

625DCT TRANSMISSION

GENERAL INFORMATION	18-3	P171A00	18-57
Overview	18-3	P171B00	18-57
Transmission Basic Component	18-3	P171500	18-61
Transmission Accessory	18-4	P171600	18-61
Serviceability List	18-5	P171700	18-61
Specifications	18-6	P171800	18-61
TCU Connector Terminal Definition	18-7	P171C00	18-61
Shift Lever Signal	18-9	P171D00	18-61
Tools	18-11	P171E00	18-61
		P170700	18-66
DIAGNOSIS & TESTING	18-14	P170800	18-66
Diagnosis Content	18-14	P170900	18-71
DTC List and Troubleshooting		P170A00	18-71
Suggestion	18-14	P070512	18-76
Diagnosis Procedure	18-22	P070514	18-76
DTC Confirmation Procedure	18-23	P070538	18-76
Intermittent DTC Troubleshooting	18-24	P070562	18-76
Ground Inspection	18-24	P172400	18-76
P170F00	18-25	P060400	18-82
P171000	18-25	P060500	18-82
P172B00	18-25	P172000	18-82
P172C00	18-25	P172200	18-84
P071517	18-33	P172300	18-84
P071516	18-33	P172500	18-86
P071629	18-33	P172600	18-86
P071564	18-33	P172700	18-86
P170000	18-39	P172800	18-86
P170100	18-39	P172900	18-86
P170200	18-39	P172A00	18-86
P172100	18-39	P173500	18-89
P090011	18-45	P173600	18-89
P090012	18-45	P173700	18-92
P090013	18-45	P173800	18-92
P09011C	18-45	P173900	18-95
P170B00	18-45	P173A00	18-95
P170D00	18-45	P173B00	18-95
P170300	18-51	P173C00	18-95
P170400	18-51	P173D00	18-95
P170500	18-51	P173E00	18-95
P170600	18-51	P174A00	18-99
P170C00	18-51	P174B00	18-99
P170E00	18-51	P174C00	18-99
P171100	18-57	P174D00	18-99
P171200	18-57	P174300	18-99
P171300	18-57	P174400	18-99
P171400	18-57	P173F00	18-103
P171900	18-57		

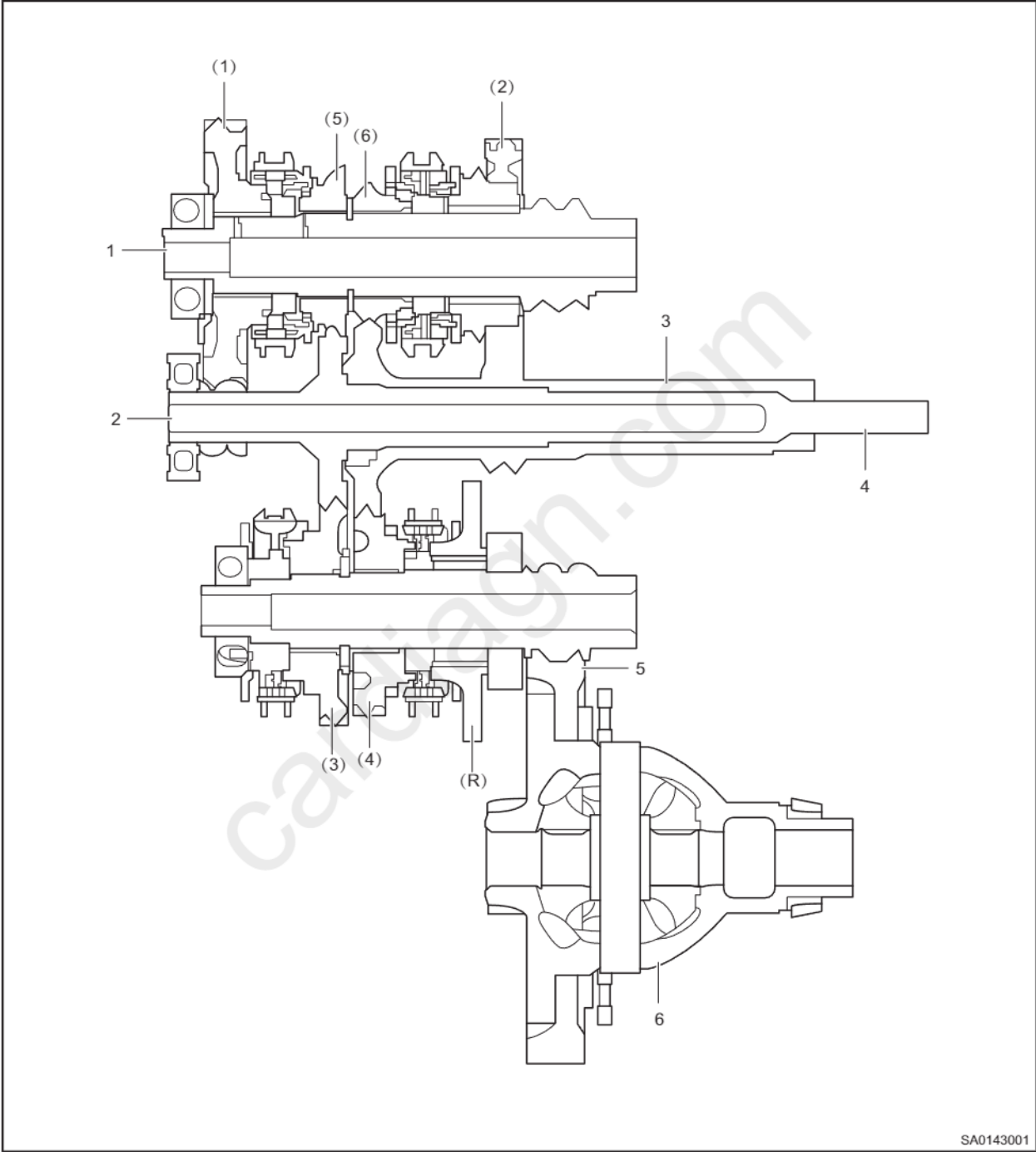


P174000	18-103	On-vehicle Inspection	18-143
P174100	18-107	Transmission Oil Level Inspection	18-143
P174200	18-107		
P174500	18-110	ON-VEHICLE SERVICE	18-144
P174600	18-110	Transmission Oil Replacement	18-144
P174700	18-110	Drain the transmission oil	18-144
P174800	18-110	Transmission Oil Filling	18-144
P174E00	18-113	Automatic Shift Cable Assembly	18-146
P174F00	18-113	Removal	18-146
P174900	18-115	Installation	18-147
P172D00	18-117	Automatic Shift Control Mechanism	18-148
P172E00	18-117	Removal	18-148
P172F00	18-117	Installation	18-149
P173000	18-117	Transmission Assembly	18-150
P173100	18-117	Removal	18-150
P173200	18-117	Installation	18-151
P173300	18-117	Dual-clutch Assembly	18-152
P173400	18-117	Removal	18-152
U007388	18-120	Clutch Disc Wear Detection	18-155
U040181	18-120	Installation	18-156
U010087	18-120	Assembly of Transmission and Engine	18-165
U041881	18-120	Removal	18-165
U012987	18-120	Installation	18-167
U042281	18-120	Transmission External Accessory	18-169
U014087	18-120	Transmission Wire Harness	18-169
U012687	18-120	Transmission Range Sensor	18-169
General Functions for Diagnostic Tester	18-124	Transmission Shift Lever	18-171
Diagnostic Tester Menu	18-124	Replacement of Transmission Shift Lever Shaft Sealing	18-172
Read and clear DTCs	18-124	Transmission Control Module	18-173
Reading Version Information	18-126	Transmission Input Shaft Sensor 1	18-175
Read Datastream	18-126	Transmission Input Shaft Sensor 2	18-176
Self-learning after Component Replacement	18-131	Removal of Clutch Actuator Motor 1	18-177
Self-learning Menu for Special Operation	18-131	Installation of Clutch Actuator Motor 1	18-178
Self-learning After Replacing Vehicle Shift Lever, Shift Cable or Transmission Range Sensor	18-132	Removal of Clutch Actuator Motor 2	18-179
Self-learning After Replacing Clutch or Clutch Actuator	18-133	Installation of Clutch Actuator Motor 2	18-180
Self-learning After Replacing Clutch Motor	18-135	Flywheel Reset	18-181
Self-learning After Replacing Mechatronic Actuator Module	18-138	Transmission Internal Accessory	18-182
Semi-clutch Self-learning	18-141	Removal of Engagement System	18-182
Transmission Self-learning	18-142	Installation of Engagement System	18-182
		Removal of Actuator Fork Assembly	18-182
		Installation of Actuator Fork Assembly	18-183
		Removal of Guide	18-183
		Installation of Guide	18-183
		Problem Feedback List	18-184
		Problem Feedback Content	18-184

GENERAL INFORMATION

Overview

Transmission Basic Component



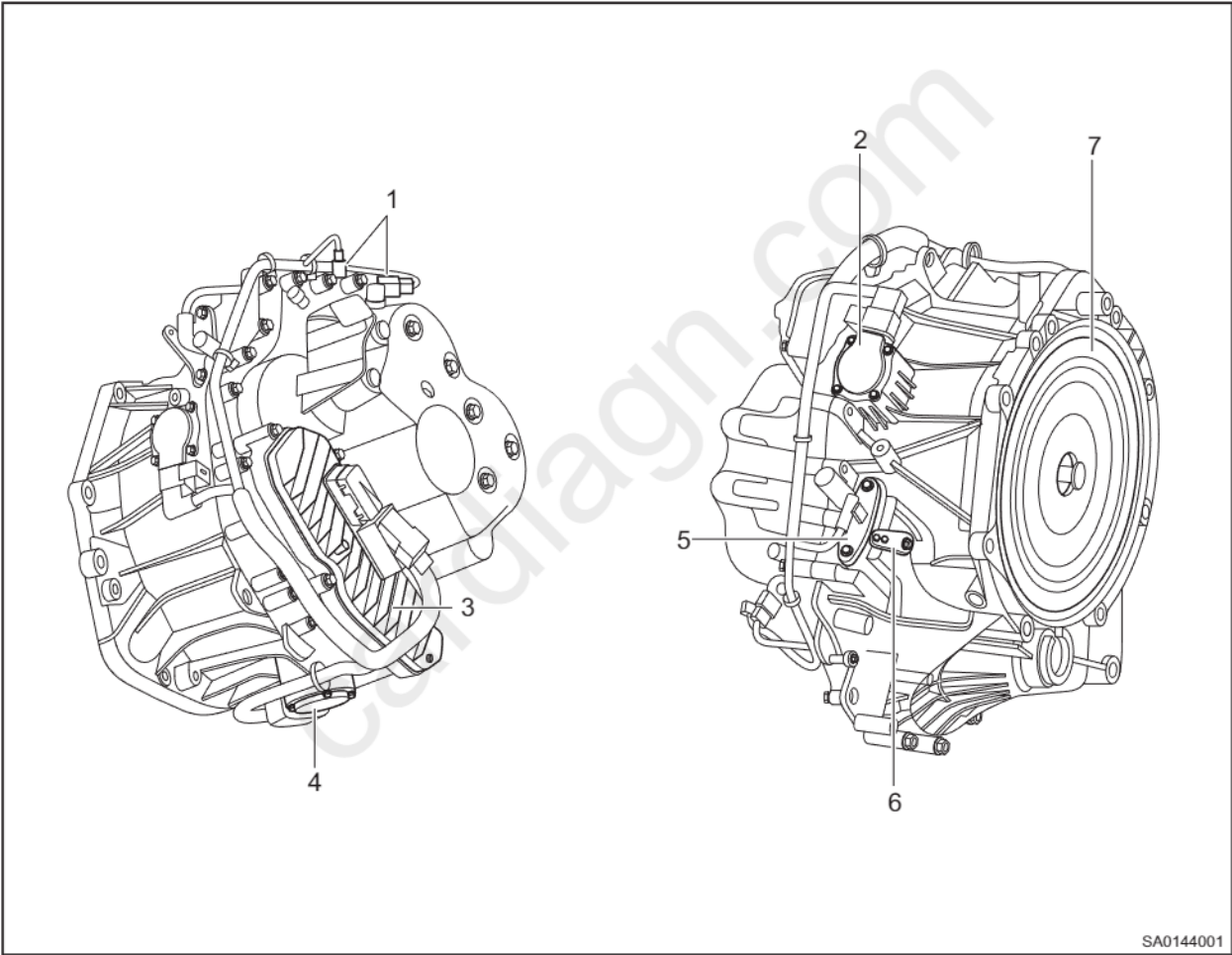
1 - Output Shaft 1	2 - Output Shaft 2
3 - Input Shaft 2	4 - Input Shaft 1
5 - Final Drive	6 - Differential

Drive features for 625 DHA transmission:

Dual-clutch automatic transmission is automatic mechanical transmission, gear change is effected through torque input which is achieved by changing 2 types of clutches. Input shaft 1 connects 1st, 3rd and 5th gears, and input shaft 2 connects 2nd, 4th, 6th and reverse gears, 2 types of clutches control each engagement of propeller shaft. Engine power will be transmitted without any interruptions by either propeller shaft.

Transmission efficiency is equal to that of manual transmission, compared to automatic transmission with hydraulic torque converter, there is an advantage in fuel efficiency, and it can realize no power interruption gear shifting and shorter gear shifting time while achieving higher level of shifting comfort. Shift pattern has manual shift pattern (select shift state manually, and engage clutch automatically) and automatic shift pattern. It can detect possible malfunction effectively, thus ensuring transmission safety operation and high reliability.

Transmission Accessory



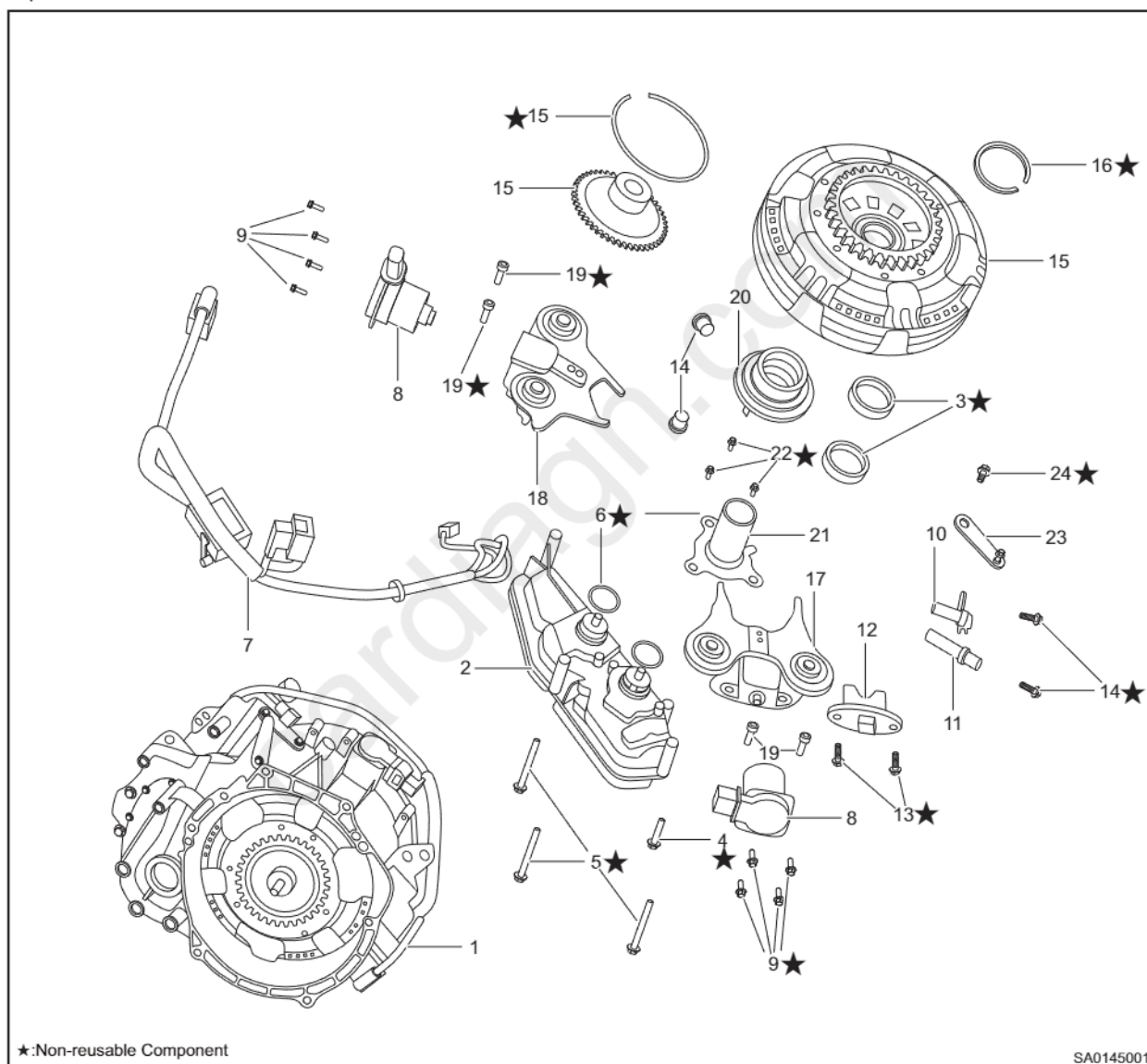
1 - Input Shaft Speed Sensor	2 - Clutch Actuator Motor 1
3 - Transmission Control Unit with Shift Motor	4 - Clutch Actuator Motor 2
5 - Transmission Range Sensor	6 - Outer Shift Lever
7 - Dual Mass Flywheel	

Serviceability List

Serviceability List

Caution:

- ★ Marked components are non-reusable components, and must be replaced after removal.
- Dual-clutch assembly consists of 3 components, in which, dual-clutch pinion snap ring is a non-reusable component, and must be replaced after removal.
- Dual-clutch assembly consists of 3 components which are needed to be replaced simultaneously. There is a one-to-one correspondence between clutch and pinion, pinion on other clutch cannot be used for this clutch.
- If drive shaft oil seal is not damaged when removing and installing drive shaft, it is not necessary to replace drive shaft oil seal.



1 - Transmission Assembly	2 - Transmission Control Module
3 - Differential Oil Seal ★	4 - Hexagon Flange Bolt ★
5 - Hexagon Flange Bolt ★	6 - O-ring ★
7 - Transmission Wire Harness	8 - Clutch Actuator Motor Assembly
9 - Hexagon Flange Bolt ★	10 - Input Shaft Speed Sensor 1
11 - Input Shaft Speed Sensor 2	12 - Range Sensor
13 - Hexagon Flange Bolt ★	14 - Filler Plug and Drain Plug ★



18-625DCT TRANSMISSION

15 - Dry Dual-clutch Assembly	16 - Bearing Snap Ring ★
17 - Actuator Lever 1	18 - Actuator Lever 2
19 - Hexagon Socket Head Bolt ★	20 - Engagement System
21 - Guide	22 - Hexagon Socket Head Bolt ★
23 - Outer Shift Lever	24 - Hexagon Head Bolt ★

Transportation, transfer and storage requirements for transmission:

Special station equipment must be used to load transmission or hang transmission with lifting eyes during transportation and transfer;

Never tread, forcibly tap and drop the transmission, gently handle transmission during transportation and never contact with surface connected engine, it can be transported only after damage is repaired by professional;

Transmission should be stored in special station equipment in a dry, well ventilated place, never expose it to sun and rain, and cover it with dust cover if storage period is more than 1 month;

Never allow non-professional to pull gear select and shift mechanism from transmission delivery to assembly with engine. Never allow non-professional to remove and install any assembly components.

Specifications

Torque Specifications

Description	Torque (N·m)
Transmission Control Module Mounting Bolt	26 ~ 28
Motor Mounting Bolt	5 ~ 6
Sensor Mounting Bolt	9 ~ 11
Filler Plug and Drain Plug	48 ~ 56
Clutch Actuator Bolt	18 ~ 20
Guide Bolt	7 ~ 9
Shift Lever Bolt	26 ~ 28

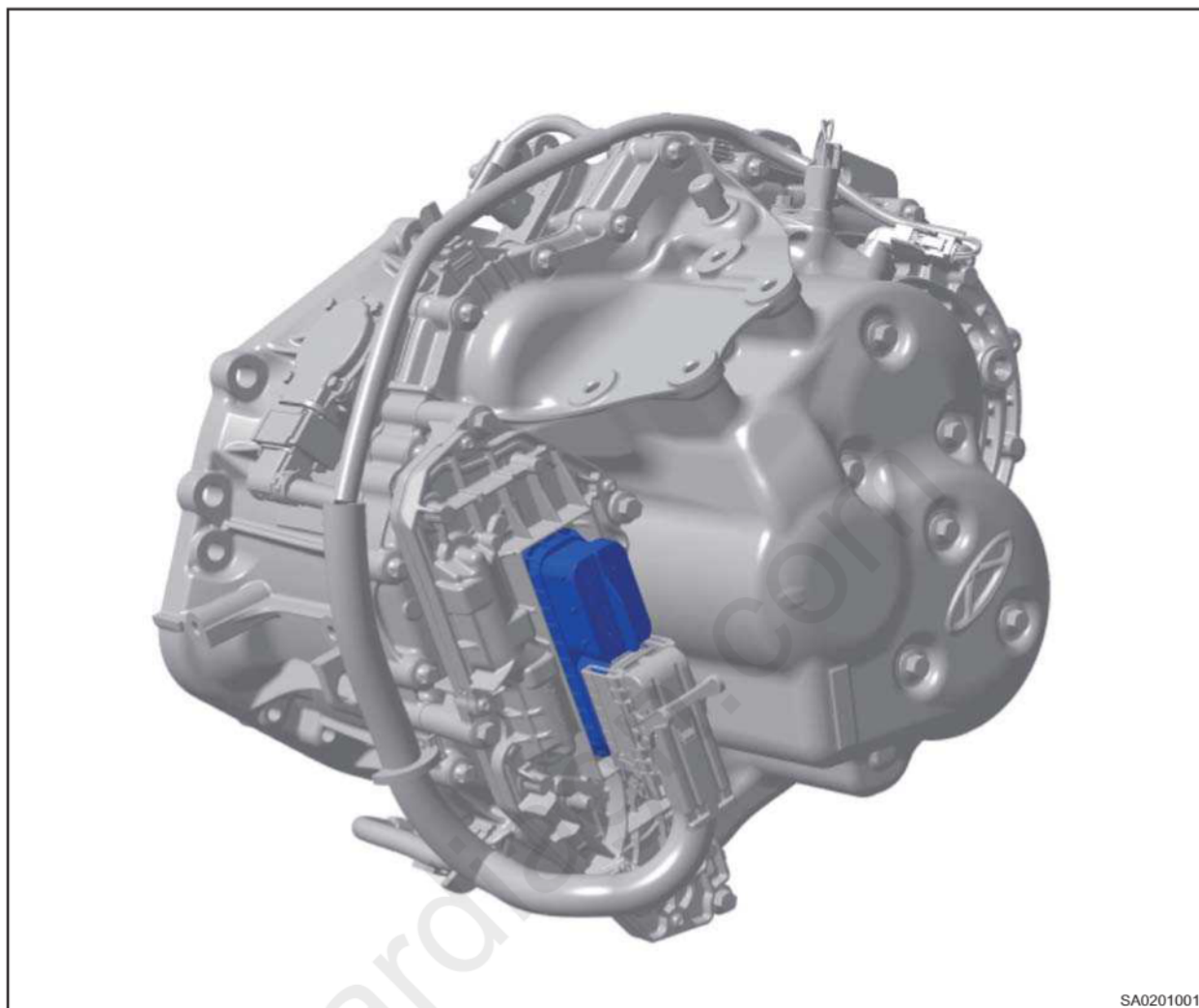
625 DHA Transmission Gear Ratio

Type	625 DHA
Gear position	1st
	4.538
	2nd
	2.35
	3rd
	1.302
	4th
	1.021
	5th
Gear position	0.907
	6th
	0.702
	Reverse
	3.661
Final Drive Ratio	1/2/5/6 final drive ratio 1: 4.158
Final Drive Ratio	3/4/R final drive ratio 2: 4.648

Lubricant specification: Add lubricant (1.2 L); type: BOT350 M3; maintenance-free for lifetime (if it is not short of lubricant or deteriorated, it is not necessary to add/replace).

TCU Connector Terminal Definition

TCU Connector A



SA0201001

Terminal No.	Description	Terminal No.	Description
A1	Power Supply	A30	-
A2	Ground	A31	KL15 Terminal
A3	Power Supply	A32	-
A4	Ground	A33	-
A5	Power Supply	A34	High-speed CAN Bus
A6	Ground	A35	Low-speed CAN Bus
A7	-	A36	-
A8	-	A37	-
A9	Shift-up Switch	A38	-
A10	Shift-down Switch	A39	-
A11	-	A40	-
A12	-	A41	-
A13	-	A42	-
A14	-	A43	-
A15	-	A44	-
A16	-	A45	-
A17	-	A46	-

18-625DCT TRANSMISSION

Terminal No.	Description	Terminal No.	Description
A18	Power Supply	A47	-
A19	-	A48	-
A20	-	A49	P Position Solenoid Valve Lock
A21	Brake Switch Signal	A50	-
A22	-	A51	-
A23	-	A52	-
A24	-	A53	-
A25	-	A54	-
A26	Power Supply	A55	-
A27	Ground	A56	-
A28	-	A57	-
A29	-	A58	-

TCU Connector B



SA0202001

Terminal No.	Description	Terminal No.	Description
B1	Phase W Clutch 2	B30	-
B2	Phase U Clutch 2	B31	-
B3	Phase V Clutch 2	B32	Clutch Motor 1 Half-bridge 1
B4	Phase W Clutch 1	B33	-

Terminal No.	Description	Terminal No.	Description
B5	Phase V Clutch 1	B34	TRS 5V Power Supply
B6	Phase U Clutch 1	B35	GNO TRS
B7	-	B36	-
B8	Input Shaft Speed Sensor 2 Input Speed	B37	-
B9	-	B38	-
B10	Input Shaft Speed Sensor 1 Input Speed DIR	B39	-
B11	-	B40	-
B12	Input Shaft Speed Sensor 2 Speed Sensor Power Supply	B41	-
B13	-	B42	Clutch Motor 2 Half-bridge 2
B14	-	B43	Clutch Motor 2 Half-bridge 1
B15	-	B44	Clutch Motor 2 Half-bridge 3
B16	-	B45	Clutch Motor 1 Half-bridge 3
B17	-	B46	-
B18	-	B47	-
B19	Clutch Motor 1 Half-bridge 2	B48	-
B20	-	B49	-
B21	Input Shaft Speed Sensor 1 Speed Sensor Power Supply	B50	-
B22	-	B51	-
B23	-	B52	-
B24	Range Sensor 1 Input Circuit	B53	-
B25	Range Sensor 2 Input Circuit	B54	-
B26	-	B55	Clutch 2.5 V Power Supply
B27	-	B56	Clutch 2 Ground Wire
B28	-	B57	Clutch 1 Ground Wire
B29	-	B58	Clutch 1 5 V Power Supply

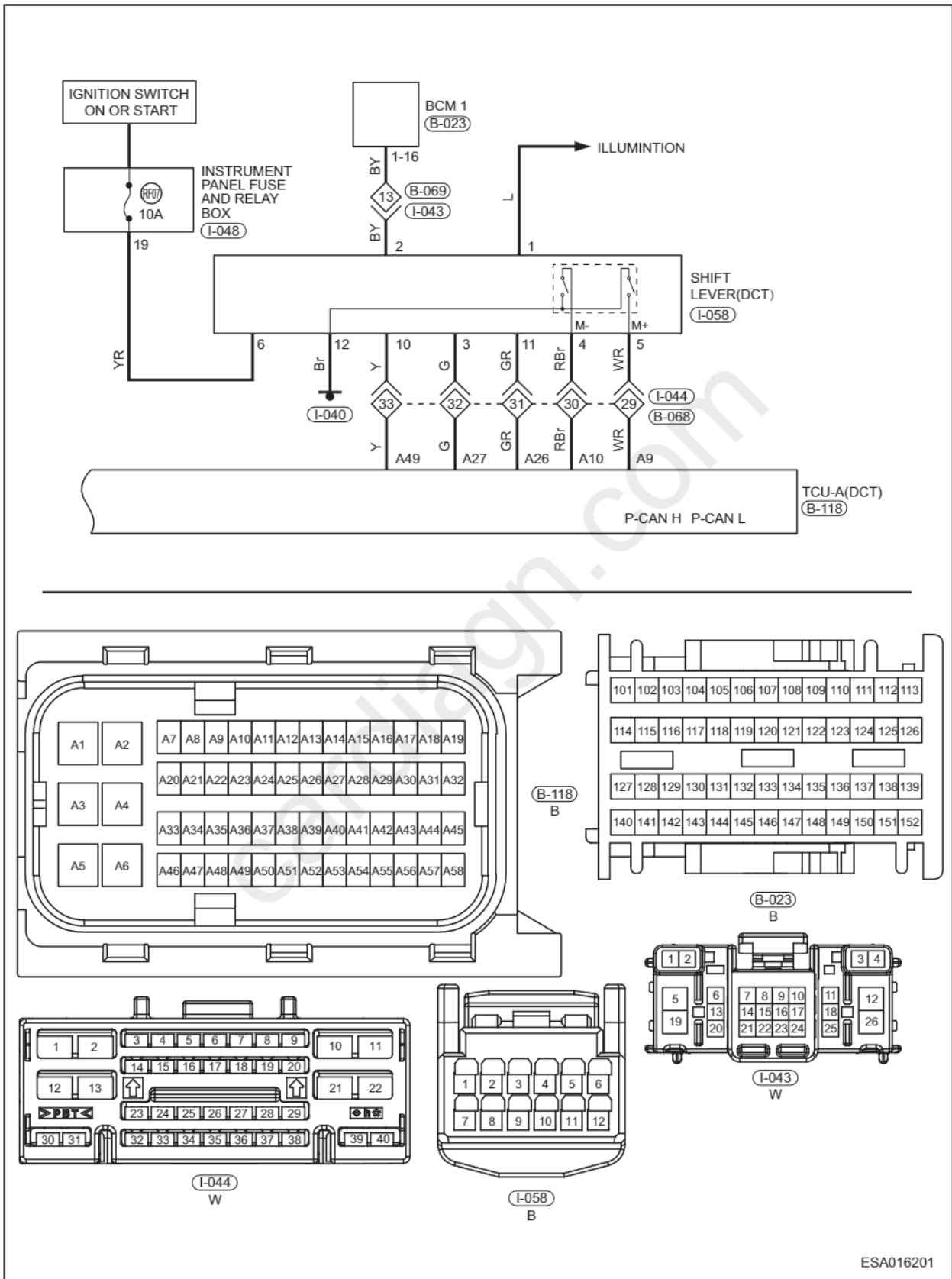
Shift Lever Signal

1. Shift lever function

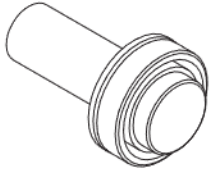
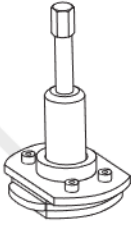
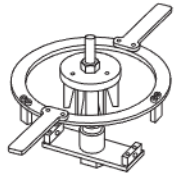
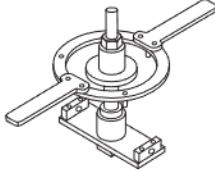
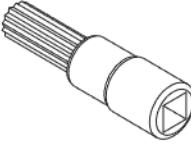
- Shift lever mechanically connects with transmission, transmission TRS generates PRND signal as shift lever moves.
- Pattern switch function.
- TCU provides a low side drive to control P position (other positions can be shifted to from P position only when depressing brake pedal).



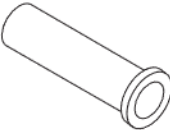
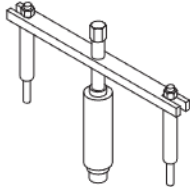
- (d) TCU provides 12 V voltage for shift lever to achieve manual pattern which can perform upshifting and downshifting manually (circuit logic is as shown in illustration).



