Precautions for Diagnosing Trouble

- Before using scan tool, read its "Operator's (Instruction) Manual" to know how to use it.
- TCM replacement
  When substituting a known-good TCM, check that all relays and actuators have resistance of specified value.
  Neglecting this check may result in damage to good TCM.

Precautions for Disassembly and Reassembly

As the CVT consists of high precision component, the following cautions should be strictly observed when handling its parts in disassembly and reassembly.

- Never disassemble the CVT except where indicated in this section. Otherwise, disassembly will spoil its original performance.
- Make sure to wash dirt off from the CVT so that no such dirt will enter the CVT during dismounting and remounting.
- When servicing, select a clean place free from dust and dirt.
- Place a rubber mat on the work bench to protect parts from damage.
- Use lint-free paper not cloth rags.
- Replace each gasket, oil seal and O-ring with a new one.
- Keep component parts in group for each subassembly and avoid mixing them up.
- Clean all parts with cleaning solvent thoroughly and air-dry them.
- Keep face and eyes away from solvent spray while air blowing parts.
- Check mating surface for irregularities and remove them, if necessary. Clean it again.
- Apply CVT fluid to all O-rings.
- Replace oil seals that are removed and apply grease to their lips.

CVT Service Description

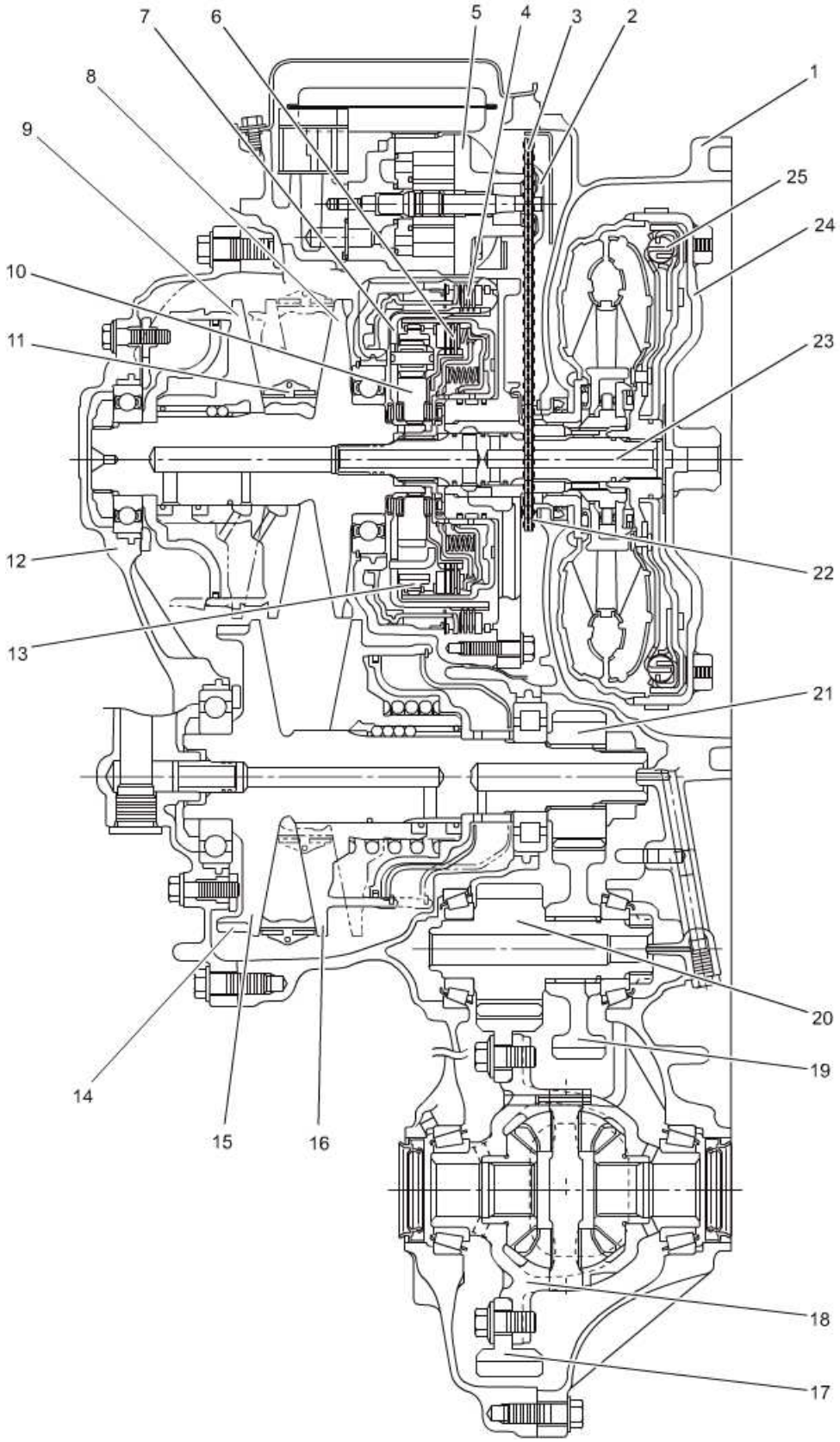
When repairing CVT, it is necessary to conduct the on-vehicle test to investigate where the cause of the trouble lies first.
If the CVT is repaired without such preliminary procedure, not only the cause of the trouble would be unknown, but also a secondary trouble may occur and often time would be wasted.

CVT Description

CVT Mechanical Description

CVT can vary the actual gear ratio continuously and stepless from low-speed to high-speed range depending on the driving conditions. The CVT allows an improved driveability with reduced shift-shock in comparison with an existing A/T.
This transaxle is an electronic control fully automatic transaxle with forward continuously variable and reverse 1-speed.
The torque converter is a 3-element, 1-step and 2-phase type and is equipped with an automatically controlled lock-up mechanism.
The gear change device consists of a ravigneaux type planetary gear unit, multiple disc type clutch, multiple disc type brake, steel belt, primary pulley and secondary pulley.
The hydraulic pressure control device consists of a valve body assembly, line pressure control solenoid valve (linear solenoid), secondary pressure control solenoid valve (linear solenoid), TCC solenoid valve (linear solenoid) and lock-up / select switching solenoid valve.
Optimum line pressure complying with engine torque is produced by the pressure control solenoid valves in dependence upon control signal from TCM. This makes it possible to control the line pressure with high accuracy in accordance with the engine power and running conditions to achieve smooth shifting characteristics and high efficiency.
The TCM can change the dimension between the two pulley surfaces. To continuously vary its gear ratio, the TCM simultaneously adjusts the diameter of the primary pulley that transmits torque from engine and the secondary pulley that transfers torque to the wheels.
With continuously shifting of gear ratio, the CVT can avoid the shift-shock and deliver smooth driving.

NOTE:
This figure shows 2WD model.



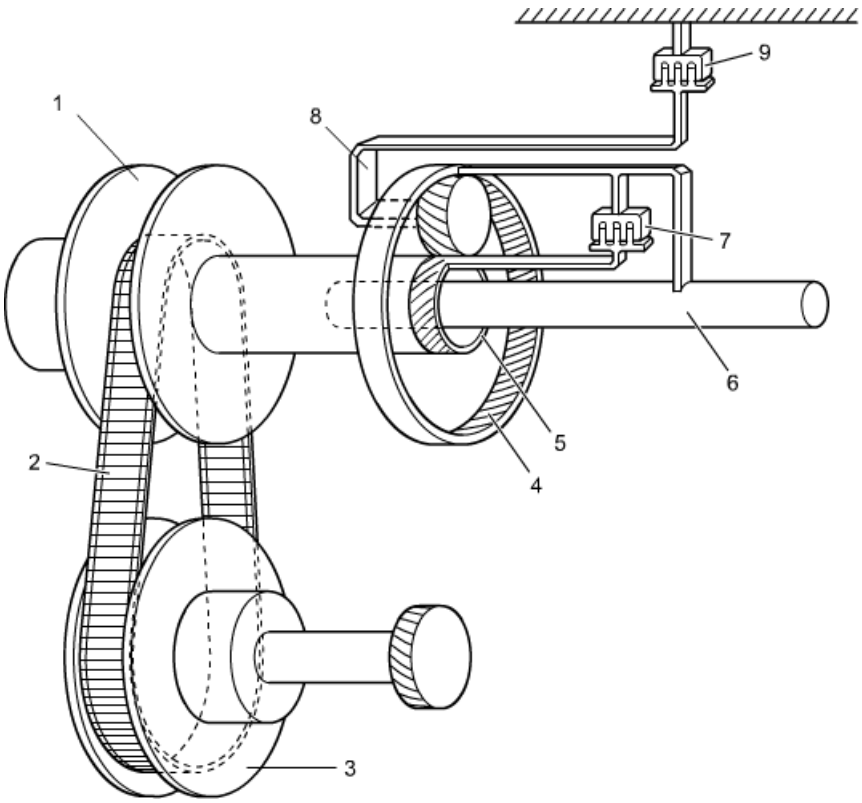
1. Converter housing	10. Sun gear	19. Reduction driven gear
2. Driven sprocket	11. Steel belt	20. Final drive pinion gear

3. Oil pump chain	12. Side cover	21. Reduction drive gear
4. Reverse brake	13. Internal gear	22. Drive sprocket
5. Oil pump	14. Parking gear	23. Input shaft
6. Forward clutch	15. Secondary pulley (fix side)	24. Torque converter
7. Planetary carrier	16. Secondary pulley (slide side)	25. Torque converter clutch (TCC)
8. Primary pulley (fix side)	17. Final driven gear	
9. Primary pulley (slide side)	18. Differential case	

Specifications

Item			Specifications	
Torque converter	Type		3-element, 1-step, 2-phase type (with TCC (lock-up) mechanism)	
	Stall torque ratio		1.826	
Oil pump	Type		Vane type oil pump (non crescent type)	
	Drive system		Engine drive	
Gear change device	Type		Forward continuously variable, reverse 1-step planetary gear type	
	Shift position	"P" range	Gear in neutral, output shaft fixed, engine start	
		"R" range	Reverse	
		"N" range	Gear in neutral, engine start	
		"D" range	Forward continuously variable gear ratio	
		Manual mode	UP (+)	1 → 2 → 3 → 4 → 5 → 6
			DOWN (−)	6 → 5 → 4 → 3 → 2 → 1
	Gear ratio	Forward (continuously variable)	2.349 – 0.394	
		Reverse (reverse gear)	1.750	
	Control elements		Steel belt and pulleys... 1 sets	
			Wet type multiple-disc clutch... 1 sets	
			Wet type multiple-disc brake... 1 sets	
	Final gear reduction ratio		5.798	
Lubrication	Lubrication system		Force feed system by oil pump	
Cooling	Cooling system		• CVT fluid cooler (air-cooled) • Radiator assisted cooling (water-cooled)	
Fluid used			SUZUKI CVT FLUID GREEN 1 or Shell GREEN-1 V	
CVT fluid capacity			8.3 liters (17.54/14.61 US/Imp pt.)	

CVT Mechanical Function



1. Primary pulley	4. Internal gear	7. Forward clutch
2. Steel belt	5. Sun gear	8. Planetary carrier
3. Secondary pulley	6. Input shaft	9. Reverse brake

Functions

Part name	Function
Forward clutch	Meshes input shaft and sun gear.
Reverse brake	Fixes planetary carrier.
Planetary carrier	Switches forward or reverse.
Internal gear	When reverse operates, transmits driving force input shaft to sun gear.
Sun gear	Transmits driving force to primary pulley.
Input shaft	Transmits driving force torque converter to forward clutch.
Primary pulley	Transmits driving force input shaft to secondary pulley.
Secondary pulley	Transmits driving force primary pulley to reduction drive gear.
Steel belt	Transmits driving force primary pulley to secondary pulley.

Operation Table of Mechanical Components

	Forward clutch	Reverse brake	Primary pulley	Secondary pulley
P	×	×	—	—
R	×	O	△	△
N	×	×	—	—

D	O	×	△	△
M	O	×	△	△

O: Engage
×: Disengage
△: Controlled
—: Not applicable

CVT Control Description

Gear Ratio Control
In order to achieve the optimum gear ratio for the driving force in accordance with the vehicle operating conditions, TCM detects vehicle conditions based on vehicle speed or input signals such as an accelerator pedal position.
TCM selects the optimum gear ratio and determines the gear change steps based on each input signal.
By outputting these command signals to the stepper motor, TCM controls the line pressure to the primary pulley, decides the adjustable pulley position of the primary pulley, and controls the gear ratio.
Lock up control:
When the vehicle speed exceeds the specified value, the TCC solenoid valve completely engages the TCC upon control signal from TCM. This control helps to improve the transaxle efficiency.
Manual mode control:
When the select lever is shifted to "M" position, or when the shift paddle switch is operated with the select lever in "D" range, TCM switches the control mode from automatic mode to manual mode, while maintaining the actual gear ratio.
In manual mode, every time the paddle-up switch, paddle-down switch, shift-up switch or shift-down switch is turned on, TCM selects the predetermined gear ratio for 1-speed to 6-speed, and performs shift up or shift down depending on the vehicle speed.
Slope shift control:
TCM distinguishes uphill or downhill according to vehicle speed, accelerator pedal position and/or brake pedal position, and controls gear ratio as follows:
- Uphill: To improve acceleration, gear ratio in the high speed range is limited.
- Downhill: To obtain effective engine brakes, gear ratio is downshifted.

Garage shift control:
If the select lever is shifted from "D" to "R" range while the vehicle is running at a specified speed or higher, TCM controls the transaxle operation and automatically shifts the transaxle to neutral in order to protect CVT inside parts from damage.

Operation Table of Solenoid Valves and Stepper Motor

NOTE:
***: This part operates at vehicle speed of 50 km/h (31 mile/h) or more.**

	Line pressure control solenoid valve	Secondary pressure control solenoid valve	TCC solenoid valve	Lock-up / select switching solenoid valve	Stepper motor
P or N (In 5 sec. after shifting to "P" or "N" range)	O	O	×	O	O
P	O	×	×	×	×
R	O	O	O	×	O
N	O	×	×	×	×
D	O	O	O	×	O
M	O	O	O*	×	O

O: Operate
×: Not operate

	Valve status	
	Operate	**Not operate**
Line pressure control solenoid valve	Close	Open
Secondary pressure control solenoid valve	Close	Open
TCC solenoid valve	Open	Close
Lock-up / select switching solenoid valve	Open	Close

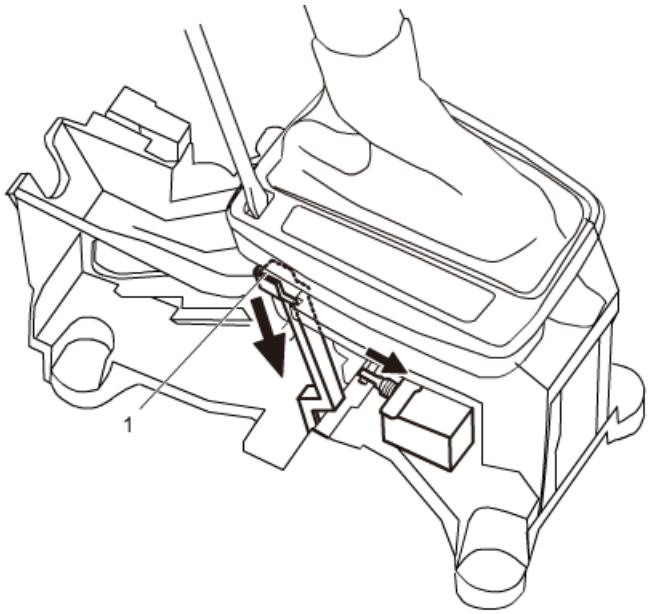
Brake Interlock System Construction

Shift Lock Solenoid Control

This system consists of shift lock solenoid control system and interlock control system.
The shift lock solenoid control system is so designed that the select lever can not be shifted from “P” range position unless engine switch is pressed to change the ignition mode to “ON” or “ACC” and the brake pedal is depressed.
And interlock control system is so designed that select lever cannot be shifted from “P” range position unless engine switch is pressed to change the ignition mode to “ON” or “ACC”.

Shift Lock Solenoid Manual Release

Remove plug cap of select lever and push down shift lock solenoid release plate (1) inside of plug hole with a flat-end screwdriver or the like. Then, select lever can be moved from “P” range position to another range even without depressing the brake pedal. (To shift select lever from “P” range to any other position, push engine switch to change the ignition mode to “ON” or “ACC”.)



CVT Diagnosis General Description

This vehicle is equipped with an electronic transaxle control system, which controls the gear ratio control, TCC operation, etc. suitably to vehicle driving conditions.
TCM has an OBD system which detects a malfunction in this system and abnormality of those parts that influence the engine exhaust emission.
When diagnosing a trouble in transaxle including this system, be sure to have full understanding of the outline of ***OBD System Description*** and each item in ***Precautions for Diagnosing Trouble*** and execute diagnosis according to ***CVT System Check*** to obtain correct result smoothly.

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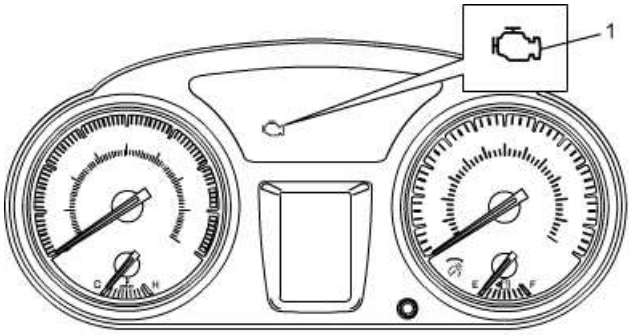
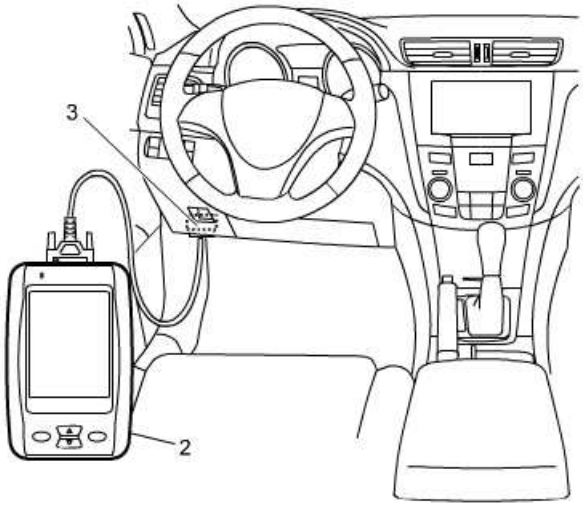
OBD System Description

For CVT control system, TCM has the following functions.

- When ignition mode of keyless push start system in "ON", MIL (1) turns ON to check the MIL and its circuit.
- When TCM detects a malfunction in CVT control system (and/or a malfunction which gives an adverse effect to vehicle emission) while the engine is running, TCM requires ECM to make the MIL in the combination meter of the instrument panel turn ON. TCM stores the malfunction area (DTC according to SAE J2012) in TCM memory.
  (If it detects that continuously 3 driving cycles are normal after detecting a malfunction, however, it makes MIL turn OFF although DTC stored in its memory will remain.)
- Malfunctions detected by TCM are stored in its memory as pending DTC, confirmed DTC (current and history) and permanent DTC. The permanent DTC, among others, will be stored in the memory that cannot be manually erased. (For the details, refer to description on ***Permanent DTC***)
- It is possible to communicate through DLC (3) by using not only SUZUKI scan tool (2) but also CAN communication OBD generic scan tool which are in compliance with SAE J1978. (Diagnostic information can be accessed by using a scan tool.)





- For information about the following items, refer to ***OBD System Description***.
  - — Warm-up cycle
  - — Driving cycle
  - — 2 driving cycle detection logic
  - — Pending DTC
  - — Freeze frame data

Permanent DTC

In accordance with SAE J1979, TCM stores DTCs that adversely affect vehicle emission (i.e. DTCs with MIL turning on) in a non-volatile RAM (NVRAM) separately from that for pending and confirmed DTCs. This DTC is called a permanent DTC.
Unlike pending and confirmed DTCs, the permanent DTC will not be cleared even when executing the clear command of scan tool or when shutting off the power to TCM. Only when does TCM detect no malfunction in the trouble area of the stored permanent DTC with the condition determined normal the permanent DTC will be cleared. (For permanent DTC clearance, refer to ***DTC Clearance***)
The maximum of four earliest detections of the permanent DTCs will be stored in memory. The DTCs are cleared in the order of completing determination as normal.

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OBD System Description - Comprehensive Component Circuit Monitor

Monitoring Procedure

Input signal of the following are checked for open, short of circuit by monitoring input voltage.

- Primary and secondary pressure sensor power supply circuit (P0641)
- Transmission range sensor (P0707)
- CVT fluid temperature sensor (P0712, P0713)
- Primary pulley pressure sensor (P0842, P0843)
- Secondary pressure sensor (P0847, P0848)
- Line pressure control solenoid valve (P0962, P0963)
- Secondary pressure control solenoid valve (P0966, P0967)
- Sensor ground circuit (P1970)
- TCC solenoid valve (P2763, P2764)

DTC Description / Detecting Condition / Confirmation Procedure

P0641
Refer to ***DTC P0641***.
P0707
Refer to ***DTC P0707***.
P0712
Refer to ***DTC P0712***.
P0713
Refer to ***DTC P0713***.
P0842
Refer to ***DTC P0842 / P0843***.
P0843
Refer to ***DTC P0842 / P0843***.
P0847
Refer to ***DTC P0847 / P0848***.
P0848
Refer to ***DTC P0847 / P0848***.
P0962
Refer to ***DTC P0962 / P0963***.
P0963
Refer to ***DTC P0962 / P0963***.
P0966
Refer to ***DTC P0966 / P0967***.
P0967
Refer to ***DTC P0966 / P0967***.
P1970
Refer to ***DTC P1970***.
P2763
Refer to ***DTC P2763***.
P2764
Refer to ***DTC P2764***.

Primary and Secondary Pressure Sensor Power Supply Circuit Monitor

Operation

DTC(s)	P0641
Monitor execution	Continuous
Monitoring duration	5 sec.

Enabled conditions

Parameter	Minimum	Maximum
Battery voltage	10.5 V	—
Engine speed	1000 rpm	—

Typical malfunction thresholds

Primary pressure sensor voltage < 0.005 V
Secondary pressure sensor voltage < 0.005 V

Transmission Range Sensor Circuit Monitor

Operation

DTC(s)	P0707
Monitor execution	Continuous
Monitoring duration	10 sec.

Enabled conditions

Parameter	Minimum	Maximum
Battery voltage	10.5 V	—
Vehicle speed	0 km/h (0 mile/h)	—
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

Range sensor signal: No signal

Transmission Fluid Temperature Sensor Circuit Monitor

Operation

DTC(s)	P0712, P0713
Monitor execution	Continuous
Monitoring duration	5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0712:		
Battery voltage	10.5 V	—
Sensor ground	No DTC (P1970)	
CAN communication	No DTC (U0073, U0100)	
P0713:		
Battery voltage	10.5 V	—
Vehicle speed	10 km/h (6 mile/h)	—
Sensor ground	No DTC (P1970)	
CAN communication	No DTC (U0073, U0100)	

Typical malfunction thresholds

P0712:
Signal voltage <= 0.157 V

P0713:
Signal voltage >= 2.476 V

Primary Pressure Sensor Circuit Monitor

Operation

DTC(s)	P0842, P0843
Monitor execution	Continuous
Monitoring duration	5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0842:		
Transmission fluid temperature	–20 °C (–4 °F)	—
Primary pulley pressure sensor	No DTC (P0843)	
Transmission fluid temperature sensor	No DTC (P0712, P0713)	
Sensor ground	No DTC (P1970)	
Battery voltage	10.5 V	—
P0843:		
Transmission fluid temperature	–20 °C (–4 °F)	—
Primary pulley pressure sensor	No DTC (P0842)	
Transmission fluid temperature sensor	No DTC (P0712, P0713)	
Sensor ground	No DTC (P1970)	
Battery voltage	10.5 V	—

Typical malfunction thresholds

P0842:
Primary pressure sensor voltage < 0.09 V
P0843:
Primary pressure sensor voltage > 4.70 V

Secondary Pressure Sensor Circuit Monitor

Operation

DTC(s)	P0847, P0848
Monitor execution	Continuous
Monitoring duration	5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0847:		
Transmission fluid temperature	–20 °C (–4 °F)	—
Secondary pressure sensor	No DTC (P0848)	
Transmission fluid temperature sensor	No DTC (P0712, P0713)	
Sensor ground	No DTC (P1970)	
Battery voltage	10.5 V	—
P0848:		

Transmission fluid temperature	–20 °C (–4 °F)	—
Target secondary pressure	—	5.70 MPa (58.1 kgf/cm², 826 psi, 57 bar)
Secondary pressure sensor	No DTC (P0847)	
Transmission fluid temperature sensor	No DTC (P0712, P0713)	
Sensor ground	No DTC (P1970)	
Battery voltage	10.5 V	—

Typical malfunction thresholds

P0847:
Secondary pressure sensor voltage < 0.09 V
P0848:
Secondary pressure sensor voltage > 4.70 V

Line Pressure Control Solenoid Valve Circuit Monitor

Operation

DTC(s)	P0962, P0963
Monitor execution	Continuous
Monitoring duration	P0962: 1 sec.
	P0963: 5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0962:		
Battery voltage	10.5 V	—
P0963:		
Target current	0.75 A	—
Battery voltage	10.5 V	—
Line pressure control solenoid valve	No DTC (P0962)	

Typical malfunction thresholds

P0962:
(Target voltage x 0.7) - monitored voltage > 0 V
P0963:
Monitored current <= 0.40 A

Secondary Pressure Control Solenoid Valve Circuit Monitor

Operation

DTC(s)	P0966, P0967
Monitor execution	Continuous
Monitoring duration	P0966: 1 sec.
	P0967: 5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0966:		

Battery voltage	10.5 V	—
P0967:		
Target current	0.75 A	—
Battery voltage	10.5 V	—
Secondary pressure control solenoid valve	No DTC (P0966)	

Typical malfunction thresholds

P0966:
(Target voltage x 0.7) - monitored voltage > 0 V
P0967:
Monitored current <= 0.40 A

Sensor Ground Circuit Monitor

Operation

DTC(s)	P1970
Monitor execution	Continuous
Monitoring duration	0.2 sec.

Enabled conditions

Parameter	Minimum	Maximum
Engine speed	1000 rpm	—
Battery voltage	10.5 V	—
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

Transmission fluid temperature sensor voltage >= 2.5 V
Primary pressure sensor voltage >= 5.0 V
Secondary pressure sensor voltage >= 5.0 V

TCC Solenoid Valve Circuit Monitor

Operation

DTC(s)	P2763, P2764
Monitor execution	Continuous
Monitoring duration	P2763: 5 sec.
	P2764: 1 sec.

Enabled conditions

Parameter	Minimum	Maximum
P2763:		
Target current	0.75 A	—
Battery voltage	10.5 V	—
Lock-up / select switching solenoid valve	No DTC (P1810)	
P2764:		
Battery voltage	10.5 V	—

Typical malfunction thresholds

P2763:
(Target voltage x 0.7) - monitored voltage > 0 V
P2764:
Monitored current <= 0.40 A

5E

OBD System Description - Comprehensive Component Rationality Monitor

Monitoring Procedure

Input signal of the following are checked for circuit strategy rationality by monitoring each sensor, actuator and vehicle condition.

- TCM (P062F)
- Brake switch (P0703)
- Transmission range sensor (P0705)
- Transmission fluid temperature sensor (P0711)
- Primary pulley speed sensor (P0716, P0717)
- Secondary pulley speed sensor (P0721, P0722)
- TCC solenoid valve (P0741)
- Secondary pressure control solenoid valve (P0776, P0777)
- Primary pressure sensor / secondary pressure sensor (P0871)
- Line pressure control solenoid valve (P0961)
- Lock-up / select switching solenoid valve (P1810)
- Stepper motor (P1816, P1818)
- CAN communication (U0073, U0100)

DTC Description / Detecting Condition / Confirmation Procedure

P062F
Refer to ***DTC P062F***.
P0703
Refer to ***DTC P0703***.
P0705
Refer to ***DTC P0705***.
P0711
Refer to ***DTC P0711***.
P0716
Refer to ***DTC P0716***.
P0717
Refer to ***DTC P0717***.
P0721
Refer to ***DTC P0721***.
P0722
Refer to ***DTC P0722***.
P0741
Refer to ***DTC P0741***.
P0776
Refer to ***DTC P0776 / P0777***.
P0777
Refer to ***DTC P0776 / P0777***.
P0871
Refer to ***DTC P0871***.
P0961
Refer to ***DTC P0961***.
P1810
Refer to ***DTC P1810***.
P1816
Refer to ***DTC P1816***.
P1818
Refer to ***DTC P1818***.
U0073
Refer to ***DTC U0073***.
U0100

Refer to ***DTC U0100***.

