TO INDEX

F5 TRANSMISSION CONTROL

■ AUTOMATIC TRANSAXLE (A4B)

1 TURBINE REVOLUTION SENSOR, OUTPUT REVOLUTION SENSOR

1-1 REMOVAL AND INSTALLATION

1-1-1 ARTICLES TO BE PREPARED

Instrument

Torque wrench

Lubricant,adhesive,others

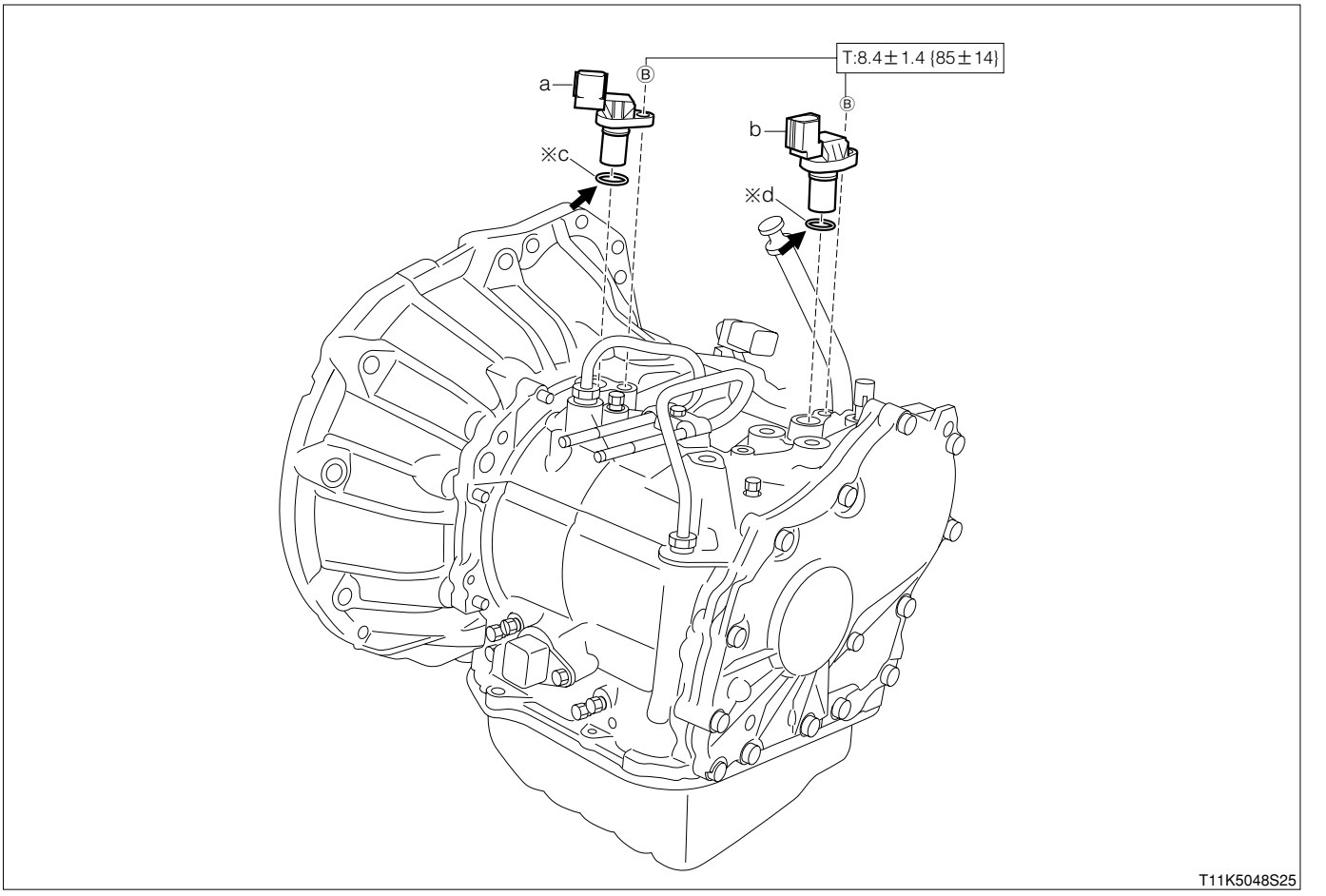
ATF Dexron®Ⅲ

1-1-2 OPERATION BEFORE REMOVAL

1.Remove the battery and battery carrier.

1-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



➡:ATF application
※:Non-reusable parts
Unit N·m{kgf·cm}

(2) Removal and installation procedures

1 a Sensor, T/M revolution (Turbine revolution sensor)
2 b Sensor, T/M revolution (Output revolution sensor)
3 c Ring, O
4 d Ring, O

1-1-4 OPERATION AFTER INSTALLATION

1.Install the battery and battery carrier.

2 TRANSMISSION CONTROL COMPUTER

2-1 REMOVAL AND INSTALLATION

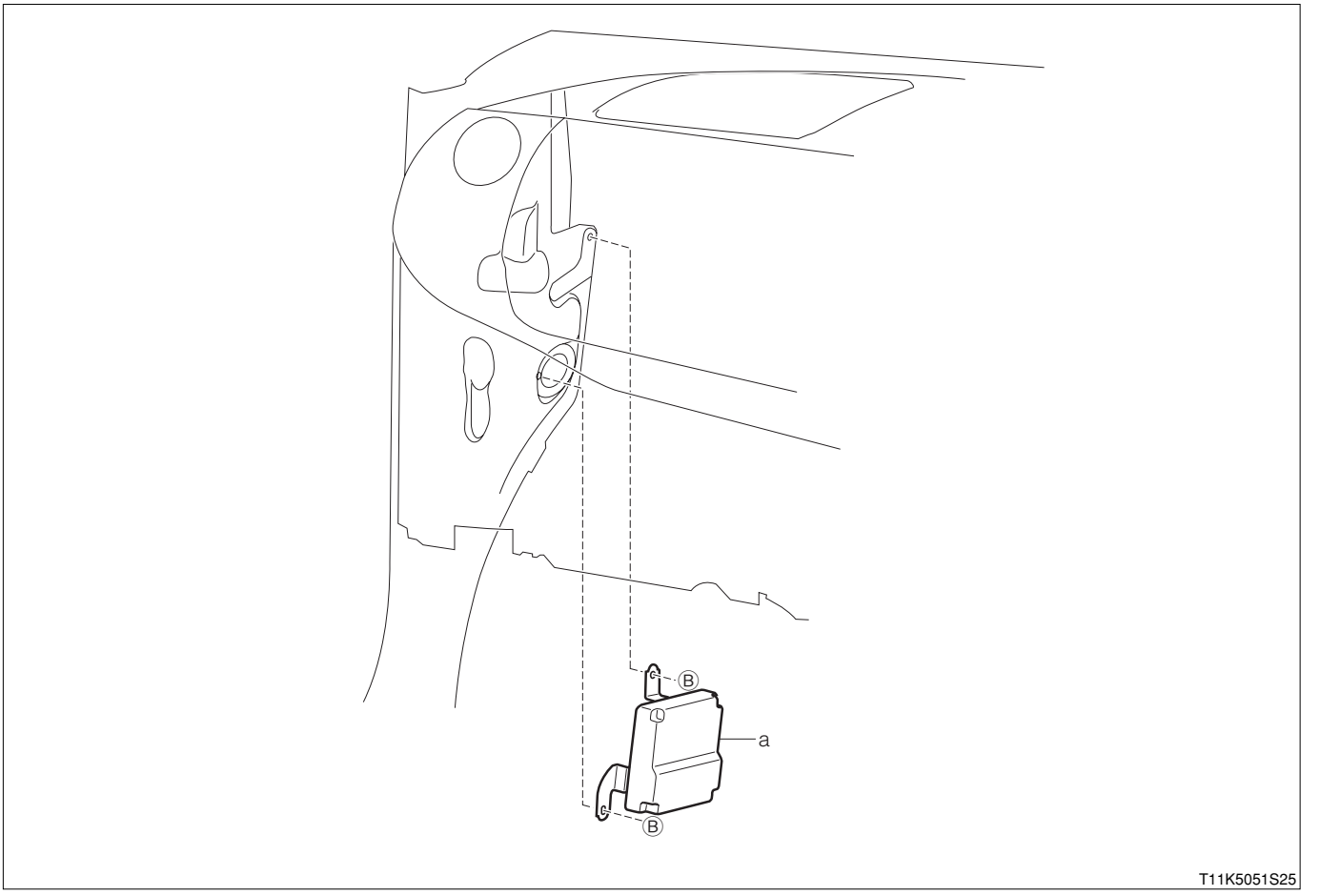
2-1-1 OPERATION BEFORE REMOVAL

1.Remove the lower instrument panel finish panel S/A and fuse box opening.
Refer to Page I2-23.

2.Remove the fuse block Ay.
Refer to Page I4-1.

2-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



T11K5051S25

(2) Removal and installation procedures

1 a Computer Ay, transmission control

2-1-3 OPERATION AFTER INSTALLATION

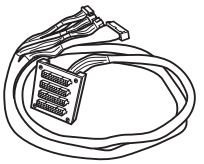
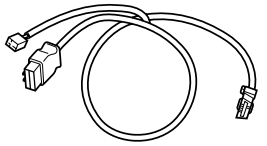
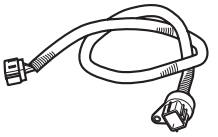
1.Install the fuse block Ay.
Refer to Page I4-1.

2.Install the lower instrument panel finish panel S/A and fuse box opening.
Refer to Page I2-23.

3 TRANSMISSION CONTROL SYSTEM

3-1 ARTICLES TO BE PREPARED

SST

Shape	Part No.	Part name
	09842-97215-000	Sub-harness,transmission control computer check
	09991-87404-000 (09991-87401-000)	Wire,engine control system inspection
	09991-87403-000	Wire,diagnosis check
	09990-97201-000	Sub-harness,A/T solenoid wire check

Instrument

Electrical Tester,Oscillo scope

3-2 HANDLING INSTRUCTIONS OF CONTROL SYSTEM

3-2-1 INSTRUCTIONS ON USE OF THIS SERVICE MANUAL

1.This service manual has been compiled in such a way that the manual may be used both in regions where the type certification is implemented based on the EU exhaust emission approval, and other regions.

2.Hence, with regard to the assignment, reading, erasing of diagnostic trouble codes and those steps of checks, repairs and confirmation, the service manual contains the procedures for both cases: One is a procedure that uses the diagnosis tester (DS-21/DS-Ⅱ) or the OBD Ⅱ generic scan tool, and the other is a procedure that does not use this tester or tool.
Therefore, the following instructions given below must be observed.

3.About Use of diagnosis tester (DS-21/DS-Ⅱ) or OBD Ⅱ Generic Scan Tool

(1) Regions where type certification is implemented based on EC exhaust emission approval: Make sure to use the diagnosis tester (DS-21/DS-Ⅱ) or the OBD Ⅱ generic scan tool.

(2) Other regions: You may use or not use the diagnosis tester (DS-21/DS-Ⅱ) or the OBD Ⅱ generic scan tool. You may perform the operation, employing whichever method that will be easier to you.

4.Instructions to be followed concerning Diagnosis Trouble Codes
Diagnosis trouble codes, such as P0105/31 (Four-digit code/two-digit code) are posted additionally.
(1) Regions where type certification is implemented based on EC exhaust emission approval
Make sure to use only four-digit trouble codes (E.G.P0105) whose have been assigned according to the ISO regulations.
(2) Other regions:
You may perform the operation using the four-digit code, employing the diagnosis tester (DS-21/DS-Ⅱ) or the OBD Ⅱ generic scan tool. Or you may perform the operation using the two-digit codes (E.G.31), without the use of the tester or tool. You may perform the operation, employing whichever method that will be easier to you.
Or you may perform the operation using the two-digit codes (E.G.31), without the use of the tester or tool.
You may perform the operation, employing whichever method that will be easier to you.

NOTE

- The OBD Ⅱ generic scan tool means a scan tool complying with the ISO 14230 (KWP2000) format.
- In cases where the OBD Ⅱ generic scan tool is employed, not all diagnostic trouble codes (Four-digit codes) can be read out. It should be noted that only those diagnostic trouble codes in which "zero" follows after "P", for example, P0XXX, can be read out.
- The accuracy of the two-digit codes in diagnosing malfunctioning components is slightly inferior to that of the four-digit codes.
- Hereinafter, those regions where the type certification is implemented based on the EU exhaust emission approval, is referred to as the "EU specifications".

3-2-2 PRECAUTIONARY MEASURES DURING TROUBLE-SHOOTING

1.Before the diagnosis information memorized in the A/T ECU memory is confirmed, never disconnect the connector from the A/TECU, the battery negative (-) terminal, the A/T ECU earth wire from the engine, or the main fuse.
2.The diagnosis information memorized in the A/T ECU memory can be erased by using the diagnosis tester (DS-21/DS-Ⅱ) or the OBD-II generic scan tool in the same way as the check. Therefore, before using the tester, read its instruction manual so as to understand the functions furnished and how to use it.
3.Priority in trouble-shooting
(1) If the priority in trouble-shooting for a number of diagnostic trouble codes is given in the concerned DTC flow chart, make sure to follow the priority.

3-3 HOW TO PROCEED WITH TROUBLE SHOOTING

3-3-1 GENERAL INFORMATION

1.The A/T control system of this vehicle are controlled by the A/T ECU. Furthermore, the vehicle is provided with the on-board diagnosis system.
Therefore, when any abnormality takes place in the input/output systems (Sensors, actuators, harnesses, connectors, etc.) of the engine control system, the A/T ECU memorizes the system concerned and informs the driver by making the malfunction indicator lamp (MIL) illuminate or flash.
2.Also the malfunction is informed to the operator by means of the malfunction indicator lamp (MIL). When trouble-shooting the engine, it is imperative for you to get the general idea of the onboard diagnostic system, and fully understand the precautionary measures in trouble-shooting, the items diagnostic system, and fully understand the precautionary measures in trouble-shooting, the items to be observed and how to use testers.
3.Then, conduct the trouble-shooting following the flow chart that indicates the correct procedure for the engine troubleshooting.

(1) On-board diagnostic system of vehicles for EU specifications

1.The vehicles for Europe have the following functions that comply with the 1999/102/EC (Generally called Euro-OBD) standards.

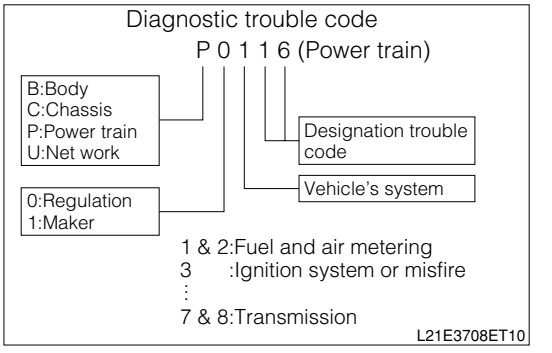
2.When the ignition switch is turned "ON", the malfunction indicator lamp (MIL) goes on. When no malfunction has been detected, the lamp will go out after the engine has started. (Check for a blown bulb)

3.While the engine is running, if the EFI ECU detects any malfunction in the emission control system/components that will affect the emissions from the vehicle, or in the power train control components, or if any malfunction is detected in the ECU itself, the A/T ECU illuminates or flashes the MIL (Only when misfire is detected which will damage the catalyst). Then, the A/T ECU memorizes the malfunction area. (DTC by ISO15031-6/SAEJ2012)

4. If that malfunction will not occur in three successive running, the MIL is automatically turned off. However, the DTC will be recorded in the A/T ECU memory.

5.It is possible to read out various data from the engine ECU by connecting the OBD Ⅱ generic scan tool which complies with the ISO 14230 format or diagnosis tester (DS-21/DS-Ⅱ) to the DLC of the vehicle. You can perform trouble-shooting efficiently by checking these data (DTC, freeze-frame data, current data, etc.).

6.The DTC is composed of the ISO standard code (Specified by ISO 15031-6) and the manufacturer's designation code. The ISO standard code should be set pursuant to the ISO. On the other hand, the manufacturer's designation code can be freely set forth by the manufacturer within a specified limit.



7.Many DTC have a two trip detection logic which assures avoidance of wrong detection and functions only when a malfunction is surely occurring. However, another diagnosis mode is provided, in which only a one-time final confirmation test is necessary for a service mechanic to confirm that the malfunction has been completely remedied after the repair.

8.When a malfunction is detected, the engine and running conditions at that moment are memorized as a freeze-frame data in the A/T ECU memory.

(2) On-board diagnostic system of vehicles for other regions

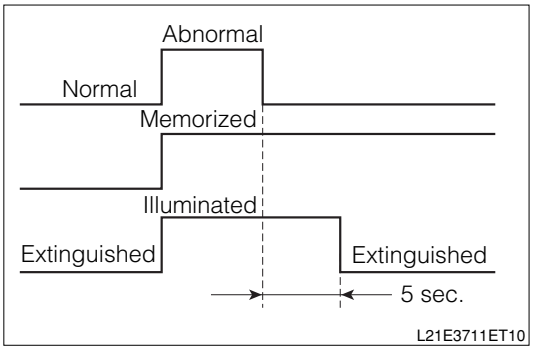
1.When the ignition switch is turned "ON", the MIL goes on. When no malfunction has been detected, the lamp will go out after the engine has started. (Check for a blown bulb)
While the engine is running, if the ECU detects any malfunction in the engine control system/components, or if any malfunction is detected in the A/T ECU itself, the A/T ECU illuminates the MIL.

2.In addition to the illumination of the MIL, the corresponding diagnostic trouble code (DTC) is memorized in the A/T ECU memory. When the malfunction has been remedied or the system returns to its normal state, the MIL automatically goes out. However, the DTC remains memorized in the A/T ECU memory.

3.It is possible to read out various data from the A/T ECU by connecting the diagnosis tester (DS-21/DS-Ⅱ) to the DLC of the vehicle. You can perform trouble-shooting accurately and efficiently by checking these data (DTC, freeze-frame data, current data, oxygen sensor monitor data, etc). Only when diagnosis tester (DS-21/DS-Ⅱ) is used.

