General Information

GENERAL TROUBLESHOOTING INFORMATION

BEFORE TROUBLESHOOTING

1. Check applicable fuses in the appropriate fuse/relay box.
2. Check the battery for damage, state of charge, and clean and tight connections.

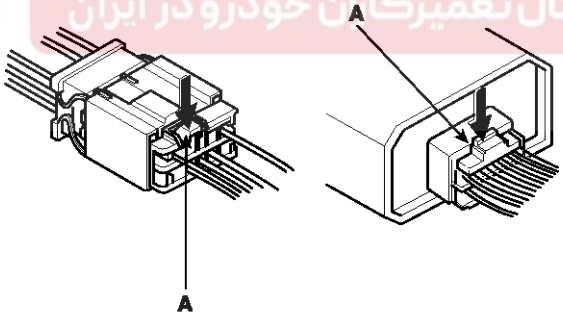
NOTICE

- *Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.*
- *Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.*

3. Check the alternator belt tension.

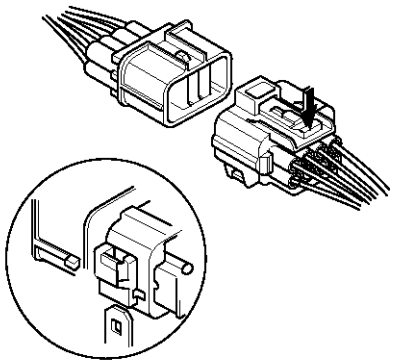
HANDLING CONNECTORS

1. Make sure the connectors are clean and have no loose wire terminals.
2. Make sure multiple cavity connectors are packed with grease (except watertight connectors).
3. All connectors have push-down release type locks (A).



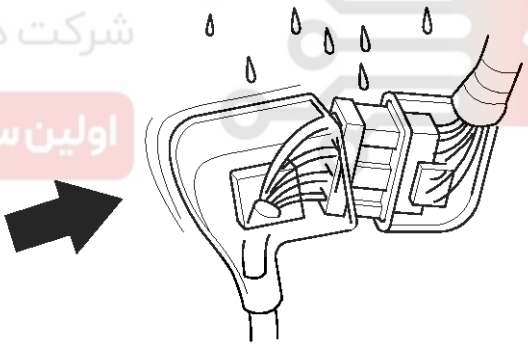
ETKD150A

4. Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
5. Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket (A).



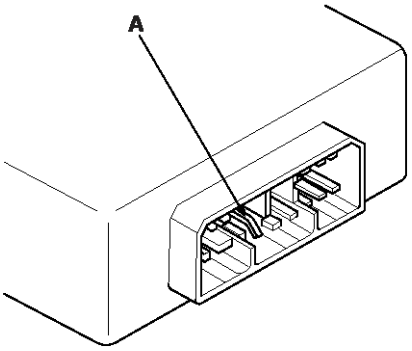
ETKD150B

6. Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
7. Always reinstall plastic covers.



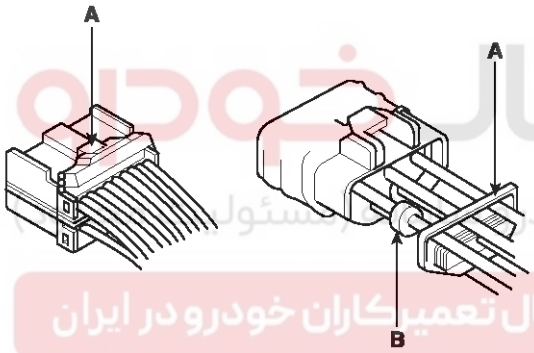
ETKD150C

8. Before connecting connectors, make sure the terminals (A) are in place and not bent.



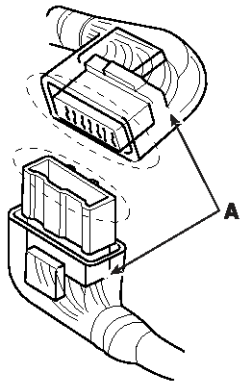
ETKD150D

9. Check for loose retainer (A) and rubber seals (B).



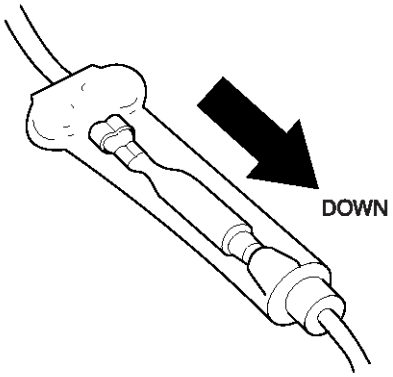
ETKD150E

10. The backs of some connectors are packed with grease. Add grease if necessary. If the grease(A) is contaminated, replace it.



ETKD150F

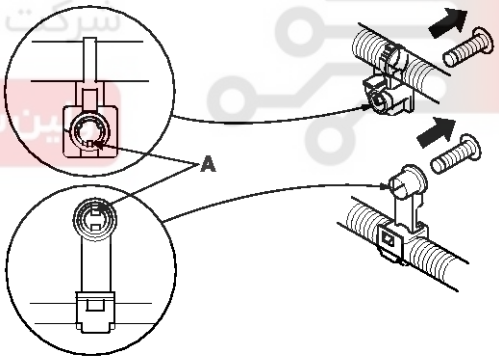
11. Insert the connector all the way and make sure it is securely locked.
12. Position wires so that the open end of the cover faces down.



ETKD150G

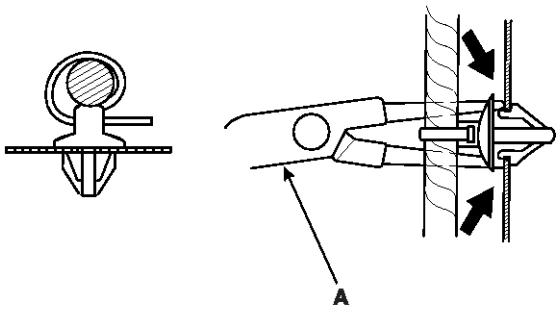
HANDLING WIRES AND HARNESSES

1. Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
2. Remove clips carefully; don't damage their locks (A).



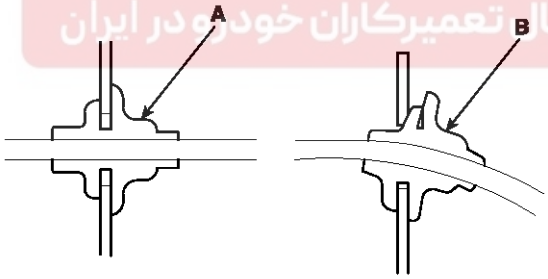
ETKD150H

3. Slip pliers (A) under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.



ETKD150I

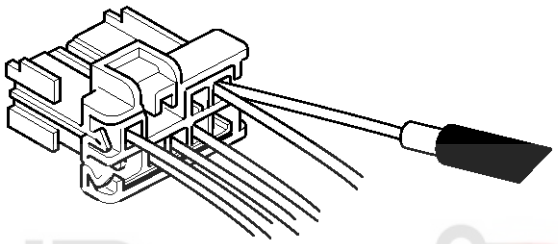
4. After installing harness clips, make sure the harness doesn't interfere with any moving parts.
5. Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.
6. Seat grommets in their grooves properly (A). Do not leave grommets distorted (B).



ETKD150J

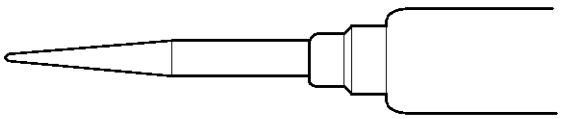
TESTING AND REPAIRS

1. Do not use wires or harnesses with broken insulation.
   Replace them or repair them by wrapping the break with electrical tape.
2. After installing parts, make sure that no wires are pinched under them.
3. When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
4. If possible, insert the probe of the tester from the wire side (except waterproof connector).



ETKD150K

5. Use a probe with a tapered tip.



ETKD150L

FIVE-STEP TROUBLESHOOTING

1. Verify the complaint

   Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. Analyze the schematic

   Look up the schematic for the problem circuit.

   Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. Isolate the problem by testing the circuit

   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting.

   Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. Fix the problem

   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

5. Make sure the circuit works

   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problemwas a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

TROUBLESHOOTING

INSTRUMENTS AND WARNING SYSTEM

Symptom	Possible cause	Remedy
Speedometer does not operate	Cluster fuse (10A) blown	Check for short and replace fuse
	Speedometer faulty	Check speedometer
	Vehicle speed sensor faulty	Check vehicle speed sensor
	Wiring or ground faulty	Repair if necessary
Tachometer does not operate	Cluster fuse (10A) blown	Check for short and replace fuse
	Tachometer faulty	Check tachometer
	Wiring or ground faulty	Repair if necessary
Fuel gauge does not operate	Cluster fuse (10A) blown	Check for short and replace fuse
	Fuel gauge faulty	Check gauge
	Fuel sender faulty	Check fuel sender
	Wiring or ground faulty	Repair if necessary
Low fuel warning lamp does not light up	Cluster fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Fuel sender faulty	Check fuel sender
	Wiring or ground faulty	Repair if necessary
Water temperature gauge does not operate	Cluster fuse (10A) blown	Check for short and replace fuse
	Water temperature gauge faulty	Check gauge
	Water temperature sender faulty	Check sender
	Wiring or ground faulty	Repair if necessary
Oil pressure warning lamp does not light up	Cluster fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Oil pressure switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Parking brake warning lamp does not light up	Cluster fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Brake fluid level warning switch faulty	Check switch
	Parking brake switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Open door warning lamp and trunk lid warning lamp do not light up	Room lamp fuse (15A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Door switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

Symptom	Possible cause	Remedy
Seat belt warning lamp does not light up	Cluster fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Seat belt switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

LIGHTING SYSTEM

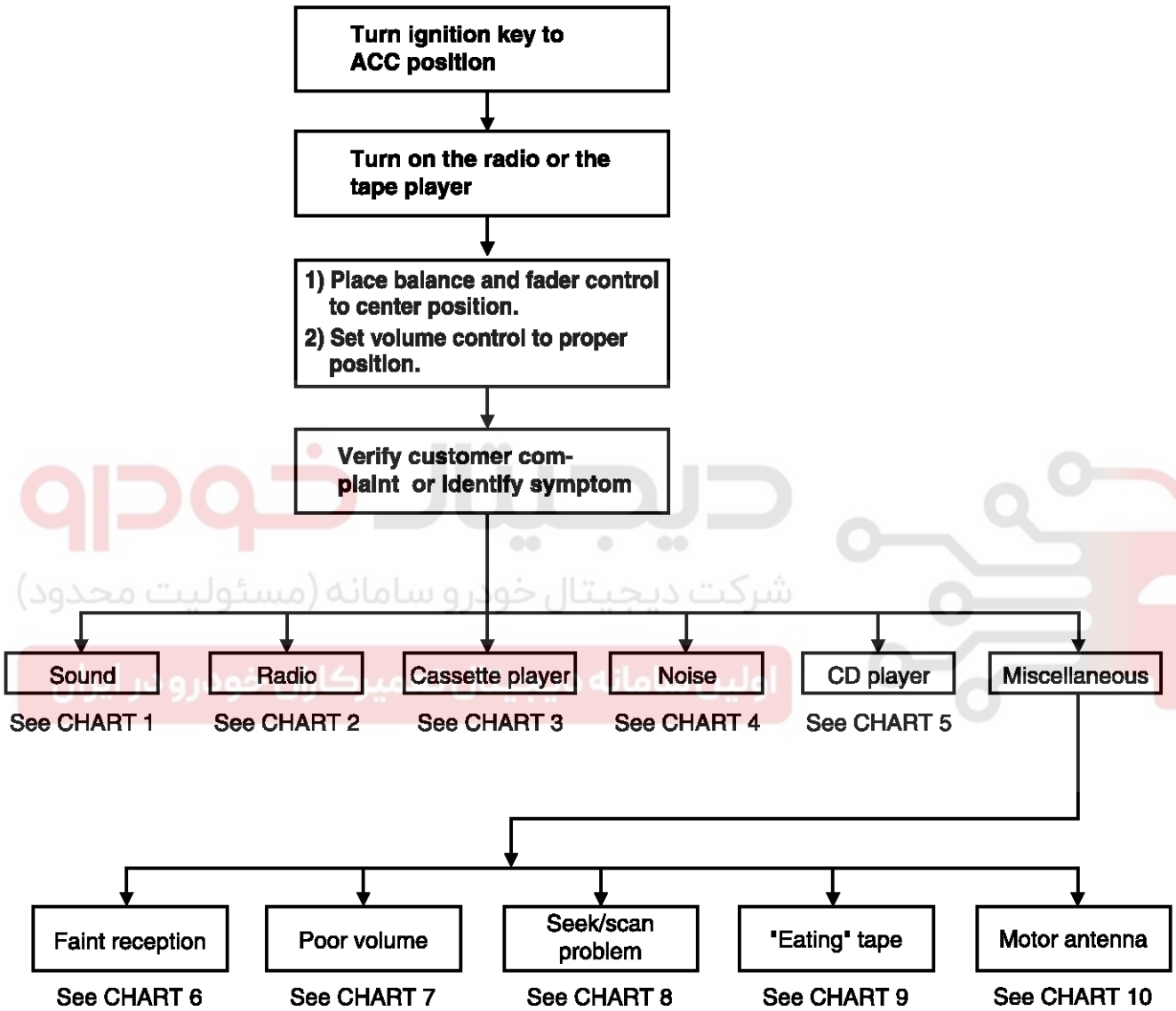
Symptom	Possible cause	Remedy
One lamp does not light (all exterior)	Bulb burned out	Replace bulb
	Socket, wiring or ground faulty	Repair if necessary
Head lamps do not light	Bulb burned out	Replace bulb
	Ignition fuse (10A) blown	Check for short and replace fuse
	Head lamp fuse (15A) blown	Check for short and replace fuse
	Head lamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Tail lamps and license plate lamps do not light	Bulb burned out	Replace bulb
	Tail lamp fuse (10A) blown	Check for short and replace fuse
	Battery fuse (50A) blown	Replace the fuse
	Tail lamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Stop lamps do not light	Bulb burned out	Replace bulb
	Stop lamp fuse (15A) blown	Check for short and replace fuse
	Stop lamp switch faulty	Adjust or replace switch
	Wiring or ground faulty	Repair if necessary
Stop lamps do not turn off	Stop lamp switch faulty	Repair or replace switch
Instrument lamps do not light (Tail lamps light)	Rheostat faulty	Check rheostat
	Wiring or ground faulty	Repair if necessary
Turn signal lamp does not flash on one side	Bulb burned out	Replace bulb
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Turn signal lamps do not light	Bulb burned out	Replace bulb
	Turn signal lamp fuse (10A) blown	Check for short and replace fuse
	ETACS faulty	Check ETACS
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

Symptom	Possible cause	Remedy
Hazard warning lamps do not light	Bulb burned out	Replace bulb
	Hazard warning lamp fuse (10A) blown	Check for short and replace fuse
	ETACS faulty	Check ETACS
	Hazard switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Flasher rate too slow or too fast	Lamps' wattages are smaller or larger than specified	Replace lamps
	ETACS faulty	Check ETACS
Back up lamps do not light	Bulb burned out	Replace bulb
	Turn signal lamp fuse (10A) blown	Check for short and replace fuse
	Back up lamp switch (M/T) faulty	Check switch
	Transaxle range switch (A/T) faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Room lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (15A) blown	Check for short and replace fuse
	Room lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Front fog lamps do not light	Bulb burned out	Replace bulb
	Front fog lamp fuse (15A) blown	Check for short and replace fuse
	Front fog lamp relay faulty	Check relay
	Front fog lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Map lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (15A) blown	Check for short and replace fuse
	Map lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Trunk room lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (15A) blown	Check for short and replace fuse
	Trunk lid switch (4 door) faulty	Check switch
	Tailgate switch (5 door) faulty	Check switch
	Wiring or ground faulty	Repair if necessary

Symptom	Possible cause	Remedy
Rear fog lamps do not light	Bulb burned out	Replace bulb
	Rear fog lamp fuse (10A) blown	Check for short and replace fuse
	Rear fog lamp relay faulty	Check relay
	Rear fog lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

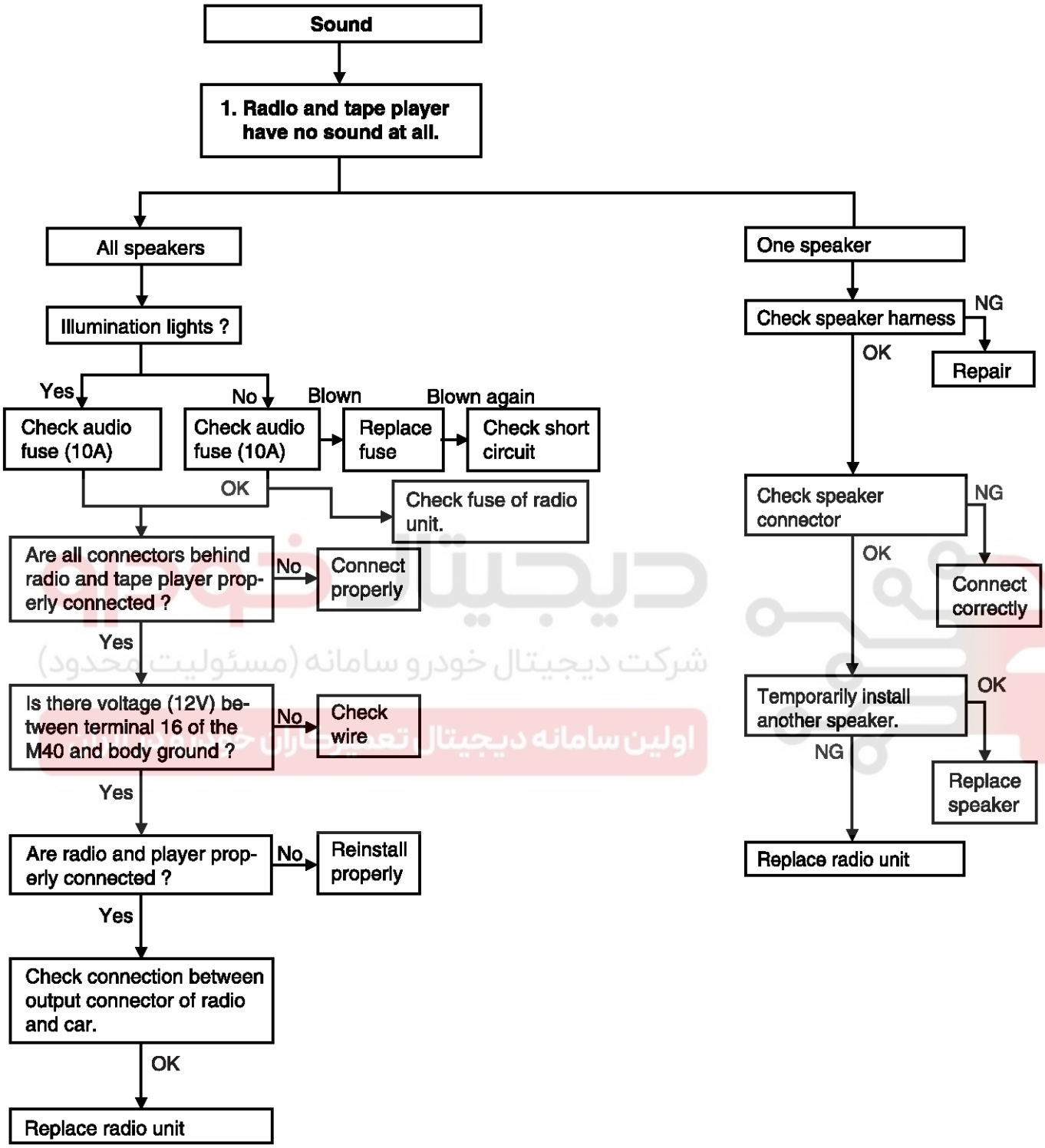
AUDIO SYSTEM

There are six areas where a problem can occur: wiring harness, the radio, the cassette tape deck, the CD player, and speaker. Troubleshooting enables you to confine the problem to a particular area.

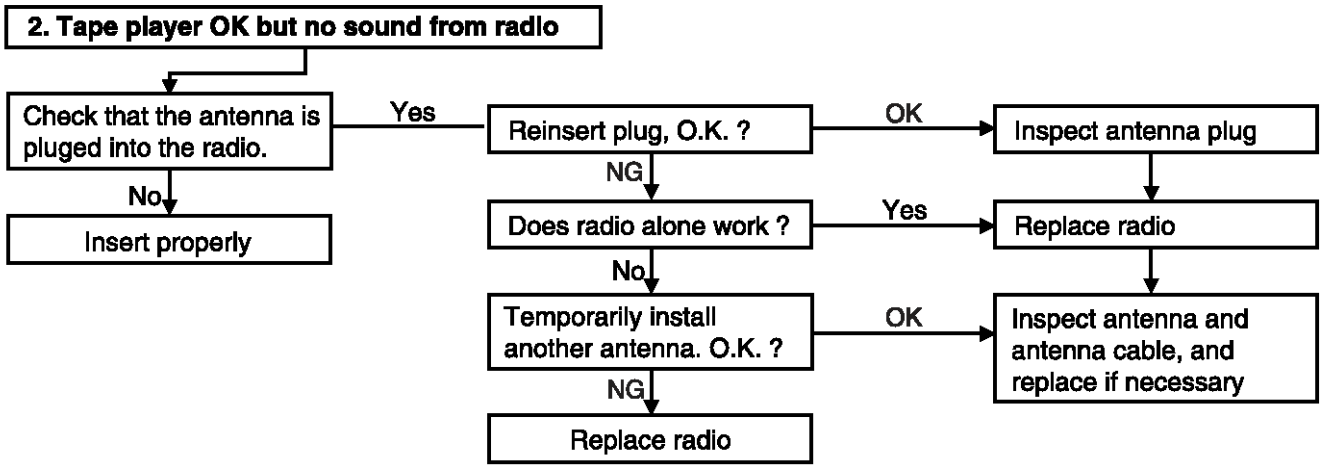


LTAC004A

CHART 1



LTAC004B



LTAC004C

CHART 2

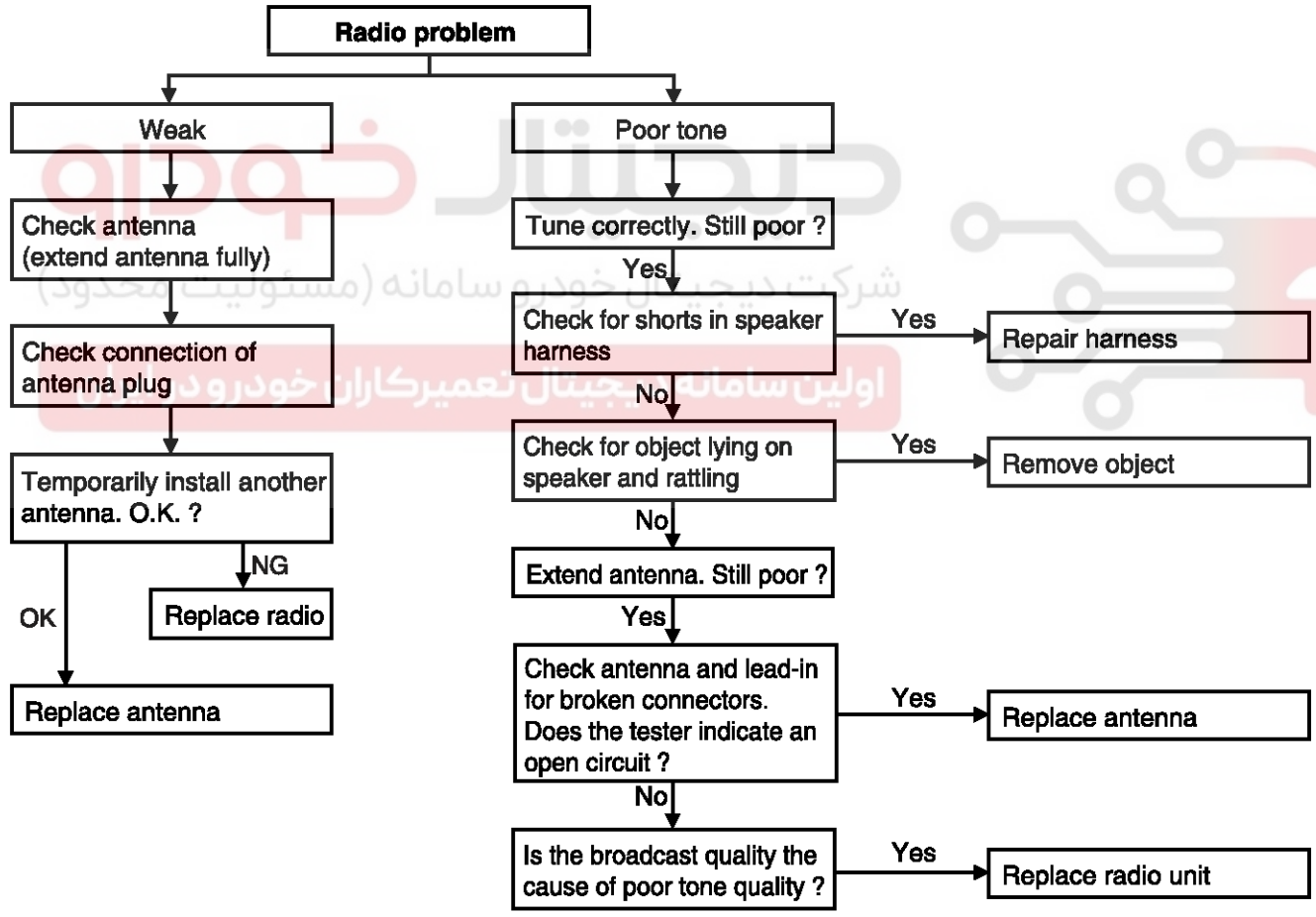


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CHART 3

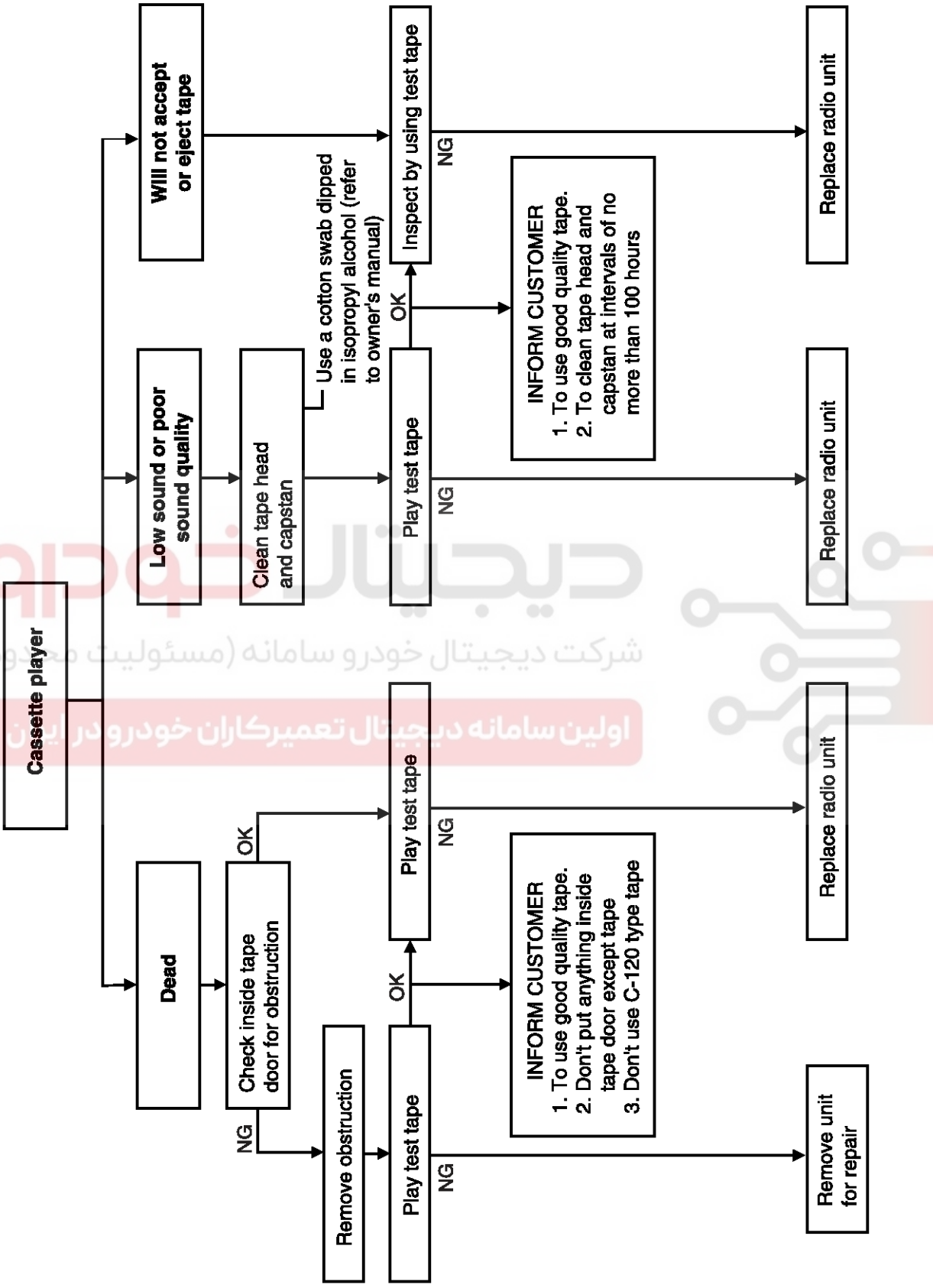

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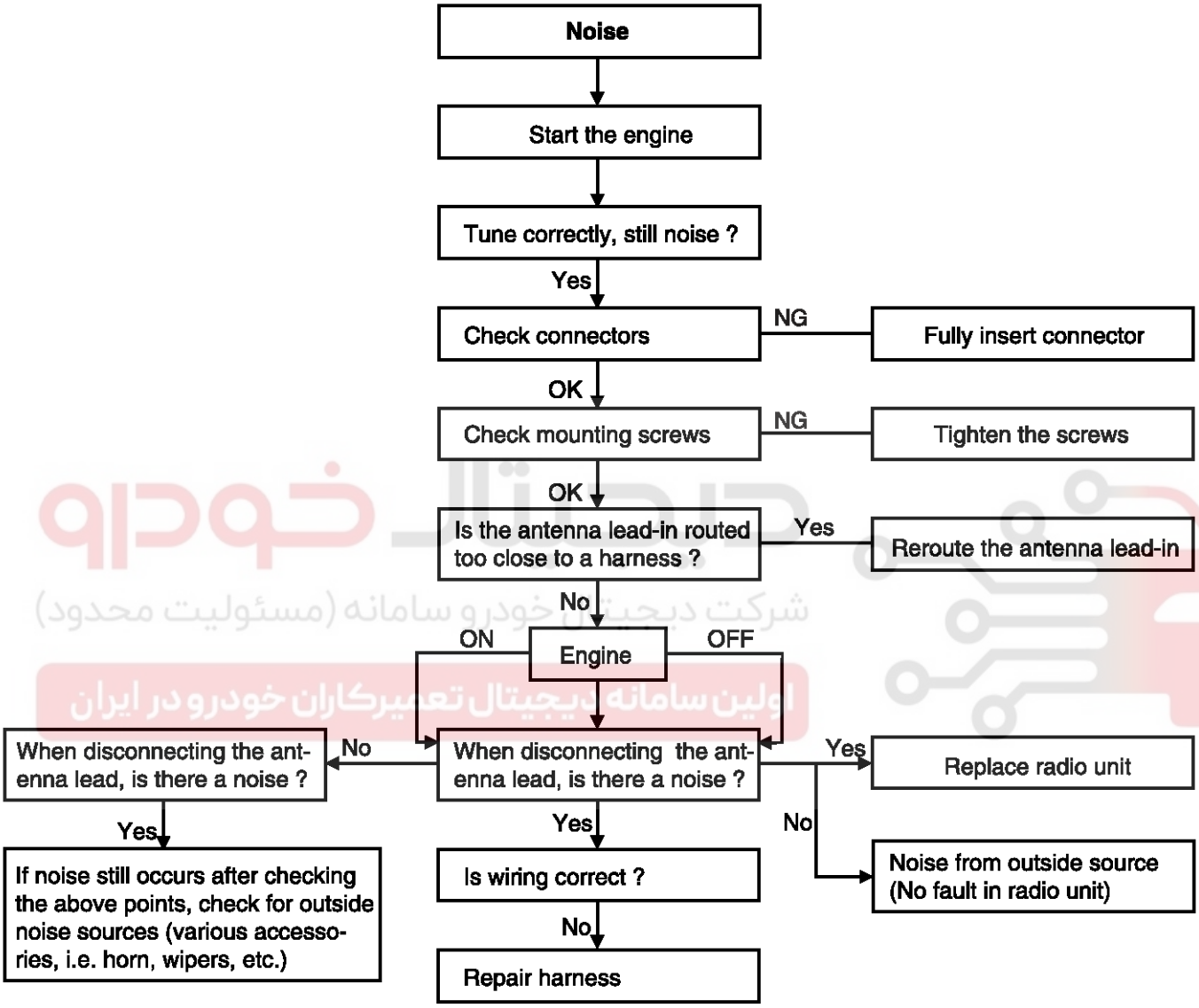
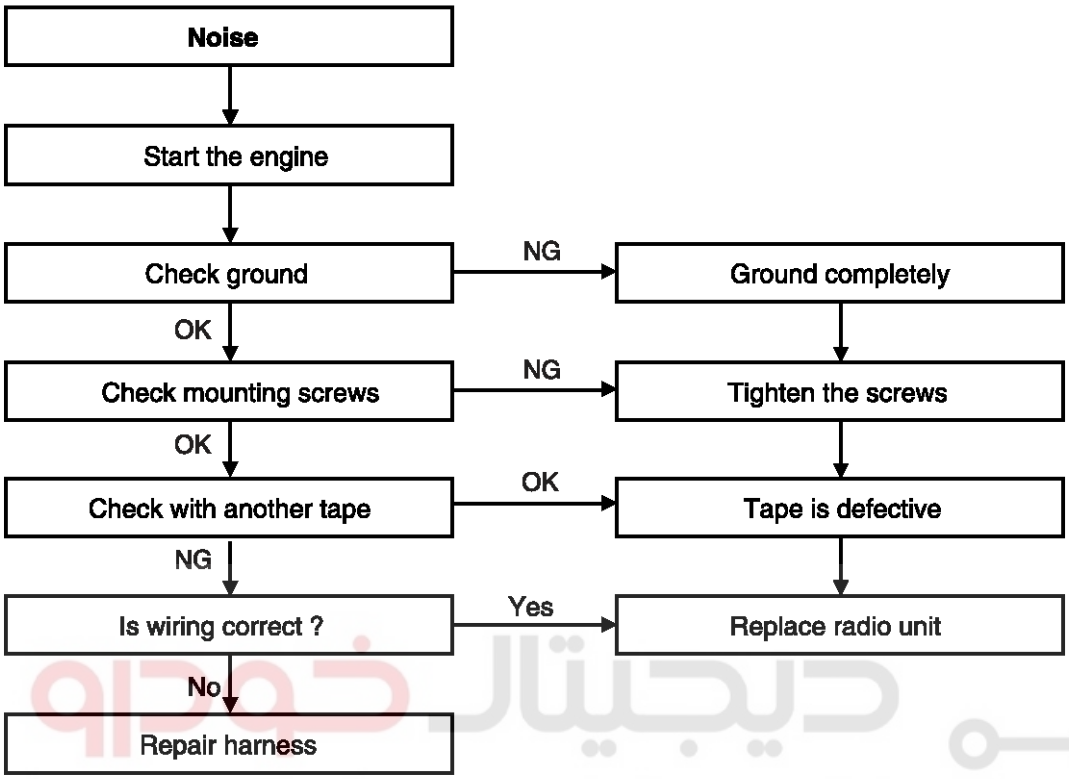
CHART 4

1. RADIO



LTAC004F

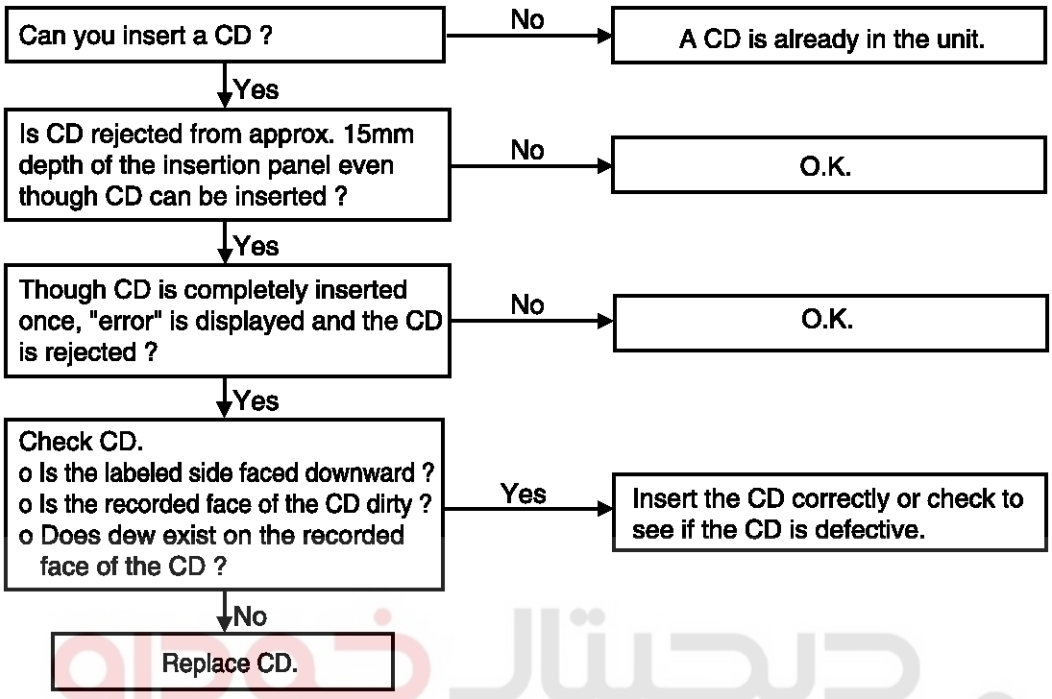
2. TAPE



LTAC004G

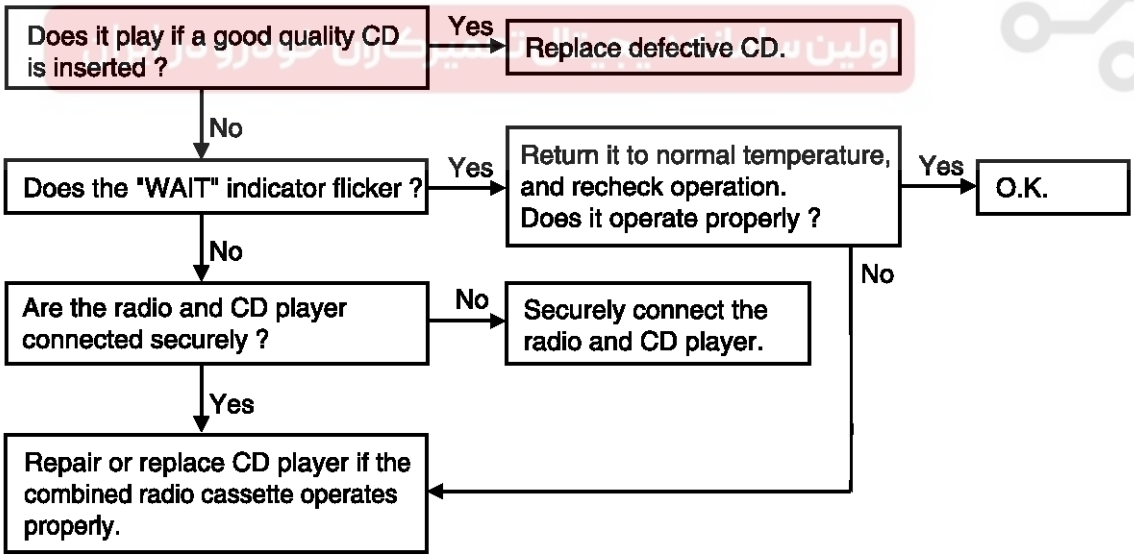
CHART 5

1. CD WILL NOT BE ACCEPTED



LTAC004H

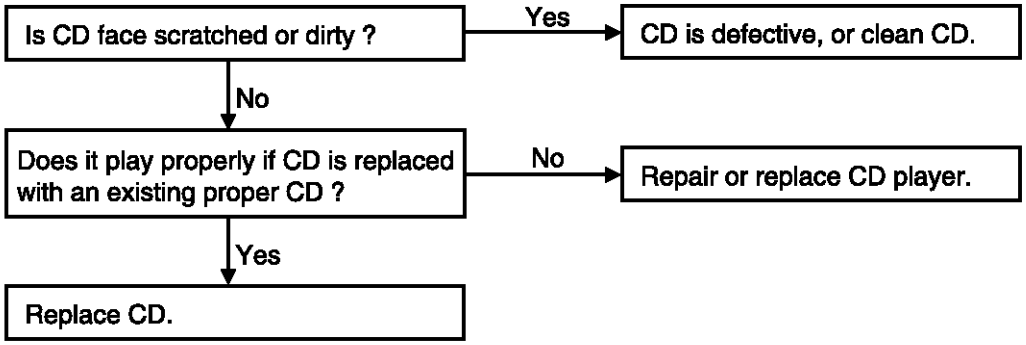
2. NO SOUND



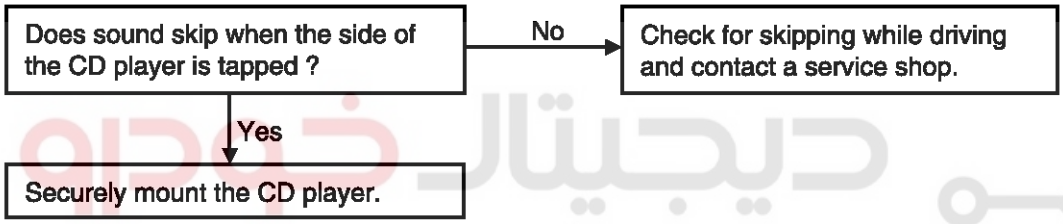
LTAC004I

3. CD SOUND SKIPS

1) Sound sometimes skips when parking.

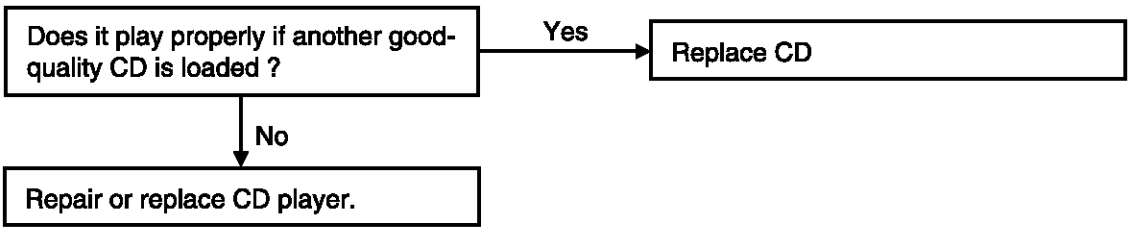


2) Sound sometimes skips when driving.
(Stop vehicle, and check it.)
(Check by using a CD which is free of scratches, dirt or other damage.)

