

BRAKE CONTROL SYSTEM

GENERAL INFORMATION	38-3	C0034-13	38-39
Description	38-3	C0034-29	38-39
Operation	38-4	C0034-37	38-39
Specifications	38-8	C0037-00	38-45
Tools	38-8	C0037-09	38-45
Circuit Diagram	38-9	C0037-11	38-45
		C0037-12	38-45
DIAGNOSIS & TESTING	38-12	C0037-13	38-45
Problem Symptoms Table	38-12	C0037-29	38-45
Diagnosis Procedure	38-12	C0037-37	38-45
Problem Repair (No DTC)	38-14	C003A-00	38-51
DTC Confirmation Procedure	38-14	C003A-09	38-51
Intermittent DTC Troubleshooting	38-15	C003A-11	38-51
Ground Inspection	38-15	C003A-12	38-51
ABS/ESP Control Module Assembly		C003A-13	38-51
Terminal List	38-16	C003A-29	38-51
Calibration	38-17	C003A-37	38-51
Calibration of Steering Angle Sensor	38-17	C0051-54	38-57
Calibration of Yaw Rate Sensor	38-18	C0051-28	38-57
Diagnostic Trouble Code (DTC) Chart	38-21	C0051-64	38-57
C0001-04	38-23	U0126-87	38-57
C0002-04	38-23	C0061-64	38-63
C0003-04	38-23	C0062-64	38-63
C0004-04	38-23	C0063-64	38-63
C0010-04	38-23	C0063-01	38-63
C0011-04	38-23	C0063-54	38-63
C0014-04	38-23	C006B-00	38-65
C0015-04	38-23	C0089-04	38-68
C0018-04	38-23	C1000-16	38-71
C0019-04	38-23	C1000-17	38-71
C001C-04	38-23	C1001-04	38-71
C001D-04	38-23	C1009-00	38-71
C0020-04	38-28	U0005-00	38-76
C0020-09	38-28	U0007-00	38-76
C0020-01	38-28	U0073-88	38-76
C0020-49	38-28	U0100-87	38-76
C0031-00	38-33	U0101-87	38-76
C0031-09	38-33		
C0031-11	38-33	ON-VEHICLE SERVICE	38-82
C0031-12	38-33	ABS Bleeding	38-82
C0031-13	38-33	ABS/ESP Control Module Assembly	38-83
C0031-29	38-33	Removal	38-83
C0031-37	38-33	Installation	38-85
C0034-00	38-39	Front Wheel Speed Sensor	
C0034-09	38-39	(take front left wheel as an example)	38-86
C0034-11	38-39	Removal	38-86
C0034-12	38-39	Inspection	38-87

Installation	38-87	Installation	38-89
Rear Wheel Speed Sensor		Steering Angle Sensor	38-90
(take rear left wheel as an example)	38-88	Removal	38-90
Removal	38-88	Installation	38-91
Inspection	38-89		

دیجیتال خودرو

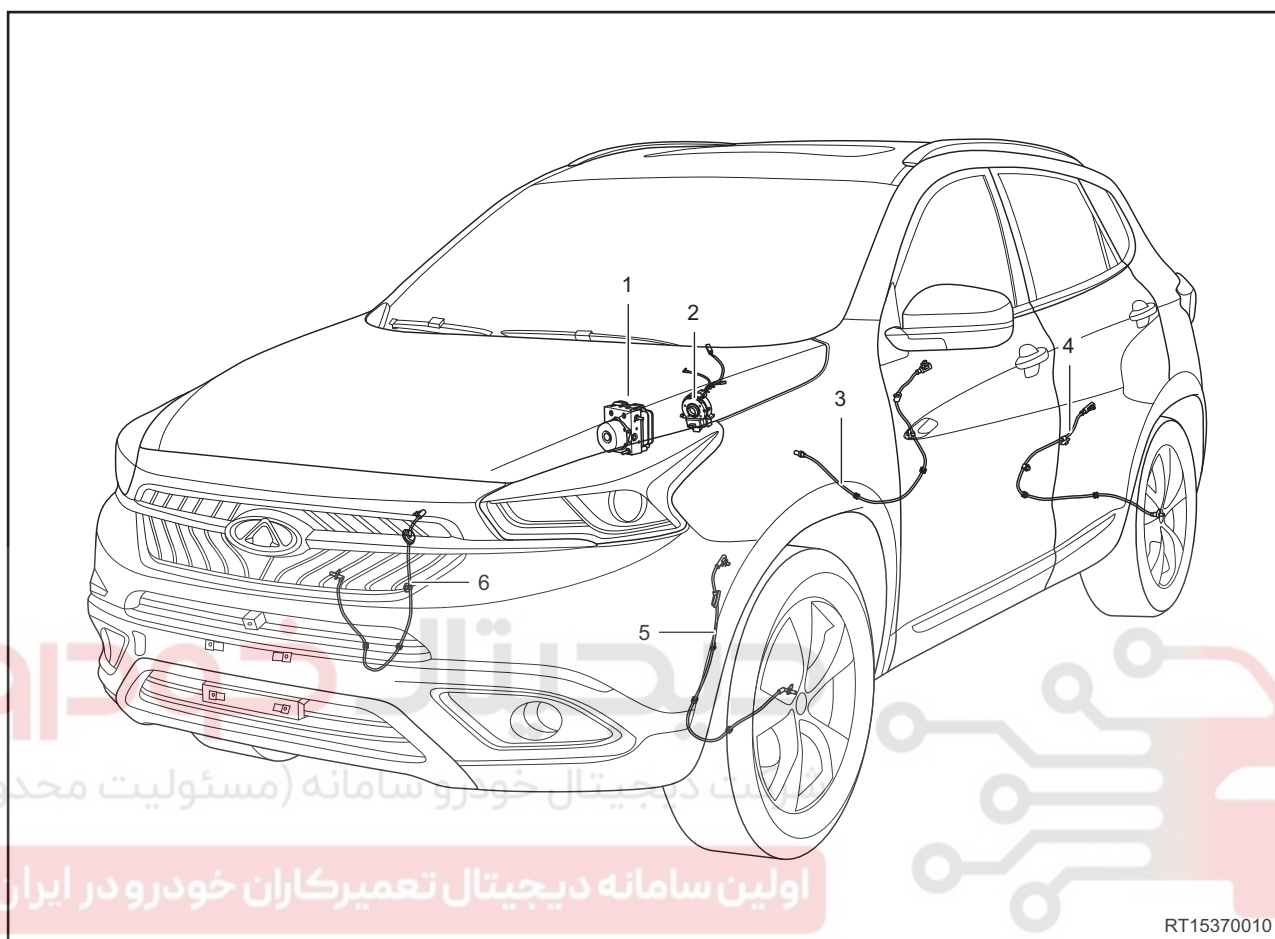
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description



38

1 - ABS/ESP Control Module Assembly	2 - Steering Angle Sensor
3 - Rear Right Wheel Speed Sensor	4 - Rear Left Wheel Speed Sensor
5 - Front Left Wheel Speed Sensor	6 - Front Right Wheel Speed Sensor

Brake control system equipped on this model is ABS (Anti-lock Brake System) + EBD (Electronic Brake Force Distribution) or ESP (Electronic Stability Program). It mainly consist of following components:

- ABS/ESP control module assembly (hydraulic control module and electronic control module)
- Wheel speed sensors (each wheel has one sensor)
- Steering angle sensor (if equipped with ESP)
- Yaw rate sensor (if equipped with ESC) (built in ESC control module assembly)

Primary purpose of ABS is to prevent wheels from being locked during sudden braking. It has following effects:

1. Improving vehicle driving stability.
2. Improving vehicle steering ability.
3. Maintaining optimal brake pressure.
4. Shortening brake distance efficiently.

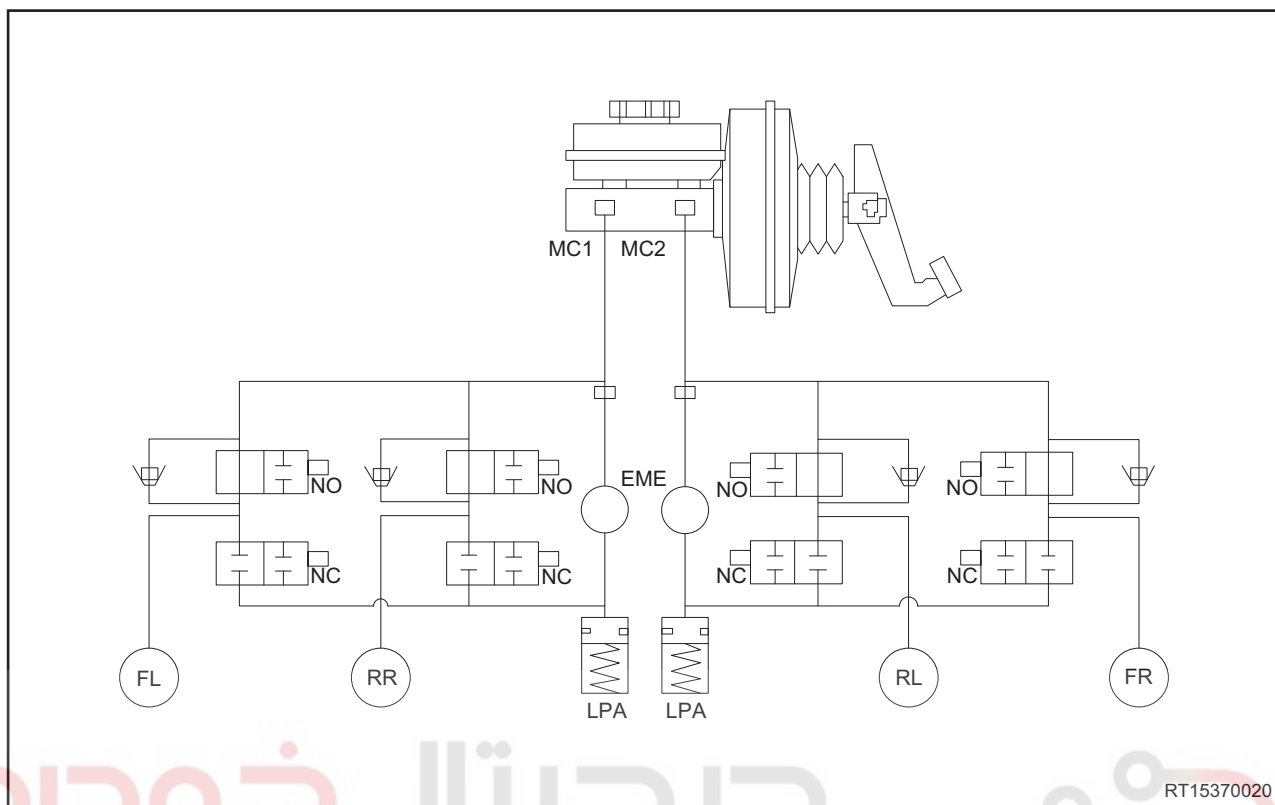
Operation

ABS Braking

1. If ABS system detects that wheels may be locked when applying brake, brake system will enter ABS braking mode. During braking, ABS/ESP control module outputs signal from each wheel speed sensor to each solenoid valve after analysis in order to adjust fluid pressure in each line, to prevent wheels from being locked.
2. There are some operating symptoms of ABS/ESP that seem to be abnormal at first, but in fact they are normal. The symptoms are as follows:
 - a. If electronic control module is malfunctioning, fail-safe function will be activated, ABS/ESP system will not operate and ABS/ESP warning light will come on.
 - b. After vehicle is powered on or engine is started, short "buzz" sound can be heard. This is normal sound from ESP self-check.
 - c. Motor, solenoid valve, and return pump movement in hydraulic unit will cause noise when ABS/ESP is operating normally, but this is normal.
 - d. Brake pedal may vibrate slightly and mechanical noise can be heard during ABS/ESP operation, but this is normal.
 - e. Bumping sound between suspension and vehicle body can be caused by sudden brake.



ABS Control Mode

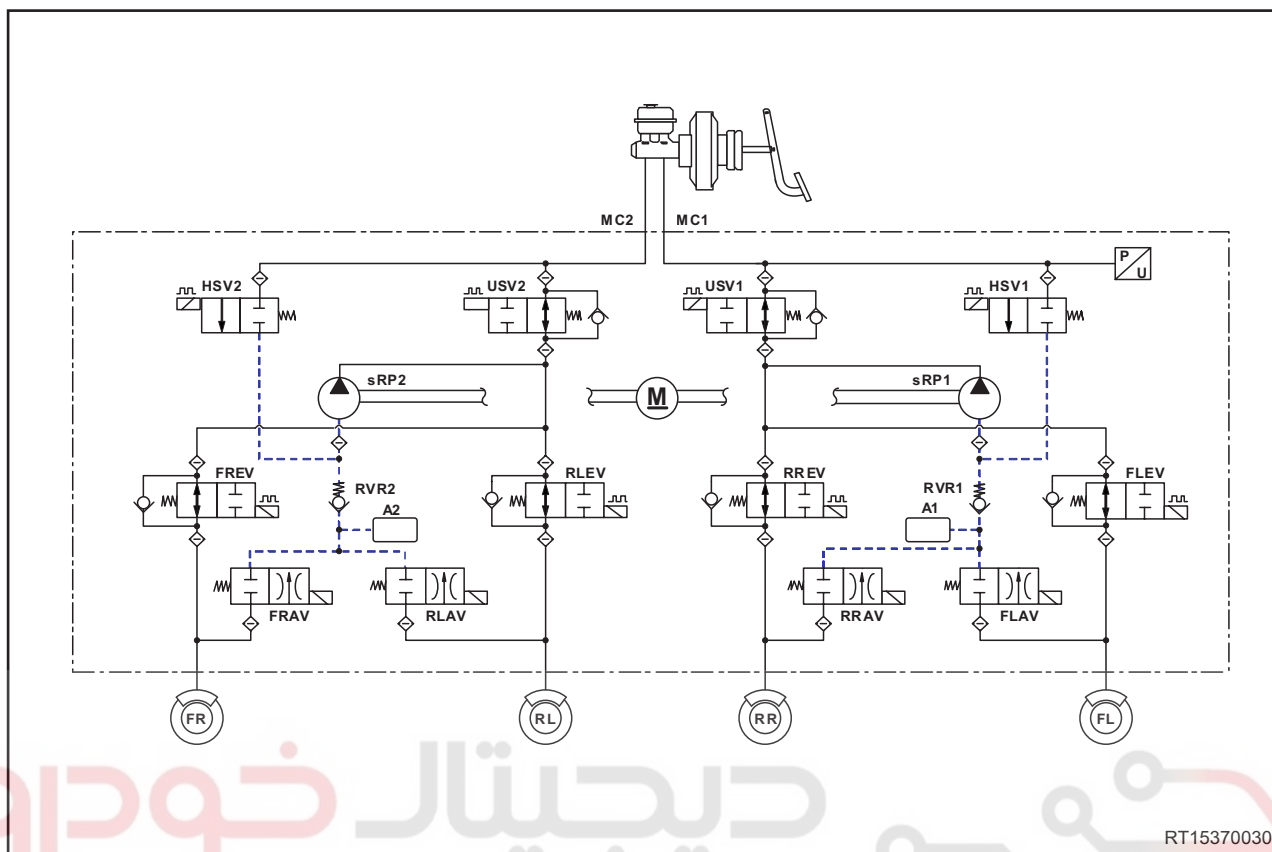


38

Description	Definition	Description	Definition
MC1	Master Cylinder Outlet 1	LPA	Low Pressure Accumulator
MC2	Master Cylinder Outlet 2	FL	Front Left Wheel
EME	Return Pump	RR	Rear Right Wheel
NO	Normal Open (Solenoid Valve)	RL	Rear Left Wheel
NC	Normal Close (Solenoid Valve)	FR	Front Right Wheel

38 - BRAKE CONTROL SYSTEM

ESP Control Mode



38

RT15370030

Description	Definition	Description	Definition
MC1	Brake Master Cylinder Circuit 1	FLEV	Front Left Wheel Inlet Valve
MC2	Brake Master Cylinder Circuit 2	FLAV	Front Left Wheel Outlet Valve
M	Motor	FREV	Front Right Wheel Inlet Valve
RP1	Return Pump 1	FRAV	Front Right Wheel Outlet Valve
RP2	Return Pump 2	FLEV	Rear Left Wheel Inlet Valve
A1	Accumulator 1	RLAV	Rear Left Wheel Outlet Valve
A2	Accumulator 2	RREV	Rear Right Wheel Inlet Valve
FL	Front Left Wheel	RRAV	Rear Right Wheel Outlet Valve
FR	Front Right Wheel	HSV1	High Pressure Switch Valve 1
RL	Rear Left Wheel	HSV2	High Pressure Switch Valve 2
RR	Rear Right Wheel	USV1	Circuit Control Valve 1
UP	Pressure Sensor	USV2	Circuit Control Valve 2

1. General Brake Operating Condition

For vehicles equipped with ABS, if brake pressure applied to wheels is not enough to lock wheels, oil pressure generated by master cylinder will be transmitted to wheel cylinder through normal open valve, producing regular braking effect. When it is not necessary to continue braking, and if driver reduces pressure to brake pedal, brake fluid of each wheel returns to master cylinder and brake pressure decreases.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	OFF	OPEN
Normal Close Valve	OFF	CLOSE

2. ABS Operating (Relief) Condition

For vehicles equipped with ABS, if brake pressure is applied excessively, friction coefficient between wheels and road will decrease, and wheels will be decelerated earlier than vehicle, which could cause wheels to be locked first. In this case, ABS/ESP control module commands hydraulic control module to reduce wheel pressure. In other words, normal open valve cuts off oil passage and the oil passage of normal close valve is open, in order to reduce wheel cylinder pressure. At this time, brake fluid drained from wheel cylinder is temporarily stored in low pressure accumulator. Then, the brake fluid stored in low pressure accumulator returns to master cylinder with rotation of motor.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	ON	CLOSE
Normal Close Valve	ON	OPEN

38

3. ABS Operating (Maintaining) Condition

When appropriate pressure is applied to wheel cylinder, ABS system enters maintaining pressure state. In other words, normal open valve cuts off oil passage and normal close valve also cuts off oil passage, the wheel cylinder pressure is maintained.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	ON	CLOSE
Normal Close Valve	OFF	CLOSE

4. ABS Operating (Boost) Condition

When ABS operates under relief pressure condition, if brake fluid is drained excessively or friction coefficient between wheels and road increases, it needs to increase each wheel pressure. In this case, ABS/ESP control module commands hydraulic control module to increase wheel pressure. As a result, normal open valve opens its passage and normal close valve shuts off oil passage, brake fluid stored in low pressure accumulator is supplied to each wheel cylinder through master cylinder and normal open valve, in order to increase wheel cylinder pressure.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	OFF	OPEN
Normal Close Valve	OFF	CLOSE

ABS system operates circularly under relief, maintaining and boost pressure conditions until vehicle is completely stopped, so vehicle braking and steering performance will be guaranteed.

ESP adjustment procedure is similar to ABS adjustment procedure. Brake fluid is supplied to wheel cylinders that need to increase pressure by pump, when traction control and stability control are realized and HSV valve opens and USV valve closes.

38 - BRAKE CONTROL SYSTEM

Specifications

Torque Specifications

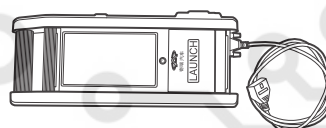
Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10
Fixing Nut Between ABS/ESP Control Module Assembly and Mounting Bracket	8 ± 2
Fixing Bolt Between ABS/ESP Control Module Assembly Mounting Bracket and Body	23 ± 3.5
Front Wheel Speed Sensor Fixing Bolt	9 ± 1.5
Rear Wheel Speed Sensor Fixing Bolt	9 ± 1.5
Coupling Bolt Between Brake Pipe and ABS/ESP Control Module Assembly	18 ± 2

Tools

Special Tool

38

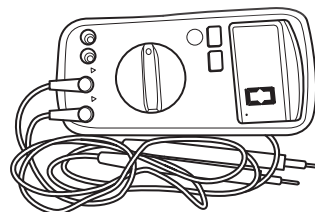
X-431 3G Diagnostic Tester



RCH0000001

General Tool

Digital Multimeter

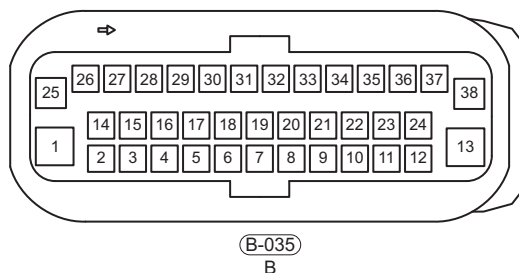
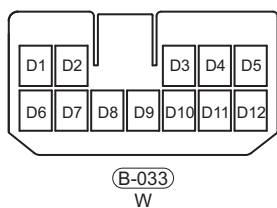
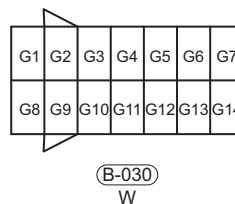
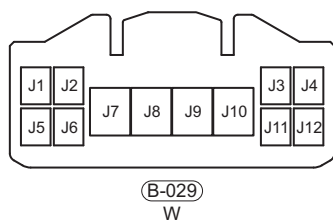
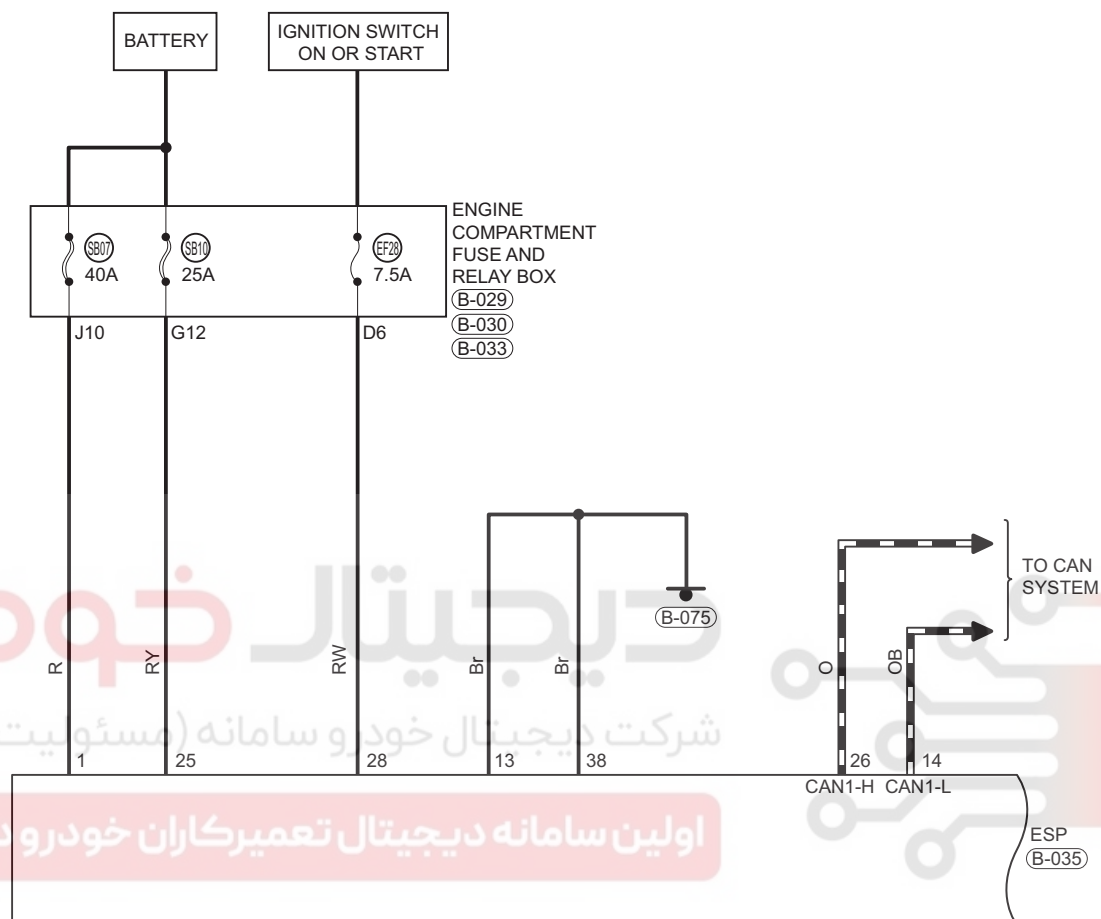


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Circuit Diagram

Brake Control System (Page 1 of 3)

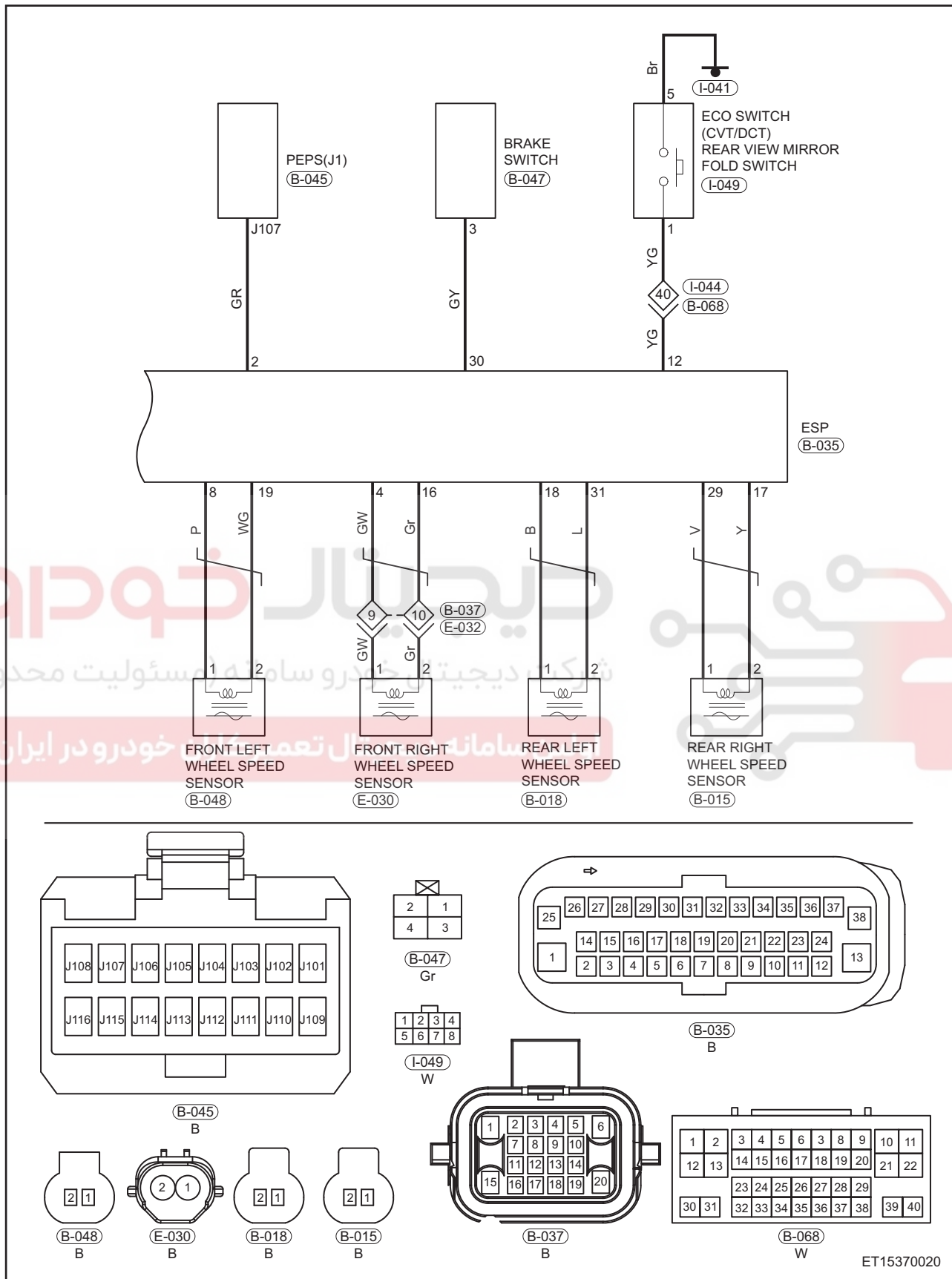
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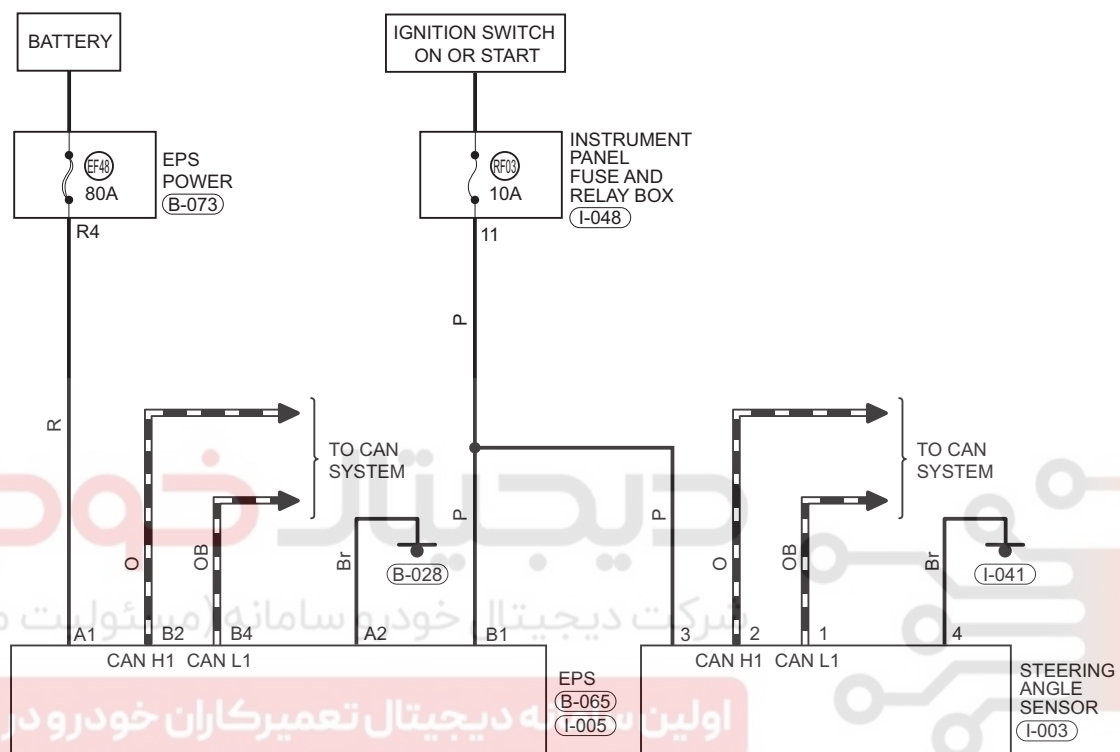
ET15370010

38 - BRAKE CONTROL SYSTEM

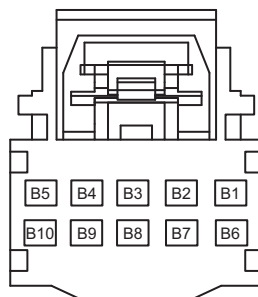
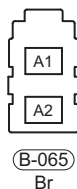
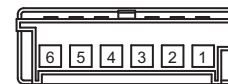
Brake Control System (Page 2 of 3)



Brake Control System (Page 3 of 3)



38

I-005
BI-003
B

ET15420010

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
When turning engine switch ON, ABS/ESP warning light does not come on	Fuse	68-36
	Wire harness or connector	-
	ABS/ESP control module assembly	38-83
	Instrument cluster	52-68
ABS/ESP warning light remains on	Fuse	68-36
	Wire harness or connector	-
	ABS/ESP control module assembly	38-83
	Instrument cluster	52-68
ABS/ESP operation is abnormal	Wheel speed sensor (damaged, improperly installed, foreign matter attached)	38-86
	Hub ring gear (damaged, improperly installed, foreign matter attached)	-
	Hub ring gear (damaged, improperly installed, foreign matter attached)	-
	Brake line (blocked or leaked)	-
	Wire harness or connector	-
	ABS/ESP control module assembly	38-83
Communication with ABS/ESP control module cannot be performed	Fuse	68-36
	Wire harness or connector	-
	X-431 3G diagnostic tester	-
	ABS/ESP control module assembly	38-83

Diagnosis Procedure

HINT:

Use following procedures to troubleshoot the brake control system.

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

NEXT

38 - BRAKE CONTROL SYSTEM

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

Standard voltage: 11 to 14 V

If voltage is below 11 V, recharge or replace battery before proceeding to next step.

NEXT

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

NEXT

4	Check and clear DTCs
---	----------------------

NEXT

5	Confirm and duplicate malfunction: accelerate vehicle to 40 km/h or above, simulate malfunction conditions and read DTCs again
---	--

38

DTC occurs

For current DTC, go to step 7

No DTC

For history DTC, go to step 8

NEXT

6	Problem repair (no DTC), then go to step 9
---	--

NEXT

7	Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 9
---	--

NEXT

8	Troubleshoot according to Problem Symptoms Table, then go to step 9
---	---

NEXT

9	Conduct test and confirm malfunction has been repaired
---	--

NEXT

Problem Repair (No DTC)

If there is a problem in brake system, but no DTC is stored in ABS/ESP control module assembly, this problem is called a problem without DTC. A problem without DTC is caused by basic brake system malfunction. For example:

1. Brake fluid leakage (it may result in weak braking, excessive brake pedal travel or even ineffective braking).
2. Using inferior brake fluid (it can result in corrosion of brake line and ABS hydraulic regulating module internal elements, or even ineffective braking).
3. Air in brake line (it may result in weak braking or even ineffective braking).
4. Brake line blockage (it may result in hard braking or even ineffective braking).
5. Excessive wear of brake disc (it may result in weak braking, excessive brake pedal travel).
6. Brake booster malfunction (it may result in weak or hard braking, excessive brake pedal travel or even ineffective braking).
7. Wrong brake line connection (it may result in ABS/ESP braking performance decreasing, drift, long braking distance, etc.).

HINT:

- ABS/ESP no power supply or power supply abnormality will cause ABS/ESP warning light remains on without storing DTC.
- Troubleshooting method: check corresponding component according to the malfunction, repair or replace as necessary.

DTC Confirmation Procedure

Confirm that battery voltage is normal 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 OFF.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in ABS/ESP control module assembly.
- Turn engine switch to OFF and wait for a few seconds.
- Start engine, drive vehicle at 40 km/h or more and perform road test with X-431 3G diagnostic tester connected to Data Link Connector (DLC).
- Use X-431 3G diagnostic tester to read DTCs.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If no DTC is detected, malfunction indicated by DTC is intermittent. Please refer to Intermittent DTC Troubleshooting.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect wheel speed sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works.

Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

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

ABS/ESP Control Module Assembly Terminal List

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Motor Power Supply Side (Positive)	20	-
2	Wheel Speed Output (Front Right)	21	-
3	-	22	-
4	Wheel Speed Sensor Signal Side (Front Right)	23	-
5	-	24	-
6	-	25	Valve Relay Power Supply Side
7	-	26	CAN-H
8	Wheel Speed Sensor Signal Side (Front Left)	27	-
9	-	28	ECU Power Supply Side (Ignition Power Wire)
10	-	29	Wheel Speed Sensor Signal Side (Rear Right)
11	-	30	Brake Light Switch
12	ESP OFF Switch	31	Wheel Speed Sensor Power Supply Side (Rear Left)
13	Motor Ground Side	32	-
14	CAN-L	33	-
15	-	34	-
16	Wheel Speed Sensor Power Supply Side (Front Right)	35	-
17	Wheel Speed Sensor Power Supply Side (Rear Right)	36	-
18	Wheel Speed Sensor Signal Side (Rear Left)	37	-
19	Wheel Speed Sensor Power Supply Side (Front Left)	38	ECU Ground Side

Calibration

Calibration of Steering Angle Sensor

1. Preconditions for Sensor Calibration

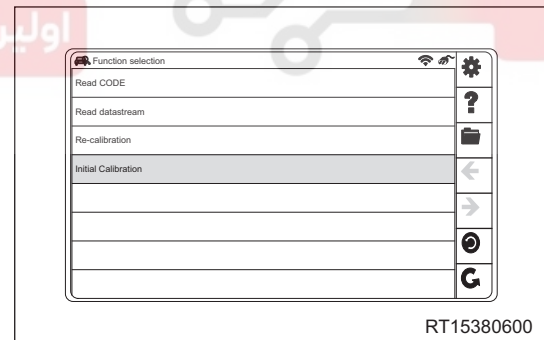
- a. Perform zero calibration after steering sensor is installed.
- b. Calibration should be finished on front wheels (four-wheel) alignment station (confirm that four-wheel alignment parameters are correct).
- c. Before calibration, make the vehicle face ahead. Wheels must be in line along driving direction, error of both angles should be met toe-in value in four-wheel alignment parameters, and steering wheel must be centered.
- d. Before performing calibration again for calibrated sensor, perform recalibration for sensor, to make the sensor back to calibration status.

CAUTION

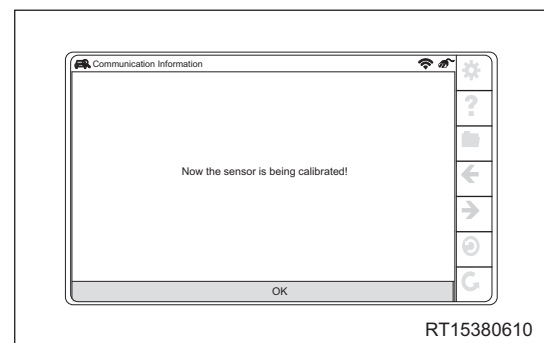
- The most important is that pay special attention to center of steering wheel during actual calibration. If not centered, it may cause error calibration data even the data is correct when performing four-wheel alignment. Such problem may not be detected in the factory, but it may cause error due to long-term accumulation during driving, or it may cause outrange when turning steering wheel fully, thus ESP light will come on. So steering wheel must be centered during four-wheel alignment.

2. Operation Procedures:

- a. Connect the diagnostic tester.
- b. Turn engine switch to ON.
- c. Confirm that steering wheel is in centered (vehicle faces ahead, and wheels must be in line along driving direction. Adjust steering wheel with centered).
- d. Enter "Function selection" menu, and click "Initial Calibration".