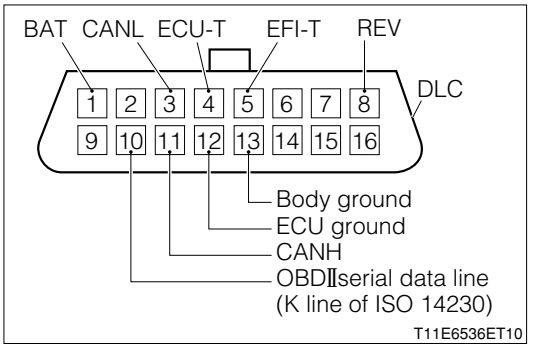
4.The DTC (Diagnostic trouble code) is set to a four-digit code in accordance with ISO standard. Furthermore, the conventional two-digit code is also provided. The four-digit code can be read out by the diagnosis tester (DS-21/DS-Ⅱ). The two-digit code has been set forth by the DMC itself. This code can be read by observing the flashing pattern of the MIL.

5.When a malfunction is detected, the engine and running conditions at that moment are memorized as a freeze-frame data in the A/T ECU memory.



3-3-2 DLC, COMMON DESTINATIONS

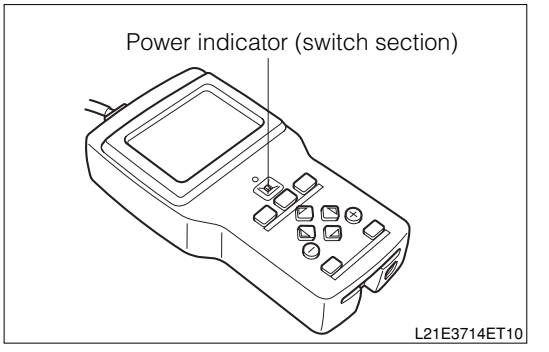
1.The vehicle A/T ECU uses the ISO14230 (Euro-OBD) protocol. As regards the position, connector shape and pin arrangement, the DLC is in accordance with the ISO 15031-3 (SAEJ1962) and has complied with the ISO14230 format. The OBD Ⅱ serial data line (K line of ISO14230) is used for the OBD Ⅱ generic scan tool or the diagnosis tester (DS-21/DS-Ⅱ) in order to communicate with the ECU.



NOTE

- With the cable of the diagnosis tester (DS-21/DS-Ⅱ) connected to the DLC through the SST, turn "ON" the ignition switch. If the power indicator of the tester will not go on, conduct the following checks and repair any malfunctioning parts.

SST: 09991-87404-000

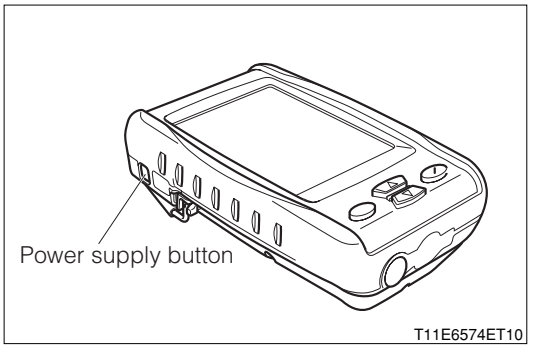


NOTE

- With the cable of the DS-Ⅱ diagnosis tester connected to the DLC, turn ON the IG switch. If the tester does not function, perform the following checks and repair the faulty parts.

(1) Connect the diagnosis tester (DS-21/DS-Ⅱ) to another vehicle.

(2) Turn "ON" the ignition switch.



3-3-3 TROUBLE-SHOOTING PROCEDURE

(1) Discription

1.The A/T control system is equipped with diagnosis functions whose are capable of diagnosing malfunctioning sections. These functions give important clues in trouble-shooting. The flow chart on the next page shows how to proceed with trouble-shooting by using these diagnosis functions.

The flow chart shows how the diagnostic trouble code check can be used effectively. Moreover, when its results are fully reviewed, you can determine whether you are going to do the trouble-shooting according to diagnostic trouble codes or the trouble-shooting according to malfunctioning phenomena.

The diagnosis of this system is equipped with a battery back-up function (A function which supplies power for diagnosis memory even if the ignition switch is turned "LOCK".)

NOTE

- When no diagnosis tester (DS-21/DS-Ⅱ) or OBD-II generic scan tool is used, the DTC or freeze-frame data in the flow chart can not be read out.

3-4 CONFIRMATION, RECORD AND ERASURE OF DIAGNOSIS CODE

3-4-1 CHECKING METHOD OF DIAGNOSIS

1.Prior to the check, check the malfunction indicator lamp (MIL), following the procedure given below.

2. Check of malfunction indicator lamp

(1) Ensure that the malfunction indicator lamp goes on when the ignition switch is turned "ON", but with the engine not running.

(2) Ensure that the malfunction indicator lamp goes out when the engine starts. If the lamp remains illuminated or is flashing, the diagnosis system is detecting a malfunction. Therefore, a DTC is memorized in the A/T ECU. If no DTC is memorized in the A/T ECU, perform the trouble-shooting for the malfunction indicator lamp circuit.

(1) Check of DTC, using DS-21 diagnosis tester:

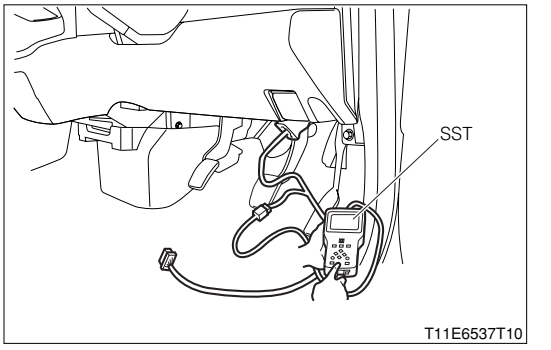
1.Prepare the DS-21 diagnosis tester.

2.Connect the DS-21 diagnosis tester to the DLC located at the lower section of the instrument panel on the driver's seat side. At this time, the DS-21 tester should be connected to the DLC with the following SST interposed.

SST: 09991-87404-000

NOTE

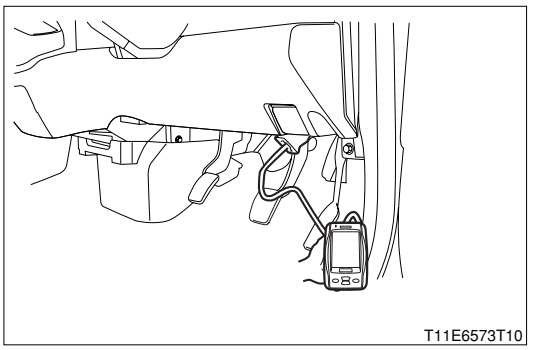
- When DS-21 diagnosis tester is used, refer the instruction manual for tester.



(2) Check of DTC, using DS-Ⅱ diagnosis tester or OBD Ⅱ generic scan tool

1.Prepare the DS-Ⅱ diagnosis tester or OBD Ⅱ generic scan tool.

2.Connect the DS-Ⅱ diagnosis tester or the OBD Ⅱ generic tester directly to the DLC located at the lower section of the instrument panel on the driver's seat side.



NOTE

- When DS-Ⅱ diagnosis tester or OBD-Ⅱ generic scan tool is used, refer the instruction manual for each tester.

3-4-2 CANCELING METHOD OF DIAGNOSIS

1.The DTC and freeze-frame data can be erased through the following methods.

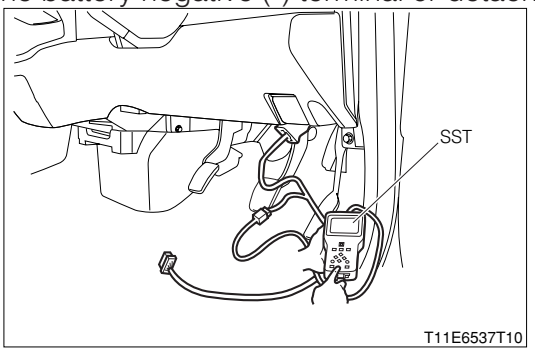
(1) The diagnosis tester (DS-21/DS-Ⅱ) or OBD Ⅱ generic scan tool is used to erase the DTC. (For the operating procedure, refer to the instruction manual.)

(2) The power supply to the A/T ECU is shut off to erase the DTC without using the diagnosis tester (DS-21/DS-Ⅱ) or OBD Ⅱ generic scan tool. (Disconnect the battery negative (-) terminal or detach the EFI fuse.)

(1) When DS-21 diagnosis is used:

1.In the same way as the check of DTC, connect the diagnosis tester (DS-21/DS-Ⅱ) to the DLC with the following SST interposed.

SST: 09991-87404-000

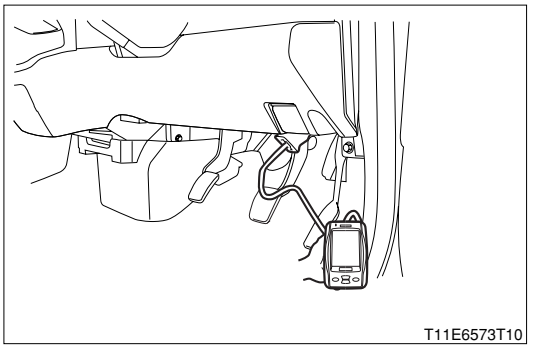


NOTE

- When DS-21 diagnosis tester is used, refer the instruction manual for tester.

(2) When DS-21 diagnosis tester or OBD Ⅱ generic scan tool is used:

1.In the same way as the check of DTC, connect the DS-Ⅱ diagnosis tester or the OBD Ⅱ generic scan tool directly to the DLC.



NOTE

- When DS-Ⅱ diagnosis tester or OBD Ⅱ generic scan tool is used, refer the instruction manual for each tester.

(3) When diagnosis tester (DS-21/DS-Ⅱ) or OBD Ⅱ generic scan tool is not used:

1.Erasure by disconnecting EFI fuse

To erase the diagnostic trouble codes (DTC) memorized in the ECU after malfunctions have been repaired, disconnect the ECU-B fuse from the relay block for at least 30 seconds with the ignition switch turned "LOCK". (When ambient temperature is about 20°C.)

NOTE

- It is possible to complete this erasing for approximately 60 seconds. In some cases, however, it may take longer. Furthermore, the erasing can be made by disconnecting the circuit, such as the battery power supply and fusible link. In cases where the battery negative (-) terminal is to be disconnected, record the radio channels in advance. After completion of the operation, set the radio channels the same as before.

3-5 SYMPTOM CONFIRMATION

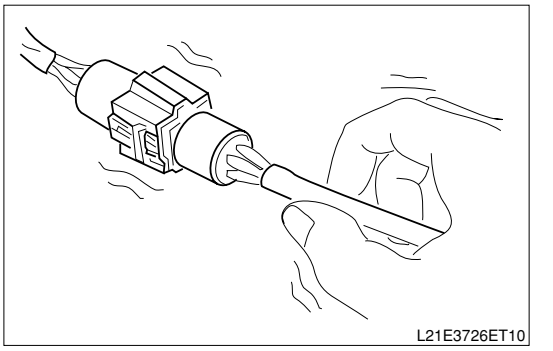
3-5-1 CONFIRMATION OF REPRODUCTION OF MALFUNCTIONING PHENOMENA

1. In the course of trouble-shooting, the operator can not pinpoint the cause for the malfunction unless he confirms the phenomenon. For this purpose, it is indispensable to reproduce the malfunctioning phenomenon by creating conditions and environments that are similar to those customer.
2. As for phenomena whose can not be reproduced easily, it is necessary to produce running conditions that are similar to those when the malfunction occurred (Road surface condition, weather condition, driving condition). For this end, it is of great importance to try to reproduce the conditions that are similar to those when the malfunction occurred (Road surface condition, weather relays by hand), heat (applying hot air) and water (Applying moisture).
3. Vibration, heat or moisture can constitute causes for malfunction that are difficult to reproduce.
4. Therefore, with the vehicle in a stationary state, you can perform the following malfunction reproduction simulation tests given below.
   Moreover, if you presume a section (Part) which can cause a malfunction and connect a tester, etc. to that section so as to confirm the malfunctioning phenomenon, you can also achieve a function to that section so as to confirm the malfunctioning phenomenon, you can also achieve a function evaluation of that section (Part).

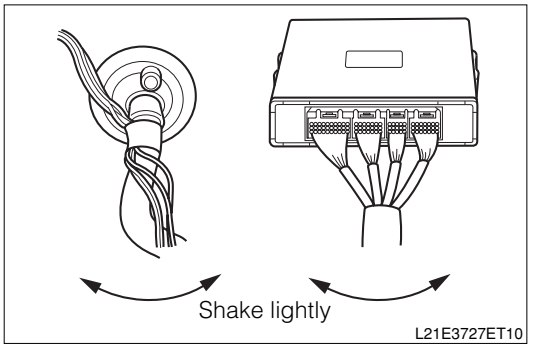
(1) Malfunction reproduction simulation test methods

① Vibration method:

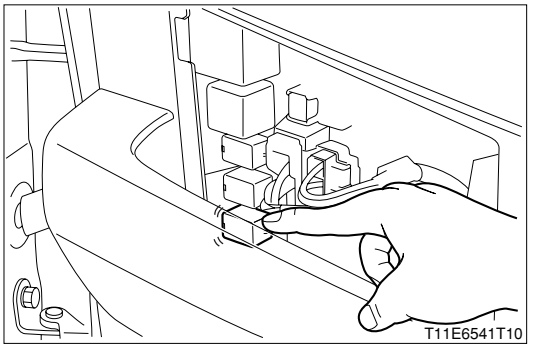
1. When vibration is thought to be the main cause
   (1) Connector
   Lightly shake the connector vertically and laterally.



(2) Wire harness
Lightly shake the wire harness vertically and laterally. The points to be checked are connector joints, the vibrating point and the section where the wire harness is passing through the body.



(3) Parts, sensors
With your finger, apply light vibrations to a part of the sensor which is presumed to be the cause for the malfunction. Check to see if the malfunction is reproduced.



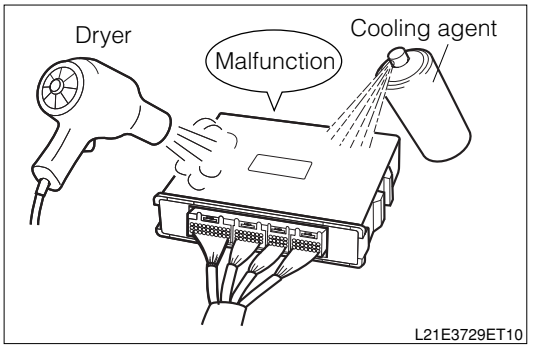
NOTE

- Be careful not to apply too strong vibration to a relay, for it can cause an open wire in the relay.

② **Cool/hot method:**

1.When a suspected section is likely causing the malfunction when it is cold or hot.

(1) Heat a component which is presumed to be causing the malfunction by using a dryer or the like. Check to see if the malfunction occurs.



CAUTION

- Do not heat the section beyond 60°C. (Temperature limit to assure that no damage be made to the component.)
- Do not directly heat the parts inside the ECU.

③ **Water applying method:**

1.When the malfunction is believed to occur on rainy days or under humid conditions. Apply water to the vehicle. Check to see if the malfunction occurs.

NOTE

- Never apply water directly to the engine compartment. By applying water to the front of the radiator, you can indirectly change the temperature and humidity.
- Never apply water directly to the electronic parts.
- If rain leaks into the vehicle compartment, rain may get into the inside of the ECU through the wire harnesses. If the vehicle has experienced any rain leakage before, utmost attention must be paid in respect to this point.

3-5-2 RECHECK AND MAKING RECORD OF DTC/FREEZE-FRAME DATA

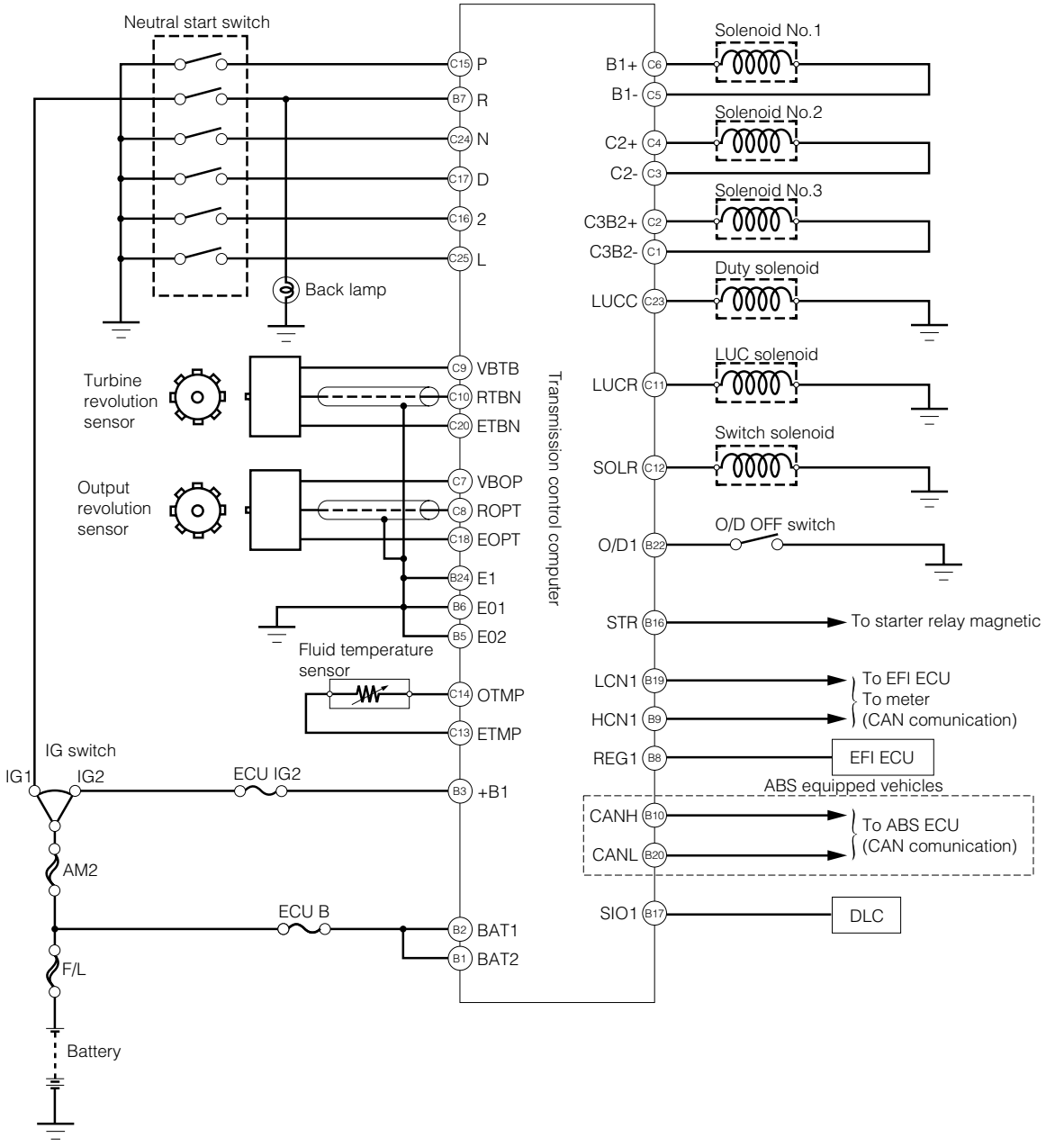
1.By checking the DTC/freeze-frame data after confirming the reproduction of the malfunctioning phenomenon, it is possible to judge whether the system related to the DTC that was indicated before confirmation of the reproduction is now functioning properly or not. Then, you are to proceed to one of the following three steps.

