

[\[Previous\]](#) [\[Next\]](#)

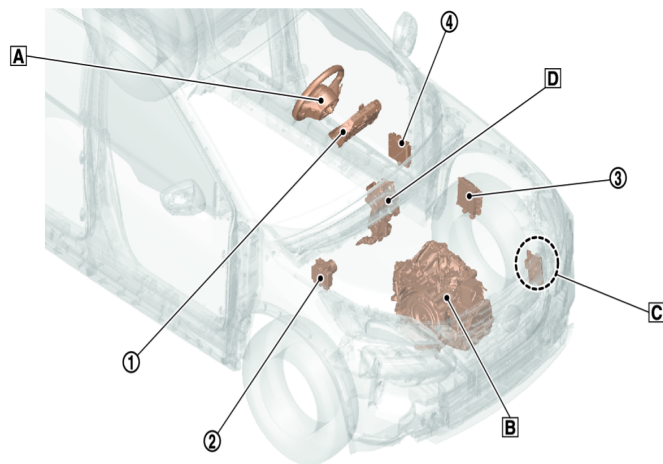
Component Description

Part name	Function
Torque converter	Increases engine torque and transmits it to the transaxle.
Oil pump	Utilizes a vane-type oil pump that is driven by the engine through the oil pump drive chain in order to increase efficiency of pump discharge volume in low-speed zone and optimize pump discharge volume in high-speed zone. Discharged oil from oil pump is transmitted to control valve. It is used as the oil of primary and secondary pulley operation, the oil of clutch operation, and the lubricant for each part.
Forward clutch	The forward clutch is wet and multiple plate type clutch that consists of clutch drum, piston, drive plate, and driven plate. It is a clutch to move the vehicle forward by activating piston hydraulically, engaging plates, and directly connecting sun gear and input shaft.
Reverse brake	The reverse brake is a wet multiple-plate type brake that consists of transaxle case, piston, drive plate, and driven plate. It is a brake to move the vehicle in reverse by activating piston hydraulically, engaging plates, and fixing planetary gear.
Internal gear	The internal gear is directly connected to forward clutch drum. It is a gear that moves the outer edge of pinion planet of planet carrier. It transmits power to move the vehicle in reverse when the planet carrier is fixed.
Planet carrier	Composed of a carrier, pinion planet, and pinion shaft. This gear fixes and releases the planet carrier in order to switch between forward and reverse driving.
Sun gear	Sun gear is a set part with planet carrier and internal gear. It transmits transmitted force to primary fixed sheave. It rotates in forward or reverse direction according to activation of either forward clutch or reverse brake.
Input shaft	The input shaft is directly connected to forward clutch drum and transmits traction force from torque converter. In shaft center, there are holes for hydraulic distribution to primary pulley and hydraulic distribution for lockup ON/OFF.

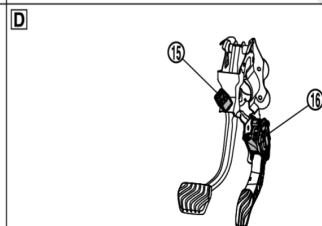
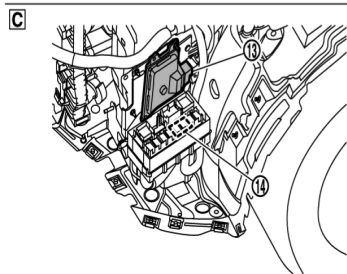
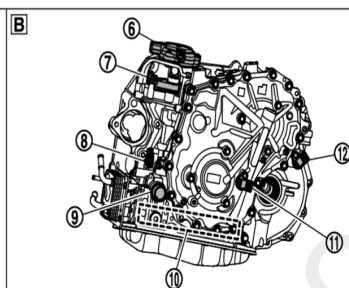
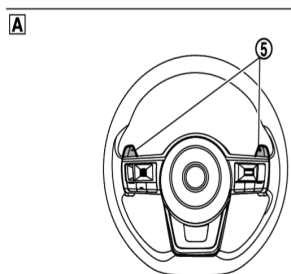
Part name	Function
Primary pulley	It is composed of a pair of pulleys (the groove width is changed freely in the axial direction) and the steel belt. The groove width changes according to wrapping radius of steel belt and pulley from low status to overdrive status continuously with non-step. It is controlled with the oil pressures of primary pulley and secondary pulley.
Secondary pulley	
steel belt	
Manual shaft	When the manual shaft is in the P position, the parking rod that is linked to the manual shaft rotates the parking pole. When the parking pole rotates, it engages with the parking gear, fixing the parking gear. As a result, the secondary pulley that is integrated with the parking gear is fixed.
Parking rod	
Parking pawl	
Parking gear	
Output gear	The deceleration gears are composed of 2 stages: primary deceleration (output gear, idler gear pair) and secondary deceleration (reduction gear, final gear pair). All of these gears are helical gears.
Idler gear	
Reduction gear	
Differential	
Torque converter regulator valve	Adjusts the feed pressure to the torque converter to the optimum pressure corresponding to the driving condition.
Pressure regulator valve	Adjusts the discharge pressure from the oil pump to the optimum pressure (line pressure) corresponding to the driving condition.
Torque converter clutch control valve	Adjusts the torque converter engage and disengage pressures.
Manual valve	Distributes the clutch operation pressure to each circuit according to the shift position.
Secondary reducing valve	Reduces line pressure and adjusts secondary pressure.
Primary reducing valve	Reduces line pressure and adjusts primary pressure.
Pilot valve A	Reduces line pressure and adjusts pilot pressure to the solenoid valves listed below. • Primary pressure solenoid valve • Secondary pressure solenoid valve • Select solenoid valve • Line pressure solenoid valve

Part name	Function
Pilot valve B	Reduces pilot pressure and adjusts pilot pressure to the torque converter clutch solenoid valve.

Component Parts Location

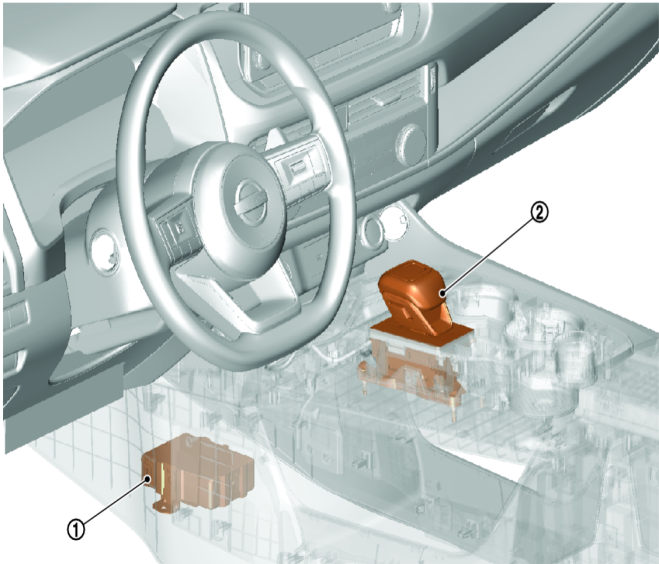


① Combination meter Refer to Removal and Installation ➡.	② ABS actuator and electronic unit (control unit) Refer to Component Parts Location ➡.	③ ECM Refer to Component Parts Location ➡.
④ BCM Refer to Component Parts Location ➡.	⑤ Paddle shifter	⑥ Electric shift actuator
⑦ Transmission range switch	⑧ Input speed sensor	⑨ CVT unit connector
⑩ Control valve	⑪ Primary speed sensor	⑫ Output speed sensor
⑬ TCM	⑭ Shift actuator relays (A and B)	⑮ Stop light switch
⑯ Accelerator pedal position switch		
A Steering wheel	B Side of transaxle assembly	C Left front of vehicle
D Brake pedal periphery		



INTERIOR SIDE

①	Electric shift control module	②	Electric shift selector		
---	-------------------------------	---	-------------------------	--	--



cardiagn.com

[\[Previous\]](#) [\[Next\]](#)

DTC Index

note

- If multiple malfunction codes are detected at the same time, check each code according to the “DTC check priority list”. [DTC Inspection Priority Chart](#) .

Self Diagnostic Result

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0571	P0571	00	BRAKE SWITCH A	1	×	—	A	—	DTC Description 
P0602	P0602	00	CONT PROGRAMMING	1	×	—	A	—	DTC Description 
P0605	P0605	00	CONTROL MODULE ROM	1	×	—	A	—	DTC Description 
—	P060B	00	CONTROL MODULE	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P062F	P062F	00	EEPROM	1	×	—	A	—	DTC Description 
P0705	P0705	00	T/M RANGE SENSOR A	2	×	—	A	—	DTC Description 
P0706	P0706	00	T/M RANGE SENSOR A	2	×	—	A	—	DTC Description 
P0711	P0711	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0712	P0712	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0713	P0713	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0715	P0715	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0716	P0716	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0717	P0717	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0718	P0718	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0740	P0740	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0741	P0741	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0742	P0742	00	TORQUE CONVERTER	1	×	—	A	—	DTC Description 
P0743	P0743	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0746	P0746	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0776	P0776	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0778	P0778	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0779	P0779	00	PC SOLENOID B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0780	P0780	00	SHIFT ERROR	1	×	×	A or B [More than 7.5 km/h (4.7 MPH)]	×	DTC Description 
P0791	P0791	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0792	P0792	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0793	P0793	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0794	P0794	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0841	P0841	00	FLUID PRESS SEN/SW A	2	×	—	A	—	DTC Description 
P0847	P0847	00	FLUID PRESS SEN/SW B	2	×	—	A	—	DTC Description 
P0848	P0848	00	FLUID PRESS SEN/SW B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P084C	P084C	00	FLUID PRESS SEN/SW H	2	×	—	A	—	DTC Description 
P084D	P084D	00	FLUID PRESS SEN/SW H	2	×	—	A	—	DTC Description 
P0863	P0863	00	CONTROL UNIT (CAN)	1	×	—	A	—	DTC Description 
P0890	P0890	00	TCM	1	×	—	A	—	DTC Description 
P0962	P0962	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0963	P0963	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0965	P0965	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0966	P0966	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0967	P0967	00	PC SOLENOID B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	P17F0	07	CVT JUDDER (T/M INSPECTION)	1	—	—	—	—	DTC Description 
—	P17F1	07	CVT JUDDER (C/V INSPECTION)	1	—	—	—	—	DTC Description 
—	P17F2	07	CVT JUDDER (T/C INSPECTION)	1	—	—	—	—	DTC Description 
—	P187E	00	T/M SYSTEM MULFUNCTION	1 or 2	—	—	A or B	—	DTC Description 
—	P18AB	00	IGNITION SW (ELECTRIC SHIFT)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description 
P2758	P2758	00	TCC PRESSURE CONT SOLENOID	1	×	—	A	—	DTC Description 
P2765	P2765	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2766	P2766	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2767	P2767	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
									
