BRAKE CONTROL SYSTEM

BRAKE CONTROL SYSTEM

Warning and Precautions

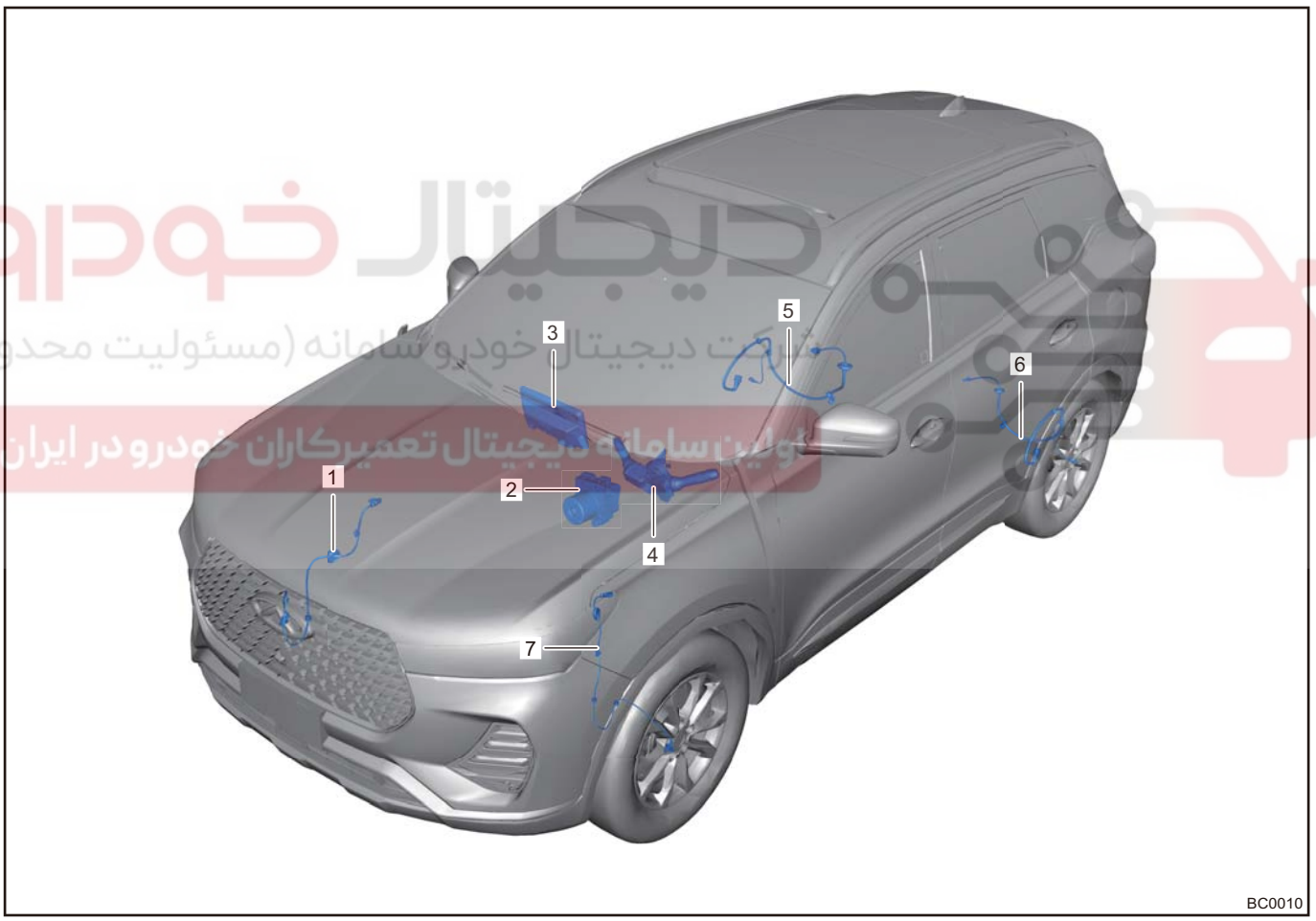
Precautions

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

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.
- When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (turn off vehicle power supply), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

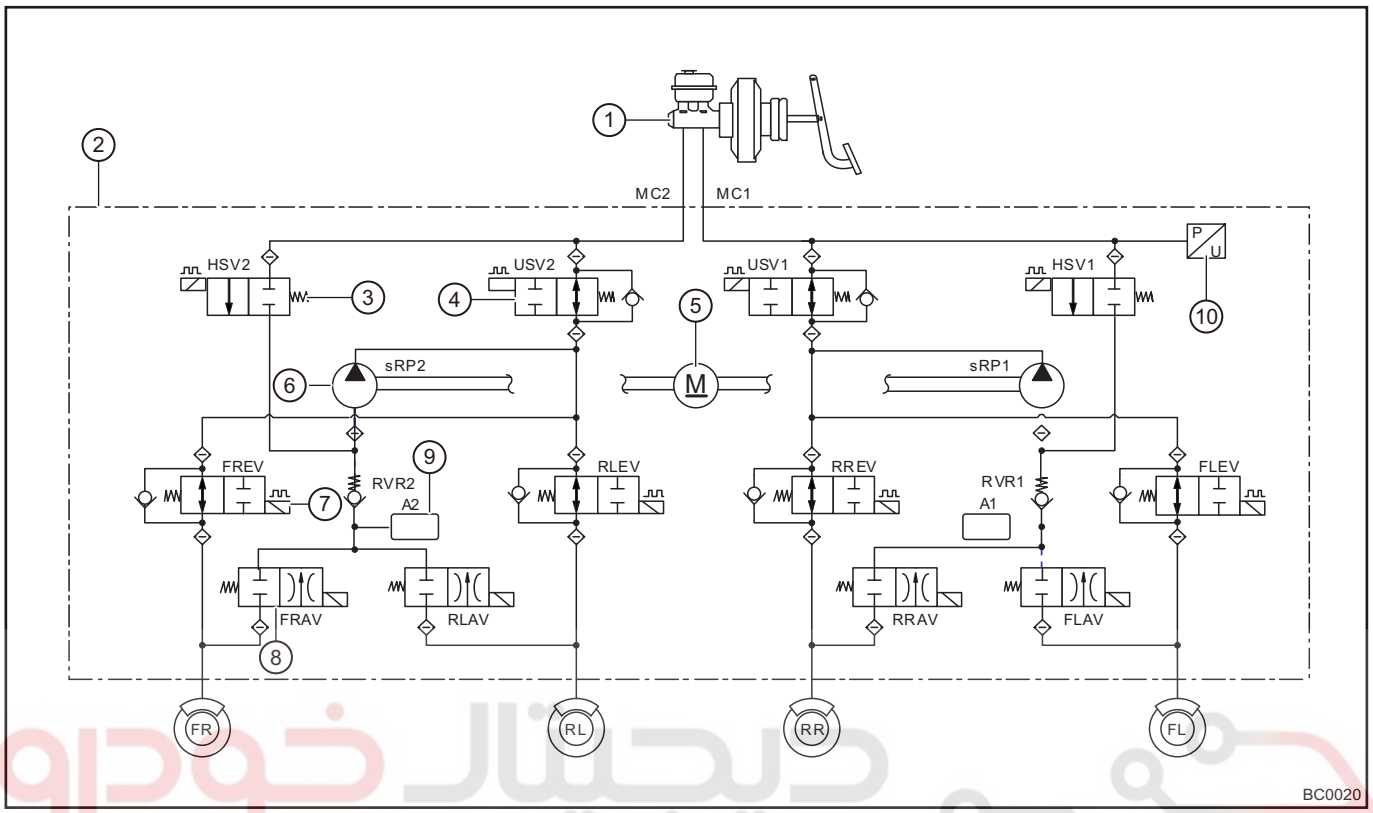
System Overview

System Components Diagram



1	Front Right Wheel Speed Sensor	5	Rear Right Wheel Speed Sensor
2	EPB Module Assembly	6	Rear Left Wheel Speed Sensor
3	Instrument Cluster	7	Front Left Wheel Speed Sensor
4	Combination Switch Assembly		

System Schematic Diagram



1	Brake Master Cylinder Assembly	6	Return Pump (sRP)
2	EPB Module Assembly	7	Input Valve (EV)
3	High Pressure Valve (HSV)	8	Output Valve (AV)
4	Circuit Control Valve (USV)	9	Low Pressure Accumulator
5	Return Pump Motor	10	Pressure Sensor

Pressure regulation is achieved by EPB module assembly mainly through four input valves (EV) (normal open valve), four output valves (AV) (normal close valve), two high pressure valves (HSV), two circuit control valves (USV), return pump motor, return pump (sRP), pressure sensor and low pressure accumulator, etc.

Conventional Brake Operating Condition

When driver does not apply enough pressure to brake pedal to lock wheels, oil pressure generated by brake master cylinder enters brake caliper assembly of each wheel through input valve (EV), producing regular braking effect. If driver reduces pressure to brake pedal, brake fluid of each wheel returns to brake master cylinder assembly, and brake pressure decreases.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	OFF	Normally open
Output Valve (AV)	OFF	Normally closed

ESP Operating Condition (Relief)

When driver applies pressure to brake pedal excessively, friction coefficient between wheels and road will decrease, and wheels will be decelerated earlier than vehicle. When wheel locking is about to occur, oil passage of input valve (EV) is cut off, and oil passage of output valve (AV) is opened to reduce wheel brake caliper assembly pressure. Brake fluid of wheel brake caliper assembly is temporarily stored in low pressure accumulator through output valve (AV).

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	ON	Normally closed
Output Valve (AV)	ON	Normally open

ESP Operating Condition (Maintaining)

When appropriate pressure is applied to wheel brake caliper assembly by relieving or boosting, pressure will be maintained. Oil passage of input valve (EV) and output valve (AV) will be cut off to maintain pressure of wheel brake caliper assembly unchanged.

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	ON	Normally closed
Output Valve (AV)	OFF	Normally closed

ESP Operating Condition (Boost)

When ESP operating condition (relief) is performed, friction coefficient between wheels and road increases, it needs to increase each wheel pressure. Oil passage of input valve (EV) is opened, oil passage of output valve (AV) is cut off, brake fluid stored in low pressure accumulator becomes oil source for next boost, and enters wheel brake caliper assembly through return pump (sRP) and input valve (EV).

Solenoid Valve	Powered Condition	Solenoid Valve Condition
Input Valve (EV)	OFF	Normally open
Output Valve (AV)	OFF	Normally closed

System Function

Brake control system consists of several subsystems: Electronic Stability Program System (ESP), Anti-lock Brake System (ABS), Electronic Brake Force Distribution System (EBD), Traction Control System (TCS), Hill Hold Control System (HHC), Hydraulic Brake Assist (HBA), Drag Torque Control (DTC), Roll Movement Intervention System (RMI).

Electronic Stability Program System (ESP)

ESP is an active safety control system. It uses system sensor to monitor vehicle driving condition. In case of oversteering or understeering, it adopts power system and brake system intervention to help prevent tendency deviating from an ideal path, so that, it provides better driving safety.

Anti-lock Brake System (ABS)

ABS can prevent wheel from being locked in the event of sudden braking or braking on slippery road. When ABS detects that one or more wheels are going to lock, ESP control module will apply or release hydraulic pressure quickly.

Electronic Brake Force Distribution System (EBD)

EBD automatically adjusts braking force distribution ratio of front and rear axles according to axial load transfer difference caused by braking to improve braking efficiency. In addition, EBD works together with ABS to improve braking stability. Also, when braking in corner, brake force of inside and outside wheel can be adjusted to improve braking stability.

Traction Control System (TCS)

TCS is a extended function of ESP. During starting off or rapidly acceleration, drive wheels may slip. In case of on a slippery road such as snowy or icy road, direction could get out of control and cause dangerous. When TCS detects that driven wheel speed is lower than drive wheel speed (a kind of wheel slip symptom) using sensor, it sends a signal to adjust ignition timing, reduce throttle opening, downshift or brake wheels so that wheel no longer slips.

Hill Hold Control System (HHC)

HHC can prevent vehicle from moving backward when starting off on uphill. After vehicle is stationary, HHC uses longitudinal acceleration sensor to determine if the vehicle is on a slope. When vehicle starts from stationary state on a slope (uphill forward or reversing), HHC will enter operating state automatically. When starting off, after driver releases brake pedal, system maintains previous braking pressure for 1 to 2 seconds to hold the vehicle. As increasing of drive torque, brake pressure reduces gradually, avoiding accidents caused by moving backward when starting off on a slope.

Hydraulic Brake Assist (HBA)

HBA is a extended function of ESP to shorten the braking distance in sudden braking. In emergency situation, drivers always apply brake quickly and timely, but not apply maximum brake force generally, thus extending brake distance. In this case, HBA will operate: When driver depresses brake pedal rapidly in an emergency with insufficient force, HBA quickly increases brake pressure to maximum level, making anti-lock brake system shorten braking distance more quickly and effectively.

Drag Torque Control (DTC)

In normal driving, if release accelerator pedal quickly or shift the shift lever to lower gear by mistake, vehicle will produce a similar braking effect, especially when wheels are locked on the slippery road. At this time, ESP will request engine to increase torque output, resume rotation of drive wheels, improving steering stability.

Roll Movement Intervention System (RMI)

RMI is used to prevent vehicle from rolling over on road when operate vehicle in dynamic (such as lane change) and static (such as loop driving) status.

Components Operation Description

EPB Module Assembly

Main Function

During driving, combination switch assembly (steering angle sensor) monitors driver's turning direction and angle, wheel speed sensor monitors vehicle speed, pressure sensor monitors brake force, while lateral acceleration sensor and yaw rate sensor monitor vehicle's yaw and tilt speed. According to these information, EPB module judges difference between normal and safety driving and driver's operation intention after calculation, adjusts engine speed and wheel brake force. If actual movement track deviates from expected movement track, EPB module automatically controls brake applied to a wheel, thus, correct understeer and oversteer of vehicle, to avoid vehicle slipping, understeer, oversteer and locking, ensuring vehicle driving safety.

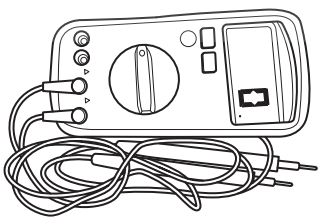
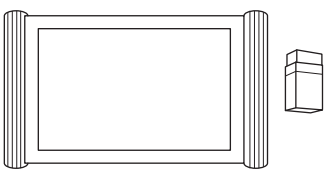
Wheel Speed Sensor

Main Function

Wheel speed sensor is mainly used to test wheel speed. It has become an indispensable speed information reflecting equipment for modern vehicle. Vehicle's ESP, ABS and automatic transmission control system all need speed information.

Special Tools and Equipment

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006
Diagnostic Tester	 RCH0001006

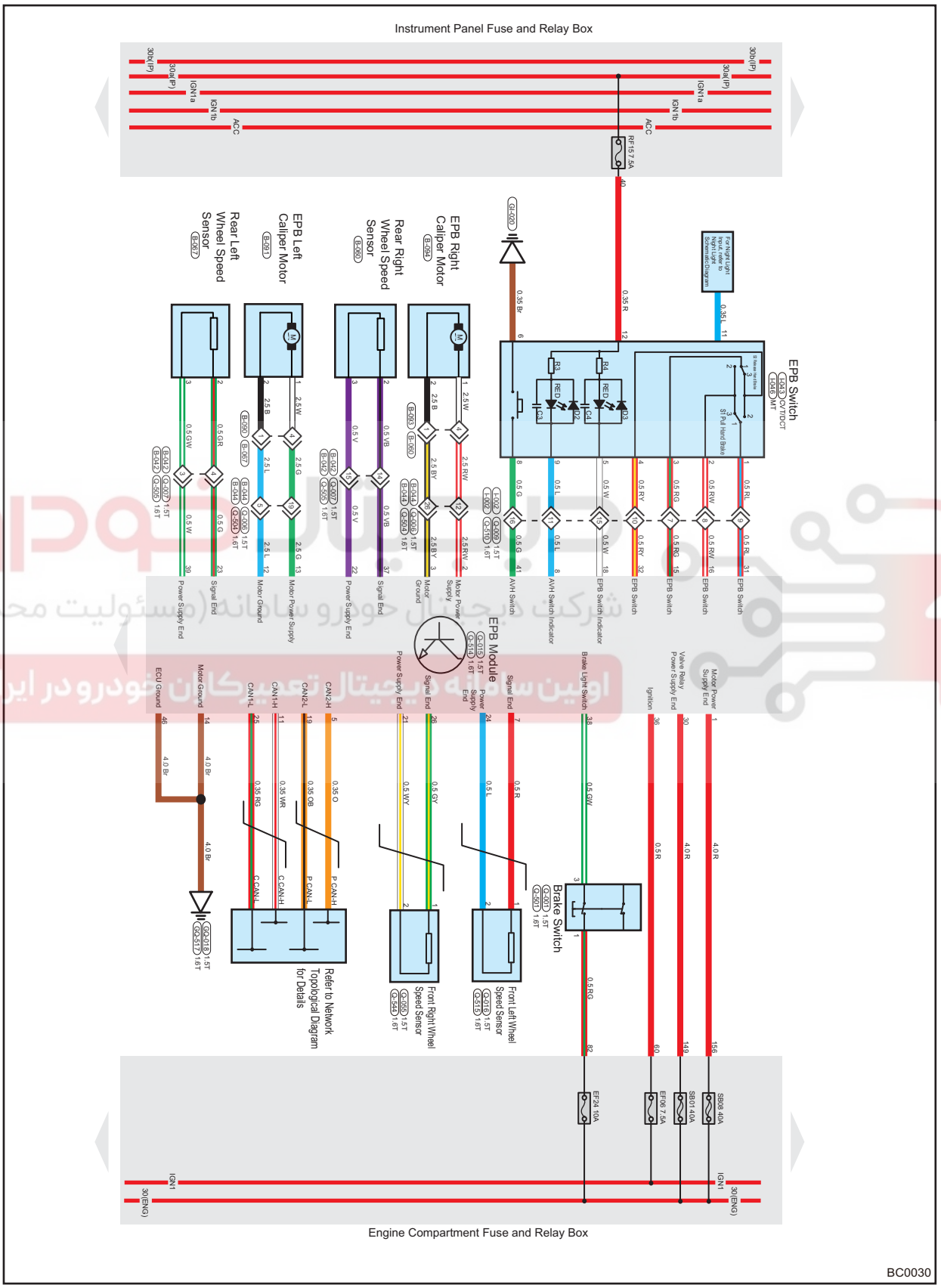
Tightening Torque List

Torque Specifications

Description	Tightening Torque
1 Fixing Bolt Between Front Left Wheel Speed Sensor Assembly and Front Left Steering Knuckle	9 ± 1.5 N·m
1 Fixing Bolt Between Rear Left Wheel Speed Sensor with Caliper Wire Harness Assembly and Rear Hub Bearing Unit	9 ± 1.5 N·m
1 Fixing Bolt Between EPB Module Assembly and Upper Body of Front Left Side Rail	23 ± 3.5 N·m
2 Fixing Bolts Between EPB Module Assembly and Side of Front Left Side Rail Body	23 ± 3.5 N·m

System Circuit Diagram

Brake Control System

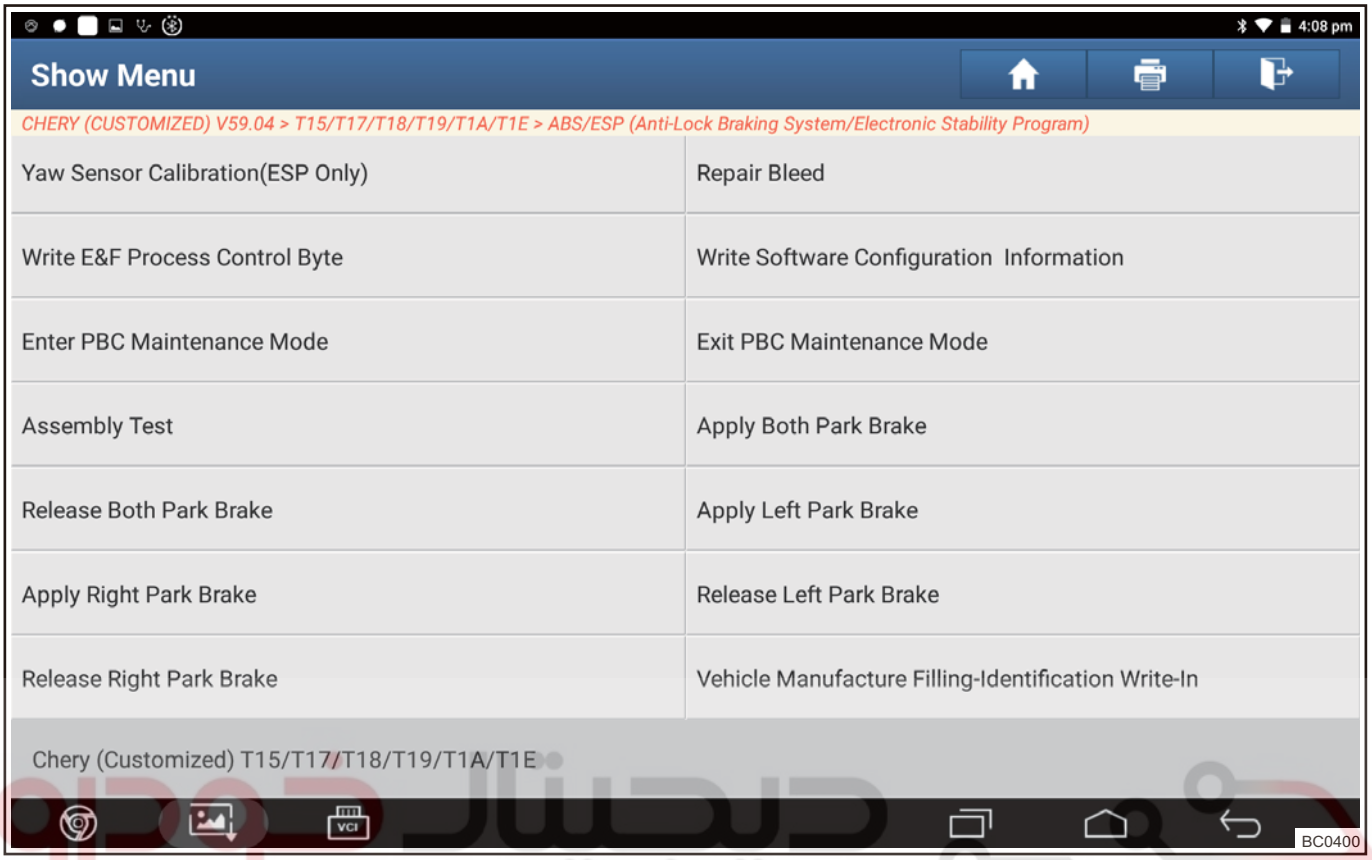


Diagnosis Information and Procedures

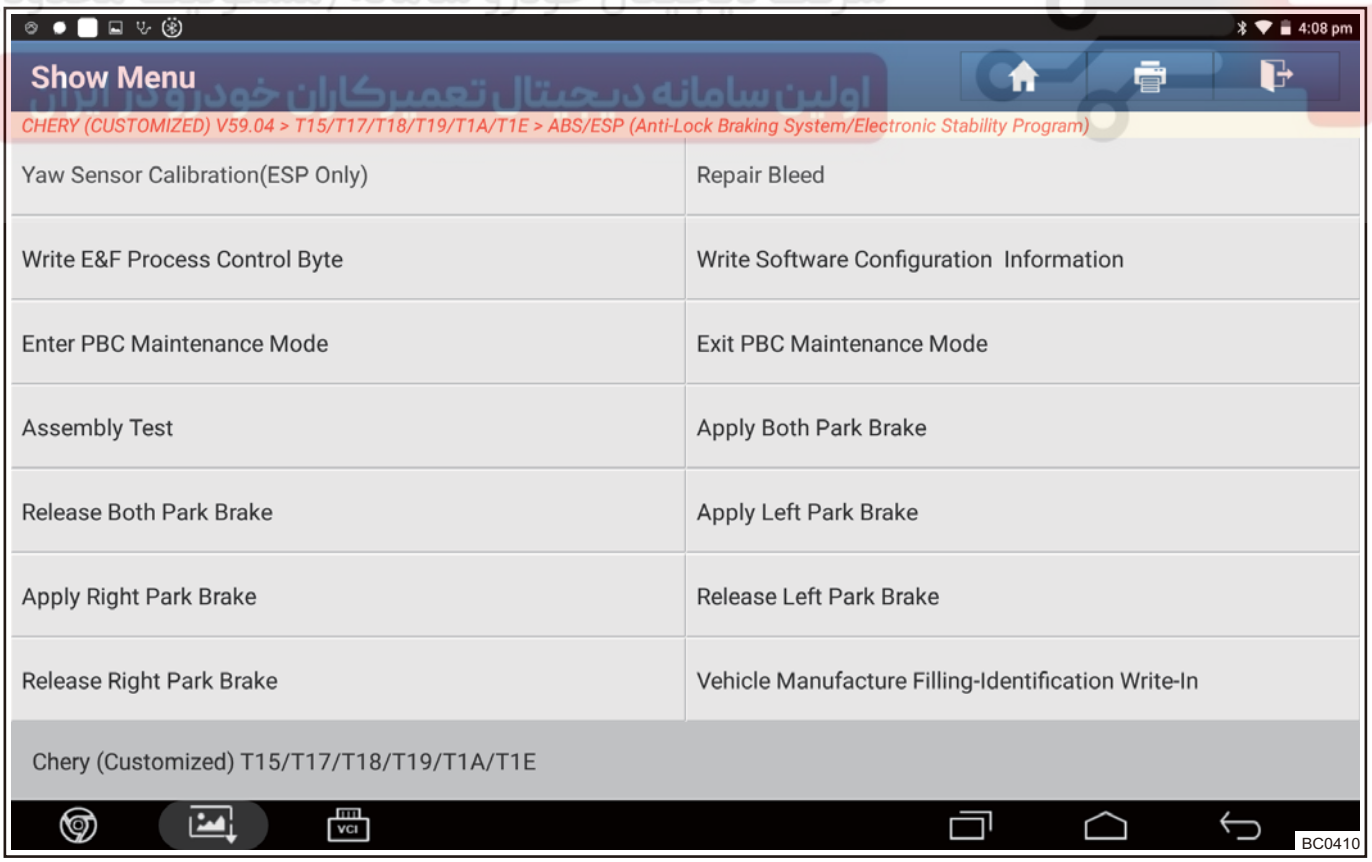
Special Function

1. Click "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)".
2. Click "Special Function".
3. Click "Yaw Sensor Calibration (ESP Only)", and integrated sensor calibration must be performed when replacing EPB module assembly.

4. Click "Repair Bleed", manual bleeding must be performed on all systems that fail in process of online vacuum pumping/filling or replaced by dry parts.



5. Click "Write E&F Process Control Byte", manual bleeding is required before performing this operation (hydraulic filling status can be read by reading data stream).



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
ABS/ESP malfunction light comes on	Fuse
	Wire harness fault
	EPB module
ABS/ESP operation is abnormal	Wire harness fault
	Wheel speed sensor assembly
	EPB module
	Improper installation for hub bearing
	Brake line (blocked or leaky)
CAN network failure	Fuse
	Wire harness fault
	Central gateway (CGW)
	EPB module

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the ESP.

1	**Vehicle brought to workshop**

NEXT

2	**Check battery voltage**

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

Result

Result	Go to
OK	A
NG	B

B → **Replace battery**

A

3	**Customer problem analysis**

NEXT

4	**Read DTCs**

Result

Result	Go to
DTC exists	A
No DTC	B

B → **Repair according to Problem Symptoms Table**

A

5	Read DTCs (current DTC and history DTC)

Result

Result	Go to
DTC exists	A
No DTC	B

B → **Troubleshoot according to intermittent DTC Troubleshooting**

A

6	Repair according to Diagnostic Trouble Code (DTC) chart

NEXT

7	Adjust, repair or replace

NEXT

8	Conduct test and confirm malfunction has been repaired

NEXT → **End**

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check the DTCs in system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.

