GROUP 23A

CVT

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WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

⚠ WARNING

- ***Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).***
- ***Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.***
- ***MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.***

NOTE
The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, driver's and passenger's (front) air bag modules, knee air bag module, side-airbag module, curtain air bag module, side impact sensors, seat belt pre-tensioners, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

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GENERAL INFORMATION

M1231200100155

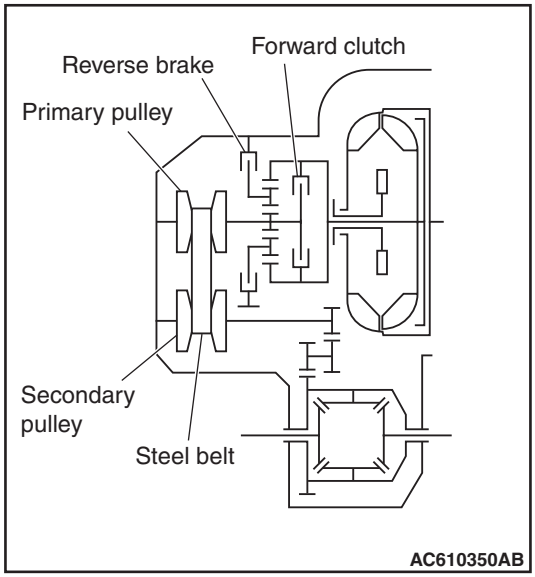
F1CJA model has been established.

Item		4B11	4B12
Transaxle model		F1CJA-2-B3W	F1CJA-1-B3X
Torque converter	Model	3-element, 1-stage, 2-phase	←
	Stall torque ratio	1.99	1.83
	Lock-up	Present	←
Transaxle type		Forward automatic continuously variable (steel belt-driven), reverse 1 speed	←
Pulley ratio	Forward	2.349 – 0.394	←
	Reverse	1.750	←
Shift position		P-R-N-D-L	P-R-N-D+6-speed sport mode (with the paddle shift)
Final reduction gear ratio		6.466	6.120
Control type		Electronically-controlled	←
Function	Shift control	Present	←
	Line pressure control	Present	←
	Select control	Present	←
	Lock-up control	Present	←
	Self-diagnosis function	Present	←
	Fail-safe function	Present	←
Speedometer gear		– (detected by the ABS sensor rotor)	←
Oil pump	Model	Vane-type pump	←
	Drive type	Driven by the engine, sprocket, and chain	←

TRANSAXLE

The transaxle consists of the torque converter and gear train. The three-element, one-stage, two-phase type torque converter with a built-in torque converter clutch has been adopted. The gear train of F1CJA transaxle consists of 1 set of multi-disc type clutches, 1 set of multi-disc type brakes, and 1 set of planetary gears which are composed of a sun gear, carrier, annulus gear, 2 sets of pulleys and 1 set of steel belts.

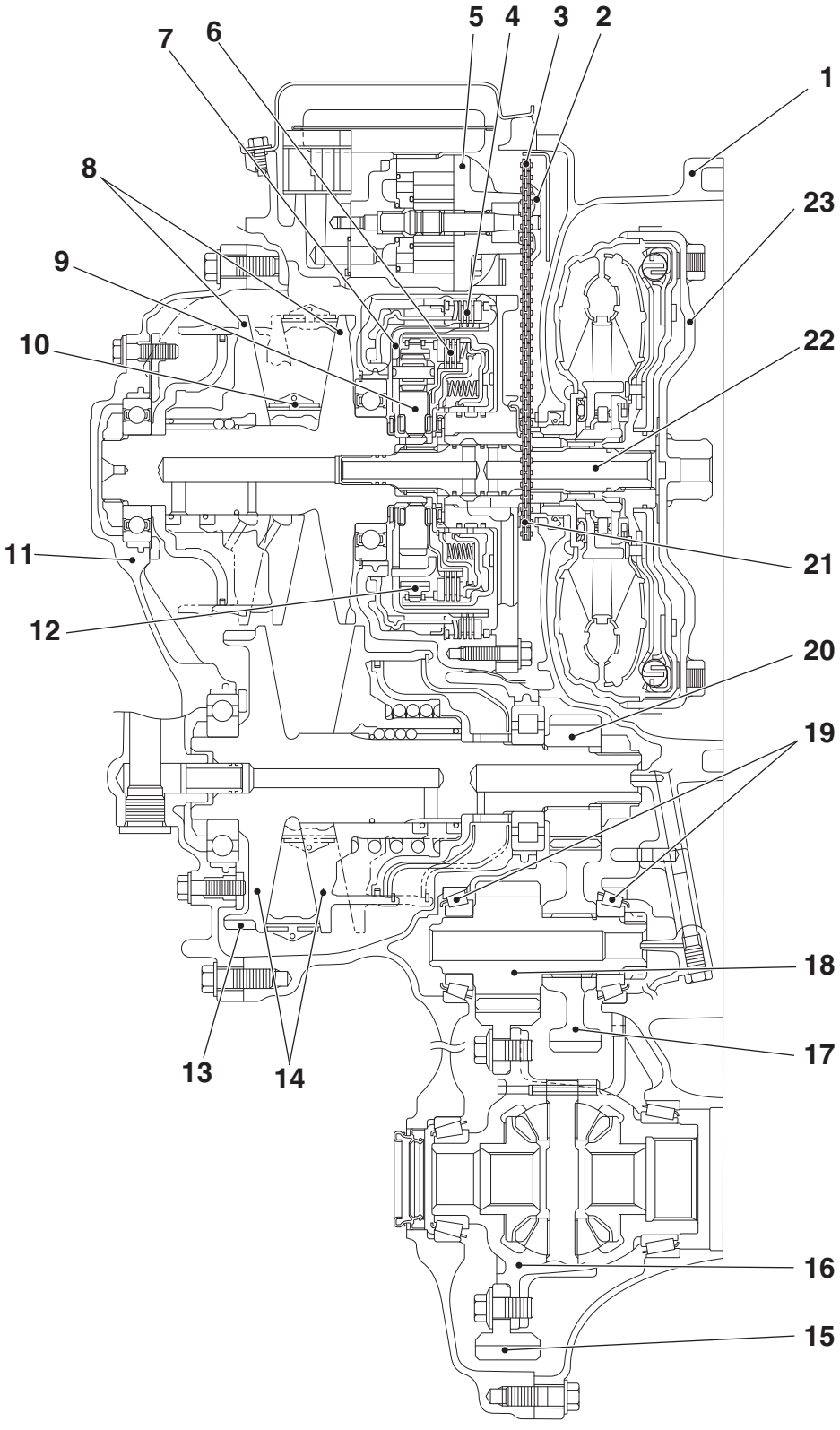
TRANSAXLE CONFIGURATION DRAWING



COMPONENTS AND FUNCTIONS

Component	Function
Forward clutch	Operates when moving forward and rotates the primary pulley normally.
Reverse brake	Operates when moving backward and rotates the primary pulley reversely via the planetary gear.
Primary pulley	Transfers the rotation from the planetary gear to the secondary pulley via the steel belt.
Steel belt	Transfers the rotation from the primary pulley to the secondary pulley.
Secondary pulley	Transfers the rotation from the primary pulley to the differential.

SECTIONAL VIEW



AC505738AB

1. Converter housing
2. Driven sprocket
3. Chain
4. Reverse brake
5. Oil pump
6. Forward clutch
7. Planet carrier
8. Primary pulley
9. Sun gear
10. Steel belt
11. Side cover

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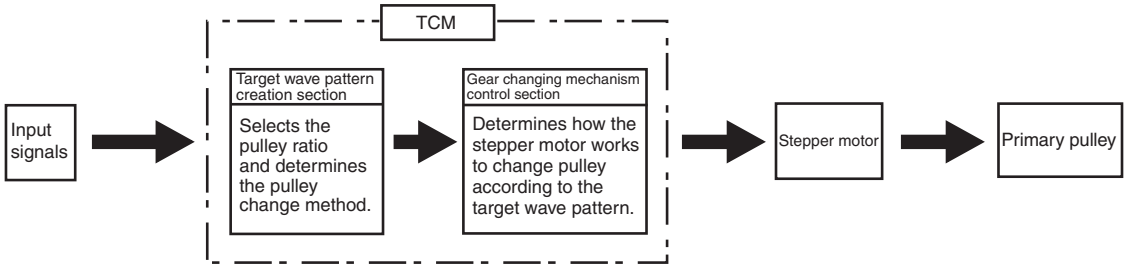
12. Internal gear
13. Parking gear
14. Secondary pulley
15. Final gear
16. Differential case
17. Idler gear
18. Reduction gear
19. Taper roller bearing
20. Output gear
21. Drive sprocket
22. Input shaft
23. Torque converter

ELECTRONICALLY-CONTROLLED SYSTEM

INVECS-III CONTROL

INVECS-III has been newly developed based on INVECS-II utilizing continuous variable characteristics of CVT.



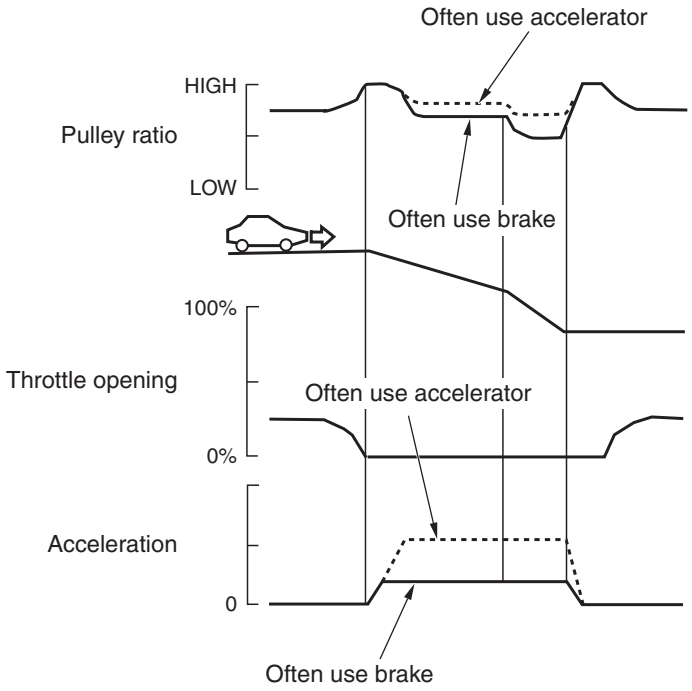
AC504721AB

To select the pulley ratio which can provide the driving force corresponding to the driver's intention and vehicle conditions, TCM selects the optimal pulley ratio and determines the shift strategy to obtain it by detecting the vehicle driving conditions such as the vehicle speed, accelerator angle. Then, it outputs the command to the stepper motor, controls in/out flow of the line pressure to/from the primary pulley, positions the movable pulley of the primary pulley, and controls the gear ratio.

ENGINE BRAKE FEATURE ON THE DESCENDING SLOPE

Pulley ratio is controlled to obtain the engine brake suitable for the driver's feelings.

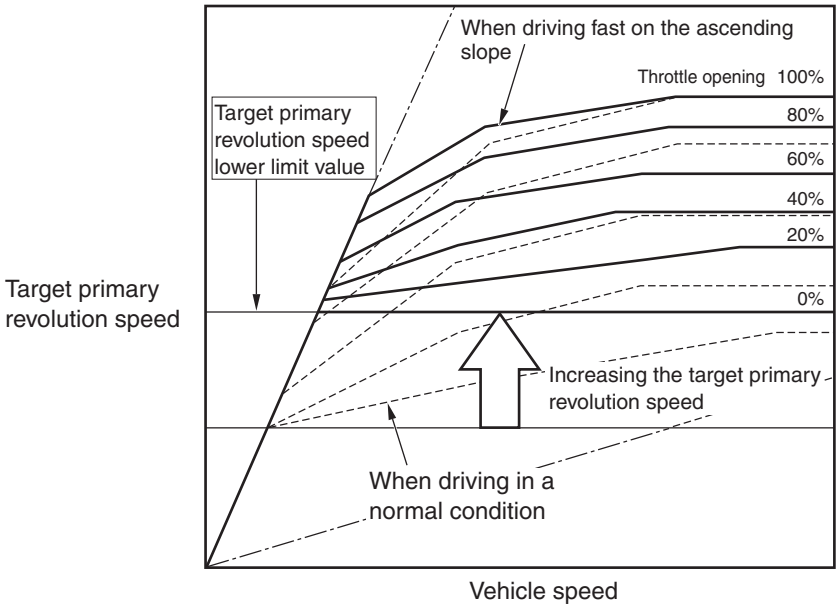
Engine brake learning feature on the descending slope



AC610382 AB

Learning compensation is made to meet the tastes of a driver by judging the amount of the engine brake from the application of the accelerator or the brake.

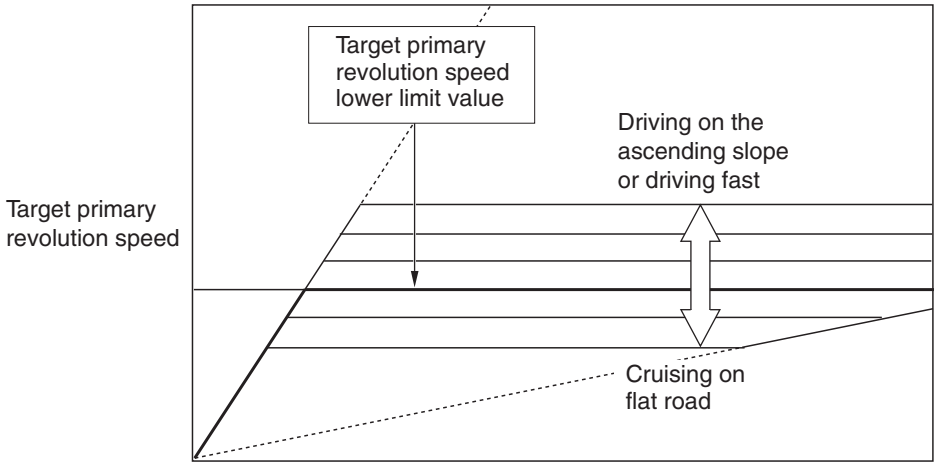
DRIVING FEATURE ON THE ASCENDING SLOPE



AC610384 AB

If the foot leaves the accelerator pedal during driving on the ascending slope (called lift foot), driving capability is secured by preventing excessive upshifting.

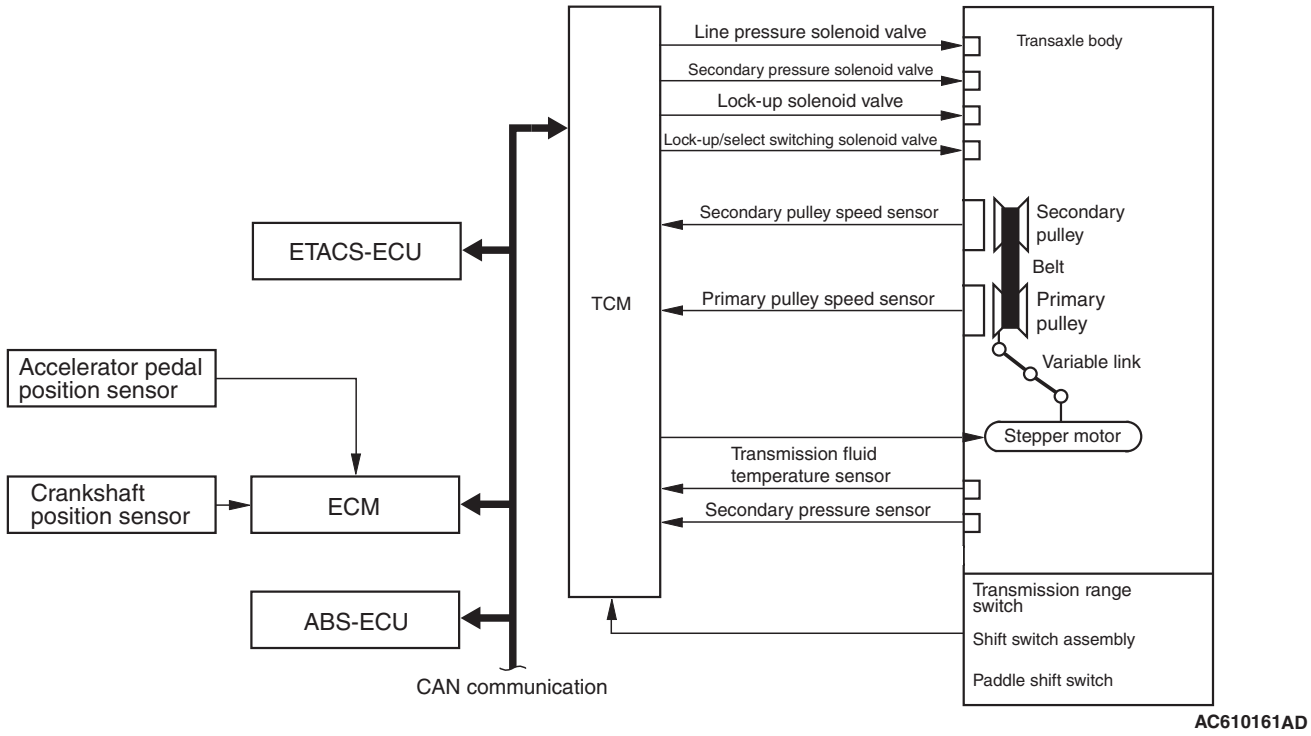
Learning feature corresponding to tastes and habits of drivers



AC610398 AB

Ratio patterns are continuously switched according to the driving method of a driver.

SYSTEM CONSTRUCTION DIAGRAM



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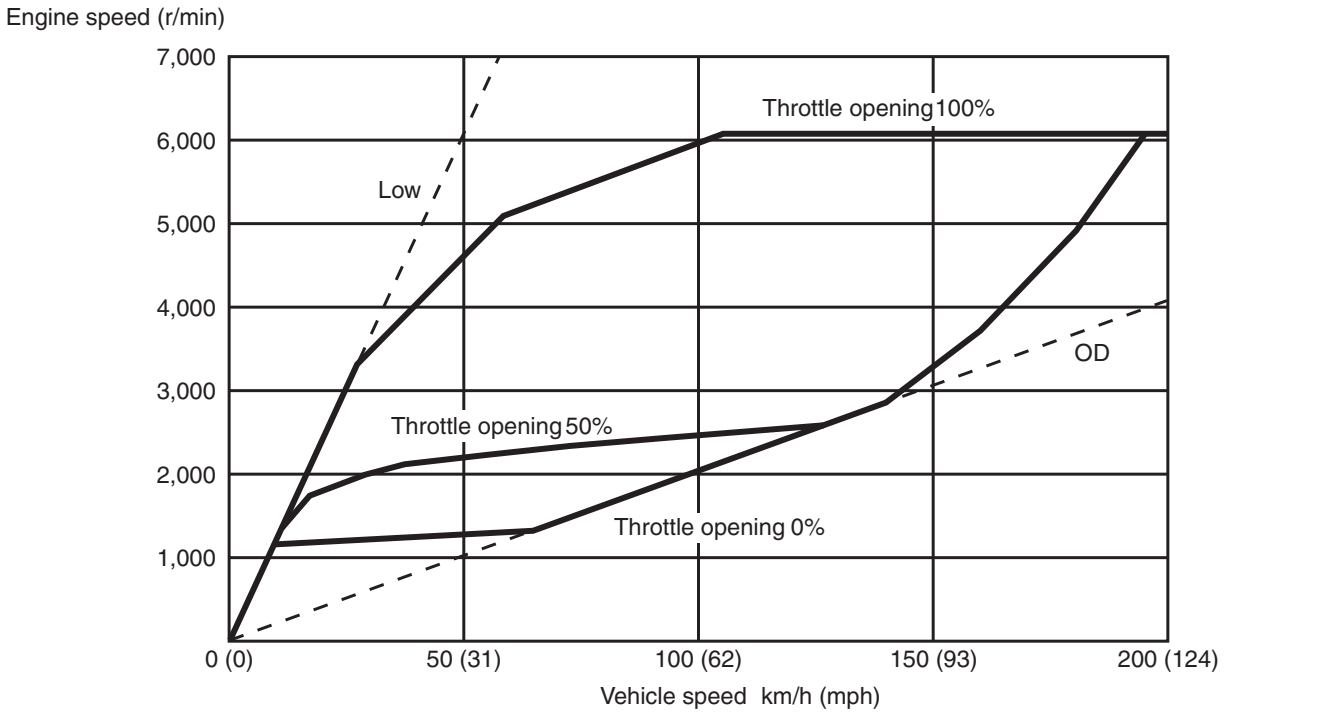
RATIO PATTERN

<2.0L ENGINE - D RANGE>



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The shift change is performed in the entire shift range from the lowest to the highest pulley ratio.

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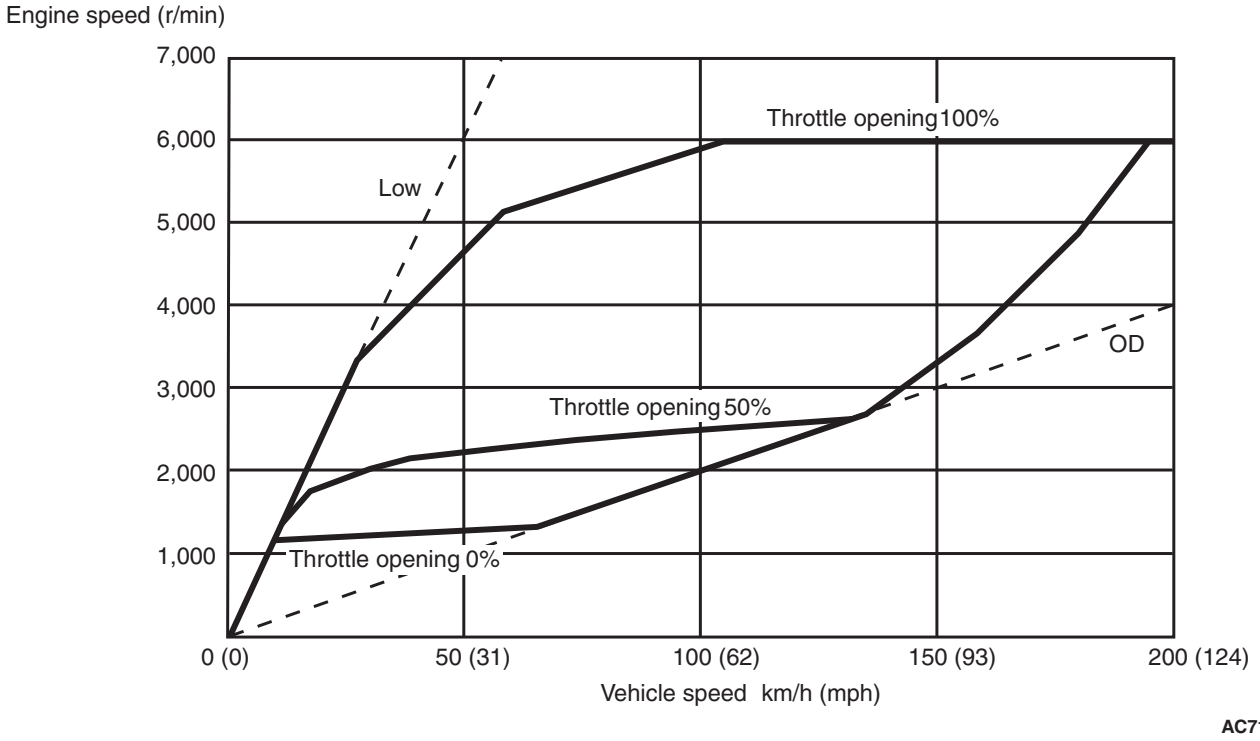
<2.4L ENGINE - D RANGE>



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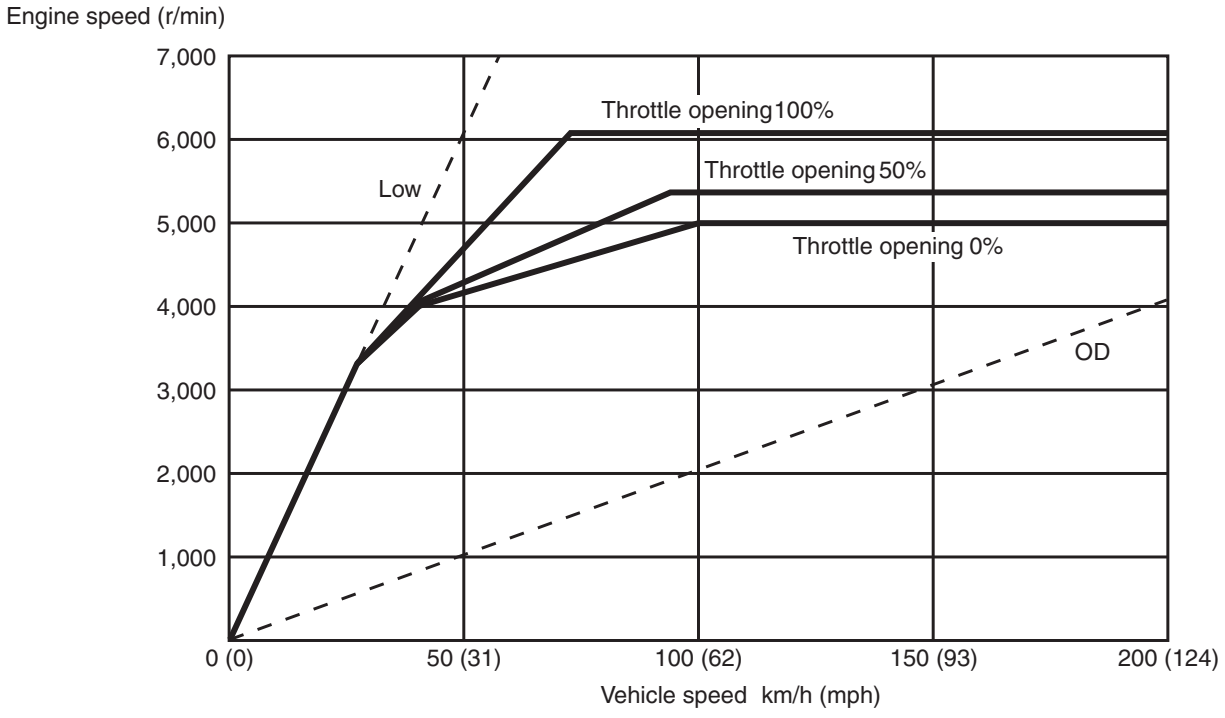
<L RANGE (VEHICLES WITHOUT SPORT MODE)>



AC611606AB

By limiting the shift range to the area around the lowest pulley ratio, the powerful driving force and engine brake is secured.

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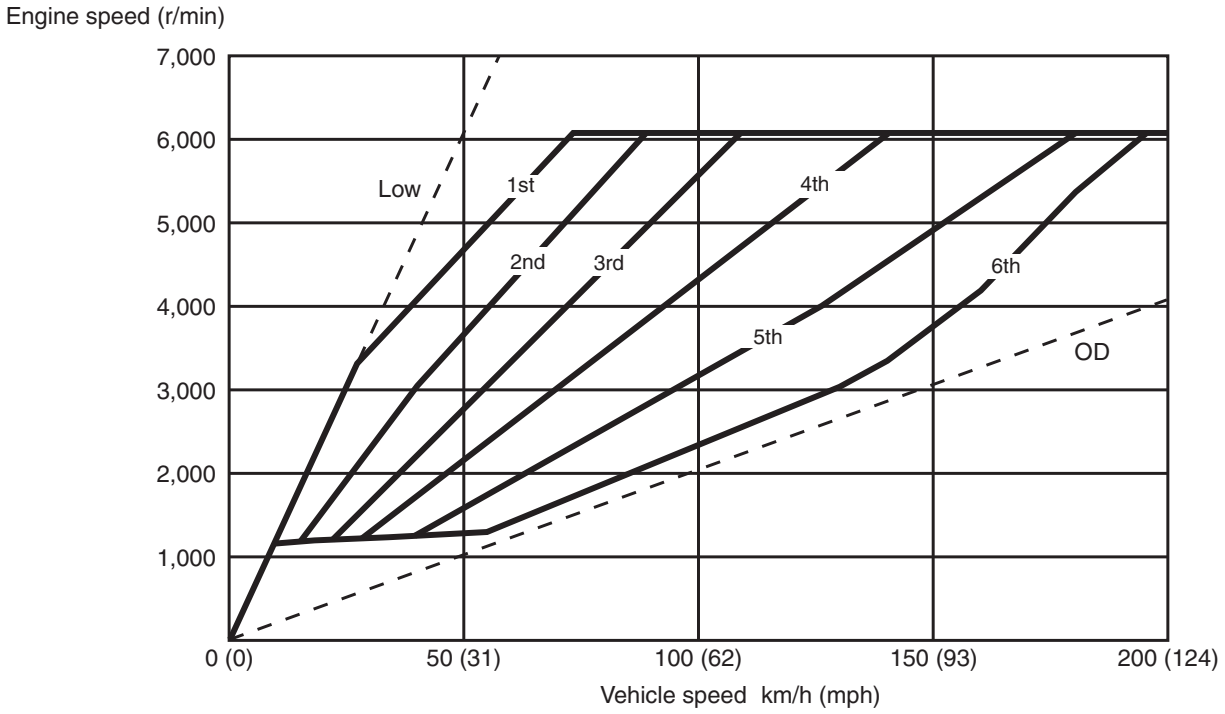
<SPORT MODE (VEHICLES WITH SPORT MODE)>

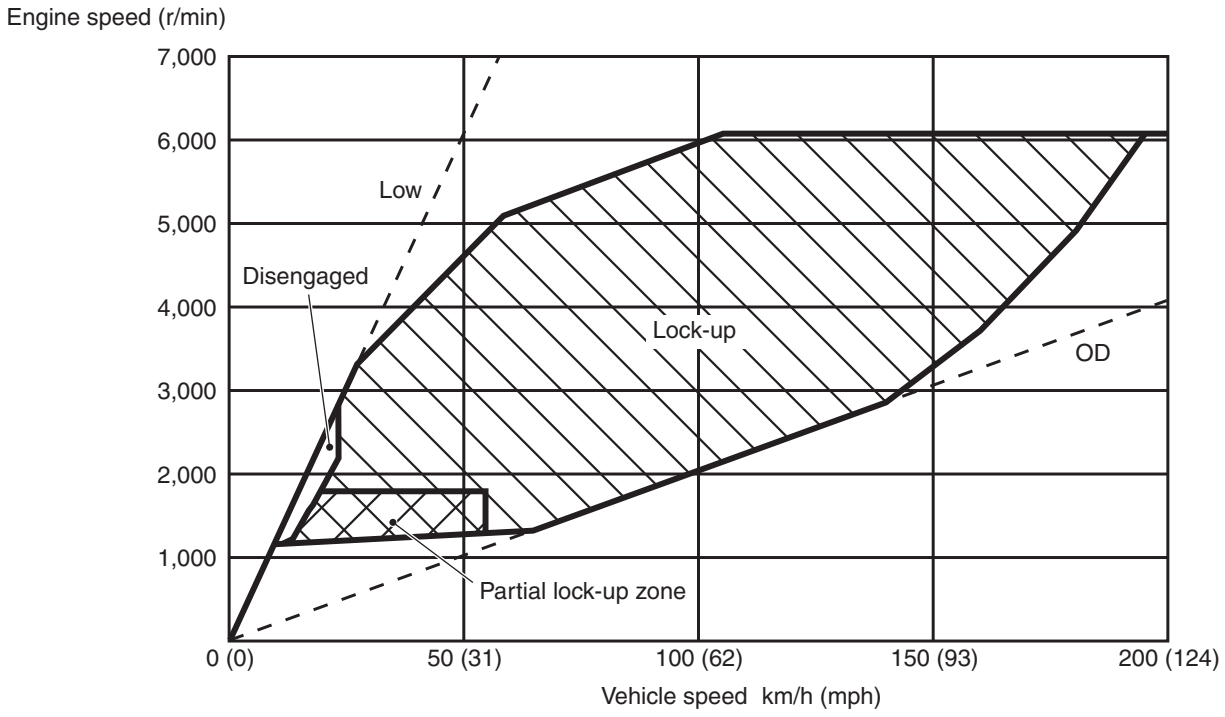


AC611607AB

When the sport mode is switched ON with the selector lever or paddle shift, the fixed shifting line is determined. The upshift/downshift operation enables to shift in steps according to the predetermined shifting line, providing M/T-like shifting. The 6-speed transmission which is suitable for sporty driving is adopted.

DIRECT CONTROL (TORQUE CONVERTER CLUTCH CONTROL)

<2.0L ENGINE>



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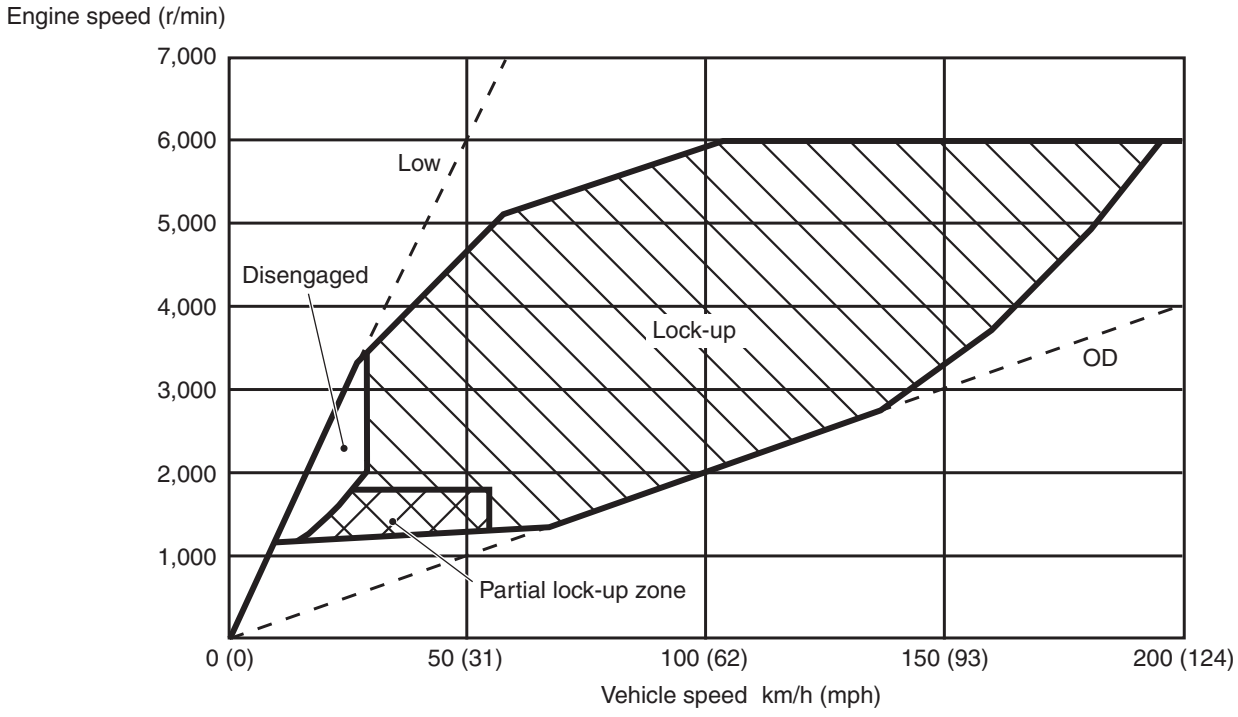
By carefully controlling the direct operating pressure depending on the driving conditions, the shock-free direct operation from low speed has been achieved.

<2.4L ENGINE>



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SERVICE SPECIFICATIONS

M1231200300416

Item		Standard value
Transmission fluid temperature sensor resistance kΩ	at 0°C (32°F)	Approximately 15.5
	at 20°C (68°F)	Approximately 6.5
	at 40°C (104°F)	Approximately 3.1
	at 60°C (140°F)	Approximately 1.6
	at 80°C (176°F)	Approximately 0.9
	at 100°C (212°F)	Approximately 0.5
Line pressure solenoid valve coil resistance [fluid temperature: 20°C (68°F)] Ω		Approximately 5.6 to 6.6
Secondary pressure solenoid valve coil resistance [fluid temperature: 20°C (68°F)] Ω		Approximately 5.6 to 6.6
Lockup/select switching solenoid valve coil resistance [fluid temperature: 20°C (68°F)] Ω		Approximately 25.5 to 29.3
Lockup solenoid valve coil resistance [fluid temperature: 20°C (68°F)] Ω		Approximately 5.6 to 6.6
Engine stall speed r/min	D range	2,400 – 2,900
	R range	2,400 – 2,900
Opening temperature of thermo valve °C (°F)		75 ± 1.5 (167 ± 2.7)
Full opening temperature of thermo valve °C (°F)		95 (203) or more
Amount of thermo valve lift when it is fully opened mm (in)		3 (0.12) or more

LUBRICANT

M1231200400424

Item	Specified lubricant	Quantity
Transmission fluid dm^3 (qt)	DIA QUEEN CVTF-J1	7.1 (7.50)

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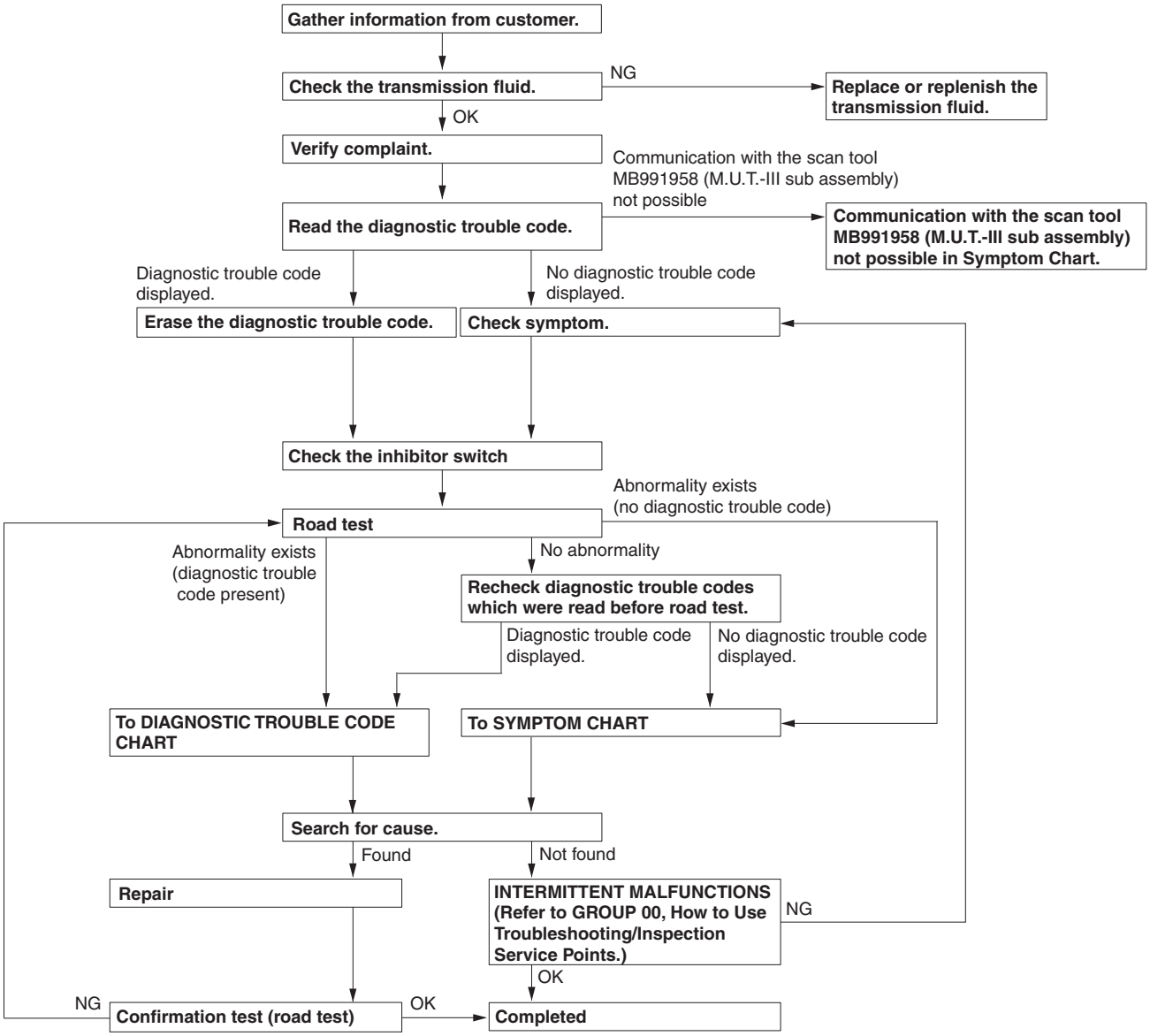
DIAGNOSIS

DIAGNOSTIC TROUBLESHOOTING FLOW

M1231213500227



AC807916

INTRODUCTION TO CVT DIAGNOSIS

M1231212300015

The CVT can exhibit any of the following symptoms: noise or vibration is generated, Transmission fluid leaks, the vehicle does not move forward or backward. The causes of these symptoms could come from: Incorrect mounting, the Transmission fluid may be low, or a component of the transaxle may be faulty.

The following items are suspected as causes for the INVECS-III troubles: malfunction of the TCM, the sensors, the switches, the harness or connectors.

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CVT DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1231207600010

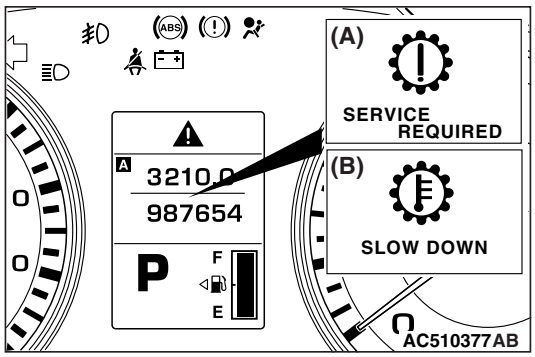
Use these steps to plan your diagnostic strategy. If you follow them carefully, you will find most CVT malfunctions.

1. Gather as much information as possible about the complaint from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any CVT Diagnostic Trouble Codes (DTCs).
4. If you can not verify the condition and there are no DTCs, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14.
5. If you can verify the condition but there are no DTCs, or the system can not communicate with scan tool, refer to the Symptom Chart P.23A-31.
6. If there is a DTC, record the number of the code, then erase the code from memory using scan tool.
7. Reconfirm the symptom with a Road Test.
8. If a DTC is set again, go to the Inspection Chart for Diagnostic Trouble Codes.
9. If a DTC is not set again, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14.
10. After repairs are completed, conduct a Road Test duplicating the complaint conditions to confirm the malfunction has been eliminated.

DIAGNOSTIC FUNCTION

M1231219000264

WARNING INDICATOR



When any malfunction occurs in the items related to the CVT system, which are described below, the symbol (A) continues being displayed in the information screen in the multi information display.
Check if the diagnosis code is set when the symbol (A) continues being displayed in the information screen in the multi information display.

NOTE: When the symbol (B) is displayed in the information screen in the multi information display, the transmission fluid temperature is high. (Symbol (B) is turned on when the fluid temperature is approximately 140 °C (284 °F) or higher and turned off automatically when the fluid temperature drops below approximately 137 °C (279 °F).)

ON-BOARD DIAGNOSTICS

The transaxle control module (TCM) monitors its input/output signals (some signals all the time and others under specified conditions). When an irregular signal is initially monitored, the TCM decides that a malfunction has occurred and records the occurrence as a diagnostic trouble code. There are 36 diagnostic items. The diagnostic results can be read with scan tool. Diagnostic trouble codes are kept in memory by direct battery feed. The codes are retained in memory even if the ignition switch is in the "LOCK" (OFF) position. DTCs are not erased even after the battery terminals and the TCM connector are disconnected. In addition, the diagnostic trouble code can also be erased by scan tool.

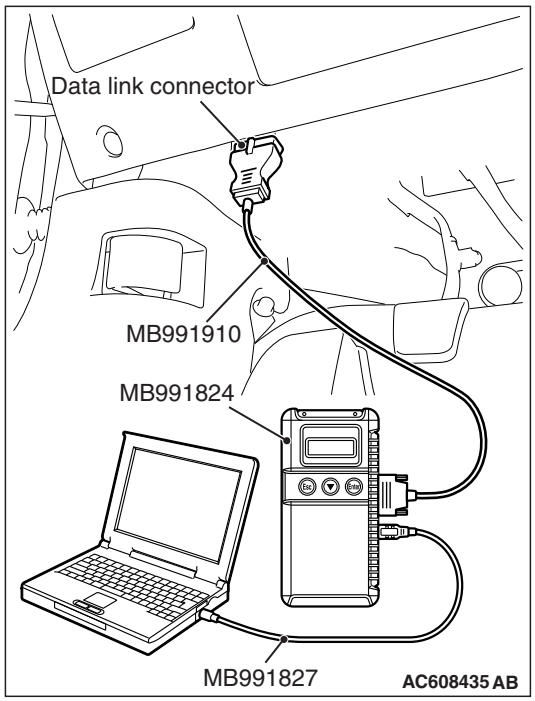
NOTE: If a sensor is disconnected when the ignition switch is in the "ON" position, a diagnostic trouble code is stored in memory. In this case, erase the DTC using scan tool.

The 36 diagnostic items are displayed in numeric order.

HOW TO CONNECT THE SCAN TOOL (M.U.T.-III)

Required Special Tools:

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



⚠ CAUTION

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

1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

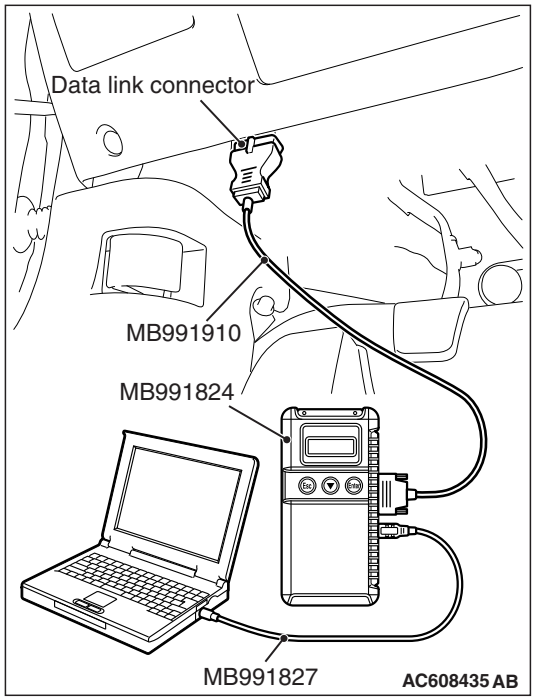
   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.
7. Start the M.U.T.-III system on the personal computer.