(1) When a DTC was indicated at the time of checking the DTC and the same DTC is indicated after the confirmation of reproduction of the malfunction, it indicates that the malfunction is still persisting in the diagnosis circuit. Proceed to the trouble-shooting according codes.

(2) When no abnormal code is indicated, although the occurrence of malfunction was observed during the confirmation of reproduction of malfunction, a malfunction other than those related to the diagnosis system is likely taking place. Proceed to the trouble-shooting according to malfunctioning phenomena.

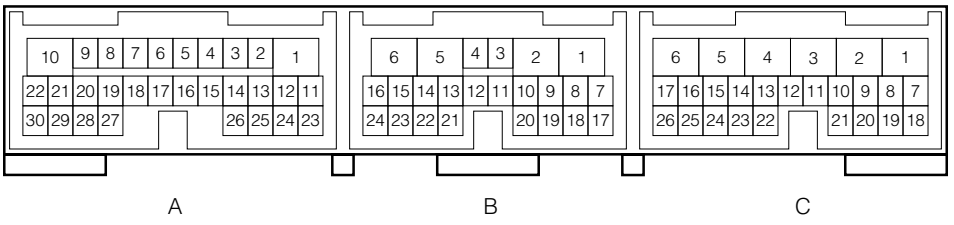
(3) When no malfunction is observed during the confirmation of reproduction of malfunction, and the normal code is indicated at the check of the DTC, it is presumed that an abnormality, such as poor contacts at the harnesses and connectors, occurred in the past, but now they are functioning properly. Check the harnesses and connectors of those systems related to the DTC that was indicated before the confirmation of reproduction of the malfunctioning phenomenon.

3-6 SYSTEM WIRING DIAGRAM



T11K5524ES44

Transmission control computer terminal name



T11K5006S10

1.Connectors A

This connector is not used.

2.Connectors B

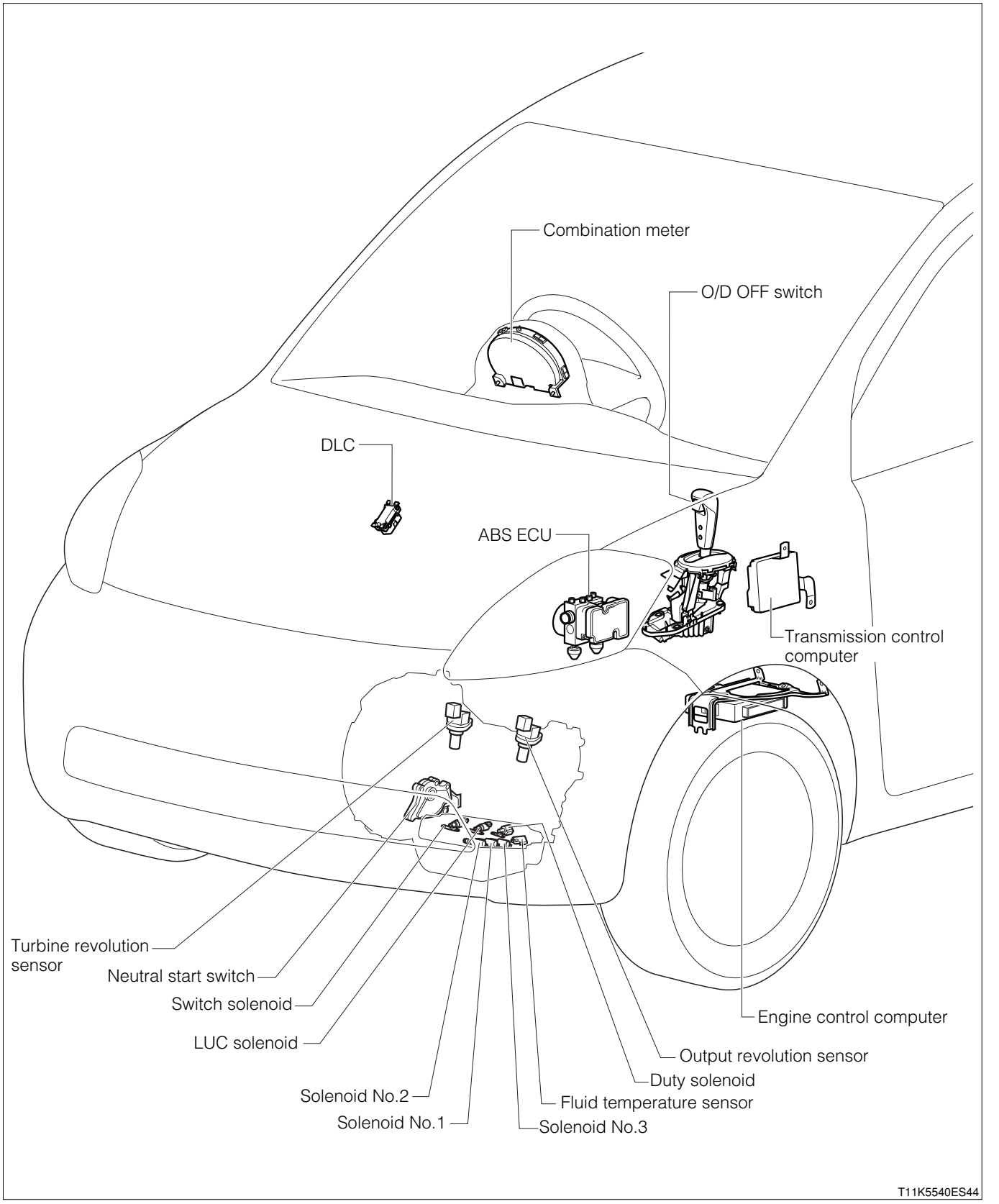
Terminal No.	Terminal code	Terminal name	Terminal No.	Terminal code	Terminal name
1	BAT2	Backup power supply	13	—	—
2	BAT1	Backup power supply	14	—	—
3	+B1	ECU power supply	15	—	—
4	—	—	16	STR	Starter relay output circuit
5	E02	A/T power system ground	17	SIO1	Diagnostic tester communication
6	E01	A/T power system ground	18	—	—
7	R	Neutral start switch (R)	19	LCN1	CAN communication LO (1)
8	REG1	Engine revolution speed	20	CANL	CAN communication LO (2)
9	HCN1	CAN communication HI (1)	21	—	—
10	CANH	CAN communication HI (2)	22	O/D1	O/D OFF switch
11	—	—	23	—	—
12	—	—	24	E1	Sensor ground

3.Connectors C

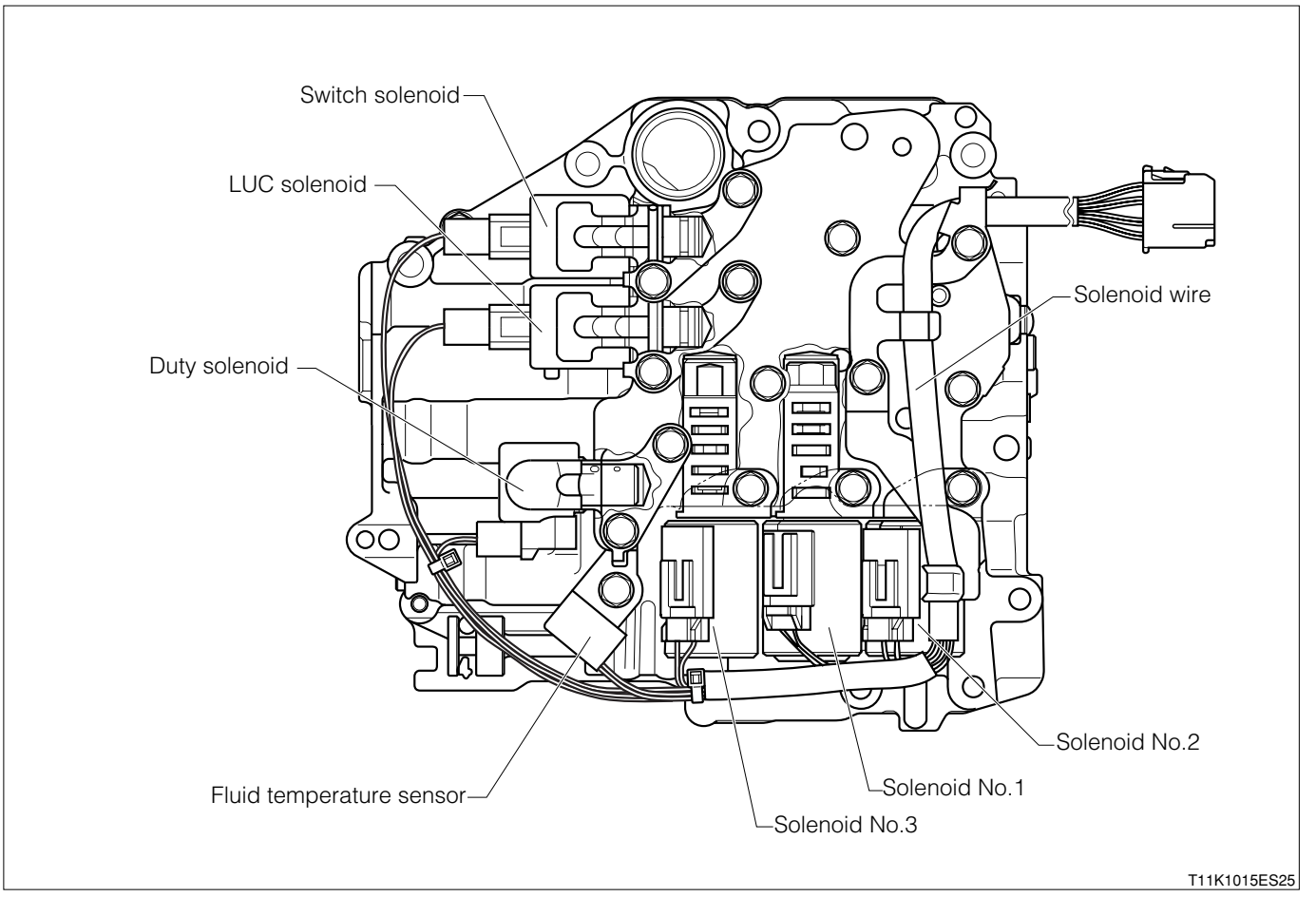
Terminal No.	Terminal code	Terminal name	Terminal No.	Terminal code	Terminal name
1	C3B2 —	Solenoid No.3 (—)	14	OTMP	Fluid temperature sensor
2	C3B2 +	Solenoid No.3 (+)	15	P	Neutral start switch (P)
3	C2—	Solenoid No.2 (—)	16	2	Neutral start switch (2)
4	C2+	Solenoid No.2 (+)	17	D	Neutral start switch (D)
5	B1—	Solenoid No.1 (—)	18	EOPT	Output revolution sensor ground
6	B1+	Solenoid No.1 (+)	19	—	—
7	VBOP	Output revolution sensor power supply	20	ETBN	Turbine revolution sensor ground
8	ROPT	Output revolution sensor	21	—	—
9	VBTB	Turbine revolution sensor power supply	22	—	—
10	RTBN	Turbine revolution sensor	23	LUCC	Duty solenoid
11	LUCR	LUC solenoid	24	N	Neutral start switch (N)
12	SOLR	Switch solenoid	25	L	Neutral start switch (L)
13	ETMP	Fluid temperature sensor ground	26	—	—

3-7 LOCATION OF COMPONENTS

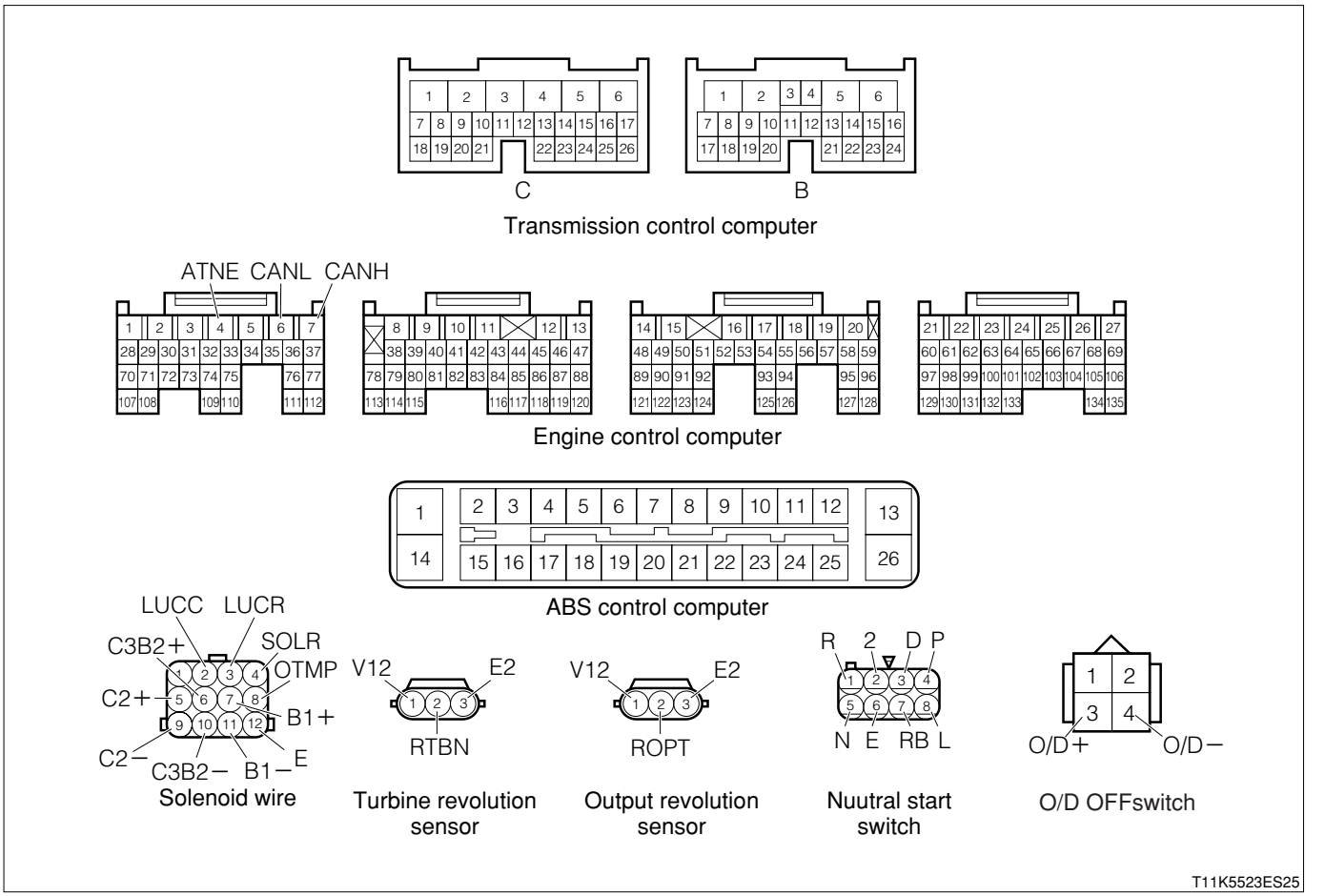
3-7-1 WHOLE VEHICLE



3-7-2 VALVE BODY SECTION



3-8 ARRANGEMENT OF VEHICLE HARNESS SIDE CONNECTOR TERMINALS



For the terminal names of transmission control computer vehicle harness side connectors, refer to the system wiring diagram.

3-9 ERASING OF LEARNING VALUE AND INITIAL LEARNING

When the automatic transaxle Ay, valve body Ay (Including the solenoid valve) have been replaced, it is necessary to erase the transmission control computer learning values and to perform the initial learning, following the procedure given below.

1. Short the ECU-T terminal and E terminal inside the DLC.
   Refer to Page F5-22.
2. Within three seconds after turning ON the IG SW(Not starting the engine), depress the brake pedal and keep depressing it. (Until the following operations 3 and 4 are completed).
3. Move the shift lever P→R→P within one second. (The time required for P→R→P is within one second.)
4. Repeat the operation of Item 3 above eight times. (The O/D OFF lamp quickly flashes for 2.5 seconds as a signal telling the completion of erasing operation.)
5. Release the short-circuit of the ECU-T terminal and E terminal inside the DLC.
6. Turn "LOCK" the IG SW and turn it "ON" again.
7. Fully warm up the engine and transmission.

NOTE

- The initial learning starts when the transmission oil temperature rises above 50°C.

8. Perform the initial learning (Urban running of about 15 minutes) (Go through the driving at various gears and kickdowns.)

3-10 HOW TO PROCEED WITH TROUBLE SHOOTING

This system is equipped with a diagnosis function that diagnoses the defective sections and this provides important clues in performing trouble shooting.

Σ>1. Bringing of malfunctioning vehicle in garage

▼Go to step Σ>2.

Σ>2. INQUIRY WITH CUSTOMER

1.Thoroughly obtain information from the customer concerning the conditions, environment and phenomena in which the malfunction took place.

▼Go to step Σ>3.

Σ>3. Confirm the normal indication of the diagnosis code of LCD inside the meter

1.Using the SST, short-circuit between the DLC4 (ECU-T) and the 13(E).
SST: 09991-87403-000

2.Confirm that the LCD inside the meter indicates the diagnosis codes (Including the normal code).
SPECIFIED VALUE: Indicates.

NOTE

- Codes other than the CAN-related codes are permissible.

▼If it is OK, go to step Σ>4.

▼If NG, conduct the following checks given below concerning the meter. If no problems are found, replace the meter.

(1) Check the harnesses between the meter and the DLC as well as between the DLC and the body ground.
(2) Check the power supply system and ground system of the combination meter.
(3) Check the power supply system and ground system of the meter.