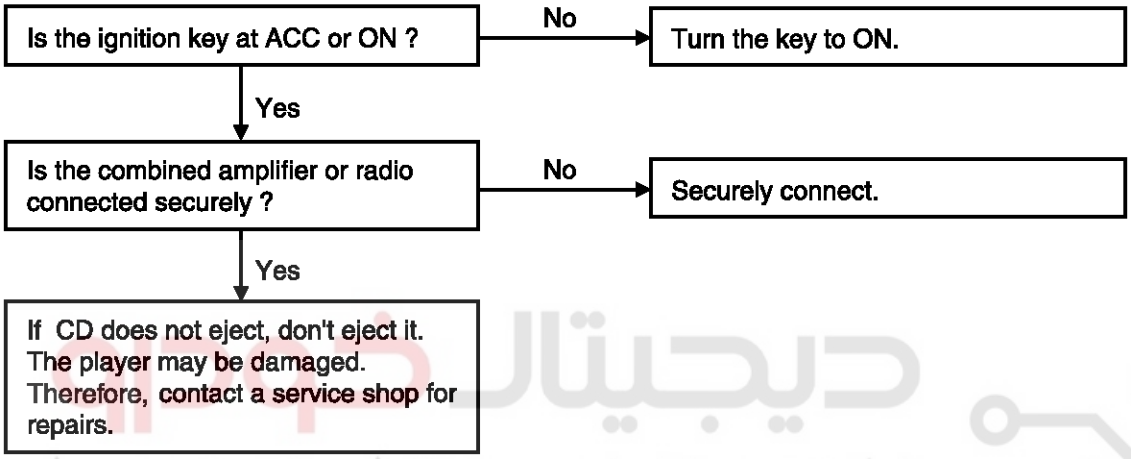


LTAC004J

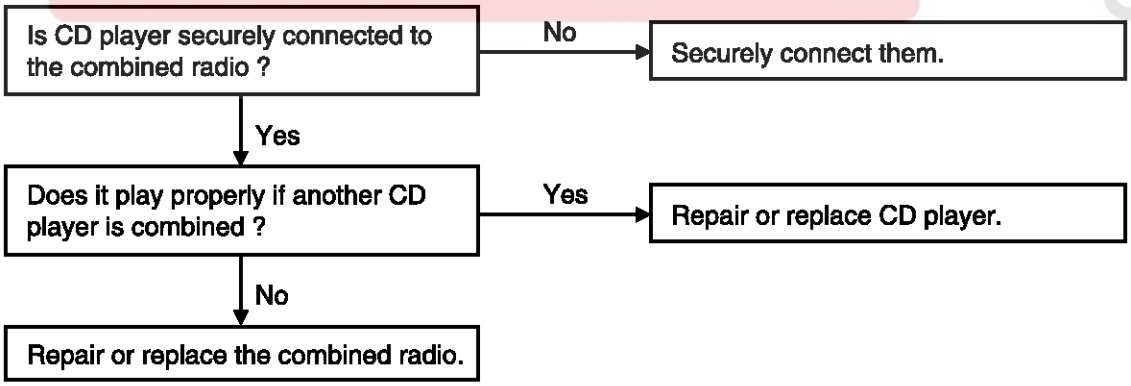
4. SOUND QUALITY IS POOR



5. CD WILL NOT EJECT

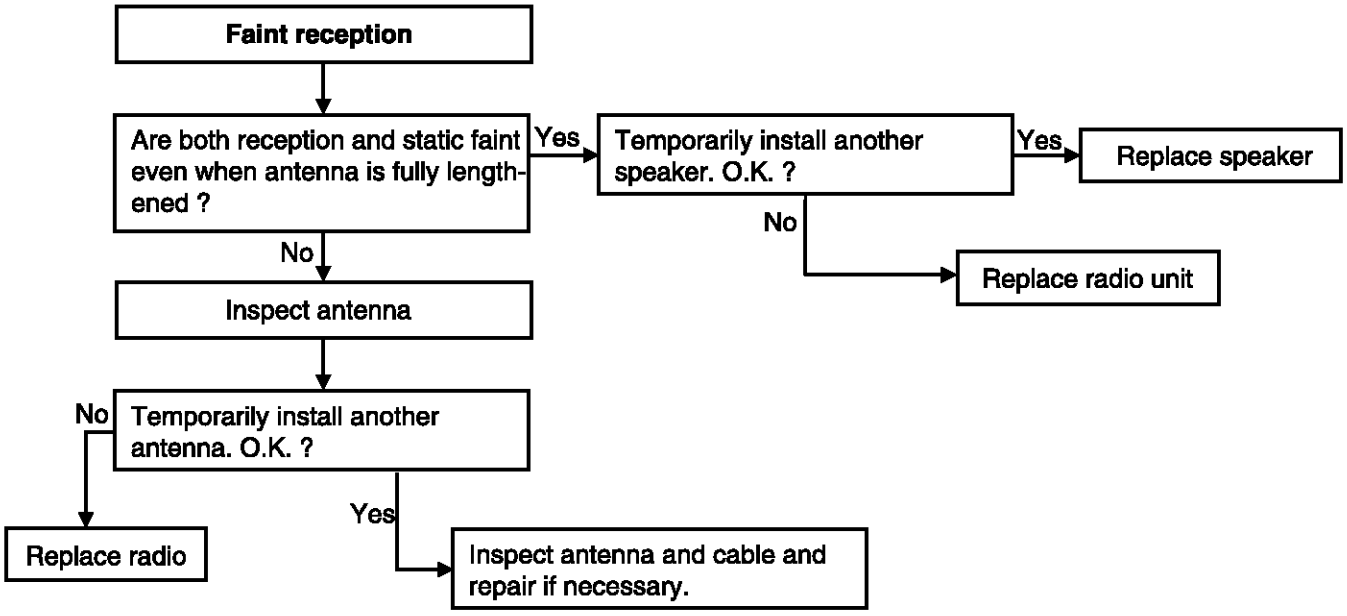


6. NO SOUND FROM ONE SPEAKER



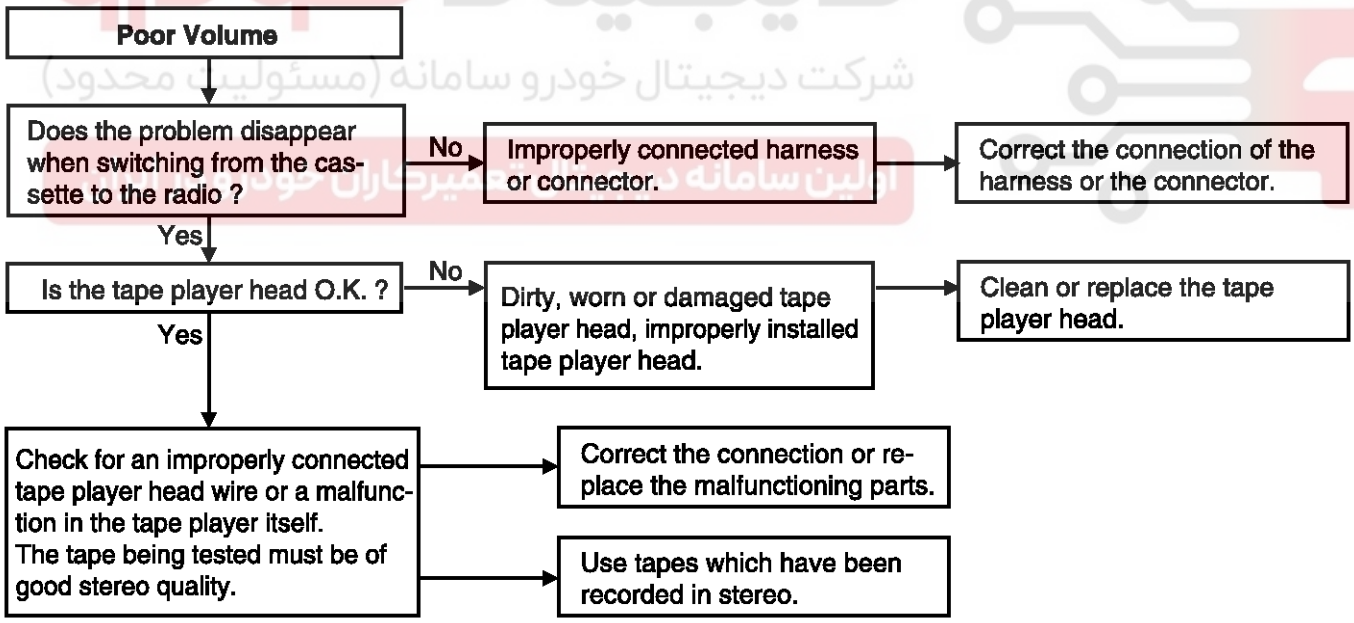
LTAC004K

CHART 6



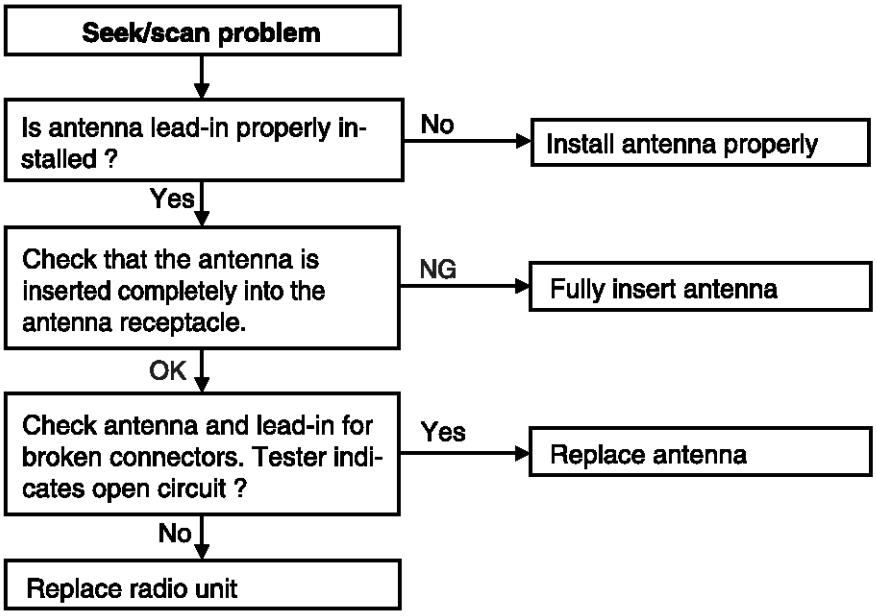
LTAC004L

CHART 7



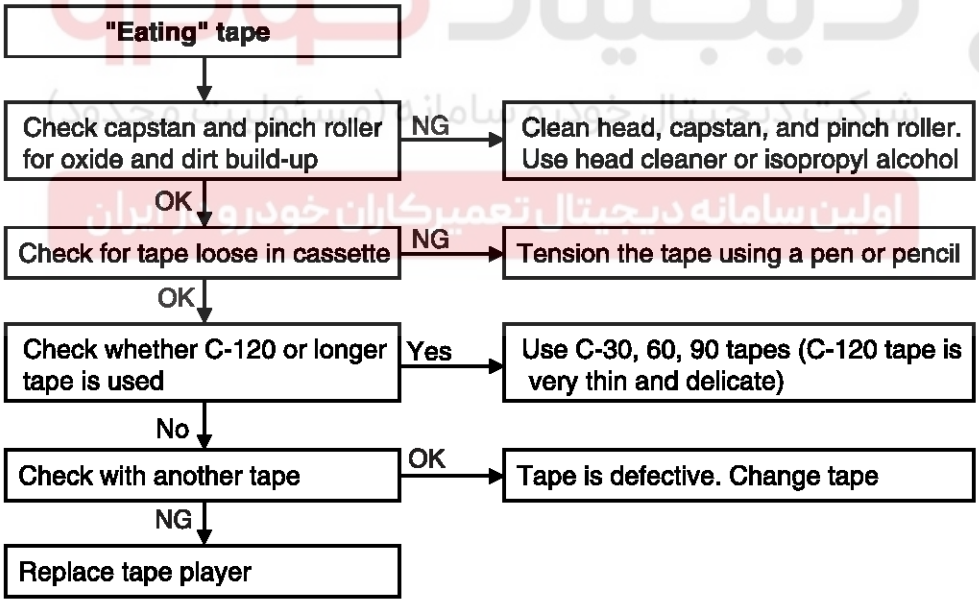
LTAC004M

CHART 8



LTAC004N

CHART 9

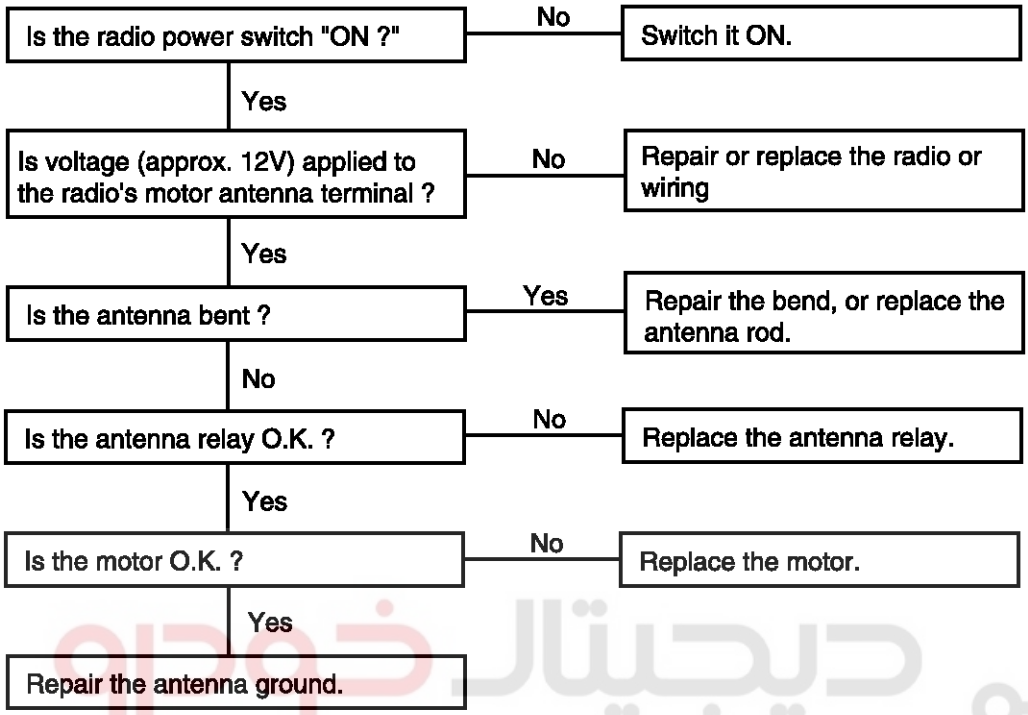


LTAC004O

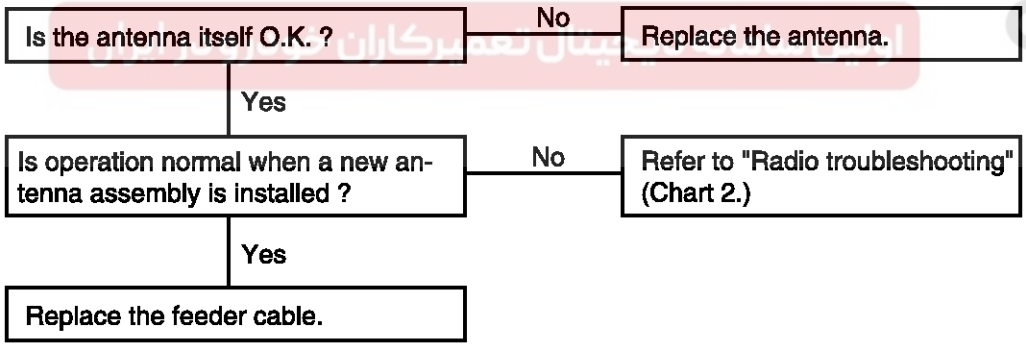
CHART 10

1. MOTOR ANTENNA WON'T EXTEND OR RETRACT

Clean and polish the surface of the antenna rod.



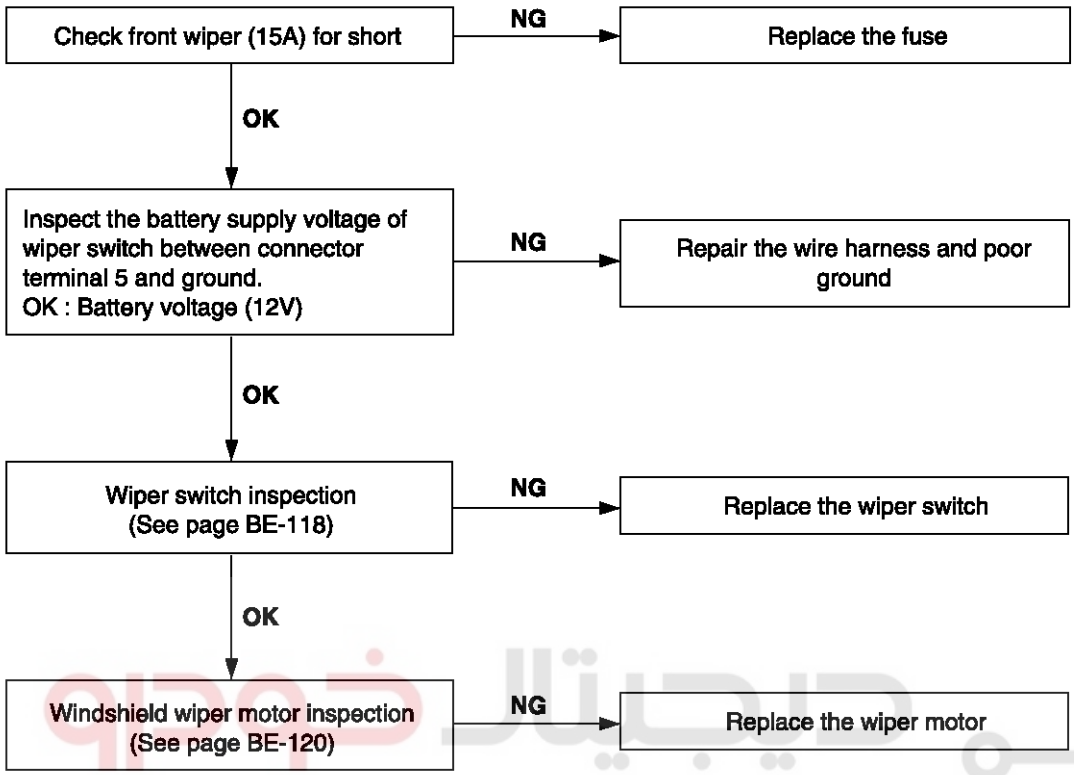
2. MOTOR ANTENNA EXTENDS AND RETRACTS BUT DOES NOT RECEIVE



ETAA010P

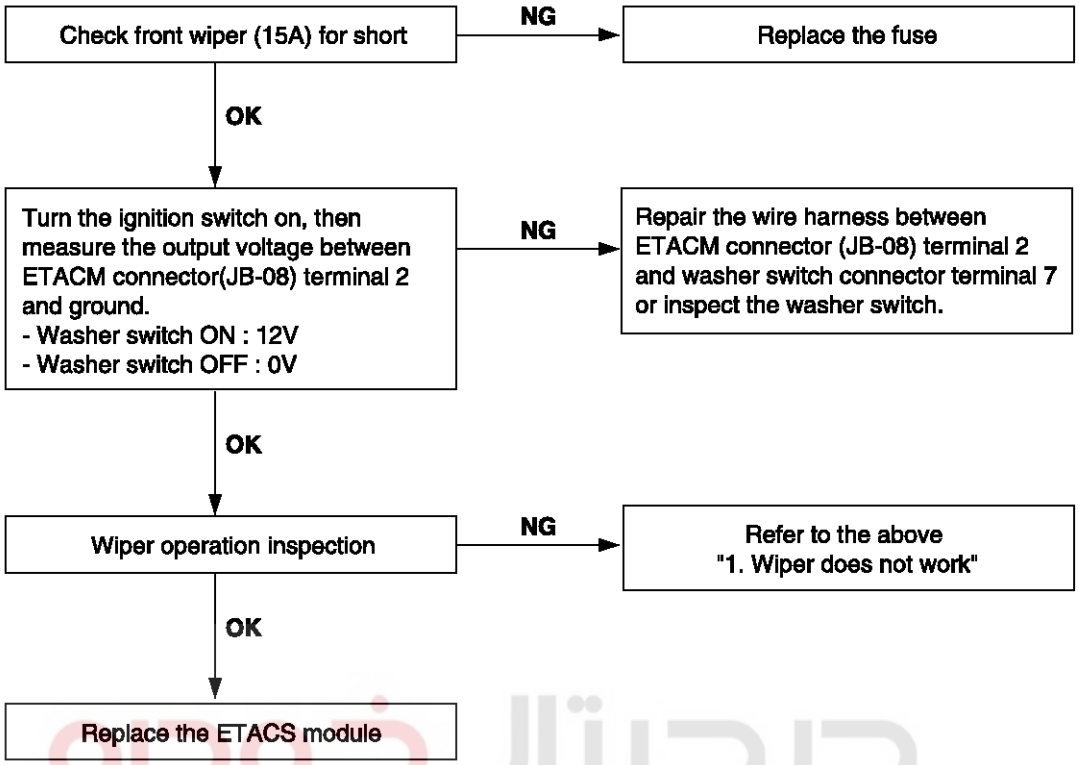
WINDSHIELD WIPER

1. Wiper low and wiper high does not work.



BTGE990A

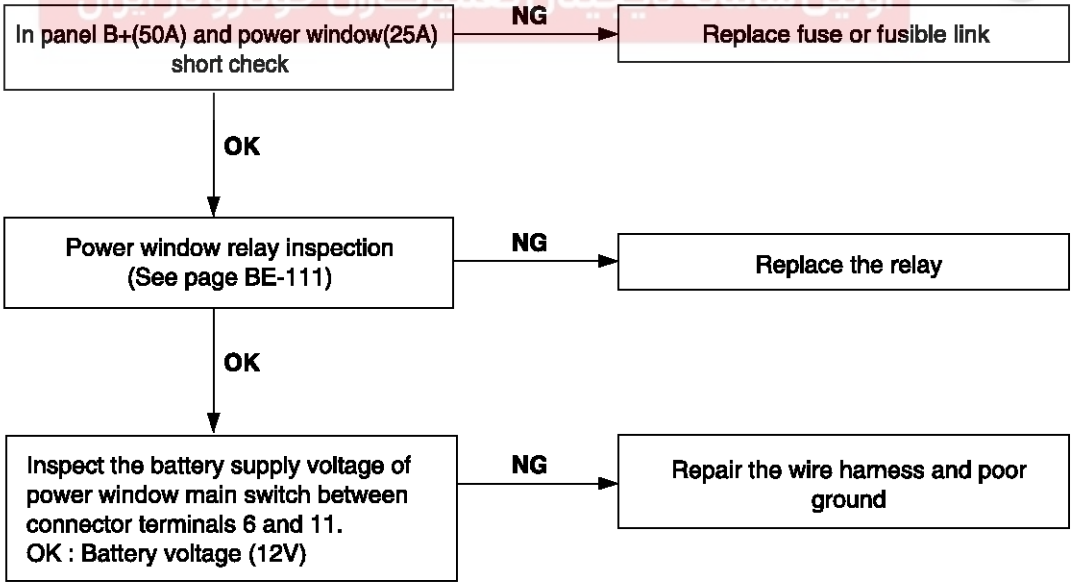
2. When washer switch is on, wiper does not work.



BTGE990B

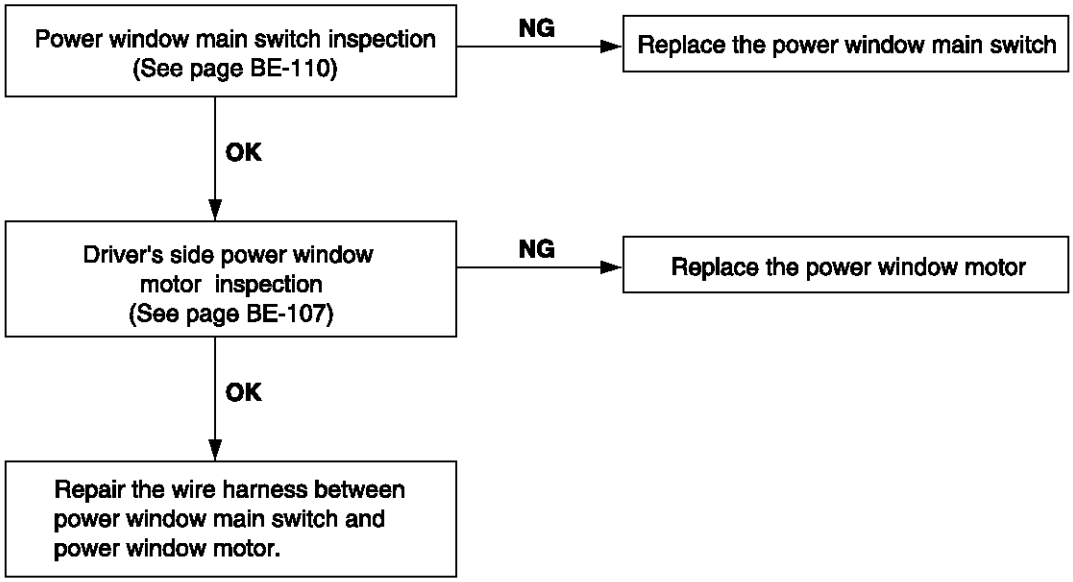
POWER WINDOW

1. No windows operate from the main switch on the driver's door.



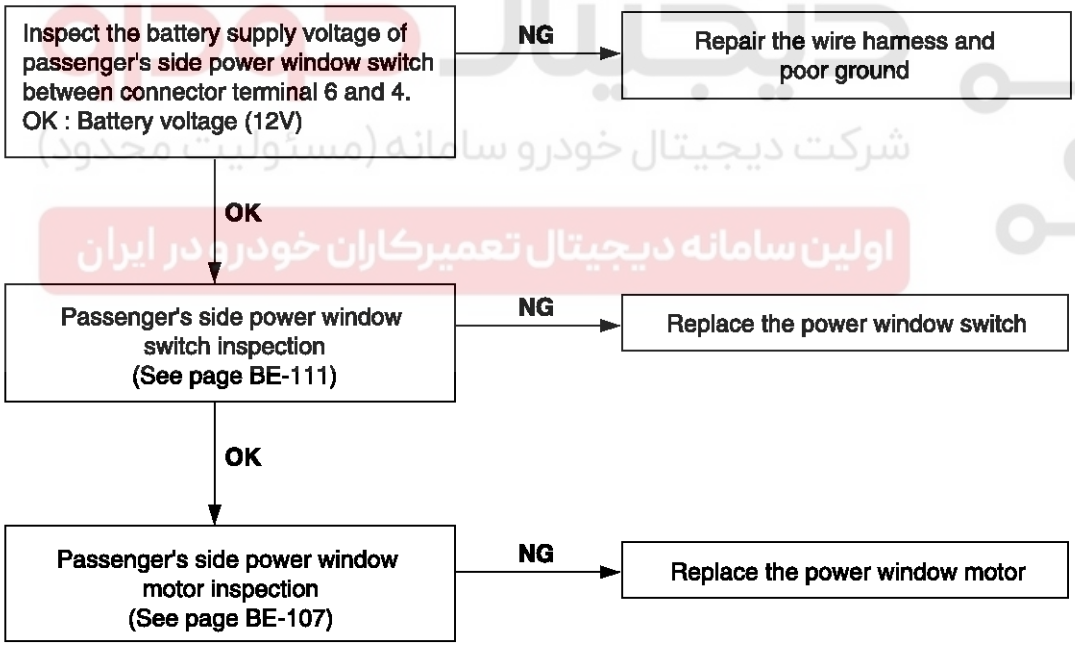
BTGE990C

2. Driver's side window does not operate.



BTGE990D

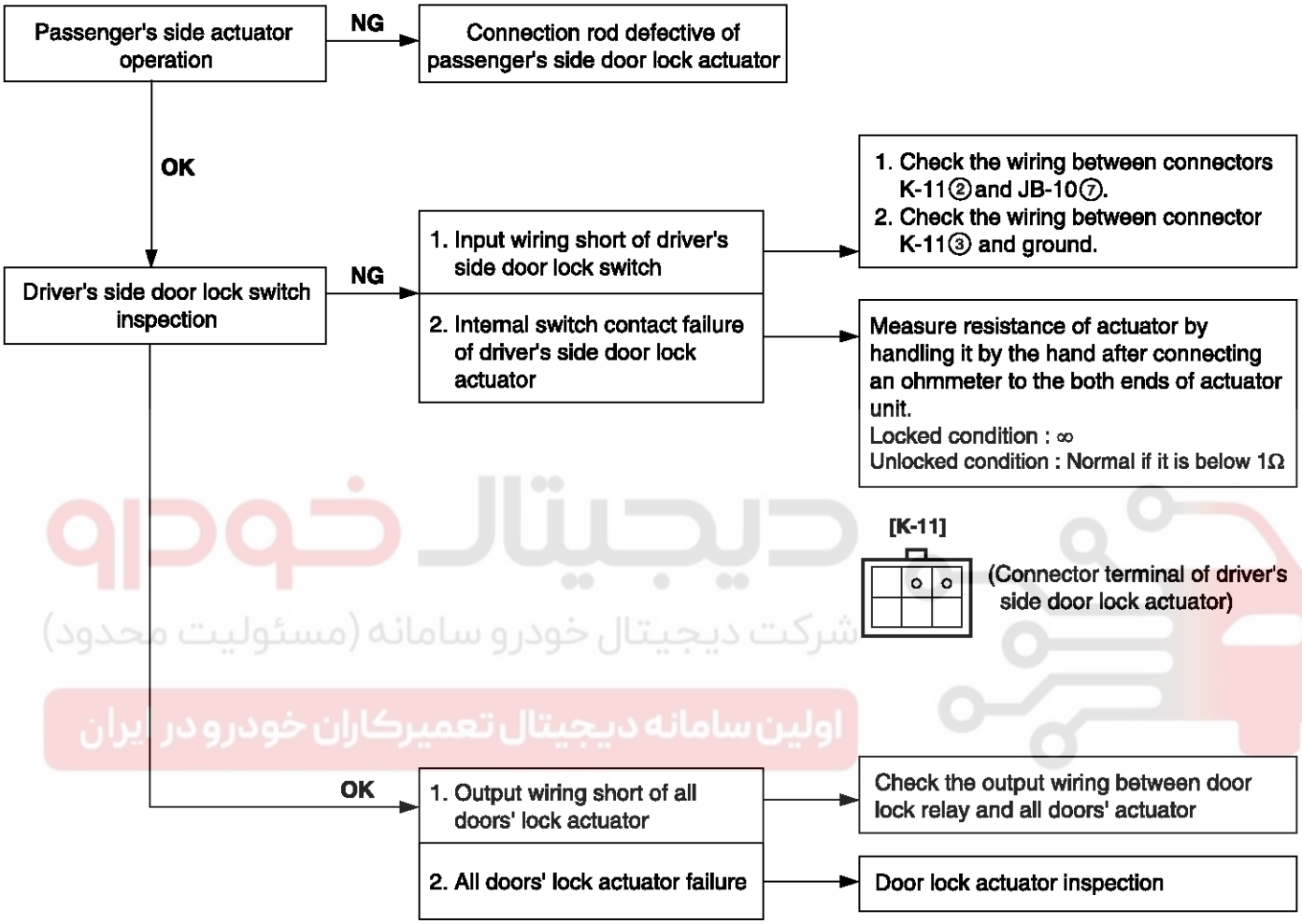
3. Passenger's side window does not operate.



BTGE990E

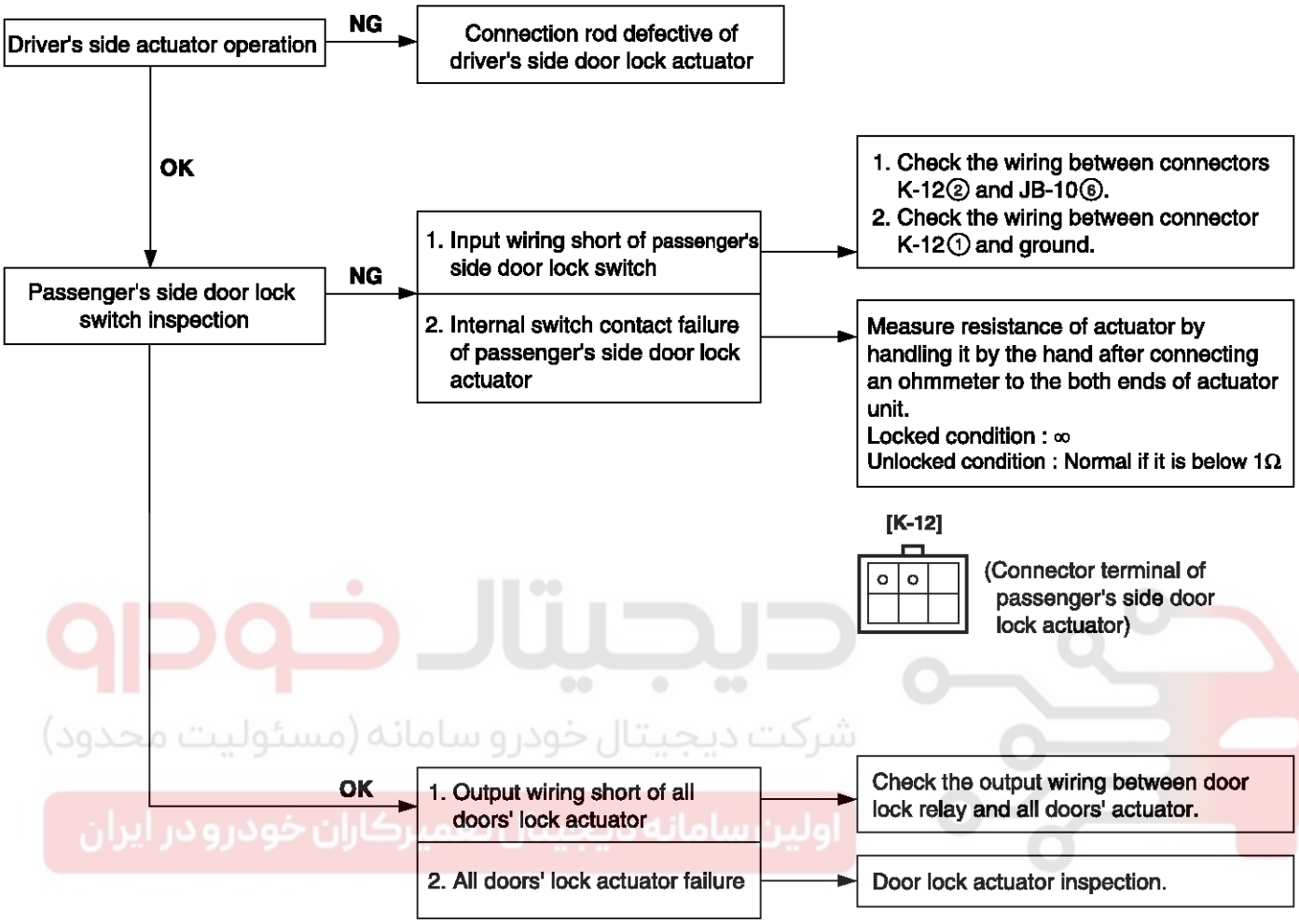
POWER DOOR LOCK

1. Lock function works but unlock function does not work. → Since door unlock relay is fail, replace the ETACS module.
2. Unlock function works but lock function does not work. → Since door lock relay is fail, replace the ETACS module.
3. When passenger side knob is controlled, all doors locks, but when driver side knob is controlled, all doors do not lock.



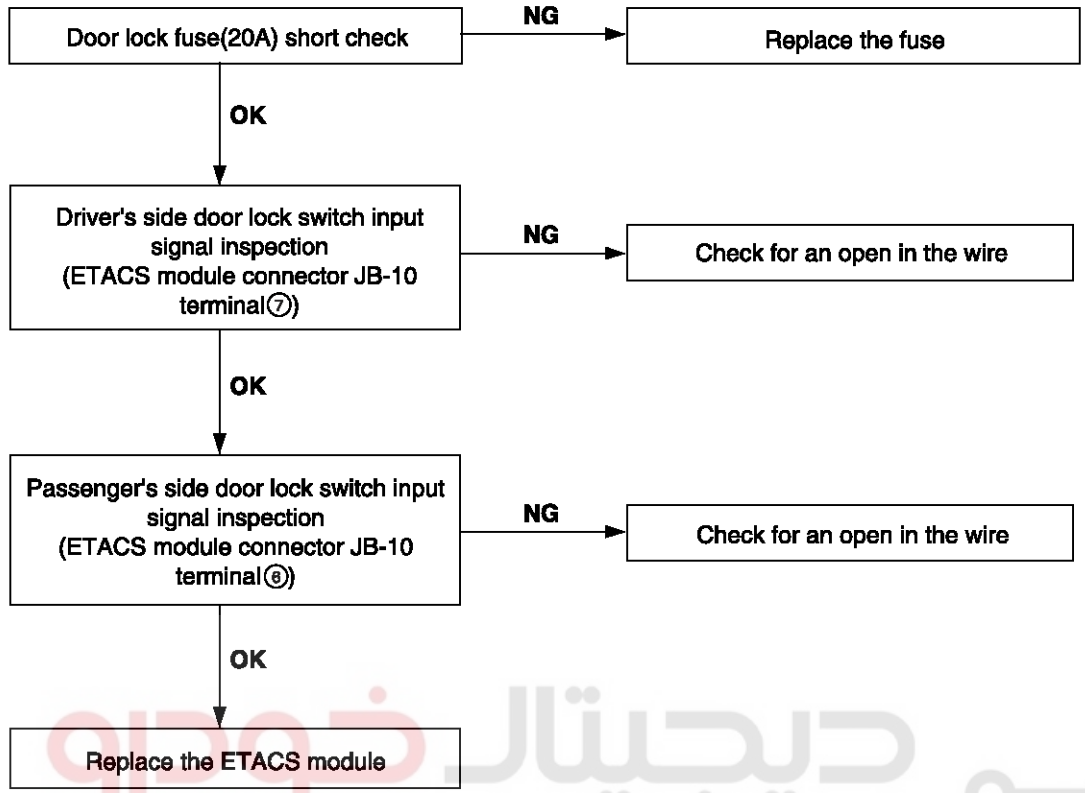
BTGE990F

4. When passenger side knob is controlled. All doors lock. But when the driver side knob is controlled, all doors do not lock.



BTGE990G

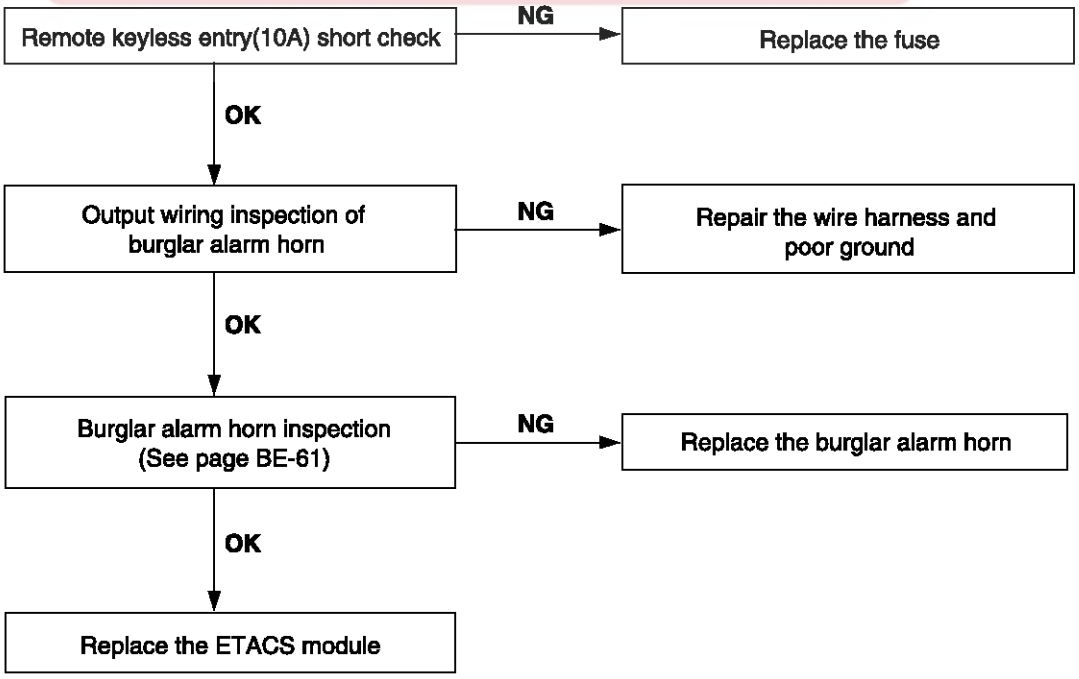
5. Both sides do not interlock either.



