

BRAKE CONTROL SYSTEM

GENERAL INFORMATION	25-3	C1004-04	25-64
Description	25-3	C0044-01	25-68
Operation	25-4	C0044-28	25-68
Specifications	25-9	C0069-54	25-73
Tools	25-10	C0069-09	25-73
Circuit Diagram	25-11	C0069-64	25-73
		C0069-86	25-73
DIAGNOSIS & TESTING	25-14	C0040-14	25-78
Problem Symptoms Table	25-14	U1300-55	25-82
Diagnosis Procedure	25-14	U0140-87	25-82
Problem Repair (No DTC)	25-16	U0101-87	25-82
DTC Confirmation Procedure	25-16	U0100-87	25-82
Intermittent DTC Troubleshooting	25-16	U0126-87	25-82
Ground Inspection	25-17	U0401-81	25-82
ESC Control Module Assembly	25-18	U0402-81	25-82
Diagnostic Trouble Code (DTC) Chart	25-19	U0428-81	25-82
C0031-14	25-21	U0422-81	25-82
C0031-03	25-21	U0073-00	25-82
C0034-14	25-26		
C0034-03	25-26	ON-VEHICLE SERVICE	25-89
C0037-14	25-31	ABS Bleeding	25-89
C0037-03	25-31	ABS/ESC Control Module Assembly	25-90
C003A-14	25-36	Removal	25-90
C003A-03	25-36	Installation	25-91
C0031-02	25-41	Front Wheel Speed Sensor (Take Front Left	
C0034-02	25-41	Wheel As An Example)	25-93
C0037-02	25-41	Removal	25-93
C003A-02	25-41	Inspection	25-94
C0051-54	25-45	Installation	25-94
C0051-28	25-45	Rear Wheel Speed Sensor (Take Rear Left	
C0089-04	25-49	Wheel As An Example)	25-95
C1000-16	25-52	Removal	25-95
C1000-17	25-52	Inspection	25-96
C1001-04	25-56	Installation	25-96
C0020-04	25-60	Steering Angle Sensor	25-97
C1003-04	25-64	Removal	25-97
		Installation	25-97

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

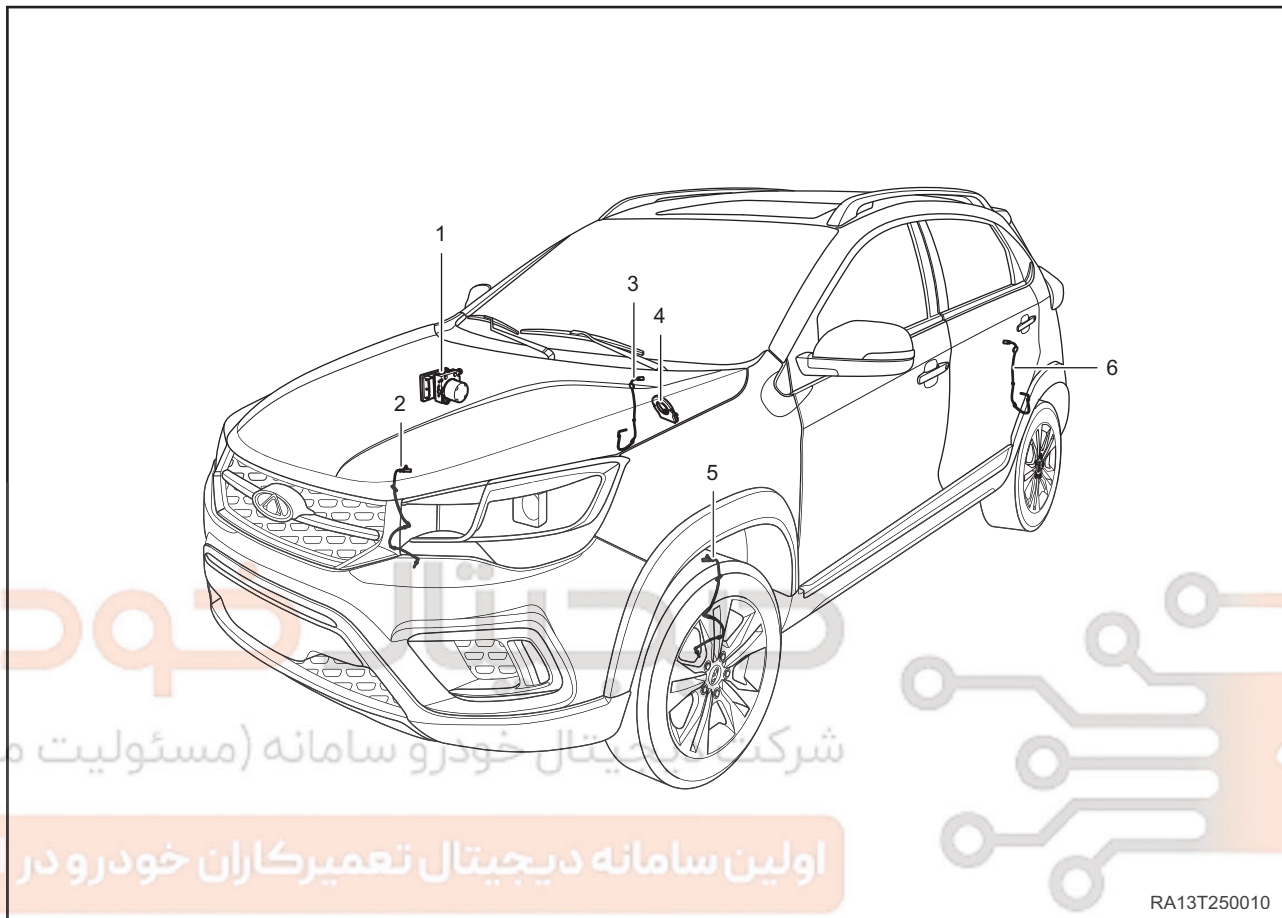


021 62 99 92 92

www.digitalkhodro.com

GENERAL INFORMATION

Description



RA13T250010

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

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

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

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

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

25 - BRAKE CONTROL SYSTEM

Operation

ABS Braking

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

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

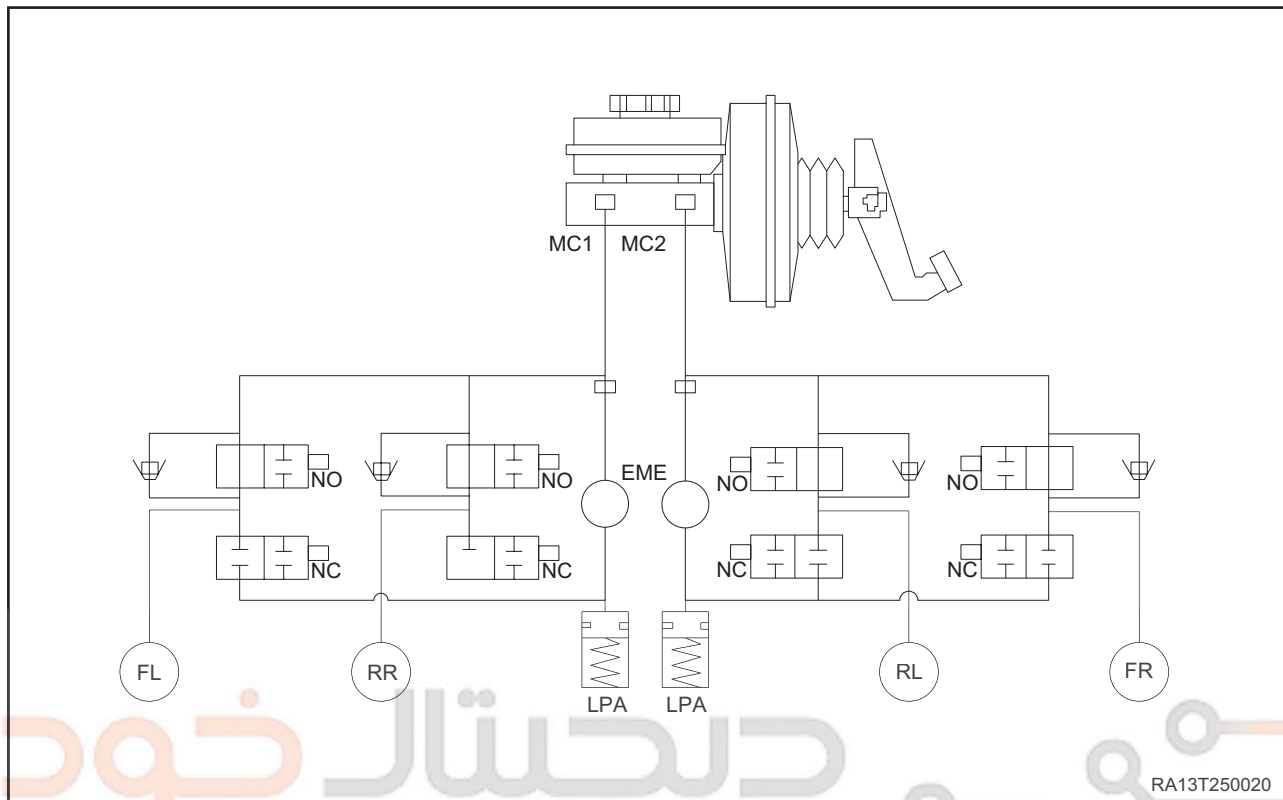
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

ABS Control Mode



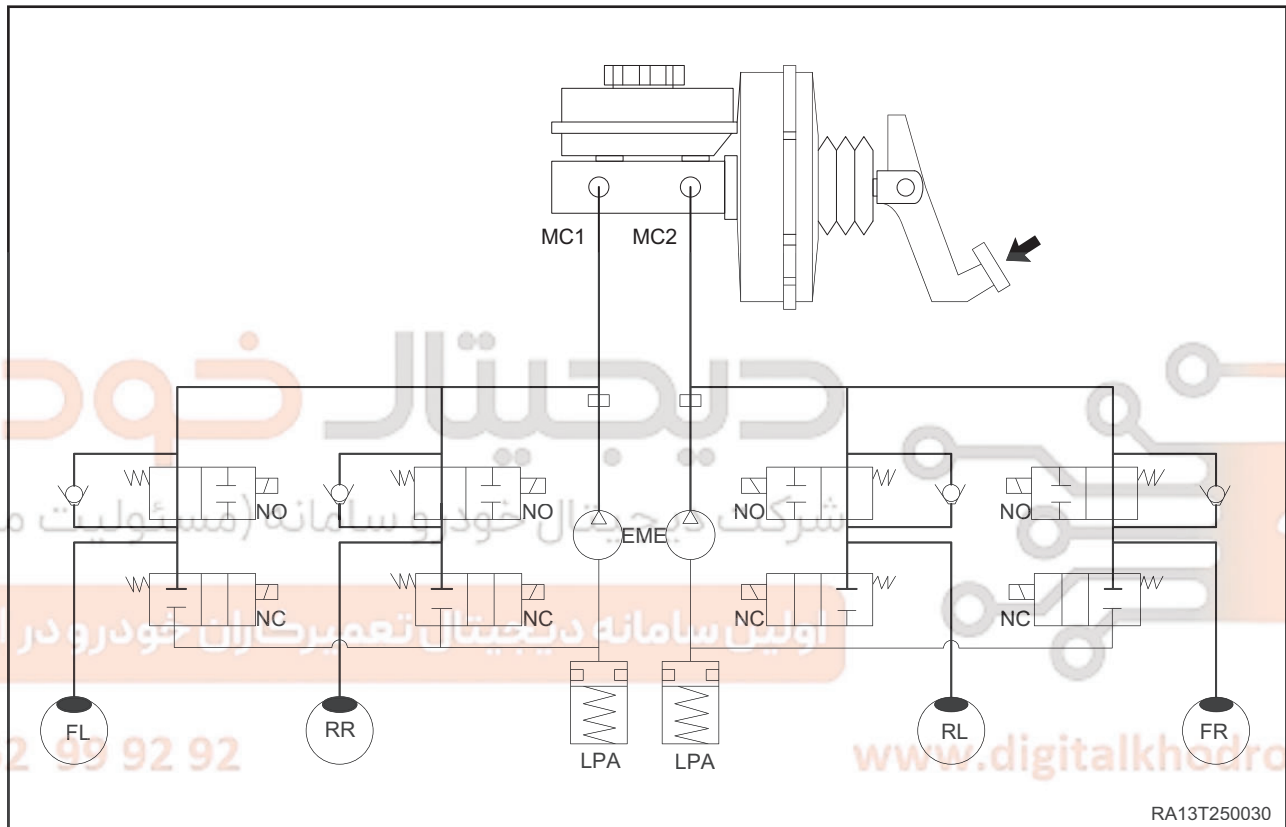
Description	Definition	Description	Definition
MC1	Master Cylinder Outlet 1	LPA	Low Pressure Accumulator
MC2	Master Cylinder Outlet 2	FL	Front Left Wheel
EME	Return Pump	RR	Rear Right Wheel
NO	Normal Open (Solenoid Valve)	RL	Rear Left Wheel
NC	Normal Close (Solenoid Valve)	FR	Front Right Wheel

25 - BRAKE CONTROL SYSTEM

1. Normal Brake Operating Condition

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

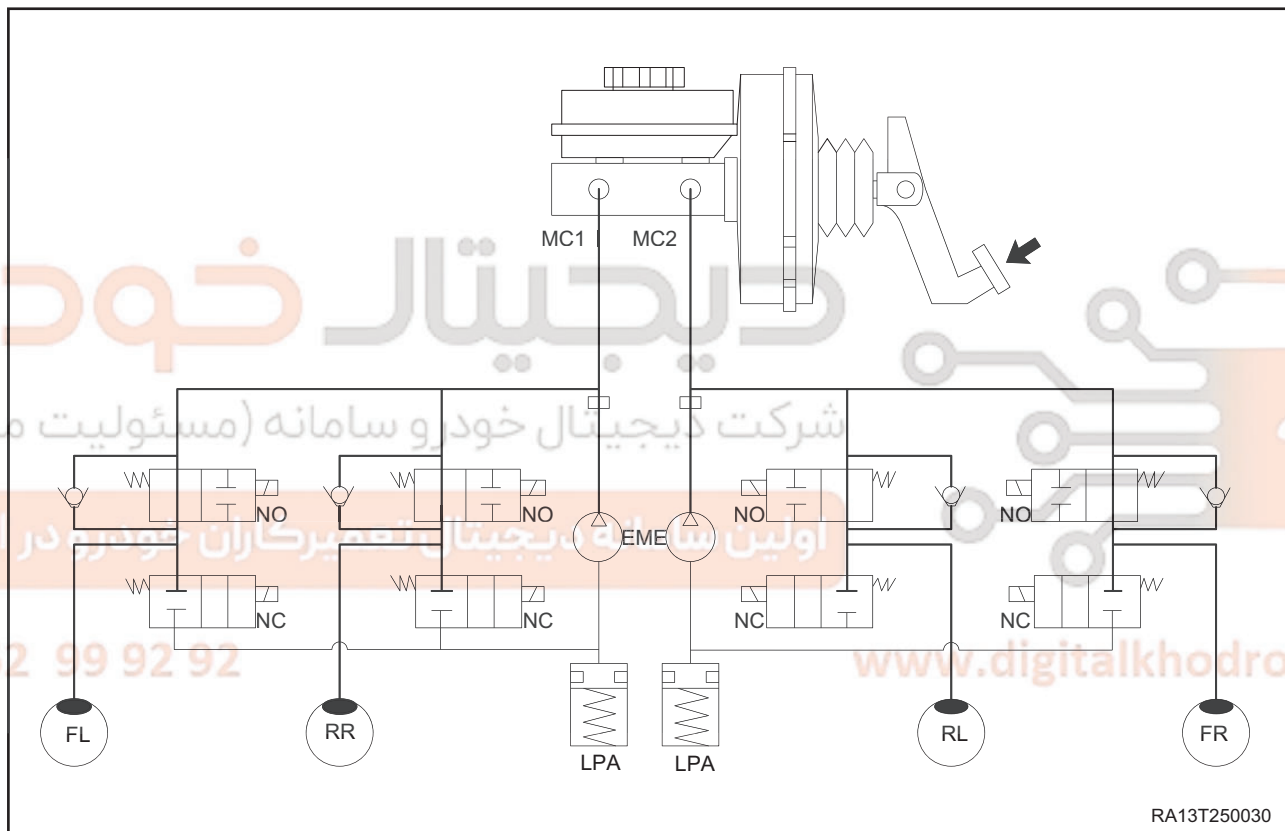
Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	OFF	OPEN
Normal Close Valve	OFF	CLOSE



2. ABS Operating (Relief) Condition

For vehicles equipped with ABS, if brake pressure is applied excessively, friction coefficient between wheels and road will decrease, and wheels will be decelerated earlier than vehicle, which could cause wheels to be locked first. In this case, ECU commands HCU to reduce wheel pressure. In other words, normal open valve cuts off oil passage and the oil passage of normal close valve is open, in order to reduce wheel cylinder pressure. At this time, brake fluid drained from wheel cylinder is temporarily stored in low pressure accumulator (LPA). Then, the brake fluid stored in low pressure accumulator (LPA) returns to master cylinder with rotation of motor. The brake fluid returns to high pressure accumulator (HPA), and reduce high pressure pulse caused by operation of oil pump with orifice fluid resistance.

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

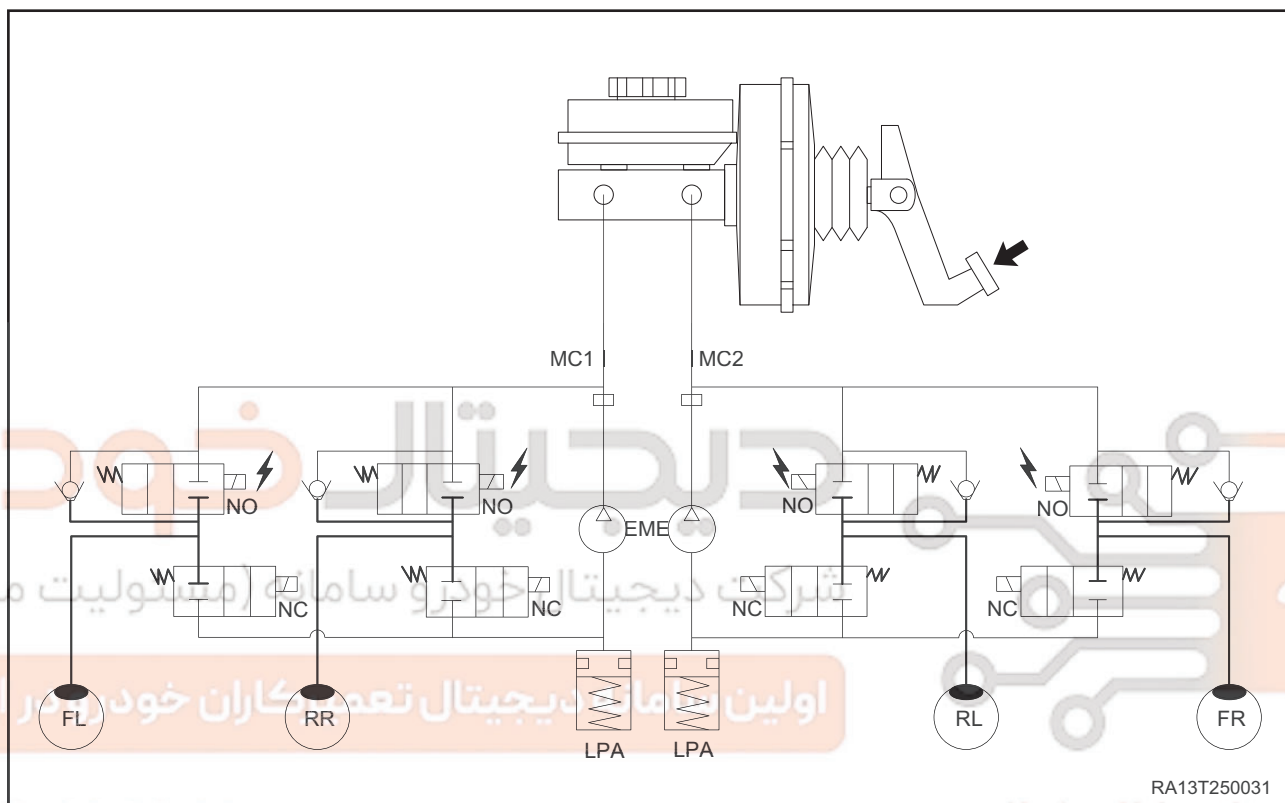


25 - BRAKE CONTROL SYSTEM

3. ABS Operating (Holding) Condition

Apply appropriate pressure to wheel cylinder by reducing pressure or increasing pressure, normal open valve and normal close valve are closed to maintain pressure of wheel cylinder. During steps (2) ~ (4), ABS system operates until vehicle is completely stopped, ensuring vehicle braking and steering performance.

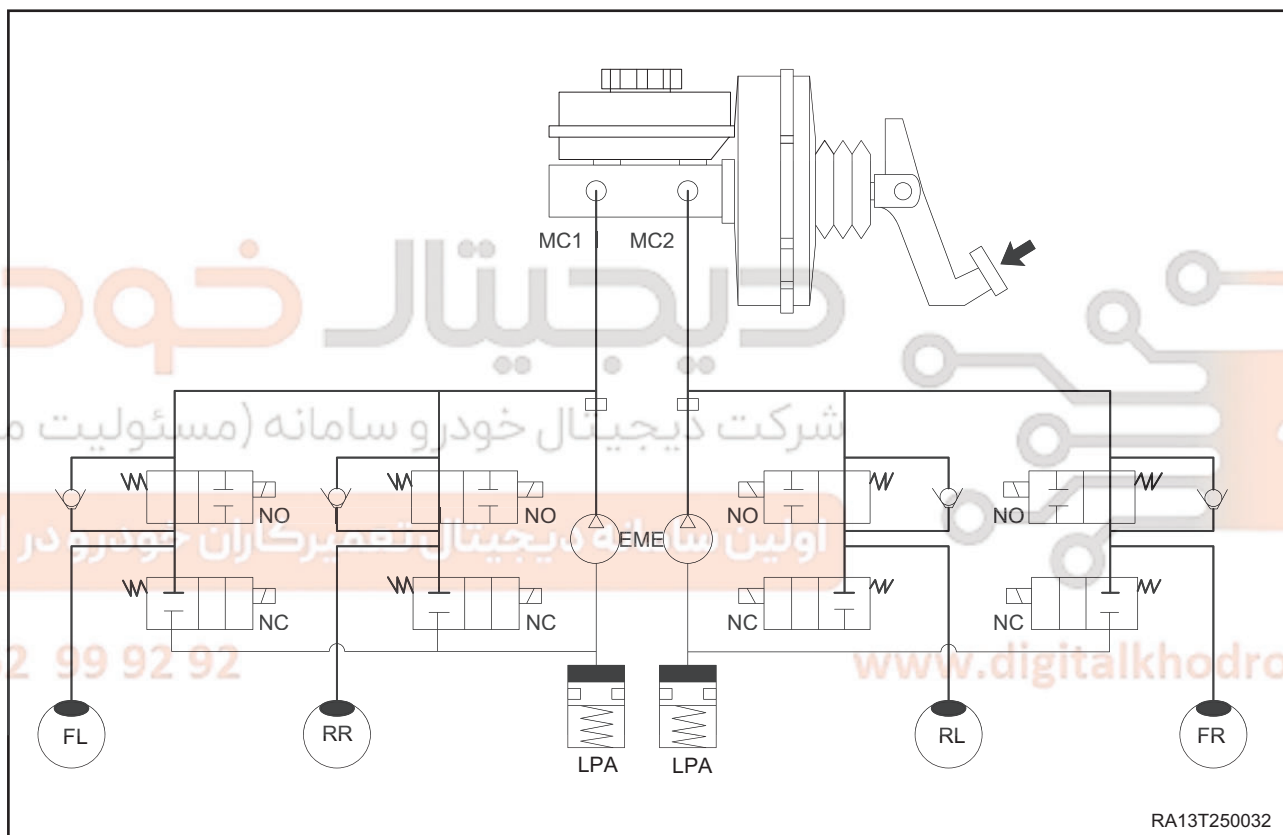
Solenoid Valve	Powered Condition	Solenoid Valve Condition
Normal Open Valve	ON	CLOSE
Normal Close Valve	OFF	CLOSE



4. ABS Operating (Boost) Condition

When ABS operates under pressure relief condition, if brake fluid is drained excessively or friction coefficient between wheels and road increases, each wheel pressure needs to be increased. In this case, ECU commands HCU to increase wheel pressure. As a result, normal open valve opens its passage and normal close valve shuts off oil passage, in order to increase wheel cylinder pressure. Under pressure relief condition, motor is rotated by brake fluid stored in Low Pressure Accumulator (LPA) in boost pressure condition to drain brake fluid. At this time, fluid is supplied to each wheel cylinder through master cylinder and normal open valve. The brake fluid returns to High Pressure Accumulator (HPA), and reduce high pressure pulse caused by operation of oil pump using orifice fluid resistance.

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



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

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

Specifications

Torque Specifications

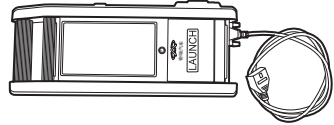
Description	Torque (N·m)
Brake Pipe Coupling Plug	12 - 16
Coupling Bolt Between ABS/ESC Control Module Assembly and Mounting Bracket	10 ± 3

25 - BRAKE CONTROL SYSTEM

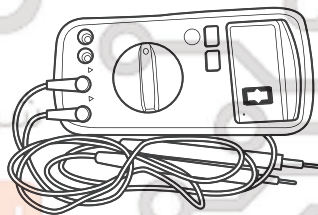
Description	Torque (N·m)
Coupling Nut Between ABS/ESC Control Module Assembly Mounting Bracket and Body	10 ± 1
Front Wheel Speed Sensor Fixing Bolt	10 ± 1
Rear Wheel Speed Sensor Fixing Bolt	10 ± 1

Tools

Special Tool

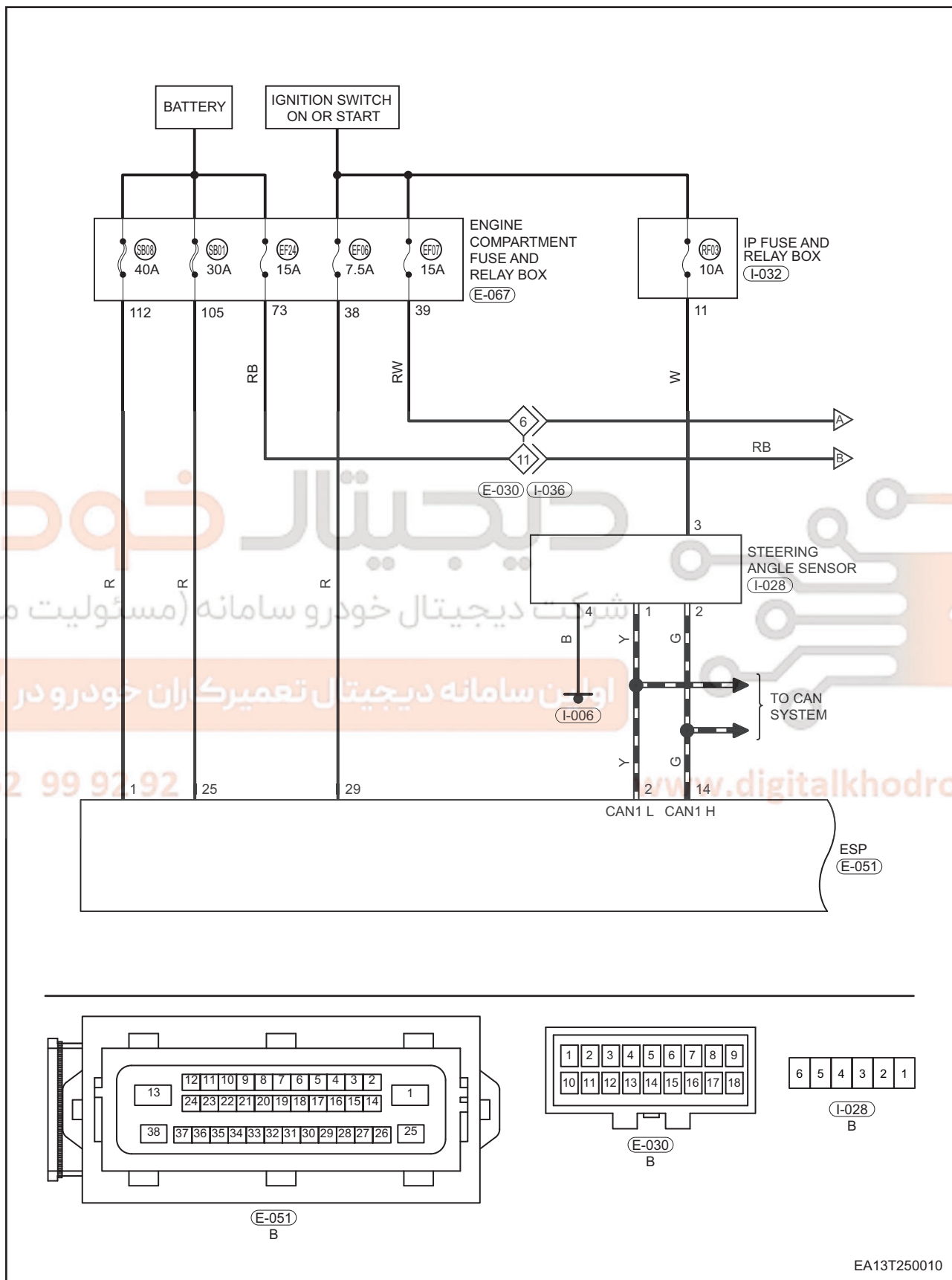
X-431 3G Diagnostic Tester	 RCH0000001
----------------------------	--

General Tool

Digital Multimeter	 RCH0000002
--------------------	---

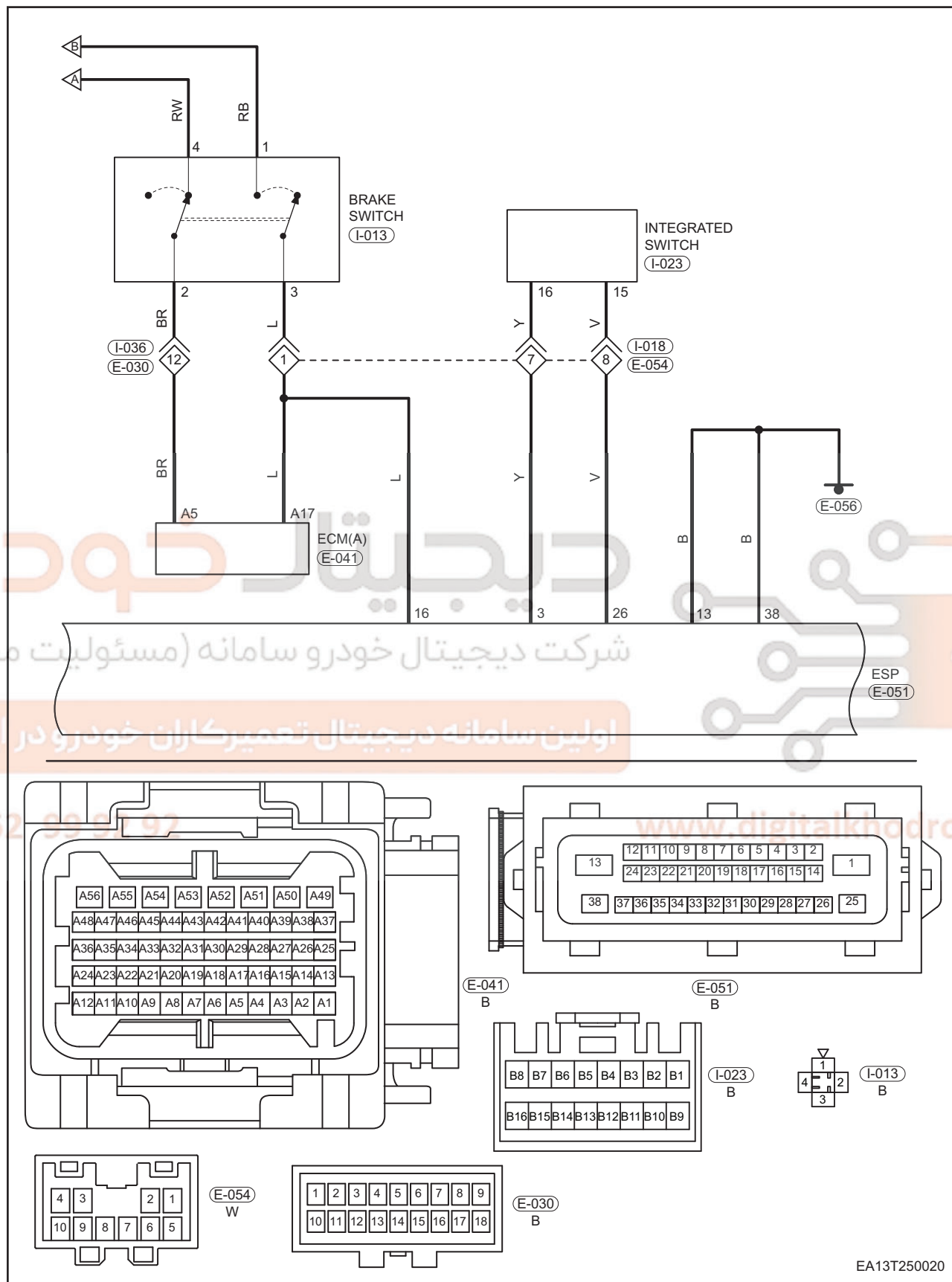
Circuit Diagram

Brake Control System (Page 1 of 3)

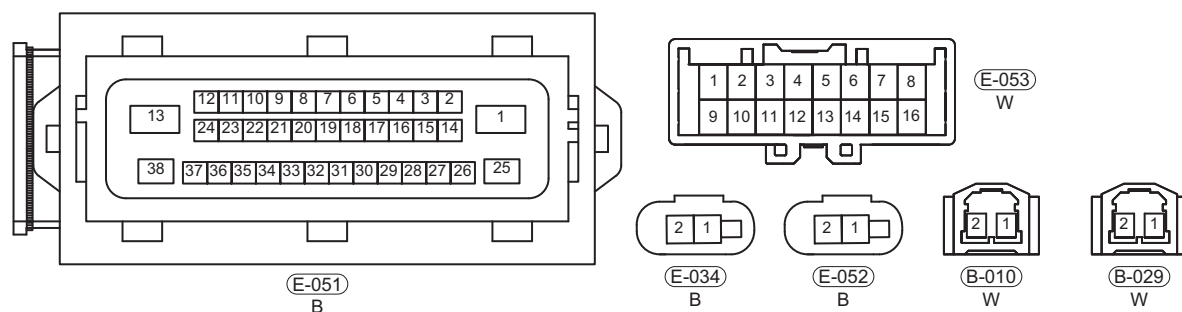
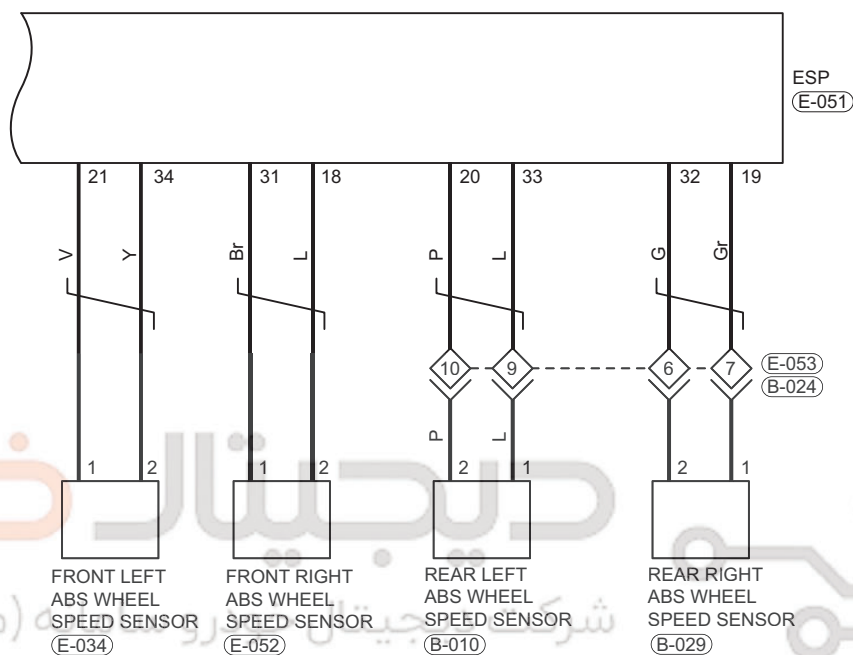


25 - BRAKE CONTROL SYSTEM

Brake Control System (Page 2 of 3)



Brake Control System (Page 3 of 3)



EA13T250030

25 - BRAKE CONTROL SYSTEM

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
When turning ignition switch ON, ABS/ESC warning light does not come on	Fuse	55-30
	Wire harness or connector	-
	ABS/ESC Control Module Assembly	25-90
	Instrument cluster	38-49
ABS/ESC warning light remains on	Fuse	55-30
	Wire harness or connector	-
	ABS/ESC Control Module Assembly	25-90
	Instrument cluster	38-49
ESC OFF indicator does not come on or remains on	Center Control Integration Panel Assembly	30-28
	Wire harness or connector	-
	ABS/ESC Control Module Assembly	25-90
	Instrument cluster	38-49
ABS/ESC operation is abnormal	Wheel speed sensor (damaged, improperly installed, foreign matter attached)	25-93
	Hub ring gear (damaged, improperly installed, foreign matter attached)	-
	Hub ring gear (damaged, improperly installed, foreign matter attached)	-
	Brake line (blocked or leaked)	-
	Wire harness or connector	-
	ABS/ESC Control Module Assembly	25-90
Communication with ABS/ESC control module cannot be performed	Fuse	55-30
	Wire harness or connector	-
	ABS/ESC Control Module Assembly	25-90

Diagnosis Procedure

25

HINT:

Use following procedures to troubleshoot the brake control system.