NOTE: Disconnecting scan tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

Required Special Tools:

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



⚠ CAUTION

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

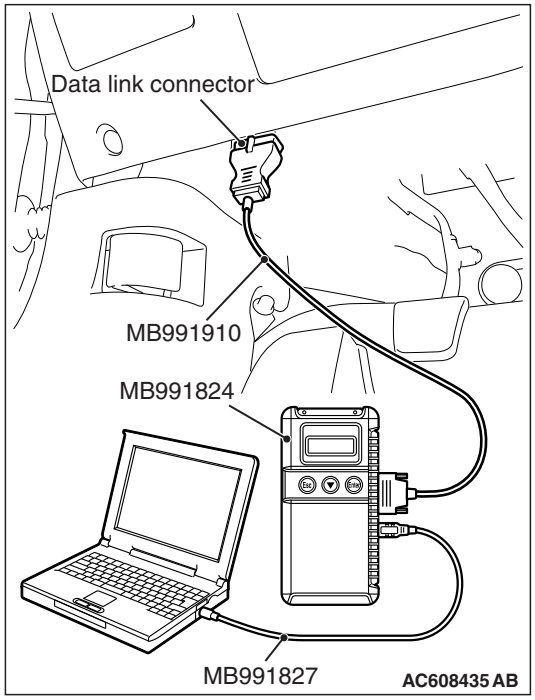
NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if scan tool MB991958 does not display.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System select" from the start-up screen.
4. Select "From 06 MY."
5. Make sure vehicle information is correct.
6. Select "AT/CVT/A-MT/TC-SST."
7. Select "Diagnostic Trouble Code" to read the DTC.
8. If a DTC is set, it is shown.
9. Choose "Erase DTCs" to erase the DTC.

HOW TO READ DATA LIST

Required Special Tools:

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



⚠ CAUTION

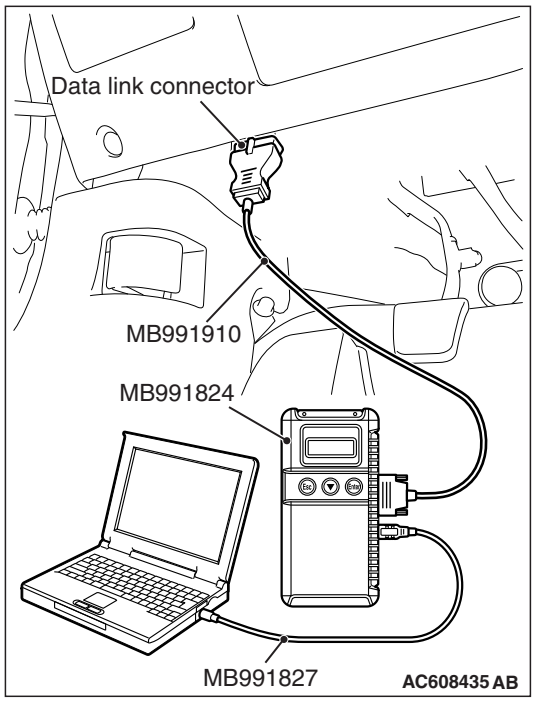
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System select" from the start-up screen.
4. Select "From 06 MY."
5. Make sure vehicle information is correct.
6. Select "AT/CVT/A-MT/TC-SST."
7. Select "Data List."
8. Choose an appropriate item and select the "OK" button.

HOW TO DIAGNOSE THE CAN BUS LINES

Required Special Tools:

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



⚠ CAUTION

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

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "CAN bus diagnosis" from the start-up screen.
4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they match, go to step 8.
   - If not, go to step 5.
5. Select the "view vehicle information" button.
6. Enter the vehicle information and select the "OK" button.
7. When the vehicle information is displayed, confirm again that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they match, go to step 8.
   - If not, go to step 5.
8. Select the "OK" button.
9. When the optional equipment screen is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.

HOW TO INITIALIZE CVT LEARNED VALUE

M1231202400237

PURPOSE

After the CVT assembly, engine assembly, and valve body assembly are replaced, their learned value must be initialized. The initialization procedure is as below.

INITIALIZATION PROCEDURE

1. Move the selector lever to the "P" range and turn the ignition switch to the "LOCK" (OFF) position. Then, connect M.U.T.-III to the diagnosis connector.
2. Turn the ignition switch to the "ON" position, and then move the selector lever to the "R" range.
3. Depress the accelerator pedal while depressing the brake pedal. (Engine is not runnning.) Using the MUT-III, execute the clear DTC function for the CVT ECU (even if no codes are set).

NOTE: Performing initialization of the learned value will also erase the diagnosis code.

LEARNING PROCEDURE FOR CVT HYDRAULIC CONTROL

M1231225500354

PURPOSE

After initialization, the TCM does not have any learned value. This may degrade the shifting operation quality. The learning procedure is described below.

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LEARNING PROCEDURES

Steps	Item		Contents
1	Learning procedure for engine idling		Refer to GROUP 00, Precautions before Service - Learning Procedures for Idling in MFI Engine P.00-43.
2	Fluid cooling		Park the vehicle in a cooler place, stop the engine, and leave the vehicle until the fluid temperature is lowered to the ambient temperature.
3	Learning in cold engine condition	(1) Fluid temperature measurement	Use M.U.T.-III to measure the fluid temperature. (Check that the fluid temperature is the same as the ambient temperature.)
		(2) Line pressure and shift control learning	Let the engine idle for 20 seconds in the "D" range.
		(3) Direct control learning	Run the vehicle at 40 – 50 km/h (25 – 31 mph) for 5 seconds in the "D" range with steady operation.
4	Learning in hot engine condition	(1) Fluid temperature adjustment	⚠ CAUTION **When the CVT fluid temperature does not increase to 80°C (176°F) in cold region, raise the fluid temperature to a maximum extent.** Raise the fluid temperature to 80°C (176°F).
		(2) Direct control learning	The same procedure as for "Learning in cold engine condition"

FAIL-SAFE FUNCTION/BACKUP FUNCTION

M1231208300067

If abnormality occurs in signals from various sensors, switches, or solenoids, this function allows controlling them with the minimum adverse effect to the driving performance. The following shows the fail-safe controls when an abnormal signal is input to TCM from each sensor.

Malfunctioning Item	Control Default During Malfunction
Secondary pulley speed sensor	Performs the shift control depending on the accelerator angle. Also, prohibits the sport mode and controls as the D range <Vehicles with sport mode>.
Primary pulley speed sensor	Performs the shift control depending on the accelerator angle and secondary pulley rotation (vehicle speed). Also, prohibits the sport mode and controls as the D range <Vehicles with sport mode>.
Transmission range switch	Controls as the D range.
Transmission fluid temperature sensor	Controls using the fixed value for the fail-safe function.
Secondary pressure sensor	Stops the secondary pressure feedback control and controls the line pressure using the fixed value for the fail-safe function. Also, suppresses the engine torque.
Line pressure solenoid valve	Switches the line pressure solenoid valve OFF to achieve the maximum line pressure.
Secondary pressure solenoid valve	Switches the secondary pressure solenoid valve OFF to achieve the maximum secondary pressure.
Lock-up solenoid valve	Switches the lock-up solenoid valve OFF to release lock-up.

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Malfunctioning Item	Control Default During Malfunction
Stepper motor	Switches all the coils A to D of the stepper motor OFF to retain the gear ratio just before the abnormality occurs.
Lock-up/select switching solenoid valve	Switches the lock-up/select switching solenoid valve OFF to release lock-up.
Back-up power supply	If the control memory back-up power supply from the battery is not supplied to TCM, limits the engine torque to protect the transmission main body. After the normal power is supplied, turning the key switch from "LOCK" (OFF) to "ON" once resumes the normal status.
Paddle shift switch <Vehicles with sport mode>	Prohibits the paddle shift operation.
Shift switch assembly <Vehicles with sport mode>	Prohibits the sport mode operation.

ROAD TEST

M1231207800490

Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
1	Ignition switch: LOCK (OFF)	Ignition switch (1) ON	Data list No.6 (1) Battery voltage	ECU power supply	–	Communication with the M.U.T.-III is not possible.

Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
2	Ignition switch: ON Engine: Stopped	Transmission range (1) P (2) R (3) N (4) D (5) L <Vehicles without sport mode>	Data list No.49 (1) P (2) R (3) N (4) D (5) L	Transmission range switch	P0705	Malfunction of transmission range switch
		Transmission range (1) P (2) R (3) N (4) D (5) L <Vehicles without sport mode> (6) Sport mode <Vehicles with sport mode>	Data list No.42 (1) ON (2) OFF (3) OFF (4) OFF (5) OFF (6) OFF			
			Data list No.43 (1) OFF (2) ON (3) OFF (4) OFF (5) OFF (6) OFF			
			Data list No.44 (1) OFF (2) OFF (3) ON (4) OFF (5) OFF (6) OFF			
			Data list No.45 (1) OFF (2) OFF (3) OFF (4) ON (5) OFF (6) OFF			
			Data list No.46 (1) OFF (2) OFF (3) OFF (4) OFF (5) ON (6) OFF			
			Data list No.47 (1) OFF (2) OFF (3) OFF (4) OFF (5) OFF (6) ON			
		Paddle shift lever position <Vehicles with sport mode> (1) Upshift (left side operation of the lever) and hold (2) Release the lever.	Data list No.54 (1) ON (2) OFF	Paddle shift switch	P0815, P0816	Malfunction of paddle shift switch assembly
		Paddle shift lever position <Vehicles with sport mode> (1) Downshift (right side operation of the lever) and hold (2) Release the lever.	Data list No.55 (1) ON (2) OFF			

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Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
2	Ignition switch: ON Engine: Stopped	Transmission range (1) D (2) Select sport mode (3) Upshift and hold (4) Downshift and hold	Data list No.51 (1) OFF (2) ON (3) ON (4) ON	Select switch	P0826	Malfunction of shift switch assembly
			Data list No.52 (1) OFF (2) OFF (3) ON (4) OFF	Shift switch (UP)		
			Data list No.53 (1) OFF (2) OFF (3) OFF (4) ON	Shift switch (DOWN)		
		Transmission range (1) P, N (2) 5 or more seconds have passed after the selector lever has been moved to the R or D position.	Data list No.36 (1) ON (2) OFF	Lockup/select switching solenoid valve	P1740	Malfunction of lockup/select switching solenoid valve
			Data list No.37 (1) ON (2) OFF			
3	Ignition switch: ON Engine: Stopped Transmission range: P	Accelerator pedal (1) Fully closed (2) Depressed (3) Fully opened	Data list No.13 (1) 0% (2) Gradually increases from (1). (3) 100%	APS	–	–
		Brake pedal (1) Depressed (2) Released	Data list No.50 (1) ON (2) OFF	Stoplight switch	P0703	Malfunction of stoplight switch
4	Engine warming up	Drive the vehicle for 15 minutes or more to raise the transmission fluid temperature to 45 – 100°C (113 – 212°F).	Data list No.5 Voltage drops gradually.	Transmission fluid temperature sensor	P0712, P0713	Malfunction of the transmission fluid temperature sensor
			Data list No.20 COUNT increases as the fluid temperature increases.			
5	Engine: Idling	• Transmission range: P • Accelerator pedal fully closed	Data list No.9 600 to 800 r/min	Engine speed	P0725	Abnormal engine speed

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Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
5	Engine: Idling	Transmission range: P → R → N → D	Should be no abnormal shift shocks Time delay when engaging should be within 2 seconds	Malfunction when starting	-	Shock is experienced during N to D and/or N to R shifting operation
					-	Vehicle creeps in the N range
		Transmission range: N	Data list No.4 0.5 – 3.0 V	Secondary pressure sensor	P0840	Malfunction of secondary pressure sensor
			Data list No.32 0.45 – 0.75 A	Line pressure solenoid valve	P0745	Malfunction of line pressure solenoid valve
			Data list No.34 0.45 – 0.75 V	Secondary pressure solenoid valve	P0778	Malfunction of secondary pressure solenoid valve

Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
6	Transmission range: D	Running	Data list No.1 Nearly the same as the tachometer display	Primary speed sensor	P0715	Malfunction of primary speed sensor
			Data list No.2 Nearly the same as the tachometer display	Secondary speed sensor	P0720	Malfunction of secondary speed sensor
			Data list Nos.38, 39, 40, 41 ON/OFF switches alternately.	Stepper motor	P1777, P1778	Malfunction of stepper motor
		Stop the vehicle, and then accelerate to 60 km/h (37 mph) on a level road.	Data list No.30 0 – 0.7 A	Lockup solenoid valve	P0740, P0741	Malfunction of lockup solenoid valve

Steps	Conditions for test/operation	Test/Operation	Judgement standard	Check item	Diagnosis code number	Reference for checking procedure in case of error
7	<Vehicles without sport mode> Transmission range: D	Accelerate to 80 km/h (50 mph).	Data list Nos.9, 13, 22 The ratio points correspond with the scan tool display and the tachometer, throttle position and vehicle speed, which are shown in the ratio pattern	Poor acceleration or incomplete shifting operation	–	Poor acceleration or incomplete shifting operation
	<Vehicles with sport mode> Transmission range: Sport mode	Transmission range (1) Stopped while idling the engine. (2) Driving at a constant speed of 30 km/h (19 mph) in 2nd gear (3) Driving at a constant speed of 35 km/h (22 mph) in 3rd gear (4) Driving at a constant speed of 40 km/h (25 mph) in 4th gear (5) Driving at a constant speed of 50 km/h (31 mph) in 5th gear (6) Driving at a constant speed of 60 km/h (37 mph) in 6th gear	Data list No.60 (1) 1st (2) 2nd (3) 3rd (4) 4th (5) 5th (6) 6th			

TORQUE CONVERTER STALL TEST

M1231205400162

This test measures the maximum engine speed at the time the torque converter stalls with the selector lever in the "D" or "R" position. With this test, the holding abilities of the clutch and brake that are incorporated in the transaxle can be checked.

⚠ ***WARNING***

For safety, operators must not stand in front of and at the rear of the vehicle during this test.

1. Check the transmission fluid level, transmission fluid temperature, and engine coolant temperature.
   - Transmission fluid level: In the "HOT" mark on the dipstick
   - Transmission fluid temperature: 70 – 80°C (158 – 176°F)
   - Engine coolant temperature: 80 – 100°C (176 – 212°F)

   NOTE: Use M.U.T.-III. to measure the transmission fluid temperature.
2. Raise the vehicle.
3. Pull the parking brake lever, and then fully depress the brake pedal.
4. Start the engine.

⚠ **CAUTION**

- **Do not maintain the WOT condition for 5 seconds or longer.**
- **When continuing the stall test, make sure that the fluid temperature does not exceed 80°C (176°F). If the transmission fluid temperature exceeds 80°C (176°F), run the engine at around 1,000 r/min for 1 minute or longer to lower the transmission fluid temperature to 80°C (176°F) or less.**

5. Move the selector lever to the "D" range and fully depress the accelerator pedal. Quickly read the maximum engine speed at this time.

   Standard value – Stall speed: 2,400 – 2,900 r/min
6. Move the selector lever to the "R" range, and then repeat the previous step.

   Standard value – Stall speed: 2,400 – 2,900 r/min

JUDGEMENT OF TORQUE CONVERTER STALL TEST RESULTS

1. Stall speed is high when selector lever is in both "D" and "R" ranges.
   - Malfunction of the torque converter (Torque converter and input shaft spline are slipping)
   - Malfunction of the valve body
   - Damaged wiring harness and connectors
   - Malfunction of TCM
2. Stall speed is high only when selector lever is in the "D" range.
   - Forward clutch is slipping
3. Stall speed is high only when the selector lever is in the "R" range.
   - Reverse brake is slipping
4. Stall speed is low when selector lever is in both "D" and "R" ranges.
   - Malfunction of the torque converter
   - Line pressure is low
   - Low engine power

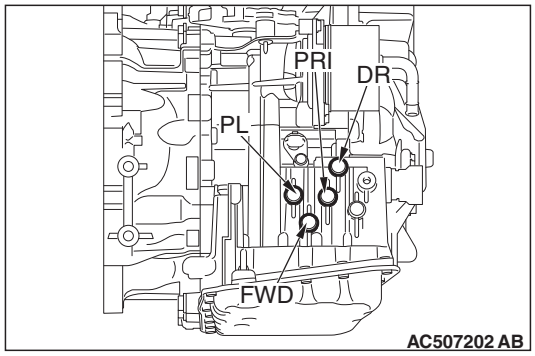
HYDRAULIC PRESSURE TEST

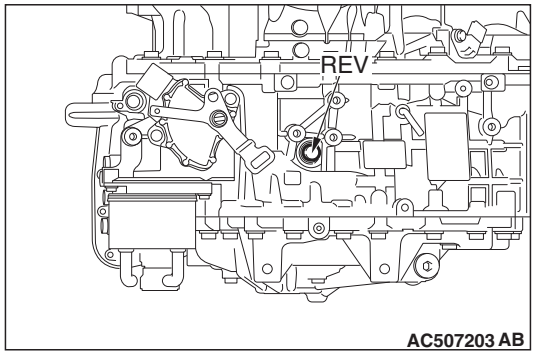
M1231205500329

⚠ CAUTION

The transmission fluid temperature should be between 70 – 80°C (158 – 176°F) during the test.

1. Check the transmission fluid level and temperature. Check engine coolant temperature.
   - Transmission fluid level: "HOT" mark on the dipstick
   - Transmission fluid temperature: 70 – 80°C (158 – 176°F)
   - Engine coolant temperature: 80 – 100°C (176 – 212°F)
2. Raise the vehicle so that the wheels are free to turn.





3. Connect the special tools (3.0 MPa (427 psi) oil pressure gauge [MD998330] and joint [MD998331, MB992127]) to each pressure discharge port.

   NOTE:
   DR: Torque converter output pressure port
   PRI: Primary pressure port
   PL: Line pressure port
   FWD: Forward clutch pressure port
   REV: Reverse brake pressure port
4. Restart the engine.
5. Check that there are no leaks around the special tool port adapters.

⚠ WARNING
For safety, operators must not stand in front of and at the rear of the vehicle during this test.

6. Measure the hydraulic pressure at each port under the conditions given in the standard hydraulic pressure table, and check that the measured values are within the standard value ranges.
7. If the pressure is not within the standard value, stop the engine and refer to the hydraulic pressure test diagnosis table.
8. Remove the O-ring from the port plug and replace it.
9. Remove the special tool, and install the plugs to the hydraulic pressure ports.
10. Start the engine and check that there are no leaks around the plugs.

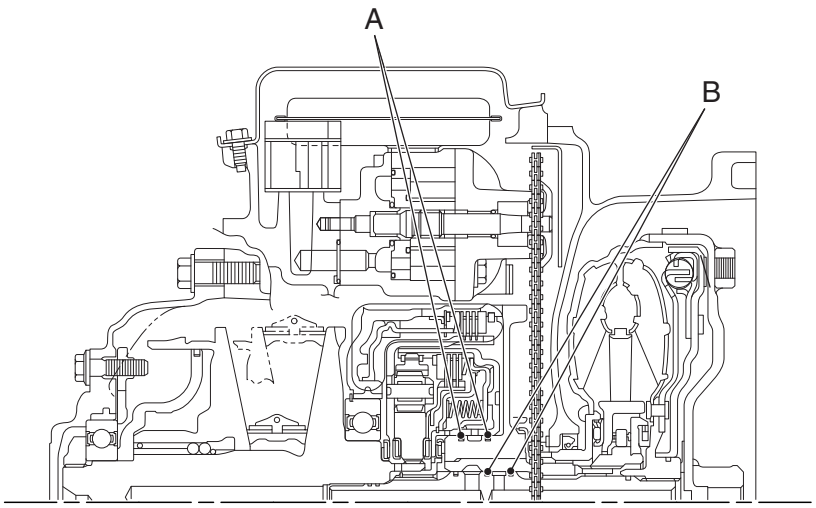
Standard hydraulic pressure table

Measuring conditions		**Standard hydraulic pressure MPa (psi)**				
Transmission range	Engine speed	Forward clutch pressure [Pressure at FWD]	Reverse brake pressure [Pressure at REV]	Primary pressure [Pressure at PRI]	Line pressure [Pressure at PL]	Torque converter [Pressure at DR]
P	Idling	0 (0)	0 (0)	0.1 – 1.5 (15 – 218)	0.5 – 1.5 (73 – 218)	0.1 – 1.0 (15 – 145)
R		0 (0)	0.5 – 1.0 (73 – 145)	0.1 – 1.5 (15 – 218)	0.5 – 1.5 (73 – 218)	0.1 – 1.0 (15 – 145)
N		0 (0)	0 (0)	0.1 – 1.5 (15 – 218)	0.5 – 1.5 (73 – 218)	0.1 – 1.0 (15 – 145)
D		0.5 – 1.0 (73 – 145)	0 (0)	0.1 – 1.5 (15 – 218)	0.5 – 1.5 (73 – 218)	0.1 – 1.0 (15 – 145)
L <Vehicles without sport mode>		0.5 – 1.0 (73 – 145)	0 (0)	0.1 – 1.5 (15 – 218)	0.5 – 1.5 (73 – 218)	0.1 – 1.0 (15 – 145)

Hydraulic pressure test diagnosis table

Symptom	Faulty part
Hydraulic pressure is high at all measuring points.	Incorrect measuring method
Hydraulic pressure is low at all measuring points.	Malfunction of oil pump Clogged oil strainer Clogged oil cooler Malfunction in valve body assembly Improper installation of valve body assembly
Only forward clutch pressure is abnormal.	Malfunction in valve body assembly Improper installation of valve body assembly Faulty seal ring A
Only reverse brake pressure is abnormal.	Malfunction in valve body assembly Improper installation of valve body assembly
Only primary pressure is abnormal	Malfunction in valve body assembly Improper installation of valve body assembly
Only line pressure is abnormal.	Malfunction in valve body assembly Improper installation of valve body assembly
Only torque converter output pressure is abnormal	Malfunction in valve body assembly Improper installation of valve body assembly Malfunction of torque converter Faulty seal ring B

Seal ring location



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DIAGNOSIS CODE CHART

M1231207900594

⚠ CAUTION

During diagnosis, a diagnosis code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

Diagnosis code No.	Diagnostic item	Reference page
P0703	Malfunction of stoplight switch	P.23A-32
P0705	Malfunction of transmission range switch	P.23A-37
P0710	Malfunction of the transmission fluid temperature sensor (open, short)	P.23A-37
P0711	Malfunction of the transmission fluid temperature sensor	P.23A-37
P0712*	Malfunction of the transmission fluid temperature sensor (short)	P.23A-44
P0713*	Malfunction of the transmission fluid temperature sensor (open)	
P0715	Malfunction of primary pulley speed sensor	P.23A-49
P0720	Malfunction of secondary pulley speed sensor	P.23A-54
P0725	Malfunction of engine speed	P.23A-58
P0740	Malfunction of lockup solenoid valve	P.23A-61
P0741	Abnormality in lockup function	P.23A-64
P0745	Malfunction of line pressure solenoid valve	P.23A-66
P0746	Abnormality in hydraulic control system function	P.23A-69
P0776	Abnormality in secondary pressure solenoid valve function	P.23A-71
P0778	Malfunction of secondary pressure solenoid valve	P.23A-72
P0815	Malfunction of paddle shift up switch <Vehicles with sport mode>	P.23A-75
P0816	Malfunction of paddle shift down switch <Vehicles with sport mode>	P.23A-77
P0826	Malfunction of sport mode shift switch <Vehicles with sport mode>	P.23A-78
P0840	Malfunction of secondary pressure sensor	P.23A-80
P0841	Abnormality in line pressure sensor function	P.23A-84
P0868	Secondary pressure drop	P.23A-85
P0882	Malfunction of system power supply (Low)	P.23A-88
P0883	Malfunction of system power supply (High)	
P1637	Malfunction of memory backup	P.23A-90
P1706	Malfunction of throttle signal	P.23A-92
P1710	Malfunction of vehicle speed signal	P.23A-94
P1723	Abnormality in speed sensor system function	P.23A-95
P1740	Malfunction of lockup/select switching solenoid valve	P.23A-98
P1745	Monitoring of percentage change in gear ratio	P.23A-101
P1773	Malfunction of ABS	P.23A-103

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Diagnosis code No.	Diagnostic item	Reference page
P1777	Malfunction of stepper motor	P.23A-103
P1778	Abnormality in stepper motor function	P.23A-107
P1902	Malfunction of engine system	P.23A-107
U0001	Malfunction of CAN communication circuit	P.23A-108
U0100	CAN time-out error (Engine)	P.23A-110
U0121	CAN time-out error (ABS)	P.23A-112
U0141	CAN time-out error (ETACS)	P.23A-113

*NOTE: *: When using general scan tool.*

TROUBLE SYMPTOM CHART

M1231208000516

⚠ CAUTION

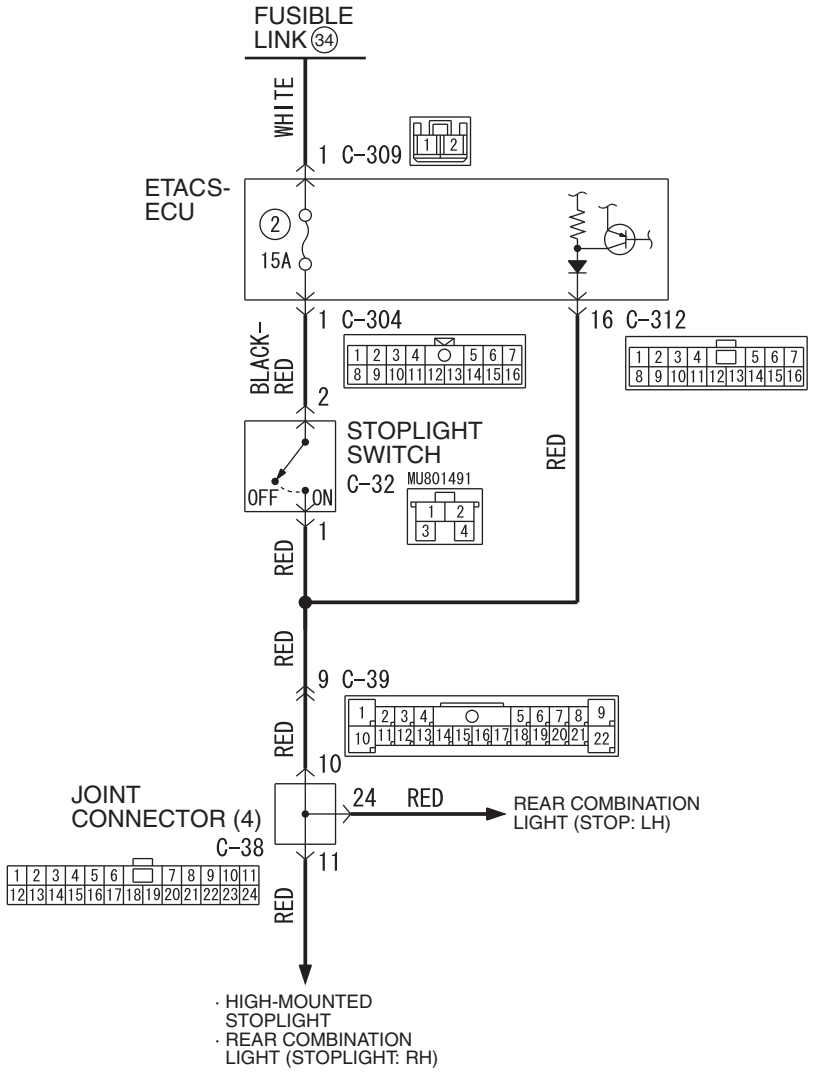
During diagnosis, a diagnosis code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

Trouble symptom	Inspection procedure number	Reference page
TCM cannot communicate with M.U.T.-III.	1	P.23A-114
Vehicle creeps in the N range.	2	P.23A-116
Shock is experienced during N to D and/or N to R shifting operation.	3	P.23A-117
Poor acceleration or incomplete shifting operation.	4	P.23A-117
Cannot be changed in sport mode. <Vehicles with sport mode>	5	P.23A-118
Cannot be changed with paddle shift. <Vehicles with sport mode>	6	P.23A-121
The fluid temperature warning lamp illuminates too frequently.	7	P.23A-123

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC P0703: Malfunction of Stoplight Switch

STOPLIGHT SWITCH SYSTEM CIRCUIT



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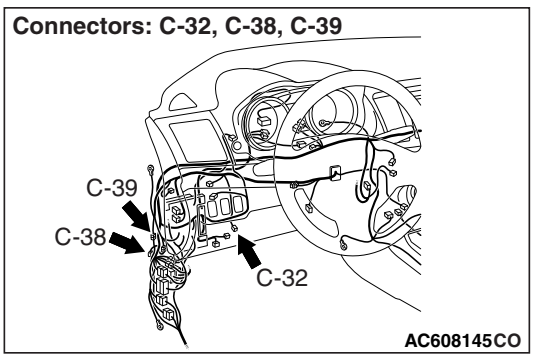

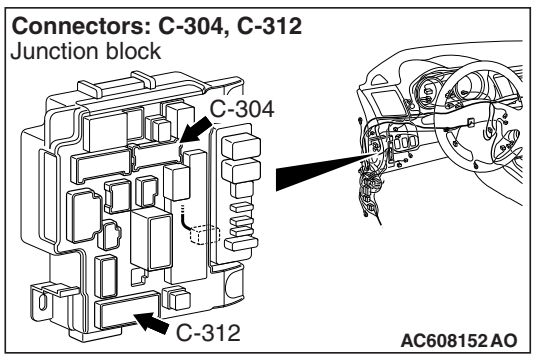

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DIAGNOSTIC FUNCTION

TCM detects malfunction using the stoplight switch signal sent from the ETACS-ECU.

DESCRIPTIONS OF MONITOR METHODS

- Drive the vehicle at 30 km/h (19 mph) or more for 10 seconds, and then turn the ignition switch to the "LOCK" (OFF) position. In this sequential operation, no variation has been found in the stoplight switch input signal in two consecutive times.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

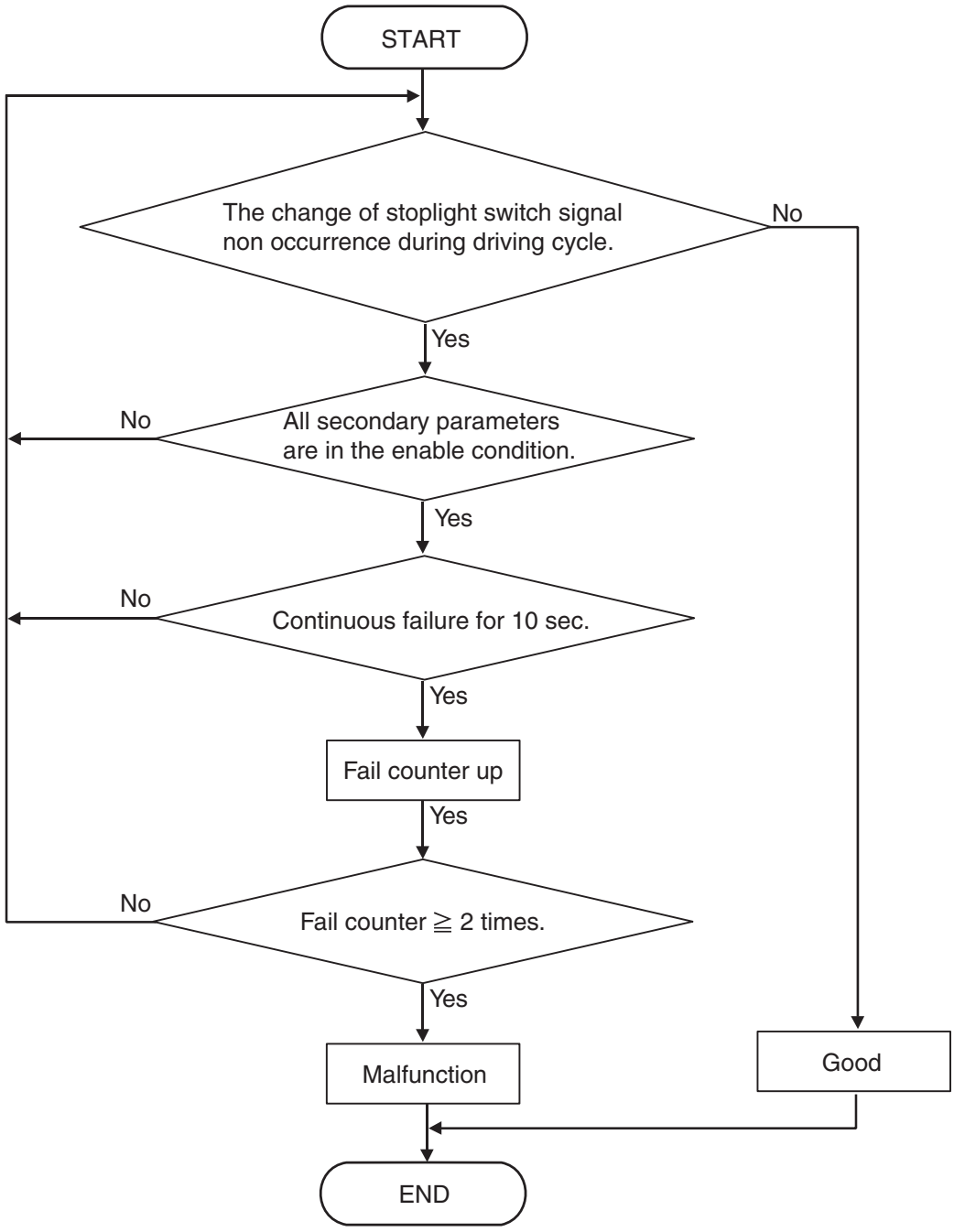
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Vehicle speed: 30 km/h (19 mph) or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- The change of stoplight switch signal during driving cycle: no occurrence (10 seconds × 2 times).

OBD-II DRIVE CYCLE PATTERN

Drive the vehicle for 10 seconds or more at 30 km/h (19 mph) or higher (2 drive cycle)

PROBABLE CAUSES

- Malfunction of the CAN bus
- Malfunction of the stoplight switch
- Damaged wiring harness and connectors
- Malfunction of TCM
- Malfunction of ETACS-ECU

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DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Troubleshooting – Diagnosis Code Chart P.54C-17).

STEP 2. M.U.T.-III data list
Item 50: Brake switch

OK: The service data changes in response to the brake operation.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 3.

STEP 3. Check the following connector:
- C-304 ETACS-ECU connector
- C-312 ETACS-ECU connector
- C-32 Stoplight switch connector

Check the contact status of the terminals.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Stoplight Switch Check
Refer to GROUP 35A, Brake Pedal P.35A-34.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the stoplight switch.

STEP 5. Check for open circuit in the wiring harness between the stoplight switch connector and the ETACS-ECU connector.
Between C-32 Stoplight switch connector (terminal No.2) and C-304 ETACS-ECU harness-side connector (terminal No.1)

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. Check for open circuit or short to ground in wiring harness between the ETACS-ECU connector and the joint connector (4)
Between C-312 ETACS-ECU harness-side connector (terminal No.16) and C-38 joint connector (4) (terminal No.10)

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair the wiring harness.

STEP 7. Check for open circuit in wiring harness between the stoplight switch connector and the joint connector (4)
Between C-32 stoplight switch connector (terminal No.1) and C-38 joint connector (4) (terminal No.10)

Q: Is the check result normal?

YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace the ETACS-ECU, and then go to Step 9.

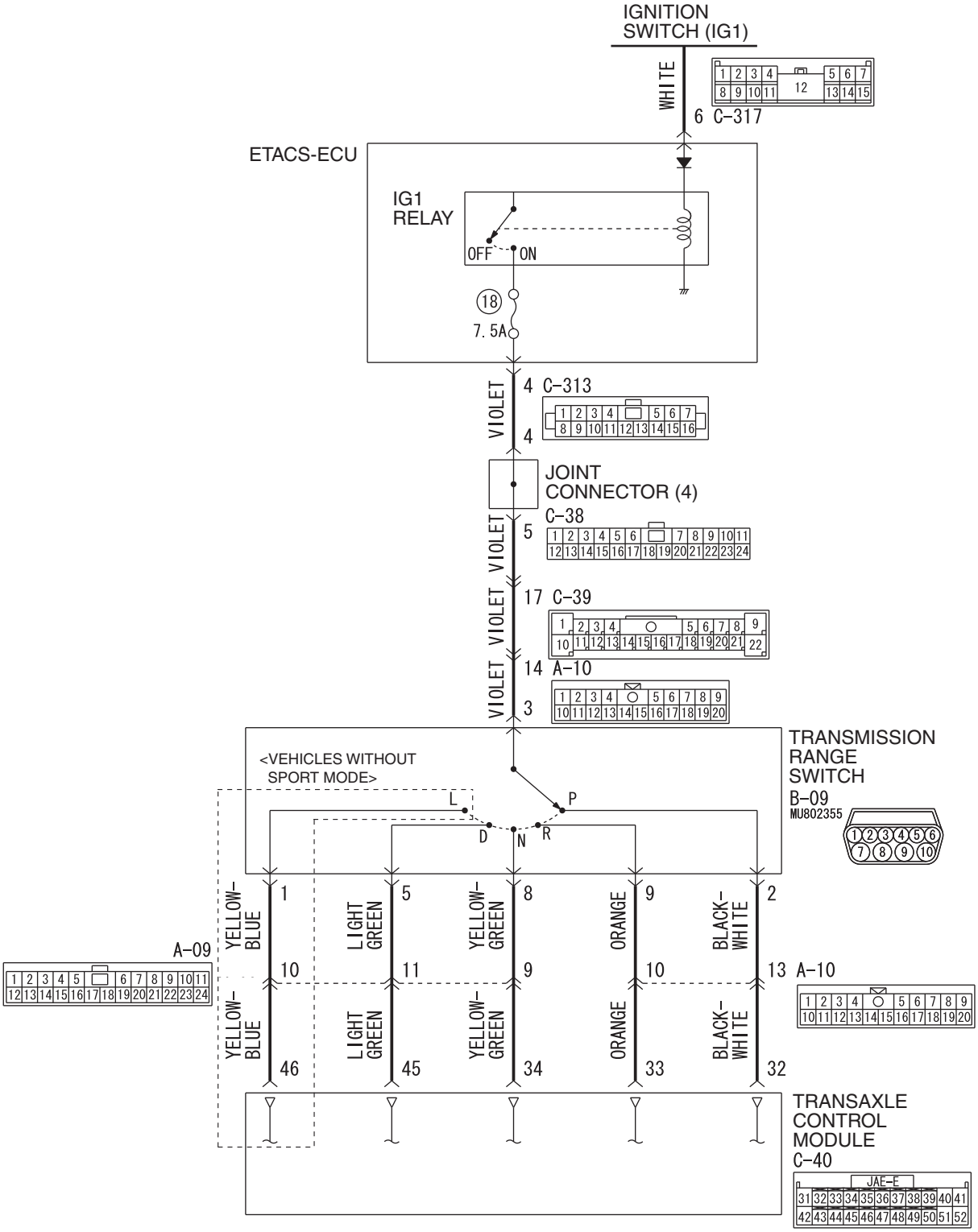
STEP 9. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0705: Malfunction of Transmission Range Switch

TRANSMISSION RANGE SWITCH SYSTEM CIRCUIT



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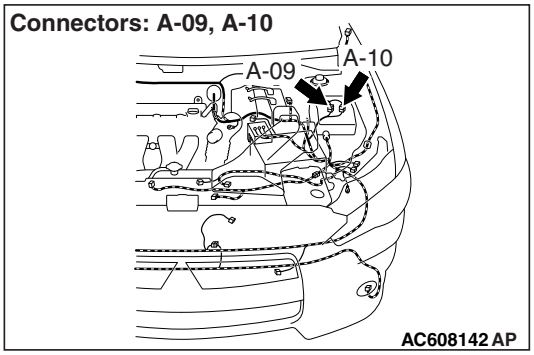
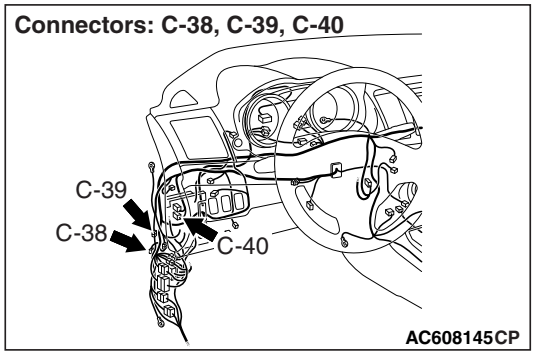
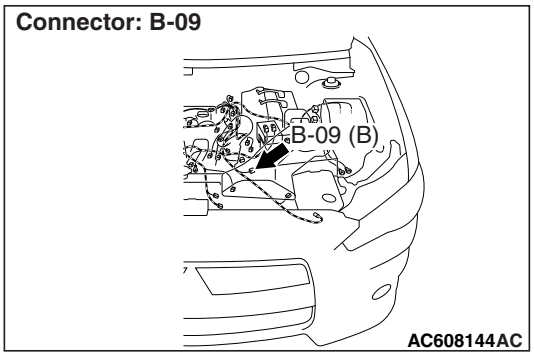
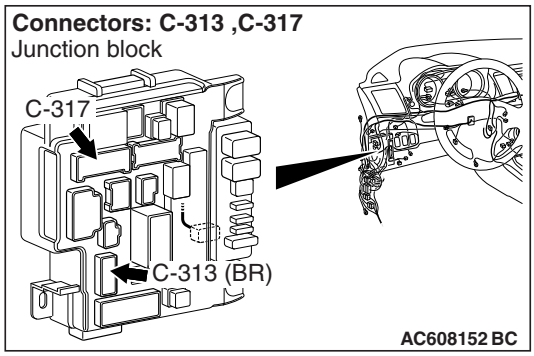








DIAGNOSTIC FUNCTION

TCM monitors the signal from the transmission range switch, and determines if the abnormal input is present or not.

DESCRIPTIONS OF MONITOR METHODS

- TCM does not detects the inhibitor switch input signal for 5 seconds when the vehicle speed is 1 km/h (0.6 mph) or more for 10 seconds continuously.
- TCM detects the multiple inputs from the transmission range switch for 2 seconds.

MONITOR EXECUTION

- Vehicle speed (no-transmission range switch signal input):1km/h (0.6 mph) or more for 10 seconds continuously
- Vehicle speed (transmission range switch signal multiple input) : No conditions
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

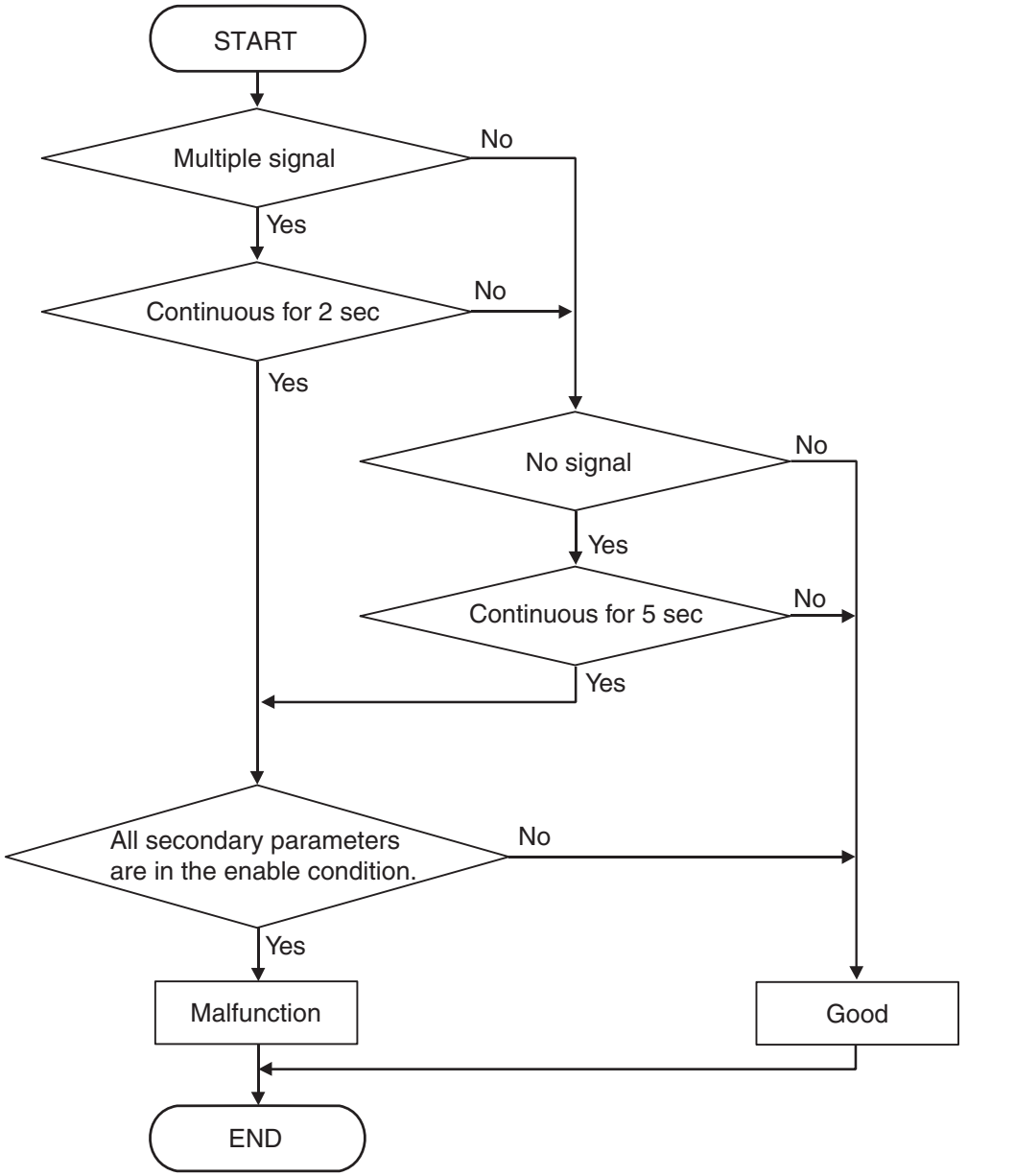
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0715: Malfunction of primary pulley speed sensor
- P0720: Malfunction of secondary pulley speed sensor
- P0725: Malfunction of engine speed
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P1706: Malfunction of throttle signal

Sensor (The sensor below is determined to be normal)

- Primary pulley speed sensor
- Secondary pulley speed sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Vehicle speed over 1 km/h (0.6 mph): 10 seconds or more.
- Throttle position sensor voltage: 1.37 volts or more.
- Engine speed: 450 r/min or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Transmission range switch: multiple signal. (2 seconds)
- Transmission range switch: no signal. (5 seconds)

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of the transmission range switch
- Improper adjustment of transaxle control cable
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
Item 49: Transmission range switch
Check that the service data changes when the selector lever is moved to all ranges.

OK: The service data changes in response to the selector lever operation.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:
- B-09 transmission range switch connector
- C-40 TCM connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit in wiring harness between the ETACS-ECU connector and the transmission range switch connector
Between the C-313 ETACS-ECU connector (terminal No.4) and the B-09 transmission range switch connector (terminal No.3)

NOTE: Prior to the wiring harness inspection, check the intermediate connectors C-39 and A-10, and repair that if necessary.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Check for open circuit in the wiring harness between the transmission range switch connector and the TCM connector
- Between B-09 transmission range switch connector (terminal No.2) and C-40 TCM connector (terminal No.32)
- Between B-09 transmission range switch connector (terminal No.5) and C-40 TCM connector (terminal No.45)
- Between B-09 transmission range switch connector (terminal No.8) and C-40 TCM connector (terminal No.34)
- Between B-09 transmission range switch connector (terminal No.9) and C-40 TCM connector (terminal No.33)
- Between B-09 transmission range switch connector (terminal No.1) and C-40 TCM connector (terminal No.46) <Vehicles without sport mode>

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Transmission range switch and control cable adjustment
Refer to P.23A-141.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Adjust the transmission range switch and control cable.

STEP 6. Transmission range switch continuity check
Refer to P.23A-141.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Replace the transmission range switch.

