

625DHA TRANSMISSION

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

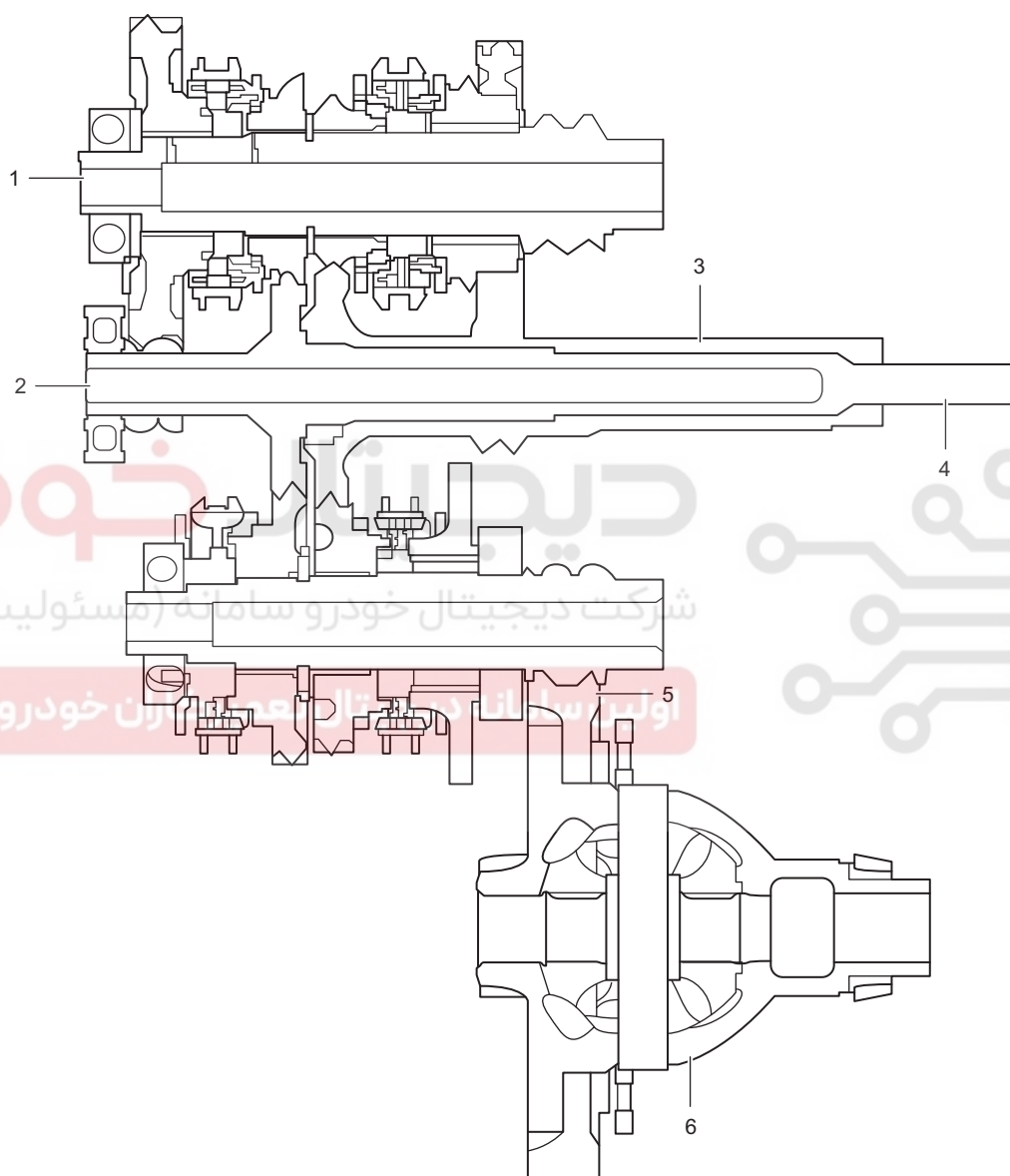


GENERAL INFORMATION

Description

Basic Components of Transmission

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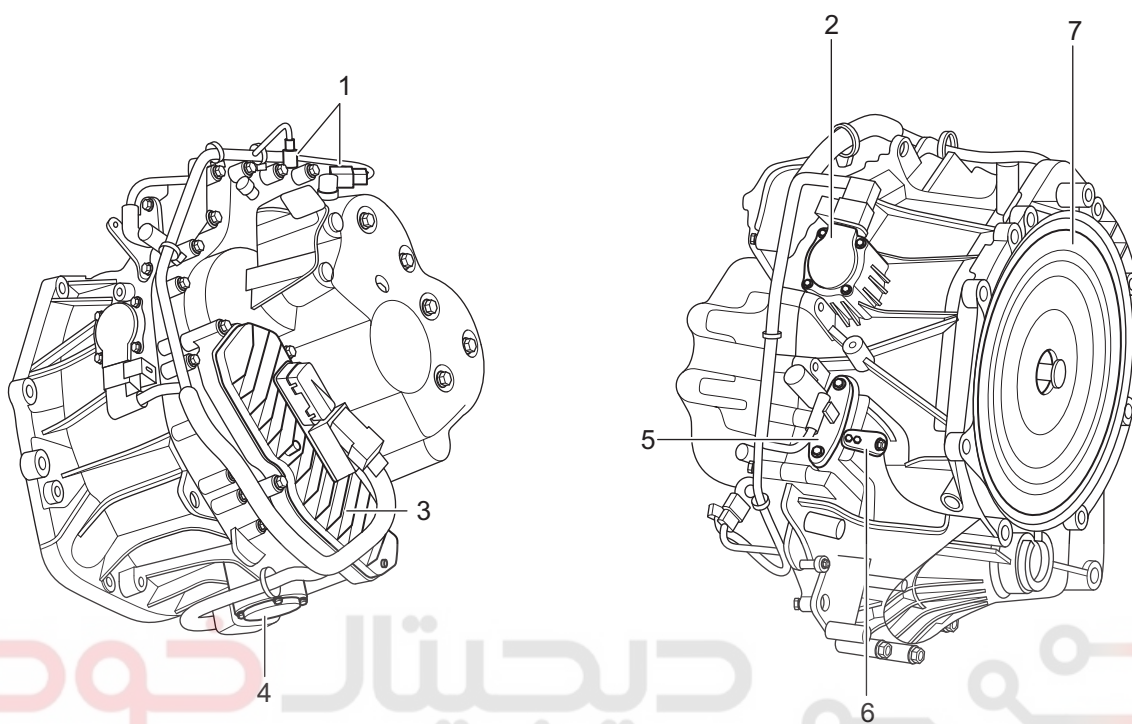


RT15290010

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

Transmission Accessories

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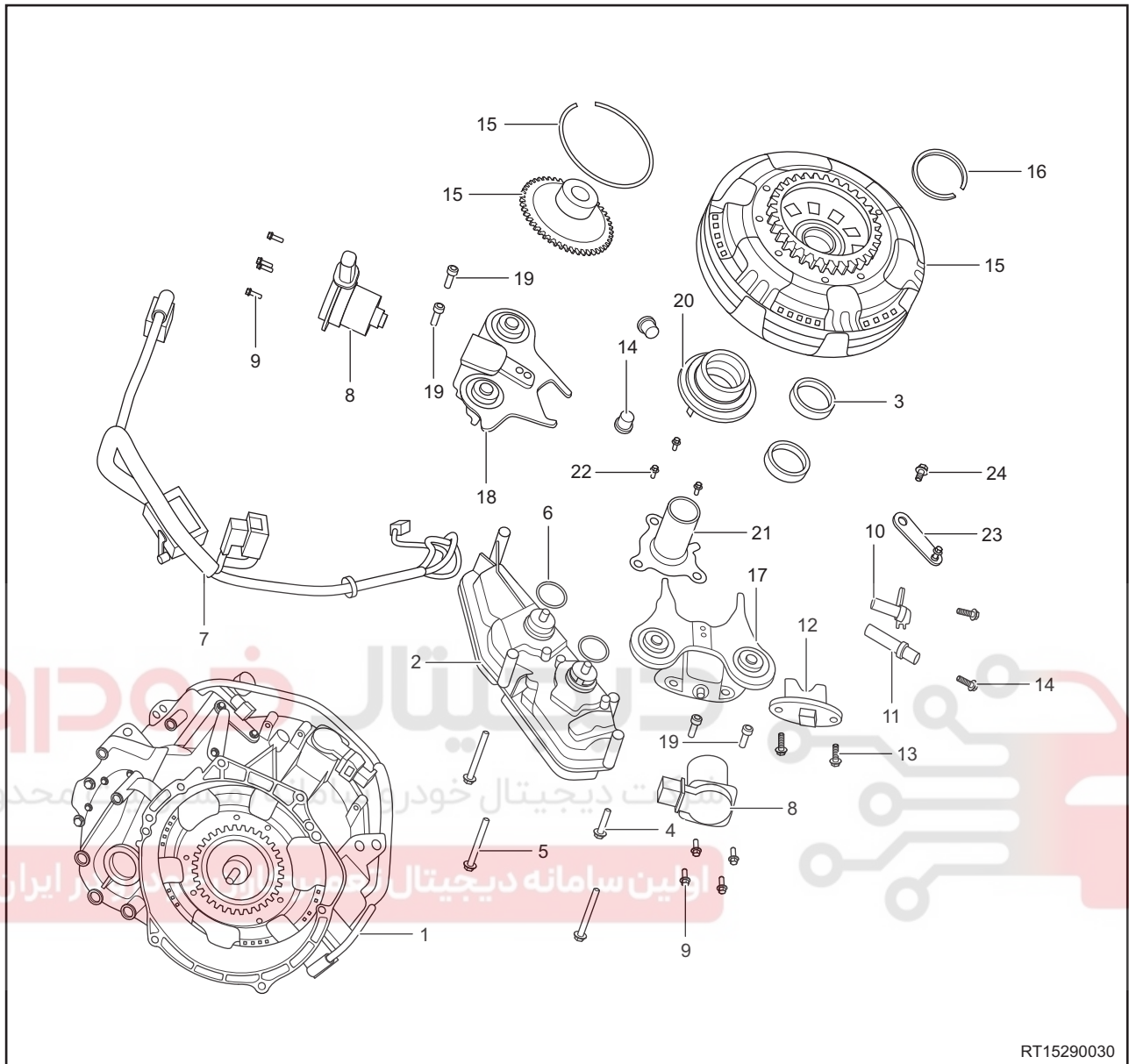


RT15290020

1 - Speed Sensor	2 - Clutch Actuation Motor 1
3 - MAM with TCU and Shift System Motor	4 - Clutch Actuation Motor 2
5 - TRS	6 - Park Lock System
7 - DMF	

Serviceability List

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RT15290030

1 - Transmission Assembly	2 - MAM
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 - Speed Sensor 1
11 - Speed Sensor 2	12 - Gear Sensor
13 - Hexagon Flange Bolt	14 - Refill and Drain Plug
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

Operation

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 1, 3, 5, and input shaft 2 connects 2, 4, 6 and reverse, 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 causable malfunction effectively, thus ensuring transmission safety operation.

Specifications

Torque Specifications

Description	Torque (N·m)
Transmission Control Module Mounting Bolt	26 ~ 28
Motor Mounting Bolt	5 ~ 6
Sensor Mounting Bolt	9 ~ 11
Refill and Drain Plug	39 ~ 47
Clutch Actuator Bolt	18 ~ 20
Guide Bolt	7 ~ 9
Shift Lever Bolt	26 ~ 28
Coupling Bolt Between Upper of Engine and Transmission	90 ± 9
Coupling Bolt Between Lower of Engine and Transmission	50 ± 5
Coupling Bolt Between Both Side of Engine and Transmission	60 ± 5
Transmission Retaining/Drain Plug	43 ± 4
Fixing Bolt Between Shift Cable Assembly and Center Body	9 ± 1.5

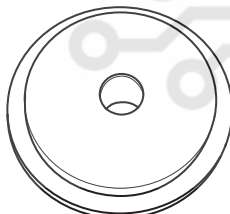
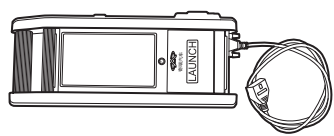
Description	Torque (N·m)
Fixing Bolt Between Gear Shift Control Mechanism and Body	20 ± 3
Coupling Bolt Between Flexible Shaft Bracket and Transmission Case	23 ± 2

625DHA Transmission Gear Ratio

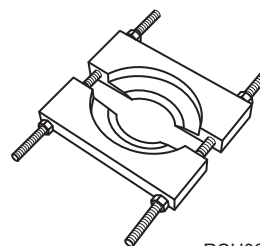
Type	625DHA
Gear	1st
	2nd
	3rd
	4th
	5th
	6th
	Reverse
	1/2/5/6 final drive ratio 1: 4.158
Final Drive Ratio	3/4/R final drive ratio 2: 4.562

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Tools**Special Tools**

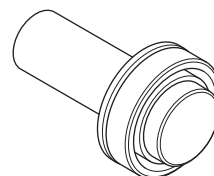
Installer Joint	 RCH0000010
X-431 3G Diagnostic Tester	 RCH0000001

Bearing Remover



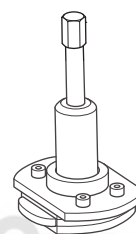
RCH0000011

Differential Oil Seal Installer



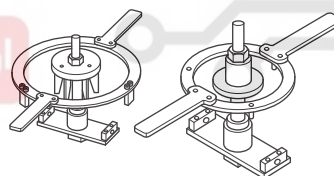
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Dual-clutch Remover



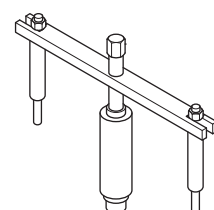
RCH0000076

Dual-clutch Reset Tool



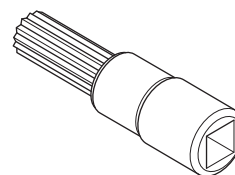
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Dual-clutch 2 Installer



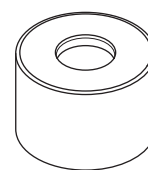
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Dual-clutch Lock Actuator



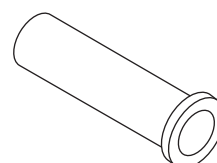
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Shift Shaft Oil Seal Installer



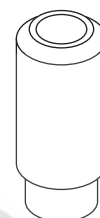
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Outer Input Shaft Oil Seal Installer



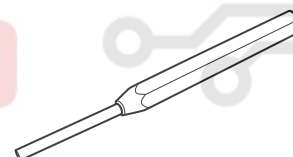
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Inner Input Shaft Oil Seal Installer



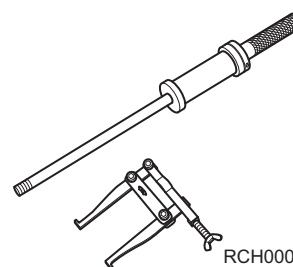
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Punch



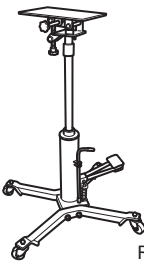
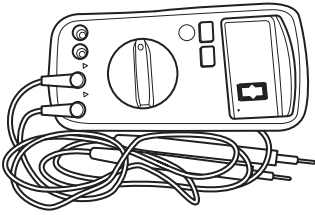
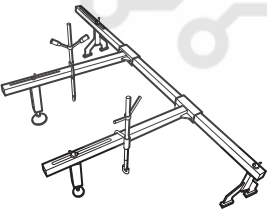
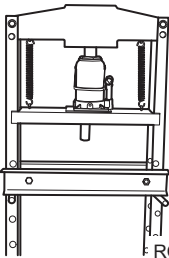
RCH0000015

Puller



RCH0000059

General Tools

Transmission Carrier	 RCH0000005
Digital Multimeter	 RCH0000002
Oscilloscope	 RCH0000061
Engine Equalizer	 RCH0000026
Hydraulic Press	 RCH0000012

TCU Terminal Definition

TCU Connector A

Terminal No.	Description	Terminal No.	Description
A1	Power Supply	A30	-
A2	Ground	A31	KL15
A3	Power Supply	A32	-
A4	Ground	A33	-
A5	Power Supply	A34	CAN-H
A6	Ground	A35	CAN-L
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	-
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	-

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TCU Connector B

Terminal No.	Description	Terminal No.	Description
B1	Phase W Clutch 2	B30	-
B2	Phase U Clutch 2	B31	-
B3	Phase V Clutch 2	B32	Hall 1 Clutch Motor 1

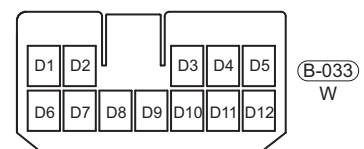
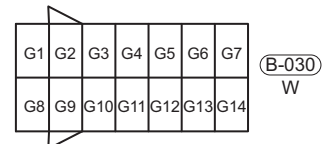
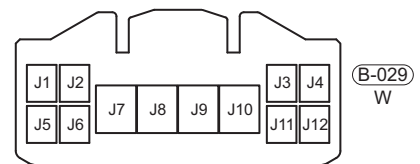
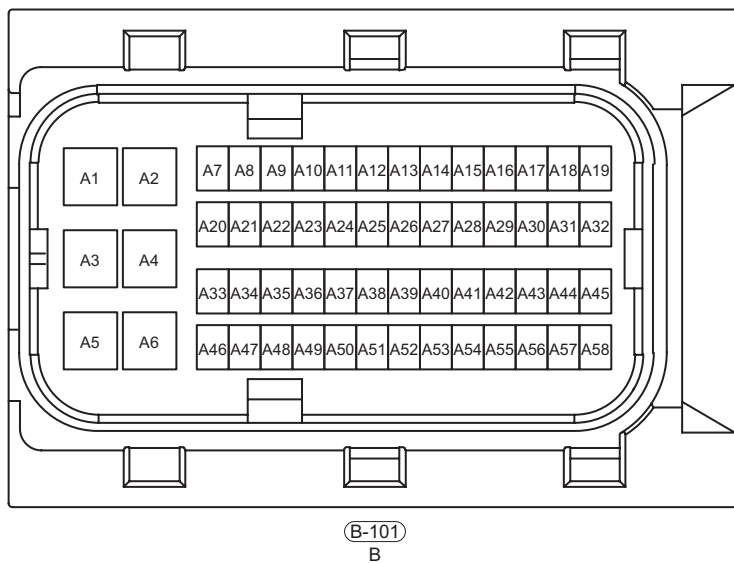
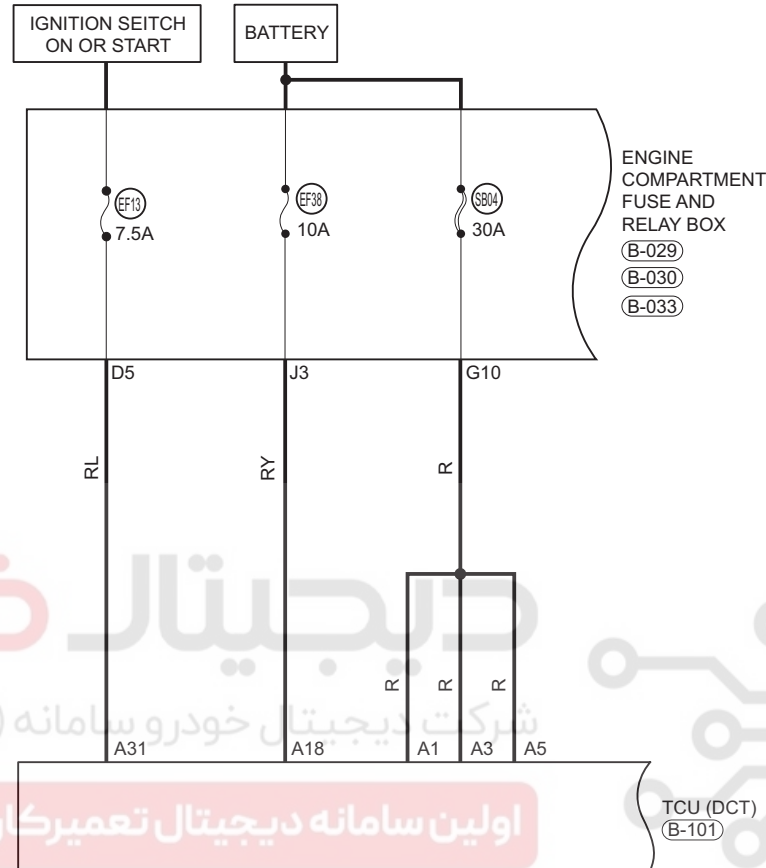
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Terminal No.	Description	Terminal No.	Description
B4	Phase W Clutch 1	B33	-
B5	Phase V Clutch 1	B34	5 V Supply TRS
B6	Phase U Clutch 1	B35	GNO TRS
B7	-	B36	-
B8	ISS 2 Input Speed	B37	-
B9	-	B38	-
B10	ISS 1 Input Speed DIR	B39	-
B11	-	B40	-
B12	ISS 2 Speed Sensor Supply	B41	-
B13	-	B42	Hall 2 Clutch Motor 2
B14	-	B43	Hall 1 Clutch Motor 2
B15	-	B44	Hall 3 Clutch Motor 2
B16	-	B45	Hall 3 Clutch Motor 1
B17	-	B46	-
B18	-	B47	-
B19	Hall 2 Clutch Motor 1	B48	-
B20	-	B49	-
B21	ISS 1 Speed Sensor Supply	B50	-
B22	-	B51	-
B23	-	B52	-
B24	TRS 1 Input	B53	-
B25	TRS 2 Input	B54	-
B26	-	B55	5 V Supply Clutch 2
B27	-	B56	GND Clutch 2
B28	-	B57	GND Clutch 1
B29	-	B58	5 V Supply Clutch 1

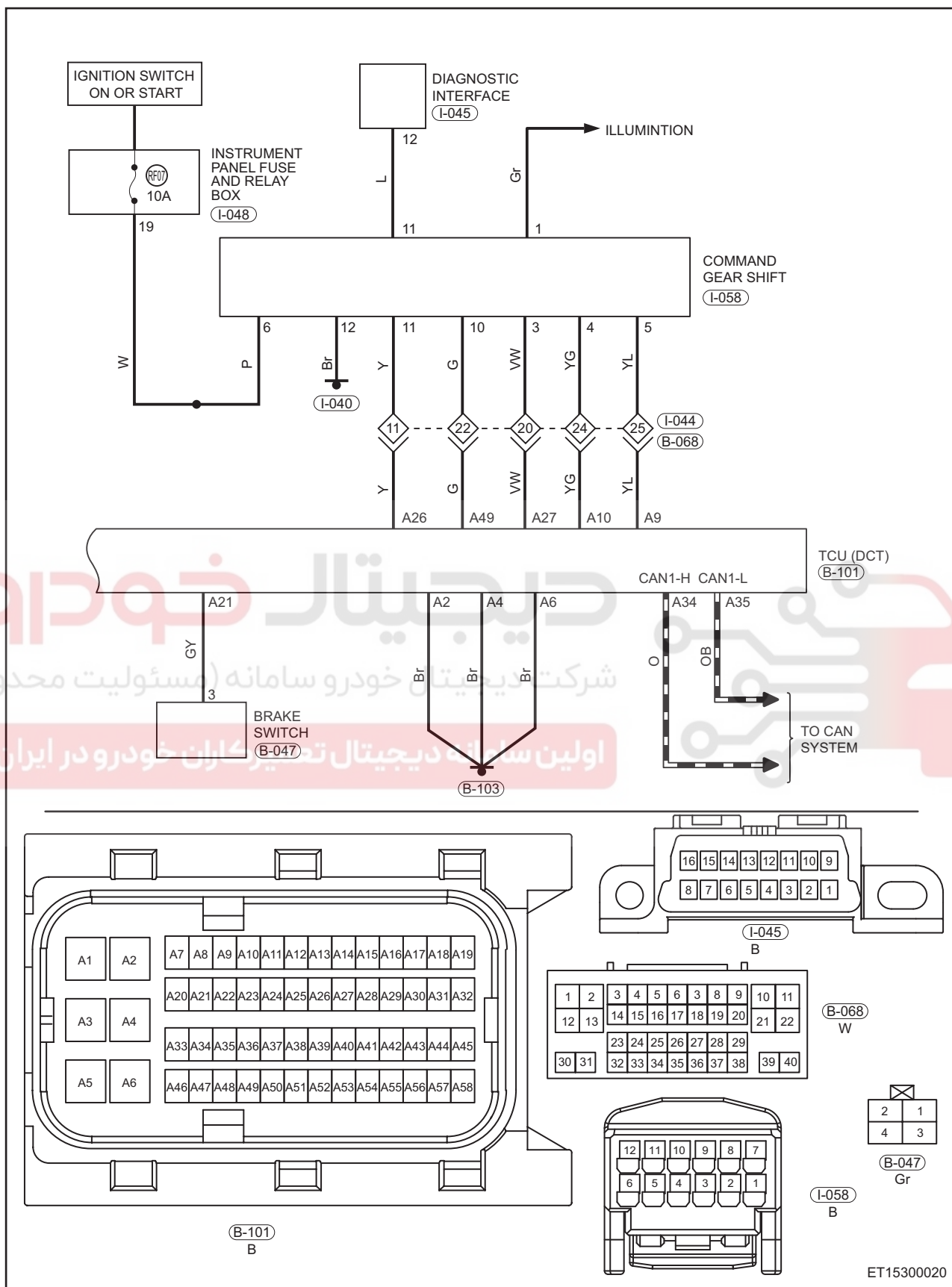
Circuit Diagram

TCU (Page 1/3)