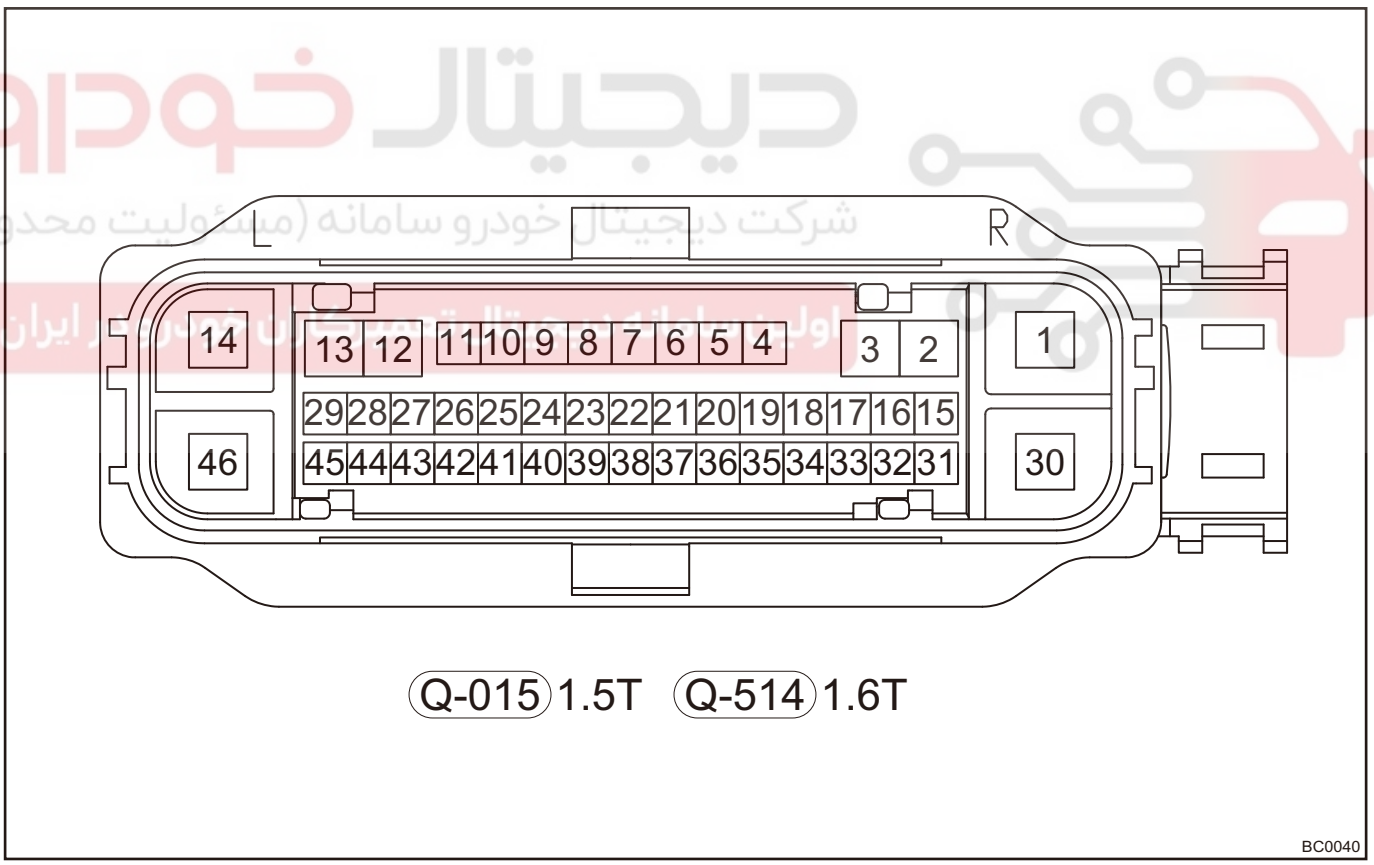
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

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

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

EPB Module Assembly Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Motor Power Supply End (Positive)	24	Front Left Wheel Speed Sensor Power Supply
2	Right Caliper Motor Power Supply Wire	25	CAN2 L
3	Right Caliper Motor Ground Wire	26	Front Right Wheel Speed Sensor Signal Wire
4	/	27	/
5	CAN H	28	/
6	/	29	/

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
7	Front Left Wheel Speed Sensor Signal Wire	30	Power Supply
8	AUTO HOLD Switch Indicator	31	EPB Switch Pin 1
9	Vehicle Speed Output	32	EPB Switch Pin 4
10	HDC Switch Indicator	33	/
11	CAN2 H	34	Front Right Wheel Speed Output
12	Left Caliper Motor Ground Wire	35	/
13	Left Caliper Motor Power Supply Wire	36	Ignited
14	Motor Ground	37	Rear Right Wheel Speed Sensor Signal Wire
15	EPB Switch Pin 3	38	Brake Switch
16	EPB Switch Pin 6	39	Rear Left Wheel Speed Sensor Power Supply Wire
17	HDC Switch	40	/
18	EPB Switch Indicator	41	AUTO HOLD Switch
19	CAN L	42	/
20	/	43	ESP_OFF Switch
21	Front Right Wheel Speed Sensor Power Supply	44	/
22	Rear Right Wheel Speed Sensor Power Supply	45	/
23	Rear Left Wheel Speed Sensor Signal Wire	46	ECU Ground

Diagnostic Trouble Code (DTC) Chart

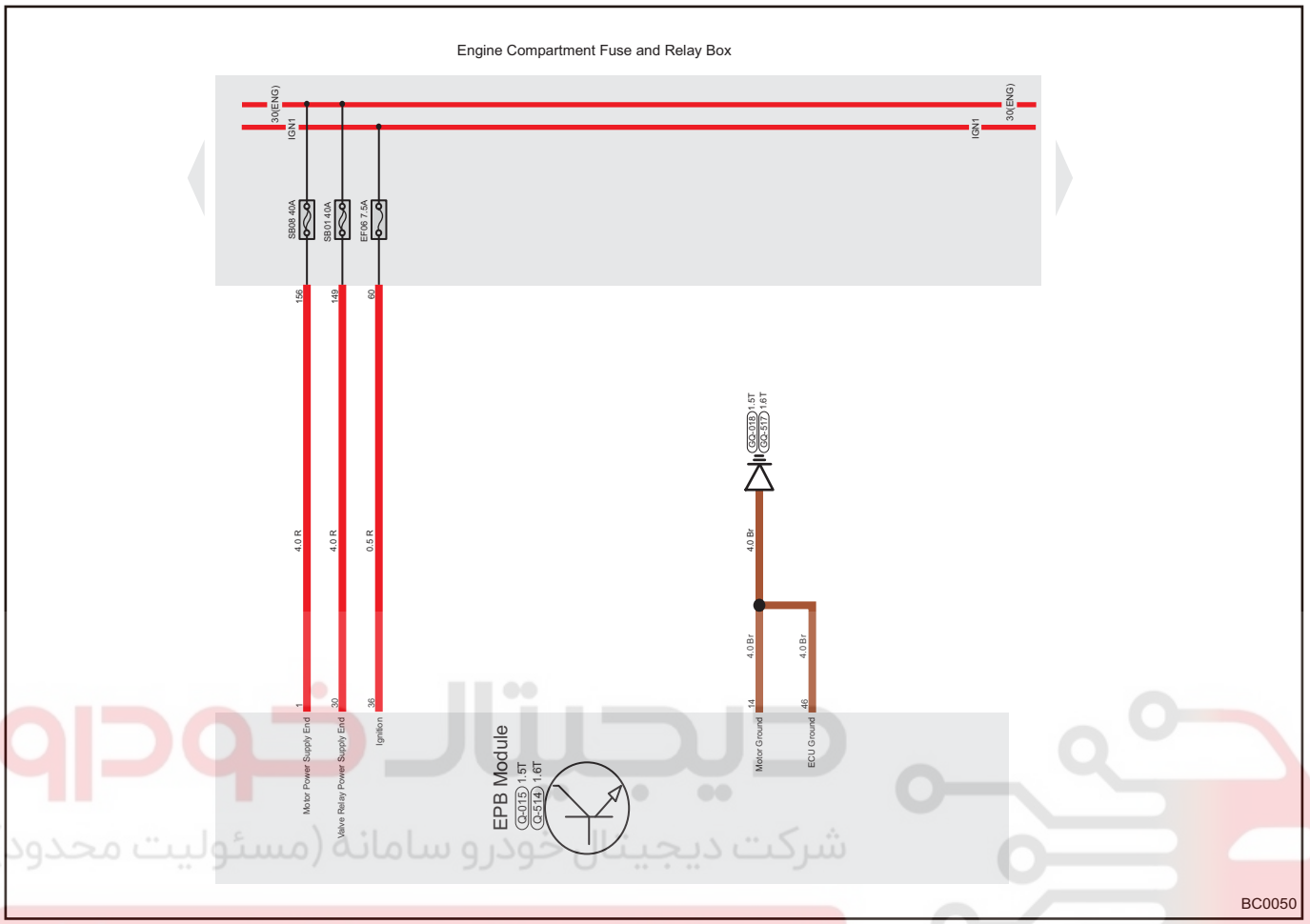
DTC	DTC Definition
C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)-System Internal Failure
C0002-04	TCS Control Channel Changeover Valve2 (ESP Only)-System Internal Failure
C0003-04	TCS Control Channel High Pressure Switch Valve1 (ESP Only)-System Internal Failure
C0004-04	TCS Control Channel High Pressure Switch Valve2 (ESP Only)-System Internal Failure
C0010-04	Left Front Inlet Control-System Internal Failure
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
C0020-04	ABS Pump Motor Control-System Internal Failure
C0031-00	Left Front Wheel Speed Sensor Failure-No Sub Type Information
C0031-09	Left Front Wheel Speed Sensor Failure-Component Failure
C0031-11	Left Front Wheel Speed Sensor Failure-Circuit Short To Ground
C0031-12	Left Front Wheel Speed Sensor Failure-Circuit Short To Battery
C0031-13	Left Front Wheel Speed Sensor Failure-Circuit Open
C0031-29	Left Front Wheel Speed Sensor Failure-Signal Invalid
C0031-37	Left Front Wheel Speed Sensor Signal Out Of Range
C0034-00	Right Front Wheel Speed Sensor Failure-No Sub Type Information
C0034-09	Right Front Wheel Speed Sensor Failure-Component Failure
C0034-11	Right Front Wheel Speed Sensor Failure-Circuit Short To Ground
C0034-12	Right Front Wheel Speed Sensor Failure-Circuit Short To Battery
C0034-13	Right Front Wheel Speed Sensor Failure-Circuit Open
C0034-29	Right Front Wheel Speed Sensor Failure-Signal Invalid
C0034-37	Right Front Wheel Speed Sensor Signal Out Of Range
C0037-00	Left Rear Wheel Speed Sensor Failure-No Sub Type Information

DTC	DTC Definition
C0037-09	Left Rear Wheel Speed Sensor Failure-Component Failure
C0037-11	Left Rear Wheel Speed Sensor Failure-Circuit Short To Ground
C0037-12	Left Rear Wheel Speed Sensor Failure-Circuit Short To Battery
C0037-13	Left Rear Wheel Speed Sensor Failure-Circuit Open
C0037-29	Left Rear Wheel Speed Sensor Failure-Signal Invalid
C0037-37	Left Rear Wheel Speed Sensor Signal Out Of Range
C003A-00	Right Rear Wheel Speed Sensor Failure-No Sub Type Information
C003A-09	Right Rear Wheel Speed Sensor Failure-Component Failure
C003A-11	Right Rear Wheel Speed Sensor Failure-Circuit Short To Ground
C003A-12	Right Rear Wheel Speed Sensor Failure-Circuit Short To Battery
C003A-13	Right Rear Wheel Speed Sensor Failure-Circuit Open
C003A-29	Right Rear Wheel Speed Sensor Failure-Signal Invalid
C003A-37	Right Rear Wheel Speed Sensor Signal Out Of Range
C0040-64	Brake Pedal Switch Failure (ESP Only)-Signal Plausibility Failure
C0044-01	Brake Pressure Sensor Failure (ESP Only)-General Electrical Failure
C0044-28	Brake Pressure Sensor Failure (ESP Only)-Signal Bias Level Out of Range / Zero Adjustment Failure
C0051-29	Steering Wheel Position Sensor (ESP Only)-Signal Invalid
C0051-54	Steering Wheel Position Sensor (ESP Only)-Missing Calibration
C0051-64	Steering Wheel Position Sensor (ESP Only)-Signal Plausibility Failure
C0061-64	Lateral Acceleration Sensor (ESP Only)-Signal Plausibility Failure
C0062-64	Longitudinal Acceleration Sensor (ESP Only)-Signal Plausibility Failure
C0063-01	Yaw Rate Sensor Failure (ESP Only)-General Electrical Failure
C0063-54	Yaw Rate Sensor Failure (ESP Only)-Missing Calibration
C0063-64	Yaw Rate Sensor Failure (ESP Only)-Signal Plausibility Failure
C006B-00	Stability System Active Too Long-No Sub Type Information
C0089-04	TCS Disable Switch Failure (ESP Only)-System Internal Failure
C1000-16	ECU Voltage Supply Failure-Circuit Voltage Below Threshold
C1000-17	ECU Voltage Supply Failure-Circuit Voltage Above Threshold
C1001-04	ECU System Internal Failure-System Internal Failure
C1002-49	CAN Hardware Internal Electronic Failure-Internal Electronic Failure
C1003-04	Valve Relay Failure-System Internal Failure
C1004-00	General Valve-No Sub Type Information
C1007-29	Reverse Gear Switch Failure (ESP Only)-Signal Invalid
C1008-00	General WSS-No Sub Type Information
C1009-00	ECU HardWare Related-No Sub Type Information
C0032-08	Wrong Direction of Left Front Wheel Speed Sensor-Wrong Direction
C0035-08	Wrong direction of Left Rear Wheel Speed Sensor -Wrong Direction
C0038-08	Wrong Direction of Right Front Wheel Speed Sensor-Wrong Direction
C003b-08	Wrong Direction of Right Rear Wheel Speed Sensor -Wrong Direction
C1099-08	Wrong Direction of Wheel Speed Sensor-Wrong Direction
C10AD-08	Vacuum Sensor General Fault-General Fault
U0005-00	High Speed CAN Communication Bus (+) High-No Sub Type Information
U0007-00	High Speed CAN Communication Bus (–) Low-No Sub Type Information
U0073-88	Control Module Communication Bus Off-BUS OFF
U0100-87	Lost Communication With ECM (ESP Only)-Miss Message
U0101-87	Lost Communication With TCM (ESP Only)-Miss Message
U0126-87	Lost Communication With Steering Angle Sensor Module (ESP Only)-Miss Message
U0140-87	Lost Communication With BCM (ESP Only)-Miss Message

DTC	DTC Definition
U0401-81	Invalid Data Received From ECM (ESP Only)-Invalid Serial Date Received
U0402-81	Invalid Data Received From TCM (ESP Only)-Invalid Serial Date Received
U0422-81	Invalid Data Received From Body Control Module (ESP Only)-Invalid Serial Date Received
U0428-81	Invalid Data Received From Steering Angle Sensor Module (ESP Only)-Invalid Serial Date Received
U1300-55	Software Configuration Error-Not Configured
U1163-87	Lost Communication With ACC (ESP Only)-Miss Message
U0433-81	Invalid Data Received From ACC (ESP Only)-Invalid Serial Date Received
U1410-81	HAS_InvalidValue-Invalid Serial Date Received
U1411-81	APBSystemState_InvalidValue APB-Invalid Serial Date Received
U1412-81	ABANet_InvalidValue-Invalid Serial Date Received
U1413-81	ABPNet_InvalidValue-Invalid Serial Date Received
U1414-81	ACCNet_InvalidValue-Invalid Serial Date Received
U1415-81	AEBNet_InvalidValue-Invalid Serial Date Received
U1416-81	AWBNet_InvalidValue-Invalid Serial Date Received
U1417-81	AccPedalNet_InvalidValue-Invalid Serial Date Received
U1418-81	BTMNet_InvalidValue-Invalid Serial Date Received
U1419-81	CDDNet_InvalidValue-Invalid Serial Date Received
U1421-81	SClutch_InvalidValue-Invalid Serial Date Received
U1422-81	EngineNet_InvalidValue-Invalid Serial Date Received
U1423-81	StartStopNet_InvalidValue StartStop-Invalid Serial Date Received
U1424-81	TCUNet_InvalidValue-Invalid Serial Date Received
U1425-81	VLCNet_InvalidValue-Invalid Serial Date Received
U1426-81	VacuumNet_InvalidValue-Invalid Serial Date Received
U0146-87	Lost Communication With CGW-Miss Message
U0447-81	Invalid Data Received From CGW-Invalid Serial Date Received
U0155-87	Lost Communication With ICM-Miss Message
U0423-81	Invalid Data Received From ICM-Invalid Serial Date Received
U0142-87	Lost Communication With AVM-Miss Message
U0443-81	Invalid Data Received From AVM-Invalid Serial Date Received

DTC	C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)-System Internal Failure
DTC	C0002-04	TCS Control Channel Changeover Valve2 (ESP Only)-System Internal Failure
DTC	C0003-04	TCS Control Channel High Pressure Switch Valve1 (ESP Only)-System Internal Failure
DTC	C0004-04	TCS Control Channel High Pressure Switch Valve2 (ESP Only)-System Internal Failure
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

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0001-04	TCS Control Channel Changeover Valve1 (ESP Only)-System Internal Failure	• Solenoid valve power supply is abnormal • Poor connection in EPB module assembly ground wire • Fuse malfunctions • Solenoid valve short or open circuit itself • Overheat protection triggered • EPB module assembly is damaged
C0002-04	TCS Control Channel Changeover Valve2 (ESP Only)-System Internal Failure	
C0003-04	TCS Control Channel High Pressure Switch Valve1 (ESP Only)-System Internal Failure	
C0004-04	TCS Control Channel High Pressure Switch Valve2 (ESP Only)-System Internal Failure	
C0010-04	Left Front Inlet Control-System Internal Failure	
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	

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

1	Check for DTCs

(a) Leave vehicle for 5 minutes, clear and read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(b) Refer to "DTC confirmation procedure".
(c) Check if the same DTCs are still output.

Result

Result	Go to
OK	A
NG	B

B → **Problem indicated by DTC is intermittent (system overheat protection)**

A

2	Check fuse

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Remove fuse SB01 (40A) from engine compartment fuse box.
(d) Check if fuse is blown.

Result

Result	Go to
OK	A
NG	B

B → **Replace related fuse**

A

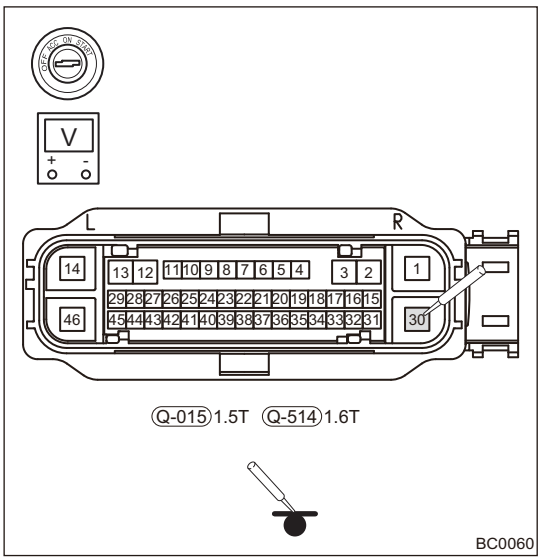
3	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corroded.

(f) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (30) and body ground is normal according to the table below.

OK

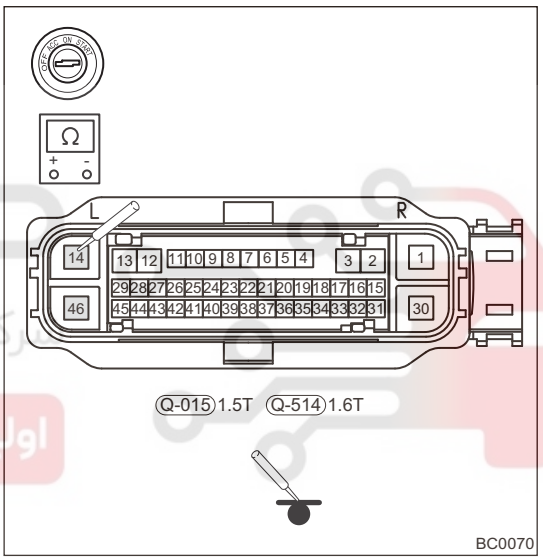
Multimeter Connection	Specified Condition
Q-015/Q-514 (30) - Body ground	⩾ 12 V



(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (14), Q-015/Q-514 (46) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (14) - Body ground	⩽ 1 Ω
Q-015/Q-514 (46) - Body ground	⩽ 1 Ω



Result

Result	Go to
OK	A
NG	B

B → **Repair/replace related wire harness and connector**

A

4	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

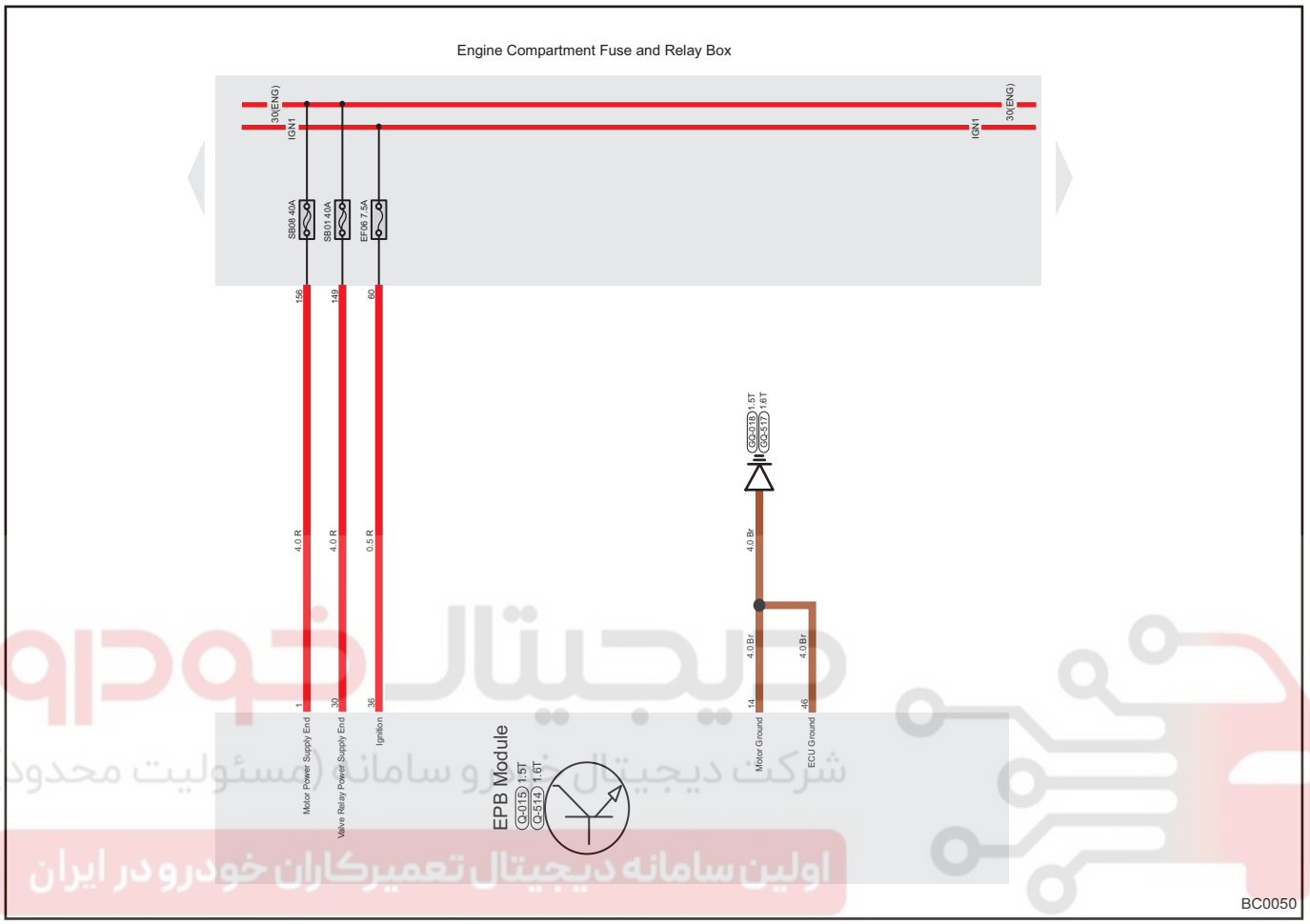
Result

Result	Go to
OK	A
NG	B

B	Replace EPB module assembly
A	System operates normally

DTC	C0020-04	ABS Pump Motor Control-System Internal Failure

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0020-04	ABS Pump Motor Control-System Internal Failure	• Fuse malfunctions • Pump motor has poor ground connection • System overheat protection • Abnormal pump motor power supply • Pump motor malfunction

Caution:

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

1	Check for DTCs

(a) Leave vehicle for 5 minutes, clear and read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.

(b) Refer to "DTC confirmation procedure".

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

Result

Result	Go to
OK	A

Result	Go to
NG	B

B → **Problem indicated by DTC is intermittent (system overheat protection)**

A

2	Check fuse

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Remove fuse SB08 (40A) from engine compartment fuse box.
(d) Check if fuse is blown.

