

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 A/T-ECU system

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

DIAGNOSIS**Required Special Tool:**

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

STEP 1. Using diagnostic tool MB991958, check A/T data list item 6: Output Shaft Speed Sensor.**⚠ CAUTION**

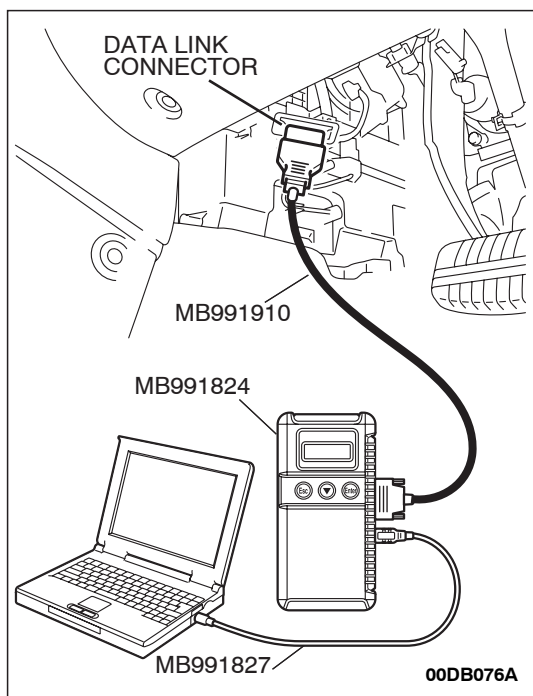
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

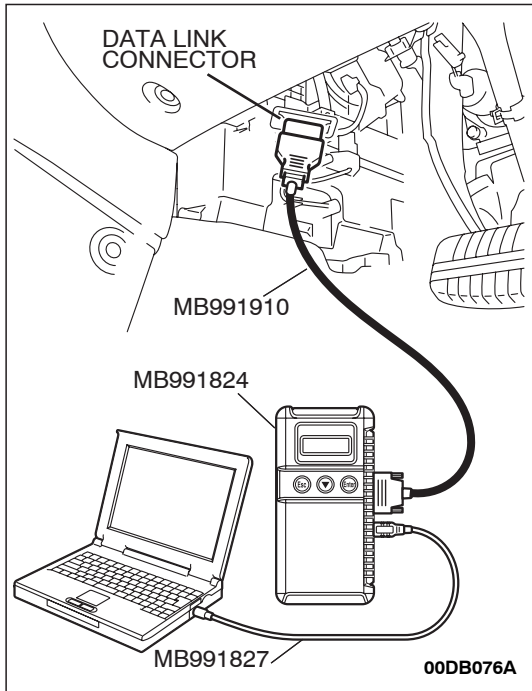
- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set diagnostic tool MB991958 to the data reading mode.
 - Item 6: Output Shaft Speed Sensor.
 - When driving at constant speed of 50km/h, the display should be "1,100 - 1,400 r/min" (Gear range: 3rd gear).
- (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-72](#), DTC (P0720): Output shaft speed sensor system.





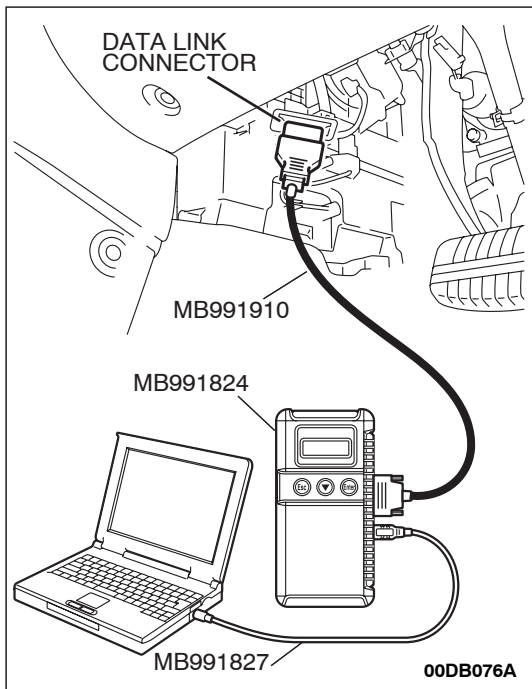
STEP 2. Using diagnostic tool MB991958, check MPI data list item 13: TP Sensor.

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool MB991958 to the data reading mode.
 - Item 13: TP Sensor (MAIN).
 - With the throttle valve in idle position, voltage should measure between 1100 and 1200 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 1100 and 1200 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 GROUP13B <3.8L Engine>, Diagnostic Trouble Code Procedures [13A-17](#), DTCs P0122, P0123: TP Sensor System. Then check the symptom.



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

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set diagnostic tool MB991958 to the data reading mode for following items.
 - a. Item 12: Low-Reverse Solenoid Valve Duty (%)
 - b. Item 13: Underdrive Solenoid Valve Duty (%)
 - c. Item 14: Second Solenoid Valve Duty (%)
 - d. Item 15: Overdrive Solenoid Valve Duty (%)
 - e. Item 16: Reduction Solenoid Valve Duty (%)
 - Check that the values shown below are displayed when each data list item is entered.

DRIVING CONDITION	DATA LIST ITEM				
	12	13	14	15	16
Driving at constant speed of 10 km/h in 1st gear	100%	0%	100%	100%	0%
Driving at constant speed of 30 km/h in 2nd gear	100%	0%	0%	100%	0%
Driving at constant speed of 50 km/h in 3rd gear	100%	0%	100%	0%	0%
Driving at constant speed of 50 km/h in 4th gear	0%	0%	100%	0%	100%
Driving at constant speed of 50 km/h in 5th gear	0%	100%	0%	0%	100%

(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-33](#), 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.

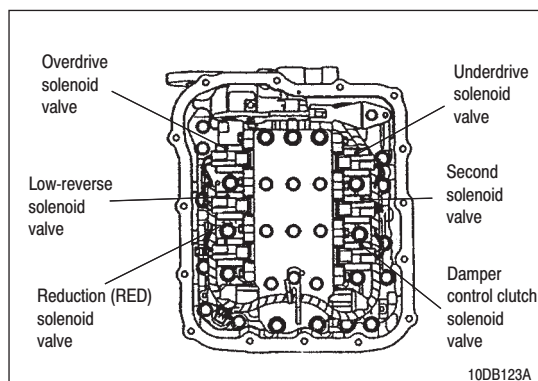
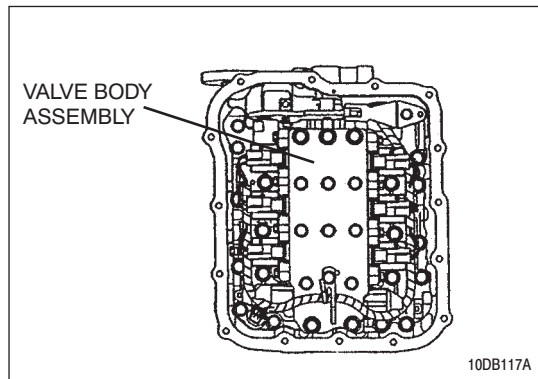
Check the O-ring installation bolts for looseness and the valve body for damage. Repair or replace the faulty parts. Refer to GROUP 23B, Valve Body [P.23B-62](#).

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 A/T-ECU.

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 A/T-ECU system

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

DIAGNOSIS

Required Special Tool:

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

STEP 1. Using diagnostic tool MB991958, check A/T Special Function test item 33: INVECS-II Control Stop.

CAUTION

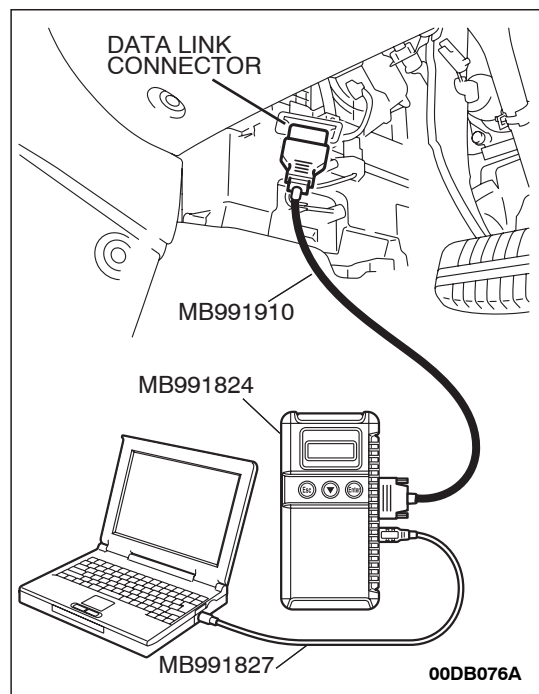
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set diagnostic tool MB991958 to the A/T special function test mode.
 - Item 33: INVECS-II Control Stop.
 - 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.

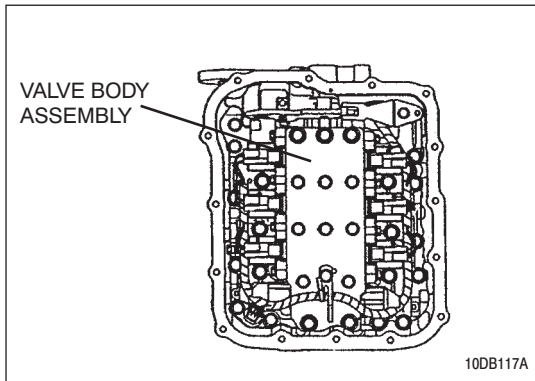


STEP 2. Check the shift points.

Q: Are the shift points early or late only when transmission fluid is 35°C or less (early), or 125°C 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-62](#).

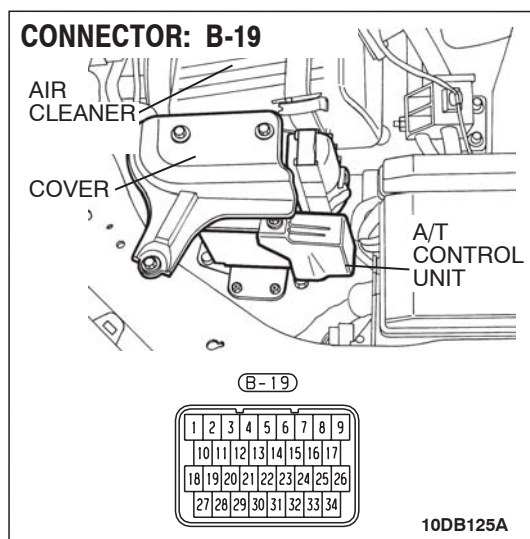
Replace the valve body assembly if the damages are thought to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

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



CIRCUIT OPERATION

A/T-ECU connector B-19 (terminal number 21) 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 inhibitor switch, or A/T-ECU may exist.

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

- Malfunction of the transmission inhibitor switch
- Damaged harness, connector
- Malfunction of the A/T-ECU

Circuit drawings

- Refer to circuit diagrams [GROUP-90](#)
- Refer to configuration diagrams [GROUP-80](#)
- Refer to component locations [GROUP-70](#)

DIAGNOSIS

Required Special Tool:

- MB991958: Diagnostic 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.

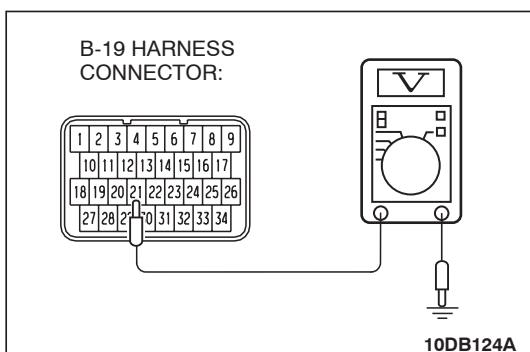
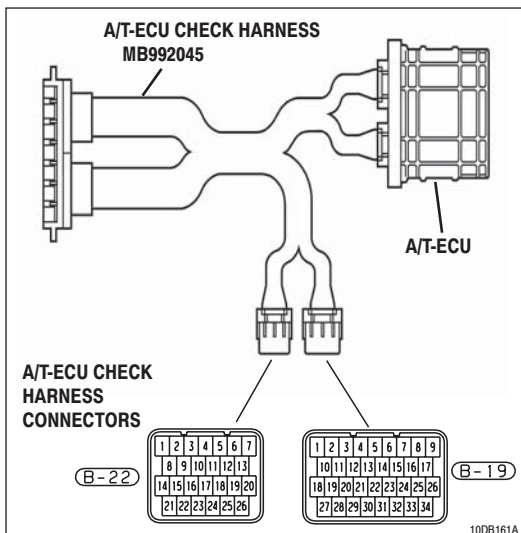
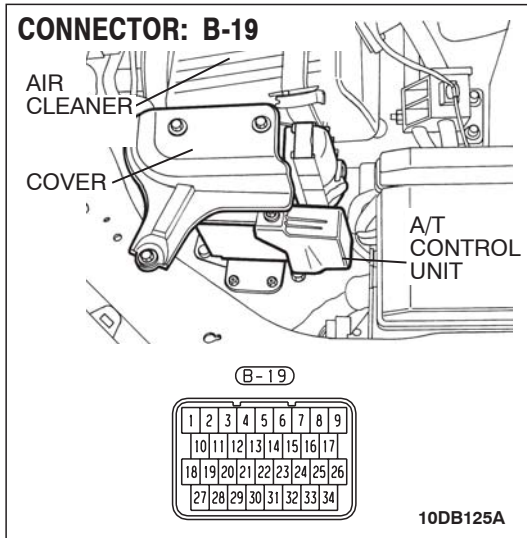
Q: Does the vehicle accelerate poorly (transmission stays in 3rd gear) when starting from a stop with the selector lever in "D" range?

YES : Go to Step 2.

NO : Go to Step 5.

STEP 2. Measure the backup power supply voltage at A/T-ECU connector B-19 by using check harness special tool MB992045.

(1) Disconnect all the connectors from the A/T-ECU.



(2) Connect special tool MB992045 (check harness) between the A/T-ECU and the body-side harness connector.

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

(4) Measure the voltage between connector B-19 terminal 21 and ground.

- The voltage should measure battery positive voltage.

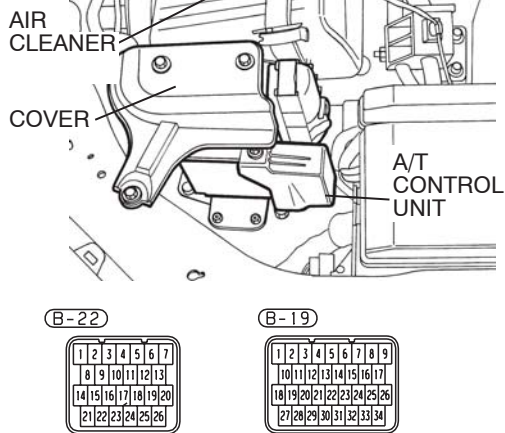
(5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 5.

NO : Go to Step 3.

CONNECTORS: B-19, B-22



STEP 3. Check A/T-ECU connector B-19 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

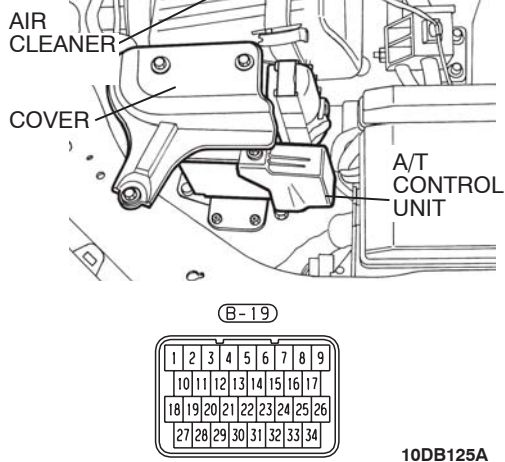
Q: Is the connector in good condition?

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.

CONNECTOR: B-19



STEP 4. Check the harness for open circuit between A/T-ECU connector B-19 terminal 21 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 diagnostic tool MB991958, check data list item 34: Inhibitor Switch.

⚠ CAUTION

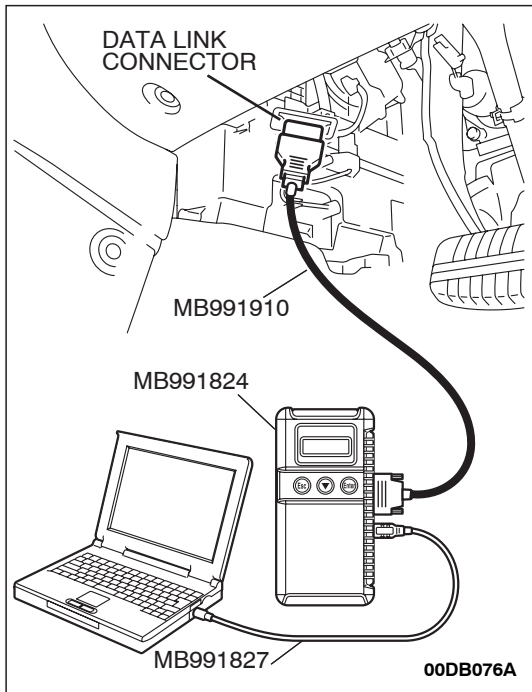
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool MB991958 to the data reading mode.
 - Item 34: Inhibitor Switch.
 - Item 27: Sports mode select switch
 - Item 28: Sports mode upshift switch
 - Item 29: Sports mode downshift switch
 - Move the selector lever positions and confirm that the selected transmission range match the positions shown on diagnostic 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 A/T-ECU.

NO : Refer to [P.23A-97](#), [P.23A-119](#), (P0705): Transmission Inhibitor Switch system, and refer to inspection procedure 15 (Sports mode 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 ENGINE-ECU or A/T-ECU system

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

DIAGNOSIS

STEP 1. Check the engine system.

Refer to GROUP 13A, Diagnosis – Symptom Chart – Poor acceleration [13A-21](#).

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-25](#), 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-26](#), 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, Transmission [P.23B-13](#).
- (2) Blow 108 kPa (15 psi) compressed air into the each brake oil orifice and clutch oil orifice of the transmission 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 transmission.
- (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, Transmission [P.23B-13](#), Underdrive Clutch and Input Shaft [P.23B-46](#), Reverse and Overdrive Clutch [P.23B-48](#). Then retest the system.

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 5th gear (top range), abnormal damper control clutch pressure a malfunction of the engine system, damper control clutch solenoid, torque converter or valve body may exist.

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

- Abnormal damper control clutch pressure
- Malfunction of the engine system
- Malfunction of the damper control clutch solenoid
- Malfunction of the torque converter
- Malfunction of the valve body
- Malfunction of the Engine or A/T system

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

DIAGNOSIS

Required Special Tool:

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

STEP 1. Using diagnostic tool MB991958, check actuator test item 6: Damper Control Clutch Solenoid Valve.