25 - BRAKE CONTROL SYSTEM

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

NEXT

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

Standard voltage: 11 to 14 V

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

NEXT

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

NEXT

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

NEXT

5	Confirm and duplicate malfunction: accelerate vehicle to 15 km/h or above, simulate malfunction conditions and read DTCs again
---	--

DTC occurs

For current DTC, go to step 7

NO DTC

For history DTC, go to step 8

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

NEXT

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

NEXT

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

NEXT

25

25 - BRAKE CONTROL SYSTEM

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

NEXT

10	End
----	-----

Problem Repair (No DTC)

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

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

ABS/ESC no power supply or power supply abnormality will cause ABS/ESC warning light remains on without storing DTC.

Troubleshooting method: check corresponding component according to the malfunction, and repair or replace as necessary.

DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in ABS/ESC control module assembly.
- Turn ignition switch to LOCK and wait for a few seconds.
- Start engine, drive vehicle at 20 km/h or more and perform road test with X-431 3G diagnostic tester connected to Data Link Connector (DLC).
- Use X-431 3G diagnostic tester to read DTCs.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If no DTC is detected, malfunction indicated by DTC is intermittent. Please refer to Intermittent DTC Troubleshooting.

Intermittent DTC Troubleshooting

25 If malfunction is intermittent, perform the followings:

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

- Look for the data that has changed or the DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect wheel speed sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and grounding parts related to the current DTC.
- If multiple trouble codes were set, refer to the circuit diagram to look for any common ground circuit or power supply circuit applied to the DTC.
- Refer to any Technical Bulletin that may apply to the malfunction.

Ground Inspection

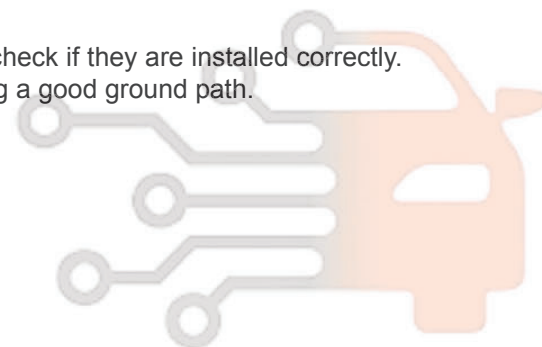
Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works.

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

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

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM

ESC Control Module Assembly

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Battery Power Supply (Pump Motor)	20	Rear Left Wheel Speed Sensor
2	CAN1-L	21	Front Left Wheel Speed Sensor
3	ESC Switch Indicator	22	-
4	-	23	-
5	-	24	-
6	-	25	Battery Power Supply (Valve)
7	-	26	ESC Switch Input
8	-	27	-
9	-	28	-
10	-	29	Ignition Switch Power Supply
11	-	30	-
12	-	31	Front Right Wheel Speed Sensor
13	Ground	32	Rear Right Wheel Speed Sensor
14	CAN1-H	33	Rear Left Wheel Speed Sensor
15	-	34	Front Left Wheel Speed Sensor
16	Brake Switch Input	35	-
17	-	36	-
18	Front Right Wheel Speed Sensor	37	-
19	Rear Right Wheel Speed Sensor	38	Ground

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C0031-14	FL Open/Short To BAT/GND
C0034-14	FR Open/Short To BAT/GND
C0037-14	FL Open/Short To BAT/GND
C003A-14	RR Open/Short To BAT/GND
C0031-02	FL Air-Gap ERROR And Long Term ABS Mode
C0034-02	FR Air-Gap ERROR And Long Term ABS Mode
C0037-02	RL Air-Gap ERROR And Long Term ABS Mode
C003A-02	RR Air-Gap ERROR And Long Term ABS Mode
C0031-03	FL Speed Jump And Wrong Exciter, Missing Teeth
C0034-03	FR Speed Jump And Wrong Exciter, Missing Teeth
C0037-03	RL Speed Jump And Wrong Exciter, Missing Teeth
C003A-03	RR Speed Jump And Wrong Exciter, Missing Teeth
C1003-04	Valve Relay Open, Short To GND, Valve Relay Short To BAT
C1004-04	Solenoid Valve Open, Short To GND, Solenoid Valve Short To BAT, Leakage Current
C0020-04	Motor Relay Open, Motor Short To GND, Motor Open, Motor Short To BAT, Motor Lock (Stuck), Motor GND Open
C1000-16	Low Voltage
C1000-17	Over Voltage
C1001-04	ECU H/W error
C0044-01	Master Pressure Sensor Open, Short To BAT/GND
C0044-28	Master Pressure Sensor Noisy Signal, Offset
C0051-54	SAS Offset Calibration
C0051-28	SAS Offset Error, Noisy Signal
C0069-54	The Zero Value Calibration For G Sensor Is Not Done
C0069-09	Sensor Initialization Error
C0069-64	Sensor Abnormal Signal
C0069-86	G Sensor Sensor Fail
C0040-14	Brake Light Switch Open, Short To BAT/GND
C0089-04	ESC Switch Short To BAT
C0072-4B	Excessive temperature of brake disc
C008B-12	DBC Switch short to BAT
C008C-12	AVH Switch short to BAT
U1300-55	Software Configuration Error
U0140-87	Lost Communication With BCM
U0101-87	Lost Communication With TCU

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition
U0100-87	Lost Communication With EMS
U0126-87	Lost Communication With SAM
U0401-81	Invalid Data Received From EMS
U0402-81	Invalid Data Received From TCU
U0428-81	Invalid Data Received From SAM
U0422-81	Invalid Data Received From BCM
U0073-00	Control Module Communication Bus Off

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

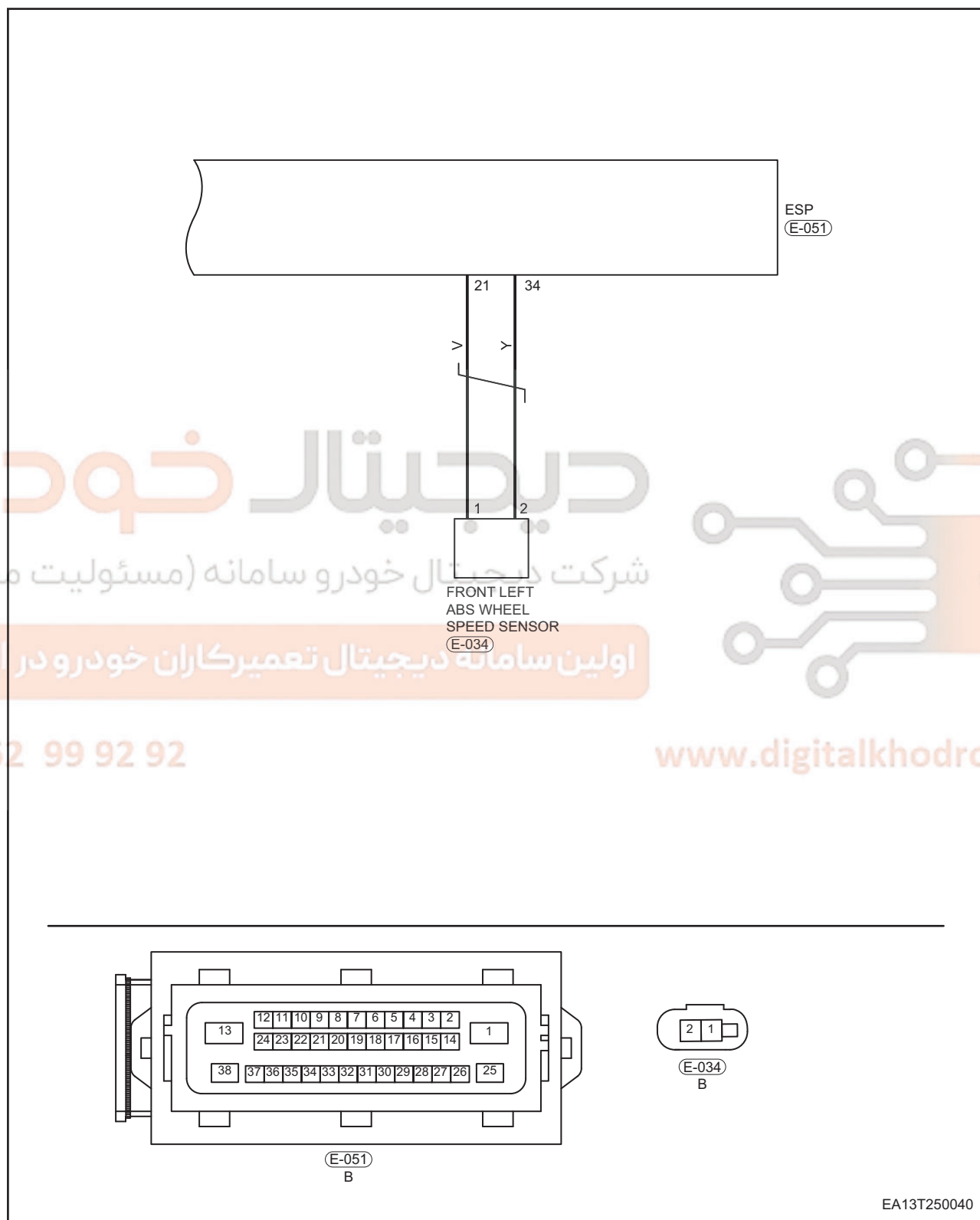


021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM

DTC	C0031-14	FL Open/Short To BAT/GND
DTC	C0031-03	FL Speed Jump And Wrong Exciter, Missing Teeth



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0031-14	FL Open/Short To BAT/ GND	This DTC occurs when any of following conditions is met: ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open.	- Wheel speed sensor signal wire is connected 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 power supply wire is short to ground. - Ring gear is not installed, dirty, demagnetized, off center or it has teeth missing. - Clearance between sensor and ring gear is excessive. - Wheel speed sensor is interfered by magnetic field outside. (wheel or axle is not demagnetized) - Wheel speed sensor body is malfunctioning. - Tire size is not as specified. - ECU is damaged.
C0031-03	FL Speed Jump And Wrong Exciter, Missing Teeth	ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESC control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	

 CAUTION

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

Diagnosis Procedure

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the front left wheel speed sensor connector E-034.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace front left wheel speed sensor harness and connector

OK

2**Check installation of front left wheel speed sensor**

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

NG**Tighten mounting bolt properly, clean or replace front left wheel speed sensor****OK****3****Check front left wheel speed sensor**

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

NG**Replace front left wheel speed sensor****OK****4****Check front left hub ring gear.**

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

NG**Replace front left hub ring gear****OK**

25 - BRAKE CONTROL SYSTEM

5

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the front left wheel speed sensor connector E-034.
- Using a digital multimeter, check for continuity between terminals of connector E-051 and connector E-034 to check if there is an open in wire harness and connector according to table below.

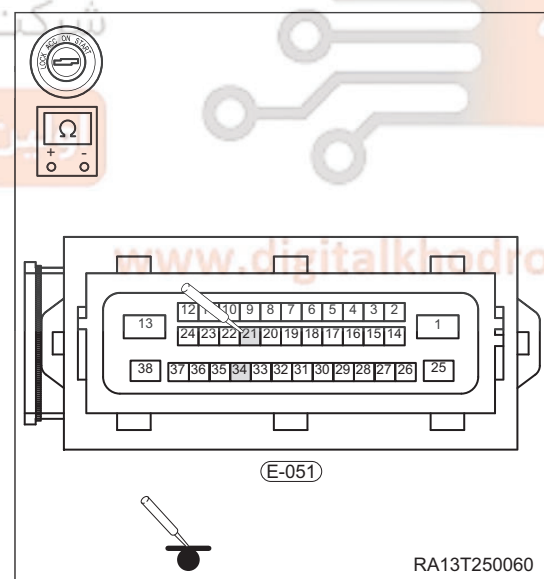
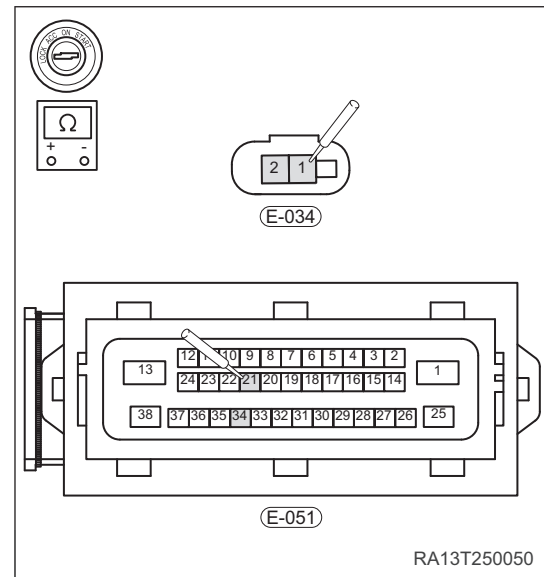
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (21) - E-034 (1)	Always	Continuity
EE-051 (34) - E-034 (2)	Always	Continuity
E-034 (2) - E-034 (1)	Always	No continuity

- Using a digital multimeter, check for continuity between connector E-051 and body ground to check if front left wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (34) - Body ground	Always	No continuity
E-051 (21) - Body ground	Always	No continuity



25 - BRAKE CONTROL SYSTEM

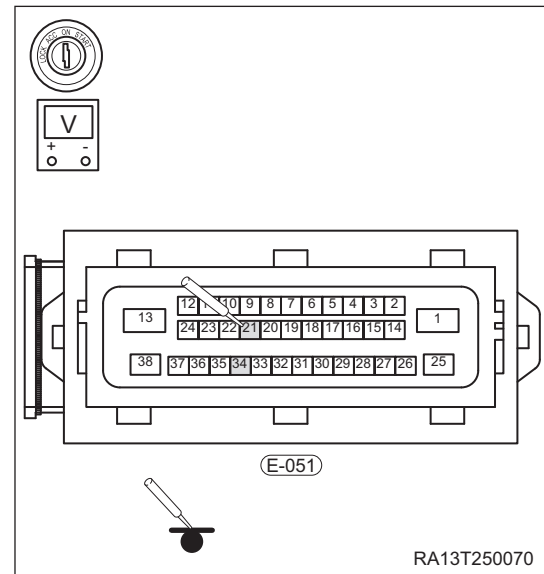
- g. Connect the negative battery cable.
- h. Turn ignition switch to ON.
- i. Using a digital multimeter, measure voltage between connector E-051 and body ground to check if front left wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (34) - Body ground	Ignition switch ON	Approx. 0 V
E-051 (21) - Body ground	Ignition switch ON	Approx. 0 V

NG

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

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

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start the engine.
- c. Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if same DTC is still output.

NO

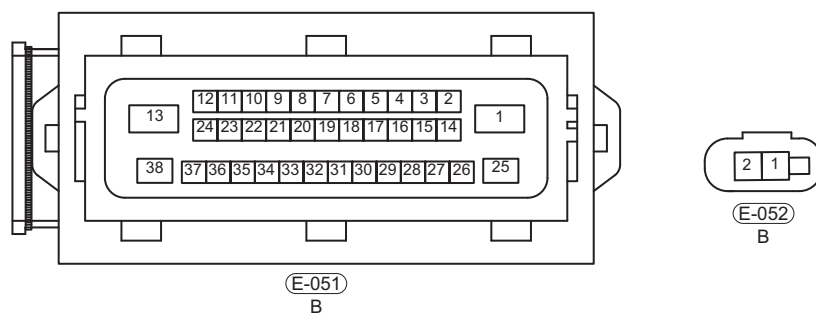
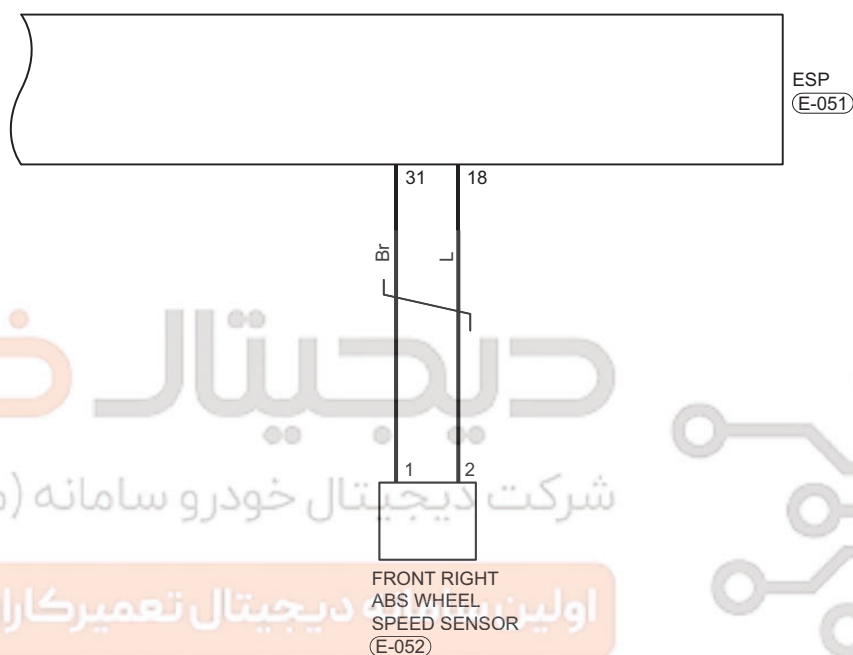
System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC	C0034-14	FR Open/Short To BAT/GND
DTC	C0034-03	FR Speed Jump And Wrong Exciter, Missing Teeth



EA13T250050

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0031-14	FR Open/Short To BAT/GND	This DTC occurs when any of following conditions is met: ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open.	- Wheel speed sensor signal wire is connected 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 power supply wire is short to ground. - Ring gear is not installed, dirty, demagnetized, off center or it has teeth missing. - Clearance between sensor and ring gear is excessive. - Wheel speed sensor is interfered by magnetic field outside. (wheel or axle is not demagnetized) - Wheel speed sensor body is malfunctioning. - Tire size is not as specified. - ECU is damaged.
C0031-03	FR Speed Jump And Wrong Exciter, Missing Teeth	ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESC control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	

 CAUTION

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

Diagnosis Procedure

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the front right wheel speed sensor connector E-052.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace front right wheel speed sensor harness and connector

OK

25 - BRAKE CONTROL SYSTEM

2**Check installation of front right wheel speed sensor**

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

NG**Tighten mounting bolt properly, clean or replace front right wheel speed sensor****OK****3****Check front right wheel speed sensor**

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

NG**Replace front right wheel speed sensor****OK****4****Check front right hub ring gear**

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

NG**Replace front right hub ring gear****OK**

5

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the front right wheel speed sensor connector E-052.
- Using a digital multimeter, check for continuity between terminals of connector E-051 and connector E-052 to check if there is an open in wire harness and connector according to table below.

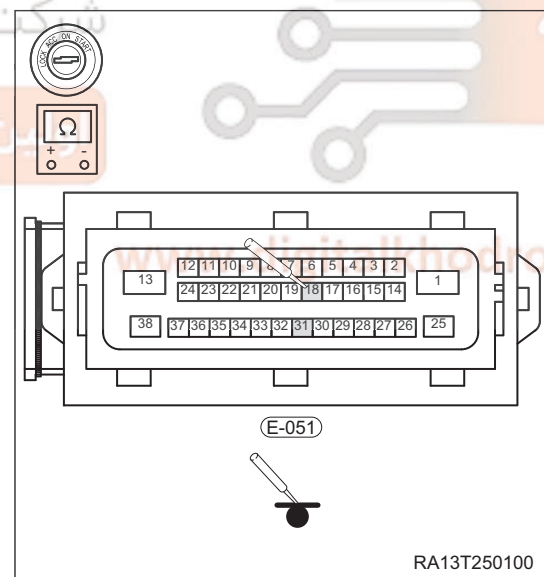
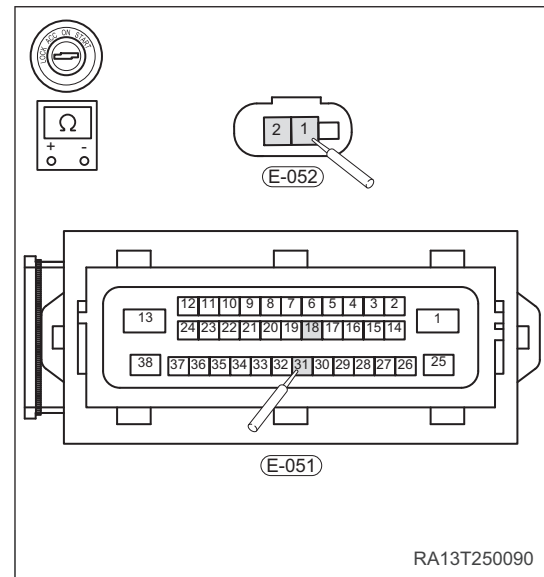
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (31) - E-052 (1)	Always	Continuity
E-051 (18) - E-052 (2)	Always	Continuity
E-052 (1) - E-052 (2)	Always	No continuity

- Using a digital multimeter, check for continuity between connector E-051 and body ground to check if front right wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (18) - Body ground	Always	No continuity
E-051 (31) - Body ground	Always	No continuity



25 - BRAKE CONTROL SYSTEM

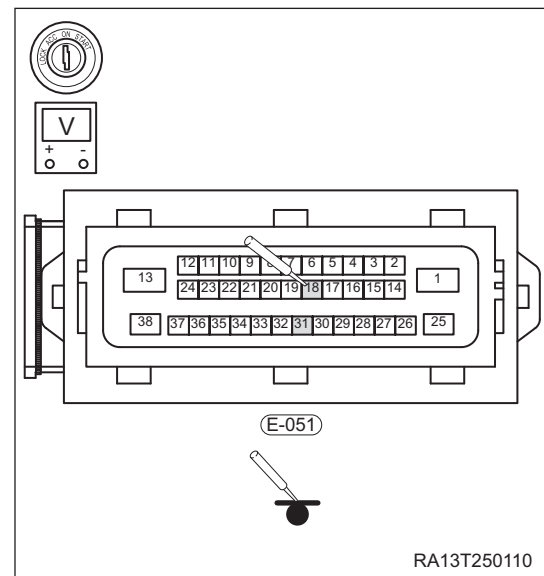
- g. Connect the negative battery cable.
- h. Turn ignition switch to ON.
- i. Using a digital multimeter, measure voltage between connector E-051 and body ground to check if front right wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (18) - Body ground	Ignition switch ON	Approx. 0 V
E-051 (31) - Body ground	Ignition switch ON	Approx. 0 V

NG

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



RA13T250110

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

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start the engine.
- c. Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if same DTC is still output.

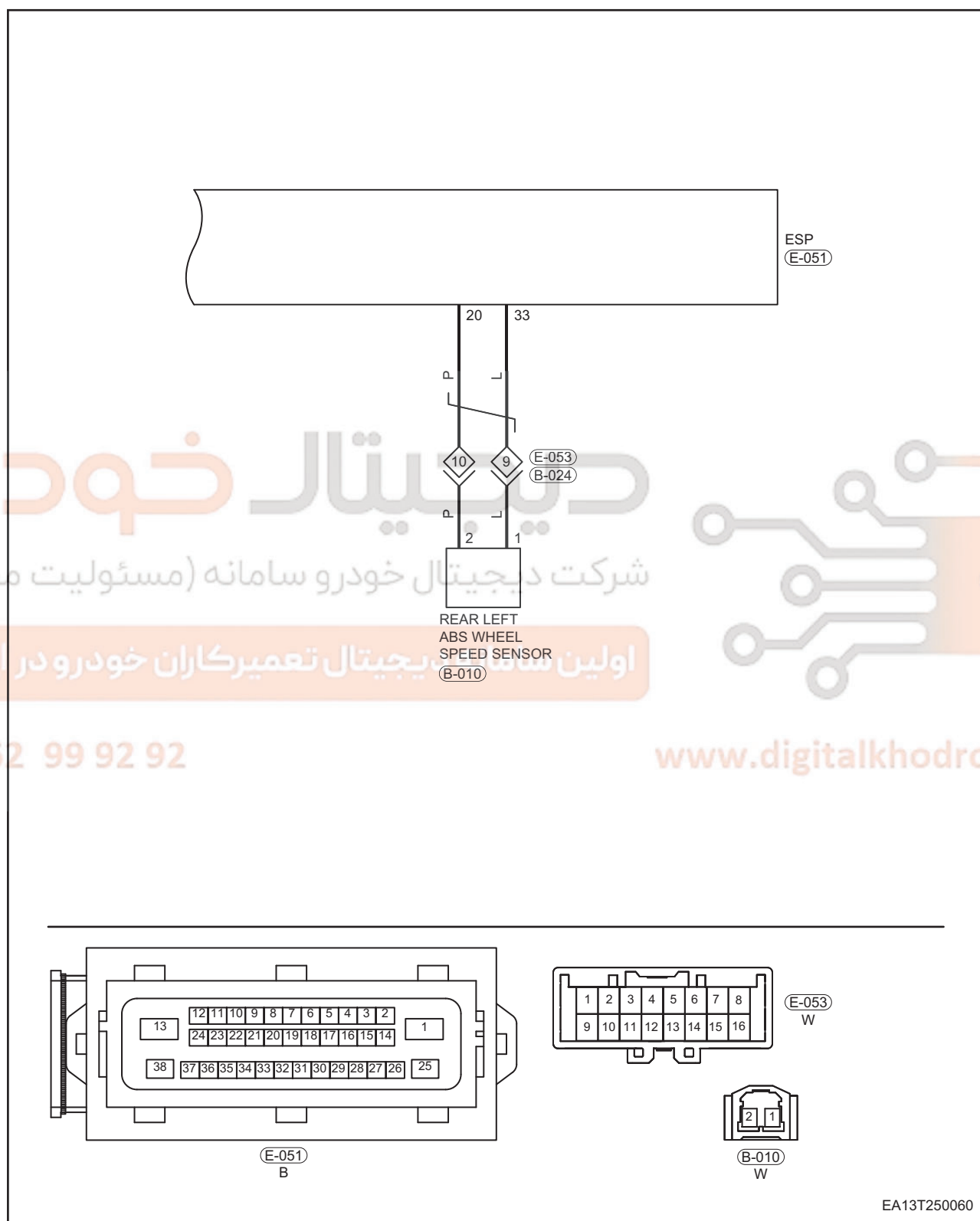
NO

System operates normally

YES

Replace ABS/ESC control module assembly

DTC	C0037-14	RL Open/Short To BAT/GND
DTC	C0037-03	RL Speed Jump And Wrong Exciter, Missing Teeth



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0031-14	RL Open/Short To BAT/GND	This DTC occurs when any of following conditions is met: ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open.	- Wheel speed sensor signal wire is connected 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 power supply wire is short to ground. - Ring gear is not installed, dirty, demagnetized, off center or it has teeth missing. - Clearance between sensor and ring gear is excessive. - Wheel speed sensor is interfered by magnetic field outside. (wheel or axle is not demagnetized) - Wheel speed sensor body is malfunctioning. - Tire size is not as specified. - ABS/ESC control module assembly is damaged.
C0031-03	RL Speed Jump And Wrong Exciter, Missing Teeth	ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESC control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	

 CAUTION

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

Diagnosis Procedure

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the rear left wheel speed sensor connector B-010.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace rear left wheel speed sensor harness and connector

OK

2**Check installation of rear left wheel speed sensor**

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

NG**Tighten mounting bolt properly, clean or replace rear left wheel speed sensor****OK****3****Check rear left wheel speed sensor**

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

NG**Replace rear left wheel speed sensor****OK****4****Check rear left hub ring gear**

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

NG**Replace rear left hub ring gear****OK**

25 - BRAKE CONTROL SYSTEM

5

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the rear left wheel speed sensor connector B-010.
- Using a digital multimeter, check for continuity between terminals of connector E-051 and connector B-010 to check if there is an open in wire harness and connector according to table below.

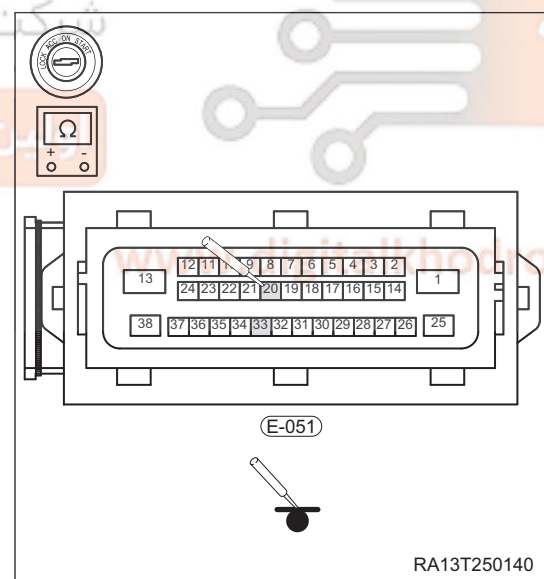
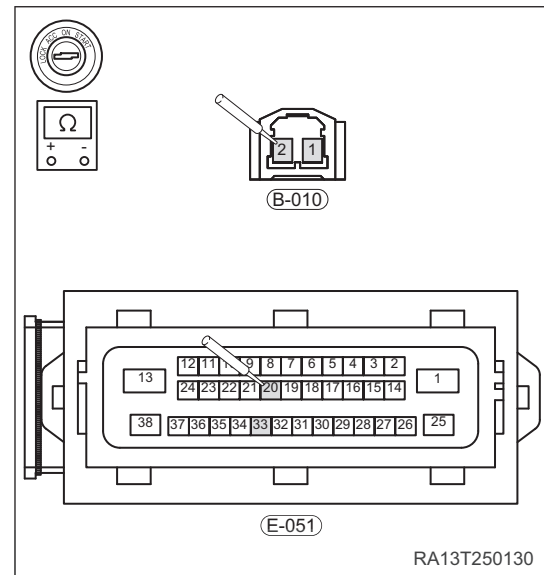
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (20) - B-010 (2)	Always	Continuity
E-051 (33) - B-010 (1)	Always	Continuity
B-010 (1) - B-010 (2)	Always	No continuity

- Using a digital multimeter, check for continuity between connector E-051 and body ground to check if rear left wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (20) - Body ground	Always	No continuity
E-051 (33) - Body ground	Always	No continuity



25 - BRAKE CONTROL SYSTEM

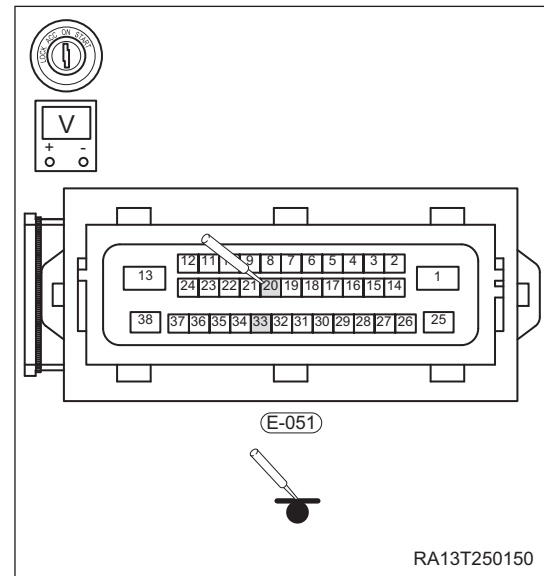
- g. Connect the negative battery cable.
- h. Turn ignition switch to ON.
- i. Using a digital multimeter, measure voltage between connector E-051 and body ground to check if rear left wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (20) - Body ground	Ignition switch ON	Approx. 0 V
E-051 (33) - Body ground	Ignition switch ON	Approx. 0 V

NG

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



RA13T250150

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

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start the engine.
- c. Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if same DTC is still output.

NO

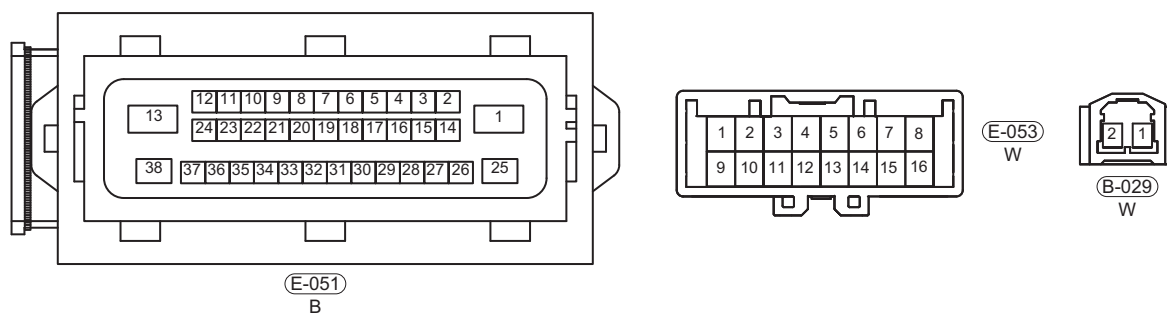
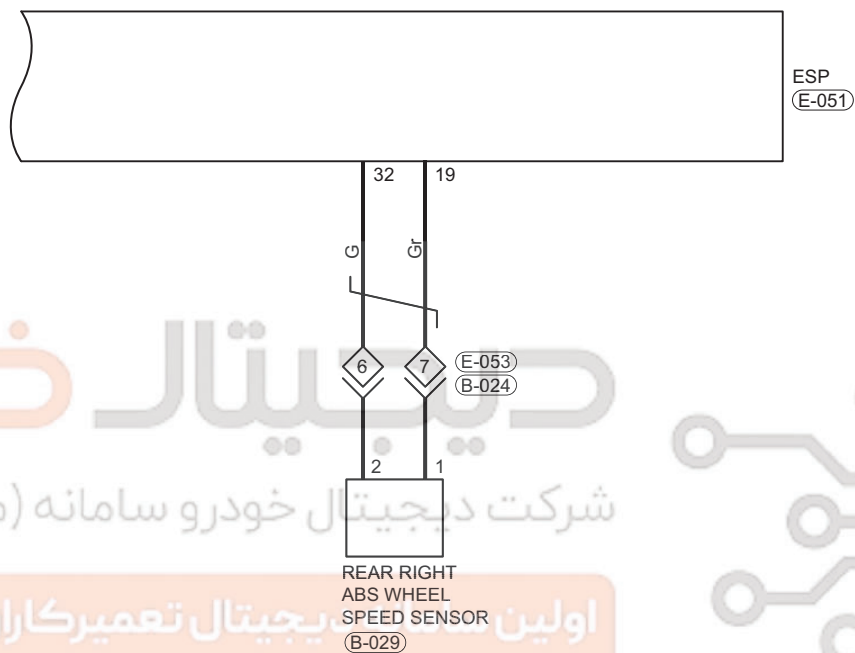
System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC	C003A-14	RR Open/Short To BAT/GND
DTC	C003A-03	RR Speed Jump And Wrong Exciter, Missing Teeth



EA13T250070

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C003A-14	RR Open/Short To BAT/GND	This DTC occurs when any of following conditions is met: ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to ground. Wheel speed sensor line is open.	- Wheel speed sensor signal wire is connected 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 power supply wire is short to ground. - Ring gear is not installed, dirty, demagnetized, off center or it has teeth missing. - Clearance between sensor and ring gear is excessive. - Wheel speed sensor is interfered by magnetic field outside. (wheel or axle is not demagnetized) - Wheel speed sensor body is malfunctioning. - Tire size is not as specified. - ECU is damaged.
C003A-03	RR Speed Jump And Wrong Exciter, Missing Teeth	ABS/ESC control module assembly detects that wheel speed sensor signal wire is short to power supply. ABS/ESC control module assembly detects that wheel speed sensor power supply wire is short to ground. Wheel speed sensor signal is invalid.	