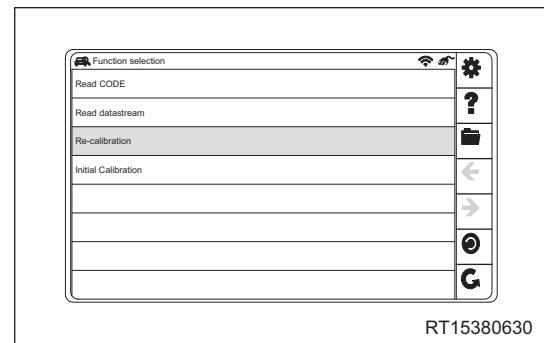
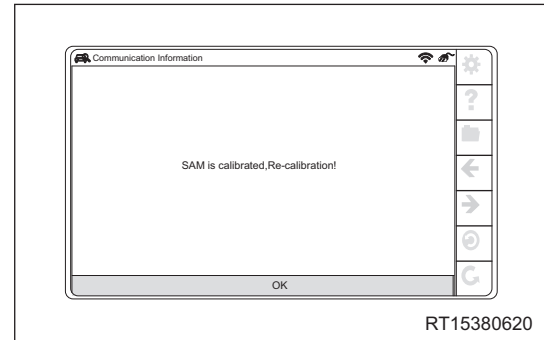


- e. Diagnostic tester will automatically detect whether the sensor is faulty or not and is calibrated or not; if sensor is fault, exit Calibration.
- f. If sensor has not been calibrated, perform calibration automatically.



38 - BRAKE CONTROL SYSTEM

- g. If sensor has been calibrated, it reminds that "Re-calibration" is needed. Click "Re-calibration" according to display on diagnostic tester, then click "Initial Calibration" again. If there is no response, exit Calibration.



- h. There is a reminder whether calibration is successful or not on diagnostic tester.

38

⚠ WARNING

- Never cut off the power during calibration. (Never cut off the power of device during calibration. Power of steering angle sensor cannot be cut off, and diagnostic tester and sensor also should be connected well. Or calibration cannot be finished correctly. If they are not connected firmly, it even may cause products overload and damage.

👁 CAUTION

- Calibration the steering angle sensor again when performing four-wheel alignment for vehicle.

Calibration of Yaw Rate Sensor

1. Preconditions for Sensor Calibration

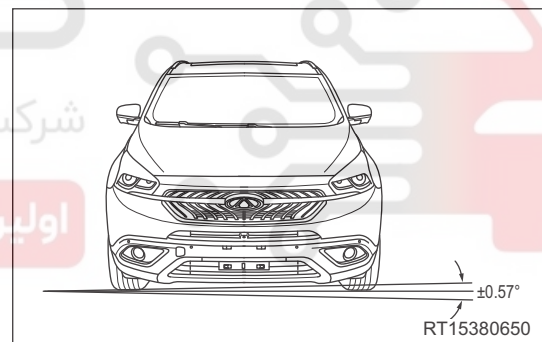
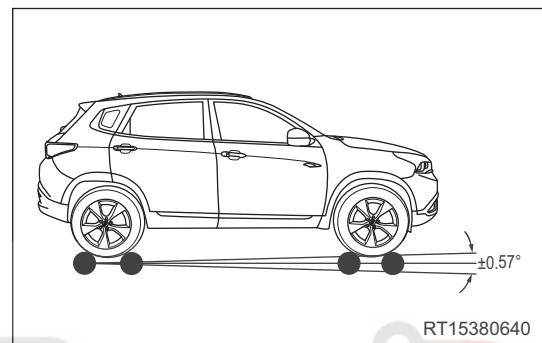
- Before calibration of sensor, confirm that tilt angle of vehicle must be within $\pm 0.57^\circ$ ($\pm 1\%$).
- Tester must be stationary.
- Turn steering wheel to straight ahead position.
- Tire pressure is correct.
- Load is in normal condition.
- Low vehicle fuel tank volume is permitted.
- Vehicle is supported by its wheels.
- Only driver sits in vehicle.
- No other vibrating interferences such as closing the door or engine cover.
- Calibration can be performed on rotary hub tester or a flat area.

CAUTION

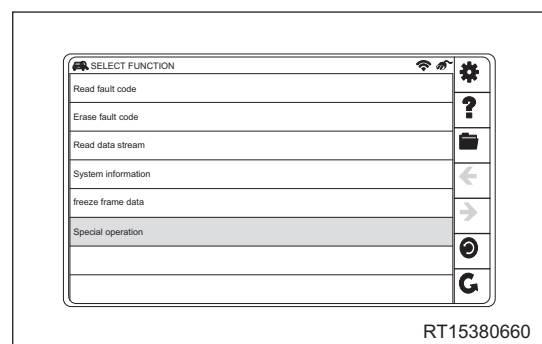
- The replaced ABS/ESP module must be calibrated for integrated sensor. ECU will write the newly measured data into EEPROM and it will be used by ESP during calibration. ESP cannot confirm some preconditions mentioned above, so it is necessary to make sure that calibration conditions above are established. If offset amount is too large, system will refuse to perform calibration, at this time, it is necessary to bring the vehicle to factory.

2. Operation Procedures:

- Connect the diagnostic tester.
- Turn engine switch to ON.
- Confirm that tilt angle of vehicle must be within $\pm 0.57^\circ$ ($\pm 1\%$).

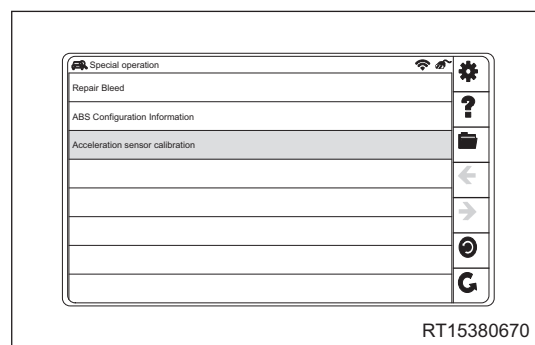


- Enter "Special operation" menu.



38 - BRAKE CONTROL SYSTEM

e. Click "Acceleration sensor calibration".

**⚠ WARNING**

- Never cut off the power during calibration.



Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C0001-04	TCS Control Channel Changeover Valve 1 (ESP Only)
C0002-04	TCS Control Channel Changeover Valve 2 (ESP Only)
C0003-04	TCS Control Channel High Pressure Switch Valve 1 (ESP Only)
C0004-04	TCS Control Channel High Pressure Switch Valve 2 (ESP Only)
C0010-04	Left Front Inlet Control
C0011-04	Left Front Outlet Control
C0014-04	Right Front Inlet Control
C0015-04	Right Front Outlet Control
C0018-04	Left Rear Inlet Control
C0019-04	Left Rear Outlet Control
C001C-04	Right Rear Inlet Control
C001D-04	Right Rear Outlet Control
C0020-04	ABS Pump Motor Control
C0020-09	ABS Pump Motor Control
C0020-01	Return Fluid Pump (RFP) IFS Test Failures
C0020-49	Return Fluid Pump (RFP) Actuation UB Motor Relay Supply Error
C0031-00	Left Front Wheel Speed Sensor Failures
C0031-09	Left Front Wheel Speed Sensor Failures
C0031-11	Left Front Wheel Speed Sensor Failures
C0031-12	Left Front Wheel Speed Sensor Failures
C0031-13	Left Front Wheel Speed Sensor Failures
C0031-29	Left Front Wheel Speed Sensor Failures
C0031-37	Left Front Wheel Speed Sensor Failures
C0034-00	Right Front Wheel Speed Sensor Failures
C0034-09	Right Front Wheel Speed Sensor Failures
C0034-11	Right Front Wheel Speed Sensor Failures
C0034-12	Right Front Wheel Speed Sensor Failures
C0034-13	Right Front Wheel Speed Sensor Failures
C0034-29	Right Front Wheel Speed Sensor Failures
C0034-37	Right Front Wheel Speed Sensor Failures
C0037-00	Left Rear Wheel Speed Sensor
C0037-09	Left Rear Wheel Speed Sensor
C0037-11	Left Rear Wheel Speed Sensor
C0037-12	Left Rear Wheel Speed Sensor
C0037-13	Left Rear Wheel Speed Sensor
C0037-29	Left Rear Wheel Speed Sensor

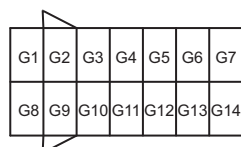
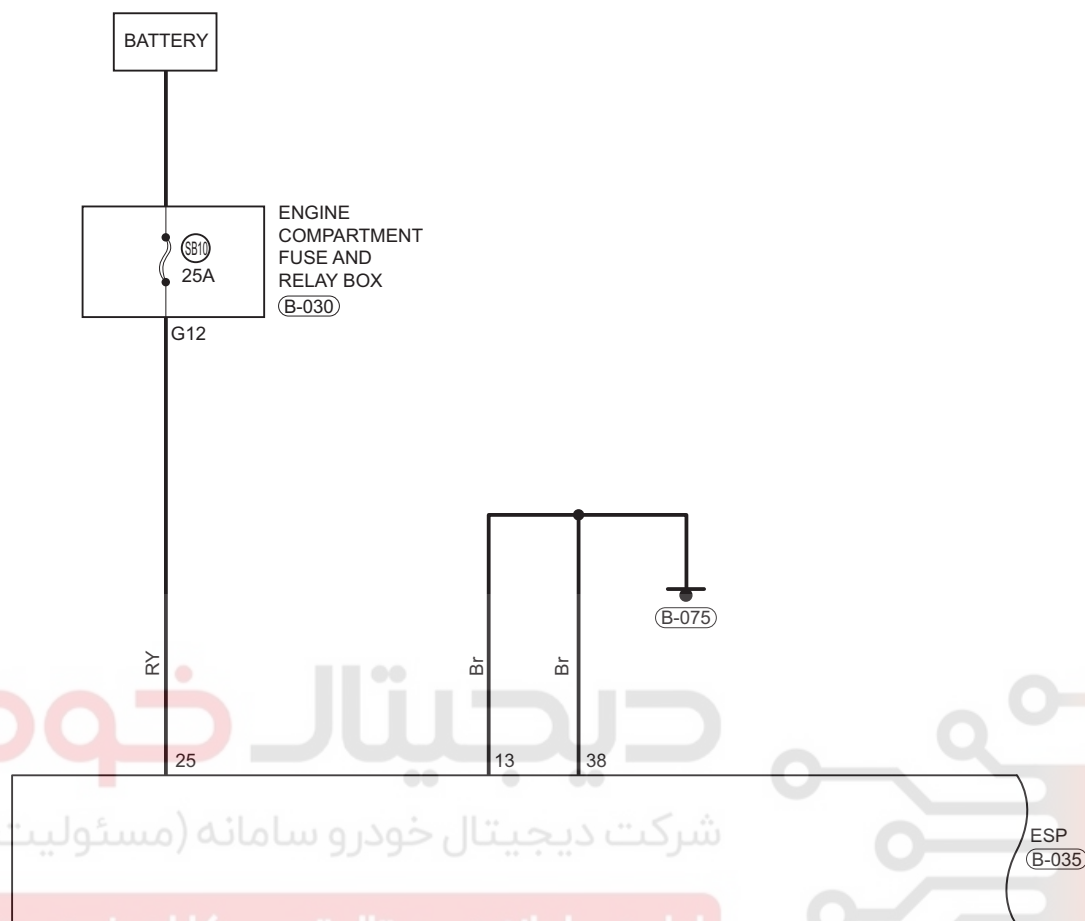
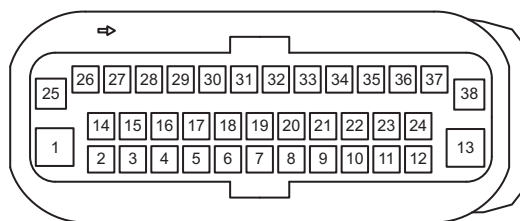
38 - BRAKE CONTROL SYSTEM

DTC	DTC Definition
C0037-37	Left Rear Wheel Speed Sensor
C003A-00	Right Rear Wheel Speed Sensor
C003A-09	Right Rear Wheel Speed Sensor
C003A-11	Right Rear Wheel Speed Sensor
C003A-12	Right Rear Wheel Speed Sensor
C003A-13	Right Rear Wheel Speed Sensor
C003A-29	Right Rear Wheel Speed Sensor
C003A-37	Right Rear Wheel Speed Sensor
C0040-64	Brake Pedal Switch (ESP Only)
C0044-01	Brake Pressure Sensor (ESP Only)
C0044-28	Brake Pressure Sensor (ESP Only)
C0051-29	Steering Wheel Position Sensor (ESP Only)
C0051-54	Steering Wheel Position Sensor (ESP Only)
C0051-64	Steering Wheel Position Sensor (ESP Only)
C0061-64	Lateral Acceleration Sensor (ESP Only)
C0062-64	Longitudinal Acceleration Sensor (ESP Only)
C0063-64	Yaw Rate Sensor (ESP Only)
C0063-01	Yaw Rate Sensor (ESP Only)
C0063-54	Yaw Rate Sensor (ESP Only)
C006B-00	Stability System Active Too Long
C0089-04	TCS Disable Switch (ESP Only)
C1000-16	ECU Voltage Supply
C1000-17	ECU Voltage Supply
C1001-04	ECU
C1002-49	CAN Hardware
C1003-04	Valve Relay
C1004-00	General Valve
C1005-08	Hand Brake Switch (ESP Only)
C1007-29	Reverse Gear Switch (ESP Only)
C1008-00	General WSS
C1009-00	ECU HardWare Related
U0005-00	High Speed CAN Communication Bus (+) High
U0007-00	High Speed CAN Communication Bus (-) Low
U0073-88	Control Module Communication Bus Off
U0100-87	Lost Communication With Engine Control System Module
U0101-87	Lost Communication With Transmission Control Unit
U0126-87	Lost Communication With SAM

DTC	C0001-04	TCS Control Channel Changeover Valve 1 (ESP Only)
DTC	C0002-04	TCS Control Channel Changeover Valve 2 (ESP Only)
DTC	C0003-04	TCS Control Channel High Pressure Switch Valve 1 (ESP Only)
DTC	C0004-04	TCS Control Channel High Pressure Switch Valve 2 (ESP Only)
DTC	C0010-04	Left Front Inlet Control
DTC	C0011-04	Left Front Outlet Control
DTC	C0014-04	Right Front Inlet Control
DTC	C0015-04	Right Front Outlet Control
DTC	C0018-04	Left Rear Inlet Control
DTC	C0019-04	Left Rear Inlet Control
DTC	C001C-04	Right Rear Inlet Control
DTC	C001D-04	Right Rear Outlet Control

38 - BRAKE CONTROL SYSTEM

38

(B-030)
W(B-035)
B

ET15380100

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0001-04	TCS Control Channel Changeover Valve 1 (ESP Only)	This DTC occurs when any of following conditions is met: Solenoid valve power supply malfunction (short circuit to power supply or ground circuit open). Solenoid valve temperature is too high (overheat protection). Short circuit in more than 5 solenoid valves (fuses). Corresponding solenoid valve activated with no feedback. Solenoid valve itself malfunction.	- Abnormal solenoid valve power supply - Poor connection of ABS/ESP control module and ground wire - Fuse malfunction - Short to solenoid valve, or open circuit - System overheat protection - Damaged ABS/ESP control module assembly
C0002-04	TCS Control Channel Changeover Valve 2 (ESP Only)		
C0003-04	TCS Control Channel High Pressure Switch Valve 1 (ESP Only)		
C0004-04	TCS Control Channel High Pressure Switch Valve 2 (ESP Only)		
C0010-04	Left Front Inlet Control		
C0011-04	Left Front Inlet Control		
C0014-04	Right Front Inlet Control		
C0015-04	Right Front Inlet Control		
C0018-04	Left Rear Inlet Control		
C0019-04	Left Rear Inlet Control		
C001C-04	Right Rear Inlet Control		
C001D-04	Right Rear Inlet Control		

CAUTION

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

Diagnosis Procedure

1	Check for DTCs
---	----------------

- Leave vehicle for 5 minutes, clear and read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Refer to DTC Confirmation Procedure.
- Check if same DTC is output.

NO

Problem indicated by DTC is intermittent (system overheat protection)

YES

38 - BRAKE CONTROL SYSTEM

2

Check fuse

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Remove fuse SB-10 (25 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse SB-10

OK

3

Check wire harness and connector

Use circuit diagram as a guide to perform following procedures:

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect ABS/ESP control module connector B-035 and engine compartment fuse and relay box connector B-030.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace body wire harness and connector

OK

4

Check ABS/ESP control module power supply circuit (ABS/ESP control module assembly - power supply)

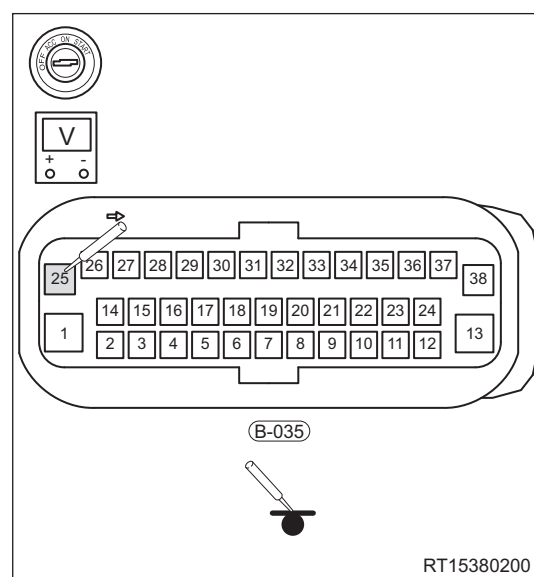
- Connect the negative battery cable.
- Turn engine switch to OFF.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Using a digital multimeter, measure voltage between terminal 25 of ABS/ESP control module assembly and body ground to check if system power supply circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (25) - Body ground	Always	9 - 16 V

NG

Repair or replace body wire harness and connector



OK

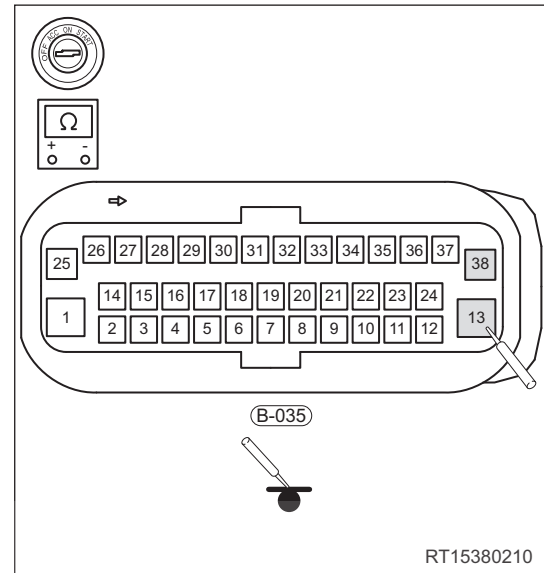
5

Check ABS/ESP control module ground circuit (ABS/ESP control module assembly - body ground)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Using a digital multimeter, check for continuity between terminals 13, 38 of ABS/ESP control module assembly and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (13) - Body ground	Always	Continuity
B-035 (38) - Body ground	Always	Continuity



NG

Repair or replace body wire harness and connector

38

OK

6

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is output.

NO

System operates normally

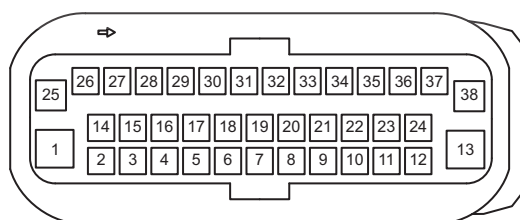
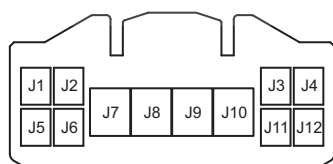
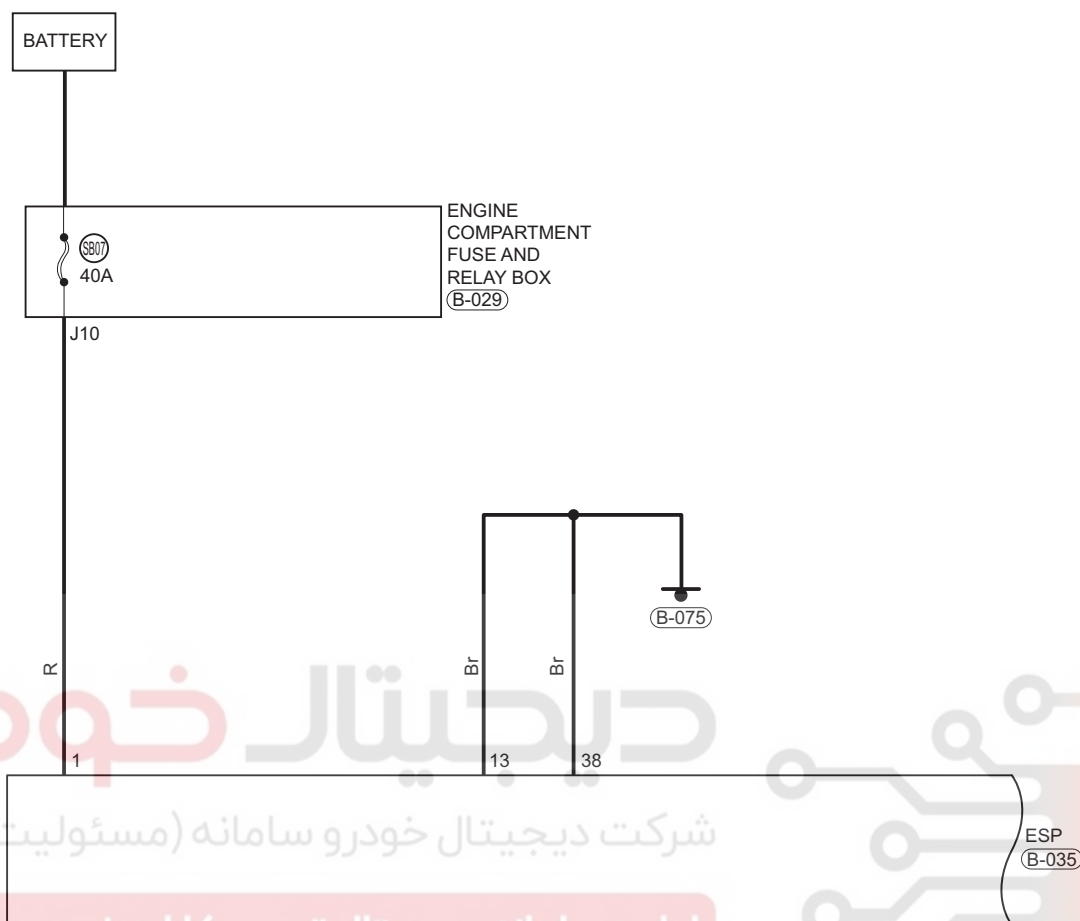
YES

Replace ABS/ESP control module assembly

38 - BRAKE CONTROL SYSTEM

DTC	C0020-04	ABS Pump Motor Control
DTC	C0020-09	ABS Pump Motor Control
DTC	C0020-01	Return Fluid Pump (RFP) IFS Test Failures
DTC	C0020-49	Return Fluid Pump (RFP) Actuation UB Motor Relay Supply Error





ET15380220

38 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0020-04	ABS Pump Motor Control	This DTC occurs when any of following conditions is met: Pump motor operates with overload, and temperature is too high (overheat protection). Return pump monitor still cannot detect voltage signal after return pump motor relay operates for 60 ms. Return pump monitor detects voltage for more than 2.5 s when return pump motor relay does not operate. Return pump monitor detects that voltage does not drop when return pump motor relay stop operating.	• Fuse malfunction • Pump motor has poor ground connection • System overheat protection • Abnormal pump motor power supply • Pump motor malfunction
C0020-09	ABS Pump Motor Control		
C0020-01	Return Fluid Pump (RFP) IFS Test Failures		
C0020-49	Return Fluid Pump (RFP) Actuation UB Motor Relay Supply Error		

 CAUTION

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

Diagnosis Procedure**1 Check for DTCs**

- Leave vehicle for 5 minutes, clear and read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Refer to DTC Confirmation Procedure.
- Check if same DTC is output.

NG

Problem indicated by DTC is intermittent (system overheat protection)

OK**2 Check fuse**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.

38 - BRAKE CONTROL SYSTEM

- c. Remove fuse SB-07 (40 A) from engine compartment fuse and relay box.
d. Check if fuse is blown.

NG

Replace fuse SB-07

OK

3

Check wire harness and connector

Use circuit diagram as a guide to perform following procedures:

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace body wire harness and connector

OK

4

Check wire harness and connector (ABS/ESP control module assembly - power supply)

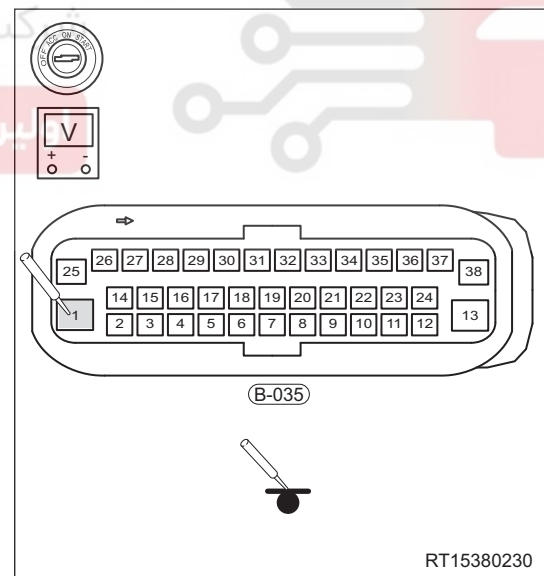
- a. Connect the negative battery cable.
b. Turn engine switch to OFF.
c. Disconnect the ABS/ESP control module assembly connector B-035.
d. Using a digital multimeter, measure voltage between terminal 1 of ABS/ESP control module assembly and body ground to check if system power supply circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (1) - Body ground	Always	9 - 16 V

NG

Repair or replace body wire harness and connector



OK

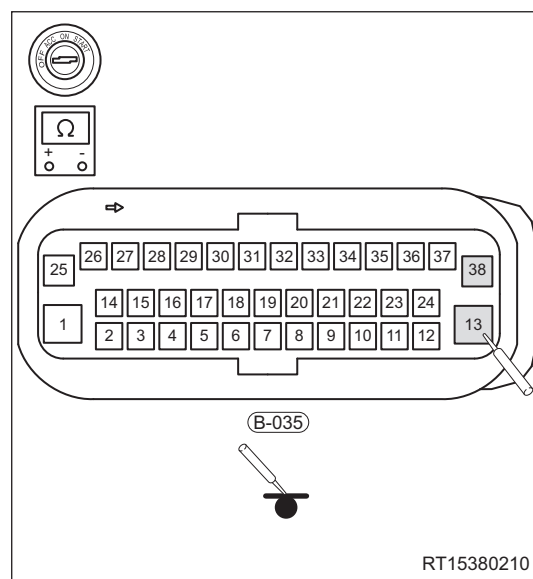
38 - BRAKE CONTROL SYSTEM

5**Check wire harness and connector (ABS/ESP control module assembly - body ground)**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Using a digital multimeter, check for continuity between terminals 13, 38 of ABS/ESP control module assembly and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (13) - Body ground	Always	Continuity
B-035 (38) - Body ground	Always	Continuity

**NG****Repair or replace body wire harness and connector****38****OK****6****Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if the same DTCs are still output.

NO**System operates normally****YES****Replace ABS/ESP control module assembly**

DTC	C0031-00	Left Front Wheel Speed Sensor Failures - No Subtype Information
DTC	C0031-09	Left Front Wheel Speed Sensor Failures
DTC	C0031-11	Left Front Wheel Speed Sensor Failures - Circuit Short to Ground
DTC	C0031-12	Left Front Wheel Speed Sensor Failures - Circuit Short to Battery
DTC	C0031-13	Left Front Wheel Speed Sensor Failures - Circuit Open
DTC	C0031-29	Left Front Wheel Speed Sensor Failures - Signal Invalid
DTC	C0031-37	Left Front Wheel Speed Sensor Failures

دیجیتال خودرو

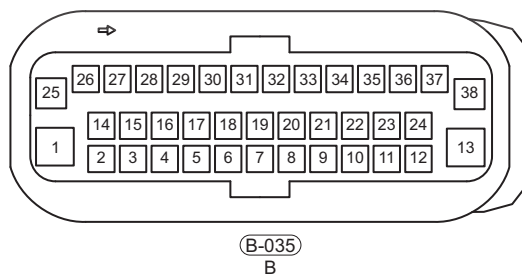
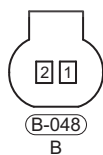
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



38 - BRAKE CONTROL SYSTEM

38



ET15380240

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0031-00	Left Front Wheel Speed Sensor Failures	This DTC occurs when any of following conditions is met: ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open. ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESP control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	- Reverse connection of wheel speed sensor signal wire and power supply wire - Short to ground in signal wire - Wheel speed sensor wire is disconnected, or connector is loose or broken - Short to power supply in wheel speed sensor signal wire - Short to ground in wheel speed sensor power supply wire - Damaged sensor connector - Wheel speed sensor is interfered by outside magnetic field (wheel or axle is not demagnetized) - Wheel speed sensor body malfunction - Ring gear is not installed, missing teeth, dirty, demagnetized, or off center - Excessive clearance between sensor and ring gear - Wrong number of ring gear teeth - Tire size is not as specified - Damaged ABS/ESP control module assembly
C0031-09	Left Front Wheel Speed Sensor Failures		
C0031-11	Left Front Wheel Speed Sensor Failures		
C0031-12	Left Front Wheel Speed Sensor Failures		
C0031-13	Left Front Wheel Speed Sensor Failures		
C0031-29	Left Front Wheel Speed Sensor Failures		
C0031-37	Left Front Wheel Speed Sensor Failures		

CAUTION

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

Diagnosis Procedure

1	Check front left wheel speed sensor wire harness and connector
---	--

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the front left wheel speed sensor connector B-048.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace front left wheel speed sensor wire harness and connector

38 - BRAKE CONTROL SYSTEM

OK

2 Check installation of front left wheel speed sensor

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check front left wheel speed sensor mounting bolt for looseness.
- Check if excessive clearance exists between installation area of front left wheel speed sensor and front steering knuckle.
- Check installation area of front left wheel speed sensor for dirt.

NG

Tighten mounting bolt properly, clean or replace front left wheel speed sensor

OK

3 Check front left wheel speed sensor

- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Drive vehicle straight ahead, and read datastream of front left wheel speed sensor with X-431 3G diagnostic tester.
- Check if data change of front left wheel speed sensor matches that of other wheel speed sensors.

NG

Replace front left wheel speed sensor

OK

4 Check front left drive shaft upper ring gear

- Check the front left drive shaft upper ring gear.
- Check for foreign matter, missing teeth or damage on front left drive shaft upper ring gear.
- Check if front left drive shaft upper ring gear is securely installed.

NG

Replace outer ball cage assembly

OK

5

Check wire harness and connector (front left wheel speed sensor - ABS/ESP control module assembly)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the front left wheel speed sensor connector B-048.
- Using a digital multimeter, check for continuity between terminals of connector B-035 and connector B-048 to check if there is an open in wire harness and connector according to table below.

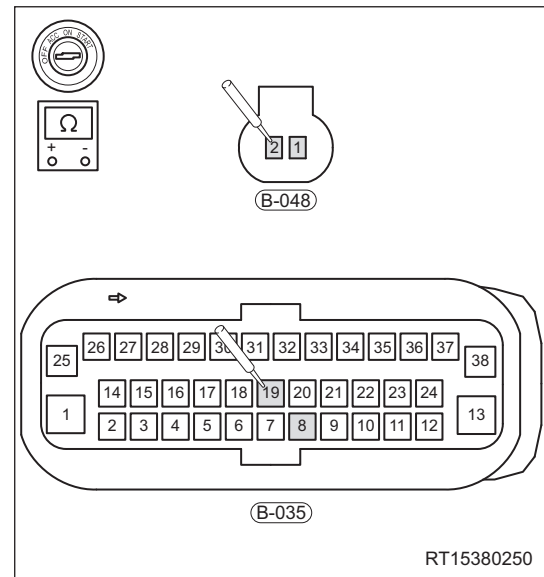
Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (19) - B-048 (2)	Always	Continuity
B-035 (8) - B-048 (1)	Always	Continuity
B-035 (19) - B-048 (1)	Always	No continuity
B-035 (8) - B-048 (2)	Always	No continuity

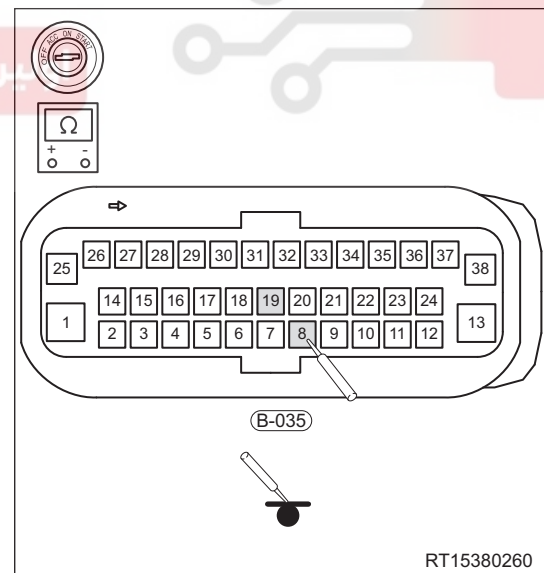
- Using a digital multimeter, check for continuity between connector B-035 and body ground to check if front left wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (8) - Body ground	Always	No continuity
B-035 (19) - Body ground	Always	No continuity



38



38 - BRAKE CONTROL SYSTEM

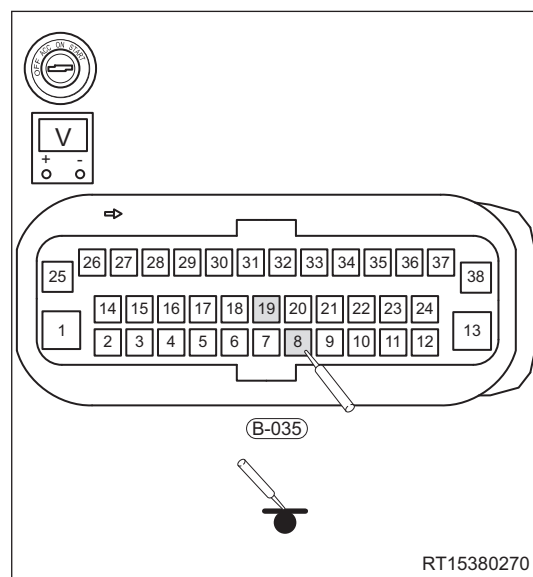
- g. Connect the negative battery cable.
- h. Turn engine switch to OFF.
- i. Using a digital multimeter, measure voltage between connector B-035 and body ground to check if front left wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (8) - Body ground	Engine switch ON	Approx. 0 V
B-035 (19) - Body ground	Engine switch ON	Approx. 0 V

NG

Repair or replace wire harness and connector between front left wheel speed sensor and ABS/ESP control module assembly



RT15380270

OK**38****6****Reconfirm DTCs**

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

DTC	C0034-00	Right Front Wheel Speed Sensor Failures - No Subtype Information
DTC	C0034-09	Right Front Wheel Speed Sensor Failures
DTC	C0034-11	Right Front Wheel Speed Sensor Failures - Circuit Short to Ground
DTC	C0034-12	Right Front Wheel Speed Sensor Failures - Circuit Short to Battery
DTC	C0034-13	Right Front Wheel Speed Sensor Failures - Circuit Open
DTC	C0034-29	Right Front Wheel Speed Sensor Failures - Signal Invalid
DTC	C0034-37	Right Front Wheel Speed Sensor Failures

دیجیتال خودرو

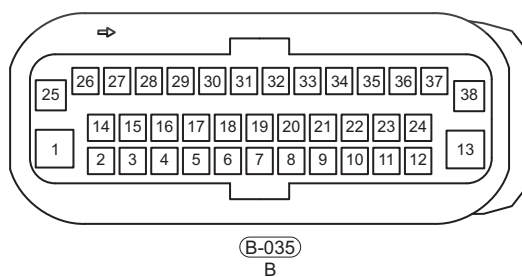
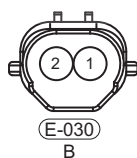
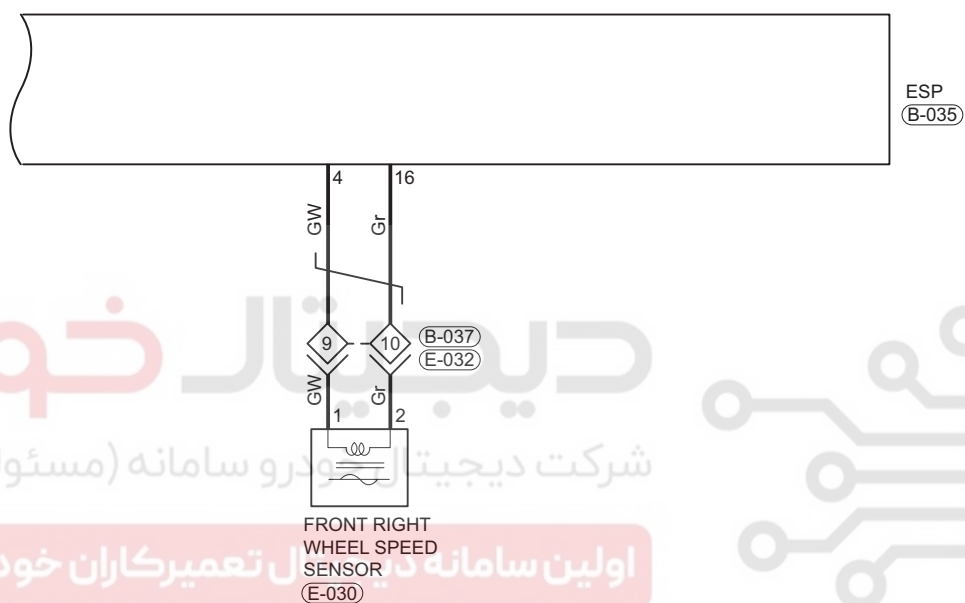
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



38 - BRAKE CONTROL SYSTEM

38



ET15380280

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0034-00	Right Front Wheel Speed Sensor Failures	This DTC occurs when any of following conditions is met: ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open. ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESP control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	- Reverse connection of wheel speed sensor signal wire and power supply wire - Short to ground in signal wire - Wheel speed sensor wire is disconnected, or connector is loose or broken - Short to power supply in wheel speed sensor signal wire - Short to ground in wheel speed sensor power supply wire - Damaged sensor connector - Wheel speed sensor is interfered by outside magnetic field (wheel or axle is not demagnetized) - Wheel speed sensor body malfunction - Ring gear is not installed, missing teeth, dirty, demagnetized, or off center - Excessive clearance between sensor and ring gear - Wrong number of ring gear teeth - Tire size is not as specified - Damaged ABS/ESP control module assembly
C0034-09	Right Front Wheel Speed Sensor Failures		
C0034-11	Right Front Wheel Speed Sensor Failures		
C0034-12	Right Front Wheel Speed Sensor Failures		
C0034-13	Right Front Wheel Speed Sensor Failures		
C0034-29	Right Front Wheel Speed Sensor Failures		
C0034-37	Right Front Wheel Speed Sensor Failures		

CAUTION

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

Diagnosis Procedure

1

Check front right wheel speed sensor wire harness and connector

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the front right wheel speed sensor connector E-030.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace front right wheel speed sensor wire harness and connector

38 - BRAKE CONTROL SYSTEM

OK

2 Check installation of front right wheel speed sensor

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check front right wheel speed sensor mounting bolt for looseness.
- Check if excessive clearance exists between installation area of front right wheel speed sensor and front steering knuckle.
- Check installation area of front right wheel speed sensor for dirt.