STEP 7. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0711: Malfunction of Transmission Fluid Temperature Sensor

DIAGNOSTIC FUNCTION

TCM conducts fault detection by monitoring the terminal voltage of the transmission fluid temperature sensor.

DESCRIPTIONS OF MONITOR METHODS

- Field A : Transmission fluid temperature is less than -20°C (-4°F)
  Field B : Transmission fluid temperature is -20°C (-4°F) or more and less than 0°C (32°F)
  Field C : Transmission fluid temperature is 0°C (32°F) or more and less than 20°C (68°F)
  When the transmission fluid temperature is kept at one of fields A, B and C above for 10 minutes.

MONITOR EXECUTION

- transmission range:D
- Vehicle speed : 10 km (6.2 mph) or more
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

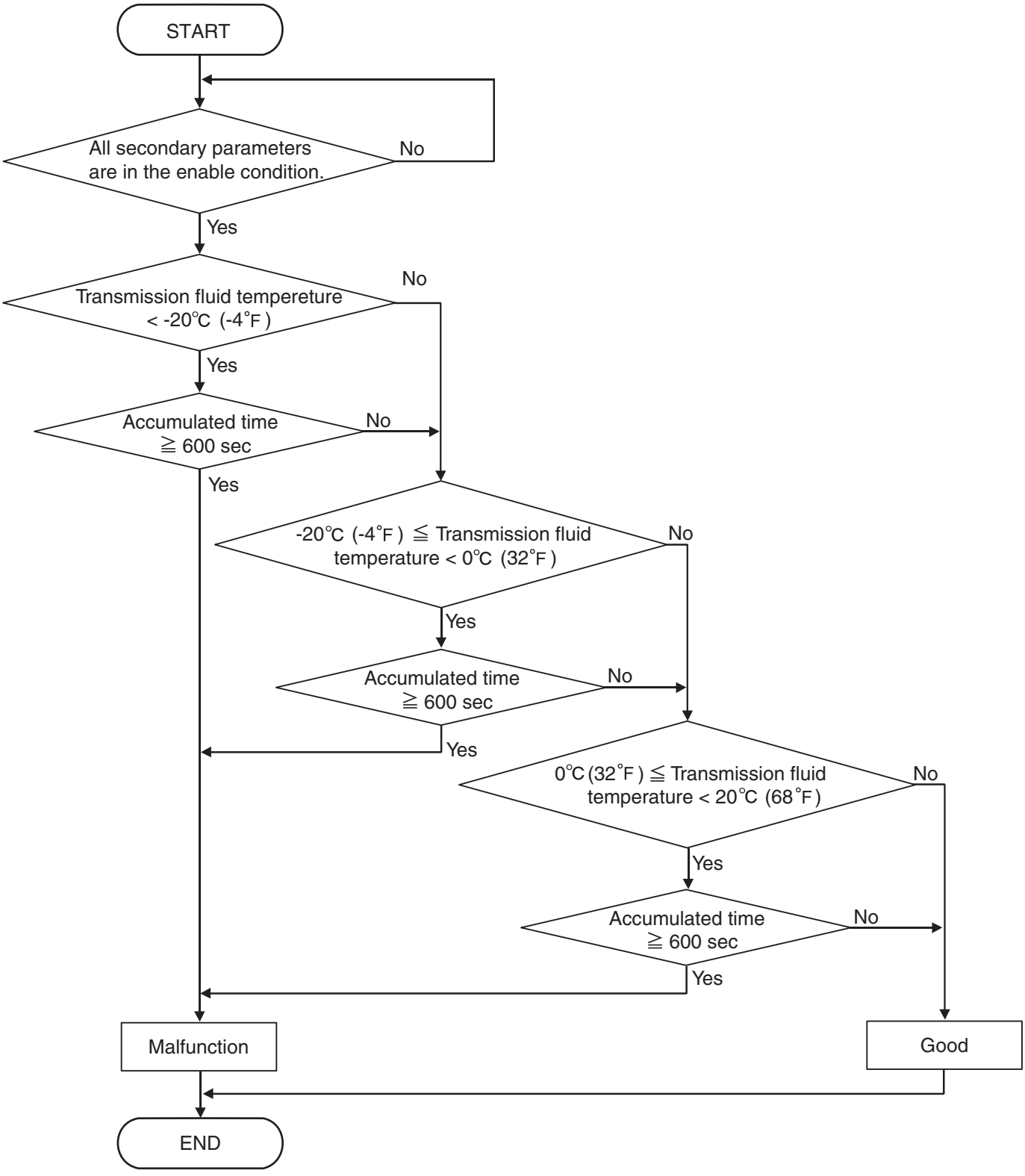
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- Not applicable

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Vehicle speed: 10 km/h (6.2 mph) or more.
- Throttle position sensor voltage: 1.37 V or more.
- Engine speed: 450 r/min or more.

TSB Revision

Judgment Criteria

- Transmission fluid temperature is less than -20°C (-4°F) for 600 seconds or more
- Transmission fluid temperature is -20°C (-4°F) or more and less than 0°C (32°F)for 600 seconds or more
- Transmission fluid temperature is 0°C (32°F) or more and less than 20°C (68°F)for 600 seconds or more

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 20 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of transmission fluid temperature sensor
- Malfunction of transmission fluid cooler piping and oil pump
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Transmission fluid cooler piping and oil pump check

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the failure sections.

STEP 2. Transmission fluid temperature sensor check

Refer to P.23A-144.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the valve body assembly.

STEP 3. Symptom recheck after erasing diagnosis code

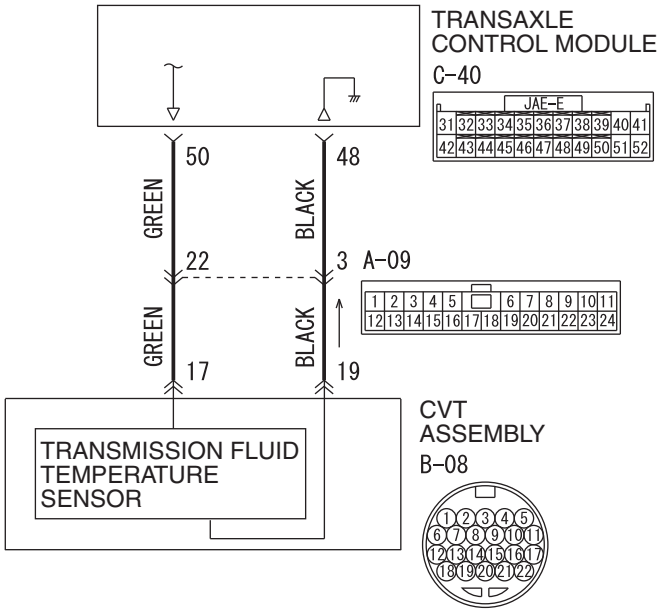
Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0710: Malfunction of Transmission Fluid Temperature Sensor
DTC P0712*: Malfunction of Transmission Fluid Temperature Sensor (Short)
DTC P0713*: Malfunction of Transmission Fluid Temperature Sensor (Open)

NOTE: When using general scan tool.

TRANSMISSION FLUID TEMPERATURE SENSOR SYSTEM CIRCUIT



AC803256
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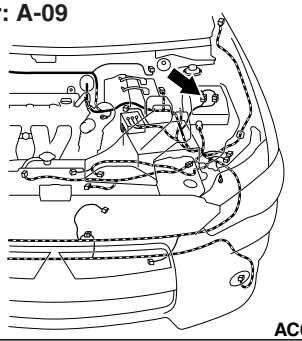
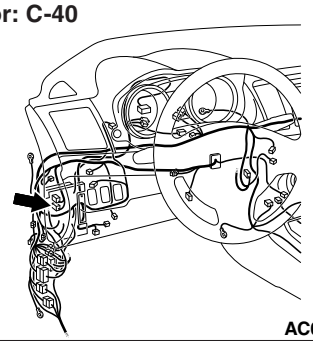
Connector: A-09



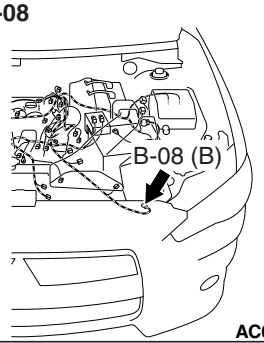
AC608142AN

Connector: C-40



AC608145BV

Connector: B-08



AC608144AD

DIAGNOSTIC FUNCTION

TCM conducts fault detection by monitoring the terminal voltage of the transmission fluid temperature sensor.

- <P0710, P0712>: If transmission fluid temperature equals or exceeds specified value, TCM judges that transmission fluid temperature sensor has a failure.

TSB Revision

- <P0710, P0713>: If transmission fluid temperature is below specified value even after test driving for more than the specified period, the TCM judges that the transmission fluid temperature sensor has a failure.

DESCRIPTIONS OF MONITOR METHODS <P0710, P0712>

- TCM detects the fluid temperature 180°C (356°F) or more for 5 seconds.

MONITOR EXECUTION <P0710, P0712>

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR) <P0710, P0712>

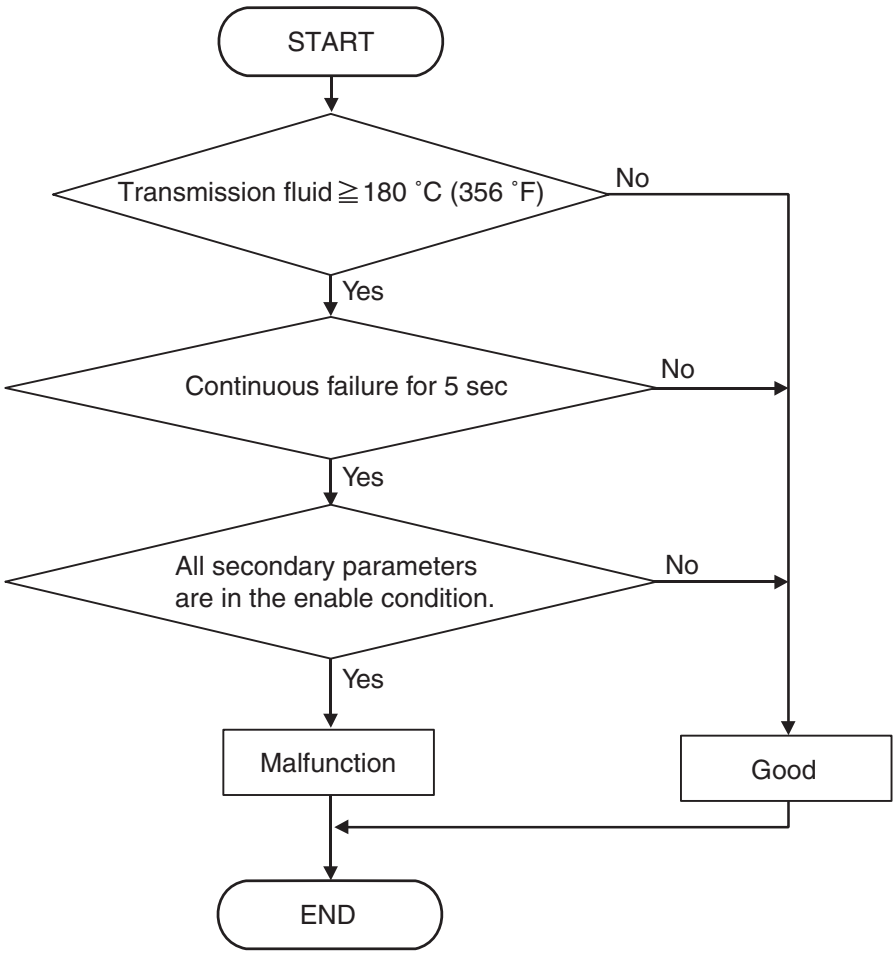
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence) <P0710, P0712>



AC803636

DTC SET CONDITIONS <P0710, P0712>

Check Conditions

- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Value of temperature of transmission fluid: 180°C (356°F) or more. (5 seconds)

TSB Revision

OBD-II DRIVE CYCLE PATTERN <P0710, P0712>

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

DESCRIPTIONS OF MONITOR METHODS <P0710, P0713>

- TCM detects the fluid temperature –40°C (–40°F) or less for five seconds.

MONITOR EXECUTION <P0710, P0713>

- Vehicle speed 10 km/h or more has been detected during 1 drive cycle

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR) <P0710, P0713>

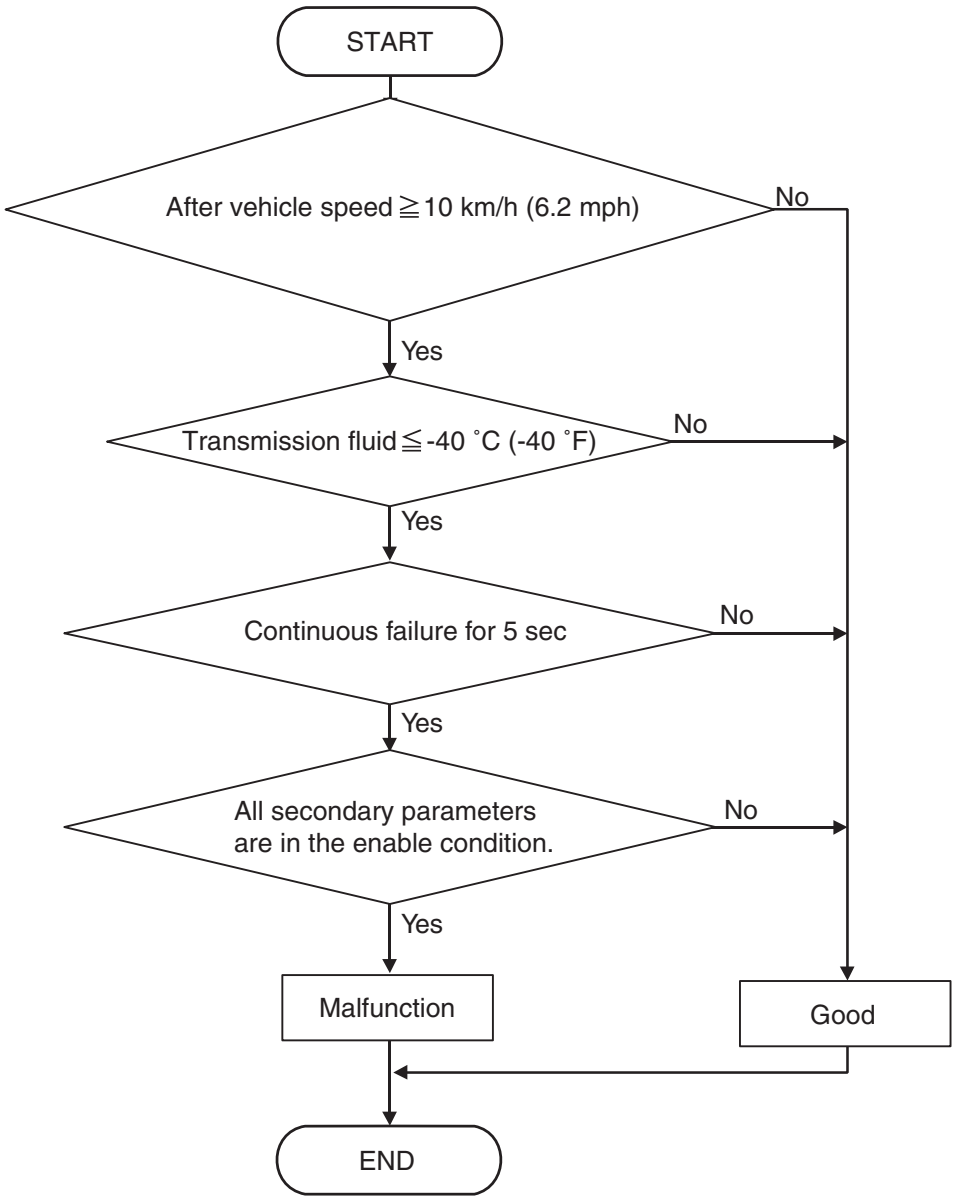
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence) <P0710, P0713>



AC710008

DTC SET CONDITIONS <P0710, P0713>

Check Conditions

- After vehicle speed: 10 km/h (6.2 mph) or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Value of temperature of transmission fluid: –40°C (-40°F) or less. (5 seconds)

OBD-II DRIVE CYCLE PATTERN <P0710, P0713>

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of the valve body assembly (Faulty transmission fluid temperature sensor)
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
Item 5: Transmission fluid temperature sensor signal (Refer to Data List Reference Table P.23A-125).

Q: Is the check result normal?
YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:
- B-08 Transmission assembly connector
- C-40 TCM connector
- A-09 Intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the CVT assembly connector and the TCM connector
Between B-08 CVT assembly connector (terminal No.17) and C-40 TCM connector (terminal No.50)

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Check for open circuit in the wiring harness between the CVT assembly connector and the TCM connector
Between B-08 CVT assembly connector (terminal No.19) and C-40 TCM connector (terminal No.48)

Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Transmission fluid temperature sensor check
Refer to P.23A-144.

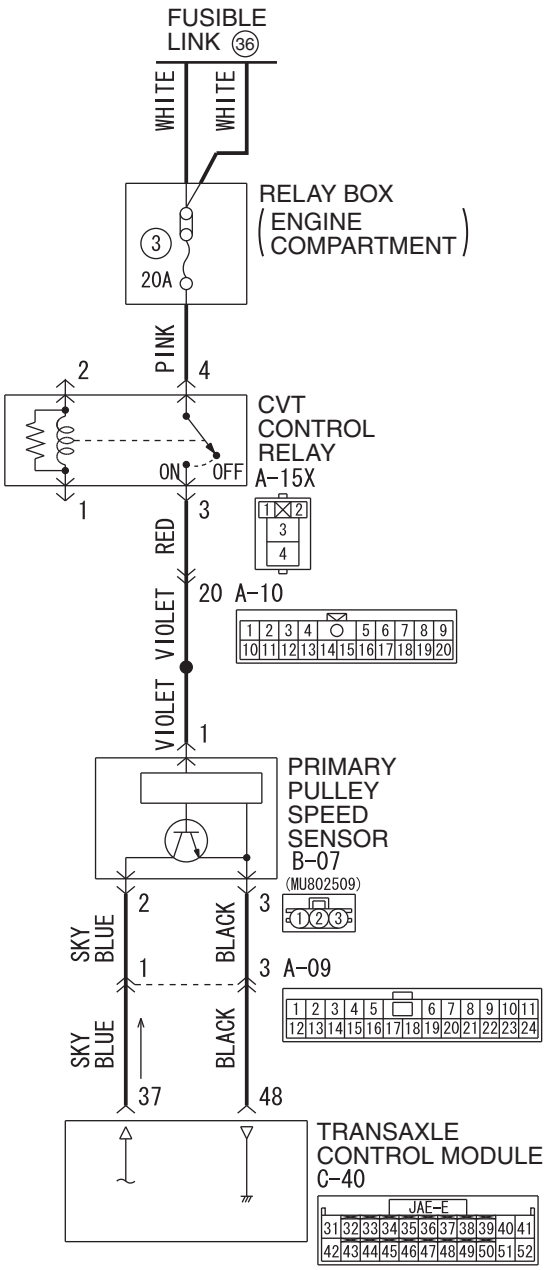
Q: Is the check result normal?
YES : Go to Step 6.
NO : Replace the valve body assembly.

STEP 6. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?
YES : Intermittent malfunction
NO : Replace TCM.

DTC P0715: Malfunction of Primary Pulley Speed Sensor

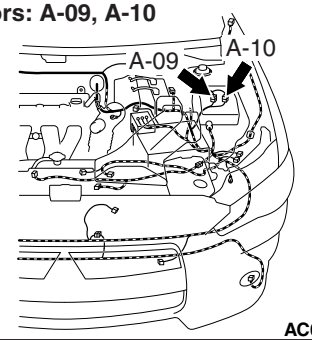
PRIMARY PULLEY SPEED SENSOR SWITCH SYSTEM CIRCUIT



W8G23M003A

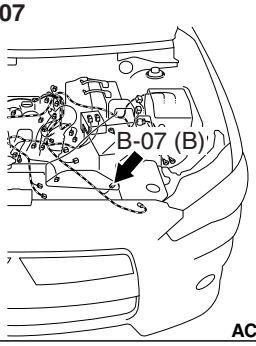
TSB Revision

Connectors: A-09, A-10



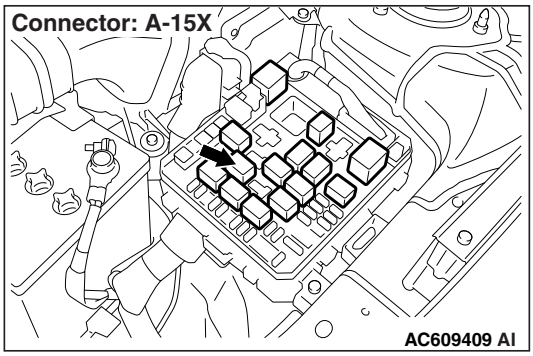
AC608142 AP

Connector: B-07



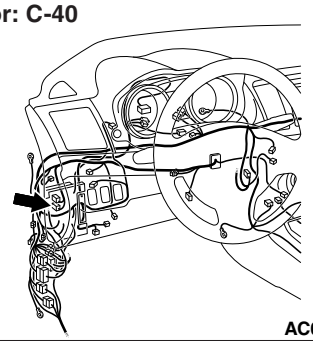
AC608144 AE

Connector: A-15X



AC609409 AI

Connector: C-40



AC608145 BV

DIAGNOSTIC FUNCTION

TCM determines that the malfunction is present when the primary pulley speed sensor value changes abruptly or when there is a discrepancy between this sensor and other sensors in sensor reading.

DESCRIPTIONS OF MONITOR METHODS

- The status with the secondary pulley speed of 500 r/min or more and with the primary pulley speed of 300 r/min or less continues for 5 seconds.
- When the primary pulley speed has dropped abruptly from 1,000 r/min or more to 300 r/min or less, and then it keeps 300 r/min or less for 0.5 seconds continuously.

MONITOR EXECUTION

- transmission range:D
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

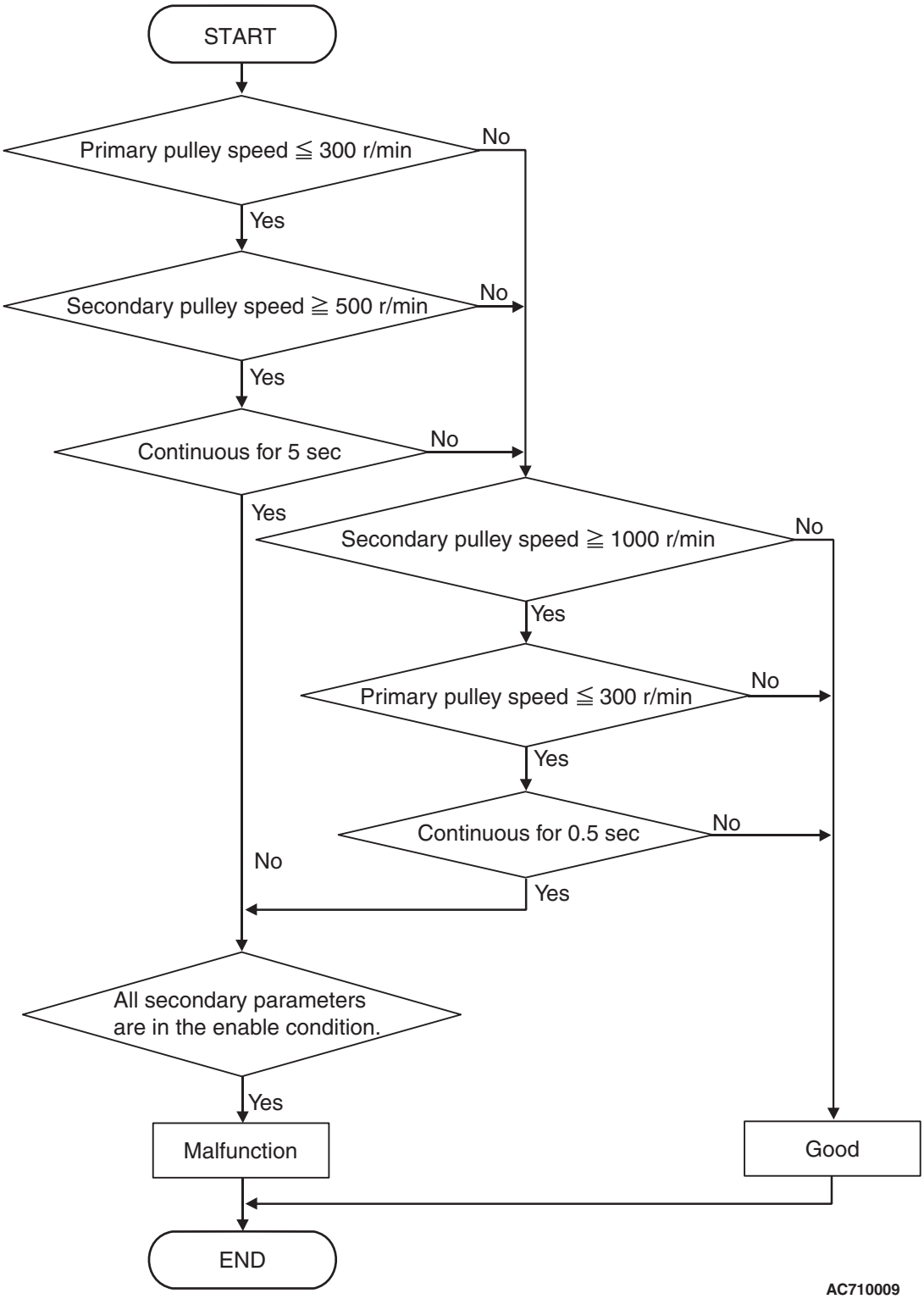
- P0712, P0713: Malfunction of the transmission fluid temperature sensor
- P0720: Malfunction of secondary pulley speed sensor
- P0725: Malfunction of engine speed
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop
- P1723: Abnormality in speed sensor system function

Sensor (The sensor below is determined to be normal)

- Transmission fluid temperature sensor
- Secondary pulley speed sensor

TSB Revision

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Secondary pulley speed: 500 r/min or more.
- Primary pulley speed at 10 millisecond before: 1,000 r/min or more.
- Throttle position sensor voltage: 1.37 volts or more.
- Engine speed: 450 r/min or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

TSB Revision

Judgment Criteria

- Primary pulley speed [secondary pulley speed: 500 r/min or more]: 300 r/min or less. (5 seconds)
- Primary pulley speed [Primary pulley speed at 10 millisecond before: 1,000 r/min or more]: 300 r/min or less. (0.5 second)

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 20 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of primary pulley speed sensor
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

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

Item 1: Primary speed sensor signal (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- B-07 Primary pulley speed sensor connector
- C-40 TCM connector
- A-09 Intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit in the wiring harness between the primary pulley speed sensor connector and the TCM connector

Between B-07 primary pulley speed sensor connector (terminal No.3) and C-40 TCM connector (terminal No.48)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Check for open circuit and short to ground in wiring harness between the primary pulley speed sensor connector and the TCM connector

Between B-07 primary pulley speed sensor connector (terminal No.2) and C-40 TCM connector (terminal No.37)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Check for open circuit in the wiring harness between the CVT control relay and the primary pulley speed sensor connector.
Between A-15X CVT control relay (terminal No.3) and B-07 primary pulley speed sensor connector (terminal No.1)

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. Primary pulley speed sensor check
Visually check the tip of the sensor for foreign materials or damage.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair.

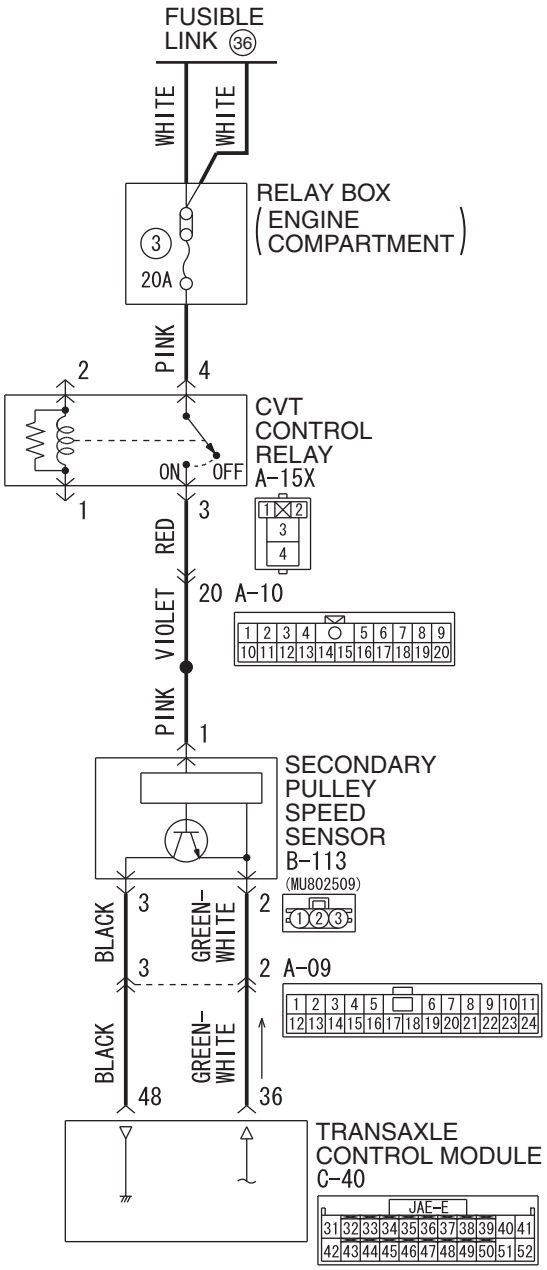
STEP 7. Diagnosis code recheck after replacing the primary pulley speed sensor

Q: Is the check result normal?

YES : The procedure is complete.
NO : Replace TCM.

DTC P0720: Malfunction of Secondary Pulley Speed Sensor

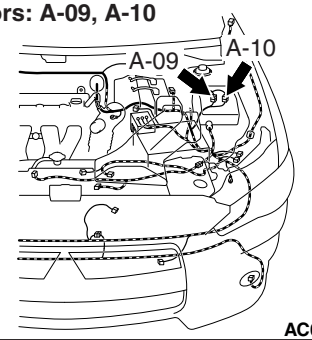
SECONDARY PULLEY SPEED SENSOR SYSTEM CIRCUIT



W8G23M004A

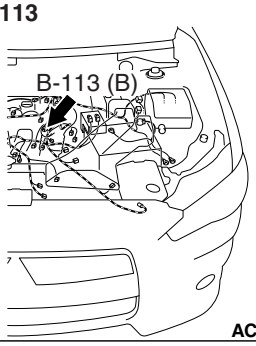
TSB Revision

Connectors: A-09, A-10



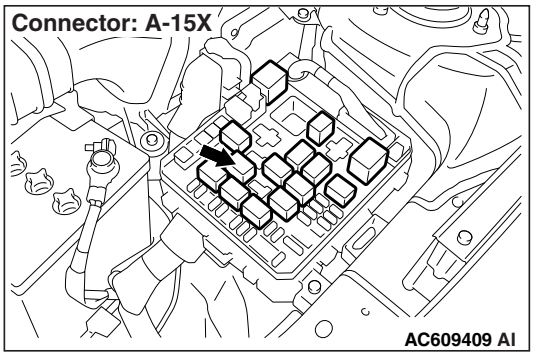
AC608142 AP

Connector: B-113



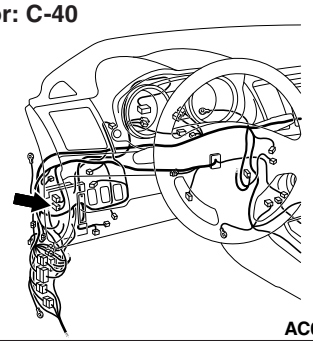
AC608144 AF

Connector: A-15X



AC609409 AI

Connector: C-40



AC608145 BV

DIAGNOSTIC FUNCTION

TCM determines that the malfunction is present when the secondary pulley speed sensor value changes abruptly or when there is a discrepancy between this sensor and other sensors in sensor reading.

DESCRIPTIONS OF MONITOR METHODS

- The status with the primary pulley speed of 1,000 r/min or more and with the secondary pulley speed of 150 r/min or less continues for 5 seconds.
- When the vehicle speed computed by CVT has dropped abruptly from 10 km/h (6.2 mph) or more to 5 km/h (3.1 mph) or less, and then the computing value keeps 5 km/h (3.1 mph) or less for 0.5 seconds continuously.

MONITOR EXECUTION

- transmission range:D
- Throttle valve opening : 1/8 or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

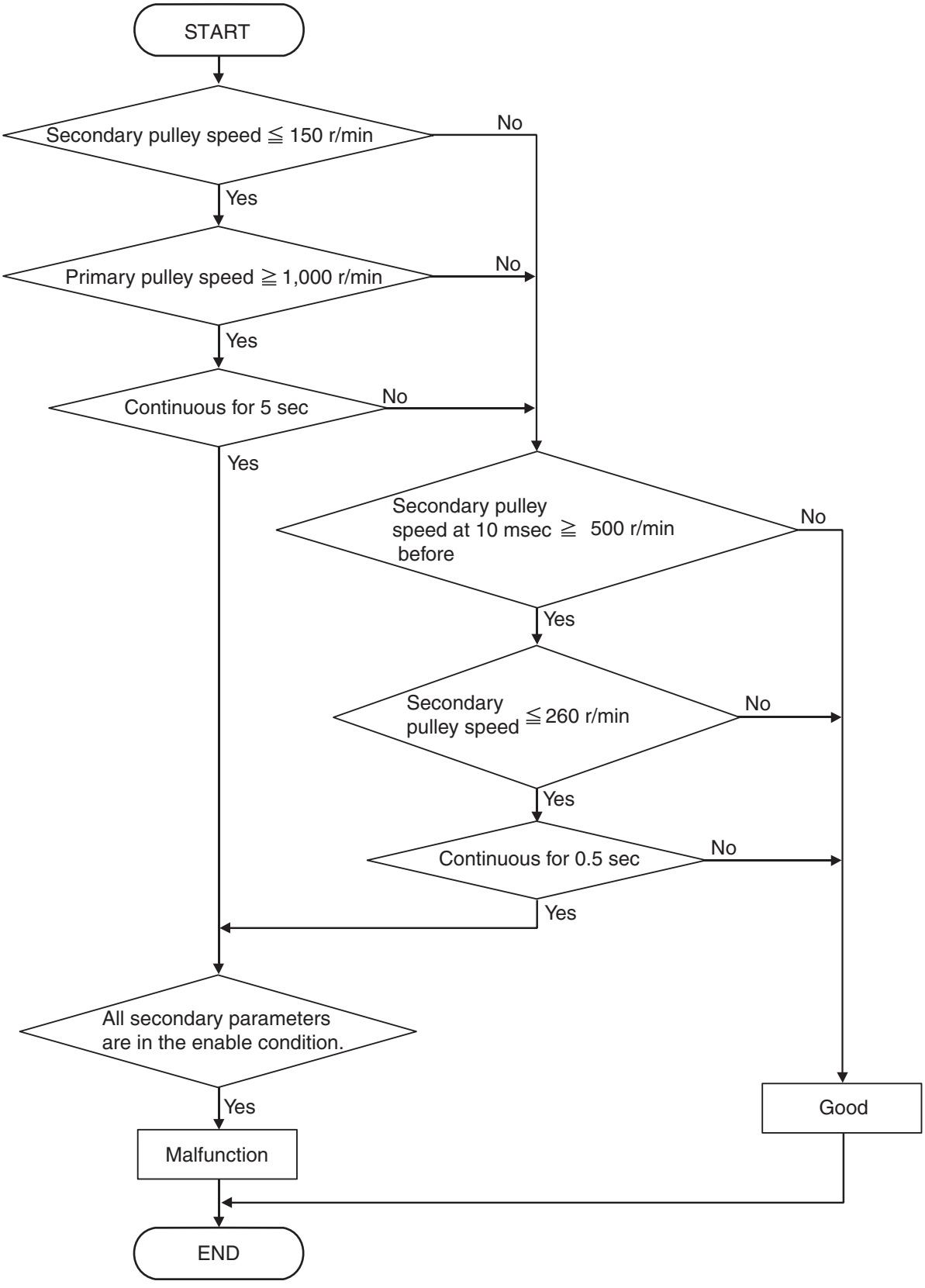
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0705: Malfunction of transmission range switch
- P0712, P0713: Malfunction of the transmission fluid temperature sensor
- P0715: Malfunction of primary pulley speed sensor
- P0725: Malfunction of engine speed
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop
- P1706: Malfunction of throttle signal
- P1723: Abnormality in speed sensor system function

Sensor (The sensor below is determined to be normal)

- Transmission range switch
- Transmission fluid temperature sensor
- Primary pulley speed sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)



TSB Revision

DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Throttle position sensor voltage: 1.37 volts or more.
- Primary pulley speed: 1,000 r/min or more.
- Secondary pulley speed at 10 millisecond before: 500 r/min or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Secondary pulley speed [primary pulley speed: 1,000 r/min or more]: 150 r/min or less. (5 seconds)
- Secondary pulley speed [secondary speed at 10 millisecond before: 500 r/min or more]: 260 r/min or less. (0.5 second)

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of secondary pulley speed sensor
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

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

Item 2: Secondary speed sensor signal (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- C-40 TCM connector
- B-113 Secondary pulley speed sensor connector
- A-10 Intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit in the wiring harness between the secondary pulley speed sensor connector and the TCM connector.

Between B-113 secondary pulley speed sensor connector (terminal No.3) and C-40 TCM connector (terminal No.48)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Check for open circuit and short to ground in the wiring harness between the secondary pulley speed sensor connector and the TCM connector

Between B-113 secondary pulley speed sensor connector (terminal No.2) and C-40 TCM connector (terminal No.36)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

TSB Revision

STEP 5. Check for open circuit in the wiring harness between the CVT control relay and the secondary pulley speed sensor connector.
Between A-15X CVT control relay (terminal No.3) and B-113 secondary pulley speed sensor connector (terminal No.1)

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. Secondary pulley speed sensor check
Visually check the tip of the sensor for foreign materials or damage.

Q: Is the check result normal?

YES : Go to Step 7.
NO : Repair.

STEP 7. Diagnosis code recheck after replacing the secondary pulley speed sensor

Q: Is the check result normal?

YES : The procedure is complete.
NO : Replace TCM.

DTC P0725: Malfunction of Engine Speed

DIAGNOSTIC FUNCTION

TCM detects malfunction of engine speed received from the ECM by comparing the primary pulley speed with the secondary pulley speed.

DESCRIPTIONS OF MONITOR METHODS

- Primary pulley speed of 1,000 r/min or more and with the engine speed of 450 r/min or less
- When the differences in rotation between the engine and the primary pulley, and between the engine and the secondary pulley are 1,000r/min or more during direct-coupled operating
- CAN communication error occurs between ECM and TCM.

MONITOR EXECUTION

- transmission range:D
- Throttle valve opening : 1/8 or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

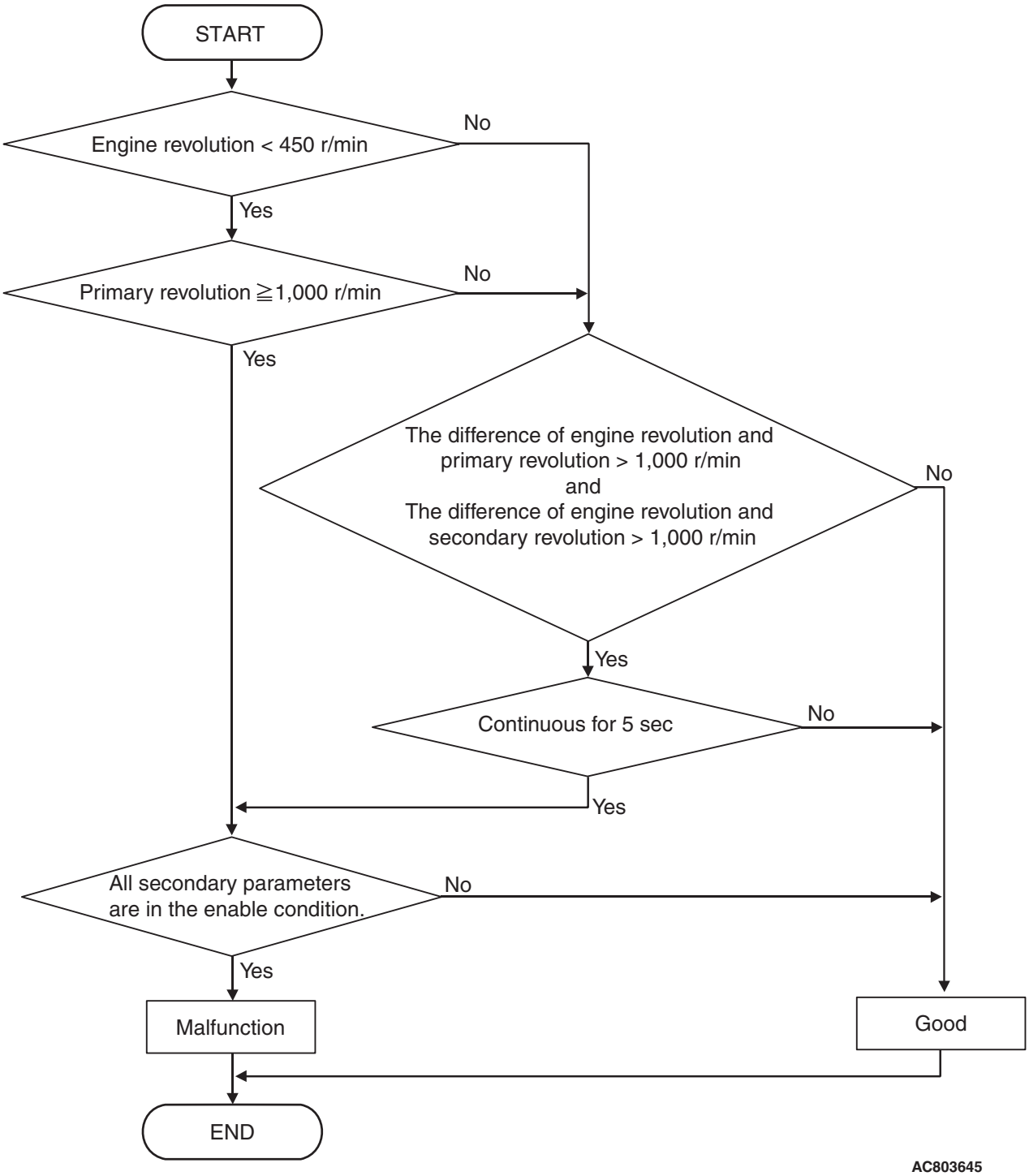
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0705: Malfunction of transmission range switch
- P0715: Malfunction of primary pulley speed sensor
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop
- P1706: Malfunction of throttle signal

Sensor (The sensor below is determined to be normal)

- Transmission range switch
- Primary pulley speed sensor
- Accelerator pedal position sensor

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Throttle position sensor voltage: 1.37 volts or more.
- Primary pulley speed: 1,000 r/min or more.
- The absolute value of the Primary pulley speed - secondary pulley speed: 1,000 r/min or less.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Engine revolution [primary pulley speed: 1,000 r/min or more]: less than 450 r/min.
- The difference of engine speed and primary speed: more than 1,000 r/min. (5 seconds)
- The difference of engine speed and secondary speed: more than 1,000 r/min. (5 seconds)

TSB Revision

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Malfunction of the CAN bus
- Malfunction of the engine system
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Go to "CAN Troubleshooting."

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

Check if the engine-related diagnosis code is set.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Go to "Engine Troubleshooting."

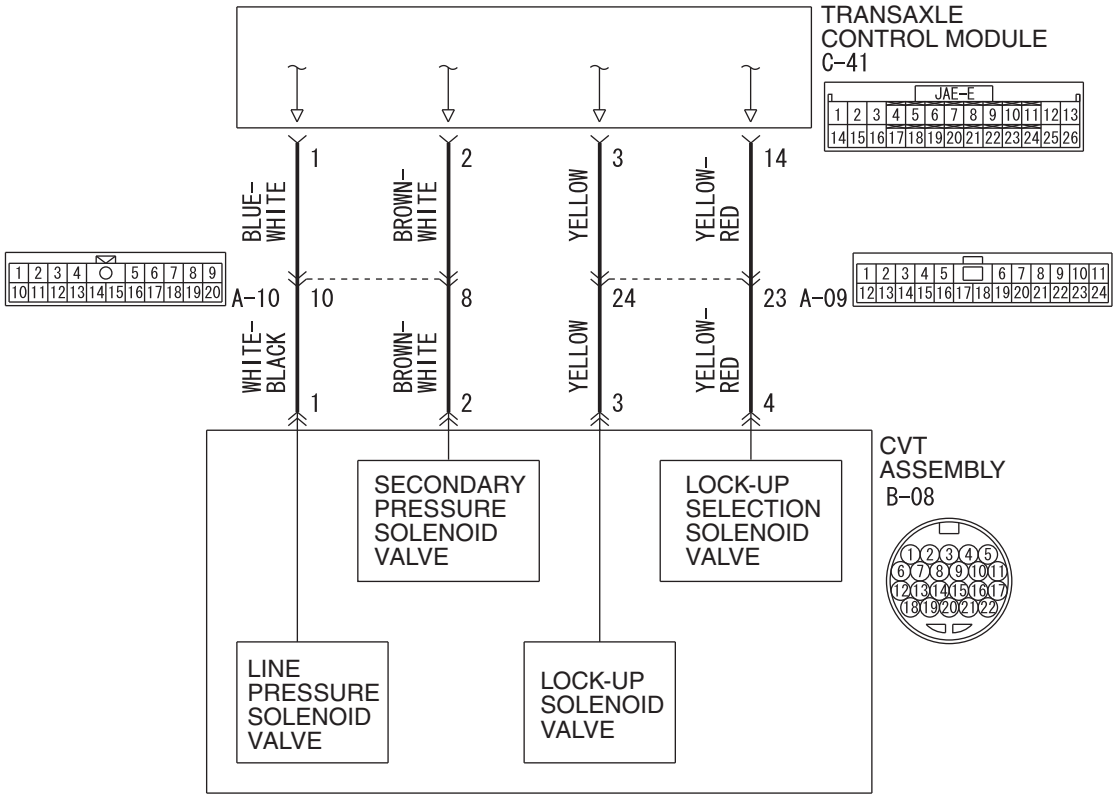
STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0740: Malfunction of Lockup Solenoid Valve

SOLENOID VALVE SYSTEM CIRCUIT



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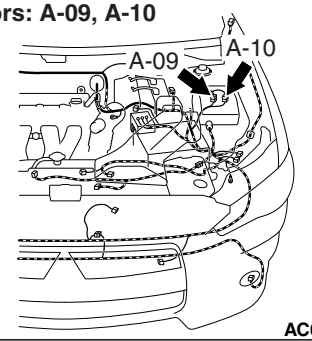
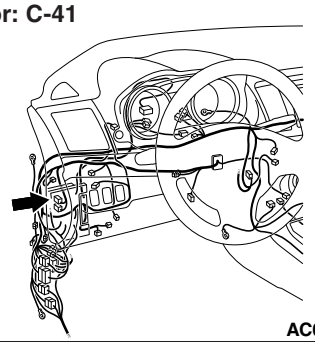
Connectors: A-09, A-10



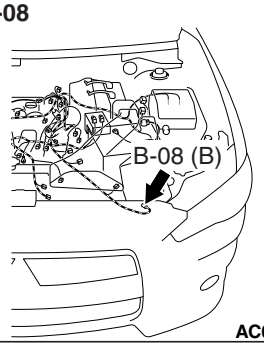
AC608142 AP

Connector: C-41



AC608145BW

Connector: B-08



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TSB Revision

DIAGNOSTIC FUNCTION

TCM determines malfunction by detecting the abnormality in the lockup solenoid valve.