 CAUTION

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

Diagnosis Procedure

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the rear right wheel speed sensor connector B-029.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace rear right wheel speed sensor harness and connector

OK

25 - BRAKE CONTROL SYSTEM

2 Check installation of rear right wheel speed sensor

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

NG**Tighten mounting bolt properly, clean or replace rear right wheel speed sensor****OK****3 Check rear right wheel speed sensor**

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

NG**Replace rear right wheel speed sensor****OK****4 Check rear right hub ring gear**

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

NG**Replace rear right hub ring gear****OK**

5

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the rear right wheel speed sensor connector B-029.
- Using a digital multimeter, check for continuity between terminals of connector E-051 and connector B-029 to check if there is an open in wire harness and connector according to table below.

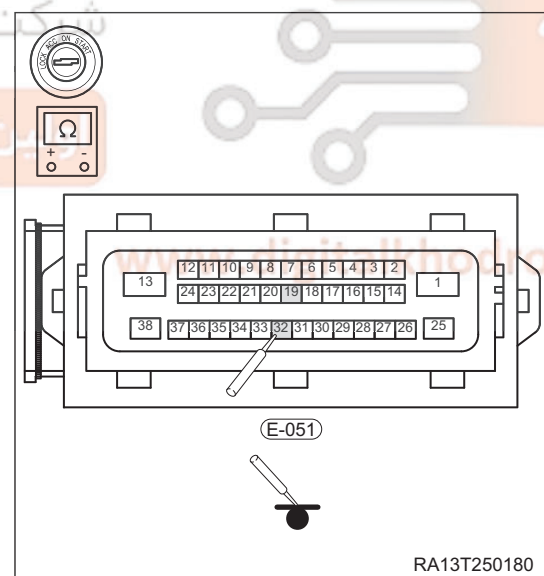
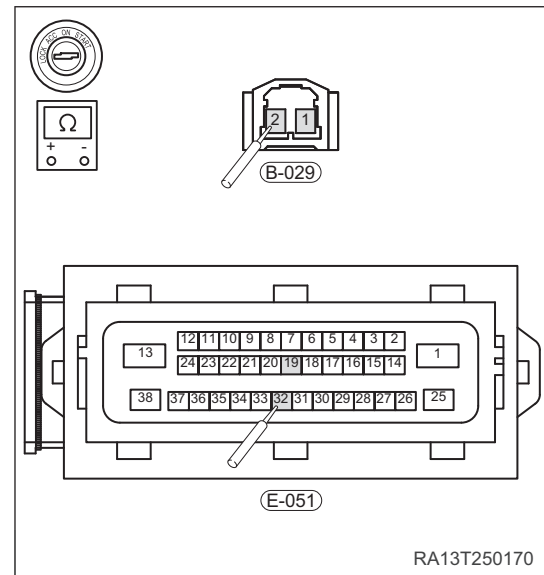
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (32) - B-029 (2)	Always	Continuity
E-051 (19) - B-029 (1)	Always	Continuity
B-029 (1) - B-029 (2)	Always	No continuity

- Using a digital multimeter, check for continuity between connector E-051 and body ground to check if rear right wheel speed sensor is short to ground according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (32) - Body ground	Always	No continuity
E-051 (19) - Body ground	Always	No continuity



25 - BRAKE CONTROL SYSTEM

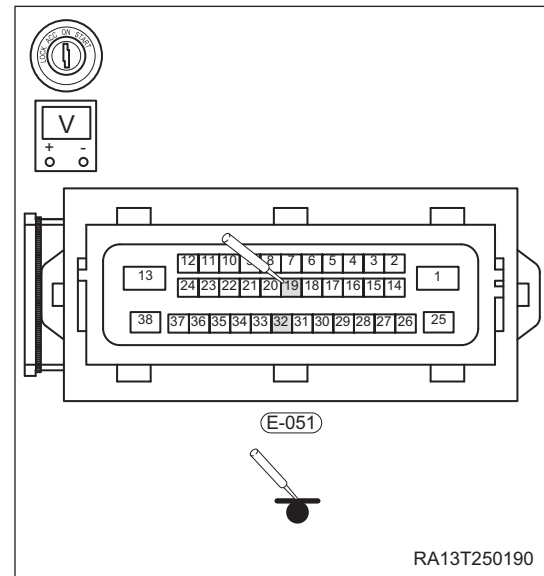
- g. Connect the negative battery cable.
- h. Turn ignition switch to ON.
- i. Using a digital multimeter, measure voltage between connector E-051 and body ground to check if rear left wheel speed sensor is short to power supply according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (32) - Body ground	Ignition switch ON	Approx. 0 V
E-051 (19) - Body ground	Ignition switch ON	Approx. 0 V

NG

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

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

- a. Use X-431 3G diagnostic tester to clear DTCs.
- b. Start the engine.
- c. Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- d. Check if same DTC is still output.

NO

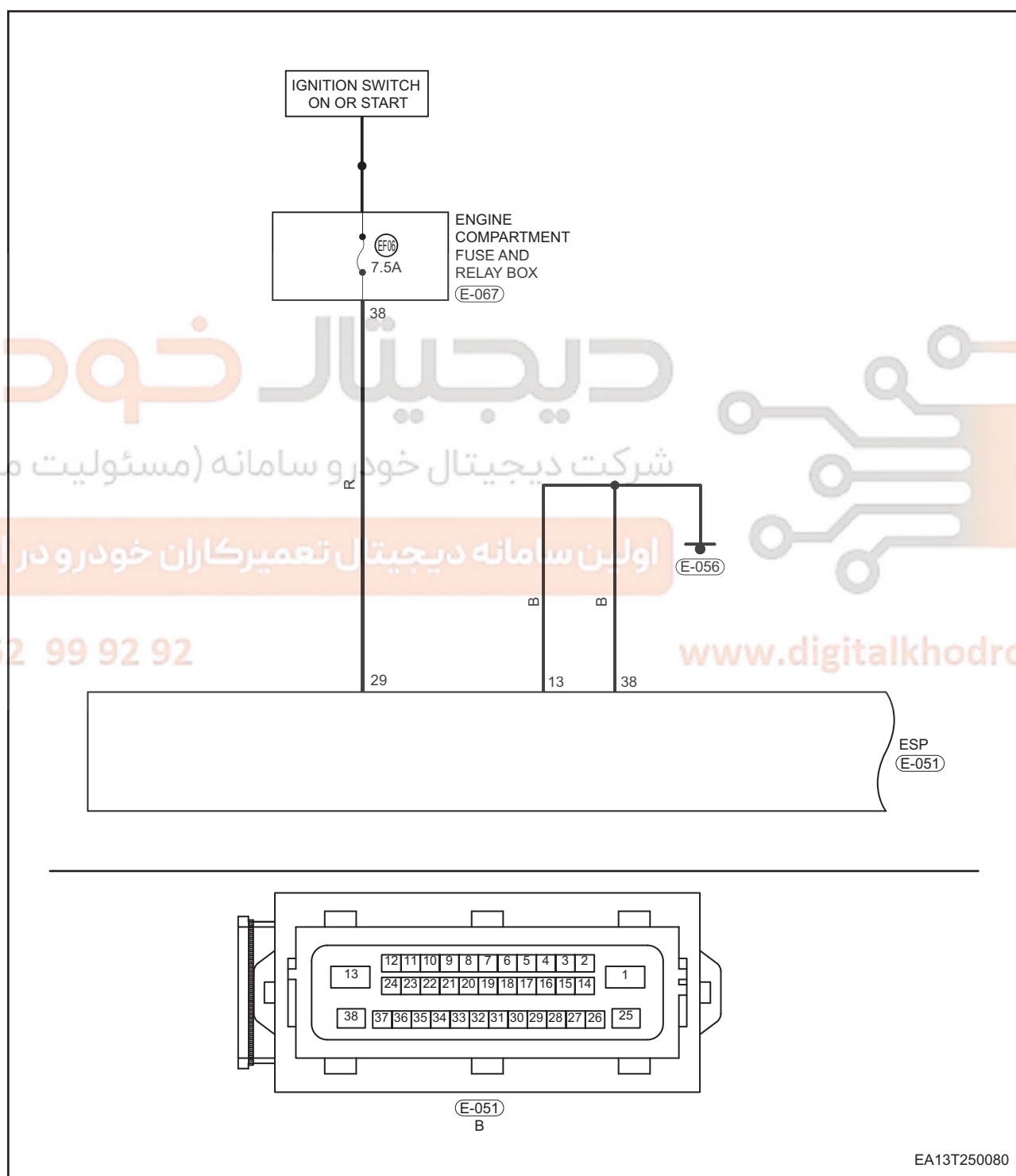
System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC	C0031-02	FL Air-Gap ERROR And Long Term ABS Mode
DTC	C0034-02	FR Air-Gap ERROR And Long Term ABS Mode
DTC	C0037-02	RL Air-Gap ERROR And Long Term ABS Mode
DTC	C003A-02	RR Air-Gap ERROR And Long Term ABS Mode



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0031-02	FL Air-Gap ERROR And Long Term ABS Mode	This DTC occurs when any of following conditions is met: ABS receives command to continue operating (more than 1 minute). ESP receives command to continue operating (more than 10 seconds).	- Wheel speed difference is excessive. - Sensor signal is incorrect. - ABS/ESC control module assembly is damaged.
C0034-02	FR Air-Gap ERROR And Long Term ABS Mode		
C0037-02	RL Air-Gap ERROR And Long Term ABS Mode		
C003A-02	RR Air-Gap ERROR And Long Term ABS Mode		

 CAUTION

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

Diagnosis Procedure

1 Check all wheel speed sensor wire harness and connector

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

NG

Repair or replace abnormal wheel speed sensor wire harness and connector

OK

2 Check installation of all wheel speed sensors

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Check all wheel speed sensor mounting bolts for looseness.
- Check if excessive clearance exists between installation position of all wheel speed sensors and front steering knuckle.
- Check installation position of all wheel speed sensor for dirt.

NG

Tighten mounting bolt properly, clean or replace wheel speed sensor

25 - BRAKE CONTROL SYSTEM

OK

3 Check wheel speed sensor

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

NG

Replace corresponding wheel speed sensor

OK

4 Check hub ring gear

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

NG

Replace corresponding hub ring gear

OK

5 Check installation of steering angle sensor

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Check installation of steering angle sensor
- Check if steering angle sensor is installed in place.
- Check installation position of steering angle sensor for dirt.

NG

Securely and properly install, clean or replace steering angle sensor

OK

6 Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

25 - BRAKE CONTROL SYSTEM

YES

Replace ABS/ESC control module assembly

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

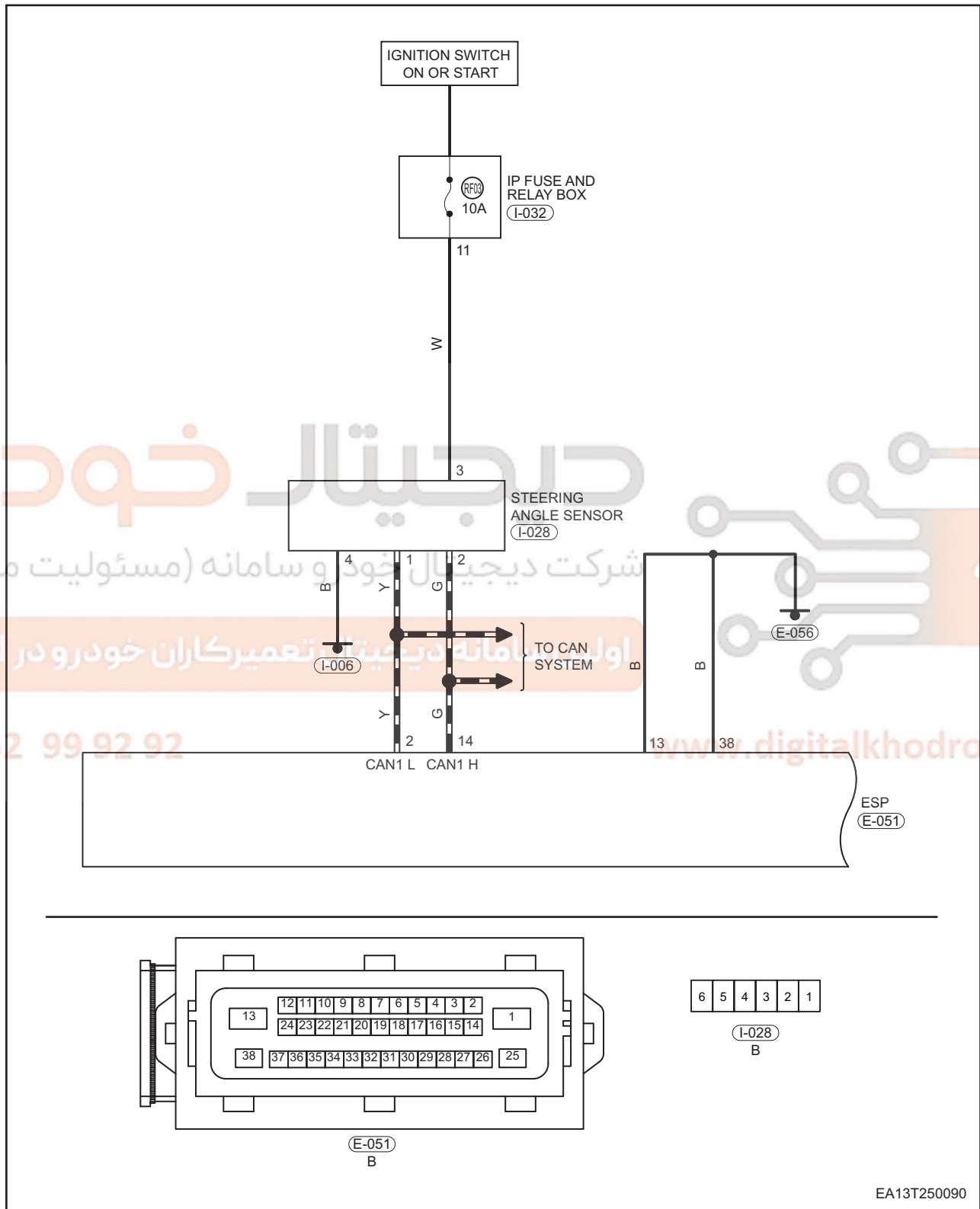


021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM

DTC	C0051-54	SAS Offset Calibration
DTC	C0051-28	SAS Offset Error, Noisy Signal



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0051-54	SAS Offset Calibration	This DTC occurs when any of following conditions is met: Calibration for steering angle sensor is not done (central point is not found). Steering wheel angle sensor signal is abnormal Steering wheel angle sensor signal is interrupted	- Calibration for steering angle sensor is not done. - Steering angle sensor line is short or open. - Steering angle sensor is damaged.
C0051-28	SAS Offset Error, Noisy Signal		

 CAUTION

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

Diagnosis Procedure

1 Steering angle sensor is damaged.

- Turn ignition switch to ON.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
- Recalibrate the steering angle sensor according to instruction of diagnostic tester.
- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

Calibration for steering angle sensor is not done

YES

2 Check wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect ABS/ESC control module assembly connector E-051 and steering angle sensor connector I-028.
- Disconnect the body wire harness connector I-034.
- Check if wire harnesses are worn, pierced, pinched or partially broken.

25 - BRAKE CONTROL SYSTEM

- f. Check for broken, bent, protruded or corroded terminals.
g. Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace body/instrument panel wire harness and connector

OK

3

Check CAN communication control circuit (ESC - steering angle sensor)

- a. Turn ignition switch to LOCK, disconnect the negative battery cable and wait for at least 90 seconds.
b. Disconnect the ABS/ESC control module assembly connector E-051.
c. Disconnect the steering angle sensor connector I-028.
d. Using a digital multimeter, check for continuity between terminals of connectors I-028 and E-051 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (14) - I-028 (2)	Always	Continuity
E-051 (2) - I-028 (1)	Always	Continuity

- e. Disconnect the body wire harness connector I-034.
f. Using a digital multimeter, check for continuity between terminals of connectors I-028 and I-034 to check if there is an open in CAN communication circuit according to table below. (See page 53-10)

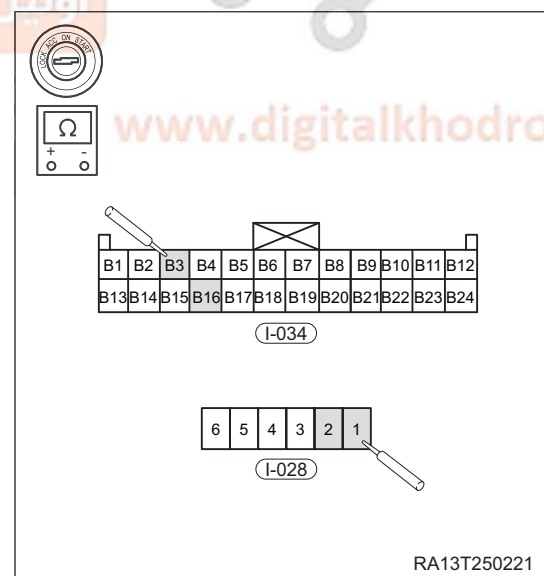
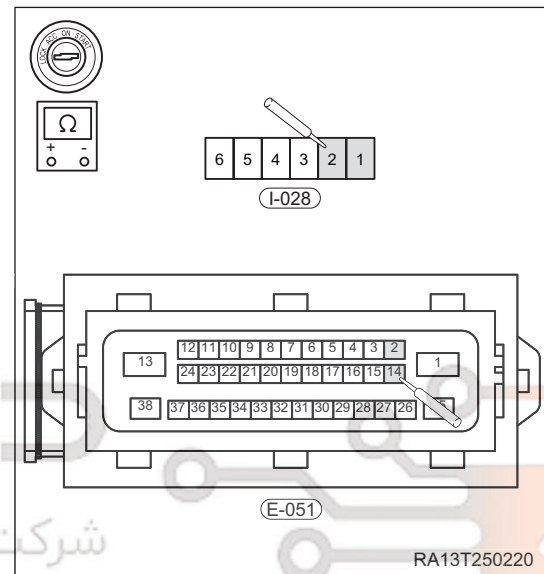
Standard Condition

Multimeter Connection	Condition	Specified Condition
I-034 (B3) - I-028 (1)	Always	Continuity
I-034 (B16) - I-028 (2)	Always	Continuity

NG

Repair or replace instrument panel/body wire harness and connector

OK



25 - BRAKE CONTROL SYSTEM

4

Replace steering angle sensor and recalibrate it

OK

5

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

Replace ABS/ESC control module assembly

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



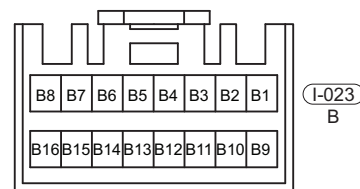
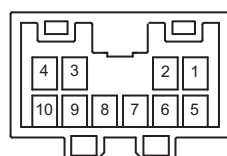
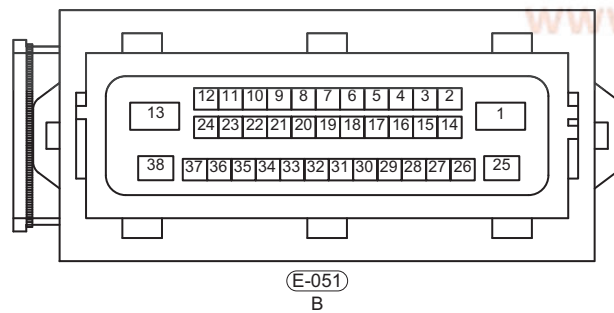
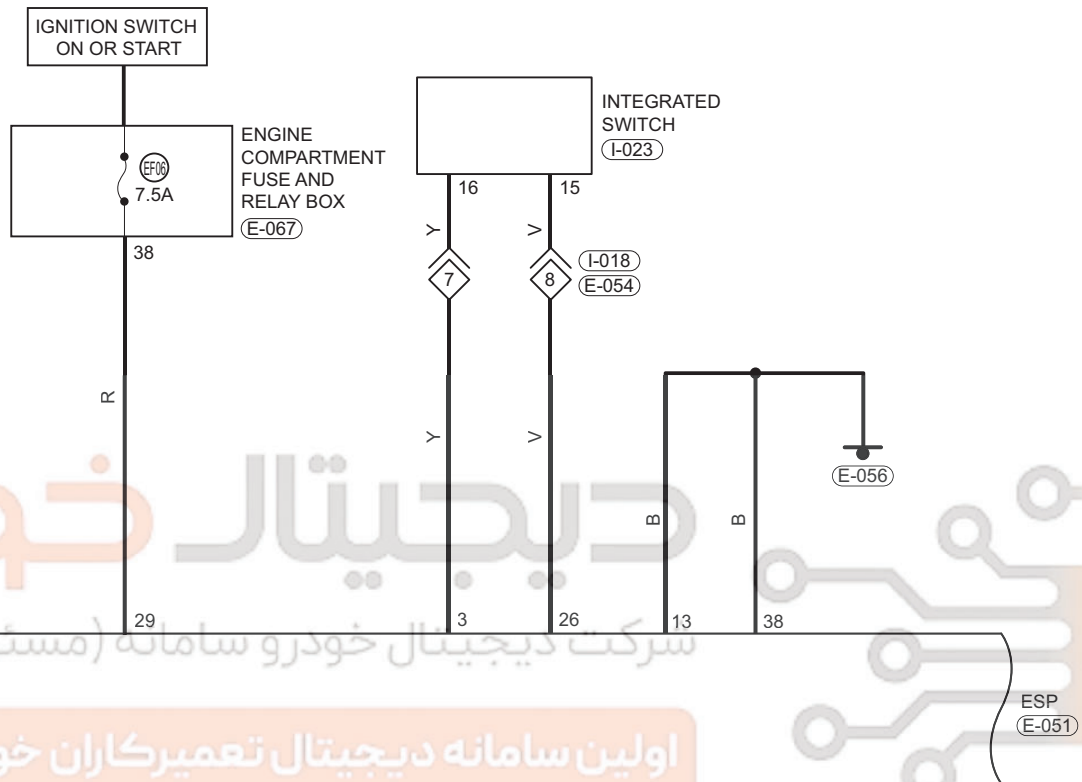
021 62 99 92 92

www.digitalkhodro.com

DTC

C0089-04

ESC Switch Short To BAT



EA13T250100

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0089-04	ESC Switch Short To BAT	This DTC occurs when any of following conditions is met: Press and hold ESC OFF switch for more than 10 seconds. During ignition, ESC OFF switch active signal is detected for more than 2 seconds.	- ESC OFF switch is pressed by other objects - ESC OFF switch is damaged

 CAUTION

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

Diagnosis Procedure

1 Check ESC OFF switch

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Check if ESC OFF switch is stuck or pressed by something.

NG

Release ESC OFF switch or move away other objects

OK

2 Check wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

Repair or replace body/instrument panel wire harness and connector

OK

25 - BRAKE CONTROL SYSTEM

3**Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO**System operates normally****YES****Replace center control integration panel assembly**

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

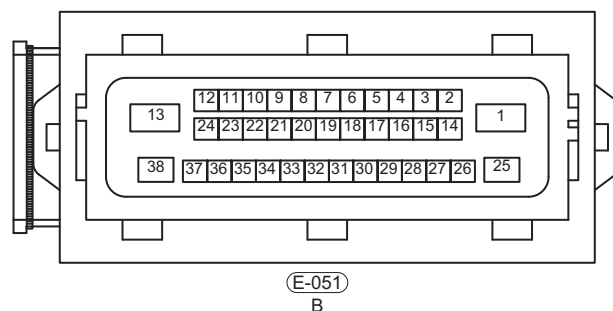
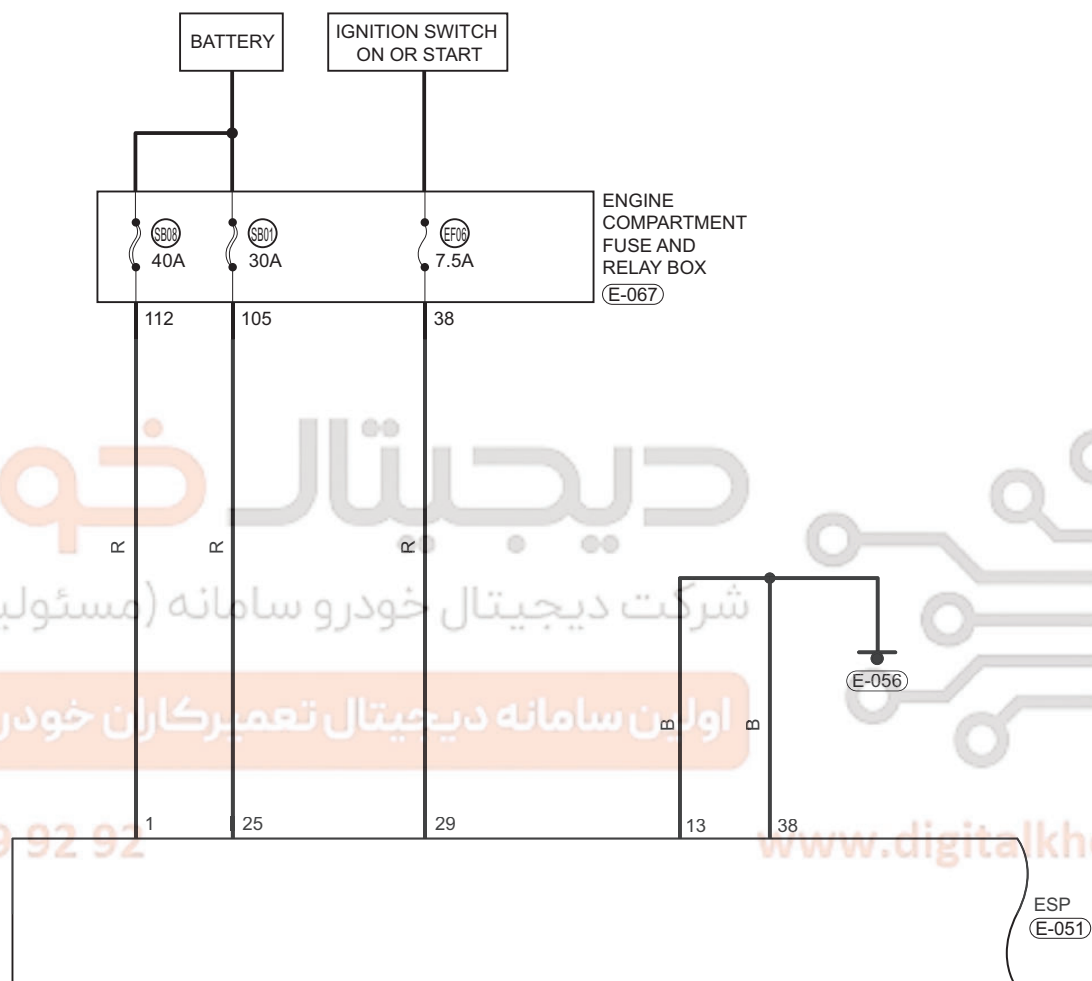


021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM

DTC	C1000-16	Low Voltage
DTC	C1000-17	Over Voltage



EA13T250110

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1000-16	Low Voltage	This DTC occurs when any of following conditions is met: Voltage is below 4.5 V just after vehicle is powered on. Voltage is below 7.7 V or above 16.8 V with ignition switch ON. Voltage is 7.7 to 9.2 V when vehicle speed is above 6 km/h.	- Fuse malfunction - High or low battery voltage - Charging system malfunction - Wire harness or connector - ABS/ESC control module assembly malfunction
C1000-17	Over Voltage		

 CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse RF06 (7.5 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse RF06

OK

2 Check battery voltage

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

NG

Check charging system ([See page 16-6](#))

OK

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.

25 - BRAKE CONTROL SYSTEM

- c. Disconnect the ABS/ESC control module assembly connector E-051.
- d. Check if wire harnesses are worn, pierced, pinched or partially broken.
- e. Check for broken, bent, protruded or corroded terminals.
- f. Check if terminal contact pins of related connectors are in good condition.

NG

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

OK

4

Check wire harness and connector (ABS/ESC control module assembly - battery)

- a. Turn ignition switch to LOCK.
- b. Disconnect the negative battery cable.
- c. Disconnect the ABS/ESC control module assembly connector E-051.
- d. Connect the negative battery cable.
- e. Turn ignition switch to ON.
- f. Using a digital multimeter, measure voltage between ABS/ESC control module assembly connector E-051 and body ground to check if power supply circuit is normal according to table below.

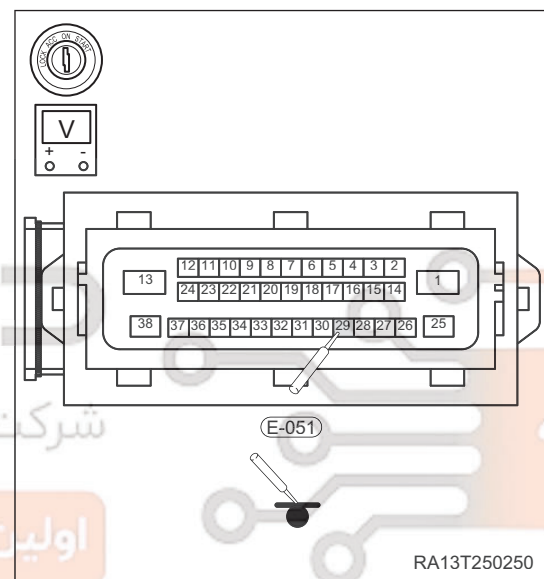
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (29) - Body ground	Ignition switch ON	9 to 16 V

NG

Repair or replace related wire harness and connector

OK

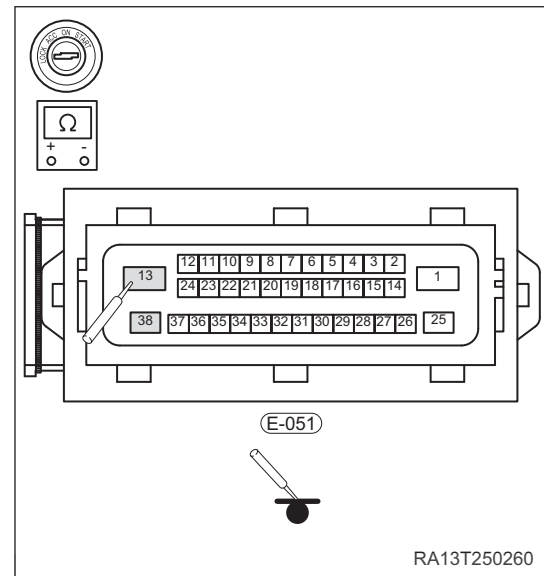


5 Check wire harness and connector (ABS/ESC control module assembly - body ground)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between ABS/ESC control module assembly connector E-051 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (13) - Body ground	Always	Continuity
E-051 (38) - Body ground	Always	Continuity

**NG**

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

OK**6 Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

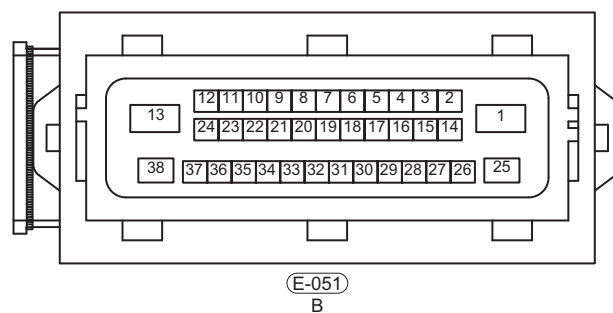
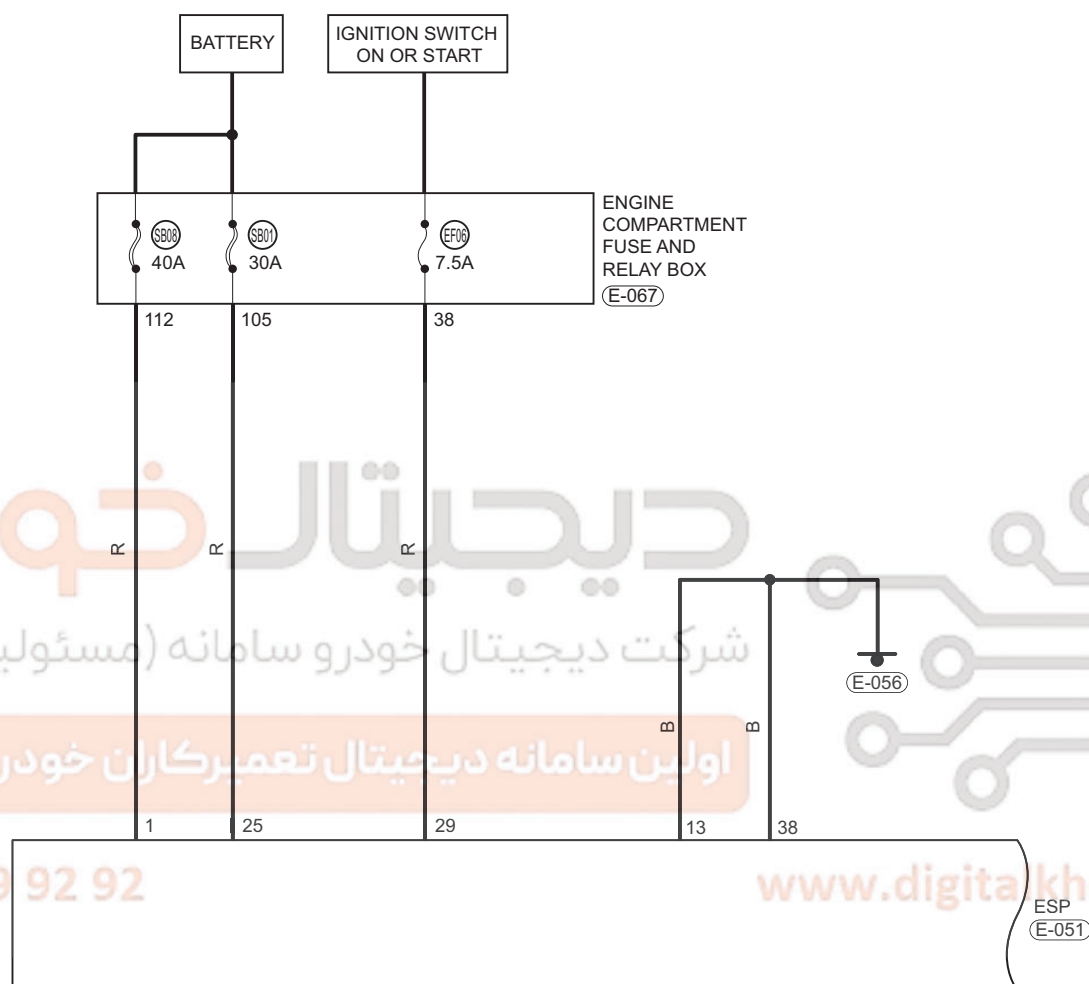
Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC

C1001-04

ECU H/W error



EA13T250111

25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1001-04	ECU H/W error	This DTC occurs when any of following conditions is met: ECU power supply is malfunctioning. ECU is damaged.	- Fuse malfunction - Wire harness or connector - ABS/ESC control module assembly malfunction

 CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse RF06 (7.5 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse RF02

OK

2 Check ABS/ESC control module assembly wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

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

OK

25 - BRAKE CONTROL SYSTEM

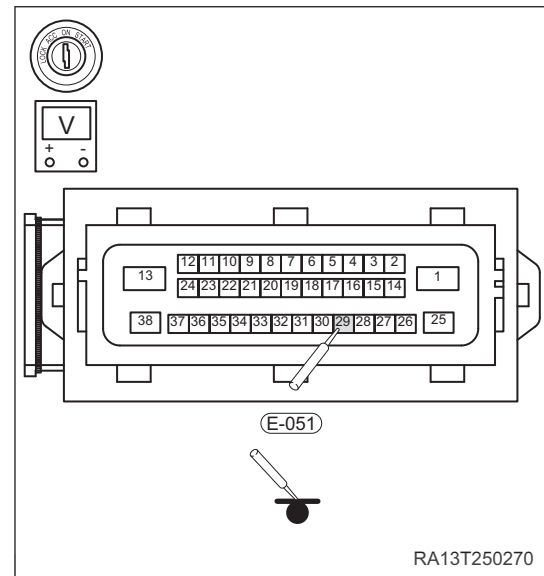
3

Check wire harness and connector (ABS/ESC control module assembly - battery)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Connect the negative battery cable.
- Turn ignition switch to ON.
- Using a digital multimeter, measure voltage between ABS/ESC control module assembly connector E-051 and body ground to check if power supply circuit is normal according to table below.