CAUTION

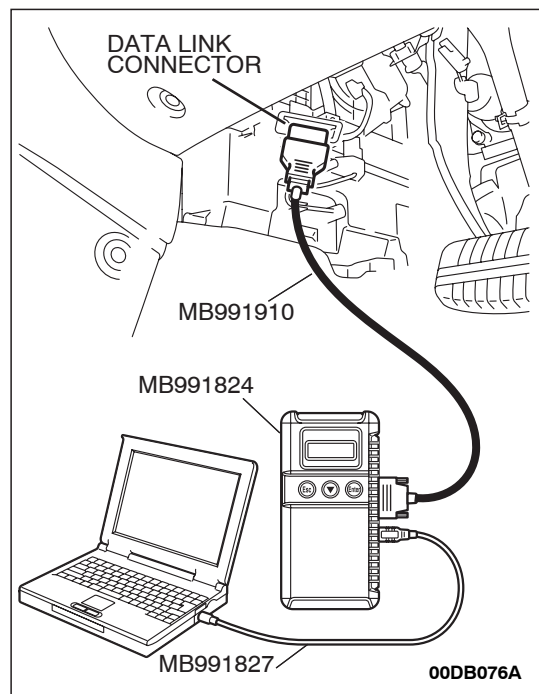
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool MB991958 to the actuator test mode.
 - Item 06: Damper Control Clutch Solenoid Valve.
 - An audible clicking or buzzing should be heard when the damper control 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 damper control clutch solenoid valve. Refer to GROUP 23B, Valve Body P.23B-62. 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 ,
Diagnosis – Symptom Chart – Driving [13A-21](#). 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-26](#), 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.

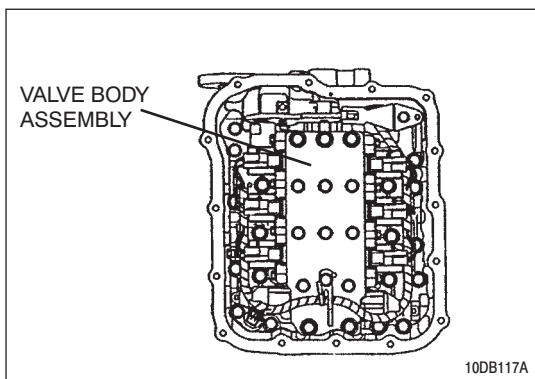
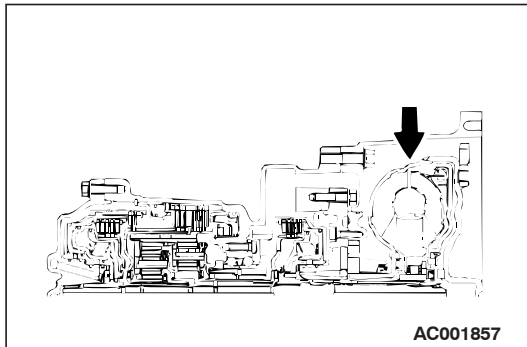
(1) Remove the transmission.

(2) Replace the torque converter assembly. Refer to GROUP
23B, Transmission [P.23B-13](#). Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.



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-62](#).

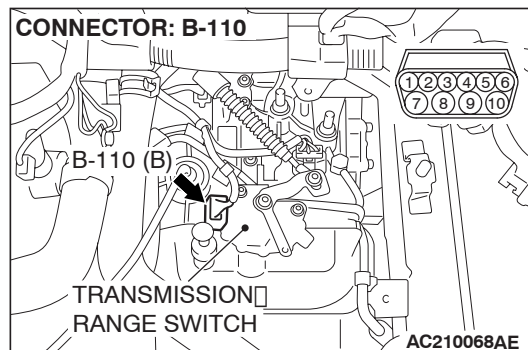
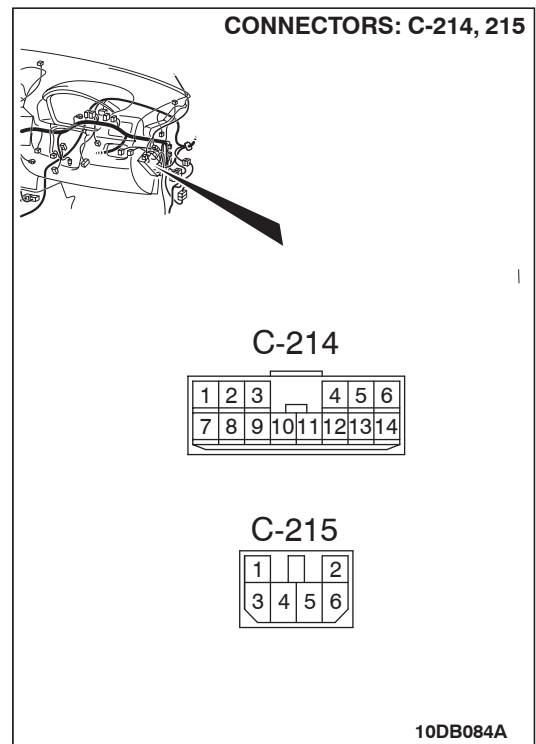
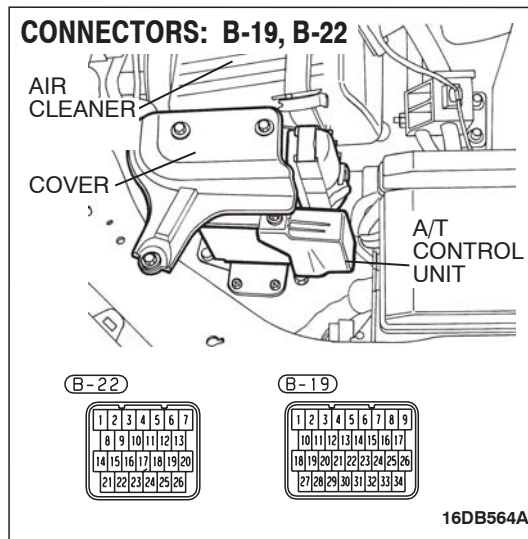
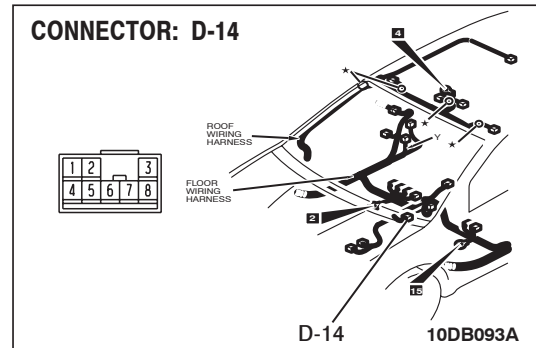
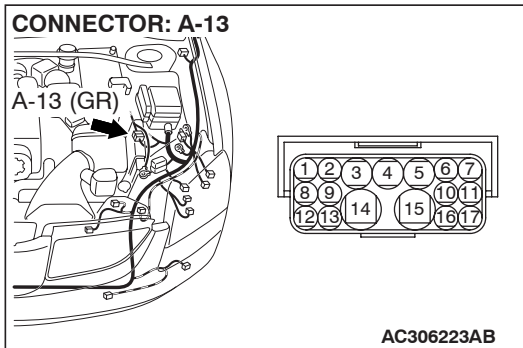
Replace the valve body assembly if the damages are thought
to be irreparable. Then check the symptom.

Q: Is the symptom eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 15: Sports Mode Switch System



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 A/T-ECU connector B-19 (terminal 17).
If the shift switch of the shift switch assembly is set to "UP" or "DOWN" position, battery positive voltage will be applied to the A/T-ECU connector B-19 (terminals 8 and 9).

COMMENT

When sport mode shift does not operate the cause is probably a malfunction of the transmission inhibitor switch circuit, shift switch assembly circuit or a defective A/T-ECU.

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

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

- Malfunction of the transmission inhibitor 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 A/T-ECU system

DIAGNOSIS

Required Special Tool:

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

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

⚠ CAUTION

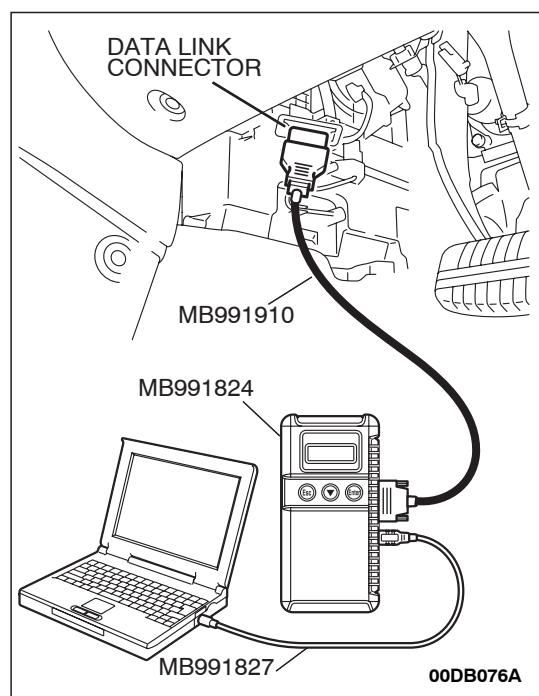
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

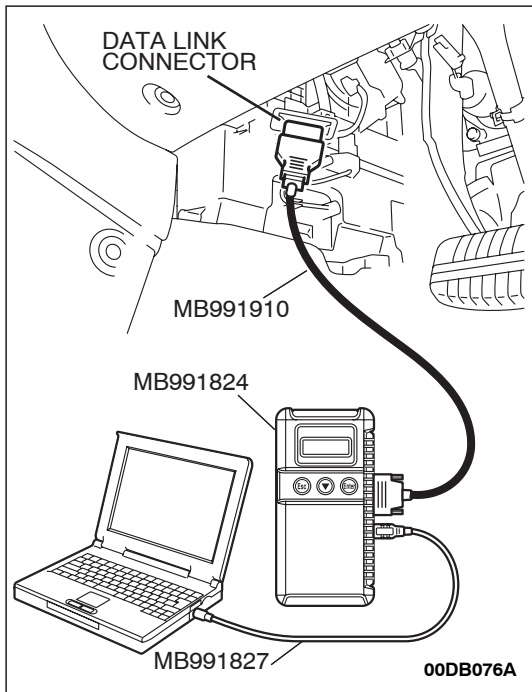
- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for A/T diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is (P0705) set?

YES <(P0705)> : Refer to [P.23A-97](#): Transmission Inhibitor Switch System (Open Circuit) or refer to [P.23A-119](#): Transmission Inhibitor Switch System (Short Circuit).

NO : Go to Step 2.





STEP 2. Using diagnostic tool MB991958, check data list item 27: Select Switch, item 28: Shift Switch (Up), item 29: Shift Switch (Down).

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool MB991958 to the data reading mode for following items.
 - a. Item 27: Select Switch
 - b. Item 28: Shift Switch (Up)
 - c. Item 29: Shift Switch (Down)

SELECTOR LEVER OPERATION	DATA LIST ITEM		
	27	28	29
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 28 and item 29 both are NG> : Go to Step 5.

NO <If only item 27 is NG> : Go to Step 9.

NO <If only item 28 is NG> : Go to Step 17.

NO <If only item 29 is NG> : Go to Step 22.

STEP 3. Check A/T-ECU connector B-19 and shift switch assembly connector D-14 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

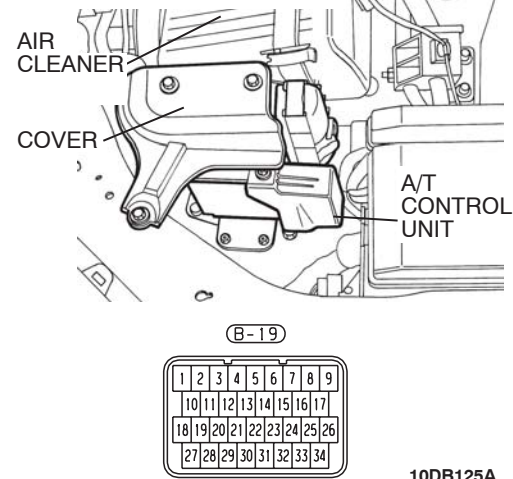
Q: Are the connectors in good condition?

YES : Go to Step 4.

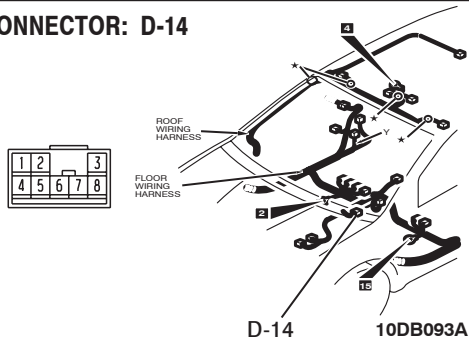
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

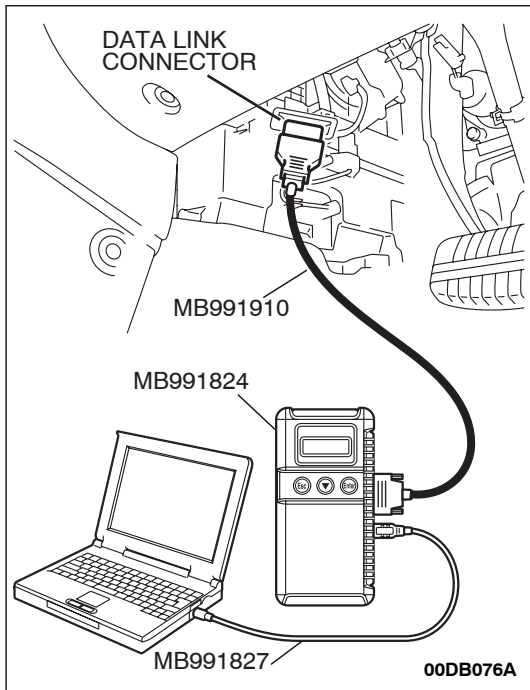
[P.00E-2.](#)

CONNECTOR: B-19



CONNECTOR: D-14





STEP 4. Using diagnostic tool MB991958, check data list item 27: Select Switch, item 28: Shift Switch (Up), item 29: Shift Switch (Down).

⚠ CAUTION

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

- (1) Connect diagnostic tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set diagnostic tool MB991958 to the data reading mode for following items.
 - a. Item 27: Select Switch
 - b. Item 28: Shift Switch (Up)
 - c. Item 29: Shift Switch (Down)

SELECTOR LEVER OPERATION	DATA LIST ITEM		
	27	28	29
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 A/T-ECU.

STEP 5. Check the shift switch assembly.

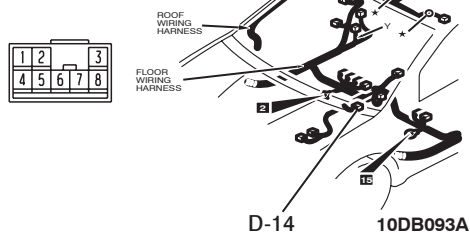
Refer to [P.23A-303](#), Transmission Control.

Q: Is the switch operating properly?

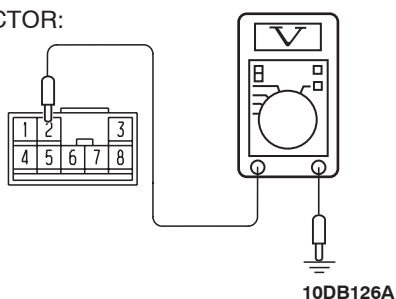
YES : Go to Step 6.

NO : Replace the shift switch assembly. Refer to [P.23A-302](#), Transmission Control.

CONNECTOR: D-14



**(D-14) FLOOR HARNESS
CONNECTOR:**



STEP 6. Measure the power supply voltage at shift switch assembly connector D-14.

- (1) Disconnect connector D-14 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

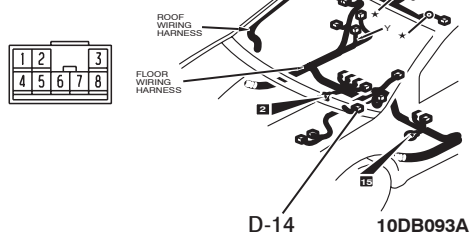
- (3) Measure the voltage between terminal 2 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

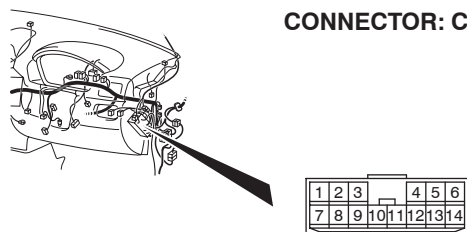
YES : Go to Step 4.

NO : Go to Step 7.

CONNECTOR: D-14



CONNECTOR: C-214



STEP 7. Check junction block connector C-214 and shift switch assembly connector D-14 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.

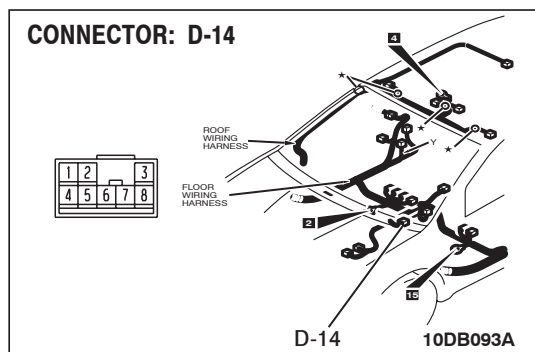
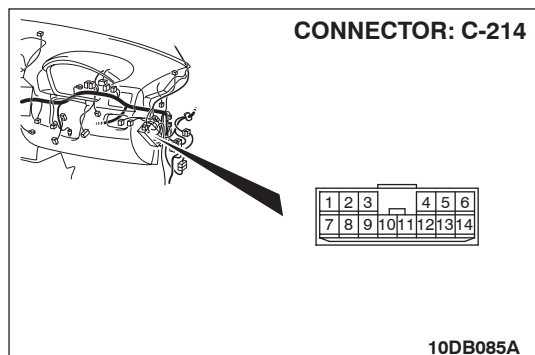
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 8. Check the harness for open circuit or short circuit to ground between junction block connector C-214 terminal 12 and shift switch assembly connector D-14 terminal 2.

Q: Is the harness wire in good condition?

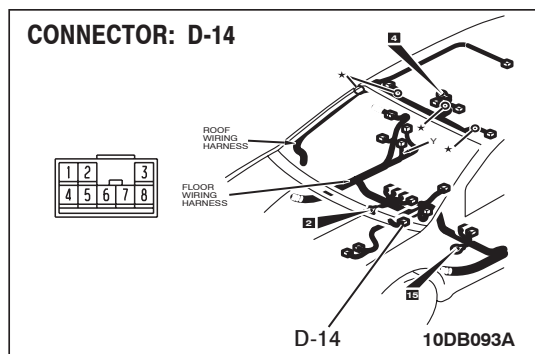
YES : Go to Step 4.

NO : Repair or replace the harness wire.



STEP 9. Measure the power supply voltage at shift switch assembly connector D-14.

- (1) Disconnect connector D-14 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Move the selector lever to the "D" position.

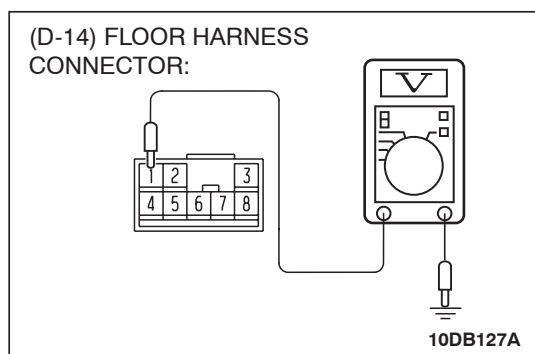


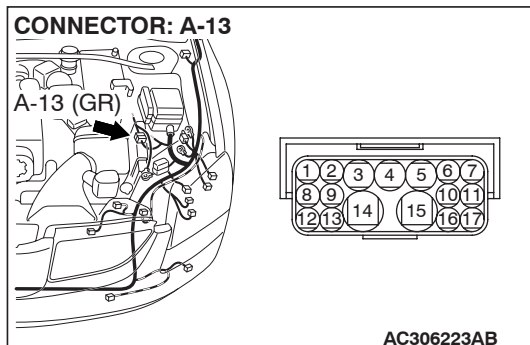
- (4) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 12.