Σ>4. Confirm the diagnosis code of LCD inside the meter (CAN-related).

1.Confirm that the LCD inside the meter will not indicate the CAN-related diagnosis codes (Codes 0051 through 0053).
SPECIFIED VALUE: Will not indicate codes 0051 through 0053.

▼If it is OK, go to step Σ>5.

▼If NG, refer to the item of the CAN communication system.
Refer to Page L2-1.

Σ>5. Confirmation and recording of diagnosis code

1.Using the SST, short-circuit between the DLC4 (ECU-T) and the 13(E).
SST: 09991-87403-000

▼Go to step Σ>6.

Σ>6. Erasing of diagnosis codes

1.Erase the diagnosis codes.

NOTE

- Before erasing the codes, record the codes that are being outputted.

▼Go to step Σ>7.

∑7.Reproduction and confirmation of malfunction phenomenon

1.Confirm the malfunctioning phenomenon and reproduce the malfunctioning situation.
SPECIFIED VALUE: The malfunctioning phenomenon has been reproduced.

▼If it is OK, go to step ∑8.
▼If NG, presume the cause of malfunction, based on the diagnosis by interview to the customer or the trouble-shooting according to malfunctioning phenomena.

∑8. Reconfirmation of diagnosis code

1.Reconfirm the diagnosis codes.
SPECIFIED VALUE: The abnormality code is outputted again.

▼If it is OK, go to step ∑9.
▼If it is OK, go to step ∑10.

∑9. Trouble-shooting according to diagnosis code

1.Perform the check concerning the diagnosis codes that are currently outputted.
Refer to Page F5-29.

▼After completion of the check, proceed to ∑11.

∑10. Trouble-shooting according to malfunction phenomenon.

1.Perform the check for the malfunctioning phenomena.
Refer to Page F5-50.

▼After completion of the check, proceed to ∑11.

∑11. Confirmation test

1.Checks whether the problem that the customer described has been corrected and the operation is back to normal.
▼If OK, finish the trouble shooting.
▼If NG, return to the ∑3 and redo the check.

3-11 INQUIRY

In an effort to remove causes for malfunction from the vehicle concerned, it is impossible to determine the cause without confirming the malfunction phenomenon. If the phenomenon is not confirmed, the vehicle may not be able to return to the normal conditions even if you continue your work. The diagnosis through interview is to collect information from the customer before confirming the malfunction phenomena. The diagnosis through interview provides very important clues in reproducing malfunction phenomena.

Since the information obtained by the diagnosis through interview is referred to during the trouble shooting, it is imperative to make an inquiry of the customer, centering on the items related to the malfunction, instead of simply asking general questions.

Please make use of the information on the next page, as it provides an example of the diagnosis by interview.

3-11-1 DIAGNOSIS BY INTERVIEW SHEET FOR AUTOMATIC TRANSMISSION SYSTEM

Checked by		Check date	Day Month (Day of week)

Customer information

Name of customer	Mr./Ms.	Gender of customer (Male, female)		Age [Approx.]	Occupation [ ]
		Area where vehicle is mainly used	Urban, suburb, seashore, mountain, others	Parking place	Outdoor, indoor

Details of vehicle

Date when vehicle was brought to workshop	Day Month (Day of week)	Date when malfunction took place	Day Month (Day of week)	Repair history	No, Yes (How many times?)
Frame No.		Registration date	Day Month Year	Vehicle model	
Engine type		Transmission	Electronically controlled 4A/T	Driving	2WD·4WD
Running distance	km	Equipment	Tire [ ]· Wheel [Steel · Aluminum]		

Contents of diagnosis by interview

Symptom		Specific contents
Engine Poor starting	☐Starter does not turn.⇨ ☐Starter turns.⇨	☐Ⓟ range ☐Ⓝ range ☐Ⓡ range ☐Ⓓ range ☐Ⓓ4 range ☐3 range ☐2 range ☐Ⓛ range
Unable to run	☐Does not run forward⇨ ☐Does not run backward⇨ ☐At time of Ⓝ→Ⓓ(Ⓓ4)·Ⓡ, engine stalls⇨	☐Ⓓ range ☐Ⓓ4 range ☐3 range ☐2 range ☐Ⓛ range ☐Ⓡ range ☐Ⓝ → Ⓓ(Ⓓ4) range ☐Ⓝ → Ⓡ range
Abnormal running	☐Clutch slips.⇨ At ☐Ⓟ·Ⓝ range, vehicle moves.⇨	☐1st gear ☐2nd gear ☐3rd gear ☐ 4th gear ☐ Reverse ☐Ⓟ range ☐Ⓝrange
Improper gear shifting	☐No gear shifting⇨ ☐Shift points deviated⇨	☐1st gear fixed ☐3rd gear fixed ☐1st ⇄3rd gear shifting only takes place. ☐1st→2nd gear ☐2nd→3rd gear ☐3rd→4th gear ☐Starts off at 2nd gear ☐Jumps from 1st→3rd gear
Gear shift shock Time lag	☐Large gear shifting shock ☐Long time lag at time of ⇨ gear shifting ☐Engine races during gear shifting.⇨	☐Ⓝ→Ⓓ(Ⓓ4) ☐Ⓝ→Ⓡ ☐1st→2nd gear ☐2nd→1st gear☐2nd→3rd gear ☐3rd→2nd gear ☐3rd→4th gear ☐4th →3rd gear ☐2nd→3rd gear ☐3rd→4th gear
Others		
Since when malfunction started?	☐Since new vehicle ☐Recently(Since about year month)	
Frequency of malfunction	☐Always ☐Under certain condition( ) ☐Sometimes( )	
Weather conditions	☐At all times	
Weather	☐Fine ☐Cloudy ☐Rainy ☐Snow ☐Other( )	
Temperature	Temperature(Approx.) (☐Spring·☐Summer·☐Fall·☐Winter)	
Road	☐Urban area ☐Suburb ☐Highway ☐Dry road ☐Wet road ☐Snowy road ☐Frozen road Hill (☐Uphill ☐Downhill)	
Driving conditions	☐Has nothing to do with malfunction ☐During running ☐During starting Vehicle speed km/h ☐During racing Engine revolution rpm During curving(☐Right curve ☐Left curve) Engine ☐During cold ☐During hot	
Other conditions		

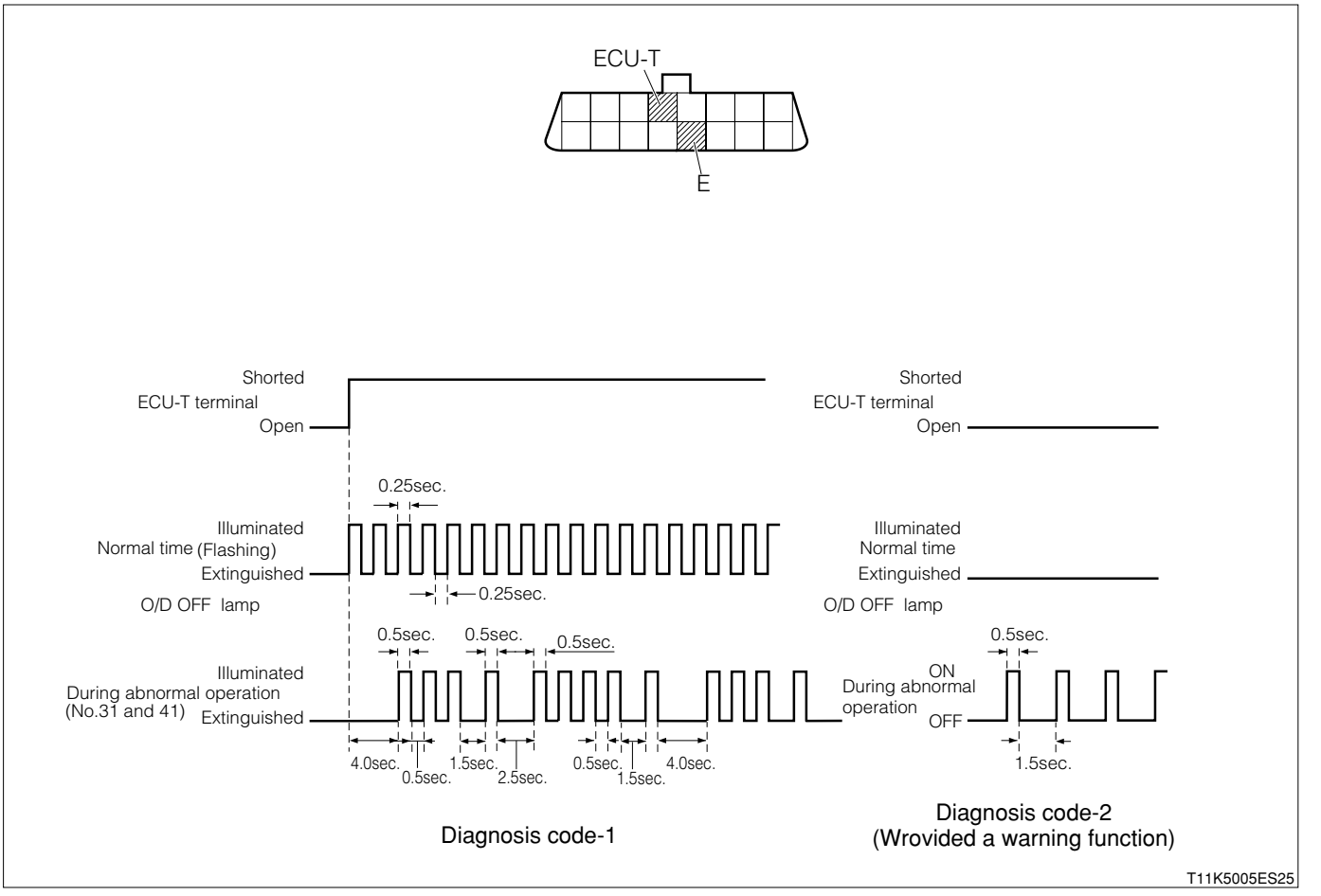
Warning lamp conditions	☐ Illuminated at all times ☐ Illuminated sometimes ☐ Not illuminated	
Diagnosis indication (Terminal T short circuited)	During checking	☐ Normal ☐ Abnormality code [ ]
	2nd time	☐ Normal ☐ Abnormality code [ ]
	th time	☐ Normal ☐ Abnormality code [ ]

When the diagnosis code is indicated, confirm whether the malfunction took place sometimes in the system or is still persisting. Also it is necessary to check any relation between the code and the reproduced malfunction. For this purpose, the diagnosis code should be indicated twice, namely before and after the confirmation of the phenomena.

3-11-2 CHECKING METHOD OF DIAGNOSIS

1. With the vehicle in a stationary state, short-circuit the ECU-T terminal and the E terminal inside the DLC, using the SST.
   SST: 09991-87404-000
   09991-87403-000

2. Turn "ON" the IG SW and read out the number of flashing of the O/D OFF lamp.



CAUTION

- If the short-circuiting is made for wrong connectors, it may cause malfunction. Be very careful not to select wrong terminals
- When the check terminals are short-circuited, the warning lamps for systems other than the electronic controlled A/T system may flash. However, this does not mean that the systems are malfunctioning.

3-11-3 CANCELING METHOD OF DIAGNOSIS

1.With the IG SW turned "LOCK", detach the ECU-B fuse located in the relay box inside the engine compartment at lease 30 seconds. (Normal temperature)

CAUTION

- When other backup circuit and ground circuit are disconnected, the diagnosis is cancelled Example: Battery power supply, fusible link.
- There are cases where the time required for erasing the diagnosis becomes longer during cold time.

3-11-4 CONTENTS OF DIAGNOSIS

Codes specified by ISO/SAE

DTC No.	Diagnosis contents	Malfunction evaluation method	Warning indication (Provided:○, Not provided:×)	Code memory (Provided:○, Not provided:×)	MIL (Malfunction indicator lamp)
P0705/56	Neutral start switch multiple-input	–	○	○	–
P0710/38	Oil temperature sensor circuit open wire or short-circuit	1 trip	○	○	○
P0711/38	Abnormal oil temperature sensor characteristics	2 trip	○	○	○
P0715/37	No turbine revolution input	2 trip	○	○	○
P0720/42	No output revolution input	2 trip	○	○	○
P0725/86	No engine revolution input	2 trip	○	○	○
P0753/61	Solenoid No.1 circuit open wire and short-circuit	1 trip	○	○	○
P0758/62	Solenoid No.2 circuit open wire and short-circuit	1 trip	○	○	○
P0763/63	Solenoid No.3 circuit open wire and short-circuit	1 trip	○	○	○
P0768/64	Duty solenoid circuit open wire and short-circuit	1 trip	○	○	○
P0773/65	LUC solenoid circuit open wire and short-circuit	1 trip	○	○	○

NOTE

- 1 trip: 1 trip detection logic
- 2 trip: 2 trip detection logic
- MIL: Malfunction indicator lamp
  When the "O" mark is shown in the MIL column, the lamp will go on for that DTC number, but when the "—" mark is shown, the lamp will not go on for that DTC No. Therefore, it is possible to read out the DTC No. by using the diagnosis tester (DS-21/DS-Ⅱ). As for the DTC No. bearing the mark, the MIL will go on except the EU specifications.

Codes specified by DMC

DTC No.	Diagnosis contents	Malfunction evaluation method	Warning indication (Provided:○, Not provided:×)	Code memory (Provided:○, Not provided:×)	MIL (Malfunction indicator lamp)
P0705/55	No neutral start switch input	–	×	×	–
P1703/72	Lockup revolution not matched	2 trip	○	○	○
P1706/31	Abnormal engine torque	–	○	×	–
P1711/41	EFI throttle sensor malfunctioning	–	○	×	–
P1730/21	Abnormal battery power supply	2 trip	○	○	○
P1731/22	Abnormal sensor system power supply	2 trip	○	○	○
P1780/66	Switch solenoid circuit open wire and short-circuit	1 trip	○	○	○
U0100/82	Abnormal communication receiving with EFI	1 trip	○	○	○
U1001/85	Abnormal communication sending with EFI	1 trip	○	○	○

NOTE

- 1 trip: 1 trip detection logic
- 2 trip: 2 trip detection logic
- MIL: Malfunction indicator lamp
  When the "O" mark is shown in the MIL column, the lamp will go on for that DTC number, but when the "−" mark is shown, the lamp will not go on for that DTC No. Therefore, it is possible to read out the DTC No. by using the diagnosis tester (DS-21/DS-Ⅱ). As for the DTC No. bearing the mark, the MIL will go on except the EU specifications.

3-12 FAIL-SAFE FUNCTION

The fail-safe function starts, based on the control contents indicated in the Table so that the drivability may not be curtailed significantly even if an abnormality occurs in the input/output signal system of the transmission control computer.

Furthermore, when the vehicle returns to the normal state after an abnormality has been detected, the fail-safe will be released. However, the memory of the diagnosis results remains. (except for some codes).

Furthermore, while the fail-safe is functioning, the warning lamp (O/D OFF lamp) is flashing. (except for the diagnosis code No.55)

FAIL-SAFE SPECIFICATIONS

DTC No.	Contents of trouble	Contents of fail-safe control	Fail-safe releasing conditions
P0705/55	No neutral start switch input	·The normal gear shift control is carried out with the shift position set to the D range.	·The fail-safe function is released when the system returns to the normal condition.
P0705/56	Neutral start switch multiple-input	·The normal gear shift control is carried out with the shift position set to the D range.	·The fail-safe function is released when the system returns to the normal condition.
P0710/38	Oil temperature sensor circuit open wire or short-circuit	·After a malfunction has been detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed and throttle opening.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P0711/38	Abnormal oil temperature sensor characteristics	After a malfunction has been detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed and throttle opening.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P0715/37	No turbine revolution input	·After a malfunction has been detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed and throttle opening.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P0720/42	No output revolution input	·In the case of the malfunction of the sensor system, the gear position at the time of the detection of malfunction will be retained. When the vehicle stops once, the transmission is kept to the first gear. ·In the case of the malfunction of the A/T main body, the transmission is kept to the first gear.	·In the case of the malfunction of the sensor system, after the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range. ·In the case of the malfunction of the A/T main body, after the system has retuned to the normal state, the fail-safe function is released when the IG SW is turned "LOCK" once.
P0725/86	No engine revolution input	·When a malfunction is detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed and throttle opening.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.

DTC No.	Contents of trouble	Contents of fail-safe control	Fail-safe releasing conditions
P0753/61	Solenoid No.1 circuit open wire and short-circuit	·Energizing to the solenoid which has been judged malfunctioning is prohibited. ·In the case of short circuit, the transmission is shifted to the 3rd gear. Afterward, 1—3 shift is performed using the normal solenoid based on the vehicle speed and throttle opening degree. However, in the case of the short circuit of the No.3 solenoid, the transmission is fixed to the 3rd gear. ·When the wire is open or plural solenoids are malfunctioning, the transmission is kept to the 3rd gear.	·After the system has returned to the normal state, the fail-safe function is released, when the IG SW is turned "LOCK" once.
P0758/62	Solenoid No.2 circuit open wire and short-circuit		
P0763/63	Solenoid No.3 circuit open wire and short-circuit		
P0768/64	Duty solenoid circuit open wire and short-circuit		
P0773/65	LUC solenoid circuit open wire and short-circuit		
P1703/72	Lockup revolution not matched	·Lockup is prohibited.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P1706/31	Abnormality of engine torque	·The engine torque is set to a constant value. ·After a malfunction has been detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed and throttle opening.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P1711/41	Abnormality of throttle sensor	·The throttle opening is set to a constant value. ·After a malfunction has been detected, the transmission is set to the 3rd gear. Then, the 1—3 gearshift takes place according to the vehicle speed.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
P1730/21	Abnormal battery system power supply	·After detecting a malfunction, the 3rd gear is fixed.	·After the system has returned to the normal state, turn "LOCK" the IG SW. Then, the fail-safe function is released.
P1731/22	Abnormal sensor system power supply	·After detecting a malfunction, the 3rd gear is fixed.	·After the system has returned to the normal state, turn "LOCK" the IG SW. Then, fail-safe function is released.
P1780/66	Solenoid switch circuit open wire and short-circuit	·Energizing to the solenoid which has been judged malfunctioning is prohibited. ·In the case of short circuit, the transmission is shifted to the 3rd gear. Afterward, 1—3 shift is performed using the normal solenoid based on the vehicle speed and throttle opening degree. However, in the case of the short circuit of the switch solenoid, the transmission is fixed to the 3rd gear. ·When the wire is open or plural solenoids are malfunctioning, the transmission is kept to the 3rd gear.	·After the system has returned to the normal state, the fail-safe function is released, when the IG SW is turned "LOCK" once.