P2768	P2768	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2813	P2813	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
P2814	P2814	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
P2815	P2815	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
U0100	U0100	00	LOST COMM (ECM A)	1	×	—	—	—	DTC Description 
U0103	U0103	00	SHIFT CONT MODULE A	1	×	× [Less than 5 km/h (3 MPH)]	B [More than 7.5 km/h (4.7 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description 
U0115	U0115	00	LOST COMM (ECM/PCM B)	1	×	—	—	—	DTC Description 
—	U0300	00	CAN COMM DATA	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U1112	24	DECELERATION REQUEST SIGNAL	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL) [Malfunction Indicator Lamp \(MIL\)](#) .

*4: Refer to Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (FULL TFT METER) or Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (7 INCH INFORMATION DISPLAY).

*5: Refer to CVT system warning [CVT System Warning](#) .

*6: Refer to [Electric Shift Warning](#) .

Network-DTC

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
U0073	U0073	00	Control module comm Bus A Off	1	×	—	—	—	DTC Description 
U007A	U007A	00	Control module comm Bus H Off	1	×	—	—	—	DTC Description 
—	U2140	87	CAN comm err (ECM)	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U2148	87	CAN comm err (brake control unit)	1	—	—	—	—	DTC Description ➡
—	U214A	87	CAN comm err (AWD/4WD)	1	—	—	—	—	DTC Description ➡
—	U214F	87	CAN comm err (BCM)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description ➡
—	U2152	87	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description ➡
—	U2153	87	CAN comm err (HVAC)	1	—	—	—	—	DTC Description ➡
—	U215B	87	CAN comm err (IPDM E/R)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description ➡
—	U2240	87	CAN comm err (ECM)	1	—	—	—	—	DTC Description ➡
—	U2247	87	CAN comm err (electric shift)	1	—	—	—	—	DTC Description ➡
—	U2248	87	CAN comm err (brake control unit)	1	—	—	—	—	DTC Description ➡
—	U2252	87	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description ➡

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U2276	87	CAN comm err (CCM)	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL) [Malfunction Indicator Lamp \(MIL\)](#) .

*4: Refer to Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (FULL TFT METER) or Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (7 INCH INFORMATION DISPLAY).

*5: Refer to CVT system warning [CVT System Warning](#) .

*6: Refer to [Electric Shift Warning](#) .

MAC Diagnosis

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U1327	52	MAC key update	1	—	—	—	—	DTC Description 
—	U1327	54	MAC key update	1	—	—	—	—	DTC Description 
—	U2140	57	CAN comm err (ECM)	1	—	—	—	—	DTC Description

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL*3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
									
—	U214F	57	CAN comm err (BCM)	1	—	—	—	—	DTC Description 
—	U2152	57	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description 
—	U2176	57	CAN comm err (CCM)	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL) [Malfunction Indicator Lamp \(MIL\)](#) .

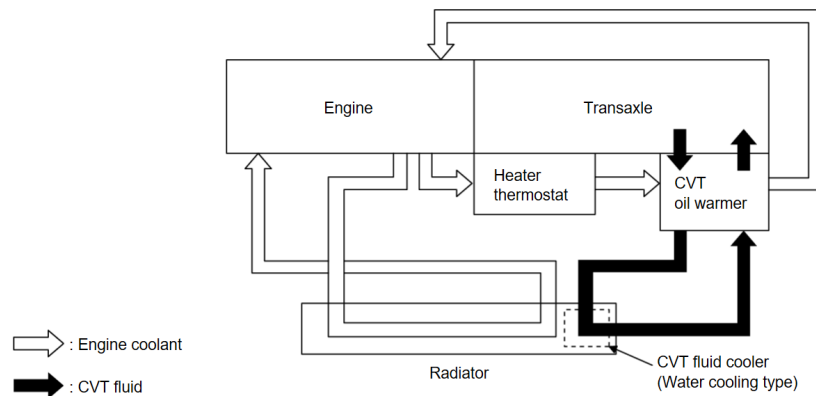
*4: Refer to Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (FULL TFT METER) or Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (7 INCH INFORMATION DISPLAY).

*5: Refer to CVT system warning [CVT System Warning](#) .

*6: Refer to [Electric Shift Warning](#) .

System Description

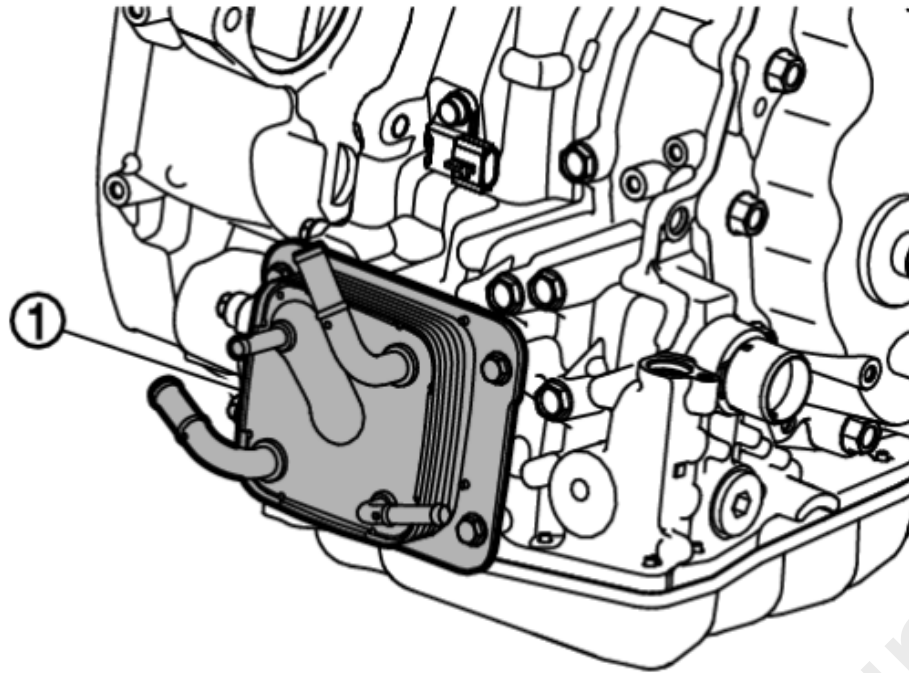
CVT FLUID COOLER SCHEMATIC



COMPONENT DESCRIPTION

CVT Oil Warmer

- The CVT oil warmer ① is installed on the front part of transaxle assembly.



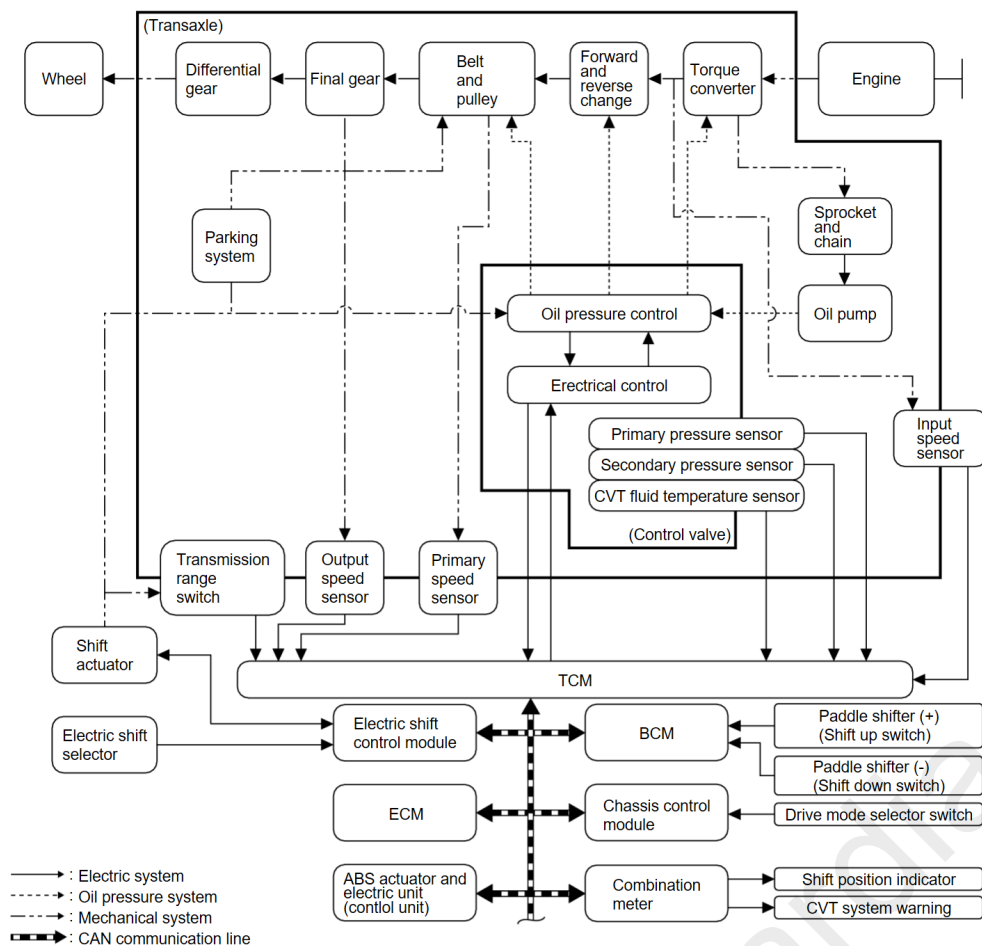
- When engine is started while engine and CVT are cold, engine coolant temperature rises more quickly than CVT fluid temperature. CVT oil warmer is provided with two circuits for CVT and engine coolant respectively so that warmed engine coolant warms CVT quickly. This helps shorten CVT warming up time, improving fuel economy.
- A cooling effect is obtained when CVT fluid temperature is high.