NO : Go to Step 10.





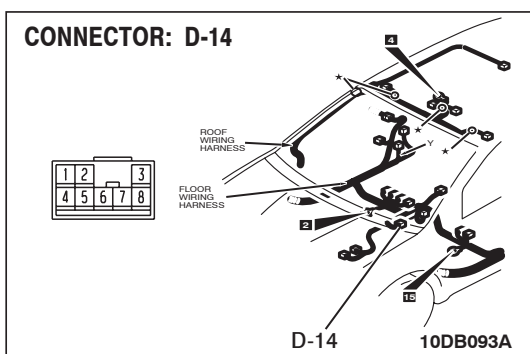
STEP 10. Check intermediate connector A-13 and shift switch assembly connector D-14 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

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.](#)

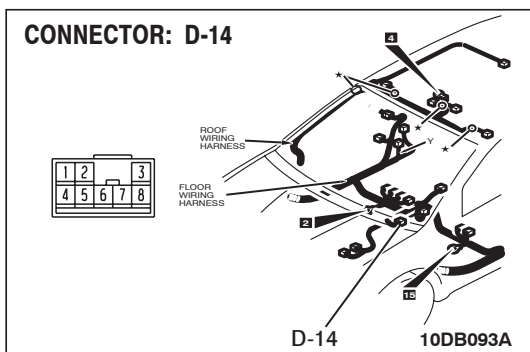
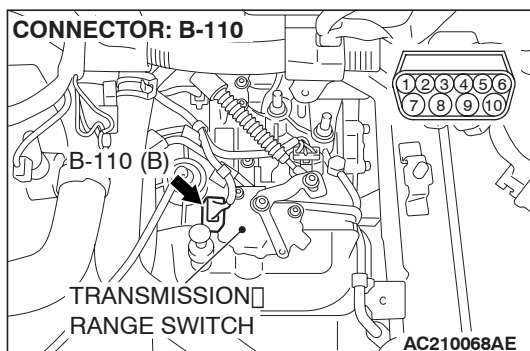


STEP 11. Check harness for open circuit or short circuit to ground between transmission inhibitor switch connector B-110 terminal 1 and shift switch assembly connector D-14 terminal 1.

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-303](#), Transmission Control.

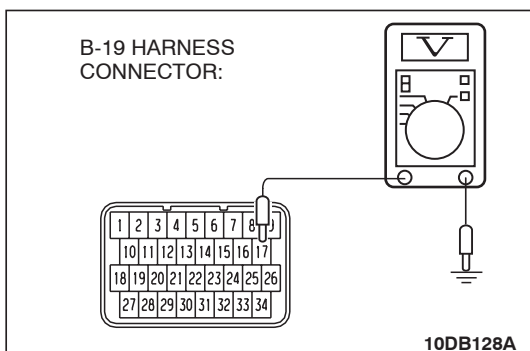
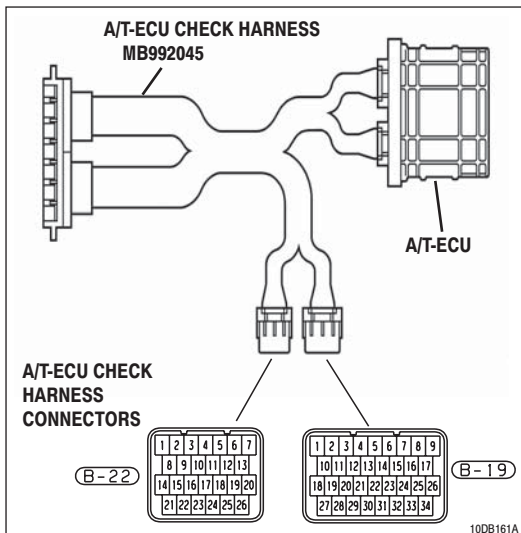
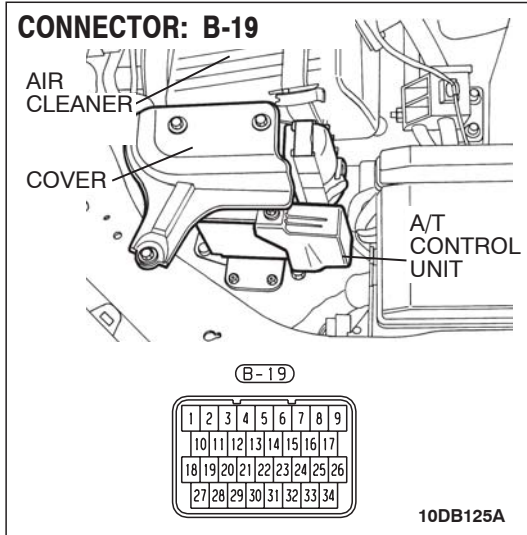
Q: Is the switch operating properly?

YES : Go to Step 13.

NO : Replace the shift switch assembly. Refer to [P.23A-302](#), Transmission Control.

STEP 13. Measure the switch output voltage at A/T-ECU connector B-19 by using check harness special tool MB992045.

(1) Disconnect all the connectors from the A/T-ECU.



(2) Connect special tool MB992045 (check harness) between the A/T-ECU 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 connector B-19 terminal 17 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 A/T-ECU connector B-19 and shift switch assembly connector D-14 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

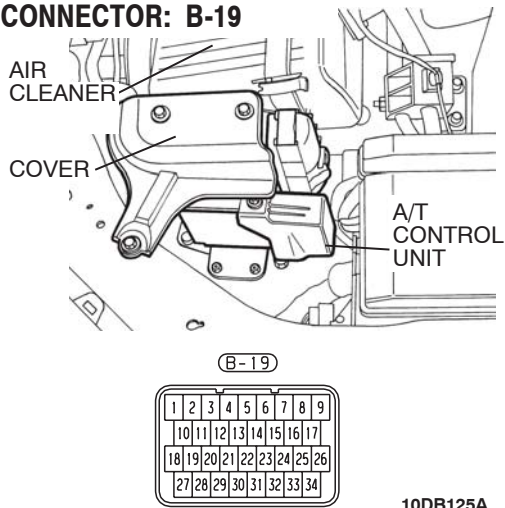
Q: Are the connectors and terminals in good condition?

YES : Go to Step 15.

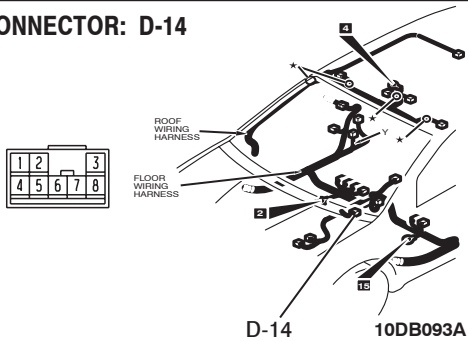
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

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

CONNECTOR: B-19



CONNECTOR: D-14

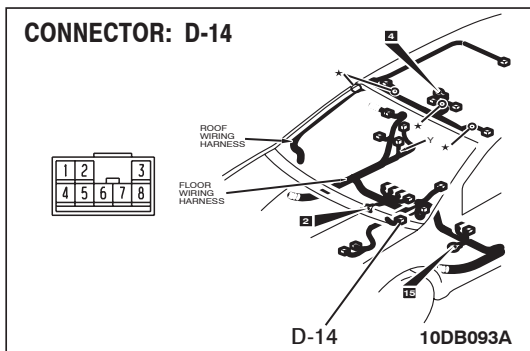
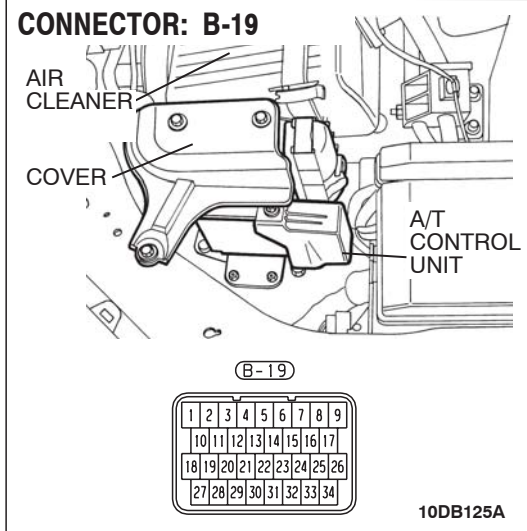


STEP 15. Check the harness for open circuit or short circuit to ground between A/T-ECU connector B-19 terminal 17 and shift switch assembly connector D-14 terminal 6.

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.



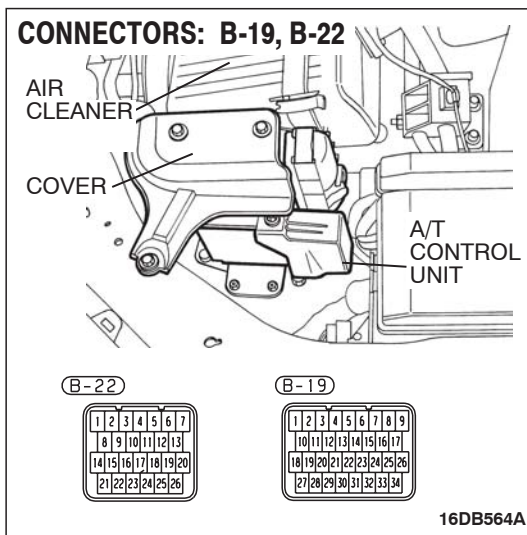
STEP 16. Check A/T-ECU connector B-19 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

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-303](#), Transmission Control.

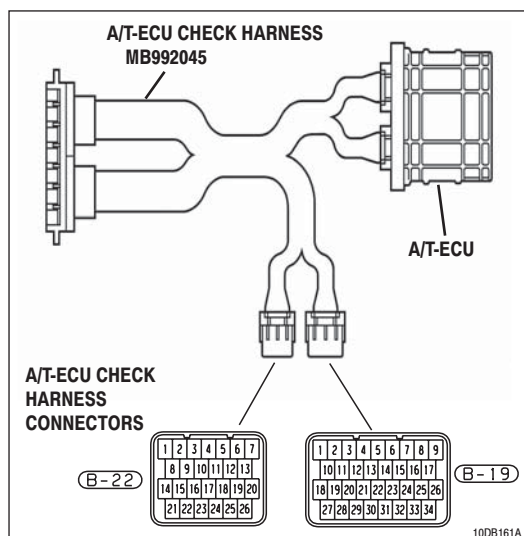
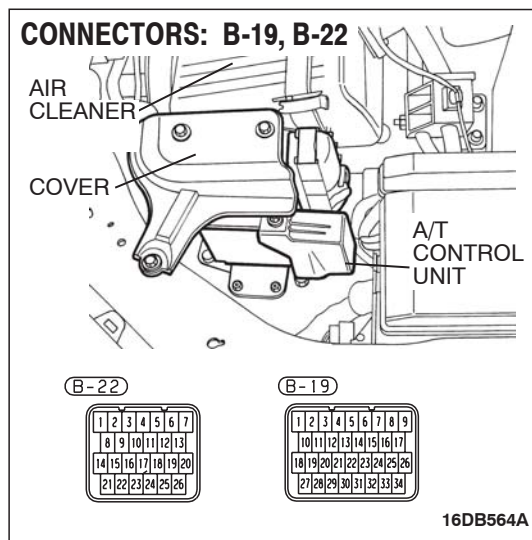
Q: Is the switch operating properly?

YES : Go to Step 18.

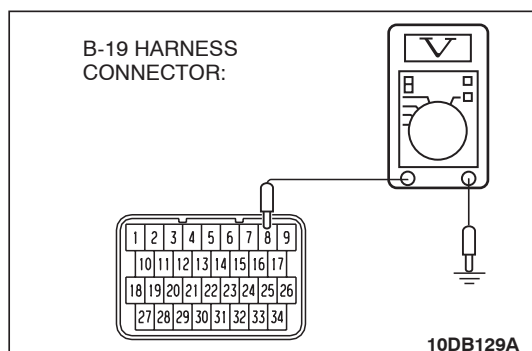
NO : Replace the shift switch assembly. Refer to [P.23A-302](#), Transmission Control.

STEP 18. Measure the switch output voltage at A/T-ECU connector B-19 by using check harness special tool MB992045.

(1) Disconnect all the connectors from the A/T-ECU.



- (2) Connect special tool MB992045 (check harness) between the A/T-ECU and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.



(4) Measure the voltage between connector B-19 terminal 8 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 A/T-ECU connector B-19 and shift switch assembly connector D-14 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

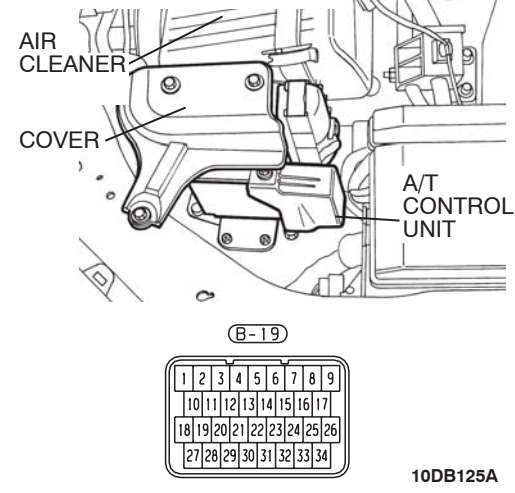
Q: Are the connectors and terminals in good condition?

YES : Go to Step 20.

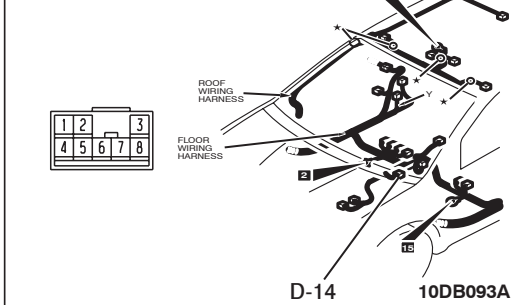
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

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

CONNECTOR: B-19



CONNECTOR: D-14

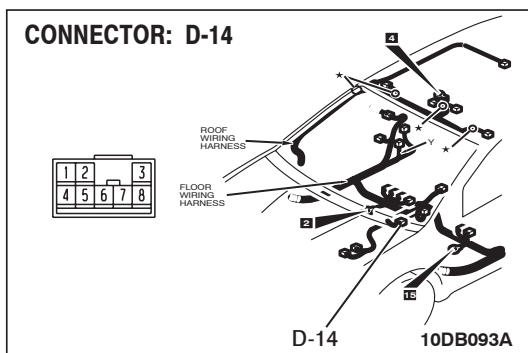
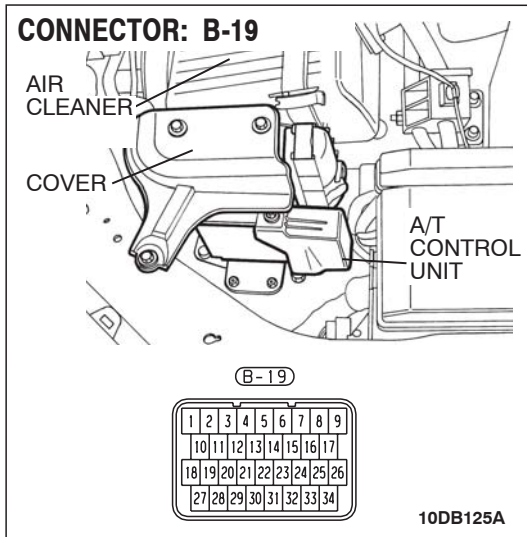


STEP 20. Check the harness for open circuit or short circuit to ground between A/T-ECU connector B-19 terminal 8 and shift switch assembly connector D-14 terminal 7.

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.



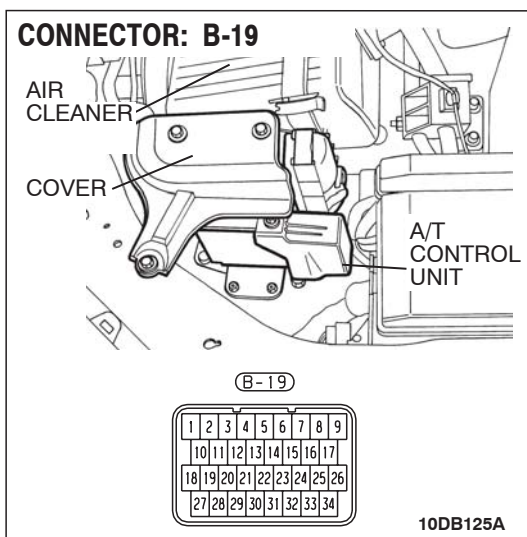
STEP 21. Check A/T-ECU connector B-19 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

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-303](#), Transmission Control.

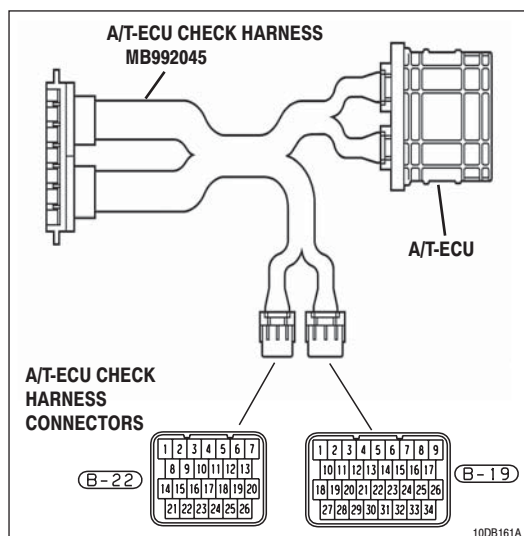
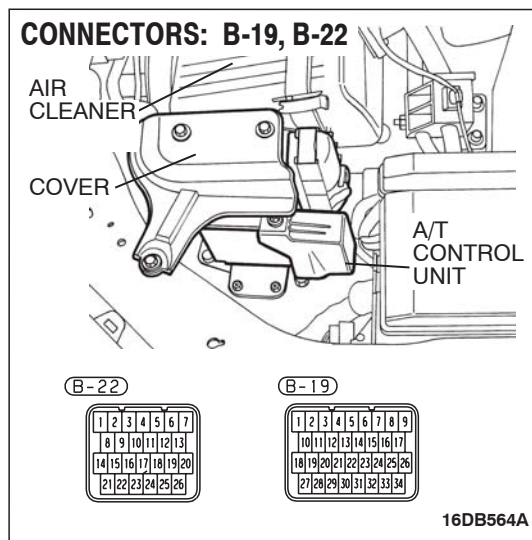
Q: Is the switch operating properly?

YES : Go to Step 23.

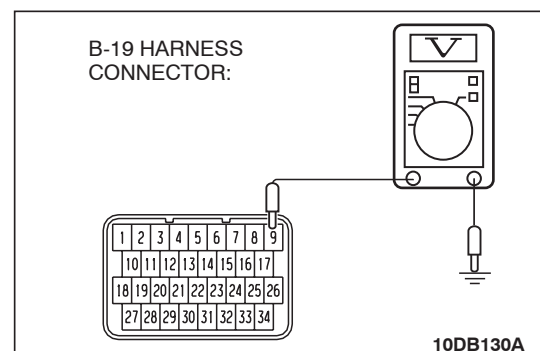
NO : Replace the shift switch assembly. Refer to [P.23A-302](#), Transmission Control.

