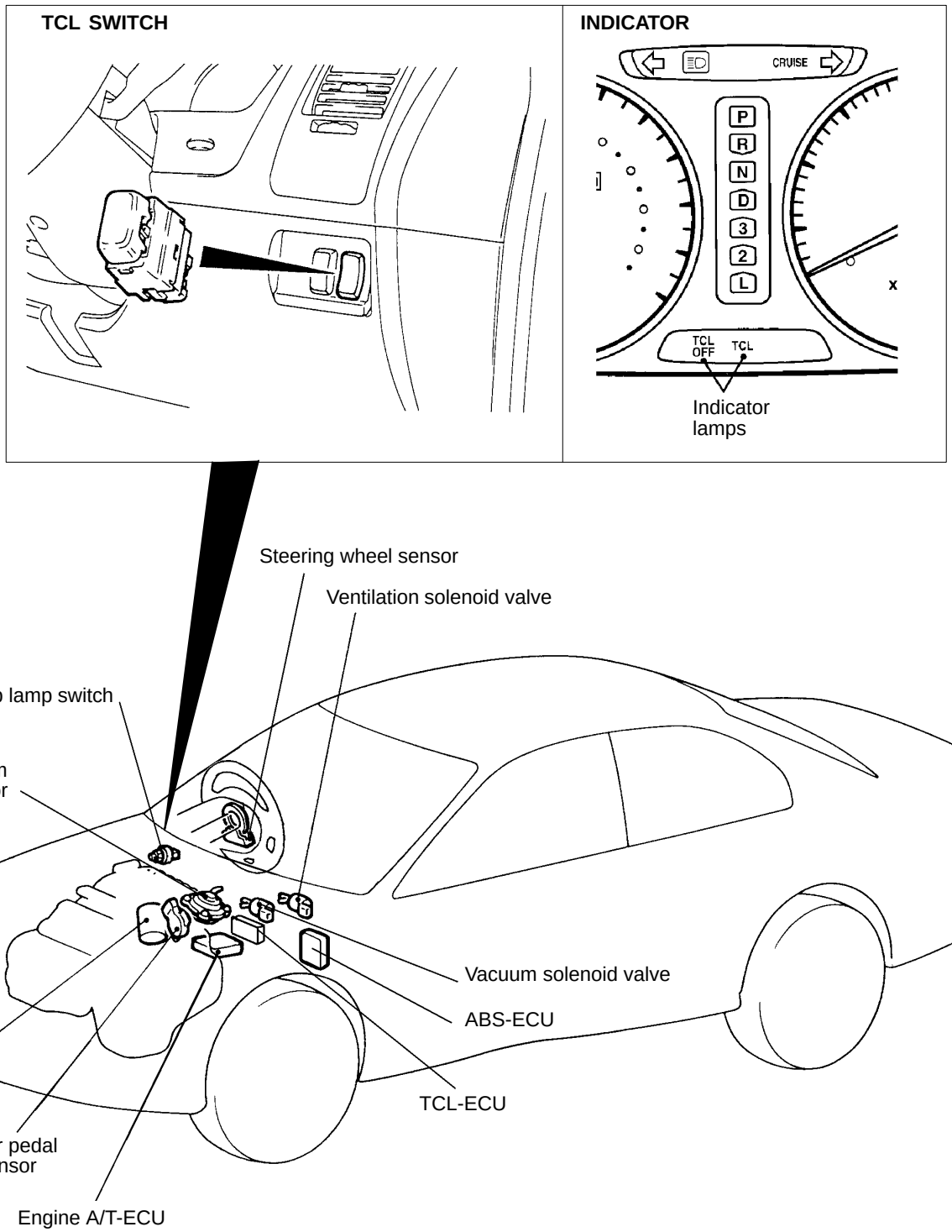
GENERAL DESCRIPTION

The TCL system (slip control and trace control) is available as an option. This system facilitates starting, accelerating, and cornering on slippery roads such as snowy roads. In addition, this system improves driveability while cornering on normal roads and contributes to easier driving.



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INSPECTION CHART FOR DIAGNOSIS TROUBLE CODES

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12	APS or TPS circuit system
13	TPS circuit system
23	Stop lamp switch circuit system
24	TCL switch circuit system
26	Ignition switch (IG2) circuit system
27	TCL-ECU power supply voltage circuit (engine control relay circuit) system
31	Front right wheel speed sensor circuit system
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33	Rear right wheel speed sensor circuit system
34	Rear left wheel speed sensor circuit system
35	Rear wheel speed sensor circuit system (1)
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41	Steering wheel sensor (ST-1) circuit system (open circuit)
42	Steering wheel sensor (ST-2) circuit system (open circuit)
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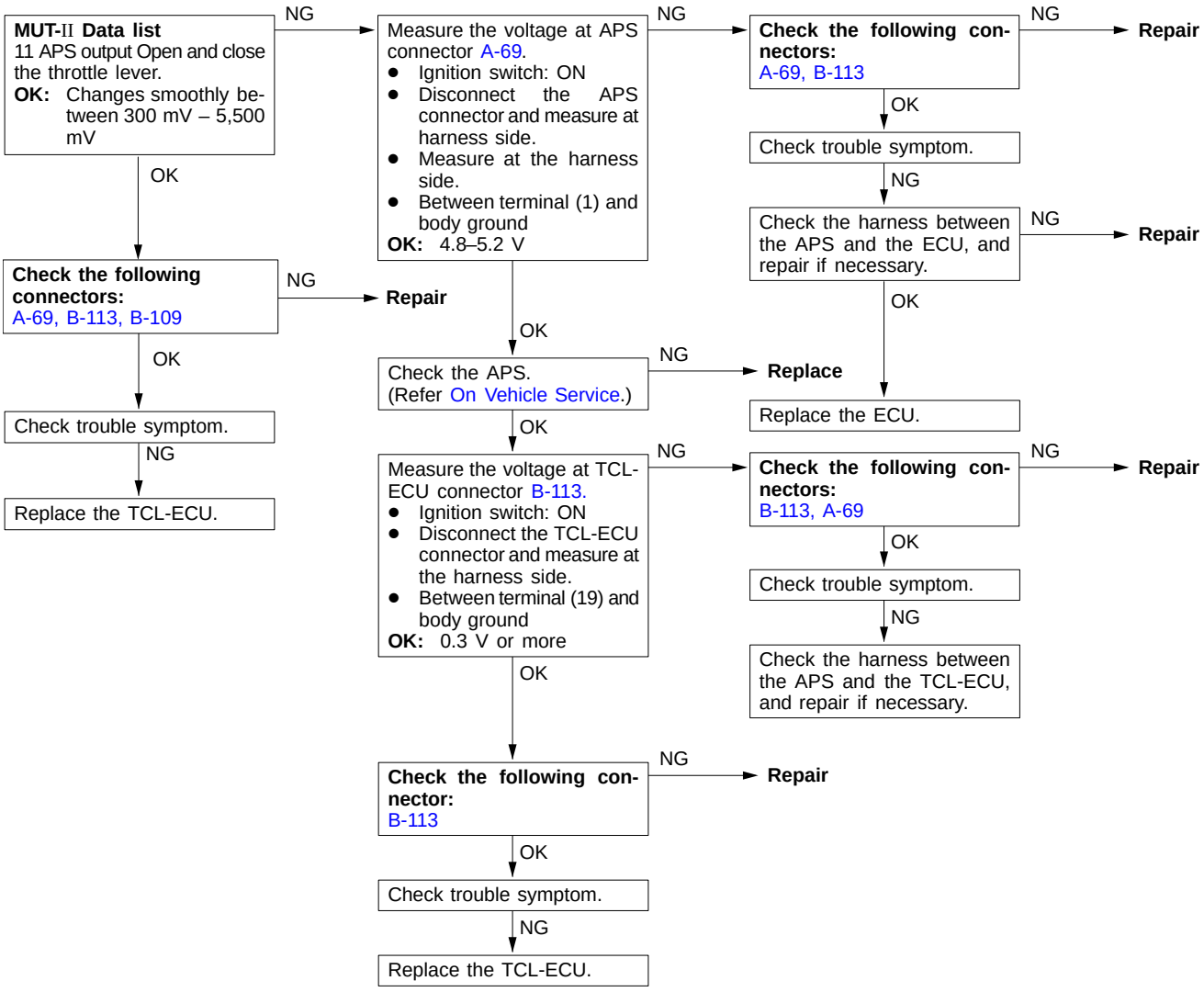
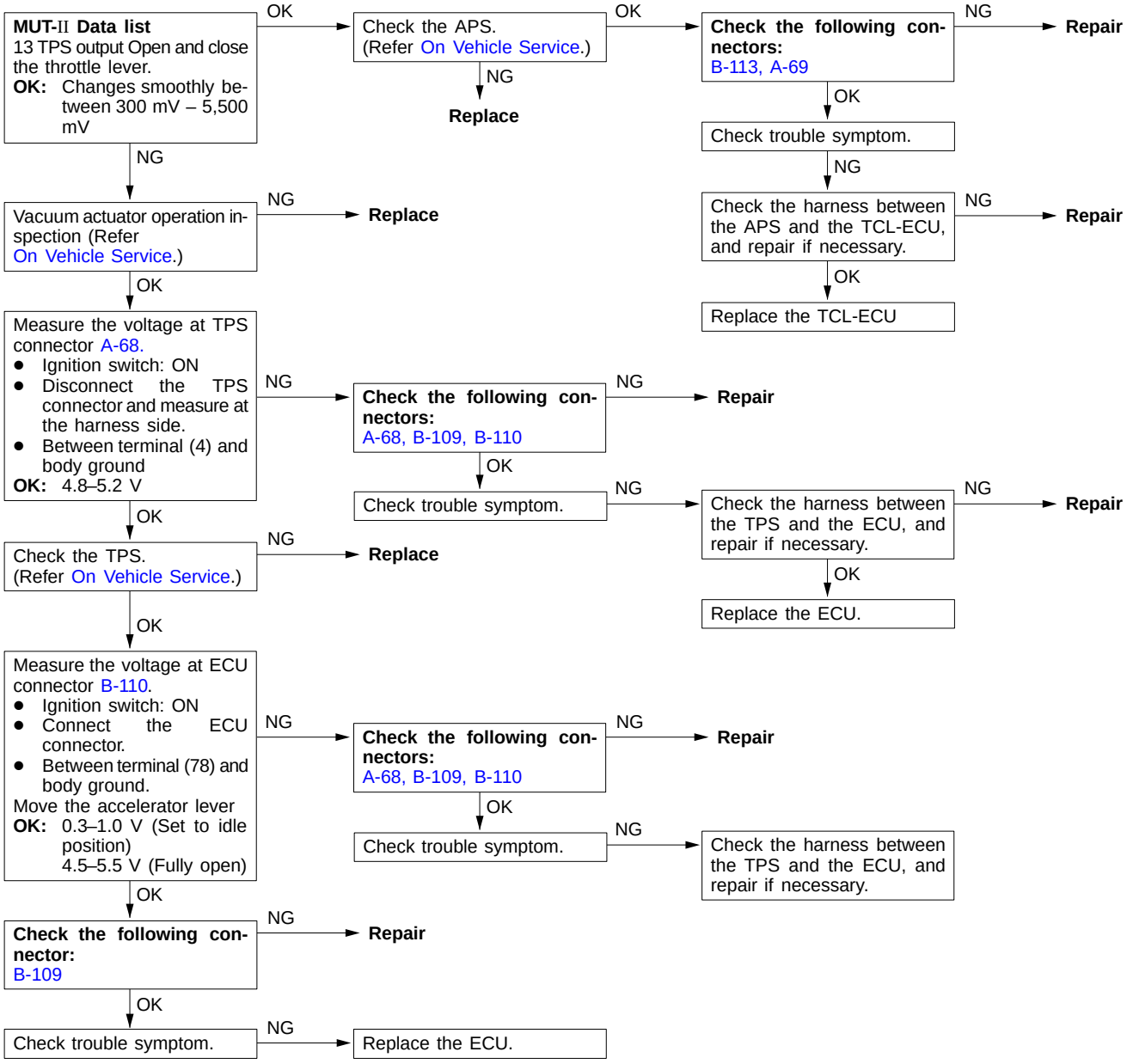
INSPECTION PROCEDURES FOR DIAGNOSIS CODES

