PCM.

NO : Refer to [P.23A-120](#), [P.23A-165](#), DTCs 27, 28: Transmission Range Switch system.



INSPECTION PROCEDURE 13: Poor Acceleration

COMMENT

If acceleration is poor when downshifting occurs while driving, a malfunction of the engine system or a brake or clutch may exist.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Malfunction of the engine system
- Malfunction of the clutch system and brake system
- Malfunction of the PCM

DIAGNOSIS

STEP 1. Check the engine system.

Refer to GROUP 13A <2.4L Engine>, Diagnosis – Symptom Chart – Poor acceleration [P. 13A-1015](#).

Refer to GROUP 13B <3.8L Engine>, Diagnosis – Symptom Chart – Poor acceleration [P. 13B-1066](#).

Q: Is the inspection result good?

YES : Go to Step 2.

NO : Repair or replace the engine component(s).

STEP 2. Check each brake and clutch.

Perform the torque converter stall test. Refer to [P. 23A-28](#), Torque Converter Stall Test. Then retest the system.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 3.

STEP 3. Perform the hydraulic pressure test.

Perform the hydraulic pressure test. Refer to [P. 23A-29](#), Hydraulic Pressure Test. Then retest the system.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 4.

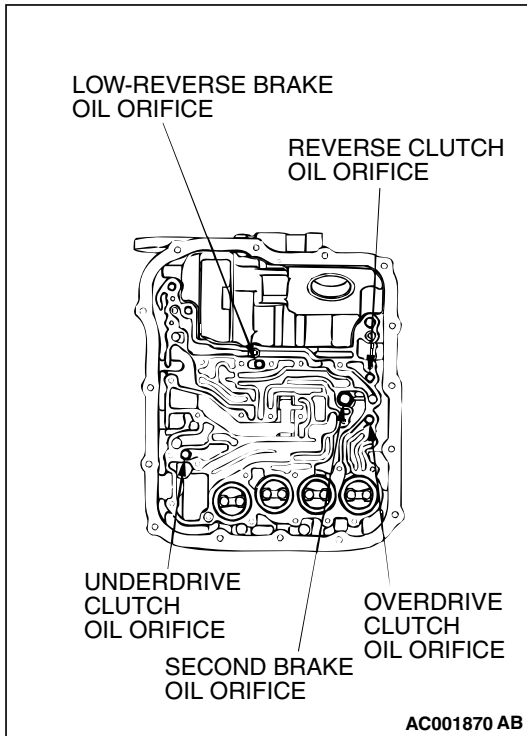
STEP 4. Check each brake system and each clutch system.

- (1) Remove the valve body cover and valve body. Refer to GROUP 23B, Transaxle [P.23B-10](#).
- (2) Blow 108 kPa (15 psi) compressed air into the each brake oil orifice and clutch oil orifice of the transaxle case, and check if each brake and each clutch piston move and air pressure is maintained.

Q: Is the air pressure maintained?

YES : The procedure is complete.

NO : Go to Step 5.



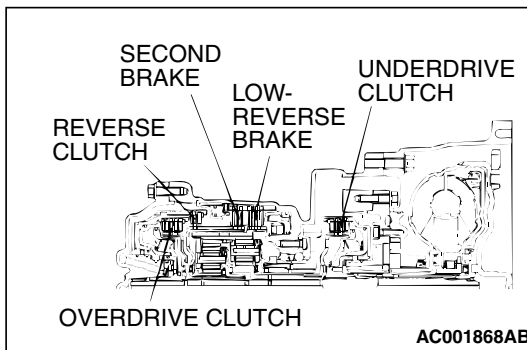
STEP 5. Check each brake system and clutch system.

- (1) Remove the transaxle.
- (2) Check the facings for seizure and piston seal ring for damage and interference with retainer. Repair or replace the faulty parts. Refer to GROUP 23B, Transaxle [P.23B-10](#), Underdrive Clutch and Input Shaft [P.23B-60](#), Reverse and Overdrive Clutch [P.23B-62](#). Then retest the system.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.



STEP 6. Replace the PCM.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 14: Vibration

COMMENT

If vibration occurs when driving at constant speed or when accelerating in 4th gear, abnormal torque converter clutch pressure a malfunction of the engine system, torque converter clutch solenoid, torque converter or valve body may exist.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Abnormal torque converter clutch pressure
- Malfunction of the engine system
- Malfunction of the torque converter clutch solenoid
- Malfunction of the torque converter
- Malfunction of the valve body
- Malfunction of the PCM

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Using scan tool MB991958, check actuator test item 06: Torque Converter Clutch Solenoid Valve.**⚠ CAUTION**

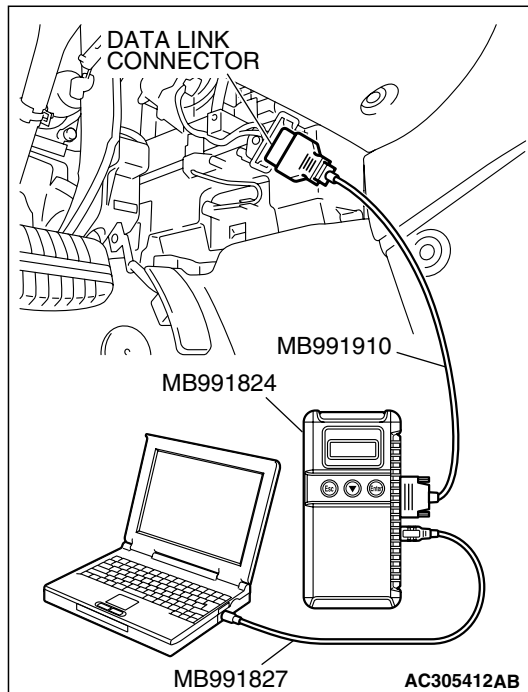
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the actuator test mode.
 - Item 06: Torque Converter Clutch Solenoid Valve.
 - An audible clicking or buzzing should be heard when the torque converter clutch solenoid valve is energized.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : Go to Step 2.

NO : Repair or replace the torque converter clutch solenoid valve. Refer to GROUP 23B, Valve Body P.23B-80. Then confirm that the symptom is eliminated.



STEP 2. Check the vibration.

Q: Does the vibration occur when the transmission fluid temperature sensor connector has been disconnected?

YES : Check the engine system. Refer to GROUP 13A <2.4L Engine>, Diagnosis – Symptom Chart – Driving [P.13A-38](#) or refer to GROUP 13B <3.8L Engine>, Diagnosis – Symptom Chart – Driving [P.13B-38](#). If the inspection result is not good, diagnose, repair, and/or replace the engine component(s).

NO : Go to Step 3.

STEP 3. Check the torque converter hydraulic pressure.

Measure the torque converter hydraulic pressure. Then check if the torque converter hydraulic pressure is within the standard value. Refer to [P.23A-29](#), Hydraulic Pressure Test.

Q: Is the torque converter hydraulic pressure within the standard value?

YES : Go to Step 4.

NO : Go to Step 5.

STEP 4. Replace the torque converter assembly.

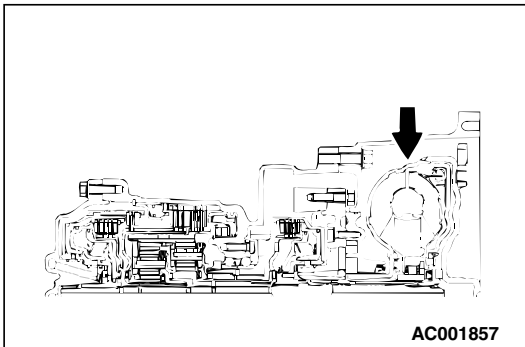
(1) Remove the transaxle.

(2) Replace the torque converter assembly. Refer to GROUP 23B, Transaxle [P.23B-10](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.



STEP 5. Disassemble and clean the valve body.

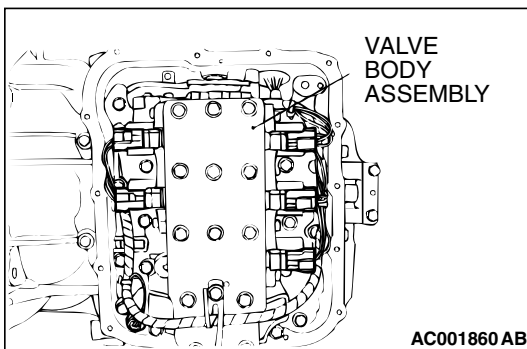
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-80](#).

Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Go to Step 6.



STEP 6. Replace the PCM.

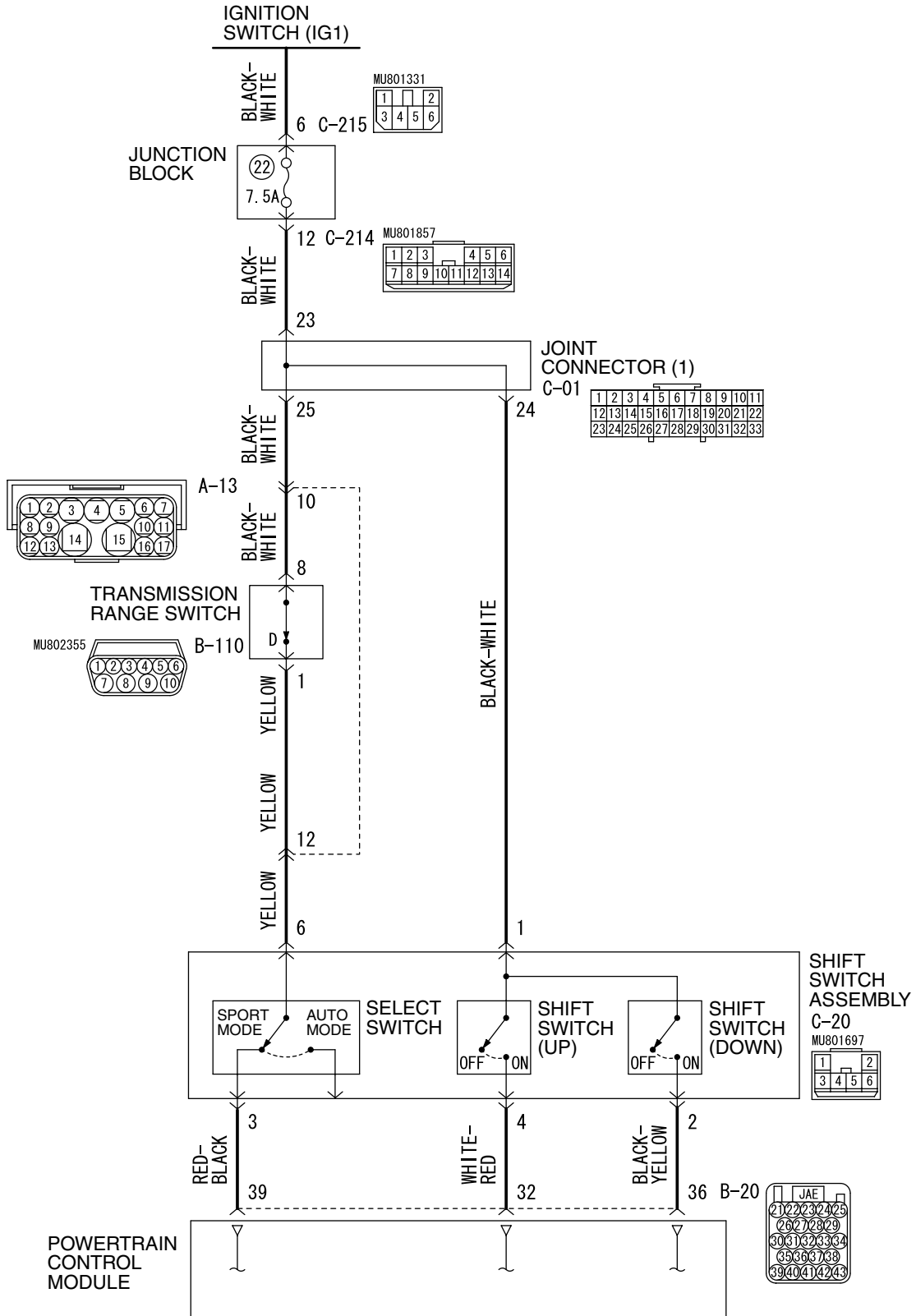
Q: Is the symptom eliminated?

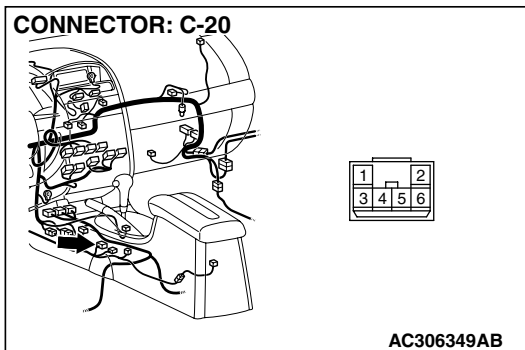
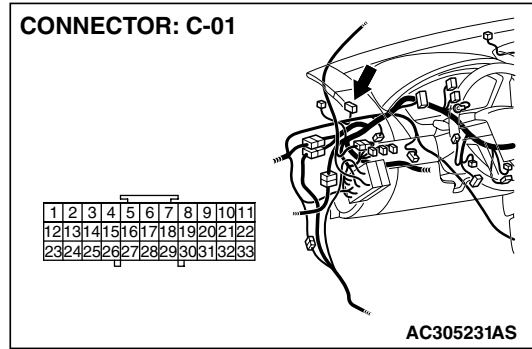
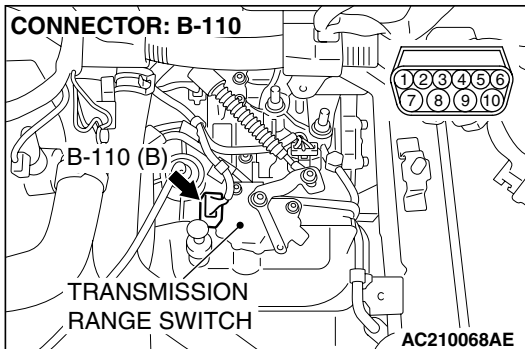
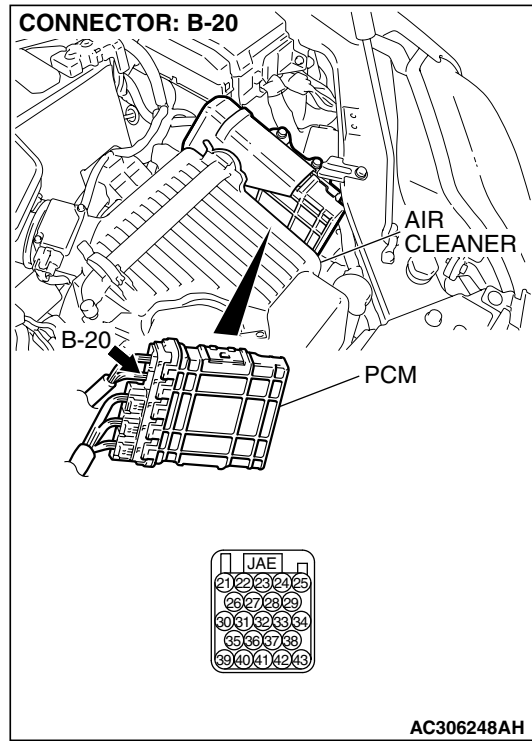
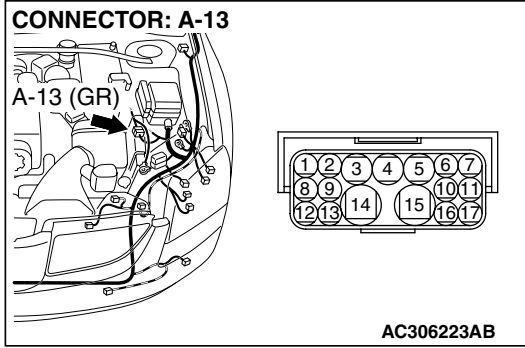
YES : The procedure is complete.

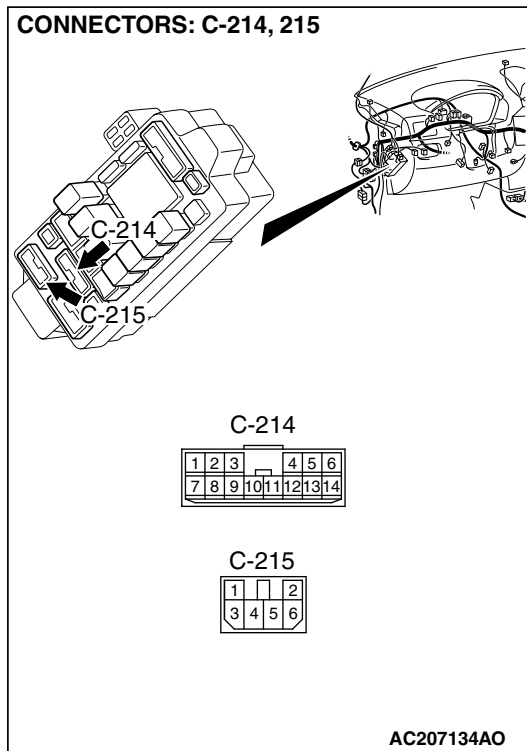
NO : Start over at Step 1.

INSPECTION PROCEDURE 15: Shift Switch Assembly System

Shift Switch Assembly System Circuit







CIRCUIT OPERATION

If the select switch of the shift switch assembly is set to the sport mode, battery positive voltage will be applied to the PCM (terminal 39). If the shift switch of the shift switch assembly is set to "UP" or "DOWN" position, battery positive voltage will be applied to the PCM (terminal 32, 36).

COMMENT

When sport mode shift does not operate the cause is probably a malfunction of the transmission range switch circuit, shift switch assembly circuit or a defective PCM.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Malfunction of the transmission range switch
- Malfunction of the shift switch assembly select switch
- Malfunction of the shift switch assembly shift switch (Up)
- Malfunction of the shift switch assembly shift switch (Down)
- Damaged harness or connector
- Malfunction of the PCM

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Using scan tool MB991958, read the A/T diagnostic trouble code.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

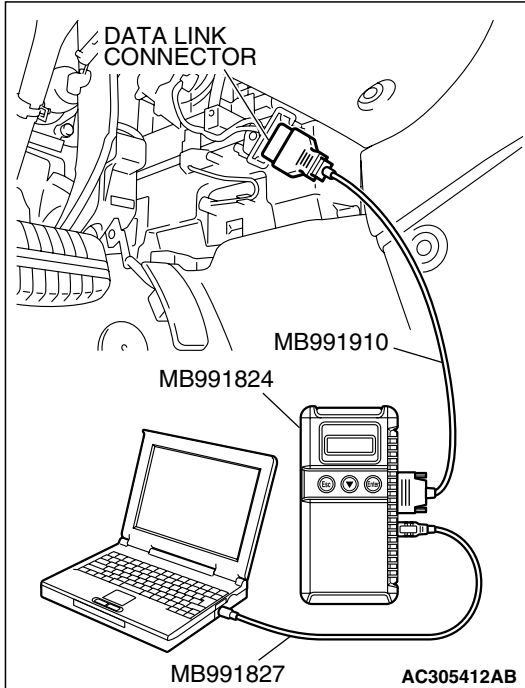
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for A/T diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

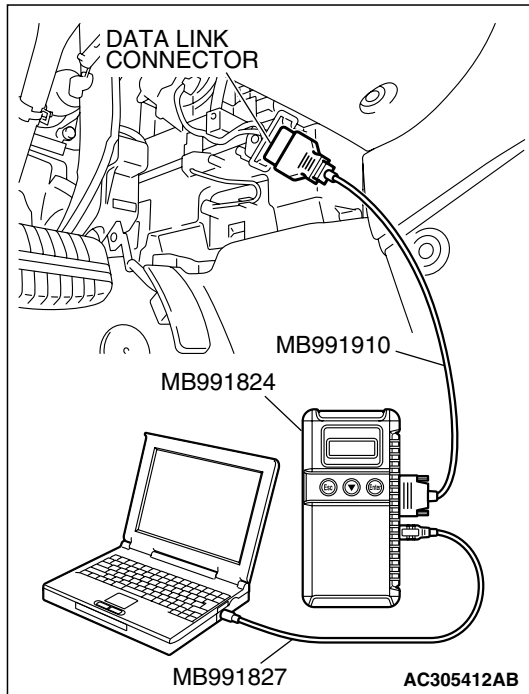
Q: Is DTC 27 or 28 set?

YES <DTC 27 set> : Refer to [P.23A-120](#), DTC 27:
Transmission Range Switch System (Open Circuit).

YES <DTC 28 set> : Refer to [P.23A-165](#), DTC 28:
Transmission Range Switch System (Short Circuit).

NO : Go to Step 2.





STEP 2. Using scan tool MB991958, check data list item 67: Select Switch, item 68: Shift Switch (Up), item 69: Shift Switch (Down).

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for following items.
 - a. Item 67: Select Switch
 - b. Item 68: Shift Switch (Up)
 - c. Item 69: Shift Switch (Down)

| SELECTOR LEVER OPERATION | DATA LIST ITEM | | |
|---------------------------------------|----------------|-----|-----|
| | 67 | 68 | 69 |
| D range | OFF | OFF | OFF |
| Sport mode | ON | OFF | OFF |
| Upshift and hold the selector lever | ON | ON | OFF |
| Downshift and hold the selector lever | ON | OFF | ON |

NOTE: The switches above are displayed, depending on the selector lever condition as shown in the table.

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

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-14](#).

NO <If completely NG> : Go to Step 3.

NO <If item 68 and item 69 both are NG> : Go to Step 5.

NO <If only item 67 is NG> : Go to Step 9.

NO <If only item 68 is NG> : Go to Step 17.

NO <If only item 69 is NG> : Go to Step 22.

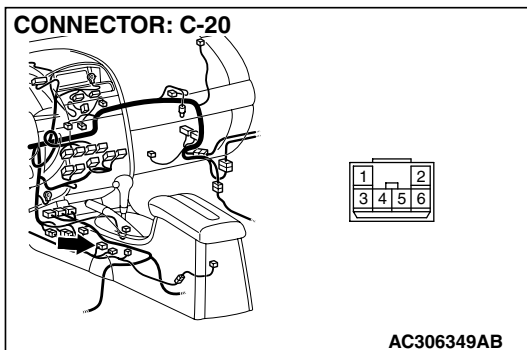
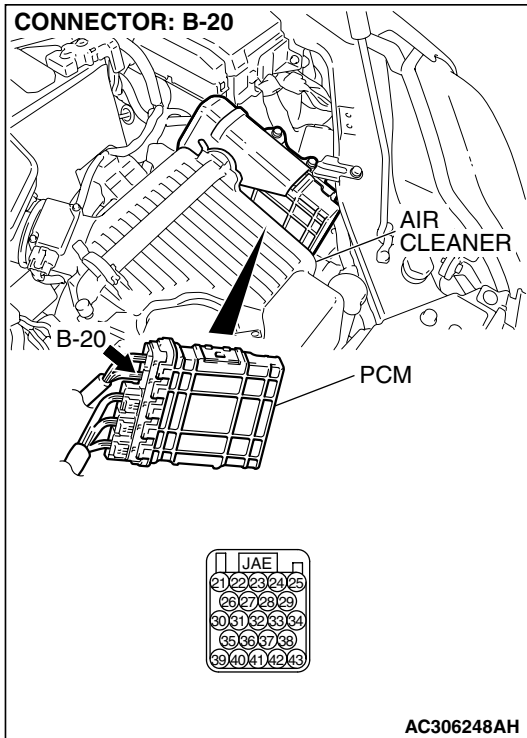
STEP 3. Check PCM connector B-20 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

[P.00E-2.](#)

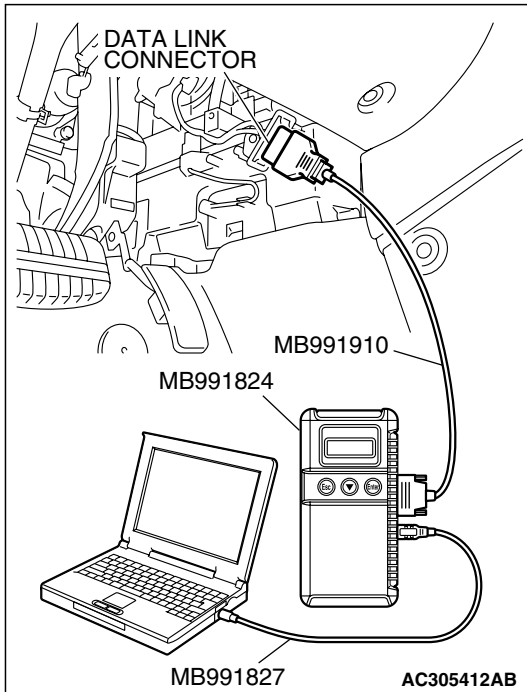


STEP 4. Using scan tool MB991958, check data list item 67: Select Switch, item 68: Shift Switch (Up), item 69: Shift Switch (Down).

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode for following items.
 - a. Item 67: Select Switch
 - b. Item 68: Shift Switch (Up)
 - c. Item 69: Shift Switch (Down)



| SELECTOR LEVER OPERATION | DATA LIST ITEM | | |
|---------------------------------------|----------------|-----|-----|
| | 67 | 68 | 69 |
| D range | OFF | OFF | OFF |
| Sport mode | ON | OFF | OFF |
| Upshift and hold the selector lever | ON | ON | OFF |
| Downshift and hold the selector lever | ON | OFF | ON |

NOTE: The switches above are displayed, depending on the selector lever condition as shown in the table.

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

Q: Is the switch operating properly?

- YES** : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-14](#).
- NO** : Replace the PCM.

STEP 5. Check the shift switch assembly.

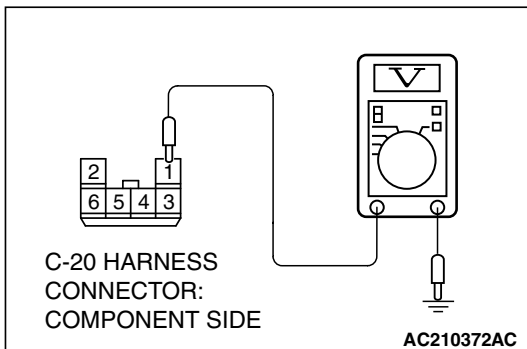
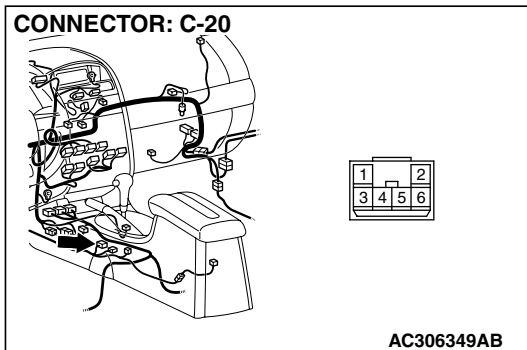
Refer to [P.23A-384](#), Transaxle Control.

Q: Is the switch operating properly?

- YES** : Go to Step 6.
- NO** : Replace the shift switch assembly. Refer to [P.23A-382](#), Transaxle Control.

STEP 6. Measure the power supply voltage at shift switch assembly connector C-20.

- (1) Disconnect connector C-20 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 4.

NO : Go to Step 7.

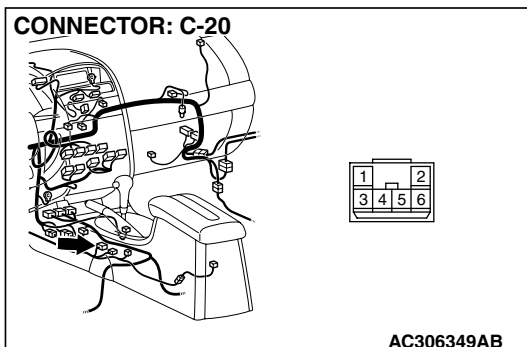
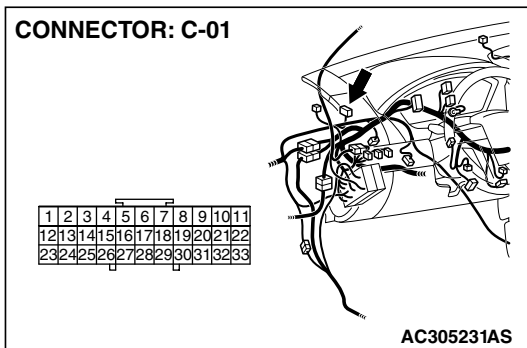
STEP 7. Check joint connector (1) C-01 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

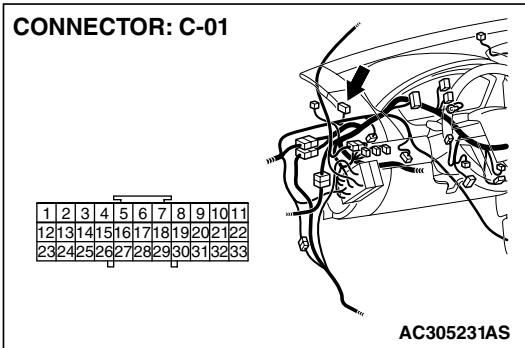
YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

[P.00E-2.](#)



CONNECTOR: C-01

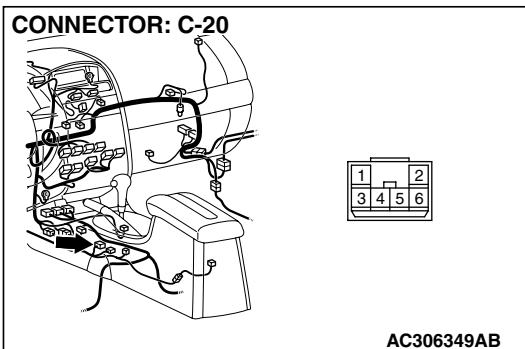


STEP 8. Check the harness for open circuit or short circuit to ground between joint connector (1) C-01 terminal 24 and shift switch assembly connector C-20 terminal 1.

Q: Is the harness wire in good condition?

- YES :** Go to Step 4.
- NO :** Repair or replace the harness wire.

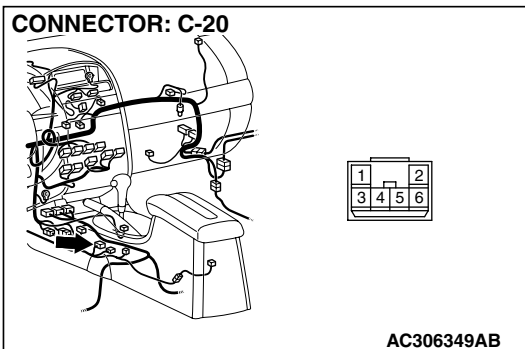
CONNECTOR: C-20



STEP 9. Measure the power supply voltage at shift switch assembly connector C-20.