STEP 23. Measure the switch output voltage at A/T-ECU connector B-19 by using check harness special tool MB992045.

(1) Disconnect all the connectors from the A/T-ECU.



- (2) Connect special tool MB992045 (check harness) between the A/T-ECU and the body-side harness connector.
(3) Turn the ignition switch to the "ON" position.



- (4) Measure the voltage between terminal 9 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 A/T-ECU connector B-19 and shift switch assembly connector D-14 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

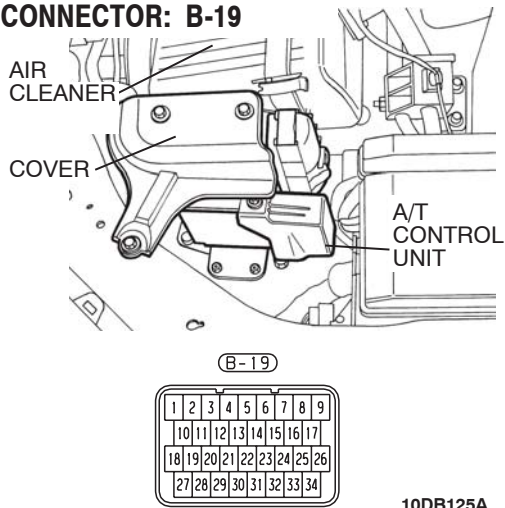
Q: Are the connectors and terminals in good condition?

YES : Go to Step 25.

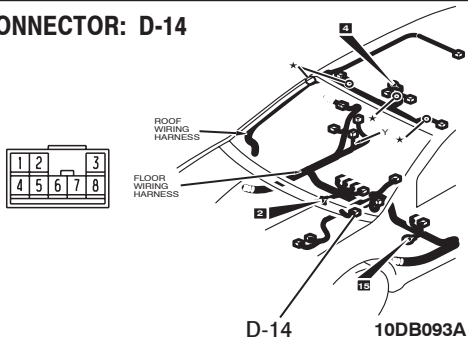
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection

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

CONNECTOR: B-19



CONNECTOR: D-14

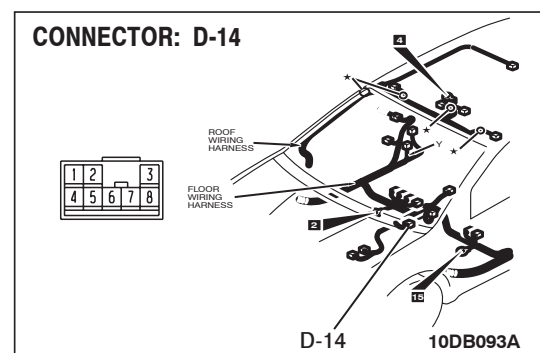
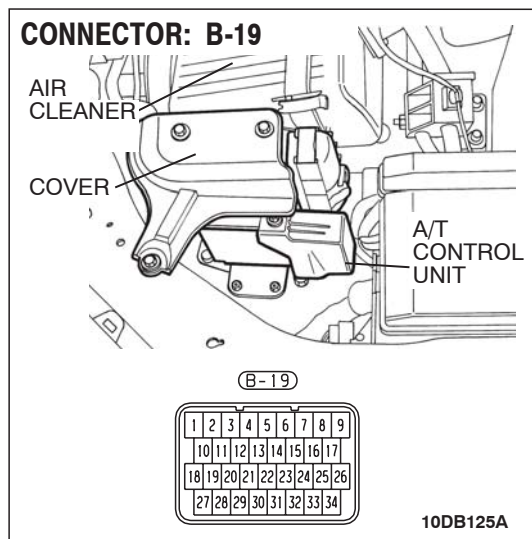


STEP 25. Check the harness for open circuit or short circuit to ground between A/T-ECU connector B-19 terminal 9 and shift switch assembly connector D-14 terminal 3.

Q: Is the harness wire in good condition?

YES : Go to Step 4.

NO : Repair or replace the harness wire.



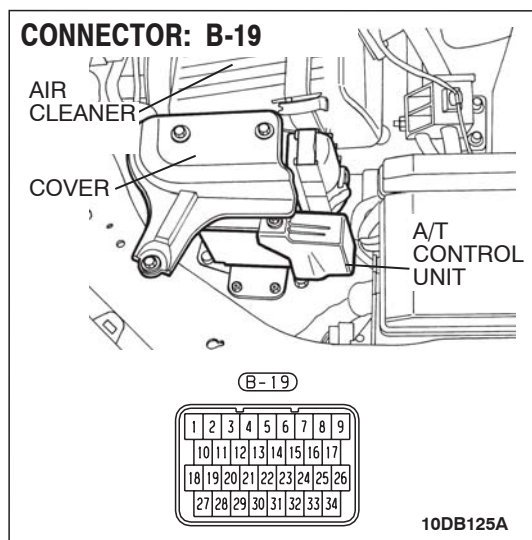
STEP 26. Check A/T-ECU connector B-19 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

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>

CIRCUIT OPERATION

- The A/T-ECU detects the transmission range ("P," "R," "N," "D," sport mode "5," "4," "3," "2," or "1"), and display it on the combination meter.

COMMENT

Connector(s), wiring harness in the CAN bus line between the A/T-ECU and the combination meter, power supply to the A/T-ECU, the combination meter, the A/T-ECU may be defective.

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

- Malfunction of the combination meter
- Damaged harness, connector
- Malfunction of the A/T-ECU

Circuit drawings

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Refer to component locations GROUP-70

DIAGNOSIS

Required Special Tool:

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

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

CAUTION

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

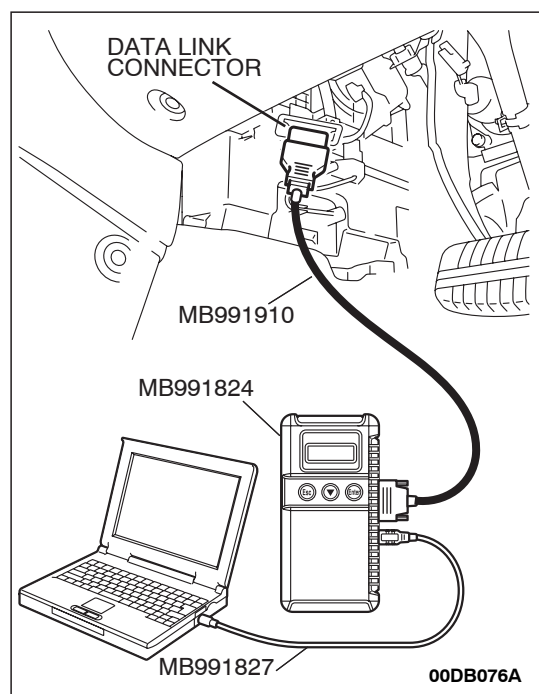
Use diagnostic tool MB991958 to diagnose the CAN bus lines.

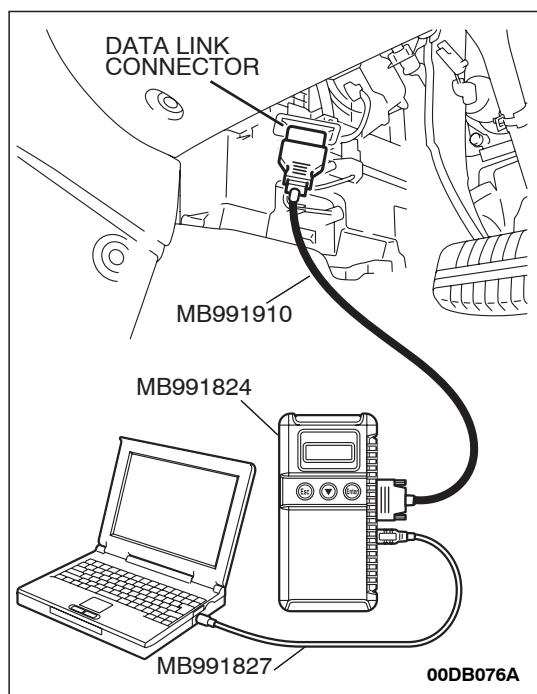
- Connect diagnostic tool MB991958 to the data link connector.
- Turn the ignition switch to the "ON" position.
- Diagnose the CAN bus line.
- Turn the ignition switch to the "LOCK" (OFF) position.

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-15).





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

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

Q: Is DTC (U1108) set?

YES : Retry the troubleshooting procedures.

NO : Replace the A/T-ECU.

DATA LIST REFERENCE TABLE

M1231008100337

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
2ND SOL DUTY	14	Second solenoid valve duty %	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 4th gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 5th gear	0%
A/T CONT RLY	8	A/T control relay output voltage (V)	Ignition switch: ON		Battery voltage
ENGINE SPEED	1	ENGINE SPEED (r/min)		Accelerator pedal: Release	600 – 900 r/min
				Accelerator pedal: Depressed	Gradually rises from the above value
A/C Compressor Relay	21	A/C Compressor Relay	<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
ISS SENSOR	5	Input shaft speed sensor (r/min)	Gear range: 4th gear	Driving at constant speed of 50 km/h (31 mph)	1,100 – 1,400 r/min

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
L/R SOL DUTY	12	Low-reverse solenoid valve duty %	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 4th gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 5th gear	0%
O/D SOL DUTY	15	Overdrive solenoid valve duty %	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 4th gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 5th gear	0%
OSS SENSOR	6	Output shaft speed sensor (r/min)	Gear range: 3rd gear	Driving at constant speed of 50 km/h (31 mph)	1,100 – 1,400 r/min

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
SELECT SW	27	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	11	Shift position	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h in 1st gear	1st
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h in 2nd gear	2nd
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h in 3rd gear	3rd
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 70 km/h in 4th gear	4th
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 70 km/h in 5th gear	5th
			Transmission range: R	Driving at constant speed of 5 km/h in reverse gear	REV
			Transmission range: P, N		NP

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
SHIFT SW DOWN	29	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	28	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	19	Stoplight switch	Ignition switch: ON Engine: stopped	Brake pedal: Depressed	ON
				Brake pedal: Released	OFF
DCC SLIPPAGE	10	Damper clutch amount of slippage	<ul style="list-style-type: none"> Warmed up Transmission range: Sport mode <Vehicles with sport mode> 	Driving at constant speed of 50 km/h in 3rd gear	Approx. 100 to 300 r/min
				Driving at constant speed of 70 km/h in 4th gear	Approx. 0 to 10 r/min
				Release accelerator pedal (at less than 50 km/h)	The value should fluctuate when the accelerator is released.
DCC SOL DUTY	17	Damper control clutch solenoid valve duty %	<ul style="list-style-type: none"> Warmed up Transmission range: Sport mode <Vehicles with sport mode> 	Driving at constant speed of 50 km/h in 3rd gear	Approx. 70 – 90%
				Accelerate to 50 km/h in 3 position, then release accelerator pedal	70 – 90% → 0% Decreases gradually as the vehicle speed decreases

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
TFT SENSOR	7	Transmission fluid temperature sensor	Warmed up	Drive for 15 minutes or more so that the transmission fluid temperature becomes 70 – 90°C	Gradually rises to 70 – 90°C
AP SENSOR	2	AP sensor (mV)	<ul style="list-style-type: none"> Ignition switch: ON Engine: Stopped Transmission range: P 	Accelerator pedal: Release	900 – 1100 mV
				Accelerator pedal: Depressed	Gradually rises from the above value
				Accelerator pedal: Fully depressed	4,000 mV or more
INHIBITOR SWITCH	34	Transmission inhibitor switch	Ignition switch: ON	Transmission range: P	P
				Transmission range: R	R
				Transmission range: N	N
				Transmission range: D	D
U/D SOL DUTY	13	Underdrive solenoid valve duty %	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 4th gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 5th gear	100%

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
RED SOL DUTY	16	Reduction solenoid valve duty %	Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	0%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 4th gear	100%
			Transmission range: Sport mode <Vehicles with sport mode>	Driving at constant speed of 50 km/h (31 mph) in 5th gear	100%

ACTUATOR TEST REFERENCE TABLE

M1231008200408

MUT-III DIAGNOSTIC 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 diagnostic 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 (2 nd)			
2ND SOL	03	Second solenoid valve	Drive the solenoid valve specified by the diagnostic 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

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	TEST CONTENT	INSPECTION REQUIREMENT	NORMAL CONDITION
3rd SIFT LMP	09	Shift position indicator light (3rd)	illuminate each indicator light for three seconds to the signal from the diagnostic tool MB991958 (MUT-III sub assembly).		Shift indicator light illuminates.
4th SIFT LMP	10	Shift position indicator light (4th)			
5th SIFT LMP	11	Shift position indicator light (5th)			
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 • 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 diagnostic 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			
RED SOL	05	Reduction solenoid valve			
DCC SOL	06	Damper control clutch solenoid valve			
U/D SOL	02	Underdrive solenoid valve			

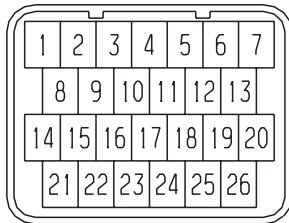
A/T-ECU TERMINAL VOLTAGE REFERENCE CHART FOR TRANSMISSION OPERATION

M1231008400305

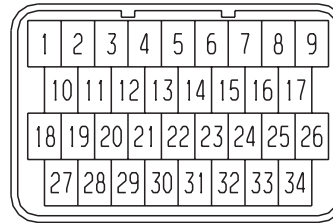
1. Disconnect the A/T-ECU connectors, and connect special tool MB992045 in between.
2. Measure the voltages between each check connector terminals of special tool MB992045 and connector B-19 ground terminals 1 or 10.

SPECIAL TOOL A/T- ECU CHECK HARNESS (MB992045) CONNECTOR: COMPONENT SIDE

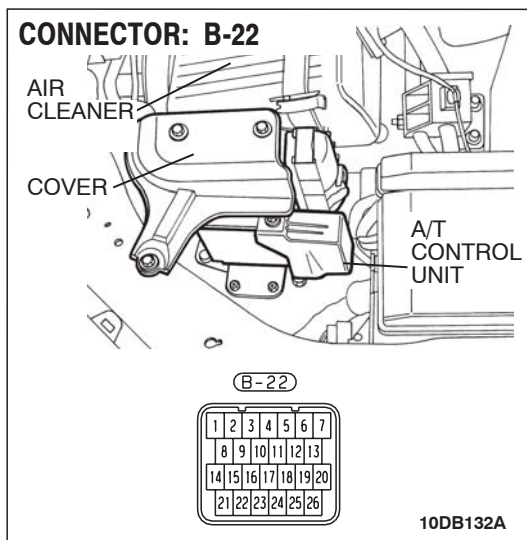
26-PIN
CONNECTOR
A/T-ECU CONNECTOR
(B-22)



34-PIN
CONNECTOR
A/T-ECU CONNECTOR
(B-19)



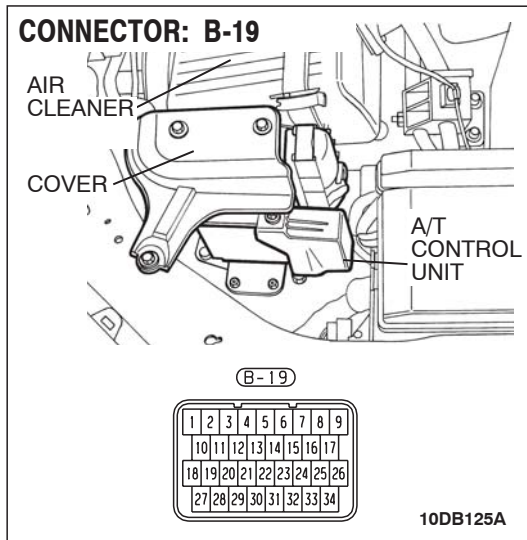
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TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
CONNECTOR (B-22)			
1	Underdrive solenoid valve	• Engine: idling • Gear range: 1st gear	Battery positive voltage
		• Engine: idling • Transmission range: R	7 – 9 V
2	Overdrive solenoid valve	• Engine: idling • Gear range: 3rd gear	Battery positive voltage
		• Engine: idling • Transmission range: D (1st gear)	7 – 9 V
3	Solenoid valve power supply	Ignition switch: LOCK (OFF)	1V or less
		Ignition switch: ON	Battery positive voltage

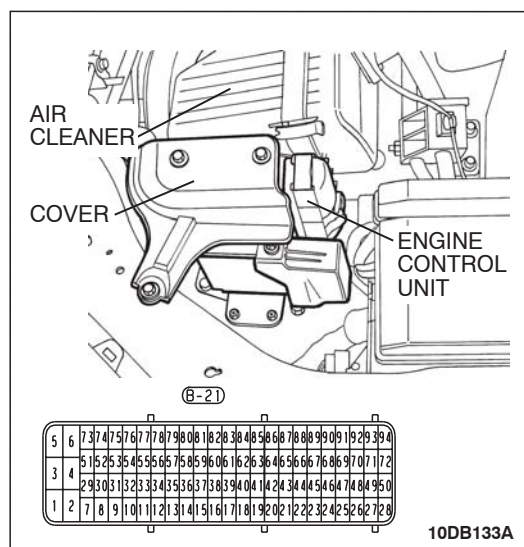
TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
4	A/T control relay	Always	1 V or less
5	Input shaft speed sensor	<ul style="list-style-type: none"> • Measure between (B-22) terminal 5 and (B-19) terminal 1 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear 	Refer to P.23A-285 , Inspection Procedure Using an Oscilloscope.
6	Transmission fluid temperature sensor	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission fluid temperature: 25°C 	3.8 – 4.0 V
		<ul style="list-style-type: none"> • Ignition switch: ON • Transmission fluid temperature: 80°C 	2.3 – 2.5 V
7	Signal ground	Always	1 V or less
8	Damper control clutch 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 • Gear range: 3rd gear (60km/h) 	7 – 9 V
9	Solenoid valve power supply	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	Battery positive voltage
11	Output shaft speed sensor	<ul style="list-style-type: none"> • Measure between (B-22) terminal 11 and (B-19) terminal 1 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear 	Refer to P.23A-285 , Inspection Procedure Using an Oscilloscope.
12	Sensor ground	Always	1 V or less
13	Power supply	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	Battery positive voltage
14	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: D (1st gear) 	7 – 9 V
15	Reduction 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: D (5th gear) 	7 – 9 V
20	Power supply	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	Battery positive voltage
21	Low-reverse solenoid valve	<ul style="list-style-type: none"> • Engine: idling • Transmission range: D (1st gear) 	Battery positive voltage
		<ul style="list-style-type: none"> • Engine: idling • Gear range: 2nd gear 	7 – 9 V
23	Transmission inhibitor 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

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
24	Transmission inhibitor 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
25	Transmission inhibitor 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
26	Transmission inhibitor 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



TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
CONNECTOR (B-19)			
1	Ground	Always	1 V or less
7	Power supply (Ignition)	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	Battery positive voltage
8	Sports mode Shift switch (up)	<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
9	Sports mode Shift switch (down)	<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
10	Ground	Always	1 V or less
17	Sports select switch	<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
18	Ground	Always	1 V or less
20	Flash EPROM battery	Data Link Connector	-
21	Battery Back-up	Always	Battery positive voltage

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
24	Vehicle speed signal	<ul style="list-style-type: none"> • Measure between connector (B-19) terminal 24 and 1 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear 	Refer to P.23A-285 , Inspection Procedure Using an Oscilloscope.
27	Ground	Always	1 V or less
29	K-Line	Data Link Connector	-
30	P- Signal [vehicles with power memory seat- (driver side)]	-	-
31	N- Signal [vehicles with power memory seat- (driver side)]	-	-



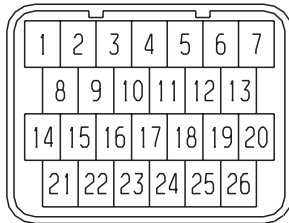
TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
ENGINE-ECU CONNECTOR (B-21)			
18	Stoplight switch	<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Depressed 	Battery positive voltage
		<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Released 	1 V or less

A/T-ECU TERMINAL RESISTANCE AND CONTINUITY INSPECTION CHART

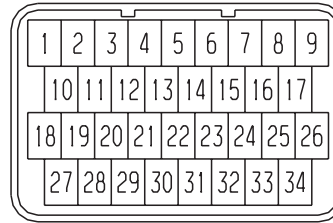
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SPECIAL TOOL A/T- ECU CHECK HARNESS (MB992045) CONNECTOR: COMPONENT SIDE

26-PIN
CONNECTOR
A/T-ECU CONNECTOR
(B-22)



34-PIN
CONNECTOR
A/T-ECU CONNECTOR
(B-19)



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NOTE: The A/T-ECU connectors should be disconnected for this inspection.