BTGE990H

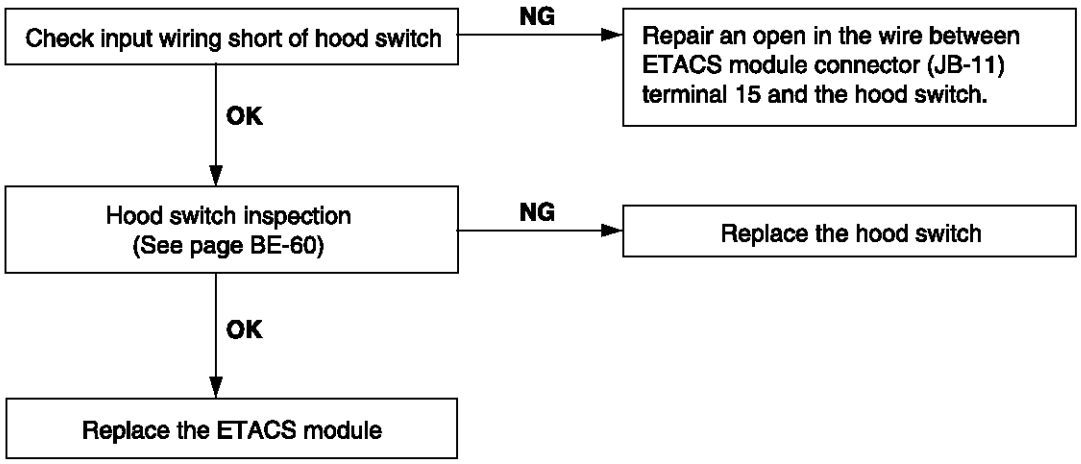
KEYLESS ENTRY & BURGLAR ALARM SYSTEM

1. Alarm does not work. (Hazard lamp works)



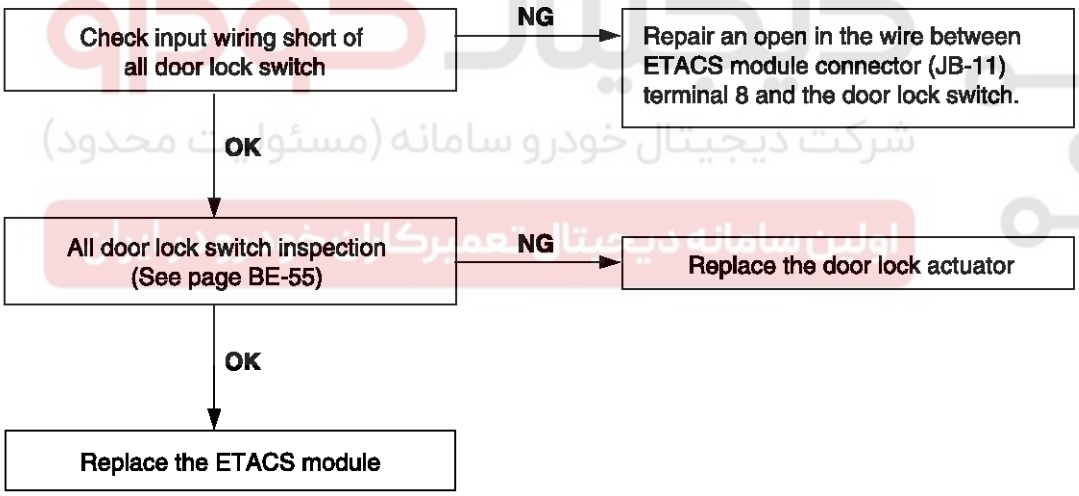
BTGE990I

2. When hood is opened inside the burglar alarm horn does not work.



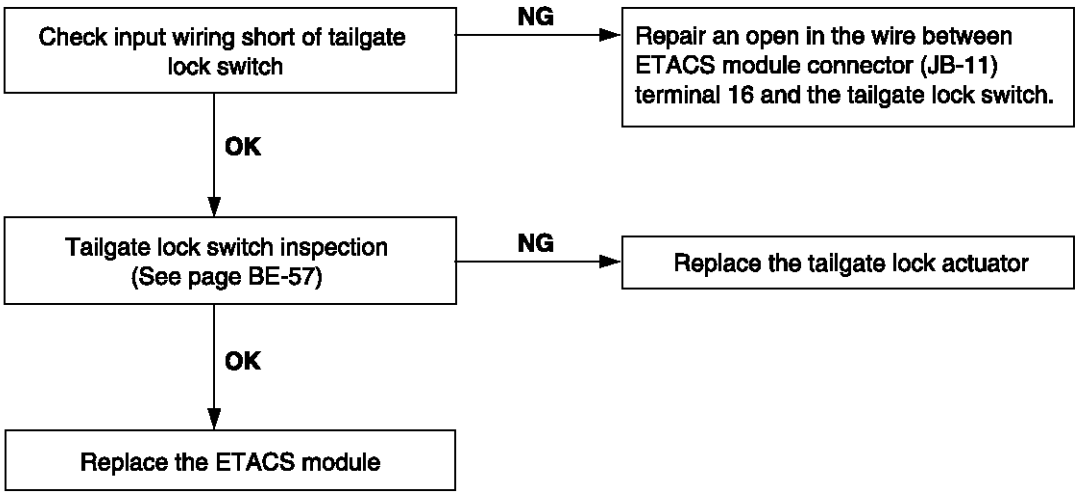
BTGE990J

3. When door is opened inside the burglar alarm horn does not work (If tailgate and hood is opened, alarm works)



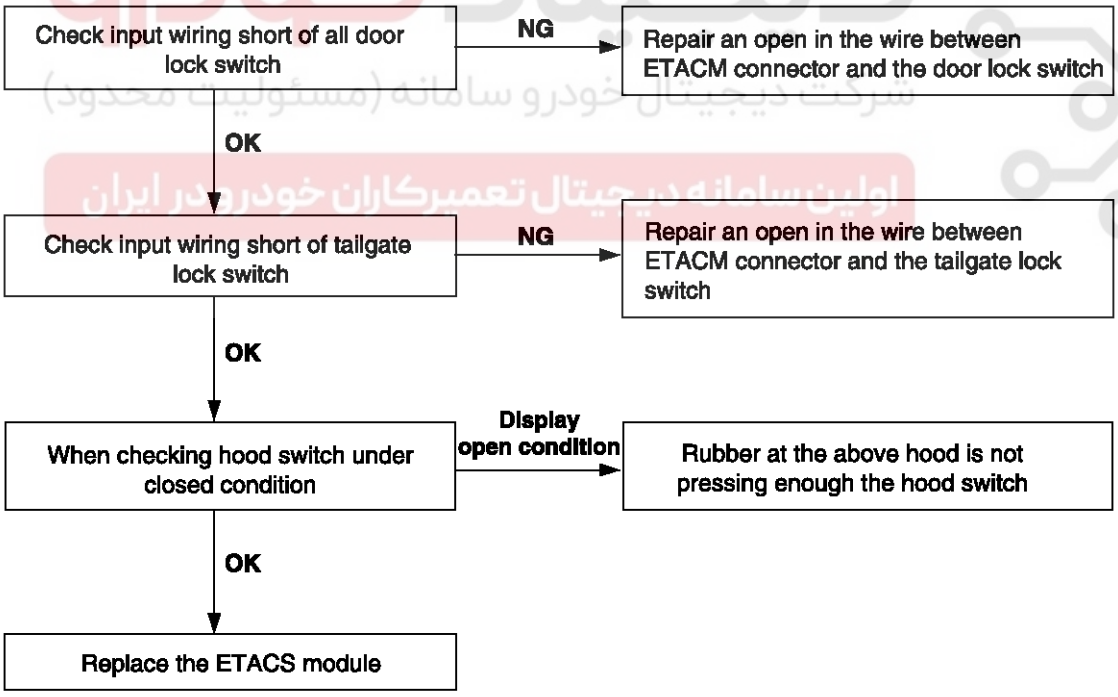
BTGE990K

4. When tailgate is opened inside the burglar alarm horn does not work.



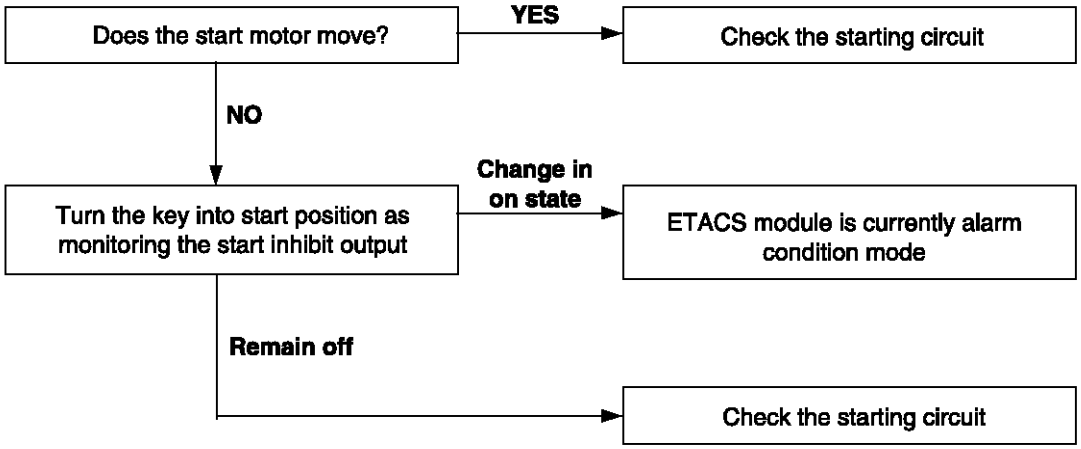
BTGE990L

5. When the vehicle is locked by the transmitter, central door lock function works but hazard lamp doesn't blink.



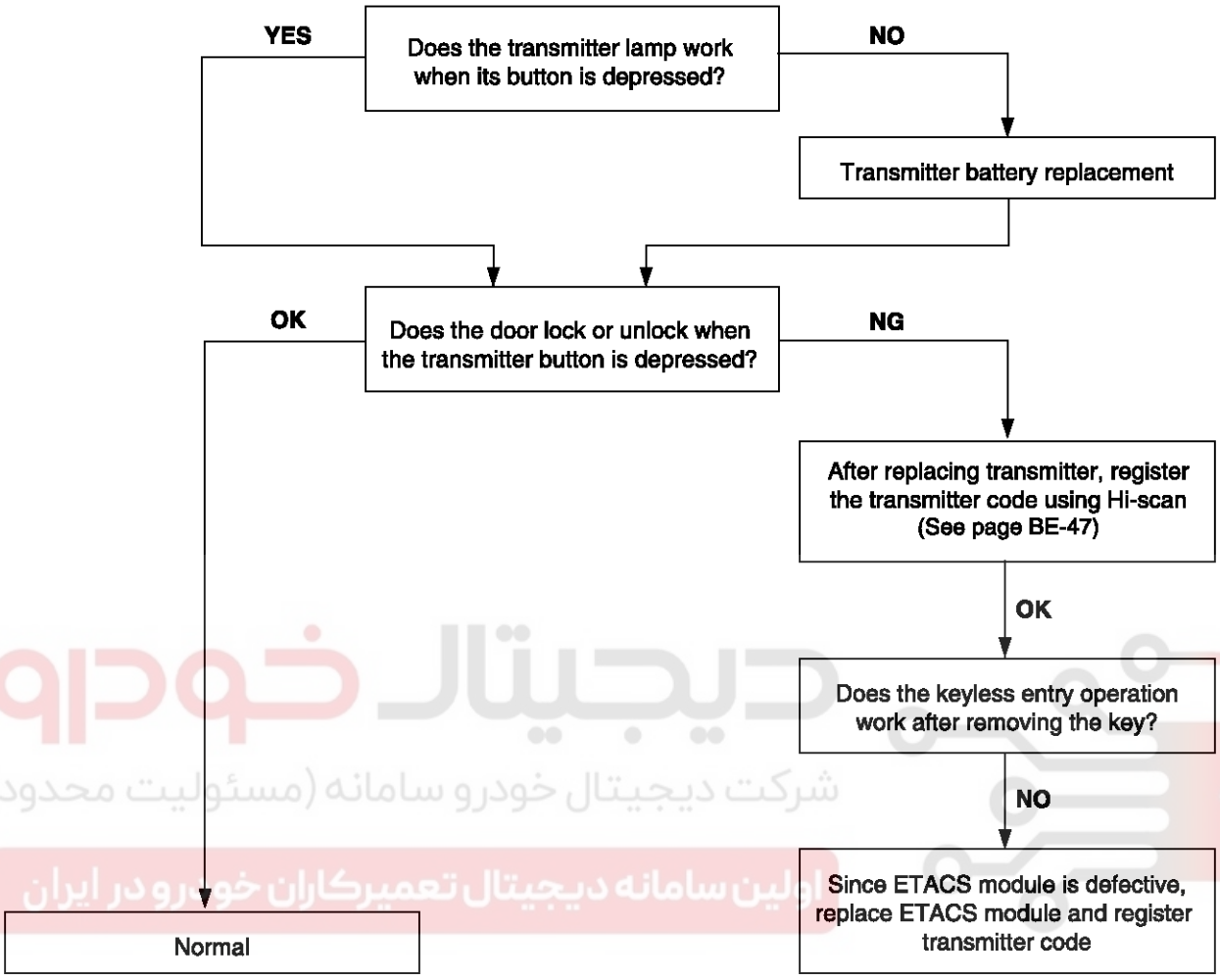
BTGE990M

6. Engine does not start, when the alarm released condition.



BTGE990N

7. Central door lock function works, but keyless entry system does not work.



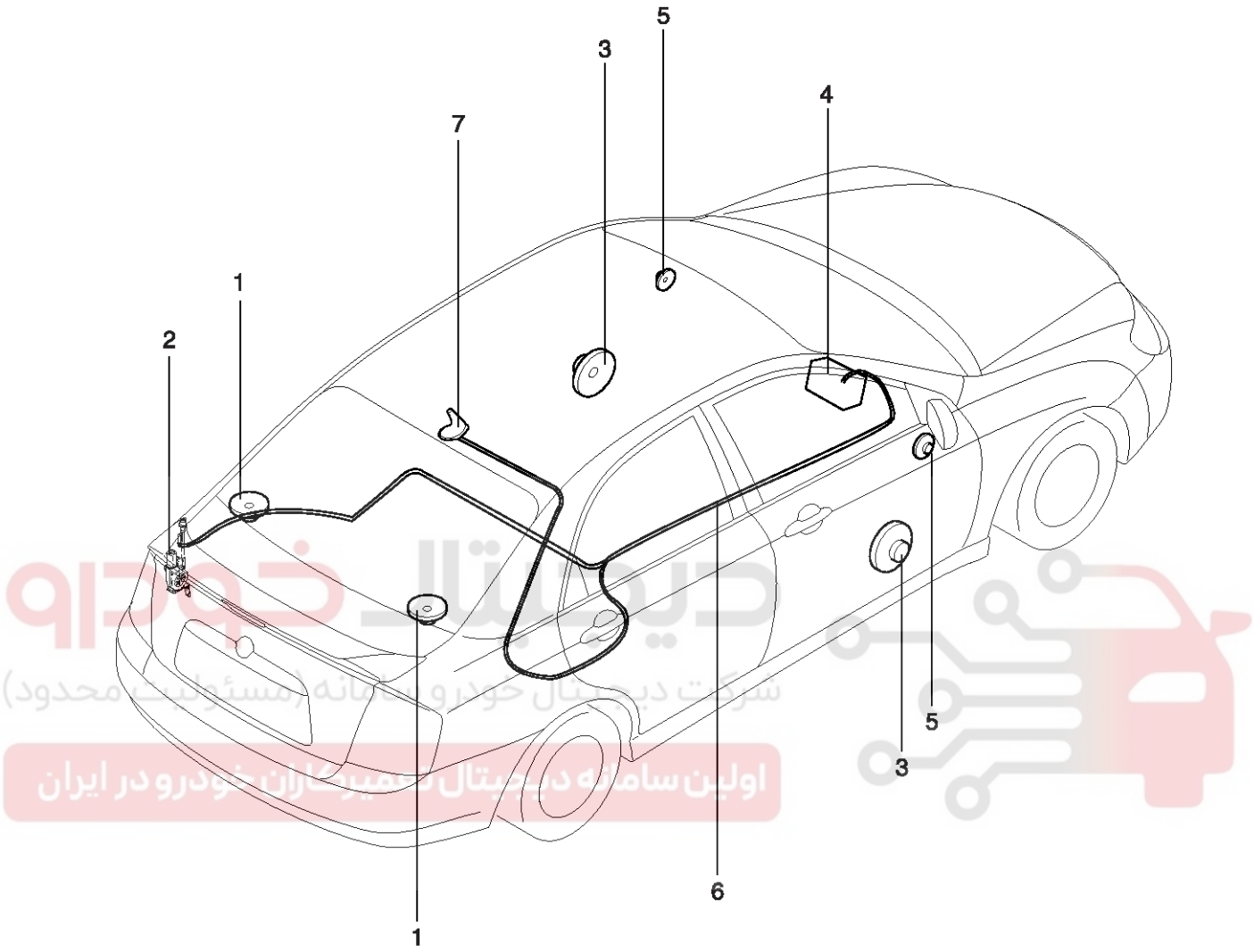
BTGE990O

Audio

SPECIFICATION

Item		Specification		
Model		AM/FM/CD	AM/FM/CD/MP3	AM/FM/6CDC/MP3
Power supply		DC 14.4V		
Rated output		Max 43W x 4		
Antenna		4Ω x 4		
Antenna		80PF 75Ω		
Tuning type		PLL synthesized type		
Frequency range / Channel space	FM	87.5 ~ 108.0 MHz/100 KHz (General)		
	AM	531 ~ 1602 KHz/9 KHz (General)		
	FM	87.5 ~ 108.0 MHz/50 KHz (Europe)		
	MW	522 ~ 1620 KHz/9 KHz (Europe)		
	LW	153 ~ 279 KHz/1 KHz (Europe)		

COMPONENTS



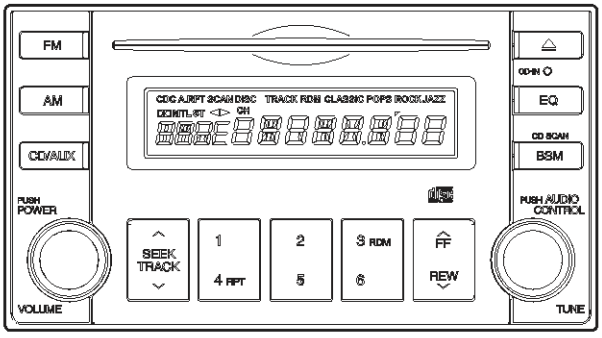
1. Rear speaker
2. Rod antenna (4 doors)
3. Front speaker
4. Audio unit
5. Tweeter speaker
6. Antenna feeder cable
7. Roof antenna (5 doors)

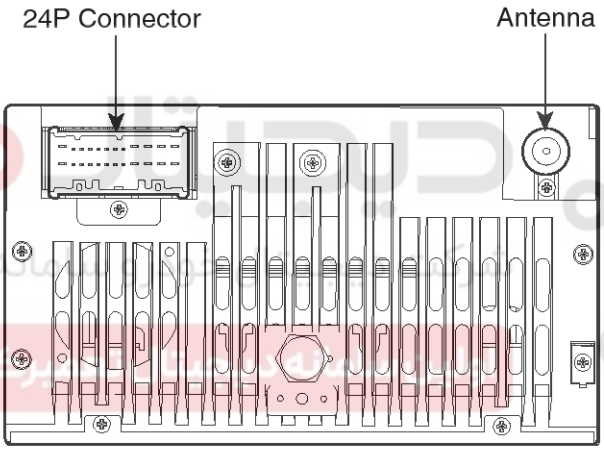
BTGE020A

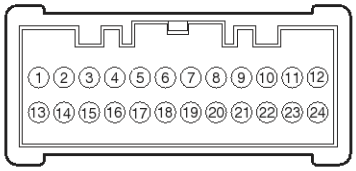
Audio Unit

COMPONENT LOCATION

[AM/FM/CD]

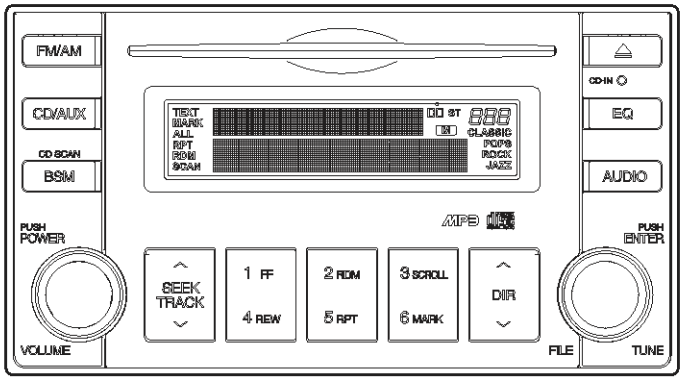


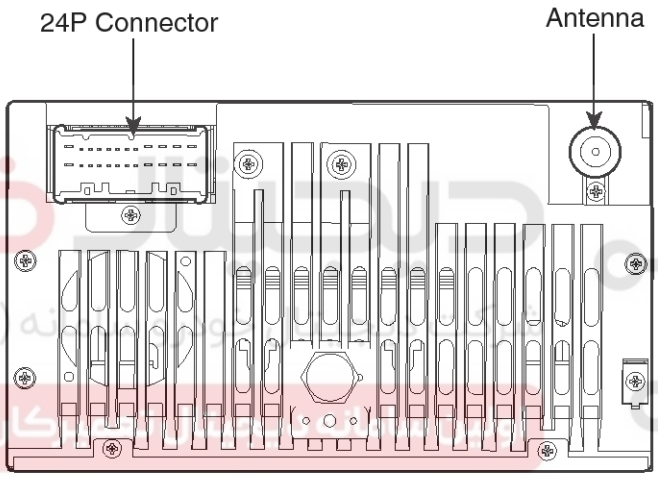


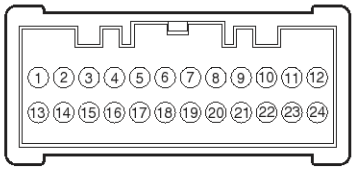
24P Connector	Pin	Description	Pin	Description
	1	Front left speaker(+)	13	Front left speaker(-)
	2	Front right speaker(+)	14	Front right speaker(-)
	3	Rear right speaker(+)	15	Rear right speaker(-)
	4	Rear left speaker(+)	16	Rear left speaker(-)
	5	Illumination(+)	17	Illumination(-)
	6	Steering remote control	18	Remote control ground
	7	-	19	MUTE
	8	AUX GND	20	AUX Detect
	9	AUX IN(L)	21	AUX IN(R)
	10	-	22	-
	11	ACC	23	Antenna B+
	12	B+	24	Ground

SLDBE7001L

[AM/FM/MP3/CD]

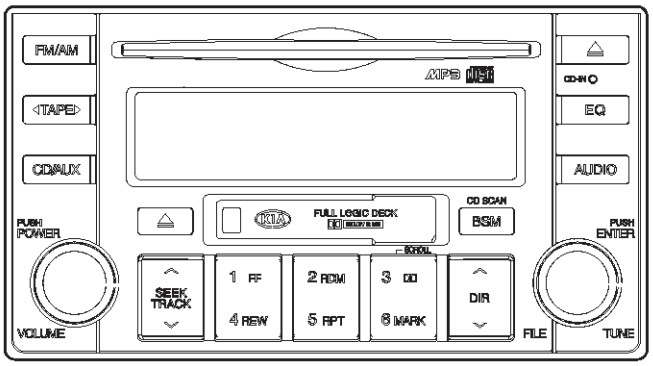


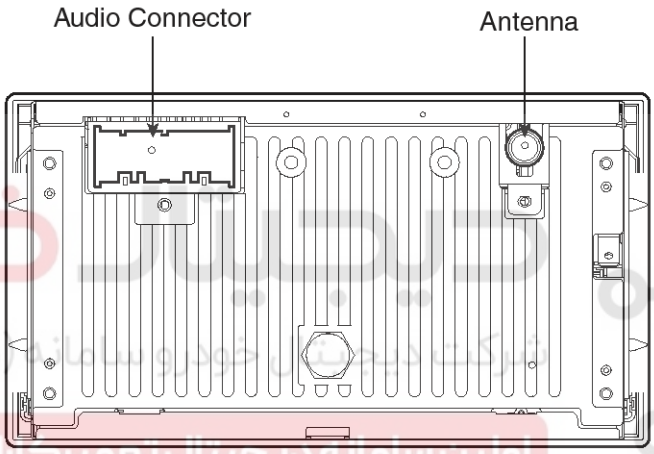


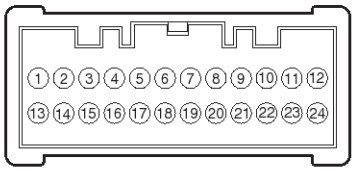
24P Connector	Pin	Description	Pin	Description
	1	Front left speaker(+)	13	Front left speaker(-)
	2	Front right speaker(+)	14	Front right speaker(-)
	3	Rear right speaker(+)	15	Rear right speaker(-)
	4	Rear left speaker(+)	16	Rear left speaker(-)
	5	Illumination(+)	17	Illumination(-)
	6	Steering remote control	18	Remote control ground
	7	-	19	MUTE
	8	AUX GND	20	AUX Detect
	9	AUX IN(L)	21	AUX IN(R)
	10	-	22	-
	11	ACC	23	Antenna B+
	12	B+	24	Ground

SLDBE7008L

[AM/FM/MP3/6CDC]



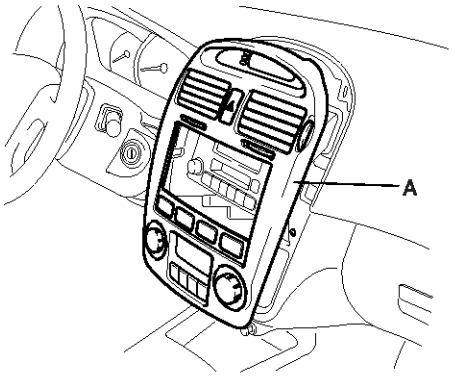


24P Connector	Pin	Description	Pin	Description
	1	Front left speaker(+)	13	Front left speaker(-)
	2	Front right speaker(+)	14	Front right speaker(-)
	3	Rear right speaker(+)	15	Rear right speaker(-)
	4	Rear left speaker(+)	16	Rear left speaker(-)
	5	Illumination(+)	17	Illumination(-)
	6	Steering remote control	18	Remote control ground
	7	-	19	MUTE
	8	AUX GND	20	AUX Detect
	9	AUX IN(L)	21	AUX IN(R)
	10	Amp remote control	22	SPEED
	11	ACC	23	Antenna B+
	12	B+	24	Ground

SLDBE7009L

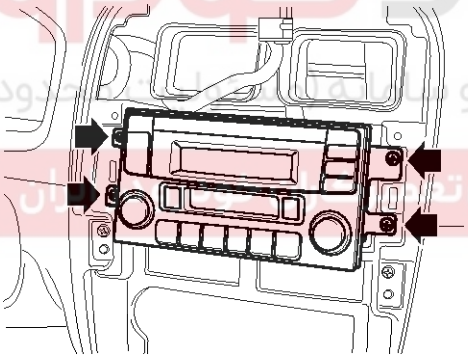
REMOVAL AND INSTALLATION

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (A) by pulling it.



ATGE021E

3. Remove the connectors.
4. Remove the mounting screws then remove the audio unit assembly.



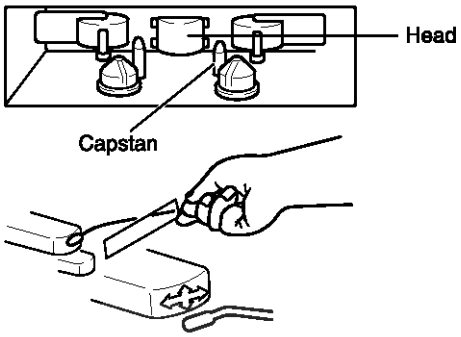
ATGE021F

5. Installation is the reverse of removal.

INSPECTION

TAPE HEAD AND CAPSTAN CLEANING

1. To obtain optimum performance, clean the head, and capstan as often as necessary, depending on frequency of use and tape cleanness.
2. To clean the tape head and capstan, use a cotton swab dipped in ordinary rubbing an alcohol. Wipe the head and capstan.



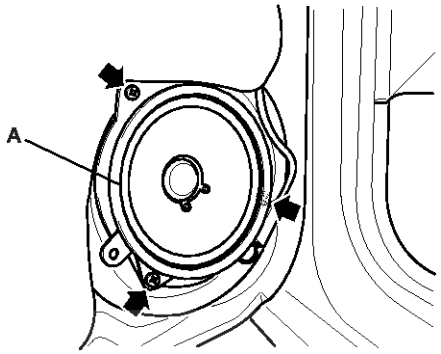
LTAC005A

Speakers

REMOVAL

FRONT SPEAKER

1. Remove the front door trim panel (Refer to the BD group - front door).
2. Remove the front speaker (A) after removing 3 screws.

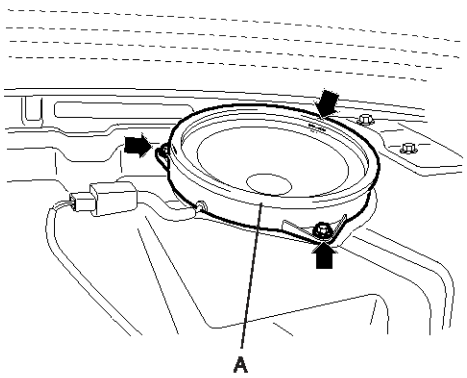


ATGE022A

3. Installation is the reverse of removal.

REAR SPEAKER

1. Remove the rear package tray trim (Refer to the BD group - rear seats).
2. Remove the rear speaker(A) after removing 3 screws.

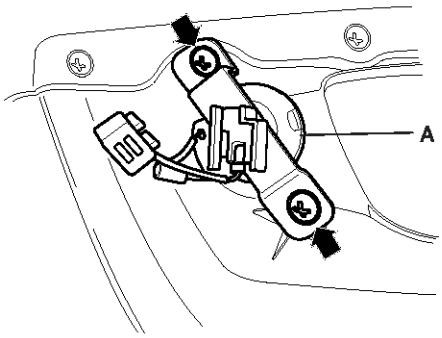


ATGE022B

3. Installation is the reverse of removal.

TWEETER SPEAKER

1. Remove the front door trim panel (Refer to the BD group - front door).
2. Remove the tweeter speaker (A) after removing 2 screws.

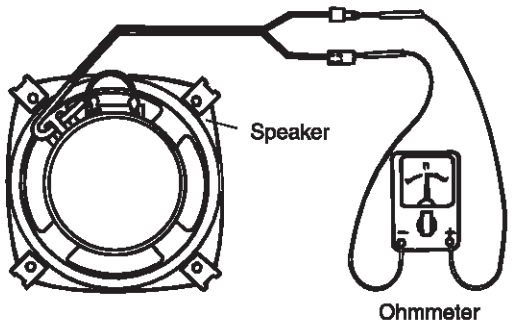


ATGE022C

3. Installation is the reverse of removal.

INSPECTION

1. Check the speaker with an ohmmeter. If an ohmmeter indicates the correct impedance of the speaker when checking between the speaker (+) and speaker (-) of the same channel, the speaker is ok.
2. If a clicking sound is emitted from the speaker when the ohmmeter is connected to the speaker terminals, the speaker is ok.



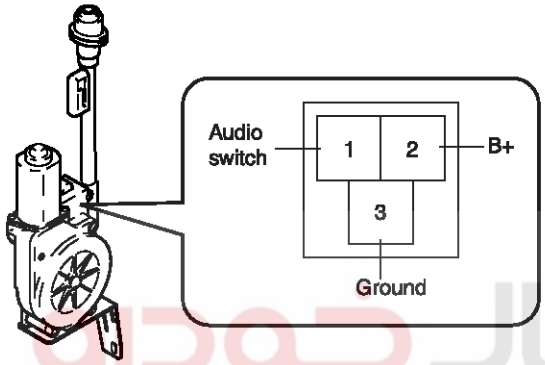
LTAC008A

Antenna

INSPECTION

MOTOR ANTENNA

1. Disconnect the connector from the antenna assembly.
2. Check if the battery voltage is measured between terminal 2 and 3 of harness side at all time.
3. Check if the battery voltage is measured between terminal 1 and 3 of the harness side when the audio turned on.



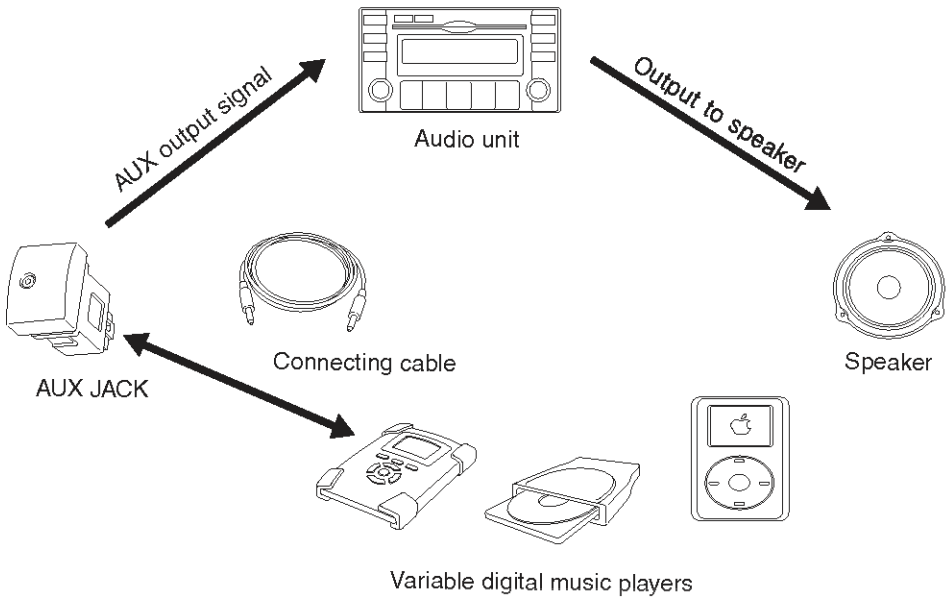
LTGE023B

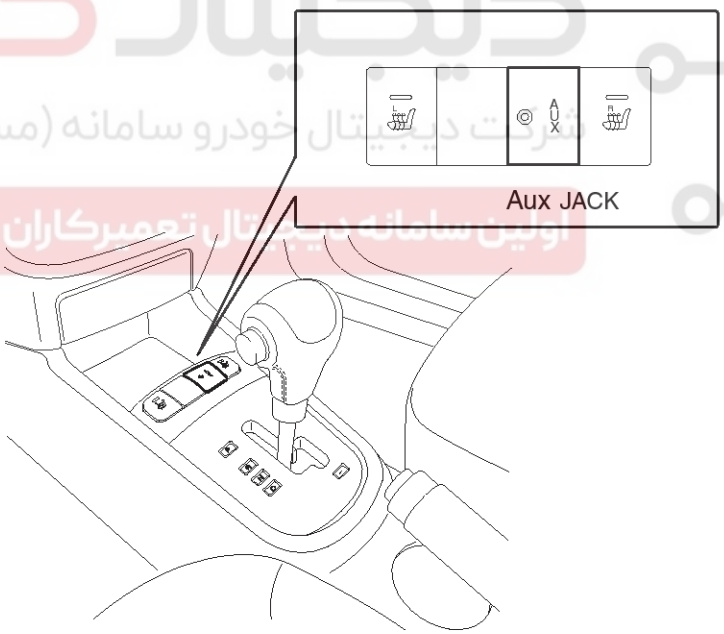
4. After connecting battery source to terminal 1 and 2 of the component side and terminal 3 to ground check if the motor operates properly. (Antenna moves up)
5. Check if the motor operates (antenna moves down) when terminal 2 is disconnected from battery source.

AUX(Auxiliary) jack

DESCRIPTION

The AUX jack on the center console is for customers who like to listen to external portable music players like the MP3, iPOD and etc., through the vehicle's sound system when it is linked to this jack. The customer has this added option.

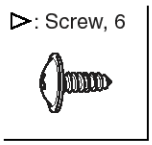


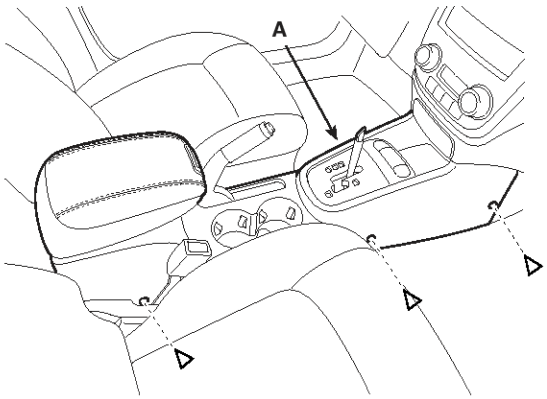


SLDBE7007L

REMOVAL

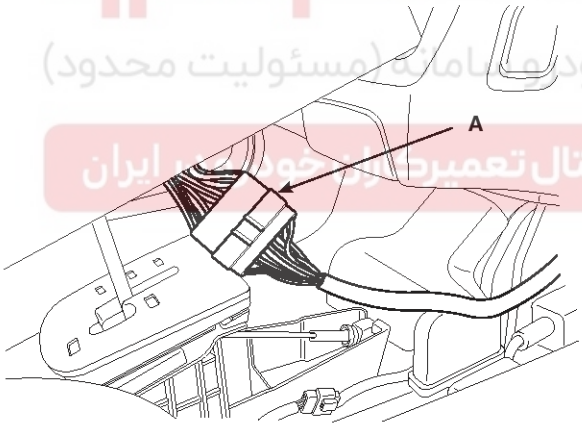
1. Remove the center console(A). (Refer to Body Gr. - Center console)





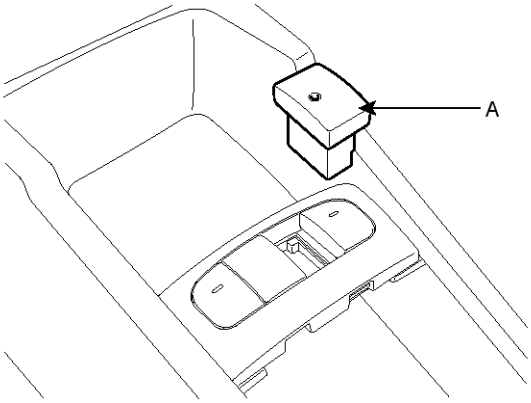
SLDBE7002L

2. Disconnect the center console connector(A).



SLDBE6003D

3. Remove the AUX jack(A) after disconnecting the jack connector.



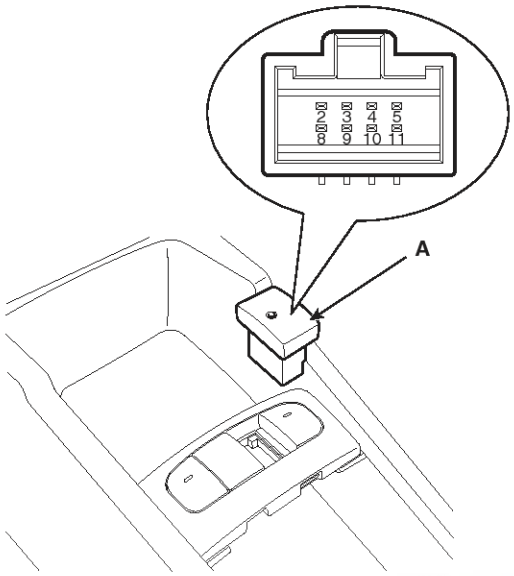
SLDBE6004D

INSTALLATION

1. Install the AUX jack.
2. Connect the AUX jack connector.
3. Install the center console.

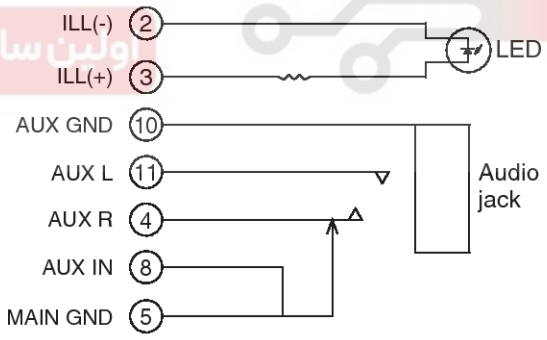
INSPECTION

1. Disconnect the negative(-) battery terminal.
2. Disconnect the AUX jack(A) after removing the center console.



SLDBE6005D

3. Using an ohmmeter, check for continuity between the terminals of AUX jack connector.



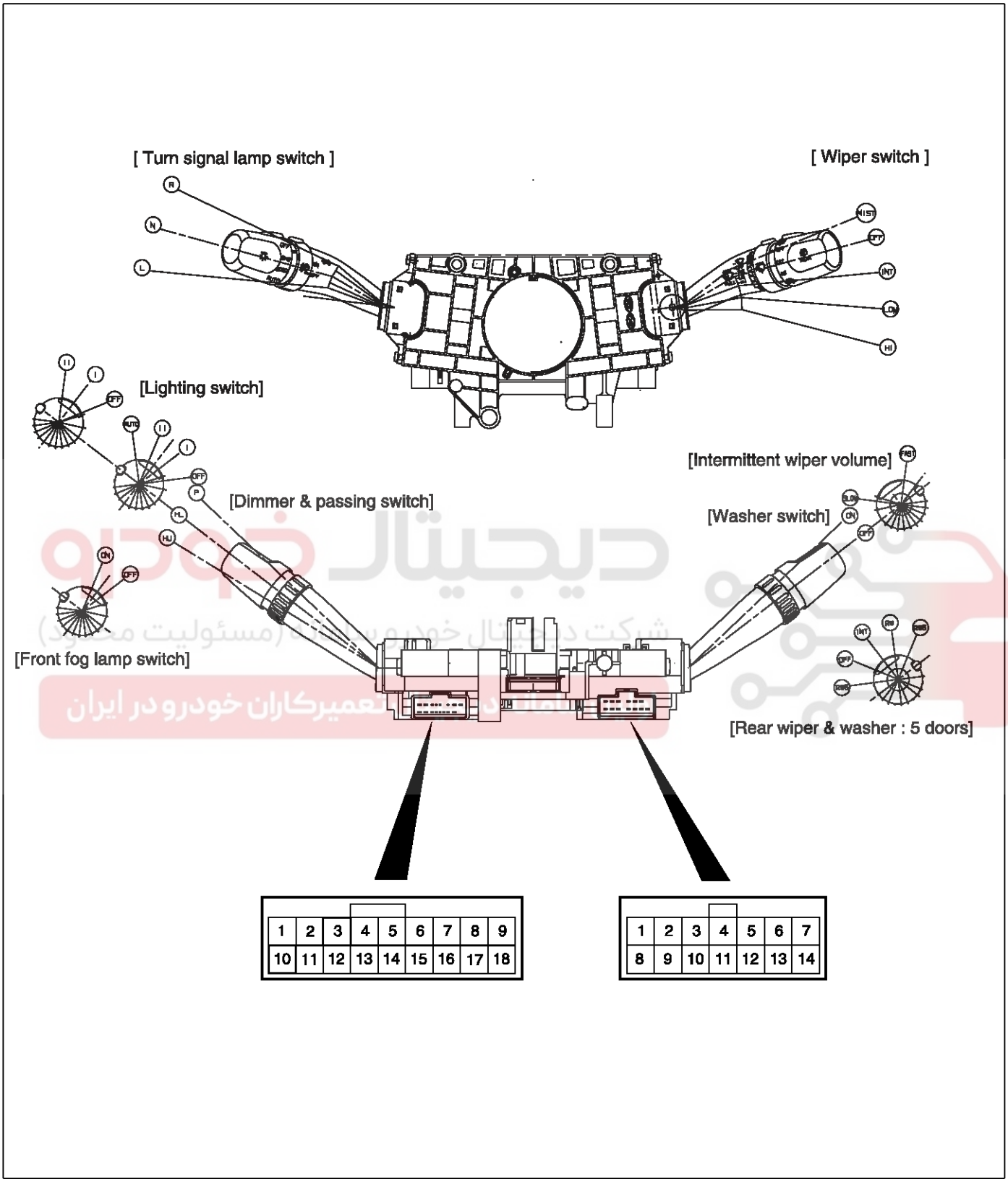
SLDBE7006L

Multifunction switch

SPECIFICATIONS

Items	Specifications
Rated voltage	DC 12V
Operating temperature range	-30℃ ~ +80℃ (-22 ~ +176˚F)
Rated load	
Dimmer & passing switch	High : 1A (Relay load) Low : 1A (Relay load) Passing : 1A (Relay load)
Lighting switch	Lighting : 1A (Relay load)
Turn signal & lane change switch	6.6 ± 0.5 A (Lamp load)
Front fog lamp switch	1A (Relay load)
Wiper & mist switch	Low, High : 4.5A (Motor load) Intermittent : 0.22 ± 0.05A (Relay load) Lock : Max. 28A (Motor load) Mist : 4.5 A (Motor load)
Washer switch	4A (Relay load)
Variable intermittent volume switch	Max. 25mA
Horn switch	1A (Relay load)
Rear wiper & washer switch (5 doors)	Rear wiper : 200mA (Relay load) Rear washer : 4A (Motor load)

COMPONENTS



LTGE031A

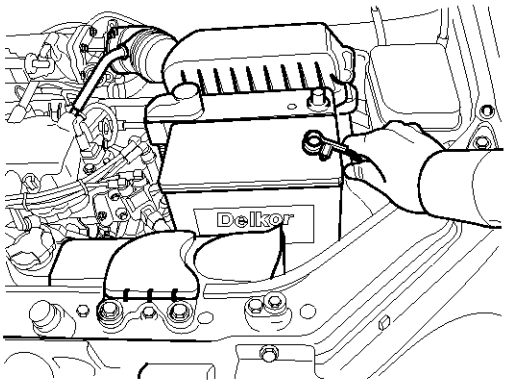
REMOVAL

Prior to removing of the multifunction switch assembly in vehicles equipped with air bags, be careful to keep the following items.

CAUTION

- **Never attempt to disassemble or repair the air bag module or clock spring. If faulty, replace it.**
- **Do not drop the air bag module or clock spring or allow contact with water, grease or oil. Replace if a dent, crack, deformation or rust are detected.**
- **The air bag module should be stored on a flat surface and placed so that the pad surface is facing upward. Do not place anything on top of it.**
- **Do not expose the air bag module to temperatures over 93˚C (200˚F).**
- **After deployment of an air bag, replace the clock spring with a new one.**
- **Wear gloves and safety glasses when handling an air bag that has already been deployed.**
- **An undeployed air bag module should only be disposed of in accordance with the procedures. mentioned in the Restraints section.**
- **When you disconnect the air bag module-clock spring connector, take care not to apply excessive force to it.**
- **The removed air bag module should be stored in a clean, dry place.**
- **Prior to installing the clock spring, align the mating mark and "NEUTRAL" position indicator of the clock spring, and, after turning the front wheels to the straight-ahead position, install the clock spring to the column switch. If the mating mark of the clock spring is not properly aligned, the steering wheel may not completely rotate during a turn, or the flat cable within the clock spring may be severed, obstructing normal operation of the SRS and possibly leading to serious injury to the vehicle's driver. To inspect the clock spring, refer to the Restraints section.**

1. Disconnect the negative (-) battery terminal.

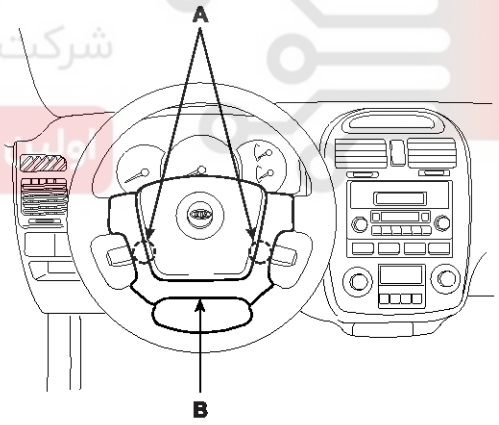


KPPD004A

NOTICE

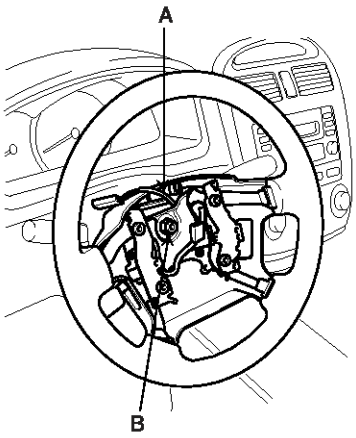
Prior to doing any further work after disconnection of the battery cable, wait at least 30 seconds.

2. Remove the 2 bolts (A) holding the air bag module.
3. Disconnect the horn connector and the air bag module connector, and remove the air bag module (B).



APGE003A

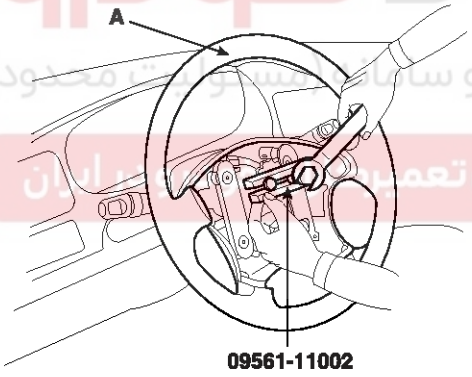
4. Remove the steering wheel after removing a nut (B).