- (1) Disconnect connector C-20 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Move the selector lever to the "D" position.

CONNECTOR: C-20

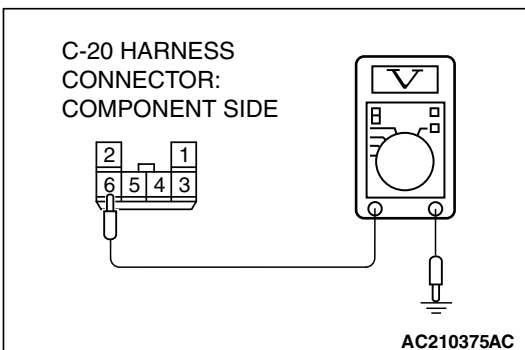


- (4) Measure the voltage between terminal 6 and ground.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

- YES :** Go to Step 12.
- NO :** Go to Step 10.

C-20 HARNESS
CONNECTOR:
COMPONENT SIDE



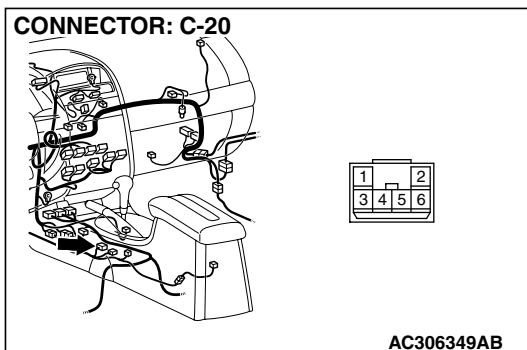
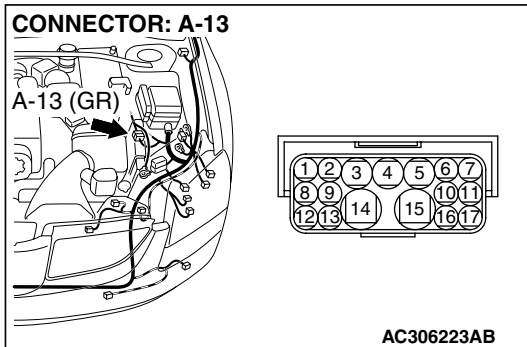
STEP 10. Check intermediate connector A-13 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 11.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

[P.00E-2.](#)

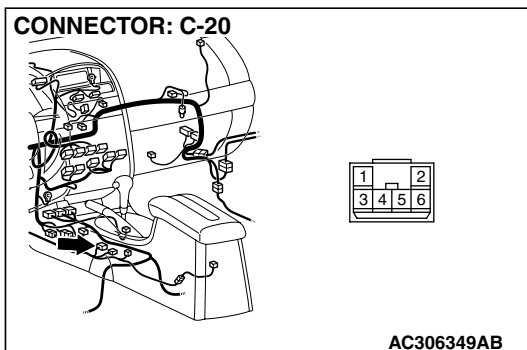
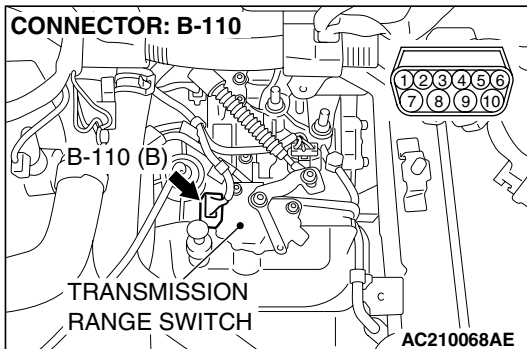


STEP 11. Check harness for open circuit or short circuit to ground between transmission range switch connector B-110 terminal 1 and shift switch assembly connector C-20 terminal 6.

Q: Is the harness wire in good condition?

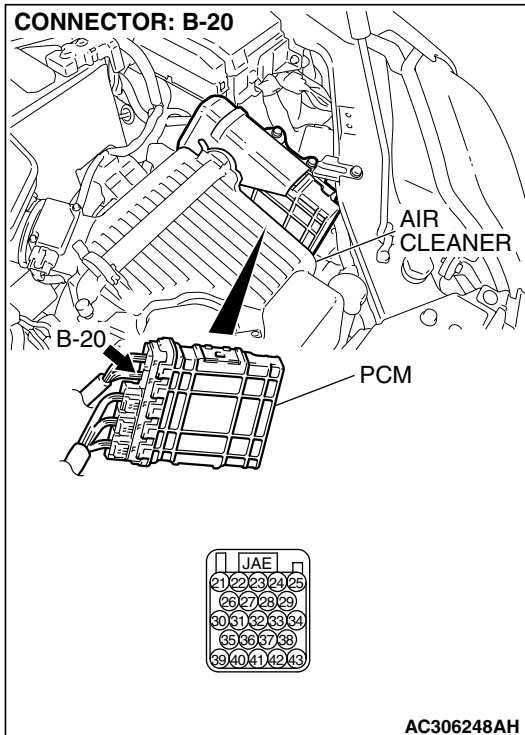
YES : Go to Step 4.

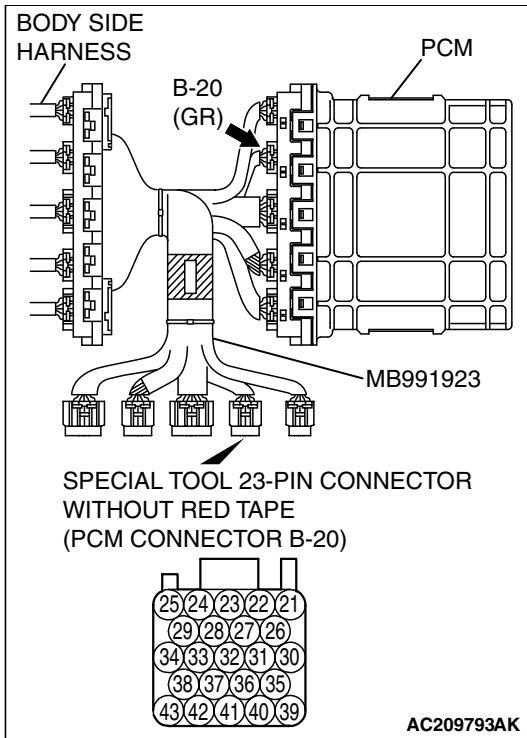
NO : Repair or replace the harness wire.



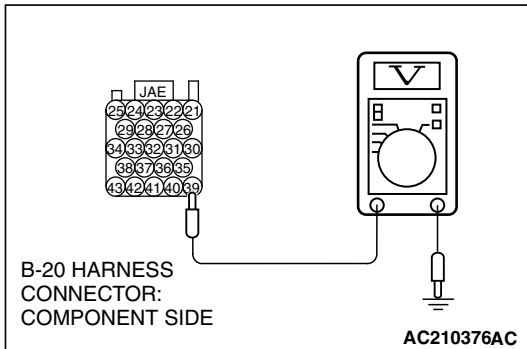
STEP 12. Check the shift switch assembly.Refer to [P.23A-384](#), Transaxle Control.**Q: Is the switch operating properly?****YES** : Go to Step 13.**NO** : Replace the shift switch assembly. Refer to [P.23A-382](#), Transaxle Control.**STEP 13. Measure the switch output voltage at PCM connector B-20 by using check harness special tool MB991923.**

(1) Disconnect all the connectors from the PCM.





- (2) Connect special tool MB991923 (check harness) between the PCM and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.
- (4) Move the selector lever to the sport mode.



- (5) Measure the voltage between terminal 39 and ground.
 - The voltage should measure battery positive voltage.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

- YES** : Go to Step 16.
- NO** : Go to Step 14.

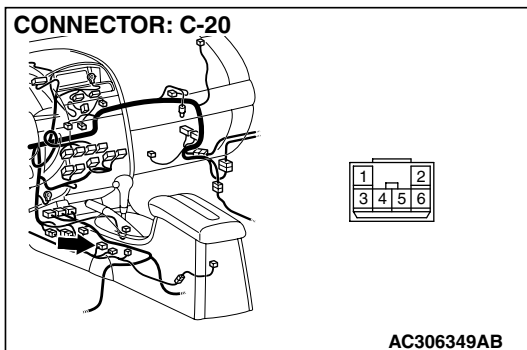
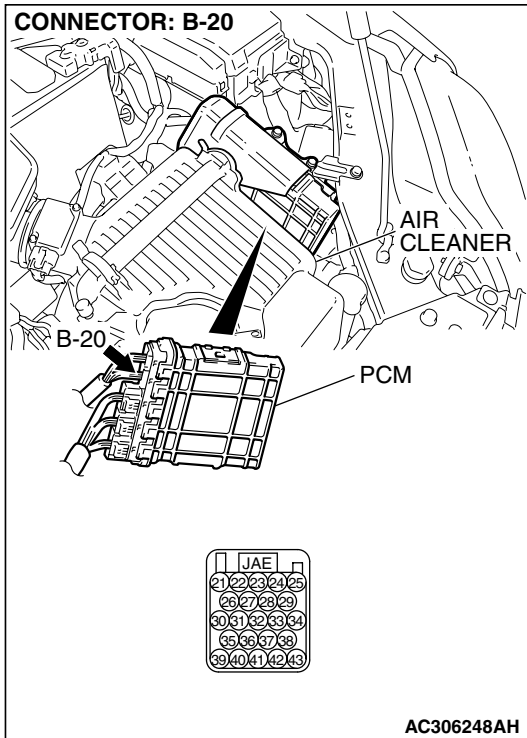
STEP 14. Check PCM connector B-20 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 15.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

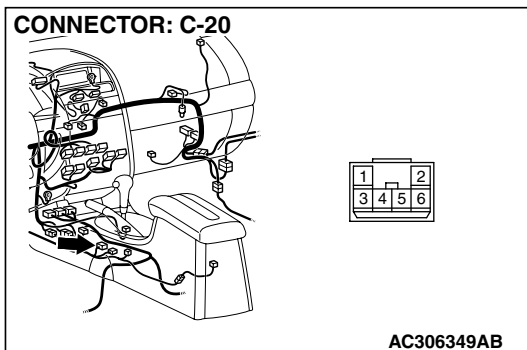
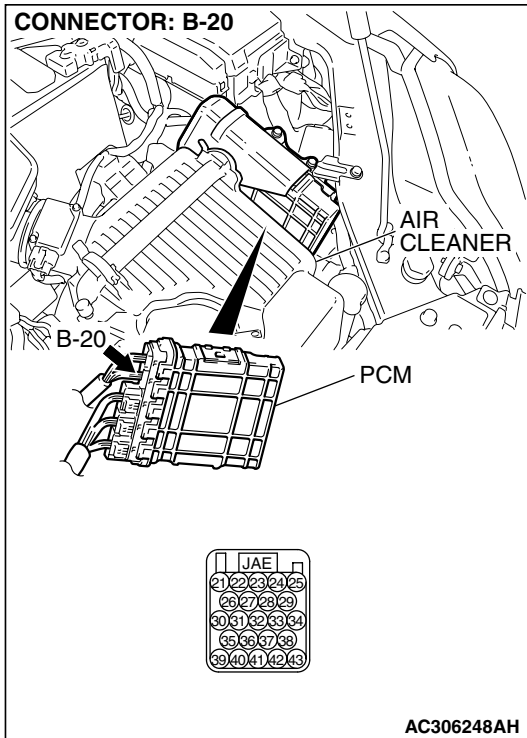
[P.00E-2.](#)

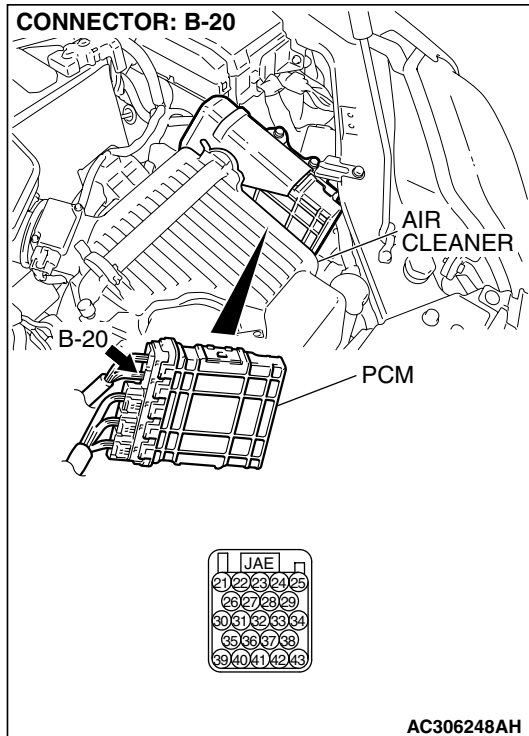


STEP 15. Check the harness for open circuit or short circuit to ground between PCM connector B-20 terminal 39 and shift switch assembly connector C-20 terminal 3.
Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.





STEP 16. Check PCM connector B-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 17. Check the shift switch assembly.

Refer to [P.23A-384](#), Transaxle Control.

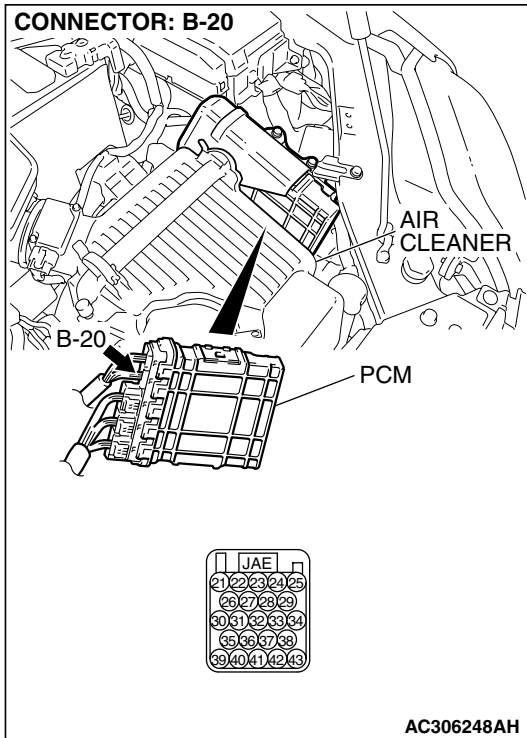
Q: Is the switch operating properly?

YES : Go to Step 18.

NO : Replace the shift switch assembly. Refer to [P.23A-382](#), Transaxle Control.

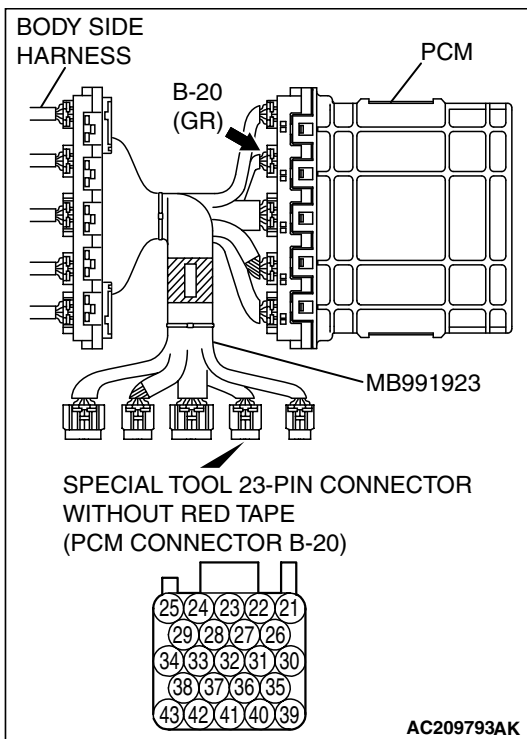
STEP 18. Measure the switch output voltage at PCM connector B-20 by using check harness special tool MB991923.

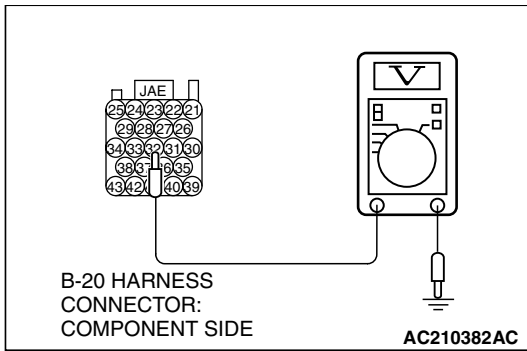
(1) Disconnect all the connectors from the PCM.



(2) Connect special tool MB991923 (check harness) between the PCM and the body-side harness connector.

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

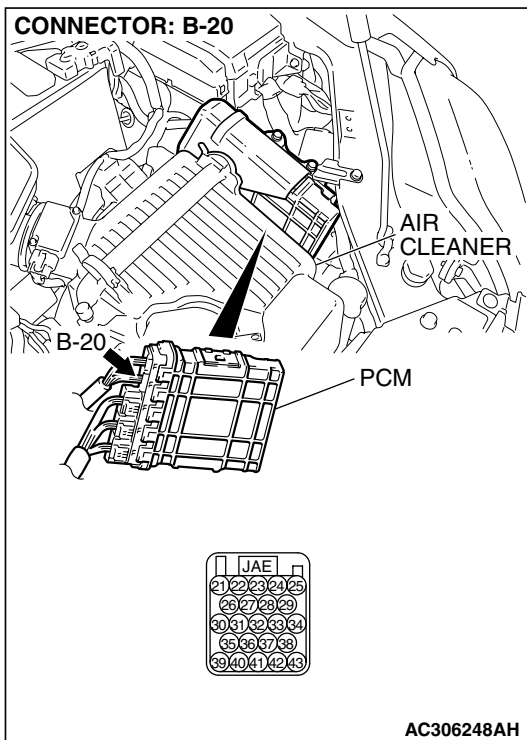




- (4) Measure the voltage between terminal 32 and ground.
- The voltage should measure battery positive voltage when the selector lever is upshift and hold.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

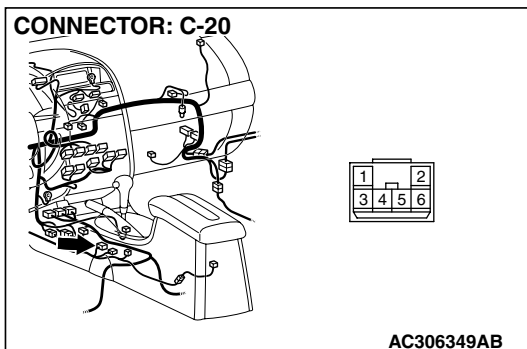
- YES** : Go to Step 21.
NO : Go to Step 19.



STEP 19. Check PCM connector B-20 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

- YES** : Go to Step 20.
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

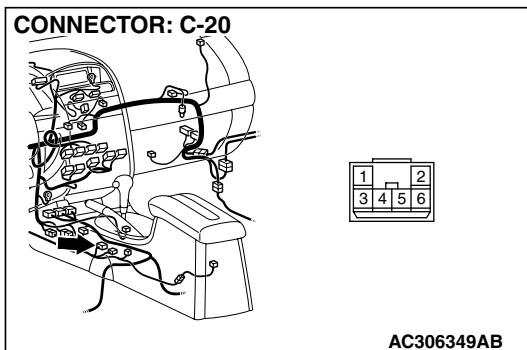
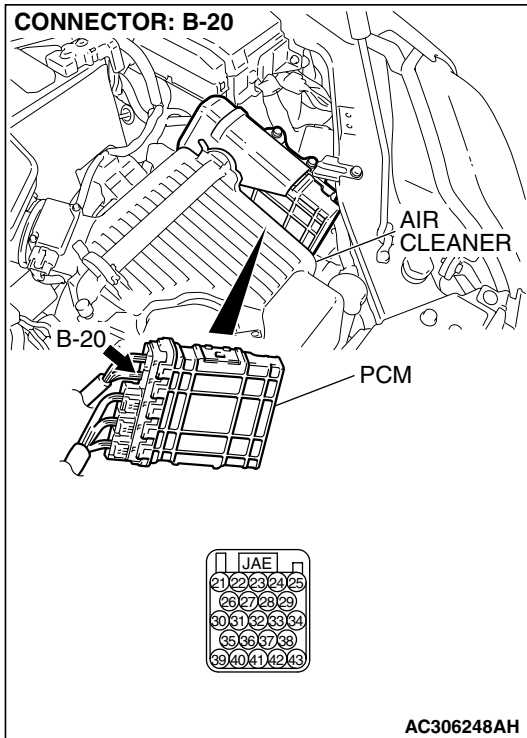


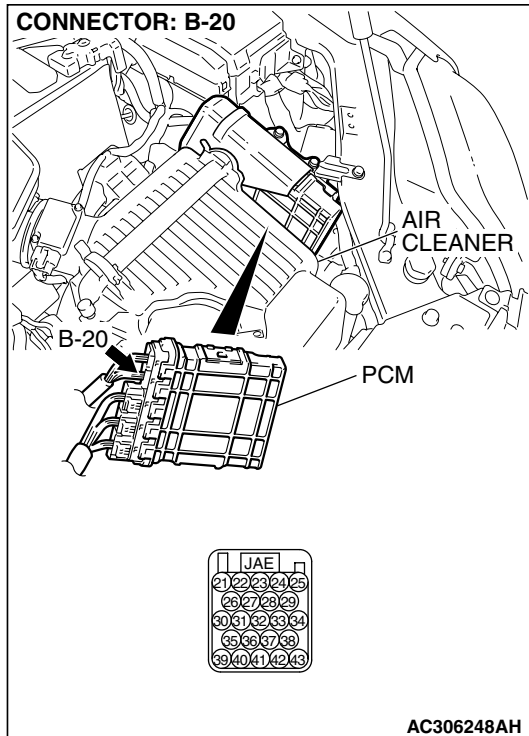
STEP 20. Check the harness for open circuit or short circuit to ground between PCM connector B-20 terminal 32 and shift switch assembly connector C-20 terminal 4.

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.





STEP 21. Check PCM connector B-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 22. Check the shift switch assembly.

Refer to [P.23A-384](#), Transaxle Control.

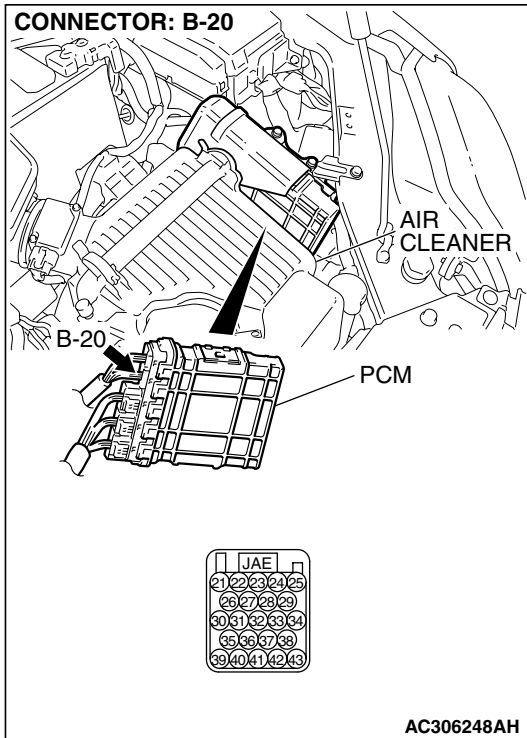
Q: Is the switch operating properly?

YES : Go to Step 23.

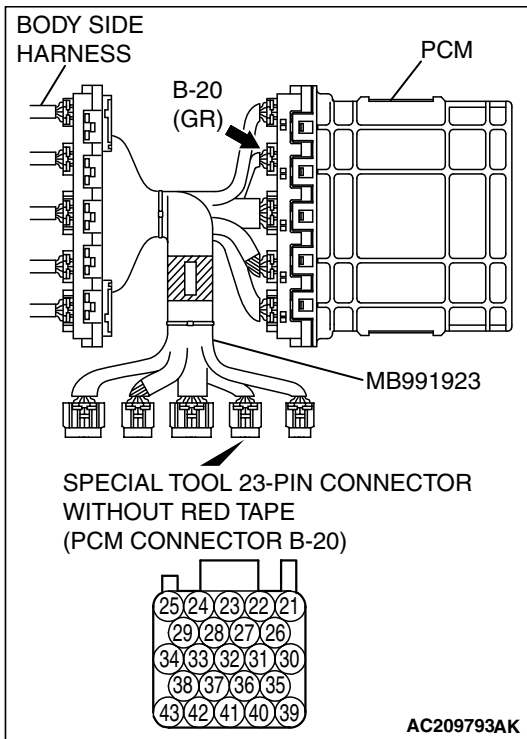
NO : Replace the shift switch assembly. Refer to [P.23A-382](#), Transaxle Control.

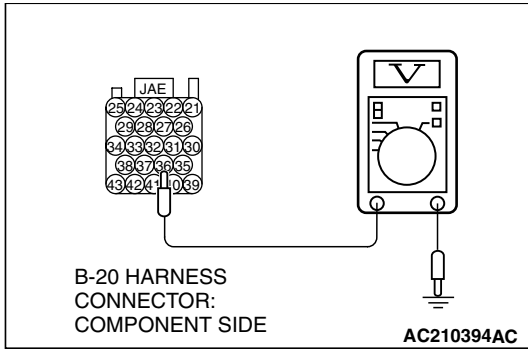
STEP 23. Measure the switch output voltage at PCM connector B-20 by using check harness special tool MB991923.

(1) Disconnect all the connectors from the PCM.



- (2) Connect special tool MB991923 (check harness) between the PCM and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.

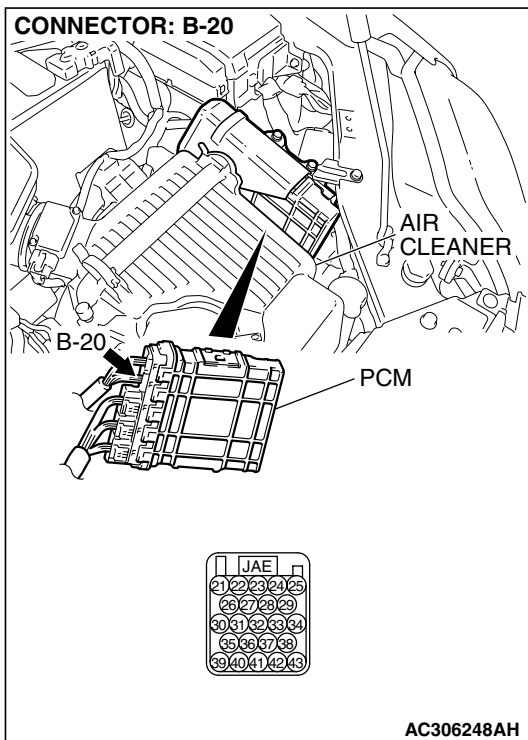




- (4) Measure the voltage between terminal 36 and ground.
 - The voltage should measure battery positive voltage when the selector lever is downshift and hold.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

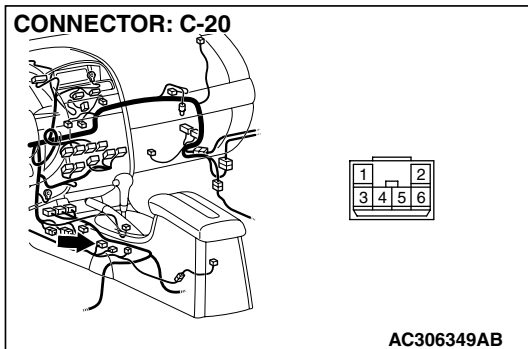
- YES** : Go to Step 26.
NO : Go to Step 24.



STEP 24. Check PCM connector B-20 and shift switch assembly connector C-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

- YES** : Go to Step 25.
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

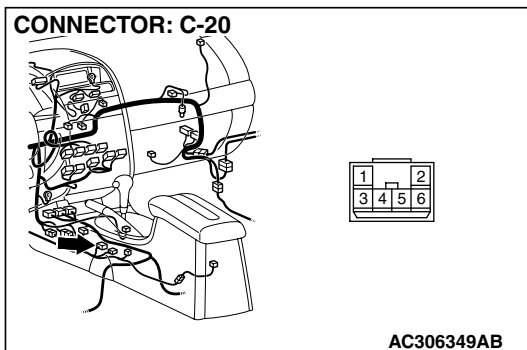
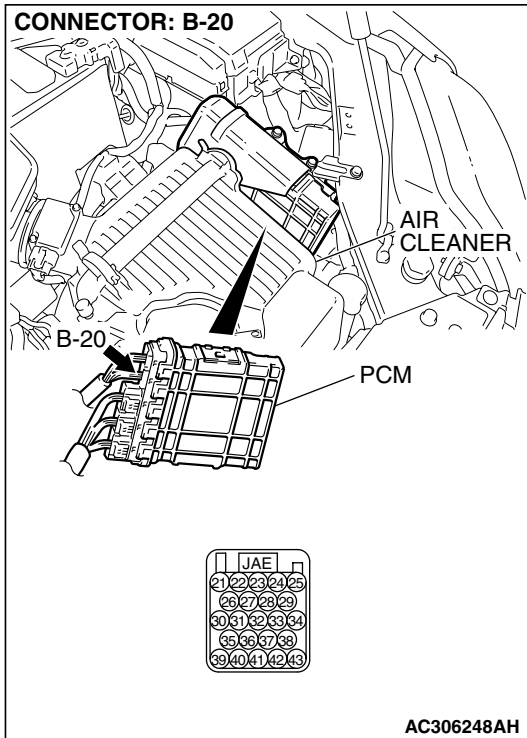


STEP 25. Check the harness for open circuit or short circuit to ground between PCM connector B-20 terminal 36 and shift switch assembly connector C-20 terminal 2.

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.



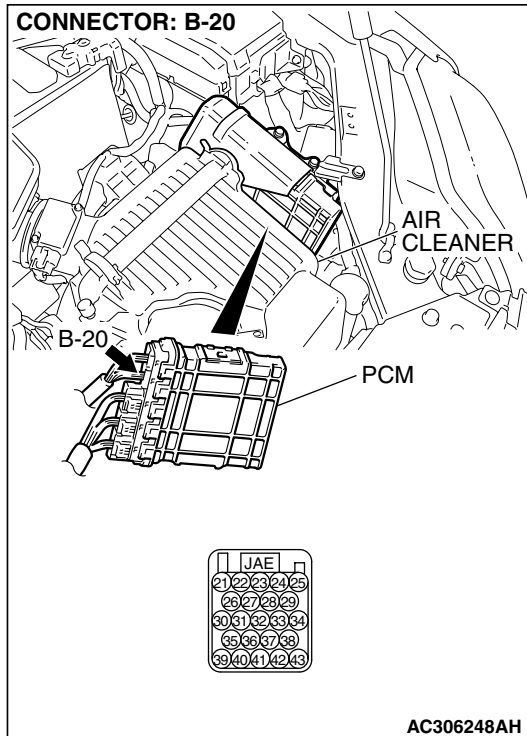
STEP 26. Check PCM connector B-20 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 4.