 [\[Previous\]](#)  [\[Next\]](#)

System Description

SYSTEM DIAGRAM

cardiagn.com



Component	Function
ECM	Mainly transmits the following signal to TCM via CAN communication. - Engine and CVT integrated control signal note General term for the communication (torque-down permission, torque down request, etc.) exchanged between the ECM and TCM. - Engine speed signal - Engine coolant temperature signal

Component	Function
	• Accelerator pedal position signal • Closed throttle position signal Mainly receives the following signals from TCM via CAN communication. • Malfunction indicator light signal
TCM	TCM 
BCM	Mainly transmits the following signal to TCM via CAN communication • Stop light switch signal • Paddle shifter shift up signal • Paddle shifter shift down signal
ABS actuator and electronic unit (control unit)	Mainly transmits the following signal to TCM via CAN communication • Vehicle speed signal • ABS operation signal • TCS operation signal • ASC operation signal • Decel G sensor signal
Combination meter	Mainly receives the following signals from TCM via CAN communication. • Shift position signal • CVT warning message signal
Malfunction indicator light (MIL)	Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL)  (FULL TFT METER) or Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL)  (7 INCH INFORMATION DISPLAY)

Component		Function
Shift position indicator		Shift position indicator Shift Position Indicator 
Drive mode select switch		Drive Mode Select Switch System Description 
Transmission range switch		Transmission Range Switch Transmission Range Switch 
Input speed sensor		Input Speed Sensor 
Output speed sensor		Output Speed Sensor Output Speed Sensor 
CVT unit connector		—
Primary speed sensor		Primary Speed Sensor Primary Speed Sensor 
Control valve	CVT fluid temperature sensor*	CVT Fluid Temperature Sensor CVT Fluid Temperature Sensor 
	Primary pressure sensor*	Primary Pressure Sensor Primary Pressure Sensor 
	Secondary pressure sensor*	Secondary Pressure Sensor Secondary Pressure Sensor 
	Line pressure solenoid valve*	Line Pressure Solenoid Valve Line Pressure Solenoid Valve 
	Primary pressure solenoid valve*	Primary Pressure Solenoid Valve 
	Secondary pressure solenoid valve*	Secondary Pressure Solenoid Valve 
	Torque converter clutch solenoid valve*	Torque Converter Clutch Solenoid Valve 
	Select solenoid valve*	Select Solenoid Valve 
Paddle shifter		Paddle Shifter 
Shift actuator		Shift Actuator 
Electric shift selector		Electric Shift Selector Electric Shift Selector 

Component	Function
Electric shift control module	Mainly transmits the following signal to TCM via CAN communication • Electric shift selector signal

These components are included in control valve assembly.

MAIN CONTROL CONTENTS OF TCM

Controls	Reference
Line pressure control	System Description ➡
Shift control	System Description ➡
Select control	System Description System Description ➡
Lock-up control	System Description ➡
Drive Mode Selector	System Description ➡
Fail-safe	Fail-safe Fail-safe ➡
Self-diagnosis function	M.U.T.-III SE Function CONSULT Function ➡
Communication function with M.U.T.-III SE	M.U.T.-III SE Function CONSULT Function ➡

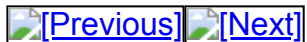
For electric shift system, refer to [System Description](#) ➡.

LIST OF CONTROL ITEMS AND INPUT/OUTPUT

Control Item		Shift control	Line pressure control	Select control	Lock-up control	Fail-safe function*
Input	Engine torque signal (CAN communication)	x	x	x	x	x
	Engine speed signal (CAN communication)	x	x	x	x	x
	Accelerator pedal position signal (CAN communication)	x	x	x	x	
	Closed throttle position signal (CAN communication)	x	x		x	
	Stop light switch signal (CAN communication)	x	x	x	x	
	Primary pressure sensor					x
	Secondary pressure sensor	x	x			x
	CVT fluid temperature sensor	x	x	x	x	x
	Primary speed sensor	x	x	x	x	x
	Output speed sensor	x	x		x	x
	Input speed sensor	x	x	x	x	x
	Transmission range switch	x	x	x	x	x
	Electric shift selector signal (CAN communication)	x	x		x	
	Paddle shifter shift up/down signal (CAN communication)	x				

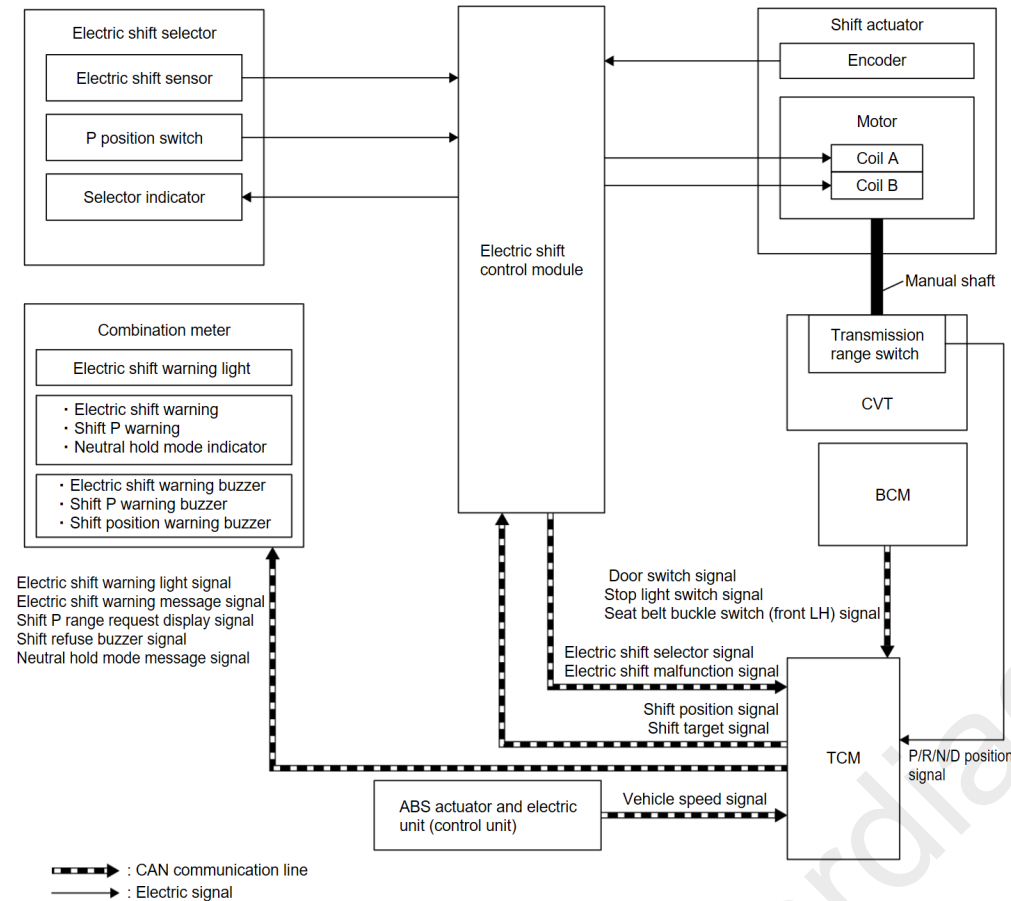
Control Item		Shift control	Line pressure control	Select control	Lock-up control	Fail-safe function*
Output	Line pressure solenoid valve	x	x	x		x
	Primary pressure solenoid valve	x	x			x
	Torque converter clutch solenoid valve				x	x
	Secondary pressure solenoid valve	x	x			x
	Select solenoid valve	x		x		x
	Shift position indicator (CAN communication)			x		

*: If these input/output signals show errors, TCM activates the fail-safe function.



System Description

- The electric shift system detects each shift position electrically. In addition, in P position, the electric shift system activates the shift actuator, according to electrical signals received from the P position switch and brings the vehicle into the parking state.
- In the event of a malfunction in the electric shift system, the selector indicator of electric shift selector turns OFF and only the shift indicator (on the combination meter) indicates the shift position.
- In the event of a malfunction in the electric shift system, the system enters fail-safe mode. Refer to [Fail-safe](#) .



Component	Function
Electric shift control module	Mainly transmits the following signal to TCM via CAN communication • Electric shift selector signal • Electric shift malfunction signal Mainly receives the following signals from TCM via CAN communication • Shift position signal • Shift target signal

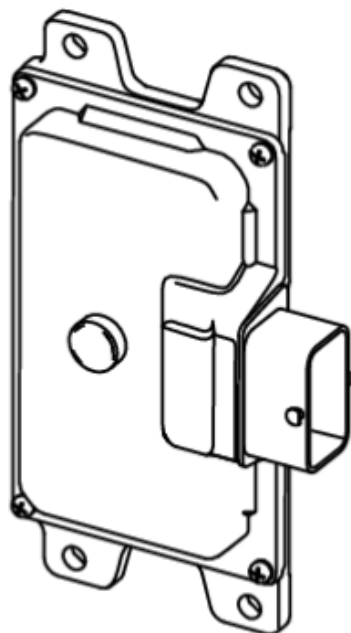
Component	Function
Electric shift selector	Refer to Electric Shift Selector  .
Electric shift sensor	Refer to Electric Shift Sensor  .
P position switch	Refer to P Position Switch  .
Selector indicator	Refer to Selector Indicator Selector Indicator  .
Shift actuator	Refer to Shift Actuator  .
Transmission range switch	Refer to Transmission Range Switch Transmission Range Switch  .
TCM	Mainly transmits the following signal to electric shift control module via CAN communication • Shift position signal • Shift target signal Mainly receives the following signals from electric shift control module via CAN communication • Electric shift selector signal • Electric shift malfunction signal
BCM	Mainly transmits the following signal to TCM via CAN communication • Stop light switch signal • Door switch signal • Seat belt buckle switch (front LH) signal
ABS actuator and electric unit (control unit)	Mainly transmits the following signal to TCM via CAN communication • Vehicle speed signal

Component	Function
Combination meter	Mainly receives the following signal from TCM via CAN communication • Electric shift warning light signal • Electric shift warning message signal • Shift refuse buzzer signal • Shift P range request display signal • Neutral hold mode message signal

TCM

FUNCTIONS WITHIN THE SYSTEM

TCM judges the vehicle driving status based on the signals from the sensors, switches, and other control units, and the optimal transaxle control is performed.