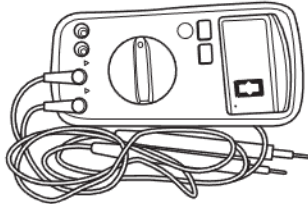
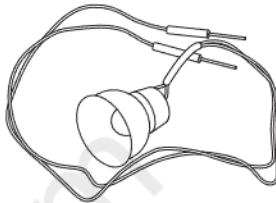
Tools**Special Tools**

Differential Oil Seal Installer	DAST-0103	 082
Dual-clutch Remover	Part number: DAST-0104	 075
Clutch 2 Reset Tool	Part number: DAST-0105	 135
Clutch 1 Reset Tool		 136
Dual-clutch Lock Actuator	Part number: DAST-0107	 078



Inner Input Shaft Oil Seal Installer	Part number: DAST-0110	 081
Outer Input Shaft Oil Seal Installer	Part number: DAST-0109	 080
Shift Shaft Oil Seal Installer	Part number: DAST-0108	 079
Dual-clutch Installer	DAST-0106	 077

General Tools

Digital Multimeter	 002
21 W Test Lamp	 087
Diagnostic Tester	 001

DIAGNOSIS & TESTING

Diagnosis Content

DTC List and Troubleshooting Suggestion

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
U007388	Control Module Communication Bus Off	- It is restricted in automatic mode - Vehicle cannot be started off again	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses - Replace TCU
U040181	Invalid EMS CAN Signal Received	- It is restricted in automatic mode - Vehicle cannot be started off again	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U010087	Lost Communication With EMS	- It is restricted in automatic mode - Vehicle cannot be started off again	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U041881	Invalid BSM CAN Signal Received	It is restricted in automatic mode	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U012987	Lost Communication With BSM	It is restricted in automatic mode	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U042281	Invalid BCM CAN Signal Received	Ambient temperature: Driving function is restricted in automatic mode	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U014087	Lost Communication With BCM	Ambient temperature: Driving function is restricted in automatic mode	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
U012687	Lost Communication With SAM	/	- Check failure cache of all ECUs - Check wire harness and connector - Replace all vehicle wire harnesses
P071517	ISS 1	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 speed with gear ratio and output speed with gear engaged or input shaft 2 speed - Hill hold assist and function fail - Change driving direction through engagement of gear	- Check wire harness and connector - Check input shaft speed sensor 1 - Replace input shaft speed sensor 1 - Replace transmission wire harness - Replace TCU

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P071516	ISS 1	• Gear jumping is not monitored • Shifting time is longer (have no influence on torque transmission) • R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) • Replace input shaft 1 speed with input shaft speed • Hill hold assist and function fail • Change driving direction through engagement of gear	• Check wire harness and connector • Check input shaft speed sensor 1 • Replace input shaft speed sensor 1 • Replace transmission wire harness • Replace TCU
P071629	ISS 1	• R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) • Replace input shaft 1 with input shaft speed and engaged gear or input shaft 2 and engaged gear • Hill hold assist and coast function fail • Change driving direction through engagement of gear	• Check wire harness and connector • Check input shaft speed sensor 1 • Replace input shaft speed sensor 1 • Replace transmission wire harness • Replace TCU
P170000	ISS 2 Supply Voltage Over 13 V	• Gear jumping is not monitored • Shifting time is longer (have no influence on torque transmission) • Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	• Check wire harness and connector • Check input shaft speed sensor 2 • Replace input shaft speed sensor 2 • Replace transmission wire harness • Replace TCU
P170100	ISS 2 Supply Voltage Under 4.5 V	• Gear jumping is not monitored • Shifting time is longer (have no influence on torque transmission) • Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	• Check wire harness and connector • Check input shaft speed sensor 2 • Replace input shaft speed sensor 2 • Replace transmission wire harness • Replace TCU
P170200	ISS 2 Signal Invalid	• Gear jumping is not monitored • Shifting time is longer (have no influence on torque transmission) • Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	• Check wire harness and connector • Check input shaft speed sensor 2 • Replace input shaft speed sensor 2 • Replace transmission wire harness • Replace TCU
P090011	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side	Drive with other part (no problem) of transmission	• Check wire harness and connector • Replace transmission wire harness • Replace clutch motor 1 • Replace TCU
P090012	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side	Drive with other part (no problem) of transmission	• Check wire harness and connector • Replace transmission wire harness • Replace clutch motor 1 • Replace TCU

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P090013	ATIC Clutch Actuator 1 on H-bridge or on 3rd Half Bridge, Low Side or High Side	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 1 - Replace TCU
P09011C	ATIC Clutch Actuator 1	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 1 - Replace TCU
P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1,2,3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 2 - Replace TCU
P170400	ATIC Clutch Actuator 2 SCB on Half Bridge 1,2,3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 2 - Replace TCU
P170500	ATIC Clutch Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 2 - Replace TCU
P170600	ATIC Clutch Actuator 2 Over or Undervoltage	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace TCU
P170700	Clutch Actuator 1 Hall Sensor Power Supply Voltage Under 3.72 V	Drive with other part (no problem) of transmission	- Check wire harness and connector - If malfunction still occurs, replace transmission wire harness - If malfunction does not occur in wire harness, replace clutch motor 1 - If malfunction still occurs after replacing clutch motor 1, replace MAM
P170800	Clutch Actuator 1 Hall Sensor Power Supply Voltage Over 5.8 V	Drive with other part (no problem) of transmission	- Check wire harness and connector - If malfunction still occurs, replace transmission wire harness - If malfunction does not occur in wire harness, replace clutch motor 1 - If malfunction still occurs after replacing clutch motor 1, replace MAM
P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V	Drive with other part (no problem) of transmission	- Check wire harness and connector - If malfunction still occurs, replace transmission wire harness - If malfunction does not occur in wire harness, replace clutch motor 2 - If malfunction still occurs after replacing clutch motor 2, replace MAM
P170A00	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V	Drive with other part (no problem) of transmission	- Check wire harness and connector - If malfunction still occurs, replace transmission wire harness - If malfunction does not occur in wire harness, replace clutch motor 2 - If malfunction still occurs after replacing clutch motor 2, replace MAM
P170B00	Clutch Actuator 1 Position Signal Correlation Not Plausible	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 1 - Replace TCU
P170C00	Clutch Actuator 2 Position Signal Correlation Not Plausible	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 2 - Replace TCU
P170D00	Clutch Actuator 1 Position Sensor Signal Incorrect ATIC vs. HALL	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 1 - Replace TCU

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P170E00	Clutch Actuator 2 Position Sensor Signal Incorrect ATIC vs. HALL	Drive with other part (no problem) of transmission	- Check wire harness and connector - Replace transmission wire harness - Replace clutch motor 2 - Replace TCU
P170F00	TCU High Power Supply Overvoltage	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	- Check wire harness and connector - Check the battery - Replace the battery - Replace alternator - Check TCU - Replace wire harness - Replace TCU
P171000	TCU Low Power Supply Overvoltage	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	- Check wire harness and connector - Check the battery - Replace the battery - Replace alternator - Check TCU - Replace wire harness - Replace TCU
P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1, 2, 3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171200	ATIC Shift Actuator 1 SCB on Half Bridge 0, 2, 3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171400	ATIC Shift Actuator 1 Over or Undervoltage	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171500	ATIC Shift Actuator 2 SCG on Half Bridge 0, 2, 3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171600	ATIC Shift Actuator 2 SCB on Half Bridge 0, 2, 3, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171700	ATIC Shift Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171800	ATIC Shift Actuator 2 Over or Undervoltage	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171900	Shift Actuator 1 RPS Signal Wrong PWM	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171A00	Shift Actuator 1 Angle Difference Too High	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171B00	Shift Actuator 1 Position Sensor Signal Incorrect ATIC vs. RPS	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171C00	Shift Actuator 2 RPS Signal Wrong PWM	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P171D00	Shift Actuator 2 Angle Difference Too High	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU



DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P171E00	Shift Actuator 2 Position Sensor Signal Incorrect ATIC vs. RPS	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P070512	TRS	- Driving direction cannot be changed - Neutral cannot be shifted to	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P070514	TRS	- Driving direction cannot be changed - Neutral cannot be shifted to	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P070538	TRS	- If driving forward, continue to drive forward in automatic mode - Only start off in manual mode - It cannot start off in R position	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P092901	Shift Lock Control Circuit	- Malfunction occurs in shift rocker arm in P position - P position cannot be shifted to from R/N/D position	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P060400	Broken RAM Cell	Vehicle cannot be driven	Check/replace TCU
P060500	Broken Flash Cell	Vehicle cannot be driven	Check/replace TCU
P171F00	TCU Overtemp	- Clutch and engine torque is restricted - Only perform continuous shift strategy	Ventilate TCU to cool down
P172000	Monitoring SOPC Pre Drive Check	Vehicle cannot be driven	Check/replace TCU
P071564	ISS 1	- R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 with output shaft speed and gear or input shaft 2 and gear - Hill hold assist and coast function fail - Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Shifting performance is reduced - Change driving direction via gear - Shifting performance is reduced	- Check wire harness and connector - Check input shaft speed sensor 1 (while monitoring direction) - Replace input shaft speed sensor 1 - Replace transmission wire harness - Replace TCU
P172100	ISS 2 Value Not Plausible	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Replace input shaft 2 speed with output shaft speed and gear of 2nd part of transmission or input shaft 1 speed and gear of 1st part of transmission - Shifting performance is reduced	- Check wire harness and connector - Check input shaft speed sensor 1 (while monitoring direction) - Replace input shaft speed sensor 1 - Replace transmission wire harness - Replace TCU
P172200	Clutch 1 Torque Unexpected Value	Drive with other part (no problem) of transmission	- Check clutch system - Replace clutch system

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P172300	Clutch 2 Torque Unexpected Value	Drive with other part (no problem) of transmission	- Check clutch system - Replace clutch system
P070562	TRS	Vehicle is damaged	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P082664	Manual Switches	Gear position cannot be shifted manually	- Check wire harness and connector - Check shift rocker arm (pull up and down) - Replace transmission range sensor - Replace shift rocker arm - Replace TCU
P172400	TRS Teach in Failure	- If driving forward, continue to drive forward in automatic mode - Only start off in manual mode - It cannot start off in R position	- Check wire harness and connector - Check transmission range sensor - Replace transmission range sensor - Replace transmission wire harness - Replace TCU
P172500	Shift Drum 1 Reference Drive Failure	Drive with other part of transmission	- Check TCU - Replace TCU
P172600	Shift Drum 2 Reference Drive Failure	Drive with other part of transmission	- Check TCU - Replace TCU
P172700	Shift Drum 1 Sync Speed Rate Not Plausible	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P172800	Shift Drum 2 Sync Speed Rate Not Plausible	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P172900	Shift Drum 1 Position Out of Range	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P172A00	Shift Drum 2 Position Out of Range	Drive with other part (no problem) of transmission	- Check TCU - Replace TCU
P172B00	TCU High Power Supply Below First Threshold	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	- Check wire harness and connector - Check TCU - Replace wire harness - Replace TCU
P172C00	TCU Low Power Supply Below First Threshold	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	- Check wire harness and connector - Check TCU - Replace wire harness - Replace TCU
P172D00	Level 2 Reset - SZ1 tq Increase	Reset	/
P172E00	Level 2 Reset - SZ2 Launching in Wrong Direction	Reset	/
P172F00	Level 2 Reset - SZ3 Shift R While Driving	Reset	/
P173100	Level 2 Reset - SZ6a Downshift Not Allowed	Reset	/
P173200	Level 2 Reset - SZ6b Downshift Overspeed	Reset	/
P173300	Level 2 Reset - SZ7 Tie Up	Reset	/



18-625DCT TRANSMISSION

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P173400	Level 2 Reset - SZ8 Overspeed	Reset	/
P173500	Gearbox 1 Gear Jump	Affected gear is locked	• Check TCU (shift actuator lever 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173600	Gearbox 2 Gear Jump	Affected gear is locked	• Check TCU (shift actuator lever 2 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173700	Gearbox Mechanic Part 1 Unexpected Shift drum Standstill	Drive with other part (no problem) of transmission	• Check TCU (shift actuator lever 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173800	Gearbox Mechanic Part 2 Unexpected Shift drum Standstill	Drive with other part (no problem) of transmission	• Check TCU (shift actuator lever 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173900	Gearbox 1 Sync Failure	Drive with other part (no problem) of transmission	• Check TCU (shift motor 1 drive shaft) • Check transmission • Check clutch system • Replace TCU • Replace clutch system • Replace transmission
P173A00	Gearbox 2 Sync Failure	/	• Check TCU (shift motor 2 drive shaft) • Check transmission • Check clutch system • Replace TCU • Replace clutch system • Replace transmission
P173B00	Gearbox 1 No Disengagement	Drive with other part (no problem) of transmission	• Check TCU (shift motor 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173C00	Gearbox 2 No Disengagement	Drive with other part (no problem) of transmission	• Check TCU (shift motor 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173D00	Gearbox 1 No Engagement	Drive with other part (no problem) of transmission	• Check TCU (shift motor 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173E00	Gearbox 2 No Engagement	Drive with other part (no problem) of transmission	• Check TCU (shift motor 1 drive shaft) • Check transmission • Replace TCU • Replace transmission
P173F00	Clutch 1 Self Open Test Failed	Drive with other part (no problem) of transmission	• Check wire harness and connector • Check TCU • Check clutch system • Replace wire harness • Replace TCU • Replace clutch system
P174000	Clutch 2 Self Open Test Failed	Drive with other part (no problem) of transmission	• Check wire harness and connector • Check TCU • Check clutch system • Replace wire harness • Replace TCU • Replace clutch system

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P174100	Clutch 1 Torque Too Low	- Torque required by engine or driver is restricted - Clutch still slips after torque is restricted (error flag appears during torque restriction) - Neutral is engaged when clutch slips - Part of transmission does not operate	- Perform torque capacity recovery program (clutch self-learning) - Check clutch system - Replace clutch system
P174200	Clutch 2 Torque Too Low	- Torque required by engine or driver is restricted - Clutch still slips after torque is restricted (error flag appears during torque restriction) - Neutral is engaged when clutch slips - Part of transmission does not operate	- Perform torque capacity recovery program (clutch self-learning) - Check clutch system - Replace clutch system
P174300	Shiftdrum 1 Endstop Position Not Plausible	Confirm that drive is successful and stop point position is believable	- Check TCU (shift motor 1 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174400	Shiftdrum 2 Endstop Position Not Plausible	Confirm that drive is successful and stop point position is believable	- Check TCU (shift motor 2 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174500	Clutch 1 Endstop Position Not Plausible	Damaged clutch is unbelievable	- Check clutch system - Replace clutch system
P174600	Clutch 2 Endstop Position Not Plausible	Damaged clutch is unbelievable	- Check clutch system - Replace clutch system
P174700	Clutch 1 Drag Torque Too High	- Clutch disengages - Part of transmission stops operating - Damaged part of transmission is shifted to neutral	- Check clutch system - Replace clutch system
P174800	Clutch 2 Drag Torque Too High	- Clutch disengages - Part of transmission stops operating - Damaged part of transmission is shifted to neutral	- Check clutch system - Replace clutch system
P174900	Broken Shift Fork	Drive with other part (no problem) of transmission	- Check transmission - Replace transmission
P174A00	Shift Drum 1 Unexpected Movement	Drive with other part of transmission	- Check TCU (shift motor 1 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174B00	Shift Drum 2 Unexpected Movement	Drive with other part of transmission	- Check TCU (shift motor 2 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174C00	Shift Drum 1 Moving Direction Not Plausible	Drive with other part of transmission	- Check TCU (shift motor 1 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174D00	Shift Drum 2 Moving Direction Not Plausible	Drive with other part of transmission	- Check TCU (shift motor 2 drive shaft) - Check transmission - Replace TCU - Replace transmission
P174E00	Clutch 1 Overtemperature	All gears related to clutch are locked (clutch 1 is overheating, 1st, 3rd and 5th gears are not allowed to use)	Stop vehicle to cool it down



18-625DCT TRANSMISSION

DTC	Description	Problem Symptoms	Troubleshooting Suggestion
P174F00	Clutch 2 Overtemperature	All gears related to clutch are locked (clutch 2 is overheating, 2nd, 4th, 6th and R gears are not allowed to use)	Stop vehicle to cool it down

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the brake control system.

1	Vehicle brought to workshop
----------	------------------------------------

Result

Proceed to
Next

Next

2	Check battery voltage
----------	------------------------------

Check if battery voltage is normal.

OK

Standard Voltage: Not less than 12 V

Result

Result
OK
NG

NG

Replace the battery

OK

18

3	Customer problem analysis
----------	----------------------------------

Result

Proceed to
Next

Next

4	Read DTCs
----------	------------------

Result

Result
No DTC
Current DTC
History DTC

History DTC

5 Problem Repair (No DTC)**Result**

Proceed to

Next

Next

Go to step 7

6 Troubleshoot according to Diagnostic Trouble Code (DTC) chart**Result**

Proceed to

Next

Next

Go to step 7

7 Troubleshoot according to Problem Symptoms Table**Result**

Proceed to

Next

Next

8 Conduct test and confirm malfunction has been repaired**Result**

Proceed to

Next

Next

End

18

DTC Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.



Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Use data recorder and/or oscilloscope to help diagnose intermittent malfunctions.
- Remove the Transmission Control Unit (TCU) from malfunctioning vehicle and install it to a new vehicle to perform a test. If DTC cannot be cleared, TCU is malfunctioning. If DTC can be cleared, reinstall TCU to original vehicle.

Ground Inspection

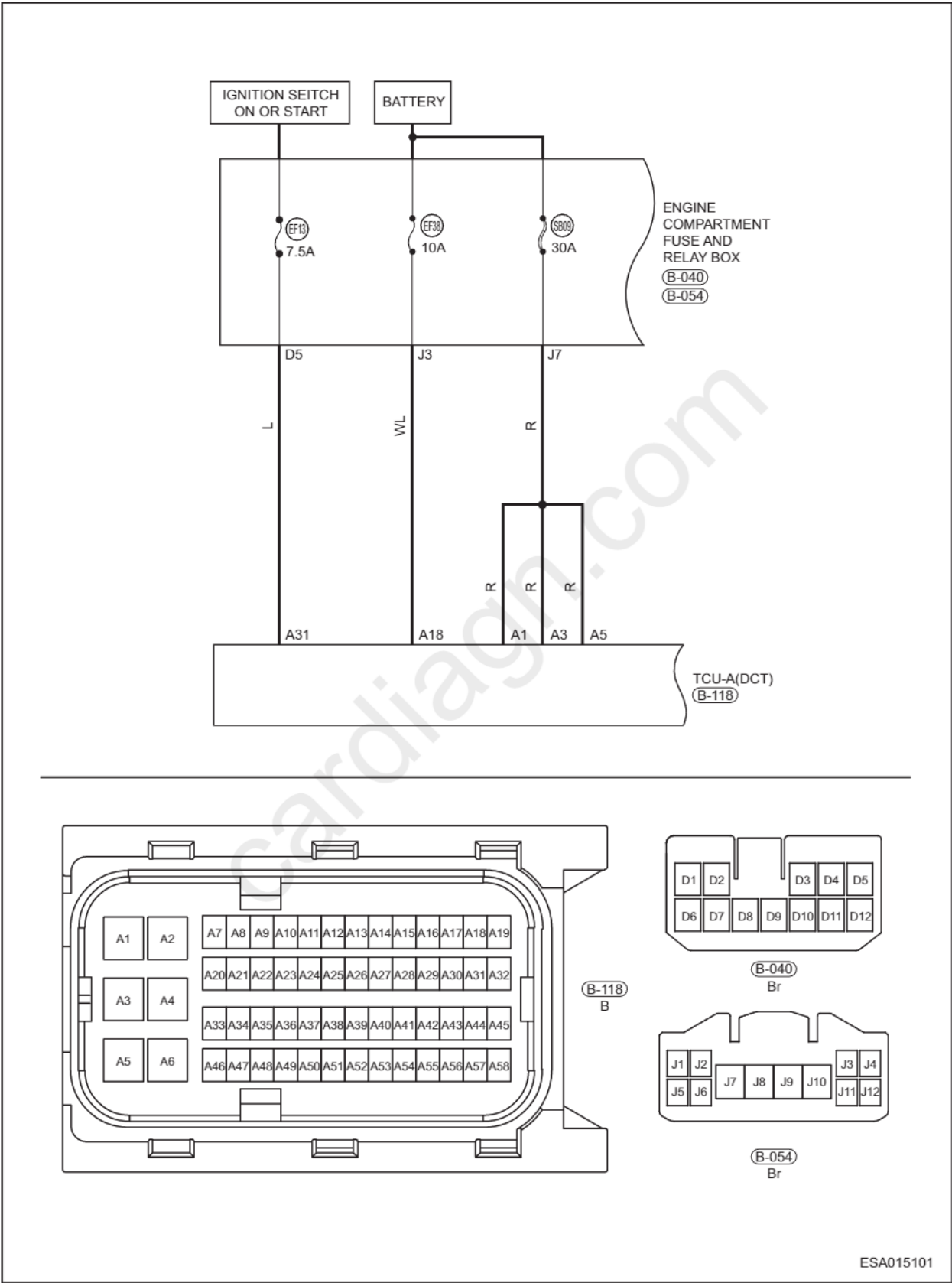
Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works. Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contacting is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

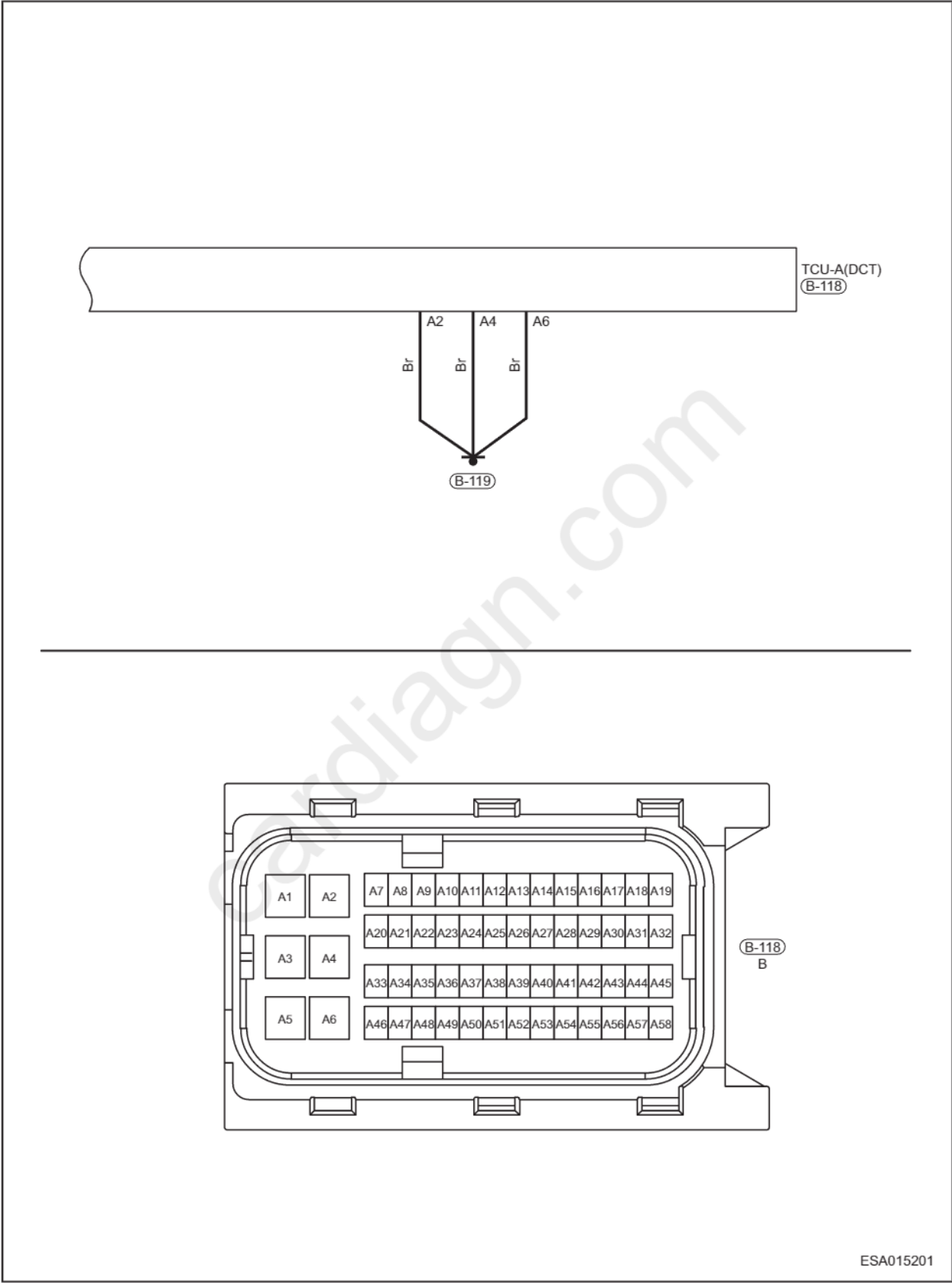
DTC	P170F00	TCU High Power Supply Overvoltage
DTC	P171000	TCU Low Power Supply Overvoltage
DTC	P172B00	TCU High Power Supply Below First Threshold
DTC	P172C00	TCU Low Power Supply Below First Threshold



Circuit Diagram
Power Supply Circuit



Ground Circuit



Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P170F00	TCU High Power Supply Overvoltage	- Overvoltage: Circuit voltage > 16 V - Filtration time: 2 s	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	1. Check wire harness and connector 2. Check the battery 3. Replace the battery 4. Replace alternator 5. Check TCU 6. Replace wire harness 7. Replace TCU
P171000	TCU Low Power Supply Overvoltage	- Overvoltage: Circuit voltage > 16.2V - Filtration time: 16.2 s	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	
P172B00	TCU High Power Supply Below First Threshold	- Circuit voltage < 9 V - Filtration time: 100 ms	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	
P172C00	TCU Low Power Supply Below First Threshold	- Circuit voltage < 7 V - Filtration time: 2 s	- Driver cannot drive vehicle - According to vehicle speed, warning message "Transmission Damage" is prompted - Both clutches do not operate - Gear is locked - It is not allowed to shift gear position - Vehicle is damaged	

18 Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to ON.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

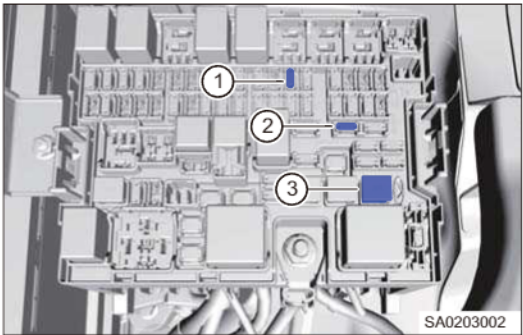
Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1 Check TCU fuses EF38 and SB09

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Unplug TCU fuses EF38 (10A) (2), SB09 (30A) (3) and EF13 (7.5A) (1) from engine compartment fuse and relay box.



- (d) Check resistance of fuse.

Standard Resistance

Less than 1 Ω

OK

Fuse is not burned out

Result

Proceed to
OK
NG

NG

Replace TCU fuse

OK

2 Check the battery

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Using a multimeter, measure voltage between positive battery terminal and negative battery terminal.

OK

Voltage between positive battery terminal and negative battery terminal is normal.

Result

Proceed to
OK
NG

NG

Replace the battery

OK

3 Check the alternator

- (a) Check the alternator



OK
Alternator is normal.
Result

Proceed to
OK
NG

NG

Replace alternator

OK

4

Check TCU power supply circuit voltage

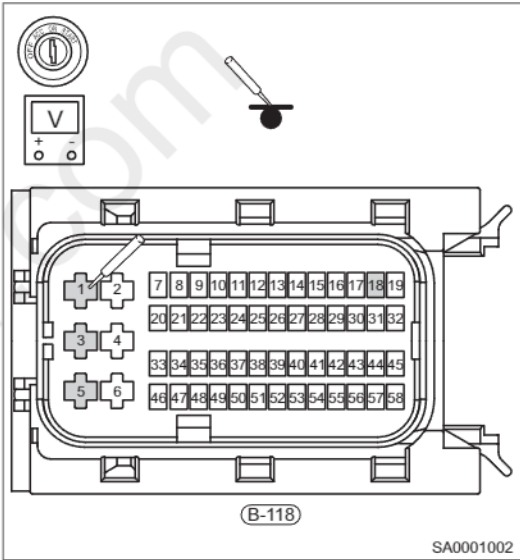
- (a) Turn ENGINE START STOP switch to ON.
- (b) Check the TCU wire harness connector B-118.

Voltage inspection (using a digital multimeter)

Multimeter Connection	Condition	Specified Condition
B-118 (1, 3, 5, 18) - Body ground	ENGINE START STOP switch ON	Not less than 12 V

OK
Voltage between terminal of TCU connector B-118 and body ground is normal.
Result

Proceed to
OK
NG



NG

Go to step 4

OK

18

5

Check TCU power supply circuit (IGN power supply)

- (a) Turn ENGINE START STOP switch to ON.

- (b) Check voltage between terminal of TCU connector B-118 and body ground (using digital multimeter or 21W test lamp).

Voltage Inspection

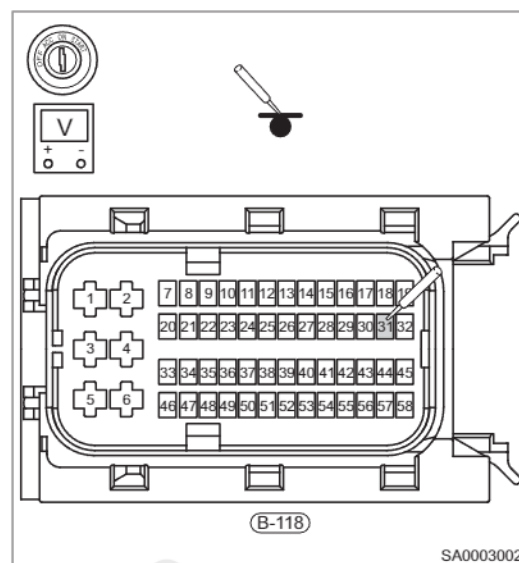
Multimeter Connection	Condition	Specified Condition
B-118 (31) - Body ground	ENGINE START STOP switch ON	Not less than 12 V

OK

Voltage between terminal of TCU connector B-118 and body ground is normal.

Result

Proceed to
OK
NG



NG

Go to step 7

OK

6 Check wire harness and connector (TCU - instrument panel fuse box and body ground)

- (a) Check wire harness between connector terminals on wire harness side and engine compartment relay box terminal.

Check for Open

Multimeter Connection	Specified Condition
B-118 (31) - B-040 (5)	Resistance $\leq 1 \Omega$

Check for Short

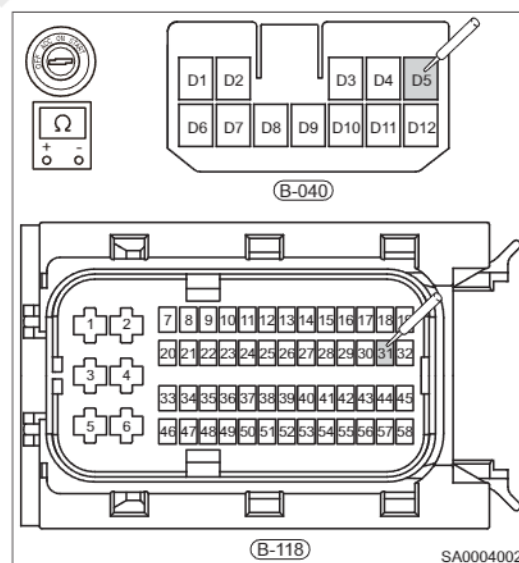
Multimeter Connection	Specified Condition
B-118 (31) or B-040 (5) - Body ground	Resistance ∞
B-118 (31) or B-040 (5) - Battery positive	Resistance ∞

OK

Wire harness between connector terminals on wire harness side is normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness and connector

OK



7 Check ground circuit

- (a) Check TCU ground point
 (b) Check the TCU ground wire harness.

Check for Open

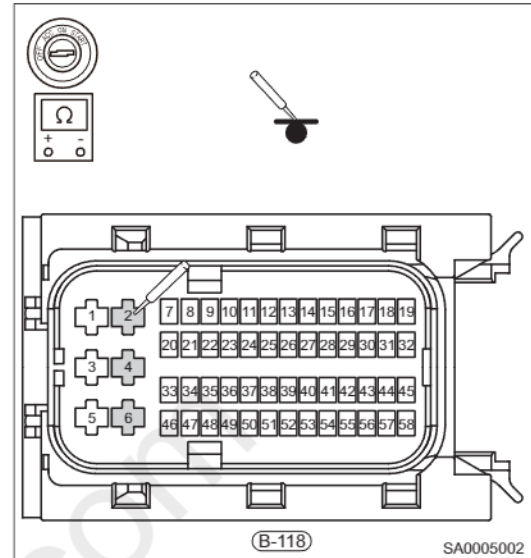
Multimeter Connection	Specified Condition
B-118 (2, 4, 6) - Body ground	Resistance $\leq 1 \Omega$

OK

Ground point and ground wire harness are normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness and connector

OK

8 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Start the engine.
 (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

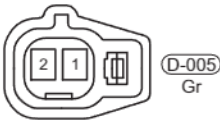
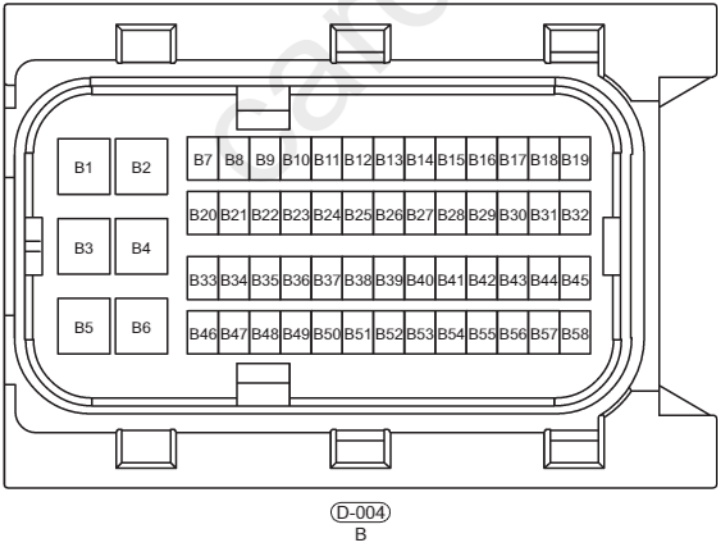
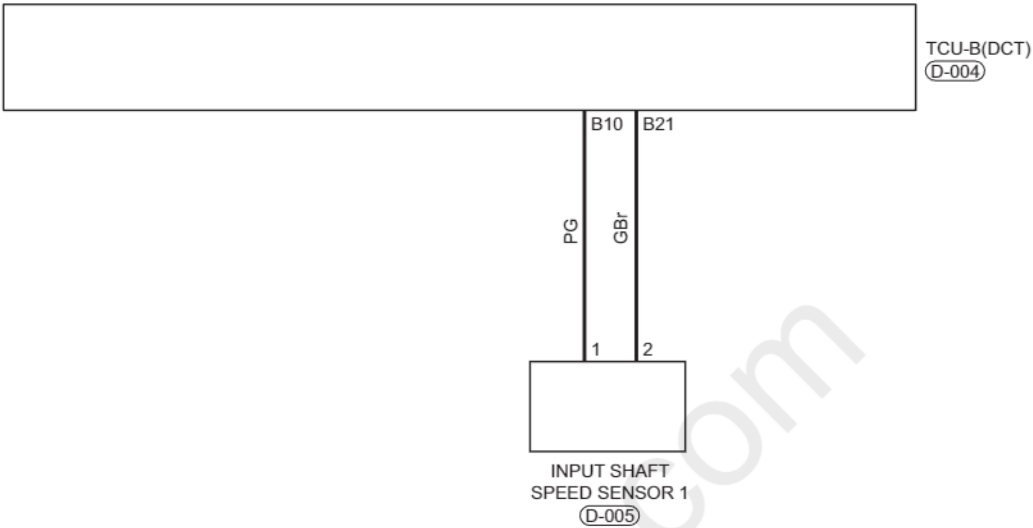
NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

DTC	P071517	ISS 1
DTC	P071516	ISS 1
DTC	P071629	ISS 1
DTC	P071564	ISS 1



Circuit Diagram



ESA015501

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P071517	ISS 1	- SCB: Circuit voltage > 13 V - Unreasonable power supply: Circuit voltage > battery voltage + 0.5 V - Filtration time: 40 ms	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 speed with gear and output speed with gear engaged or input shaft 2 speed - Hill hold assist and coast function fail - Change driving direction through engagement of gear	1. Check wire harness and connector 2. Check input shaft speed sensor 1 3. Replace input shaft speed sensor 1 4. Replace transmission wire harness 5. Replace TCU
P071516	ISS 1	- SCG: Circuit voltage < 4.5 V - Unreasonable power supply: Circuit voltage < battery voltage - 2.5 V - Filtration time: 40 ms	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 speed with input shaft speed - Hill hold assist and coast function fail - Change driving direction through engagement of gear	
P071564	ISS 1	- Range inspection (input shaft) - Reliability of input shaft 1 is judged by input shaft 2 speed - Reliability of input shaft 1 is judged by output shaft speed - Engaged gear is unbelievable - Filtration time: 100 ms	- R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 with output shaft speed and gear or input shaft 2 and gear - Hill hold assist and coast function fail - Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Shifting performance is reduced - Change driving direction via gear - Shifting performance is reduced	
P071629	ISS 1	- Speed signal SCG or speed signal OL - Speed signal SCB - Too high speed signal frequency ≥ 12 kHz - Unbelievable frequency signal - Filtration time: 40 ms	- R position: Start-off can be achieved with minimum engine torque (it is not necessary to restrict torque for D position) - Replace input shaft 1 with input shaft speed and engaged gear or input shaft 2 and engaged gear - Hill hold assist and coast function fail - Change driving direction through engagement of gear	



Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to ON.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check input shaft speed sensor 1 connector**

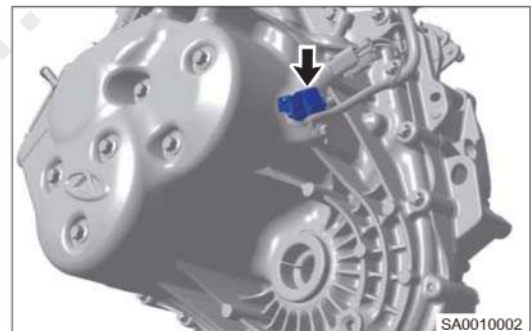
- (a) Check input shaft speed sensor 1 connector D-005 (arrow) for poor connection or installation.

OK

Input shaft speed sensor 1 connector is normal.

Result

Proceed to
OK
NG

**NG****Repair or replace connector****OK****2 Check input shaft speed sensor power supply voltage**

- (a) Turn ENGINE START STOP switch to ON.
 (b) Check voltage between terminal 2 of input shaft speed sensor 1 connector and ground.
 Check for Open

Multimeter Connection	Condition	Specified Condition
D - 005 (2) - Ground	ENGINE START STOP switch ON	5 V

Result

Proceed to
OK
NG

NG

Repair or replace power supply wire harness between input shaft speed sensor 1 and TCU

OK

3 Check input shaft speed sensor 1 signal circuit

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect TCU connector D-004 and input shaft speed sensor 1 connector D-005.
- Check wire harness between terminal of input shaft speed sensor 1 connector and terminal of TCU connector.

Check for Open

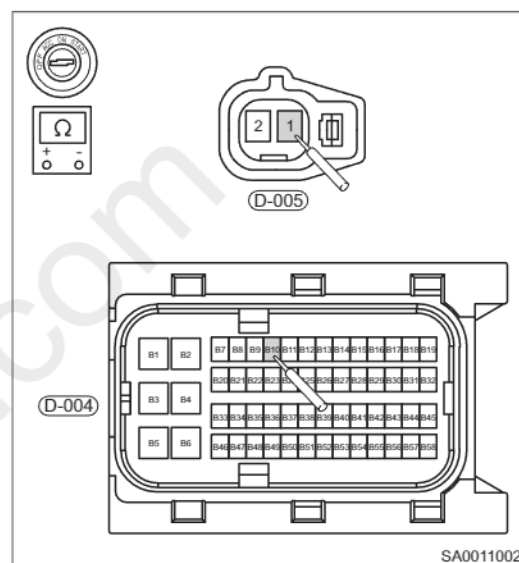
Multimeter Connection	Condition	Specified Condition
D-005 (1) - D-004 (10)	Always	Resistance $\leq 1 \Omega$

OK

Wire harness between terminal of input shaft speed sensor 1 connector and terminal of TCU connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness or connector (input shaft speed sensor 1 - TCU)

OK

4 Check input shaft speed sensor 1

- Remove the input shaft speed sensor 1.
- Check speed sensing part of input shaft speed sensor 1 for foreign matter or sensor for damage and cracks.