APGE003B

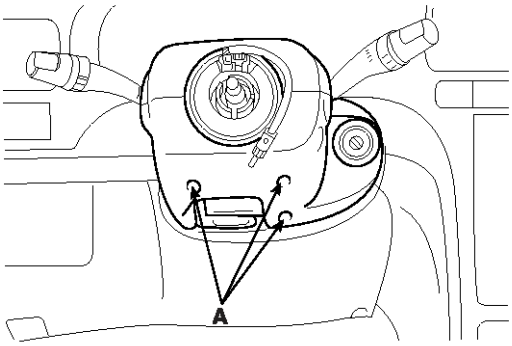
5. Align the steering shaft with wheel then remove the steering wheel(A) using special tool (09561-11002).

⚠CAUTION
Do not hammer on the steering wheel to remove it; dong so may damage the collapsible mechanism.



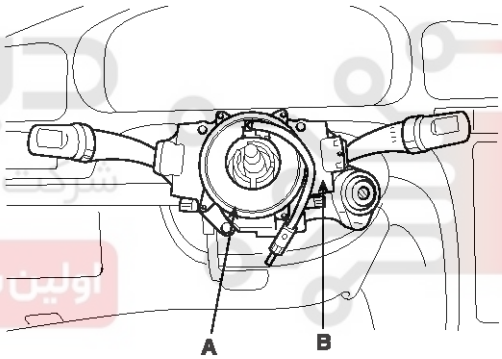
EPKE014A

6. Remove the steering column upper and lower shrouds after removing 3 screws (A).



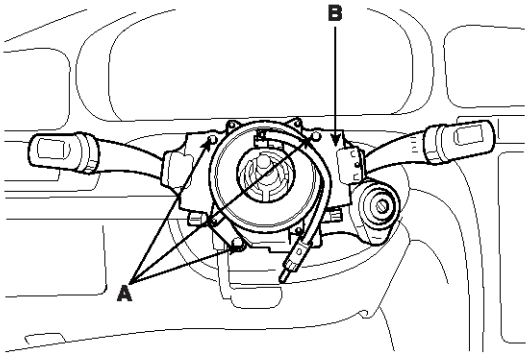
APGE003C

7. Remove the clock spring (A), then disconnect the connector(B) of multi-function switch.



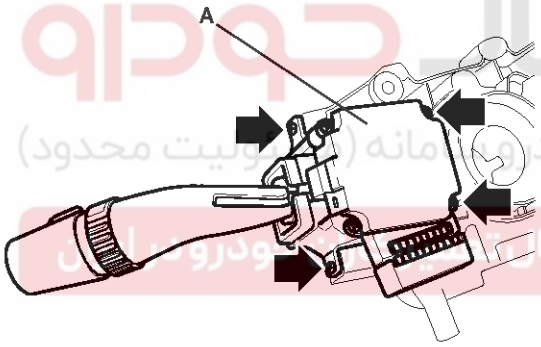
APGE003D

8. Remove the 3 screws holding the multi-function switch, then remove the multi-function switch assembly.



EPKE150A

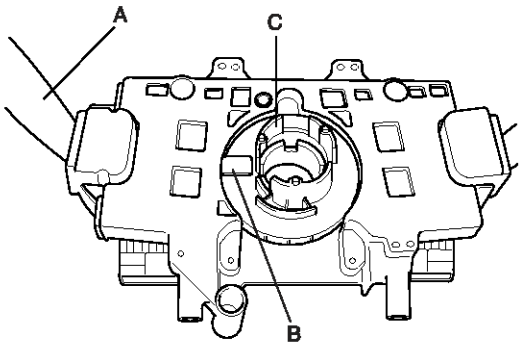
9. Remove the light switch (A) after loosening its 4 screws.



ATGE031C

10. Installation is the reverse of removal.

11. Installation the cancel lever (B) to the cancel cam (C) as below figure when replacing the lighting switch (A).

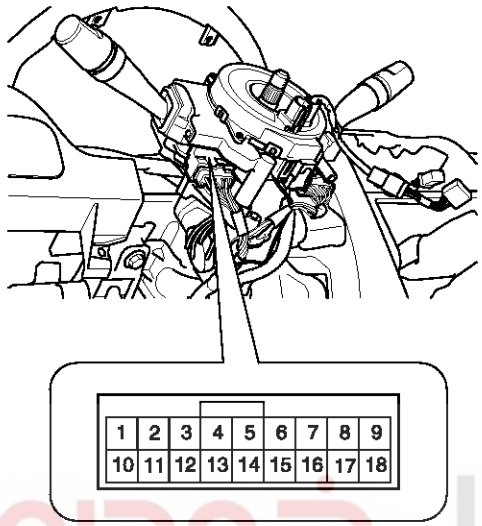


ATGE031D

INSPECTION

LIGHTING SWITCH INSPECTION

With the multi function switch in each position, make sure that continuity exists between the terminals below. If continuity is not as specified, replace the multi-function switch.



KTDD075G

LIGHTING SWITCH (AUTO LIGHT)

Position \ Terminal	14	15	16	17
OFF				
I	○	—	—	○
II	○	○	—	○
AUTO			○	○

LTGE031E

LIGHTING SWITCH

Position \ Terminal	14	15	16	17
OFF				
I	○	—	—	○
II	○	○	—	○

LTGE031B

DIMMER AND PASSING SWITCH

Position \ Terminal	1	2	10	11
HU		○	—	○
HL			○	○
P	○	○	—	○

HU : Head lamp high beam
HL : Head lamp low beam
P : Head lamp passing switch

LTGE031F

TURN SIGNAL SWITCH

Hazard switch	Trun signal switch \ Terminal	7	8	9
	L		○	○
OFF	N			
	R	○	○	

LTGE031G

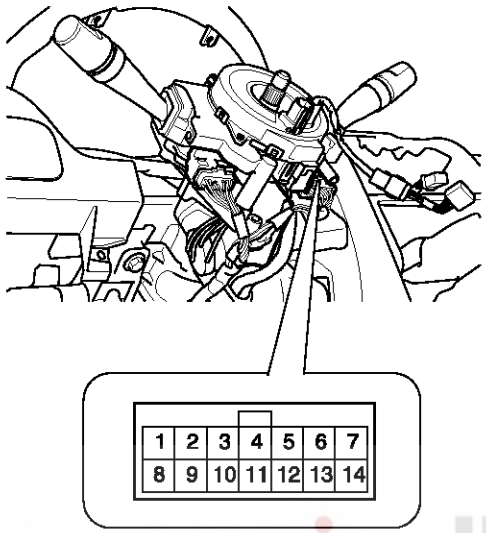
FRONT FOG LAMP SWITCH

Position \ Terminal	12	13
OFF		
ON	○	○

LTGE031H

WIPER AND WASHER SWITCH INSPECTION

With the multi function switch in each position, make sure that continuity exists between the terminals below. If continuity is not as specified, replace the multi-function switch.



KTDD075I

WIPER SWITCH

Position \ Terminal	1	2	3	4	5	6	13	14
MIST				○	○			
OFF		○	○					
INT		○	○		○	○	○	○
LOW		○	○	○	○			
HI	○	○	○	○	○			

LTGE031I

WASHER SWITCH

Position \ Terminal	5	7
OFF		
ON	○	○

LTGE031J

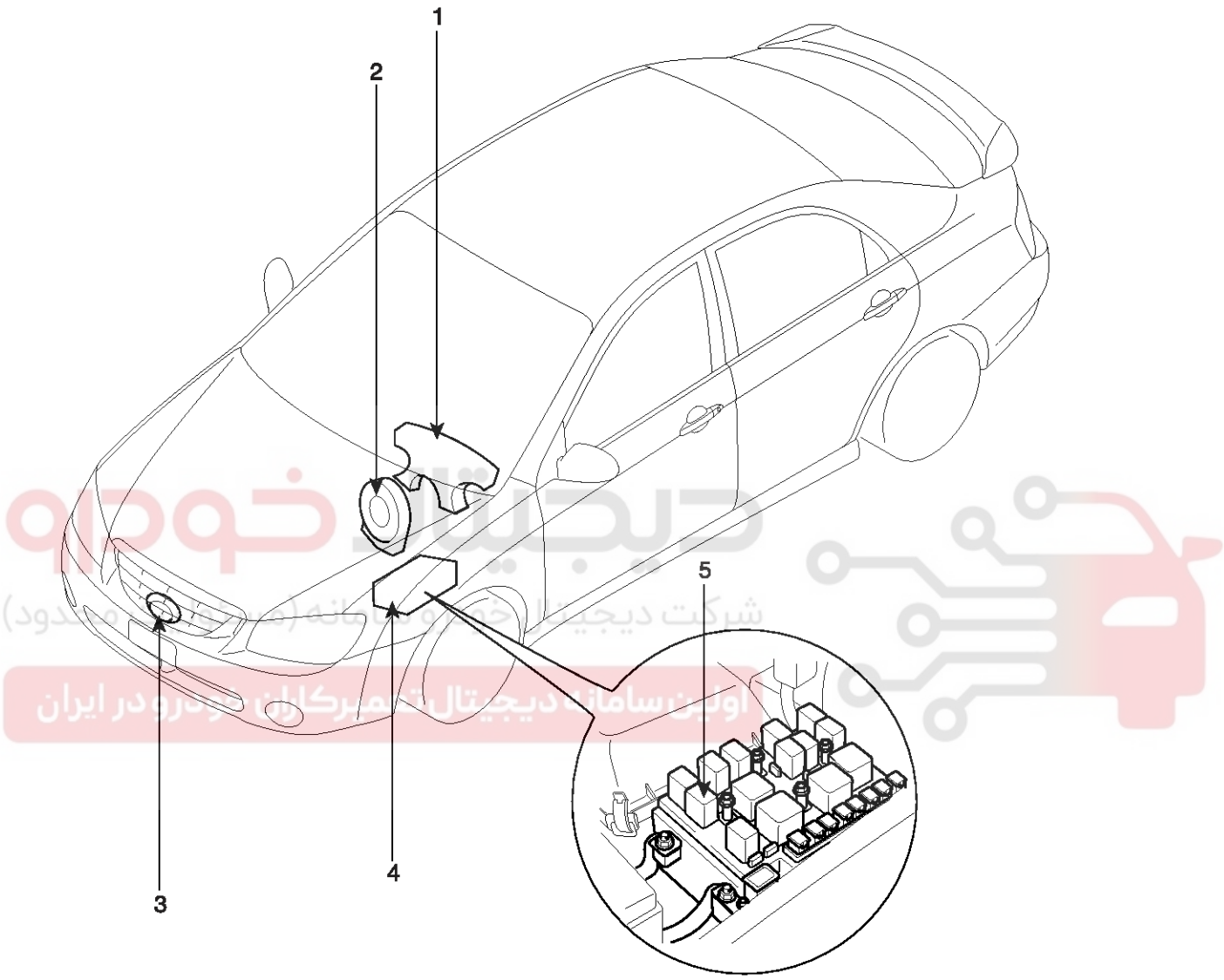
REAR WIPER & WASHER SWITCH (5 DOORS)

Position \ Terminal	9	10	11	12
Rear washer	○			○
OFF				
INT			○	○
ON		○	○	○
Rear washer	○	○	○	○

LTGE031K

Horn

COMPONENTS

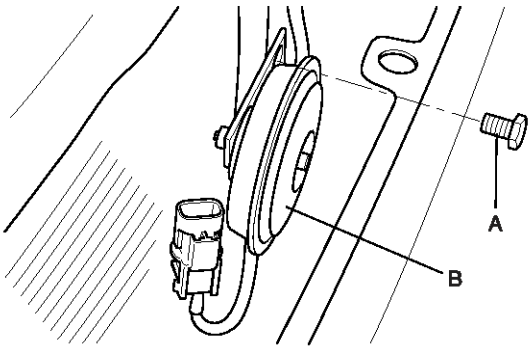


1. Horn switch
2. Clock spring
3. Horn
4. Relay box (Engine room compartment)
5. Horn relay

LTGE051A

REMOVAL

1. Remove the upper tray after opening the hood (Refer to the BD group - front door).
2. Remove the bolt (A) and disconnect the horn connector (B), then remove the horn.



ATGE051D

3. Installation is the reverse of removal.

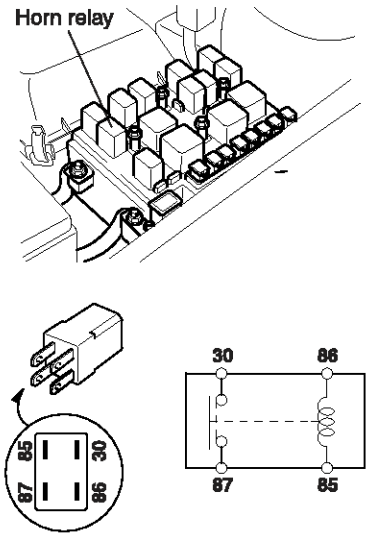
INSPECTION

Test the horn by connecting battery voltage to the 1 terminal and ground the 2 terminal.

The horn should make a sound. If the horn fails to make a sound, replace it.

HORN RELAY INSPECTION

1. Check for continuity between the terminals.
2. There should be continuity between the No.87 and No.30 terminals when power and ground are connected to the No.86 and No.85 terminals.
3. There should be no continuity between the No.87 and No.30 terminals when power is disconnected.



LTGE051B

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

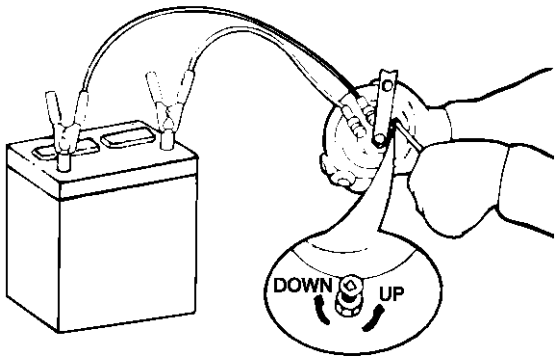
LTGE221B

ADJUSTMENT

Operate the horn, and adjust the tone to a suitable level by turning the adjusting screw.

NOTICE

After adjustment, apply a small amount of paint around the screw head to keep it from loosening.



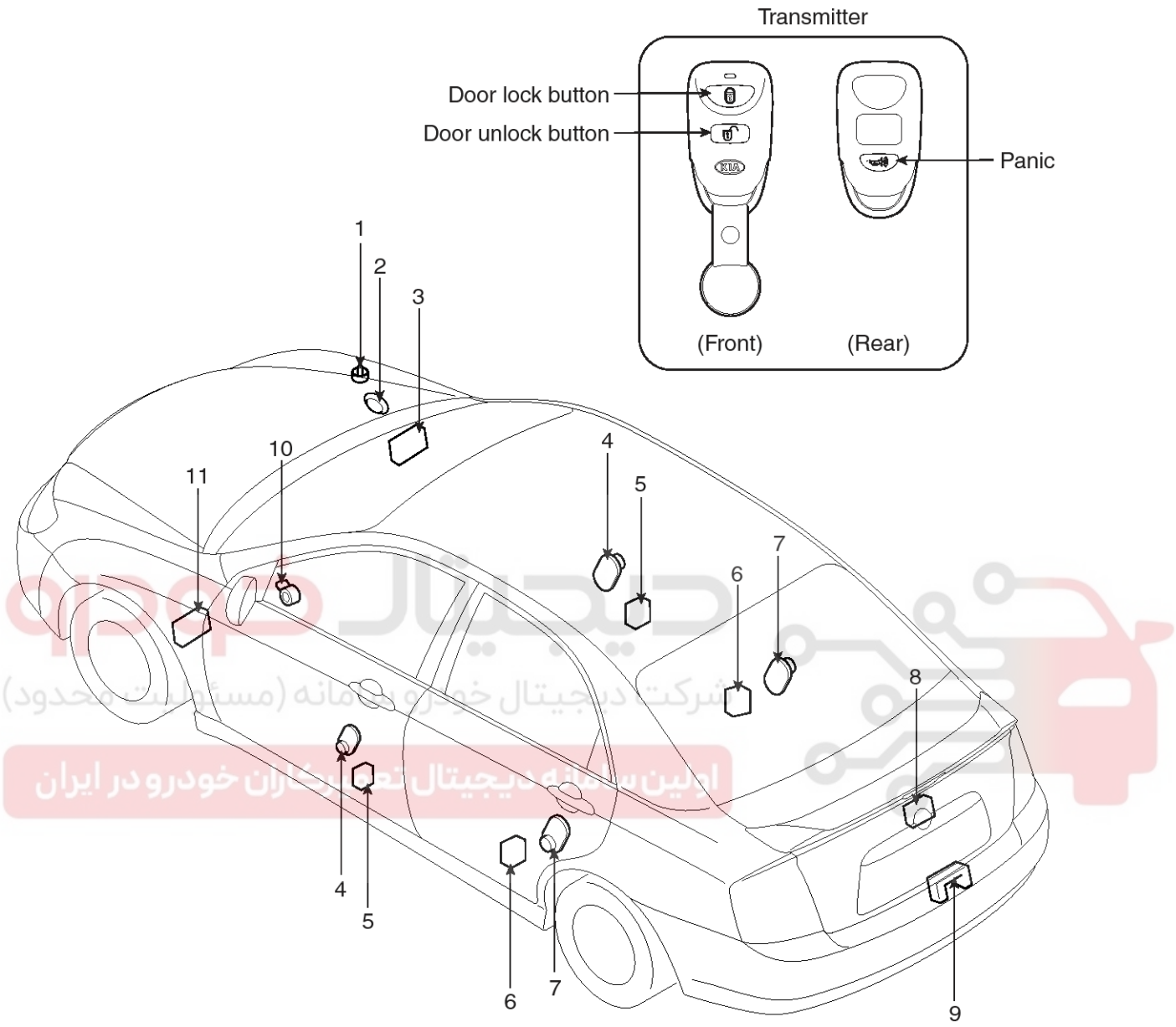
ETDA050A

Keyless Entry And Burglar Alarm

SPECIFICATION

Items	Specifications
Keyless entry transmitter Power source	Lithium 3V battery (1EA)
Transmissible distance	30m or more
Life of battery	2 years or more (at 10 times per day)
Button	4 Door : 4 (Door lock, Door unlock, Trunk open, Panic) 5 Door : 3 (Door lock, Door unlock, Panic)
Transmission frequency	433.92 MHz

COMPONENT LOCATION



1. Hood switch
2. Burglar horn
3. Receiver
4. Front door switch
5. Front door lock actuator & switch
6. Rear door lock actuator & switch
7. Rear door switch
8. Tailgate lock actuator & switch (5 doors)
9. Tailgate switch (5 doors) / Trunk lid switch (4 doors)
10. Door warning switch
11. Body control module (BCM)

SLDBE7010L

Keyless Entry And Burglar Alarm BE-55

DESCRIPTION

BURGLAR ALARM SYSTEM

The burglar alarm system is armed automatically after the doors, hood, and trunk are closed and locked.

The system is set off when any of these things occur :

- A door is forced open.
- A door is unlocked without using the transmitter.
- The trunk lid is opened without using the key.
- The hood is opened.
- The remote panic is operated.

When the system is set off, the alarm horn sounds and the hazard lamp flashes for about two minutes or until the system is disarmed by unlocking the transmitter.

For the system to arm, the ignition switch must be off and the key removed. Then, the ETACS module must receive signals that the doors, hood, and trunk lid are closed and locked. When everything is closed and locked, none of the control unit inputs are grounded.

The door switches, hood switch and trunk lid switch are all closed then immediately after locking the doors with the remote transmitter the system arms.

If anything is opened or improperly unlocked after the system is armed, the ETACS module gets a ground signal from that switch, and the system is set off.

If the trunk is opened using the key after the system is armed, the doors and hood are continues arm state and the system will be not set off. Then after the trunk is closed, the trunk hold arm state.

If one of the switches is misadjusted or there is a short in the system, the system will not arm. As long as the ETACS module continues to get a ground signal, it thinks the vehicle is not closed and locked and will not arm. Conversely, a switch that is slightly misadjusted can cause the alarm to sound for no apparent reason. In this case, it may only take a significant change in outside temperature, the vibration of a passing truck, or someone bumping into the vehicle to make the alarm sound.

KEYLESS ENTRY SYSTEM

The burglar alarm system is integrated with the keyless entry system. The keyless entry system allows you to lock and unlock the vehicle with the remote transmitter.

When you push the LOCK button, all doors lock. When you push the UNLOCK button all doors unlock.

The room lamp, if its switch is in the center position, will come on when you press the UNLOCK button. If you do not open a door, the light will go off in about 30 seconds, the doors will automatically relock, and the burglar alarm system will rearm. If you relock the doors with the remote transmitter within 30 seconds, the light will go off immediately.

You cannot lock or unlock the doors with the remote transmitter if the key is in the ignition switch.

The trunk will be opened using the key.

The system will signal you when the doors lock and unlock by flashing the hazard lamp once when they lock, and twice when they unlock.

PANIC MODE

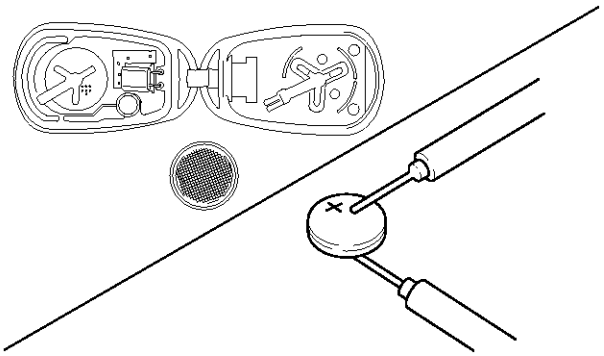
The panic mode rigs the ETACS to sound the alarm with the remote transmitter in order to attract attention. When the PANIC button is pressed and held for 2 seconds, the alarm will sound and exterior lights will flash for about 30 seconds.

The panic mode can be canceled at any time by pressing any button on the remote transmitter or by turning the ignition switch ON. The panic mode will not function if the ignition switch is ON.

INSPECTION

1. Check that the red light flickers when the door lock or unlock button is pressed on the transmitter.
2. Remove the battery and check voltage if the red light doesn't flicker.

Standard voltage : 3V

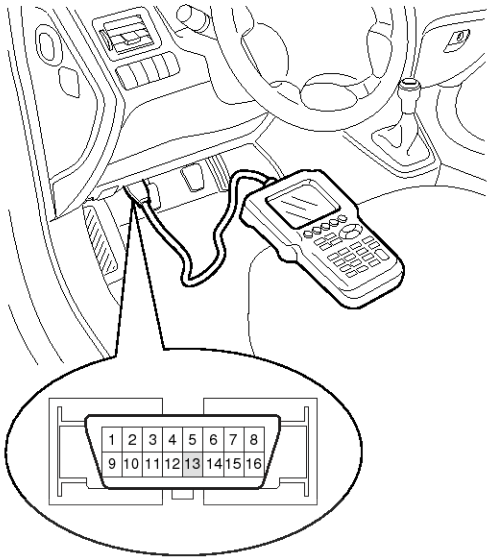


KTKD029A

3. Replace the transmitter battery with a new one, if voltage is below 3V then try to lock and unlock the doors with the transmitter by pressing the lock or unlock button five or six times.
4. If the doors lock and unlock, the transmitter is O.K, but if the doors don't lock and unlock, register the transmitter code, then try to lock and unlock the doors.
5. If the transmitter is fails, replace only the transmitter (A).

TRANSMITTER CODE REGISTRATION

1. Connect the DLC cable of scan tool to the data link connector (16 pins) in driver side crash pad lower panel, turn the power on scan tool.



SLDBE6143D

2. Select the vehicle model and then do "CODE SAVING".

1. KIA VEHICLE DIAGNOSIS

MODEL : ALL

02. ENGINE
03. AUTOMATIC TRANSAXLE
04. ABS/ESP

:
:
:

10. CODE SAVING

SLDBE7145L

3. After selecting "CODE SAVING" menu, push "ENTER" key, then the screen will be shown as below.

TRANSMITTER CODE SAVE

REMOVE THE IG. KEY FROM THE KEY CYLINDER. CONNECT THE DLC CABLE AND 16 PIN CONNECTOR OF THE VEHICLE.

PRESS [ENTER], IF YOU ARE READY!

ETRF065M

4. After removing the ignition key from key cylinder, push "ENTER" key to proceed to the next mode for code saving. Follow steps 1 to 4 and then code saving is completed.

TRANSMITTER CODE SAVE

1ST. TRANSMITTER SAVE
PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.

* NO. OF CODED KEY : 0 EA

ETRF065N

TRANSMITTER CODE SAVE

1ST. TRANSMITTER SAVE
PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.

1ST. TRANSMITTER SAVE SUCCESS!

IF YOU WANT TO SAVE THE 2ND KEY PRESS [YES], OR NOT PRESS [NO]

* NO. OF CODED KEY : 1 EA

ETRF065O

TRANSMITTER CODE SAVE

2ND. TRANSMITTER SAVE
PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.

* NO. OF CODED KEY : 1 EA

ETRF065P

TRANSMITTER CODE SAVE

2ND. TRANSMITTER SAVE
PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.

2ND. TRANSMITTER SAVE SUCCESS!

CODE SAVING IS COMPLETED!
IF YOU STOP, PRESS [ESC] KEY!!!

* NO. OF CODED KEY : 2 EA

ETRF065Q

Transmitter

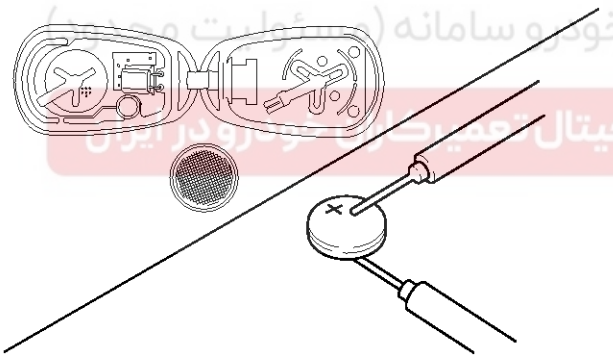
SPECIFICATIONS

Items	Specifications
Keyless entry transmitter	
Power source	Lithium 3V battery (1EA)
Transmissible distance	10m or more
Life of battery	2 years or more (at 20 times per day)
Button	Door lock, door unlock, trunk open (option), panic
Transmission frequency	313.85 MHz (General), 433.92 MHz (Europe)

INSPECTION

1. Check that the red light flickers when the door lock or unlock button is pressed on the transmitter.
2. Remove the battery (A) and check voltage if the red light doesn't flicker.

Standard voltage : 3V



KTKD029A

3. Replace the transmitter battery with a new one, if voltage is below 3V then try to lock and unlock the doors with the transmitter by pressing the lock or unlock button five or six times.
4. If the doors lock and unlock, the transmitter is O.K, but if the doors don't lock and unlock, register the transmitter code, then try to lock and unlock the doors.
5. If the doors lock and unlock, the transmitter is O.K, but if the doors don't lock and unlock, replace the transmitter.

TRANSMITTER CODE REGISTRATION

1. To register transmitter code, first connect DLC (Data Link Connector) cable to the multi purpose check connector at the engine room, turn the power on hi-scan.
2. Select the vehicle model and then do "CODE SAVING".
3. After selecting "CODE SAVING" menu, button "ENTER" key, then the screen will be shown as below.

KEYLESS ENTRY CODE SAVING

1. PRESS THE TRANSMITTER [LOCK] BUTTON FOR 1 SECOND.
2. IF SAVE ONE MORE PRESS OTHER TRANSMITTER [LOCK] BUTTON FOR 1 SECOND.
3. PRESS [ESC] AND DISCONNECT KEYLESS ADAPTER FROM VEHICLE AND CHECK THE KEYLESS ENTRY SYSTEM.

LTGE283A

4. After removing the ignition key from key cylinder, push "ENTER" key to proceed to the next mode for code saving.

   Follow steps 1 to 3 and then code saving is completed.
5. Disconnect DLC cable from the multi purpose check connector and check the function of transmitter.

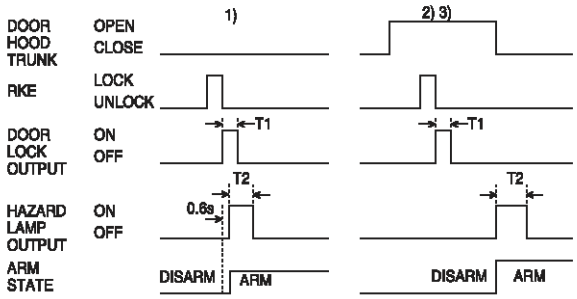
Receiver

FUNCTIONS

ANTI-THEFT FUNCTION

1. ARM Function
   1) When using LOCK on the RKE (Remote Keyless Entry) the doors will lock, the hazard lamp will blink once within 0.06 seconds (MAX 0.06seconds) and the Anti-Theft System will ARM, if the following conditions have been met.
      - The ignition key is removed from the ignition switch.
      - All entry points are closed (doors, trunk, hood)
   2) If either the door, trunk or hood are open when activating LOCK using the RKE, the doors will lock, however the hazard lamp WILL NOT flash and the Anti-Theft System WILL NOT ARM.
   3) In Step 2) if the opened entry points are subsequently closed… the door will lock, the hazard lamp will blink once and the Anti-Theft System will ARM.
   4) If LOCK is activated on the RKE while the Anti-Theft system is already in the ARM mode, the hazard lamp will blink once.(If, however, any of the vehicle entry points is unlocked the Anti-Theft System will lock the door, the hazard lamp willblink once, and the system will re-ARM itself.
   5) The ARM mode of the Anti-Theft System can only be set using the LOCK feature of the RKE. The door key WILL NOT arm the Anti-theft System.
   6) Once the ignition key is IN (inserted into the ignition switch) and the ignition is turned to the ON position the Anti-Theft system will immediately DISARM.
   7) If the UNLOCK signal is sent by the RKE, and either the ignition key is not inserted or entry (door, trunk, hood) to thevehicle is not made within 30 seconds, the LOCK mode will be automatically reset, the hazard lamps will blink, and the Anti-Theft System will rearm. (Key IN = Key Insertion)

      (Provided that there is no automatic lock function at a period of 30 seconds, when the UNLOCK is done by the RKE with an entry being open).
   8) In steps 7), when UNLOCK is activated within the initial 30 seconds, another period of 30 seconds occurs.
   9) Automatic lock WILL NOT function if an entry point is opened within 30 seconds of activating UNLOCK.
   10) Once the 30 seconds have passed, after the initial UNLOCK, the Anti-Theft System will lock the doors, blink the hazard lamps and then ARM.



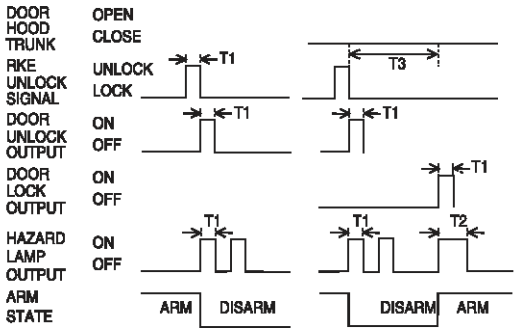
LTGE121O

T1 : 0.5 sec,

T2 : 1.0 ± 0.1 sec

2. DISARM Function
   1) When UNLOCK is pressed on the RKE (Remote Keyless Entry control) the ANTI-Theft System will DISARM, the hazard lamps blink 2 times and the doors unlock

      (Whether entry points are Open or Closed is irrelevant)
   2) In DISARM mode, the ALARM and start inhibitor do not function.
   3) When repeating UNLOCK on the RKE, the hazard lamps blink 2 times and the doors unlock.
   4) When the doors UNLOCK switch is on, the ANTI-Theft system is in DISARM mode and the doors are unlocked, however the hazard lamps do not blink



LTGE121P

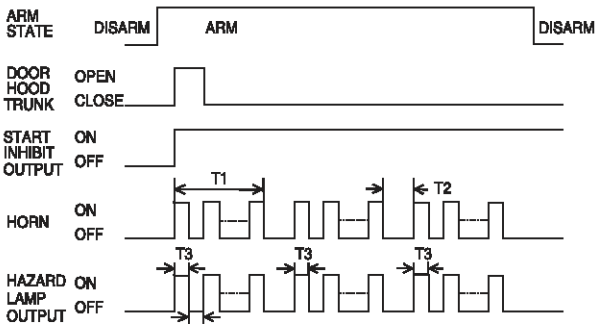
T1 : 0.5 sec,

T2 : 1.0 ± 0.1 sec,

T3 : 30 sec

3. ALARM Function
   1) GENERAL AREA.
      a. When a point of entry is opened while the Anti-Theft System is in the ARM mode, the hazard lamp and horn alarm will activate (ON/OFF 3 times each) for a period of 27 seconds.
      b. Output intervals for the horn alarm and hazard lamps are identical.
      c. The alarm sequence, when activated will continue for the duration of the alarm period even when the entry point is closed.

         (The alarm will reactivate if entry port is reopened after the initial alarm sequence completes.)



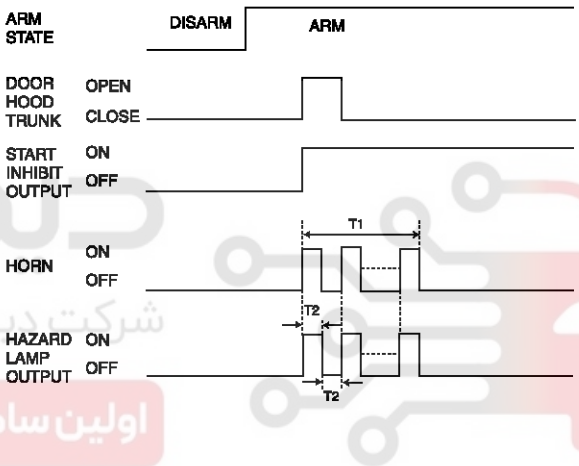
LTGE121C

T1 : 27 ~ 30 sec,

T2 : 10 ~ 13 sec,

T3 : 0.5 ± 0.1 sec

   2) EUROPE AREA.
      a. When a point of entry is opened while the Anti-Theft System is in the ARM mode, the hazard lamp and horn alarm will activate (ON/OFF 1 time each) for a period of 27 seconds.
      b. Output intervals for the horn alarm and hazard lamps are identical.
      c. The alarm sequence, when activated will continue for the duration of the alarm period even when the entry point is closed. (The alarm will reactivate if entry port is reopened after the initial alarm sequence completes.)



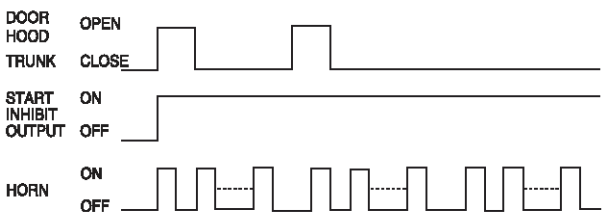
LTGE121R

T1 : 27 ± 2 sec,

T2 : 0.5 ± 0.1 sec

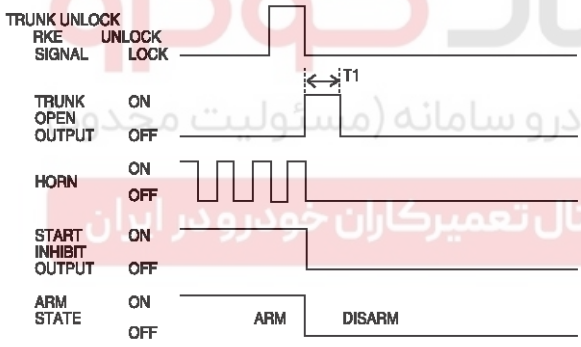
4. New alarm condition during active alarm activation
   1) If a new alarm condition occurs during the initial alarm sequence, the start inhibitor will remain on and only the horn alarm will continue.

      (The alarm will continue even if the point of entry is closed.)



LTGE121D

5. Activating RKE Trunk OPEN during an alarm sequence.
   1) If the RKE Trunk OPEN is activated during an alarm sequence the trunk will open and the Anti-Theft system will DISARM. The horn, hazard lamps and start inhibitor will be off).

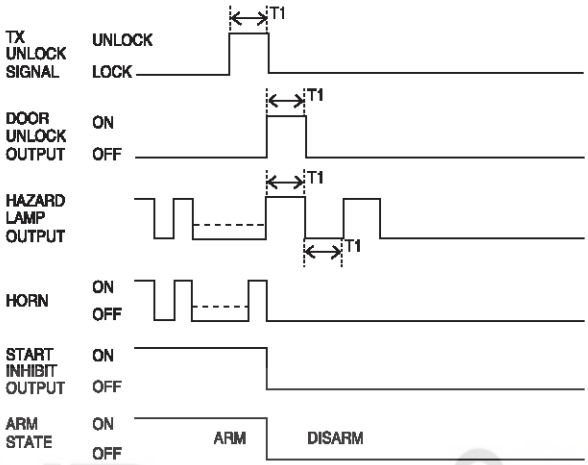


LTGE121E

T1 : 0.5 sec

6. Remote control is UNLOCKED / Key is UNLOCKED during the alarm
   1) If a remote UNLOCK occurs during an alarm sequence, UNLOCK will activate, the hazard lamp will blink 2 times, and then Anti-Theft system will DISARM.

      The horn, hazard lamp, and start inhibitor will be off.
   2) If a key UNLOCK occurs during an alarm sequence, the Anti-Theft system will DISARM. The horn, hazard lamp, and start inhibitor will be off.
   3) When trunk key UNLOCK occurs, the horn, hazard lamp and start inhibitor will be off, however alarm on hold mode is on and the ARM state for other entry ports remains activated. (If the trunk is closed and remains closed for more than 2 seconds, a door lock check will occur and the Anti-Theft system will ARM. Also, if any door is unlocked a LOCK sequence willoccur.)

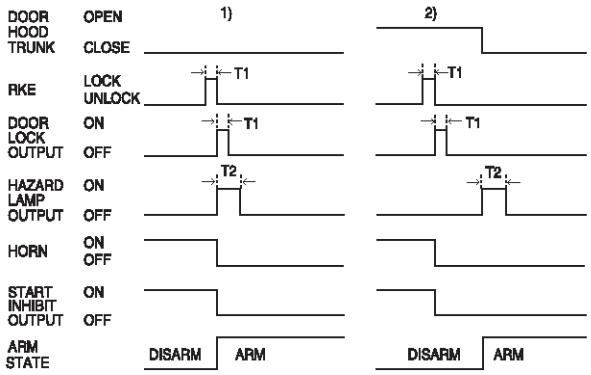


LTGE121F

T1 : 0.5 sec

7. RKE controlled LOCK during an alarm sequence
   1) When a RKE (Remote Keyless Entry) controlled LOCK occurs during an alarm sequence, but after the door, that had been broken-in, has been closed the following occurs:
      - All entry points are checked and then LOCK occurs
      - Horn alarm and start inhibitor are set to off
      - Hazard lamp blinks once
      - Anti-Theft system is set to ARM
   2) When a RKE controlled LOCK occurs during an alarm sequence, but the broken-in door remains opened the following occurs :
      - All entry points are checked and then LOCK occurs
      - Horn alarm and start inhibitor are set to off

      (If the door is then closed the hazard lamp will blink once and the Anti-Theft system will ARM)



LTGE121G

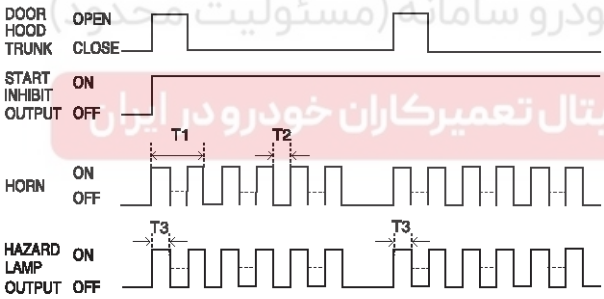
T1 : 0.5 sec,

3) T2 : 1.0 ± 0.1 sec

8. New condition occurs after an alarm

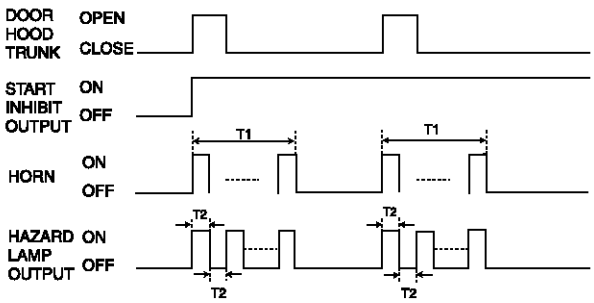
1) When all the doors are opened and UNLOCKed after the doors were closed and LOCKed after an alarm, the horn alarm, hazard lamps and start inhibitor will engage again.

[General area]



LTGE121H

[Europe area]



LTGE121S

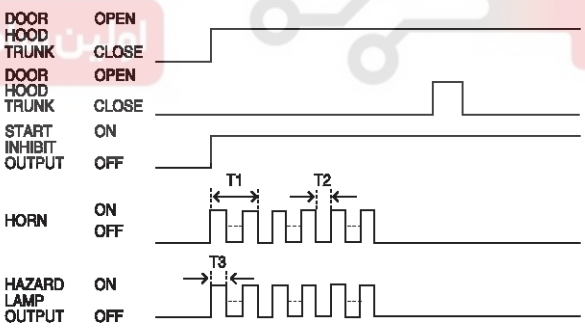
T1 : 27 ~ 30 sec (General), 27 ± 2 sec (Europe)

T2 : 10 ~ 13 sec (General), 0.5 ± 0.1 sec (Europe)

T3 : 0.5 ± 0.1 sec

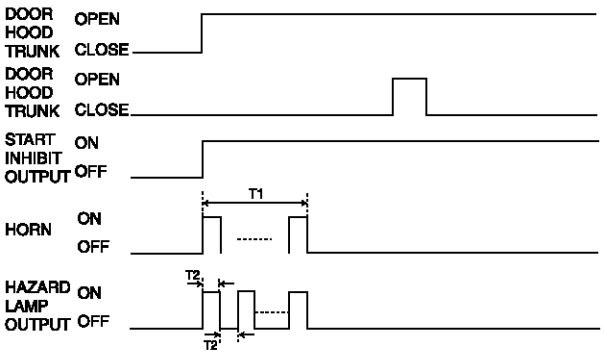
2) If an alarm occurs due to an open point of entry, and then an unaffected door is opened, the start inhibitor will remain ON, but the horn alarm will not restart.

[General area]



LTGE121I

[Europe area]



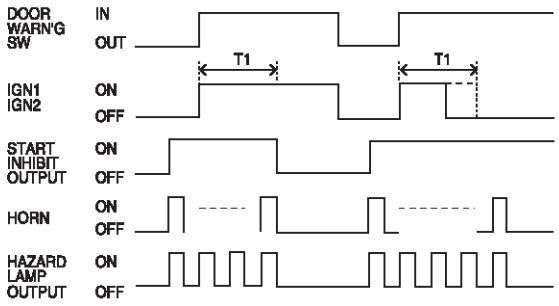
LTGE121T

T1 : 27 ~ 30 sec (General), 27 ± 2 sec (Europe)

T2 : 10 ~ 13 sec (General), 0.5 ± 0.1 sec (Europe)

T3 : 0.5 ± 0.1 sec

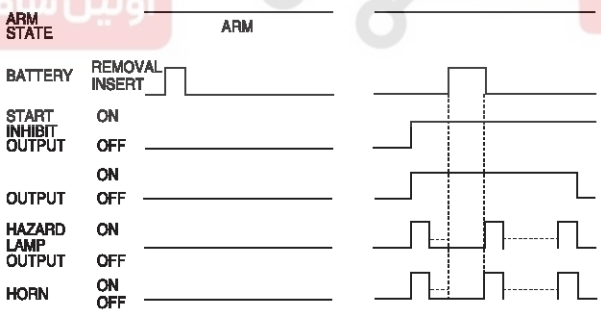
9. ALARM CLEARANCE
   1) When choosing LOCK on the RKE (Remote Keyless Entry) either during or after alarm activation, the alarm is cleared.
   2) When choosing UNLOCK on the RKE either during or after alarm activation, the alarm is cleared.
   3) When choosing TRUNK OPEN on the RKE either during or after alarm activation, the alarm is cleared.
   4) When using key UNLOCK either during or after alarm activation, the alarm is cleared.
   5) If the ignition key is turned to ON for 30 seconds either during or after alarm activation the alarm will be cleared and the start inhibitor reset.
   6) If during an alarm sequence the ignition key is turned ON and then OFF within 30 seconds, the alarm will continue. See 5)



LTGE121J

T1 : 30 ± 3 sec

10. Battery separation
    1) When the battery is reconnected after having been disconnected/removed while in ARM mode. ARM mode continues.
    2) When the battery is reconnected after having been disconnected/removed, and after the alarm completes, the alarm will restart.
    3) When battery is reconnected after having been disconnected/removed during an active alarm, the alarm sequence will restart from the beginning.