DESCRIPTIONS OF MONITOR METHODS

- Specified amount of current is not flown to the lockup solenoid valve because of an open or short circuit.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

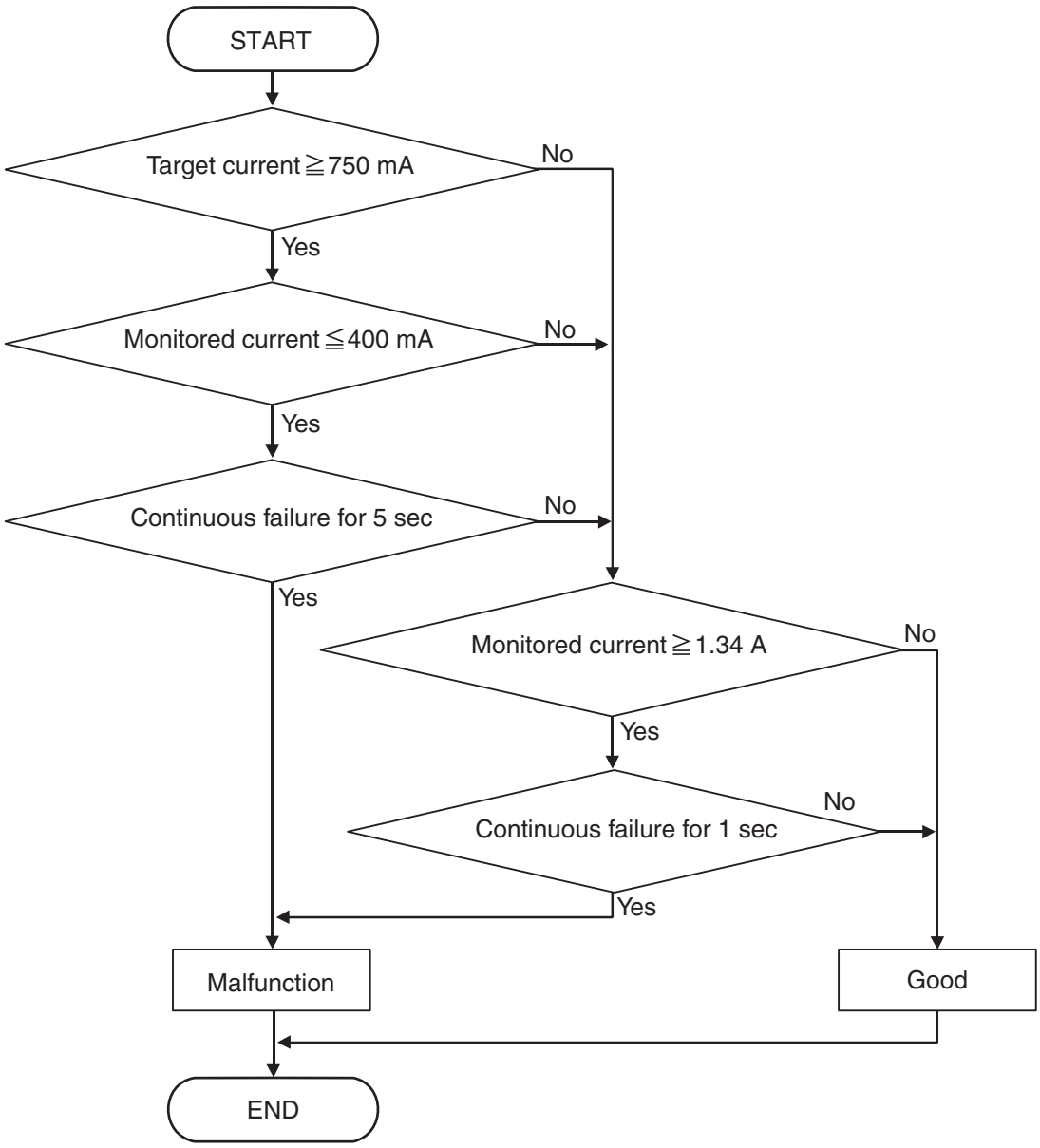
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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TSB Revision

DTC SET CONDITIONS

Judgment Criteria

- Monitored current [target current: 750 mA or more]: 400 mA or less. (5 seconds)
- Monitored current: 1.34 A or more (1 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty lockup solenoid valve)
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

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

- Item 31: LU solenoid output current
- Item 30: LU solenoid monitor current

OK: Check if the output current and monitoring current differ largely.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- C-41 TCM connector
- B-08 CVT assembly connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the TCM connector and the CVT assembly connector.

Between C-41 TCM connector (terminal No.3) and B-08 CVT assembly connector (terminal No.3)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Lockup solenoid valve single unit check

Refer to P.23A-143.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the valve body assembly.

STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

TSB Revision

DTC P0741: Abnormality in Lock-up Function

DIAGNOSTIC FUNCTION

Abnormality is detected by the TCM when the torque converter slip speed is high during lockup control.

DESCRIPTIONS OF MONITOR METHODS

- The status with the high torque converter slip speed continues for 30 seconds during lockup control [Primary pulley speed and engine speed are normal, and lockup differential pressure is 0.2 MPa (29 psi) or more].

MONITOR EXECUTION

- transmission range:D
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more
- CVT fluid temperature : from 20 to 180°C (68~356°F)

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

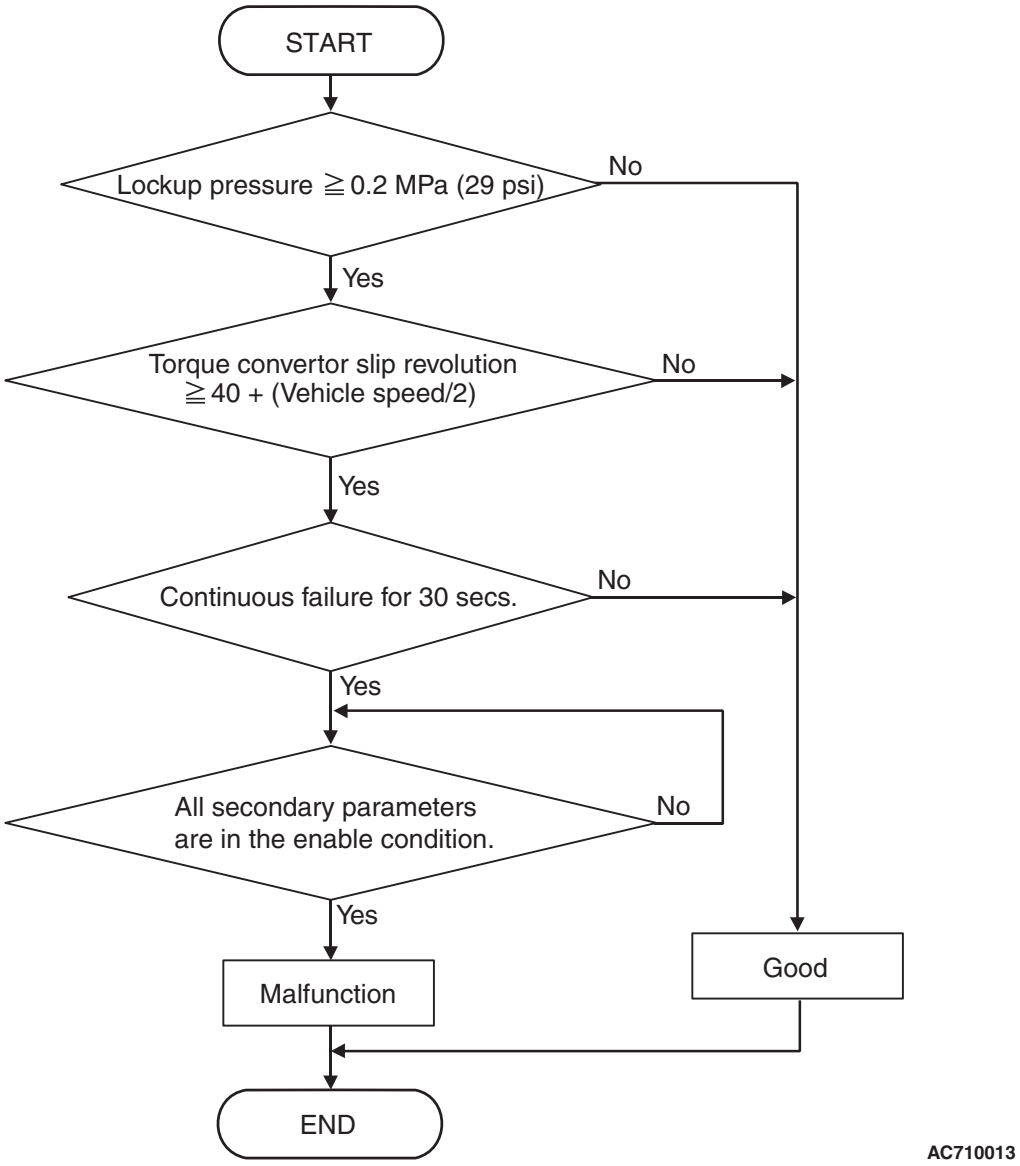
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Throttle position sensor voltage: 1.37 volts or more.
- Engine speed: 450 r/min or more.
- Transmission fluid temperature: 20°C (68°F) or more.
- Transmission fluid temperature: 180°C (356°F) or less.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Lock-up pressure: 0.2 MPa (29 psi) or more. (30 seconds)
- Torque converter slip revolution: 40+(vehicle speed/2) or more. (30 seconds)

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 30 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Abnormal line pressure
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. Check other diagnosis codes.

Q: Are other diagnosis codes set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 2.

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

- Item 7: Primary speed
- Item 9: Engine revolution

OK: No considerable difference is observed between the primary pulley speed and the engine speed.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 3.

STEP 3. Line Pressure Check

Carry out "hydraulic test"(Refer to P.23A-27).

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair according to the hydraulic pressure test diagnosis table.

STEP 4. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0745: Malfunction of Line Pressure Solenoid Valve

SOLENOID VALVE SYSTEM CIRCUIT

Refer to P.23A-61.

DIAGNOSTIC FUNCTION

TCM determines malfunction by detecting the abnormality in the line pressure solenoid valve.

DESCRIPTIONS OF MONITOR METHODS

- Specified amount of current is not flown to the line pressure solenoid valve because of an open or short circuit.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

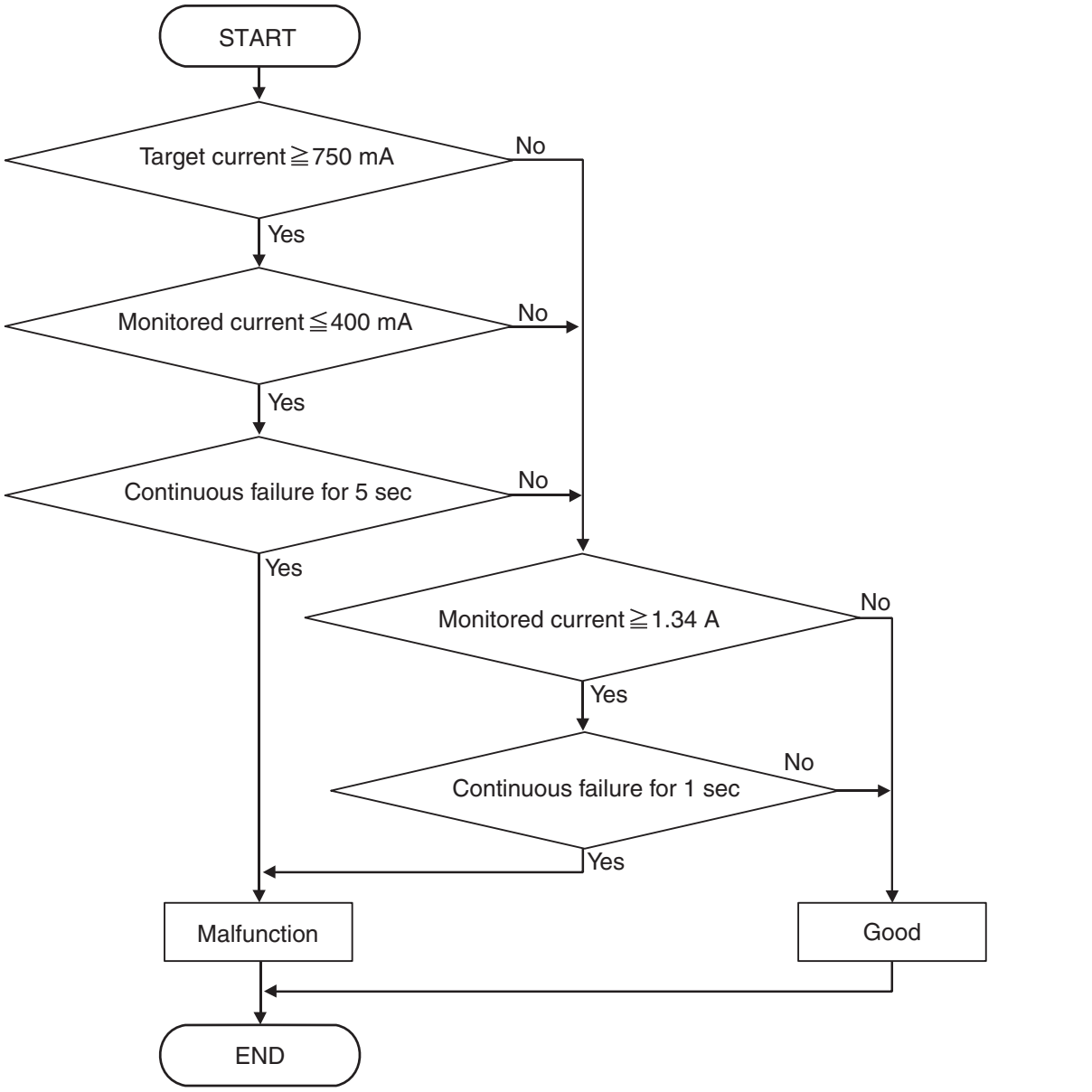
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Judgment Criteria

- Monitored current [target current: 750 mA or more]: 400 mA or less. (5 seconds)
- Monitored current: 1.34 A or more. (1 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty line pressure solenoid valve)
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

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

- Item 33: Line pressure SOL. output current
- Item 32: Line pressure SOL. monitor current

OK: Check if the output current and monitoring current differ largely.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- C-41 TCM connector
- B-08 CVT assembly connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the TCM connector and the CVT assembly connector.

Between C-41 TCM connector (terminal No.1) and B-08 CVT assembly connector (terminal No.1)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Line pressure solenoid valve single unit check

Refer to P.23A-143.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the valve body assembly.

STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0746: Abnormality in Hydraulic Control System Function

DIAGNOSTIC FUNCTION

TCM determines that the malfunction is present when pulley ratio becomes higher (pulley ratio range: 2.349 to 0.394).

DESCRIPTIONS OF MONITOR METHODS

- The status with the pulley ratio of 3.5 or more continues for 0.1 second or with the pulley ratio of 2.7 or more continues for 0.2 second.

MONITOR EXECUTION

- transmission range:D
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more
- CVT fluid temperature : from 20 to 180°C (68~356°F)

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

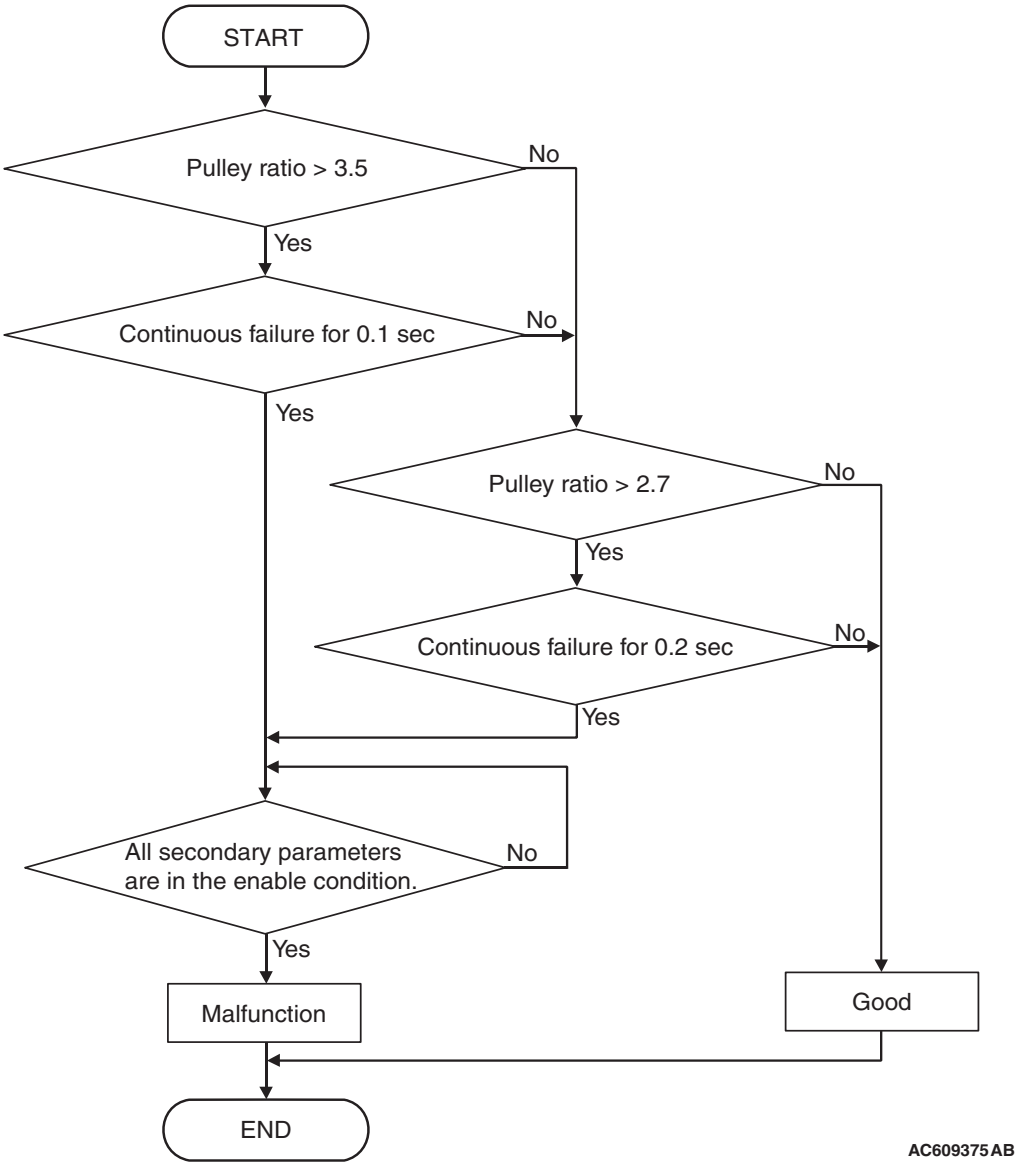
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Throttle position sensor voltage: 1.37 volts or more.
- Engine speed: 450 r/min or more.
- Transmission fluid temperature: 20°C (68°F) or more.
- Transmission fluid temperature: 180°C (356°F) or less.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Pulley ratio (primary pulley ratio/secondary pulley ratio): more than 3.5. (0.1 second)
- Pulley ratio (primary pulley ratio/secondary pulley ratio): more than 2.7. (0.2 second)

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Abnormal line pressure
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. Check other diagnosis codes.

Q: Are other diagnosis codes set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 2.

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

Item 33: Line pressure SOL. output current (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 3.

STEP 3. Line Pressure Check

Carry out "hydraulic test"(Refer to P.23A-27).

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair according to the hydraulic pressure test diagnosis table.

STEP 4. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0776: Abnormality in Secondary Pressure Solenoid Valve Function

DIAGNOSTIC FUNCTION

TCM conducts fault detection by measuring the difference between the target value and the actual value for the secondary pressure.

JUDGEMENT CRITERIA

The following three conditions are met for three seconds.

1. Engine speed is 450 r/min or more.
2. Power supply voltage is 10 volts or more.
3. Difference between target secondary pressure and actual secondary pressure is 1.20 MPa (174 psi) or more.

PROBABLE CAUSES

- Trouble in CAN bus system
- Abnormal line pressure
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17).

STEP 2. Check other diagnosis codes.

Q: Are other diagnosis codes set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 3.

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

Item 19: Secondary pressure (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 4.

STEP 4. Line Pressure Check

Carry out "hydraulic test"(Refer to P.23A-27).

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair according to the hydraulic pressure test diagnosis table.

STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0778: Malfunction of Secondary Pressure Solenoid Valve

SOLENOID VALVE SYSTEM CIRCUIT

Refer to P.23A-61.

DIAGNOSTIC FUNCTION

TCM determines malfunction by detecting the abnormality in the secondary pressure solenoid valve.

DESCRIPTIONS OF MONITOR METHODS

- Specified amount of current is not flown to the secondary pressure solenoid valve because of an open or short circuit.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

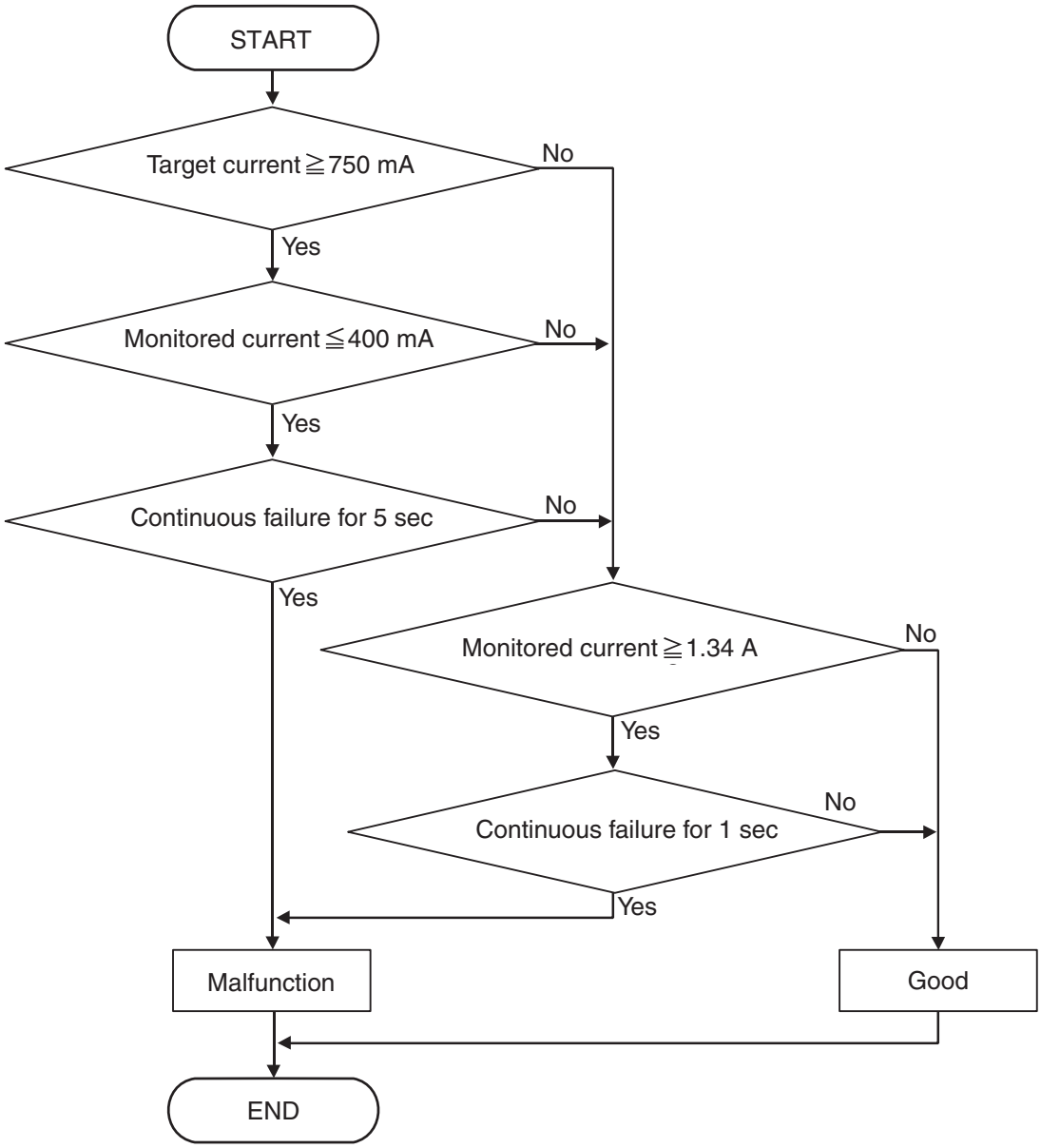
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Judgment Criteria

- Monitored current [target current: 750 mA or more]: 400 mA or less. (5 seconds)
- Monitored current: 1.34 A or more. (1 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty secondary pressure solenoid valve)
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

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

- Item 35: Secondary PRS. SOL. output current
- Item 34: Secondary PRS. SOL. monitor current

OK: Check if the output current and monitoring current differ largely.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- C-41 TCM connector
- B-08 CVT assembly connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the TCM connector and the CVT assembly connector.

Between C-41 TCM connector (terminal No.2) and B-08 CVT assembly connector (terminal No.2)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Secondary pressure solenoid valve single unit check

Refer to P.23A-143.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the valve body assembly.

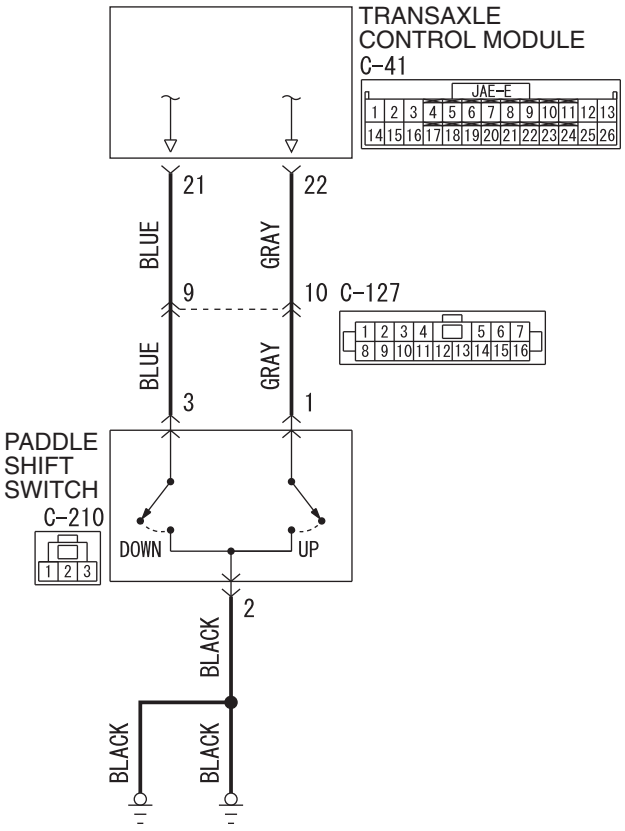
STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0815: Malfunction of Paddle Shift Up Switch

PADDLE SHIFT SWITCH SYSTEM CIRCUIT



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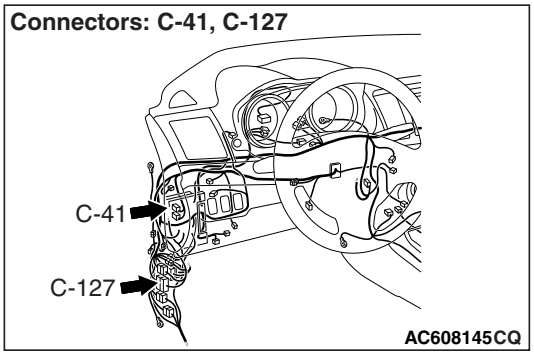
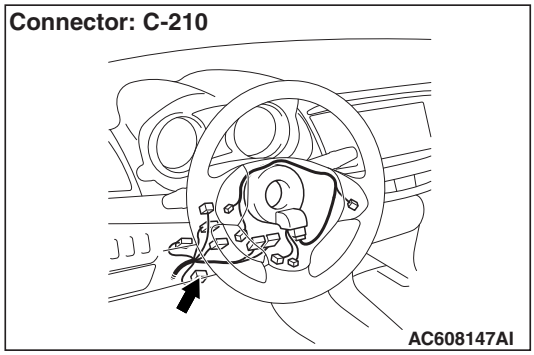
Connectors: C-41, C-127



Connector: C-210



DIAGNOSTIC FUNCTION

TCM detects that the paddle shift UP switch is stuck to ON.

JUDGEMENT CRITERIA

When the paddle shift UP switch being ON consecutively for 60 seconds is detected.

PROBABLE CAUSES

- Malfunction of paddle shift switch
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
Item 54: Paddle switch (up)

OK: The service data changes in response to the paddle shift operation.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:
- C-41 TCM connector
- C-210 paddle shift switch connector
- C-127 intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the damaged connector.

STEP 3. Paddle shift switch single unit check
Refer to P.23A-145.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Replace the paddle shift switch.

STEP 4. Check for short to ground in the wiring harness between the TCM connector and the paddle shift switch connector
Between C-41 TCM connector (terminal No.22) and C-210 paddle shift switch connector (terminal No.1)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0816: Malfunction of Paddle Shift Down Switch

PADDLE SHIFT SWITCH SYSTEM CIRCUIT

Refer to P.23A-75.

DIAGNOSTIC FUNCTION

TCM detects that the paddle shift DOWN switch is stuck to ON.

JUDGEMENT CRITERIA

When the paddle shift DOWN switch being ON consecutively for 60 seconds is detected.

PROBABLE CAUSES

- Malfunction of paddle shift switch
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

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

Item 55: Paddle switch (down)

OK: The service data changes in response to the paddle shift operation.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- C-41 TCM connector
- C-210 paddle shift switch connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the damaged connector.

STEP 3. Paddle shift switch single unit check

Refer to P.23A-145.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Replace the paddle shift switch.

STEP 4. Check for short to ground in the wiring harness between the TCM connector and the paddle shift switch connector

Between C-41 TCM connector (terminal No.21) and C-210 paddle shift switch connector (terminal No.3)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Symptom recheck after erasing diagnosis code

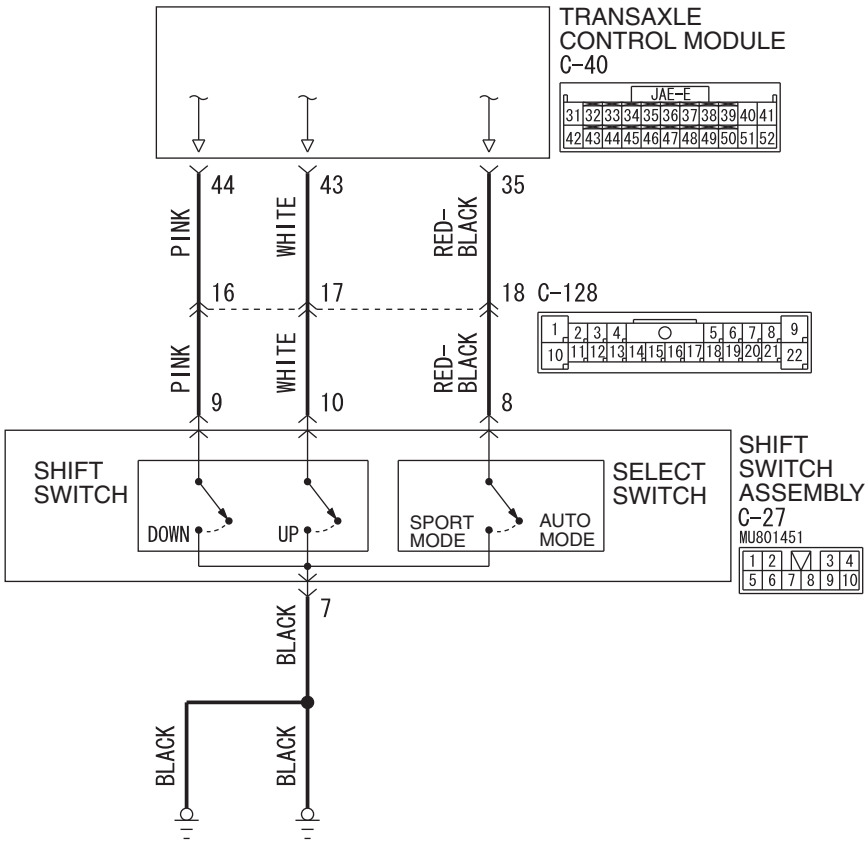
Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

TSB Revision

DTC P0826: Malfunction of Shift Switch Assembly

SHIFT SWITCH SYSTEM CIRCUIT



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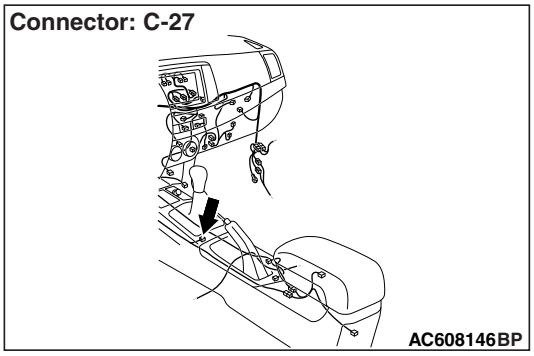
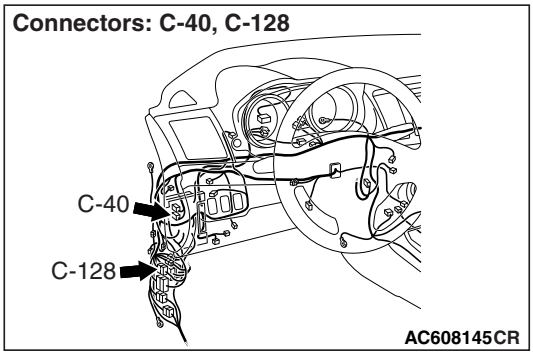
Connector: C-27



Connectors: C-40, C-128



DIAGNOSTIC FUNCTION

TCM detects the UP/DOWN operation of the shift switch assembly. TCM determines that the malfunction is present if an abnormal value is input.

JUDGEMENT CRITERIA

Input to the shift switch assembly remains abnormal for 1 second.

PROBABLE CAUSES

- Malfunction of selector lever assembly (Faulty shift switch assembly)
- Damaged wiring harness and connectors
- Malfunction of TCM

TSB Revision

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
- Item 52: Select switch (up)
- Item 53: Select switch (down)

(Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check shift switch assembly
Refer to P.23A-152.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the selector lever assembly.

STEP 3. Check the following connector:
- C-40 TCM connector
- C-27 selector lever assembly connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Check for open circuit and short to ground in the wiring harness between the TCM connector and the selector lever assembly.
- Between C-40 TCM connector (terminal No.35) and C-27 selector lever assembly connector (terminal No.8)
- Between C-40 TCM connector (terminal No.43) and C-27 selector lever assembly connector (terminal No.10)
- Between C-40 TCM connector (terminal No.44) and C-27 selector lever assembly connector (terminal No.9)

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Check for open circuit in the wiring harness between the selector lever assembly connector and the body ground
Between C-27 selector lever assembly connector (terminal No.7) and body ground

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

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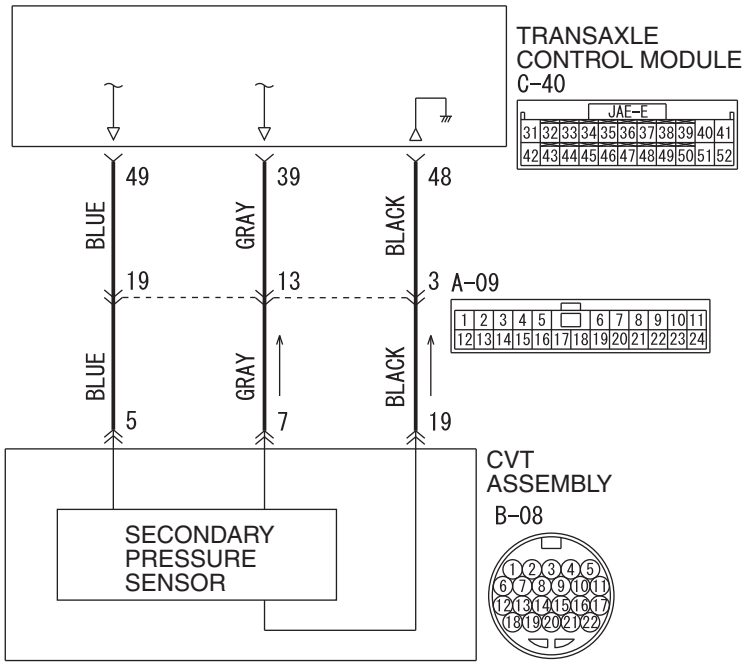
DTC P0840: Malfunction of Secondary Pressure Sensor

SECONDARY PRESSURE SENSOR SYSTEM CIRCUIT



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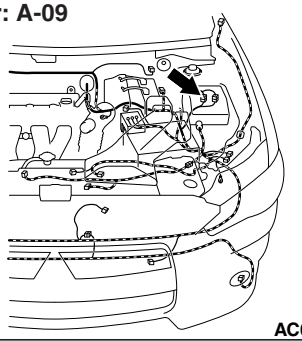
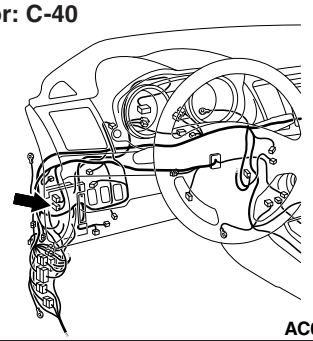
Connector: A-09



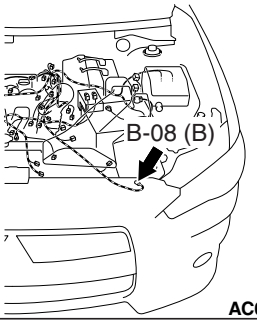
AC608142AN

Connector: C-40



AC608145BV

Connector: B-08



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DIAGNOSTIC FUNCTION

TCM conducts fault detection by monitoring the output voltage of the secondary pressure sensor.

DESCRIPTIONS OF MONITOR METHODS

- The status with the fluid temperature of –20°C (–4°F) or more and with the secondary pressure sensor voltage of 4.69 volts or more continues for 5 seconds.

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- The status with the fluid temperature of –20°C (–4°F) or more and with the secondary pressure sensor voltage of 0.09 volt or less continues for 5 seconds.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

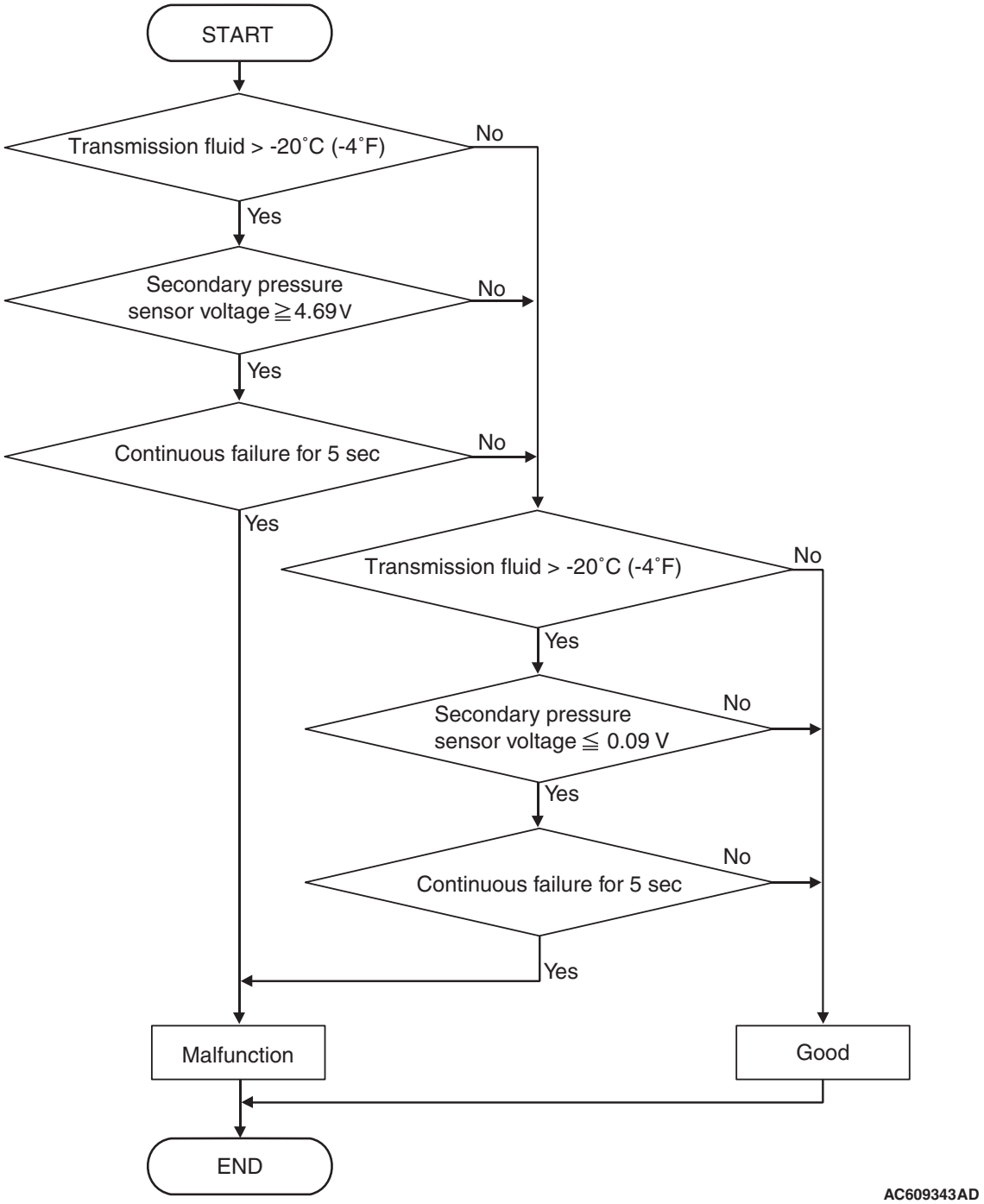
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Judgment Criteria

- Secondary pressure sensor voltage [transmission fluid temperature: more than –20°C (–4°F)]: 4.69 volts or more. (5 seconds)
- Secondary pressure sensor voltage [transmission fluid temperature: more than –20°C (–4°F)]: 0.09 volt or less. (5 seconds)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty secondary pressure sensor)
- Damaged wiring harness and connectors
- Malfunction of TCM

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DIAGNOSTIC PROCEDURE

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

- Item 4: Secondary pressure sensor signal (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:

- B-08 CVT assembly connector
- C-40 TCM connector
- A-09 Intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the TCM connector and the CVT assembly connector.

- Between C-40 TCM connector (terminal No.39) and B-08 CVT assembly connector (terminal No.7)
- Between C-40 TCM connector (terminal No.48) and B-08 CVT assembly connector (terminal No.19)
- Between C-40 TCM connector (terminal No.49) and B-08 CVT assembly connector (terminal No.5)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Symptom recheck after replacing the valve body assembly

Q: Is the check result normal?

YES : The procedure is complete.
NO : Replace TCM.

DTC P0841: Abnormality in Line Pressure Sensor Function

DIAGNOSTIC FUNCTION
TCM conducts fault detection by comparing the target line pressure reading with the actual secondary pressure reading.

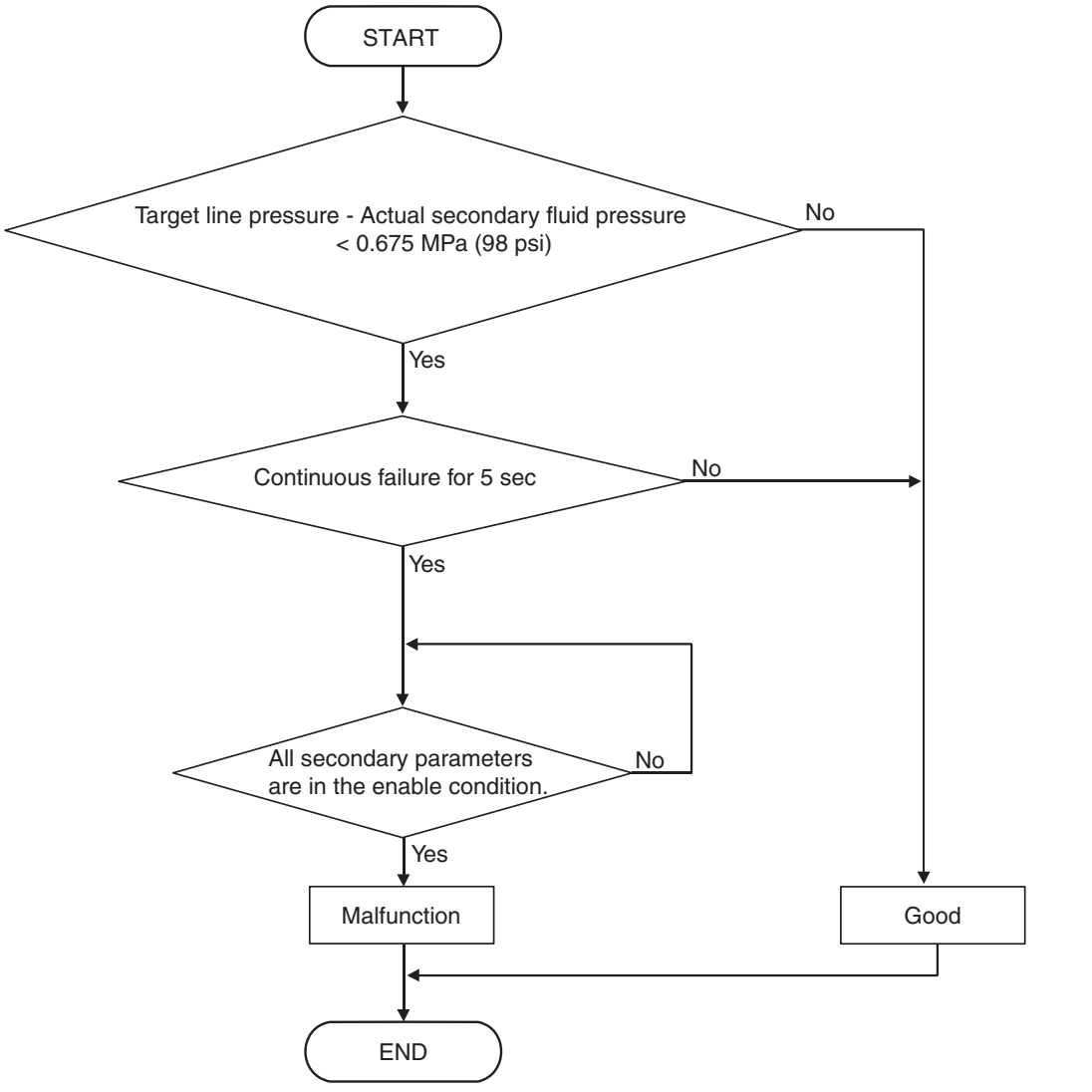
DESCRIPTIONS OF MONITOR METHODS
The actual secondary pressure reading is 0.675 MPa (98 psi) or more, and the status over the target line pressure remains for 5 seconds.