OK

Input shaft speed sensor 1 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace input shaft speed sensor 1



OK

5	Reconfirm DTCs
---	----------------

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

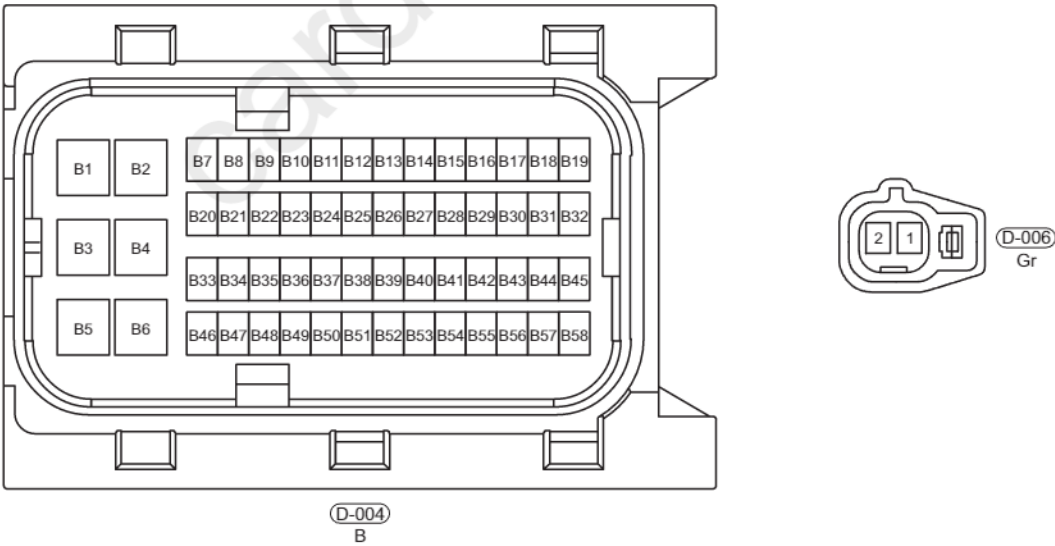
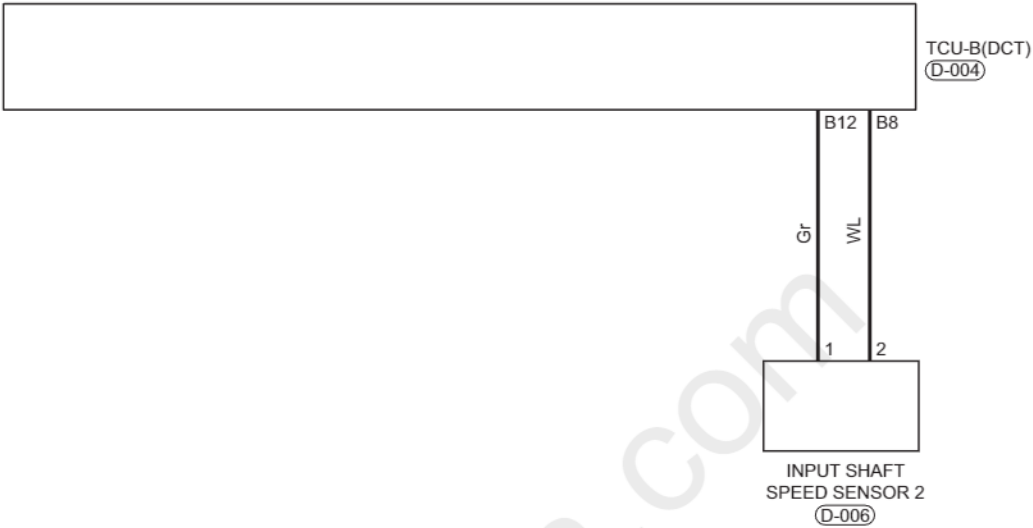
System operates normally

NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

DTC	P170000	ISS 2 Supply Voltage Over 13 V
DTC	P170100	ISS 2 Supply Voltage Under 4.5 V
DTC	P170200	ISS 2 Signal Invalid
DTC	P172100	ISS 2 Value Not Plausible

Circuit Diagram



ESA015601

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P170000	ISS 2 Supply Voltage Over 13 V	- SCB: Circuit voltage > 13 V - Unreasonable power supply: Circuit voltage > battery voltage +0.5 V - Filtration time: 40 ms	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	1. Check wire harness and connector 2. Check input shaft speed sensor 2 (while monitoring direction) 3. Replace input shaft speed sensor 2 4. Replace transmission wire harness 5. Replace TCU
P170100	ISS 2 Supply Voltage Under 4.5 V	- SCG: Circuit voltage < 4.5 V - Unreasonable power supply: Circuit voltage < battery voltage - 2.5 V - Filtration time: 40 ms	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	
P170200	ISS 2 Signal Invalid	- Speed signal SCG or speed signal OL - Speed signal SCB - Too high speed signal frequency ≥ 12 kHz - Unbelievable frequency signal - Filtration time: 40 ms	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Replace input shaft 2 speed with output shaft speed and engaged gear of 2nd part of transmission or input shaft 1 and engaged gear of 1st, 2nd part of transmission	
P172100	ISS 2 Value Not Plausible	- Range inspection (input shaft speed < input shaft max. speed, such as 10000 rpm) - Gradient test based on brake, parking brake, ESP, ABS and so on - Check based on drive shaft speed or output shaft speed is unbelievable - Check based on shift information is unbelievable - Check based on shift information and input shaft 1 speed is unbelievable	- Gear jumping is not monitored - Shifting time is longer (have no influence on torque transmission) - Replace input shaft 2 speed with output shaft speed and gear of 2nd part of transmission or input shaft 1 speed and gear of 1st part of transmission - Shifting performance is reduced	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.



Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check input shaft speed sensor 2 connector**

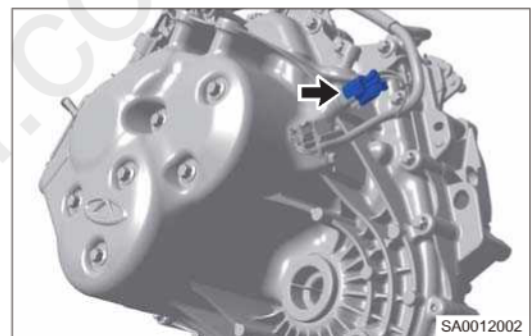
- (a) Check input shaft speed sensor 2 connector D-006 (arrow) for poor connection or installation.

OK

Input shaft speed sensor 2 connector is normal.

Result

Proceed to
OK
NG

**NG****Repair or replace connector****OK****18****2 Check input shaft speed sensor power supply voltage**

- (a) Turn ENGINE START STOP switch to ON.
 (b) Check voltage between terminal 1 of input shaft speed sensor 2 connector and ground.
 Check for Open

Multimeter Connection	Condition	Specified Condition
D - 006 (1) - Ground	ENGINE START STOP switch ON	5 V

Result

Proceed to
OK
NG

NG

Repair or replace power supply wire harness between input shaft speed sensor 2 and TCU

OK

3 Check input shaft speed sensor 2 signal circuit

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect TCU connector D-004 and input shaft speed sensor 2 connector D-006.
- Check wire harness between terminal of input shaft speed sensor 2 connector and terminal of TCU connector.

Check for Open

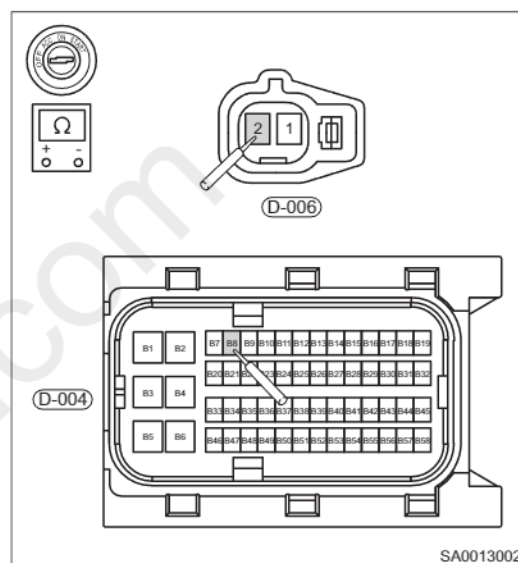
Multimeter Connection	Condition	Specified Condition
D-006 (2) - D-004 (B8)	Always	Resistance $\leq 1 \Omega$

OK

Wire harness between terminal of input shaft speed sensor 2 connector and terminal of TCU connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness or connector (input shaft speed sensor 2 - TCU)

OK

4 Check input shaft speed sensor 2

- Remove the input shaft speed sensor 2.
- Check speed sensing part of input shaft speed sensor 2 for foreign matter or sensor for damage and cracks.

OK

Input shaft speed sensor 2 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace input shaft speed sensor 2



OK

5 Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

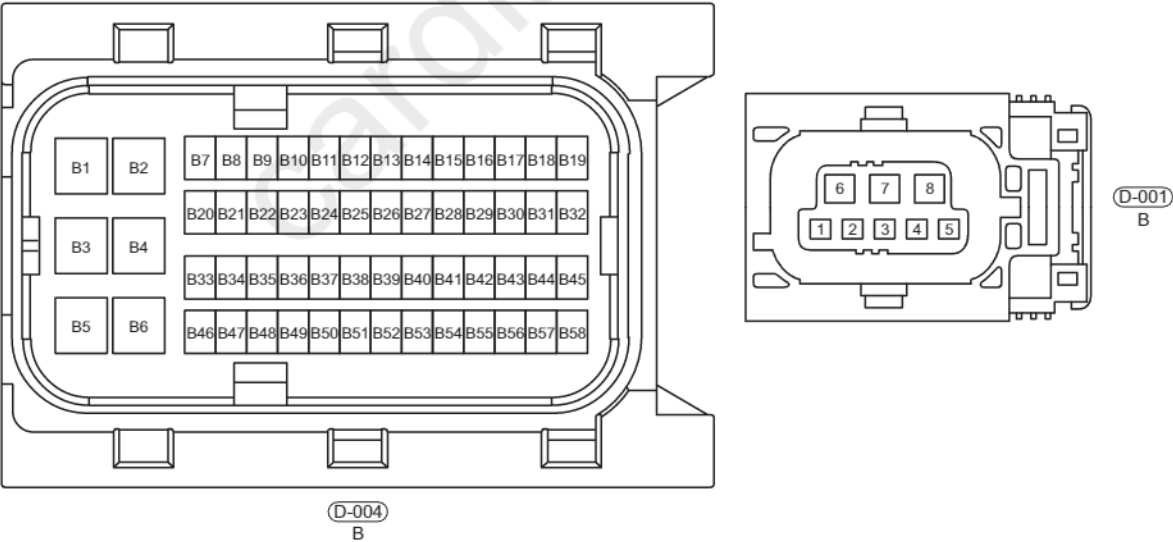
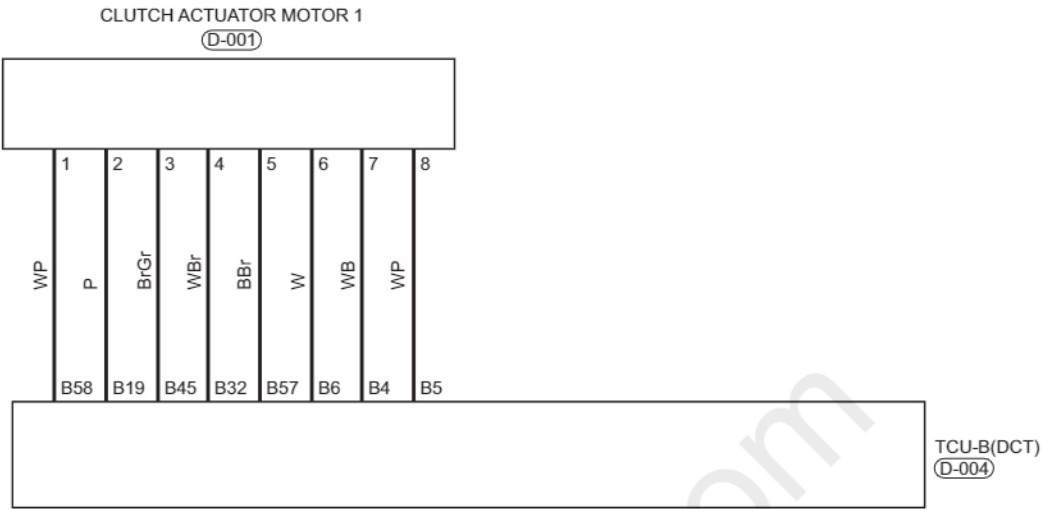
NG

Replace TCU control module assembly
and perform self-learning (refer to "Self-
learning after Component Replacement")

DTC	P090011	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side
DTC	P090012	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side
DTC	P090013	ATIC Clutch Actuator 1 on H-bridge or on 3rd Half Bridge, Low Side or High Side
DTC	P09011C	ATIC Clutch Actuator 1
DTC	P170B00	Clutch Actuator 1 Position Signal Correlation Not Plausible
DTC	P170D00	Clutch Actuator 1 Position Sensor Signal Incorrect ATIC vs. HALL



Circuit Diagram



ESA015701

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P090011	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side	- Short to ground in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	1. Check wire harness and connector 2. Replace transmission wire harness 3. Replace clutch actuator motor 1 4. Replace TCU
P090012	ATIC Clutch Actuator 1 on Half Bridge 1,2,3, Low Side or High Side	- Short to power supply in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P090013	ATIC Clutch Actuator 1 on H-bridge or on 3rd Half Bridge, Low Side or High Side	- Open in h bridge or 3rd bridge (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P09011C	ATIC Clutch Actuator 1	- Too low voltage < 6 V - Too high voltage > 25 V - Filtration time: 100 ms	Drive with other part (no problem) of transmission	
P170B00	Clutch Actuator 1 Position Signal Correlation Not Plausible	- Signals from 3 related channels do not match - Error occurs for 3 times within 1000 ms	Drive with other part (no problem) of transmission	
P170D00	Clutch Actuator 1 Position Sensor Signal Incorrect ATIC vs. HALL	- Clutch actuator motor 1 position sensor signal is unbelievable - Difference of ± 15 increment - Filtration time: 10 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.



Procedure

1 Check clutch actuator motor 1 connector

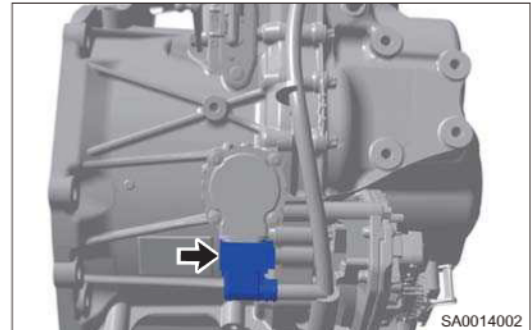
- (a) Check clutch actuator motor 1 connector D-001 (arrow) for poor connection, damage or cracks.

OK

Clutch actuator motor 1 connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace connector

OK

2 Check clutch actuator motor 1 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
 (b) Check voltage between terminal 1 of clutch actuator motor 1 connector and ground.
 Check for Open

Multimeter Connection	Condition	Specified Condition
D - 001 (1) - Ground	ENGINE START STOP switch ON	5 V

Result

Proceed to
OK
NG

18

NG

Repair or replace power supply wire harness between clutch actuator motor 1 and TCU

OK

3 Check clutch actuator motor 1 circuit

- (a) Disconnect the TCU connector D-004.

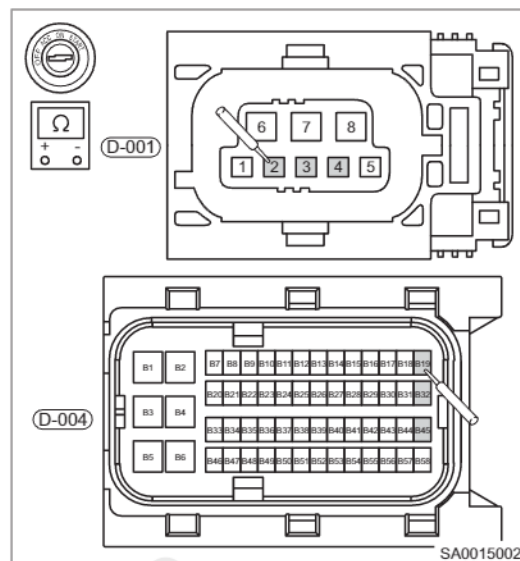
- (b) Check wire harness between terminal of clutch actuator motor 1 connector and terminal of TCU connector.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-001 (2) - D-004 (19)	Always	Resistance $\leq 1 \Omega$
D-001 (3) - D-004 (45)	Always	Resistance $\leq 1 \Omega$
D-001 (4) - D-004 (32)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-001 (2, 3, 4) or D-004 (19, 45, 32) - Body ground	Always	Resistance ∞
D-001 (2, 3, 4) or D-004 (19, 45, 32) - Battery positive	Always	Resistance ∞



OK

Wire harness between terminal of clutch actuator motor 1 connector and terminal of TCU connector is normal.

Result

Proceed to
OK
NG

NG

Repair or replace wire harness or connector (clutch actuator motor 1 - TCU)

OK

4 Check clutch actuator motor 1

- (a) Check the clutch actuator motor 1.

OK

Clutch actuator motor 1 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace clutch actuator motor 1

OK

5 Reconfirm DTCs

- Connect the negative battery cable.
- Use diagnostic tester to clear DTCs.
- Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
- Start the engine.



(e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

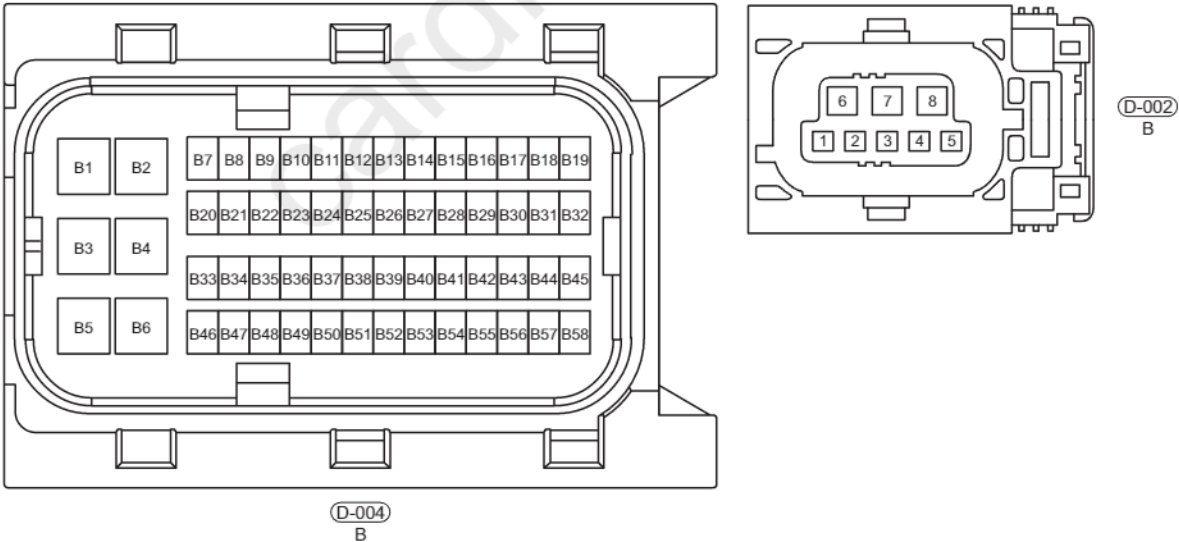
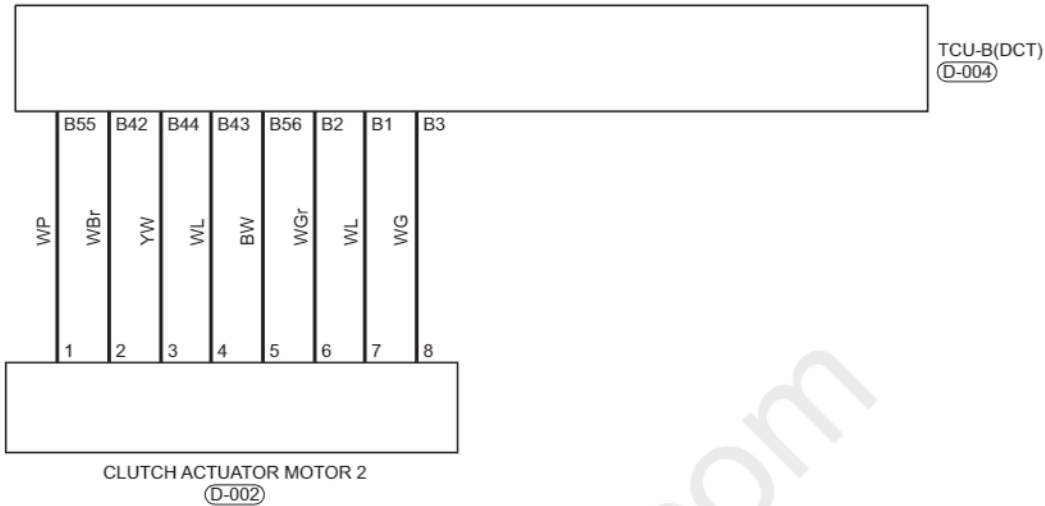
NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

DTC	P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1,2,3, Low Side or High Side
DTC	P170400	ATIC Clutch Actuator 2 SCB on Half Bridge 1,2,3, Low Side or High Side
DTC	P170500	ATIC Clutch Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
DTC	P170600	ATIC Clutch Actuator 2 Over or Undervoltage
DTC	P170C00	Clutch Actuator 2 Position Signal Correlation Not Plausible
DTC	P170E00	Clutch Actuator 2 Position Sensor Signal Incorrect ATIC vs. HALL



Circuit Diagram



ESA003001

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1,2,3, Low Side or High Side	- Short to ground in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	1. Check wire harness and connector 2. Replace transmission wire harness 3. Replace clutch actuator motor 2 4. Replace TCU
P170400	ATIC Clutch Actuator 2 SCB on Half Bridge 1,2,3, Low Side or High Side	- Short to power supply in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P170500	ATIC Clutch Actuator 2 OC on H-bridge or on 3rd Half Bbridge, Low Side or High Side	- Open in h bridge or 3rd bridge (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P170600	ATIC Clutch Actuator 2 Over or Undervoltage	- Too low voltage < 6 V - Too high voltage > 25 V - Filtration time: 100 ms	Drive with other part (no problem) of transmission	
P170C00	Clutch Actuator 2 Position Signal Correlation Not Plausible	Signals from 3 related channels do not match and this condition occurs for 3 times within 1000 ms	Drive with other part (no problem) of transmission	
P170E00	Clutch Actuator 2 Position Sensor Signal Incorrect ATIC vs. HALL	- Clutch actuator motor 2 position sensor signal is unbelievable - Difference of ± 15 increment - Filtration time: 10 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.



Procedure

1 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK**2** Check clutch actuator motor 1 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
- (b) Check voltage between terminal 1 of clutch actuator motor 2 connector and ground.
Check for Open

Multimeter Connection	Condition	Specified Condition
D - 002 (1) - Ground	ENGINE START STOP switch ON	5 V

Result

Proceed to
OK
NG

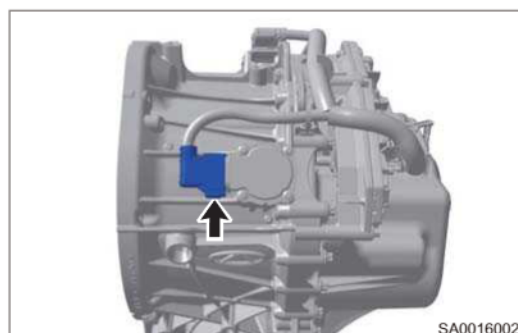
18**NG**

Repair or replace power supply wire harness between clutch actuator motor 2 and TCU

OK

3 Check the clutch actuator motor 2 connector

- (a) Disconnect the clutch actuator motor 2 connector D-002 (arrow).



SA0016002

- (b) Check the clutch actuator motor 2 connector.

OK

Clutch actuator motor 2 connector is normal.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

4 Check clutch actuator motor 2 circuit

- (a) Disconnect the TCU connector D-004.
(b) Check wire harness between terminal of clutch actuator motor 2 connector and terminal of TCU connector.

Check for Open

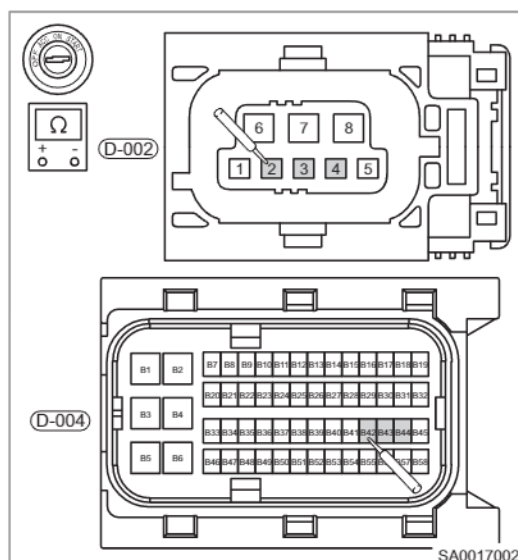
Multimeter Connection	Condition	Specified Condition
D-002 (2) - D-004 (42)	Always	Resistance $\leq 1 \Omega$
D-002 (3) - D-004 (44)	Always	Resistance $\leq 1 \Omega$
D-002 (4) - D-004 (43)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-002 (2, 3, 4) or D-004 (42, 44, 43) - Body ground	Always	Resistance ∞
D-002 (2, 3, 4) or D-004 (42, 44, 43) - Battery positive	Always	Resistance ∞

OK

Wire harness between terminal of clutch actuator motor 2 connector and terminal of TCU connector is normal.



SA0017002

Result

Proceed to
OK
NG

NG

Repair or replace wire harness or connector (clutch actuator motor 2 - TCU)

OK**5 Check clutch actuator motor 2**

- (a) Check the clutch actuator motor 2.

OK

Clutch actuator motor 2 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace clutch actuator motor 2

OK**6 Reconfirm DTCs**

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

DTC	P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1,2,3, Low Side or High Side
DTC	P171200	ATIC Shift Actuator 1 SCB on Half Bridge 0,2,3, Low Side or High Side
DTC	P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
DTC	P171400	ATIC Shift Actuator 1 Over or Undervoltage
DTC	P171900	Shift Actuator 1 RPS Signal Wrong PWM
DTC	P171A00	Shift Actuator 1 Angle Difference Too High
DTC	P171B00	Shift Actuator 1 Position Sensor Signal Incorrect ATIC vs. RPS



Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1, 2, 3, Low Side or High Side	- Short to ground in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	1. Check TCU 2. Replace TCU
P171200	ATIC Shift Actuator 1 SCB on Half Bridge 1, 2, 3, Low Side or High Side	- Short to power supply in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	- Open in h bridge or 3rd bridge (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171400	ATIC Shift Actuator 1 Over or Undervoltage	- Too low voltage < 6 V - Too high voltage > 25 V - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171900	Shift Actuator 1 RPS Signal Wrong PWM	- Frequency exceeds specified range - Filtration time = 100 ms	Drive with other part (no problem) of transmission	
P171A00	Shift Actuator 1 Angle Difference Too High	- Continuous failure/drifting position signal - Filtration time: 8 ms	Drive with other part (no problem) of transmission	
P171B00	Shift Actuator 1 Position Sensor Signal Incorrect ATIC vs. RPS	- Clutch actuator motor 2 position sensor signal is unbelievable - Difference of ± 15 increment - Filtration time: 10 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

18

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1 Check TCU connector

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

2 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally



NG

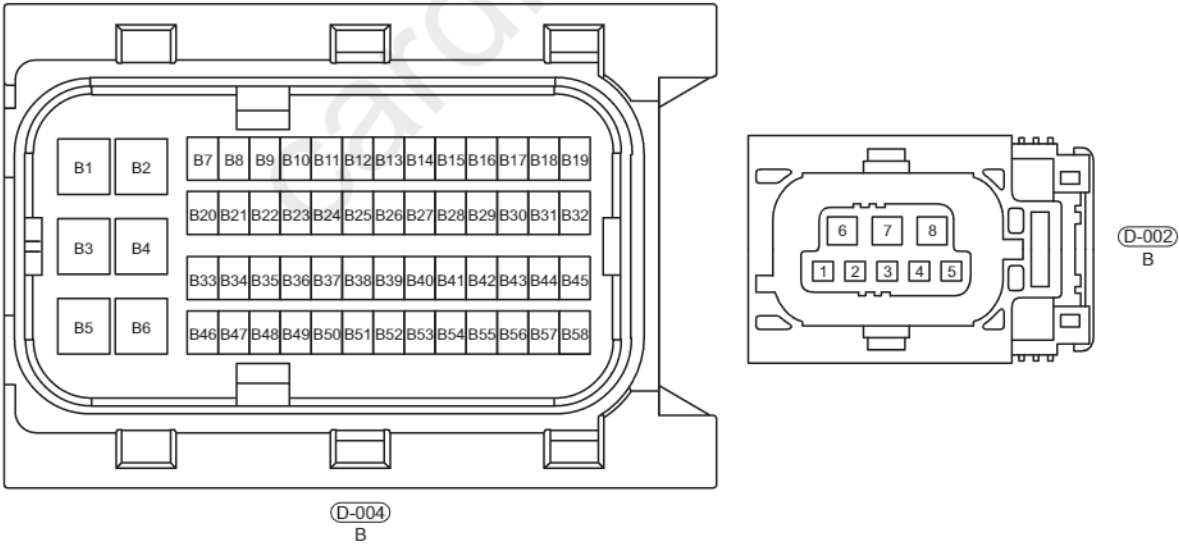
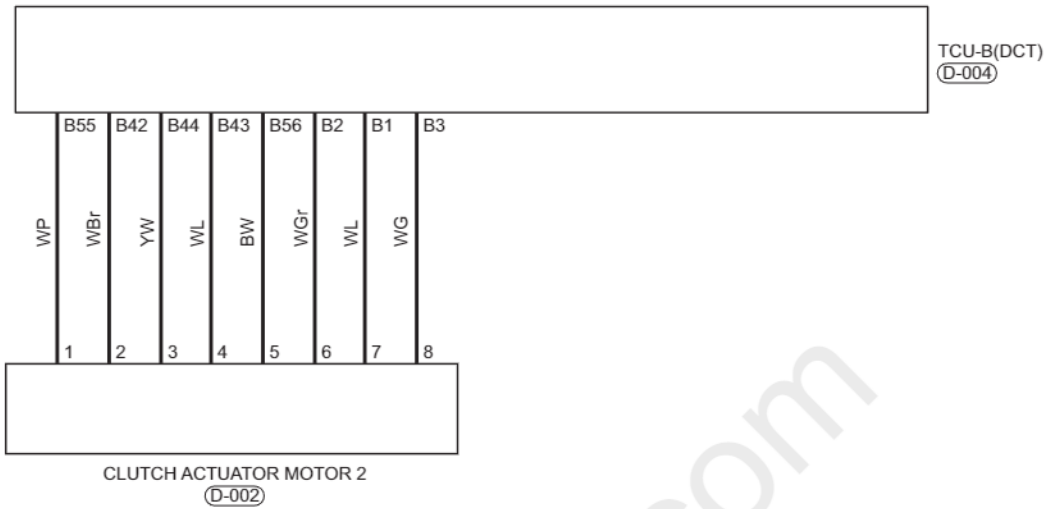
Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

cardiagn.com

DTC	P171500	ATIC Shift Actuator 2 SCG on Half Bridge 0, 2, 3, Low Side or High Side
DTC	P171600	ATIC Shift Actuator 2 SCB on Half Bridge 0, 2, 3, Low Side or High Side
DTC	P171700	ATIC Shift Actuator 2 OC on H-bridge or on 3rd Half Bbridge, Low Side or High Side
DTC	P171800	ATIC Shift Actuator 2 Over or Undervoltage
DTC	P171C00	Shift Actuator 2 RPS Signal Wrong PWM
DTC	P171D00	Shift Actuator 2 Angle Difference Too High
DTC	P171E00	Shift Actuator 2 Position Sensor Signal Incorrect ATIC vs. RPS



Circuit Diagram



ESA015401

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P171500	ATIC Shift Actuator 2 SCG on Half Bridge 0, 2, 3, Low Side or High Side	- Short to ground in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	1. Check TCU 2. Replace TCU
P171600	ATIC Shift Actuator 2 SCB on Half Bridge 1, 2, 3, Low Side or High Side	- Short to power supply in half bridges 1, 2, 3 (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171700	ATIC Shift Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	- Open in h bridge or 3rd bridge (low side/high side output) - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171800	ATIC Shift Actuator 2 Over or Undervoltage	- Too low voltage < 6 V - Too high voltage > 25 V - Filtration time: 10 ms	Drive with other part (no problem) of transmission	
P171C00	Shift Actuator 2 RPS Signal Wrong PWM	- Frequency exceeds specified range - Filtration time = 100 ms	Drive with other part (no problem) of transmission	
P171D00	Shift Actuator 2 Angle Difference Too High	- Continuous failure/ drifting position signal - Filtration time: 8 ms	Drive with other part (no problem) of transmission	
P171E00	Shift Actuator 2 Position Sensor Signal Incorrect ATIC vs. RPS	- Clutch actuator motor 2 position sensor signal is unbelievable - Difference of ± 15 increment - Filtration time: 10 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.