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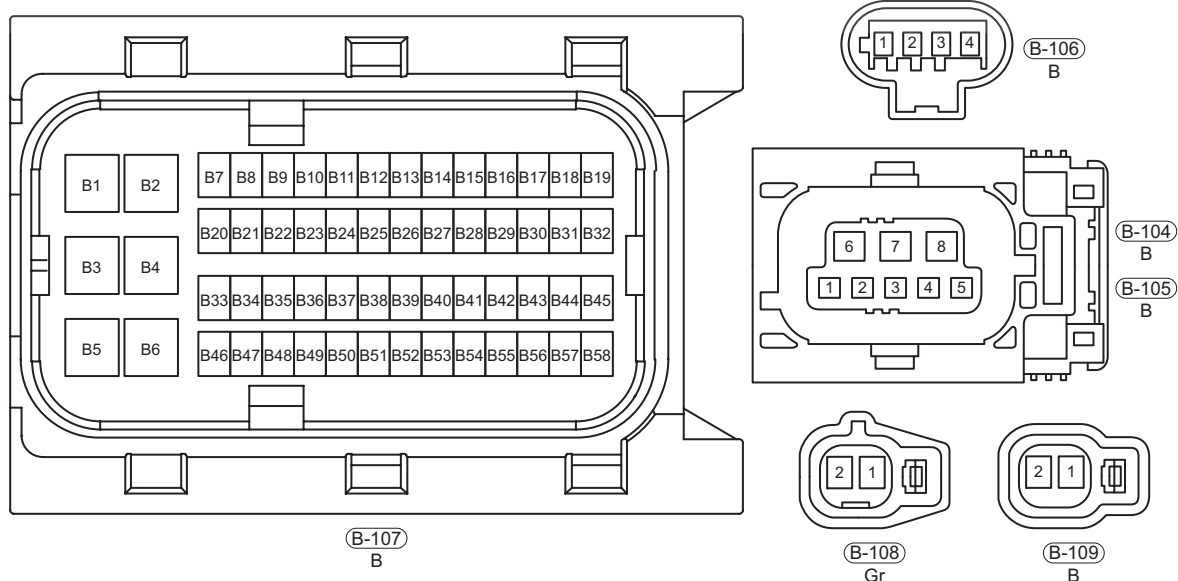
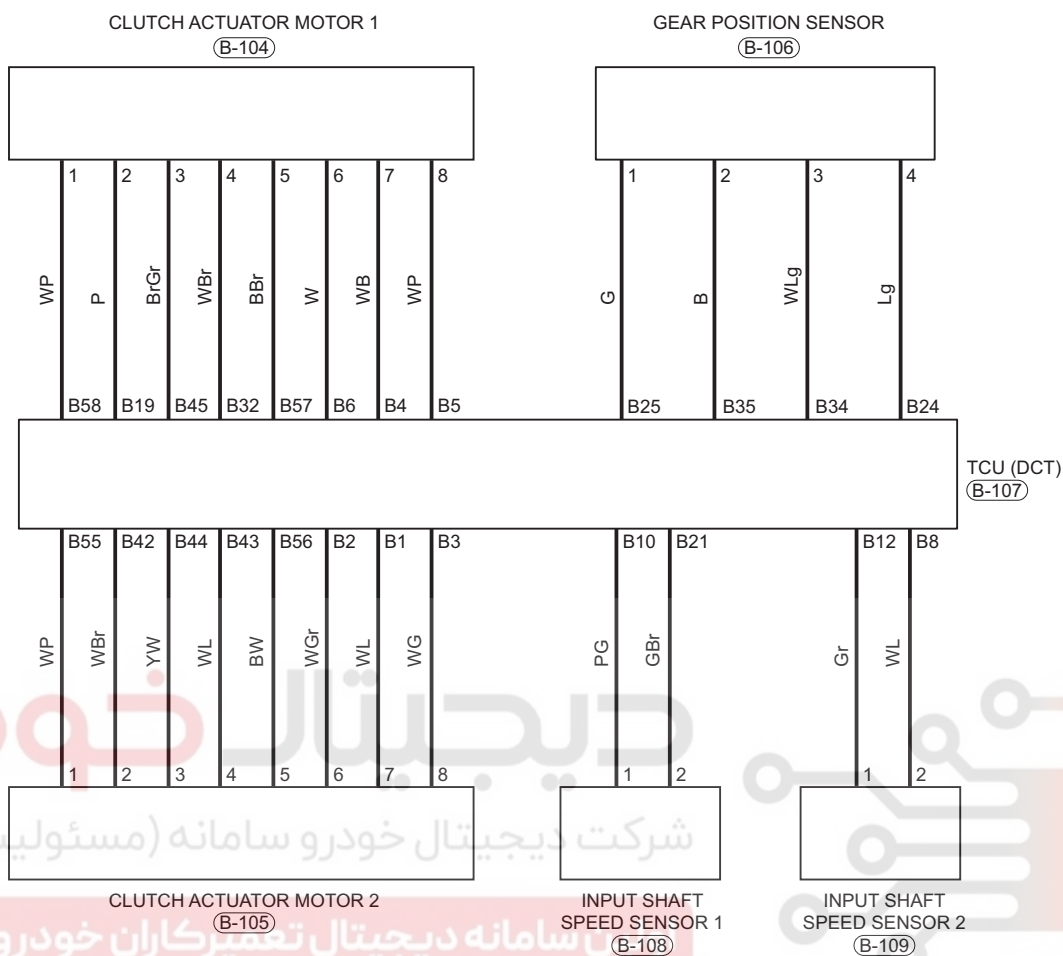


ET15300010



TCU (Page 3/3)

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ET15300030

DIAGNOSIS & TESTING

Diagnostic Help

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1. Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction occurs, and perform diagnosis tests and repair procedures.
3. If diagnostic trouble code (DTC) cannot be deleted, it is a current malfunction.
4. Only use a digital multimeter to measure voltage of electrical systems.
5. Refer to any Technical Bulletin that may apply to malfunction.
6. Visually check related wire harnesses.
7. Check and clean all Transmission Control Unit (TCU) ground that are related to latest DTC.
8. 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 following:

- Check if connectors are loose.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Monitor X-431 3G diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if related circuit signal 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.
- Look for broken, bent, protruded or corroded terminals.
- Check 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 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) can increase resistance which will change the way in which a circuit works.

Electrical control circuits are very sensitive to proper grounding. A loose or corroded ground point can seriously affect 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 eyelet terminal, check if they are installed correctly. Make sure that all wires are clean, securely fastened and good contacted without crimping any excessive insulation coat.

Problem Symptoms Table

Symptom	Suspected Area	Recommended Repair Method
Noise	Oil level (too low)	Add oil to specified level
	Oil grade (incorrect)	Replace specified oil
	Clutch release bearing (worn or damaged)	Check and replace
	Clutch disc (worn or damaged)	Check and replace
	Synchronizer gear ring (output shaft) (worn or damaged)	Replace
	Synchronizer gear ring (input shaft) (worn or damaged)	Replace
	Gear (input shaft) (worn or damaged)	Replace
	Gear (output shaft) (worn or damaged)	Replace
	Bearing (input shaft) (worn or damaged)	Replace
	Bearing (output shaft) (worn or damaged)	Replace
	Bearing (differential) (worn or damaged)	Replace
Oil leakage	Bolt (loose or not installed)	Replace
	Oil seal (worn or damaged)	Replace
	Oil (excessive), oil level (too low)	Oil level reaches specified level
	Breather plug (fault)	Replace
	Packing (damaged)	Replace

Symptom	Suspected Area	Recommended Repair Method
Hard shifting or impossible to shift	Oil (wrong)	Replace specified oil
	Clutch (stuck)	Check and adjust
	Select and shift shaft sub-assembly (worn or damaged)	Check and adjust
	Gear (output shaft) (worn or damaged)	Replace
	Gear (input shaft) (worn or damaged)	Replace
	Synchronizer gear sleeve (input shaft) (worn or damaged)	Replace
	Synchronizer gear sleeve (output shaft) (worn or damaged)	Replace
	Clutch disengages incompletely	Check and adjust
	Synchronizer gear ring (severe wear)	Replace
	Compression spring (too hard)	Replace
	Control cable (fault) (gear select)	Check and adjust
	Control cable (fault) (gear shift)	Check and adjust
	Shift fork (input shaft) (worn)	Replace
	Shift fork (output shaft) (worn)	Replace
	Synchronizer gear ring (input shaft) (worn or damaged)	Replace
	Synchronizer gear ring (output shaft) (worn or damaged)	Replace
	Synchronizer slider spring (input shaft) (worn or damaged)	Replace
	Synchronizer slider spring (output shaft) (worn or damaged)	Replace synchronizer slider
Jumps out of gear or shift lever moves excessively	Shift fork (input shaft) (worn)	Replace
	Shift fork (output shaft) (worn)	Replace
	Synchronizer gear sleeve (input shaft) (worn or damaged)	Replace
	Synchronizer gear sleeve (output shaft) (worn or damaged)	Replace
	Gear (input shaft) (worn or damaged)	Replace
	Gear (output shaft) (worn or damaged)	Replace
	Bearing (input shaft) (worn or damaged)	Replace
	Bearing (output shaft) (worn or damaged)	Replace

CAUTION

- To guarantee service quality of transmission, perform operations carefully and keep each component clean.
- Select appropriate or special tools.
- Transmission can achieve a good operation condition only when strictly performing service according to technical requirements of assembly or adjustment.

Diagnostic Trouble Code (DTC) Chart

31

U007388	Control Module Communication Bus Off
U040181	Invalid EMS CAN Signal Received
U010087	Lost Communication with EMS
U041881	Invalid BSM CAN Signal Received
U012987	Lost Communication with BSM
U042281	Invalid BCM CAN Signal Received
U014087	Lost Communication with BCM
U012687	Lost Communication with SAM
P071517	ISS 1 Circuit voltage above threshold
P071516	ISS 1 Circuit voltage below threshold
P071629	ISS 1 Signal invalid
P170000	ISS 2 Supply Voltage Over 13 V
P170100	ISS 2 Supply Voltage Over 4.5 V
P170200	ISS 2 Signal Invalid
P090011	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side
P090012	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side
P090013	ATIC Clutch Actuator 1 on H-Bridge or on 3rd Half Bridge, Low Side or High Side
P09011C	ATIC Clutch Actuator 1
P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1, 2, 3, Low Side or High Sides
P170400	ATIC Clutch Actuator 2 SCB on Half Bridge 1, 2, 3, Low Side or High Side
P170500	ATIC Clutch Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
P170600	ATIC Clutch Actuator 2 Over or Undervoltage
P170700	Clutch Actuator 1 Hall Sensor Power Supply Voltage Under 3.72 V
P170800	Clutch Actuator 1 Hall Sensor Power Supply Voltage Over 5.8 V
P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V
P170A00	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V
P170B00	Clutch Actuator 1 Position Signal Correlation Not Plausible
P170C00	Clutch Actuator 2 Position Signal Correlation Not Plausible
P170D00	Clutch Actuator 1 Position Sensor Signal Incorrect ATIC vs. HALL

P170E00	Clutch Actuator 2 Position Sensor Signal Incorrect ATIC vs. HALL
P170F00	TCU High Power Supply Overvoltage
P171000	TCU Low Power Supply Overvoltage
P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1, 2, 3, Low Side or High Side
P171200	ATIC Shift Actuator 1 SCB on Half Bridge 0, 2, 3, Low Side or High Side
P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
P171400	ATIC Shift Actuator 1 Over or Undervoltage
P171500	ATIC Shift Actuator 2 SCG on Half Bridge 0, 2, 3, Low Side or High Side
P171600	ATIC Shift Actuator 2 SCB on Half Bridge 0, 2, 3, Low Side or High Side
P171700	ATIC Shift Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
P171800	ATIC Shift Actuator 2 Over or Undervoltage
P171900	Shift Actuator 1 RPS Signal Wrong PWM
P171A00	Shift Actuator 1 Angle Difference Too High
P171B00	Shift Actuator 1 Position Sensor Signal Incorrect ATIC vs. RPS
P171C00	Shift Actuator 2 RPS Signal Wrong PWM
P171D00	Shift Actuator 2 Angle Difference Too High
P171E00	Shift Actuator 2 Position Sensor Signal Incorrect ATIC vs. RPS
P070512	TRS signal frequency failure
P070514	TRS Circuit short to ground or open
P070538	TRS TRS Circuit short to battery
P092901	Shift Lock Control Circuit
P060400	Broken RAM Cell
P060500	Broken Flash Cell
P171F00	TCU Overtemp
P172000	Monitoring SOPC Pre Drive Check
P071564	ISS 1 Signal plausibility failure
P172100	ISS 2 Value Not Plausible
P172200	Clutch 1 Torque Unexpected Value
P172300	Clutch 2 Torque Unexpected Value
P070562	TRS Circuit short to ground or open
P082664	Manual Switches
P172400	TRS Teach in Failure
P172500	Shift Drum 1 Reference Drive Failure
P172600	Shift Drum 2 Reference Drive Failure
P172700	Shift Drum 1 Sync Speed Rate Not Plausible
P172800	Shift Drum 2 Sync Speed Rate Not Plausible
P172900	Shift Drum 1 Position Out of Range

P172A00	Shift Drum 2 Position Out of Range
P172B00	TCU High Power Supply Below First Threshold
P172C00	TCU Low Power Supply Below First Threshold
P172D00	Level 2 Reset - SZ1 tq Increase
P172E00	Level 2 Reset - SZ2 Launching in Wrong Direction
P172F00	Level 2 Reset - SZ3 Shift R While Driving
P173100	Level 2 Reset - SZ4 Unwanted Launch
P173200	Level 2 Reset - SZ6a Downshift Not Allowed
P173300	Level 2 Reset - SZ7 Tie Up
P173400	Level 2 Reset - SZ8 Overspeed
P173500	Gearbox 1 Gear Jump
P173600	Gearbox 2 Gear Jump
P173700	Gearbox Mechanic Part 1 Unexpected Shiftdrum Standstill
P173800	Gearbox Mechanic Part 2 Unexpected Shiftdrum Standstill
P173900	Gearbox 1 Sync Failure
P173A00	Gearbox 2 Sync Failure
P173B00	Gearbox 1 No Disengagement
P173C00	Gearbox 2 No Disengagement
P173D00	Gearbox 1 No Engagement
P173E00	Gearbox 2 No Engagement
P173F00	Clutch 1 Self Open Test Failed
P174000	Clutch 2 Self Open Test Failed
P174100	Clutch 1 Torque Too Low
P174200	Clutch 2 Torque Too Low
P174300	Shiftdrum 1 Endstop Position Not Plausible
P174400	Shiftdrum 2 Endstop Position Not Plausible
P174500	Clutch 1 Endstop Position Not Plausible
P174600	Clutch 2 Endstop Position Not Plausible
P174700	Clutch 1 Drag Torque Too High
P174800	Clutch 2 Drag Torque Too High
P174900	Broken Shift Fork
P174A00	Shift Drum 1 Unexpected Movement
P174B00	Shift Drum 2 Unexpected Movement
P174C00	Shift Drum 1 Moving Direction Not Plausible
P174D00	Shift Drum 2 Moving Direction Not Plausible
P174E00	Clutch 1 Overtemperature
P174F00	Clutch 2 Overtemperature

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

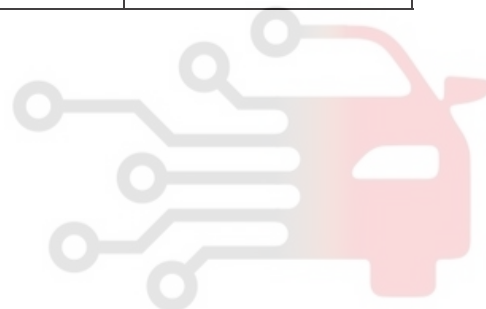
31

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P170F00	TCU High Power Supply Overvoltage	Overvoltage: Supply voltage > 16 V Debounce time: 2 s	• Wire harness or connector • Fuse • TCU • Battery • Generator
P171000	TCU Low Power Supply Overvoltage	Overvoltage: Supply voltage > 16.2 V Debounce time: 800 ms	
P172B00	TCU High Power Supply Below First Threshold	Supply voltage < 9 V Debounce time: 100 ms	
P172C00	TCU Low Power Supply Below First Threshold	• Supply voltage > 7 V • Debounce time: 2 s	

دیجیتال خودرو

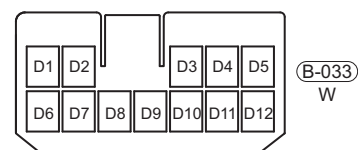
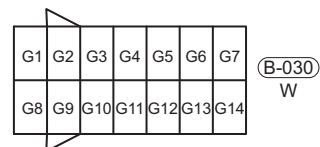
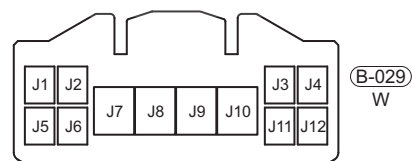
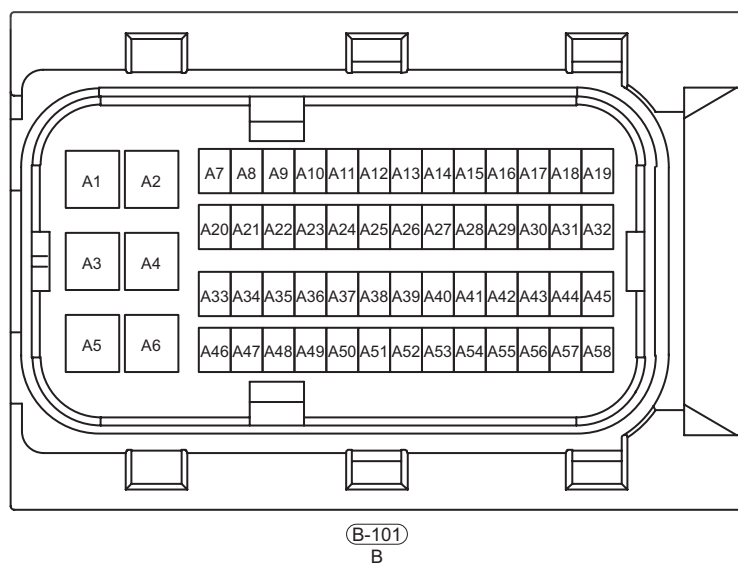
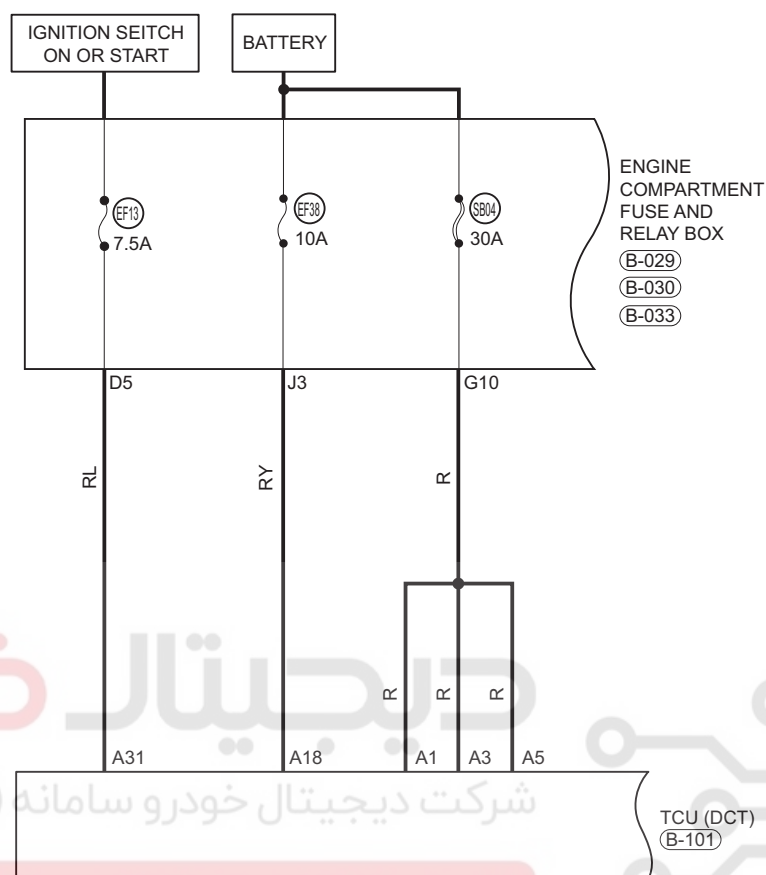
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Power Supply Circuit

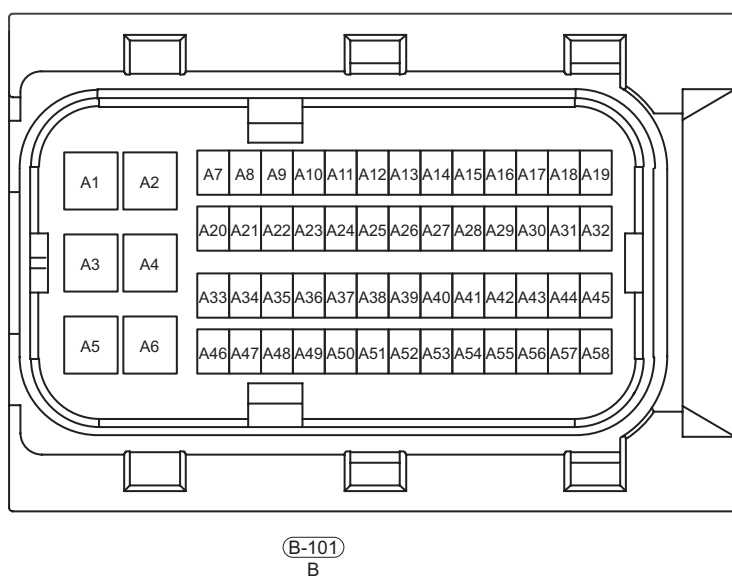
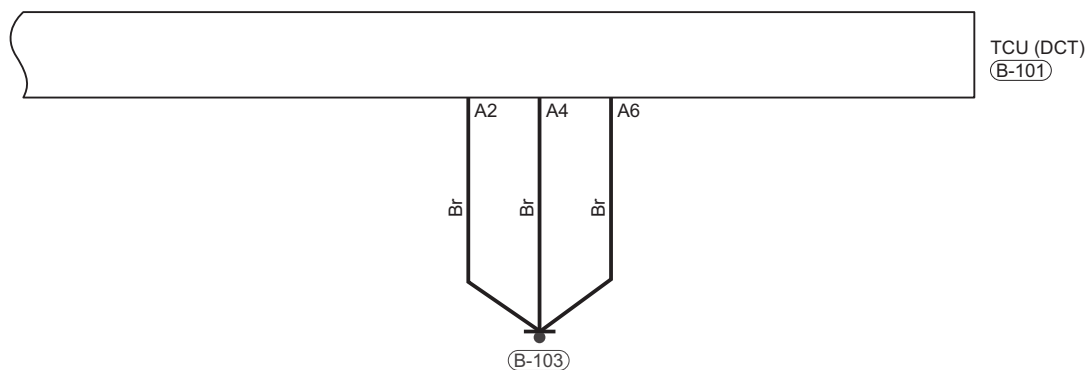
31



ET15300010

Ground Circuit

31



ET15300060

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

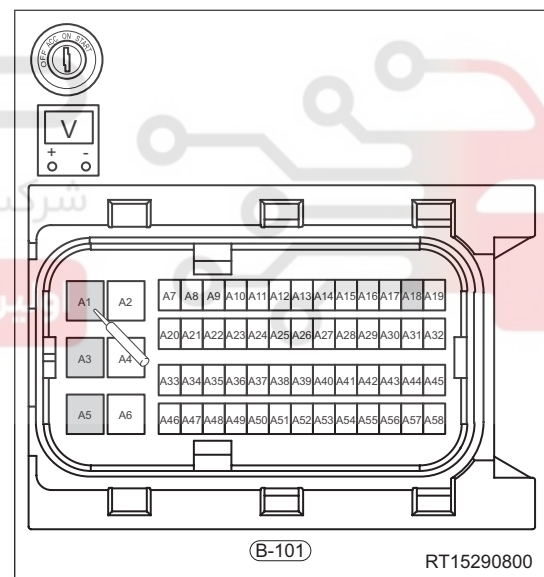
1 Check ECM power supply circuit

- Turn engine switch to OFF.
- Disconnect the TCU connector B-101.
- Check voltage between TCU connector B-101 terminal and body ground.

Multimeter Connection	Condition	Specified Condition
B-101 (A1, A3, A5, A18) - Body ground	Always	11 to 14 V

OK

Go to step 4



NG

2 Check TCU fuse

- Find TCU fuse EF38 (10 A) and SB04 (30 A) from engine compartment fuse and relay box.
- Check resistance of fuse.

Standard resistance: less than 1 Ω

NG

Replace TCU fuse

OK

3**Check wire harness and connector (TCU - engine compartment fuse and relay box)**

- Disconnect engine compartment fuse and relay box connectors B-029 and B-030.
- Check wire harness between connector terminals on wire harness side.

Check for Open

Multimeter Connection	Specified Condition
B-101 (A1, A3, A5) - B-030 (G10)	Continuity
B-101 (A18) - B-029 (J3)	Continuity

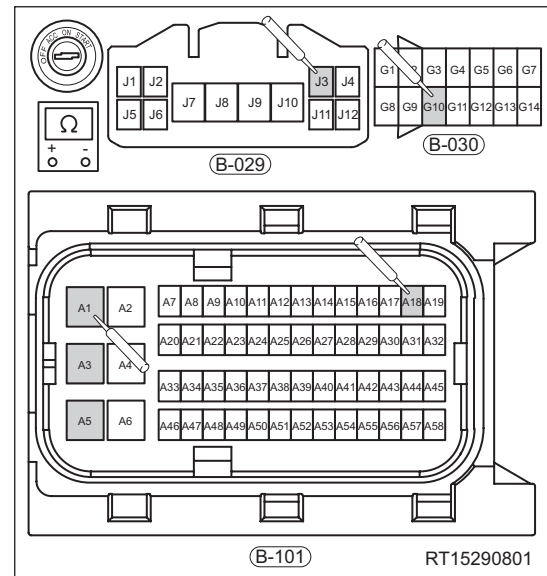
Check for Short

Multimeter Connection	Specified Condition
B-101 (A1, A3, A5) or B-030 (G10) - Body ground	No continuity
B-101 (A1, A3, A5) or B-030 (G10) - Battery positive	No continuity

Multimeter Connection	Specified Condition
B-101 (A1, A3, A5) or B-030 (G10) - Body ground	No continuity
B-101 (A1, A3, A5) or B-030 (G10) - Battery positive	No continuity

NG**Repair or replace wire harness or connector****OK**

Repair or replace engine compartment fuse and relay box or wire harness (engine compartment fuse and relay box - battery)



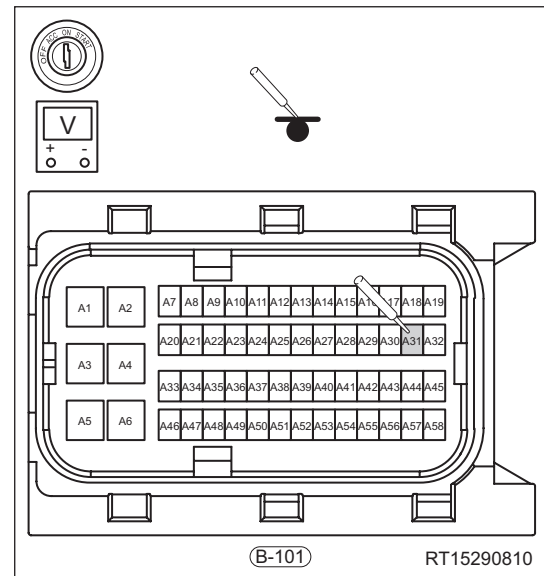
4 Check TCU power supply circuit (engine switch)

- Turn engine switch to ON.
- Disconnect the TCU connector B-101.
- Check voltage between TCU connector B-101 terminal and body ground.

