

BRAKE SYSTEM

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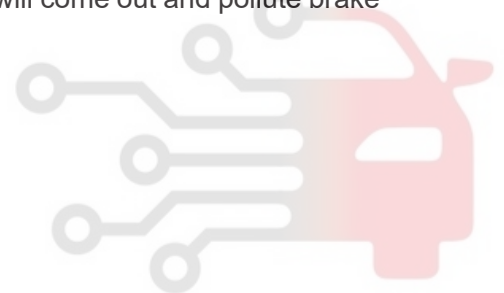
BRAKE CONTROL SYSTEM

Warnings and precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

1. When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.
2. Brake control system must be repaired by professional technicians who have trained and mastered maintenance skills and only use original parts for replacement.
3. DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.
4. After removing brake line, perform sealing treatment to prevent foreign matter from entering.
5. DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.
6. When connecting ESP module brake line, it must be connected properly. Incorrect connection may cause serious accidents.
7. After removing brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

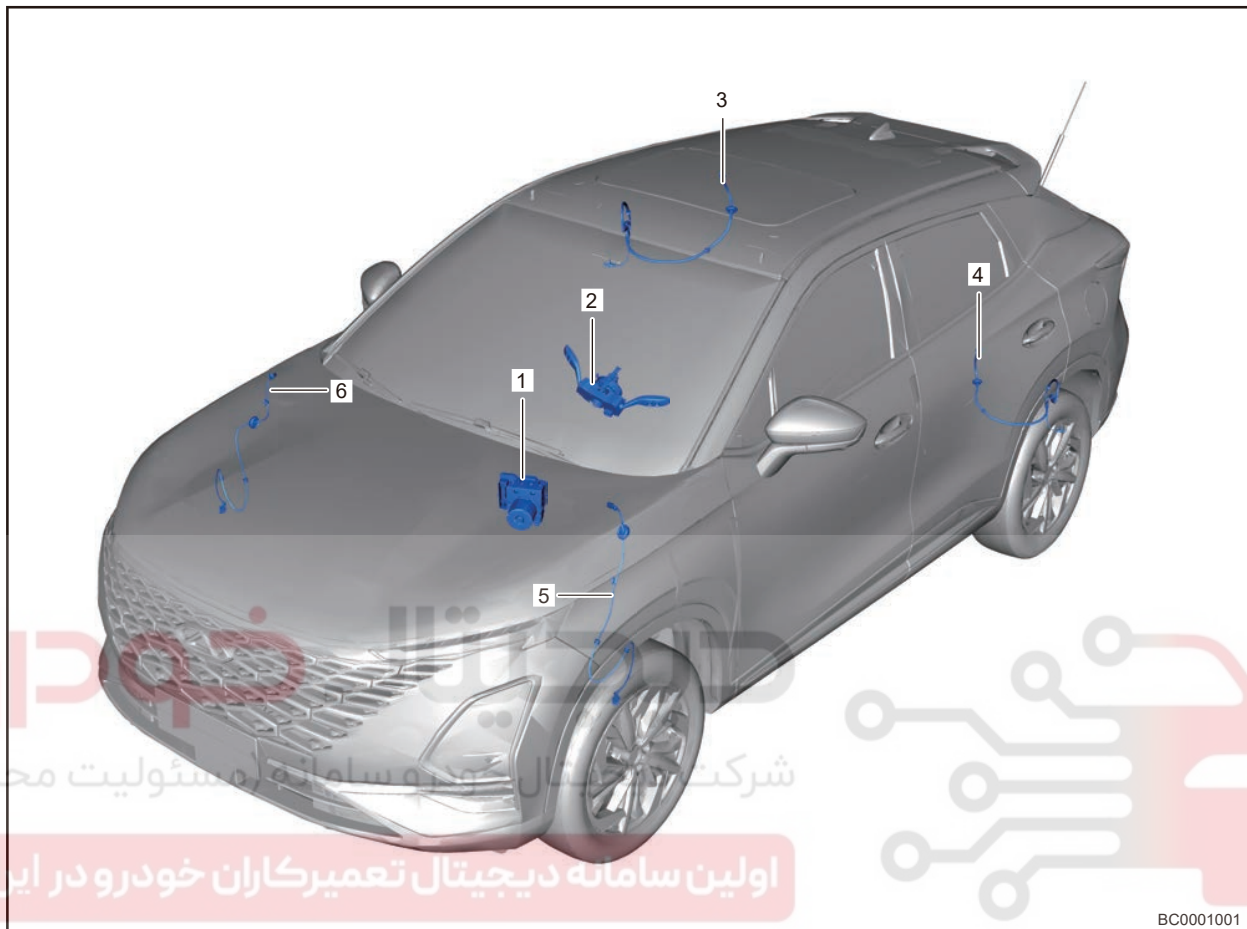


شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

System Overview

System Components Diagram



BC0001001

1	EPB/ESP Control Module Assembly	4	Rear Left Wheel Speed Sensor with Caliper Wire Harness Assembly
2	Steering Angle Sensor	5	Front Left Wheel Speed Sensor
3	Rear Right Wheel Speed Sensor with Caliper Wire Harness Assembly	6	Front Right Wheel Speed Sensor

Brake control system equipped on this model is ABS (Anti-lock Brake System) + EBD (Electronic Brake Force Distribution), ESP (Body Electronic Stability Program). With HDC (Hill Descent Control). It mainly consist of following components and functions:

- EPB/ESP control module assembly (hydraulic control module and electronic control module).
- Wheel speed sensors (each wheel has one sensor).
- Steering angle sensor (ESP).
- Yaw rate sensor (built in ESP control module assembly).
- BAS is English abbreviation of brake assist system, which functions as extension of ESP system. In emergency situation, drivers always apply braking timely, but not apply maximum braking force generally, thus extending brake distance. When this occurs, brake assist system will operate: when driver depresses brake pedal quickly in emergency with insufficient depressing force, BAS will increase brake pressure to maximum quickly, thus brake distance will be shortened by anti-lock brake system quickly and effectively.

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- HHC is English abbreviation of Hill-start Assist Control System. When vehicle is static, HHC will determine if vehicle is on slope via longitudinal acceleration sensor. When vehicle starts to up from resting state (uphill forward or reversing), HHC will enter operating state automatically. When starting off, system will keep previous brake pressure for 1 to 2 seconds after driver releases brake pedal, make sure vehicle is still stopped. Brake pressure will decrease when drive torque increases, thus avoiding an accident caused by vehicle sliding rearward during starting off on a slope.

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

- Improving vehicle driving stability.
- Improving vehicle steering ability.
- Maintaining optimal brake pressure.
- Shortening brake distance efficiently.

EPB/ESP Operation

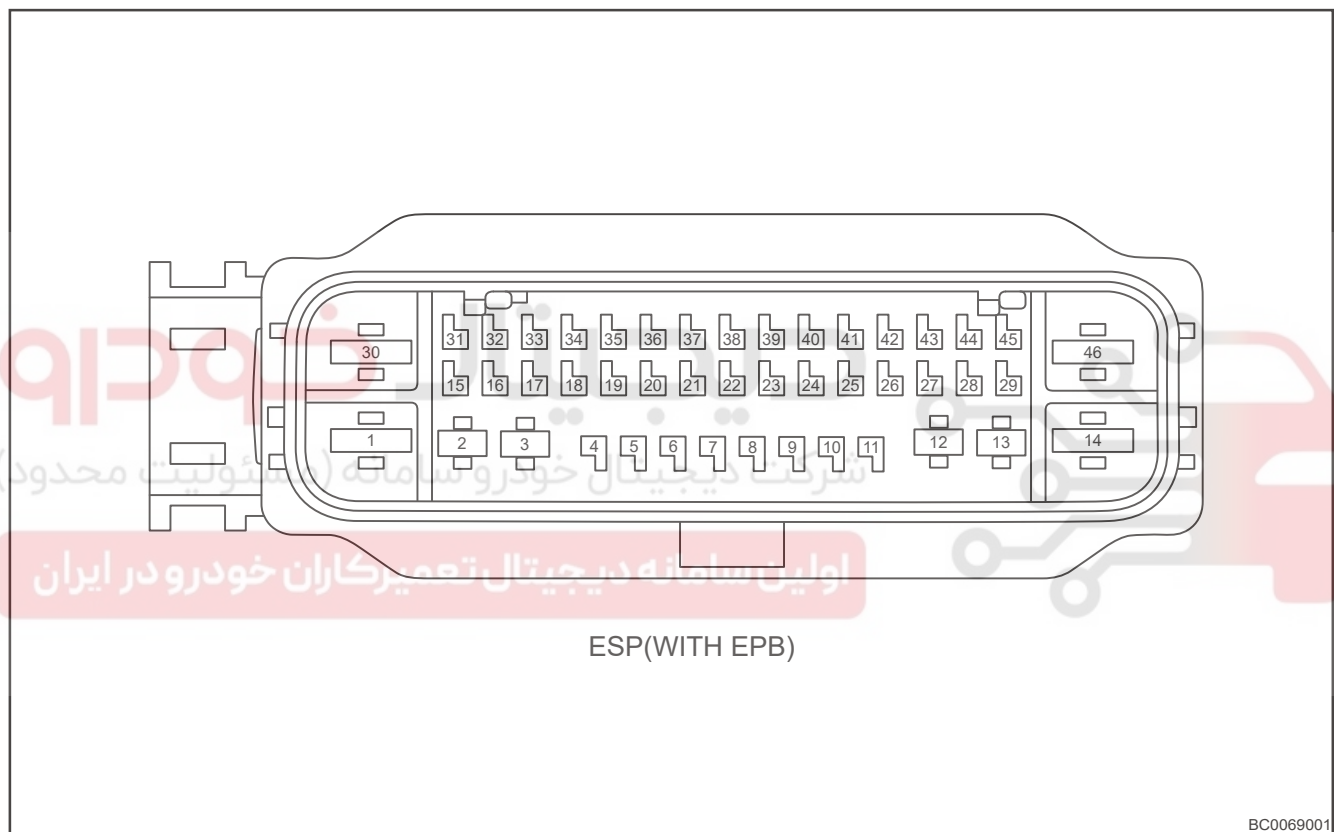
1. ABS Braking

- If ABS system detects that wheels may be locked when applying brake, brake system will enter ABS braking mode. During braking, EPB/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.
- There are some operating symptoms of EPB/ESP, but in fact they are normal.
 - If electronic control module is malfunctioning, fail-safe function will be activated, EPB/ESP system will not operate and EPB/ESP warning light will come on.
 - After vehicle is powered on or engine is started, short “buzz” sound can be heard. This is normal sound from EPB/ESP self-check.
 - Motor, solenoid valve, and return pump movement in hydraulic unit will cause noise when EPB/ESP is operating normally, but this is normal.
 - Brake pedal may vibrate slightly and mechanical noise can be heard during EPB/ESP operation, but this is normal.
 - Bumping sound between suspension and vehicle body can be caused by sudden brake.

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Hint:

- When HDC system is operating, ABS will be activated automatically if wheel is locked.
- When HDC system is operating, brake force will be distributed to wheel with higher attachment coefficient if any wheel loses contact with ground.
- When HDC system is operating, for safety, driver must make preparations to control vehicle any time. Because system may be overheating or ESP system malfunction will occur except it is locked by button. At this time system will exit control automatically, driver needs to control speed timely instead of HDC.

System Circuit Diagram**EPB/ESP Control Module Assembly Terminal Definition**

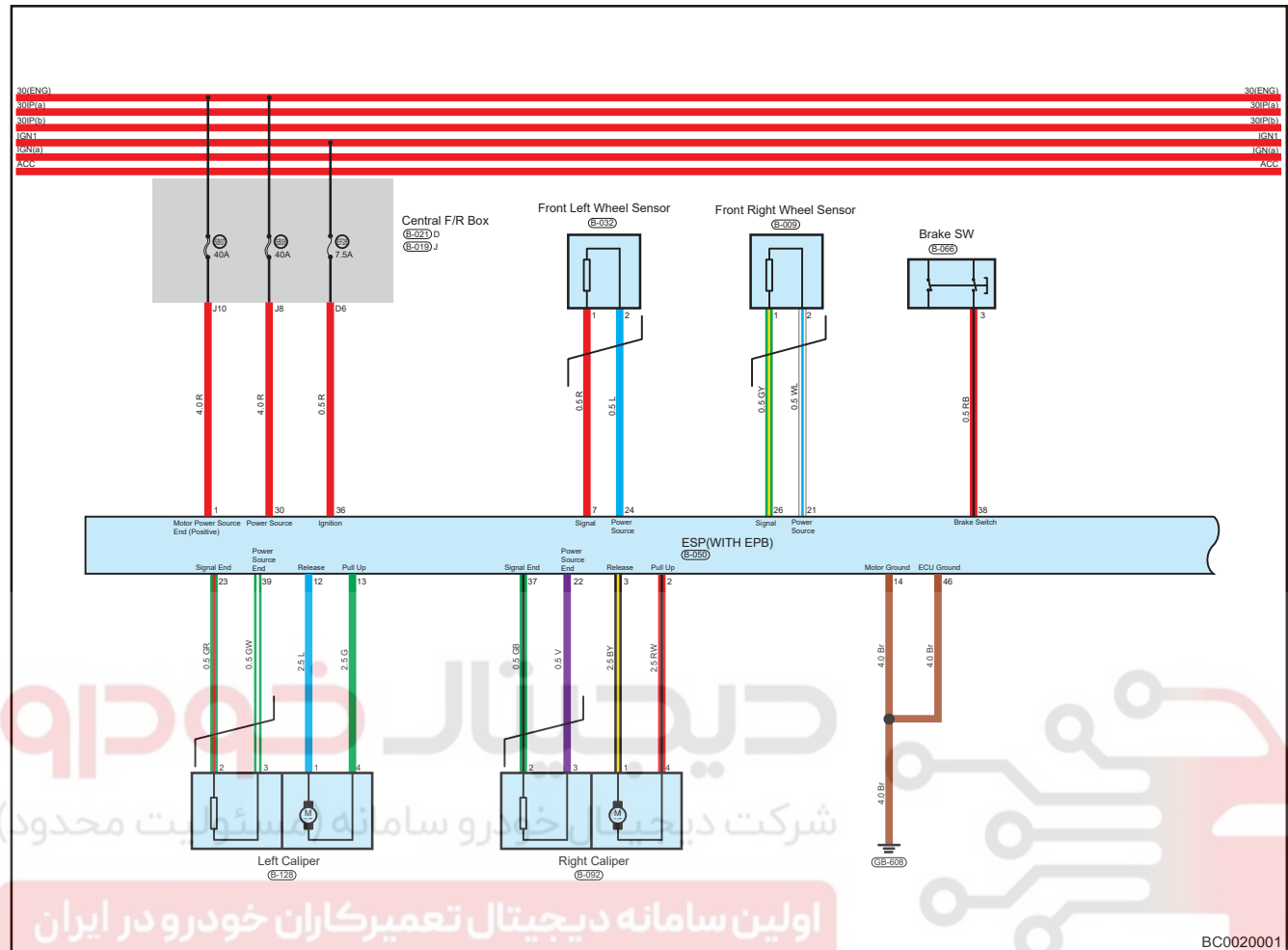
Pin	Definition	Pin	Definition
1	Motor Power Supply End (Positive)	2	Right Caliper Motor
3	Right Caliper Motor	4	-
5	P-CAN H	6	-
7	Wheel Speed Sensor Signal End (- Front Left)	8	AUTO HOLD Switch Indicator
9	-	10	-
11	C-CAN H	12	Left Caliper Motor
13	Left Caliper Motor	14	Motor Ground End
15	EPB Switch 3	16	EPB Switch 6

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Pin	Definition	Pin	Definition
17	-	18	EPB Switch Indicator
19	P-CAN L	20	-
21	Wheel Speed Sensor Supply End (- Front Right)	22	Front Right Wheel Speed Sensor Power Source End
23	Front Left Wheel Speed Sensor Power Source End	24	Wheel Speed Sensor Supply End (- Front Left)
25	C-CAN L	26	Wheel Speed Sensor Signal End (- Front Right)
27	-	28	-
29	-	30	Valve Relay Power Source End
31	EPB Switch 1	32	EPB Switch 4
33	-	34	-
35	-	36	Ignition Coil
37	Right Wheel Speed Sensor Signal End	38	Brake SW
39	Left Wheel Speed Sensor Power Supply End	40	-
41	AUTO HOLD Switch	42	-
43	-	44	-
45	-	46	ECU Ground End

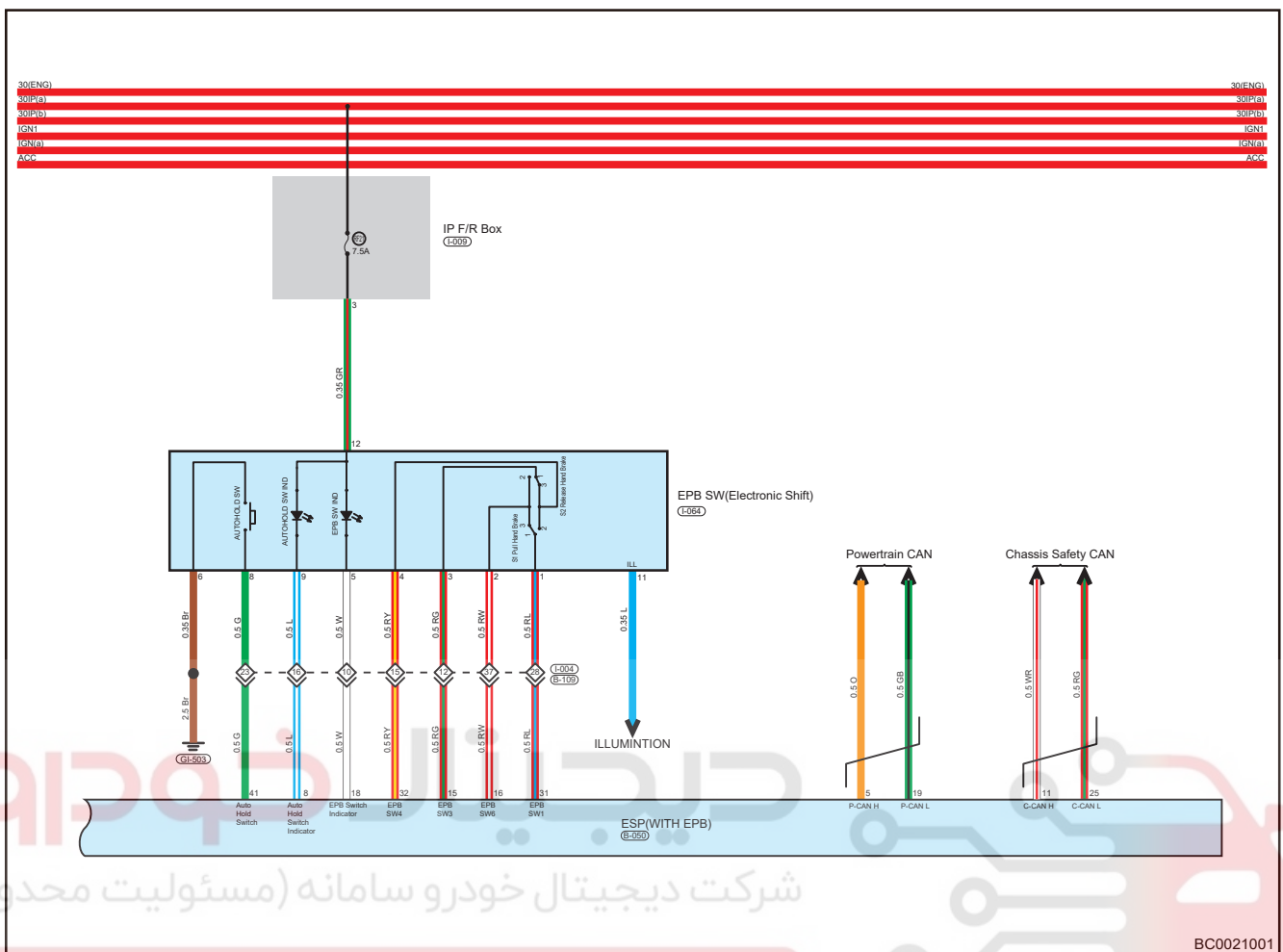
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Circuit Diagram



BC0020001

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BC0021001

Diagnosis & Testing

Problem Symptoms Table

Hint:

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

Symptom	Suspected Area
When turning ENGINE START STOP switch ON, EPB/ESP warning light does not come on	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Instrument cluster
EPB/ESP warning light remains on	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Instrument cluster
EPB/ESP operation is abnormal	Wheel speed sensor (damaged, improperly installed, foreign matter attached)

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Symptom	Suspected Area
	Hub ring gear (damaged, improperly installed, foreign matter attached)
	Brake line (blocked or leaked)
	Wire harness or connector
	EPB/ESP Control Module Assembly
Communication with EPB/ESP control module assembly cannot be performed	Fuse
	Wire harness or connector
	EPB/ESP Control Module Assembly
	Diagnostic tester

Problem Repair (No DTC)

If there is a problem in brake system, but no DTC is stored in EPB/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, brake pedal over-travel or even ineffective braking).
2. Using inferior brake fluid (it can result in corrosion of brake line and EPB/ESP 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, brake pedal over-travel).
6. Brake booster malfunction (it may result in weak or hard braking, brake pedal over-travel or even ineffective braking).
7. Wrong brake line connection (it may result in EPB/ESP braking performance decreasing, drift, long braking distance etc.).

Hint:

- Note: No power supply to EPB/ESP or abnormally interrupted power supply will cause EPB/ESP warning light remaining on without storing DTC.
- Troubleshooting method: check corresponding component according to the malfunction, repair or replace as necessary.

Diagnostic Help

1. Connect diagnostic tester (the latest software) to diagnostic connector, and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of brake control system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all ESP wire harness system grounds related to the latest DTC.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent Troubleshooting

If malfunction is intermittent, perform the followings:

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1. Check if connector is loose.
2. Check if wire harness is worn, pierced, pinched or partially broken.
3. Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
4. If possible, try to duplicate the conditions under which DTC was set.
5. Look for data that has changed or DTC to reset during wiggling test.
6. Look for broken, bent, protruded or corroded terminals.
7. Inspect the mounting areas of brake control system, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
8. Check and clean all wire harness connectors and ground parts related to DTC.
9. Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to normal work of circuit, and they 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 operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously 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 contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the ESP.

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

Next

2	Check battery voltage
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Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

NG

Replace battery

OK

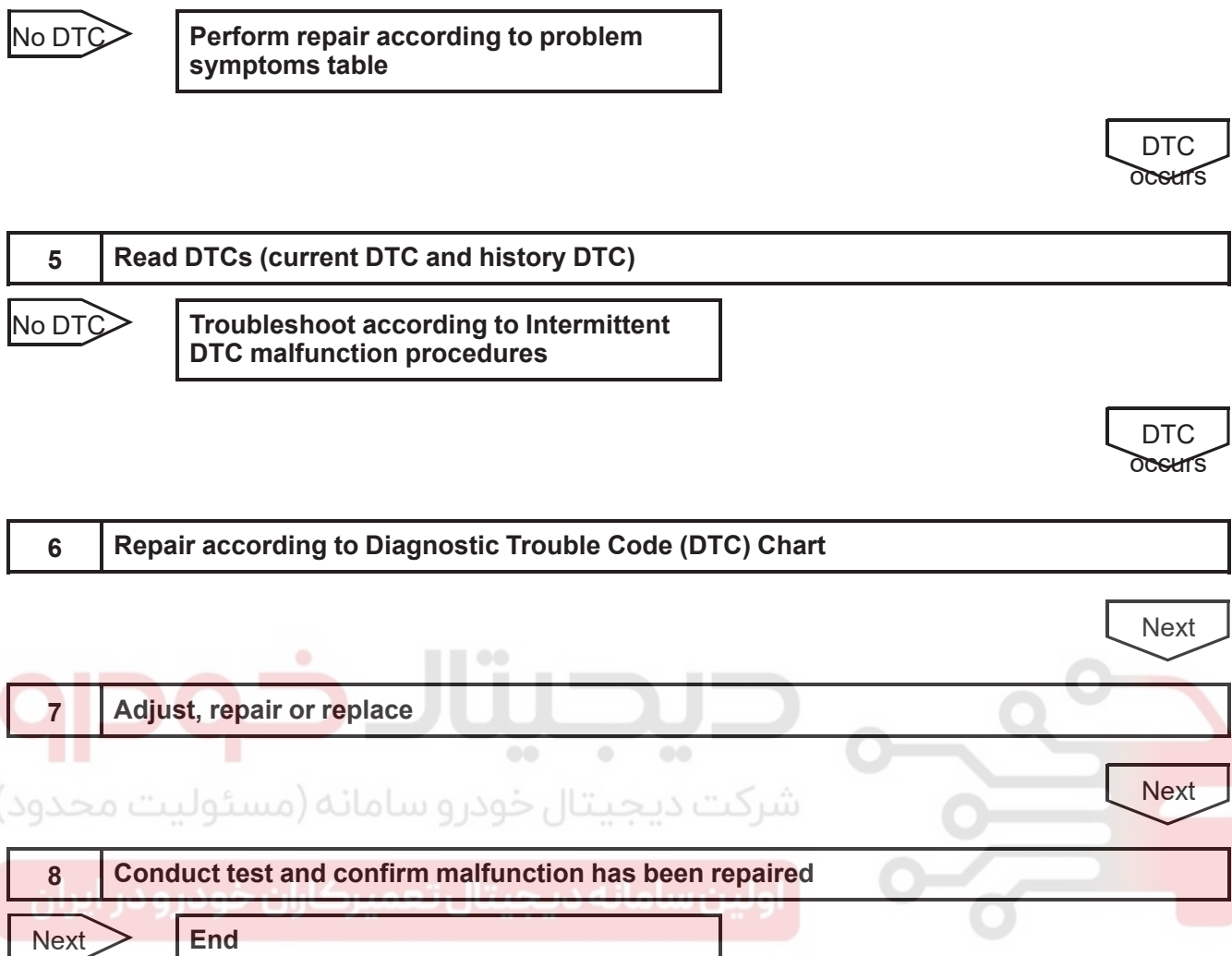
3	Customer problem analysis
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Next

4	Read DTCs
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**DTC Confirmation Procedure**

Confirm that battery voltage is over 12V before performing following procedures

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software) to diagnostic connector, and make it communicate with vehicle electronic module through data network.
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in ESP system.
- Turn ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to ON, select "Read DTC" .
- If DTC is not detected, malfunction indicated by DTC is intermittent.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1802-16	Supply Voltage - Low Voltage- Circuit Voltage Below Threshold	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C1802-17	Supply Voltage	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C1802-17	Supply Voltage	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0010-04	Left Front Inlet Control-System Internal Failure	/	- Valve set relay malfunction. - Poor connection of EPB control module assembly ground wire - Fuse malfunction - Solenoid valve short or open circuit itself - Overheat protection triggered - EPB control module assembly is damaged	/
C0011-04	Left Front Outlet Control-System Internal Failure	/		/
C0014-04	Right Front Inlet Control-System Internal Failure	/		/
C0015-04	Right Front Outlet Control-System Internal Failure	/		/
C0018-04	Left Rear Inlet Control-System Internal Failure	/		/
C0019-04	Left Rear Outlet Control-System Internal Failure	/		/
C001C-04	Right Rear Inlet Control-System Internal Failure	/		/
C001D-04	Right Rear Outlet Control-System Internal Failure	/		/
C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)	/		/

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DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0002-04	TCS Control Channel Changeover Valve2 (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)	/		/
C1003-04	Valve Relay Failure-System Internal Failure	/		/
C1004-00	General Valve	/		/
C0020-04	ABS Pump Motor Control-System Internal Failure	/	• Fuse malfunction • Pump motor has poor ground connection • System overheat protection • System overheat protection • Abnormal pump motor power supply • Pump motor malfunction	/
C0031-00	Front Left Wheel Speed Sensor Failure	/	• Battery voltage is too low or battery is damaged • ECU internal fault	/
C0031-09	Front Left Wheel Speed Sensor Component Fault	/		/
C0031-11	Front Left Wheel Speed Sensor Short to Ground	/		/
C0031-12	Front Left Wheel Speed Sensor Short to Power Supply	/		/

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DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0031-13	Front Left Wheel Speed Sensor Signal Invalid	/		/
C0031-29	Front Left Wheel Speed Sensor Signal Invalid	/		/
C0031-37	Front Left Wheel Speed Sensor Signal Out of Range	/		/
C0032-00	WSS FL Undervoltage	/		/
C0032-08	Wrong Direction of Left Front Wheel Speed Sensor	/		/
C0034-00	Front Right Wheel Speed Sensor Fault	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0034-09	Front Right Wheel Speed Sensor Component Fault	/		/
C0034-11	Front Right Wheel Speed Sensor Short to Ground	/		/
C0034-12	Front Right Wheel Speed Sensor Short to Battery	/		/
C0034-13	Front Right Wheel Speed Sensor Open	/		/
C0034-29	Front Right Wheel Speed Sensor Signal Invalid	/		/
C0034-37	Front Right Wheel Speed Sensor Signal Out of Range	/		/
C0035-00	WSS FR Undervoltage	/		/

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DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0035-08	Wrong Direction of Right Front Wheel Speed Sensor	/		/
C0037-00	Rear Left Wheel Speed Sensor Fault	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0037-09	Rear Left Wheel Speed Sensor Component Fault	/		/
C0037-11	Rear Left Wheel Speed Sensor Short to Ground	/		/
C0037-12	Rear Left Wheel Speed Sensor Short to Power Supply	/		/
C0037-13	Rear Left Wheel Speed Sensor Signal Invalid	/		/
C0037-29	Rear Left Wheel Speed Sensor Signal Invalid	/		/
C0037-37	Rear Left Wheel Speed Sensor Signal Out of Range	/		/
C0038-00	WSS RL Undervoltage	/		/
C0038-08	Wrong Direction of Left Rear Wheel Speed Sensor	/		/
C003A-00	Rear Right Wheel Speed Sensor Fault	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C003A-09	Rear Right Wheel Speed Sensor Component Fault	/		/
C003A-11	Rear Right Wheel Speed Sensor Short to Ground	/		/

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DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C003A-12	Rear Right Wheel Speed Sensor Short to Power Supply	/		/
C003A-13	Rear Right Wheel Speed Sensor Signal Invalid	/		/
C003A-29	Rear Right Wheel Speed Sensor Signal Invalid	/		/
C003A-37	Rear Right Wheel Speed Sensor Signal Out of Range	/		/
C003B-00	WSS RR Undervoltage	/		/
C003B-08	Wrong Direction of Right Rear Wheel Speed Sensor	/		/
C0040-64	Brake Pedal Switch Failure (ESP Only)	/	/	/
C0044-01	Brake Pressure Sensor Failure (ESP Only)- General Electrical Failure	/	/	/
C0044-28	Pressure Sensor Temperature Error	/	/	/
C0051-29	Steering Wheel Angle Sensor Signal Invalid (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0051-54	Steering Wheel Angle Sensor Uncalibrated (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0051-64	Steering Wheel Angle Sensor Signal Abnormal (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/

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DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C0061-64	Lateral Acceleration Sensor Signal Abnormal (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0062-64	Longitudinal Acceleration Sensor Signal Abnormal (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0063-64	Yaw Rate Sensor Signal Abnormal (ESP Only)	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0063-01	Yaw Rate Sensor General Electrical Fault	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0063-54	Yaw Rate Sensor Uncalibrated	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C006B-00	Stability System Active Too Long	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C0072-FC	DHP Valve Overheat Protection	/	/	/
C0089-04	TCS Disable Switch(ESP Only)	/	/	/
C0500-00	WSS Test FL Failure	/	/	/
C0506-00	WSS Test FR Failure	/	/	/
C050C-00	WSS Test RL Failure	/	/	/
C0512-00	WSS Test RR Failure	/	/	/
C053B-00	Valve Path Supply Line Open	/	/	/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C053CFC	Wheel-speed Sensor Generic Error	/	/	/
C053D-00	Pressure Sensor 1 Range Error or Defective Plunger Pressure Sensor	/	/	/
C0563-00	ABS Implausible Long Control	/	/	/
C056B-00	Pressure Sensor 1 Noise or Internal Failure	/	/	/
C1000-16	ECU Voltage Too Low	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C1000-17	ECU Voltage Too High	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C1000-FC	System ASIC GPIO Error or APB Asic Voltage Error or PBC SW Failure	/	/	/
C1001-04	Internal fault in ECU system	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C1002-49	CAN Hardware Internal Electronic Failure	/	/	/
C1003-04	Valve Relay Failure-System Internal Failure	/	/	/
C1004-00	General Valve	/	/	/
C1007-29	Reverse Gear Switch Failure (ESP Only)-Signal Invalid	/	/	/
C1008-00	General WSS	/	/	/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1009-00	ECU Hardware Related Fault	/	- Battery voltage is too low or battery is damaged - ECU internal fault	/
C104D-04	AVH Button Switch Failure	/	/	/
C1099-08	Wrong Direction of Wheel Speed Sensor	/	/	/
C1546-04	EPB Supply Fault-System Internal Failure	/	/	/
C156B-00	EPBASIC_GenericError-No Sub Type Information	/	/	/
C1803-95	Assembly Test	/	- Assembly test is not performed - Power is not turned off normally after performing assembly test	/
C1804-53	EPB Maintenance Mode	/	Enter service mode and not exit	/
C1826-01	EPB (Electronic Parking Brake) Actuator Driver Gen Electrical Failure	/	- Electronic control execution unit - ECU internal fault	/
C1807-98	Disc Over Heat	/	- Electronic control execution unit - ECU internal fault	/
C1823-00	APB Motor Enable Line Violation	/	- Electronic control execution unit - ECU internal fault	/
C1806-01	EPB Button Line Failure-General Electrical Failure	/	- EPB switch failure - ECU internal fault	/
C1806-16	EPB Button Under Voltage	/		/
C1830-00	EPB (Electronic Parking Brake)	/	Electronic control execution unit	/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Left Actuator CAT		• ECU internal fault	
C1831-00	EPB (Electronic Parking Brake) Right Actuator CAT	/		/
C1800-97	Left Actuator - Action Limited	/	• Electronic control execution unit failure • Dynamic park	/
C1801-97	Right Actuator - Action Limited	/		/
C1832-00	EPB Left Actuator Unintended Run- No Sub Type Information	/	• ECU internal fault	/
C1833-00	EPB Right Actuator Unintended Run- No Sub Type Information	/		/
C1800-73	Left Actuator - Apply Failed- Actuator Stuck Closed	/	• Vehicle Power Supply Voltage - Voltage Below Threshold • Electronic control execution unit internal resistance is too big	/
C1800-74	Left Actuator - Actuator Slipping (Apply Time Out)	/		/
C1801-73	Right Actuator - Apply Failed- Actuator Stuck Closed	/		/
C1801-74	Right Actuator - Actuator Slipping (Apply TimeOut)- Actuator Slipping	/		/
C1800-72	Left Actuator - Release Failed- Actuator Stuck Open	/	• Electronic control execution unit internal mechanical malfunction	/
C1801-72	Right Actuator -- Release Failed- Actuator Stuck Open	/		/
C1800-93	Left Actuator - No Motor Start	/	• Electronic control execution unit	/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Detected-No Operation		internal resistance is too big	
C1801-93	Right Actuator - No Motor Start Detected-No Operation	/		/
C1800-19	Left Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold	/	Short circuit in electronic control execution unit	/
C1801-19	Right Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold	/		/
C1800-92	Left Actuator - High Mechanical Resistance-Performance or Incorrect Operation	/	Electronic control execution unit mechanical malfunction	/
C1801-92	Right Actuator - High Mechanical Resistance-Performance or Incorrect Operation	/		/
C1800-91	Left Actuator - Wrong Operating Characteristics Detect-Parametric	/	Electronic control execution unit internal resistance is too big	/
C1801-91	Right Actuator - Wrong Operating Characteristics Detect-Parametric	/		/
C1824-01	EPB Left Actuator Electrical Failure-General Electrical Failure	/	- Electronic control execution unit - ECU internal fault	/
C1822-00	EPB Left Actuator Failure	/		/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C1824-1E	EPB Left Actuator Shunt On Line or ECU-Circuit Resistance Out of Range	/		/
C1825-01	EPB Right Actuator Electrical Failure-General Electrical Failure	/		/
C1821-00	EPB Right Actuator Failure	/		/
C1825-1E	EPB Right Actuator Shunt On Line or ECU-Circuit Resistance Out of Range	/		/
C1802-44	PBC EEPROM Fault	/	/	/
C1805-94	Hydric Support Failed	/	/	/
C1806-04	EPB Button Always Pushed or Pulled-System Internal Failure	/	/	/
C1808-11	Circuit Short To Ground of Left Rear Caliper	/	/	/
C1808-12	Circuit Short To Battery of Left Rear Caliper	/	/	/
C1808-13	Circuit Open of Left Rear Caliper - Circuit Open	/	/	/
C1810-01	Short in Left Rear Caliper Positive and Negative	/	/	/
C1815-11	Circuit Short To Ground of Right Rear Caliper-Circuit Short To Ground	/	/	/
C1815-12	Circuit Short To Battery of Right	/	/	/

06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
	Rear Caliper-Circuit Short To Battery			
C1815-13	Circuit Open of Right Rear caliper-Circuit Open	/	/	/
C1817-01	Short in Right Rear Caliper Positive and Negative	/	/	/
C1821FC	EPB Right Motor Line Failure	/	/	/
C1822FC	EPB Left Motor Line Failure	/	/	/
C182496	EPB Intern Left HW Failure	/	/	/
C182596	EPB Intern Right HW Failure	/	/	/
C182B1E	EPB Motor Electrical Coupling Failure	/	/	/
C18341D	Short in Left Rear Caliper Positive and Negative	/	/	/
C1834FC	EPB Left Motor Transistors Error	/	/	/
C18351D	Short in Right Rear Caliper Positive and Negative	/	/	/
C1835FC	EPB Right Motor Transistors Error	/	/	/
C1836FC	EPB Motor GPIO Overcurrent Failure	/	/	/
C183700	APB_GPIO OverTemperature	/	/	/
C186D-44	SupervisionFail-Data Memory Failure	/	/	/

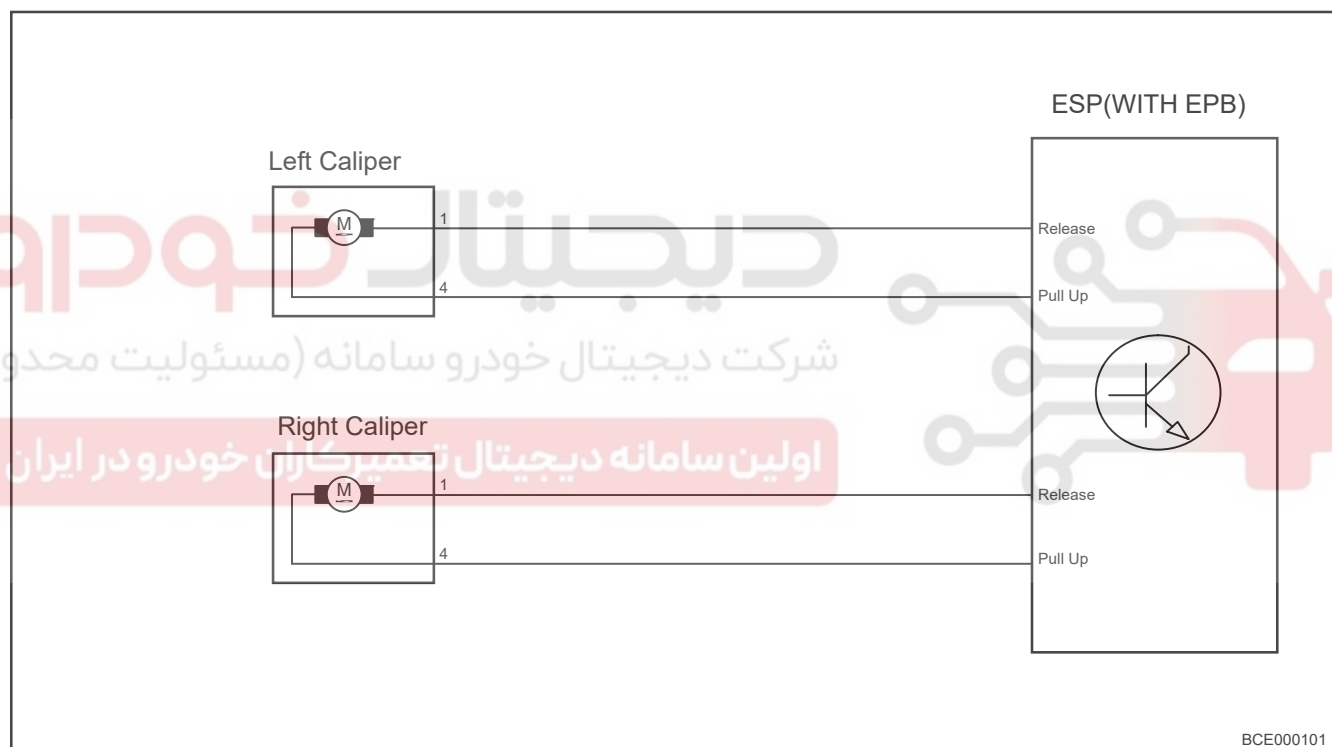
06 - BRAKE SYSTEM

DTC	DTC Definition	Detection Condition	Possible Causes	Maintenance Advice
C186E-FC	ABS Pump Motor Control Othercycle	/	/	/
C186F-28	Brake Pressure Sensor Signal Bias Level Out Of Range Failure (ESP Only)	/	/	/

DTC Diagnosis Procedure

DTC	C1802-16	Supply Voltage - Low Voltage-Circuit Voltage Below Threshold
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Control Schematic Diagram



BCE000101

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check battery voltage
---	-----------------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG

Check or replace charging system or battery.

OK

2

Check wire harness and connector (brake caliper - ESP (integrated EPB))

(a) Check if related wire harness connection and installation are in good condition.

(b) Disconnect the negative battery cable.

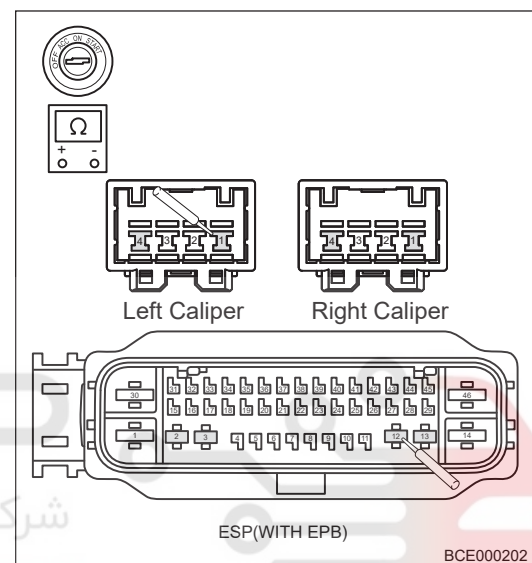
(c) Disconnect the ESP (integrated EPB) connector.

(d) Disconnect the rear left brake caliper connector.

(e) Disconnect the rear right brake caliper connector.

(f) Check for continuity between EPB and brake caliper.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



NG

Repair or replace wire harness or connector.

OK

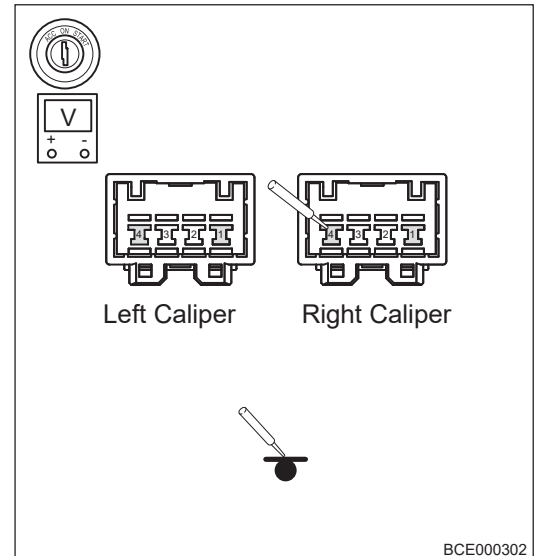
3

Check brake caliper power supply circuit

06 - BRAKE SYSTEM

- Disconnect the rear left brake caliper connector.
- Disconnect the rear right brake caliper connector.
- Turn ignition switch to ON.
- Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (4) - Body ground	Ignition switch ON	5 V
Rear right brake caliper (4) - Body ground	Ignition switch ON	5 V



BCE000302

OK

Replace brake caliper

NG

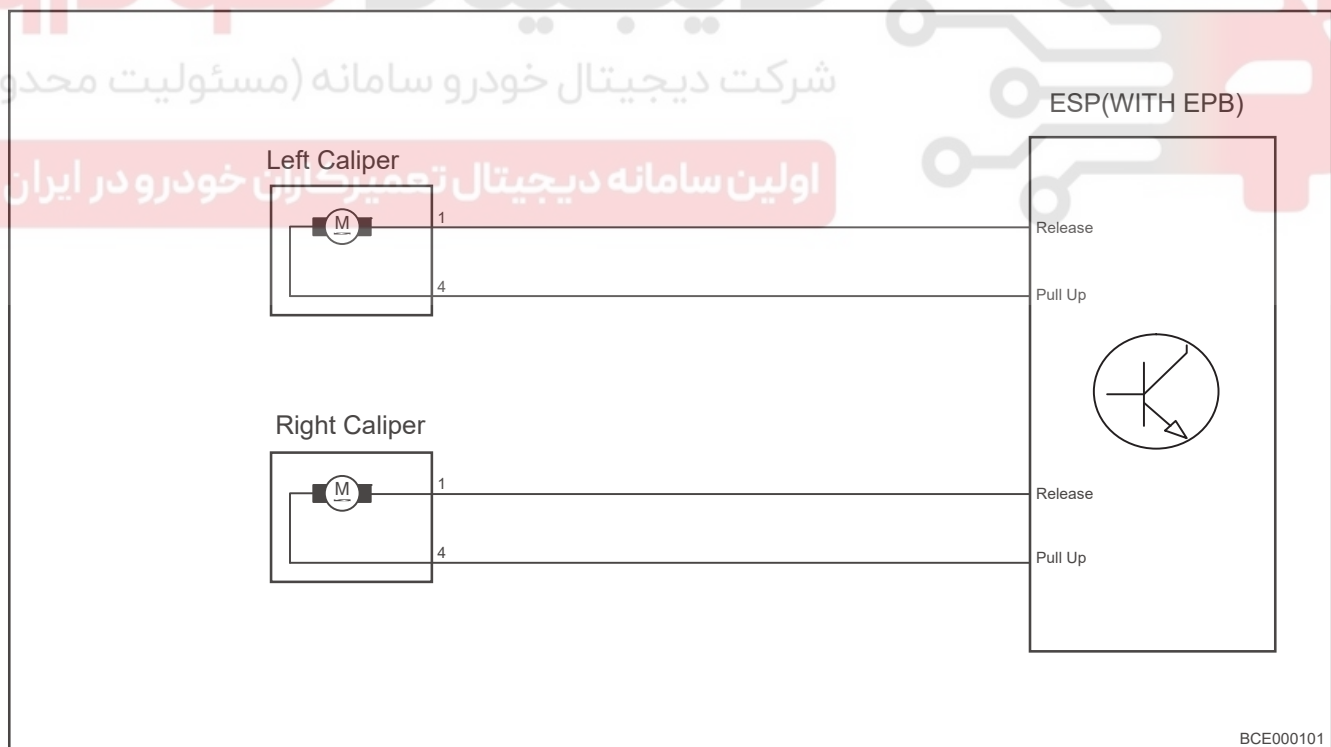
Replace ESP (integrated EPB)

DTC

C1802-17

Supply Voltage

Control Schematic Diagram



BCE000101

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.



06 - BRAKE SYSTEM

Hint:

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

1 Check battery voltage

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG

Check or replace charging system or battery.

OK

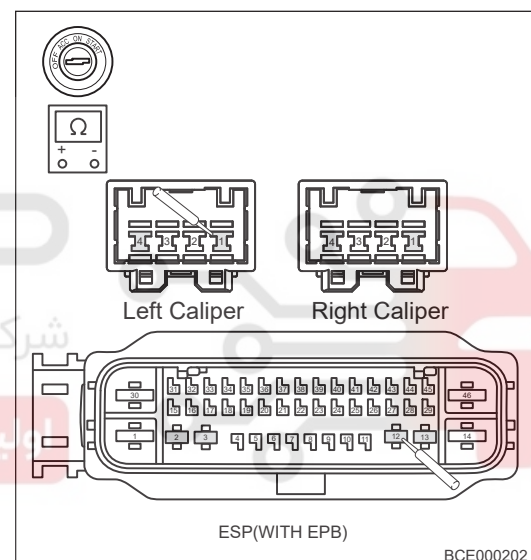
2 Check wire harness and connector (brake caliper - ESP (integrated EPB))

- (a) Check if related wire harness connection and installation are in good condition.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the ESP (integrated EPB) connector.
- (d) Disconnect the rear left brake caliper connector.
- (e) Disconnect the rear right brake caliper connector.
- (f) Check for continuity between ESP (integrated EPB) and brake caliper.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω

NG

Repair or replace wire harness or connector.

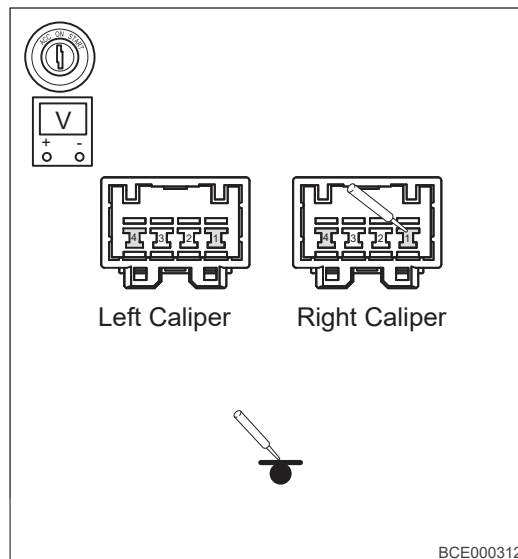


OK

3 Check brake caliper power supply circuit

- (a) Disconnect the rear left brake caliper connector.
 (b) Disconnect the rear right brake caliper connector.
 (c) Turn ignition switch to ON.
 (d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Ignition switch ON	5 V
Rear right brake caliper (1) - Body ground	Ignition switch ON	5 V



OK

Replace brake caliper

NG

Replace ESP (integrated EPB)

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

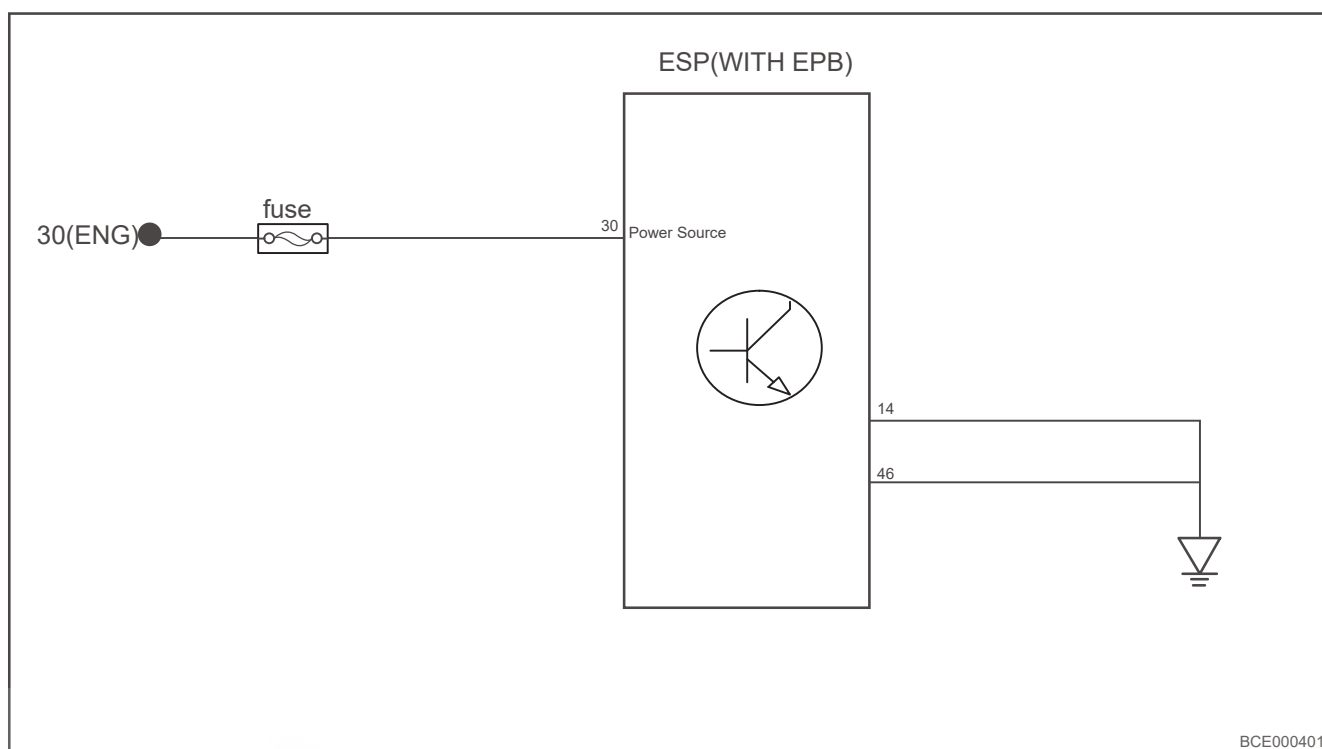
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

06 - BRAKE SYSTEM

DTC	C0010-04	Left Front Inlet Control-System Internal Failure
DTC	C0011-04	Left Front Outlet Control-System Internal Failure
DTC	C0014-04	Right Front Inlet Control-System Internal Failure
DTC	C0015-04	Right Front Outlet Control-System Internal Failure
DTC	C0018-04	Left Rear Inlet Control-System Internal Failure
DTC	C0019-04	Left Rear Outlet Control-System Internal Failure
DTC	C001C-04	Right Rear Inlet Control-System Internal Failure
DTC	C001D-04	Right Rear Outlet Control-System Internal Failure
DTC	C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)
DTC	C0002-04	TCS Control Channel Changeover Valve2 (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	C1003-04	Valve Relay Failure-System Internal Failure
DTC	C1004-00	General Valve
DTC	C1008-00	General WSS
DTC	C0044-01	Brake Pressure Sensor Failure (ESP Only)-General Electrical Failure
DTC	C0044-28	Pressure Sensor Temperature Error
DTC	C053B-00	Valve Path Supply Line Open
DTC	C053D-00	Pressure Sensor 1 Range Error or Defective Plunger Pressure Sensor
DTC	C056B-00	Pressure Sensor 1 Noise or Internal Failure
DTC	C186F-28	Brake Pressure Sensor Signal Bias Level Out Of Range Failure (ESP Only)

Control Schematic Diagram

06 - BRAKE SYSTEM

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1 Check fuse

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check the fuse.