Result

Result	Go to
OK	A
NG	B

B → **Replace related fuse**

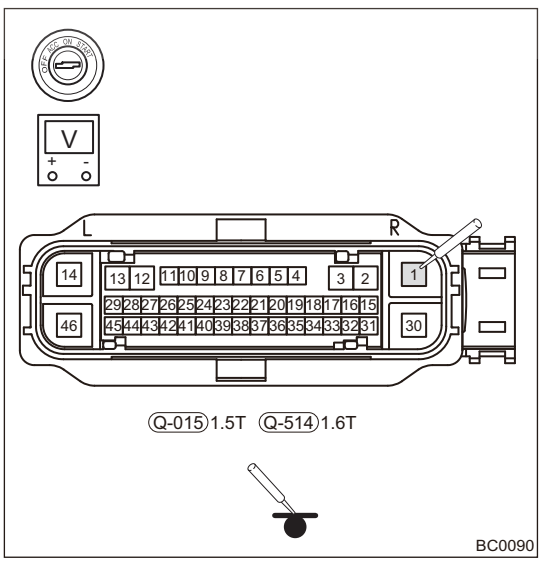
A

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 module assembly connector Q-015/Q-514.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corroded.
(f) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (1) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (1) - Body ground	⩾ 12 V



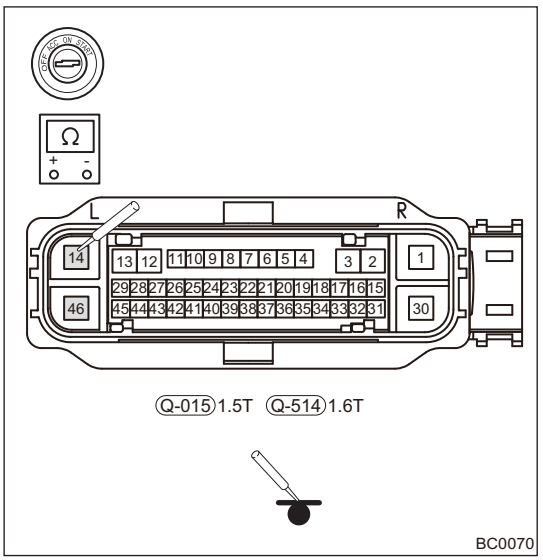
(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (14), Q-015/Q-514 (46) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (14) - Body ground	⩽ 1 Ω
Q-015/Q-514 (46) - Body ground	⩽ 1 Ω

Result

Result	Go to
OK	A
NG	B



35

B → **Repair/replace related wire harness and connector**

A

4 Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

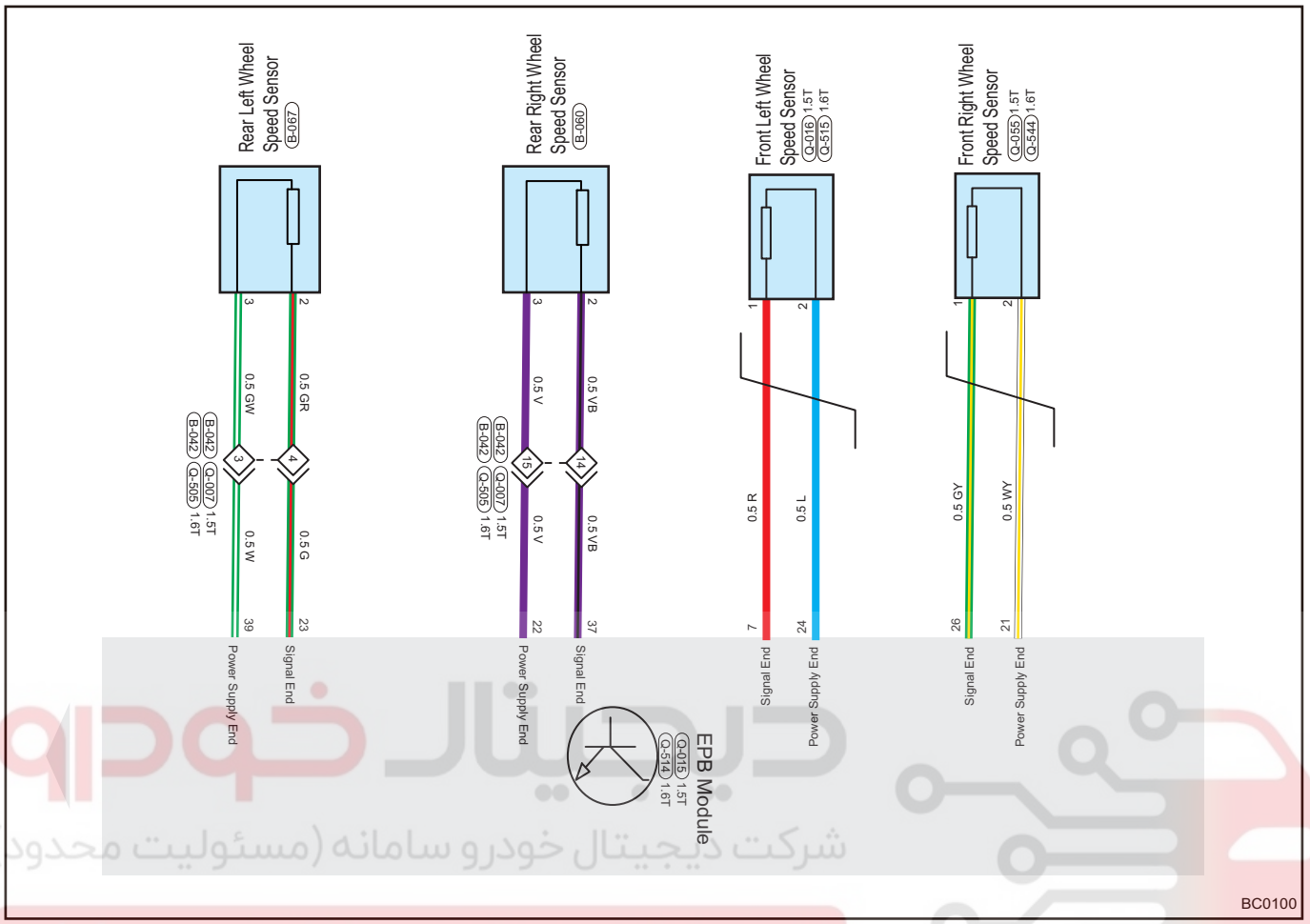
Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

DTC	C0031-00	Left Front Wheel Speed Sensor Failure-No Sub Type Information
DTC	C0031-09	Left Front Wheel Speed Sensor Failure-Component Failure
DTC	C0031-11	Left Front Wheel Speed Sensor Failure-Circuit Short To Ground
DTC	C0031-12	Left Front Wheel Speed Sensor Failure-Circuit Short To Battery
DTC	C0031-13	Left Front Wheel Speed Sensor Failure-Circuit Open
DTC	C0031-29	Left Front Wheel Speed Sensor Failure-Signal Invalid
DTC	C0031-37	Left Front Wheel Speed Sensor Signal Out Of Range

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0031-00	Left Front Wheel Speed Sensor Failure-No Sub Type Information	• Wheel speed sensor signal wire is connecting with power supply wire in reverse • Signal wire is short to ground • Wheel speed sensor line is open, connector is loose or broken • Wheel speed sensor signal wire is short to power supply • Wheel speed sensor power supply wire is short to ground • Sensor connector damages • Wheel speed sensor is interfered by magnetic field outside (wheel or axle is not demagnetized) • Wheel speed sensor body is malfunctioning • Ring gear is not installed, teeth missing, dirty with foreign matters, demagnetized, off center • Clearance between sensor and ring gear is excessive • Number of ring gear teeth is wrong • Tire size is not as specified • EPB module assembly is damaged
C0031-09	Left Front Wheel Speed Sensor Failure-Component Failure	
C0031-11	Left Front Wheel Speed Sensor Failure-Circuit Short To Ground	
C0031-12	Left Front Wheel Speed Sensor Failure-Circuit Short To Battery	
C0031-13	Left Front Wheel Speed Sensor Failure-Circuit Open	
C0031-29	Left Front Wheel Speed Sensor Failure-Signal Invalid	
C0031-37	Left Front Wheel Speed Sensor Signal Out Of Range	

Caution:

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

1	Check front left wheel speed sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check front left wheel speed sensor fixing bolt for looseness.
(d) Check if excessive clearance exists between installation position of front left wheel speed sensor and front steering knuckle.
(e) Check installation position of front left wheel speed sensor for dirt.

Result

Result	Go to
OK	A
NG	B

B → **Tighten fixing bolt properly, clean or replace front left wheel speed sensor assembly**

A

2	Check front left drive shaft ring gear upper

(a) Check front left drive shaft ring gear upper for foreign matter, missing teeth or damage.

Result

Result	Go to
OK	A
NG	B

B → **Replace outer joint assembly**

A

3	Read datastream of front left wheel speed sensor

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

Result

Result	Go to
OK	A
NG	B

B → **Replace front left wheel speed sensor assembly**

A

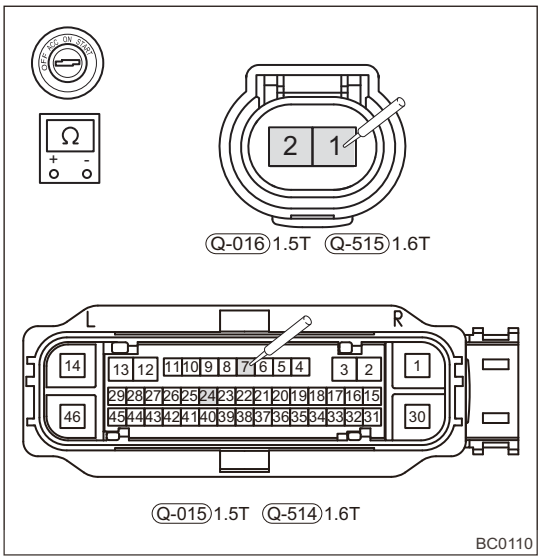
4	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.

(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Disconnect the front left wheel speed sensor connector Q-016/Q-515.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corroded.
(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (7), Q-015/Q-514 (24) and front left wheel speed sensor connector Q-016/Q-515 (1), Q-016/Q-515 (2) is normal according to the table below.

OK

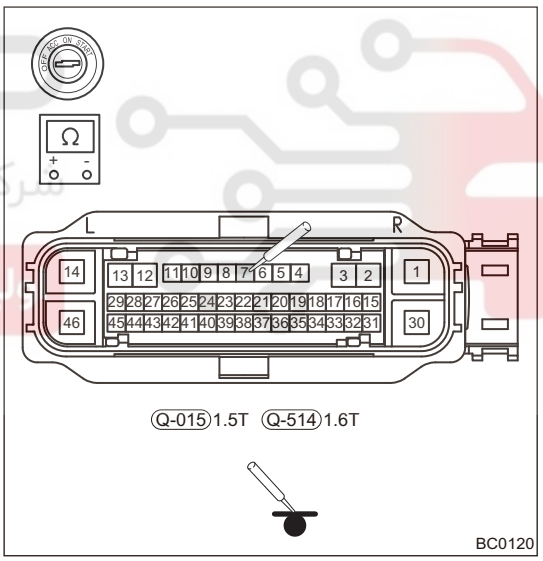
Multimeter Connection	Specified Condition
Q-015/Q-514 (7) - Q-016/Q-515 (1)	⩽ 1 Ω
Q-015/Q-514 (24) - Q-016/Q-515 (2)	⩽ 1 Ω



(h) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (7), Q-015/Q-514 (24) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (7) - Body ground	∞
Q-015/Q-514 (24) - Body ground	∞



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.

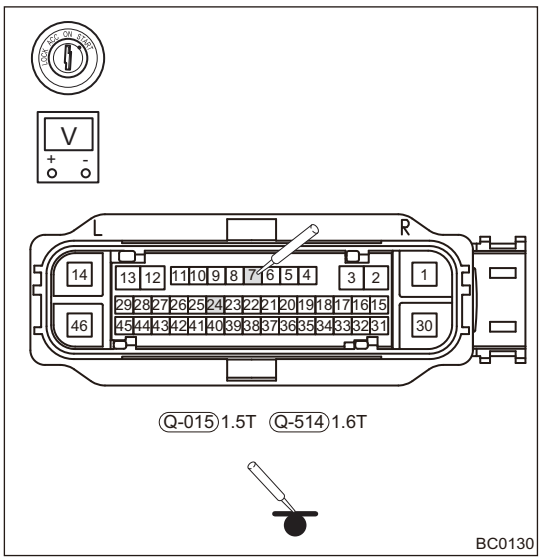
(k) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (7), Q-015/Q-514 (24) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (7) - Body ground	0 V
Q-015/Q-514 (24) - Body ground	0 V

Result

Result	Go to
OK	A
NG	B



B → **Repair/replace related wire harness and connector**

35

A

5	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

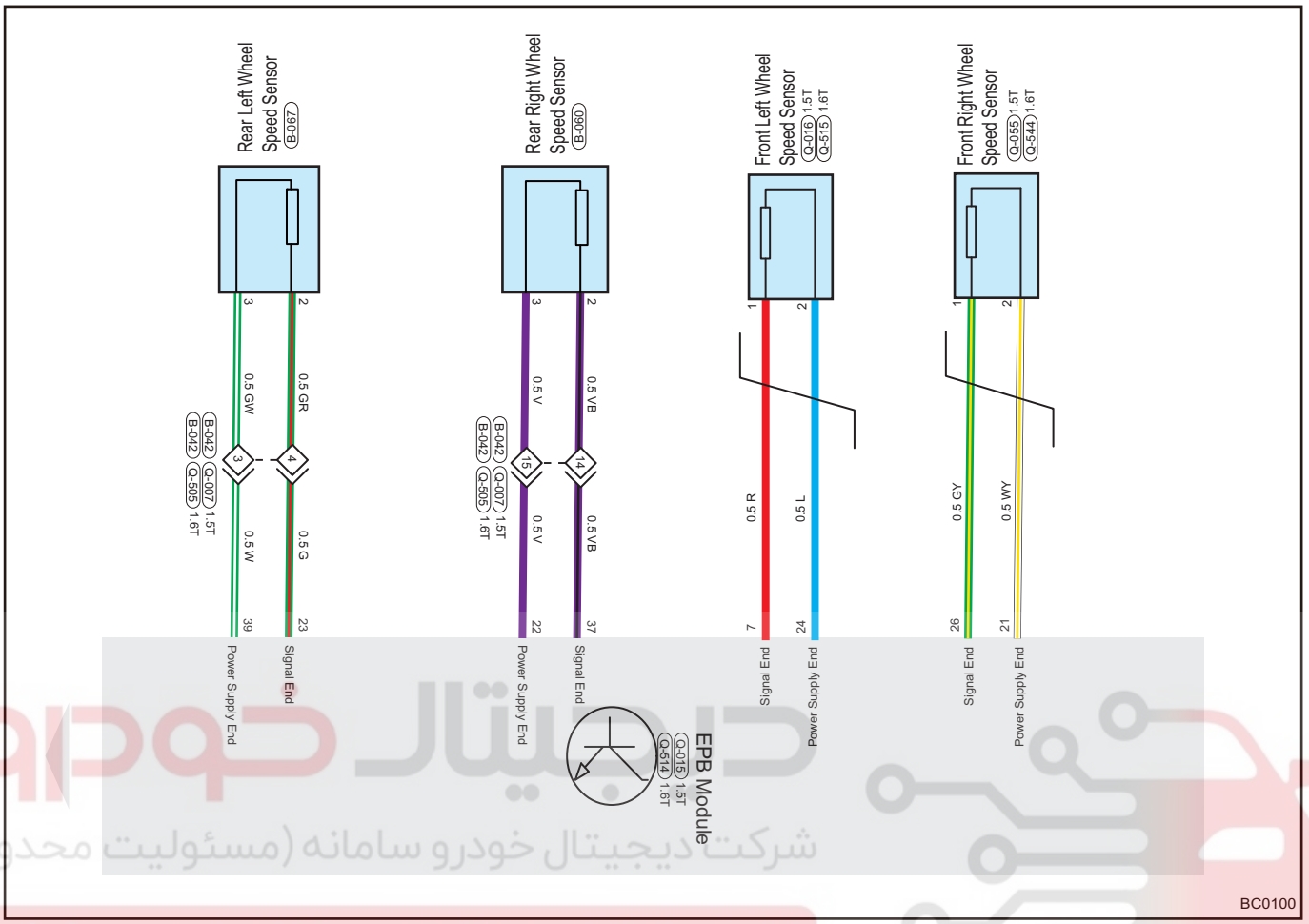
Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

DTC	C0034-00	Right Front Wheel Speed Sensor Failure-No Sub Type Information
DTC	C0034-09	Right Front Wheel Speed Sensor Failure-Component Failure
DTC	C0034-11	Right Front Wheel Speed Sensor Failure-Circuit Short To Ground
DTC	C0034-12	Right Front Wheel Speed Sensor Failure-Circuit Short To Battery
DTC	C0034-13	Right Front Wheel Speed Sensor Failure-Circuit Open
DTC	C0034-29	Right Front Wheel Speed Sensor Failure-Signal Invalid
DTC	C0034-37	Right Front Wheel Speed Sensor Signal Out Of Range

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0034-00	Right Front Wheel Speed Sensor Failure-No Sub Type Information	• Wheel speed sensor signal wire is connecting with power supply wire in reverse • Signal wire is short to ground • Wheel speed sensor line is open, connector is loose or broken • Wheel speed sensor signal wire is short to power supply • Wheel speed sensor power supply wire is short to ground • Sensor connector damages • Wheel speed sensor is interfered by magnetic field outside (wheel or axle is not demagnetized) • Wheel speed sensor body is malfunctioning • Ring gear is not installed, teeth missing, dirty with foreign matters, demagnetized, off center • Clearance between sensor and ring gear is excessive • Number of ring gear teeth is wrong • Tire size is not as specified • EPB module assembly is damaged
C0034-09	Right Front Wheel Speed Sensor Failure-Component Failure	
C0034-11	Right Front Wheel Speed Sensor Failure-Circuit Short To Ground	
C0034-12	Right Front Wheel Speed Sensor Failure-Circuit Short To Battery	
C0034-13	Right Front Wheel Speed Sensor Failure-Circuit Open	
C0034-29	Right Front Wheel Speed Sensor Failure-Signal Invalid	
C0034-37	Right Front Wheel Speed Sensor Signal Out Of Range	

Caution:

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

1	Check front right wheel speed sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check front right wheel speed sensor fixing bolt for looseness.
(d) Check if excessive clearance exists between installation position of front right wheel speed sensor and front steering knuckle.
(e) Check installation position of front right wheel speed sensor for dirt.

Result

Result	Go to
OK	A
NG	B

B → **Tighten fixing bolt properly, clean or replace front right wheel speed sensor assembly**

A

2	Check front right drive shaft ring gear upper

(a) Check front right drive shaft ring gear upper for foreign matter, missing teeth or damage.

Result

Result	Go to
OK	A
NG	B

B → **Replace outer joint assembly**

A

3	Read datastream of front right wheel speed sensor

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

Result

Result	Go to
OK	A
NG	B

B → **Replace front right wheel speed sensor assembly**

A

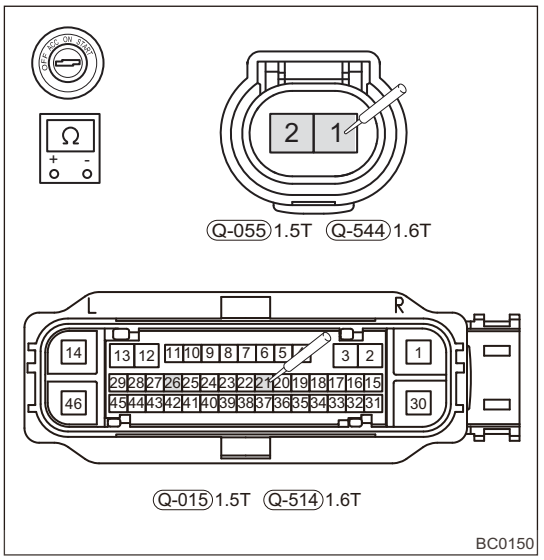
4	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.

(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Disconnect the front right wheel speed sensor connector Q-055/Q-544.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corroded.
(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (21), Q-015/Q-514 (26) and front right wheel speed sensor connector Q-055/Q-544 (1), Q-055/Q-544 (2) is normal according to the table below.

OK

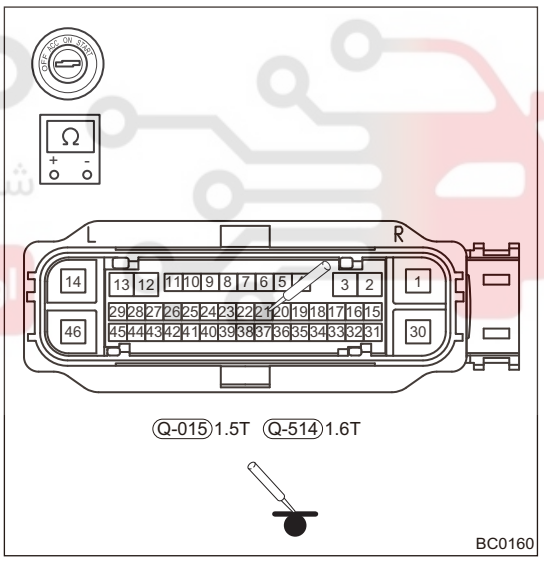
Multimeter Connection	Specified Condition
Q-015/Q-514 (26) - Q-055/Q-544 (1)	⩽ 1 Ω
Q-015/Q-514 (21) - Q-055/Q-544 (2)	⩽ 1 Ω



(h) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (21), Q-015/Q-514 (26) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (21) - Body ground	∞
Q-015/Q-514 (26) - Body ground	∞



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.

35

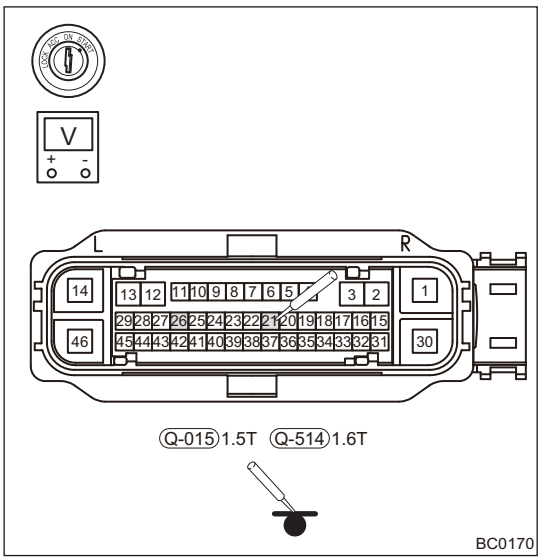
(k) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (21), Q-015/Q-514 (26) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (21) - Body ground	0 V
Q-015/Q-514 (26) - Body ground	0 V

Result

Result	Go to
OK	A
NG	B



35

B → **Repair/replace related wire harness and connector**

A

5 Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

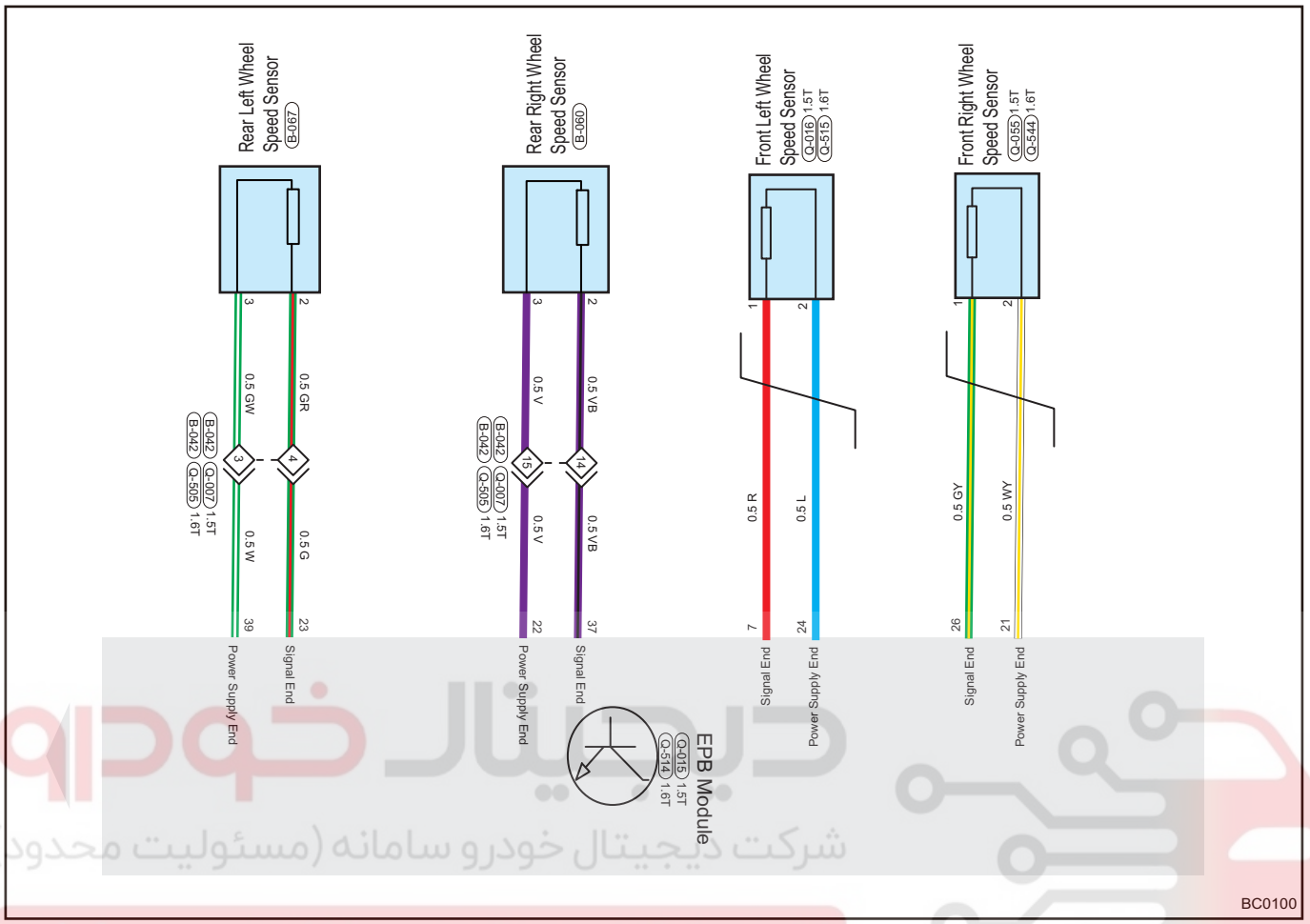
Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

DTC	C0037-00	Left Rear Wheel Speed Sensor Failure-No Sub Type Information
DTC	C0037-09	Left Rear Wheel Speed Sensor Failure-Component Failure
DTC	C0037-11	Left Rear Wheel Speed Sensor Failure-Circuit Short To Ground
DTC	C0037-12	Left Rear Wheel Speed Sensor Failure-Circuit Short To Battery
DTC	C0037-13	Left Rear Wheel Speed Sensor Failure-Circuit Open
DTC	C0037-29	Left Rear Wheel Speed Sensor Failure-Signal Invalid
DTC	C0037-37	Left Rear Wheel Speed Sensor Signal Out Of Range

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0037-00	Left Rear Wheel Speed Sensor Failure-No Sub Type Information	• Wheel speed sensor signal wire is connecting with power supply wire in reverse • Signal wire is short to ground • Wheel speed sensor line is open, connector is loose or broken • Wheel speed sensor signal wire is short to power supply • Wheel speed sensor power supply wire is short to ground • Sensor connector damages • Wheel speed sensor is interfered by magnetic field outside (wheel or axle is not demagnetized) • Wheel speed sensor body is malfunctioning • Ring gear is not installed, teeth missing, dirty with foreign matters, demagnetized, off center • Clearance between sensor and ring gear is excessive • Number of ring gear teeth is wrong • Tire size is not as specified • EPB module assembly is damaged
C0037-09	Left Rear Wheel Speed Sensor Failure-Component Failure	
C0037-11	Left Rear Wheel Speed Sensor Failure-Circuit Short To Ground	
C0037-12	Left Rear Wheel Speed Sensor Failure-Circuit Short To Battery	
C0037-13	Left Rear Wheel Speed Sensor Failure-Circuit Open	
C0037-29	Left Rear Wheel Speed Sensor Failure-Signal Invalid	
C0037-37	Left Rear Wheel Speed Sensor Signal Out Of Range	

Caution:

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

1	Check rear left wheel speed sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check rear left wheel speed sensor fixing bolt for looseness.
(d) Check if excessive clearance exists between installation position of rear left wheel speed sensor and front steering knuckle.
(e) Check installation position of rear left wheel speed sensor for dirt.

Result

Result	Go to
OK	A
NG	B

B → **Tighten fixing bolt properly, clean or replace rear left wheel speed sensor assembly**

A

2	Check rear left hub ring gear

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

Result

Result	Go to
OK	A
NG	B

B → **Replace rear left hub bearing assembly**

A

3	Read datastream of rear left wheel speed sensor

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

Result

Result	Go to
OK	A
NG	B

B → **Replace rear left wheel speed sensor assembly**

A

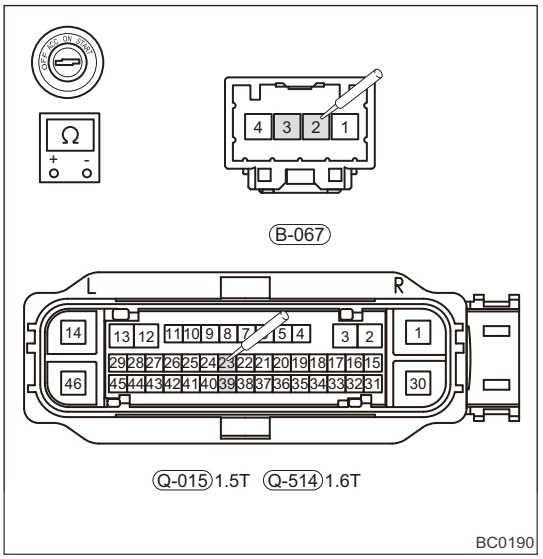
4	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.
(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Disconnect the rear left wheel speed sensor connector B-067.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corroded.
(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (23), Q-015/Q-514 (39) and rear left wheel speed sensor connector B-067 (2), B-067 (3) is normal according to the table below.