Multimeter Connection	Condition	Specified Condition
B-101 (A31) - Body ground	Always	11 to 14 V

OK

Go to step 7



NG

5 Check TCU fuse

- Find TCU fuse EF13 (7.5A) from engine compartment fuse and relay box.
- Check resistance of fuse.

Standard resistance: less than 1 Ω

NG

Replace TCU fuse

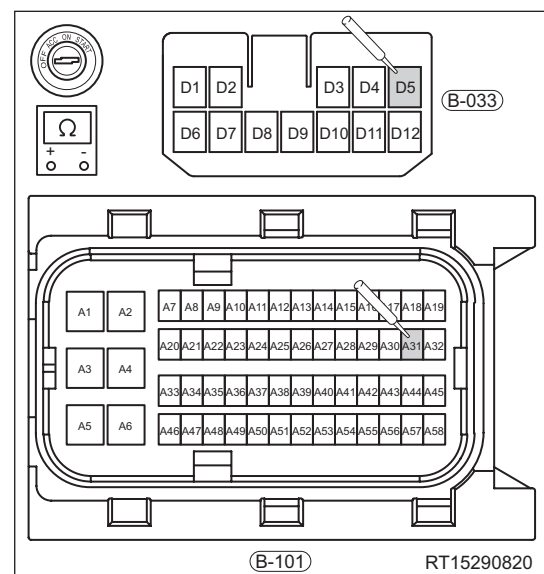
OK

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

- Disconnect engine compartment fuse box connector B-033.
- Check wire harness between connector terminals on wire harness side.

Check for Open

Multimeter Connection	Specified Condition
B-101 (A31) - B-033 (D5)	Continuity



31 - 625DHA TRANSMISSION

Check for Short

Multimeter Connection	Specified Condition
B-101 (A31) or B-033 (D5) - Body ground	No continuity
B-101 (A31) or B-033 (D5) - Battery positive	No continuity

NG

Repair or replace wire harness or connector

31

OK

7

Check ground line

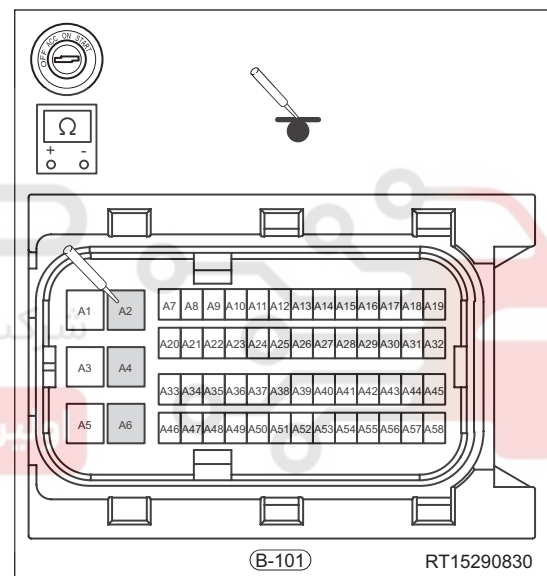
- Disconnect the ground point B-101.
- Check the TCU ground point (See page 31-16).
- Check the TCU ground wire harness.

Check for Open

Multimeter Connection	Specified Condition
B-101 (A2, A4, A6) - Body ground	Continuity

NG

Repair or replace wire harness or connector



OK

8

Check the engine switch assembly

NG

Replace engine switch assembly

OK

Repair or replace engine compartment fuse box or wire harness

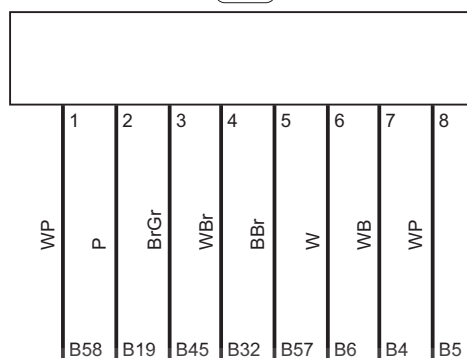
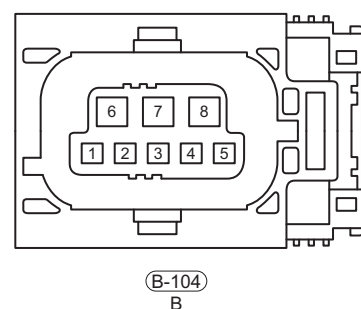
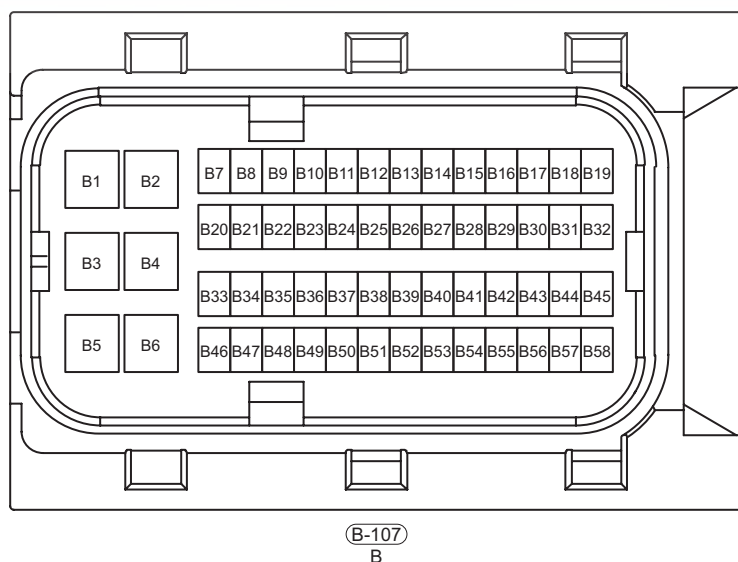
DTC	P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1, 2, 3, Low Side or High Side
DTC	P171200	ATIC Shift Actuator 1 SCB on Half Bridge 0, 2, 3, Low Side or High Side
DTC	P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side
DTC	P171400	ATIC Shift Actuator 1 Over 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

دیجیتال خودرو

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CLUTCH ACTUATOR MOTOR 1
(B-104)TCU (DCT)
(B-107)

ET15300050

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P171100	ATIC Shift Actuator 1 SCG on Half Bridge 1, 2, 3, Low Side or High Side	SCG on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	- Wire harness or connector - TCU
P171200	ATIC Shift Actuator 1 SCB on Half Bridge 0, 2, 3, Low Side or High Side	SCB on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	
P171300	ATIC Shift Actuator 1 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	OC on H-bridge or on 3rd half bridge (low side or high side output) Debounce time: 10 ms	
P171400	ATIC Shift Actuator 1 Over or Undervoltage	Undervoltage < 6 V Overvoltage > 25 V Debounce time: 10 ms	
P171900	Shift Actuator 1 RPS Signal Wrong PWM	Frequency is out of specified range Debounce time: 100 ms	
P171A00	Shift Actuator 1 Angle Difference Too High	Sequence failure/drift position signal Debounce time: 8 ms	
P171B00	Shift Actuator 1 Position Sensor Signal Incorrect ATIC vs. RPS	Shift actuator 2 position sensor signal incorrect. Difference of +/- 15 increments Debounce time: 10 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

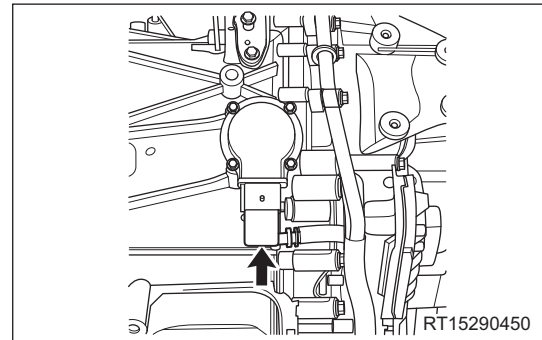
OK

2 Check clutch actuator motor 1 connector

- Disconnect the clutch actuator motor 1 connector B-104 (arrow).
- Check the clutch actuator motor 1 connector.

NG

Repair or replace connector



OK

3 Check clutch actuator motor 1 circuit

- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator motor 1 connector terminals and TCU connector terminals.

Check for Open

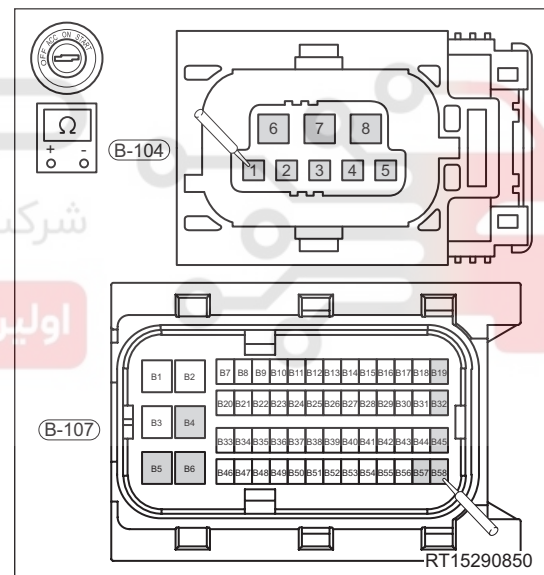
Multimeter Connection	Condition	Specified Condition
B-104 (1/2/3/4/5/6/7/8) - B-107 (B58/19/45/32/57/6/4/5)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-104 (1/2/3/4/5/6/7/8) or B-107 (B58/19/45/32/57/6/4/5) - Body ground	Always	No continuity
B-104 (1/2/3/4/5/6/7/8) or B-107 (B58/19/45/32/57/6/4/5) - Battery positive	Always	No continuity

NG

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



OK

4 Check clutch actuator motor 1

NG

Replace clutch actuator motor 1

OK

5 Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P171100, P171200, P171300, P171400, P171900, P171A00 or P171B00 still exist.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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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 Bridge, 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

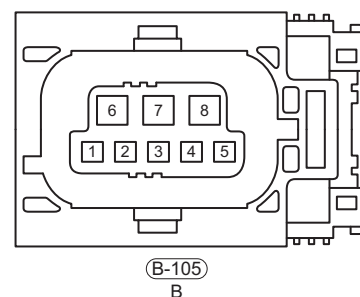
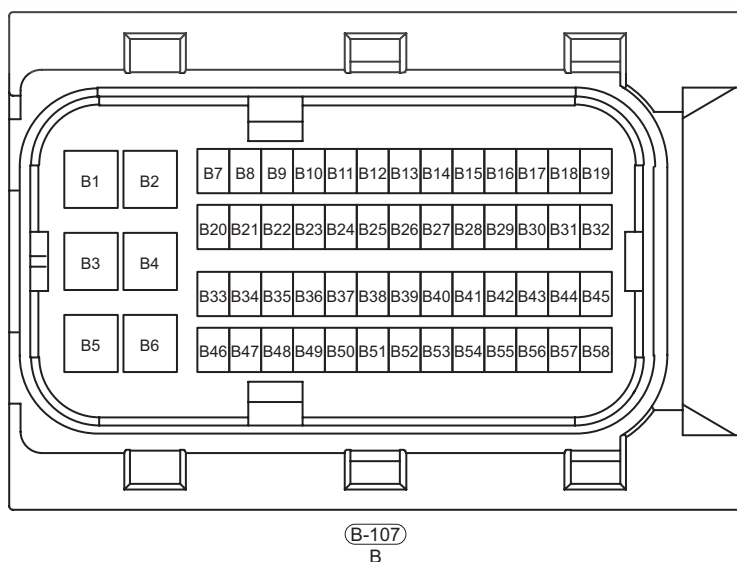
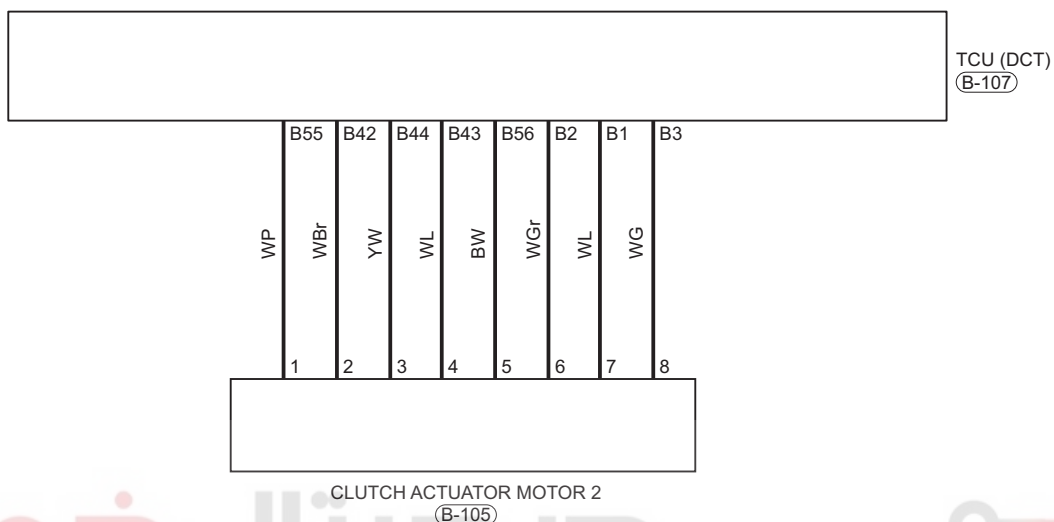
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ET15300070

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P171500	ATIC Shift Actuator 2 SCG on Half Bridge 0, 2, 3, Low Side or High Side	SCG on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	- Wire harness or connector - TCU
P171600	ATIC Shift Actuator 2 SCB on Half Bridge 0, 2, 3, Low Side or High Side	SCB on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	
P171700	ATIC Shift Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	OC on H-bridge or on 3rd half bridge (low side or high side output) Debounce time: 10 ms	
P171800	ATIC Shift Actuator 2 Over or Undervoltage	Undervoltage < 6 V Overvoltage > 25 V Debounce time: 10 ms	
P171C00	Shift Actuator 2 RPS Signal Wrong PWM	Frequency is out of specified range Debounce time: 100 ms	
P171D00	Shift Actuator 2 Angle Difference Too High	Sequence failure/drift position signal Debounce time: 8 ms	
P171E00	Shift Actuator 2 Position Sensor Signal Incorrect ATIC vs. RPS	Shift actuator 2 position sensor signal incorrect. Difference of +/- 15 increments Debounce time: 10 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

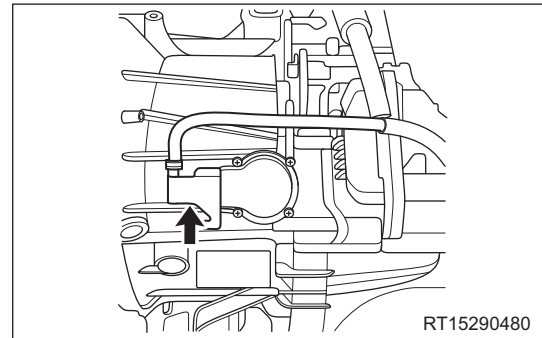
OK

2 Check clutch actuator motor 2 connector

- Disconnect the clutch actuator motor 2 connector B-105 (arrow).
- Check the clutch actuator motor 2 connector.

NG

Repair or replace connector



RT15290480

31

OK

3 Check clutch actuator motor 2 circuit

- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator motor 2 connector terminals and TCU connector terminals.

Check for Open

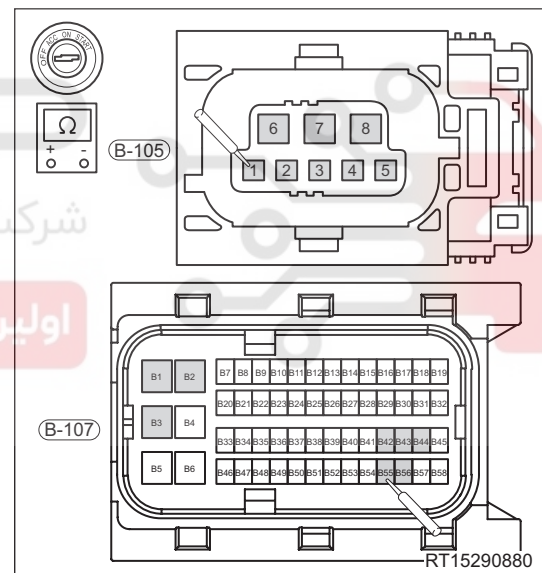
Multimeter Connection	Condition	Specified Condition
B-105 (1/2/3/4/5/6/7/8) - B-107 (B55/42/44/43/56/2/1/3)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-105 (1/2/3/4/5/6/7/8) or B-107 (B55/42/44/43/56/2/1/3) - Body ground	Always	No continuity
B-105 (1/2/3/4/5/6/7/8) or B-107 (B55/42/44/43/56/2/1/3) - Battery positive	Always	No continuity

NG

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



RT15290880

OK

4 Check clutch actuator motor 2

NG

Replace clutch actuator motor 2

OK

31 **5** Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P171500, P171600, P171700, P171800, P171C00, P171D00 or P171E00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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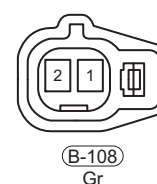
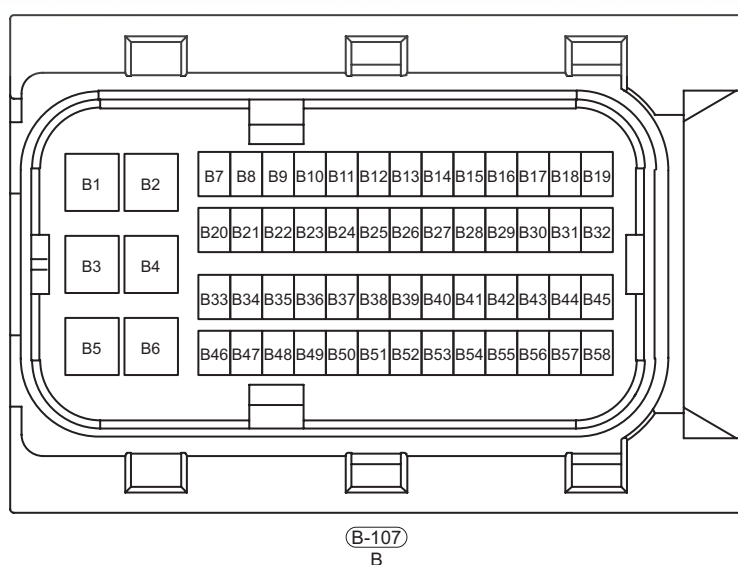
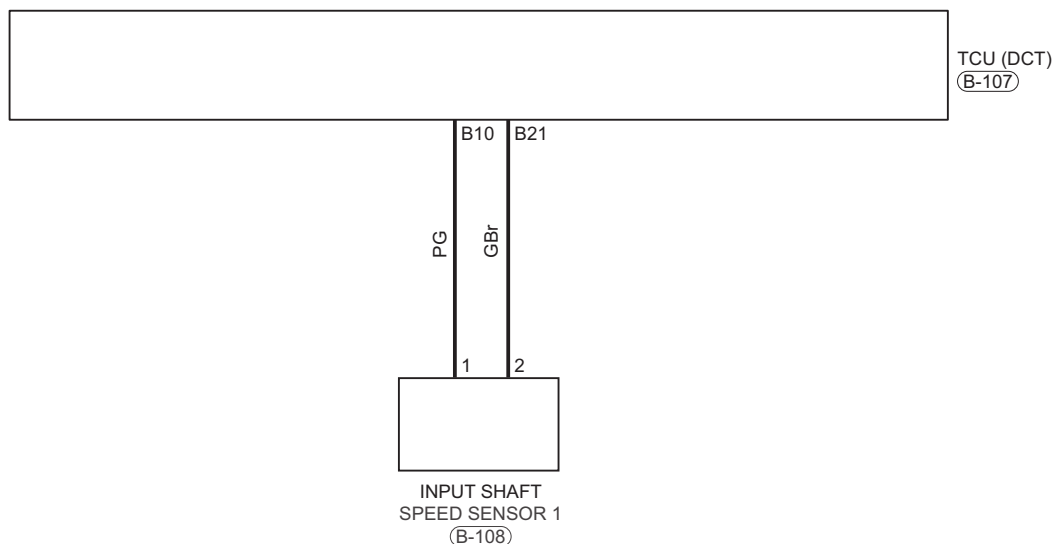
DTC	P071517	ISS 1 Circuit voltage above threshold
DTC	P071516	ISS 1 Circuit voltage below threshold
DTC	P071629	ISS 1 Signal invalid
DTC	P071564	ISS 1 Signal plausibility failure

دیجیتال خودرو

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ET15300080

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P071517	Circuit Voltage Above Threshold	SCB: Supply voltage > 13 V Supply implausible: Supply voltage > battery voltage + 0.5 V Debounce time: 40 ms	• Wire harness or connector • ISS1 • TCU
P071516	Circuit Voltage Below Threshold	SCG: Supply voltage < 4.5 V Supply implausible: Supply voltage < battery voltage - 2.5 V Debounce time: 40 ms	
P071629	Signal Invalid	Speed signal SCG or speed signal OL Speed signal SCB Speed signal frequency over high limit $\geq 12\text{kHz}$ Implausible frequency Debounce time: 40 ms	
P071564	ISS 1 Signal Plausibility Failure	Range check (input shaft) Gradient check of ISS1 ISS1 plausibility through ISS2 ISS1 plausibility through OSS Plausibility engaged gear Debounce time: 100 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

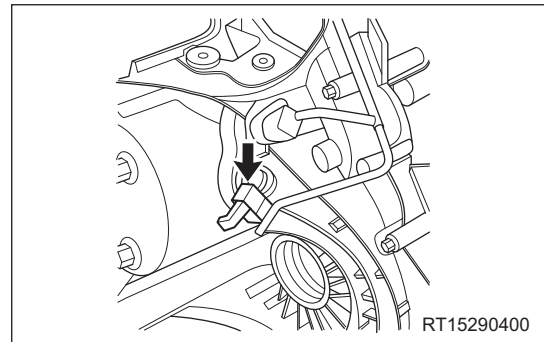
NG

Repair or replace ground wire harness or ground point

OK

2**Check ISS1 connector**

- Disconnect the ISS1 connector B-108 (arrow).
- Check the ISS1 connector.

NG**Repair or replace connector****OK****3****Check ISS1 circuit**

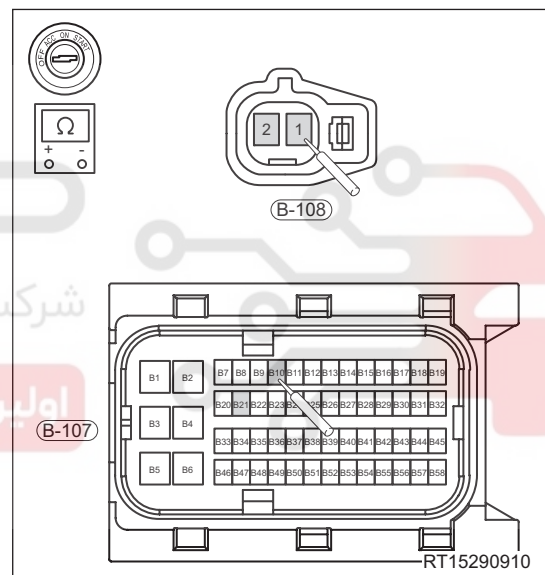
- Disconnect the TCU connector B-107.
- Check wire harness between ISS1 connector terminals and TCU connector terminals.

Check for Open

Multimeter Connection	Condition	Specified Condition
B-108 (1) - B-107 (B10)	Always	Continuity
B-108 (2) - B-107 (B21)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-108 (1) or B-107 (B10) - Body ground	Always	No continuity
B-108 (1) or B-107 (B10) - Battery positive	Always	No continuity
B-108 (2) or B-107 (B21) - Battery positive	Always	No continuity
B-108 (2) or B-107 (B21) - Battery positive	Always	No continuity

NG**Repair or replace wire harness or connector (ISS1 - TCU)**

OK

4 Check ISS1

NG

Replace ISS1

OK

5 Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P071517, P071516, P071629 or P071564 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

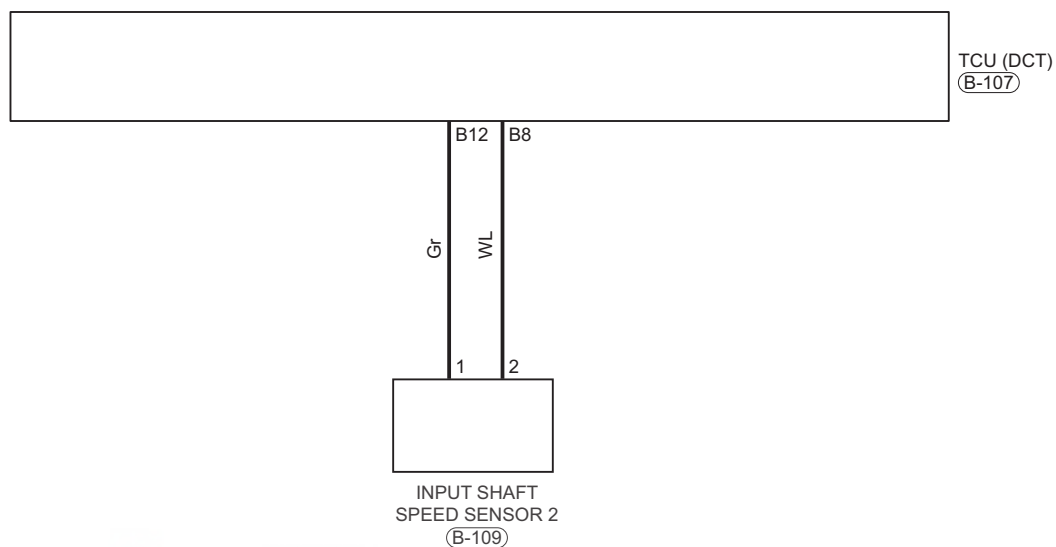
DTC	P170000	ISS 2 Supply Voltage Over 13 V
DTC	P170100	ISS 2 Supply Voltage Over 4.5 V
DTC	P170200	ISS 2 Signal Invalid
DTC	P170200	ISS 2 Value Not Plausible

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

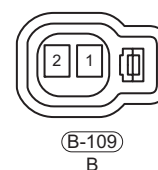
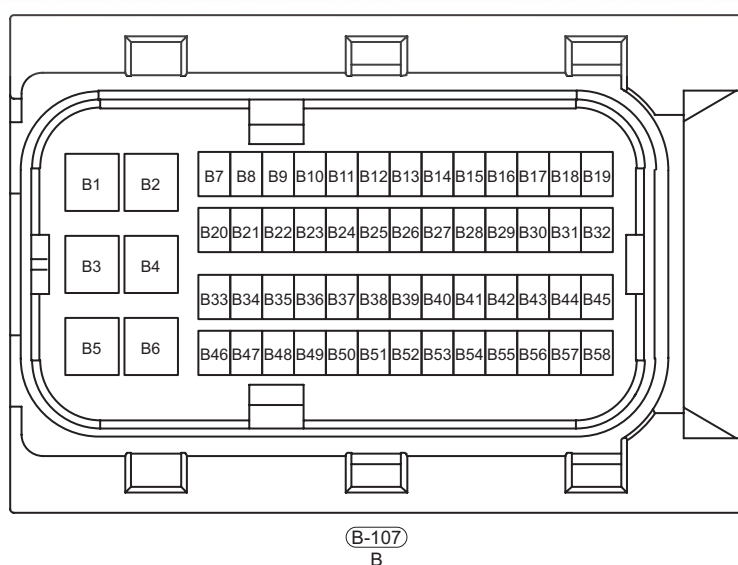




دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ET15300090

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P170000	ISS 2 Supply Voltage Over 13 V	SCB: Supply voltage > 13 V Supply implausible: Supply voltage > battery voltage + 0.5 V Debounce time: 40 ms	• Wire harness or connector • ISS1 • TCU
P170100	ISS 2 Supply Voltage Over 4.5 V	SCG: Supply voltage < 4.5 V Supply implausible: Supply voltage < battery voltage - 2.5 V Debounce time: 40 ms	
P170200	ISS 2 Signal Invalid	Speed signal SCG or speed signal OL Speed signal SCB Speed signal frequency over high limit ≥ 12 kHz Implausible frequency Debounce time: 40 ms	
P172100	ISS 2 Value Not Plausible	Range check (input shaft speed < max. input shaft speed e.g. 10.000 rpm) Gradient check dependent on brake, hand-brake, ESP, ABS, etc. Plausibility output shaft-/axle-speed-signals (CAN) Plausibility engaged gear Plausibility by ISS1 speed and engaged gears Debounce time: 100 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

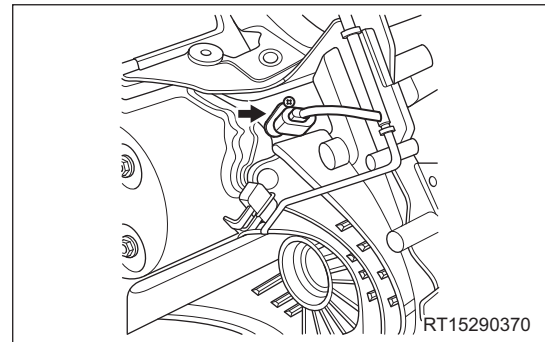
NG

Repair or replace ground wire harness or ground point

OK

2**Check ISS2 connector**

- Disconnect the ISS2 connector B-109 (arrow).
- Check the ISS2 connector.