NG

Replace the related fuse.

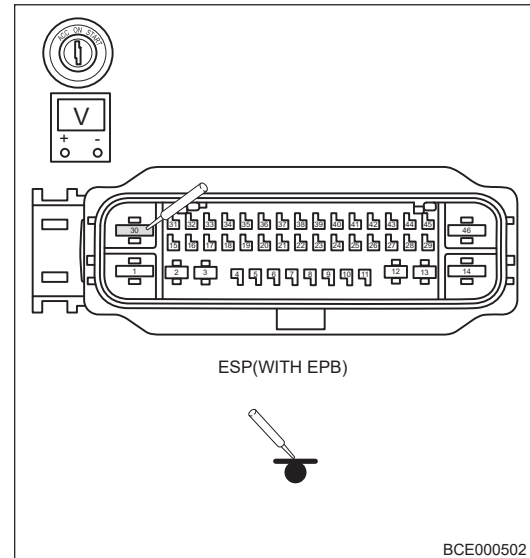
OK

2 Check ESP (integrated EPB) power supply circuit

06 - BRAKE SYSTEM

- (a) Disconnect the ESP (integrated EPB) connector.
- (b) Check if related wire harnesses are worn, pinched or broken.
- (c) Check if related connector terminals are loose, broken, bent or corrosive.
- (d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply circuit) - Body ground	Always	9-16V



NG

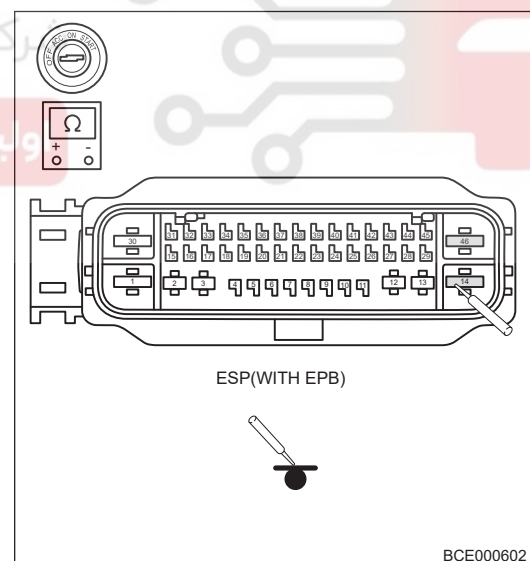
Repair or replace wire harness or connector.

OK

3 Check ESP (integrated EPB) ground circuit

- (a) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground circuit) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground circuit) - Body ground	Always	Less than 1 Ω



NG

Repair or replace wire harness or connector.

OK

4 Confirm DTCs again

- (a) Reconnect the ESP (integrated EPB) connector.
- (b) Clear DTCs.
- (c) Start the vehicle.
- (d) Read DTCs again.
- (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

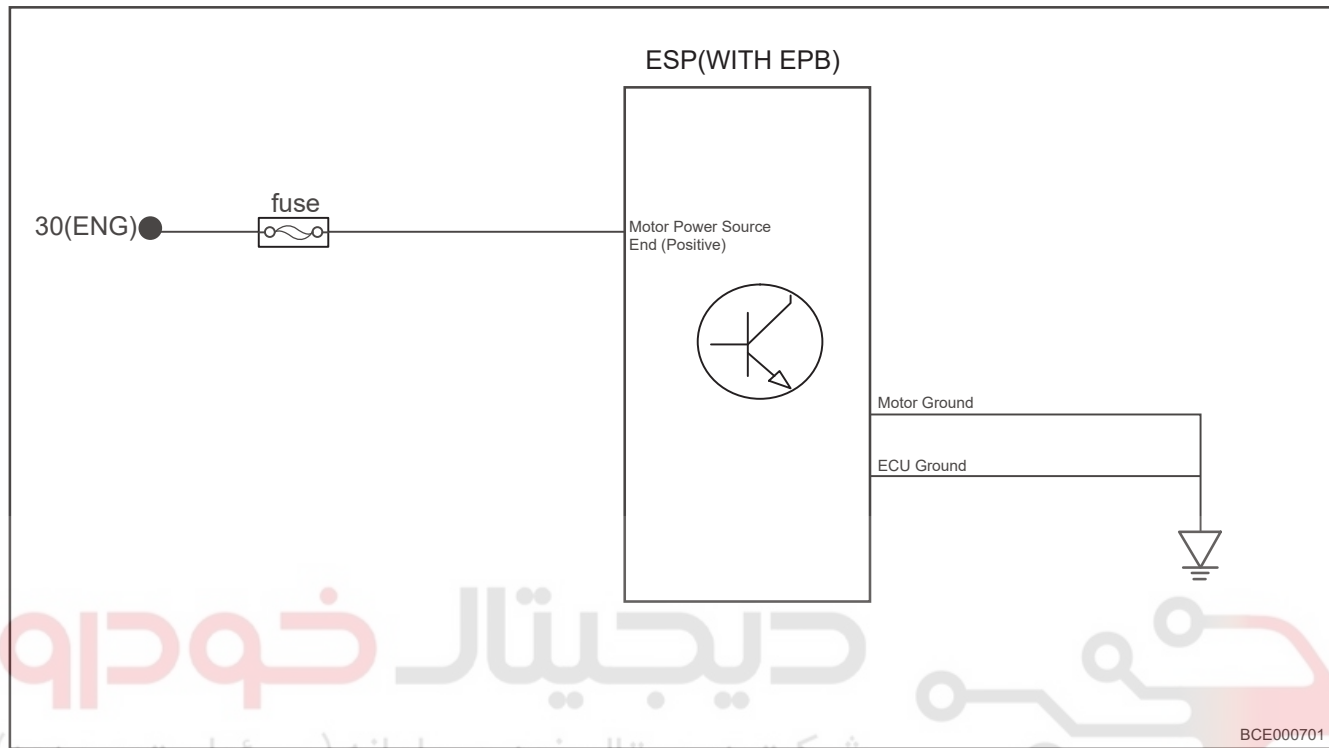
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C0020-04	ABS Pump Motor Control-System Internal Failure
DTC	C186E-FC	ABS Pump Motor Control Othercycle

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check fuse
---	------------

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Check the fuse.

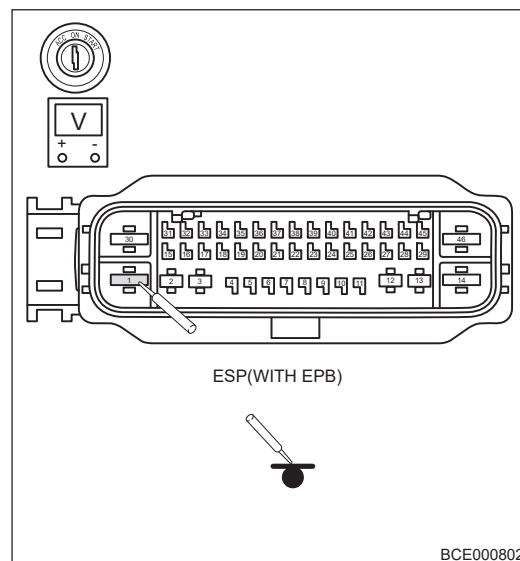


2	Check ESP (integrated EPB) power supply circuit
---	---

06 - BRAKE SYSTEM

- (a) Check if related wire harnesses are worn, pinched or broken.
- (b) Check if related connector terminals are loose, broken, bent or corrosive.
- (c) Disconnect the ESP (integrated EPB) connector.
- (d) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply terminal) - Body ground	Always	9-16V



NG

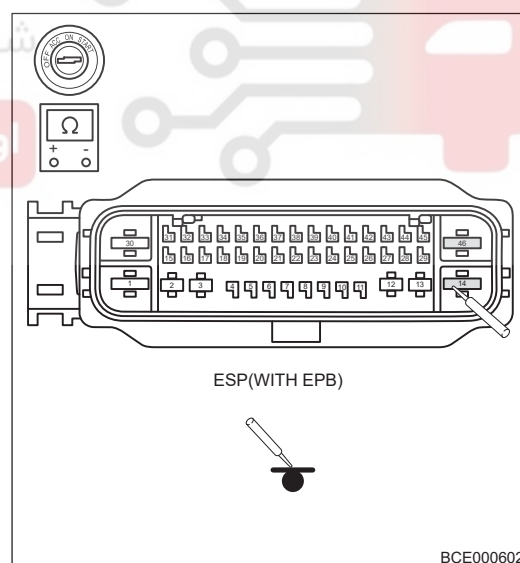
Repair or replace wire harness or connector.

OK

3 Check ESP (integrated EPB) ground circuit

- (a) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω



NG

Repair or replace wire harness or connector.

OK

4 Confirm DTCs again

06 - BRAKE SYSTEM

- (a) Reconnect the ESP (integrated EPB) connector.
- (b) Clear DTCs.
- (c) Start the vehicle.
- (d) Read DTCs again.
- (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

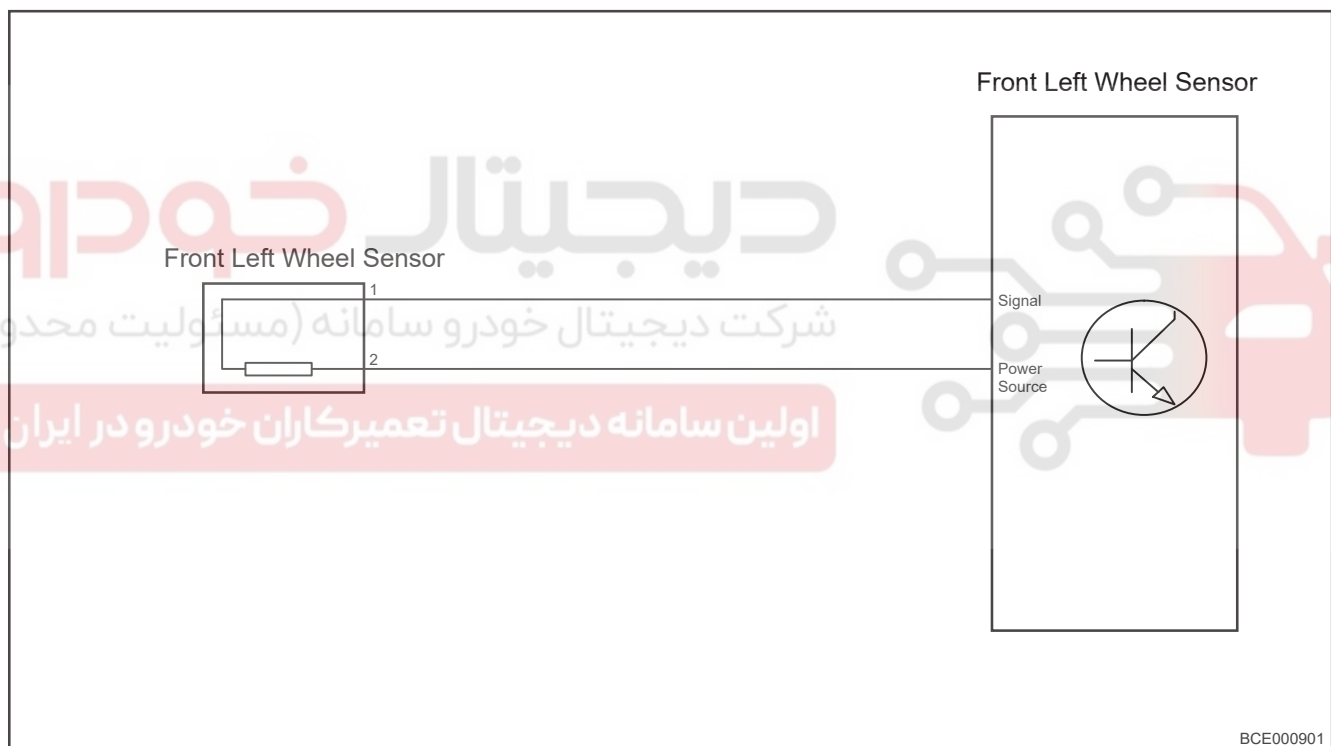
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06 - BRAKE SYSTEM

DTC	C0031-00	Front Left Wheel Speed Sensor Failure
DTC	C0031-09	Front Left Wheel Speed Sensor Component Fault
DTC	C0031-11	Front Left Wheel Speed Sensor Short to Ground
DTC	C0031-12	Front Left Wheel Speed Sensor Short to Power Supply
DTC	C0031-13	Front Left Wheel Speed Sensor Open
DTC	C0031-29	Front Left Wheel Speed Sensor Signal Invalid
DTC	C0031-37	Front Left Wheel Speed Sensor Signal Out of Range
DTC	C0032-00	WSS FL Undervoltage
DTC	C0032-08	Wrong Direction of Left Front Wheel Speed Sensor
DTC	C0500-00	WSS Test FL Failure

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check front left wheel speed sensor
---	-------------------------------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check front left wheel speed sensor.
- Check if related wire harness connector installation is in good condition and check for dirty.

NG

Clean or replace the front left wheel speed sensor.

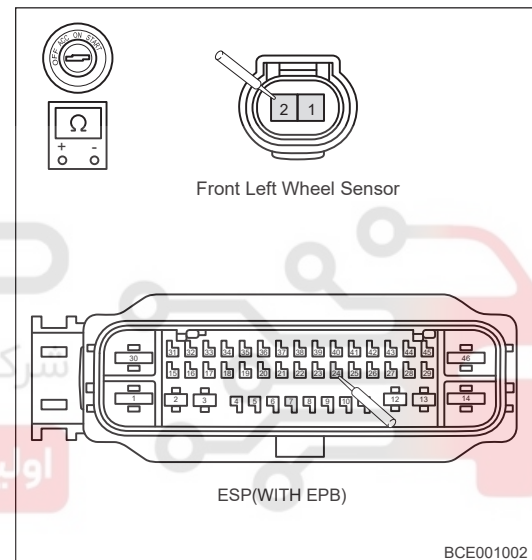
OK

2

Check wire harness and connector (front left wheel speed sensor - ESP (integrated EPB))

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check the front left wheel speed sensor connector.
- Check ESP (integrated EPB) connector.
- Check for continuity between front left wheel speed sensor and ESP (integrated EPB) according to the table below.

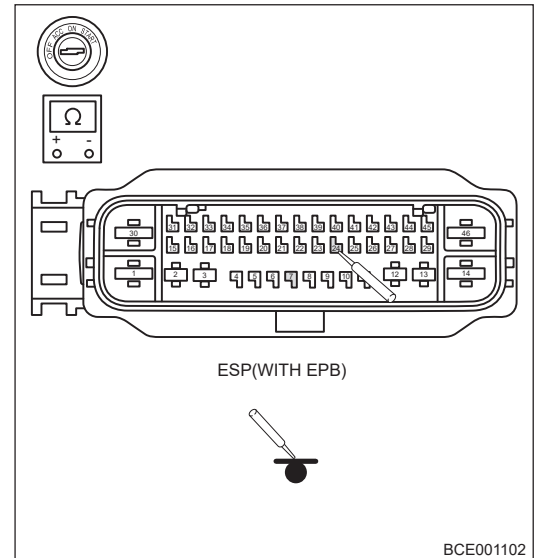
Multimeter Connection	Condition	Specified Condition
Front left wheel speed sensor (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Front left wheel speed sensor (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

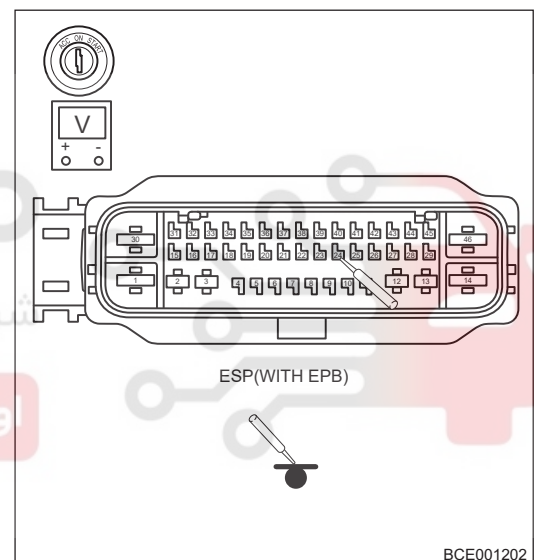
- (f) Check if the resistance between sensor to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



- (g) Connect the negative battery cable.
 (h) Turn ENGINE START STOP switch to ON.
 (i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG

Repair or replace wire harness or connector.

OK

3

Confirm DTCs again

- (a) Reconnect the ESP (integrated EPB) connector.
 (b) Clear DTCs.
 (c) Start the vehicle.
 (d) Read DTCs again.
 (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

NG

Replace ESP (integrated EPB)



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

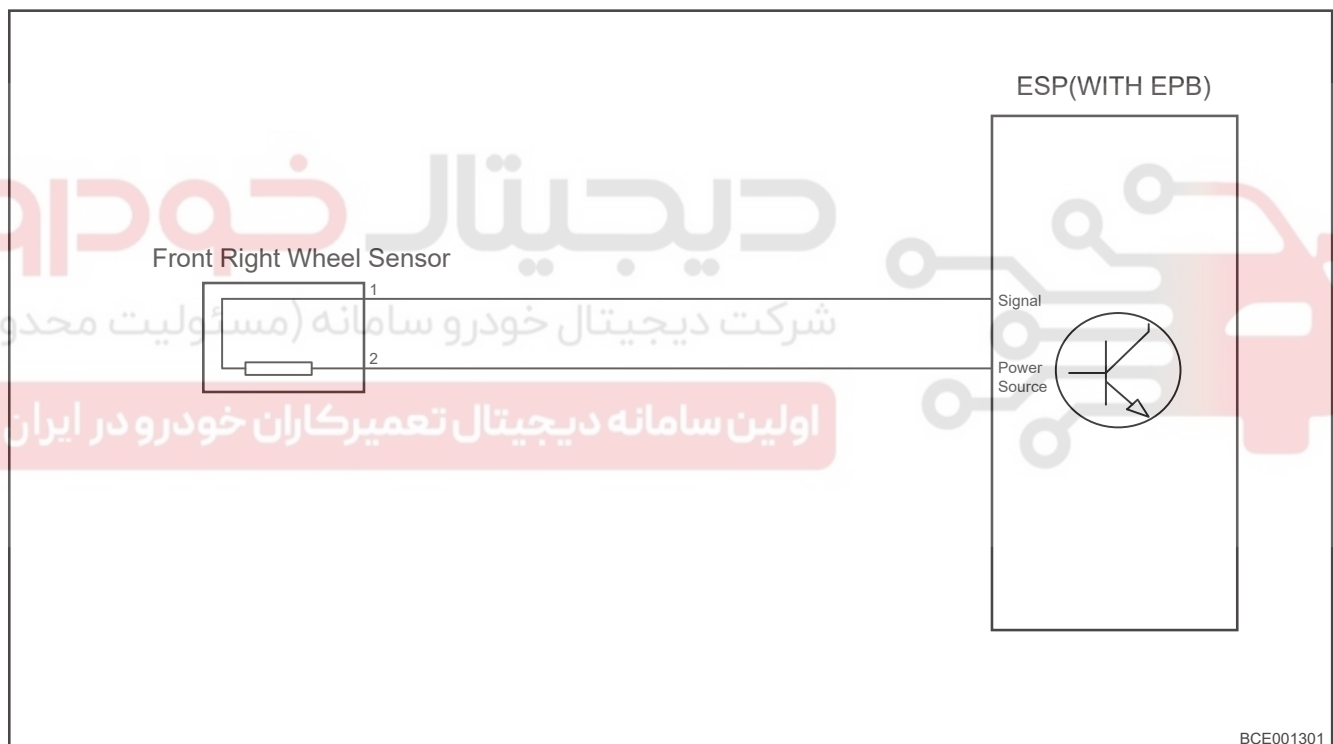
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C0034-00	Front Right Wheel Speed Sensor Fault
DTC	C0034-09	Front Right Wheel Speed Sensor Component Fault
DTC	C0034-11	Front Right Wheel Speed Sensor Short to Ground
DTC	C0034-12	Front Right Wheel Speed Sensor Short to Power Supply
DTC	C0034-13	Front Right Wheel Speed Sensor Open
DTC	C0034-29	Front Right Wheel Speed Sensor Signal Invalid
DTC	C0034-37	Front Right Wheel Speed Sensor Signal Out of Range
DTC	C0035-00	WSS FR Undervoltage
DTC	C0035-08	Wrong Direction of Right Front Wheel Speed Sensor
DTC	C0506-00	WSS Test FR Failure

Control Schematic Diagram



BCE001301

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check front right wheel speed sensor
---	--------------------------------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check front right wheel speed sensor.
- Check if related wire harness connector installation is in good condition and check for dirty.

NG

Clean or replace front right wheel speed sensor.

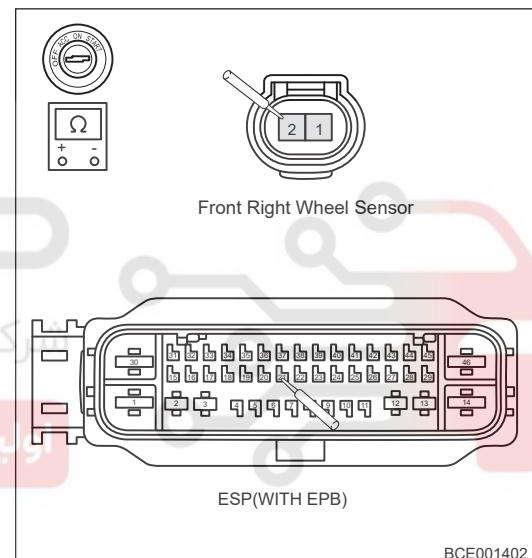
OK

2

Check wire harness and connector (front right wheel speed sensor - ESP (integrated EPB))

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check the front right wheel speed sensor connector.
- Check ESP (integrated EPB) connector.
- Check for continuity between front right wheel speed sensor and ESP (integrated EPB) according to the table below.

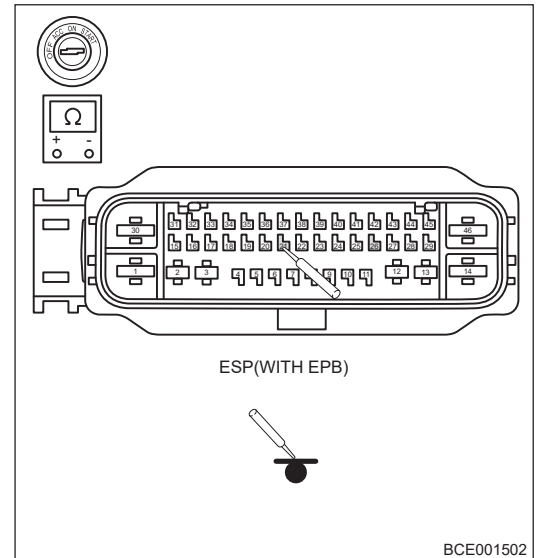
Multimeter Connection	Condition	Specified Condition
Front right wheel speed sensor (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Front right wheel speed sensor (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

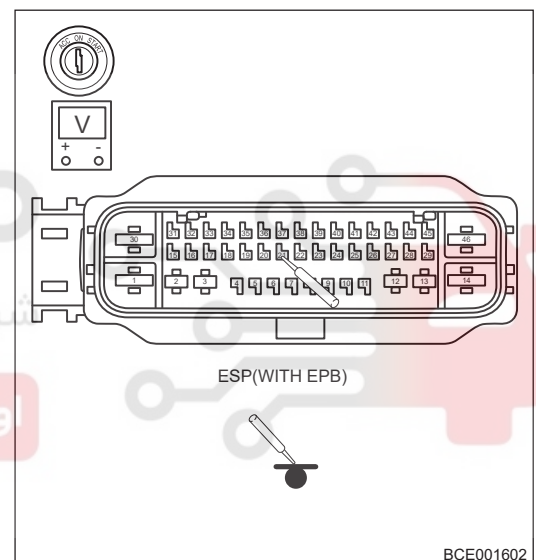
- (f) Check if the resistance between sensor to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



- (g) Connect the negative battery cable.
 (h) Turn ENGINE START STOP switch to ON.
 (i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG

Repair or replace wire harness or connector.

OK

3

Confirm DTCs again

- (a) Reconnect the ESP (integrated EPB) connector.
 (b) Clear DTCs.
 (c) Start the vehicle.
 (d) Read DTCs again.
 (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

NG

Replace ESP (integrated EPB)



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

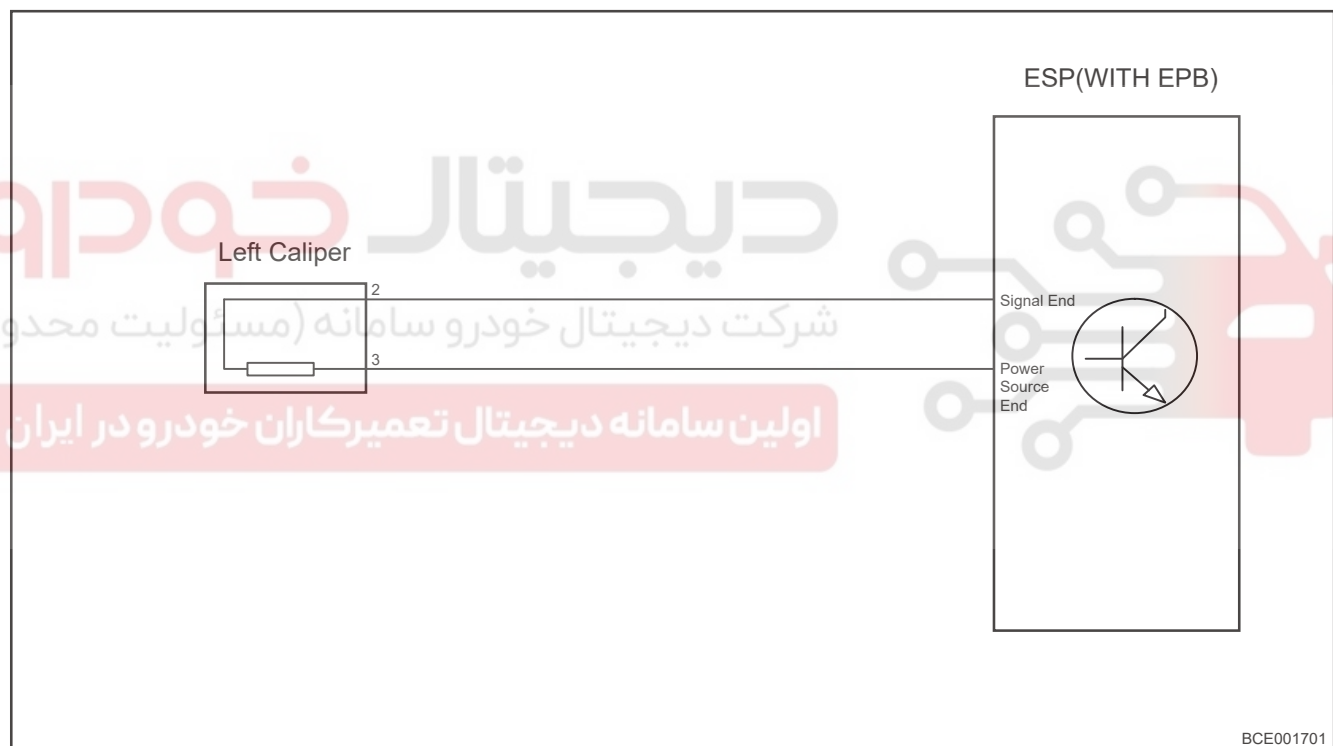
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C0037-00	Rear Left Wheel Speed Sensor Fault
DTC	C0037-09	Rear Left Wheel Speed Sensor Component Fault
DTC	C0037-11	Rear Left Wheel Speed Sensor Short to Ground
DTC	C0037-12	Rear Left Wheel Speed Sensor Short to Power Supply
DTC	C0037-13	Rear Left Wheel Speed Sensor Open
DTC	C0037-29	Rear Left Wheel Speed Sensor Signal Invalid
DTC	C0037-37	Rear Left Wheel Speed Sensor Signal Out of Range
DTC	C0038-00	WSS RL Undervoltage
DTC	C0038-08	Wrong Direction of Left Rear Wheel Speed Sensor
DTC	C050C-00	WSS Test RL Failure

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check rear left wheel speed sensor
---	------------------------------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check rear left wheel speed sensor.
- Check if related wire harness connector installation is in good condition and check for dirty.

NG

Clean or replace rear left wheel speed sensor.

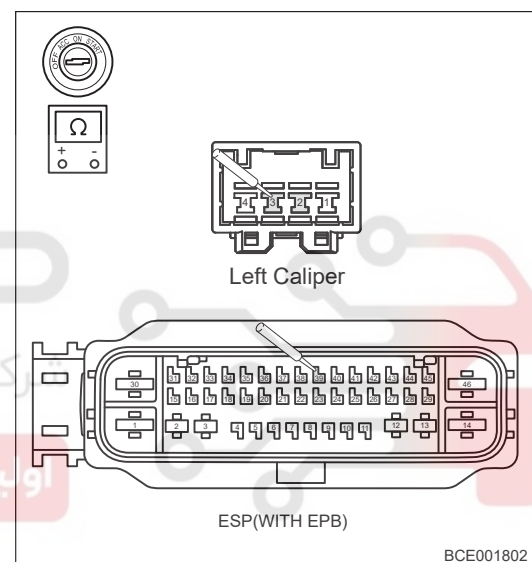
OK

2

Check wire harness and connector (rear left wheel speed sensor - ESP (integrated EPB))

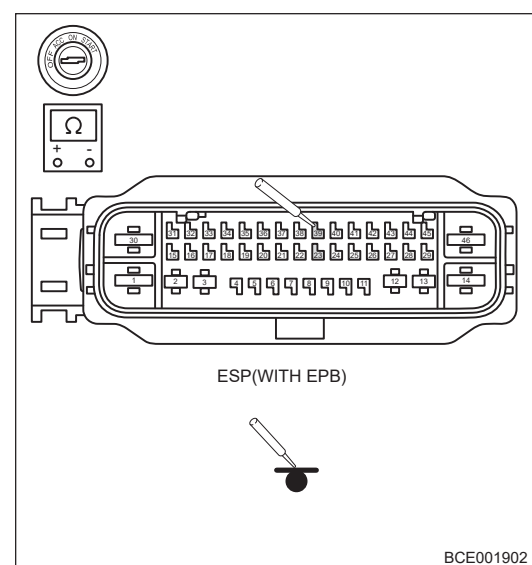
- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check the rear left wheel speed sensor connector.
- Check for continuity between rear left wheel speed sensor and ESP (integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear left brake caliper (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



- Check if the resistance between sensor to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

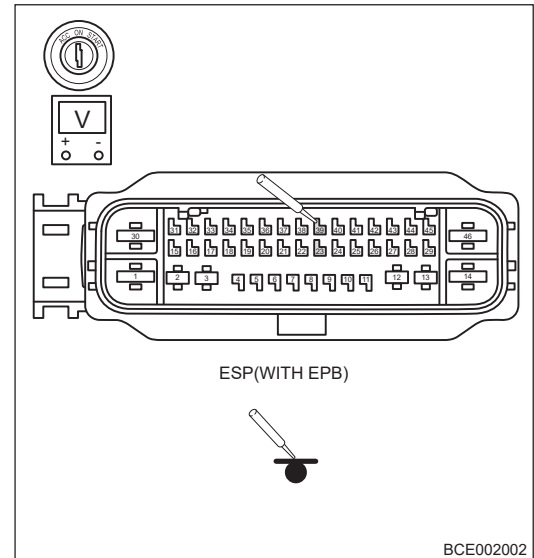
Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω



06 - BRAKE SYSTEM

- (f) Connect the negative battery cable.
 (g) Turn ENGINE START STOP switch to ON.
 (h) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG

Repair or replace wire harness or connector.

OK

3 Confirm DTCs again

- (a) Reconnect the ESP (integrated EPB) connector.
 (b) Clear DTCs.
 (c) Start the vehicle.
 (d) Read DTCs again.
 (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

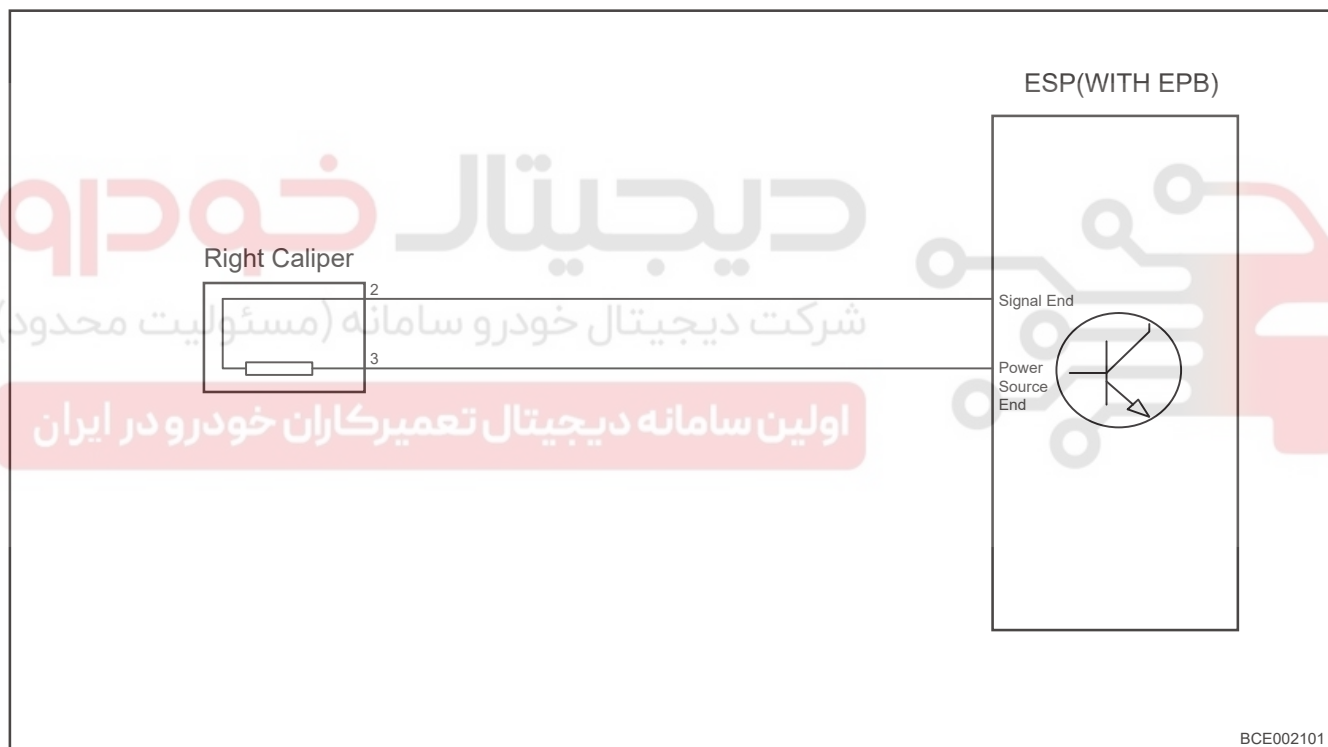
NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C003A-00	Rear Right Wheel Speed Sensor Fault
DTC	C003A-09	Rear Right Wheel Speed Sensor Component Fault
DTC	C003A-11	Rear Right Wheel Speed Sensor Short to Ground
DTC	C003A-12	Rear Right Wheel Speed Sensor Short to Power Supply
DTC	C003A-13	Rear Right Wheel Speed Sensor Open
DTC	C003A-29	Rear Right Wheel Speed Sensor Signal Invalid
DTC	C003A-37	Rear Right Wheel Speed Sensor Signal Out of Range
DTC	C003B-00	WSS RR Undervoltage
DTC	C003B-08	Wrong Direction of Right Rear Wheel Speed Sensor
DTC	C0512-00	WSS Test RR Failure

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check rear right wheel speed sensor
---	-------------------------------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

- (a) Turn ignition switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check rear right wheel speed sensor.
- (d) Check if related wire harness connector installation is in good condition and check for dirty.

NG

Clean or replace rear right wheel speed sensor.

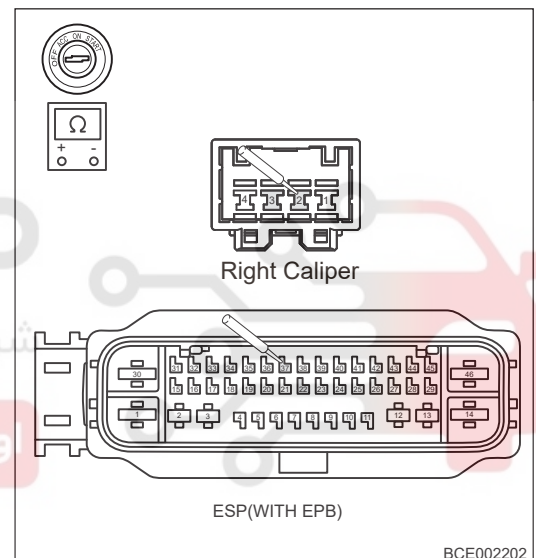
OK

2

Check wire harness and connector (rear right wheel speed sensor - ESP (integrated EPB))

- (a) Turn ignition switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check the rear right wheel speed sensor connector.
- (d) Check ESP (integrated EPB) connector.
- (e) Check for continuity between rear right wheel speed sensor and ESP (integrated EPB) according to the table below.

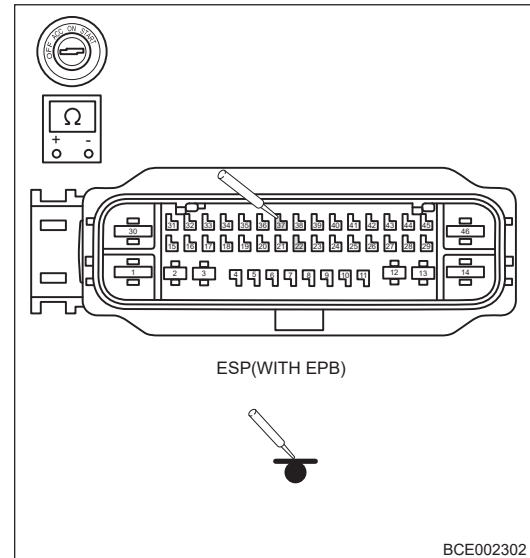
Multimeter Connection	Condition	Specified Condition
Rear right brake caliper (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Rear right brake caliper (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

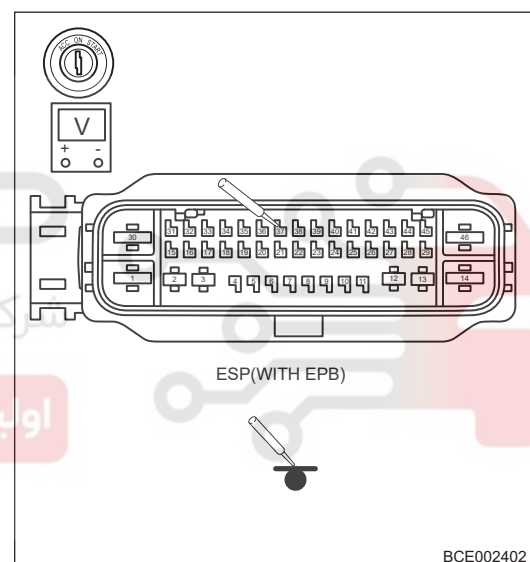
- (f) Check if the resistance between sensor to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



- (g) Connect the negative battery cable.
 (h) Turn ENGINE START STOP switch to ON.
 (i) Check if the voltage between sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG

Repair or replace wire harness or connector.

OK

3 Confirm DTCs again

- (a) Reconnect the ESP (integrated EPB) connector.
 (b) Clear DTCs.
 (c) Start the vehicle.
 (d) Read DTCs again.
 (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

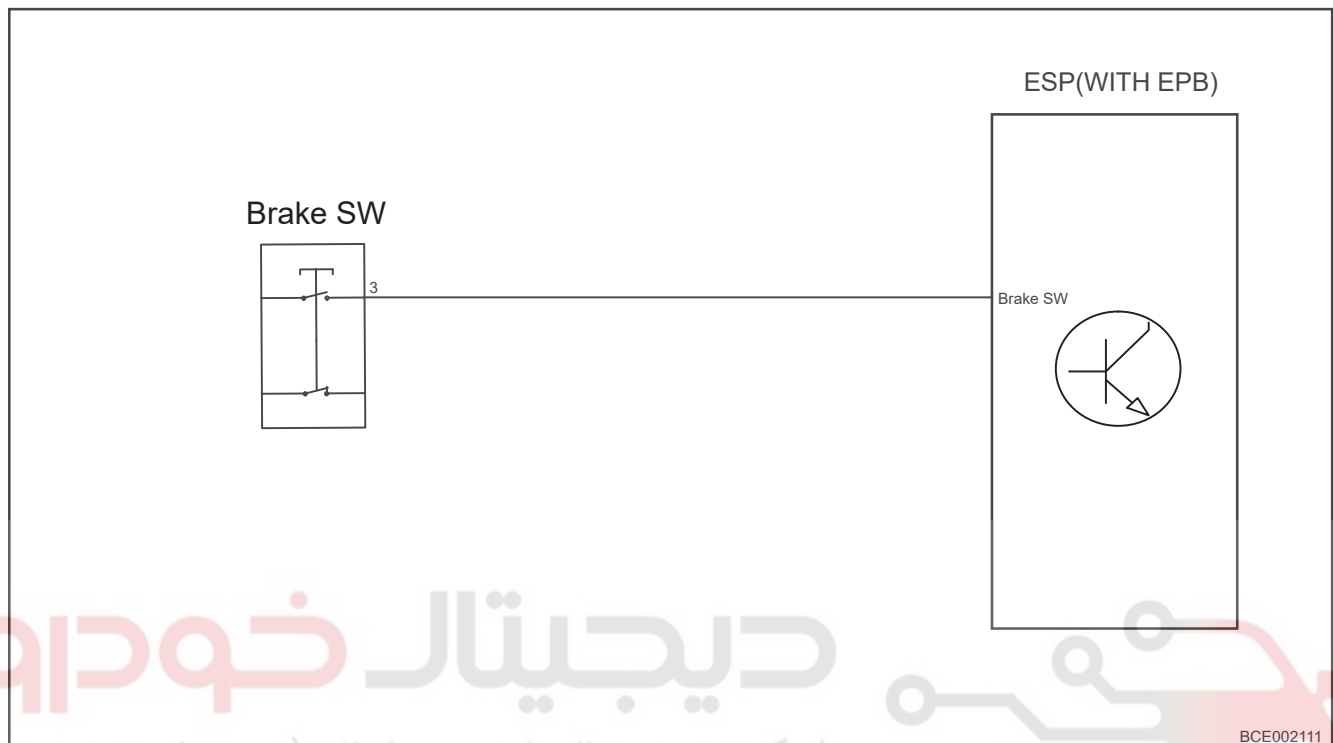
NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C0040-64	Brake Pedal Switch Failure (ESP Only)
DTC	C1007-29	Reverse Gear Switch Failure (ESP Only)-Signal Invalid

Control Schematic Diagram



BCE002111

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check brake switch
---	--------------------

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check brake switch.
- Check if related wire harness connector installation is in good condition.

NG

Replace brake switch.

OK

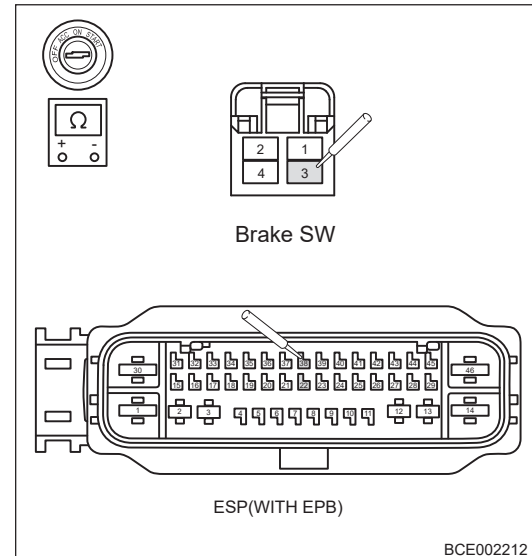
2	Check wire harness and connector (brake switch - ESP (integrated EPB))
---	--



06 - BRAKE SYSTEM

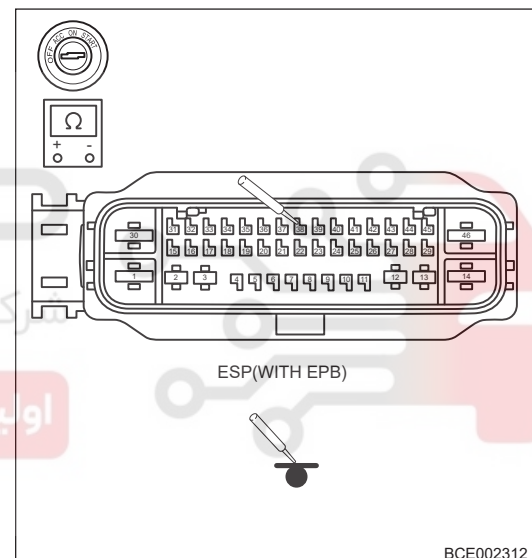
- (a) Turn ignition switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check brake switch connector.
 (d) Check ESP (integrated EPB) connector.
 (e) Check for continuity between brake switch and ESP (- integrated EPB) according to the table below.

Multimeter Connection	Condition	Specified Condition
Brake switch (3) - ESP (integrated EPB (connect terminals))	Always	Less than 1 Ω



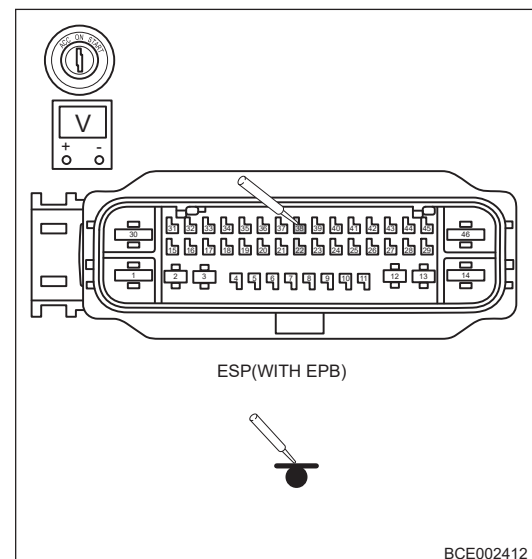
- (f) Check if the resistance between brake switch sensor to ESP (integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω



- (g) Connect the negative battery cable.
 (h) Turn ENGINE START STOP switch to ON.
 (i) Check if the voltage between brake switch to ESP (- integrated EPB) wire harness and body ground is normal according to the table below.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	0 V



NG

Repair or replace wire harness or connector.

OK

3**Confirm DTCs again**

- (a) Reconnect the ESP (integrated EPB) connector.
- (b) Clear DTCs.
- (c) Start the vehicle.
- (d) Read DTCs again.
- (e) Check if the same DTCs occur.

OK

Check if intermittent fault occurs

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

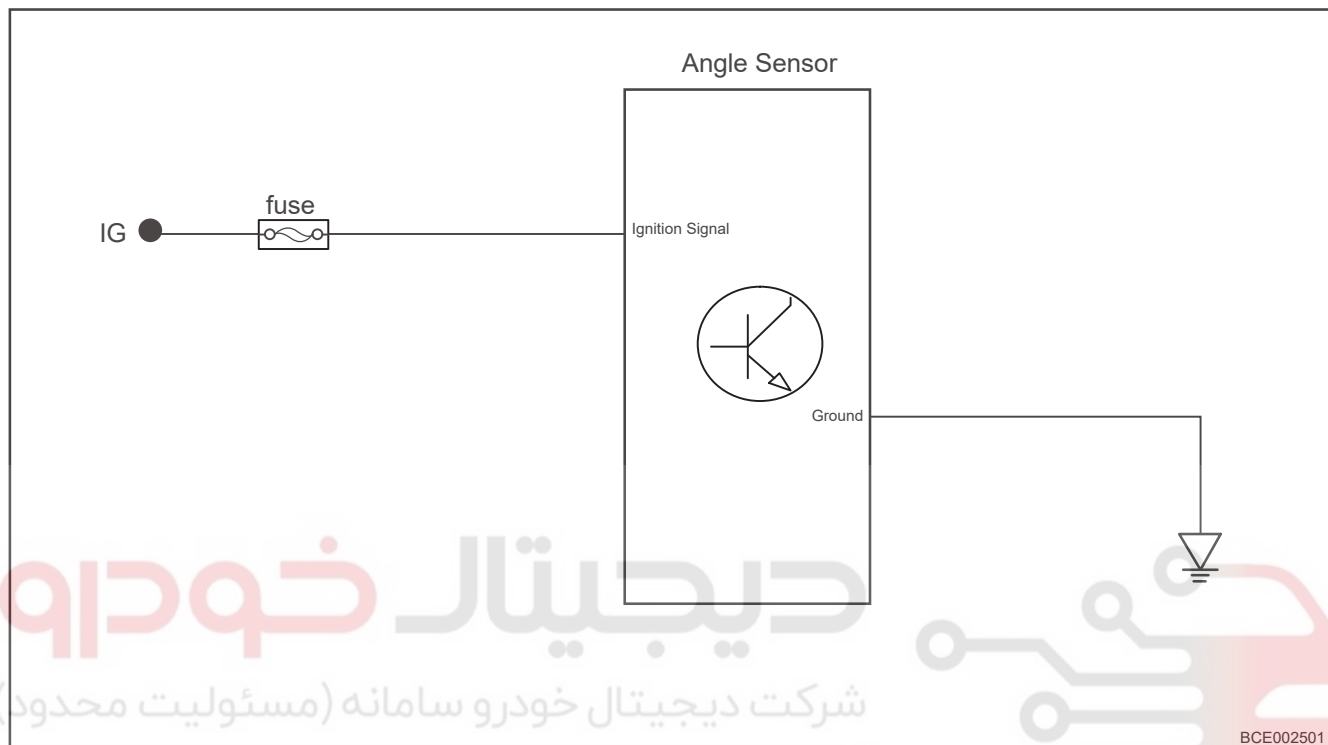
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C0051-29	Steering Wheel Angle Sensor Signal Invalid (ESP Only)
DTC	C0051-54	Steering Wheel Angle Sensor Uncalibrated (ESP Only)
DTC	C0051-64	Steering Wheel Angle Sensor Signal Abnormal (ESP Only)

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check angle sensor calibration
---	--------------------------------

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to ON.
- Use diagnostic tester to recalibrate angle sensor.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- Check if the same DTCs are still output.

NG	Calibrate steering angle sensor
----	---------------------------------

06 - BRAKE SYSTEM

OK

2 Check fuse

- (a) Turn ignition switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check if fuse is blown.

NG

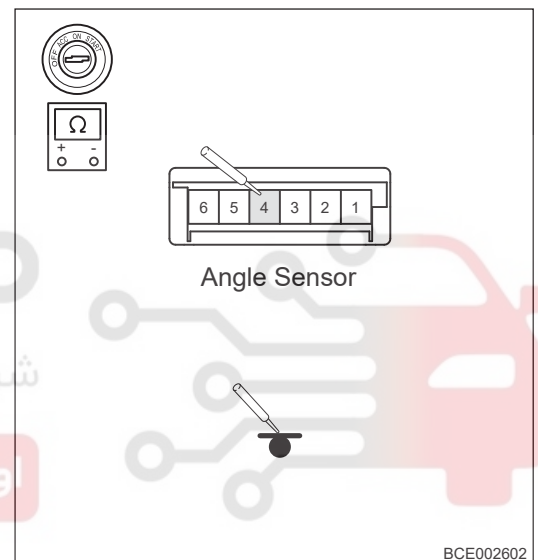
Replace fuse.