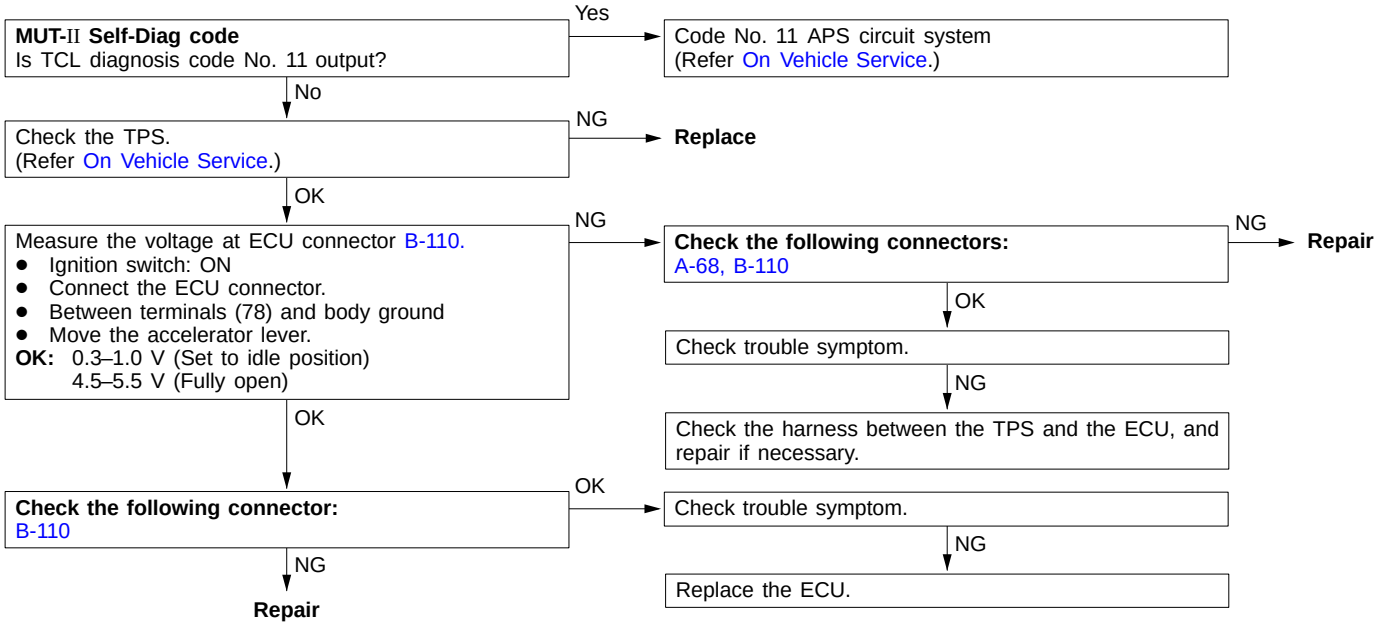
Code No. 11 APS circuit system	Probable cause
This DTC is output if the APS output voltage is less than 0.2 V due to an open circuit or other malfunction in the APS circuit. The APS power supply and ground are supplied from the ECU, and the output signal is used by the Engine A/T-ECU and auto-cruise control-ECU as well as by the TCL-ECU.	• Malfunction of APS • Malfunction of TCL-ECU • Malfunction of ECU • Malfunction of harness or connector



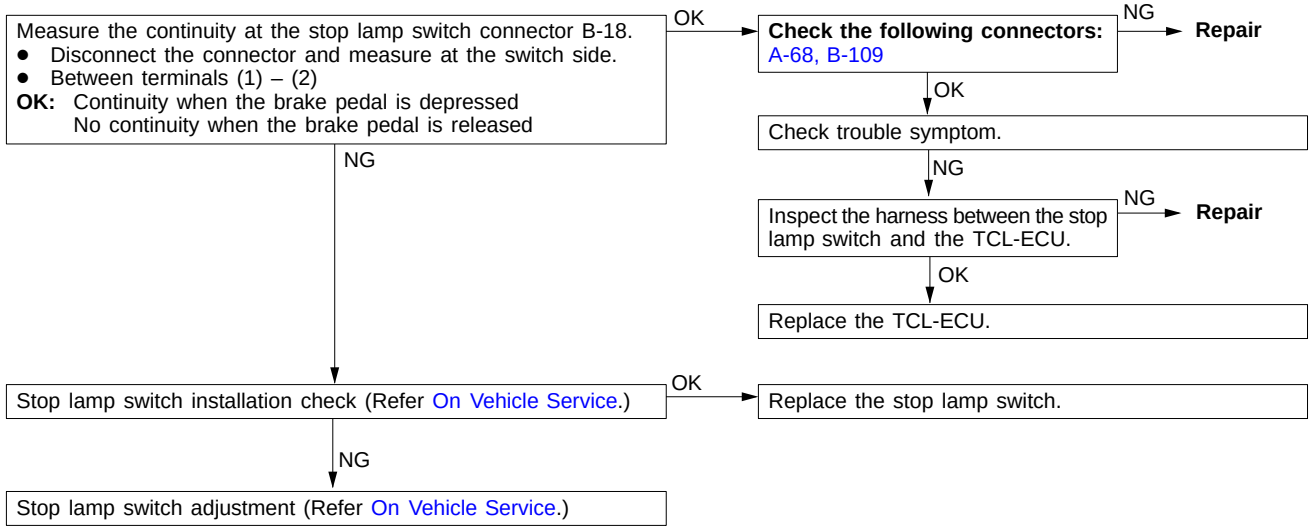
Code No. 12 APS or TPS circuit system	Probable cause
This DTC is output if the APS opening angle is 20° or greater than the TPS opening angle because of a short in the APS, an open circuit in the TPS or sticking of the vacuum actuator. As this detection condition can be applicable during throttle control, trouble diagnosis is invalid at this time.	• Malfunction of APS • Malfunction of TPS • Malfunction of TCL-ECU • Malfunction of ECU • Malfunction of harness or connector • Malfunction of vacuum actuator