NG**Repair or replace connector****OK****31****3****Check ISS1 circuit**

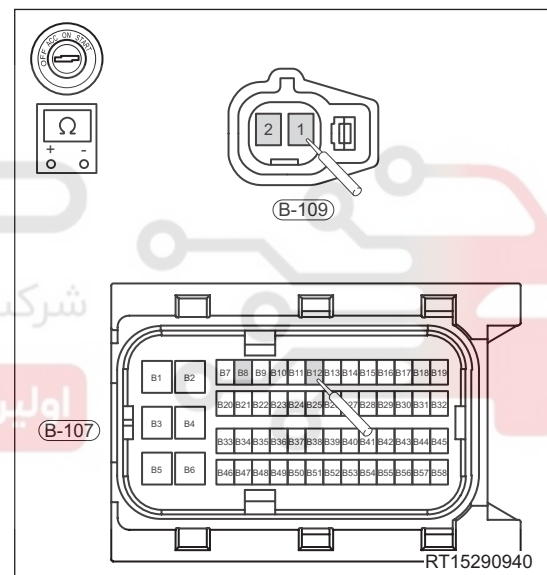
- Disconnect the TCU connector B-107.
- Check wire harness between ISS2 connector terminals and TCU connector terminals.

Check for Open

Multimeter Connection	Condition	Specified Condition
B-109 (1) - B-107 (B12)	Always	Continuity
B-109 (2) - B-107 (B8)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-109 (1) or B-107 (B12) - Body ground	Always	No continuity
B-109 (1) or B-107 (B12) - Battery positive	Always	No continuity
B-109 (2) or B-107 (B8) - Battery positive	Always	No continuity
B-109 (2) or B-107 (B8) - Battery positive	Always	No continuity

NG**Repair or replace wire harness or connector (ISS2 - TCU)**

دیجیتال خودرو (مسئول محدود)
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

OK

4 Check ISS2

NG

Replace ISS2

OK

31 5 Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P171500, P171600, P171700, P171800, P171C00, P171D00 or P171E00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

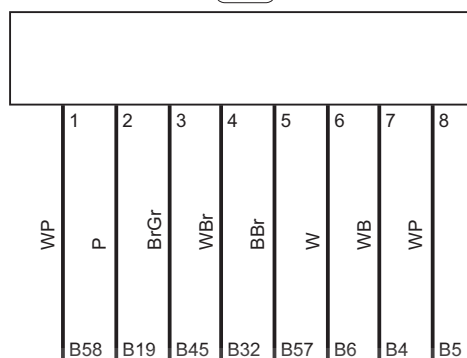
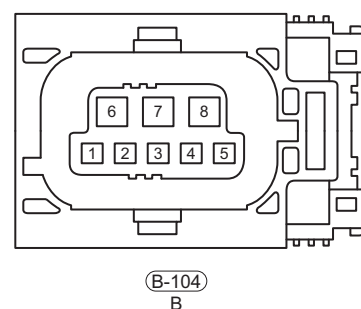
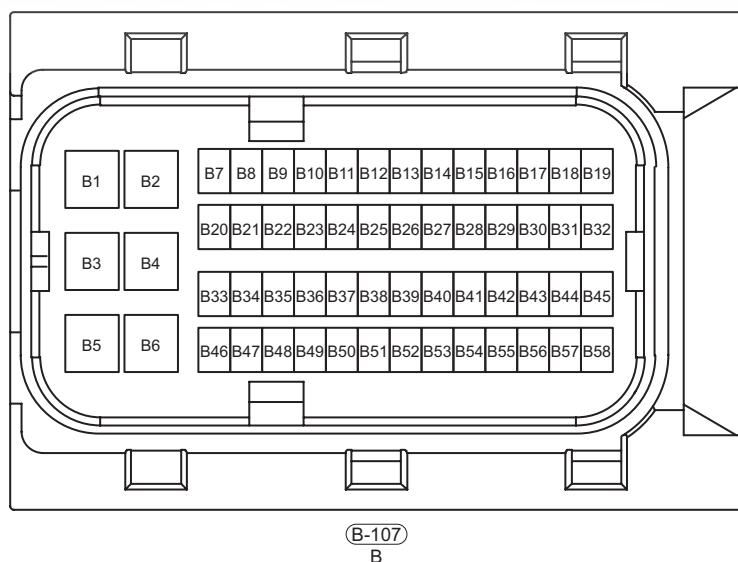
DTC	P090011	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side
DTC	P090012	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side
DTC	P090013	ATIC Clutch Actuator 1 on H-Bridge or on 3rd Half Bridge, Low Side or High Side
DTC	P09011C	ATIC Clutch Actuator 1
DTC	P170B00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

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



CLUTCH ACTUATOR MOTOR 1
(B-104)TCU (DCT)
(B-107)

ET15300050

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P090011	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side	SCG on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	- Wire harness or connector - ISS1 - TCU
P090012	ATIC Clutch Actuator 1 on Half Bridge 1, 2, 3, Low Side or High Side	SCB on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	
P090013	ATIC Clutch Actuator 1 on H-Bridge or on 3rd Half Bridge, Low Side or High Side	OC on H-bridge or on 3rd half bridge (low side or high side output) Debounce time: 10 ms	
P09011C	ATIC Clutch Actuator 1	Undervoltage < 6 V Overvoltage > 25 V Debounce time: 100 ms	
P170B00	Clutch Actuator 1 Position Signal Correlation Not Plausible	Correlation between 3 Hall signals not plausible Error occurs 3 times in 1000 ms	
P170D00	Clutch Actuator 1 Position Sensor Signal Incorrect ATIC vs. HALL	Clutch 1 actuator position sensor signal not plausible Difference of +/- 15 increments Debounce time: 10 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

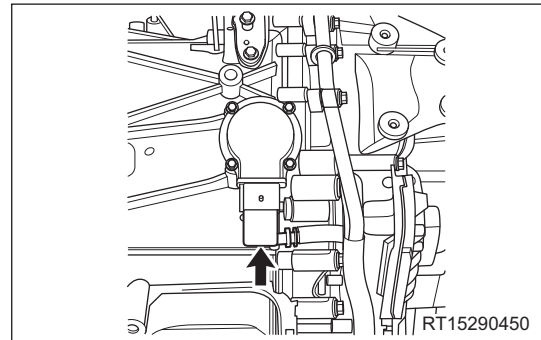
OK

2 Check clutch actuator 1 connector

- Disconnect the clutch actuator 1 connector B-104 (arrow).
- Check the clutch actuator 1 connector.

NG

Repair or replace connector



OK

3 Check clutch actuator 1 connector.

- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator 1 connector terminals and TCU connector terminals.

Check for Open

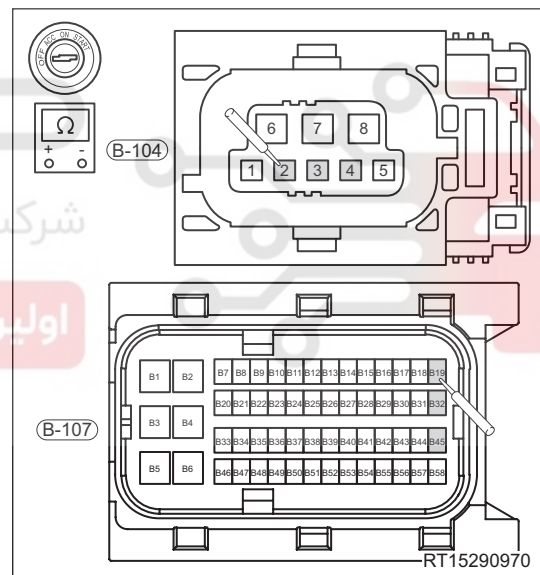
Multimeter Connection	Condition	Specified Condition
B-104 (2) - B-107 (B19)	Always	Continuity
B-104 (3) - B-107 (B45)	Always	Continuity
B-104 (4) - B-107 (B32)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-104 (2, 3, 4) or B-107 (B19, B45, B32) - Body ground	Always	No continuity
B-104 (2, 3, 4) or B-107 (B19, B45, B32) - Battery positive	Always	No continuity

NG

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



OK

4 Check clutch actuator 1

NG

Replace clutch actuator 1

OK

5 Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P090011, P090012, P090013, P09011C, P170B00 or P170D00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC	P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1, 2, 3, Low Side or High Sides
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

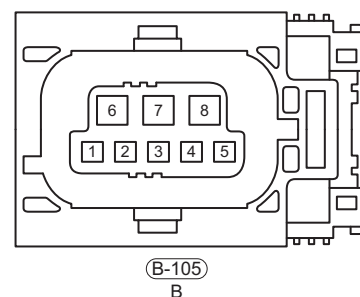
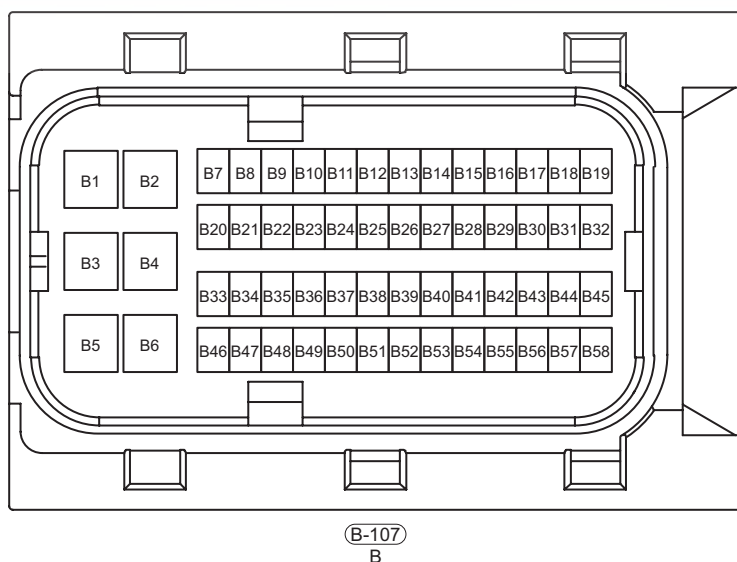
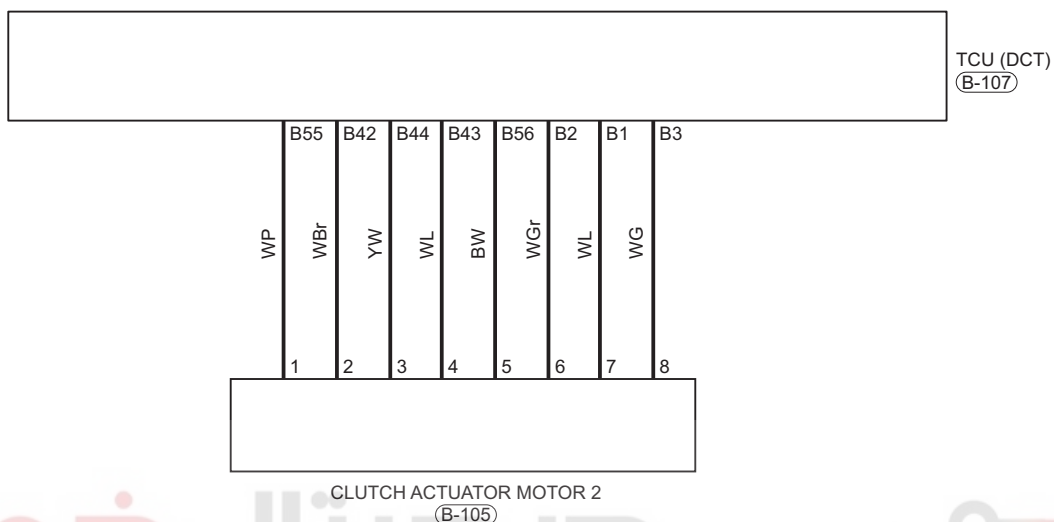
31

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





ET15300070

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P170300	ATIC Clutch Actuator 2 SCG on Half Bridge 1, 2, 3, Low Side or High Sides	SCG on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	- Wire harness or connector - ISS2 - TCU
P170400	ATIC Clutch Actuator 2 SCB on Half Bridge 1, 2, 3, Low Side or High Side	SCB on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	
P170500	ATIC Clutch Actuator 2 OC on H-bridge or on 3rd Half Bridge, Low Side or High Side	OC on H-bridge or on 3rd half bridge (low side or high side output) Debounce time: 10 ms	
P170600	ATIC Clutch Actuator 2 Over or Undervoltage	Undervoltage < 6 V Overvoltage > 25 V Debounce time: 100 ms	
P170C00	Clutch Actuator 2 Position Signal Correlation Not Plausible	Correlation between 3 Hall signals not plausible Error occurs 3 times in 1000 ms	
P170E00	Clutch Actuator 2 Position Sensor Signal Incorrect ATIC vs. HALL	Clutch 2 actuator position sensor signal not plausible Difference of +/- 15 increments Debounce time: 10 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

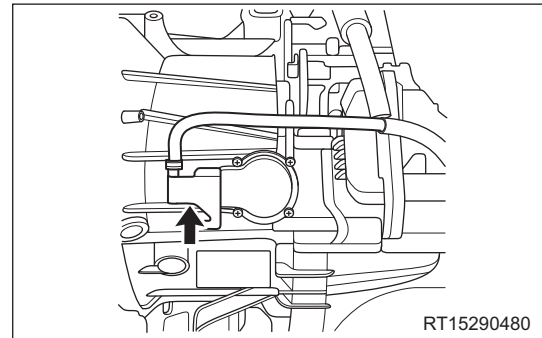
OK

2 Check clutch actuator 2 connector

- Disconnect the clutch actuator 2 connector B-105 (arrow).
- Check the clutch actuator 2 connector.

NG

Repair or replace connector



31

OK

3 Check clutch actuator 2 circuit

- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator 2 connector terminals and TCU connector terminals.

Check for Open

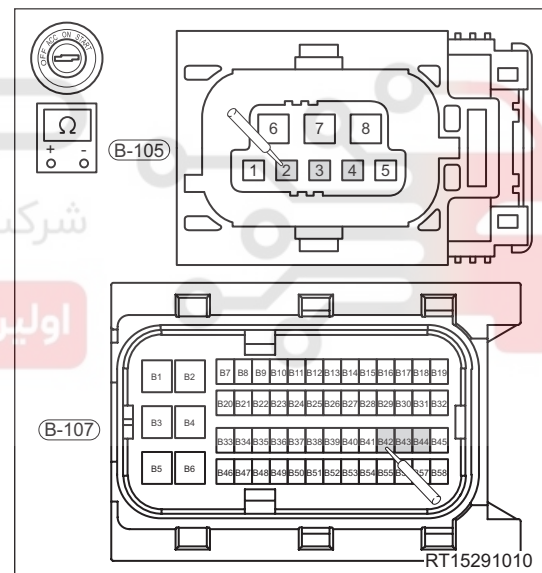
Multimeter Connection	Condition	Specified Condition
B-105 (2) - B-107 (B42)	Always	Continuity
B-105 (3) - B-107 (B44)	Always	Continuity
B-105 (4) - B-107 (B43)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-105 (2, 3, 4) or B-107 (B42, B44, B43) - Body ground	Always	No continuity
B-105 (2, 3, 4) or B-107 (B42, B44, B43) - Battery positive	Always	No continuity

NG

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



OK

4 Check clutch actuator 2

NG

Replace clutch actuator 2

OK

31 **5** Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P170300, P170400, P170500, P170600, P170C00 or P170E00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

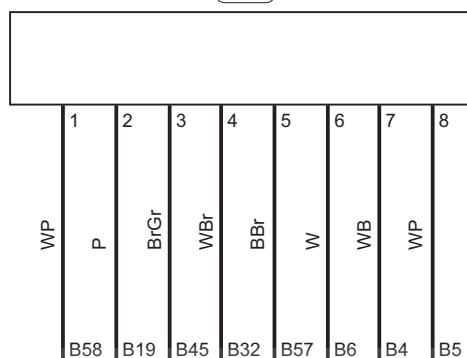
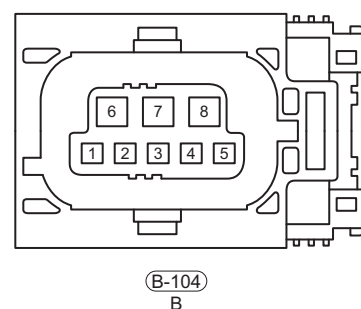
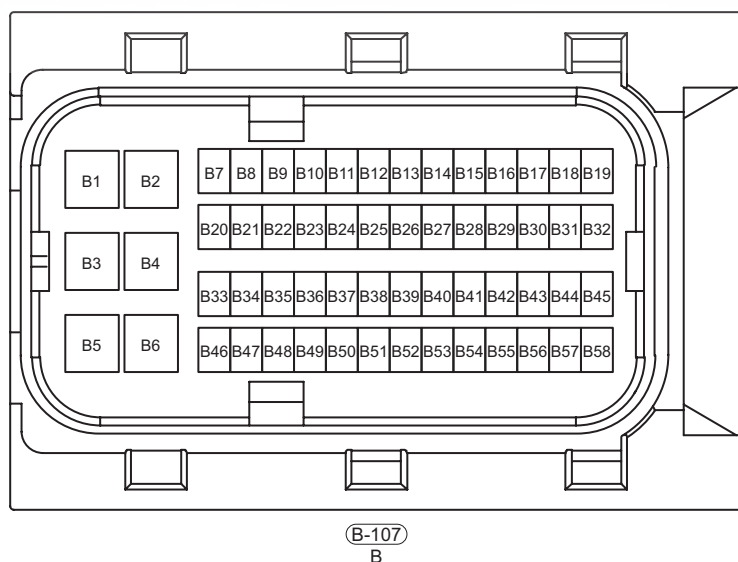
DTC	P170700	Clutch Actuator 1 Hall Sensor Power Supply Voltage Under 3.72 V
DTC	P170800	Clutch Actuator 1 Hall Sensor Power Supply Voltage Over 5.8 V

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



CLUTCH ACTUATOR MOTOR 1
(B-104)TCU (DCT)
(B-107)

ET15300050

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P170700	Clutch Actuator 1 Hall Sensor Power Supply Voltage Under 3.72 V	Supply voltage < 3.72 V Debounce time: 40 ms	- Clutch actuator 1 - Wire harness or connector - MAM
P170800	Clutch Actuator 1 Hall Sensor Power Supply Voltage Over 5.8 V	Supply voltage > 5.8 V Debounce time: 40 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

31

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

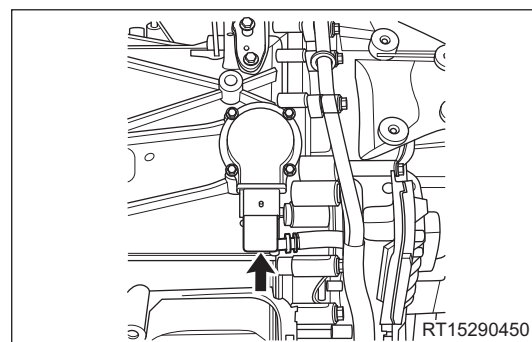
OK

2 Check clutch actuator 1 connector

- Disconnect the clutch actuator 1 connector B-104 (arrow).
- Check the clutch actuator 1 connector.

NG

Repair or replace connector



OK

3 Check clutch actuator 1 circuit

- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator 1 connector terminals and TCU connector terminals.

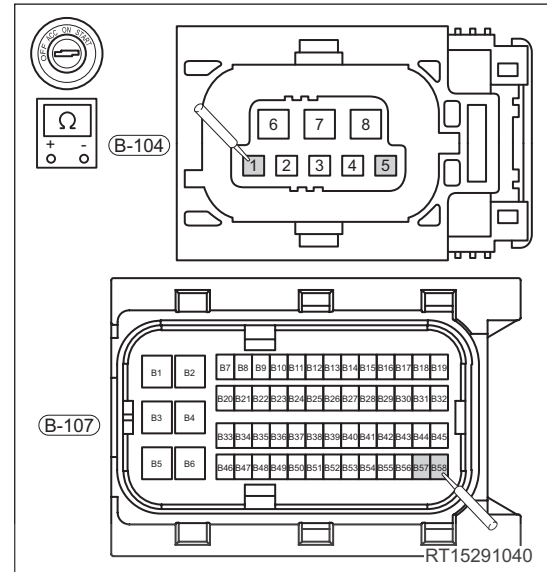
Check for Open

31

Multimeter Connection	Condition	Specified Condition
B-104 (1) - B-107 (B58)	Always	Continuity
B-104 (5) - B-107 (B57)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-104 (1, 5) or B-107 (B58, B57) - Body ground	Always	No continuity
B-104 (1, 5) or B-107 (B58, B57) - Battery positive	Always	No continuity



NG

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

OK

4 Check clutch actuator 1

NG

Replace clutch actuator 1

OK

5 Check DTC

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P170700 or P170800 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

31

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



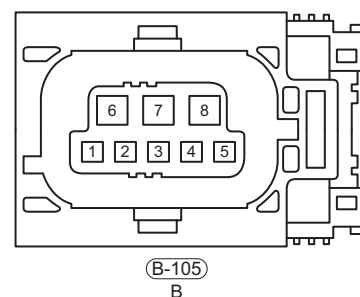
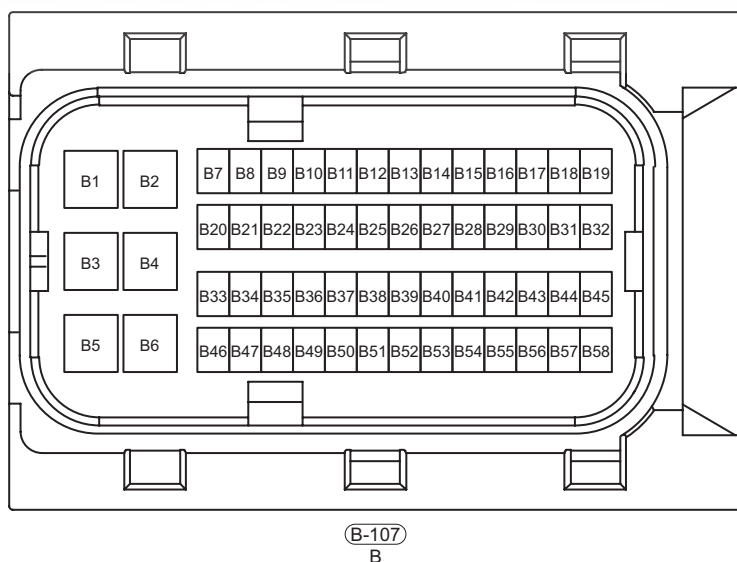
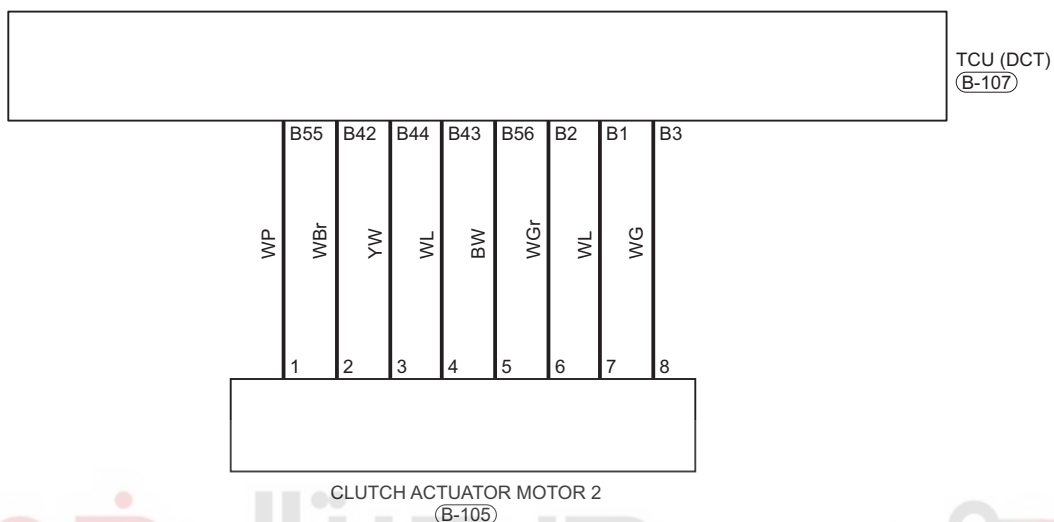
DTC	P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V
DTC	P170400	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





ET15300070

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P170900	Clutch Actuator 2 Hall Sensor Power Supply Voltage Under 3.72 V	Supply voltage < 3.72 V Debounce time: 40 ms	- Clutch actuator 2 - Wire harness or connector - MAM
P170400	Clutch Actuator 2 Hall Sensor Power Supply Voltage Over 5.8 V	SCB on half bridge 1, 2 or 3 (low side or high side output) Debounce time: 10 ms	

DTC Confirmation Procedure

31

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

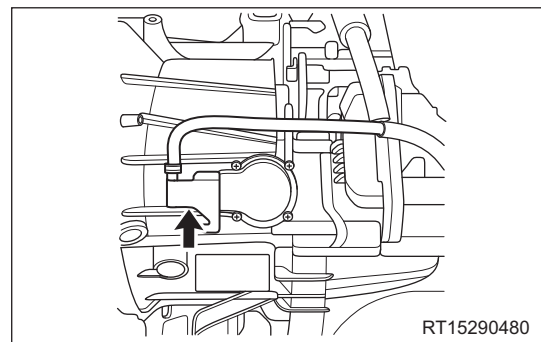
OK

2 Check clutch actuator 2 connector

- Disconnect the clutch actuator 2 connector B-105 (arrow).
- Check the clutch actuator 2 connector.