OK

3 Check related wire harness and connector of steering angle sensor

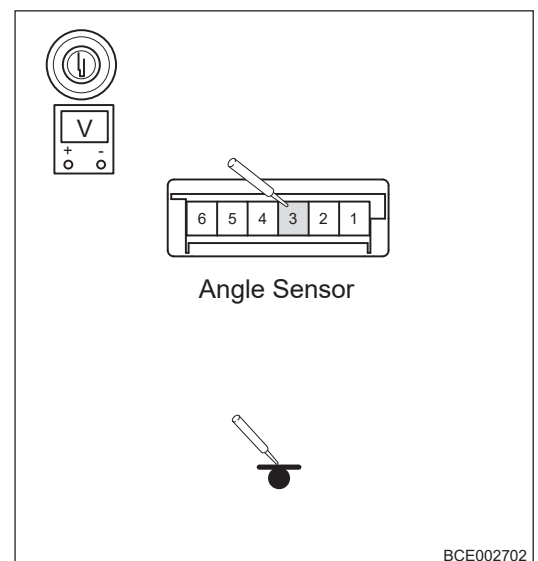
- (a) Turn ignition switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Disconnect the angle sensor connector.
 (d) Check if related wire harnesses are worn, pinched or broken.
 (e) Check if related connector terminals are loose, broken, bent or corrosive.
 (f) Check for continuity between steering angle sensor and body ground.

Multimeter Connection	Condition	Specified Condition
Angle sensor (- connect terminal) - Body ground	Always	Less than 1 Ω



- (g) Connect the negative battery cable.
 (h) Turn ignition switch to ON.
 (i) Check if voltage between steering angle sensor and body ground is normal.

Multimeter Connection	Condition	Specified Condition
Steering angle sensor (connect terminal) - Body ground	Always	More than 12 V



NG

Repair or replace related wire harness or connector.

06 - BRAKE SYSTEM

OK

4 Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C0061-64	Lateral Acceleration Sensor Signal Abnormal (ESP Only)
DTC	C0062-64	Longitudinal Acceleration Sensor Signal Abnormal (ESP Only)
DTC	C0063-64	Yaw Rate Sensor Signal Abnormal (ESP Only)
DTC	C0063-01	Yaw Rate Sensor General Electrical Fault
DTC	C0063-54	Yaw Rate Sensor Uncalibrated

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check lateral acceleration/yaw rate sensor calibration
----------	---

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to ON.
- Use diagnostic tester to recalibrate lateral acceleration/yaw rate sensor.
- Use diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- Check if the same DTCs are still output.

NG

Lateral acceleration/yaw rate sensor is not calibrated

OK

2	Check ESP (integrated EPB)
----------	-----------------------------------

- Check ESP control module assembly fixing bolt for looseness.
- Check ESP control module assembly fixing bracket bolt for looseness.

NG

Tighten fixing bolt and fixing bracket bolt of ESP (integrated EPB) properly

OK

3	Confirm DTCs again
----------	---------------------------



06 - BRAKE SYSTEM

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C006B-00	Stability System Active Too Long
DTC	C053C-FC	Wheel-speed Sensor Generic Error
DTC	C1099-08	Wrong Direction of Wheel Speed Sensor

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check related wire harness and connector
----------	---

Use circuit diagram as a guide to perform the following inspection procedures:

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Disconnect all wheel speed sensor and angle sensor connectors.
- Check if related wire harnesses are worn, pinched or broken.

NG

Repair or replace related wire harness and connector

OK

2	Check installation of wheel speed sensor
----------	---

- Turn ignition switch to OFF.
- Disconnect the negative battery cable.
- Check wheel speed sensor fixing bolt for looseness.
- Check for excessive clearance between installation position of wheel speed sensor and front steering knuckle.
- Check installation position of rear right wheel speed sensor for dirt.

NG

Tighten fixing bolt properly, clean or replace wheel speed sensor

OK

3	Check hub gear ring and drive shaft upper gear ring
----------	--

- Check hub gear ring and drive shaft upper gear ring for foreign matter, missing teeth or damage.



06 - BRAKE SYSTEM

NG

Replace hub bearing assembly or outer ball cage assembly

OK

4

Check wheel speed sensor

- (a) Drive vehicle straight ahead, and read datastream of wheel speed sensor with diagnostic tester.
- (b) Check if data change of wheel speed sensor matches that of other wheel speed sensors.

NG

Replace corresponding wheel speed sensor assembly

OK

5

Check installation of angle sensor

- (a) Turn ignition switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check if angle sensor connector is connected securely.
- (d) Check if angle sensor is installed in place.
- (e) Check if angle sensor connector position is dirty.

NG

Clean or replace spiral cable

OK

6

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

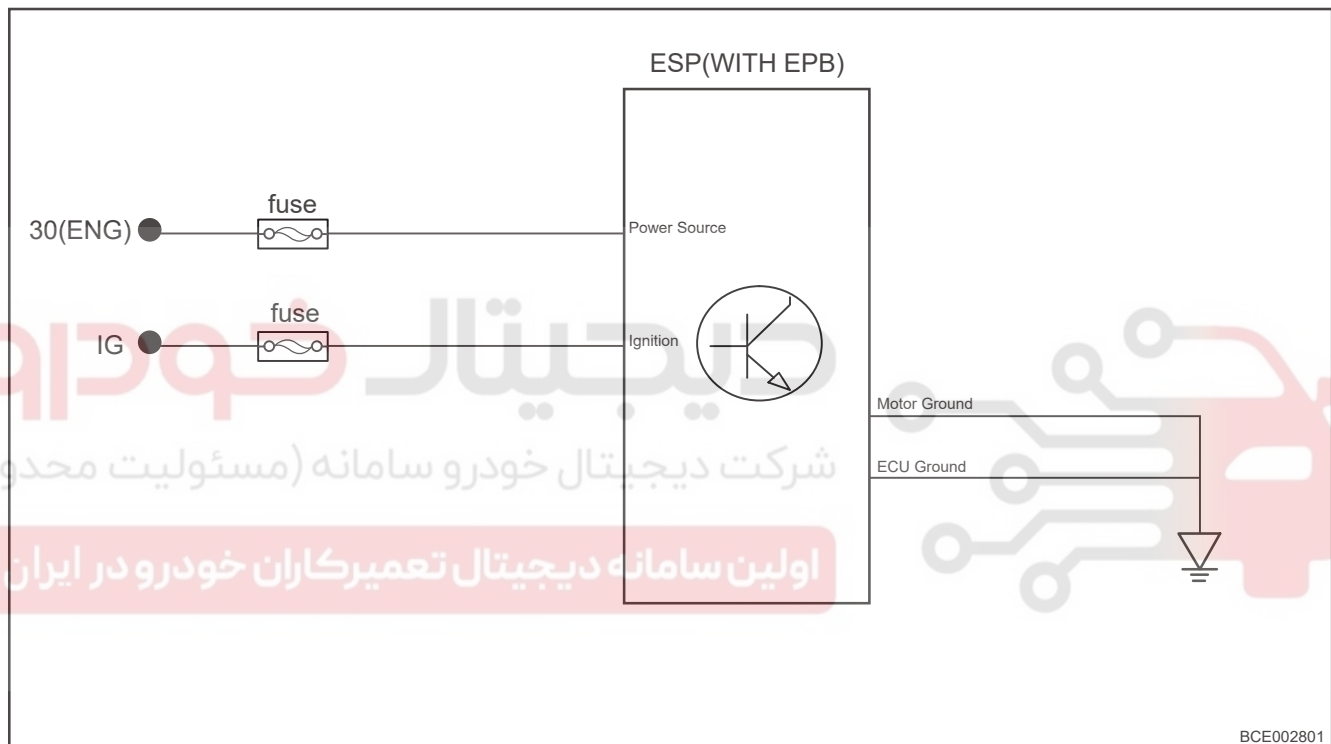
NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1000-16	ECU Voltage Too Low
DTC	C1000-17	ECU Voltage Too High
DTC	C1001-04	Internal fault in ECU system
DTC	C1009-00	ECU Hardware Related Fault
DTC	C1002-49	CAN Hardware Internal Electronic Failure
DTC	C1002-49	System ASIC GPIO Error or APB Asic Voltage Error or PBC SW Failure
DTC	C156B-00	EPBASIC_GenericError-No Sub Type Information

Control Schematic Diagram



DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check fuse
---	------------

06 - BRAKE SYSTEM

Use circuit diagram as a guide to perform the following inspection procedures:

- (a) Turn ignition switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check if related wire harness or connector is well installed and check for looseness.
- (d) Check the fuse.
- (e) Check if fuse is blown.

NG

Replace related fuse

OK

2 Check battery voltage

- (a) Standard voltage: Not less than 12V.

NG

Replace battery or check charging system

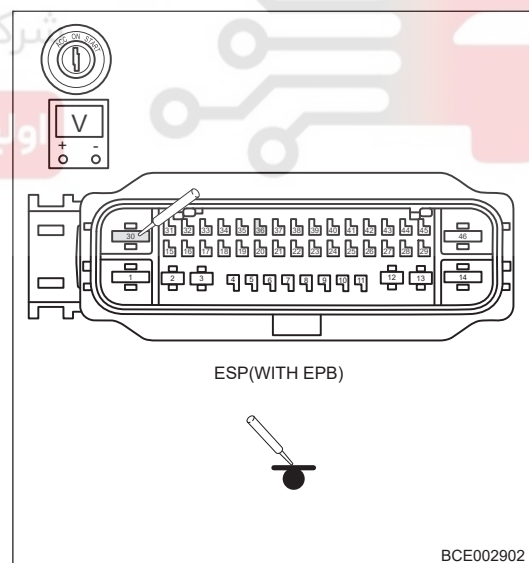
OK

3 Check wire harness and connector

- (a) Disconnect ESP (integrated EPB) connector.
- (b) Turn ignition switch to ON.
- (c) Check if the voltage between ESP (integrated EPB) and body ground is normal.

Voltage Measurement

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (power supply terminal) - Body ground	Always	More than 12 V
ESP (integrated EPB) (power supply terminal) - Body ground	Always	More than 12 V

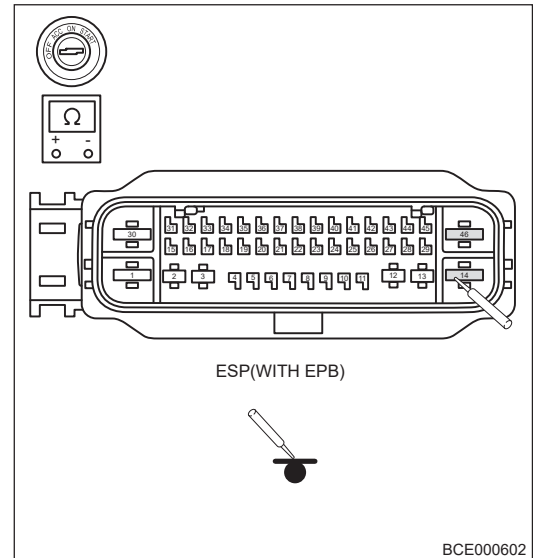


06 - BRAKE SYSTEM

- (d) Check if the resistance between ESP (integrated EPB) and body ground is normal.

Resistance Measurement

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω
ESP (integrated EPB) (ground terminal) - Body ground	Always	Less than 1 Ω



NG

Repair or replace related wire harness and connector

OK

4 Confirm DTCs again

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

DTC	C1803-95	Assembly Test
-----	----------	---------------

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1 Perform assembly test

- (a) Turn off power normally after performing assembly test using diagnostic tester.



06 - BRAKE SYSTEM

Next

2 Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



06 - BRAKE SYSTEM

DTC	C1804-53	EPB Maintenance Mode
------------	-----------------	-----------------------------

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Perform assembly test
----------	------------------------------

- (a) Turn off power normally after performing assembly test using diagnostic tester.

Next

2	Confirm DTCs again
----------	---------------------------

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

DTC	C0072-FC	DHP Valve Overheat Protection
DTC	C1802-44	PBC EEPROM Fault
DTC	C186D-44	SupervisionFail-Data Memory Failure

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Turn the power supply off
----------	----------------------------------

- (a) Disconnect the negative battery.

Next



06 - BRAKE SYSTEM

2	Confirm DTCs again
----------	---------------------------

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK	Confirm that system operates normally
NG	Replace ESP (integrated EPB)

DTC	C0563-00	ABS Implausible Long Control
DTC	C1805-94	Hydric Support Failed

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Turn the power supply off
----------	----------------------------------

- (a) Disconnect the negative battery.

Next

2	Confirm DTCs again
----------	---------------------------

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK	Confirm that system operates normally
NG	Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1826-01	EPB (Electronic Parking Brake) Actuator Driver Gen Electrical Failure
DTC	C182B-1E	EPB Motor Electrical Coupling Failure
DTC	C1836-FC	EPB Motor GPIO Overcurrent Failure

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1 Check related wire harness and connector

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the electronic control execution unit connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

NG

Repair/replace related wire harness and connector

OK

2 Perform left/right brake caliper active test

- Perform rear left/right brake caliper active tester.

NG

Replace left/right brake caliper

OK

3 Confirm DTCs again

- Clear DTCs.
- Start the vehicle.
- Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)



06 - BRAKE SYSTEM

DTC	C1807-98	Disc Over Heat
------------	-----------------	-----------------------

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Perform left/right brake caliper active test
----------	---

(a) Perform rear left/right brake caliper active tester.

NG	Replace left/right brake caliper
----	----------------------------------

OK

2	Confirm DTCs again
----------	---------------------------

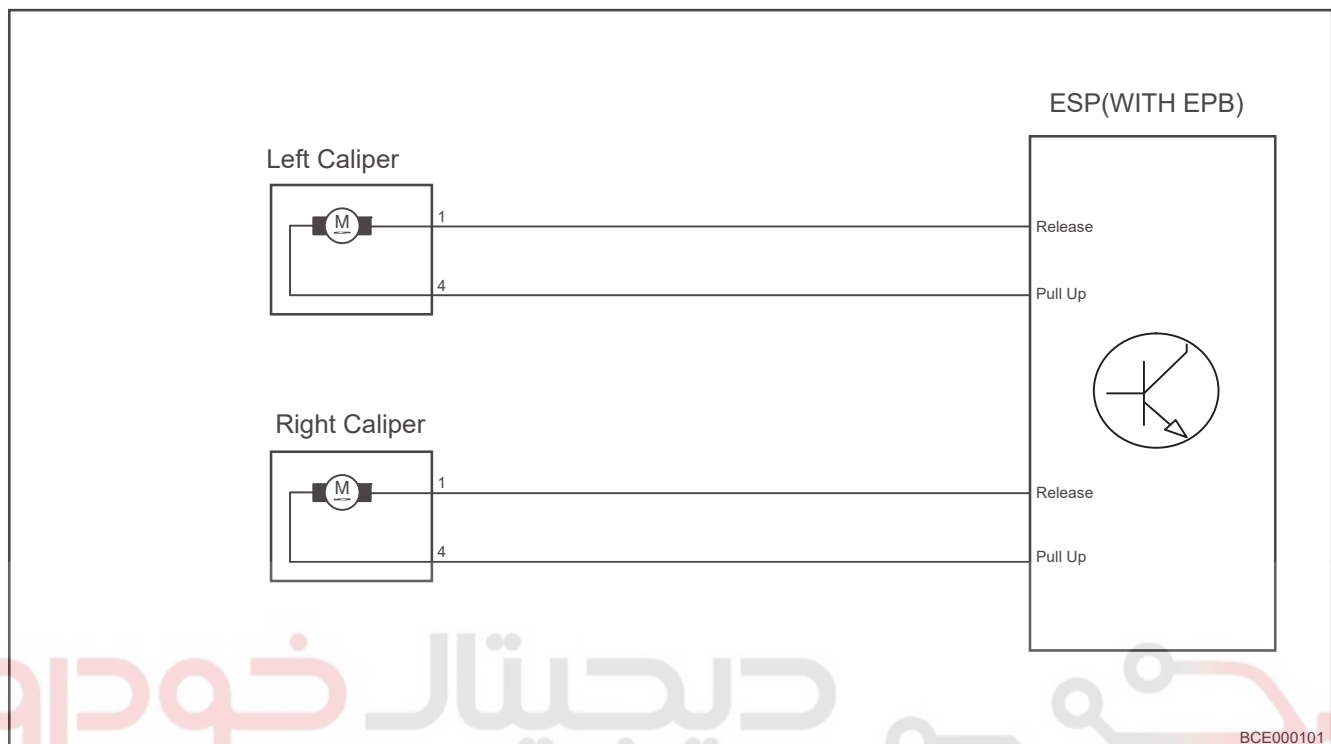
- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK	Confirm that system operates normally
NG	Replace ESP (integrated EPB)



06 - BRAKE SYSTEM

DTC	C1823-00	APB Motor Enable Line Violation
DTC	C1837-00	APB_GPIO_OverTemperature

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

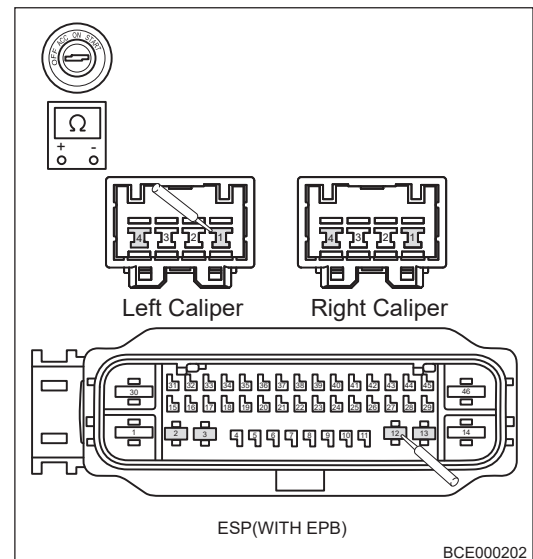
1	Check related wire harness and connector
---	---

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

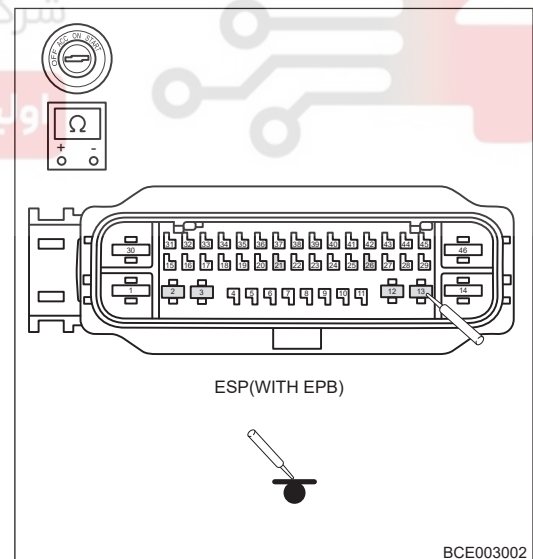
- (g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



- (h) Check if the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground is normal.

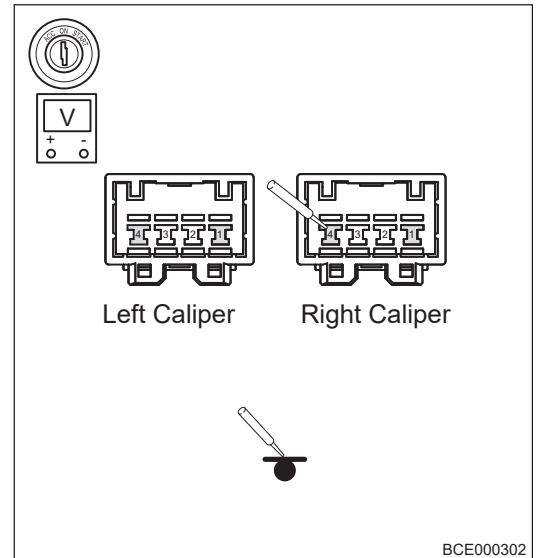
Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω



06 - BRAKE SYSTEM

- (i) Connect the negative battery cable.
- (j) Turn ENGINE START STOP switch to ON.
- (k) Check the voltage between ESP (integrated EPB) and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG

Repair or replace related wire harness and connector

OK

2

Perform left/right brake caliper active test

- (a) Perform rear left/right brake caliper active tester.

NG

Replace left/right brake caliper

OK

3

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

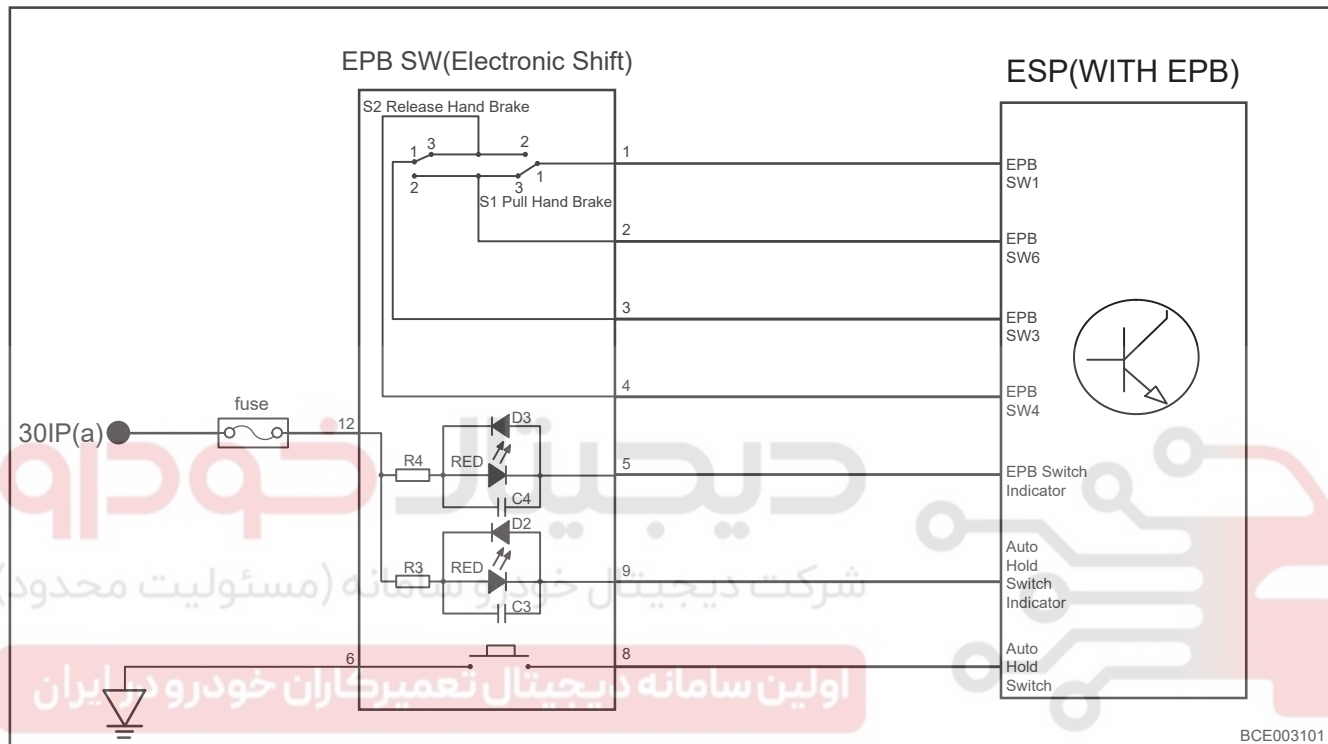
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1806-01	EPB Button Line Failure-General Electrical Failure
DTC	C1806-16	EPB Button Under Voltage
DTC	C1806-04	EPB Button Always Pushed or Pulled-System Internal Failure
DTC	C156B-00	EPB_SupplyFault-System Internal Failure
DTC	C0089-04	TCS Disable Switch(ESP Only)
DTC	C104D-04	AVH Button Switch Failure

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

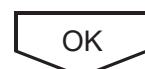
Hint:

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

1	Check battery voltage
---	-----------------------

(a) Standard voltage: Not less than 12V.

NG	Repair charging system/replace battery
----	--

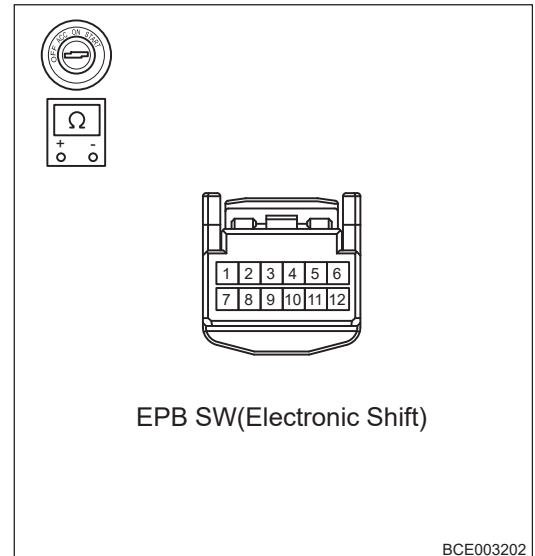


2	Check EPB switch
---	------------------

06 - BRAKE SYSTEM

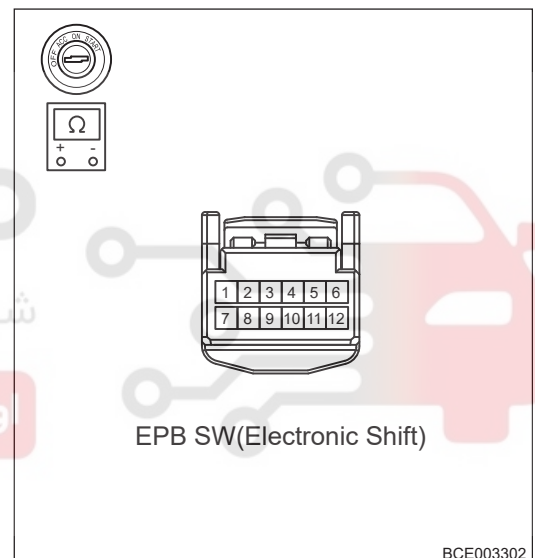
- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Disconnect the EPB switch connector.
 (d) Check if EPB switch is stuck or pushed in by other objects.
 (e) Check for switch continuity when EPB switch is not pressed.

Multimeter Connection	Condition	Specified Condition
EPB switch (1) - EPB switch (2)	Always	Less than 1 Ω
EPB switch (3) - EPB switch (4)	Always	Less than 1 Ω



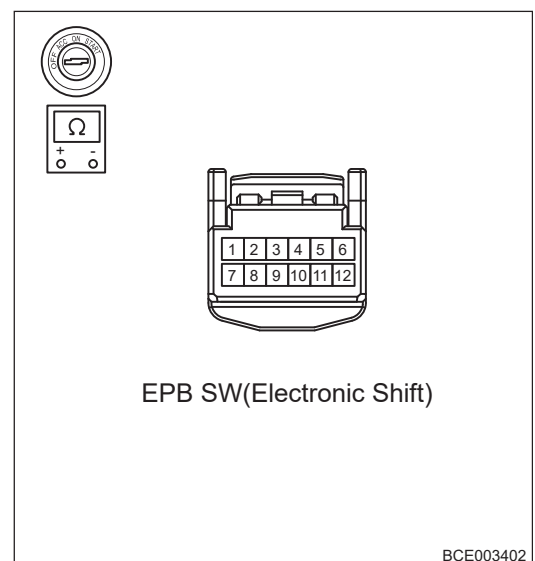
- (f) Check for switch continuity when EPB switch is pressed.

Multimeter Connection	Condition	Specified Condition
EPB switch (1) - EPB switch (3)	Always	Less than 1 Ω



- (g) Check for switch continuity when EPB switch is pulled.

Multimeter Connection	Condition	Specified Condition
EPB switch (2) - EPB switch (4)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

NG

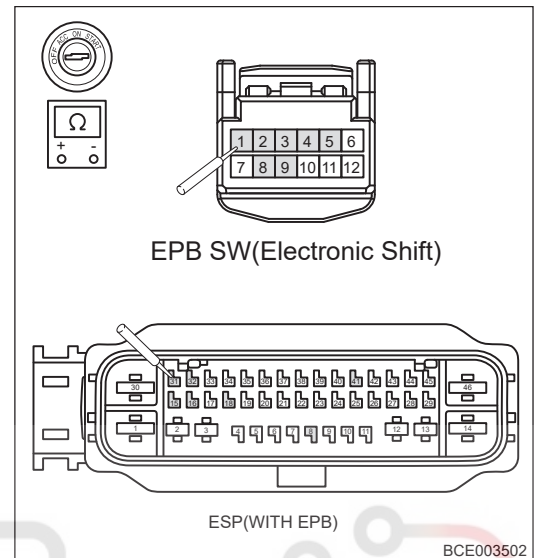
Replace EPB switch

OK

3 Check related wire harness and connector

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the EPB switch connector.
- (d) Disconnect the EPB control module assembly.
- (e) Check if related wire harnesses are worn, pinched or broken.
- (f) Check if related connector terminals are loose, broken, bent or corrosive.
- (g) Check for continuity between wire harness of EPB switch and ESP (integrated EPB).

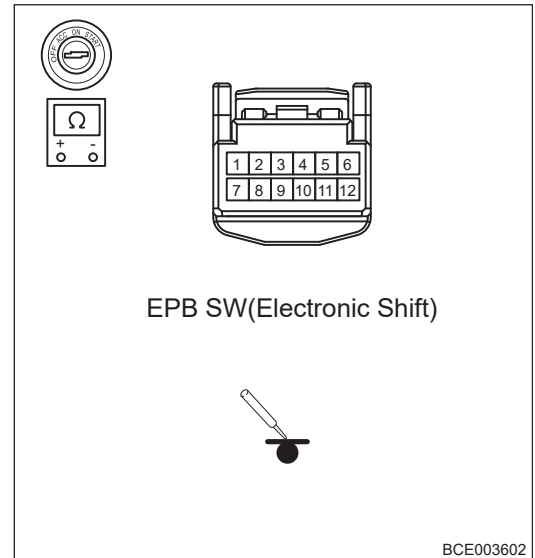
Multimeter Connection	Condition	Specified Condition
EPB switch (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (2) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (3) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (5) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (9) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
EPB switch (8) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

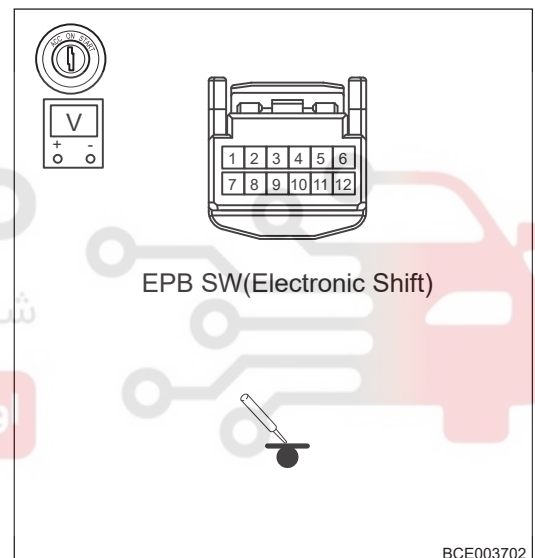
(h) Check the resistance between EPB switch and body ground.

Multimeter Connection	Condition	Specified Condition
EPB switch (6) - Body ground	Always	Less than 1 Ω



(i) Check the voltage between EPB switch and body ground.

Multimeter Connection	Condition	Specified Condition
EPB switch (12) - Body ground	Always	5 V



NG

Repair/replace related wire harness and connector

OK

4 Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

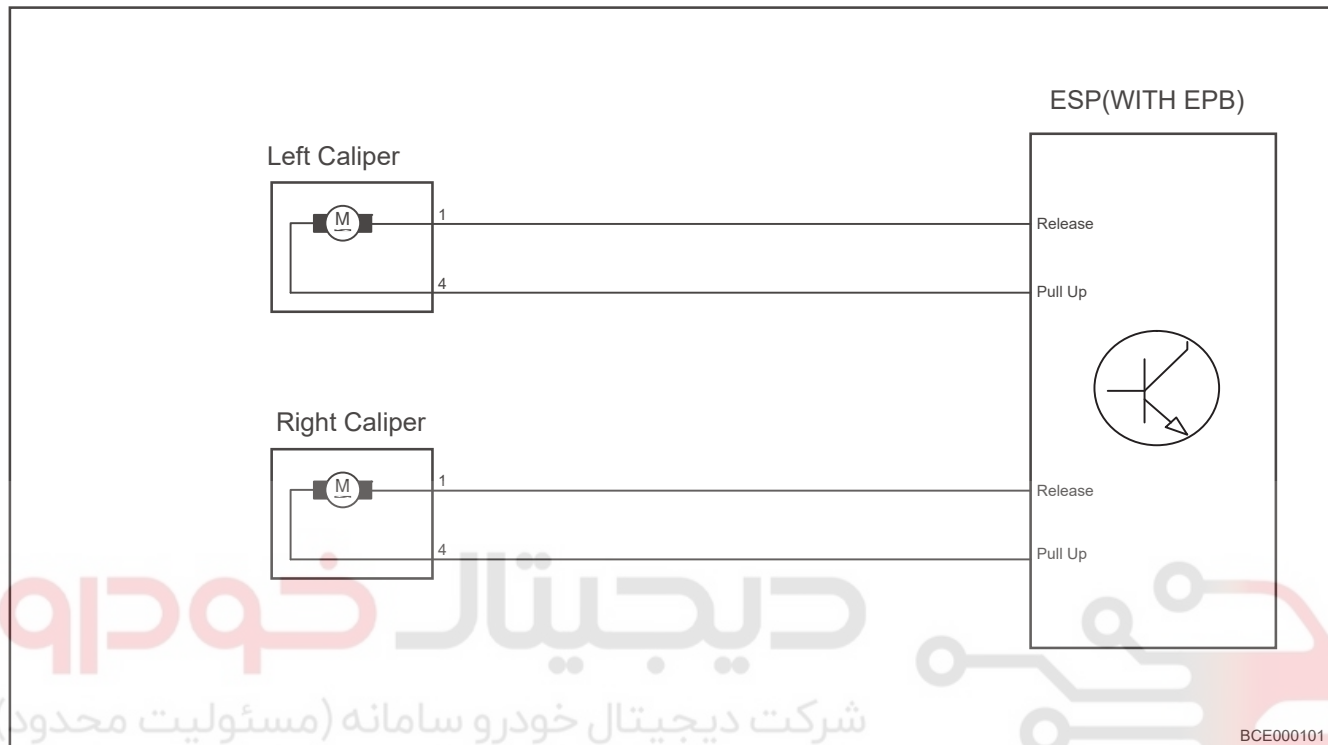


06 - BRAKE SYSTEM

NG

Replace ESP (integrated EPB)

DTC	C1830-00	EPB (Electronic Parking Brake) Left Actuator CAT
DTC	C1831-00	EPB (Electronic Parking Brake) Right Actuator CAT

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

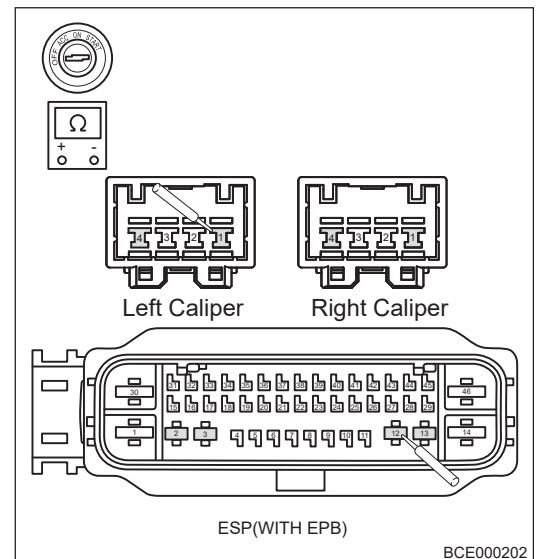
1	Check related wire harness and connector
---	--

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

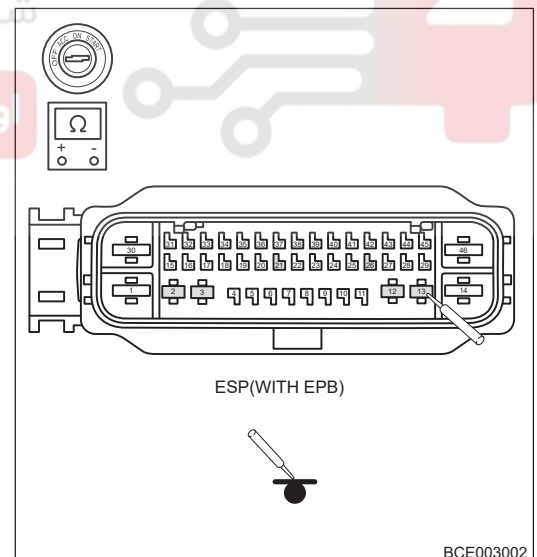
- (g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



- (h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

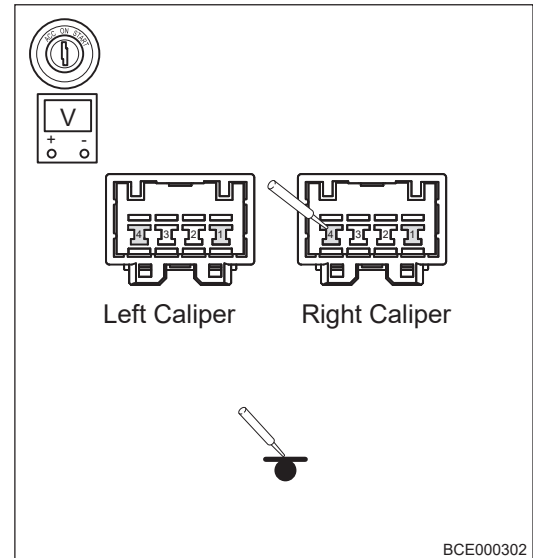
Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω



06 - BRAKE SYSTEM

- (i) Connect the negative battery cable.
- (j) Turn ENGINE START STOP switch to ON.
- (k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG

Repair or replace related wire harness and connector

OK

2

Perform left/right brake caliper active test

- (a) Perform rear left/right brake caliper active tester.

NG

Replace left/right brake caliper

OK

3

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

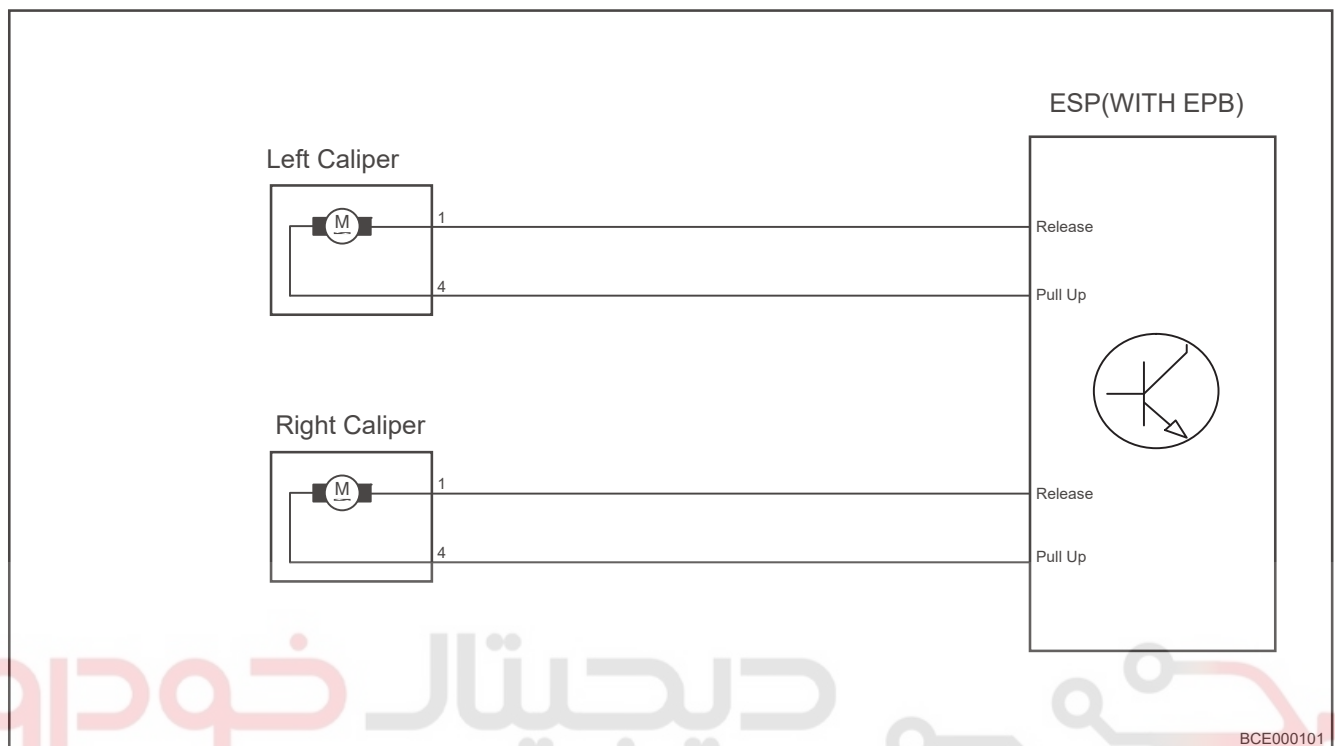
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1800-97	Left Actuator - Action Limited
DTC	C1801-97	Right Actuator - Action Limited

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

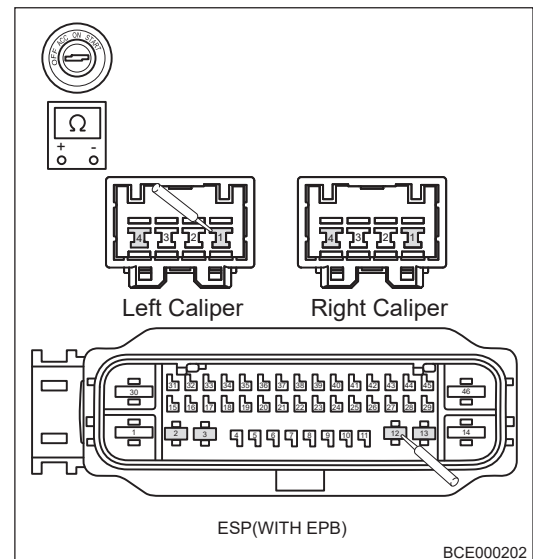
1	Check related wire harness and connector
---	---

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

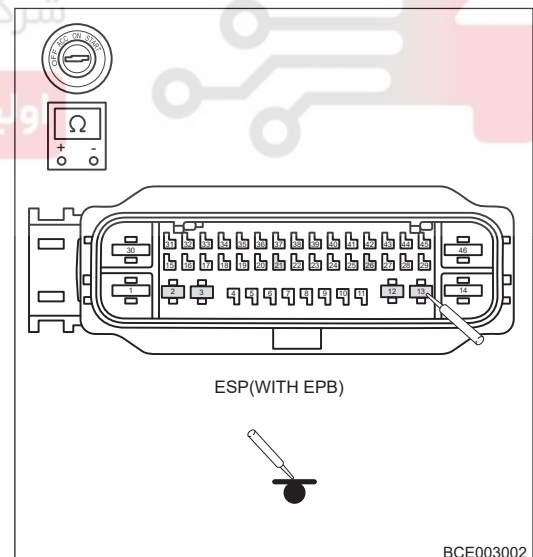
- (g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



- (h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

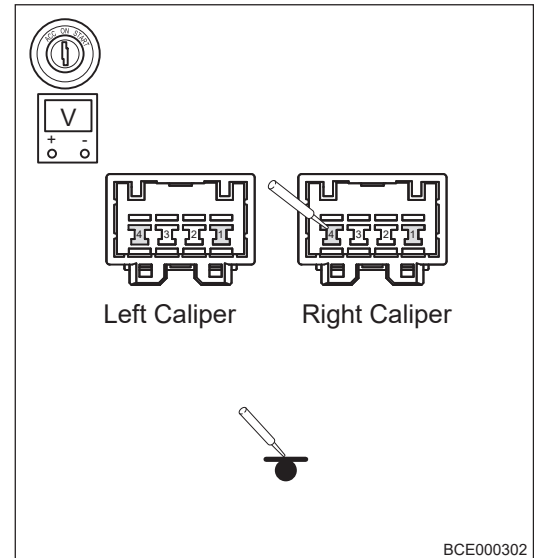
Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 k Ω



06 - BRAKE SYSTEM

- (i) Connect the negative battery cable.
- (j) Turn ENGINE START STOP switch to ON.
- (k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG

Repair or replace related wire harness and connector

OK

2 Perform left/right brake caliper active test

- (a) Perform rear left/right brake caliper active tester.

NG

Replace left/right brake caliper

OK

3 Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

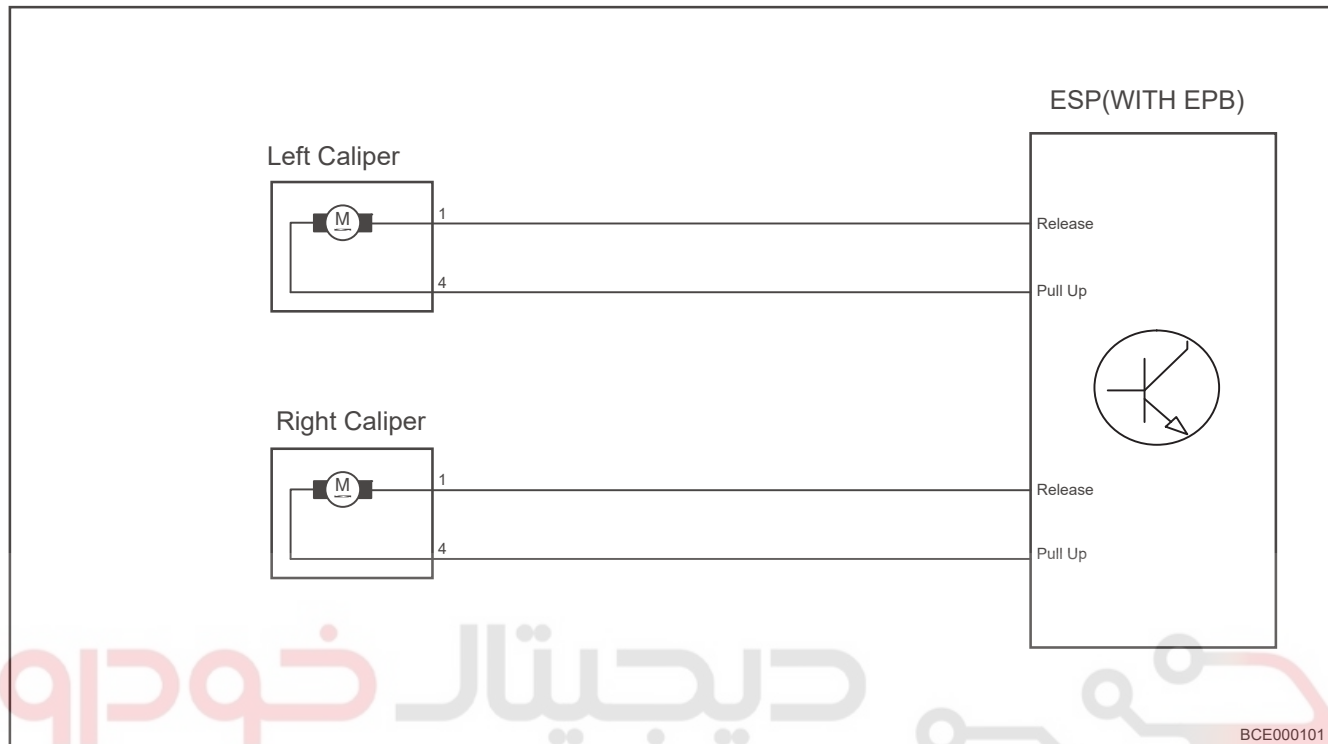
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1832-00	EPB Left Actuator Unintended Run-No Sub Type Information
DTC	C1833-00	EPB Right Actuator Unintended Run-No Sub Type Information

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

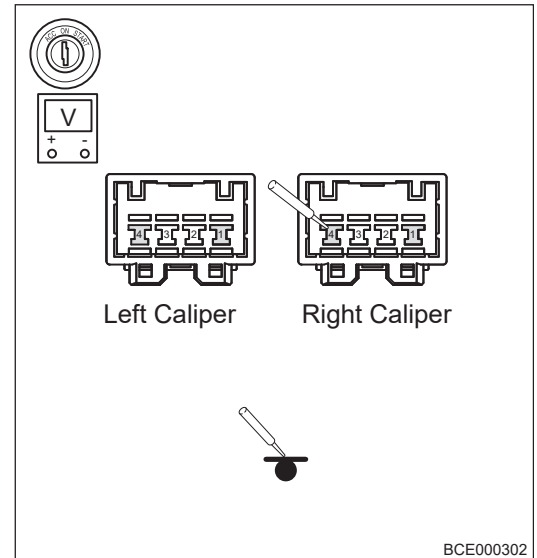
1	Check related wire harness and connector
---	--

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

- (g) Connect the negative battery cable.
 (h) Turn ENGINE START STOP switch to ON.
 (i) Check the voltage between ESP (integrated EPB) and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG

Repair or replace related wire harness and connector

OK

2

Confirm DTCs again

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK

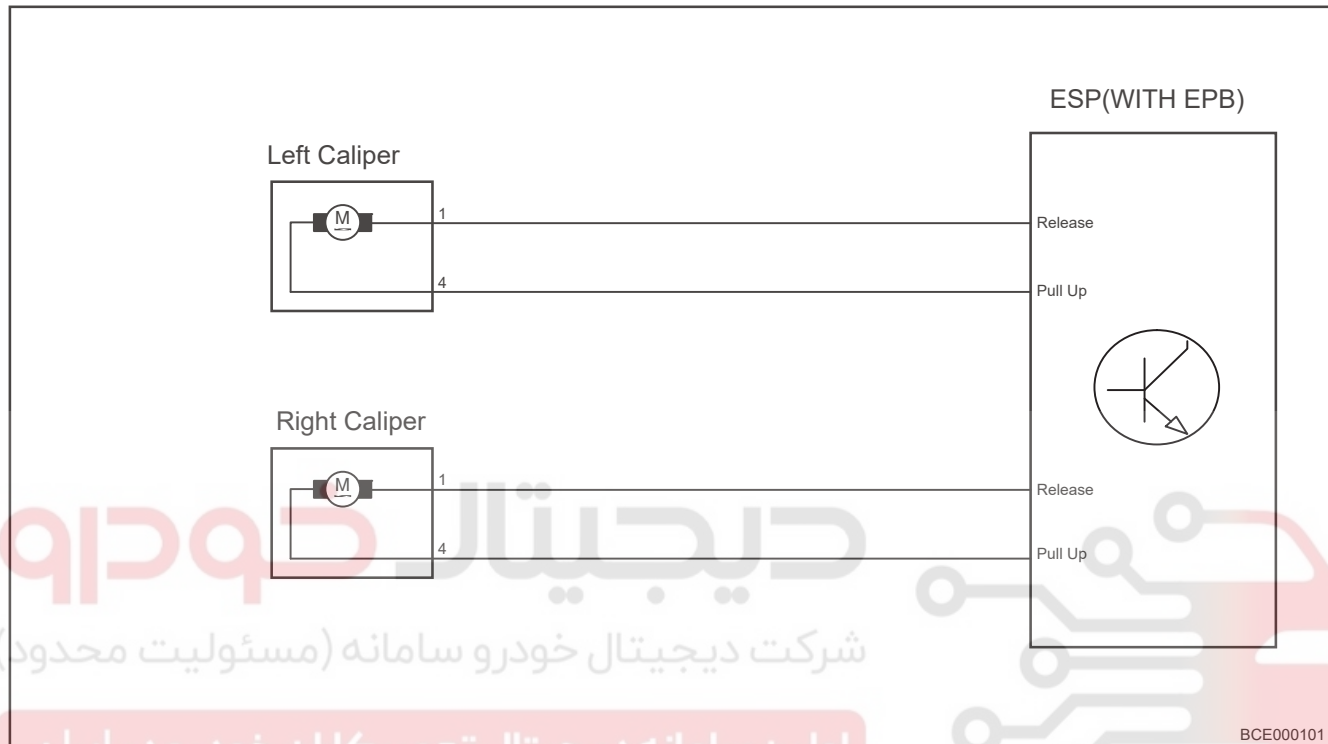
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1800-73	Left Actuator - Apply Failed-Actuator Stuck Closed
DTC	C1800-74	Left Actuator - Actuator Slipping (Apply Time Out)
DTC	C1801-73	Right Actuator - Apply Failed-Actuator Stuck Closed
DTC	C1801-74	Right Actuator - Actuator Slipping (Apply TimeOut)-Actuator Slipping

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check battery voltage
---	------------------------------

(a) Standard voltage: Not less than 12V.

NG	Repair charging system/replace battery
----	---

OK

2	Check related wire harness and connector
---	---

06 - BRAKE SYSTEM

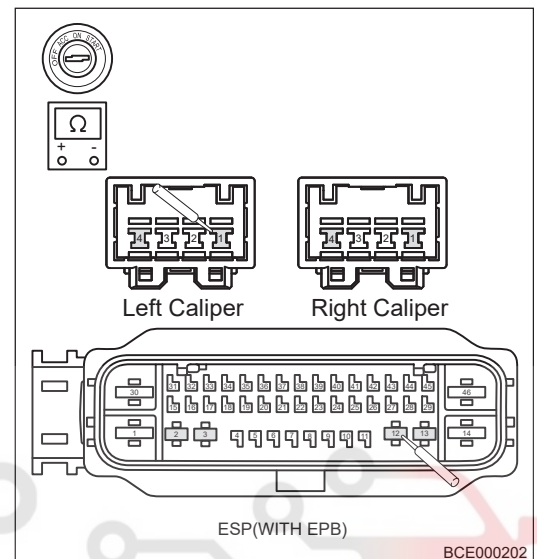
- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the left/right brake caliper connector.
- (d) Disconnect the EPB control module assembly connector.
- (e) Check if related wire harnesses are worn, pinched or broken.
- (f) Check if related connector terminals are loose, broken, bent or corrosive.
- (g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω

NG

Repair or replace related wire harness and connector

OK



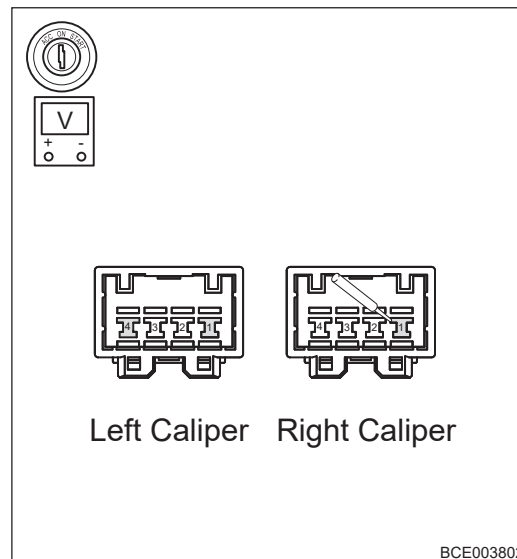
3

Check left/right brake caliper

06 - BRAKE SYSTEM

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG

Replace left/right brake caliper

OK

4 Confirm DTCs again

- (a) Clear DTCs.
 (b) Start the vehicle.
 (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
 (d) Check if the same DTCs occur.