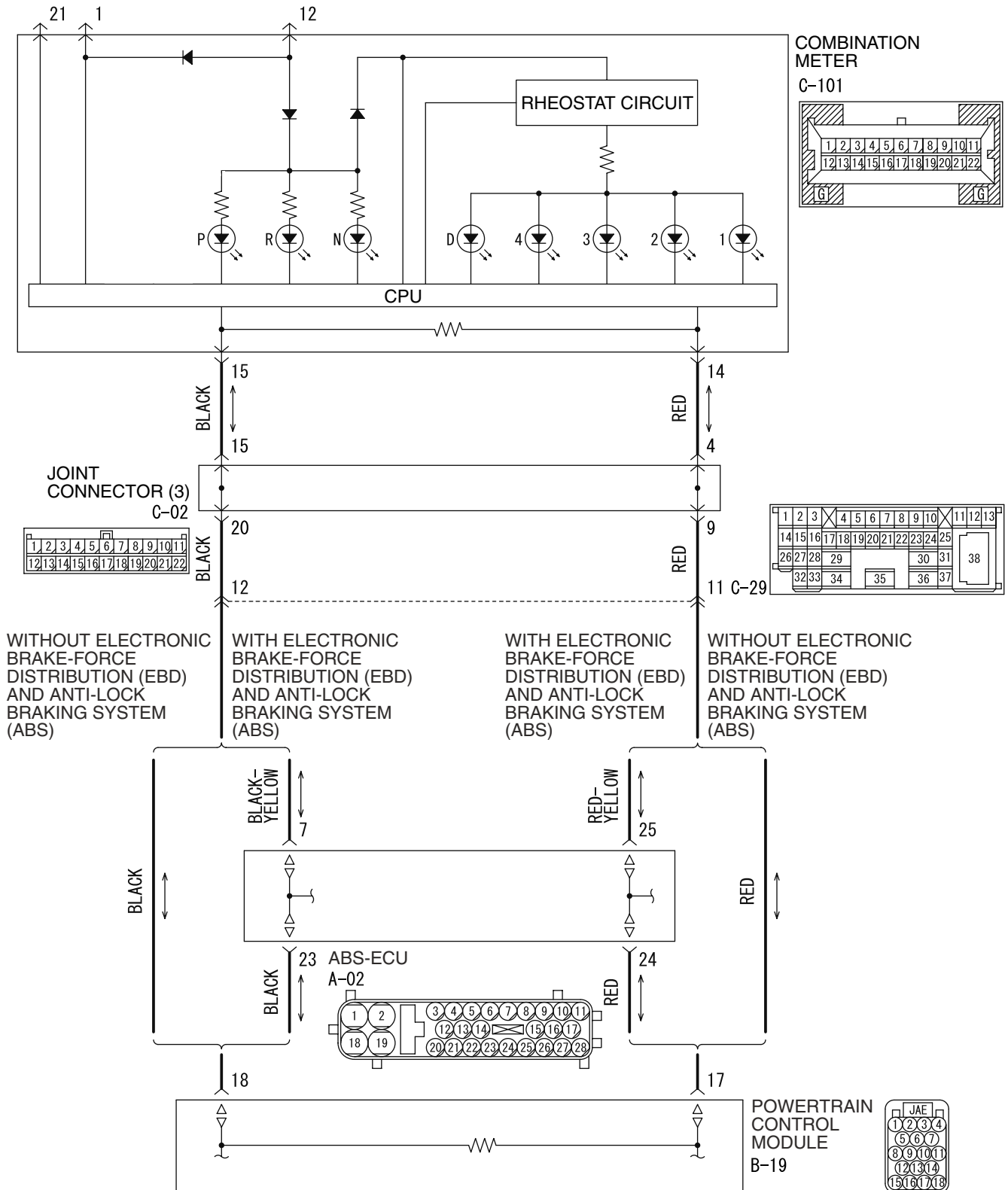
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

[P.00E-2.](#)



INSPECTION PROCEDURE 16: Shift Position Indicator Light System <Vehicles with Sport Mode>

Communication circuit (CAN Communication Line) between PCM and Combination Meter



W4P06M10AA
AC209763AC

CIRCUIT OPERATION

- The PCM detects the transmission range ("P," "R," "N," "D," sport mode "4," "3," "2," or "1"), and display it on the combination meter.

COMMENT

Connector(s), wiring harness in the CAN bus line between the PCM and the combination meter, power supply to the PCM, the combination meter, the PCM may be defective.

TROUBLESHOOTING HINTS (The most likely causes for this condition:)

- Malfunction of the combination meter
- Damaged harness, connector
- Malfunction of the PCM

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991910: MUT-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.**⚠ CAUTION**

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

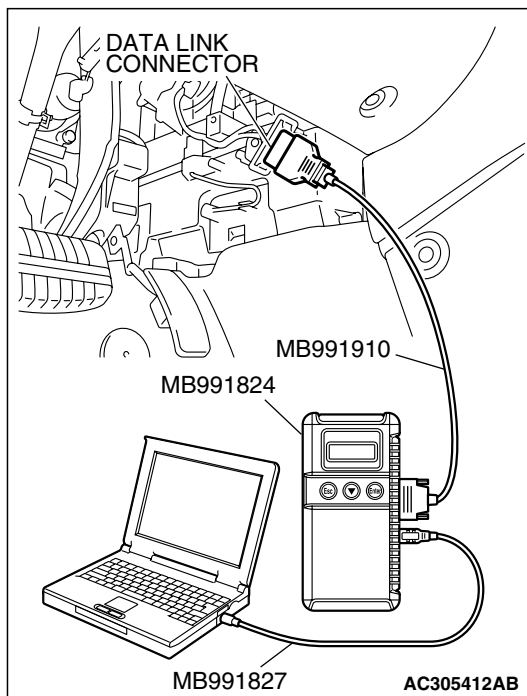
Use scan tool MB991958 to diagnose the CAN bus lines.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result properly?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-CAN Bus Diagnostic Chart [P.54C-14](#)).



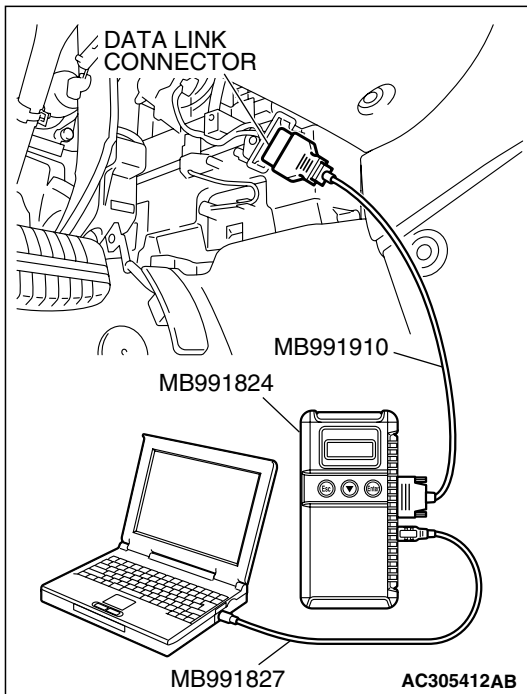
STEP 2. Using scan tool MB991958, read the MFI diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC U1108 set?

YES : Refer to GROUP 13A <2.4L Engine>, Diagnostic Trouble Code Procedures [P.13A-958](#) DTC U1108: Combination Meter-ECU CAN Communication Time Out or refer to GROUP 13B <3.8L Engine>, Diagnostic Trouble Code Procedures [P.13B-1003](#) DTC U1108: Combination Meter-ECU CAN Communication Time Out.

NO : Replace the PCM.



DATA LIST REFERENCE TABLE

M1231008100337

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|---------------------------------|-------------|---|--|--|--|
| 2ND SOL DUTY | 33 | Second solenoid valve duty % | Transmission range: L <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 100% |
| | | | Transmission range: 2 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 0% |
| | | | Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 100% |
| | | | Transmission range: D <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 4th gear | 0% |
| A/T CONT RLY | 54 | A/T control relay output voltage | Ignition switch: ON | | Battery voltage |
| CKP SENSOR | 21 | Crankshaft position sensor | <ul style="list-style-type: none"> Engine: Idling (after the worming up) Transmission range: P | Accelerator pedal: Release | 600 – 900 r/min |
| | | | | Accelerator pedal: Depressed | Gradually rises from the above value |
| DUAL PRESS SW | 65 | Dual pressure switch | <ul style="list-style-type: none"> Engine: Idling Transmission range: P, N | A/C switch: ON (while the A/C compressor is in operation) | ON |
| | | | | A/C switch: OFF | OFF |
| ENGINE LOAD | 57 | Engine load (volumetric efficiency) | <ul style="list-style-type: none"> Engine: Idling Transmission range: P, N | Accelerator pedal: Release → depressed | Data changes |
| ISS SENSOR | 22 | Input shaft speed sensor | Gear range: 3rd gear | Driving at constant speed of 50 km/h (31 mph) | 1,400 – 1,700 r/min |

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|---------------------------------|-------------|---|---|--|---------------------|
| L/R SOL DUTY | 31 | Low-reverse solenoid valve duty % | Transmission range: L <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 0% |
| | | | Transmission range: 2 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 100% |
| | | | Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 100% |
| | | | Transmission range: D <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 4th gear | 100% |
| O/D SOL DUTY | 34 | Overdrive solenoid valve duty % | Transmission range: L <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 100% |
| | | | Transmission range: 2 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 100% |
| | | | Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 0% |
| | | | Transmission range: D <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 4th gear | 0% |

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|---------------------------------|-------------|---|---|--|------------------------|
| OD OFF SIGNAL | 66 | Overdrive off signal (Auto-cruise ECM signal) | While auto-cruise is engaged | Level road | OFF |
| | | | | Uphill grade | ON |
| OSS SENSOR | 23 | Output shaft speed sensor | Gear range: 3rd gear | Driving at constant speed of 50 km/h (31 mph) | 1,400 – 1,700 r/min |
| SELECT SW | 67 | Select switch <Vehicles with sport mode> | Ignition switch: ON | Transmission range: D | OFF |
| | | | | Selector lever operation: Select sport mode | ON |
| | | | | Selector lever operation: Upshift and hold the selector lever | ON |
| | | | | Selector lever operation: Downshift and hold the selector lever | ON |
| SHIFT POS | 63 | Shift position | Transmission range: L <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 1st |
| | | | | Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 2nd |
| | | | | Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 3rd |
| | | | | Driving at constant speed of 50 km/h (31 mph) in 4th gear | 4th |
| | | | | Driving at constant speed of 5 km/h (3.1 mph) in reverse gear | REV |
| | | | | Transmission range: P, N | NP |

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|---------------------------------|-------------|--|---|--|---|
| SHIFT SW DOWN | 69 | Shift switch (Down) <Vehicles with sport mode> | Ignition switch: ON | Transmission range: D | OFF |
| | | | | Selector lever operation: Select sport mode | OFF |
| | | | | Selector lever operation: Upshift and hold the selector lever | OFF |
| | | | | Selector lever operation: Downshift and hold the selector lever | ON |
| SHIFT SW UP | 68 | Shift switch (Up) <Vehicles with sport mode> | Ignition switch: ON | Transmission range: D | OFF |
| | | | | Selector lever operation: Select sport mode | OFF |
| | | | | Selector lever operation: Upshift and hold the selector lever | ON |
| | | | | Selector lever operation: Downshift and hold the selector lever | OFF |
| STOPLIGHT SW | 26 | Stoplight switch | Ignition switch: ON | Brake pedal: Depressed | ON |
| | | | | Brake pedal: Released | OFF |
| TCC SLIPPAGE | 52 | Torque converter clutch amount of slippage | <ul style="list-style-type: none"> • Warmed up • Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> • Driving at speed of 60 km/h (37 mph) in 3rd gear | Driving at constant speed of 60 km/h (37 mph) | -10 to 10 r/min |
| | | | | Release accelerator pedal (at less than 50 km/h (31 mph)) | The value should fluctuate when the accelerator is released. |
| TCC SOL DUTY | 36 | Torque converter clutch solenoid valve duty % | <ul style="list-style-type: none"> • Warmed up • Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> • Driving at speed of 60 km/h (38 mph) in 3rd gear | Driving at constant speed of 60 km/h (37 mph) | 70 – 99.6% |
| | | | | Release accelerator pedal (at less than 50 km/h (31 mph)) | 70 – 99.6% → 0% Decreases gradually as the vehicle speed decreases |

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|---------------------------|----------|---------------------------------------|---|---|--|
| TFT SENSOR | 15 | Transmission fluid temperature sensor | Warmed up | Drive for 15 minutes or more so that the transmission fluid temperature becomes 70 – 80°C (158 – 176°F) | Gradually rises to 70 – 80°C (158 – 176°F) |
| TP SENSOR | 11 | TP sensor | <ul style="list-style-type: none"> • Ignition switch: ON • Engine: Stopped • Transmission range: P | Accelerator pedal: Release | 300 – 700 mV |
| | | | | Accelerator pedal: Depressed | Gradually rises from the above value |
| | | | | Accelerator pedal: Fully depressed | 4,000 mV or more |
| TR SWITCH | 61 | Transmission range switch | Ignition switch: ON | Transmission range: P | P |
| | | | | Transmission range: R | R |
| | | | | Transmission range: N | N |
| | | | | Transmission range: D | D |
| | | | | Transmission range: 3 <Vehicles without sport mode> | 3 |
| | | | | Transmission range: 2 <Vehicles without sport mode> | 2 |
| | | | | Transmission range: L <Vehicles without sport mode> | L |

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | | NORMAL CONDITION |
|--|---------------------|-------------------------------------|---|--|-----------------------------|
| U/D SOL DUTY | 32 | Underdrive solenoid valve duty % | Transmission range: L <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 10 km/h (6.2 mph) in 1st gear | 0% |
| | | | Transmission range: 2 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 30 km/h (19 mph) in 2nd gear | 0% |
| | | | Transmission range: 3 <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 3rd gear | 0% |
| | | | Transmission range: D <Vehicles without sport mode> or Sport mode <Vehicles with sport mode> | Driving at constant speed of 50 km/h (31 mph) in 4th gear | 100% |

ACTUATOR TEST REFERENCE TABLE

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | TEST CONTENT | INSPECTION REQUIREMENT | NORMAL CONDITION |
|---------------------------|----------|--|--|---|---|
| 1st SIFT LMP | 07 | Shift position indicator light (1st) | Illuminate each indicator light for three seconds to the signal from the scan tool MB991958 (MUT-III sub assembly). | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: P Engine: stopped Throttle opening voltage: Less than one volt | Shift indicator light illuminates. |
| 2nd SIFT LMP | 08 | Shift position indicator light (2nd) | | | |
| 2ND SOL | 03 | Second solenoid valve | Drive the solenoid valve specified by the scan tool MB991958 (MUT-III sub assembly) at 50% duty for five seconds. No other solenoid valve should be energized. | | The solenoid should click when activated |
| 3rd SIFT LMP | 09 | Shift position indicator light (3rd) | illuminate each indicator light for three seconds to the signal from the scan tool MB991958 (MUT-III sub assembly). | | Shift indicator light illuminates. |
| 4th SIFT LMP | 10 | Shift position indicator light (4th) | | | |
| A/T RELAY | 12 | A/T control relay | Actuator test in scope mode, data list No.54. Control relay is OFF for three seconds. | | Data list No.54 <ul style="list-style-type: none"> During test: 0 V Normal: Battery positive voltage [12 V] |
| L/R SOL | 01 | Low-reverse solenoid valve | Drive the solenoid valve specified by the scan tool MB991958 (MUT-III sub assembly) at 50% duty for five seconds. No other solenoid valve should be energized. | | The solenoid should click when activated |
| O/D SOL | 04 | Overdrive solenoid valve | | | |
| TCC SOL | 06 | Torque converter clutch solenoid valve | | | |
| U/D SOL | 02 | Underdrive solenoid valve | | | |

INVECS-II CANCEL COMMAND

M1231009500286

| MUT-III SCAN TOOL DISPLAY | ITEM NO. | ITEM | CONTENT | REMARKS |
|---------------------------|----------|------------------------|---|--|
| Std. SIFT PATN | 14 | Standard shift pattern | Stops the INVECS-II control and shifts gears according to the standard shift pattern. | Use this function when performing procedure 8 in the road tests. (Refer to P.23A-21) The INVECS-II cancel command will last until the ignition switch is turned from "ON" to "LOCK"(OFF) or vice versa. |

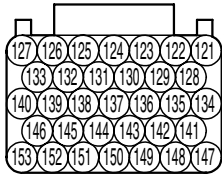
PCM TERMINAL VOLTAGE REFERENCE CHART FOR TRANSAXLE OPERATION

M1231008400305

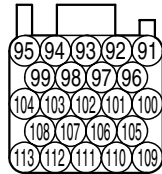
1. Disconnect the PCM connectors, and connect special tool MB991923 in between.
2. Measure the voltages between each check connector terminals of special tool MB991923 and ground terminals 4 or 7.

SPECIAL TOOL-POWER PLANT ECU CHECK HARNESS (MB991923) CONNECTOR: COMPONENT SIDE

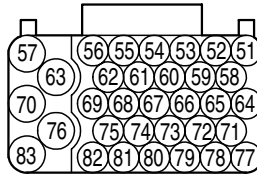
33-PIN CONNECTOR (PCM CONNECTOR B-23)



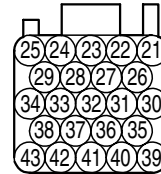
23-PIN CONNECTOR WITH RED TAPE (PCM CONNECTOR B-22)



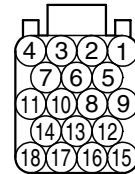
33-PIN CONNECTOR (PCM CONNECTOR B-21)



23-PIN CONNECTOR WITHOUT RED TAPE (PCM CONNECTOR B-20)



18-PIN CONNECTOR (PCM CONNECTOR B-19)



AC209259AC

| TERMINAL NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | NORMAL CONDITION |
|--------------|---|--|---|
| 4 | Ground | Always | 1 V or less |
| 7 | Ground | Always | 1 V or less |
| 9 | Stoplight switch | <ul style="list-style-type: none"> Ignition switch: ON Brake pedal: Depressed | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Brake pedal: Released | 1 V or less |
| 14 | Vehicle speed signal | <ul style="list-style-type: none"> Measure between terminal 14 and 4 with an oscilloscope. Engine: 2,000 r/min Gear range: 3rd gear | Refer to P.23A-352, Inspection Procedure Using an Oscilloscope. |
| 32 | Shift switch (up) <Vehicles with sport mode> | <ul style="list-style-type: none"> Ignition switch: ON Selector lever operation: Upshift and hold the selector lever | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Selector lever operation: Other than above | 1 V or less |

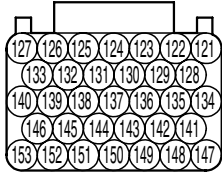
| TERMINAL NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | NORMAL CONDITION |
|--------------|--|--|--------------------------|
| 36 | Shift switch (down) <Vehicles with sport mode> | <ul style="list-style-type: none"> Ignition switch: ON Selector lever operation: Downshift and hold the selector lever | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Selector lever operation: Other than above | 1 V or less |
| 39 | Select switch <Vehicles with sport mode> | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: Sport mode | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: Other than above | 1 V or less |
| 54 | Torque converter clutch solenoid valve | <ul style="list-style-type: none"> Engine: idling Gear range: 1st gear | Battery positive voltage |
| 55 | Overdrive solenoid valve | <ul style="list-style-type: none"> Engine: idling Gear range: 3rd gear | Battery positive voltage |
| | | <ul style="list-style-type: none"> Engine: idling Transmission range: P | 6 – 9 V |
| 56 | Low-reverse solenoid valve | <ul style="list-style-type: none"> Engine: idling Transmission range: P | Battery positive voltage |
| | | <ul style="list-style-type: none"> Engine: idling Gear range: 2nd gear | 6 – 9 V |
| 57 | Solenoid valve power supply | Ignition switch: LOCK (OFF) | 1V or less |
| | | Ignition switch: ON | Battery positive voltage |
| 61 | Transmission range switch: R | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: R | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: Other than above | 1 V or less |
| 62 | Transmission range switch: 3 <Vehicles without sport mode> | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: 3 | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: Other than above | 1 V or less |
| 65 | Underdrive solenoid valve | <ul style="list-style-type: none"> Engine: idling Gear range: 1st gear | Battery positive voltage |
| | | <ul style="list-style-type: none"> Engine: idling Transmission range: P | 6 – 9 V |
| 66 | Second solenoid valve | <ul style="list-style-type: none"> Engine: idling Gear range: 2nd gear | Battery positive voltage |
| | | <ul style="list-style-type: none"> Engine: idling Transmission range: P | 6 – 9 V |
| 67 | Transmission range switch: P | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: P | Battery positive voltage |
| | | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: Other than above | 1 V or less |
| 70 | Solenoid valve power supply | Ignition switch: LOCK (OFF) | 1 V or less |
| | | Ignition switch: ON | Battery positive voltage |

| TERMINAL NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | NORMAL CONDITION |
|--------------|--|---|--|
| 72 | Transmission range switch: L <Vehicles without sport mode> | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: L | Battery positive voltage |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: Other than above | 1 V or less |
| 73 | Transmission range switch: D | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: D | Battery positive voltage |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: Other than above | 1 V or less |
| 74 | Transmission fluid temperature sensor | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission fluid temperature: 20°C (68°F) | 3.8 – 4.0 V |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission fluid temperature: 40°C (104°F) | 3.2 – 3.4 V |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission fluid temperature: 80°C (176°F) | 1.7 – 1.9 V |
| 75 | Transmission range switch: 2 <Vehicles without sport mode> | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: 2 | Battery positive voltage |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: Other than above | 1 V or less |
| 77 | Transmission range switch: N | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N | Battery positive voltage |
| | | <ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: Other than above | 1 V or less |
| 82 | A/T control relay | Always | 1 V or less |
| 111 | Input shaft speed sensor | <ul style="list-style-type: none"> • Measure between terminal 111 and 4 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear | Refer to P.23A-352 , Inspection Procedure Using an Oscilloscope. |
| 112 | Output shaft speed sensor | <ul style="list-style-type: none"> • Measure between terminal 112 and 4 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear | Refer to P.23A-352 , Inspection Procedure Using an Oscilloscope. |

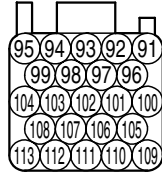
PCM TERMINAL RESISTANCE AND CONTINUITY INSPECTION CHART

M1231013400204

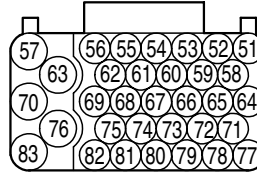
33-PIN
CONNECTOR
(PCM CONNECTOR
B-23)



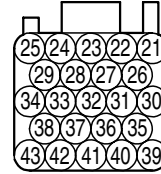
23-PIN
CONNECTOR
WITH RED TAPE
(PCM CONNECTOR
B-22)



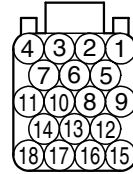
33-PIN
CONNECTOR
(PCM CONNECTOR
B-21)



23-PIN
CONNECTOR
WITHOUT RED TAPE
(PCM CONNECTOR
B-20)



18-PIN
CONNECTOR
(PCM CONNECTOR
B-19)



AC209259AD

NOTE: The PCM connectors should be disconnected for this inspection.

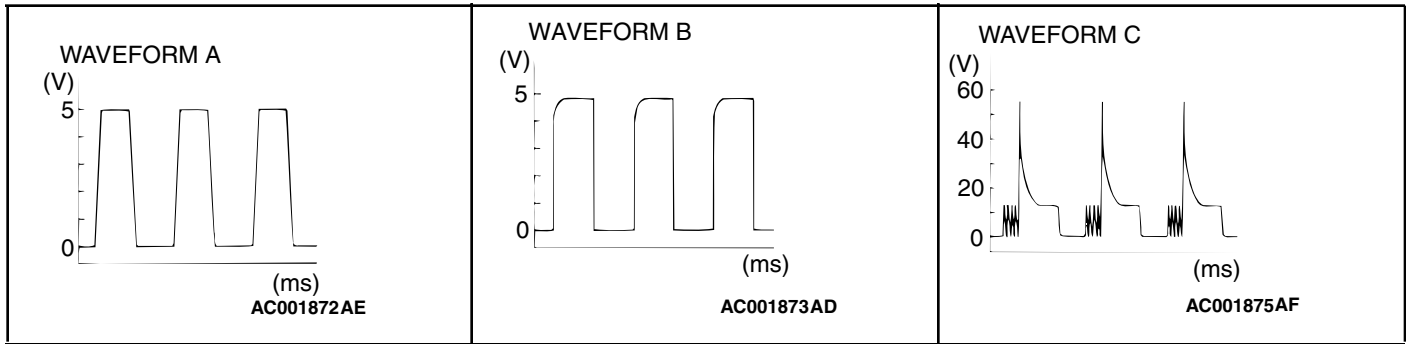
| TERMINAL NO. | INSPECTION ITEM | NORMAL CONDITION (CHECK CONDITION) |
|--------------|---------------------------------------|------------------------------------|
| 69 – 74 | Transmission fluid temperature sensor | 16.7 – 20.5 kΩ [at 0°C (32°F)] |
| | | 7.3 – 8.9 kΩ [at 20°C (68°F)] |
| | | 3.4 – 4.2 kΩ [at 40°C (104°F)] |
| | | 1.9 – 2.2 kΩ [at 60°C (140°F)] |
| | | 1.0 – 1.2 kΩ [at 80°C (176°F)] |
| | | 0.57 – 0.69 kΩ [at 100°C (212°F)] |

INSPECTION PROCEDURE USING AN OSCILLOSCOPE

M1231008500313

| TERMINAL NO. | INSPECTION ITEM | INSPECTION REQUIREMENT | NORMAL CONDITION (WAVEFORM SAMPLE) | |
|--------------|--|--|--|------------|
| 103 | Crankshaft position sensor | Transmission range: N | Idling (Vehicle stopped) | Waveform A |
| 111 | Input shaft speed sensor | Gear range: 3rd gear | Driving at constant speed of 50 km/h (31 mph) in 3rd gear (1,400 – 1,700 r/min) | Waveform B |
| 112 | Output shaft speed sensor | | | |
| 56 | Low-reverse solenoid valve | <ul style="list-style-type: none"> Ignition switch: ON Transmission range: P Engine: Stopped Throttle (Accelerator) opening voltage: 1 V or less | Force drive each solenoid valve (Actuator test) | Waveform C |
| 65 | Underdrive solenoid valve | | | |
| 66 | Second solenoid valve | | | |
| 55 | Overdrive solenoid valve | | | |
| 54 | Torque converter clutch control solenoid | | | |

Waveform sample



A/T FAULTY OPERATION PREVENTION MECHANISM DIAGNOSIS

INTRODUCTION TO A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

M1232001600226

If the key interlock and shift lock mechanisms indicate a malfunction, the key interlock cable, the shift lock cable, or the selector lever assembly may be defective. In this case, follow troubleshooting below.

A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1232001700223

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find automatic transaxle key interlock and shift lock mechanisms fault.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

SYMPTOM CHART

M1232001800413

| SYMPTOM | INSPECTION PROCEDURE | REFERENCE PAGE |
|--|----------------------|---------------------------|
| Selector lever can be moved from "P" to "R" position without depressing brake pedal when ignition key is at any position other than "LOCK" (OFF) position. | 1 | P.23A-354 |
| Selector lever cannot be moved from "P" to "R" position with brake pedal depressed when ignition key is at any position other than "LOCK" (OFF) position. | 2 | P.23A-354 |
| Selector lever can be moved from "P" to "R" position with brake pedal depressed when ignition key is at "LOCK" (OFF) position. | 3 | P.23A-356 |
| Selector lever cannot be moved from "P" to "R" position smoothly. | 4 | P.23A-356 |
| Selector lever cannot be moved from "P" to "R" position. | 5 | P.23A-357 |
| Ignition key cannot be turned to "LOCK" (OFF) position when selector lever is at "P" position. | 6 | P.23A-358 |
| Ignition key can be turned to "LOCK" (OFF) position when selector lever is at any position other than "P" position. | 7 | P.23A-359 |

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Selector Lever can be Moved from "P" to "R" Position without Depressing Brake Pedal when Ignition Key is at any Position Other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam or shift lock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of shift lock cable

DIAGNOSIS

STEP 1. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 2.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 3.

NO : Replace the lock cam. Refer to [P.23A-382](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 2: Selector Lever cannot be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at any Position Other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Selector lever assembly, shift lock cable, key interlock cable, transaxle control cable, or lock cam may be defective.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23A-385](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : No action to be taken.

NO : Replace the shift lock cable. Refer to [P.23A-385](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

TROUBLESHOOTING HINTS

- Malfunction of selector lever assembly
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of transaxle control cable
- Malfunction of lock cam

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 2. Check the connection of selector lever assembly and transaxle control cable.

Q: Is the connection of selector lever assembly and shift transaxle control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and transaxle control cable. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 5.

NO : Replace the shift lock cable. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 5. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 6.

NO : Install the key interlock cable correctly. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 6. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 7.

NO : Replace the key interlock cable. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 7. Check the fit of the transaxle control cable.

Q: Is the transaxle control cable installed correctly?

YES : Go to Step 8.

NO : Install the transaxle control cable correctly. Refer to [P.23A-380](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 8. Check the transaxle control cable.

Q: Is the transaxle control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-380](#) and

[P.23A-382](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

NO : Replace the transaxle control cable. Refer to [P.23A-380](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

INSPECTION PROCEDURE 3: Selector Lever can be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Key interlock cable or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam. When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23A-382](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : No action to be taken.

NO : Replace the key interlock cable. Refer to [P.23A-385](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 4: Selector Lever cannot be Moved from "P" to "R" Position Smoothly.

TECHNICAL DESCRIPTION (COMMENT)

Key interlock cable, shift lock cable, transaxle control cable, lock cam, or selector lever assembly may be defective.