Standard Voltage

Multimeter Connection	Condition	Specified Condition
E-051 (29) - Body ground	Ignition switch ON	9 to 16 V



NG

Repair or replace engine wire harness and connector

OK

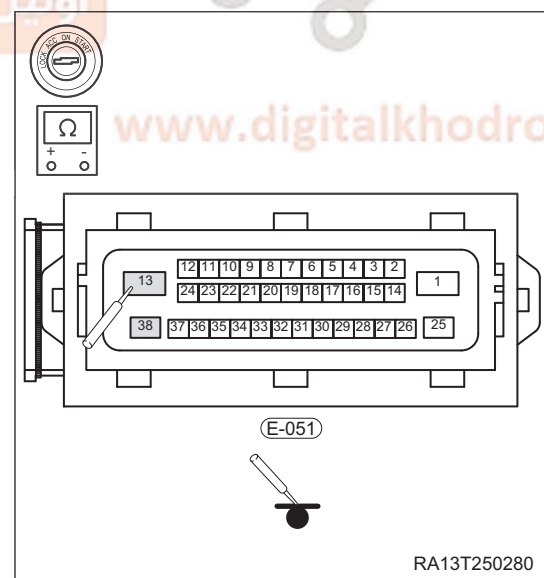
4

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between ABS/ESC control module assembly connector E-051 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (13) - Body ground	Always	Continuity
E-051 (38) - Body ground	Always	Continuity



25

NG

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

25 - BRAKE CONTROL SYSTEM

OK

5 Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

Replace ABS/ESC control module assembly

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

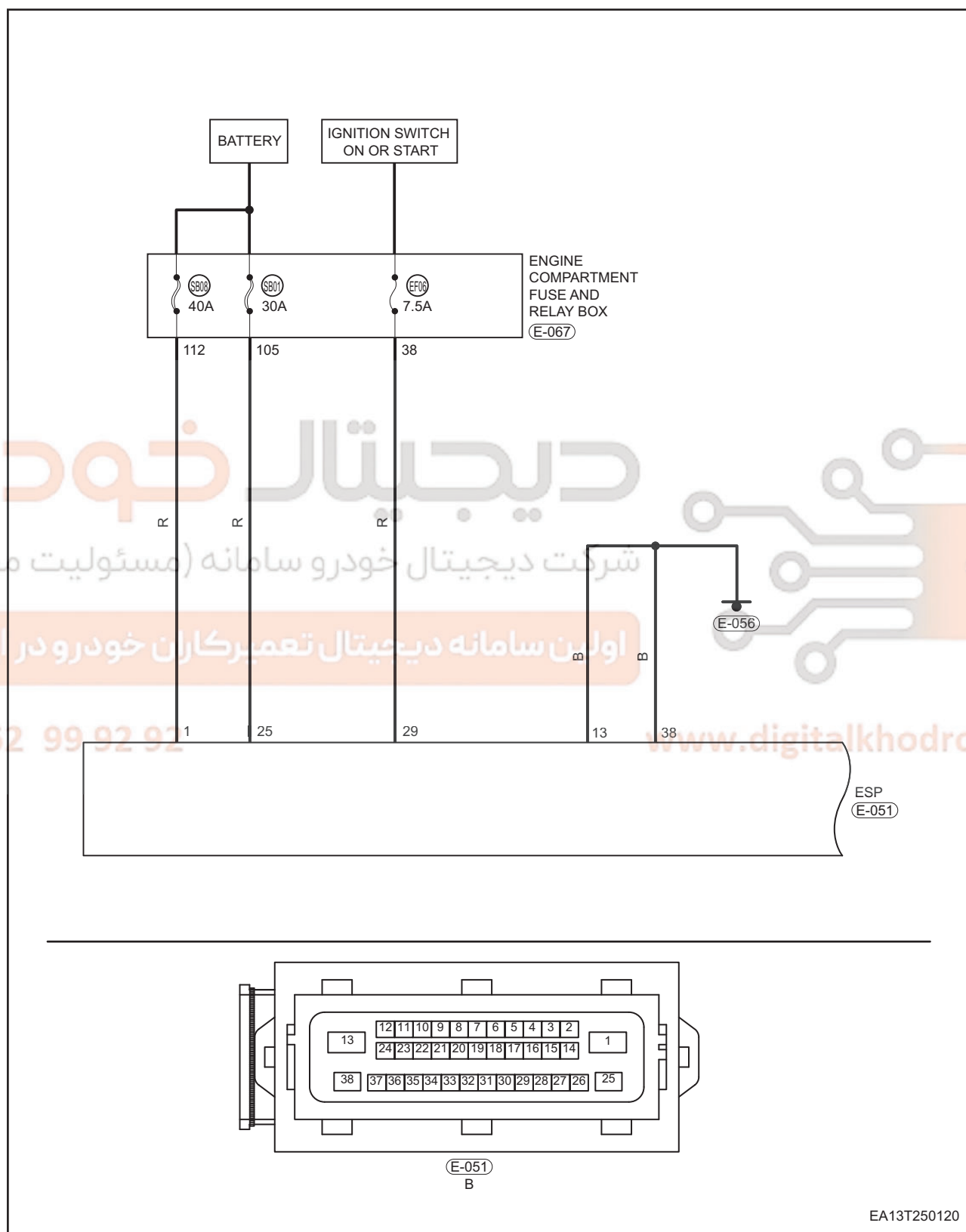


021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM

DTC	C0020-04	Motor Relay Open, Motor Short To GND, Motor Open, Motor Short To BAT, Motor Lock (Stuck), Motor GND Open
-----	----------	--



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0020-04	Motor Relay Open, Motor Short To GND, Motor Open, Motor Short To BAT, Motor Lock (Stuck), Motor GND Open	This DTC occurs when any of following conditions is met: Pump motor operates with overload, and temperature is too high. (overheat protection) Return pump monitor still cannot detect voltage signal after return pump motor relay operates for 60 ms. Return pump monitor detects voltage for more than 2.5 s when return pump motor relay stops operating. Return pump monitor detects that voltage does not drop when return pump motor relay does not operate.	• Fuse malfunction • Pump motor has poor ground connection • System overheat protection • Abnormal pump motor power supply • Pump motor relay malfunction • Pump motor malfunction

CAUTION

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

Diagnosis Procedure

1 Cool engine down to check if malfunction is repaired

YES

System overheat protection

NO

2 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse SB01 (30A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse SB01

25 - BRAKE CONTROL SYSTEM

OK

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

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

OK

4 Check wire harness and connector (ABS/ESC control module assembly - battery)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Connect the negative battery cable.
- Using a digital multimeter, measure voltage between ABS/ESC control module assembly connector E-051 and body ground to check if power supply circuit is normal according to table below.

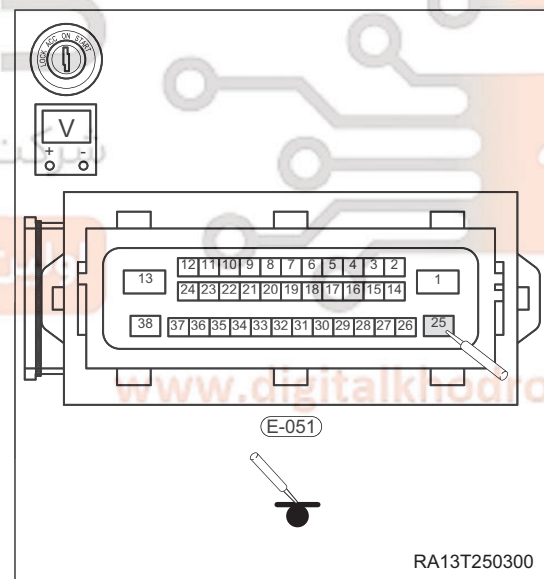
Standard Voltage

Multimeter Connection	Condition	Specified Condition
E-051 (25) - Body ground	Always	9 to 16 V

NG

Repair or replace engine wire harness and connector

OK

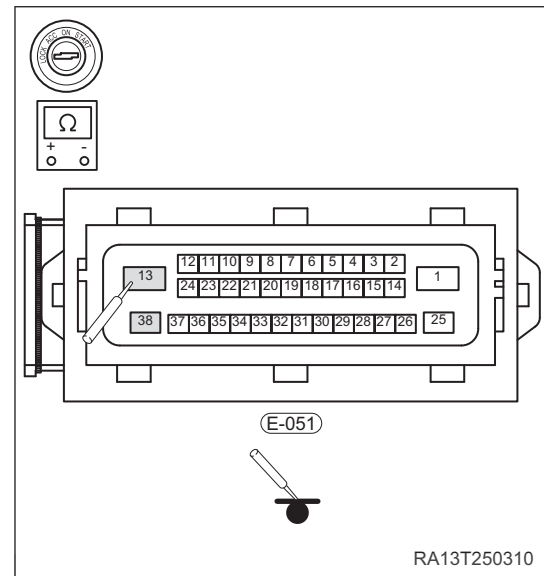


5 Check wire harness and connector (ABS/ESC control module assembly - body ground)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between ABS/ESC control module assembly connector E-051 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (13) - Body ground	Always	Continuity
E-051 (38) - Body ground	Always	Continuity

**NG**

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

OK**6 Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

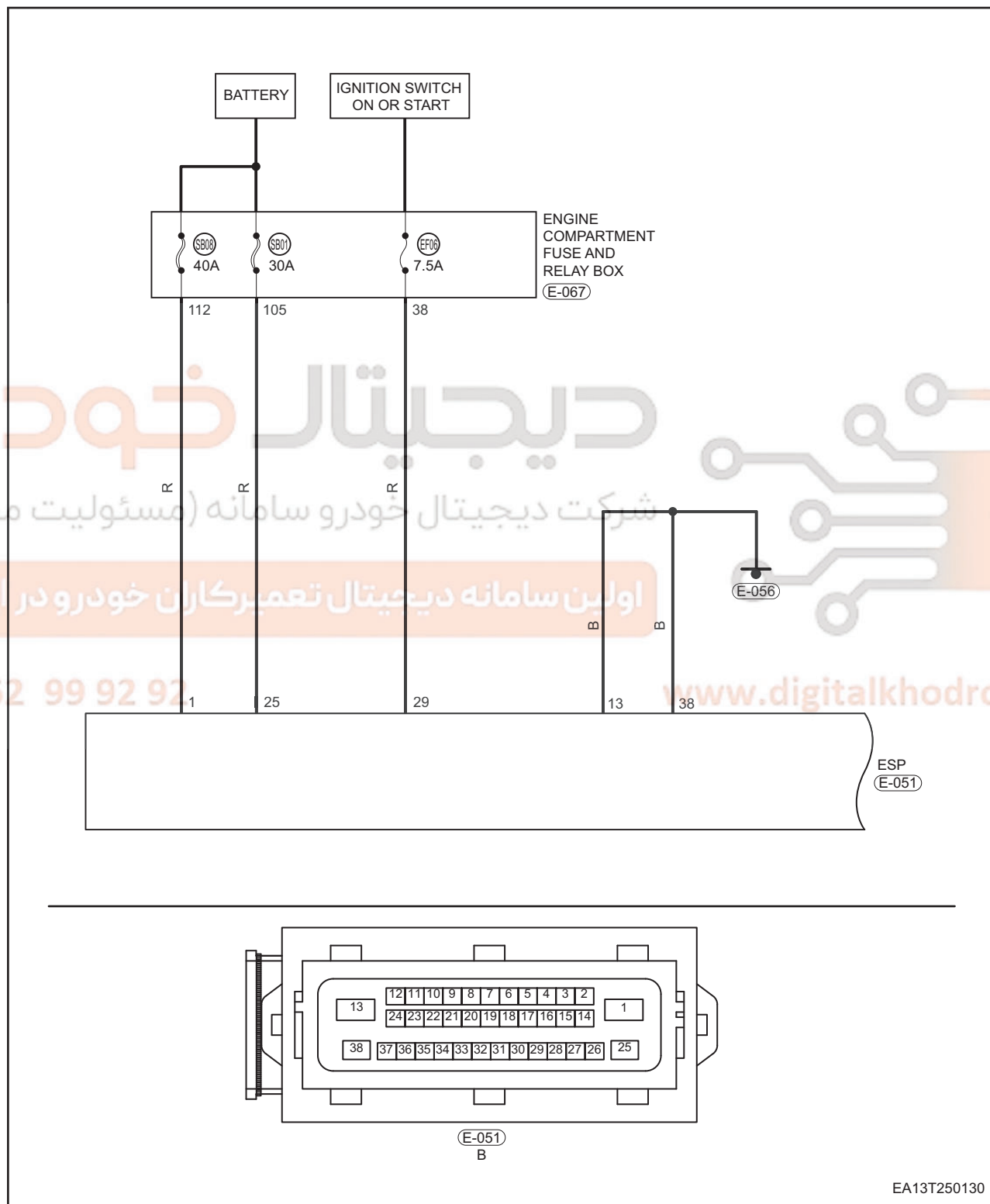
System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC	C1003-04	Valve Relay Open, Short To GND, Valve Relay Short To BAT
DTC	C1004-04	Solenoid Valve Open, Short To GND, Solenoid Valve Short To BAT, Leakage Current



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1003-04	Valve Relay Open, Short To GND, Valve Relay Short To BAT	This DTC occurs when any of following conditions is met:	- Abnormal valve relay power supply - ECU has poor ground connection - Fuse malfunction - Solenoid valve is short to power supply or ground, or circuit is open. - System overheat protection - ABS/ESC damaged.
C1004-04	Solenoid Valve Open, Short To GND, Solenoid Valve Short To BAT, Leakage Current	Valve power supply is malfunctioning. (power supply is short to ground or ground wire is open) Solenoid valve temperature is too high. (overheat protection) 5 or more solenoid valves are short. (fuse) Activate corresponsive solenoid valve, but no feedback. Solenoid valve itself is malfunctioning. Valve set relay is malfunctioning.	

 CAUTION

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

Diagnosis Procedure

1	Cool engine down to check if malfunction is repaired
---	--

YES

System overheat protection

NO

2	Check fuse
---	------------

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse SB01 (30 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse SB01 (30 A)

25 - BRAKE CONTROL SYSTEM

OK

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

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

OK

4 Check wire harness and connector (ABS/ESC control module assembly - battery)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Connect the negative battery cable.
- Turn ignition switch to ON.
- Using a digital multimeter, measure voltage between ABS/ESC control module assembly connector E-051 and body ground to check if power supply circuit is normal according to table below.

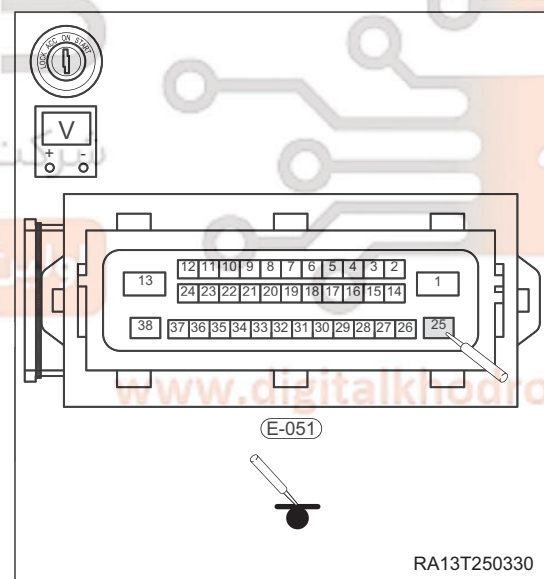
Standard Voltage

Multimeter Connection	Condition	Specified Condition
E-051 (25) - Body ground	Always	9 to 16 V

NG

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

OK

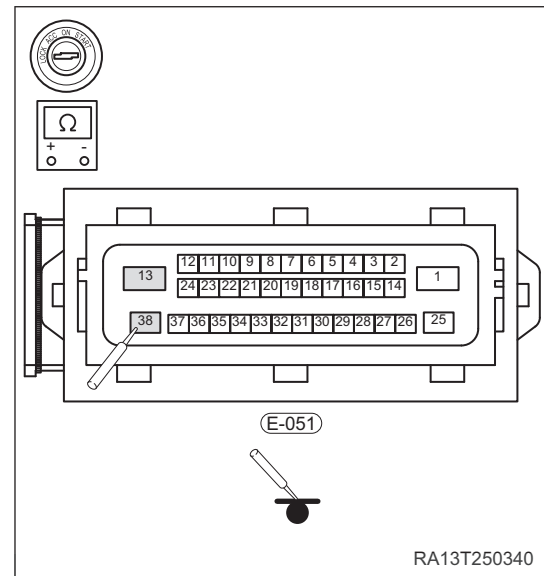


5 Check wire harness and connector (ABS/ESC control module assembly - body ground)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between ABS/ESC control module assembly connector E-051 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (38) - Body ground	Always	Continuity
E-051 (13) - Body ground	Always	Continuity

**NG**

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

OK**6 Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC	C0044-01	Master Pressure Sensor Open, Short To BAT/GND
DTC	C0044-28	Master Pressure Sensor Noisy Signal, Offset

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

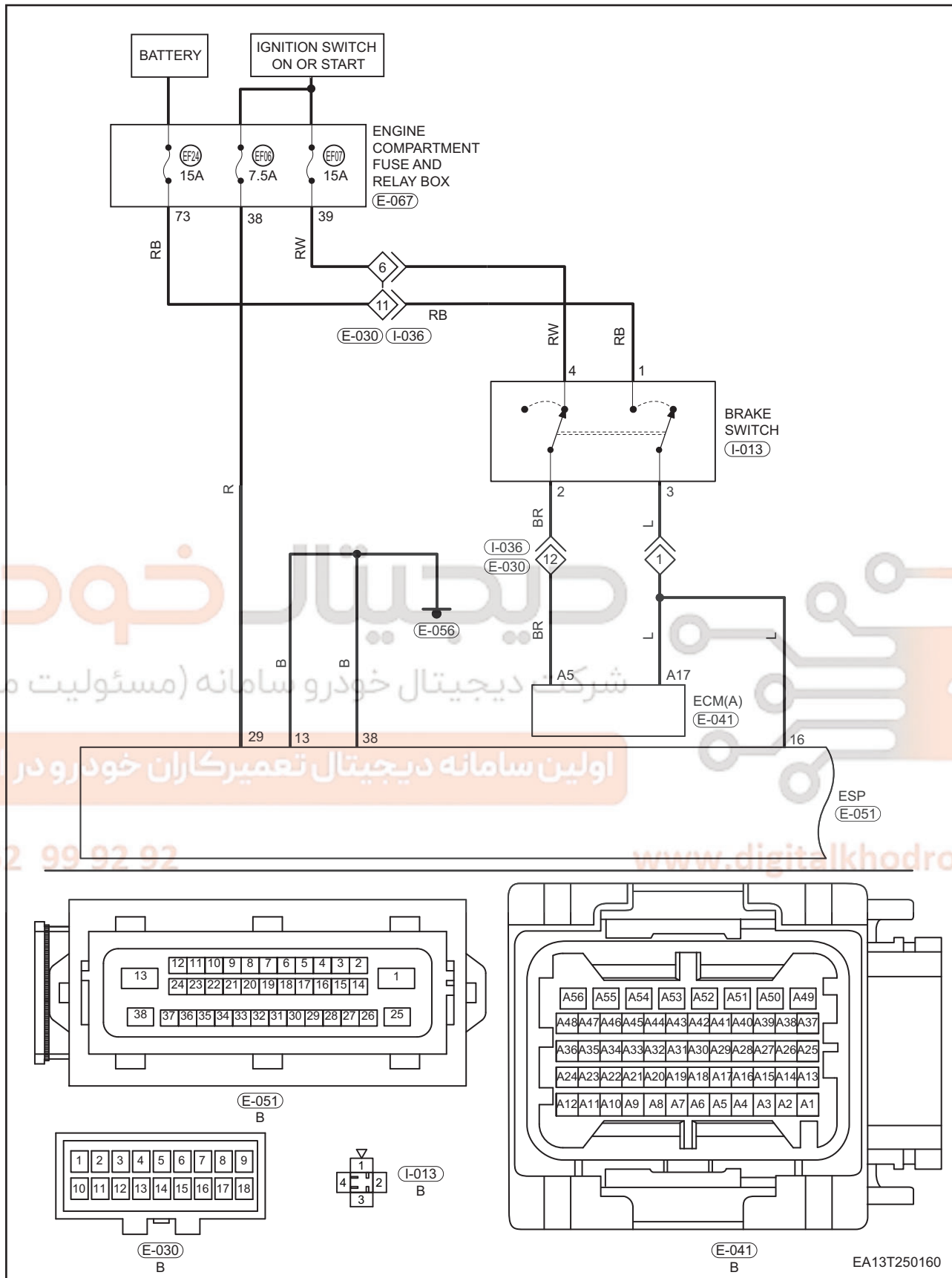
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0044-01	Master Pressure Sensor Open, Short To BAT/GND	This DTC occurs when any of following conditions is met:	- Brake light switch is short or open - Pressure sensor malfunction - ESC module malfunction
C0044-28	Master Pressure Sensor Noisy Signal, Offset	Pressure signal is interrupted. Pressure value is abnormal. (less than initial value)	

 CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse EF24 (15 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse EF24 (15 A)

OK

2 Check ABS/ESC control module assembly wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

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

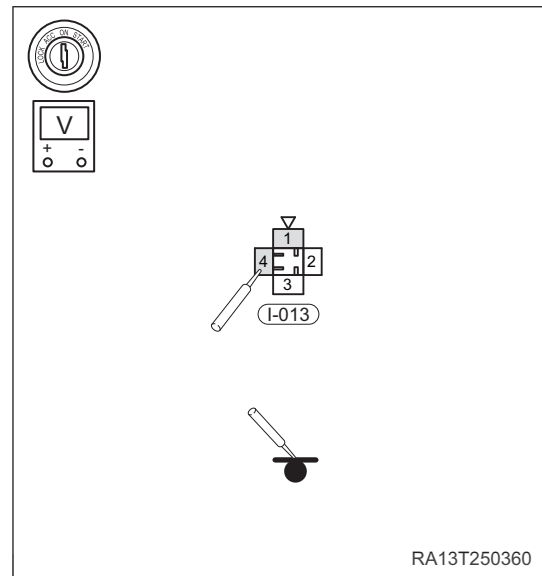
OK

3**Check brake light switch circuit (brake switch connector I-013 - battery power supply)**

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the brake switch connector I-013.
- Connect the negative battery cable.
- Turn ignition switch to ON.
- Using a digital multimeter, measure voltage between brake switch connector I-013 and body ground to check if power supply circuit is normal according to table below.

Standard Voltage

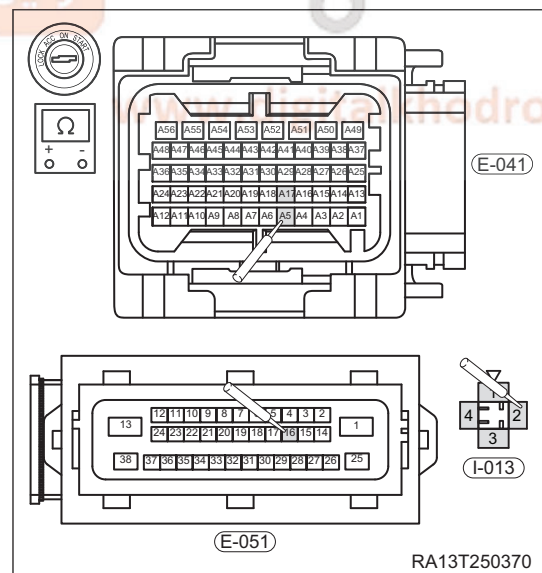
Multimeter Connection	Condition	Specified Condition
I-013 (4) - Body ground	Always	9 to 16 V
I-013 (1) - Body ground	Always	9 to 16 V

NG**Repair or replace engine wire harness and connector****OK****4****Check wire harness and connector for an open or short failure**

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the brake switch connector I-013.
- Disconnect ECM (A) connector E-041.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between brake switch connector I-013 and wire harness connector to check if system circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-041 (A5) - I-013 (2)	Always	Continuity
E-041 (A17) and E-051 (16) - I-013 (3)	Always	Continuity
I-013 (4) - I-013 (1)	Always	No continuity



25 - BRAKE CONTROL SYSTEM

Multimeter Connection	Condition	Specified Condition
I-013 (2) - I-013 (3)	Always	No continuity

NG

Repair or replace wire harness and connector

OK

5

Replace brake switch

OK

6

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

Replace ABS/ESC control module assembly

DTC	C0069-54	The Zero Value Calibration For G Sensor Is Not Done
DTC	C0069-09	Sensor Initialization Error
DTC	C0069-64	Sensor Abnormal Signal
DTC	C0069-86	G Sensor Sensor Fail

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

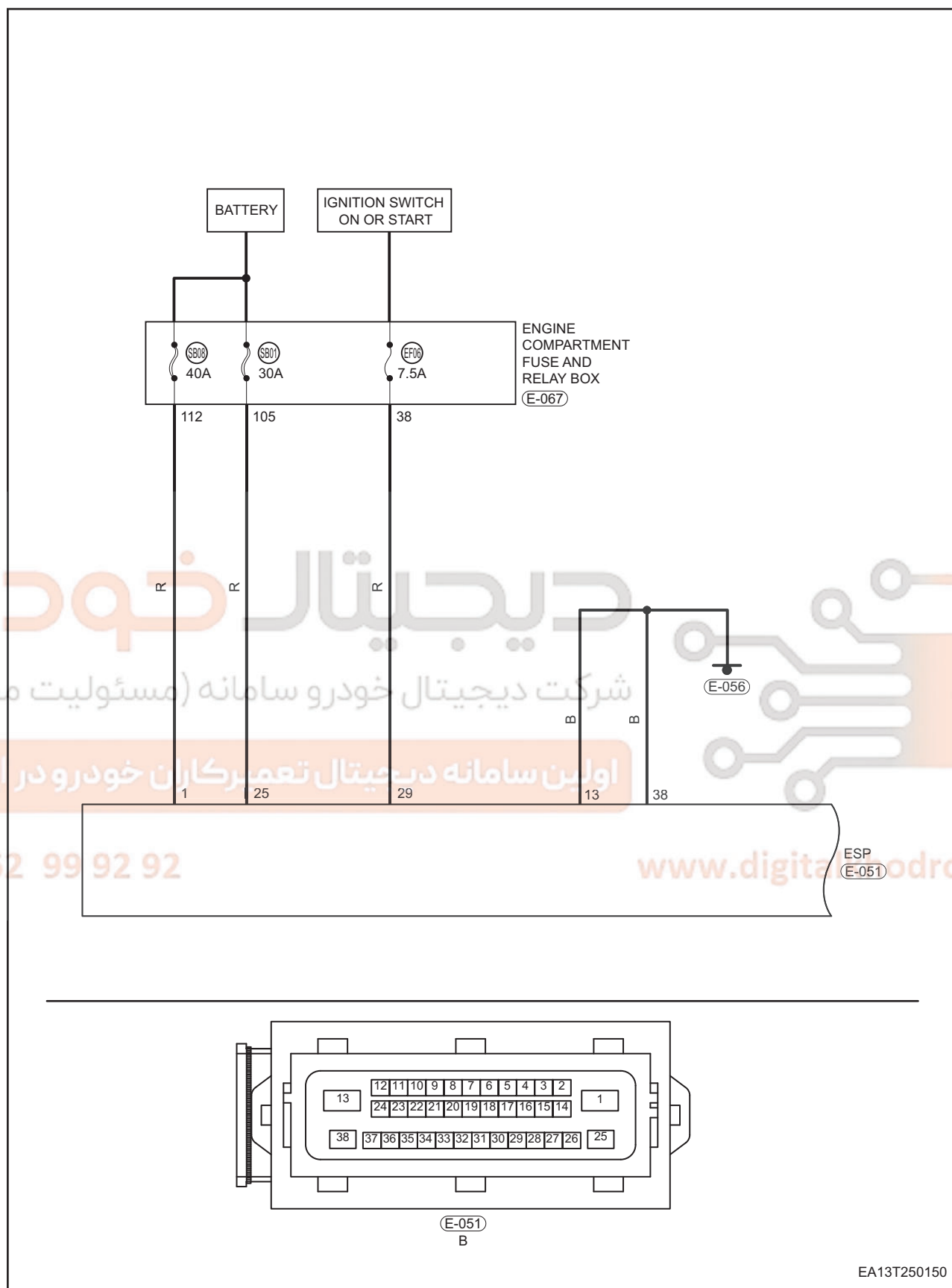
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0069-54	The Zero Value Calibration For G Sensor Is Not Done	This DTC occurs when any of following conditions is met:	- Calibration for G sensor is not done - ESC module malfunction
C0069-09	Sensor Initialization Error	Calibration for yaw rate sensor is not done	
C0069-64	Sensor Abnormal Signal	Yaw rate sensor signal is abnormal.	
C0069-86	G Sensor Sensor Fail	Yaw rate sensor is malfunctioning.	

 CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse EF06 (7.5A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse EF06 (7.5A)

OK

2 Calibrate yaw rate sensor

OK

Calibration for sensor is not done

NG

3 Check ESC control module assembly wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

25 - BRAKE CONTROL SYSTEM

NG

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

OK

4

Check wire harness and connector (ABS/ESC control module assembly - battery)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Connect the negative battery cable.
- Turn ignition switch to ON.
- Using a digital multimeter, measure voltage between ABS/ESC control module assembly connector E-051 and body ground to check if power supply circuit is normal according to table below.

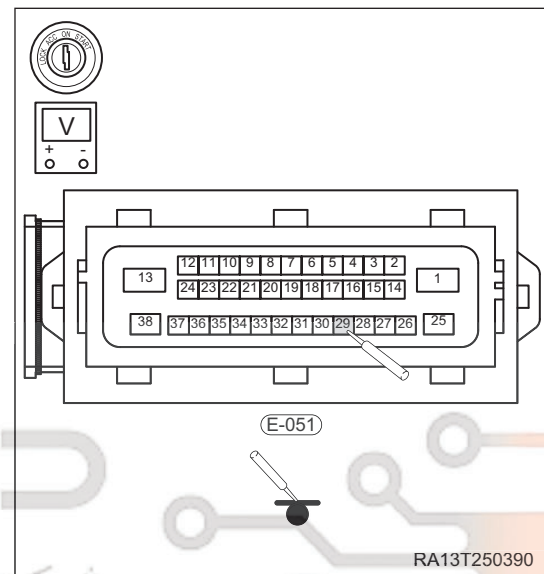
Standard Voltage

Multimeter Connection	Condition	Specified Condition
E-051 (29) - Body ground	Always	9 to 16 V

NG

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

OK

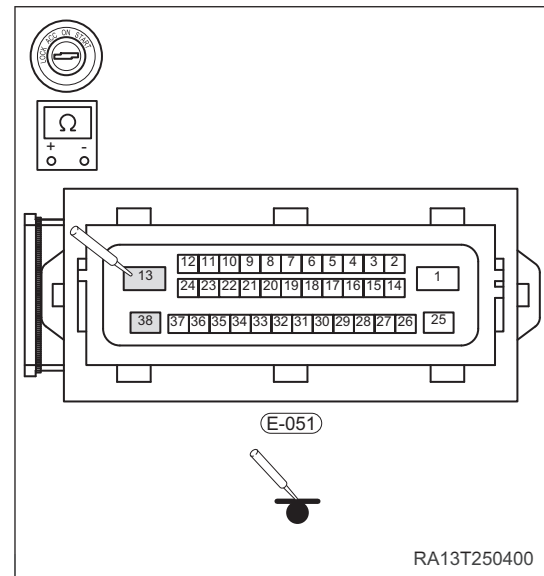


5 Check wire harness and connector (ABS/ESC control module assembly - body ground)

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between ABS/ESC control module assembly connector E-051 and body ground to check if system ground circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (13) - Body ground	Always	Continuity
E-051 (38) - Body ground	Always	Continuity

**NG**

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

OK**6 Reconfirm DTCs**

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

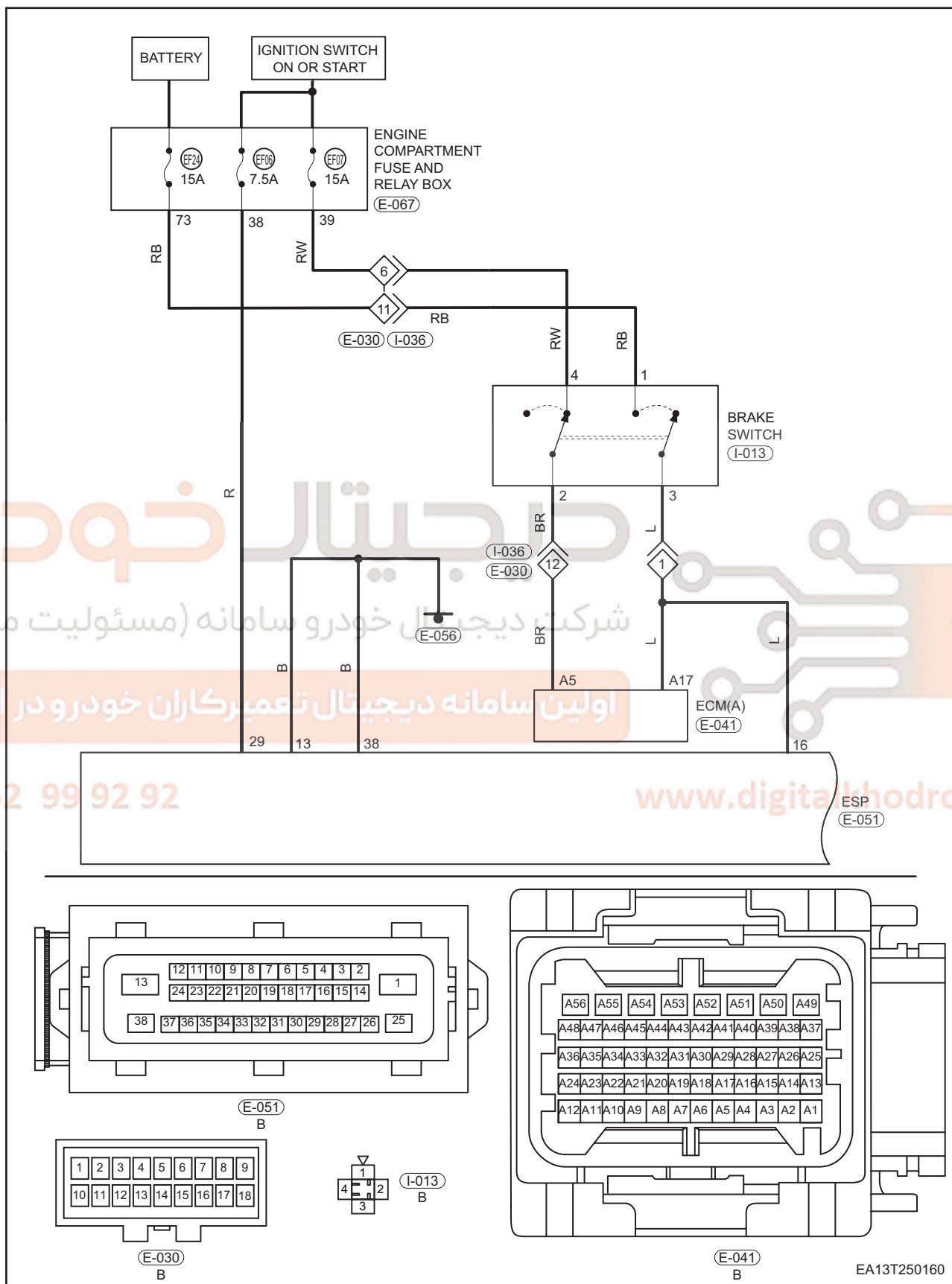
System operates normally

YES

Replace ABS/ESC control module assembly

25 - BRAKE CONTROL SYSTEM

DTC C0040-14 Brake Light Switch Open, Short To BAT/GND



25 - BRAKE CONTROL SYSTEM

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C0040-14	Brake Light Switch Open, Short To BAT/ GND	This DTC occurs when any of following conditions is met: BLS signal is abnormal. BLS signal is interrupted.	- BLS line is short or open. - Incorrect BLS installation - BLS damaged

 CAUTION

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

Diagnosis Procedure

1 Check fuse

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Remove fuse EF24 (15 A) from engine compartment fuse and relay box.
- Check if fuse is blown.

NG

Replace fuse RF02 EF24 (15 A)

OK

2 Check wire harness and connector

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the brake light switch connector.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

NG

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

OK

25

25 - BRAKE CONTROL SYSTEM

3

Check BLS installation, jig and wire harness

NG

Install BLS, jig and wire harness properly

OK

4

Check brake light switch circuit for an open, short failure

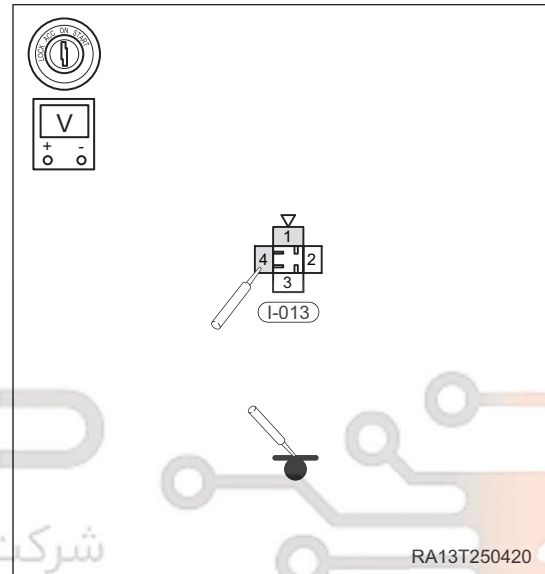
- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the brake switch connector I-013.
- Connect the negative battery cable.
- Turn ignition switch to ON.
- Using a digital multimeter, measure voltage between brake switch connector I-013 and body ground to check if power supply circuit is normal according to table below.