NG

Tighten mounting bolt properly, clean or replace front right wheel speed sensor

OK

3 Check front right wheel speed sensor

- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Drive vehicle straight ahead, and read datastream of front right wheel speed sensor with X-431 3G diagnostic tester.
- Check if data change of front right wheel speed sensor matches that of other wheel speed sensors.

NG

Replace front right wheel speed sensor

OK

4 Check front right drive shaft upper ring gear

- Check the front right drive shaft upper ring gear.
- Check for foreign matter, missing teeth or damage on front right drive shaft upper ring gear.
- Check if front right drive shaft upper ring gear is securely installed.

NG

Replace front right drive shaft

OK

5

Check wire harness and connector (front right wheel speed sensor - ABS/ESP control module assembly)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the front right wheel speed sensor connector E-030.
- Using a digital multimeter, check for continuity between terminals of connector B-035 and connector E-030 to check if there is an open in wire harness and connector according to table below.

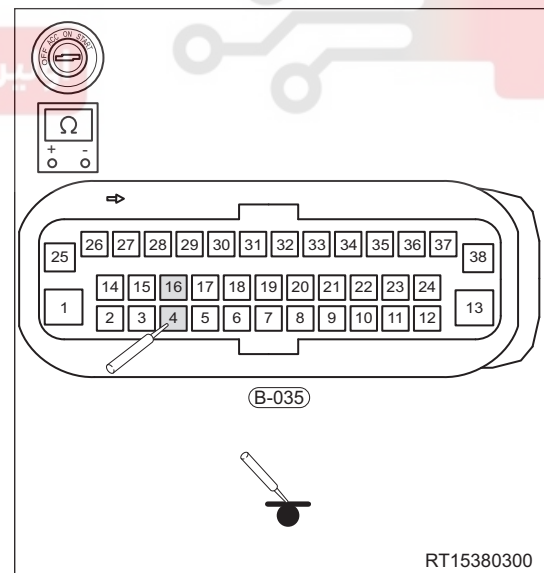
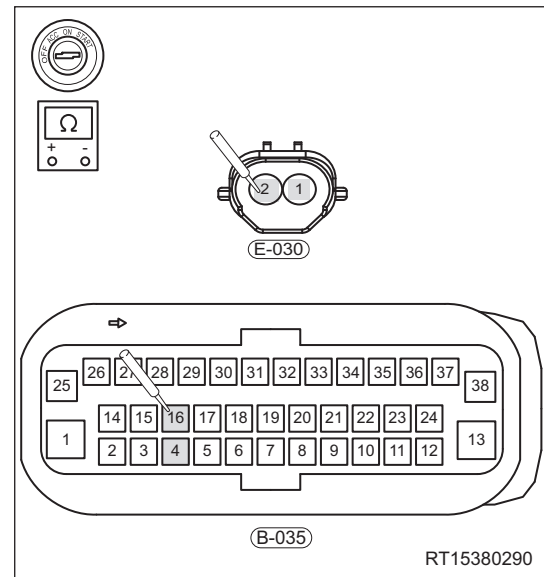
Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (16) - E-030 (2)	Always	Continuity
B-035 (4) - E-030 (1)	Always	Continuity
B-035 (16) - E-030 (1)	Always	No continuity
B-035 (4) - E-030 (2)	Always	No continuity

- Using a digital multimeter, check for continuity between connector B-035 and body ground to check if front right wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (4) - Body ground	Always	No continuity
B-035 (16) - Body ground	Always	No continuity



38 - BRAKE CONTROL SYSTEM

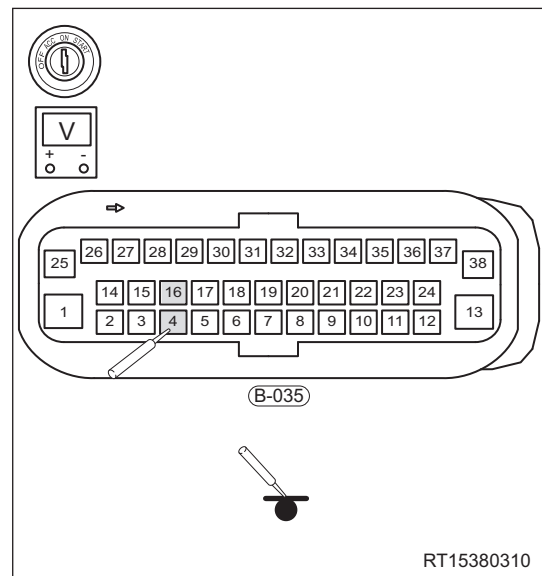
- g. Connect the negative battery cable.
- h. Turn engine switch to OFF.
- i. Using a digital multimeter, measure voltage between connector B-035 and body ground to check if front right wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (4) - Body ground	Engine switch ON	Approx. 0 V
B-035 (16) - Body ground	Engine switch ON	Approx. 0 V

NG

Repair or replace wire harness and connector between front right wheel speed sensor and ABS/ESP control module assembly

**OK****38****6****Reconfirm DTCs**

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

DTC	C0037-00	Left Rear Wheel Speed Sensor - No Subtype Information
DTC	C0037-09	Left Rear Wheel Speed Sensor
DTC	C0037-11	Left Rear Wheel Speed Sensor - Circuit Short to Ground
DTC	C0037-12	Left Rear Wheel Speed Sensor - Circuit Short to Battery
DTC	C0037-13	Left Rear Wheel Speed Sensor - Circuit Open
DTC	C0037-29	Left Rear Wheel Speed Sensor - Signal Invalid
DTC	C0037-37	Left Rear Wheel Speed Sensor

دیجیتال خودرو

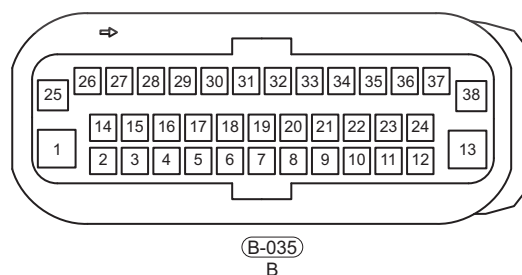
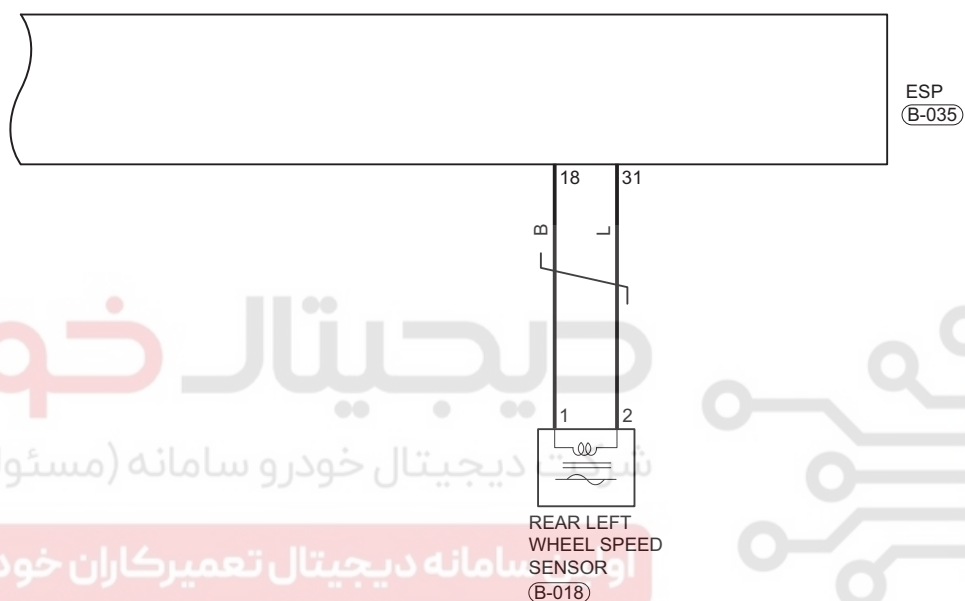
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



38 - BRAKE CONTROL SYSTEM

38



ET15380320

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0034-00	Left Rear Wheel Speed Sensor	This DTC occurs when any of following conditions is met: ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open. ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESP control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	- Reverse connection of wheel speed sensor signal wire and power supply wire - Short to ground in signal wire - Wheel speed sensor wire is disconnected, or connector is loose or broken - Short to power supply in wheel speed sensor signal wire - Short to ground in wheel speed sensor power supply wire - Damaged sensor connector - Wheel speed sensor is interfered by outside magnetic field (wheel or axle is not demagnetized) - Wheel speed sensor body malfunction - Ring gear is not installed, missing teeth, dirty, demagnetized, or off center - Excessive clearance between sensor and ring gear - Wrong number of ring gear teeth - Tire size is not as specified - Damaged ABS/ESP control module assembly
C0034-09	Left Rear Wheel Speed Sensor		
C0034-11	Left Rear Wheel Speed Sensor		
C0034-12	Left Rear Wheel Speed Sensor		
C0034-13	Left Rear Wheel Speed Sensor		
C0034-29	Left Rear Wheel Speed Sensor		
C0034-37	Left Rear Wheel Speed Sensor		

CAUTION

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

Diagnosis Procedure

1	Check rear left wheel speed sensor wire harness and connector
---	---

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the rear left wheel speed sensor connector B-018.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace rear left wheel speed sensor wire harness and connector

38 - BRAKE CONTROL SYSTEM

OK

2 Check installation of rear left wheel speed sensor

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check rear left wheel speed sensor mounting bolt for looseness.
- Check if excessive clearance exists between installation area of rear left wheel speed sensor and front steering knuckle.
- Check installation area of rear left wheel speed sensor for dirt.

NG

Tighten mounting bolt properly, clean or replace rear left wheel speed sensor

OK

3 Check rear left wheel speed sensor

- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Drive vehicle straight ahead, and read datastream of rear left wheel speed sensor with X-431 3G diagnostic tester.
- Check if data change of rear left wheel speed sensor matches that of other wheel speed sensors.

NG

Replace rear left wheel speed sensor

OK

4 Check rear left hub ring gear

- Check the rear left hub ring gear.
- Check for foreign matter, missing teeth or damage on the rear left hub ring gear.
- Check if rear left hub assembly is securely installed.

NG

Replace rear left hub ring gear

OK

5

Check wire harness and connector (rear left wheel speed sensor - ABS/ESP control module assembly)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the rear left wheel speed sensor connector B-018.
- Using a digital multimeter, check for continuity between terminals of connector B-035 and connector B-018 to check if there is an open in wire harness and connector according to table below.

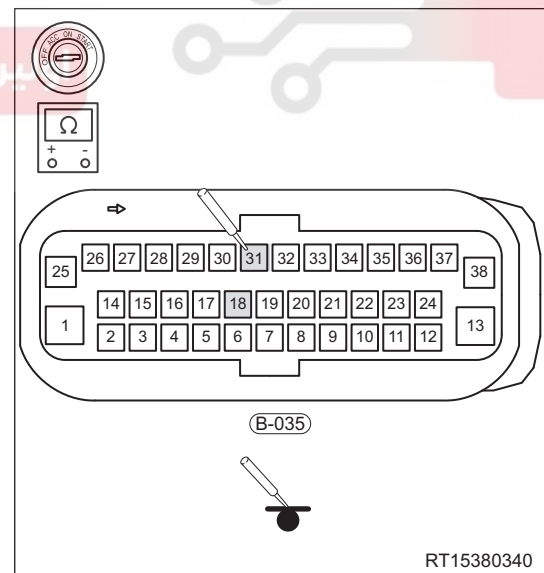
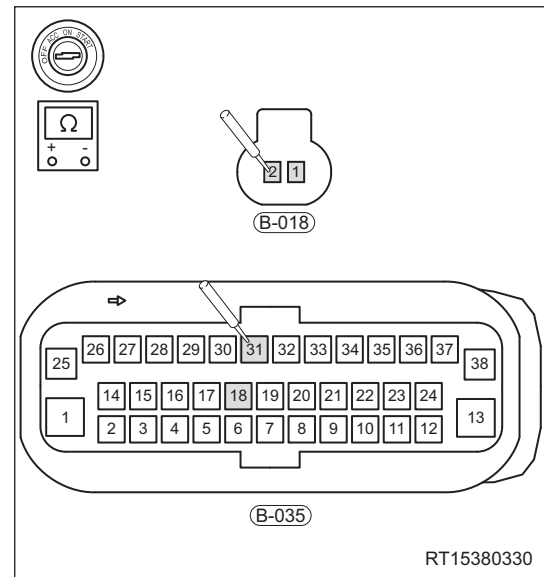
Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (31) - B-018 (2)	Always	Continuity
B-035 (18) - B-018 (1)	Always	Continuity
B-035 (31) - B-018 (1)	Always	No continuity
B-035 (18) - B-018 (2)	Always	No continuity

- Using a digital multimeter, check for continuity between connector B-035 and body ground to check if rear left wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (18) - Body ground	Always	No continuity
B-035 (31) - Body ground	Always	No continuity



38 - BRAKE CONTROL SYSTEM

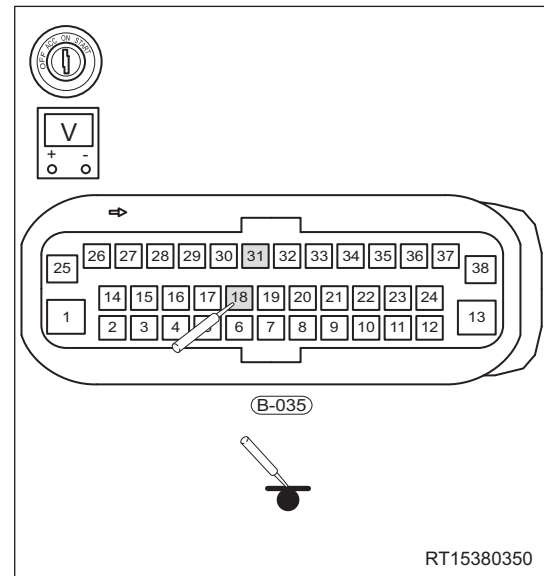
- g. Connect the negative battery cable.
- h. Turn engine switch to OFF.
- i. Using a digital multimeter, measure voltage between connector B-035 and body ground to check if rear left wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (18) - Body ground	Engine switch ON	Approx. 0 V
B-035 (31) - Body ground	Engine switch ON	Approx. 0 V

NG

Repair or replace wire harness and connector between rear left wheel speed sensor and ABS/ESP control module assembly



RT15380350

OK**38****6****Reconfirm DTCs**

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

DTC	C003A-00	Right Rear Wheel Speed Sensor - No Subtype Information
DTC	C003A-09	Right Rear Wheel Speed Sensor
DTC	C003A-11	Right Rear Wheel Speed Sensor
DTC	C003A-12	Right Rear Wheel Speed Sensor - Circuit Short to Battery
DTC	C003A-13	Right Rear Wheel Speed Sensor - Circuit Open
DTC	C003A-29	Right Rear Wheel Speed Sensor - Signal Invalid
DTC	C003A-37	Right Rear Wheel Speed Sensor

دیجیتال خودرو

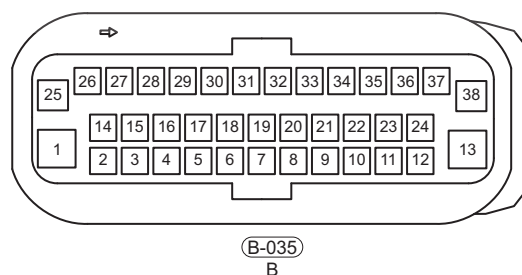
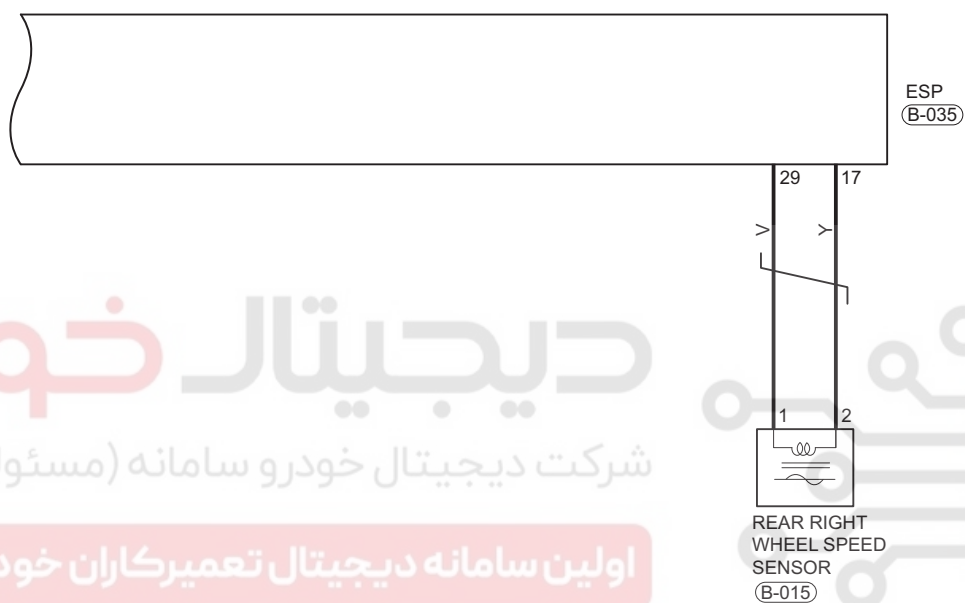
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38 - BRAKE CONTROL SYSTEM

38



RT15380360

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0034-00	Right Rear Wheel Speed Sensor	This DTC occurs when any of following conditions is met: ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open.	- Reverse connection of wheel speed sensor signal wire and power supply wire - Short to ground in signal wire - Wheel speed sensor wire is disconnected, or connector is loose or broken - Short to power supply in wheel speed sensor signal wire - Short to ground in wheel speed sensor power supply wire - Damaged sensor connector - Wheel speed sensor is interfered by outside magnetic field (wheel or axle is not demagnetized) - Wheel speed sensor body malfunction - Ring gear is not installed, missing teeth, dirty, demagnetized, or off center - Excessive clearance between sensor and ring gear - Wrong number of ring gear teeth - Tire size is not as specified - Damaged ABS/ESP control module assembly
C0034-09	Right Rear Wheel Speed Sensor		
C0034-11	Right Rear Wheel Speed Sensor		
C0034-12	Right Rear Wheel Speed Sensor		
C0034-13	Right Rear Wheel Speed Sensor		
C0034-29	Right Rear Wheel Speed Sensor	ABS/ESP control module assembly detects that wheel speed sensor signal wire is short to power supply.	
C0034-37	Right Rear Wheel Speed Sensor	ABS/ESP control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	

CAUTION

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

Diagnosis Procedure

1 Check rear right wheel speed sensor wire harness and connector

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the rear right wheel speed sensor connector B-015.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace rear right wheel speed sensor wire harness and connector

38 - BRAKE CONTROL SYSTEM

OK

2 Check installation of rear right wheel speed sensor

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check rear right wheel speed sensor mounting bolt for looseness.
- Check if excessive clearance exists between installation area of rear right wheel speed sensor and front steering knuckle.
- Check installation area of rear right wheel speed sensor for dirt.

NG

Tighten mounting bolt properly, clean or replace rear right wheel speed sensor

OK

3 Check rear right wheel speed sensor

- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Drive vehicle straight ahead, and read datastream of rear right wheel speed sensor with X-431 3G diagnostic tester.
- Check if data change of rear right wheel speed sensor matches that of other wheel speed sensors.

NG

Replace rear right wheel speed sensor

OK

4 Check rear right hub ring gear

- Check the rear right hub ring gear.
- Check for foreign matter, missing teeth or damage on the rear right hub ring gear.
- Check if rear right hub assembly is securely installed.

NG

Replace rear right hub ring gear

OK

5

Check wire harness and connector (rear right wheel speed sensor - ABS/ESP control module assembly)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the rear right wheel speed sensor connector B-015.
- Using a digital multimeter, check for continuity between terminals of connector B-035 and connector B-015 to check if there is an open in wire harness and connector according to table below.

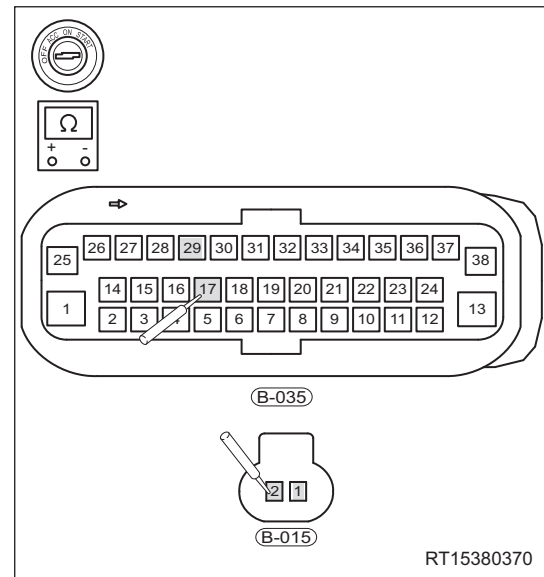
Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (17) - B-015 (2)	Always	Continuity
B-035 (29) - B-015 (1)	Always	Continuity
B-035 (17) - B-015 (1)	Always	No continuity
B-035 (29) - B-015 (2)	Always	No continuity

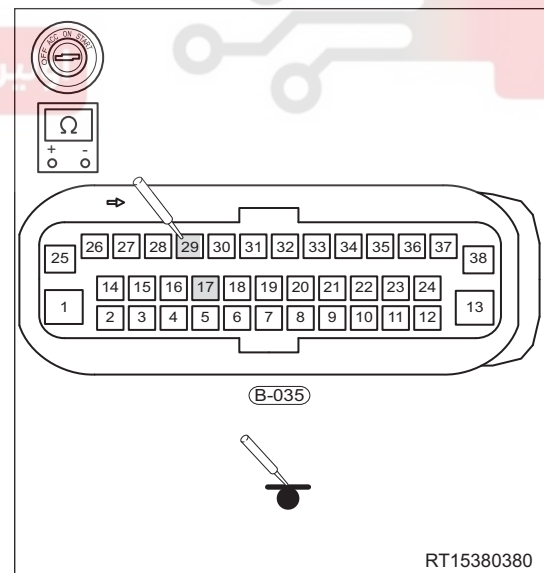
- Using a digital multimeter, check for continuity between connector B-035 and body ground to check if rear right wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (29) - Body ground	Always	No continuity
B-035 (17) - Body ground	Always	No continuity



38



38 - BRAKE CONTROL SYSTEM

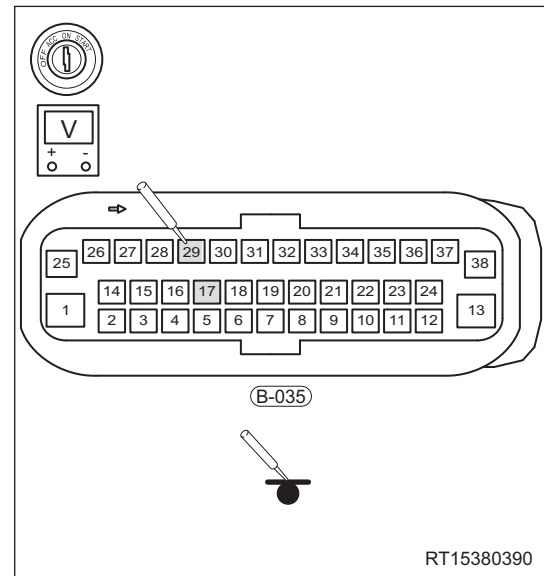
- g. Connect the negative battery cable.
- h. Turn engine switch to ON.
- i. Using a digital multimeter, measure voltage between connector B-035 and body ground to check if rear right wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (29) - Body ground	Engine switch ON	Approx. 0 V
B-035 (17) - Body ground	Engine switch ON	Approx. 0 V

NG

Repair or replace wire harness and connector between rear right wheel speed sensor and ABS/ESP control module assembly

**OK****38****6****Reconfirm DTCs**

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if same DTC is output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

DTC	C0051-54	Steering Wheel Position Sensor (ESP Only) - Unmatched
DTC	C0051-28	Steering Wheel Position Sensor (ESP Only)
DTC	C0051-64	Steering Wheel Position Sensor (ESP Only)
DTC	U0126-87	Lost Communication with SAM - Miss Message

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

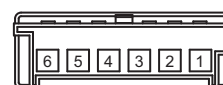
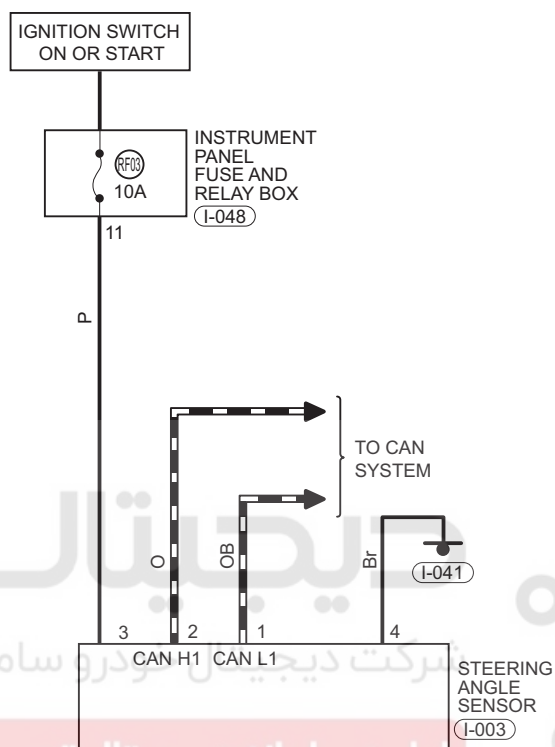
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38

38 - BRAKE CONTROL SYSTEM

38

I-003
B

RT15380400

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0051-29	Steering Wheel Position Sensor (ESP Only)	This DTC occurs when any of following conditions is met:	- Steering angle sensor is uncalibrated - Steering angle sensor line is short or open - Steering angle sensor is damaged
C0051-54	Steering Wheel Position Sensor (ESP Only)	Steering wheel angle sensor is unmatched (central point is not found).	
C0051-64	Steering Wheel Position Sensor (ESP Only)	Steering wheel angle sensor signal is abnormal. Steering wheel angle sensor signal is interrupted.	

CAUTION

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

Diagnosis Procedure

38

1 Check calibration of steering angle sensor

- Turn engine switch to OFF.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Perform steering angle sensor calibration again according to instruction on diagnostic tester.
- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if the same DTCs are still output.

NO**Steering angle sensor is uncalibrated****YES****2 Check fuse**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Remove fuse RF-03 (10 A) from instrument panel fuse and relay box.
- Check if fuse is blown.

NG**Replace fuse RF-03**

38 - BRAKE CONTROL SYSTEM

OK

3 Check wire harness and connector

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the steering angle sensor connector I-003.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace body/instrument panel wire harness and connector

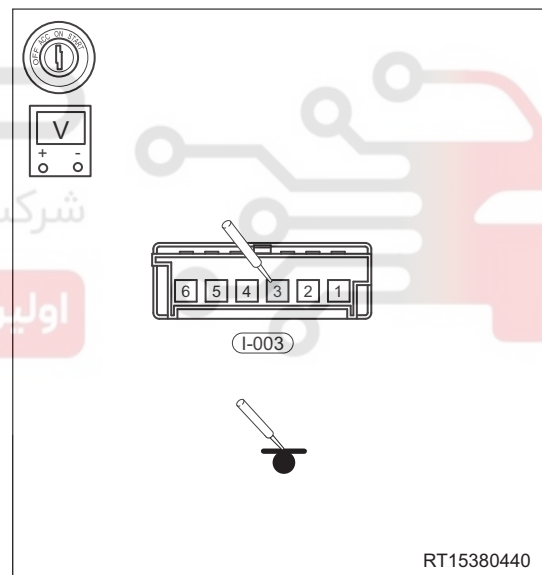
OK

4 Check power supply and ground of steering angle sensor

- Connect the negative battery cable.
- Turn engine switch to ON.
- Using a digital multimeter, measure voltage between steering angle sensor wire harness connector I-003 and body ground to check if system power supply control circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-003 (3) - Body ground	Engine switch ON	9 - 16 V



38 - BRAKE CONTROL SYSTEM

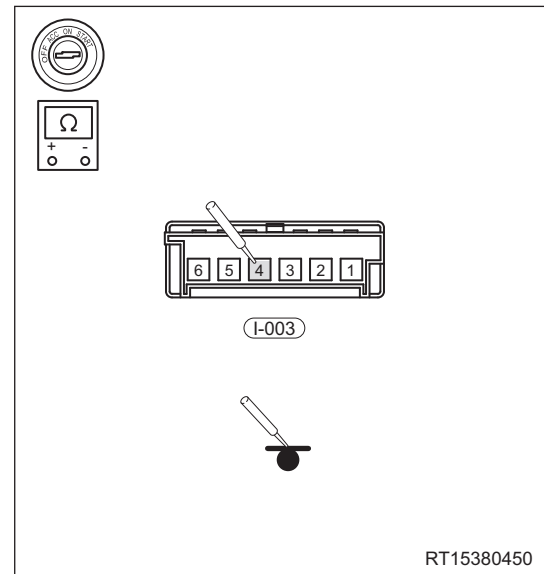
- d. Turn engine switch to OFF.
- e. Disconnect the negative battery cable.
- f. Using a digital multimeter, check for continuity between steering angle sensor wire harness connector I-003 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-003 (4) - Body ground	Turn engine switch to OFF.	9 - 16 V

NG

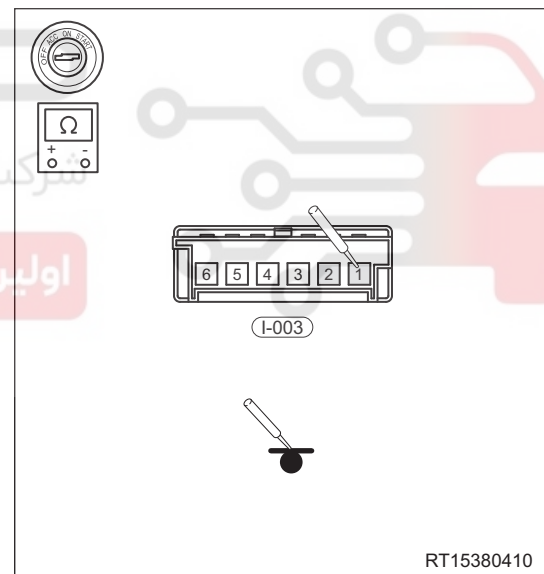
Repair or replace body/instrument panel wire harness and connector

**OK****5****Check CAN communication control circuit (steering angle sensor)**

- a. Turn engine switch to OFF, disconnect negative battery cable and wait for at least 90 seconds.
- b. Disconnect the steering angle sensor connector I-003.
- c. Using a digital multimeter, check if connection between steering angle sensor and CAN communication line is normal (measure terminal resistance from CAN node).

Standard Condition

Multimeter Connection	Condition	Specified Condition (Ω)
I-003 (1) - I-003 (2)	Always	≈ 60

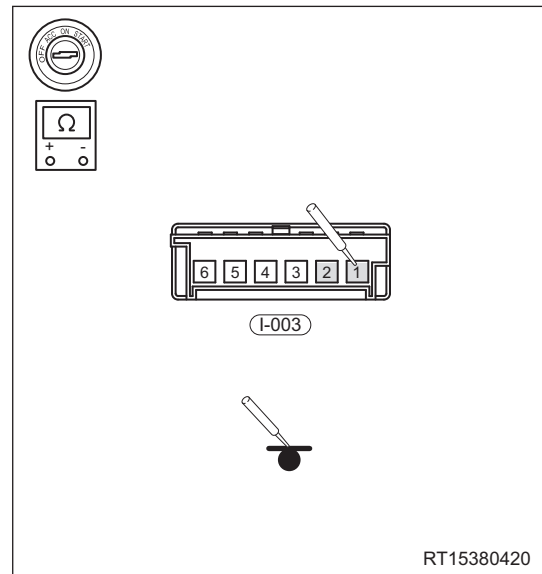
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38 - BRAKE CONTROL SYSTEM

- d. Using a digital multimeter, check if connection between steering angle sensor and CAN communication line is short to body ground.

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-003 (1) - Body ground	Always	No continuity
I-003 (2) - Body ground	Always	No continuity



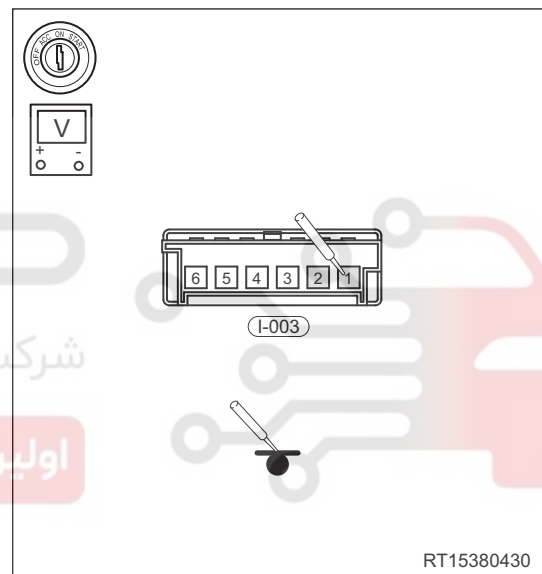
- e. Connect the negative battery cable.
f. Turn engine switch to ON.
g. Using a digital multimeter, check if connection between steering angle sensor and CAN communication line is short to power supply.

Standard Condition

Multimeter Connection	Condition	Specified Condition
I-003 (1) - Body ground	Always	1.5 - 2.5 V
I-003 (2) - Body ground	Always	2.5 - 3.5 V

NG

Refer to CAN communication inspection and repair



OK

6

Reconfirm DTCs

- a. Use X-431 3G diagnostic tester to clear DTCs.
b. Start engine.
c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
d. Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

DTC	C0061-64	Lateral Acceleration Sensor (ESP Only)
DTC	C0062-64	Longitudinal Acceleration Sensor (ESP Only)
DTC	C0063-64	Yaw Rate Sensor (ESP Only)
DTC	C0063-01	Yaw Rate Sensor (ESP Only)
DTC	C0063-54	Yaw Rate Sensor (ESP Only) - Uncalibrated

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0061-64	Lateral Acceleration Sensor (ESP Only)	This DTC occurs when any of following conditions is met: Y&G sensor is uncalibrated. Y&G sensor signal is abnormal. Y&G sensor signal is interrupted.	- Y&G sensor is uncalibrated - Y&G sensor circuit is short or open - Y&G sensor sensor is damaged
C0062-64	Longitudinal Acceleration Sensor (ESP Only)		
C0063-64	Yaw Rate Sensor (ESP Only)		
C0063-01	Yaw Rate Sensor (ESP Only)		
C0063-54	Yaw Rate Sensor (ESP Only)		

CAUTION

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

Diagnosis Procedure

1	Check calibration of sensor
----------	------------------------------------

- Turn engine switch to ON.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Perform Y&G sensor calibration again according to instruction on diagnostic tester.
- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is output.

NO**Y&G sensor is uncalibrated**

38 - BRAKE CONTROL SYSTEM

YES

2 Check installation of ABS/ESP control module **CAUTION**

- Y&G sensor is integrated and installed inside the ABS/ESP control module.

- Check if ABS/ESP control module fixing bolt is loose.
- Check if ABS/ESP control module fixing bracket bolt is loose.

NG

Retighten ABS/ESP control module fixing bolt and fixing bracket bolt

OK

3 Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is output.

NO

System operates normally

YES

Replace ABS/ESP control module

DTC	C006B-00	Stability System Active Too Long - No Subtype Information
-----	----------	---

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C006B-00	Stability System Active Too Long	This DTC occurs when any of following conditions is met: ABS continues to operate after receiving command (more than 1 second). ESP continues to operate after receiving command (more than 10 second).	• Wheel speed difference • Sensor signal error • Damaged ABS/ESP control module assembly

CAUTION

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

38

Diagnosis Procedure**1 Check sensor wire harness and connector**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect all wheel speed sensor connectors and steering angle sensor connector.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG**Repair or replace related wire harness and connector****OK****2 Check installation of wheel speed sensor**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check wheel speed sensor mounting bolt for looseness.
- Check if clearance between installation position of wheel speed sensor and hub ring gear is excessive.
- Check there exists dust in installation position of wheel speed sensor.

38 - BRAKE CONTROL SYSTEM

NG

Correctly tighten mounting bolt, clean or replace wheel speed sensor

OK

3

Check wheel speed sensor

- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Drive vehicle straight ahead, and read datastream of wheel speed sensor with X-431 3G diagnostic tester.
- Check if data change of wheel speed sensor matches that of other wheel speed sensors.

NG

Replace corresponding wheel speed sensor

OK

4

Check hub ring gear and drive shaft upper ring gear

- Remove the hub assembly.
- Check for foreign matter, missing teeth or damage on hub ring gear and drive shaft upper ring gear.
- Check if hub assembly and drive shaft upper ring gear is securely installed.

NG

Replace corresponding hub ring gear

OK

5

Check installation of steering angle sensor

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check if steering angle sensor connector is connected securely.
- Check if steering angle sensor is installed in place.
- Check installation position of steering angle sensor for dirt.