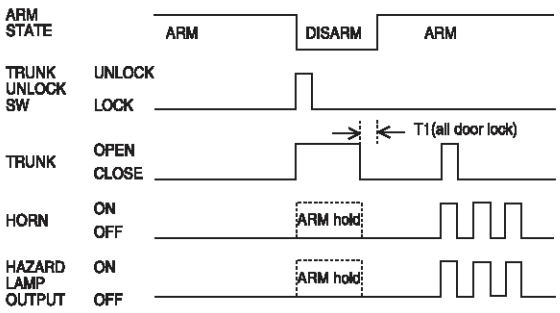


LTGE121K

11. Unlocking with the key
    1) When the trunk is opened using the trunk UNLOCK switch during ARM mode, the alarm is set to hold. The door and hood shall remain in ARM mode.
    2) When the trunk is closed following Step 1) and it remains closed for more than 2 seconds, all door locks are checked andARM mode is reset. (If any door is unlocked during lock check, all doors will

lock.).

3) Unlocking the driver and the assist door with the key, the DISARM mode shall be on

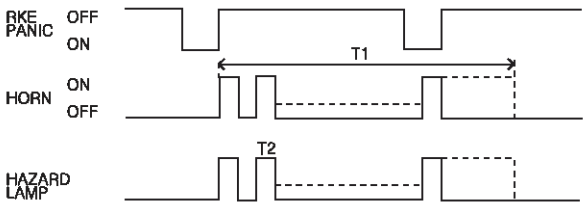


LTGE121L

T1 : 2 sec

12. PANIC

1) If PANIC on the RKE (Remote Keyless Entry) is activated while in ARM mode, alarm activation will be set to hold for 27 seconds. If during the 27 seconds someone breaks in, PANIC mode is cleared and the alarm activates.
2) When PANIC on the RKE is activated while in DISARM mode, the horn alarm and hazard lamps will activate for 27 seconds.
3) If LOCK, UNLOCK, TRUNK OPEN, or PANIC is activated on the RKE control during Steps 1) or 2), PANIC mode will be cleared.
4) When a PANIC signal is received during or after an alarm, the alarm turns OFF, the start inhibitor is set to OFF, and panic mode is set to ON.
5) PANIC mode will not start if the ignition key is IN or ON even if a PANIC signal is received.
6) PANIC mode operates independently from entry points (door, hood, trunk) being opened or closed.



ATGE121M

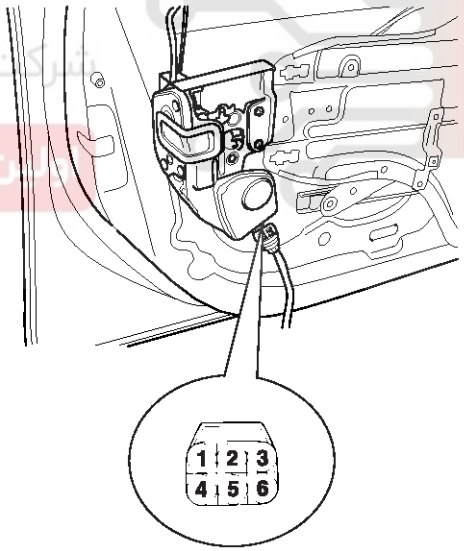
T1 : 27 ± 2 sec,

T2 : 0.5 ± 0.1 sec (Duty 50%)

INSPECTION

FRONT DOOR LOCK ACTUATOR INSPECTION

1. Remove the front door trim panel. (Refer to the BD group - front door)
2. Disconnect the 6P connector from the actuator.



KTKD047A

3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily

Position \ Terminal		4	6
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Front right	Lock	⊖	⊕
	Unlock	⊕	⊖

LTGE282A

REAR DOOR LOCK ACTUATOR INSPECTION

1. Remove the rear door trim panel. (Refer to the BD group - rear door)
2. Disconnect the 6P connector from the actuator.

KTKD048A

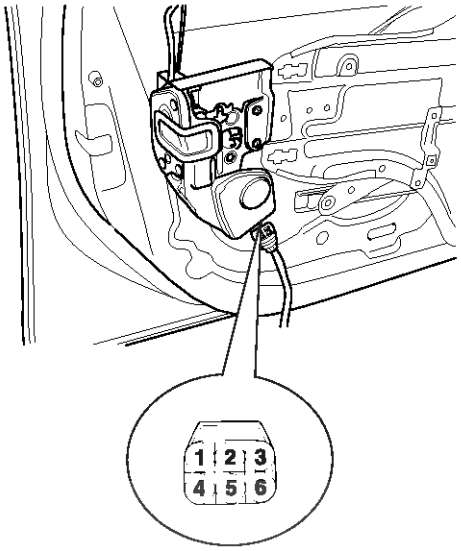
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal		1	4
Rear	Lock	⊕	⊖
	Unlock	⊖	⊕

LTGE282B

FRONT DOOR LOCK SWITCH INSPECTION

1. Remove the front door trim panel. (Refer to the BD group - front door)
2. Disconnect the 6P connector from the actuator.



KTKD047A

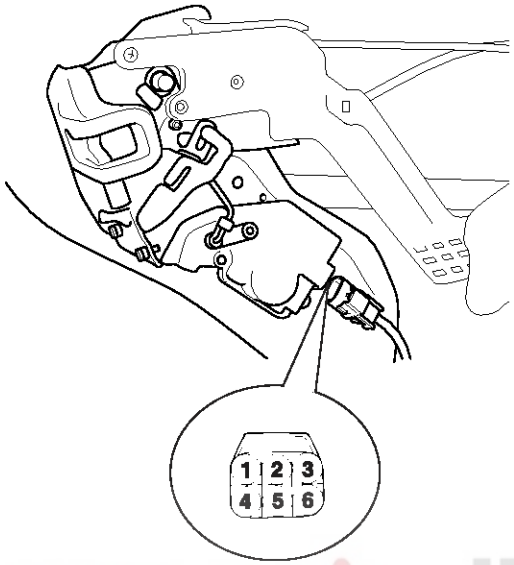
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		1	2	3
Front left	Lock			
	Unlock		○——	——○
Front right	Lock			
	Unlock	○——	——○	

BTGE282C

REAR DOOR LOCK SWITCH INSPECTION

1. Remove the rear door trim panel. (Refer to the BD group - rear door)
2. Disconnect the 6P connector from the actuator.



KTKD048A

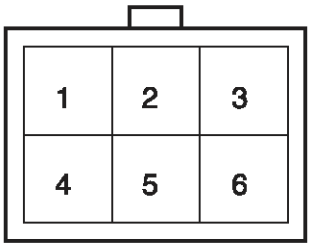
3. Check for continuity between the terminals in each switch position according to the table.

Position		Terminal 2	3	6
Rear left	Lock			
	Unlock		○	○
Rear right	Lock			
	Unlock		○	○

BTGE282D

TAILGATE LOCK ACTUATOR INSPECTION (5 DOORS)

1. Remove the tailgate trim panel.
2. Disconnect the 6P connector from the actuator.



ATGE282E

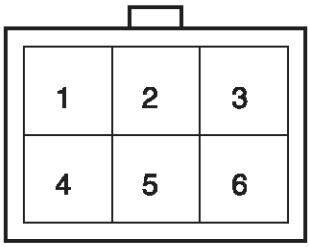
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal	1	2
LOCK→UNLOCK	⊕	⊖
UNLOCK→LOCK	⊖	⊕

LTGE282F

TAILGATE LOCK SWITCH INSPECTION (5 DOORS)

1. Remove the tailgate trim panel.
2. Disconnect the 6P connector from the actuator.



ATGE282E

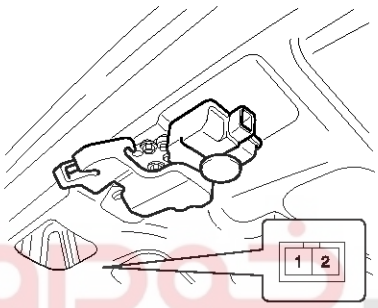
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	4	5	6
Lock		○	○
Unlock	○		○

LTGE282H

TRUNK LID UNLOCK SWITCH INSPECTION

1. Remove the trunk lid trim panel (Refer to the Body group - Trunk lid).
2. Disconnect the 2P connector.



LTGE161A

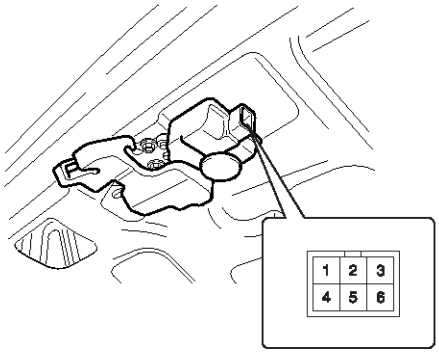
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2
Unlock	○	○
Lock		

LTGE282L

TRUNK LID ACTUATOR INSPECTION (4 DOORS)

1. Remove the trunk lid trim panel (Refer to the Body group - Trunk lid).
2. Disconnect the 6P connector from the actuator.



ATGE161A

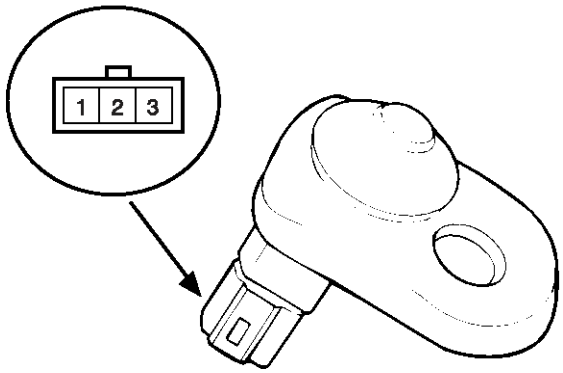
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal	2	3
Trunk lid open	○	○

LTGE282J

DOOR SWITCH INSPECTION

Remove the door switch and check for continuity between the terminals.



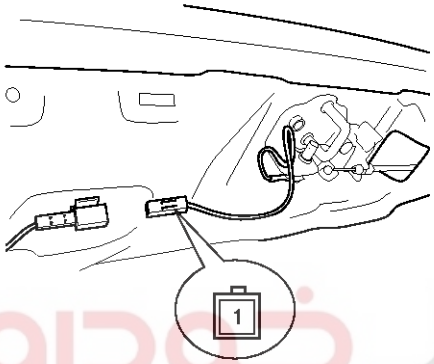
KTKD020A

Position \ Terminal	1	3	2	Ground
Free(Door unlock)	○——	——○	○——	——○
Push(Door lock)				

LTGE282I

TRUNK ROOM LAMP SWITCH INSPECTION

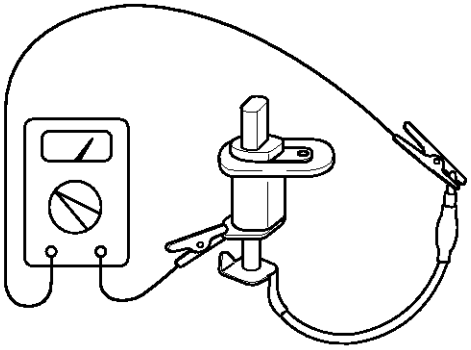
1. Disconnect the negative battery terminal.
2. Remove the rear trunk lid trim, then remove the trunk room lamp switch from the trunk lid striker.



KTKD005M

3. Disconnect the 1P connector from the rear harness.
4. Check for continuity between the terminal and body while pushing the rod.

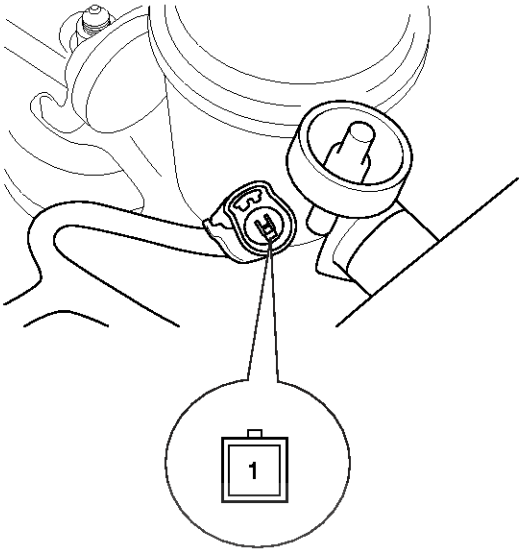
Switch rod condition	Continuity
Push (OFF)	Non-conductive (∞Ω)
Released (ON)	Conductive (0Ω)



KTBC455E

HOOD SWITCH INSPECTION

1. Disconnect the 1P connector from the hood switch.
2. Check for continuity between the terminals and ground according to the table.



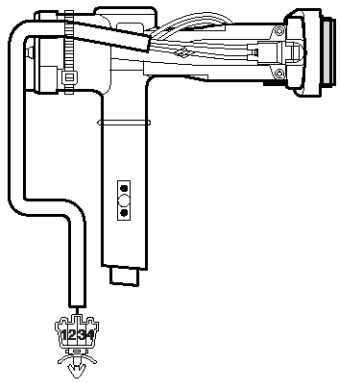
KTKD026A

Position \ Terminal	Ground (Body)	1
Hood open (Free)	○——	——○
Hood close (Push)		

ETPD180B

DOOR WARNING SWITCH INSPECTION

1. Remove the driver's crash pad lower panel. (Refer to the BD group-crash pad)



KTKD096A

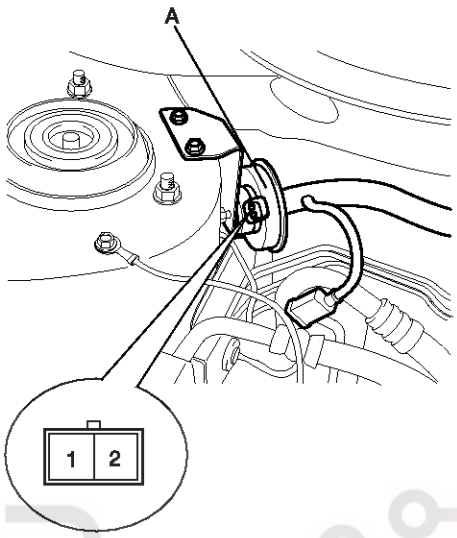
2. Disconnect the 4P connector from the door warning switch
3. Check continuity between the terminals in each position according to the table.

Terminal / Key position	3	4
Insert	○	○
Removal		

ETKE185B

BURGLAR HORN INSPECTION

1. Remove the burglar horn (A) after removing 2 bolts and disconnect the 2P connector from the burglar horn.
2. Test the burglar horn by connecting battery power to the terminal 1 and ground the terminal 2.

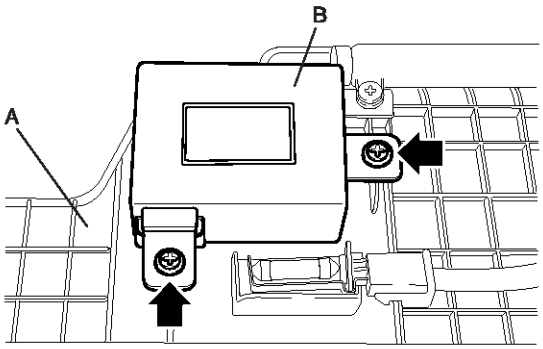


LTGE121Q

3. The burglar horn should make a sound. If the burglar horn fails to make a sound replace it.

REMOVAL AND INSTALLATION

1. Disconnect the negative (-) battery terminal.
2. Remove the passenger lower crash pad (Refer to the BD group - Crash pad).
3. Remove the receiver (B) from the passenger lower crash pad (A).



ATGE121B

BCM (Body Control Module)

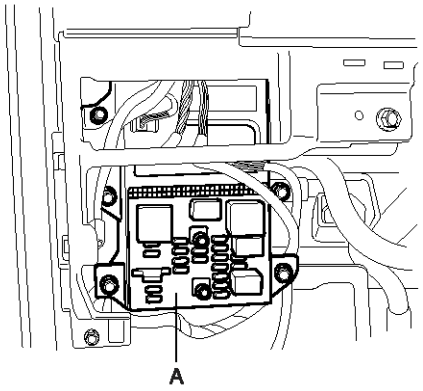
ETACS Module

SPECIFICATIONS

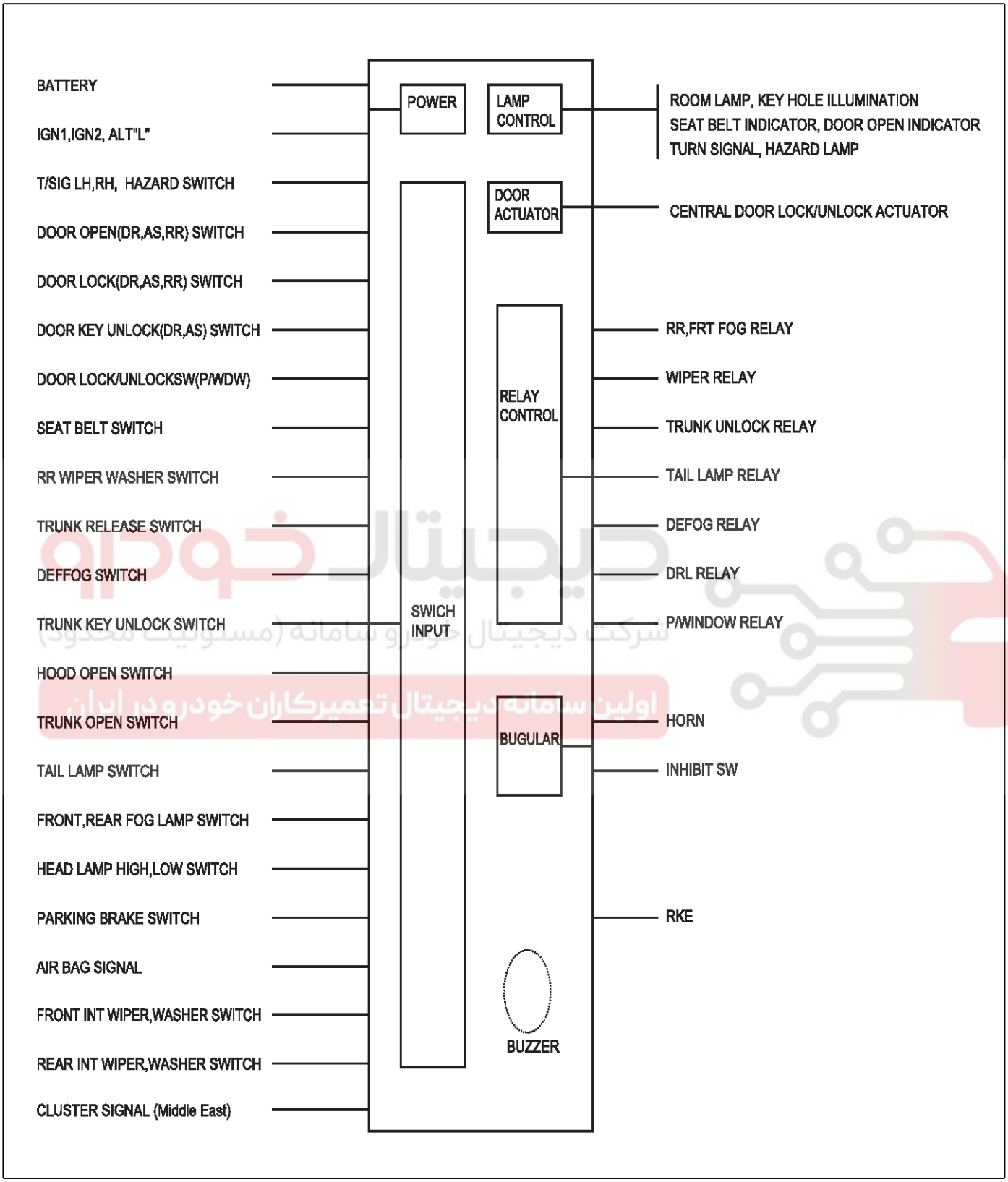
Items	Specifications
Rated voltage	DC 12V
Operating voltage	DC 9 ~ 16V
Operating temperature	-22°F ~ 176°F (-30℃ ~ 80℃)
Insulation resistance	100MΩ or more
Dark current	Below 2mA
Rated load	
Burglar horn	DC 12V, 3.5A (Inductance load)
Burglar relay	DC 12V, 200mA (Inductance load)
Tail lamp relay	DC 12V, 200mA (Inductance load)
Fog lamp relay	DC 12V, 200mA (Inductance load)
Rear defogger relay	DC 12V, 200mA (Inductance load)
Flasher unit	Turn signal : DC 12V, 21W+21W+5W+1.4W (Lamp load)
Hazard lamp relay	Hazard : DC 12V, (21W+21W+5W+1.4W)*2 (Lamp load)
Trunk lamp relay	DC 12V, 200mA (Inductance load)
Power window timer relay	DC 12V, 200mA (Inductance load)
Seat belt warning indicator	DC 12V, 1.4W (Lamp load)
Key hole illumination lamp	DC 12V, 2W (Lamp load)
Room lamp	DC 12V, 10W (Lamp load)
Intermittent wiper relay	DC 12V, 200mA (Inductance load)
Central door actuator	DC 12V, 25A (Actuator load) : 5EA
Rear fog lamp relay	DC 12V, 200mA (Lamp load)
Rear wiper relay (5 doors)	DC 12V, 200mA (Inductance load)
DRL relay	C 12V, 200mA (Inductance load)

DESCRIPTION

ETACS module (A) receives various input switch signals controlling time and alarm functions for the intermittent wiper timer, washer timer, rear defogger timer, seat belts warning, delayed out room lamp, central door lock, ignition key reminder, power window timer, door warning, tail lamp auto cut, crash door unlock, ignition key hole illumination, rear fog lamp, daytime running lamps, over speed warning (Middle East) and keyless entry & burglar alarm. The ETACS module (A) is integrated in the junction box.



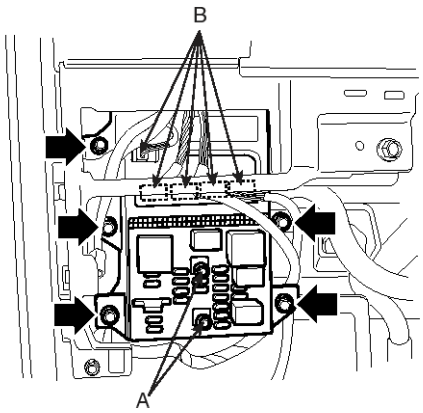
SYSTEM BLOCK DIAGRAM



LTGE140B

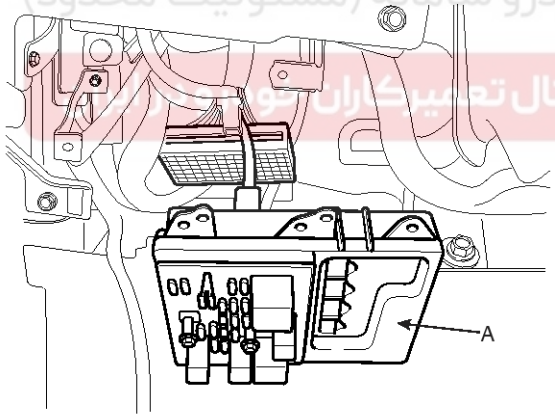
REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the driver's lower crash panel (Refer to the BD group - Crash pad).
3. Disconnect the ETACM connectors (B).
4. Loosen the connector mounting bolts (A).



ATGE140C

5. Loosen the mounting bolts
6. Remove the ETACM(A) after disconnecting the connector.



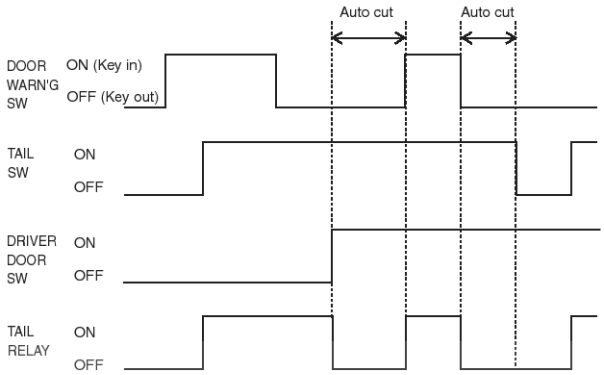
ATGE140D

7. Installation is the reverse of removal procedures.

INSPECTION

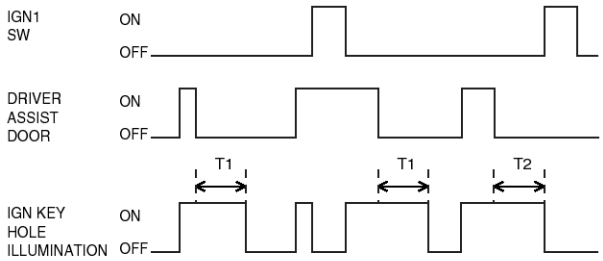
Verify each components operation using related timing charts.

1. TAIL LAMP AUTO CUT
   1) With the tail lamp switched ON, if the ignition
      Is switched OFF and the driver's door opened, the tail lamp should be automatically turned OFF.
   2) With the ignition switch ON, if the driver's door is opened and the ignition is switched to OFF, the tail lamp should be automatically turned OFF.
   3) When the tail lamp is cut automatically and the tail lamp switch is turned OFF and ON, the tail lamp illuminates and auto cut function is cancelled.
   4) When the tail lamp is cut automatically and the ignition key is inserted, the tail lamp illuminates and auto cut function is canceled.



LTGE141A

2. IGNITION KEYHOLE ILLUMINATION
   1) Ignition keyhole illumination is turned ON when the driver or passenger door is opened.
   2) The "ON" state for ignition keyhole illumination is delayed 10 seconds when the door is closed as in Step 1).
   3) Ignition keyhole illumination is turned off if the ignition switch is turned ON as in Step 1) & 2).
   4) Ignition keyhole illumination is turned off if ARM state is entered. See Steps 1) & 2).



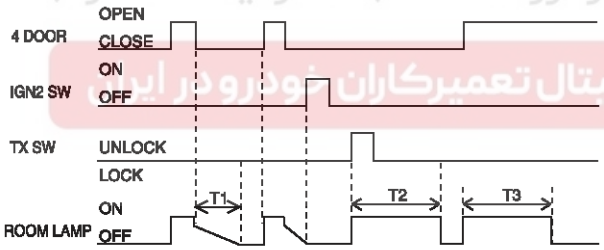
LTGE141B

T1 : 10 ± 1 sec,

T2 : 0 ~ 10 sec

3. DECAYED ROOM LAMP & KEYLESS UNLOCK TIMER
   1) When the first door is opened, the dome light brightens. When the last door is closed, the dome light drops to 75% intensity and then fades out within 5-6 seconds.
   2) If a door switch is ON for less than 0.1 sec., then illumination does not occur.
   3) Fade resolution occurs over 32 steps.
   4) The room lamp must not flicker during fade operation, if the ignition is switched ON.
   5) When keyless UNLOCK activates with the door closed, the dome light is turned ON, then fades to OFF after about 30 seconds. If another While the dome light is ON due to keyless UNLOCK. If another UNLOCK signal is received, the dome light will turn ON once more for 30 seconds.

      If the door is opened while the dome light is ON, the light will stay ON. If the door is closed the dome light drops to 75% intensity and then fades out within 5-6 seconds. If keyless LOCK (ARM state) is received during fade out, the room lamp is switched off immediately.



ATGE141C

T1 : 5.5 ± 1 sec,

T2 : 30 ± 5 sec,

T3 : 20 ± 1 min.

4. CENTRAL DOOR LOCK/UNLOCK
   1) Central door lock/unlock

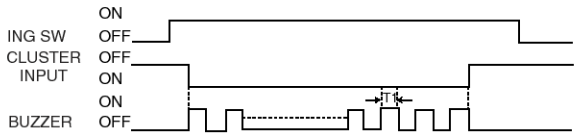
Function \ Option		Centeral door Lock	Transmitter (RKE)
Door key UNLOCK	Driver	–	All unlock
	Assist	–	All unlock
Transmitter (RKE)	Lock	–	All lock
	Unlock	–	All unlock
Driver knob	Lock	All lock	All lock
	Unlock	All unlock	Driver unlock
Assist knob	Lock	All lock	All lock
	Unlock	All unlock	Assist unlock
Main door Lock switch	Lock	All lock	All lock
	Unlock	All unlock	All unlock

LTGE141U

   2) When UNLOCK is input during LOCK output, the LOCK output stops immediately and the UNLOCK output continues. (vice versa)
   3) When the LOCK/UNLOCK signal is received by the remote control, the LOCK/UNLOCK output continues for 0.5 seconds.
   4) When the hazard lamp is on during the LOCK/UNLOCK by the remote control, the LOCK/UNLOCK signal by the remote control shall be ignored again.
5. Over speed warning Function Description (Middle East)

   If vehicle runs over 120km/h, the cluster input is to be set.

   When the cluster input indicates that vehicle runs over 120km/h, the over speed warning starts.



LTGE141T

T1 : 0.5 ± 0.1 sec

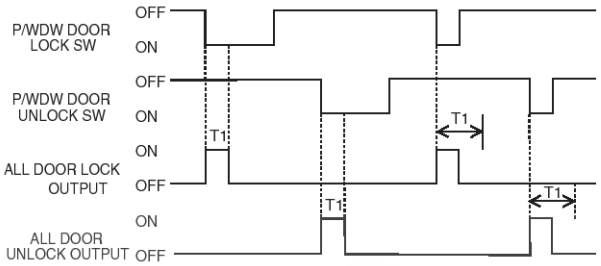
6. POWER WINDOW MAIN DOOR SWITCH

LOCK/UNLOCK

1) When using the power window main door switch LOCK/ UNLOCK ON, all doors will LOCK/ UNLOCK within a maximum period of 0.5 seconds.

   (Provided that if main switch LOCK is OFF within 0.5 seconds, relay output is OFF right after.)

2) When using UNLOCK input during an active LOCK action, the UNLOCK output will be made right after the LOCK completes. (Vice versa)



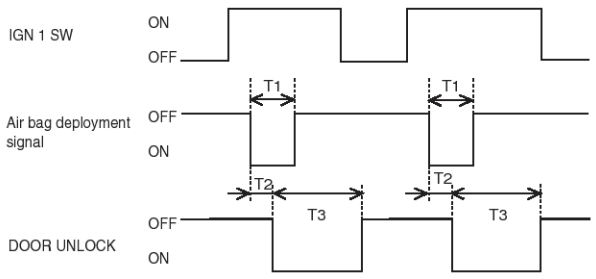
LTGE141E

T1 : 0.5 ± 0.1 sec.

7. CRASH DOOR UNLOCK

1) With ignition turned ON, if the air bag deploys, a crash signal is received and simultaneously sends an unlock output to all doors.

2) After unlock signal, if lock is set, unlock pulse is output again for 5 seconds period.



LTGE141F

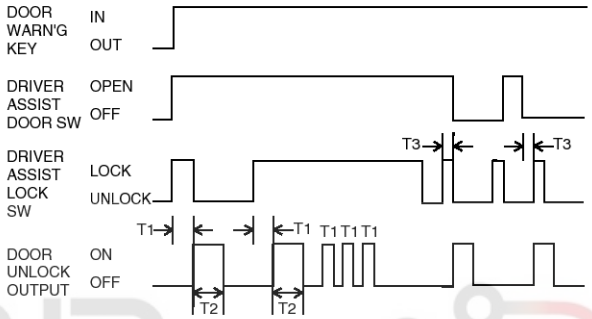
T1 : 100 msec,

T2 : 40 msec,

T3 : 5 ± 0.5 sec.

8. IGNITION KEY REMINDER

1) If the key is in the ignition, with either the driver's door or assist door open, and then the vehicle is locked using the driver's knob or assist knob, the central locking system will issue an unlock pulse (1 sec. duration) to all doors preventing locking of the vehicle. (When a knob remains locked, if the switch in the actuator is not changed, the central locking will issue 1 pulse (1 sec. duration) and then 3 pulses (0.5 sec.) to unlock the vehicle.)



LTGE141G

T1 : 0.5 sec,

T2 : 1.0 sec,

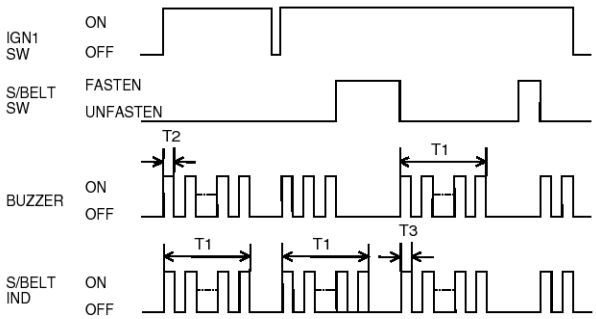
T3 : 0 sec. < T3 < 0.5 sec.

9. SEAT BELT WARNING TIMER

1) When the ignition is switched ON, the seat belt warning indicator will illuminate (period: 1.0 sec., duty rate : 50%) and the chime bell will sound (period: 1.0 sec., duty rate : 50%) for total of 6 seconds.

2) If the ignition is switched off while the seat belt warning indicator and chime bell are active (Step 1) the indicator and chime bell will be switched OFF. If the seat belt is sensed as fastened during indicator and chime bell output, the chime bell will switch OFF however the seat belt warning indicator will stay illuminated for the remaining seconds.

3) If the seat belt is removed, with the ignition switched ON, the seat belt warning indicator and chime bell will activate for 6 seconds.



LTGE141H

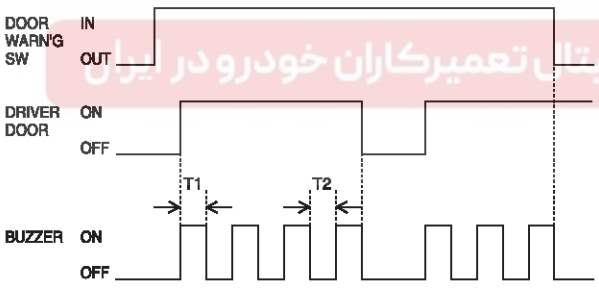
T1 : 6 ± 1,

T2 : 0.5 ± 0.1 sec,

T3 : 0.5 ± 0.1 sec.

10. KEY OPERATED WARNING

1) If the key is in the ignition and the driver's door is opened, the buzzer is sounded (period : 1.0 sec., duty rate : 50%).
2) If the ignition key is removed, or the door is closed, the buzzer is switched OFF immediately.

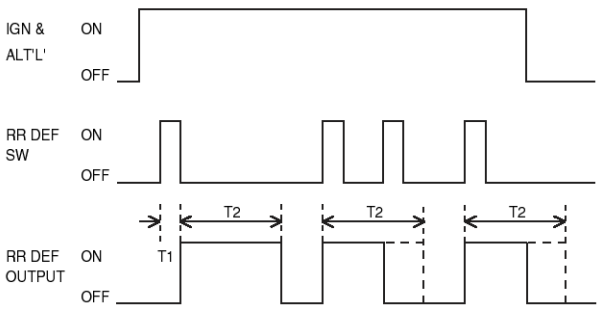


LTGE141I

T1, T2 : 0.5 ± 0.1 sec.

11. DEFOGGER TIMER

1) Once ALT "L" is ON, if the defogger is switched ON, the defogger will stay ON for 20 minutes duration.
2) If defogger switch is pressed again (see Step 1), or if ignition is switched OFF, the defogger will shut OFF.



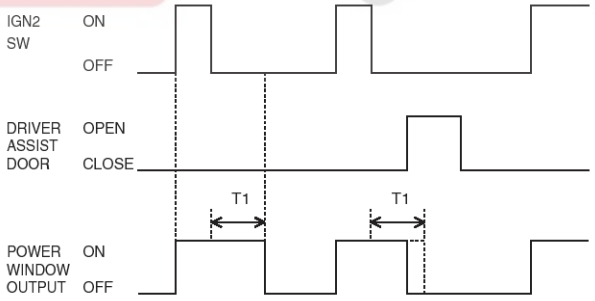
LTGE141J

T1 : 0.06 ± 0.01 sec,

T2 : 20 ± 1 min.

12. POWER WINDOW TIMER

1) When the ignition is switched OFF, power window output remains ON for 30 seconds and then turns OFF.
2) Related to Step 1), if the driver's door or assist door is opened, window power output is turned OFF immediately.
3) When the driver's door or assist door is opened, the power window relay output is turned OFF immediately.



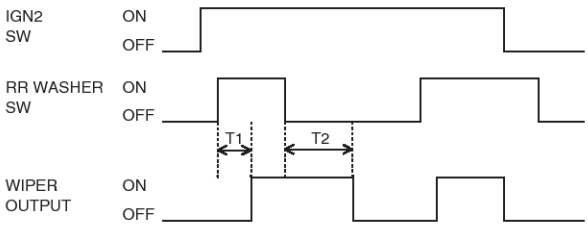
LTGE141K

T1 : 30 ± 3 sec.

13. REAR WIPER AND WASHER (5 DOORS)

1) If rear washer switch is turned on while the ignition switch is ON, rear wiper output will turn ON after 0.3 sec.
2) If rear washer switch is turned OFF, rear wiper output remains ON for up to 3.8 sec. (T2).

3) If rear washer switch is turned OFF within 0.3 sec. (T1), rear wiper output will remain ON for up to 3.8 sec. (T2).

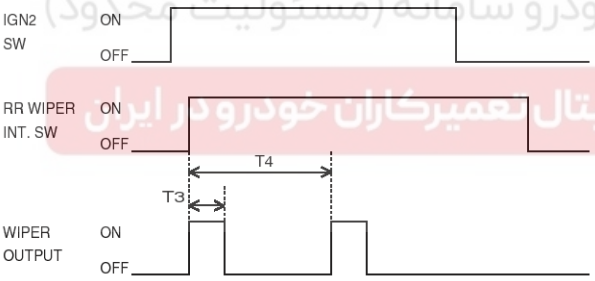


LTGE141L

T1 : 0.3 ± 0.1 sec.

T2 : 2.5 ~ 3.8 sec.

4) When the ignition switch is ON, if the intermittent rear wiper switch is turned ON, rear wiper output will remain ON for up to 0.7 sec. (T3).



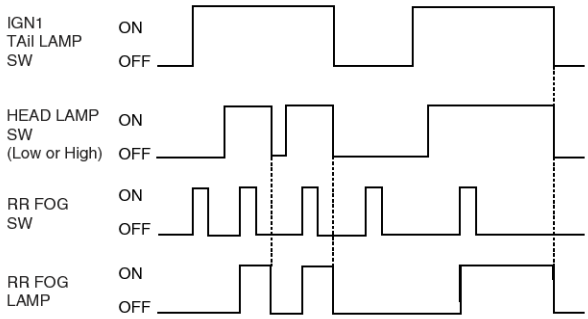
LTGE141M

T3 : 0.7 ± 0.1 sec,

T4 : 5 ± 0.5 sec.

14. REAR FOG LAMP CONTROL

In case of (IGN1 & tail output) and [(head lamp low output) or (front fog lamp output) is turned ON, if rear fog switch is pushed, rear fog lamp is turned ON.

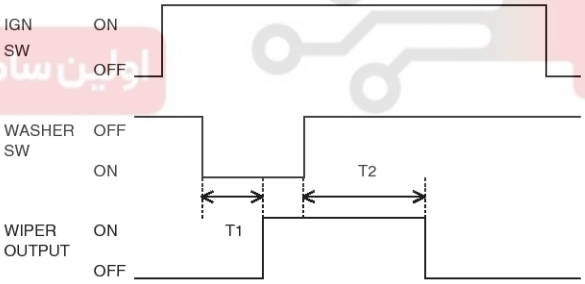


LTGE141S

15. WIPER RELATED TO WASHER

1) When the ignition switch is turned ON :
   - If washer switch is turned on, wiper output is ON after 0.3 sec. (T1)
   - If washer switch is turned OFF, wiper output is OFF after 3.8 sec. (T2)

2) If the washer switch is turned OFF within 0.3 sec.(T1) of the ignition switch the wiper will remain ON for up to 3.8 sec.(T2).



LTGE141N

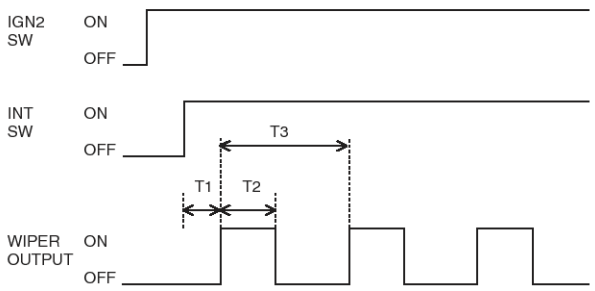
T1 : 0.3 ± 0.1 sec,

T2 : 2.5 ~ 3.8 sec.

16. VARIABLE INTERMITTENT WIPER (WINDSHIELD WIPER)

1) With the ignition switch ON, if the intermittent wiper switch is turned on, wiper output is ON according to the setting.

2) When the intermittent wiper switch is ON, if the ignition switch is turned ON wiper output is ON.



LTGE141O

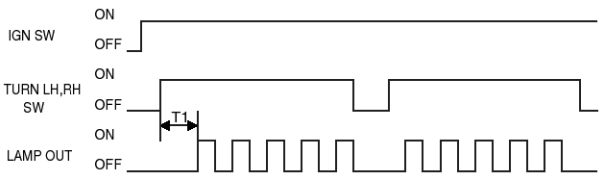
T1 : MAX 0.3 sec,

T2 : 0.7 ± 0.1 sec,

T3 : 2.2 ± 0.2 sec. (FAST), T3 : 10.0 ± 1.0 sec.(SLOW)

17. FLASHER UNIT

1) With the ignition switch ON, if the turn signal (Left or right) is switched on, turn signal output (85 cycle/min.) is ON.
2) When the battery is ON and the hazard switch on, turn signal output (85 cycle/min) is ON.
3) When one of the front or rear turn signal lamps is broken, the turn signal will blink at double frequency.
   Period : More than 120 cycle/min

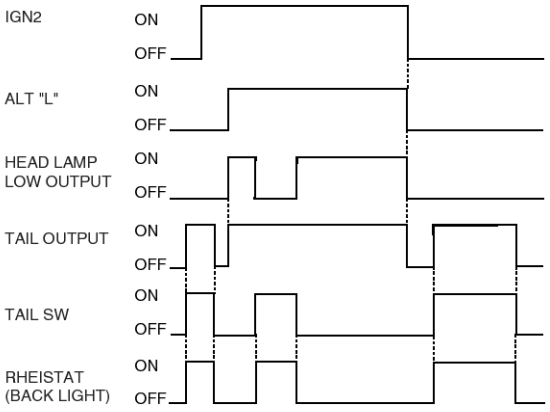


LTGE141P

T1 : MAX 0.3 sec.

18. DAYTIME RUNNING LIGHT (DRL) CONTROL

1) When the ALT "L" is ON, DRL(headlamp low relay and tail lamp relay) output is ON.
2) If ALT "L" is OFF, DRL output is OFF.
3) If the headlamp switch is ON or tail lamp switch is ON, DRL output is OFF.



LTGE141R

Body Control Module (BCM)

SPECIFICATIONS

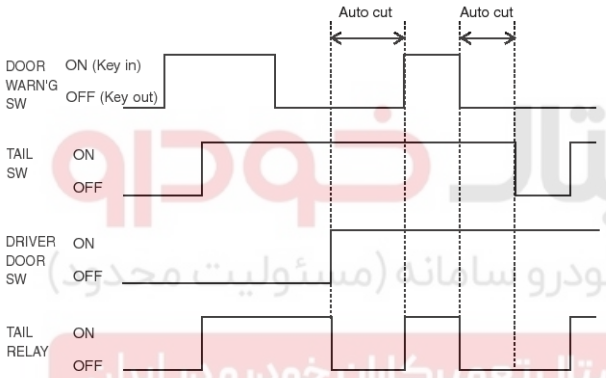
Item	Requirements	Note
Rated Load	DC 12V	Should be operated normally between two ranges.
Operating Voltage	DC 9V ~ 16V	
Operating Temperature	-30°C ~ +80°C	
Storage Temperature	-40°C ~ +85°C	
Insulation Resistance	Should have no heating or burning due to the leakage current (100 MΩ)	Measure with 500V Megger Measure CASE on TML (Except for Earth)

Item	Rated Load
Tail lamp relay	DC 12V , 200 mA (Induced Load)
FRT fog lamp relay	DC 12V , 200 mA (Induced Load)
RR fog lamp relay	DC 12V , 200 mA (Induced Load)
Key hole illumination lamp	DC 12V , 2W (LAMP Load)
Room lamp	DC 12V , 10W (LAMP Load)
Central door actuator	DC 12V , MAX 25A (ACTUATOR Load) : 5 EA
Burglar horn	DC 12V , 3.5A (Induced Load)
Burglar relay	DC 12V , 200 mA (Induced Load)
Seat belt lamp	DC 12V , 1.4W (LAMP Load)
RR defogger relay	DC 12V , 200 mA (Induced Load)
P/WDW timer relay	DC 12V , 200 mA (Induced Load)
INT wiper relay	DC 12V , 200 mA (Induced Load)
RR wiper relay	DC 12V , 200 mA (Induced Load)
Trunk relay	DC 12V , 200 mA (Induced Load)
DRL relay	DC 12V , 200 mA (Induced Load)
Flasher lamp	TURN SIGNAL : DC 12V, 21WX2+5W+1.4W (LAMP Load) HAZARD : DC 12V, (21WX2+5W+1.4W)X2 (LAMP Load)
Side repeater	DC 12V, 5WX2 (LAMP load)

FUNCTION

1. TAIL LAMP AUTO CUT
   1) After DOOR WARNING SW is ON (KEY on), Off the DOOR WARNING SW in case TAIL SW is ON.

      When the KEY is off and Diver side door is opened, TAIL LAMP turns automatically off.
   2) Also, in case the Diver's seat door opened and DOOR WARNING SW is off, the TAIL LAMP turns automatically off.
   3) After turned automatically off, TAIL LAMP turns on and AUTO CUT function cancels in case TAIL LAMP SW is ON after OFF.
   4) If the KEY is ON after the automatic turn-off, TAIL LAMP turns on and AUTO CUT function is canceled.