Procedure

1 Check TCU connector

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

2 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

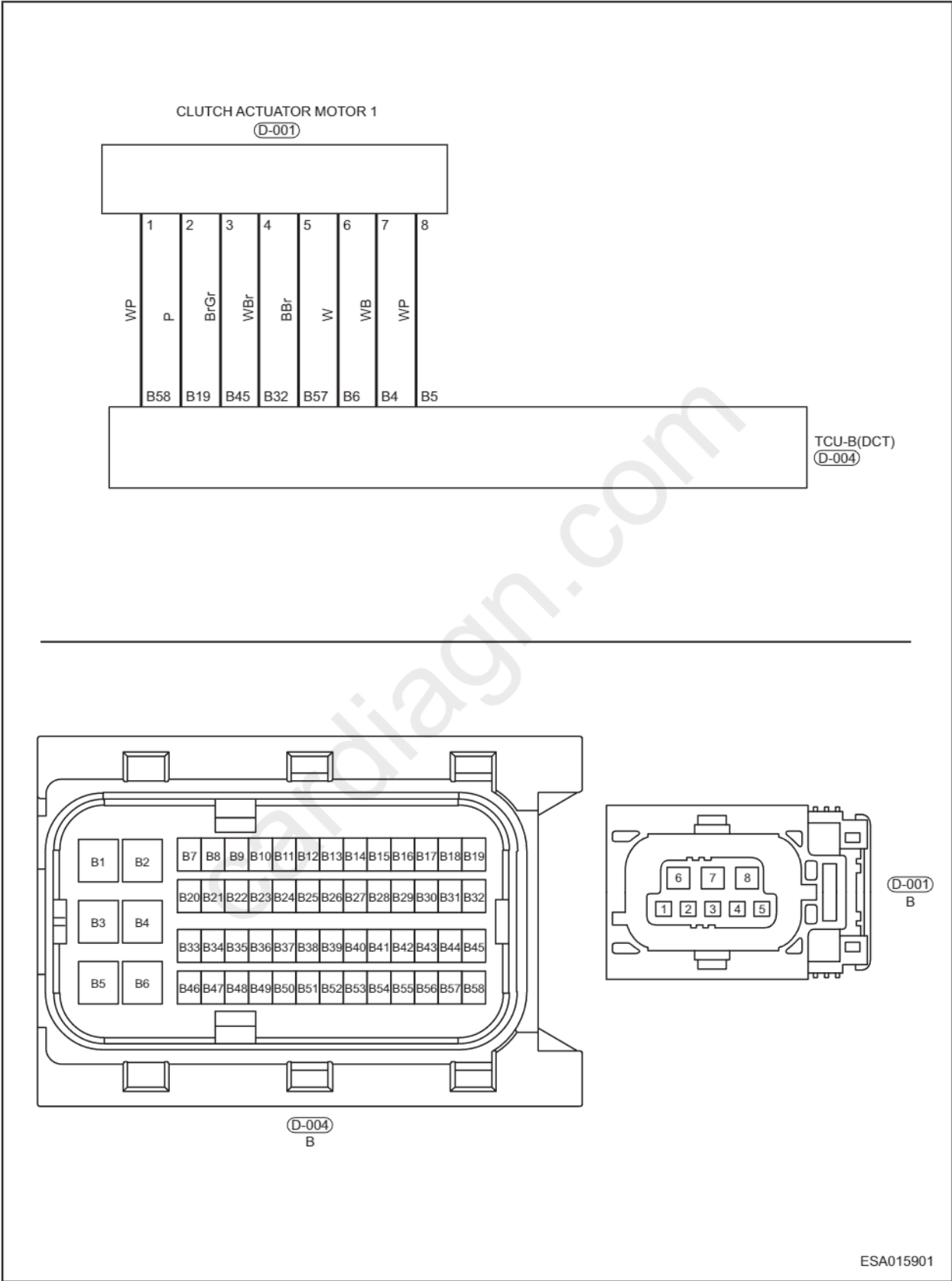
NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")



DTC	P170700	Clutch Actuator 1 Hall Ssensor Power Supply Voltage Under 3.72 V
DTC	P170800	Clutch Actuator 1 Hall Sensor Power Supply Voltage Over 5.8 V

Circuit Diagram



Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P170700	Clutch Actuator 1 Hall Sensor Power Supply Voltage Under 3.72 V	- Circuit voltage < 3.72 V - Filtration time: 40 ms	Drive with other part (no problem) of transmission	1. Check wire harness and connector 2. If malfunction still occurs, replace transmission wire harness 3. If malfunction does not occur in wire harness, replace clutch actuator motor 1 4. If malfunction still occurs after replacing clutch actuator motor 1, replace transmission control unit
P170800	Clutch Aactuator 1 Hall Sensor Power Supply Voltage Over 5.8 V	- Circuit voltage > 5.8 V - Filtration time: 40 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check TCU ground point
----------	-------------------------------

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

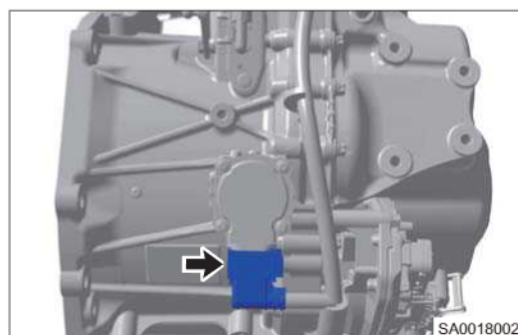
NG

Repair or replace ground wire harness or ground point

OK

2 Check clutch actuator motor 1 connector

- (a) Disconnect clutch actuator motor 1 connector D-001 (arrow).



- (b) Check clutch actuator motor 1 connector.

OK

Clutch actuator motor 1 connector is normal.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

3 Check clutch actuator motor 1 circuit

- (a) Disconnect the TCU connector D-004.
(b) Check wire harness between terminal of clutch actuator motor 1 connector and terminal of TCU connector.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-001 (1) - D-004 (58)	Always	Resistance $\leq 1 \Omega$
D-001 (5) - D-004 (57)	Always	Resistance $\leq 1 \Omega$

Check for Short

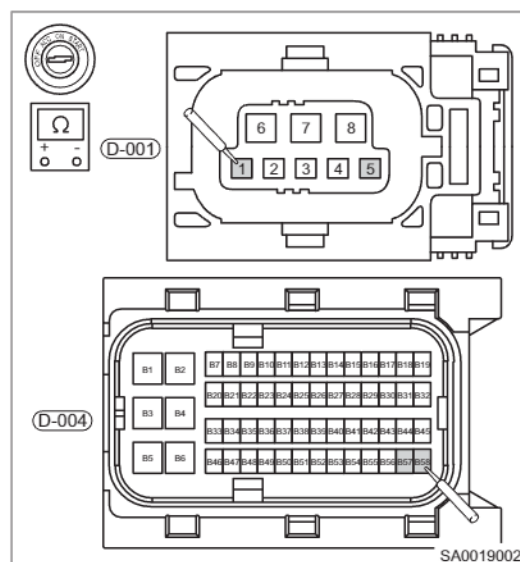
Multimeter Connection	Condition	Specified Condition
D-001 (1, 5) or D-004 (58, 57) - Body ground	Always	Resistance ∞
D-001 (1, 5) or D-004 (58, 57) - Battery positive	Always	Resistance ∞

OK

Wire harness between terminal of clutch actuator motor 1 connector and terminal of TCU connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness or connector (clutch actuator motor 1 - TCU)

OK

4 Check clutch actuator motor 1

- (a) Check the clutch actuator motor 1.

OK

Clutch actuator motor 1 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace clutch actuator motor 1

OK

5 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

18

OK

System operates normally

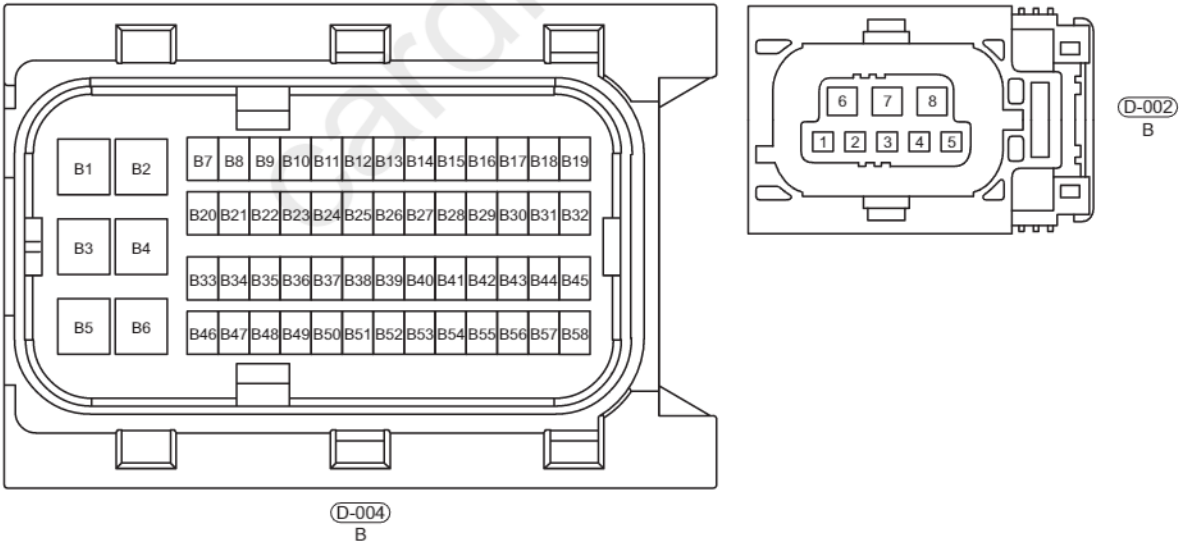
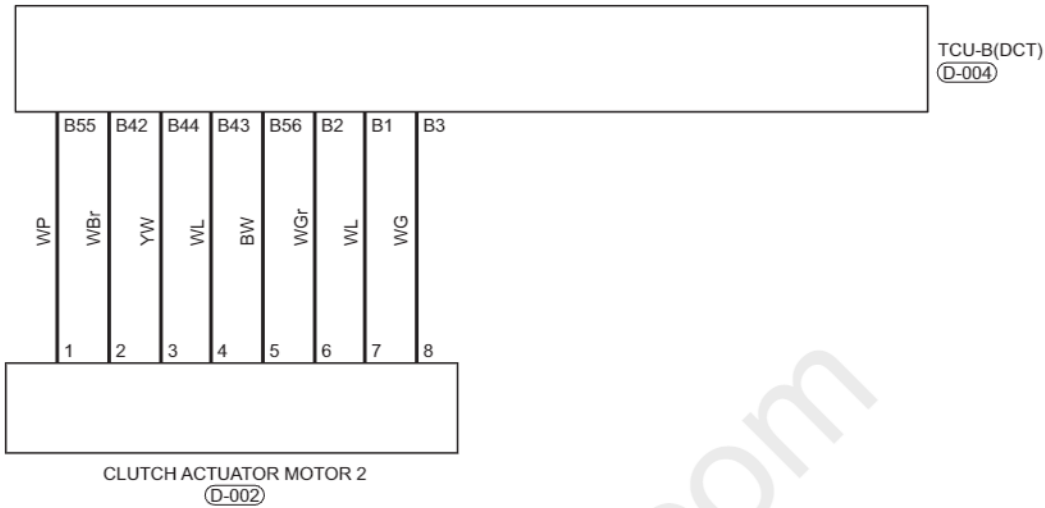
NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

DTC	P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V
DTC	P170A00	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V



Circuit Diagram



ESA016001

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V	- Circuit voltage < 3.72 V - Filtration time: 40 ms	Drive with other part (no problem) of transmission	1. Check wire harness and connector 2. If malfunction still occurs, replace transmission wire harness 3. If malfunction does not occur in wire harness, replace clutch actuator motor 2 4. If malfunction still occurs after replacing clutch actuator motor 2, replace transmission control unit
P170A00	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V	- Circuit voltage > 5.8 V - Filtration time: 40 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

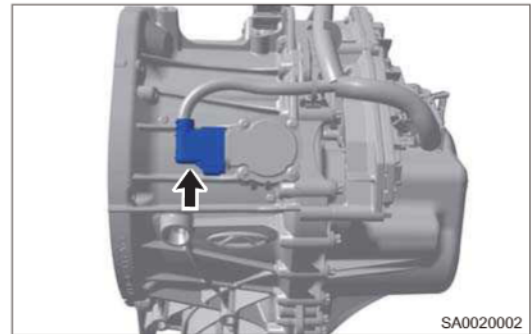
NG

Repair or replace ground wire harness or ground point

OK

2 Check the clutch actuator motor 2 connector.

- (a) Disconnect the clutch actuator motor 2 connector D-002 (arrow).



- (b) Check the clutch actuator motor 2 connector.

OK

Clutch actuator motor 2 connector is normal.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

3 Check clutch actuator motor 2 circuit

- (a) Disconnect the TCU connector D-004.
(b) Check wire harness between terminal of clutch actuator motor 2 connector and terminal of TCU connector.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-002 (1) - D-004 (55)	Always	Resistance $\leq 1 \Omega$
D-002 (5) - D-004 (56)	Always	Resistance $\leq 1 \Omega$

Check for Short

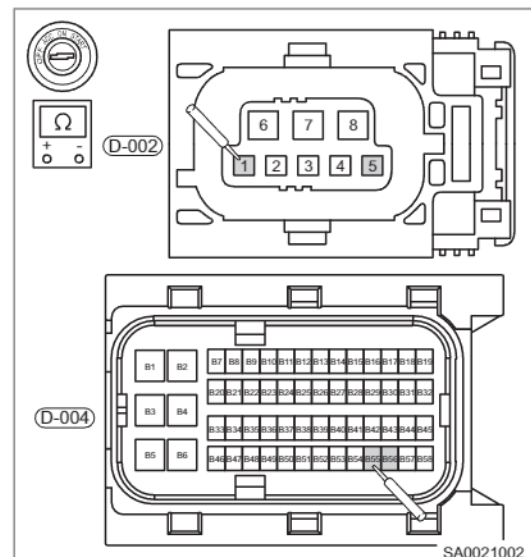
Multimeter Connection	Condition	Specified Condition
D-002 (1, 5) or D-004 (55, 56) - Body ground	Always	Resistance ∞
D-002 (1, 5) or D-004 (55, 56) - Battery positive	Always	Resistance ∞

OK

Wire harness between terminal of clutch actuator motor 2 connector and terminal of TCU connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace wire harness or connector (clutch actuator motor 2 - TCU)

OK

4 Check clutch actuator motor 2

- (a) Check the clutch actuator motor 2.

OK

Clutch actuator motor 2 is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace clutch actuator motor 2

OK

5 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for clutch motor (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

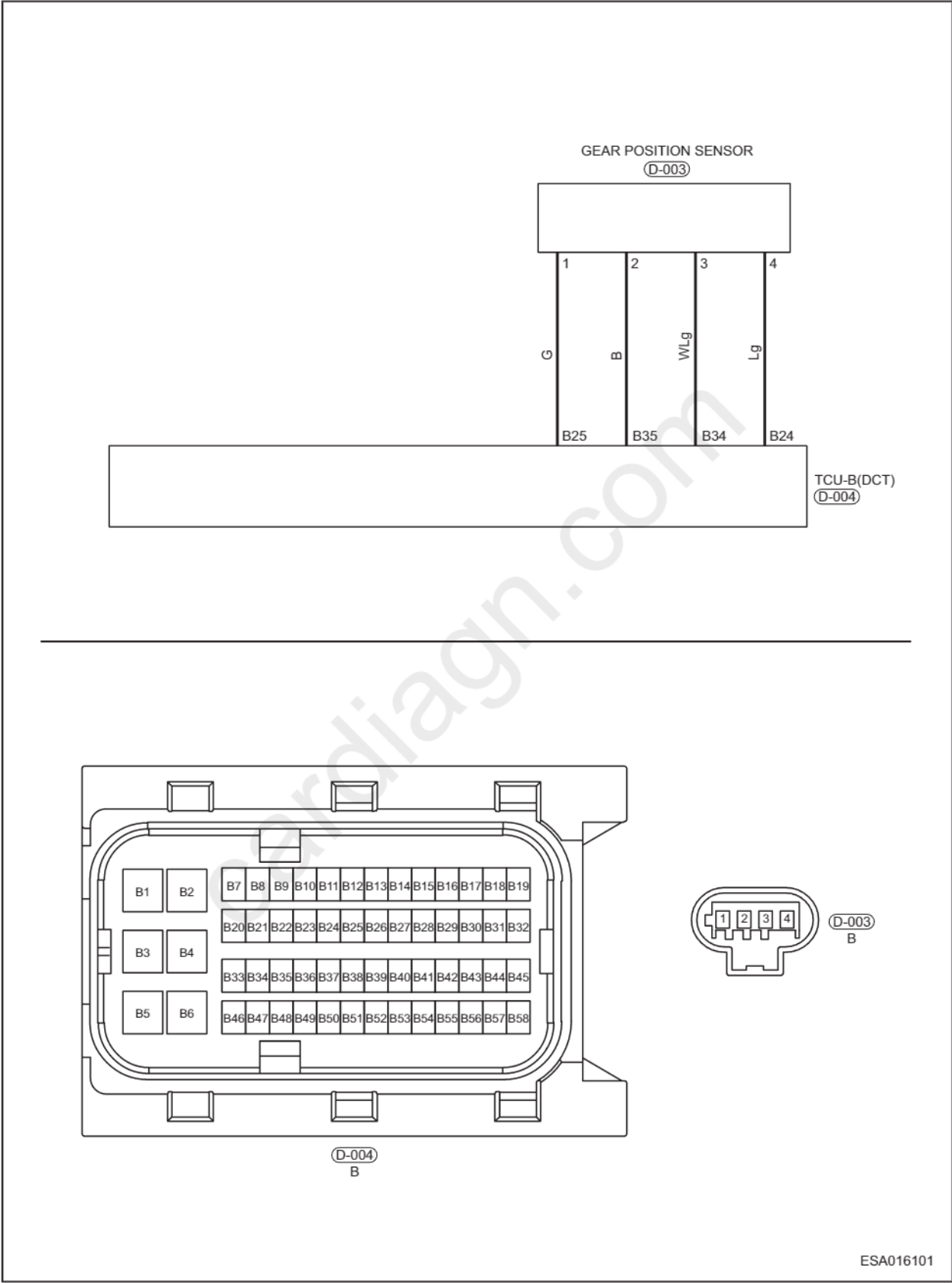
NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")



DTC	P070512	TRS
DTC	P070514	TRS
DTC	P070538	TRS
DTC	P070562	TRS
DTC	P172400	TRS Teach in Failure

Circuit Diagram



Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P070512	TRS	- Short to power supply in transmission range sensor circuit - Circuit voltage > 5.18 V - Filtration time: 40 ms	- Driving direction cannot be changed - Neutral cannot be shifted to	1. Check wire harness and connector 2. Check transmission range sensor 3. Replace transmission range sensor 4. Replace transmission wire harness 5. Replace TCU
P070514	TRS	- Short to ground or open in transmission range sensor circuit - Circuit voltage < 4.75V - Filtration time: 40 ms	- Driving direction cannot be changed - Neutral cannot be shifted to	
P070538	TRS	- Range sensor signal frequency is wrong - PWM is wrong - Filtration time: 40 ms	- If driving forward, continue to drive forward in automatic mode - Only start off in manual mode - It cannot start off in R position	
P070562	TRS	- Sum of PWM1 and PWM2 must be within correct range - Sum of other positions can be confirmed (P, R, N, D) - Physical/Mechanical inspection - Filtration time: 40 ms	Vehicle is damaged	
P172400	TRS Teach in Failure	Range sensor self-learning is not successful	- If driving forward, continue to drive forward in automatic mode - Only start off in manual mode - It cannot start off in R position	

18

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check range sensor connector**

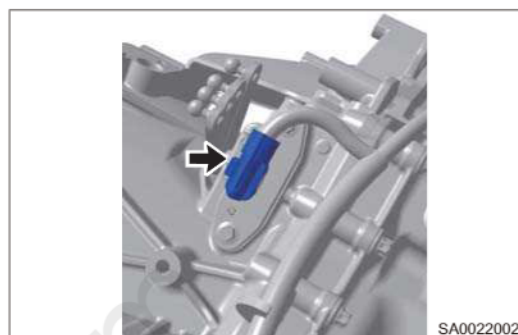
- (a) Check range sensor connector D-003 (arrow) for poor connection, damage, cracks or poor installation.

OK

Range sensor connector is normal.

Result

Proceed to
OK
NG



SA0022002

NG**Repair or replace connector****OK****2 Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace ground wire harness or ground point****OK****3 Check range sensor circuit**

- (a) Disconnect the TCU connector D-004.



- (b) Check wire harness between terminal of range sensor connector and terminal of TCU connector.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-003 (1) - D-004 (25)	Always	Resistance $\leq 1 \Omega$
D-003 (2) - D-004 (35)	Always	Resistance $\leq 1 \Omega$
D-003 (3) - D-004 (34)	Always	Resistance $\leq 1 \Omega$
D-003 (4) - D-004 (24)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-003 (1, 2, 3, 4) or D-004 (25, 35, 34, 24) - Body ground	Always	Resistance ∞

OK

Wire harness between terminal of range sensor connector and terminal of TCU connector is normal.

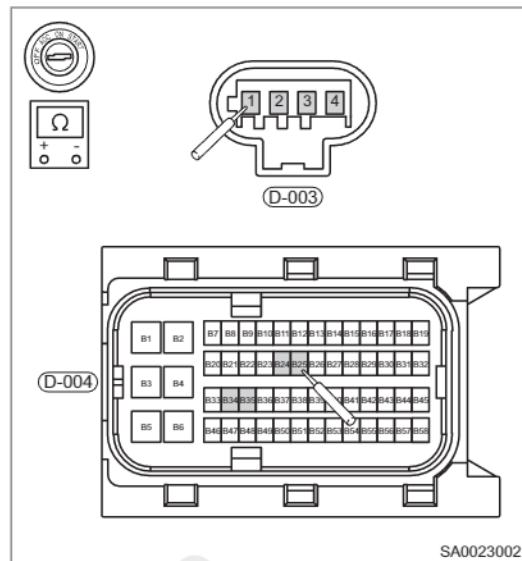
Result

Proceed to
OK
NG

NG

Repair or replace wire harness or connector (range sensor - TCU)

OK



4 Check range sensor

- (a) Remove the range sensor.
(b) Check range sensor for internal damage and broken.

OK

Range sensor is normal and has no malfunction.

Result

Proceed to
OK
NG

NG

Replace range sensor and perform self-learning

OK

5 Replace TCU control module and perform vehicle test

- (a) Reconnect the negative battery cable, and connect diagnostic tester.
(b) Delete DTC after storing.
(c) Turn ENGINE START STOP switch to OFF and disconnect the negative battery cable.

- (d) Replace TCU control module assembly, perform self-learning for transmission control module and then perform vehicle test.
- (e) Connect the negative battery cable.
- (f) Turn ENGINE START STOP switch to ON, connect diagnostic tester, read DTC again and check if DTC still appears.

OK

DTC does not appear again.

Result

Proceed to
OK
NG

NG

Replace transmission wire harness assembly

OK

6

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Perform self-learning for TCU control module (refer to "Self-learning after Component Replacement").
- (d) Start the engine.
- (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

NG

End

18



DTC	P060400	Broken RAM Cell
DTC	P060500	Broken Flash Cell
DTC	P172000	Monitoring SOPC Pre Drive Check

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P060400	Broken RAM Cell	RAM error	Vehicle cannot be driven	1. Check TCU 2. Replace TCU
P060500	Broken Flash Cell	ROM is error	Vehicle cannot be driven	
P172000	Monitoring SOPC Pre Drive Check	Self-test is not completed successfully after 62 ms	Vehicle cannot be driven	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**18**

1	Check TCU connector
----------	----------------------------

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG	Repair or replace connector
-----------	------------------------------------

OK

2	Check TCU ground point
----------	-------------------------------

- (a) Turn ENGINE START STOP switch to OFF.

- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3 Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Perform self-learning for TCU control module (refer to "Self-learning after Component Replacement").
- (d) Start the engine.
- (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")



DTC	P172200	Clutch 1 Torque Unexpected Value
------------	----------------	---

DTC	P172300	Clutch 2 Torque Unexpected Value
------------	----------------	---

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P172200	Clutch 1 Torque Unexpected Value	- If target value (abnormal) of TCU reaches specified torque within specified period - Filtration time: 400 ms	Drive with other part (no problem) of transmission	1. Check clutch system 2. Replace clutch system
P172300	Clutch 2 Torque Unexpected Value	- If target value (abnormal) of TCU reaches specified torque within specified period - Filtration time: 400 ms	Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- 18** When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check clutch system
----------	----------------------------

- (a) Check the clutch system.

OK

Clutch system is normal.

Result

Proceed to
OK
NG

NG	Replace clutch system
-----------	------------------------------

OK

2 Reconfirm DTCs

- (a) Turn ENGINE START STOP switch to ON.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

NG

Replace TCU control module assembly
and perform self-learning (refer to "Self-
learning after Component Replacement")



DTC	P172500	Shift Drum 1 Reference Drive Failure
DTC	P172600	Shift Drum 2 Reference Drive Failure
DTC	P172700	Shift Drum 1 Sync Speed Rate Not Plausible
DTC	P172800	Shift Drum 2 Sync Speed Rate Not Plausible
DTC	P172900	Shift Drum 1 Position Out of Range
DTC	P172A00	Shift Drum 2 Position Out of Range

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P172500	Shift Drum 1 Reference Drive Failure	Check drive exceeds reference range	Drive with other part of transmission	1. Check TCU 2. Replace TCU
P172600	Shift Drum 2 Reference Drive Failure		Drive with other part of transmission	
P172700	Shift Drum 1 Sync Speed Rate Not Plausible	- Synchronization is not successful caused by wrong shift drum gear or wrong movement direction. Compare target speed and current speed. Speed difference exceeds set threshold at the beginning of synchronization phase. - Filtration time: 50 ms	Drive with other part (no problem) of transmission	
P172800	Shift Drum 2 Sync Speed Rate Not Plausible		Drive with other part (no problem) of transmission	
P172900	Shift Drum 1 Position Out of Range	- Shift hub position exceeds effective range - it is not activated during check drive - Filtration time: 8 ms	Drive with other part (no problem) of transmission	
P172A00	Shift Drum 2 Position Out of Range		Drive with other part (no problem) of transmission	

18 Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1 Check TCU connector

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

2 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTCs.
 (c) Perform self-learning for TCU control module (refer to "Self-learning after Component Replacement").
 (d) Start the engine.
 (e) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally

18



NG

Replace TCU control module assembly and perform self-learning (refer to "Self-learning after Component Replacement")

cardiagn.com

DTC	P173500	Gearbox 1 Gear Jump
DTC	P173600	Gearbox 2 Gear Jump

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P173500	Gearbox 1 Gear Jump	- Gear jumping occurs in 1st or 2nd shaft of transmission without request. Compare input and output speed related to input speed. When threshold is reached, malfunction will be monitored. If shift hub position matches with gear position, function returns to normal. - Filtration time: 500 ms	Affected gear is locked	1. Check TCU (shift actuator lever 1 drive shaft) 2. Check transmission 3. Replace TCU 4. Replace transmission
P173600	Gearbox 2 Gear Jump		Affected gear is locked	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check TCU connector
----------	----------------------------

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG



NG

Repair or replace connector

OK

2**Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3**Check TCU control module assembly**

- (a) Remove TCU control module assembly, check drive shaft of TCU control module internal shift actuator lever 2 for malfunction.
- (b) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- (c) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

18

Proceed to
OK
NG

NG

Replace transmission and perform vehicle test

OK

4**Reconfirm DTCs**

- (a) Perform self-learning for transmission (refer to "Self-learning after Component Replacement").
- (b) Start the engine.
- (c) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK	System operates normally
NG	End



DTC	P173700	Gearbox Mechanic Part 1 Unexpected Shift drum Standstill
------------	----------------	---

DTC	P173800	Gearbox Mechanic Part 2 Unexpected Shift drum Standstill
------------	----------------	---

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P173700	Gearbox Mechanic Part 1 Unexpected Shift drum Standstill	- In theory, shift drum will move in shift phase, such as gear is disengaged or synchronizer moves to synchronization point, compare actual position (and movement speed of shift hub) of shift hub and theoretical position (calculated). If ratio between actual position and theoretical position is not within specified range, filtration time (150 ms) will be started. If the ratio is still not within specified range after reaching filtration time, the malfunction will be stored. - Filtration time: 150 ms	Drive with other part (no problem) of transmission	1. Check TCU (shift actuator lever 2 drive shaft) 2. Check transmission 3. Replace TCU 4. Replace transmission
P173800	Gearbox Mechanic Part 2 Unexpected Shift drum Standstill		Drive with other part (no problem) of transmission	

18**Caution:**

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1 Check TCU connector

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

2 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

3 Check TCU control module assembly

18

- (a) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
 (b) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG

Replace transmission and perform vehicle test



OK

4 Reconfirm DTCs

- (a) Perform self-learning for transmission (refer to "Self-learning after Component Replacement").
- (b) Start the engine.
- (c) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK	System operates normally
NG	End

DTC	P173900	Gearbox 1 Sync Failure
DTC	P173A00	Gearbox 2 Sync Failure
DTC	P173B00	Gearbox 1 No Disengagement
DTC	P173C00	Gearbox 2 No Disengagement
DTC	P173D00	Gearbox 1 No Engagement
DTC	P173E00	Gearbox 2 No Engagement

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P173900	Gearbox 1 Sync Failure	1st shaft of input shaft cannot synchronize. There will be differences among monitored interruption positions (offset for 11° before engagement position) - Filtration time: 1500 ms	Drive with other part (no problem) of transmission	1. Check TCU (shift actuator lever 1 or 2 drive shaft) 2. Check transmission 3. Check clutch system 4. Replace TCU 5. Replace clutch system 6. Replace transmission
P173A00	Gearbox 2 Sync Failure			
P173B00	Gearbox 1 No Disengagement	- Transmission gear cannot be disengaged within specified period (shift hub cannot reach target position), or shift hub is stuck. Judgment time for sticking is faster than protection time of actuator - Filtration time: 1000 ms	Drive with other part (no problem) of transmission	
P173C00	Gearbox 2 No Disengagement		Drive with other part (no problem) of transmission	
P173D00	Gearbox 1 No Engagement	- Shift hub does not move before stop point after synchronization - Filtration time: 150 ms	Drive with other part (no problem) of transmission	
P173E00	Gearbox 2 No Engagement		Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.



5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check TCU connector**

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG**Repair or replace connector****OK****2 Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check the TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace ground wire harness or ground point****OK****3 Check clutch actuator motor**

- (a) Check if clutch actuator motor connector is normal.
- (b) Check if clutch actuator motor connector circuit and voltage are normal.
- (c) Remove clutch actuator motor and check if it is damaged.
- (d) Replace clutch actuator motor and perform self-learning, then verify if malfunction occurs again.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace clutch actuator motor****OK****4 Check TCU control module assembly**

- Remove TCU control module assembly, check drive shaft of TCU control module internal shift actuator lever 2 for malfunction.
- Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG**Replace transmission and perform vehicle test****OK****5 Check clutch system**

- Remove the transmission assembly.
- Remove dual-clutch assembly, and check dual-clutch assembly for malfunction.
- Replace dual-clutch assembly and perform vehicle test.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace dual-clutch assembly and perform self-learning for clutch****OK****6 Reconfirm DTCs**

- Replace transmission assembly with a new one.



- (b) Perform self-learning for transmission (refer to "Self-learning after Component Replacement").
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK	System operates normally
NG	End

DTC	P174A00	Shift Drum 1 Unexpected Movement
DTC	P174B00	Shift Drum 2 Unexpected Movement
DTC	P174C00	Shift Drum 1 Moving Direction Not Plausible
DTC	P174D00	Shift Drum 2 Moving Direction Not Plausible
DTC	P174300	Shiftdrum 1 Endstop Position Not Plausible
DTC	P174400	Shiftdrum 2 Endstop Position Not Plausible

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P174A00	Shift Drum 1 Unexpected Movement	- Shift hub is not requested to move or shift hub moves in opposite direction, shift hub position will be monitored before moving to any synchronization point. - Filtration time: 150 ms	Drive with other part of transmission	1. Check TCU (shift actuator lever 1 or 2 drive shaft) 2. Check transmission 3. Replace TCU 4. Replace transmission
P174B00	Shift Drum 2 Unexpected Movement		Drive with other part of transmission	
P174C00	Shift Drum 2 Unexpected Movement	- If PWM is larger than threshold and movement speed of shift hub is larger than threshold, and movement direction is wrong, it is necessary to consider that actuation direction is changed. - Filtration time: 8 ms/ 50 ms (after actuation direction is changed)	Drive with other part of transmission	
P174D00	Shift Drum 2 Moving Direction Not Plausible		Drive with other part of transmission	
P174300	Shiftdrum 1 Endstop Position Not Plausible	- If engaged gear is near stop point position of shift hub, shift hub will move to stop point position - Compare measured and calculated stop point position - If difference is not unbelievable, - record the error - Confirm that drive will be activated (if possible)	Confirm that drive is successful and stop point position is believable	
P174400	Shiftdrum 2 Endstop Position Not Plausible		Confirm that drive is successful and stop point position is believable	



Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Check TCU connector**

- (a) Check TCU connectors D-004 and B-118 for poor connection, damage, cracks or poor installation.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

18

2 Check clutch actuator motor

- (a) Check if clutch actuator motor connector is normal.
 (b) Check if clutch actuator motor connector circuit and voltage are normal.
 (c) Remove clutch actuator motor and check if it is damaged.
 (d) Replace clutch actuator motor and perform self-learning, then verify if malfunction occurs again.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace clutch actuator motor

OK

3 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check the TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK**4 Check TCU control module assembly**

- (a) Remove TCU control module assembly, check drive shafts of TCU control module internal shift actuator levers 1 and 2 for malfunction.
- (b) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- (c) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG

Replace transmission and perform vehicle test

OK**5 Reconfirm DTCs**

- (a) Replace transmission assembly with a new one.
- (b) Perform self-learning for transmission (refer to "Self-learning after Component Replacement").
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.



Result	
Proceed to	
OK	
NG	

OK	System operates normally
NG	End

DTC	P173F00	Clutch 1 Self Open Test Failed
DTC	P174000	Clutch 2 Self Open Test Failed

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P173F00	Clutch 1 Self Open Test Failed	- Automatic disengagement function of clutch actuator motor 1 or 2 fails - Filtration time: 500 ms	Drive with other part (no problem) of transmission	1. Check wire harness or connector 2. Check clutch system 3. Replace wire harness 4. Replace TCU 5. Replace clutch system
P174000	Clutch 2 Self Open Test Failed		Drive with other part (no problem) of transmission	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check clutch actuator motor 1 wire harness connector
----------	---

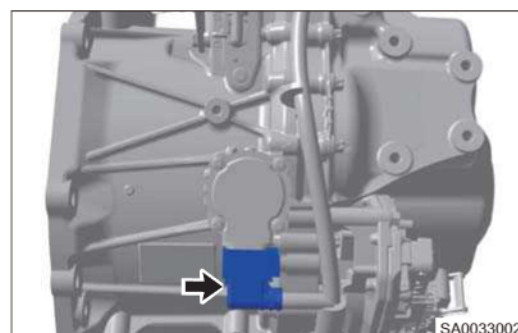
- (a) Check clutch actuator motor 1 wire harness connector (arrow) for poor connection, damage, cracks or poor installation.

OK

Clutch actuator motor 1 wire harness connector is normal.

Result

Proceed to
OK
NG



NG	Repair or replace connector
-----------	------------------------------------



OK

2 Check clutch actuator motor 2 wire harness connector

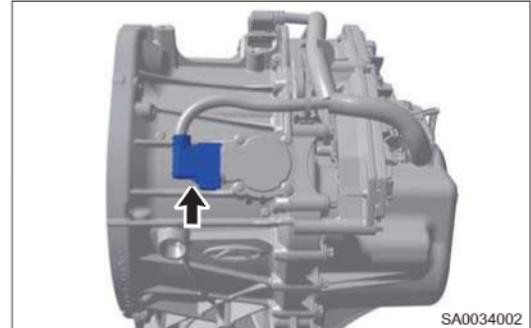
- (a) Check clutch actuator motor 2 wire harness connector (arrow) for poor connection, damage, cracks or poor installation.

OK

Clutch actuator motor 2 wire harness connector is normal.

Result

Proceed to
OK
NG



NG

Repair or replace connector

OK

3 Check TCU wire harness connector

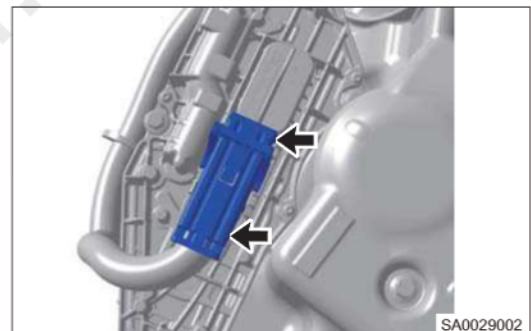
- (a) Check TCU wire harness connectors (arrow) for poor connection, damage, cracks or poor installation.

OK

TCU wire harness connectors are normal.

Result

Proceed to
OK
NG



18

NG

Repair or replace connector

OK

4 Check clutch actuator motor

- (a) Check if clutch actuator motor connector is normal.
 (b) Check if clutch actuator motor connector circuit and voltage are normal.
 (c) Remove clutch actuator motor and check if it is damaged.
 (d) Replace clutch actuator motor and perform self-learning, then verify if malfunction occurs again.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace clutch actuator motor

OK

5 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace ground wire harness or ground point

OK

6 Check TCU control module assembly

- (a) Remove TCU control module assembly, check drive shafts of TCU control module internal shift actuator levers 1 and 2 for malfunction.
- (b) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- (c) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG

Replace transmission and perform vehicle test

OK

7 Check clutch system

- (a) Remove the transmission assembly.
- (b) Remove dual-clutch assembly, and check dual-clutch assembly for malfunction.
- (c) Replace dual-clutch assembly and perform vehicle test.