NG

Clean or replace steering angle sensor

OK

6

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

دیجیتال خودرو

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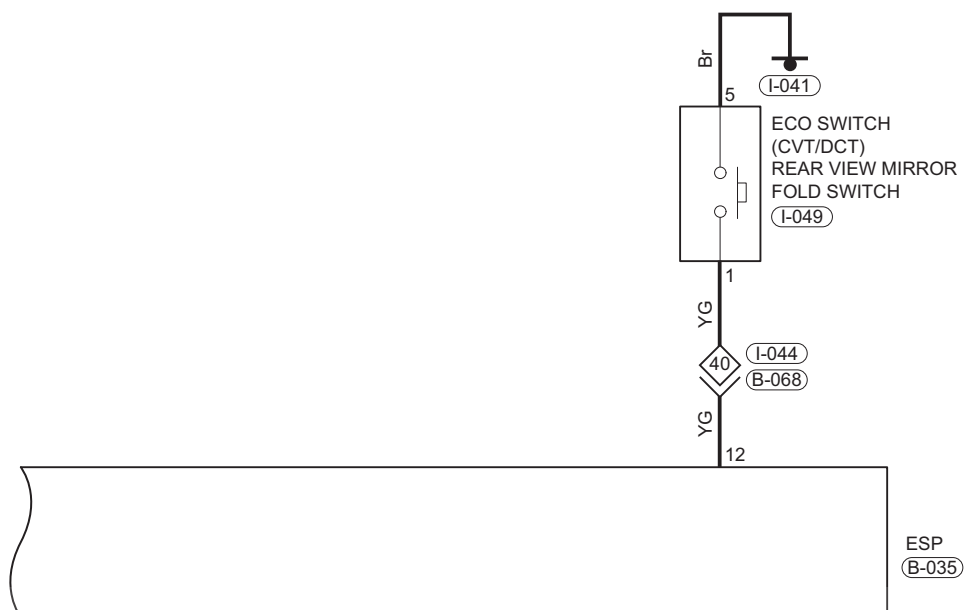
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38 - BRAKE CONTROL SYSTEM

DTC

C0089-04

TCS Disable Switch (ESP Only)

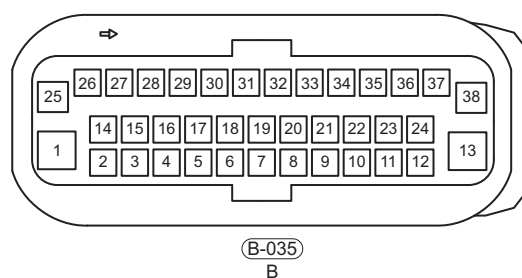


38

دیجیتال خودرو

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اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ET15380700

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0089-04	TCS Disable Switch (ESP Only)	This DTC occurs when any of following conditions is met: Press and hold ESP switch more than 10 seconds. ESP OFF switch activation signal is detected more than 2 seconds during ignition.	- ESP switch off - ESP switch damaged

CAUTION

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

Diagnosis Procedure**1 Check ESP switch**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check if ESP switch is stuck by other objects or pressed in.

NG**Release ESP OFF switch or move away other objects****OK****2 Check wire harness and connector**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG**Repair or replace body/instrument panel wire harness and connector****OK**

38 - BRAKE CONTROL SYSTEM

3**Reconfirm DTCs**

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if the same DTCs are still output.

NO**System operates normally****YES****Replace adjustment switch assembly**

38

دیجیتال خودرو

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DTC	C1000-16	ECU Voltage Supply - Circuit Voltage Below Threshold
DTC	C1000-17	ECU Voltage Supply - Circuit Voltage Above Threshold
DTC	C1001-04	ECU
DTC	C1009-00	ECU Hardware Related - No Subtype Information

دیجیتال خودرو

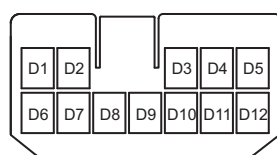
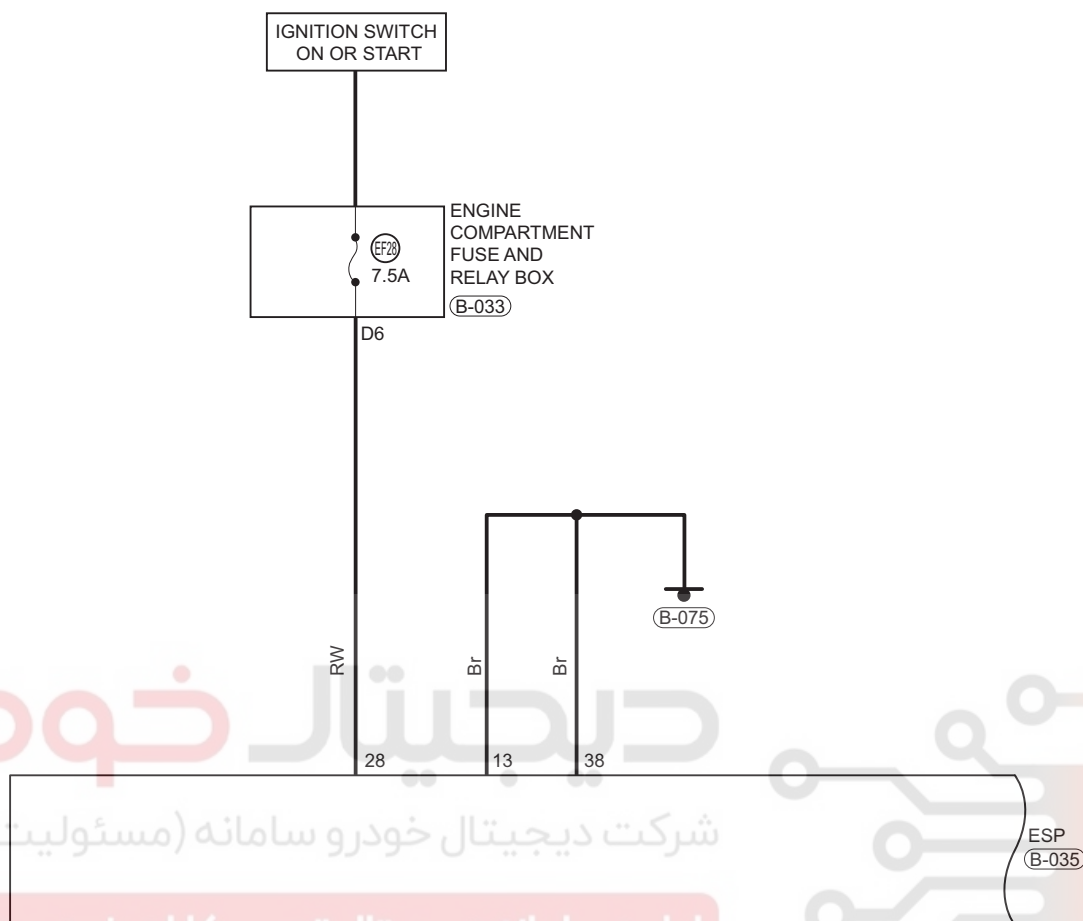
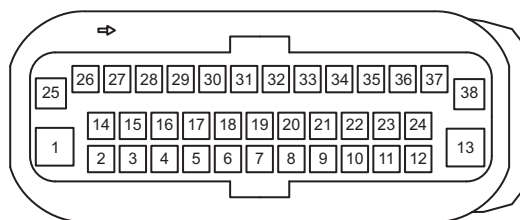
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38 - BRAKE CONTROL SYSTEM

38

(B-033)
W(B-035)
B

ET15380470

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1000-16	ECU Voltage Supply	This DTC occurs when any of following conditions is met: Battery voltage is high. Battery voltage is low. Module itself is faulty.	- Fuse malfunction - High or low battery voltage - Charging system malfunction - Damaged wire harness or connector - ABS/ESP control module assembly malfunction
C1000-17	ECU Voltage Supply		
C1001-04	ECU		
C1009-00	ECU Hard Ware Related		

CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Remove the ABS fuse EF-28 (7.5A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace ABS fuse

OK

2 Check battery

- Using a digital multimeter, measure voltage between positive battery terminal and negative battery terminal.
- Battery voltage should be between 9 and 16 V.

NG

Check charging system

OK

3 Check ABS/ESP control module assembly wire harness and connector

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

38 - BRAKE CONTROL SYSTEM

NG

Repair or replace ABS/ESP control module assembly wire harness and connector

OK

4

Check wire harness and connector (ABS/ESP control module assembly - power supply)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Connect the negative battery cable.
- Turn engine switch to ON.
- Using a digital multimeter, measure supply voltage between ABS/ESP control module assembly connector B-035 and body ground to check if system power supply circuit is normal according to table below.

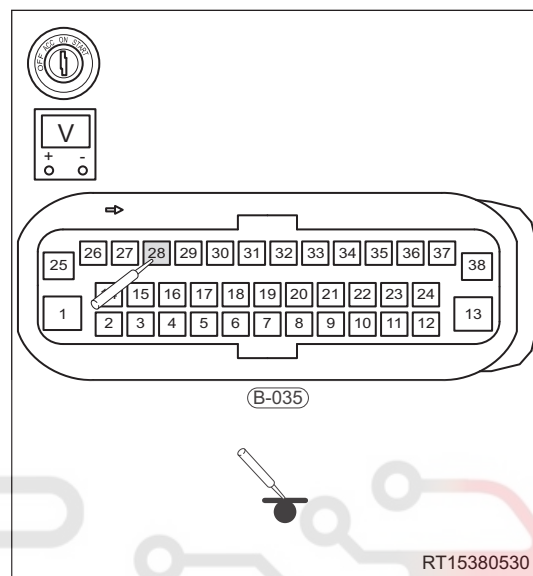
Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (28) - Body ground	Engine switch ON	9 - 16 V

NG

Repair or replace related wire harness and connector

OK



38

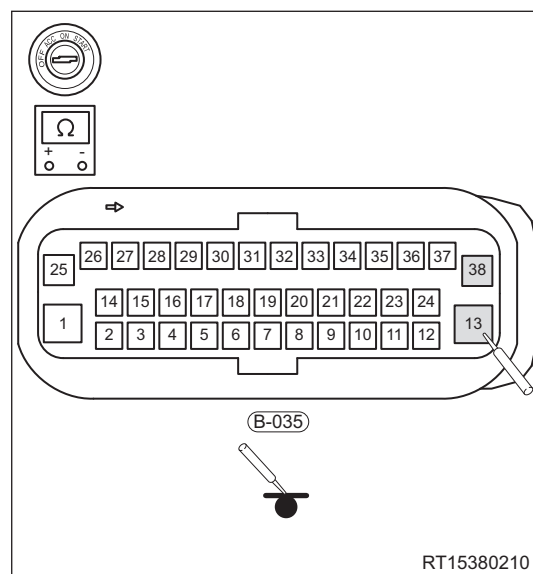
5

Check wire harness and connector (ABS/ESP control module assembly - body ground)

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Using a digital multimeter, check for continuity between ABS/ESP control module assembly connector B-035 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (13) - Body ground	Always	Continuity



38 - BRAKE CONTROL SYSTEM

Multimeter Connection	Condition	Specified Condition
B-035 (38) - Body ground	Always	Continuity

NG

Repair or replace ABS/ESP control module assembly wire harness and connector

OK

6

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start engine.
- Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- Check if the same DTCs are still output.

NO

System operates normally

YES

38

Replace ABS/ESP control module assembly

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شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

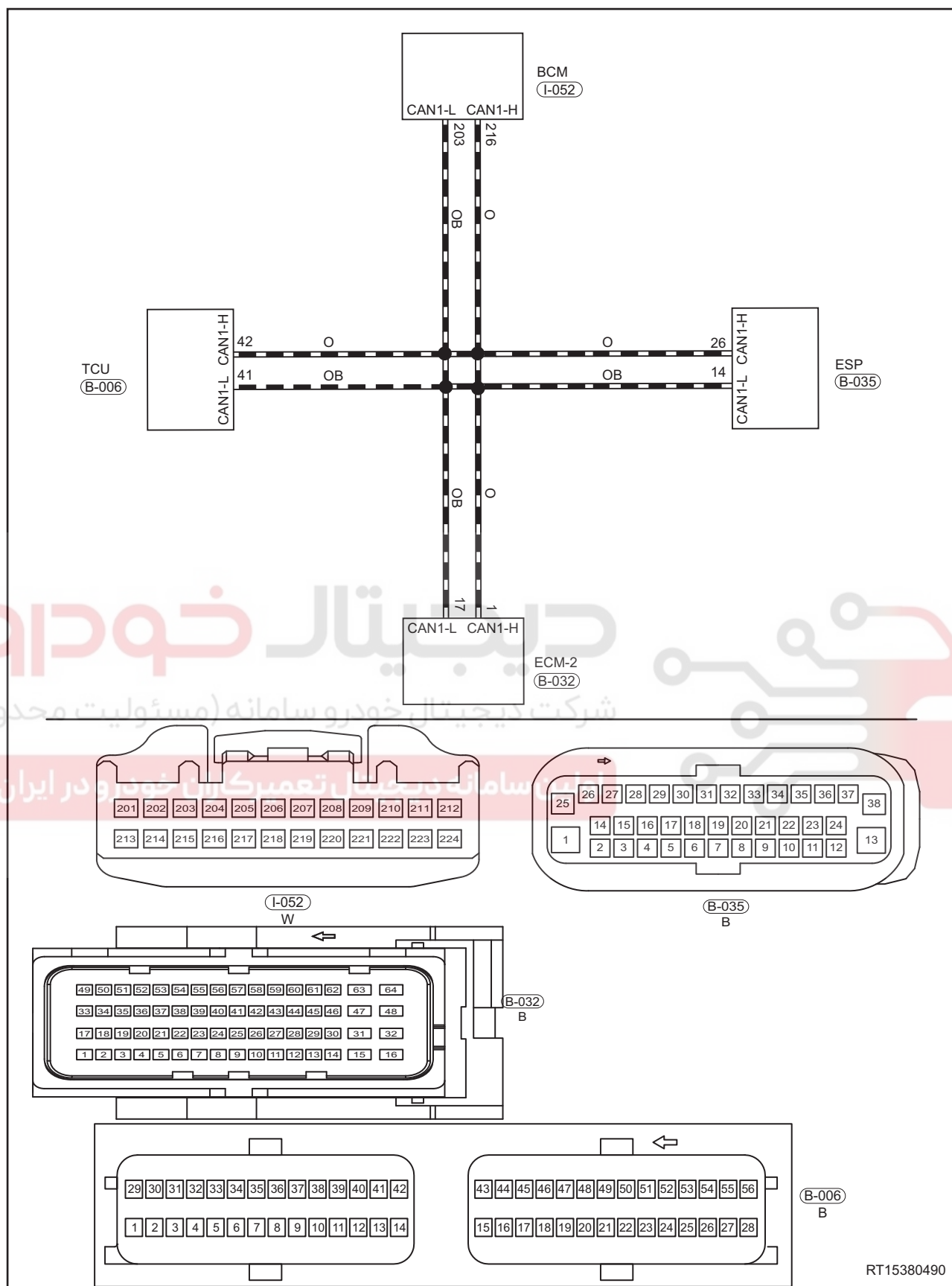
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38 - BRAKE CONTROL SYSTEM

DTC	U0005-00	High Speed CAN Communication Bus (+) High - No Subtype Information
DTC	U0007-00	High Speed CAN Communication Bus (-) Low - No Subtype Information
DTC	U0073-88	Control Module Communication Bus Off - Bus Off
DTC	U0100-87	Lost Communication With Engine Control System Module - Miss Message
DTC	U0101-87	Lost Communication With Transmission Control Unit - Miss Message



38 - BRAKE CONTROL SYSTEM



38 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
U0005-00	High Speed CAN Communication Bus (+) High	This DTC occurs when any of following conditions is met: CAN bus communication, configuration information and line are malfunctioning. ECM message timeout. ECM message error. TCU message timeout. TCU message error.	- CAN controller malfunction - Unmatched CAN configuration information - CAN communication off - CAN bus line malfunction - Unmatched ECM software version - Damaged ECM - Unmatched TCU software version - Damaged BCM - Damaged ESP (ABS)
U0007-00	High Speed CAN Communication Bus (-) Low		
U0073-88	Control Module Communication Bus Off		
U0100-87	Lost Communication With Engine Control System Module		
U0101-87	Lost Communication With Transmission Control Unit		

 CAUTION

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

38

Diagnosis Procedure

1 Check wire harness and connector

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the Engine Control Module (ECM) connector B-032.
- Disconnect the Body Control Module (BCM) connector I-052.
- Disconnect the Transmission Control Module (BCM) connector E-006.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if related connector pins are in good condition.

NG

Repair or replace body wire harness and connector

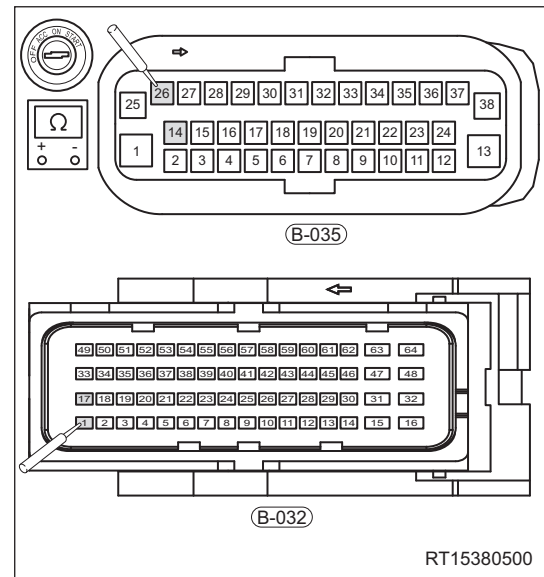
OK

2**Check CAN communication control circuit (ABS/ESP control module assembly - Engine Control Module (ECM))**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the Engine Control Module (ECM) connector B-032.
- Using a digital multimeter, check for continuity between terminals of connectors B-035 and B-032 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

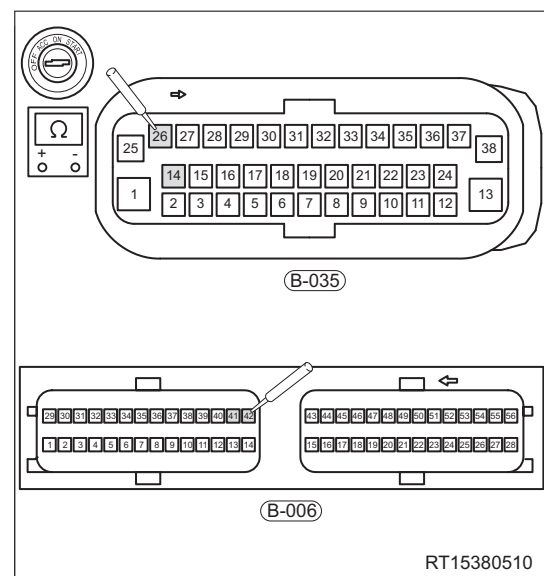
Multimeter Connection	Condition	Specified Condition
B-035 (26) - B-032 (1)	Always	Continuity
B-035 (14) - B-032 (17)	Always	Continuity

NG**Repair or replace engine wire harness and connector****38****OK****3****Check CAN communication control circuit (ABS/ESP control module assembly - Transmission Control Unit (TCU))**

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the Transmission Control Unit (TCU) connector B-006.
- Using a digital multimeter, check for continuity between terminals of connectors B-035 and B-006 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (26) - B-006 (42)	Always	Continuity
B-035 (14) - B-006 (41)	Always	Continuity



38 - BRAKE CONTROL SYSTEM

NG

Repair or replace engine wire harness and connector

OK

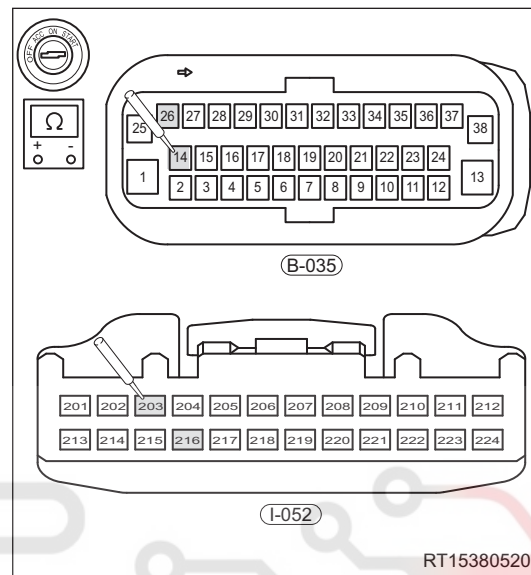
4

Check CAN communication control circuit (ABS/ESP control module assembly - Body Control Module (BCM))

- Turn engine switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESP control module assembly connector B-035.
- Disconnect the Body Control Module (BCM) connector I-052.
- Using a digital multimeter, check for continuity between terminals of connectors B-035 and I-052 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-035 (26) - I-052 (216)	Always	Continuity
B-035 (14) - I-052 (203)	Always	Continuity



38

NG

Repair or replace body/instrument panel wire harness and connector

OK

5

Check wire harness and connector of CAN communication control circuit

NG

Repair or replace body wire harness and connector

OK

6

Check module software version information

- Connect the negative battery cable.
- Turn engine switch to ON.
- Use X-431 3G diagnostic tester to read ECM/TCU software version information.
- Check if there is any abnormality.

NG

ECM/TCU software version is unmatched

OK

7

Reconfirm DTCs

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start engine.
- c. Drive vehicle at 40 km/h or above, read ABS/ESP control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if the same DTCs are still output.

NO

System operates normally

YES

Replace ABS/ESP control module assembly

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اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



38

ON-VEHICLE SERVICE

ABS Bleeding

WARNING

- When bleeding brake system, wear safety glasses. If brake fluid gets on your eyes or skin, wash off with water completely.
- If brake fluid gets on your eyes or skin, wash off with water completely.

CAUTION

- Type of brake fluid as Chery specified (DOT 4) should be used. DO NOT mix brake fluid with other types of brake fluid.
- Brake fluid has strong water absorbability, be sure to place it in the original sealed container.
- To prevent dust and other foreign matter from entering reservoir, wipe it off before removing reservoir cap.

38

Bleeding procedures for brake system with X-431 3G diagnostic tester are as follows:

1. Make sure all brake lines are installed and tightened properly.
2. Check that battery voltage is normal.
3. Turn engine switch to OFF.
4. Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
5. Turn engine switch to ON.
6. Using X-431 3G diagnostic tester, read and clear DTCs stored in ABS/ESP control module assembly.
7. Using X-431 3G diagnostic tester, enter Brake Control System, select manual bleeding, and then perform operation according to information and procedures displayed on diagnostic tester.

HINT:

- If bleeder plug is open, never depress brake pedal repeatedly. Doing so will increase the amount of air in system.
 - Do not drain brake fluid from brake fluid reservoir while bleeding the system. Otherwise, low fluid level in brake reservoir will cause additional air to enter the brake system.
 - Always check brake fluid level at all times to ensure that brake fluid level in brake reservoir is always close to MAX level.
8. For X type brake circuit, the bleeding order is: rear left wheel, front left wheel, front right wheel, rear right wheel.
 9. After bleeding is completed, fill brake reservoir with brake fluid to MAX level.
 10. Drive vehicle to perform a road test, and confirm that ABS/ESP system operates normally and brake pedal feel is good.

ABS/ESP Control Module Assembly

Removal

WARNING

- When repairing ABS/ESP system, first release the pressure of high pressure brake fluid in accumulator, to prevent high pressure brake fluid from spraying out and causing injury.
- Operation procedures: turn engine switch to OFF first, and then depress and release brake pedal repeatedly until brake pedal becomes hard.
- In addition, never turn engine switch on before ABS/ESP system is installed completely to prevent hydraulic pump from energizing and running.

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.
3. Drain the brake fluid ([See page 39-15](#)).

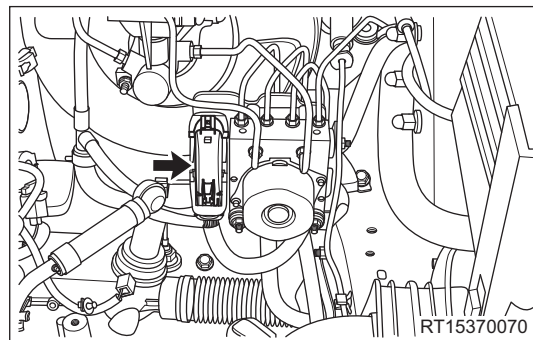
ENVIRONMENTAL PROTECTION

- Drained brake fluid should be well kept in a container. Never discard it at will.

CAUTION

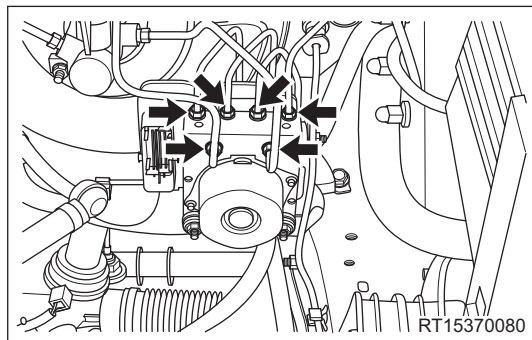
- Wash off brake fluid immediately if it comes in contact with any paint surface.

4. Remove the engine trim cover assembly.
5. Remove the battery assembly ([See page 27-7](#)).
6. Remove the air filter assembly ([See page 15-10](#)).
7. Remove the ABS/ESP control module assembly.
 - a. Press lock area of ABS/ESP control module assembly connector, toggle connector lock bracket downward and disconnect ABS/ESP control module assembly connector (arrow).



38 - BRAKE CONTROL SYSTEM

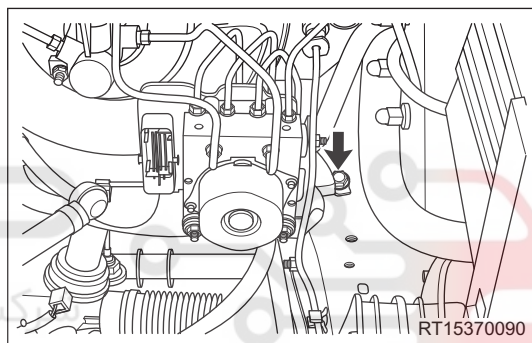
- b. Using a fixing wrench, carefully disconnect 6 brake pipe coupling bolts (arrow).
(Tightening torque: 18 ± 2 N·m)



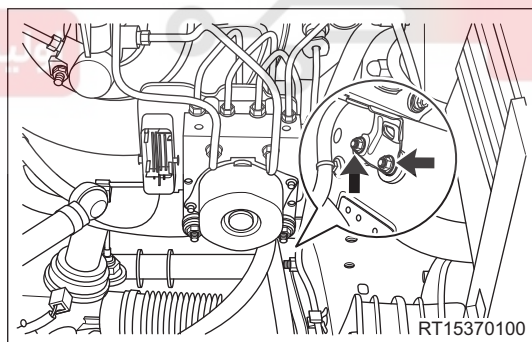
CAUTION

- When removing brake line, prevent foreign matter from entering ABS/ESP control module assembly threaded holes.
- After disconnecting brake line, sealing measure should be taken to prevent foreign matter from entering.

- c. Remove fixing bolt (arrow) between ABS/ESP control module assembly mounting bracket and body.
(Tightening torque: 23 ± 3.5 N·m)



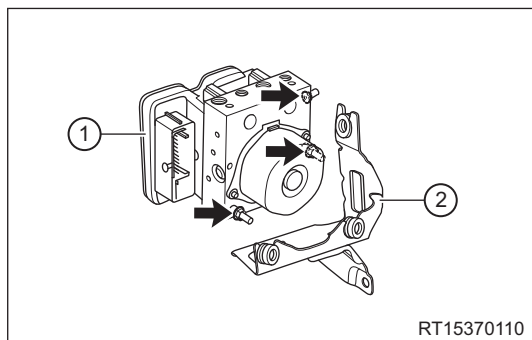
- d. Remove coupling nuts (arrow) between ABS/ESP control module assembly mounting bracket and body.



- e. Remove the ABS/ESP control module assembly with mounting bracket.

Disassembly

1. Remove the ABS/ESP control module assembly.
 - a. Remove 3 fixing nuts (arrow) between ABS/ESP control module assembly and mounting bracket.
(Tightening torque: 8 ± 2 N·m)
 - b. Disengage ABS/ESP control module assembly (1) from mounting bracket (2).



Assembly

Assembly is in the reverse order of disassembly.

CAUTION

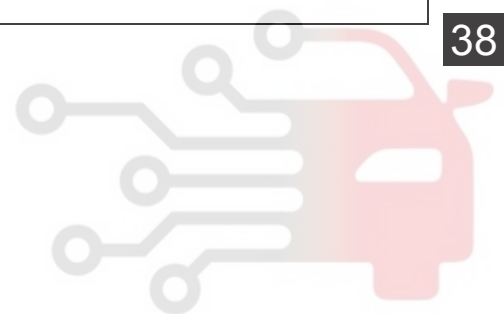
- When installing fixing nuts, be sure to tighten to specified torque.

Installation

Installation is in the reverse order of removal.

CAUTION

- ABS/ESP control module assembly contains hydraulic control module and electronic control module. As a unit, they cannot be repaired or replaced individually.
- Check insulator for aging or damage. Replace if necessary.
- When installing fixing bolts and nuts, be sure to tighten to specified torque.
- Perform ABS bleeding procedures for brake system after completing installation ([See page 38-82](#)).
- Using X-431 3G diagnostic tester, enter brake control system, record and clear trouble code, then drive vehicle to perform a road test, confirming that ABS/ESP system operates normally and brake pedal feel is good.



Front Wheel Speed Sensor (take front left wheel as an example)

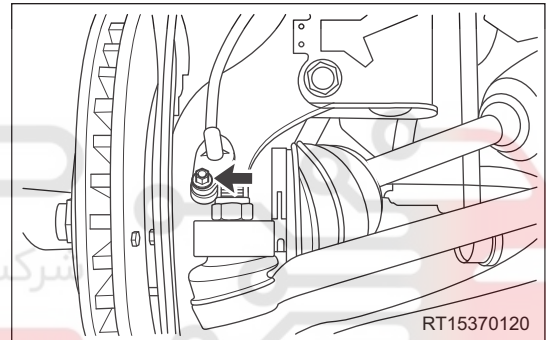
Removal

CAUTION

- Keep wheel speed sensor away from oil or other foreign matter. Otherwise speed signal generated by wheel speed sensor may be inaccurate, and system may even fail to operate normally.

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Turn off all electrical equipment and the engine switch.
 2. Disconnect the negative battery cable.
 3. Remove the front left wheel ([See page 37-7](#)).
 4. Remove the front left wheel speed sensor.
 - a. Remove fixing bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage front left wheel speed sensor carefully.
(Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)



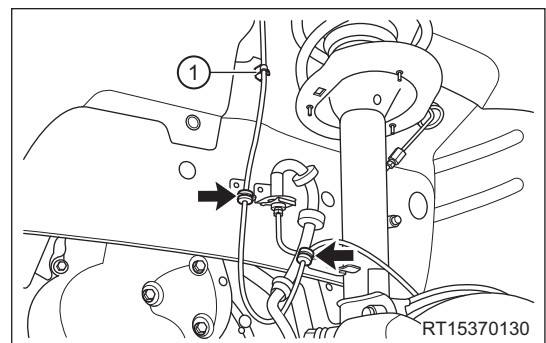
CAUTION

- Keep head and installation hole of sensor free of foreign matter.

- b. Disengage clamping part (arrow) of front left wheel speed sensor wire harness from front left shock absorber assembly and fixing bracket, and disengage front left wheel speed sensor wire harness fixing clip (1) from body.

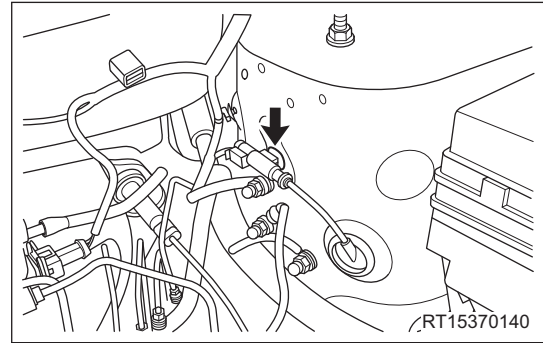
HINT:

- Observe winding direction of sensor wire harness to prevent incorrect installation.

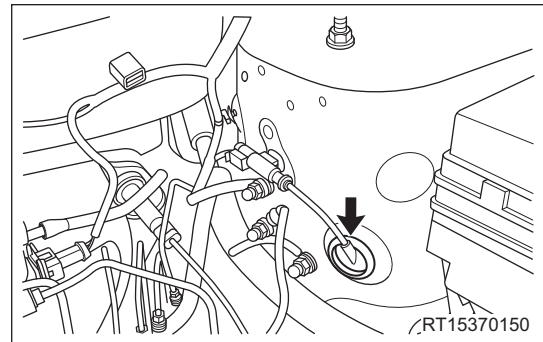


38 - BRAKE CONTROL SYSTEM

- c. Disconnect the front left wheel speed sensor wire harness connector (arrow).



- d. Detach front left wheel speed sensor wire harness cover (arrow) from body.



- e. Remove the front left wheel speed sensor.

Inspection

1. Inspect the rear wheel speed sensor.
 - a. Check rear wheel speed sensor surface for breakage, dents or notch.
 - b. Check rear wheel speed sensor connector or wire harness for scratches, breakage or damage.
 - c. If any of above conditions occurs, replace rear wheel speed sensor with a new one.

38

Installation

CAUTION

- When installing coupling bolts, be sure to tighten to specified torque.

Rear Wheel Speed Sensor (take rear left wheel as an example)

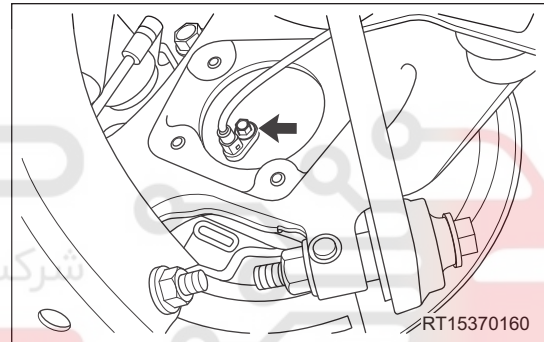
Removal

CAUTION

- Keep wheel speed sensor away from oil or other foreign matter. Otherwise speed signal generated by wheel speed sensor may be inaccurate, and system may even fail to operate normally.

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Turn off all electrical equipment and the engine switch.
 2. Disconnect the negative battery cable.
 3. Remove the rear left wheel ([See page 37-7](#)).
 4. Remove the rear left wheel speed sensor.
 - a. Remove fixing bolt (arrow) between rear left wheel speed sensor and rear left hub bearing unit, and detach rear left wheel speed sensor.
(Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)



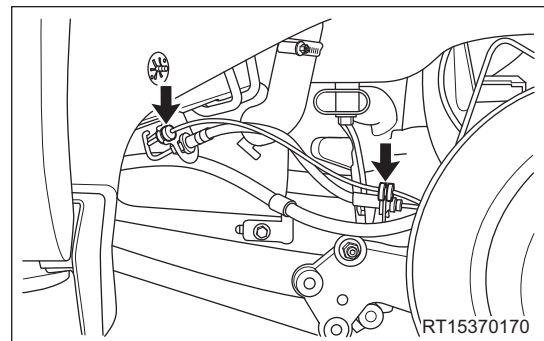
CAUTION

- Keep head and installation hole of sensor free of foreign matter.

- b. Detach clamping parts (arrow) of front left wheel speed sensor wire harness from fixing bracket.

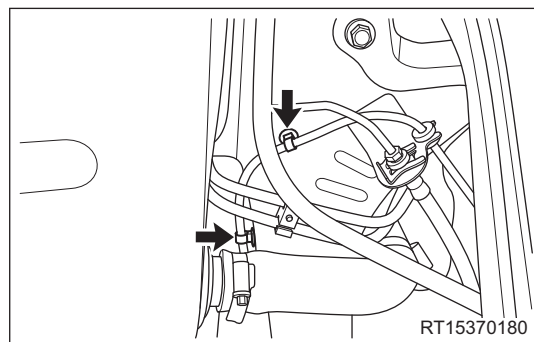
HINT:

Observe winding direction of sensor wire harness to prevent incorrect installation.

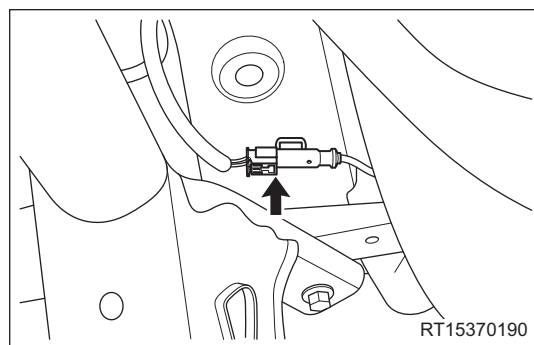


38 - BRAKE CONTROL SYSTEM

- c. Detach rear left wheel speed sensor wire harness fixing clips (arrow) from body.



- d. Disconnect the rear left wheel speed sensor wire harness connector (arrow).



- e. Remove the rear left wheel speed sensor.

Inspection

1. Inspect the rear wheel speed sensor.
 - a. Check rear wheel speed sensor surface for breakage, dents or notch.
 - b. Check rear wheel speed sensor connector or wire harness for scratches, breakage or damage.
 - c. If any of above conditions occurs, replace rear wheel speed sensor with a new one.

Installation

CAUTION

- When installing coupling bolts, be sure to tighten to specified torque.

Steering Angle Sensor

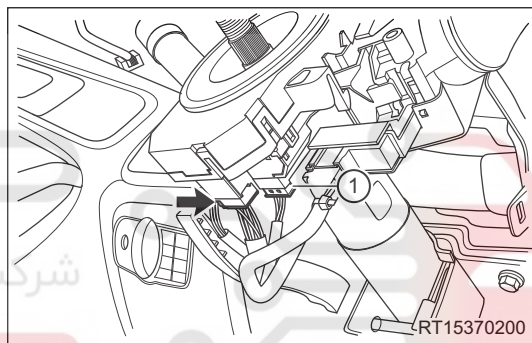
Removal

1. Turn off all electrical equipment and the engine switch.
2. Disconnect the negative battery cable.

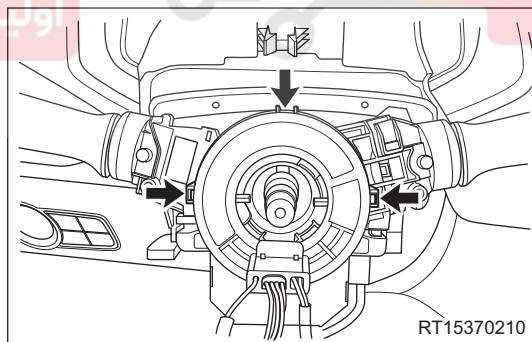
CAUTION

- Wait at least 90 seconds after disconnecting the negative battery cable to disable supplementary restraint system.