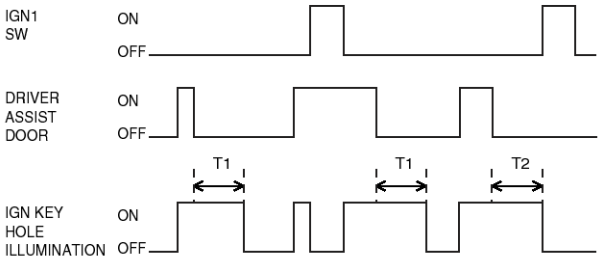
LTGE141A

2. IGN KEY HOLE Lighting
   1) When the driver's door is opened, IGN KEY HOLE light should be turned on.

      On 1), when the driver's door is closed, IGN KEY HOLE lights should be turned on for 30 seconds before turning it off.
   2) When the assistant's door is opened, IGN KEY HOLE light should be turned on.

      On 3), when the assistant's door is closed, IGN KEY HOLE lights should be turned on for 30 seconds before turning it off.
   3) 1) and 3) has the priorities.
   4) While operating the actions of 1) through 4), as soon as IGN 1 SW is on, IGN KEY HOLE lighting should be off immediately.

      (However, when the ARM MODE started, IGN KEY HOLE lighting should be off.)



LTGE141B

T1 : 30 ± 1.0 sec., T2 : 0 ~ 30 sec.

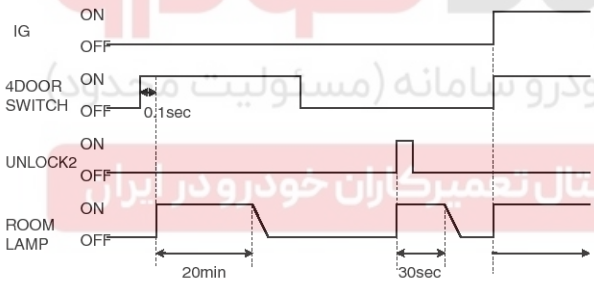
3. DECAYED ROOM LAMP

ROOM LAMP OFF STATE

State	Description
First condition	Room lamp OFF & IGN1 off & 4Door SW off
Event	IGN1 off & (4Door SW off → on for 100ms)
Action	Change ROOM LAMP ON for 20 min state. Output RoomLamp for 20 +/-1 minute.

State	Description
First condition	Room lamp OFF & IGN1 off & 4Door SW off
Event	UNLOCK2
Action	Change ROOM LAMP ON for 30s state Output Room Lamp for 30sec.

State	Description
First condition	Room Lamp OFF & IGN1 off & 4Door SW off
Event	IGN1 ON & 4DRSW on
Action	Change ROOM LAMP ON state Output Room Lamp (No limit time)



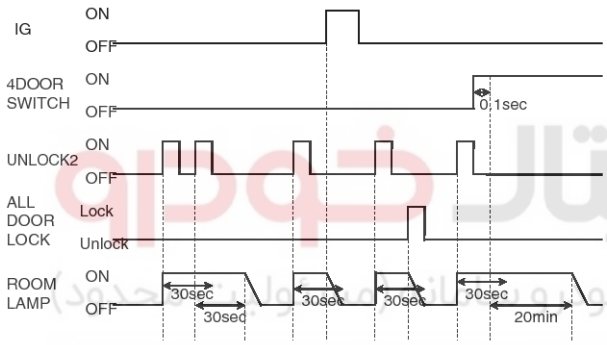
SLDBE7013L

Room lamp ON for 30s state

State	Description
First condition	Room lamp ON for 30s & IGN1 OFF
Event	4Door SW off → on for 100ms
Action	Change ROOM LAMP ON for 20 min state. Output Room Lamp for 20 ± 1 minute.

State	Description
First condition	Room lamp ON for 30s & IGN1 OFF
Event	UNLOCK2
Action	Change ROOM LAMP ON for 30s state. Output Room Lamp for 30 sec.

State	Description
First condition	Room Lamp ON for 30s & IGN1 OFF
Event	IGN1 ON Or 30s timer elapsed Or ALL DOOR LOCK
Action	Change ROOM LAMP DECAYING state Decaying Room Lamp output for 2 ± 0.2 sec off



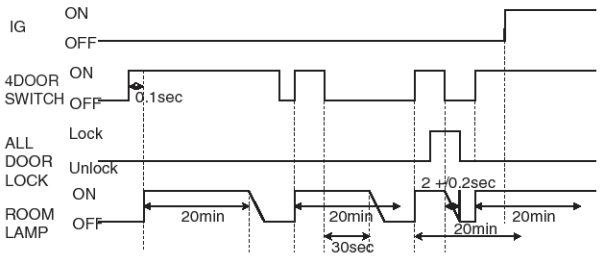
SLDBE7014L

Room lamp ON for 20min state

State	Description
First condition	ROOM LAMP ON for 20min & IGN1 OFF
Event	IGN1 ON
Action	Change ROOM LAMP ON state. Output Room Lamp (no limit time).

State	Description
First condition	ROOM LAMP ON for 20min & IGN1 OFF
Event	4Door SW off
Action	Change ROOM LAMP ON for 30s state. Output Room Lamp for 30 sec.

State	Description
First condition	ROOM LAMP ON for 20min & IGN1 OFF
Event	(4Door SW off & ALL DOOR LOCK) Or 20min timer elapsed
Action	Change ROOM LAMP DECAYING state. Decaying Room Lamp output for 2 ± 0.2 sec off.



SLDBE7015L

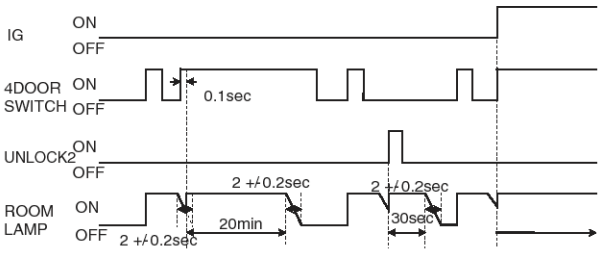
Room lamp Decaying state

State	Description
First condition	ROOM LAMP DECAYING & IGN1 OFF
Event	4Door SW off → on for 100ms
Action	Change ROOM LAMP ON for 20 min state. Output Room Lamp for 20 ± 1minute.

State	Description
First condition	ROOM LAMP DECAYING & IGN1 OFF & 4Door SW off
Event	UNLOCK2
Action	Change ROOM LAMP ON for 30sec state. Output Room Lamp for 30 sec.

State	Description
First condition	ROOM LAMP DECAYING
Event	Room lamp decaying completed
Action	Change ROOM LAMP OFF state. STOP Room Lamp output.

State	Description
First condition	ROOM LAMP DECAYING
Event	IGN1 ON & 4Door SW ON
Action	Change ROOM LAMP ON state. Output Room Lamp (no limit time).



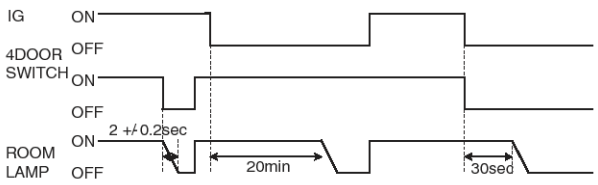
SLDBE7016L

Room lamp ON state

State	Description
First condition	ROOM LAMP ON & IGN1 ON & 4Door SW on
Event	4Door SW off
Action	Change ROOM LAMP DECAYING state. Decaying Room Lamp output for 2 ± 0.2 sec off.

State	Description
First condition	ROOM LAMP ON & IGN1 ON & 4Door SW on
Event	IGN1 off.
Action	Change ROOM LAMP ON for 20min state. Output Room Lamp for 20 ± 1minute.

State	Description
First condition	ROOM LAMP ON & IGN1 ON & 4Door SW on
Event	4Door SW off & IGN1 OFF
Action	Change ROOM LAMP ON for 30s state. Output Room Lamp for 30 sec.



SLDBE7017L

NOTICE

1. *The flickering of lamp is not allowed even though IGN1 ON.*
2. *The resolution of DECAYED ROOM LAMP must be more then 32 steps.*

4. CENTRAL DOOR LOCK / UNLOCK

1) Central Door Lock Auto Logic

OPTION		Central DR Lock	RKE
DR KEY UN-LOCK	Driver's seat	-	All unlock
	Assistant's seat	-	All unlock
RKE Fob	Lock	-	All lock
	Unlock	-	All unlock
Driver's seat KNOB	Lock	All lock	All lock
	Unlock	All unlock	DR Seat unl-ock
Assistant's seat KNOB	Lock	All lock	All lock
	Unlock	All unlock	Asst. unlock
Main Door L-ock SW	Lock	All lock	All lock
	Unlock	All unlock	All unlock

2) There should be no error when the battery is connected (When KNOB is LOCKed or UNLOCKed, there should be no LOCK output when the battery's connected).

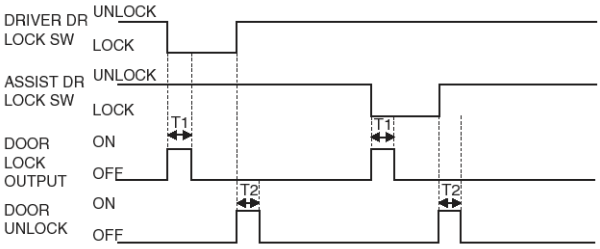
3) Ignore the signal under 60msec.

4) When UNLOCK is input while outputting LOCK, immediately stop outputting LOCK or output UNLOCK after 100ms pause (and vice versa).

5) When RKE LOCK signal is received, output LOCK for 0.5 seconds.

6) When RKE UNLOCK signal is received, output UNLOCK for 0.5 seconds.

7) When RKE LOCK signal is received, output LOCK ON irrespective of ALL DOOR state.



SLDBE7018L

T1, T2 : 0.5 ± 0.1 sec.

5. POWER WINDOW MAIN DOOR SW LOCK / UNLOCK

1) When P/WDW MAIN DOOR SW LOCK is ON, all Door LOCK outputs for max. 0.5 seconds.

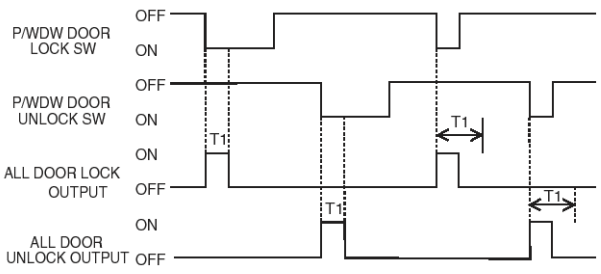
(However, RELAY output should be OFF immediately while MAIN SW LOCK is OFF within 0.5 sec.)

2) When P/WDW MAIN DOOR SW UNLOCK is ON, all Door UNLOCK outputs for max. 0.5 seconds.

(However, RELAY output should be OFF immediately while MAIN SW UNLOCK is OFF within 0.5 sec.)

3) Ignore the signal under 60msec.

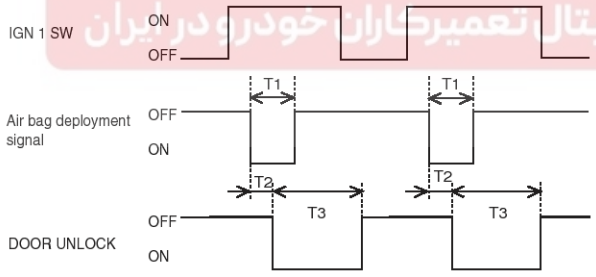
4) When UNLOCK is input while LOCK signal is outputting, stop outputting LOCK signal and output UNLOCK after 100ms pause (vice versa).



LTGE141E

T1 : 0.5 ± 0.1 sec.

6. CRASH DOOR UNLOCK
   1) In case CRASH UNLOCK is inputting on IGN SW ON state, all the doors should be unlocked.
   2) This function is prior to all the door lock functions (when Crash Unlock is operating, Door Lock function is disable).
   3) After operating Crash Unlock function, if DRIVER or ASSIST or REAR(RKE only) door is locked, all the doors unlocked for T3 seconds.



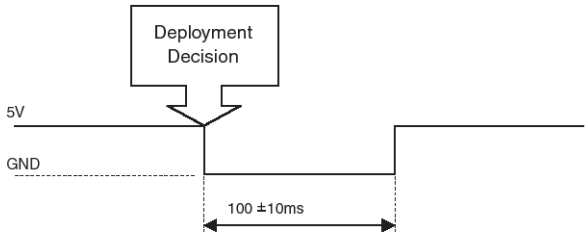
LTGE141F

T1 : 100 ± 10ms, T2 : 40ms,

T3 : 5 ± 0.5 sec.

   4) If re-input the Airbag signal, always output Unlock T3 time.

      (If maintain Airbag signal ON, NO re-output The Crash unlock)
   5) Ignore the Crash unlock, if IGN ON while IGN SW OFF & Airbag signal ON.
   6) If Reset function CRASH UNLOCK after IGN 1 SW OFF, normal active central DOOR LOCK.



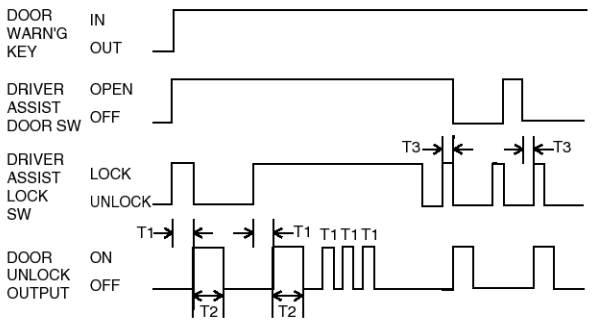
SLDBE7020L

7. IGN KEY REMINDER
   1) Insert IGN KEY to the KEY CYLINDER, open the driver's seat door and assistant's seat door and press DOOR LOCK KNOB to lock the door. After outputting UNLOCK signal for 1 second, confirm its reaction. IF it's locked, output the UNLOCK signal for three times for 0.5 seconds. (However, if the door warning switching is off before 0.5 seconds passed after door lock switch is pressed, Key reminder function will be cancelled and the central door lock signal will be output.)
   2) Confirming its ACT while three times of outputting, the following output will be stopped.
   3) When the door closed or key is off while three times of outputting, the following output will be stopped.
   4) Confirming its ACT while three times of outputting, if it's locked, maintain its state.

      If there's any changes of DOOR WARNING SW, driver's/assistant's seat DOOR SW, or DR/AS DOOR LOCK SW, RESET(UNLOCK) it.
   5) When the door is opened and key inserted when it is on the LOCK state, UNLOCK should be output.

      (However, there's no output when the key is inserted after unlocked the driver's seat on 2 TURN UNLOCK vehicle.)
   6) If In side 0.5 sec DOOR LOCK SW became LOCK form DOOR(DR or ASSIST) Open → Close at IGN KEY IN state, output UNLOCK for 1sec.
   7) When P/WDW MAIN DOOR SW is LOCKed, lock it for 0.5 seconds and output UNLOCK signal immediately.

(DOOR WARN'G SW = KEYLESS SW)

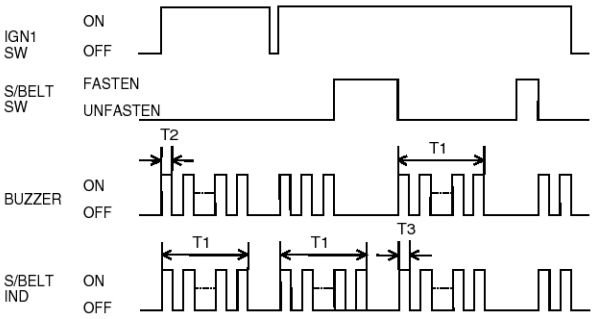


LTGE141G

T1 : 0.5sec, T2 : 1sec,

T3 : 0 sec < T3 < 0.5sec.

8. SEAT BELT WARNING TIMER (General/Middle East)
   1) From the time of IGN1 SW is ON, SEAT BELT WARNING IND outputs for 0.6 cycle, BUZZER for 1 sec cycle, and reduce sound for 6 sec.
   2) When IGN1 SW is OFF while outputting, SEAT BELT WARNING IND and BUZZER immediately stop outputting.
   3) If the SEAT BELT is ON while the assigned time (SW OFF), BUZZER immediately stops outputting, but SEAT BELT WARNING IND will output remained time.
   4) After fastening the seat belt(SW OFF) on the IGN1 SW is ON and then, SW ON, SEAT BELT WARNING IND and BUZZER again outputs for 6 seconds.

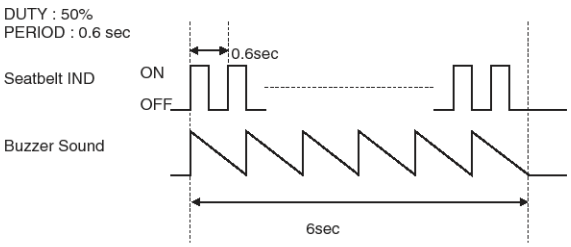


LTGE141H

T1 : 6 ± 1sec, T2 : 0.5 ± 0.1sec (ON, OFF TIME),

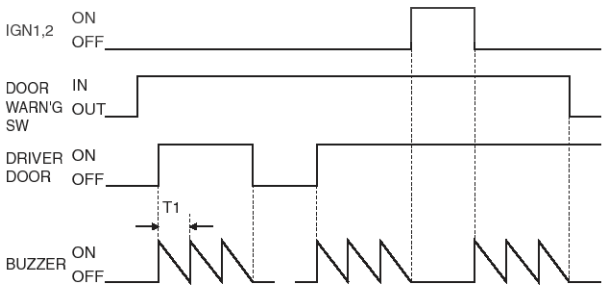
T3 : 0.3 ± 0.1sec (ON, OFF TIME).

9. SEAT BELT REMINDER
   1) SEAT BELT WARNING LAMP DRIVING CONDITION



SLDBE7022L

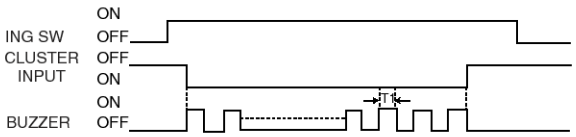
10. KEY OPERATED WARNING (BUZZER applying specification)
    1) When the driver's door is opened with IGN OFF and IGN KEY inserted in KEY CYLINDER (DOOR WARNING SW ON), BUZZER output occurs as 0.7 seconds cycle DUTY 50%.
    2) If IGN KEY pulled out from KEY CYLINDER or the driver's door closed, the output immediately is stopped.



SLDBE7021L

T1 : 0.7sec.

11. OVER SPEED WARNING(For Middle East ONLY)
    1) When IGN SW is ON and CLUSTER GND is input, BUZZER is on as 1 second cycle.



LTGE141T

T1 : 0.5 ± 0.1sec.

12. REAR DEFOGGER TIMER

1) Rear Defogger Timer

a. On the ALT "L" ON state, switch on the DEFOG SW to output DEFOG for 20 minutes.

b. While outputting DEFOG, off the switch if DEFOG SW is ON again.

c. While outputting DEFOG, off the output if ALT "L" terminal is OFF.

2) Front Deicer Timer

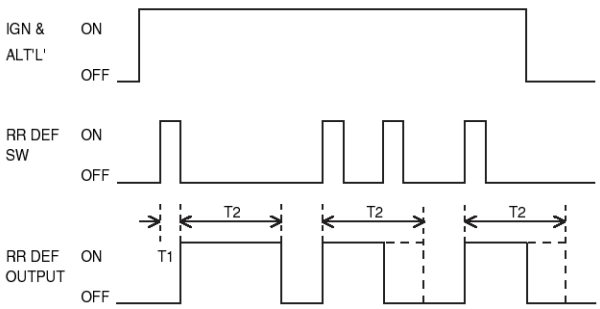
a. On the ALT "L" ON state, switch on the Deicer to output Deicer Relay for 20 minutes.

b. While outputting Deicer, off the switch if Deicer SW is ON again.

c. While outputting Deicer, off the output if ALT "L" terminal is OFF.

d. Deicer Relay output terminal and Deicer SW input terminal are operating by using RR FOG LAMP SW and RELAY terminal.

e. Refer to the TIME CHART below for the detailed operation logic.



LTGE141J

T1 : 60±10ms, T2 : 20±1min.

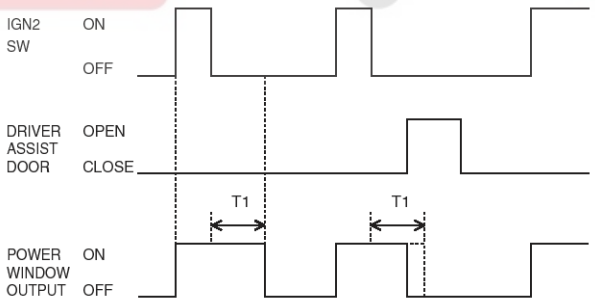
13. POWER WINDOW TIMER

1) When the IGN2 switch is ON, turn on the POWER WINDOW output.

2) When IGN2 SW is OFF, maintain the output for 30 seconds, then off the switch.

3) During 2), as soon as opening the driver's or assistant's door within 30 seconds, the output will be stopped at once.

4) When the driver's/assistant's seat door open and IGN is off, POWER WINDOW output will be stopped at once.



LTGE141K

T1 : 30 ± 3sec.

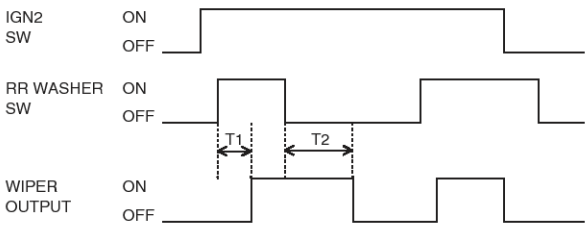
14. REAR WIPER & WASHER Control

1) When IGN2 SW is ON, switch on the RR WASHER to output REAR WIPER after 0.3 seconds.

2) After WASHER SW is OFF, output the REAR WIPER during the T2.

(WIPER 2~3 times operation time).

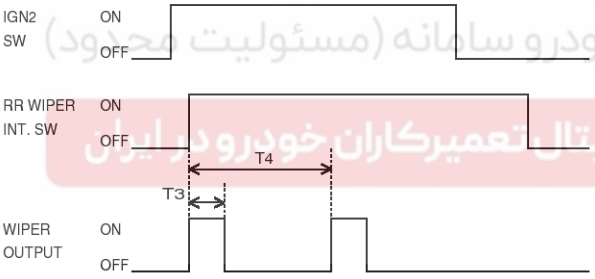
3) When the WASHER SW is off within T1, output WIPER for T2 time at T1.



LTGE141L

T1 : 0.3±0.1sec., T2 : 2.5~3.8sec.

4) On the state of IGN2 SW ON, turn on the RR WIPER output for T3 when RR WIPER INT SW is ON.



LTGE141M

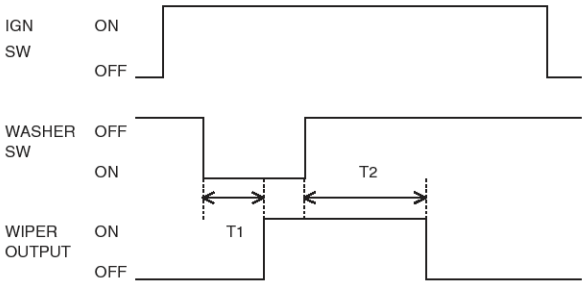
T3 : 0.7±0.1sec., T4 : 5±0.5sec.

5) Ignore the signal under 60msec.

15. FRONT WASHER GEARED WIPER

1) Switch on the WASHER when IGN switch is ON, start and stop outputting WIPER after T2 sec (2.5-3.8sec) and stop outputting WIPER.
2) WAHER GEARED WIPER operation is priority while operating INT WIPER.
3) Ignore the WASHER SW input when IGN1 is ON and IGN2 is OFF.
4) Even if the WASHER SW is OFF within T1, output WIPER at T1 for T2.

5) Ignore the signal under 60msec.

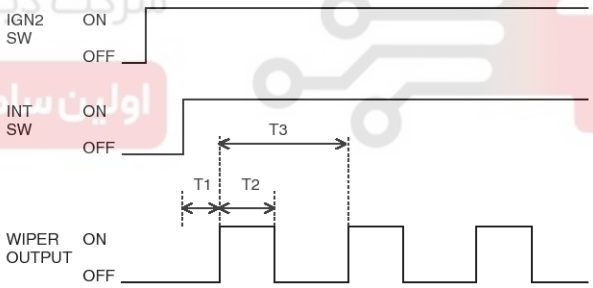


LTGE141N

T1 : 0.3±0.1sec., T2 : 2.5~3.8sec.

16. VARIABLE INTERMITTENT WIPER

1) If INT SW is on when IGN2 SW is ON, INT WIPER is occasionally operating by the set value of INT VOLUME.
2) If the INT SW is ON, WIPER output should be ON when IGN is ON.



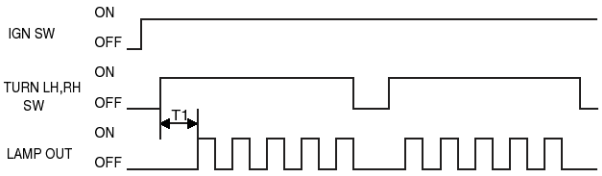
LTGE141O

T1 : MAX 0.3 sec., T2 : 0.7 ± 0.1 sec.,
T3 : 2.2 ± 0.2 sec. (at VR=0 kΩ)
10.0 ± 1.0 sec. (at VR=50 kΩ)

INT V-OL	INT V-OL L-EVEL(DEG)	0 (FAST)	0.25	0.5	0.75	1 (SLO-W)
	VOLU-ME(k-ohm)	0	10.9 ± 20 %	25 ± 20%	39 ± 20%	50 ± 20%

17. FLASHER UNIT

1) On the IGN1 SW ON state, switch on the TURN Signal LH (or RH) to flicker the LH (or RH) LAMP 85 times per minute.
2) Switch on the HAZARD on the B+ state, flicker the LAMP 85 times per minute.
3) When the LAMP1 is disconnected on the TURN state, flicker 120 times per minute.



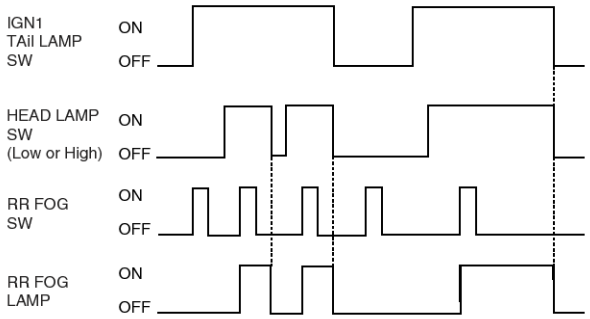
LTGE141P

T1 : MAX 0.1sec., T/SIG : 85±10 C/M,

HAZARD : 85±10 C/M

18. REAR FOG LAMP CONTROL

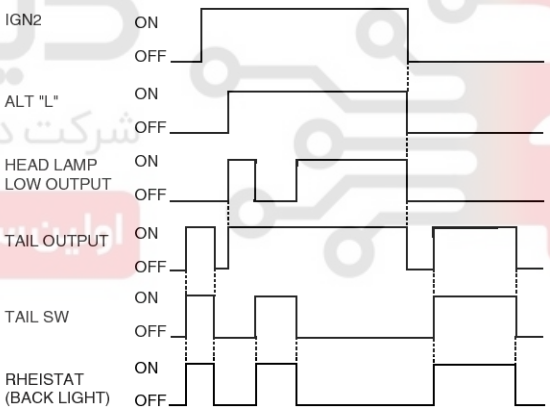
1) In case of switching on the HEAD LAMP (low or high) and inputting RR FOG SW on IGN1 ON state, output RR FOG LAMP RELAY.
2) REAR FOG LAMP SW is SELF RETURN TYPE.
3) If HEAD LAMP SW or FRONT FOG LAMP SW is turned-on on IGN2 ON state, press REAR FOG LAMP SW to output REAR FOG LAMP.
4) Press REAR FOG LAMP SW again or OFF any conditions above while outputting REAR FOG LAMP, immediately off the output of REAR FOG LAMP.
5) Press RR FOG SW while operating DRL, AUTOLIGHT to output LAMP.



LTGE141S

19. DAYTIME RUNNING LAMPS CONTROL

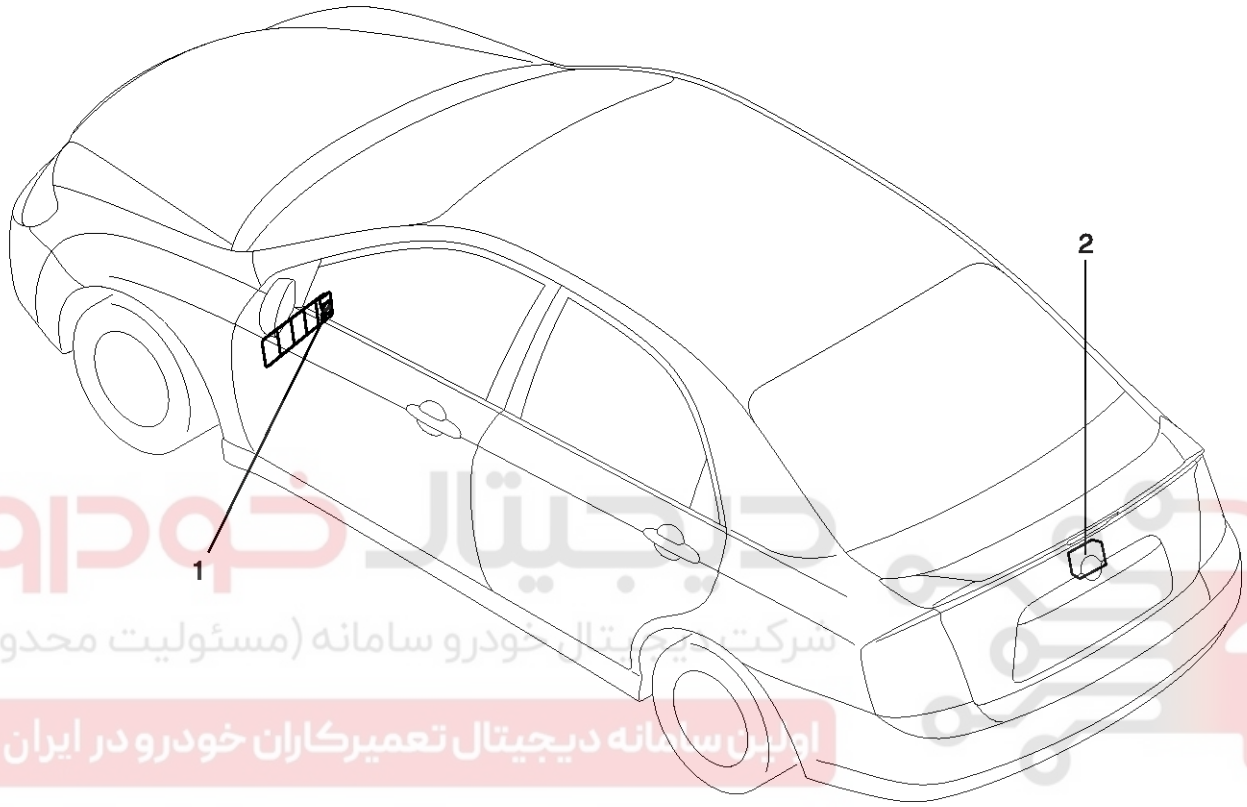
1) If the vehicle is on ALT "L" ON state, output HEAD LAMP LOW and TAIL RELAY.
2) If the TAIL Switch is ON, turn on the BACK LIGHT RELAY, and off the HEAD LAMP LOW output.



LTGE141R

Trunk lid

COMPONENTS



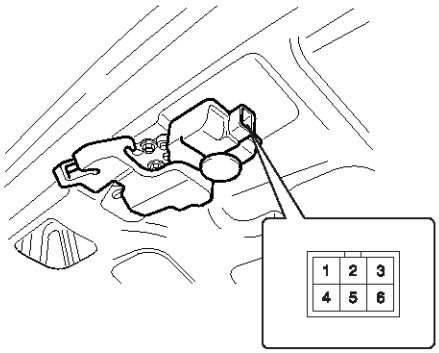
1. Trunk lid opener switch
2. Trunk lid release solenoid (4doors)

LTGE160A

Trunk Lid Release Actuator

INSPECTION

1. Check for continuity between terminal 2 and 3.
2. If there is no continuity, replace the trunk lid release solenoid.

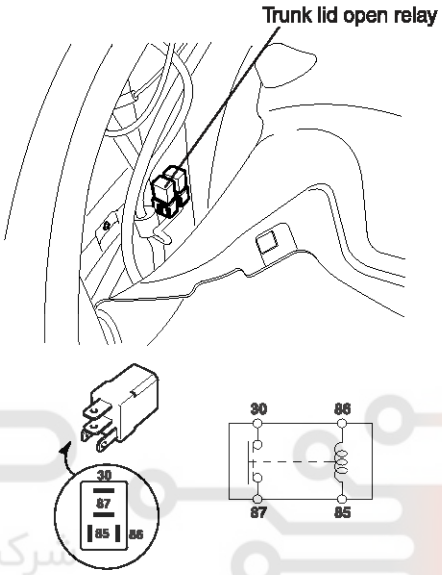


ATGE161A

TRUNK LID OPEN RELAY TEST

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



LTGE161B

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

LTGE221B

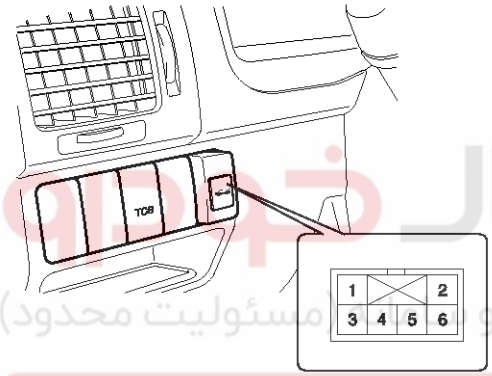
Trunk Lid Open Switch

INSPECTION

1. Check the switch for continuity between the terminals.
2. If the continuity is not as specified, replace the switch.

Terminal / Position	2	5	3	6
ON	○	○ (Illumination)	○	○
OFF				

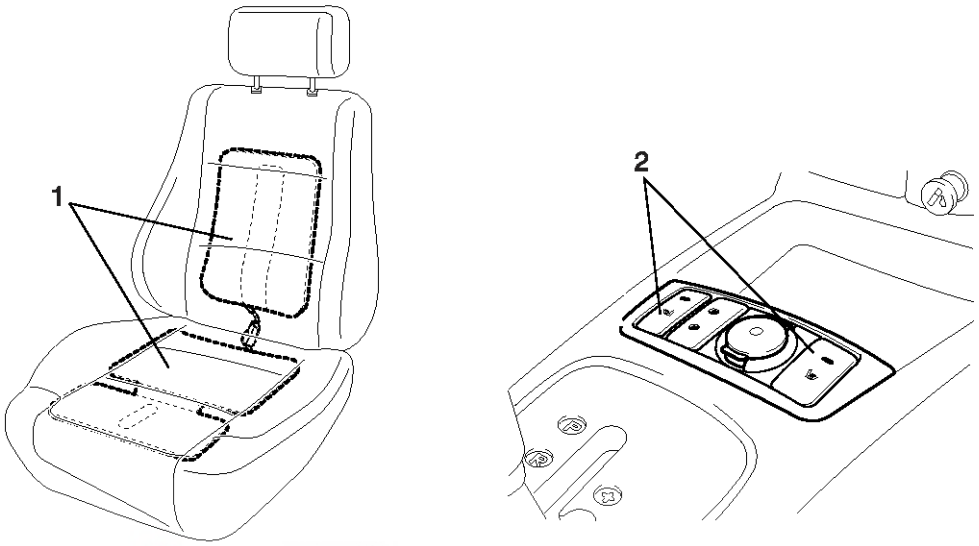
LTGE162A



ATGE162B

Seat Electrical

COMPONENTS



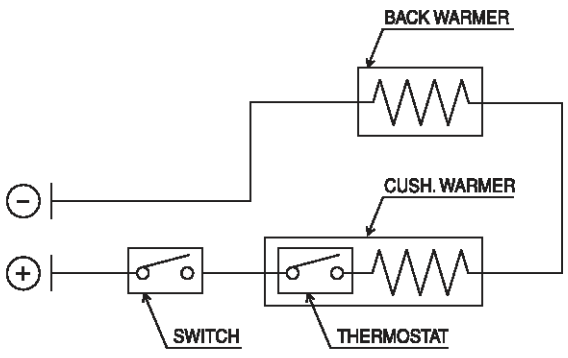
1. Seat warmer
2. Seat warmer switch

LTGE440A

SEAT WARMER INSPECTION

1. Check for continuity and measure the resistance between the terminals.

Standard value : 2.6Ω ± 10%



LTGE441C

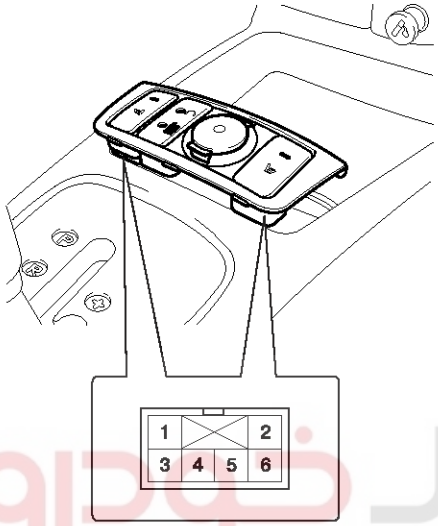
2. Operate the seat warmer after connecting the 2P connector, and then check for the thermostat by measuring the temperature of seat surface.
3. Check for continuity between the terminals after disconnecting the 2P connector.

Standard value :
28 ±3.5℃(Continuity),
37 ±3.0℃(Short)

Seat Heater Switch

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Carefully push out the seat warmer switch from behind the floor console upper cover, then disconnect the 6P connector from the switch.



ATGE441A

3. Check for continuity between the terminals in each switch position according to the table.

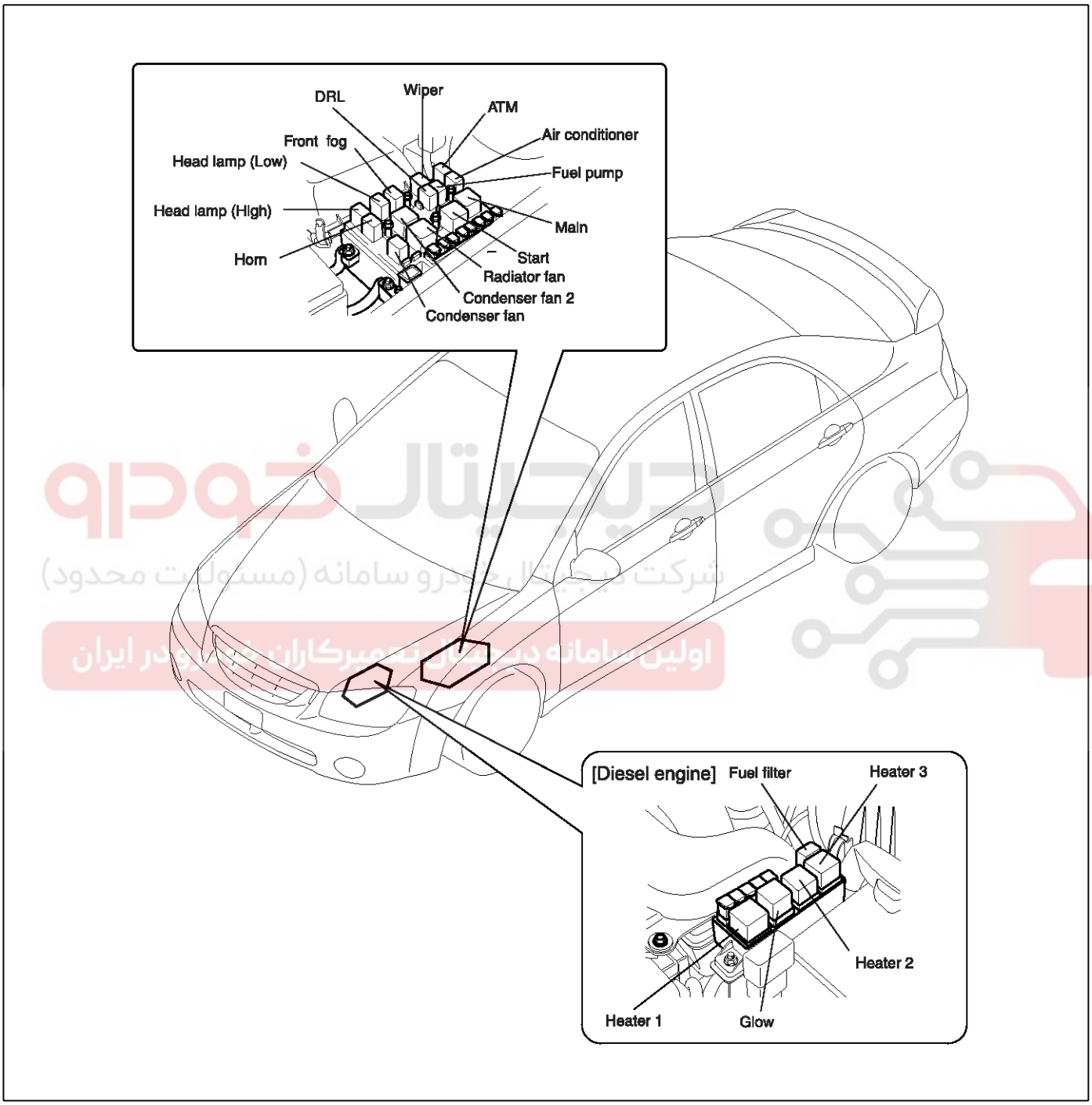
Position \ Terminal	2	5	1	4	3
ON		Illumination		IND.	
OFF					

LTGE441B

Fuses And Relays

Relay Box (Engine Compartment)

COMPONENTS



LTGE220A

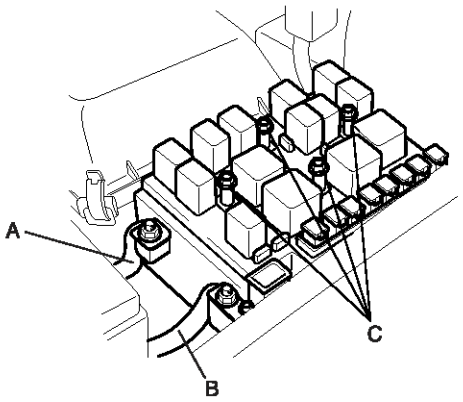
RELAY TYPE AND FUSE CAPACITY

Description	Title	Type & Capacity	Remark
Relays	MAIN	A TYPE	
	ATM	A TYPE	
	AIR CONDITIONER	A TYPE	
	WIPER	B TYPE	
	FUEL PUMP	A TYPE	
	SHUNT	A TYPE	
	START	A TYPE	
	FRONT FOG	A TYPE	
	HEAD LAMP - HIGH	A TYPE	
	HEAD LAMP - LOW	A TYPE	
	HORN	A TYPE	
	CONDENSER FAN	A TYPE	
	RADIATOR FAN	A TYPE	
	CONDENSER FAN 2	B TYPE	
	DRL	A TYPE	
	FUEL FILTER	C TYPE	Diesel box (Diesel engine)
	Heater 1 (PTC 1)	D TYPE	
	Heater 2 (PTC 2)	D TYPE	
	Heater 3 (PTC 3)	D TYPE	
	GLOW	D TYPE	

Description	Title	Type & Capacity	Remark
Fuses	DEICER	15A	
	ATM	20A	
	STOP LAMP	15A	
	AIR CONDITIONER	10A	
	FUEL PUMP	15A	
	ECU 1	10A	
	ECU 2	30A	
	INJECTION	15A	
	02 SENSOR	10A	
	TRUNK OPEN	10A	
	FRONT WIPER	15A	
	FRONT FOG	15A	
	REAR FOG	10A	
	MIRROR FOLD	10A	
	HORN	10A	
	HEAD LAMP - HIGH	15A	
	HEAD LAMP - LOW	15A	
	IG 1	30A	
	IG 2	30A	
	CONDENSER FAN	20A	
	ABS 1	30A	
	ABS 2	30A	
	BLOWER	30A	
	RADIATOR FAN	30A	
	IN PANEL B+	50A	
	ALTERNATER	120A (Gasoline), 140A (Diesel)	
	FUEL FILTER	30A	Diesel box (Diesel engine)
	Heater 1 (PTC 1)	40A	
	Heater 2 (PTC 2)	40A	
	Heater 3 (PTC 3)	40A	
	GLOW	60A	

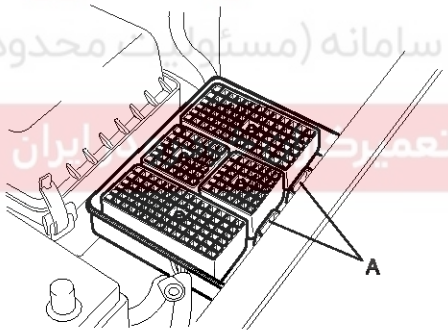
REMOVAL

1. Remove the relay box cover.
2. Remove the positive (+) battery terminal (A) and alternate L terminal (B).
3. Loosen the relay connectors mounting bolts (C).