DTC No.	Contents of trouble	Contents of fail-safe control	Fail-safe releasing conditions
U0100/82	Abnormal communication receiving with EFI	·The throttle opening and engine torque are set to constant values. ·When a malfunction is detected, the transmission is set to the 3rd gear. Then, the 1—3 gear-shift takes place according to the vehicle speed.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.
U1001/85	Abnormal communication sending with EFI	·The throttle opening and engine torque are set to constant values. ·When a malfunction is detected, the transmission is set to the 3rd gear. Then, the 1—3 gear-shift takes place according to the vehicle speed.	·After the system has returned to the normal state, the fail-safe function is released, when the vehicle speed reaches 0 km/h in the P or N range.

3-13 TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

3-13-1 NO.21 (ABNORMAL BATTERY SYSTEM POWER SUPPLY)

(1) Output conditions

1.The battery system power supply (BAT1, BAT2) are interrupted over a certain period of time.

(2) Checking points

1.Are the harness and connector between the battery and the A/T ECU normal?

(3) Checking method

⊳1. Check of ECU B fuse

SPECIFIED VALUE: Not fused.

▼If it is OK, go to step ⊳2.
▼If it is NG, go to step ⊳4.

⊳2. Check the voltage between the A/T ECU and the ECU B fuse.

1.After setting the IG SW to "LOCK", disconnect the connector from the A/T ECU.
2.After turning ON the IG SW, measure the voltage.
(1) Between A/T ECU vehicle harness side connector B2 (BAT1) and B6(E01)
(2) Between A/T ECU vehicle harness side connector B1 (BAT2) and B6(E01)

SPECIFIED VALUE: Battery voltage

▼If OK, check the A/T ECU unit circuit.
Refer to Page A1-24.

▼If it is NG, go to step ⊳3.

⊳3. Check the continuity between A/T ECU and ECU B fuse.

1.After setting IG switch to LOCK, measure the resistance.
(1) Between A/T ECU vehicle harness side connector B2 (BAT1) and ECU B fuse downstream side terminal
(2) Between A/T ECU vehicle harness side connector B1 (BAT2) and ECU B fuse downstream side terminal

SPECIFIED VALUE: Continuity exists.

▼If OK, check the fitting condition of each connector and harness condition.
▼If NG, repair or replace the harness and connector.

⊳4. Check short-circuit between A/T ECU and ECU B fuse.

1.After setting IG switch to LOCK, disconnect the connector from the A/T ECU. Check the continuity.
(1) Between A/T ECU vehicle harness side connector B2 (BAT1) and B6(E01)
(2) Between A/T ECU vehicle harness side connector B1 (BAT2) and B6(E01)

SPECIFIED VALUE: No continuity exists.

▼If it is OK, replace the ECU B fuse. Then, wait for a little while.
▼If NG, repair the harness and connector between A/T ECU and ECU B fuse. Then, replace the ECU B fuse.

3-13-2 NO.22 (ABNORMAL SENSOR SYSTEM POWER SUPPLY)

(1) Output conditions

1.When the revolution sensor system power supply is short-circuited over a certain period of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and turbine revolution sensor, output revolution sensor normal?

2.Are the turbine revolution sensor and output revolution sensor normal?

(3) Checking method

Σ>1. Check the short-circuit between A/T ECU and body ground.

1.After setting IG SW to "LOCK", disconnect the connector from the A/T ECU. Check the continuity.

(1) Between A/T ECU vehicle harness side connector C9(VBTB) and body ground.

(2) Between A/T ECU vehicle harness side connector C7(VBOP) and body ground.

SPECIFIED VALUE: No continuity exists.

▼If it is OK, go to step Σ>2.

▼If NG, repair or replace the vehicle harness.

Σ>2. Check the turbine revolution sensor unit.

1.Disconnect the vehicle harness side connector of the turbine revolution sensor.

2.After turning ON the IG switch, check that the code No.22 is extinguished.

NOTE

- When the vehicle harness side connector of the turbine revolution sensor is disconnected, ensure that the code No.37 is indicated.

SPECIFIED VALUE: The code No.22 is extinguished.

▼If OK, replace the turbine revolution sensor.

Refer to Page F5-1.

▼If it is NG, go to step Σ>3.

Σ>3. Check of the output revolution sensor unit

1.Disconnect the vehicle harness side connector of the output revolution sensor.

2.After turning ON the IG switch, check that the code No.22 is extinguished.

NOTE

- When the vehicle harness side connector of the output revolution sensor is disconnected, ensure that the code No.42 is indicated.

SPECIFIED VALUE: The code No.22 is extinguished.

▼If OK, replace the output revolution sensor.

Refer to Page F5-1.

▼If NG, check the A/T ECU unit circuit.

Refer to Page A1-24.

3-13-3 NO.31 (ABNORMAL ENGINE TORQUE)

(1) Output conditions

1.Detected when one of the following items is malfunctioning.
(1) Manifold absolute pressure sensor malfunctioning
(2) Engine revolution sensor malfunctioning
(3) Knocking sensor malfunctioning
(4) Variable valve timing control system malfunctioning

(2) Checking method

1.Check the engine system.
(1) Type K3-VE engine-mounted vehicle
Refer to Page B8-292.

Refer to Page B8-349.

Refer to Page B8-352.

Refer to Page B8-355.

Refer to Page B8-396.

Refer to Page B8-407.

3-13-4 NO.37 (TURBINE REVOLUTION SENSOR SYSTEM)

(1) Output conditions

1.Outputted under conditions specified in Item (1) or (2).
(1) When the engine is running and the vehicle is stopped in the range of Ⓟ or Ⓝ, the turbine will not run over a certain period of time.
(2) The turbine will not run when the vehicle is running in ranges other than Ⓟ·Ⓝ.

(2) Checking points

1.Is the D range signal system of the neutral start switch normal?
2.Is the turbine revolution sensor normal?
3.Are the harness and connector between A/T ECU and turbine revolution sensor normal?

(3) Checking method

∑1. Illumination of neutral start switch D range signal system

1.The diagnosis output is indicated at the shift lever D range position.
SPECIFIED VALUE: The diagnosis code No.55 or No.56 is outputted.

▼If YES, check the neutral start switch system.
Refer to Page F5-36.

Refer to Page F5-38.

▼If it is NO, go to step ∑2.

⊳2. Check the vehicle harness and connector between A/T ECU and the turbine revolution sensor.

1.Between A/T ECU vehicle harness side connector C20 (ETBN) and sensor vehicle harness side connector 3

2.Between A/T ECU vehicle harness side connector C10 (RTBN) and sensor vehicle harness side connector 2

3.Between A/T ECU vehicle harness side connector C9 (VBTB) and sensor vehicle harness side connector 1

SPECIFIED VALUE: Continuity exists.

▼If NG, repair or replace the vehicle harness.

▼If it is OK, go to step ⊳3.

⊳3. Replacement of turbine revolution sensor.

1.Replace the turbine revolution sensor.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If it is NG, go to step ⊳4.

⊳4. Check of A/T ECU input/output signals (Turbine revolution sensor)

1.Is the normal waveform outputted?

2.Does the waveform include abnormal noise?

Refer to Page F5-79.

SPECIFIED VALUE: The normal waveform is outputted.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, perform the following operations.

(1) Remove the noise generating source.

(2) Again check the fitting state of each connector and harness conditions.

3-13-5 NO.38 (OIL TEMPERATURE SENSOR SYSTEM)

(1) Output conditions

1.When a voltage value which is not plausible in view of the sensor characteristics is detected for a certain length of time.

(2) Checking points

1.Is the oil temperature sensor (Solenoid wire) normal?

2.Are the harness and connector between A/T ECU and oil temperature sensor (Solenoid wire) normal?

(3) Checking method

⊳1. Check of vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C14 (OTMP) and solenoid wire vehicle harness side connector 8

2.Between A/T ECU vehicle harness side connector C13 (ETMP) and solenoid wire vehicle harness side connector 12

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step ⊳2.

▼If NG, repair or replace the vehicle harness.

⊳2. Check of solenoid wire unit (Oil temperature sensor system)

Refer to Page F5-73.

▼If it is OK, go to step ⊳3.

▼If NG, replace the solenoid wire.

⊳3. Check of A/T ECU input/output signals (Oil temperature sensor system)

Refer to Page F5-79.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, again check the fitting state of each connector and harness conditions.

3-13-6 NO.41 (ABNORMAL THROTTLE SENSOR)

1.Check the engine ECU throttle sensor system.

Type K3-VE engine-mounted vehicle

Refer to Page B8-306.

3-13-7 NO.42 (OUTPUT REVOLUTION SENSOR SYSTEM)

(1) Output conditions

1.Outputted under conditions specified in Item (1) or (2).

(1) While the vehicle is running, the output revolution disappears suddenly. Or the ratio relative to the turbine revolution is abnormal (sensor system open wire or short-circuit).

(2) The vehicle can not start off due to failure of the C2 clutch engagement. (The turbine revolution only rises) (Malfunction of the A/T main body)

(2) Checking points

1.Is the P, N range signal system of the neutral start switch normal?

2.Is the output revolution sensor normal?

3.Are the harness and connector between A/T ECU and output revolution sensor normal?

4.Is the A/T main body normal?

(3) Checking method

⊿1. Check of neutral start switch P·N range signal system

1.The diagnosis code output is indicated at the shift lever P·N range position.

SPECIFIED VALUE: The diagnosis code No.55 or No.56 is outputted.

▼If YES, check the neutral start switch system.

Refer to Page F5-36.

Refer to Page F5-38.

▼If it is NO, go to step ⊿2.

⊿2. Check of neutral start switch signal 1

1.After turning "LOCK" the IG SW once, start the engine in the N range.

2.With the accelerator set to OFF, move the shift lever from the N→D range.

SPECIFIED VALUE: The vehicle moves forward.

▼If it is OK, go to step ⊿4.

▼If it is NG, go to step ⊿3.

⊿3. Check of neutral start switch signal 2

1.After turning "LOCK" the IG SW once, start the engine in the neutral range.

2.With the accelerator set to OFF, move the shift lever in the sequence of the N→D→N→D range.

SPECIFIED VALUE: The vehicle moves forward.

▼If OK, replace the valve body Ay.

▼If NG, replace the A/T Ay.

Σ>4. Check of vehicle harness and connector between A/T ECU and output revolution sensor

1.Between A/T ECU vehicle harness side connector C18 (EOPT) and sensor vehicle harness side connector 3
2.Between A/T ECU vehicle harness side connector C8 (ROPT) and sensor vehicle harness side connector2
3.Between A/T ECU vehicle harness side connector C7 (VBOP) and sensor vehicle harness side connector 1

SPECIFIED VALUE: Continuity exists.

▼If OK, repair or replace the vehicle harness.
▼If it is NG, go to step Σ>5.

Σ>5. Replace the output revolution sensor.

1.Replace the output revolution sensor.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If it is NG, go to step Σ>6.

Σ>6. Check of A/T ECU input/output signals (Output revolution sensor system)

1.Is the normal waveform outputted?
2.Does the waveform include abnormal noise?

Refer to Page F5-79.

SPECIFIED VALUE: The normal waveform is outputted.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, perform the following operations,
(1) Remove the noise generating source.
(2) Again check the fitting state of each connector and harness conditions.

3-13-8 NO.55 (NO NEUTRAL START SWITCH INPUT)

(1) Output conditions

1.When no signal input state is detected over a certain length of time:

(2) Checking points

1.Is the neutral start switch normal?

2.Are the harness and connector between A/T ECU and the neutral start switch normal?

CAUTION

- The diagnosis code No.55 is not memorized. (The code is outputted only when a malfunction is occurring.)

(3) Checking method

⊿1. Check of lighting of the shift indicator

1.Check the illuminating state of the shift indicator inside the combination meter by operating the shift lever .

SPECIFIED VALUE: Illuminates normally.

▼If it is OK, go to step ⊿2.

▼If NG, check the neutral start switch unit.

Refer to Page F5-78.

⊿2. Check of harness and connector between A/T ECU and sensor harness.

1.With the vehicle in a stationary state, short-circuit the ECU-T terminal and the E terminal inside the DLC, using the SST.

SST: 09991-87404-000
09991-87403-000

2.After turning ON the IG switch, move the shift lever progressively and hold it in each range (for about 10 seconds). Check to see in which range the O/D OFF lamp flashes (the diagnosis code indication).

3.At the range where the O/D OFF lamp flashes, check the harness for fitting state and open wire.

(1) Between A/T ECU vehicle harness side connector C15 (P) and switch vehicle harness side connector 4 (P)

(2) Between A/T ECU vehicle harness side connector B7 (R) and switch vehicle harness side connector 1 (R)

(3) Between A/T ECU vehicle harness side connector C24 (N) and switch vehicle harness side connector 5 (N)

(4) Between A/T ECU vehicle harness side connector C17 (D) and switch vehicle harness side connector 3 (D)

(5) Between A/T ECU vehicle harness side connector C16 (2) and switch vehicle harness side connector 2 (2)

(6) Between A/T ECU vehicle harness side connector C25 (L) and switch vehicle harness side connector 8 (L)

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step ⊿3.

▼If NG, repair or replace the harness of the vehicle concerned.

⊃3. Check of A/T ECU input/output signals (Neutral start switch system)

Refer to Page F5-79.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, again check the fitting state of each connector and harness conditions.

3-13-9 NO.56 (NEUTRAL START SWITCH MULTIPLE INPUT)

(1) Output conditions

1.When multiple input of signals is detected over a certain length of time.

(2) Checking points

1.Is the neutral start switch normal?

2.Are the harness and connector between A/T ECU and neutral start switch normal?

(3) Checking method

Σ>1. Check of lighting of shift indicator

1.Check the illuminating state of the shift indicator inside the combination meter by operating the shift lever .

SPECIFIED VALUE: Illuminates normally.

▼If it is OK, go to step Σ>2.

▼If NG, check the neutral start switch unit.

Refer to Page F5-78.

Σ>2. Check of harness and connector between A/T ECU and sensor harness

1.Check each harness for being pinched (Short-circuit).

(1) Between A/T ECU vehicle harness side connector C15 (P) and switch vehicle harness side connector 4 (P)

(2) Between A/T ECU vehicle harness side connector B7 (R) and switch vehicle harness side connector 1 (R)

(3) Between A/T ECU vehicle harness side connector C24 (N) and switch vehicle harness side connector 5 (N)

(4) Between A/T ECU vehicle harness side connector C17 (D) and switch vehicle harness side connector 3 (D)

(5) Between A/T ECU vehicle harness side connector C16 (2) and switch vehicle harness side connector 2 (2)

(6) Between A/T ECU vehicle harness side connector C25 (L) and switch vehicle harness side connector 8 (L)

SPECIFIED VALUE: Not pinched (Short-circuit)

▼If it is OK, go to step Σ>3.

▼If NG, repair or replace the vehicle harness.

Σ>3. Check of A/T ECU input/output signals (Neutral start switch system)

Refer to Page F5-79.

▼If OK, check A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, again check the state of each connector and harness conditions.

3-13-10 NO.61 (SOLENOID NO.1 SYSTEM)

(1) Output conditions

1.When the solenoid No.1 is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and solenoid No.1 normal?

2.Is the solenoid No.1 normal?

(3) Checking method

Σ>1. Check of vehicle harness and connector between the A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C6 (B1+) and solenoid wire vehicle harness side connector 7

2.Between A/T ECU vehicle harness side connector C5 (B1-) and solenoid wire vehicle harness side connector 11

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>2.

▼If NG, repair or replace the vehicle harness.

Σ>2. Check of solenoid wire unit (Solenoid No.1 system)

Refer to Page F5-73.

▼If it is OK, go to step Σ>3.

▼If NG, replace the solenoid wire.

Σ>3. Check of solenoid No.1 unit

Refer to Page F5-77.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, replace the solenoid No.1.

3-13-11 NO.62 (SOLENOID NO.2 SYSTEM)

(1) Output conditions

1.When the solenoid No.2 is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and solenoid No.2 normal?

2.Is the solenoid No.2 normal?

(3) Checking method

Σ>1. Check the vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C4 (C2+) and solenoid wire vehicle harness side connector 5

2.Between A/T ECU vehicle harness side connector C3 (C2-) and solenoid wire vehicle harness side connector 9

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>2.

▼If NG, repair or replace the vehicle harness.

Σ>2. Check of solenoid wire unit (Solenoid No.2 system)

Refer to Page F5-73.

▼If it is OK, go to step Σ>3.

▼If NG, replace the solenoid wire.

Σ>3. Check of solenoid No.2 unit

Refer to Page F5-77.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, replace the solenoid No.2.

3-13-12 NO.63 (SOLENOID NO.3 SYSTEM)

(1) Output conditions

1.When the solenoid No.3 is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Is the harness and connector between A/T ECU and solenoid No.3 normal?

2.Is the solenoid No.3 normal?

(3) Checking method

⊳1. Check of vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C2 (C3B2+) and solenoid wire vehicle harness side connector 6

2.Between A/T ECU vehicle harness side connector C1 (C3B2-) and solenoid wire vehicle harness side connector 10

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step ⊳2.

▼If NG, repair or replace the vehicle harness.

⊳2. Check of solenoid wire unit (Solenoid No.3 system)

Refer to Page F5-73.

▼If it is OK, go to step ⊳3.

▼If NG, replace the solenoid wire.

⊳3. Check of solenoid No.3 unit

Refer to Page F5-77.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, replace the solenoid No.3.

3-13-13 NO.64 (DUTY SOLENOID SYSTEM)

(1) Output conditions

1.When the duty solenoid is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and duty solenoid normal?
2.Is the duty solenoid normal?

(3) Checking method

Σ>1. Check of vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C23 (LUCC) and solenoid wire vehicle harness side connector 2
SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>2.
▼If NG, repair or replace the vehicle harness.

Σ>2. Check of solenoid wire unit (Duty solenoid system)

Refer to Page F5-73.

▼If it is OK, go to step Σ>3.
▼If NG, replace the solenoid wire.

Σ>3. Check of duty solenoid unit

Refer to Page F5-77.

▼If OK, check the A/T ECU unit circuit.
Refer to Page A1-24.

▼If NG, replace the duty solenoid.