Code No.13 TPS circuit system	Probable cause
This DTC is output if the TPS opening angle is 20° or greater than the APS opening angle because of a short in the TPS or an open circuit in the APS. If there is an open circuit in the APS, diagnosis code No. 11 is output at the same time. Accordingly, if only DTC No. 13 is output, the cause is probably an abnormality in the TPS circuit system.	• Malfunction of APS • Malfunction of TPS • Malfunction of harness or connector • Malfunction of ECU



Code No. 23 Stop lamp switch circuit system	Probable cause
This DTC is output if the stop lamp switch remains ON for a continuous period of 15 minutes or more, or for a continuous period of 1 minute or more when driving at a speed of 10 km/h or more, because of a short circuit or defective adjustment of the stop lamp switch. This DTC No. may also occur while driving in traffic jams or if the foot is resting on the brake pedal with driving.	• Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of TCL-ECU



Code No. 24 TCL switch circuit system	Probable cause
This DTC is output if signals are input simultaneously from both the TCL-OFF and TCL-ON positions because of a short circuit in the TCL switch circuit.	• Malfunction of the TCL switch • Malfunction of harness or connector • Malfunction of TCL-ECU

Measure the continuity at TCL switch connector C-08.
- Disconnect the connector and measure at the switch side.
- Between terminals (1) – (3) and (3) – (6)

OK: No continuity

NG → Replace the TCL switch.

OK ↓

Check the following connectors:
C-08, B-105, B-114

NG → **Repair**

OK ↓

Check trouble symptom.

NG ↓

Inspect the harness between the TCL switch and the TCL-ECU.

NG → **Repair**

OK ↓

Replace the TCL-ECU.

Code No. 26 Ignition switch (IG2) circuit system	Probable cause
This DTC is output if the IG2 power supply is not distributed, even though the engine speed is 450 r/min or more.	• Malfunction of harness or connector • Malfunction of TCL-ECU

Measure the voltage at TCL-ECU connector B-114.
- Ignition switch : ON
- Disconnect the TCL-ECU connector and measure at the harness side.
- Between terminal (35) and body ground

OK: System voltage

OK → **Check the following connector:** B-114

NG → **Repair**

OK ↓

Check trouble symptom.

NG ↓

Replace the TCL-ECU.

NG ↓

Check the following connectors:
B-77, B-76, B-42, B-114

NG → **Repair**

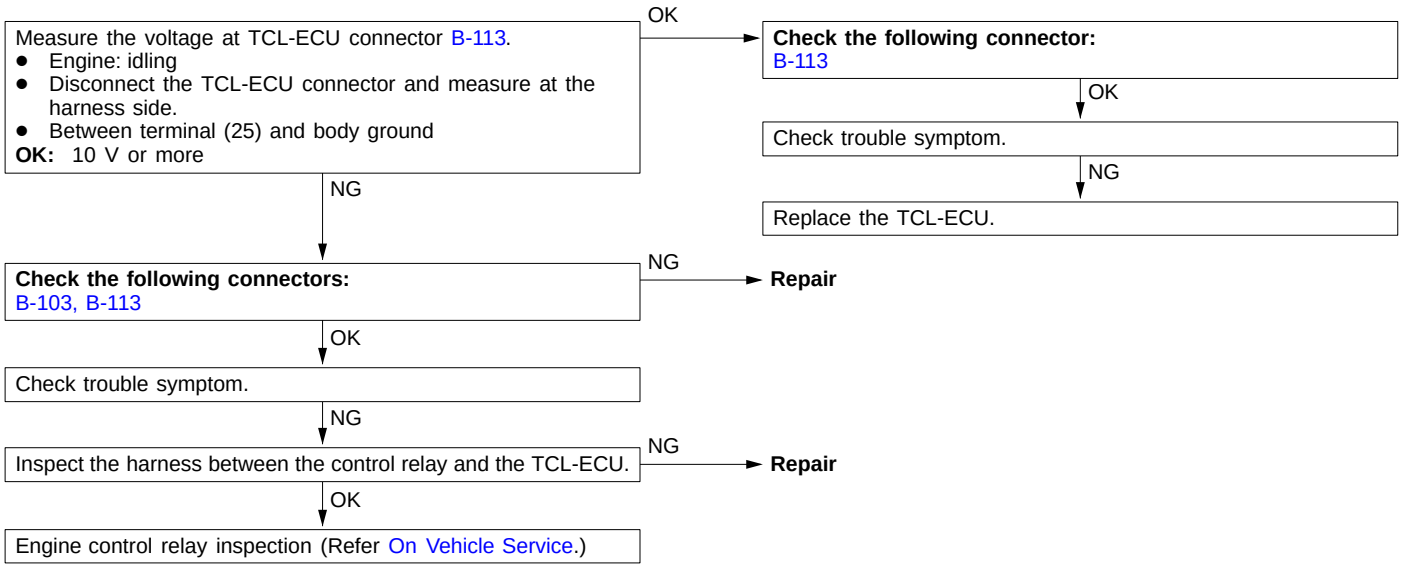
OK ↓

Check trouble symptom.

NG ↓

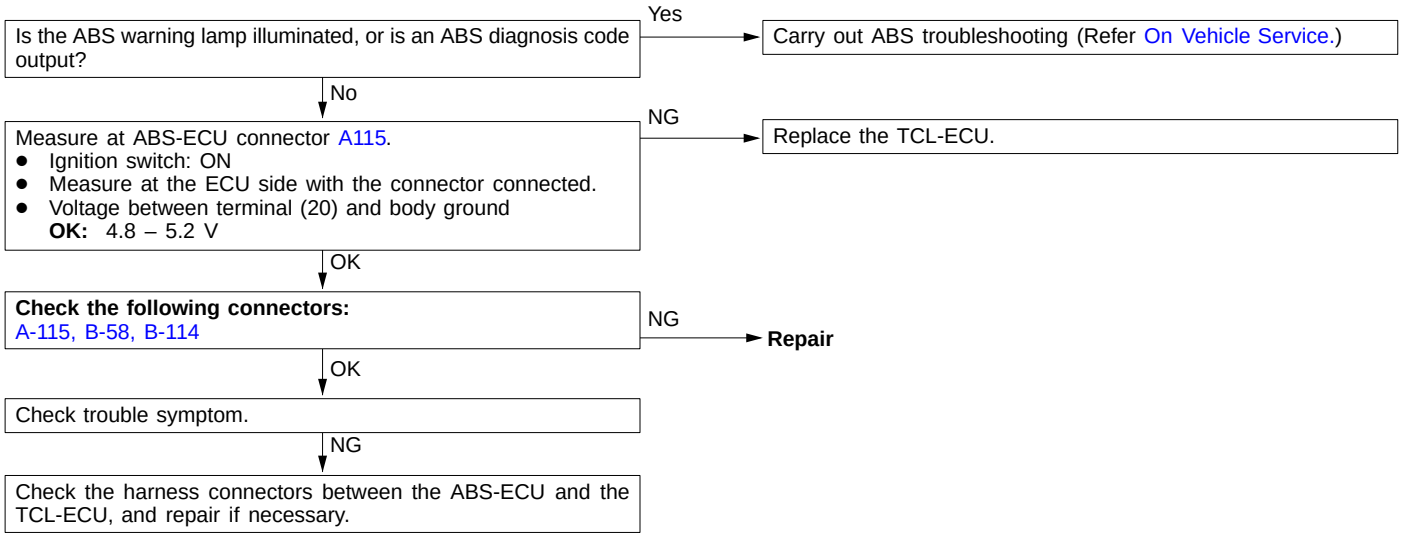
Check the harness between the ignition switch and the TCL-ECU, and repair if necessary.