OK

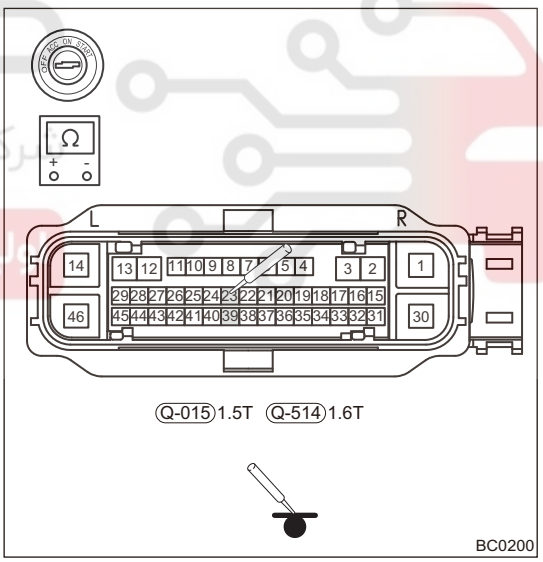
Multimeter Connection	Specified Condition
Q-015/Q-514 (23) - B-067 (2)	⩽ 1 Ω
Q-015/Q-514 (39) - B-067 (3)	⩽ 1 Ω



(h) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (23), Q-015/Q-514 (39) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (23) - Body ground	∞
Q-015/Q-514 (39) - Body ground	∞



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.

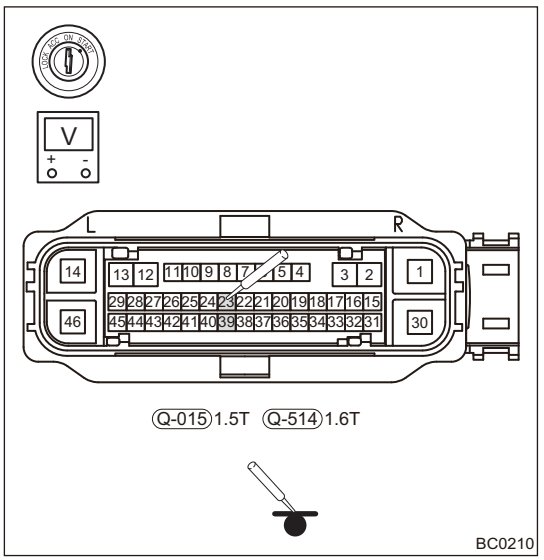
(k) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (23), Q-015/Q-514 (39) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (23) - Body ground	0 V
Q-015/Q-514 (39) - Body ground	0 V

Result

Result	Go to
OK	A
NG	B



B → **Repair/replace related wire harness and connector**

35

A

5	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

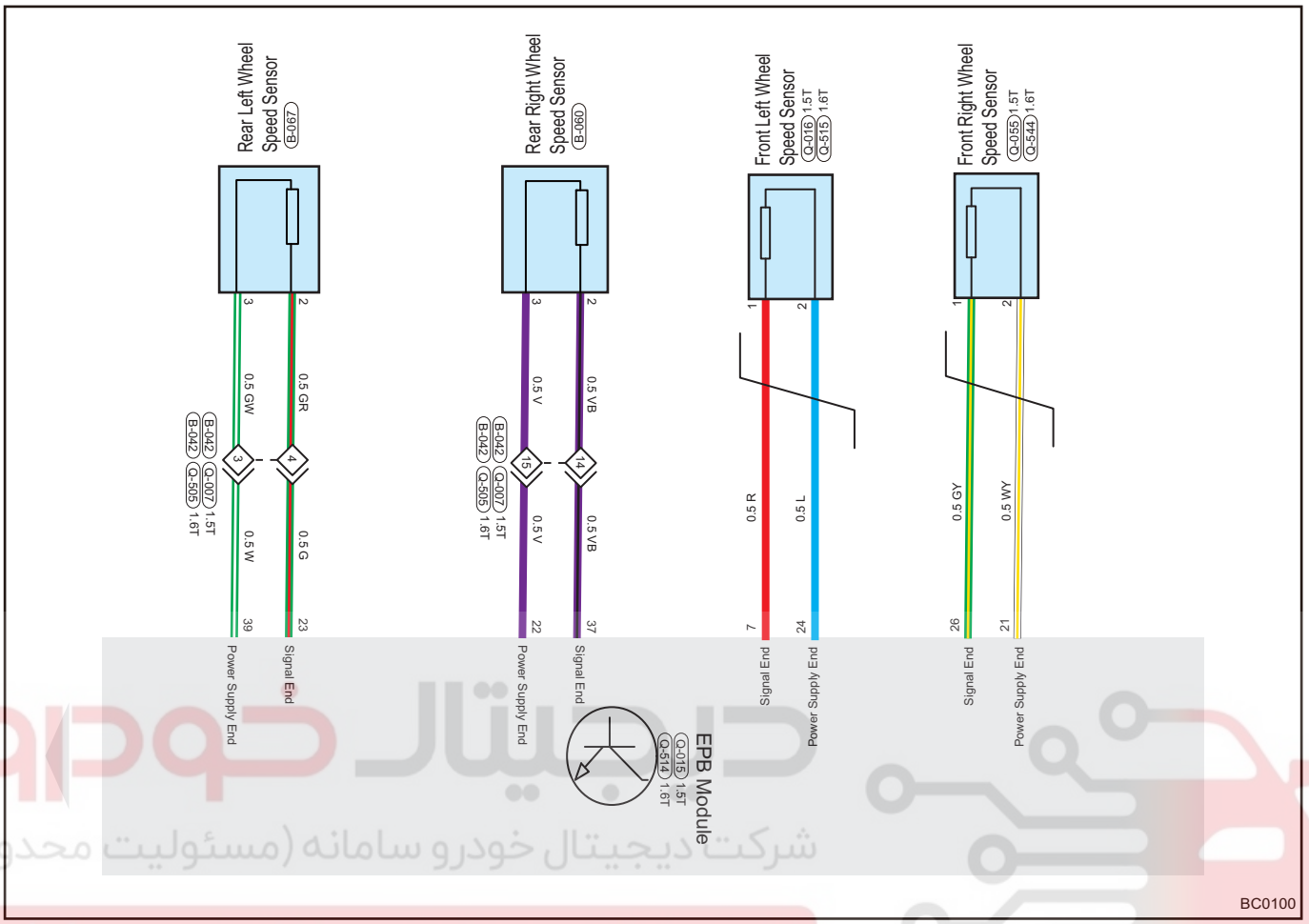
Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

DTC	C003A-00	Right Rear Wheel Speed Sensor Failure-No Sub Type Information
DTC	C003A-09	Right Rear Wheel Speed Sensor Failure-Component Failure
DTC	C003A-11	Right Rear Wheel Speed Sensor Failure-Circuit Short To Ground
DTC	C003A-12	Right Rear Wheel Speed Sensor Failure-Circuit Short To Battery
DTC	C003A-13	Right Rear Wheel Speed Sensor Failure-Circuit Open
DTC	C003A-29	Right Rear Wheel Speed Sensor Failure-Signal Invalid
DTC	C003A-37	Right Rear Wheel Speed Sensor Signal Out Of Range

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C003A-00	Right Rear Wheel Speed Sensor Failure-No Sub Type Information	• Wheel speed sensor signal wire is connecting with power supply wire in reverse • Signal wire is short to ground • Wheel speed sensor line is open, connector is loose or broken • Wheel speed sensor signal wire is short to power supply • Wheel speed sensor power supply wire is short to ground • Sensor connector damages • Wheel speed sensor is interfered by magnetic field outside (wheel or axle is not demagnetized) • Wheel speed sensor body is malfunctioning • Ring gear is not installed, teeth missing, dirty with foreign matters, demagnetized, off center • Clearance between sensor and ring gear is excessive • Number of ring gear teeth is wrong • Tire size is not as specified • EPB module assembly is damaged
C003A-09	Right Rear Wheel Speed Sensor Failure-Component Failure	
C003A-11	Right Rear Wheel Speed Sensor Failure-Circuit Short To Ground	
C003A-12	Right Rear Wheel Speed Sensor Failure-Circuit Short To Battery	
C003A-13	Right Rear Wheel Speed Sensor Failure-Circuit Open	
C003A-29	Right Rear Wheel Speed Sensor Failure-Signal Invalid	
C003A-37	Right Rear Wheel Speed Sensor Signal Out Of Range	

Caution:

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

1	Check rear right wheel speed sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check rear right wheel speed sensor fixing bolt for looseness.
(d) Check if excessive clearance exists between installation position of rear right wheel speed sensor and front steering knuckle.
(e) Check installation position of rear right wheel speed sensor for dirt.

Result

Result	Go to
OK	A
NG	B

B → **Tighten fixing bolt properly, clean or replace rear right wheel speed sensor assembly**

A

2	Check right rear hub ring gear

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

Result

Result	Go to
OK	A
NG	B

B → **Replace rear right hub bearing assembly**

A

3	Read datastream of rear right wheel speed sensor

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

Result

Result	Go to
OK	A
NG	B

B → **Replace rear right wheel speed sensor assembly**

A

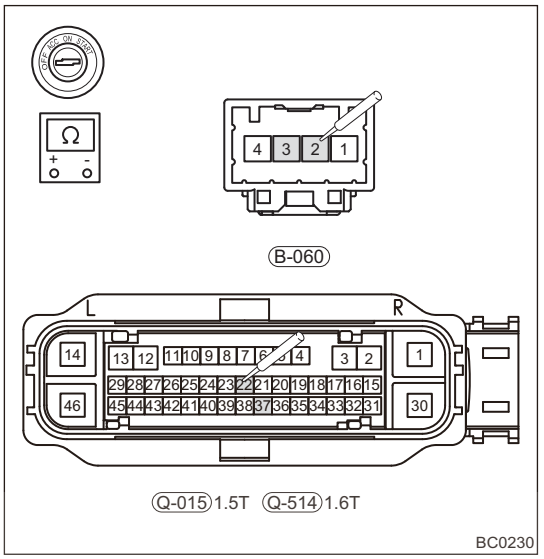
4	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.
(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Disconnect the rear right wheel speed sensor connector B-060.
(e) Check if related wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loose, broken, bent or corroded.
(g) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (22), Q-015/Q-514 (37) and rear right wheel speed sensor connector B-060 (2), B-060 (3) is normal according to the table below.

OK

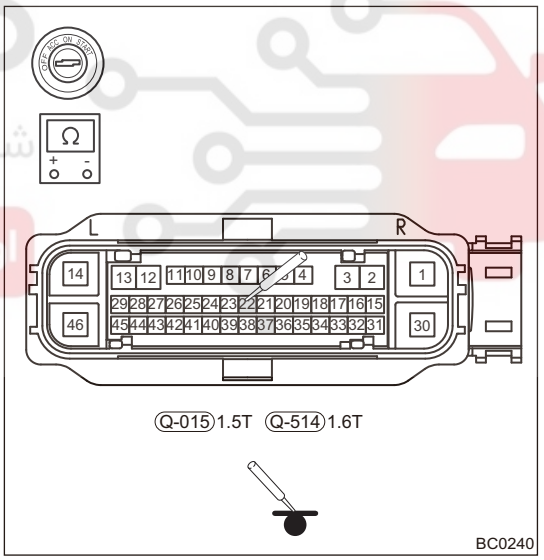
Multimeter Connection	Specified Condition
Q-015/Q-514 (22) - B-060 (3)	⩽ 1 Ω
Q-015/Q-514 (37) - B-060 (2)	⩽ 1 Ω



(h) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (22), Q-015/Q-514 (37) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (22) - Body ground	∞
Q-015/Q-514 (37) - Body ground	∞



(i) Connect the negative battery cable.
(j) Turn ENGINE START STOP switch to ON.

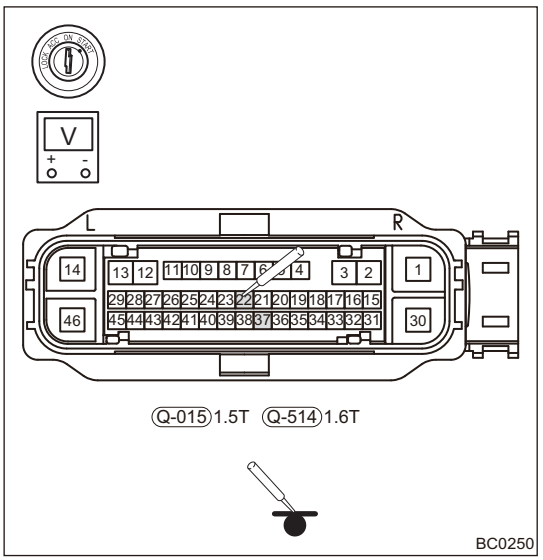
(k) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (22), Q-015/Q-514 (37) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (22) - Body ground	0 V
Q-015/Q-514 (37) - Body ground	0 V

Result

Result	Go to
OK	A
NG	B



B → **Repair/replace related wire harness and connector**

A

5	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

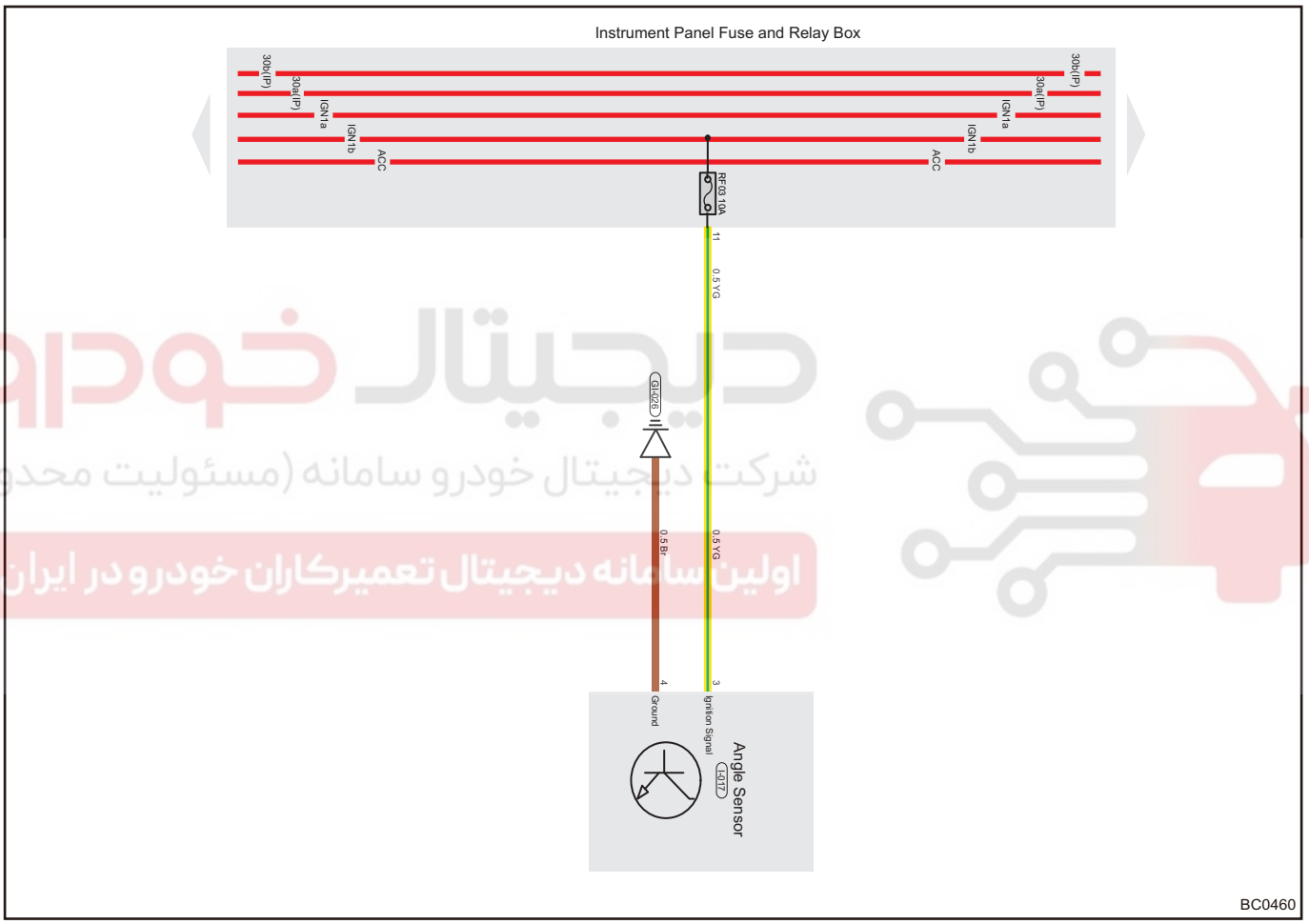
A → **System operates normally**

DTC	C0051-29	Steering Wheel Position Sensor (ESP Only)-Signal Invalid

DTC	C0051-54	Steering Wheel Position Sensor (ESP Only)-Missing Calibration

DTC	C0051-64	Steering Wheel Position Sensor (ESP Only)-Signal Plausibility Failure

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C0051-29	Steering Wheel Position Sensor (ESP Only)-Signal Invalid	• Angle sensor is not calibrated • Angle sensor line is short or open • Angle sensor is damaged
C0051-54	Steering Wheel Position Sensor (ESP Only)-Missing Calibration	
C0051-64	Steering Wheel Position Sensor (ESP Only)-Signal Plausibility Failure	

Hint:

Angle sensor is integrated and installed in combination switch assembly.

Caution:

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

1	Check angle sensor calibration

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

Result

Result	Go to
OK	A
NG	B

B → **Angle sensor is not calibrated**

A

2	Check fuse

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Remove fuse RF03 (10A) from instrument panel fuse box.
(d) Check if fuse is blown.

Result

Result	Go to
OK	A
NG	B

B → **Replace related fuse**

A

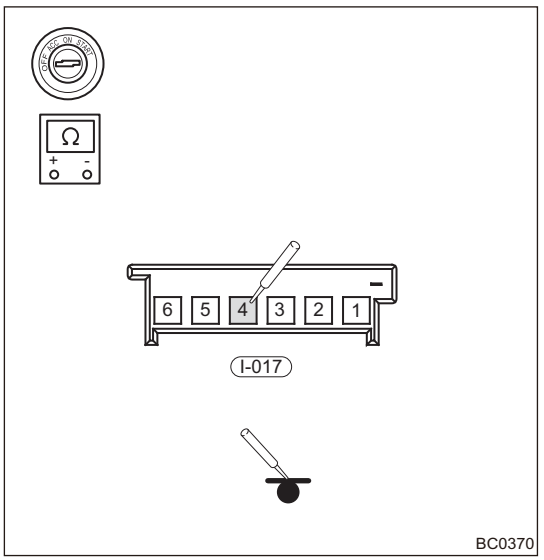
3	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the angle sensor connector I-017.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corroded.

(f) Using a digital multimeter, measure if the continuity between angle sensor connector I-017 (4) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
I-017 (4) - Body ground	⩽ 1 Ω



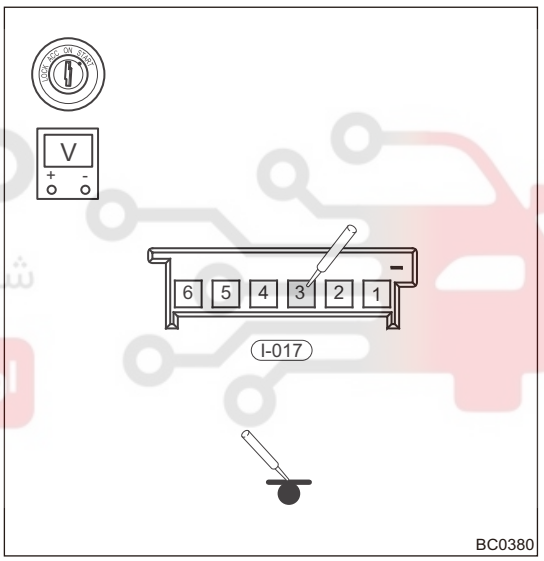
(g) Connect the negative battery cable.

(h) Turn ENGINE START STOP switch to ON.

(i) Using a digital multimeter, measure if the voltage between angle sensor connector I-017 (3) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
I-017 (3) - Body ground	⩾ 12 V



B → **Repair/replace related wire harness and connector**

A

4	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.

(b) Start the engine.

(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.

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

Result

Result	Go to
OK	A
NG	B

B → Replace EPB module assembly

A → System operates normally

DTC	C0061-64	Lateral Acceleration Sensor (ESP Only)-Signal Plausibility Failure

DTC	C0062-64	Longitudinal Acceleration Sensor (ESP Only)-Signal Plausibility Failure

DTC	C0063-64	Yaw Rate Sensor Failure (ESP Only)-Signal Plausibility Failure

DTC	C0063-01	Yaw Rate Sensor Failure (ESP Only)-General Electrical Failure

DTC	C0063-54	Yaw Rate Sensor Failure (ESP Only)-Missing Calibration

Description

DTC	DTC Definition	Possible Cause
C0061-64	Lateral Acceleration Sensor (ESP Only)-Signal Plausibility Failure	• Lateral acceleration/yaw rate sensor is not calibrated • Y&G sensor is short or open • Lateral acceleration/yaw rate sensor is damaged
C0062-64	Longitudinal Acceleration Sensor (ESP Only)-Signal Plausibility Failure	
C0063-64	Yaw Rate Sensor Failure (ESP Only)-Signal Plausibility Failure	
C0063-01	Yaw Rate Sensor Failure (ESP Only)-General Electrical Failure	
C0063-54	Yaw Rate Sensor Failure (ESP Only)-Missing Calibration	

Caution:

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

1	Check lateral acceleration/yaw rate sensor calibration

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

Result

Result	Go to
OK	A
NG	B

B	Lateral acceleration/yaw rate sensor is not calibrated

A

2	Check EPB module assembly

Hint:

Lateral acceleration/yaw rate sensor is integrated and installed in EPB module assembly.

(a) Check EPB module assembly fixing bolt for looseness.

(b) Check EPB module assembly fixing bracket bolt for looseness.

Result

Result	Go to
OK	A
NG	B

B → **Tighten EPB module assembly fixing bolt and fixing bracket bolt properly**

35

A

3	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.

(b) Start the engine.

(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.

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

Result

Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

DTC	C006B-00	Stability System Active Too Long-No Sub Type Information

Description

DTC	DTC Definition	Possible Cause
C006B-00	Stability System Active Too Long-No Sub Type Information	• Wheel speed differs • Sensor signal is incorrect • EPB module assembly is damaged

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

1	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect all wheel speed sensor and angle sensor connectors.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corroded.

Result

Result	Go to
OK	A
NG	B

B → **Repair/replace related wire harness and connector**

A

2	Check installation of wheel speed sensor

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Check wheel speed sensor fixing bolt for looseness.
(d) Check if excessive clearance exists between installation position of wheel speed sensor and front steering knuckle.
(e) Check installation position of rear right wheel speed sensor for dirt.

Result

Result	Go to
OK	A
NG	B

B → **Tighten fixing bolt properly, clean or replace wheel speed sensor**

A

3	Check hub gear ring and drive shaft ring gear upper

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

Result

Result	Go to
OK	A
NG	B

B → **Replace hub bearing assembly or outer joint assembly**

A

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.

Result

Result	Go to
OK	A
NG	B

B → **Replace corresponding wheel speed sensor assembly**

A

5	Check installation of angle sensor

Hint:

Angle sensor is integrated and installed in combination switch assembly.

(a) Turn ENGINE START STOP 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.

Result

Result	Go to
OK	A
NG	B

B → **Clean or replace combination switch assembly**

A

6	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

Result	Go to
OK	A
NG	B

B → **Replace EPB module assembly**

A → **System operates normally**

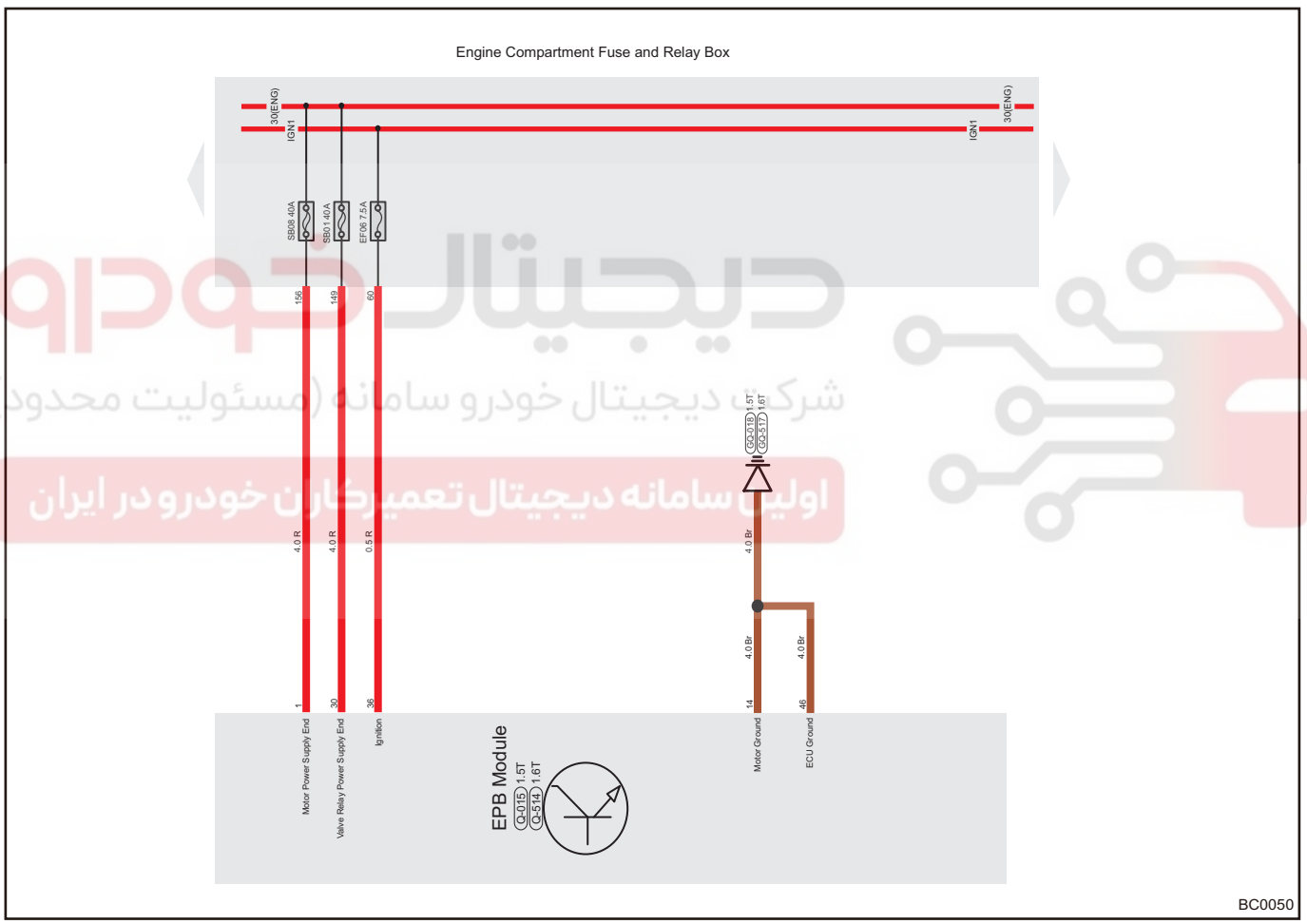
DTC	C1000-16	ECU Voltage Supply Failure-Circuit Voltage Below Threshold

DTC	C1000-17	ECU Voltage Supply Failure-Circuit Voltage Above Threshold

DTC	C1001-04	ECU System Internal Failure-System Internal Failure

DTC	C1009-00	ECU HardWare Related-No Sub Type Information

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
C1000-16	ECU Voltage Supply Failure-Circuit Voltage Below Threshold	• Fuse malfunctions • High or low battery voltage • Charging system malfunctions • Wire harness or connector is damaged • EPB module assembly malfunctions
C1000-17	ECU Voltage Supply Failure-Circuit Voltage Above Threshold	
C1001-04	ECU System Internal Failure-System Internal Failure	
C1009-00	ECU HardWare Related-No Sub Type Information	

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

1	Check fuse

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Remove fuse SB01 (40A) and EF06 (7.5A) from engine compartment fuse box.
(d) Check if fuse is blown.