OK

Ground point is normal



Result

Proceed to
OK
NG

NG

**Repair or replace dual-clutch assembly
and perform self-learning for clutch**

OK**8****Reconfirm DTCs**

- (a) Install new dual-clutch assembly to transmission assembly, then install transmission assembly.
- (b) Connect the negative battery cable.
- (c) Use diagnostic tester to clear DTCs.
- (d) Perform self-learning for clutch (refer to "Self-learning after Component Replacement").
- (e) Start the engine.
- (f) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

Reinstall and perform self-learning

NG

End

DTC	P174100	Clutch 1 Torque Too Low
DTC	P174200	Clutch 2 Torque Too Low

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P174100	Clutch 1 Torque Too Low	- Compared to maximum engine torque, torque of clutch actuator motor 1 or 2 is too low a long time after torque transmission is completed - This error is monitored by counter	- Torque required by engine or driver is restricted - Clutch still slips after torque is restricted (error flag appears during torque restriction) - Neutral is engaged when clutch slips - Part of transmission does not operate	- Perform the torque capacity recovery program. - Check clutch system - Replace clutch system
P174200	Clutch 2 Torque Too Low		- Torque required by engine or driver is restricted - Clutch still slips after torque is restricted (error flag appears during torque restriction) - Neutral is engaged when clutch slips - Part of transmission does not operate	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be deleted, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Perform the torque capacity recovery program.
----------	--

- Connect the negative battery cable.
- Perform the torque capacity recovery program.

OK

Perform torque capacity recovery program normally.



Result

Proceed to
OK
NG

NG**Replace clutch system****OK****2 Check clutch actuator motor**

- (a) Check if clutch actuator motor connector is normal.
- (b) Check if clutch actuator motor connector circuit and voltage are normal.
- (c) Remove clutch actuator motor and check if it is damaged.
- (d) Replace clutch actuator motor and perform self-learning, then verify if malfunction occurs again.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace clutch actuator motor****OK****3 Check TCU control module assembly**

- (a) Remove TCU control module assembly, check drive shafts of TCU control module internal shift actuator levers 1 and 2 for malfunction.
- (b) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- (c) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG**Replace transmission and perform vehicle test****OK****4 Check clutch system**

- (a) Remove the transmission assembly.

- (b) Remove dual-clutch assembly, and check dual-clutch assembly for malfunction.
- (c) Replace dual-clutch assembly and perform vehicle test.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

Repair or replace dual-clutch assembly and perform self-learning for clutch

OK

5 Reconfirm DTCs

- (a) Install new dual-clutch assembly to transmission assembly, then install transmission assembly.
- (b) Connect the negative battery cable.
- (c) Use diagnostic tester to clear DTCs.
- (d) Perform self-learning for clutch (refer to "Self-learning after Component Replacement").
- (e) Start the engine.
- (f) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

Reinstall and perform self-learning

NG

End



DTC	P174500	Clutch 1 Endstop Position Not Plausible
DTC	P174600	Clutch 2 Endstop Position Not Plausible
DTC	P174700	Clutch 1 Drag Torque Too High
DTC	P174800	Clutch 2 Drag Torque Too High

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P174500	Clutch 1 Endstop Position Not Plausible	To prevent clutch fully disengaging or engaging: Compare theoretical and actual stop point positions	Damaged clutch is unbelievable	1. Check clutch system 2. Replace clutch system
P174600	Clutch 2 Endstop Position Not Plausible		Damaged clutch is unbelievable	
P174700	Clutch 1 Drag Torque Too High	- Clutch 1 drag torque is too high - Filtration time: 1000 ms	- Clutch disengages - Part of transmission stops operating - Damaged part of transmission is shifted to neutral	
P174800	Clutch 2 Drag Torque Too High		- Clutch disengages - Part of transmission stops operating - Damaged part of transmission is shifted to neutral	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Perform self-learning for clutch actuator motor
----------	--

- (a) Connect the negative battery cable.
- (b) Perform the torque capacity recovery program.

OK

Perform torque capacity recovery program normally.

Result

Proceed to
OK
NG

NG**Go to step 2****OK****2****Check clutch actuator motor**

- (a) Check if clutch actuator motor connector is normal.
- (b) Check if clutch actuator motor connector circuit and voltage are normal.
- (c) Remove clutch actuator motor and check if it is damaged.
- (d) Replace clutch actuator motor and perform self-learning, then verify if malfunction occurs again.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG**Repair or replace clutch actuator motor****OK****3****Check TCU control module assembly**

- (a) Remove TCU control module assembly, check drive shafts of TCU control module internal shift actuator levers 1 and 2 for malfunction.
- (b) Replace TCU control module assembly, connect the negative battery cable and diagnostic tester to perform self-learning for transmission control module.
- (c) Start and run engine for a while, and stall it after self-learning is completed, then read DTC again and observe if malfunction occurs again.

OK

Malfunction does not occur again.

Result

Proceed to
OK
NG

NG**Replace transmission and perform vehicle test****OK**

4 Check clutch system

- (a) Remove the transmission assembly.
- (b) Remove dual-clutch assembly, and check dual-clutch assembly for malfunction.
- (c) Replace dual-clutch assembly and perform vehicle test.

OK

Ground point is normal

Result

Proceed to
OK
NG

NG

**Repair or replace dual-clutch assembly
and perform self-learning for clutch**

OK**5 Reconfirm DTCs**

- (a) Install new dual-clutch assembly to transmission assembly, then install transmission assembly.
- (b) Connect the negative battery cable.
- (c) Use diagnostic tester to clear DTCs.
- (d) Perform self-learning for clutch (refer to "Self-learning after Component Replacement").
- (e) Start the engine.
- (f) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

18**OK**

Reinstall and perform self-learning

NG

End

DTC	P174E00	Clutch 1 Overtemperature
DTC	P174F00	Clutch 2 Overtemperature

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P174E00	Clutch 1 Overtemperature	Clutch actuator motor 1 or 2 is overheating Filtration time = 100 ms	All gears related to clutch are locked (clutch 1 is overheating, 1st, 3rd and 5th gears are not allowed to use)	1. Cool down clutch actuator motor
P174F00	Clutch 2 Overtemperature		All gears related to clutch are locked (clutch 2 is overheating, 2nd, 4th, 6th and R gears are not allowed to use)	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

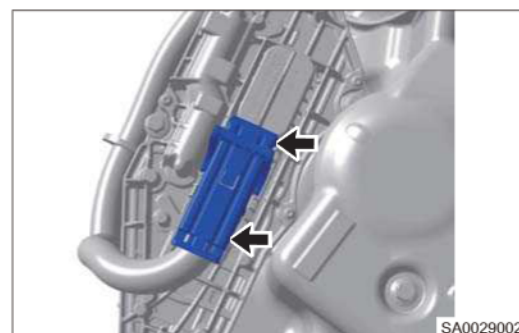
Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check TCU wire harness connector
----------	---

- (a) Disconnect the TCU wire harness connector (arrow).



SA0029002

- (b) Check the TCU wire harness connectors.

OK

TCU wire harness connectors are normal.



Result

Proceed to
OK
NG

NG

Repair or replace connector
Stop vehicle to cool it down

OK**2****Reconfirm DTCs**

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally, replace TCU
and perform self-learning (refer to "Self-
learning after Component Replacement")

NG

DTC still exists, replace transmission and
perform self-learning (refer to "Self-
learning after Component Replacement")

DTC	P174900	Broken Shift Fork
------------	----------------	--------------------------

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P174900	Broken Shift Fork	- Gear with damaged shift fork is shifted to neutral - Neutral is requested by software based on shift hub position information - Input shaft speed is kept at value at beginning of synchronization - Synchronization error or PWM of shift hub above threshold is monitored by software in next synchronization phase - Filtration time: Same as judgment time for synchronization malfunction or 50ms (judged by PWM)	Drive with other part (no problem) of transmission	1. Check transmission 2. Replace transmission

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1	Check transmission assembly
----------	------------------------------------

- (a) Remove the transmission assembly
- (b) Replace transmission assembly and perform self-learning for transmission, then perform vehicle test.



Result

Proceed to
OK
NG

NG

Perform self-learning for transmission again

OK**2****Reconfirm DTCs**

- (a) Start the engine.
 (b) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

DTC still exists, replace transmission and perform self-learning (refer to "Self-learning after Component Replacement")

NG

End

DTC	P172D00	Level 2 Reset - SZ1 tq Increase
DTC	P172E00	Level 2 Reset - SZ2 Launching in Wrong Direction
DTC	P172F00	Level 2 Reset - SZ3 Shift R While Driving
DTC	P173000	Level 2 Reset - SZ4 Unwanted Launch
DTC	P173100	Level 2 Reset - SZ6a Downshift Not Allowed
DTC	P173200	Level 2 Reset - SZ6b Downshift Overspeed
DTC	P173300	Level 2 Reset - SZ7 Tie Up
DTC	P173400	Level 2 Reset - SZ8 Overspeed

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
P172D00	Level 2 Reset - SZ1 tq Increase	- Torque does not increase as expected - Filtration time: 400 ms	Reset	1. Reset
P172E00	Level 2 Reset - SZ2 Launching in Wrong Direction	Filtration time: 250 ms	Reset	
P172F00	Level 2 Reset - SZ3 Shift R While Driving	Filtration time: 100 ms	Reset	
P173000	Level 2 Reset - SZ4 Unwanted Launch	Filtration time: 250 ms	Reset	
P173100	Level 2 Reset - SZ6a Downshift Not Allowed	Filtration time: 100 ms	Reset	
P173200	Level 2 Reset - SZ6b Downshift Overspeed	Filtration time: 100 ms	Reset	
P173300	Level 2 Reset - SZ7 Tie Up	Filtration time: 100 ms	Reset	
P173400	Level 2 Reset - SZ8 Overspeed	Filtration time: 40 ms	/	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.



18-625DCT TRANSMISSION

8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure

1 Check TCU ground point

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

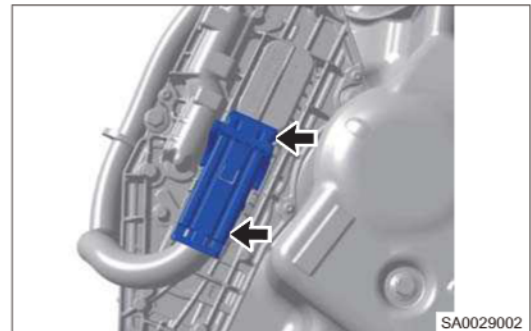
NG

Repair or replace ground wire harness or ground point

OK

2 Check the TCU wire harness connectors.

- (a) Disconnect the TCU wire harness connectors.



- (b) Check the TCU wire harness connectors.

OK

TCU wire harness connectors are normal.

Result

Proceed to
OK
NG

NG

Repair or replace connector

OK

3 Reset the transmission control module.

- (a) Connect the negative battery cable.
- (b) Reset the transmission control module.

OK

Transmission operates normally after reset.

Result

Proceed to
OK
NG

NG

Replace TCU

OK

4 Reconfirm DTCs

- (a) Use diagnostic tester to clear DTCs.
- (b) Start the engine.
- (c) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally, replace TCU and perform self-learning (refer to "Self-learning after Component Replacement")

NG

DTC still exists, replace transmission and perform self-learning (refer to "Self-learning after Component Replacement")



DTC	U007388	Control Module Communication Bus Off
DTC	U040181	Invalid EMS CAN Signal Received
DTC	U010087	Lost Communication with EMS
DTC	U041881	Invalid BSM CAN Signal Received
DTC	U012987	Lost Communication with BSM
DTC	U042281	Invalid BCM CAN Signal Received
DTC	U014087	Lost Communication with BCM
DTC	U012687	Lost Communication With Sam

cardiagn.com

Description

DTC	DTC Definition	Malfunction Condition	Problem Symptoms	Troubleshooting Suggestion
U007388	Control Module Communication Bus Off	- Error counter = 255 - Filtration time = 100 ms	- It is restricted in automatic mode - Vehicle cannot be started off again	1. Check failure cache of all ECUs 2. Check wire harness and connector 3. Replace all vehicle wire harnesses 4. Replace TCU
U040181	Invalid EMS CAN Signal Received	- Received EMS CAN signal is invalid - No filtration time	- It is restricted in automatic mode - Vehicle cannot be started off again	
U010087	Lost Communication with EMS	- Information is not correctly received within expected period - Filtration time = 100 ms	- It is restricted in automatic mode - Vehicle cannot be started off again	
U041881	Invalid BSM CAN Signal Received	- Received BSM CAN signal is invalid - No filtration time	It is restricted in automatic mode	
U012987	Lost Communication with BSM	- Information is not correctly received within expected period - Filtration time = 200 ms	It is restricted in automatic mode	
U042281	Invalid BCM CAN Signal Received	- Received BCM CAN signal is invalid - No filtration time	Ambient temperature: Driving function is restricted in automatic mode	
U014087	Lost Communication with BCM	- Information is not correctly received within expected period - Filtration time = 500 ms	Ambient temperature: Driving function is restricted in automatic mode	
U012687	Lost Communication with SAM	- Information is not correctly received within expected period - Filtration time = 100 ms	/	

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

1. Turn ENGINE START STOP switch to OFF.
2. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
3. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
4. If DTC cannot be deleted, malfunction is current.
5. Only use a digital multimeter to measure voltage of electronic system.
6. Refer to any Technical Bulletin that may apply to this malfunction.
7. Visually check the related wire harness.
8. Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
9. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.



Caution:

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Procedure**1 Read ECU DTC**

- (a) Connect the diagnostic tester.
 (b) Read all the DTCs.

OK

No DTC

Result

Proceed to
OK
NG

NG

Check malfunction causes indicated by
DTC and repair faulty area

OK**2 Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check TCU ground point GB-119.

OK

Ground point is normal

Result

Proceed to
OK
NG

18**NG**

Repair or replace ground wire harness or
ground point

OK**3 Check the TCU wire harness connectors.**

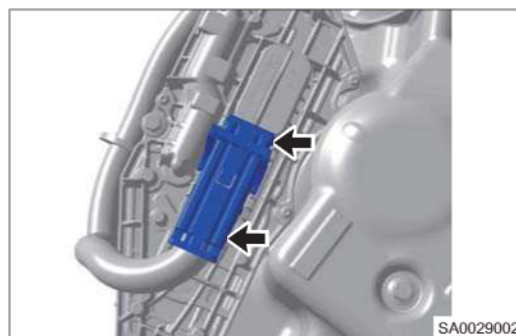
- (a) Disconnect the TCU wire harness connector (arrow).
- (b) Check the TCU wire harness connectors.

OK

TCU wire harness connectors are normal.

Result

Proceed to
OK
NG



NG

Repair or replace connector

OK

4 Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTCs.
- (c) Start the engine.
- (d) Check if the same DTCs are still output.

OK

Same DTCs are not output.

Result

Proceed to
OK
NG

OK

System operates normally, replace TCU and perform self-learning (refer to "Self-learning after Component Replacement")

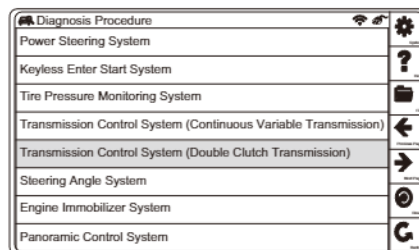
NG

DTC still exists, replace transmission and perform self-learning (refer to "Self-learning after Component Replacement")

General Functions for Diagnostic Tester

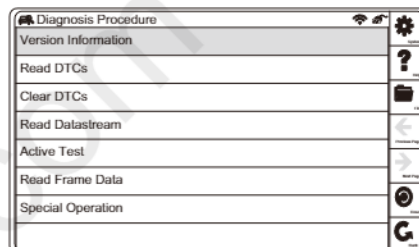
Diagnostic Tester Menu

1. Enter diagnostic tester screen to select "Tiggo 8/T18".
2. Select "Transmission Control System (Dual-clutch Transmission)"



SA0164002

3. Diagnostic menu is as shown in illustration

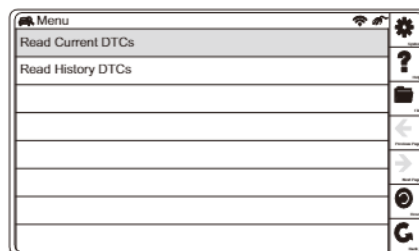


SA0165002

Read and clear DTCs

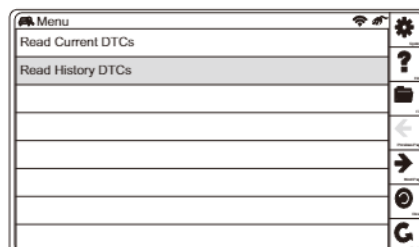
Read DTCs

1. Read current DTC
 - (a) Read current DTC existing in system



SA0166002

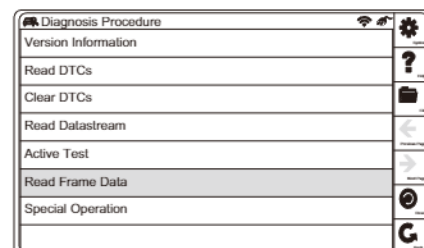
2. Read history DTC
 - (a) Read history DTC stored in system



SA0166102

3. Read freeze frame data

(a) Displays as there is no DTC: No DTC



SA0167002

(b) When there is DTC, DTC and corresponding meaning is displayed. Click this DTC;

DTCs	Description	Status
U042281	Invalid BCM CAN Signal Received	Invalid Continuous Data Received
U012687	Lost Communication with Steering Angle Sensor	Lost Communication

SA0167102

(c) The freeze frame data for this DTC is displayed.

Datastream Name	Value	Unit
Mileage	44	
KL30 High Voltage	11.97	V
Vehicle Speed	0	mph
Malfunction Occurrence Time	2339878400	s
Engine Speed	0	rpm
KL30 Low Voltage	12.04	v
Engine Condition	Engine Stopped	

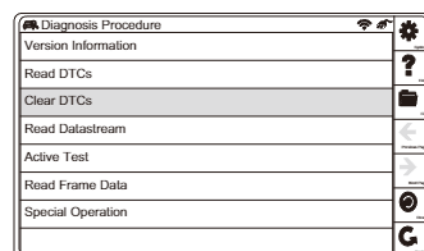
SA0168002

Clear DTCs

4. Click "Clear DTC".

Caution:

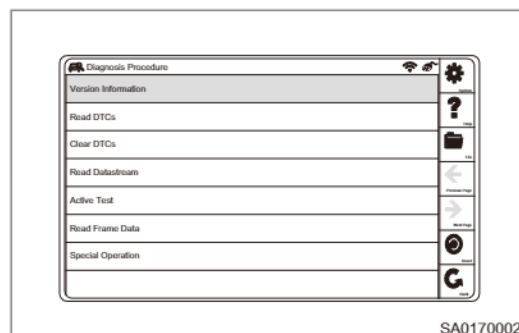
Check that engine is not in activated condition and key is in IGN ON condition before clearing the DTCs.



SA0169002

Reading Version Information

1. Click Reading Version Information to read the version basic information
 - (a) Edition information includes: Supplier code, part number, head unit factory ECU hardware edition number, head unit factory ECU software edition number, Boot software version and ECU manufacture data, etc.



Read Datastream

Items in basic datastream:

1. Static engine torque: unit: N·m
2. Battery voltage: System is supplied by TCU KL30 power supply voltage (unit: V)
3. Original accelerator pedal position: (unit: %)

Caution:

EMS gains accelerator pedal position according to accelerator pedal sensor.

- (a) Accelerator pedal not depressed: 0%;
 - (b) Changes as accelerator pedal is depressed: the same as the datastream of "Actual Accelerator Pedal Position"
4. No static engine torque required by TCU: (unit: N·m)

Hint:

Description: besides TCU, there are also many controllers which can require torque for engine. This datastream means that engine torque required by TCU is not included.

5. Cruising mode control condition: Press the cruising switch to enter the pre-cruising condition, which will display as activated
6. Actual accelerator pedal position: (unit: %)

Caution:

- EMS gains accelerator pedal position according to accelerator pedal sensor.
- Original accelerator pedal position is the signal which is not filtered while actual accelerator pedal position is the signal which is filtered.

18

- (a) Accelerator pedal not depressed: 0%;
 - (b) Changes as accelerator pedal is depressed: the same as the datastream of "Original Accelerator Pedal Position"
7. ABS vehicle speed: Signal from brake controller (unit: km/h)
8. Engine start allowable condition:
 - (a) Enable/Disable/Reserved/Invalid Value;
 - (b) "Enable" is displayed in neutral and park gear position while "Disabled" is displayed in other gear positions.
9. Transmission oil temperature: It is calculated in TCU (unit: °C)
10. Shift lever position

Caution:

Signals are from TRS sensor on transmission.

- (a) P: park position.
- (b) R: reverse position.
- (c) N: neutral position.
- (d) D: forward.
- (e) M: manual.

11. Full accelerator pedal information: Activated information is displayed as accelerator pedal is fully depressed; otherwise, Not Activated information is displayed
 12. Target gear position: 1st/2nd/3rd/4th/5th/6th/R/Abnormal value. When gear position signal is incredible, abnormal value will be displayed
 13. Input shaft 1 rotation speed: (unit: rpm)
 14. Input shaft 2 rotation speed: (unit: rpm)
 15. Output shaft rotation speed: (unit: rpm)
 16. Non-drive wheel speed: (unit: rpm)
 17. Shift lever sensor duty ratio: duty ratios of TRS sensor are different in different gear positions. There are two signal wires for TRS sensor. They are both of duty ratio, one of which is redundant signals (unit: %)
 18. Manual mode switch condition: For signals from shift lever switch, "Manual Gear Position" is displayed as shift lever in M position; downshifting position is displayed as in "-" position; upshifting position is displayed as in "+" position; "P/R/N/Forward Position" is displayed as in other positions
 19. Current position for shift drum motor 1: Built-in Hall sensor is adapted, which is used to calculate the current position and speed (no unit)
 20. Current position for shift drum motor 2: Built-in Hall sensor is adapted, which is used to calculate the current position and speed (no unit)
 21. Current speed for shift drum motor 1
 22. Current speed for shift drum motor 2
 23. Inside TCU temperature: It is provided by temperature sensor in transmission MAM (unit: °C)
 24. Error count of shifting from R position: It records the failing count of shifting from R position
 25. Error count of shifting from 1st position: It records the failing count of shifting from 1st position
 26. Error count of shifting from 2nd position: It records the failing count of shifting from 2nd position
 27. Error count of shifting from 3rd position: It records the failing count of shifting from 3rd position
 28. Error count of shifting from 4th position: It records the failing count of shifting from 4th position
 29. Error count of shifting from 5th position: It records the failing count of shifting from 5th position
 30. EEPROM error mark:
 1. Data is recovered from current driving cycle.
 2. Data in Getrag or Luk module has been damaged.
 3. Data in Getrag or Luk module has been damaged.
 4. Software version mark has been changed in current ignition cycle, which cause that data structure doesn't match.
 5. Data of last ignition cycle is not stored and data is recovered from previous ignition cycle.
- Hint:**
Some data of transmission normally operating are stored in EEPROM and data for each block has one mark digit. If data in any block is incomplete or damaged, mark digit will display 1, which will affect the corresponding function.
31. The current increases as shift drum motor 1 operates while it is nearly zero as motor doesn't work (current: unit A)
 32. The current increases as shift drum motor 2 operates while it is nearly zero as motor doesn't work (current: unit A)
 33. Gear position 1 information/Gear position 2 information
 1. 1st
 2. 2nd
 3. 3rd
 4. 4th
 5. 5th
 6. 6th
 7. R position



- 8. Abnormal value
- 9. N position (1-3)
- 10. N position (3-5)
- 11. N position (R-2)
- 12. N position (2-4)
- 13. N position (4-6)

Hint:

When shift drum is at N position located between 1st and 3rd, N position (1-3) is displayed; others are in the same way. The two datastream provides feedback which gear position is in two shift drums and transmission.

- 34. Right front wheel speed: (unit: rpm)
- 35. Left front wheel speed: (unit: rpm)
- 36. Right rear wheel speed: (unit: rpm)
- 37. Left rear wheel speed: (unit: rpm)
- 38. Vehicle acceleration: This value is provided by YAS sensor (unit: m/s²)
- 39. Original shift lever position: P/R/N/D/M/Inter

Hint:

Previous "Shift Lever Position" data signals will be processed. There will be no difference between normal and this data stream. Inter will be displayed between P and R, R and N, or N and D.

- 40. TCU voltage: It will detect TCU supply voltage (PIN 18) (unit: V)
- 41. Engine Speed (unit: rpm)
- 42. Clutch Max. torque: Max. torque that clutch can bear (unit: N·m)
- 43. Shift lock condition: Unlock is displayed as brake pedal is depressed, or Lock will be displayed

Items in special datastream:

- 1. Brake switch and parking brake lever condition
 - (a) Brake switch: "On" will be displayed as brake pedal is depressed, or "Off" will be displayed.
- Caution:**
TCU shifts down as brake pedal is depressed slowly; if brake pedal is depressed rapidly (ESP brake master cylinder pressure signal is used), clutch keeps disengagement. This signal is from EMS of CAN network, which is brake switch signal; it is not PIN of TCU; for X5-21 terminal (this terminal is not in use), there will be a reserved value if brake switch in network has malfunction.
- (b) Parking brake condition: "On" is displayed as the parking brake lever is pulled up, or "Off" will be displayed
- 2. Malfunction indicator light condition:
 - (a) EPS light: After engine EPC light comes on, Activated is displayed, or Not Activated is displayed; currently, this light has nothing to do with the transmission control system.
 - (b) Transmission malfunction warning light: After transmission malfunction warning light comes on, Activated is displayed, or Not Activated is displayed.
 - (c) Transmission temperature warning light: Clutch temperature exceeds the threshold, Activated is displayed, or Not Activated is displayed.
- 3. ESP condition:
 - (a) Traction Control System (TCS): When TCS is activated, Activated is displayed, or Not Activated is displayed.
 - (b) Electronic Stability Program (ESP): When body stability function is activated, Activated is displayed, or Not Activated is displayed.
 - (c) Engine traction control (MSR): When MSR is activated, Activated is displayed, or Not Activated is displayed.

Hint:

MSR: Engine resistance torque control system for short.

4. Transmission internal mechanical data:

- (a) Starting count from 1st: the count is not the current driving cycle.
- (b) Starting count from R position: Starting count from 1st is not the current driving cycle.
- (c) Starting count from 2nd: It is the starting count from 2nd; in normal condition, it is not allowed to start from 2nd, except when clutch 1 or shifting hub 1 has malfunction.
- (d) Count that shift lever is in P position and speed exceeds the threshold:
 - (1) Count that driver shifts the lever to P position by mistake when vehicle speed is over 5 km/h.
 - (2) When error occurs, shift lever is in P position, TRS is in P position and transmission internal mechanical may not be in parking position.
- (e) Count that shift lever is in R position and speed exceeds the threshold:
 - (1) Count that driver shifts the lever to R position by mistake when vehicle speed is over 7 km/h.
 - (2) When error occurs, shift lever is in R position, TRS is in R position and transmission internal mechanical shifting is driven by motor, so transmission cannot be shifted to R position.
- (f) Max. energy for clutch 1 in current driving cycle: It is calculated by the clutch temperature model (unit: KJ).
- (g) Max. energy for clutch 2 in current driving cycle: It is calculated by the clutch temperature model (unit: KJ).
- (h) Max. power for clutch 1: The heat power for clutch 1 generated by sliding friction is not the current driving cycle.
- (i) Max. power for clutch 2: The heat power for clutch 2 generated by sliding friction is not the current driving cycle.
- (j) Driving mileage under low temperature: Driving mileage when temperature $\leq 0^{\circ}\text{C}$; it is not the current driving cycle (unit: km).
- (k) Driving mileage when temperature $> 0^{\circ}\text{C}$; it is not the current driving cycle (unit: km).
- (l) Max. rotation speed for input shaft 1: it is max. rotation speed for input shaft 1 and not the current driving cycle (unit: rpm).
- (m) Max. rotation speed for input shaft 2: it is max. rotation speed for input shaft 2 and not the current driving cycle (unit: rpm).
- (n) Max. half-engagement point position for clutch 1: In whole life cycle of clutch, the characteristics of clutch changes continuously and the half-engagement point position will change accordingly (unit: mm).
- (o) Max. half-engagement point position for clutch 2: In whole life cycle of clutch, the characteristics of clutch changes continuously and the half-engagement point position will change accordingly (unit: mm).
- (p) Min. half-engagement point position for clutch 1: In whole life cycle of clutch, the characteristics of clutch changes continuously and the half-engagement point position will change accordingly (unit: mm).
- (q) Min. half-engagement point position for clutch 2: In whole life cycle of clutch, the characteristics of clutch changes continuously and the half-engagement point position will change accordingly (unit: mm).

Hint:

These positions are the distance relative to the position when the clutch is fully opened. In whole life cycle of clutch, the characteristics of clutch changes continuously and the half-engagement point position will change accordingly (MAM will perform learning automatically).

- (r) Reset count: Reset count for NVM; NVM is a kind of memory or storage space (EEPROM) for TCU.



5. Gear position data content:

Caution:

Resolve the datastream as follows: TRS is duty ratio signal and each gear position has the corresponding duty ratio range. The whole duty ratio signal has upper and lower limits.

- (a) Gear position sensor max. value in P position: It is from TRS, which is the duty ratio signal upper limit in P position.
- (b) Gear position sensor min. value in P position: It is from TRS, which is the duty ratio signal lower limit in P position.
- (c) Gear position sensor max. value in R position: It is from TRS, which is the duty ratio signal upper limit in R position.
- (d) Gear position sensor min. value in R position: It is from TRS, which is the duty ratio signal lower limit in R position.
- (e) Gear position sensor max. value in N position: It is from TRS, which is the duty ratio signal upper limit in N position.
- (f) Gear position sensor min. value in N position: It is from TRS, which is the duty ratio signal lower limit in N position.
- (g) Gear position sensor max. value in D position: It is from TRS, which is the duty ratio signal upper limit in D position.
- (h) Gear position sensor min. value in D position: It is from TRS, which is the duty ratio signal lower limit in D position.
- (i) Gear position sensor max. value: It is from TRS, which is the duty ratio signal upper limit.
- (j) Gear position sensor min. value: It is from TRS, which is the duty ratio signal lower limit.
- (k) Input shaft 1 speed sensor status: Initial, effective, substitute, shaking treatment to reconfirm the error, error.

Hint:

When sensor initialization is performed - initial, when sensor is normal - effective, when use other signals for substitution - substitute, when error occurs - error, when error occurs, the system will not judge it is sensor malfunction and shaking treatment will be performed - shaking treatment to reconfirm the error

- (l) Input shaft 2 speed sensor status: initial, effective, substitute, shaking treatment to reconfirm the error, error.

Hint:

When sensor initialization is performed - initial, when sensor is normal - effective, when use other signals for substitution - substitute, when error occurs - error, when error occurs, the system will not judge it is sensor malfunction and shaking treatment will be performed - shaking treatment to reconfirm the error

Self-learning after Component Replacement

Self-learning Menu for Special Operation

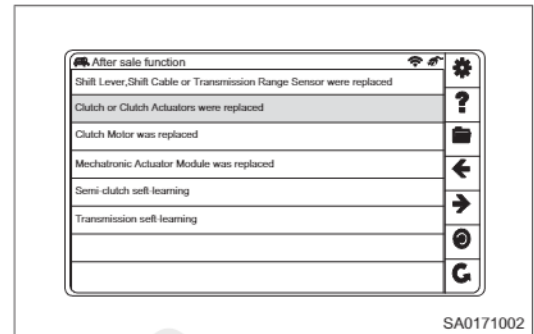
Caution:

Before performing self-learning, it is necessary to enter each module to check for malfunctions and perform troubleshooting.

1. Self-learning contents

Caution:

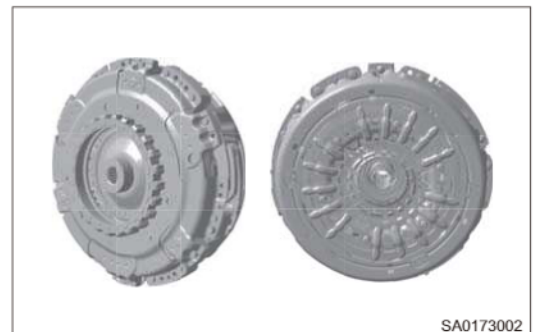
- There are repeated self-learning contents for semi-clutch, transmission and other items.



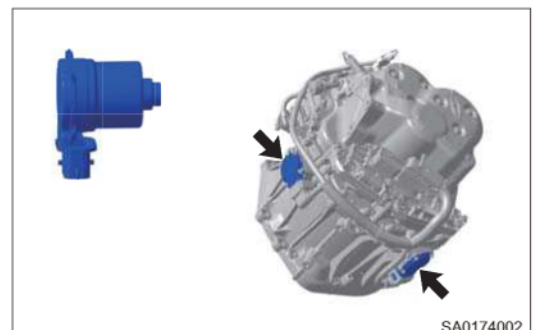
- (a) Replace/remove and install vehicle shift lever, shift cable or transmission range sensor.



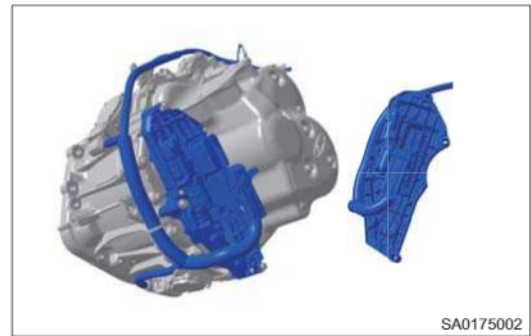
- (b) Replace/remove and install clutch or clutch actuator.



- (c) Replace/remove and install clutch motors (arrow).



- (d) Replace/remove and install Mechatronic Actuator Module (MAM).
- (e) Semi-clutch self-learning.
 - (1) Semi-clutch self-learning: It is mainly used for learning after replacing clutch related components or MAM, such as clutch, clutch actuator motor. If shift shock is felt, try to perform this menu.
- (f) Transmission self-learning.
 - (1) It is mainly used after replacing MAM. If abnormal shifting is felt, try to perform this menu.



Self-learning After Replacing Vehicle Shift Lever, Shift Cable or Transmission Range Sensor

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
 - After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
 - If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.
1. Click "Shift Lever, Shift Cable or Transmission Range Sensor were replaced" on diagnostic tester.
 2. Perform operations according to prompt on diagnostic tester, turn ENGINE START STOP switch to ON, apply parking brake, shift to P position and engine does not start.
 3. After above operations are completed, go to next step and click "Yes".
 4. Screen switches to "Please wait" and wait for about 2 seconds.
 5. After screen switches to "Transmission range sensor self-learning is being performed", wait for 2 seconds and go to next step.
 6. "Shift lever, shift cable or transmission range sensor were replaced successfully; IG OFF and Wait for at least 4 minutes" is prompted on diagnostic tester.

Caution:

- If "Transmission range sensor self-learning fails" is prompted on diagnostic tester, it is necessary to turn ENGINE START STOP switch to OFF and wait for 4 minutes or disconnect the negative battery cable once, then connect the negative battery cable, perform the procedures again from step 1.
 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
7. Click "OK".
 8. Perform operations according to prompts on diagnostic tester, turn ENGINE START STOP switch to OFF and disconnect power supply of battery and wait for 4 minutes, to make sure that data is stored into EEPROM.
 9. End

Self-learning After Replacing Clutch or Clutch Actuator

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
- After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
- If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.

1. Connect diagnostic tester and enter common Chery Automobile diagnostic screen.
2. Enter each module to check for malfunctions and perform troubleshooting.
3. Click "Clutch or Clutch Actuators were replaced" on diagnostic tester.
4. Perform operations according to prompt on diagnostic tester, turn ENGINE START STOP switch to ON, apply parking brake, shift to P position and engine does not start.
5. After above operations are completed, go to next step and click "Yes".
6. Screen switches to "Clutch is resetting" automatically and wait a moment.

Caution:

- If "Clutch XX EOL reset fails" is prompted, it indicates that this step fails, click OK and return to previous menu;
 - If "IG OFF and wait for 4 minutes or disconnect battery and perform procedures again from step 1" is prompted, it indicates that this step fails, perform operations according to prompt on diagnostic tester;
 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
7. After a successful response, screen switches to "It is performing clutch 1 stroke test, please wait..." automatically, please wait patiently.

Caution:

- If "Clutch 1 stroke test learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
8. After a successful response, screen switches to "It is performing clutch 2 stroke test" automatically, please wait patiently.

Caution:

- If "Clutch 2 stroke test learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
9. After a successful response, screen switches to "It is assembling clutch, please wait..." automatically, and wait for a moment.

Caution:

- If it fails, "Clutch assembly fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.



10. After a successful response, screen switches to "Engine start, always depress and hold brake pedal; to supply sufficient torque during idling, it is necessary to turn off A/C and other electrical, wait for 30 seconds until engine speed is stable, click OK and go to next step" automatically.