Code No. 27 TCL-ECU power supply voltage circuit (engine control relay circuit) system	Probable cause
This DTC is output if the TCL-ECU power supply voltage (engine control relay supply voltage) is lower than the specified value. If the voltage returns to the specified value or greater, the DTC is erased.	• Malfunction of control relay • Malfunction of harness or connector • Malfunction of TCL-ECU



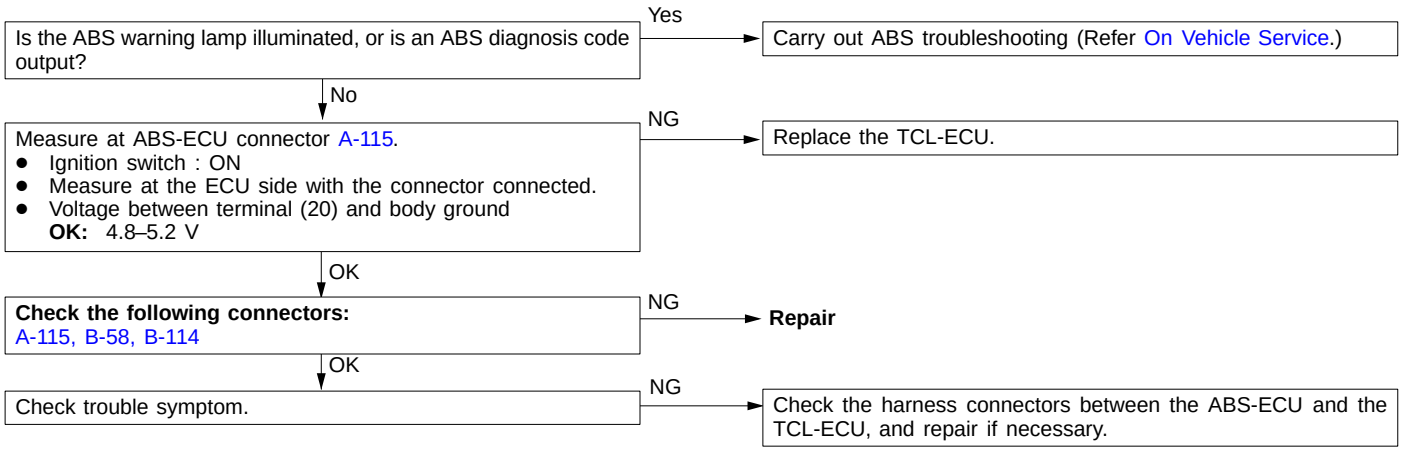
Code No. 31 Front right wheel speed sensor circuit system Code No. 32 Front left wheel speed sensor circuit system	Probable cause
These DTC are output if a pulse (from the front wheels) indicates that the difference between the front wheels and the rear wheels is 8 km/h or more because of an open or short circuit in a wheel speed sensor or a malfunction of sensor.	• Malfunction of front wheel speed sensor • Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU

NOTE: When these diagnosis trouble codes are output, erase the diagnosis trouble code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis trouble codes are not output again.



Code No. 33 Rear right wheel speed sensor circuit system Code No. 34 Rear left wheel speed sensor circuit system	Probable cause
These diagnosis trouble codes are output if a pulse (from the wheels on one side of rear) indicates that the difference between the left wheel and the right wheel is 8km/h or more because of an open or short circuit in a wheel speed sensor or a defective sensor.	• Malfunction of rear wheel speed sensor • Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU

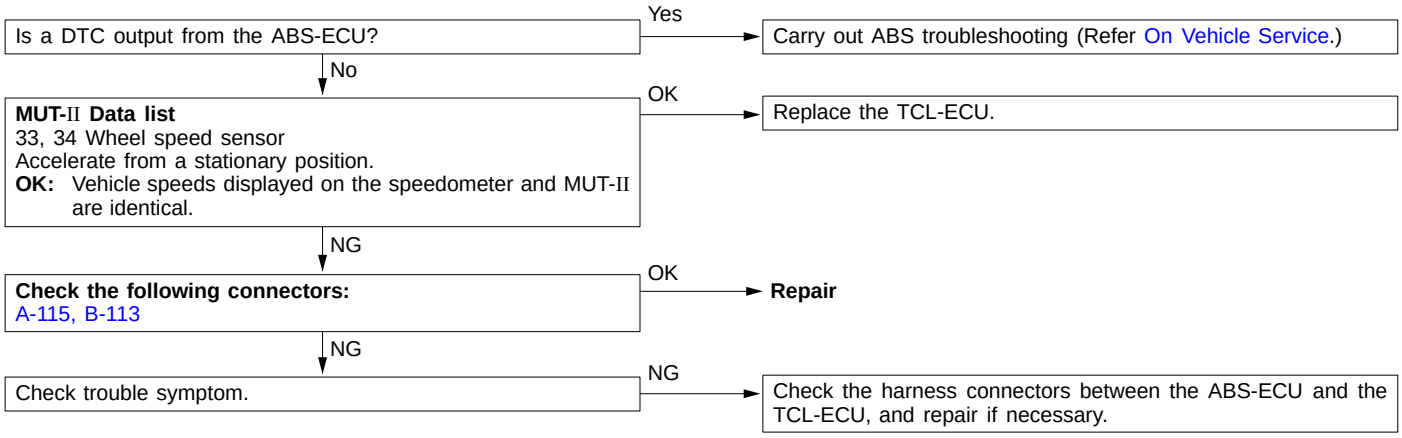
NOTE: When these diagnosis trouble codes are output, erase the diagnosis code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis trouble codes are not output again.



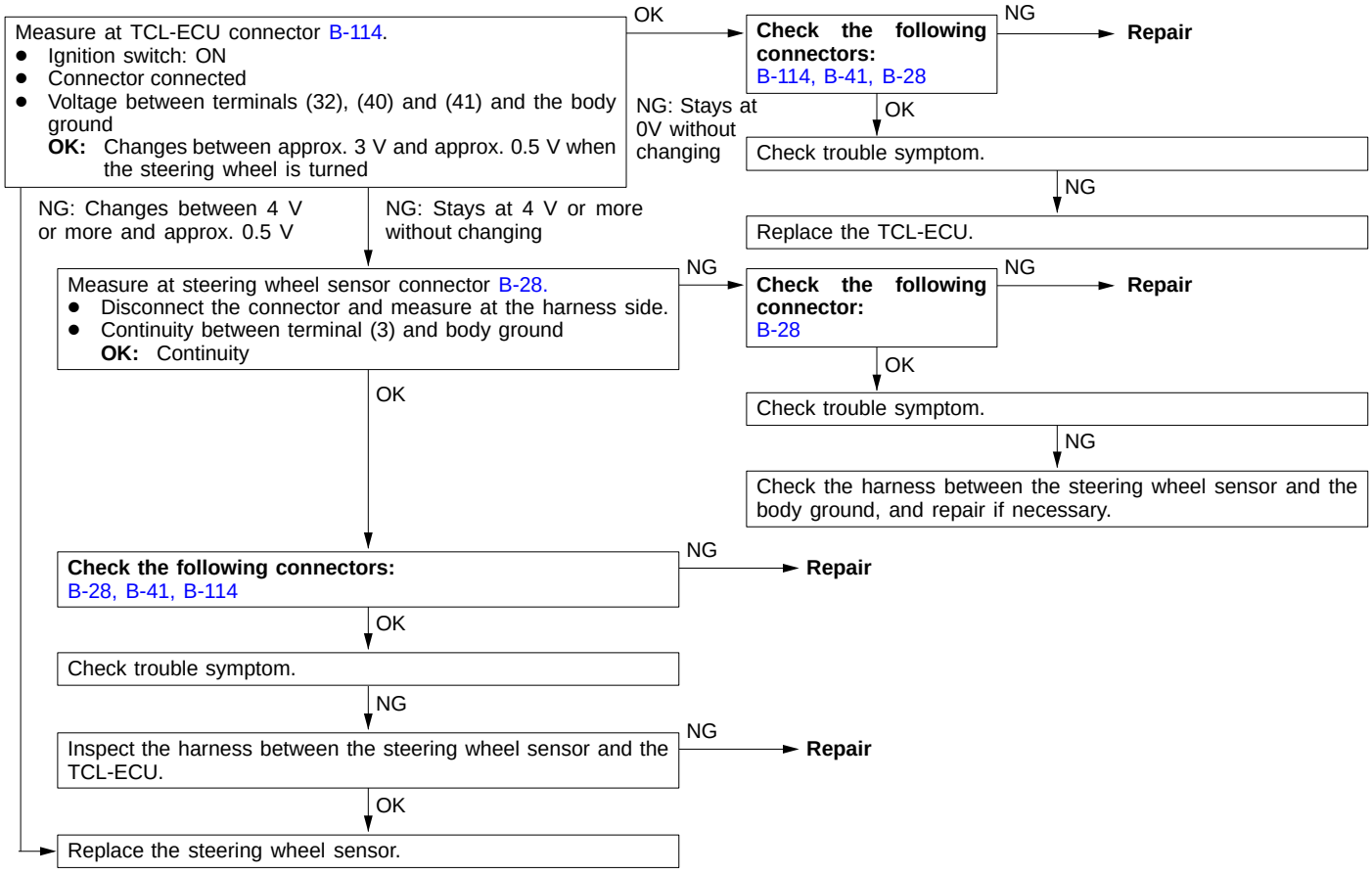
Code No. 35 Rear wheel speed sensor circuit system (1) Code No. 36 Rear wheel speed sensor circuit system (2)	Probable cause
DTC code No. 35 is output if the pulse signal from a rear wheel sensor is momentarily interrupted (0.02 sec.) because of a transient open circuit in a rear wheel speed sensor. DTC No. 36 is output if a rear wheel speed sensor abnormality is judged when the turning speed of both rear wheels is 0 km/h for 20 seconds or more while TCL is operating.	• Malfunction of rear wheel speed sensor • Malfunction of harness or connector • Malfunction of ABS-ECU • Malfunction of TCL-ECU

NOTE: If the front wheels only are turning while the rear wheels are stationary (wheel slip), the TCL-OFF indicator will start flashing after 20 seconds, and the system will be isolated.