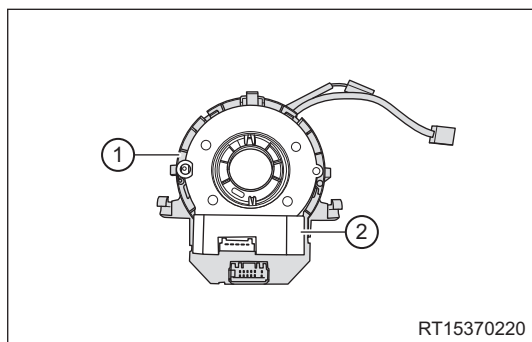
3. Position the front wheels straight ahead.
4. Remove the steering wheel assembly (See page 41-8).
5. Remove the combination switch cover assembly (See page 41-11).
6. Remove the combination switch (See page 41-13).
7. Remove the steering angle sensor.
 - a. Disconnect spiral cable wire harness connector (arrow) and steering angle sensor connector (1).



- b. Detach fixing claws (arrow) between spiral cable and steering column, and remove spiral cable.



- c. Detach steering angle sensor fixing claws and separate steering angle sensor (1) and spiral cable (2).

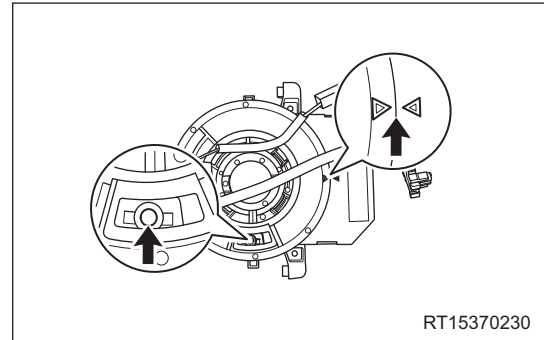


Installation

Installation is in the reverse order of removal.

HINT:

Always install spiral cable correctly according to matchmarks on spiral cable and steering column (fully turn spiral cable clockwise slowly, then turn it counterclockwise until yellow ball appears in transparent neutral window and arrow marks align with each other), otherwise the spiral cable may be damaged.



CAUTION

- Always install spiral cable correctly according to specified operating instructions.
- DO NOT rotate the spiral cable over specified turns to prevent it from breaking.
- Be sure to install fixing claws in place when installing spiral cable.
- Check that horn operates normally after installation.
- Check SRS warning light after installation, and make sure that supplemental restraint system operates normally.

- MEMO -

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



BRAKE

GENERAL INFORMATION	39-3	Brake Pedal Assembly	39-23
Description	39-3	Removal	39-23
Specifications	39-5	Inspection	39-24
Tools	39-6	Installation	39-24
Circuit Diagram	39-8	Front Disc Brake Assembly	39-25
DIAGNOSIS & TESTING	39-9	On-vehicle Inspection	39-25
Problem Symptoms Table	39-9	Removal	39-26
Inspection	39-11	Disassembly	39-27
ON-VEHICLE SERVICE	39-12	Inspection	39-29
Brake Bleeding	39-12	Assembly	39-30
Brake Fluid Replacement	39-15	Installation	39-34
Brake Fluid Reservoir Assembly	39-16	Front Brake Hose Assembly	39-35
On-vehicle Inspection	39-16	Removal	39-35
Removal	39-16	Installation	39-36
Installation	39-17	Rear Disc Brake Assembly	39-37
Brake Master Cylinder Assembly	39-18	On-vehicle Inspection	39-37
Removal	39-18	Removal	39-38
Installation	39-19	Disassembly	39-39
Vacuum Booster with Brake Master		Inspection	39-42
Cylinder Assembly	39-20	Assembly	39-43
On-vehicle Inspection	39-20	Installation	39-46
Removal	39-20	Rear Brake Hose Assembly	39-47
Inspection	39-21	Removal	39-47
Installation	39-22	Installation	39-48

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

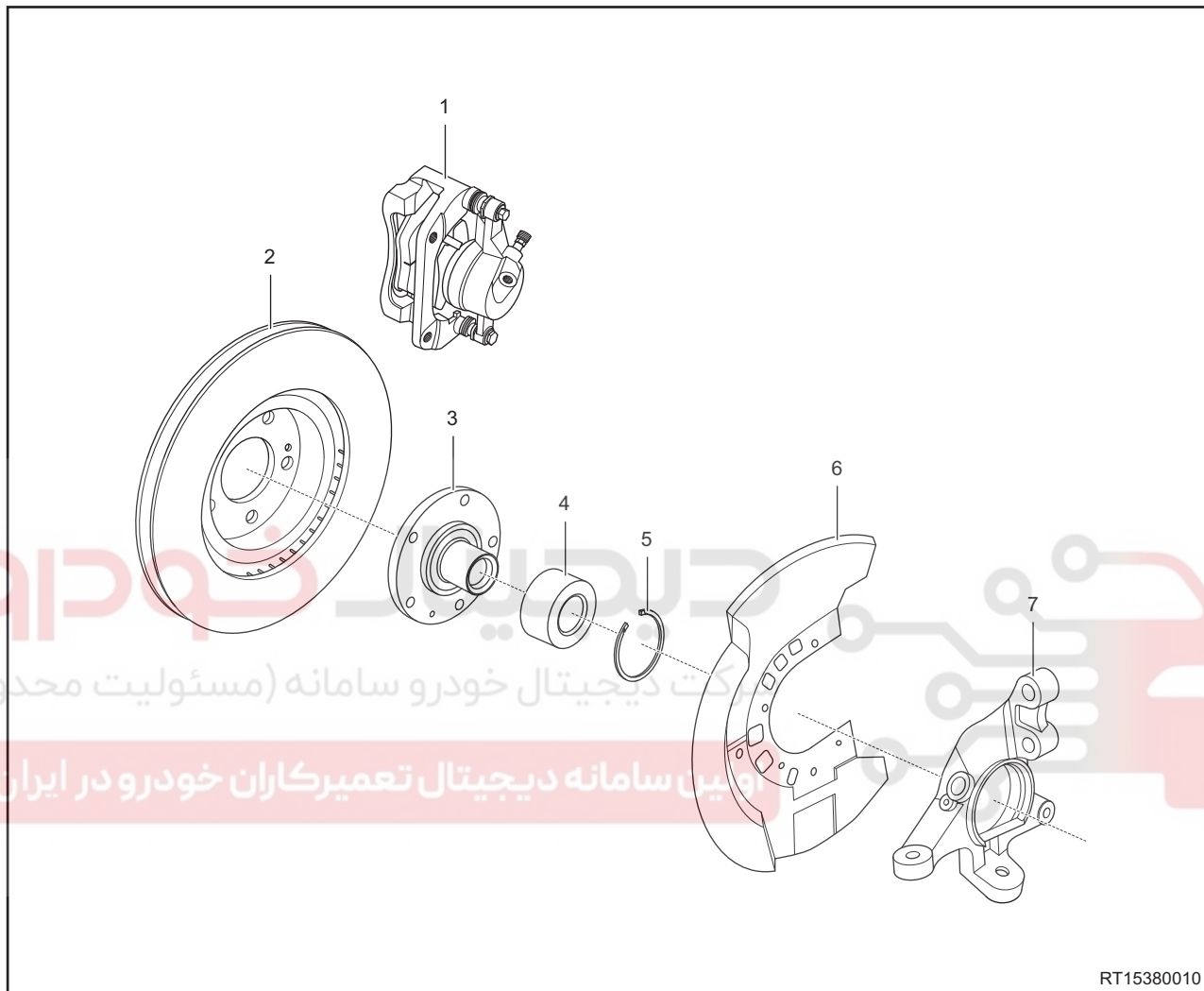
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description

Front Ventilated Disc Brake Assembly



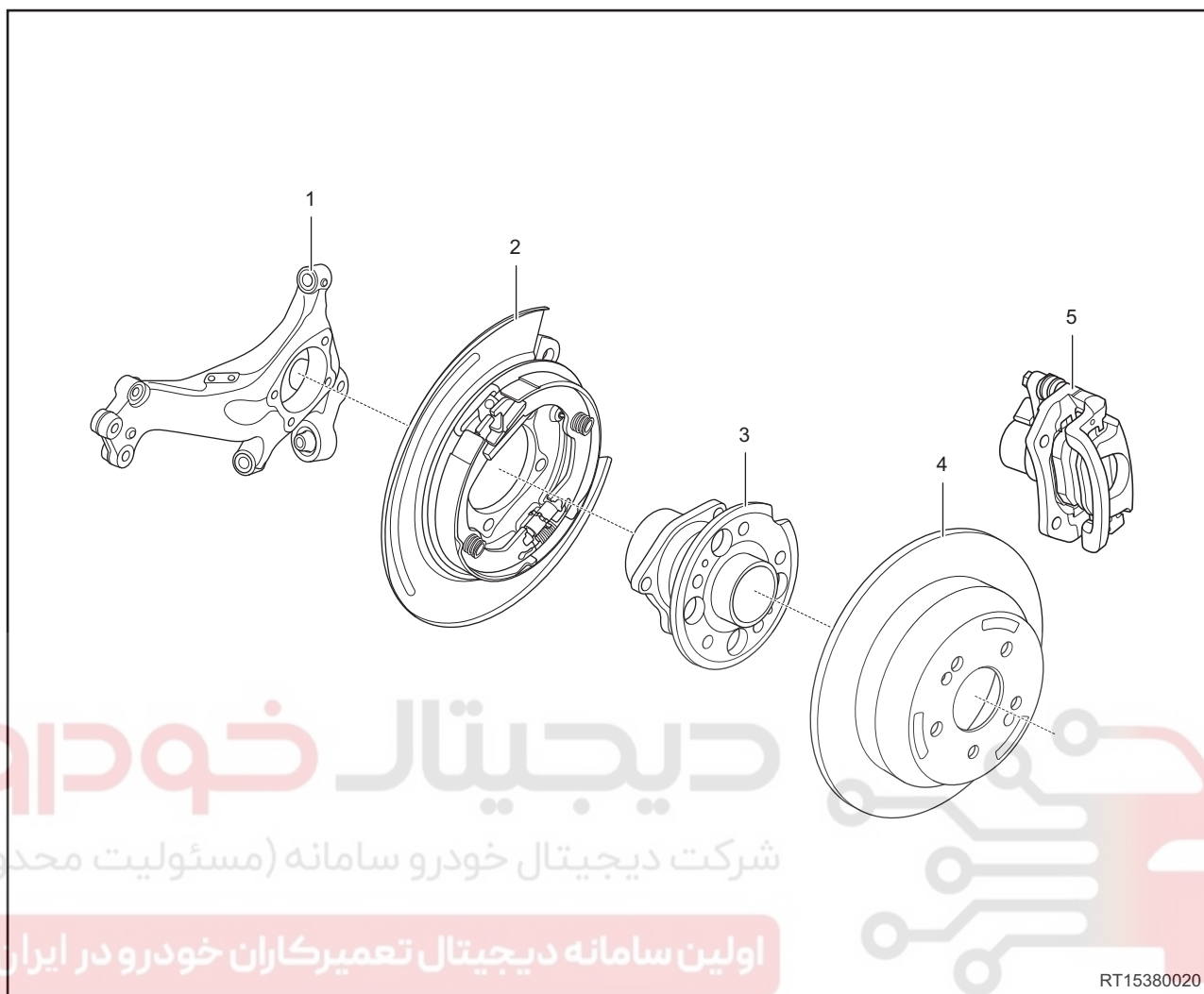
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39

1 - Front Brake Caliper Assembly	2 - Front Brake Disc
3 - Front Hub	4 - Front Hub Bearing
5 - Bearing Retainer	6 - Front Dust Guard
7 - Front Steering Knuckle	

39 - BRAKE

Rear Disc Brake Assembly



39

RT15380020

1 - Front Steering Knuckle	2 - Rear Brake Hub
3 - Rear Hub Bearing Assembly	4 - Rear Brake Disc
5 - Rear Brake Caliper Assembly	

Brake system uses the following configuration: a ventilated disc brake is used for each front wheel, and DIH (Drum-in-hat) (disc brake is used as service brake, and drum brake is used as parking brake) is used for each rear wheel.

Using lever principle, brake pedal pushes the pushrod into vacuum booster, which boosts the force of pushrod by using vacuum and then transmits the force to brake master cylinder assembly. Hydraulic pressure, produced in brake master cylinder assembly, is transmitted to ABS Hydraulic Control Unit (HCU) through the brake line, and then distributed to individual brake calipers. Brake calipers apply pressure to brake linings using hydraulic pressure. Depending on the amount of brake pressure applied to brake linings, wheels will slow down or stop.

Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10
Master Cylinder Mounting Nut	13.7 ~ 21.6
Coupling Bolt Between Brake Master Cylinder Assembly and Brake Pipe	18 ± 2
Fixing Nut Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2
Fixing Nut Between Brake Pedal Assembly and Body	23 ± 2
Coupling Bolt Between Front Brake Caliper Assembly and Front Brake Hose Assembly	20 ± 2
Coupling Bolt Between Front Brake Caliper Assembly and Front Steering Knuckle Assembly	90 ~ 110
Front Brake Disc Locating Screw	4.5 ± 0.5
Front Brake Caliper Bleeder Plug	9 ~ 11
Guide Bolt Between Front Brake Caliper Fixing Bracket and Front Brake Cylinder Assembly	22 ~ 32
Coupling Bolt Between Front Brake Hose Assembly and Front Brake Pipe	18 ± 2
Coupling Bolt Between Rear Brake Caliper Assembly and Rear Brake Hose Assembly	27 ± 2
Coupling Bolt Between Rear Brake Caliper Assembly and Brake Caliper Mounting Board Assembly	90 ~ 110
Rear Brake Disc Locating Screw	4.5 ± 0.5
Rear Brake Caliper Bleeder Plug	9 ~ 11
Guide Bolt Between Rear Brake Caliper Fixing Bracket and Rear Brake Cylinder Assembly	22 ~ 32
Coupling Bolt Between Rear Brake Hose Assembly and Brake Pipe	18 ± 2

39

Front Disc Brake

Description	Standard Thickness (mm)	Minimum Thickness (mm)	Brake Disc Runout (mm)
Front Brake Disc	25	23	0.025
Front Brake Lining	17.1	8.1	-

39 - BRAKE

Rear Disc Brake

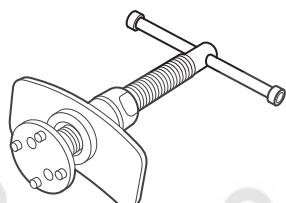
Description	Standard Thickness (mm)	Minimum Thickness (mm)	Brake Disc Runout (mm)
Rear Brake Disc	Terminal 10	Terminal 8	Terminal 0.02
Rear Brake Lining	Terminal 16.3	Terminal 8.3	-

Rear Brake Shoe

Description	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Shoe	2.8	1

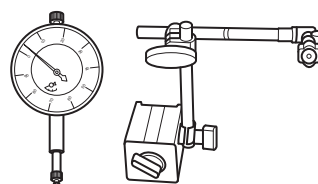
Tools

Special Tool

Brake Caliper Piston Pressing Tool	 RCH0000053
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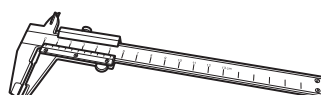
General Tools

Dial Indicator and Magnetic Holder



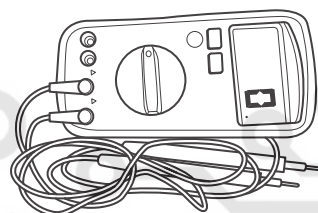
RCH0000023

Vernier Caliper



RCH0000019

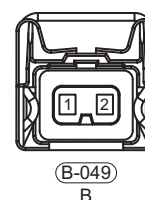
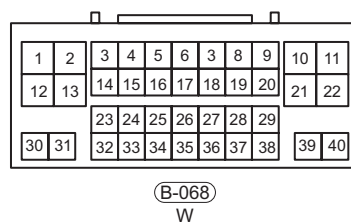
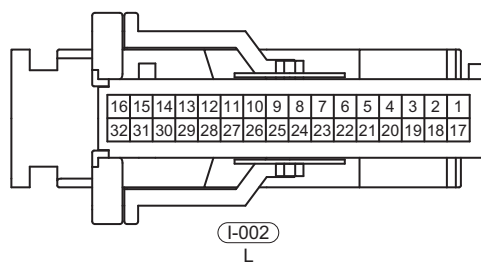
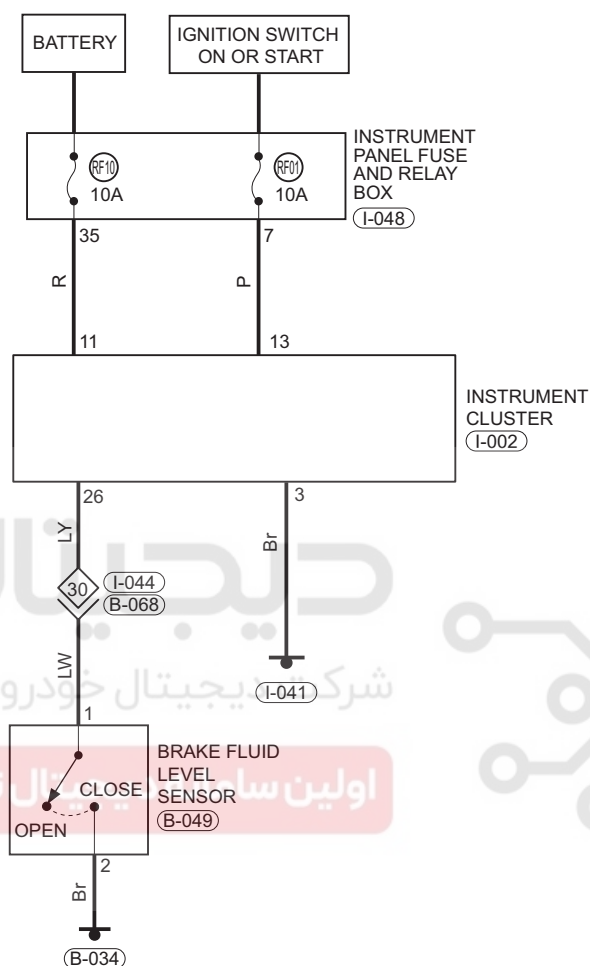
Digital Multimeter



RCH0000002

Circuit Diagram

Brake System



ET15380010

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
Noise in brake	Front brake lining (cracked, deformed, dirty or burnished)	39-27
	Rear brake lining (cracked, deformed, dirty or burnished)	39-39
	Front disc brake guide bolt guide pin (worn)	39-27
	Rear disc brake guide bolt guide pin (worn)	39-39
	Front brake caliper assembly fixing bolt (loose)	39-27
	Rear brake caliper assembly fixing bolt (loose)	39-39
	Front brake disc (scored)	39-26
	Rear brake disc (scored)	39-38
	Brake disc runout (excessive)	39-26
	Brake shoe stopper spring (damaged)	40-18
	Brake shoe return tension spring (damaged or insufficient in elasticity)	40-18
	Foreign matter on front brake disc	-
	Foreign matter on rear brake disc	-
Hard pedal but braking inefficient	Front brake lining (worn, cracked, deformed, oily or burnished)	39-27
	Rear brake lining (worn, cracked, deformed, oily or burnished)	39-39
	Front brake disc (unevenly worn)	39-25
	Rear brake disc (unevenly worn)	39-38
	Vacuum booster pushrod position (incorrect)	39-20
	Booster system (vacuum leaks)	39-21
Hard pedal (firm-depress unable to lock-up wheels)	Vacuum booster (bounce)	39-20
Pedal overtravel (vehicle stops normally)	Brake system (air ingress)	39-12
	Brake system (leaked)	-
Pedal pulsates/bounces during braking	Brake disc (unevenly worn)	39-25

39 - BRAKE

Symptom	Suspected Area	See page
Low or spongy pedal	Brake system (air ingress)	39-12
	Brake system (leaked)	-
	Front brake piston seal (worn or damaged)	39-27
	Rear brake piston seal (worn or damaged)	39-39
	Brake master cylinder assembly (malfunction)	39-18
	Vacuum booster pushrod position (incorrect)	39-20
Vehicle pulls during braking	Front brake piston (seized or frozen)	39-27
	Rear brake piston (seized or frozen)	39-39
	Front brake lining (dirty, cracked or deformed)	39-27
	Rear brake lining (dirty, cracked or deformed)	39-39
	Front brake disc (unevenly worn)	39-25
	Rear brake disc (unevenly worn)	39-39
Brake catching	Brake pedal free play (minimum)	39-23
	Parking brake control mechanism stroke (in need of adjustment)	40-7
	Parking brake cable (catching)	40-13
	Parking brake shoe clearance (in need of adjustment)	40-7
	Front brake lining (cracked or deformed)	39-27
	Rear brake lining (cracked or deformed)	39-39
	Front brake piston (seized or frozen)	39-27
	Rear brake piston (seized or frozen)	39-39
	Brake shoe return tension spring (loose or damaged)	40-18
	Vacuum booster pushrod position (incorrect)	39-20
	Booster system (vacuum leaks)	39-21
	Brake master cylinder assembly (malfunction)	39-18

Inspection

CAUTION

- Use well-sealed brake fluid DOT4 or equivalent. DO NOT use oily solution, otherwise brake system seal may be damaged.
- Brake fluid may damage paint surface. If brake fluid spills on paint surface, wash it off immediately with water.
- DO NOT use gasoline, kerosene, alcohol, engine oil, transmission oil or any other fluid that contains mineral oil to clean the system components. These kinds of fluid will damage the rubber cover and seal.
- During servicing, be sure to clean the grease or other foreign matter on outer surface of brake caliper assembly, brake lining, brake disc and wheel hub.
- When operating brake disc and brake caliper, be careful not to damage brake disc and brake caliper and scratch or cut brake shoe linings.

1. Check conditions of tires and wheels. Damaged or worn wheels and tires can cause a pull, shudder, vibration and a condition similar to sudden braking.
2. If noise occurs while braking, check suspension components. Bounce the vehicle up and down several times and check suspension or steering components for any looseness, wear or damage.
3. Check brake fluid level and condition.
 - a. If brake fluid level is too low, check ABS control unit assembly, brake caliper, brake line, brake master cylinder assembly and brake fluid reservoir, etc. for leakage.
 - b. If brake fluid is contaminated, drain a certain amount of fluid for inspection. Replace with new fluid as necessary.

39

HINT:

It is normal that brake fluid will become dark after being used for a period of time. Do not mistake this for contamination.

ON-VEHICLE SERVICE

Brake Bleeding

Be sure to perform brake bleeding and clutch bleeding after replacing hydraulic parts related to brake and clutch. For details about clutch bleeding, [See page 32-17](#). There are 2 methods for brake bleeding, and specific operation procedures are as follows:

Method 1: manual bleeding brake

WARNING

- When bleeding brake system, wear safety glasses.
- Be careful when bleeding air, as brake fluid at high pressure may spray out from bleeder plug.

CAUTION

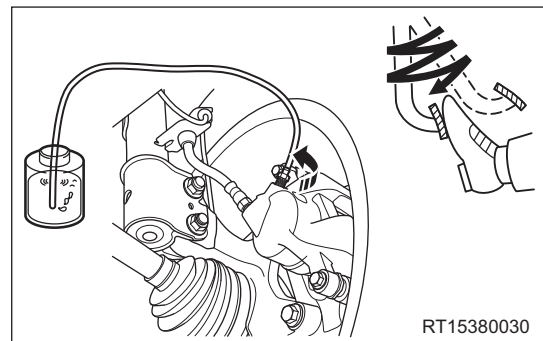
- Before removing brake fluid reservoir, wipe off any dust and other foreign matters on brake fluid reservoir to prevent them from entering.
- Use fresh, clear and well-sealed brake fluid with specified type or equivalent.
- DO NOT allow the brake fluid to adhere to any paint surface, such as vehicle body. If brake fluid leaks onto any paint surface, immediately wash it off.
- During bleeding, do not depress brake pedal repeatedly whenever bleeder plug opened. Otherwise, air amount in the system will increase to make an extra bleeding.
- DO NOT drain the brake fluid in brake fluid reservoir while bleeding brake system.

39

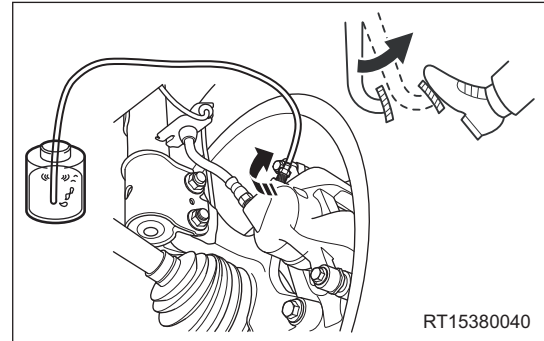
HINT:

An assistant will be required to assist when bleeding brake system.

1. Fill brake fluid reservoir with brake fluid to a proper level.
2. Loosen bleeder plug cap and connect a clear plastic hose to bleeder plug. Submerge the end of hose into clear container filled with new brake fluid.
3. Have an assistant depress brake pedal 3 to 4 times repeatedly; and depress and hold it at a lower position. Then loosen bleeder plug at least one turn.



4. Tighten bleeder plug every time brake pedal goes down quickly. Then release the brake pedal.

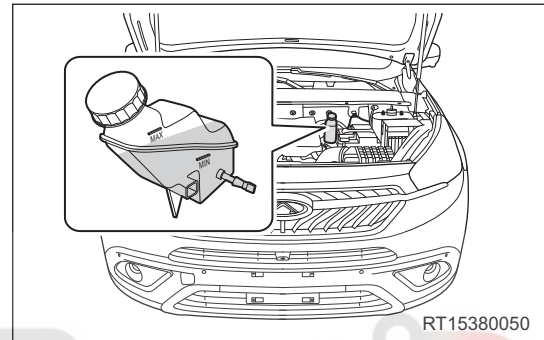


5. Repeat above steps, and use the same procedures to bleed brake line of each wheel in order of rear left wheel, front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

Empty sign: a stream of fresh brake fluid flows into clear container without bubbles.

HINT:

During bleeding brake system, make sure brake fluid level in brake fluid reservoir is always near "MAX" mark. Check brake fluid level at all times during bleeding. Add brake fluid as necessary.



6. Check and adjust brake fluid level to "MAX" mark.
7. Check the brake pedal effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
8. Test vehicle to confirm that brakes operate properly with good depressing feel.

39

Method 2: bleeding brake using diagnostic tester

CAUTION

- Check that battery voltage should not be lower than 11 V.
- Bleeding order must be rear left/front left/front right/rear right. If it is necessary to repeat part or whole bleeding procedure, be sure to wait for 5 minutes to cool solenoid valve down, otherwise solenoid valve may be damaged due to overheat.

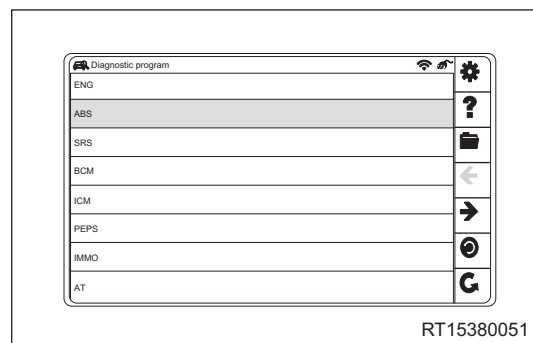
In order to reach sufficient pressure in hydraulic regulator, depress brake pedal repeatedly during whole process.

9. Fill brake fluid reservoir with brake fluid to a proper level.
10. Depress brake pedal 20 times or more with engine stopped.

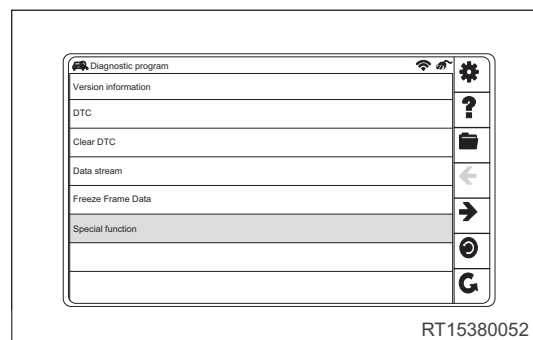
39 - BRAKE

11. Turn engine switch to ON, and enter T15 "ABS" system using X-431 3G diagnostic tester (latest software).

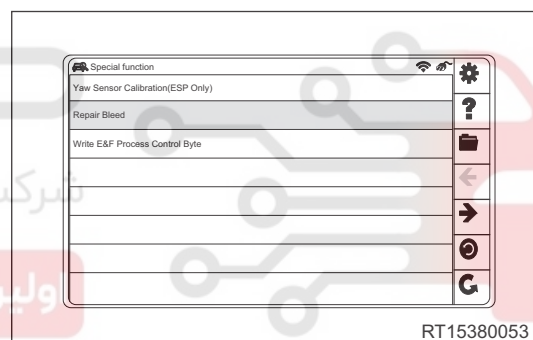
a. Please select [ABS] on Diagnostic program screen.



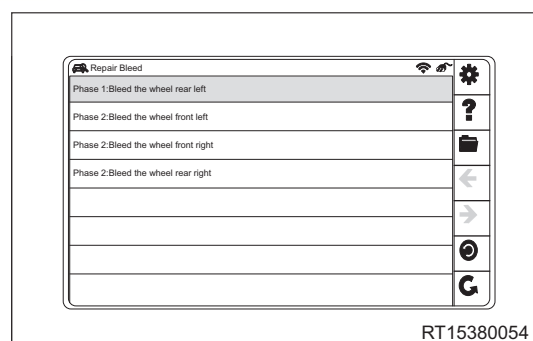
b. Please select [Special function] on Diagnostic program screen.



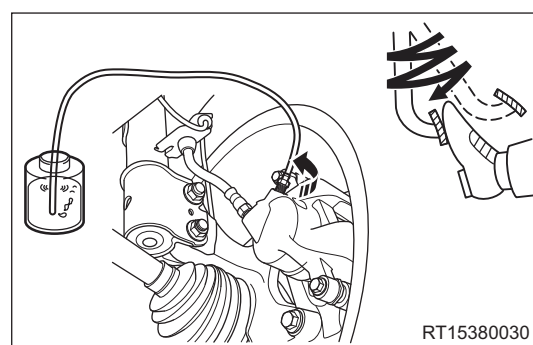
c. Please select [Repair Bleed] on Special function screen.



d. Please select [Phase 1: Bleed the wheel rear left] on Repair Bleed screen, then perform bleeding operation for rear left wheel.



12. Loosen bleeder plug cap of rear left wheel and connect a clear plastic hose to bleeder plug. Submerge the end of hose into clear container filled with new brake fluid.

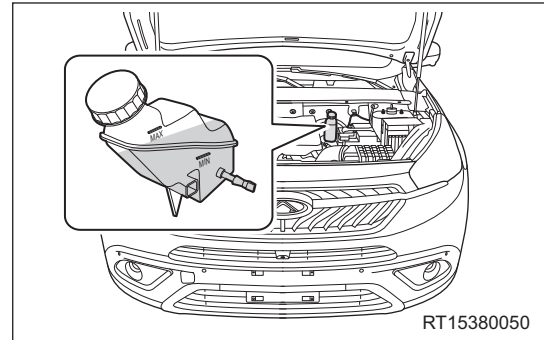


13. Use same bleeding procedures as rear left wheel to bleed air for brake lines of front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

Empty sign: a stream of fresh brake fluid flows into clear container without bubbles.

HINT:

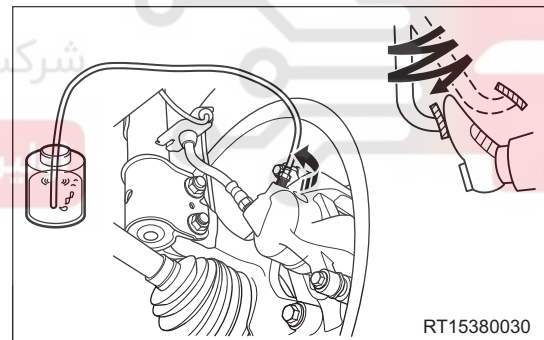
During bleeding brake system, make sure brake fluid level in brake fluid reservoir is always near "MAX" mark. Check brake fluid level at all times during bleeding. Add brake fluid as necessary.



14. Check and adjust brake fluid level to "MAX" mark.
15. Check the brake pedal effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
16. Test vehicle to confirm that brakes operate properly with good depressing feel.

Brake Fluid Replacement

1. Drain the brake fluid.
 - a. Start the engine and run it at idle.
 - b. Unscrew filler cap of brake fluid reservoir assembly. Loosen bleeder plug cap and connect a clear plastic hose to bleeder plug. Submerge the end of hose into clear container filled with new brake fluid.
 - c. Loosen the bleeder plug, and depress the brake pedal continuously until no brake fluid comes out.



2. Add brake fluid.
 - a. Tighten bleeder plug after confirming that brake fluid has been drained. Fill brake fluid reservoir with new brake fluid to a proper level.
3. Perform bleeding procedures.
 - a. After replacing with new brake fluid, be sure to bleed brake system for normal operation. For details about brake system bleeding, [See page 39-12.](#)

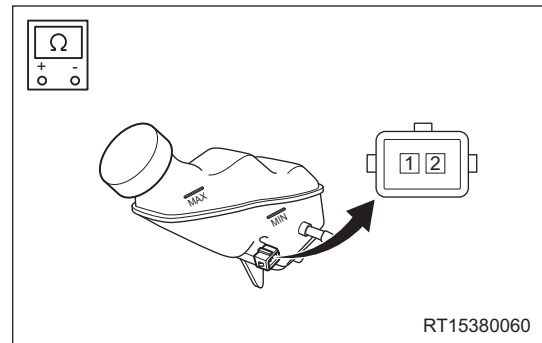
Brake Fluid Reservoir Assembly

On-vehicle Inspection

1. Check the brake fluid level warning switch.
 - a. Remove the brake fluid reservoir filler cap.
 - b. Disconnect the brake fluid level warning switch wire harness connector.
 - c. Using ohm band of digital multimeter, check for continuity between brake fluid level warning switch terminals according to conditions shown in table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
Terminal 1 - Terminal 2	Float upward (switch ON)	No continuity
Terminal 1 - Terminal 2	Float downward (switch OFF)	Continuity



HINT:

- There is a float in fluid reservoir. Position of float changes as brake fluid level rises or drops.
 - If result is not as specified, replace brake fluid reservoir assembly.
- d. Add brake fluid to "MAX" mark.

39

Removal

1. Drain the brake fluid (See page 39-15).

CAUTION

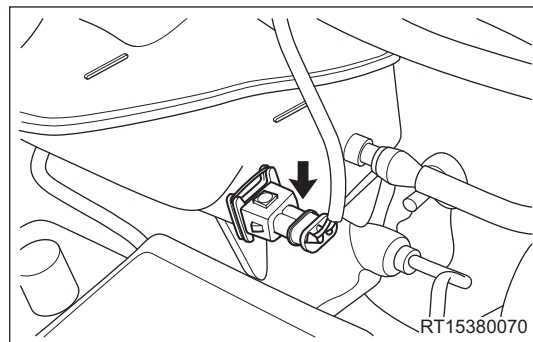
- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

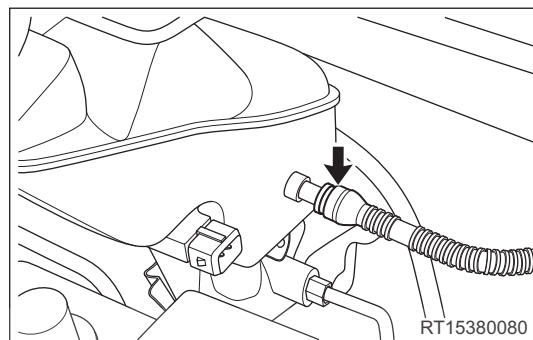
- Drained brake fluid should be well kept in a container. Never discard it at will.

2. Remove the brake fluid reservoir assembly.

- a. Disconnect the brake fluid level warning switch connector (arrow).

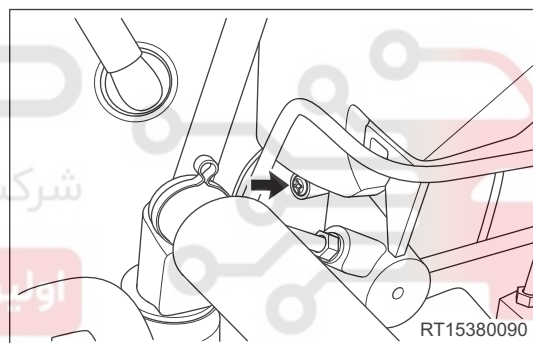


- b. Disconnect clutch hose and master cylinder inlet tube (arrow) from brake fluid reservoir assembly (for MT model).



- c. Remove fixing screw (arrow) between brake fluid reservoir assembly and brake master cylinder assembly.

(Tightening torque: 5 ± 1 N·m)



- d. Remove brake fluid reservoir assembly from brake master cylinder assembly.

Installation

Installation is in the reverse order of removal.

HINT:

Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.

Brake Master Cylinder Assembly

Removal

CAUTION

- Release vacuum in vacuum booster before removing brake master cylinder assembly to avoid damaging the brake master cylinder assembly and prevent booster from sucking in any pollutant.
- When engine is not running, release vacuum by pumping brake pedal until brake pedal can be depressed firmly.
- When removing brake line, sealing measures should be taken to prevent foreign matter from entering.

1. Drain the brake fluid (See page 39-15).

CAUTION

- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

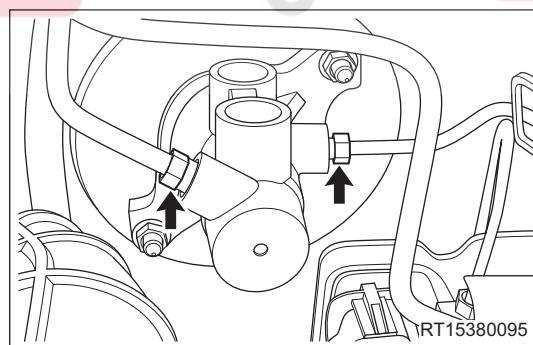
- Drained brake fluid should be well kept in a container. Never discard it at will.

39

2. Remove the air filter with intake hose (See page 16-14).
3. Remove the brake fluid reservoir assembly (See page 39-16).
4. Remove the brake master cylinder assembly.

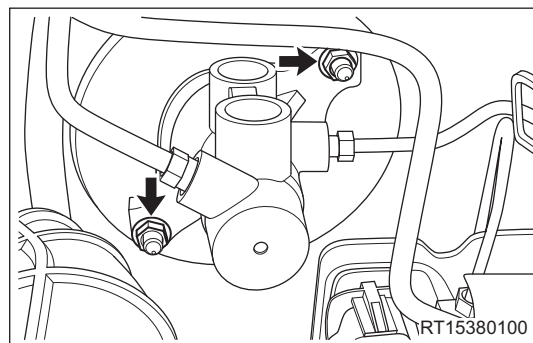
- a. Loosen 2 coupling bolts (arrow) between brake master cylinder assembly and brake pipes.