TCM Internal Circuit / Memory Monitor

Operation

DTC(s)	P062F
Monitor execution	Continuous
Monitoring duration	1 times

Enabled conditions

Parameter	Minimum	Maximum
Not applicable		

Brake Switch Rationality Monitor

Operation

DTC(s)	P0703
Monitor execution	Continuous
Monitoring duration	Not applicable

Enabled conditions

Parameter	Minimum	Maximum
Vehicle speed > 29 km/h (18 mile/h)	10 sec.	—
CAN communication with ECM	No DTC (U0100)	

Typical malfunction thresholds

Brake switch signal during driving cycle: no change (CAN communication signal)

Transmission Range Sensor Rationality Monitor

Operation

DTC(s)	P0705
Monitor execution	Continuous
Monitoring duration	2 sec.

Enabled conditions

Parameter	Minimum	Maximum
Battery voltage	10.5 V	—

Typical malfunction thresholds

The number of range sensor signal >= 2

Transmission Fluid Temperature Sensor Rationality Monitor

Operation

DTC(s)	P0711
Monitor execution	Continuous
Monitoring duration	Not applicable

Enabled conditions

Parameter	Minimum	Maximum
Shift position	"D" range	
Vehicle speed	10 km/h (6 mile/h)	—
Engine speed	450 rpm	—
Accelerator pedal position	5%	—
Battery voltage	10.5 V	—
Transmission range sensor	No DTC (P0707, P0705)	
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

Time within the temperature range > Table P0711

Table P0711

NOTE:
***: Time required to raise the transmission fluid temperature by 1 °C (33 °F).**

Transmission fluid temperature range (°C)	−30 – −15	−15 – 0	0 – 5	5 – 10	10 – 12	12 – 15	15 – 18	18 – 20
(°F)	−22 – 5	5 – 32	32 – 41	41 – 50	50 – 53	53 – 59	59 – 64	64 – 68
Time required* (sec.)	300	240	300	360	360	360	360	360

Primary Pulley Speed Sensor Rationality Monitor

Operation

DTC(s)	P0716, P0717
Monitor execution	Continuous
Monitoring duration	P0716: 5 sec.
	P0717:
	Monitor 1: 5 sec.
	Monitor 2: 0.5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0716:		
TCC ON command = True Consisting of: Engine speed >= 800 rpm Transmission fluid temperature >= 10 °C (50 °F) Accelerator pedal position > Table TCC ON command		
Battery voltage	10.5 V	—
Engine speed - (secondary speed x estimated ratio)	—	1000 rpm
Primary pulley speed sensor	No DTC (P0717)	
Secondary pulley speed sensor	No DTC (P0722)	
Stepper motor	No DTC (P1816)	
CAN communication	No DTC (U0100, U0073)	

Table TCC ON command

Accelerator pedal position (%)	0.0	12.5	20.0	25.0	35.0	62.5	75.0	87.5	100.0
Vehicle speed (km/h)	16	16	16	16	24	29	29	29	29
(mile/h)	10	10	10	10	15	18	18	18	18

Parameter	Minimum	Maximum
P0717:		
Monitor 1:		
Secondary pulley speed	500 rpm	—
Battery voltage	10.5 V	—
Secondary pulley speed sensor	No DTC (P0721)	
Sensor ground	No DTC (P1970)	
CAN communication	No DTC (U0100, U0073)	
Monitor 2:		
Last primary pulley speed	1000 rpm	—
Battery voltage	10.5 V	—
Secondary pulley speed sensor	No DTC (P0721)	
Sensor ground	No DTC (P1970)	
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

P0716:
Engine speed - primary speed > 1000 rpm and (Secondary speed x estimated ratio) - primary speed > 1000 rpm
P0717:
Monitor 1:
Primary pulley speed < 150 rpm
Monitor 2:
Primary pulley speed = 0 rpm

Secondary Pulley Speed Sensor Rationality Monitor

Operation

DTC(s)	P0721, P0722
Monitor execution	Continuous
Monitoring duration	P0721: 5 sec.
	P0722:
	Monitor 1: 5 sec.
	Monitor 2: 0.5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0721:		
TCC ON command = True Consisting of: Engine speed >= 800 rpm		

Transmission fluid temperature >= 10 °C (50 °F) Accelerator pedal position > Table TCC ON command		
Battery voltage	10.5 V	—
Stepper motor	No DTC (P1816)	
Primary pulley speed sensor	No DTC (P0717)	
Secondary pulley speed sensor	No DTC (P0722)	
CAN communication	No DTC (U0100, U0073)	

Table TCC ON command

Accelerator pedal position (%)	0.0	12.5	20.0	25.0	35.0	62.5	75.0	87.5	100.0
Vehicle speed (km/h)	16	16	16	16	24	29	29	29	29
(mile/h)	10	10	10	10	15	18	18	18	18

Parameter	Minimum	Maximum
P0722:		
Monitor 1:		
Primary pulley speed	1000 rpm	—
Battery voltage	10.5 V	—
Primary pulley speed sensor	No DTC (P0716)	
CAN communication	No DTC (U0100, U0073)	
Monitor 2:		
Last vehicle speed calculated by secondary pulley speed	10 km/h (6 mile/h)	—
Battery voltage	10.5 V	—
Primary pulley speed sensor	No DTC (P0716)	
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

P0721:
Engine speed - (secondary speed x estimated ratio) > 1000 rpm and Primary speed - (secondary speed x estimated ratio) >1000 rpm
P0722:
Monitor 1:
Secondary pulley speed < 150 rpm
Monitor 2:
Secondary pulley speed = 0 rpm

TCC Solenoid Valve Rationality Monitor

Operation

DTC(s)	P0741
Monitor execution	Continuous
Monitoring duration	30 sec.

Enabled conditions

Parameter	Minimum	Maximum
TCC ON command = True Consisting of:		

Engine speed >= 800 rpm Transmission fluid temperature >= 10 °C (50 °F) Accelerator pedal position > Table TCC ON command		
Primary pulley speed sensor	No DTC (P0716, P0717)	
CAN communication	No DTC (U0100, U0073)	
Battery voltage	10.5 V	—

Table TCC ON command

Accelerator pedal position (%)	0.0	12.5	20.0	25.0	35.0	62.5	75.0	87.5	100.0
Vehicle speed (km/h)	16	16	16	16	24	29	29	29	29
(mile/h)	10	10	10	10	15	18	18	18	18

Typical malfunction thresholds

Engine speed - primary speed > 130 rpm

Secondary Pressure Control Solenoid Valve Rationality Monitor

Operation

DTC(s)	P0776, P0777
Monitor execution	Continuous
Monitoring duration	P0776: 30 sec.
	P0777:
	Monitor 1: 1.52 sec. x 2 times
	Monitor 2: 0.8 sec.

Enabled conditions

Parameter	Minimum	Maximum
P0776:		
Shift position	"D" range	
Vehicle speed	10 km/h (6 mile/h)	—
Accelerator pedal position	12.5%	—
Engine speed	450 rpm	—
Line pressure control solenoid valve	No DTC (P0962, P0963)	
Stepper motor	No DTC (P1816)	
Transmission range sensor	No DTC (P0707, P0705)	
Secondary pressure control solenoid valve	No DTC (P0966, P0967)	
Primary pulley speed sensor	No DTC (P0717, P0716)	
Secondary pulley speed sensor	No DTC (P0722, P0721)	
Primary pressure sensor	No DTC (P0842, P0843)	
Secondary pressure sensor	No DTC (P0847, P0848)	
TCC solenoid valve	No DTC (P2764, P2763)	
Lock-up / select switching solenoid valve	No DTC (P1810)	
CAN communication	No DTC (U0100, U0073)	
Battery voltage	10.5 V	—
P0777:		
Shift position	Other than "N" range	

Brake light switch	OFF	
Transmission fluid temperature	–20 °C (–4 °F)	—
Change rate of vehicle speed	—	+/– 14 km/h (9 mile/h) / 10 ms
Change rate of accelerator pedal position	—	+/– 6.25% / 10 ms
CAN communication	No DTC (U0100, U0073)	
Line pressure control solenoid valve	No DTC (P0962)	
Secondary pressure control solenoid valve	No DTC (P0966)	

Typical malfunction thresholds

P0776:
Measured secondary pressure - target secondary pressure > 1.2 MPa (12.2 kgf/cm², 174 psi, 12 bar)
P0777:
Monitor 1:
Target secondary pressure - measured secondary pressure >= 0.25 MPa (2.5 kgf/cm², 36.2 psi, 2.5 bar)
Monitor 2:
Target secondary pressure - measured secondary pressure >= 2.0 MPa (20.4 kgf/cm², 290 psi, 20 bar)

Primary Pressure Sensor / Secondary Pressure Sensor Rationality Monitor

Operation

DTC(s)	P0871
Monitor execution	Continuous
Monitoring duration	5 sec.

Enabled conditions

Parameter	Minimum	Maximum
Gear ratio	0.5	1.0
Gear ratio change rate	—	0.1 / sec.
Primary pulley speed sensor	No DTC (P0716, P0717)	
Secondary pulley speed sensor	No DTC (P0721, P0722)	
Primary pressure sensor	No DTC (P0842, P0843)	
Secondary pressure sensor	No DTC (P0847, P0848)	
Battery voltage	10.5 V	—

Typical malfunction thresholds

Monitor 1:
Indicated primary pressure sensor < Table P0871 low (lower limit of primary pressure sensor correlated with secondary pressure)
Monitor 2:
Indicated primary pressure sensor > Table P0871 high (upper limit of primary pressure sensor correlated with secondary pressure)

Table P0871 low

Secondary pressure sensor [MPa, kgf/cm², psi, bar]	0.000	2.3 (23.5, 333, 23)	6.375 (65, 924, 63)
Lower limit of primary pressure sensor [MPa, kgf/cm², psi, bar]	0.010 (0.1, 1.45, 0.1)	0.010 (0.1, 1.45, 0.1)	3.000 (30.6, 435, 30)

Table P0871 high

Secondary pressure sensor [MPa, kgf/cm², psi, bar]	0.000	4.375 (44.6, 634, 43)	6.375 (65, 924, 63)
Upper limit of primary pressure sensor [MPa, kgf/cm², psi, bar]	2.000 (20.4, 290, 20)	6.375 (65, 924, 63)	6.375 (65, 924, 63)

Line Pressure Control Solenoid Valve Rationality Monitor

Operation

DTC(s)	P0961
Monitor execution	Continuous
Monitoring duration	0.2 sec.

Enabled conditions

Parameter	Minimum	Maximum
Primary pulley speed	500 rpm	—
Battery voltage	10.5 V	—
Primary pulley speed sensor	No DTC (P0716, P0717)	

Typical malfunction thresholds

Primary pulley speed / secondary pulley speed > 2.7

Lock-up / Select Solenoid Valve Rationality Monitor

Operation

DTC(s)	P1810
Monitor execution	Continuous
Monitoring duration	0.2 sec.

Enabled conditions

Parameter	Minimum	Maximum
Battery voltage	10.5 V	—

Typical malfunction thresholds

Monitor solenoid status = Command solenoid status (ON/OFF) = False

Stepper Motor Circuit Rationality Monitor

Operation

DTC(s)	P1816, P1818
Monitor execution	Continuous
Monitoring duration	P1816: 0.2 sec.
	P1818: 5 sec.

Enabled conditions

Parameter	Minimum	Maximum
P1816:		
Battery voltage	10.5 V	—
P1818:		
Shift position	"D" range	
Vehicle speed	10 km/h (6 mile/h)	—
Accelerator pedal position	12.5%	—
Engine speed	450 rpm	—
Battery voltage	10.5 V	—
Transmission fluid temperature sensor	No DTC (P0712, P0713)	
Transmission range sensor	No DTC (P0707, P0705)	
Line pressure control solenoid valve	No DTC (P0962, P0963)	
Stepper motor	No DTC (P1816)	
Primary pulley speed sensor	No DTC (P0717)	
Secondary pulley speed sensor	No DTC (P0722)	
Primary pressure sensor	No DTC (P0842, P0843)	
Secondary pressure sensor	No DTC (P0847, P0848)	
CAN communication	No DTC (U0100, U0073)	

Typical malfunction thresholds

P1816:
Monitor motor status = Command motor status (ON/OFF) = False
P1818:
Estimated primary speed - measured primary speed > 1000 rpm

CAN Communication Signal Rationality Monitor

Operation

DTC(s)	U0073, U0100
Monitor execution	Continuous
Monitoring duration	U0073: 100 ms x 30 times
	U0100: 2 sec.

Enabled conditions

Parameter	Minimum	Maximum
U0073:		
Battery voltage	9.0 V	—
U0100:		
Battery voltage	9.0 V	—
CAN communication bus off	No DTC (U0073)	

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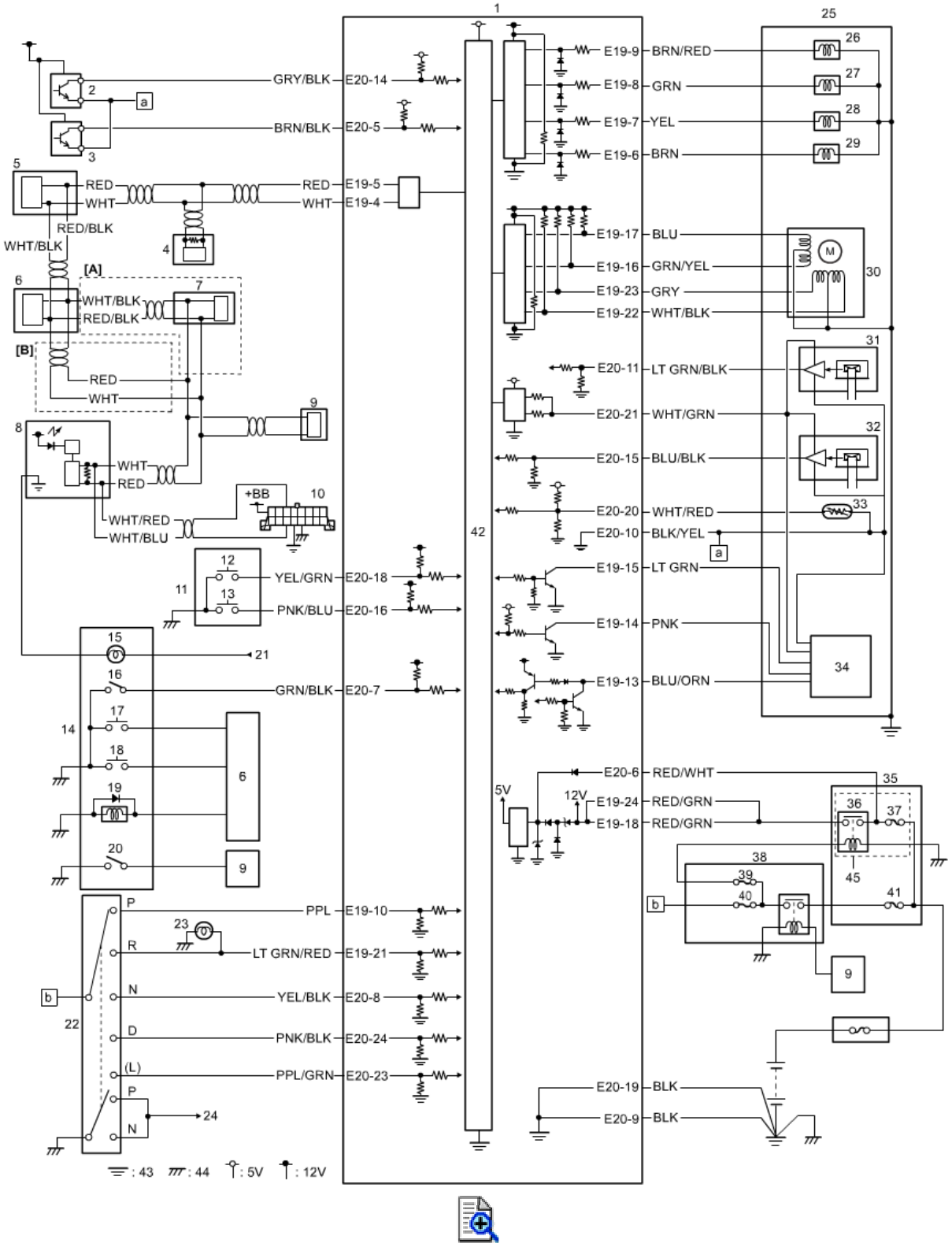
TCM Circuit Diagram



[A]: 4WD model	11. Shift paddles	23. Back up light	35. Main fuse box
[B]: 2WD model	12. Paddle-up switch	24. To starting relay	36. CVT relay
1. TCM	13. Paddle-down switch	25. Valve body	37. "AT" fuse

2. Primary pulley speed sensor	14. Select lever assembly	26. Line pressure control solenoid valve	38. Junction block
3. Secondary pulley speed sensor	15. Illumination light	27. Secondary pressure control solenoid valve	39. "IG1 SIG" fuse
4. ECM	16. Manual mode switch	28. TCC solenoid valve	40. "BACK" fuse
5. ESP® control module	17. Manual shift-up switch	29. Lock-up / select switching solenoid valve	41. "IGN" fuse
6. BCM	18. Manual shift-down switch	30. Stepper motor	42. CPU
7. 4WD control module	19. Shift lock solenoid	31. Primary pressure sensor	43. Engine ground
8. Combination meter	20. P position switch	32. Secondary pressure sensor	44. Ground
9. Keyless start control module	21. To tail light relay	33. CVT fluid temperature sensor	45. Power integration
10. DLC	22. Transmission range sensor	34. ROM	

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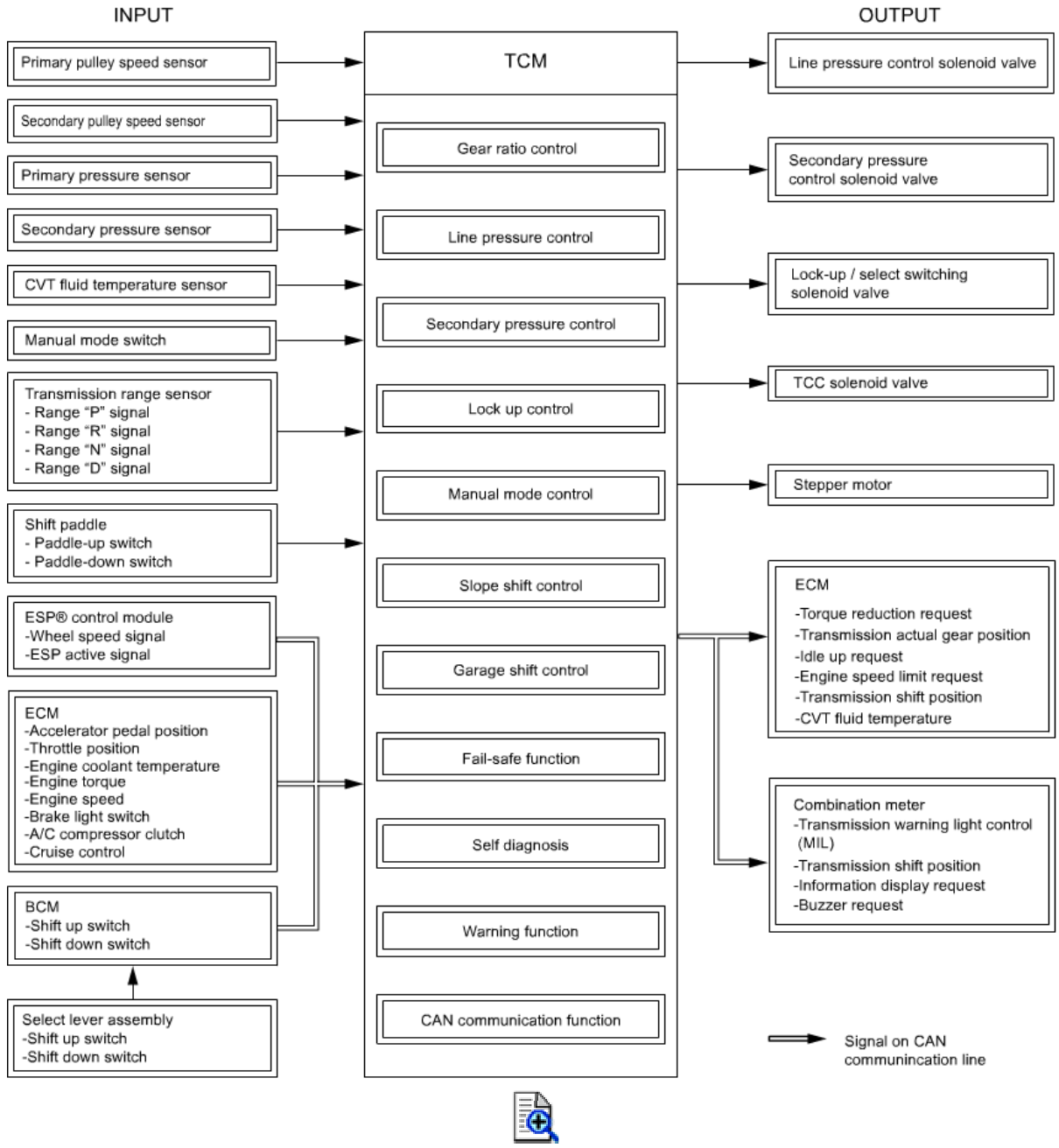
Electronic Shift Control Input / Output Diagram



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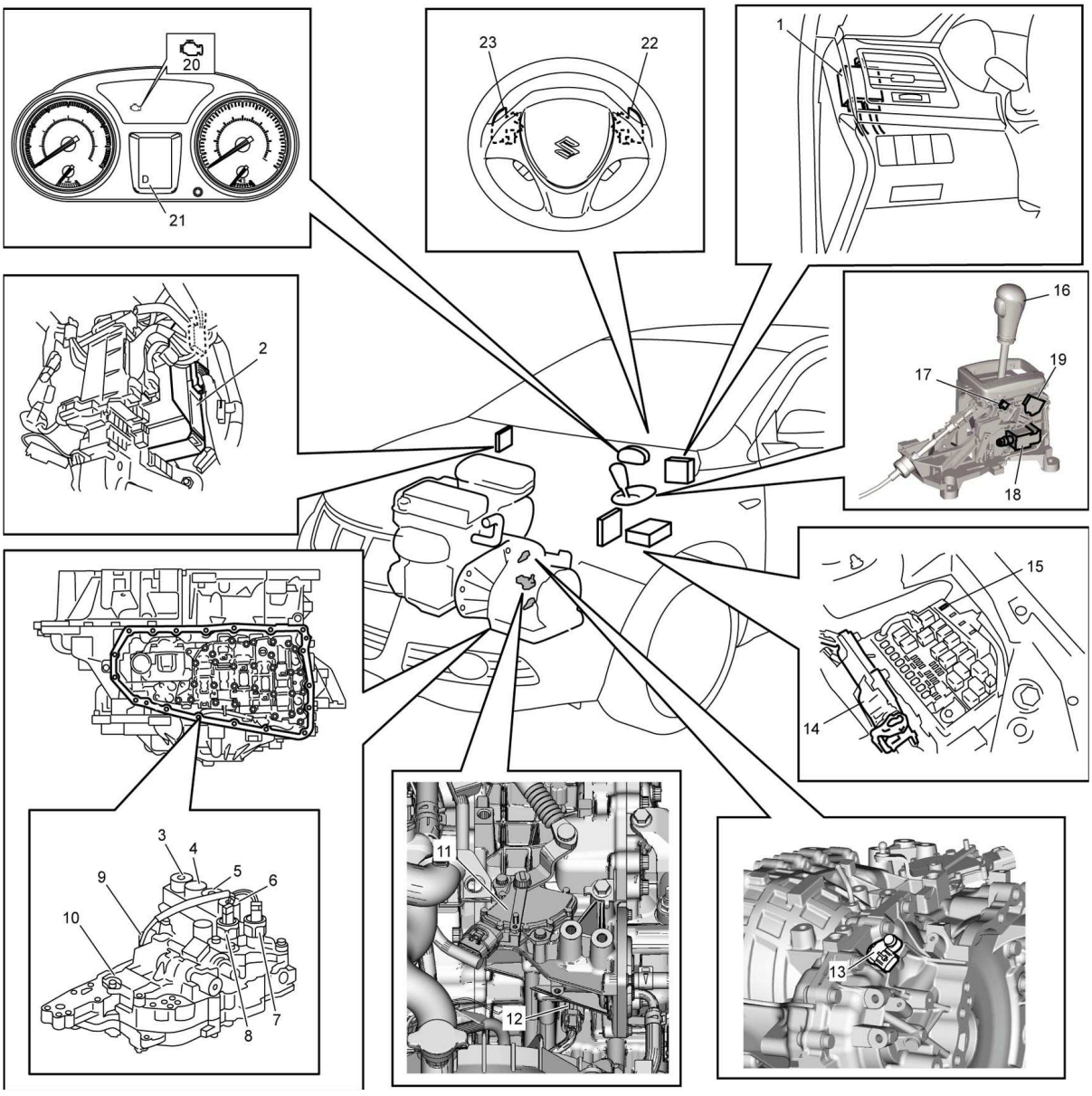
Electronic Shift Control System Component Location



1. TCM	9. CVT fluid temperature sensor	17. P position switch
2. BCM	10. Valve body assembly	18. Shift lock solenoid
3. Line pressure control solenoid valve	11. Transmission range sensor	19. Manual mode switch
4. Secondary pressure control solenoid valve	12. Primary pulley speed sensor	20. MIL
5. TCC solenoid valve	13. Secondary pulley speed sensor	21. Shift position indicator (included in information display)

6. Lock-up / select switching solenoid valve	14. ECM	22. Paddle-up switch
7. Primary pressure sensor	15. "AT" fuse	23. Paddle-down switch
8. Secondary pressure sensor	16. Select lever	

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CVT System Check

Step	Action	YES	NO
1	**Customer complaint analysis** ☞ 1) Perform customer complaint analysis. ***Was customer complaint analysis performed?***	Go to Step 2.	Perform customer complaint analysis.
2	**DTC / freeze frame data check, record and clearance** ☞ 1) Check for DTC (including pending DTC). ***Is there any DTC(s)?***	Print DTC and freeze frame data or write them down and clear them by referring to ***DTC Clearance***. Then go to Step 3.	Go to Step 4.
3	**Visual inspection** ☞ 1) Perform visual inspection. ***Is there any faulty condition?***	Repair or replace malfunction part. Then go to Step 11.	Go to Step 5.
4	**Visual inspection** ☞ 1) Perform visual inspection. ***Is there any faulty condition?***	Repair or replace malfunction part. Then go to Step 11.	Go to Step 8.
5	**Trouble symptom confirmation** ☞ 1) Confirm trouble symptom. ***Is trouble symptom identified?***	Go to Step 6.	Go to Step 7.
6	**Rechecking and recording of DTC / freeze frame data** ☞ 1) Recheck for DTC (current and pending DTC) and freeze frame data. ☞ ***Is there any DTC(s)?***	Go to Step 9.	Go to Step 8.
7	**Rechecking and recording of DTC / freeze frame data** ☞ 1) Recheck for DTC and freeze frame data. ☞ ***Is there any DTC(s)?***	Go to Step 9.	Go to Step 10.

8	**CVT basic check and CVT symptom diagnosis** ☞ 1) Perform CVT basic check and CVT symptom diagnosis. ***Are check and repair completed?***	Go to Step 11.	Check and repair malfunction part (s). Then go to Step 11.
9	**Troubleshooting for DTC** ☞ 1) Perform troubleshooting for applicable DTC. ***Are check and repair completed?***	Go to Step 11.	Check and repair malfunction part (s). Then go to Step 11.
10	**Intermittent problems check** ☞ 1) Check for intermittent problem. ***Is there any faulty condition?***	Repair or replace malfunction part (s). Then go to Step 11.	Go to Step 11.
11	**Final confirmation test** ☞ 1) Perform final confirmation test. ***Is there any problem symptom, DTC or abnormal condition?***	Go to Step 6.	End.