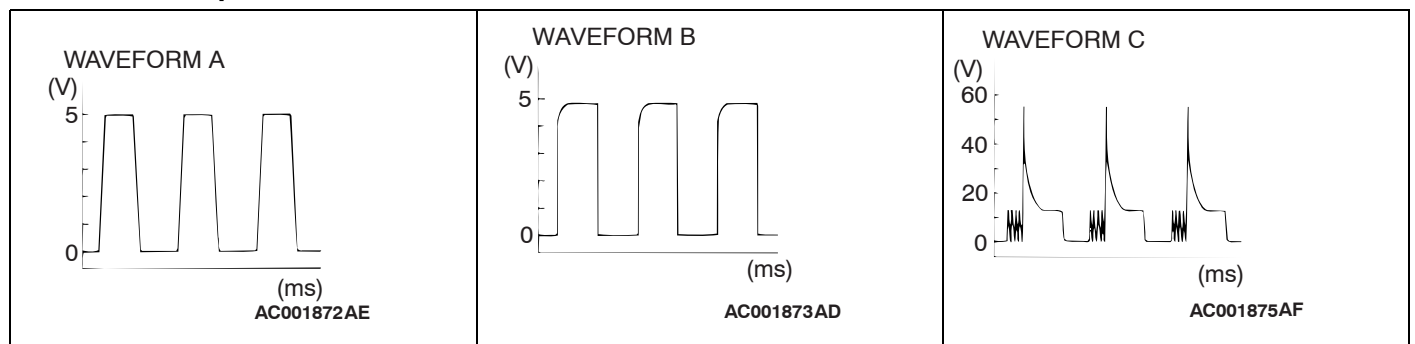
TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (CHECK CONDITION)
(B-22) 12 – 6	Transmission fluid temperature sensor	16.7 – 20.5 kΩ [at 0°C]
		7.3 – 8.9 kΩ [at 20°C]
		3.4 – 4.2 kΩ [at 40°C]
		1.9 – 2.2 kΩ [at 60°C]
		1.0 – 1.2 kΩ [at 80°C]
		0.57 – 0.69 kΩ [at 100°C]

INSPECTION PROCEDURE USING AN OSCILLOSCOPE

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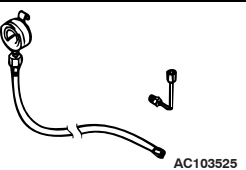
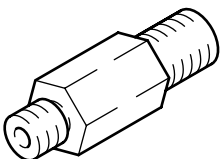
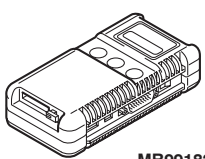
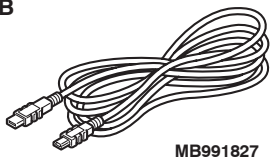
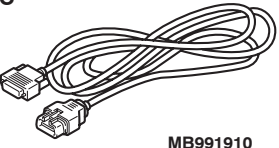
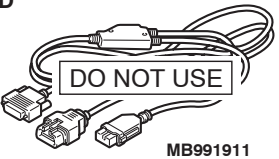
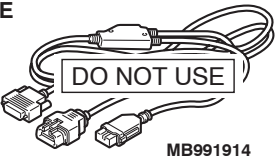
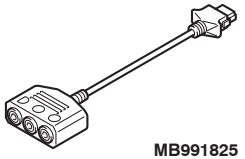
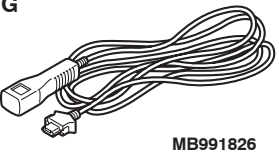
(B-22) TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION (WAVEFORM SAMPLE)
5	Input shaft speed sensor	Gear range: 3rd gear	Driving at constant speed of 50 km/h in 3rd gear (1,900 – 2,100 r/min)	Waveform B
11	Output shaft speed sensor			
21	Low-reverse solenoid valve	<ul style="list-style-type: 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
1	Underdrive solenoid valve			
14	Second solenoid valve			
2	Overdrive solenoid valve			
15	Reduction (RED) solenoid valve			
8	Damper clutch control (DCC) solenoid			

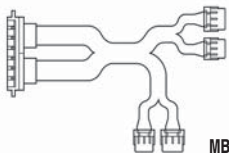
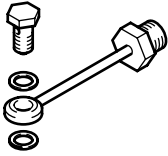
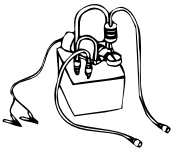
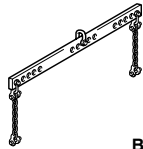
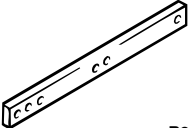
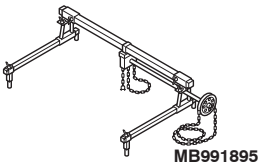
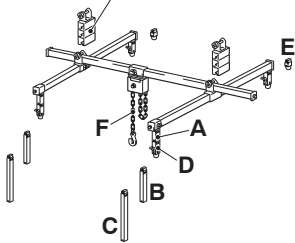
Waveform sample


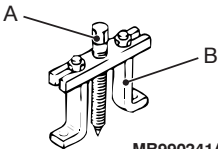

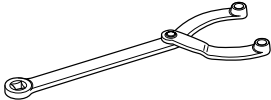
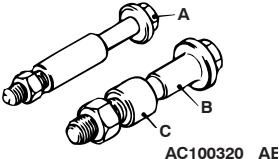


SPECIAL TOOLS

M1231000600413

TOOL	TOOL NUMBER AND NAME	SUPERSESSON	APPLICATION
	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 align="center">MB991824</p> <p>B</p>  <p align="center">MB991827</p> <p>C</p>  <p align="center">MB991910</p> <p>D</p>  <p align="center">MB991911</p> <p>E</p>  <p align="center">MB991914</p> <p>F</p>  <p align="center">MB991825</p> <p>G</p>  <p align="center">MB991826 MB991958</p>	<p>MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826</p> <p>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</p>	<p>MB991824-KIT</p> <p><i>NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I. ENTER key.</i></p>	<p>Checking diagnostic trouble codes</p> <p>⚠ CAUTION</p> <p>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.</p>

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB992045	MB992045 A/T-ECU Test Check Harness	MD998478-01	Measurement of A/T-ECU terminal voltage
	MD998900 Adapter	MIT220433	Connection for oil pressure gauge
	MB995062 Flushing tool	MLR-6906B or Equivalent	Flushing cooler and tube
 B991454	MB991454 Engine hanger balancer	MZ203827-01	When the engine hanger is used: Supporting the engine assembly during removal and installation of the transmission assembly <i>NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.</i>
 B991527	MB991527 Hanger	—	
 MB991895	MB991895 Engine hanger	—	
SLIDE BRACKET (HI)  B991928	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
 AC106827	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>
 MB990241AB	MB990241 Axle shaft puller A: MB990242 Puller shaft B: MB990244 Puller bar	MB990241-01 or General service tool	Removal of the drive shaft
 MB991354	MB991354 Puller body	General service tool	
 B990767	MB990767 End yoke holder	MB990767-01	Fixing of the hub
 AC100320 AE	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>

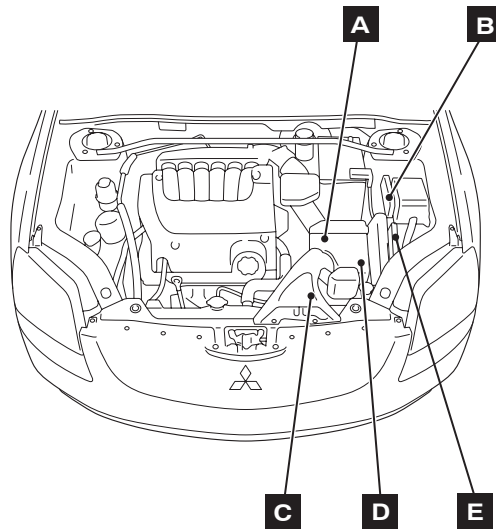
ON-VEHICLE SERVICE

A/T CONTROL COMPONENT LAYOUT

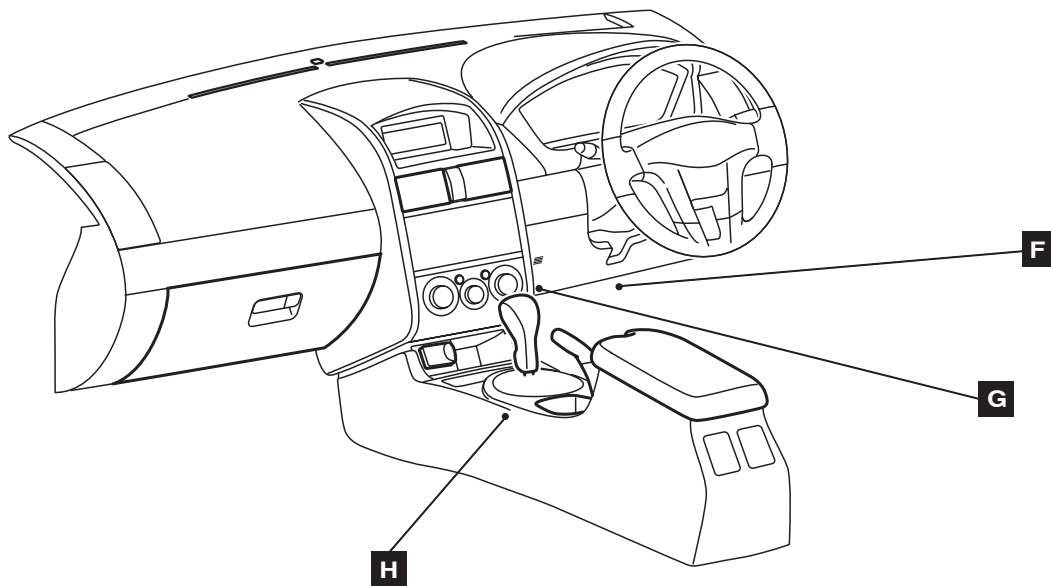
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NAME	SYMBOL	NAME	SYMBOL
A/T control relay	B	A/T-ECU	E
A/T control solenoid valves	D	Stoplight switch	F
Data link connector	G	Sports mode shift switch	H
Input shaft speed sensor	A	Transmission fluid temperature sensor	D
Output shaft speed sensor	A	Transmission inhibitor switch	C

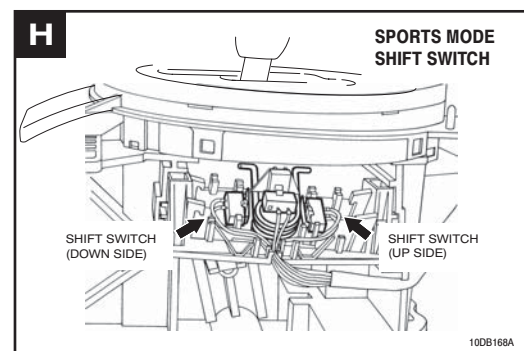
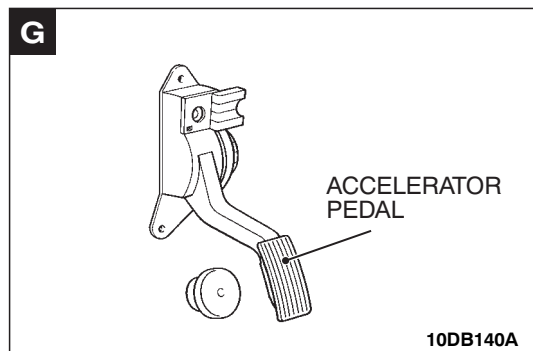
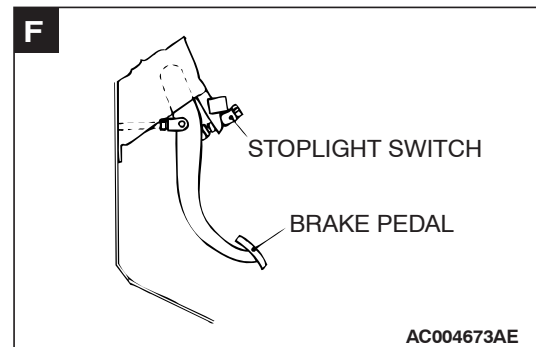
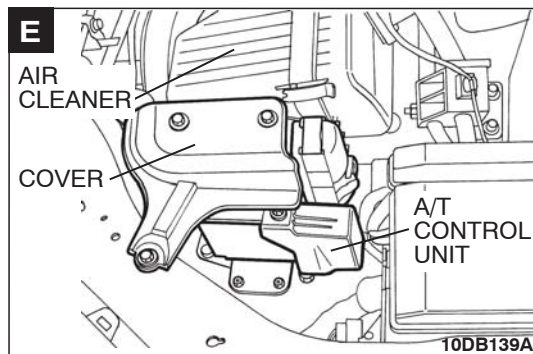
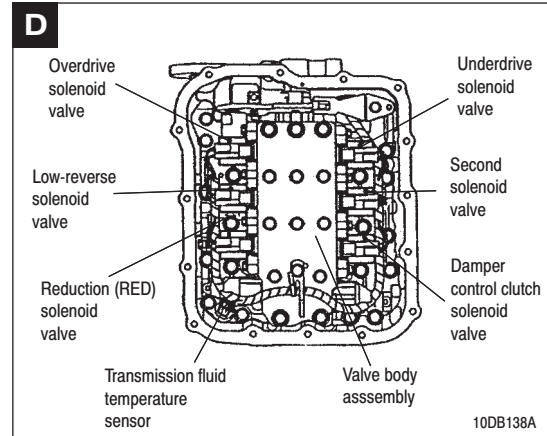
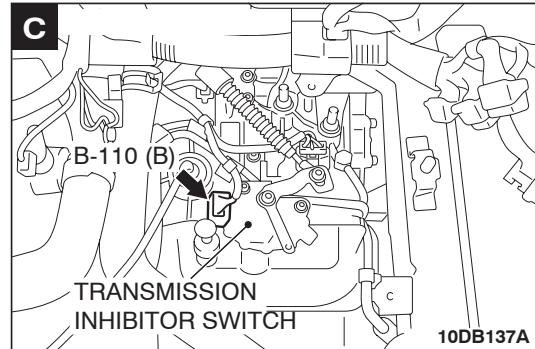
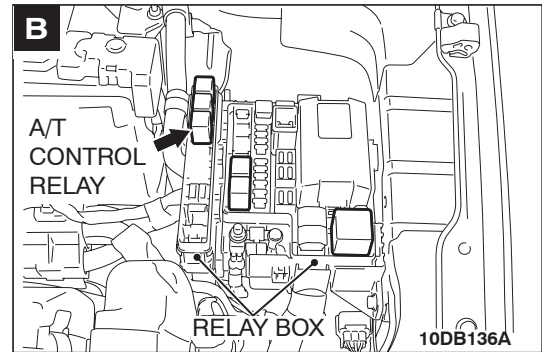
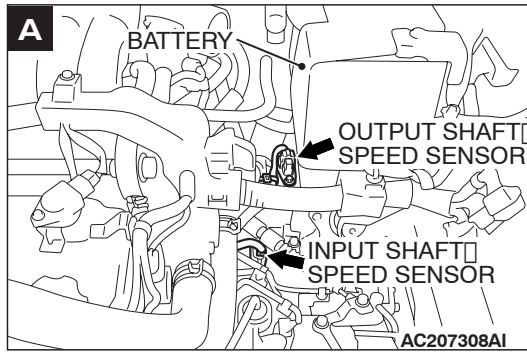
<3.8L ENGINE>



10DB134A



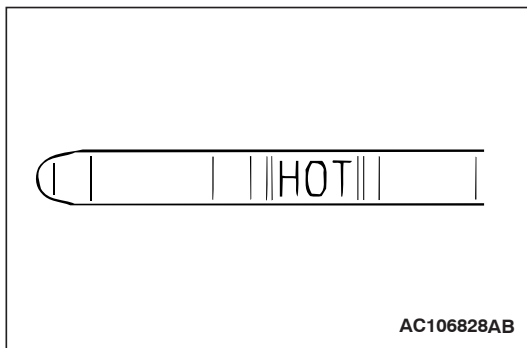
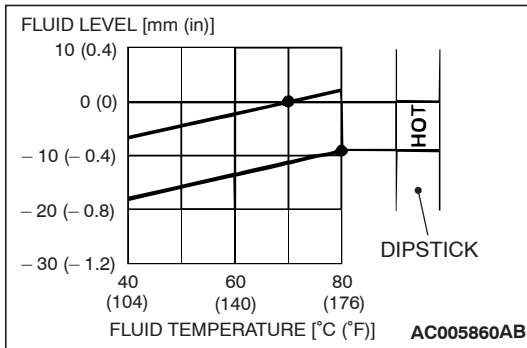
10DB135A



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 diagnostic 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.
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 transmission will churn 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 transmission 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 transmission.
- When overhauling the transmission.
- When the transmission fluid is noticeably dirty or burnt (driving under severe conditions).

TRANSMISSION FLUID CHANGE

M1231021500057

If you have a 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.

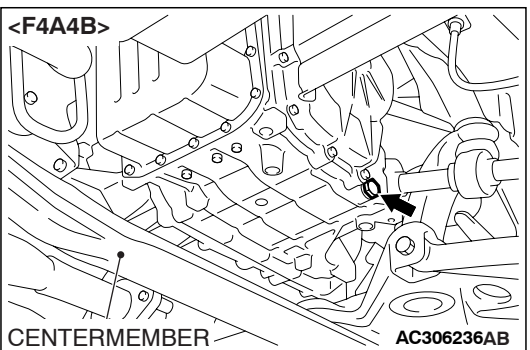
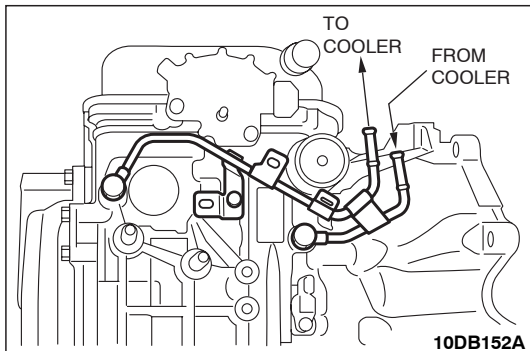
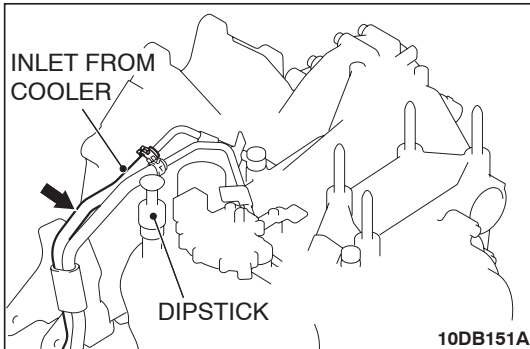
1. Disconnect the hose shown in the illustration which connects the transmission and the oil cooler (inside the radiator). Place a container under the hose to collect the discharge.