INDIVIDUAL FUNCTION WITHIN SYSTEM

The TCM consists of a microcomputer and connectors for signal input and output and for power supply.

INDIVIDUAL OPERATION

- CVT control system. Refer to [System Description](#) .
 - Line pressure control system. Refer to [System Description](#) .
 - Shift control system. Refer to [System Description](#) .
 - Select control system. Refer to System Description [System Description](#) .
 - Lock-up control system. Refer to [System Description](#) .
 - Drive mode selector system. Refer to [System Description](#) .
-

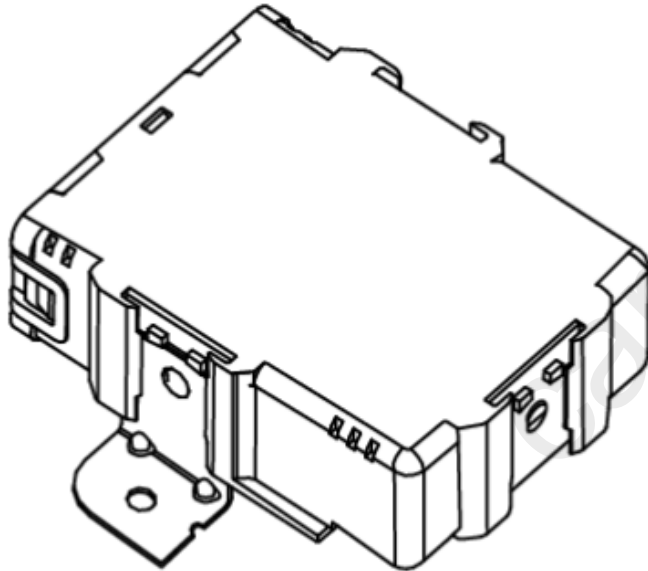
COMPONENT PARTS LOCATION

The TCM is installed on the front side of battery.

Electric Shift Control Module

FUNCTIONS WITHIN THE SYSTEM

The electric shift control module actuates the shift actuator according to the signals transmitted from electric shift sensor, P position switch and various ECUs.



INDIVIDUAL FUNCTION WITHIN THE SYSTEM

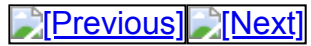
- The electric shift control module consists of the microcomputer and input/output connectors for signal and power supply.
 - The electric shift control module includes a self-diagnosis function for simplifying trouble diagnosis.
-

INDIVIDUAL OPERATION

The electric shift control module is started by the ignition switch signal.

COMPONENT PARTS LOCATION

The electric shift control module is installed below the center console.

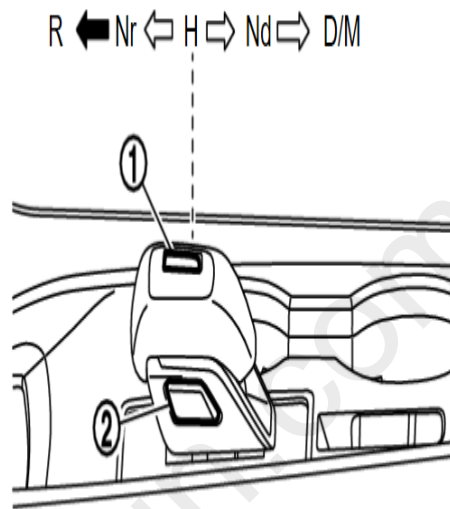


Electric Shift Selector

FUNCTIONS WITHIN THE SYSTEM

The electric shift selector sends the shift request of the driver to the electric shift control module as an electric signal.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM

Shift selector position	Operation/Function	
H (Home position)	The selector lever automatically moves back to the home position after it is operated.	R ← ■ Nr ⇄ H ⇄ Nd ⇄ D/M  ■: Press the button ② to shift ⇄: Shift without pressing the button ②

Shift selector position	Operation/Function	
P (P position switch ①)	Completely stop the vehicle and press the P position switch while depressing the brake pedal. The shift position changes to P.	
R	While depressing the brake pedal, press the selector knob button and shift the selector lever to R position. The shift position changes to R.	
Nr	When shift position is D or M, while depressing the brake pedal, shift the selector lever to the Nr position and hold it for approx. 0.5 second. The shift position changes to N.	
	note Even if selector lever is shifted to the Nr position when shift position is R, the shift position does not change to N and the shift position warning buzzer sounds.	
Nd	When shift position is R, while depressing the brake pedal, shift the selector lever to the Nd position and hold it for approx. 0.5 second. The shift position changes to N.	
	note Even if selector lever is shifted to the Nd position when shift position is D or M, the shift position does not change to N and the shift position warning buzzer sounds.	
D/M	While depressing the brake pedal, shift the selector lever	

Shift selector position	Operation/Function
	to D/M position. The shift position changes to D. - While driving in the D position, shift the selector lever to D/M position again. The shift position changes to M (manual mode) - To switch from M (manual mode) to the D driving, shift the selector lever to D/M position again.

OPERATIONAL CONDITIONS FOR SHIFT

■: Hold ●: Current shift position ○: Be able to shift here

POWER SW	Operation	Vehicle speed	Stop light switch	Shift position					Remarks
				P	R	N	D	M	
OFF/ACC	Selector lever	—	—	■			—		—
	P position SW	—	—	■			—		—

POWER SW	Operation	Vehicle speed	Stop light switch	Shift position					Remarks
				P	R	N	D	M	
ON (Engine stop)	Selector lever	—	ON	●	—	○	—	—	- Shifted to N position even when shifted to R or D position - Shift position warning buzzer: Two short beeps
		—	OFF	■	—				Shift position warning buzzer: Two short beeps
	P position SW	—	—	○	—	●	—	—	—
ON (Engine running)	Selector lever	—	ON	●	○	○	○	○*	—
		—	OFF	■	—				Shift position warning buzzer: Two short beeps
	P position SW	3 km/h (1.86 MPH) or less	—	○	●	●	●	●	—
		3 km/h (1.86 MPH) or more	—	—	■	■	■	■	Shift position warning buzzer: Two short beeps

*: Direct shifting to the M position from the P position is not possible.

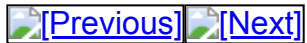
INDIVIDUAL OPERATION

The electric shift selector sends a signal to the electric shift control module by shifting.

COMPONENT PARTS LOCATION

The electric shift selector is installed on the center console.

cardiagn.com



Electric Shift Sensor

FUNCTIONS WITHIN THE SYSTEM

The electric shift control module determines the shift selector position from the combination of the electric shift sensor ON/OFF signals.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM

The electric shift sensor has 8 non-contact sensors (Hall IC) built in. Each sensor switches ON/OFF according to the selector lever position.

SELECTOR LEVER position judgement Table

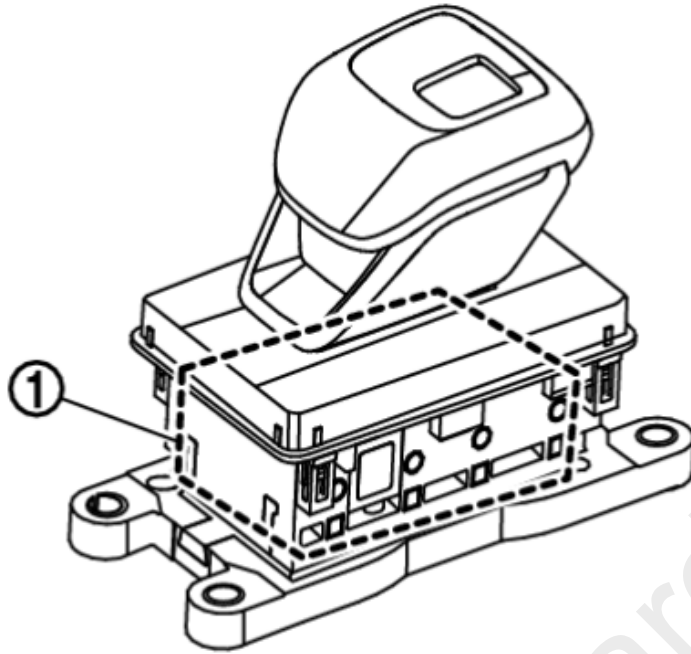
Selector lever position	Electric shift sensor							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
R	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Nr	ON	ON	ON	ON	ON	OFF	OFF	OFF
H	ON	ON	ON	ON	ON	ON	ON	ON
Nd	OFF	OFF	OFF	ON	ON	ON	ON	ON
D/M	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON

INDIVIDUAL OPERATION

The electric shift sensor transmits ON/OFF signals according to the selector lever position to the electric shift control module.

COMPONENT PARTS LOCATION

The electric shift sensor ① is installed to the electric shift selector.