Result

Result	Go to
OK	A
NG	B

B → **Replace related fuse**

A

2	Check battery voltage

Standard voltage: Not less than 12 V.

Result

Result	Go to
OK	A
NG	B

B → **Replace battery**

A

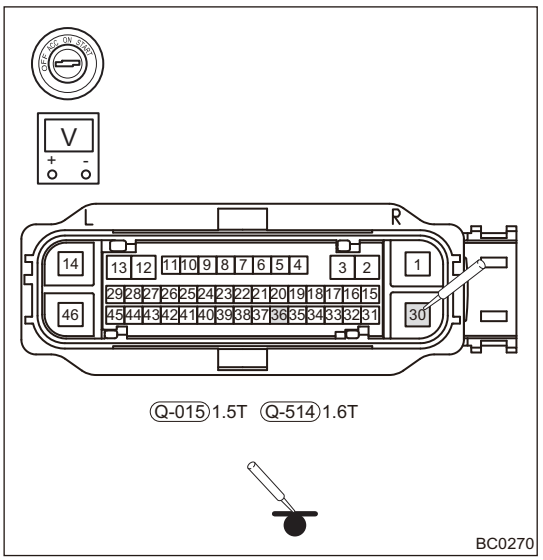
3	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the EPB module assembly connector Q-015/Q-514.
(d) Check if related wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loose, broken, bent or corroded.
(f) Check if related connector terminals are in good condition.

(g) Using a digital multimeter, measure if the voltage between EPB module assembly connector Q-015/Q-514 (30), Q-015/Q-514 (36) and body ground is normal according to the table below.

OK

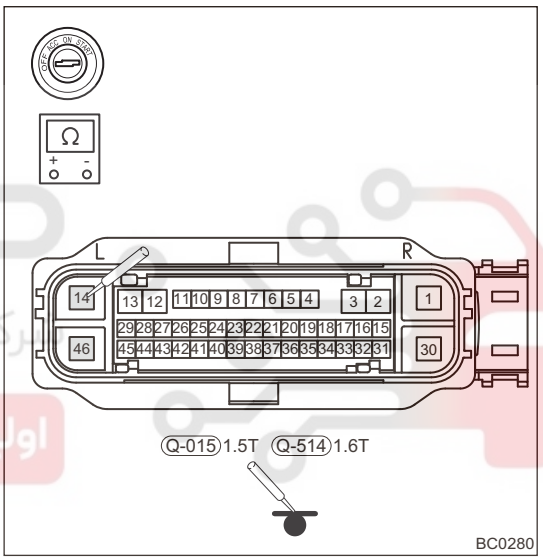
Multimeter Connection	Specified Condition
Q-015/Q-514 (30) - Body ground	⩾ 12 V
Q-015/Q-514 (36) - Body ground	⩾ 12 V



(h) Using a digital multimeter, measure if the continuity between EPB module assembly connector Q-015/Q-514 (14), Q-015/Q-514 (46) and body ground is normal according to the table below.

OK

Multimeter Connection	Specified Condition
Q-015/Q-514 (14) - Body ground	⩽ 1 Ω
Q-015/Q-514 (46) - Body ground	⩽ 1 Ω



Result

Result	Go to
OK	A
NG	B

B → **Repair/replace related wire harness and connector**

A

4	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Start the engine.
(c) Drive vehicle at 40 km/h or above, read "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)" system DTC again with diagnostic tester.
(d) Check if the same DTCs are still output.

Result

Result	Go to
OK	A
NG	B

B	Replace EPB module assembly
A	System operates normally

DTC	U0005-00	High Speed CAN Communication Bus (+) High-No Sub Type Information
DTC	U0007-00	High Speed CAN Communication Bus (–) Low-No Sub Type Information
DTC	U0073-88	Control Module Communication Bus Off-BUS OFF
DTC	U0100-87	Lost Communication With ECM (ESP Only)-Miss Message
DTC	U0101-87	Lost Communication With TCM (ESP Only)-Miss Message
DTC	U0126-87	Lost Communication With Steering Angle Sensor Module (ESP Only)-Miss Message
DTC	U0140-87	Lost Communication With BCM (ESP Only)-Miss Message
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)-Invalid Serial Date Received
DTC	U0428-81	Invalid Data Received From Steering Angle Sensor Module (ESP Only)-Invalid Serial Date Received
DTC	U1300-55	Software Configuration Error-Not Configured
DTC	U1163-87	Lost Communication With ACC (ESP Only)-Miss Message
DTC	U0433-81	Invalid Data Received From ACC (ESP Only)-Invalid Serial Date Received
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-Invalid Serial Date Received
DTC	U1418-81	BTMNet_InvalidValue-Invalid Serial Date Received
DTC	U1419-81	CDDNet_InvalidValue-Invalid Serial Date Received
DTC	U1421-81	SClutch_InvalidValue-Invalid Serial Date Received
DTC	U1422-81	EngineNet_InvalidValue-Invalid Serial Date Received
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
DTC	U1426-81	VacuumNet_InvalidValue-Invalid Serial Date Received
DTC	U0146-87	Lost Communication With CGW-Miss Message
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

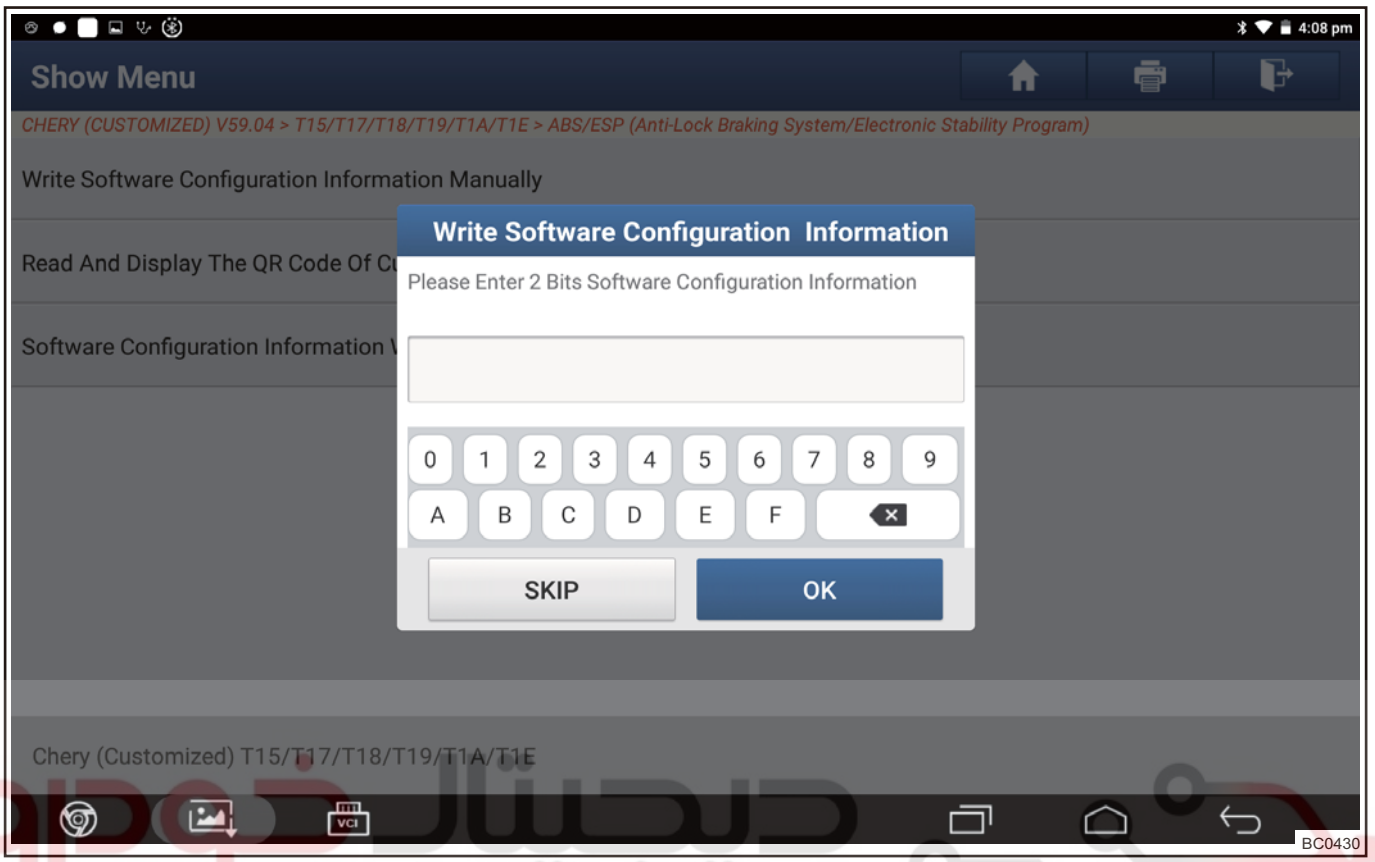
DTC	U0443-81	Invalid Data Received From AVM-Invalid Serial Date Received

Refer to CAN communication system

Matching Learning

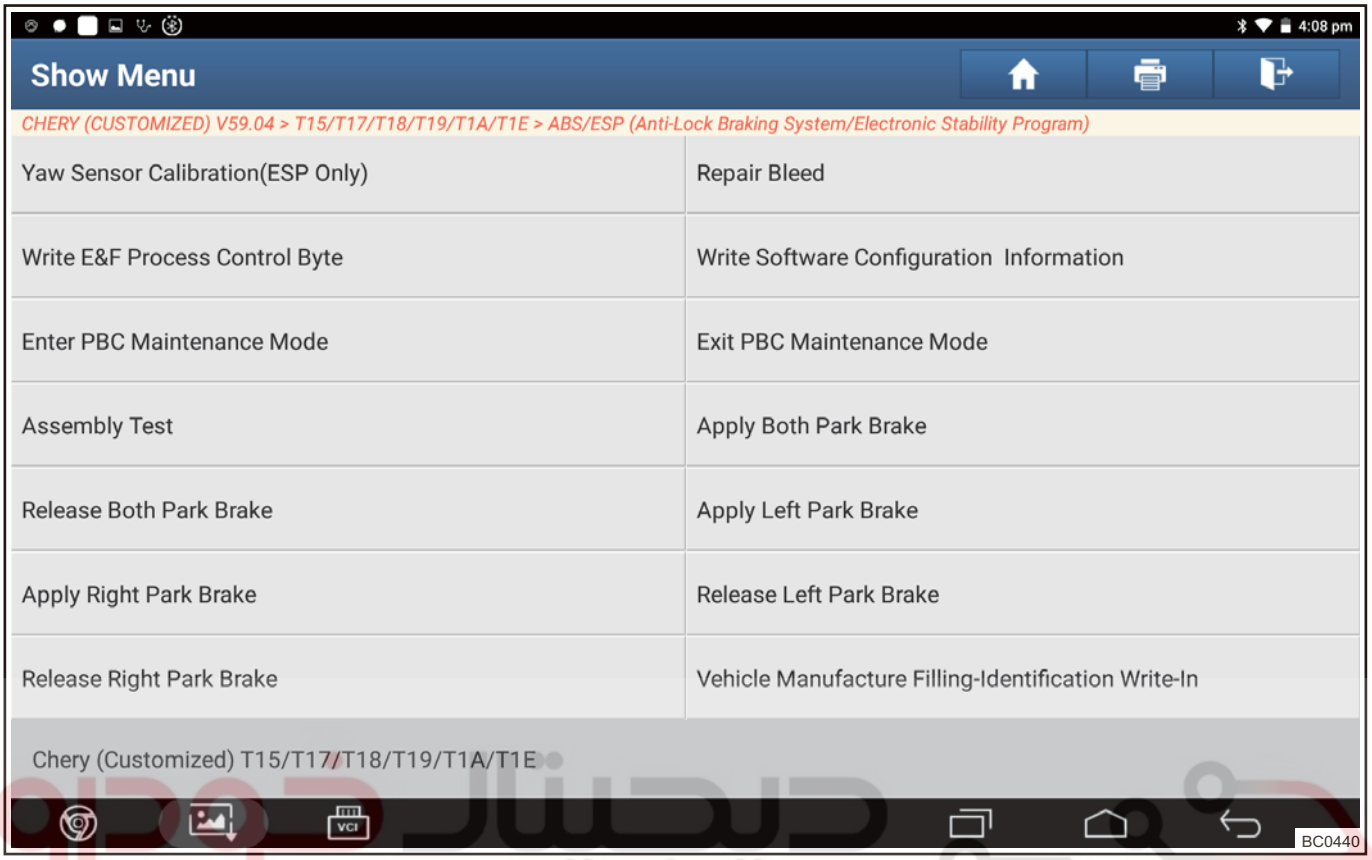
Write Software Configuration Information

1. Click "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)".
2. Click "Special Function".
3. Click "Write Software Configuration Information" (Configuration code can be read by reading data stream).



Vehicle Manufacture Filling-Identification Write-in

1. Click "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)".
2. Click "Special Function".
3. Vehicle manufacture filling-identification write-in (Configuration code can be read by reading data stream).


4:08 pm
Show Menu
CHERY (CUSTOMIZED) V59.04 > T15/T17/T18/T19/T1A/T1E > ABS/ESP (Anti-Lock Braking System/Electronic Stability Program)
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
Chery (Customized) T15/T17/T18/T19/T1A/T1E
VCI
BC0440

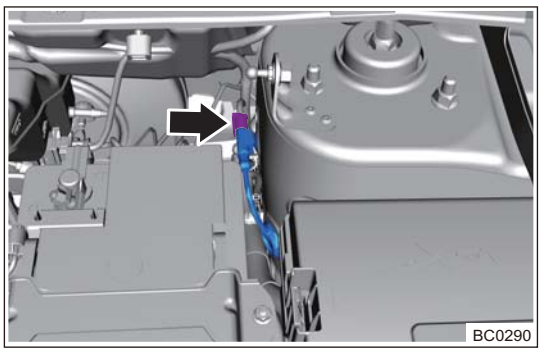

4:08 pm
Show Menu
CHERY (CUSTOMIZED) V59.04 > T15/T17/T18/T19/T1A/T1E > ABS/ESP (Anti-Lock Braking System/Electronic Stability Program)
Yaw Sensor Calibration(ESP Only)
Repair Bleed
Write E&F Process Control Byte
Information
Enter PBC Maintenance Mode
Assembly Test
Release Both Park Brake
Apply Right Park Brake
Release Right Park Brake
Vehicle Manufacture Filling-Identification Write-In
Chery (Customized) T15/T17/T18/T19/T1A/T1E
Vehicle Manufacture Filling-Identification W...
Please Enter 2 Bits Vehicle Manufacture Filling-Identification Information
0 1 2 3 4 5 6 7 8 9
A B C D E F
SKIP
OK
VCI
BC0450

Removal & Installation

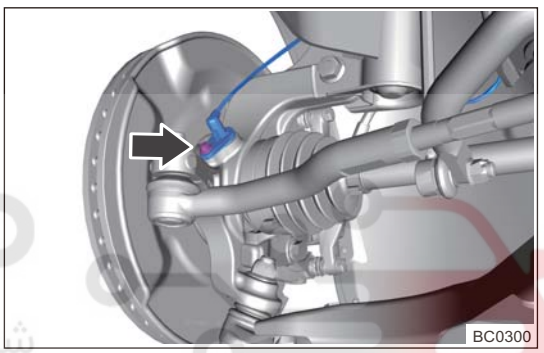
Wheel Speed Sensor Assembly (Take left side as an example)

Removal

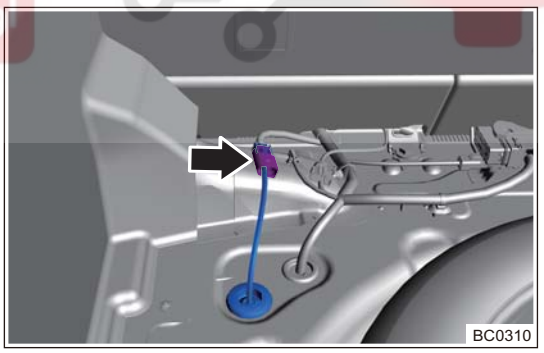
1. Turn ENGINE START STOP switch to OFF.
2. Disconnect the negative battery cable.
3. Disconnect the front left wheel speed sensor assembly connector.



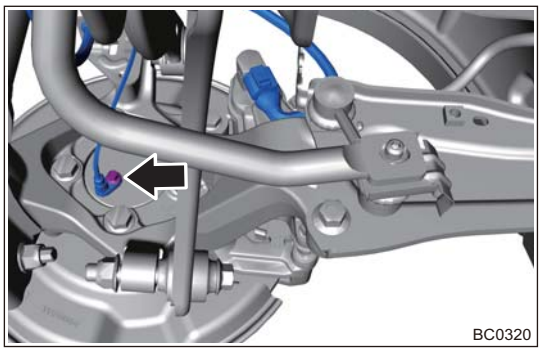
4. Remove 1 fixing bolt between front left wheel speed sensor assembly and front left steering knuckle.
   Torque: 9 ± 1.5 N·m



5. Remove the front left wheel speed sensor assembly.
6. Remove the luggage compartment storage box.
7. Disconnect the rear left wheel speed sensor with caliper wire harness assembly connector.

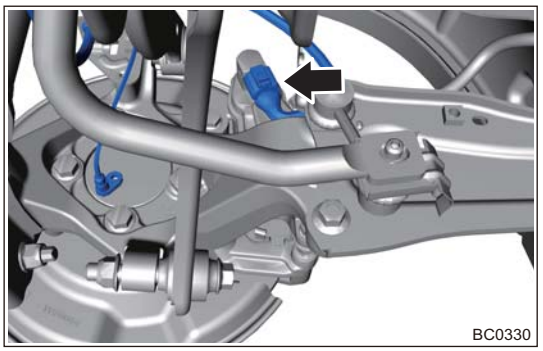


8. Remove 1 fixing bolt between rear left wheel speed sensor with caliper wire harness assembly and rear hub bearing unit.



Torque: 9 ± 1.5 N·m

9. Disconnect the rear left wheel speed sensor with caliper wire harness assembly connector.



10. Remove the rear left wheel speed sensor with caliper wire harness assembly.

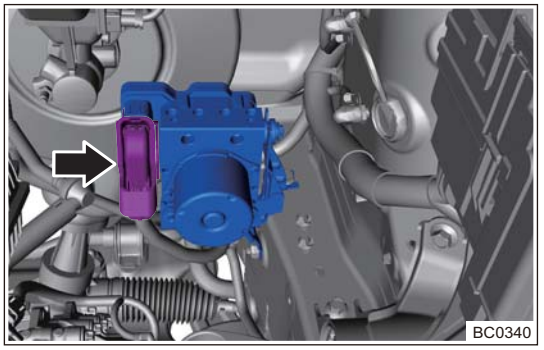
Installation

Installation is in the reverse order of removal.

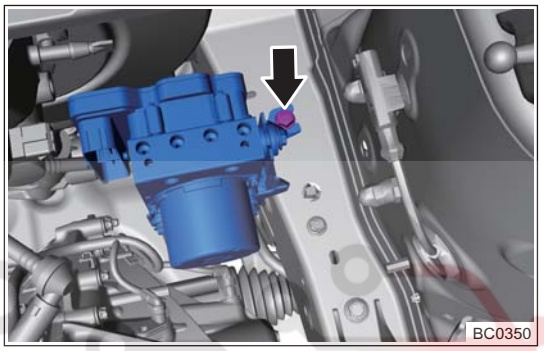
EPB Module Assembly

Removal

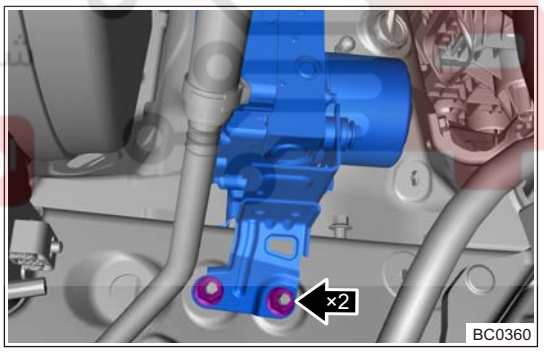
1. Remove battery and tray.
2. Remove the brake pipe assembly.
3. Disconnect the EPB module assembly connector.



4. Remove 1 fixing bolt between EPB module assembly and upper body of front left side rail.
   Torque: 23 ± 3.5 N·m



5. Remove 2 fixing bolts between EPB module assembly and side of front left side rail body.
   Torque: 23 ± 3.5 N·m



6. Remove the EPB module assembly.

Installation

Installation is in the reverse order of removal.

- MEMO -

BRAKE SYSTEM

HYDRAULIC BRAKE

Warning and Precautions

Precautions

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

- DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.
- 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.
- 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 EPS (turn off vehicle power supply), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

System Overview

Front Brake

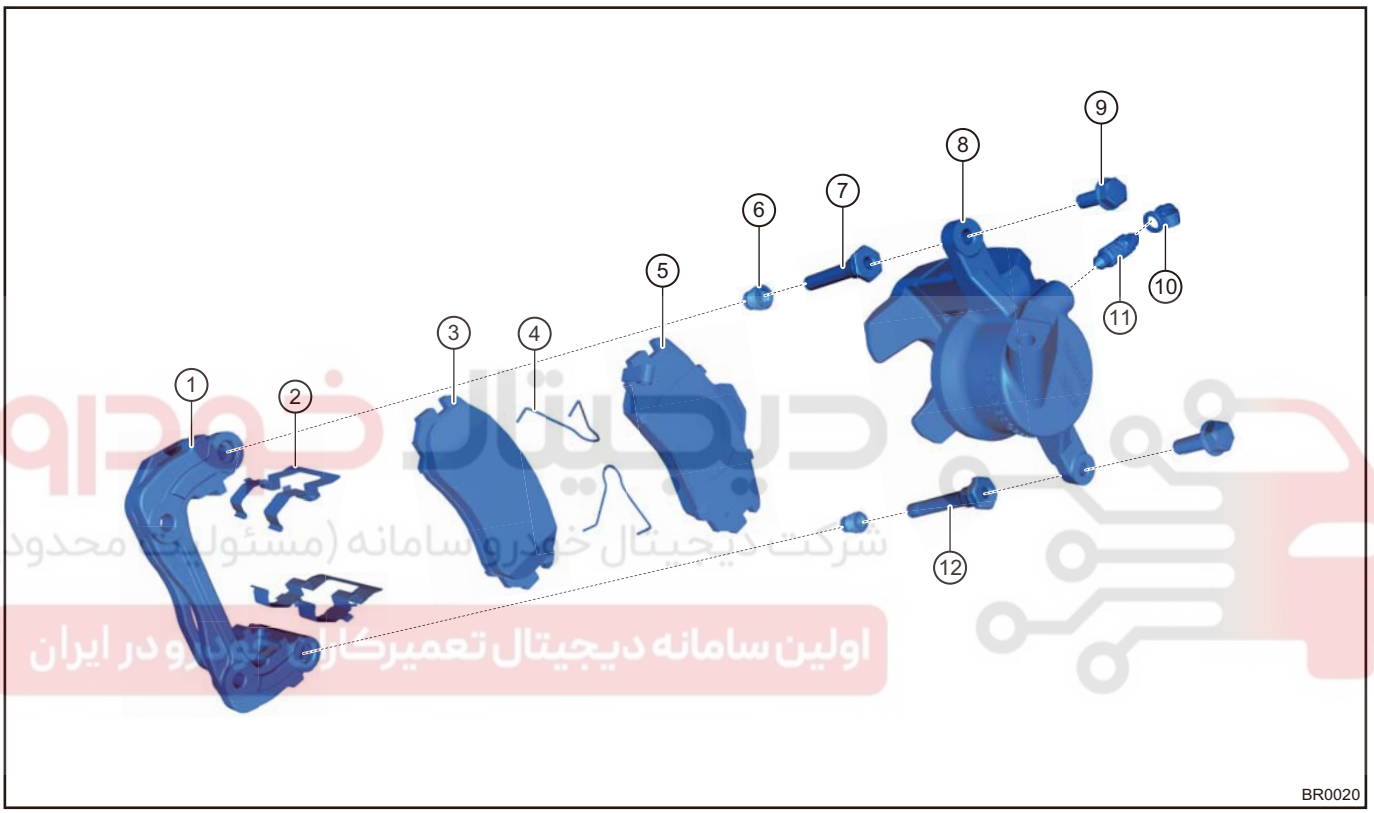
Front Left Steering Knuckle with Disc Brake Assembly

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



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:

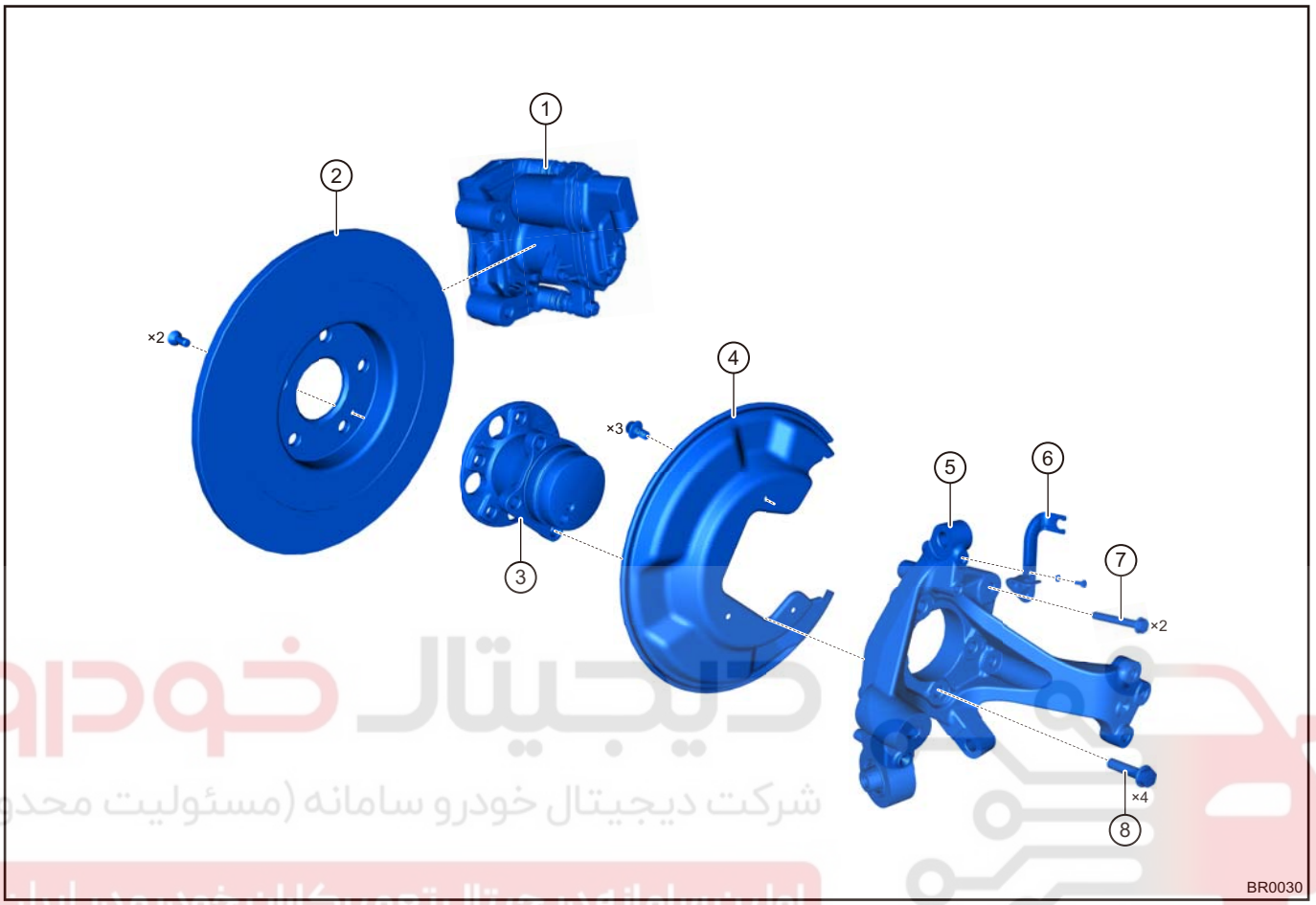
Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.