MONITOR EXECUTION
- transmission range:D
- Throttle valve opening : 1/8 or more
- Engine speed : 450 r/min or more
- CVT fluid temperature : from 20 to 180°C (68~356°F)

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Throttle position sensor voltage: 1.37 volts or more.
- Engine speed: 450 r/min or more.
- Transmission fluid temperature: 20°C (68°F) or more.
- Transmission fluid temperature: 180°C (356°F) or less.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- The actual secondary pressure reading is 0.675 MPa (98 psi) or more, and the status over the target line pressure remains for 5 seconds.

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Abnormal line pressure
- Abnormality in secondary pressure sensor system
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check other diagnostic trouble codes.

Q: Are other diagnostic trouble codes set?

YES : Go to the appropriate troubleshooting.
NO : Go to Step 2.

STEP 2. Line pressure check

Carry out "hydraulic test" (Refer to P.23A-27).

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair according to the hydraulic pressure test diagnosis table.

STEP 3. Symptom recheck after erasing diagnostic trouble code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P0868: Secondary Pressure Drop

SECONDARY PRESSURE SENSOR SYSTEM CIRCUIT

Refer to P.23A-80.

DIAGNOSTIC FUNCTION

TCM detects the secondary pressure drop during driving.

DESCRIPTIONS OF MONITOR METHODS

- The value obtained by subtracting the actual secondary pressure sensor reading from the target secondary pressure sensor reading is 0.25 MPa (36 psi) or more.

MONITOR EXECUTION

- Engine speed : 450 r/min or more

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

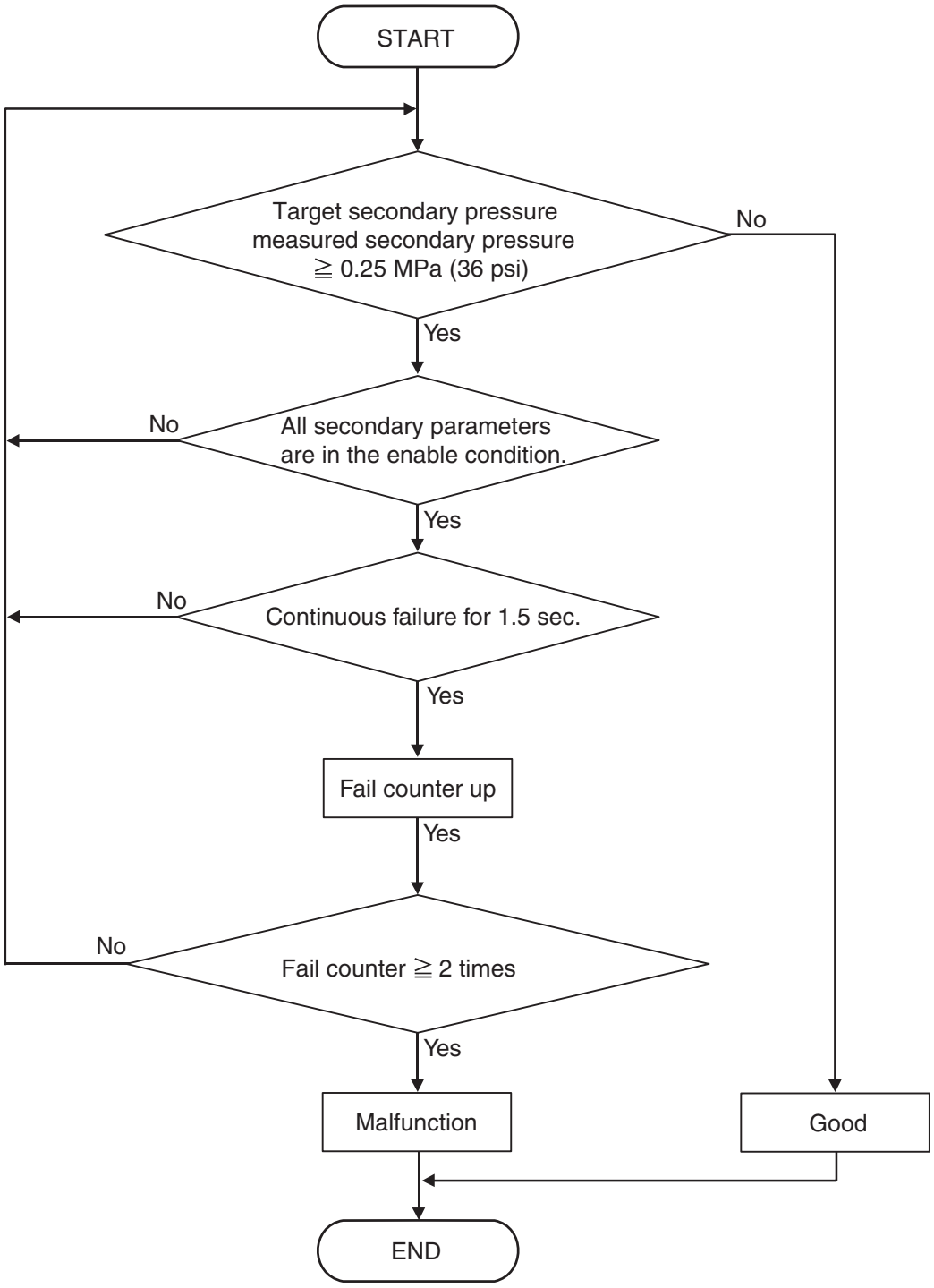
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Engine speed: 450 r/min or more.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Secondary linear solenoid performance fail [target secondary pressure – measured secondary pressure: 0.25 MPa (36 psi) or more. (1.52 seconds)]: 2 count or more.

OBD-II DRIVE CYCLE PATTERN

transmission range: D (Drive the vehicle for 10 seconds or more while the accelerator opening angle is 20% or more)

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of CVT assembly
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check other diagnosis codes.

Q: Are other diagnosis codes set?

YES : Go to the appropriate troubleshooting.
NO : Go to Step 2.

STEP 2. Check the following connector:

- B-08 CVT assembly connector
- C-40 TCM connector
- A-09 Intermediate connector

Check contacts for internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for short to ground in the wiring harness between the TCM connector and the CVT assembly connector.

- Between C-40 TCM connector (terminal No.39) and B-08 CVT assembly connector (terminal No.7)

  OK: 100 Ω or more

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace the TCM, and then go to Step 5.

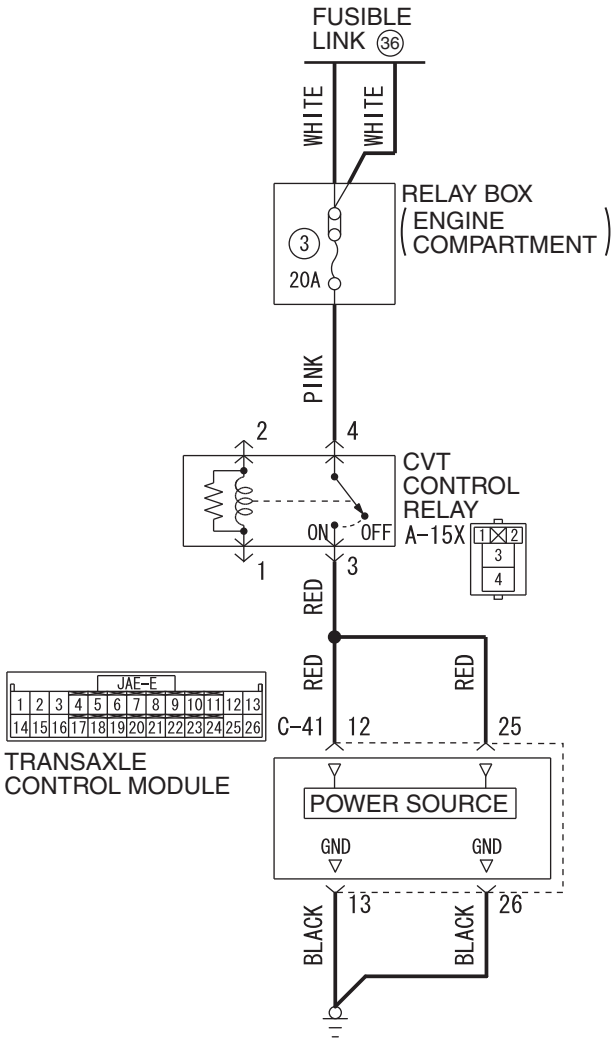
STEP 5. Retest the system.

Q: Is the check result normal?

YES : The procedure is complete.
NO : Replace the CVT assembly.

DTC P0882: Malfunction of power supply system (Low)
DTC P0883: Malfunction of power supply system (high)

TCM POWER SUPPLY CIRCUIT



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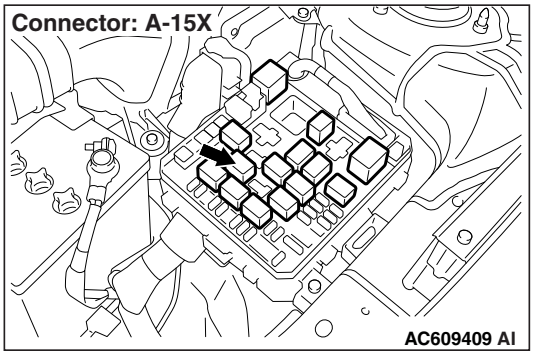

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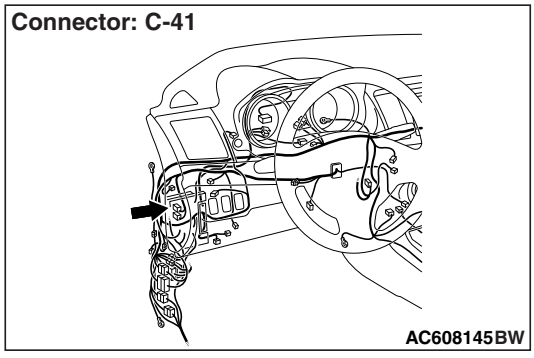

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DIAGNOSTIC FUNCTION

TCM monitors if power supply system is normal or not and judges the trouble.

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JUDGMENT CRITERIA

- <P0882> : When the engine speed is 450 r/min or more and secondary pressure is above 0.3 MPa (44 psi), the power supply voltage is 9.0 volts or less (for 5 seconds)
- <P0883>: : When the engine speed is 450 r/min or more, the secondary pressure is above 0.3 MPa (44 psi) and the vehicle speed is 1 km/h (0.6 mph) or more, the power supply voltage is 16.0 volts or more (for 5 seconds)

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check the following connector:
- A-15X CVT control relay connector
- C-41 TCM connector

Check each terminal for imperfect contact.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the defective connector.

STEP 2. Check for short circuit in the wiring harness between the fusible link No.36 and the TCM connector.
- Between fusible link No.36 and C-41 TCM connector (terminal No.12)
- Between fusible link No.36 and C-41 TCM connector (terminal No.25)

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the wiring harness.

STEP 3. Check for open circuit in the wiring harness between the TCM connector and the ground.
- Between C-41 TCM (terminal No.13) and ground
- Between C-41 TCM (terminal No.26) and ground

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Retest the system.

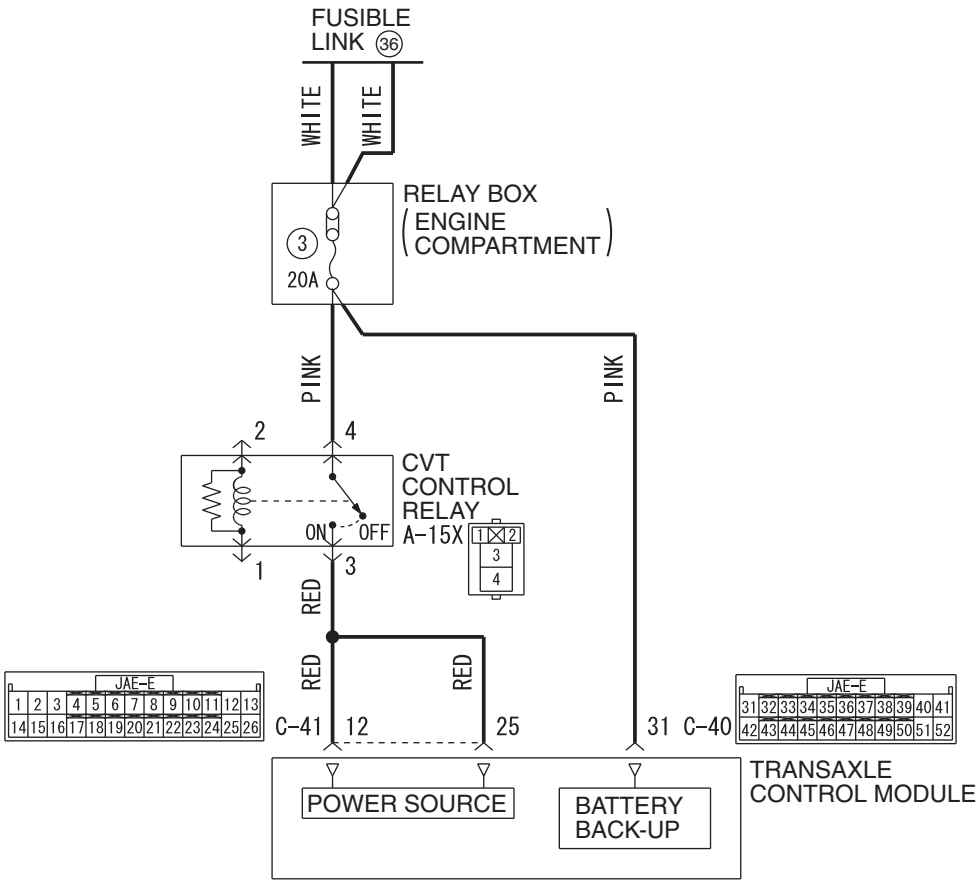
Recheck the trouble symptom.

Q: Does the malfunction take place again?

YES : Replace TCM.
NO : Intermittent malfunction

DTC P1637: Malfunction of Memory Backup

MEMORY BACKUP SYSTEM CIRCUIT



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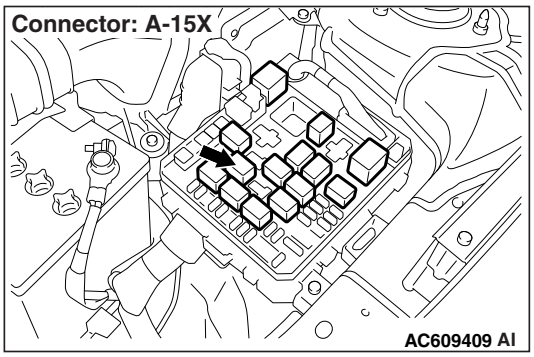

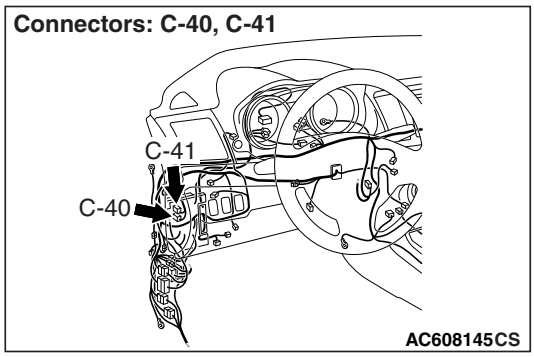

DIAGNOSTIC FUNCTION

TCM checks the consistency between EEPROM and the backup memory.

DESCRIPTIONS OF MONITOR METHODS

- When the ignition switch is turned to the "ON" position, TCM determines that the writing to the EEPROM area had failed last time the ignition switch was turned to the "LOCK" (OFF) position.

MONITOR EXECUTION

- Continuous

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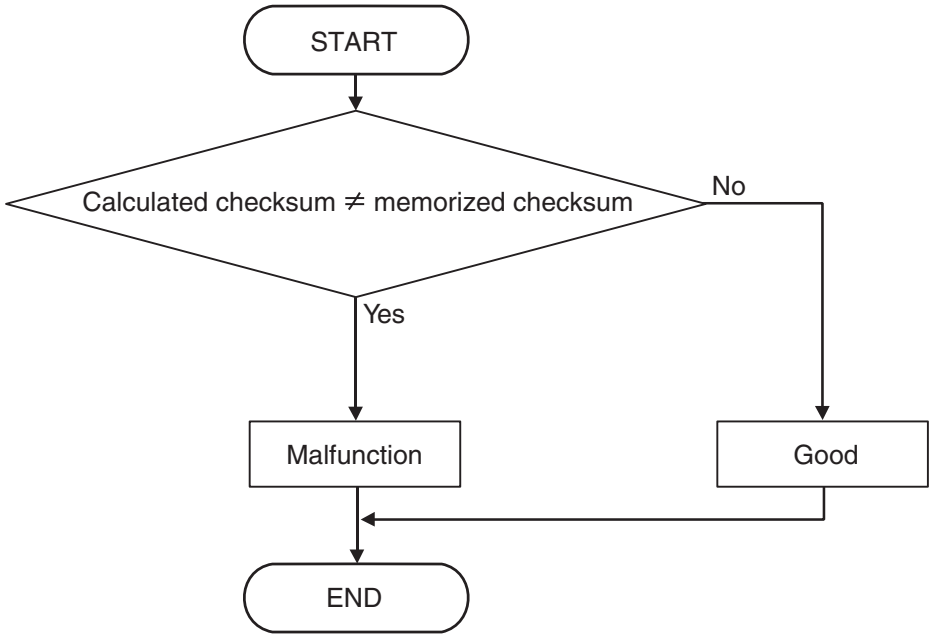
MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Judgment Criteria
- Calculated checksum is not same as memorized checksum.

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of TCM (Faulty EEPROM)

DIAGNOSTIC PROCEDURE

STEP 1. Check if diagnosis code P1637 is erased by turning the ignition switch from the "LOCK" (OFF) position to the "ON" position.

Q: Is the check result normal?

YES : This diagnosis code will be set by disconnecting the battery. If the diagnosis code is not erased by turning the ignition switch to the "ON" position, it is judged to be normal.

NO : Go to Step 2.

STEP 2. Check for open circuit in power supply wiring harness

- Between relay box and C-40 TCM backup power supply connector (terminal No.31)
- Between relay box and A-15X CVT control relay (terminal No.4)

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the wiring harness.

STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1706: Malfunction of Throttle Signal

DIAGNOSTIC FUNCTION

TCM detects the abnormality in the throttle position signal sent from the ECM.

DESCRIPTIONS OF MONITOR METHODS

- The difference between the throttle position signal received from the ECM and the corresponding turnover value is 1.37 V or more, and this status continues for 1 second.

MONITOR EXECUTION

- Transmission range:D

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

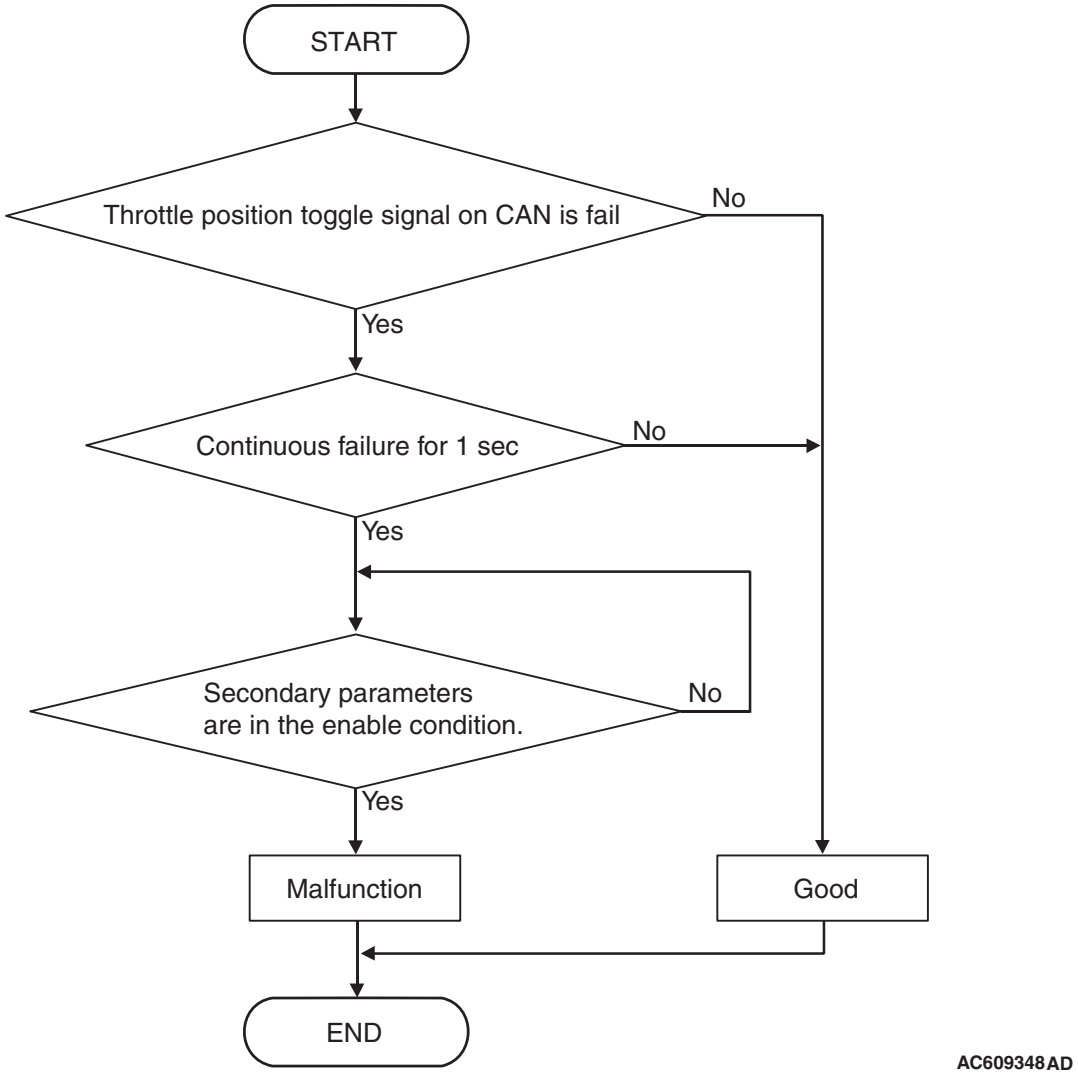
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0705: Malfunction of transmission range switch
- P0715: Malfunction of primary pulley speed sensor
- P0720: Malfunction of secondary pulley speed sensor
- P0725: Malfunction of engine speed
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)

- Transmission range switch
- Primary pulley speed sensor
- Secondary pulley speed sensor

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Transmission range switch position: D.
- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Throttle position toggle signal on CAN: fail. (1 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of the CAN bus
- Malfunction of engine system
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17).

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STEP 2. M.U.T.-III diagnosis code
Check if the engine-related diagnosis code is set.

Q: Is diagnosis code set?
YES : Diagnose the engine control system.
NO : Go to Step 3.

STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?
YES : Intermittent malfunction
NO : Replace TCM.

DTC P1710: Malfunction of Vehicle Speed Signal

DIAGNOSTIC FUNCTION
TCM conducts fault detection by detecting the rapid change in the estimated vehicle speed signal received from the ABC-ECU.

JUDGEMENT CRITERIA
- Difference between the estimated vehicle speed and the one measured before 0.1 second is 29 km/h (18 mph) or more.
- The status with the vehicle speed of 10 km/h (6.2 mph) or more and with the estimated vehicle speed of 2 km/h (1.2 mph) or less continues for 20 seconds.

PROBABLE CAUSES
- Malfunction of the CAN bus
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Troubleshoot the CAN system if diagnosis code U0121 is set.

Q: Is the diagnosis code U0121 set?
YES : Diagnose the CAN system.
NO : Go to Step 2.

STEP 2. M.U.T.-III data list
- Item 21: Vehicle speed (inference)
- Item 22: Real vehicle speed

OK: Vehicle speed signal and vehicle speed do not differ greatly.

Q: Is the check result normal?
YES : Intermittent malfunction
NO : Go to Step 3.

STEP 3. Check ABS-related diagnosis codes.

Q: Is the ABS-related diagnosis code set?
YES : Carry out the appropriate troubleshooting.
NO : Go to Step 4.

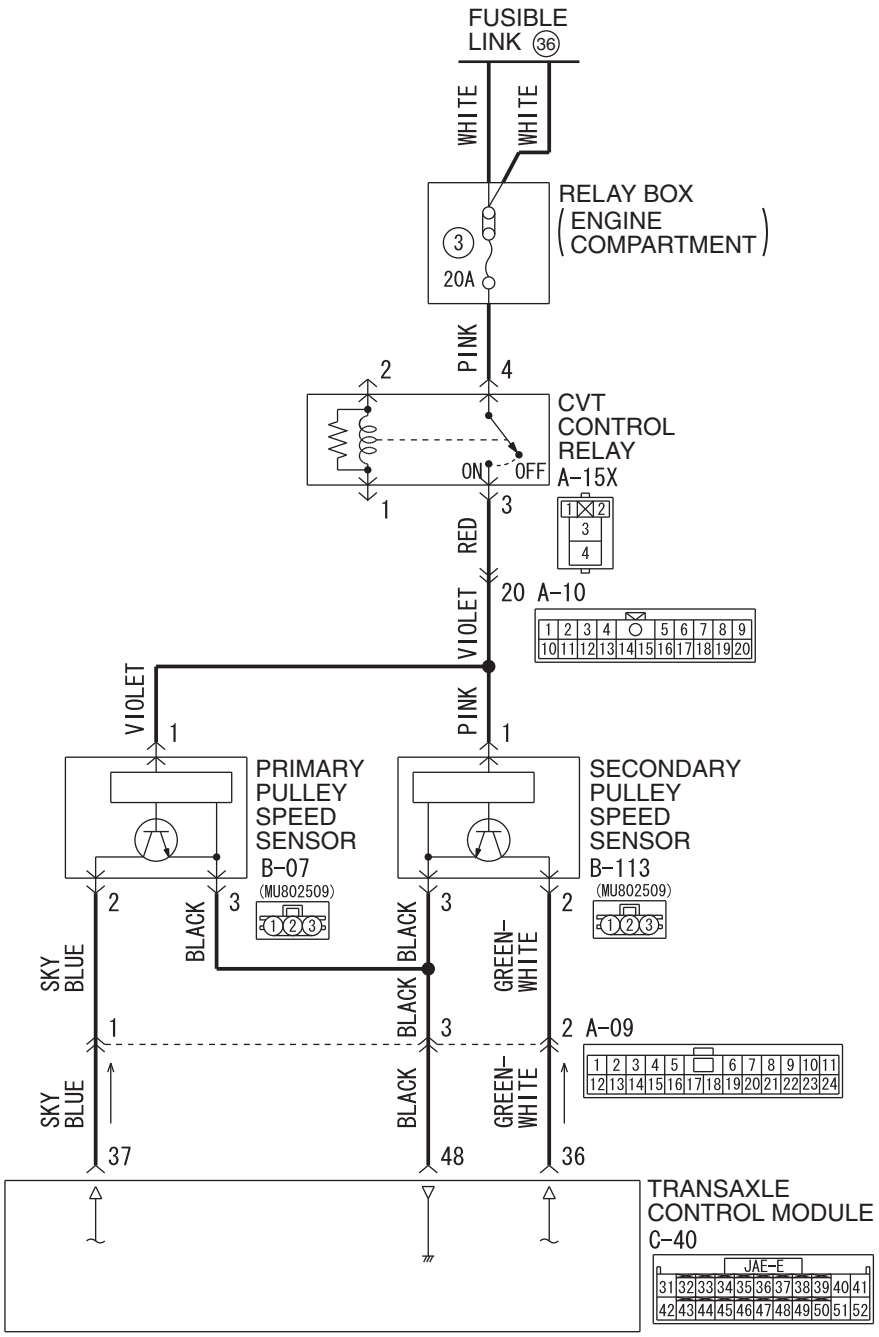
STEP 4. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1723: Abnormality in Speed Sensor System Function

SPEED SENSOR SYSTEM CIRCUIT



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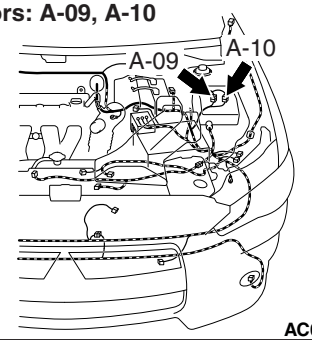
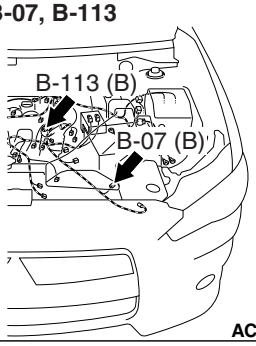
TSB Revision

Connectors: A-09, A-10



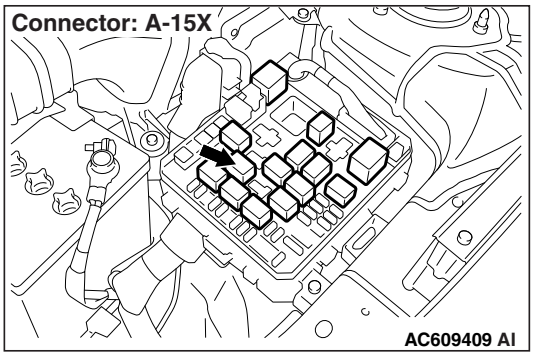
AC608142 AP

Connectors: B-07, B-113



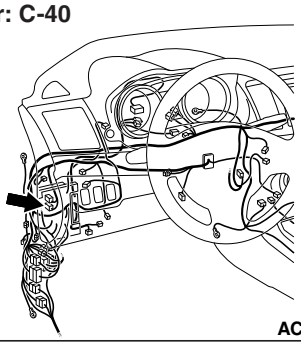
AC608144 AG

Connector: A-15X



AC609409 AI

Connector: C-40



AC608145 BV

DIAGNOSTIC FUNCTION

TCM detects the abnormal wave pattern of the speed sensor signal.

DESCRIPTIONS OF MONITOR METHODS

- Rotational fluctuation of primary pulley is large (for 1 second).
- Rotational fluctuation of secondary pulley is large (for 1 second).

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

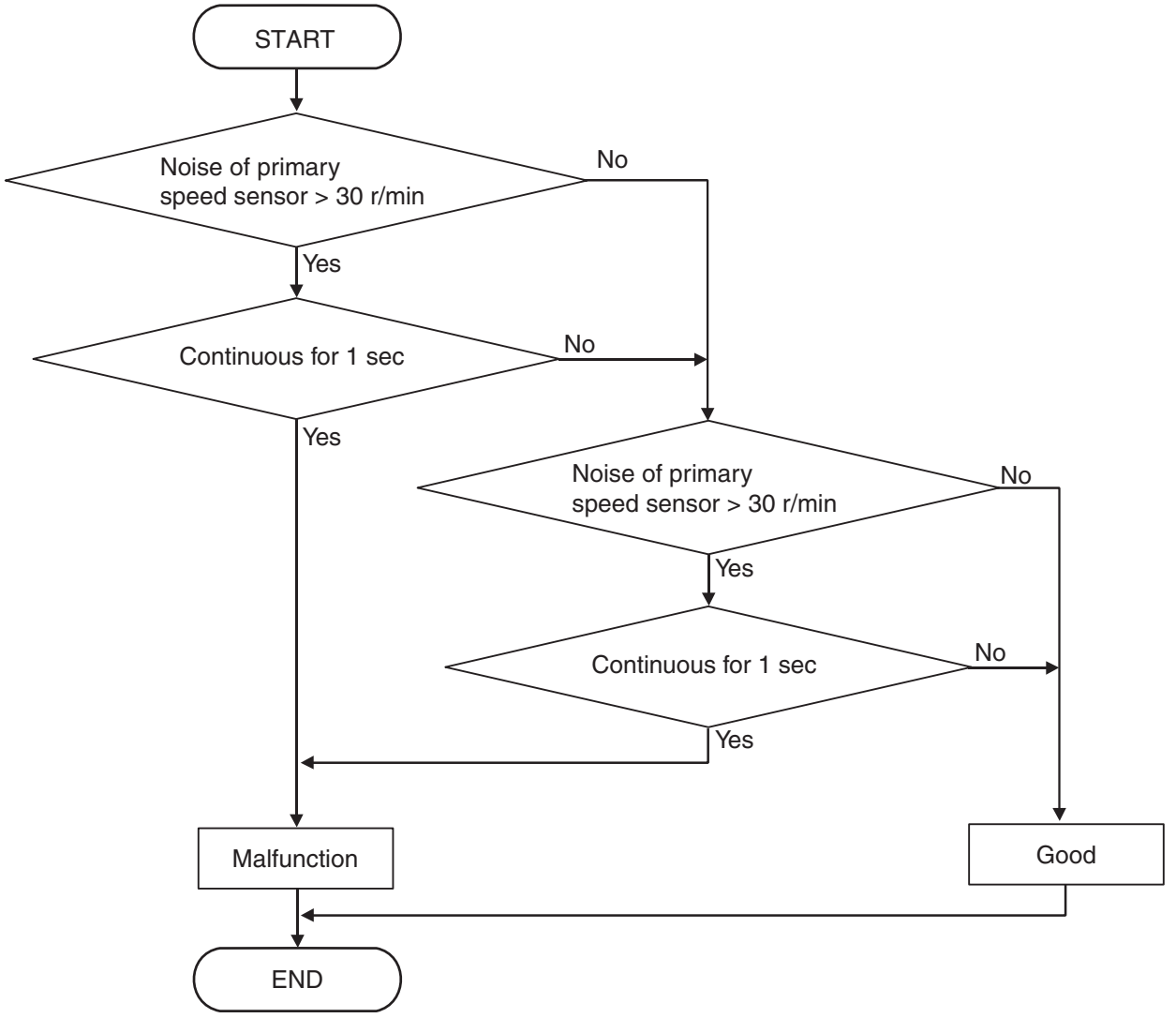
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Voltage of battery: 9 volts or more.
- Voltage of battery: 16 volts or less.

Judgment Criteria

- Noise of primary pulley or primary pulley speed sensor signal: more than 30 r/min. (1 second)
- Noise of primary pulley or secondary pulley speed sensor signal: more than 30 r/min. (1 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of primary pulley speed sensor
- Malfunction of secondary pulley speed sensor
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check the following connector:
- C-40 TCM connector
- B-07 Primary pulley speed sensor connector
- B-113 Secondary pulley speed sensor connector

Check for the connection with terminals.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the defective connector.

STEP 2. Use an oscilloscope to measure the wave patterns of the primary pulley speed sensor and secondary pulley speed sensor.
Refer to P.23A-132.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the primary pulley speed sensor or secondary pulley speed sensor.

STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1740: Malfunction of Lockup/Select Switching Solenoid Valve

SOLENOID VALVE SYSTEM CIRCUIT
Refer to P.23A-61.

DIAGNOSTIC FUNCTION
TCM detects abnormal operation of the lockup/select switching solenoid valve.

DESCRIPTIONS OF MONITOR METHODS
- Specified amount of current is not flown to the lockup/select switching solenoid valve because of an open or short circuit.

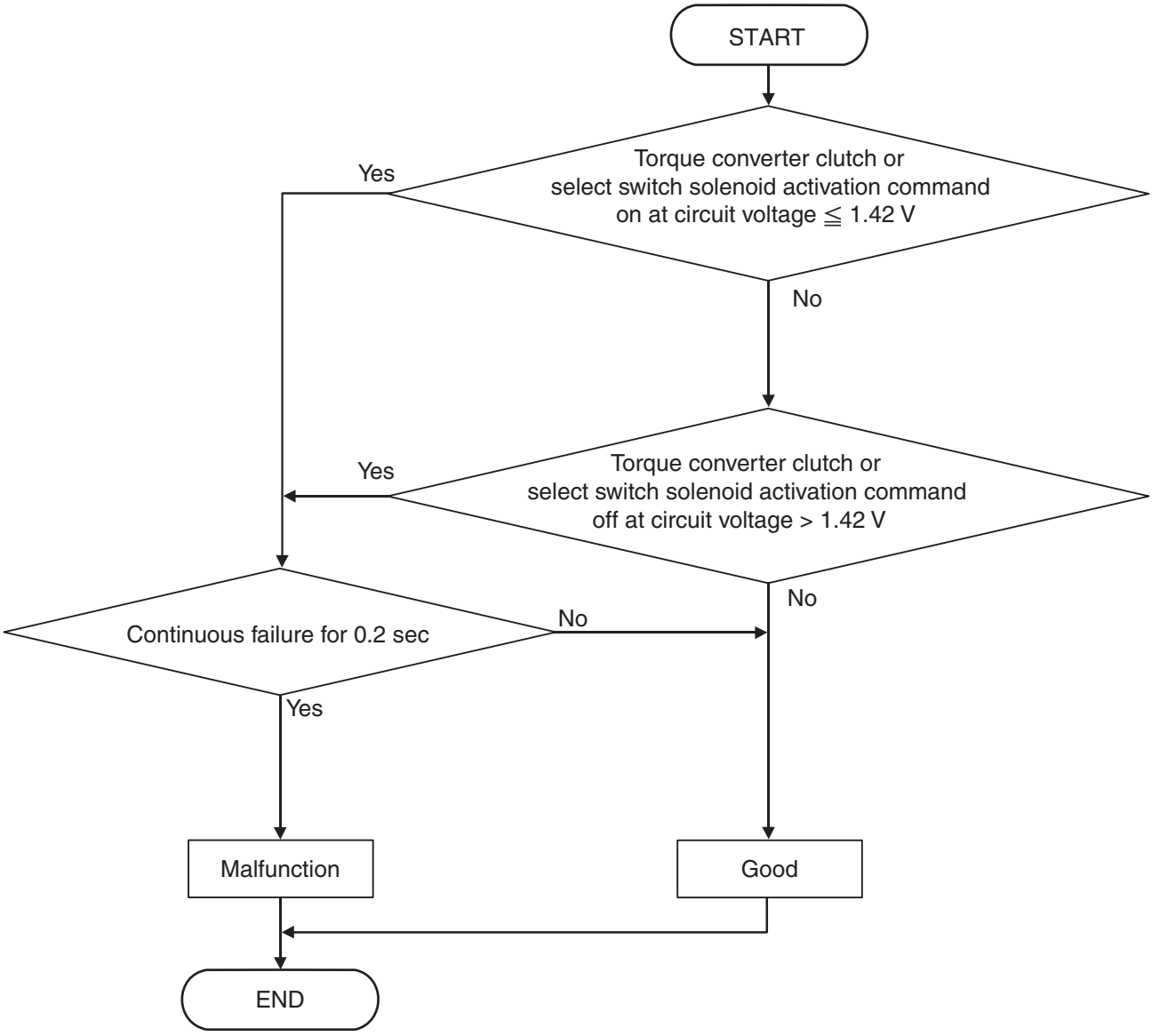
MONITOR EXECUTION
- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function

Sensor (The sensor below is determined to be normal)
- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Judgment Criteria

- Lockup/select switching solenoid valve activation command (ON voltage): 1.42 volts or less (0.2 second)
- Lockup/select switching solenoid valve activation command (OFF voltage): more than 1.42 volts (0.2 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty lockup/select switching solenoid valve)
- Damaged wiring harness and connectors
- Malfunction of TCM

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty lockup/select switching solenoid valve)
- Damaged wiring harness and connectors
- Malfunction of TCM

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DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
Item 36: LU/SEL changeover SOL. output
Item 37: LU/SEL changeover SOL. monitor

OK: Check that the output and monitor do not differ greatly.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:
- B-08 CVT assembly connector
- C-41 TCM connector
- A-09 Intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check for open circuit and short to ground in the wiring harness between the TCM connector and the CVT assembly connector.
Between C-41 TCM connector (terminal No.14) and B-08 CVT assembly connector (terminal No.4)

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Lockup/select switching solenoid valve single unit check
Refer to P.23A-143.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the valve body assembly.

STEP 5. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1745: Monitoring of Percentage Change in Pulley Ratio

DIAGNOSTIC FUNCTION
TCM conducts fault detection by monitoring the internal calculated value.

JUDGEMENT CRITERIA
Percentage change in pulley ratio is larger than the standard value.

PROBABLE CAUSES
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1773: Malfunction of ABS

DIAGNOSTIC FUNCTION
TCM detects the ABS abnormality.

DESCRIPTIONS OF MONITOR METHODS
- When the ABS error signal reception continues for 0.5 seconds.

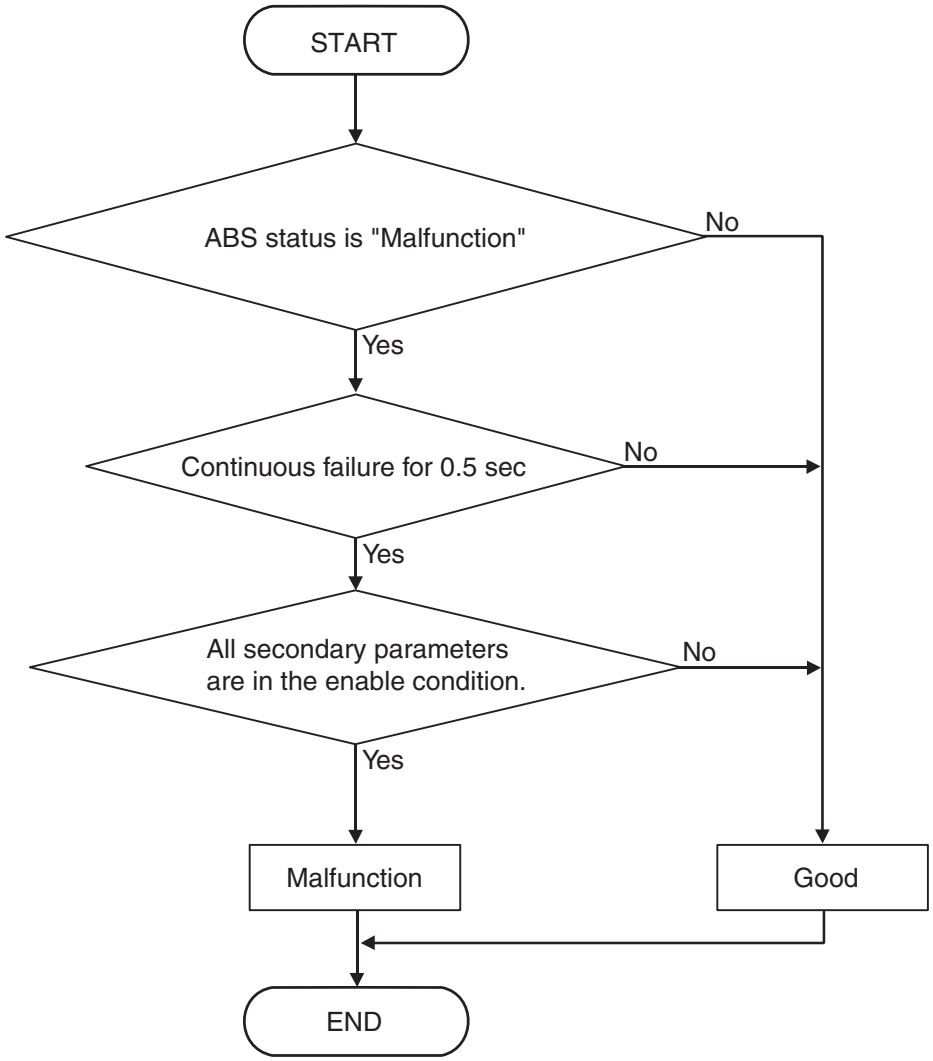
MONITOR EXECUTION
- When 1.05 seconds have elapsed after TCM started (not during M.U.T.-III communication)

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

Other Monitor (There is no temporary DTC stored in memory for the item monitored below)
- Not applicable

Sensor (The sensor below is determined to be normal)
- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Time after TCM start: more than 1.05 seconds.

Judgment Criteria

- ABS status: malfunction

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more, not during M.U.T.-III communication)

PROBABLE CAUSES

- Malfunction of the ABS system
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. ABS system DTC check

Q: Is the ABS system DTC set?

YES : Carry out the troubleshooting for ABS.
NO : Go to Step 2.

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STEP 2. Symptom recheck after erasing diagnosis code

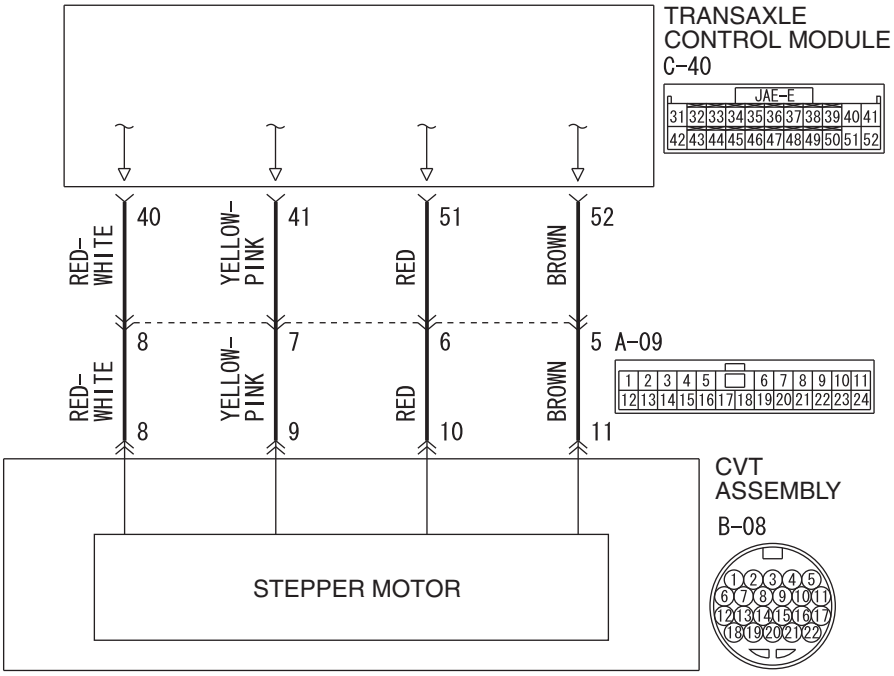
Q: Is the check result normal?

YES : Intermittent malfunction

NO : Replace TCM.

DTC P1777: Malfunction of Stepper Motor

STEPPER MOTOR SYSTEM CIRCUIT



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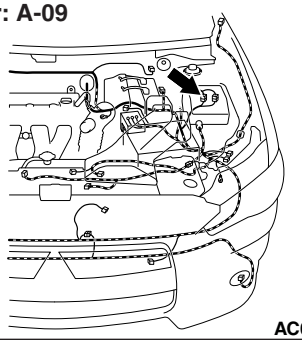
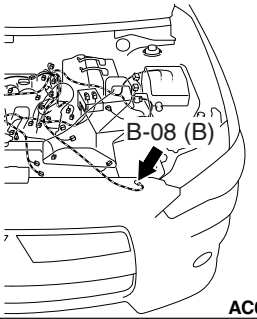
Connector: A-09



AC608142AN

Connector: B-08



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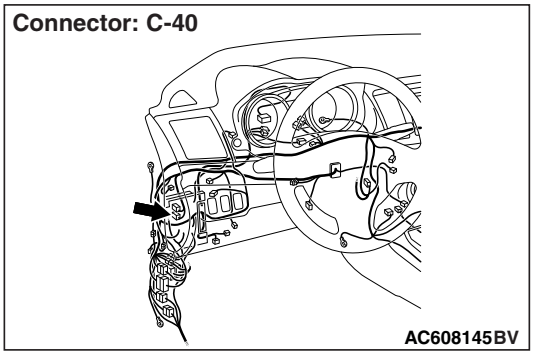


DIAGNOSTIC FUNCTION

TCM conducts fault detection by monitoring the voltage of each coil for stepper motors.