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 4.5 litres of transmission fluid should be removed.



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

Approximately 1.0 litre 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 (MITSUBISHI ATF SP III) through the oil filter tube.

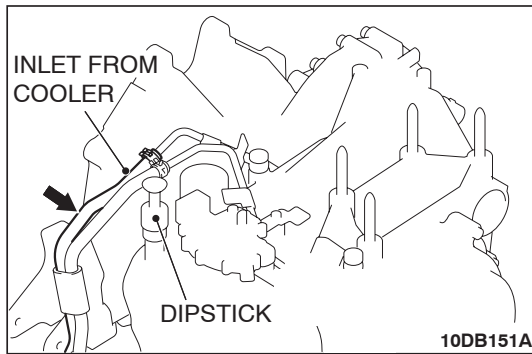
Approximately 5.5 litres of transmission fluid should be added.

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

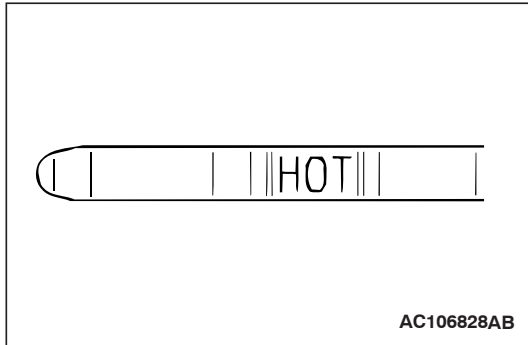
7. Add new transmission fluid (MITSUBISHI ATF SP III) through the oil filter tube.

Approximately 3.5 litres 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.

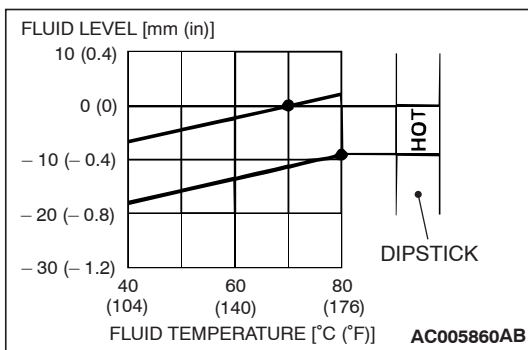


11. Check that the transmission fluid level is at the "COLD" mark on the dipstick. If the level is less than this, add transmission fluid.
12. Drive the vehicle until the transmission fluid temperature rises to the normal operating temperature [70 – 80°C (158 – 176°F)], and then check the transmission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

NOTE: The transmission fluid temperature is measured with diagnostic 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.

OIL COOLER FLOW CHECK

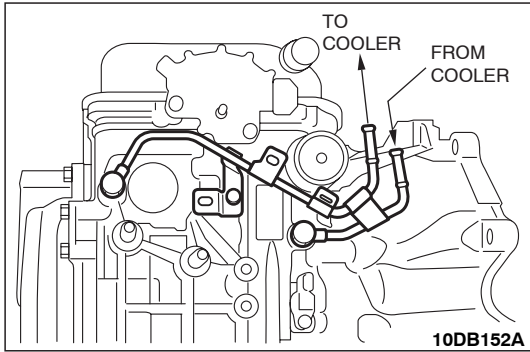
M1231013100214

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

⚠ CAUTION

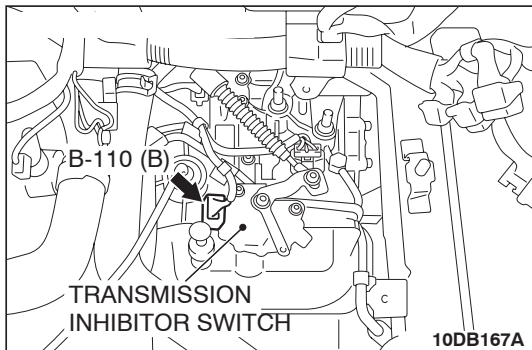
With the fluid set at the proper level, transmission fluid collection should not exceed one litre or internal damage to the transmission may occur.

1. Disconnect the OUTLET line (from cooler) at the transmission 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 litre of transmission fluid, replace the cooler.
4. If flow is within acceptable limits, reconnect the cooler line. Then fill the transmission to the proper level, using MITSUBISHI ATF SP III.



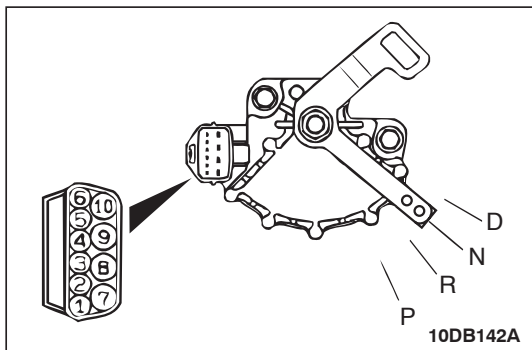
TRANSMISSION INHIBITOR SWITCH CHECK

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	

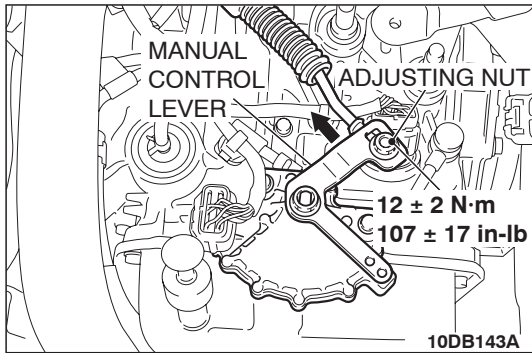
NOTE: For vehicles with sport mode, four positions (P, R, N, D) are used.



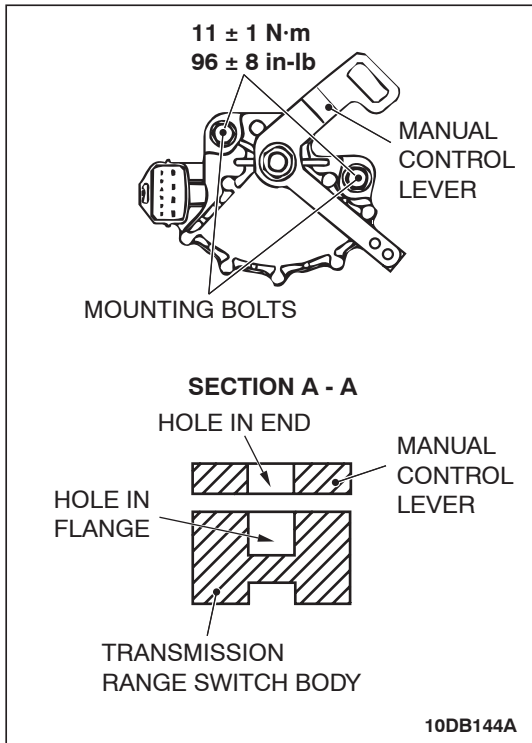
TRANSMISSION INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

M1231021700051

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

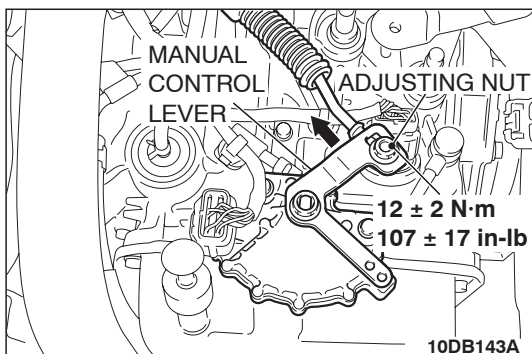


2. Loosen the control cable to the manual control lever coupling nut to free the cable and lever.
3. Set the manual control lever to the neutral position.



4. Loosen the transmission inhibitor 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 inhibitor switch body are aligned.
5. Tighten the transmission inhibitor switch body mounting bolts to the specified torque. Be careful at this time that the switch body does not move.

Tightening torque: 11 ± 1 N·m (96 ± 8 in-lb)



6. Gently push the transmission 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 diagnostic tool MB991958 (MUT-III sub assembly).

AUTOMATIC TRANSMISSION CONTROL COMPONENT CHECK

CRANKSHAFT POSITION SENSOR CHECK

Refer to GROUP 13A <3.8L Engine>, Diagnosis – Inspection Procedure Using an Oscilloscope [13A-652](#).
M1231009000355

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

3. 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 INHIBITOR SWITCH CHECK

M1231021600117

Refer to [P.23A-294](#).

STOPLIGHT SWITCH CHECK

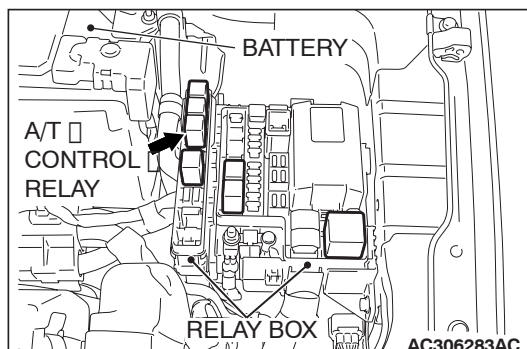
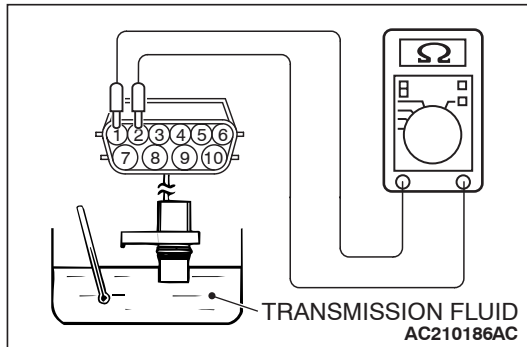
M1231009100192

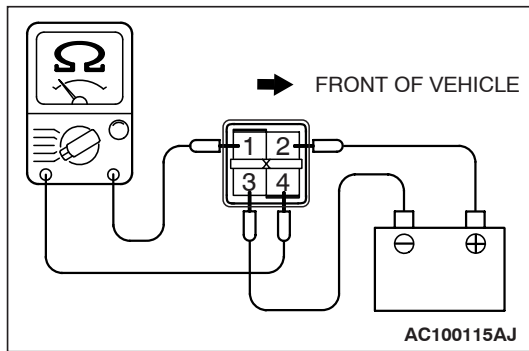
Refer to GROUP 35A, Brake Pedal – Brake Pedal Inspection [P.35A-25](#).

A/T CONTROL RELAY CHECK

M1231009300248

1. Remove the A/T control relay.





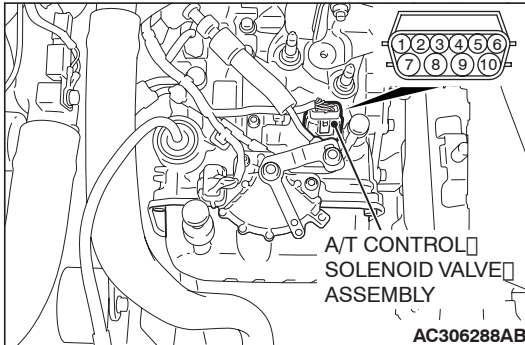
2. Use jumper wires to connect A/T control relay terminal 3 to the negative battery terminal and terminal 2 to the positive battery terminal.
3. Check for continuity between A/T control relay terminals 1 and 4 when the jumper wires are connected to and disconnected from the battery.

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

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

SOLENOID VALVE CHECK

M1231009400267

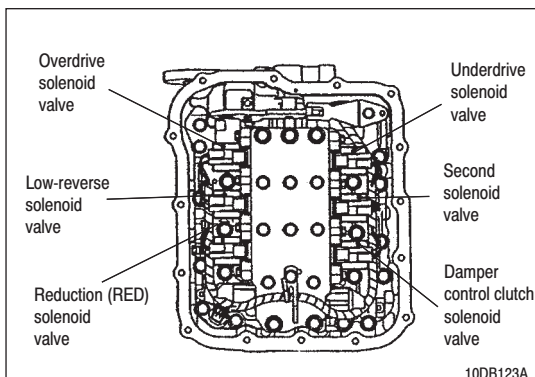


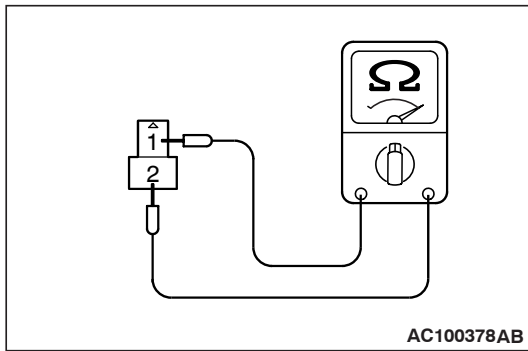
1. Use diagnostic tool MB991958 (MUT-III sub assembly) to measure the transmission fluid temperature. The desired transmission fluid temperature setting for performing the solenoid valve check is 20°C (68°F).
2. Remove the A/T control solenoid valve assembly connector.
3. Measure the resistance between 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	Damper control clutch (DCC) solenoid valve	2.7 – 3.4 Ω [at 20°C (68°F)]
6 - 10	Low-reverse solenoid valve	
8 - 10	Reduction (RED) 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.

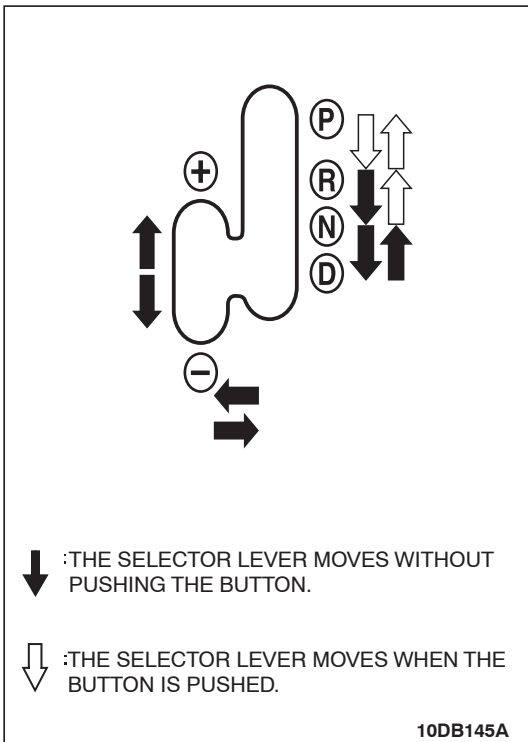
Specified resistance: 2.7 – 3.4 Ω [at 20°C (68°F)]

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" 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.



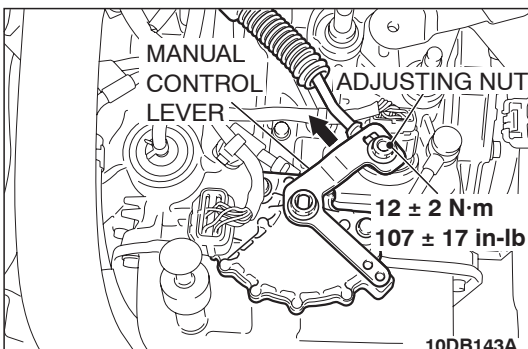
TRANSMISSION CONTROL CABLE ADJUSTMENT

M1231028000064

1. Move the selector lever to the "N" position.
2. Loosen the upper control lever adjusting nut.
3. Gently push the transmission 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 transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.



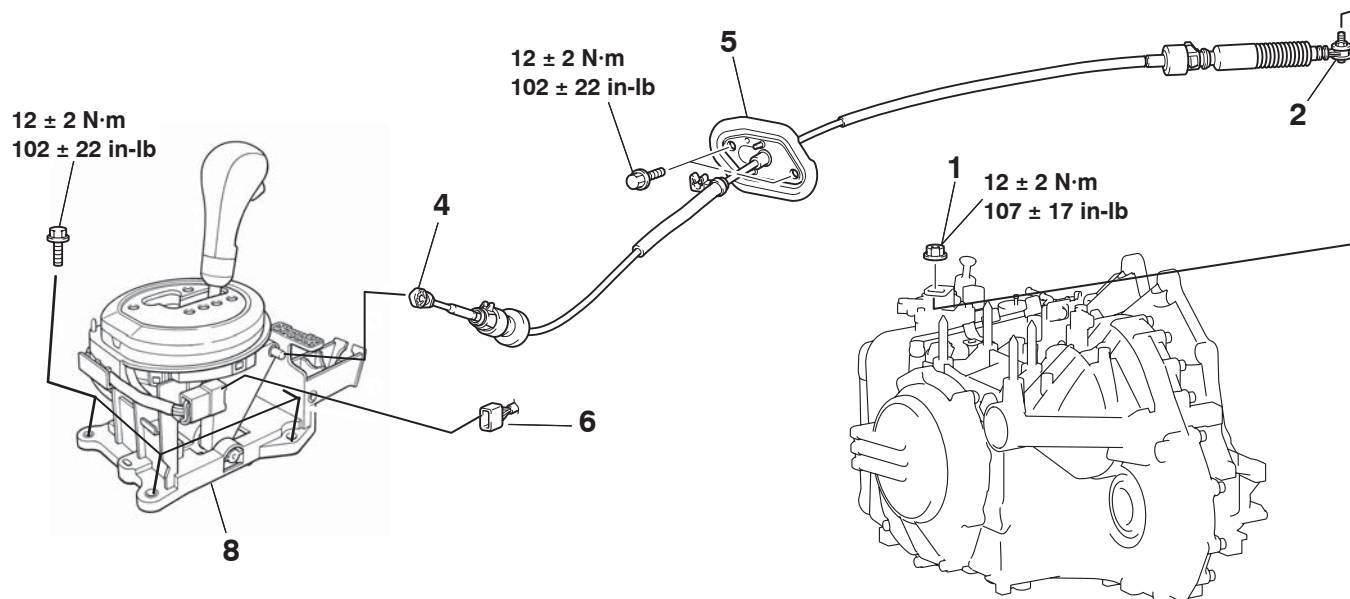
TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

M1231006600585

⚠ WARNING

- When removing and installing the transmission control cable unit, be careful not to hit the SRS-ECU.