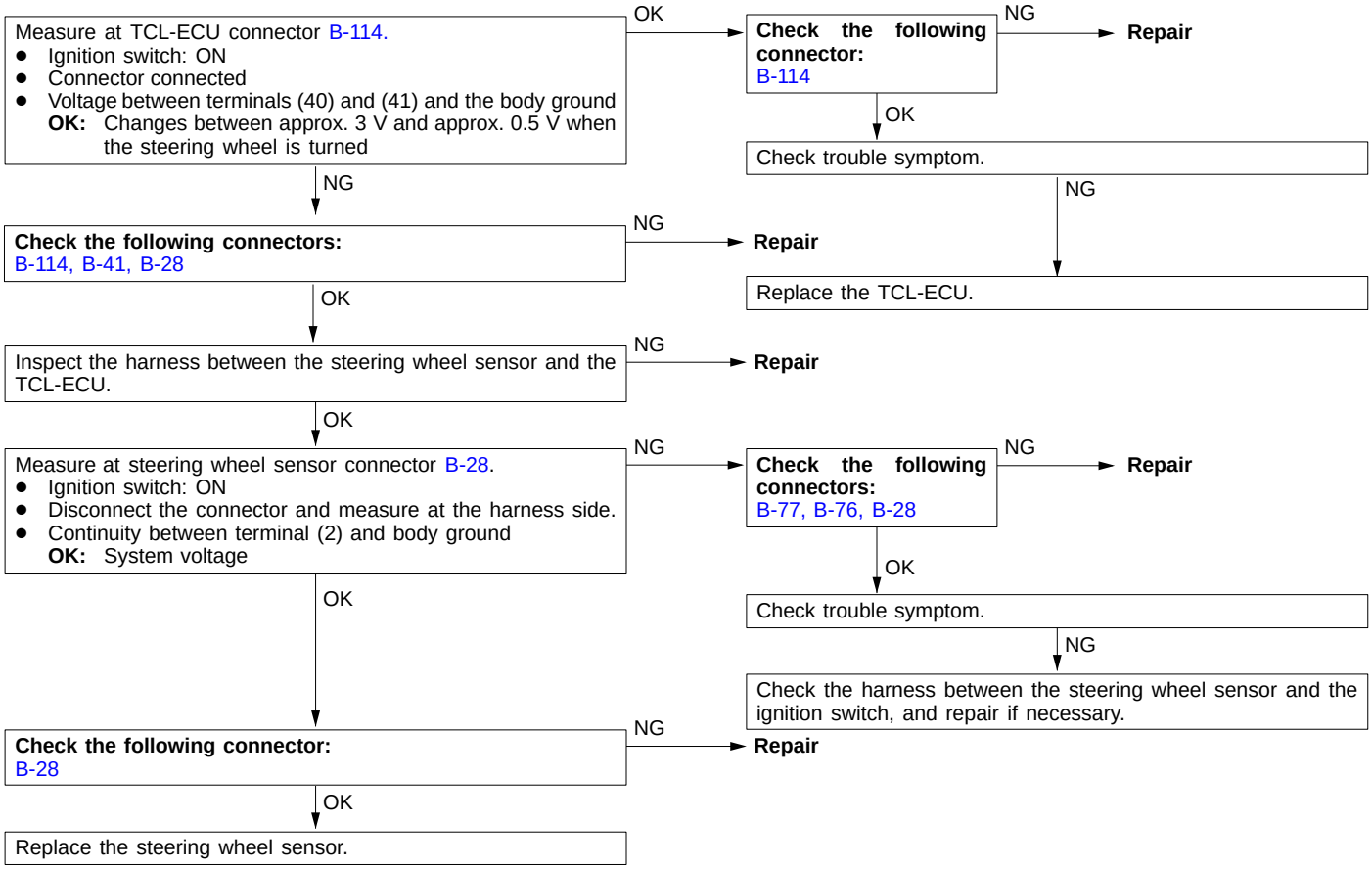
NOTE: When these diagnosis trouble codes are output, erase the diagnosis trouble code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis trouble codes are not output again.



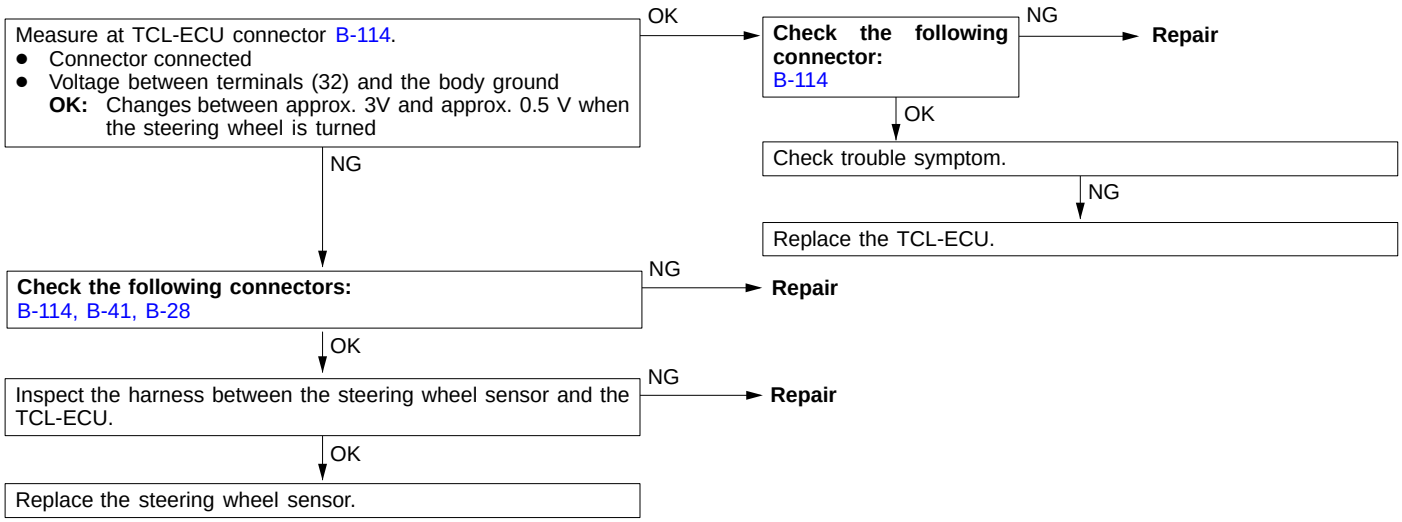
Code No. 41 Steering wheel sensor (ST-1) circuit system (open circuit) Code No. 42 Steering wheel sensor (ST-2) circuit system (open circuit) Code No. 43 Steering wheel sensor (ST-N) circuit system (open circuit)	Probable cause
These diagnosis trouble codes are output if there is an open circuit in the output wire of the steering wheel sensor circuit.	• Malfunction of harness or connector • Malfunction of steering wheel sensor • Malfunction of TCL-ECU



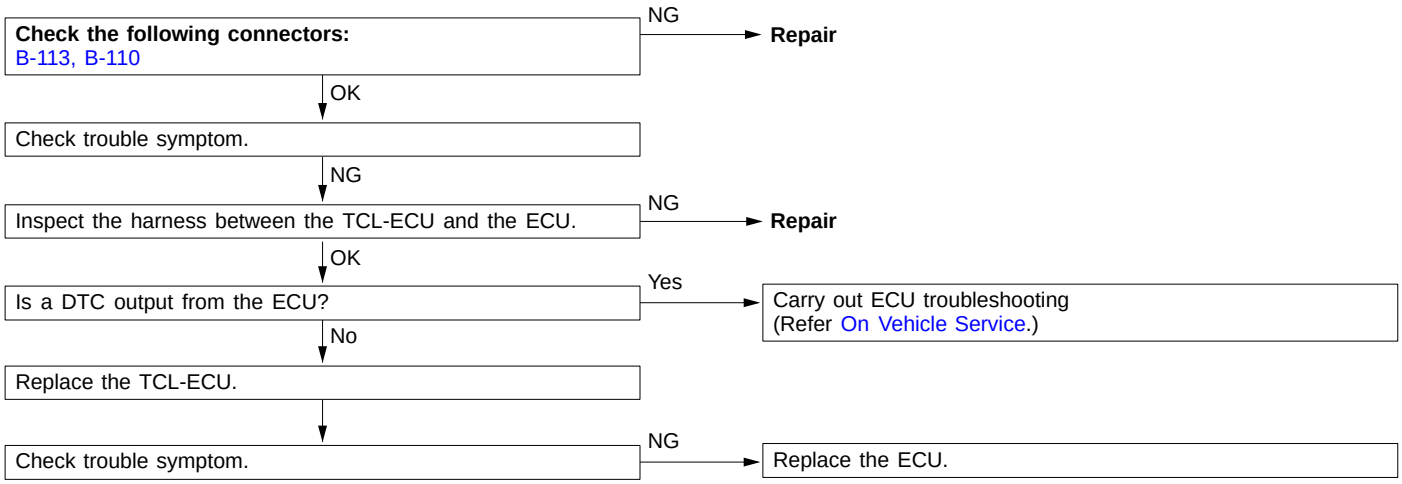
Code No. 44 Steering wheel sensor circuit system (short circuit)	Probable cause
This DTC is output when no steering angle signal is output because there is a short-circuit in either steering wheel sensor ST-1 or steering wheel sensor ST-2 when the speed averages output by the left and right rear wheel speed sensors are 15 km/h or more.	• Malfunction of harness or connector • Malfunction of steering wheel sensor • Malfunction of TCL-ECU