DESCRIPTIONS OF MONITOR METHODS

- The specified voltage is not applied to each coil for stepper motors for 0.2 second because of an open or short circuit.

MONITOR EXECUTION

- Continuous

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

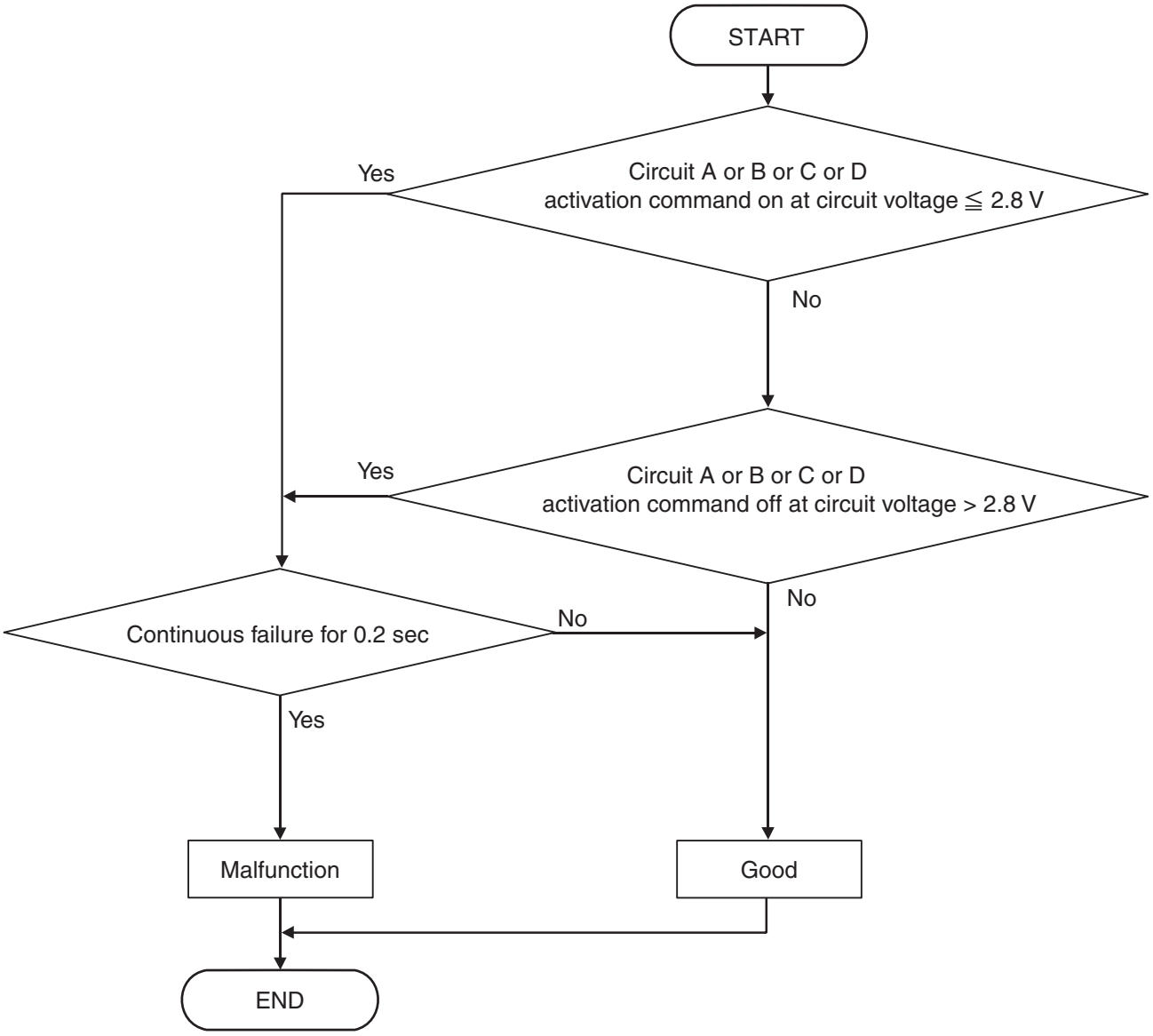
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Judgment Criteria

- Stepping motor activation command (ON voltage): 2.8 volts or less. (0.2 second)
- Stepping motor activation command (OFF voltage): More than 2.8 volts. (0.2 second)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of valve body assembly (Faulty stepper motor)
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check the following connector:
- B-08 CVT assembly connector
- C-40 TCM connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the defective connector.

STEP 2. Check for open circuit and short to ground in the wiring harness between the TCM connector and the stepper motor.
- Between TCM connector (terminal No.40) and body ground
- Between TCM connector (terminal No.41) and body ground
- Between TCM connector (terminal No.51) and body ground
- Between TCM connector (terminal No.52) and body ground

OK: Resistance value is approximately 15 Ω.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check for open circuit and short to ground in the wiring harness between TCM and the stepper motor
- Between C-40 TCM connector (terminal No.40) and B-08 CVT assembly connector (terminal No.8)
- Between C-40 TCM connector (terminal No.41) and B-08 CVT assembly connector (terminal No.9)
- Between C-40 TCM connector (terminal No.51) and B-08 CVT assembly connector (terminal No.10)
- Between C-40 TCM connector (terminal No.52) and B-08 CVT assembly connector (terminal No.11)

Check that there is no continuity in both sides of the connectors and that no short circuit is present between the connectors and the body ground.

Q: Is the check result normal?

YES : Replace the valve body assembly.
NO : Repair the wiring harness.

STEP 4. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC P1778: Malfunction of Stepper Motor

STEPPER MOTOR SYSTEM CIRCUIT

Refer to P.23A-103.

DIAGNOSTIC FUNCTION

TCM conducts the fault detection of the stepper motor by comparing the target value of the primary pulley speed with the actual value. (Target value: Actual secondary pulley speed multiplied by pulley ratio corresponding to stepper motor position) (Actual measurement value: Actual primary pulley speed)

JUDGEMENT CRITERIA

The difference between the target value of the primary pulley speed and the actual measurement value is greater than the standard value, the difference between the target pulley ratio and the actual pulley ratio is 0.3 or greater, and this status continues for 5 seconds.

PROBABLE CAUSES

- Malfunction of TCM
- Malfunction of valve body assembly (Faulty stepper motor)

DIAGNOSTIC PROCEDURE

STEP 1. Check other diagnosis codes.

Q: Are other diagnosis codes set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 2.

STEP 2. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace the TCM, and then go to Step 3.

STEP 3. Retest the system.

Q: Is the check result normal?

YES : The inspection is complete.
NO : Replace the valve body assembly.

DTC P1902: Malfunction of Engine System

DIAGNOSTIC FUNCTION

- When the ECM detects the malfunction of the ETV system, the ECM enters the limp-home control mode (throttle valve angle: approximately 20%).
- TCM begins controlling the following items: lockup inhibition, increase of secondary pressure, fixing of pulley ratio line.

JUDGEMENT CRITERIA

TCM receives the limp-home signal from ECM via CAN.

PROBABLE CAUSES

- Malfunction of the engine system (ETV)

DIAGNOSIS PROCEDURE

STEP 1. Check the engine-related diagnosis code.

Q: Is the engine-related diagnosis code set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 2.

STEP 2. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace the TCM.

DTC U0001: Malfunction of CAN Communication Circuit

DIAGNOSTIC FUNCTION

TCM conducts bus-off detection.

DESCRIPTIONS OF MONITOR METHODS

- TCM cannot receive the periodic communication data.

MONITOR EXECUTION

- When 1.05 seconds have elapsed after TCM started

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

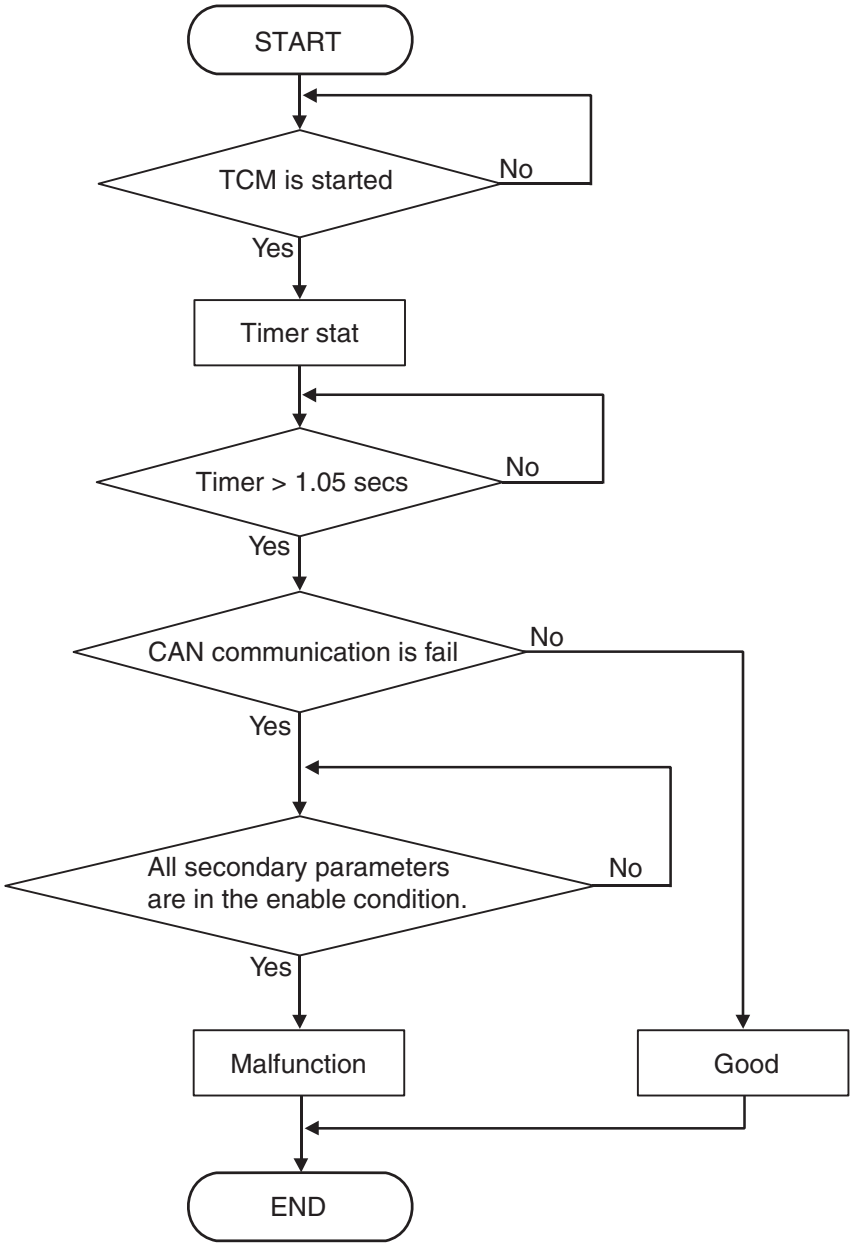
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0703: Malfunction of stoplight switch
- P0705: Malfunction of transmission range switch
- P0715: Malfunction of primary pulley speed sensor
- P0720: Malfunction of secondary pulley speed sensor
- P0725: Malfunction of engine speed
- P0741: Abnormality in lockup function
- P0746: Abnormality in hydraulic control system function
- P0841: Abnormality in line pressure sensor function
- P0868: Secondary pressure drop
- P1706: Malfunction of throttle signal
- P1773: Malfunction of ABS
- U0100: CAN time-out error (Engine)

Sensor (The sensor below is determined to be normal)

- Stoplight switch
- Transmission range switch
- Primary pulley speed sensor
- Secondary pulley speed sensor

LOGIC FLOW CHARTS (Monitor Sequence)



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DTC SET CONDITIONS

Check Conditions

- Time after TCM start: more than 1.05 seconds.
- Voltage of battery: 9 volts or more
- Voltage of battery: 16 volts or less

Judgment Criteria

- CAN communication: fail

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of the CAN bus

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DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17).

DTC U0100: CAN Time-out Error (Engine)

DIAGNOSTIC FUNCTION

TCM receives periodic communication data from the ECM via CAN bus lines.

DESCRIPTIONS OF MONITOR METHODS

- TCM cannot receive the periodic communication data from the ECM.

MONITOR EXECUTION

- When 1.05 seconds have elapsed after TCM started

MONITOR EXECUTION CONDITIONS (OTHER MONITOR AND SENSOR)

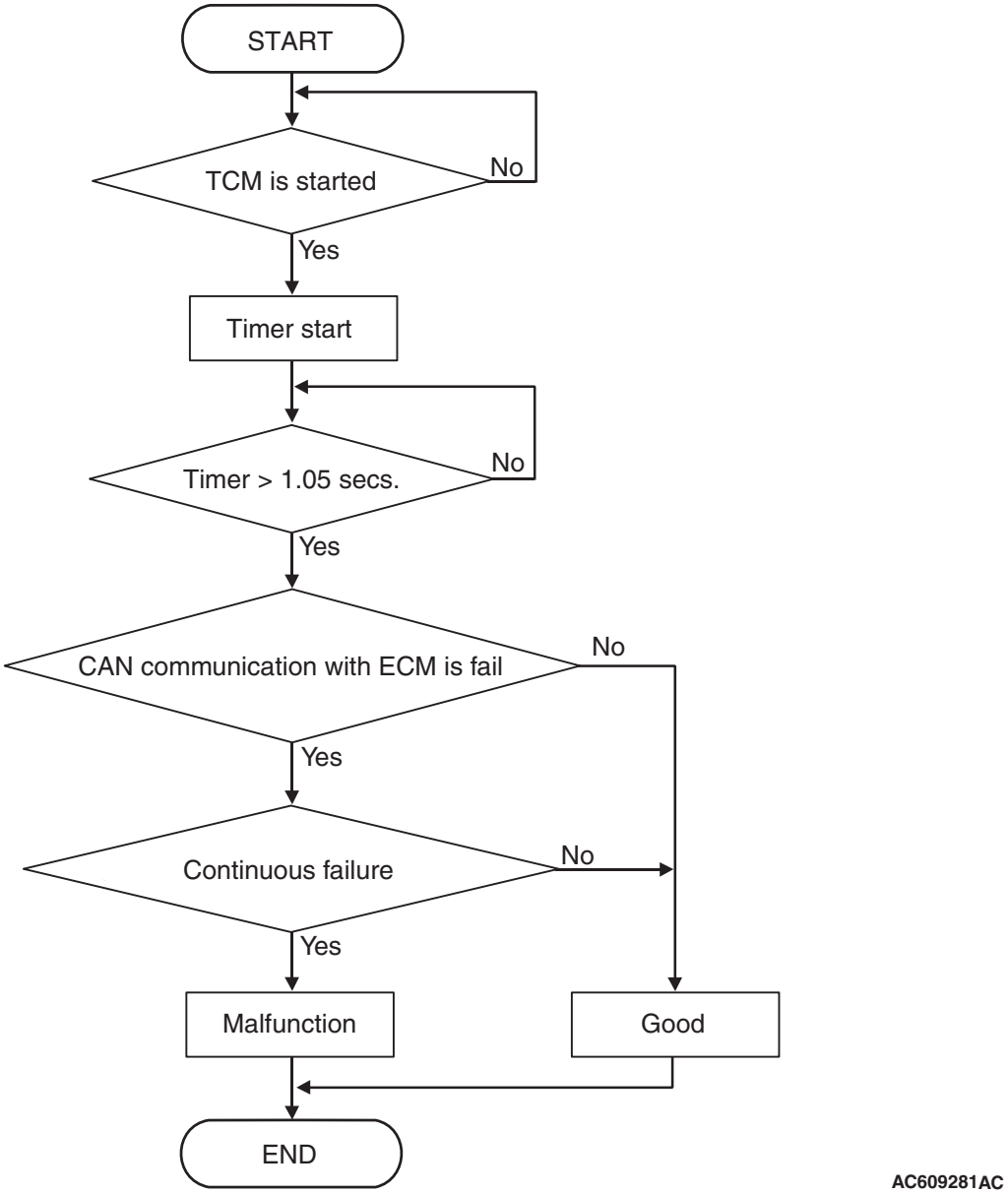
Other Monitor (There is no temporary DTC stored in memory for the item monitored below)

- P0725: Malfunction of engine speed
- P0868: Secondary pressure drop

Sensor (The sensor below is determined to be normal)

- Not applicable

LOGIC FLOW CHARTS (Monitor Sequence)



DTC SET CONDITIONS

Check Conditions

- Time after TCM start: more than 1.05 seconds.
- Voltage of battery: 9 volts or more
- Voltage of battery: 16 volts or less

Judgment Criteria

- CAN communication with ECM: fail. (500 millisecond)

OBD-II DRIVE CYCLE PATTERN

Ignition switch : ON (start the engine and keep it for 10 seconds or more)

PROBABLE CAUSES

- Malfunction of the CAN bus
- Engine ECU malfunction
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17).

STEP 2. M.U.T.-III diagnosis code
Check if the engine-related diagnosis code is set.

Q: Is the engine-related diagnosis code set?
YES : Carry out the appropriate troubleshooting.
NO : Go to Step 3.

STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?
YES : Intermittent malfunction
NO : Replace TCM.

DTC U0121: CAN Time-out Error (ABS)

DIAGNOSTIC FUNCTION
TCM determines that malfunction is present if the periodic communication data sent from the ABS-ECU via CAN bus lines is abnormal.

JUDGEMENT CRITERIA
TCM cannot receive the periodic communication data from ABS-ECU.

PROBABLE CAUSES
- Malfunction of the CAN bus
- ABS-ECU malfunction
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics
Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17).

STEP 2. M.U.T.-III diagnosis code
Check if the ABS-related diagnosis code is set.

Q: Is the ABS-related diagnosis code set?
YES : Carry out the appropriate troubleshooting.
NO : Go to Step 3.

STEP 3. Symptom recheck after erasing diagnosis code

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

DTC U0141: CAN Time-out Error (ETACS)

DIAGNOSTIC FUNCTION

TCM determines that malfunction is present if the periodic communication data sent from ETACS-ECU via the CAN bus lines is abnormal.

JUDGEMENT CRITERIA

TCM cannot receive the periodic communication data from ETACS-ECU.

PROBABLE CAUSES

- Malfunction of the CAN bus
- Malfunction of ETACS-ECU
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III CAN bus diagnostics

Use M.U.T.-III to perform the CAN bus diagnosis.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C – Troubleshooting, Diagnosis Code Chart P.54C-17.)

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

Check if ETACS-related diagnosis code is set.

Q: Is the ECU-related diagnosis code set?

YES : Carry out the appropriate troubleshooting.
NO : Go to Step 3.

STEP 3. Symptom recheck after erasing diagnosis code

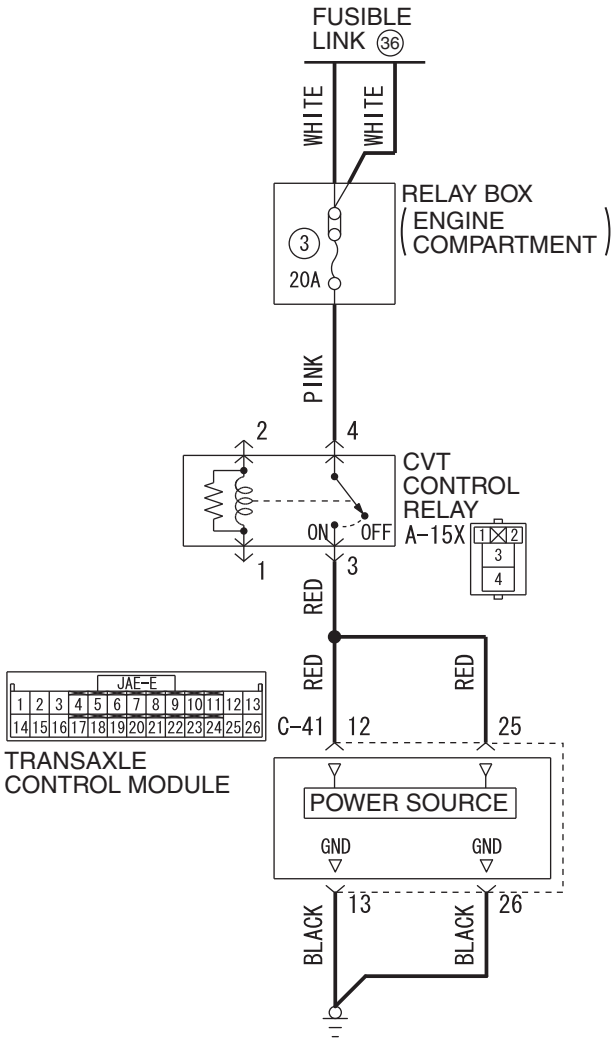
Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

SYMPTOM PROCEDURES

Inspection Procedure 1: TCM cannot communication with M.U.T.-III.

TCM POWER SUPPLY CIRCUIT



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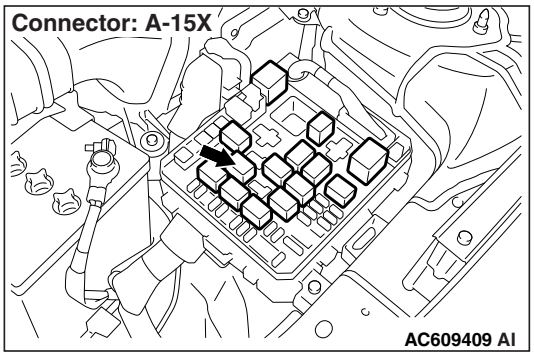

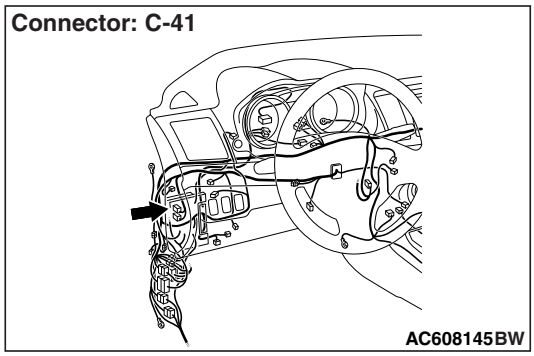

SYMPTOMS

TCM cannot be turned ON.

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PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Check the following connector:
- A-18X CVT control relay connector
- C-41 TCM connector

Check each terminal for imperfect contact.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Repair the defective connector.

STEP 2. Check for open circuit in the wiring harness between the relay box connector and the TCM connector.
- Between A-18X CVT control relay connector (terminal No.3) and C-41 TCM connector (terminal No.12)
- Between A-18X CVT control relay connector (terminal No.3) and C-41 TCM connector (terminal No.25)

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the wiring harness.

STEP 3. Check for open circuit in the wiring harness between the TCM connector and the ground.
- Between C-41 TCM (terminal No.13) and ground
- Between C-41 TCM (terminal No.26) and ground

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Retest the system.

Recheck the trouble symptom.

Q: Does the malfunction take place again?

YES : Replace TCM.
NO : Intermittent malfunction

Inspection Procedure 2: Vehicle Creeps in the N Range.

SYMPTOMS

Engine torque is transferred to the driveshaft in the N range, and the vehicle consequently moves forward or rearward.

PROBABLE CAUSES

- Malfunction of the transmission range switch
- Malfunction of CVT assembly
- Damaged wiring harness and connectors
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

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

Item 49: Transmission range switch

Check that the service data changes when the selector lever is moved to all ranges.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Go to Step 3.

STEP 2. Check of the transmission range switch and shift control cable

Refer to P.23A-141.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Adjust the transmission range switch and the control cable.

STEP 3. Transmission range switch continuity check

Refer to P.23A-141.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Replace the transmission range switch.

STEP 4. Retest the system.

- Replace TCM.
- Recheck the trouble symptom.

Q: Does the malfunction take place again?

YES : Replace the CVT assembly.

NO : The inspection is complete.

Inspection Procedure 3: Shock is experienced during N to D and/or N to R shifting operation.

SYMPTOMS

Deep shock is experienced when the selector lever is moved from the N to R range or from the N to D range.

PROBABLE CAUSES

- Abnormal line pressure
- Malfunction of TCM
- Malfunction of CVT assembly

DIAGNOSTIC PROCEDURE

STEP 1. Engine idling speed check

Q: Is the check result normal?

YES : Go to Step 2.
NO : Refer to the "Engine troubleshooting."

STEP 2. Line pressure check

Carry out "hydraulic test" (Refer to P.23A-27).

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair according to the hydraulic pressure test diagnosis table.

STEP 3. Retest the system.

- Replace TCM.
- Recheck the trouble symptom.

Q: Does the malfunction take place again?

YES : Replace the CVT assembly.
NO : The inspection is complete.

Inspection Procedure 4: Poor Acceleration or Incomplete Shifting Operation

SYMPTOMS

Vehicle does not creep. Incomplete shifting operation or extremely poor acceleration is observed.

PROBABLE CAUSES

- Malfunction of forward clutch
- Malfunction of torque converter
- Malfunction of CVT assembly
- Malfunction of valve body assembly
- Malfunction of TCM

DIAGNOSTIC PROCEDURE

STEP 1. Engine-related troubleshooting check

Check for engine malfunction.

Q: Is the check result normal?

YES : Go to Step 2.
NO : Carry out the engine-related troubleshooting.

STEP 2. Torque converter stall test implementation
Refer to P.23A-26.

Q: Is the check result normal?

YES : Go to Step 3.
NO (stall speed is low.) : Replace the torque converter.
NO (stall speed is high.) : Go to Step 4.

STEP 3. Forward clutch pressure check
Carry out "hydraulic test"(Refer to P.23A-27).

Q: Is the check result normal?

YES : Replace the forward clutch.
NO : Replace the valve body assembly.

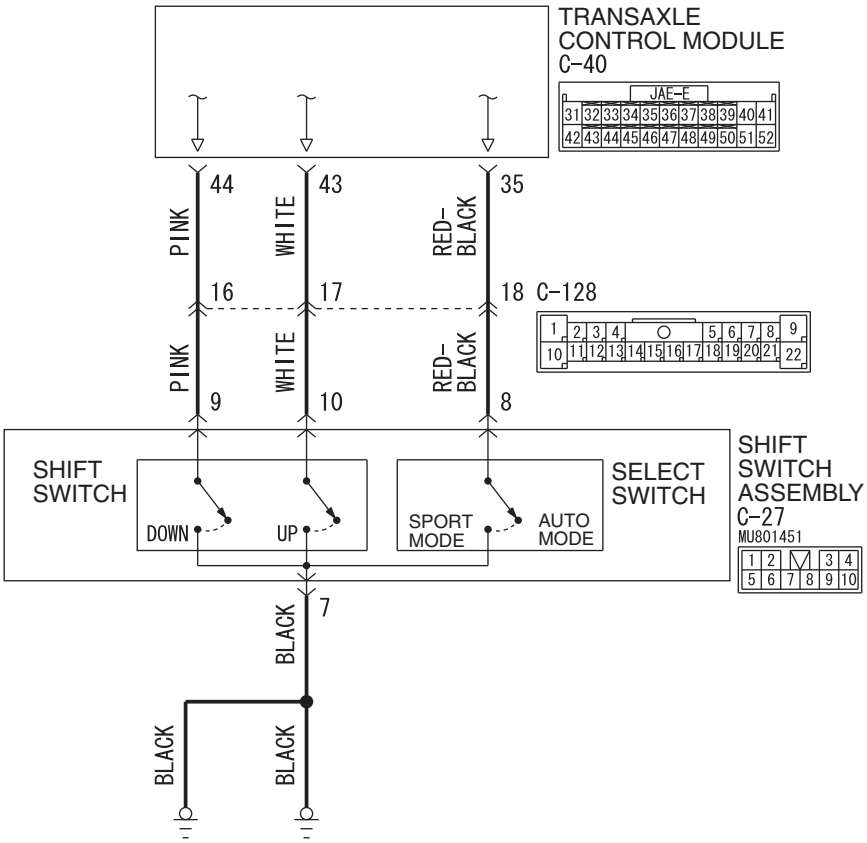
STEP 4. Retest the system.
Replace TCM, and then recheck symptoms.

Q: Does the malfunction take place again?

YES : Replace the CVT assembly.
NO : The inspection is complete.

Inspection Procedure 5: Cannot be Changed in Sport Mode. <Vehicles with sport mode>

SHIFT SWITCH SYSTEM CIRCUIT



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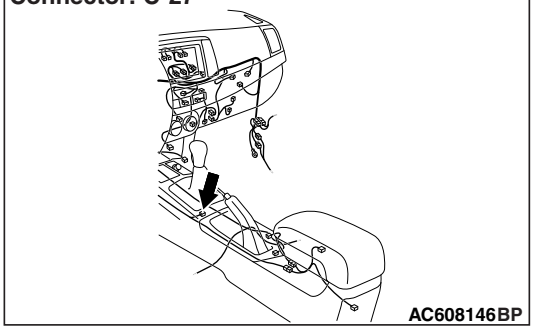
TSB Revision

Connector: C-27



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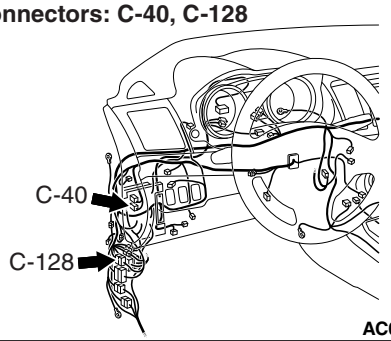
Connectors: C-40, C-128



AC608145CR

SYMPTOMS

Gears cannot be changed even when the selector lever is moved to "+" or "–" position during sport mode.

PROBABLE CAUSES

- Damaged wiring harness and connectors
- Malfunction of TCM
- Malfunction of selector lever assembly (Faulty shift switch assembly)

DIAGNOSTIC PROCEDURE

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

- Item 52: Select switch (up)
- Item 53: Select switch (down)

(Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Shift switch assembly single unit check

Refer to P.23A-152.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Replace the selector lever assembly.

STEP 3. Check the following connector:

- C-27 selector lever assembly connector
- C-40 TCM connector
- C-128 intermediate connector

Check the terminals for a contact status problem and internal short circuit.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the connector concerned.

STEP 4. Check for open circuit and short to ground in the wiring harness between the selector lever assembly connector and the TCM connector.

- Between C-27 selector lever assembly connector (terminal No.7) and body ground
- Between C-27 selector lever assembly connector (terminal No.8) and C-40 TCM connector (terminal No.35)
- Between C-27 selector lever assembly connector (terminal No.9) and C-40 TCM connector (terminal No.44)
- Between C-27 selector lever assembly connector (terminal No.10) and C-40 TCM connector (terminal No.43)
- Between C-27 selector lever assembly connector (terminal No.8) and body ground
- Between C-27 selector lever assembly connector (terminal No.9) and body ground
- Between C-27 selector lever assembly connector (terminal No.10) and body ground

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

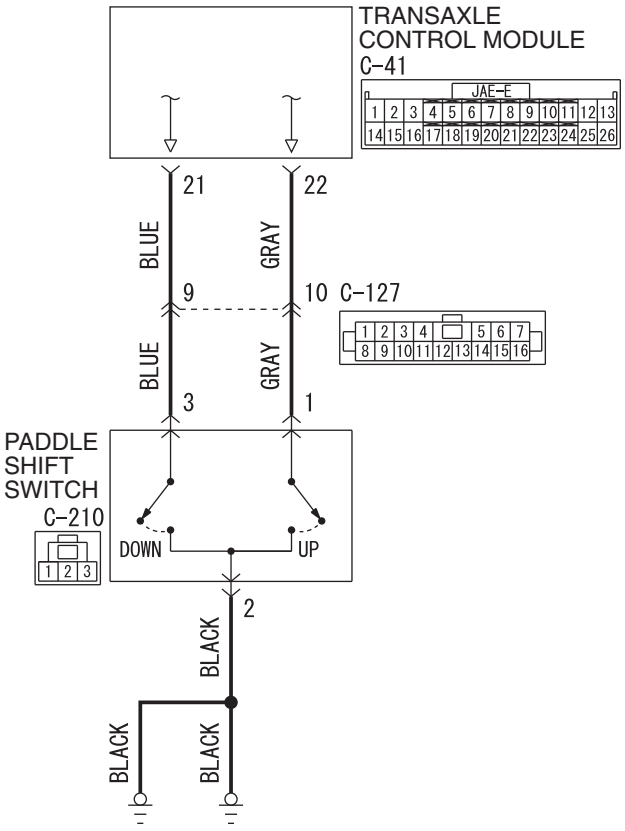
STEP 5. Retest the system.

Q: Does the malfunction take place again?

YES : Replace TCM.
NO : Intermittent malfunction

Inspection Procedure 6: Cannot be Changed with the Paddle Shift. <Vehicles with sport mode>

PADDLE SHIFT SWITCH SYSTEM CIRCUIT



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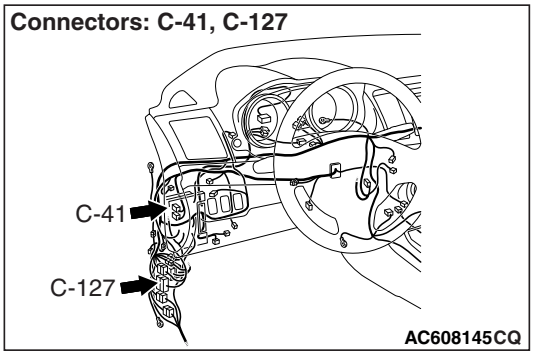
Connectors: C-41, C-127



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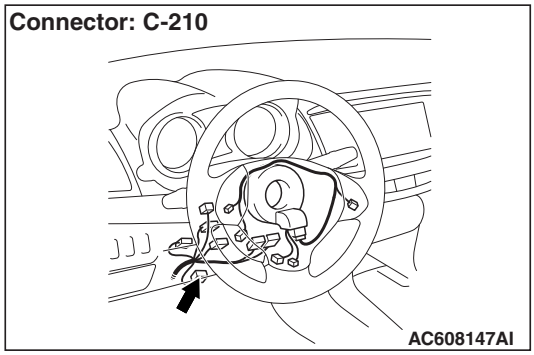
Connector: C-210



AC608147AI

SYMPTOMS

The transaxle does not upshift or downshift when the paddle shift is operated.

PROBABLE CAUSES

- Malfunction of paddle shift switch
- Damaged wiring harness and connectors
- Malfunction of TCM

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DIAGNOSTIC PROCEDURE

STEP 1. M.U.T.-III data list
- Item 54: Paddle switch (up)
- Item 55: Paddle switch (down)

(Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Go to Step 2.

STEP 2. Check the following connector:
- C-41 TCM connector
- C-210 paddle shift switch connector
- C-127 intermediate connector

Check the contact status of the terminals.

Q: Is the check result normal?

YES : Go to Step 3.
NO : Repair the damaged connector.

STEP 3. Paddle shift switch single unit check

Refer to P.23A-145.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Replace the paddle shift assembly.

STEP 4. Check for open circuit in the wiring harness between the TCM connector and the paddle shift switch connector
- Between C-41 TCM connector (terminal No.22) and C-210 paddle shift switch connector (terminal No.1)
- Between C-41 TCM connector (terminal No.21) and C-210 paddle shift switch connector (terminal No.3)
- Between C-210 paddle shift switch connector (terminal No.2) and the body ground

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

STEP 5. Retest the system.

Q: Is the check result normal?

YES : Intermittent malfunction
NO : Replace TCM.

Inspection Procedure 7: The fluid temperature warning lamp illuminates too frequently.

PROBABLE CAUSES

- Thermal deterioration of the transmission fluid
- Damaged wiring harness and connectors
- Malfunction of the transmission fluid temperature sensor
- Clogged coolant system
- Clogged air-cooled transmission fluid cooler system
- Malfunction of the thermo valve
- Malfunction of TCM
- Malfunction of CVT assembly

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III special function

Check the deterioration level of the transmission fluid.

NOTE: The transmission fluid deterioration level is the accumulation of the values counted depending on the fluid temperature of a certain period of time, and it shows the thermal deterioration level of the transmission fluid.

Q: Is the deterioration level of the transmission fluid less than 210,000?

YES : Go to Step 2.
NO : Replace the transmission Fluid.

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

Item 5: Transmission fluid temperature sensor (Refer to Data List Reference Table P.23A-125.)

Q: Is the check result normal?

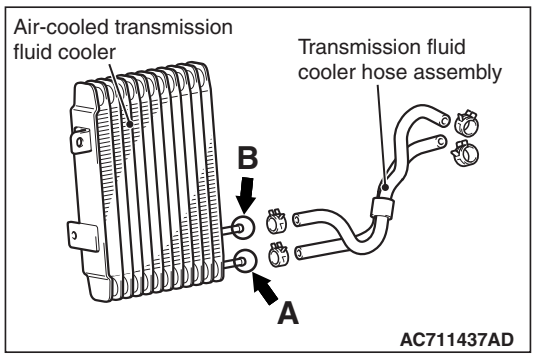
YES : Go to Step 3.
NO : Diagnosis code No.P0712, P0713: Diagnose the transmission fluid temperature sensor P.23A-44.

STEP 3. Air-cooled transmission fluid cooler system clogging check <2.4 L engine>

Check if the air-cooled transmission fluid cooler system is clogged according to the following procedure.

⚠ CAUTION
Do not reuse the drained transmission fluid.

(1) Remove the transmission fluid cooler hose assembly.
(2) Blow air into the transmission fluid cooler hose assembly, and check that the air comes out from the opposite side.
(3) Blow air into the air-cooled transmission fluid cooler (A in the figure), and check that the air comes out from the opposite side (B in the figure).
(4) Install the parts, and replenish the transmission fluid to the specified quantity.



Q: Is the check result normal?

YES : Go to Step 4.
NO : Replace the part(s) having damage or other problems.

STEP 4. Thermo valve check

Refer to P.23A-162.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Replace the thermo valve.

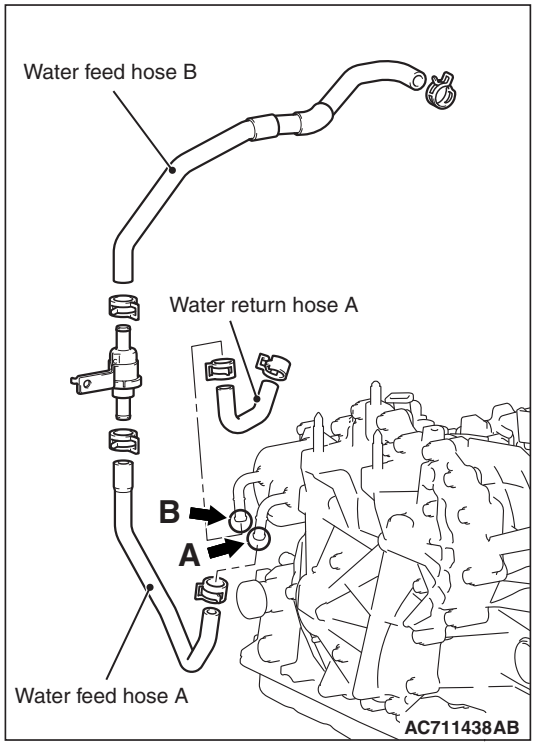
STEP 5. Coolant system clogging check

Check if the coolant system is clogged according to the following procedure.

⚠ CAUTION

Do not reuse the drained coolant.

(1) Drain the coolant.
(2) Remove water feed hose A, water feed hose B and water return hose A.
(3) Blow air into the removed parts, and check that the air comes out from the opposite side.
(4) Blow air into the coolant outlet (A in the figure), and check that the air comes out from the opposite side (B in the figure).
(5) Install the parts, and replenish the coolant to the specified quantity.



Q: Is the check result normal?

YES : Go to Step 6.
NO : Replace the part(s) having damage or other problems.

STEP 6. Retest the system.

Q: Does a malfunction take place again?

YES : Replace the CVT assembly.
NO : Intermittent malfunction

DATA LIST REFERENCE TABLE

M1231208100535

Item No.	Display on M.U.T.-III	Check conditions		Normal conditions
1	Primary speed sensor signal	Driving conditions		Nearly the same as the tachometer display
2	Secondary speed sensor signal	Driving conditions		Nearly the same as the speedometer display
3	Primary pressure sensor signal	Always		0 V
4	Secondary pressure sensor signal	• Engine: Idling • Transmission range: N		0.5 – 3.0 V
5	Transmission fluid temperature sensor signal	Ignition switch: ON	Transmission fluid temperature: Approximately 20°C (68°F)	1.9 – 22 V
			Transmission fluid temperature: Approximately 80°C (176°F)	0.8 – 1.1 V
6	Power supply voltage	Ignition switch: ON		Battery positive voltage
7	Primary speed	Driving conditions		Nearly the same as the tachometer display
8	Secondary speed	Driving conditions		Approximately (Speedometer display) × 45
9	Engine revolution	Engine: Idling		Nearly the same as the tachometer display
11	Real variable speed ratio	Driving conditions		2.34 – 0.39
13	Accelerator position	Accelerator pedal: Fully closed		0%
		Accelerator pedal: Depressed		Opening angle value increases in response to the depression amount of the accelerator pedal.
		Accelerator pedal: Fully opened		100%
18	Primary pressure	Always		0 MPa
19	Secondary pressure	• Engine: Idling • Transmission range: N		0.1 – 3.0 MPa (14.5 – 435 psi)

Item No.	Display on M.U.T.-III	Check conditions		Normal conditions
20	Transmission fluid temperature*	Ignition switch: ON	Transmission fluid temperature: Approximately 20°C (68°F)	39 – 55 count
			Transmission fluid temperature: Approximately 80°C (176°F)	152 – 170 count
21	Vehicle speed (inference)	Driving conditions		Nearly the same as the speedometer display
22	Real vehicle speed	Driving conditions		Nearly the same as the speedometer display
26	Real step	Driving conditions		–20 to 190 step
30	LU solenoid monitor current	From lockup release to engage		0 – 0.7 A
31	LU solenoid output current	From lockup release to engage		0 – 0.7 A
32	Line pressure SOL. monitor current	• Engine: Idling • Transmission range: N		0.45 – 0.75 A
		Engine: Stalled		0.08 – 0.3 A
33	Line pressure SOL. output current	From low line pressure to high line pressure		0 – 0.8 A
34	Secondary PRS. SOL. monitor current	• Engine: Idling • Transmission range: N		0.45 – 0.75 A
		Engine: Stalled		0.08 – 0.3 A
35	Secondary PRS. SOL. monitor output current	From low secondary pressure to high secondary pressure		0 – 0.8 A
36	LU/SEL changeover SOL. output	Ignition switch: ON	Transmission range: P, N	ON
			Transmission range: 5 or more seconds have passed after the selector lever has been moved to R or D position.	OFF
37	LU/SEL changeover SOL. monitor	Ignition switch: ON	Transmission range: P, N	ON
			Transmission range: 5 or more seconds have passed after the selector lever has been moved to R or D position.	OFF
38	Stepper motor coil A	Driving conditions		ON/OFF switches alternately.
39	Stepper motor coil B	Driving conditions		ON/OFF switches alternately.

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Item No.	Display on M.U.T.-III	Check conditions		Normal conditions
40	Stepper motor coil C	Driving conditions		ON/OFF switches alternately.
41	Stepper motor coil D	Driving conditions		ON/OFF switches alternately.
42	Indicator P output	• Ignition switch: ON • Engine: Stopped	Transmission range: P	ON
			Transmission range: Other than the above	OFF
43	Indicator R output	• Ignition switch: ON • Engine: Stopped	Transmission range: R	ON
			Transmission range: Other than the above	OFF
44	Indicator N output	• Ignition switch: ON • Engine: Stopped	Transmission range: N	ON
			Transmission range: Other than the above	OFF
45	Indicator D output	• Ignition switch: ON • Engine: Stopped	Transmission range: D	ON
			Transmission range: Other than the above	OFF
46	Indicator L output <Vehicles without sport mode>	• Ignition switch: ON • Engine: Stopped	Transmission range: L	ON
			Transmission range: Other than the above	OFF
47	Indicator SP mode output <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Transmission range: Sport mode	ON
			Transmission range: Other than the above	OFF
48	Idle switch signal	• Ignition switch: ON • Engine: Stopped	Accelerator pedal: Fully closed	ON
			Accelerator pedal: Fully opened	OFF
49	Transmission range switch	• Ignition switch: ON • Engine: Stopped	Transmission range: P	P, N
			Transmission range: R	R
			Transmission range: N	P, N
			Transmission range: D	D
			Transmission range: L <Vehicles without sport mode>	L
50	Brake switch	• Ignition switch: ON • Engine: Stopped	Brake pedal: Depressed	ON
			Brake pedal: Released	OFF
51	SP mode switch <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Transmission range: Sport mode	ON
			Transmission range: Other than sport mode	OFF

Item No.	Display on M.U.T.-III	Check conditions		Normal conditions
52	Select switch (up) <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Transmission range: Upshift and hold	ON
			Transmission range: Other than the above	OFF
53	Select switch (down) <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Transmission range: Downshift and hold	ON
			Transmission range: Other than the above	OFF
54	Paddle switch (up) <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Paddle shift lever position: Upshift and hold	ON
			Paddle shift lever position: Other than the above	OFF
55	Paddle switch (down) <Vehicles with sport mode>	• Ignition switch: ON • Engine: Stopped	Paddle shift lever position: Downshift and hold	ON
			Paddle shift lever position: Other than the above	OFF
56	ABS actuation signal	ABS operated		ON
		ABS not operated		OFF
59	Shift position	• Ignition switch: ON • Engine: Stopped	Transmission range: P	P, N
			Transmission range: R	R
			Transmission range: N	P, N
			Transmission range: D	D
			Transmission range: L <Vehicles without sport mode>	L
60	Gear position (SP mode) <Vehicles with sport mode>	Transmission range: Sport mode	Idling	1st
			Drive at a constant speed of 30 km/h (19 mph) in 2nd gear.	2nd
			Drive at a constant speed of 35 km/h (22 mph) in 3rd gear.	3rd
			Drive at a constant speed of 40 km/h (25 mph) in 4th gear.	4th
			Drive at a constant speed of 50 km/h (31 mph) in 5th gear.	5th
			Drive at a constant speed of 60 km/h (37 mph) in 6th gear.	6th

*NOTE: *: Relation between fluid temperature and COUNT is shown to the characteristics chart.*

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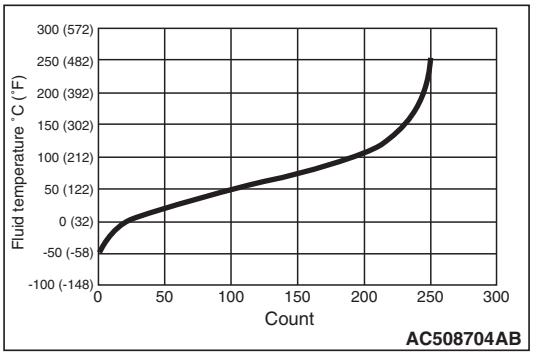

TCM TERMINAL VOLTAGE REFERENCE CHART FOR TRANSAXLE OPERATION

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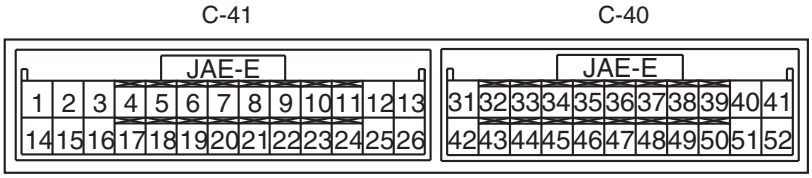

Terminal No.	Check item	Check conditions		Standard value
1	Line pressure solenoid valve	• Ignition switch: ON • Engine: Stopped • Transmission range: P	Accelerator pedal: Fully closed	Approximately 5.0 – 7.0 V
			Accelerator pedal: Fully opened	Approximately 1.0 V
2	Secondary pressure solenoid valve	• Ignition switch: ON • Engine: Stopped • Transmission range: P	Accelerator pedal: Fully closed	Approximately 5.0 – 7.0 V
			Accelerator pedal: Fully opened	Approximately 3.0 – 4.0 V
3	Lockup/select switching solenoid valve	• Ignition switch: ON • Engine: Stopped	Transmission range: N, P	Battery positive voltage
			Transmission range: 5 or more seconds have passed after the selector lever has been moved to R or D position.	1 V or less
4	CAN_H	–		–
5	CAN_L	–		–
12	Power supply	Ignition switch: ON		Battery positive voltage
		Ignition switch: OFF		1 V or less
13	Ground	Always		1 V or less
14	Lockup solenoid valve	Driving conditions	Lockup released	Approximately 6.0 V
			Lockup engaged	Approximately 1.5 V
17	ROM assembly (SEL2)	–		–

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Terminal No.	Check item	Check conditions		Standard value
18	ROM assembly (SEL1)	–		–
19	ROM assembly (SEL3)	–		–
21	Paddle shift switch (down) <Vehicles with sport mode>	Ignition switch: ON	Paddle shift lever position: Downshift and hold	1 V or less
			Paddle shift lever position: Other than the above	Battery positive voltage
22	Paddle shift switch (up) <Vehicles with sport mode>	Ignition switch: ON	Paddle shift lever position: Upshift and hold	1 V or less
			Paddle shift lever position: Other than the above	Battery positive voltage
25	Power supply	Ignition switch: ON		Battery positive voltage
		Ignition switch: OFF		1 V or less
26	Ground	Always		1 V or less
31	Back-up power supply	Always		Battery positive voltage
32	Transmission range switch P	• Ignition switch: ON • Transmission range: P		Battery positive voltage
		• Ignition switch: ON • Transmission range: Other than P		1 V or less
33	Transmission range switch R	• Ignition switch: ON • Transmission range: R		Battery positive voltage
		• Ignition switch: ON • Transmission range: other than R		1 V or less
34	Transmission range switch N	• Ignition switch: ON • Transmission range: N		Battery positive voltage
		• Ignition switch: ON • Transmission range: Other than N		1 V or less
35	Select switch <Vehicles with sport mode>	Ignition switch: ON	Transmission range: Sport mode	1 V or less
			Transmission range: Other than the above	Battery positive voltage
36	Secondary pulley rotation sensor	• Transmission range: D • Drive at a constant speed of Approximately 20 km/h (12 mph) • Use an oscilloscope to measure the voltage between the terminals No.36 and No.26.		Oscilloscope inspection procedure (Refer to P.23A-132.)