Step 1. Customer Complaint Analysis

Record details of the problem (failure, complaint) and how it occurred as described by the customer.
For this purpose, use of such an inspection form as shown in the following table as an example will facilitate collecting information to the point required for proper analysis and diagnosis.

NOTE:
The form is a standard sample. It should be modified according to characteristics of each market.

Customer problem inspection form (Example)

User name:	Model:	VIN:	
Date of issue:	Date of reg.:	Date of problem:	Mileage:

PROBLEM SYMPTOMS	
☐ No cranking (☐ P ☐ N)	☐ No upshift
☐ Vehicle does not move (R, D, or any range)	☐ No downshift
☐ TCC no lock-up ☐ TCC no lock-up off	
☐ Excessive gear change shock	
☐ Others_____	

VEHICLE / ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental Condition	
Weather Temperature Frequency Road	☐ Fair ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Always ☐ Other _____ (°F / °C) ☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Always ☐ Always ☐ Sometimes (times / day, month) ☐ Only once ☐ Under certain condition ☐ Urban ☐ Suburb ☐ Highway ☐ Mountainous ☐ Uphill ☐ Downhill ☐ Tarmacadam ☐ Gravel ☐ Other_____
Vehicle Condition	
Engine & transaxle condition	☐ Cold ☐ Warming up phase ☐ Warmed up Engine speed (r/min.) Throttle opening (☐ Idle ☐ About % ☐ Full)
Vehicle condition	☐ At stop ☐ During driving (☐ Constant speed ☐ Accelerating ☐ Decelerating ☐ Braking ☐ Manual mode) ☐ Right hand corner ☐ Left hand corner ☐ Vehicle speed (km/h mile/h) ☐ Other_____

Malfunction indicator lamp	☐ Blink ☐ Always ON ☐ Sometimes ON ☐ Always OFF ☐ Good condition	
DTC	First check: ☐ No code	☐ Malfunction code ( )
	Second check: ☐ No code	☐ Malfunction code ( )

Step 2. DTC / Freeze Frame Data Check, Record and Clearance

First, check DTC (current and pending DTC). ☞

If DTC is indicated, print DTC and freeze frame data or write them down and then clear them. ☞

Step 3 and 4. Visual Inspection

As a preliminary step, be sure to perform visual check of the items that support proper function of engine and CVT. ☞

Step 5. Trouble Symptom Confirmation

In case that there is no DTC at Step 2:

Based on information obtained in ***Step 1. Customer Complaint Analysis*** and ***Step 2. DTC / Freeze Frame Data Check, Record and Clearance***, confirm trouble symptoms.

In case that there is any DTC at Step 2:

Recheck DTC according to "DTC Confirmation Procedure" described in each DTC troubleshooting.

Step 6 and 7. Rechecking and Record of DTC and Freeze Frame Data

Refer to ***DTC Check*** for checking procedure.

Step 8. CVT Basic Check and CVT Symptom Diagnosis

1) Perform CVT basic check. ☞

2) In case there is no faulty part found in inspection procedure of "CVT basic check", perform ***CVT Symptom Diagnosis*** based on symptom found in vehicle checking in the following items.
- Customer complaint analysis
- Trouble symptom confirmation

Step 9. Troubleshooting for DTC

Perform applicable DTC troubleshooting and repair or replace faulty parts.

Step 10. Intermittent Problems Check

In case that there is no DTC at Step 2:

Check for intermittent problem. ☞

In case that there is any DTC at Step 2:

Check parts related to detected DTC (e.g., wire harness, connector, etc.). ☞

Step 11. Final Confirmation Test

Confirm that the problem symptom has gone and the vehicle is free from any abnormal conditions. If what has been repaired is related to DTC, clear DTC once, perform DTC confirmation procedure and confirm that no DTC is indicated.

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Visual Inspection

Visually check the following parts and systems.

Inspection item	Referring section
• CVT fluid ----- level, leakage, color, smell	***CVT Fluid Check***
• CVT fluid cooler ----- leakage	***CVT Fluid Cooler and CVT Fluid Cooler Hoses Inspection***
• CVT fluid hoses ----- disconnection, looseness, deterioration	***CVT Fluid Cooler Hoses Replacement***
• CVT select cable ----- installation, operation	***Select Cable Inspection***
• Engine oil ----- level, leakage	***Engine Oil and Filter Change***
• Engine coolant ----- level, leakage	***Engine Cooling System Inspection***
• Engine mountings ----- play, looseness, damage	***Engine Mountings Components***
• Drive shafts ----- damage	***Front Drive Shaft Assembly On-Vehicle Inspection:Front***
• Battery ----- indicator condition, corrosion of terminal	***Battery Inspection***
• Connectors of electric wire harness ----- disconnection, friction	***Electronic Shift Control System Component Location***
• Fuses ----- burning	
• Parts ----- installation, damage	
• Bolts ----- looseness	
• Other parts that can be checked visually	
Also check the following items at engine start, if possible.	
• Malfunction indicator lamp ----- Operation	***MIL Check***
• Charge warning light ----- Operation	***Generator Symptom Diagnosis***
• Engine oil pressure warning light ----- Operation	***Combination Meter Diagnosis***

Road Test

This test is performed to diagnose trouble conditions accurately and to check the condition after servicing. Also check for shift shock or abnormal noise.

WARNING:
- **Perform road test in a place where there is no traffic to prevent an accident.**
- **Road test should be performed by two persons, a driver and a tester, on a level road.**

1) Connect scan tool to DLC.

2) Select "Data list" mode on scan tool.

3) Drive vehicle so that CVT fluid temperature reaches normal operating temperature (50 – 80 °C (122 – 176 °F)). ☞

NOTE:
Engine coolant temperature rises when revving engine in "P" or "N" position, but CVT fluid temperature does not rise in "P" or "N" position. Be sure to drive vehicle in order to raise CVT fluid temperature.

4) While driving in "D" range, check if gear shift and lock-up occur properly as shown in ***CVT Gear Shift Table***.

CVT Gear Shift Table

CVT gear shift schedule is shown in the following table. Test-drive the vehicle on a flat road in the "D" position.

NOTE:
The values are for reference only.

Shift table

Throttle opening	Shift position	Engine speed (rpm)	
		When drive vehicle at 40 km/h (25 mile/h)	When drive vehicle at 60 km/h (37 mile/h)
100%	"D" range	3400 – 4400	4000 – 5000
25%		1400 – 2000	1500 – 2100

Lock-up point

Lock-up clutch status	Throttle opening	Vehicle speed (km/h (mile/h))
Connected	10 – 50%	17 – 40 (11 – 25)
Released		3 – 10 (2 – 6)

Stall Test

This test is performed to check overall performance of CVT and engine by measuring stall speed at "D" and "R" ranges.

CAUTION:
- **Do not run engine at stall more than 5 seconds continuously, or fluid temperature may rise excessively.**
- **After performing stall test, be sure to leave engine running at idle for longer than 1 minute before performing another stall test.**

1) Connect scan tool to DLC.
2) Select "Data list" mode on scan tool.
3) Drive vehicle so that CVT fluid temperature reaches normal operating temperature (50 – 80 °C (122 – 176 °F)). ☞

NOTE:
Engine coolant temperature rises when revving engine in "P" or "N" position, but CVT fluid temperature does not rise in "P" or "N" position. Be sure to drive vehicle in order to raise CVT fluid temperature.

4) Apply parking brake and block wheels.
5) Start engine with select lever shifted to "P" range.
6) Depress brake pedal fully.
7) Shift select lever to "D" range and depress accelerator pedal fully. Read engine rpm quickly when it has become constant (stall speed).
8) Release accelerator pedal immediately after stall speed is checked.
9) In the same way, check stall speed in "R" range.
10) Stall speed should be within the following specification.

Engine stall speed
Standard: 2,100 – 2,500 rpm

Troubleshooting

Condition	Possible Cause	Action
Lower than standard level in both "D" and "R" range	Faulty throttle body assembly	*Replace throttle body assembly.* ☞
	Failure engine output torque	*Perform engine basic Inspection.* ☞
	Faulty torque converter	*Replace CVT assembly.*
Higher than standard level only in "D" range	Faulty valve body component	*Replace CVT assembly.*
	Slippery forward clutch	*Replace CVT assembly.*
Higher than standard level only in "R" range	Faulty valve body component	*Replace CVT assembly.*
	Slippery reverse brake	*Replace CVT assembly.*
Higher than standard level in both "D" and "R" range	Faulty torque converter	*Replace CVT assembly.*
	Low line pressure	*Perform "Line Pressure Test".* ☞
	Faulty steel belt	*Replace CVT assembly.*
	Faulty primary pulley	*Replace CVT assembly.*
	Faulty secondary pulley	*Replace CVT assembly.*
	Faulty valve body component	*Replace CVT assembly.*

Time Lag Test

This test is performed to check conditions of clutch, brake and fluid pressure. "Time lag" means time elapsed since select lever is shifted with engine idling till shock is felt.

1) Connect scan tool to DLC.

2) Select "Data list" mode on scan tool.

3) Drive vehicle so that CVT fluid temperature reaches normal operating temperature (50 – 80 °C (122 – 176 °F)). ☞

> **NOTE:**
> **Engine coolant temperature rises when revving engine in "P" or "N" position, but CVT fluid temperature does not rise in "P" or "N" position. Be sure to drive vehicle in order to raise CVT fluid temperature.**

4) Apply parking brake and block wheels.

5) Start engine.

6) Depress brake pedal.

7) With stopwatch ready, shift select lever from "N" to "D" range and measure time from that moment till shock is felt.

8) Similarly measure time lag by shifting select lever from "N" to "R" range.

Gear shifting time lag

"N" → "D": Less than 3.0 sec.
"N" → "R": Less than 3.0 sec.

> **NOTE:**
> - **When repeating this test, be sure to wait at least 1 minute after select lever is shifted back to "N" range.**
> - **Engine should be warmed up fully for this test.**
> - **Repeat test 3 times and take average of those data for final time lag data.**

Troubleshooting

Condition	Possible Cause	Action
"N" → "D" time lag exceeds specification	Low line pressure	*Perform "Line Pressure Test".* ☞
	Slippery forward clutch	*Replace CVT assembly.*
	Broken forward clutch piston oil seal	*Replace CVT assembly.*
"N" → "R" time lag exceeds specification	Low line pressure	*Perform "Line Pressure Test".* ☞
	Slippery reverse brake	*Replace CVT assembly.*
	Broken reverse brake piston oil seal	*Replace CVT assembly.*

Line Pressure Test

This test is performed to check operating conditions of each part by measuring fluid pressure in fluid pressure line.

1) Connect scan tool to DLC.

2) Select "Data list" mode on scan tool.

3) Drive vehicle so that CVT fluid temperature reaches normal operating temperature (50 – 80 °C (122 – 176 °F)). ☞

NOTE:
Engine coolant temperature rises when revving engine in "P" or "N" position, but CVT fluid temperature does not rise in "P" or "N" position. Be sure to drive vehicle in order to raise CVT fluid temperature.

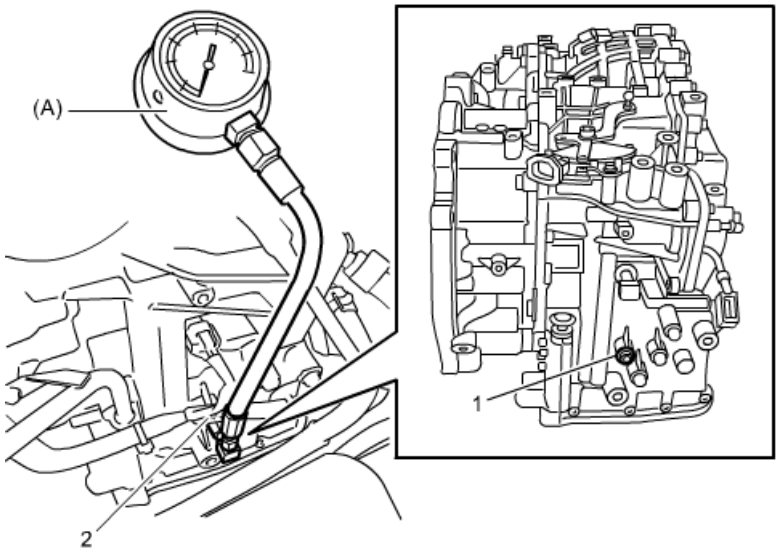
4) Apply parking brake and block wheels.

5) Remove fluid pressure check hole bolt (1).

6) Attach oil pressure gauge to fluid pressure check hole (2) in transaxle case.

NOTE:
After attaching oil pressure gauge, check that no fluid leakage exists.

Special Tool
(A): 09925–37910



7) Depress brake pedal fully, run engine at idle and stall then check fluid pressure in "D" or "R" range.

CAUTION:
- **Do not continue running engine at stall speed longer than 5 seconds.**
- **After performing line pressure test, be sure to leave engine running at idle for longer than 1 minute before performing another line pressure test.**

CVT line pressure

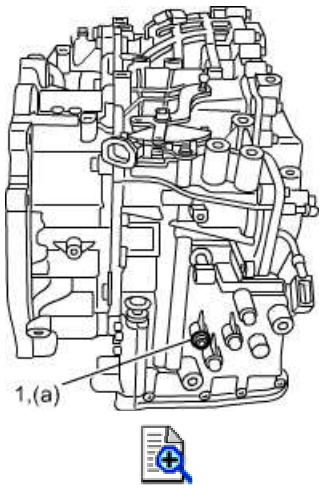
	"D" range	"R" range

At idle speed	**0.5 – 1.0 MPa (5.1 – 10.2 kgf/cm², 72.5 – 145 psi, 5 – 10 bar)**
At stall speed (Reference)	**4.9 – 6.1 MPa (50.0 – 62.2 kgf/cm², 710 – 884 psi, 49 – 61 bar)**

8) If check result is OK, disconnect special tool and then tighten fluid pressure check hole bolt (1) to specified torque.

Tightening torque

Fluid pressure check hole bolt (a): 7.5 N·m (0.76 kg-m, 5.5 lbf-ft)



Troubleshooting

Condition	Possible Cause	Action
Higher than standard level in "D" and "R" range	Faulty valve body component	*Perform "Solenoid Valve On-Vehicle Inspection.* ☞
Lower than standard level in "D" and "R" range	Faulty valve body component	*Perform "Solenoid Valve On-Vehicle Inspection.* ☞
	Clogged oil strainer	*Replace CVT assembly.*
	Faulty oil pump	*Replace CVT assembly.*
	Faulty primary pulley	*Replace CVT assembly.*
	Faulty secondary pulley	*Replace CVT assembly.*
	Faulty torque converter	*Replace CVT assembly.*
Lower than standard level only in "D" range	Faulty forward clutch	*Replace CVT assembly.*
Lower than standard level only in "R" range	Faulty reverse brake	*Replace CVT assembly.*

"P" Range Test

WARNING:
Before test, make sure no one is around vehicle or down on a slope and keep watchful for safety during test.

1) Stop vehicle on a slope of 5 degrees or more, shift select lever to "P" range and at the same time apply parking brake.
2) After stopping engine, depress brake pedal and release parking brake.
3) Release brake pedal gradually and check that vehicle remains stationary.
4) Depress brake pedal and shift select lever to "N" range.
5) Release brake pedal gradually and check that vehicle moves.

Troubleshooting

Condition	Possible Cause	Action
Vehicle moves at "P" range or remains stationary at "N" range	Faulty select cable position	*Check select cable position.* ☞
	Faulty transmission range sensor	*Check transmission range sensor.* ☞
	Faulty valve body component	*Replace CVT assembly.*
	Faulty parking system	*Replace CVT assembly.*

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CVT Symptom Diagnosis

Driving performance problems

Symptom \ Diagnostic item	Engine system	Improper CVT fluid level	Line pressure out of specification	Select cable position	Electrical system: TCM	CAN communication	Power supply circuit	Transmission range sensor	Manual mode switch	Shift paddle switch	Primary pulley speed sensor	Secondary pulley speed sensor	Primary pressure sensor	Secondary pressure sensor	Secondary pressure control solenoid valve	Line pressure control solenoid valve	TCC solenoid valve	Lock-up / select switching solenoid valve	Stepper motor	CVT fluid temperature sensor	Hydraulic system: Valve body component	Oil pump	Transmission system: Torque converter	Pulleys and steel belt	Forward clutch	Reverse brake	Bearings	Planetary gear	Reduction gear	Final gear	Parking system
Unable to start in "D" ("M") range	●	●	●	●	●		●	●			●	●		●	●	●			●	▲	●	●	▲	▲	●		▲	▲	▲	●
Unable to start in "R" range	●	●	●	●	●		●	●			●	●		●	●	●			●	▲	●	●	▲	▲		●		▲	▲	▲	●
Unable to run in all ranges	●	●	●	●	●		●	●			●	●		●	●	●			●	●	●	●	●	●	●	●		▲	▲	▲	●
Unable to run in "D" ("M") range	●	●	●	●	●		●	●			●	●		●	●	●			●	●	●	●	●	▲	●			▲	▲	▲	●
Unable to run in "R" range	●	●	●	●	●		●	●			●	●		●	●	●			●	●	●	●	●	▲		●		▲	▲	▲	●
Poor startability and acceleration in "D" ("M") range	●	▲	▲	▲	●	▲	▲	▲			●	●	▲	▲	●	●	▲		●	▲	●	▲	●	▲	●						
Poor startability and acceleration in "R" range	●	▲	▲	▲	●	▲	▲	▲			●	●	▲	▲	●	●	▲		●	▲	●	▲	●	▲		●					
Unable to run or extremely poor acceleration in "R" range	●	●	●	●	●		●	●			●	●		●	●	●	●		●	●	●	●	●	▲		●		▲	▲	▲	●
Engine brake does not work	▲	●	●	●	●	●					●	●			▲	●	●		●		●	▲	▲	●	●						
When decelerating in "D" ("M") range, lock-up is not released until just before stop	▲	▲	▲		●	▲											●				●	▲	▲								
When running in "D" ("M") range, lock-up function does not work	▲	▲	▲		●	●		●			●	●		▲			●	●	▲	●	●	▲	●								
When running in "D" ("M") range, lock-up ON cannot be maintained	▲	▲	▲		●	●		●			●	●		▲		▲	▲	●	▲	●	●	▲	●								
No gear shift in "D" ("M") range	▲	●	●	●	●	●	●	●			●	●	●	●	●	●			●	▲	●	●		▲							
Does not switch to manual mode					●	●			●		●	●																			
No gear shift in manual mode	▲	●	●		●	●			●	●	●	●	●	●	●	●			●		●	●									

(●:Applicable ▲ :Possible)

Shock / vibration / abnormal noise

Symptom \ Diagnostic item	Engine system	Improper CVT fluid level	Line pressure out of specification	Select cable position	Electrical system: TCM	CAN communication	Power supply circuit	Transmission range sensor	Manual mode switch	Shift paddle switch	Primary pulley speed sensor	Secondary pulley speed sensor	Primary pressure sensor	Secondary pressure sensor	Secondary pressure control solenoid valve	Line pressure control solenoid valve	TCC solenoid valve	Lock-up / select switching solenoid valve	Stepper motor	CVT fluid temperature sensor	Hydraulic system: Valve body component	Oil pump	Transmission system: Torque converter	Pulleys and steel belt	Forward clutch	Reverse brake	Bearings	Planetary gear	Reduction gear	Final gear	Parking system
Excessive shock at lock-up ON when running in "D" ("M") range	●	▲			●												●	▲			●		●								
Slippage at lock-up ON	●	●	●								●	●				▲	●	●		●	●	●	●								
Judder occurs at lock-up ON	●	●									●	●				▲	●	▲			●	●	●								
Excessive shock at "N" to "D" range	●	●	●	▲	▲	▲		●									●	●		●	●				●						
Excessive shock at "N" to "R" range	●	●	●	▲	▲	▲		●									●	●		●	●					●					
Abnormal noise in "D" ("M") range	●	●																			●	●	●		●		●	●	●	●	
Abnormal noise in "R" range	●	●																			●	●	●			●	●	●	●	●	
Abnormal noise in "N" range	●	●																			●	●	●				▲	▲	▲		

(●:Applicable ▲ :Possible)

Others

Symptom \ Diagnostic item	Engine system	Improper CVT fluid level	Line pressure out of specification	Select cable position	TCM	CAN communication	Power supply circuit	Transmission range sensor	Manual mode switch	Shift paddle switch	Primary pulley speed sensor	Secondary pulley speed sensor	Primary pressure sensor	Secondary pressure sensor	Secondary pressure control solenoid valve	Line pressure control solenoid valve	TCC solenoid valve	Lock-up / select switching solenoid valve	Stepper motor	CVT fluid temperature sensor	Valve body component	Oil pump	Torque converter	Pulleys and steel belt	Forward clutch	Reverse brake	Bearings	Planetary gear	Reduction gear	Final gear	Parking system
	Electrical system																				Hydraulic system		Transmission system								
Starting motor operates in ranges other than “P” or “N”	●			●	●	●		●																							
Starting motor does not operate in “P” or “N” range	●			●	●	●		●																							
Parking lock does not lock or cannot be released in “P” range				●				●																▲							●
Engine stalls in “D” (“M”) or “R” range when stopping	●	▲															●	●			●		●								
Engine stalls in “P” or “N” range when stopping	●	▲												●			●	●			●		●								
Low maximum vehicle speed	●	●	●								●	●	●	●	●	●	▲	▲	●	●	●	●	●		●				▲	▲	
Does not creep at all in “D” (“M”) or “R” range	●	●	●	●				●			●	●	●	●			▲	▲	●	●	●	●	●	▲	●	●		▲	▲	▲	
When decelerating, engine speed does not decrease to engine idle speed	●	▲				●						●									●			●							
Shift position does not indicated in information display					●	●		●																							
Vehicle moves in “P” range		▲		●				●													●			▲					▲	▲	●
Vehicle moves in “N” range		▲		●	▲			●													●				● Forward	● Reverse		▲			

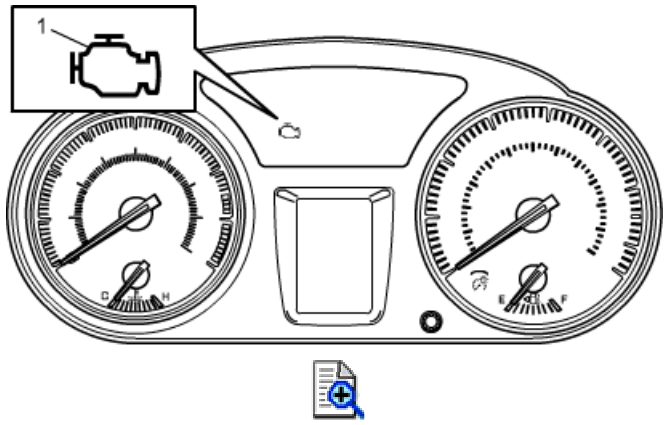
(●:Applicable ▲ :Possible)

1A

MIL Check

1) Push engine switch to change the ignition mode to "ON" (with engine stopped) and check that MIL (1) lights up.
If MIL does not light up (or MIL dims) but engine can be started, go to ***MIL Does Not Come ON with Ignition Mode of Keyless Push Start System in "ON" and Engine Stopped (but Engine Can Be Started)*** for troubleshooting.
If MIL does not light with ignition mode of keyless push start system in "ON" and engine does not start even though it is cranked up, go to ***ECM Power and Ground Circuit Check***.

2) Start engine and check that MIL turns OFF.
If MIL remains ON and no DTC is stored in ECM, go to ***MIL Remains ON after Engine Starts*** for troubleshooting.

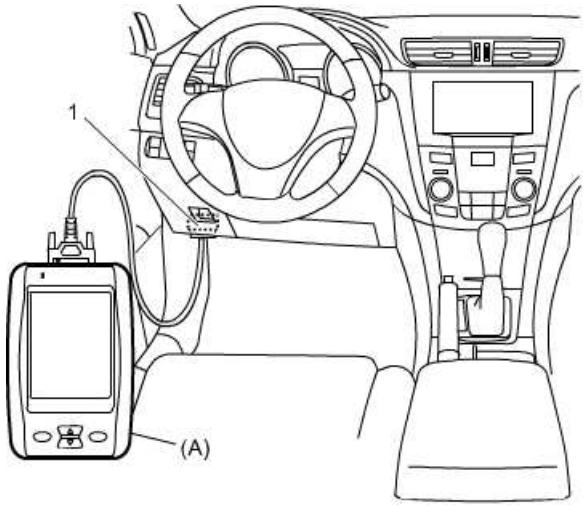


DTC Check

NOTE:
In case that MIL turns on, the malfunction(s) is detected in either ECM or TCM and it stores the trouble information (DTC, freeze flame data, etc.) in its memory.
According to the varieties of scan tool, check the trouble information as follows.
- **SUZUKI scan tool:**
  It is necessary to check both ECM and TCM separately because the trouble information of both modules can not be read and displayed at once.
- **CAN communication OBD generic scan tool:**
  It is not necessary to check both ECM and TCM separately because the trouble information of both modules can be read and displayed at once.

1) Prepare CAN communication OBD generic scan tool or SUZUKI scan tool.
2) Confirm that ignition mode of keyless push start system is in "OFF".
3) Connect scan tool to DLC (1).

Special Tool
(A): SUZUKI scan tool (SUZUKI-SDT)



4) Push engine switch to change ignition mode to "ON".
5) Read DTC, pending DTC and freeze frame data according to instructions displayed on scan tool and print it down. Refer to scan tool operator's manual for further details.
If communication between scan tool and TCM is not possible, go to ***CAN Communication Check***.
6) After completing check, push engine switch to change ignition mode to "OFF" and disconnect scan tool from DLC.

DTC Clearance

Pending and Confirmed DTC

1) Confirm that ignition mode of keyless push start system is in "OFF".

2) Connect CAN communication OBD generic scan tool or SUZUKI scan tool to DLC. ☞

3) Push engine switch to change ignition mode to "ON".

4) Erase DTC and pending DTC according to instructions displayed on scan tool. Refer to scan tool operator's manual for further details.
If communication between scan tool and TCM is not possible, go to ***CAN Communication Check***.

5) After completing clearance, push engine switch to change ignition mode to "OFF" and disconnect scan tool from DLC.

NOTE:
Pending and confirmed DTC and freeze frame data stored in TCM memory are also cleared in the following cases. Be careful not to clear them before recording their record.
- **When the same malfunction (DTC) is not detected again during 40 engine warm-up cycles.**
- **Even though the pending and confirmed DTCs are cleared, the permanent DTC will not be cleared.**

Permanent DTC

1) Confirm that ignition mode of keyless push start system is in "OFF".

2) Connect CAN communication OBD generic scan tool or SUZUKI scan tool to DLC. ☞

3) Push engine switch to change ignition mode to "ON".

4) Clear pending and confirmed DTCs. ☞

5) Select "Permanent DTC" display mode on scan tool. (Refer to scan tool operator's manual for details.)

6) Execute corresponding DTC confirmation procedure in DTC diagnostic flow and confirm that pending and current DTCs cannot be detected. At this time, if DTC confirmation procedure does not satisfy any of the following conditions, execute DTC confirmation procedure so as to satisfy such condition.
- Engine operated for more than 12 minutes.
- Vehicle driven for more than 6 minutes at more than 45 km/h (28 mile/h).
- Engine idled for more than 1 minute.

7) Display permanent DTC on scan tool and check that permanent DTC is cleared.
If permanent DTC has not been cleared, repeat Step 5) again.