NG

Repair or replace connector



OK

3 Check clutch actuator 2 circuit

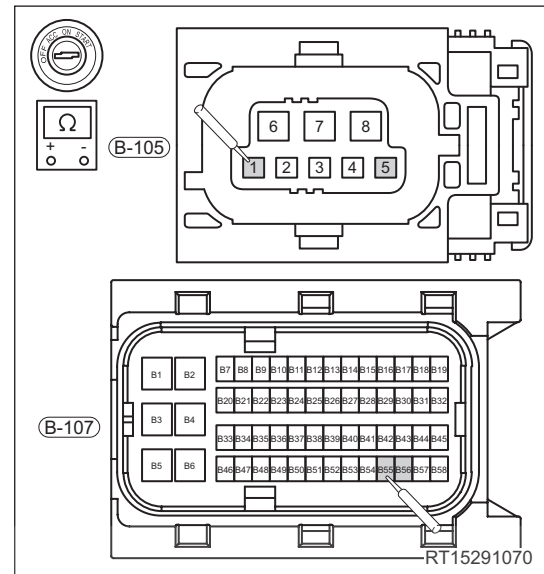
- Disconnect the TCU connector B-107.
- Check wire harness between clutch actuator 2 connector terminals and TCU connector terminals.

Check for Open

Multimeter Connection	Condition	Specified Condition
B-105 (1) - B-107 (B55)	Always	Continuity
B-105 (5) - B-107 (B56)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
B-105 (1, 5) or B-107 (B55, B56) - Body ground	Always	No continuity
B-105 (1, 5) or B-107 (B55, B56) - Battery positive	Always	No continuity



31

NG

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

OK

4 Check clutch actuator 2

NG

Replace clutch actuator 2

OK

5 Check DTC

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P170900 or P170A00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



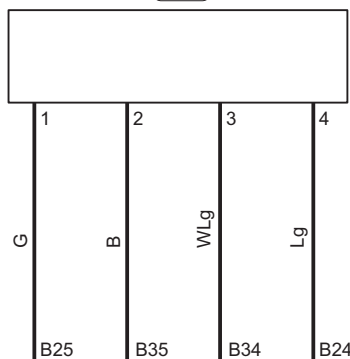
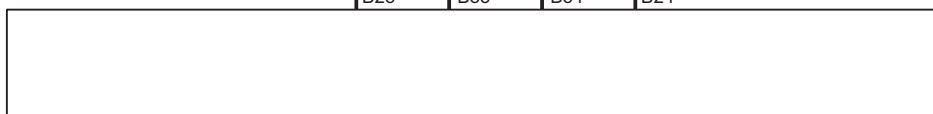
DTC	P070514	TRS Circuit Short to Ground or Open
DTC	P070538	TRS Circuit Short to Battery
DTC	P070562	TRS Circuit Short to Ground or Open
DTC	P070512	TRS Signal Frequency Failure
DTC	P172400	TRS Teach in Failure

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



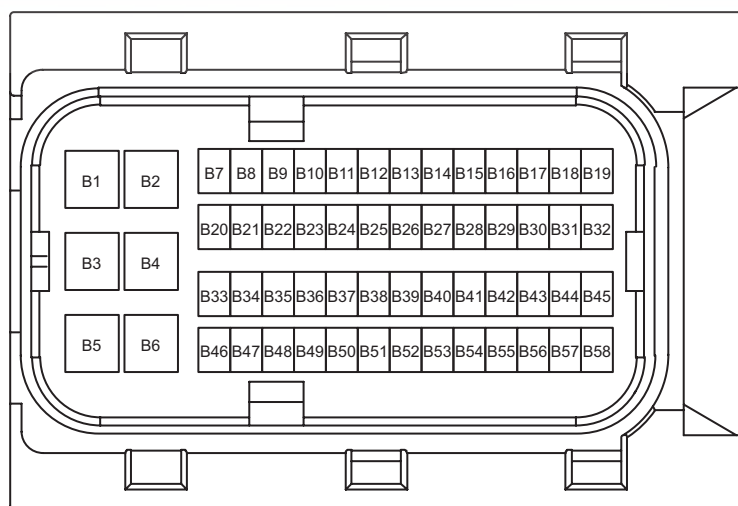
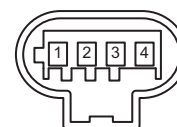
GEAR POSITION SENSOR
(B-106)TCU (DCT)
(B-107)

31

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

(B-107)
B(B-106)
B

ET15300140

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P070514	TRS Circuit Short to Ground or Open	Power supply of transmission range sensor short circuit to ground or open Circuit supply voltage < 4.75 V Debounce time: 40 ms	- Transmission range sensor - Transmission wire harness - TCU
P070538	TRS Circuit Short to Battery	Power supply of transmission range sensor short circuit to battery Supply voltage > 5.18 V Debounce time: 40 ms	
P070562	TRS Circuit Short to Ground or Open	TRS teach-in not successful.	
P070512	TRS Signal Frequency Failure	TRS signal frequency failure PWM failure Debounce time: 40 ms	
P172400	TRS Teach in Failure	Sum of PWM1 and PWM2 has to be 100% +/- range Additional sum of position can be checked (PRND) Physical/mechanical range check Debounce time: 40 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

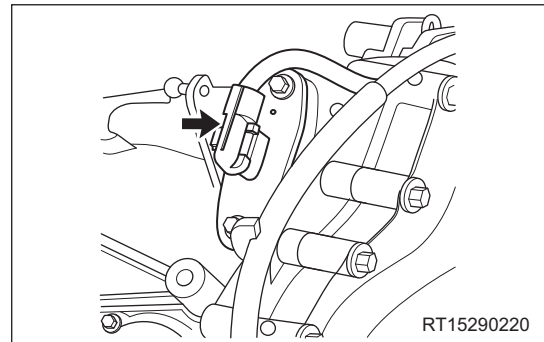
NG

Repair or replace ground wire harness or ground point

OK

2 Check transmission range sensor connector

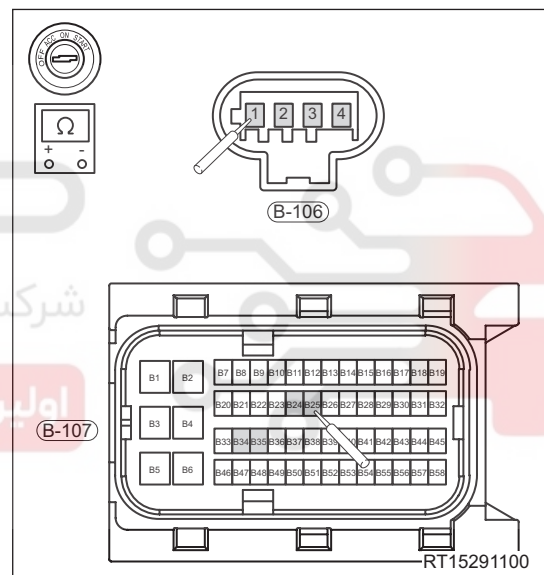
- Disconnect the transmission range sensor connector B-106 (arrow).
- Check the transmission range sensor connector.

NG**Repair or replace connector****OK****3 Check transmission range sensor circuit**

- Disconnect the TCU connector B-107.
- Check wire harness between transmission range sensor connector terminals and TCU connector terminals.

Check for Open

Multimeter Connection	Condition	Specified Condition
B-106 (1) - B-107 (B25)	Always	Continuity
B-106 (2) - B-107 (B35)	Always	Continuity
B-106 (3) - B-107 (B34)	Always	Continuity
B-106 (4) - B-107 (B24)	Always	Continuity

**Check for Short**

Multimeter Connection	Condition	Specified Condition
B-106 (1, 2, 3, 4) or B-107 (B25, B35, B34, B24) - Body ground	Always	No continuity
B-106 (1, 2, 3, 4) or B-107 (B25, B35, B34, B24) - Battery positive	Always	No continuity

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

OK

4 Check transmission range sensor

NG

Replace transmission range sensor

OK

5 Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P070514, P070538 or P070562 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

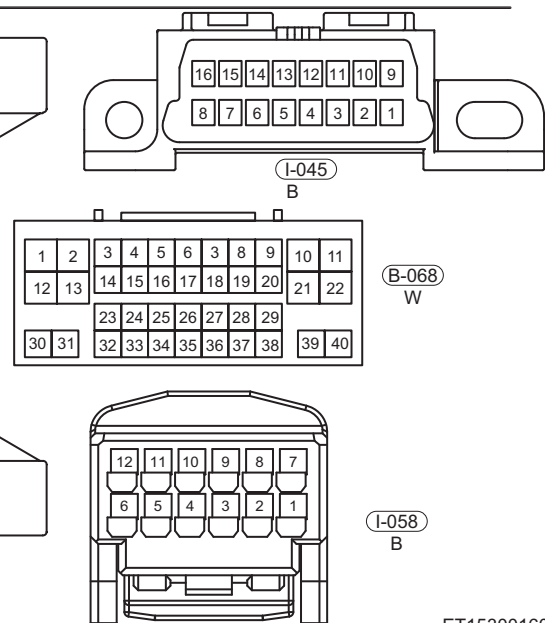
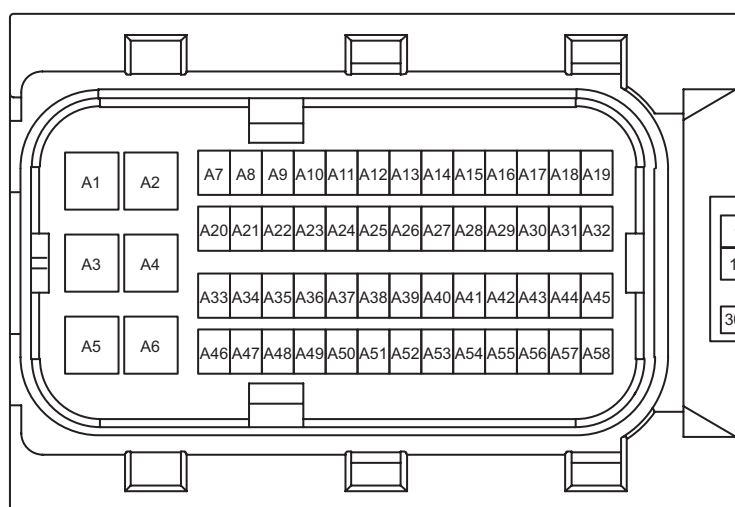
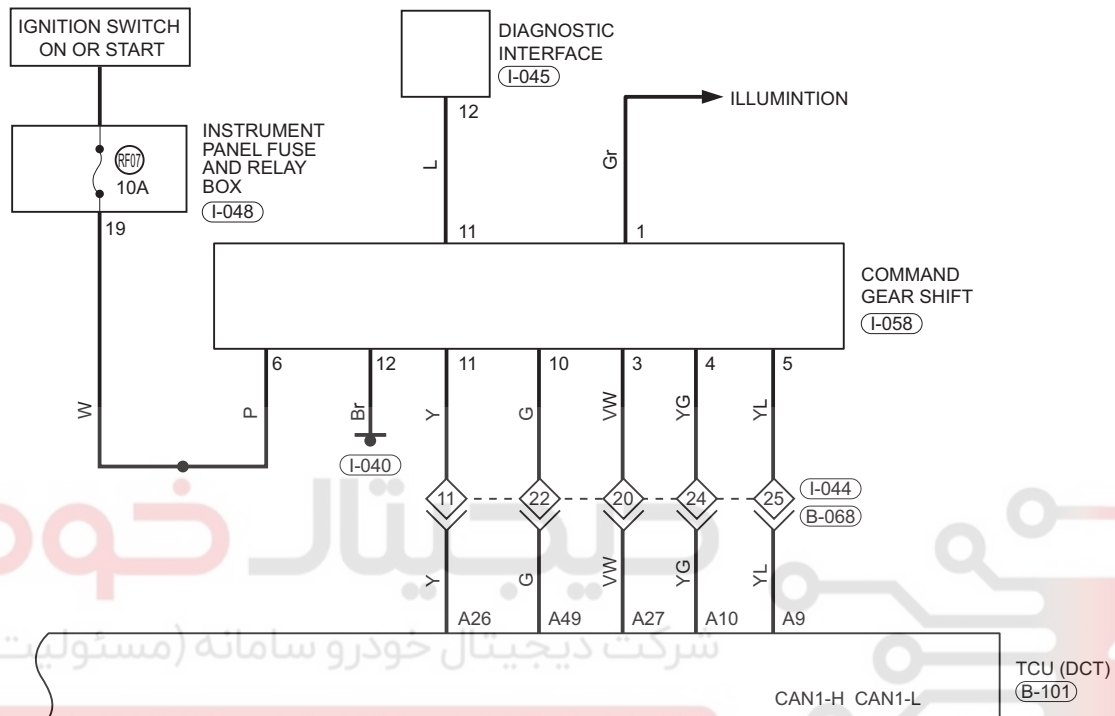
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC

P082664

Manual Switches

31



ET15300160

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P082664	Manual Switches - Signal Plausibility Failure	TRS signal without error, both switches must be activated at the same time while shift lever is in P, R or N	- Shift lever (up/down switches) - Transmission wire harness - Wire harness and connector - Command gear shift - TCU

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

31

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

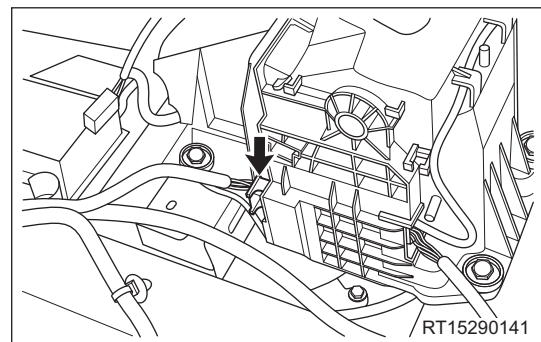
OK

2 Check command gear shift connector

- Disconnect the command gear shift connector I-058.
- Check the command gear shift connector.

NG

Repair or replace connector



OK

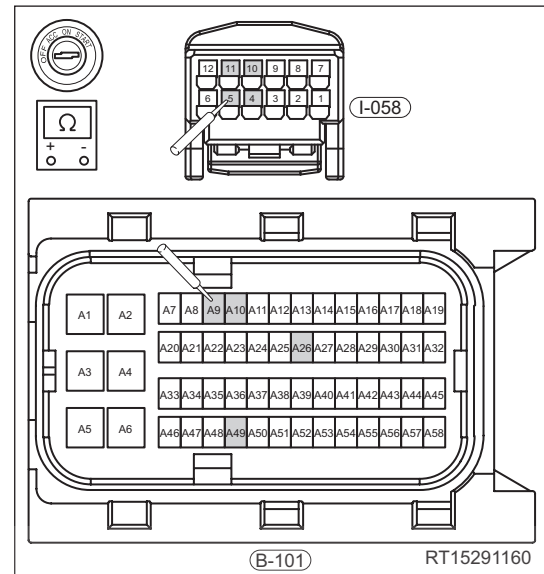
3 Check command gear shift circuit

- Disconnect the TCU connector B-101.
- Check wire harness between command gear shift connector terminals and TCU connector terminals.

Check for Open

31

Multimeter Connection	Condition	Specified Condition
I-058 (5) - B-101 (A9)	Always	Continuity
I-058 (4) - B-101 (A10)	Always	Continuity
I-058 (10) - B-101 (A49)	Always	Continuity
I-058 (11) - B-101 (A26)	Always	Continuity

**Check for Short**

Multimeter Connection	Condition	Specified Condition
I-058 (5, 4, 10, 11) or B-101 (A9, A10, A49, A26) - Body ground	Always	No continuity
I-058 (5, 4, 10, 11) or B-101 (A9, A10, A49, A26) - Battery positive	Always	No continuity

NG

Repair or replace wire harness or connector (command gear shift - TCU)

OK

4 Check command gear shift

NG

Replace command gear shift

OK

5

Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P082664 still exists.

NG

Replace TCU

OK

31

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

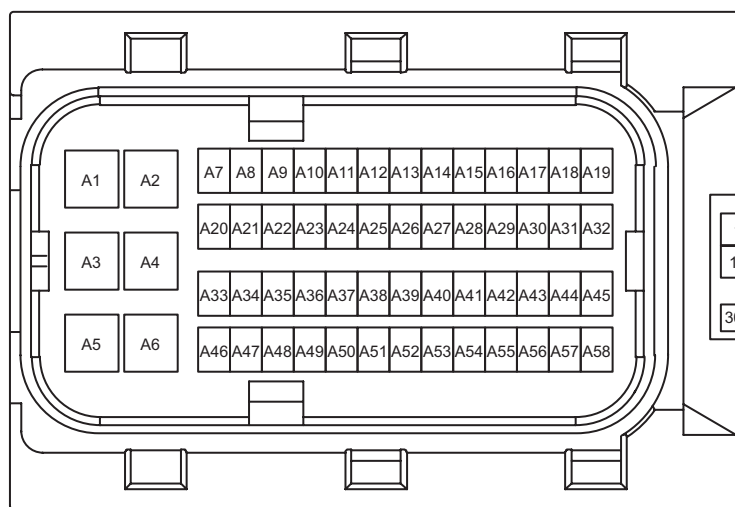
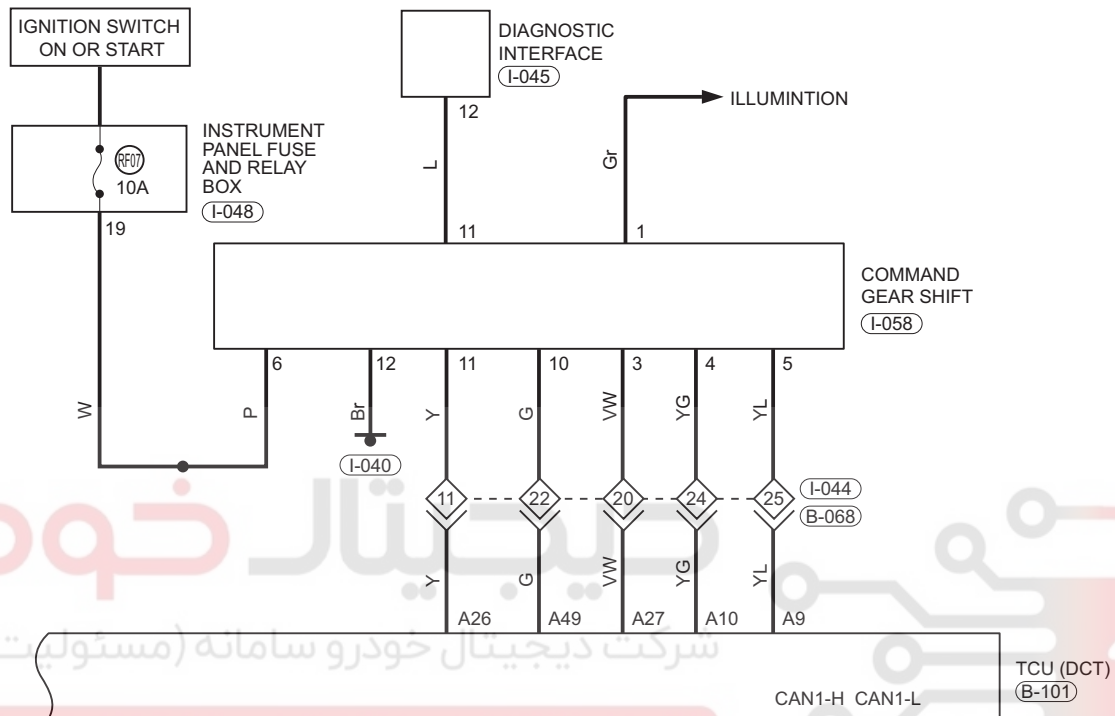
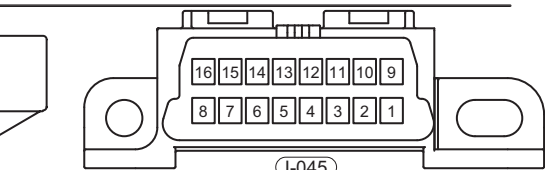
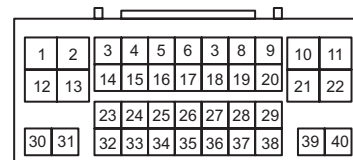
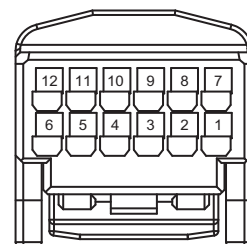


DTC

P092901

Shift Lock Control Circuit

31

(B-101)
B(I-045)
B(B-068)
W(I-058)
B

ET15300160

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P092901	Shift Lock Control Circuit - General Electrical Failure	In case of shift lock is active: It is possible to detect short circuit to battery In case of shift lock is inactive: It is possible to detect short circuit to ground and open circuit Debounce time: 40 ms	- Shift lever - Wire harness and connector - Shift lever - Vehicle wire harness - TCU

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

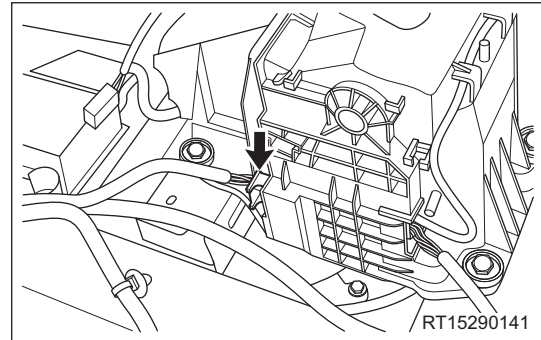
NG

Repair or replace ground wire harness or ground point

OK

2**Check command gear shift connector**

- Disconnect the command gear shift connector I-058.
- Check the command gear shift connector.

NG**Repair or replace connector****OK****3****Check command gear shift circuit**

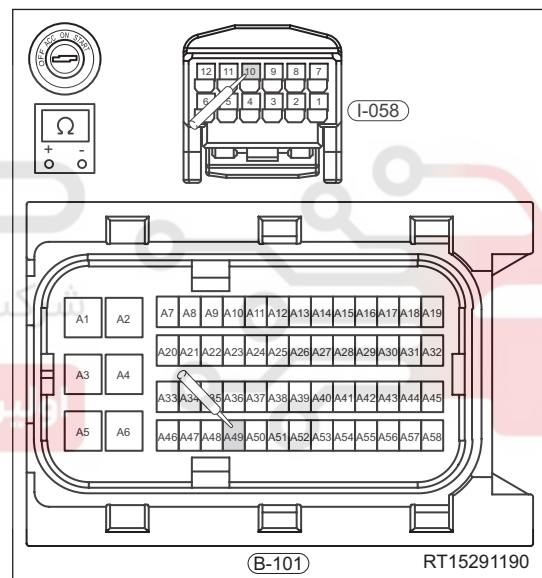
- Disconnect the TCU connector B-101.
- Check wire harness between command gear shift connector terminals and TCU connector terminals.

Check for Open

Multimeter Connection	Condition	Specified Condition
I-058 (10) - B-101 (A49)	Always	Continuity

Check for Short

Multimeter Connection	Condition	Specified Condition
I-058 (10) or B-101 (A49) - Body ground	Always	No continuity

**NG****Repair or replace wire harness or connector (command gear shift - TCU)****OK****4****Check command gear shift****NG****Replace command gear shift****OK**

5

Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P092901 still exists.

NG

Replace TCU

OK

31

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

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

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P060400	Broken Ram Cell - NoSubtype Information	Defect RAM cell detected	• TCU
P060500	Broken Flash Cell - No Subtype Information	Defect RAM cell detected	
P172000	Monitoring SOPC Pre Drive Check - TCU	Pre drive check not successful finished after 62 ms	

31

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).



CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2**Check DTC**

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P060400, P060500 or P172000 still exists.

NG**Replace TCU****OK****31**

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DTC	P171F00	TCU Overtemp
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DTC	DTC Definition	DTC Detection Condition	Possible Cause
P171F00	TCU Overtemp	Temperature > 120°C Debounce time: 500 ms	TCU

DTC Confirmation Procedure

- 31** Confirm that battery voltage is between 11 and 14 V before performing following procedures.
- Turn engine switch to OFF.
 - Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
 - Turn engine switch to ON.
 - Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
 - Start engine and warm it up to normal operating temperature, and then select Read Code.
 - If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
 - If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Ventilate TCU
---	---------------

OK

2	Check DTC
---	-----------

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P171F00 still exists.

NG

Replace TCU

OK

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

DTC	P172200	Clutch 1 Torque Unexpected Value
DTC	P172300	Clutch 2 Torque Unexpected Value

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P172200	Clutch 1 Torque Unexpected Value	If controller target value to reach required torque value varies by a specified value for a specified time (completely abnormal behaviour): error will be set Debounce time: 400 ms	Clutch system
P172300	Clutch 2 Torque Unexpected Value	If controller target value to reach required torque value varies by a specified value for a specified time (completely abnormal behaviour): error will be set Debounce time: 400 ms	

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

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

NG

Replace clutch system

OK

2

Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P172200 or P172300 still exists.