Front left brake caliper assembly is mainly composed of front brake caliper bracket, front left brake caliper body assembly, 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 it's 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.

Rear Brake

Rear Left Brake Assembly

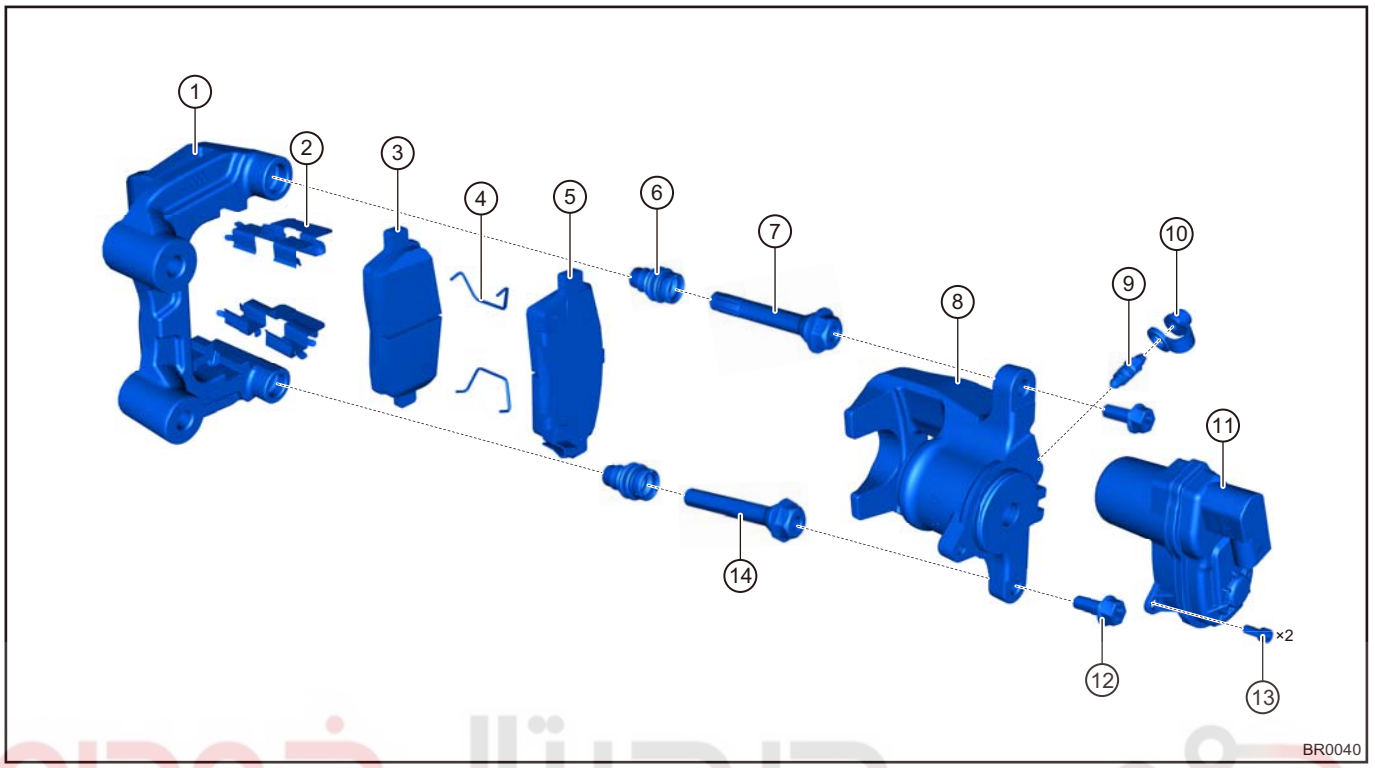


1	Rear Left Brake Caliper Assembly	5	Rear Left Steering Knuckle
2	Rear Brake Disc	6	Rear Left Wheel Electrical Caliper Wire Harness Bracket
3	Rear Hub Bearing Unit	7	Brake Caliper Mounting Bolt x 2
4	Rear Left Dust Guard	8	Hub Bearing Fixing Bolt x 4

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



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:

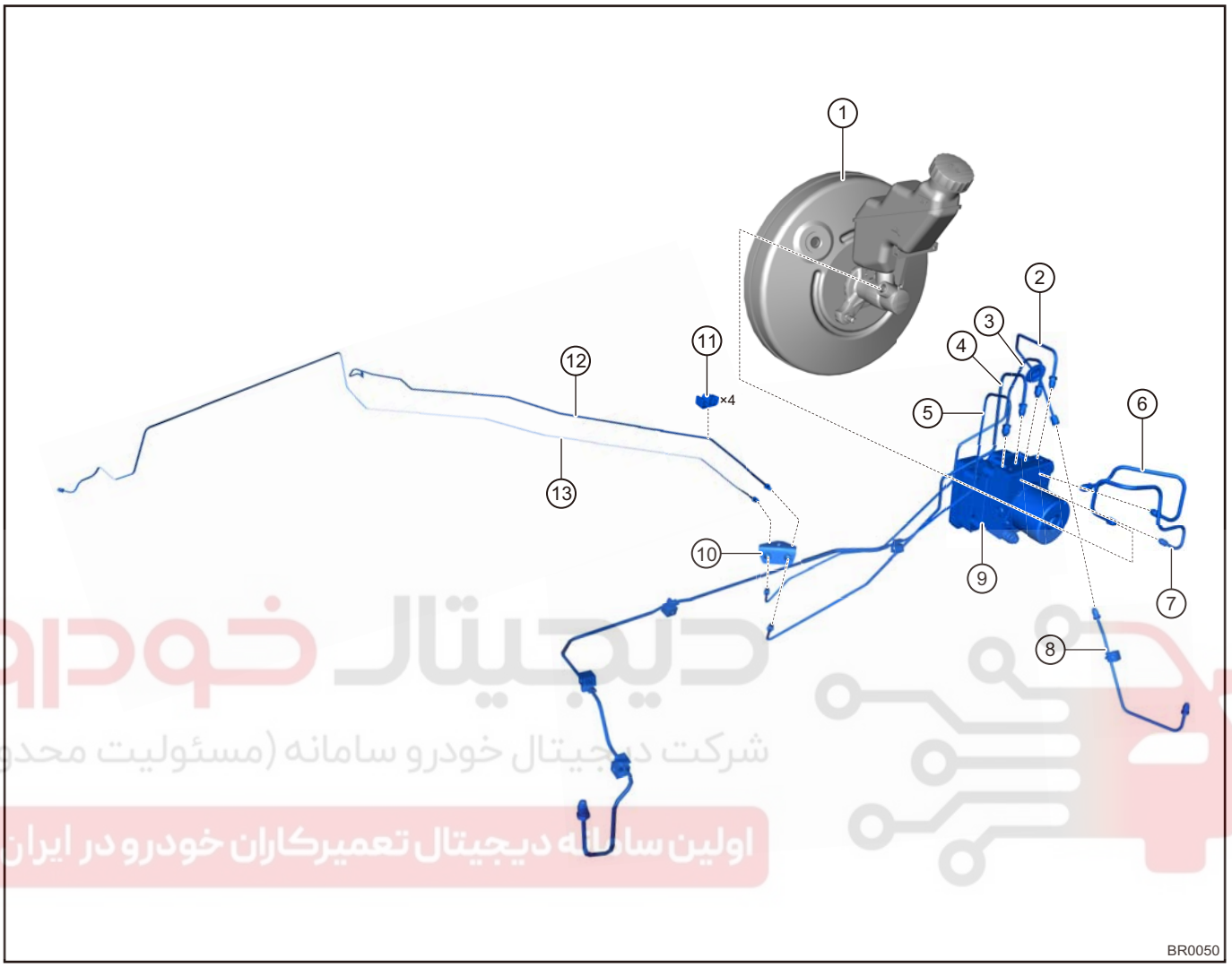
Main guide pin is installed on the side close to bleeder plug, and sub guide pin is installed on the side far away from bleeder plug. Incorrect installation method will lead to abnormal sound on bumpy road.

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 it's 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.

Hydraulic Brake

Hydraulic Brake



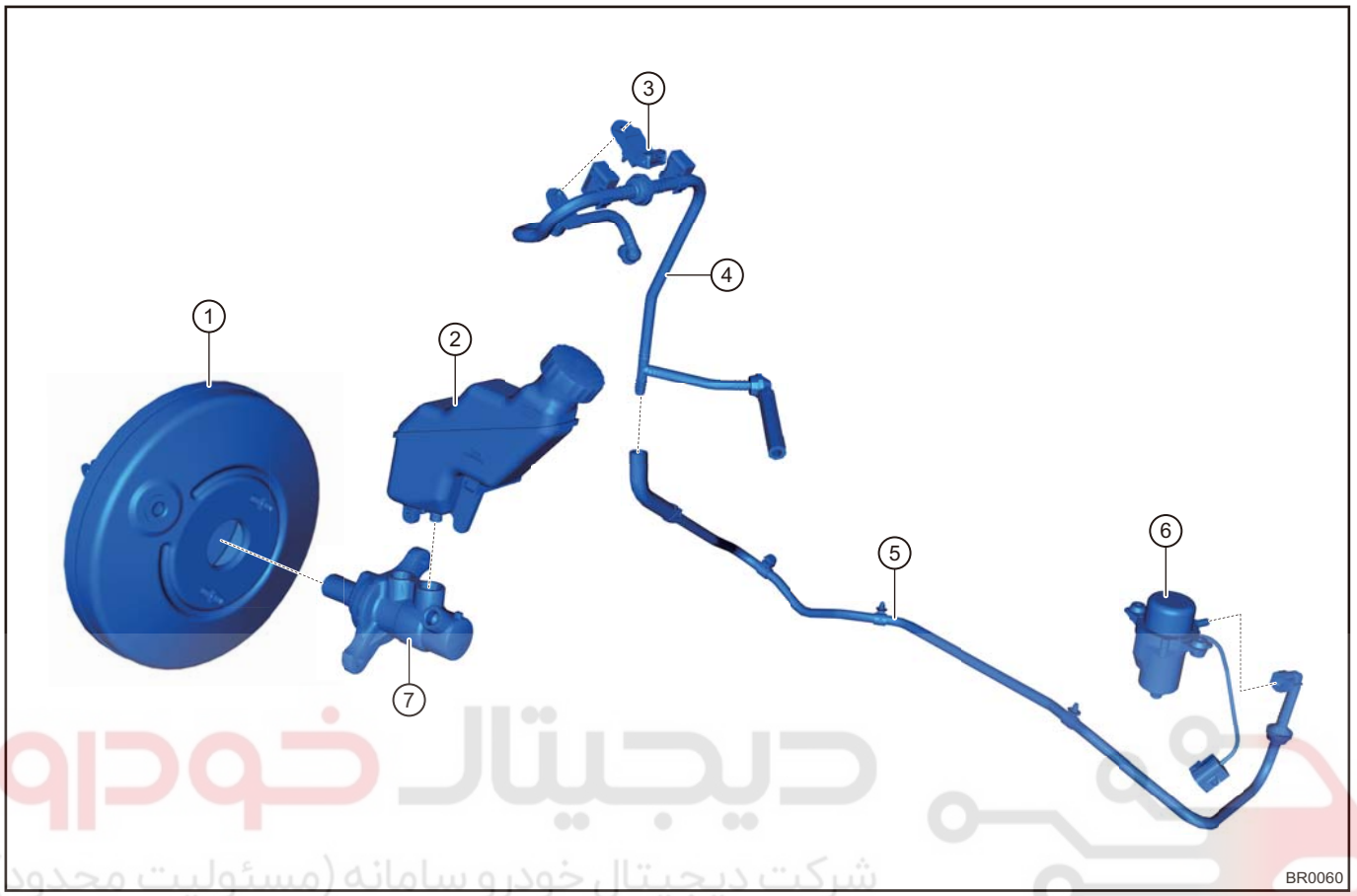
1	Vacuum Booster with Brake Master Cylinder Assembly	8	Front Left Brake Pipe II Assembly
2	Front Left Brake Pipe I Assembly	9	EPB Module Assembly
3	Rear Right Brake Pipe I Assembly	10	Two-way
4	Rear Left Brake Pipe I Assembly	11	Pipe Clamp with 2 Grooves
5	Front Right Brake Pipe Assembly	12	Rear Left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

Hydraulic brake adopts hydraulic transmission device, mainly composed of EPB 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



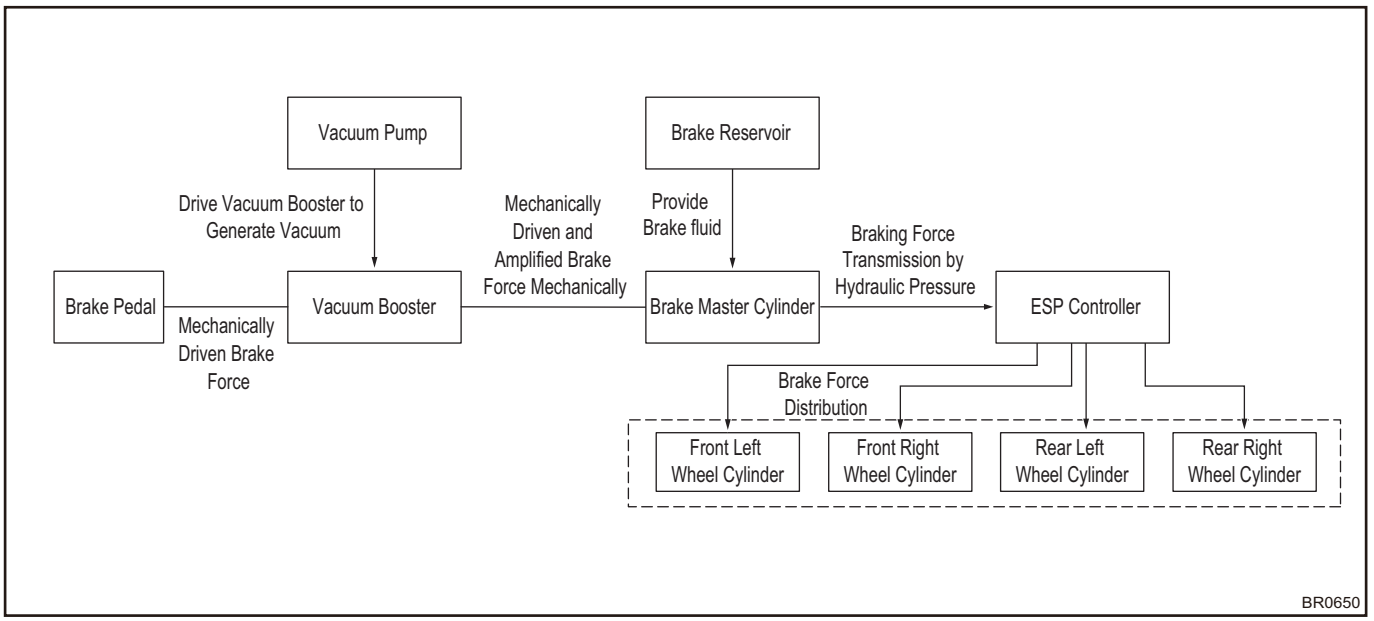
1	Vacuum Booster Assembly	5	Vacuum Pump Connecting Pipe Assembly
2	Brake Reservoir Assembly	6	Vacuum Pump Assembly
3	Atmospheric Pressure Sensor Assembly	7	Brake Master Cylinder Assembly
4	Vacuum Tube Assembly		

Vacuum booster system is mainly composed of vacuum booster assembly, brake master cylinder assembly, brake 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.

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.

Components Operation Description

Brake Fluid Level Sensor

Main Function

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

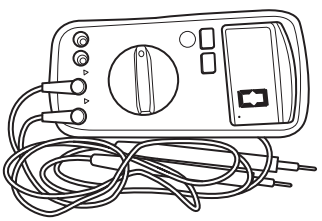
When brake fluid level is on "MAX (maximum)" mark on brake reservoir, the float in brake reservoir rises.

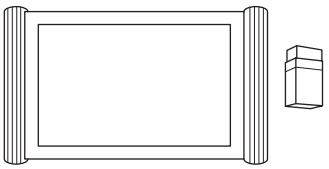
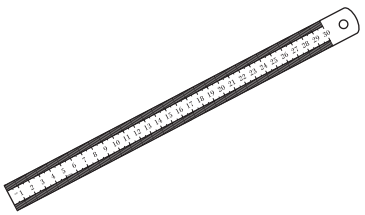
When brake fluid level is on "MIN (minimum)" mark on brake reservoir, the float in brake reservoir falls.

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

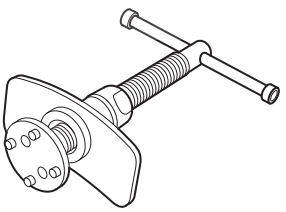
Special Tools and Equipment

General Tools

Tool Name	Tool Drawing
Digital Multimeter	 RCH0002006

Tool Name	Tool Drawing
Diagnostic Tester	 RCH0001006
Caliper	 RCH0063006
Thickness Measurement Caliper	 RCH0019006

Special Tool

Tool Name	Tool Drawing
Brake Cylinder Release Tool	 RCH0053006

Tightening Torque List

Torque Specifications

Description	Tightening Torque
2 Front Brake Disc Fixing Screws	7 - 9 N·m
2 Coupling Bolts Between Front Left Brake Caliper Assembly and Front Left Steering Knuckle	81 - 93 N·m
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	18 ± 2 N·m
1 Guide Pin Tightening Bolt Between Front Left Brake Caliper Body Assembly and Front Brake Caliper Bracket	30 - 35 N·m
2 Mounting Bolts Between Electronic Control Execution Unit and Rear Left Brake Caliper Assembly	7.5 - 8.5 N·m

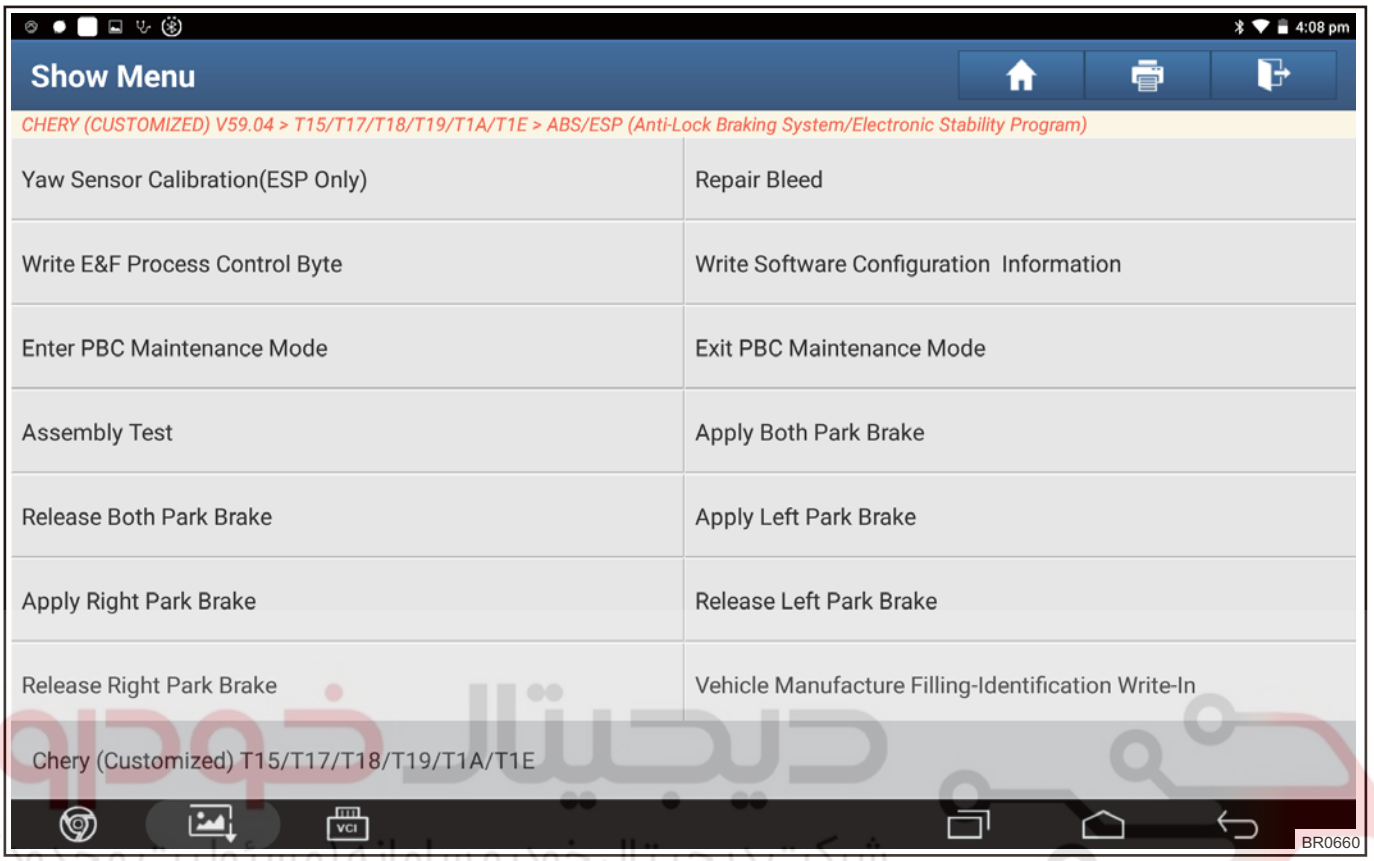
Description	Tightening Torque
2 Rear Brake Disc Fixing Screws	7 - 9 N·m
2 Brake Caliper Mounting Bolts Between Rear Left Brake Caliper Assembly and Rear Left Steering Knuckle	81 - 93 N·m
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2 N·m
2 Guide Pin Tightening Bolts Between Rear Left Brake Caliper Body Assembly and Rear Brake Caliper Bracket	30 - 35 N·m
1 Fixing Nut Between Brake Pedal Assembly and Vehicle Body	23 ± 2 N·m
4 Fixing Nuts Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2 N·m
Fixing Screw Between Brake Reservoir Assembly and Brake Master Cylinder Assembly	2 - 5 N·m
Fixing Nut Between Brake Master Cylinder Assembly and Vacuum Booster Assembly	25 ± 4 N·m
Fixing Nut Between Master Cylinder Rear Chamber Pipe Assembly and Brake Master Cylinder Assembly	18 ± 2 N·m
Fixing Nut Between Master Cylinder Front Chamber Pipe Assembly and Brake Master Cylinder Assembly	18 ± 2 N·m
2 Vacuum Pump Assembly Fixing Bolts	9 ± 1.5 N·m
Coupling Bolt Between Front Left Brake Hose Assembly and Front Left Brake Caliper Assembly	18 ± 2 N·m
Coupling Nut Between Front Left Brake Hose Assembly and Front Left Brake Pipe II Assembly	18 ± 2 N·m
Coupling Bolt Between Rear Left Brake Hose Assembly and Rear Left Brake Caliper Assembly	27 ± 2 N·m
Coupling Nut Between Rear Left Brake Hose Assembly and Rear Left Brake Pipe II Assembly	18 ± 2 N·m
Coupling Nut Between Front Right Brake Pipe Assembly and EPB Module Assembly	18 ± 2 N·m
Coupling Nut Between Front Right Brake Pipe Assembly and Front Right Brake Hose Assembly	18 ± 2 N·m
Coupling Nut Between Rear Right Brake Pipe I Assembly and EPB Module Assembly	18 ± 2 N·m
Coupling Nut Between Rear Right Brake Pipe I Assembly and Two-way	18 ± 2 N·m
Coupling Nut Between Rear Right Brake Pipe II Assembly and Two-way	18 ± 2 N·m
Coupling Nut Between Rear Right Brake Pipe II Assembly and Rear Right Brake Hose Assembly	18 ± 2 N·m
Coupling Nut Between Front Left Brake Pipe I Assembly and EPB Module Assembly	18 ± 2 N·m
Coupling Nut Between Front Left Brake Pipe I Assembly and Front Left Brake Pipe II	18 ± 2 N·m
Coupling Nut Between Front Left Brake Pipe II Assembly and Front Left Brake Hose Assembly	18 ± 2 N·m
Coupling Nut Between Rear Left Brake Pipe I Assembly and EPB Module Assembly	18 ± 2 N·m
Coupling Nut Between Rear Left Brake Pipe I Assembly and Two-way	18 ± 2 N·m
Coupling Nut Between Rear Left Brake Pipe II Assembly and Two-way	18 ± 2 N·m
Coupling Nut Between Rear Left Brake Pipe II Assembly and Rear Left Brake Hose Assembly	18 ± 2 N·m

Diagnosis Information and Procedures

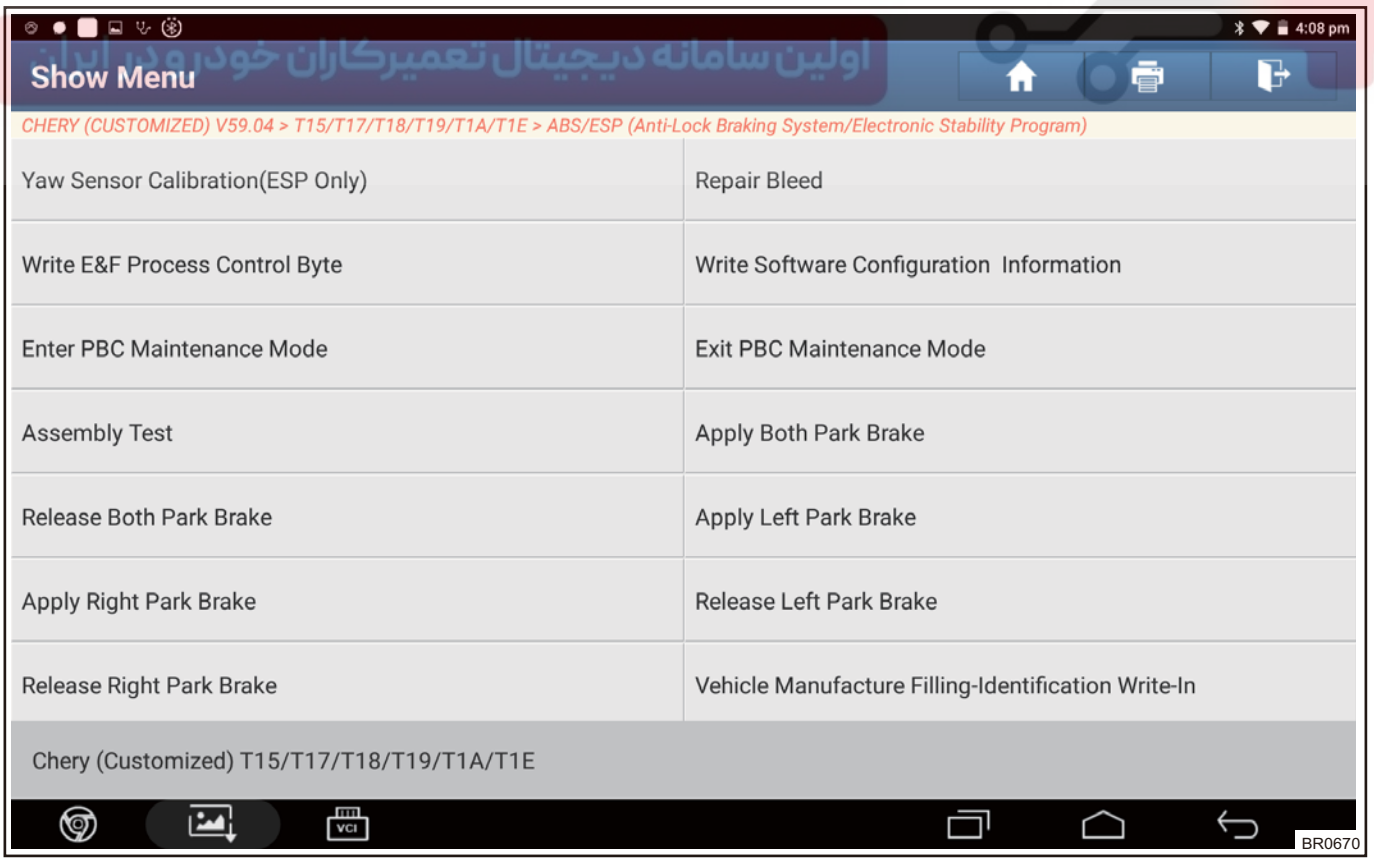
Special Function

1. Click "ABS/ESP (Anti-lock Braking System/Electronic Stability Program)".
2. Click "Special Function".

3. Click "Enter PBC Maintenance Mode", it is necessary to enter maintenance mode before replacing lining.



4. Click "Exit PBC Maintenance Mode", it is necessary to exit maintenance mode after replacing lining.



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.