Caution:

- At this time, perform operations according to prompts on diagnostic tester, start vehicle and make sure vehicle idling speed is stable and wait for more than 30 seconds, then click "OK" and go to next step, otherwise "Learning fails" may be prompted.

11. Screen switches to "It is performing semi-clutch 1 self-learning, please wait..." automatically.

Caution:

- If self-learning fails, "Semi-clutch 1 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

12. After a successful response, screen switches to "It is performing semi-clutch 2 self-learning, please wait" automatically.

Caution:

- If self-learning fails, "Semi-clutch 2 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
- If failure is prompted in step 11 or 12, it may be caused by unstable idling.
- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

13. After a successful response, screen switches to "Always depress and hold brake pedal while depressing accelerator pedal fully, keep engine speed at more than 3500 rpm, click OK and go to next step" automatically.

- (a) At this time, always depress and hold brake pedal, keep engine speed at more than 3500 rpm for 2 seconds and then click "OK".

14. Screen switches to "It is performing clutch 1 preliminary adjustment, please wait..." automatically.

Caution:

- If "Clutch 1 preliminary adjustment learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

15. After a successful response, screen switches to "Always depress and hold brake pedal while depressing accelerator pedal fully, keep engine speed at more than 3500 rpm, click OK and go to next step" automatically.

Caution:

- At this time, always depress and hold brake pedal, keep engine speed at more than 3500 rpm for 2 seconds and then click "OK".

16. After a successful response, screen switches to "It is performing clutch 2 preliminary adjustment, please wait..." automatically.

Caution:

- If "Clutch 2 preliminary adjustment learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
- Note: If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

17. After a successful response, screen switches to "Replace clutch or clutch actuator successfully; IG OFF and wait for at least 4 minutes, click OK and go to next step" automatically.
Caution:
 - At this time, release accelerator pedal and brake pedal, IG OFF for at least 4 minutes, then click "OK".
18. Screen switches to "Turn ignition switch to ON" automatically.
Caution:
 - At this time, turn ignition switch to ON and click "OK".
19. Screen switches to "Clear DTCs successfully" automatically.
20. Screen switches to "Drive vehicle at a speed of more than 20 km/h for 3 minutes, then shut down power supply for at least 4 minutes" automatically.
Caution:
 - In this case, perform operations according to prompt on diagnostic tester.
21. After above operations are completed, click "OK".
22. Then disconnect negative battery cable, wait for at least 4 minutes to make sure that data is stored into EEPROM.
23. End.

Self-learning After Replacing Clutch Motor

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
 - After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
 - If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.
1. Connect diagnostic tester and enter common Chery Automobile diagnostic screen.
 2. Enter each module to check for malfunctions and perform troubleshooting.
 3. Click "Clutch Motor was replaced" on diagnostic tester.
 4. "IG ON, apply parking brake, shift to P and engine does not start" is promoted on diagnostic tester.

Caution:

- At this time, perform operations according to prompt on diagnostic tester, turn ENGINE START STOP switch to ON, apply parking brake, shift to P position and engine does not start.
5. After above operations are completed, go to next step and click "Yes".
 6. Screen switches to "Clutch is Resetting" automatically, wait for a moment and after a successful response
 - (a) If it fails, "Clutch XX EOL reset fails" is prompted on diagnostic tester. Return to previous menu after clicking OK, and perform operations according to prompt on diagnostic tester;
 - (b) If it fails, "IG OFF and wait for 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

Caution:

- Note: If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.



7. After a successful response, screen switches to "It is performing clutch 1 stroke test, please wait..." automatically.
 - (a) At this time, please wait patiently.
 - (b) If it fails, "Clutch 1 stroke test learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
8. After a successful response, screen switches to "It is performing clutch 2 stroke test, please wait..." automatically, please wait patiently.
 - (a) At this time, please wait patiently;
 - (b) If "Clutch 2 stroke test learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
9. After a successful response, screen switches to "It is assembling clutch, please wait..." automatically, please wait patiently at this time.
 - (a) If it fails, "Clutch assembly fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
10. After a successful response, screen switches to "Engine start, always depress and hold brake pedal; to supply sufficient torque during idling, it is necessary to turn off A/C and other electrical, wait for 30 seconds until engine speed is stable, click OK and go to next step" automatically.
 - (a) At this time, perform operations according to prompt on diagnostic tester.

Caution:

 - Make sure engine is stable and wait for more than 30 seconds, then click "OK" and go to next step.
 - If engine idling time is less than 30 seconds or idling is unstable, learning may be failed.
11. After above operations are completed, screen switches to "It is performing semi-clutch 1 self-learning, please wait..." automatically, please wait patiently at this time.
 - (a) If it fails, "Semi-clutch 1 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
12. After a successful response, screen switches to "It is performing semi-clutch 2 self-learning, please wait..." automatically.
 - (a) If it fails, "Semi-clutch 2 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

- (b) If it fails, "It is not allowed to perform clutch adaptation unsuccessfully" is prompted on diagnostic tester, click OK and return to previous menu;

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

13. After a successful response, screen switches to "It is performing clutch 1 position control, please wait..." automatically, please wait patiently.

- (a) If "Clutch 1 position control fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that learning fails, in this case, perform operations according to prompt on diagnostic tester;

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

14. After a successful response, screen switches to "It is performing clutch 2 position control, please wait..." automatically, please wait patiently.

- (a) If "Clutch 2 position control fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that learning fails, in this case, perform operations according to prompt on diagnostic tester;

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

15. After a successful response, screen switches to "Always depress and hold brake pedal while depressing accelerator pedal fully, keep engine speed at more than 3500 rpm, click OK and go to next step" automatically.

- (a) In this case, perform operations according to prompt on diagnostic tester, keep engine speed at more than 3500 rpm for 2 seconds, then click "OK".

16. Screen switches to "It is performing clutch 1 preliminary adjustment, please wait..." automatically.

- (a) If it fails, "Clutch 1 preliminary adjustment learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester;

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

17. After a successful response, screen switches to "Always depress and hold brake pedal while depressing accelerator pedal fully, keep engine speed at more than 3500 rpm, click OK and go to next step" automatically.

- (a) In this case, perform operations according to prompt on diagnostic tester, keep engine speed at more than 3500 rpm for 2 seconds, then click "OK".



18. Screen switches to "It is performing clutch 2 preliminary adjustment, please wait..." automatically, please wait at this time.
 - (a) If it fails, "Clutch 2 preliminary adjustment learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester;

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
19. After a successful response, wait for 200 ms, then go to next step. If it fails, "Clutch adaption is activated unsuccessfully" is promoted. Click OK and return to previous menu.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
20. After a successful response, screen switches to "Replace clutch motor successfully; IG OFF and wait for at least 4 minutes" automatically.
 - (a) At this time, release accelerator pedal, turn ENGINE START STOP switch to OFF and wait for 4 minutes, then click "OK".
21. Screen switches to "Turn ignition switch to ON" automatically, then click "OK".
22. Screen switches to "Clear DTCs successfully" automatically.
23. Screen switches to "Drive vehicle at a speed of more than 20 km/h for 3 minutes, then shut down power supply for at least 4 minutes" automatically. At this time, perform operations according to prompt on diagnostic tester.
24. After above operations are completed, click "Back".
25. Then disconnect negative battery cable, wait for at least 4 minutes to make sure that data is stored into EEPROM.
26. End

Self-learning After Replacing Mechatronic Actuator Module

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
 - After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
 - If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.
1. Click menu "Special operation → Mechatronic Actuator Module was replaced".
 2. "IG ON, apply parking brake, shift to P and engine does not start" is promoted on diagnostic tester.
 - (a) At this time, perform operations according to prompt, then click OK.

3. "Transmission range sensor self-learning is being performed, please wait..." is prompted on diagnostic tester.
 - (a) If "Transmission range sensor learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that learning fails, perform operations according to prompt on diagnostic tester;

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
4. "IG OFF and wait for at least 4 minutes, click OK and go to next step" is prompted on diagnostic tester.
 - (a) At this time, IG OFF for at least 4 minutes, then click OK.
5. "IG OFF and engine does not start, click OK and go to next step" is prompted on diagnostic tester.
 - (a) At this time, perform operations according to prompt on diagnostic tester.
6. "Transmission self-learning is being performed, please wait..." is prompted on diagnostic tester.
 - (a) If "Transmission self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
 - (b) If it fails, "Friction coefficient of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (c) If it fails, "Friction coefficient of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (d) If it fails, "Shape coefficient of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (e) If it fails, "Shape coefficient of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (f) If it fails, "Load curve adaptive value in disengagement direction of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (g) If it fails, "Load curve adaptive value in disengagement direction of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (h) If it fails, "Load curve adaptive value in engagement direction of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (i) If it fails, "Load curve adaptive value in engagement direction of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (j) If it fails, "Position hysteresis adaptive value of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (k) If it fails, "Position hysteresis adaptive value of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (l) If it fails, "Position hysteresis adaptive value (absolute) of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (m) If it fails, "Position hysteresis adaptive value (absolute) of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu;
 - (n) If it fails, "Warning flag bit of clutch 1 is reset unsuccessfully" is prompted. Click OK and return to previous menu.
 - (o) If it fails, "Warning flag bit of clutch 2 is reset unsuccessfully" is prompted. Click OK and return to previous menu.



- (p) If it fails, "Completion flag bit of clutch 1 EOL is reset unsuccessfully" is prompted on diagnostic tester. Click OK and return to previous menu.
- (q) If it fails, "Completion flag bit of clutch 2 EOL is reset unsuccessfully" is prompted on diagnostic tester. Click OK and return to previous menu.

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

7. "It is performing clutch 1 stroke test, please wait..." is prompted on diagnostic tester.

- (a) If "Clutch 1 stroke test fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that it fails, in this case, perform operations according to prompt on diagnostic tester.

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

8. After a successful response, screen switches to "It is performing clutch 2 stroke test, please wait..." automatically.

- (a) If "Clutch 2 stroke test fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that it fails, in this case, perform operations according to prompt on diagnostic tester.

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

9. After a successful response, screen switches to "Engine start, always depress and hold brake pedal; to supply sufficient torque during idling, it is necessary to turn off A/C and other electrical, wait for 30 seconds until engine speed is stable, click OK and go to next step" automatically.

- (a) At this time, perform operations according to prompts on diagnostic tester, and pay attention that make sure engine is stable and wait for more than 30 seconds, then click "OK" and go to next step.

Caution:

- If engine idling time is less than 30 seconds or idling is unstable, learning may be failed.

10. Screen switches to "It is performing semi-clutch 1 self-learning, please wait..." automatically.

- (a) If it fails, "Semi-clutch 1 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester;

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.

11. After response is successful, "It is performing semi-clutch 2 self-learning, please wait" is prompted on diagnostic tester.

- (a) If "Semi-clutch 2 self-learning is completed" is prompted on diagnostic tester, go to next step automatically.

- (b) If "Semi-clutch 2 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, it indicates that this step fails, in this case, perform operations according to prompt on diagnostic tester.

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
12. After a successful response, "Replace mechatronic actuator module successfully, IG OFF and wait for at least 4 minutes, click OK and go to next step" is promoted on diagnostic tester.
 - (a) At this time, IG OFF for at least 4 minutes, then click OK and go to next step.
 13. "Turn ignition switch to ON, click OK and go to next step" is prompted on diagnostic tester, perform operations according to prompt on diagnostic tester.
 14. "Clear DTCs successfully" is promoted on diagnostic tester.
 15. "Drive vehicle at a speed of more than 20 km/h for 3 minutes, then shut down power supply for at least 4 minutes" is prompted on diagnostic tester.
 - (a) At this time, Drive vehicle as specified, IG OFF for at least 4 minutes to make sure that power supply of TCU is shut down completely, then return to previous menu.
 16. End

Semi-clutch Self-learning

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
 - After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
 - If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.
1. Click menu "Special operation → Semi-clutch self-learning".
 2. "IG ON, apply parking brake, shift to P and engine does not start" is prompted on diagnostic tester.
 3. "Apply parking brake, engine starts, depress and hold brake pedal and if semi-clutch 1 self-learning is performed" is prompted on diagnostic tester.
 - (a) At this time, start engine and always depress and hold brake pedal; to supply sufficient torque during idling, it is necessary to turn off A/C and other electrical, wait for 30 seconds until engine speed is stable (if engine idling time is less than 30 seconds or idling is unstable, learning may be failed).
 - (b) At this time, if Yes is selected, semi-clutch 1 self-learning will be performed, if No is selected, it is prompted that if semi-clutch 2 self-learning will be performed (step 5).
 4. "It is performing semi-clutch 1 self-learning, please wait..." is promoted on diagnostic tester.
 - (a) If this step fails, "Semi-clutch 1 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester.

Caution:

- If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.



5. "If semi-clutch 2 self-learning is performed" is prompted on diagnostic tester.
 - (a) If Yes is selected, "It is performing semi-clutch 2 self-learning, please wait..." will be prompted on diagnostic tester.
 - (b) If No is selected, semi-clutch 2 self-learning will not be performed.
 - (c) If this step fails, "Semi-clutch 2 self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester.

Caution:

 - If it is not successful for the first time, refer to "Special Operation Precaution" and try several more times. If it is still not successful after several attempts, please contact Chery after-sales service department, diagnostic engineer will collect data during self-learning and send it to supplier to determine causes.
6. If "No" is selected in step 3 through step 5, diagnostic tester will exit this menu.
7. "Semi-clutch self-learning is successful, IG OFF for at least 4 minutes" is promoted on diagnostic tester.
 - (a) After operations are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.

Transmission Self-learning

Caution:

- Make sure that all vehicle systems (such as EMS/ESP) operate normally, there is no malfunction, power supply is within normal operating range (generally not less than 12 V) and four doors are closed, then perform special operation menu.
 - After all self-learning operations for component replacement are completed, it is necessary to clear DTCs, drive vehicle at a speed of more than 20 kph for 3 minutes to complete clutch characteristic curve learning, then shut down the power supply (turn ENGINE START STOP switch to OFF) for at least 4 minutes, to make sure that power supply of TCU can be shut down completely and data can be stored into EEPROM.
 - If engine idling is needed during self-learning, it is necessary to make sure speed is stable, otherwise, self-learning will not be successful.
1. Click menu "Special operation → Transmission self-learning".
 2. "IG ON, apply parking brake, shift to P and engine does not start" is prompted on diagnostic tester, in this case, perform operations according to prompt on diagnostic tester.
 3. "Transmission self-learning is being performed, please wait..." is prompted on diagnostic tester.
 - (a) If learning fails, "Transmission self-learning fails, IG OFF and wait for at least 4 minutes or disconnect battery and perform procedures again from step 1" is prompted on diagnostic tester.
 4. "Transmission self-learning is successful, IG OFF for at least 4 minutes" is prompted on diagnostic tester; in this case, perform operations according to prompt on diagnostic tester.
 5. After above operations are completed, click "Back" to exit menu.

On-vehicle Inspection

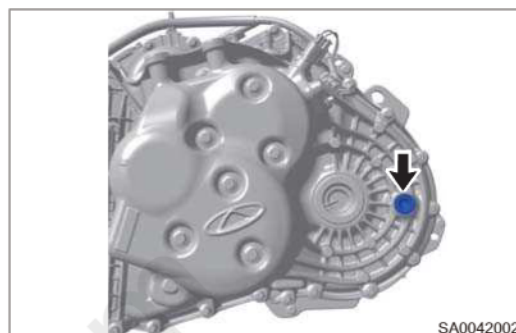
Transmission Oil Level Inspection

1. Raise vehicle with a lift.

Hint:

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing or inspecting the lifted vehicle.

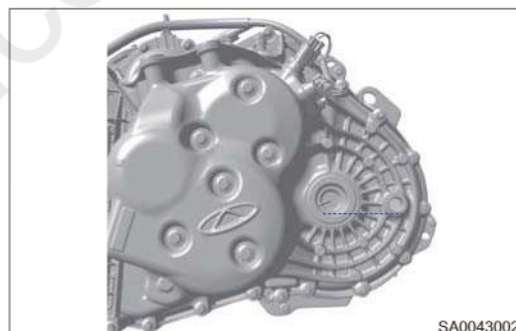
2. Remove transmission filler plug (arrow) and bolt washer.



3. Oil level should be flush with bottom edge of filler plug. Use this standard to adjust transmission oil amount.

Transmission oil type:

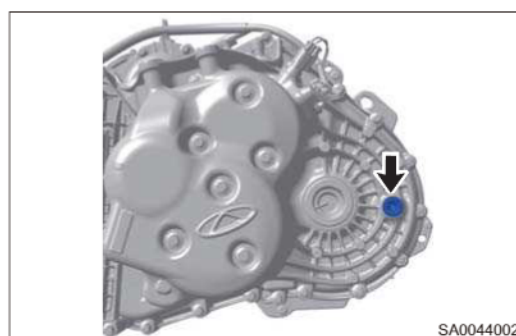
BOT350 M3



4. If oil level is too low, check for oil leakage.
5. Reinstall the filler plug (arrow).

Tightening torque

39 ~ 47 N·m



Caution:

An excessively large or small amount of oil may affect proper functioning of transmission. After filling oil, run vehicle and then check oil level.

ON-VEHICLE SERVICE

Transmission Oil Replacement

Drain the transmission oil

Warning / Caution / Hint:

Caution:

- Transmission oil is maintenance-free for lifetime (if it is not short of transmission oil or deteriorated, it is not necessary to add/replace), if vehicle is submerged in water, it is necessary to check oil for deterioration or replace oil.
 - Replace transmission oil only when engine stops and transmission cools down.
1. Turn off all electrical equipment and ENGINE START STOP switch.
 2. Raise vehicle to a proper height.
 3. Place a recovering container under transmission drain hole.
 4. Remove transmission drain plug (arrow) with a tool and drain transmission oil.



Caution:

- Drained transmission oil should be collected with a recovering container.
5. Install drain plug with a tool.

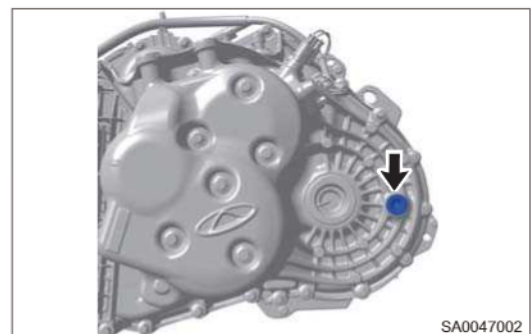
Tightening torque

48 ~ 56 N·m

Transmission Oil Filling

1. Make sure that transmission drain plug has been tightened in place.
2. Remove transmission filler plug (arrow) with a tool.

18



3. Oil level should be flush with bottom edge of filler plug. Use this standard to adjust transmission oil amount.

Transmission Oil Type	Standard Capacity
BOT350 M3	1.2 L

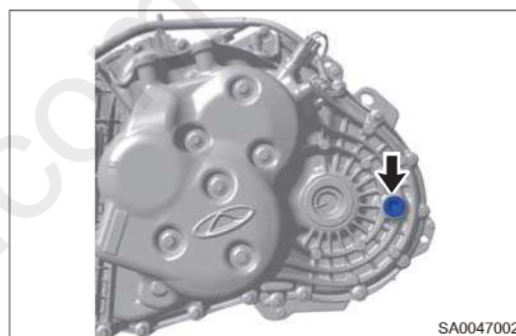


Caution:

- An excessively large or small amount of oil may affect proper functioning of transmission.
 - After filling oil, run vehicle and then check oil level.
4. After filling oil, tighten limit/filler plug (arrow) with a special tool.

Tightening torque

48 ~ 56 N·m



Automatic Shift Cable Assembly

Removal

Warning / Caution / Hint:

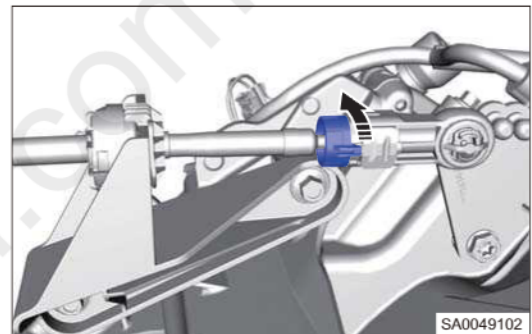
- When removing automatic shift cable, make sure shift control mechanism and transmission shift arm are in P position.
- Perform self-learning again after replacing shift cable.

1. Disconnect the negative battery cable.
2. Remove the air filter assembly (See page 10-8).
3. Remove the battery assembly (See page 16-12).
4. Remove the battery tray (See page 16-15).
5. Remove the auxiliary fascia console. (See page 47-7).
6. Remove select and shift cable from transmission.

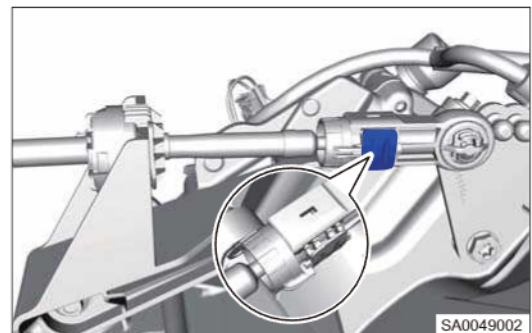
Warning:

- When removing select and shift cable from transmission, make sure shift control mechanism and transmission shift arm are in P position.

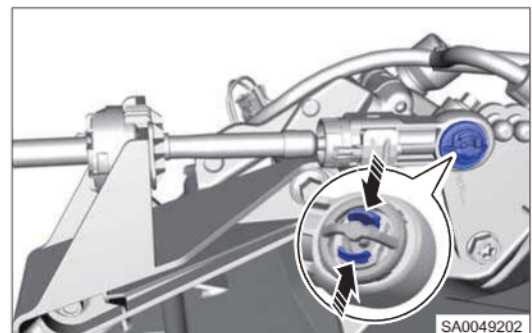
- (a) Unscrew locking knob from lock slider on adjustable joint counterclockwise.



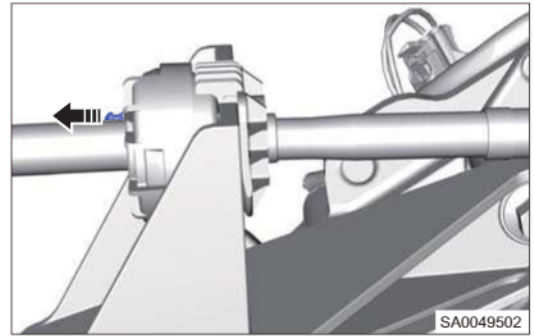
- (b) Pry off lock slider on adjustable joint with a tool, and make joint in adjustable state.



- (c) Press bowel in direction of arrow to separate shift cable joint and transmission shift arm.

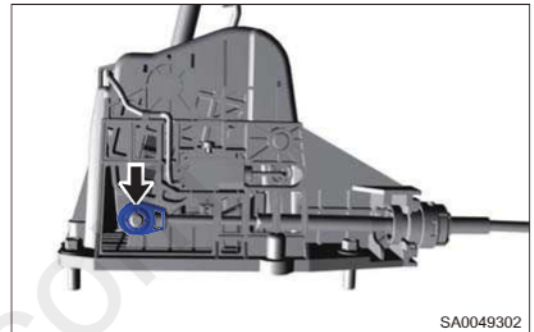


- (d) Pull dowel pin (arrow) on cable damper and remove cable damper from shift arm.

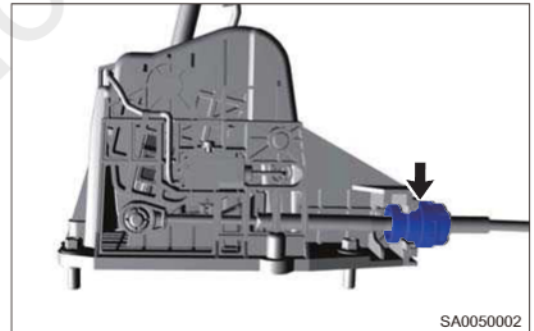


7. Remove select and shift cable from shift control mechanism.

- (a) Remove and separate shift cable joint (arrow) from shift control mechanism.



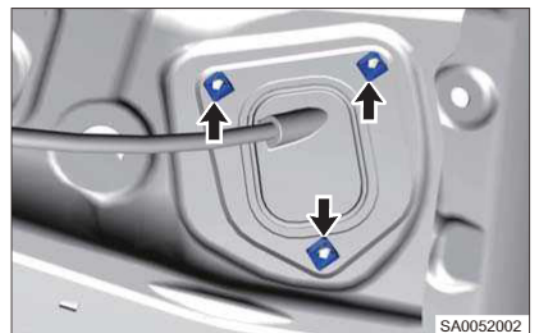
- (b) Detach shift cable damper from slot (arrow) of shift control mechanism, and separate cable joint and control mechanism.



8. Remove coupling bolts (arrow) between shift cable and body.

Tightening torque

$9 \pm 1.5 \text{ N}\cdot\text{m}$



9. Remove the shift cable assembly.

Installation

Warning / Caution / Hint:

- When installing automatic shift cable, make sure shift control mechanism and transmission shift arm are in P position.
 - Perform self-learning after replacing shift cable.
1. Installation is in the reverse order of removal.

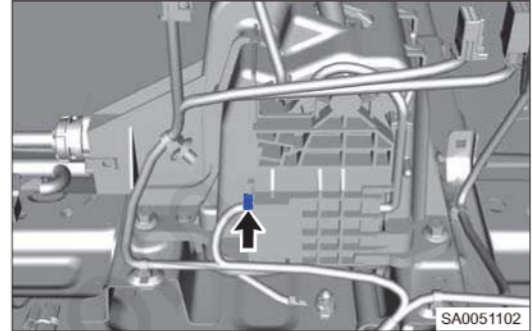


Automatic Shift Control Mechanism

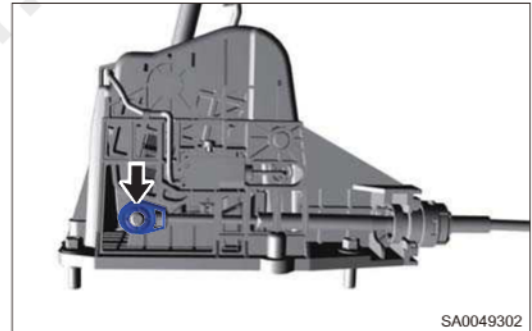
Removal

Warning / Caution / Hint:

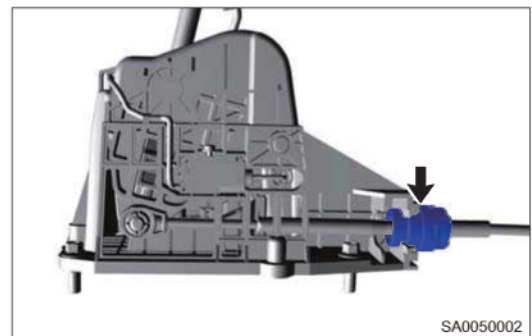
- When removing automatic shift cable from shift control mechanism, make sure shift control mechanism and transmission shift arm are in P position.
 - Perform self-learning after replacing shift control mechanism.
1. Disconnect the negative battery cable.
 2. Remove the auxiliary fascia console (See page 47-7).
 3. Unplug the automatic shift control mechanism wire harness connector (arrow).



4. Detach wire harness from shift control mechanism with clip remover.
5. Remove select and shift cable from shift control mechanism.
 - (a) Remove and separate shift cable joint (arrow) from shift control mechanism.



- (b) Detach shift cable damper from slot (arrow) of shift control mechanism, and separate cable joint and control mechanism.



6. Remove the automatic shift control mechanism.
 - (a) Remove 4 fixing bolts between automatic shift control mechanism and body, then remove shift control mechanism.

Tightening torque

$20 \pm 3 \text{ N}\cdot\text{m}$

**Installation****Warning / Caution / Hint:**

- When installing automatic shift cable to shift control mechanism, make sure shift control mechanism and transmission shift arm are in P position.
 - Perform self-learning after replacing shift control mechanism.
1. Installation is in the reverse order of removal.

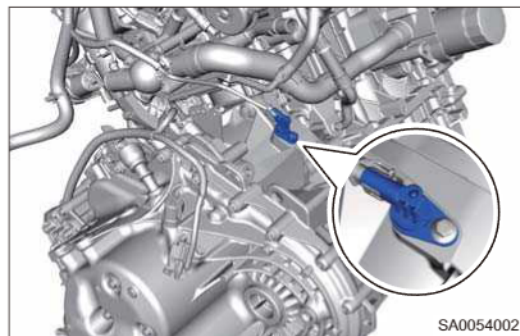
Transmission Assembly

Removal

Warning / Caution / Hint:

Caution:

- Special station equipment must be used to load transmission or hang transmission with lifting eyes during transportation and transfer.
 - Never tread, forcibly tap and drop the transmission, gently handle transmission during transportation and never contact with surface connected engine, it can be transported only after damage is repaired by professional.
 - Transmission should be stored in special station equipment in a dry, well ventilated place, never expose it to sun and rain, and cover it with dust cover if storage period is more than 1 month.
 - Never allow non-professional to pull select and shift mechanism from transmission delivery to assembly with engine. Never allow non-professional to remove any assembly component.
1. Turn off all electrical equipment and ENGINE START STOP switch.
 2. Disconnect the negative battery cable.
 3. Remove the battery ([See page 16-12](#)).
 4. Remove the battery tray ([See page 16-15](#)).
 5. Remove the air filter assembly ([See page 10-8](#)).
 6. Remove starter assembly ([See page 15-9](#)).
 7. Drain the transmission oil ([See page 18-144](#)).
 8. Remove front tire ([See page 24-8](#)).
 9. Remove the drive shaft ([See page 20-5](#)).
 10. Disconnect connection between shift cable and transmission shift arm.
 11. Disconnect connector between interior wire harness and transmission module.
 12. Remove the crankshaft position sensor.



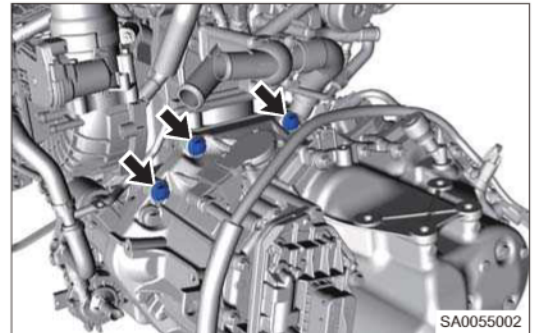
(a) Remove fixing bolt and crankshaft position sensor.

13. Remove flexible shaft bracket with a tool.
14. Use an engine equalizer to hang the engine.

15. Remove 3 coupling bolts (arrow) from upper part of transmission.

Tightening torque

$90 \pm 9 \text{ N}\cdot\text{m}$

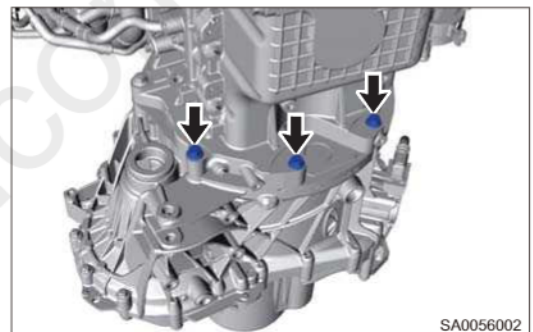


16. Remove the left mounting (See page 07-59).
 17. Remove the right mounting (See page 07-61).
 18. Remove the rear mounting.
 (a) Raise vehicle and support transmission assembly with a transmission carrier.
 (b) Remove fixing bolt and rear mounting.
 19. Remove the transmission assembly.

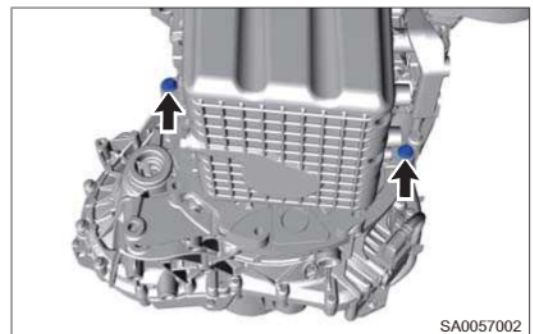
- (a) Remove 3 coupling bolts (arrow) from lower part of transmission.

Tightening torque

$50 \pm 5 \text{ N}\cdot\text{m}$



- (b) Remove 2 coupling bolts (arrow) on both sides of transmission.



- (c) Pull transmission and separate it from engine.

Tightening torque

$60 \pm 5 \text{ N}\cdot\text{m}$

Installation

1. Installation is in the reverse order of removal.

Caution:

- After installation, add transmission oil and check transmission oil level.

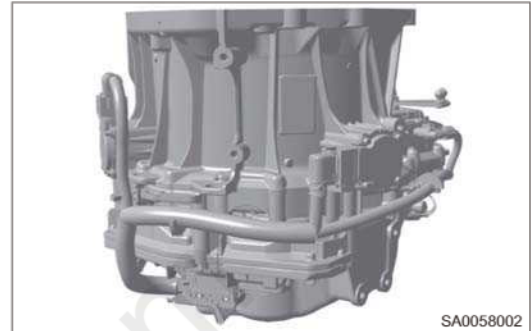
2. Perform self-learning after installing transmission assembly.

Dual-clutch Assembly

Removal

Warning / Caution / Hint:

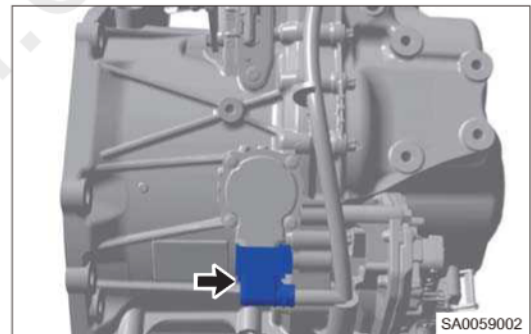
- Perform self-learning after replacing dual-clutch assembly.
- 1. Turn off all electrical equipment and ENGINE START STOP switch.
- 2. Disconnect the negative battery cable.
- 3. Remove transmission from vehicle, put it in a safe location, and install special tool.



Warning:

This step needs another person to assist.

4. Remove the upper clutch actuator motor.
 - (a) Disconnect the upper clutch actuator motor wire harness connector (arrow).



- (b) Clean area around control module with appropriate detergent and dry this area with compressed air.

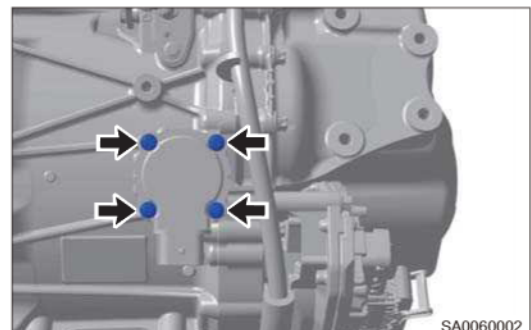
Caution:

- When using compressed air, wear protective glasses.

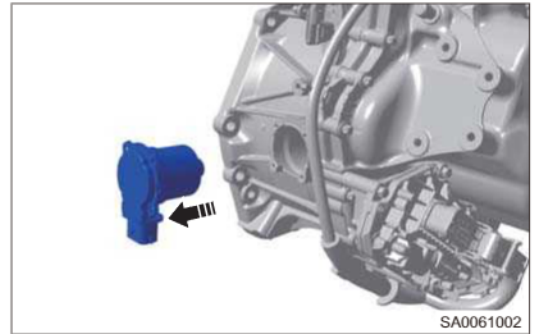
- (c) Remove 4 fixing bolts (arrow) from upper clutch actuator motor.

Caution:

- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.

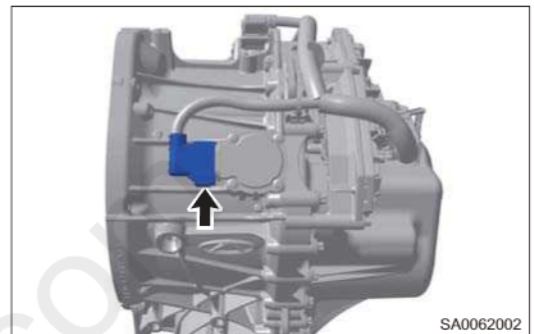


- (d) Remove motor in direction of arrow and mark it to make sure that motor can be installed to original position while keeping transmission free from dirt.