Standard Voltage

Multimeter Connection	Condition	Specified Condition
I-013 (4) - Body ground	Always	9 to 16 V
I-013 (1) - Body ground	Always	9 to 16 V

NG

Repair or replace wire harness and connector



RA13T250420

OK

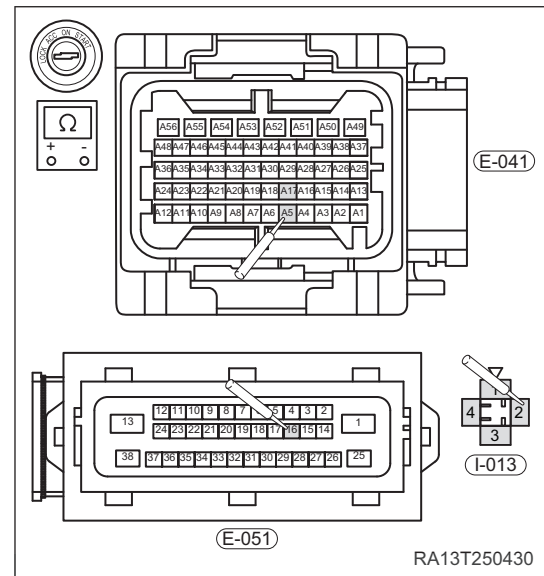
25 - BRAKE CONTROL SYSTEM

5**Check wire harness and connector for an open or short failure**

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the brake switch connector I-013.
- Disconnect ECM (A) connector E-041.
- Disconnect the ESC control module assembly connector E-051.
- Using a digital multimeter, check for continuity between brake switch connector I-013 and wire harness connector to check if system circuit is normal according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-041 (A5) - I-013 (2)	Always	Continuity
E-041 (A17) and E-051 (16) - I-013 (3)	Always	Continuity
I-013 (4) - I-013 (1)	Always	No continuity
I-013 (2) - I-013 (3)	Always	No continuity

NG**Repair or replace brake light switch, wire harness and connector**

RA13T250430

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

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

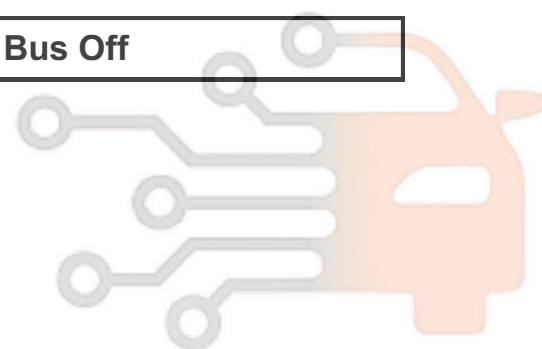
NO**System operates normally****YES****25****Replace ABS/ESC control module assembly**

25 - BRAKE CONTROL SYSTEM

DTC	U1300-55	Software Configuration Error
DTC	U0140-87	Lost Communication With BCM
DTC	U0101-87	Lost Communication With TCU
DTC	U0100-87	Lost Communication With EMS
DTC	U0126-87	Lost Communication With SAM
DTC	U0401-81	Invalid Data Received From EMS
DTC	U0402-81	Invalid Data Received From TCU
DTC	U0428-81	Invalid Data Received From SAM
DTC	U0422-81	Invalid Data Received From BCM
DTC	U0073-00	Control Module Communication Bus Off

شرکت دیجیتال خودرو (مسئولیت محدود)

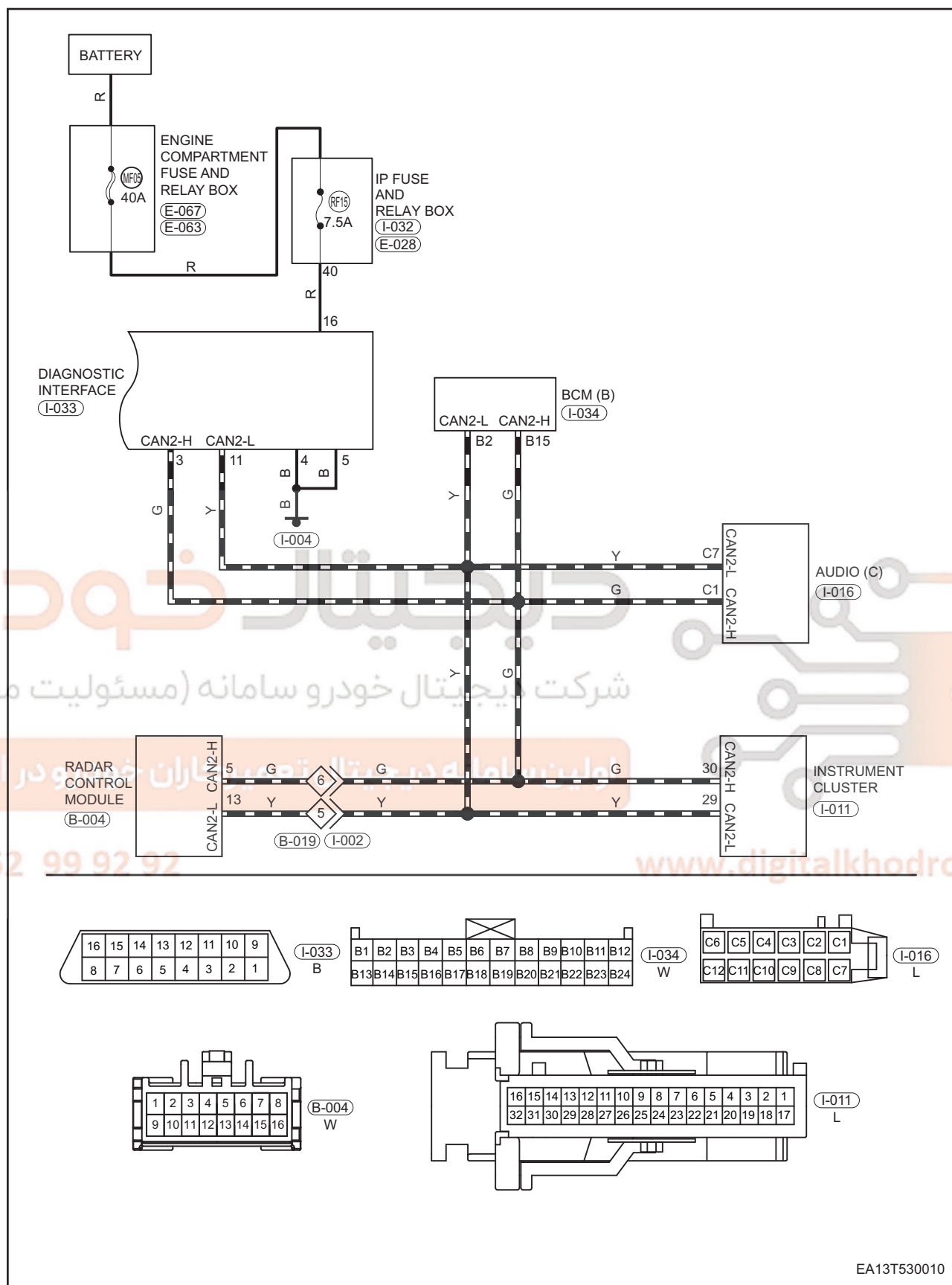
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

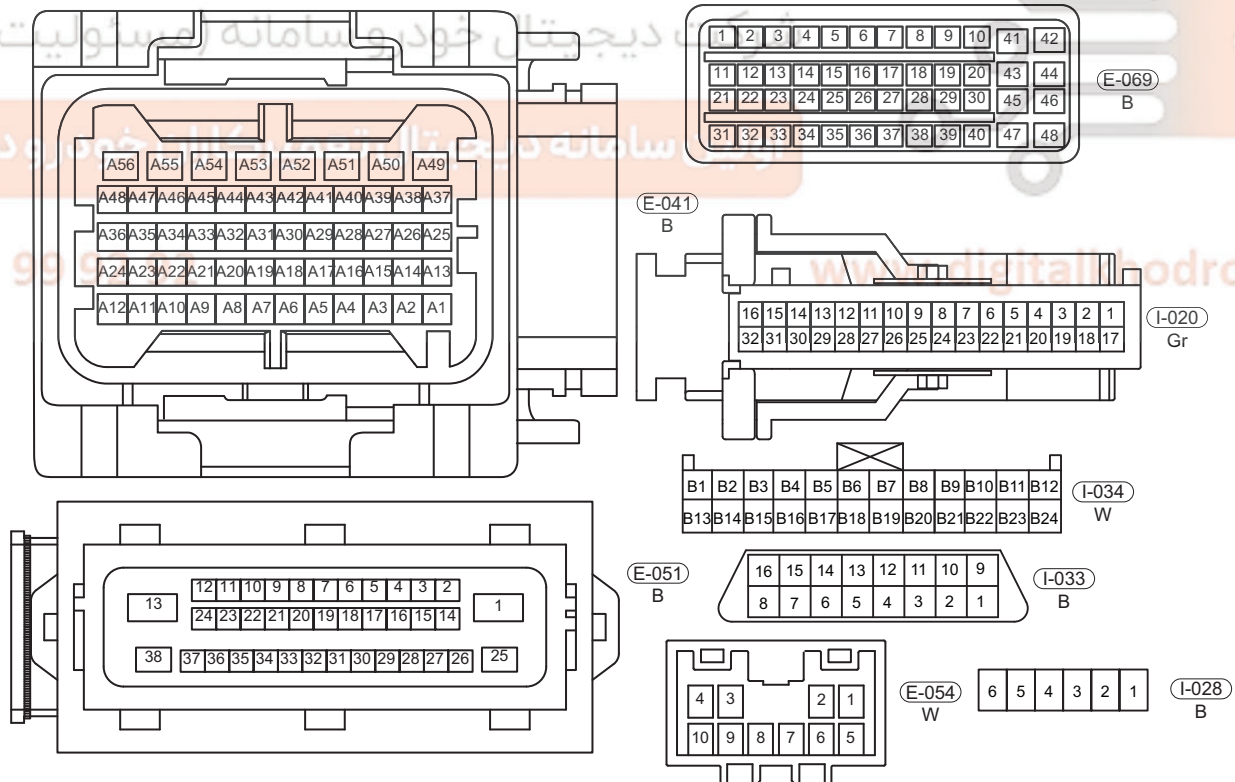
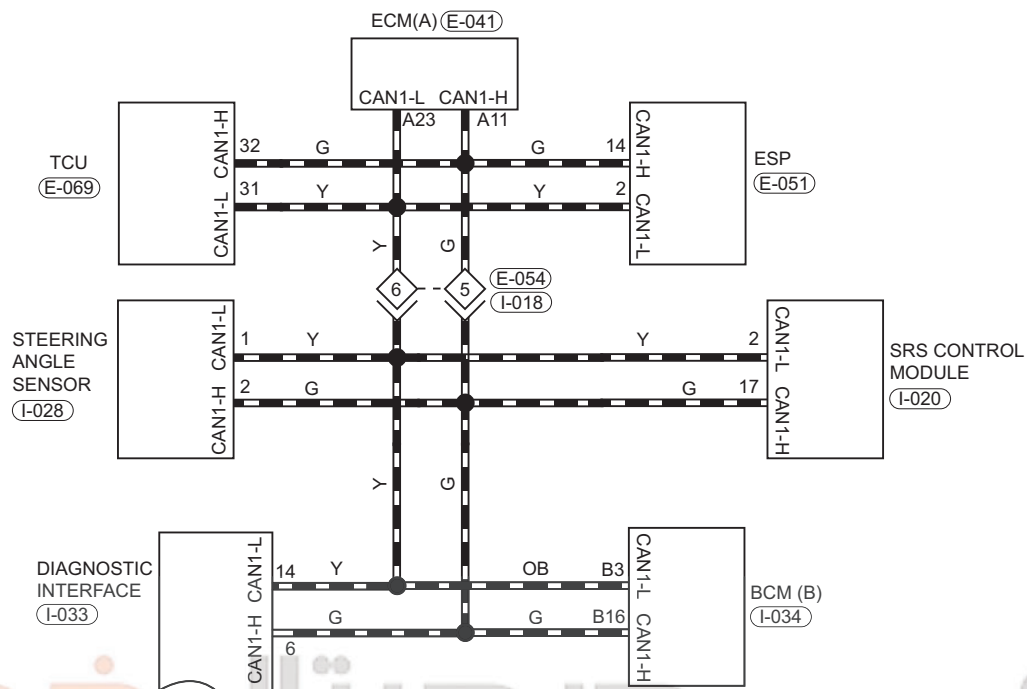
www.digitalkhodro.com

25 - BRAKE CONTROL SYSTEM



EA13T530010

25 - BRAKE CONTROL SYSTEM



DTC	DTC Definition	DTC Detection Condition	Possible Cause
U1300-55	Software Configuration Error	This DTC occurs when any of following conditions is met: Vehicle CAN bus communication, configuration information and line malfunction ECM overtime ECM error TCU overtime TCU error	- CAN controller malfunction - CAN configuration information unmatched - CAN communication off - CAN bus line malfunction - ECM software version unmatched - ECM damaged - TCU software version unmatched - TCU software version unmatched - BCM damaged - ESC (ABS) damaged
U0140-87	Lost Communication With BCM		
U0101-87	Lost Communication With TCU		
U0100-87	Lost Communication With EMS		
U0126-87	Lost Communication With SAM		
U0401-81	Invalid Data Received From EMS		
U0402-81	Invalid Data Received From TCU		
U0428-81	Invalid Data Received From SAM		
U0422-81	Invalid Data Received From BCM		
U0073-00	Control Module Communication Bus Off		

CAUTION

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

Diagnosis Procedure

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

- Turn ignition switch to ON.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the Engine Control Module (ECM) connector E-041.
- Disconnect the Body Control Module (BCM) connector I-034.
- Disconnect the Transmission Control Module (BCM) connector E-069.
- Disconnect the steering angle sensor connector I-028.
- Disconnect the SRS control module (SRS) connector I-020.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Check for broken, bent, protruded or corroded terminals.
- Check if terminal contact pins of related connectors are in good condition.

25 - BRAKE CONTROL SYSTEM

NG

Repair or replace wire harness and connector

OK

2

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

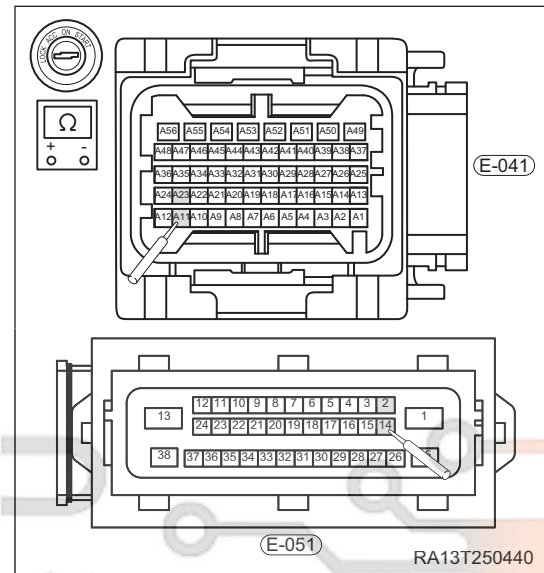
- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the Engine Control Module (ECM) connector E-041.
- Using a digital multimeter, check for continuity between terminals of connectors E-051 and E-041 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (14) - E-041 (A11)	Always	Continuity
E-051 (2) - E-041 (A23)	Always	No continuity

NG

Repair or replace engine wire harness and connector



OK

25 - BRAKE CONTROL SYSTEM

3

Check CAN communication control circuit (ABS/ESC control module assembly - Transmission Control Unit (TCU))

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the Transmission Control Module (BCM) connector E-069.
- Using a digital multimeter, check for continuity between terminals of connectors E-051 and E-069 to check if there is an open in CAN communication circuit according to table below.

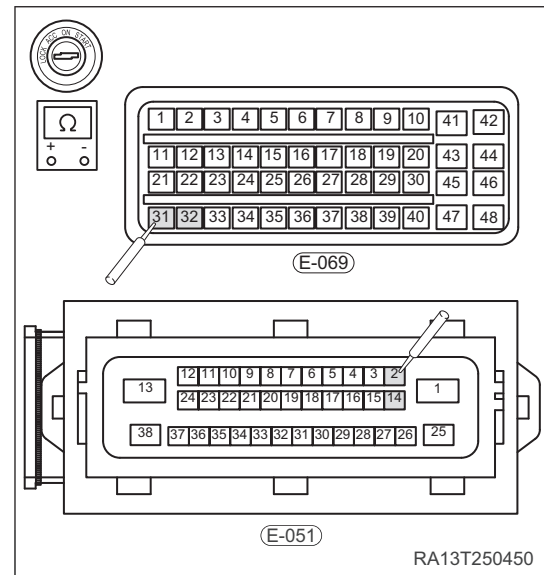
Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (2) - E-069 (31)	Always	Continuity
E-051 (14) - E-069 (32)	Always	Continuity

NG

Repair or replace engine wire harness and connector

OK



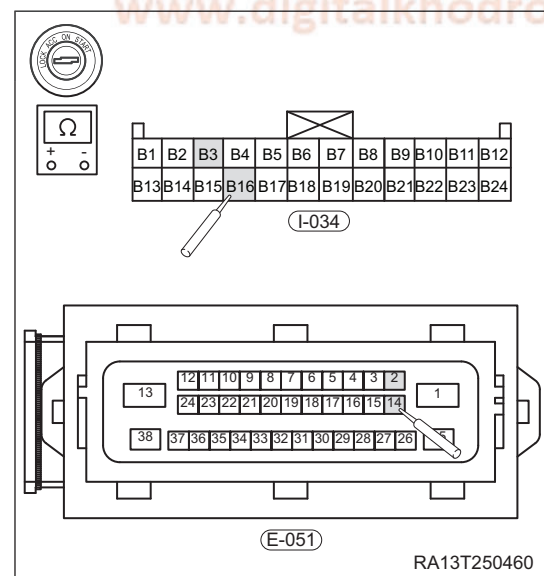
4

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

- Turn ignition switch to LOCK.
- Disconnect the negative battery cable.
- Disconnect the ABS/ESC control module assembly connector E-051.
- Disconnect the Body Control Module (BCM) connector I-034.
- Using a digital multimeter, check for continuity between terminals of connectors E-051 and I-034 to check if there is an open in CAN communication circuit according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
E-051 (14) - I-034 (B16)	Always	Continuity
E-051 (2) - I-034 (B3)	Always	Continuity



25 - BRAKE CONTROL SYSTEM

NG

Repair or replace body/instrument panel wire harness and connector

OK

5

Check other wire harness and connector of CAN communication control circuit ([See page 53-10](#))

NG

Repair or replace wire harness and connector

OK

6

Check module software version information

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

NG

ECM/TCM software version is unmatched

OK

7

Reconfirm DTCs

- Use X-431 3G diagnostic tester to clear DTCs.
- Start the engine.
- Drive vehicle at 15 km/h or above, read ABS/ESC control module assembly DTC again with X-431 3G diagnostic tester.
- Check if same DTC is still output.

NO

System operates normally

YES

Replace ABS/ESC control module assembly

ON-VEHICLE SERVICE

ABS Bleeding

WARNING

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

CAUTION

- Brake fluid should meet Chery specified type (DOT4). DO NOT mix brake fluid with other types of brake fluid.
- Brake fluid has strong water absorbability, so be sure to place it in original sealed container.
- To prevent dust and other foreign matter from entering reservoir, wipe it off before removing reservoir cap.

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

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

HINT:

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

25 - BRAKE CONTROL SYSTEM

ABS/ESC Control Module Assembly

Removal

⚠ WARNING

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

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Drain brake fluid (See page 26-15).

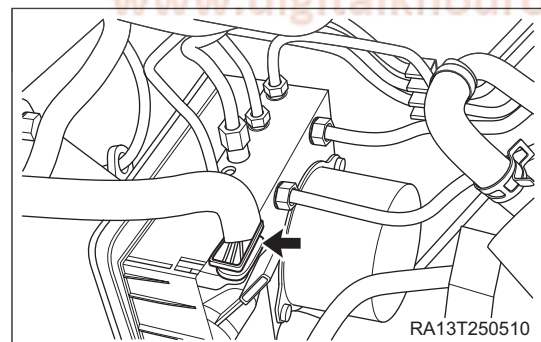
♻ ENVIRONMENTAL PROTECTION

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

👁 CAUTION

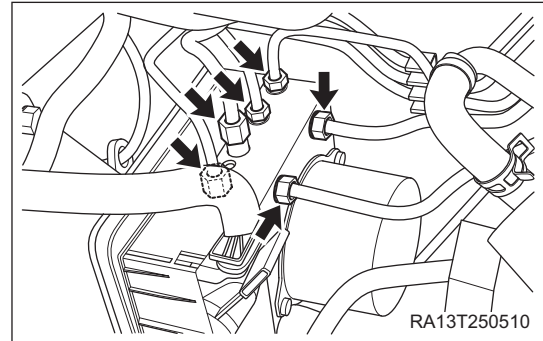
- Wash off brake fluid immediately if it contacts with any paint surface.

4. Remove the engine trim cover assembly.
5. Remove the ABS/ESC control module assembly.
 - a. Press lock area of ABS/ESC control module assembly connector, toggle connector lock bracket downward and disconnect ABS/ESC control module assembly connector (arrow).



25 - BRAKE CONTROL SYSTEM

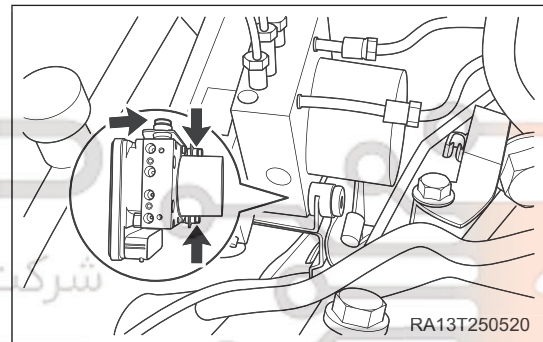
- b. Using a fixing wrench, carefully disconnect 6 brake pipe coupling plugs (arrow).
(Tightening torque: 12 - 16 N·m)



 CAUTION

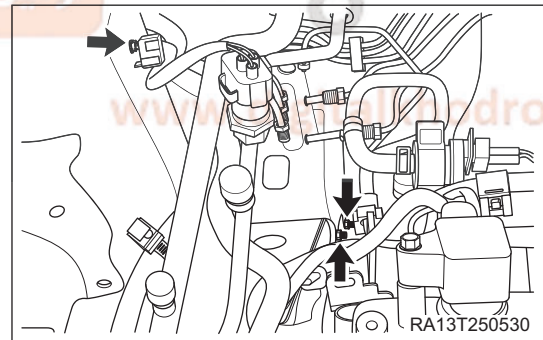
- When removing brake line, prevent foreign matter from entering ABS/ESC control module assembly threaded holes.
- After disconnecting brake line, sealing measure should be taken to prevent foreign matter from entering.

- c. Disengage insulators (arrow) from mounting bracket.
d. Remove the ABS/ESC control module assembly.
(Tightening torque: 10 ± 3 N·m)



6. Remove the ABS/ESC control module assembly mounting bracket.

- a. Remove 3 coupling nuts (arrow) between ABS/ESC control module assembly mounting bracket and body.
(Tightening torque: 10 ± 1 N·m)



- b. Remove the ABS/ESC control module assembly mounting bracket.

Installation

Installation is in the reverse order of removal.

25 - BRAKE CONTROL SYSTEM

 CAUTION

- ABS/ESC control module assembly contains hydraulic control module and electronic control module. As a unit, they cannot be repaired or replaced individually.
- Check insulator for aging or damage. Replace if necessary.
- When installing fixing bolts and screws, be sure to tighten them to specified torque.
- Perform ABS bleeding procedures for brake system after completing installation ([See page 26-12](#)).
- Using X-431 3G diagnostic tester, enter brake control system, record and clear trouble code, then drive vehicle to perform a road test, confirming that ABS/ESC system operates normally and feeling to depress brake pedal is good.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

Front Wheel Speed Sensor (Take Front Left Wheel As An Example)

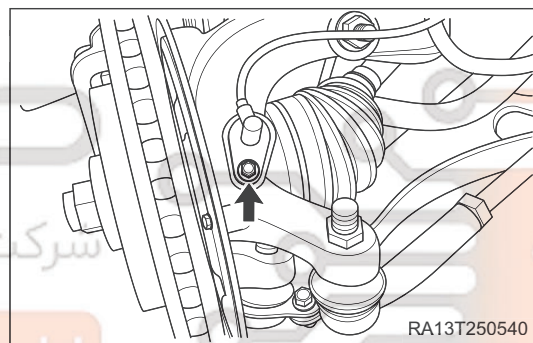
Removal

CAUTION

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

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
- Turn off all electrical equipment and the ignition switch.
 - Disconnect the negative battery cable.
 - Remove the front left wheel (See page 24-9).
 - Remove the front left wheel speed sensor.
 - Remove the coupling bolt (arrow) between front left wheel speed sensor and front left steering knuckle assembly, and disengage front left wheel speed sensor carefully.
(Tightening torque: 10 ± 1 N·m)



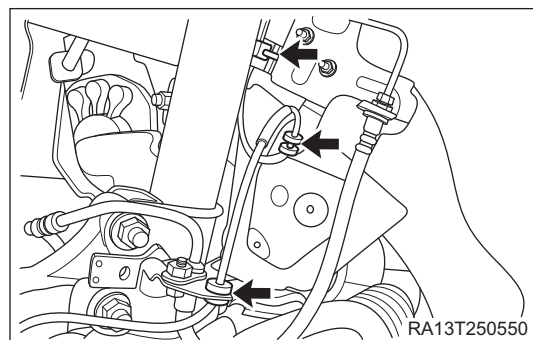
CAUTION

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

- Disengage attachment parts (arrow) of front left wheel speed sensor wire harness.

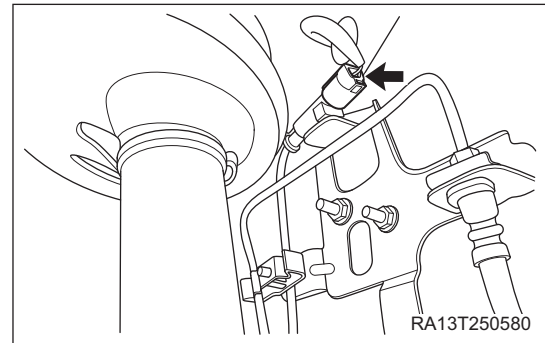
HINT:

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



25 - BRAKE CONTROL SYSTEM

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



- d. Detach wire harness connector fixing clip and remove front left wheel speed sensor.

Inspection

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

Installation

CAUTION

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

Rear Wheel Speed Sensor (Take Rear Left Wheel As An Example)

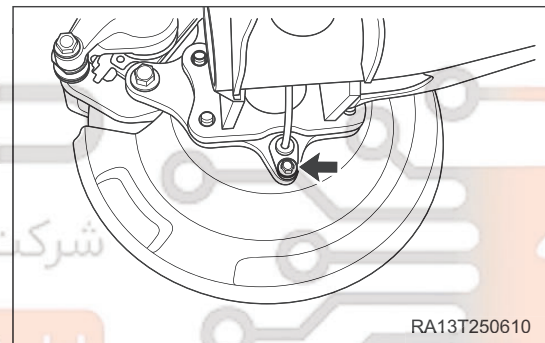
Removal

CAUTION

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

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
- Turn off all electrical equipment and the ignition switch.
 - Disconnect the negative battery cable.
 - Remove the rear left wheel (See page 24-9).
 - Remove the rear left wheel speed sensor.
 - Remove coupling bolt (arrow) between rear left wheel speed sensor and rear left steering knuckle assembly, and disengage rear left wheel speed sensor carefully. (Tightening torque: $10 \pm 1 \text{ N}\cdot\text{m}$)



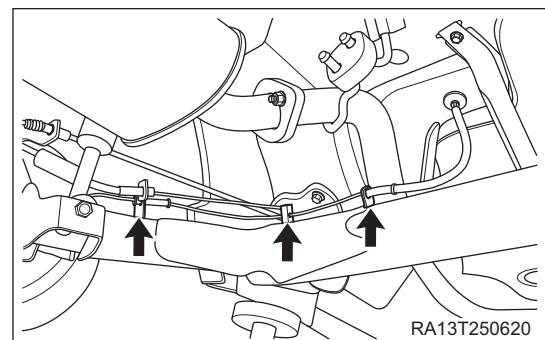
CAUTION

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

- Disengage attachment parts (arrow) of rear left wheel speed sensor wire harness.

HINT:

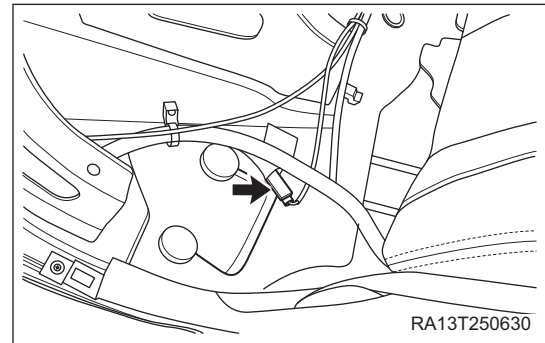
Observe winding direction of sensor wire harness to prevent incorrect installation.



- Remove rear seat and turn over carpet (See page 47-15).

25 - BRAKE CONTROL SYSTEM

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



- e. Disengage wire harness fixing rubber ring and remove rear left wheel speed sensor.

Inspection

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

Installation

CAUTION

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

Steering Angle Sensor

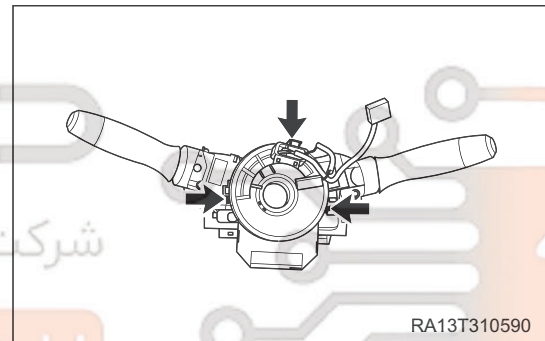
Removal

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

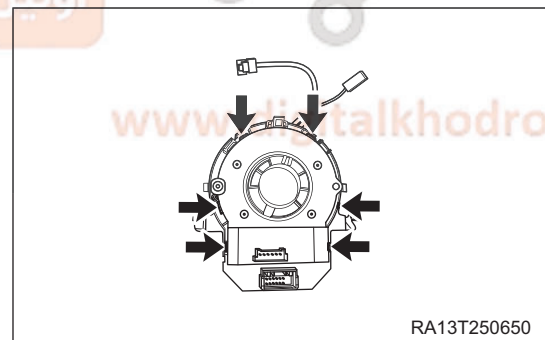
CAUTION

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

3. Position the front wheels straight ahead.
4. Remove the steering wheel assembly (See page 28-8).
5. Remove the combination switch cover assembly (See page 28-11).
6. Remove the combination switch (See page 28-13).
7. Remove the steering angle sensor.
 - a. Detach fixing claws (arrow) between combination switch and spiral cable.



- b. Detach angle sensor fixing claws (arrow) and separate spiral cable and angle sensor.



Installation

Installation is in the reverse order of removal.

25 - BRAKE CONTROL SYSTEM

 CAUTION

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

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

BRAKE

GENERAL INFORMATION	26-3	Brake Pedal Assembly	26-23
Description	26-3	On-vehicle Inspection	26-23
Specifications	26-5	Removal	26-24
Tools	26-7	Inspection	26-25
Circuit Diagram	26-8	Installation	26-25
DIAGNOSIS & TESTING	26-9	Front Disc Brake Assembly	26-26
Problem Symptoms Table	26-9	On-vehicle Inspection	26-27
Inspection	26-11	Removal	26-27
ON-VEHICLE SERVICE	26-12	Disassembly	26-28
Brake Bleeding	26-12	Inspection	26-31
Brake Fluid Replacement	26-15	Assembly	26-32
Brake Fluid Reservoir Assembly	26-16	Installation	26-34
On-vehicle Inspection	26-16	Front Brake Hose Assembly	26-35
Removal	26-16	Removal	26-35
Installation	26-17	Installation	26-36
Brake Master Cylinder Assembly	26-18	Rear Disc Brake Assembly	26-37
Removal	26-18	On-vehicle Inspection	26-37
Installation	26-19	Removal	26-38
Vacuum Booster with Brake Master Cylinder Assembly	26-20	Disassembly	26-39
On-vehicle Inspection	26-20	Inspection	26-42
Removal	26-21	Assembly	26-43
Inspection	26-22	Installation	26-46
Installation	26-22	Rear Brake Hose Assembly	26-47
		Removal	26-47
		Installation	26-48

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



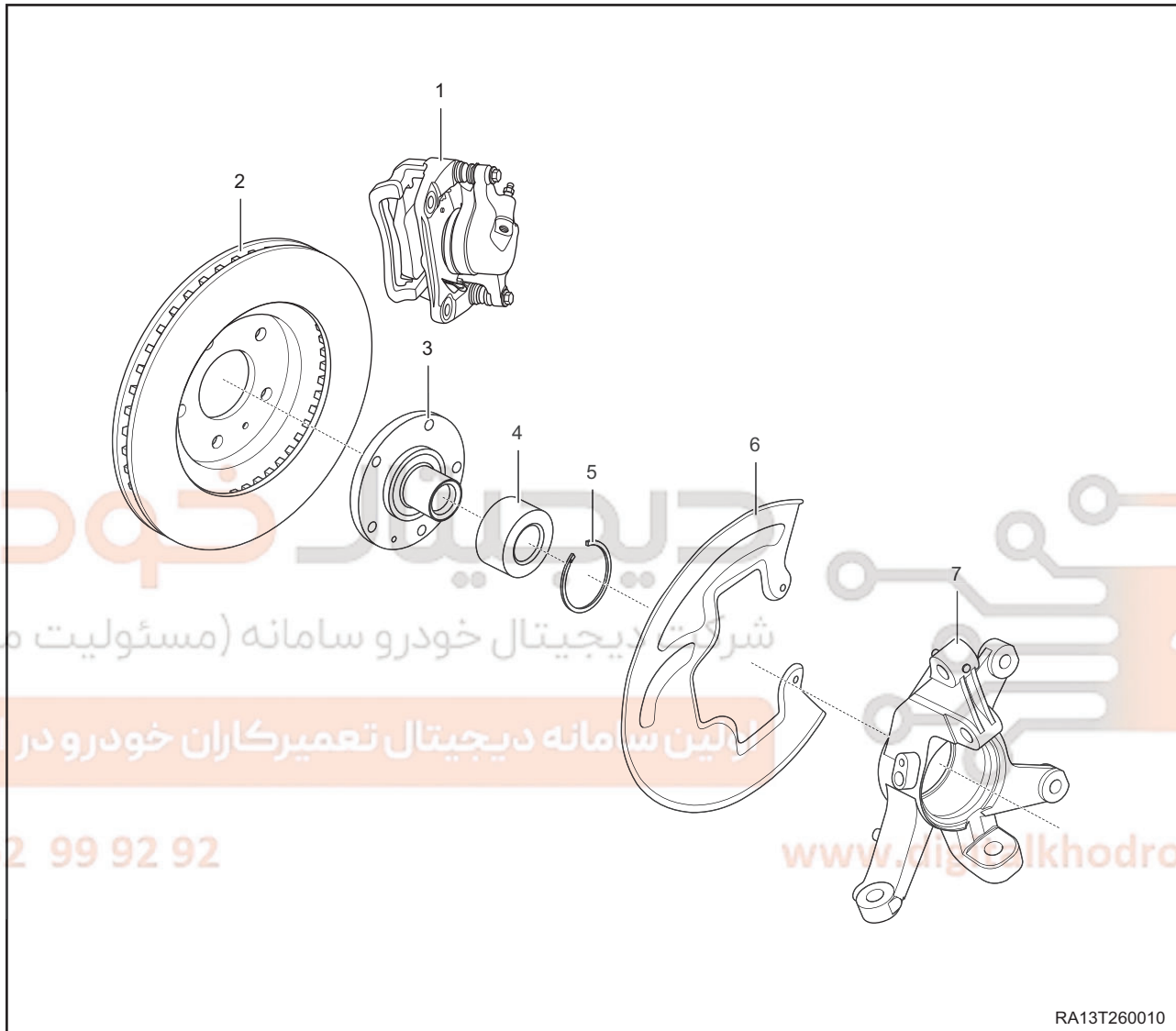
021 62 99 92 92

www.digitalkhodro.com

GENERAL INFORMATION

Description

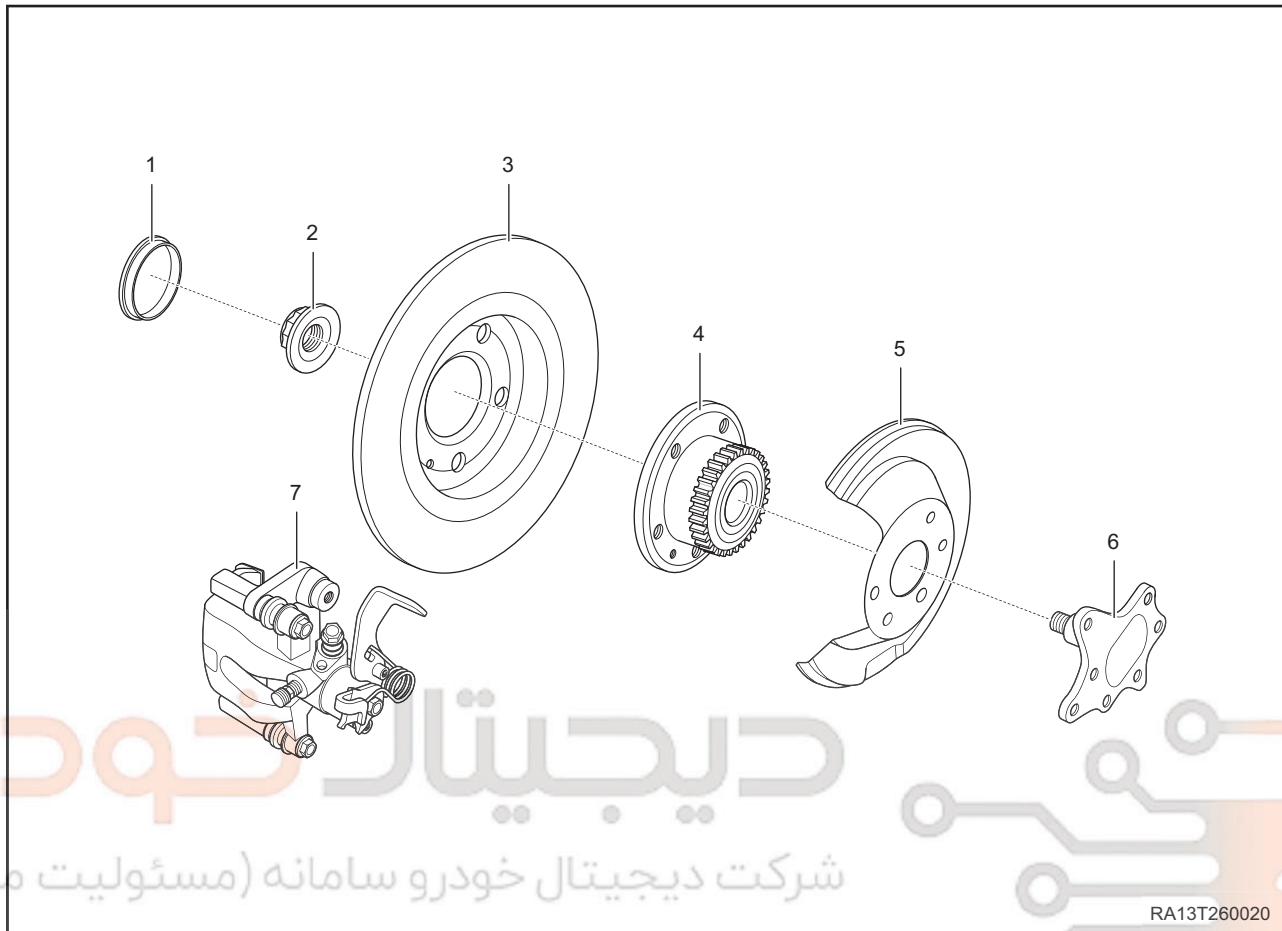
Front Ventilated Disc Brake Assembly



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

26 - BRAKE

Rear Disc Brake Assembly



RA13T260020

1 - Bearing End Cover	2 - Locking Nut
3 - Rear Brake Disc	4 - Rear Hub Bearing Assembly
5 - Rear Dust Guard	6 - Rear Hub Shaft
7 - Rear Brake Caliper Assembly	

Brake system uses following configuration: a ventilated disc brake is used for front wheel, and a solid disc brake is used for rear wheel (parking brake can adjust automatically as rear brake lining is worn, press brake caliper against brake lining with mechanical force, so apply pressure to brake disc).