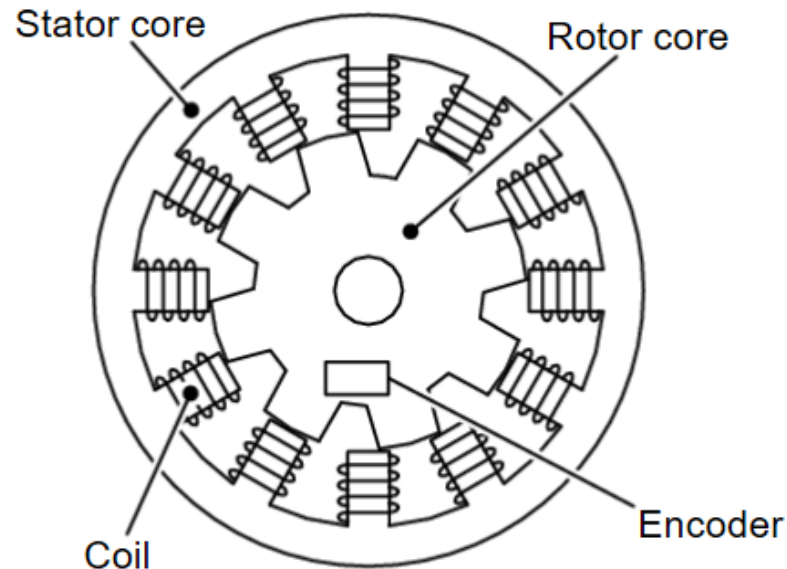


Shift Actuator

FUNCTIONS WITHIN THE SYSTEM

The shift actuator operates according to the output signal from the electric shift control module and changes the shift position of the transaxle.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM



- Motor
 - A 3-phase SR motor is used.
 - Coil is placed on the stator core around the motor and the current that passes through the coil in sequence generates the rotating force for the inner rotor core.
- Encoder
 - The Hall IC type rotation angle sensor is used for higher accuracy in the detection of the rotor rotation angle.
 - It detects the rotor rotation angle and outputs pulse signals to the electric shift control module.
 - The electric shift control module controls the timing of the current feed to the coils optimally based on the signal from the encoder.
- Actuator Reduction Gear

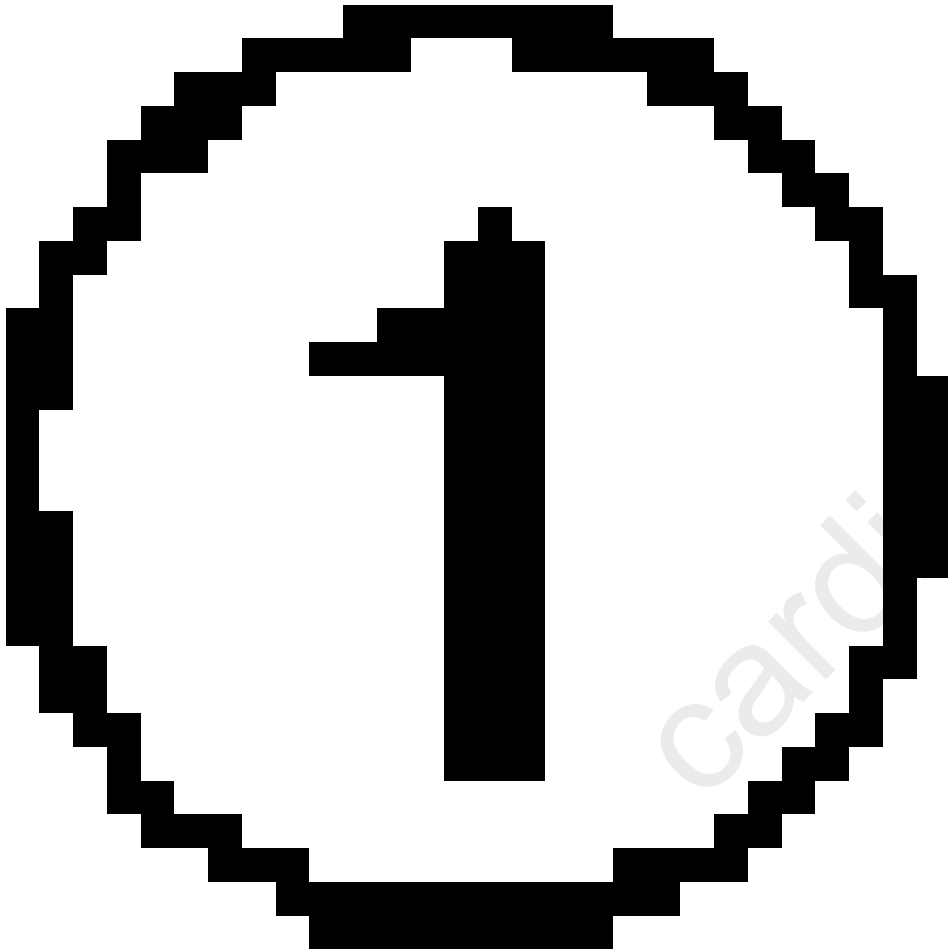
The actuator reduction gear consists of a cycloidal gear and includes a motor with its torque amplified for secure operation under high torque-requiring conditions.

INDIVIDUAL OPERATION

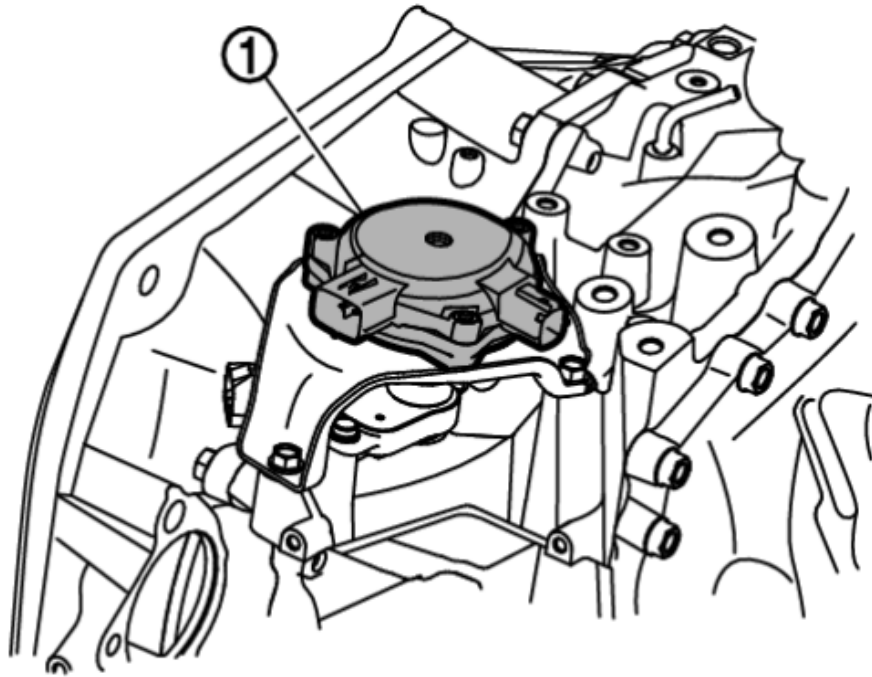
The shift actuator moves the manual shaft of transaxle and changes shift position.

COMPONENT PARTS LOCATION

The shift actuator



is installed above the transaxle.



[\[Previous\]](#) [\[Next\]](#)

M.U.T.-III SE Function

caution

After disconnecting the M.U.T.-III SE vehicle interface (VI) from the data link connector, the ignition must be cycled OFF → ON (for at least 5 seconds) → OFF. If this step is not performed, the BCM may not go to “sleep mode”, potentially causing a discharged battery and a no-start condition.

APPLICABLE ITEM

Diagnosis mode	Description
Self Diagnostic Result	Display DTC which TCM memorizes
Data List	Displays TCM input/output data in real time
Special Function	• Displays TCM part number • This mode enables a technician to adjust some devices faster and more accurately
CALIB DATA	The calibration data status of TCM can be checked

SELF DIAGNOSTIC RESULTS

Refer to [DTC Index](#) .

DTC at 1st trip and method to read DTC

- DTC (P0705, P0711, P0720, etc.) is specified by SAE J2012/ISO 15031-6.
 - DTC and DTC at 1st trip are displayed on “Self Diagnostic results” of M.U.T.-III SE.
When DTC is currently detected, “Active DTC” is displayed. If “Stored DTC” is displayed, it shows a malfunction occurred in the past.
 - When the DTC at the 1st trip is detected, “1t” is displayed.
-

DTC deletion method

note	If the ignition switch is left ON after repair, turn OFF the ignition switch and wait for 10 seconds or more. Then, turn the ignition ON again. (Engine stop)
-------------	---

1. Touch “TRANSMISSION” of M.U.T.-III SE.
 2. Touch “Self Diagnostic Result”.
 3. Touch “Erase DTCs”. (DTC memorized in TCM is erased.)
-

Freeze Frame Data (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on M.U.T.-III SE.

Monitored item	Displayed contents
ODO/TRIP METER	Displays the mileage at the time the malfunction is detected.
DTC count (Count)	Displays the number of times DTC is detected.

DATA MONITOR

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitored item	(Unit)	Remarks
L POSITION SW	(On/Off)	- Displays the operation status of the transmission range switch (L position). - This monitor item do not use.
SPORT MODE SW	(On/Off)	- Displays the reception status of the overdrive control switch signal received through CAN communication. - This monitor item do not use.
ECO MODE SW	(On/Off)	- Displays the reception status of the ECO mode switch signal received through CAN communication. - This monitor item do not use.
SPORT MODE IND	(On/Off)	- Displays the transaxle status of the O/D OFF indicator light signal transmitted through CAN communication. - This monitor item do not use.
MANU MODE SIGNAL	(On/Off)	Displays the transaxle status of the manual mode signal transmitted through CAN communication.
Ds mode signal		- Displays whether it is the Ds mode. - This monitor item do not use.
ECO MODE SIGNAL	(On/Off)	- Displays the transaxle status of the ECO mode signal transmitted through CAN communication. - This monitor item do not use.
M GEAR POS		Display the target gear of manual mode
ENGBRKLVL	(On/Off)	Displays the setting of "ENGINE BRAKE ADJ" in "Special Function".