OK

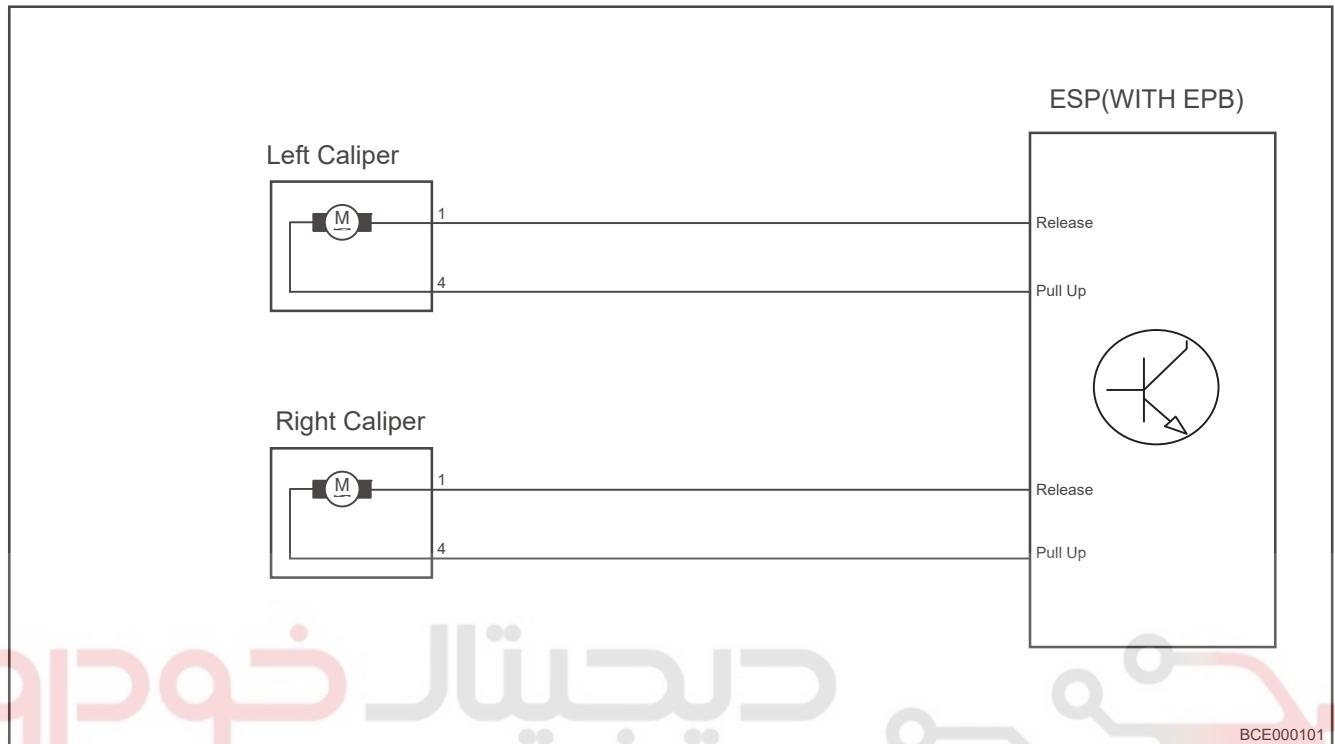
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1800-72	Left Actuator - Release Failed-Actuator Stuck Open
DTC	C1801-72	Right Actuator -Release Failed-Actuator Stuck Open

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

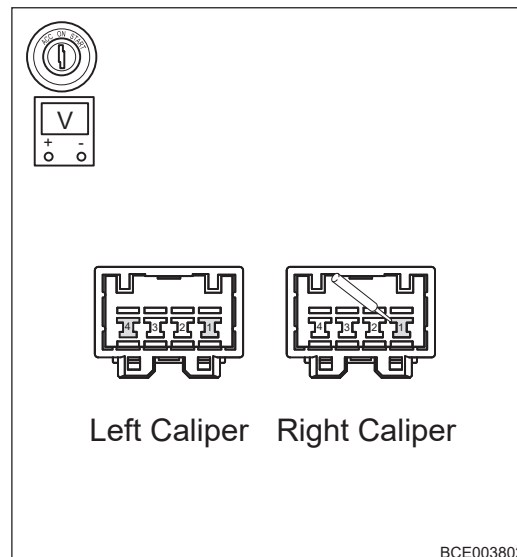
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check left/right brake caliper
---	--------------------------------

06 - BRAKE SYSTEM

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG

Replace left/right brake caliper

OK

2

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

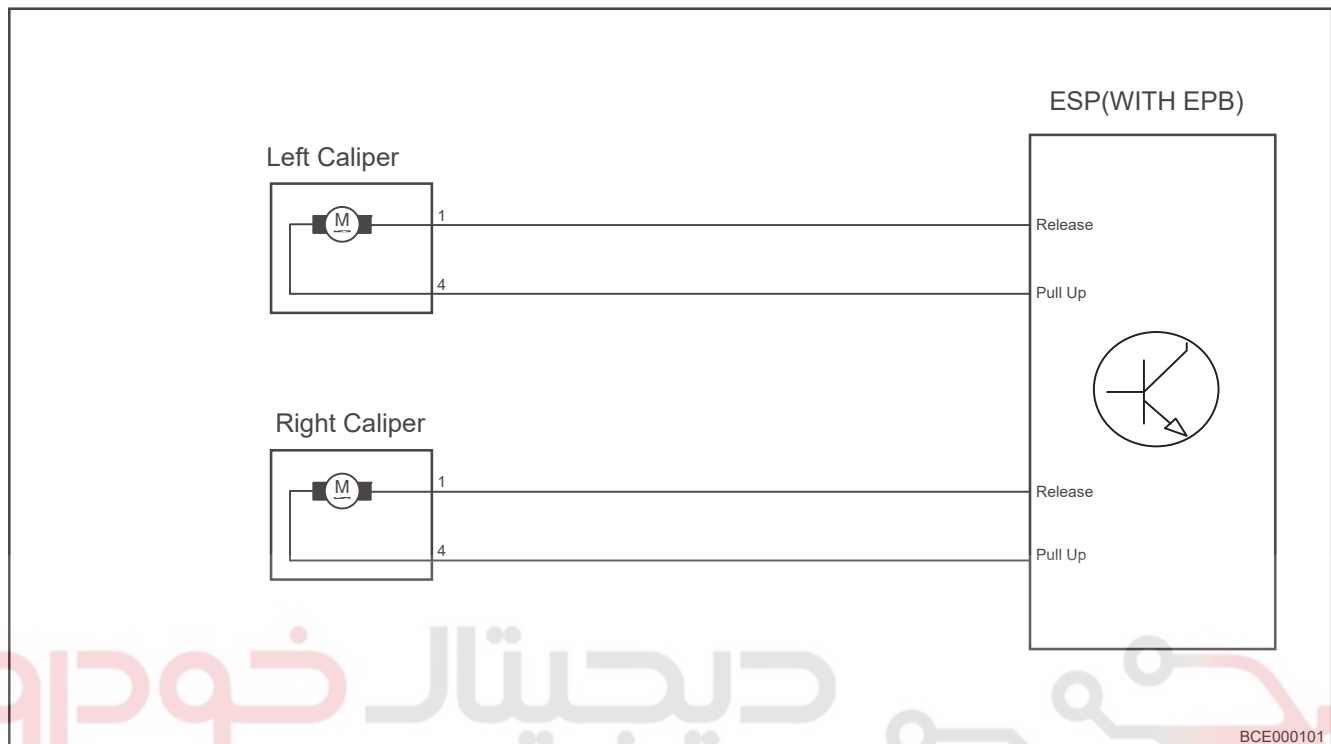
Confirm that system operates normally

NG

Replace ESP (integrated EPB)

06 - BRAKE SYSTEM

DTC	C1800-93	Left Actuator - No Motor Start Detected-No Operation
DTC	C1801-93	Right Actuator - No Motor Start Detected-No Operation

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

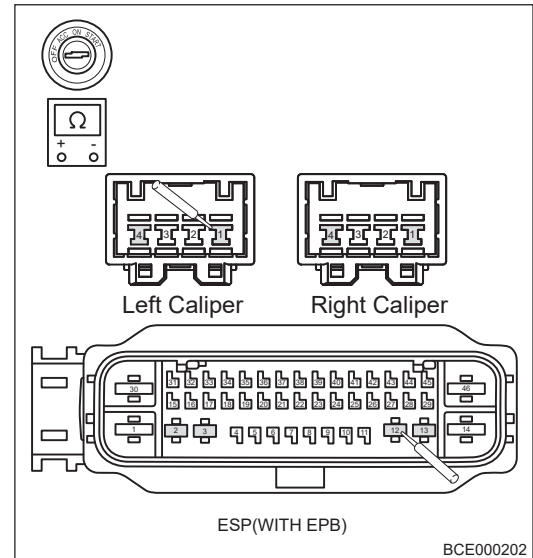
1	Check related wire harness and connector
---	---

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (-integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



NG

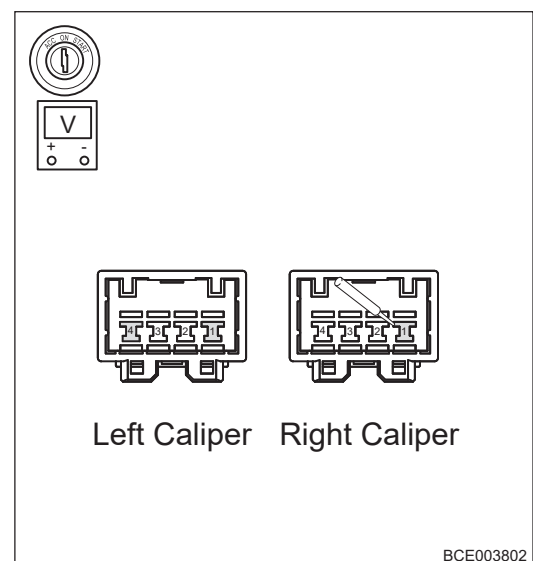
Repair or replace related wire harness and connector

OK

2 Check left/right brake caliper

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG

Replace left/right brake caliper

OK

3

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

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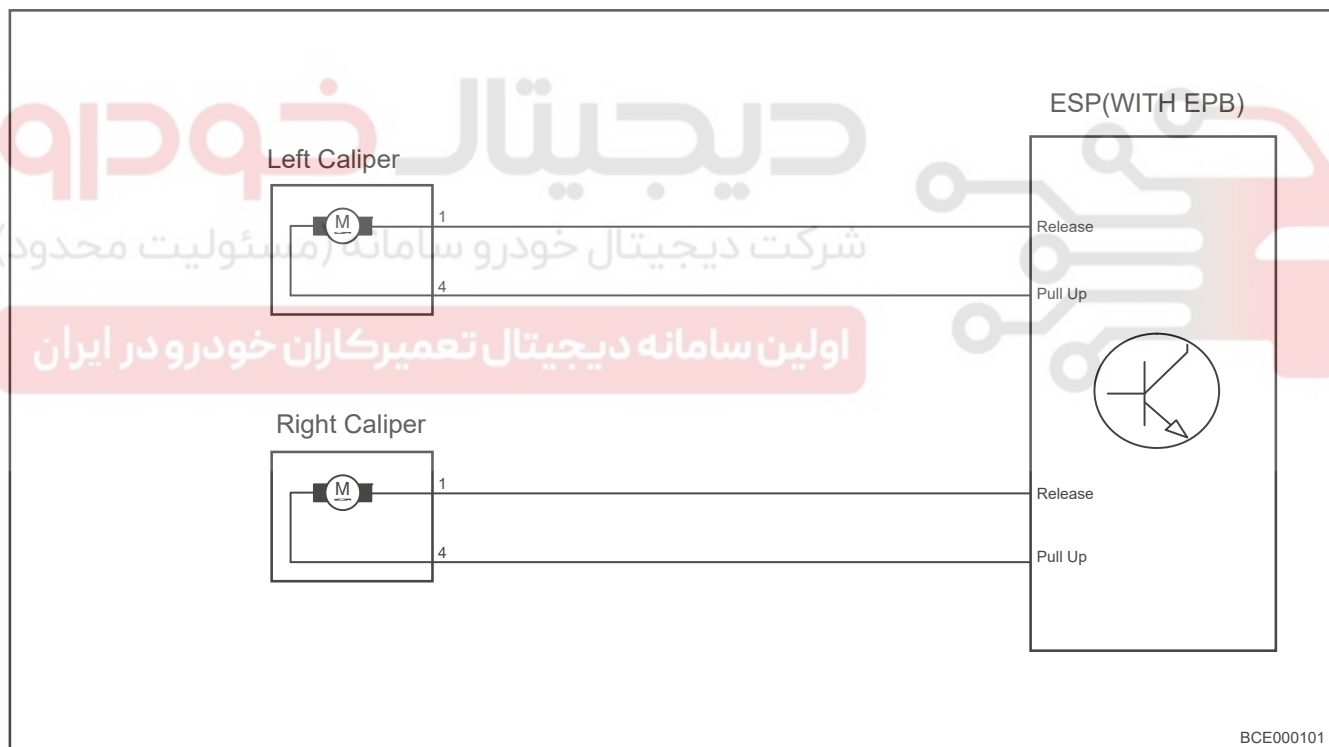
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06 - BRAKE SYSTEM

DTC	C1800-19	Left Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold
DTC	C1808-11	Circuit Short To Ground of Left Rear Caliper
DTC	C1808-12	Circuit Short To Battery of Left Rear Caliper
DTC	C1808-13	Circuit Open of Left Rear Caliper - Circuit Open
DTC	C1810-01	Short in Left Rear Caliper Positive and Negative
DTC	C1801-19	Right Actuator - Circuit Current Above Threshold-Circuit Current Above Threshold
DTC	C1815-11	Circuit Short To Ground of Right Rear Caliper-Circuit Short To Ground
DTC	C1815-12	Circuit Short To Battery of Right Rear Caliper-Circuit Short To Battery
DTC	C1815-13	Circuit Open of Right Rear caliper-Circuit Open
DTC	C1817-01	Short in Right Rear Caliper Positive and Negative



BCE000101

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

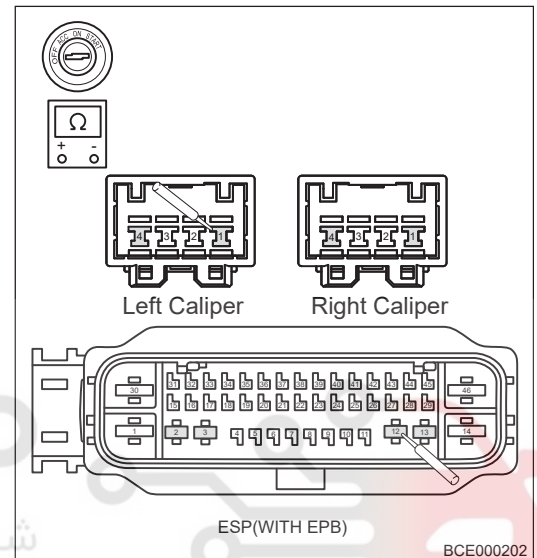
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

06 - BRAKE SYSTEM

1 Check related wire harness and connector

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the left/right brake caliper connector.
- (d) Disconnect the EPB control module assembly connector.
- (e) Check if related wire harnesses are worn, pinched or broken.
- (f) Check if related connector terminals are loose, broken, bent or corrosive.
- (g) Check for continuity between left/right brake caliper to ESP (integrated EPB) wire harness and ESP (integrated EPB) wire harness.

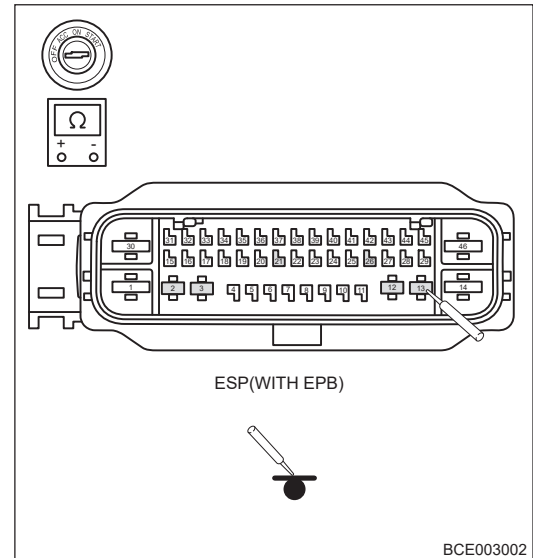
Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

- (h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



NG

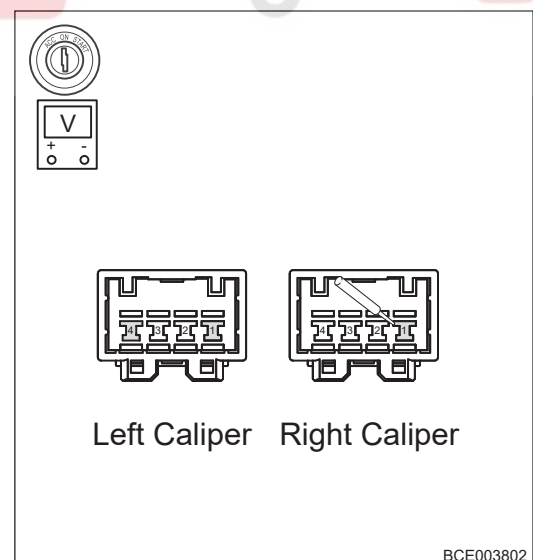
Repair or replace related wire harness and connector

OK

2 Check left/right brake caliper

- (a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG

Replace left/right brake caliper

OK

3 Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

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06 - BRAKE SYSTEM

DTC	C1800-92	Left Actuator - High Mechanical Resistance-Performance or Incorrect Operation
DTC	C1801-92	Right Actuator - High Mechanical Resistance-Performance or Incorrect Operation

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Perform left/right brake caliper active test
---	--

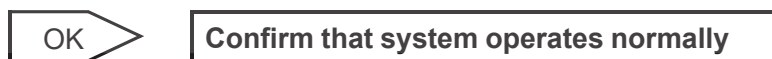
(a) Perform rear left/right brake caliper active tester.



OK

2	Confirm DTCs again
---	--------------------

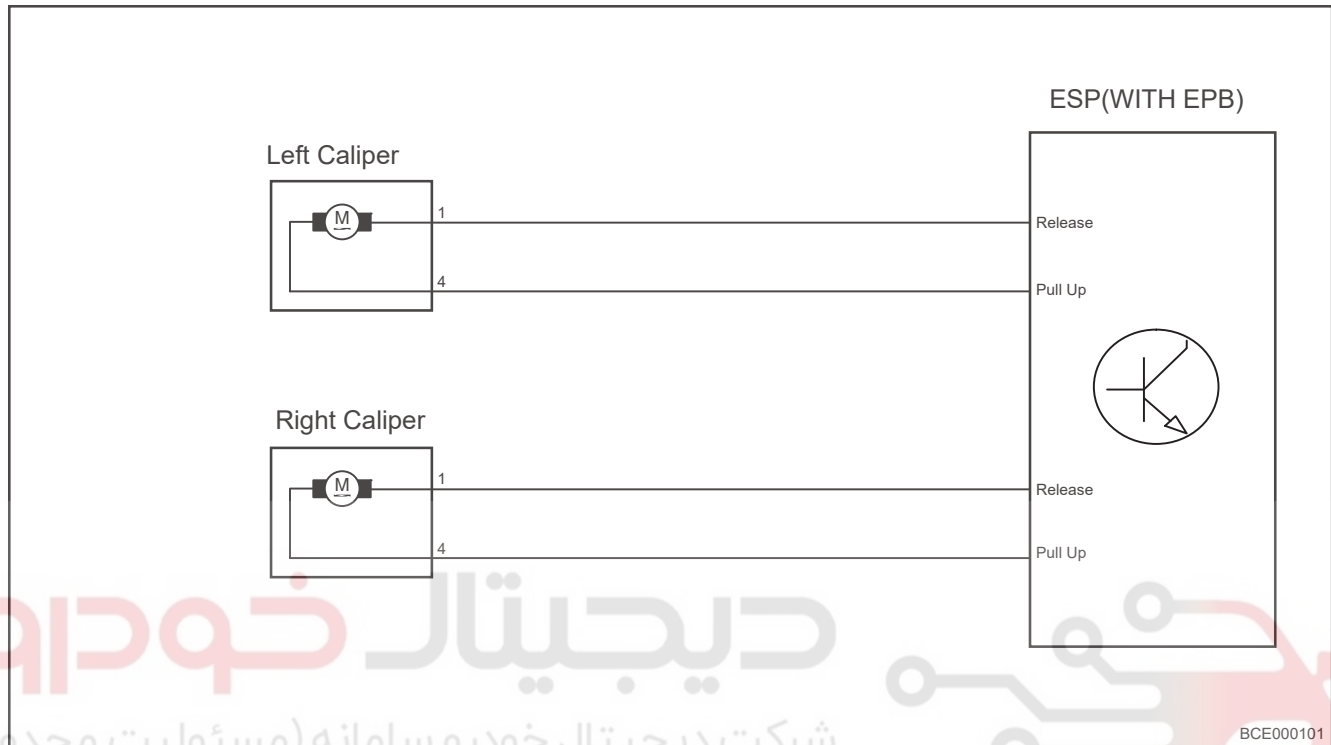
- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.



OK

06 - BRAKE SYSTEM

DTC	C1800-91	Left Actuator - Wrong Operating Characteristics Detect-Parametric
DTC	C1801-91	Right Actuator - Wrong Operating Characteristics Detect-Parametric

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

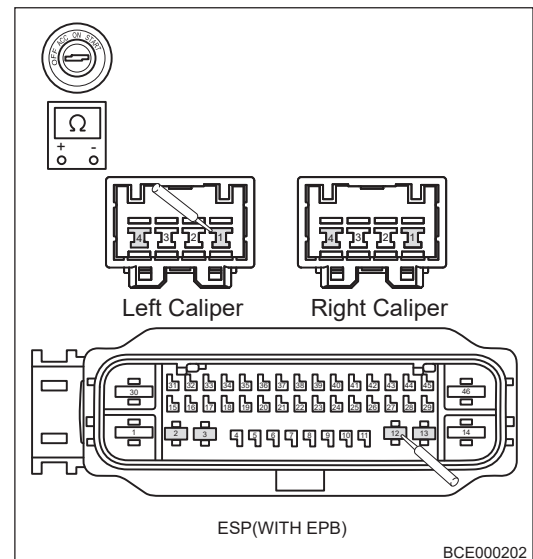
1	Check related wire harness and connector
---	---

- Turn ENGINE START STOP switch to OFF.
- Disconnect the negative battery cable.
- Disconnect the left/right brake caliper connector.
- Disconnect the EPB control module assembly connector.
- Check if related wire harnesses are worn, pinched or broken.
- Check if related connector terminals are loose, broken, bent or corrosive.

06 - BRAKE SYSTEM

(g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



NG

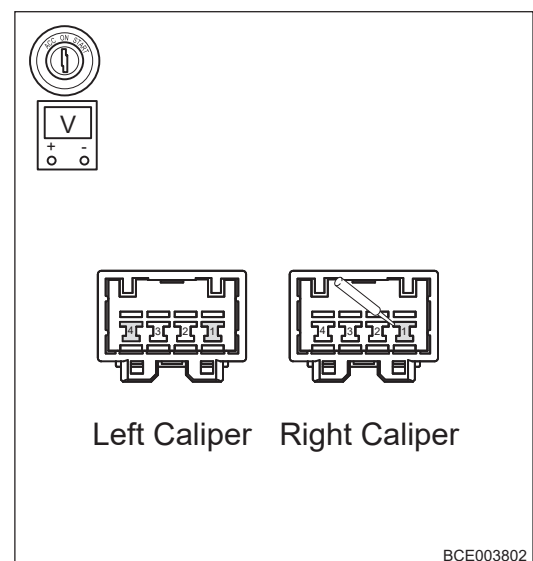
Repair or replace related wire harness and connector

OK

2 Check left/right brake caliper

(a) Check internal resistance of left/right brake caliper motor.

Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - Left brake caliper (4)	Always	1.1 - 1.6 Ω
Right brake caliper (1) - right brake caliper (4)	Always	1.1 - 1.6 Ω



NG

Replace left/right brake caliper

OK

3

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Brake System/Electronic Stability Program)" system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

دیجیتال خودرو

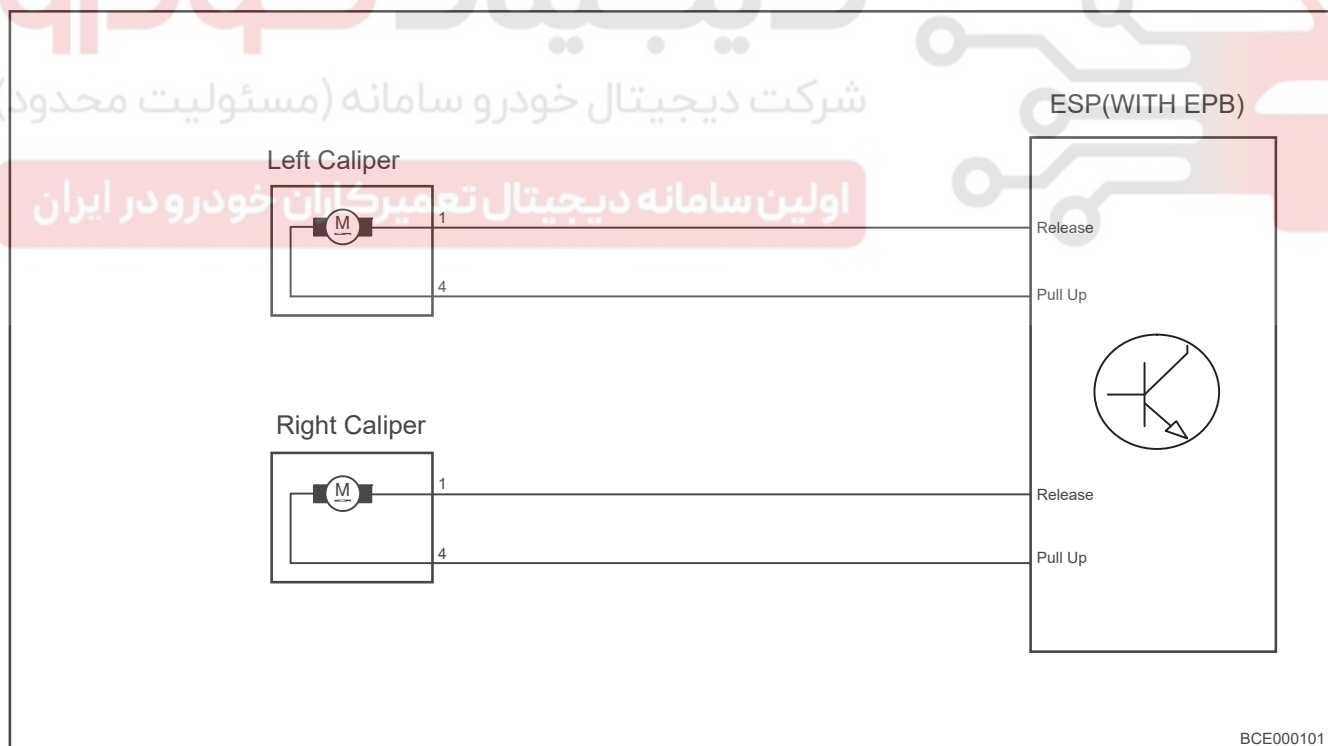
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06 - BRAKE SYSTEM

DTC	C1824-01	EPB Left Actuator Electrical Failure-General Electrical Failure
DTC	C1822-00	EPB Left Actuator Failure
DTC	C1824-1E	EPB Left Actuator Shunt On Line or ECU-Circuit Resistance Out of Range
DTC	C1822-FC	EPB Left Motor Line Failure
DTC	C1824-96	EPB Intern Left HW Failure
DTC	C1825-01	EPB Right Actuator Electrical Failure-General Electrical Failure
DTC	C1821-00	EPB Right Actuator Failure
DTC	C1825-1E	EPB Right Actuator Shunt On Line or ECU-Circuit Resistance Out of Range
DTC	C1821-FC	EPB Right Motor Line Failure
DTC	C1825-96	EPB Intern Right HW Failure
DTC	C1834-1D	Short in Left Rear Caliper Positive and Negative
DTC	C1834-FC	EPB Left Motor Transistors Error
DTC	C1835-1D	Short in Right Rear Caliper Positive and Negative
DTC	C1835-FC	EPB Right Motor Transistors Error

**DTC Confirmation Procedure**

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

06 - BRAKE SYSTEM

Hint:

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

1 Perform left/right brake caliper active test

(a) Perform rear left/right brake caliper active tester.

NG

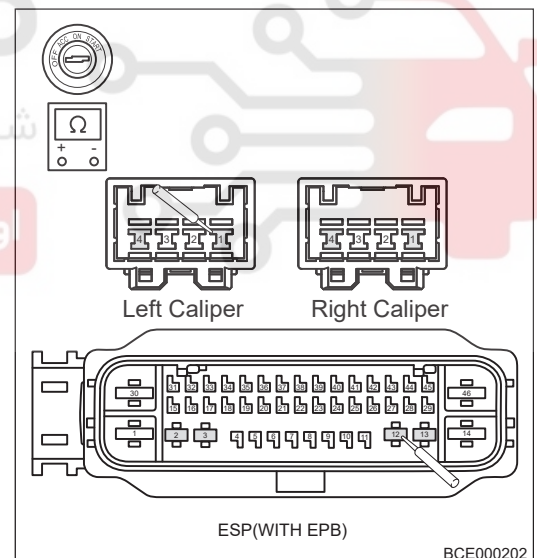
Replace left/right brake caliper

OK

2 Check related wire harness and connector

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the left/right brake caliper connector.
- (d) Disconnect the EPB control module assembly connector.
- (e) Check if related wire harnesses are worn, pinched or broken.
- (f) Check if related connector terminals are loose, broken, bent or corrosive.
- (g) Check for continuity between left/right brake caliper and ESP (integrated EPB) wire harness.

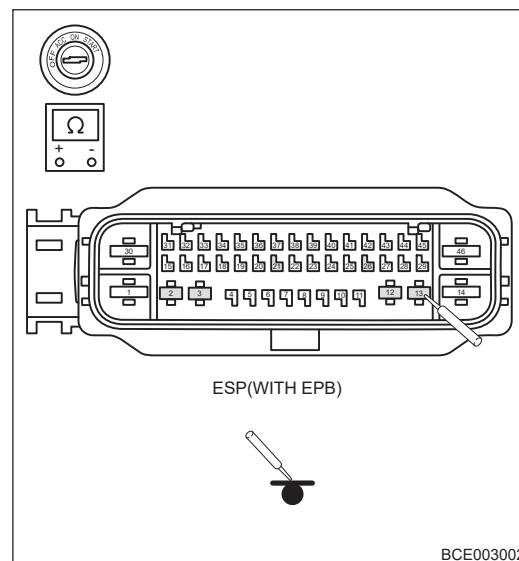
Multimeter Connection	Condition	Specified Condition
Left brake caliper (1) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Left brake caliper (4) - ESP (- integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (1) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω
Right brake caliper (4) - ESP (integrated EPB) (connect terminals)	Always	Less than 1 Ω



06 - BRAKE SYSTEM

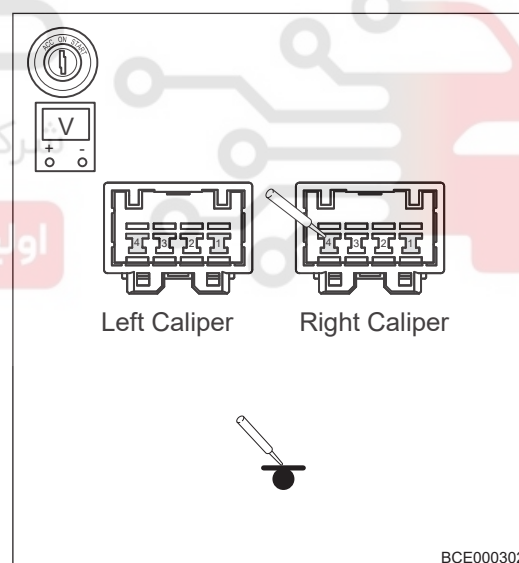
- (h) Check the resistance between left/right brake caliper to ESP (integrated EPB) wire harness and body ground.

Multimeter Connection	Condition	Specified Condition
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ
ESP (integrated EPB) (connect terminals) - Body ground	Always	More than 10 kΩ



- (i) Connect the negative battery cable.
 (j) Turn ENGINE START STOP switch to ON.
 (k) Check the voltage between ESP (integrated EPB) to ESP (integrated EPB) wire harness between and body ground.

Multimeter Connection	Condition	Specified Condition
Rear left brake caliper (1) - Body ground	Always	0 V
Rear left brake caliper (4) - Body ground	Always	0 V
Rear right brake caliper (1) - Body ground	Always	0 V
Rear right brake caliper (4) - Body ground	Always	0 V



NG

Repair or replace related wire harness and connector

OK

3

Confirm DTCs again

- (a) Clear DTCs.
- (b) Start the vehicle.
- (c) Drive vehicle at 40 km/h or above, read “ABS/ESP (Anti-lock Brake System/Electronic Stability Program)” system DTC again with diagnostic tester.
- (d) Check if the same DTCs occur.

OK

Confirm that system operates normally

NG

Replace ESP (integrated EPB)

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06 - BRAKE SYSTEM

DTC	U0005-00	High Speed CAN Communication Bus (+) High
DTC	U0007-00	High Speed CAN Communication Bus (-) Low
DTC	U0073-88	Control Module Communication Bus Off
DTC	U0100-87	Lost Communication With ECM (ESP Only)
DTC	U0101-87	Lost Communication With TCM (ESP Only)
DTC	U0126-87	Lost Communication with Steering Angle Sensor Module (ESP Only)
DTC	U0140-87	Lost Communication With BCM (ESP Only)
DTC	U0401-81	Invalid Data Received From ECM (ESP Only)-Invalid Serial Date Received
DTC	U0402-81	Invalid Data Received From TCM (ESP Only)-Invalid Serial Date Received
DTC	U0422-81	Invalid Data Received From Body Control Module (ESP Only)
DTC	U0428-81	Invalid Data Received From Steering Angle Sensor Module (ESP Only)
DTC	U1300-55	Software Configuration Error
DTC	U1163-87	Lost Communication With ACC (ESP Only)-Miss Message
DTC	U0433-81	Invalid Data Received From ACC (ESP Only)
DTC	U1410-81	HAS_InvalidValue-Invalid Serial Date Received
DTC	U1411-81	APBSystemState_InvalidValue APB-Invalid Serial Date Received
DTC	U1412-81	ABANet_InvalidValue-Invalid Serial Date Received
DTC	U1413-81	ABPNet_InvalidValue-Invalid Serial Date Received
DTC	U1414-81	ACCNet_InvalidValue-Invalid Serial Date Received
DTC	U1415-81	AEBNet_InvalidValue-Invalid Serial Date Received
DTC	U1416-81	AWBNet_InvalidValue-Invalid Serial Date Received
DTC	U1417-81	AccPedalNet_InvalidValue
DTC	U1418-81	BTMNet_InvalidValue-Invalid Serial Date Received
DTC	U1419-81	CDDNet_InvalidValue-Invalid Serial Date Received
DTC	U1421-81	SCLutch_InvalidValue
DTC	U1422-81	EngineNet_InvalidValue
DTC	U1423-81	StartStopNet_InvalidValue StartStop-Invalid Serial Date Received
DTC	U1424-81	TCUNet_InvalidValue-Invalid Serial Date Received
DTC	U1425-81	VLCNet_InvalidValue-Invalid Serial Date Received

06 - BRAKE SYSTEM

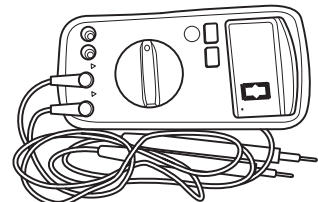
DTC	U1426-81	VacuumNet_InvalidValue-Invalid Serial Date Received
DTC	U0146-87	Lost Communication With CGW
DTC	U0447-81	Invalid Data Received From CGW-Invalid Serial Date Received
DTC	U0155-87	Lost Communication With ICM-Miss Message
DTC	U0423-81	Invalid Data Received From ICM-Invalid Serial Date Received
DTC	U0142-87	Lost Communication With AVM-Miss Message
DTC	U0433-81	Invalid Data Received from AVM-Invalid Serial Date Received
DTC	U0100-00	Lost Communication with YAS
DTC	U0170-04	Lost Communication With SCM
DTC	U0170-08	Invalid Data Received From SCM
DTC	U0170-81	SCM Invalid Value
DTC	U0404-04	Invalid Data Received from YAS

Refer to CAN Data Communication.

On-vehicle Service

Tools

General Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH000106
Digital Multimeter	 RCH000206

06 - BRAKE SYSTEM

Specifications**Torque Specifications**

Description	Torque (N·m)
Wheel Mounting Bolt	130 ± 10
Fixing Nut Between EPB/ESP Control Module Assembly and Mounting Bracket	8 ± 2
Fixing Bolt Between EPB/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 EPB/ESP Control Module Assembly	18 ± 2

Brake Fluid Type

Name	Type
Brake Fluid Type	DOT4

Brake System Bleeding**Operation Step****⚠ Warning**

- When bleeding brake system, wear safety glasses. If brake fluid gets on your eyes or skin, wash off with water completely.
- Brake fluid has a corrosive on body paint surface. Do not drop brake fluid on body paint surface.

⚠ Caution

- Brake fluid should meet Chery specified type (DOT4). 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.

1. Bleeding procedures for brake system with diagnostic tester are as follows:

- a. Make sure all brake lines are installed and tightened properly.
- b. Check that battery voltage is normal.
- c. Turn ENGINE START STOP switch to OFF.
- d. Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- e. Turn ENGINE START STOP switch to ON.
- f. Using diagnostic tester, read and clear DTCs stored in EPB/ESP control module assembly.
- g. Using 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.
- h. For X type brake circuit, the bleeding order is: rear left wheel, front left wheel, front right wheel, rear right wheel.
 - i. After bleeding is completed, fill brake reservoir with brake fluid to MAX level.
 - j. Drive vehicle to perform a road test, and confirm that EPB/ESP system operates normally and brake pedal feel is good.

Matching Learning**Steering Angle Sensor Calibration**

Prerequisites for sensor calibration:

- Perform zero point calibration after steering angle sensor is installed.
- Calibration should be performed at front (four) wheel alignment station (make sure that the four-wheel alignment parameters are correct).
- Before calibrating, straighten up the vehicle and wheels must be in straight lines along proceeding direction. Difference between the two angles should meet toe-in of four-wheel alignment parameters value. Steering wheel must be adjusted to center.
- Before calibrate a calibrated sensor again, always calibrate it again to make it return uncalibrated state.

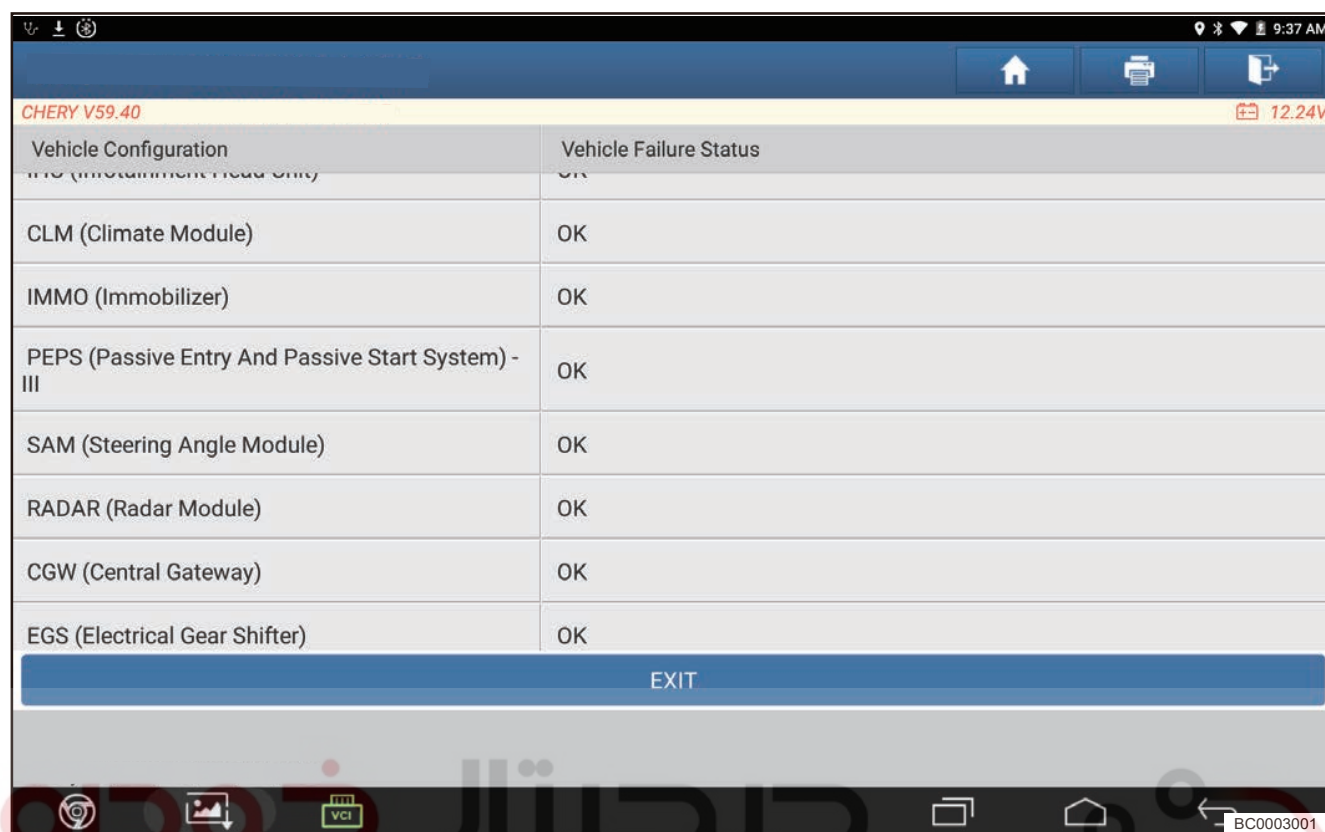
⚠ Caution

- Steering wheel must be centered in the actual calibration. If not, even the data is correct, it can cause wrong calibration when performing four-wheel alignment. This problem may not be detected at factory. Long-term cumulative errors may be caused or overrange phenomenon and ESP light illumination problem may occur when turning steering wheel to limit position during actual driving. Therefore, when performing four-wheel alignment, the steering wheel must be centered.
- Power should not be cut during calibration.

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Place the steering wheel to center position (straighten up the vehicle, wheels must be in straight lines along proceeding direction, and center steering wheel).
4. Using diagnostic tester, enter “SAM (Steering Angle Module)” .



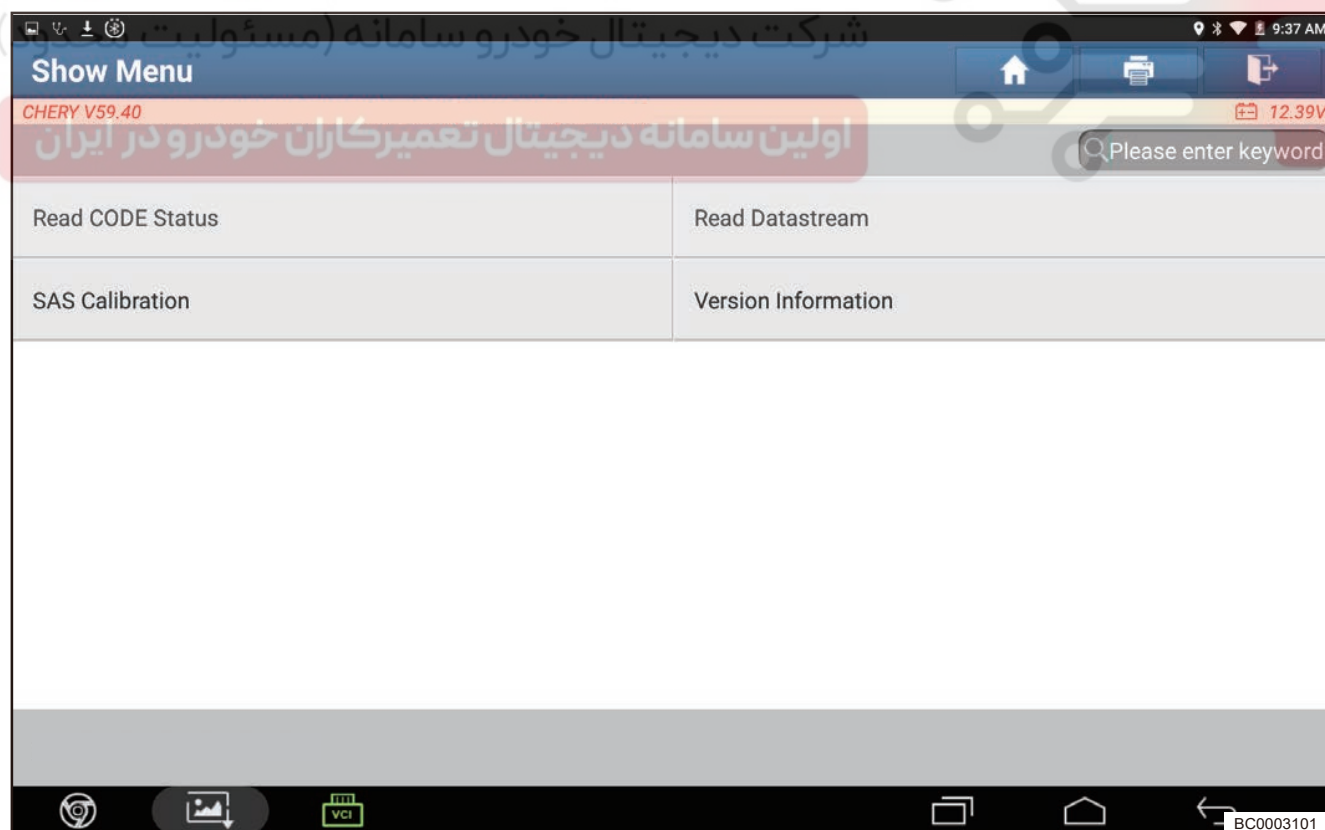
06 - BRAKE SYSTEM



Vehicle Configuration	Vehicle Failure Status
IMMO (Immobilizer)	OK
CLM (Climate Module)	OK
IMMO (Immobilizer)	OK
PEPS (Passive Entry And Passive Start System) - III	OK
SAM (Steering Angle Module)	OK
RADAR (Radar Module)	OK
CGW (Central Gateway)	OK
EGS (Electrical Gear Shifter)	OK

EXIT

5. Click “SAS Calibration” .

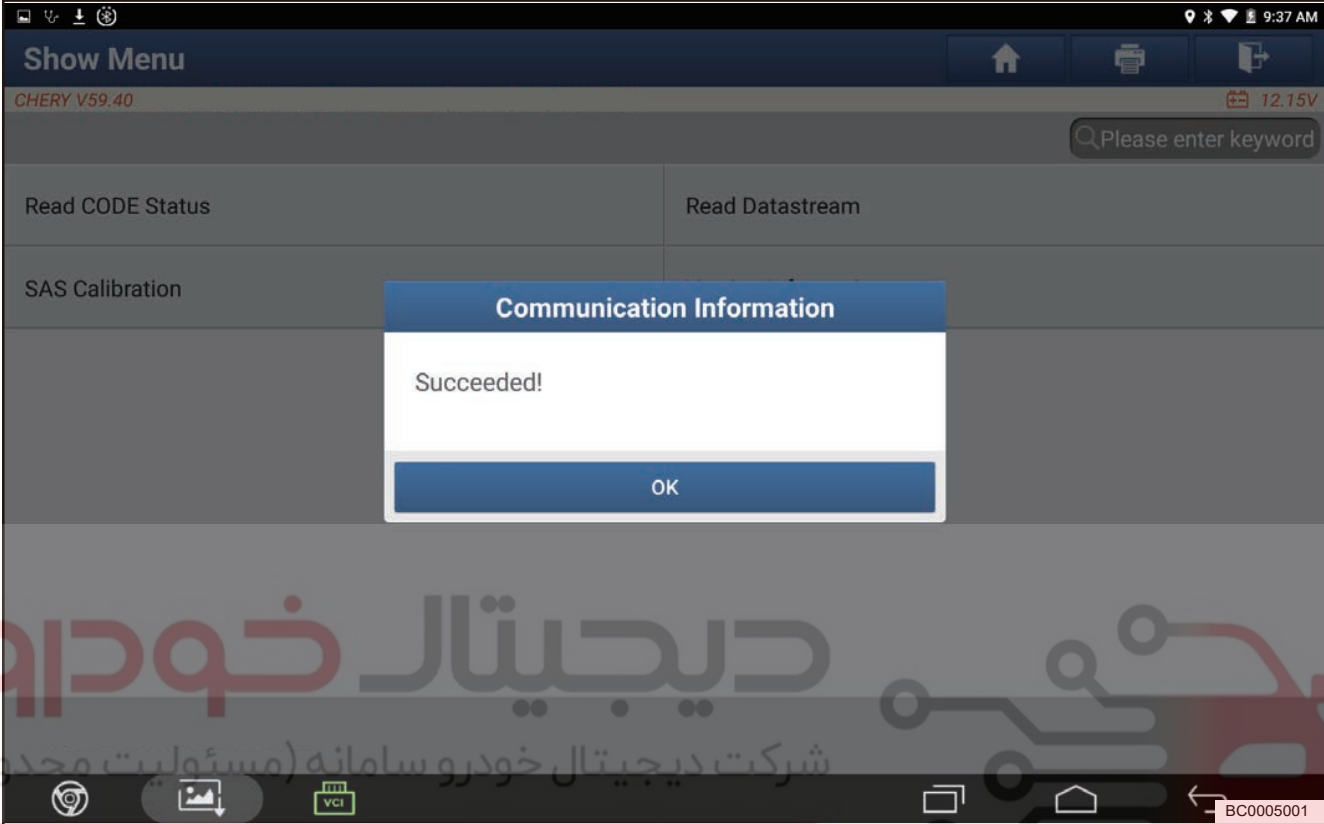


Show Menu	
Read CODE Status	Read Datastream
SAS Calibration	Version Information

6. Diagnostic tester will detect sensor malfunction and calibration automatically; if sensor has malfunction, it will exit calibration.

06 - BRAKE SYSTEM

7. If sensor has been calibrated, "Recalibration" will be prompted. In this case, click "Recalibration" according to prompt on diagnostic tester and then click "Initial Calibration". If there is no response, it will exit calibration.
8. Diagnostic tester will prompt whether calibration is succeed or not.



Warning

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- Never cut off the power during calibration. (Power applied to equipment and steering angle sensor must not be cut off during calibration. Also, diagnostic tester and sensor must be connected properly. Otherwise, calibration cannot be performed properly. If any of them are connected poorly, electrical overload of the products can be caused worst of all.)

Caution

- The steering angle sensor should to be calibrated again after four-wheel alignment is performed.

Calibrating Yaw Rate Sensor

Prerequisites for sensor calibration:

- Calibration can be performed on rotary hub tester or a flat area.
- Maximum tilting angle of tester must be within allowable range, that both are met $\pm 0.57^\circ$ ($\pm 1\%$) in two positive directions.
- The tester must be stationary.
- Turn steering wheel to straight ahead position.
- Tire pressure is proper.
- Vehicle load is normal.
- Less remaining fuel in fuel tank is allowable.
- Vehicle stands on its own wheels.



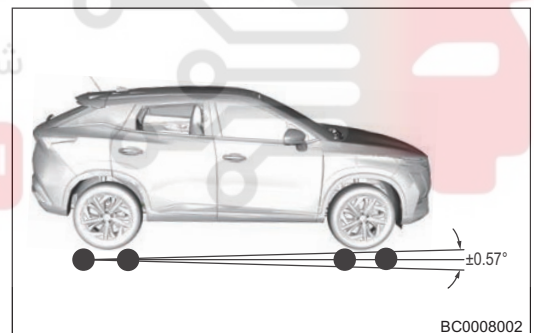
06 - BRAKE SYSTEM

- Only driver sits in vehicle.
- Additional interference is prohibited, such as vibration due to opening or closing hood etc.

⚠ Caution

- When replacing EPB/ESP module, integrated sensor must be calibrated. During calibration, ECU will write the measured new data into the EEPROM for use by ESP. Ensure the above calibration conditions are right, because ESP cannot determine whether the above mentioned preconditions are proper or not. If offset is too large, system will reject the calibration. In the case, it is necessary to repair the vehicle.