TROUBLESHOOTING HINTS

- Malfunction of key interlock cable
- Malfunction of shift lock cable
- Malfunction of transaxle control cable
- Malfunction of lock cam
- Malfunction of selector lever assembly

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 2. Check the connection of selector lever assembly and transaxle control cable.

Q: Is the connection of selector lever assembly and transaxle control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and transaxle control cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 3. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 4.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 4. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 5.

NO : Replace the lock cam. Refer to [P.23A-382](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 5. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 6.

NO : Install the shift lock cable correctly. Refer to [P.23A-385](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 6. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 7.

NO : Replace the shift lock cable. Refer to [P.23A-385](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 7. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 8.

NO : Install the key interlock cable correctly. Refer to [P.23A-385](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 8. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 9.

NO : Replace the key interlock cable. Refer to [P.23A-385](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 9. Check the fit of the transaxle control cable.

Q: Is the transaxle control cable installed correctly?

YES : Go to Step 10.

NO : Install the transaxle control cable correctly. Refer to [P.23A-380](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 10. Check the transaxle control cable.

Q: Is the transaxle control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-380](#) and [P.23A-382](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

NO : Replace the transaxle control cable. Refer to [P.23A-380](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

INSPECTION PROCEDURE 5: Selector Lever cannot be Moved from "R" to "P" Position.

TECHNICAL DESCRIPTION (COMMENT)

Selector lever assembly, transaxle control cable, or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of selector lever assembly
- Malfunction of transaxle control cable
- Malfunction of lock cam

DIAGNOSIS**STEP 1. Check the connection of selector lever assembly and transaxle control cable.**

Q: Is the connection of selector lever assembly and transaxle control cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of selector lever assembly and transaxle control cable. Check that the selector lever can be moved from "R" position to "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23A-382](#). Check that the selector lever can be moved from "R" position to "P" position.

INSPECTION PROCEDURE 6: Ignition Key cannot be Turned to the "LOCK" (OFF) Position when Selector Lever is at "P" Position.**TECHNICAL DESCRIPTION (COMMENT)**

Lock cam, steering lock cylinder assembly, transaxle control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable
- Malfunction of transaxle control cable
- Malfunction of steering lock cylinder assembly

STEP 4. Check the fit of the transaxle control cable.

Q: Is the transaxle control cable installed correctly?

YES : Go to Step 5.

NO : Install the transaxle control cable correctly. Refer to [P.23A-380](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 5. Check the transaxle control cable.

Q: Is the transaxle control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-380](#) and [P.23A-382](#). Check that the selector lever can be moved from "R" position to "P" position smoothly.

NO : Replace the transaxle control cable. Refer to [P.23A-380](#). Check that the selector lever can be moved from "R" position to "P" position.

DIAGNOSIS**STEP 1. Check the connection of lock cam and key interlock cable.**

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam. Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23A-382](#). Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23A-385](#). Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 6.

NO : Replace the key interlock cable. Refer to [P.23A-385](#). Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 6. Check the fit of the transaxle control cable.

Q: Is the transaxle control cable installed correctly?

YES : Replace the steering lock cylinder assembly. Refer to [P.37-28](#) and [P.37-31](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

NO : Install the transaxle control cable correctly. Refer to [P.23A-380](#). Check that the ignition key can be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

INSPECTION PROCEDURE 7: Ignition Key can be Turned to the "LOCK" (OFF) Position when Selector Lever is at any Position Other than "P" Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam, steering lock cylinder assembly, transaxle control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of steering lock cylinder assembly
- Malfunction of transaxle control cable
- Malfunction of key interlock cable

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam. Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-382](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 3. Check the lock cam.**Q: Is the lock cam in good condition?****YES :** Go to Step 4.**NO :** Replace the lock cam. Refer to [P.23A-382](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

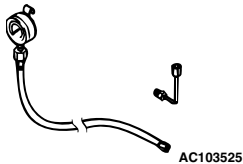
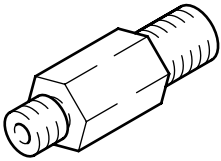
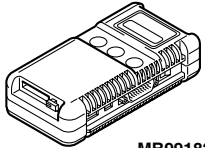
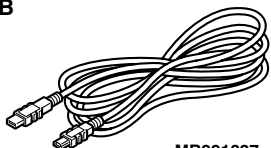
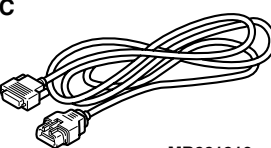
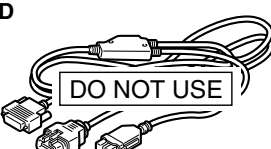
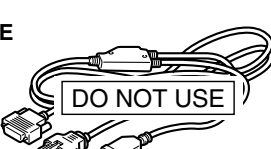
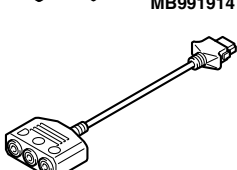
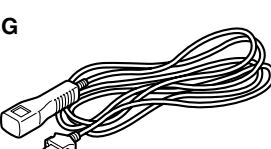
STEP 4. Check the fit of the key interlock cable.**Q: Is the key interlock cable installed correctly?****YES :** Go to Step 5.**NO :** Install the key interlock cable correctly.
Refer to [P.23A-385](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.


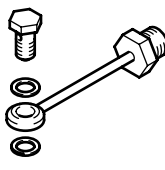
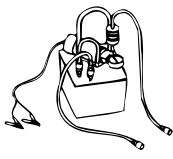

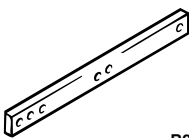
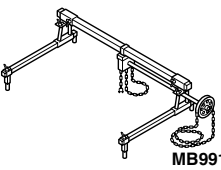
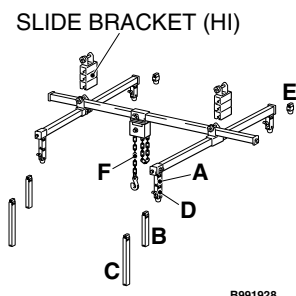
STEP 5. Check the key interlock cable.**Q: Is the key interlock cable in good condition?****YES :** Go to Step 6.**NO :** Replace the key interlock cable. Refer to [P.23A-385](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

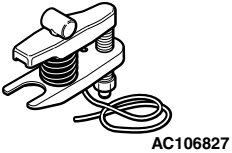
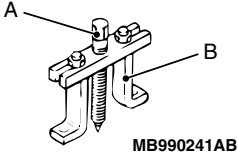

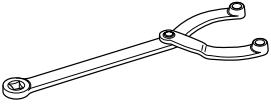
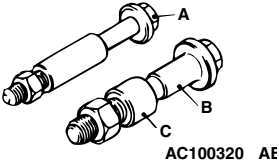
STEP 6. Check the fit of the transaxle control cable.**Q: Is the transaxle control cable installed correctly?****YES :** Replace the steering lock cylinder assembly. Refer to [P.37-28](#) and [P.37-31](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.**NO :** Install the transaxle control cable correctly.
Refer to [P.23A-380](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

SPECIAL TOOLS

M1231000600413

| TOOL | TOOL NUMBER AND NAME | SUPERSESION | APPLICATION |
|---|---|--|---|
|  <p style="text-align: center;">AC103525</p> | MD998330 (Includes MD998331) Oil pressure gauge (3.0 MPa, 427 psi) | MD998330-01 | Measurement of hydraulic pressure |
|  | MD998332 Adapter | MD998332-01 | Connection for oil pressure gauge |
| <p>A</p>  <p style="text-align: center;">MB991824</p> <p>B</p>  <p style="text-align: center;">MB991827</p> <p>C</p>  <p style="text-align: center;">MB991910</p> <p>D</p>  <p style="text-align: center;">MB991911</p> <p>E</p>  <p style="text-align: center;">MB991914</p> <p>F</p>  <p style="text-align: center;">MB991825</p> <p>G</p>  <p style="text-align: center;">MB991826 MB991958</p> | MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness | MB991824-KIT <i>NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I. ENTER key.</i> | Checking diagnostic trouble codes <div style="border: 1px solid black; padding: 2px; display: inline-block;"> CAUTION </div> For vehicles with CAN communication, use MUT-III main harness A to send simulated vehicle speed. If you connect MUT-III main harness B instead, the CAN communication does not function correctly. |

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|--|---|-------------------------|---|
|  <p>MB991923</p> | MB991923 Test harness (3 pin, triangle) | MD998478-01 | Measurement of PCM terminal voltage |
|  | MD998900 Adapter | MIT220433 | Connection for oil pressure gauge |
|  | MB995062 Flushing tool | MLR-6906B or Equivalent | Flushing cooler and tube |
|  <p>B991454</p> | MB991454 Engine hanger balancer | MZ203827-01 | When the engine hanger is used: Supporting the engine assembly during removal and installation of the transaxle assembly <i>NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.</i> |
|  <p>B991527</p> | MB991527 Hanger | - | |
|  <p>MB991895</p> | MB991895 Engine hanger | - | |
|  <p>SLIDE BRACKET (HI)</p> <p>B991928</p> | MB991928 Engine hanger A: MB991929 Joint (50) ×2 B: MB991930 Joint (90) ×2 C: MB991931 Joint (140) ×2 D: MB991932 Foot (standard) ×4 E: MB991933 Foot (short) ×2 F: MB991934 Chain and hook assembly | - | |

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|---|--|---|---|
|  <p align="center">AC106827</p> | MB991897 Ball joint remover | MB991113-01, MB990635-01 or general service tool | Knuckle and tie rod end ball joint breakaway torque check <i>NOTE: Steering linkage puller(MB990635 or MB991113)is also used to disconnect knuckle and tie rod end ball joint.</i> |
|  <p align="center">MB990241AB</p> | MB990241 Axle shaft puller A: MB990242 Puller shaft B: MB990244 Puller bar | MB990241-01 or General service tool | Removal of the drive shaft |
|  <p align="center">MB991354</p> | MB991354 Puller body | General service tool | |
|  <p align="center">B990767</p> | MB990767 End yoke holder | MB990767-01 | Fixing of the hub |
|  <p align="center">AC100320 AE</p> | A: MB991017 B: MB990998 C: MB991000 A, B: Front hub remover and installer C: Spacer | MB990998-01 | <ul style="list-style-type: none"> • Removal of the hub • Provisional holding of the wheel bearing • Measurement of hub starting torque • Measurement of wheel bearing end play <i>NOTE: MB991000, which belongs to MB990998, should be used as a spacer.</i> |

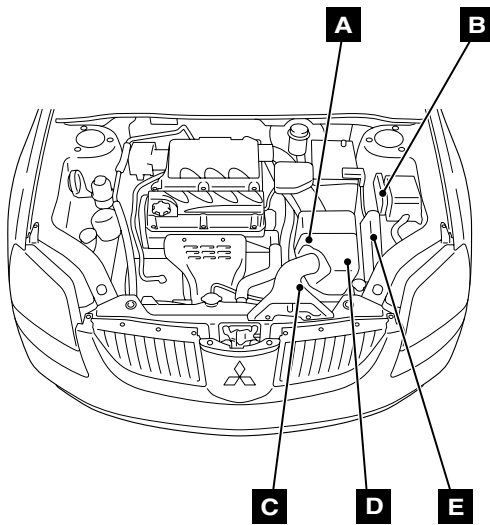
ON-VEHICLE SERVICE

A/T CONTROL COMPONENT LAYOUT

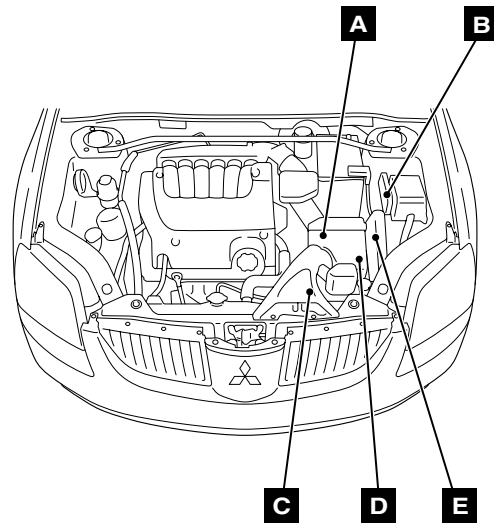
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| NAME | SYMBOL | NAME | SYMBOL |
|-----------------------------|--------|---|--------|
| A/T control relay | B | Powertrain control module (PCM) | E |
| A/T control solenoid valves | D | Stoplight switch | F |
| Data link connector | G | Shift switch <vehicles with sport mode> | H |
| Input shaft speed sensor | A | Transmission fluid temperature sensor | D |
| Output shaft speed sensor | A | Transmission range switch | C |

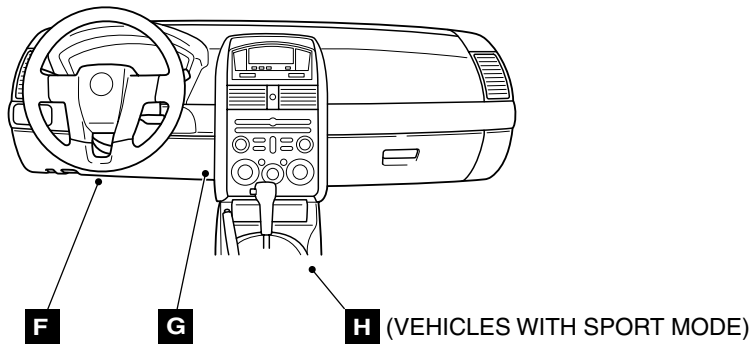
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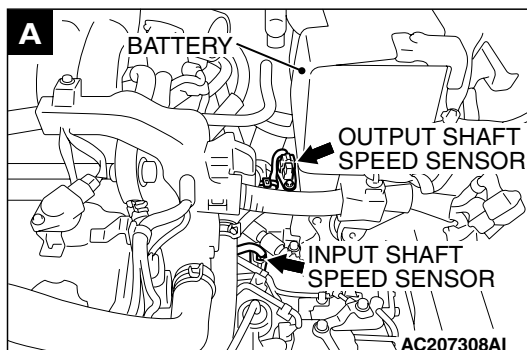
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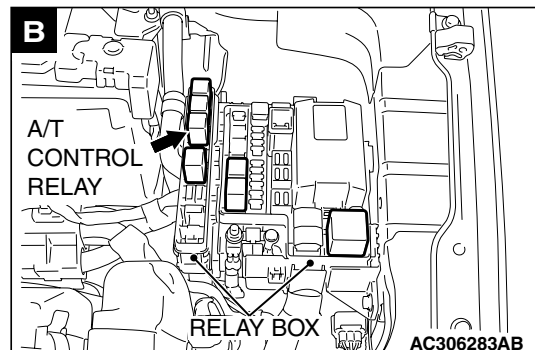
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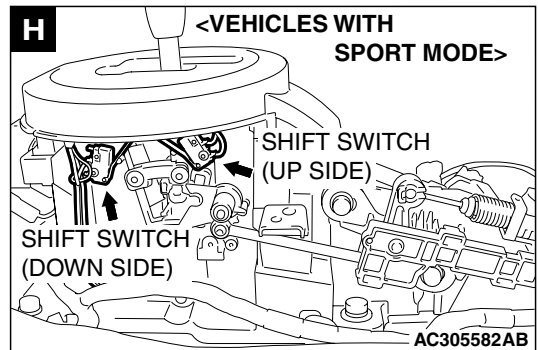
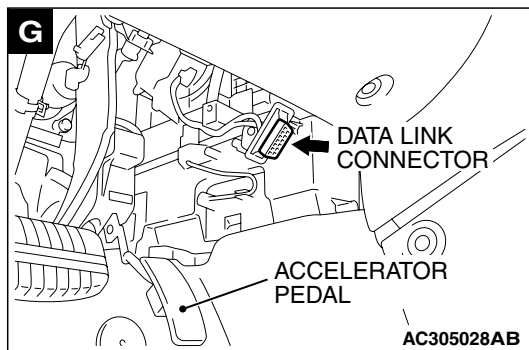
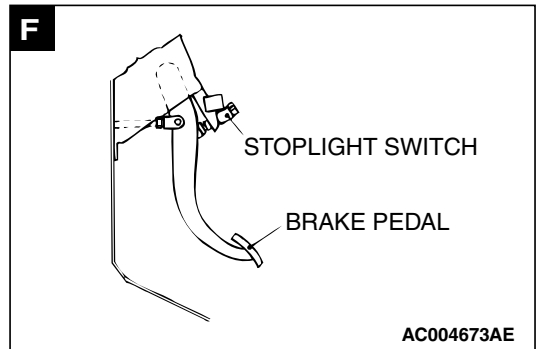
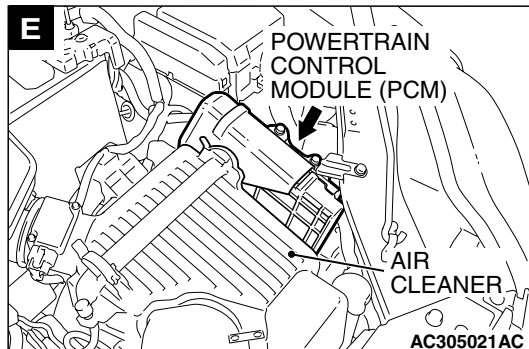
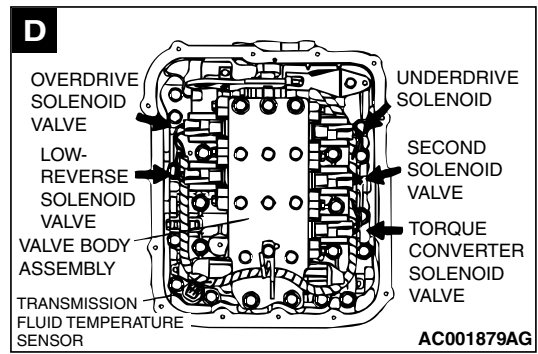
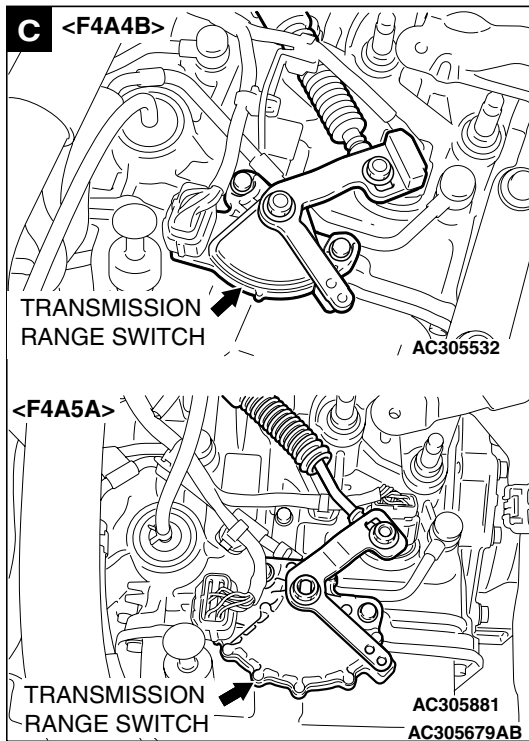
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AC207308AI



AC306283AB



ESSENTIAL SERVICE

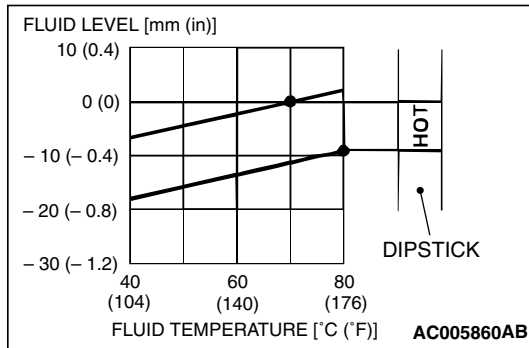
TRANSMISSION FLUID CHECK

M1231021400050

1. Drive the vehicle until the transmission fluid temperature rises to the normal operating temperature [70 – 80°C (158 – 176°F)].

NOTE: The transmission fluid temperature is measured with scan tool MB991958 (MUT-III sub assembly).

NOTE: If it takes some amount of time until the transmission fluid reaches its normal operating temperature [70 – 80°C (158 – 176°F)], check the transmission fluid level by referring to the left diagram.



2. Park the vehicle on a level surface.
3. Move the selector lever through all positions to fill the torque converter and the hydraulic circuits with fluid, and then move the selector lever to the "N" position.

4. After wiping off any dirt around the dipstick, remove the dipstick and check the condition of the transmission fluid.

NOTE: If the transmission fluid smells as if it is burnt, it means that the transmission fluid has been contaminated by fine particles from the bushings and friction materials. Transaxle overhaul and cooler line flushing may be necessary.

5. Check transmission fluid level is at the "HOT" mark on the dipstick. If the transmission fluid level is less than this, add DIAMOND ATF SP III until the level reaches the "HOT" mark.

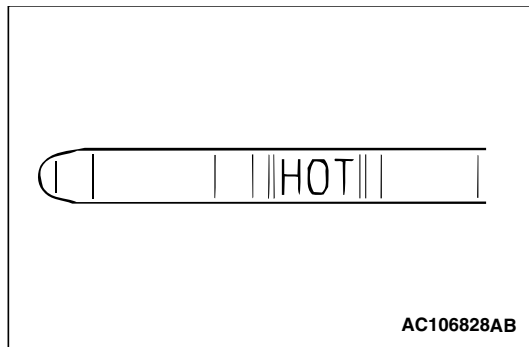
NOTE: If the transmission fluid level is too low, the oil pump will draw in air along with the transmission fluid, which will cause to form bubbles. If the transmission fluid level is too high, rotating components inside the transaxle will chum the fluid and air into a foamy liquid. Both conditions (level too low or too high) will cause the hydraulic pressure to drop, which will result in late shifting and slipping of the clutches and brakes.

NOTE: In either case, air bubbles can interfere with normal valve, clutch, and brake operation. Also, foaming can cause transmission fluid to escape from the transaxle vent where it may be mistaken for a leak.

6. Securely insert the dipstick.

NOTE: The transmission fluid should always be replaced under the following conditions:

- When troubleshooting the transaxle.
- When overhauling the transaxle.
- When the transmission fluid is noticeably dirty or burnt (driving under severe conditions).



TRANSMISSION FLUID CHANGE

M1231021500057

If you have an transmission fluid changer, use this changer to replace the transmission fluid. If you do not have an transmission fluid changer, replace the transmission fluid by the following procedure.

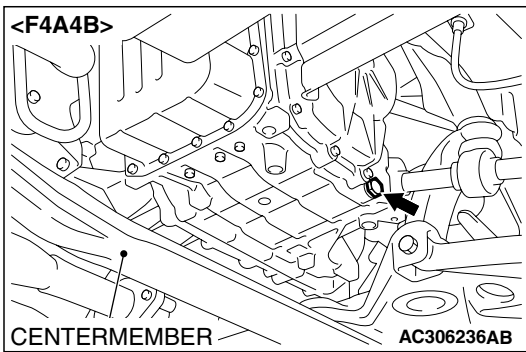
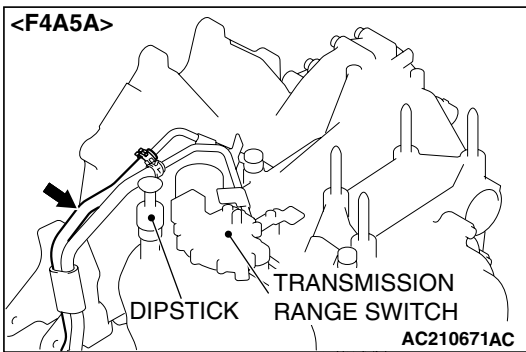
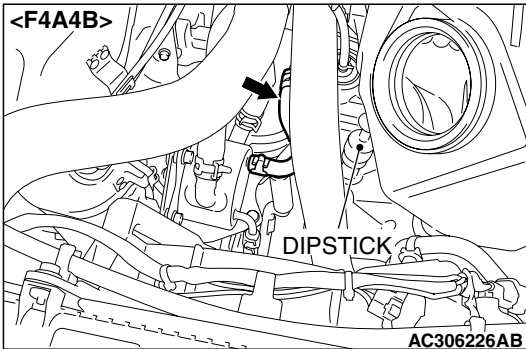
1. Disconnect the hose shown in the illustration which connects the transaxle and the oil cooler (inside the radiator). Place a container under the hose to collect the discharge.

CAUTION

The engine should be stopped within one minute after it is started. If all the transmission fluid has drained out before then, the engine should be stopped at that point.

2. Start the engine and let the transmission fluid drain out. (Running conditions: "N" range with engine idling)

Approximately 3.5 dm³ (3.7 quarts) of transmission fluid should be removed.



3. Remove the drain plug from the bottom of the transaxle case to drain the transmission fluid.

Approximately 2.0 dm³ (2.1 quarts) of transmission fluid should be removed.

4. Install the drain plug with a new gasket, and tighten it to the specified torque.

Tightening torque: 32 ± 2 N·m (23 ± 2 ft-lb)

CAUTION

Stop pouring if the full volume of transmission fluid can not be added.

5. Add new transmission fluid (DIAMOND ATF SP III) through the oil filter tube.

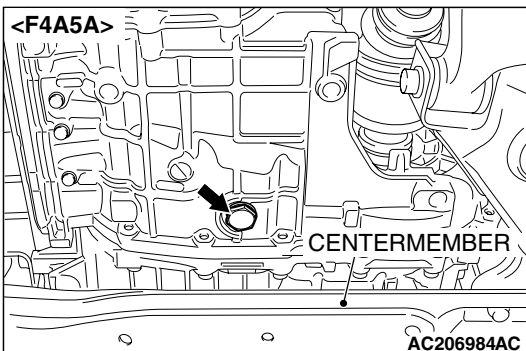
Approximately 5.5 dm³ (5.8 quarts) of transmission fluid should be added.

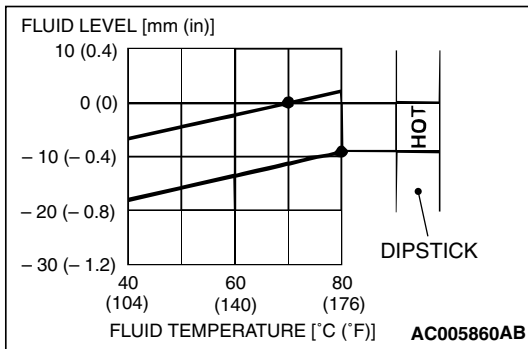
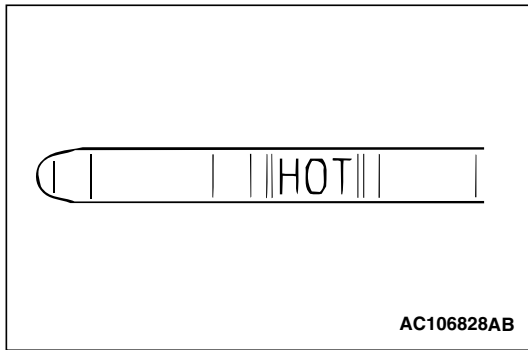
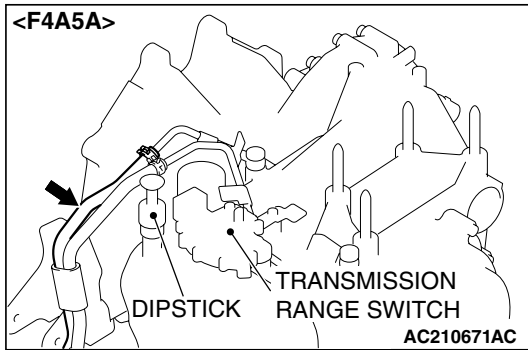
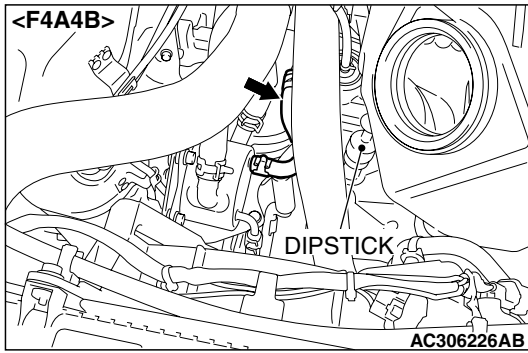
6. Repeat the procedure in Step 2. (to pump out the rest of the contaminated transmission fluid)

7. Add new transmission fluid (DIAMOND ATF SP III) through the oil filter tube.

Approximately 3.5 dm³ (3.7 quarts) of transmission fluid should be added.

NOTE: Check for contamination or a burnt odor. If the transmission fluid is still contaminated or burnt, repeat Steps 6 and 7 before proceeding to Step 8.





8. Reconnect the hose which was disconnected in step 1 above, and firmly replace the dipstick.
9. Start the engine and run it at idle for one to two minutes.
10. Move the selector lever through all positions, and then move it to the "N" position.

11. Check that the transmission fluid level is at the "COLD" mark on the dipstick. If the level is less than this, add transmission fluid.
12. Drive the vehicle until the transmission fluid temperature rises to the normal operating temperature [70 – 80°C (158 – 176°F)], and then check the transmission fluid level again. The transmission fluid level must be at the "HOT" mark.

NOTE: The transmission fluid temperature is measured with scan tool MB991958 (MUT-III sub assembly).

NOTE: The "COLD" level is for reference only; the "HOT" level should be regarded as the standard level.

NOTE: If it takes some amount of time until the transmission fluid reaches its normal operating temperature [70 – 80°C (158 – 176°F)], check the transmission fluid level by referring to the left diagram.

13. When the transmission fluid is less than the specified level, add transmission fluid. When the transmission fluid is greater than the specified level, drain the excess fluid through the drain plug to adjust the transmission fluid to the specified level.