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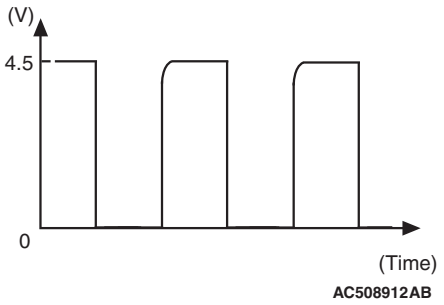
Terminal No.	Check item	Check conditions		Standard value
37	Primary rotation sensor	• Transmission range: D • Drive at a constant speed of Approximately 20 km/h (12 mph) • Use an oscilloscope to measure the voltage between the terminals No.37 and No.26.		Oscilloscope inspection procedure (Refer to P.23A-132.)
39	Secondary pressure sensor	• Engine: Idling • Transmission range: N		Approximately 1.0 V
40	Stepper motor A	Within 2 seconds after the ignition switch is turned to the ON position		Pulse width: 30 ms
41	Stepper motor B	Within 2 seconds after the ignition switch is turned to the ON position		Pulse width: 10 ms
43	Upshift switch <Vehicles with sport mode>	Transmission range: Sport mode	Transmission range: Upshift and hold	1 V or less
			Transmission range: Other than the above	Battery positive voltage
44	Downshift switch <Vehicles with sport mode>	Transmission range: Sport mode	Transmission range: Downshift and hold	1 V or less
			Transmission range: Other than the above	Battery positive voltage
45	Transmission range switch D	• Ignition switch: ON • Transmission range: D		Battery positive voltage
		• Ignition switch: ON • Transmission range: other than D		1 V or less
46	Transmission range switch L <Vehicles without sport mode>	• Ignition switch: ON • Transmission range: L		Battery positive voltage
		• Ignition switch: ON • Transmission range: other than L		1 V or less
48	Sensor ground	Always		1 V or less
49	Sensor power supply:	Ignition switch: ON		5.0 V
50	Transmission fluid temperature sensor	• Ignition switch: ON • Transmission fluid temperature: 20°C (68°F)		Approximately 2.0 V
		• Ignition switch: ON • Transmission fluid temperature: 80°C (176°F)		Approximately 1.0 V
51	Stepper motor C	Within 2 seconds after the ignition switch is turned to the ON position		Pulse width: 30 ms
52	Stepper motor D	Within 2 seconds after the ignition switch is turned to the ON position		Pulse width: 10 ms

OSCILLOSCOPE INSPECTION PROCEDURES

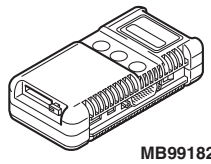
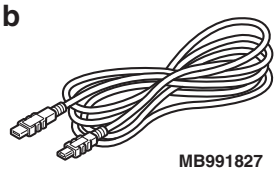
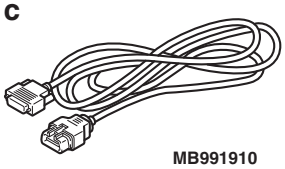
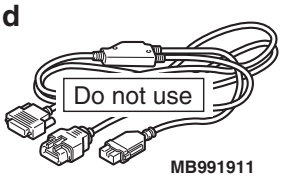
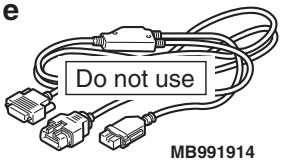
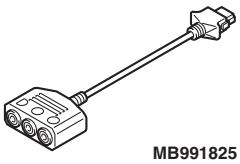
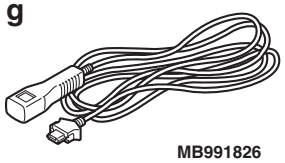
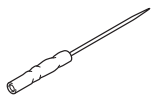
M1231208500265

With the connector remain connected, connect the oscilloscope probe to each terminal of TCM.

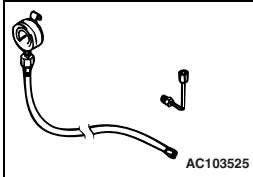
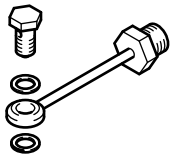
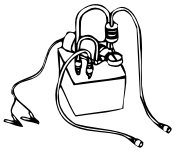
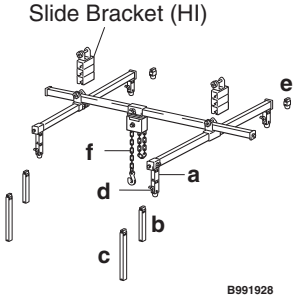
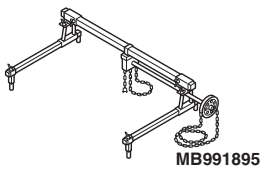
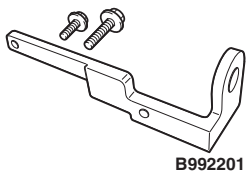
Terminal No.	Check item	Check conditions	Normal conditions	Wave patterns
36 - 26	Secondary pulley rotation sensor	• Transmission range: D • Drive at a constant speed of Approximately 20 km/h (12 mph)	Between 0 and 4.5 V, the pulse cycle is constant.	 AC508912AB
37 - 26	Primary pulley rotation sensor			

SPECIAL TOOLS

M1231200600376

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991914 f  MB991825 g  MB991826 MB991958	MB991958 a: MB991824 b: MB991827 c: MB991910 d: MB991911 e: MB991914 f: MB991825 g: MB991826 M.U.T.-III sub assembly a: Vehicle communication interface (V.C.I.) b: M.U.T.-III USB cable c: M.U.T.-III main harness A (Vehicles with CAN communication system) d: M.U.T.-III main harness B (Vehicles without CAN communication system) e: M.U.T.-III main harness C (for Chrysler models only) f: M.U.T.-III measurement adapter g: M.U.T.-III trigger harness	MB991824-KIT *NOTE: G: MB991826 M.U.T.-III trigger harness is not necessary when pushing V.C.I. ENTER key.*	**⚠ CAUTION** **For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.** Checking diagnostic trouble codes
 MB992006	MB992006 Extra fine probe	–	Making voltage and resistance measurement during troubleshooting

TSB Revision

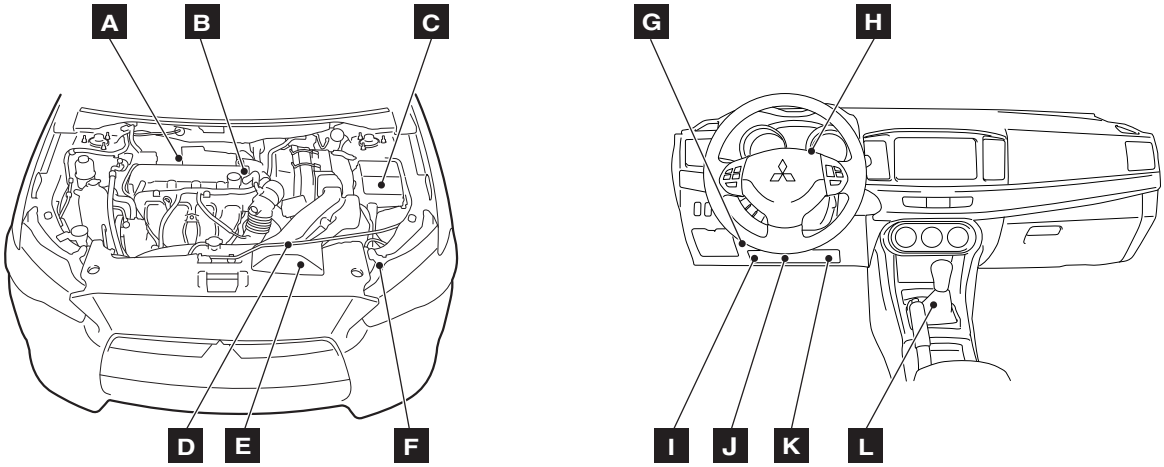
Tool	Tool number and name	Supersession	Application
 AC103525	MD998330 (Includes MD998331) Oil pressure gauge (3.0 MPa, 427 psi)	MD998330-01	Measurement of hydraulic pressure
	MB992127 Joint	–	
	MB995062 Flushing tool	MLR-6906-C or Equivalent	Flushing cooler and tube
	MB991928 Engine hanger a: MB991929 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 not available	When the engine hanger is used: Supporting the engine assembly during removal and installation of the transaxle assembly
 MB991895	MB991895 Engine hanger	Tool not available	
 B992201	MB992201 Engine hanger plate	–	

ON-VEHICLE SERVICE

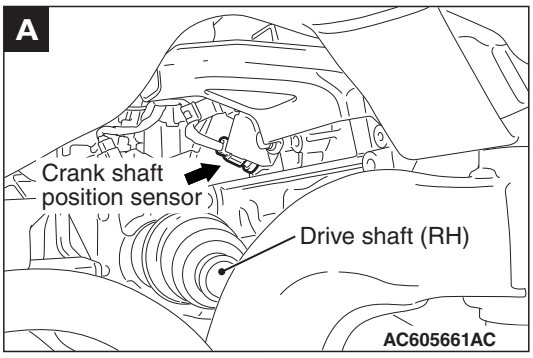
CVT CONTROL COMPONENT LAYOUT

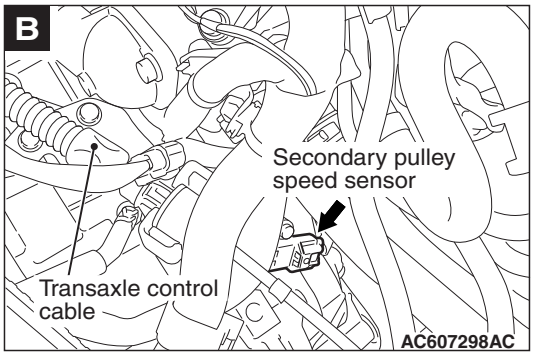
M1231208600132

Name	Symbol	Name	Symbol
Accelerator pedal position sensor	K	Primary pulley speed sensor	E
CVT assembly connector (Solenoid valve assembly, transmission fluid temperature sensor)	F	Secondary pulley speed sensor	B
CVT control relay	C	Shift lock solenoid	L
Crankshaft position sensor	A	Shift switch assembly <Vehicles with sport mode>	L
Data link connector	I	Stoplight switch	J
Paddle shift switch <Vehicles with sport mode>	H	TCM	G
		Transmission range switch	D



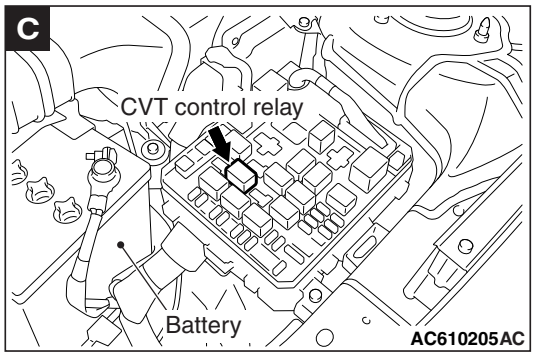
AC610160AB





TSB Revision

C



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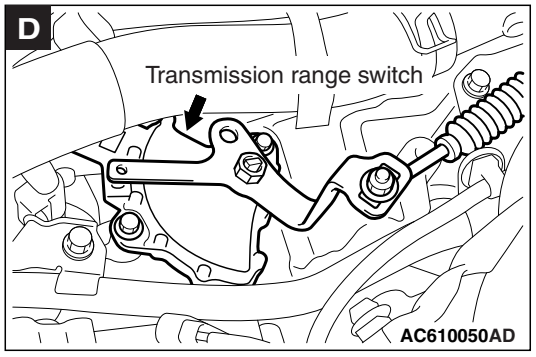

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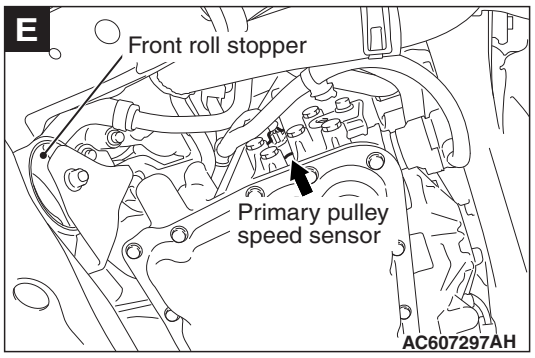

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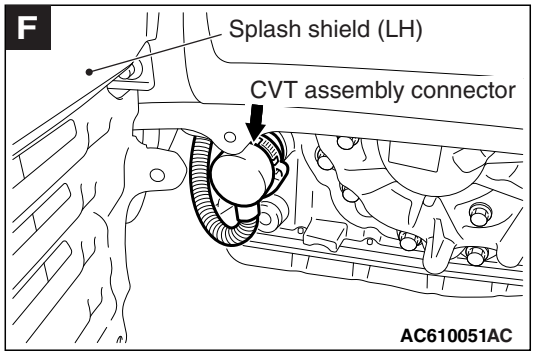

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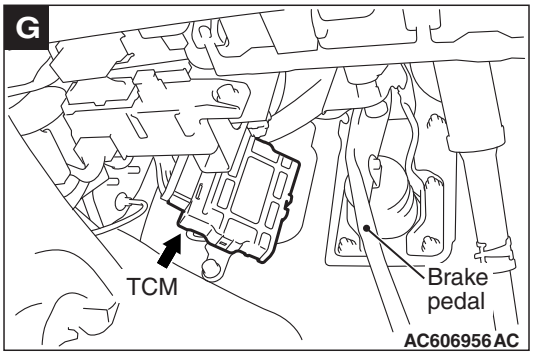

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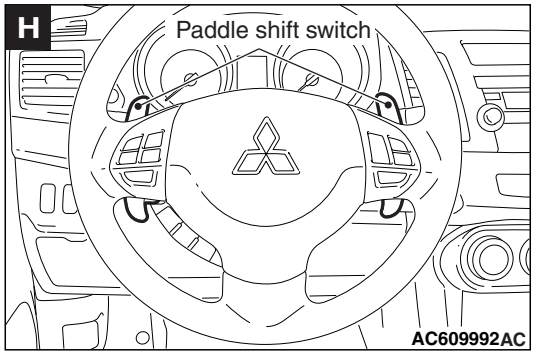

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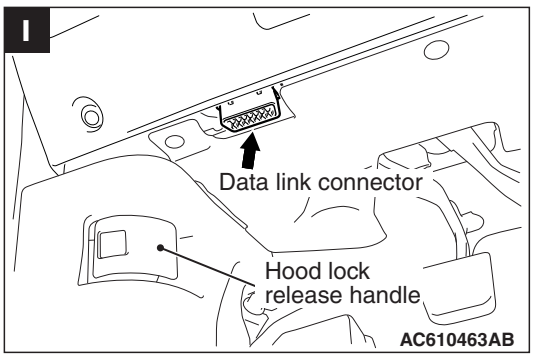

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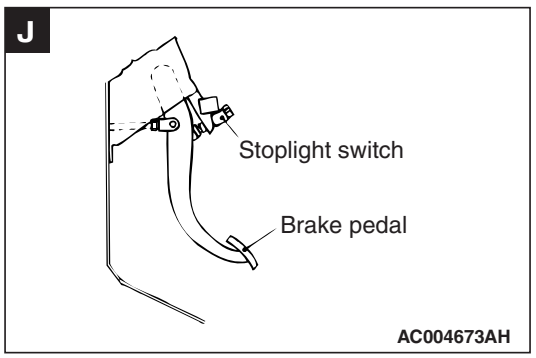
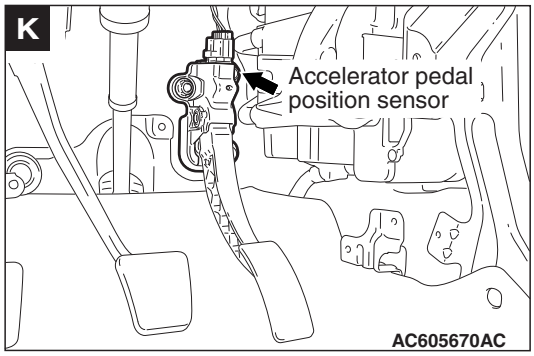
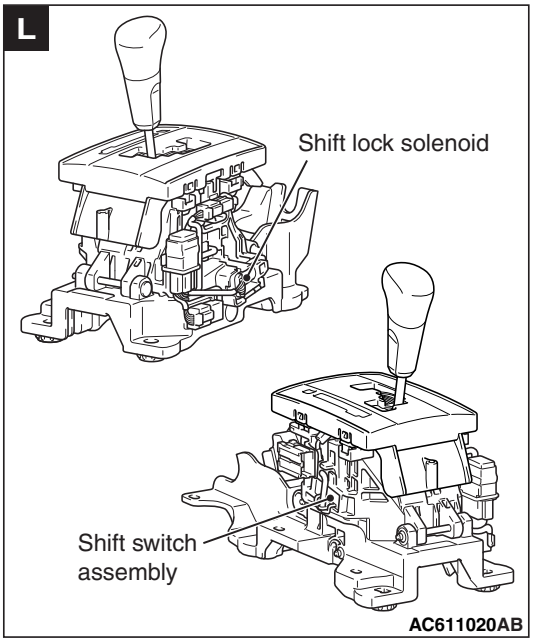


TSB Revision





ESSENTIAL SERVICE

TRANSMISSION FLUID CHECK

M1231211700151

⚠ CAUTION

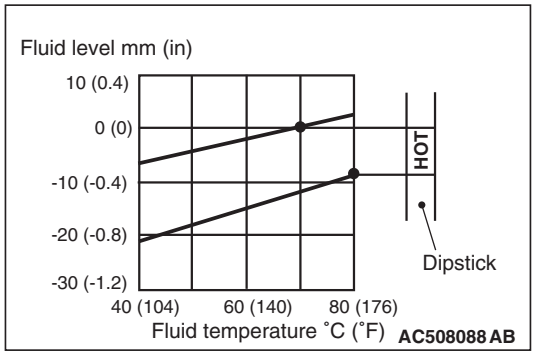
Replace the transmission fluid whenever the transaxle is replaced with a new one or the vehicle is driven in harsh conditions.

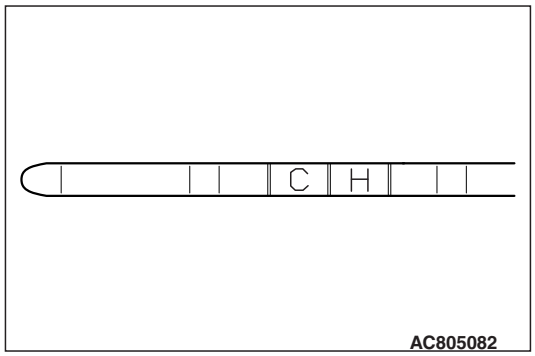
1. Drive the vehicle until the transmission fluid is warmed up to the normal operating temperature 70 – 80°C (158 – 176°F).

   NOTE: Use M.U.T.-III. to measure the transmission fluid temperature.

   NOTE: When a certain amount of time is required to warm up the transmission fluid to the normal operating temperature 70 – 80°C (158 – 176°F), check the oil level referring to the characteristics chart.
2. Park the vehicle on a level surface.
3. Move the selector lever to every position to fill the torque converter and the hydraulic circuit with the transmission fluid, and then move the selector lever to "P" or "N" range.
4. Wipe clean the area around the dipstick, and then remove the dipstick to check the condition of the transmission fluid.

   NOTE: If the transmission fluid smells burnt or is excessively deteriorated or dirty, the transmission fluid is contaminated with particles of the metal bushings and friction material. In these cases, the transaxle must be overhauled.





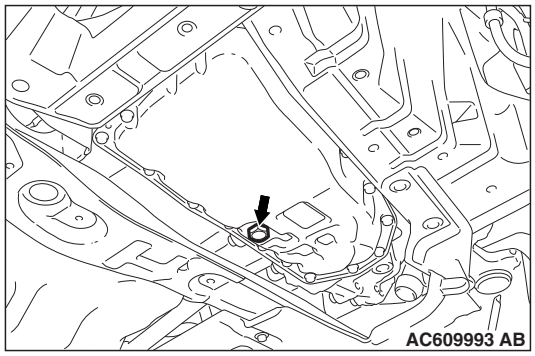
5. Check that the transmission fluid level is within the "H" area on the dipstick. If the fluid level is low, add the transmission fluid to the "H" level.

   Transmission fluid: DIA QUEEN CVTF-J1

   NOTE: When the transmission fluid level is low, the oil pump sucks air together with the transmission fluid, and produces air bubbles in the hydraulic circuit. The air bubbles in the hydraulic circuit decreases the hydraulic pressure, causing the delayed shift or slippage of the belt, clutch, and brake. When the transmission fluid level is too high, the fluid is stirred by the gear and foams up, and the problems similar to those when the transmission fluid level is low will occur. In either case, air bubbles cause the overheat and oxidation of the transmission fluid, which prevents normal operation of the valve, clutch, and brake. Beside, when the transmission fluid is foamy, it flows out of the transaxle vent hole. This may be taken as the fluid leakage by mistake.
6. Insert the dipstick securely.

TRANSMISSION FLUID REPLACEMENT

M1231211800608



1. Remove the drain plug on the bottom of the transaxle case to drain the transmission fluid.

   Draining amount: Approximately 5.1 dm^3 (5.39 qt)
2. Install the drain plug with a new gasket to the transaxle case, and tighten it to the specified torque.

   Tightening torque: 34 ± 2 N·m (25 ± 2 ft-lb)

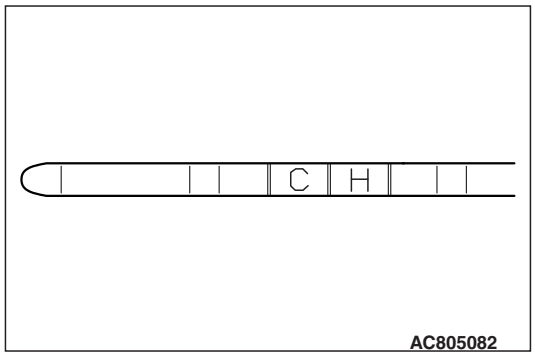
⚠ CAUTION

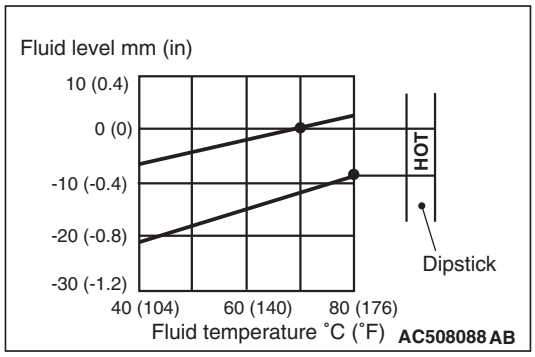
If the transaxle case becomes full before filling 5.1 dm^3 (5.39 qt) of transmission fluid, stop filling the transmission fluid.

3. Fill in the new transmission fluid through the filler tube.

   Filling amount: Approximately 5.1 dm^3 (5.39 qt)

   Transmission fluid: DIA QUEEN CVTF-J1
4. Start up the engine and let it idle for 1 to 2 minutes.
5. Move the selector lever to every position, and then move it to the "P" or "N" range.
6. Stop the engine and perform the above steps 1 to 5 again.
7. Stop the engine, and discharge a small amount of transmission fluid to check for fouling. If fouling is found, repeat steps 1 to 5 until clean transmission fluid comes out.





8. Drive the vehicle until the transmission fluid is warmed up to the normal operating temperature 70 – 80°C (158 – 176°F), and check the transmission fluid level. It must be within the "H" area on the dipstick.

   NOTE: The "COLD" level is for reference only. Use the "H" level as the criteria.

   NOTE: Use M.U.T.-III. to measure the transmission fluid temperature.

   NOTE:

   When a certain amount of time is required to warm up the transmission fluid to the normal operating temperature 70 – 80°C (158 – 176°F), check the fluid level referring to the characteristics chart.
9. Adjust the transmission fluid level to the specified level. Refill the transmission fluid when the fluid level is low, and drain the transmission fluid through the drain plug when the fluid level is high.
10. Securely insert the dipstick into the filler tube.
11. TCM records the deterioration level of the transmission fluid. After replacing the transmission fluid with new one, use M.U.T.-III to reset the deterioration level recorded in TCM.

FLUSHING COOLERS AND TUBES

M1231212700013

Required Special Tool:
MB995062: Flushing Tool

⚠ WARNING

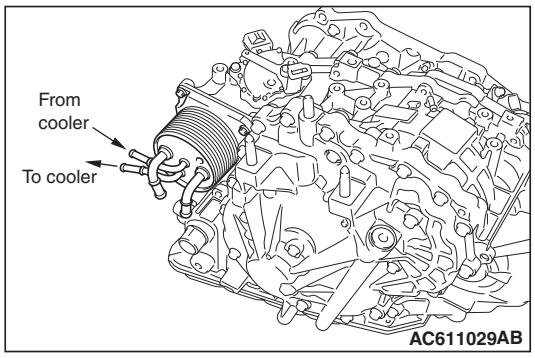
- ***Wear protective eyewear that meets the requirements of ANSI Z87.1 – 1968 and OSHA. Wear standard industrial rubber gloves.***
- ***Keep lighted cigarettes, sparks, flames, and other ignition sources away from the area to prevent the ignition of combustible liquids and gases. Keep a class B fire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

When a transaxle failure has contaminated the transmission fluid, the transaxle must be flushed. The transmission fluid warmer (transmission fluid cooler) on the transaxle must also be replaced. The torque converter must also be replaced with an exchange unit. This will ensure that metal particles or sludged transmission fluid are not later transferred back into

the reconditioned (or replaced) transaxle. There are two different procedures for flushing coolers and lines. The recommended procedure is to use special tool MB995062 Flushing Tool. The other procedure is to use a hand suction gun and mineral spirits.

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

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

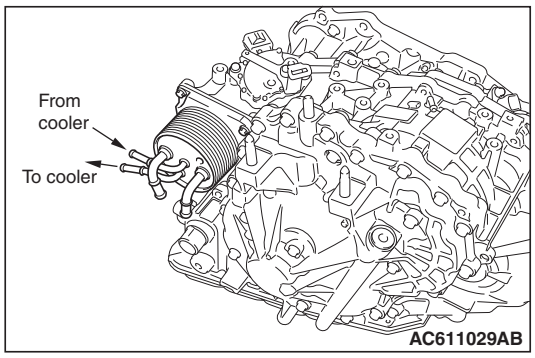


5. Connect the pressure line to the OUTLET line (from cooler).
6. Connect the return line to the INLET line (to cooler).
7. Turn the pump "ON" for two to three minutes to flush the cooler(s) and lines. Monitor the pressure readings. Clear the return lines. Pressure readings should stabilize below 138 kPa (20 psi) for vehicles equipped with a single cooler and 208 kPa (30 psi) for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace the cooler(s).
8. Turn the pump "OFF."
9. Disconnect the suction line from the reservoir at the cover plate. Disconnect the return line at the cover plate and place it in a drain pan.
10. Turn the pump "ON" for 30 seconds to purge flushing solution from the cooler(s) and lines. Turn the pump "OFF."
11. Place the suction line into a one quart container of DIA QUEEN CVTF-J1 transmission fluid.
12. Turn the pump "ON" until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transaxle cooler(s) and lines. Turn the pump "OFF."
13. Disconnect the alligator clips from the battery. Reconnect the flusher lines to the cover plate, and remove the flushing adapters from the cooler lines. Reconnect the cooler lines.

OIL COOLER FLOW CHECK

M1231212800010

After the new or repaired transaxle has been installed, fill to the proper level with DIA QUEEN CVTF-J1. The flow should be checked using the following procedure:



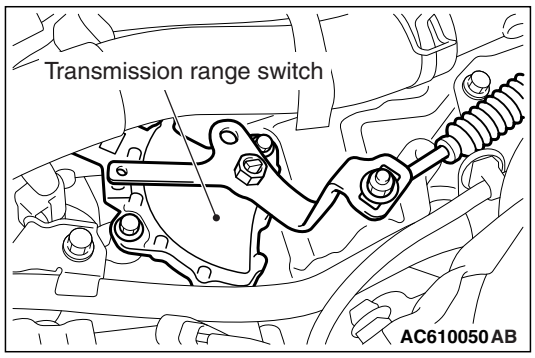
⚠ CAUTION

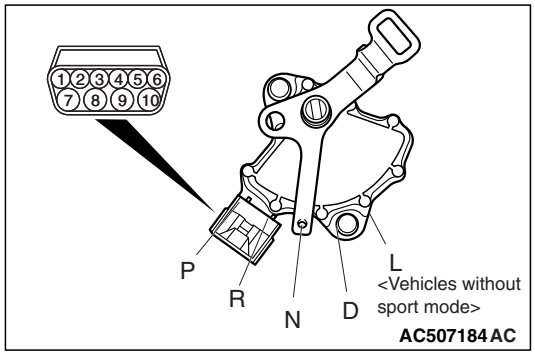
With the fluid set at the proper level, transmission fluid collection should not exceed one quart or internal damage to the transaxle may occur.

1. Disconnect the OUTLET line (from cooler) at the transaxle and place a collecting container under the disconnected line.
2. Run the engine at curb idle speed with the shift selector in neutral.
3. If transmission fluid flow is intermittent or it takes more than 20 seconds to collect one quart of transmission fluid, replace the cooler.
4. If flow is within acceptable limits, reconnect the cooler line. Then fill the transaxle to the proper level, using DIA QUEEN CVTF-J1.

TRANSMISSION RANGE SWITCH CONTINUITY CHECK

M1231201400201



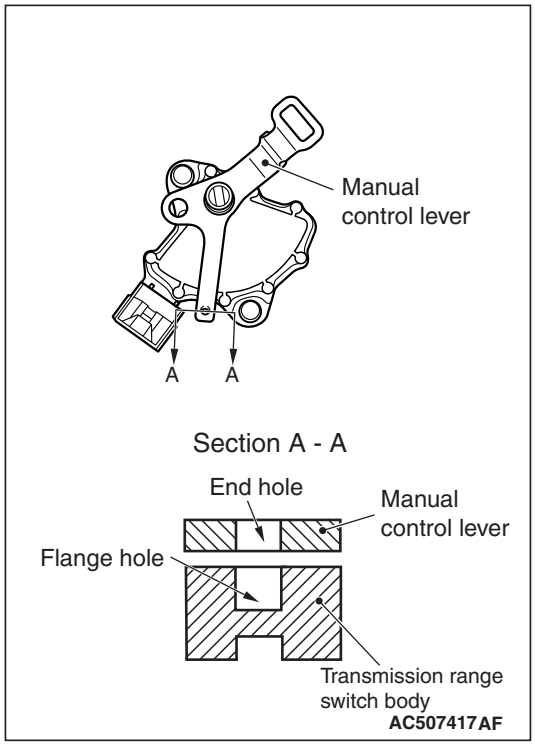


Item	Terminal number	Resistance value
P	3 – 2, 7 – 10	Continuity exists (2 Ω or less).
R	3 – 9	
N	3 – 8, 7 – 10	
D	3 – 5	
L <Vehicles without sport mode>	3 – 1	

TRANSMISSION RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

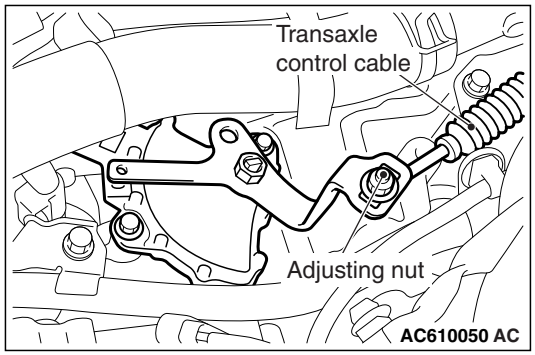
M1231201500338

1. Move the selector lever to the N range.
2. Loosen the adjusting nut so that the manual control lever moves freely.
3. Move the manual control lever to Neutral position.



4. Align the hole at the end of the manual control lever and the hole in the transmission range switch body flange (section A – A).

   NOTE: Insert a ϕ5 bar into the aligned holes in the transmission range switch body flange and on the tip of the manual control lever to position the transmission range switch body.



5. Use the adjusting nut to tighten the transaxle control cable to the specified torque.

   Tightening torque: 9.5 ± 3.5 N·m (84 ± 30 in-lb)

6. Make sure that the selector lever is in the N range.
7. Make sure that the transaxle-side ranges that are corresponding to the transmission range operate and function without fail.

CVT CONTROL COMPONENT CHECK

ACCELERATOR PEDAL POSITION SENSOR (APS) CHECK

M1231204200251

Refer to GROUP 13A <2.0L engine>, Diagnostic Trouble Code Chart P.13A-50 or 13B <2.4L engine>, Diagnostic Trouble Code Chart P.13C-48.

TRANSMISSION RANGE SWITCH CHECK

M1231201400212

Refer to P.23A-141.

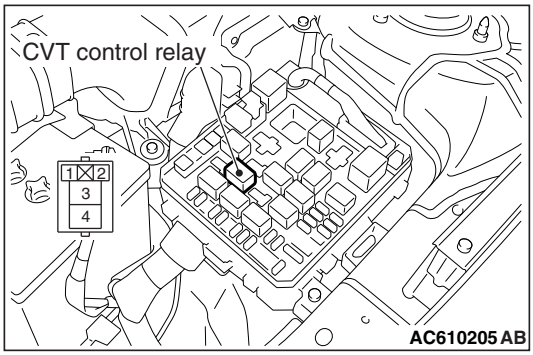
STOPLIGHT SWITCH CHECK

M1231210100082

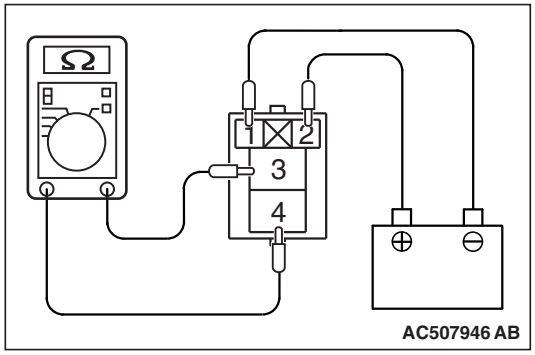
Refer to GROUP 35A, Brake Pedal P.35A-34.

CVT CONTROL RELAY CHECK

M1231229400100



1. Remove the CVT control relay.



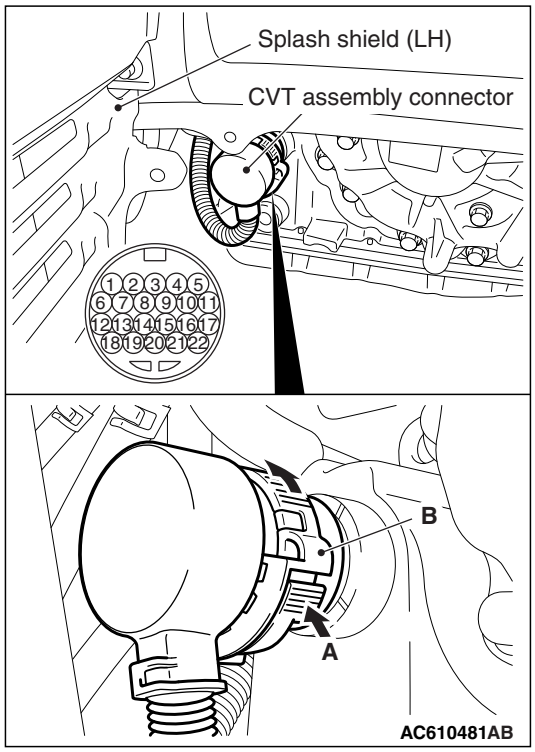
2. Use a jumper wire to connect the positive battery terminal (+) to the CVT control relay terminal No.2, and the negative battery terminal (−) to the terminal No.1.
3. Check for continuity between the CVT control relay terminals No.3 and No.4.

Jumper wire	Continuity between terminals No.3 and No.4
Connect	Yes (2 Ω or less)
Disconnect	No

4. If not as specified, replace the CVT control relay.

SOLENOID VALVE CHECK

M1231229500367



1. While pressing A in the figure, turn B counterclockwise to unlock the CVT assembly connector, and disconnect the connector.
2. Measure the resistance between the terminals of the applicable solenoid valves and ground.

Standard value:

Terminal No.	Applicable solenoid valve	Resistance value Ω
1	Line pressure solenoid valve	Approximately 5.6 to 6.6
2	Secondary pressure solenoid valve	
3	Lockup solenoid valve	
4	Lockup/select switching solenoid valve	Approximately 25.5 to 29.3

3. When the resistance is within the standard value, check the power supply and the ground circuits.

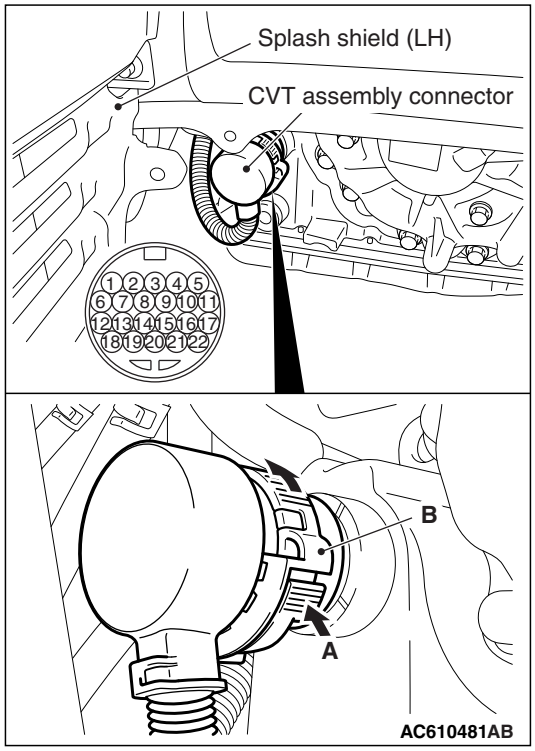
⚠ CAUTION

Each solenoid valve cannot be removed or replaced as a single unit. When replacement of any one of the solenoid valves is necessary, replace the valve body assembly.

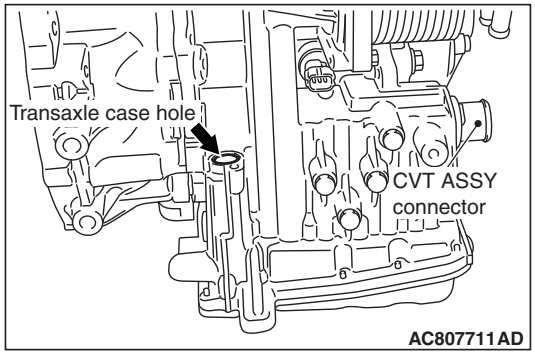
4. When the resistance is outside the standard value, replace the valve body assembly and the harness.

TRANSMISSION FLUID TEMPERATURE SENSOR CHECK

M1231229600580



1. While pressing A in the figure, turn B counterclockwise to unlock the CVT assembly connector, and disconnect the connector.



⚠ CAUTION

Insert a thermometer which is made of metal or is put in a metal case (overall length: approximately 150 – 200 mm) into the transaxle case hole approximately 80 mm.

2. Remove the oil filler tube assembly (Refer to Transaxle Assembly), and insert a thermometer into the transaxle case hole.

   NOTE: If a radiation thermometer (noncontact thermometer) is available, use it to measure the surface temperature of the oil pan.

3. Measure the resistance between the sensor-side connector terminal No.17 of the CVT assembly connector and ground (terminal No.19).

   Standard value:

Fluid temperature °C (°F)	**Resistance kΩ**
At 0 (32)	Approximately 15.5
At 20 (68)	Approximately 6.5
At 40 (104)	Approximately 3.1

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Fluid temperature °C (°F)	Resistance kΩ
At 60 (140)	Approximately 1.6
At 80 (176)	Approximately 0.9
At 100 (212)	Approximately 0.5

NOTE: In the information screen on the multi-information display, the fluid temperature warning comes on when the transmission fluid temperature is approximately 140°C (284°F) or higher, and automatically goes out when the transmission fluid temperature dropped below approximately 137°C (279°F).

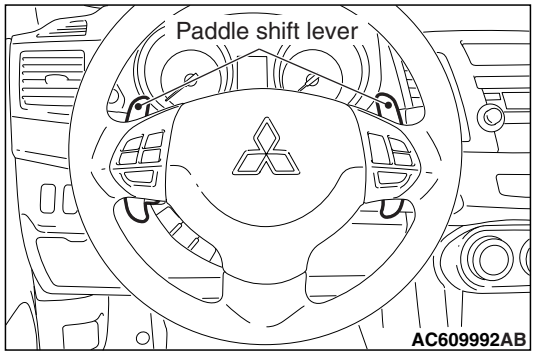
⚠ CAUTION

The transmission fluid temperature sensor cannot be removed or replaced as a single unit. When the transmission fluid temperature sensor needs to be replaced, replace the valve body assembly.

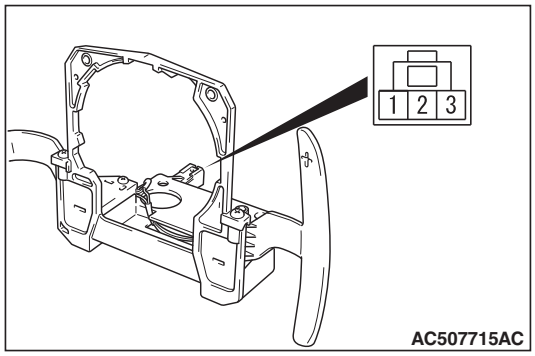
4. When the resistance of the transmission fluid temperature sensor is outside the standard value, and the fluid temperature warning comes on/goes out at other than the specified temperatures, replace the valve body assembly and the harness.

PADDLE SHIFT SWITCH CHECK

M1231211500038



1. Check that the paddle shift lever is returned to the original position quickly when the lever is released after operation of the paddle shift lever (+/– side) (pulling to the rear side of the vehicle). In addition, check for abnormal looseness, friction and abnormal noise.
2. Remove the paddle shift assembly. (Refer to GROUP 37, Steering Column Shaft Assembly P.37-37.)



3. Check the continuity between the paddle shift switch connecter terminals.

Standard value:

Paddle shift lever	Terminal number	Resistance value
Upshift and hold the lever.	1 – 2	Continuity exists (2 Ω or less).
Downshift and hold the lever.	2 – 3	
No operation	No continuity between the terminals.	

4. In the cases other than the above, replace the paddle shift assembly.

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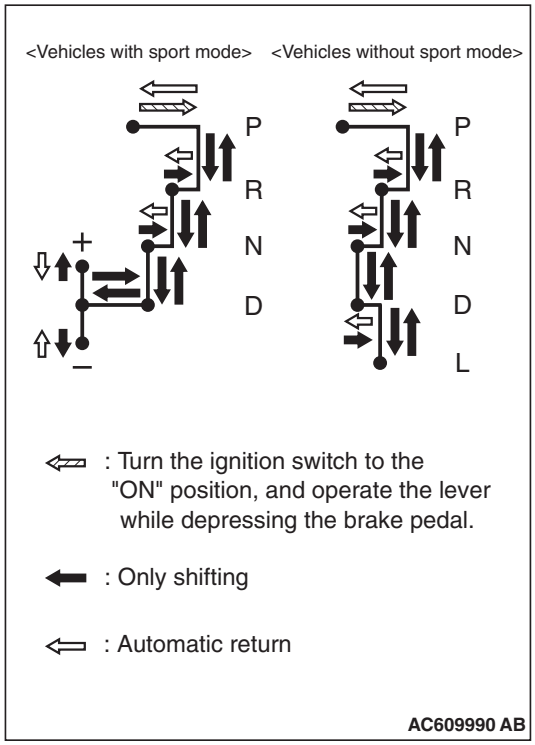
SELECTOR LEVER OPERATION CHECK

M1231202900135



1. Pull up on the parking brake lever.
2. Move the selector lever to every range and check that the lever moves smoothly with secure feel of engagement.
3. Make sure that the engine starts when the selector lever is in the "N" or "P" range, and does not start when the selector lever is in other range.
4. Start the engine. Release the parking brake lever.
5. Make sure that the vehicle moves forward when the selector lever is moved from the "N" range to "D" range, or to the 1st to 6th speed in the sports mode <Vehicles with sport mode>. Also make sure that the vehicle moves backward when the selector lever is moved from the "N" to "R" range.
6. Stop the engine.
7. Turn "ON" the ignition switch, and move the selector lever from the "P" to "R" range. Check that the backup light comes on and the buzzer sounds at this time.