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DTC Table

NOTE:
- **With the CAN communication OBD generic scan tool, DTC No. with delta (△) mark in the following table can not be read.**
- **For details of D/C (driving cycle), refer to *OBD System Description*.**

DTC	DTC name	DTC detecting condition	DTC detection logic	MIL
△P0602 ☞	Control Module Programming Error	TCM internal failure (data programming error).	1 D/C	Off
P062F ☞	Internal Control Module EEPROM Error	TCM internal failure (EEPROM error).	1 D/C	Lights up
P0641 ☞	Sensor Reference Voltage "A" Circuit / Open	Primary and secondary pressure sensor power supply circuit voltage is out of specified value for 5 sec.	1 D/C	Lights up
P0703 ☞	Brake Switch "B" Circuit	Brake light switch signal received from ECM is no change.	2 D/C	Lights up
P0705 ☞	Transmission Range Sensor "A" Circuit (PRNDL Input)	Two or more transmission range sensor signals are input simultaneously for 2 sec.	1 D/C	Lights up
P0707 ☞	Transmission Range Sensor "A" Circuit Low	Transmission range signal is not input for 10 sec.	2 D/C	Lights up
P0711 ☞	Transmission Fluid Temperature Sensor "A" Circuit Range / Performance	CVT fluid temperature variation is lower than specified value even if engine was running for specified time after engine start.	2 D/C	Lights up
P0712 ☞	Transmission Fluid Temperature Sensor "A" Circuit Low	CVT fluid temperature signal circuit voltage is lower than specified value for 5 sec.	1 D/C	Lights up
P0713 ☞	Transmission Fluid Temperature Sensor "A" Circuit High	CVT fluid temperature signal circuit voltage is higher than specified value for 5 sec.	1 D/C	Lights up
P0716 ☞	Input / Turbine Speed Sensor "A" Circuit Range / Performance	This DTC is detected if all the following conditions are met. • Difference between engine speed and primary pulley speed is higher than 1000 rpm for 5 sec. when lock-up ON. • Difference between measured value and estimated value of primary pulley speed is higher than 1000 rpm for 5 sec. when lock-up ON.	2 D/C	Lights up
P0717 ☞	Input / Turbine Speed Sensor "A" Circuit No Signal	Primary pulley speed signal is no signal even if secondary pulley speed signal is input.	1 D/C	Lights up
P0721 ☞	Output Speed Sensor Circuit Range / Performance	This DTC is detected if all of the following conditions are met. • Difference between measured engine speed and the estimated secondary pulley speed is higher than 1000 rpm for 5 sec. when lock-up ON. • Difference between measured primary pulley speed and the estimated	2 D/C	Lights up

		secondary pulley speed is higher than 1000 rpm for 5 sec. when lock-up ON.		
P0722	Output Speed Sensor Circuit No Signal	This DTC is detected if any one of the following conditions is met. • The secondary pulley speed is lower than 150 rpm for 5 sec. in a row when the primary pulley speed is higher than 1000 rpm. • The secondary pulley speed is 0 rpm for specified times when the vehicle speed is higher than 10 km/h (6 mile/h).	1 D/C	Lights up
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	Difference between engine speed and primary pulley speed is more than 130 rpm for 30 sec. even if TCC solenoid valve is ON.	2 D/C	Lights up
P0776	Pressure Control Solenoid "B" Performance / Stuck Off	Secondary pressure value is 1.2 MPa (12.2 kgf/cm², 174 psi, 12 bar) or higher for 30 sec. or more.	2 D/C	Lights up
P0777	Pressure Control Solenoid "B" Stuck On	Secondary pressure value is equal to or lower than specified value.	2 D/C	Lights up
△P0826	Manual Mode Control Switch Circuit	This DTC is detected if any one of the following conditions is met. • Manual mode switch ON signal continues to be input for longer than 5 sec. even after "P", "R" or "N" range signal input. • ON signal of manual shift-down switch or manual shift-up switch is input for longer than 5 sec. even while manual mode switch is OFF.	1 D/C	Off
P0842	Transmission Fluid Pressure Sensor / Switch "A" Circuit Low	Primary pressure sensor signal circuit voltage is lower than specified value for 5 sec.	1 D/C	Lights up
P0843	Transmission Fluid Pressure Sensor / Switch "A" Circuit High	Primary pressure sensor signal circuit voltage is higher than 4.7 V for 5 sec.	1 D/C	Lights up
P0847	Transmission Fluid Pressure Sensor / Switch "B" Circuit Low	Secondary pressure sensor signal circuit voltage is lower than specified value for 5 sec.	1 D/C	Lights up
P0848	Transmission Fluid Pressure Sensor / Switch "B" Circuit High	Secondary pressure sensor signal circuit voltage is higher than 4.7 V for 5 sec.	1 D/C	Lights up
P0871	Transmission Fluid Pressure Sensor / Switch "C" Circuit Range / Performance	Measured line pressure is out of specified line pressure that calculate base on secondary pressure for 5 sec.	2 D/C	Lights up
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	Gear ratio calculated from primary pulley speed and secondary pulley speed is higher than specified value.	2 D/C	Lights up
P0962	Pressure Control Solenoid "A" Control Circuit Low	Monitored circuit voltage of line pressure control solenoid valve is lower than limit value even if TCM outputs power to its control circuit.	1 D/C	Lights up

P0963 ☞	Pressure Control Solenoid "A" Control Circuit High	Monitored circuit current of line pressure control solenoid valve is lower than limit value for 5 sec. even if TCM outputs power to its control circuit.	1 D/C	Lights up
P0966 ☞	Pressure Control Solenoid "B" Control Circuit Low	Monitored circuit voltage of secondary pressure control solenoid valve is lower than limit value even if TCM outputs power to its control circuit.	1 D/C	Lights up
P0967 ☞	Pressure Control Solenoid "B" Control Circuit High	Monitored circuit current of secondary pressure control solenoid valve is lower than limit value for 5 sec. even if TCM outputs power to its control circuit.	1 D/C	Lights up
△P1706 ☞	Torque Request Communication Error from TCM	ECM detects abnormality of CAN communication data which TCM transmits.	1 D/C	Off
P1810 ☞	Lockup / Select Control Circuit	Monitor signal of the lock-up / select switching solenoid valve is different from its command signal.	1 D/C	Lights up
P1816 ☞	Stepper Motor Circuit Malfunction	Monitor signal of stepper motor is different from its command signal.	1 D/C	Lights up
P1818 ☞	Stepper Motor Performance	Difference between measured primary pulley speed and estimated primary pulley speed is higher than 1000 rpm for 5 sec.	2 D/C	Lights up
P1970 ☞	Sensor Ground Circuit Malfunction	Ground circuit of following sensors is open circuit for specified times. • CVT fluid temperature sensor • Primary pressure sensor • Secondary pressure sensor	1 D/C	Lights up
P2763 ☞	Torque Converter Clutch Pressure Control Solenoid Control Circuit High	Monitored circuit current of TCC (Torque Converter Clutch) solenoid valve is lower than limit value for 5 sec. even if TCM outputs power to its control circuit.	1 D/C	Lights up
P2764 ☞	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low	Monitored circuit current of TCC (Torque Converter Clutch) solenoid valve is higher than limit value even if TCM outputs power to its control circuit.	1 D/C	Lights up
U0073 ☞	Control Module Communication Bus Off	Refer to ***CAN DTC (Lost Communication and Communication Bus Off) Table***.	1 D/C	Lights up
U0100 ☞	Lost Communication With ECM		1 D/C	Lights up
△U0121 ☞	Lost Communication With ABS		1 D/C	Off
△U0140 ☞	Lost Communication With BCM		1 D/C	Off

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Fail-Safe Table

This function is provided by the safe mechanism that assures safe driveability even when the solenoid valve, sensor or its circuit fails. The following table shows the fail-safe function for each fail condition of solenoid valve, sensor or its circuit.

DTC	DTC name	Fail-safe operation
P0602	Control Module Programming Error	—
P062F	Internal Control Module EEPROM Error	—
P0641	Sensor Reference Voltage "A" Circuit / Open	—
P0703	Brake Switch "B" Circuit	TCM controls actuators assuming that brake light switch is always on.
P0705	Transmission Range Sensor "A" Circuit (PRNDL Input)	• TCM controls actuators assuming that select range is "D" range. • TCM stops following operation / function. — Lock-up control operation — Manual shift mode function • TCM transmits torque request signal to ECM (torque reduction). • TCM transmits engine speed upper limit request signal to ECM.
P0707	Transmission Range Sensor "A" Circuit Low	
P0711	Transmission Fluid Temperature Sensor "A" Circuit Range / Performance	TCM controls actuators assuming that CVT fluid temperature is specified value.
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	
P0713	Transmission Fluid Temperature Sensor "A" Circuit High	
P0716	Input / Turbine Speed Sensor "A" Circuit Range / Performance	• TCM controls actuator in presumption gear ratio calculated from secondary pulley speed and stepper motor position. • TCM inhibits following operation / function. — Lock-up control operation — Manual shift mode function • TCM delays changing speed of gear ratio.
P0717	Input / Turbine Speed Sensor "A" Circuit No Signal	
P0721	Output Speed Sensor Circuit Range / Performance	• TCM controls actuator by gear ratio depending on accelerator pedal position and primary pulley speed. • TCM inhibits following operation / function. — Lock-up control operation — Manual shift mode function • TCM delays changing speed of gear ratio.
P0722	Output Speed Sensor Circuit No Signal	
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	TCM stops lock-up control operation.
P0776	Pressure Control Solenoid "B" Performance / Stuck Off	—
P0777	Pressure Control Solenoid "B" Stuck On	TCM transmits torque request signal to ECM (torque reduction).
P0826	Up and Down Shift Switch Circuit	TCM stops manual shift mode control.

P0842 ☞	Transmission Fluid Pressure Sensor / Switch "A" Circuit Low	• TCM controls actuators assuming that line pressure is 0 MPa (0 kgf/cm², 0 psi, 0 bar). • TCM transmits torque request signal to ECM (torque reduction).
P0843 ☞	Transmission Fluid Pressure Sensor / Switch "A" Circuit High	
P0847 ☞	Transmission Fluid Pressure Sensor / Switch "B" Circuit Low	• TCM controls actuators assuming that secondary pressure is 0 MPa (0 kgf/cm², 0 psi, 0 bar). • TCM transmits torque request signal to ECM (torque reduction).
P0848 ☞	Transmission Fluid Pressure Sensor / Switch "B" Circuit High	
P0871 ☞	Transmission Fluid Pressure Sensor / Switch "C" Circuit Range / Performance	• TCM transmits torque request signal to ECM (torque reduction). • Gear ratio is fixed at gear ratio of point that this DTC was detected.
P0961 ☞	Pressure Control Solenoid "A" Control Circuit Range /Performance	• TCM transmits torque request signal to ECM (torque reduction). • The following items are executed according to the detection frequency. — TCM transmits torque request signal to ECM (torque reduction). — TCM stops lock-up control. — TCM limits shift speed of gear ratio. — TCM controls gear ratio assuming that is specified value.
P0962 ☞	Pressure Control Solenoid "A" Control Circuit Low	TCM maximizes line pressure value (duty 0%).
P0963 ☞	Pressure Control Solenoid "A" Control Circuit High	
P0966 ☞	Pressure Control Solenoid "B" Control Circuit Low	TCM maximizes secondary pressure value (duty 0%).
P0967 ☞	Pressure Control Solenoid "B" Control Circuit High	
P1706 ☞	Torque Request Communication Error from TCM	—
P1810 ☞	Lockup / Select Control Circuit	TCM controls actuators assuming that lock-up / select switching solenoid valve is OFF.
P1816 ☞	Stepper Motor Circuit Malfunction	• Gear ratio is fixed at gear ratio of point that this DTC was detected. • TCM stops lock-up control.
P1818 ☞	Stepper Motor Performance	—
P1970 ☞	Sensor Ground Circuit Malfunction	• TCM stops following operation / function. — Lock-up control operation — Manual shift mode function • TCM controls actuators assuming that CVT fluid temperature is specified value. • TCM controls actuators assuming that line pressure is 0 MPa (0 kgf/cm², 0 psi, 0 bar). • TCM controls actuators assuming that secondary pressure is 0 MPa (0 kgf/cm², 0 psi, 0 bar). • TCM transmits torque request signal to ECM (torque reduction).

		• Gear ratio is fixed at gear ratio of point that this DTC was detected.
P2763 ☞	Torque Converter Clutch Pressure Control Solenoid Control Circuit High	TCM stops lock-up operation.
P2764 ☞	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low	
U0073 ☞	Control Module Communication Bus Off	—
U0100 ☞	Lost Communication With ECM	• Engine speed is assumed to be specified value. • Engine torque is assumed to be maximum value. • TCM stops lock-up control. • Throttle opening angle is assumed to be 0%.
U0121 ☞	Lost Communication With ABS	—
U0140 ☞	Lost Communication With BCM	—

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Scan Tool Data

TCM

As the data values given in the following table are standard values estimated on the basis of values obtained from the normally operating vehicles by using a scan tool, use them as reference values. Even when the vehicle is in good condition, there may be cases where the checked value does not fall within each specified data range. Therefore, judgment as abnormal should not be made by checking with these data alone.
Also, condition in the following table that can be checked by the scan tool are those detected by TCM and output from TCM as commands and there may be cases where the CVT or actuator is not operating (in the condition) as indicated by the scan tool.

NOTE:
The following scan tool data related to CVT can be checked only by communicating with TCM.

Scan tool data	Vehicle condition	Normal condition / Reference values
Vehicle Speed ☞	Vehicle: Running	Value as same as speedometer reading
Engine Speed ☞	• Engine: Specified idle speed after warming up • Select lever: "N" range	650 rpm
Primary Pulley Speed ☞	Vehicle: Stop	0 rpm
	Lock-up: On	Value as same as engine speed
Secondary Pulley Speed ☞	Vehicle: Stop	0 rpm
	Vehicle: Running at 40 km/h (25 mile/h)	Approx. 1950 rpm
Torque converter Slip ☞	• Engine: Specified idle speed • Select lever: "N" range	Approx. 127 rpm
Primary Oil Pres ☞	• Engine: Specified idle speed • Select lever: "N" range	1.0 – 1.5 MPa
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	3.5 – 4.5 MPa
Secondary Oil Pres ☞	• Engine: Specified idle speed • Select lever: "N" range	1.0 – 1.2 MPa
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	5.0 – 5.8 MPa
CVTF Temperature ☞	• Engine: Specified idle speed after warming up • Vehicle: After running	70 – 80 °C (158 – 176 °F)
ECT ☞	Engine: Specified idle speed after warming up	80 – 100 °C (176 – 230 °F)
Battery Voltage ☞	Engine: Specified idle speed	13 – 15 V
Throttle position ☞	• Engine: Stop • Accelerator pedal: Released	0%
	• Engine: Stop • Accelerator pedal: Depressed fully	99.96%

Accel Actual Position ☞	• Engine: Stop • Accelerator pedal: Released	0%
	• Engine: Stop • Accelerator pedal: Depressed fully	99.96%
Gear Actual Ratio ☞	Vehicle: Running	0.40 – 2.34
Lock Up Solenoid (Com) ☞	• Vehicle: Running • Lock-up: Off	250 – 270 mA
	• Vehicle: Running • Lock-up: On	550 – 650 mA
Lock Up Solenoid (Mon) ☞	• Vehicle: Running • Lock-up: Off	250 – 270 mA
	• Vehicle: Running • Lock-up: On	550 – 650 mA
Line Press Solenoid (Com) ☞	• Engine: Specified idle speed • Select lever: "N" range • Accelerator pedal: Released	650 – 680 mA
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	200 – 250 mA
Line Press Solenoid (Mon) ☞	• Engine: Specified idle speed • Select lever: "N" range • Accelerator pedal: Released	650 – 680 mA
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	200 – 250 mA
Secondary Solenoid (Com) ☞	• Engine: Specified idle speed • Select lever: "N" range • Accelerator pedal: Released	600 – 640 mA
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	60 – 80 mA
Secondary Solenoid (Mon) ☞	• Engine: Specified idle speed • Select lever: "N" range • Accelerator pedal: Released	600 – 640 mA
	• Engine: Running • Select lever: "D" or "R" range • Accelerator pedal: Depressed fully	60 – 80 mA
Torque Converter Clutch ☞	Lock-up: Off	Release
	Lock-up: Off ↔ On	Slip
	Lock-up: On	Connect
Manual Gear Position ☞	Select lever: other than "M" range	deactive
	• Select lever: "M" range • Manual mode gear position: 1	1st
	• Select lever: "M" range • Manual mode gear position: 2	2nd
	• Select lever: "M" range • Manual mode gear position: 3	3rd
	• Select lever: "M" range • Manual mode gear position: 4	4th
	• Select lever: "M" range • Manual mode gear position: 5	5th

	• Select lever: "M" range • Manual mode gear position: 6	6th
Shift Down SW ☞	Select lever: "-" position	ON
	Other than above condition	OFF
Shift Up SW ☞	Select lever: "+" position	ON
	Other than above condition	OFF
Manual Mode SW ☞	Select lever: "M" range	ON
	Other than above condition	OFF
Transaxle Range ☞	Select lever is in "P" position	P
	Select lever is in "R" position	R
	Select lever is in "N" position	N
	Select lever is in "D" position	D
ABS Active ☞	ABS operating	ON
	ABS not operating	OFF
A/C Comp Clutch ☞	A/C compressor magnet clutch: Connected	ON
	A/C compressor magnet clutch: Released	OFF
Brake Switch ☞	Brake pedal: Depressed fully	ON
	Brake pedal: Released	OFF
Paddle Up SW ☞	Right side shift paddle "+": Pulled	ON
	Right side shift paddle "+": Released	OFF
Paddle Down SW ☞	Left side shift paddle "-": Pulled	ON
	Left side shift paddle "-": Released	OFF
Switching Solenoid (Mon) ☞	Select lever: "P" or "N" range	ON
	Select lever: "D" or "R" range	OFF
Switching Solenoid (Com) ☞	Select lever: "P" or "N" range	ON
	Select lever: "D" or "R" range	OFF

Scan Tool Data Definitions:

Vehicle Speed (km/h / mph)

This parameter indicates vehicle speed calculated by TCM based on secondary pulley speed sensor signal.

Engine Speed (rpm)

This parameter indicates engine speed information received from ECM.

Primary Pulley Speed (rpm)

This parameter indicates primary pulley speed detected by primary pulley speed sensor.

Secondary Pulley Speed (rpm)

This parameter indicates secondary pulley speed detected by secondary pulley speed sensor.

Torque converter Slip (rpm)

This parameter indicates the slip speed of the torque converter according to the difference between engine speed and the secondary pulley speed.

Primary Oil Pres (Primary Oil Pressure, MPa)

This parameter indicates line pressure detected by primary pressure sensor.

Secondary Oil Pres (Secondary Oil Pressure, MPa)

This parameter indicates secondary pressure detected by secondary pressure sensor.

CVTF Temperature (°C, °F)

This parameter indicates CVT fluid temperature detected by CVT fluid temperature sensor.

ECT (Engine Coolant Temperature, °C, °F)

This parameter indicates engine coolant temperature information received from ECM.

Battery Voltage (V)

This parameter indicates battery positive voltage inputted through CVT relay to TCM.

Throttle Position (%)

This parameter indicates throttle position information received from ECM.

Accel Actual Position (%)

This parameter indicates accelerator pedal opening ratio information from ECM.

Gear Actual Ratio

This parameter indicates current gear ratio calculated by TCM based on primary pulley speed and secondary pulley speed.

Lock Up Solenoid (Com) (Lock Up Solenoid Command, mA)

This parameter indicates control current value that TCM outputs to TCC solenoid valve.

Lock Up Solenoid (Mon) (Lock Up Solenoid Monitor, mA)

This parameter indicates current value that flows to TCC solenoid valve.

Line Press Solenoid (Com) (Line Pressure Solenoid Command, mA)

This parameter indicates control current value that TCM outputs to line pressure control solenoid valve.

Line Press Solenoid (Mon) (Line Pressure Solenoid Monitor, mA)

This parameter indicates current value that flows to line pressure control solenoid valve.

Secondary Solenoid (Com) (Secondary Solenoid Command, mA)

This parameter indicates control current value that TCM outputs to secondary pressure control solenoid valve.

Secondary Solenoid (Mon) (Secondary Solenoid Monitor, mA)

This parameter indicates current value that flows to secondary pressure control solenoid valve.

Torque Converter Clutch (Release / Slip / Connect)

This parameter indicates the state of the torque converter clutch according to the difference between engine speed and the secondary pulley speed.
Open: The difference between engine speed and secondly pulley speed is more than specified speed.
Conclude: The speed of engine and secondly pulley is completely corresponding.
Slip: TCC is opening or it is concluding.

Manual Gear Position (deactive, 1st, 2nd, 3rd, 4th, 5th, 6th)

This parameter indicates manual mode shift position information received from BCM.

Shift Down SW (Shift Down Switch, ON/OFF)

This parameter indicates the states of shift-down switch.

Shift Up SW (Shift Up Switch, ON/OFF)

This parameter indicates the states of shift-up switch.

Manual Mode SW (Manual Mode Switch, ON/OFF)

This parameter indicates the states of manual mode switch.

Transaxle Range (P, R, N, D)

This parameter indicates the state of each range switch in transmission range sensor.

ABS Active (ON/OFF)

This parameter indicates ABS status.

A/C Comp Clutch (A/C Compressor Clutch, ON/OFF)

This parameter indicates air conditioner compressor clutch information received from ECM.
ON: A/C compressor clutch engaged.
OFF: A/C compressor clutch disengaged.

Brake Switch (ON/OFF)

This parameter indicates brake light switch information received from ECM.
ON: Brake light switch is ON. (Brake pedal depressed)
OFF: Brake light switch is OFF. (Brake pedal released)

Paddle Up SW (Paddle Up Switch, ON/OFF)

This parameter indicates the states of paddle-up switch "+".

Paddle Down SW (Paddle Down Switch, ON/OFF)

This parameter indicates the states of paddle-down switch "–".

Switching Solenoid (Mon) (Switching Solenoid Monitor, ON/OFF)

This parameter indicates the state of lock-up / select switching solenoid valve.

Switching Solenoid (Com) (Switching Solenoid Command, ON/OFF)

This parameter indicates the output state of TCM to lock-up / select switching solenoid valve.

5E

Inspection of TCM and Its Circuits

TCM and its circuits can be checked at TCM wiring connectors by measuring voltage and pulse signal.

CAUTION:
It is strictly prohibited to connect voltmeter or ohmmeter to TCM with connector disconnected from it.

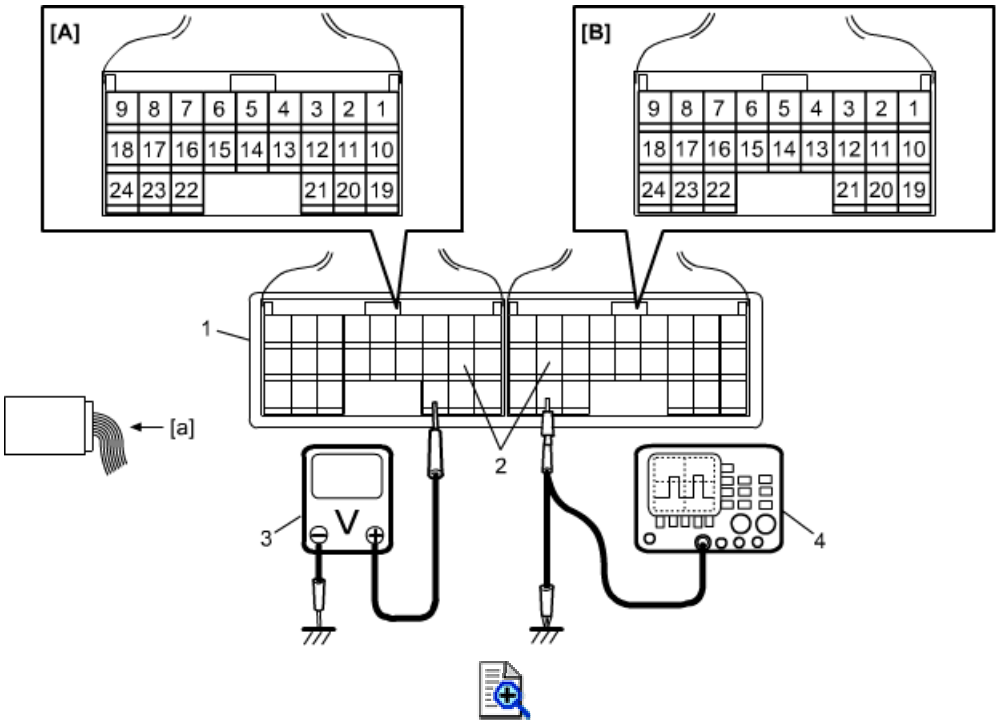
Voltage and Signal Check

1) Remove TCM (1) from vehicle. ☞ .

2) Connect TCM connectors (2) to TCM.

3) Check voltage and/or pulse signal at each terminal of connectors using voltmeter (3) and oscilloscope (4).

NOTE:
- **As each terminal voltage is affected by battery voltage, confirm that it is 11 V or more when ignition mode of keyless push start system is "ON".**
- **Voltage with asterisk (*) cannot be measured by voltmeter because it is pulse signal. Check it with oscilloscope.**
- ***1: Reference voltage**
- **For "Ignition mode" described in the following table, it means power supply mode in keyless push start system.**
  For more details of ignition mode, refer to *Description of Keyless Engine Start Function*.



[A]: TCM connector "E19" (View: [a])	[B]: TCM connector "E20" (View: [a])

Connector "E19"

Terminal No.	Wire color	Circuit	Normal voltage	Condition

E19-1	—	—	—	—
E19-2	—	—	—	—
E19-3	—	—	—	—
E19-4*	WHT	CAN communication (Low)	Refer to reference waveform. ***CAN communication signal***	
E19-5*	RED	CAN communication (High)		
E19-6	BRN	Lock-up / select solenoid valve	10 – 14 V	Ignition mode: ON Select lever position: "P" or "N" range
			0 – 1 V	Ignition mode: ON Select lever position: After 5 sec. in "D" or "R" position
E19-7*	YEL	TCC solenoid valve	Refer to reference waveform. ***TCC solenoid valve signal***	
E19-8*	GRN	Secondary pressure control solenoid valve	Refer to reference waveform. ***Secondary pressure control solenoid valve signal***	
E19-9*	BRN/RED	Line pressure control solenoid valve	Refer to reference waveform. ***Line pressure control solenoid valve signal***	
E19-10	PPL	Transmission range sensor ("P" range)	10 – 14 V	Ignition mode: ON Select lever position: "P" range
			0 – 1 V	Other than above condition
E19-11	—	—	—	—
E19-12	—	—	—	—
E19-13	BLU/ORN	ROM (SEL2) *1	10 – 14 V	Ignition mode: ON
E19-14	PNK	ROM (SEL1) *1	Approx. 5 V	Ignition mode: ON
E19-15	LT GRN	ROM (SEL3) *1	Approx. 5 V	Ignition mode: ON
E19-16*	GRN/YEL	Stepper motor No.2	Refer to reference waveform. ***Stepper motor signal***	
E19-17*	BLU	Stepper motor No.1		
E19-18	RED/GRN	Power source	10 – 14 V	Ignition mode: ON
			0 – 1 V	Ignition mode: OFF
E19-19	—	—	—	—
E19-20	—	—	—	—
E19-21	LT GRN/RED	Transmission range sensor ("R" range)	10 – 14 V	Ignition mode: ON Select lever position: "R" range
			0 – 1 V	Other than above condition
E19-22*	WHT/BLK	Stepper motor No.4	Refer to reference waveform. ***Stepper motor signal***	
E19-23*	GRY	Stepper motor No.3		
E19-24	RED/GRN	Power source	10 – 14 V	Ignition mode: ON
			0 – 1 V	Ignition mode: OFF

Connector "E20"

Terminal No.	Wire color	Circuit	Normal voltage	Condition
E20-1	—	—	—	—
E20-2	—	—	—	—
E20-3	—	—	—	—
E20-4	—	—	—	—
E20-5*	BRN/BLK	Secondary pulley speed sensor	Refer to reference waveform. ***Secondary pulley speed sensor signal***	

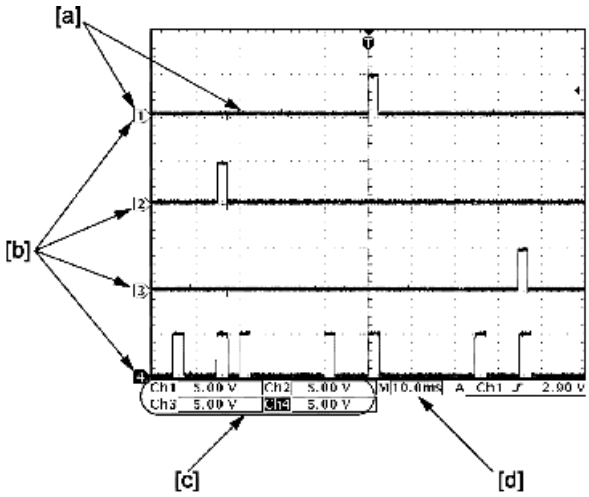
E20-6	RED/WHT	Power source for back-up	10 – 14 V	Constantly
E20-7	GRN/BLK	Manual mode switch	0 – 1 V	Ignition mode: ON Manual mode switch: ON
			10 – 14 V	Other than above condition
E20-8	YEL/BLK	Transmission range sensor (“N” range)	10 – 14 V	Ignition mode: ON Select lever position: “N” range
			0 – 1 V	Other than above condition
E20-9	BLK	Ground	Below 0.3 V	Constantly
E20-10	BLK/YEL	Sensor ground	Below 0.3 V	Constantly
E20-11	LT GRN/BLK	Primary pressure sensor	0.7 – 3.5 V	Engine: Idle speed Select lever position: “N” range
E20-12	—	—	—	—
E20-13	—	—	—	—
E20-14*	GRY/BLK	Primary pulley speed sensor	Refer to reference waveform. ***Primary pulley speed sensor signal***	
E20-15	BLU/BLK	Secondary pressure sensor	Approx. 1.0 V	Engine: Idle speed Select lever position: “N” range
E20-16	PNK/BLU	Paddle-down switch	0 – 1 V	Ignition mode: ON Paddle-down switch: Pulled
			10 – 14 V	Ignition mode: ON Paddle-down switch: Released
E20-17	—	—	—	—
E20-18	YEL/GRN	Paddle-up switch	0 – 1 V	Ignition mode: ON Paddle-up switch: Pulled
			10 – 14 V	Ignition mode: ON Paddle-up switch: Released
E20-19	BLK	Ground	Below 0.3 V	Constantly
E20-20	WHT/RED	CVT fluid temperature sensor	Approx. 2.0 V	Ignition mode: ON CVT fluid temperature: 20 °C (68 °F)
			Approx. 1.0 V	Ignition mode: ON CVT fluid temperature: 80 °C (176 °F)
E20-21	WHT/GRN	Sensor power supply	Approx. 5.0 V	Ignition mode: ON
E20-22	—	—	—	—
E20-23	PPL/GRN	Transmission range sensor (“L” range)	0 – 1 V	Ignition mode: ON Select lever position: “P”, “R” or “D” (“M”) range
E20-24	PNK/BLK	Transmission range sensor (“D” range)	10 – 14 V	Ignition mode: ON Select lever position: “D” range
			0 – 1 V	Ignition mode: ON Select lever position: Other than “D” range

Reference Waveform

Oscilloscope display

Shown below is typical waveform display provided by oscilloscope.