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Make sure vehicle tilt angle is in range of $\pm 0.57^\circ$ ($\pm 1\%$).



4. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .

06 - BRAKE SYSTEM

Vehicle Configuration	Vehicle Failure Status
Multi-Service	
EMS (Engine Management System)	OK
CVT18/25 (Transmission Control Unit)	OK
ABS/ESP (Anti-Lock Braking System/Electronic Stability Program)	OK
EPS (Electronic Power Steering)	C1221-00
BCM (Body Control Module)	OK
TPMS (Tire Pressure Monitoring System)	OK

EXIT

BC0006001

5. Click “Special Function” .

Show Menu

CHERY V59.40

Please enter keyword

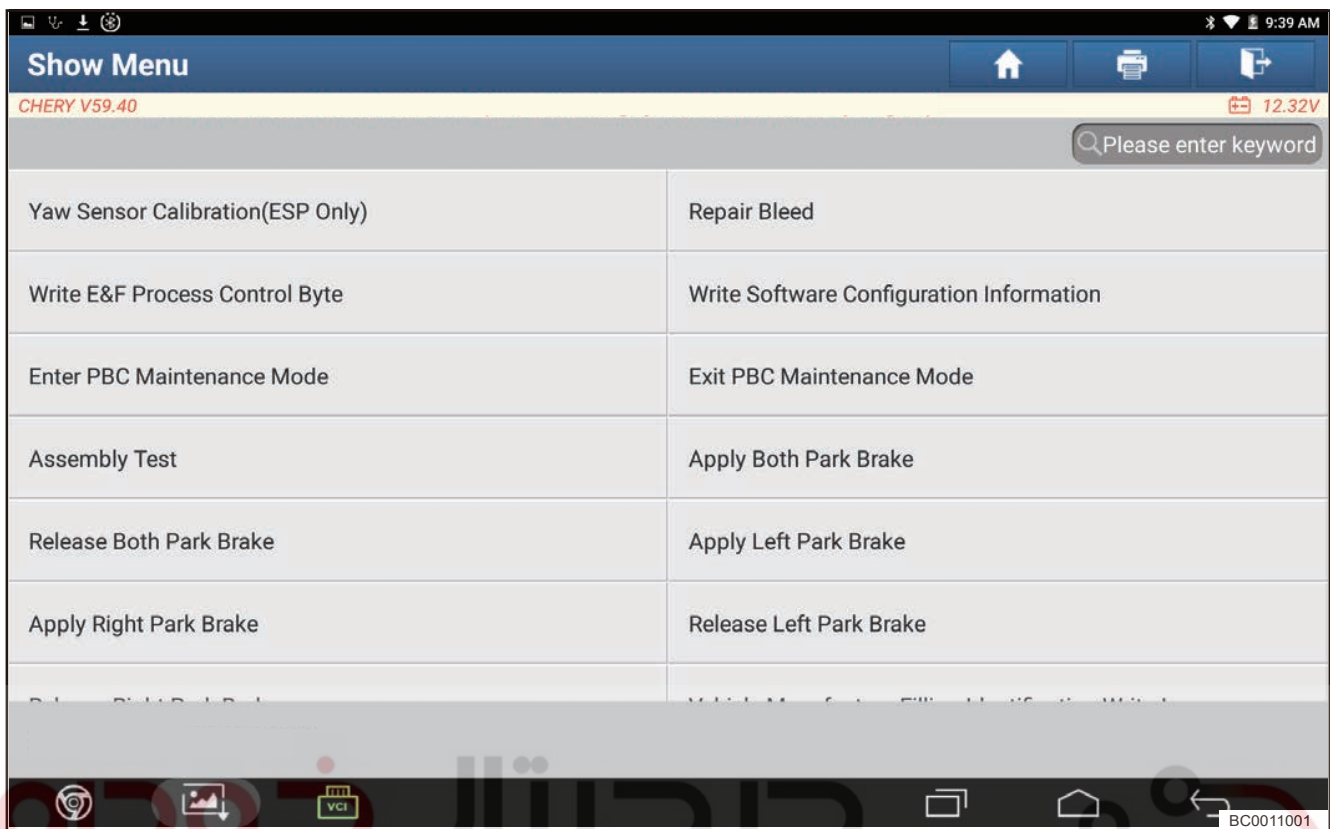
Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	

BC0010001

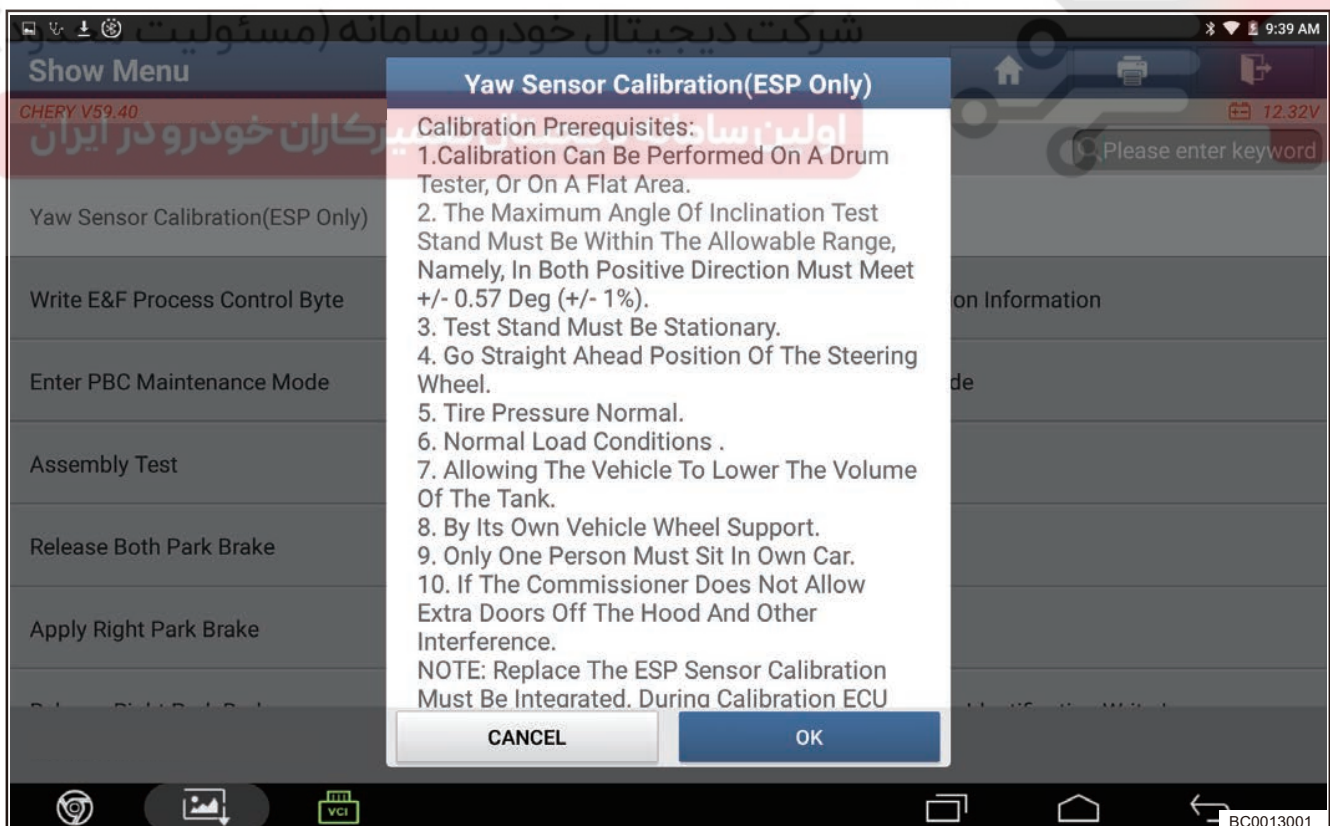
6. Click “Yaw Sensor Calibration (ESP Only)” .



06 - BRAKE SYSTEM

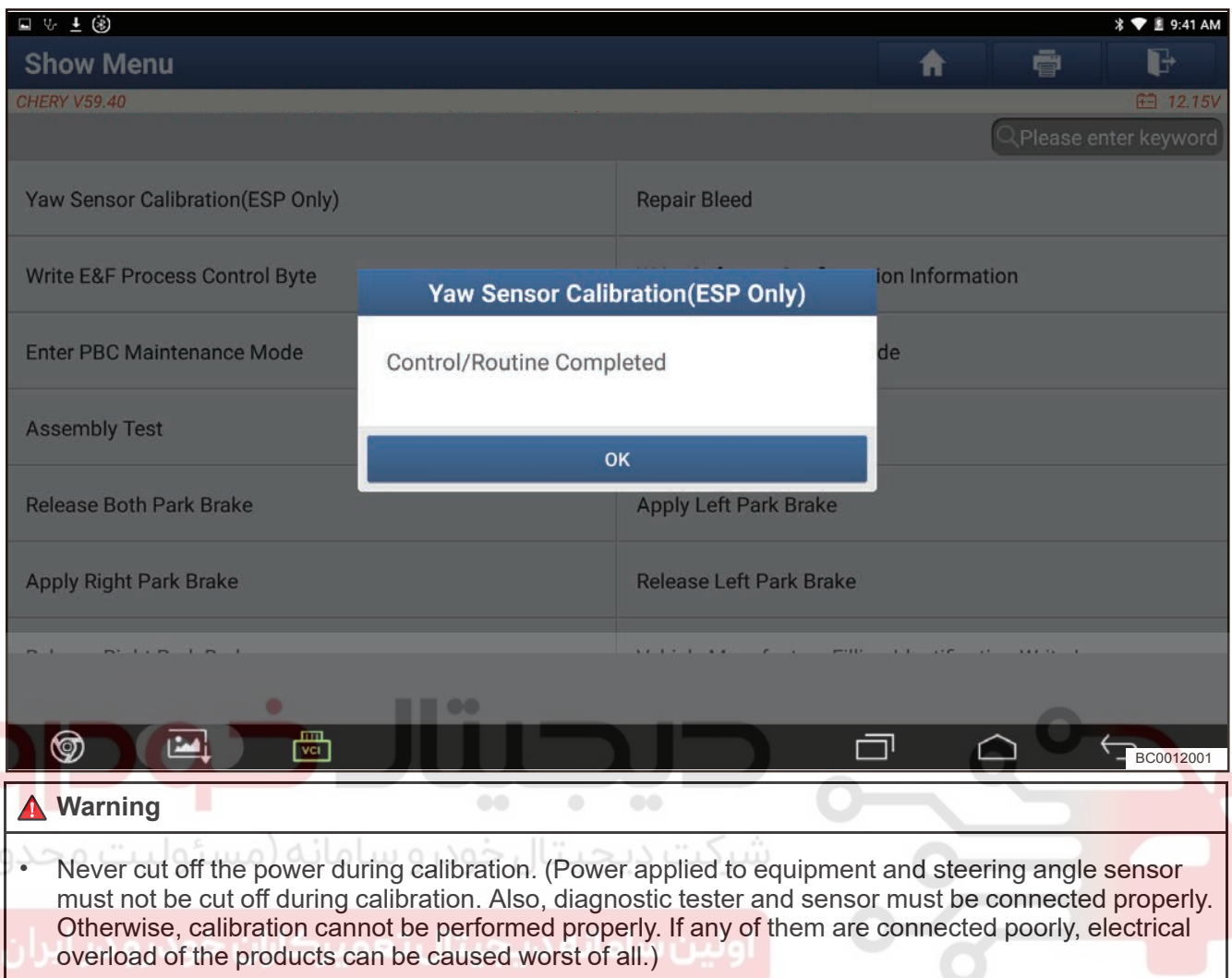


7. Sensor calibration conditions.



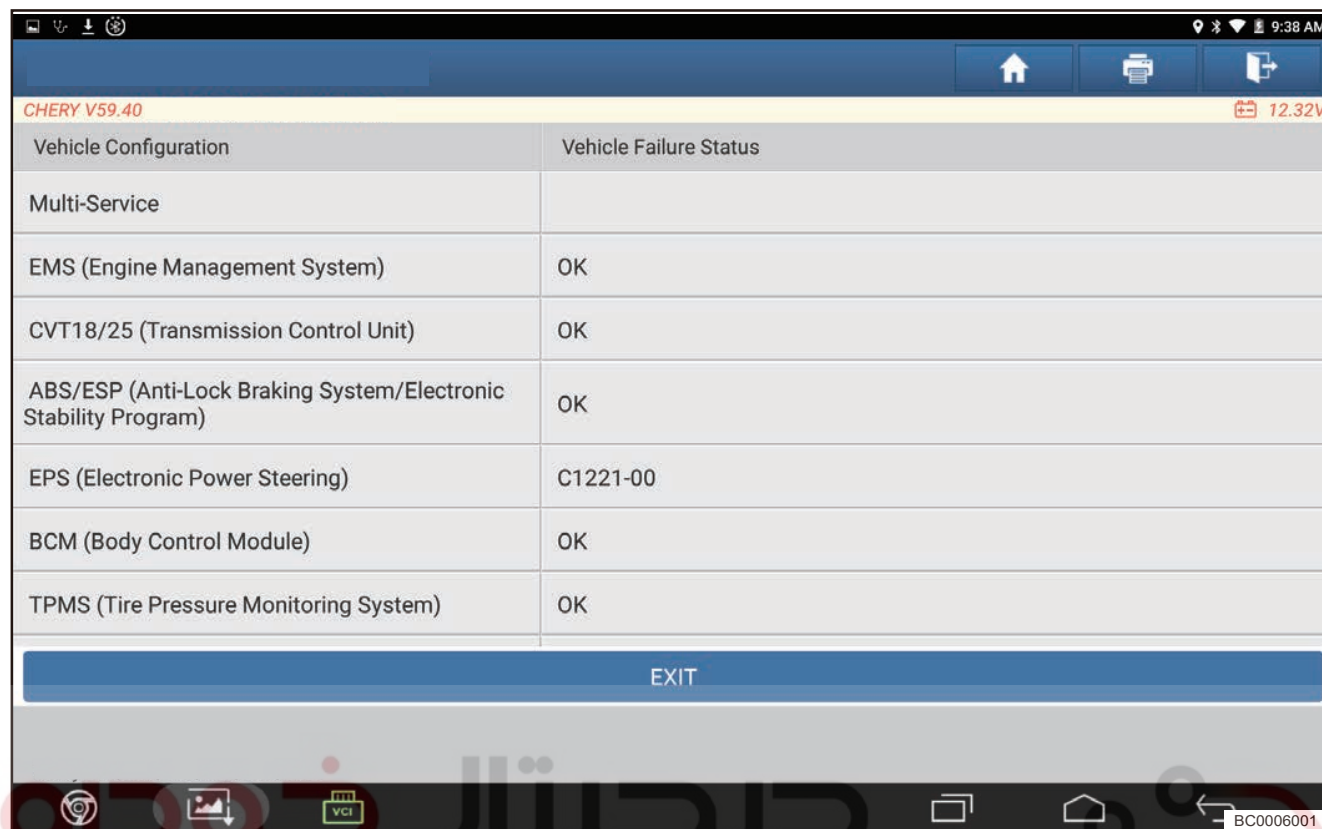
8. Diagnostic tester will prompt whether calibration is succeed or not.

06 - BRAKE SYSTEM

**Software Configuration Information Writing**

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.
3. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .

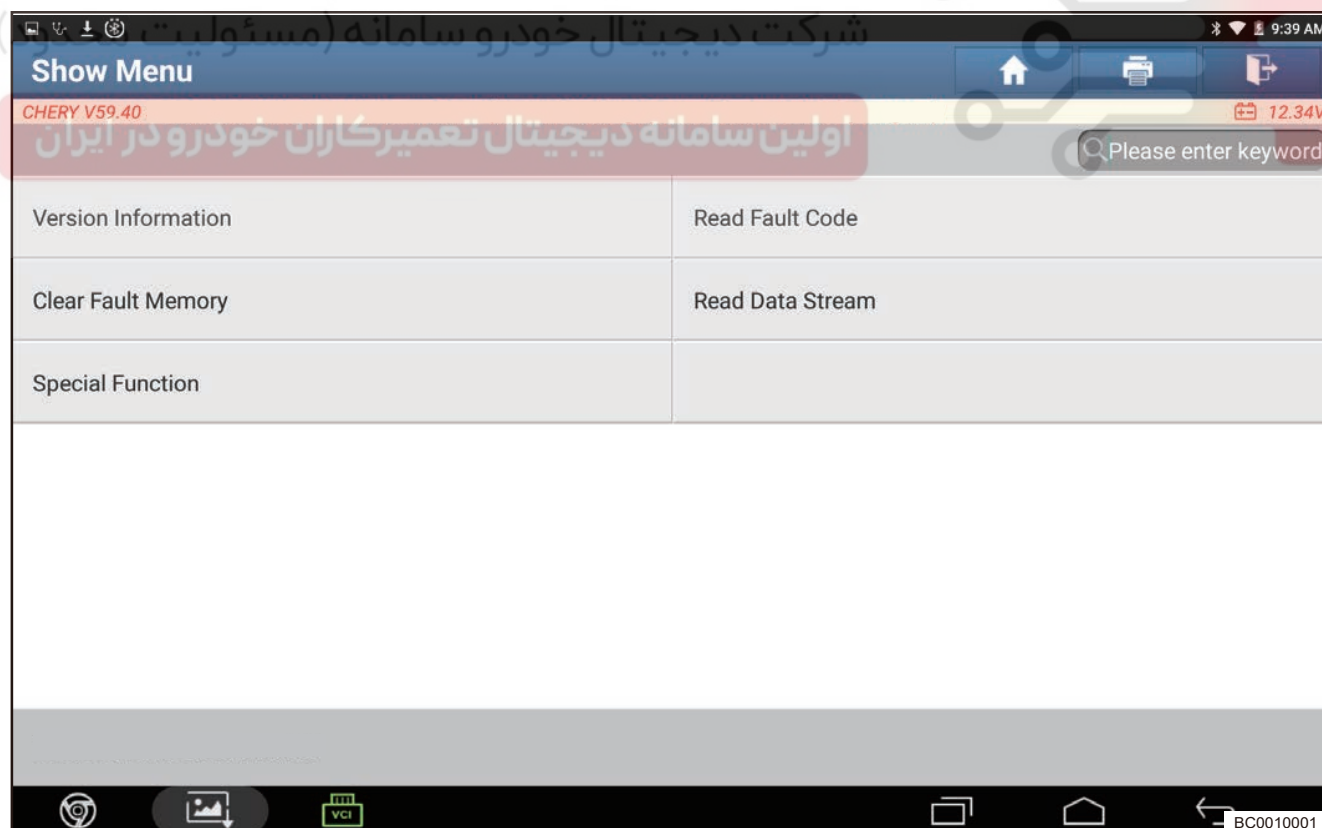
06 - BRAKE SYSTEM



Vehicle Configuration	Vehicle Failure Status
Multi-Service	
EMS (Engine Management System)	OK
CVT18/25 (Transmission Control Unit)	OK
ABS/ESP (Anti-Lock Braking System/Electronic Stability Program)	OK
EPS (Electronic Power Steering)	C1221-00
BCM (Body Control Module)	OK
TPMS (Tire Pressure Monitoring System)	OK

EXIT

4. Click “Special Function” .



Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	

Please enter keyword

5. Click “Write Software Configuration Information” (Configuration code can be read by reading data stream).

06 - BRAKE SYSTEM

Show Menu

CHERY V59.40 12.19V

Please enter keyword

Yaw Sensor Calibration(ESP Only)	Repair Bleed
Write E&F Process Control Byte	Write Software Configuration Information
Enter PBC Maintenance Mode	Exit PBC Maintenance Mode
Assembly Test	Apply Both Park Brake
Release Both Park Brake	Apply Left Park Brake
Apply Right Park Brake	Release Left Park Brake

BC0420001

Write Software Configuration Information

Please Enter 2 Bits Software Configuration Information

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0 1 2 3 4 5 6 7 8 9

A B C D E F

Confirm

BC0430001

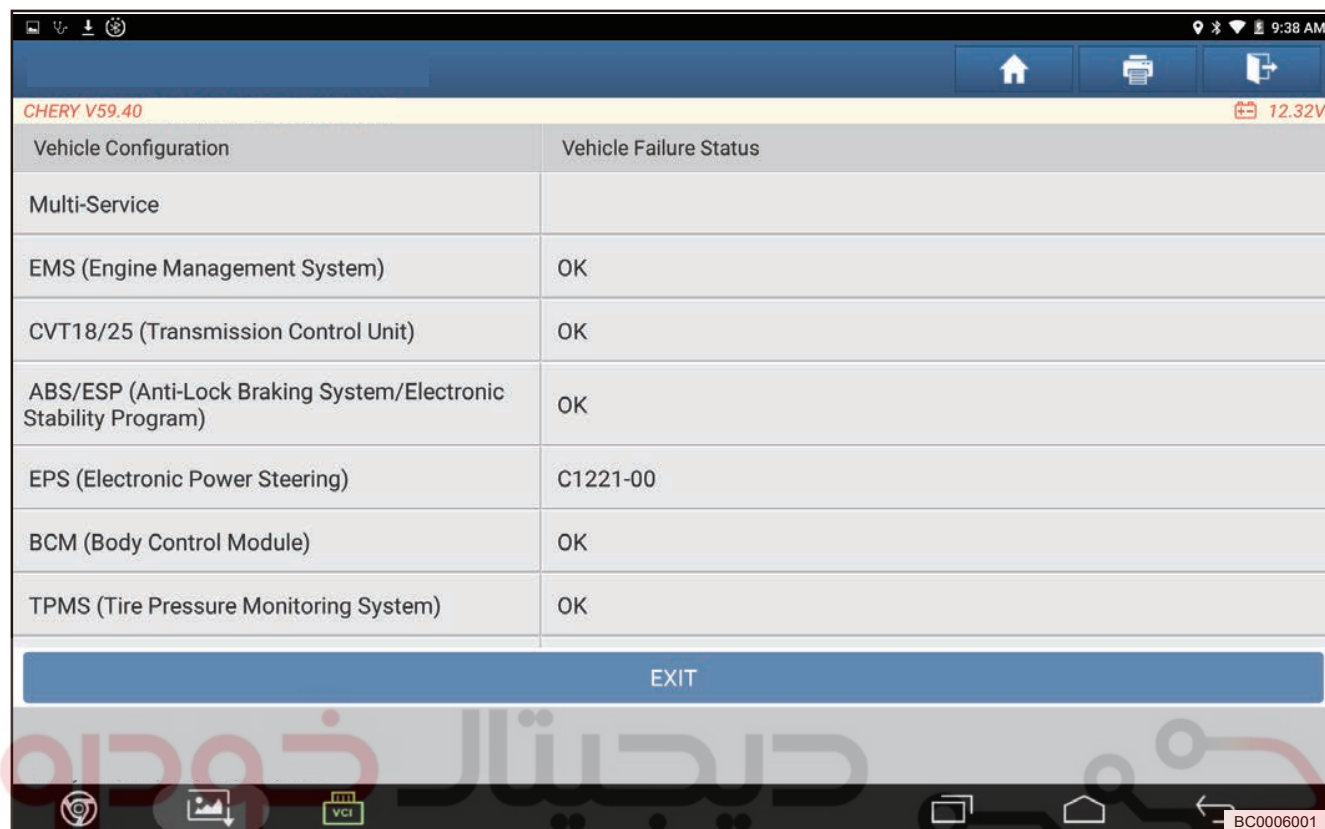
Vehicle Manufacture Filling-Identification Write-in

1. Connect the diagnostic tester.
2. Turn ENGINE START STOP switch to ON.

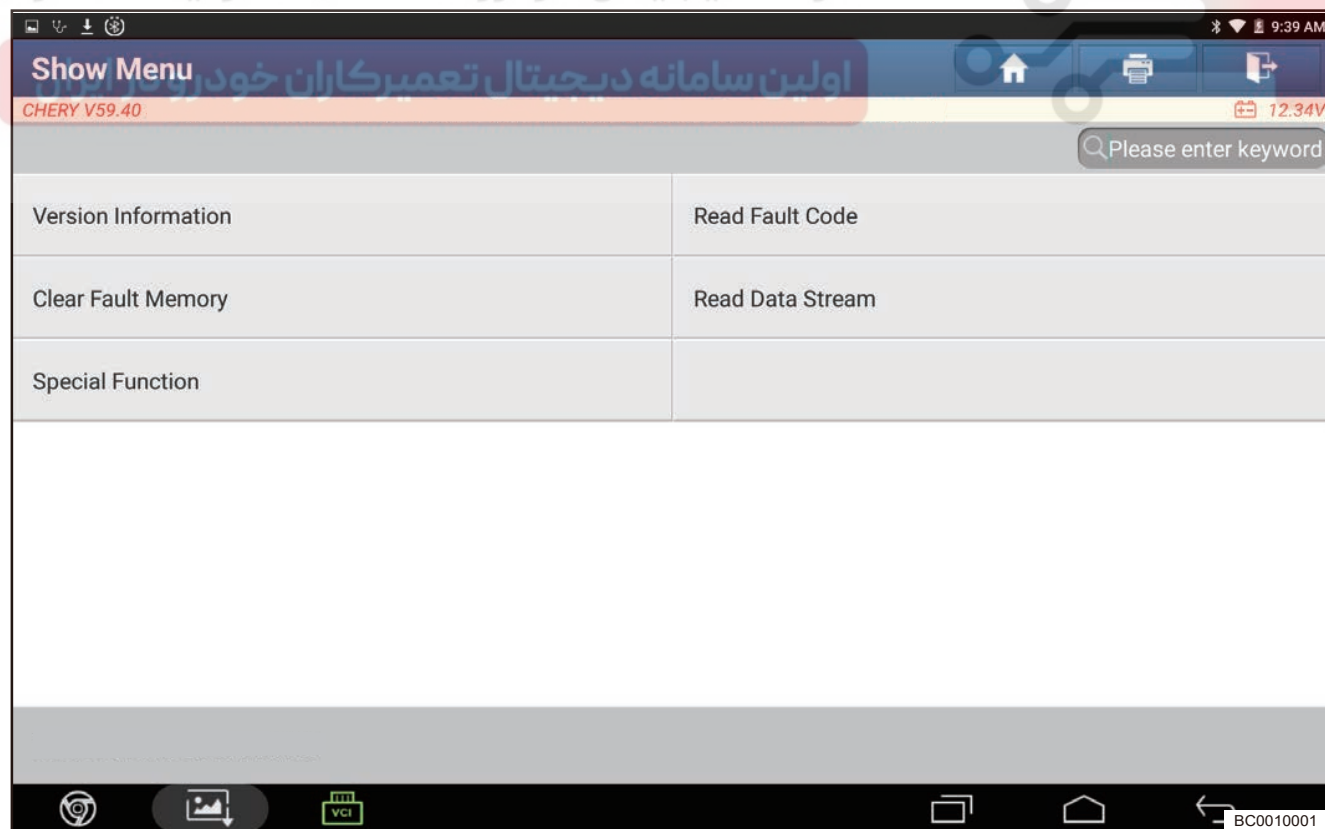


06 - BRAKE SYSTEM

3. Enter menu “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .



4. Click “Special Function” .



06 - BRAKE SYSTEM

5. Vehicle manufacture filling-identification write-in (configuration code can be read by reading data stream).

The screenshot displays two screens from a vehicle diagnostic application. The top screen is the 'Show Menu' screen, which lists various maintenance and diagnostic functions. The bottom screen is the 'Vehicle Manufacture Filling-Identification Write-In' screen, which prompts the user to enter 2 bits of vehicle manufacture filling-identification information.

Show Menu

CHERY V59.40 12.37V

Please enter keyword

Enter PBC Maintenance Mode	Exit PBC Maintenance Mode
Assembly Test	Apply Both Park Brake
Release Both Park Brake	Apply Left Park Brake
Apply Right Park Brake	Release Left Park Brake
Release Right Park Brake	Vehicle Manufacture Filling-Identification Write-In
Manual bleeding (applicable for IPB (Integrated Brake Controller Assembly))	IPB (Integrated Brake Controller Assembly) assembly mode switching

BC0440001

Vehicle Manufacture Filling-Identification Write-In

Please Enter 2 Bits Vehicle Manufacture Filling-Identification Information

Confirm

BC0450001

06 - BRAKE SYSTEM

EPB/ESP Control Module Assembly**Removal****⚠ Caution**

- When repairing EPB/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 step: First turn ENGINE START STOP switch off, then depress and release brake pedal repeatedly, until brake pedal becomes hard.
- In addition, never turn on ENGINE START STOP switch before EPB/ESP system is installed completely to prevent hydraulic pump from energizing and running.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the battery assembly.
3. Drain the brake fluid.

Hint:

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

⚠ Caution

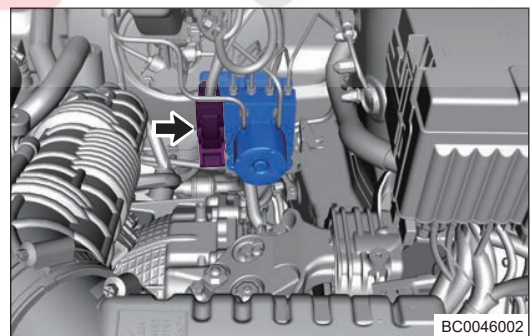
- Wash off brake fluid immediately if it comes in contact with any paint surface.

4. Remove the brake pipe assembly.

⚠ Caution

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

5. Remove the EPB/ESP control module assembly.
 - a. Press the lock area of EPB/ESP control module assembly connector, toggle the connector lock bracket downward and disconnect the EPB/ESP control module assembly connector (arrow).



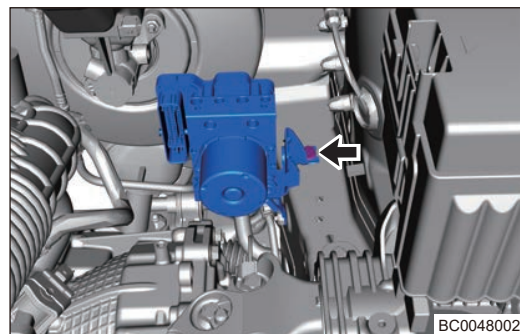
BC0046002

⚠ Caution

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

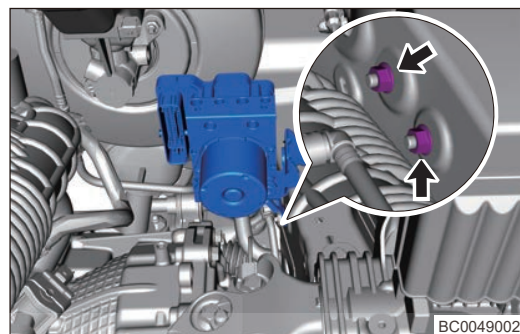
- b. Remove fixing bolt (arrow) between EPB/ESP control module assembly mounting bracket and body.

Tightening torque: $23 \pm 3.5 \text{ N}\cdot\text{m}$



- c. Remove 2 coupling nuts (arrow) between EPB/ESP control module assembly mounting bracket and body.

Tightening torque: $23 \pm 3.5 \text{ N}\cdot\text{m}$

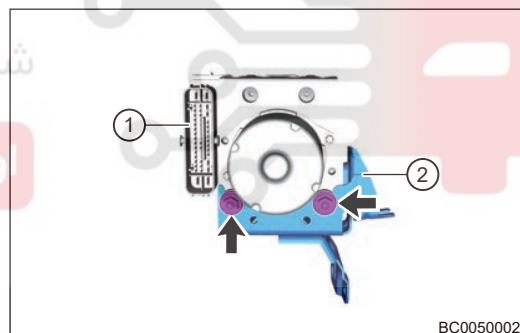


- d. Remove the EPB/ESP control module assembly with mounting bracket.

Disassembly

1. Remove the EPB/ESP control module assembly.

- a. Remove 2 fixing nuts (arrow) between EPB/ESP control module assembly (1) and mounting bracket (2).



- b. Remove the EPB/ESP control module assembly with mounting bracket.

Installation

1. Installation is in the reverse order of removal.

06 - BRAKE SYSTEM

⚠ Caution

- EPB/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 screws, be sure to tighten them to specified torque.
- Perform ABS bleeding procedures for brake system after completing installation.
- Using diagnostic tester, enter brake control system, record and clear trouble code, then drive vehicle to perform a road test, confirming that EPB/ESP system operates normally and brake pedal feel is good.
- It is necessary to perform yaw rate sensor calibration after replacing ESP assembly.
- After replacing ESP assembly, perform “Assembly Inspection” with diagnostic tester, otherwise, malfunction may be lit.

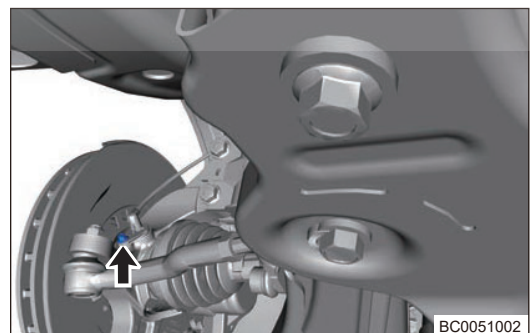
Front Wheel Speed Sensor (Front Left Wheel as Example)**Removal****⚠ Caution**

- 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 ENGINE START STOP switch.
 2. Disconnect the negative battery cable.
 3. Remove the front left wheel.
 4. Remove the front left wheel speed sensor.
 - a. Remove the fixing bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage the front left wheel speed sensor carefully.

Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$

**⚠ Caution**

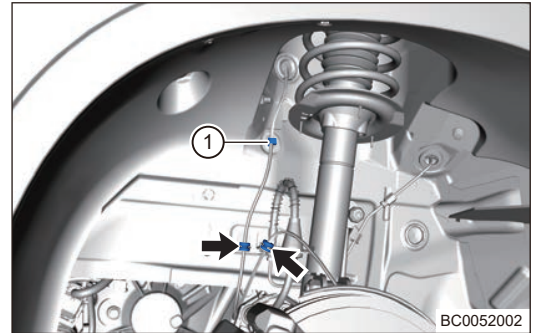
- Keep head and installation hole of sensor free of foreign matter.

06 - BRAKE SYSTEM

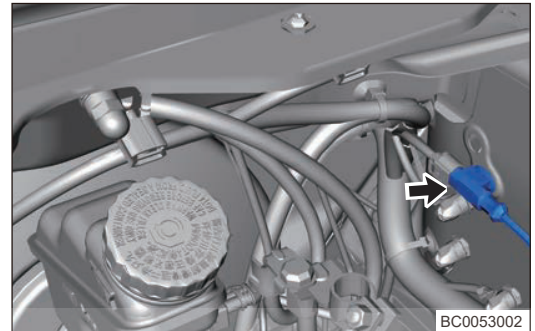
- b. Disengage the attachment part (arrow) of front left wheel speed sensor wire harness from front left shock absorber assembly and fixing bracket, disengage fixing clip (1) from front left wheel speed sensor wire harness.

Hint:

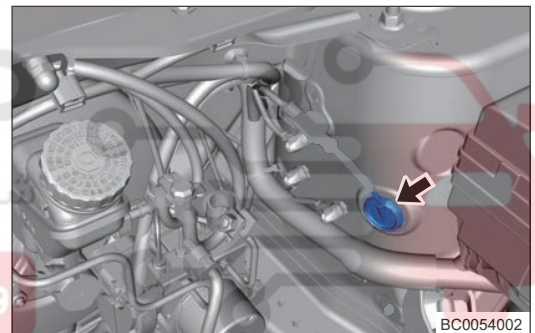
Observe winding direction of sensor wire harness to prevent incorrect installation.



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



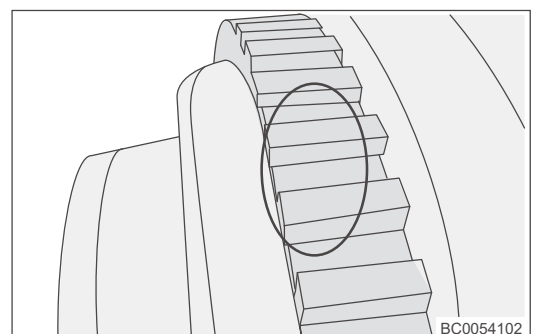
- d. Detach the front left wheel speed sensor wire harness cover (arrow) from body.



- e. Remove the front left wheel speed sensor.

Inspection

1. Check the front wheel speed sensor.
 - a. Check front wheel speed sensor surface for breakage, dents or notch.
 - b. Check front wheel speed sensor connector or wire harness for scratches, breakage or damage.
 - c. If any of above conditions occurs, replace the front wheel speed sensor with a new one.
 - d. Check wheel speed sensor for proper installation.
 - e. Using a diagnostic tester, read datastream of wheel speed sensor, record if each wheel speed is consistent with acceleration display, and if vehicle speed display is accurate.



Rear Wheel Speed Sensor (Rear Left Wheel as Example)

Removal

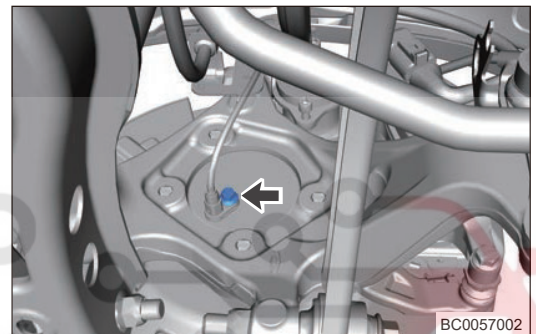
Caution

- 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.

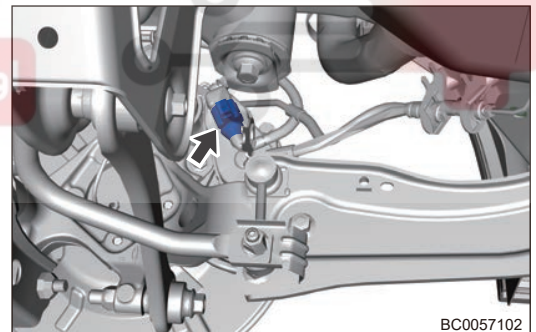
Hint:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
- Turn off all electrical equipment and ENGINE START STOP switch.
 - Disconnect the negative battery cable.
 - Remove the rear left wheel.
 - Remove the rear left wheel speed sensor.
 - Remove fixing bolt (arrow) from rear left wheel speed sensor.

Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$



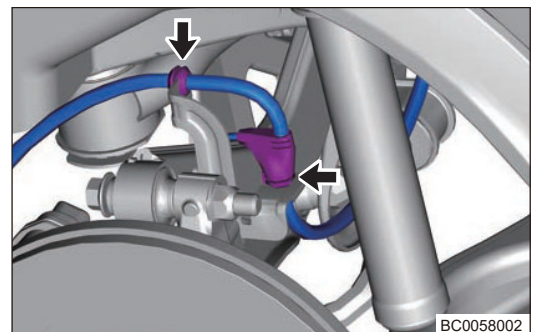
- Remove the rear left brake caliper motor connector (arrow).



Caution

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

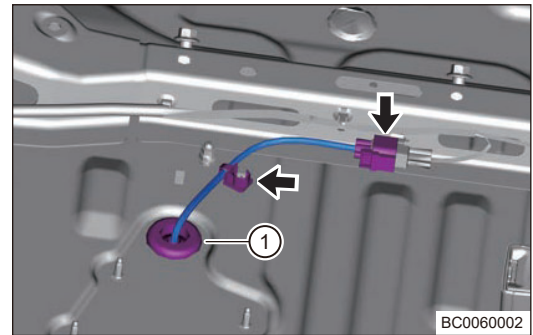
- Detach attachment parts (arrow) of rear wheel speed sensor wire harness from fixing bracket.



- Remove the rear seat cushion assembly.

06 - BRAKE SYSTEM

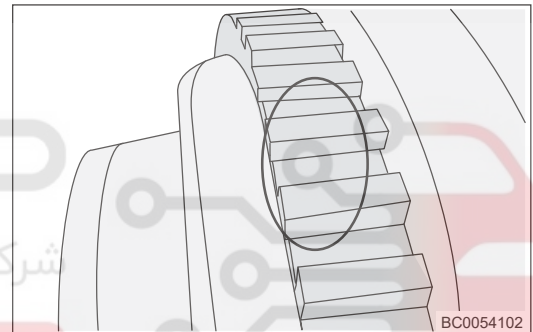
- e. Disconnect rear wheel speed sensor with caliper wire harness assembly connector (arrow) and fixing clip (- arrow), and detach rear left wheel speed sensor wire harness plug (1) from vehicle body.



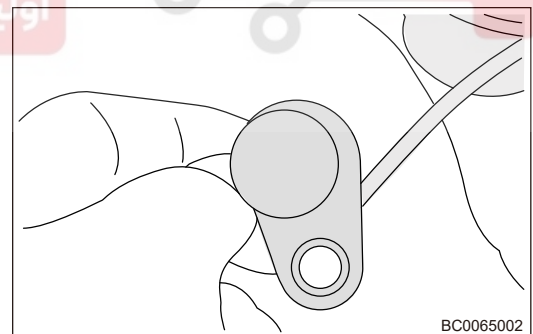
- f. Remove the rear left wheel speed sensor.

Inspection

1. Check the rear left 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.
 - d. Check wheel speed sensor for proper installation.
 - e. Using a diagnostic tester, read datastream of wheel speed sensor, record if each wheel speed is consistent with acceleration display, and if vehicle speed display is accurate.

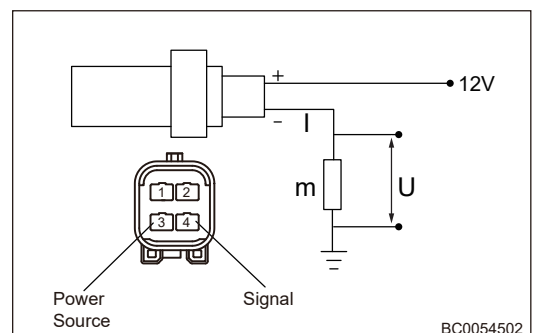


- f. If wheel speed display is inconsistent, check the corresponding wheel speed sensor signal ring gear for missing teeth, dirt, demagnetization, off center.



2. Simple test for wheel speed sensor.

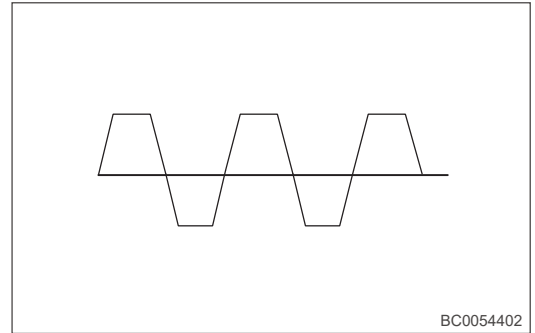
- a. Connect power supply terminal of sensor to 12 V power supply, connect sensor signal terminal and 75 Ω resistor in series and make it grounded, then rotate wheels and test voltage signal of resistor with an oscilloscope.



06 - BRAKE SYSTEM

- b. U is switched between high and low levels without any obvious teeth missing as ring gear rotates.

- U low ≈ 0.54 V
- U high ≈ 1.07 V



⚠ Caution

- Poles cannot be connected inversely during test, otherwise, damage may be caused.
- Above mentioned is a simple method and cannot replace the complete function test.
- Causes that affect test may include: Ring gear quality, installation error, etc.

- c. After any repair actions on wheel speed sensor, it is necessary to accelerate vehicle to 40 Km/h or more to perform dynamic self-test of EPB/ESP system.
- d. If malfunction still cannot be eliminated after completing dynamic self-test, replace wheel speed sensor.
- e. After repair is finished, perform completion inspection.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

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

Steering Angle Sensor

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.

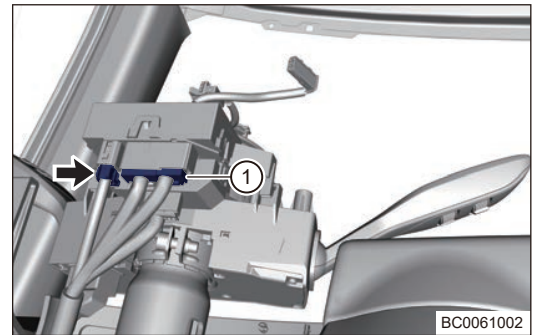
⚠ Caution

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

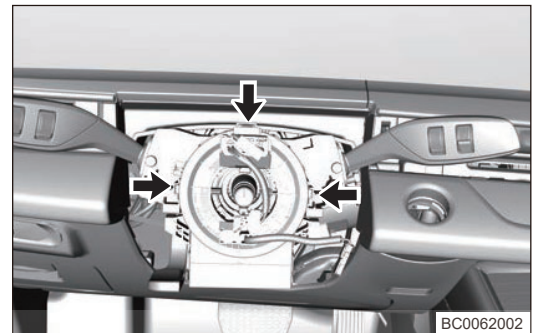
3. Position the front wheels straight ahead.
4. Remove the steering wheel assembly.
5. Remove the combination switch cover assembly.
6. Remove the steering angle sensor.

06 - BRAKE SYSTEM

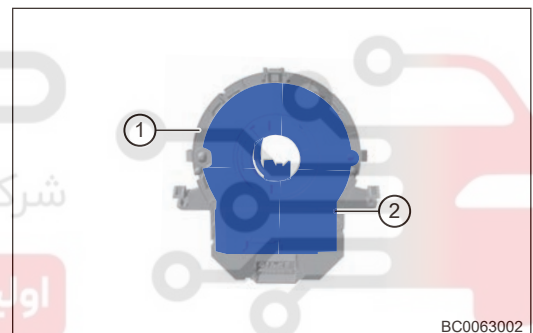
- a. Disconnect the spiral cable wire harness connector (- arrow) and angle sensor connector (1).



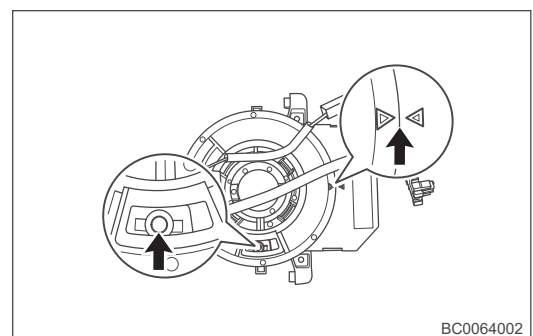
- b. Detach the fixing claws (arrow) between spiral cable and steering column, and remove the spiral cable.



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

**Installation**

1. Installation is in the reverse order of removal.
 - 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 are aligned 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.
- It is necessary to adjust front wheel alignment.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



FRONT BRAKE ASSEMBLY

Warnings and Precautions

Precautions

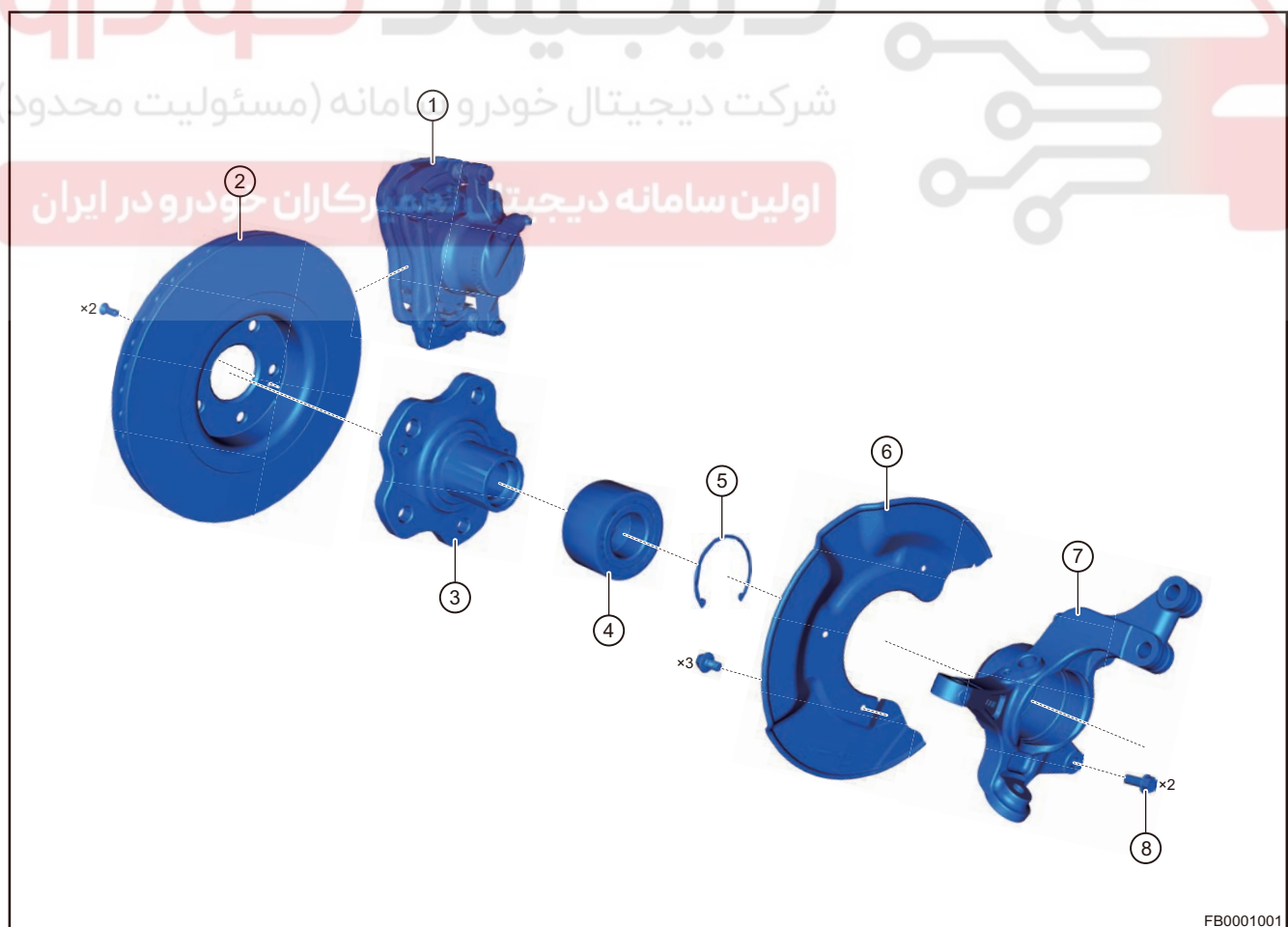
In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.
2. After removing front/rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

System Component Diagram

Front Left Steering Knuckle with Disc Brake Assembly



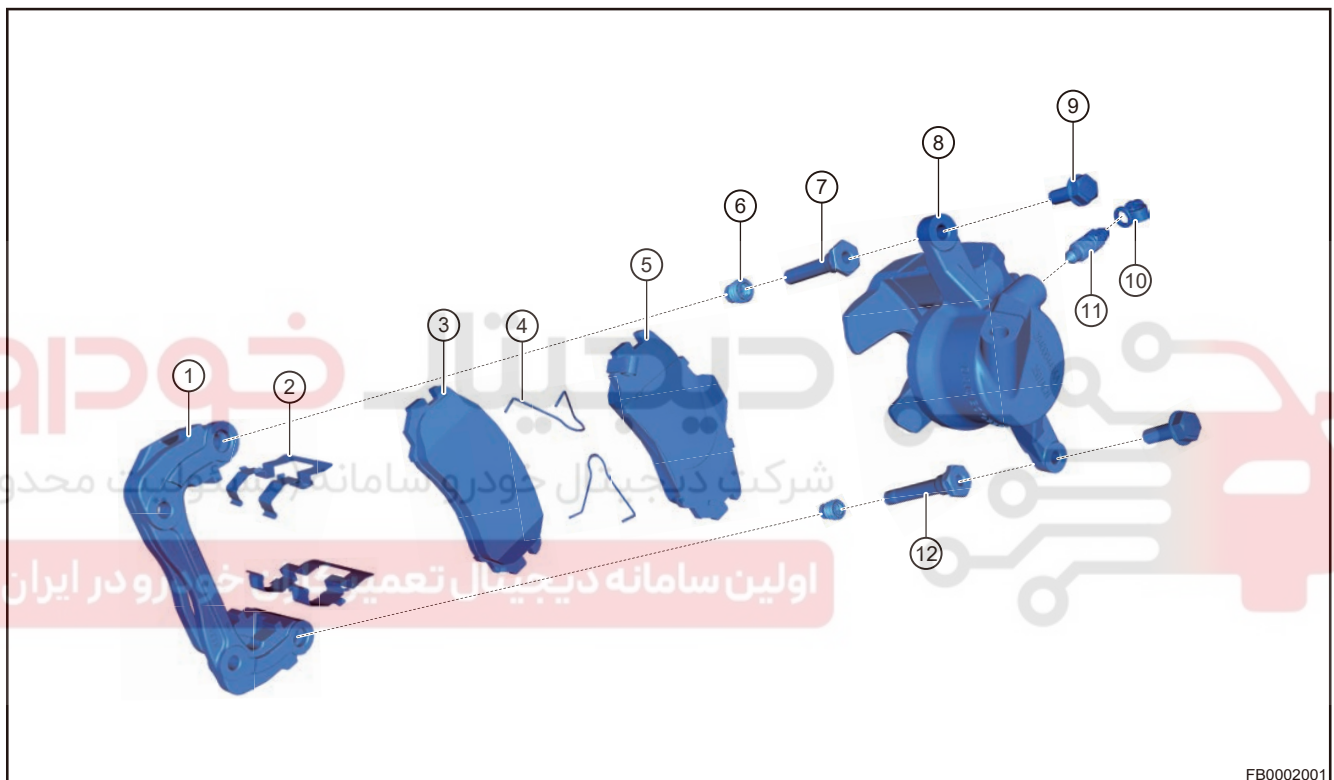
FB0001001

06 - BRAKE SYSTEM

1	Front Left Brake Caliper Assembly	5	Snap Ring
2	Front Brake Disc	6	Front Left Dust Guard
3	Front Hub	7	Front Left Steering Knuckle
4	Front Hub Bearing	8	Front Brake Caliper Fixing Bolt

Front left steering knuckle with disc brake assembly is mainly composed of front left brake caliper assembly, front brake disc, front hub, front hub bearing, snap ring, etc.