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

Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	110 ± 10
Coupling Plug Between Brake Master Cylinder Assembly and Brake Pipe	16 ± 1
Coupling Nut Between Brake Master Cylinder Assembly and Vacuum Booster Assembly	23 ± 2
Coupling Nut Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2
Coupling Bolt Between Brake Pedal Assembly and Body	23 ± 2
Coupling Plug Between Front Brake Caliper Assembly and Front Brake Hose Assembly	16 ± 1
Coupling Bolt Between Front Brake Caliper Assembly and Front Steering Knuckle Assembly	70 ± 5
Front Brake Disc Locating Screw	4.5 ± 0.5
Front Brake Caliper Bleeder Plug	9 - 11
Guide Bolt Between Front Brake Caliper Fixing Bracket and Front Brake Cylinder Assembly	22 - 32
Coupling Plug Between Front Brake Hose Assembly and Front Brake Pipe	16 ± 1
Coupling Bolt Between Rear Brake Caliper Assembly and Rear Brake Hose Assembly	16 ± 1
Coupling Bolt Between Rear Brake Caliper Assembly and Brake Caliper Mounting Board Assembly	70 ± 5
Rear Brake Disc Locating Screw	4.5 ± 0.5
Rear Brake Caliper Bleeder Plug	9 - 11
Guide Bolt Between Rear Brake Caliper Fixing Bracket and Rear Brake Cylinder Assembly	23 ± 2
Coupling Plug Between Rear Brake Hose Assembly and Brake Pipe	16 ± 1
Rear Hub Shaft Locking Nut	300 ± 20
Rear Left and Right Hub Shaft Fixing Bolt	70 ± 5

26 - BRAKE

Front Disc Brake

Description	Standard Thickness (mm)	Minimum Thickness (mm)	Maximum Runout (mm)
Front Brake Disc	25	20	0.06
Front Brake Lining	11.2	2.2	-

Rear Disc Brake

Description	Standard Thickness (mm)	Minimum Thickness (mm)	Maximum Runout (mm)
Rear Brake Disc	9	7	0.06
Rear Brake Lining	9.5	2	-

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



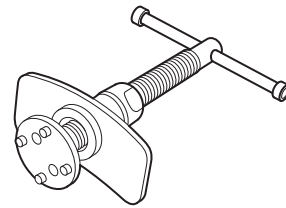
021 62 99 92 92

www.digitalkhodro.com

Tools

Special Tool

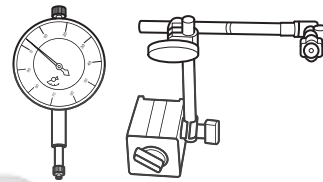
Brake Caliper Piston Pressing Tool



RCH0000053

General Tools

Dial Indicator and Magnetic Holder



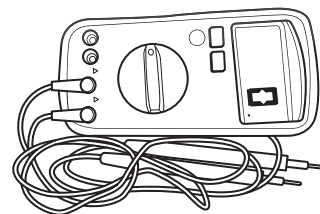
RCH0000023

Vernier Caliper



RCH0000019

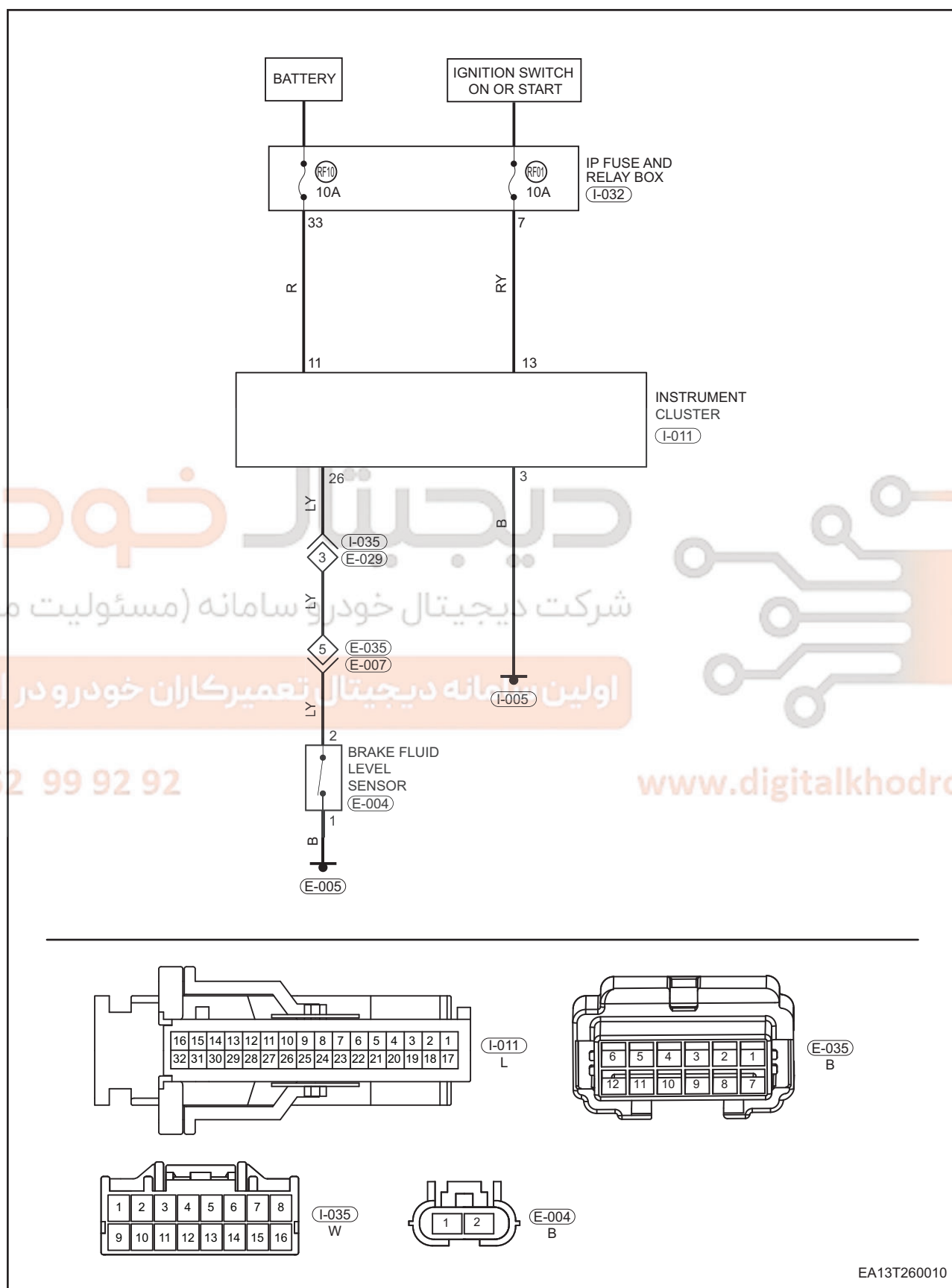
Digital Multimeter



RCH0000002

Circuit Diagram

Brake System



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
Noise in brake	Front brake lining (cracked, deformed, dirty or burnished)	26-31
	Rear brake lining (cracked, deformed, dirty or burnished)	26-42
	Front disc brake guide bolt guide pin (worn)	26-29
	Rear disc brake guide bolt guide pin (worn)	26-40
	Front brake caliper assembly fixing bolt (loose)	26-27
	Rear brake caliper assembly fixing bolt (loose)	26-38
	Front brake disc (scored)	26-27
	Rear brake disc (scored)	26-37
	Brake disc runout (excessive)	26-27
	Parking brake return tension spring (damaged or insufficient elasticity)	26-38
Hard pedal but braking inefficient	Front brake disc (foreign matter)	26-32
	Rear brake disc (foreign matter)	26-43
	Front brake lining (worn, cracked, deformed, oily or burnished)	26-31
	Rear brake lining (worn, cracked, deformed, oily or burnished)	26-42
	Front brake disc (unevenly worn)	26-27
	Rear brake disc (unevenly worn)	26-37
Hard pedal (firm-depress unable to lock-up wheels)	Vacuum booster pushrod position (incorrect)	26-23
	Booster system (vacuum leaks)	26-21
Pedal overtravel (vehicle stops normally)	Vacuum booster (bounce)	26-21
Pedal pulsates/bounces during braking	Brake system (air ingress)	26-12
	Brake system (leaked)	26-12
Pedal pulsates/bounces during braking	Brake disc (unevenly worn)	26-27

26 - BRAKE

Symptom	Suspected Area	See page
Low or spongy pedal	Brake system (air ingress)	26-12
	Brake system (leaked)	26-12
	Front brake piston seal (worn or damaged)	26-30
	Rear brake piston seal (worn or damaged)	26-42
	Brake master cylinder assembly (malfunction)	26-18
	Vacuum booster pushrod position (incorrect)	26-23
Vehicle pulls during braking	Front brake piston (catching or frozen)	26-30
	Rear brake piston (catching or frozen)	26-41
	Front brake lining (dirty, cracked or deformed)	26-31
	Rear brake lining (dirty, cracked or deformed)	26-42
	Front brake disc (unevenly worn)	26-27
	Rear brake disc (unevenly worn)	26-37
Brake catching	Brake pedal free play (minimum)	26-23
	Parking brake control mechanism stroke (in need of adjustment)	26-38
	Parking brake cable (catching)	27-13
	Front brake lining (cracked or deformed)	26-31
	Rear brake lining (cracked or deformed)	26-42
	Front brake piston (catching or frozen)	26-30
	Rear brake piston (catching or frozen)	26-41
	Rear parking brake return tension spring (loose or damaged)	26-38
	Vacuum booster pushrod position (incorrect)	26-23
	Booster system (vacuum leaks)	26-21
	Brake master cylinder assembly (malfunction)	26-18

Inspection

CAUTION

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

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

HINT:

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

ON-VEHICLE SERVICE

Brake Bleeding

Be sure to perform brake bleeding and clutch bleeding after replacing hydraulic parts related to brake and clutch. For details about clutch bleeding, [See page 26-12](#). There are 2 methods for brake bleeding, and specific operation procedures are as follows:

Method 1: perform bleeding brake manually

WARNING

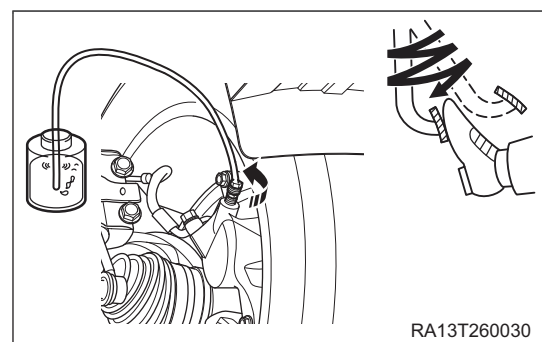
- When bleeding brake system, wear safety glasses.
- Be careful when bleeding air, as brake fluid at high pressure may spray out from bleeder plug.

CAUTION

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

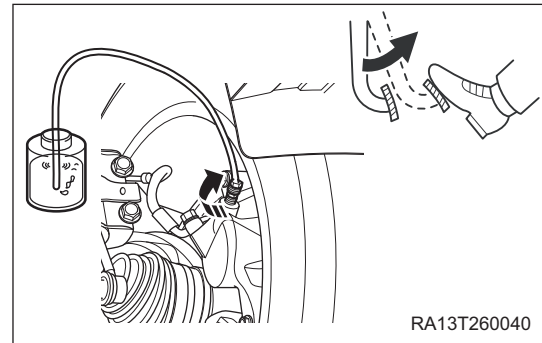
HINT:
An assistant will be required to assist when bleeding brake system.

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



RA13T260030

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

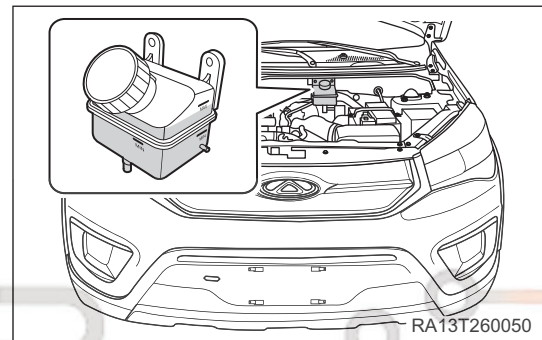


5. Repeat above steps, and use the same procedures to bleed brake line of each wheel in order of rear left wheel, front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

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

HINT:

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



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

Method 2: bleeding brake using diagnostic tester

CAUTION

- Check that battery voltage should not be lower than 10 V.
- Bleeding order must be rear left / front left / front right / rear right. If it is necessary to repeat part or whole bleeding procedure, be sure to wait for 5 minutes to cool solenoid valve down, otherwise solenoid valve may be damaged due to overheat.

Method 2: bleeding brake using diagnostic tester

CAUTION

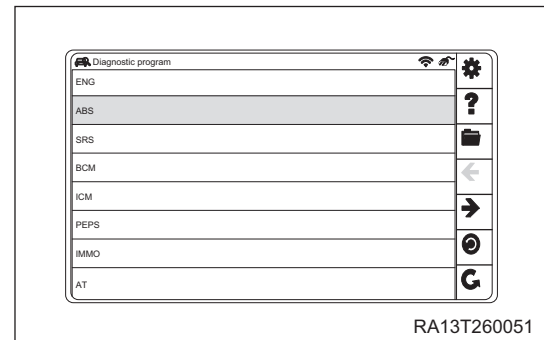
- Check that battery voltage should not be lower than 10 V.
- Bleeding order must be rear left / front left / front right / rear right. If it is necessary to repeat part or whole bleeding procedure, be sure to wait for 5 minutes to cool solenoid valve down, otherwise solenoid valve may be damaged due to overheat.

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

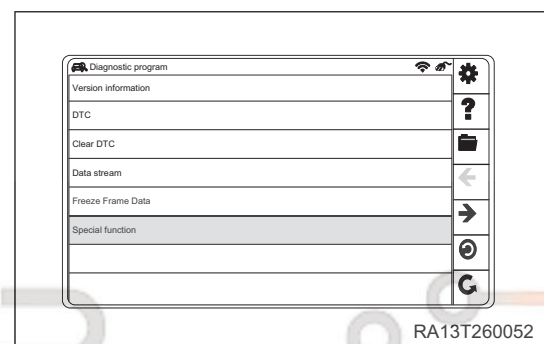
1. Fill brake fluid reservoir with brake fluid to a proper level.

26 - BRAKE

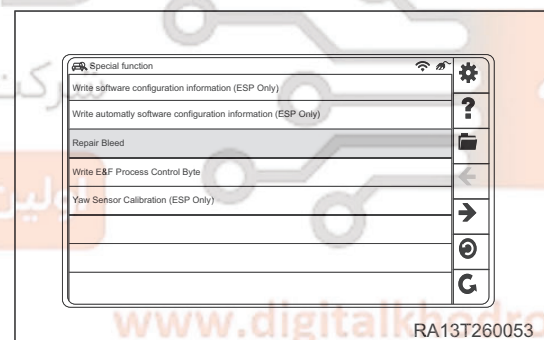
2. Depress brake pedal 20 times or more with engine stopped.
 3. Turn ignition switch to ON, and enter A13T "ABS" system using X-431 3G diagnostic tester (the latest software).
- Please select [ABS] on Diagnostic program screen.



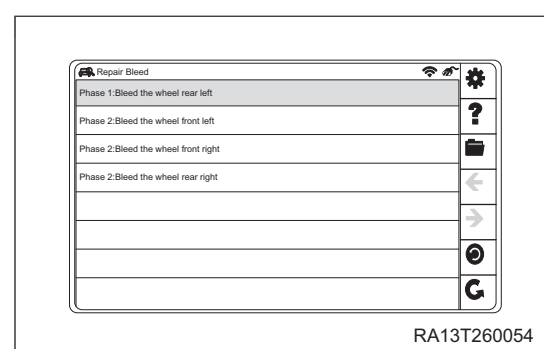
- Please select [Special function] on Diagnostic program screen.



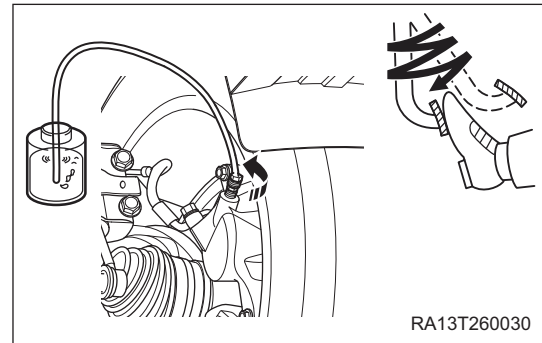
- Please select [Repair Bleed] on Special function screen.



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



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

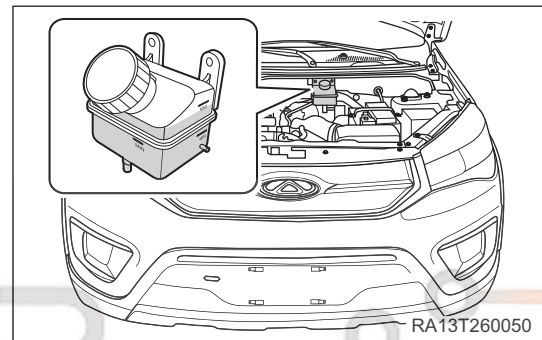


5. Use same bleeding procedures as rear left wheel to bleed air for brake lines of front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

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

HINT:

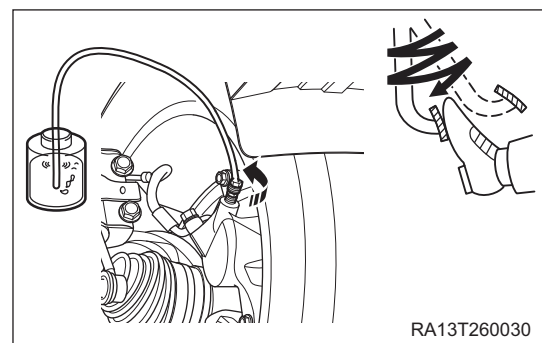
During bleeding brake system, make sure brake fluid level in brake fluid reservoir is always near "MAX" mark. Check the brake fluid level at all times during bleeding. Add brake fluid as necessary.



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

Brake Fluid Replacement

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



2. Add the brake fluid.
 - a. Tighten bleeder plug after confirming that brake fluid has been drained. Fill brake fluid reservoir with new brake fluid to a proper level.
3. Perform bleeding procedures.
 - a. After replacing with new brake fluid, be sure to bleed brake system for normal operation. For details about brake system bleeding, [See page 26-12](#).

26 - BRAKE

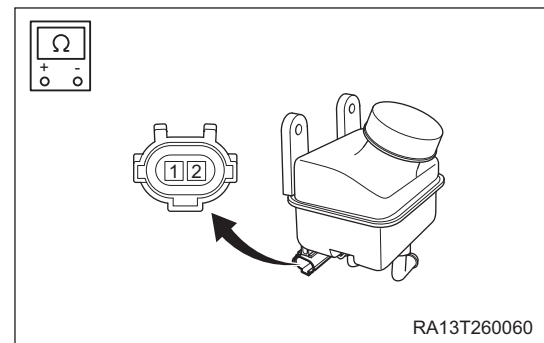
Brake Fluid Reservoir Assembly

On-vehicle Inspection

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

Standard Condition

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



HINT:

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

d. Add brake fluid to the level 0 - 5 mm below "MAX" mark.

Removal

1. Drain the brake fluid (See page 26-15).



ENVIRONMENTAL PROTECTION

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

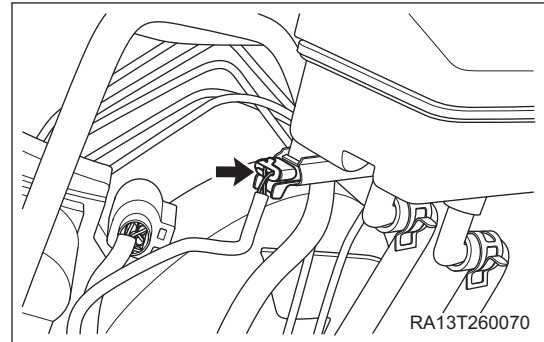


CAUTION

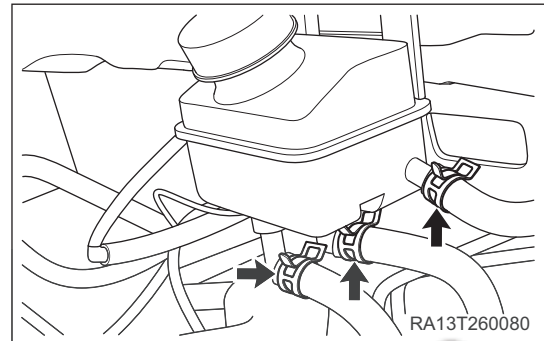
- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Remove the brake fluid reservoir assembly.

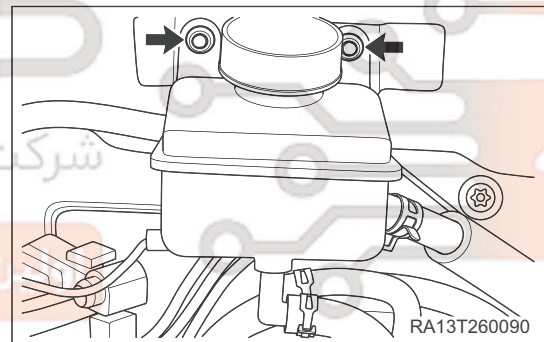
- a. Disconnect the brake fluid level warning switch connector (arrow).



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



- c. Remove 2 fixing nuts (arrow) from brake fluid reservoir assembly.
(Tightening torque: 5 ± 1 N·m)



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

Installation

Installation is in the reverse order of removal.

HINT:

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

Brake Master Cylinder Assembly

Removal

CAUTION

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

1. Drain the brake fluid (See page 26-15).

ENVIRONMENTAL PROTECTION

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

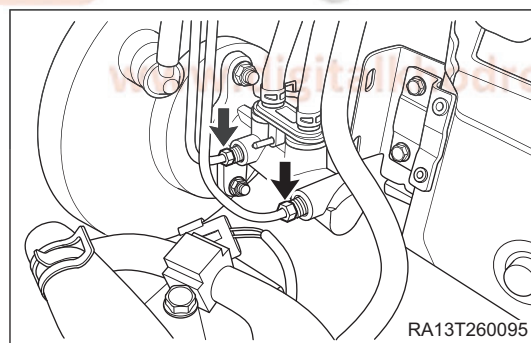
CAUTION

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

2. Remove the air filter with intake hose (See page 10-10).
3. Remove the brake fluid reservoir assembly (See page 26-16).
4. Remove the brake master cylinder assembly.

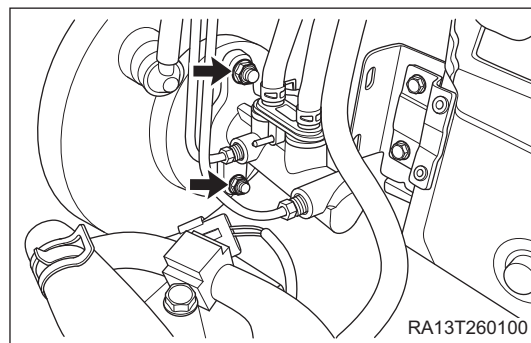
- a. Loosen 2 coupling plugs (arrow) between brake master cylinder assembly and brake pipes.

(Tightening torque: 18 ± 2 N·m)



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

(Tightening torque: 25 ± 4 N·m)



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

 CAUTION

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

Installation

Installation is in the reverse order of removal.

 CAUTION

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

شرکت دیجیتال خودرو (مسئولیت محدود)

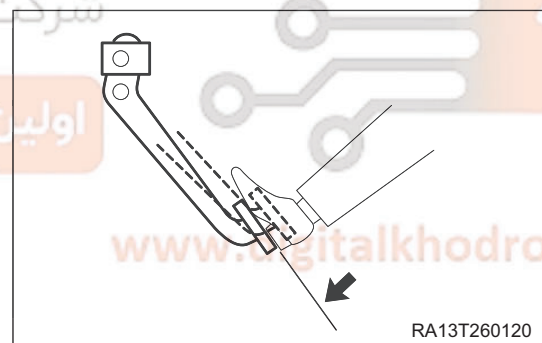
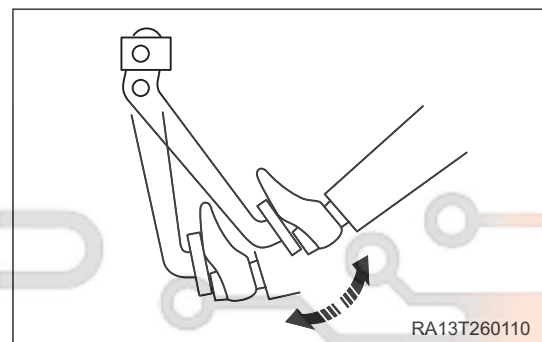
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

www.digitalkhodro.com

Vacuum Booster with Brake Master Cylinder Assembly

On-vehicle Inspection

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



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

Removal

1. Drain the brake fluid (See page 26-15).



ENVIRONMENTAL PROTECTION

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



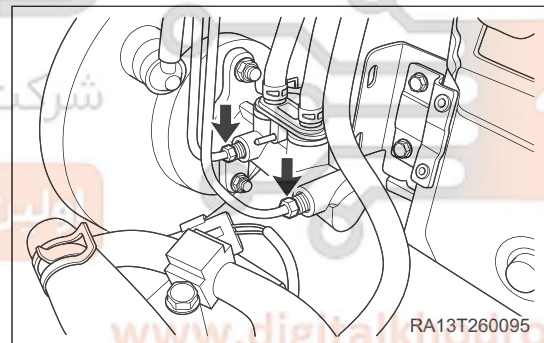
CAUTION

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

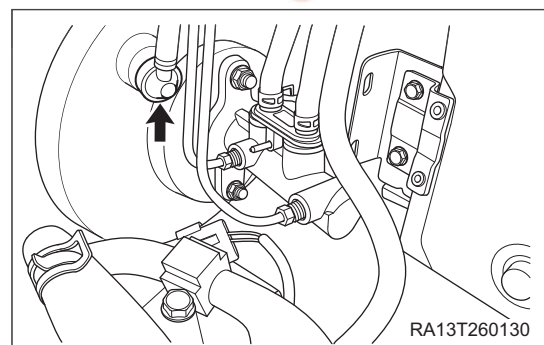
2. Remove the air filter (See page 10-10).
3. Remove the battery (See page 16-7).
4. Remove the battery tray (See page 16-9).
5. Remove the brake fluid reservoir assembly (See page 26-16).
6. Remove the accelerator pedal assembly (See page 10-17).
7. Remove the accelerator pedal bracket.
8. Remove the vacuum booster with brake master cylinder assembly.

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

(Tightening torque: 18 ± 2 N·m)

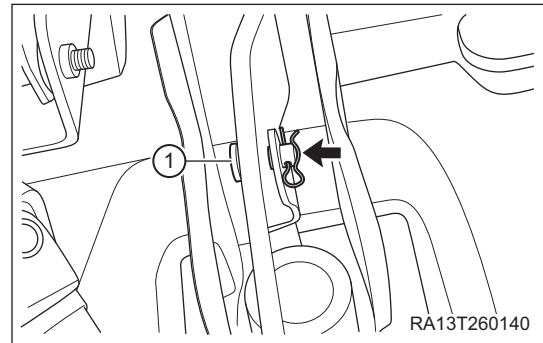


- b. Detach vacuum hose assembly with check valve (arrow) from vacuum booster assembly.

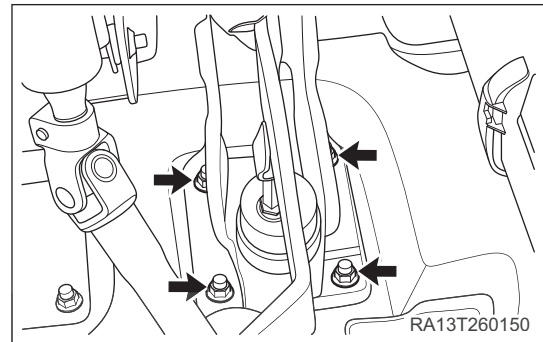


26 - BRAKE

- c. Using needle-nose pliers, remove locking pin (arrow) and pushrod pin (1) from vacuum booster pushrod and detach brake pedal assembly.



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

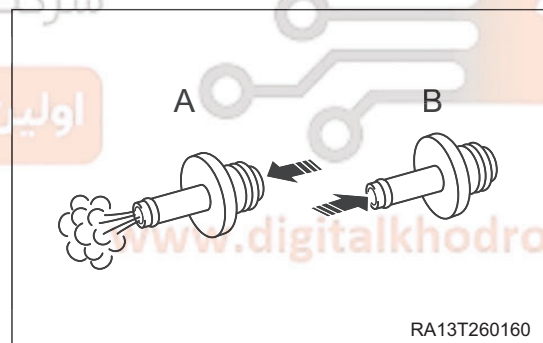


- e. Remove vacuum booster with brake master cylinder assembly from engine compartment.

Inspection

1. Check the check valve.
 - a. Remove check valve from vacuum hose assembly.
 - b. Check that there is airflow (A) from vacuum booster to engine, and no airflow (B) from engine to vacuum booster.

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



Installation

Installation is in the reverse order of removal.

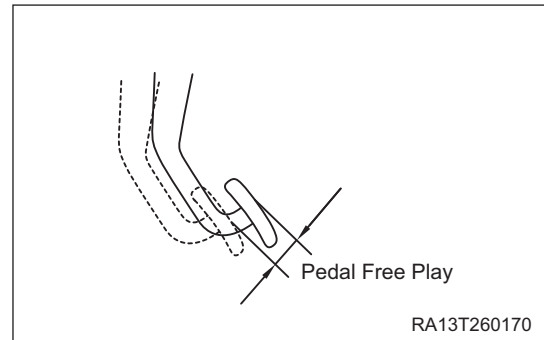
CAUTION

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

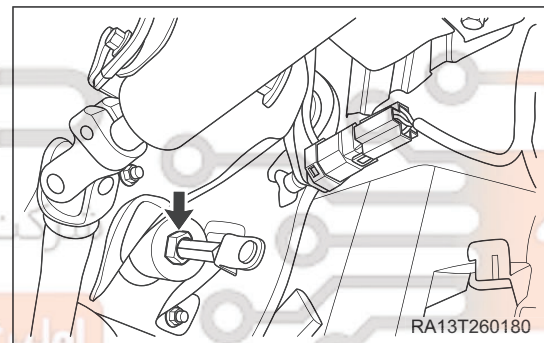
Brake Pedal Assembly

On-vehicle Inspection

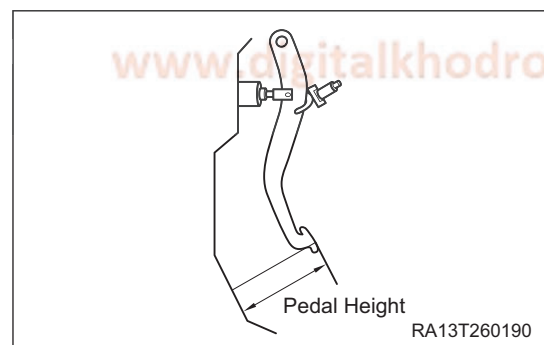
1. Check the brake pedal free play.
 - a. Stop the engine. Depress brake pedal several times until no vacuum is left in vacuum booster, then release brake pedal.
 - b. Depress brake pedal until resistance is felt.
 - c. As shown in illustration, check brake pedal free play by measuring distance between pedal position in previous step and pedal position after released.
Standard brake pedal free play: 1 - 9 mm



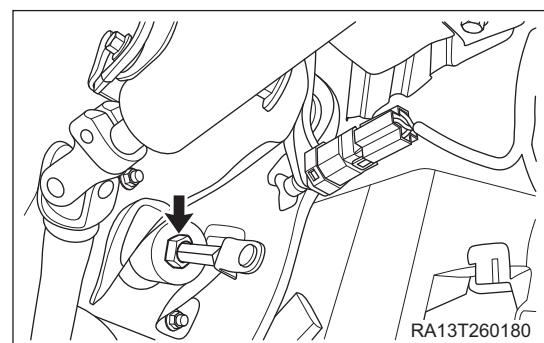
2. Adjust the brake pedal free play.
 - a. As shown in illustration, loosen vacuum booster pushrod locking nut (arrow) and rotate vacuum booster pushrod clockwise or counterclockwise to adjust brake pedal free play to specified value.