NG

Replace TCU

OK

31

System is operating normally. Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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

31

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P172500	Shift Drum 1 Reference Drive Failure	Reference drive out of range	• TCU • TCU wire harness connector • Transmission mechanical malfunction
P172600	Shift Drum 2 Reference Drive Failure		
P172700	Shift Drum 1 Sync Speed Rate Not Plausible	Synchronization of wrong gear and shiftdrum moving direction not plausible. Comparison of target speed and current speed. Difference has to exceed threshold fixed at begin of synchronizer phase Debounce time: 50 ms	
P172800	Shift Drum 2 Sync Speed Rate Not Plausible		
P172900	Shift Drum 1 Position Out of Range	Shiftdrum position out of valid range - not active while reference drive Debounce time: 8 ms	
P172A00	Shift Drum 2 Position Out of Range		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

31 - 625DHA TRANSMISSION

Diagnosis Procedure

1 Check the TCU ground point.

- a. Turn engine switch to OFF.
- b. Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

OK

31

2 Check TCU wire harness connector (See page 31-129)

NG

Repair or replace connector

OK

3 Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P172500, P172600, P172700, P172800, P172900 or P172A00 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P173500	Gearbox 1 Gear Jump	Gear of gearbox part 1 or 2 disengaged without request. Comparison of input and output speed related to input speed. Failure will be detected if threshold is reached. Function becomes active if shift drum position is equal to gear position Debounce time: 500 ms	- TCU - TCU (driveshaft of shift actuator 1 or 2) - Transmission mechanical malfunction
P173600	Gearbox 2 Gear Jump		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2	Check TCU wire harness connector (See page 31-129)
---	--

NG

Repair or replace connector

OK

31 - 625DHA TRANSMISSION

3	Check TCU driveshaft of shift actuator
---	--

NG

Replace TCU

OK

4	Check DTC
---	-----------

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P173500 or P173600 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.
--

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC	P173700	Gearbox Mechanic Part 1 Unexpected Shift drum Standstill
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DTC	P173800	Gearbox Mechanic Part 2 Unexpected Shift drum Standstill
------------	----------------	---

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P173700	Gearbox Mechanic Part 1 Unexpected Shift drum Standstill	In shifting phases where a movement of the shift drum is expected - e.g. while disengaging a gear or while moving synchronizer to sync-point - actual and theoretical (calculated) shift drum position (and shift drum velocity) will be compared. If ratio between actual and theoretical value is outside a window, a debounce timer (150 ms) is started. An error storage entry will be set if ratio is still outside window after time has expired Debounce time: 150 ms	• TCU • TCU wire harness connector • Transmission mechanical malfunction
P173800	Gearbox Mechanic Part 2 Unexpected Shift drum Standstill		

31

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
----------	------------------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

OK

31 - 625DHA TRANSMISSION

2

Check TCU wire harness connector (See page 31-129)

NG

Repair or replace connector

OK

3

Check TCU driveshaft of shift actuator

31

NG

Replace TCU

OK

4

Check DTC

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P173700 or P173800 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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

31

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P173900	Gearbox 1 Sync Failure	Synchronization input shaft 1 or 2 not possible. Detection of speed difference at break-position (offset [11°] before engage position) Debounce time: 1500 ms	• TCU • TCU wire harness connector • Transmission mechanical malfunction
P173A00	Gearbox 2 Sync Failure		
P173B00	Gearbox 1 No Disengagement	It is not possible to disengage (shiftdrum target position can not be reached) gear in a given time, or shiftdrum is blocked. Block detection is faster than timeout and is for protection of amplifier Debounce time: 1000 ms	
P173C00	Gearbox 2 No Disengagement		
P173D00	Gearbox 1 No Engagement	No shiftdrum movement after synchronization and before endstop position possible Debounce time: 150 ms	
P173E00	Gearbox 2 No Engagement		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1 Check the TCU ground point.

- a. Turn engine switch to OFF.
- b. Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

OK

31

2 Check TCU wire harness connector (See page 31-129)

NG

Repair or replace connector

OK

3 Check TCU driveshaft of shift actuator

NG

Replace TCU

OK

4 Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P173900, P173A00, P173B00, P173C00, P173D00 or P173E00 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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

31

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P174A00	Shift Drum 1 Unexpected Movement	In situations where no shiftdrum movement is expected or the shiftdrum is moving in the opposite direction, the current position will be monitored against movement towards any sync point Debounce time: 150 ms	• TCU • TCU wire harness connector • Transmission mechanical malfunction
P174B00	Shift Drum 2 Unexpected Movement		
P174C00	Shift Drum 1 Moving Direction Not Plausible	In case of PWM > threshold and shiftdrum moving speed is > threshold and moving direction is wrong: Error will be set - change of mind must be considered Debounce time: 8 ms/50 ms (after change of mind)	
P174D00	Shift Drum 2 Moving Direction Not Plausible		
P174300	Shiftdrum 1 Endstop Position Not Plausible	• In case of engaging gear which is near shiftdrum endstop position, shiftdrum is moved to endstop position • Actual measured and teached endstop position will be compared • If difference is not plausible • Error will be set • Reference drive will be triggered (if possible)	
P174400	Shiftdrum 2 Endstop Position Not Plausible		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure**1** Check the TCU ground point.**31**

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

OK**2** Check TCU wire harness connector (See page 31-129)**NG**

Repair or replace connector

OK**3** Check TCU driveshaft of shift actuator**NG**

Replace TCU

OK**4** Check DTC

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P174A00, P174B00, P174C00, P174D00, P174300 or P174400 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

DTC	P173F00	Clutch 1 Self Open Test Failed
------------	----------------	---------------------------------------

DTC	P174000	Clutch 2 Self Open Test Failed
------------	----------------	---------------------------------------

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P173F00	Clutch 1 Self Open Test Failed	Clutch 1 or 2 mechanical self open test failed Debounce time: 500 ms	- TCU - Wire harness and connector - Clutch system malfunction - Transmission mechanical malfunction
P174000	Clutch 2 Self Open Test Failed		

31

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
----------	------------------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2	Check clutch 1 wire harness connector (See page 31-120)
----------	--

NG

Repair or replace connector

OK

3 Check clutch 2 wire harness connector (See page 31-120)

NG Repair or replace connector

OK

31

4 Check TCU wire harness connector (See page 31-129)

NG Replace TCU

OK

5 Check DTC

- Use X-431 3G diagnostic tester to read TCU DTCs.
- Refer to "DTC Confirmation Procedure".
- Check if DTC P173F00 or P174000 still exists.

NG Replace TCU

Check Check if DTC still exists

NG Replace clutch system

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

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

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P174100	Clutch 1 Torque Too Low	Clutch torque 1 or 2 is too low for maximum engine torque after torque transfer is completed for long time Error detection is controlled with a counter	- Execute torque capacity recovery procedure - Clutch system - TCU
P174200	Clutch 2 Torque Too Low		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2	Check TCU wire harness connector (See page 31-129)
---	--

NG

Repair or replace connector

OK

31 - 625DHA TRANSMISSION

3	Execute torque capacity recovery procedure
---	--

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

OK

4	Check DTC
---	-----------

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P174100 or P174200 still exists.

NG	Replace TCU
----	-------------

Check	Check if DTC still exists
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NG	Replace transmission
----	----------------------

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.
--

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC	P174E00	Clutch 1 Endstop Position Not Plausible
DTC	P174F00	Clutch 2 Endstop Position Not Plausible
DTC	P174700	Clutch 1 Drag Torque Too High
DTC	P174800	Clutch 2 Drag Torque Too High

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P174500	Clutch 1 Endstop Position Not Plausible	In case of completely opened or closed clutch: Teached and actual endstop positions are compared	- TCU - Clutch system malfunction - Transmission mechanical malfunction
P174600	Clutch 2 Endstop Position Not Plausible		
P174700	Clutch 1 Drag Torque Too High	Drag torque on clutch 1 is too high Debounce time: 1000 ms	
P174800	Clutch 2 Drag Torque Too High	Drag torque on clutch 2 is too high Debounce time: 1000 ms	

31

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2

Check TCU wire harness connector (See page 31-129)

NG

Repair or replace connector

OK

3

Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P174500, P174600, P174700 or P174800 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace clutch

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC	P174E00	Clutch 1 Overtemperature
DTC	P174F00	Clutch 2 Overtemperature

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P174E00	Clutch 1 Overtemperature	Overtemperature of clutch 1 or 2 Debounce time: 100 ms	- TCU - Clutch temperature is too high
P174F00	Clutch 2 Overtemperature		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2	Check TCU wire harness connector (See page 31-129)
---	--

NG

Repair or replace connector

OK

31 - 625DHA TRANSMISSION

3	Stop vehicle to cool down
---	---------------------------

4	Check DTC
---	-----------

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P174E00 or P174F00 still exists.

NG

Replace TCU

31

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.
--

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P174900	Broken Shift Fork	- Based on broken shift fork the gear is engaged - SW expects neutral position based on shift drum position information - If ISSx value will hold on the level present at the beginning of synchronization ($n_{out} * i$ [gear ratio]) - In next synchronization phase, SW will detect a synchronization error (detection of synchronization failure) or PWM of shift drum above threshold - Debounce time: see detection of synchronization failure or 50 ms for detection by PWM	- TCU - Transmission mechanical malfunction

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 08-22).

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
---	-----------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 (See page 31-16).

NG

Repair or replace ground wire harness or ground point

OK

2

Check TCU wire harness connector (See page 31-129)

NG

Repair or replace connector

OK

3

Check DTC

31

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P174900 still exists.

NG

Replace TCU

Check

Check if DTC still exists

NG

Replace transmission

OK

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

DTC	P172D00	Level 2 Reset - SZ1 tq Increase
------------	----------------	--

DTC	DTC Definition	DTC Detection Condition	Possible Cause
P172D00	Level 2 Reset - SZ1 tq Increase	Unwanted engine torque increase Debounce time: 400 ms	Reset

DTC Confirmation Procedure

Confirm that battery voltage is between 11 and 14 V before performing following procedures.

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to record and clear DTCs stored in TCU.
- Start engine and warm it up to normal operating temperature, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 08-22](#)).

31

CAUTION

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

Diagnosis Procedure

1	Check the TCU ground point.
----------	------------------------------------

- Turn engine switch to OFF.
- Check the TCU ground point B-103 ([See page 31-16](#)).

NG

Repair or replace ground wire harness or ground point

OK

2	Check TCU wire harness connector (See page 31-129)
----------	---

NG

Repair or replace connector

OK

3	Release automatically after reset
----------	--

4

Check DTC

- a. Use X-431 3G diagnostic tester to read TCU DTCs.
- b. Refer to "DTC Confirmation Procedure".
- c. Check if DTC P172D00, P172E00, P172F00, P173000, P173100, P173200, P173300 or P173400 still exists.

NG

Replace TCU

OK

31

Reassemble vehicle and perform a road test to confirm that malfunction reported by customer has been repaired.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



On-vehicle Inspection

Transmission Oil

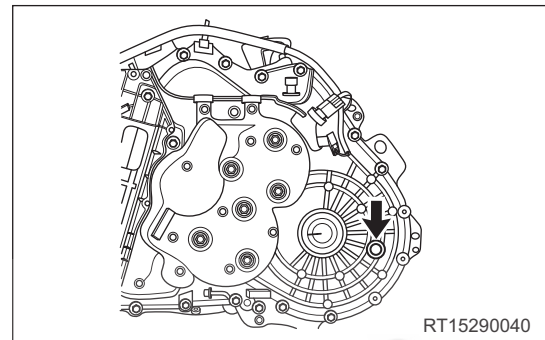
Check the transmission oil level.

1. Raise vehicle with a lift.

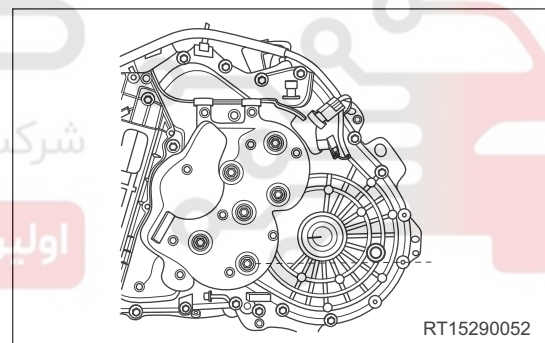
WARNING

- 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.

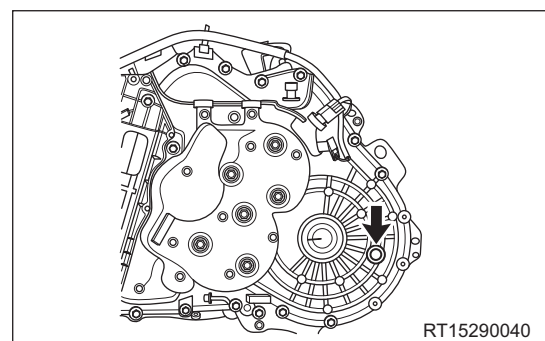
2. Remove transmission refill plug (arrow) and plug washer.



3. Oil level should be flush with bottom edge of refill plug to adjust transmission oil amount.



4. If oil level is too low, check for leakage.
5. Install the refill plug (arrow).
(Tightening torque: 39 ~ 47 N·m)



ON-VEHICLE SERVICE

Transmission Oil Replacement

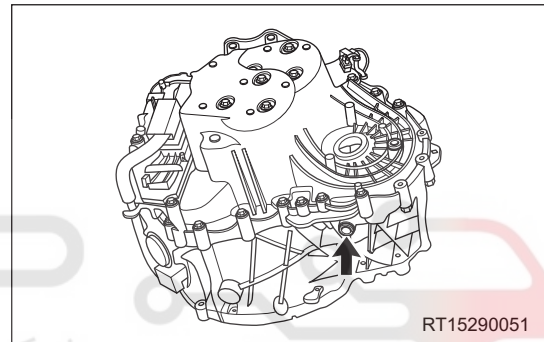
CAUTION

- Replace transmission oil only when engine stops and transmission cools down.

31

Draining

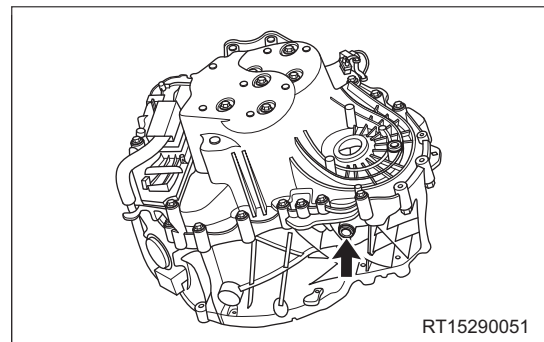
1. Park vehicle on a level ground.
2. Turn off all electrical equipment and the engine switch.
3. Raise vehicle to a proper height.
4. Place a recovering container under transmission drain hole.
5. Remove transmission refill plug (arrow) with a tool.



ENVIRONMENTAL PROTECTION

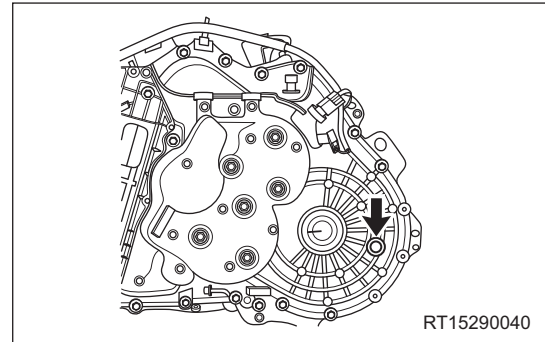
- Drained transmission oil should be collected with a recovering container.

6. Install the drain plug with a tool.
(Tightening torque: 39 ~ 47 N·m)



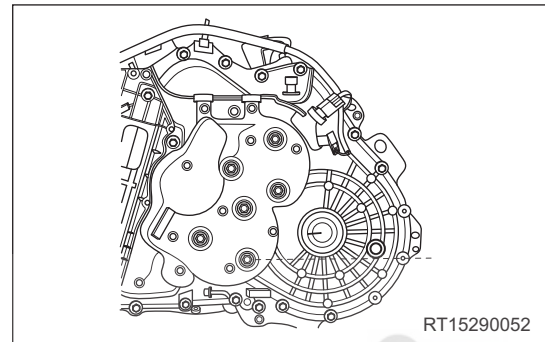
Filling

1. Make sure that transmission drain plug has been tightened in place.



2. Remove the transmission retaining/refill plug (arrow) with a tool.
3. Oil level should be flush with bottom edge of filler plug to adjust transmission oil amount.

Transmission Oil Type	Standard Capacity
Castrol BOT350 M3	1.2 L



CAUTION

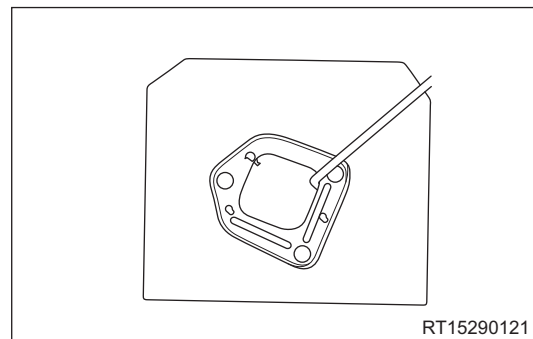
- An excessively large or small amount of oil may affect proper functioning of transmission.
- After filling oil, run vehicle and then check oil level.

4. After filling oil, tighten retaining/refill plug with a special tool.
(Tightening torque: 39 ~ 47 N·m)

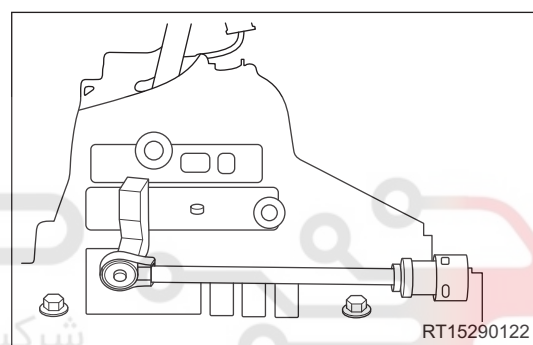
Automatic Shift Cable Assembly

Installation

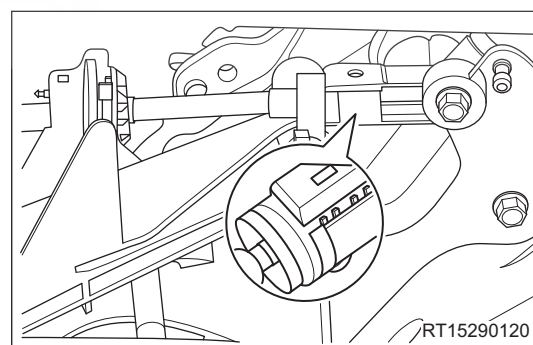
1. Raise vehicle to a proper height.
2. Install coupling bolt between shift cable and body.
 - a. Secure automatic shift cable assembly to body central channel with 3 fixing bolts.
(Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)



3. Connect shift cable and gear shift control mechanism.
 - a. Press automatic shift cable damper into slot of gear shift mechanism, install cable joint to mechanism gear shift arm directly, and clamp it.



4. Connect shift cable and flexible shaft bracket.
 - a. Fix cable to flexible shaft bracket stopper hole of transmission from top to bottom, and clamp it.
5. Connect shift cable and transmission gear shift arm.
 - a. Install shift cable to transmission gear shift arm.
 - b. Make slider of adjustable joint in adjustable state.
 - c. Fix cable joint to transmission gear shift arm directly, gear shift mechanism and transmission gear shift arm are in P position, press slider to lock, and turn lock knob to make sure slider cannot come off.



6. Install the auxiliary fascia console ([See page 60-8](#)).
7. Install the battery tray ([See page 28-9](#)).
8. Install the battery ([See page 28-7](#)).
9. Install the air filter assembly ([See page 16-13](#)).
10. Connect the negative battery cable.

Removal

Removal is in the reverse order of installation.

CAUTION

- Gear lock mechanism pin is locked in P. Never flip gear mechanism before installing shift cable.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

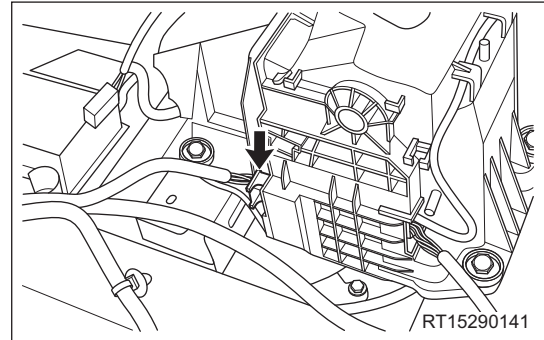
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



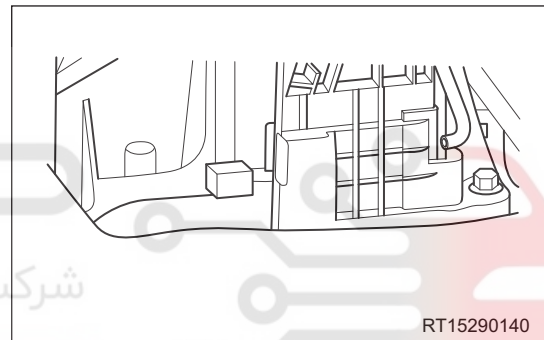
Automatic Gear Shift Control Mechanism

Removal

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the auxiliary fascia console (See page 60-8).
4. Remove the automatic gear shift control mechanism wire harness connector.

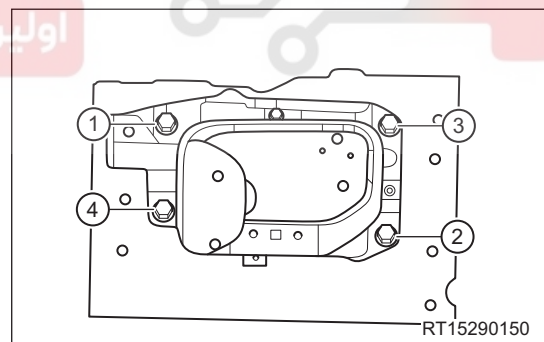


5. Remove the automatic gear shift control mechanism.
 - a. Detach damper on shift cable side from automatic gear shift control mechanism.



- b. Remove 4 fixing bolts from automatic gear shift control mechanism, and remove gear shift control mechanism.

(Tightening torque: $20 \pm 3 \text{ N}\cdot\text{m}$)



Installation

Installation is in the reverse order of removal.

Transmission Assembly

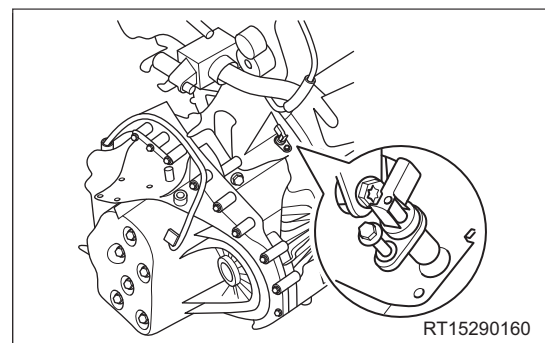
Removal

CAUTION

- Be sure to use special working position apparatus to load transmission or hang it from lifting eye, when transport or moving transmission.
- DO NOT depress transmission, strike transmission with hard object or drop transmission from height, it must be handled carefully when carrying. Never make cross section connecting engine subjected to impact. If it has been subjected to impact, it can be installed to vehicle only repair it by professional immediately.
- Transmission should be stored on special working position apparatus which in a ventilated and dry area. Never sun and rain. Cover dust cover to transmission which storage time is more than one month.
- Never move gear select and shift mechanism by non-specialized individuals, before transmission engages with engine after it leaves factory. Never remove any part from transmission by non-specialized individuals.

31

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Remove the battery (See page 28-7).
4. Remove the battery tray (See page 28-9).
5. Remove the air filter assembly (See page 16-13).
6. Drain the transmission oil (See page 31-110).
7. Remove the front wheels (See page 37-7).
8. Remove the drive shaft (See page 33-5).
9. Disconnect shift cable and transmission gear shift arm.
10. Disconnect the connector between room wire harness and transmission module.
11. Remove the crankshaft position sensor.
 - a. Remove fixing bolt from crankshaft position sensor, and remove crankshaft position sensor.



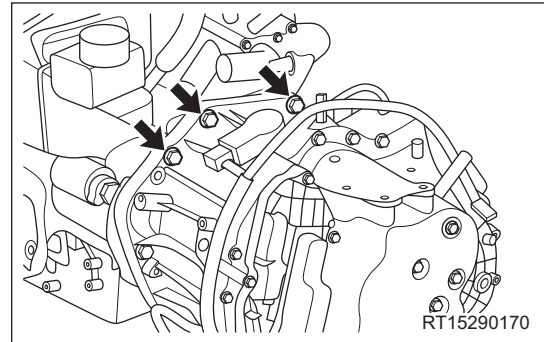
12. Remove the flexible shaft bracket with a tool.
13. Use an engine equalizer to hang engine.
14. Remove the left mounting (See page 10-48).
15. Remove the starter (See page 26-9).
16. Remove the rear mounting (See page 10-48).

31 - 625DHA TRANSMISSION

17. Remove the transmission.

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

(Tightening torque: $90 \pm 9 \text{ N}\cdot\text{m}$)

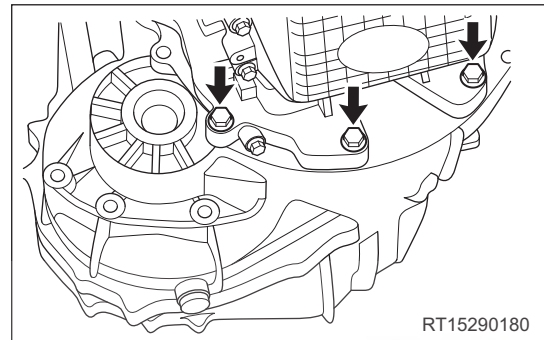


31

- b. Raise vehicle and support transmission assembly with a transmission carrier.

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

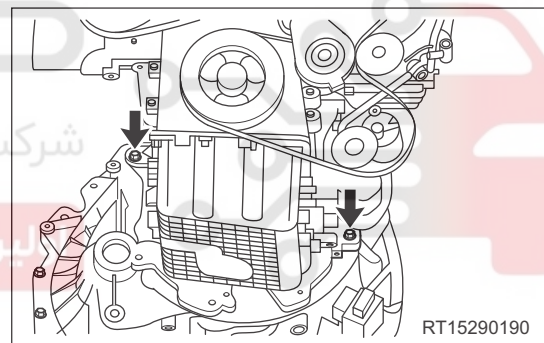
(Tightening torque: $50 \pm 5 \text{ N}\cdot\text{m}$)



- d. Remove 2 coupling bolts (arrow) from both sides of transmission.