(Tightening torque: 18 ± 2 N·m)



- b. Loosen 2 fixing nuts and washers (arrow) between brake master cylinder assembly and vacuum booster.

(Tightening torque: $13.7 \sim 21.6$ N·m)



- c. Slide the brake master cylinder assembly straight out of vacuum booster carefully.

CAUTION

- The design of brake master cylinder assembly and piston makes piston could make piston easy to fall out. To prevent this, make sure that brake master cylinder is horizontal or end surface faces down (piston surface faces upward) when handling brake master cylinder assembly.
- Make sure that no foreign matter adheres to brake master cylinder assembly piston. If foreign matter adheres, clean it off with a piece of clean cloth. Then, apply grease to entire periphery of contact surface of master cylinder piston.
- Master cylinder should be handled carefully. Avoid any impact to master cylinder, such as dropping. It cannot be reused if dropped.
- DO NOT tap or pinch master cylinder piston, and avoid damaging master cylinder piston in any other ways.

Installation

Installation is in the reverse order of removal.

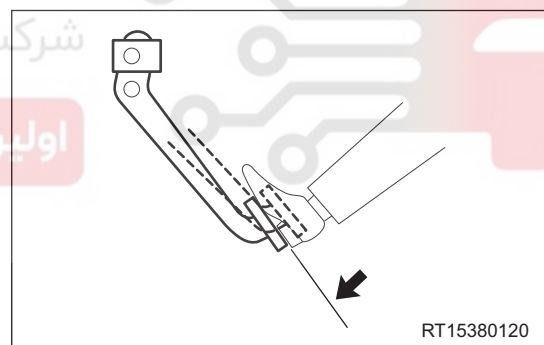
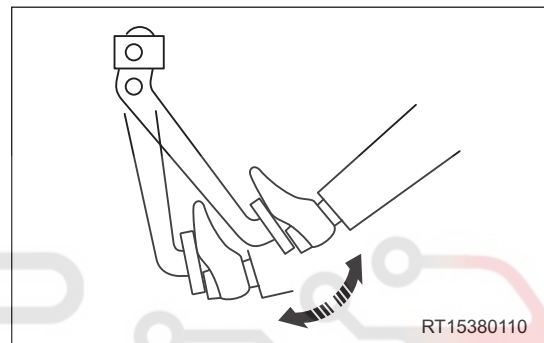
CAUTION

- Make sure to tighten coupling bolts and nuts to specified torque during installation.
- Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.

Vacuum Booster with Brake Master Cylinder Assembly

On-vehicle Inspection

1. Check the vacuum booster assembly.
 - a. Check the air tightness.
 - Start the engine and stop it after 1 or 2 minutes. Slowly depress the brake pedal several times.
 - Make sure that booster is airtight. Check that the amount every time pedal can be depressed decreases gradually in comparison with previous depression amount. If pedal operation is not as specified, check the check valve. If check valve is normal, replace vacuum booster assembly.
 - Start the engine. Depress and hold pedal, and then stop engine.
 - Make sure that booster is airtight. Depress and hold the pedal for 30 seconds, and check that pedal reserve distance does not change.
 - b. Check the operation.
 - Stop the engine.
 - Depress the pedal several times and check that pedal reserve distance does not change.



39

- Depress and hold pedal, and then start engine. Check that pedal can only be depressed slightly.
- If pedal operation is not as specified, check the check valve. If check valve is normal, replace vacuum booster assembly.

Removal

1. Drain the brake fluid (See page 39-15).

CAUTION

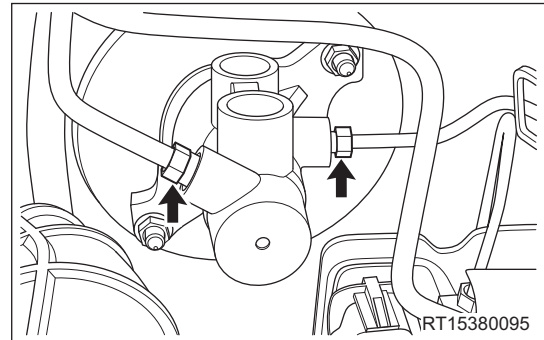
- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

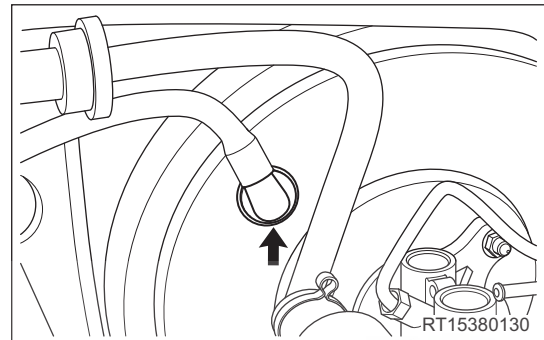
- Drained brake fluid should be well kept in a container. Never discard it at will.

2. Disconnect the battery.

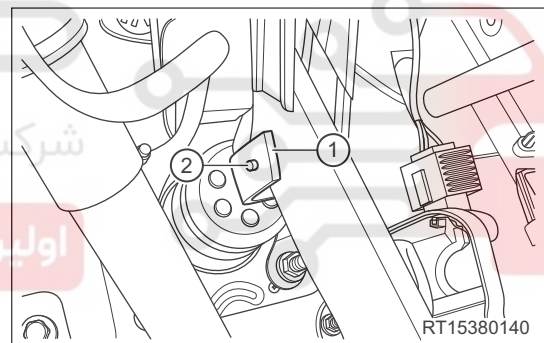
3. Remove the brake fluid reservoir assembly (See page 39-16).
4. Remove the vacuum booster with brake master cylinder assembly.
 - a. Loosen 2 coupling bolts (arrow) between brake master cylinder assembly and brake pipes.
(Tightening torque: 18 ± 2 N·m)



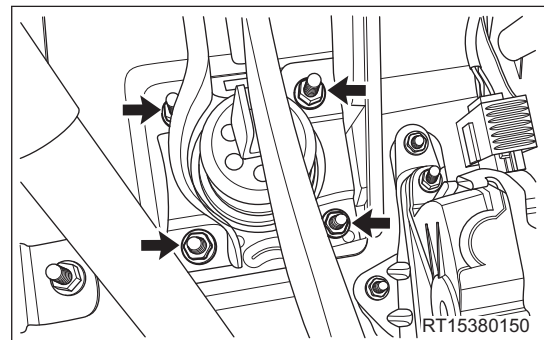
- b. Detach vacuum hose assembly with check valve (arrow) from vacuum booster assembly.



- c. Remove locking pin (2) and pushrod pin (1) from vacuum booster pushrod and detach the brake pedal assembly.



- d. Remove 4 coupling nuts (arrow) between vacuum booster assembly and brake pedal assembly.
(Tightening torque: 23 ± 2 N·m)



- e. Remove the brake pedal.
 - f. Remove vacuum booster with brake master cylinder assembly from engine compartment.

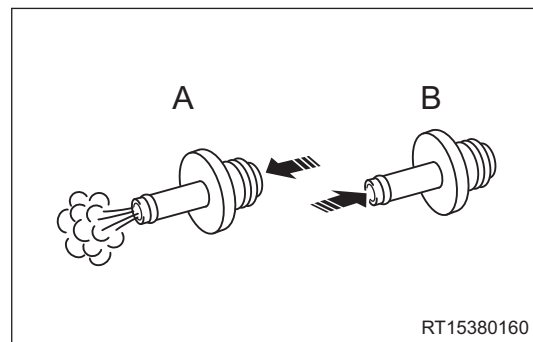
Inspection

1. Check the check valve.
 - a. Remove check valve from vacuum hose assembly.

39 - BRAKE

- b. Check that there is airflow (A) from vacuum booster to engine, and no airflow (B) from engine to vacuum booster.

If result is not as specified, replace vacuum hose assembly.



Installation

Installation is in the reverse order of removal.

CAUTION

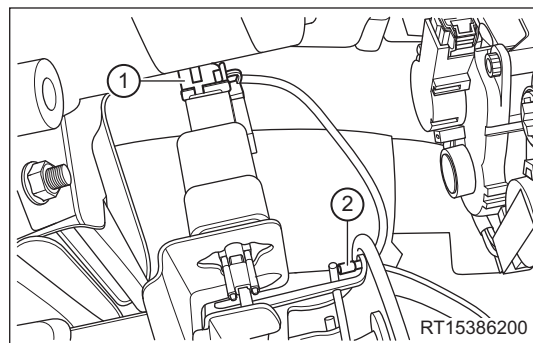
- Make sure to tighten coupling bolts and nuts to specified torque during installation.
- Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.



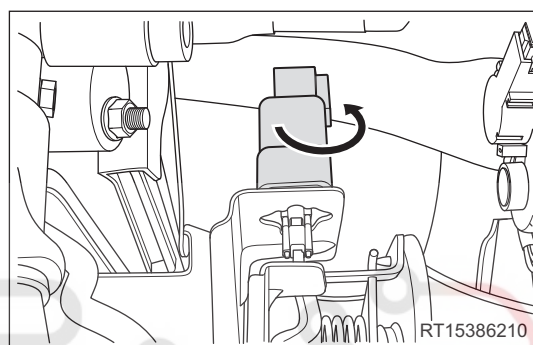
Brake Pedal Assembly

Removal

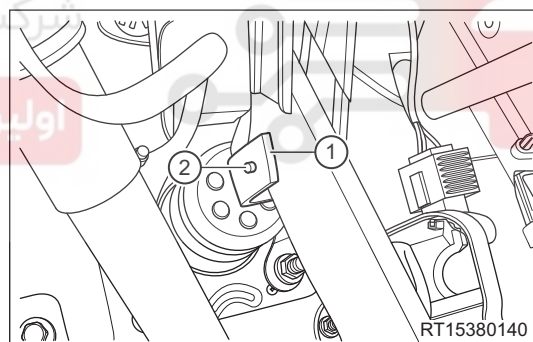
1. Remove the brake light switch assembly.
 - a. Disconnect the brake light switch assembly wire harness connector (1) and clip (2) fixed on brake pedal.



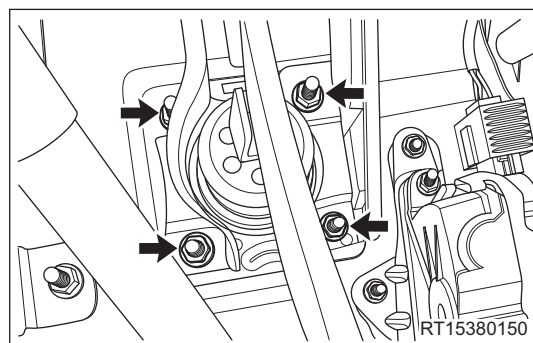
- b. Remove brake light switch assembly by rotating it 90° clockwise or counterclockwise.



2. Remove the brake pedal assembly.
 - a. Remove locking pin (2) and pushrod pin (1) from vacuum booster pushrod and detach brake pedal assembly.

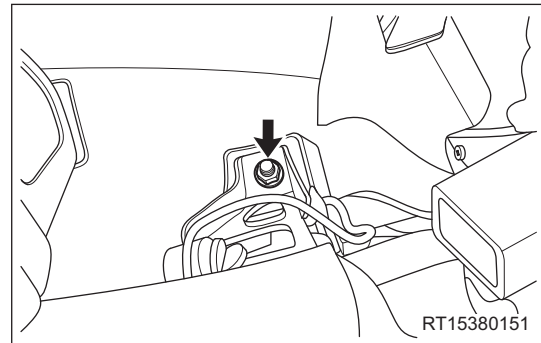


- b. Remove 4 fixing nuts (arrow) between vacuum booster assembly and brake pedal assembly. (Tightening torque: 23 ± 2 N·m)



39 - BRAKE

- c. Remove coupling bolt (arrow) between brake pedal assembly and body.
(Tightening torque: 23 ± 2 N·m)



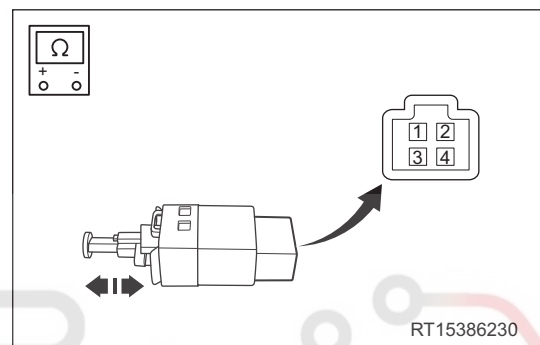
- d. Remove brake pedal assembly from inside of vehicle.

Inspection

1. Check the brake light switch assembly.
a. Using ohm band of digital multimeter, check for continuity between brake light switch assembly terminals according to table below.

Standard Condition

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	Brake pedal depressed (switch pin released)	Continuity
Terminal 2 - Terminal 4	Brake pedal depressed (switch pin released)	No continuity
Terminal 1 - Terminal 3	Brake pedal released (switch pin pushed)	No continuity
Terminal 2 - Terminal 4	Brake pedal released (switch pin pushed)	Continuity



If result is not as specified, replace brake light switch assembly.

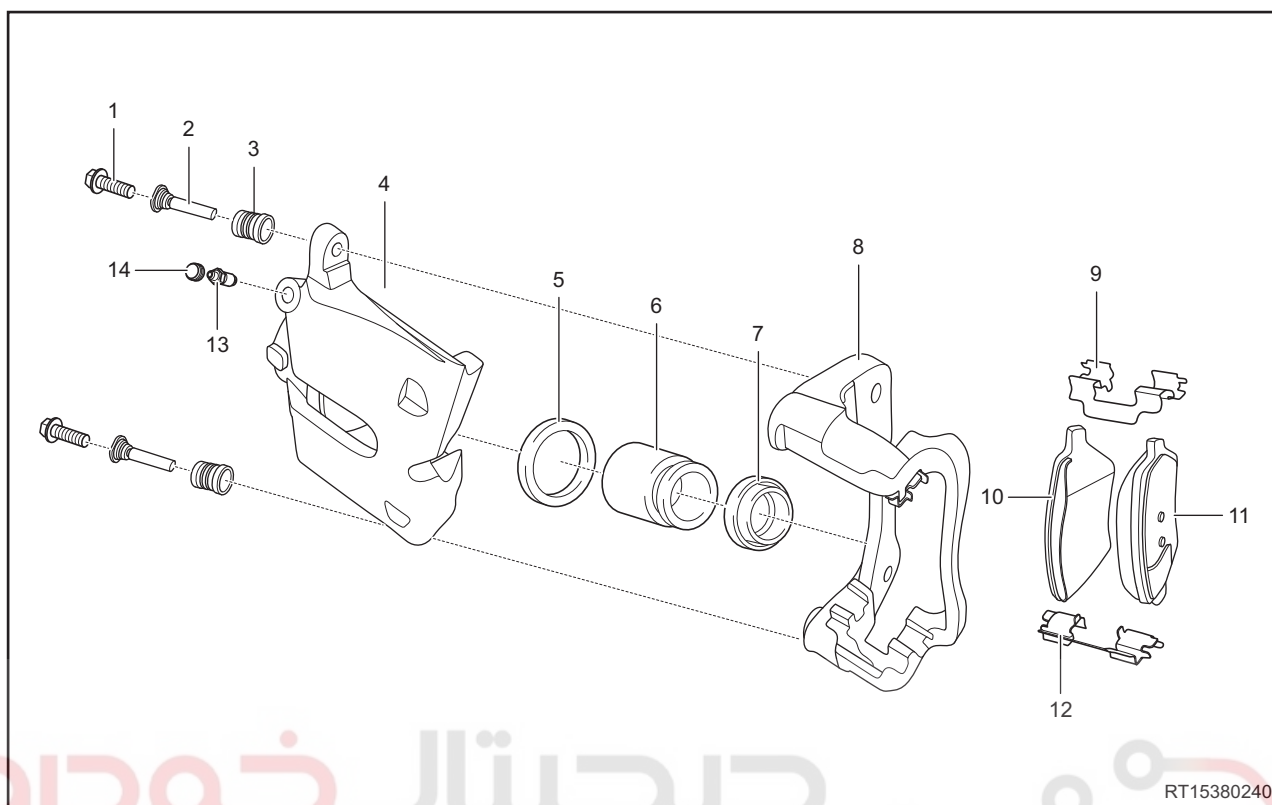
Installation

Installation is in the reverse order of removal.

CAUTION

- Make sure to tighten fixing nuts to specified torques during installation.
- Check that brake light operates properly after installation.

Front Disc Brake Assembly

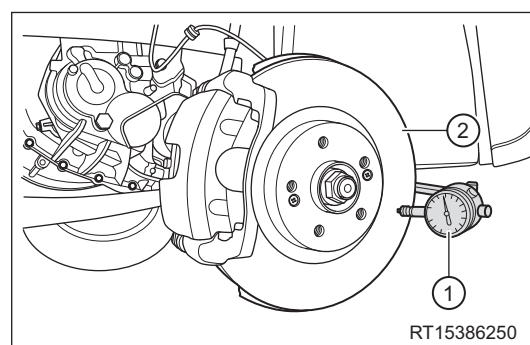


1 - Brake Caliper Guide Bolt	2 - Brake Caliper Guide Bolt Guide Pin
3 - Brake Caliper Guide Pin Rubber Dust Boot	4 - Front Disc Brake Cylinder
5 - Front Disc Brake Piston Seal Ring	6 - Front Disc Brake Piston
7 - Rear Disc Brake Piston Dust Boot	8 - Front Disc Brake Caliper Fixing Bracket
9 - Upper Support Shim	10 - Inner Brake Lining
11 - Outer Brake Lining	12 - Lower Support Shim
13 - Bleeder Plug	14 - Bleeder Plug Cap

39

On-vehicle Inspection

1. Check the brake disc runout.
 - a. Remove the front wheel ([See page 37-7](#)).
 - b. Secure a dial indicator (1) to a proper position. Position dial indicator pointer approximately 10 mm from outer edge of brake disc.
 - c. Slowly rotate brake disc (2) and check runout. Mark the lowest and highest points and record these measured values.



- d. Check runout on opposite side of brake disc in the same way. Mark the lowest and highest points and record these measured values.

39 - BRAKE

- e. Compare recorded runout value with limit value.
Front brake disc runout: 0.025 mm
- f. If runout exceeds the maximum value, replace brake disc.

Removal**HINT:**

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Drain the brake fluid (See page 39-15).

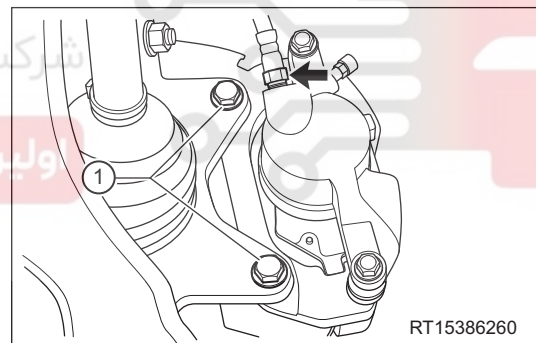
CAUTION

- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

- Drained brake fluid should be well kept in a container. Never discard it at will.

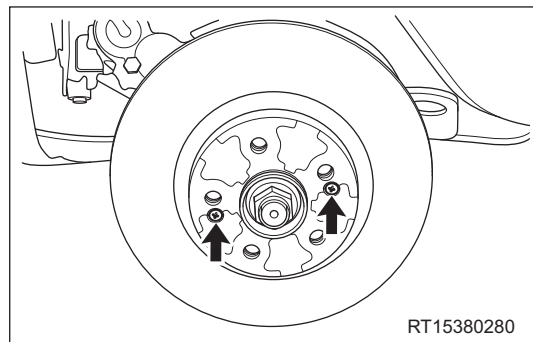
2. Remove the front left wheel (See page 37-7).
3. Remove the front left brake caliper assembly.
 - a. Remove 2 coupling bolts (1) between front left brake caliper assembly and front left steering knuckle.
(Tightening torque: 90 ~ 110 N·m)
 - b. Remove coupling bolt (arrow) between front left brake caliper assembly and front left brake hose assembly.
(Tightening torque: 20 ± 2 N·m)

**CAUTION**

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

- c. Remove the front left brake caliper assembly.

4. Remove the front left brake disc.
 - a. Remove 2 locating screws (arrow) from front left brake disc and remove the front left brake disc.
(Tightening torque: $4.5 \pm 0.5 \text{ N}\cdot\text{m}$)



Disassembly

HINT:

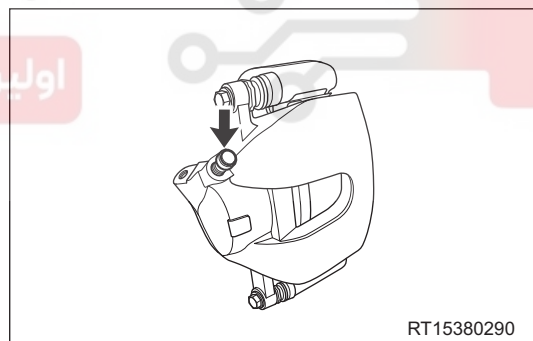
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ WARNING

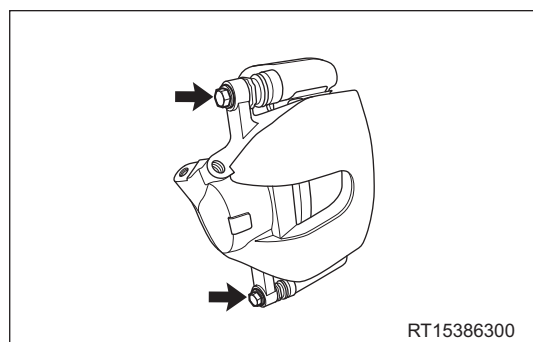
- Never use high pressure when removing piston from the bore of brake caliper. Otherwise, this may cause personal injuries.
- If it is needed to remove the piston with compressed air, do not allow the piston to face yourself or place your hands around the brake caliper and piston.

39

1. Remove the bleeder plug (w/bleeder plug cap).
 - a. Remove bleeder plug (w/bleeder plug cap) (arrow) from brake caliper assembly.
(Tightening torque: $9 \sim 11 \text{ N}\cdot\text{m}$)



2. Remove the brake cylinder assembly.
 - a. Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.
(Tightening torque: $22 \sim 32 \text{ N}\cdot\text{m}$)

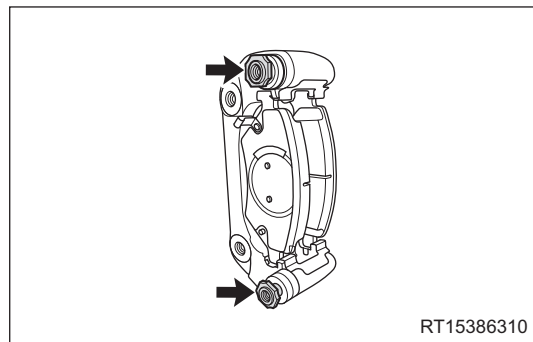


- b. Separate brake cylinder assembly and brake caliper fixing bracket.

39 - BRAKE

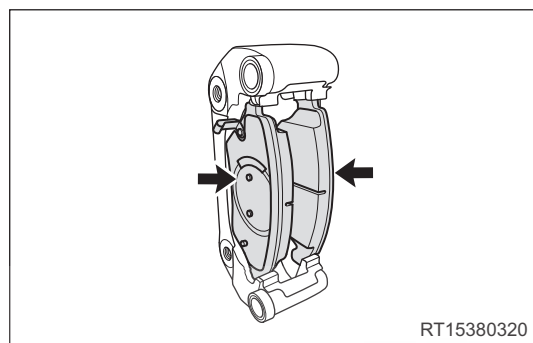
3. Remove the front brake caliper guide bolt guide pin (w/dust boot).

- a. Remove 2 brake caliper guide bolt guide pins (w/dust boot) (arrow) from brake caliper fixing bracket.



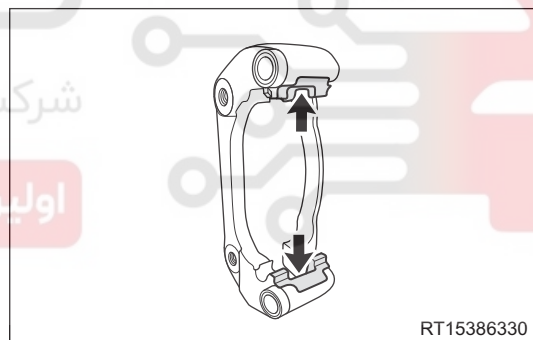
4. Remove the front brake lining.

- a. Remove inner brake lining and outer brake lining (arrow) from brake caliper fixing bracket.



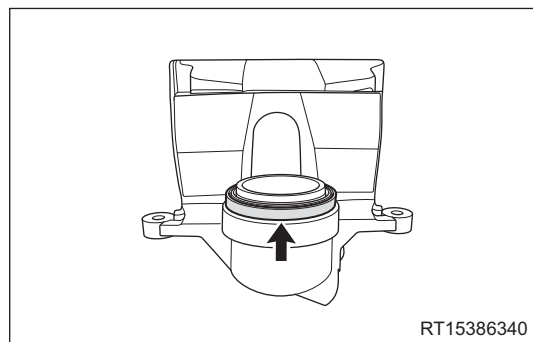
5. Remove the brake lining support shim.

- a. Remove 2 brake lining support shims (arrow) from brake caliper fixing bracket.



6. Remove the brake cylinder dust boot.

- a. Using a flat tip screwdriver wrapped with protective tape, pry out dust boot (arrow) carefully.



39

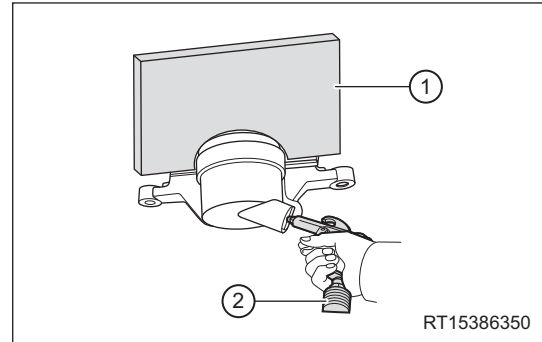
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

 CAUTION

- Be careful not to damage the brake piston and brake cylinder.

7. Remove the front disc brake piston.
 - a. Place a wooden board (1) between front disc brake piston and front disc brake cylinder.
 - b. Use compressed air (2) to carefully press out piston from front disc brake cylinder through attachment hole.

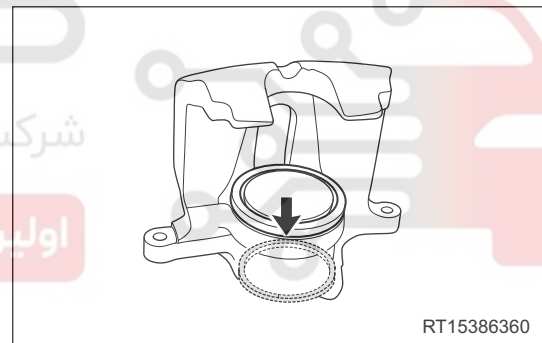


CAUTION

- Be careful not to splash brake fluid.
- DO NOT hold piston by hands to prevent injury.
- DO NOT remove or install the brake piston casually, and always perform these operations by a professional.

- c. Clean piston bore with alcohol or proper solution, then wipe it with a piece of lint.
8. Remove the front disc brake piston seal ring.

- a. Using a flat tip screwdriver wrapped with protective tape, carefully pry out front disc brake piston seal ring (arrow) from brake cylinder rear ring groove.



39

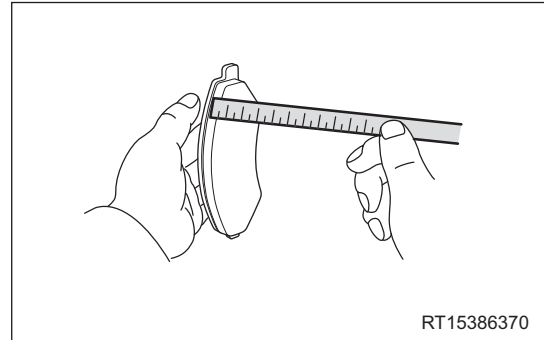
Inspection

1. Check brake cylinder and piston.
 - a. Check piston and bore for scratches or corrosion. If there are scratches or corrosion, remove them with fine sand cloth.
 - b. Remove dirt on piston with a soft coarse cloth. Do not clean piston with polishing cloth or sand cloth, as this may damage its surface. If surface of piston is damaged, replace it. If piston is stuck or bore is worn or corroded, replace entire brake caliper assembly. Using polishing cloth, remove carefully press out the piston.
2. Check brake caliper fixing bracket and brake caliper guide pin set.
 - a. Clean contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - b. Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
 - c. Install brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it by hand; otherwise replace it.
 - d. After installing brake lining, check if it is easy to fall out (due to insufficient elasticity of support shim). Replace it as necessary.

39 - BRAKE

3. Check the brake lining.

- a. Visually check brake lining for flatness, and also check for excessive wear. If condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
- b. Measure the minimum brake lining thickness. When minimum thickness of brake lining is 8.3 mm or less, replace brake linings.



RT15386370

- c. When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall them to original positions.

4. Check the brake disc.

- a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, brake disc must be replaced.
- b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
- c. It is normal that surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.

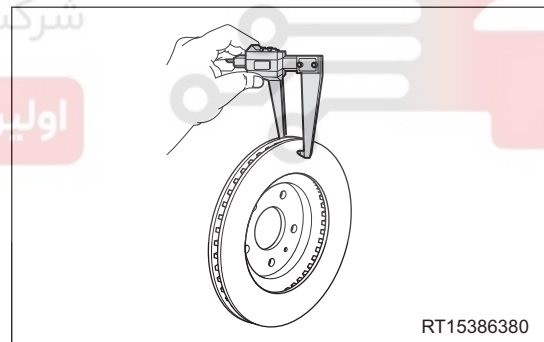
39

5. Check the brake disc thickness.

- a. Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.

Standard thickness: 25 mm

Minimum thickness: 23 mm



RT15386380

- b. If it is less than minimum thickness due to wear of brake disc, replace brake disc.

CAUTION

- DO NOT machine brake disc, because it may make brake disc thickness less than the minimum.

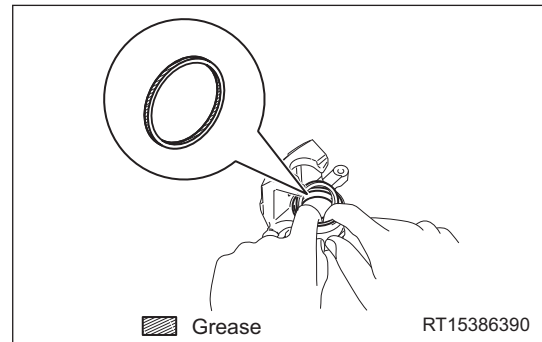
Assembly**HINT:**

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

CAUTION

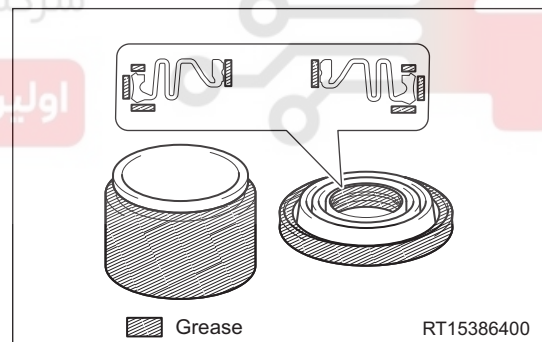
- When assembling brake caliper assembly, always keep your hands clean.
- When assembling brake caliper assembly, always use new clean brake fluid.
- Never use old front disc brake piston seal ring.

1. Install the front disc brake piston seal ring.
 - a. Apply a light coat of grease to entire inner and outer circumferences of new front disc brake piston seal ring.
 - b. Install front disc brake piston seal ring to brake cylinder.

**CAUTION**

- Securely install front disc brake piston seal ring into rear groove of brake cylinder.

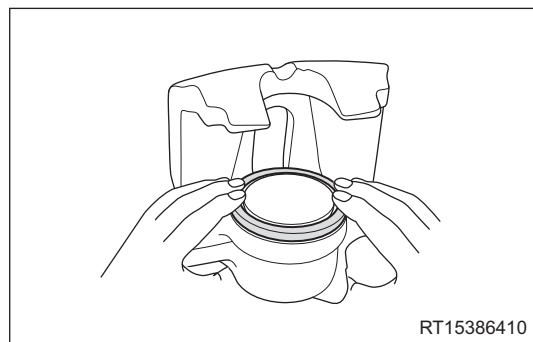
2. Install the front disc brake piston.
 - a. Apply a light coat of grease to inner and outer circumferences, and entire periphery of outer flange top/bottom surfaces of new brake cylinder dust boot as shown in illustration.
 - b. Apply a light coat of grease to entire outer circumference (part contacting with brake cylinder dust boot and front disc brake cylinder) of front disc brake piston.
- c. Install brake cylinder dust boot to front disc brake piston.
3. Install the brake cylinder dust boot.
 - a. Install front disc brake piston to front disc brake cylinder.

**CAUTION**

- DO NOT install piston forcibly to brake cylinder.

39 - BRAKE

- b. Install brake cylinder dust boot to brake cylinder.

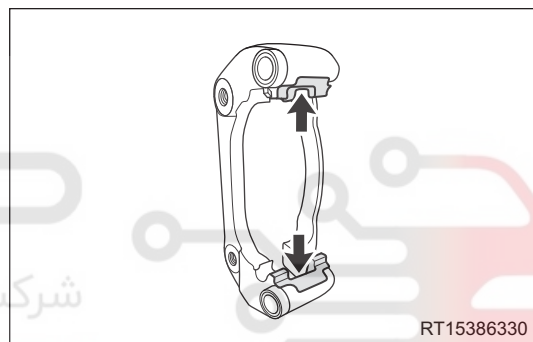


 CAUTION

- Securely install brake cylinder dust boot into front ring groove of disc brake cylinder.
- DO NOT damage the brake cylinder dust boot.

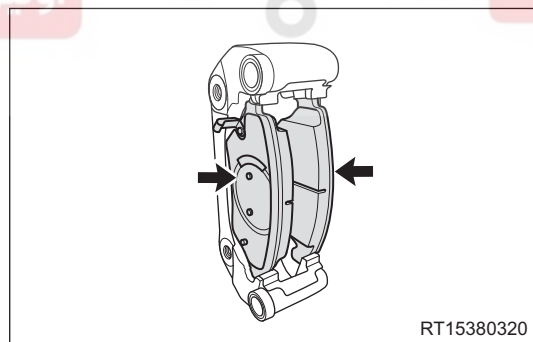
4. Install the brake lining support shim.

- a. Securely install upper and lower support shims (arrow) to brake caliper fixing bracket.



5. Install the front brake lining.

- a. Securely install inner brake lining and outer brake lining (arrow) to brake caliper fixing bracket. Make sure they are clamped in place.

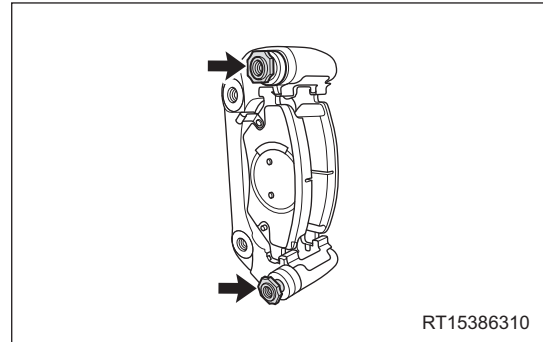


 CAUTION

- Make sure contact surface of lining and brake disc is free of oil and grease.

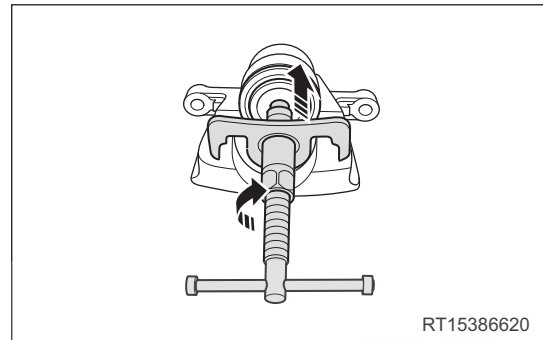
6. Install the front brake caliper guide bolt guide pin (w/dust boot).

- a. Apply a small amount of grease to contact surface between guide bolt guide pin and guide pin rubber dust boot (arrow), and securely install them to brake caliper fixing bracket.



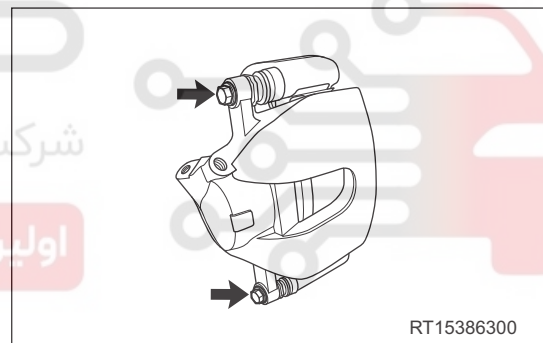
7. Install the brake cylinder assembly.

- a. Using brake cylinder piston pressing tool, slightly retract the brake cylinder piston.



- b. Align brake caliper guide bolts (arrow) with guide pin holes and securely install the brake cylinder assembly.

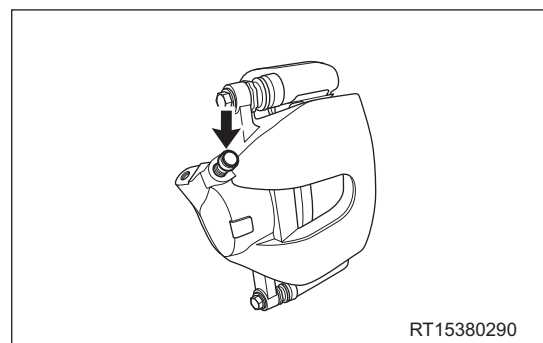
(Tightening torque: 22 ~ 32 N·m)



8. Install the bleeder plug (w/bleeder plug cap).

- a. Securely install the bleeder plug (w/bleeder plug cap) (arrow) to front brake caliper assembly.

(Tightening torque: 9 ~ 11 N·m)



39 - BRAKE

Installation

Installation is in the reverse order of removal.

CAUTION

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Make sure to tighten fixing bolt and nut to specified torque during installation.
- Before installing brake linings, completely retract the brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.