3-13-14 NO.65 (LUC SOLENOID SYSTEM)

(1) Output conditions

1.When the LUC solenoid is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and LUC solenoid normal?
2.Is the LUC solenoid normal?

(3) Checking method

Σ>1. Check of vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C11 (LUCR) and solenoid wire vehicle harness side connector 3
SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>2.
▼If NG, repair or replace the vehicle harness.

Σ>2. Check of solenoid wire unit (LUC solenoid system)

Refer to Page F5-73.

▼If it is OK, go to step Σ>3.
▼If NG, replace the solenoid wire.

⊃3. Check of LUC solenoid unit

Refer to Page F5-78.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, replace the LUC solenoid.

3-13-15 NO.66 (SWITCH SOLENOID SYSTEM)

(1) Output conditions

1.When the switch solenoid is energized, no current flowed or excessive current flowed over a certain length of time.

(2) Checking points

1.Are the harness and connector between A/T ECU and switch solenoid normal?

2.Is the switch solenoid normal?

(3) Checking method

Σ>1. Check of vehicle harness and connector between A/T ECU and solenoid wire

1.Between A/T ECU vehicle harness side connector C12 (SOLR) and solenoid wire vehicle harness side connector 4

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step Σ>2.

▼If NG, repair or replace the vehicle harness.

Σ>2. Check of solenoid wire unit (Switch solenoid system)

Refer to Page F5-73.

▼If it is OK, go to step Σ>3.

▼If NG, replace the solenoid wire.

Σ>3. Check of switch solenoid unit

Refer to Page F5-78.

▼If OK, check the A/T ECU unit circuit.

Refer to Page A1-24.

▼If NG, replace the switch solenoid.

3-13-16 NO.72 (LOCK-UP REVOLUTION NOT MASTCHED)

(1) Output conditions

1.When the engine revolution differs from the lock-up revolution greatly during the direct lock-up operation.

(2) Checking points

1.Is the valve body Ay normal?
2.Is the torque converter Ay normal?

(3) Checking method

Σ>1. Check of hydraulic pressure

Refer to Page F3-6.

1.With the vehicle lifted up, slowly depress the accelerator pedal so that the transmission may be set to the 3rd gear and further accelerate the vehicle until the direct lockup occurs. Measure the LUC ON pressure and LUC OFF pressure.
SPECIFIED VALUE: 666±49kPa{6.8±0.5kgf/cm } (LUC ON pressure−LUC OFF pressure)

NOTE

- When the direct lock-up occurs, the duty ratio of the LUC control solenoid is 100%. (Refer to the A/T input/output signal check.)
- When you want to measure the hydraulic pressure after the warning indication, stop the vehicle and move the shift lever once to the neutral range (Releasing of the fail-safe). Then, again set the shift lever to the D range so as to perform the measurement.

▼If it is OK, go to step Σ>2.
▼If NG, replace the valve body Ay.

Σ>2.Replace the torque converter Ay

1.Replace the torque converter Ay.
SPECIFIED VALUE: The vehicle retunes to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, replace the A/T Ay.

3-13-17 NO.82 (ABNORMAL COMMUNICATION RECEIVING WITH EFI)
NO.85 (ABNORMAL COMMUNICATION SENDING WITH EFI)

(1) No.82 output conditions

1.When the communication signal from the EFI ECU can not be received:

(2) No.85 output conditions

1.When the communication signal to the EFI ECU can not be sent out:

(3) Checking points

1.Is the harness between EFI ECU and A/T ECU normal?
2.Does the connector section exhibit poor contact?

(4) Checking method

Σ>1. CAN communication basic check

1.Conduct the CAN communication basic check.
Refer to Page L2-14.

▼If OK for the R.H.D. vehicles, proceed to Σ>2.
▼If OK for the L.H.D. vehicles, proceed to Σ>3.
▼If NG, repair or replace the malfunctioning sections.

Σ>2. Check of short-circuit in CAN line

1.Conduct continuity check for between the following terminals given below.
(1) Between A/T ECU connection vehicle harness side connector B9 (HCN1) and A/T ECU connection vehicle harness side connectorB19 (LCN1)
(2) Between EFI ECU connection vehicle harness side connector 6 (CANL) and EFI ECU connection vehicle harness side connector 7 (CANH)
(3) Between EFI ECU connection vehicle harness side connector 8 (LCAN) and EFI ECU connection vehicle harness side connector 9 (HCAN)
SPECIFIED VALUE: No continuity exists.

▼If it is OK, go to step Σ>4.
▼If NG, repair or replace the malfunctioning sections.

Σ>3. Check of short-circuit in CAN line

1.Perform continuity check between the following terminals.
(1) Between A/T ECU connection vehicle harness side connector B9(HCN1) and A/T ECU connection vehicle harness side connector B19(LCN1)
(2) Between meter connection vehicle harness side connector 1(CANH) and meter connection vehicle harness side connector 2(CANL) interval
(3) Between meter connection vehicle harness side connector 3(HCAN) and meter connection vehicle harness side connector 4(LCAN)
SPECIFIED VALUE: No continuity exists.

▼If it is OK, go to step Σ>4.
▼If NG, repair or replace the malfunctioning sections.

⊳4. Check of CAN line for short circuit

1.Conduct continuity check for between the following terminals given below.
(1) Between A/T ECU connection vehicle harness side connector B19 (LCN1) and battery positive terminal
(2) Between A/T ECU connection vehicle harness side connector B9 (HCN1) and battery positive terminal
(3) Between A/T ECU connection vehicle harness side connector B19 (LCN1) and body ground
(4) Between A/T ECU connection vehicle harness side connector B9 (HCN1) and body ground
SPECIFIED VALUE: No continuity exists.

▼If it is OK, go to step ⊳5.
▼If NG, repair or replace the malfunctioning sections.

⊳5. Check of EFI ECU voltage

1.Turn ON the IG SW.
2.Measure the voltage between the following terminals given below.
(1) Between EFI ECU connection vehicle harness side connector 27 (+B) and body ground
(2) Between EFI ECU connection vehicle harness side connector 38 (BAT) and body ground
(3) Between EFI ECU connection vehicle harness side connector 39 (MRO) and body ground
SPECIFIED VALUE: Battery voltage

▼If OK for the R.H.D. vehicles, proceed to ⊳7.
▼If OK for the R.H.D. vehicles, proceed to ⊳6.
▼If NG, repair or replace the malfunctioning sections.

⊳6. Check of meter voltage

1.Measure the voltage between the following terminals given below.
SPECIFIED VALUE: Battery voltage

▼If it is OK, go to step ⊳7.
▼If NG, repair or replace the malfunctioning sections.

⊳7. Check of A/T ECU voltage

1.Measure the voltage between the following terminals given below.
(1) Between A/T ECU connection vehicle harness side connector B2 (BAT2) and body ground
(2) Between A/T ECU connection vehicle harness side connector 2(BAT2) and body ground
(3) Between A/T ECU connection vehicle harness side connector B3(+B) and body ground
SPECIFIED VALUE: Battery voltage

▼If OK for the R.H.D. vehicles, proceed to ⊳8.
▼If OK for the R.H.D. vehicles, proceed to ⊳9.
▼If NG, repair or replace the malfunctioning sections.

⊃8. Check of ECU ground

1.Set the IG SW to the "LOCK" position.
2.Conduct continuity check for between the following terminals given below.
(1) Between EFI ECU connection vehicle harness side connector 20 (E01) and body ground
(2) Between EFI ECU connection vehicle harness side connector 125(E1) and body ground
(3) Between A/T ECU connection vehicle harness side connector B5(E02) and body ground
(4) Between A/T ECU connection vehicle harness side connector B6(E01) and body ground
(5) Between A/T ECU connection vehicle harness side connector B24(E1) and body ground
SPECIFIED VALUE: Continuity exists.

▼If OK, check the unit circuits of the EFI ECU and A/T ECU.
Refer to Page A1-24.

▼If NG, repair or replace the malfunctioning sections.

⊃9. Check of ECU ground

1.Set the IG SW to the "LOCK" position.
2.Conduct continuity check for between the following terminals given below.
(1) Between EFI ECU connection vehicle harness side connector 20 (E01) and body ground
(2) Between EFI ECU connection vehicle harness side connector 125(E1) and body ground
(3) Between A/T ECU connection vehicle harness side connector B5(E02) and body ground
(4) Between A/T ECU connection vehicle harness side connector B6(E01) and body ground
(5) Between A/T ECU connection vehicle harness side connector B24(E1) and body ground
(6) Between meter connection vehicle harness side connector 18(GND) and body ground
SPECIFIED VALUE: Continuity exists.

▼If OK, check the unit circuits of the EFI ECU and A/T ECU.
Refer to Page A1-24.

▼If NG, repair or replace the malfunctioning sections.

3-13-18 NO.86 (NO ENGINE REVOLUTION INPUT)

(1) Output conditions

1.When the engine revolution signal from the EFI ECU is not inputted into the A/T ECU over a certain length of time:

(2) Checking points

1.Is the engine revolution sensor signal of the EFI ECU normal?

2.Is the EFI ECU normal?

(3) Checking method

⊳1. Check of harness and connector between A/T ECU and EFI ECU

1.After setting IG switch to LOCK, disconnect the connector from the A/T ECU. Conduct the continuity check.

(1) Between A/T ECU vehicle harness side connector B8(REG1) and EFI ECU vehicle harness side connector 4 (AYNE)

SPECIFIED VALUE: Continuity exists.

▼If it is OK, go to step ⊳2.

▼If NG, repair or replace the vehicle harness.

⊳2. Check of EFI ECU unit circuit

Refer to Page A1-24.

▼If OK, replace the EFI ECU.

▼If NG, repair the malfunctioning sections.

3-14 TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

3-14-1 TABLE SHOWING POSSIBLE CAUSES ACCORDING TO MALFUNCTION PHENOMENA

Malfunction phenomena \ Possible causes	Idle speed faulty	Poor engine performance	Valve body malfunctioning (except for solenoid valve)	Solenoid No.2 malfunctioning	Solenoid No.3 malfunctioning	Solenoid No.1 malfunctioning	Duty solenoid malfunctioning	LUC solenoid malfunctioning	Switch solenoid malfunctioning	Strainer O-ring broken or worn out	2nd & 4th brake cylinder seal faulty	Torque converter malfunctioning	Oil pump malfunctioning	Manual valve lever improperly adjusted	Neutral start switch improperly adjusted	Transmission Ay malfunctioning	Drive plate cracked, bolts loose	Improper oil level	Control cable improperly adjusted	A/T ECU malfunctioning	Stop lamp switch system open wire or short-circuit
(1) Starter inoperative													○		○				○		
(2) The vehicle can not move forward nor backward.			○									○	○	○			○	○	○	○	
(3) The vehicle can not move forward.			○	○										○		○			○	○	
(4) The vehicle can not move backward.														○		○			○	○	
(5) The engine stalls during N→D·R.	○	○	○				○	○				○									
(6) The clutch is slipping during the 1st gear running.			○	○						○				○		○		○	○	○	
(7) The clutch is slipping during the 2nd gear running.			○	○		○				○	○			○		○		○		○	
(8) The clutch is slipping during the 3rd gear running.			○	○	○				○	○				○		○		○		○	
(9) The clutch is slipping during the 4th gear running.			○		○	○			○	○	○			○		○		○		○	
(10) The clutch is slipping during the R range running.			○		○		○			○				○		○		○	○	○	
(11) The vehicle starts moving in the P or N range.														○		○			○		
(12) When the engine speed is raised in the N range, the vehicle starts to move.																○					
(13) The engine starts in ranges other than P·N .															○				○		
(14) No gear shifting takes place. (kept in the 1st gear)			○				○														
(15) No gear shifting takes place. (kept in the 3rd gear)																				○	
(16) The vehicle starts off from the 2nd gear.																				○	○
(17) Gear shifting shock·time lag large (N→D)			○	○			○			○						○		○		○	○
(18) Gear shifting shock·time lag large (N→R)			○		○		○			○						○		○		○	
(19) Gear shifting shock·time lag large (1st⇄2nd)			○			○				○	○					○		○		○	
(20) Gear shifting shock·time lag large (2nd⇄3rd)			○		○	○				○	○					○		○		○	
(21) Gear shifting shock·time lag large (3rd⇄4th)			○	○		○			○	○	○					○		○		○	
(22) Engine racing during gear shifting (2nd→3rd)			○			○					○					○				○	
(23) Engine racing during gear shifting (3rd→4th)			○	○							○					○				○	
(24) Gear shifting takes place only in (1st⇄3rd)			○																	○	

3-14-2 TROUBLE-SHOOTING ACCORDING TO MALFUNCTION PHENOMENON ITEMS

(1) Starter inoperative

1.CHECK AND ADJUSTMENT OF CONTROL CABLE
Refer to Page F3-2.

2.CHECK AND ADJUSTMENT OF NEUTRAL START SWITCH
Refer to Page F3-3.

3.Check of engine cranking system
4.Check of oil pump system

(2) The vehicle will not move forward nor backward.

Σ>1. Check of oil level
Refer to Page F3-1.

▼If it is OK, go to step Σ>2.
▼If NG, adjust the oil level.

Σ>2. Check and adjustment of control cable
Refer to Page F3-2.

▼If it is OK, go to step Σ>3.
▼If NG, adjust the control cable.

Σ>3. Manual running test

1.Disconnect the A/T ECU connector. Check the gear position at each range.
SPECIFIED VALUE:

Range	Ⓟ·Ⓝ	Ⓓ	Ⓡ
Gear position	Neutral	3rd	Reverse

▼If it is OK, go to step Σ>4.
▼If it is NG, go to step Σ>5.

Σ>4. Check of ECU power supply circuit
Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to Σ>5.
▼If NG, repair the connector or circuit concerned.

Σ>5. Check and adjustment of manual valve

1.Remove the oil pan. Check that the manual valve groove is aligned with the hole at the valve body in the Ⓝ range.
Refer to Page F3-25.

CAUTION
- The oil pan is a non-reusable part.

▼If it is OK, go to step Σ>6.
▼If NG, adjust the manual valve.

Σ6. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If it is NG, go to step Σ7.

Σ7. Hydraulic pressure measurement

1.Measure the LUC OFF pressure when the lockup is OFF.
Refer to Page F3-6.

▼If OK, replace the torque converter Ay.
▼If it is NG, go to step Σ8.

Σ8. Check of drive plate

1.Remove the A/T from the vehicle. Check the drive plate for cracks; the bolts for looseness.
▼If OK, replace the oil pump Ay.
▼If NG, replace the drive plate or tighten the bolts.

(3) The vehicle can not move forward.

Σ1. Check and adjustment of control cable

Refer to Page F3-2.

▼If it is OK, go to step Σ2.
▼If NG, adjust the control cable.

Σ2. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.
▼If it is OK, go to step Σ3.
▼If it is NG, go to step Σ4.

Range	P·N	D	R
Gear position	Neutral	3rd	Reverse

Σ3. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to Σ5.
▼If NG, repair the connector or circuit concerned.

Σ4. Check and adjustment of manual valve

1.Remove the oil pan. Check that the manual valve groove is aligned with the hole at the valve body in the N range.
Refer to Page F3-25.

▼If it is OK, go to step Σ5.
▼If NG, adjust the manual valve.

CAUTION

- The oil pan is a non-reusable part.

Σ5. Check of solenoid No.2 unit (Operation)
Refer to Page F5-77.

▼If it is OK, go to step Σ6.
▼If NG, replace the solenoid No.2.

Σ6. Replacement of valve body
Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(4) The vehicle can not move backward.

Σ1. Check and adjustment of control cable
Refer to Page F3-2.

▼If it is OK, go to step Σ2.
▼If NG, adjust the control cable.

Σ2. Manual running test
1.Disconnect the connector of the A/T ECU. Check the gear position of each range.
▼If it is OK, go to step Σ3.
▼If it is NG, go to step Σ4.
SPECIFIED VALUE:

Range	P·N	D	R
Gear position	Neutral	3rd	Reverse

Σ3. ECU power supply circuit check
Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to Σ4.
▼If NG, repair the connector or circuit concerned.

Σ4. Check and adjustment of manual valve
1.Remove the oil pan. Check that the manual valve groove is aligned with the hole at the valve body in the N range.
Refer to Page F3-25.

CAUTION
- The oil pan is a non-reusable part.

▼If OK, repair or replace the A/T Ay.
▼If NG, adjust the manual valve.

(5) The engine stalls during [N]→[D]·[R]

Σ>1. Check of idle speed

1.Check the idle speed.

(1) Type K3-VE engine-mounted vehicle

Refer to Page B1-25.

▼If it is OK, go to step Σ>2.

▼If NG, repair the engine idle system.

Σ>2. Check of duty solenoid, LUC solenoid unit (Operation)

Refer to Page F5-77.

Refer to Page F5-78.

▼If it is OK, go to step Σ>2.

▼If NG, replace the solenoid concerned.

Σ>3. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If NG, replace the torque converter Ay.

(6) The clutch is slipping during the 1st gear running.

Σ>1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step Σ>2.

▼If NG, adjust the oil level.

Σ>2. Check and adjustment of control cable

Refer to Page F3-2.

▼If it is OK, go to step Σ>3.

▼If NG, adjust the control cable.

Σ>3. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.

▼If it is OK, go to step Σ>4.

▼If it is NG, go to step Σ>5.

SPECIFIED VALUE:

Range	[P]·[N]	[D]	[R]
Gear position	Neutral	3rd	Reverse

Σ>4. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to Σ>5.

▼If NG, repair the connector or circuit concerned.

∑5. Check of strainer

1.Replace the oil pan and strainer. Check the O-ring of the strainer for cut and wear.

▼If it is OK, go to step ∑6.

▼If NG, replace the O-ring of the strainer.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

∑6. Check and adjustment of manual valve

1.Check that the manual valve groove is aligned with the hole at the valve body in the N range.
Refer to Page F3-25.

▼If it is OK, go to step ∑7.

▼If NG, adjust the manual valve.

∑7. Check of solenoid No.2 unit (Operation)

Refer to Page F5-77.

▼If it is OK, go to step ∑8.

▼If NG, replace the solenoid No.2.

∑8. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If NG, repair or replace the A/T Ay.

(7) The clutch is slipping during the 2nd gear running.

∑1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑2.

▼If NG, adjust the oil level.

∑2. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.

▼If it is OK, go to step ∑3.

▼If it is NG, go to step ∑4.

SPECIFIED VALUE:

Range	P·N	D	R
Gear position	Neutral	3rd	Reverse

∑3. Check of ECU power supply circuit

Refer to Page A1-24.....