ATGE221E

4. Remove the relay box after removing two connectors (A).



ATGE221F

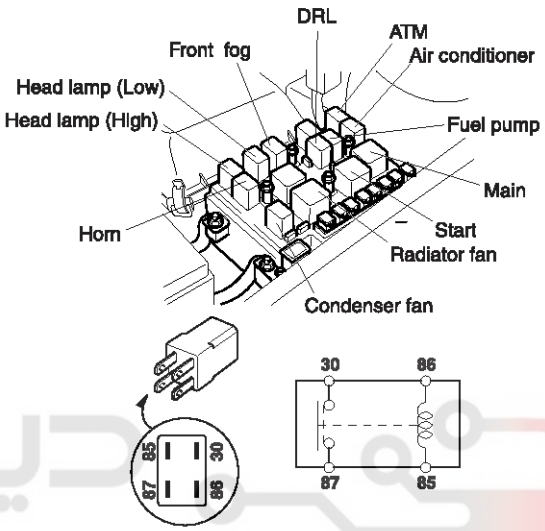
5. Installation is the reverse of removal.

INSPECTION

POWER RELAY TEST (TYPE A)

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



LTGE221A

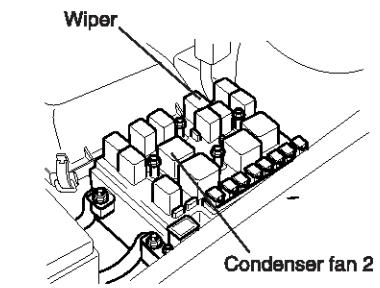
Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

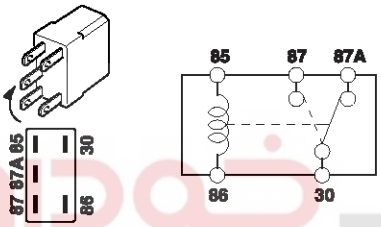
LTGE221B

POWER RELAY TEST (TYPE B)

Check continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be continuity between the No.30 and No.87A terminals when power is disconnected.





BTGE221C

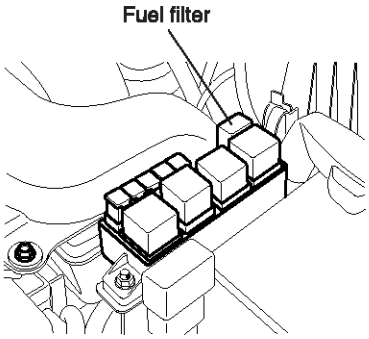
Terminal / Position	85	86	30	87	87A
Disconnected			○		○
Connected	⊖	⊕	○	○	

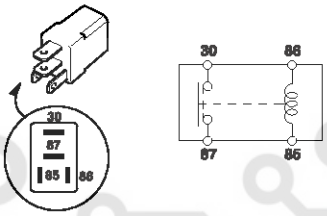
LTGE221D

POWER RELAY TEST (TYPE C)

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.





LTGE221G

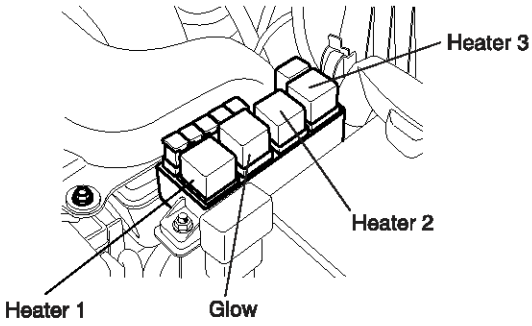
Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

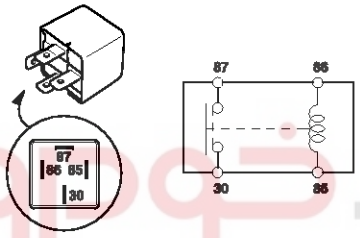
LTGE221B

POWER RELAY TEST (TYPE D)

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.





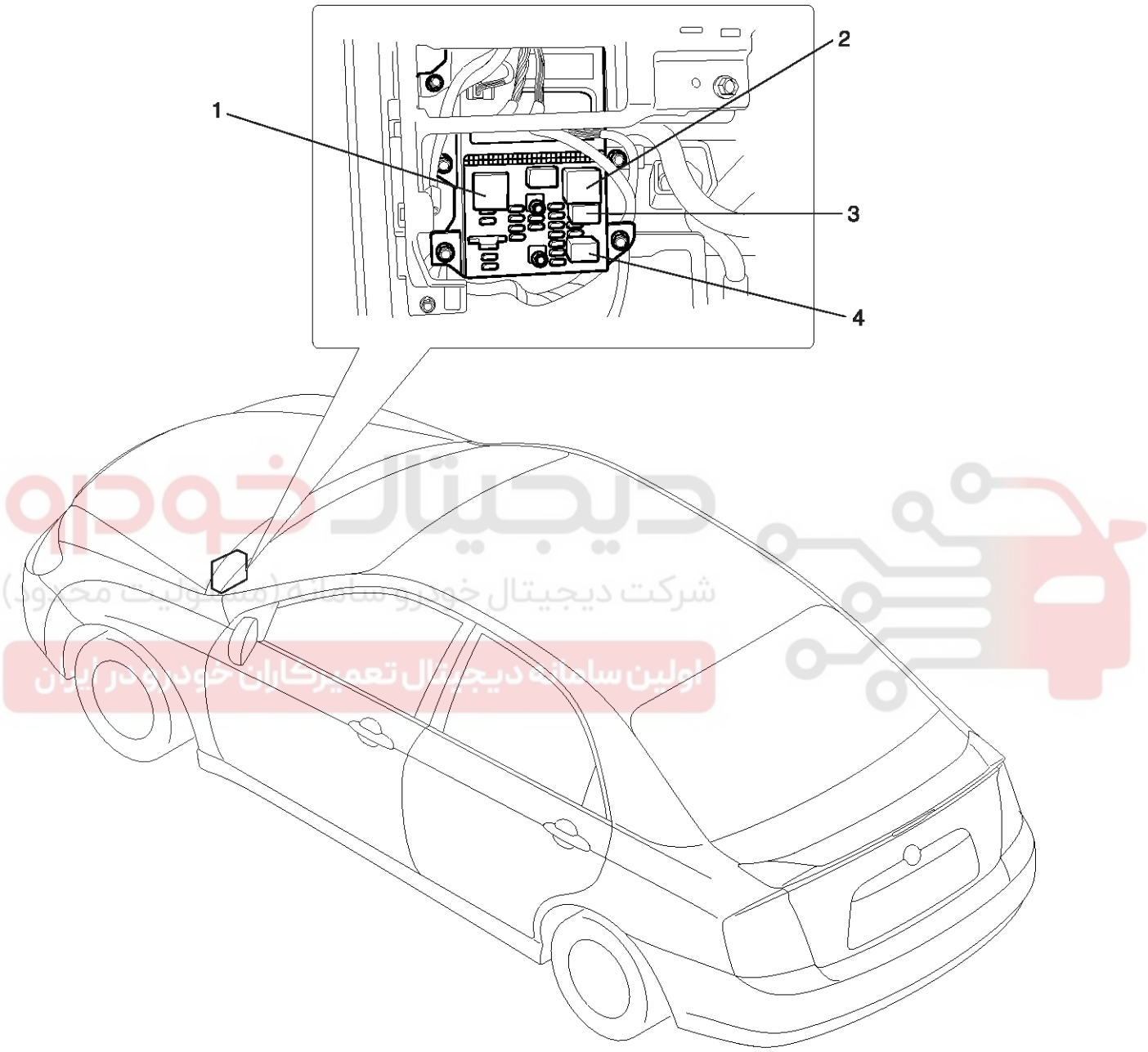
LTGE221H

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

LTGE221B

Relay Box (Passenger Compartment)

COMPONENTS



1. Rear window defogger relay
2. Power window relay
3. Accessory/power relay
4. Tail lamp relay

LTGE220B

RELAY TYPE AND FUSE CAPACITY

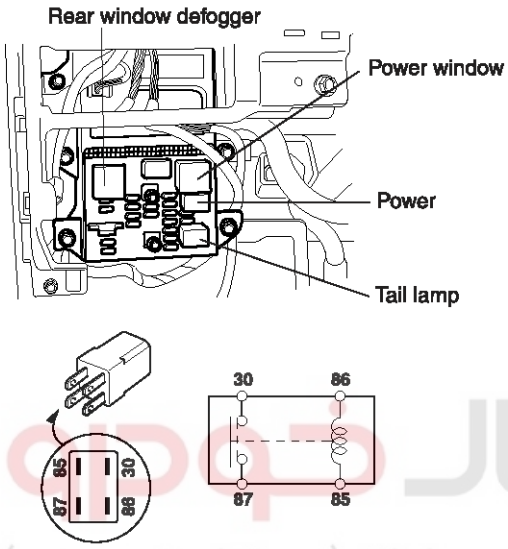
Description	Title	Type & Capacity
RELAYS	REAR WINDOW DEFOGGER	A TYPE
	POWER	A TYPE
	POWER WINDOW	A TYPE
	TAIL LAMP	A TYPE
FUSES	HAZARD LAMP	10A
	REMOTE KEYLESS ENTRY	10A
	ROOM LAMP	15A
	REAR WINDOW DEFOGGER	30A
	MIRROR HEATER	10A
	A/C	10A
	SEAT WARMER	20A
	REAR WIPER	15A
	IGNITION	10A
	START	10A
	DOOR LOCK	20A
	CIGAR LIGHTER	15A
	AUDIO	10A
	CLUSTER	10A
	AIR BAG	15A
	ABS	10A
	ECU	10A
	TURN SIGNAL LAMP	10A
	POWER	15A
	TAIL LAMP (LEFT)	10A
	TAIL LAMP (RIGHT)	10A
	POWER WINDOW (LEFT)	25A
	POWER WINDOW (RIGHT)	25A

INSPECTION

POWER RELAY TEST (TYPE A)

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



LTGE222A

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

LTGE221B

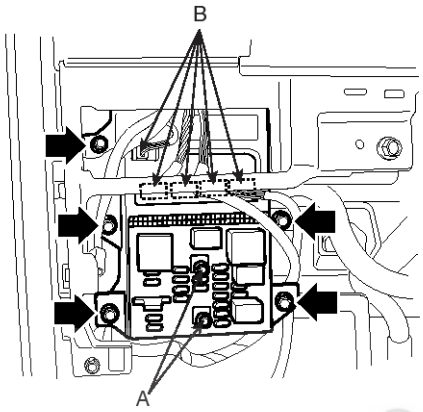
FUSE INSPECTION

1. Be sure there is no play in the fuse holders, and that the fuses are held securely.
2. Are the fuse capacities for each circuit correct?
3. Are there any blown fuses?

   If a fuse is to be replaced, be sure to use a new fuse of the same capacity. Always determine why the fuse blew first and completely eliminate the problem before installing a new fuse.

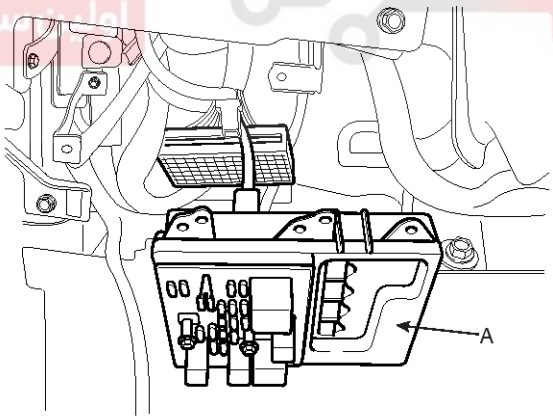
REPLACEMENT

1. The junction box integrated ETACS module. Refer to the replacement of ETACS.
2. Disconnect the negative (-) battery terminal.
3. Remove the driver's lower crash panel (Refer to the BD group).
4. Disconnect the ETACM connectors (B).
5. Loosen the connector mounting bolts (A)



ATGE140C

6. Loosen the mounting bolts.
7. Remove the ETACM (A) after disconnecting the connector.

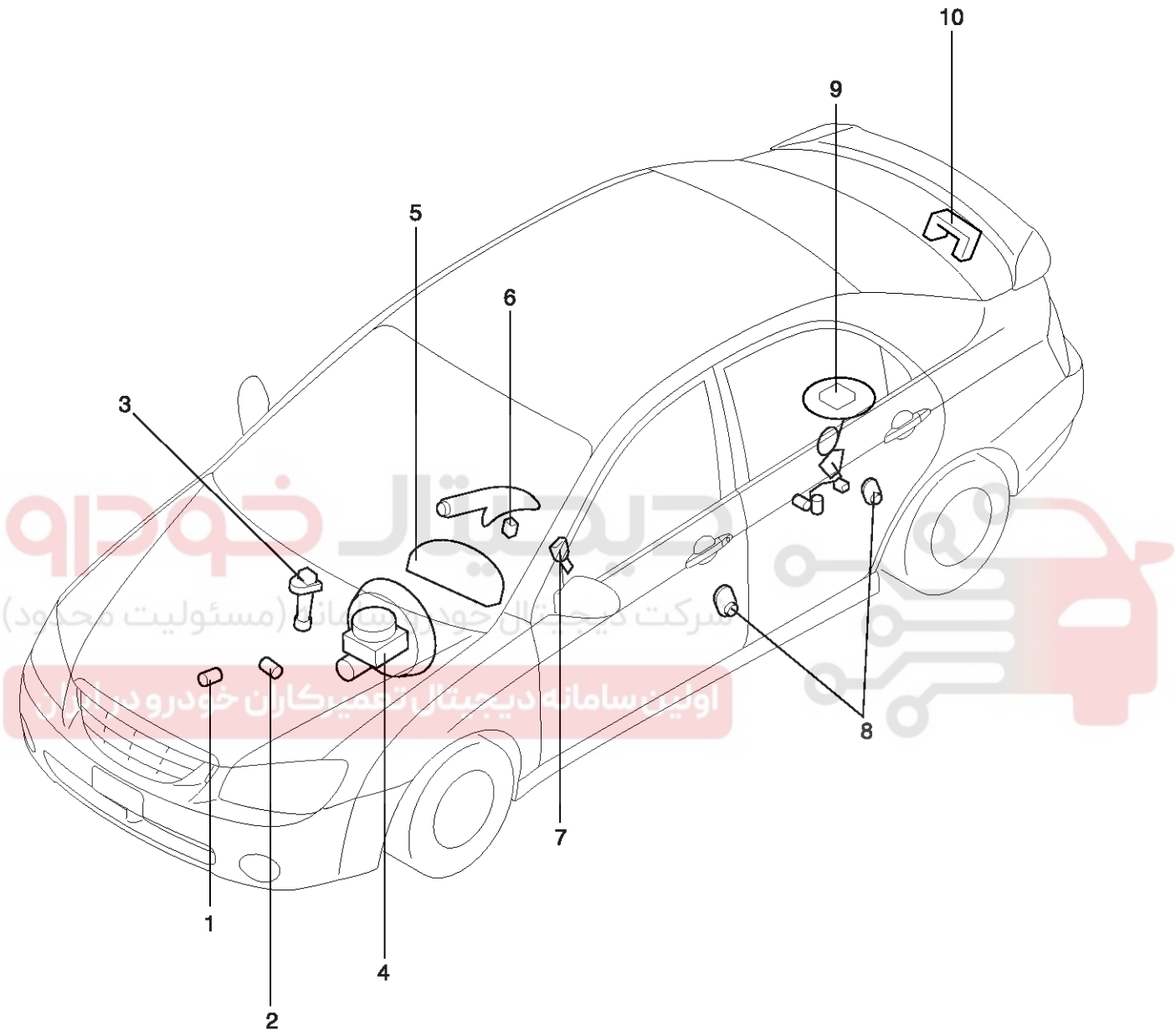


ATGE140D

8. Installation is the reverse of removal procedures.

Indicators And Gauges

COMPONENTS

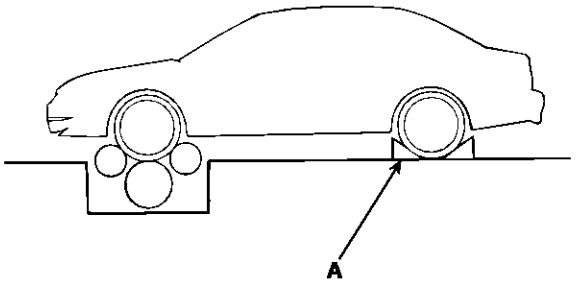


1. Engine coolant temperature sender
2. Oil pressure switch
3. Vehicle speed sensor
4. Brake fluid level warning switch
5. Cluster assembly
6. Parking brake switch
7. Seat belt switch
8. Door switch
9. Fuel gauge sender
10. Trunk lid switch (4 doors), Tailgate switch (5 doors)

LTGE260A

INSPECTION

SPEEDOMETER



ETKE100E

1. adjust the pressure of the tires to the specified level.
2. Drive the vehicle onto a speedometer tester. Use wheel chocks (A) as appropriate.
3. Check if the speedometer indicator range is within the standard values.

CAUTION

Do not operate the clutch suddenly or increase/ decrease speed rapidly while testing.

NOTICE

Tire wear and tire over or under inflation will increase the indication error.

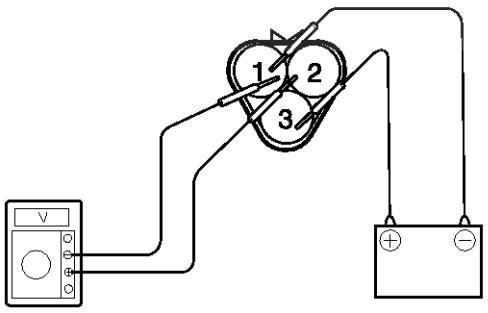
Velocity (km/h)	20	40	60	80	100	120	140	160	180	200	Remark
Toleran-ce (km/h)	+0 -12.6	+0 -7.3	+0 -5.9	+0 -5.2	+0 -5.0	+0 -5.0	+0 -5.0	+0 -5.0	+0 -5.0	+0 -5.0	CANAD-A

Velocity (MPH)	10	20	40	60	80	100	120	Remark
Tolerance (MPH)	+0 -13.6	+0 -8.8	+0 -5.7	+0 -5.0	+0 -5.0	+0 -5.0	+0 -5.0	U.S.A

VEHICLE SPEED SENSOR

1. Connect the positive (+) lead from battery to terminal 3 and negative (-) lead to terminal 1.
2. Connect the positive (+) lead from tester to terminal 2 and the negative (-) lead to terminal 1.
3. Rotate the shaft.
4. Check that there is voltage change from approx. 0V to 11V or more between terminals 1 and 2.
5. The voltage change should be 4 times for every revolution of the speed sensor shaft.

   If operation is not as specified, replace the sensor.



ETKD330A

TACHOMETER

1. Connect the scan tool to the diagnostic link connector or install a tachometer.
2. With the engine started, compare the readings of the tester with that of the tachometer. Replace the tachometer if the tolerance is exceeded.

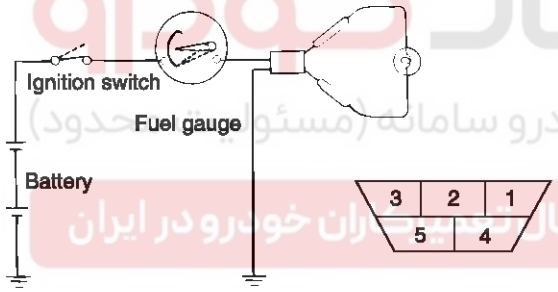
⚠CAUTION

1. **Reversing the connections of the tachometer will damage the transistor and diodes inside.**
2. **When removing or installing the tachometer, be careful not to drop it or subject it to severe shock.**

Revolution (RPM)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	Remark
Tolerance (RPM)	±100	±125	±150	±170	±200	±240	±260	Gasoline

FUEL GAUGE

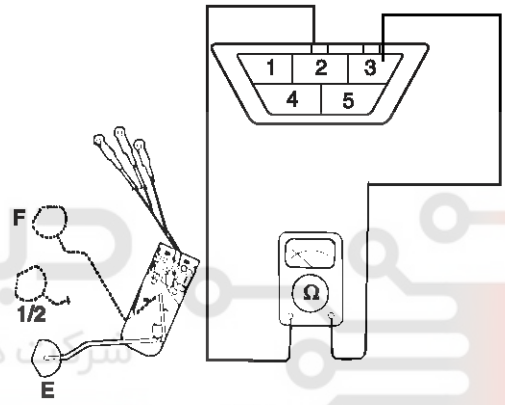
1. Disconnect the fuel sender connector from the fuel sender.
2. Connect a 3.4 wattages, 12V test bulb to terminals 2 and 3 on the wire harness side connector.
3. Turn the ignition switch to the ON, and then check that the bulb lights up and the fuel gauge needle moves to full.



LTGE262A

FUEL SENDER

1. Using an ohmmeter, measure the resistance between terminals 2 and 3 at each float level.



ATGE262B

2. Also check that the resistance changes smoothly when the float is moved from "E" to "F".

Position	Resistance (Ω)
Empty	200.0 ± 2
Warning lamp	170.0 ± 2
1/2	66.0 ± 1
Full	8.0 ± 1

3. If the height resistance is unsatisfied, replace the fuel sender as an assembly.

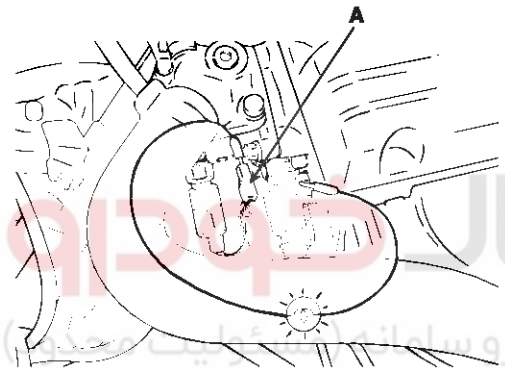
⚠CAUTION

After completing this test, wipe the sender dry and reinstall it in the fuel tank.

ENGINE COOLANT TEMPERATURE GAUGE

1. Disconnect the wiring connector (A) from the engine coolant temperature sender in the engine compartment.
2. Turn the ignition switch ON. Check that the gauge needle indicates cool. Turn the ignition switch OFF.
3. Connect a 12V, 3.4 wattages test bulb between the harness side connector and ground.
4. Turn the ignition switch ON.
5. Verify that the test bulb flashes and that the indicator moves to HOT.

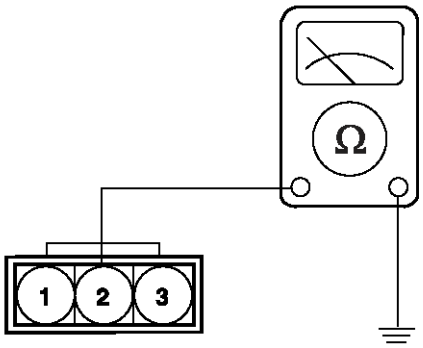
   If operation is not as specified, replace the engine coolant temperature gauge. Then recheck the system.



ETKE605D

ENGINE COOLANT TEMPERATURE SENSOR

1. Using an ohmmeter, measure the resistance between the terminal 2 and ground.



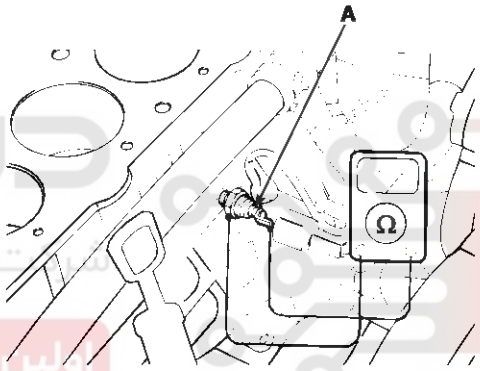
ETKE110I

2. If the resistance value is not as shown in the table, replace the temperature sender.

Temperature [°F(℃)]	140 (60)	185 (85)	230 (110)	257 (125)
Gauge angle (°)	-43±2.4	-7±2.4	-7±2.4	4.0±2.4
Resistance (Ω)	128	53.8	25.8	17.1

OIL PRESSURE SWITCH

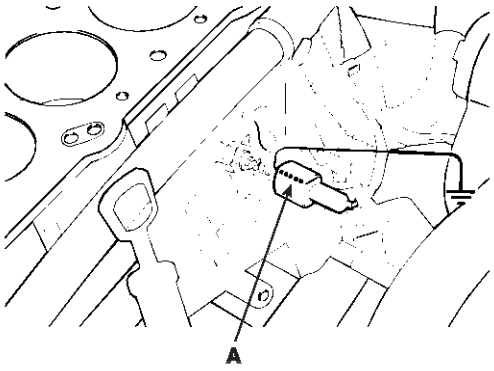
1. Check that there is continuity between the oil press switch terminal (A) and ground with the engine off.
2. Check that there is no continuity between the terminal and ground with the engine running.
3. If operation is not as specified, replace the switch.



ETKE060K

OIL PRESSURE WARNING LAMP

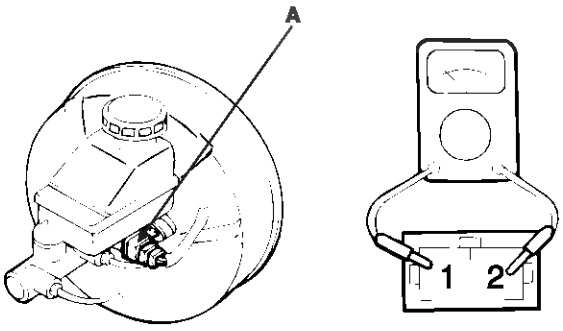
1. Disconnect the connector (A) from the warning switch and ground the terminal on the wire harness side connector.
2. Turn the ignition switch ON. Check that the warning lamp lights up. If the warning lamp doesn't light, test the bulb or inspect the wire harness.



ETKE060L

BRAKE FLUID LEVEL WARNING SWITCH

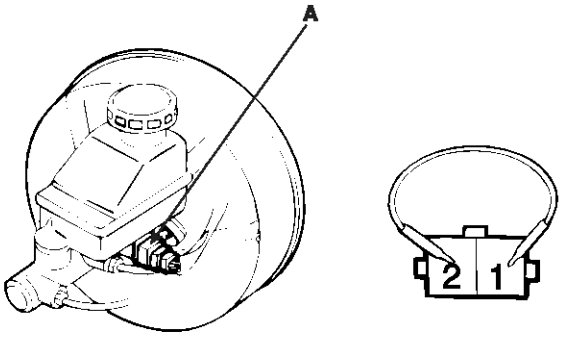
1. Remove the connector (A) from the switch located at the brake fluid reservoir.
2. Verify that continuity exists between switch terminals 1 and 2 while pressing the switch (float) down with a rod.



ETKE060M

BRAKE FLUID LEVEL WARNING LAMP

1. Start the engine.
2. Release the parking brake.
3. Remove the connector from the brake fluid level warning switch (A).
4. Ground the connector at the harness side.
5. Verify that the warning lamp lights.



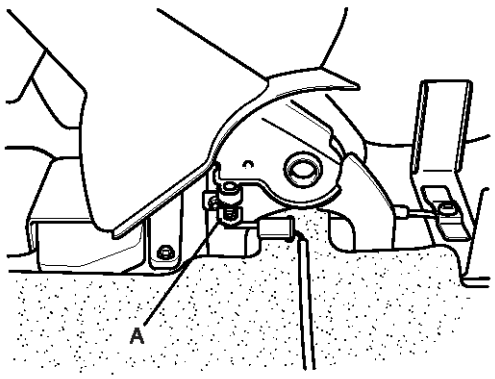
ETKE060N

PARKING BRAKE SWITCH

The parking brake switch (A) is a push type located under the parking brake lever. To adjust, move the switch mount up and down with the parking brake lever released all the way.

1. Check that there is continuity between the terminal and switch body with the switch ON (Lever is pulled).
2. Check that there is no continuity between the terminal and switch body with the switch OFF (Lever is released).

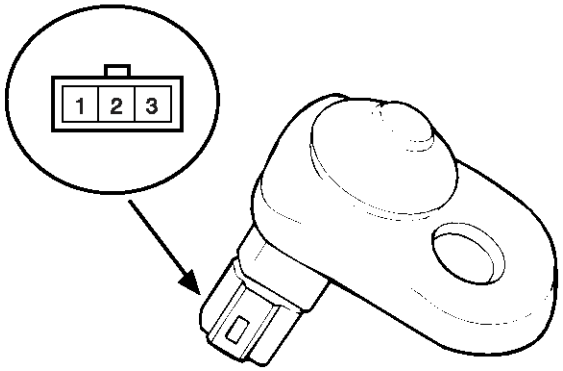
   If continuity is not as specified, replace the switch or inspect its ground connection.



LTGE038B

DOOR SWITCH

Remove the door switch and check for continuity between the terminals.



KTKD020A

[FRONT DOOR SWITCH]

Terminal / Position	1	2	3 (Ground)
Free(Door open)	○	○	○
Push(Door close)			

ETKE021A

[REAR DOOR SWITCH]

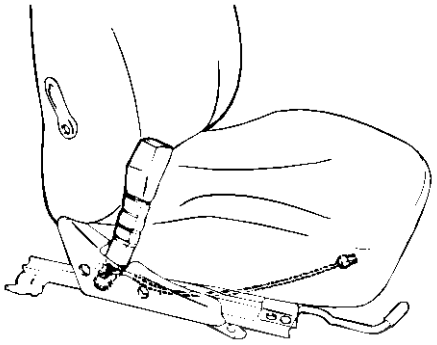
Terminal / Position	2	3 (Ground)
Free(Door open)	○	○
Push(Door close)		

ETKE021B

SEAT BELT SWITCH

1. Remove the connector from the switch.
2. Check for continuity between terminals.

Seat belt condition	Continuity
Fastened	Non-conductive (∞Ω)
Not fastened	Conductive (Ω)



V5BE060Q

SEAT BELT WARNING LAMP

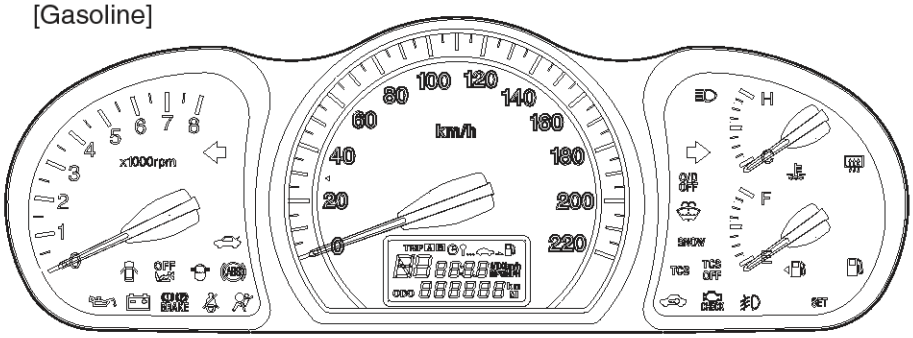
With the ignition switch turned ON, verify that the lamp glows

Seat belt condition	Warning lamp
Fastened	OFF
Not fastened	ON

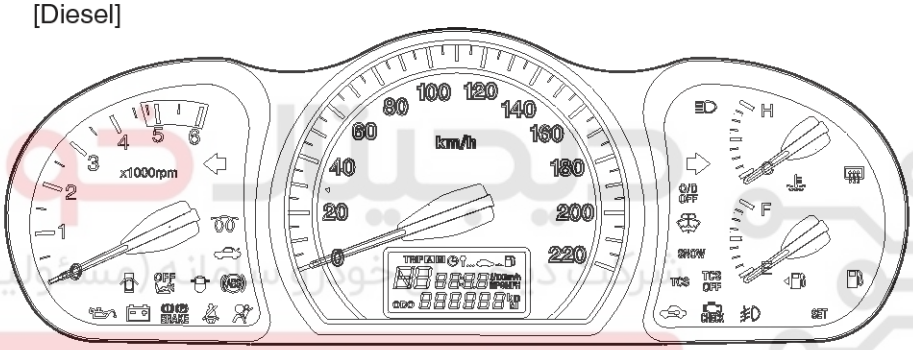
Instrument Cluster

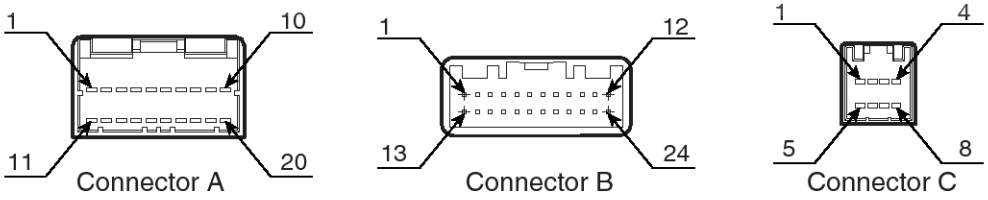
COMPONENTS

[Gasoline]



[Diesel]



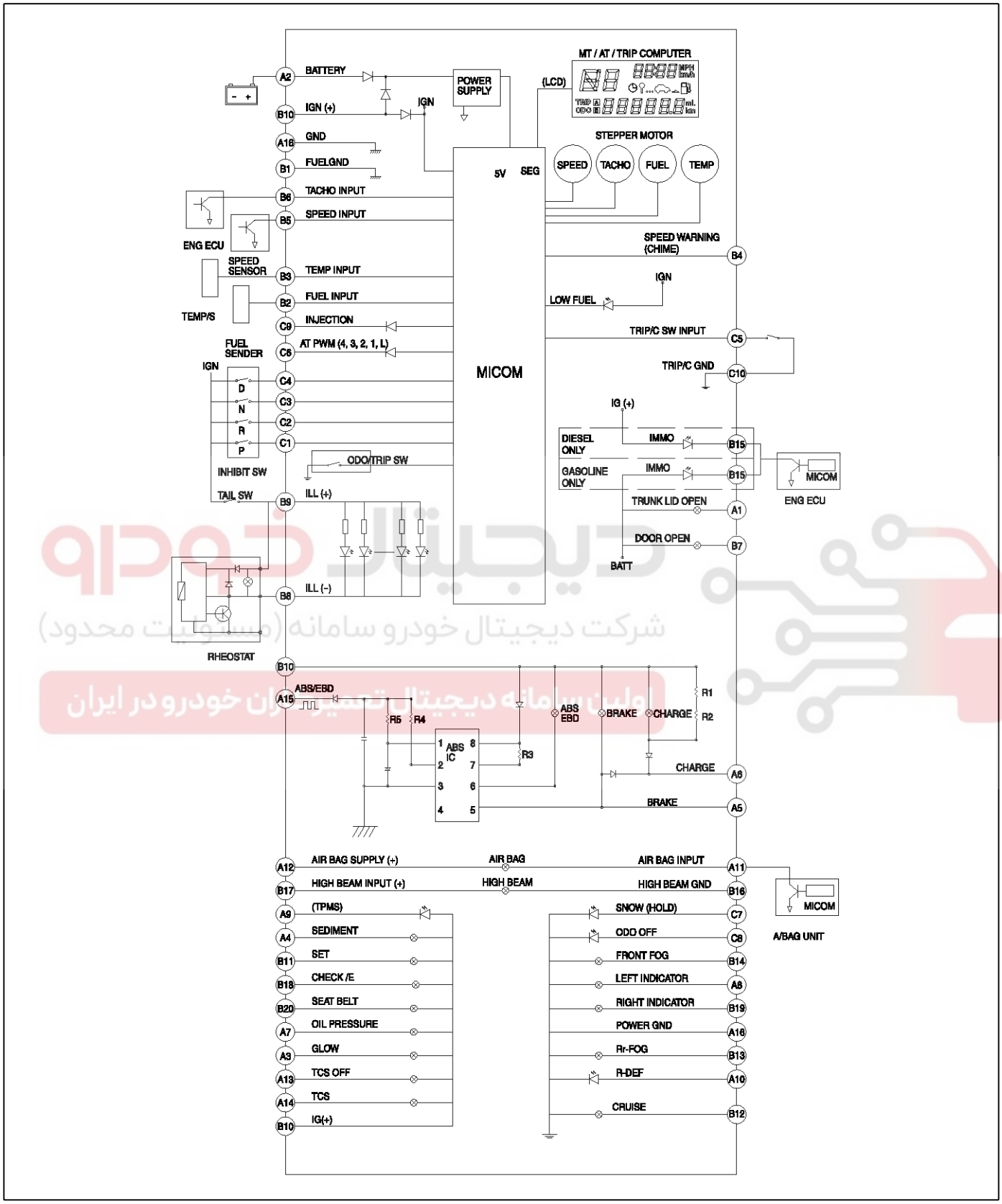


SLDBE7221L

CONNECTOR PIN INFORMATION

NO.	Connector A	Connector B	Connector C
1	Turn left	Passenger air bag OFF(+)	P
2	-	Turn right	R
3	-	Temp. Input	N
4	Passenger air bag OFF(-)	Fuel GND	D
5	Tachometer Input	Washer	PWM signal
6	ILL(-)	Immobilizer	O/D OFF
7	ILL(+)	TCS	SNOW
8	Oil pressure	TCS OFF	-
9	Water seperator	Rear Defogger	
10	IG+	4P OUT	
11	Air Bag +	Injection Signal	
12	Air Bag -	GND	
13	ABS/EBD	-	
14	Charge	Fuel Input	
15	B(+)	Trip Comp. GND	
16	Trunk Lid Open	Engine check	
17	Door	Front Fog	
18	GND(P)	Head lamp (H/Beam) -	
19	Brake	Head lamp (H/Beam) +	
20	Seat belt	-	
21		SET	
22		Trip Comp. SW	
23		Chime	
24		Speed Input	

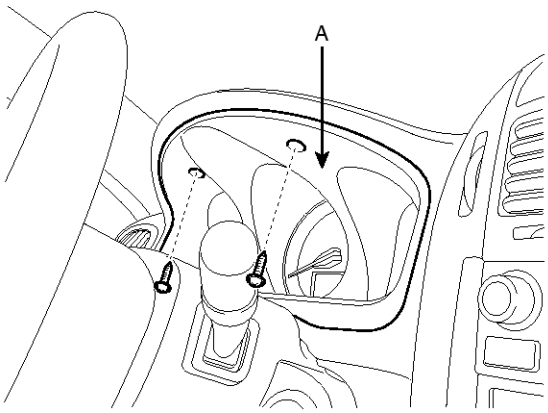
CIRCUIT DIAGRAM



LTGE260C

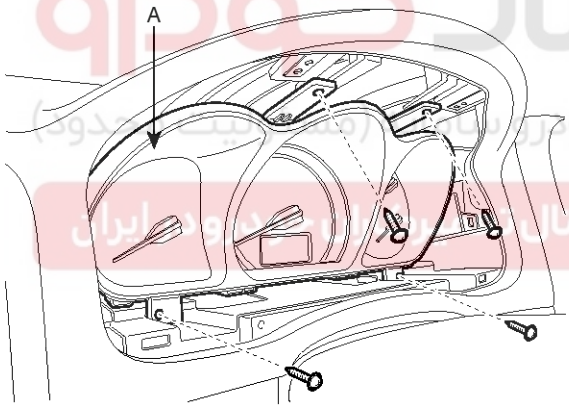
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the cluster facia panel (A) after loosening 2 screws.



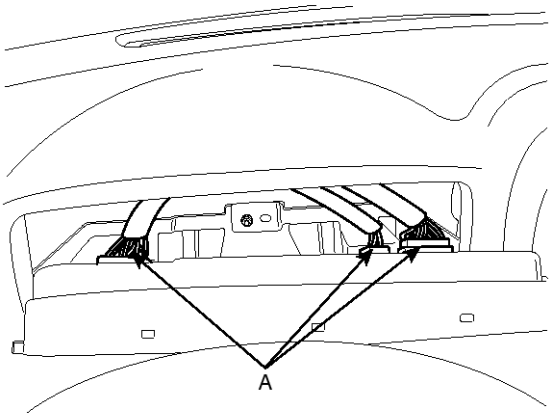
SLDBE6222D

3. Pull out the cluster (A) from the housing after removing 4 screws.



SLDBE6223D

4. Disconnect the cluster connecters (A) and then remove the cluster.



SLDBE6224D

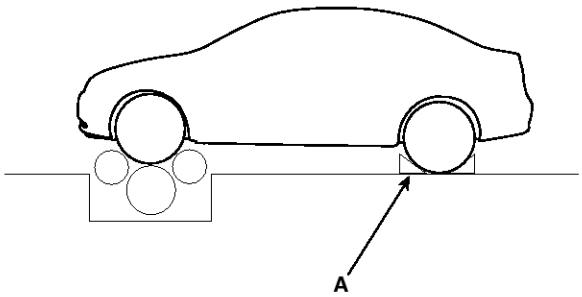
INSTALLATION

1. Connect the cluster connector.
2. Install the cluster assembly.
3. Install the cluster facia panel.

Speedometer

INSPECTION

1. Adjust the pressure of the tires to the specified level.
2. Drive the vehicle onto a speedometer tester. Use wheel chocks(A) as appropriate.



SHDBE6204L

3. Check if the speedometer indicator range is within the standard values.

⚠CAUTION

Do not operate the clutch suddenly or increase/ decrease speed rapidly while testing.

NOTICE

Tire wear and tire over or under inflation will increase the indication error.

[km/h]

Velocity(km/h)	20	40	60	80	100	120
Tolerance (km/h)	+4.0 +1.0	+5.5 +1.5	+7.0 +3.0	+9.0 +4.0	+10.0 +5.0	+12.0 +6.0
Velocity(km/h)	140	160	180	200	220	-
Tolerance (km/h)	+14.0 +7.0	+16.0 +8.5	+17.0 +9.0	+18.0 +9.5	+19.0 +10.0	-

[MPH]

Velocity (MPH)	10	20	40	60
Tolerance (MPH)	+2.5 +0.2	+3.2 +0.8	+4.5 +1.5	+5.7 +2.0
Velocity (MPH)	80	100	120	140
Tolerance (MPH)	+7.0 +3.0	+8.0 +4.0	+9.5 +5.0	+10.5 +6.0

TACHOMETER

1. Connect the scan tool to the diagnostic link connector or install a tachometer.
2. With the engine started, compare the readings of the tester with that of the tachometer. Replace the tachometer if the tolerance is exceeded.