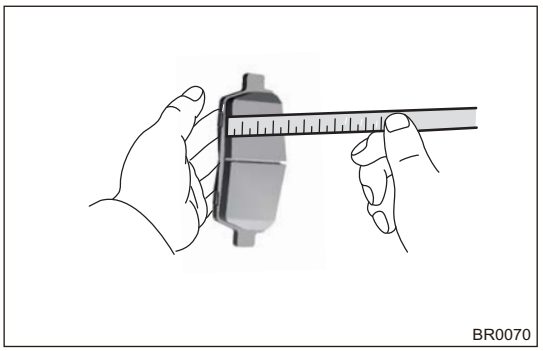
Brake System:

Symptom	Possible Cause
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
Abnormal noise occurs during braking	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)
Poor braking effect	Brake fluid is deteriorated
	Air in brake system
	Uneven brake disc wear
	Brake master cylinder assembly failure
	Vacuum booster assembly failure
	Uneven lining assembly wear
	Minimum brake pedal free play
	Brake system leakage (fluid or pressure)

Inspection and Adjustment

Lining

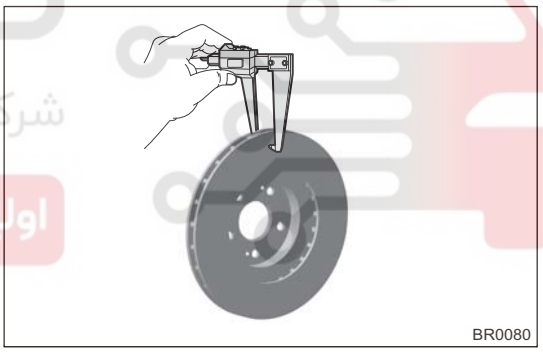
1. Visually check lining assembly for flatness, and also check for excessive wear. If the condition of lining assembly cannot be confirmed only by visual inspection, perform physical inspection as necessary.
2. If it is less than the minimum thickness due to wear, replace lining assembly.
   Minimum thickness: 2 mm


BR0070

3. When replacing lining assembly, it is necessary to replace outer/inner lining assembly as well as lining on the other side of vehicle to maintain proper braking performance.
4. If it is unnecessary to replace lining assembly, be sure to reinstall brake linings to original positions.

Brake Disc

1. Visually check brake disc for flatness, and also check for excessive wear. If the condition of front brake disc cannot be confirmed only by visual inspection, perform physical inspection as necessary.
2. If it is less than the minimum thickness due to wear, replace front brake disc.
   Minimum thickness of front brake disc: 23 mm
   Minimum thickness of rear brake disc: 8 mm
   Caution:
   DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.


BR0080

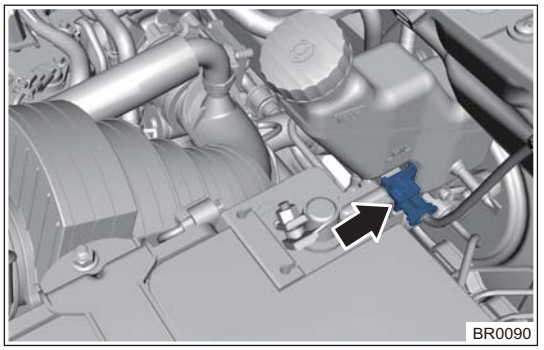
3. Slight scratch on the surface of brake disc is a normal phenomenon. If crack, severe scratch, deformation and burned spots are found, the brake disc must be replaced.
4. Abnormal wear of brake disc may cause poor contact between new lining assembly and surface of front brake disc, which may cause abnormal wear of lining assembly.

Brake Caliper Bracket and Guide Pin Set

1. Check if spring plate is deformed, cracked, rusted or elasticity is not enough (lining assembly cannot be clamped); clean the contact surface between brake caliper bracket and spring plate with brake cleaner.
2. Check if guide pin and guide pin dust boot are deformed, cracked and worn; Apply grease to guide pin and install guide pin dust boot to front brake caliper bracket, and push guide pin back and forth freely without sticking.

Brake Fluid Level Sensor

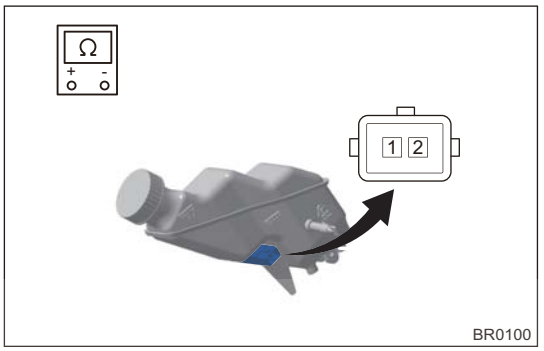
1. Disconnect the brake fluid level sensor connector.



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	⩽ 1 Ω

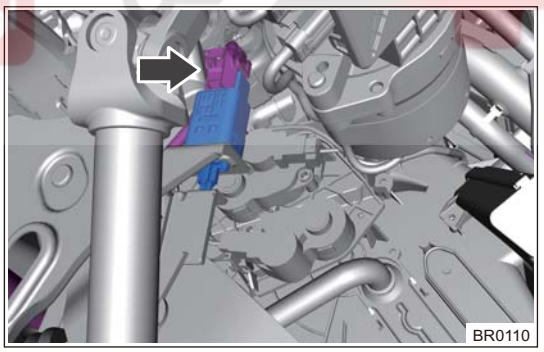
If measurement result is not as specified, replace brake reservoir assembly.



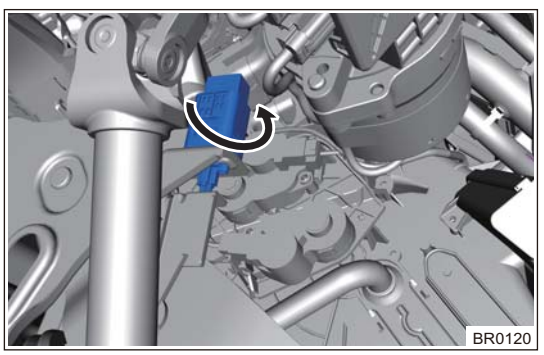
3. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid level sensor connector, if brake system malfunction indicator remains on. check wire harness and instrument cluster.
4. When brake system malfunction indicator on instrument cluster comes on, unplug brake fluid 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.



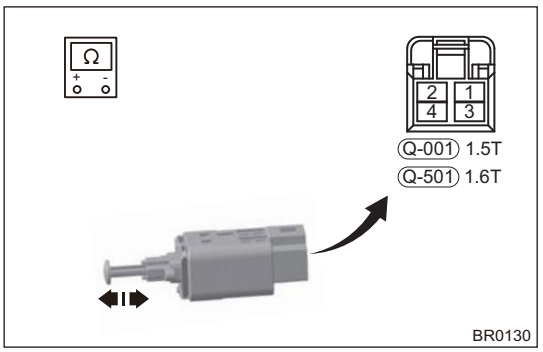
2. Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



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

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	Brake pedal depressed	⩽ 1 Ω
Terminal 2 - Terminal 4	Brake pedal depressed	∞
Terminal 1 - Terminal 3	Brake pedal released	∞
Terminal 2 - Terminal 4	Brake pedal released	⩽ 1 Ω

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



Brake Pedal Assembly

1. 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.
2. 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

1. 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.
2. 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.

Brake System Bleeding

Hint:

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

Caution:

- When bleeding brake system, wear safety glasses.
- DO NOT drain the brake fluid in brake master cylinder assembly while bleeding brake system.
- When bleeding brake system, brake fluid may spray out from drain plug due to high pressure.
- When bleeding brake system, do not depress brake pedal repeatedly at any time with drain plug opened. Otherwise, air amount in the system will increase to make an extra bleeding.

1. Remove cap from brake reservoir assembly and ensure that brake fluid level is between the "MIN (Minimum)" and "MAX (Maximum)" mark on brake reservoir.
2. Raise vehicle and remove drain plug cover.
3. Connect a clear plastic hose to drain plug and submerge the end of hose into container.
4. Have an assistant depress brake pedal 3 to 4 times repeatedly (depress to the lower position), and keep depressing brake pedal, then loosen drain plug.
5. Tighten drain plug every time 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 reservoir assembly.
7. Wait for 2 seconds between 2 brake pedal depressions in order to stabilize brake fluid.

8. 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 (a stream of fresh brake fluid flows into clear container without bubbles).
9. Install drain plug cover and lower the vehicle.
10. Check that brake fluid level is between the "MIN (Minimum)" and "MAX (Maximum)" mark on brake reservoir.
11. Check the brake pedal braking effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding for brake system again as necessary.
12. Test vehicle to confirm that brake system operate properly with good brake pedal feel.

Removal & Installation

Disc Brake Assembly (Take left side as an example)

Removal

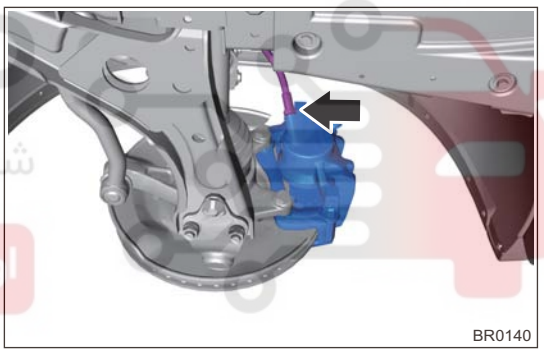
Hint:

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

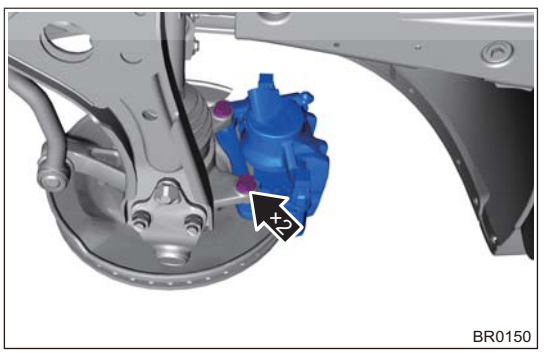
Caution:

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.

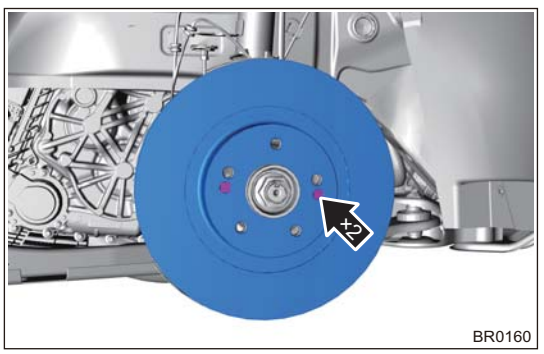
1. Remove the front left wheel.
2. Loosen coupling bolt between front left brake hose assembly and front left brake caliper assembly.
   Torque: 18 ± 2 N·m
   Caution:
   - After removing brake hose, perform sealing treatment to prevent foreign matter from entering.
   - DO NOT allow any foreign matter such as dirt and dust to enter brake hose from joint parts.


BR0140

3. Remove 2 coupling bolts between front left brake caliper assembly and front left steering knuckle.
   Torque: 81 - 93 N·m


BR0150

4. Remove the front left brake caliper assembly.
5. Remove 2 fixing screws from front brake disc.


BR0160

Torque: 7 - 9 N·m

6. Remove the front brake disc.

Installation

Installation is in the reverse order of removal.

Rear Left Brake Assembly (Take left side as an example)

Removal

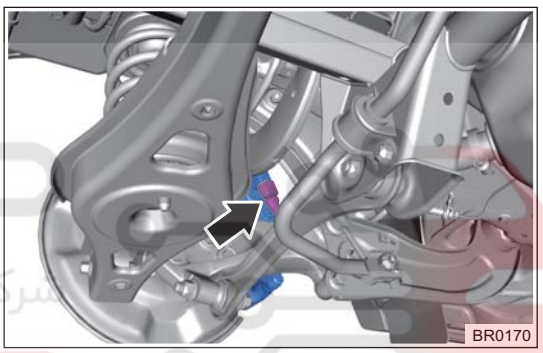
Hint:

- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.
- Before removing rear disc brake assembly, it is necessary to use diagnostic tester to perform "Enter PBC Maintenance Mode".

Caution:

After removing rear 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.

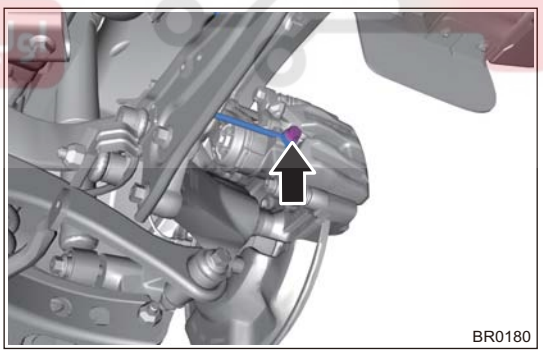
   Torque: 27 ± 2 N·m

   Hint:

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

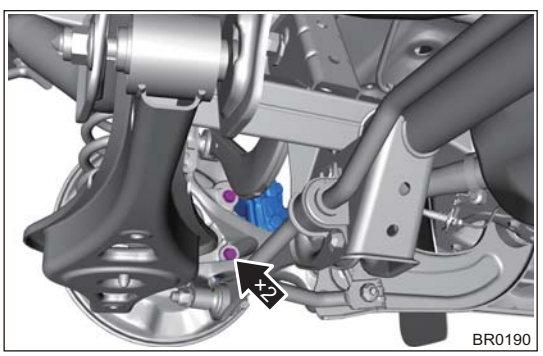
   Caution:

   - 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.



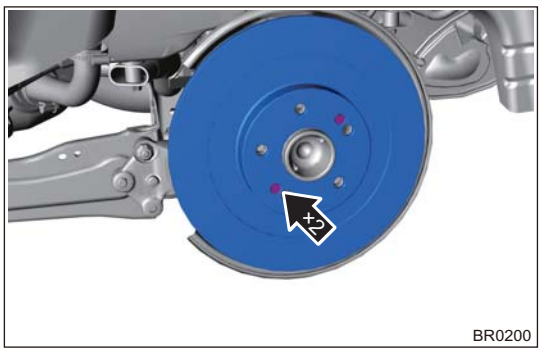
5. Remove 2 brake caliper mounting bolts between rear left brake caliper assembly and rear left steering knuckle.

   Torque: 81 - 93 N·m



6. Remove the rear left brake caliper assembly.

7. Remove 2 fixing screws from rear brake disc.
   Torque: 7 - 9 N·m


BR0200

8. Remove the rear brake disc.

Installation

Hint:

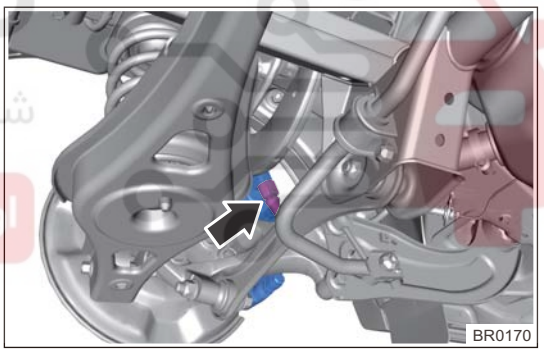
- Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.
- After installing rear disc brake assembly, it is necessary to use diagnostic tester to perform "Exit PBC Maintenance Mode".

Installation is in the reverse order of removal.

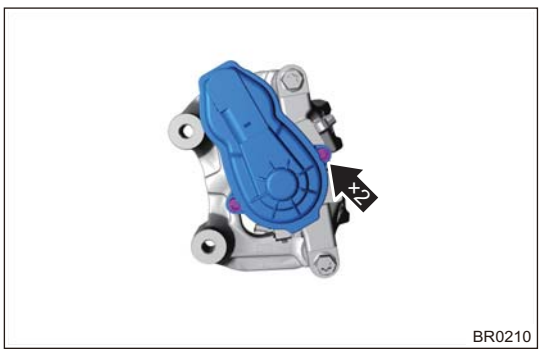
Electronic Control Execution Unit

Removal

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


BR0170

4. Remove 2 mounting bolts between electronic control execution unit and rear left brake caliper assembly.
   Torque: 7.5 - 8.5 N·m


BR0210

5. Remove the electronic control execution unit.
   Hint:
   Remove electronic control execution unit and be careful not to damage motor seal ring.

Installation

Installation is in the reverse order of removal.

Lining Assembly (Take left side as an example)

Removal

Hint:

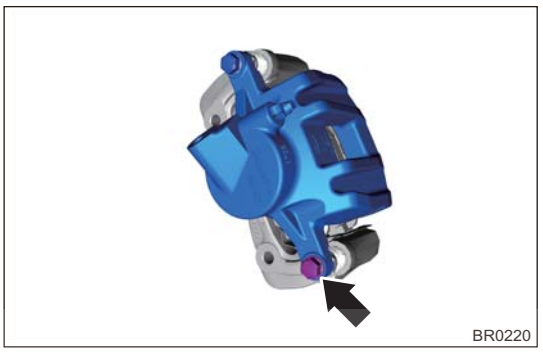
Before removing rear left brake caliper body assembly, it is necessary to use diagnostic tester to perform "Enter PBC Maintenance Mode".

Caution:

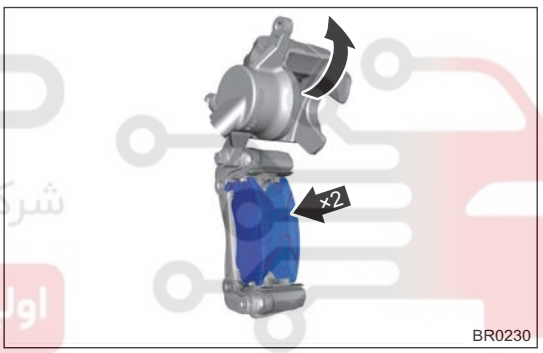
After removing rear brake caliper assembly, it is strictly forbidden to depress brake pedal, otherwise the brake caliper piston will rush out of cylinder hole and the brake fluid will come out and pollute brake disc and other parts.

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

   Torque: 30 - 35 N·m

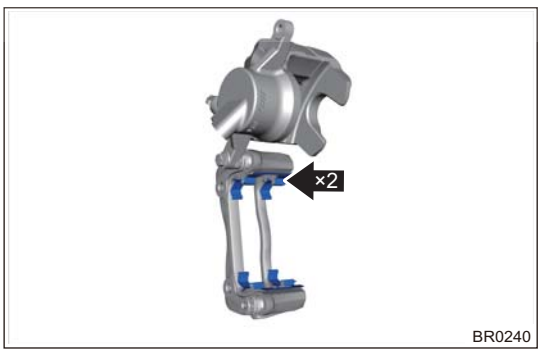

BR0220

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



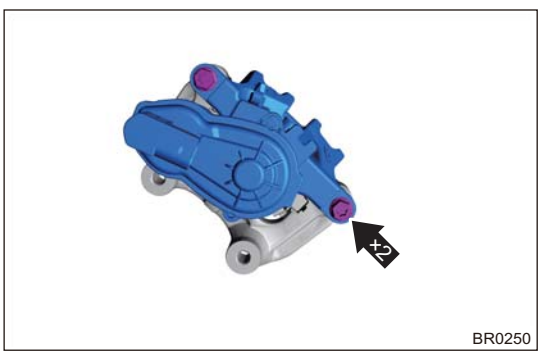
BR0230

4. Remove the front outer/inner lining assembly.
5. Remove 2 front spring plates.



BR0240

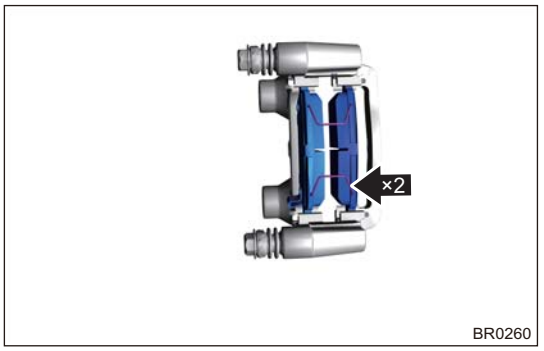
6. Remove the rear left wheel.
7. Remove 2 guide pin tightening bolts between rear left brake caliper body assembly and rear brake caliper bracket.



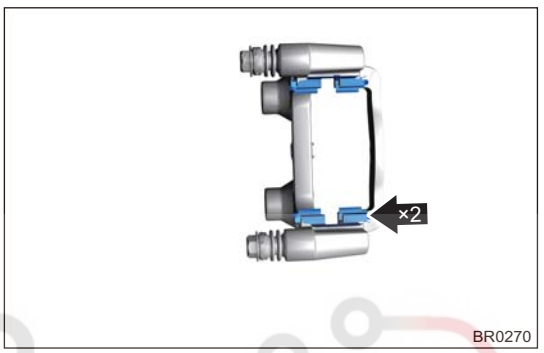
BR0250

Torque: 30 - 35 N·m

8. Remove the rear left brake caliper body assembly.
9. Remove 2 lining return springs.



10. Remove rear outer/inner lining assembly.
11. Remove 2 rear spring plates.



Installation

Hint:

- After installing rear left brake caliper body assembly, it is necessary to use diagnostic tester to perform "Exit PBC Maintenance Mode".

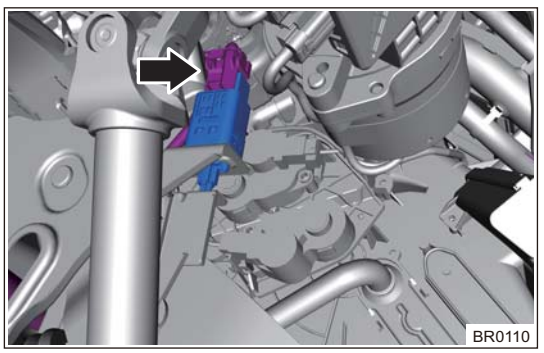
Caution:

- 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.
- 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.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner and outer linings in reverse.

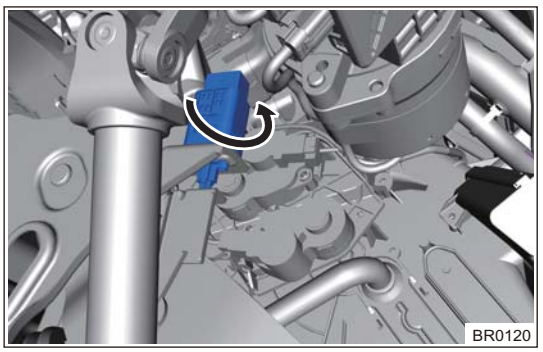
Brake Pedal Assembly

Removal

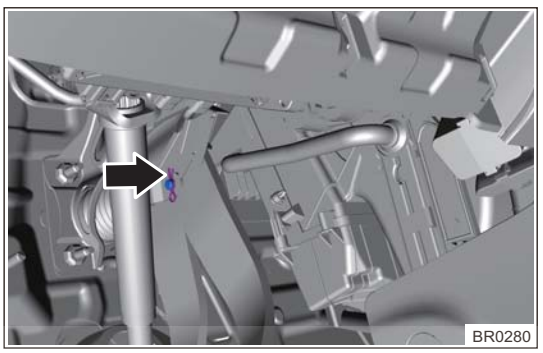
1. Remove the instrument panel lower left protector assembly.
2. Remove the electronic accelerator pedal assembly.
3. Disconnect the brake light switch assembly connector.



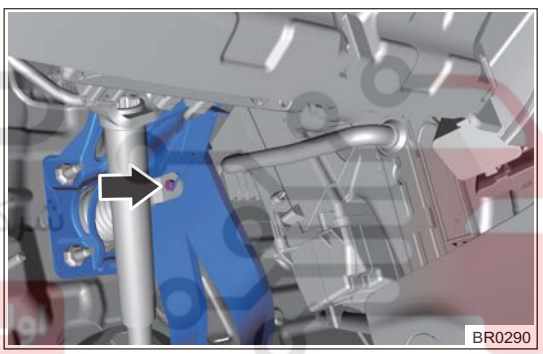
4. Press switch with hand and turn it by 90° counterclockwise to remove brake switch assembly.



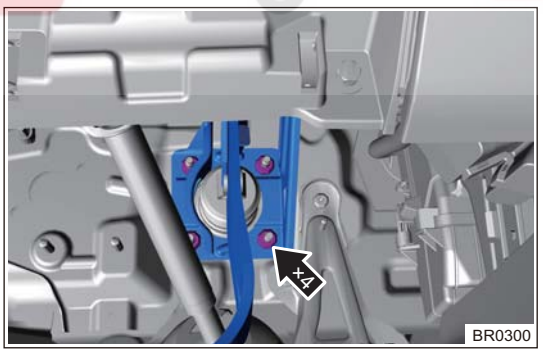
5. Remove lock pin between vacuum booster assembly and brake pedal.