- e. Pull transmission to separate it from engine.

(Tightening torque: $60 \pm 5 \text{ N}\cdot\text{m}$)



Installation

Installation is in the reverse order of removal.

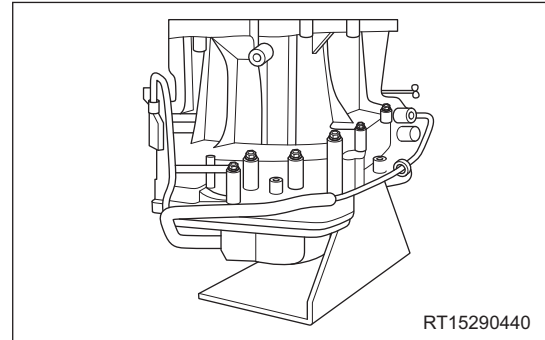
CAUTION

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

Dual-clutch Assembly

Removal

1. Remove transmission from vehicle, put it in a safe location, and install special tool.

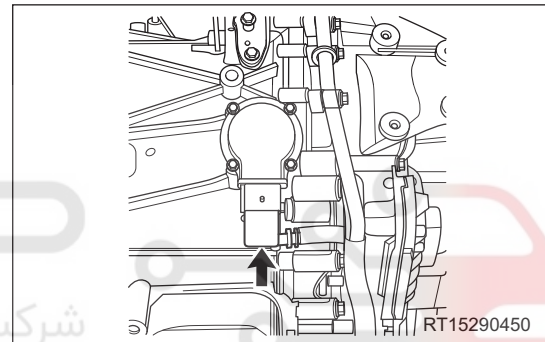


31

HINT:

This step needs another person to assist.

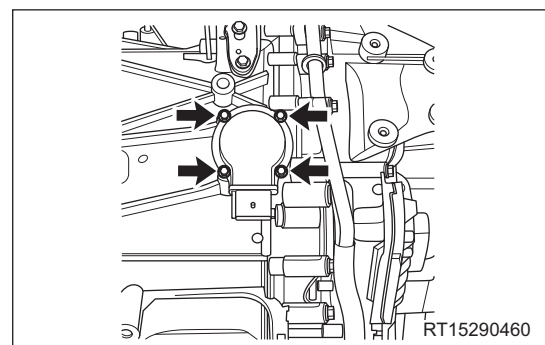
1. Remove upper clutch actuator motor.
 - a. Disconnect the upper clutch actuator motor wire harness connector (arrow).
 - b. Clean area around control module with appropriate washer fluid and compressed air.



⚠ WARNING

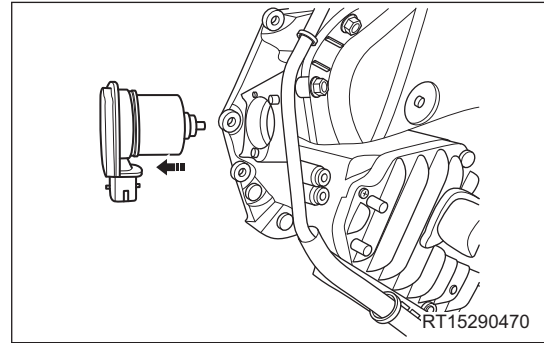
- When cleaning with compressed air, wear protective glasses.

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



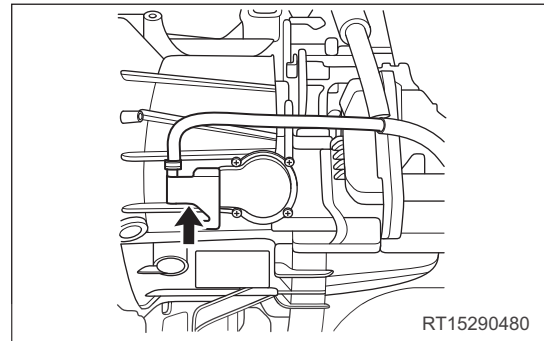
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- d. Remove motor, and mark to make sure motor is installed to original position, keep transmission free from dirt.



31

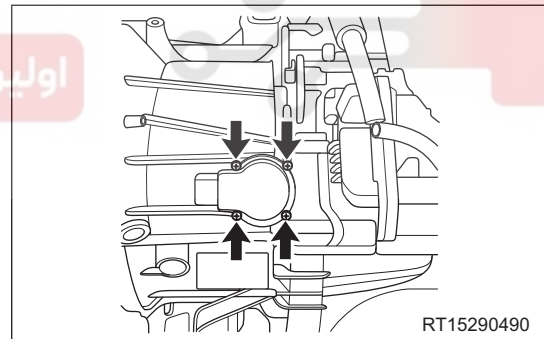
2. Remove the lower clutch actuator motor (arrow).
- Disconnect the lower clutch actuator motor wire harness connector (arrow).
 - Clean area around control module with appropriate washer fluid and compressed air.



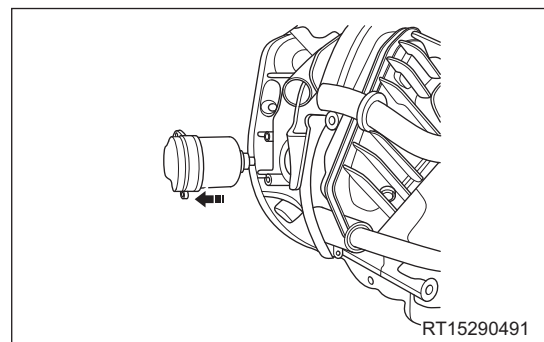
 WARNING

- When cleaning with compressed air, wear protective glasses.

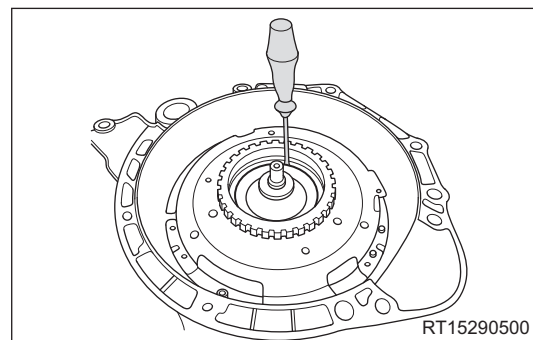
- c. Remove 4 tightening bolts (arrow) from lower clutch actuator motor.



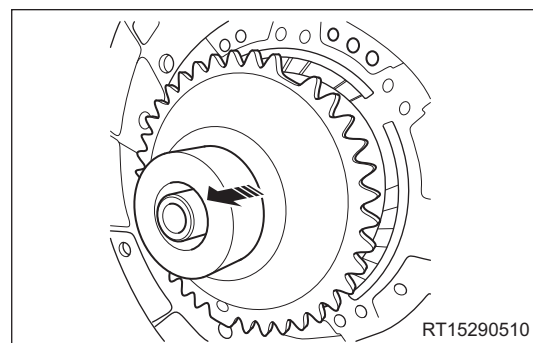
- d. Remove motor, and mark to make sure motor is installed to original position, keep transmission free from dirt.



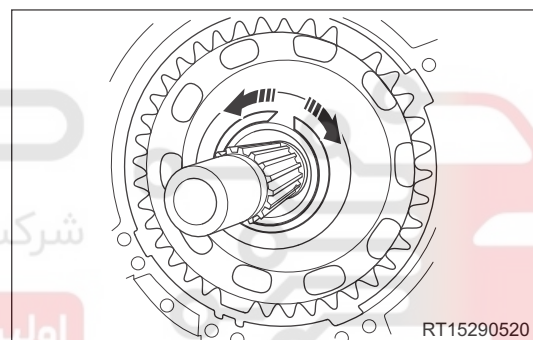
3. Using a screwdriver, pry out big snap ring, and dispose it, it cannot be reused.



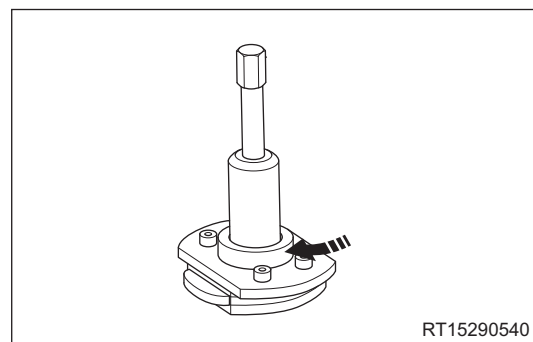
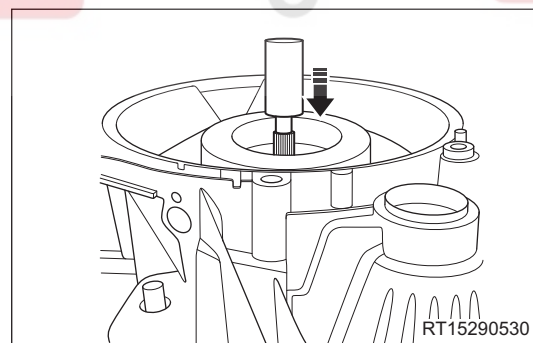
4. Move away gear plate from inner input shaft (solid shaft) in direction of arrow.



5. Using snap ring pliers, move away small snap ring in direction of arrow.

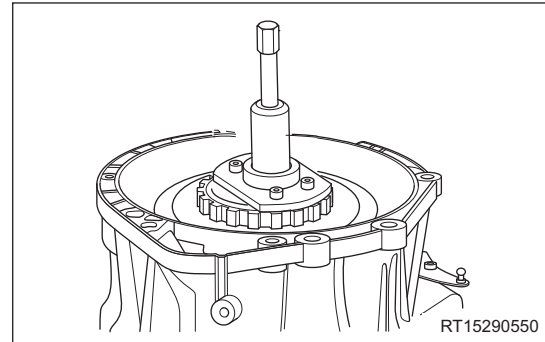


6. Install the special tool in direction of arrow.



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7. Using a special tool, remove dual-clutch assembly.
8. Install special tool to dual-clutch, remove clutch, and move away tool.



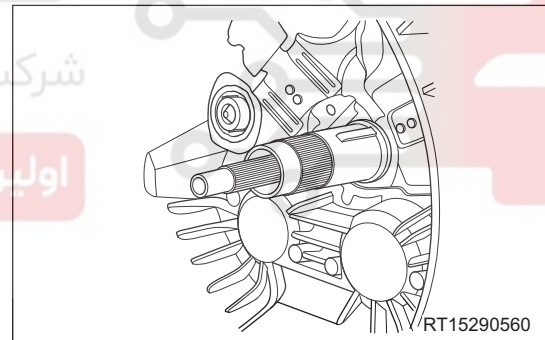
31

CAUTION

- 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. Doing so will cause clutch support bearing or its race to be damaged. Be sure to fit dual-clutch to clutch plate properly, otherwise it will cause damage to support bearing, or bearing oil seal is pushed out. Assembly tolerance is: 0.3° .
- For operation of dual-clutch: Never dropping it, and Never position head of dual-clutch facing down (transmission side facing down), otherwise clutch adjustment diaphragm will be bent.

Assembly

1. Clean spline part of inner and outer input shaft, support bearing race and outer input shaft bearing race with proper cleaner.

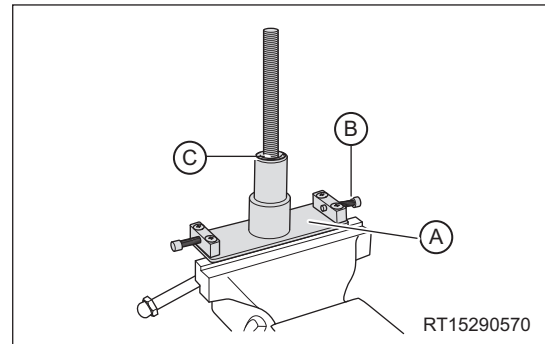
**HINT:**

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

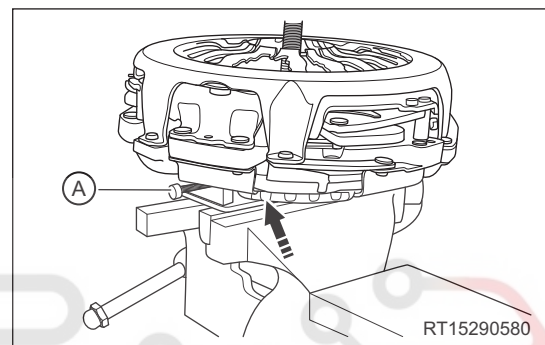
CAUTION

- 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 bracket (A). Do not tighten it excessively in this step.



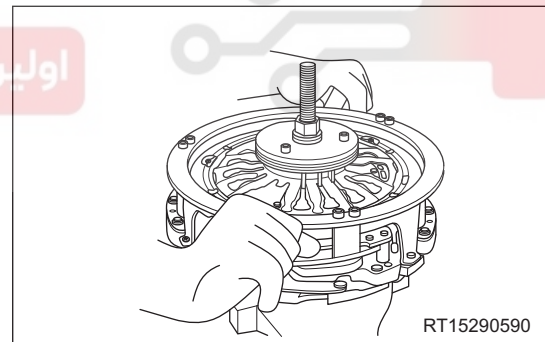
- b. Install clutch gear holding tool (B). Do not tighten it excessively in this steps.
 - c. Install the washer (C).
3. Install the clutch support device.
 - a. Push clutch gear holding tool (A) inward to lock clutch (arrow).



- b. Tighten 4 fixing bolts.

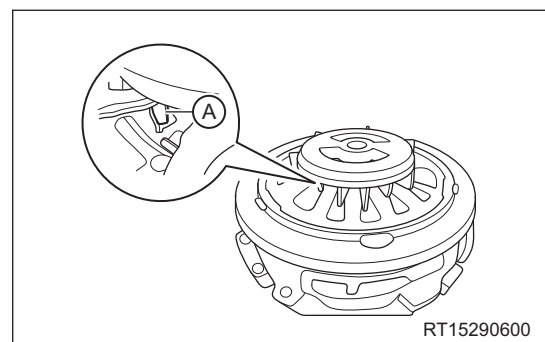
4. Install dual-clutch special tool as shown in illustration.

- a. Install the adjustment ring installer.



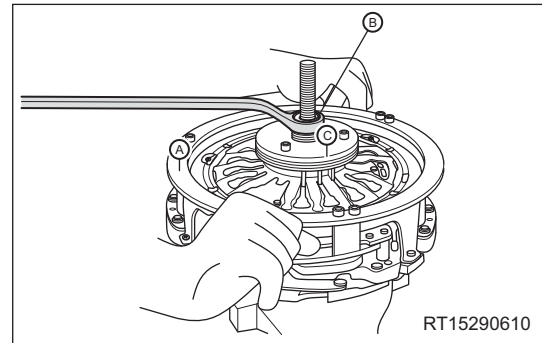
- b. Install the holding tool.
 - c. Install threaded rod, nut and bearing.
 - d. Do not tighten nut in this step. See next step for details.

5. Make sure that holding tool of clutch 2 is installed to correct position (A).



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6. Turn clutch adjustment ring installer (A) counterclockwise to a small degree, until it contacts adjustment ring stopper module position.



31

HINT:

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

CAUTION

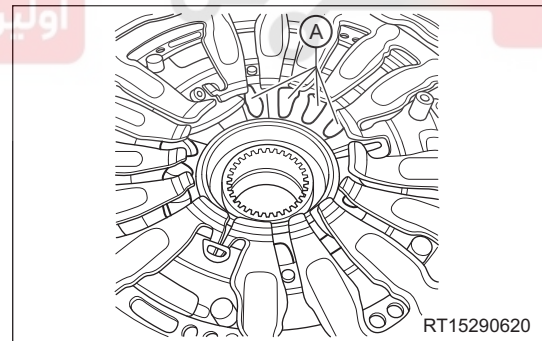
- Before tightening nut, make sure that adjustment ring is in reset state.

- b. Tighten nut (B) to squeeze lock tool (C), until 12 lock claws of both clutches is completely engaged and locked.

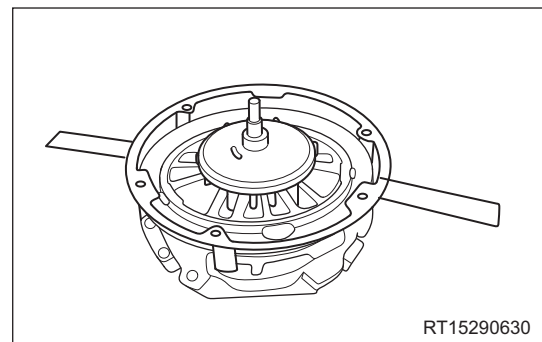
HINT:

- Do not apply excessive pressure.
- When all clutch lock claws are at correct position, stop to tighten nut.
- Do not 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 lock claws are locked.

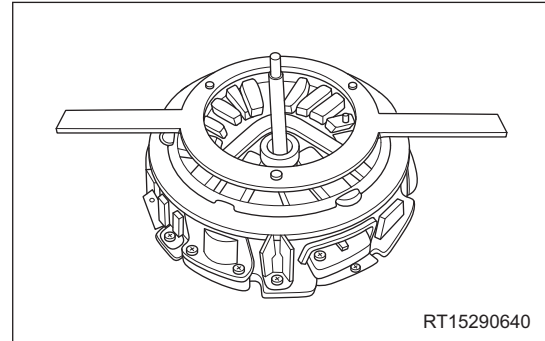


8. Remove nut and bearing. Remove lock tool and No.2 clutch adjustment ring installer.

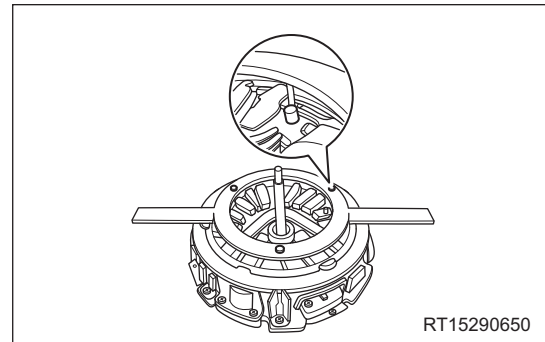
**HINT:**

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

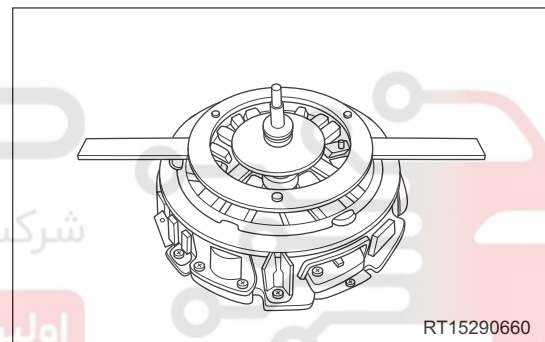
1. As shown in the illustration, install clutch 1 adjustment ring reset tool , see next step.



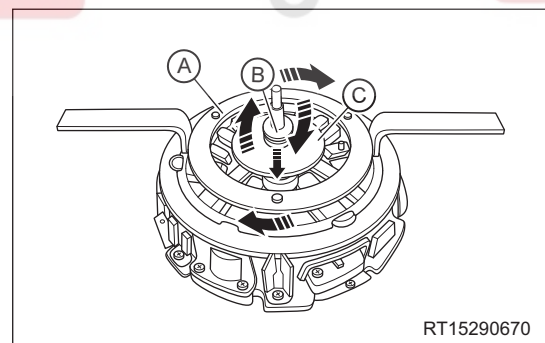
2. Make sure that 3 pin heads of adjustment ring reset tool are inserted to correct position.



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



4. Turn clutch adjustment ring installer (A) counterclockwise to a small degree, until it contacts adjustment ring stopper module position.

**HINT:**

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

CAUTION

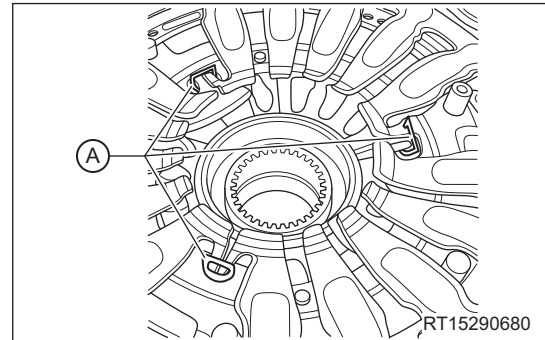
- This step needs another person to assist.

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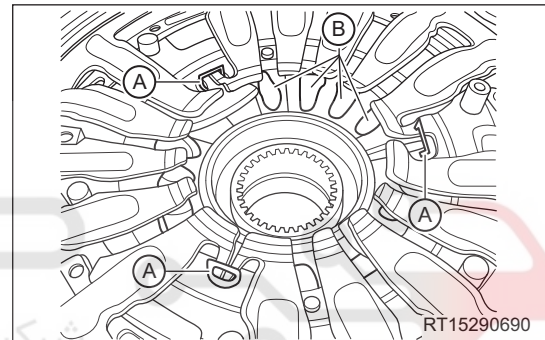
- b. Tighten nut (B) to squeeze clutch pressure plate (C) and clutch claws, until 3 transport locks can be locked manually.

HINT:

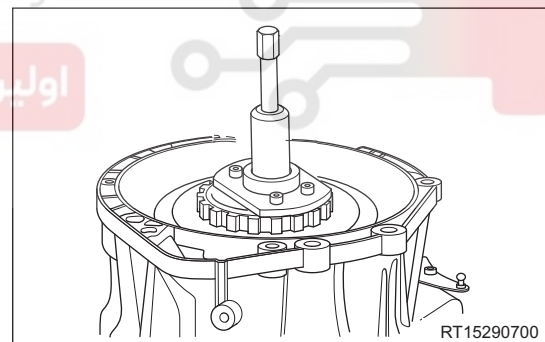
- Do not apply excessive pressure.
 - When all clutch lock claws are at correct position, stop to tighten nut.
 - Do not overtighten the nut.
5. Make sure that all clutch transport locks (A) are locked. When all hooks are hooked, loose nut, there will be a sound when removing nut, bearing and clutch pressure plate.



6. Remove all other tools (including clutch).



7. visually check to make sure that transport locks of clutch 1 (A) and clutch 2 (B) are locked.

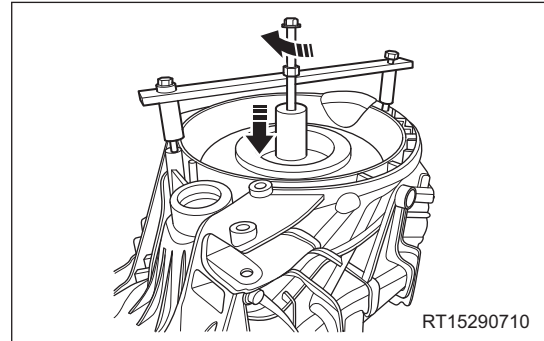


8. Install clutch to its original place, use puller as auxiliary tool to raise clutch.

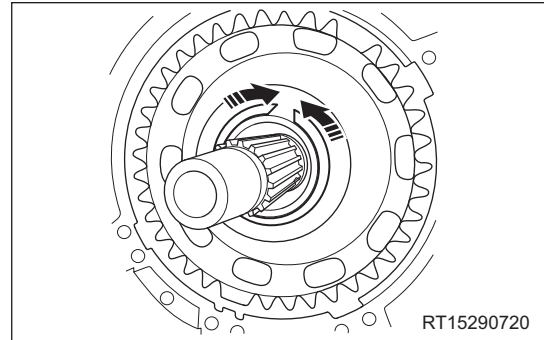
CAUTION

- 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 dropping it, and never position head of dual-clutch facing down (transmission side facing down), otherwise clutch adjustment diaphragm will be bent.

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



10. Using snap ring pliers, install small snap ring (direction of arrow).

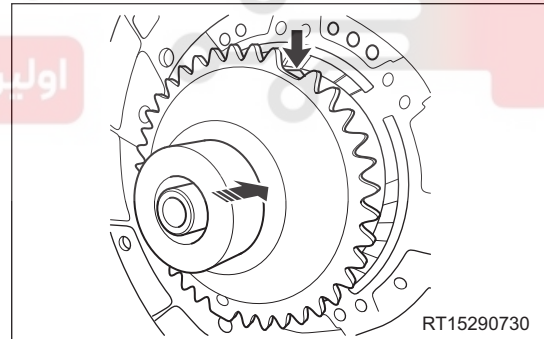


31

CAUTION

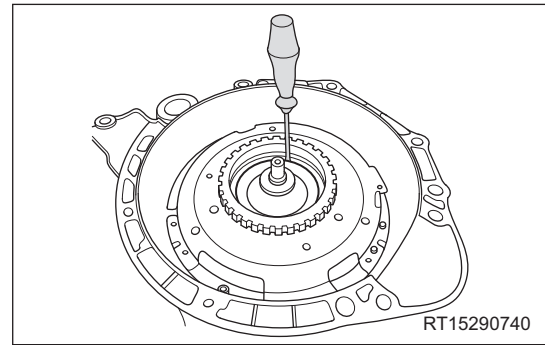
- DO NOT reuse old snap ring, please use new one.
- Make sure that snap ring is installed correctly to snap ring groove of outer input shaft, and is locked.

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



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12. Install big snap ring.



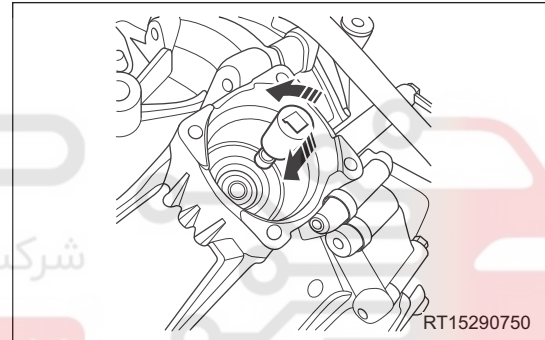
31

 CAUTION

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

13. Using a special tool, turn counterclockwise, release clutch transport lock function of clutch actuator on upper part.

- a. Use the same procedure for clutch actuator on lower part.



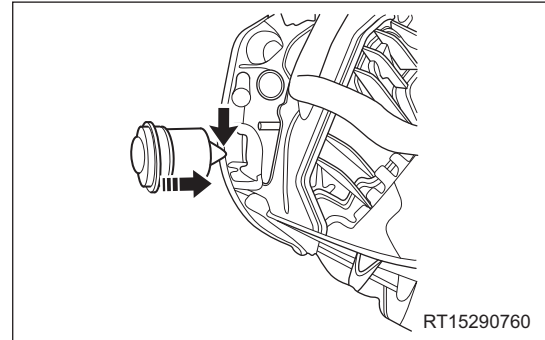
HINT:

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

CAUTION

- If special tool is turned more than 2 times, actuation rod of clutch actuator will be damaged.
- When clutch transportation. lock is released, there will be a sound.