Front Brake Hose Assembly

Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 37-7).
 2. Drain the brake fluid (See page 39-15).

CAUTION

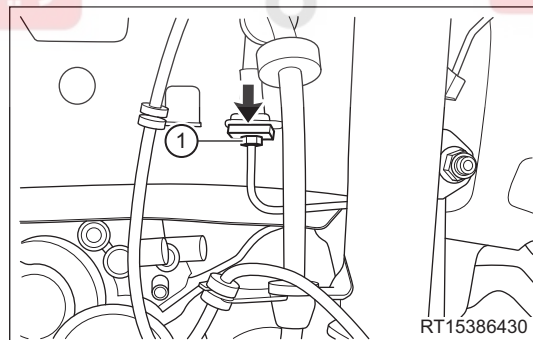
- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

- Drained brake fluid should be well kept in a container. Never discard it at will.

39

3. Remove the front left brake hose assembly.
 - a. Loosen coupling bolt (1) between front left brake hose assembly and front left brake pipe, detach fixing clip (arrow).
 (Tightening torque: 18 ± 2 N·m)

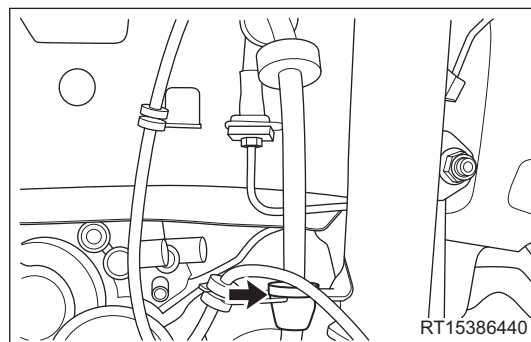


CAUTION

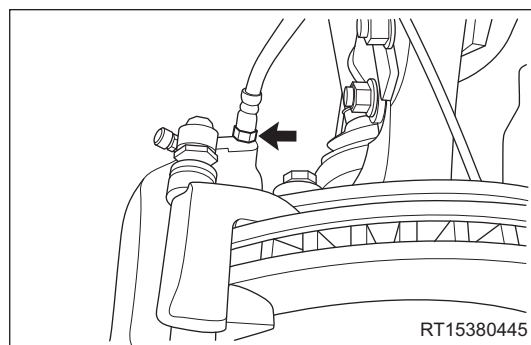
- DO NOT bend or damage brake tube.
- DO NOT allow any foreign matter such as dirt and dust to enter the brake tube from joint parts.
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.

39 - BRAKE

- b. Detach fixing part (arrow) of front left brake hose assembly from front left shock absorber assembly.



- c. Remove coupling bolt (arrow) between front left brake caliper assembly and front left brake hose assembly.
(Tightening torque: 20 ± 2 N·m)

**CAUTION**

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

39

- d. Remove the front left brake hose assembly.

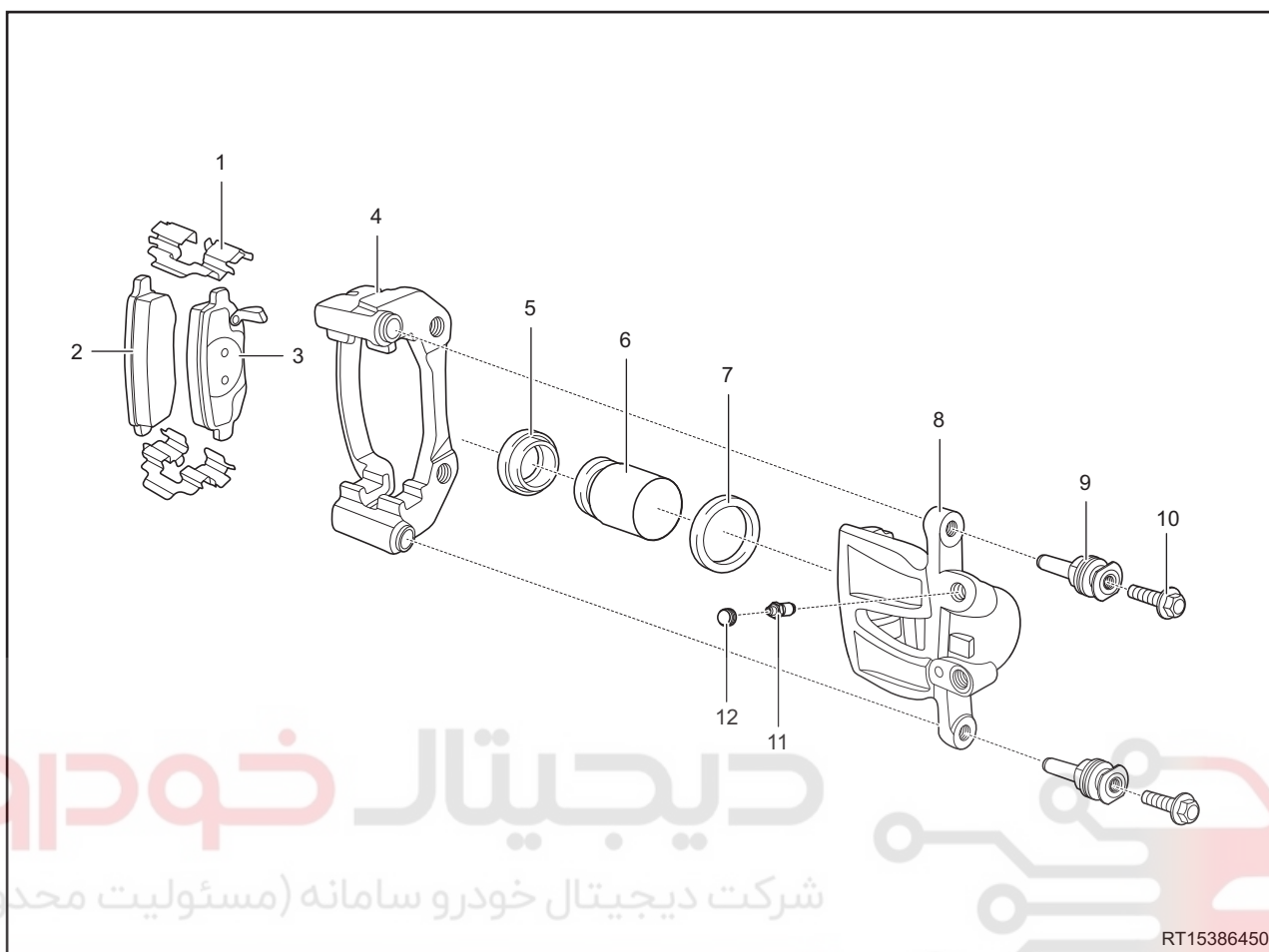
Installation

Installation is in the reverse order of removal.

CAUTION

- Make sure to tighten coupling bolt to specified torques during installation.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

Rear Disc Brake Assembly



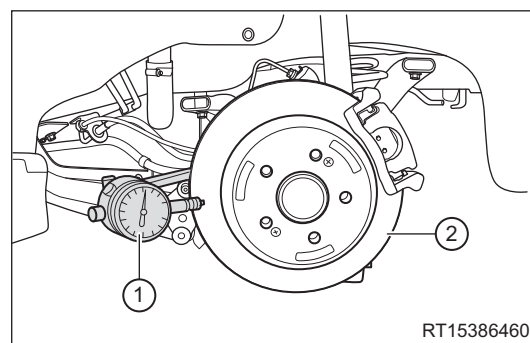
RT15386450

39

1 - Upper Support Shim	2 - Inner Brake Lining
3 - Outer Brake Lining	4 - Rear Disc Brake Caliper Fixing Bracket
5 - Rear Disc Brake Piston Dust Boot	6 - Rear Disc Brake Piston
7 - Rear Disc Brake Piston Seal Ring	8 - Rear Disc Brake Cylinder
9 - Brake Caliper Guide Bolt Guide Pin	10 - Brake Caliper Guide Bolt
11 - Bleeder Plug	12 - Bleeder Plug Cap

On-vehicle Inspection

1. Check the brake disc runout.
 - a. Remove the rear wheel (See page 37-7).
 - b. Secure a dial indicator (1) to a proper position. Position the dial indicator pointer approximately 10 mm from outer edge of rear brake disc.
 - c. Slowly rotate brake disc (2) and check runout. Mark the lowest and highest points and record these measured values.



RT15386460

39 - BRAKE

- d. Check runout on opposite side of brake disc in the same way. Mark the lowest and highest points and record these measured values.
- e. Compare recorded runout value with limit value.
Rear brake disc runout: 0.02 mm
- f. If runout exceeds the maximum value, replace brake disc.

Removal**HINT:**

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Drain the brake fluid (See page 39-15).

CAUTION

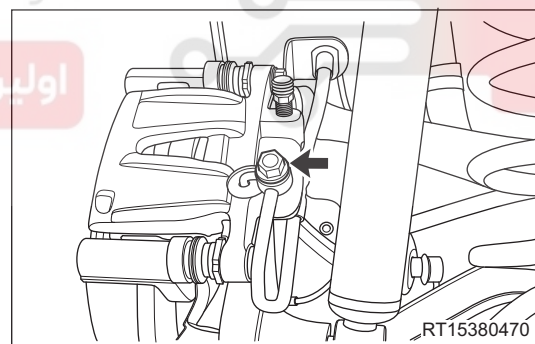
- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

- Drained brake fluid should be well kept in a container. Never discard it at will.

39

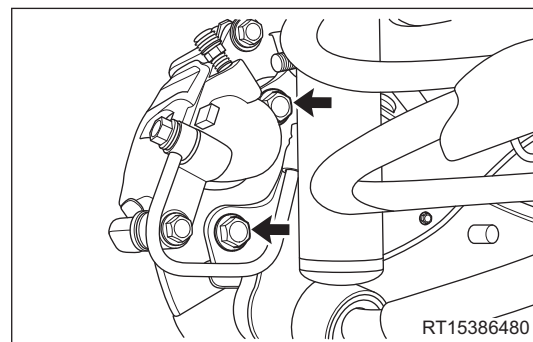
2. Remove the rear left wheel (See page 37-7).
3. Remove the rear left brake caliper assembly.
 - a. Remove coupling bolt and washer (arrow) between rear left brake caliper assembly and rear left brake hose assembly.
(Tightening torque: 27 ± 2 N·m)

**CAUTION**

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

- b. Remove coupling bolts (arrow) between rear left brake caliper assembly and left brake caliper mounting board assembly.

(Tightening torque: 90 ~ 110 N·m)

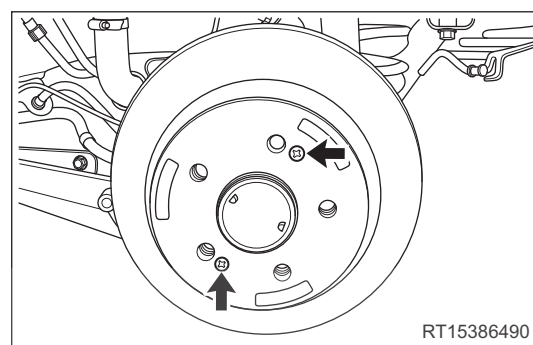


- c. Remove the rear left brake caliper assembly.

4. Remove the rear left brake disc.

- a. Remove locating screws (arrow) from rear left brake disc and remove rear left brake disc.

(Tightening torque: 4.5 ± 0.5 N·m)



Disassembly

HINT:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

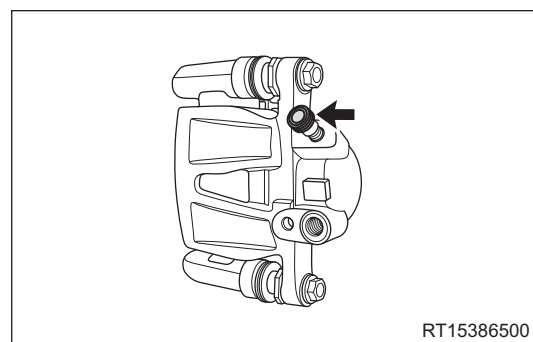
⚠ WARNING

- Never use high pressure when removing piston from the bore of brake caliper. Otherwise, this may cause personal injuries.
- If it is needed to remove the piston with compressed air, do not allow the piston to face yourself or place your hands around the brake caliper and piston.

1. Remove the bleeder plug (w/bleeder plug cap).

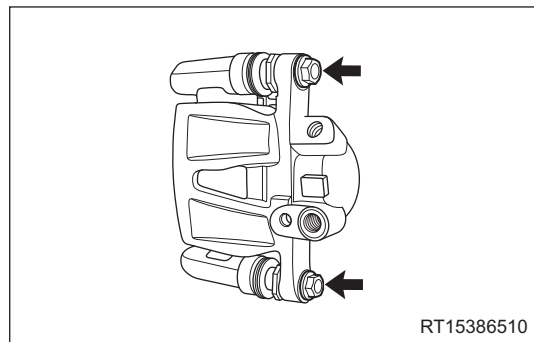
- a. Remove bleeder plug (w/bleeder plug cap) (arrow) from brake caliper assembly.

(Tightening torque: 9 ~ 11 N·m)



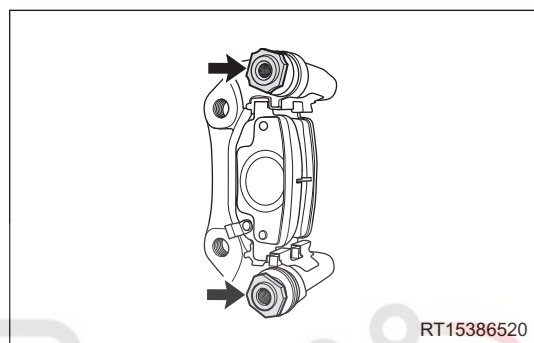
39 - BRAKE

2. Remove the brake cylinder assembly.
 - a. Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.
(Tightening torque: 22 ~ 32 N·m)



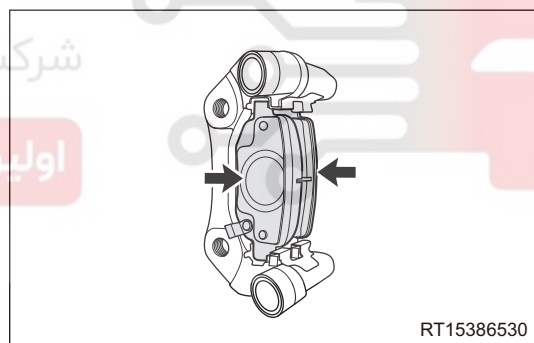
- b. Separate the brake cylinder assembly from brake caliper fixing bracket.
3. Remove the rear brake caliper guide bolt guide pin (w/dust boot).

- a. Remove 2 brake caliper guide bolt guide pins (w/dust boot) (arrow) from brake caliper fixing bracket.

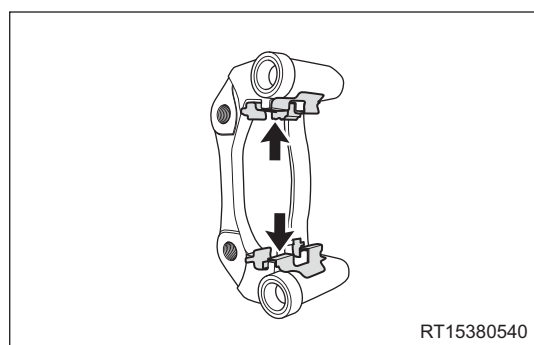


39

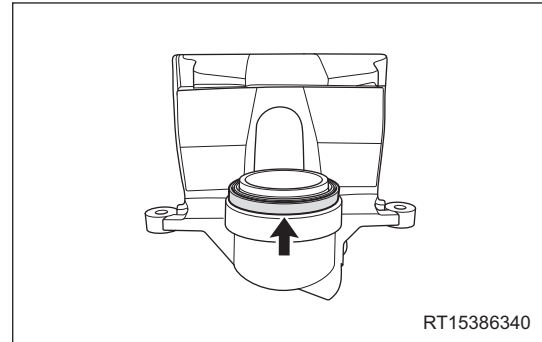
4. Remove the rear brake lining.
 - a. Remove inner brake lining and outer brake lining (arrow) from brake caliper fixing bracket.



5. Remove the brake lining support shim.
 - a. Remove 2 brake lining support shims (arrow) from brake caliper fixing bracket.



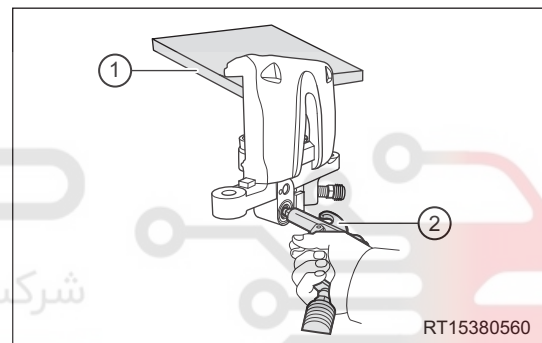
6. Remove the brake cylinder dust boot.
 - a. Using a flat tip screwdriver wrapped with protective tape, pry out the dust boot carefully.



CAUTION

- Be careful not to damage the brake piston and brake cylinder.

7. Remove the rear disc brake piston.
 - a. Place a wooden board (1) between rear disc brake piston and rear disc brake cylinder.
 - b. Use compressed air (2) to carefully press out piston from rear disc brake cylinder through attachment hole.



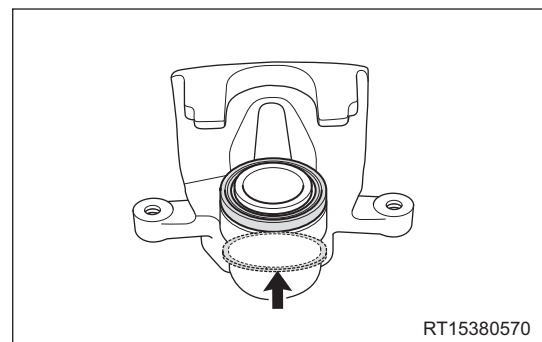
39

CAUTION

- Be careful not to splash brake fluid.
- DO NOT hold piston by hands to prevent injury.
- DO NOT remove or install the brake piston casually, and always perform these operations by a professional.

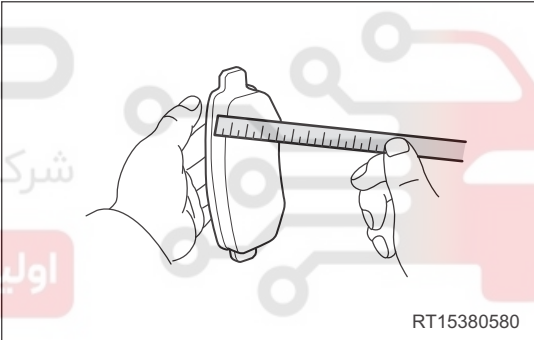
- c. Clean piston bore with alcohol or proper solution. Then wipe it with a piece of lint.

8. Remove the rear disc brake piston seal ring.
 - a. Using a flat tip screwdriver wrapped with protective tape, carefully pry out rear disc brake piston seal ring (arrow) from rear ring groove of brake cylinder.



39 - BRAKE

Inspection

1. Check brake cylinder and piston.
 - a. Check piston and bore for scratches or corrosion. If there are scratches or corrosion, remove them with fine sand cloth.
 - b. Remove dirt on piston with a soft brass wire brush and coarse cloth. Do not clean piston with polishing cloth or sand cloth, as this may damage its surface. If surface of piston is damaged, replace it. If piston is stuck or bore is worn or corroded, replace entire brake caliper assembly. Using polishing cloth, remove small pitting inside bore.
 2. Check brake caliper fixing bracket and brake caliper guide pin set.
 - a. Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - b. Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
 - c. Install the brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it with hand; otherwise replace it.
 - d. After installing brake lining, check if it is easy to fall out (due to weak elasticity of support shim). Replace it as necessary.
 3. Check the brake lining.
 - a. Visually check brake lining for flatness, and also check for excessive wear. If condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - b. Measure the minimum brake lining thickness. When minimum thickness of brake lining is 8.3 mm or less, replace brake linings.
- 

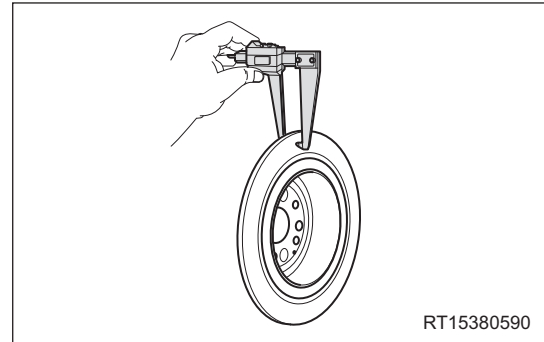
RT15380580
- c. When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall them to original positions.
4. Check the brake disc.
 - a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, brake disc must be replaced.
 - b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
 - c. It is normal that the surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.

5. Check the brake disc thickness.

- a. Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.

Standard thickness: 10 mm

Minimum thickness: 8 mm



- b. If it is less than minimum thickness due to the wear of brake disc, replace brake disc.

CAUTION

- DO NOT machine brake disc, because it may make brake disc thickness less than the minimum.

Assembly**HINT:**

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

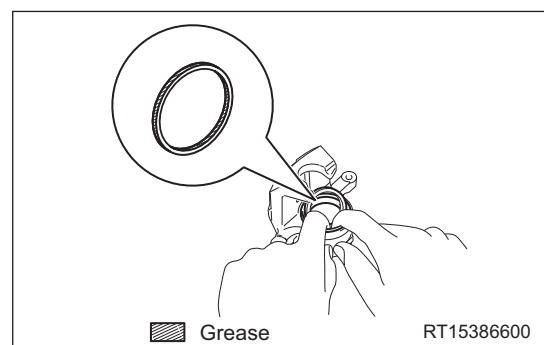
CAUTION

- When assembling brake caliper assembly, always keep your hands clean.
- When assembling brake caliper assembly, always use new clean brake fluid.
- Never use old front disc brake piston seal ring.

39

1. Install the rear disc brake piston seal ring.

- a. Apply a light coat of grease to entire inner and outer circumferences of new rear disc brake piston seal ring.
- b. Install rear disc brake piston seal ring to brake cylinder.

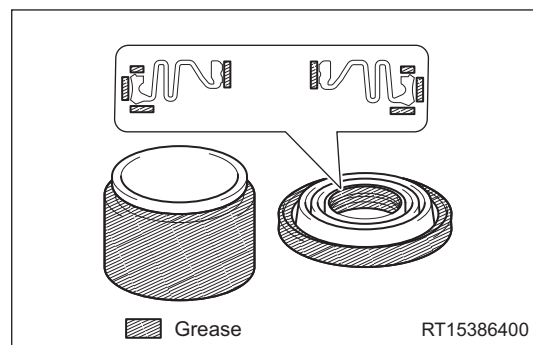
**CAUTION**

- Securely install the rear disc brake piston seal ring into rear groove of brake cylinder.

39 - BRAKE

2. Install the rear disc brake piston.

- a. Apply a light coat of grease to inner and outer circumferences, and entire periphery of outer flange top/bottom surfaces of new brake cylinder dust boot as shown in illustration.
- b. Apply a light coat of grease to entire outer circumference (part contacting with the brake cylinder dust boot and rear disc brake cylinder) of rear disc brake piston.



- c. Install brake cylinder dust boot to rear disc brake piston.

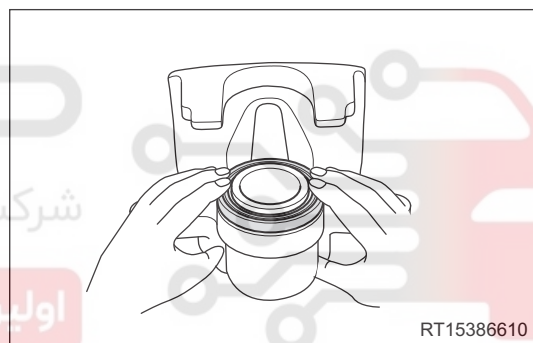
3. Install the brake cylinder dust boot.

- a. Install rear disc brake piston to rear disc brake cylinder.

CAUTION

- DO NOT install piston forcibly to brake cylinder.

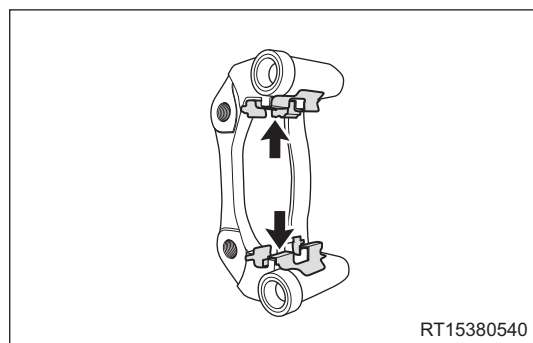
- b. Install brake cylinder dust boot to brake cylinder.

**CAUTION**

- Securely install brake cylinder dust boot into front ring groove of disc brake cylinder.
- DO NOT damage the brake cylinder dust boot.

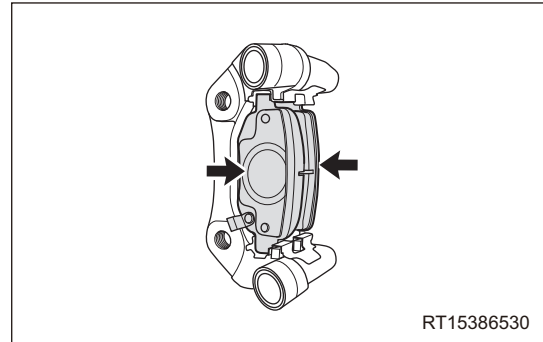
4. Install the brake lining support shim.

- a. Securely install upper and lower support shims (arrow) to brake caliper fixing bracket.



5. Install the rear brake lining.

- a. Securely install inner brake lining and outer brake lining (arrow) to brake caliper fixing bracket. Make sure they are clamped in place.

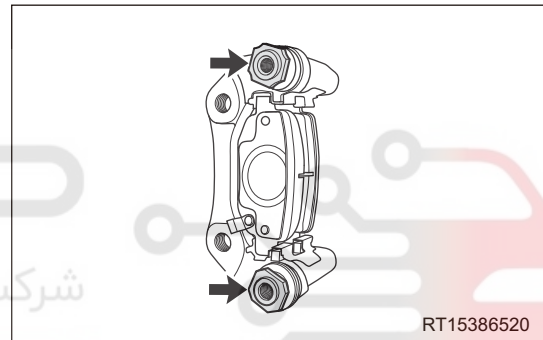


CAUTION

- Make sure contact surface of lining and brake disc is free of oil and grease.

6. Install the rear brake caliper guide bolt guide pin (w/dust boot).

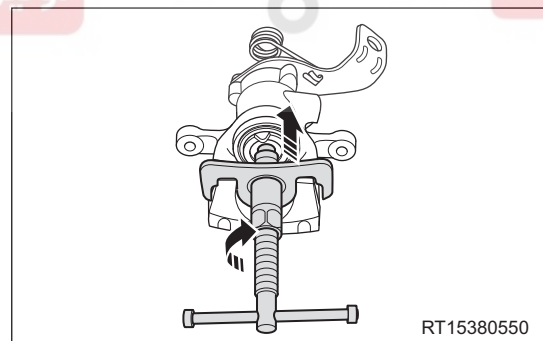
- a. Apply a small amount of grease to the contact surface between guide bolt guide pin and guide pin rubber dust boot (arrow), and securely install them to brake caliper fixing bracket.



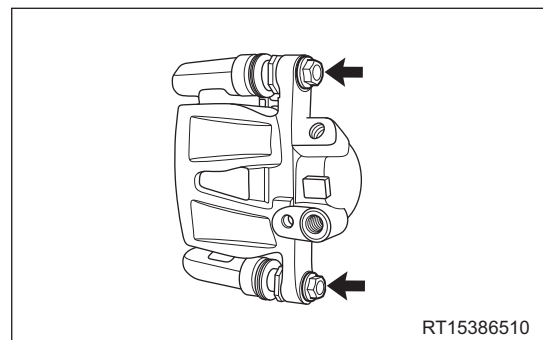
39

7. Install the brake cylinder assembly.

- a. Using brake cylinder piston pressing tool, slightly retract the brake cylinder piston.

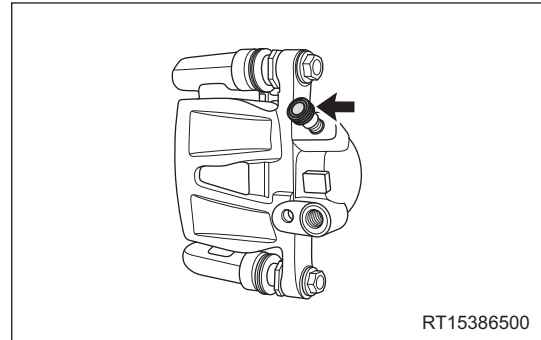


- b. Align brake caliper guide bolts (arrow) with guide pin holes and securely install brake cylinder assembly. (Tightening torque: 22 ~ 32 N·m)



39 - BRAKE

8. Install the bleeder plug (w/bleeder plug cap).
 - a. Securely install bleeder plug (w/bleeder plug cap) (arrow) to rear brake caliper assembly.
(Tightening torque: 9 ~ 11 N·m)

**Installation**

Installation is in the reverse order of removal.

CAUTION

- Make sure to tighten fixing bolt and nut to specified torque during installation.
- Before installing brake linings, completely retract the brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

Rear Brake Hose Assembly

Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

HINT:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Drain the brake fluid (See page 39-15).

CAUTION

- Wash off brake fluid immediately if it comes in contact with any paint surface.

ENVIRONMENTAL PROTECTION

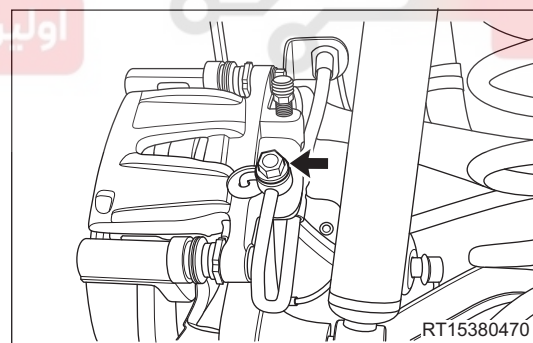
- Drained brake fluid should be well kept in a container. Never discard it at will.

39

2. Remove the rear left brake hose assembly.

- a. Remove coupling bolt and washer (arrow) between rear left brake caliper assembly and rear left brake hose assembly.

(Tightening torque: 27 ± 2 N·m)



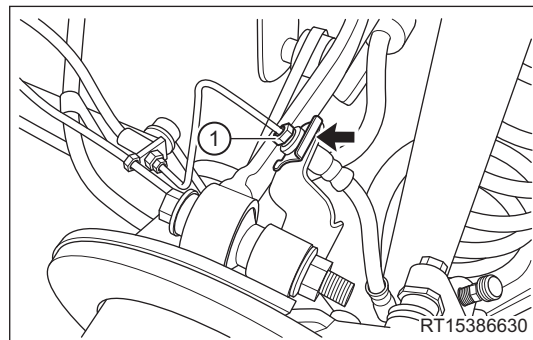
CAUTION

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

39 - BRAKE

- b. Detach fixing clamp (arrow) and loosen coupling bolt (1) between rear left brake hose assembly and rear brake pipe.

(Tightening torque: 18 ± 2 N·m)

**CAUTION**

- DO NOT bend or damage brake tube.
- DO NOT allow any foreign matter such as dirt and dust to enter the brake tube from joint parts.
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.

- c. Remove the rear left brake hose assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten bolts in place.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

PARKING BRAKE

GENERAL INFORMATION	40-3	Parking Brake Control Mechanism Assembly	40-11
Description	40-3	Removal	40-11
Specifications	40-4	Installation	40-12
Tools	40-4	Parking Brake Rear Cable Assembly	40-13
Circuit Diagram	40-5	Removal	40-13
DIAGNOSIS & TESTING	40-6	Installation	40-15
Problem Symptoms Table	40-6	Parking Brake Assembly	40-16
ON-VEHICLE SERVICE	40-7	Removal	40-17
Adjustment	40-7	Disassembly	40-18
Parking Brake Switch Assembly	40-9	Inspection	40-20
On-vehicle Inspection	40-9	Assembly	40-21
Removal	40-9	Installation	40-21
Inspection	40-10		
Installation	40-10		

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



دیجیتال خودرو

40 شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

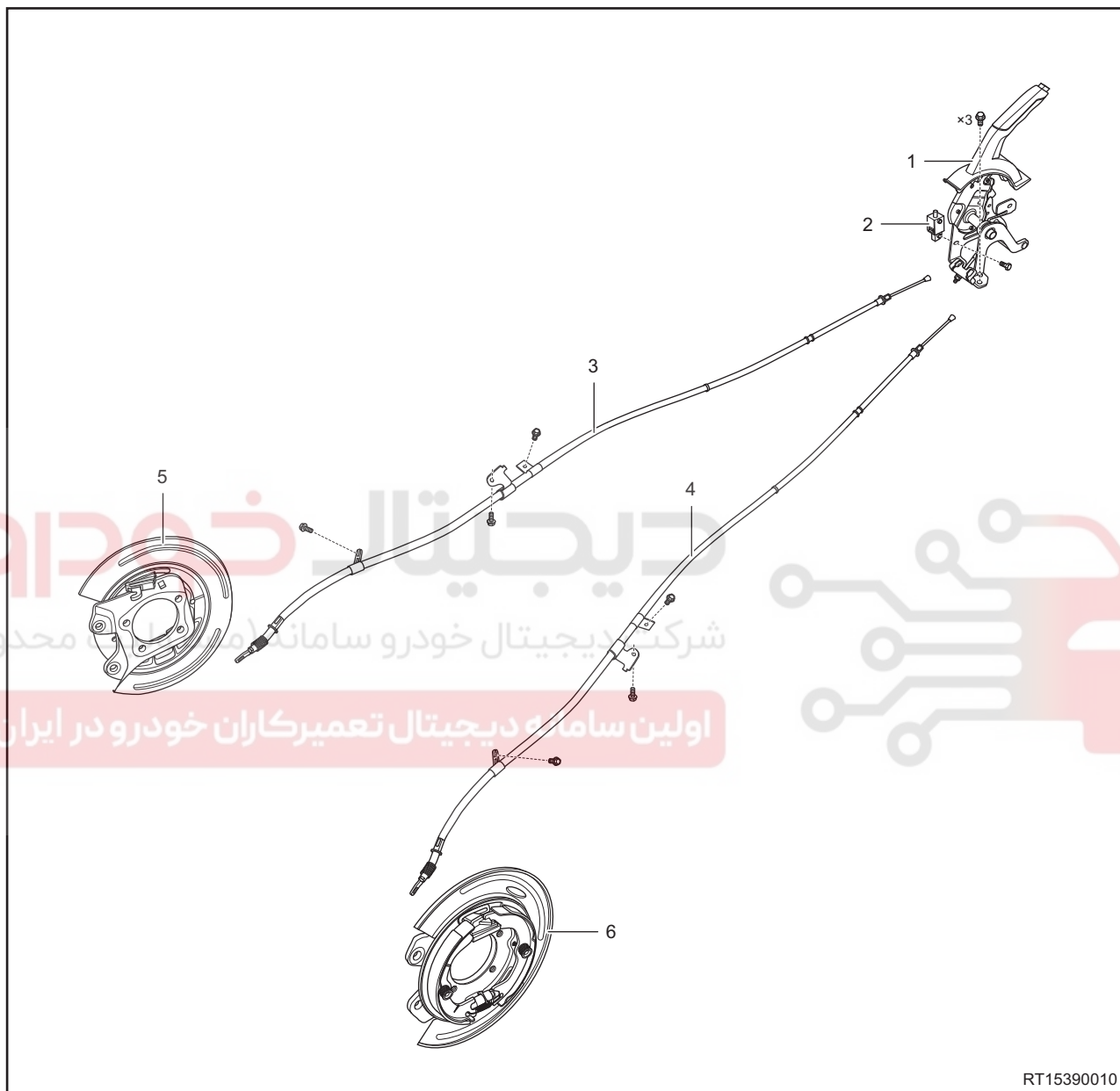
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description

Parking Brake Assembly



40

1 - Parking Brake Control Mechanism Assembly	2 - Parking Brake Switch Assembly
3 - Parking Brake Rear Left Cable Assembly	4 - Parking Brake Rear Right Cable Assembly
5 - Rear Left Brake Assembly	6 - Rear Right Brake Assembly

The vehicle is equipped with a manual-operated parking brake control mechanism assembly, which is mounted between front seats. Tension balance block is built in parking brake control mechanism assembly. Each rear wheel has an individual parking brake rear cable assembly, which is respectively connected with parking brake control mechanism assembly and parking brake assembly. The parking brake cable is made of flexible wire.