NOTE:
- **Display includes the following types of data:**



[a]:	Waveform of channel 1	[c]:	VOLT/DIV of each channel
[b]:	Ground level of each channel	[d]:	TIME/DIV

- **Waveforms may vary with measurement conditions and vehicle specifications.**

CAN communication signal

CAN communication signal (High) (1):

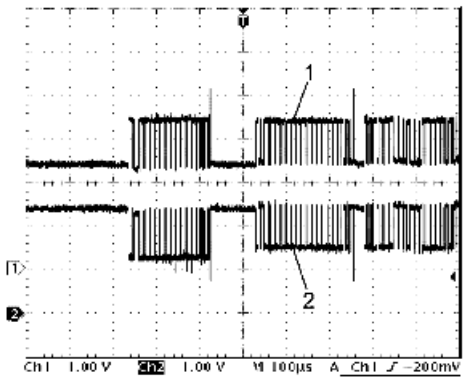
Channel	Probe	Terminal No.
1	+	E19-5
	–	E20-9

CAN communication signal (Low) (2):

Channel	Probe	Terminal No.
2	+	E19-4
	–	E20-9

Measurement condition

- Engine: Stop
- Ignition mode: ON



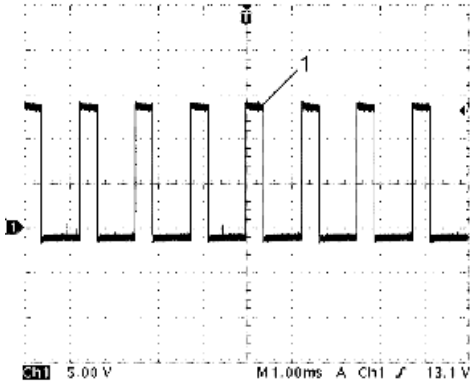
TCC solenoid valve signal

TCC solenoid valve signal (1):

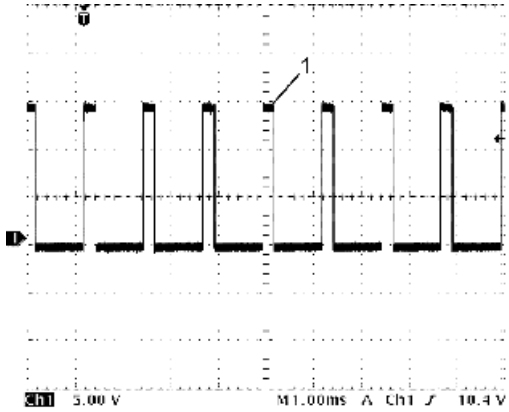
Channel	Probe	Terminal No.
1	+	E19-7
	–	E20-9

Measurement condition

- Vehicle: Running
- CVT: Lock-up on after warming up



- Vehicle: Running
- CVT: Lock-up off after warming up



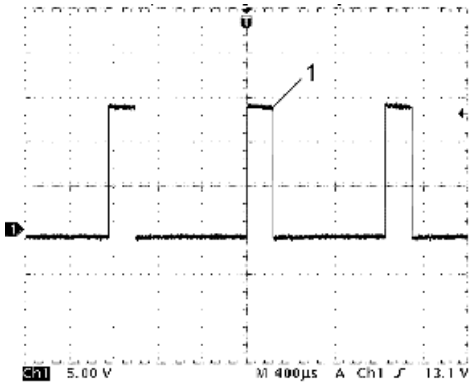
Secondary pressure control solenoid valve signal

Secondary pressure control solenoid valve signal (1):

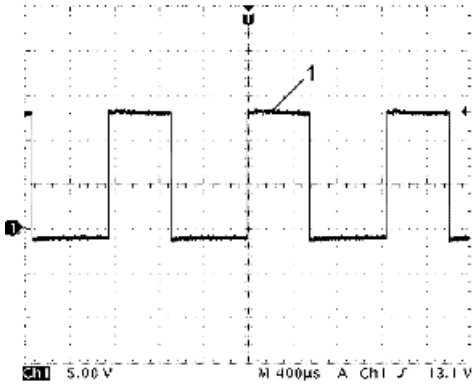
Channel	Probe	Terminal No.
1	+	E19-8
	–	E20-9

Measurement condition

- Engine: Running after warming up
- Select lever position: "D" range
- Accelerator pedal: Depressed fully



- Engine: Idle speed
- Select lever position: "D" range
- Accelerator pedal: Released



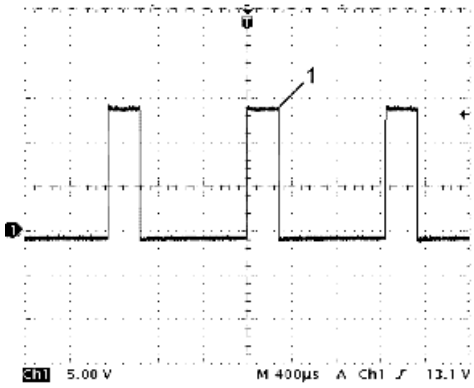
Line pressure control solenoid valve signal

Line pressure control valve signal (1):

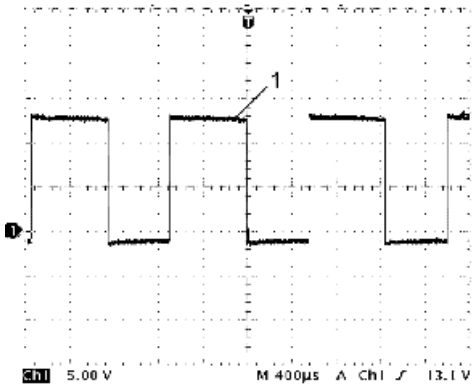
Channel	Probe	Terminal No.
1	+	E19-9
	–	E20-9

Measurement condition

- Engine: Running after warming up
- Select lever position: "D" range
- Accelerator pedal: Depressed fully



- Engine: Idle speed
- Select lever position: “D” range
- Accelerator pedal: Released



Stepper motor signal

Stepper motor No.1 signal (1):

Channel	Probe	Terminal No.
1	+	E19-17
	–	E20-9

Stepper motor No.2 signal (2):

Channel	Probe	Terminal No.
2	+	E19-16
	–	E20-9

Stepper motor No.3 signal (1):

Channel	Probe	Terminal No.
1	+	E19-23
	–	E20-9

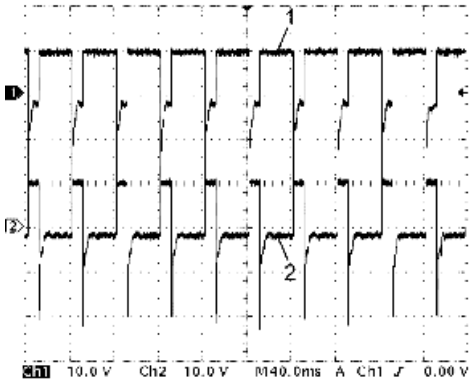
Stepper motor No.4 signal (2):

Channel	Probe	Terminal No.

2	+	E19-22
	–	E20-9

Measurement condition

- Engine switch: For 10 sec. from ignition mode to "ON"



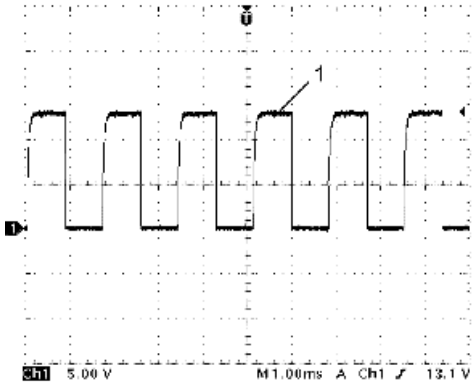
Secondary pulley speed sensor signal

Secondary pulley speed sensor signal (1):

Channel	Probe	Terminal No.
1	+	E20-5
	–	E20-9

Measurement condition

- Vehicle: Drive vehicle at 20 km/h (12 mile/h)
- CVT: After warming up



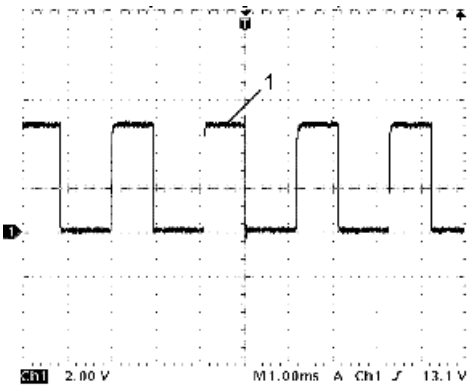
Primary pulley speed sensor signal

Primary pulley speed sensor signal (1):

Channel	Probe	Terminal No.
1	+	E20-14
	–	E20-9

Measurement condition

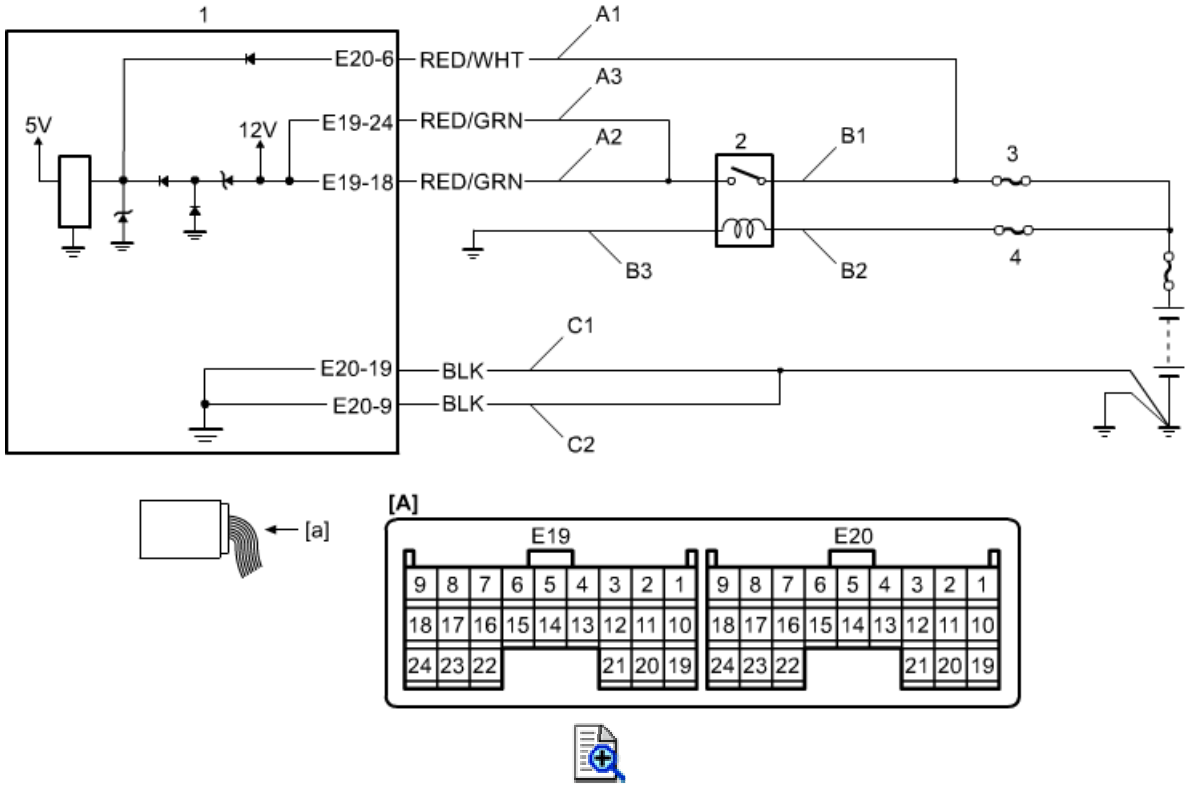
- Vehicle: Drive vehicle at 20 km/h (12 mile/h)
- CVT: After warming up


1
Ch1 2.00 V
M1.00ms A Ch1 13.1 V

5E

TCM Power Supply and Ground Circuit Check

Circuit Diagram



[A]: TCM connector (View: [a])	B2: CVT relay power supply circuit (coil side)	2. CVT relay (built power integration)
A1: Back up power supply circuit	B3: CVT relay ground circuit	3. "AT" fuse
A2: TCM power supply circuit 1	C1: TCM ground circuit 1	4. "IG1 SIG" fuse
A3: TCM power supply circuit 2	C2: TCM ground circuit 2	
B1: CVT relay power supply circuit (switch side)	1. TCM	

Troubleshooting

Step	Action	YES	NO
1	**Back up power supply circuit check** 1) Confirm that ignition mode of keyless push start system is "OFF". 2) Disconnect "E19" and "E20" connectors. 3) Check for proper terminal connection to "E19" and "E20" connectors.	Go to Step 2.	Repair or replace defective wire harness.

	4) If connections are OK, check that voltage between "A1" circuit and ground is battery voltage. ***Is it in good condition?***		
2	**CVT relay power supply circuit (switch side) check** 1) Remove power integration from main fuse box. 2) Check for proper terminal connection for power integration connector. 3) If connections are OK, check that voltage between "B1" circuit and ground is battery voltage. ***Is it in good condition?***	Go to Step 3.	Repair or replace defective wire harness.
3	**CVT relay power supply (coil side) circuit check** 1) Push engine switch to change ignition mode to "ON". 2) Check that voltage between "B2" circuit and ground is battery voltage. ***Is it in good condition?***	Go to Step 4.	Repair or replace defective wire harness.
4	**CVT relay ground circuit check** 1) Check that voltage between "B2" and "B3" circuits are battery voltage. ***Is it in good condition?***	Go to Step 5.	Repair or replace defective wire harness.
5	**CVT relay check** 1) Check CVT relay. ☞ ***Is it in good condition?***	Go to Step 6.	Replace CVT relay (power integration).
6	**Main power supply circuit check** 1) Push engine switch to change ignition mode to "OFF". 2) Install power integration. 3) Push engine switch to change ignition mode to "ON". 4) Check that voltage between each of "A2" and "A3" circuits and ground are battery voltage. ***Are they in good condition?***	Go to Step 7.	Repair or replace defective wire harness.

7	**TCM ground circuit check** 1) Push engine switch to change ignition mode to "OFF". 2) Check that resistance between each of "C1" and "C2" circuits and ground are less than 1 Ω. ***Are they in good condition?***	TCM power and ground circuit is in good condition.	Repair or replace defective wire harness.

5E

TCM Initialization and Learning Control

In this operation, perform initialization procedure before performing learning control procedure.

CAUTION:
- **When replacing TCM and CVT assembly, be sure to perform "TCM Initialization and Learning Control".**
- **When replacing TCM and CVT assembly, replace CVT assembly first and then replace TCM. If CVT assembly is replaced before replacing TCM, be sure to perform initialization procedure [B].**
- **Neglecting this initialization may result in excessive shift shock.**

Initialization Procedure

1) Select initialization procedure from table below.

Initialization procedure	Service item
[A]	Replace TCM with new one
[B]	• Replace TCM with used one • Replace CVT assembly

2) Perform selected initialization procedure as follows.

Initialization procedure [A]:

a) Push engine switch to change ignition mode to "ON" and shift select lever to "P" range.

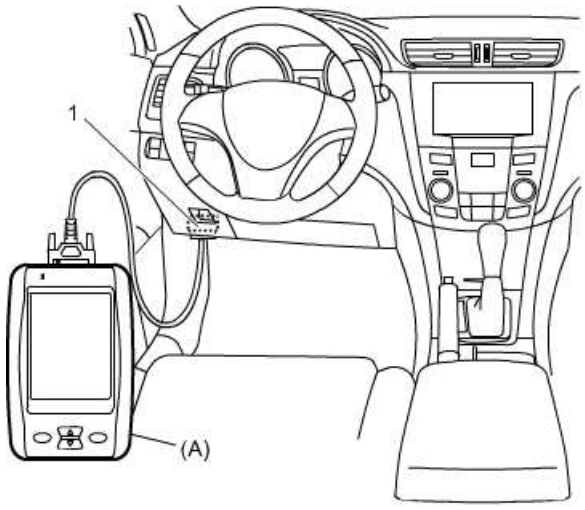
b) Check that the shift position indicated in information display comes on in approx. 2 sec. after engine switch is pressed to change ignition mode to "ON". If the shift position does not come on, check the following items:
- Check for open or shorted to ground in wiring harness between TCM and ROM in CVT assembly. ☞
- Check for proper terminal connection to TCM connector and solenoid connector.

Initialization procedure [B]:

a) Confirm that ignition mode of keyless push start system is "OFF" and connect SUZUKI scan tool to DLC (1).

Special Tool

(A): SUZUKI scan tool (SUZUKI-SDT)



b) Push engine switch to turn "ON" ignition switch.
c) Select "Learning Value Initialization" function under "Utility" mode on SUZUKI scan tool, and follow the instructions displayed on SUZUKI scan tool.
d) Push engine switch to change ignition mode to "OFF" and leave ignition mode in "OFF" for 10 sec.
e) Shift select lever to "P" range.
f) Check that the shift position indicated in information display comes on in approx. 2 sec. after engine switch is pressed to change ignition mode to "ON". If the shift position does not come on, check the following items:
- Check for open or shorted to ground in wiring harness between TCM and ROM in CVT assembly.
- Check for proper terminal connection to TCM connector and solenoid connector.

Learning Control Procedure

CAUTION:
To perform the learning function normally, follow instructions below:
- **When operating the select lever, hold it for more than 2 sec. in each position.**
- **Do not shift the select lever from "N" position to other positions until specified idle engine speed is obtained.**

Cold condition

1) Select "Data List" mode on SUZUKI scan tool.
2) Cool down CVT fluid to ambient temperature.
3) Start engine.
4) Depress brake pedal fully and repeat shift operation from "N" range to "D" range, and from "N" range to "R" range 3 times for each gear shift. If excessive shift shock is observed, repeat this operation 10 times.
5) Depress brake pedal fully at idle speed and hold in "D" range for 20 sec.
6) Drive vehicle so that CVT fluid temperature reaches 40 °C (104 °F)
7) Drive vehicle at 40 – 50 km/h (25 – 31 mile/h) constantly for 5 sec. in "D" range.

Hot condition

1) Drive vehicle so that CVT fluid temperature reaches 80 °C (176 °F)
2) Depress brake pedal fully and repeat shift operation from "N" position to "D" position and from "N" position to "R" position 3 times each. If excessive shift shock is observed, repeat this operation 10 times.
3) Depress brake pedal fully at idle speed and hold in "D" position for 20 sec.
4) Drive vehicle at 40 – 50 km/h (25 – 31 mile/h) constantly for 5 sec. in "D" position.

5E

CVT Fluid Check

CAUTION:
- **To obtain proper data from CVT performance test, check and adjust the fluid level before the test.**
- **If any checking of CVT is carried out without checking and adjusting the fluid level, the checking result may show a discrepancy.**

1) Check CVT fluid for deterioration referring to factors shown below.
Replace CVT fluid and also check functioning of CVT and the vehicle if any faulty conditions are found. ☞

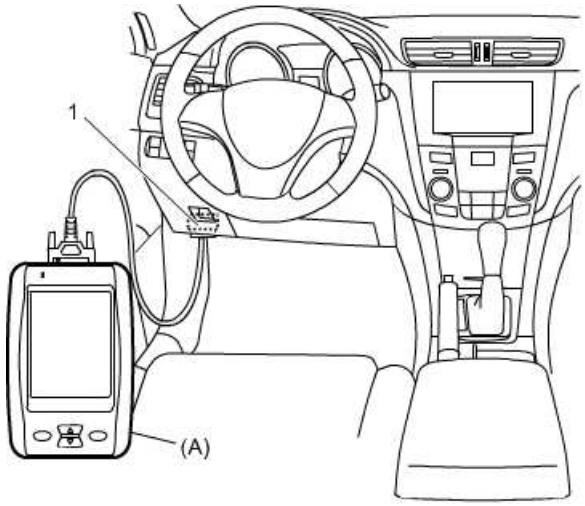
NOTE:
Burning smell or heavy discoloration of CVT fluid suggests that dust-size friction material particles are mixed in the fluid. In that case, replacement of CVT assembly may be required.

- Varnish-like appearance
- Milky or whitish appearance
- Large amount of metal particles mixed in fluid

2) Confirm that ignition mode of keyless push start system is "OFF" and connect SUZUKI scan tool to DLC (1).

Special Tool

(A): SUZUKI scan tool (SUZUKI-SDT)



3) Display "Data List" mode on SUZUKI scan tool.

4) Drive vehicle so that CVT fluid temperature reaches normal operating temperature (70 – 80 °C (158 – 176 °F)).

NOTE:
Engine coolant temperature rises when racing engine at "P" or "N" range. But CVT fluid temperature does not rise at "P" or "N" range. Be sure to drive vehicle in order to rise CVT fluid temperature.

5) Stop vehicle with engine running and place it horizontally.

6) With select lever at "P" range, apply parking brake and block wheels.

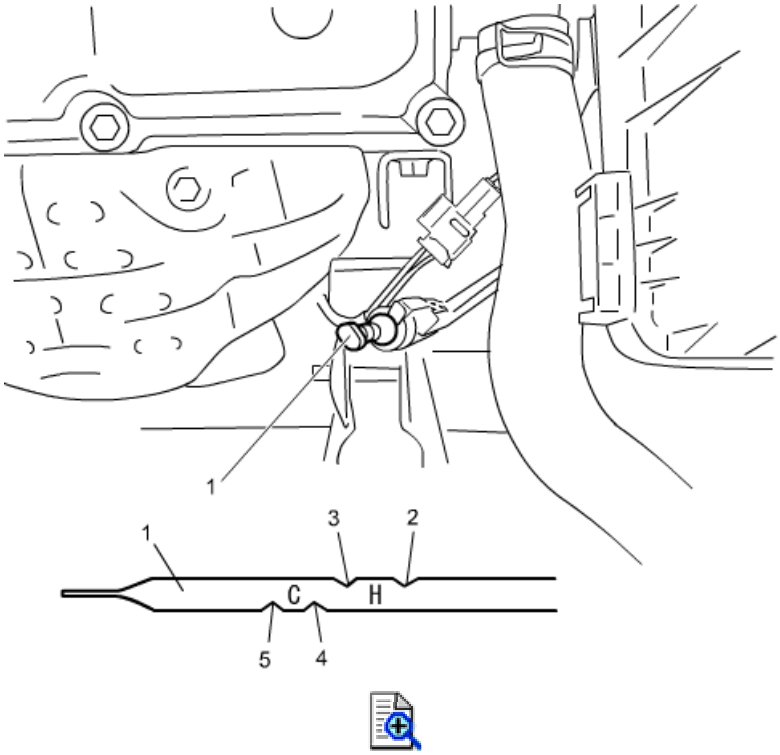
7) Keep engine idling, depress brake pedal fully and shift select lever slowly to "D" and back to "P" position.

8) With engine idling and A/C switch turned off, pull out fluid level gauge (1), wipe it off with lint-free paper towel and put it back into place.

9) Pull out fluid level gauge (1) again and check CVT fluid level indicated on it. Lowest fluid level should be between full hot (2) and low hot (3). If it is below low hot, add specified CVT fluid up to full hot.

CVT fluid specification

: SUZUKI CVT FLUID GREEN 1 or Shell GREEN-1 V



4.	Full cold mark
5.	Low cold mark

NOTE:

- **Do not race engine while checking fluid level, even after engine start.**
- **Although fluid level can be checked temporarily at room (cold) temperature of 20 – 30 °C (68 – 86 °F), this level check is considered to be preparation before performing level check under normal operating (hot) temperature.**
- **Bringing level from low hot to full hot requires 0.6 liters (1.27 / 1.06 US / Imp. pt.).**
- **If vehicle was driven under high load such as pulling trailer, fluid level should be checked about half an hour after it is stopped.**
- **Check lower position of fluid on both sides of level gauge.**

CVT Fluid Change

CAUTION:
- **Do not use any fluid other than specified CVT fluid. Use of any fluid other than specified CVT fluid may cause juddering or some other faulty condition to occur.**
- **Do not overfill. Overfilling can cause foaming and loss of fluid through breather. Then slippage and transaxle failure can result.**
- **After changing CVT fluid, check drain plug for CVT fluid leakage.**
- **Do not change or drain CVT fluid before each test.**

NOTE:
CVT fluid does not drain completely.

1) Hoist vehicle.

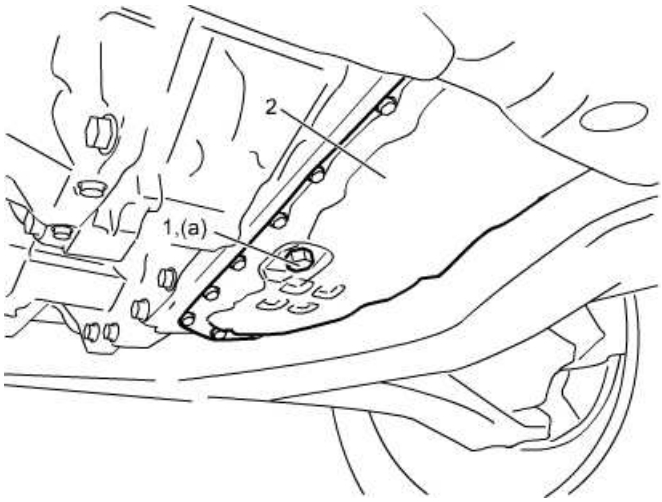
2) Remove left side engine undercover.

3) When engine is cool, remove CVT fluid drain plug (1) from CVT oil pan (2) and drain CVT fluid.

4) Install CVT fluid drain plug (1) with new gasket and then tighten it to specified torque.

Tightening torque

CVT fluid drain plug (a): 34 N·m (3.5 kg-m, 25.0 lbf-ft)



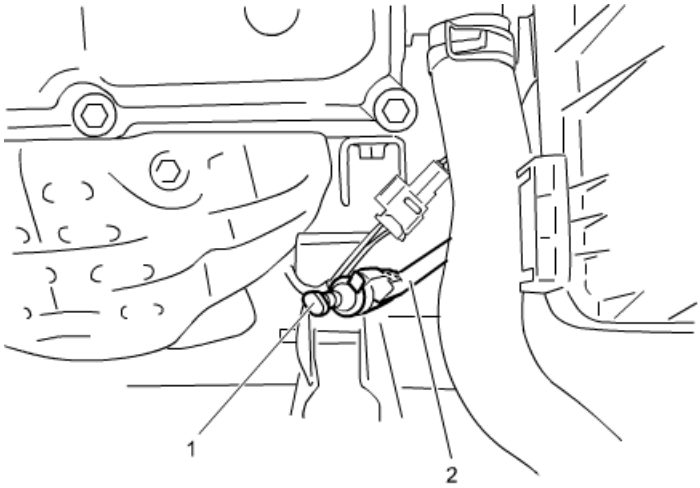
5) Lower vehicle and replenish proper amount of specified CVT fluid from fluid filler tube (2).