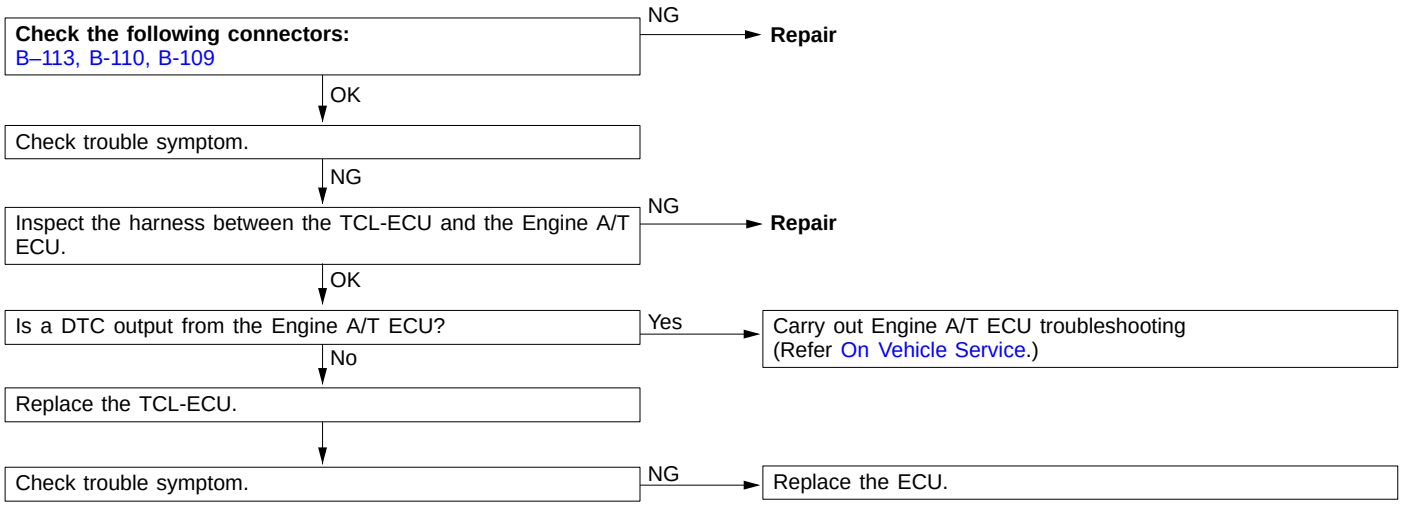
Code No. 45 Steering wheel sensor (ST-N) circuit system (short circuit)	Probable cause
This DTC is output if it is considered that there is an abnormality in the steering wheel sensor (ST-N) circuit system when the straight-ahead position is continuously detected even though the steering wheel is turned 20° or more.	• Malfunction of steering wheel sensor • Malfunction of harness or connector • Malfunction of TCL-ECU



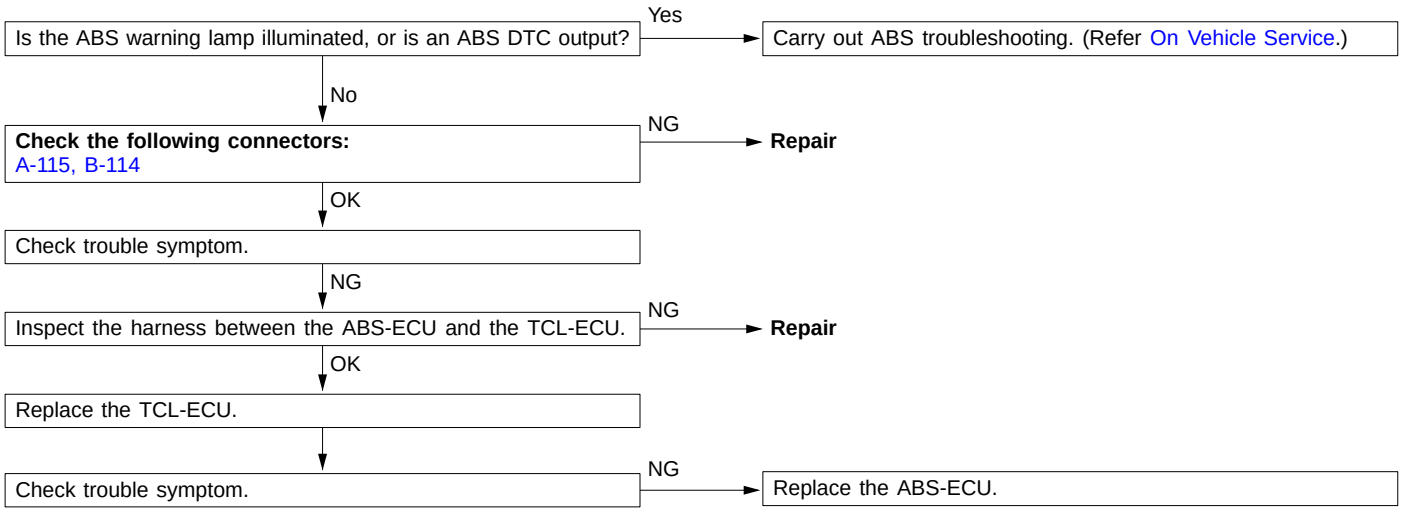
Code No. 71 ECU communication circuit system	Probable cause
This DTC is output if an error is detected in the communication contents because of an open or short circuit in the serial communication circuit between the TCL-ECU and the ECU, a malfunction of ECU and a defective shielding of the shield wire.	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ECU



Code No. 74 Engine A/T ECU communication circuit system	Probable cause
This DTC is output if an error is detected in the communication contents because of an open or short circuit in the serial communication circuit between the TCL-ECU and the A/T-ECU, a malfunction of ECU and a defective shielding of the shield wire.	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of Engine A/T ECU



Code No. 76 ABS circuit system	Probable cause
This diagnosis code is output if the ABS-ECU detects the system abnormality (when ABS warning lamp illumination is controlled).	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU



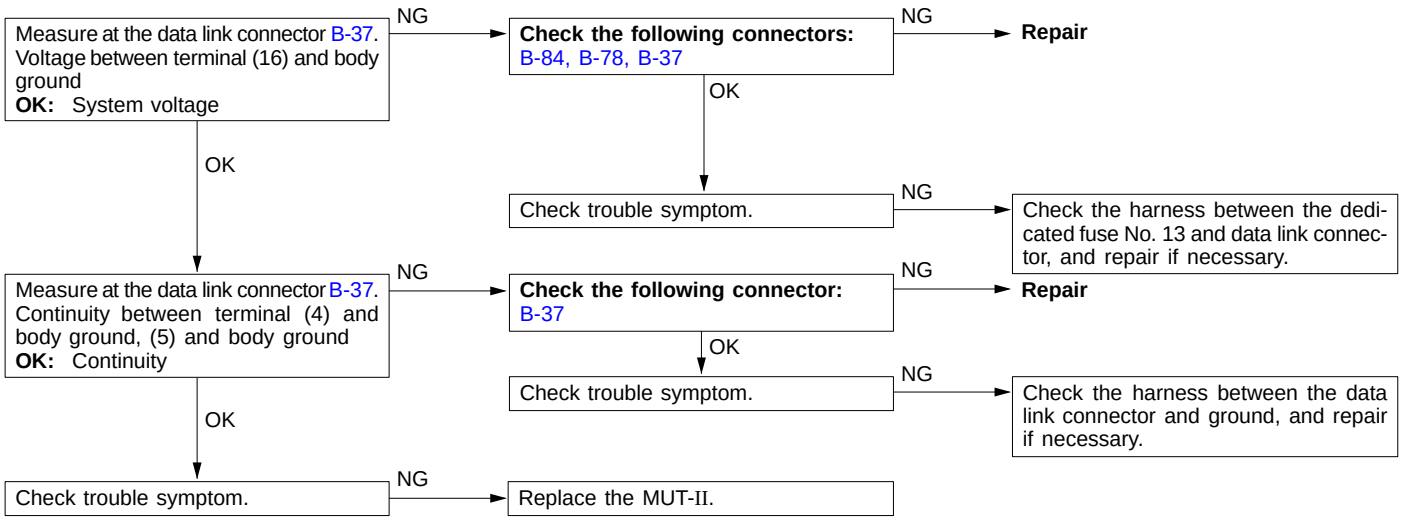
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.
Communication with the MUT-II is not possible.	Communication with all systems is not possible.	1
	Communication with TCL-ECU only is not possible.	2
Malfunction of TCL indicator lamp display	None of the TCL indicator lamps (TCL OFF, TCL) illuminate when the ignition switch is ON.	3
	One of the TCL indicator lamps does not illuminate when the ignition switch is ON (Another lamp does illuminate).	4
	TCL OFF indicator lamp remains illuminated even after the engine is started.	5
	TCL OFF indicator lamp flashes after the engine is started.	
	TCL remains illuminated even after the engine is started.	6
	TCL OFF indicator lamp does not illuminate even if the TCL switch is continuously pressed to the OFF side while the engine is idling.	7
Malfunction of TCL operation	TCL illuminates in the TCL operation range, but torque is not reduced.	8
Poor starting Poor acceleration	Engine output is reduced in the TCL non-operation range (TCL indicator lamp does not illuminate) and starting and acceleration performance is poor.	