Monitored item	(Unit)	Remarks
AIR BLDING STATE	(INCOMP/COMP)	- Displays the status of “ELECTRIC O.P. AIR BLEEDING” in “Special Function”. - This monitor item do not use.
2WD/4WD identification		Displays the axle type of the vehicle.
T/M warning indicator DTC		Displays the first DTC when CVT system warning is displayed.
T/M warning indicator mileage		Displays the total mileage when CVT system warning is displayed at first time.
D POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (D position).
N POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (N position).
R POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (R position).
P POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (P position).
IDLE SW	(On/Off)	Displays the reception status of the closed throttle position signal received through CAN communication.
STRDWSW	(On/Off)	Displays the operation status of the paddle shifter (down switch).
STRUPSW	(On/Off)	Displays the operation status of the paddle shifter (up switch).
DOWNLVR	(On/Off)	- Displays the operation status of the selector lever (down switch). - This monitor item do not use.
UPLVR	(On/Off)	- Displays the operation status of the selector lever (up switch). - This monitor item do not use.

Monitored item	(Unit)	Remarks
NONMMODE	(On/Off)	- Displays if manual mode is not activated. - This monitor item do not use.
MMODE	(On/Off)	- Displays if manual mode is activated. - This monitor item do not use.
Tow mode switch	(On/Off)	- Displays the reception status of the TOW mode switch signal received through CAN communication. - This monitor item do not use.
CVT LIGHT	(On/Off)	- Displays the transaxle status of the CVT warning light signal transmitted through CAN communication. - This monitor item do not use.
ASC ON	(On/Off)	Displays the reception status of the ASC operation signal received through CAN communication.
TCS ON	(On/Off)	Displays the reception status of the TCS operation signal received through CAN communication.
ABS FAIL SIGNAL	(On/Off)	Displays the reception status of the ABS malfunction signal received through CAN communication.
ABS ON	(On/Off)	Displays the reception status of the ABS operation signal received through CAN communication.
G SEN CALIBRATION	(YET/DONE)	Displays the status of "G SENSOR CALIBRATION" in "Special Function".
N IDLE STATUS	(On/Off)	- Displays idle neutral status. - This monitor item do not use.
SNOW MODE	(On/Off)	- Displays whether it is the SNOW mode. - This monitor item do not use.

Monitored item	(Unit)	Remarks
ECO MODE	(On/Off)	- Displays whether it is the ECO mode. - This monitor item do not use.
NORMAL MODE	(On/Off)	- Displays whether it is the NORMAL mode. - This monitor item do not use.
SPORT MODE	(On/Off)	- Displays whether it is the SPORT mode. - This monitor item do not use.
ELECTRIC OP RELAY	(On/Off)	- Displays the command status from TCM to the electric oil pump relay. - This monitor item do not use.
E-OP RELAY MON	(On/Off)	- Monitors the command status from TCM to the oil pump relay and displays the monitored value. - This monitor item do not use.
Exchange transmission		This monitor item do not use.
Exchange oil pressure C/V		This monitor item do not use.
CVTF DETERIORATION DATE		This monitor item do not use.
Select - Initial learning temp		This monitor item do not use.
Lock-up - Initial learning temp		This monitor item do not use.
Select (N-D) - Initial learn press		This monitor item do not use.
Select (N-D) - Initial learn time		This monitor item do not use.

Monitored item	(Unit)	Remarks
Select (N-R) - Initial learn press		This monitor item do not use.
Select (N-R) - Initial learn time		This monitor item do not use.
Lock-up - Initial learning 1		This monitor item do not use.
SLIP REV	(rpm)	Displays the speed difference between the input shaft speed of CVT and the engine speed.
ELECTRIC OP DUTY	(%)	- Displays the command signal value (duty) of the electric oil pump transmitted from TCM. - This monitor item do not use.
Slip revolution absolute value	(rpm)	This monitor item do not use.
Target transmission speed	(sec)	This monitor item do not use.
E-OP DUTY MON	(%)	- Monitors the status signal value (duty) transmitted from the electric oil pump and displays the monitored value. - This monitor item do not use.
Input speed sensor	(rpm)	Displays the input speed calculated from the pulse signal of the input speed sensor.
PRI SPEED SEN	(rpm)	Displays the primary pulley speed calculated from the pulse signal of the primary speed sensor.
SEC REV SENSOR	(rpm)	Displays the secondary pulley speed calculated from the pulse signal of the output speed sensor.
ENG SPEED SIG	(rpm)	Displays the engine speed received through CAN communication.
SEC PRESSURE SEN	(V)	Displays the signal voltage of the secondary pressure sensor.
PRI PRESSURE SEN	(V)	Displays the signal voltage of the primary pressure sensor.

Monitored item	(Unit)	Remarks
ATF TEMP SEN	(V)	Displays the signal voltage of the CVT fluid temperature sensor.
G SENSOR	(V)	Displays the signal voltage of the G sensor.
TRQ RTO		Display the torque ratio of torque converter.
G sensor (TCM)	(V)	- Displays the voltage signal of G sensor for TCM. - This monitor item do not use.
BRAKESW	(On/Off)	Displays the reception status of the stop light switch signal received through CAN communication.
SHIFT IND SIGNAL		Displays the transaxle value of shift position signal transmitted via CAN communication.
RANGE		Displays the gear position recognized by TCM.
VSP SENSOR	(km/h or mph)	Displays the vehicle speed calculated from the CVT output shaft speed.
ESTM VSP SIG	(km/h or mph)	- Displays the vehicle speed signal (ABS) received through CAN communication. - Models with ABS are displayed.
VIGN SEN	(V)	Displays the battery voltage applied to TCM.
PVIGN VOLT	(V)	Displays the backup voltage of TCM.
VEHICLE SPEED	(km/h or mph)	Displays the vehicle speed recognized by TCM.
INPUT REV	(rpm)	Displays the input shaft speed of CVT recognized by TCM.
PRI SPEED	(rpm)	Displays the primary pulley speed recognized by TCM.
SEC SPEED	(rpm)	Displays the secondary pulley speed recognized by TCM.
ENG SPEED	(rpm)	Displays the engine speed recognized by TCM.
PULLEY GEAR RATIO		Displays the pulley gear ratio calculated from primary pulley speed/secondary pulley speed.
G SPEED	(G)	Displays the acceleration and deceleration speed of the vehicle calculated from vehicle speed change.
ACCEL POSI SEN 1	(deg)	Displays the estimated throttle position received through CAN communication.

Monitored item	(Unit)	Remarks
VENG TRQ	(Nm)	Display the engine torque recognized by TCM.
PRI TRQ	(Nm)	Display the input shaft torque of CVT.
SEC PRESSURE	(MPa)	Displays the secondary pressure calculated from the signal voltage of the secondary pressure sensor.
PRI PRESSURE	(MPa)	Displays the primary pressure calculated from the signal voltage of the primary pressure sensor.
FLUID TEMP	(°C or °F)	Displays the CVT fluid temperature calculated from the signal voltage of the CVT fluid temperature sensor.
DSR REV	(rpm)	Displays the target primary pulley speed calculated from processing of gear shift control.
TRGT GEAR RATIO		Displays the target gear ratio of the pulley from processing of gear shift control.
LU PRS	(MPa)	Displays the target oil pressure of the torque converter clutch solenoid valve calculated from oil pressure processing of gear shift control.
LINE PRS	(MPa)	Displays the target oil pressure of the line pressure solenoid valve calculated from oil pressure processing of gear shift control.
TRGT PRI PRESSURE	(MPa)	Displays the target oil pressure of the primary pressure solenoid valve calculated from oil pressure processing of gear shift control.
Target select pressure	(MPa)	Displays the target oil pressure of the select solenoid valve calculated from oil pressure processing of gear shift control.
TARGET SEC PRESSUR	(MPa)	Displays the target oil pressure of the secondary pressure solenoid valve calculated from oil pressure processing of gear shift control.
ISOLT1	(mA)	Displays the command current from TCM to the torque converter clutch solenoid valve.
ISOLT2	(mA)	Displays the command current from TCM to the line pressure solenoid valve.
PRI SOLENOID	(mA)	Displays the command current from TCM to the primary pressure solenoid valve.
SEC SOLENOID CURRENT	(mA)	Displays the command current from TCM to the secondary pressure solenoid valve.

Monitored item	(Unit)	Remarks
SELECT SOLENOID CURRENT	(mA)	Displays the command current from TCM to the select solenoid valve.
SOLMON1	(mA)	Monitors the command current from TCM to the torque converter clutch solenoid valve and displays the monitored value.
SOLMON2	(mA)	Monitors the command current from TCM to the line pressure solenoid valve and displays the monitored value.
PRI SOL MON	(mA)	Monitors the command current from TCM to the primary pressure solenoid valve and displays the monitored value.
SEC SOL MON CURRENT	(mA)	Monitors the command current from TCM to the secondary pressure solenoid valve and displays the monitored value.
SELECT SOL MON CURRENT	(mA)	Monitors the command current from TCM to the select solenoid valve and displays the monitored value.
G SEN SLOPE	(%)	Displays the gradient angle calculated from the G sensor signal voltage.
CVT-B		- Displays CVT fluid temperature count. - This monitor item do not use.
CVT-A		- Displays CVT fluid temperature count. - This monitor item do not use.

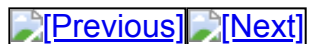
WORK SUPPORT

Function name	Item name	Description
ECU Information	-	Displays TCM part number.
Clear	ERASE LEARNING VALUE	Erases learning value memorized by TCM.