Front brake disc is fixed on front hub, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Front brake caliper body assembly is connected with front brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Front Left Brake Caliper Assembly

FB0002001

1	Front Brake Caliper Bracket	7	Main Guide Pin (without Bushing)
2	Front Spring Plate	8	Front Left Brake Caliper Body Assembly
3	Front Outer Lining Assembly	9	Guide Pin Tightening Bolt
4	Lining Return Spring	10	Bleeder Plug Cover
5	Front Inner Lining Assembly	11	Bleeder Plug
6	Guide Pin Dust Boot	12	Sub Guide Pin (with Bushing)

⚠ Caution

- Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.

06 - BRAKE SYSTEM

Front left steering knuckle with disc brake assembly is mainly composed of front left brake caliper assembly, front brake disc, front hub, front hub bearing, snap ring, etc.

Front brake disc is fixed on front hub, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Front brake caliper body assembly is connected with front brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Diagnosis & Testing

Problem Symptoms Table

Hint:

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

Symptom	Possible Cause
Braking deviation	Oily lining assembly
	Uneven brake disc wear
	Brake caliper body assembly failure (piston stuck)
Brake shakes	Hub bearing is damaged
	Uneven brake disc wear
	Steering/suspension part is loose
	Uneven lining assembly wear
	Brake caliper assembly fixing bolt is loose
	Spring plate is damaged
	Hub bearing is damaged
Abnormal noise occurs during braking	Abnormal brake disc wear
	Oily lining assembly
	Steering/suspension part is loose
	Abnormal lining assembly wear
Brake stuck	Brake caliper assembly fixing bolt is loose
	Minimum brake pedal free play
	Poor returning of guide pin (deformed or damaged)
	Brake caliper body assembly failure (piston stuck)

On-vehicle Service

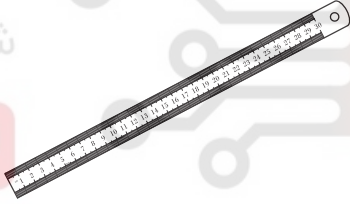
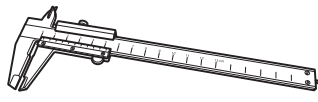
Specifications

Torque Specifications

Description	Torque (N·m)
2 Front Brake Disc Fixing Screws	7 - 9
2 Coupling Bolts Between Front Left Brake Caliper Assembly and Front Left Steering Knuckle	90 - 110
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	18 ± 2
1 Guide Pin Tightening Bolt Between Front Left Brake Caliper Body Assembly and Front Brake Caliper Bracket	22 - 32

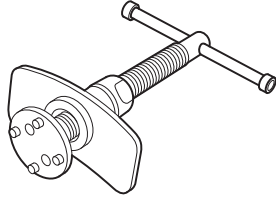
Tools

General Tools

Tool Name	Tool Drawing
Caliper	 RCH0063006
Thickness Measurement Caliper	 RCH0019006

06 - BRAKE SYSTEM

Special Tool

Tool Name	Part No.	Tool Drawing
Brake Cylinder Release Tool	ECH-0005	 S00076

Front Disc Brake Assembly

Removal

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

⚠ Caution

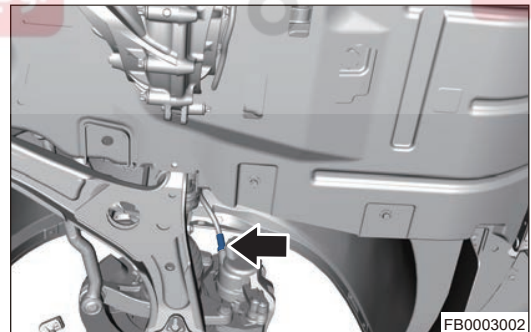
- After removing disc brake assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the front left wheel.
2. Loosen coupling bolt between front left brake hose assembly and front left brake caliper assembly.

Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$

⚠ Caution

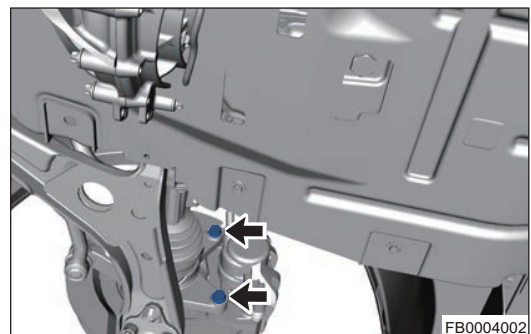
- After removing brake hose, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake hose from joint parts.



FB0003002

3. Remove 2 coupling bolts between front left brake caliper assembly and front left steering knuckle.

Tightening torque: $90 - 110 \text{ N}\cdot\text{m}$



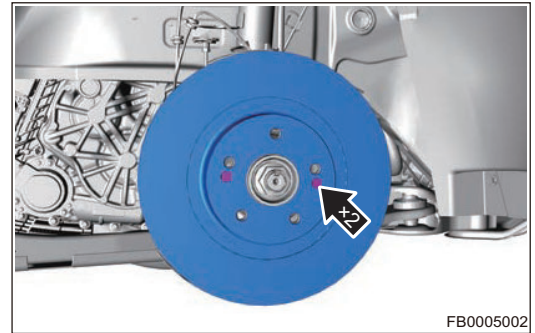
FB0004002

4. Remove the front left brake caliper assembly.

06 - BRAKE SYSTEM

5. Remove 2 fixing screws from front brake disc.

Tightening torque: 7 - 9 N·m



FB0005002

6. Remove the front brake disc.

Inspection

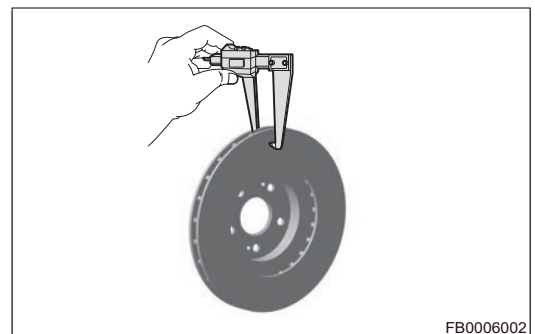
1. Check brake caliper fixing bracket and brake caliper guide pin set.
 - a. Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - b. Check brake caliper guide 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 the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake disc.
 - a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the 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 the brake 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.

3. 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



FB0006002

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

⚠ Caution

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

Installation

1. Installation is in the reverse order of removal.



06 - BRAKE SYSTEM

⚠ Caution

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Before installing brake linings, completely retract 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.

Replacement of Lining Assembly**Removal****Hint:**

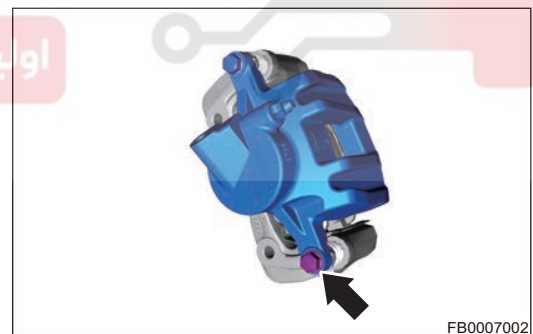
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ Caution

- After removing front brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the front left wheel.
2. Remove 1 guide pin tightening bolt between front left brake caliper body assembly and front brake caliper bracket.

Tightening torque: 22 - 32 N·m



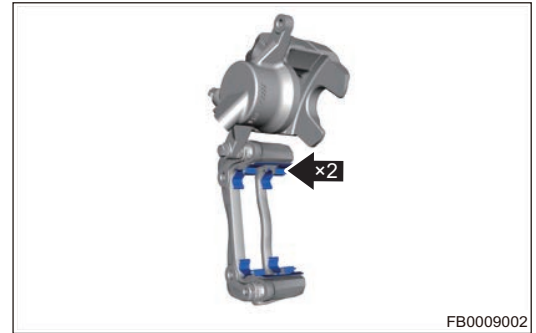
3. Slowly lift up front left brake caliper body assembly and remove 2 lining return springs.



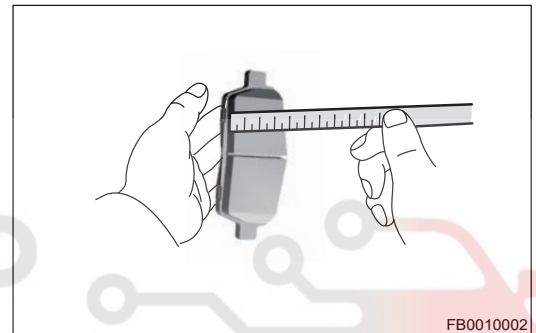
4. Remove the front outer/inner lining assembly.

06 - BRAKE SYSTEM

5. Remove 2 front spring plates.

**Inspection**

1. Check the brake lining.
 - a. Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - b. Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.



- 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.
 - d. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

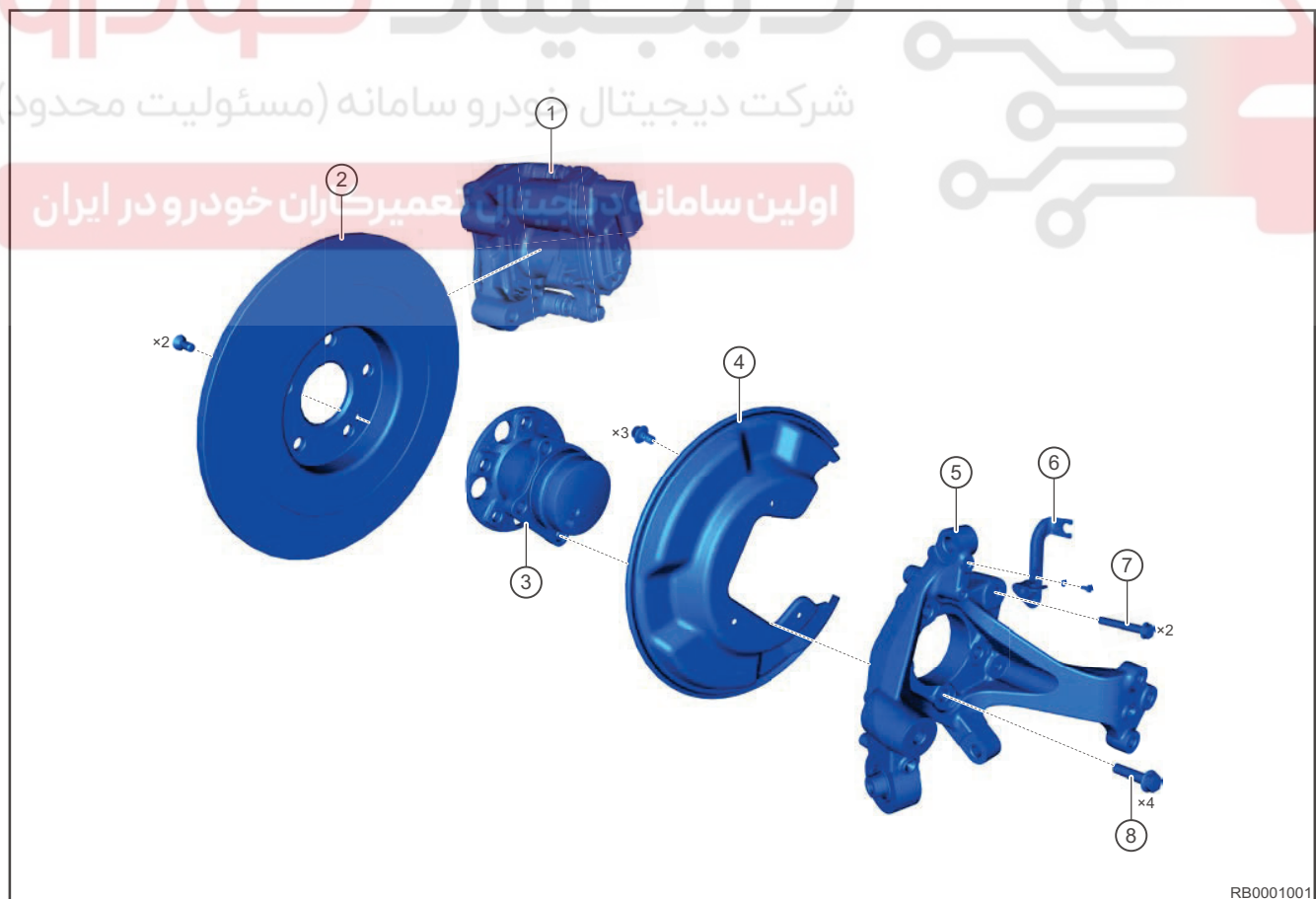
- Be sure to tighten fixing bolts to specified torques during installation.
- Be sure to add brake fluid to a proper level after installation.
- Be sure to perform bleeding procedures for brake system after installation.
- Replace the brake linings in pairs. DO NOT replace one alone.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- 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.
- DO NOT install inner and outer linings in reverse.

06 - BRAKE SYSTEM

REAR BRAKE ASSEMBLY**Warnings and Precautions****Precautions**

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.
2. After removing front/rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.
3. When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview**System Component Diagram****Rear Left Brake Assembly**

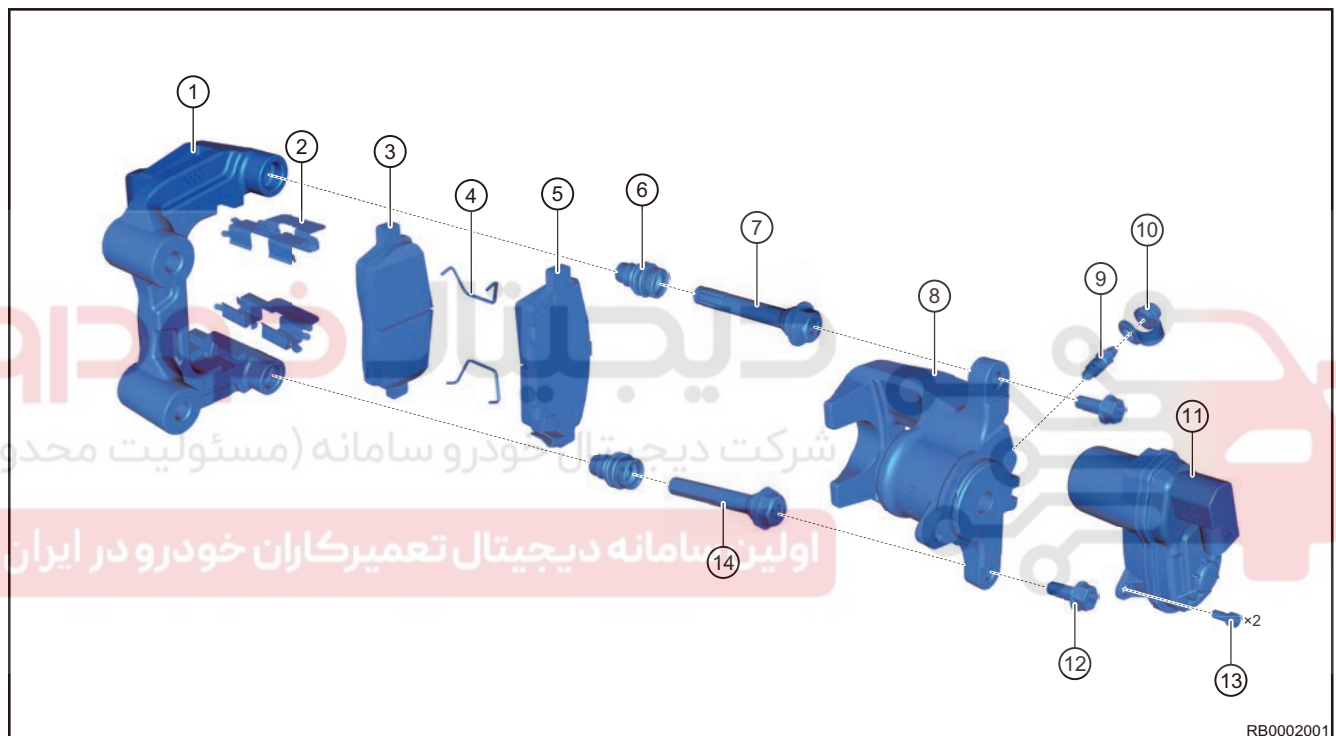
RB0001001

06 - BRAKE SYSTEM

1	Rear Left Brake Caliper Assembly	5	Rear Left Steering Knuckle
2	Rear Brake Disc	6	Rear Left Wheel Electrical Caliper Wire Harness Bracket
3	Rear Hub Bearing Unit	7	Brake Caliper Mounting Bolt x 2
4	Rear Left Dust Guard	8	Hub Bearing Fixing Bolt x 4

Rear left brake assembly is mainly composed of rear left brake caliper assembly, rear brake disc, front hub, rear hub bearing unit, etc.

Rear brake disc is fixed on rear hub bearing unit, clamped in the middle of rear outer lining assembly/rear inner lining assembly, and rotates with wheel. Rear brake caliper body assembly is connected with rear brake caliper bracket (bracket is fixed on steering knuckle) through guide pin tightening bolt.

Rear Left Brake Caliper Assembly

RB0002001

1	Rear Brake Caliper Bracket	8	Rear Left Brake Caliper Body Assembly
2	Rear Spring Plate x 2	9	Drain Plug
3	Rear Outer Lining Assembly	10	Drain Plug Cover
4	Lining Return Spring x 2	11	Electronic Control Execution Unit
5	Rear Inner Lining Assembly	12	Guide Pin Tightening Bolt
6	Guide Pin Dust Boot	13	Electronic Control Execution Unit Mounting Bolt x 2
7	Main Guide Pin	14	Sub Guide Pin

⚠ Caution

- Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.



06 - BRAKE SYSTEM

Rear left brake caliper assembly is mainly composed of rear brake caliper bracket, rear left brake caliper body assembly, electronic control execution unit, guide pin, guide pin dust boot, etc.

When braking, brake fluid of brake master cylinder enters brake caliper assembly of each wheel through hydraulic line. A force acting on brake caliper assembly piston pushes brake caliper assembly piston and its inner lining assembly to move to the left and press it onto brake disc, so brake disc applies a rightward reaction force to brake caliper assembly piston, making brake caliper assembly piston and brake caliper body assembly move to the right along guide pin until outer lining assembly is also pressed onto brake disc. At this time, lining assemblies on both sides are pressed on brake disc, and brake disc is clamped to make it brake.

Diagnosis & Testing

Problem Symptoms Table

Hint:

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

Symptom	Possible Cause
Braking deviation	Oily lining assembly
	Uneven brake disc wear
	Brake caliper body assembly failure (piston stuck)
Brake shakes	Hub bearing is damaged
	Uneven brake disc wear
	Steering/suspension part is loose
	Uneven lining assembly wear
Abnormal noise occurs during braking	Brake caliper assembly fixing bolt is loose
	Spring plate is damaged
	Hub bearing is damaged
	Abnormal brake disc wear
	Oily lining assembly
	Steering/suspension part is loose
	Abnormal lining assembly wear
	Brake caliper assembly fixing bolt is loose
Brake stuck	Minimum brake pedal free play
	Poor returning of guide pin (deformed or damaged)
	Brake caliper body assembly failure (piston stuck)

On-vehicle Service

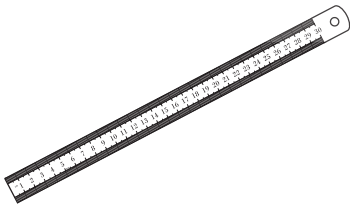
Specifications

Torque Specifications

Description	Torque (N·m)
2 Mounting Bolts Between Electronic Control Execution Unit and Rear Left Brake Caliper Assembly	9 - 11
Rear Brake Disc Fixing Screw	4.5 ± 0.5
2 Brake Caliper Mounting Bolts Between Rear Left Brake Caliper Assembly and Rear Left Steering Knuckle	85 - 90
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2
2 Guide Pin Tightening Bolts Between Rear Left Brake Caliper Body Assembly and Rear Brake Caliper Bracket	22 - 32
Coupling Bolt Between Rear Bearing and Rear Steering Knuckle	70 - 75

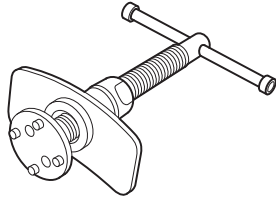
Tools

General Tools

Tool Name	Tool Drawing
Caliper	 RCH0063006
Thickness Measurement Caliper	 RCH0019006

06 - BRAKE SYSTEM

Special Tool

Tool Name	Part No.	Tool Drawing
Brake Cylinder Release Tool	ECH-0005	 S00076

Rear Left Brake Assembly

Removal

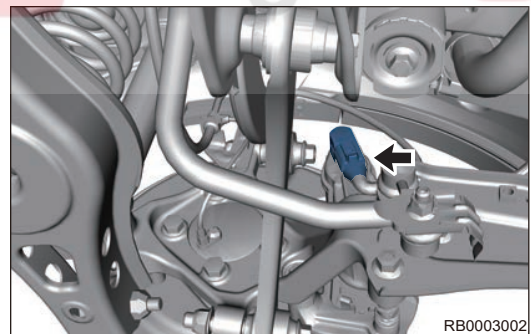
Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

⚠ Caution

- After removing disc brake assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Disconnect the negative battery cable.
2. Remove the rear left wheel.
3. Disconnect the electronic control execution unit wire harness connector.

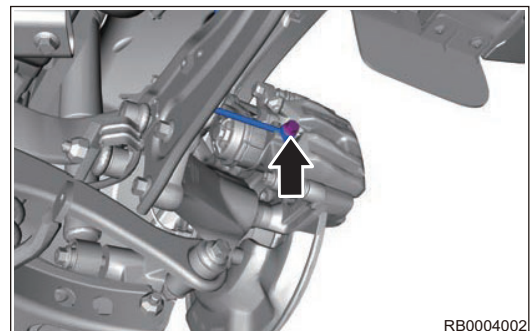


4. Remove coupling bolt between rear left brake hose assembly and rear left brake caliper assembly.

Tightening torque: $27 \pm 2 \text{ N}\cdot\text{m}$

⚠ Caution

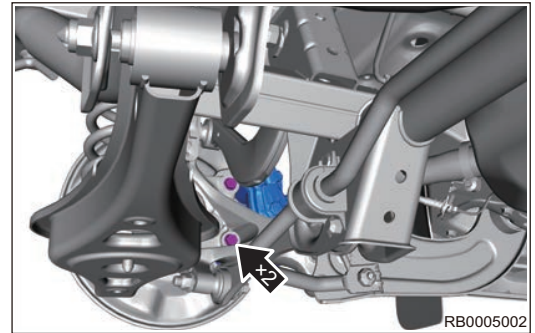
- When removing coupling bolt, be careful not to drop 2 gaskets.
- After removing brake hose, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake hose from joint parts.



06 - BRAKE SYSTEM

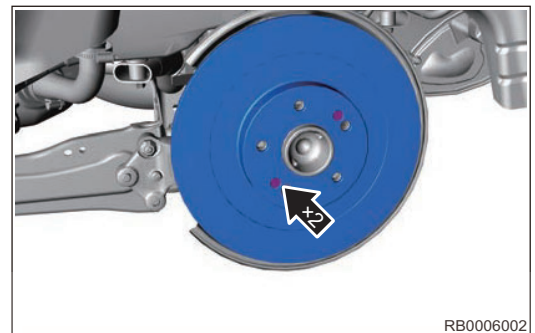
5. Remove 2 brake caliper mounting bolts between rear left brake caliper assembly and rear left steering knuckle.

Tightening torque: 85 - 90 N·m



6. Remove the rear left brake caliper assembly.
7. Remove fixing screw from rear brake disc

Tightening torque: 4.5 ± 0.5 N·m



8. Remove the rear brake disc.

Inspection

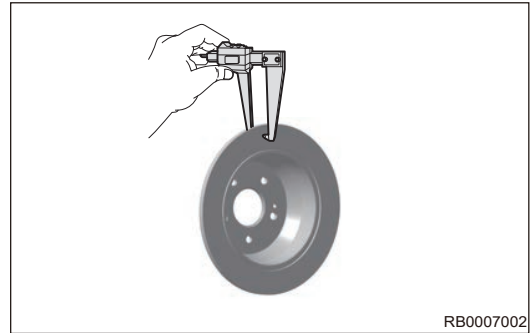
1. Check brake caliper fixing bracket and brake caliper guide pin set.
 - a. Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - b. Check brake caliper guide 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 the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake disc.
 - a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the 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 the brake 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.
3. Check the brake disc thickness.

06 - BRAKE SYSTEM

- 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



RB0007002

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

⚠ Caution

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

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Before installing brake linings, completely retract 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.

Replacement of Lining Assembly

Removal

Hint:

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

⚠ Caution

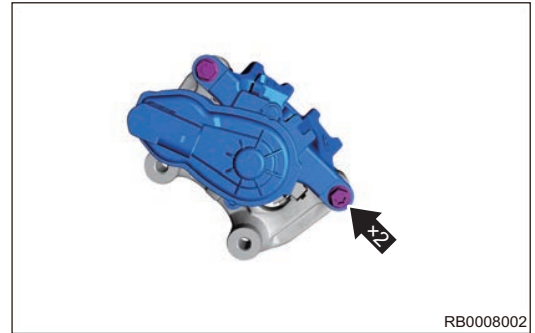
- After removing rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

1. Remove the rear left wheel.

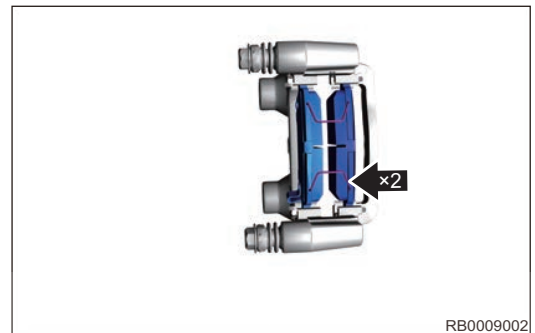
06 - BRAKE SYSTEM

2. Remove 2 guide pin tightening bolts between rear left brake caliper body assembly and rear brake caliper bracket.

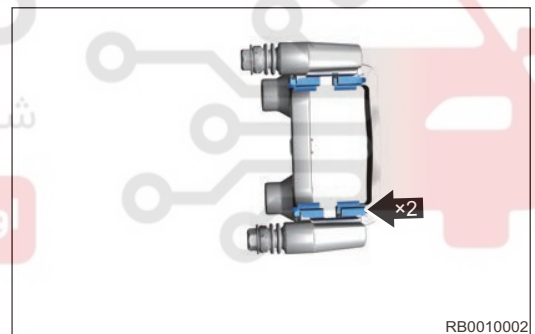
Tightening torque: 22 - 32 N·m



3. Remove the rear left brake caliper body assembly.
4. Remove 2 lining return springs.

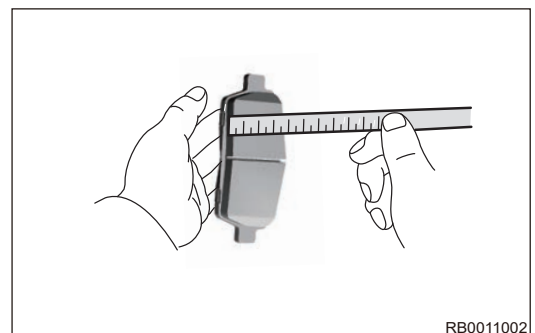


5. Remove rear outer/inner lining assembly.
6. Remove 2 rear spring plates.



Inspection

1. Check the brake lining.
 - a. Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - b. Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.



- 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.

06 - BRAKE SYSTEM

- d. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.

Installation

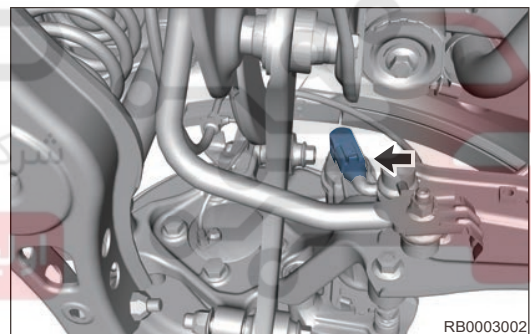
1. Installation is in the reverse order of removal.

⚠ Caution

- Be sure to tighten fixing bolts to specified torques during installation.
- Be sure to add brake fluid to a proper level after installation.
- Be sure to perform bleeding procedures for brake system after installation.
- Replace the brake linings in pairs. DO NOT replace one alone.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- 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.
- DO NOT install inner and outer linings in reverse.

Electronic Control Execution Unit**Removal**

1. Disconnect the negative battery cable.
2. Remove the rear left wheel.
3. Disconnect the electronic control execution unit wire harness connector.



4. Remove 2 mounting bolts between electronic control execution unit and rear left brake caliper assembly.

Tightening torque: 9 - 11 N·m



5. Remove the electronic control execution unit.

Hint:

Remove electronic control execution unit and be careful not to damage motor seal ring.

Installation

1. Installation is in the reverse order of removal.

HYDRAULIC BRAKE

Precautions

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

- After removing brake line, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.
- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.
- When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of ESP (vehicle power supply is turned off), so as to avoid reverse impact, resulting in ESP internal protection circuit breakdown.

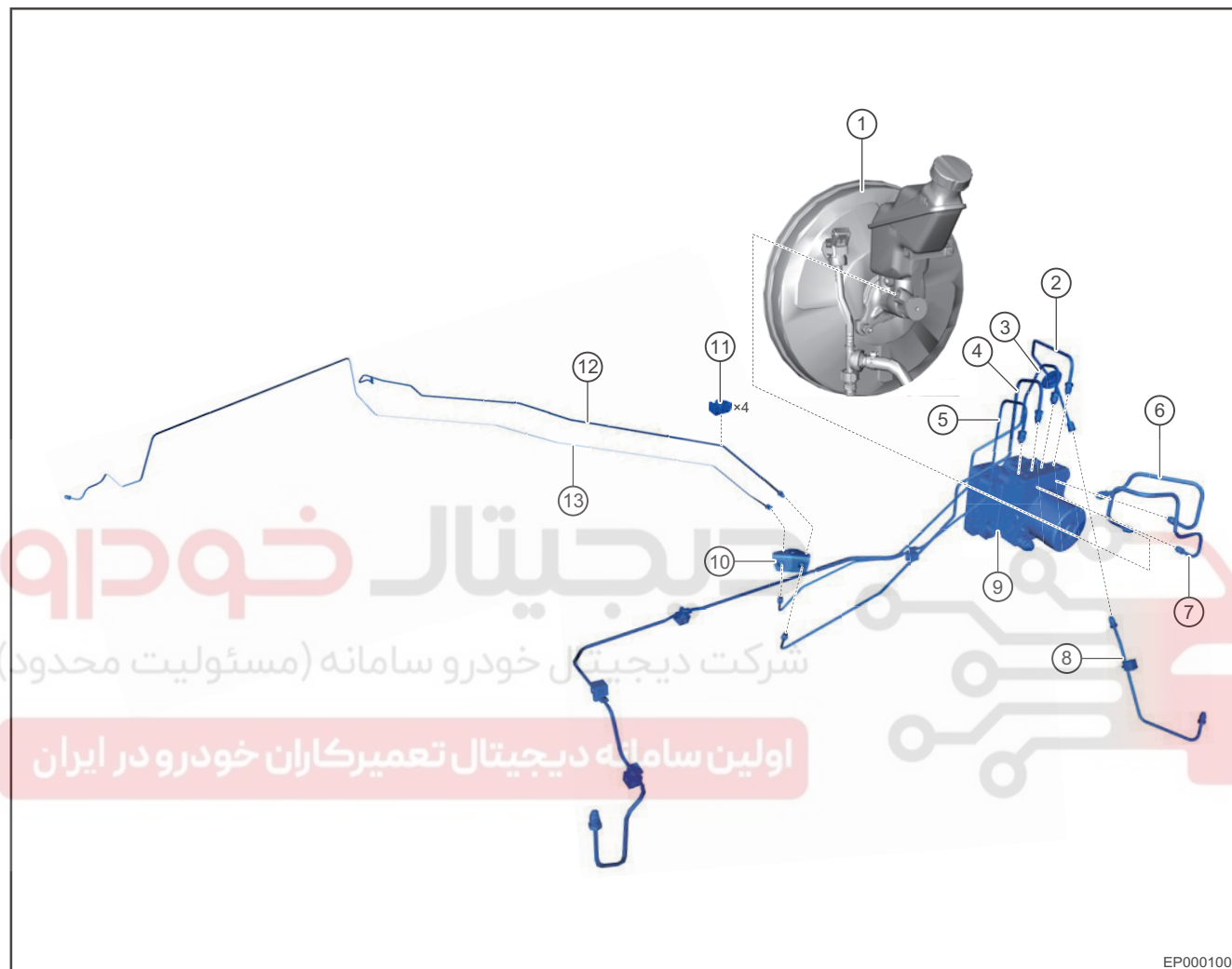


06 - BRAKE SYSTEM

System Overview

System Component Diagram

Hydraulic Brake



1	Vacuum Booster with Brake Master Cylinder Assembly	8	Front Left Brake Pipe II Assembly
2	Front Left Brake Pipe I Assembly	9	ESP Module Assembly
3	Rear Right Brake Pipe I Assembly	10	Two-way
4	Rear Left Brake Pipe I Assembly	11	Pipe Clamp with 2 Grooves
5	Front Right Brake Pipe Assembly	12	Rear Left Brake Pipe II Assembly
6	Master Cylinder 1st Chamber Pipe Assembly	13	Rear Right Brake Pipe II Assembly
7	Master Cylinder 2nd Chamber Pipe Assembly		

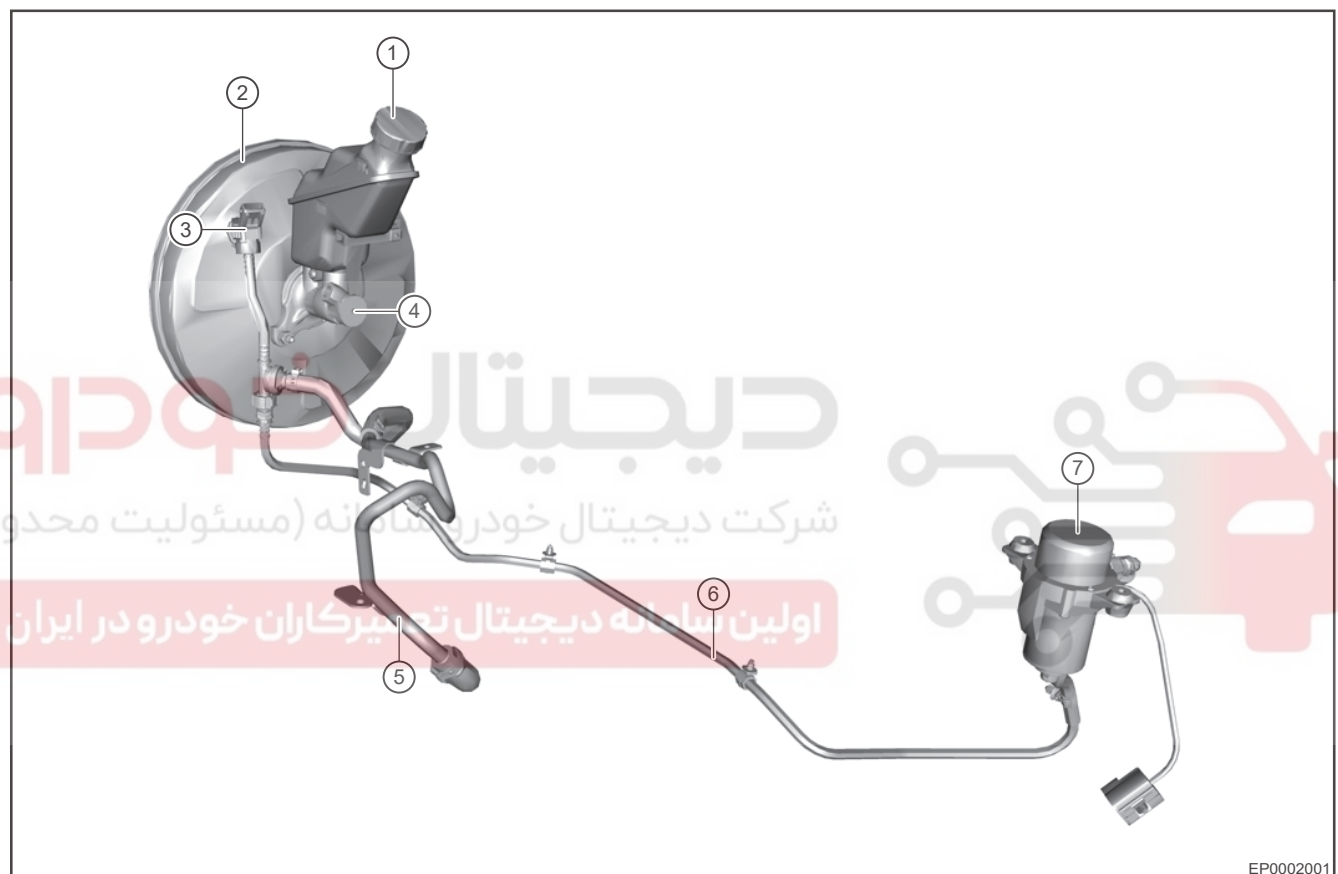
06 - BRAKE SYSTEM

Hydraulic brake adopts hydraulic transmission device, mainly consists of ESP module assembly, vacuum booster with master cylinder assembly, brake master cylinder assembly, brake reservoir assembly, hydraulic line (brake hose, brake pipe), brake caliper assembly, vacuum pump assembly, etc.

When brake pedal assembly is depressed, brake master cylinder assembly piston is pushed forward, and brake fluid pressure in brake master cylinder assembly is increased. Brake fluid enters brake caliper assembly of each wheel through hydraulic line, and brake caliper assembly piston is pushed outward to allow the force of depressing brake pedal to be transmitted to wheel brake caliper assembly, and push wheel brake caliper assembly to brake.

When brake pedal assembly is released, brake master cylinder assembly piston will return under the action of oil pressure and return spring, brake caliper assembly piston and wheel brake caliper assembly will return to release the brake on wheel.

Vacuum Booster with Brake Master Cylinder Assembly



EP0002001

1	Brake Reservoir Assembly	5	Vacuum Tube Assembly
2	Vacuum Booster Assembly	6	Vacuum Pump Connecting Pipe Assembly
3	Atmospheric Pressure Sensor Assembly	7	Vacuum Pump Assembly
4	Brake Master Cylinder Assembly		

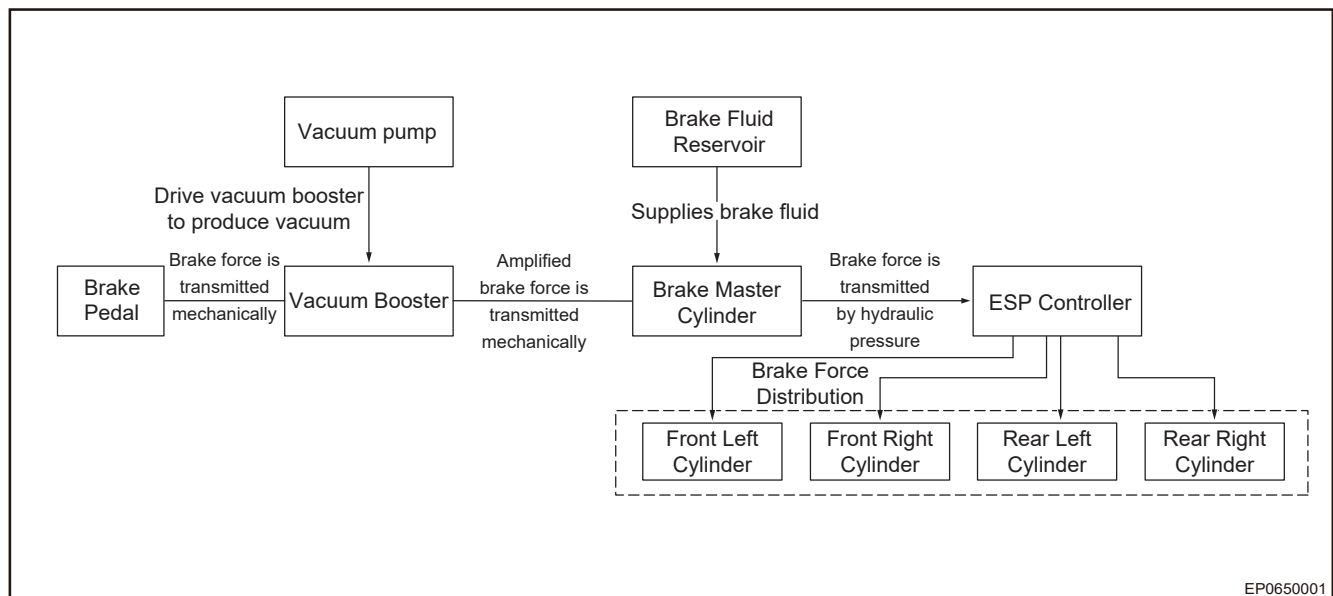
Vacuum booster system is mainly composed of vacuum booster assembly, brake master cylinder assembly, brake fluid reservoir assembly, vacuum pump assembly, atmospheric pressure sensor, etc. Vacuum booster is a component that uses vacuum (negative pressure) to increase force applied by driver to brake pedal assembly.

Vacuum booster is generally located between brake pedal assembly and brake master cylinder assembly. For easy installation, it is usually combined with master cylinder as a set, and part of master cylinder is penetrated into vacuum booster housing.



06 - BRAKE SYSTEM

System Schematic Diagram



When vacuum booster can not obtain vacuum or obtained vacuum is insufficient (at high altitude, low temperature, etc.), it will lead to poor assistance of brake system. Vacuum booster system monitors vacuum changes in vacuum booster through atmospheric pressure sensor, judges operating time of vacuum pump through logic and provides appropriate auxiliary power for brake system. Thereby ensuring that it can provide driver with sufficient braking assistance effect under various working conditions.

Component Operation Description

Brake Fluid Level Sensor

The float in brake fluid reservoir rises/falls according to brake fluid level.

When brake fluid level is on "MAX (maximum)" mark on brake fluid reservoir, the float in brake fluid reservoir rises.

When brake fluid level is on "MIN (minimum)" mark on brake fluid reservoir, the float in brake fluid reservoir falls.

When brake fluid level is below "MIN (minimum)" mark on brake fluid reservoir, brake system malfunction indicator on instrument cluster will come on.

Diagnostic Information and Steps

Problem Symptoms Table

Hint:

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

Brake System:

Symptom	Possible Cause
Poor braking effect	Brake fluid quality
	Air in brake system
	Uneven brake disc wear
	Uneven lining assembly wear
	Minimum brake pedal free play

06 - BRAKE SYSTEM

Symptom	Possible Cause
	Brake system leakage (fluid or pressure)

On-vehicle Service

Specifications

Torque Specifications

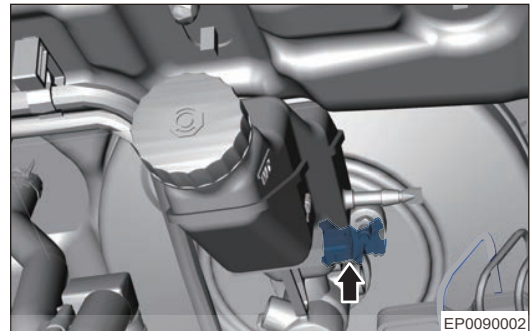
Item	Tightening Torque (N·m)
2 Fixing Nuts Between Brake Pedal Assembly and Vehicle Body	23 ± 2
4 Fixing Nuts Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2
Fixing Screw Between Brake Reservoir Assembly and Brake Master Cylinder Assembly	2 - 5
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	27 ± 2
Coupling Nut Between Front Left Brake Hose Assembly and Front Left Brake Pipe II Assembly	18 ± 2
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2
Coupling Nut Between Rear Left Brake Hose Assembly and Rear Left Brake Pipe II Assembly	18 ± 2
Coupling Nut Between Rear Left Brake Pipe I Assembly and Two-way	18 ± 2
Coupling Nut Between Rear Left Brake Pipe I Assembly and ESP Module Assembly	18 ± 2
Coupling Bolt Between Front Right Brake Hose Assembly and Front Right Brake Caliper Assembly	27 ± 2
Coupling Nut Between Front Right Brake Pipe Assembly and Front Right Brake Hose Assembly	18 ± 2
Coupling Nut Between Front Right Brake Pipe Assembly and ESP Controller Assembly	18 ± 2
Coupling Bolt Between Rear Right Brake Hose Assembly and Rear Right Brake Caliper Assembly	27 ± 2
Coupling Nut Between Rear Right Brake Pipe II Assembly and Rear Right Brake Hose Assembly	18 ± 2
Coupling Nut Between Rear Right Brake Pipe II Assembly and Two-way	18 ± 2

06 - BRAKE SYSTEM

Item	Tightening Torque (N·m)
Coupling Nut Between Rear Right Brake Pipe I Assembly and Two-way	18 ± 2
Coupling Nut Between Rear Right Brake Pipe I Assembly and ESP Controller Assembly	18 ± 2

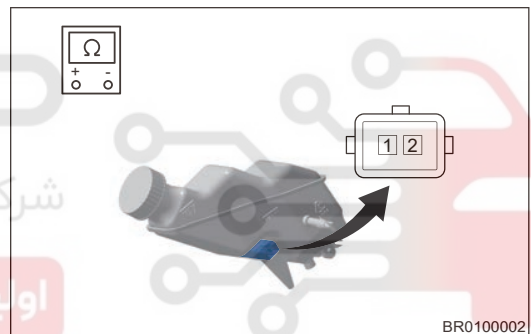
Inspection and Adjustment**Brake Fluid Level Sensor**

1. Disconnect the brake fluid level sensor connector.



2. Using ohm band of digital multimeter, measure brake fluid level sensor terminal.

Multimeter Connection	Brake Fluid Level	Specified Condition
Terminal 1 - Terminal 2	MAX	∞
Terminal 1 - Terminal 2	MIN	$\leq 1 \Omega$

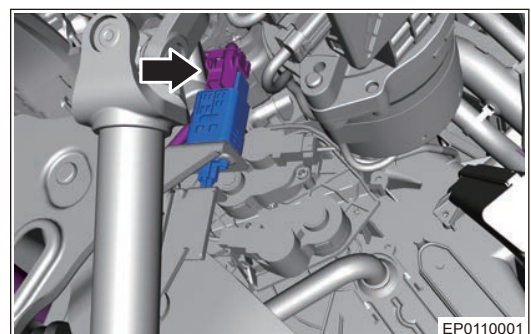


If measurement result is not as specified, replace brake reservoir assembly.

3. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid level sensor connector, if brake system malfunction indicator remains on, check wire harness and instrument cluster.
4. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid level sensor connector, if brake system malfunction indicator goes off immediately, the level sensor is malfunctioning (precondition: brake fluid is within scale range).

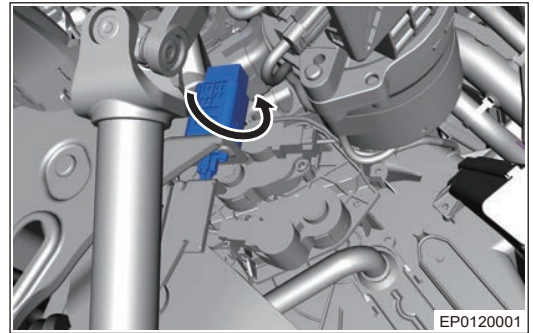
Brake Switch Assembly

1. Disconnect the brake light switch assembly connector.



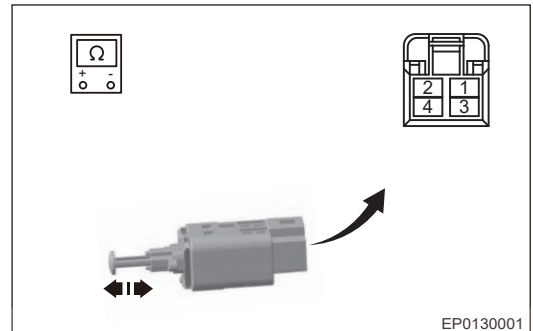
06 - BRAKE SYSTEM

- Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



- Using ohm band of digital multimeter, measure brake switch assembly terminal.

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	Brake pedal depressed	∞
Terminal 2 - Terminal 4	Brake pedal depressed	$\leq 1 \Omega$
Terminal 1 - Terminal 3	Brake pedal released	$\leq 1 \Omega$
Terminal 2 - Terminal 4	Brake pedal released	∞



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

Brake Pedal Assembly

- Brake pedal free play inspection:
 - Stop engine. Depress brake pedal several times until there is no vacuum in vacuum booster (- depress brake pedal until resistance is felt), then release brake pedal.
 - Reasonable range of brake pedal free play: 0 - 65 mm.
- Brake pedal height inspection:
 - Turn over carpet and measure the distance between brake pedal center and dash panel.
 - Loosen the vacuum booster push rod locking nut and rotate the vacuum booster push rod clockwise or counterclockwise to adjust brake pedal height to specified value.

Vacuum Booster Assembly

- Air tightness inspection:
 - Start engine and stop it after 1 or 2 minutes, disconnect the negative battery cable, and then slowly depress brake pedal several times. Check that every pedal depression amount becomes less than the previous one.
 - Start engine, depress and hold pedal, and then stop engine. Depress and hold pedal for 30 seconds, and check that pedal reserve distance does not change.
- Operation inspection:
 - Stop engine and disconnect negative battery cable.
 - Depress the pedal several times and check that pedal reserve distance does not change.
 - Depress and hold pedal, and then start engine. Check that pedal can only be depressed slightly.



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Brake System Bleeding**⚠ Caution**

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

⚠ Warning

- 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 at any time with bleeder screw 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.

Hint:

- An assistant will be required to assist when bleeding brake system.
1. Remove cap from brake fluid reservoir assembly and ensure that brake fluid level is between the "MIN (Minimum)" and "MAX (Maximum)" mark on brake fluid reservoir.
 2. Raise vehicle and remove drain plug cover.
 3. Loosen brake bleeder screw cap and connect a clear plastic hose to bleeder screw. Submerge the end of hose into container.
 4. Have an assistant depress brake pedal 3 to 4 times repeatedly; and depress and hold it at a lower position, then loosen the bleeder screw.
 5. Tighten bleeder screw every time the brake pedal goes down quickly, then release the brake pedal.
 6. Ensure that brake fluid level is not lower than "MIN (minimum)" mark on brake fluid reservoir assembly.
 7. 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 of 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.

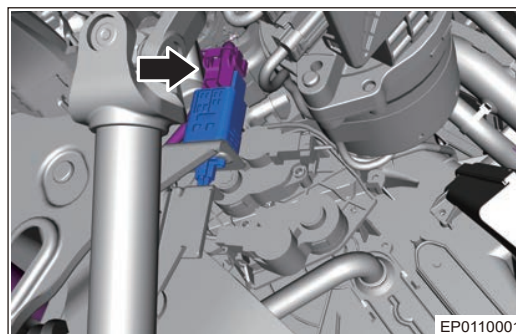
8. Check that brake fluid level is between the "MIN (Minimum)" and "MAX (Maximum)" mark on brake fluid reservoir.
9. Check the brake pedal braking effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
10. Test vehicle to confirm that brakes operate properly with good depressing feel.

Brake Pedal Assembly**Removal**

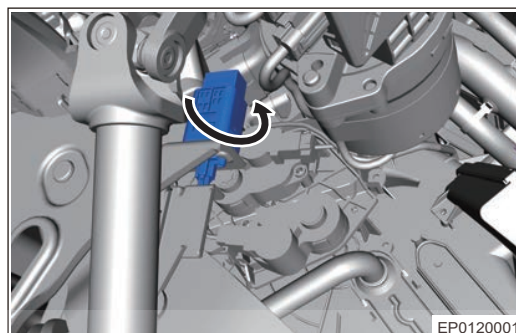
1. Disconnect the negative battery cable.
2. Remove the instrument panel lower left protector assembly.
3. Remove the electronic accelerator pedal assembly.

06 - BRAKE SYSTEM

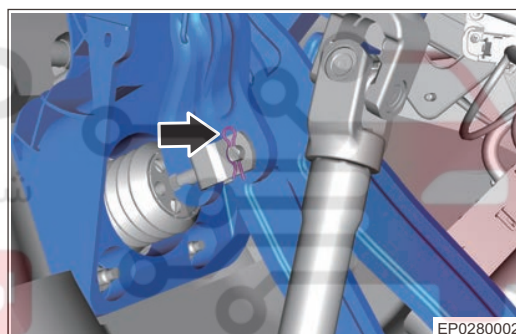
4. Disconnect the brake light switch assembly connector.