3. Check the brake pedal height.
 - a. As shown in illustration, turn over carpet and measure brake pedal height between brake pedal center and dash panel.
Standard brake pedal height: 139.9 mm



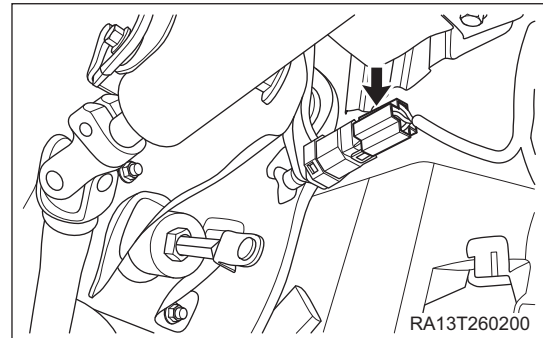
4. Adjust the brake pedal height.
 - a. As shown in illustration, loosen vacuum booster pushrod locking nut (arrow) and rotate vacuum booster pushrod clockwise or counterclockwise to adjust brake pedal height to specified value.



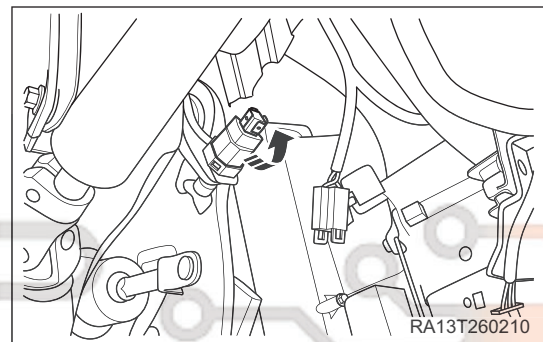
26 - BRAKE

Removal

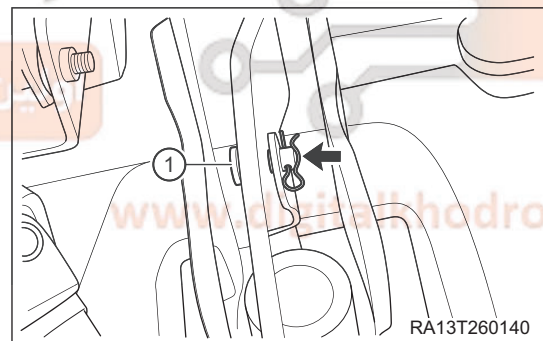
1. Remove the accelerator pedal assembly (See page 10-17).
2. Remove the accelerator pedal bracket.
3. Remove the brake light switch assembly.
 - a. Disconnect the brake light switch assembly wire harness connector (arrow).



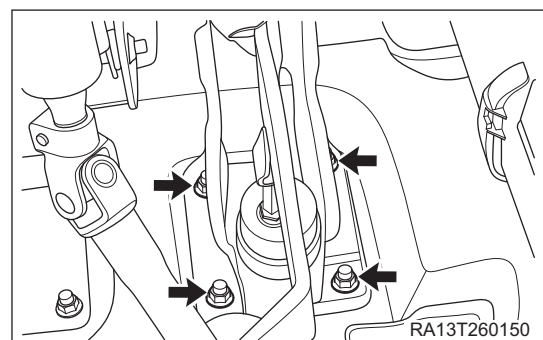
- b. Remove brake light switch assembly by rotating it 90° clockwise or counterclockwise.



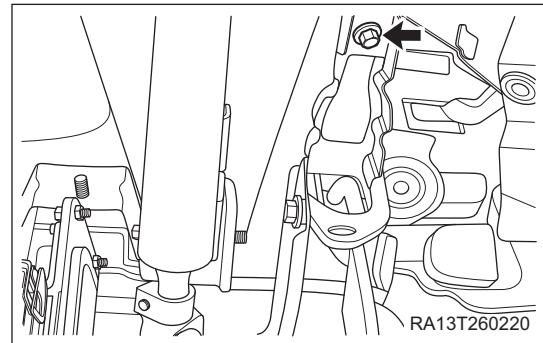
4. Remove the brake pedal assembly.
 - a. Using needle-nose pliers, remove locking pin (arrow) and pushrod pin (1) from vacuum booster pushrod and detach brake pedal assembly.



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



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



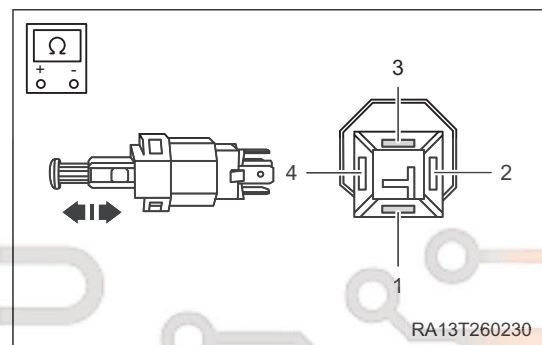
- d. Remove brake pedal assembly from inside of vehicle.

Inspection

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

Standard Condition

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



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

Installation

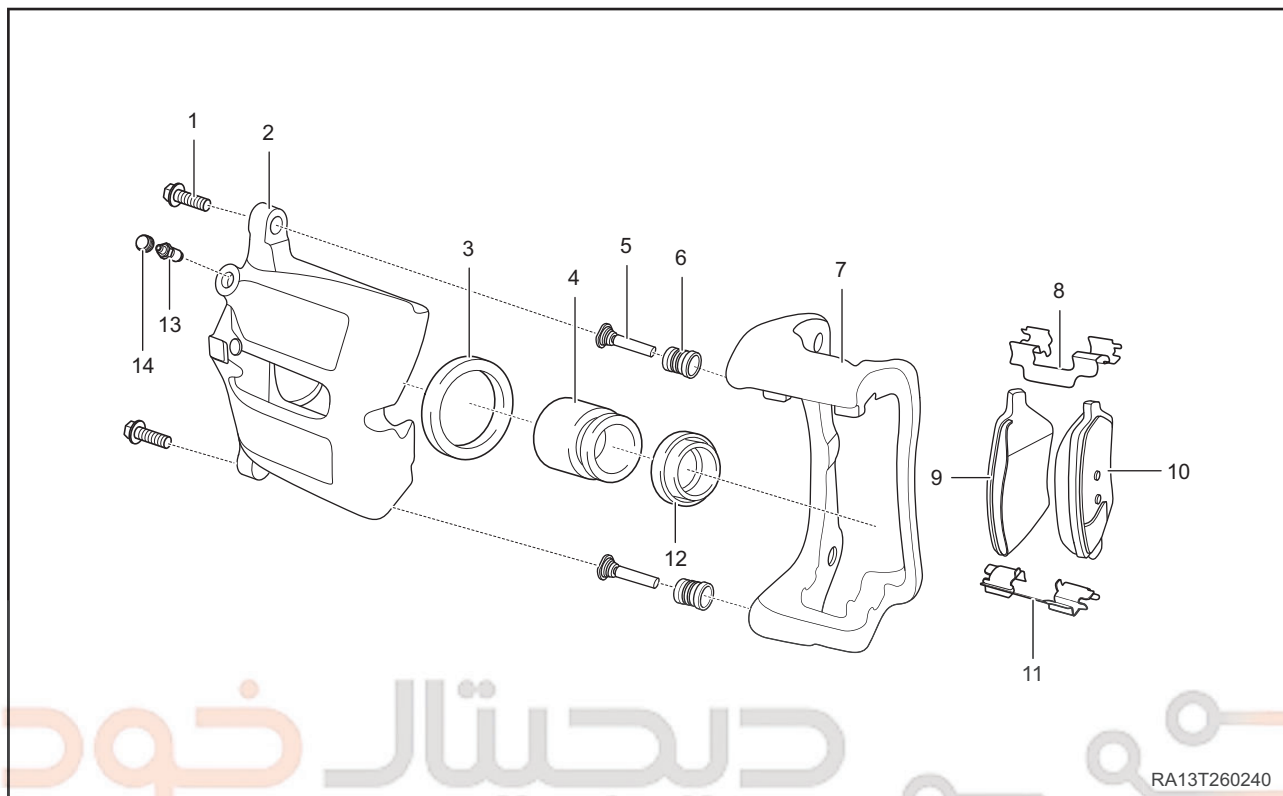
Installation is in the reverse order of removal.

CAUTION

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

26 - BRAKE

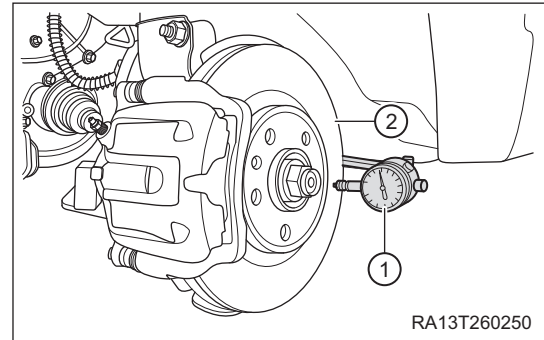
Front Disc Brake Assembly



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

On-vehicle Inspection

1. Check the brake disc runout.
 - a. Remove the front wheel (See page 24-9).
 - b. Secure a dial indicator (1) to a proper position. Then position dial indicator pointer approximately 10 mm from outer edge of brake disc.
 - c. Slowly rotate brake disc (2) and check its runout. Mark the lowest and highest points and record these measured values.
- d. Check runout on opposite side of brake disc in the same way. Mark the lowest and highest points and record these measured values.
- e. Compare recorded runout value with limit value.
Maximum runout for front brake disc: 0.06 mm
- f. If runout exceeds the maximum value, replace brake disc.



Removal

HINT:

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

1. Drain the brake fluid (See page 26-15).



ENVIRONMENTAL PROTECTION

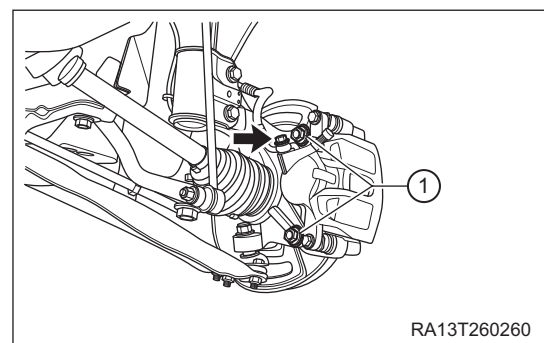
- Drained brake fluid should be well kept in a container. Never discard it at will.



CAUTION

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

2. Remove the front left wheel (See page 24-9).
3. Remove the front left brake caliper assembly.
 - a. Remove coupling plug (arrow) between front left brake caliper assembly and front left brake hose assembly.
(Tightening torque: 25 ± 4 N·m)
 - b. Remove 2 coupling bolts (arrow) between front left brake caliper assembly and front left steering knuckle.
(Tightening torque: 70 ± 5 N·m)

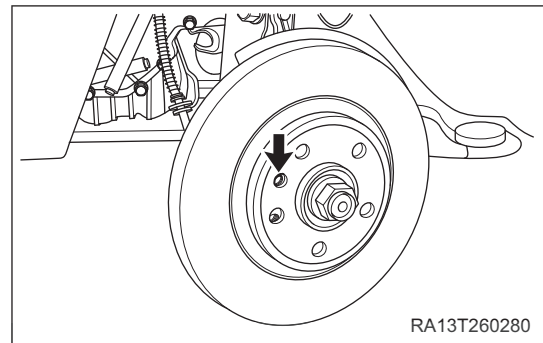


26 - BRAKE

CAUTION

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

- c. Remove the front left brake caliper assembly.
4. Remove the front left brake disc.
 - a. Remove locating screw (arrow) and front left brake disc.
(Tightening torque: $4.5 \pm 0.5 \text{ N}\cdot\text{m}$)

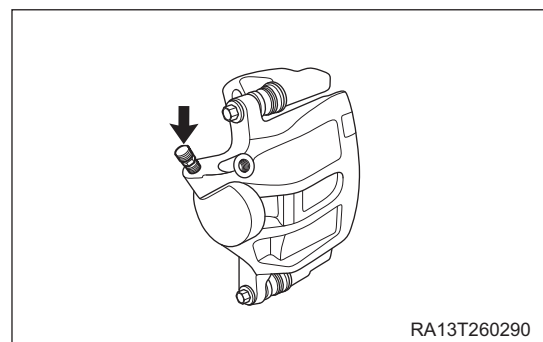
**Disassembly****HINT:**

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

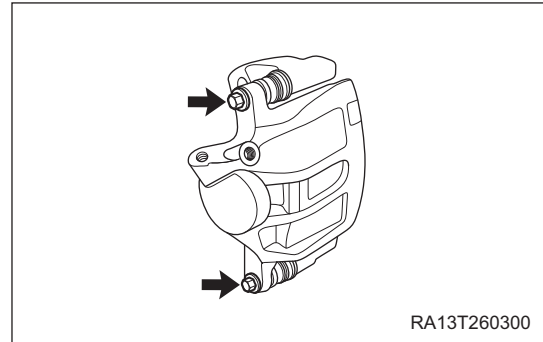
WARNING

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

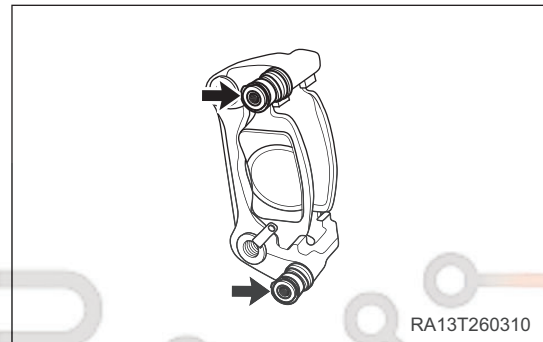
1. Remove the bleeder plug (w/ bleeder plug cap).
- a. Remove bleeder plug (w/ bleeder plug cap) (arrow) from brake caliper assembly.
(Tightening torque: $5.88 - 9.8 \text{ N}\cdot\text{m}$)



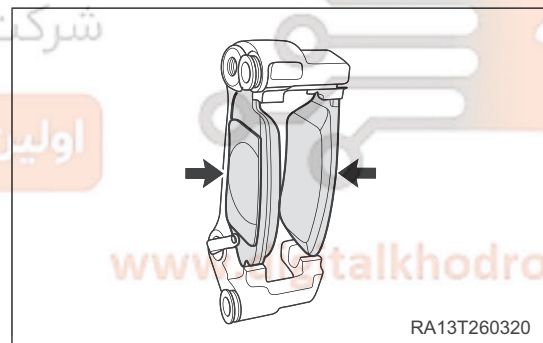
2. Remove the brake cylinder assembly.
 - a. Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.
(Tightening torque: 25 ± 4 N·m)



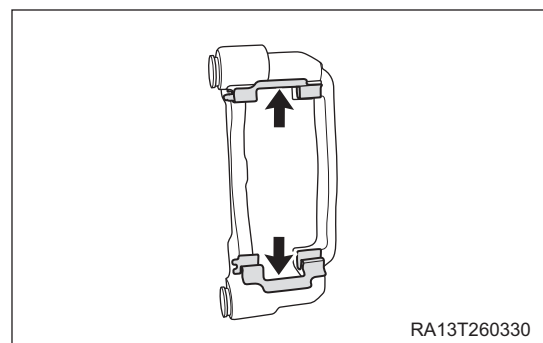
- b. Separate brake cylinder assembly and brake caliper fixing bracket.
3. Remove the front brake caliper guide bolt guide pin (w/ dust boot).
 - a. Remove 2 brake caliper guide bolt guide pins (w/ dust boot) (arrow) from brake caliper fixing bracket.



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

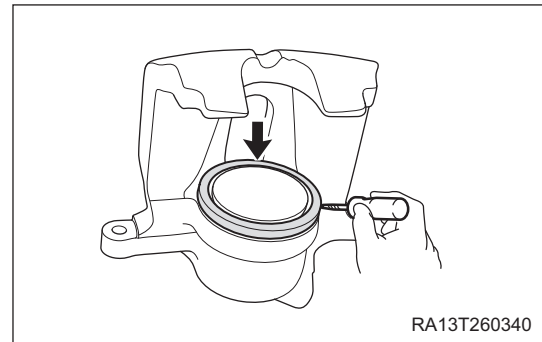


5. Remove the brake lining support shim.
 - a. Remove 2 brake lining support shims (arrow) from brake caliper fixing bracket.



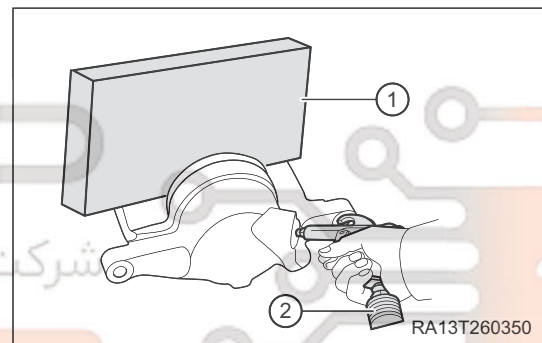
26 - BRAKE

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


CAUTION

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

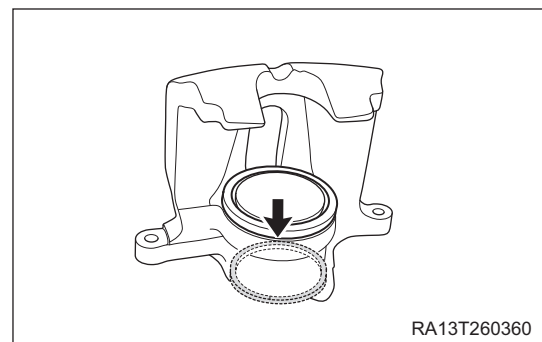
7. Remove the front disc brake piston.
 - a. Place a wooden board (1) between front disc brake piston and front disc brake cylinder.
 - b. Use compressed air (2) to carefully press out piston from front disc brake cylinder through attachment hole.


CAUTION

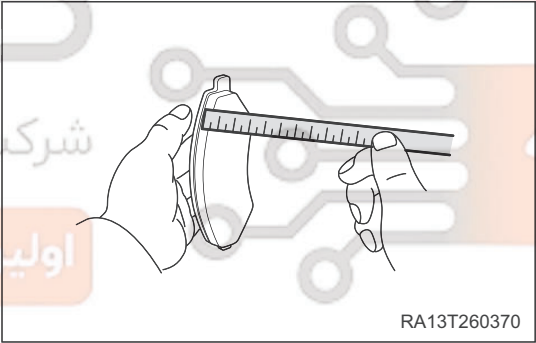
- Be careful not to splash brake fluid.
- DO NOT hold piston by hands to prevent injury.
- DO NOT remove or install brake piston by yourself, and always perform these operations by a professional.

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

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



Inspection

1. Check brake cylinder and piston.
 - a. Check piston and bore for scratches or corrosion. If there are scratches or corrosion, remove them with fine sand cloth.
 - b. Remove dirt on piston with a soft brass wire brush and coarse cloth. Do not clean piston with polishing cloth or sand cloth, as this may damage its surface. If surface of piston is damaged, replace it. If piston is stuck or bore is worn or corroded, replace entire brake caliper assembly. Using polishing cloth, remove the small pitting inside bore.
 2. Check brake caliper fixing bracket and brake caliper guide pin set.
 - a. Clean contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - b. Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
 - c. Install brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it by hand; otherwise replace it.
 - d. After installing brake lining, check if it is easy to fall out (due to weak elasticity of support shim). Replace it as necessary.
 3. Check the brake lining.
 - a. Visually check brake lining for flatness, and also check for excessive wear. If condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - b. Measure the minimum brake lining thickness. When minimum thickness of brake lining is 2.2 mm or less, replace brake linings.
- 

RA13T260370
- c. When replacing the excessive worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall them to original positions.
4. Check the brake disc.
 - a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, brake disc must be replaced.
 - b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on brake disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
 - c. It is normal that surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, brake disc must be replaced.

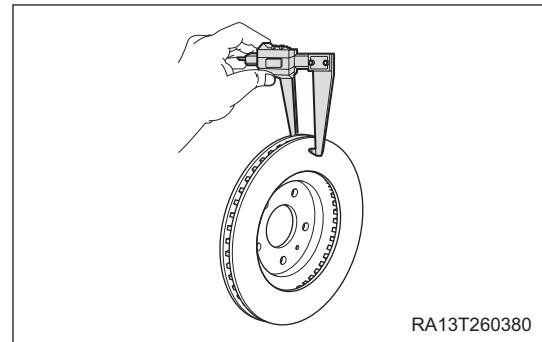
26 - BRAKE

5. Check the brake disc thickness.

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

Standard thickness: 25 mm

Minimum thickness: 20 mm



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

CAUTION

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

Assembly

HINT:

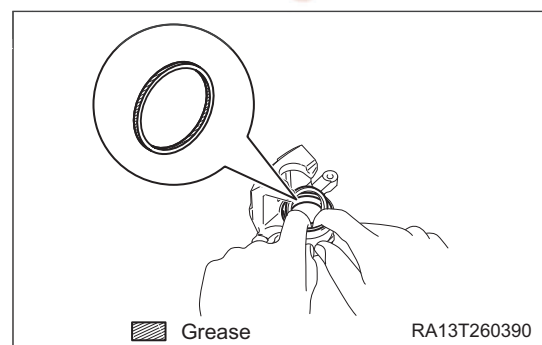
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

CAUTION

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

1. Install the front disc brake piston seal ring.

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

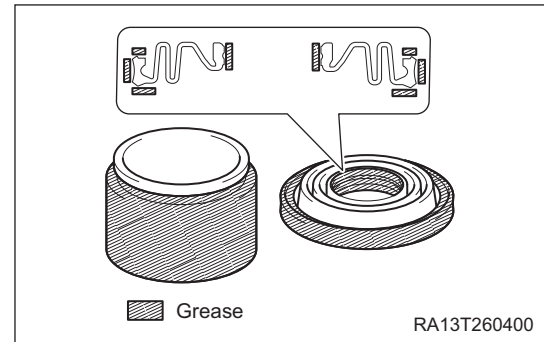


CAUTION

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

2. Install the front disc brake piston.

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



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

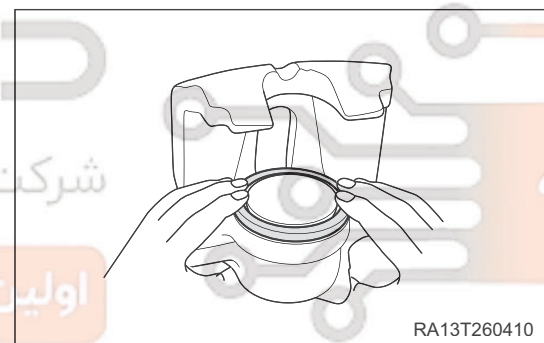
3. Install the brake cylinder dust boot.

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

CAUTION

- DO NOT install piston forcibly to brake cylinder.

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

**CAUTION**

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

26 - BRAKE

Installation

Installation is in the reverse order of removal.

CAUTION

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

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

Front Brake Hose Assembly

Removal

CAUTION

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

HINT:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 24-9).
 2. Drain the brake fluid (See page 26-15).

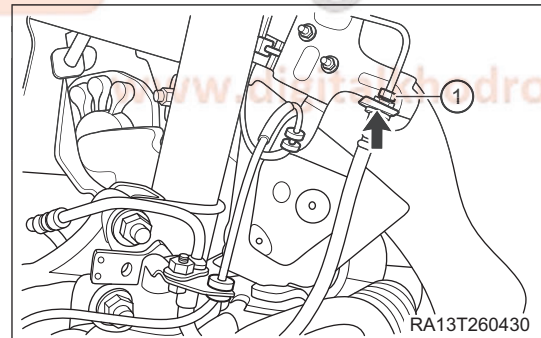
ENVIRONMENTAL PROTECTION

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

CAUTION

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

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

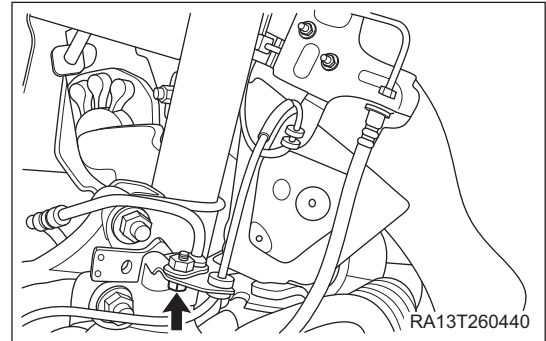


CAUTION

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

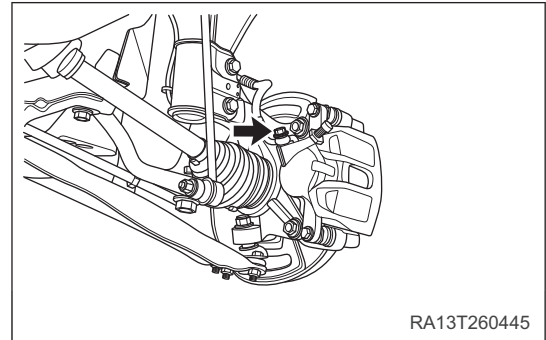
26 - BRAKE

- b. Remove fixing bolt (arrow) from brake hose bracket.



- c. Remove coupling plug and washer (arrow) between front left brake caliper assembly and front left brake hose assembly.

(Tightening torque: 25 ± 4 N·m)



CAUTION

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

- d. Remove the front left brake hose assembly.

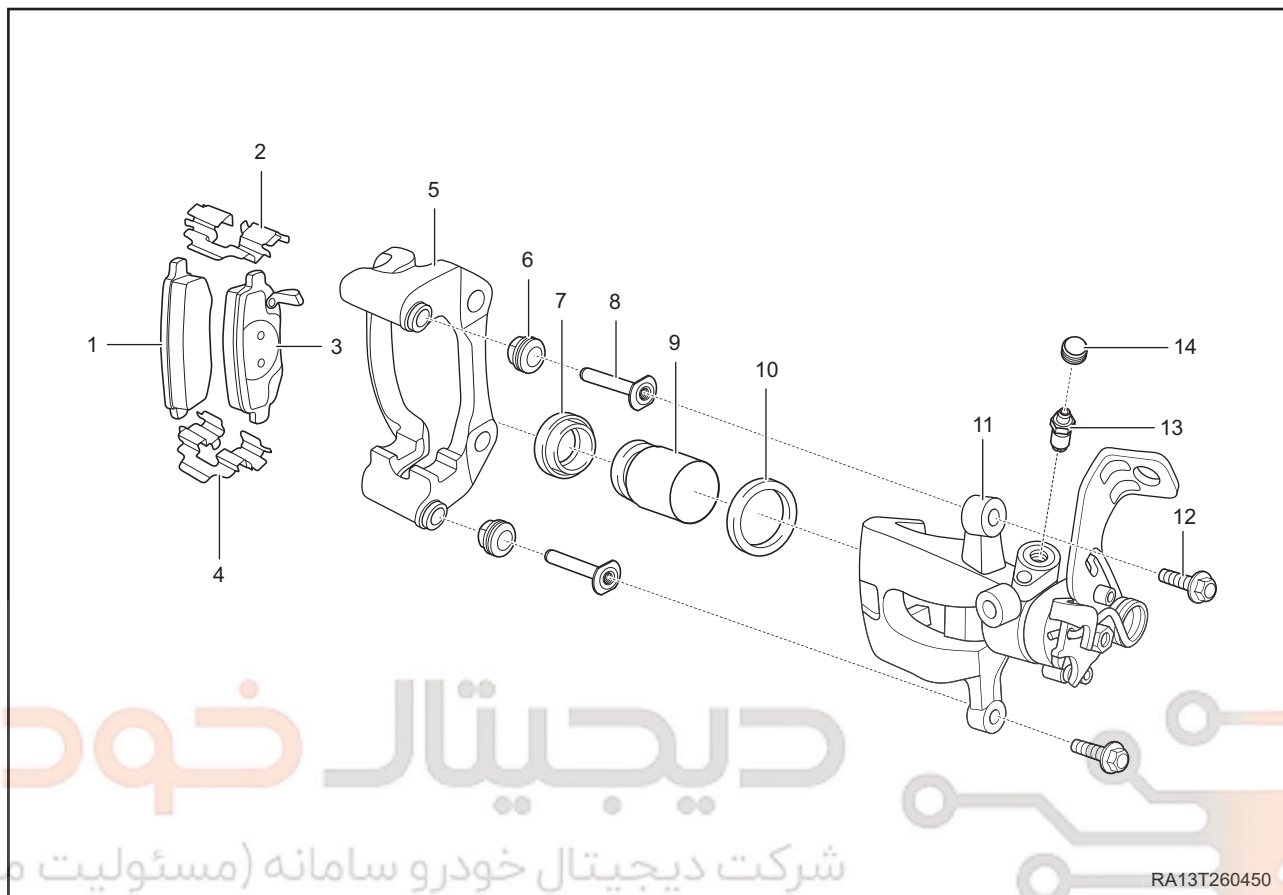
Installation

Installation is in the reverse order of removal.

CAUTION

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

Rear Disc Brake Assembly

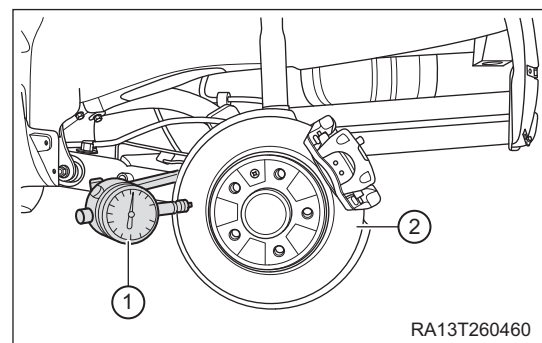


RA13T260450

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

On-vehicle Inspection

1. Check the brake disc runout.
 - a. Remove the rear wheel (See page 24-9).
 - b. Secure a dial indicator (1) to a proper position. Then position dial indicator pointer approximately 10 mm from outer edge of rear brake disc.



RA13T260460

26 - BRAKE

- c. Slowly rotate brake disc (2) and check its runout. Mark the lowest and highest points and record these measured values.
- d. Check runout on opposite side of brake disc in the same way. Mark the lowest and highest points and record these measured values.
- e. Compare recorded runout value with limit value.
Maximum runout for rear brake disc: 0.06 mm
- f. If runout exceeds the maximum value, replace brake disc.

Removal

HINT:

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

1. Drain the brake fluid (See page 26-15).



ENVIRONMENTAL PROTECTION

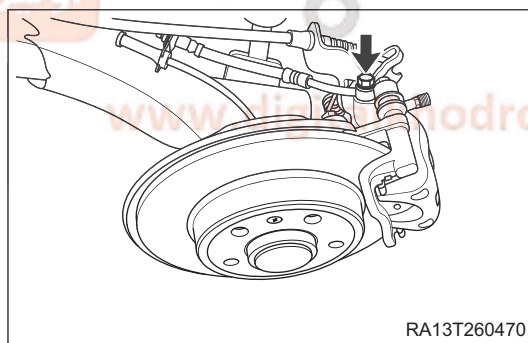
- Drained brake fluid should be well kept in a container. Never discard it at will.



CAUTION

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

2. Remove the rear left wheel (See page 24-9).
3. Remove the rear left brake caliper assembly.
 - a. Remove coupling bolt and washer (arrow) between rear left brake caliper assembly and rear left brake hose assembly.
 (Tightening torque: $25 \pm 4 \text{ N}\cdot\text{m}$)



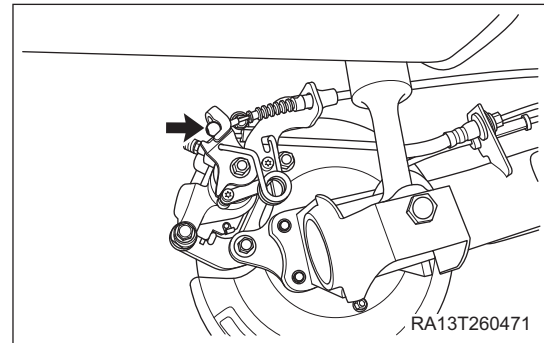
RA13T260470



CAUTION

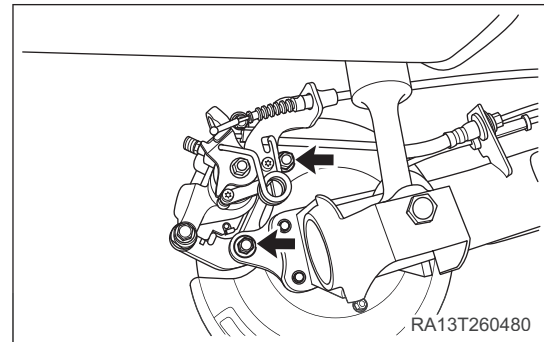
- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

- b. Disconnect connection between parking brake rear cable ball and rear brake assembly.



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

(Tightening torque: $70 \pm 5 \text{ N}\cdot\text{m}$)

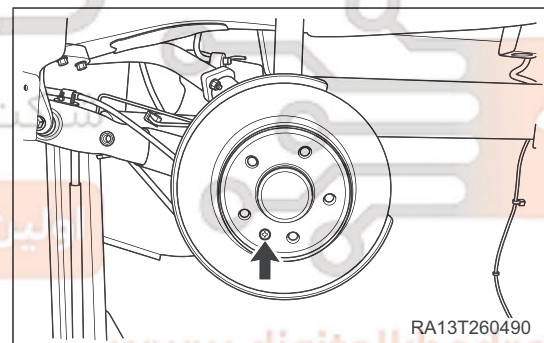


- d. Remove the rear left brake caliper assembly.

4. Remove the rear left brake disc.

- a. Remove locating screw (arrow) and rear left brake disc.

(Tightening torque: $4.5 \pm 0.5 \text{ N}\cdot\text{m}$)



Disassembly

HINT:

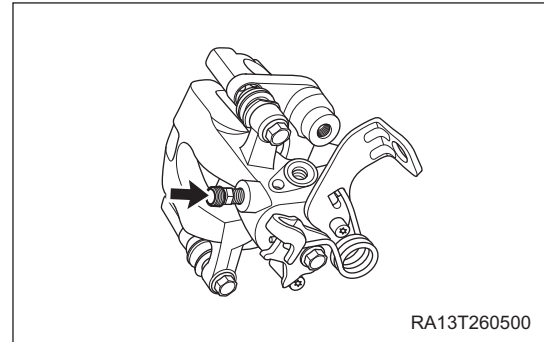
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

⚠ WARNING

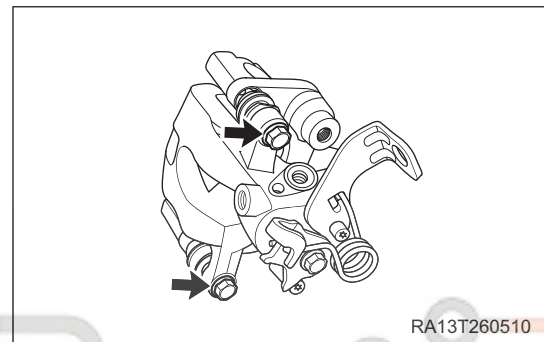
- Never use high pressure when removing piston from the bore of brake caliper. Otherwise, this may cause personal injuries.
- If it is needed to remove piston with compressed air, do not allow piston to face yourself or place your hands around brake caliper and piston.

26 - BRAKE

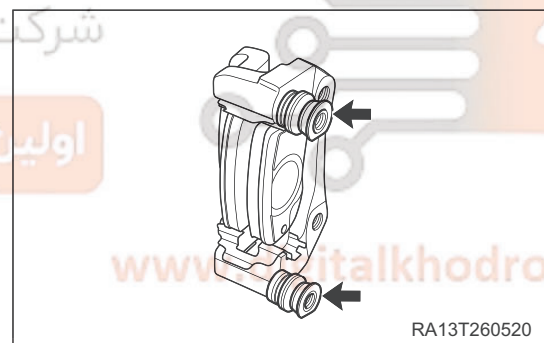
1. Remove the bleeder plug (w/ bleeder plug cap).
 - a. Remove bleeder plug (w/ bleeder plug cap) (arrow) from brake caliper assembly.
(Tightening torque: 5.88 - 9.8 N·m)



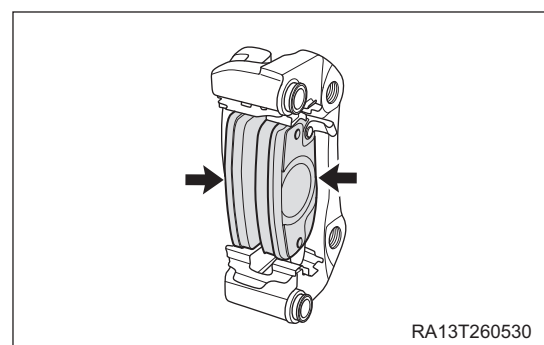
2. Remove the brake cylinder assembly.
 - a. Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.
(Tightening torque: 25 ± 4 N·m)



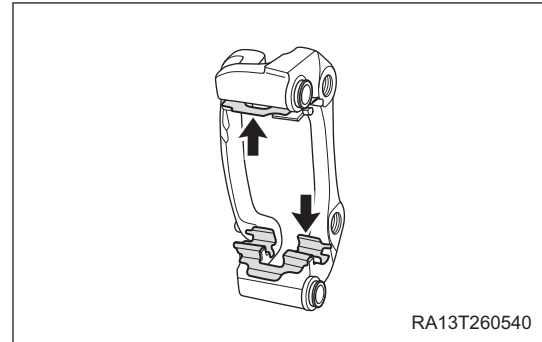
- b. Separate brake cylinder assembly and brake caliper fixing bracket.
3. Remove the rear brake caliper guide bolt guide pin (w/ dust boot).
 - a. Remove 2 brake caliper guide bolt guide pins (w/ dust boot) (arrow) from brake caliper fixing bracket.