5. Remove the lower clutch actuator motor (arrow).

- (a) Disconnect the lower clutch actuator motor wire harness connector (arrow).



- (b) Clean area around control module with appropriate detergent and dry this area with compressed air.

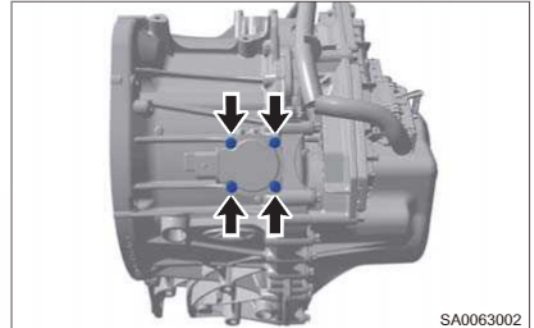
Caution:

- When using compressed air, wear protective glasses.

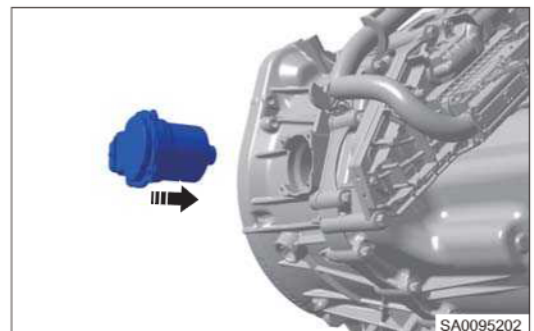
- (c) Remove 4 fixing bolts (arrow) from lower clutch actuator motor.

Caution:

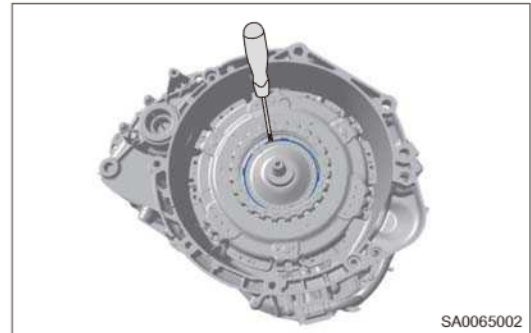
- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.



- (d) Remove motor in direction of arrow and mark it to make sure that motor can be installed to original position while keeping transmission free from dirt.



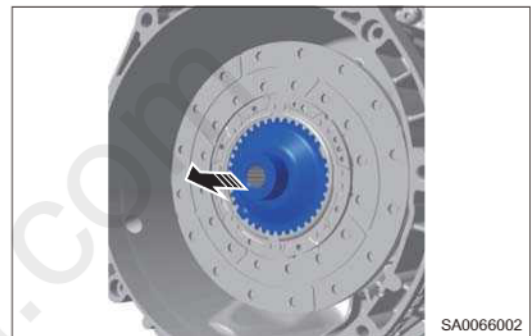
6. Using a screwdriver, pry out outer snap ring, and dispose it, it cannot be reused.



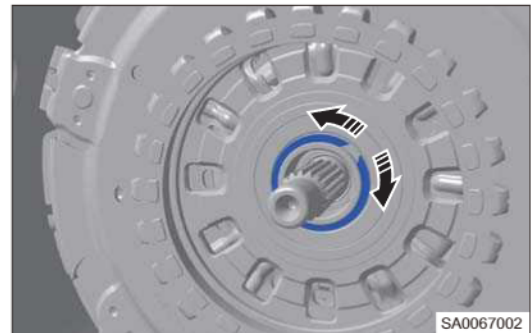
Caution:

- Snap ring is a non-reusable component, and replace it after removal.

7. Move away gear plate from inner input shaft (solid shaft) in direction of arrow.



8. Using snap ring pliers, remove outer snap ring in direction of arrow.

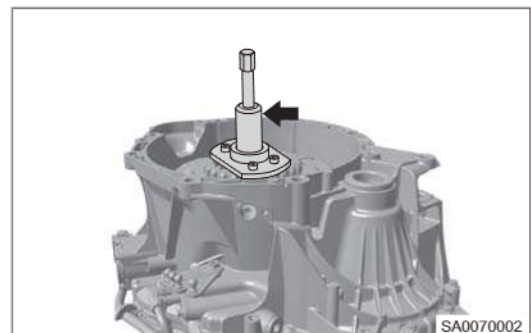


18

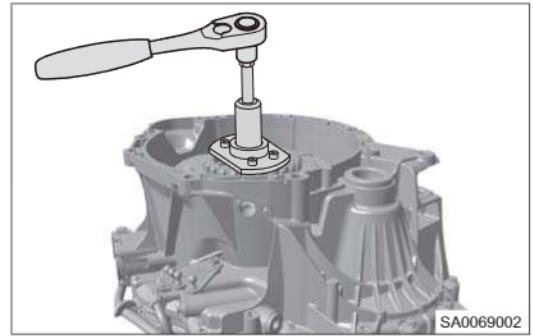
Caution:

- Snap ring is a non-reusable component, and replace it after removal.

9. Install a special tool.
 - (a) Install and lock the dual-clutch remover.



- (b) Use a tool to tighten special tool head bolt until clutch is detached.



10. Remove clutch and move away tool.

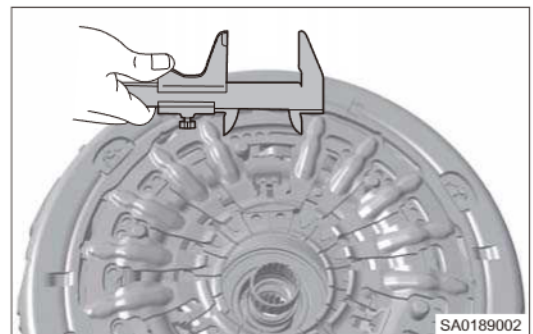


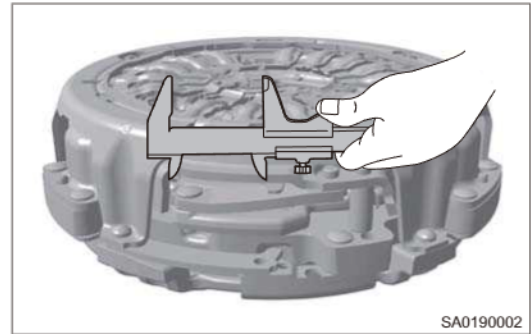
- Be careful not to damage support bearing grommet of dual-clutch during removal. If grommet is damaged, use function of transmission will be affected, or that will shorten usable life of grommet.
- DO NOT use more than 5 KN of torque during removal. Failure to do so will cause clutch support bearing or its race to be damaged.
- Be sure to fit dual-clutch to center plate properly, otherwise it will cause damage to support bearing, or bearing oil seal is pushed out.
- For operation of dual-clutch: Never impact or drop it, and never position head of dual-clutch facing downward, that is, transmission end faces downward, otherwise clutch adjustment diaphragm will be bent.

Assembly tolerance
0.3°

Clutch Disc Wear Detection

1. When measuring, first reset and lock clutch, measure the distance between clutch 1 round opening and spring and the distance between clutch 2 adjustment ring and case as shown in illustration; For different types of clutch, wear limits are different, DMF clutch: 27 mm for clutch 1 and 21 mm for clutch 2.

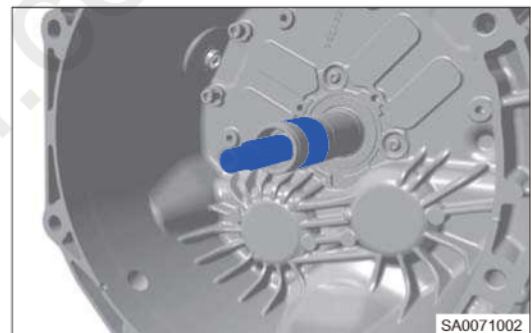




Installation

Warning / Caution / Hint:

- For new dual-clutch assembly, it is not necessary to reset again and it can be directly installed to transmission, then perform clutch actuator disengagement procedures.
 - Disengage clutch actuator and never rotate special tool more than 12 turns, or clutch actuator lever will be damaged.
 - When clutch transport lock is released, a sound may be heard.
1. Clean spline part of inner and outer input shaft, guide bearing race and outer input shaft bearing race with proper cleaner.



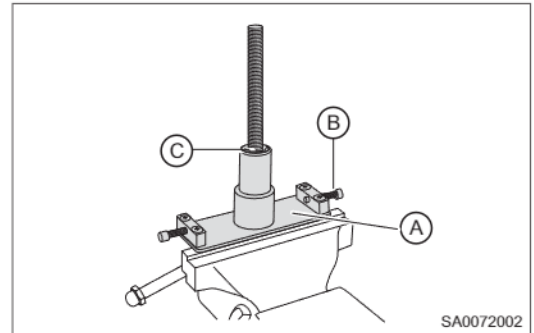
Hint:

- Instruction for lubrication: Lubricate hollow shaft (outer input shaft) bearing race with a small amount of transmission oil. Apply appropriate grease to spline part of inner and outer input shaft. Use small oil brush to apply grease evenly to each spline part and area around it. Do not fill in spline groove with grease. If excessive amount of grease is found, remove it immediately.
- Automatic adjustment mechanical part of both clutches will be released to no reset state during removal of dual-clutch. Therefore, automatic adjustment mechanical part should be reset to correct position before installing clutch.

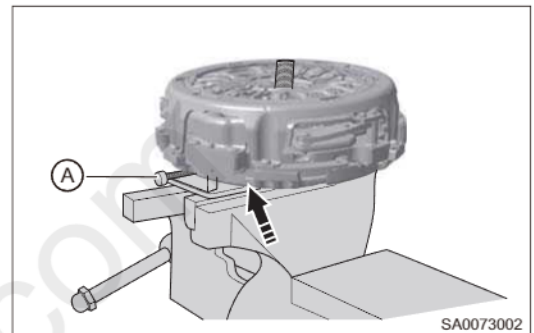
Caution:

- Following steps are only for assembling clutch which has been used. If installing a new clutch, it will have otherwise stated.

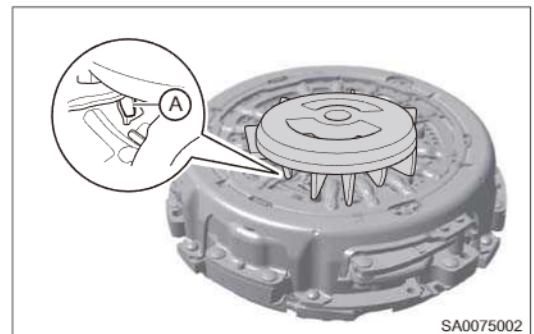
2. Hold clutch support device with a vise.
 - (a) Install support rod (C) bracket (A). Do not tighten it fully in this step.
 - (b) Install clutch gear holding tool (B). Do not tighten it fully in this step.
 - (c) Tighten 4 fixing bolts.



3. Install clutch assembly to support device.
 - (a) Push clutch gear holding tool (A) inward to lock clutch (arrow).

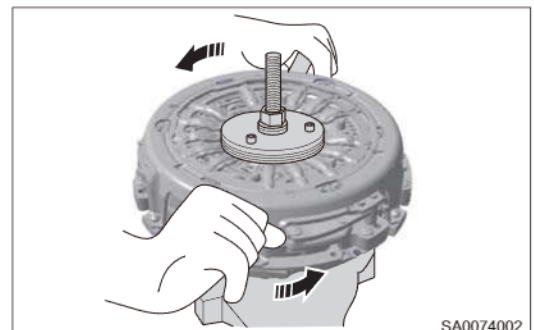


- (b) Tighten 4 fixing bolts.
 - (c) Install clutch assembly to support device.
4. Make sure clutch 2 reset tool is installed to correct position (A).

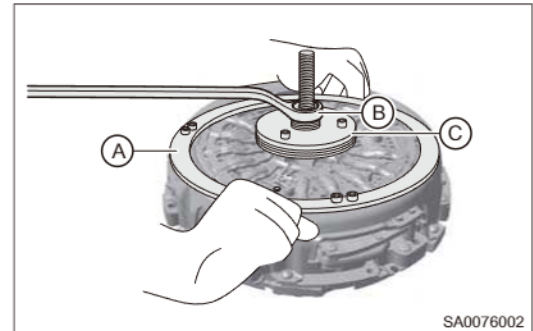


5. Install dual-clutch 2 reset tool as shown in illustration.

- (a) Install the adjustment ring installer.
- (b) Install the holding tool.
- (c) Install threaded rod, nut and bearing.
- (d) Do not tighten in this step.



6. Rotate clutch 1 reset tool (A) counterclockwise for a small angle until it contacts with adjustment ring stopper module.



Hint:

- Do not apply excessive force.
- Sound from interior can be heard during rotation.

- (a) Keep clutch adjustment ring installer (A) at adjustment ring stopper module position.

Caution:

- Confirm that adjustment ring is in reset state before tightening nut.
- (b) Tighten nut (B) to squeeze lock tool (C), until 12 lock claws of both clutches are completely engaged and locked.

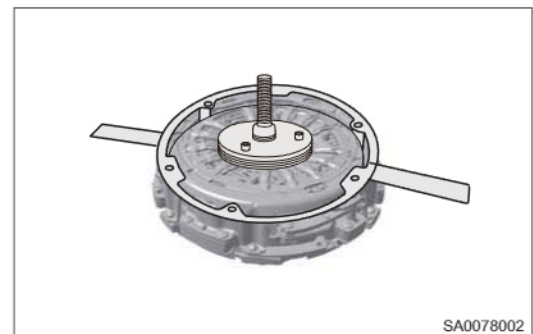
Hint:

- Do not apply excessive force.
- When all clutch lock claws are at correct position, stop to tighten nut.
- Never overtighten the nut.
- When all lock claws are at correct position, clear sound can be heard.

7. Positions (A) shown in illustration are 4 of all lock claws, make sure that all the 12 lock claws are locked.



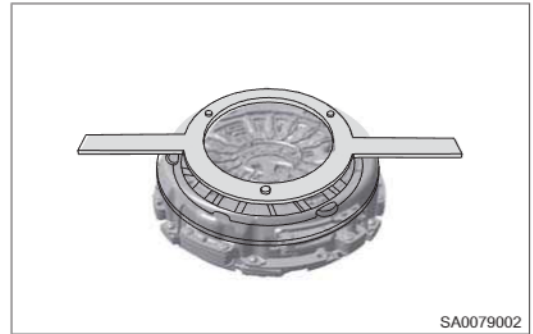
8. Remove nut and bearing. Remove lock tool and clutch 1 reset tool.



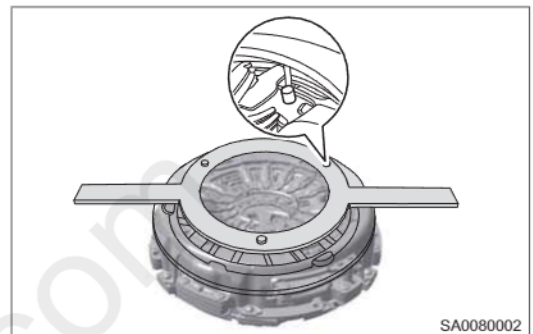
Hint:

- When removing nut, bearing and lock tool, there will be a sound.

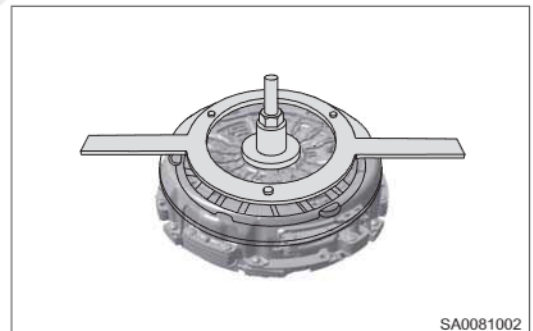
9. Install clutch 1 reset tool as shown in illustration.



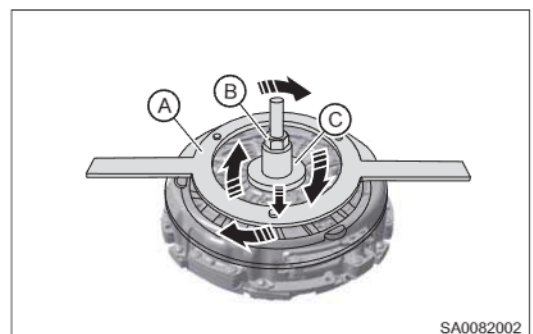
10. Make sure that 3 pin heads of adjustment ring reset tool are inserted to correct position.



11. Install clutch 1 actuator motor pressure plate, and install bearing and nut. Do not tighten nut in this step.



12. Rotate clutch adjustment ring installer (A) counterclockwise for a small angle until it contacts with adjustment ring stopper module.



Hint:

- Do not apply excessive force.
 - Sound from interior can be heard during rotation.
- (a) Keep clutch adjustment ring installer (A) at adjustment ring stopper module position.

Caution:

- This step needs another person to assist.

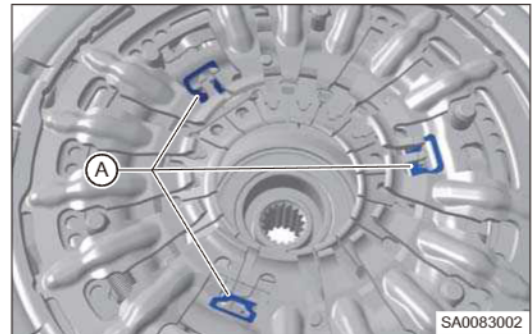


- (b) Tighten nut (B) to squeeze clutch pressure plate (C) and clutch claws, until 3 transport locks can be locked manually.

Hint:

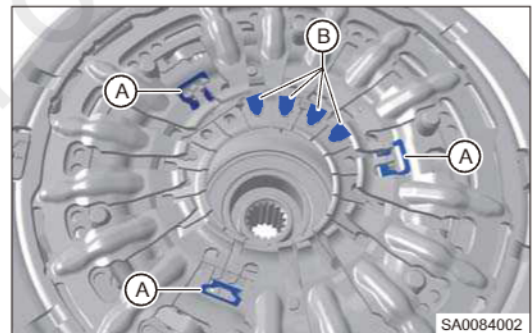
- Do not apply excessive force.
- When all clutch lock claws are at correct position, stop to tighten nut.
- Never overtighten the nut.

13. Make sure that all clutch transport locks (A) are locked. When all hooks are hooked, loosen nut, there will be a sound when removing nut, bearing and clutch pressure plate.

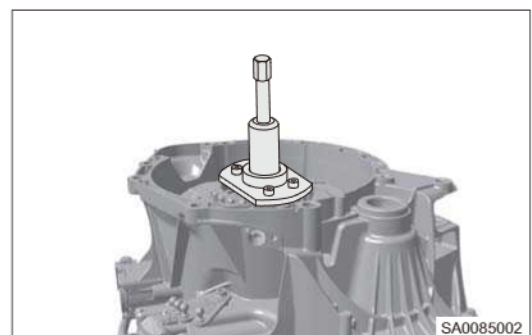


14. Remove all other tools (including clutch).

15. Visually check to make sure that transport locks of clutch 1 actuator motors (A) and clutch 2 actuator motors (B) are locked.



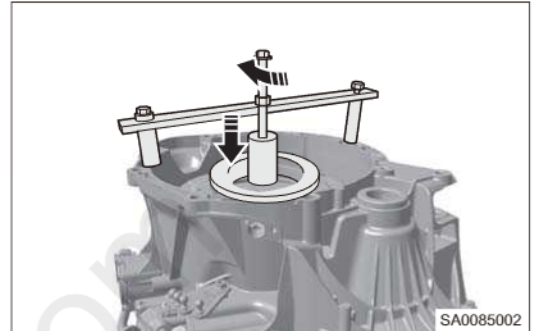
16. Install clutch to its original position, use special tool as auxiliary tool to raise clutch.



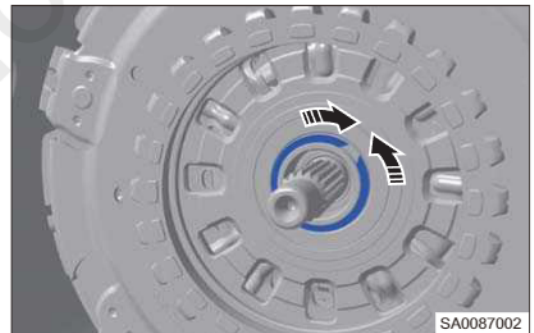
Caution:

- DO NOT damage spline of outer input shaft.
- Be careful not to damage support bearing grommet of dual-clutch during removal. If grommet is damaged, use function of transmission will be affected, or that will shorten usable life of grommet.
- For operation of dual-clutch: Never impact or drop it, and never position head of dual-clutch facing downward, that is, transmission end faces downward, otherwise clutch adjustment diaphragm will be bent.

17. Using a special tool, install clutch, make sure that clutch set is in correct position (direction of arrow), and do not apply excessive force.



18. Using snap ring pliers, install outer snap ring in direction of arrow.

**Caution:**

- DO NOT reuse old snap ring, please use a new one.
- Make sure that snap ring is installed correctly to snap ring groove of outer input shaft, and is locked.

19. Install drive pinion to inner input shaft (solid shaft), and make sure that V groove is in correct position (arrow).



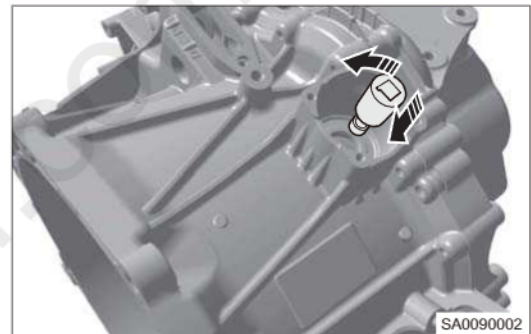
20. Install the outer snap ring.



Caution:

- DO NOT reuse old snap ring, please use a new one.
- Make sure that snap ring is installed correctly to snap ring groove of outer input shaft, and is locked.

21. Using a special tool, release clutch transport lock function of upper clutch actuator by turning counterclockwise.



(a) Use the same procedure for lower clutch actuator.

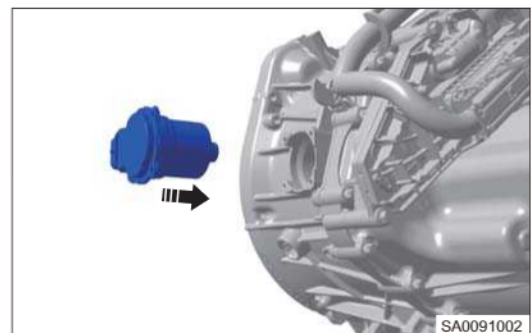
Hint:

- Clutch set is after-sales service part, which contains diaphragm spring with transport lock function during transportation. Lock must be released in this step.

Caution:

- Never rotate special tool more than 12 turns, or clutch actuator lever will be damaged.
- When clutch transport lock is released, a sound may be heard.

18 22. Install upper motor in direction of arrow and apply a smaller force.



Caution:

- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.

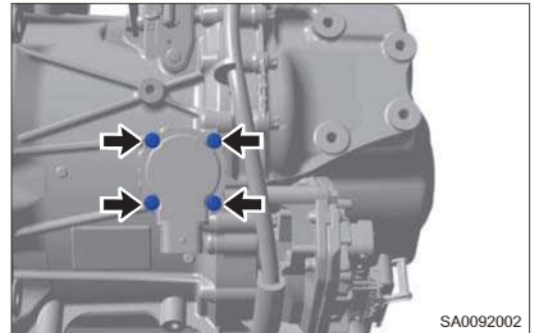
23. Install 4 fixing bolts (arrow) to upper clutch actuator.

Tightening torque

6 N·m

Caution:

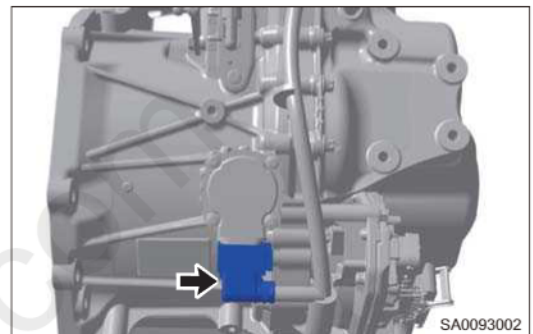
- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.



24. Connect the clutch actuator motor wire harness connector (arrow).

Caution:

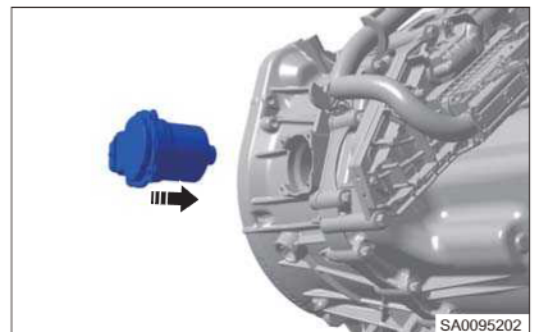
- Connect wire harness connector safely. If connector has self-locking device, make sure that a click sound is heard. Otherwise, there may be error function in transmission.



25. Install the lower clutch actuator motor.

Caution:

- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.



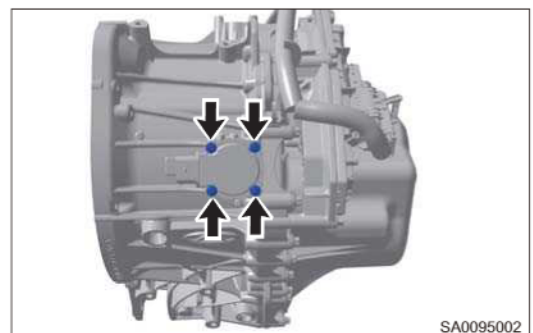
26. Install 4 fixing bolts (arrow) to lower clutch actuator.

Tightening torque

6 N·m

Caution:

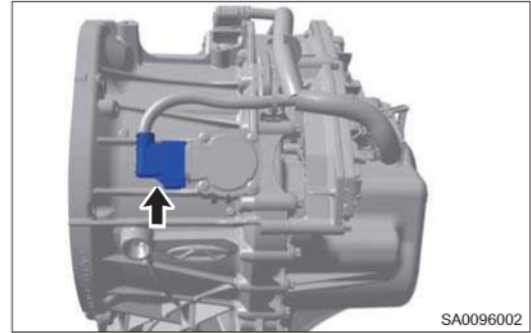
- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.



27. Connect the lower clutch actuator motor wire harness connector (arrow).

Caution:

- Connect wire harness connector safely. If connector has self-locking device, make sure that a click sound is heard. Otherwise, there may be error function in transmission.

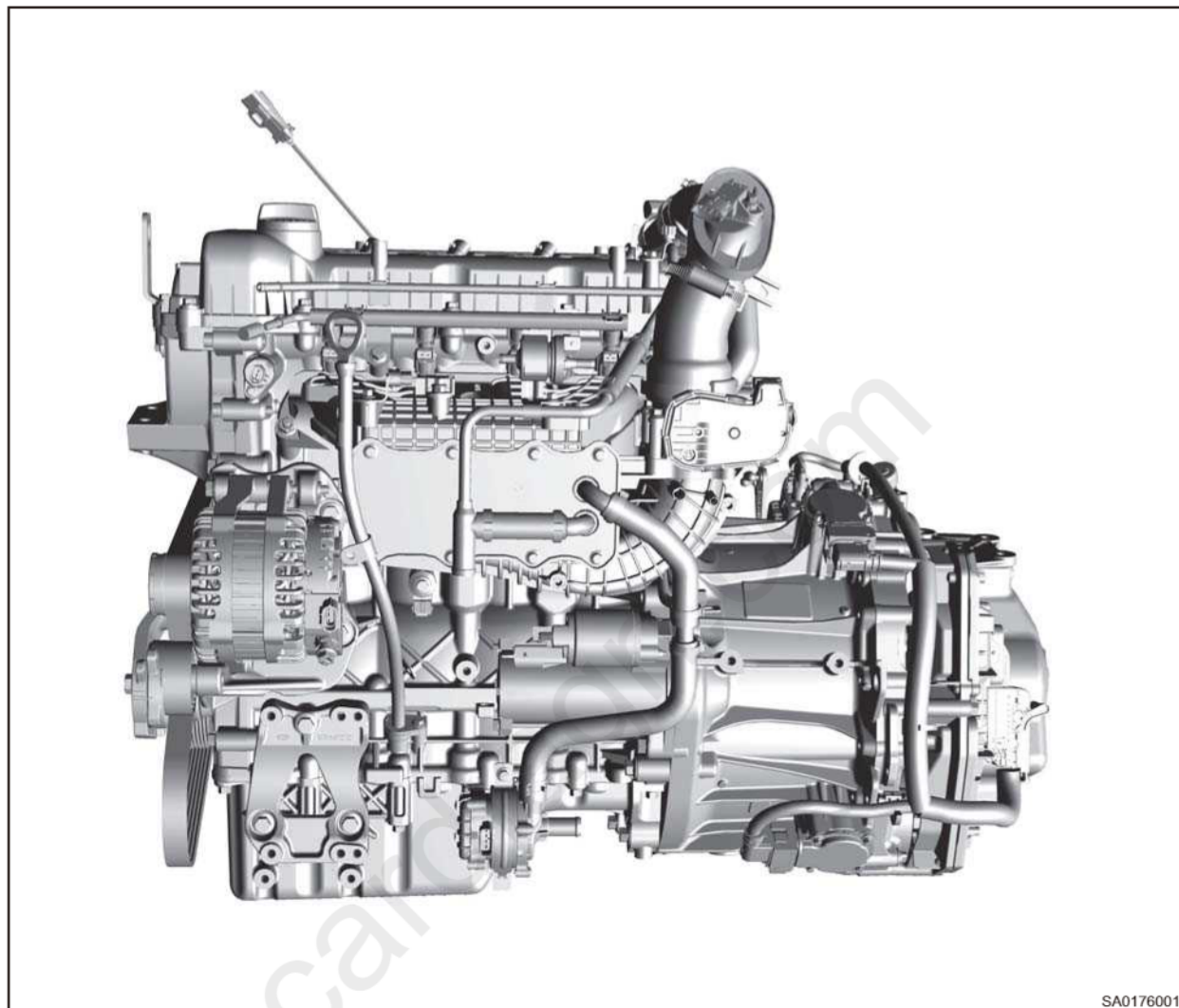


28. Remove special tool, replacement of dual-clutch is completed.
29. Perform self-learning after installing dual-clutch (refer to "Self-learning after Component Replacement").

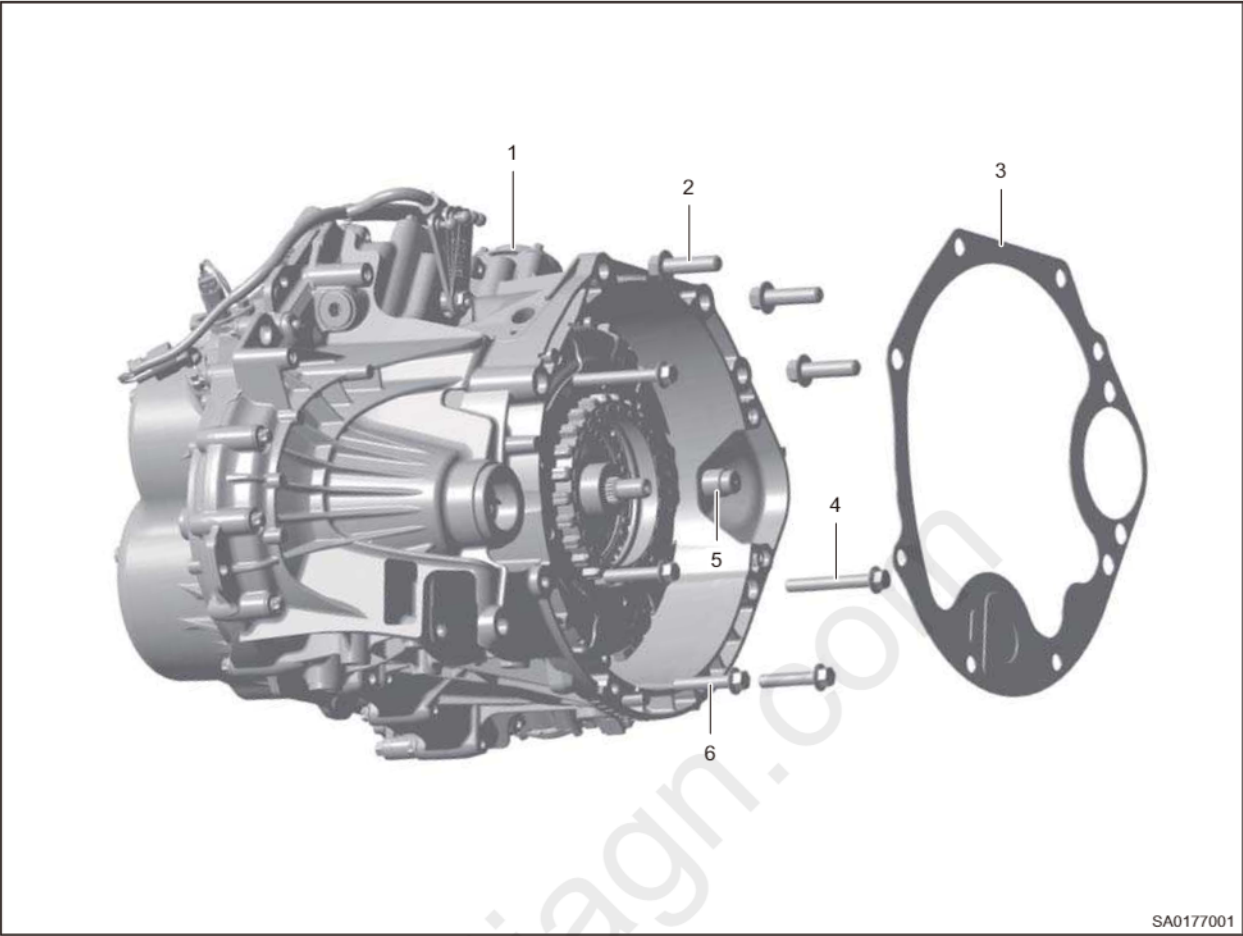
Assembly of Transmission and Engine

Removal

1. Assembly Diagram of Transmission and Engine



2. Schematic Diagram of Transmission



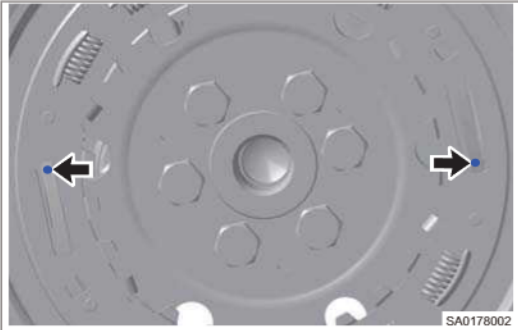
1 - Transmission Assembly	2 - Coupling Bolt
3 - Seal Plate	4 - Coupling Bolt
5 - 1st Shaft Bearing	6 - Coupling Bolt

3. Using a tool, remove 8 coupling bolts between transmission and engine diagonally.
4. Separate junction surface between transmission and engine, and remove seal plate and 1st shaft bearing.

18

Caution:

- Make sure that two lock levers (arrow) of dual mass flywheel are pushed into flange groove and locked before transmission joints with engine during installation.



- If it is not pushed into, it is necessary to perform dual mass flywheel reset procedures.

Installation

Warning/Caution/Hint:

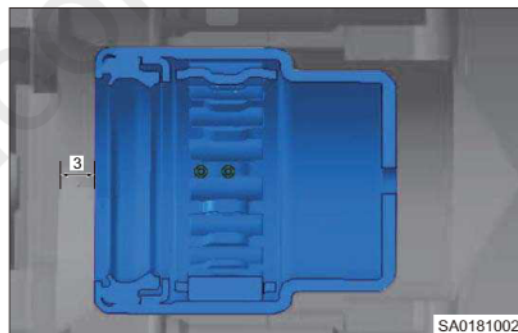
1. Make sure to install 1st shaft bearing and do not bend seal plate before assembling engine.
2. Make sure to install coupling bolts between transmission and engine after transmission completely joints with engine during assembly of transmission and engine, then tighten them alternately and diagonally, or looseness may occurs in bolt hole on transmission clutch case or accident adjustment of clutch automatic adjustment mechanism, thus resulting in change of clutch hardware characteristics state.
3. Oil seal boot is needed during assembly of propeller shaft, and do not damage differential oil seal when inserting or removing differential.
4. It is necessary to fill transmission gear oil with amount of 1.2 ± 0.1 L (residual amount is 0.5 L) and oil type is BOT350 M3 synthetic gear oil.
5. After loosening limit/drain plug, drain oil and then tighten it to specified torque (43 ± 4 N·m).
6. Differential oil seal cover is used to protect transmission and never remove it before loading it.
7. If cracks, oil leakage and rust occurs in transmission case, please go to nearest service station for repair immediately (if vehicle can be driven continuously is determined by conditions).
8. Secure power assembly with a special tool, wear safety equipment and make sure to operate safely during removal and installation.