CVT fluid specification

: SUZUKI CVT FLUID GREEN 1 or Shell GREEN-1 V

CVT fluid capacity

Reference: 8.3 liters (17.54 / 14.61 US / Imp.pt.).



1.	Fluid level gauge

6) Check CVT fluid level. ☞
7) Check drain plug for CVT fluid leakage.
8) Install left side engine undercover.

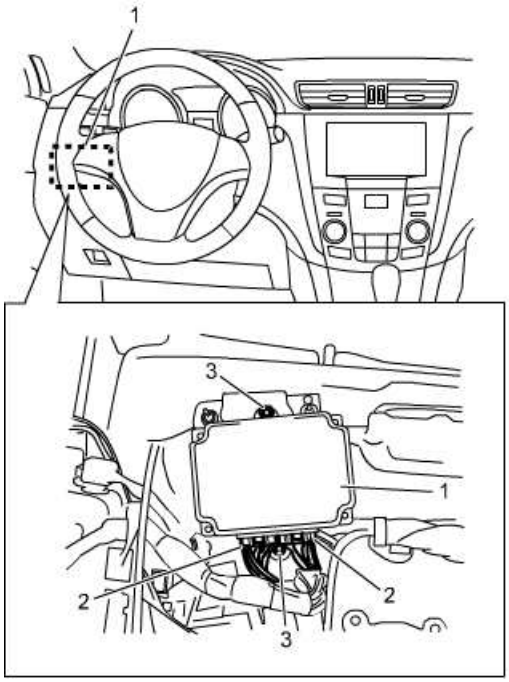
5E

Transmission Control Module (TCM) Removal and Installation

CAUTION:
- **TCM consists of highly precise parts, therefore when handling it, be careful not to expose to excessive shock.**
- **When performing the replacing TCM with used one, all learned controls which are stored in TCM memory should be erased after the replacement.** ☞
  Neglecting this initialization may cause excessive shift shock.

Removal

1) Disconnect negative (–) cable at battery.
2) Remove driver side instrument panel undercover. ☞
3) Disconnect connectors (2) from TCM (1).
4) Remove TCM by removing nuts (3).



Installation

Reverse removal procedure noting the following points.
- After replacing TCM, perform ***TCM Initialization and Learning Control***.

5E

Shift Paddle Switch Removal and Installation

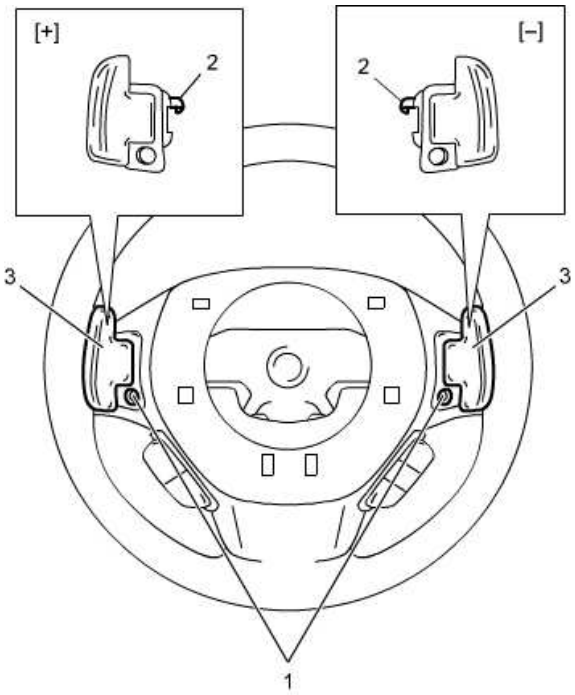
CAUTION:
To avoid impairment of the original performance, do not remove horn plate from steering wheel assembly. If it is removed, one replace the entire steering wheel assembly with new one.

Removal

1) Remove steering wheel. ☞

2) Remove screws (1) and release claws (2).

3) Disconnect connectors and then remove shift paddle switches (3).



Installation

Reference: Shift Paddle Switch Inspection

Reverse removal procedure.

5E

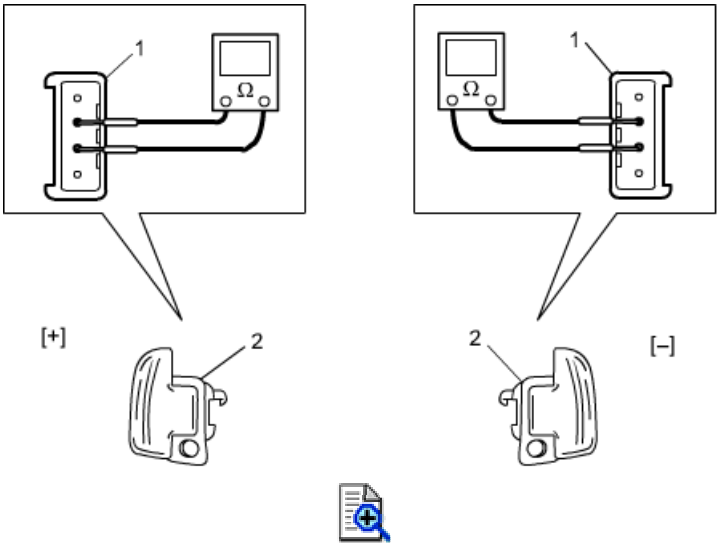
Shift Paddle Switch Inspection

Reference: Shift Paddle Switch Removal and Installation

Check for continuity between terminals of shift paddle switch connectors (1). Replace steering wheel assembly if check result is not as specified.

Shift paddle switch specification

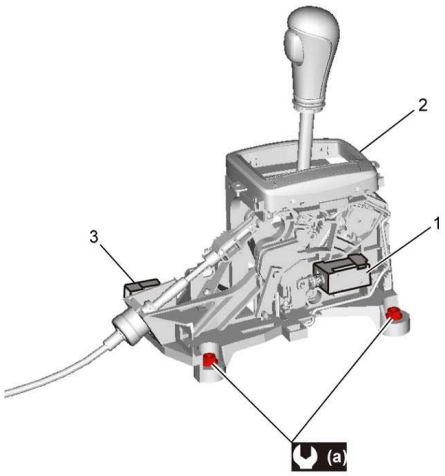
Condition	Specification
Pulled	Continuity
Released	No continuity



2. Shift paddle switch

5E

Select Lever Assembly Components



1.	Shift lock solenoid	3.	Select lever connector
2.	Select lever assembly	(a) :	13 N·m (1.3 kgf-m, 9.5 lbf-ft)

5E

Select Lever Assembly Removal and Installation

Removal

1) Disconnect negative (–) cable at battery.
2) Remove console box. ☞
3) Disconnect adjuster case (select cable end) from select lever assembly. ☞
4) Disconnect select lever connector.
5) Remove select lever nuts and detach select lever assembly from floor panel.

Installation

Reverse removal procedure noting the following points.

- Tighten select lever nuts to specified torque. ☞
- After installing select lever assembly, adjust select cable. ☞

5E

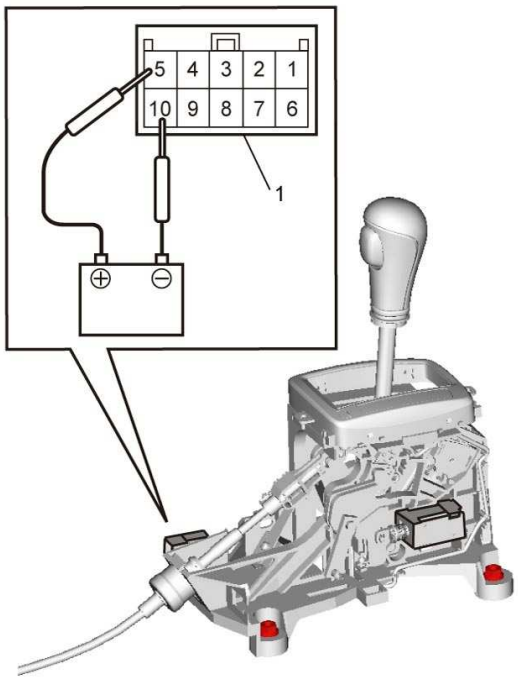
Shift Lock Solenoid Inspection

CAUTION:
- **When connecting cables from battery for operation check, make sure not to create any accidental shorts.**
- **Reverse connection of polarity may damage shift lock solenoid.**

1) Remove console box.

2) Disconnect select lever connector (1).

3) Check that shift lock solenoid rod moves smoothly and returns when positive terminal of battery is connected to terminal "5" and negative terminal of battery is connected to terminal "10".
If solenoid rod does not move smoothly, replace select lever assembly.



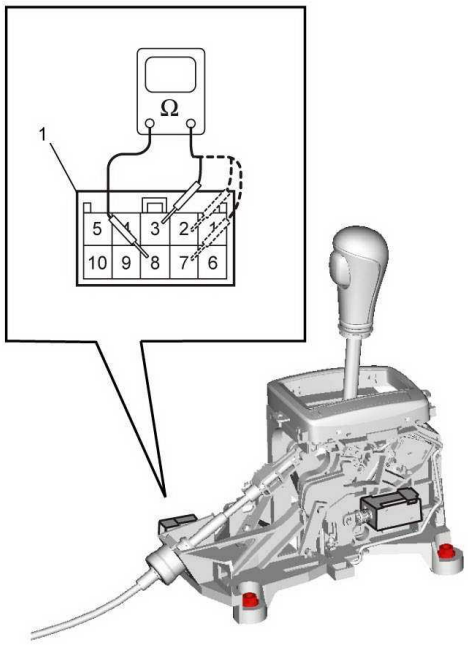
5E

Manual Mode Shift Switch Inspection

1) Remove console box.

2) Disconnect select lever connector (1).

3) Check for continuity between terminals at each switch position. If check result is not as specified, replace select lever assembly.



		Terminal			
		2	3	7	8
Select lever position	"M" (Manual mode on)		○		○
	"+" (Shift up)	○			○
	"-" (Shift down)			○	○

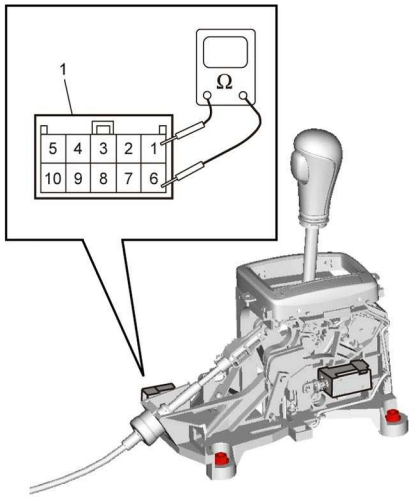
5E

P Position Switch Inspection

1) Remove console box.
2) Disconnect select lever connector.
3) Check for continuity between terminals "1" and "6" of select lever connector (1). If check result is not as specified, replace select lever assembly.

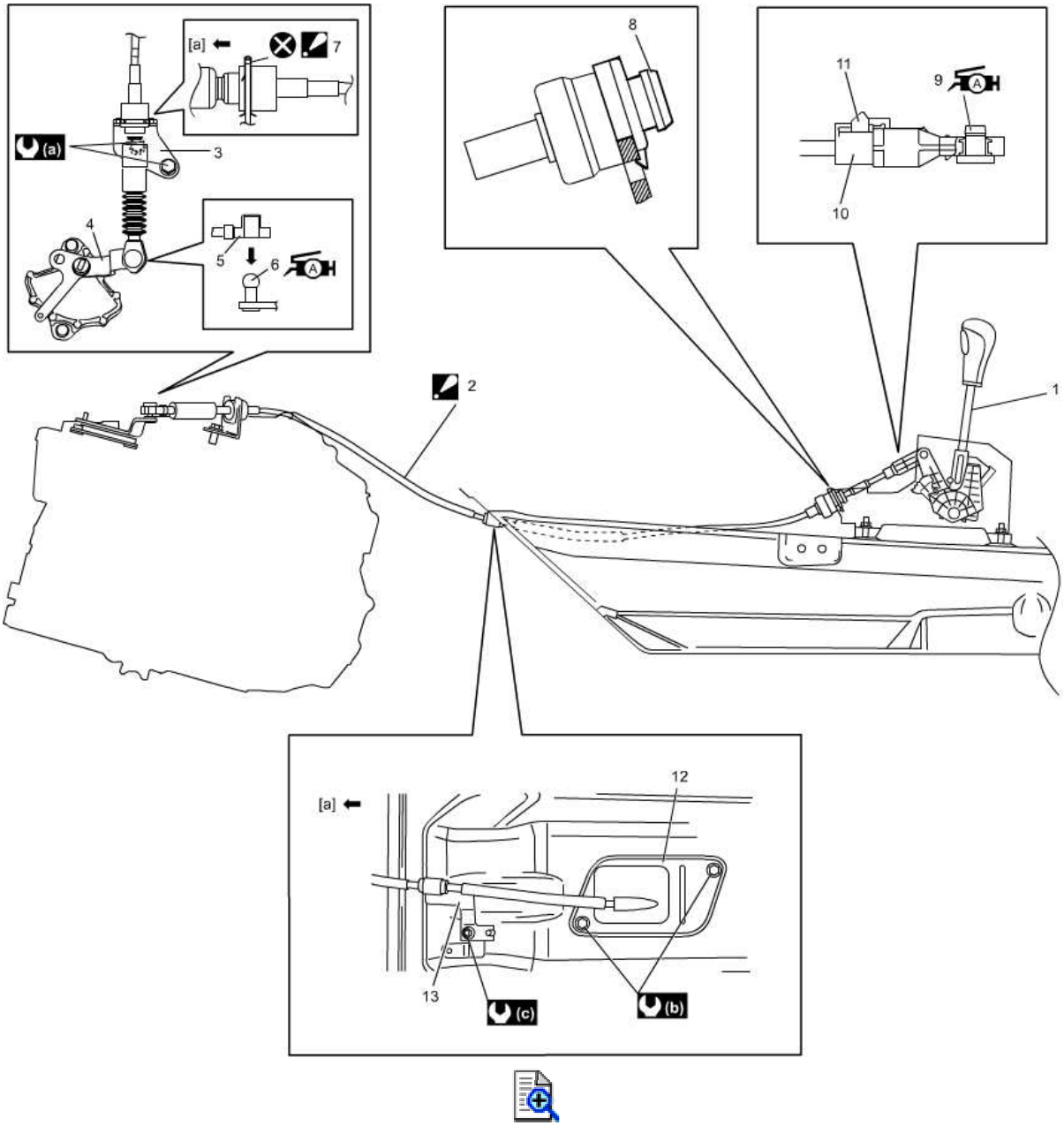
P position switch specification

Condition	Specification
"P" range	Continuity
Other than "P" range	No continuity



5E

Select Cable Components



[a]: Vehicle forward	Manual select lever pin : Apply grease 99000-25011 6.	12. Select cable retainer
1. Select lever assembly	7. Clip : Insert clip so that the claw is positioned toward the vehicle forward.	13. Clamp
Select cable After completing installation, 2. adjust select cable.	8. Casing cap : Make sure that claw of the casing cap fit completely to the select lever assembly.	(a) : 23 N·m (2.3 kgf -m, 17.0 lbf-ft)
3. Select cable bracket	Select lever pin : Apply grease 99000-25011 9.	(b) : 5.5 N·m (0.56 kgf-m, 4.0 lbf-ft)

4. Manual select lever	10. Adjuster case	: 10 N·m (1.0 kgf -m, 7.5 lbf-ft)
5. Select cable clip	11. Lock plate	: Do not reuse

5E

Select Cable Removal and Installation

Reference: Select Cable Components

WARNING:
To avoid getting burned, do not work on exhaust system when it is hot. Exhaust system must be completely cool before beginning any work on it.

Removal

1) Disconnect negative (–) cable at battery.
2) Remove air cleaner assembly. ☞
3) Remove console box. ☞
4) Disconnect select cable from select lever and then detach it from bracket. ☞
5) Remove clip of select cable and disconnect select cable from manual select lever.
6) Remove select cable retainer from dash panel.

Installation

Reference: Select Cable Adjustment

Reverse removal procedure noting the following points.

- Apply grease to pin and cable joint. ☞
- Use new clip.
- Tighten bolts to specified torque. ☞
- Adjust select cable. ☞

Select Cable Inspection

Perform ***Select Cable Adjustment*** if check results are not satisfactory:
Check the following points:

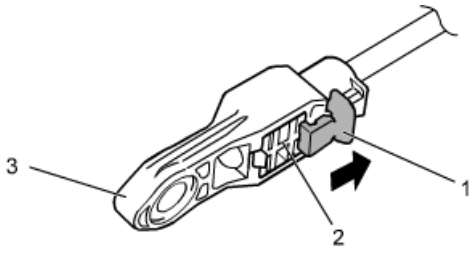
- Check that engine starts at "P" and "N" positions, and check that it does not start at other positions.
- Perform ***"P" Range Test***.
- Check that back-up light turns on when select lever is shifted to "R" position.
- Check that shift position indicator display is consistent with select lever position.

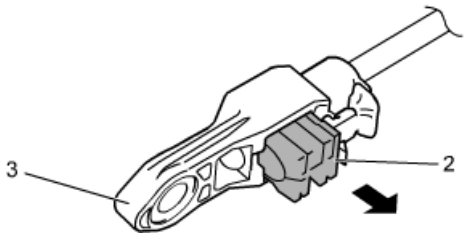
5E

Select Cable Adjustment

Reference: Select Cable Removal and Installation

1) Apply parking brake and block wheels.
2) Push engine switch to change ignition mode to "ON", shift select lever to "N" range.
3) Remove air cleaner assembly. ☞
4) Remove console box. ☞
5) Remove adjuster case (cable end) from select lever pin of select lever assembly. ☞
6) Release lock plate (1) which restricts moving of lock piece (2).
7) Pull out lock piece (2) from adjuster case (3) using pliers or the like to disengage cable.

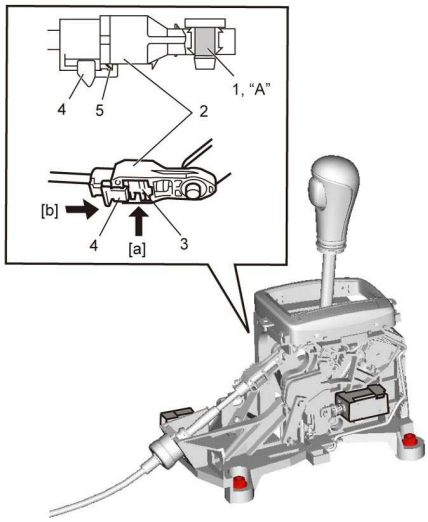




8) Check that manual select lever is "N" range, referring to Step 4) of ***Transmission Range Sensor Inspection***.
9) Apply grease to select lever pin (1), and then install adjuster case (2) into select lever pin securely.

"A": Grease 99000–25011 (SUZUKI Super Grease A)

10) Push lock piece (3) in arrow direction [a] as shown in figure.
11) Slide lock plate (4) in arrow direction [b] as shown in figure, until it gets over the claw (5).



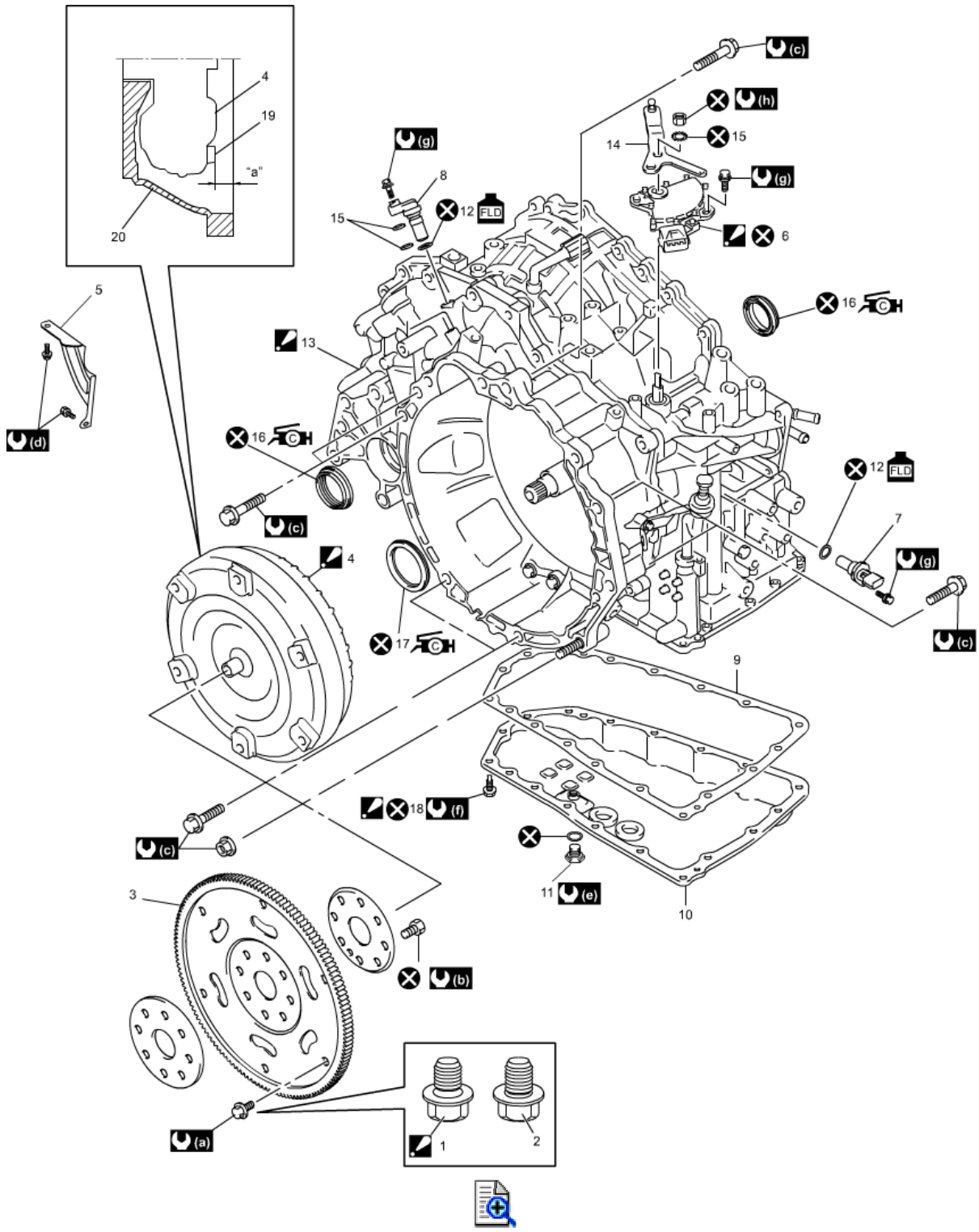
12) After installing select cable, check the following points.
- Perform ***"P" Range Test***.
- Check back-up light is turned on when shifting select lever to "R" range.
- Check shift position indicated in information display is consistent with select lever range.
- Check engine starts at "P" and "N" ranges but does not start at other than "P" and "N" ranges.

13) Install air cleaner assembly.

5E

CVT Assembly Components

CAUTION:
Check that distance "a" is more than 17.0 mm (0.669 in.) when installing.



1. Torque converter bolt No.1 : For installation, refer to ***CVT Assembly Dismounting and Remounting***.	11. Drain bolt	(a) : 23 N·m (2.3 kgf -m, 17.0 lbf-ft)

2. Torque converter bolt No.2	12. O-ring	(b): 70 N·m (7.1 kgf-m, 52.0 lbf-ft)
3. Drive plate	13. CVT assembly : Never disassemble CVT assembly.	(c): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)
4. Torque converter : For installation, refer to ***Input Shaft Oil Seal Replacement***.	14. Manual select lever	(d): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)
5. Drive plate cover	15. Washer	(e): 34 N·m (3.5 kgf-m, 25.0 lbf-ft)
6. Transmission range sensor : After completing installation, Adjust transmission range sensor.	16. Differential side oil seal : Apply grease 99000-25030 to oil seal lip.	(f): 7.9 N·m (0.81 kgf-m, 6.0 lbf-ft)
7. Primary pulley speed sensor	17. Input shaft oil seal : Apply grease 99000-25030 to oil seal lip.	(g): 5.9 N·m (0.60 kgf-m, 4.5 lbf-ft)
8. Secondary pulley speed sensor	18. CVT oil pan bolt : For tightening order, refer to ***CVT Oil Pan Removal and Installation***	(h): 17 N·m (1.7 kgf-m, 12.5 lbf-ft)
9. CVT oil pan gasket	19. Flange nut	FLD: Apply CVT fluid
10. CVT oil pan	20. CVT case	: Do not reuse.

5E

CVT Assembly Dismounting and Remounting

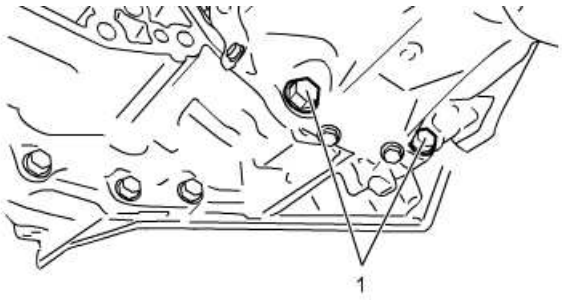
Reference: CVT Assembly Components

WARNING:
Be sure to keep CVT assembly with torque converter horizontal or facing up throughout the work. Torque converter should be tilted to avoid fall it off. Otherwise, personal injury may occur.

CAUTION:
When replacing CVT assembly, all learned controls which are stored in TCM memory should be erased after the replacement. ☞
Neglecting this initialization may cause excessive shift shock.

Dismounting

1) Remove bolts (1) fastening engine and CVT assembly.



2) Dismount CVT assembly with engine. ☞

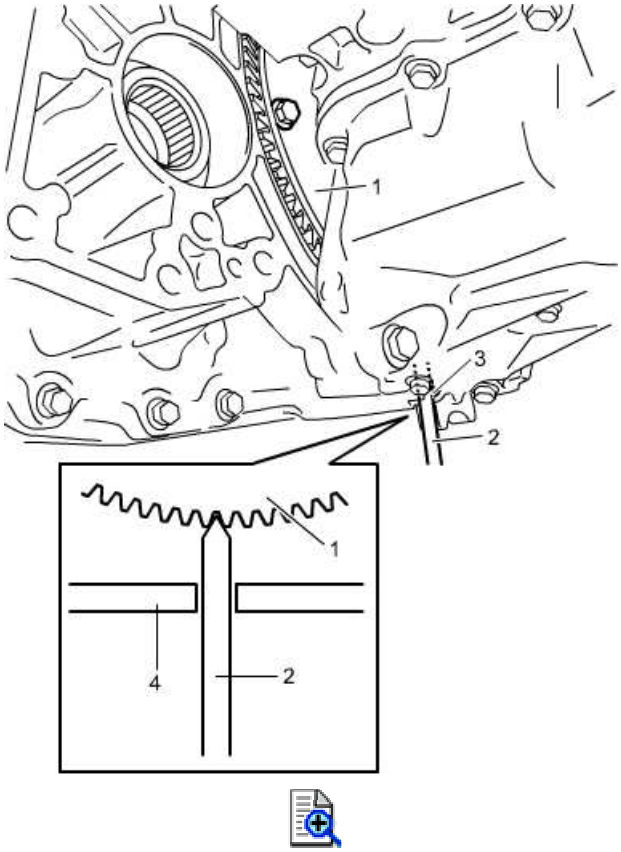
3) Remove front drive shafts. ☞

4) For 4WD model, remove transfer. ☞

5) For 2WD model, remove drive intermediate shaft. ☞

6) Remove drive plate cover. ☞

7) Remove torque converter No.1 and No.2 bolt as follows.
a) Insert flat-end screwdriver or the like (2) to hole (3) of CVT assembly as shown in figure.
b) Lock drive plate (1), engage a flat-end screwdriver or the like with gear of drive plate as shown in figure.
c) Remove torque converter No.1 or No.2 bolt through drive plate cover opening.
d) Turn crankshaft by 60° by turning crankshaft pulley bolt using wrench.
e) Repeat Step a) through c) 5 times.



4. CVT case

8) Remove starting motor. ☞

9) Remove the following parts. ☞

- Front mounting bracket
- Rear mounting
- Engine rear mounting bracket No.1
- Engine rear mounting bracket No.2

10) Remove bolts and nut fastening engine and CVT assembly, and then detach CVT assembly from engine.