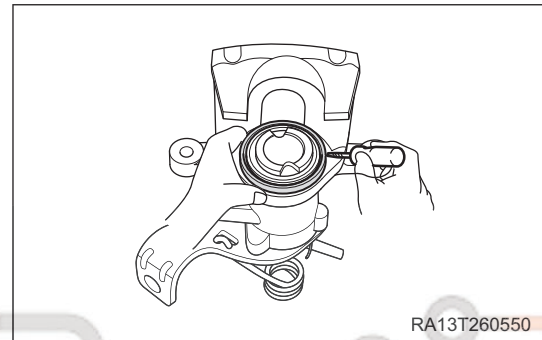
4. Remove the rear brake lining.
 - a. Remove inner brake lining and outer brake lining (arrow) from brake caliper fixing bracket.



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



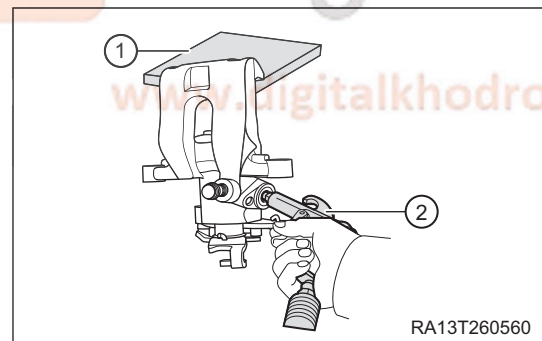
6. Remove the brake cylinder dust boot.
 - a. Using a flat tip screwdriver wrapped with protective tape, pry out dust boot carefully.



CAUTION

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

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



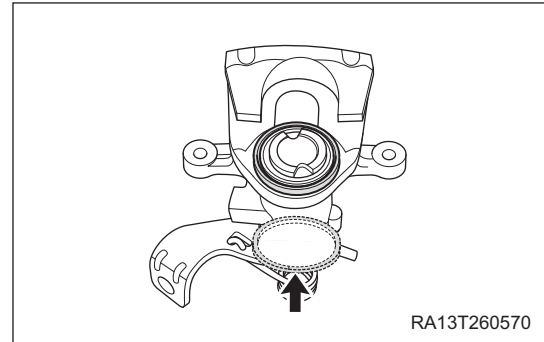
CAUTION

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

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

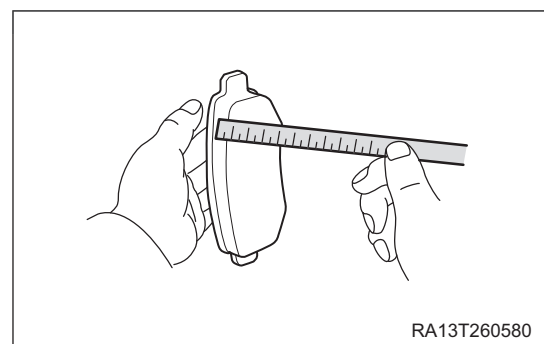
26 - BRAKE

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



Inspection

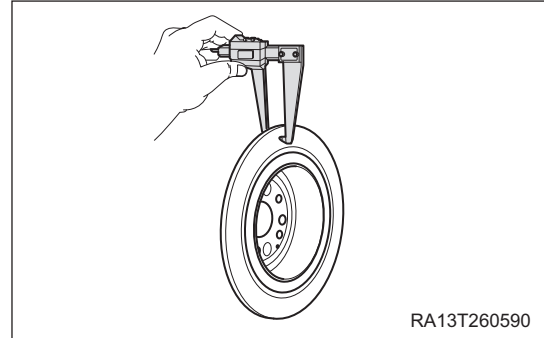
1. Check brake cylinder and piston.
 - a. Check piston and bore for scratches or corrosion. If there are scratches or corrosion, remove them with fine sand cloth.
 - b. Remove dirt on piston with a soft brass wire brush and coarse cloth. Do not clean piston with polishing cloth or sand cloth, as this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



- c. When replacing the excessive worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall them to original positions.
4. Check the brake disc.
 - a. Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, brake disc must be replaced.

26 - BRAKE

- b. Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on brake disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
 - c. It is normal that surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, brake disc must be replaced.
5. Check the brake disc thickness.
- a. Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.
- Standard thickness: 9 mm
Minimum thickness: 7 mm



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

CAUTION

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

Assembly

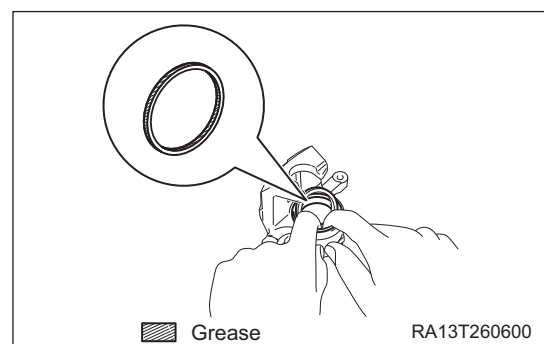
HINT:

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

CAUTION

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

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



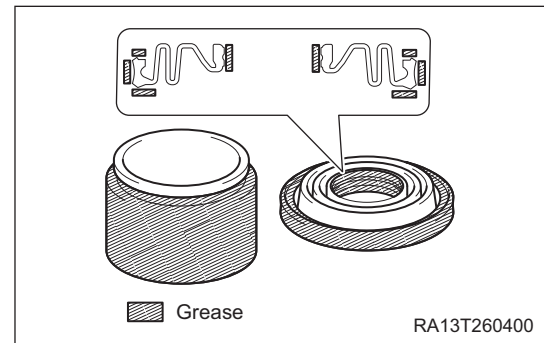
26 - BRAKE

CAUTION

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

2. Install the rear disc brake piston.

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



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

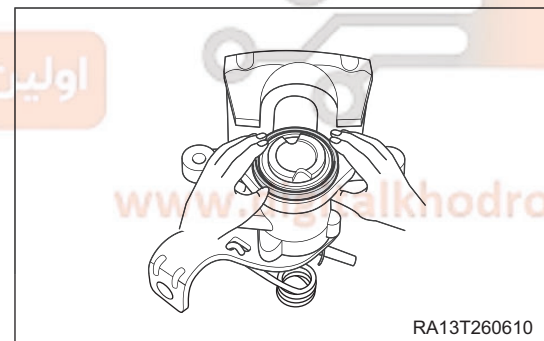
3. Install the brake cylinder dust boot.

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

CAUTION

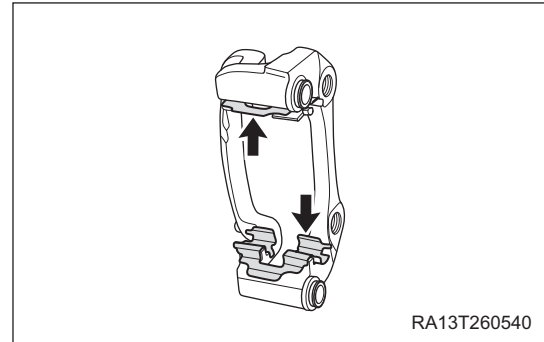
- DO NOT install piston forcibly to brake cylinder.

- Install brake cylinder dust boot to brake cylinder.

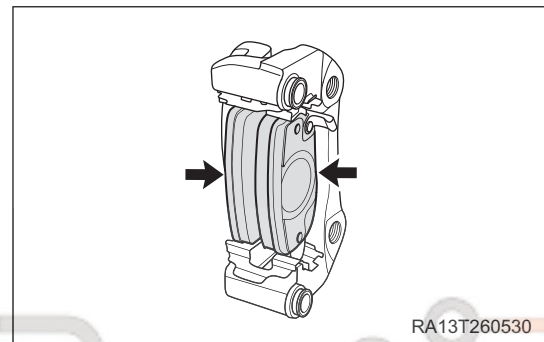
**CAUTION**

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

4. Install the brake lining support shim.
 - a. Securely install upper and lower support shims (arrow) to brake caliper fixing bracket.



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

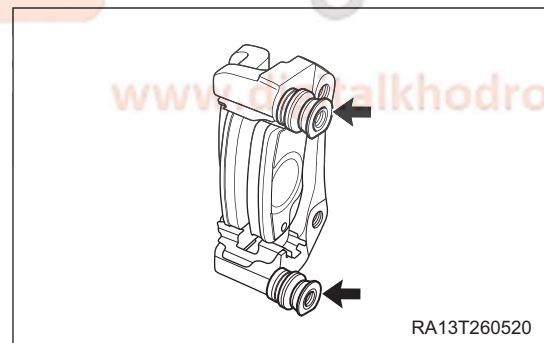


CAUTION

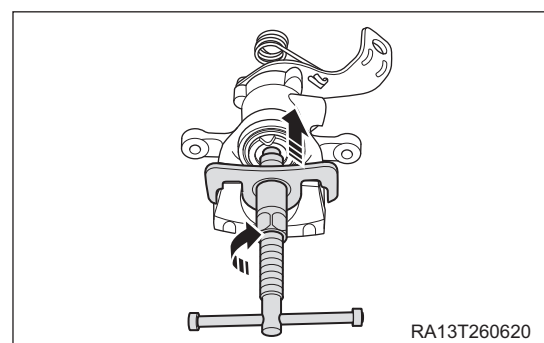
- Make sure contact surface of lining and brake disc is free of oil and grease.

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

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

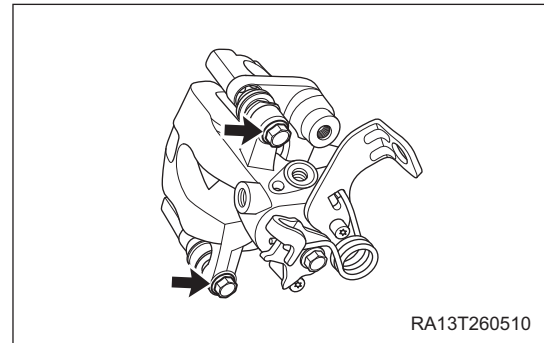


7. Install the brake cylinder assembly.
 - a. Using brake cylinder piston pressing tool, slightly retract brake cylinder piston.



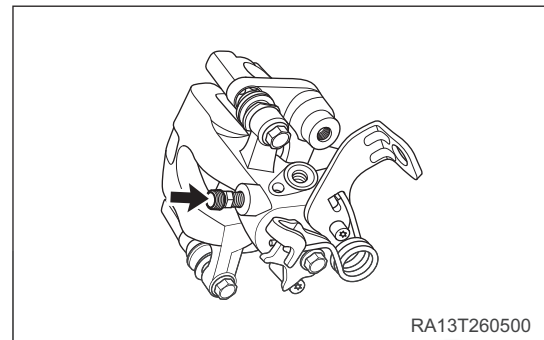
26 - BRAKE

- b. Align brake caliper guide bolts (arrow) with guide pin holes and securely install brake cylinder assembly.
(Tightening torque: 25 ± 4 N·m)



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

- a. Securely install bleeder plug (w/ bleeder plug cap) (arrow) to rear brake caliper assembly.
(Tightening torque: 5.88 - 9.8 N·m)



Installation

Installation is in the reverse order of removal.

CAUTION

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

Rear Brake Hose Assembly

Removal

CAUTION

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

HINT:

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

1. Drain the brake fluid (See page 26-15).

ENVIRONMENTAL PROTECTION

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

CAUTION

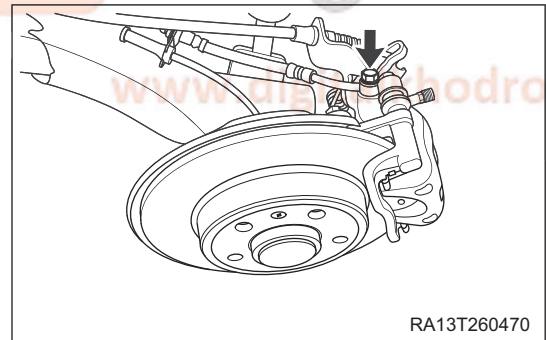
- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Remove the rear left wheel

3. Remove the rear left brake hose assembly.

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

(Tightening torque: 25 ± 4 N·m)



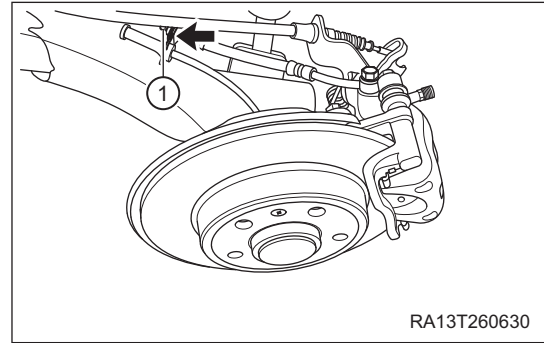
CAUTION

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

26 - BRAKE

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

(Tightening torque: 18 ± 2 N·m)



CAUTION

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

- c. Remove the rear left brake hose assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

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

PARKING BRAKE

GENERAL INFORMATION	27-3	Parking Brake Switch Assembly	27-10
Description	27-3	On-vehicle Inspection	27-10
Specifications	27-4	Removal	27-10
Tools	27-5	Inspection	27-11
Circuit Diagram	27-6	Installation	27-11
DIAGNOSIS & TESTING	27-7	Parking Brake Control Mechanism Assembly	27-12
Problem Symptoms Table	27-7	Removal	27-12
ON-VEHICLE SERVICE	27-8	Installation	27-12
Parking Brake Cable Adjustment	27-8	Parking Brake Rear Cable Assembly	27-13
Judgement Standard of Correctly Adjusting Parking Brake Cable	27-9	Removal	27-13
Parking Brake System Readjustment Method	27-9	Installation	27-14

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



www.digitalkhodro.com

021 62 99 92 92

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



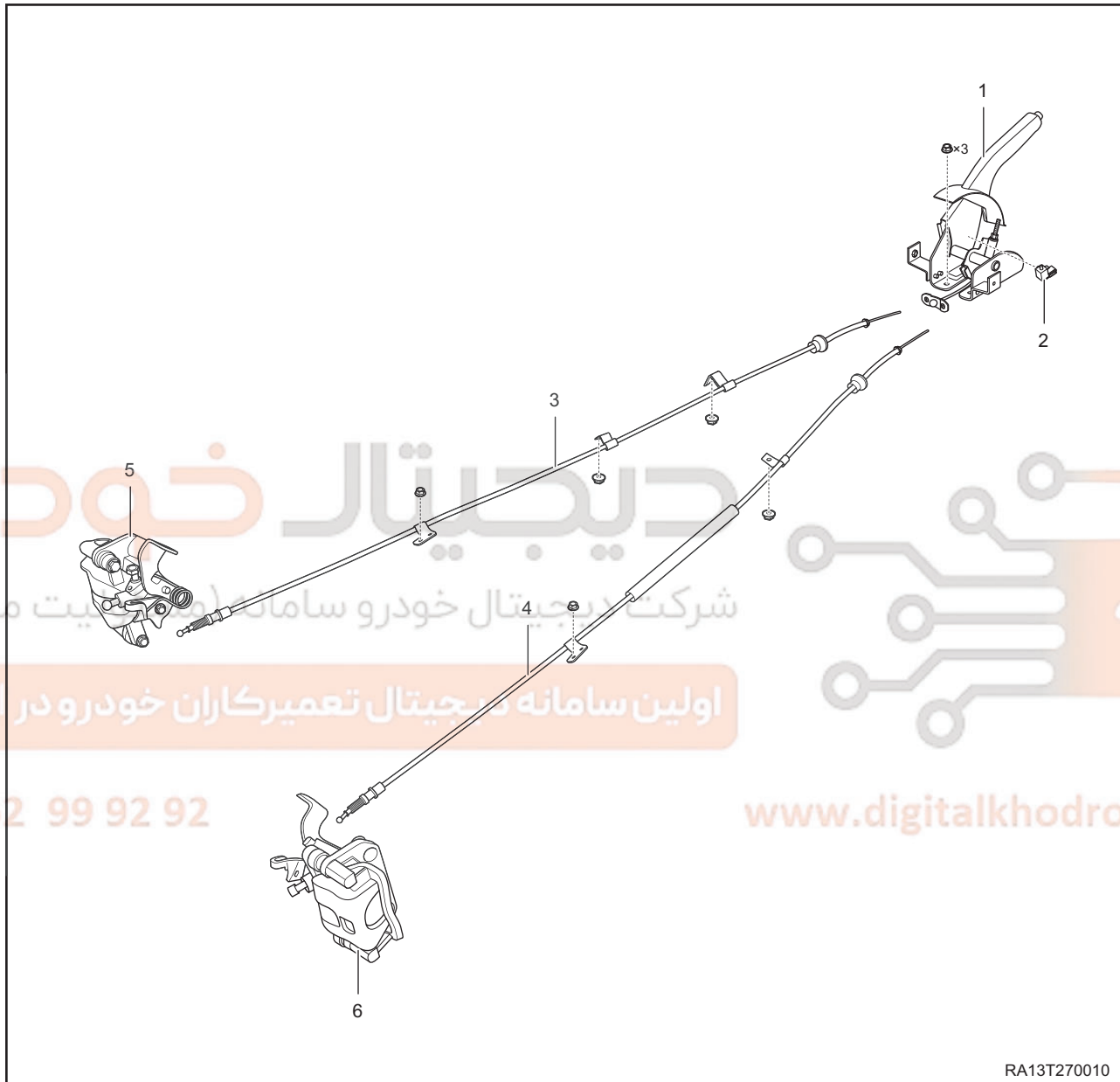
021 62 99 92 92

www.digitalkhodro.com

GENERAL INFORMATION

Description

Parking Brake Assembly



RA13T270010

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

A13T vehicles are equipped with a manual-operated parking brake control mechanism assembly, which is mounted between front seats. Each rear wheel has an individual parking brake rear cable assembly, which is respectively connected with parking brake control mechanism assembly and rear brake assembly. Parking brake cable is made of flexible wire.

27 - PARKING BRAKE

Specifications**Torque Specifications**

Description	Torque (N·m)
Wheel Mounting Bolt	110 ± 10
Locking Nut Between Parking Brake Cable and Rear Cable	7 ± 1
Coupling Nut Between Parking Brake Control Mechanism Assembly and Body	22 ± 2
Coupling Bolt Between Parking Brake Rear Cable Assembly Fixing Bracket and Body	6 ± 1

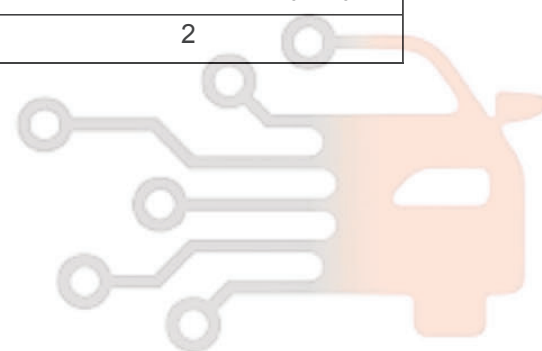
Rear Disc Brake

Description	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Disc	9	7

Description	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Disc	9.5	2

دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

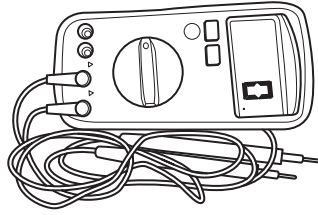
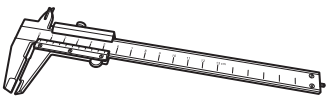


021 62 99 92 92

www.digitalkhodro.com

Tools

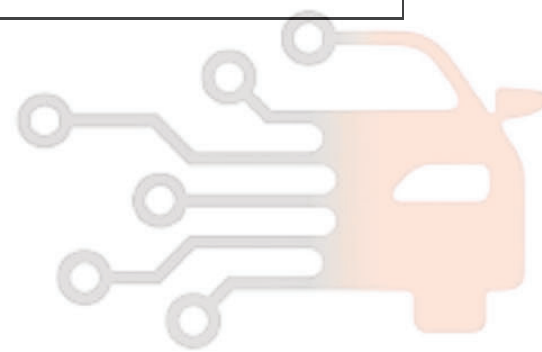
General Tools

Digital Multimeter	 RCH0000002
Vernier Caliper	 RCH0000019

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



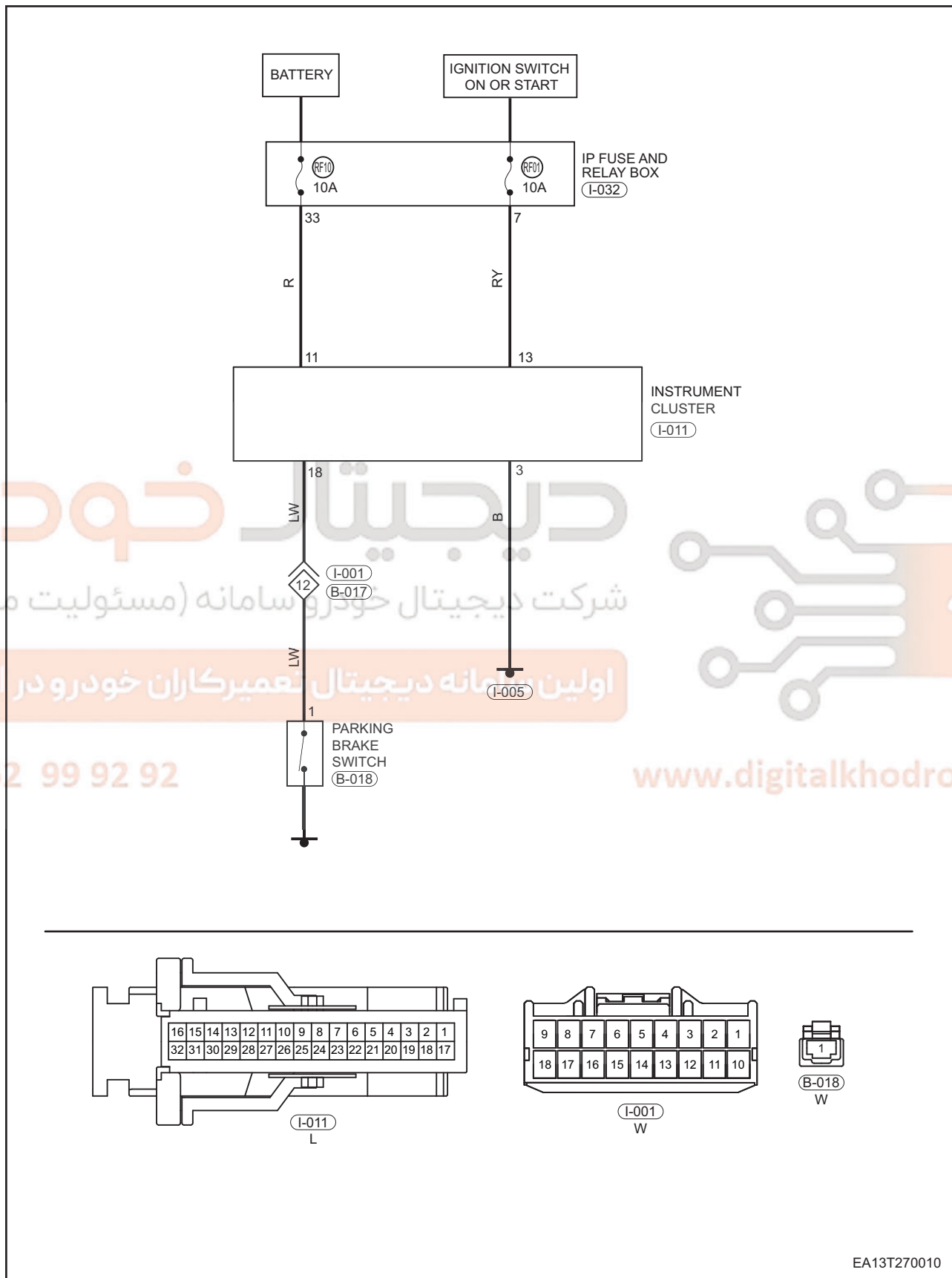
021 62 99 92 92

www.digitalkhodro.com

27 - PARKING BRAKE

Circuit Diagram

Parking Brake System



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Suspected Area	See page
Parking brake drag	Parking brake control mechanism stroke (incorrect)	27-8
	Rear brake disc (worn)	26-42
	Parking brake shoe return tension spring (damaged)	26-38
Abnormal parking brake operation	Parking brake disc (worn)	26-42
	Rear brake disc (excessively worn)	26-43
	Parking brake control mechanism assembly (improperly fixed)	27-12
	Parking brake control mechanism assembly (sticking)	27-12
	Parking brake cable assembly (improperly fixed)	27-13
Brake warning light does not come on when parking brake is applied	Warning light circuit (faulty)	27-10

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

021 62 99 92 92

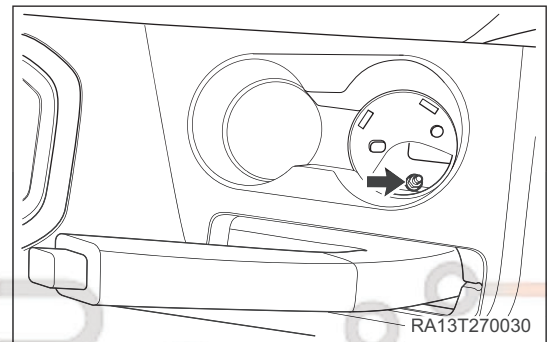
www.digitalkhodro.com

ON-VEHICLE SERVICE

Parking Brake Cable Adjustment

Parking brake is acted on rear wheels with parking brake cable. A13T rear brake assembly is integrated park type with clearance adjusted automatically, it is unnecessary to adjust manually when brake lining is worn. Specific adjustment procedures are as follows:

1. Pre-tighten front cable adjusting nut so that screw can be exposed to a certain length (approximately 10 mm).
2. Firmly depress brake pedal 5 times after adding brake fluid (push brake position with hydraulic to attach brake linings to brake disc closely, thus eliminating the clearance between them).
3. Pull up parking brake level to maximum stroke 4 times (fully release parking brake level to release cable stress fully);
4. Pull up 8 notches manually, using a torque wrench (4 ± 1 N·m) to tighten front cable adjusting nut (arrow) through parking brake adjusting hole cover under cup holder which is opened previously.



5. **This is key step:** Check it with parking brake adjustment assistive device, when pulling up parking brake level 8 to 9 notches, a click sound should be heard from torque wrench of assistive device I (it indicated that desired torque is achieved), that is $8 \leq \text{alarm notches} \leq 10$. If it is not alarmed within this range, finely adjust it as follows, check again with assistive device after adjusting until it is as specified.
 - a. If it is alarmed when parking brake level is pulled up 10 notches or more, it indicates that it is too loose, tighten adjusting nut with a wrench.
 - b. If it is alarmed when parking brake level is pulled up 7 notches or less, it indicates that it is too tight, loosen adjusting nut with a wrench.

CAUTION

Following conditions meet alarm requirements with 8 to 9 notches.

- alarm when pulling up to 8th notch, alarm between 8th to 9th notch, alarm when pulling up to 9th notch, alarm between 9th to 10th notch.
- Torque of torque wrench of parking brake adjustment assistive device is 20 ± 2 N·m.
- Assistive device should be used as specified direction, if not, it will not alarm.

6. Finally, install parking brake adjusting hole cover to its original position.

Judgement Standard of Correctly Adjusting Parking Brake Cable

1. When parking brake control mechanism is fully released with the vehicle is on flat ground, it should be no blocking force when one person is pushing vehicle; and vehicle can be pushed with one person when pulling up parking brake level to 1st notch (this is empirical method, not as inspection requirements).
2. When pulling up parking brake level 10 notches or less with vehicle is being driving, vehicle can be parked on a inclined road with an inclination of 20% (on both directions of uphill and downhill) and parking control force is less than 400 N (inspection standard).
3. Check vehicle on drum tester, rear wheel drag force meets requirements of GB7258 (inspection standard).

Parking Brake System Readjustment Method

If assembled vehicle needs to be readjusted, perform the following:

1. Open parking brake adjusting hole cover under rear cup holder, pull up parking brake level 8 notches so that adjusting nut can be seen;
2. Using a wrench to tighten or loosen parking brake adjusting nut, adjust according to key step 5 in Parking Brake Cable Adjustment until it is as specified.
3. Finally, install parking brake adjusting hole cover to its original position.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

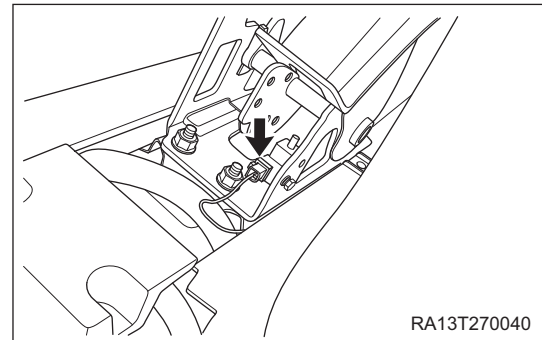
www.digitalkhodro.com

27 - PARKING BRAKE

Parking Brake Switch Assembly

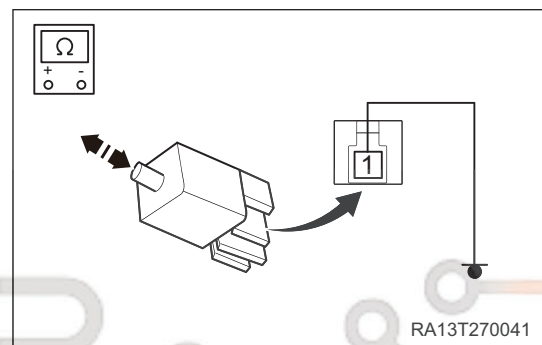
On-vehicle Inspection

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



Standard Condition

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



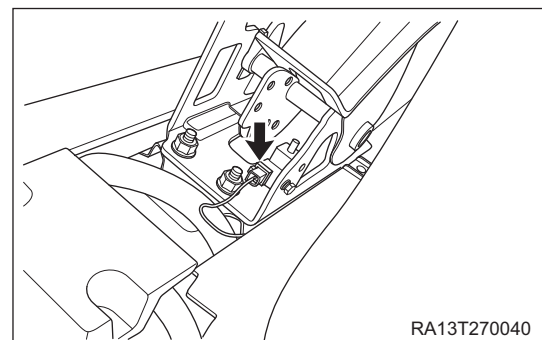
If result is not as specified, replace parking brake switch assembly.

Removal

CAUTION

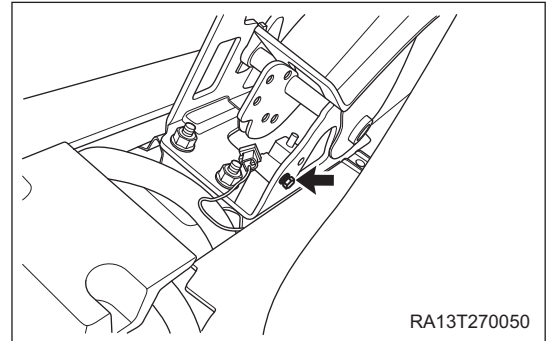
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Secure the rear wheel assembly.
2. Remove the auxiliary fascia console assembly ([See page 46-8](#)).
3. Remove the parking brake switch assembly.
 - a. Disconnect parking brake switch assembly wire harness connector (arrow) as shown in illustration.



27 - PARKING BRAKE

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



- c. Remove the parking brake switch assembly.

Inspection

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

Installation

Installation is in the reverse order of removal.

دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com

27 - PARKING BRAKE

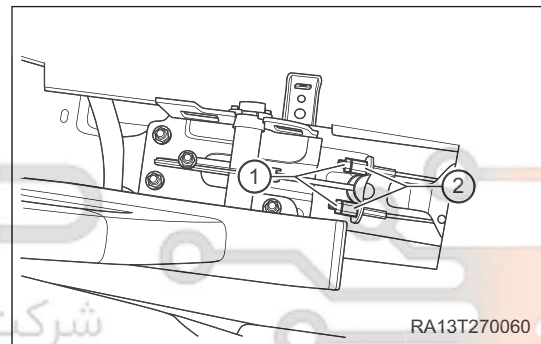
Parking Brake Control Mechanism Assembly

Removal

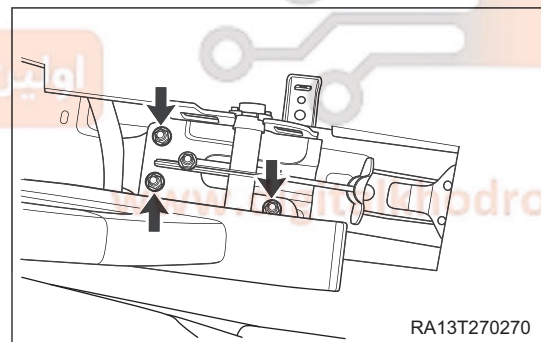
CAUTION

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

1. Secure the wheel assembly.
2. Remove the auxiliary fascia console assembly (See page 46-8).
3. Remove the parking brake switch assembly (See page 27-10).
4. Remove the parking brake control mechanism assembly.
 - a. Fully release the parking brake control mechanism.
 - b. Loosen locking nut (1) and adjusting nut (2) from left and right parking brake cables separately, release tension of parking brake cable assembly.
(Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)



- c. Remove 3 coupling nuts (arrow) between parking brake control mechanism assembly and body.
(Tightening torque: $22 \pm 2 \text{ N}\cdot\text{m}$)



- d. Remove the parking brake control mechanism assembly.

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling nuts to specified torque.

HINT:

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

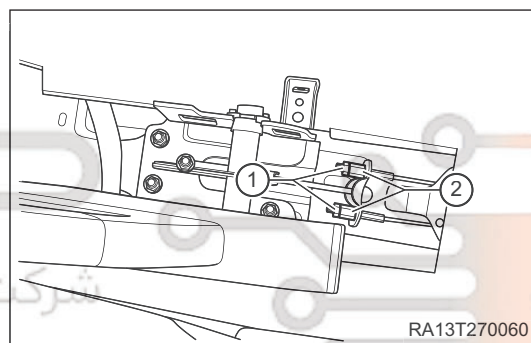
Parking Brake Rear Cable Assembly

Removal

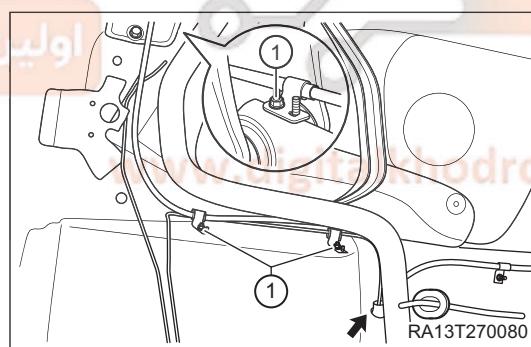
CAUTION

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

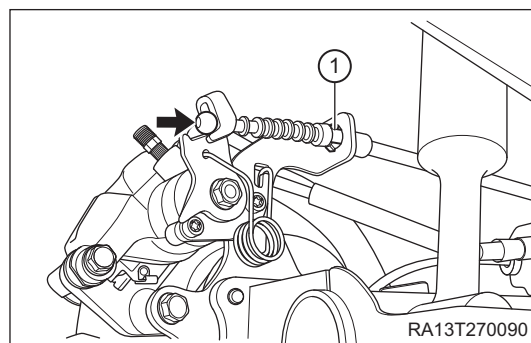
- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the rear left wheel (See page 24-9).
 2. Remove the auxiliary fascia console assembly (See page 46-8).
 3. Remove the parking brake rear cable assembly.
 - a. Fully release the parking brake control mechanism.
 - b. Loosen locking nut (1) and adjusting nut (2) from left and right parking brake cables separately, release tension of parking brake cable assembly.
(Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)



- c. Disengage parking brake rear cable assembly from body lower positioning hole (arrow), and remove 3 coupling nuts (1) between parking brake rear cable assembly fixing bracket and body fixing bolt.
(Tightening torque: $6 \pm 1 \text{ N}\cdot\text{m}$)



- d. Disconnect connection between cable rear ball joint and parking pulling arm (arrow), and remove cable protection pipe rear joint (1) from guide plate .



- e. Remove the left parking brake rear cable assembly.

27 - PARKING BRAKE

Installation

Installation is in the reverse order of removal.

CAUTION

- Be sure to tighten coupling nuts to specified torque.

HINT:

Parking brake should be adjusted after replacing parking brake cable assembly. Check if parking brake functions properly after adjustment. Check the parking brake control mechanism stroke. Release parking brake control mechanism and check if rear wheels rotate freely. If wheels are difficult to rotate freely, repeat adjustment procedure.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



021 62 99 92 92

www.digitalkhodro.com