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

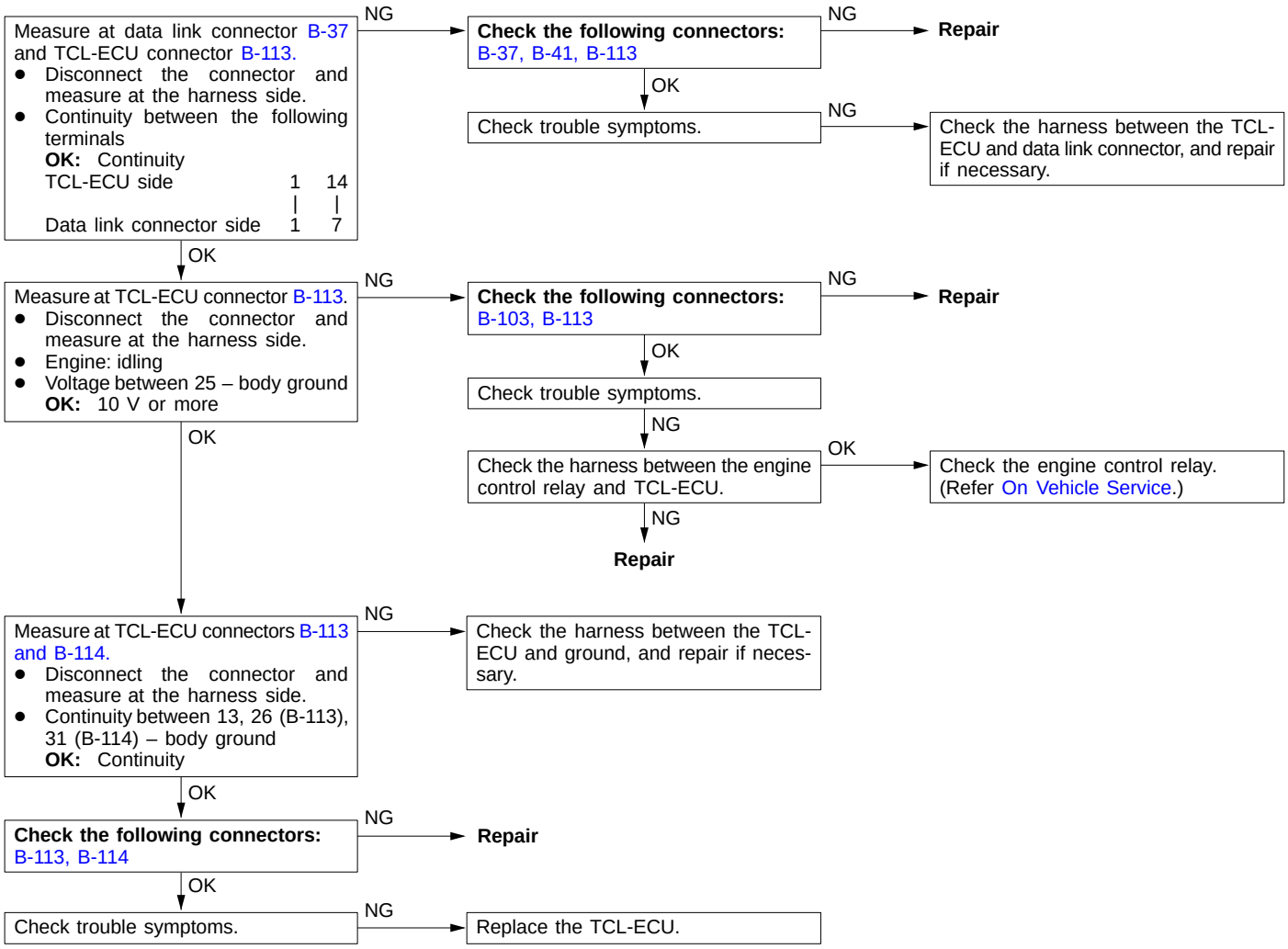
Inspection Procedure 1

Communication with the MUT-II is not possible. (Communication with all systems is not possible.)	Probable cause
The cause is probably a defective power supply system (including ground) for the diagnosis line.	• Malfunction of connector • Malfunction of harness



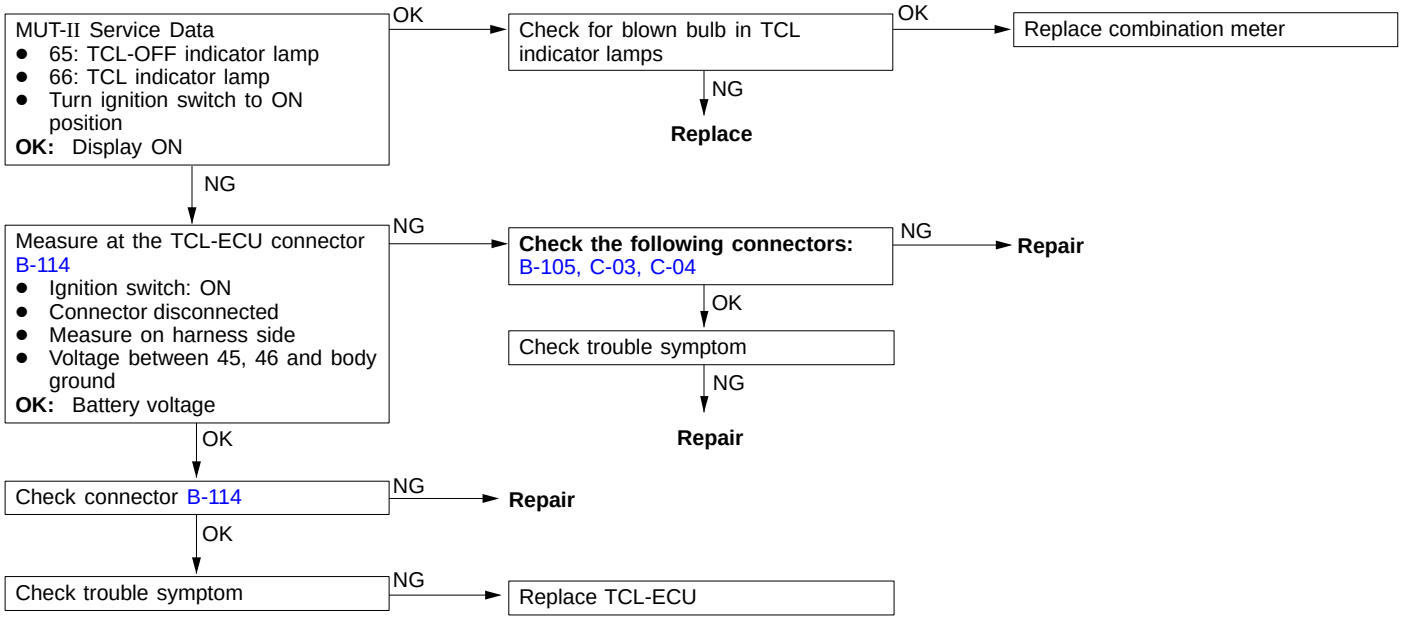
Inspection Procedure 2

Communication with the MUT-II is not possible. (Communication with TCL-ECU only is not possible.)	Probable cause
If the MUT-II cannot communicate with the TCL-ECU only, the cause is probably an abnormality in the TCL diagnosis line or in the TCL-ECU power supply line or ground line.	• Malfunction of harness or connector • Malfunction of engine control relay • Malfunction of TCL-ECU