CAUTION:
When detaching CVT assembly from engine, move it in parallel with crankshaft and be careful not to apply excessive force to drive plate and torque converter.

Remounting

1) Make sure that torque converter is installed correctly to CVT assembly. ☞

2) Attach CVT assembly to engine.

3) Tighten bolts and nut to specified torque. ☞

4) Install the following parts. ☞

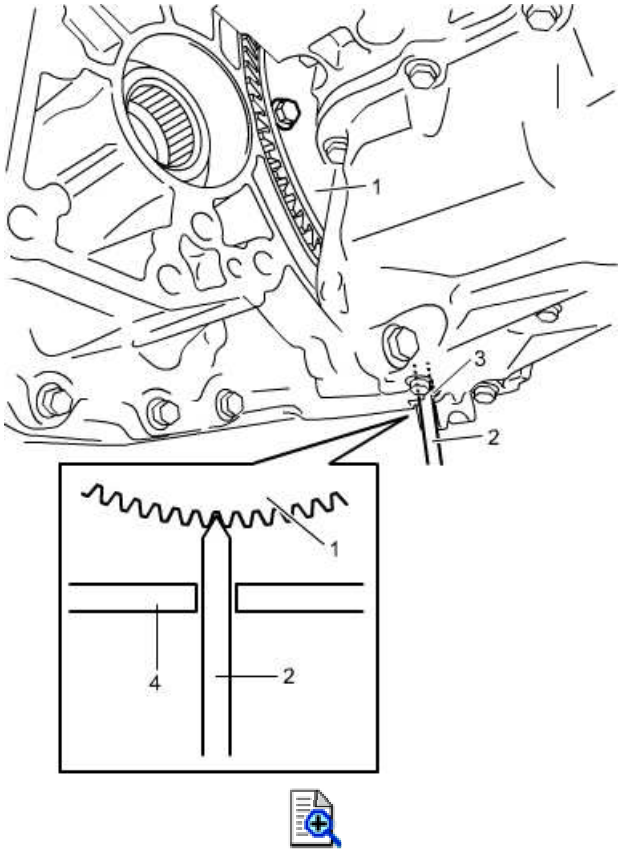
- Front mounting bracket
- Rear mounting
- Engine rear mounting bracket No.1
- Engine rear mounting bracket No.2

5) Tighten torque converter No.1 and No.2 bolts as follows.

NOTE:

Torque converter No.1 bolt is used for accurate positioning.
Tighten torque converter No.1 bolt first so that bolt holes for torque converter and drive plate are positioned properly, and that torque converter No.2 bolt is tightened securely.
One torque converter No.1 bolt and five torque converter No.2 bolts are required to secure torque converter and drive plate.

a) Align bolt hole of drive plate with bolt hole of torque converter by turning crankshaft.
b) Insert flat-end screwdriver or the like (2) to hole (3) of CVT assembly as shown in figure.
c) Lock drive plate (1), engage a flat-end screwdriver or the like with gear of drive plate as shown in figure.



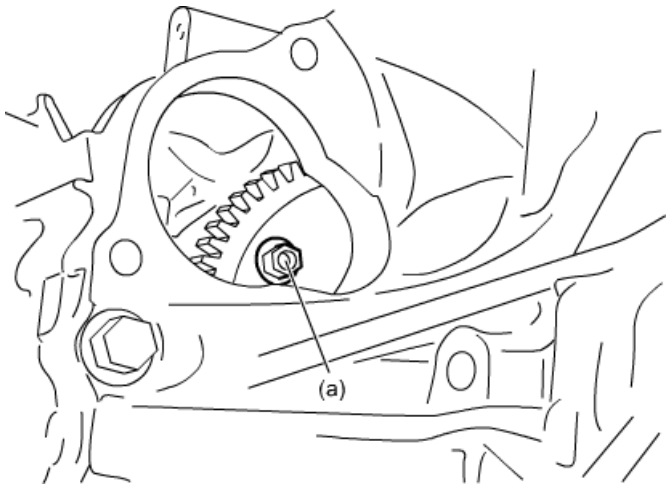
4. CVT case

d) Tighten torque converter No.1 bolt to 5 N·m (0.51 kgf-m, 4.0 lbf-ft) through starting motor opening.
e) Turn crankshaft by 60° and tighten torque converter No.2 bolts by hand through starting motor opening.
f) Tighten torque converter No.1 bolt to specified torque.

Tightening torque
Torque converter No.1 bolt (a): 23 N·m (2.3 kg-m, 17.0 lbf-ft)

g) Turn crankshaft by 60° and tighten torque converter No.2 bolts to specified torque.

Tightening torque
Torque converter No.2 bolt (a): 23 N·m (2.3 kg-m, 17.0 lbf-ft)



6) Install starting motor.

7) Install drive plate cover.

8) For 2WD model, install drive intermediate shaft.

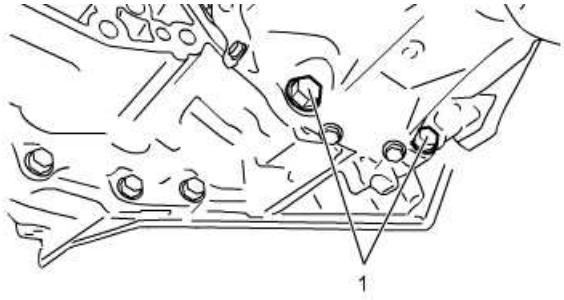
CAUTION:
Be careful not to scratch oil seal lip with center shaft while installing.

9) For 4WD model, install transfer.

10) Install front drive shaft.

11) Remount engine with CVT assembly to vehicle.
Refer to ***Engine Assembly Removal and Installation***.

12) Tighten engine fastening bolts (1) and CVT assembly to specified torque.



13) Refill CVT fluid.

14) Check CVT fluid level.

15) After installation, check for CVT fluid leakage at each connection.

16) After replacing CVT assembly, perform learning control initialization.

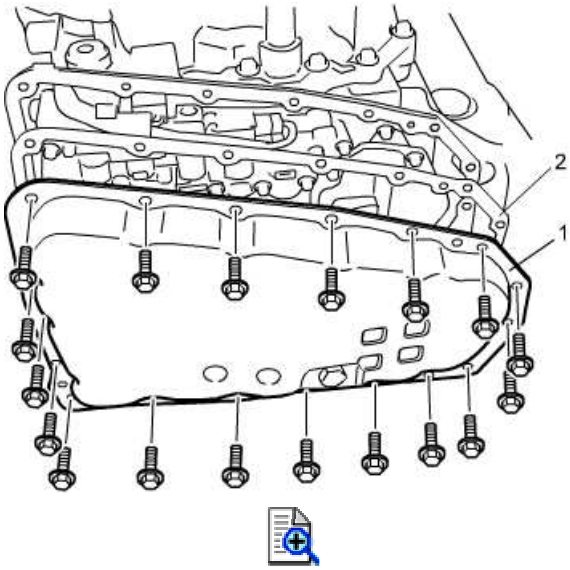
5E

CVT Oil Pan Removal and Installation

CAUTION:
- **Do not use any fluid other than specified CVT fluid. Use of any fluid other than specified CVT fluid may cause juddering or some other faulty condition to occur.**
- **Use lint-free paper not cloth rags.**
- **Do not reuse CVT fluid.**

Removal

1) Hoist vehicle.
2) Remove left side engine undercover.
3) Drain CVT fluid.
4) Remove CVT oil pan (1) and oil pan gasket (2).



Installation

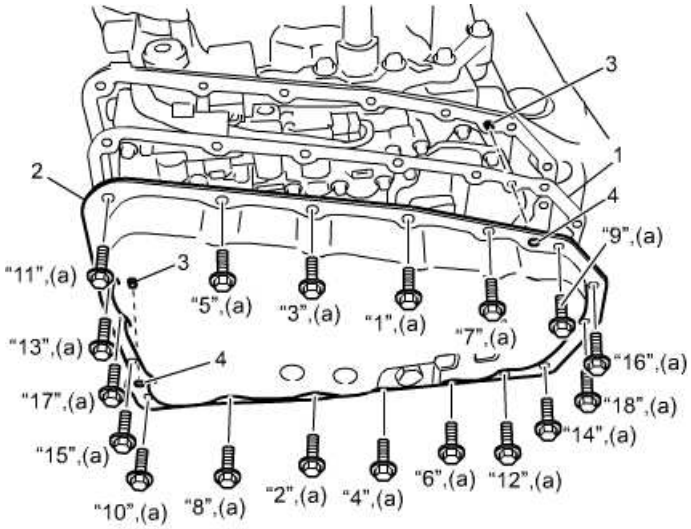
Reference: CVT Oil Pan Inspection

Reverse removal procedure noting the following points.
- Clean matching surface of CVT case and CVT oil pan. Remove CVT fluid, old gasket and dust from matching surface.
- Use new gasket (1) for CVT oil pan (2).
- Align the dowel pin (3) of CVT case and the dowel pin hole (4) of CVT oil pan, and then install CVT oil pan.
- Tighten CVT oil pan bolts in numerical order (“1” – “18”) evenly and gradually to specified torque.

CAUTION:
Be sure to use new oil pan bolts pre-coated with adhesive. Otherwise, bolts may loosen.

Tightening torque

CVT oil pan bolt* (a): 7.9 N·m (0.81 kg-m, 6.0 lbf-ft)



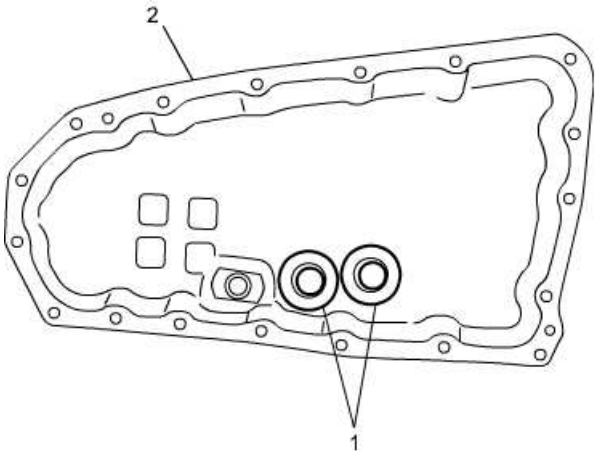
- Replenish CVT fluid. ☞
- Check CVT fluid level. ☞
- Check for CVT fluid leakage after warming up CVT.

5E

CVT Oil Pan Inspection

Reference: CVT Oil Pan Removal and Installation

- Check that no metal particle is attached to the oil cleaner magnets (1). If attached, clean it.
- Check CVT oil pan (2) for crack, deformation, and damage. If any defect is found, replace CVT oil pan.



5E

Transmission Range Sensor Inspection

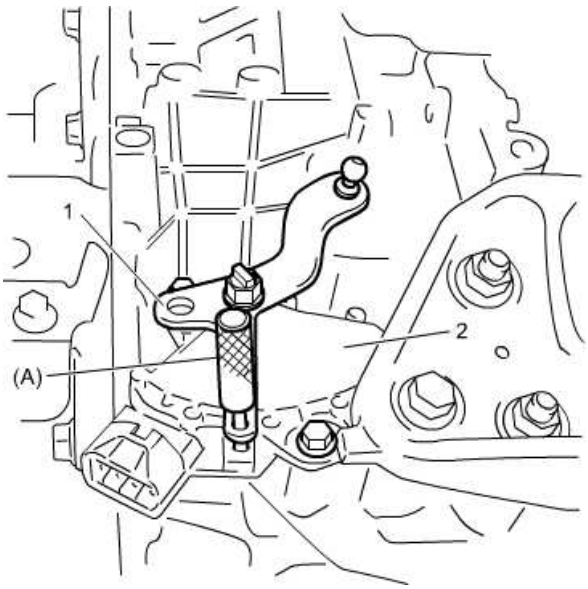
CAUTION:
Do not reuse transmission range sensor.
Reusing of transmission range sensor may affect the performance of CVT system.

1) Disconnect negative (–) cable at battery.

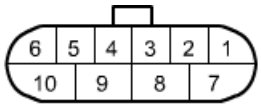
2) Remove air cleaner assembly. ☞

3) Shift select lever to "N" position and use special tool to check that aligning holes on manual select lever (1) and transmission range sensor (2) are aligned as shown in figure. If not, adjust transmission range sensor. ☞

Special Tool
(A): 09916–44310



4) Check for continuity between terminals of transmission range sensor connector over each range shown in figure.



		Terminal									
		1	2	3	4	5	6	7	8	9	10
Select lever position	P				○	○		○			○
	R				○				○		
	N				○					○	
								○			○
	D		○		○						

5E

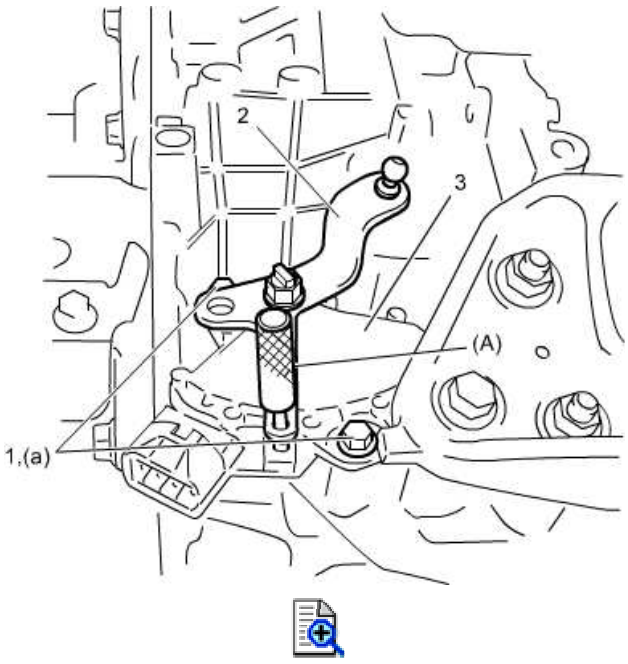
Transmission Range Sensor Adjustment

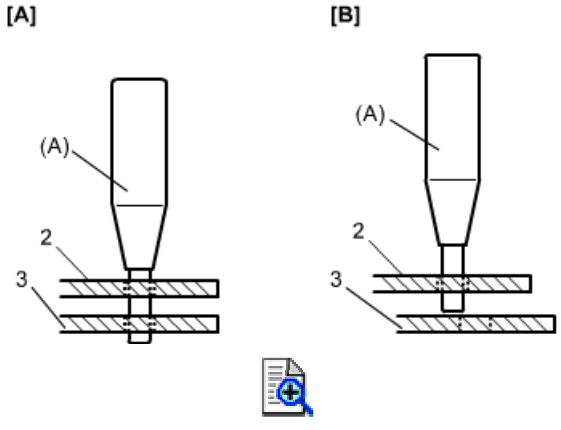
CAUTION:
Do not reuse transmission range sensor.
Reusing of transmission range sensor may affect the performance of CVT system.

1) Disconnect negative (–) cable at battery.
2) Remove air cleaner assembly. ☞
3) Shift select lever to "N" position and loosen transmission range sensor bolts (1).
4) Use special tool to align aligning holes on manual select lever (2) and transmission range sensor (3) as shown in figure.
5) Tighten transmission range sensor bolts to specified torque.

Special Tool
(A): 09916–44310

Tightening torque
Transmission range sensor bolt (a): 5.9 N·m (0.60 kg-m, 4.5 lbf-ft)





[A]: OK

[B]: NG

6) Check transmission range sensor for the following points.
- Check engine starts at "P" and "N" ranges but does not start at other than "P" and "N" ranges.
- Perform ***"P" Range Test***.
- Check back-up light is turned on when shifting select lever to "R" range.
- Check shift position indicated in information display is consistent with select lever range.

Transmission Range Sensor Removal and Installation

Removal

1) Disconnect negative (–) cable at battery.

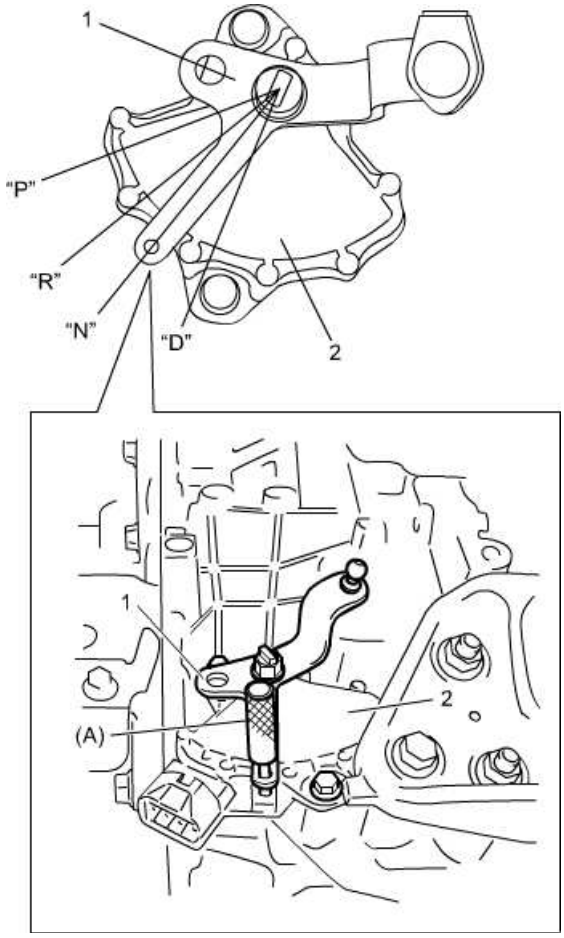
2) Remove air cleaner assembly. ☞

3) Shift manual select lever (1) to "N" position.
Insert special tool to aligning hole on manual select lever (1) and check that the position of aligning hole on transmission range sensor (2) as shown in figure.

4) Remove clip of select cable and disconnect select cable from manual select lever. ☞

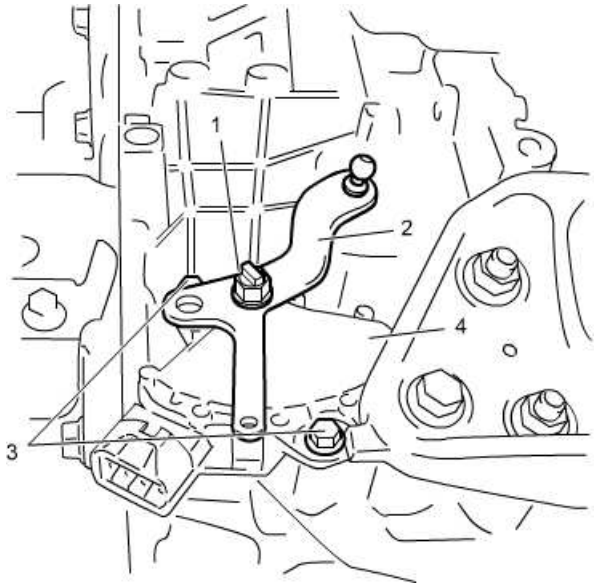
Special Tool
(A): 09916–44310

5) Disconnect transmission range sensor connector.



6) Remove manual select lever nut (1) and manual select lever (2).

7) Remove transmission range sensor bolts (3) and transmission range sensor (4).



Installation

Reference: Transmission Range Sensor Inspection

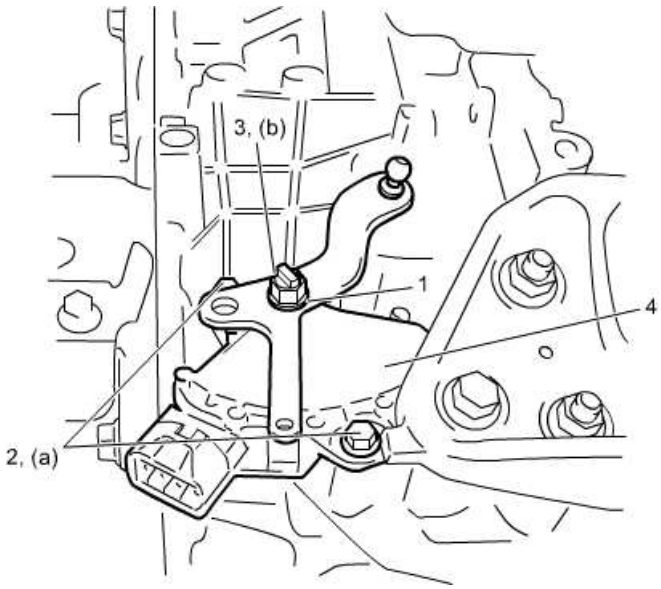
CAUTION:
Do not reuse transmission range sensor.
Reusing of transmission range sensor may affect the performance of CVT system.

Reverse removal procedure noting the following points.

- Adjust select cable. ☞
- Use new transmission range sensor (4).
- Use new washer (1).
- Adjust transmission range sensor. ☞
- Tighten transmission range sensor bolts (2) and new manual select lever nut (3) to specified torque.

Tightening torque

Transmission range sensor bolt (a): 5.9 N·m (0.60 kg-m, 4.5 lbf-ft)
Manual select lever nut (b): 17 N·m (1.7 kg-m, 12.5 lbf-ft)


3, (b)
1
4
2, (a)

5E

Primary Pulley Speed Sensor Removal and Installation

Removal

1) Disconnect negative (–) cable at battery.

2) Remove air cleaner inlet hose. ☞

3) Disconnect connector (1) from primary pulley speed sensor.

4) Remove primary pulley speed sensor (3) from transaxle by removing primary pulley speed sensor bolt (2).

Installation

Reference: Primary Pulley Speed Sensor and Secondary Pulley Speed Sensor Inspection

Reverse removal procedure noting the following points.

- Apply CVT fluid to new O-ring of sensor.
- Tighten primary pulley speed sensor bolt to specified torque.

Tightening torque

Primary pulley speed sensor bolt (a): 5.9 N·m (0.60 kg-m, 4.5 lbf-ft)

- Connect connector and fix wire harness with clamp securely.

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Secondary Pulley Speed Sensor Removal and Installation

CAUTION:
Be careful not to drop washer when removing and installing secondary pulley speed sensor.

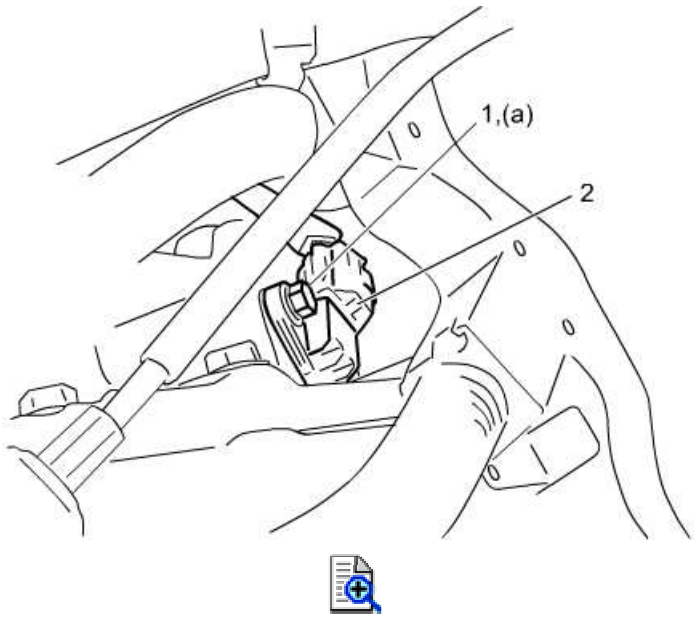
Removal

1) Disconnect negative (–) cable at battery.
2) Remove air cleaner assembly. ☞
3) Disconnect connector from secondary pulley speed sensor.
4) Remove secondary pulley speed sensor (2) from transaxle by removing secondary pulley speed sensor bolt (1).

Installation

Reference: Primary Pulley Speed Sensor and Secondary Pulley Speed Sensor Inspection
Reverse removal procedure noting the following points.
- Apply CVT fluid to new O-ring of sensor.
- Tighten secondary pulley speed sensor bolt to specified torque.

Tightening torque
Secondary pulley speed sensor bolt (a): 5.9 N·m (0.60 kg-m, 4.5 lbf-ft)



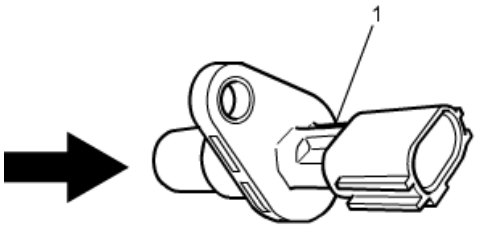
- Connect connector and fix wire harness with clamp securely.

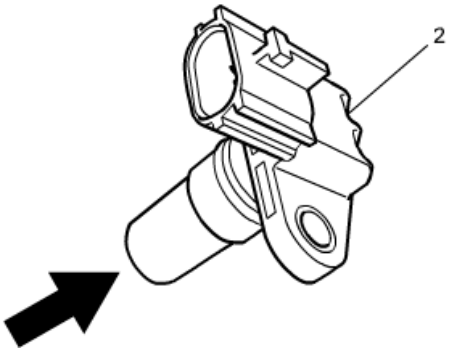
5E

Primary Pulley Speed Sensor and Secondary Pulley Speed Sensor Inspection

Reference: Primary Pulley Speed Sensor Removal and Installation
Reference: Secondary Pulley Speed Sensor Removal and Installation

1) Check the following points:
- O-ring is free of damage.
- End face of sensor is free of any metal particles and damage.

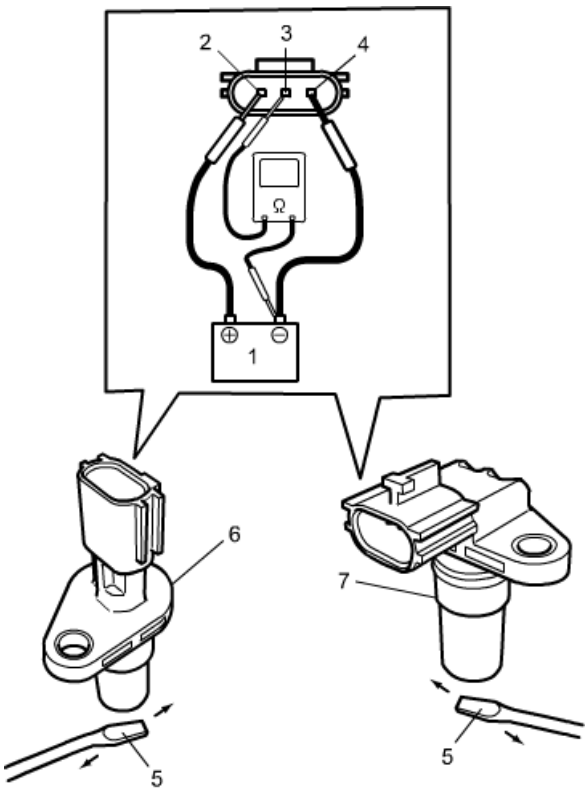




1.	Primary pulley speed sensor
2.	Secondary pulley speed sensor

2) Check sensors by the following procedure:
a) Arrange 12 V battery (1) and connect its positive terminal to terminal "2" (2) and negative terminal to terminal "4" (4) of primary pulley speed sensor connector or secondary pulley speed sensor connector.
b) Use ohmmeter to measure resistance between terminal "3" (3) of sensor connector and negative terminal of battery by passing flat-end screwdriver or the like (5) between them while maintaining an approximately 1 mm (0.03 in) gap with respect to end face of primary pulley speed sensor (6) or secondary pulley speed sensor (7).

Primary pulley speed sensor and secondary pulley speed sensor resistance
Less than 220 Ω (ON) ←→ Infinity (OFF)



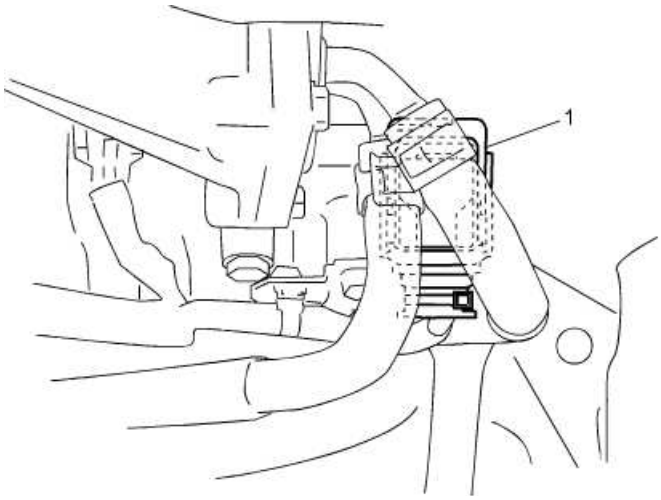
3) If resistance does not vary, replace primary pulley speed sensor or secondary pulley speed sensor.