14. Firmly insert the dipstick into the oil filler tube.

FLUSHING COOLERS AND TUBES

M1231013000444

Required Special Tool:

MB995062: Flushing Tool

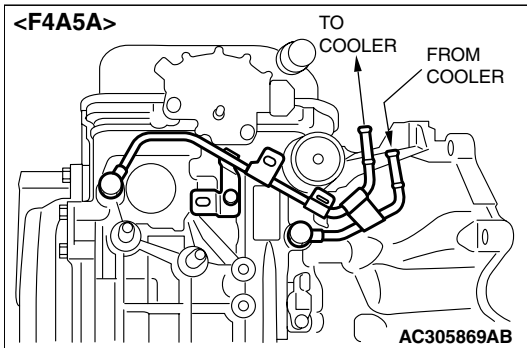
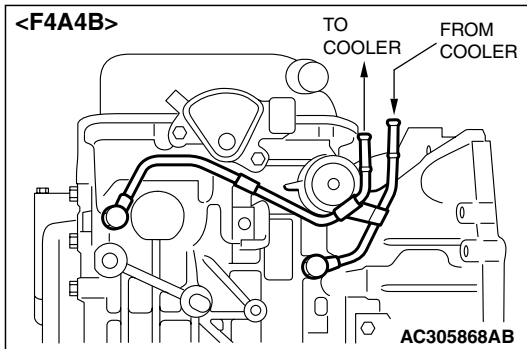
WARNING

- ***Wear protective eyewear that meets the requirements of ANSI Z87.1 – 1968 and OSHA. Wear standard industrial rubber gloves.***
- ***Keep lighted cigarettes, sparks, flames, and other ignition sources away from the area to prevent the ignition of combustible liquids and gases. Keep a class B fire extinguisher in the area where the flushing tool will be used. Keep the area well ventilated. Do not let flushing solvent come in contact with eyes or skin. If it does, flush with water for 15 to 20 seconds. Remove contaminated clothing and wash affected skin with soap and water. Seek medical attention.***

When a transaxle failure has contaminated the transmission fluid, the oil cooler(s) must be flushed. The cooler by-pass valve in the transaxle must also be replaced. The torque converter must also be replaced with an exchange unit. This will ensure that metal particles or sludged transmission fluid are not later transferred back into the reconditioned (or replaced) transaxle. There are two different procedures for flushing coolers and lines. The recommended procedure is to use special tool MB995062 Flushing Tool. The other procedure is to use a hand suction gun and mineral spirits.

1. Remove the cover plate filler plug on special tool MB995062. Fill the reservoir 1/2 to 3/4 full with fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean transaxle components. Do not use solvents containing acids, water, gasoline, or any other corrosive liquids.
2. Reinstall the filler plug on special tool MB995062.
3. Verify that the pump power switch is turned "OFF." Connect the red alligator clip to the positive battery terminal. Connect the black alligator clip to a good ground.
4. Disconnect the cooler lines at the transaxle.

NOTE: When flushing the transaxle cooler and lines, always reverse flush.



5. Connect the pressure line to the OUTLET line (from cooler).
6. Connect the return line to the INLET line (to cooler).
7. Turn the pump "ON" for two to three minutes to flush the cooler(s) and lines. Monitor the pressure readings. Clear the return lines. Pressure readings should stabilize below 138 kPa (20 psi) for vehicles equipped with a single cooler and 208 kPa (30 psi) for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace the cooler(s).
8. Turn the pump "OFF."
9. Disconnect the suction line from the reservoir at the cover plate. Disconnect the return line at the cover plate and place it in a drain pan.
10. Turn the pump "ON" for 30 seconds to purge flushing solution from the cooler(s) and lines. Turn the pump "OFF."
11. Place the suction line into a one quart container of DIAMOND ATF SP III transmission fluid.
12. Turn the pump "ON" until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transaxle cooler(s) and lines. Turn the pump "OFF."
13. Disconnect the alligator clips from the battery. Reconnect the flusher lines to the cover plate, and remove the flushing adapters from the cooler lines. Reconnect the cooler lines.

OIL COOLER FLOW CHECK

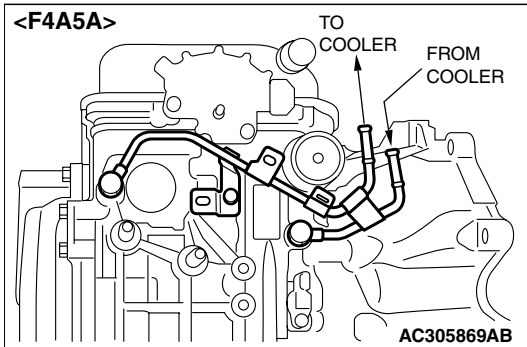
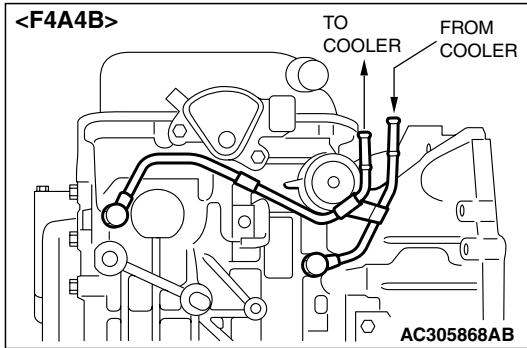
M1231013100214

After the new or repaired transaxle has been installed, fill to the proper level with DIAMOND ATF SP III. The flow should be checked using the following procedure:

⚠ CAUTION

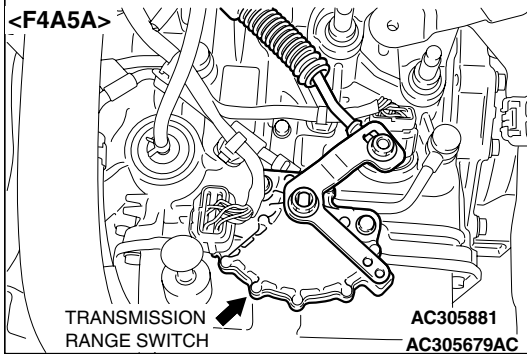
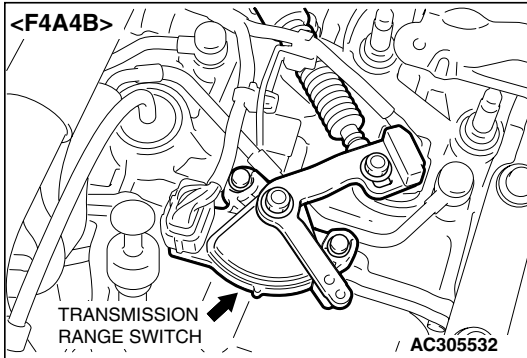
With the fluid set at the proper level, transmission fluid collection should not exceed one quart or internal damage to the transaxle may occur.

1. Disconnect the OUTLET line (from cooler) at the transaxle and place a collecting container under the disconnected line.
2. Run the engine at curb idle speed with the shift selector in neutral.
3. If transmission fluid flow is intermittent or it takes more than 20 seconds to collect one quart of transmission fluid, replace the cooler.
4. If flow is within acceptable limits, reconnect the cooler line. Then fill the transaxle to the proper level, using DIAMOND ATF SP III.



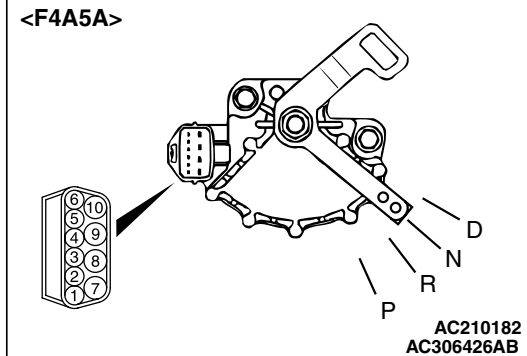
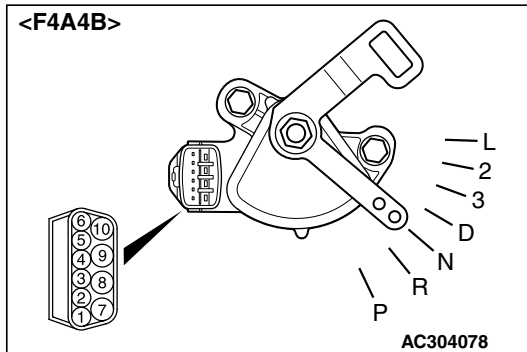
TRANSMISSION RANGE SWITCH CHECK

M1231021600106



| TRANSMISSION RANGE | TERMINAL CONNECTION OF TESTER | SPECIFIED CONDITION |
|--------------------|-------------------------------|---------------------|
| P | 3 – 8, 9 – 10 | Less than 2 ohms. |
| R | 7 – 8 | |
| N | 4 – 8, 9 – 10 | |
| D | 1 – 8 | |
| 3 | 5 – 8 | |
| 2 | 2 – 8 | |
| L | 6 – 8 | |

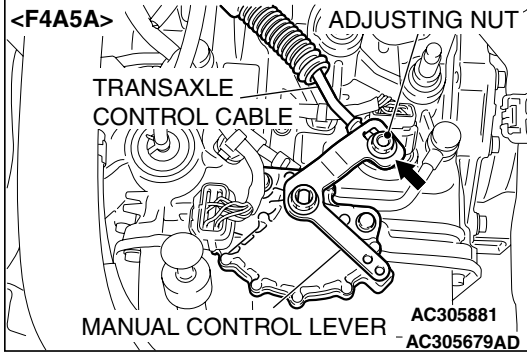
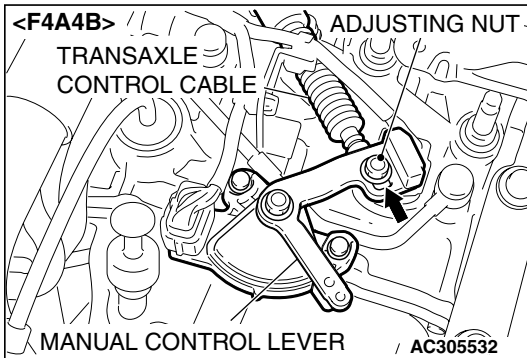
NOTE: For vehicles with sport mode, four positions (P, R, N, D) are used.



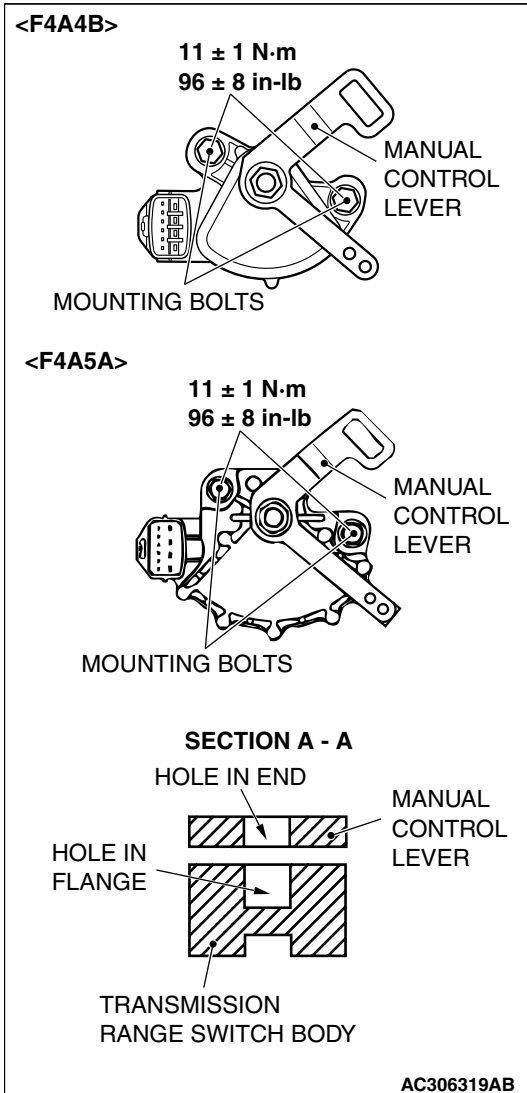
TRANSMISSION RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

M1231021700051

1. Set the selector lever to the "N" position.



2. Loosen the control cable to the manual control lever coupling nut to free the cable and lever.
3. Set the manual control lever to the neutral position.

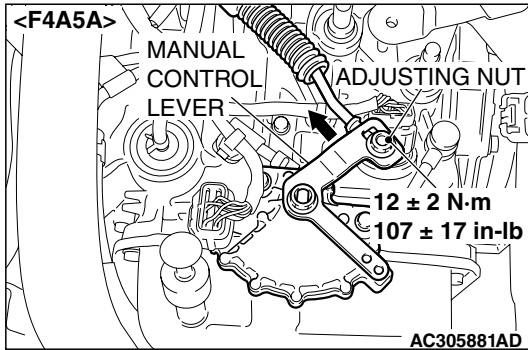
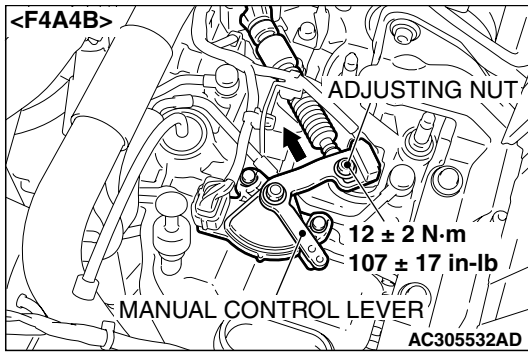


4. Loosen the transmission range switch body mounting bolts and turn the park/neutral position switch body so the hole in the end of the manual control lever and the hole (section A – A in the figure on the left) in the flange of the transmission range switch body are aligned.

NOTE: The transmission range switch body can be aligned by inserting a 5-mm diameter steel bar into the end hole of the manual control lever and the flange hole of the transmission range switch body.

5. Tighten the transmission range switch body mounting bolts to the specified torque. Be careful at this time that the switch body does not move.

Tightening torque: $11 \pm 1 \text{ N}\cdot\text{m}$ ($96 \pm 8 \text{ in}\cdot\text{lb}$)



6. Gently push the transaxle control cable in the direction of the arrow, until the cable is taut. Tighten the adjusting nut.
Tightening torque: 12 ± 2 N·m (107 ± 17 in-lb)
7. Check that the selector lever is in the "N" position.
8. Check that each position of the manual control lever matches each position of the selector lever using scan tool MB991958 (MUT-III sub assembly).

AUTOMATIC TRANSAXLE CONTROL COMPONENT CHECK

CRANKSHAFT POSITION SENSOR CHECK

M1231009000355

Refer to GROUP 13A <2.4L Engine>, Diagnosis – Inspection Procedure Using an Oscilloscope P.13A-1106.

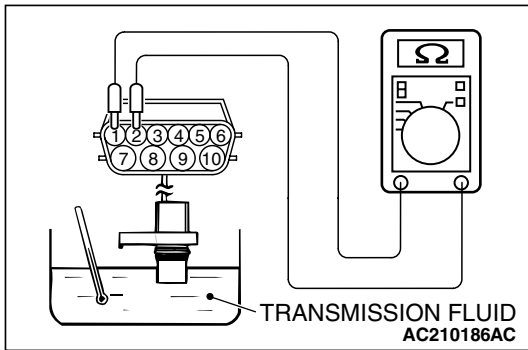
Refer to GROUP 13B <3.8L Engine>, Diagnosis – Inspection Procedure Using an Oscilloscope P.13B-1161.

TRANSMISSION FLUID TEMPERATURE SENSOR CHECK

M1231021800133

1. Remove the transmission fluid temperature sensor.
2. Measure the resistance between terminals 1 and 2 of the transmission fluid temperature sensor connector.

Standard value:



| TRANSMISSION FLUID TEMPERATURE | RESISTANCE |
|--------------------------------|----------------|
| 0°C (32°F) | 16.7 – 20.5 kΩ |
| 20°C (68°F) | 7.3 – 8.9 kΩ |
| 40°C (104°F) | 3.4 – 4.2 kΩ |
| 60°C (140°F) | 1.9 – 2.2 kΩ |
| 80°C (176°F) | 1.0 – 1.2 kΩ |
| 100°C (212°F) | 0.57 – 0.69 kΩ |

- If the transmission fluid temperature sensor resistance is outside the specified range and the "N" range indicator light is flashing, replace the transmission fluid temperature sensor.

NOTE: The "N" range indicator light on the combination meter flashes when the temperature reaches approximately 125°C (257°F) or greater, and then stops flashing when the temperature drops below approximately 115°C (238°F).

TRANSMISSION RANGE SWITCH CHECK

M1231021600117

Refer to [P.23A-372](#).

STOPLIGHT SWITCH CHECK

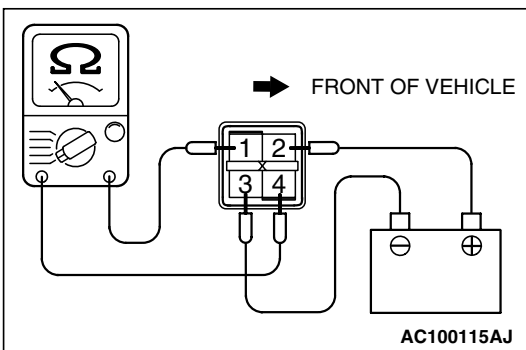
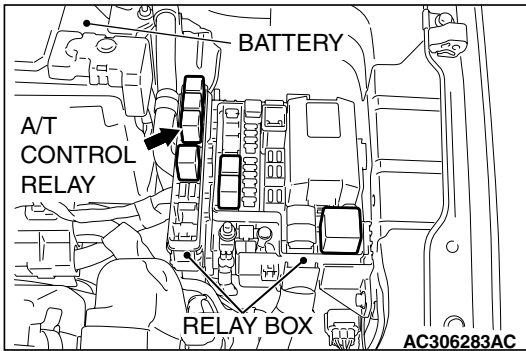
M1231009100192

Refer to GROUP 35A, Brake Pedal – Brake Pedal Inspection [P.35A-25](#).

A/T CONTROL RELAY CHECK

M1231009300248

- Remove the A/T control relay.



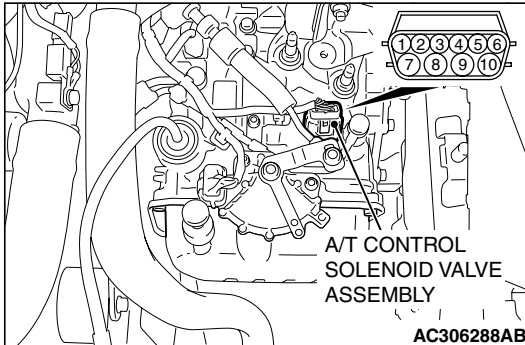
- Use jumper wires to connect A/T control relay terminal 3 to the negative battery terminal and terminal 2 to the positive battery terminal.
- Check for continuity between A/T control relay terminals 1 and 4 when the jumper wires are connected to and disconnected from the battery.

| JUMPER WIRE | CONTINUITY BETWEEN TERMINALS NO.1 AND NO.4 |
|--------------|--|
| Connected | Continuity |
| Disconnected | No continuity |

- If there is any problem with the A/T control relay, replace it.

SOLENOID VALVE CHECK

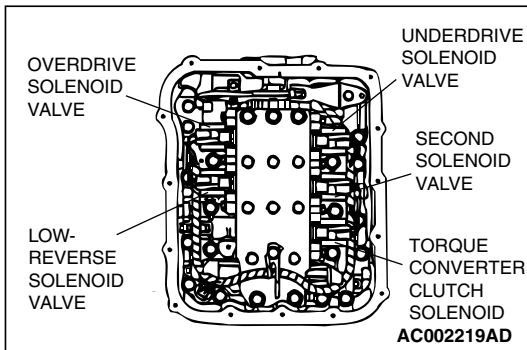
1. Use scan tool MB991958 (MUT-III sub assembly) to measure the transmission fluid temperature. The desired transmission fluid temperature setting for performing the solenoid valve check is 20°C (68°F).
2. Remove the A/T control solenoid valve assembly connector.
3. Measure the resistance between the solenoid valve terminals.
4. The measured resistance of the solenoid valve when the transmission fluid temperature is 20°C (68°F) should match the specified resistance on the chart below.



Specified resistance:

| TERMINAL NO. | NAME | RESISTANCE |
|--------------|--|------------------------------|
| 7 - 10 | Torque converter clutch solenoid valve | 2.7 – 3.4 Ω [at 20°C (68°F)] |
| 6 - 10 | Low-reverse solenoid valve | |
| 4 - 9 | Second solenoid valve | |
| 3 - 9 | Underdrive solenoid valve | |
| 5 - 9 | Overdrive solenoid valve | |

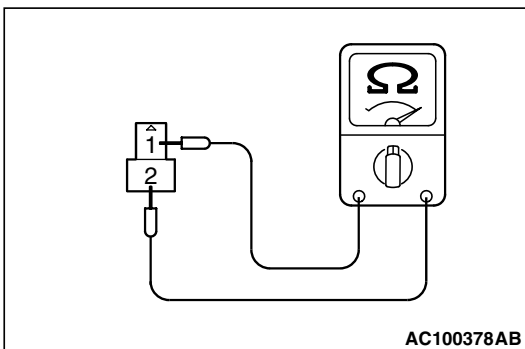
5. If the solenoid valve resistance is within the specified range, check the power supply and the ground circuits.
6. If the solenoid valve resistance is not within the specified range, drain the transmission fluid and remove the valve body cover.
7. Disconnect the connector of any solenoid valves that are not within the specified range.



8. Measure the resistance between terminals 1 and 2 of any solenoid valve that was not within the specified range.

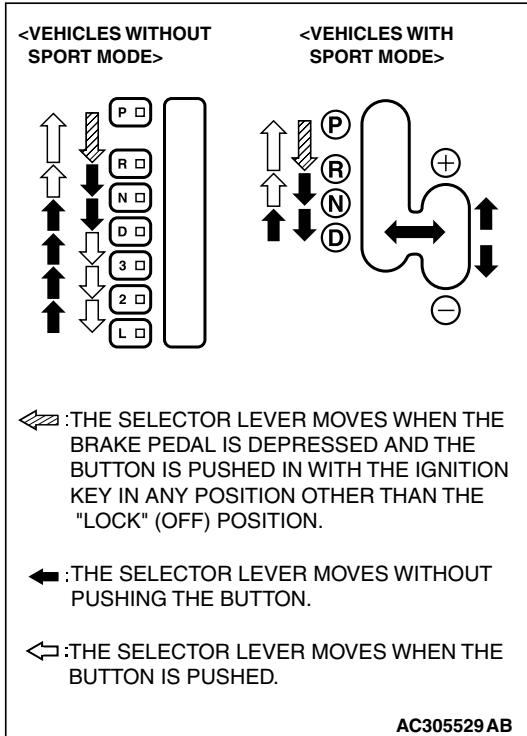
Specified resistance: 2.7 – 3.4 Ω [at 20°C (68°F)]

9. If the resistance is not within the specified range, replace the solenoid valve.
10. If the resistance is within the specified range, check the wiring harness between the affected A/T control solenoid valve assembly and the solenoid valve. If a problem is not found in the above steps, check the solenoid valve O-rings and replace them if necessary.



SELECTOR LEVER OPERATION CHECK

M1231001300426



1. Apply the parking brake, and check that the selector lever moves smoothly and accurately to each position.
2. Check that the engine starts when the selector lever is at the "N" or "P" position, and that it does not start when the selector lever is in any other position.
3. Start the engine, release the parking brake, and check that the vehicle moves forward when the selector lever is moved from "N" position to "D," "3," "2" or "L" position or to 1st or 2nd gear in Sports mode, and that the vehicle reverses when the selector lever is moved to "R" position.
4. Stop the engine.
5. Turn the ignition switch to the "ON" position, and check that the backup lamp illuminates when the selector lever is shifted from "P" position to "R" position.

NOTE: The A/T mis-operation prevention mechanism is provided so that the selector lever cannot be moved from the "P" position if the ignition switch is at a position other than the "LOCK" (OFF) position and the brake pedal is not depressed.

**KEY INTERLOCK AND SHIFT LOCK MECHANISM
CHECK**

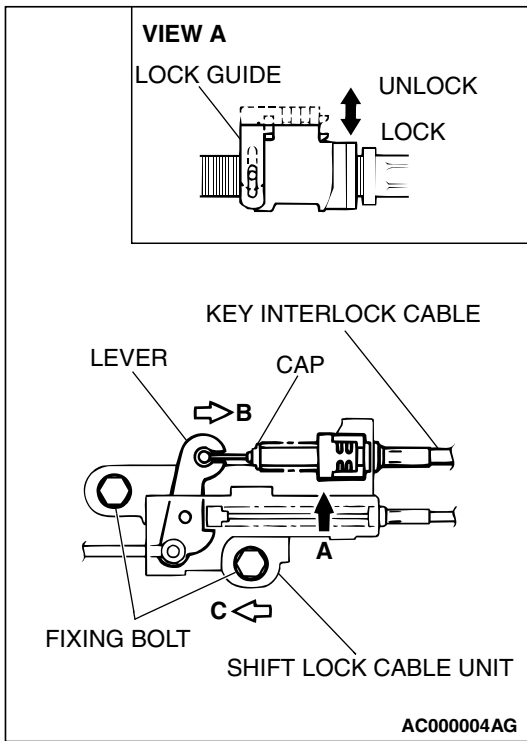
M1232003100216

1. Carry out the following inspection.

| KEY INTERLOCK SIDE | | | |
|----------------------|----------------------------|---|--|
| INSPECTION PROCEDURE | INSPECTION REQUIREMENT | INSPECTION ITEM (NORMAL CONDITION) | |
| 1 | Brake pedal: Depressed | Ignition key position: "LOCK" (OFF) or removed | Unable to push in the selector lever push button and move the lever out of the "P" position. |
| 2 | | Ignition key position: "ACC" | Able to push in the selector lever push button, move the lever out of the "P" position, and shift to any position. |
| 3 | Brake pedal: Not depressed | Selector lever: Other than "P" position | Unable to turn the ignition key to the "LOCK" (OFF) position. |
| 4 | | Selector lever: "P" position | Able to turn the ignition key to the "LOCK" (OFF) position. |

| SHIFT LOCK SIDE | | | |
|----------------------|-------------------------------|------------------------------|---|
| INSPECTION PROCEDURE | INSPECTION CONTENTS | | CHECK DETAILS (NORMAL CONDITION) |
| 1 | Brake pedal: Not depressed | Ignition key position: "ACC" | When the selector lever push button is depressed, the selector lever can not be shifted out of the "P" position. |
| 2 | Brake pedal: Depressed | | When the selector lever push button is depressed, the selector lever can be shifted smoothly to other position. |
| 3 | Brake pedal: Not depressed | | When the selector lever push button is depressed, the selector lever can be shifted smoothly from the "R" position to the "P" position. |

2. When any of the above checks are not normal, adjust the key interlock cable and shift lock cable unit in following procedure.
- (1) Remove the front floor console. (Refer to GROUP 52A – Floor Console Assembly [P.52A-9](#)).
 - (2) Shift selector lever to "P" position.
 - (3) Turn the ignition key to "LOCK" (OFF) position.



- (4) Loosen the bolt fixing the shift lock cable unit, push the lever in direction B and the unit in direction C and tighten the bolt at the standard torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

- (5) Lift the lock guide of the key interlock cable and then unlock it.
- (6) Lower the lock guide of the key interlock cable and then lock it.

NOTE: The key interlock cable is adjusted according to the lock position (cap push state) at this time. Readjust the lock position if key interlocking operations malfunction after locking.

3. After adjustment, re-check the operations. Replace the key interlock cable and shift lock cable unit if operations are defective. (Refer to [P 23A-385](#)).

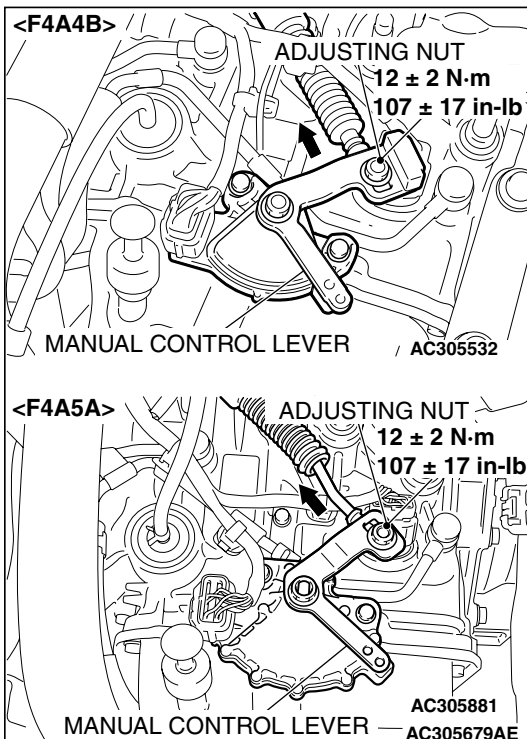
TRANSAXLE CONTROL CABLE ADJUSTMENT

M1231028000064

1. Move the selector lever to the "N" position.
2. Loosen the upper control lever adjusting nut.
3. Gently push the transaxle control cable in the direction of the arrow, and then tighten the adjusting nut.

Tightening torque: 12 ± 2 N·m (107 ± 17 in-lb)

4. Check that the transaxle shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.



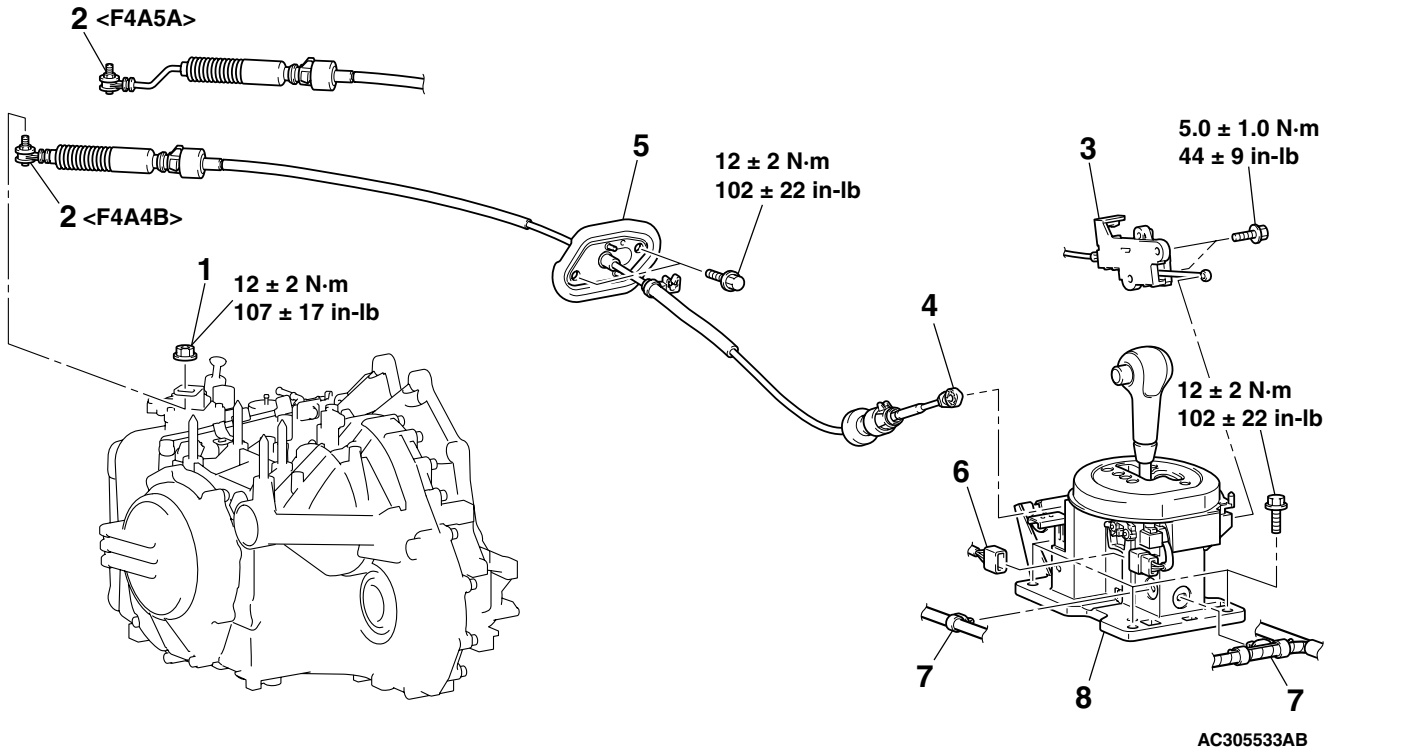
TRANSAXLE CONTROL

REMOVAL AND INSTALLATION

M1231006600585

⚠ WARNING

- When removing and installing the transaxle control cable and shift lock cable unit, be careful not to hit the SRS-ECU.
- When removing and installing the front passenger seat, be sure to carry out accuracy check occupant classification sensor after the seat has been installed in the vehicle. (Refer to GROUP 52B, On-Vehicle Service P.52B-355.)