40 - PARKING BRAKE

Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10
Coupling Bolt Between Parking Brake Cable and Body	9 ± 1.5
Coupling Bolt Between Parking Brake Control Mechanism Assembly and Body	23 ± 2
Coupling Bolt Between Parking Brake Assembly and Rear Steering Knuckle Assembly	60 ± 5
Coupling Bolt Between Parking Brake Rear Cable Assembly Fixing Bracket and Rear Trailing Arm	23 ± 2
Coupling Bolt Between Parking Brake Rear Cable Pipe Joint Bracket and Rear Steering Knuckle	27 ± 3

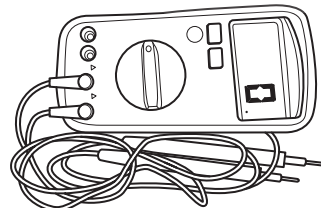
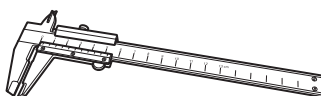
Rear DIH (Drum-in-hat)

Description	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Shoe Lining	2.8	1

Description	Standard Inner Diameter (mm)	Maximum Inner Diameter (mm)
Rear Brake Shoe Lining	186	188

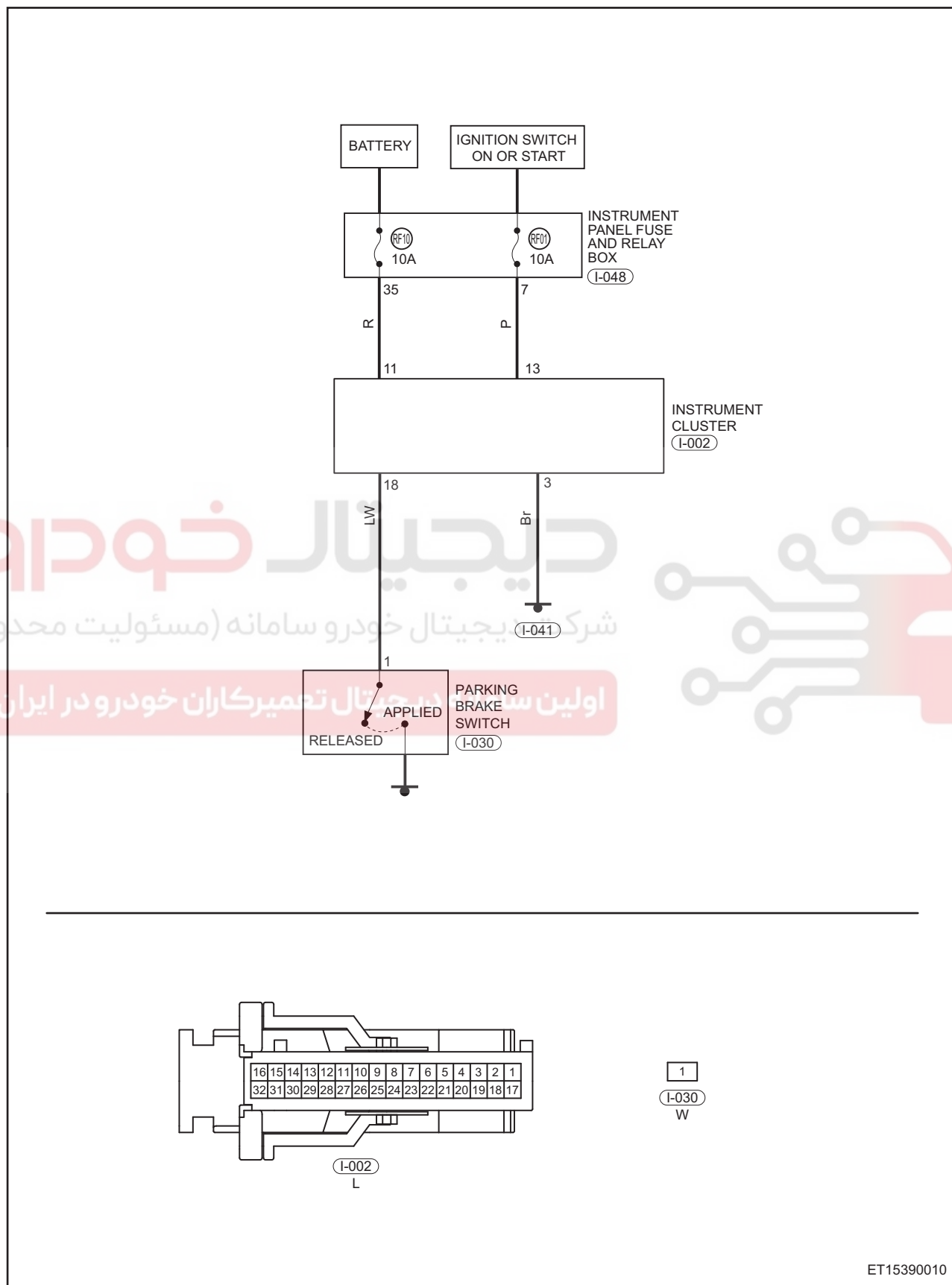
Tools

General Tools

Digital Multimeter	 RCH0000002
Vernier Caliper	 RCH0000019

Circuit Diagram

Parking Brake System



40 - PARKING BRAKE

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

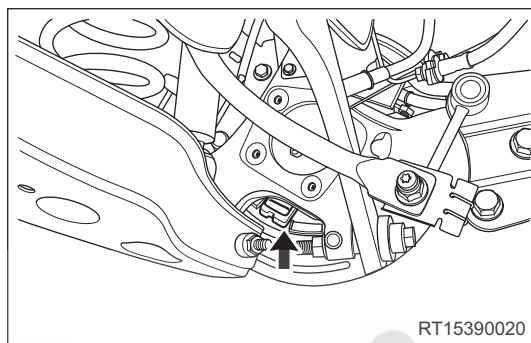
Symptom	Suspected Area	See page
Parking brake catching	Parking brake control mechanism stroke (incorrect)	40-7
	Parking brake shoe clearance (incorrect)	40-7
	Parking brake shoe return tension spring (damaged)	40-18
Abnormal parking brake operation	Parking brake shoe (worn)	40-18
	Rear brake disc (excessively worn)	39-25
	Parking brake control mechanism assembly (improperly fixed)	40-11
	Parking brake control mechanism assembly (catching)	40-11
	Parking brake cable assembly (improperly fixed)	40-13
Brake warning light does not come on when parking brake is applied	Warning light circuit (faulty)	40-9

ON-VEHICLE SERVICE

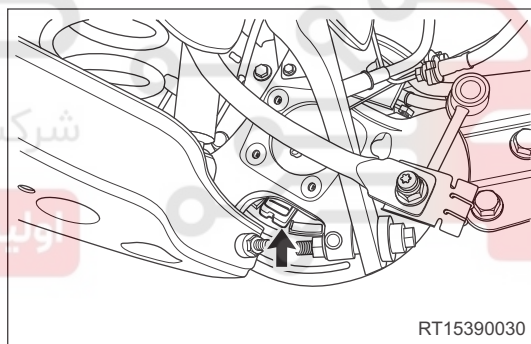
Adjustment

Abnormal parking brake operation may be caused by brake shoe lining wear, incorrect brake shoe clearance adjustment, incorrect parking brake control mechanism stroke or incorrect parking brake component installation. Perform following procedures to adjust parking brake shoe clearance and parking brake control mechanism stroke:

1. Support and raise vehicle to a proper height.
2. Remove the rear wheel (See page 37-7).
3. Adjust the parking brake shoe clearance:
 - a. Fully release the parking brake control mechanism.
 - b. Using a flat tip screwdriver, pry off brake shoe adjusting hole plug (arrow).



- c. Rotate brake shoe clearance adjustment mechanism assembly clockwise or counterclockwise to adjust parking brake shoe clearance (arrow).

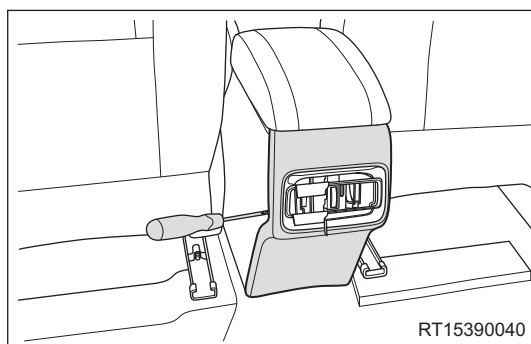


40

- d. Try to rotate rear brake disc by hand to confirm that brake disc rotates freely. Check that there is no brake catching for brake shoe.

4. Adjust the parking brake control mechanism stroke:

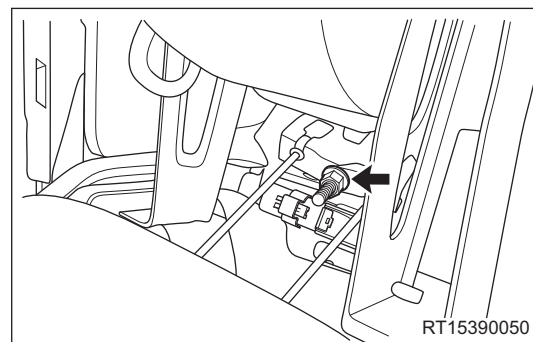
- a. Remove the auxiliary fascia console rear cover assembly.



- b. Fully release the parking brake control mechanism.

40 - PARKING BRAKE

- c. Rotate parking brake control mechanism adjusting nut (arrow), until parking brake control mechanism stroke is correct.



- d. Correct judgment method: After adjustment, completely release parking brake control mechanism and rotate rear wheel by hand.

OK: Rear wheel can rotate freely without dragging.

Pull up parking brake control mechanism until a click sound is heard. There is resistance when rotating rear wheel by hand. Pull up parking brake control mechanism until 2 or 3 click sounds are heard and rear wheel cannot rotate.

- e. When operating parking brake control mechanism, check that brake warning light illuminates at the first click.

OK: Parking brake warning light always illuminates at the first click.

- f. Followings should be met after adjusting parking brake control mechanism stroke:

Parking brake force should be less than 350 N when vehicle is parking on a ramp with a slope of 20 %.

Parking brake stroke is 4 to 7 teeth when vehicle is driving on general road.

- g. If result is not as specified, repeat above procedures until parking brake control mechanism stroke is proper.

5. Install the rear wheel (See page 37-7).

Parking Brake Switch Assembly

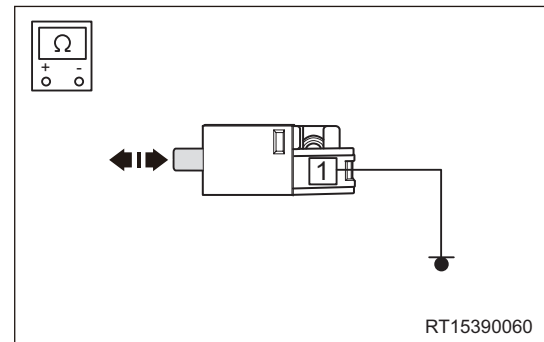
On-vehicle Inspection

1. Disconnect parking brake switch assembly connector, and check continuity of parking brake switch assembly with ohm band of digital multimeter as shown in table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
Terminal 1 - Body ground	Parking brake applied (switch pin released)	Continuity
	Parking brake released (switch pin pushed)	No continuity

If result is not as specified, replace parking brake switch assembly.



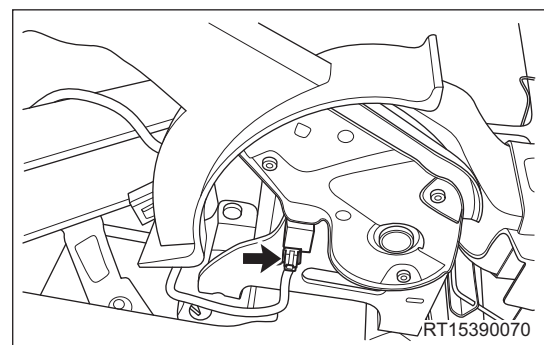
Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

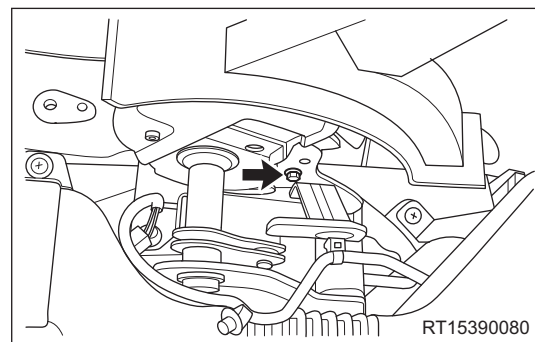
40

1. Fix the wheel assembly.
2. Remove the auxiliary fascia console assembly (See page 60-8).
3. Remove the parking brake switch assembly.
 - a. Disconnect parking brake switch assembly wire harness connector (arrow) as shown in illustration.



40 - PARKING BRAKE

- b. Loosen fixing screw (arrow) from parking brake switch assembly.



- c. Remove the parking brake switch assembly.

Inspection

1. Check the parking brake switch assembly.
 - a. Check parking brake switch assembly for wear or breakage. Replace parking brake switch assembly as necessary.
 - b. Check parking brake switch assembly compression spring for damage or weak elasticity. Replace parking brake switch assembly as necessary.

Installation

Installation is in the reverse order of removal.

دیجیتال خودرو

40 شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



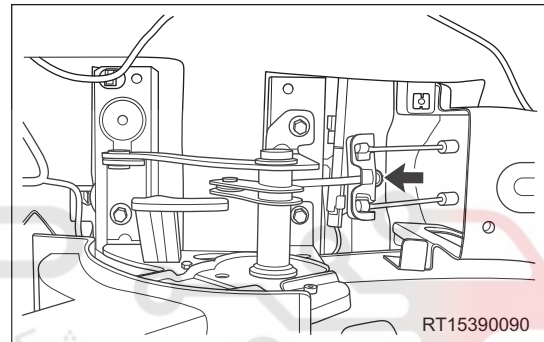
Parking Brake Control Mechanism Assembly

Removal

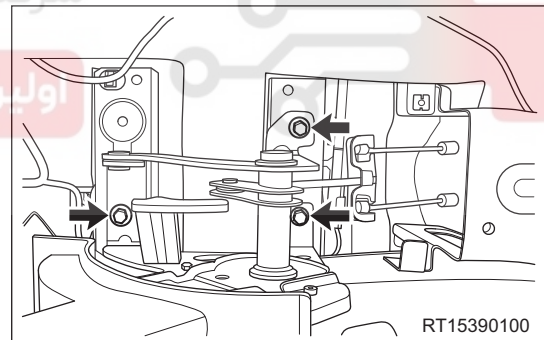
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

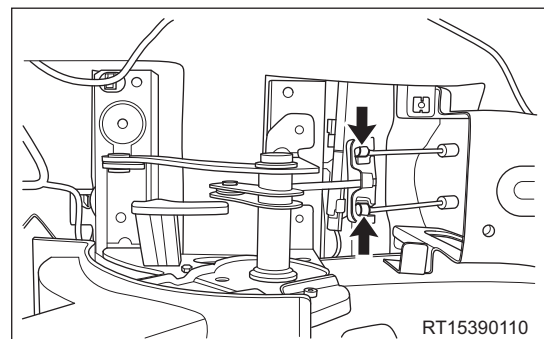
1. Fix the wheel assembly.
2. Remove the auxiliary fascia console assembly (See page 60-8).
3. Remove the parking brake switch assembly (See page 40-9).
4. Remove the parking brake control mechanism assembly.
 - a. Fully release the parking brake control mechanism.
 - b. Loosen locking nut (arrow) from parking brake control mechanism assembly to release tension of parking brake cable assembly.
(Tightening torque: $4.0 \pm 0.5 \text{ N}\cdot\text{m}$)



- c. Remove 3 coupling bolts (arrow) between parking brake control mechanism assembly and body.
(Tightening torque: $23 \pm 2 \text{ N}\cdot\text{m}$)



- d. Disengage parking brake rear cable assembly from grooves (arrow) on both rear sides of parking brake control mechanism assembly.



- e. Remove the parking brake control mechanism assembly.

40 - PARKING BRAKE

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling nuts to specified torque.

HINT:

Be sure to check parking brake control mechanism stroke, after installing parking brake control mechanism assembly. Adjust parking brake control mechanism stroke to proper position by adjusting parking brake control mechanism locking nut if necessary.

دیجیتال خودرو

40 شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Parking Brake Rear Cable Assembly

Removal

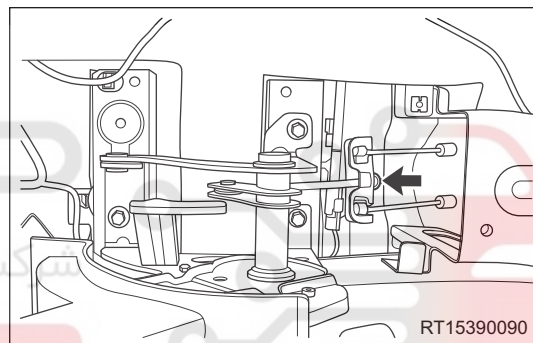
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

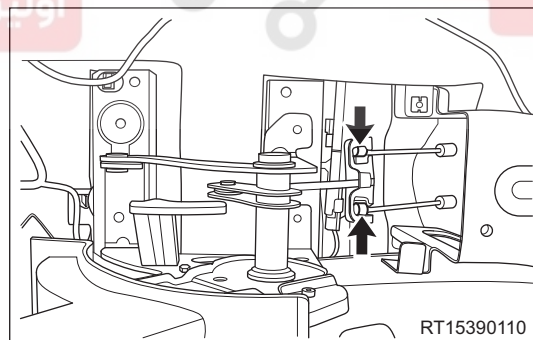
HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the rear left wheel (See page 37-7).
 2. Remove the auxiliary fascia console assembly (See page 60-8).
 3. Remove the parking brake rear cable assembly.

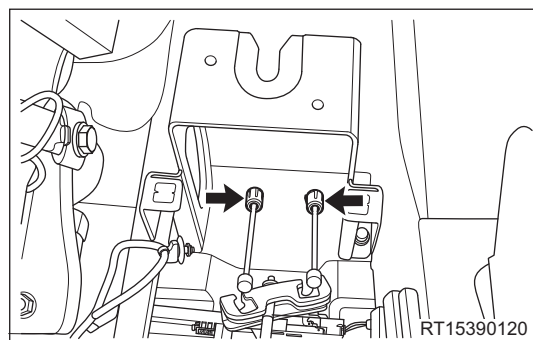
- a. Fully release the parking brake control mechanism.
- b. Loosen locking nut (arrow) from parking brake control mechanism assembly to release tension of parking brake cable assembly.
(Tightening torque: $4.0 \pm 0.5 \text{ N}\cdot\text{m}$)



- c. Disengage parking brake rear cable assembly from grooves (arrow) on rear side of parking brake control mechanism assembly.

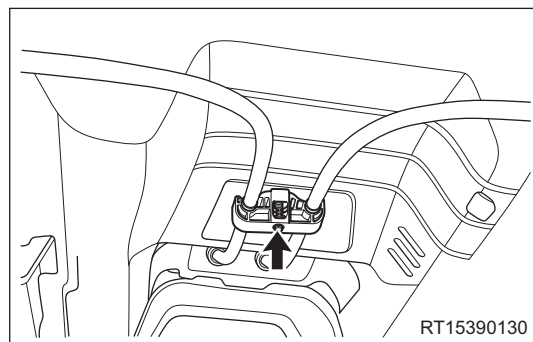


- d. Disengage quick connectors on front end of cable from body hole.

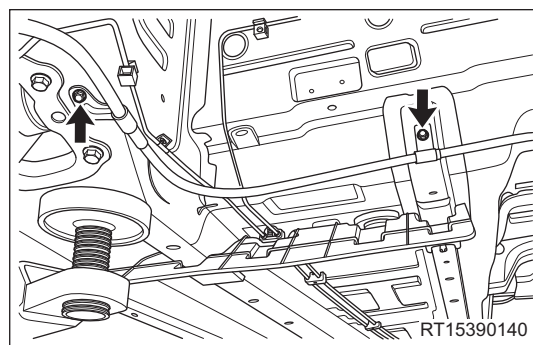


40 - PARKING BRAKE

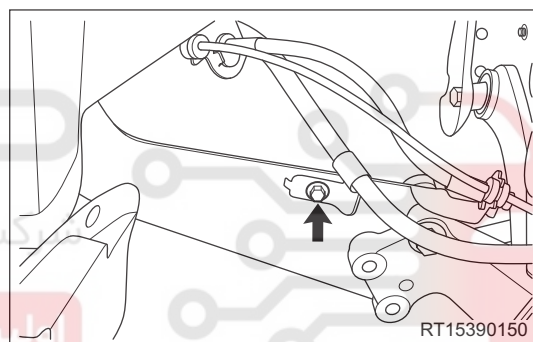
- e. Disengage cable tube clamp from body bolt, and disengage right cable from tube clamp of left cable (arrow).



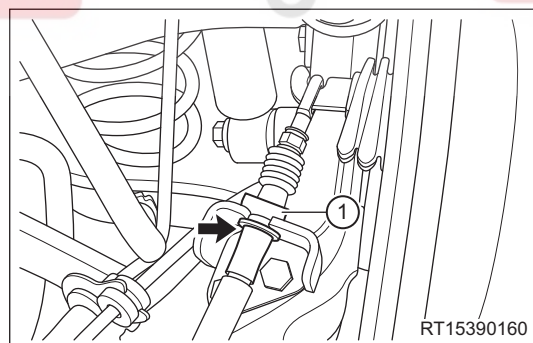
- f. Remove coupling bolts (arrow) between cable and body lower side rail and body rear side rail separately. (Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$)



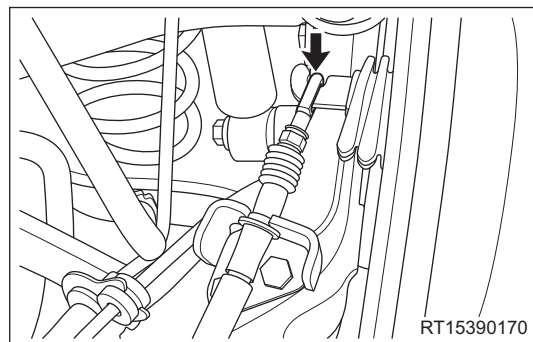
- g. Remove coupling bolt (arrow) between cable and suspension trailing arm. (Tightening torque: $27 \pm 3 \text{ N}\cdot\text{m}$)



- h. Remove locating plate (1) of cable joint and bracket hole, and disengage cable joint from bracket hole (arrow).



- i. Disengage parking brake cable from parking pulling arm hook of brake (arrow).



4. Remove the parking brake rear cable assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling bolts and nuts to specified torque.

HINT:

Parking brake should be adjusted after replacing parking brake shoe or parking brake cable assembly. Check if parking brake functions properly after adjustment. Check the parking brake control mechanism stroke. Release parking brake control mechanism and check if rear wheels rotate freely. If wheels are difficult to rotate freely, repeat adjustment procedure. After driving for a period of time, parking brake control mechanism stroke should be readjusted due to wear of rear brake shoe linings.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

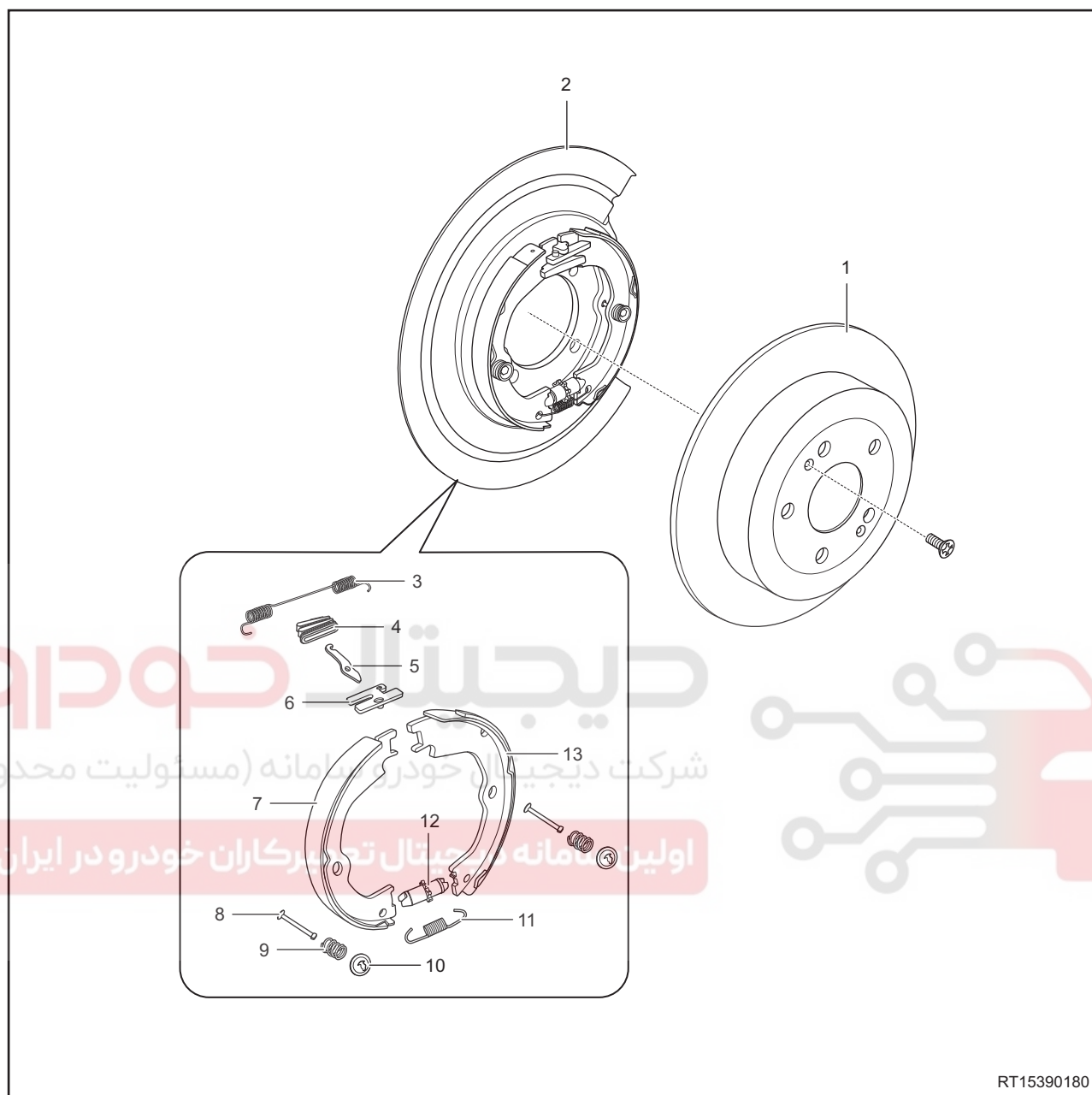
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



40

40 - PARKING BRAKE

Parking Brake Assembly



1 - Rear Brake Disc	2 - Parking Brake Assembly
3 - Brake Shoe Return Tension Spring (Upper)	4 - Parking Pulling Arm Dust Boot
5 - Parking Pulling Arm	6 - Parking Push Rod
7 - Left Parking Brake Shoe Lining	8 - Compression Spring Tie Rod
9 - Brake Shoe Compression Spring	10 - Compression Spring Seat
11 - Brake Shoe Return Tension Spring (Lower)	12 - Brake Shoe Clearance Adjustment Mechanism Assembly
13 - Right Parking Brake Shoe Lining	

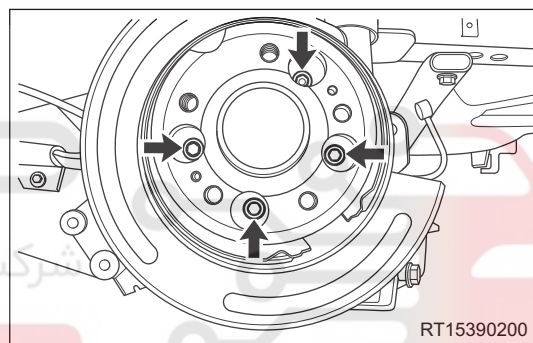
Removal

CAUTION

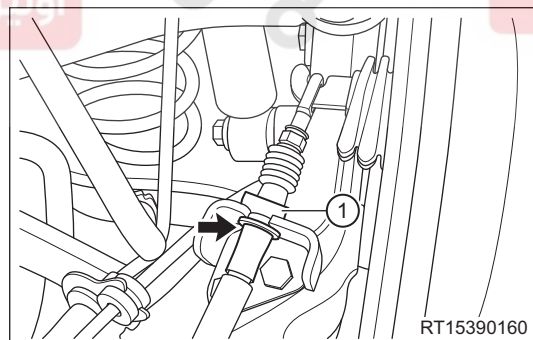
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

HINT:

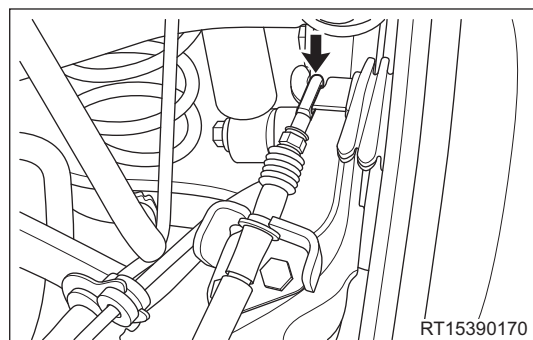
- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- 1. Remove the rear left wheel (See page 37-7).
- 2. Remove the rear left brake caliper assembly (See page 39-38).
- 3. Remove the rear left brake disc (See page 39-38).
- 4. Remove the rear left hub bearing assembly (See page 35-20).
- 5. Remove the left parking brake assembly.
 - Fully release the parking brake control mechanism.
 - Remove 4 coupling bolts (arrow) between left parking brake assembly and rear steering knuckle assembly. (Tightening torque: $60 \pm 5 \text{ N}\cdot\text{m}$)



- Remove locating plate (1) of cable joint and bracket hole, and disengage cable joint (arrow) from bracket hole.



- Disengage parking brake cable (arrow) from parking pulling arm hook of brake.

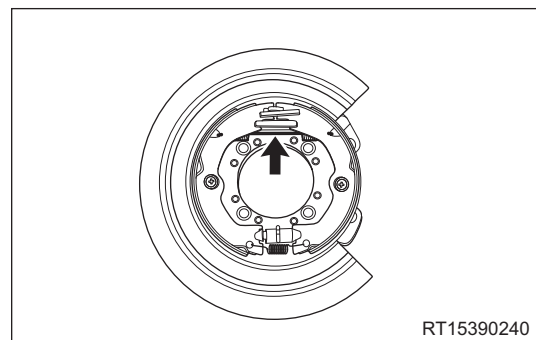


- Remove the left parking brake assembly.

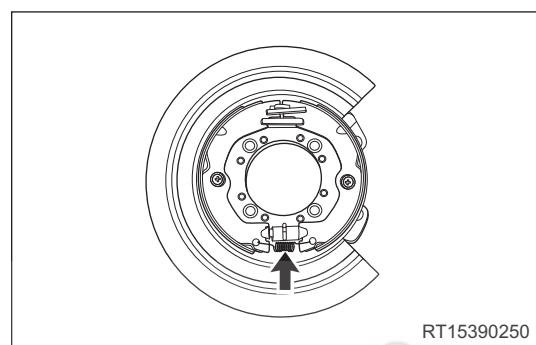
40 - PARKING BRAKE

Disassembly

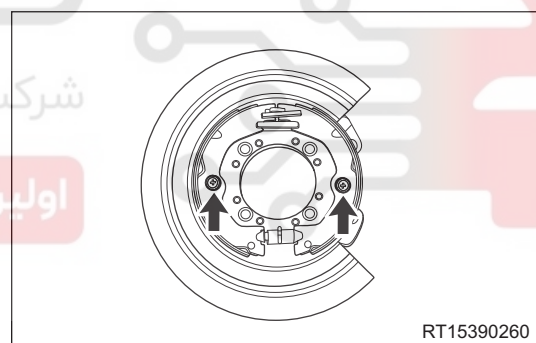
1. Remove the brake shoe return tension spring.
 - a. Using needle-nose pliers, carefully remove the brake shoe upper return tension spring (arrow).



- b. Using needle-nose pliers, carefully remove the brake shoe lower return tension spring (arrow).

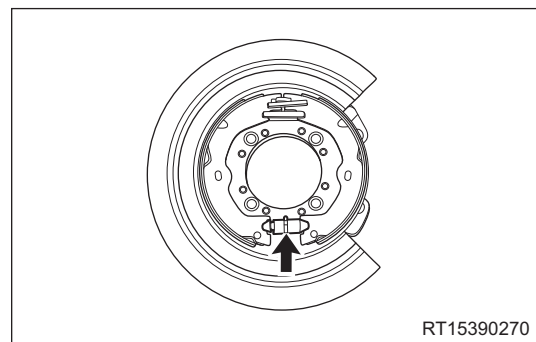


2. Remove the brake shoe stopper spring set.
 - a. Using needle-nose pliers, press brake shoe compression spring and rotate compression spring tie rod to remove stopper spring sets (arrow) on both sides.



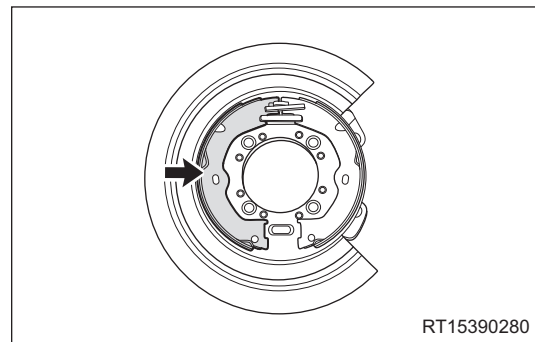
3. Remove the brake shoe clearance adjustment mechanism assembly.

- a. Disengage brake shoe linings on both sides and remove clearance adjustment mechanism assembly (arrow) as shown in illustration.

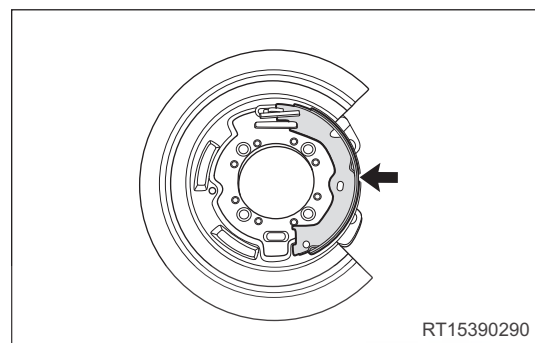


40 - PARKING BRAKE

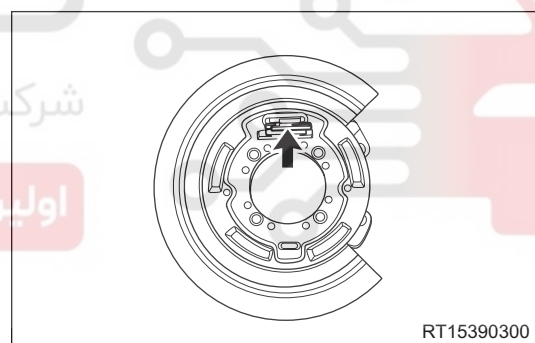
4. Remove the left brake shoe lining.
- a. Disengage left brake shoe lining (arrow) from parking push rod as shown in illustration.



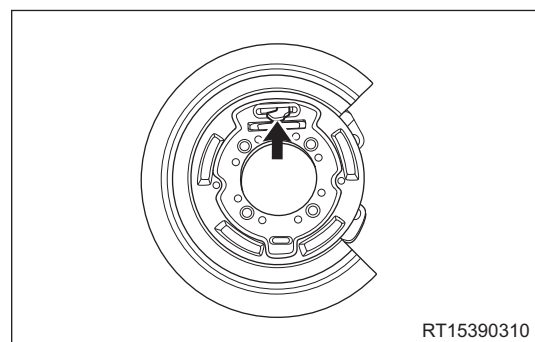
5. Remove the right brake shoe lining.
- a. Disengage right brake shoe lining (arrow) from parking push rod as shown in illustration.



6. Remove the parking push rod.
- a. Disengage parking push rod (arrow) from parking pulling arm as shown in illustration.

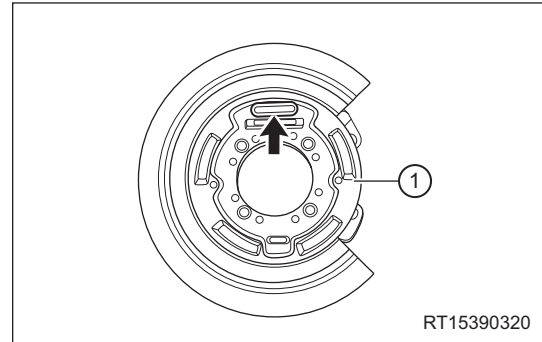


7. Remove the parking pulling arm.
- a. Remove parking pulling arm (arrow) from parking pulling arm dust boot as shown in illustration.



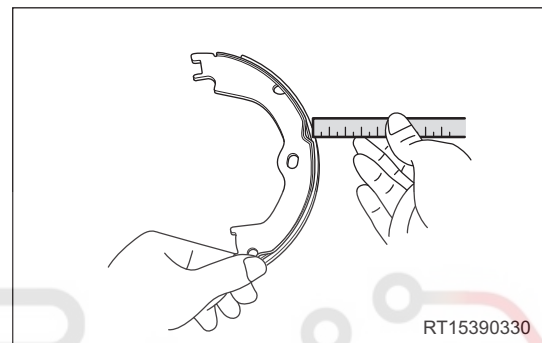
40 - PARKING BRAKE

8. Remove the parking pulling arm dust boot.
 - a. Disengage parking pulling arm dust boot (arrow) from brake caliper mounting board assembly (1) as shown in illustration.



Inspection

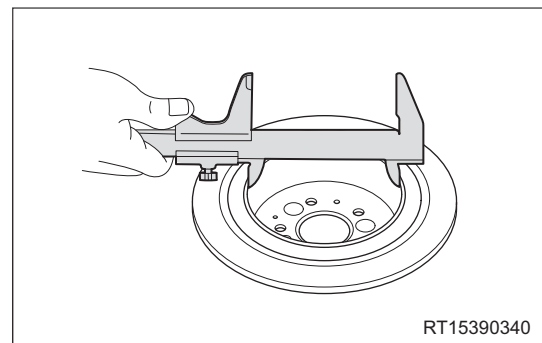
1. Check the thickness of brake shoe lining.
 - a. Using a straightedge, measure the thickness of brake shoe lining as shown in illustration.
Standard thickness: 2.8 mm
Minimum thickness: 1 mm
 - b. If thickness of brake shoe lining is equal to or less than minimum value, replace brake shoe lining.



CAUTION

- Replace brake shoe linings in pairs. DO NOT replace it alone.

2. Check the rear brake disc inner diameter.
 - a. Using a vernier caliper or equivalent, measure rear brake disc inner diameter.
Standard inner diameter: 186 mm
Maximum inner diameter: 188 mm



- b. If rear brake disc inner diameter is more than maximum value, replace rear brake disc.
3. Check other components.
 - a. Check if brake shoe return tension spring (upper) is broken, bent, damaged or weak in elasticity. Replace as necessary.
 - b. Check if brake shoe return tension spring (lower) is broken, bent, damaged or weak in elasticity. Replace as necessary.
 - c. Check if parking push rod and pulling arm are broken, bent or damaged. Replace as necessary.
 - d. Check if parking pulling arm dust boot is worn, cracked or dirty. Replace as necessary.

- e. Check if brake shoe stopper spring set is broken, bent, damaged or weak in elasticity. Replace as necessary.
- f. Check if brake shoe clearance adjustment mechanism assembly is struck, damaged, or slides off. Replace as necessary.

Assembly

Assembly is in the reverse order of disassembly.

CAUTION

- Adjust brake shoe clearance to the proper position, by brake shoe clearance adjustment mechanism assembly, after installation is completed.

Installation

Installation is in the reverse order of removal.

CAUTION

- Make sure to tighten fixing bolts to specified torque during installation.
- Make sure to install fixing clamps in place.

HINT:

Parking brake should be adjusted after replacing parking brake shoe. Check if parking brake functions properly after adjustment. Check the parking brake control mechanism stroke. Release parking brake control mechanism and check if rear wheels rotate freely. If wheels are difficult to rotate freely, repeat adjustment procedure. After driving for a period of time, parking brake control mechanism stroke should be readjusted due to wear of rear brake shoe linings.

- MEMO -

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