5E

Solenoid Valve On-Vehicle Inspection

NOTE:
Do not remove valve body from CVT assembly. If faulty condition is found, replace CVT assembly.

1) Disconnect negative (–) cable at battery.
2) Disconnect connector (1) from solenoid harness.



3) Check for proper terminal connection to solenoid connector.
4) Check resistance of each solenoid valve and its circuit.
If faulty condition is found, replace CVT assembly.

Line pressure control solenoid valve resistance: [A]

Between line pressure control solenoid valve terminal "8" and CVT case: 3.0 – 9.0 Ω at 20 °C (68 °F)

Secondary pressure control solenoid valve resistance: [B]

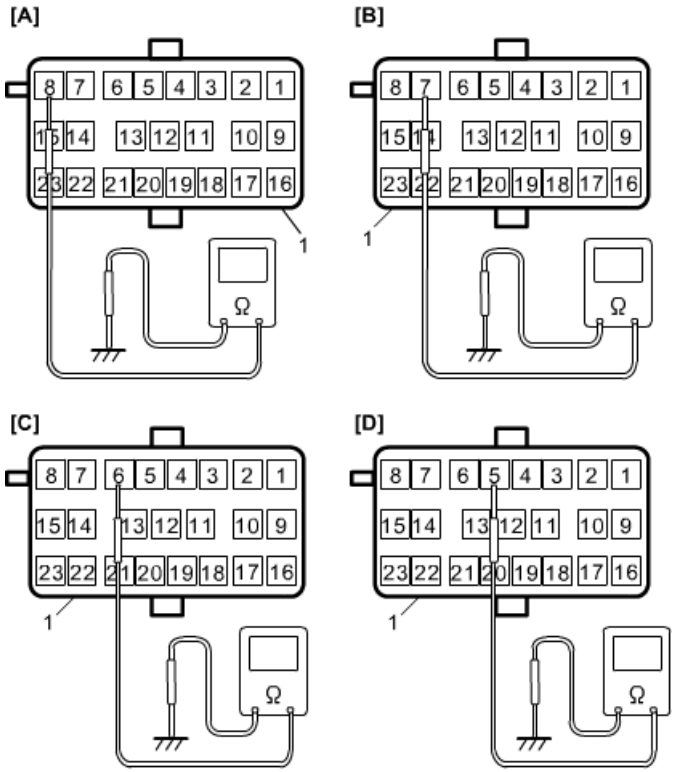
Between secondary pressure control solenoid valve terminal "7" and CVT case: 3.0 – 9.0 Ω at 20 °C (68 °F)

TCC solenoid valve resistance: [C]

Between TCC solenoid valve terminal "6" and CVT case: 3.0 – 9.0 Ω at 20 °C (68 °F)

Lock-up / select switching solenoid valve resistance: [D]

Between Lock-up / select switching solenoid valve terminal "5" and CVT case: 17 – 38 Ω at 20 °C (68 °F)


[A]
[B]
[C]
[D]
8 7 6 5 4 3 2 1
15 14 13 12 11 10 9
23 22 21 20 19 18 17 16
1
Ω

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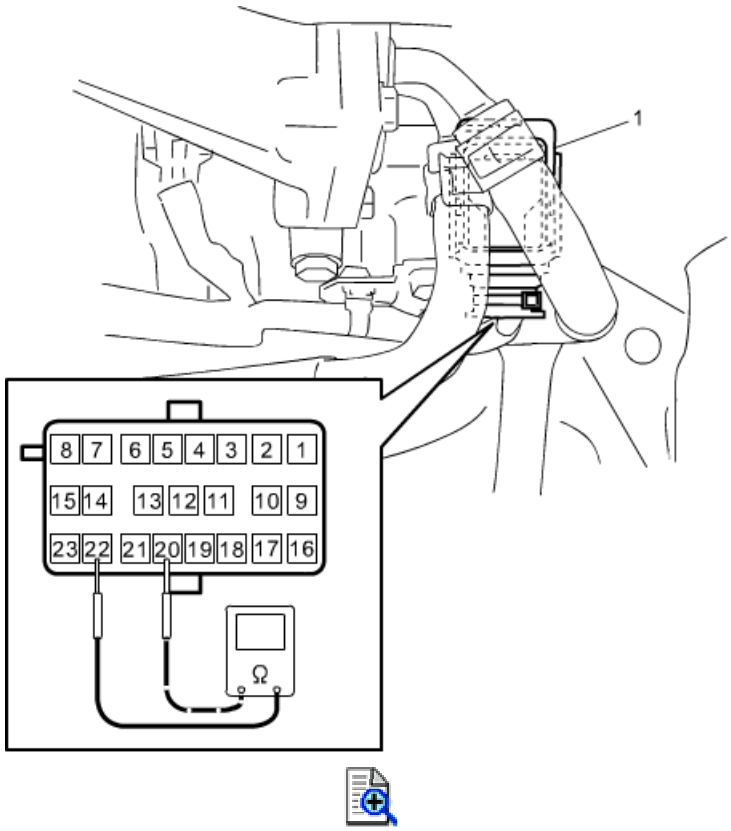
CVT Fluid Temperature Sensor On-Vehicle Inspection

NOTE:
Do not remove CVT fluid temperature sensor from CVT assembly. If faulty condition is found, replace CVT assembly.

1) Disconnect negative (–) cable at battery.
2) Disconnect connector (1) from solenoid harness.
3) Check for proper terminal connection to solenoid harness connector.
4) Check resistance of CVT fluid temperature sensor and its circuit between terminals "20" and "22" at connector of solenoid harness.
If faulty condition is found, replace CVT assembly.

CVT fluid temperature sensor resistance:

20 °C (68 °F): Approx. 6.5 kΩ
80 °C (176 °F): Approx. 0.9 kΩ



5E

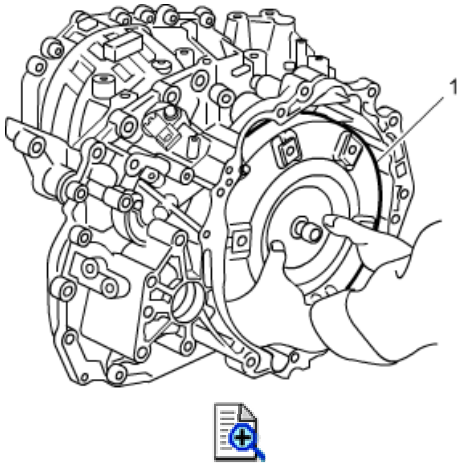
Input Shaft Oil Seal Replacement

CAUTION:
Be careful to handle aluminum parts so as not to damage them.

NOTE:
- **Thoroughly clean CVT assembly exterior before servicing it.**
- **Keep working table, tools and hands clean while servicing.**
- **Do not expose removed parts to dust.**
  Keep them always clean.

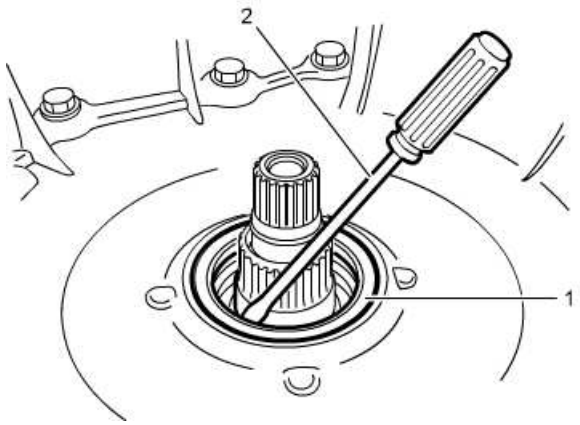
1) Dismount CVT assembly. ☞

2) Remove torque converter (1) from CVT assembly.



3) Remove input shaft oil seal (1) by using flat-end screwdriver or the like (2).

CAUTION:
When removing oil seal, be careful not to scratch the oil seal press-fit part of transaxle housing. Otherwise CVT fluid may cause leakage.



4) Apply grease to new input shaft oil seal lip.
: Grease 99000–25030 (SUZUKI Super Grease C)

5) Using special tool, install input shaft oil seal (1) at specified position as shown in figure.
Special Tool

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Differential Side Oil Seal Replacement

1) Hoist vehicle and drain CVT fluid. ☞

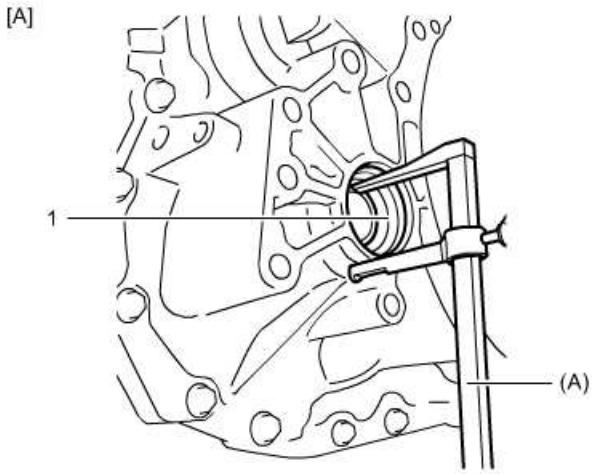
2) Remove drive shaft joints from differential gear of transaxle. Refer to ***Front Drive Shaft Assembly Removal and Installation:Front*** for procedure to disconnect drive shaft joints.

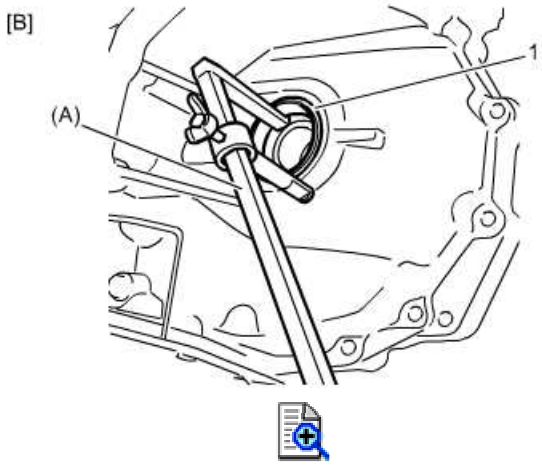
NOTE:
For differential side oil seal removal, it is not necessary to remove drive shafts from steering knuckle.

3) Remove differential side oil seal (1) using special tool.

Special Tool
(A): 09913–50121

CAUTION:
When removing oil seal, be careful not to scratch the oil seal press-fit part of transaxle housing. Otherwise, CVT fluid may cause leakage.





[A]:	Right side
[B]:	Left side

4) Apply grease to new differential side oil seal lip.

: Grease 99000–25030 (SUZUKI Super Grease C)

5) Using special tool, install new differential side oil seals (1) at specified position as shown in figure.

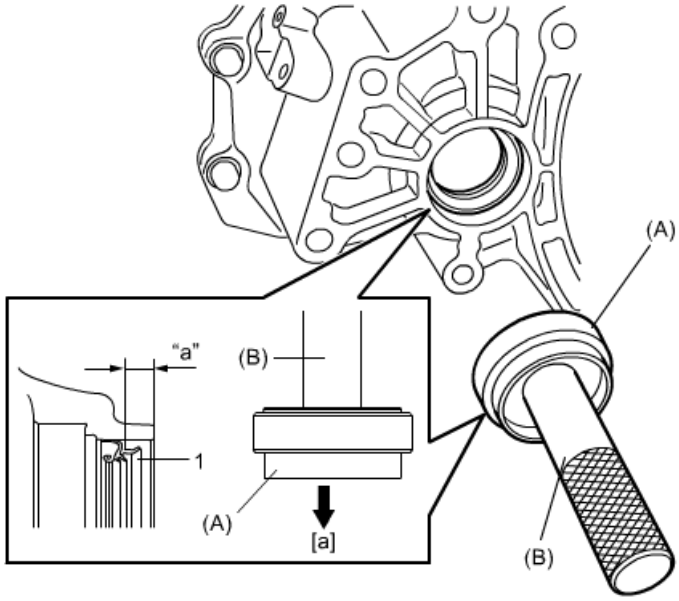
Special Tool

(A): 09925–17910
(B): 09924–74510

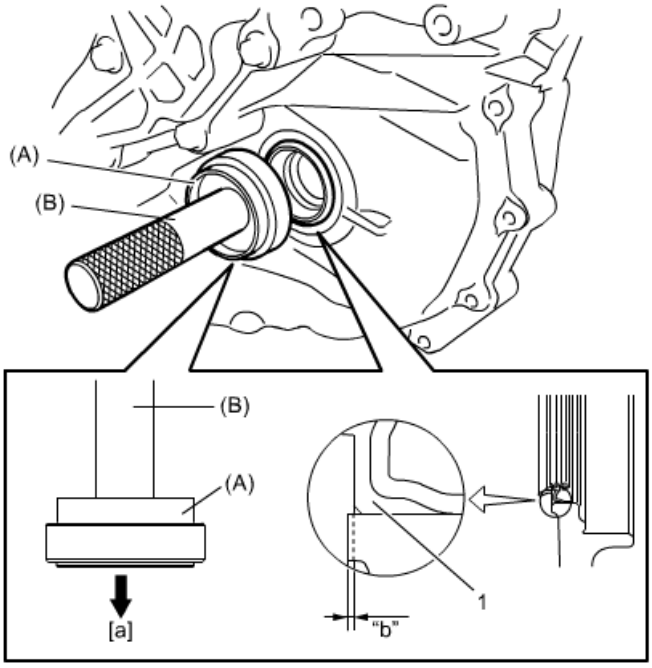
Differential side oil seal installing depth

Right side "a": 9.2 – 10.2 mm (0.363 – 0.401 in.) (2WD model)
Left side "b": 1.3 – 2.3 mm (0.052 – 0.090 in.)

[A]



[B]



[A]: Right side	[a]: Oil seal installing direction
[B]: Left side	

6) Install drive shaft. ☞
7) Replenish CVT fluid. ☞
8) Check CVT fluid level. ☞
9) Check for fluid leakage.

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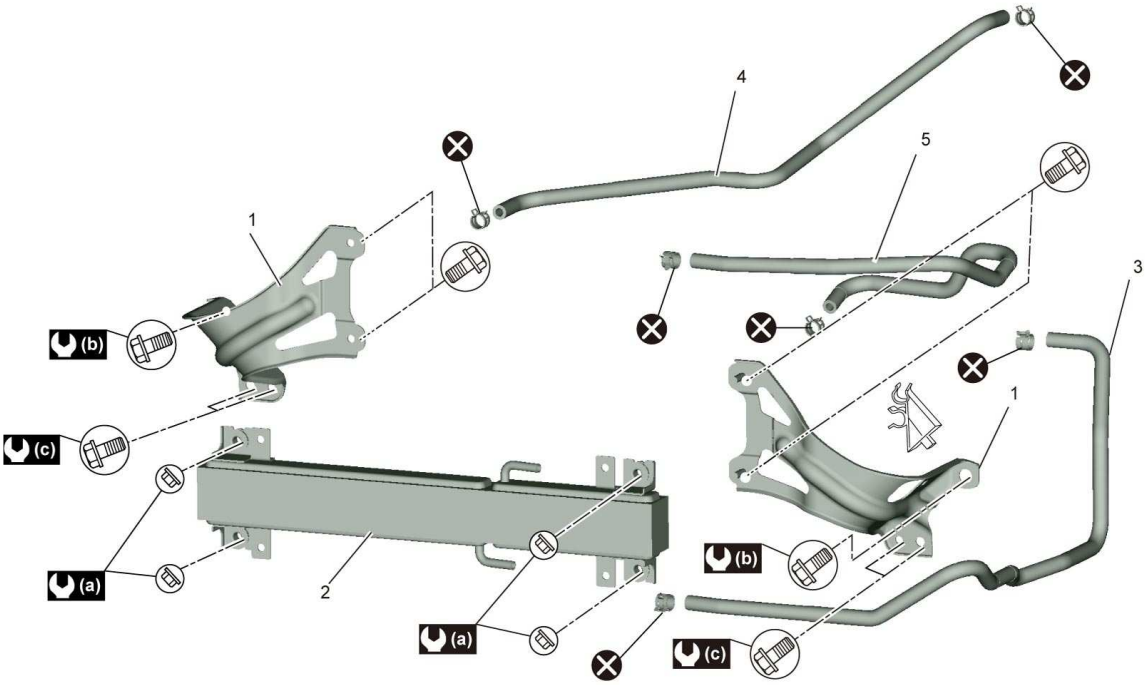
CVT Fluid Cooler Components



1. CVT fluid cooler bracket	4. CVT fluid cooler hose No.2	(b): 85 N·m (8.7 kgf-m, 63.0 lbf-ft)
2. CVT fluid cooler	5. CVT fluid cooler hose No.3	(c): 20 N·m (2.0 kgf-m, 15.0 lbf-ft)
3. CVT fluid cooler hose No.1	(a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)	: Do not reuse.

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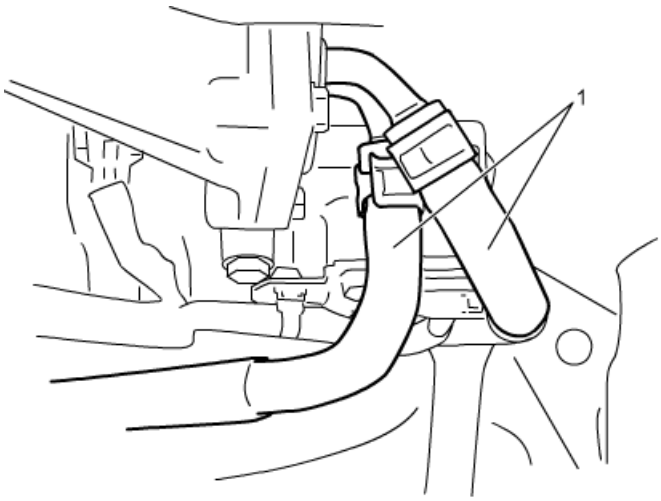
CVT Fluid Cooler and CVT Fluid Cooler Hoses Inspection

Check CVT fluid cooler and CVT fluid cooler hoses (1) for fluid leakage, cracks, damage and deterioration. Replace CVT fluid cooler, CVT fluid cooler hose and/or clamp if any faulty condition is found.



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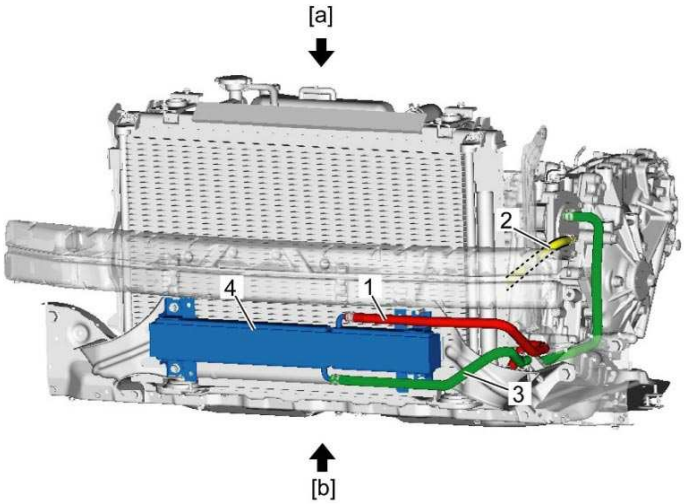
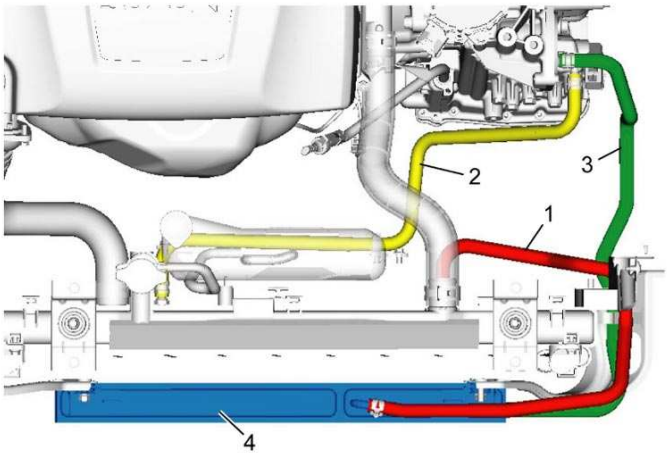
CVT Fluid Cooler Hoses Replacement

Rubber hoses for CVT fluid cooler should be checked at specified interval. If replacing them, be sure to note the following points.

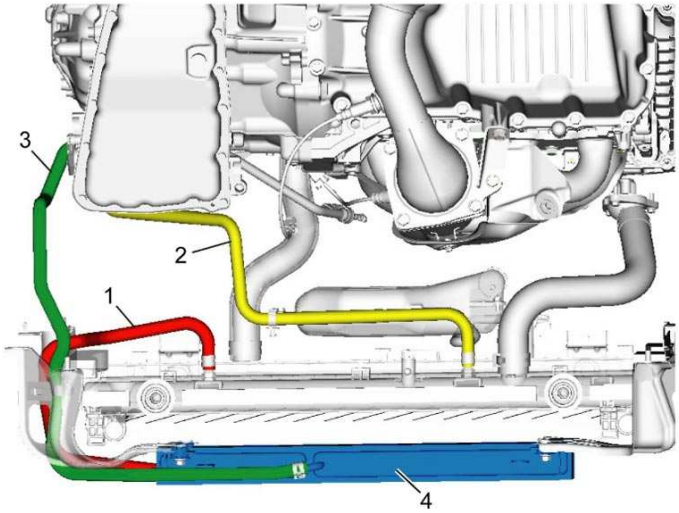
- Remove front bumper, if necessary. ☞
- Replace clamps with new ones at the same time.
- Clamp new clamps securely.



[A]



[B]



[A]: View: [a]	2. CVT fluid cooler No.2 hose
[B]: View: [b]	3. CVT fluid cooler No.1 hose
1. CVT fluid cooler No.3 hose	4. CVT fluid cooler

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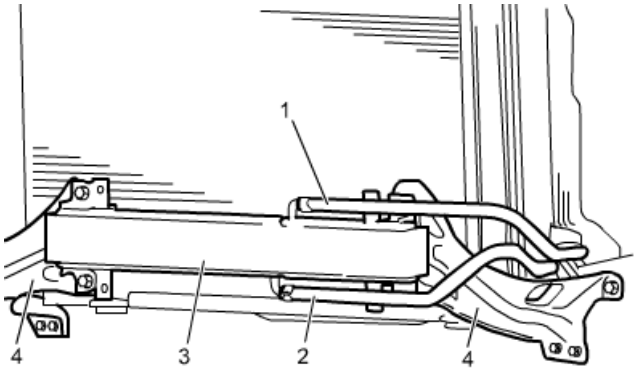
CVT Fluid Cooler Removal and Installation

Removal

1) Disconnect negative (–) cable at battery.
2) Disconnect CVT fluid cooler No.1 hose (2) and No.3 hose (1).
3) Remove CVT fluid cooler bolts, and then remove CVT fluid cooler (3).
4) Remove fluid cooler bracket (4), if necessary.



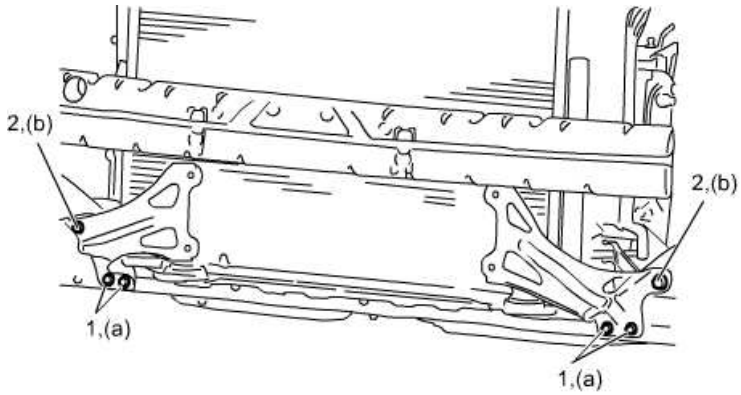
Installation

Reverse removal procedure noting the following points.

- Tighten CVT fluid cooler bracket bolts, if removed.

Tightening torque

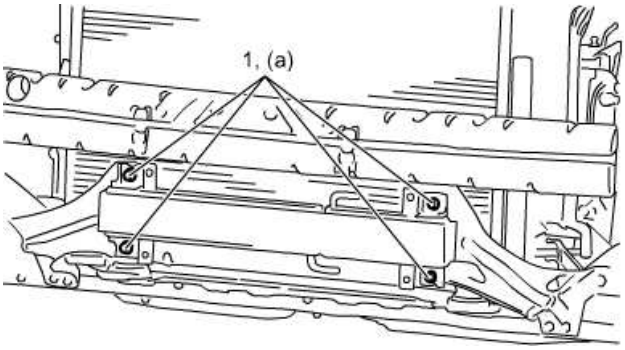
CVT fluid cooler bracket bolt No.1 (a): 20 N·m (2.0 kg-m, 15.0 lbf-ft)
CVT fluid cooler bracket bolt No.2 (b): 85 N·m (8.7 kg-m, 63.0 lbf-ft)



- Tighten CVT fluid cooler bolts (1) to specified torque.

Tightening torque

CVT fluid cooler bolt (a): 13 N·m (1.3 kg-m, 9.5 lbf-ft)



- Clamp new clamps securely.
- Refill CVT fluid. ☞
- Check CVT fluid level. ☞
- After installation, check CVT fluid leakage each connection.

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Tightening Torque Specifications

CAUTION:
For fastener with * (asterisk) below, be sure to tighten it according to specified procedure in "Repair Instructions".

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Fluid pressure check hole bolt	7.5	0.76	5.5	☞
CVT fluid drain plug	34	3.5	25.0	☞
Torque converter No.1 bolt	23	2.3	17.0	☞
Torque converter No.2 bolt	23	2.3	17.0	☞
CVT oil pan bolt*	7.9	0.81	6.0	☞
Transmission range sensor bolt	5.9	0.60	4.5	☞ ☞
Manual select lever nut	17	1.7	12.5	☞
Primary pulley speed sensor bolt	5.9	0.60	4.5	☞
Secondary pulley speed sensor bolt	5.9	0.60	4.5	☞
CVT fluid cooler bracket bolt No.1	20	2.0	15.0	☞
CVT fluid cooler bracket bolt No.2	85	8.7	63.0	☞
CVT fluid cooler bolt	13	1.3	9.5	☞

NOTE:
The specified tightening torque is described in the following.
Select Lever Assembly Components
Select Cable Components
CVT Assembly Components
CVT Fluid Cooler Components

Reference:
For the tightening torque of fastener not specified in this section, refer to ***Fasteners Information***.

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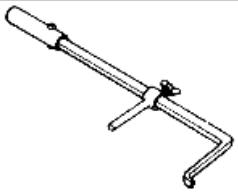
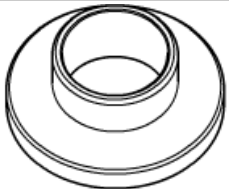
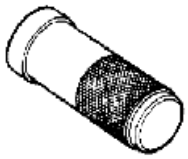
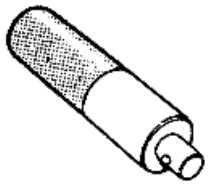
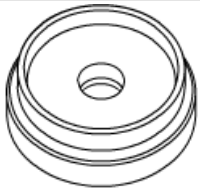
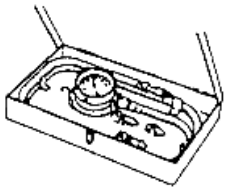
Recommended Service Material

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI Super Grease A	P/No.: 99000–25011	☞
	SUZUKI Super Grease C	P/No.: 99000–25030	☞ ☞

NOTE:
Required service material is also described in the following.
Select Cable Components
CVT Assembly Components

Special Tool

09913–50121 Oil seal remover 	09914–87910 Oil seal installer 
09916–44310 Valve guide remover (5 mm) 	09922–59420 Installer handle 
09924–74510 Bearing and oil seal handle 	09925–17910 Oil seal installer 
09925–37910 Oil pressure gauge 	SUZUKI scan tool (SUZUKI-SDT) — This kit includes following items. 1. SUZUKI-SDT 2. DLC cable 3. USB cable 4. AC/DC power supply 5. Voltage meter probe 6. Storage case