14. Install lower motor. Please apply small force.



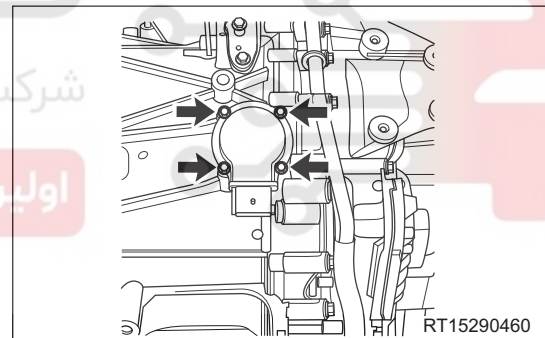
31

CAUTION

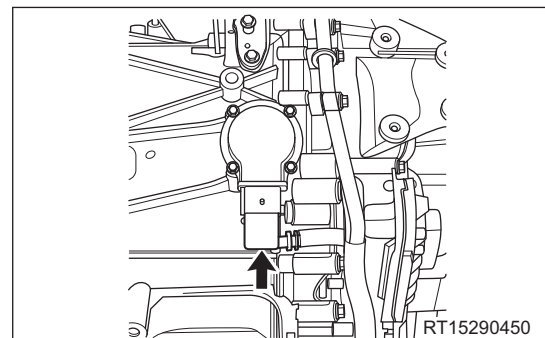
- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.

15. Install 4 tightening bolts (arrow) from clutch actuator.

Tightening torque: 6 N·m



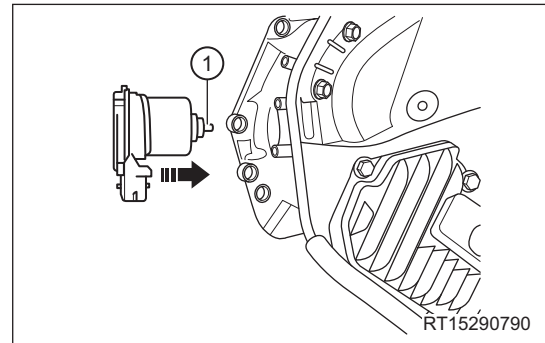
16. Connect the motor wire harness connector (arrow).

**CAUTION**

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

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17. Connect the motor wire harness connector.



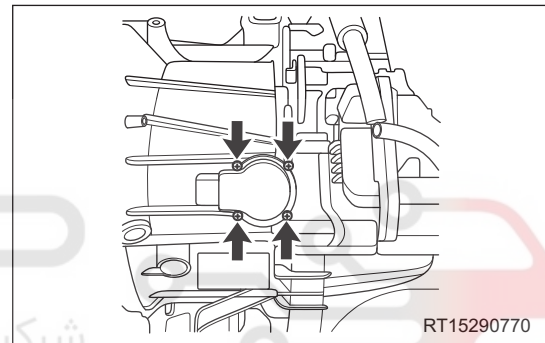
31

 CAUTION

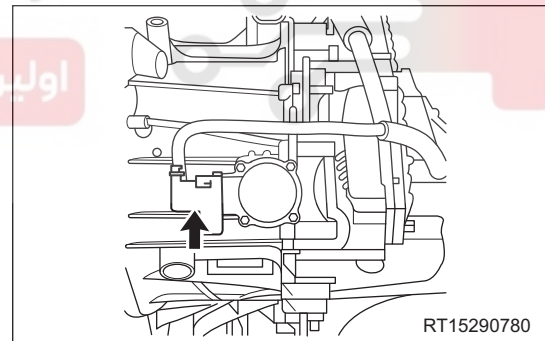
- Be careful not to damage spline of motor shaft head.
- Lubricate grommet and spline.

18. Install 4 tightening bolts (arrow) from clutch actuator.

Tightening torque: 6 N·m



19. Connect the motor wire harness connector (arrow).



 CAUTION

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

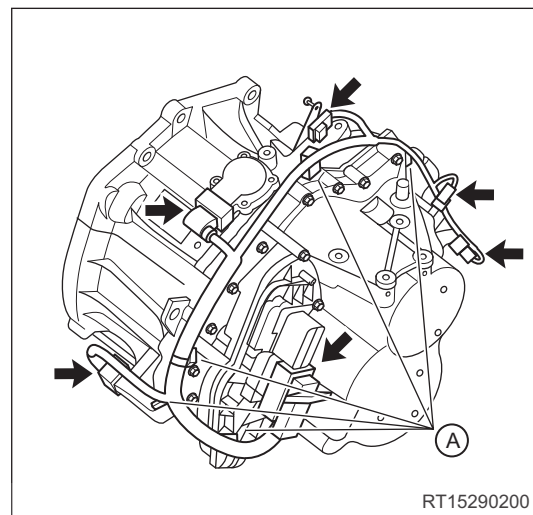
20. Remove special tool, replacement of dual-clutch is completed.

Transmission External Accessory

Transmission Wire Harness

Removal and Installation of Transmission Wire Harness

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



31

2. Installation is in the reverse order of removal.

CAUTION

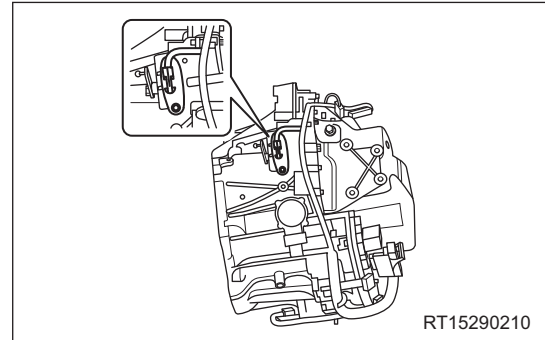
- Connect wire harness connector safely. If connector has self-locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

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Transmission Range Sensor

Replacement of Transmission Range Sensor

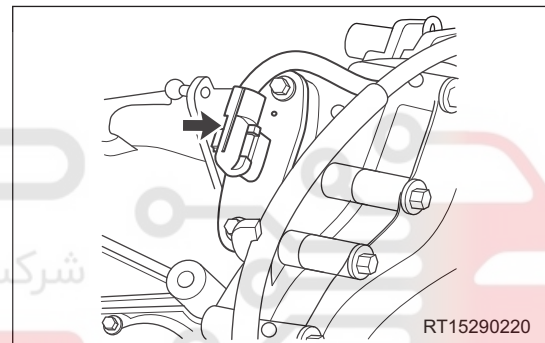
1. Clean area around sensor with appropriate washer fluid and compressed air.



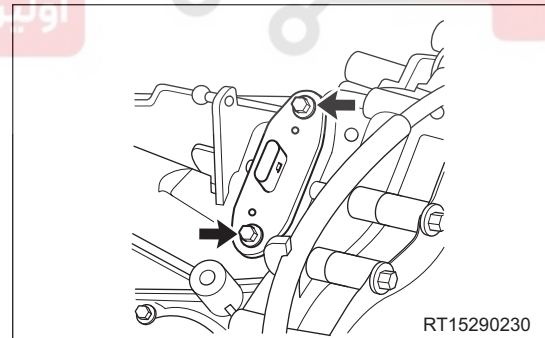
WARNING

- When cleaning with compressed air, wear protective glasses.

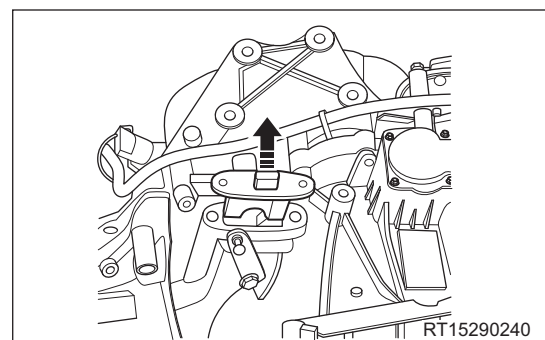
- a. Disconnect the wire harness connector (arrow).



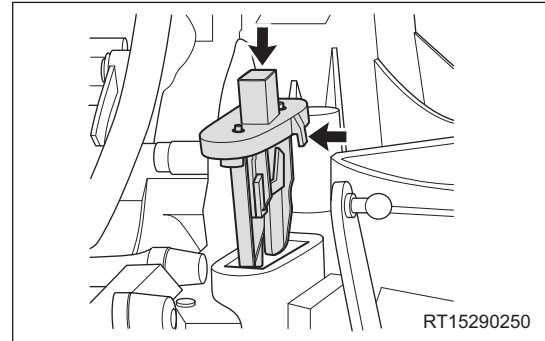
2. Remove tightening bolts (arrow) from both sides of range sensor.



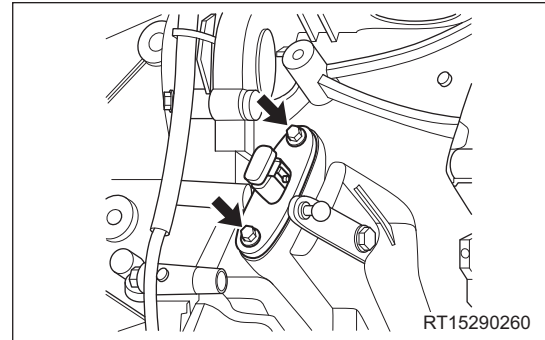
3. Remove sensor (direction of arrow), make sure that no dirt have entered.



4. When installing sensor (direction of arrow), make sure that mark position faces toward shift lever.



5. Install tightening screws from both sides of sensor.
(Tightening torque: 9 ~ 11 N·m)



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6. Connect wire harness connector.

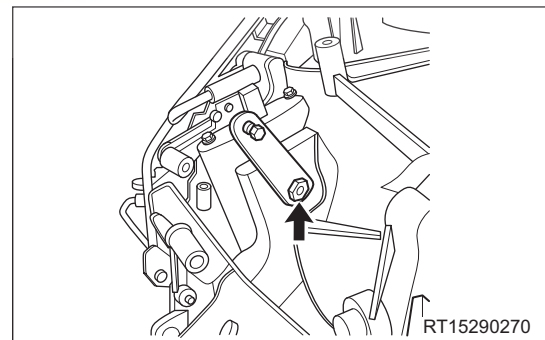
CAUTION

- Connect wire harness connector safely. If connector has locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

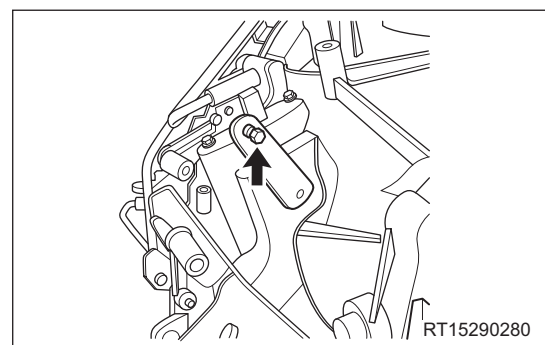
Transmission Shift Lever

Replacement of Transmission Shift Lever

1. Remove tightening bolt (arrow) from transmission shift lever.



2. Remove the shift lever (arrow).

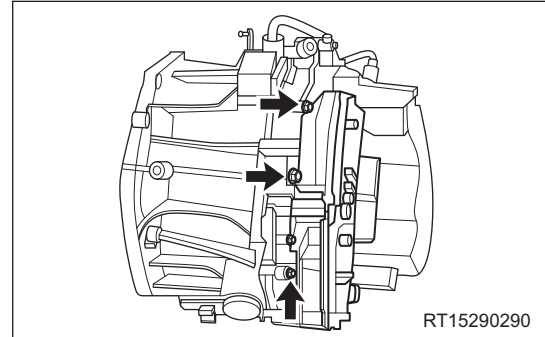


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3. Installation is in the reverse order of removal.
(Tightening torque: 26 ~ 28 N·m)

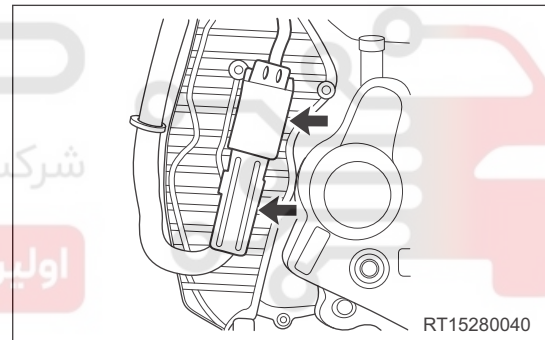
Transmission Control Module**Transmission Control Module**

1. Clean area around control module with appropriate washer fluid and compressed air.

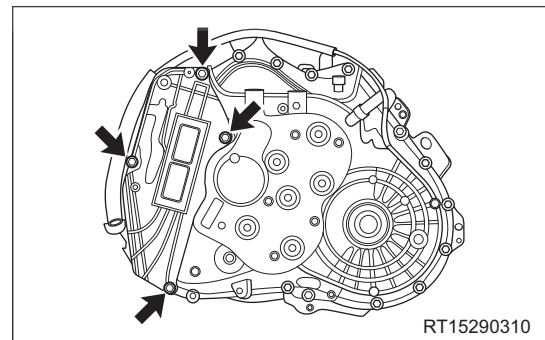
**⚠ WARNING**

- When cleaning with compressed air, wear protective glasses.

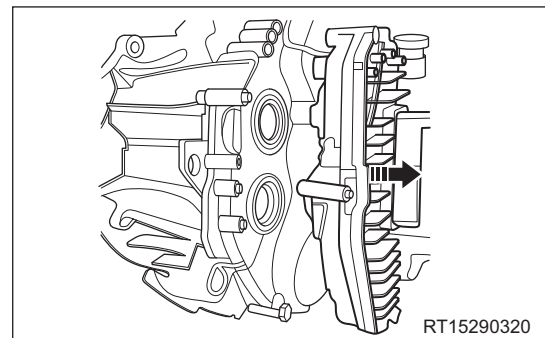
2. Disconnect the wire harness connector (arrow).



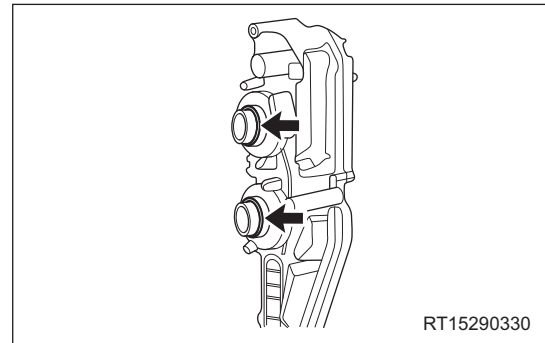
3. Remove 4 tightening bolts (arrow) from control module.



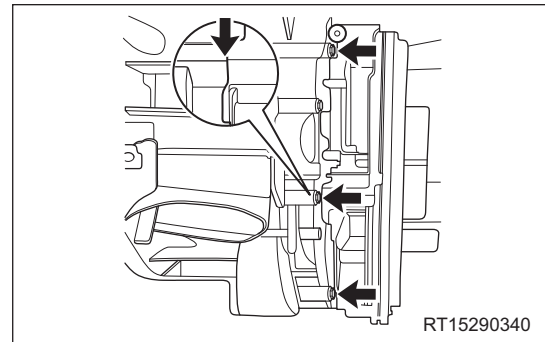
4. Remove the control module (arrow). Make sure dirt do not enter transmission.



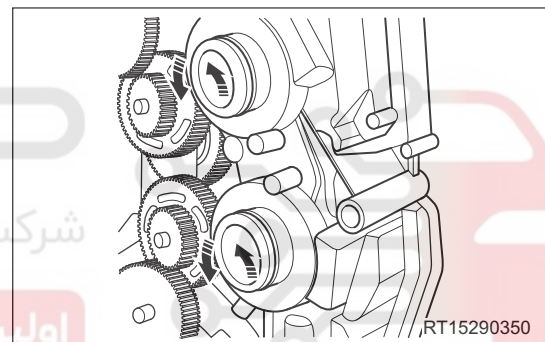
5. When installing control module, replace O-rings (arrow) with a new one.



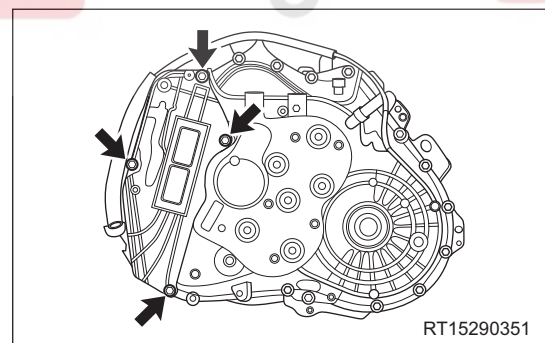
6. Install the control module. Apply a force slightly, make sure there is no gap between control module and transmission before tightening bolt. If encounter an obstacle When installing control module, remove this module again. See next step.



7. Turn gear on control module carefully to make gears contact each other.



8. Install 4 tightening bolts from control module.
(Tightening torque: 26 ~ 28 N·m)



 CAUTION

- DO NOT reuse old bolt, please use new one.

9. Connect wire harness connector.

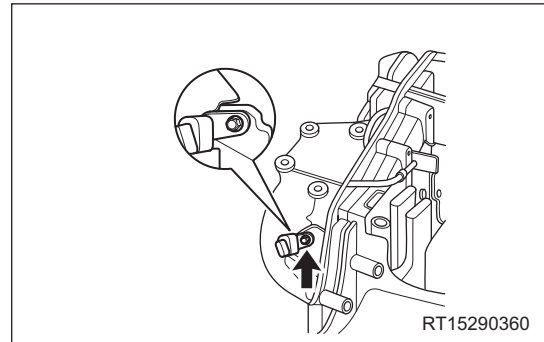
CAUTION

- Connect wire harness connector safely. If connector has locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

Transmission Input Shaft Sensor 2**Replacement of Transmission Input Shaft Sensor 2**

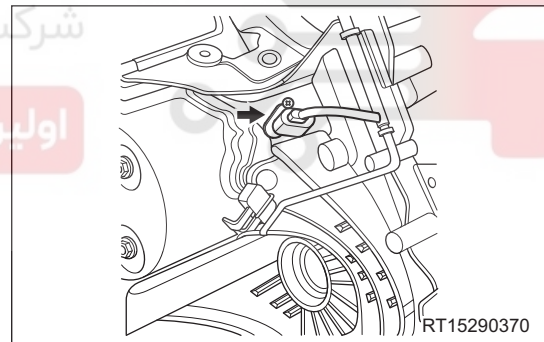
31

1. Clean area around transmission input shaft sensor with appropriate washer fluid and compressed air.

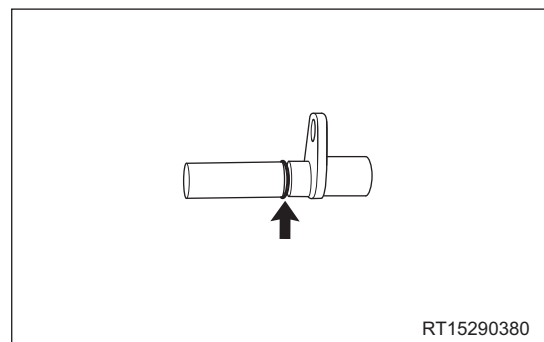
**WARNING**

- When cleaning with compressed air, wear protective glasses.

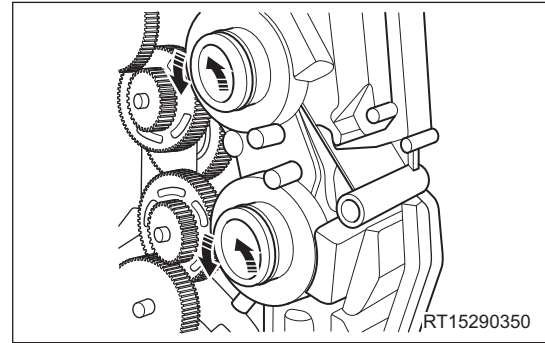
2. Disconnect the wire harness connector (arrow), and remove sensor tightening bolt.



3. Remove the sensor. Make sure that no dirt have entered in transmission.



4. Install new O-rings to sensor. Lubricate O-rings with a small amount of transmission oil (arrow).



5. Install the sensor tightening bolt.
(Tightening torque: 9 ~ 11 N·m)
6. Connect wire harness connector.

31

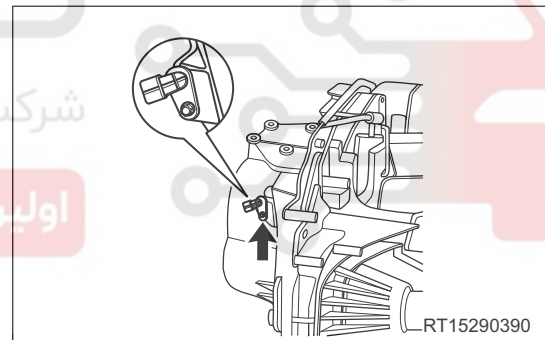
CAUTION

- Connect wire harness connector safely. If connector has locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

Transmission Input Shaft Sensor 1

Replacement of Transmission Input Shaft Sensor 1

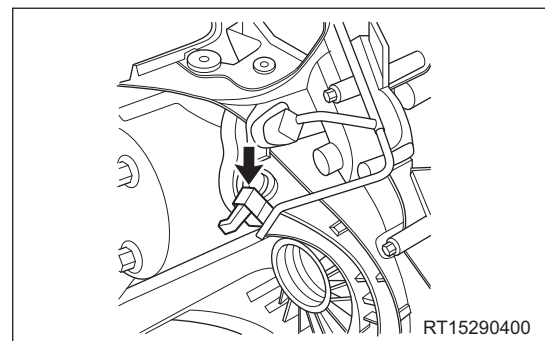
1. Clean area around transmission input shaft sensor with appropriate washer fluid and compressed air.



WARNING

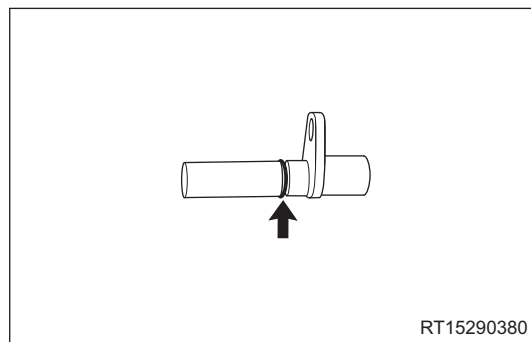
- When cleaning with compressed air, wear protective glasses.

2. Disconnect the wire harness connector (arrow), and remove sensor tightening bolt.



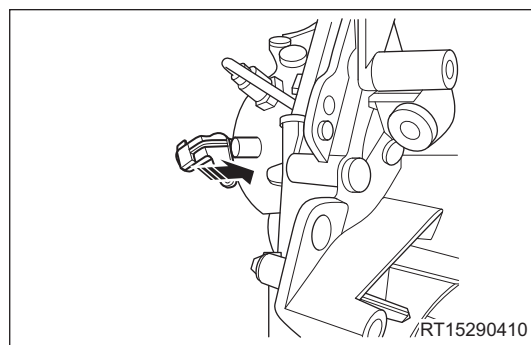
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3. Remove the sensor. Make sure that no dirt have entered in transmission.



31

4. Install new O-rings to sensor. Lubricate O-rings with a small amount of transmission oil (arrow).



5. Install the sensor tightening bolt.

(Tightening torque: 9 ~ 11 N·m)

6. Connect wire harness connector.

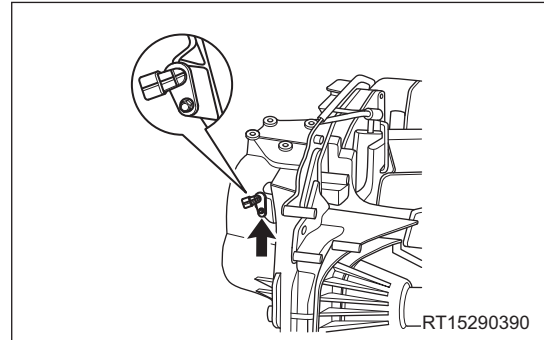
 CAUTION

- Connect wire harness connector safely. If connector has locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

Transmission Input Shaft Sensor 1

Replacement of Transmission Input Shaft Sensor 1

1. Clean area around transmission input shaft sensor with appropriate washer fluid and compressed air.

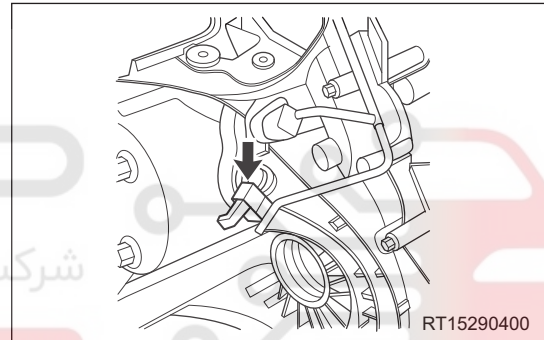


31

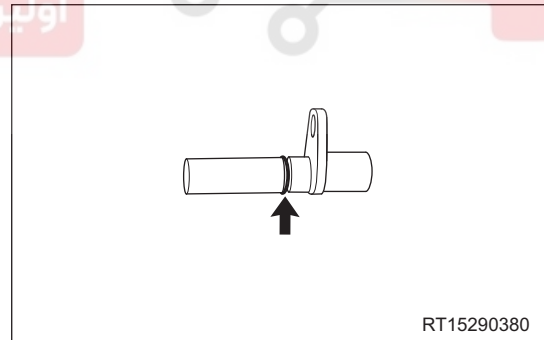
WARNING

- When cleaning with compressed air, wear protective glasses.

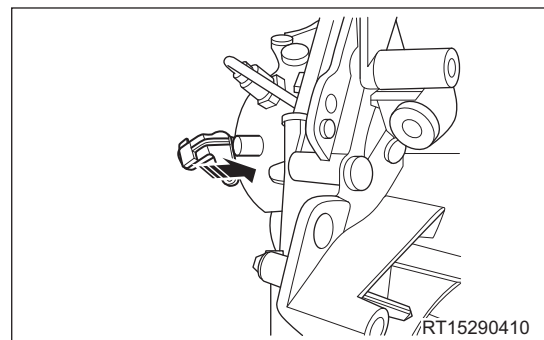
2. Disconnect the wire harness connector (arrow), and remove sensor tightening bolt.



3. Remove the sensor. Make sure dirt do not enter transmission.



4. Install new O-rings to sensor. Lubricate O-rings with a small amount of transmission oil.



5. Install the sensor tightening bolt.
(Tightening torque: 9 ~ 11 N·m)

6. Connect wire harness connector.

CAUTION

- Connect wire harness connector safely. If connector has locking device, make sure that clicking sound is heard. Failure to do so may cause malfunction.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