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TRANSMISSION CONTROL CABLE ASSEMBLY REMOVAL STEPS

- AIR DUCT AND AIR CLEANER ASSEMBLY (REFER TO GROUP 15 [P.15-4.](#))
- BATTERY AND BATTERY TRAY
- ENGINE-ECU AND A/T-ECU (REFER TO GROUP 13A [13A-675.](#))
- HEATER UNIT AND DECK CROSSMEMBER ASSEMBLY (REFER TO GROUP 55, HEATER UNIT, HEATER CORE, BLOWER ASSEMBLY AND EVAPORATOR UNIT [55-151.](#))

- >>B<< 1. ADJUSTING NUT
- >>B<< 2. TRANSMISSION CONTROL CABLE ASSEMBLY CONNECTION (TRANSMISSION SIDE)

TRANSMISSION CONTROL CABLE ASSEMBLY REMOVAL STEPS

4. TRANSMISSION CONTROL CABLE ASSEMBLY CONNECTION (SELECTOR LEVER ASSEMBLY SIDE)

5. TRANSMISSION CONTROL CABLE ASSEMBLY

SELECTOR LEVER ASSEMBLY REMOVAL STEPS

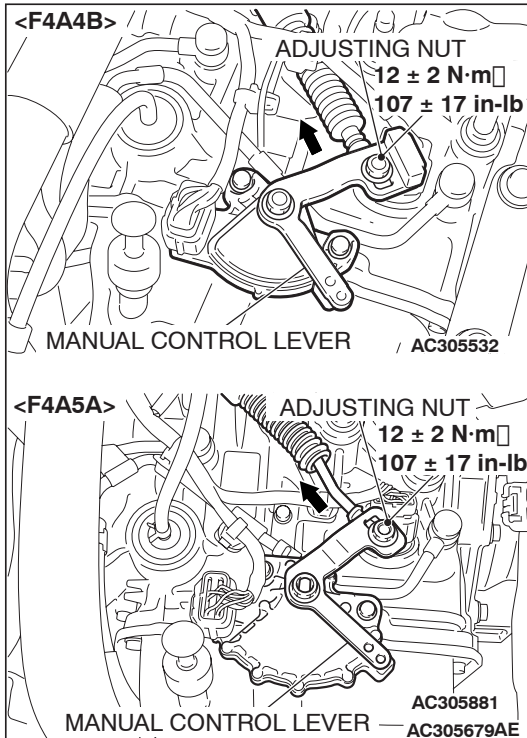
- FLOOR CONSOLE (REFER TO GROUP 52A, FLOOR CONSOLE ASSEMBLY [52A-10](#))
4. TRANSMISSION CONTROL CABLE ASSEMBLY CONNECTION (SELECTOR LEVER ASSEMBLY SIDE)
 6. A/T SELECTOR LEVER POSITION ILLUMINATION LIGHT HARNESS CONNECTOR AND SHIFT SWITCH ASSEMBLY HARNESS CONNECTOR
 8. SELECTOR LEVER ASSEMBLY

INSTALLATION SERVICE POINTS

>>B<< TRANSMISSION CONTROL CABLE ASSEMBLY (TRANSMISSION 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 transmission control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

Tightening torque: $12 \pm 2 \text{ N}\cdot\text{m}$ ($107 \pm 17 \text{ in}\cdot\text{lb}$)



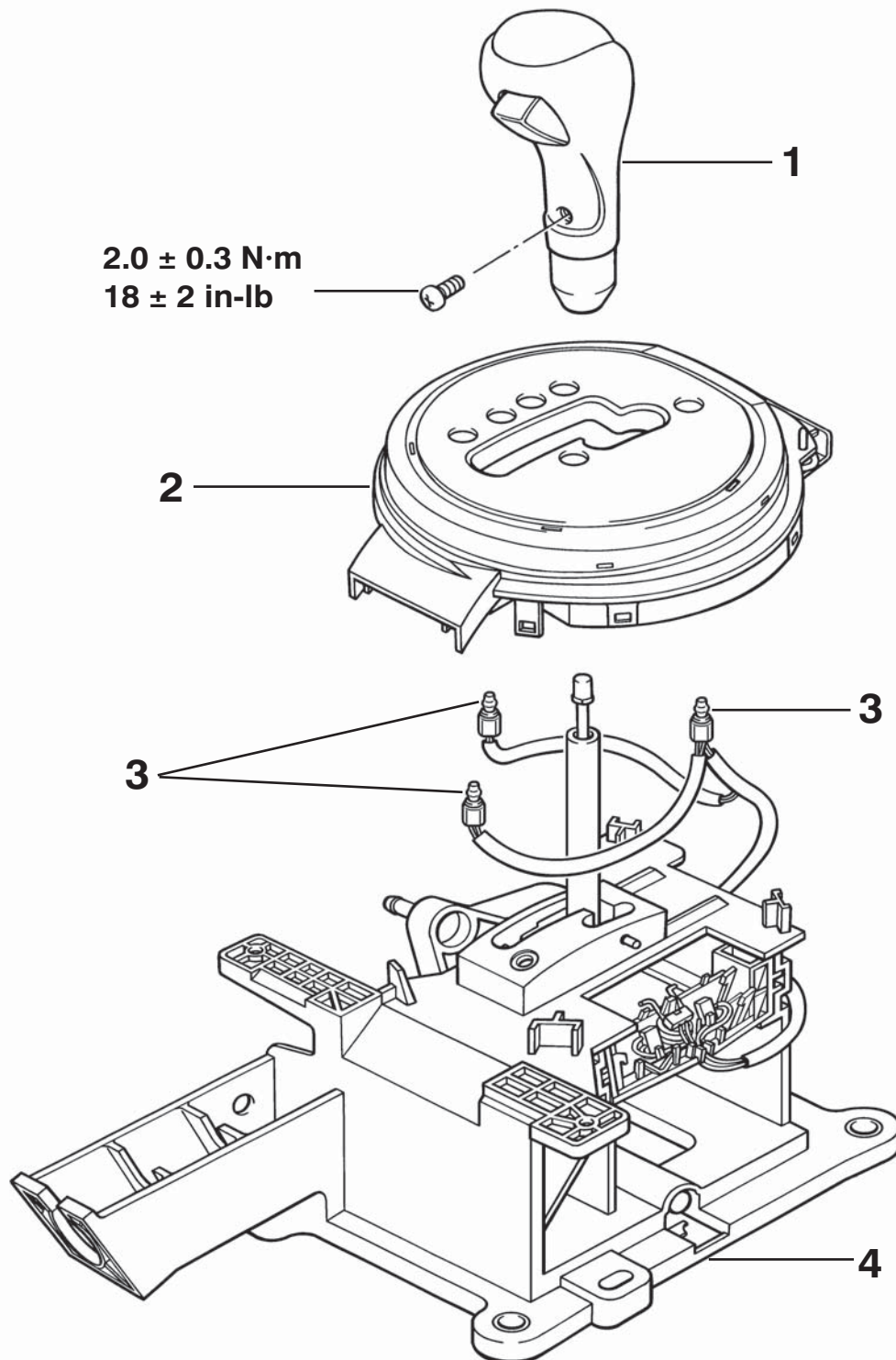
INSPECTION

Check the cable assembly for function and for damage.

M1231030000094

DISASSEMBLY AND ASSEMBLY

M1231006800363



10DB165A

DISASSEMBLY STEPS

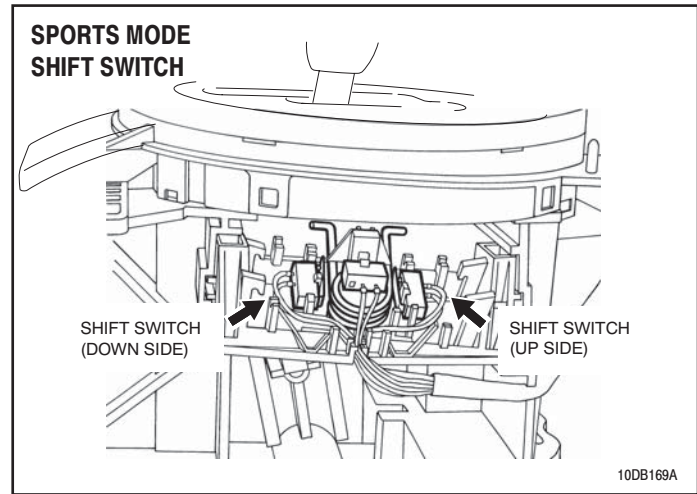
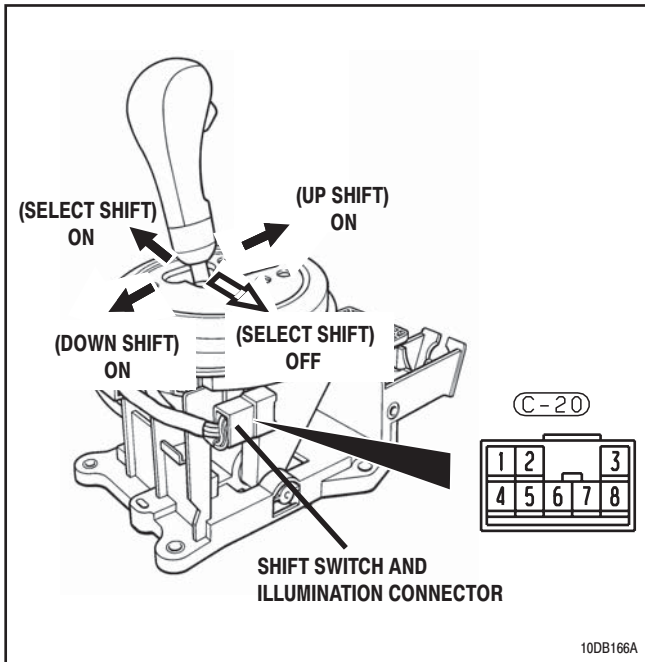
1. SHIFT KNOB
2. INDICATOR PANEL

DISASSEMBLY STEPS

3. LED ILLUMINATION BULBS
4. SHIFT LEVER ASSEMBLY

INSPECTION

M1231006900188



SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

SWITCH POSITION		TERMINAL NO.
Select switch (select shift)	ON	6 – 1
	OFF	–
Shift switch (up shift)	ON	2 – 7
	OFF	–
Shift switch (down shift)	ON	2 – 3
	OFF	–
illumination (tail lamp relay supply)	ON (12V)	5
	OFF (0V)	
illumination (rheostat/dimmer switch)	< than 2 ohms	4

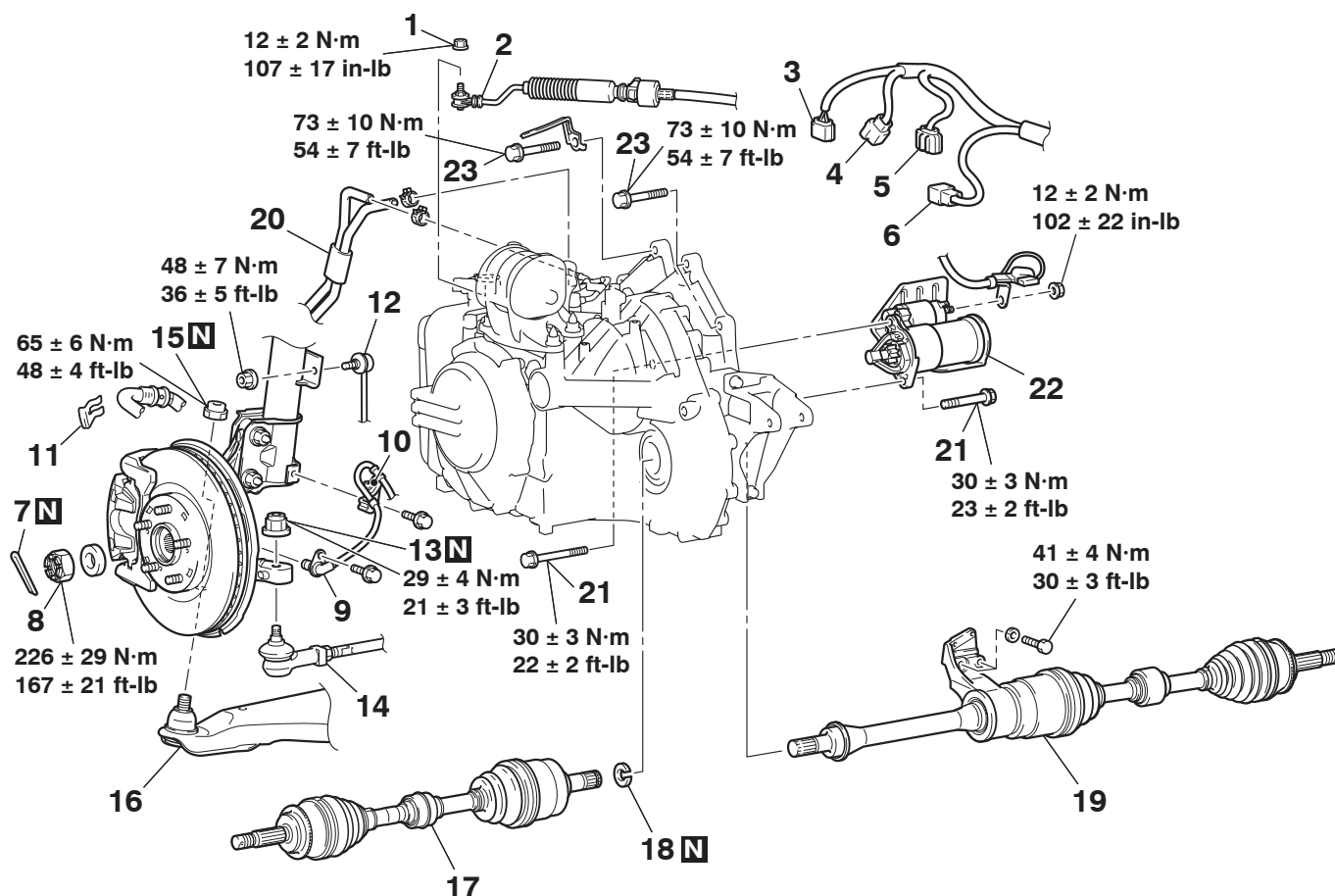
REMOVAL AND INSTALLATION

M1231005700459

*: 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.

- Front Under Cover, Side Under Cover Removal
- Transmission Fluid Draining (Refer to GROUP 00, Maintenance Service – Automatic Transmission [P.00-45.](#))
- Engine Cover Removal (Refer to GROUP 11C, Engine Assembly [11A-14.](#))
- Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner [P.15-4.](#))
- Engine-ECU and A/T-ECU Removal (Refer to GROUP 13A [13A-675.](#))
- Battery and Battery Tray Removal
- Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler [P.15-14.](#))

- Front Exhaust Pipe Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler [P.15-14.](#))
- Battery and Battery Tray Installation
- Engine-ECU and A/T-ECU Installation (Refer to GROUP 13A [13A-675.](#))
- Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner [P.15-4.](#))
- Engine Cover Installation (Refer to GROUP 11C, Engine Assembly [11A-14.](#))
- Transmission Fluid Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transmission [P.00-45.](#))
- Front Under Cover, Side Under Cover Installation
- Selector Lever Operation Check (Refer to [P.23A-299.](#))
- Speedometer Operation Check (Refer to GROUP 54A, Combination Meter – On-vehicle Service – Speedometer Check [P.54A-92.](#))
- Front Wheel Alignment Check and Adjustment (Refer to GROUP 33, On-vehicle Service – Front Wheel Alignment Check and Adjustment [P.33-6.](#))



>>E<< 1. ADJUSTING NUT

>>E<< 2. TRANSMISSION CONTROL
CABLE CONNECTION

3. INHIBITOR SWITCH SENSOR CONNECTOR
4. A/T CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR

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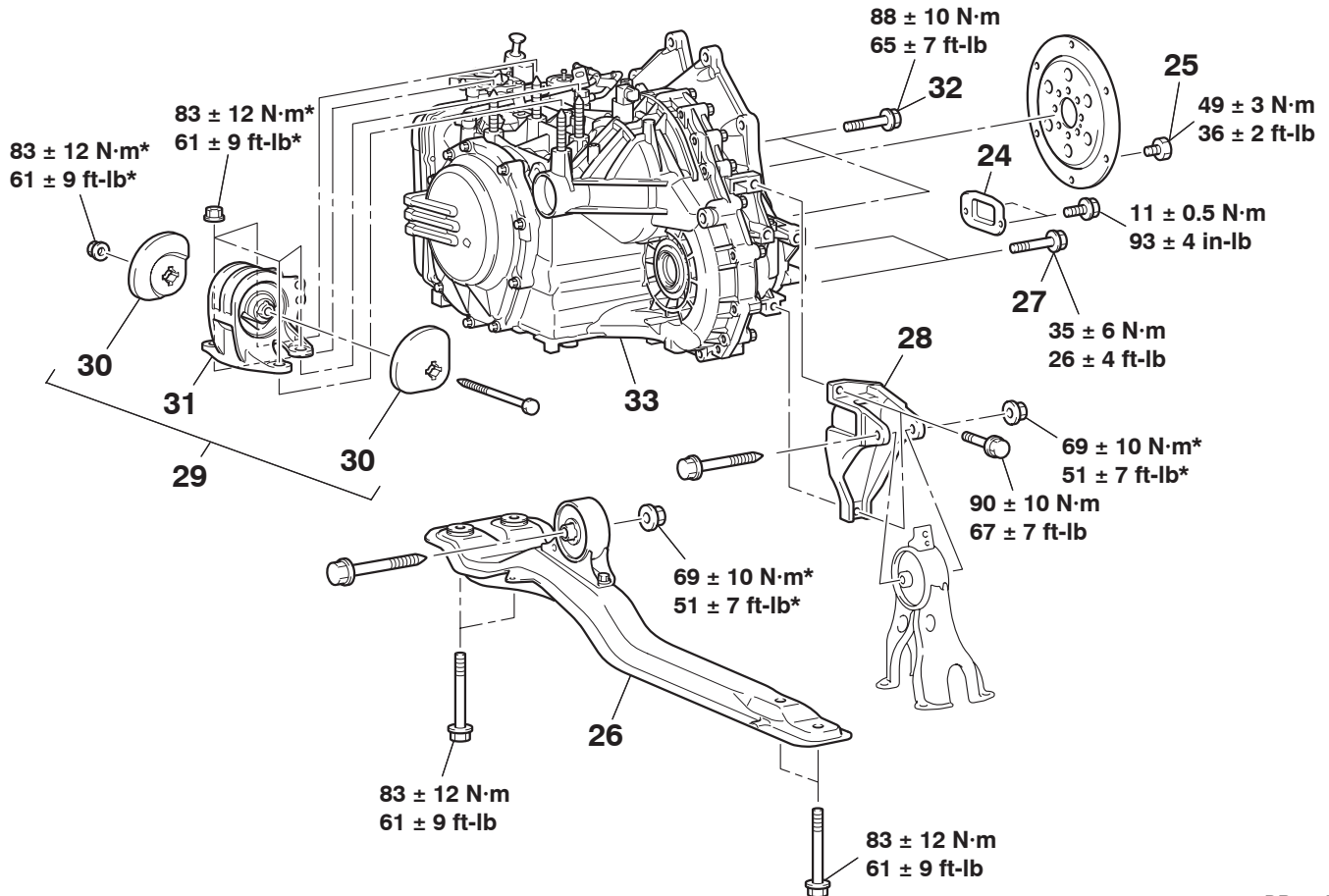
REMOVAL STEPS (Continued)

REMOVAL STEPS (Continued)

<<A>> >>D<<

5. INPUT SHAFT SPEED SENSOR CONNECTOR <>
6. OUTPUT SHAFT SPEED SENSOR CONNECTOR
7. SPLIT PIN <>
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. TRANSMISSION ASSEMBLY UPPER PART COUPLING BOLTS



REMOVAL STEPS

REMOVAL STEPS (Continued)

<<D>>

24. COVER
25. TORQUE CONVERTER AND DRIVE PLATE BOLTS
26. CENTERMEMBER ASSEMBLY
27. ENGINE OIL PAN AND TRANSMISSION COUPLING BOLTS
28. REAR ROLL STOPPER BRACKET
 - AIR CLEANER BRACKET

>>B<<

29. TRANSMISSION MOUNT BRACKET ASSEMBLY
30. TRANSMISSION MOUNT STOPPER
31. TRANSMISSION MOUNT BRACKET
 - ENGINE ASSEMBLY SUPPORTING
 - LIFTING UP OF THE VEHICLE

<<E>>

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REMOVAL STEPS (Continued)

- SUPPORT THE TRANSMISSION
WITH A TRANSMISSION JACK
- 32. TRANSMISSION ASSEMBLY
LOWER PART COUPLING BOLTS
- >>A<< 33. TRANSMISSION 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

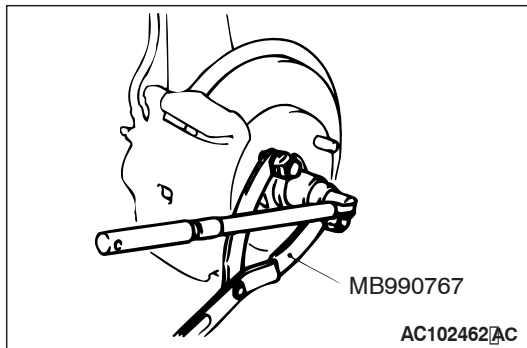
REMOVAL SERVICE POINTS

<<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.