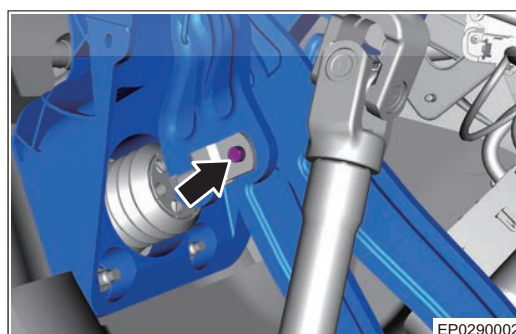
5. Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



6. Remove lock pin between vacuum booster assembly and brake pedal.

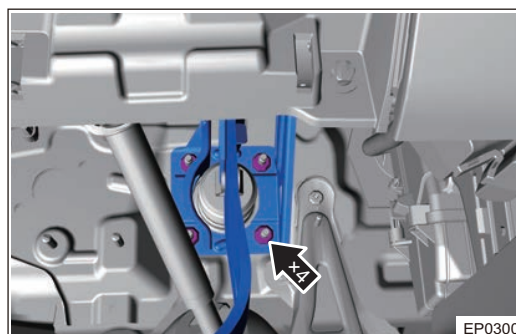


7. Remove lock shaft between vacuum booster assembly and brake pedal.



8. Remove 4 fixing nuts between vacuum booster assembly and brake pedal assembly.

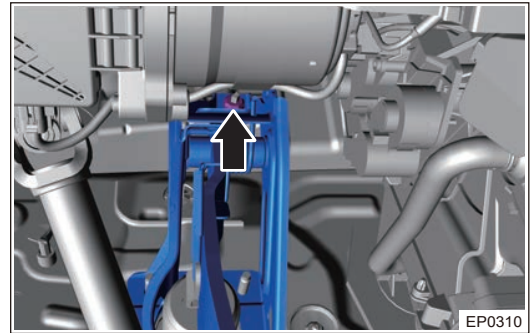
Tightening torque: 23 ± 2 N·m



06 - BRAKE SYSTEM

9. Remove 1 fixing nut between brake pedal assembly and vehicle body.

Tightening torque: 23 ± 2 N·m



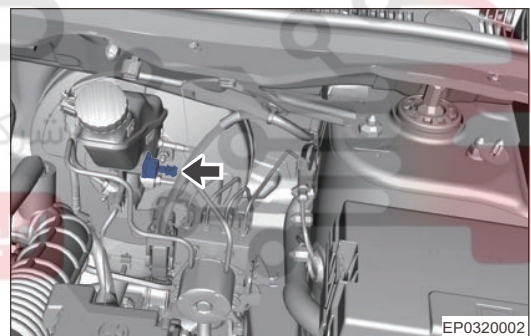
10. Remove the brake pedal assembly.

Installation

1. Installation is in the reverse order of removal.

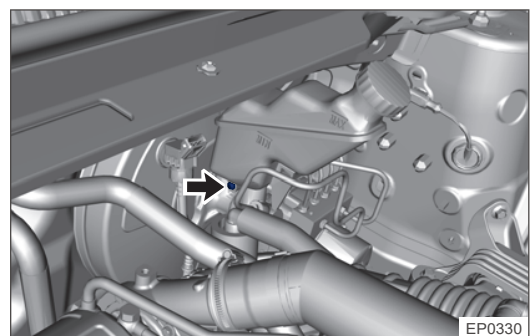
Brake Reservoir Assembly**Removal****Hint:**

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.
1. Drain the brake fluid in brake reservoir assembly.
 2. Disconnect the brake fluid level sensor connector (arrow).



3. Remove fixing screw (arrow) between brake reservoir assembly and brake master cylinder assembly.

Tightening torque: 5 ± 1 N·m



4. Remove the brake reservoir assembly.

Installation

1. Installation is in the reverse order of removal.

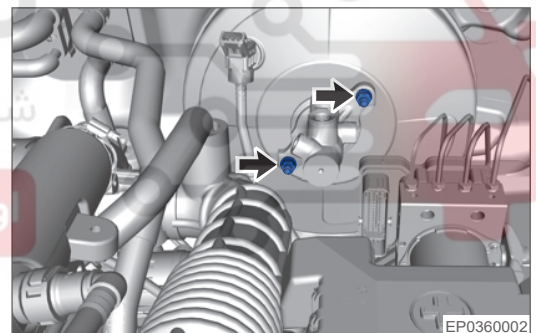
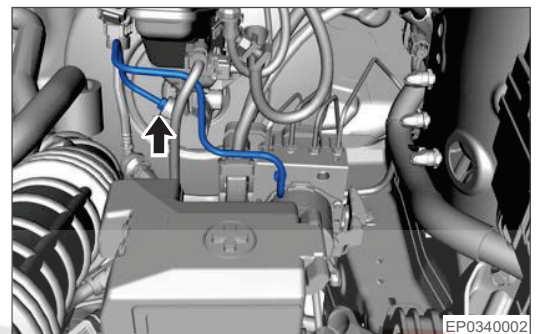
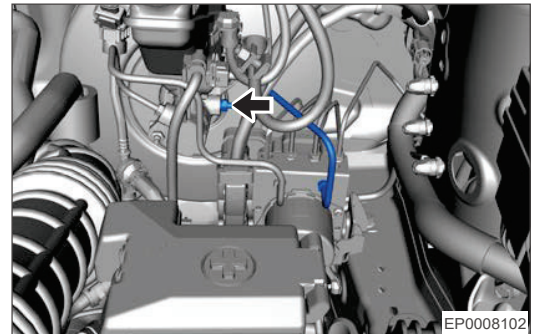
Brake Master Cylinder Assembly**Hint:**

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

Removal

1. Remove the brake reservoir assembly.
2. Loosen fixing nut (arrow) between master cylinder front chamber pipe assembly and brake master cylinder assembly.
3. Loosen fixing nut between master cylinder rear chamber pipe assembly and brake master cylinder assembly.
4. Remove 2 fixing bolts between brake master cylinder assembly and vacuum booster assembly.

Tightening torque: 25 ± 4 N·m



5. Remove the brake master cylinder assembly.

Installation

1. Installation is in the reverse order of removal.

Vacuum Booster Assembly**Hint:**

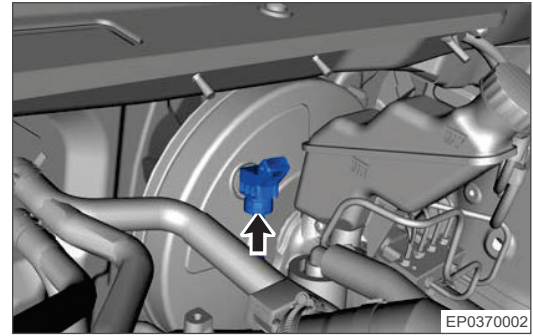
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

Removal

1. Disconnect the negative battery cable.
2. Remove the brake master cylinder assembly.
3. Remove the brake pedal assembly.

06 - BRAKE SYSTEM

4. Disconnect connection between vacuum tube assembly and vacuum booster assembly.



5. Remove the vacuum booster with brake master cylinder assembly.

Installation

1. Install the vacuum booster with brake master cylinder assembly.
2. Install 4 fixing nuts between brake pedal assembly and vacuum booster assembly.

Tightening torque: 23 ± 2 N·m

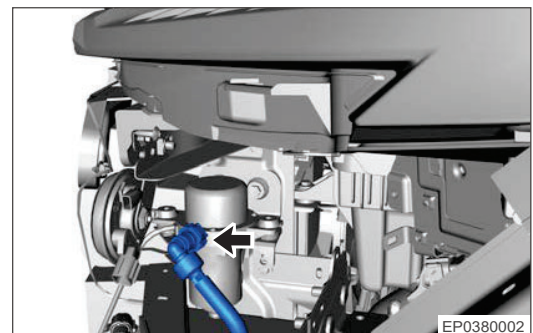
3. Install lock shaft and lock pin between vacuum booster assembly and brake pedal.
4. Install coupling nuts between master cylinder 1st, 2nd brake pipe and brake cylinder.

Tightening torque: 18 ± 2 N·m

5. Connect vacuum pipe assembly and vacuum booster assembly.
6. Install brake fluid reservoir assembly to master cylinder connecting pipe and reservoir adapter, and install clamp.
7. Fill brake fluid and drain the air in brake system.

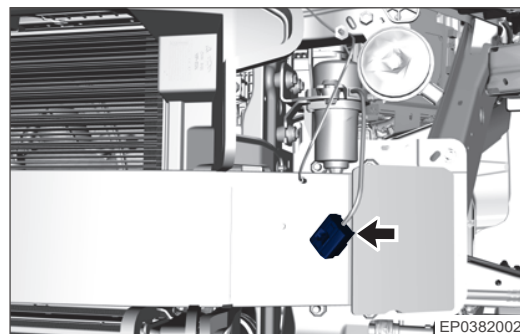
Vacuum Pump Assembly**Removal**

1. Disconnect the negative battery cable.
2. Remove the front left wheel.
3. Remove the front left wheel house protector.
4. Disconnect connection between vacuum pump connecting pipe assembly and vacuum pump assembly.



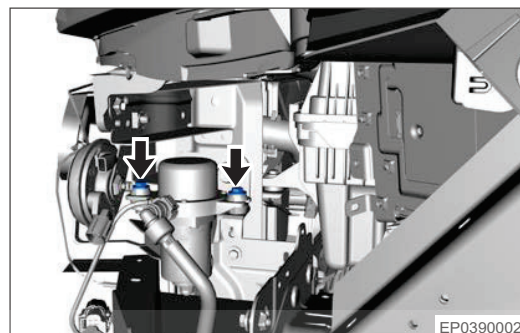
06 - BRAKE SYSTEM

5. Disconnect the vacuum pump assembly connector.



6. Remove 2 fixing bolts from vacuum pump assembly.

Tightening torque: 9 ± 1.5 N·m



7. Remove the vacuum pump assembly.

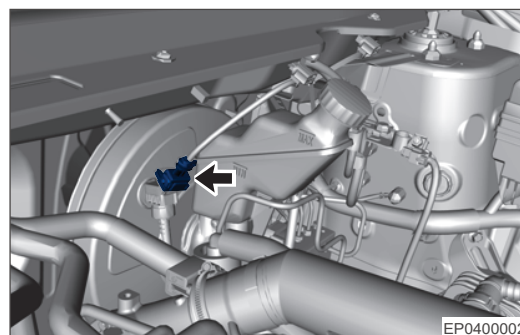
Installation

1. Installation is in the reverse order of removal.

Vacuum Tube Assembly

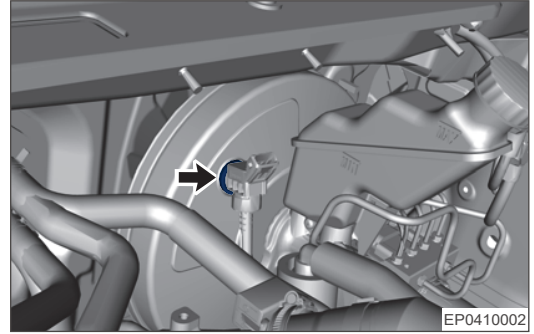
Removal

1. Remove battery and tray.
2. Remove the air filter assembly.
3. Remove the front left wheel.
4. Remove the front left wheel house protector.
5. Disconnect the atmospheric pressure sensor assembly connector.

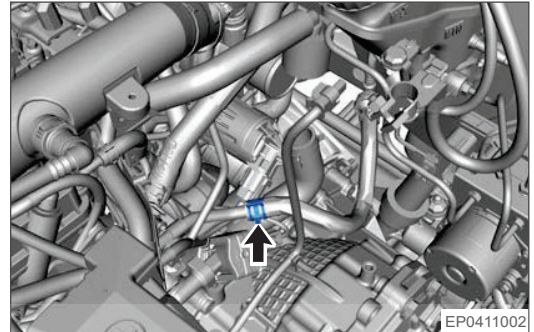


06 - BRAKE SYSTEM

6. Disconnect connection between vacuum tube assembly and vacuum booster assembly.

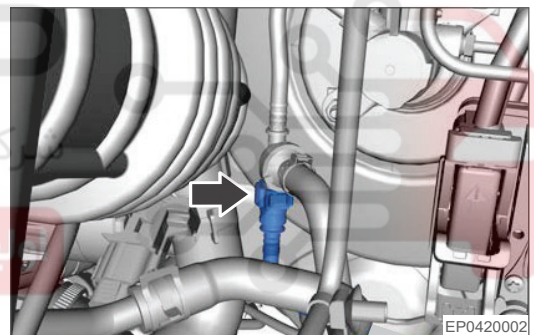


7. Loosen elastic hose clamp between vacuum tube assembly and metal vacuum tube.



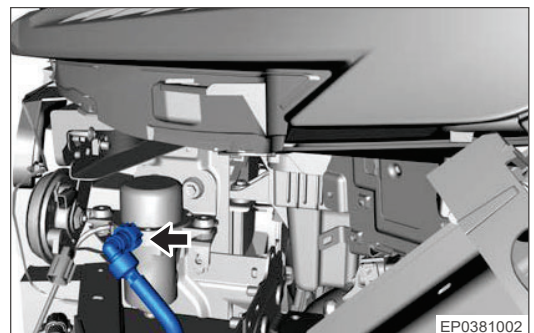
8. Remove the vacuum tube assembly.

9. Loosen elastic hose clamp between vacuum pump connecting pipe assembly and vacuum tube assembly.



10. Remove the vacuum tube assembly.

11. Disconnect connection between vacuum pump connecting pipe assembly and vacuum pump assembly.



12. Remove the vacuum pump connecting pipe assembly.

Installation

1. Installation is in the reverse order of removal.

Brake Hose Assembly (Take left side as an example)

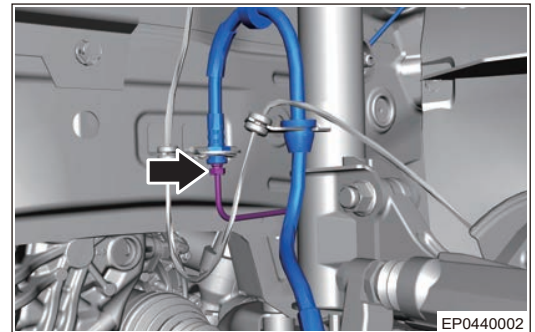
Removal

Hint:

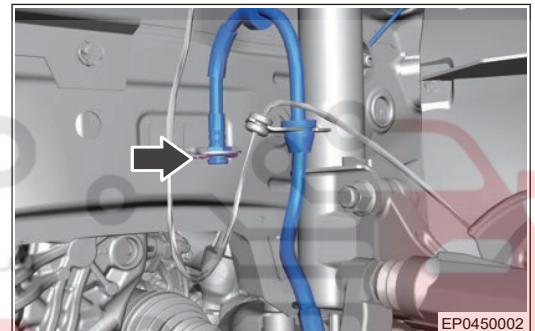
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.
1. Remove the front left wheel.
 2. Remove coupling nut (arrow) between front left brake hose assembly and front left brake pipe II assembly.

Caution

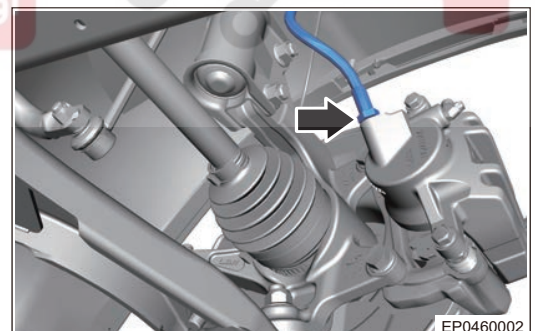
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.



3. Remove holding reed (arrow) between front left brake hose assembly and front left brake pipe II assembly.



4. Remove holding reed (arrow) between front left brake hose assembly and front left brake pipe II assembly.



5. Remove the front left brake hose assembly.

Caution

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

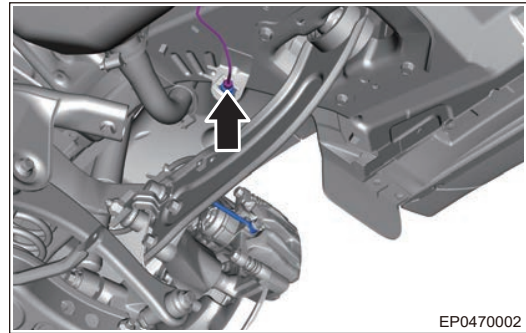
6. Remove the rear left wheel.

06 - BRAKE SYSTEM

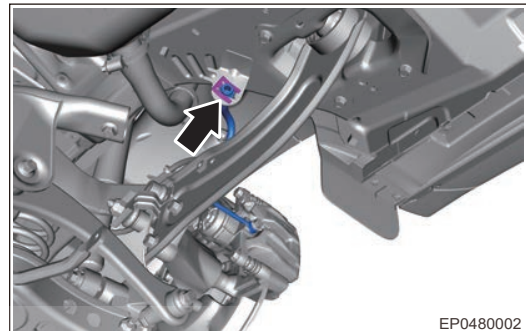
7. Remove coupling nut (arrow) between rear left brake hose assembly and rear left brake pipe II assembly.

⚠ Caution

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



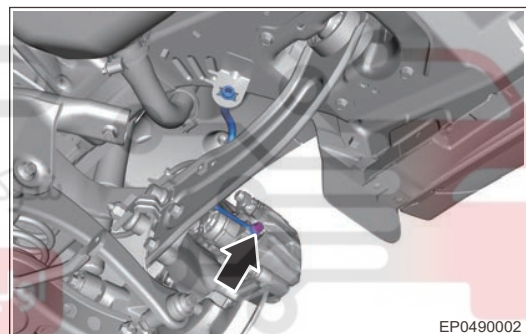
8. Remove holding reed (arrow) between rear left brake hose assembly and rear left brake pipe II assembly.



9. Remove coupling bolt (arrow) between rear left brake hose assembly and rear left brake caliper assembly.

Hint:

- When removing coupling bolt, be careful not to drop 2 gaskets.



10. Remove the rear left brake hose assembly.

⚠ Caution

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

Installation

1. Install the front left brake hose assembly.
2. Install and tighten coupling bolt between front left brake hose assembly and front left brake caliper assembly.

Tightening torque: $27 \pm 2 \text{ N}\cdot\text{m}$

3. Install and tighten coupling nut between front left brake hose assembly and front left brake pipe II assembly.

Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$

4. Install holding reed between front left brake hose assembly and front left brake pipe assembly.
5. Install the rear left brake hose assembly.

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6. Install and tighten coupling bolt between rear left brake hose assembly and rear left brake caliper assembly.

Tightening torque: $27 \pm 2 \text{ N}\cdot\text{m}$

Hint:

- When installing coupling bolt, be careful not to drop the 2 gaskets.

7. Install and tighten coupling nut between rear left brake hose assembly and rear left brake pipe II assembly.

Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$

8. Install holding reed between rear left brake hose assembly and rear left brake pipe II assembly.

9. Fill brake fluid and drain the air in brake system.

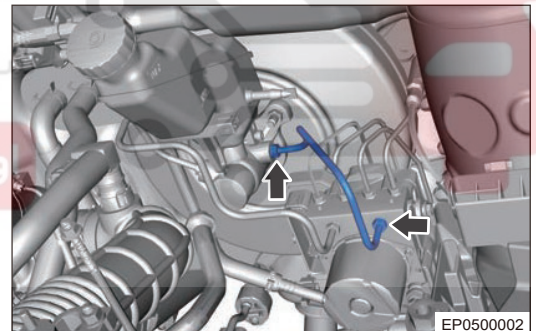
10. Install front left wheel and rear left wheel.

Brake Pipe Assembly**Removal****Hint:**

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

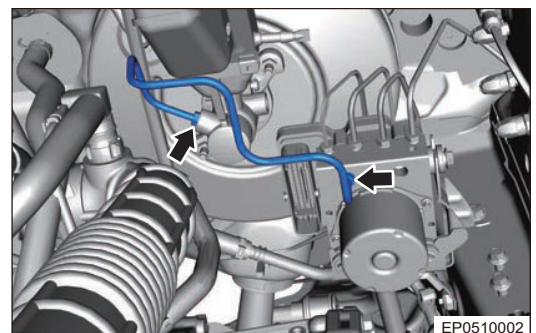
1. Drain the brake fluid in reservoir.
2. Remove battery and tray.
3. Loosen coupling nuts (arrow) between master cylinder front chamber pipe assembly and brake master cylinder assembly and EPB module assembly.

Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$



4. Loosen coupling nuts (arrow) between master cylinder rear chamber pipe assembly and brake master cylinder assembly and EPB module assembly.

Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$

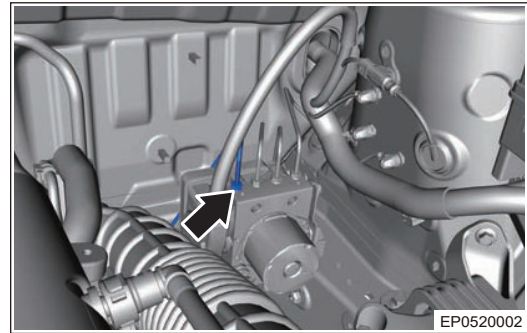


5. Remove the front right wheel.

06 - BRAKE SYSTEM

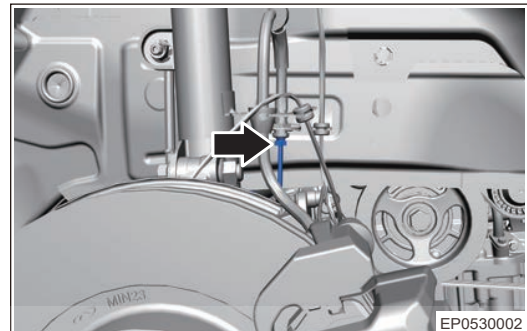
6. Remove coupling nut (arrow) between front right brake pipe assembly and ESP module assembly.

Tightening torque: 18 ± 2 N·m



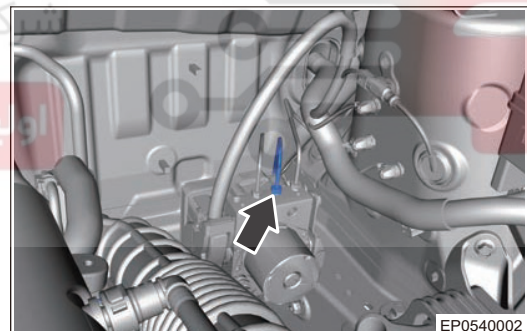
7. Remove coupling nut (arrow) between front right brake pipe assembly and front right brake hose assembly

Tightening torque: 18 ± 2 N·m



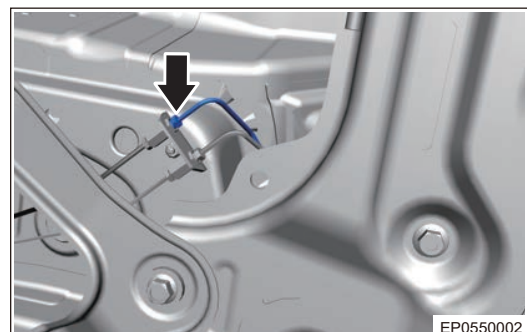
8. Remove the front right brake pipe assembly.
 9. Remove the rear right wheel.
 10. Remove the fuel tank assembly.
 11. Remove the left fuel tank spoiler.
 12. Remove coupling nut (arrow) between rear right brake pipe I assembly and ESP module assembly.

Tightening torque: 18 ± 2 N·m



13. Remove coupling nut (arrow) between rear right brake pipe I assembly and two-way.

Tightening torque: 18 ± 2 N·m

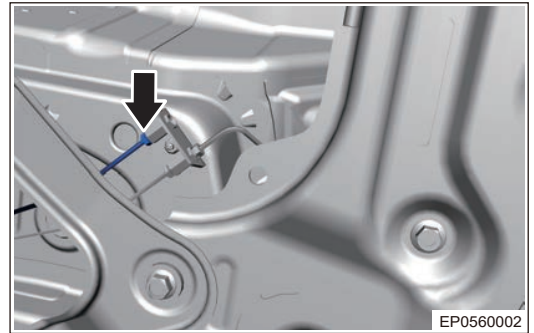


14. Remove the rear right brake pipe I assembly.

06 - BRAKE SYSTEM

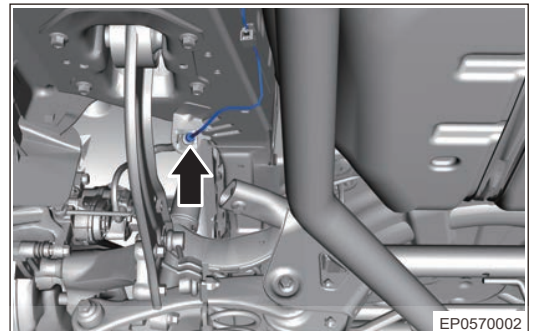
15. Remove coupling nut (arrow) between rear right brake pipe II assembly and two-way.

Tightening torque: 18 ± 2 N·m



16. Remove coupling nut (arrow) between rear right brake pipe II assembly and rear right brake hose assembly

Tightening torque: 18 ± 2 N·m

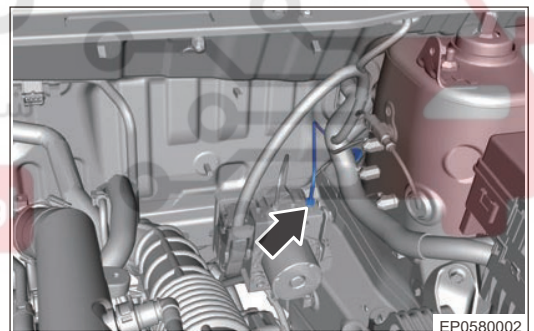


17. Remove the rear right brake pipe II assembly.

18. Remove the front left wheel.

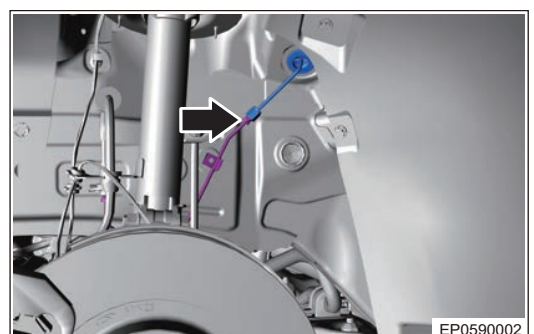
19. Remove coupling nut (arrow) between front left brake pipe I assembly and ESP module assembly.

Tightening torque: 18 ± 2 N·m



20. Remove coupling nut (arrow) between front left brake pipe I assembly and front left brake pipe II assembly.

Tightening torque: 18 ± 2 N·m

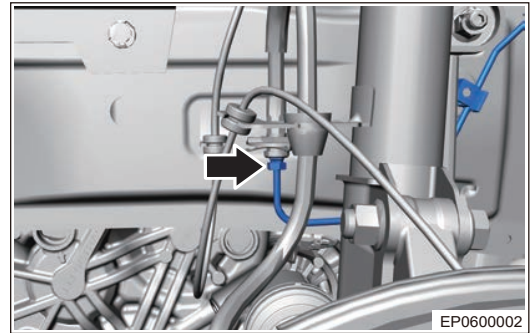


21. Remove the front left brake pipe I assembly.

06 - BRAKE SYSTEM

22. Remove coupling nut (arrow) between front left brake pipe II assembly and front left brake hose assembly.

Tightening torque: 18 ± 2 N·m

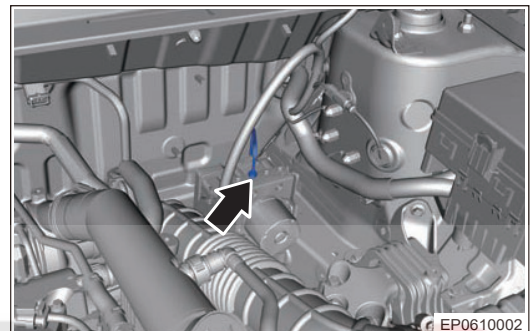


23. Remove the front left brake pipe II assembly.

24. Remove the rear left wheel.

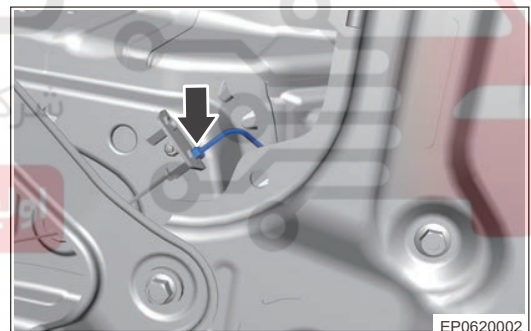
25. Remove coupling nut (arrow) between rear left brake pipe I assembly and ESP module assembly.

Tightening torque: 18 ± 2 N·m



26. Remove coupling nut (arrow) between rear left brake pipe I assembly and two-way.

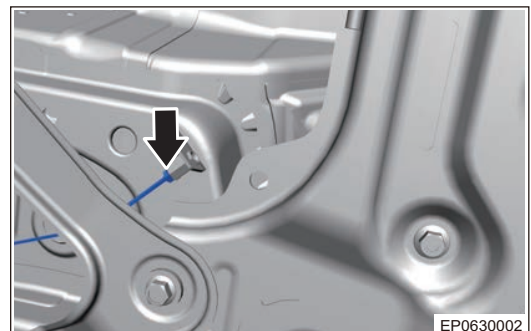
Tightening torque: 18 ± 2 N·m



27. Remove the rear left brake pipe I assembly.

28. Remove coupling nut (arrow) between rear left brake pipe II assembly and two-way.

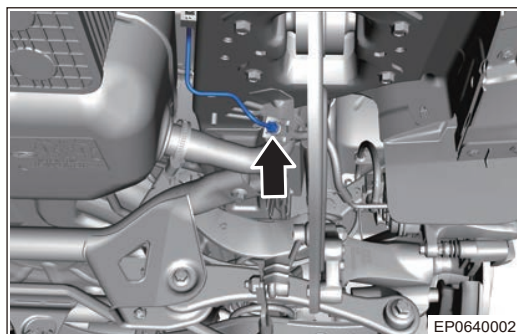
Tightening torque: 18 ± 2 N·m



06 - BRAKE SYSTEM

29. Remove coupling nut (arrow) between rear left brake pipe II assembly and rear left brake hose assembly.

Tightening torque: 18 ± 2 N·m



30. Remove the rear left brake pipe II assembly.

Installation

1. Installation is in the reverse order of removal.

⚠ Caution

- When connecting brake pipe to ESP module assembly, the pipes of 4 wheels cannot be interchanged.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ELECTRONIC PARKING BRAKE SYSTEM

Warnings and Precautions

Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. To prevent vehicle from moving accidentally, after Electronic Parking Brake System (EPB) operates when vehicle is stopped or leaving vehicle, both red indicator and electronic parking switch indicator come on for a while and then go off. At the moment, observe if the indicators come on to make sure that electronic parking brake is applied successfully.
2. To prevent vehicle from moving accidentally, when vehicle is in automatic parking status, it is necessary to confirm the gear position before starting vehicle by depressing accelerator pedal.
3. Turn on sudden braking function only when the foot brake is faulty or brake pedal is stuck.
4. Because ESP and its component can not exceed the physical limit of road adhesion. Turning on emergency braking function when driving on a curve, dangerous road area, heavy traffic road or in bad weather may lead to drift, sideslip or pull. Beware of accident.
5. Use this function with caution during normal driving. Prevent other passengers from touching this switch by mistake while driving. Otherwise it may lead to an accident.
6. When sudden braking function is triggered, a “drone” sound will be heard, it is normal.
7. During sudden braking, electronic parking performs braking operation in a constant deceleration, which may be different from driver's expected deceleration and the braking distance may be different as well.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair:

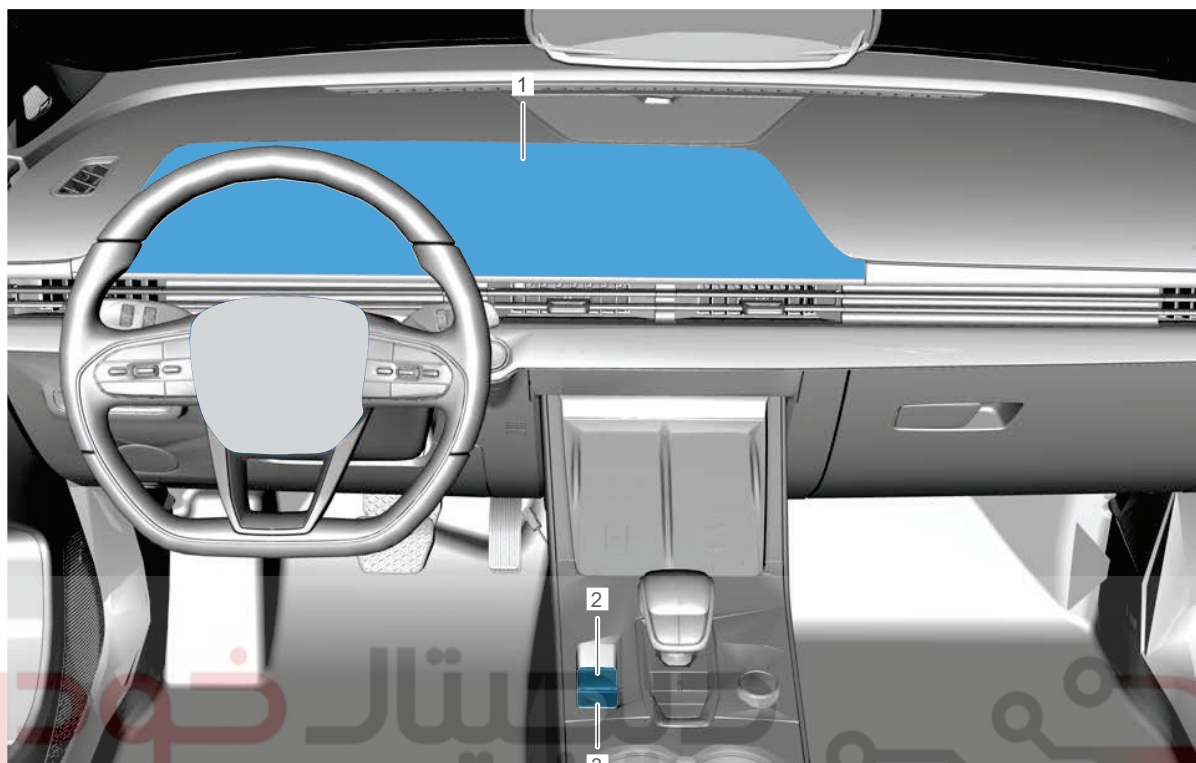
1. When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.
2. If parking brake cannot be released by parking brake switch manually or automatically on a slope, please try to tow vehicle to a level road or place obstacles such as stoppers in front of or rear of front wheels respectively to prevent wheel rolling, avoiding coasting accident after releasing parking brake.

General Information

Description

Electronic Parking Brake System (EPB) integrates temporary braking while driving with long-term braking after stopping. Therefore, vehicle can be stopped through electronic parking brake operation. Electronic parking brake stops vehicle through electronic parking brake operation. Its operation principle is the same as mechanical parking brake operation, which is to control vehicle stopping by friction generated from brake disc and brake lining, but control changes to electronic button from mechanical parking brake lever. Electronic parking brake has extended basic parking function to AUTO HOLD. With AUTO HOLD enabled, driver does not have to depress brake pedal for long time when stopping vehicle, and avoid unnecessary moving, that is vehicle will not slide rearward.

System Component Diagram

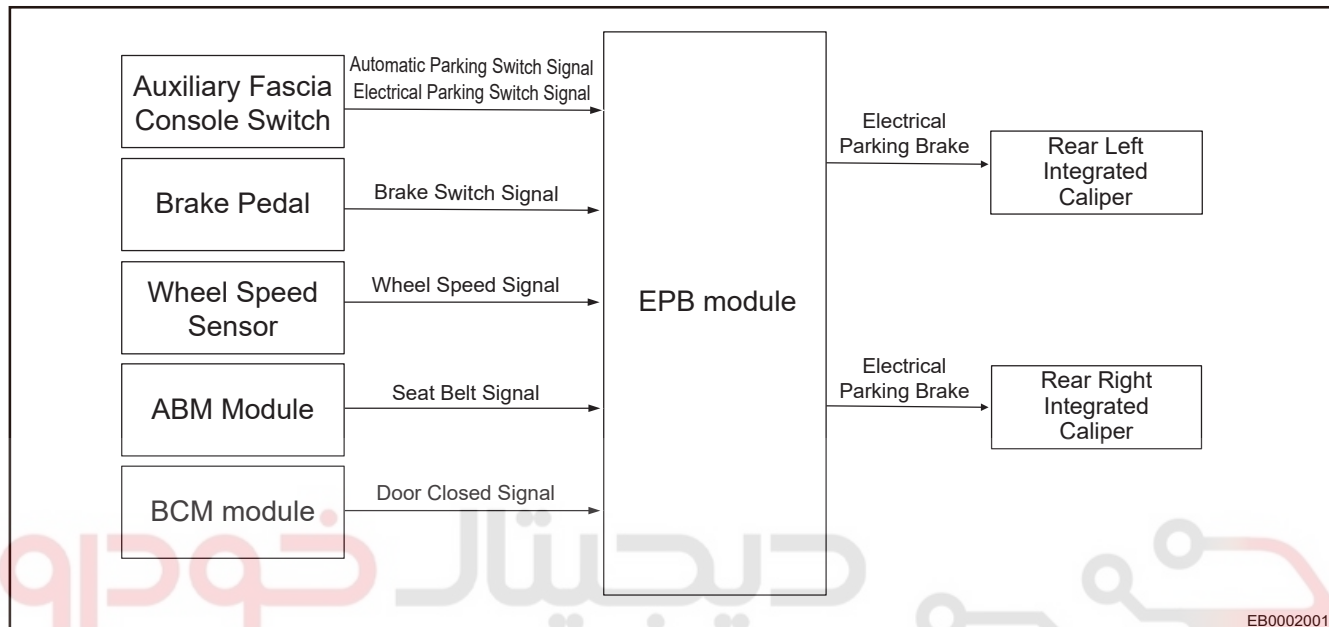


EB0000101

06 - BRAKE SYSTEM

1	Instrument Cluster	4	Rear Right Integrated Caliper Assembly
2	Electrical Parking Brake Switch	5	Rear Left Integrated Caliper Assembly
3	Automatic Parking Switch	6	EPB Module Assembly

System Schematic Diagram



ESP controller assembly collects seat belt signal and door closed signal via CAN line, and collects electric parking switch signal, automatic parking switch signal, brake switch signal and wheel speed signal via hard-wire connection. Then, integrated caliper assembly operates according to data requirements analysis.

System Function Introduction

Electronic Parking Brake System (EPB)

Electronic Parking Brake System (EPB) integrates temporary braking while driving with long-term parking braking after stopping. Therefore, vehicle can be stopped through electronic parking brake operation instead of traditional manual operation.

- Manual parking brake application

When engine starts or ENGINE START STOP switch is in ON mode while vehicle is stationary, pull up the electronic parking switch, the red electronic parking brake system indicator on instrument cluster and indicator on electronic parking switch come on, which indicates parking brake function is operating.

Turn ENGINE START STOP switch to OFF, and Electronic Parking Brake (EPB) achieves parking brake automatic application function.

- Manual parking brake releasing

When engine starts or ENGINE START STOP switch is in ON mode while depressing brake pedal, press the electronic parking switch manually, the red electronic parking brake system indicator on instrument cluster and indicator on electronic parking switch go off, which indicates parking brake function is released.

- Automatic releasing

06 - BRAKE SYSTEM

Fasten driver side seat belt, close driver side door. Depress accelerator pedal when vehicle is in D or R position on a level ground. Then electronic parking brake will be released automatically and red electronic parking brake system indicator on instrument cluster goes off.

If shift to D or R position when vehicle is stooped on a slope, it is necessary to depress accelerator pedal deeply and automatic parking brake is released only when drive force is greater than the force in coasting direction.

⚠ Caution

- Electronic parking brake system (EPB) and automatic parking system (AUTO HOLD) are unavailable when battery is depleted.
- If parking brake is applied or released while depressing the brake pedal, brake pedal may move up or down slightly, just depress brake pedal firmly.
- Fasten driver side seat belt and close driver side door when electronic parking brake is released automatically. Otherwise, automatic parking brake releasing conditions are not met.
- While electronic parking brake is applied or released, a “fizz” sound may be heard from rear of vehicle, which is generated during parking brake operation. This is normal, please rest assured use.
- If vehicle coasts after stopping for a while, for safety, system will increase parking brake force automatically, to make vehicle stationary; during the process of increasing parking brake force, system will produce a certain operating sound, which is normal.
- With engine starting or ENGINE START STOP switch turned to ON, if parking brake can not be released manually by depressing brake pedal, depress accelerator pedal and press electronic parking brake switch to release parking brake. Use this method only when parking brake can not be released manually by depressing brake pedal. Please take care when using this method.

⚠ Warning

- To prevent vehicle from moving accidentally, after EPB operates when vehicle is stopped or leaving vehicle, both red electronic parking brake system indicator on instrument cluster and electronic parking switch indicator come on for a while and then go off. At the moment, observe if the indicators come on to make sure that electronic parking brake is applied successfully.

Automatic Parking Function (AUTO HOLD)

Electronic parking brake system (EPB) has extended basic parking function to automatic parking function (AUTO HOLD). With AUTO HOLD enabled, driver does not have to depress brake pedal for long time when stopping vehicle, automatic parking can be used to avoid unnecessary moving (such as coasting).

- Automatic parking operating condition
Start the engine, close driver side door and fasten driver side seat belt.
- Turn on automatic parking
When automatic parking conditions are met, press automatic parking button and indicator on automatic parking button comes on, which indicates automatic parking function is turned on.
- Activate automatic parking
With automatic parking function turned on, vehicle stops from moving status after depressing brake pedal, automatic parking function is activated and green automatic parking system indicator on instrument cluster comes on.

When vehicle is stationary and depressing brake pedal, while automatic parking function is turned on and automatic parking conditions are met, automatic parking function is enabled and green automatic parking system indicator on instrument cluster comes on.

- Turn off automatic parking



06 - BRAKE SYSTEM

With automatic parking function turned on, press automatic parking button to turn off automatic parking function and indicator on automatic parking button goes off, which indicates vehicle has exited automatic parking function.

With automatic parking function activated, press automatic parking button to turn off automatic parking function. Both green automatic parking system indicator on instrument cluster and indicator on automatic parking button go off, which indicates vehicle has exited automatic parking function and turned to parking brake function.

- Release automatic parking

Automatic parking releasing method is the same as that of electronic parking, including manual and automatic releasing operations.

Caution

- Be sure to turn automatic parking function off before driving into car washing room.
- Be sure to observe safety regulations to park the vehicle properly, avoid hurting yourself and pedestrian.
- Slowly depress the accelerator pedal, as it is normal that there is delay for the automatic releasing of automatic parking.
- After engine starts, automatic parking system can not be entered if driver side seat belt is unfastened or driver side door is not closed.
- When automatic parking function is activated, open driver side door or unfasten driver side seat belt, then automatic parking turns to electronic parking.
- For MT model, fully depress the clutch pedal and shift to D/R position and then depress accelerator pedal to release automatic parking. If vehicle is driving on an uphill slope, it is suggested to depress accelerator pedal under half-linkage state to perform hill starting.
- With automatic parking turned on, when vehicle is stopped moving by brake and kept in stationary state, automatic parking system will apply parking brake automatically while transmission is in D or R position. It is suggested to shift to N in short time parking, and shift to P in long time parking.
- With automatic parking function turned on, when opening driver side door or unfastening driver side seat belt, it will exit automatic parking function. When driver side door is closed or driver side seat belt is fastened again, automatic parking function is turned on again.

Warning

- To prevent vehicle from moving accidentally, when vehicle is in automatic parking status, it is necessary to confirm the gear position before starting vehicle by depressing accelerator pedal.

Emergency Braking Function

If foot brake is faulty, pull up and hold the electronic parking switch to forcibly apply brake through parking brake. The red electronic parking system indicator on instrument cluster flashes during sudden braking. To exit sudden braking, release the electronic parking switch.

Warning

- When sudden braking function is triggered, a “drone” sound will be heard, it is normal.
- During sudden braking, electronic parking performs braking operation in a constant deceleration, which may be different from driver's expected deceleration and the braking distance may be different as well.
- Use this function with caution during normal driving. Prevent other passengers from touching this switch by mistake while driving. Otherwise it may lead to an accident.
- Turn on sudden braking function only when the foot brake is faulty or brake pedal is stuck. Because Electronic Stability Program (ESP) system and its component can not exceed the physical limit of road adhesion. Turn on emergency braking function when driving on a curve, dangerous road area, heavy traffic road or in bad weather may lead to drift, sideslip or pull. Beware of accident.

Service Mode

1. This mode is used when checking and repairing EPB system.
2. When entering service mode, EPB caliper will be released in place automatically.
3. Never perform “Exit Maintenance Mode” if inspection and repair of vehicle are not finished, to prevent serious accident.
4. Diagnostic tester must be used to perform “Exit Maintenance Mode” after inspection and repair of vehicle are finished (such as replacing brake linings with new ones), failure to do so may cause vehicle to lose EPB function, however, conventional braking will not be affected.
5. When service mode function is triggered, a “drone” sound will be heard, it is normal.
6. Operation methods for entering and exiting service mode are as shown in table below:

Function	Vehicle Status	Engine Status	Key Status	Operation Method	HMI Status	
					Instrument Cluster	Switch
Service Mode	Stationary	Ignited/Stall	ON	Entering or exiting is performed using diagnostic tester or by professional technicians at 4S shop	Red P and yellow P lights flash when entering service mode, and reflect EPB status of real-vehicle after exiting service mode	Reflect EPB status of real vehicle

Emergency Brake

1. This function is used when service brake becomes unavailable. Never use electric parking brake on this vehicle in emergency case other than service brake failure.
2. Emergency brake refers to the ESP system brake, and the brake force is constant during emergency brake.
3. Brake light comes on normally during emergency brake.
4. When emergency brake function is triggered, a “drone” sound will be heard, it is normal.
5. Operation methods for entering and exiting emergency brake are as shown in table below:



06 - BRAKE SYSTEM

Function	Vehicle Status	Engine Status	Key Status	Operation Method	HMI Status	
					Instrument Cluster	Switch
Entering Emergency Brake	Stationary	Ignited/stall	ON	Pull up EPB switch and hold it when vehicle speed is more than 3 km/h	Red P light flashes	EPB switch indicator flashes
Exiting Emergency Brake	Driving	Ignited/Stall	ON	Release EPB switch/ depress accelerator pedal	No P light comes on	No indicator comes on
	Driving → Stationary			Stop vehicle		

Meter Indicator Light and Prompt Information

No.	Indicator Light Condition or Prompt Information	Indicator Light Description	Treatment
1	Yellow P light - remains ON	EPB system malfunction	Check and repair
2	Red P light - flashes	Switch always pulled while driving, which belongs to emergency brake mode	Normal, don't need to repair
		Switch is not operated, caliper status is unknown	Try to press or pull up the switch. It needs to be checked and repaired if the operation above is invalid
3	Red P light - remains ON	EPB parking function is operative	Normal, don't need to repair
4	Green A light - remains ON	Automatic parking function is operative	Normal, don't need to repair
5	Please depress brake pedal when releasing parking brake	Press EPB release button when parking brake is applied and brake pedal is not depressed	Depress brake pedal and press EPB button simultaneously
6	Please fasten seat belt	Seat belt is not fastened when driving away after parking	Fasten seat belt and depress accelerator pedal

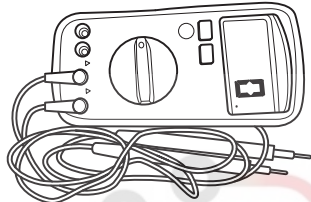
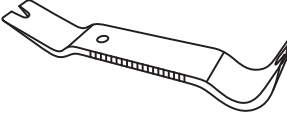
06 - BRAKE SYSTEM

7	Please close door and fasten seat belt	Press automatic parking switch when seat belt is not fastened or a door is not closed	Close driver door and fasten seat belt, then press automatic parking switch
8	Parking slope is too large, please pay attention to safety	Static parking on a slope is larger than 30%	It is recommended to park vehicle on a small slope

On-vehicle Service

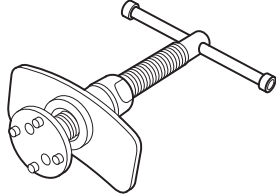
Tools

General Tools

Tool Name	Part No.	Tool Drawing
Digital Multimeter	-	 RCH000206
Diagnostic Tester	-	 RCH000106
Interior Crow Plate	-	 S00020

06 - BRAKE SYSTEM

Special Tool

Tool Name	Part No.	Tool Drawing
Rear Brake Cylinder Release Tool	ECH-0005	 RCH0000053

Specifications

Torque Specifications

Description	Torque (N·m)
Left Integrated Caliper Motor Fixing Bolt	10 ± 1.0
Right Integrated Caliper Motor Fixing Bolt	10 ± 1.0
Left Integrated Caliper Guide Pin Bolt	30 ± 2.0
Right Integrated Caliper Guide Pin Bolt	30 ± 2.0

On-vehicle inspection

⚠ Caution

- EPB system must be repaired by professional technicians who have trained and mastered maintenance skills and only use original parts for replacement.
- Before perform a fault diagnosis of EPB system, it is necessary to confirm that vehicle CAN interface can be connected properly.
- Note following when connecting EPB wire harness: Turn ENGINE START STOP switch off before disconnecting wire harness connector, make sure that connector is dry and clean and avoid any foreign material entering; Wire harness must be installed in place horizontally and vertically in order to avoid damaging connector.
- If EPB motor fuse need to be replaced, make sure that it is exactly the same with original model, including shape and parameters, and ensure that connection is fully in place.

1. Inspect friction material thickness of brake linings on both sides visually, replace it when minimum value is less than 2 mm.
2. When brake lining is worn to limit state, there will be mechanical alarm, and the brake lining should be replaced.
3. It is necessary to replace 4 brake linings of left and right brake calipers when replacing brake linings.
4. If removed brake lining can be reused, it must be installed at original position when it is reinstalled.
5. During warranty period of brake lining, it is not possible to replace brake lining with different wear thickness. If friction material thickness is less than 2mm in warranty period, brake lining should be replaced, and check brake caliper for dragging at the same time.
6. Check EPB wire harness for aging or damage, replace as necessary.