   NOTE: Since the vehicle is equipped with the CVT wrong-operation preventive device, the selector lever cannot be moved out of the "P" position without depressing the brake pedal after turning "ON" the ignition switch.

KEY INTERLOCK MECHANISM CHECK/ADJUSTMENT

M1232100200039

1. Carry out the following check.

Inspection procedure	Check conditions		Items to be checked (Normal conditions)
1	Brake pedal: Depress	Ignition switch position: "LOCK" (OFF) or removed	The selector lever cannot be moved out of "P" position.
2		Ignition switch position: "ON"	The selector lever can be moved from "P" position to other positions smoothly.
3	Transmission range: Other than "P"		The ignition switch cannot be turned to the "LOCK" (OFF) position.
4	Transmission range: "P"		The ignition switch can be turned to the "LOCK" (OFF) position smoothly.

2. If the normal conditions are not obtained after performing the above operations, install the key interlock cable in the following procedures. (Automatic adjustment)
   (1) Disconnect the key interlock cable connection (selector lever side) (Refer to P.23A-153).

⚠ CAUTION

Leave the ignition switch in the "LOCK" (OFF) position until the key interlock cable installation is completed.

   (2) Move the selector lever to the "P" position and turn the ignition switch to the "LOCK" (OFF) position.

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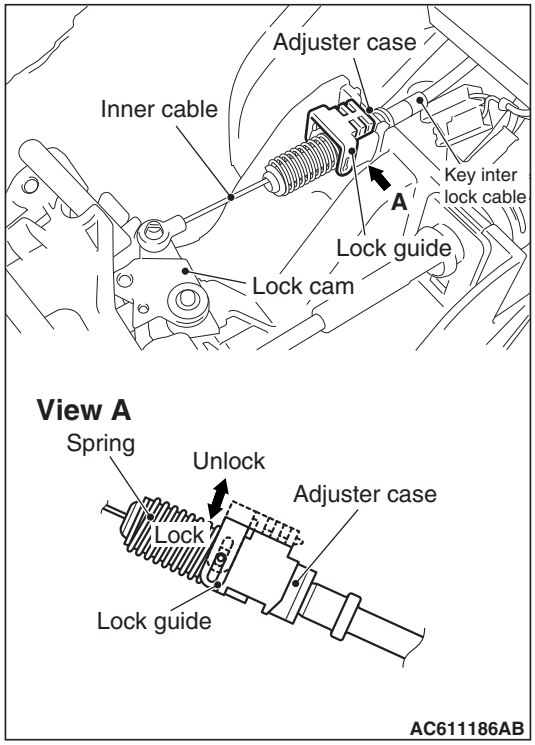


(3) Install the tip of the key interlock cable to the lock cam of the selector lever assembly, taking care not to twist the inner cable.
(4) Install the adjuster case with its lock guide pulled up (unlocked).
(5) Securely push down the lock guide to lock it.

NOTE: The lock position of the key interlock cable is automatically adjusted by a spring.

SHIFT LOCK MECHANISM CHECK

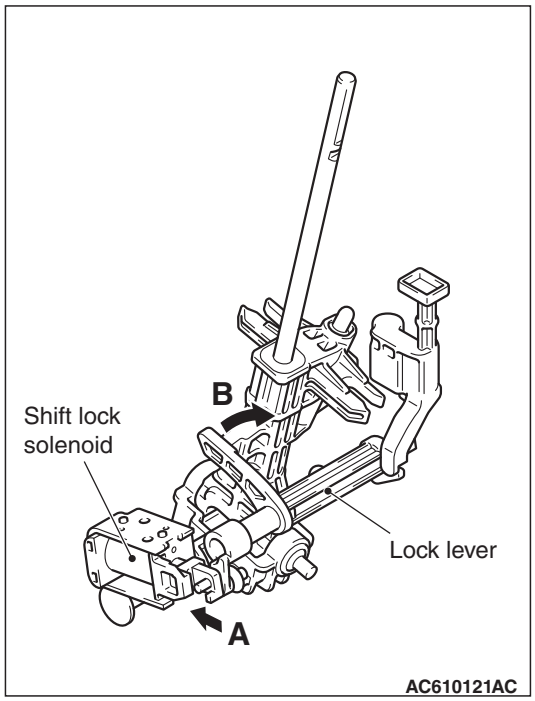
M1232100300229

SYSTEM CHECK

Inspection procedure	Check conditions		Items to be checked (Normal conditions)	Possible cause of abnormality
1	Brake pedal not depressed	Ignition switch position: "LOCK" (OFF), "ACC" or removed	The selector lever cannot be moved out of the "P" position	• Abnormality in the shift lock link (stuck, disengaged, broken, etc.) • Abnormality in the electrical circuit (short circuit in the switches or harnesses) • Abnormality in the key interlock mechanism
2	Brake pedal depressed			• Abnormality in the electrical circuit (short circuit in the switches or harnesses) • Abnormality in the key interlock mechanism
3	Brake pedal not depressed	Ignition switch position: "ON"		• Abnormality in the shift lock link (stuck, disengaged, broken, etc.) • Abnormality in the electrical circuit (short circuit in the switches or harnesses)
4	Brake pedal depressed		The selector lever can be moved from the "P" position to other positions smoothly.	• Abnormality in the shift lock link (stuck, disengaged, broken, etc.) • Abnormality in the electrical circuit (short circuit in the switches or harnesses)
5	Shift lock release button pressed			• Abnormality in the shift lock link (stuck, disengaged, broken, etc.)
6	Brake pedal depressed / not depressed		The selector lever can be moved from the "R" position to the "P" position smoothly.	• Abnormality in the shift lock link (stuck, disengaged, broken, etc.)

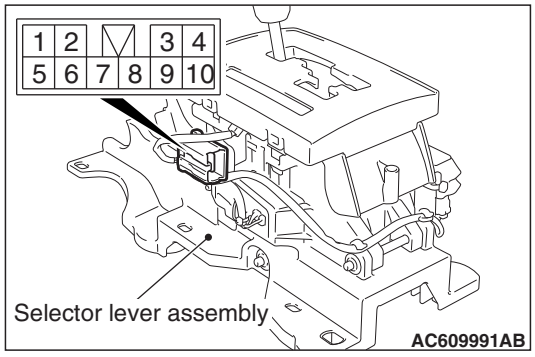
COMPONENT PARTS CHECK

SHIFT LOCK LINK



Check each part for damage and disengagement.
Check that the lock lever smoothly moves in the direction of arrow B in the figure when the shift lock solenoid plunger is pressed in the direction of arrow A, and smoothly moves back to the original position when the plunger is released.

ELECTRICAL CIRCUIT



Check for the following operations.

1. Shift the selector lever to P position.
2. Using a jumper wire, connect the battery (+) to the selector lever assembly connector terminals No. 3 and No. 4, and the battery (–) to the terminal No. 6. Then, check the operation of shift lock solenoid.

Jumper wire	Shift lock solenoid
Connect	Operate
Disconnect	Not operate

TRANSAXLE CONTROL

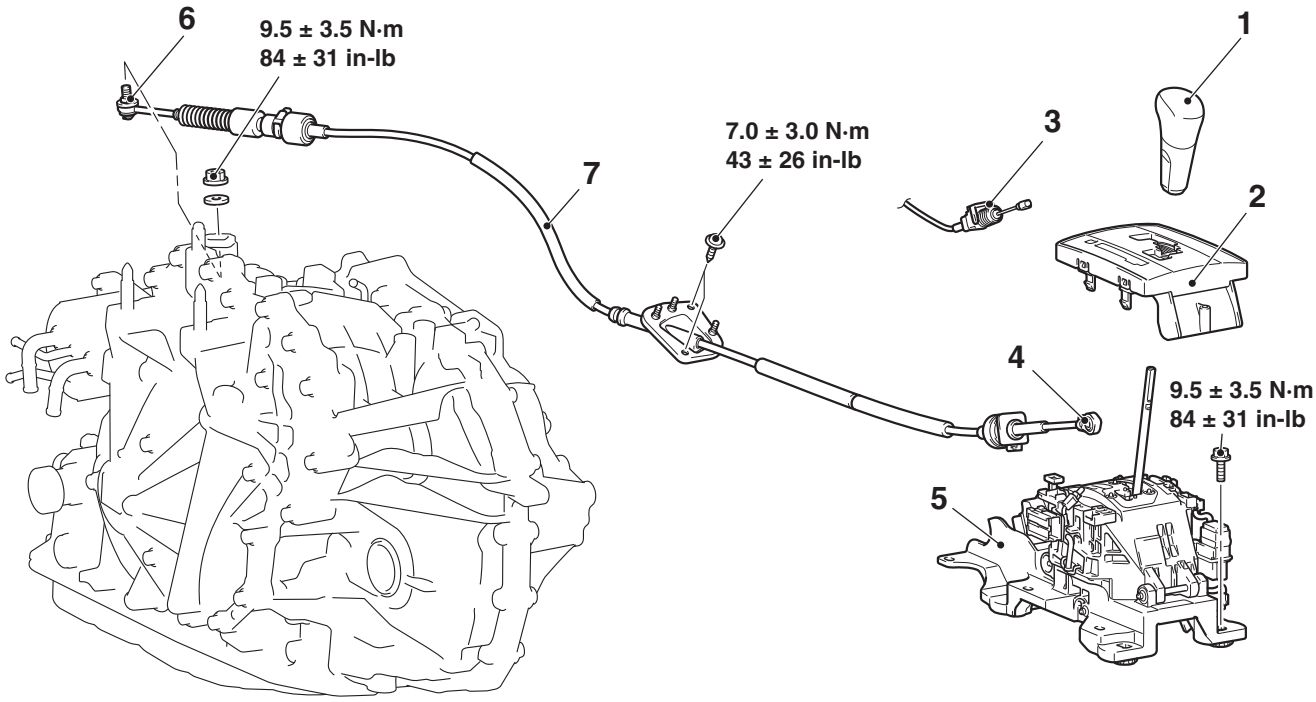
REMOVAL AND INSTALLATION

M1231203200474

⚠ WARNING

Be careful not to subject the SRS-ECU to any shocks during removal and installation of the transaxle control cable assembly.

Post-installation operation
- Key interlock mechanism check (Refer to P.23A-146.)
- Shift lock mechanism check (Refer to P.23A-148.)
- Selector lever operation check (Refer to P.23A-146.)
- Transmission range switch and control cable adjustment (Refer to P.23A-141.)



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Selector lever assembly removal steps
- Move the selector lever to the "N" position.

<<A>> 1. Selector lever knob
- Floor console bracket (A) (Refer to GROUP 52A, Floor Console Assembly P.52A-9).

2. Shift indicator panel

>>A<< 3. Key interlock cable connection (selector lever side)

4. transaxle control cable connection (selector lever side)
- Connectors and harnesses connections

5. Selector lever assembly

Transaxle control cable assembly removal steps
- Move the selector lever to the "N" position.

<<A>> 1. Selector lever knob
- SRS-ECU (Refer to GROUP 52B, SRS-ECU P.52B-416).

4. Transaxle control cable connection (selector lever side)
- Air cleaner assembly (Refer to GROUP 15, Air Cleaner P.15-9).
- Battery and battery tray

6. Transaxle control cable connection (transaxle side)

7. Transaxle control cable

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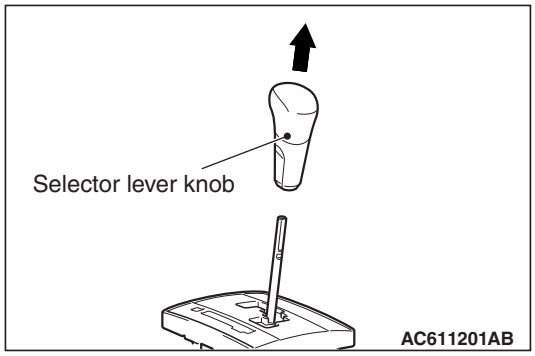
REMOVAL SERVICE POINT

<<A>> SELECTOR LEVER KNOB REMOVAL



Pull out the selector lever knob to the direction of arrow shown in the figure.

INSTALLATION SERVICE POINTS

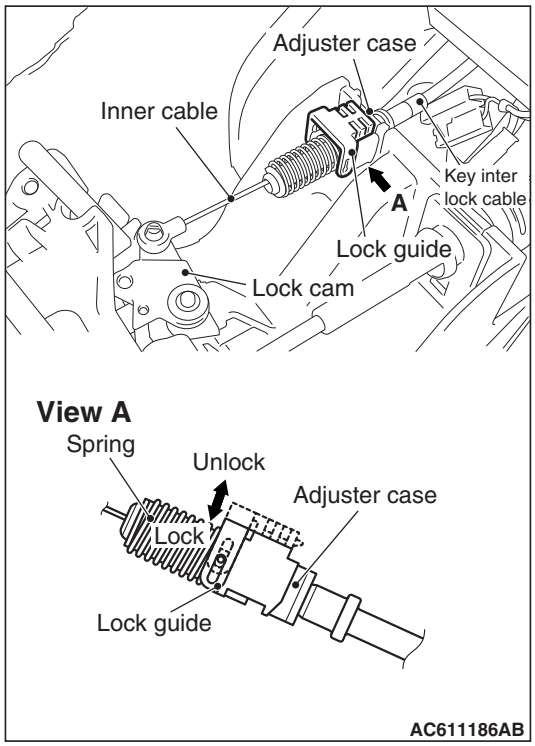
>>A<< KEY INTERLOCK CABLE INSTALLATION

⚠ CAUTION

Leave the ignition switch in the "LOCK" (OFF) position until the key interlock cable installation is completed.

1. Move the selector lever to the "P" position and turn the ignition switch to the "LOCK" (OFF) position.
2. Install the tip of the key interlock cable to the lock cam of the selector lever assembly, taking care not to twist the inner cable.
3. Install the adjuster case with its lock guide pulled up (unlocked).
4. Securely push down the lock guide to lock it.

NOTE: The lock position of the key interlock cable is automatically adjusted by a spring.



SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

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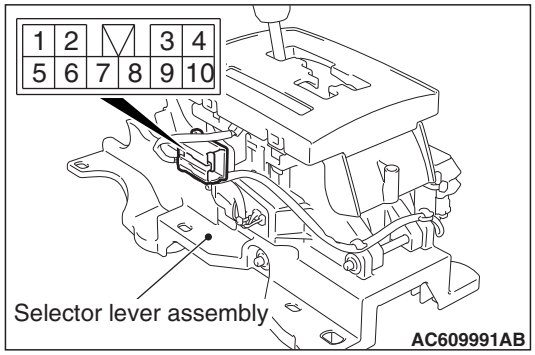


Shift switch assembly	Transmission range	Terminal number	Continuity
Select switch	Sport mode	7 – 8	Continuity
	Other than above	7 – 8	No continuity
Shift switch (UP)	Upshift and hold	7 – 10	Continuity
	Other than above	7 – 10	No continuity
Shift switch (DOWN)	Downshift and hold	7 – 9	Continuity
	Other than above	7 – 9	No continuity

CVT KEY INTERLOCK AND SHIFT LOCK MECHANISMS

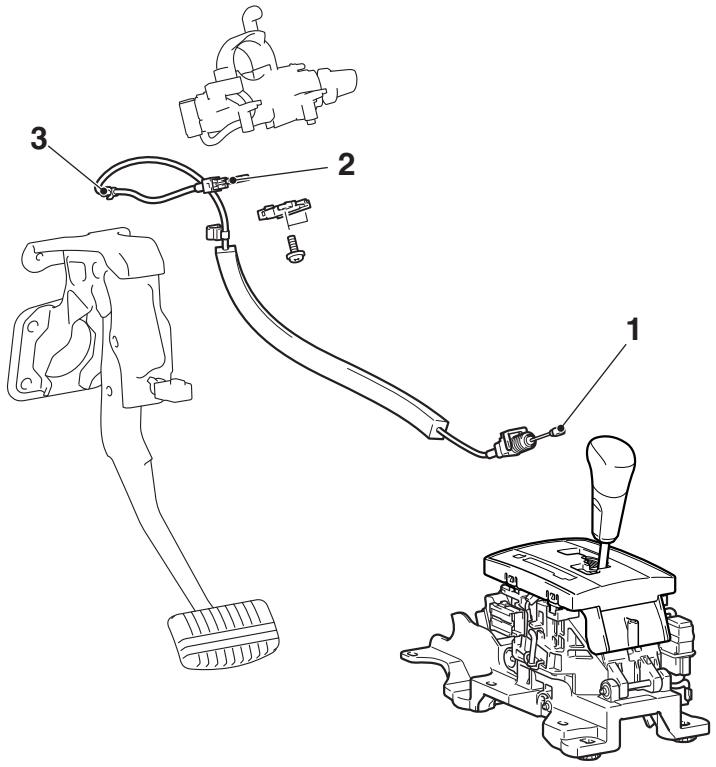
REMOVAL AND INSTALLATION

M1231203400177

⚠ ***WARNING***

Be careful not to subject the SRS-ECU to any shocks during removal and installation of the key interlock cable.

Pre-removal operation	Post-installation operation
• Floor Console Bracket (A) and Floor Console Side Cover Removal (Refer to GROUP 52A, Floor Console Assembly P.52A-9.) • Bottom Cover (Driver's Side) Removal (Refer to GROUP 52A, Instrument Lower Panel P.52A-8.) • Steering Column Lower Cover Removal (Refer to GROUP 37, Steering Shaft Assembly P.37-37.) • Foot Duct (Driver's Side) Removal (Refer to GROUP 55A, Ducts P.55A-203.)	• Foot Duct (Driver's Side) Installation (Refer to GROUP 55A, Ducts P.55A-203.) • Steering Column Lower Cover Installation (Refer to GROUP 37, Steering Shaft Assembly P.37-37.) • Bottom Cover (Driver's Side) Installation (Refer to GROUP 52A, Instrument Lower Panel P.52A-8.) • Floor Console Bracket (A) and Floor Console Side Cover Installation (Refer to GROUP 52A, Floor Console Assembly P.52A-9.) • Key Interlock Mechanism Check (Refer to P.23A-146.) • Shift Lock Mechanism Check (Refer to P.23A-148.) • Selector Lever Operation Check (Refer to P.23A-146.)



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Removal steps

>>**B**<< 1. Key interlock cable connection (selector lever side)

Removal steps (Continued)

<<**A**>> >>**A**<< 2. Key interlock cable connection (steering side)

3. Key interlock cable

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REMOVAL SERVICE POINT

<<A>> KEY INTERLOCK CABLE (STEERING SIDE) REMOVAL

Turn the ignition switch to the "ACC" position and then pull the key interlock cable out from the ignition key cylinder.

INSTALLATION SERVICE POINTS

>>A<< KEY INTERLOCK CABLE (STEERING LOCK CYLINDER SIDE) INSTALLATION

Turn the ignition switch to the "ACC" position and then install the key interlock cable to the ignition key cylinder.

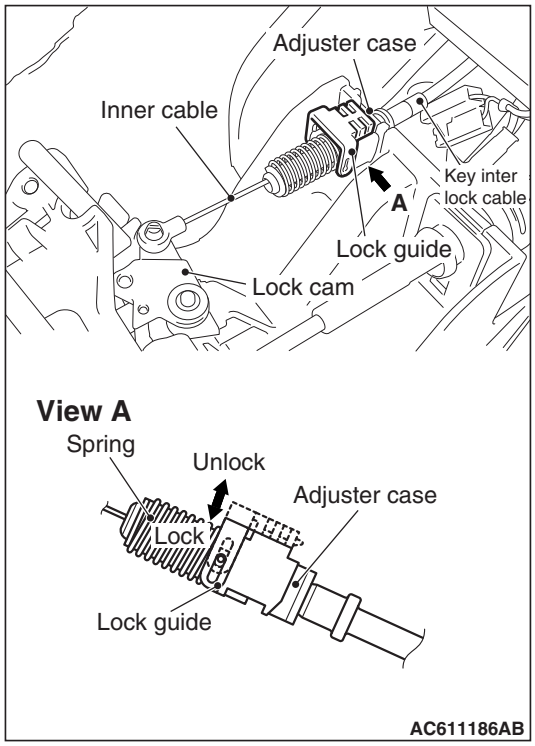
>>B<< KEY INTERLOCK CABLE INSTALLATION

⚠ CAUTION

Leave the ignition switch in the "LOCK" (OFF) position until the key interlock cable installation is completed.

1. Move the selector lever to the "P" position and turn the ignition switch to the "LOCK" (OFF) position.
2. Install the tip of the key interlock cable to the lock cam of the selector lever assembly, taking care not to twist the inner cable.
3. Install the adjuster case with its lock guide pulled up (unlocked).
4. Securely push down the lock guide to lock it.

NOTE: The lock position of the key interlock cable is automatically adjusted by a spring.



TRANSAXLE ASSEMBLY

REMOVAL AND INSTALLATION

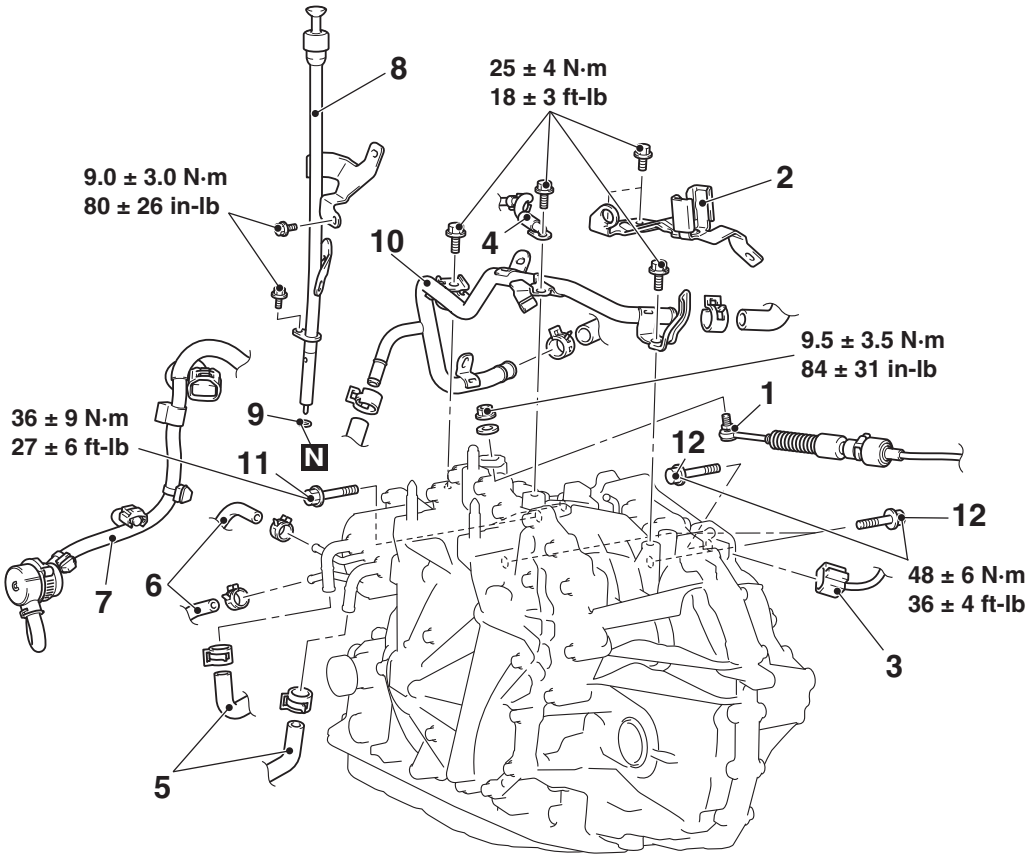
M1231203600717

⚠ CAUTION

- **The part indicated by the *1 mark should be temporarily tightened, and then fully tightened with the engine and transaxle assembly weight applied on the vehicle body.**
- **The parts indicated by the *2 are the bolts with friction coefficient stabilizer. In removal, ensure there is no damage, clean dust and soiling from bearing and thread surfaces, and tighten them to the specified torque.**

Pre-removal and Post-installation Operation

- Engine Room Under Cover and Engine Room Side Cover Removal and Installation (Refer to GROUP 51, Under Cover P.51-17).
- Transmission Fluid Draining and Refilling (Refer to P.23A-138).
- Engine Coolant Draining and Refilling (Refer to GROUP 14, On-vehicle Service P.14-25).
- Air Cleaner Assembly and Air Cleaner Bracket Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-9).
- Battery and Battery Tray Removal and Installation (Refer to GROUP 54A, Battery P.54A-10.)
- Headlamp Support Panel Cover Removal and Installation (Refer to GROUP 51, Front Bumper Assembly and Radiator Grille P.51-3).
- ECM Removal and Installation (Refer to GROUP 13A<2.0L engine>, Engine Control Module P.13A-985 or 13C<2.4L engine>, Engine Control Module P.13C-972).
- Engine Cover Removal and Installation (Refer to GROUP 11A<2.0L engine>, Engine assembly P.11A-76 or 11C<2.4L engine>, Engine assembly P.11E-84).
- Drive Shaft Removal and Installation (Refer to GROUP 26, Drive Shaft Assembly P.26-21.)



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Removal steps

>>**C**<< 1. Transaxle control cable connection (Transaxle side)
2. Transaxle control cable bracket
3. Secondary pulley speed sensor connector connection
4. Battery ground
5. Water hose connection
6. Air-cooled transmission fluid cooler hose connection <2.4L engine>

Removal steps (Continued)

<<**A**>> 7. CVT assembly harness connector connection
8. Oil filler pipe assembly
9. O-ring
10. Water pipe assembly
11. Starter mounting bolts
12. Transaxle assembly upper part coupling bolt

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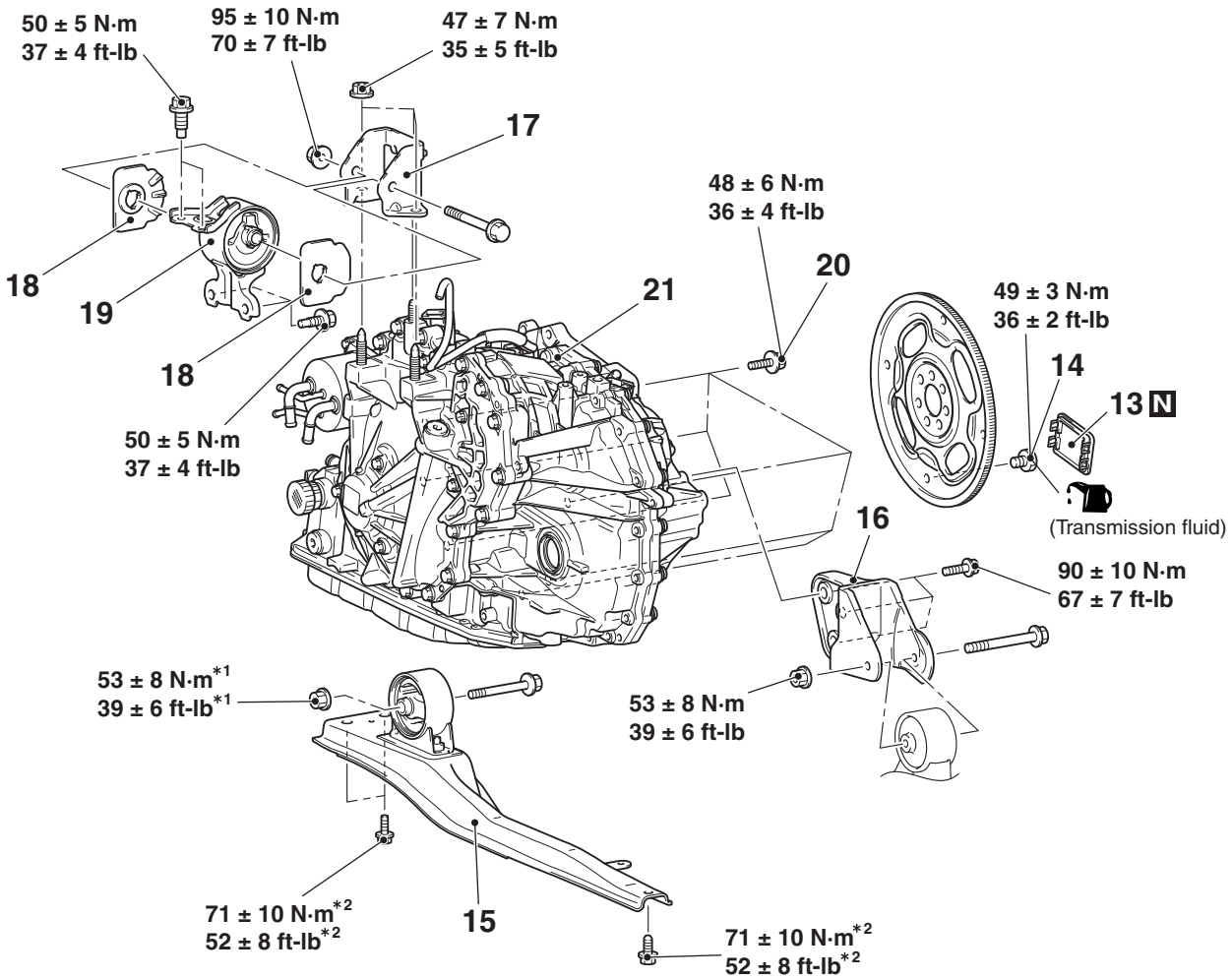

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Removal steps

13. Cover

<<**B**>> 14. Torque converter and drive plate coupling bolt

15. Center member assembly

16. Transaxle case rear roll stopper bracket

- While supporting the engine and transaxle assembly with a garage jack.

17. Transaxle mounting bracket

Removal steps (Continued)

>>**B**<< 18. Transaxle mounting insulator stopper

<<**C**>> 19. Transaxle mounting insulator

<<**D**>>

- Engine assembly supporting

20. Transaxle assembly lower part coupling bolt

>>**A**<< 21. Transaxle assembly

Required Special Tools:

- MB990900 or MB991164: Door adjusting wrench
- MB991895: Engine Hanger
- MB991928: Engine Hanger
- MB991930: Joint (90)
- MB991932: Foot (standard)
- MB992201: Engine hanger plate

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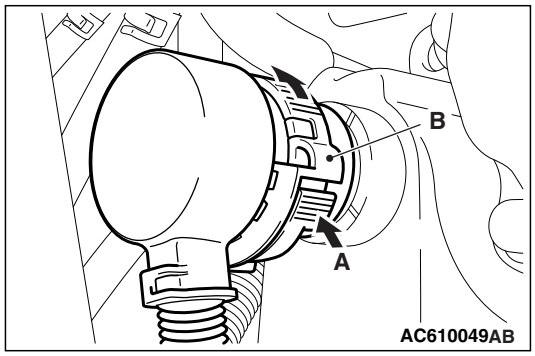
REMOVAL SERVICE POINTS

<<A>> CVT ASSEMBLY HARNESS CONNECTOR DISCONNECTION



While pressing A in the figure, turn B counterclockwise to unlock the CVT assembly connector, and disconnect the connector.

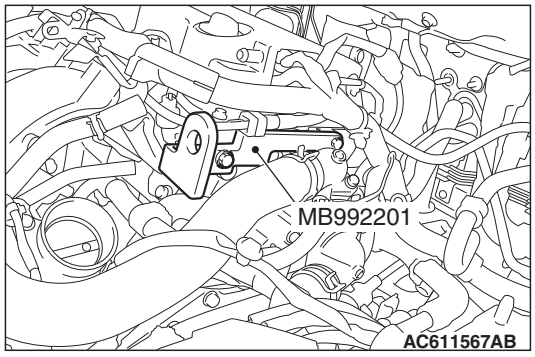
<<B>> TORQUE CONVERTER AND DRIVE PLATE COUPLING BOLT REMOVAL

1. Remove the coupling bolts while turning the crankshaft.
2. Fully push the torque converter into the transaxle side so that it does not remain on the engine side.

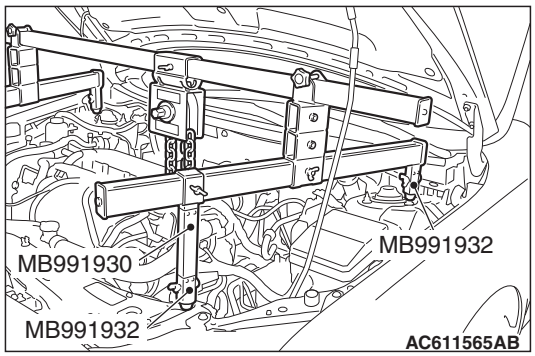
<<C>> TRANSAXLE MOUNTING INSULATOR REMOVAL

Use special tool MB990900 or MB991164 to remove the mounting bolt on the lower side of the transaxle mounting insulator.

<<D>> ENGINE ASSEMBLY SUPPORTING

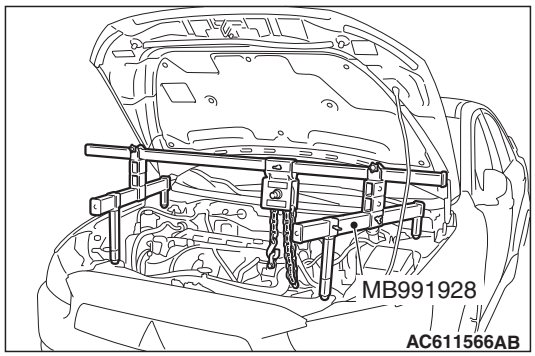


1. Remove the vacuum pipe assembly (Refer to GROUP 14, Water Hose and Water Pipe P.14-41), and install the engine hanger plate (special tool: MB992201) to the position as shown in the figure.
2. <When engine hanger (Special tool: MB991928) is used>
   (1) Assemble the engine hanger (Special tool: MB991928). (Set the components below to the base hanger.)
   - Slide bracket (HI)
   - Foot x 4 (standard) (MB991932)
   - Joint x 2 (90) (MB991930)



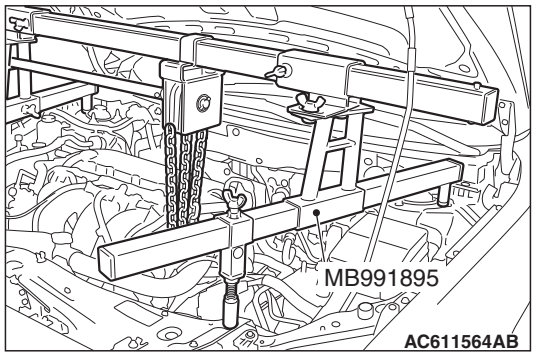
   (2) Set the feet of the special tool as shown in the figure.

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



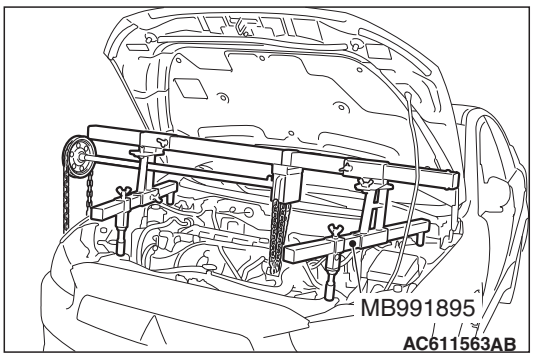
(3) Remove the garage jack and then remove the transaxle assembly upper part coupling bolts that have been loosened previously.

3. <When using engine mechanical hanger (Special tool: MB991895)>



(1) Set the foot of the engine mechanical hanger (Special tool: MB991895) as shown in the figure.

NOTE: Slide the front foot of the engine mechanical hanger (Special tool: MB991895) to balance the engine hanger.

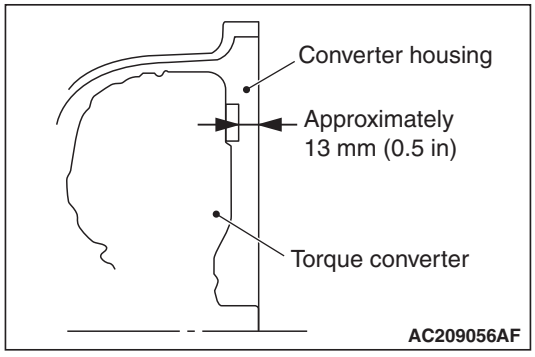


(2) Remove the garage jack and then remove the transaxle assembly upper part coupling bolts that have been loosened previously.

INSTALLATION SERVICE POINTS

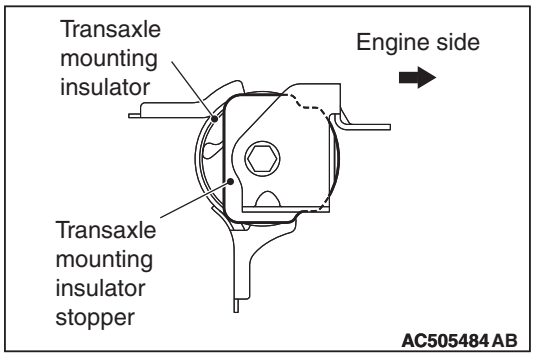
>>A<< TRANSAXLE ASSEMBLY INSTALLATION

Fully push the torque converter into the transaxle side, and then assemble the transaxle assembly to the engine.



>>B<< TRANSAXLE MOUNTING INSULATOR STOPPER INSTALLATION

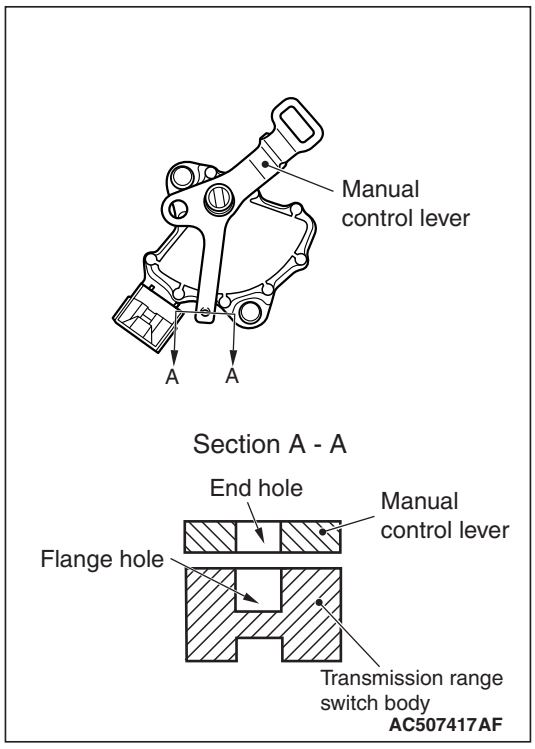
Install the transaxle mounting insulator stopper as shown in the figure.

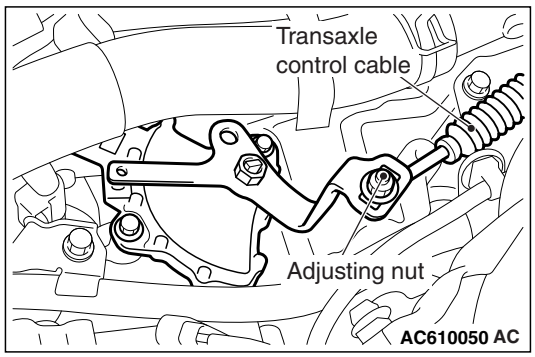


>>C<< TRANSAXLE CONTROL CABLE (TRANSAXLE SIDE) INSTALLATION

1. Move the selector lever to the "N" range.
2. Move the manual control lever to Neutral position.
3. Align the hole at the end of the manual control lever and the hole in the inhibitor switch body flange (section A – A).

   NOTE: Insert a ϕ5 mm (0.2 inch) bar into the aligned holes in the transmission range switch body flange and on the tip of the manual control lever to position the transmission range switch body.





4. Use the adjusting nut to tighten the transmission control cable to the specified torque.

   Tightening torque: 9.5 ± 3.5 N·m (84 ± 31 in-lb)

5. Make sure that the transmission-side ranges that are corresponding to the transmission range operate and function without fail.

TRANSAXLE CONTROL MODULE (TCM)

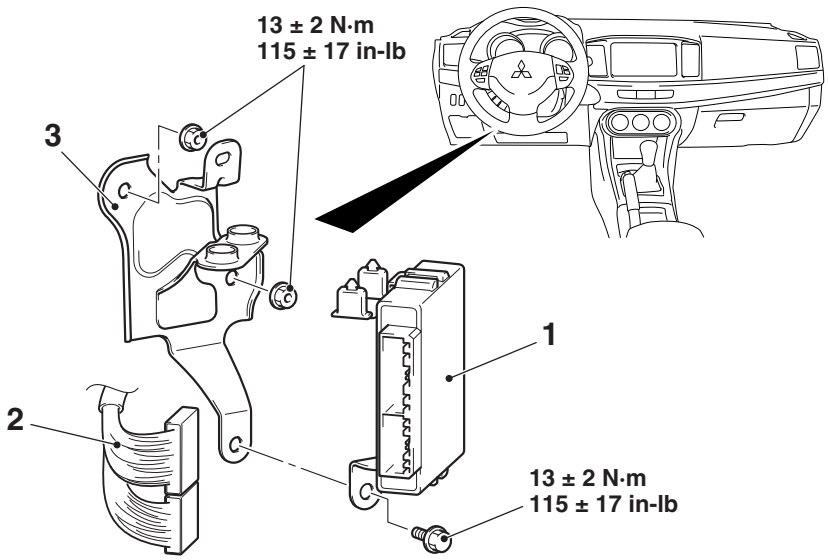
REMOVAL AND INSTALLATION

M1231211400161

⚠ CAUTION

To store the change pulley ratio status of the transaxle assembly in the TCM memory, drive the vehicle at 3 km/h (1.9 mph) or faster after replacing the TCM.

Pre-removal and post-installation operation
- Bottom Cover (Driver's Side) Removal and Installation (Refer to GROUP 52A, Instrument Lower Panel P.52A-8.)



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Removal steps
1. TCM

Removal steps (Continued)
2. Harness connector
3. TCM bracket

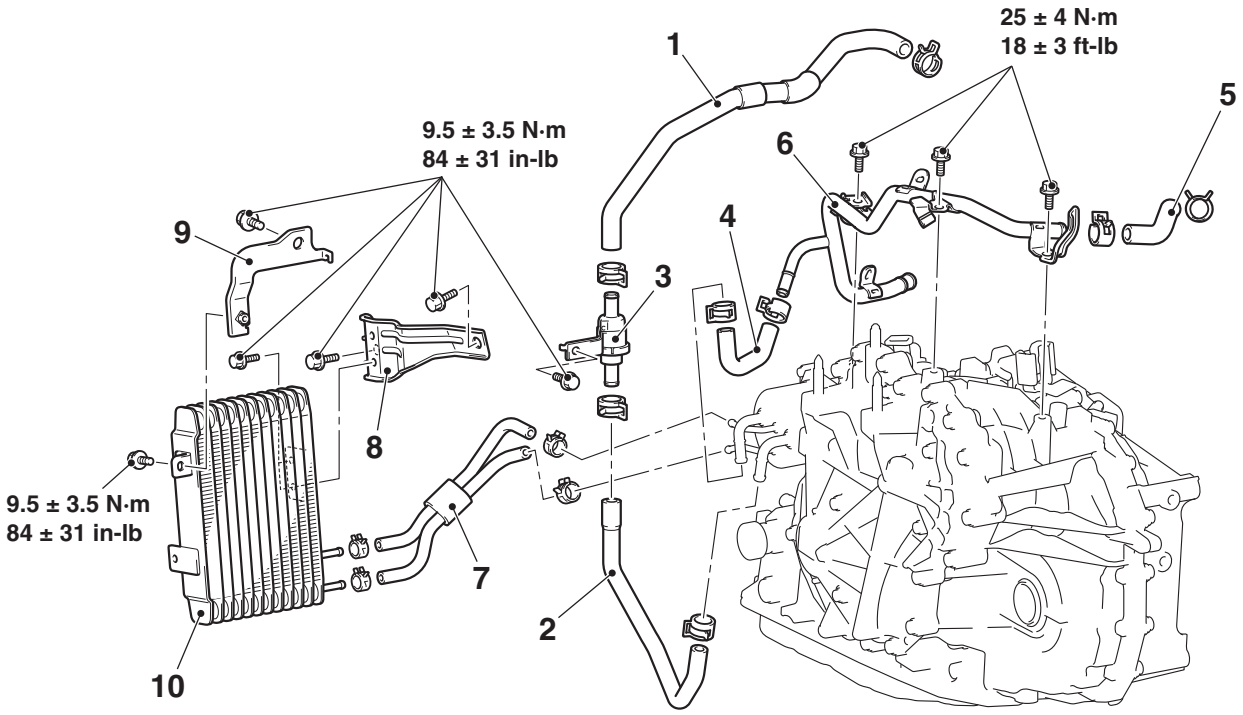
TSB Revision

TRANSMISSION FLUID COOLER AND COOLER LINE

REMOVAL AND INSTALLATION

M1231212500150

Pre-removal and post-installation operation
- Engine Room Under Cover and Engine Room Side Cover Removal and Installation (Refer to GROUP 51, Under Cover P.51-17).
- Transmission Fluid Draining and Refilling (Refer to P.23A-138).
- Engine Coolant Draining and Refilling (Refer to GROUP 14, On-vehicle Service P.14-25).
- Air Cleaner Assembly and Air Cleaner Bracket Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-9).
- Battery and Battery Tray Removal and Installation (Refer to GROUP 54A, Battery P.54A-10.)



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Transmission fluid cooler line removal steps
1. Water feed hose B
2. Water feed hose A
3. Thermo valve assembly
4. Water return hose A
5. Water return hose B
6. Water pipe assembly

Air-cooled transmission fluid cooler removal steps <2.4L engine>
7. Air-cooled transmission fluid cooler hose assembly
8. Air-cooled transmission fluid cooler bracket A
9. Air-cooled transmission fluid cooler bracket B
10. Air-cooled transmission fluid cooler assembly

THERMO VALVE CHECK

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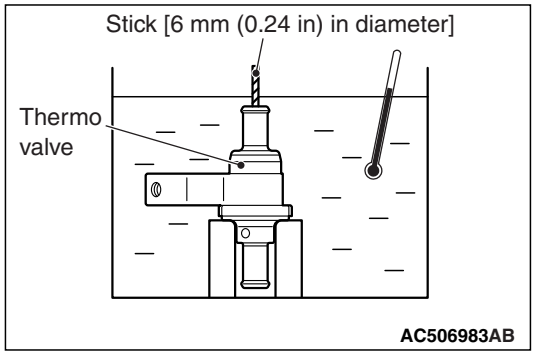
TSB Revision



1. Obtain a container filled with water and place the thermo valve in it with a stick [approximately 6 mm (0.24 inch) in diameter] inserted. Gradually warm up the water while stirring, and check that the thermo valve opening temperature is within the standard value. The stick rises when the thermo valve opens.

   Standard value:
   75 ± 1.5°C (167 ± 2.7°F)

2. Warm up the water to the full-open temperature of the thermo valve, and check that the valve lift amount is within the standard value.

   Standard value:
   Full-open temperature 95°C (203°F) or more
   Valve lift amount when it is fully opened:
   3 mm (0.12 inch) or more

   NOTE: Measure the height of the fully closed valve in advance, and then measure the valve height at fully open temperature to calculate the lift amount.

NOTES