Function name	Item name	Description
		This monitor item do not use.
Learning	FWD CLUTCH POINT LEARNING	Allow learning of the forward clutch engagement point.
Engine brake adjustment	ENGINE BRAKE ADJ.	Although there is no malfunction on the transaxle and the CVT system, if a customer make a complaint like "I do not feel comfortable with automatic operation of the engine brake on downhill", the engine brake may be cancelled with "engine brake adjustment".
Confirm CVTF deterioration (clear)	CONFORM CVTF DETERIORTN	Checks the degradation level of the CVT fluid under severe conditions.
G sensor calibration	G SENSOR CALIBRATION	Compensates the G sensor.
IP characteristics data writing	WRITE IP CHARA - REPLACEMENT AT/CVT	Writes IP characteristics when transaxle assembly is replaced.
	READ IP CHARA - REPLACEMENT TCM	Reads IP characteristics when TCM is replaced.
	WRITE IP CHARA - REPLACEMENT TCM	Writes IP characteristics when TCM is replaced.
MAC KEY writing	-	Write MAC key to TCM.

Engine brake adjustment

ENGINE BRAKE LEVEL	
ON	: Turn ON the engine brake control.
OFF	: Turn OFF the engine brake control.



M.U.T.-III SE Function

APPLICABLE ITEM

Diagnosis mode	Description
Self Diagnostic Result	Display DTC which TCM memorizes
Data List	Displays TCM input/output data in real time
Special Function	• Displays TCM part number • This mode enables a technician to adjust some devices faster and more accurately
CALIB DATA	The calibration data status of TCM can be checked

SELF DIAGNOSTIC RESULTS

Display Item List

Refer to [DTC Index](#) .

How to Read DTC

DTC is displayed on “Self Diagnostic results” of M.U.T.-III SE.

When DTC is currently detected, “Active DTC” is displayed. If “Stored DTC” is displayed, it shows a malfunction occurred in the past.

How to Erase DTC

note

If the ignition switch is left ON after repair, turn OFF the ignition switch and wait for 10 seconds or more. Then, turn the ignition ON again. (Engine stop)

1. Touch “SHIFT” of M.U.T.-III SE.
 2. Touch “Self Diagnostic Result”.
 3. Touch “Erase DTCs”. (DTC memorized in electric shift control module is erased.)
-

Freeze Frame Data (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on M.U.T.-III SE.

Monitored item	Displayed contents
ODO/TRIP METER	Displays the mileage at the time the malfunction is detected.
DTC count (Count)	Displays the number of times DTC is detected.

DATA MONITOR

note

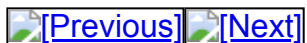
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitored item	(Unit)	Remarks
Range position		Displays the position recognized by the electric shift control module
Shift position judgment		Displays the shift input position recognized by the electric shift control module
Target shift position		Displays the target shift position recognized by the electric shift control module
Actual shift position		Displays the shift position signal received from TCM
Vehicle state		Displays the status of vehicle • State1: Ignition switch OFF • State2: Ignition switch is ACC • State3: Ignition switch is ON (Engine is stopped) • State4: While engine starting • State5: Engine started
Shift sensor 1		Displays the signal value of electric shift sensor No. 1
Shift sensor 2		Displays the signal value of electric shift sensor No. 2
Shift sensor 3		Displays the signal value of electric shift sensor No. 3
Shift sensor 4		Displays the signal value of electric shift sensor No. 4
Shift sensor 5		Displays the signal value of electric shift sensor No. 5
Shift sensor 6		Displays the signal value of electric shift sensor No. 6
Shift sensor 7		Displays the signal value of electric shift sensor No. 7
Shift sensor 8		Displays the signal value of electric shift sensor No. 8
Shift switch 1		Displays the signal value of P position switch No. 1
Shift switch 2		Displays the signal value of P position switch No. 2
Power supply relay A		Displays the command value from the electric shift control module to shift actuator relay A
Power supply relay B		Displays the command value from the electric shift control module to shift actuator relay B
Ignition switch		Displays the input status of the ignition switch

Monitored item	(Unit)	Remarks
Power supply voltage		Displays the status of battery voltage
ECU power 1		Monitors the power supply of electric shift control module and displays the status
Main power voltage	(V)	Monitors the voltage value of the main power supply for the electric shift control module and displays the monitored value
ECU power 2		Monitors the power supply of electric shift control module and displays the status
Motor A U voltage	(V)	Displays the motor A U-phase terminal voltage A/D converted value
Motor A V voltage	(V)	Displays the motor A V-phase terminal voltage A/D converted value
Motor A W voltage	(V)	Displays the motor A W-phase terminal voltage A/D converted value
Motor B U voltage	(V)	Displays the motor B U-phase terminal voltage A/D converted value
Motor B V voltage	(V)	Displays the motor B V-phase terminal voltage A/D converted value
Motor B W voltage	(V)	Displays the motor B W-phase terminal voltage A/D converted value
Shift sensor 1 voltage	(V)	Displays the voltage value of electric shift sensor No. 1
Shift sensor 2 voltage	(V)	Displays the voltage value of electric shift sensor No. 2
Shift sensor 3 voltage	(V)	Displays the voltage value of electric shift sensor No. 3
Shift sensor 4 voltage	(V)	Displays the voltage value of electric shift sensor No. 4
Shift sensor 5 voltage	(V)	Displays the voltage value of electric shift sensor No. 5
Shift sensor 6 voltage	(V)	Displays the voltage value of electric shift sensor No. 6
Shift sensor 7 voltage	(V)	Displays the voltage value of electric shift sensor No. 7
Shift sensor 8 voltage	(V)	Displays the voltage value of electric shift sensor No. 8
Shift switch 1 voltage	(V)	Displays the voltage value of P position switch No. 1
Shift switch 2 voltage	(V)	Displays the voltage value of P position switch No. 2

WORK SUPPORT

Function name	Item name	Description
ECU Information	-	Displays TCM part number
Learned value clear	ACTUATOR LERNING VALVE ELIMINATION	Erases learning value memorized by electric shift control module.



Reference Value

M.U.T.-III SE DATA MONITOR STANDARD VALUE

- In M.U.T.-III SE, electric shift timing or lock-up timing, i.e. operation timing of each solenoid valve, is displayed. Therefore, if there is an obvious difference between the shift timing estimated from a shift shock (or engine speed variations) and that shown on the M.U.T.-III SE, the mechanism parts (including the hydraulic circuit) excluding the solenoids and sensors may be malfunctioning. In this case, check the mechanical parts following the appropriate diagnosis procedure.
- Shift point (gear position) displayed on M.U.T.-III SE slightly differs from shift pattern described in Service Manual. This is due to the following reasons.
 - Actual shift pattern may vary slightly within specified tolerances.
 - While shift pattern described in Service Manual indicates start of each shift, M.U.T.-III SE shows gear position at end of shift.
 - The solenoid display (ON/OFF) on M.U.T.-III SE is changed at the start of gear shifting. In contrast, the gear position display is changed at the time when gear shifting calculated in the control unit is completed.

note The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitor item	Condition	Value/Status (Approx.)
L POSITION SW	Always	Off
SPORT MODE SW	Always	Off
ECO MODE SW	Always	Off
SPORT MODE IND	Always	Off
MANU MODE SIGNAL	Driving with manual mode	On
	Other than the above	Off
Ds mode signal*	—	—
ECO MODE SIGNAL	Always	Off
M GEAR POS	Manual mode: 1st – 8th	1 to 8

Monitor item	Condition	Value/Status (Approx.)
ENGBRKLVL	When the engine brake level of "ENGINE BRAKE ADJ". in "Special Function" is ON	On
	When the engine brake level of "ENGINE BRAKE ADJ". in "Special Function" is OFF	Off
AIR BLDING STATE	Always	COMP
2WD/4WD identification	—	2WD/4WD
T/M warning indicator DTC	Ignition switch ON	Displays the first DTC when CVT system warning is displayed.
T/M warning indicator mileage	Ignition switch ON	Displays the total mileage when CVT system warning is displayed at first time.
D POSITION SW	Sift position: "D" position	On
	Other than the above	Off
N POSITION SW	Sift position: "N" position	On
	Other than the above	Off
R POSITION SW	Sift position: "R" position	On
	Other than the above	Off
P POSITION SW	Sift position: "P" position	On
	Other than the above	Off
IDLE SW	Accelerator pedal is released	On
	Accelerator pedal is fully depressed	Off
STRDWNSW	Paddle shifter (-) is pulled	On
	Other than the above	Off
STRUPSW	Paddle shifter (+) is pulled	On
	Other than the above	Off
DOWNLVR	Always	Off
UPLVR	Always	Off
NONMMODE	Always	On

Monitor item	Condition	Value/Status (Approx.)
MMODE	Always	Off
Tow mode switch	Always	Off
CVT LIGHT	Always	Off
ASC ON	ASC is activated	On
	Other than the above	Off
TCS ON	TCS is activated	On
	Other than the above	Off
ABS FAIL SIGNAL	When ABS malfunction signal is received	On
	Other than the above	Off
ABS ON	ABS is activated	On
	Other than the above	Off
G SEN CALIBRATION	When G sensor calibration is completed	DONE
	When G sensor calibration is not completed	YET
N IDLE STATUS	Always	Off
SNOW MODE	Always	Off
ECO MODE	Always	Off
NORMAL MODE	Always	Off
SPORT MODE	Always	Off
ELECTRIC OP RELAY	Always	Off
E-OP RELAY MON	Always	Off
Exchange transmission*	—	—
Exchange oil pressure C/V*	—	—
CVTF DETERIORATION DATE*	—	—
Select - Initial learning temp*	—	—
Lock-up - Initial learning temp*	—	—
Select (N-D) - Initial learn press*	—	—

Monitor item	Condition	Value/Status (Approx.)
Select (N-D) - Initial learn time*	—	—
Select (N-R) - Initial learn press*	—	—
Select (N-R) - Initial learn time*	—	—
Lock-up - Initial learning 1*	—	—
SLIP REV	While driving	Engine speed – Input speed
ELECTRIC OP DUTY	Always	0%
E-OP DUTY MON	Always	0%
Slip revolution absolute value*	—	—
Target transmission speed*	—	—
Input speed sensor	In driving (lock-up ON)	Approximately matches the engine speed.
PRI SPEED SEN	In driving (lock-up ON)	Approximately matches the engine speed.
SEC REV SENSOR	While driving	VSP SENSOR × 40
ENG SPEED SIG	Engine running	Almost same reading as tachometer
SEC PRESSURE SEN	• After engine warm up • Shift position: “N” position • At idle	1.2 – 1.3V
PRI PRESSURE SEN	• After engine warm up • Shift position: “N” position • At idle	0.7 – 0.9V
ATF TEMP SEN	CVT fluid: Approx. 20°C (68°F)	2.01 – 2.05 V
	CVT fluid: Approx. 50°C (122°F)	1.45 – 1.50 V
	CVT fluid: Approx. 80°C (176°F)	0.90 – 0.94 V