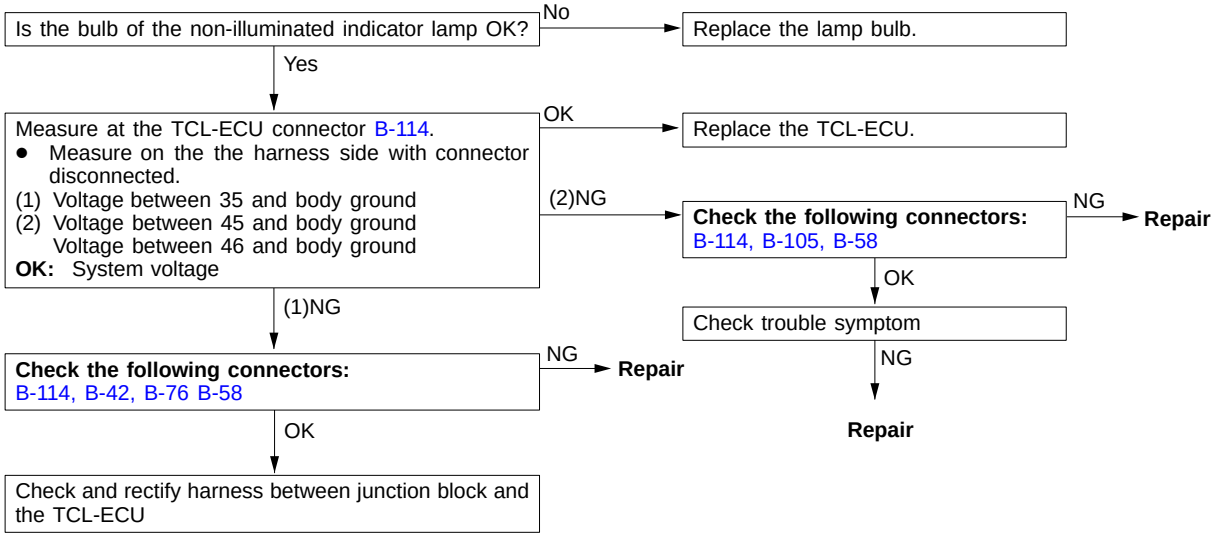
Inspection Procedure 3

None of the TCL indicator lamps (TCL OFF, TCL) illuminate when the ignition switch is ON.	Probable cause
The main cause is an open circuit in the indicator circuit because of a burnt-out indicator lamp bulb.	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of indicator lamp bulb



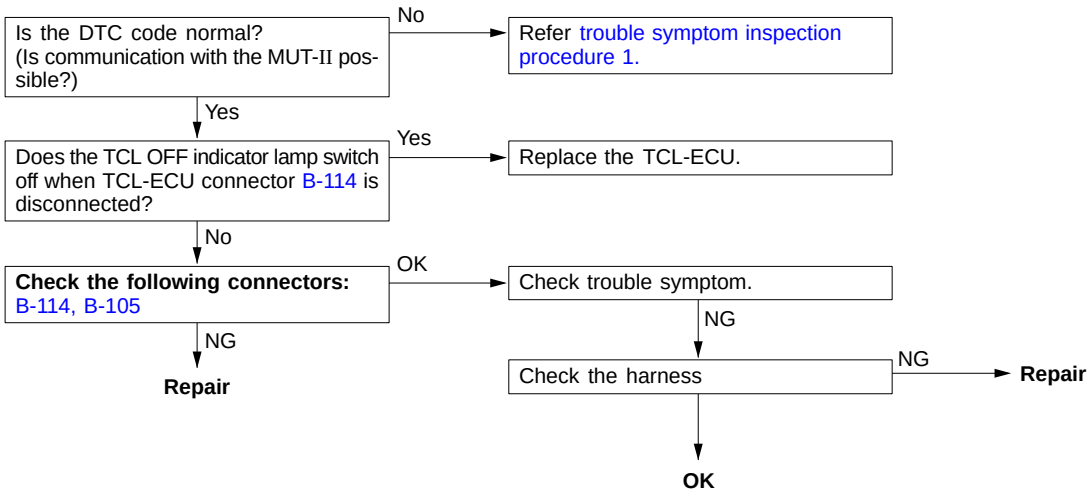
Inspection Procedure 4

One of the TCL indicator lamps does not illuminate when the ignition switch is ON.	Probable cause
Because the TCL indicators utilise shared power supply circuits, if one of the indicator lamps is illuminated, the power supply circuit can be judged to be normal.	• Burnt-out indicator lamp bulb • Harness or connector fault • TCL-ECU fault



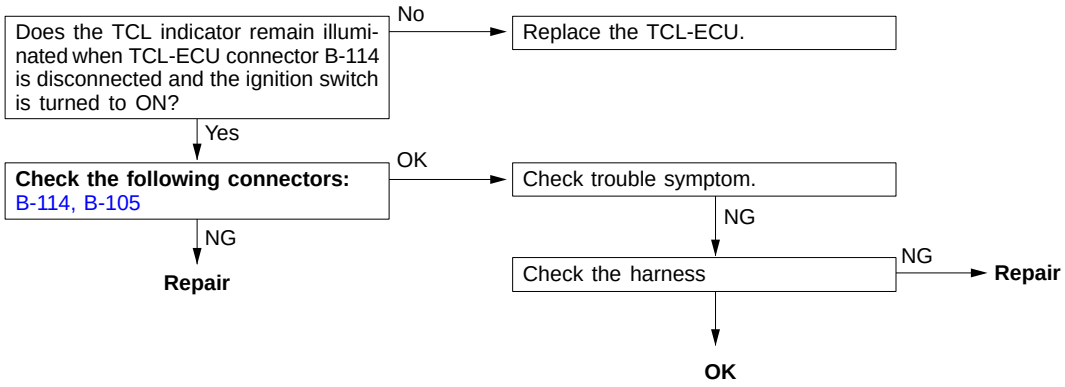
Inspection Procedure 5

• TCL OFF indicator lamp remains illuminated even after the engine is started. • TCL OFF indicator lamp flashes after the engine is started.	Probable cause
The TCL-OFF indicator is also used as a system warning indicator. If there is a system abnormality, this indicator will illuminate or flash.	• Other system related to the TCL • Malfunction of harness or connector



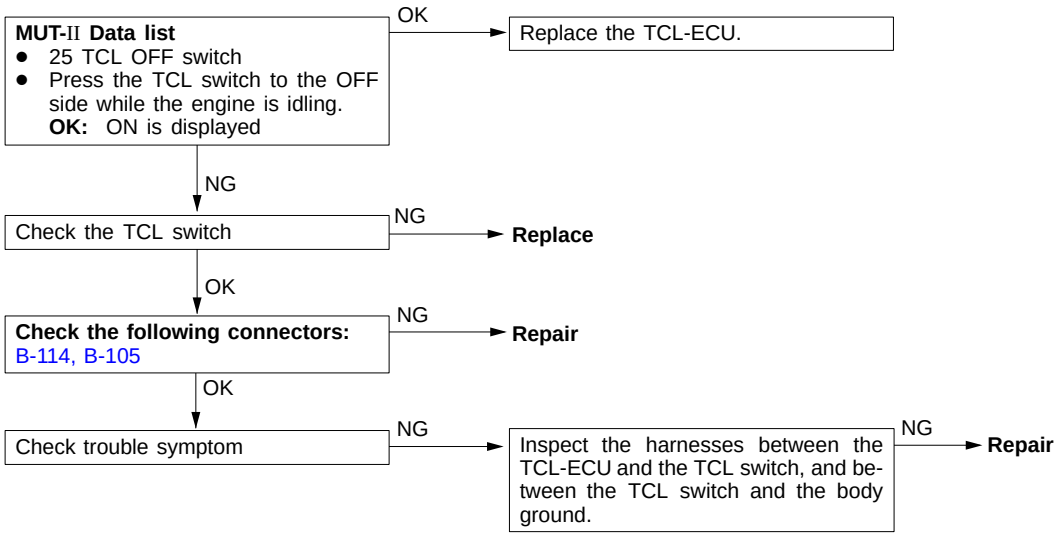
Inspection Procedure 6

TCL indicator lamp remains illuminated even after the engine is started.	Probable cause
The TCL indicator lamp only illuminates while the engine is running if the TCL is operating.	• Malfunction of TCL indicator power supply circuit • Malfunction of TCL-ECU • Malfunction of harness or connector



Inspection Procedure 7

TCL OFF indicator lamp does not illuminate even if the TCL switch is continuously pressed to the OFF side while the engine is idling.	Probable cause
If the indicator lamp does not illuminate when the switch is operated, there is a malfunction in the switch, switch circuit or in the TCL-ECU.	• Malfunction of harness or connector • Malfunction of TCL switch • Malfunction of TCL-ECU



Inspection Procedure 8

• TCL illuminates in the TCL operation range, but torque is not reduced. • Engine output is reduced in the TCL non-operation range (TCL indicator lamp does not illuminate) and starting and acceleration performance is poor.	Probable cause
In cases such as the above, the electrical system is normal, and the cause is probably an abnormality in the mechanical system (vacuum actuator).	• Malfunction of vacuum solenoid valve • Malfunction of ventilation solenoid valve • Malfunction of vacuum actuator • Incorrect vacuum hose connector • Malfunction of throttle link • Malfunction of vacuum tank • Blocked air cleaner element

As the cause is probably a malfunction of the vacuum actuator system, carry out inspection of the following items in order.

- Vacuum solenoid valve operation inspection (Refer Group 13A On Vehicle Service.)
- Ventilation solenoid valve operation inspection (Refer Group 13A On Vehicle Service.)
- Disconnected or mis-connected vacuum hose inspection (Refer Group 17 On Vehicle Service.)
- Throttle link operation inspection (Refer Group 13A On Vehicle Service.)
- Vacuum tank inspection (Refer Group 13A On Vehicle Service.)
- Air cleaner element blockage inspection