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to ∑4.

▼If NG, repair the connector or circuit concerned.

∑>4. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut and wear.

▼If it is OK, go to step ∑>5.

▼If NG, replace the strainer O-ring.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The O-ring is a non-reusable part.

∑>5. Check and adjustment of manual valve

1.Check that the manual valve groove is aligned with the hole at the valve body in the [N] range.

▼If it is OK, go to step ∑>6.

▼If NG, adjust the manual valve.

∑>6. Check of solenoid No1, solenoid No.2 units (Operation)

Refer to Page F5-77.

Refer to Page F5-77.

▼If it is OK, go to step ∑>7.

▼If NG, replace the solenoid concerned.

∑>7. Check of the 2nd & 4th brake cylinder seal

Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.

▼If it is OK, go to step ∑>8.

▼If NG, replace the 2nd & 4th brake cylinder seal.

CAUTION

- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

∑>8. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If NG, repair or replace the A/T Ay.

(8) The clutch is slipping during the 3rd gear running.

∑>1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑>2.

▼If NG, adjust the oil level.

∑2. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.

▼If it is OK, go to step ∑3.

▼If it is NG, go to step ∑4.

SPECIFIED VALUE:

Range	Ⓟ·Ⓝ	Ⓓ	Ⓡ
Gear position	Neutral	3rd	Reverse

∑3. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to ∑4.

▼If NG, repair the connector or circuit concerned.

∑4. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut and wear.

▼If it is OK, go to step ∑5.

▼If NG, replace the strainer O-ring.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.

∑5. Check and adjustment of manual valve

1.Check that the manual valve groove is aligned with the hole at the valve body in the Ⓝ range.

Refer to Page F3-25.

▼If it is OK, go to step ∑6.

▼If NG, adjust the manual valve.

∑6. Check of solenoid No2, solenoid No.3 and switch solenoid unit (Operation)

Refer to Page F5-77.

Refer to Page F5-78.

▼If it is OK, go to step ∑7.

▼If NG, replace the solenoid concerned.

∑7. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If NG, repair or replace the A/T Ay.

(9) The clutch is slipping during the 4th gear running.

∑1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑2.

▼If NG, adjust the oil level.

Σ2. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.

▼If it is OK, go to step Σ3.

▼If it is NG, go to step Σ4.

SPECIFIED VALUE:

Range	P·N	D	R
Gear position	Neutral	3rd	Reverse

Σ3. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ4.

▼If NG, repair the connector or circuit concerned.

Σ4. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.

▼If it is OK, go to step Σ5.

▼If NG, replace the O-ring of the strainer.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.

Σ5. Check and adjustment of manual valve

1.Check that the manual valve groove is aligned with the hole at the valve body in the N range.

Refer to Page F3-25.

▼If it is OK, go to step Σ6.

▼If NG, adjust the manual valve.

Σ6. Check of solenoid No.1, solenoid No.3 and switch solenoid unit (Operation)

Refer to Page F5-77.

Refer to Page F5-77.

Refer to Page F5-78.

▼If it is OK, go to step Σ7.

▼If NG, replace the solenoid concerned.

Σ7. Check of 2nd & 4th brake cylinder seal

Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.

▼If it is OK, go to step Σ8.

▼If NG, replace the 2nd & 4th brake cylinder seal.

CAUTION

- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

Σ8. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(10) The clutch is slipping during the Ⓡ range running.

Σ1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step Σ2.
▼If NG, adjust the oil level.

Σ2. Check and adjustment of control cable

Refer to Page F3-2.

▼If it is OK, go to step Σ3.
▼If NG, adjust the control cable.

Σ3. Manual running test

1.Disconnect the connector of the A/T ECU. Check the gear position of each range.
▼If it is OK, go to step Σ4.
▼If it is NG, go to step Σ5.
SPECIFIED VALUE:

Range	Ⓟ·Ⓝ	Ⓓ	Ⓡ
Gear position	Neutral	3rd	Reverse

Σ4. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ5.
▼If NG, repair the connector or circuit concerned.

Σ5. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.
▼If it is OK, go to step Σ6.
▼If NG, replace the O-ring of the strainer.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.

Σ6. Check and adjustment of manual valve

1.Check that the manual valve groove is aligned with the hole at the valve body in the Ⓝ range.
Refer to Page F3-25.

▼If it is OK, go to step Σ7.
▼If NG, adjust the manual valve.

∑7. Check of solenoid No.3 and duty solenoid unit (Operation)
Refer to Page F5-77.

Refer to Page F5-77.

▼If it is OK, go to step ∑8.
▼If NG, replace the solenoid concerned.

∑8. Replacement of valve body
Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(11) The vehicle starts to move in the Ⓟ or Ⓝ range.
∑1. Check and adjustment of control cable
Refer to Page F3-2.

▼If it is OK, go to step ∑2.
▼If NG, adjust the control cable.

∑2. Check and adjustment of manual valve
1.Remove the oil pan. Check that the manual valve groove is aligned with the hole at the valve body in the Ⓝ range.
Refer to Page F3-25.

CAUTION
- The oil pan is a non-reusable part.

▼If OK, replace the A/T Ay.
▼If NG, adjust the manual valve.

(12) When the engine speed is raised in the Ⓝ range, the vehicle starts to move.
1.Repair or replace the A/T Ay.

(13) The engine starts in ranges other than Ⓟ·Ⓝ.
∑1. Check and adjustment of neutral start switch
Refer to Page F3-3.

▼If it is OK, go to step ∑2.
▼If NG, adjust the neutral start switch position.

∑2. Check and adjustment of control cable
Refer to Page F3-2.

(14) No gear shifting takes place (Kept in the 1st gear)

∑1. Check of duty solenoid unit (Operation)

Refer to Page F5-77.

▼If OK, replace the valve body.

▼If NG, replace the duty solenoid.

(15) No gear shifting takes place (Kept in the 3rd gear)

∑1. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU.

▼If NG, repair the connector or circuit concerned.

(16) The vehicle starts off from the 2nd gear

∑1. Check of stop lamp switch unit

Refer to Page E3-36.

▼If it is OK, go to step ∑2.

▼If NG, replace the stop lamp switch.

∑2. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU.

▼If NG, repair the connector or circuit concerned.

(17) Gear shifting shock · time lag large (N→D)

∑1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑2.

▼If NG, adjust the oil level.

∑2. Check of stop lamp switch unit

Refer to Page E3-36.

▼If it is OK, go to step ∑3.

▼If NG, replace the stop lamp switch.

∑3. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the ∑4.

▼If NG, repair the connector or circuit concerned.

Σ>4. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.

▼If it is OK, go to step Σ>5.

▼If NG, replace the O-ring of the strainer.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

Σ>5. Check of solenoid No.2, duty solenoid unit (Operation)

Refer to Page F5-77.

Refer to Page F5-77.

▼If it is OK, go to step Σ>6.

▼If NG, replace the solenoid concerned.

Σ>6. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.

▼If NG, repair or replace the A/T Ay.

(18) Gear shifting shock · time lag large (Ⓝ→Ⓡ)

Σ>1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step Σ>2.

▼If NG, adjust the oil level.

Σ>2. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ>3.

▼If NG, repair the connector or circuit concerned.

Σ>3. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.

▼If it is OK, go to step Σ>4.

▼If NG, replace the O-ring of the strainer.

CAUTION

- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

Σ>4. Check of solenoid No.3, duty solenoid unit (Operation)

Refer to Page F5-77.

▼If it is OK, go to step Σ>5.

▼If NG, replace the solenoid concerned.

⊃5. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(19) Gear shifting shock · time lag large (1st⇄2nd)

∑>1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑>2.
▼If NG, adjust the oil level.

∑>2. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the ∑>3.
▼If NG, repair the connector and circuit concerned.

∑>3. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.
▼If it is OK, go to step ∑>4.
▼If NG, replace the O-ring of the strainer.

CAUTION
- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

∑>4. Check of solenoid No.1 unit (Operation)

Refer to Page F5-77.

▼If it is OK, go to step ∑>5.
▼If NG, replace the solenoid No.1.

∑>5. Check of 2nd & 4th brake cylinder seal

Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.
▼If it is OK, go to step ∑>6.
▼If NG, replace the 2nd & 4th brake cylinder seal.

CAUTION
- The 2nd & 4th brake cylinder seal is a non-reusable part.Hence, even in the case of OK, replace the seal.

∑>6. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(20) Gear shifting shock · time lag large (2nd⇄3rd)

∑>1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step ∑>2.
▼If NG, adjust the oil level.

Σ2. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ3.
▼If NG, repair the connector or circuit concerned.

Σ3. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.
▼If it is OK, go to step Σ4.
▼If NG, replace the O-ring of the strainer.

CAUTION
- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

Σ4. Check of solenoid No.3 and solenoid No.1 unit (Operation)

Refer to Page F5-77.

Refer to Page F5-77.

▼If it is OK, go to step Σ5.
▼If NG, replace the solenoid concerned.

Σ5. Check of 2nd & 4th brake cylinder seal

Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.
▼If it is OK, go to step Σ6.
▼If NG, replace the 2nd & 4th brake cylinder seal.

CAUTION
- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

Σ6. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(21) Gear shifting shock· time lag large (3rd⇄4th)

Σ1. Check of oil level

Refer to Page F3-1.

▼If it is OK, go to step Σ2.
▼If NG, adjust the oil level.

Σ2. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ3.
▼If NG, repair the connector or circuit concerned.

Σ3. Check of strainer

1.Remove the oil pan and strainer. Check the strainer O-ring for cut or wear.
▼If it is OK, go to step Σ4.
▼If NG, replace the O-ring of the strainer.

CAUTION
- The O-ring is a non-reusable part. Hence, even in the case of OK, replace the O-ring.
- The oil pan is a non-reusable part.

Σ4. Check of solenoid No.1, solenoid No.2 and switch solenoid unit (Operation)

Refer to Page F5-77.

Refer to Page F5-77.

Refer to Page F5-78.

▼If it is OK, go to step Σ5.
▼If NG, replace the solenoid concerned.

Σ5. Check of the 2nd & 4th brake cylinder seal

Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.
▼If it is OK, go to step Σ6.
▼If NG, replace the 2nd & 4th brake cylinder seal.

CAUTION
- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

Σ6. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(22) Engine racing during gear shifting (2nd→3rd

Σ1. Check of solenoid No.1 unit (Operation)

Refer to Page F5-77.

▼If it is OK, go to step Σ2.
▼If NG, replace the solenoid No.1.

Σ2. Check of ECU power supply circuit
Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ3.
▼If NG, repair the connector or circuit concerned.

Σ3. Check of 2nd & 4th brake cylinder seal
Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.
▼If it is OK, go to step Σ4.
▼If NG, replace the 2nd & 4th brake cylinder seal.
CAUTION
- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

Σ4. Replacement of valve body
Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(23) The engine racing during the gear shifting (3rd→4th)
Σ1. Check of solenoid No.2 unit (Operation)
Refer to Page F5-77.

▼If it is OK, go to step Σ2.
▼If NG, replace the solenoid No.2.

Σ2. Check of ECU power supply circuit
Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the Σ3.
▼If NG, repair the connector or circuit concerned.

Σ3. Check of 2nd & 4th brake cylinder seal
Refer to Page F3-25.

1.Check the 2nd & 4th brake cylinder seal for cut or wear.
▼If it is OK, go to step Σ4.
▼If NG, replace the 2nd & 4th brake cylinder seal.
CAUTION
- The 2nd & 4th brake cylinder seal is a non-reusable part. Hence, even in the case of OK, replace the seal.

⊳4. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

(24) The gear shifting takes place only for 1st⇄3rd

⊳1. Check of ECU power supply circuit

Refer to Page A1-24.

▼If OK, replace the A/T ECU. After the replacement, if the malfunction persists, proceed to the ⊳2.
▼If NG, repair the connector or circuit concerned.

⊳2. Replacement of valve body

Refer to Page F3-25.

SPECIFIED VALUE: The vehicle returns to the normal state.

▼If OK, finish the trouble shooting.
▼If NG, repair or replace the A/T Ay.

3-15 UNIT CHECK

3-15-1 TURBINE REVOLUTION SENSOR,OUTPUT REVOLUTION SENSOR

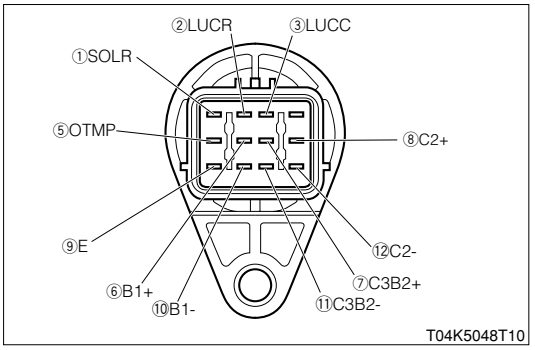
1. As for the turbine revolution sensor and output revolution sensor, it is impossible to evaluate good/bad of their individual performance because of their construction. Hence, make a total evaluation, using the trouble-shooting according to diagnosis codes (No.37, 42) and transmission control computer input / output signal check (Oscilloscope waveform).

Refer to Page F5-31.

Refer to Page F5-34.

Refer to Page F5-79.

3-15-2 SOLENOID WIRE AY (INCLUDING OIR TEMPERATURE SENSOR)



(1) In-vehicle Check

1.Disconnect the solenoid connector of the transaxle.

2.Connect the SST to the transaxle.

SST: 09990-97201-000

3.Check of switch solenoid system

(1) Measure the resistance between the ①SOLR and the transmission ground.

SPECIFIED VALUE: 16±2.0Ω(at time of 20°C)

(2) Connect the battery positive terminal to the ①SOLR terminal. Connect the battery negative terminal to the transmission ground. Check the solenoid for operating sound.

SPECIFIED VALUE: Emits a clicking sound.

CAUTION

- No spring is included in the switch solenoid valve. Therefore, when it is necessary to operate it again after it has been operated, once start the engine in the P range. Then, after stopping, redo the operation.
- The operating sound is very small. Hence, it is necessary to apply a sound scope or the like to the oil pan so as to confirm it.

4.Check of LUC solenoid system

(1) Measure the resistance between the ② LUCR and the transmission ground

SPECIFIED VALUE: 16±2.0Ω(At time of 20°C)

(2) Connect the battery positive terminal to the ②LUCR. Connect the battery negative terminal to the transmission ground. Check the solenoid for operating sound.

SPECIFIED VALUE: Emits a clicking sound.

CAUTION

- No spring is included in the switch solenoid valve. Therefore, when it is necessary to operate it again after it has been operated, once start the engine in the P range. Then, after stopping, redo the operation.
- The operating sound is very small. Hence, it is necessary to apply a sound scope or the like to the oil pan so as to confirm it.

5.Check of duty solenoid system

(1) Measure the resistance between ③ LUCC and transmission ground.

SPECIFIED VALUE: 12±1Ω(at time of 20°C)

(2) Connect the battery positive terminal to the③LUCC.Connect the battery negative terminal to the transmission ground.Check the solenoid for operating sound.

SPECIFIED VALUE: Emits a clicking sound.

6.Check of oil temperature sensor system
(1) Measure the resistance between ⑤OTMP and ⑨E.
SPECIFIED VALUE: 5.63±0.56kΩ(0°C)
0.072±0.0022kΩ(140°C)

NOTE
- About 2.4kΩ(20°C)
  about 0.313kΩ(80°C)

CAUTION
- The final evaluation shall be carried out in the next unit check given below.

7.Check of solenoid No.1 system
(1) Measure the resistance between ⑥B1+ and ⑩B1−.
SPECIFIED VALUE: 5.3±0.3Ω(At time of 20°C)

(2) Connect the battery positive terminal to the ⑥B1+ with a bulb of 12V−21W interposed.Connect the battery negative terminal to the ⑩B1−. Check for the operating sound of the solenoid.
SPECIFIED VALUE: Emits a clicking sound.

CAUTION
- Never directly apply the battery voltage. (Do not allow a current of 1A or more to flow) Carry out the operation check through the specified bulb (resistance).
- If a current of 1A or more is allowed to flow, the solenoid characteristics will be changed.

8.Check of solenoid No.2 system
(1) Measure the resistance between the ⑧C2+ and the ⑫C2−.
SPECIFIED VALUE: 5.3±0.2Ω(at time of 20°C)

(2) Connect the battery positive terminal to the ⑧C2+ with a bulb of 12V−21W interposed. Connect the battery negative terminal to the ⑫C2−. Check for the operating sound of the solenoid.
SPECIFIED VALUE: Emits a clicking sound.

CAUTION
- Never directly apply the battery voltage. (Do not allow a current of 1A or more to flow.) Carry out the operation check through the specified bulb (Resistance).
- If a current of 1A or more is allowed to flow, the solenoid characteristics will be changed.

9.Check of solenoid No.3 system
(1) ⑦C3B2+ - ⑪C3B2−
SPECIFIED VALUE: 5.3±0.2Ω(At time of 20°C)

(2) Connect the battery positive terminal to the ⑦C3B2+ with a bulb of 12V−21W interposed. Connect the battery negative terminal to the ⑪C3B2−. Check for the operating sound of the solenoid.
SPECIFIED VALUE: Emits a clicking sound.

CAUTION

- Never directly apply the battery voltage. (Do not allow a current of 1A or more to flow.) Carry out the operation check through the specified bulb (Resistance).
- If a current of 1 A or more is allowed to flow, the solenoid characteristics will be changed.