Monitor item	Condition	Value/Status (Approx.)
G SENSOR	- Vehicle stopped - Vehicle is level	0 G
	During acceleration	The value changes to the positive side along with acceleration.
	During deceleration	The value changes to the positive side along with deceleration.
TRQ RTO	While driving	The value changes along with acceleration/deceleration.
G sensor (TCM)	Always	0 V
BRAKESW	Brake pedal is depressed	On
	Brake pedal is released	Off
SHIFT IND SIGNAL	When the selector lever is positioned in between each position.	OFF
	Shift position: P position	P
	Shift position: R position	R
	Shift position: N position	N
	Shift position: D position	D
	Manual mode: 1st	M1
	Manual mode: 2nd	M2
	Manual mode: 3rd	M3
	Manual mode: 4th	M4
	Manual mode: 5th	M5
	Manual mode: 6th	M6
	Manual mode: 7th	M7
	Manual mode: 8th	M8

Monitor item	Condition	Value/Status (Approx.)
RANGE	Shift position: P and N positions	N/P
	Shift position: R position	R
	Shift position: D position	D
	Shift position: M position	
VSP SENSOR	While driving	Almost same as the speedometer display.
ESTM VSP SIG	While driving	Almost same as the speedometer display.
VIGN SEN	Ignition switch: ON	10.0 – 16.0 V
PVIGN VOLT	Ignition switch: ON	10.0 – 16.0 V
VEHICLE SPEED	While driving	Almost same as the speedometer display.
INPUT REV	In driving (lock-up ON)	Almost same as the engine speed.
PRI SPEED	In driving (lock-up ON)	Approximately matches the engine speed.
SEC SPEED	While driving	VSP SENSOR × 40
ENG SPEED	Engine running	Almost same reading as tachometer
PULLEY GEAR RATIO	In driving (forward)	2.63 – 0.38
	In driving (reverse)	2.63
G SPEED	Vehicle stopped	0.00 G
	During acceleration	The value changes to the positive side along with acceleration.
	During deceleration	The value changes to the positive side along with deceleration.
ACCEL POSI SEN 1	Accelerator pedal released	0.00 deg
	Accelerator pedal fully depressed	80.00 deg

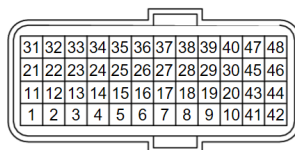
Monitor item	Condition	Value/Status (Approx.)
VENG TRQ	While driving	The value changes along with acceleration/deceleration.
PRI TRQ	While driving	The value changes along with acceleration/deceleration.
SEC PRESSURE	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
PRI PRESSURE	• After engine warm up • Shift position: "N" position • At idle	0.500 MPa
FLUID TEMP	Ignition switch ON.	Displays the CVT fluid temperature.
DSR REV	While driving	It varies along with the driving condition.
TRGT GEAR RATIO	In driving (forward)	2.63 – 0.38
	In driving (reverse)	2.63
LU PRS	• Engine started • Vehicle is stopped.	–0.50 MPa
	• Shift position: "D" position • Accelerator pedal position: 1/8 or less • Vehicle speed: 20 km/h (12 MPH) or more	0.6 MPa

Monitor item	Condition	Value/Status (Approx.)
LINE PRS	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
	• After engine warm up • Shift position: "N" position • Depress the accelerator pedal fully	5.750 – 6.000 MPa
TRGT PRI PRESSURE	• After engine warm up • Shift position: "N" position • At idle	0.500 MPa
Target select pressure	• After engine warm up • Shift position: "N" position • At idle	0.000 MPa
TARGET SEC PRESSUR	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
ISOLT1	—	—
ISOLT2	—	—
PRI SOLENOID	—	—
SEC SOLENOID CURRENT	—	—
SELECT SOLENOID CURRENT	—	—
SOLMON1	—	—
SOLMON2	—	—
PRI SOL MON	—	—

Monitor item	Condition	Value/Status (Approx.)
SEC SOL MON CURRENT	—	—
SELECT SOL MON CURRENT	—	—
G SEN SLOPE	Flat road	0%
	Uphill gradient	The value changes to the positive side along with uphill gradient. (Maximum 40.45%)
	Downhill gradient	The value changes to the negative side along with downhill gradient. (Minimum -40.45%)
CVT-B*	—	—
CVT-A*	—	—

*: This monitor item does not use.

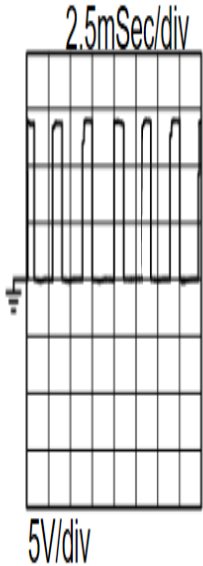
TERMINAL LAYOUT



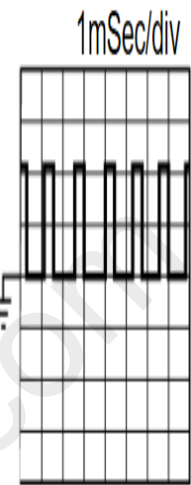
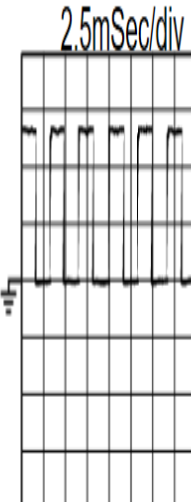
INPUT/OUTPUT SIGNAL STANDARD

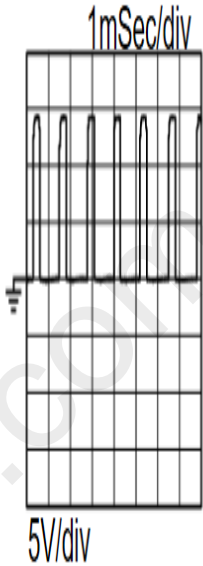
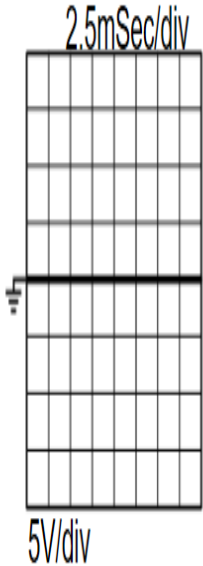
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	—	Signal	Input/Output			
2* (BR)	Ground	—	—	Ignition switch ON	—	—
4 (W)	Ground	D position switch	Input		Shift position: "D" position	10 – 16 V
					Other than the above	0 V
5 (Y)	Ground	N position switch	Input		Shift position: "N" position	10 – 16 V
					Other than the above	0 V
6 (G)	Ground	R position switch	Input		Shift position: "R" position	10 – 16 V
					Other than the above	0 V
7 (L)	Ground	P position switch	Input		Shift position: "P" position	10 – 16 V
					Other than the above	0 V
8 (GR)	—	CAN-H	Input/Output	—		—
9 (R)	—	CAN-L	Input/Output	—		—
11 (Y)	Ground	Sensor ground	—	Always		0 V
12 (SB)	Ground	CVT fluid temperature sensor	Input	Ignition switch ON	CVT fluid: Approx. 20°C (68°F)	2.01 – 2.05 V
					CVT fluid: Approx. 50°C (122°F)	1.45 – 1.50 V
					CVT fluid: Approx. 80°C 176°F)	0.90 – 0.94 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
16 (P)	Ground	Secondary pressure sensor	Input	- Shift position: "N" position - At idle	1.2 – 1.3 V
17 (BR)	Ground	Primary pressure sensor	Input	- Shift position: "N" position - At idle	0.70 – 0.85 V
23 (R)	—	CAN-L	Input/Output	—	—
24 (V)	Ground	Input speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	880 Hz
26 (R)	Ground	Sensor power supply	Output	Ignition switch: ON	5.0 V
				Ignition switch: OFF	0 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
30 (Y)	Ground	Line pressure solenoid valve	Output	• After engine warming up • Shift position: “N” position • At idle	
				• After engine warming up • Shift position: “N” position • Depress the accelerator pedal fully	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
33 (GR)	—	CAN-H	Input/Output	—	—
34 (R)	Ground	Output speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	200 Hz 
35 (BG)	Ground	Primary speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	700 Hz

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
					
37 (L)	Ground	Select solenoid valve	Output	• Engine started • Vehicle is stopped • Shift position: "N" position	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
38 (LG)	Ground	Torque converter clutch solenoid valve	Output	- Shift position: "D" position - Accelerator pedal position: 1/8 or less - Vehicle speed: 20 km/h (12 MPH) or more	
				- Engine started - Vehicle is stopped	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
39 (G)	Ground	Secondary pressure solenoid valve	Output	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	
40 (W)	Ground	Primary pressure solenoid valve	Output	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
41 (B)	Ground	Ground	—	Always	0 V
42 (B)	Ground	Ground	—	Always	0 V
45 (V)	Ground	Battery power supply (Memory backup)	Input	Always	10 – 16 V
46 (V)	Ground	Battery power supply (Memory backup)	Input	Always	10 – 16 V
47 (LG)	Ground	Ignition power supply	Input	Ignition switch: ON	10 – 16 V
				Ignition switch: OFF	0 V
48 (LG)	Ground	Ignition power supply	Input	Ignition switch: ON	10 – 16 V
				Ignition switch: OFF	0 V

*: This harness does not use.