TRANSAXLE CONTROL CABLE ASSEMBLY REMOVAL STEPS

- AIR DUCT AND AIR CLEANER ASSEMBLY (REFER TO GROUP 15 P.15-4.)
- BATTERY AND BATTERY TRAY
- POWERTRAIN CONTROL MODULE (PCM) (REFER TO GROUP 13A P.13A-1140.)
- HEATER UNIT AND DECK CROSSMEMBER ASSEMBLY (REFER TO GROUP 55, HEATER UNIT, HEATER CORE, BLOWER ASSEMBLY AND EVAPORATOR UNIT P.55A-267.)

- >>B<< 1. ADJUSTING NUT
- >>B<< 2. TRANSAXLE CONTROL CABLE ASSEMBLY CONNECTION (TRANSAXLE SIDE)
- >>A<< 3. SHIFT LOCK CABLE UNIT

TRANSAXLE CONTROL CABLE ASSEMBLY REMOVAL STEPS

- 4. TRANSAXLE CONTROL CABLE ASSEMBLY CONNECTION (SELECTOR LEVER ASSEMBLY SIDE)
 - 5. TRANSAXLE CONTROL CABLE ASSEMBLY
- SELECTOR LEVER ASSEMBLY ASSEMBLY REMOVAL STEPS**
- FLOOR CONSOLE (REFER TO GROUP 52A, FLOOR CONSOL ASSEMBLY P.52A-9)
 - >>A<< 3. SHIFT LOCK CABLE UNIT
 - 4. TRANSAXLE CONTROL CABLE ASSEMBLY CONNECTION (SELECTOR LEVER ASSEMBLY SIDE)
 - 6. AT SELECTOR LEVER POSITION ILLUMINATION LIGHT HARNESS CONNECTOR <VEHICLES WITHOUT SPORT MODE>, SHIFT SWITCH ASSEMBLY HARNESS CONNECTOR <VEHICLES WITH SPORT MODE>

**SELECTOR LEVER ASSEMBLY
ASSEMBLY REMOVAL STEPS**

7. HARNESS CILP CONNECTION
8. SELECTOR LEVER ASSEMBLY

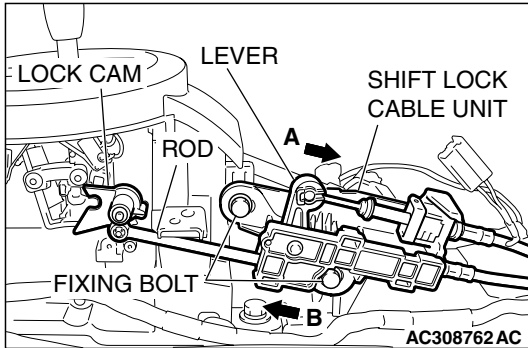
INSTALLATION SERVICE POINTS

>>A<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Selector lever to "P" position.
2. Turn the ignition key to "LOCK" (OFF) position.
3. Install the rod of the shift lock cable unit to the lock cam, push the lever in direction A, push the shift lock cable unit in direction B and tighten the fixing bolt at the standard torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

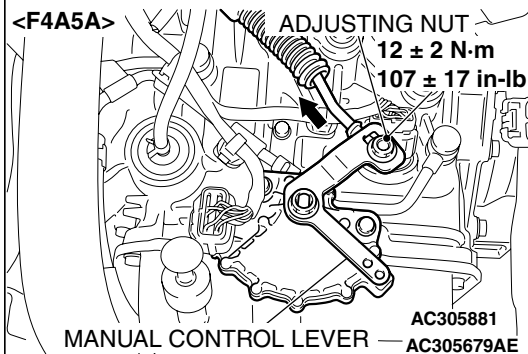
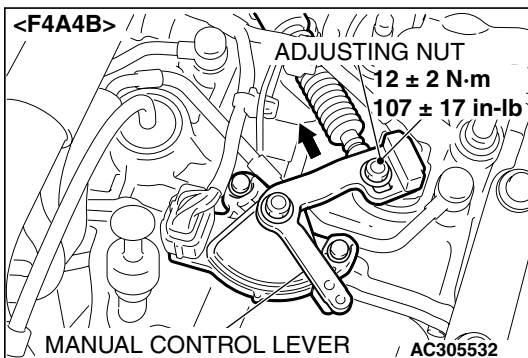
4. Check the selector lever operation.(Refer to [P.23A-377](#)).



>>B<< TRANSAXLE CONTROL CABLE ASSEMBLY (TRANSAXLE SIDE)/ADJUSTING NUT INSTALLATION

1. Place the selector lever and manual control lever in the "N" position.
2. Place the cable stud into the manual control lever slot and install the nut loosely. Gently push the transaxle control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

Tightening torque: 12 ± 2 N·m (107 ± 17 in-lb)



INSPECTION

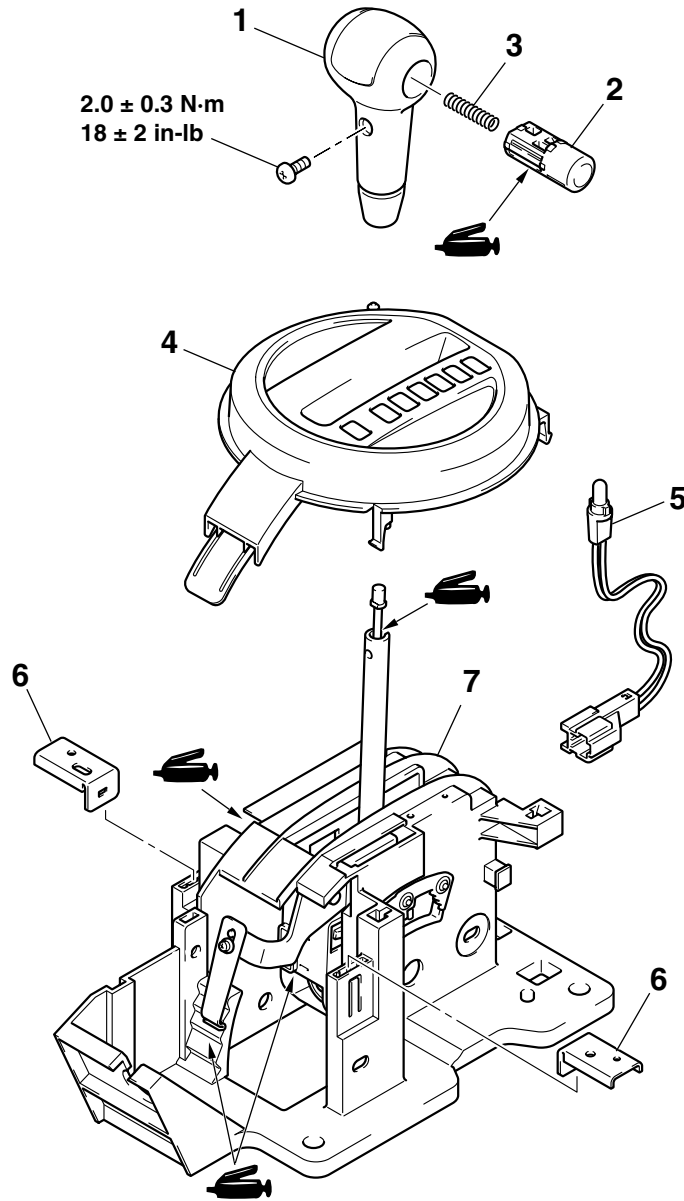
Check the cable assembly for function and for damage.

M123103000094

DISASSEMBLY AND ASSEMBLY

M1231006800363

<VEHICLES WITHOUT SPORT MODE>



DISASSEMBLY STEPS

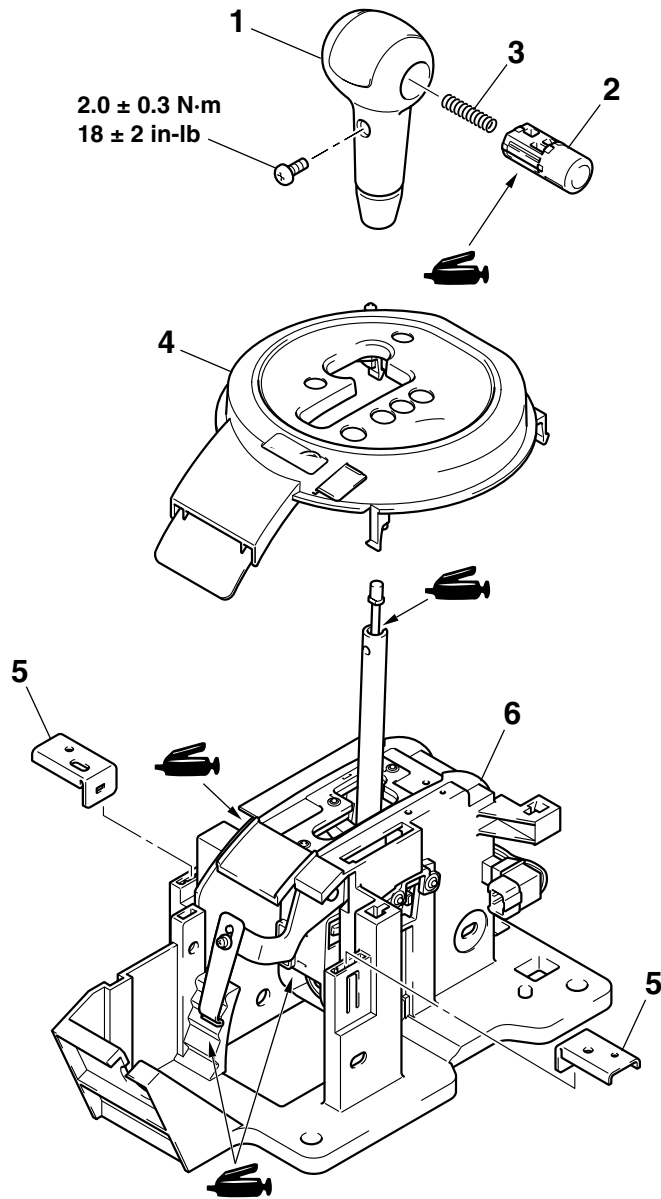
1. SHIFT KNOB
2. PUSH BUTTON
3. SPRING
4. INDICATOR PANEL

AC306189AB

DISASSEMBLY STEPS

5. A/T SELECTOR LEVER POSITION ILLUMINATION LIGHT
6. BRACKET STAY
7. SHIFT LEVER ASSEMBLY

<VEHICLES WITH SPORT MODE>



DISASSEMBLY STEPS

1. SHIFT KNOB
2. PUSH BUTTON
3. SPRING

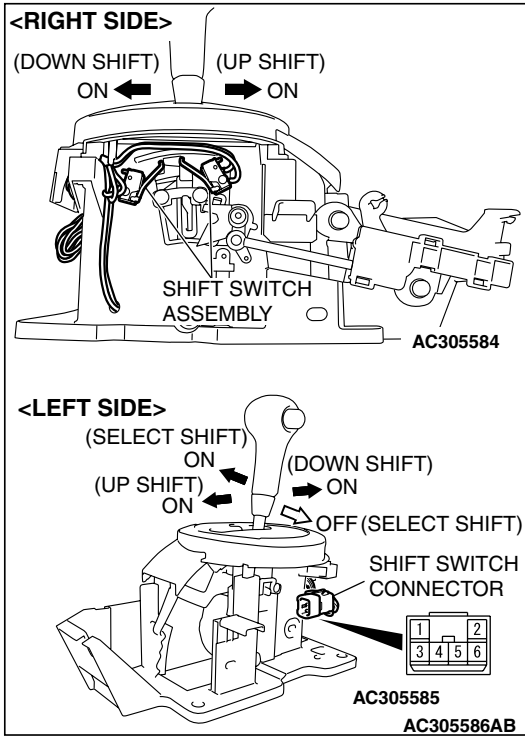
AC305576AB

DISASSEMBLY STEPS

4. INDICATOR PANEL
5. BRACKET STAY
6. SHIFT LEVER ASSEMBLY

INSPECTION

SHIFT SWITCH ASSEMBLY CONTINUITY CHECK <VEHICLES WITH SPORT MODE>



| SWITCH POSITION | | TERMINAL NO. |
|------------------------------|-----|--------------|
| Select switch (select shift) | ON | 3 - 6 |
| | OFF | 5 - 6 |
| Shift switch (up shift) | ON | 1 - 4 |
| | OFF | - |
| Shift switch (down shift) | ON | 1 - 2 |
| | OFF | - |

A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

REMOVAL AND INSTALLATION

M1232001200648

⚠ WARNING

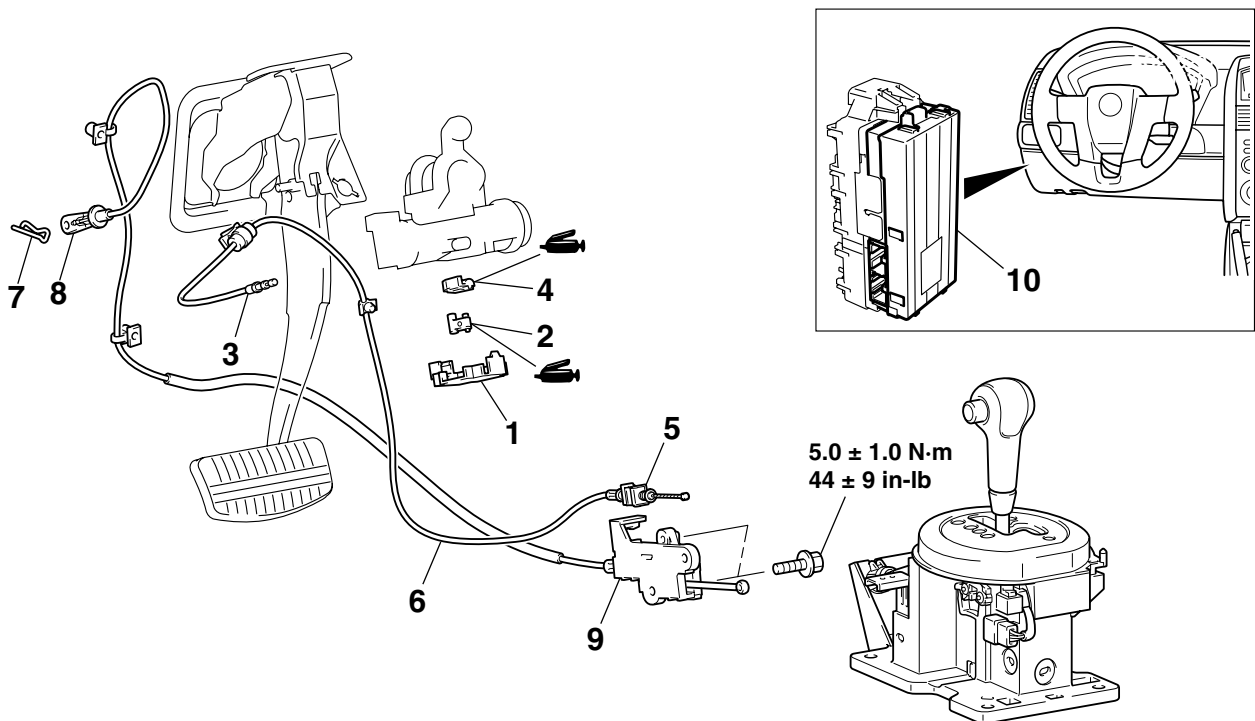
- When removing and installing the shift lock cable unit and key interlock cable, be careful not to hit the SRS-ECU.
- When removing and installing the front passenger seat, be sure to carry out accuracy check occupant classification sensor after the seat has been installed in the vehicle. (Refer to GROUP 52B, On-Vehicle Service P.52B-355.)

Pre-removal Operation

- Floor Console Removal (Refer to GROUP 52A, Floor Console Assembly P.52A-9.)
- Center Console Assembly Removal (Refer to GROUP 52A, Instrument Panel Assembly P.52A-3.)
- Lower Column Cover Removal (Refer to GROUP 37, Steering Shaft P.37-28.)
- Accelerator Pedal Assembly Removal (Refer to GROUP 17, Accelerator Cable and Pedal P.17-9.)

Post-installation Operation

- Accelerator Pedal Assembly Installation (Refer to GROUP 17, Accelerator Cable and Pedal P.17-9.)
- Center Console Assembly Installation (Refer to GROUP 52A, Instrument Panel Assembly P.52A-3.)
- Floor Console Installation (Refer to GROUP 52A, Floor Console Assembly P.52A-9.)
- Lower Column Cover Installation (Refer to GROUP 37, Steering Shaft P.37-28.)
- Key Interlock and Shift Lock Mechanism Check (Refer to P.23A-378.)



AC306127AB

**KEY INTERLOCK CABLE
REMOVAL STEPS**

1. COVER
2. ROCK CAM (STEERING LOCK CYLINDER SIDE)
3. KEY INTERLOCK CABLE (STEERING LOCK CYLINDER SIDE) CONNECTION
4. SLIDER
5. KEY INTERLOCK CABLE (SELECTOR LEVER SIDE) CONNECTION
6. KEY INTERLOCK CABLE

**SHIFT LOCK CABLE UNIT
REMOVAL STEPS**

7. COTTER PIN
 8. SHIFT LOCK CABLE UNIT (BRAKE PEDAL SIDE) CONNECTION
 9. SHIFT LOCK CABLE UNIT
- ETACS-ECU REMOVAL**
- INSTRUMENT LOWER PANEL (REFER TO GROUP 52A P.52A-3.)
 - 10. ETACS-ECU

REMOVAL SERVICE POINTS

<<A>> SHIFT LOCK CABLE UNIT REMOVAL

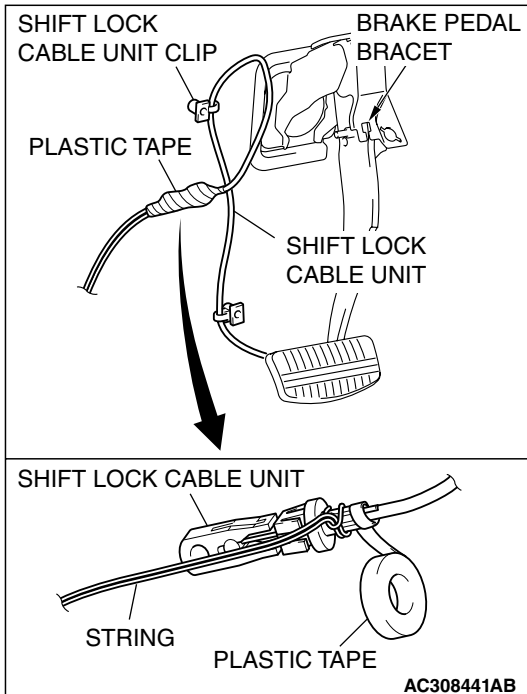
Remove the shift lock cable from vehicles as follows to configure it easily upon assembling.

1. Remove the shift lock cable unit from the brake pedal bracket.
2. Remove the shift lock cable unit clip.
3. Bind up the cap of shift lock cable unit with a string.

⚠ CAUTION

Bind up it securely so that the string will not loosen.

4. Wind a plastic tape around the string bound to the shift lock cable unit.
5. To remove the shift lock cable unit pull it slowly and thread the string behind the heater unit.



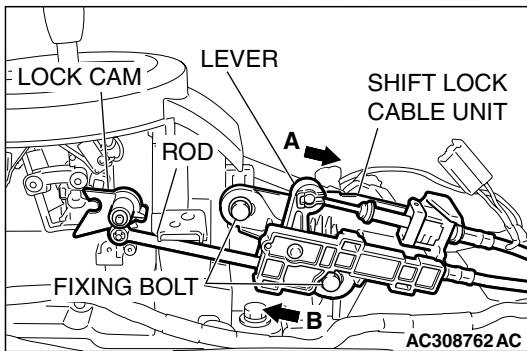
INSTALLATION SERVICE POINTS

>>A<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Selector lever to "P" position.
2. Turn the ignition key to "LOCK" (OFF) position.
3. Install the rod of the shift lock cable unit to the lock cam, push the lever in direction A, push the shift lock cable unit in direction B and tighten the fixing bolt at the standard torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

4. Check the selector lever operation. (Refer to [P.23A-377](#))

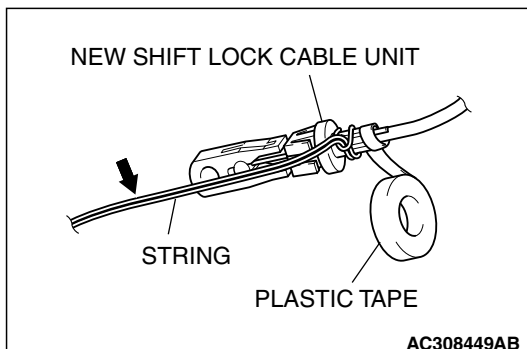


>>B<< SHIFT LOCK CABLE UNIT (BRAKE PEDAL SIDE) INSTALLATION

⚠ CAUTION

When threading the shift lock cable unit behind the heater unit, wind a plastic tape around it up to the arrow as shown so that the shift lock cable unit will not be bent.

1. Bind up the cap of new shift lock cable unit with the string threaded behind the heater unit when removing and wind a plastic tape around it.
2. Pull the string slowly and thread the shift lock cable unit behind the heater unit.
3. Install the shift lock cable unit clip.
4. Remove the string and the plastic tape from the shift lock cable unit, and then install the shift lock cable unit to the brake pedal bracket.



INSPECTION

Check the cable assembly for function and for damage.

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TRANSAXLE ASSEMBLY

REMOVAL AND INSTALLATION

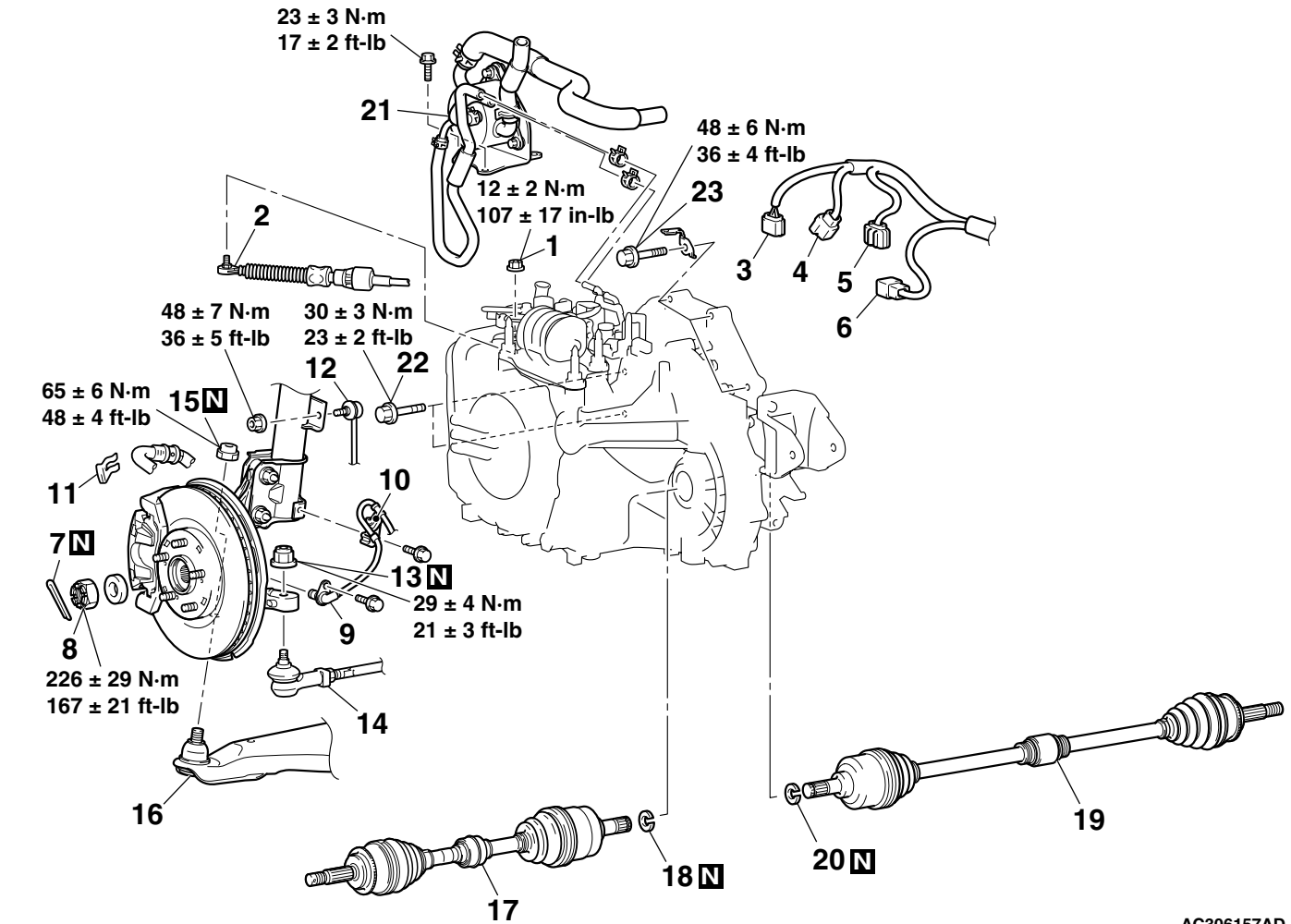
M1231005700448

<F4A4B>

⚠ CAUTION

*: Indicates parts which should be temporarily tightened, and then fully tightened after placing the vehicle horizontally and loading the full weight of the engine on the vehicle body.

| Pre-installation Operation | Post-installation Operation |
|--|---|
| <ul style="list-style-type: none"> • Front Under Cover, Side Under Cover Removal • Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service P.14-7.) • Transmission Fluid Draining (Refer to GROUP 00, Maintenance Service – Automatic Transaxle P.00-53.) • Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner P.15-4.) • Powertrain Control Module (PCM) Removal (Refer to GROUP 13A P.13A-1140.) • Battery and Battery Tray Removal • Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-20.) | <ul style="list-style-type: none"> • Front Exhaust Pipe Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-20.) • Battery and Battery Tray Installation • Powertrain Control Module (PCM) Installation (Refer to GROUP 13A P.13A-1140.) • Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner P.15-4.) • Transmission Fluid Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transaxle P.00-53.) • Engine Coolant Supplying (Refer to GROUP 14, On-vehicle Service P.14-7.) • Front Under Cover, Side Under Cover Installation • Selector Lever Operation Check (Refer to P.23A-377.) • Speedometer Operation Check (Refer to GROUP 54A, Combination Meter – On-vehicle Service – Speedometer Check P.54A-102.) • Front Wheel Alignment Check and Adjustment (Refer to GROUP 33, On-vehicle Service – Front Wheel Alignment Check and Adjustment P.33-6.) |

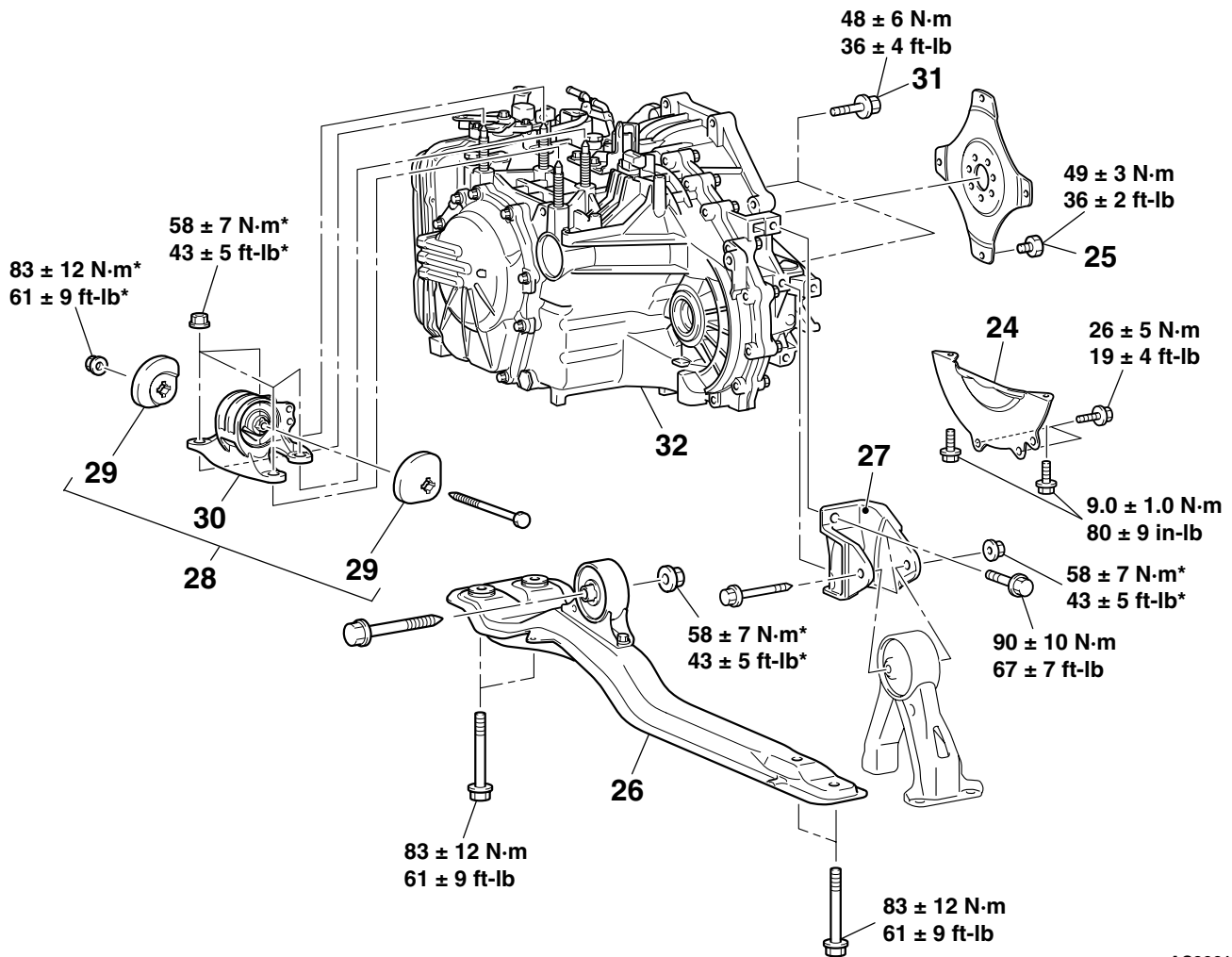


AC306157AD

REMOVAL STEPS

REMOVAL STEPS (Continued)