1. Install 1st shaft bearing to engine crankshaft installation hole.

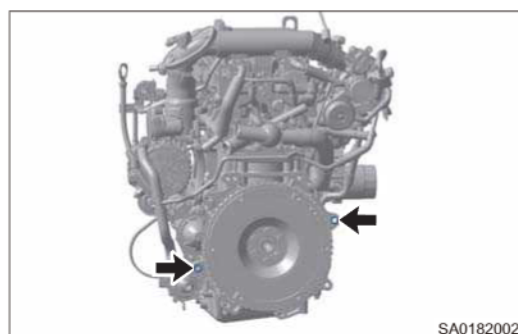
When installing bearing, apply even pressure to full circumference of race end surface to press into race.

Installation depth:

3 ± 0.1 mm



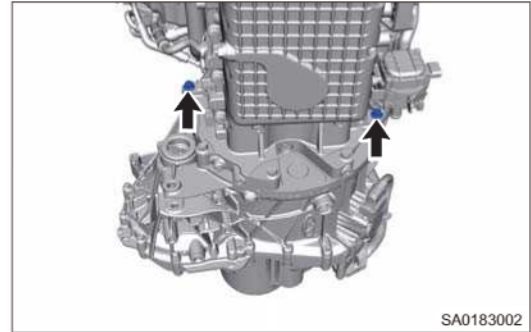
2. Install seal plate to engine and make sure that dowel pins on engine are inserted into corresponding holes (arrow) on seal plate.



3. Align dowel pin hole on transmission with dowel pin hole on engine, push transmission until engine well contacts with transmission, then use a tool to install 2 coupling bolts from engine side.

Specified torque:

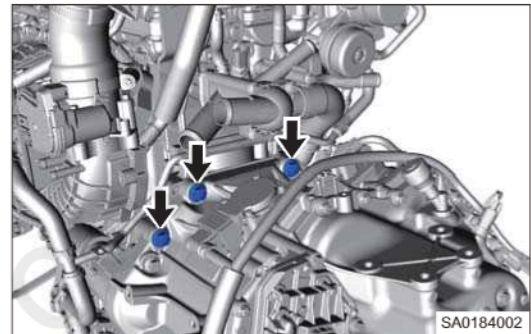
$50 \pm 5 \text{ N}\cdot\text{m}$



4. Using a tool, install 3 upper coupling bolts.

Specified torque:

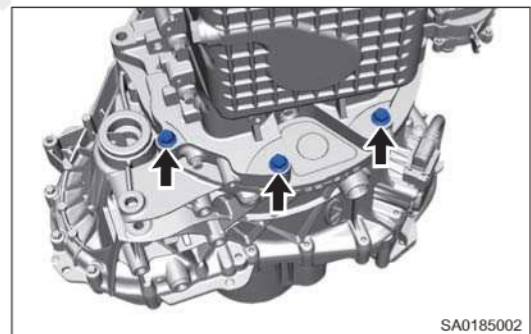
$90 \pm 9 \text{ N}\cdot\text{m}$



5. Using a tool, install 3 lower coupling bolts.

Specified torque:

$50 \pm 5 \text{ N}\cdot\text{m}$



18

6. Lock the shift lock mechanism pin at P position and never pull shift control mechanism before installing select and shift cable.



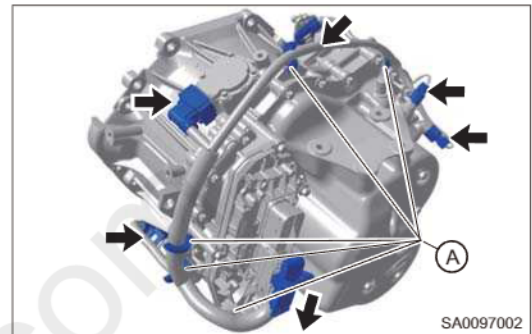
Transmission External Accessory

Transmission Wire Harness

Removal & Installation of Transmission Wire Harness

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the battery (See page 16-12).
4. Remove the battery tray bracket (See page 16-15).
5. Remove the air filter assembly (See page 10-8).
6. Remove the transmission wire harness assembly.

- (a) Remove wire harness clamps (A), disconnect wire harness connectors (arrow), and remove wire harness.



7. Installation is in the reverse order of removal.

Caution:

- Connect the connector safely. If connector has self-locking device, make sure that a click sound is heard. Failure to do so may cause malfunction.

Transmission Range Sensor

Warning / Caution / Hint:

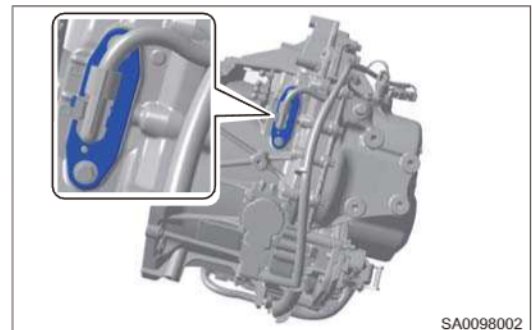
- Perform self-learning after replacing transmission range sensor.

Replacement of Transmission Range Sensor

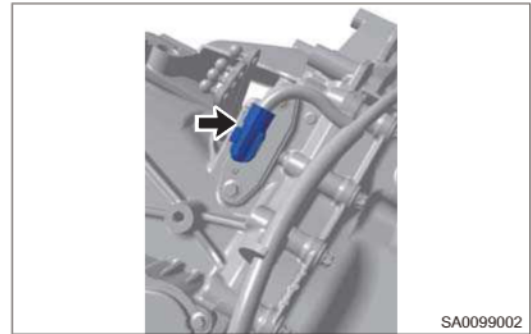
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the battery (See page 16-12).
4. Remove the battery tray bracket (See page 16-15).
5. Remove the air filter assembly (See page 10-8).
6. Clean area around sensor with appropriate detergent and dry this area with compressed air.

Caution:

- When cleaning with compressed air, wear protective glasses.



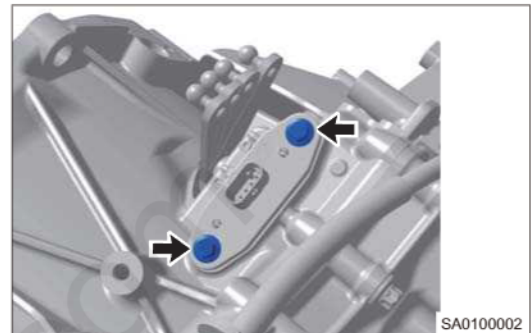
- (a) Disconnect the wire harness connector (arrow).



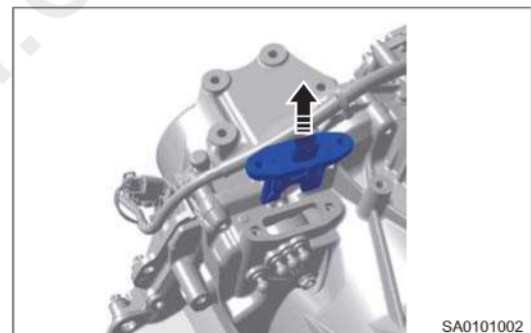
7. Remove fixing bolts (arrow) from both sides of range sensor.

Caution:

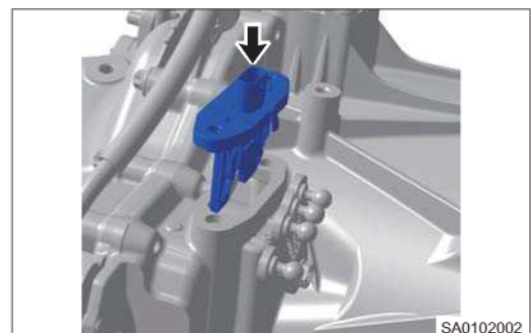
- Range sensor fixing bolts are non-reusable components, and replace them after removal.



8. Remove sensor in direction of arrow, make sure that no dirt is entered.



9. When installing sensor in direction of arrow, make sure that mark position faces toward shift lever.



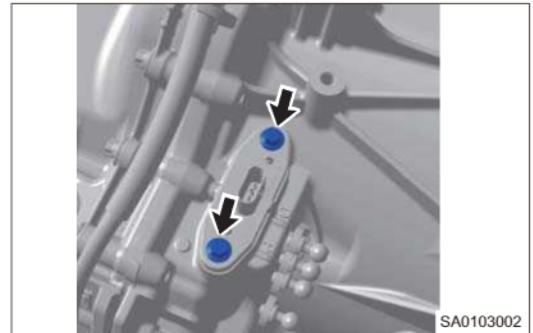
10. Install fixing screws (arrow) to both sides of sensor.

Tightening torque

9 ~ 11 N·m

Caution:

- Range sensor fixing bolts are non-reusable components, and replace them after removal.



SA0103002

11. Connect the wire harness connector.

Caution:

- Connect the connector safely. If connector has self-locking device, make sure that a click sound is heard. Failure to do so may cause malfunction.

12. After installation, perform special menu "Shift Lever, Shift Cable or Transmission Range Sensor were replaced" with diagnostic tester.

Transmission Shift Lever

Warning / Caution / Hint:

- It is necessary to perform self-learning after replacing transmission shift lever.
- DO NOT remove, install or replace shift rocker arm shaft oil seal.

Replacement of Transmission Shift Lever

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the battery (See page 16-12).
4. Remove the battery tray bracket (See page 16-15).
5. Remove the air filter assembly (See page 10-8).
6. Remove fixing bolt (arrow) from transmission shift lever.

Caution:

- This bolt is a non-reusable component, and replace it after removal.



SA0104002

7. Remove the shift lever (arrow).



SA0105002

8. Installation is in the reverse order of removal.

Tightening torque

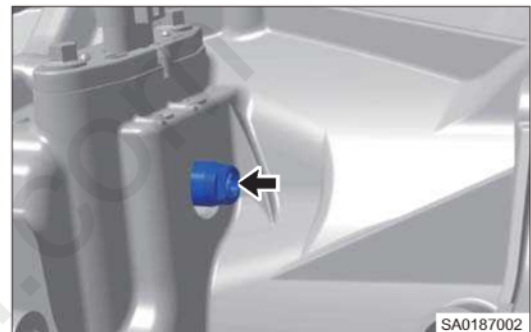
26 ± 28 N·m

9. After installation, perform special menu "Shift Lever, Shift Cable or Transmission Range Sensor were replaced" with diagnostic tester.

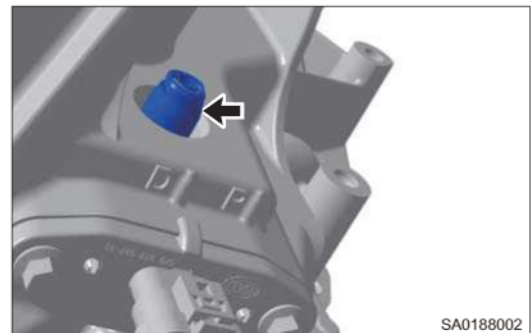
Replacement of Transmission Shift Lever Shaft Sealing

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the battery (See page 16-12).
4. Remove the battery tray bracket (See page 16-15).
5. Remove the air filter assembly (See page 10-8).
6. Remove the transmission shift lever.
7. Use a tool to remove shift lever shaft sealing.

Use a proper screwdriver or similar tool to pull out sealing (arrow). Make sure shift lever shaft is not damaged. Make sure that no dirt enters into transmission.



8. Using shift shaft oil seal installer, install new shift lever shaft sealing (arrow).



9. Install the transmission shift lever.
10. After installation, perform special menu "Shift Lever, Shift Cable or Transmission Range Sensor were replaced" with diagnostic tester.

Transmission Control Module

Warning / Caution / Hint:

- After installation, perform special menu "Mechatronic Actuator Module was replaced" with diagnostic tester.

Replacement of Transmission Control Module

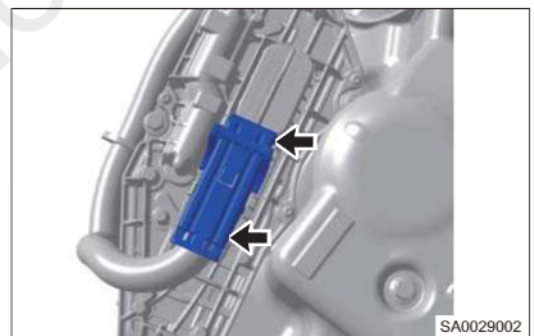
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine lower protector assembly ([See page 50-23](#)).
4. Clean areas around control module with appropriate detergent and dry these areas (arrow) with compressed air.

Caution:

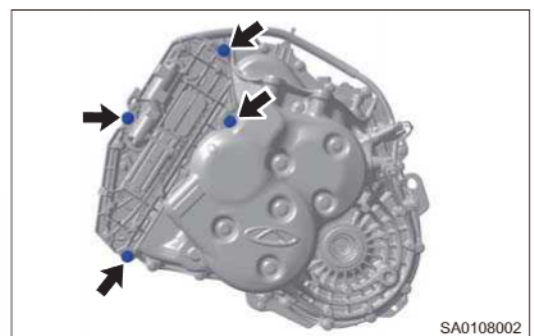
- When cleaning with compressed air, wear protective glasses.



5. Disconnect the wire harness connectors (arrow).



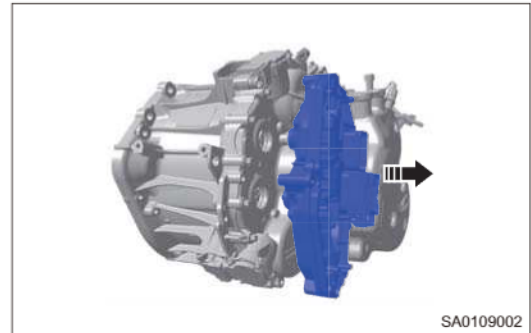
6. Remove 4 fixing bolts (arrow) from control module.



Caution:

- These four bolts are non-reusable components, and replace them after removal.

7. Remove control module in direction of arrow and make sure that no dirt enters into transmission.



8. Replace O-rings (arrow) with new ones when installing control module.



Caution:

- O-ring is a non-reusable component, and replace it after removal.

9. Carefully rotate gear on control module to make gears engage with each other.

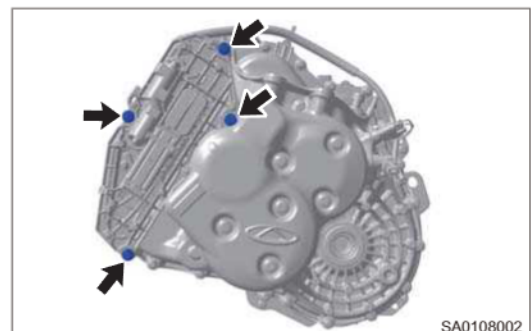


18

10. Install 4 fixing bolts to control module.

Tightening torque

$26 \pm 28 \text{ N}\cdot\text{m}$



Caution:

- Make sure that there is no gap between control module and transmission before tightening fixing bolt. If interference occurs when installing control module, remove this module again.
- Never reuse old bolt, and use a new bolt.

11. Connect the wire harness connector.

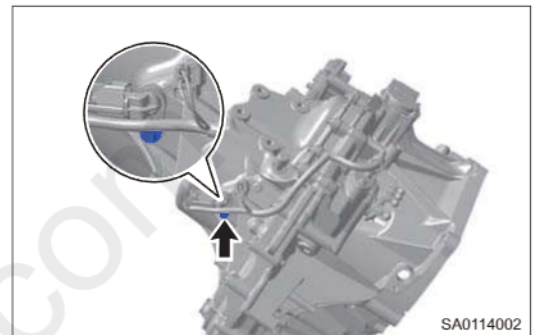
Caution:

- Connect the connector safely. If connector has self-locking device, make sure that a click sound is heard. Failure to do so may cause malfunction.

Transmission Input Shaft Sensor 1

Replacement of Transmission Input Shaft Sensor 1

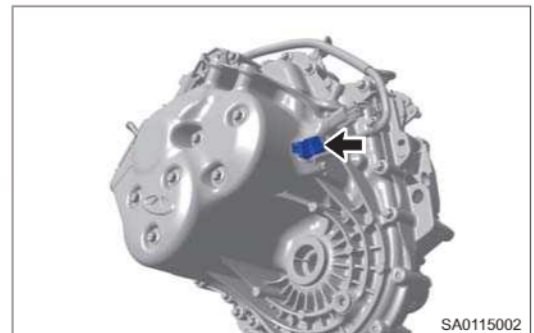
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine lower protector assembly ([See page 50-23](#)).
4. Clean area around input shaft sensor 1 (arrow) with appropriate detergent and dry this area with compressed air.



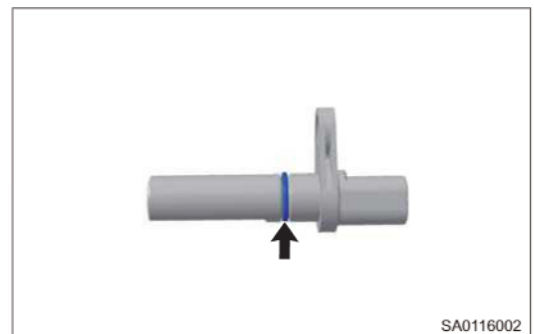
Caution:

- When cleaning with compressed air, wear protective glasses.

5. Disconnect wire harness connector (arrow) and remove sensor fixing bolt.



6. Remove sensor, and make sure that no dirt enters into transmission.
7. Lubricate O-ring (arrow) with a small amount of transmission oil, then install input shaft speed sensor 1.



8. Install the sensor fixing bolt.

Tightening torque

9 ~ 11 N·m

9. Connect the wire harness connector.

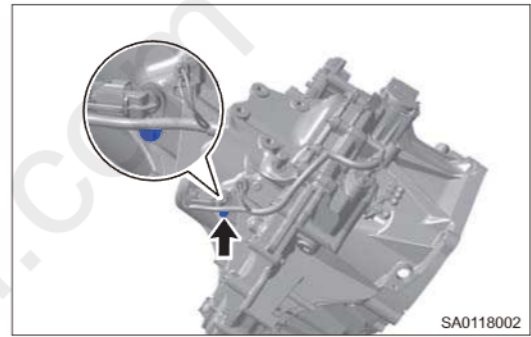
Caution:

- Connect the connector safely. If connector has locking device, make sure that a click sound is heard. Failure to do so may cause malfunction.

Transmission Input Shaft Sensor 2

Replacement of Transmission Input Shaft Sensor 2

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine lower protector assembly (See page 50-23).
4. Clean area around input shaft sensor 2 (arrow) with appropriate detergent and dry this area with compressed air.



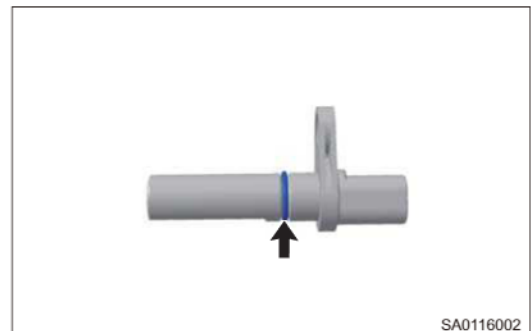
Caution:

- When cleaning with compressed air, wear protective glasses.

5. Disconnect wire harness connector (arrow) and remove sensor fixing bolt.



6. Remove sensor, and make sure that no dirt enters into transmission.
7. Lubricate O-ring (arrow) with a small amount of transmission oil, then install input shaft speed sensor 2.



8. Install the sensor fixing bolt.

Tightening torque

9 ~ 11 N·m

9. Connect the wire harness connector.

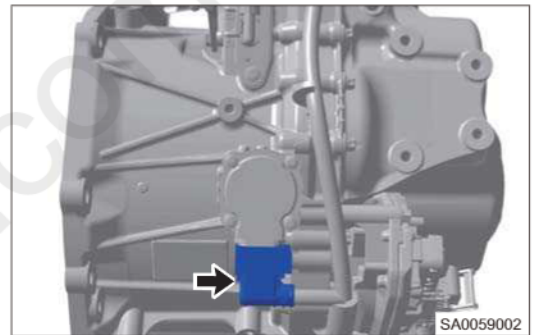
Caution:

- Connect the connector safely. If connector has self-locking device, make sure that a click sound is heard. Failure to do so may cause malfunction.

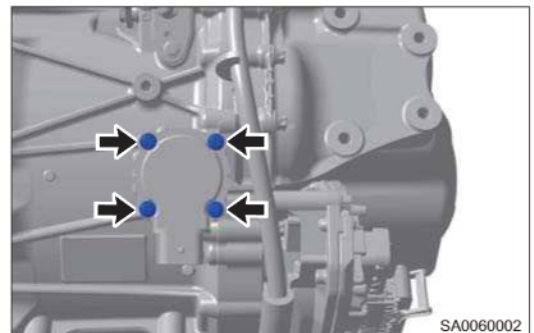
Removal of Clutch Actuator Motor 1

Warning / Caution / Hint:

- After replacing actuator motor, perform special operation "Clutch Motor was replaced".
1. Turn off all electrical equipment and ENGINE START STOP switch.
 2. Disconnect the negative battery cable.
 3. Remove the air filter assembly (See page 10-8).
 4. Remove the battery tray bracket
 5. Disconnect the clutch actuator motor 1 connector (arrow).



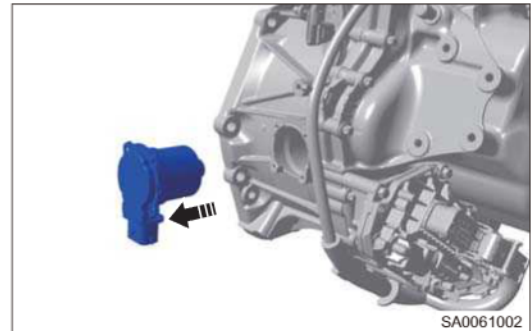
6. Remove 4 fixing bolts (arrow) from clutch actuator motor 1.



Caution:

- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.

7. Remove clutch actuator motor 1 in direction of arrow and mark it to make sure that motor can be installed to original position while keeping transmission free from dirt.



Installation of Clutch Actuator Motor 1

1. Install clutch actuator motor to original position in direction of arrow.



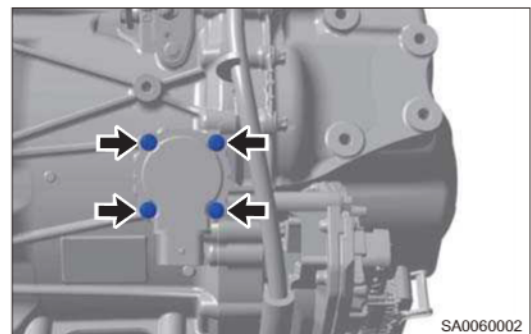
Caution:

- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.

2. Install and tighten 4 fixing bolts (arrow) to clutch actuator motor 1.

Tightening torque

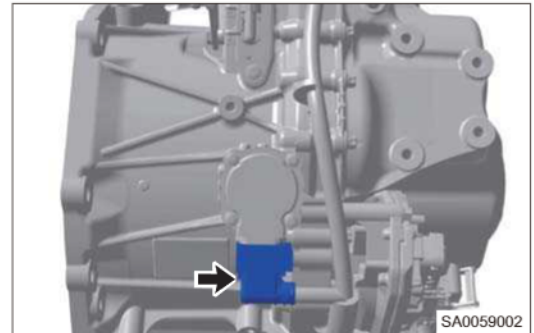
5 ~ 6 N·m



Caution:

- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.

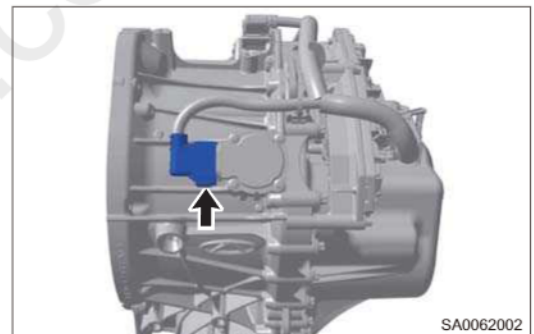
3. Connect the clutch actuator motor 1 connector (arrow).



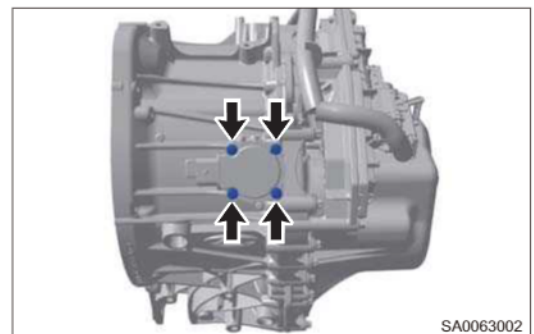
Removal of Clutch Actuator Motor 2

Warning / Caution / Hint:

- After replacing actuator motor, perform special operation "Clutch Motor was replaced".
1. Turn off all electrical equipment and ENGINE START STOP switch.
 2. Disconnect the negative battery cable.
 3. Remove the air filter assembly ([See page 10-8](#)).
 4. Remove the battery tray bracket.
 5. Disconnect the clutch actuator motor 2 connector (arrow).



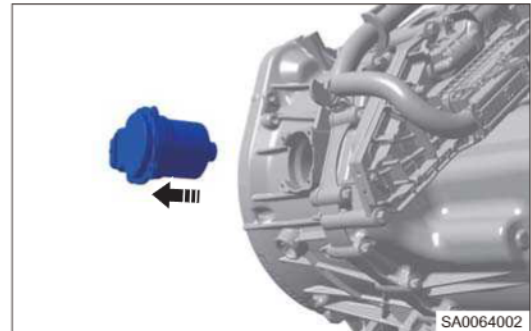
6. Remove 4 fixing bolts (arrow) from clutch actuator motor 2.



Caution:

- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.

- Remove clutch actuator motor 2 in direction of arrow and mark it to make sure that motor can be installed to original position while keeping transmission free from dirt.



Installation of Clutch Actuator Motor 2

- Install clutch actuator motor to original position in direction of arrow.

Caution:

- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.



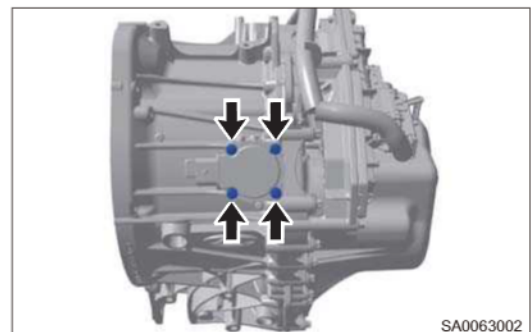
- Install and tighten 4 fixing bolts (arrow) to clutch actuator motor 2.

Tightening torque

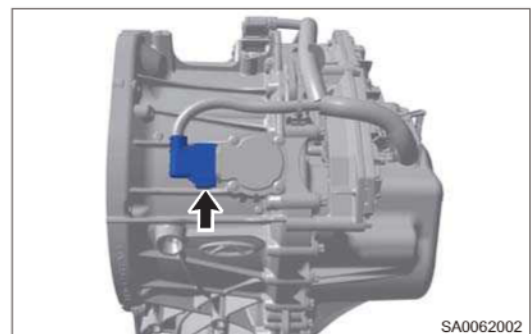
5 ~ 6 N·m

Caution:

- Clutch actuator motor fixing bolts are non-reusable components, and replace them after removal.



- Connect the clutch actuator motor 2 connector (arrow).

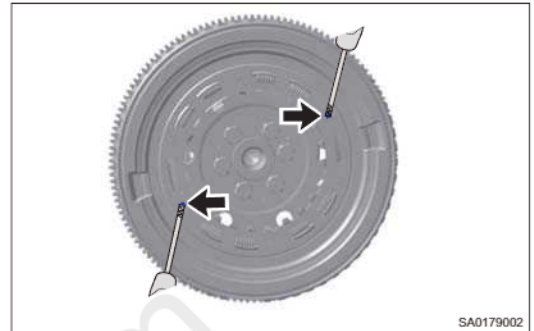


Flywheel Reset

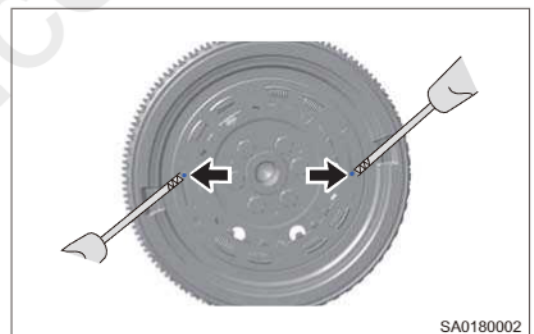
Warning/Caution/Hint:

Caution:

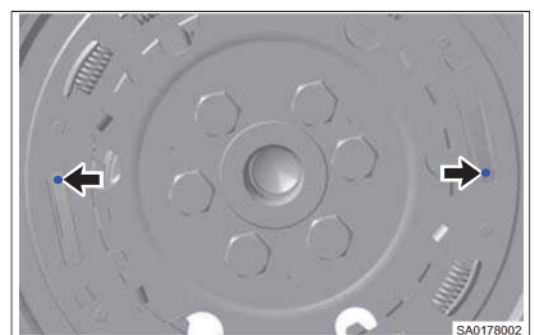
- Gently release screwdriver after reset.
 - This step needs another person to assist.
1. Insert two flat tip screwdrivers with proper dimension into holes (arrow) next to lock lever simultaneously.



2. Simultaneously rotate two flat tip screwdrivers to return flywheel to reset position.
3. An assistant is needed to push two lock levers into flange grooves (arrow), then gently release screwdrivers to lock flywheel after reset.



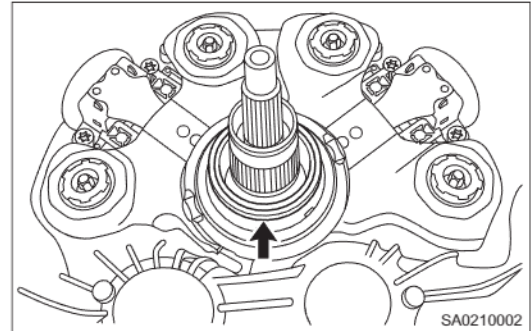
4. Make sure that two lock levers (paint mark) of dual mass flywheel are pushed into flange groove and locked.



Transmission Internal Accessory

Removal of Engagement System

1. Remove the dual-clutch assembly (refer to "Dual-clutch Assembly" in this chapter).
2. Remove the engagement system.
 - (a) Remove engagement system (arrow) from internal of transmission.



Installation of Engagement System

Warning / Caution / Hint:

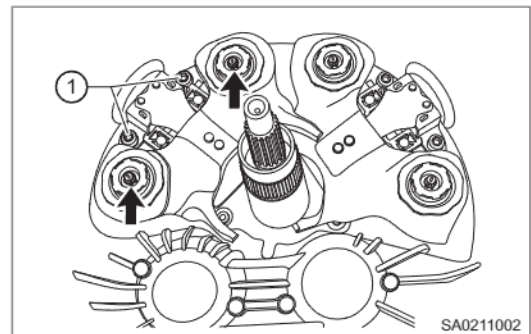
- Installed clutch must be the reset dual-clutch assembly.
 - It is necessary to perform self-learning for clutch system after installing engagement system.
1. Installation is in the reverse order of removal.

Removal of Actuator Fork Assembly

1. Dual-clutch Assembly (See page 18-152).
2. Remove the engagement system.
3. Remove the actuator lever assembly 1.
 - (a) Remove 2 compression springs (arrow) from actuator lever assembly 1.

Tightening torque
25 - 27 N·m
 - (b) Remove 2 actuator lever fixing bolts (1) from actuator lever assembly 1.

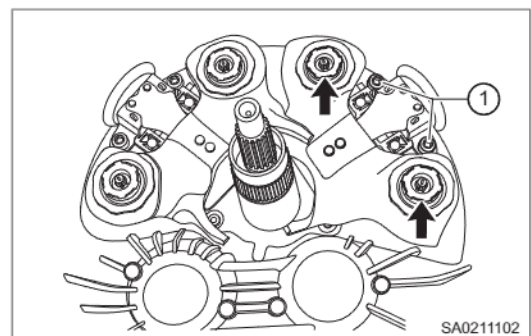
Tightening torque
18 - 20 N·m
 - (c) Remove the actuator lever assembly 1.



4. Remove the actuator lever assembly 2.
 - (a) Remove 2 compression springs (arrow) from actuator lever assembly 2.

Tightening torque
25 - 27 N·m
 - (b) Remove 2 actuator lever fixing bolts (1) from actuator lever assembly 2.

Tightening torque
18 - 20 N·m
 - (c) Remove the actuator lever assembly 2.



Installation of Actuator Fork Assembly

Warning / Caution / Hint:

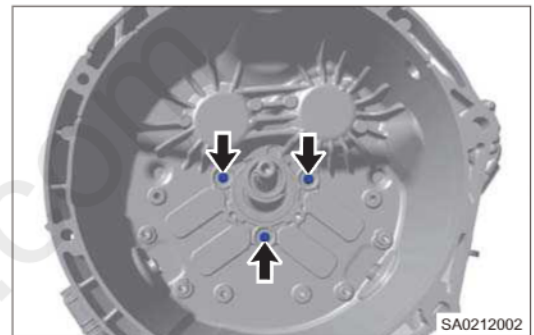
- Installed clutch must be the reset dual-clutch assembly.
 - It is necessary to release clutch actuator transport lock function after installing actuator lever assembly and dual-clutch assembly.
 - It is necessary to perform self-learning for clutch system after installing transmission fork.
1. Installation is in the reverse order of removal.

Removal of Guide

1. Dual-clutch Assembly (See page 18-152).
2. Remove the engagement system.
3. Remove the actuator fork assembly 1.
4. Remove the actuator fork assembly 2.
5. Remove 3 guide fixing bolts (arrow).

Tightening torque:

7 - 9 N·m



6. Remove the guide.

Installation of Guide

Warning / Caution / Hint:

- Installed clutch must be the reset dual-clutch assembly.
 - It is necessary to release clutch actuator transport lock function after installing actuator lever assembly and dual-clutch assembly.
 - It is necessary to perform self-learning for clutch system after installing transmission fork.
1. Installation is in the reverse order of removal.

Problem Feedback List

Problem Feedback Content

Caution:

1. If the dealer needs to contact with the Cherry After-sale Department for technical support, please fill in this list and send the electronic version to technical support personnel of Cherry After-sale Department.
2. Before the dealer returns the warranty parts, it is necessary to fill in this list and print it, then send the warranty parts together with the printed list, so as to facilitate the technical support personnel to diagnose and analyze the problem.

Problem Feedback List

Problem Occurrence Place		Manufacture Date	
Problem Occurrence Date		Sale Date	
Vehicle Model		Mileage	
Chassis Number VIN		Transmission Number	
Transmission Software Version			
Customer Complaints			
Detailed problem description or DTCs	1. Detailed description of problem		
Operating conditions: Cold or warmed up engine, gear position, vehicle speed, acceleration or deceleration, large or small throttle opening, braking or not, turning or not, etc.; Check if problem occurs continuously or intermittently and the occurrence frequency; Check if the vehicle driving is abnormal before problem occurs; Check what operations taken by vehicle's owner after problem occurs; Transmission current trouble code and history trouble code; Other systems current trouble code and history trouble code on the vehicle.	2. Trouble code		
Semi-clutch Value	If it is possible to read values from diagnostic tester		
Malfunction Image or Video			
Others (Malfunction Box Inspection or Testing Information)	1. What testing service operations are performed by 4S workshop, including history service of vehicle: 2. Whether the transmission appearance inspection is abnormal (oil leakage, bumps, etc.) 3. Whether the operating condition by user is abnormal (mountain, wading areas, etc.);		
Fill in the Person Number and Date	Signature	Date	