Diagnosis Tester Test

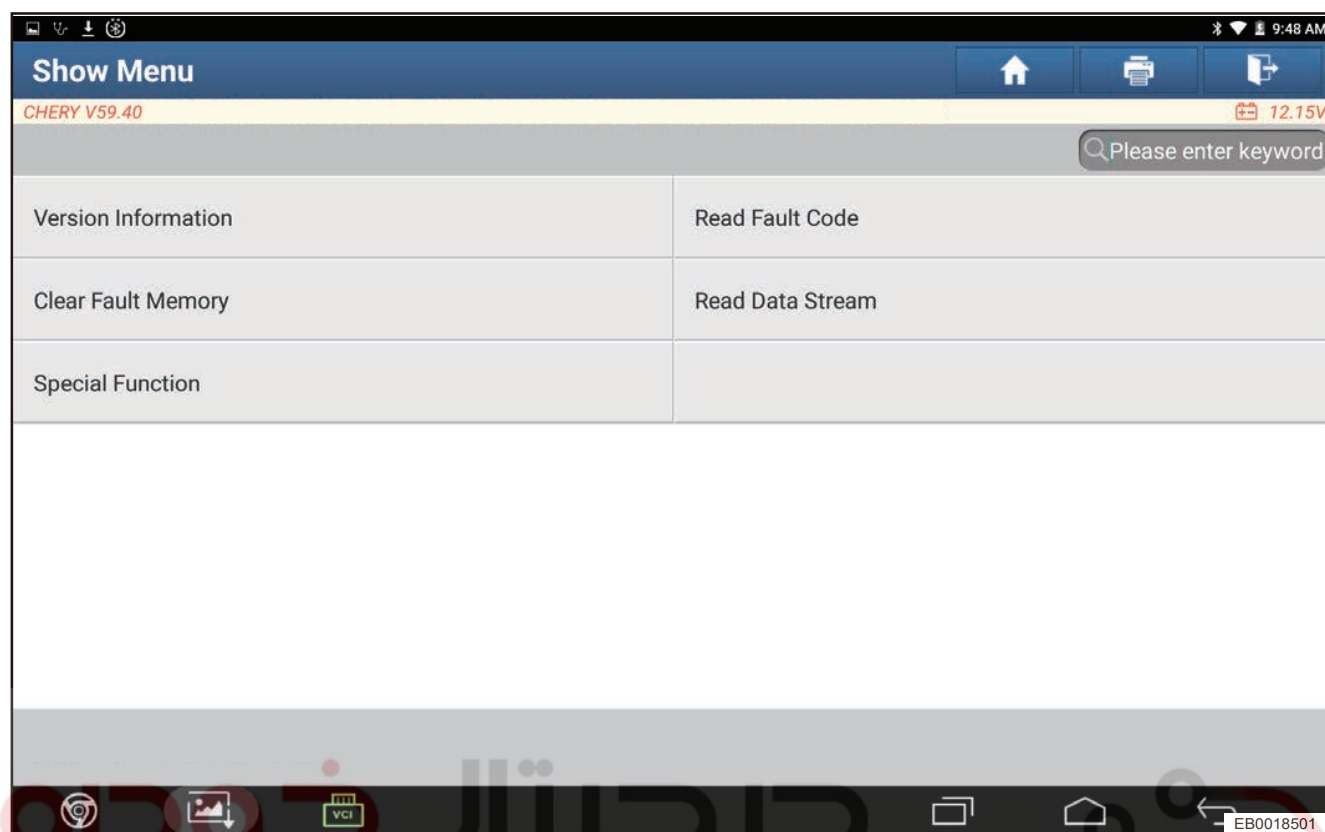
Brake System Service Mode

1. Turn ENGINE START STOP switch to ON.
2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .

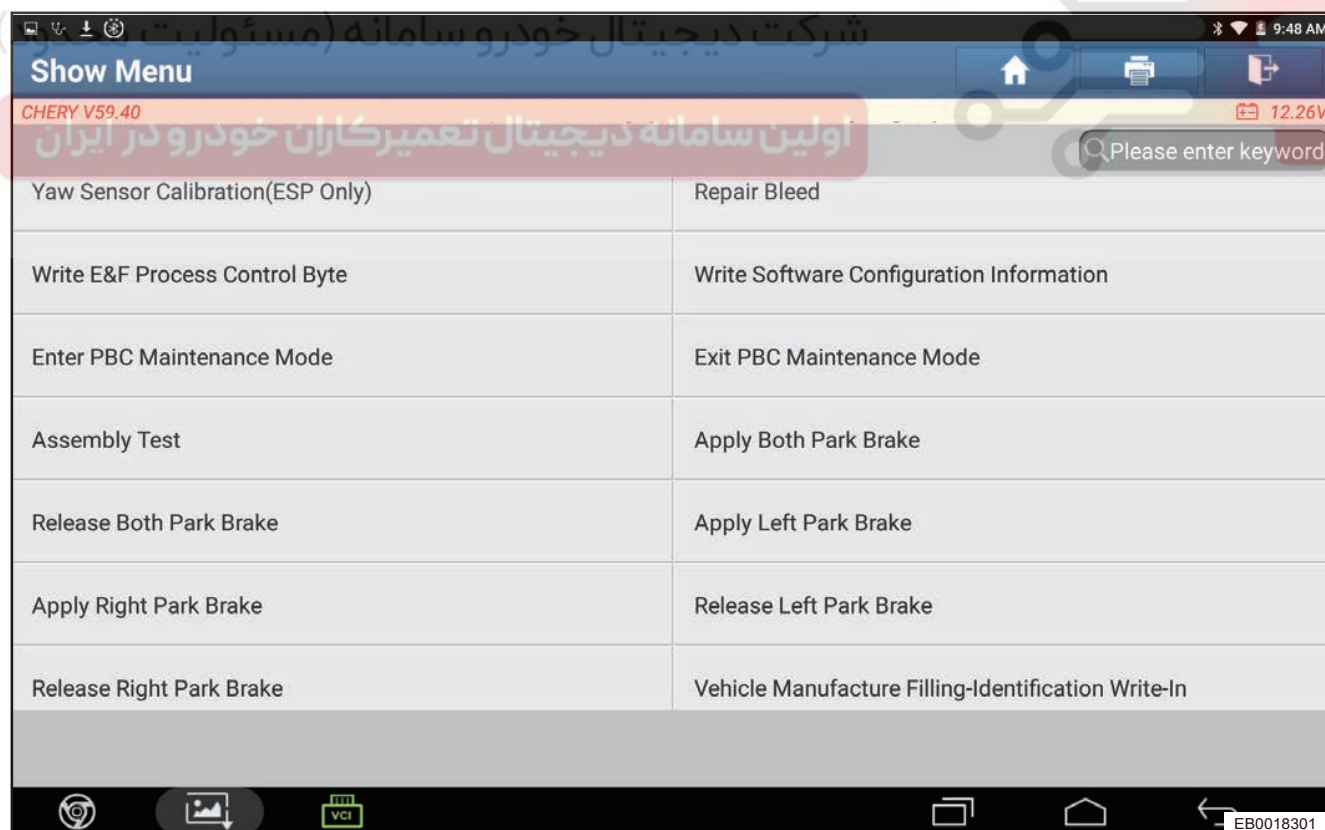


4. Click diagnostic tester to enter “Special Function” .

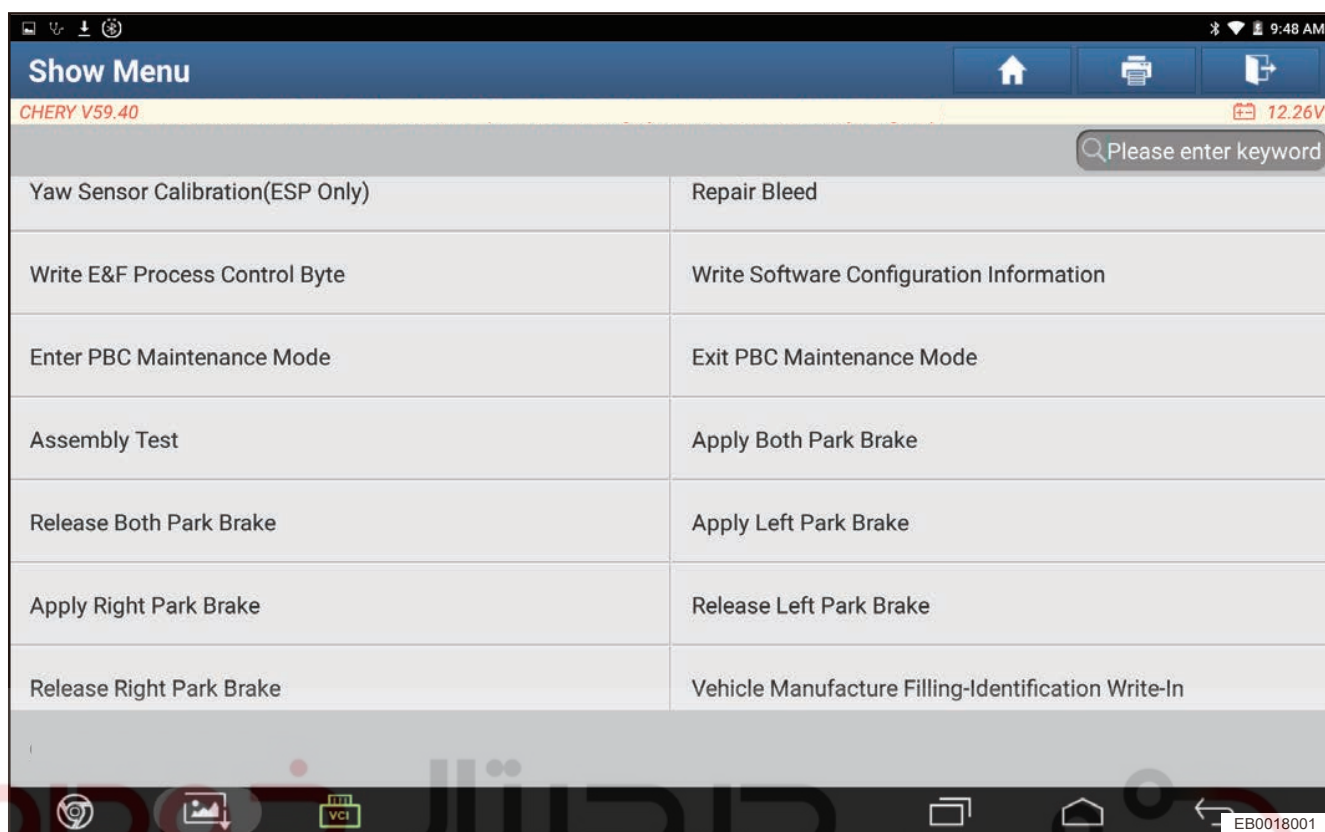
06 - BRAKE SYSTEM



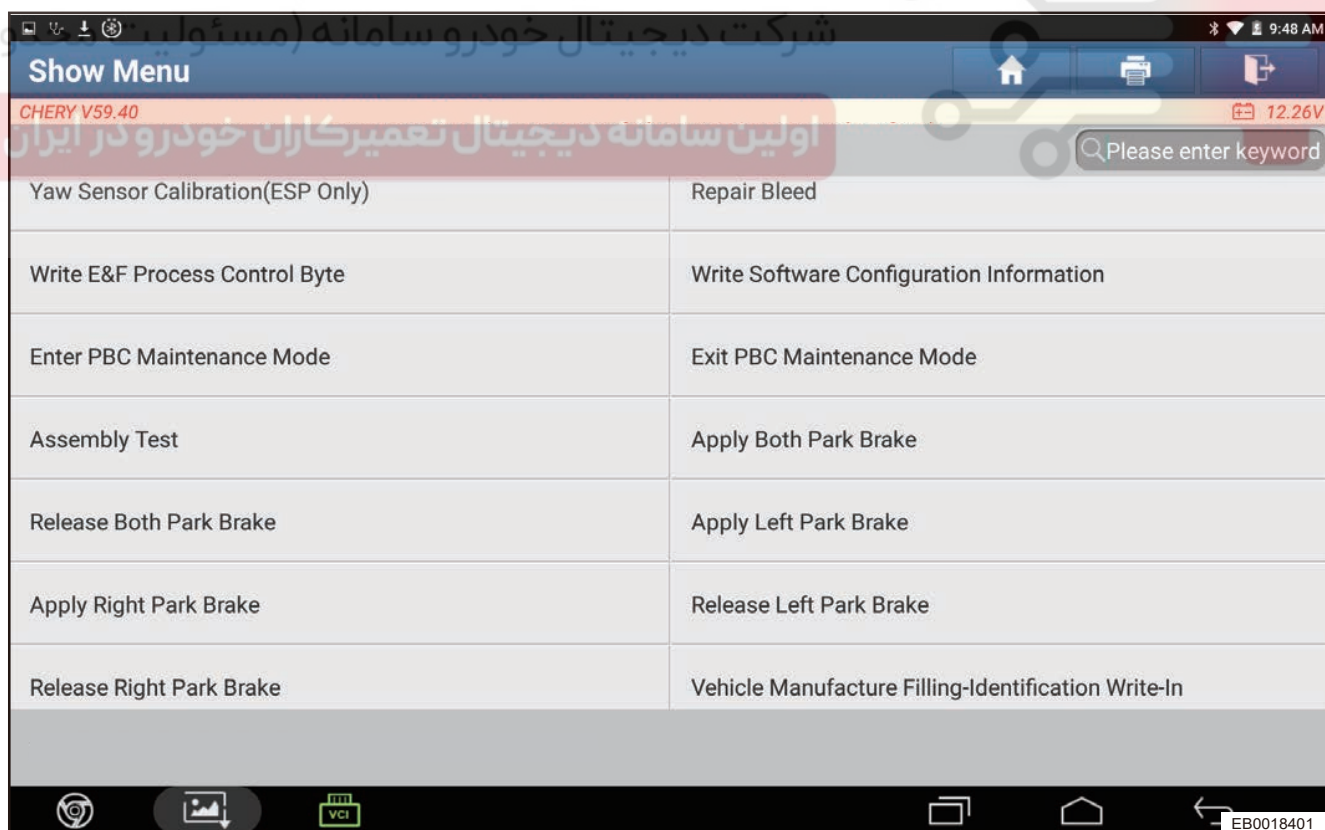
5. Click “Enter PBC Maintenance Mode” .



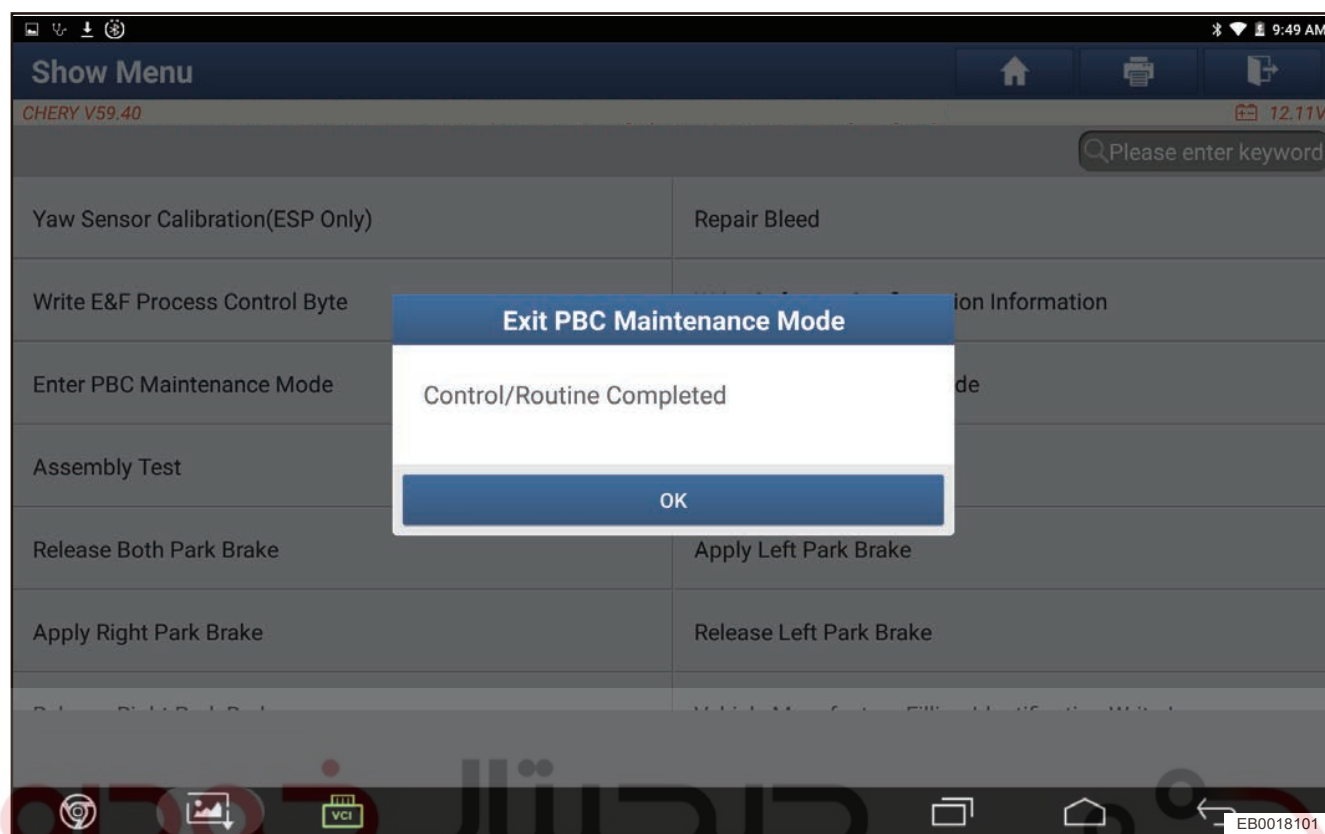
06 - BRAKE SYSTEM



6. Click “Exit PBC Maintenance Mode”.

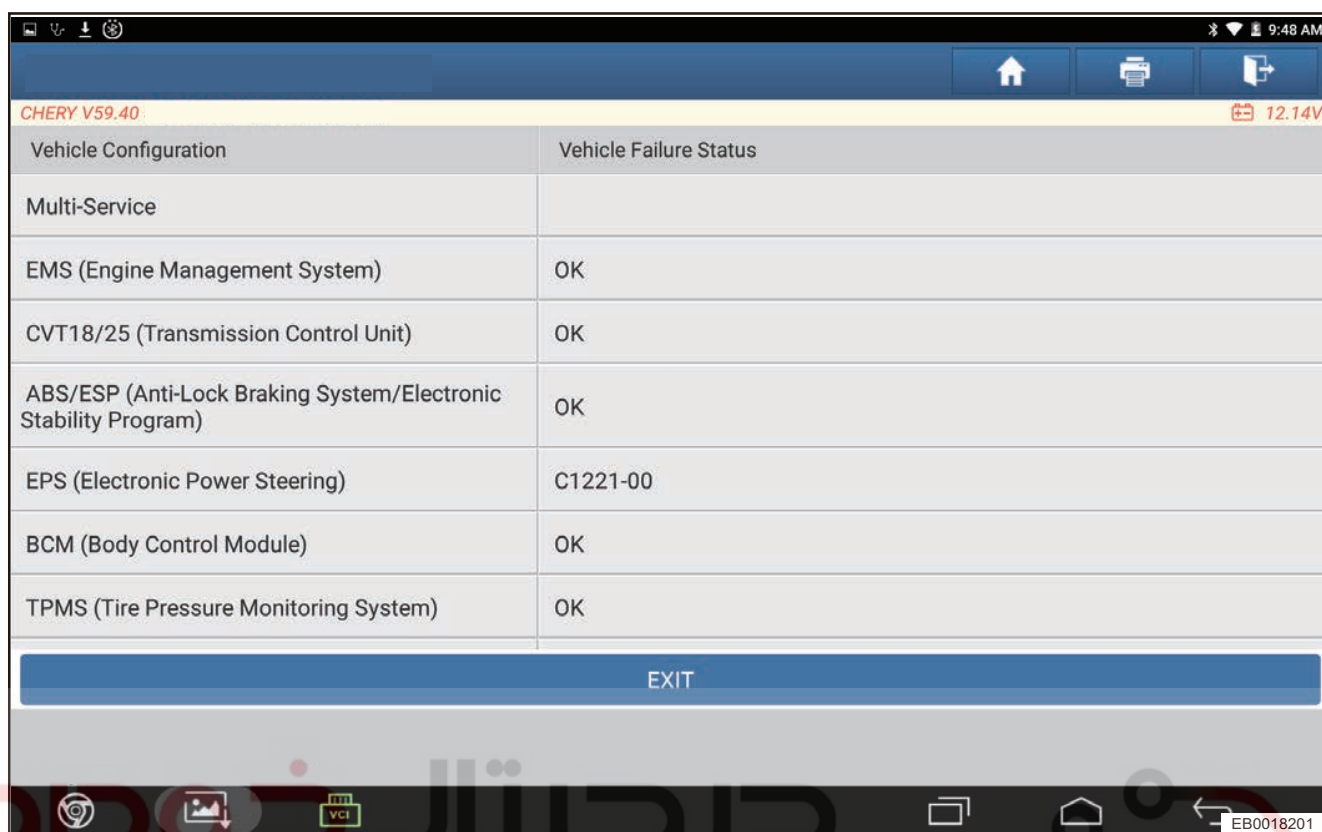


06 - BRAKE SYSTEM

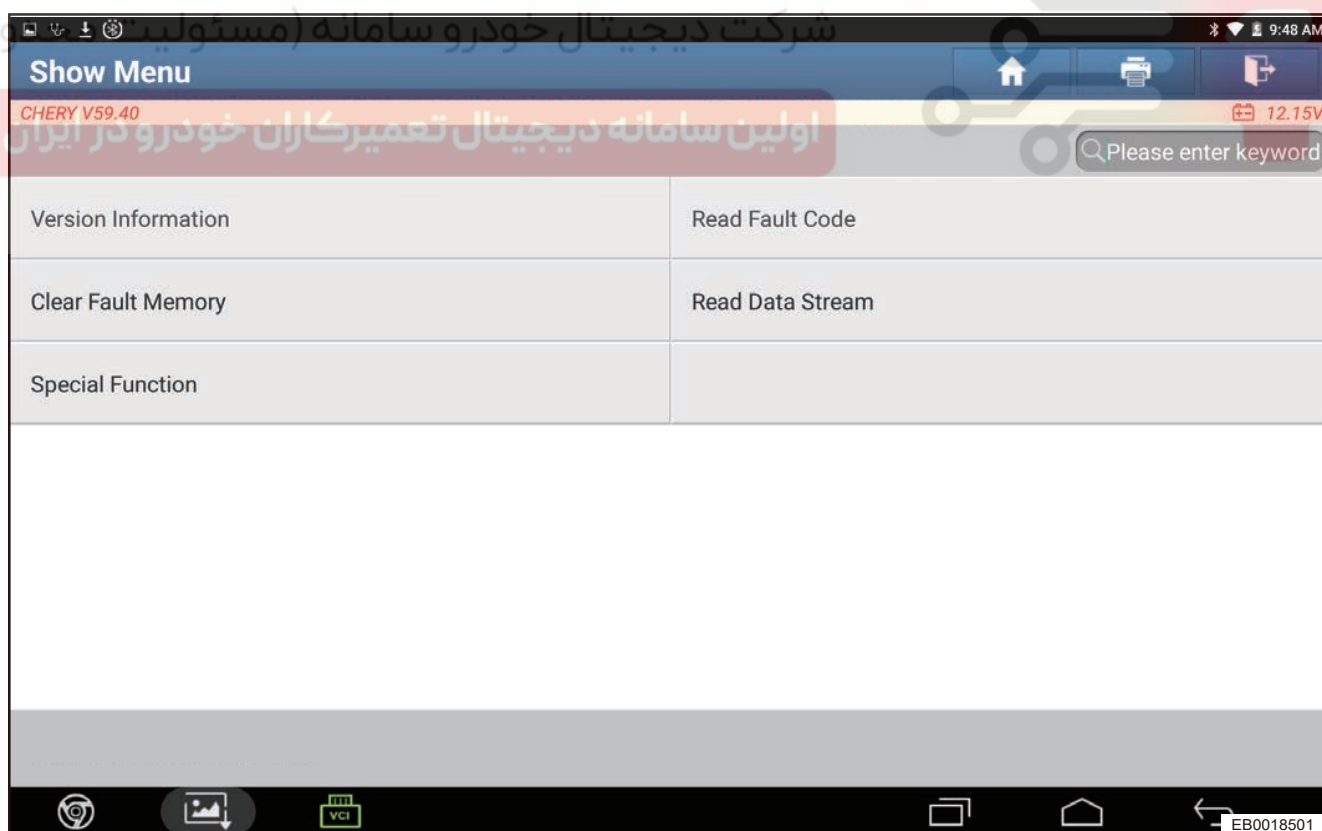
**Simultaneously Apply and Release Rear Brake Caliper Test**

1. Turn ENGINE START STOP switch to ON.
2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .

06 - BRAKE SYSTEM



4. Click diagnostic tester to enter “Special Function”.



5. Click “Apply Both Rear Brake Caliper”.



06 - BRAKE SYSTEM

The screenshot shows the digital dashboard interface for a Chery V59.40 vehicle. The interface includes a 'Show Menu' button, a search bar, and a list of functions. A dialog box is displayed over the menu, titled 'Apply Both Park Brake', with the message 'Control/Routine Failure Or Not Run' and an 'OK' button.

Show Menu	
Yaw Sensor Calibration(ESP Only)	Repair Bleed
Write E&F Process Control Byte	Write Software Configuration Information
Enter PBC Maintenance Mode	Exit PBC Maintenance Mode
Assembly Test	Apply Both Park Brake
Release Both Park Brake	Apply Left Park Brake
Apply Right Park Brake	Release Left Park Brake
Release Right Park Brake	Vehicle Manufacture Filling-Identification Write-In

Dialog Box:

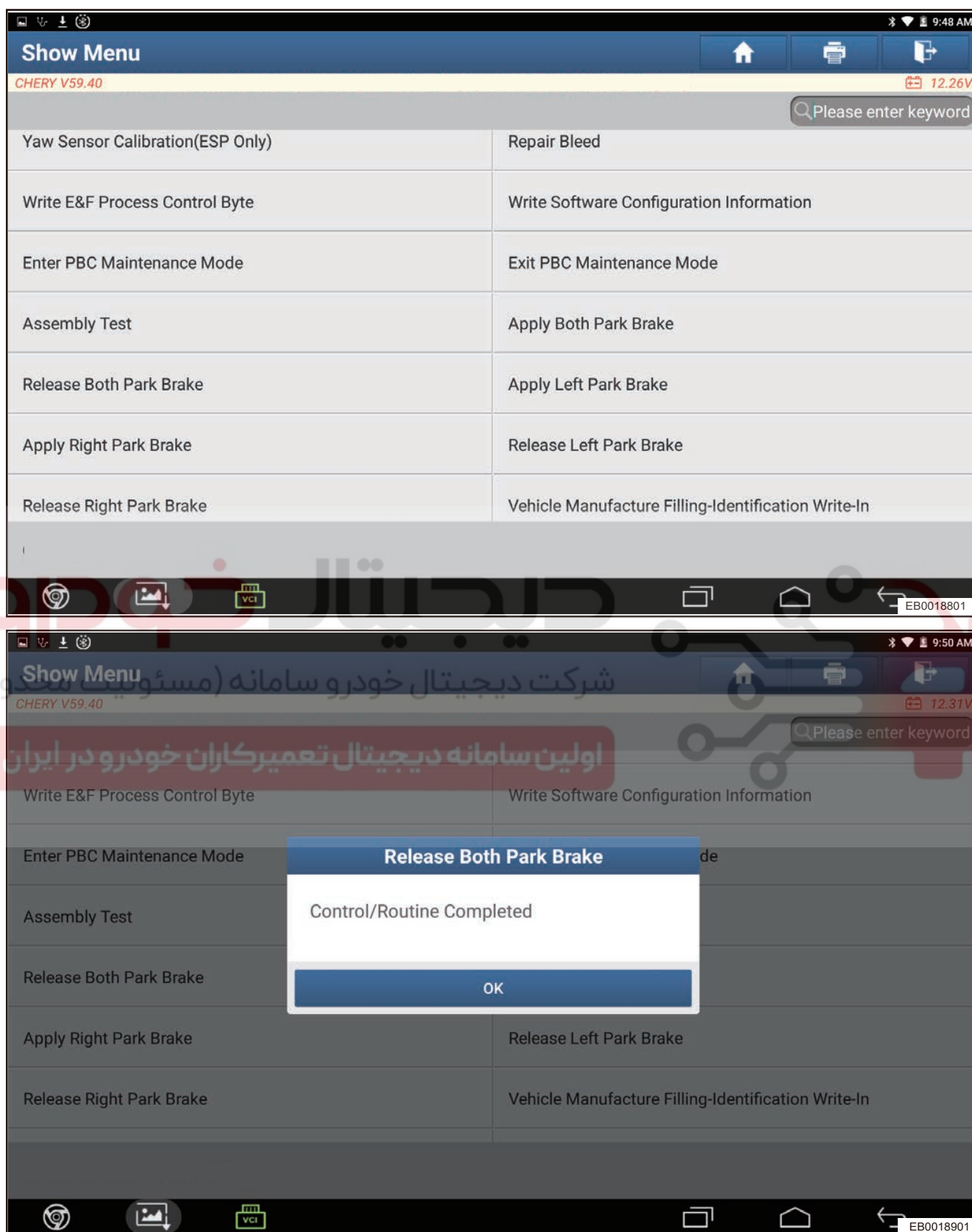
Apply Both Park Brake

Control/Routine Failure Or Not Run

OK

6. Click “Release Both Rear Brake Caliper” .

06 - BRAKE SYSTEM

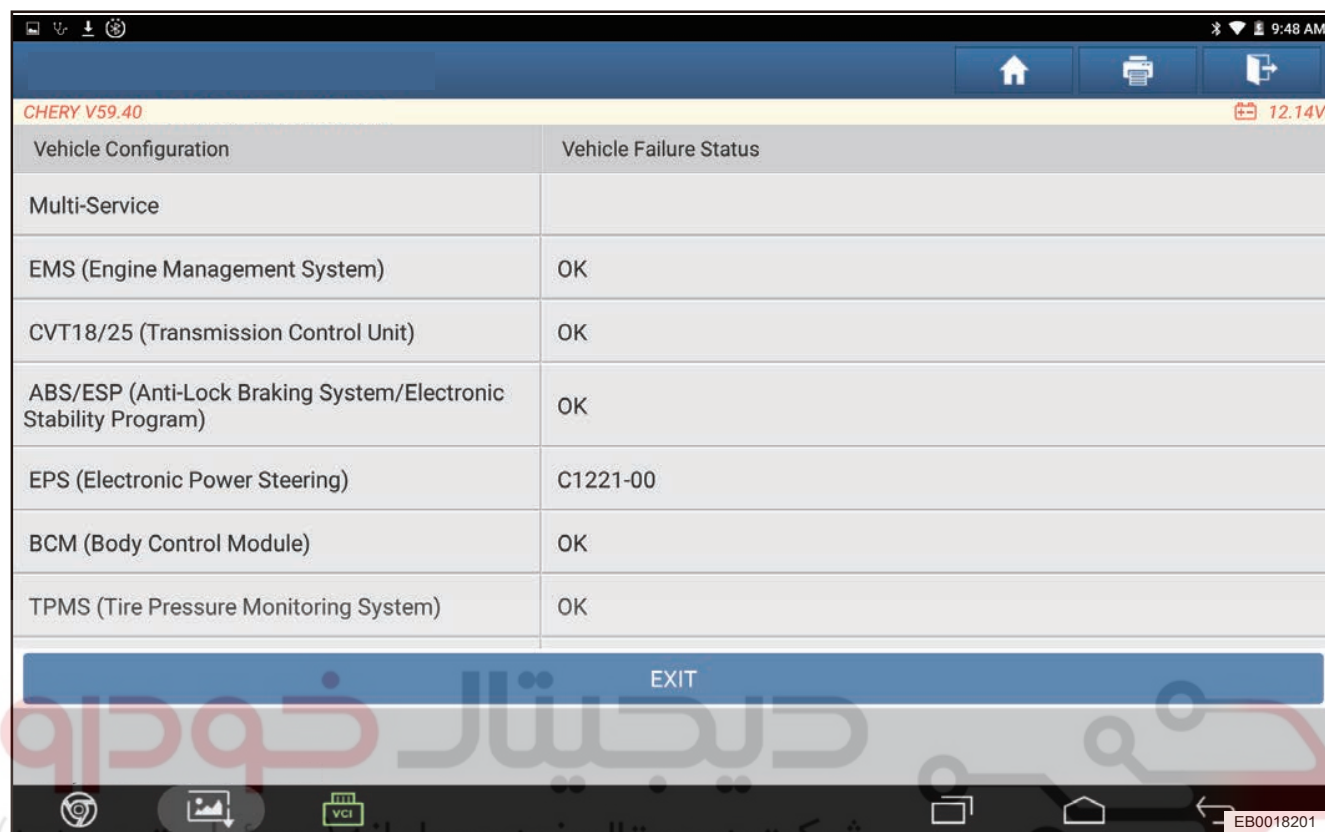
**Separately Apply and Release Rear Brake Caliper Test**

1. Turn ENGINE START STOP switch to ON.

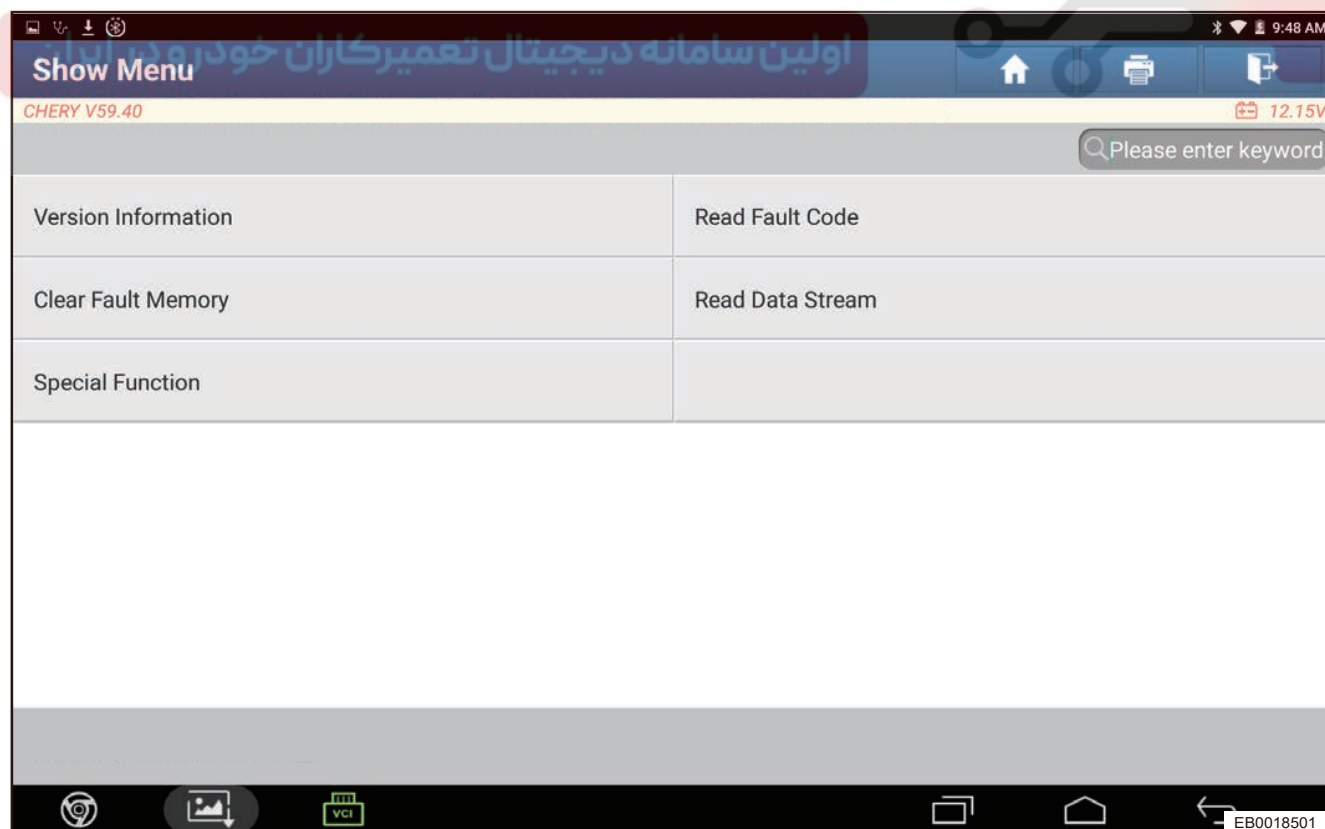


06 - BRAKE SYSTEM

2. Connect the diagnostic tester.
3. Select and enter “ABS/ESP (Anti-lock Braking System/Electronic Stability Program)” .

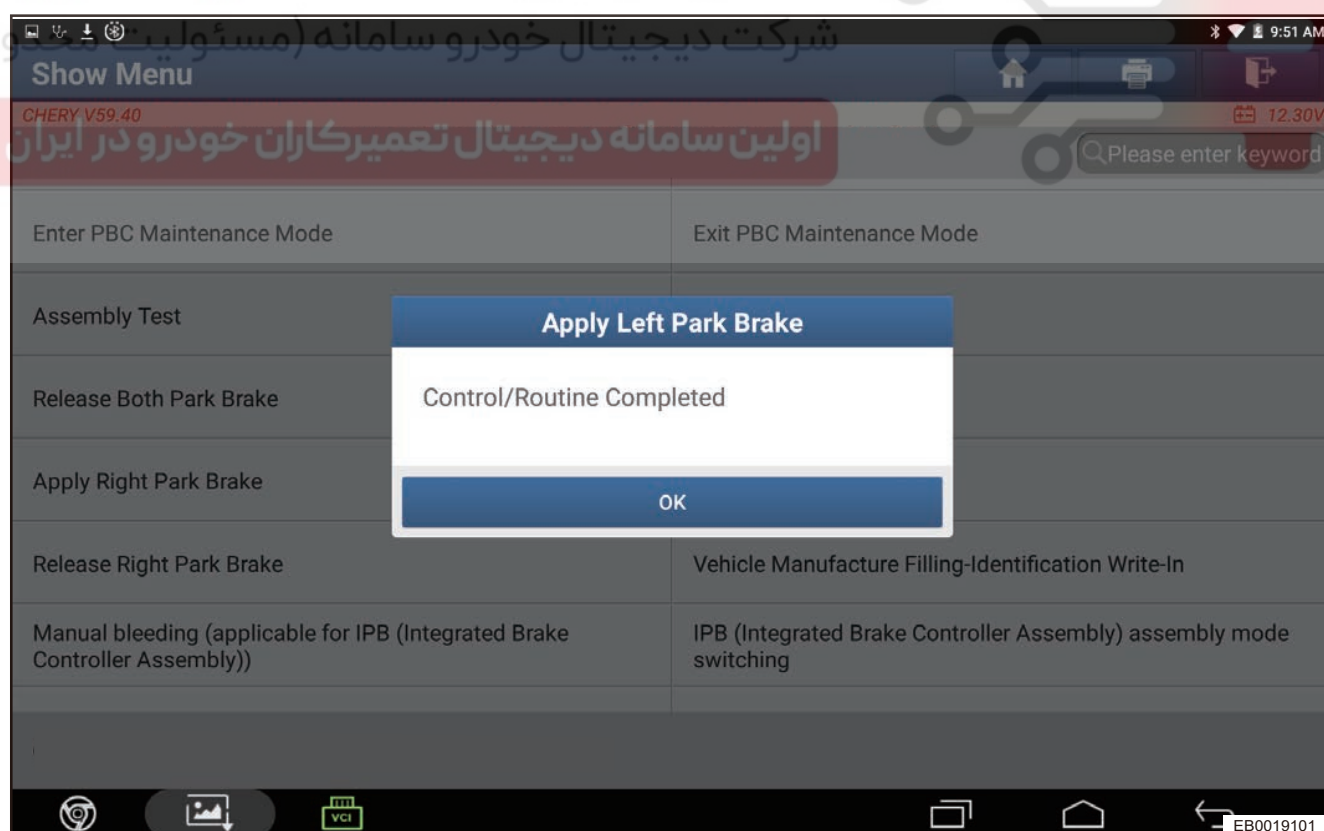
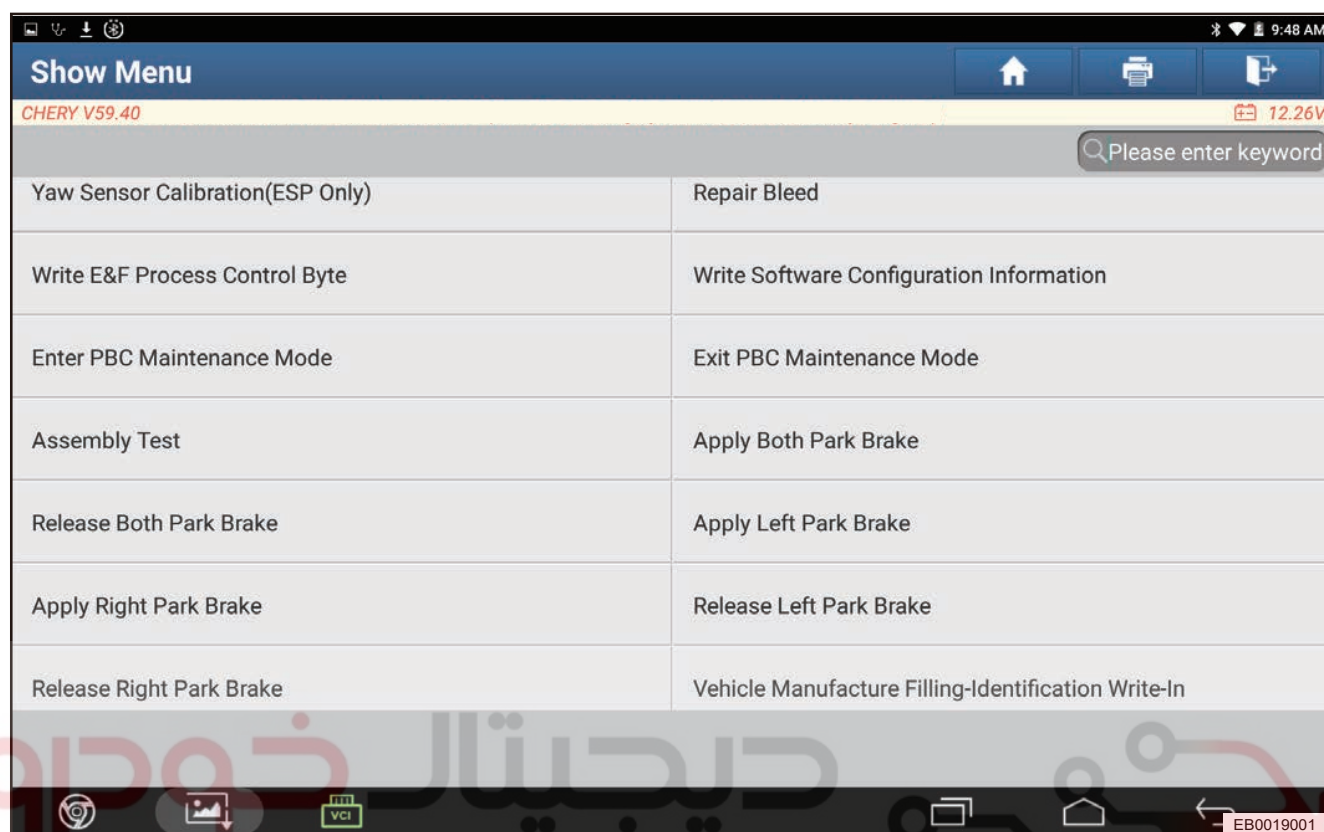


4. Click diagnostic tester to enter “Special Function” .



06 - BRAKE SYSTEM

5. Click “Apply Rear Left Brake Caliper” .



6. Click “Release Rear Left Brake Caliper” .



06 - BRAKE SYSTEM

The screenshot shows the digital dashboard interface for a Chery V59.40 vehicle. The interface is in Persian and includes a search bar, a list of maintenance tasks, and a confirmation dialog box.

Top Bar: Shows the vehicle model "CHERY V59.40" and the battery voltage "12.26V".

Search Bar: "Please enter keyword"

Maintenance Tasks:

Yaw Sensor Calibration(ESP Only)	Repair Bleed
Write E&F Process Control Byte	Write Software Configuration Information
Enter PBC Maintenance Mode	Exit PBC Maintenance Mode
Assembly Test	Apply Both Park Brake
Release Both Park Brake	Apply Left Park Brake
Apply Right Park Brake	Release Left Park Brake
Release Right Park Brake	Vehicle Manufacture Filling-Identification Write-In

Bottom Bar: Shows the vehicle model "CHERY V59.40" and the battery voltage "12.30V".

Confirmation Dialog Box:

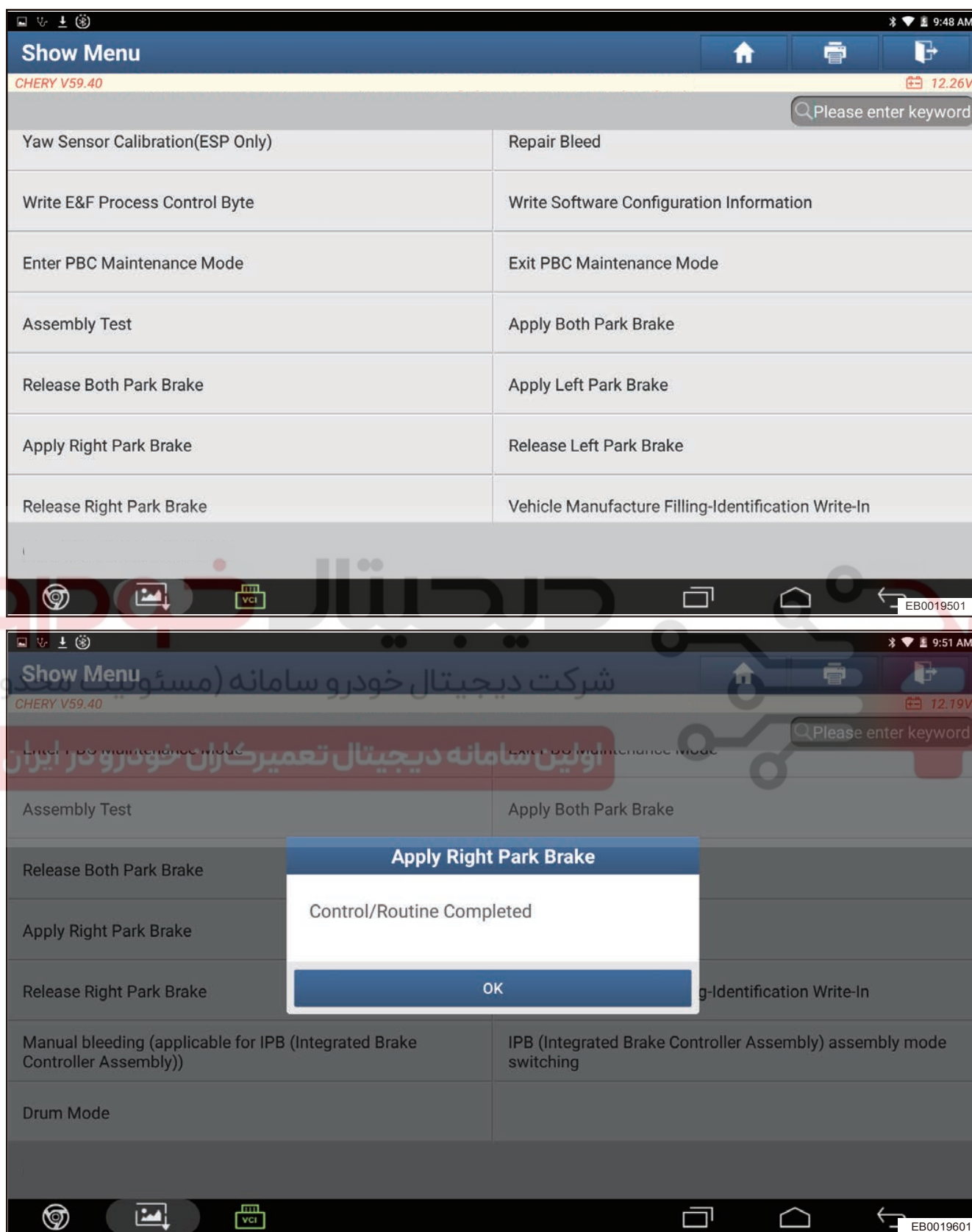
Apply Left Park Brake

Control/Routine Completed

OK

7. Click “Apply Rear Right Brake Caliper” .

06 - BRAKE SYSTEM



8. Click “Release Rear Right Brake Caliper” .



06 - BRAKE SYSTEM

Show Menu

CHERY V59.40 12.26V

Please enter keyword

Yaw Sensor Calibration(ESP Only)	Repair Bleed
Write E&F Process Control Byte	Write Software Configuration Information
Enter PBC Maintenance Mode	Exit PBC Maintenance Mode
Assembly Test	Apply Both Park Brake
Release Both Park Brake	Apply Left Park Brake
Apply Right Park Brake	Release Left Park Brake
Release Right Park Brake	Vehicle Manufacture Filling-Identification Write-In

EB0019701

Show Menu

CHERY V59.40 12.11V

Please enter keyword

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

Assembly Test

Apply Both Park Brake

Release Both Park Brake

Apply Right Park Brake

Release Right Park Brake

g-Identification Write-In

Manual bleeding (applicable for IPB (Integrated Brake Controller Assembly))

IPB (Integrated Brake Controller Assembly) assembly mode switching

Drum Mode

Release Right Park Brake

Control/Routine Completed

OK

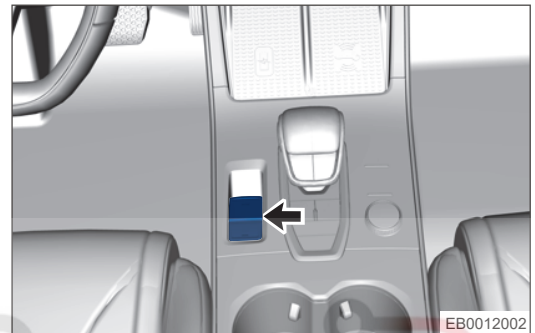
EB0019801

⚠ Caution

- All actions of the EPB action test should be in line with the actual operation, otherwise the EPB system should be overhauled.

EPB Switch**Removal**

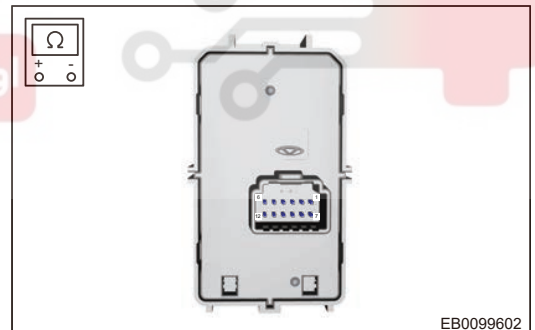
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the shift lever assembly.
4. Remove the A/C control panel assembly.
5. Using an interior crow plate, remove the auxiliary fascia console control panel assembly (arrow).



6. Disconnect electronic parking switch connector and remove electronic parking switch.

Inspection

1. According to circuit diagram, internal resistance of EPB switch is measured using digital multimeter ohm gear. If it does not match with measured value of following table, replace the EPB switch.



Multimeter Connection	Manual Parking Switch State	Specified Condition
Terminal 1 - Terminal 2	No action	$\leq 1 \Omega$
Terminal 3 - Terminal 4	No action	$\leq 1 \Omega$
Terminal 1 - Terminal 3 - Terminal 4	Parking brake pulled up	$\leq 1 \Omega$
Terminal 3 - Terminal 2 - Terminal 1	Parking brake released	$\leq 1 \Omega$

06 - BRAKE SYSTEM

Multimeter Connection	Automatic Parking Switch State	Specified Condition
Terminal 6 - Terminal 8	Not pressed	∞
Terminal 6 - Terminal 8	Pressed	$\leq 1 \Omega$

Multimeter Connection	Manual Parking Switch State	Specified Condition
Terminal 12 - Terminal 5	Manual parking switch indicator	2.2 k Ω
Terminal 12 - Terminal 9	Automatic parking switch indicator	2.2 k Ω

Installation

1. Install the electric parking switch.
2. Connect the electric parking switch connector.
3. Install the auxiliary fascia console control panel assembly.
4. Install the A/C control panel assembly.
5. Install the shift knob assembly.
6. Connect the negative battery cable.

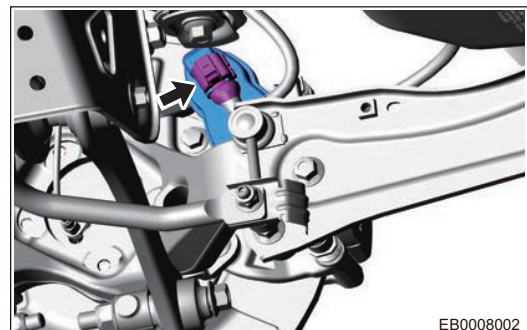
Integrated Caliper Motor**Removal****Hint:**

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

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when removing integrated caliper motor.
- Remove integrated caliper motor without damaging motor seal ring and replace it when necessary.
- When removing integrated caliper motor, do not allow foreign matter enter into motor.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear left tire.
4. Remove the rear left integrated caliper motor.
 - a. Disconnect the rear left integrated caliper motor wire harness connector (arrow).

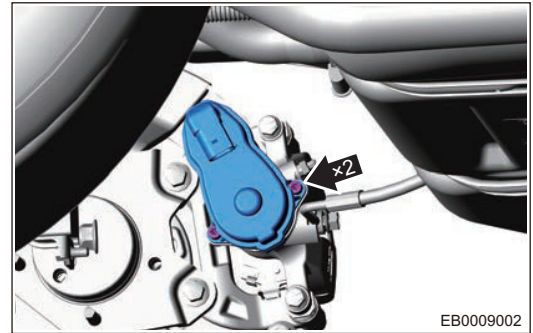


EB0008002

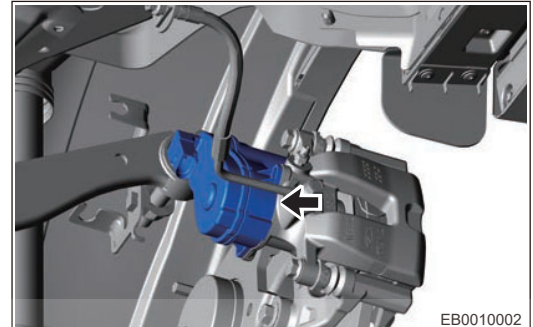
06 - BRAKE SYSTEM

- b. Remove 2 fixing bolts (arrows) from rear left integrated caliper motor.

Tightening torque: $10 \pm 1.0 \text{ N}\cdot\text{m}$



- c. Remove the integrated caliper motor (arrow).



⚠ Caution

- Save the removed parking actuator properly to avoid dust or water polluting grease and seal rings.

Installation

- Installation is in the reverse order of removal.

⚠ Caution

- Be sure to wear safety equipment to prevent accidents, when installing integrated caliper motor.
- When installing integrated caliper motor, remove sediment, dust and other foreign objects that are on matching surface of parking actuator and on head of parking caliper.
- When installing integrated caliper motor, check whether the O-ring of parking caliper head is invalid or abnormal. Please replace it in time.
- When installing integrated caliper motor, parking caliper head and actuator motor must be tightly coupled, tighten fixing bolts to specified torque.
- When installing integrated caliper motor, check whether the o-ring seal is extruded between parking actuator and parking caliper, if it is extruded, should be reinstalled.
- When installing integrated caliper motor, manual parking clamp and release must be performed to confirm if parking function is normal.

EPB Brake Caliper Emergency Release

Hint:

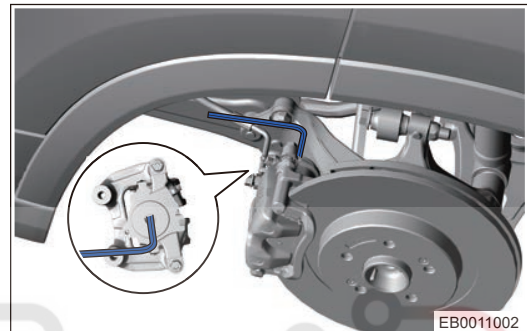
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

06 - BRAKE SYSTEM

⚠ Caution

- If parking brake cannot be released by parking brake switch manually or automatically due to unexpected circumstances (such as battery does not output voltage, parking brake system failure, etc.) during using EPB system, you need to enable parking emergency releasing function to release parking brake, please follow the following steps for specific methods.
- If this malfunction occurs on a slope, please try to tow vehicle to a level road or place obstacles such as rocks in front of or rear of front wheels respectively to prevent wheel rolling, avoiding coasting accident after releasing rear wheel brake urgently.
- Be sure to wear safety equipment to prevent accidents, when EPB brake caliper emergency releasing.

1. Remove the rear left tire.
2. Remove the rear left integrated caliper motor.
3. Align inner hexagon 6# with spline in EPB caliper, rotate 2-3 cycles clockwise (when operator faces spline) or stop until brake disc can rotate freely (it is normal that a large rotation force is needed due to vehicle parking brake condition).



4. The vehicle only loses parking function and does not affect normal braking function after releasing parking brake.

⚠ Caution

- Emergency release is highly specialized, it is recommended to perform by Chery 4S shop professionals.