(2) Unit Check

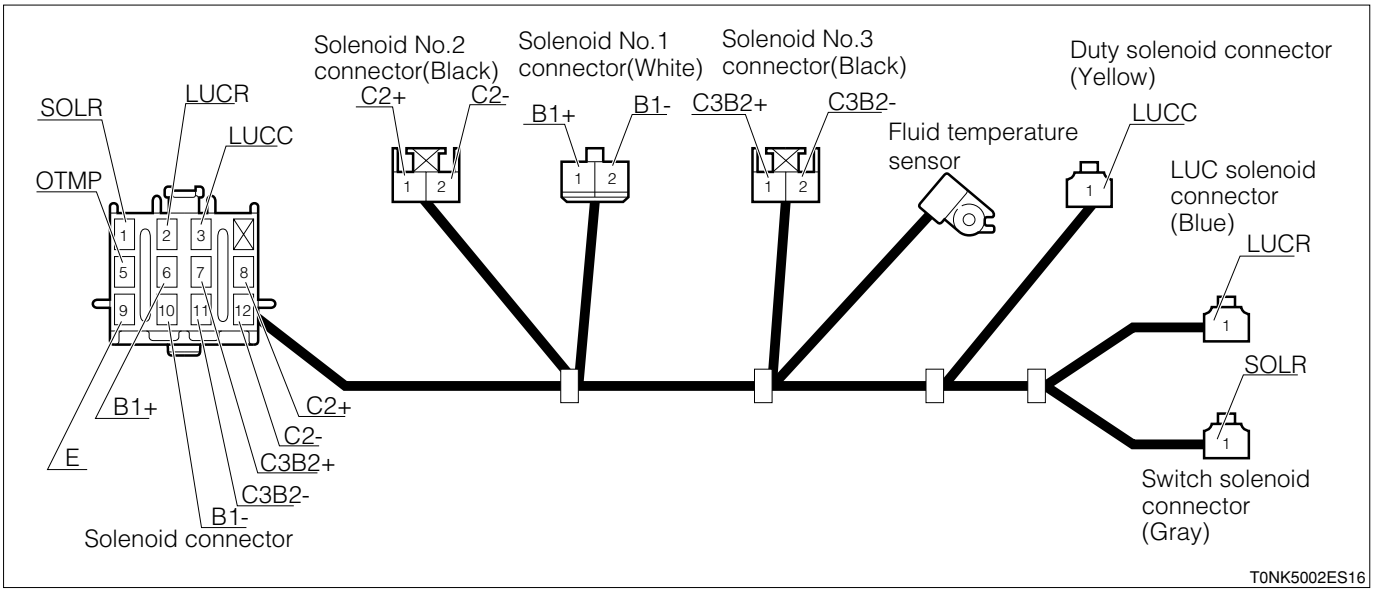
1.Remove the solenoid wire Ay from the transaxle.
Refer to Page F3-25.

2.Check continuity between the following terminals given below.
SPECIFIED VALUE: Continuity exists.

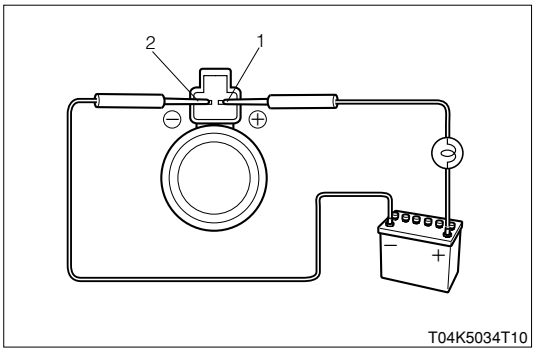
(1) Switch solenoid system
Between solenoid connector ① and switch solenoid connector ① (SOLR)
(2) LUC solenoid system
Between solenoid connector ② and LUC solenoid connector ① (LUCR)
(3) Duty solenoid system
Between solenoid connector ③ and duty solenoid connector ① (LUCC)
(4) Solenoid No.1 system
Between solenoid connector ⑥ and solenoid No.1 connector ① (B1+)
Between solenoid connector ⑩ and solenoid No.1 connector ② (B1−)
(5) Solenoid No.2 system
Between solenoid connector ⑧ and solenoid No.2 connector ① (C2+)
Between solenoid connector ⑫ and solenoid No.2 connector ② (C2−)
(6) Solenoid No.3 system
Between solenoid connector ⑦ and solenoid No.3 connector ① (C3B2+)
Between solenoid connector ⑪ and solenoid No.3 connector ② (C3B2−)

3.Oil temperature sensor system
(1) Measure the resistance between solenoid connectors ⑤OTMP and ⑨E.
SPECIFIED VALUE: 5.63±0.56kΩ(0°C)
0.072±0.0022kΩ(140°C)

4.Ensure that there is no short-circuit between connector terminals.



3-15-3 SOLENOID NO.1



1.Operation check

(1) Connect the battery positive terminal to the terminal 1 with a bulb of 12V−21W interposed. Connect the battery negative terminal to the terminal 2. Check that the valve inside the solenoid is working.

CAUTION

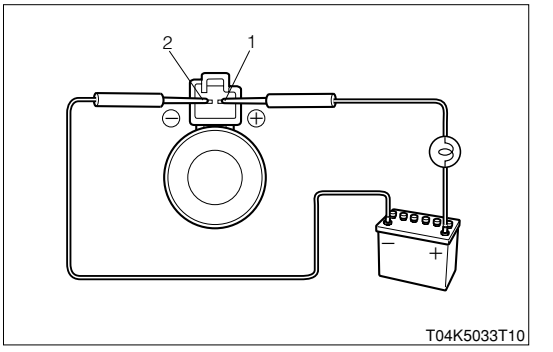
- Never directly apply the battery voltage. (Do not allow a current of 1A or more to flow.) Carry out the operation check through the specified bulb (Resistance)
- If a current of 1A or more is allowed to flow, the solenoid characteristics will be changed.

2.Resistance check

(1) Measure the resistance between terminals 1 and 2.

SPECIFIED VALUE: 5.3±0.3Ω(At time of 20°C)

3-15-4 SOLENOID NO.2, SOLENOID NO.3



1.Operation check

(1) Connect the battery positive terminal to the terminal 1 with a bulb of 12V−21W interposed. Connect the battery negative terminal to the terminal 2. Check that the valve inside the solenoid is working.

CAUTION

- Never directly apply the battery voltage. (Do not allow a current of 1A or more to flow.) Carry out the operation check through the specified valve (Resistance)
- If a current of 1 A or more is allowed to flow, the solenoid characteristics will be changed.

2.Resistance check

(1) Measure the resistance between the terminals 1 and 2.

SPECIFIED VALUE: 5.3±0.2Ω(At time of 20°C)

3-15-5 DUTY SOLENOID

1.Operation check

(1) Connect the battery positive terminal to the solenoid terminal. Connect the battery negative terminal to the solenoid body. Check that the valve inside the solenoid is working.

2.Resistance check

(1) Check the resistance between the solenoid terminal and solenoid body.

SPECIFIED VALUE: 12±1Ω(At time of 20°C)

3-15-6 LUC SOLENOID, SWITCH SOLENOID

1.Operation check

(1) Connect the battery positive terminal to the solenoid terminal. Connect the battery negative terminal to the solenoid body. Check that the valve inside the solenoid is working.

CAUTION

- No spring is included in the LUC solenoid, switch solenoid valve. Therefore, when you want to operate it again after it has been operated, shake the solenoid or return the valve position by pushing the ball. (When you want to return the valve position on the vehicle, start the engine in the P range.)

2.Resistance check

(1) Check the resistance between the solenoid terminal and solenoid body.

SPECIFIED VALUE: 16±2.0Ω (at time of 20°C)

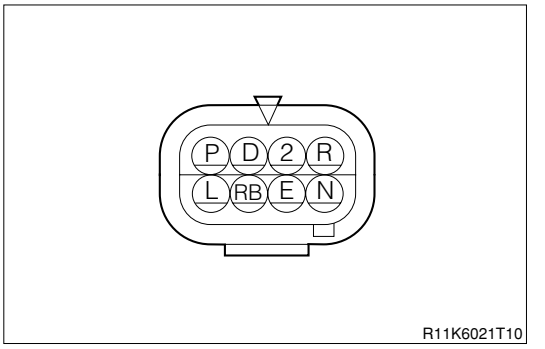
3-15-7 NEUTRAL START SWITCH

1.Carry out the continuity check, based on the connection table.

○—○:Continuity should exist

Shift position \ Terminal No.	E	R	RB	P	N	D	2	L
P	○			○				
R		○	○					
N	○				○			
D	○					○		
2	○						○	
L	○							○

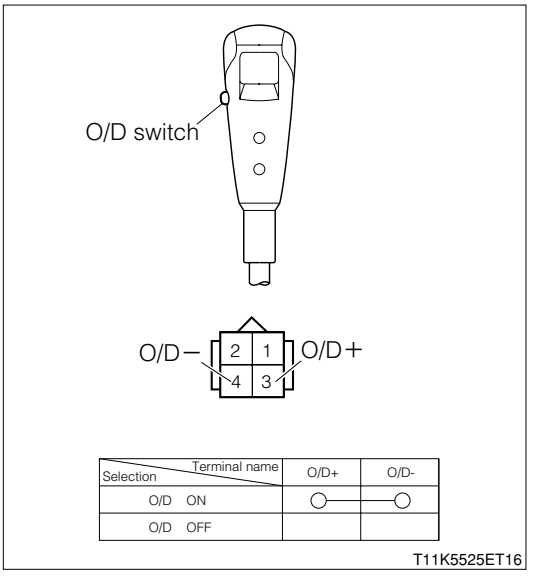
R11K6110EL10



R11K6021T10

3-15-8 O/D OFF SWITCH

1.Carry out the continuity check, based on the connection table.



Selection \ Terminal name	O/D+	O/D-
O/D ON	○	○
O/D OFF		

T11K5525ET16

3-16 ECU INPUT/OUTPUT SIGNAL CHECK

3-16-1 CHECKING METHOD

1. Check the voltage, pulse and continuity between each terminal, using the SST.
   SST: 09842-97215-000

2. As for those items where no specific measuring conditions are provided, perform checks with the engine stopped and the IG SW turned ON.

3-16-2 SPECIFIED VALUE FOR INPUT/ OUTPUT SIGNAL

Check system	Terminal	Measuring condition	Specified value	Reference value (Example of measured value)
Turbine revolution sensor	C10(RTBN)~B24(E1)	When the engine is idling	Pulse generation	※
Output revolution sensor	C8(ROPT)－B24(E1)	At the time when the vehicle speed is 20 km/h	Pulse generation	※
Turbine revolution sensor power supply	C9(VBTB)－B24(E1)	Engine stopped, IG SW turned ON	Battery voltage	13.3V
Output revolution sensor power supply	C7(VBOP)－B24(E1)	Engine stopped, IG SW turned ON	Battery voltage	13.3V
Engine revolution signal	B8(REG1)－B24(E1)	When the engine is idling	Pulse generation	※
NEUTRAL START SWITCH	C15(P)－B24(E1)	Ⓟ range	About 0V	0V
		Except for Ⓟ range	Battery voltage	12.1V
	B7(R)－B24(E1)	Ⓡ range	Battery voltage	11.2V
		Except for Ⓡ range	About 0V	0V
	C24(N)－B24(E1)	Ⓝ range	About 0V	0V
		Except for Ⓝ range	Battery voltage	11.9V
	C17(D)－B24(E1)	Ⓓ range	About 0V	0V
		Except for Ⓓ range	Battery voltage	10.8V
	C16(2)－B24(E1)	② range	About 0V	0V
		Except for ② range	Battery voltage	12.4V
	C25(L)－B24(E1)	Ⓛ range	About 0V	0V
		Except for Ⓛ range	Battery voltage	12.3V
Oil temperature sensor system	C14(OTMP)－C13(ETMP)	At time when the oil temperature is 20℃	About 3.4V	－
		At the time when the oil temperature is 80℃	About 1.1V	
Solenoid No.1	C6(B1＋)－C5(B1－)	During non-energizing period	About 0V	0V
		During energizing period	Pulse generation	※
Solenoid No.2	C4(C2＋)－C3(C2－)	During non-energizing period	About 0V	0V
		During energizing period	Pulse generation	※
Solenoid No.3	C2(C3B2＋)－C1(C3B2－)	During non-energizing period	About 0V	0V
		During energizing period	Pulse generation	※
Duty solenoid	C23(LUCC)－B6(E01)	Lock-up OFF period	About 0V	0V
		Slip lock-up period	Pulse generation	※
LUC solenoid	C11(LUCR)－B6(E01)	During non-energizing period	About 0V	0V
		During energizing period	Battery voltage	12.6V
Switch solenoid	C12(SOLR)－B6(E01)	During non-energizing period	About 0V	0V
		During energizing period	Battery voltage	12.6V
Power supply	B3(＋B1)－B6(E01)	Engine stopped, IG SW turned ON	Battery voltage	12.3V
	B2(BAT1)－B6(E01)	At all times	Battery time	12.5V
	B1(BAT2)－B6(E01)	At all times	Battery voltage	12.5V
Ground	B7(R)－Body ground	At all times	Continuity exists.	Continuity exists.
	B6(E01)－Body ground	At all times	Continuity exists.	Continuity exists.
	B5(E02)－Body ground	At all times	Continuity exists.	Continuity exists.

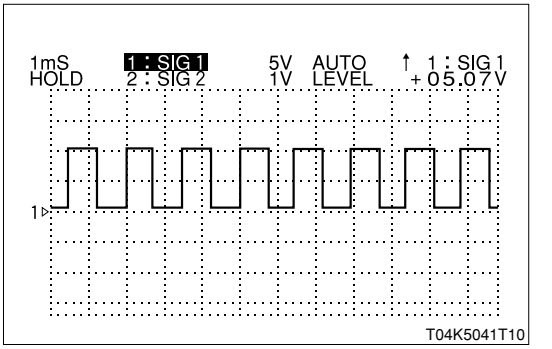
※:Refer to the oscilloscope waveforms indicated in the following Item given below.

3-16-3 OSCILLOSCOPE WAVEFORMS

Waveforms measured by the oscilloscope function of the diagnosis tester (DS-21) are shown below as reference.

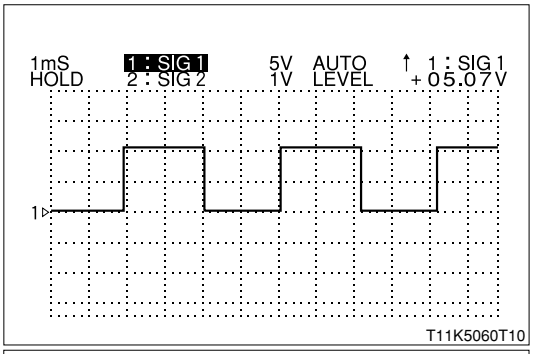
(1) Turbine revolution sensor

1. Measuring terminals C10(RTBN)—B24(E1)
2. Measuring conditions: During engine idling period: (Measured waveform is the one at the time of 1360rpm)
3. Measuring range : 5V (voltage axis), 1mS (time axis)
4. The more the turbine revolution speed, the shorter the period.



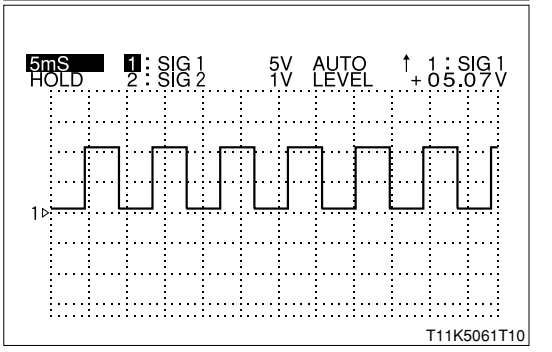
(2) Output revolution sensor

1. Measuring terminals C8(ROPT)—B24(E1)
2. Measuring conditions: The vehicle speed is about 20 km/h.
3. Measuring range : 5V (Voltage axis), 1mS (Time axis)
4. The more the output revolution speed (Vehicle speed), the shorter the period.



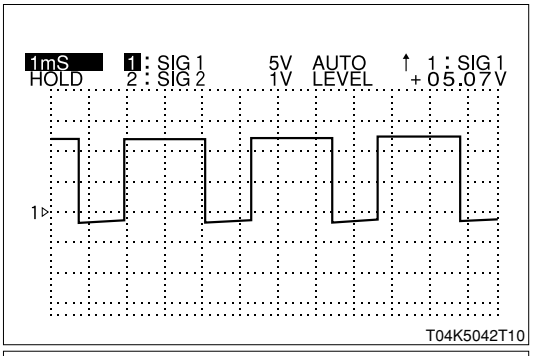
(3) Engine revolution signal waveform

1. Measuring terminals B8(REG1)—B24(E1)
2. Measuring conditions: During engine idling period: (Measurement waveform is the one at the time of 1100 rpm)
3. Measuring range : 5V (Voltage axis), 5mS (Time axis)
4. The more the engine revolution speed, the shorter the period.



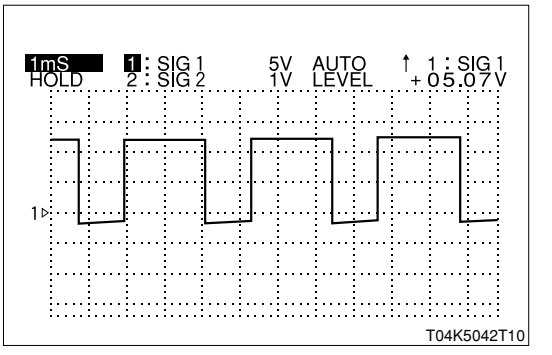
(4) Solenoid No.1

1. Measuring terminals C6(B1+)—C5(B1—)
2. Measuring conditions: During energizing period
3. Measuring range : 5V (Voltage axis), 1mS (Time axis)
4. The duty ratio becomes smaller during the gear shift transient period.
5. The waveform frequency: 300 Hz



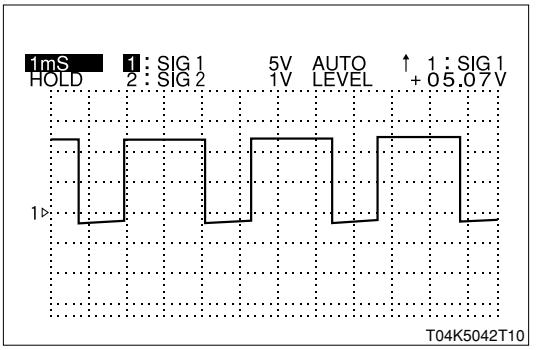
(5) Solenoid No.2

1. Measuring terminals C4(C2+)—C3(C2—)
2. Measuring conditions: During energizing period
3. Measuring range : 5V (Voltage axis), 1mS (time)
4. The duty ratio becomes smaller during the gear shift transient period.
5. The waveform frequency: 300 Hz



(6) Solenoid No.3

1.Measuring terminals C2(C3B2+)−C1(C3B2−)
2.Measuring conditions: During energizing period
3.Measuring range : 5V (Voltage axis), 1mS (Time axis)
4.The duty ratio becomes smaller during the gear shift transient period and line pressure regulating period
5.The waveform frequency: 300 Hz



(7) Duty solenoid

1.Measuring terminals C23(LUCC)−B6(E01)
2.Measuring conditions: Slip lock-up time period
3.Measuring range : 5V (Voltage axis), 5mS (Time axis)
4.The duty ratio becomes 100% during the direct lock-up period.
5.The waveform frequency: 60 Hz