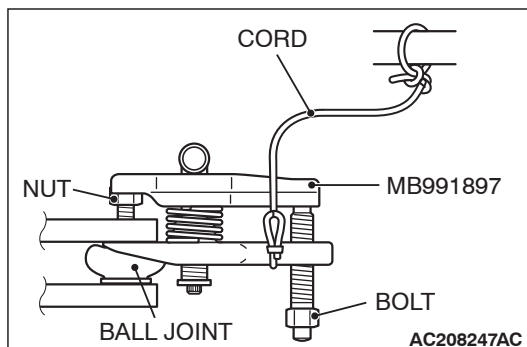


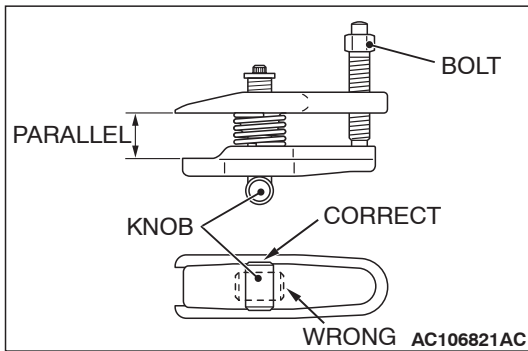
<> TIE ROD END CONNECTION/LOWER ARM BALL JOINT CONNECTION REMOVAL

⚠ 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.



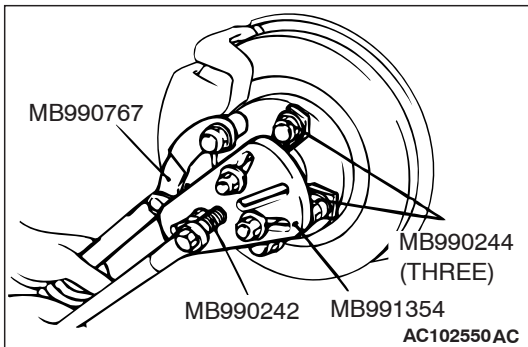


2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

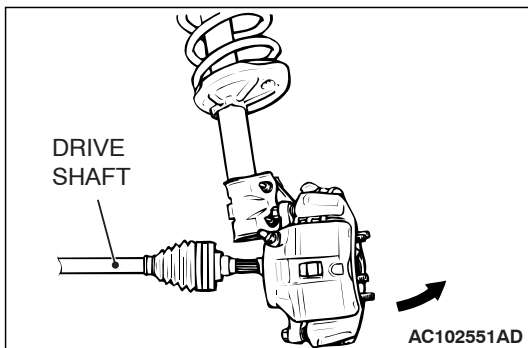
NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

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

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

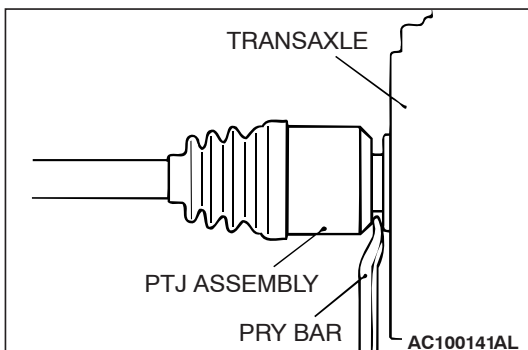


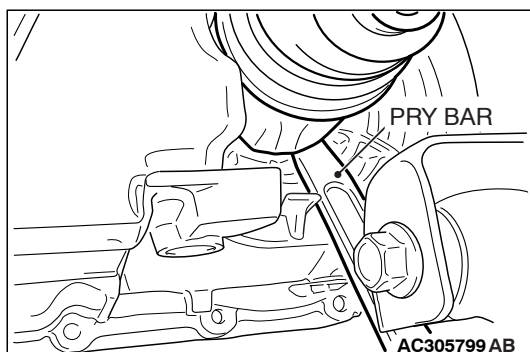
2. Remove the drive shaft from the hub by pulling the bottom of the brake disc towards you.

⚠ CAUTION

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

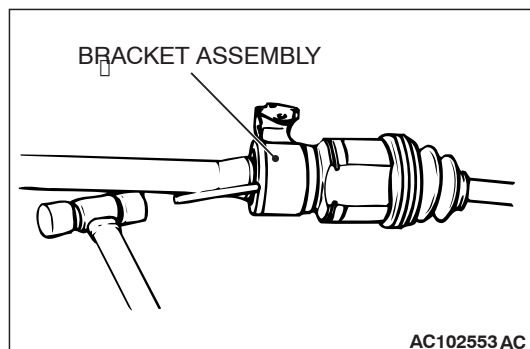
3. Insert a pry bar between the transmission case and the drive shaft, and then pry and remove the drive shaft from the transmission.





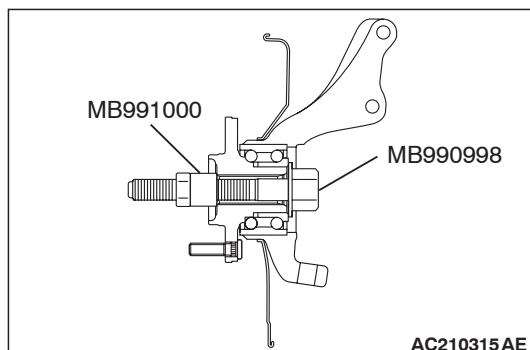
NOTE: Insert a pry bar, taking care not to damage the protrusion of transmission case when removing the drive shaft LH.

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



⚠ 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.



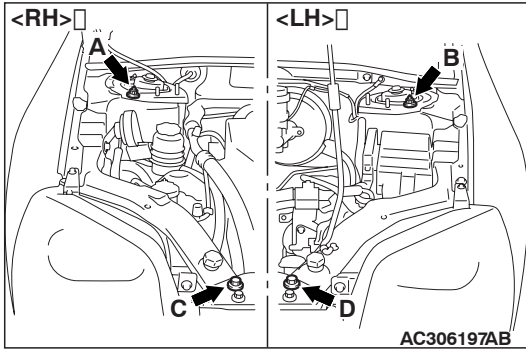
<<D>> TORQUE CONVERTER AND DRIVE PLATE COUPLING BOLTS REMOVAL

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

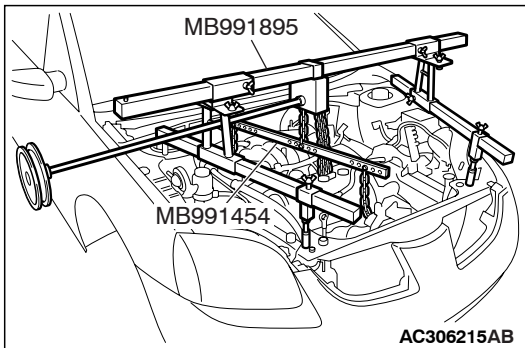
<<E>> ENGINE ASSEMBLY SUPPORTING

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/transmission assembly.

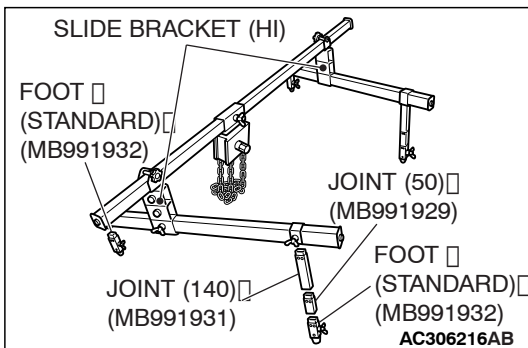


2. <Engine hanger (special tool MB991928) is used>

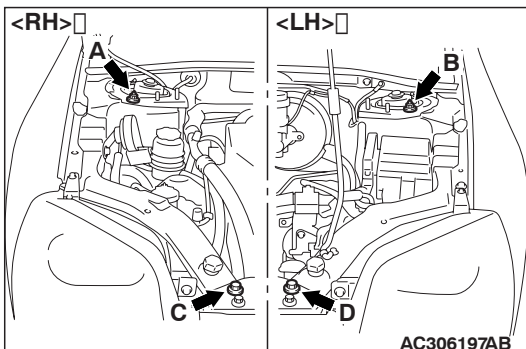
- (1) Assemble the engine hanger (special tool MB991928).

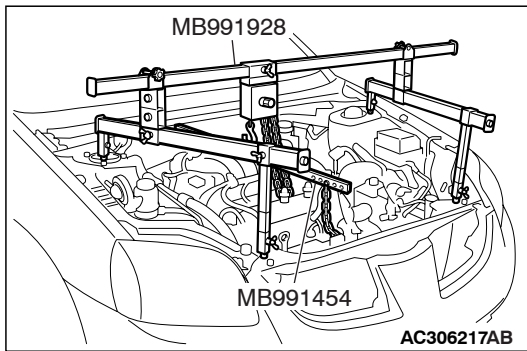
Attach following parts to the base hanger.)

- 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.





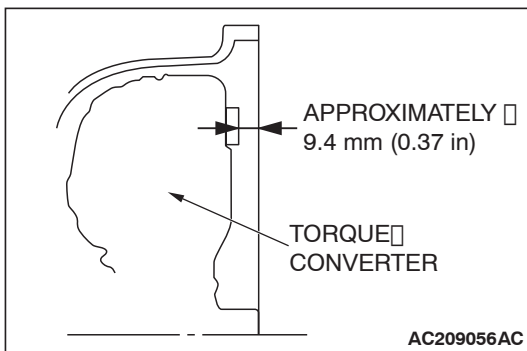
- (3) Position special tool MB991454 to hold the engine/transmission assembly.

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

INSTALLATION SERVICE POINT

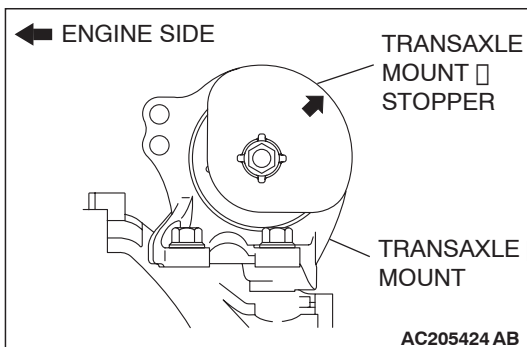
>>A<< TRANSMISSION ASSEMBLY INSTALLATION

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



>>B<< TRANSMISSION MOUNT STOPPER INSTALLATION

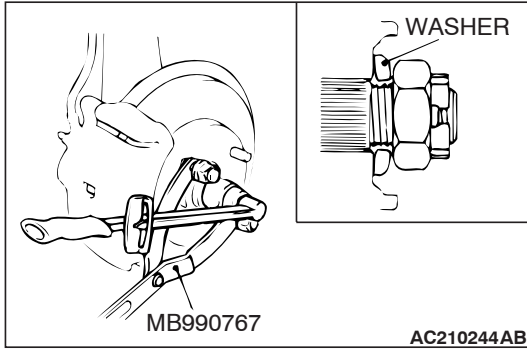
Install the transmission mount stopper so that the arrow points upward as shown in illustration. Ensure stoppers are installed onto mount correctly prior to fitment and do not dislodge during transmission installation.



>>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.

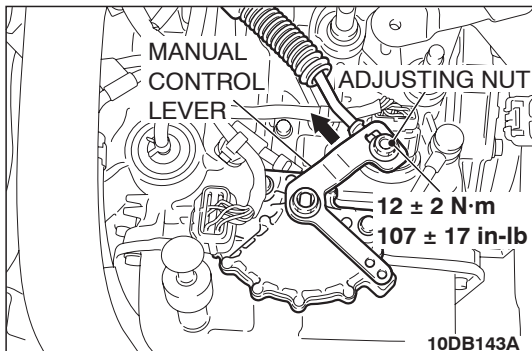
2. Using special tool MB990767, tighten the drive shaft nut to the specified torque.

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

>>E<< TRANSMISSION 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 transmission 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)



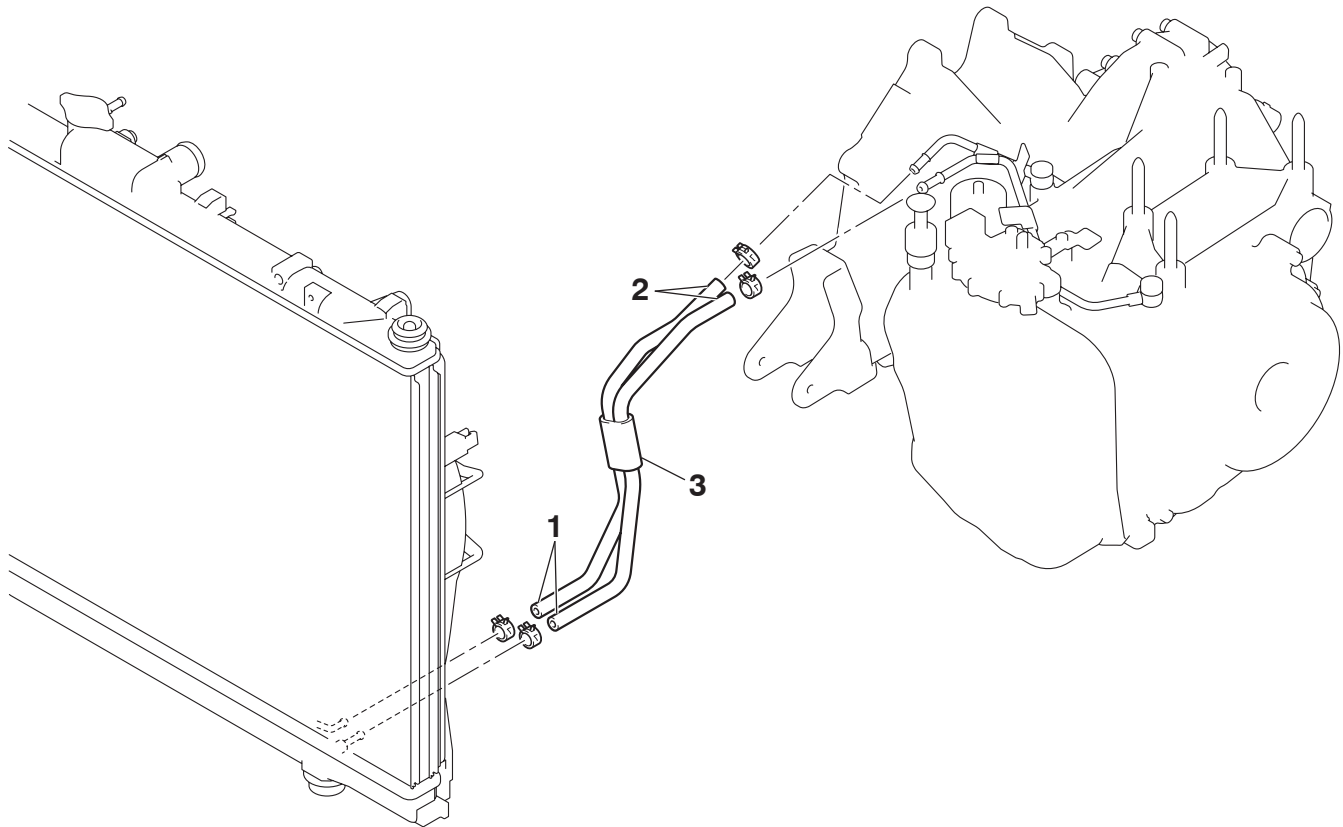
TRANSMISSION FLUID COOLER, HOSE AND PIPE

REMOVAL AND INSTALLATION

M1231021900033

Pre-removal and Post-installation Operation

- Transmission Fluid Draining and Supplying (Refer to GROUP 00, Maintenance Service – Automatic Transmission Fluid [P.00-45](#).)
- Front Under Cover <LH> Removal and Installation



AC306186AB

TRANSMISSION FLUID COOLER LINE ASSEMBLY REMOVAL STEPS

<<A>>

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

TRANSMISSION FLUID COOLER LINE ASSEMBLY REMOVAL STEPS (Continued)

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

REMOVAL SERVICE POINTS

<<A>> HOSE ASSEMBLY <RADIATOR SIDE>/HOSE ASSEMBLY <TRANSMISSION 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 inhibitor switch	
Transmission inhibitor switch body mounting bolt	11 ± 1 N·m (96 ± 8 in-lb)
Transmission 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)
Transmission control cable attaching bolt	12 ± 2 N·m (102 ± 22 in-lb)
Transmission assembly	
Adjusting nut	12 ± 2 N·m (107 ± 17 in-lb)
Center member attaching bolt	83 ± 12 N·m (61 ± 9 ft-lb)
Cover attaching bolt	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)	41 ± 4 N·m (30 ± 3 ft-lb)
Drive shaft nut	226 ± 29 N·m (167 ± 21 ft-lb)
Engine oil pan and transmission coupling bolt	35 ± 6 N·m (26 ± 4 ft-lb)
Front roll stopper bracket retainer nut	69 ± 10 N·m (51 ± 7 ft-lb)
Rear roll stopper bracket attaching bolt	90 ± 10 N·m (67 ± 7 ft-lb)
Rear roll stopper bracket retainer nut	69 ± 10 N·m (51 ± 7 ft-lb)
Flange nut (lower arm ball joint connection)	110 ± 10 N·m
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)
Transmission assembly upper part coupling bolt	73 ± 10 N·m (54 ± 7 ft-lb)
Transmission assembly lower part coupling bolt	88 ± 10 N·m (65 ± 7 ft-lb)
Transmission mount bracket attaching nut	83 ± 12 N·m (61 ± 9 ft-lb)
Transmission mount stopper attaching nut	83 ± 12 N·m (61 ± 9 ft-lb)
Transmission fluid drain plug	32 ± 2 N·m (23 ± 2 ft-lb)

SERVICE SPECIFICATIONS

M1231000300359

ITEM	STANDARD VALUE
Transmission fluid temperature sensor kΩ	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

ITEM	STANDARD VALUE
Line pressure kPa	980 – 1050
Resistance of damper control clutch 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
Resistance of reduction (RED) solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4
Stall speed r/min	2,100 – 2,600 r/min

LUBRICANT

M1231000400419

ITEM		SPECIFIED LUBRICANT	QUANTITY
Transmission fluid (litres)	F5A5A	MITSUBISHI ELC4 SP III	8.4