- | | | | | | |
|-------------|-----|--|-------------|-----|--|
| >>E<< | 1. | ADJUSTING NUT | | 13. | SELF-LOCKING NUT (CONNECTION FOR TIE ROD END) |
| >>E<< | 2. | TRANSAXLE CONTROL CABLE CONNECTION | | 14. | TIE ROD END CONNECTION |
| | 3. | INHIBITOR SWITCH SENSOR CONNECTOR | <> | 15. | SELF-LOCKING NUT (CONNECTION FOR LOWER ARM BALL JOINT) |
| | 4. | A/T CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR | | 16. | LOWER ARM BALL JOINT CONNECTION |
| | 5. | INPUT SHAFT SPEED SENSOR CONNECTOR | <> | | |
| | 6. | OUTPUT SHAFT SPEED SENSOR CONNECTOR | <<C>> >>C<< | 17. | DRIVE SHAFT <LH> |
| | 7. | SPLIT PIN | <<C>> >>C<< | 18. | CIRCLIP |
| <<A>> >>D<< | 8. | DRIVE SHAFT NUT | | 19. | DRIVE SHAFT <RH> |
| | 9. | WHEEL SPEED SENSOR | | 20. | CIRCLIP |
| | 10. | WHEEL SPEED SENSOR BRACKET | | 21. | ATF WARMER (TRANSMISSION FLUID COOLER) ASSEMBLY |
| | 11. | BRAKE HOSE CLAMP | | 22. | STARTER MOTOR ATTACHING BOLTS |
| | 12. | STABILIZER LINK CONNECTION <STRUT SIDE> | | 23. | TRANSAXLE ASSEMBLY UPPER PART COUPLING BOLTS |



AC306158AC

REMOVAL STEPS

REMOVAL STEPS (Continued)

<<D>>

24. BELL HOUSING COVER
25. TORQUE CONVERTER AND DRIVE PLATE COUPLING BOLTS
26. CENTER MEMBER ASSEMBLY
 - FRONT No.1 EXHAUST PIPE AND FRONT No.2 EXHAUST PIPE CONNECTION (REFER TO GROUP 15, EXHAUST PIPE AND MAIN MUFFLER P.15-20.)
27. REAR ROLL STOPPER BRACKET
 - AIR CLEANER BRACKET

>>B<<

28. TRANSAXLE MOUNT BRACKET ASSEMBLY
29. TRANSAXLE MOUNT STOPPER
30. TRANSAXLE MOUNT BRACKET
 - ENGINE ASSEMBLY SUPPORTING
 - LIFTING UP OF THE VEHICLE
 - SUPPORT THE TRANSAXLE WITH A TRANSAXLE JACK
31. TRANSAXLE ASSEMBLY LOWER PART COUPLING BOLTS
32. TRANSAXLE ASSEMBLY

<<E>>

>>A<<

Required Special Tools:

- MB990767: End Yoke Holder
- MB991897: Ball Joint Remover
- MB990242: Puller Shaft Puller
- MB990244: Puller Bar
- MB991354: Puller Body
- MB990998: Front Hub Remover and Installer
- MB991000: Spacer
- MB991527: Hanger
- MB991454: Engine Hanger Balancer (chain)
- MB991895: Engine Hanger
- MB991928: Engine Hanger
- MB991932: Foot (standard)
- MB991933: Foot (short)
- MB991930: Joint (90)
- MB991934: Chain and Hook Assembly

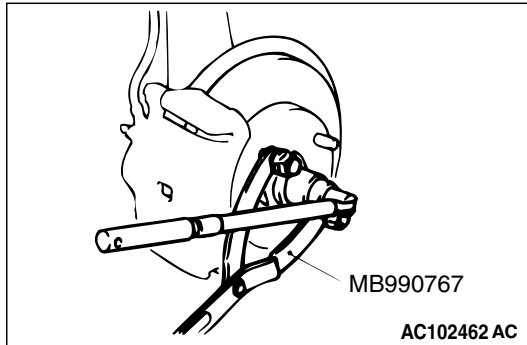
REMOVAL SERVICE POINTS

<<A>> DRIVE SHAFT NUT REMOVAL

⚠ CAUTION

Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft nut is loosened.

Use special tool MB990767 to fix the hub and remove the drive shaft nut.

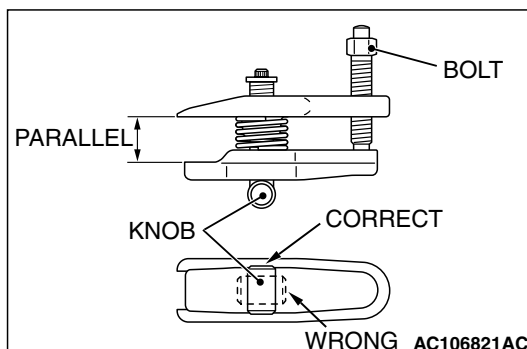
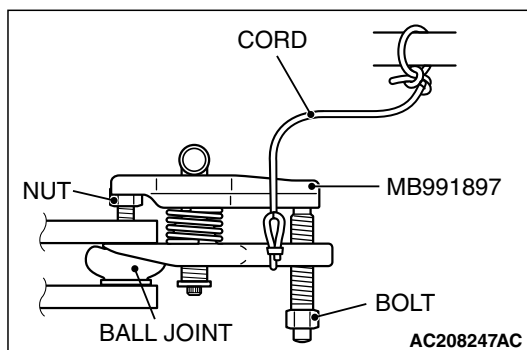


<> TIE ROD END CONNECTION/LOWER ARM BALL JOINT CONNECTION REMOVAL

⚠ CAUTION

- Do not remove the nut from ball joint. Loosen it and use the special tool to avoid possible damage to ball joint threads.
- Hang the special tool with cord to prevent it from falling.

1. Replace the self locking nut with a regular nut, because the original one is a little bit large to install the special tool. Install special tool MB991897 as shown in the figure.



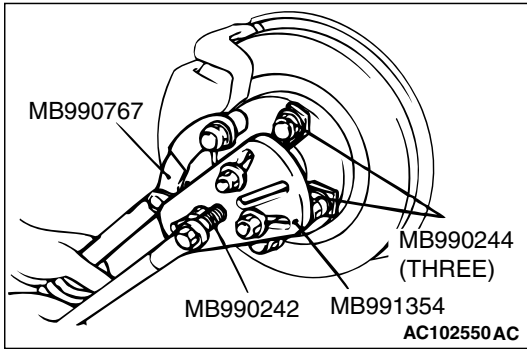
2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

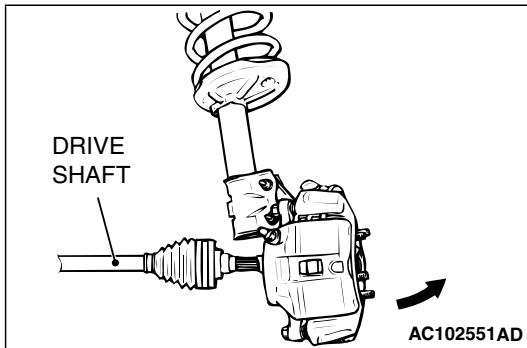
3. Tighten the bolt with a wrench to disconnect the tie rod end and remove the self locking nut.

<<C>> DRIVE SHAFT REMOVAL

1. Use special tools MB990242, MB990244, MB991354 and MB990767 to push out the drive shaft or the drive shaft and inner shaft assembly from the hub.

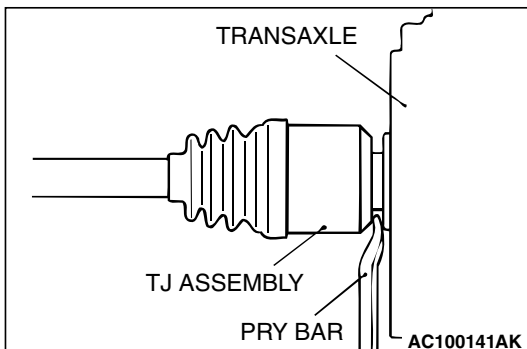


2. Remove the drive shaft from the hub by pulling the bottom of the brake disc towards you.



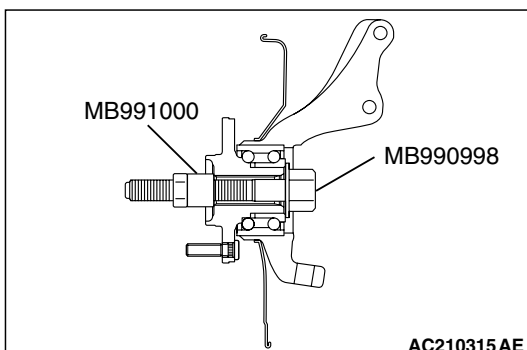
CAUTION

- Do not pull on the drive shaft; doing so will damage the TJ; be sure to use the pry bar.
 - When pulling the drive shaft out from the transaxle, be careful that the spline part of the drive shaft does not damage the oil seal.
3. Remove the drive shaft from the transaxle by the following procedure. Insert a pry bar between the transaxle case and the drive shaft, and then pry the drive shaft from the transaxle.



CAUTION

Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft is removed. If, however, vehicle weight must be applied to the bearing to move the vehicle, temporarily secure the wheel bearing by using special tools MB991000 and MB990998.

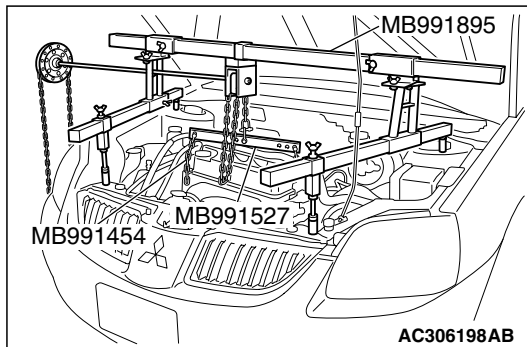
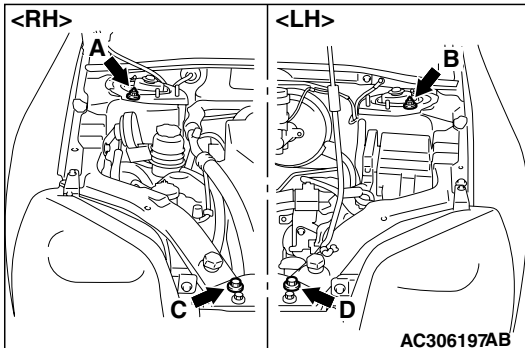


**<<D>> TORQUE CONVERTER AND DRIVE
PLATE COUPLING BOLTS REMOVAL**

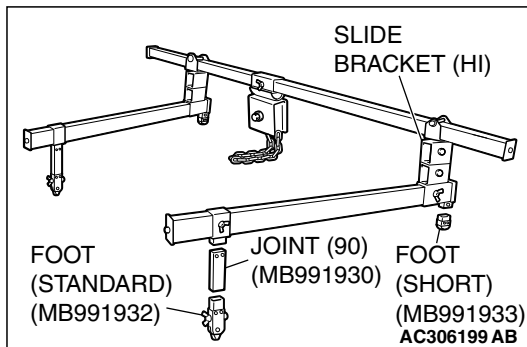
1. Remove the drive plate coupling bolts while turning the crank shaft.
2. Pry the torque converter towards the transaxle side.
Remove the torque converter with the transaxle.

<<E>> ENGINE ASSEMBLY SUPPORTING

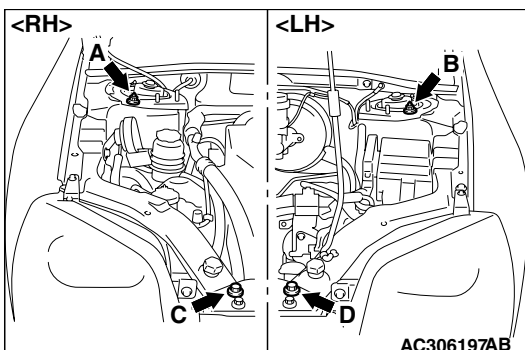
1. <Engine hanger (special tool MB991895) is used>
 - (1) Set special tool MB991895 (engine hanger) to the front fender assembling bolts (A and B) and (C and D) as shown.



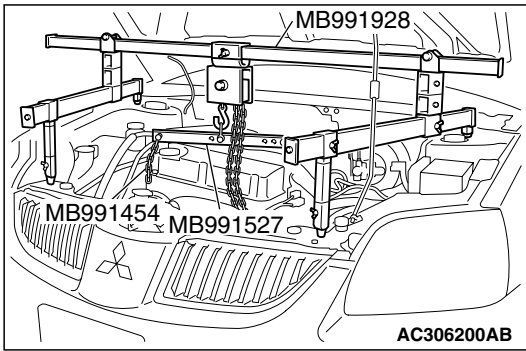
- (2) Set special tool MB991527 and MB991454 (chain) to hold the engine/transaxle assembly.



2. <Engine hanger (special tool MB991928) is used>
 - (1) Assemble the engine hanger (special tool MB991928).
Attach following parts to the base hanger.)
 - SLIDE BRACKET (HI)
 - FOOT (STANDARD) (MB991932) <FRONT SIDE>
 - JOINT (90) (MB991930)
 - FOOT (SHORT) (MB991933) <REAR SIDE>



- (2) Set special tool MB991928 (engine hanger) to the front fender assembling bolts (A and B) and (C and D) as shown.



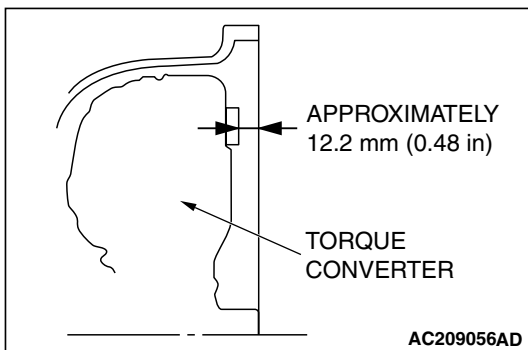
- (3) Position special tool MB991527 and MB991454 (chain) to hold the engine/transaxle assembly.

NOTE: Adjust the engine hanger balance by sliding the slide bracket (H).

INSTALLATION SERVICE POINT

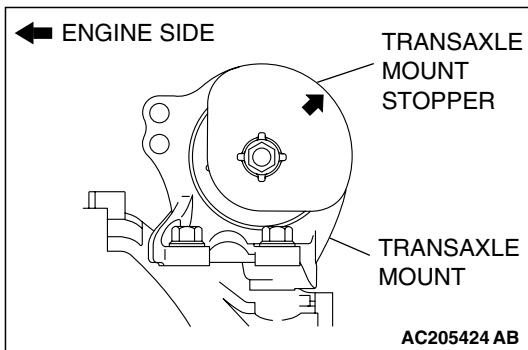
>>A<< TRANSAXLE ASSEMBLY INSTALLATION

Engage the torque converter into the transaxle side securely, and then assemble the transaxle assembly on the engine.



>>B<< TRANSAXLE MOUNT STOPPER INSTALLATION

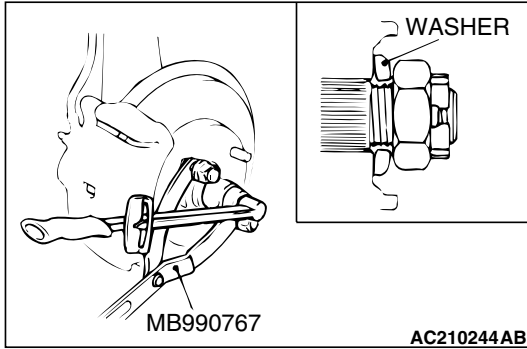
Install the transaxle mount stopper so that its arrow points upward.



>>C<< DRIVE SHAFT INSTALLATION

CAUTION

When installing the drive shaft, be careful that the spline part of the drive shaft do not damage the oil seal.

**>>D<< DRIVE SHAFT NUT INSTALLATION**

1. Be sure to install the drive shaft washer in the specified direction.

⚠ CAUTION

Before securely tightening the drive shaft nuts, make sure there is no load on the wheel bearings. Otherwise the wheel bearing will be damaged.

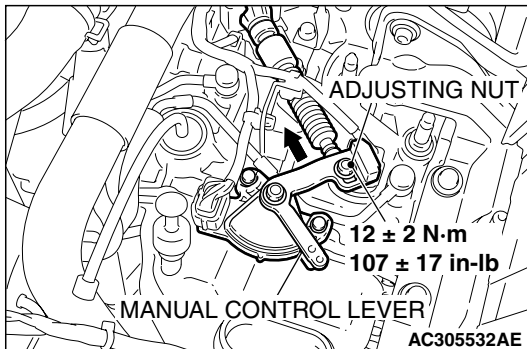
2. Using special tool MB990767, tighten the drive shaft nut to the specified torque.

Tightening torque: 226 ± 29 N·m (167 ± 21 ft·lb)

**>>E<< TRANSAXLE CONTROL
CABLE/ADJUSTING NUT INSTALLATION**

1. Place the selector lever and manual control lever in the “N” position.
2. Place the cable stud into the manual control lever slot and install the nut loosely. Gently push the transaxle control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

Tightening torque: 12 ± 2 N·m (107 ± 17 in·lb)



REMOVAL AND INSTALLATION

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<F4A5A>

⚠ CAUTION

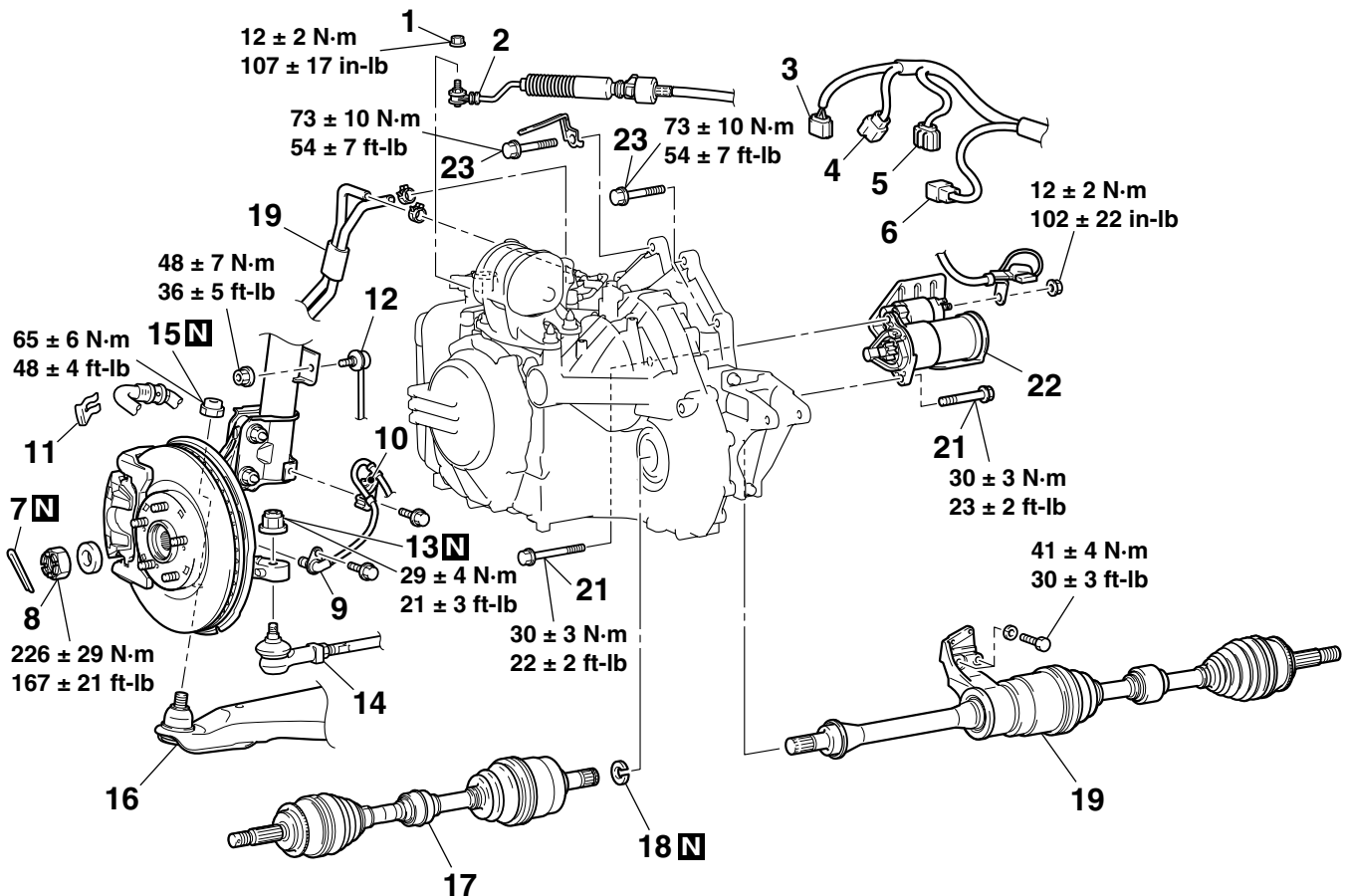
*: Indicates parts which should be temporarily tightened, and then fully tightened after placing the vehicle horizontally and loading the full weight of the engine on the vehicle body.

Pre-installation Operation

- Front Under Cover, Side Under Cover Removal
- Transmission Fluid Draining (Refer to GROUP 00, Maintenance Service – Automatic Transaxle P.00-53.)
- Engine Cover Removal (Refer to GROUP 11C, Engine Assembly P.11C-16.)
- Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner P.15-4.)
- Powertrain Control Module (PCM) Removal (Refer to GROUP 13A P.13A-1140.)
- Battery and Battery Tray Removal
- Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-20.)

Post-installation Operation

- Front Exhaust Pipe Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-20.)
- Battery and Battery Tray Installation
- Powertrain Control Module (PCM) Installation (Refer to GROUP 13A P.13A-1140.)
- Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner P.15-4.)
- Engine Cover Installation (Refer to GROUP 11C, Engine Assembly P.11C-16.)
- Transmission Fluid Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transaxle P.00-53.)
- Front Under Cover, Side Under Cover Installation
- Selector Lever Operation Check (Refer to P.23A-377.)
- Speedometer Operation Check (Refer to GROUP 54A, Combination Meter – On-vehicle Service – Speedometer Check P.54A-102.)
- Front Wheel Alignment Check and Adjustment (Refer to GROUP 33, On-vehicle Service – Front Wheel Alignment Check and Adjustment P.33-6.)



AC305969AB

- REMOVAL STEPS**
- >>E<< 1. ADJUSTING NUT
>>E<< 2. TRANSAXLE CONTROL CABLE CONNECTION

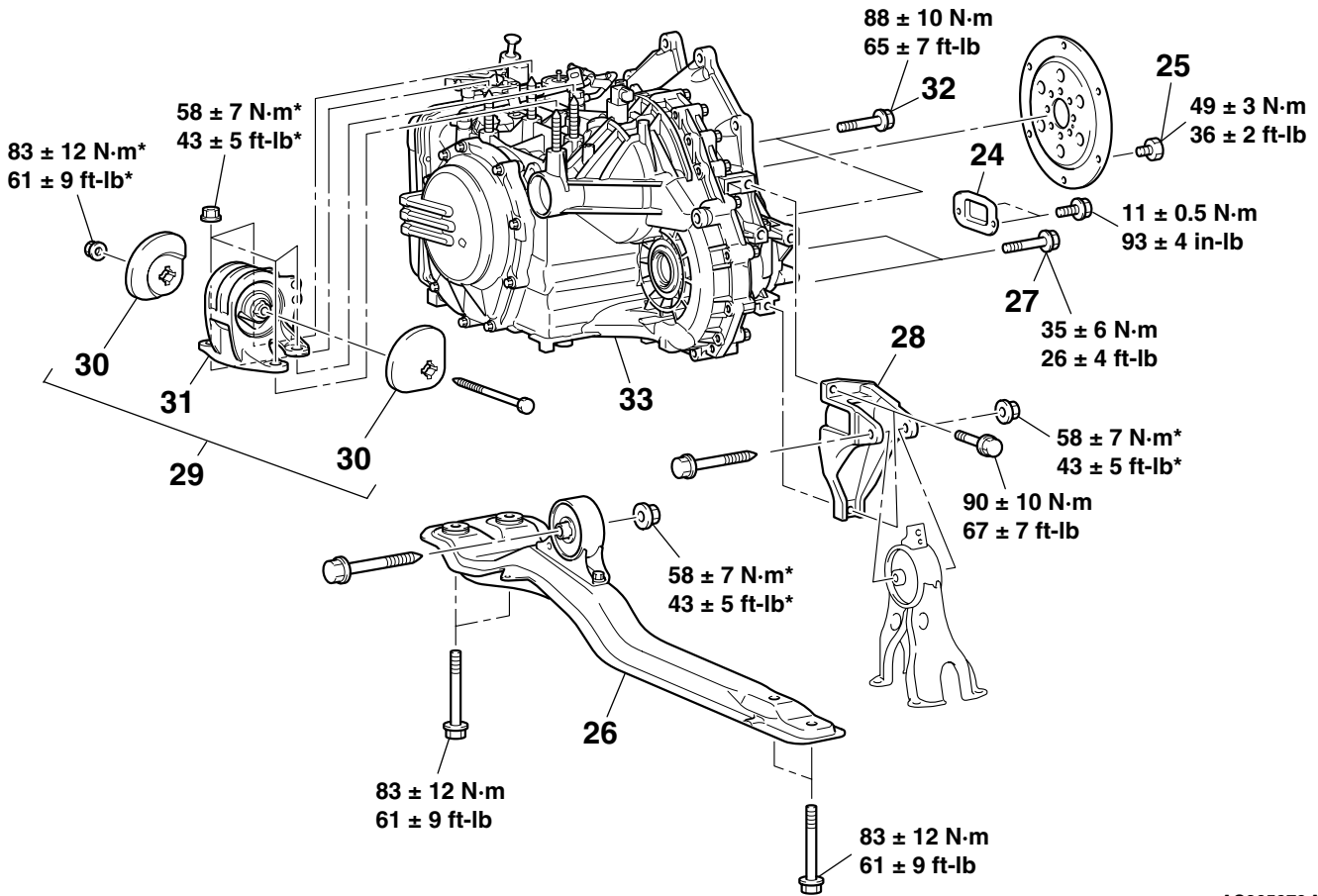
- REMOVAL STEPS (Continued)**
3. INHIBITOR SWITCH SENSOR CONNECTOR
4. A/T CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR

REMOVAL STEPS (Continued)

REMOVAL STEPS (Continued)

- 5. INPUT SHAFT SPEED SENSOR CONNECTOR <>
- 6. OUTPUT SHAFT SPEED SENSOR CONNECTOR
- 7. SPLIT PIN <>
- <<A>> >>D<< 8. DRIVE SHAFT NUT
- 9. WHEEL SPEED SENSOR <<C>> >>C<<
- 10. WHEEL SPEED SENSOR BRACKET <<C>> >>C<<
- 11. BRAKE HOSE CLAMP
- 12. STABILIZER LINK CONNECTION <STRUT SIDE>
- 13. SELF-LOCKING NUT (CONNECTION FOR TIE ROD END)

- 14. TIE ROD END CONNECTION
- 15. SELF-LOCKING NUT (CONNECTION FOR LOWER ARM BALL JOINT)
- 16. LOWER ARM BALL JOINT CONNECTION
- 17. DRIVE SHAFT <LH>
- 18. CIRCLIP
- 19. DRIVE SHAFT AND INNER SHAFT ASSEMBLY <RH>
- 20. TRANSMISSION FLUID COOLER HOSE
- 21. STARTER MOTOR ATTACHING BOLTS
- 22. STARTER MOTOR
- 23. TRANSAXLE ASSEMBLY UPPER PART COUPLING BOLTS



AC305970 AB

REMOVAL STEPS

REMOVAL STEPS (Continued)

- <<D>> 24. COVER
- 25. TORQUE CONVERTER AND DRIVE PLATE BOLTS <<E>>
- 26. CENTERMEMBER ASSEMBLY
- 27. ENGINE OIL PAN AND TRANSAXLE COUPLING BOLTS
- 28. REAR ROLL STOPPER BRACKET
- AIR CLEANER BRACKET
- 29. TRANSAXLE MOUNT BRACKET ASSEMBLY >>A<<
- >>B<< 30. TRANSAXLE MOUNT STOPPER

- 31. TRANSAXLE MOUNT BRACKET ENGINE ASSEMBLY SUPPORTING
- LIFTING UP OF THE VEHICLE
- SUPPORT THE TRANSAXLE WITH A TRANSAXLE JACK
- 32. TRANSAXLE ASSEMBLY LOWER PART COUPLING BOLTS
- 33. TRANSAXLE ASSEMBLY

Required Special Tools:

- MB990767: End Yoke Holder
- MB991897: Ball Joint Remover
- MB990242: Puller Shaft Puller
- MB990244: Puller Bar
- MB991354: Puller Body
- MB990998: Front Hub Remover and Installer
- MB991000: Spacer
- MB991454: Engine Hanger Balancer
- MB991895: Engine Hanger
- MB991928: Engine Hanger
- MB991932: Foot (standard)
- MB991929: Joint (50)
- MB991931: Joint (140)
- MB991934: Chain and Hook Assembly

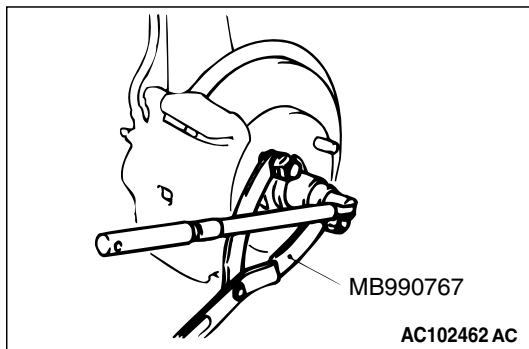
REMOVAL SERVICE POINTS

<<A>> DRIVE SHAFT NUT REMOVAL

⚠ CAUTION

Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft nut is loosened.