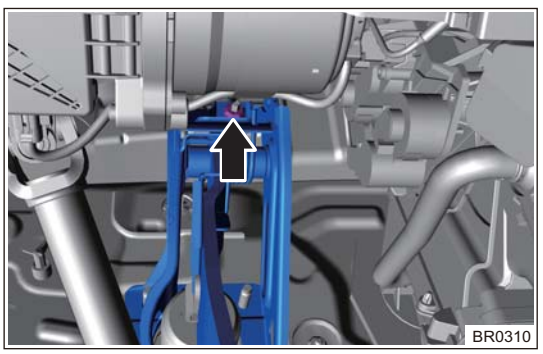
6. Remove lock shaft between vacuum booster assembly and brake pedal.



7. Remove 4 fixing nuts between vacuum booster assembly and brake pedal assembly.
Torque: 23 ± 2 N·m



8. Remove 1 fixing nut between brake pedal assembly and vehicle body.
Torque: 23 ± 2 N·m



9. Remove the brake pedal assembly.

Installation

Installation is in the reverse order of removal.

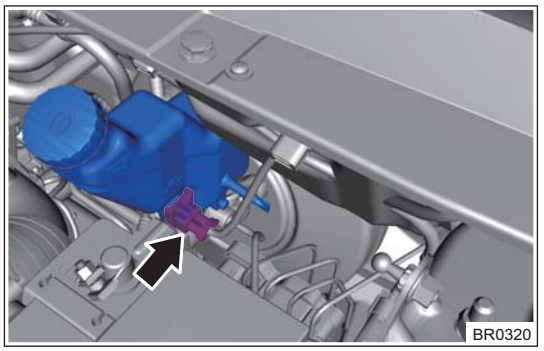
Brake Reservoir Assembly

Removal

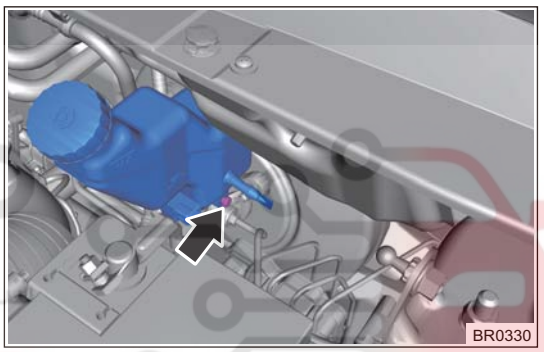
Hint:

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

1. Disconnect the brake fluid level sensor connector.



2. Remove fixing screw between brake reservoir assembly and brake master cylinder assembly.
   Torque: 2 - 5 N·m



3. Remove the brake reservoir assembly.

Installation

Installation is in the reverse order of removal.

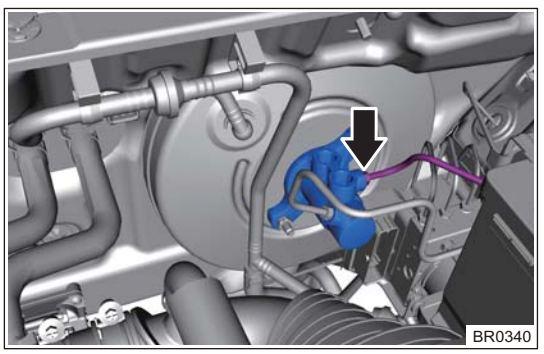
Brake Master Cylinder Assembly

Removal

Hint:

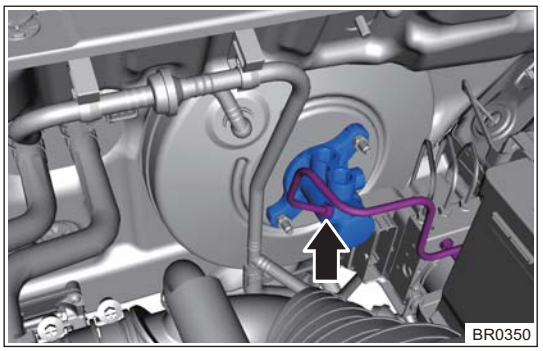
Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

1. Remove the brake reservoir assembly.
2. Loosen fixing nut between master cylinder front chamber pipe assembly and brake master cylinder assembly.

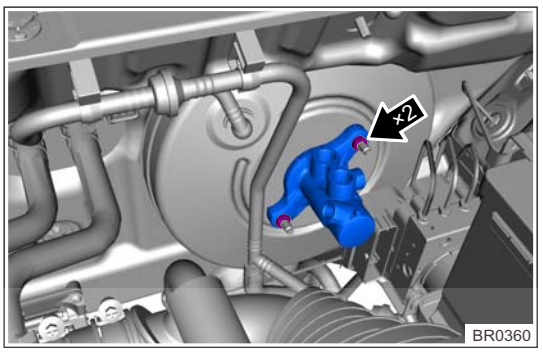


Torque: 18 ± 2 N·m

3. Loosen fixing nut between master cylinder rear chamber pipe assembly and brake master cylinder assembly.
   Torque: 18 ± 2 N·m



4. Remove 2 fixing bolts between brake master cylinder assembly and vacuum booster assembly.
   Torque: 25 ± 4 N·m



5. Remove the brake master cylinder assembly.

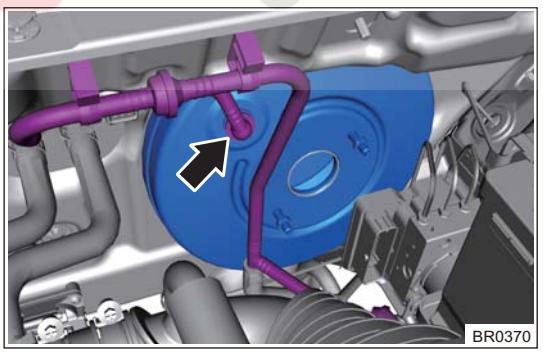
Installation

Installation is in the reverse order of removal.

Vacuum Booster Assembly

Removal

1. Remove the brake reservoir assembly.
2. Remove the brake master cylinder assembly.
3. Remove the brake pedal assembly.
4. Disconnect connection between vacuum tube assembly and vacuum booster assembly.



5. Remove the vacuum booster assembly.

Installation

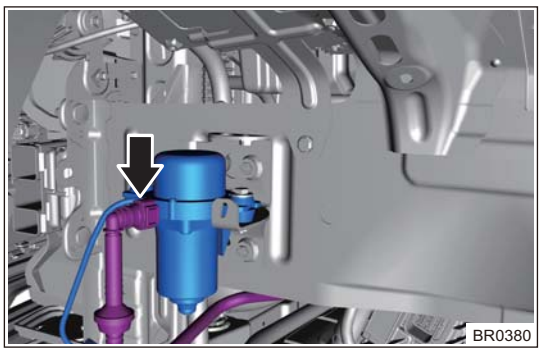
Installation is in the reverse order of removal.

Vacuum Pump Assembly

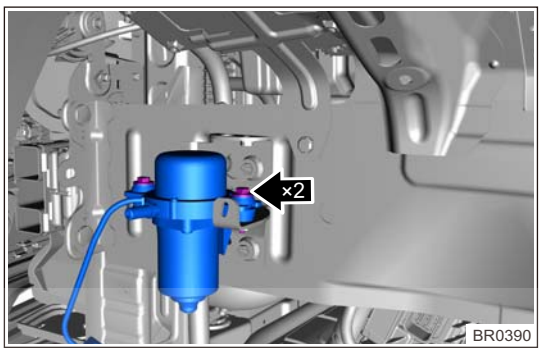
Removal

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.



5. Disconnect the vacuum pump assembly connector.
6. Remove 2 fixing bolts from vacuum pump assembly.
   Torque: 9 ± 1.5 N·m



7. Remove the vacuum pump assembly.

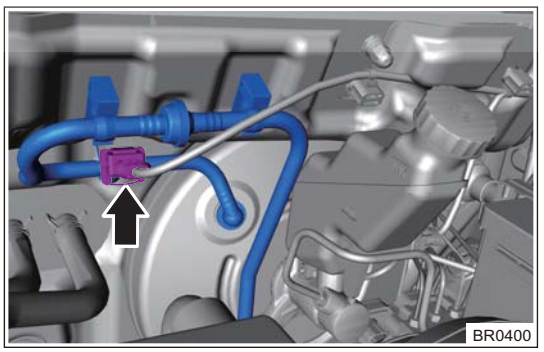
Installation

Installation is in the reverse order of removal.

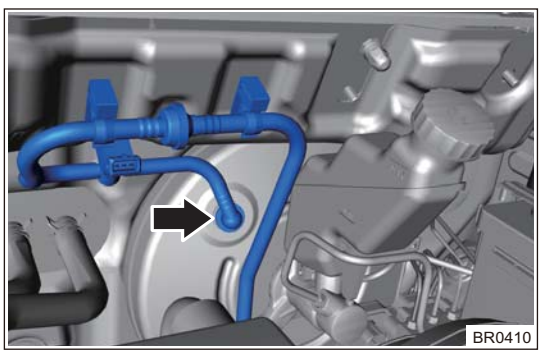
Vacuum Tube Assembly

Removal

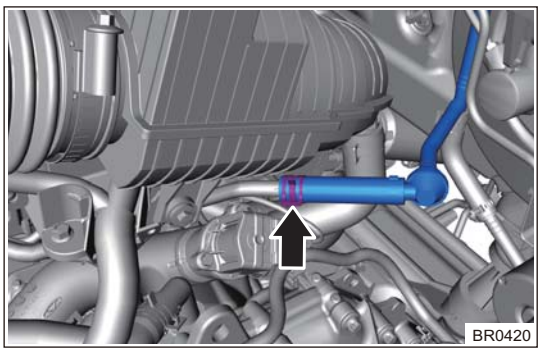
1. Remove the front left wheel.
2. Remove the front left wheel house protector.
3. Remove the air filter assembly.
4. Remove battery and tray.
5. Disconnect the atmospheric pressure sensor assembly connector.



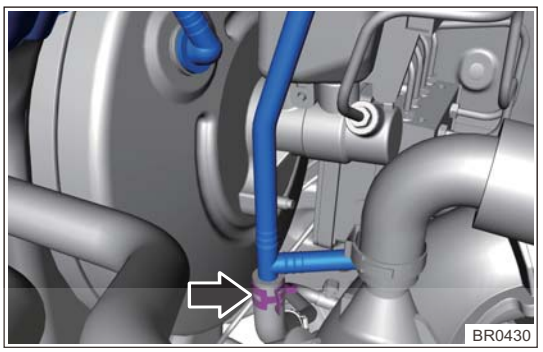
6. Disconnect connection between vacuum tube assembly and vacuum booster assembly.



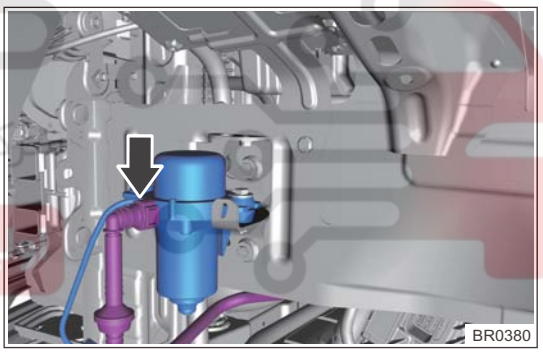
7. Loosen elastic hose clamp between vacuum tube assembly and metal vacuum tube.



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

Installation is in the reverse order of removal.

Brake Hose Assembly (Take left side as an example)

Removal

Hint:

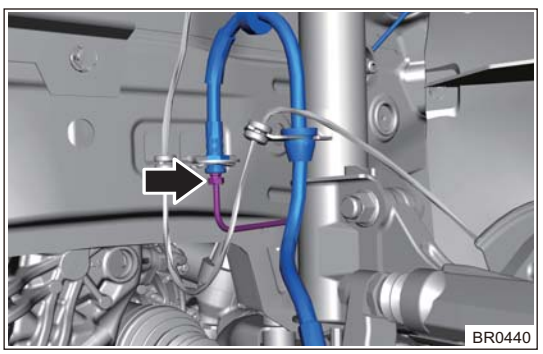
Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

1. Remove the front left wheel.
2. Loosen coupling nut between front left brake hose assembly and front left brake pipe II assembly.

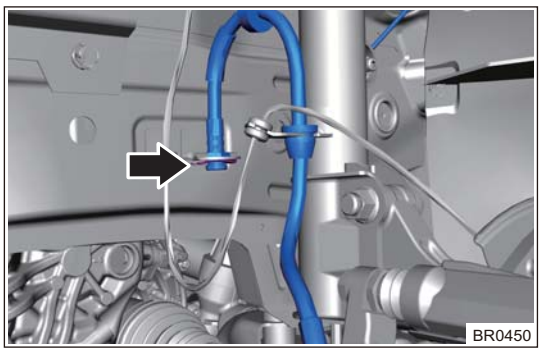
   Torque: 18 ± 2 N·m

   Caution:

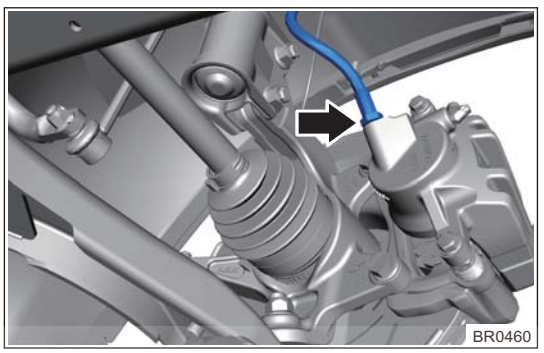
   - After removing brake line, perform sealing treatment to prevent foreign matter from entering.
   - DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.



3. Remove spring plate between front left brake hose assembly and front left brake pipe II assembly.

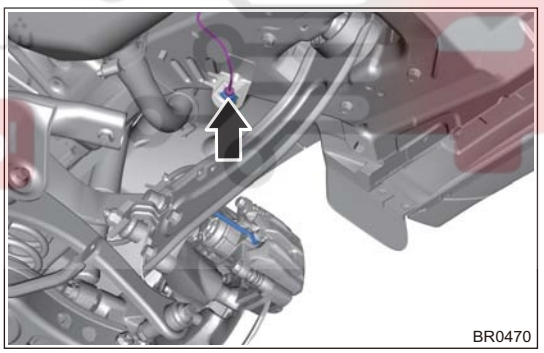


4. Loosen coupling bolt between front left brake hose assembly and front left brake caliper assembly.
Torque: 27 ± 2 N·m

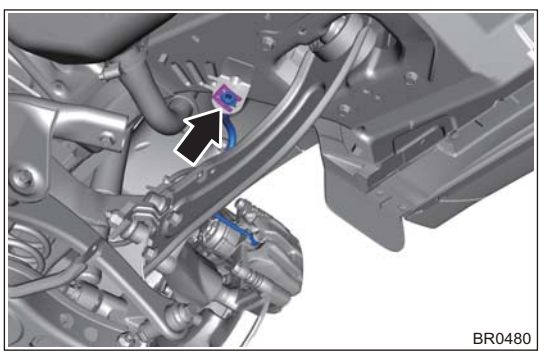


5. Remove the front left brake hose assembly.
Caution:
- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose assembly, as brake fluid is corrosive.

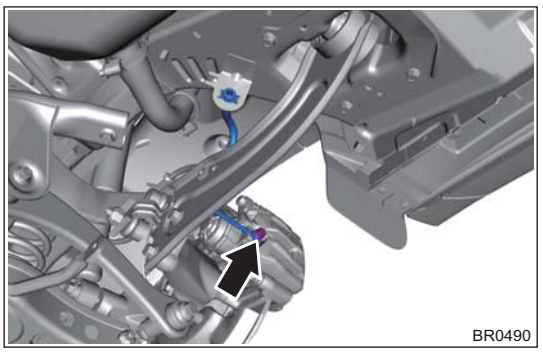
6. Remove the rear left wheel.
7. Loosen coupling nut between rear left brake hose assembly and rear left brake pipe II assembly.
Torque: 18 ± 2 N·m
Caution:
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.
- DO NOT allow any foreign matter such as dirt and dust to enter brake line from joint parts.



8. Remove spring plate between rear left brake hose assembly and front left brake pipe II assembly.



9. Remove coupling bolt between rear left brake hose assembly and rear left brake caliper assembly.
   Torque: 18 ± 2 N·m
   Hint:
   When removing coupling bolt, be careful not to drop 2 gaskets.


BR0490

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

Installation is in the reverse order of removal.

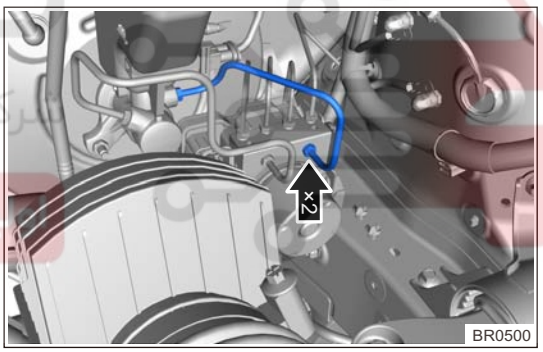
Brake Pipe Assembly

Removal

Hint:

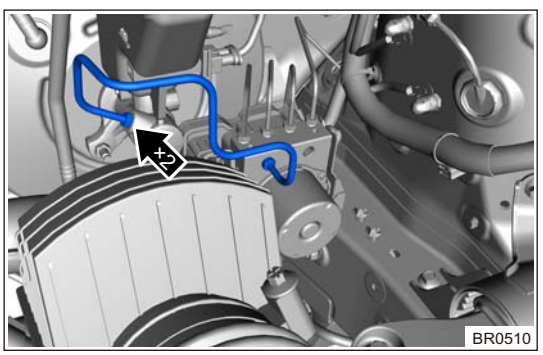
Be sure to perform brake system bleeding after removing/replacing hydraulic parts related to brake system.

1. Remove battery and tray.
2. Loosen coupling nuts between master cylinder front chamber pipe assembly and brake master cylinder assembly and EPB module assembly.
   Torque: 18 ± 2 N·m



BR0500

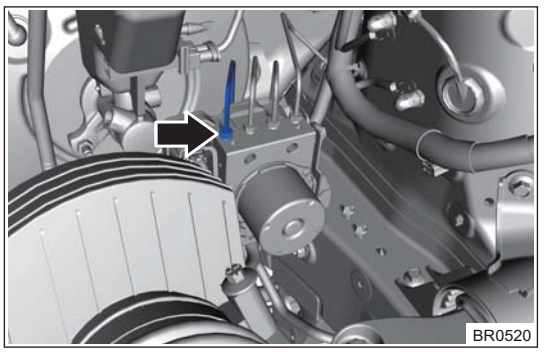
3. Loosen coupling nuts between master cylinder rear chamber pipe assembly and brake master cylinder assembly and EPB module assembly.
   Torque: 18 ± 2 N·m



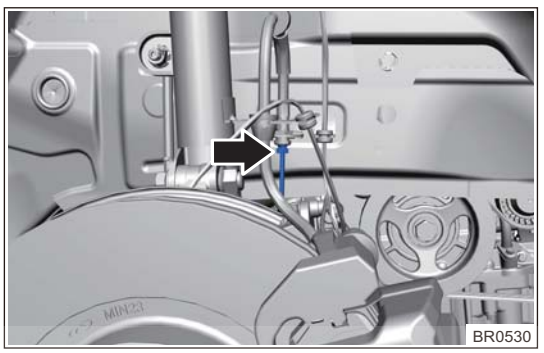
BR0510

4. Remove the front right wheel.

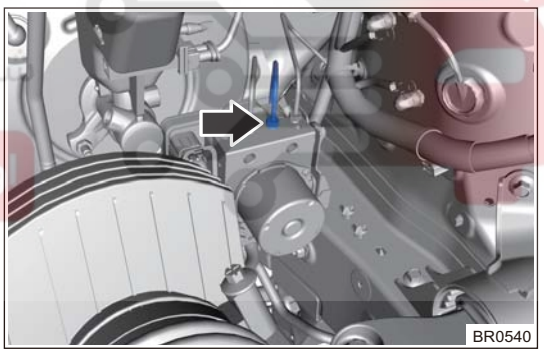
5. Loosen coupling nut between front right brake pipe assembly and EPB module assembly.
   Torque: 18 ± 2 N·m



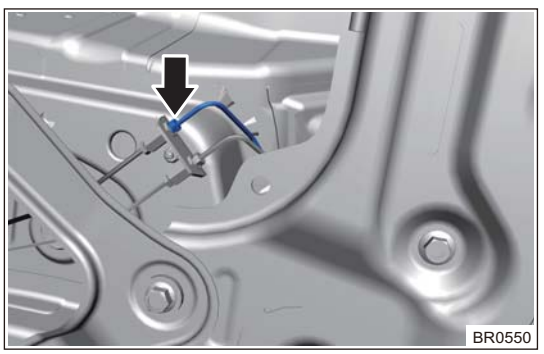
6. Loosen coupling nut between front right brake pipe assembly and front right brake hose assembly.
   Torque: 18 ± 2 N·m



7. Remove the front right brake pipe assembly.
8. Remove the rear right wheel.
9. Remove the fuel tank assembly.
10. Remove the left fuel tank spoiler.
11. Loosen coupling nut between rear right brake pipe I assembly and EPB module assembly.
    Torque: 18 ± 2 N·m

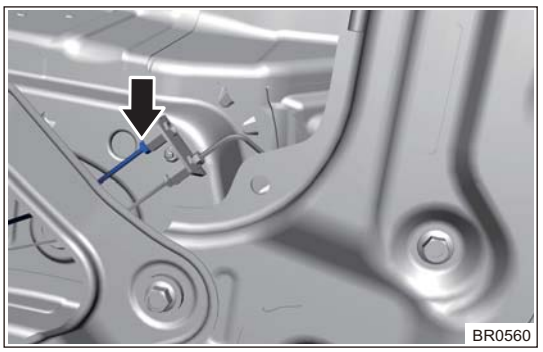


12. Loosen coupling nut between rear right brake pipe I assembly and two-way.
    Torque: 18 ± 2 N·m

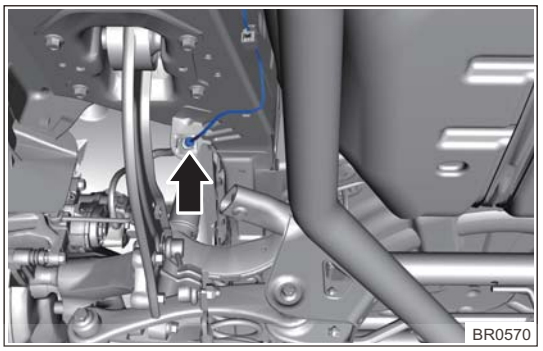


13. Remove the rear right brake pipe I assembly.

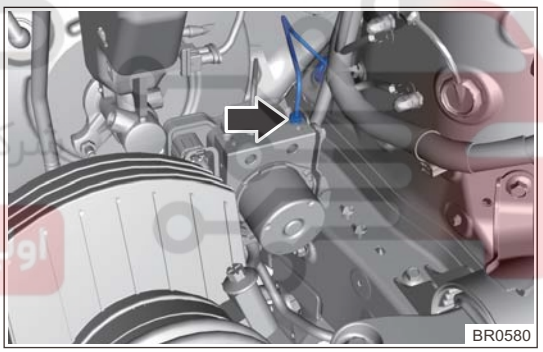
14. Loosen coupling nut between rear right brake pipe II assembly and two-way.
    Torque: 18 ± 2 N·m



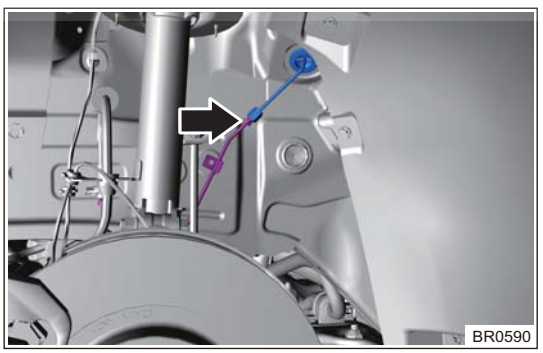
15. Loosen coupling nut between rear right brake pipe II assembly and rear right brake hose assembly.
    Torque: 18 ± 2 N·m



16. Remove the rear right brake pipe II assembly.
17. Remove the front left wheel.
18. Loosen coupling nut between front left brake pipe I assembly and EPB module assembly.
    Torque: 18 ± 2 N·m



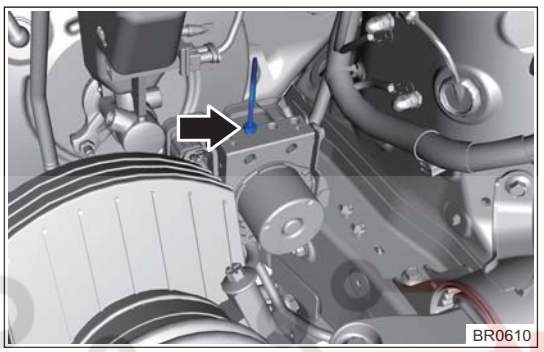
19. Loosen coupling nut between front left brake pipe I assembly and front left brake pipe II assembly.
    Torque: 18 ± 2 N·m



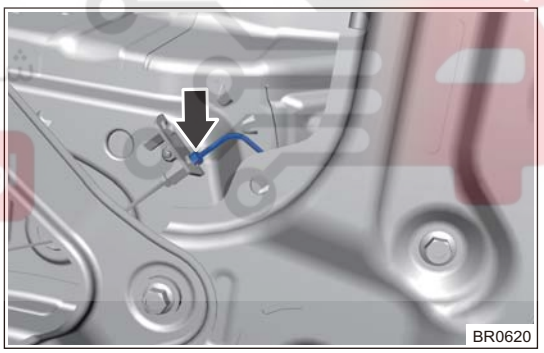
20. Remove the front left brake pipe I assembly.

21. Loosen coupling nut between front left brake pipe II assembly and front left brake hose assembly.
    Torque: 18 ± 2 N·m

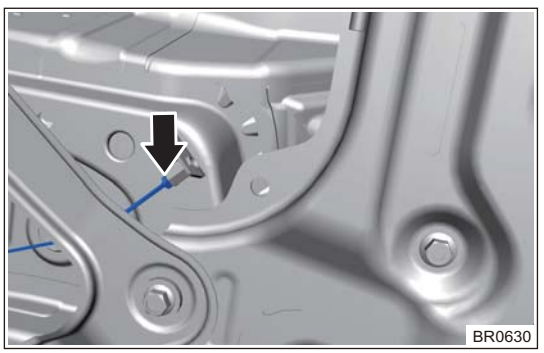
22. Remove the front left brake pipe II assembly.
23. Remove the rear left wheel.
24. Remove the fuel tank assembly.
25. Remove the left fuel tank spoiler.
26. Loosen coupling nut between rear left brake pipe I assembly and EPB module assembly.
    Torque: 18 ± 2 N·m



27. Loosen coupling nut between rear left brake pipe I assembly and two-way.
    Torque: 18 ± 2 N·m

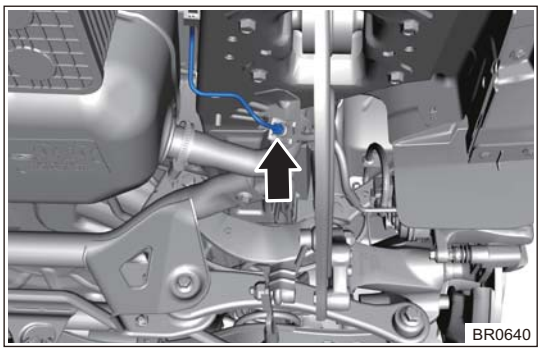


28. Remove the rear left brake pipe I assembly.
29. Loosen coupling nut between rear left brake pipe II assembly and two-way.



Torque: 18 ± 2 N·m

30. Loosen coupling nut between rear left brake pipe II assembly and rear left brake hose assembly.
    Torque: 18 ± 2 N·m



31. Remove the rear left brake pipe II assembly.

Installation

Installation is in the reverse order of removal.