Use special tool MB990767 to fix the hub and remove the drive shaft nut.

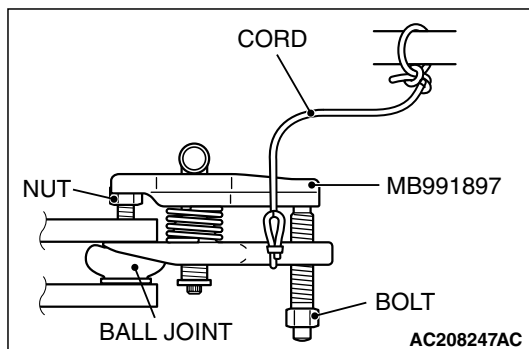


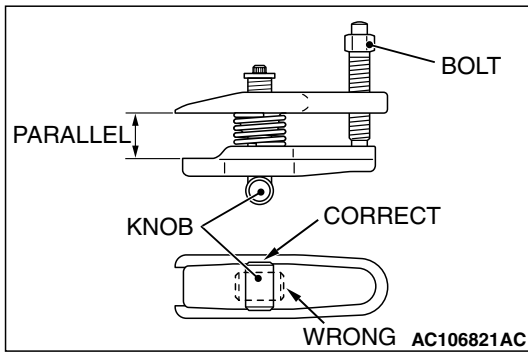
<> TIE ROD END CONNECTION/LOWER ARM BALL JOINT CONNECTION REMOVAL

⚠ CAUTION

- Do not remove the nut from ball joint. Loosen it and use the special tool to avoid possible damage to ball joint threads.
- Hang the special tool with cord to prevent it from falling.

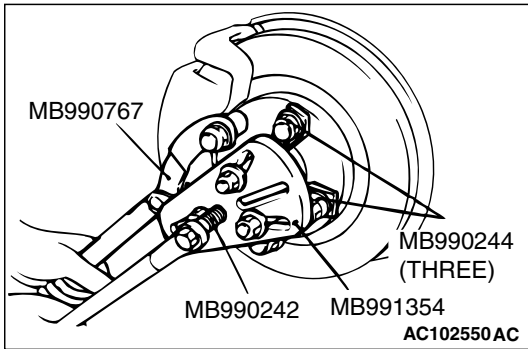
1. Replace the self locking nut with a regular nut, because the original one is a little bit large to install the special tool. Install special tool MB991897 as shown in the figure.



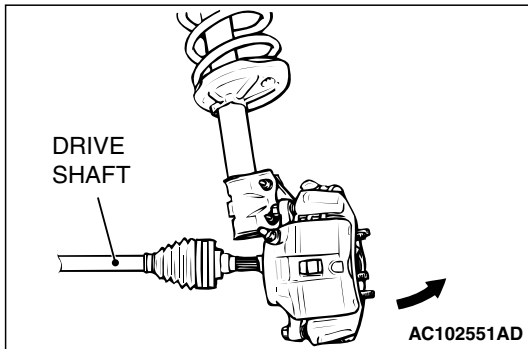


- Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.
NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.
- Tighten the bolt with a wrench to disconnect the tie rod end and remove the self locking nut.

<<C>> DRIVE SHAFT <LH>/DRIVE SHAFT AND INNER SHAFT ASSEMBLY <RH> REMOVAL



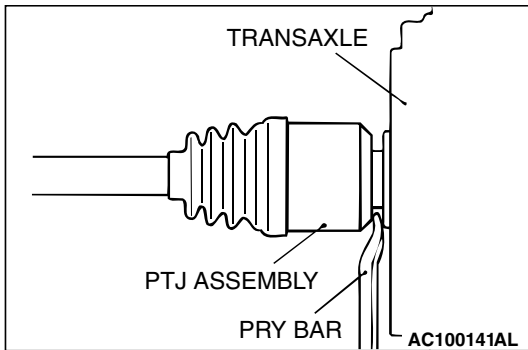
- Use special tools MB990242, MB990244, MB991354 and MB990767 to push out the drive shaft or the drive shaft and inner shaft assembly from the hub.



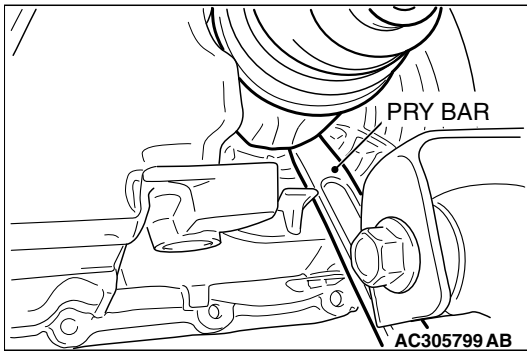
- Remove the drive shaft from the hub by pulling the bottom of the brake disc towards you.

⚠ CAUTION

- Do not pull on the drive shaft; doing so will damage the PTJ; be sure to use the pry bar.
- When pulling the drive shaft out from the transaxle, be careful that the spline part of the drive shaft does not damage the oil seal.

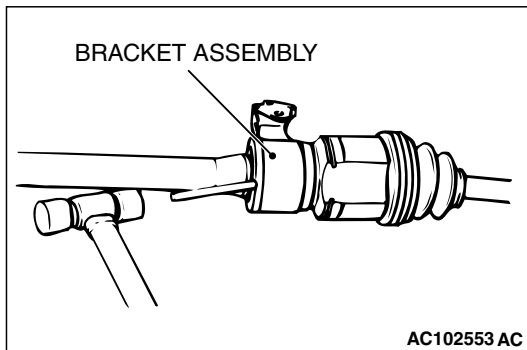


- Insert a pry bar between the transaxle case and the drive shaft, and then pry and remove the drive shaft from the transaxle.



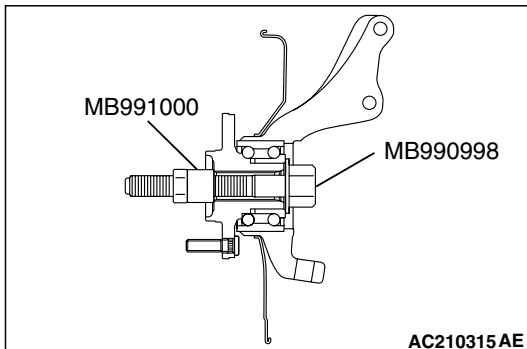
NOTE: Insert a pry bar, taking care not to damage the protrusion of transaxle case when removing the drive shaft LH.

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



⚠ CAUTION

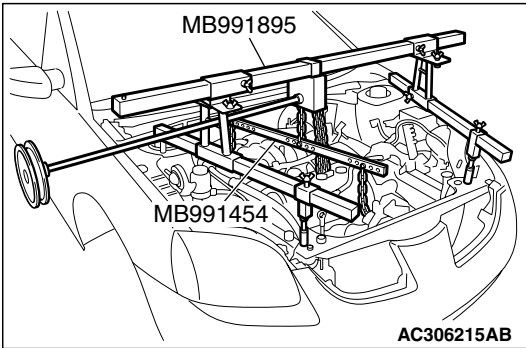
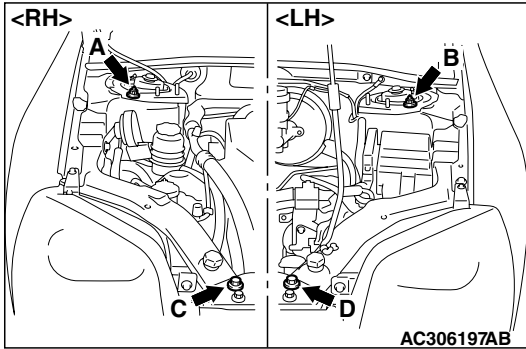
Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft is removed. If, however, vehicle weight must be applied to the bearing to move the vehicle, temporarily secure the wheel bearing by using special tools MB991000 and MB990998.



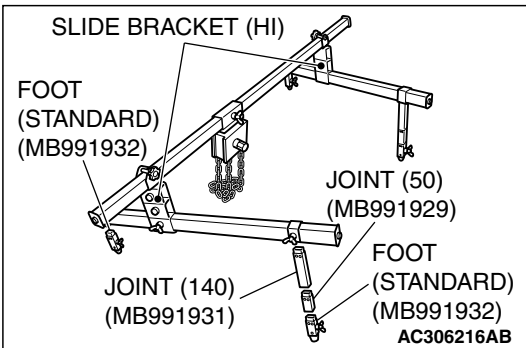
<<D>> TORQUE CONVERTER AND DRIVE PLATE COUPLING BOLTS REMOVAL

1. Remove the drive plate coupling bolts while turning the crank shaft.
2. Pry the torque converter towards the transaxle side. Remove the torque converter with the transaxle.

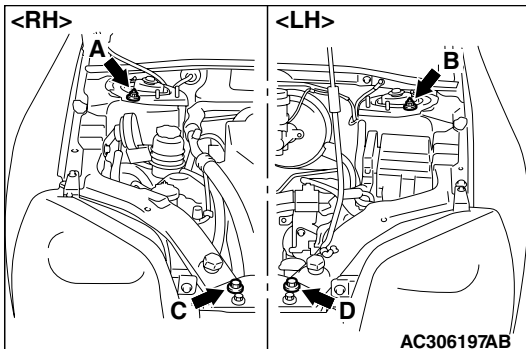
<<E>> ENGINE ASSEMBLY SUPPORTING



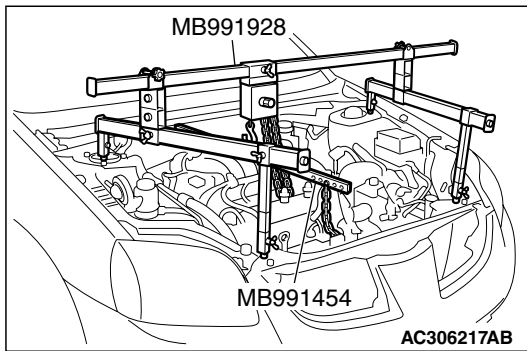
1. <Engine hanger (special tool MB991895) is used>
 - (1) Set special tool MB991895 (engine hanger) to the front fender assembling bolts (A and B) and (C and D) as shown.
 - (2) Set special tool MB991454 to hold the engine/transaxle assembly.



2. <Engine hanger (special tool MB991928) is used>
 - (1) Assemble the engine hanger (special tool MB991928). Attach following parts to the base hanger.)
 - SLIDE BRACKET (HI)
 - FOOT (STANDARD) (MB991932)
 - JOINT (50) (MB991929)
 - JOINT (140) (MB991931)



- (2) Set special tool MB991928 (engine hanger) to the front fender assembling bolts (A and B) and (C and D) as shown.



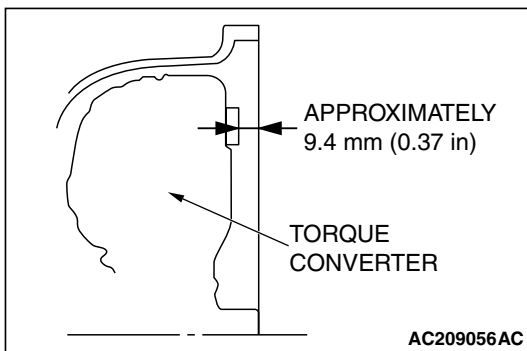
- (3) Position special tool MB99 1454 to hold the engine/transaxle assembly.

NOTE: Adjust the engine hanger balance by sliding the slide bracket (HI).

INSTALLATION SERVICE POINT

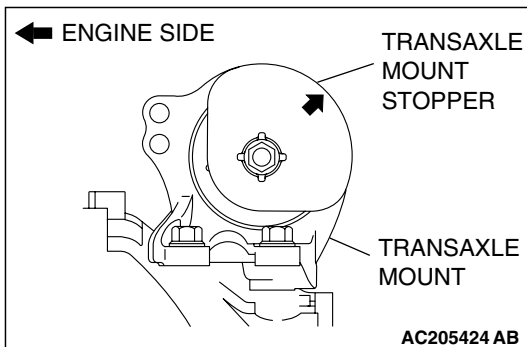
>>A<< TRANSAXLE ASSEMBLY INSTALLATION

Engage the torque converter into the transmission side securely, and then assemble the transmission assembly on the engine.



>>B<< TRANSAXLE MOUNT STOPPER INSTALLATION

Install the transaxle mount stopper so that its arrow points upward.



>>C<< DRIVE SHAFT AND INNER SHAFT ASSEMBLY <RH>/DRIVE SHAFT <LH> INSTALLATION

⚠ CAUTION

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

>>D<< DRIVE SHAFT NUT INSTALLATION

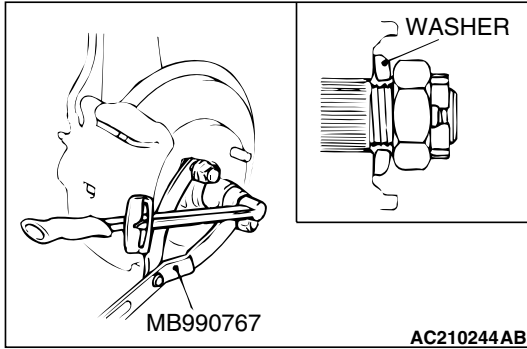
1. Be sure to install the drive shaft washer in the specified direction.

⚠ CAUTION

Before securely tightening the drive shaft nuts, make sure there is no load on the wheel bearings. Otherwise the wheel bearing will be damaged.

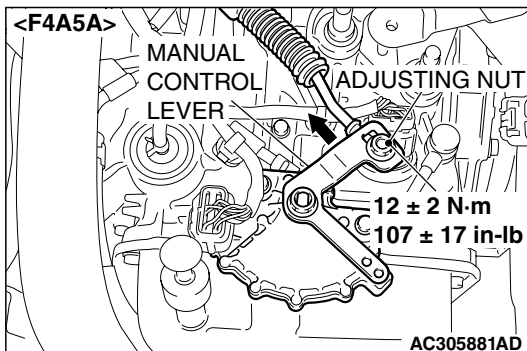
2. Using special tool MB990767, tighten the drive shaft nut to the specified torque.

Tightening torque: 226 ± 29 N·m (167 ± 21 ft-lb)

>>E<< TRANSAXLE CONTROL
CABLE/ADJUSTING NUT INSTALLATION

1. Place the selector lever and manual control lever in the "N" position.
2. Place the cable stud into the manual control lever slot and install the nut loosely. Gently push the transaxle control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

Tightening torque: 12 ± 2 N·m (107 ± 17 in-lb)



TRANSMISSION FLUID COOLER, HOSE AND PIPE

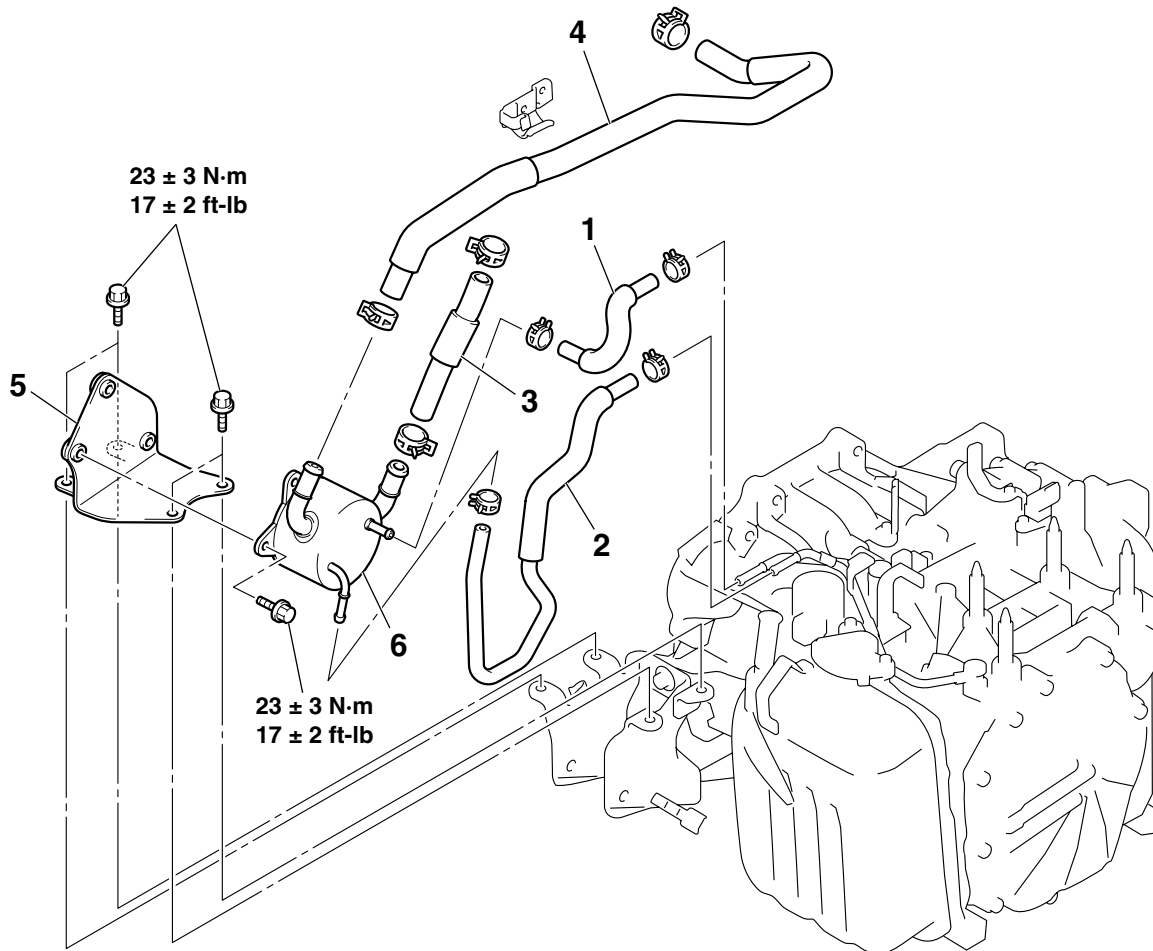
REMOVAL AND INSTALLATION

M1231021900044

<F4A4B>

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying (Refer to GROUP 00 – Maintenance Service P.00-56.)
- Transmission Fluid Draining and Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transmission Fluid P.00-53.)
- Air Cleaner Intake Duct Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-4.)



AC306185AB

- <<A>>
- <<A>>
- <<A>>
- <<A>>
- | | |
|---|--------------------------|
| <p>1. TRANSMISSION FLUID COOLER RETURN HOSE</p> <p>2. TRANSMISSION FLUID COOLER FEED HOSE</p> <p>3. WATER COOLER FEED HOSE</p> <p>4. WATER COOLER RETURN HOSE</p> | <p><<A>></p> |
|---|--------------------------|

- REMOVAL STEPS (Continued)**
- ATF WARMER (TRANSMISSION FLUID COOLER) AND ATF WARMER (TRANSMISSION FLUID COOLER) BRACKET
 - 5. ATF WARMER (TRANSMISSION FLUID COOLER) BRACKET
 - 6. ATF WARMER (TRANSMISSION FLUID COOLER)

REMOVAL SERVICE POINTS

<<A>> TRANSMISSION FLUID COOLER RETURN HOSE/TRANSMISSION FLUID COOLER FEED HOSE/WATER COOLER FEED HOSE/WATER COOLER RETURN HOSE/ATF WARMER (TRANSMISSION FLUID COOLER) REMOVAL

Drain the transmission fluid and engine coolant, which still remained in the hoses and the ATF warmer (transmission fluid cooler).

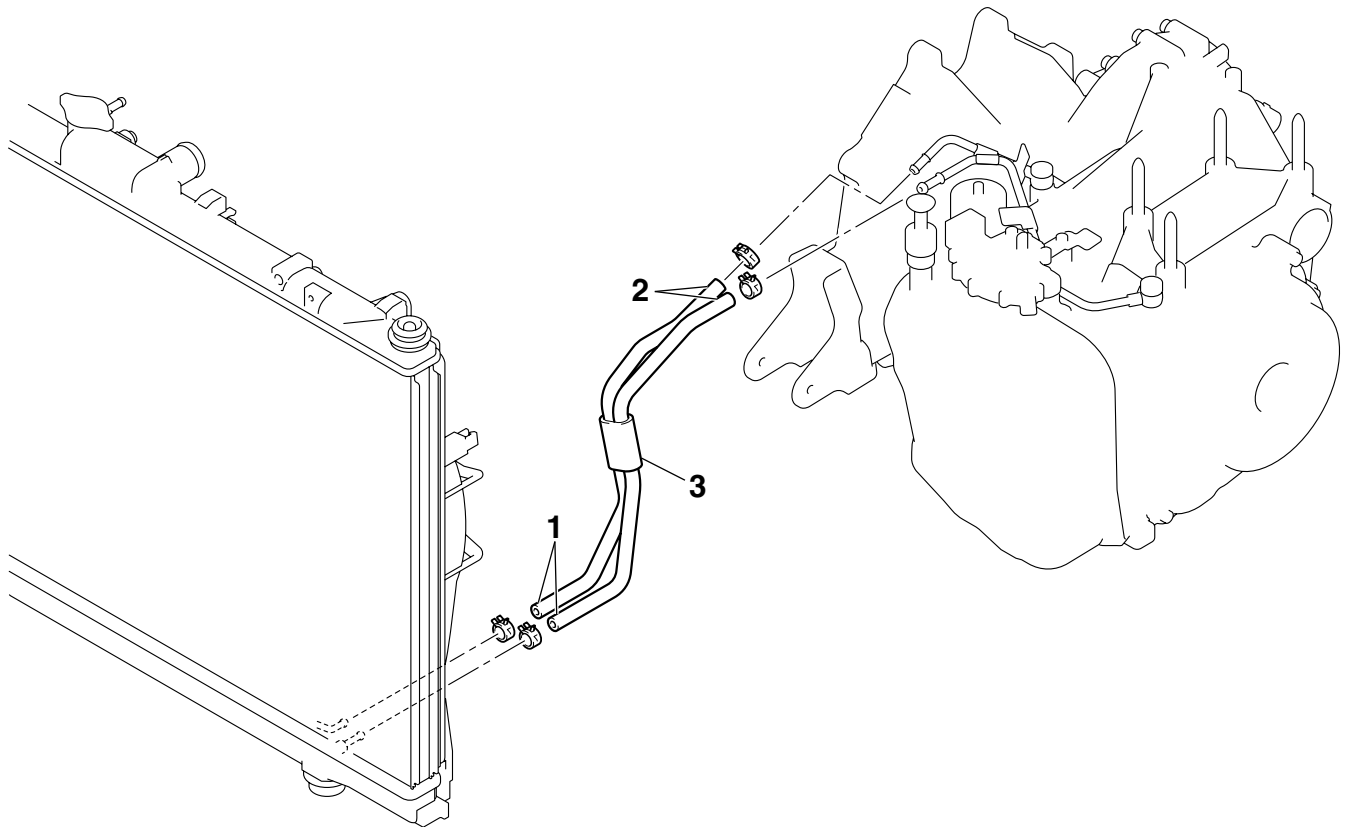
REMOVAL AND INSTALLATION

M1231021900033

<F4A5A>

Pre-removal and Post-installation Operation

- Transmission Fluid Draining and Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transmission Fluid [P.00-53.](#))
- Front Under Cover <LH> Removal and Installation



AC306186AB

TRANSMISSION FLUID COOLER LINE ASSEMBLY REMOVAL STEPS

TRANSMISSION FLUID COOLER LINE ASSEMBLY REMOVAL STEPS (Continued)

<<A>>

1. HOSE ASSEMBLY CONNECTION <RADIATOR SIDE>
- AIR CLEANER ASSEMBLY (REFER TO GROUP 15 [P.15-4.](#))

<<A>>

2. HOSE ASSEMBLY CONNECTION <TRANSAXLE SIDE>
3. HOSE ASSEMBLY

REMOVAL SERVICE POINTS

**<<A>> HOSE ASSEMBLY <RADIATOR
SIDE>/HOSE ASSEMBLY <TRANSAXLE SIDE>
REMOVAL**

Drain the transmission fluid, which still remained in the hose assembly and the transmission fluid cooler.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1231012400245

| ITEM | SPECIFICATION |
|---|-------------------------------|
| Transmission range switch | |
| Transmission range switch body mounting bolt | 11 ± 1 N·m (96 ± 8 in-lb) |
| Transaxle control | |
| Adjusting nut | 12 ± 2 N·m (107 ± 17 in-lb) |
| Shift knob attaching screw | 2.0 ± 0.3 N·m (18 ± 2 in-lb) |
| Selector lever assembly attaching bolt | 12 ± 2 N·m (102 ± 22 in-lb) |
| Shift lock cable unit fixing bolt | 5.0 ± 1.0 N·m (44 ± 9 in-lb) |
| Transaxle control cable attaching bolt | 12 ± 2 N·m (102 ± 22 in-lb) |
| Key interlock and shift lock mechanisms | |
| Shift lock cable unit fixing bolt | 5.0 ± 1.0 N·m (44 ± 9 in-lb) |
| Transaxle assembly | |
| Adjusting nut | 12 ± 2 N·m (107 ± 17 in-lb) |
| ATF warmer (transmission fluid cooler) bracket attaching bolt <F4A4B> | 23 ± 3 N·m (17 ± 2 ft-lb) |
| Bell housing cover attaching bolt (engine side) <F4A4B> | 9.0 ± 1.0 N·m (80 ± 9 in-lb) |
| Bell housing cover attaching bolt (transaxle side) <F4A4B> | 26 ± 5 N·m (19 ± 4 ft-lb) |
| Center member attaching bolt | 83 ± 12 N·m (61 ± 9 ft-lb) |
| Cover attaching bolt <F4A5A> | 11 ± 0.5 N·m (93 ± 4 in-lb) |
| Drive plate bolt | 49 ± 3 N·m (36 ± 2 ft-lb) |
| Drive shaft and inner shaft assembly bolt (RH) <F4A5A> | 41 ± 4 N·m (30 ± 3 ft-lb) |
| Drive shaft nut | 226 ± 29 N·m (167 ± 21 ft-lb) |
| Engine oil pan and transaxle coupling bolt <F4A5A> | 35 ± 6 N·m (26 ± 4 ft-lb) |
| Front roll stopper bracket retainer nut | 58 ± 7 N·m (43 ± 5 ft-lb) |
| Rear roll stopper bracket attaching bolt | 90 ± 10 N·m (67 ± 7 ft-lb) |
| Rear roll stopper bracket retainer nut | 58 ± 7 N·m (43 ± 5 ft-lb) |
| Self-locking nut (lower arm ball joint connection) | 65 ± 6 N·m (48 ± 4 ft-lb) |
| Self-locking nut (tie rod end connection) | 29 ± 4 N·m (21 ± 3 ft-lb) |
| Stabilizer link to strut connecting nut | 48 ± 7 N·m (36 ± 5 ft-lb) |
| Starter motor attaching bolt | 30 ± 3 N·m (23 ± 2 ft-lb) |
| Starter terminal nut | 12 ± 2 N·m (102 ± 22 in-lb) |
| Transaxle assembly upper part coupling bolt <F4A4B> | 48 ± 6 N·m (36 ± 4 ft-lb) |

| ITEM | SPECIFICATION |
|---|----------------------------|
| Transaxle assembly upper part coupling bolt <F4A5A> | 73 ± 10 N·m (54 ± 7 ft-lb) |
| Transaxle assembly lower part coupling bolt <F4A4B> | 48 ± 6 N·m (36 ± 4 ft-lb) |
| Transaxle assembly lower part coupling bolt <F4A5A> | 88 ± 10 N·m (65 ± 7 ft-lb) |
| Transaxle mount bracket attaching nut | 58 ± 7 N·m (43 ± 5 ft-lb) |
| Transaxle mount stopper attaching nut | 83 ± 12 N·m (61 ± 9 ft-lb) |
| Transmission fluid drain plug | 32 ± 2 N·m (23 ± 2 ft-lb) |
| Transmission Fluid Cooler | |
| ATF warmer (transmission fluid cooler) bracket attaching bolt | 23 ± 3 N·m (17 ± 2 ft-lb) |
| ATF warmer (transmission fluid cooler) attaching bolt | 23 ± 3 N·m (17 ± 2 ft-lb) |

SERVICE SPECIFICATIONS

M1231000300359

| ITEM | STANDARD VALUE | |
|---|-------------------------|---------------|
| Transmission fluid temperature sensor k Ω | at 0°C (32°F) | 16.7 – 20.5 |
| | at 20°C (68°F) | 7.3 – 8.9 |
| | at 40°C (104°F) | 3.4 – 4.2 |
| | at 60°C (140°F) | 1.9 – 2.2 |
| | at 80°C (176°F) | 1.0 – 1.2 |
| | at 100°C (212°F) | 0.57 – 0.69 |
| Line pressure MPa (psi) | 0.98 – 1.05 (142 – 152) | |
| Resistance of torque converter clutch control solenoid valve coil [at 20°C (68°F)] Ω | 2.7 – 3.4 | |
| Resistance of low-reverse solenoid valve coil [at 20°C (68°F)] Ω | 2.7 – 3.4 | |
| Resistance of overdrive solenoid valve coil [at 20°C (68°F)] Ω | 2.7 – 3.4 | |
| Resistance of second solenoid valve coil [at 20°C (68°F)] Ω | 2.7 – 3.4 | |
| Resistance of underdrive solenoid valve coil [at 20°C (68°F)] Ω | 2.7 – 3.4 | |
| Stall speed r/min | F4A4B | 2,500 – 3,000 |
| | F4A5A | 2,200 – 2,700 |

LUBRICANT

M1231000400419

| ITEM | SPECIFIED LUBRICANT | QUANTITY |
|---|---------------------|-----------|
| Transmission fluid dm ³ (qt) | F4A4B | 7.7 (8.1) |
| | F4A5A | 8.4 (8.9) |