⚠CAUTION

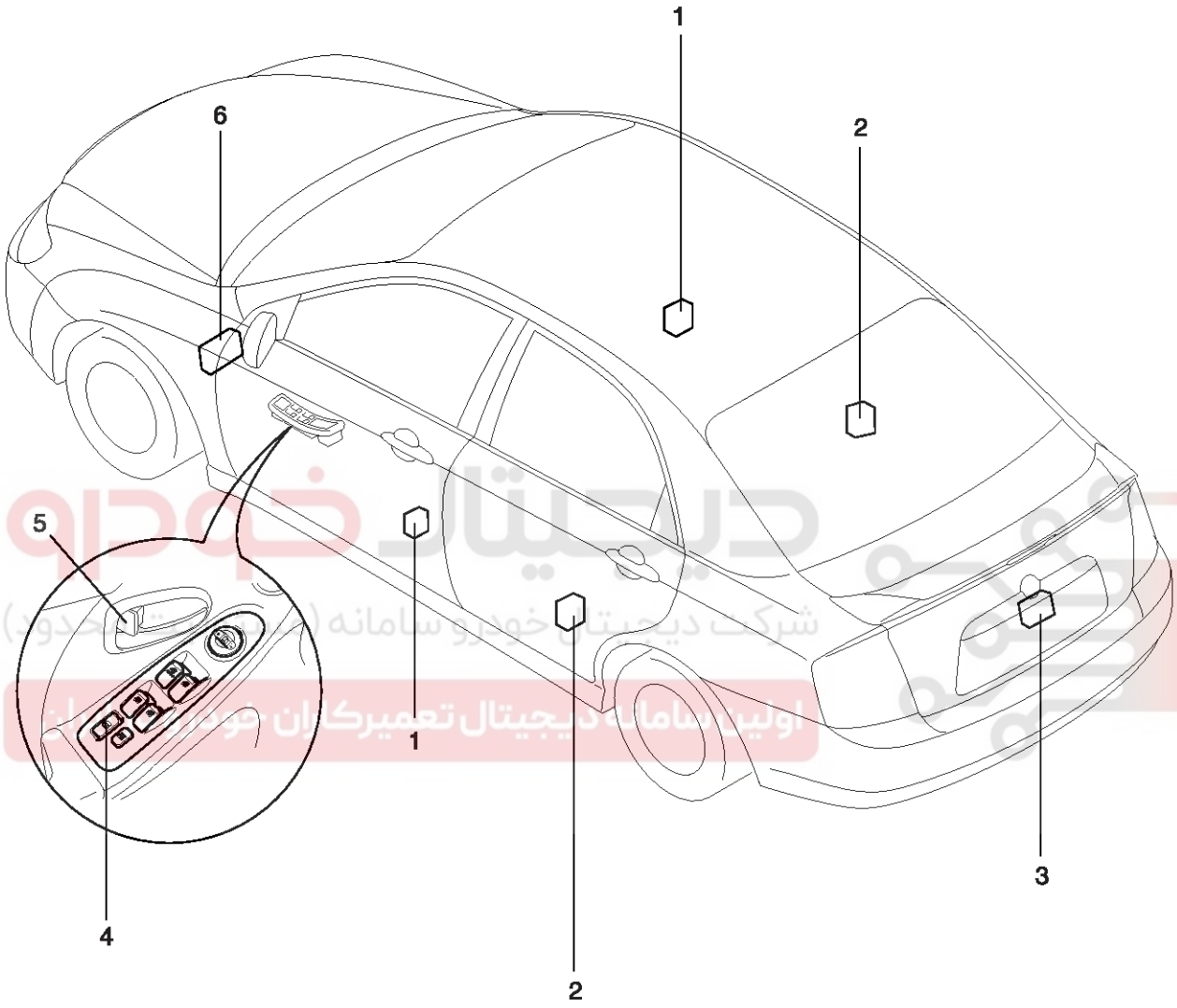
a. Reversing the connections of the tachometer will damage the transistor and diodes inside.

b. When removing or installing the tachometer, be careful not to drop it or subject it to severe shock.

Revolution (rpm)	1,000	2,000	3,000	4,000	Remark
Tolerance (rpm)	±100	±125	±150	±170	Gasoline
Tolerance (rpm)	±100	±125	±150	±170	Diesel
Revolution (rpm)	5,000	6,000	7,000	-	Remark
Tolerance (rpm)	±200	±240	±260	-	Gasoline
Tolerance (rpm)	±200	-	-	-	Diesel

Power Door Locks

COMPONENTS



1. Front door lock actuator & switch
2. Rear door lock actuator & switch
3. Tailgate lock actuator & switch (5 doors)
4. Door lock switch
5. Door lock knob
6. ETACS module

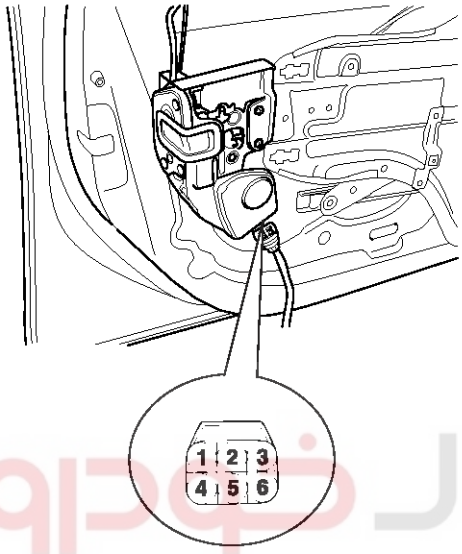
LTGE280A

Power Door Lock Actuators

INSPECTION

FRONT DOOR LOCK ACTUATOR INSPECTION

1. Remove the front door trim panel. (Refer to the BD group - front door)
2. Disconnect the 6P connector from the actuator.



KTKD047A

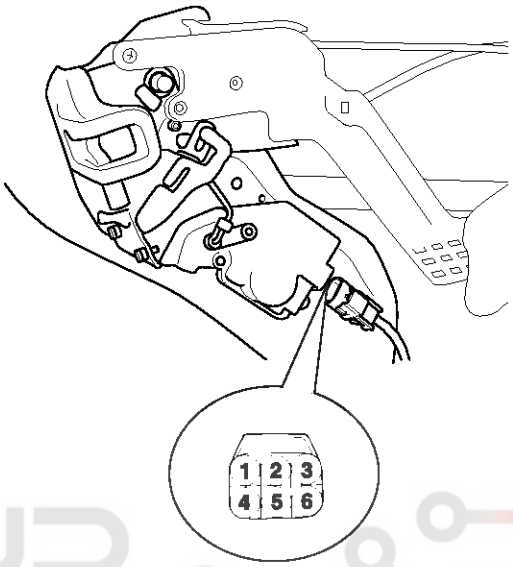
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal		4	6
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Front right	Lock	⊖	⊕
	Unlock	⊕	⊖

LTGE282A

REAR DOOR LOCK ACTUATOR INSPECTION

1. Remove the rear door trim panel. (Refer to the BD group - rear door)
2. Disconnect the 6P connector from the actuator.



KTKD048A

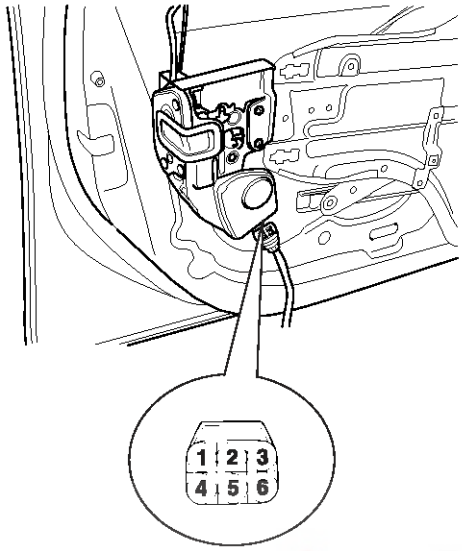
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal		1	4
Rear	Lock	⊕	⊖
	Unlock	⊖	⊕

LTGE282B

FRONT DOOR LOCK SWITCH INSPECTION

1. Remove the front door trim panel. (Refer to the BD group - front door)
2. Disconnect the 6P connector from the actuator.



KTKD047A

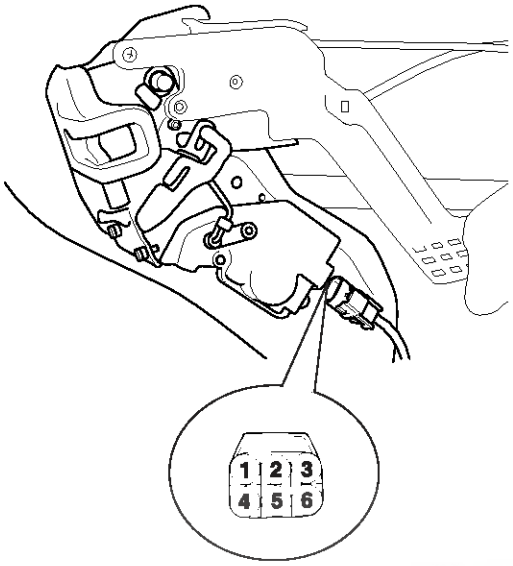
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		1	2	3
Front left	Lock			
	Unlock		○——	——○
Front right	Lock			
	Unlock	○——	——○	

BTGE282C

REAR DOOR LOCK SWITCH INSPECTION

1. Remove the rear door trim panel. (Refer to the BD group - rear door).
2. Disconnect the 6P connector from the actuator.



KTKD048A

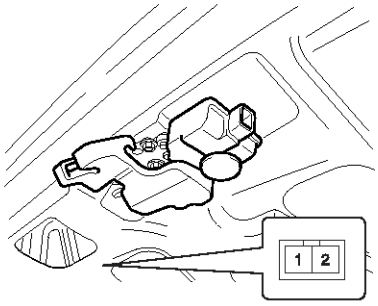
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		2	3	6
Rear left	Lock			
	Unlock		○——	——○
Rear right	Lock			
	Unlock		○——	——○

BTGE282D

TRUNK LID UNLOCK SWITCH INSPECTION

1. Remove the trunk lid trim panel (Refer to the BD group - Trunk lid).
2. Disconnect the 2P connector.



LTGE161A

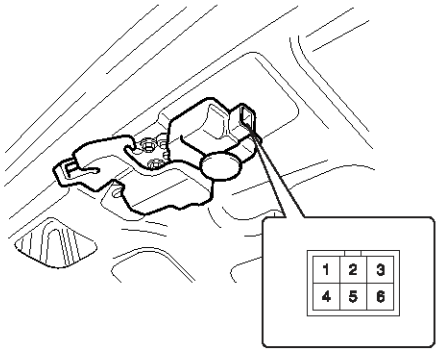
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2
Unlock	○	○
Lock		

LTGE282L

TRUNK LID ACTUATOR INSPECTION

1. Remove the trunk lid trim panel (Refer to the BD group - Trunk lid).
2. Disconnect the 6P connector from the actuator.



ATGE161A

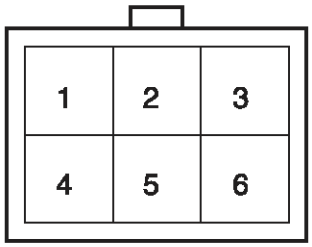
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal	2	3
Trunk lid open	○	○

LTGE282J

TAILGATE LOCK ACTUATOR INSPECTION (5 DOORS)

1. Remove the tailgate trim panel.
2. Disconnect the 6P connector from the actuator.



ATGE282E

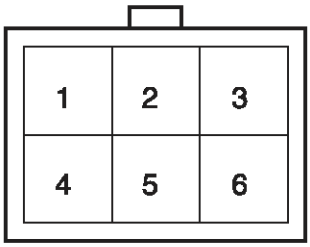
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal	1	2
LOCK→UNLOCK	⊕	⊖
UNLOCK→LOCK	⊖	⊕

LTGE282F

TAILGATE LOCK SWITCH INPSECTION (5 DOORS)

1. Remove the tailgate trim panel.
2. Disconnect the 6P connector from the actuator.



ATGE282E

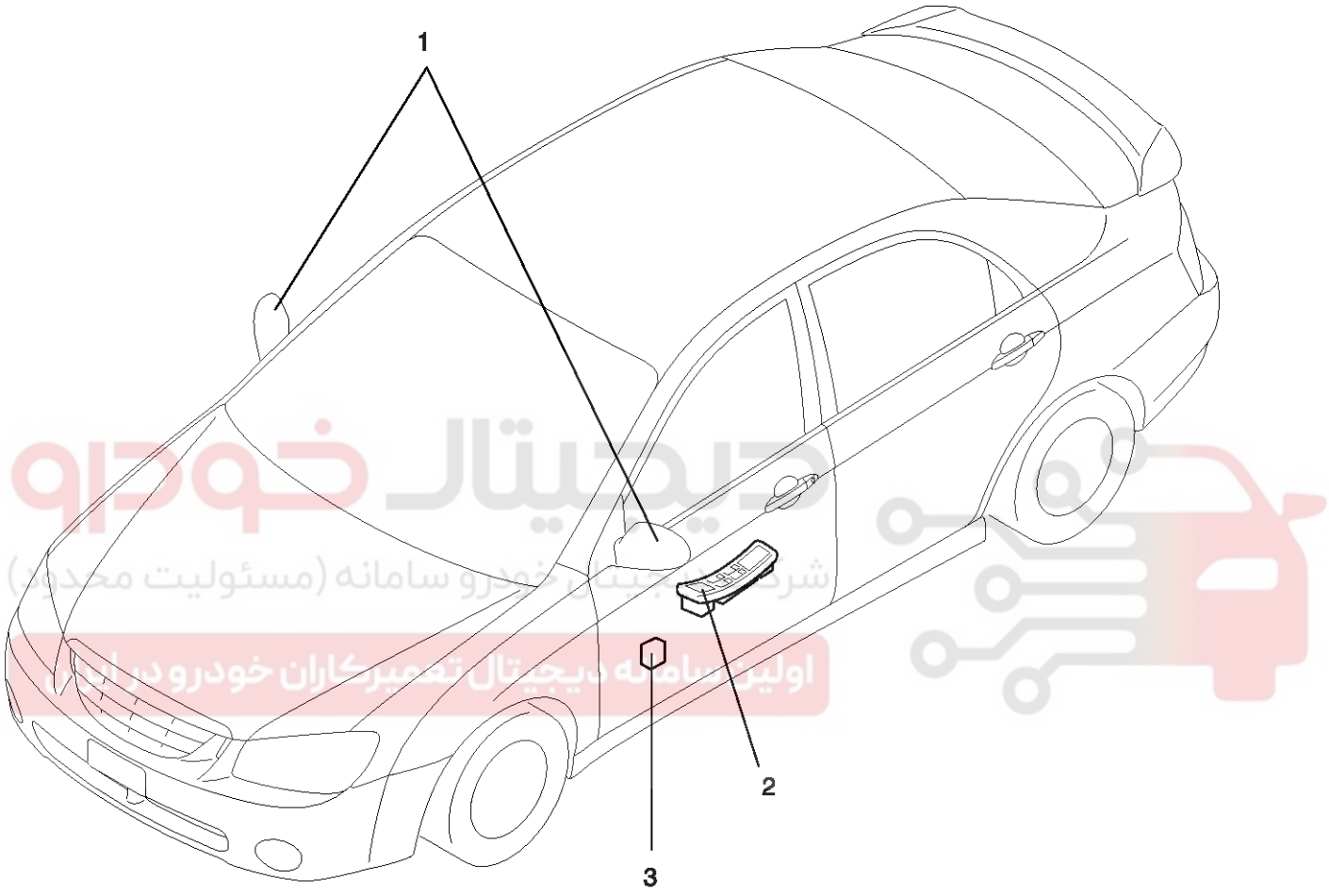
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	4	5	6
Lock		○	○
Unlock	○		○

LTGE282H

Power Door Mirrors

COMPONENTS

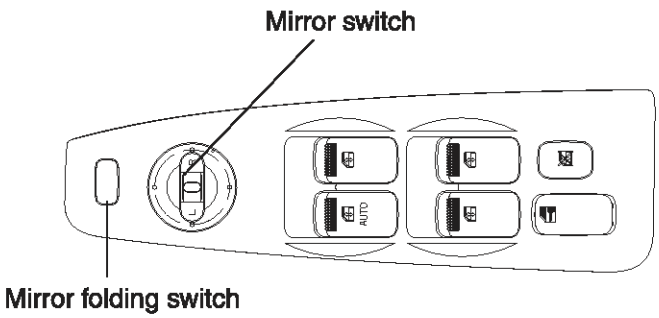


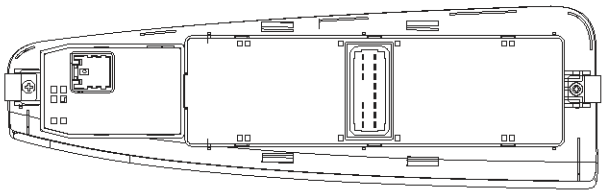
1. Power door mirror
2. Power door mirror switch
3. Mirror folding control module

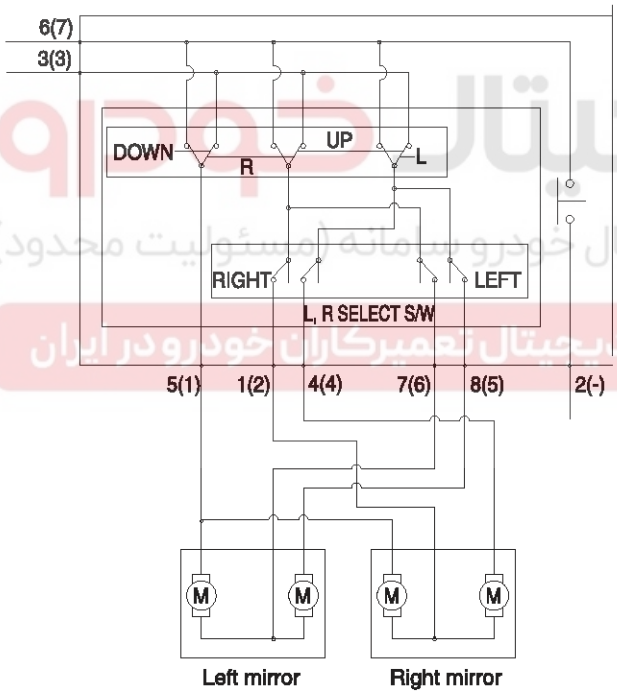
BTGE300A

Power Out Side Mirror Switch

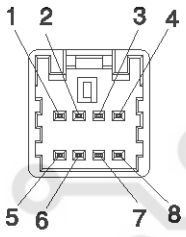
CIRCUIT DIAGRAM



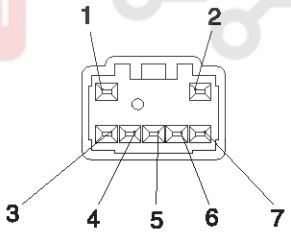




Mirror & Folding switch (Mirror switch)



<Mirror & Folding switch>

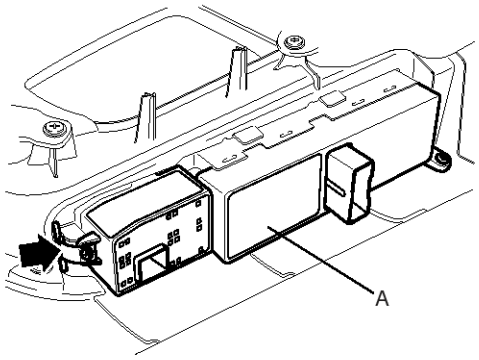


<Mirror switch>

BTGE301A

REMOVAL

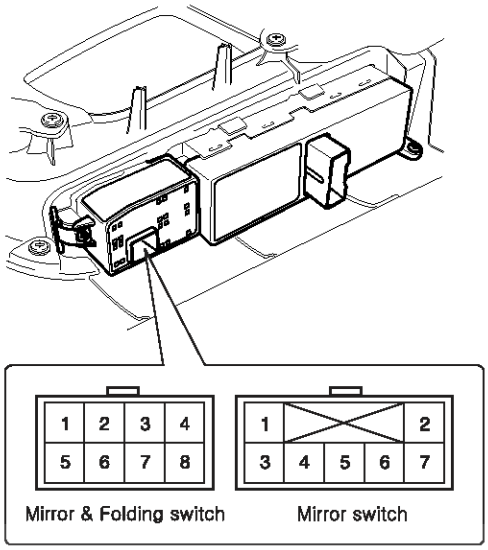
1. Remove the front door trim panel. (Refer to the BD group-front door)
2. Remove the power window main switch (A) by pushing the mounting clip of the power window main switch.



ATGE301B

INSPECTION

1. Remove the power door mirror switch from the door trim panel.



BTGE301C

2. Check for continuity between the terminals in each switch position according to the table.

Class	Terminal / Direction	1	2	3	4	5	6	7
Left	UP	○		○		○	○	○
	DOWN	○		○		○	○	○
	OFF	○		○		○	○	
	LEFT	○		○		○	○	○
	RIGHT	○		○		○	○	○
Right	UP	○	○	○	○			○
	DOWN	○	○	○	○			○
	OFF	○	○	○	○			
	LEFT	○	○	○	○			○
	RIGHT	○	○	○	○			○

<Mirror switch>

BTGE301E

Class	Terminal / Direction	1	3	4	5	6	7	8
Left	UP		○		○	○	○	○
	DOWN		○		○	○	○	○
	OFF				○	○	○	○
	LEFT		○		○	○	○	
	RIGHT		○		○	○	○	○
Right	UP	○	○	○	○	○		
	DOWN	○	○	○		○		
	OFF	○		○	○	○		
	LEFT	○	○		○	○		
	RIGHT	○	○	○	○			

<Mirror & Folding switch>

BTGE301D

Mirror folding switch inspection

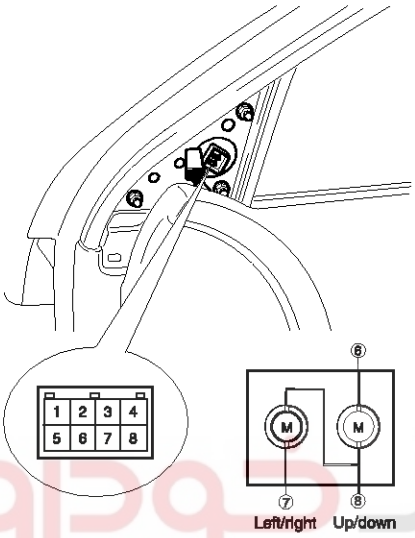
Position / Terminal	2	6
ON(PUSH)	○	○
OFF(FREE)		

ETKE053B

Power Door Mirror Actuator

INSPECTION

1. Disconnect the power door mirror connector from the harness.
2. Apply battery voltage to each terminal as shown in the table and verify that the mirror operates properly.

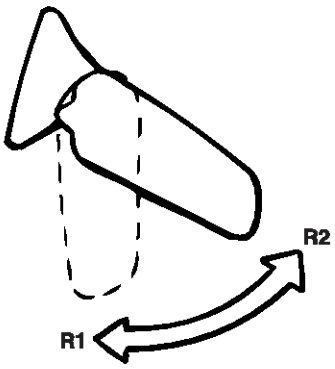


LTGE301F

Position \ Terminal	6	7	8
UP	⊖	⊕	⊕
DOWN	⊕	⊖	⊖
OFF	⊕	⊕	⊕
LEFT	⊖	⊕	⊖
RIGHT	⊕	⊖	⊕

ETKE195B

Mirror folding inspection



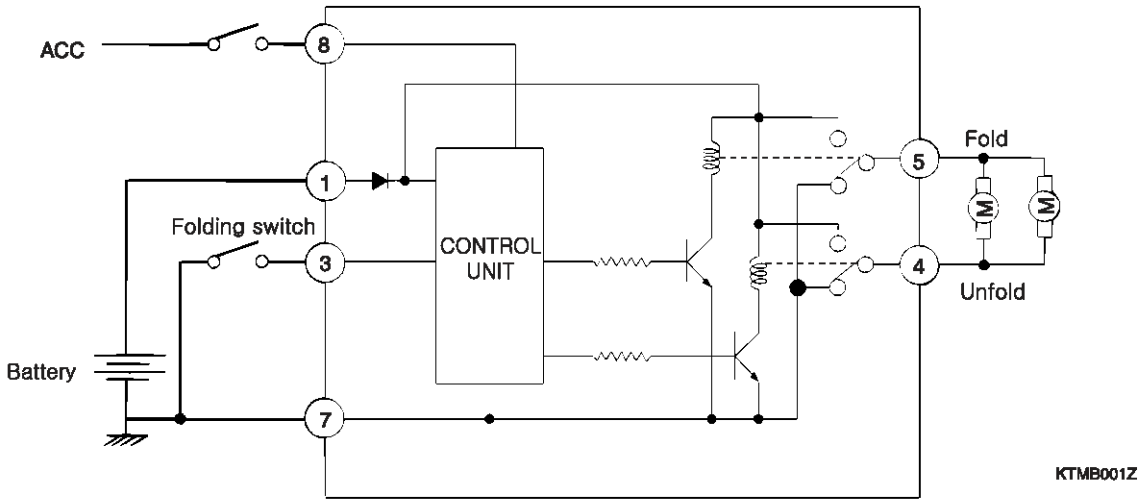
ETJA055B

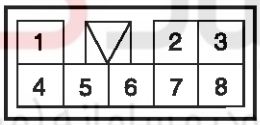
Direction \ Terminal	3	4
R1	⊖ — M —	— M — ⊕
R2	⊕ — M —	— M — ⊖

ETKE055A

Door Mirror Folding Control Unit

CIRCUIT DIAGRAM





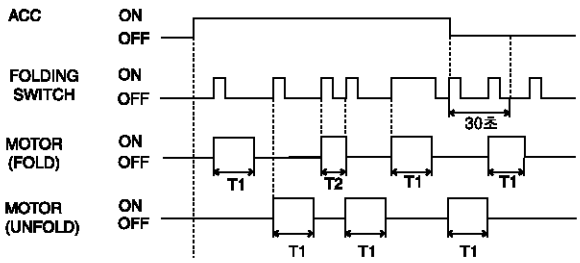
PIN CONNECTION

Pin No.	Description
1	B+
2	-
3	Folding switch
4	Unfold
5	Fold
6	-
7	Ground
8	ACC+

ETKE099A

INSPECTION

1. While operating the folding mirror switch, check if the operations are normal as shown in the timing chart.

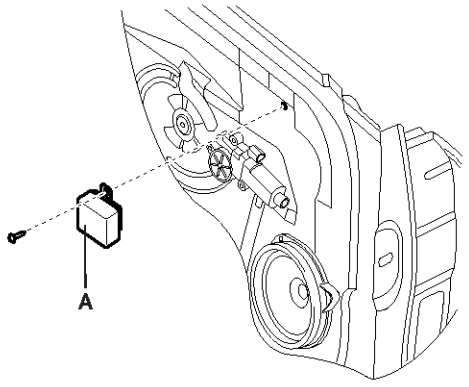


LTGE304B

T1 : 16 ± 6 sec,

T1 > T2

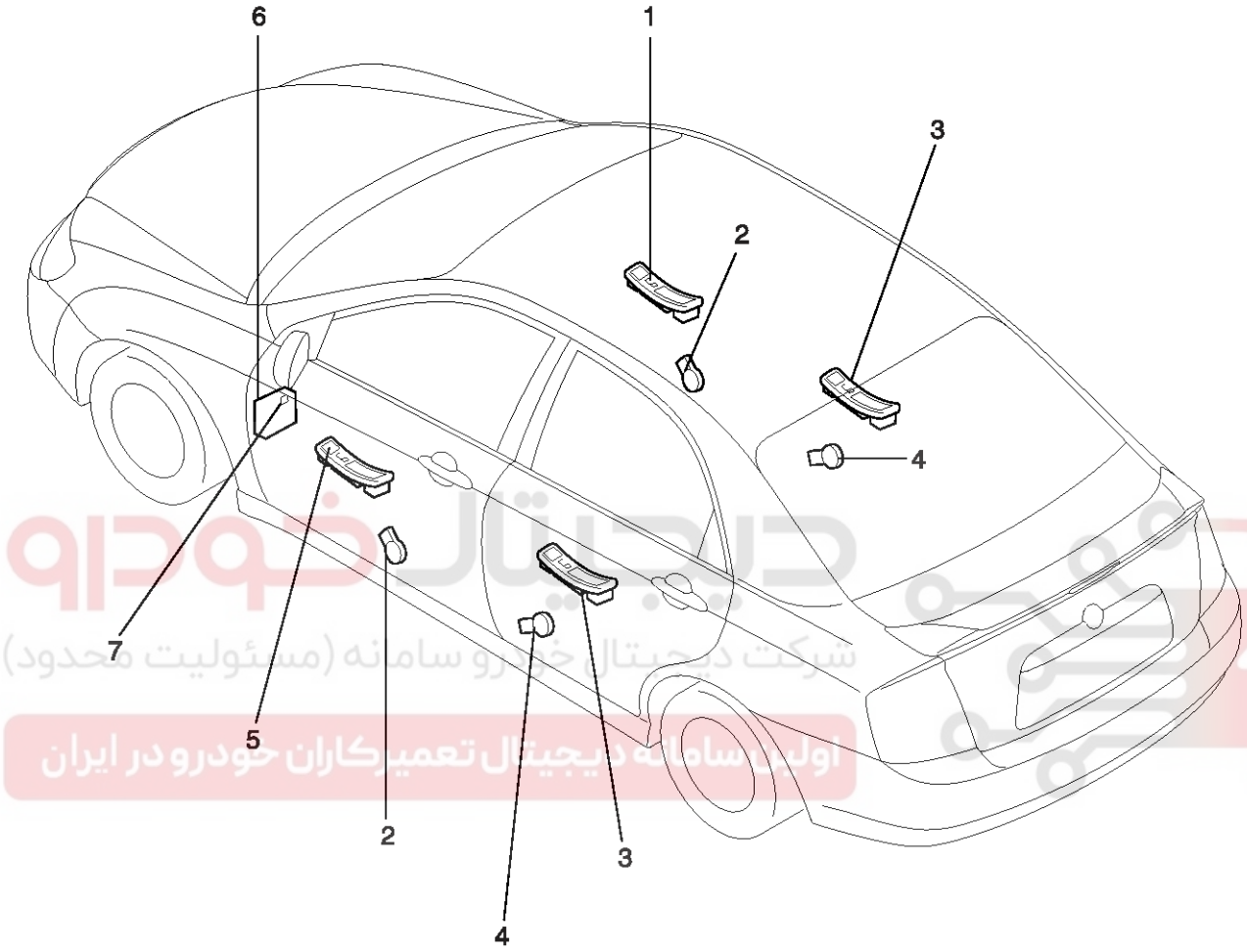
2. If operations are abnormal, check the control module (A) from the door trim after removing the driver's door panel.)



ATGE304A

Power Windows

COMPONENTS



1. Assist window switch
2. Front window motor
3. Rear window switch
4. Rear window motor
5. Driver window main switch
6. Passenger compartment junction box
7. Power window relay

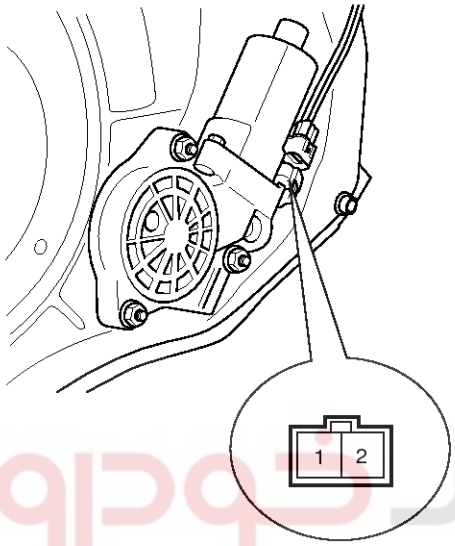
LTGE320A

Power Window Motor

INSPECTION

FRONT POWER WINDOW MOTOR INSPECTION

1. Remove the front door trim panel. (Refer to the BD group-front door)
2. Disconnect the 2P connector from the motor.



KTKD056A

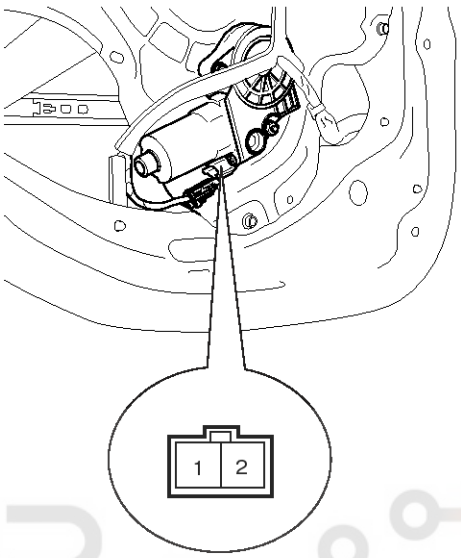
3. Connect the motor terminals directly to battery voltage (12V) and check that the motor operates smoothly. Next, reverse the polarity and check that the motor operates smoothly in the reverse direction. If the operation is abnormal, replace the motor.

Position \ Terminal		1	2
LH	Clockwise	⊕	⊖
	Counter-clockwise	⊖	⊕
RH	Clockwise	⊖	⊕
	Counter-clockwise	⊕	⊖

ETKE057A

REAR POWER WINDOW MOTOR INSPECTION

1. Remove the rear door trim panel. (Refer to the BD group-rear door)
2. Disconnect the 2P connector from the motor.



KTKD058A

3. Connect the motor terminals directly to battery voltage (12V) and check that the motor operates smoothly. Next, reverse the polarity and check that the motor operates smoothly in the reverse direction. If the operation is abnormal, replace the motor.

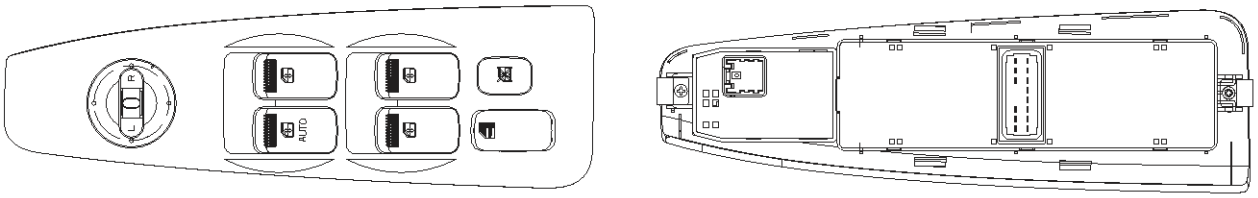
Position \ Terminal		1	2
LH	Clockwise	⊕	⊖
	Counter-clockwise	⊖	⊕
RH	Clockwise	⊖	⊕
	Counter-clockwise	⊕	⊖

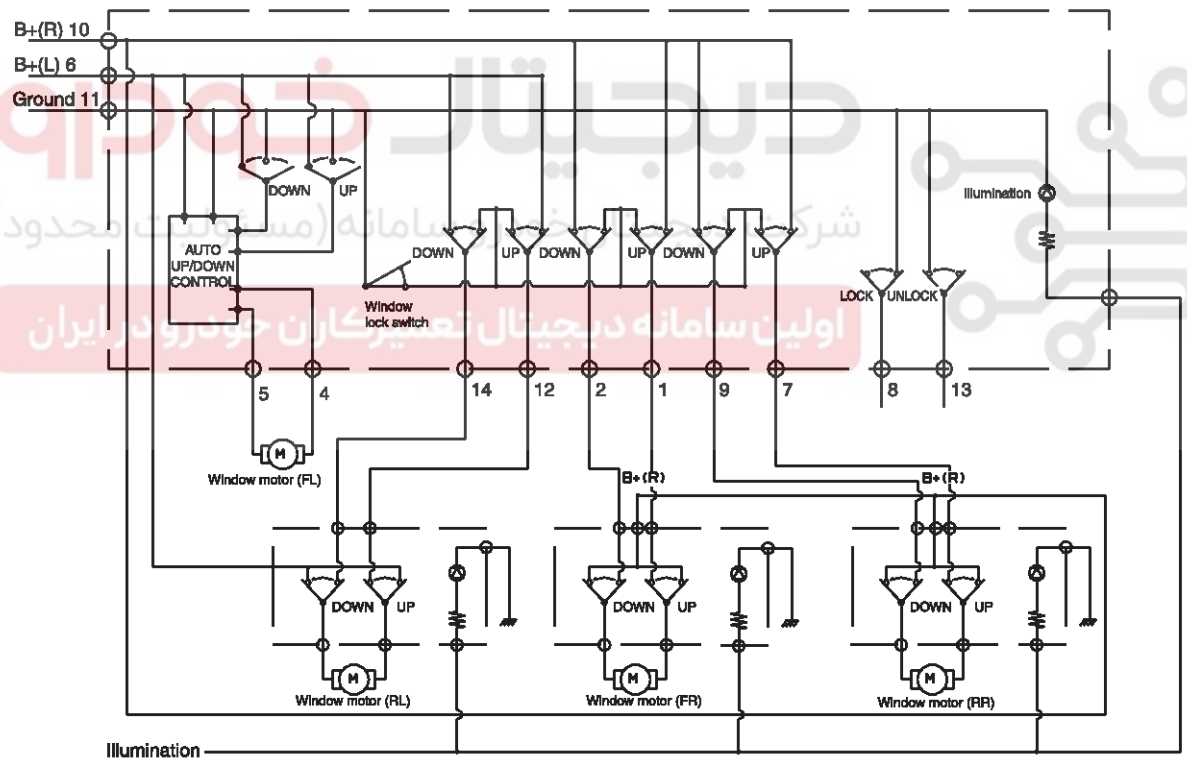
ETKE057A

Power Window Switch

CIRCUIT DIAGRAM

[Power window main switch]

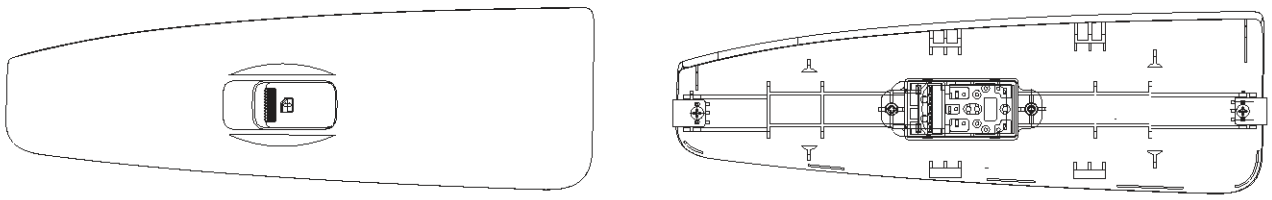


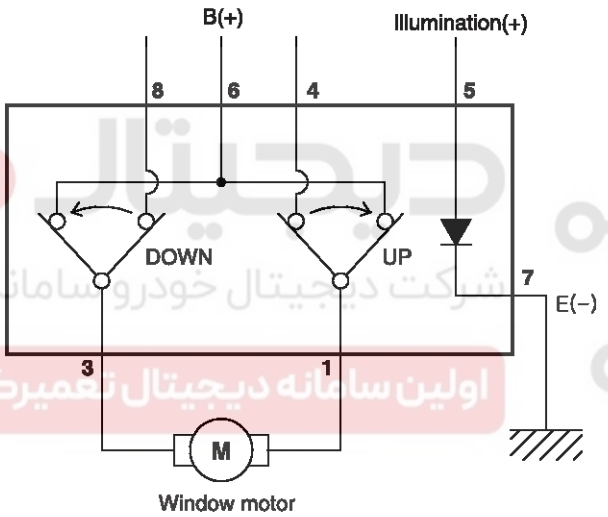


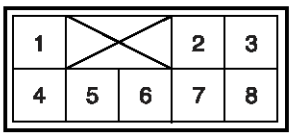
1	2	3			4	5	6
7	8	9	10	11	12	13	14

LTGE322A

[Power window sub switch]





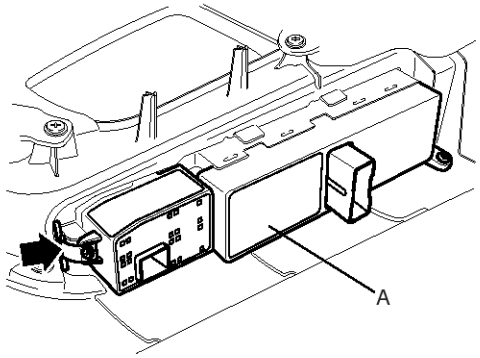


LTGE322B

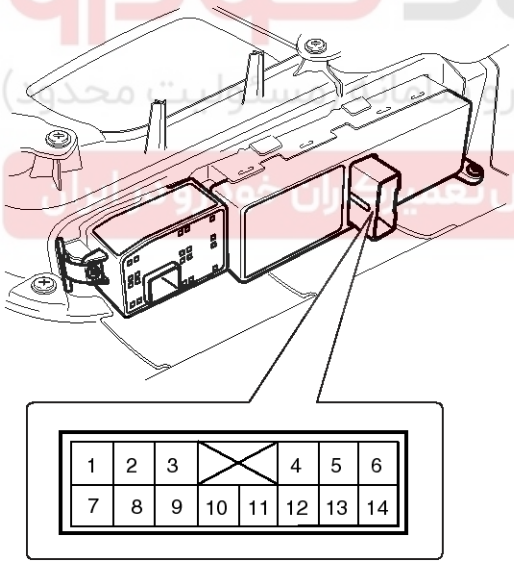
INSPECTION

POWER WINDOW MAIN SWITCH

1. Remove the front door trim panel. (Refer to the BD group-front door)
2. Remove the power window main switch (A) by pushing the mounting clip of the power window main switch.



ATGE301B



ATGE322C

3. Check for continuity between the terminals. When the continuity does not agree, it exchanges the switch.

Position \ Terminal	Front left				Front right			
	6	4	5	11	10	1	2	11
UP	○—○		○—○		○—○		○—○	
OFF		○—○—○				○—○—○		
DOWN	○—○		○—○		○—○		○—○	

Position \ Terminal	Rear left				Rear right			
	6	12	14	11	10	7	9	11
UP	○—○		○—○		○—○		○—○	
OFF		○—○—○				○—○—○		
DOWN	○—○		○—○		○—○		○—○	

LTGE322D

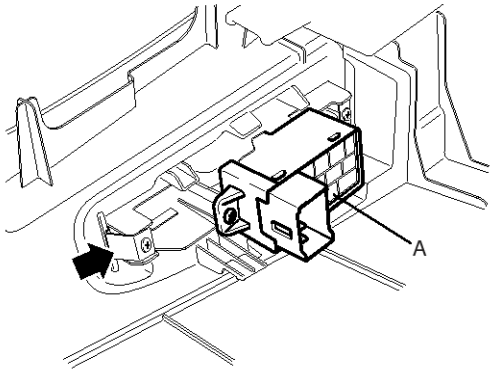
DOOR LOCK SWITCH

Position \ Terminal	8	11	13
UNLOCK		○	○—○
LOCK	○	○—○	

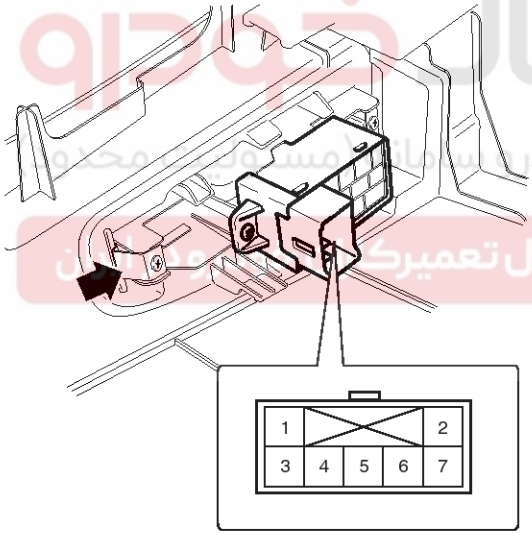
LTGE322I

POWER WINDOW SUB SWITCH

1. Remove the rear door trim panel. (Refer to the BD group-front door)
2. Remove the power window sub switch (A) by pushing the fixation clip of the power window sub switch.



ATGE322E



ATGE322H

3. Check for continuity between the terminals. When the continuity does not agree, it exchanges the switch.

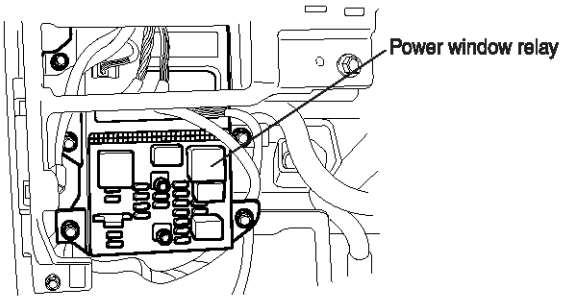
Terminal / Position	6	8	4	1	3
UP	○			○	
		○			○
OFF		○			○
			○	○	
DOWN	○				○
			○	○	

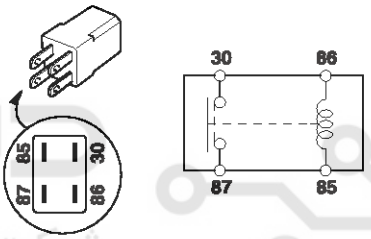
LTGE322F

POWER WINDOW RELAY INSPECTION

Check for continuity between the terminals.

1. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
2. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.





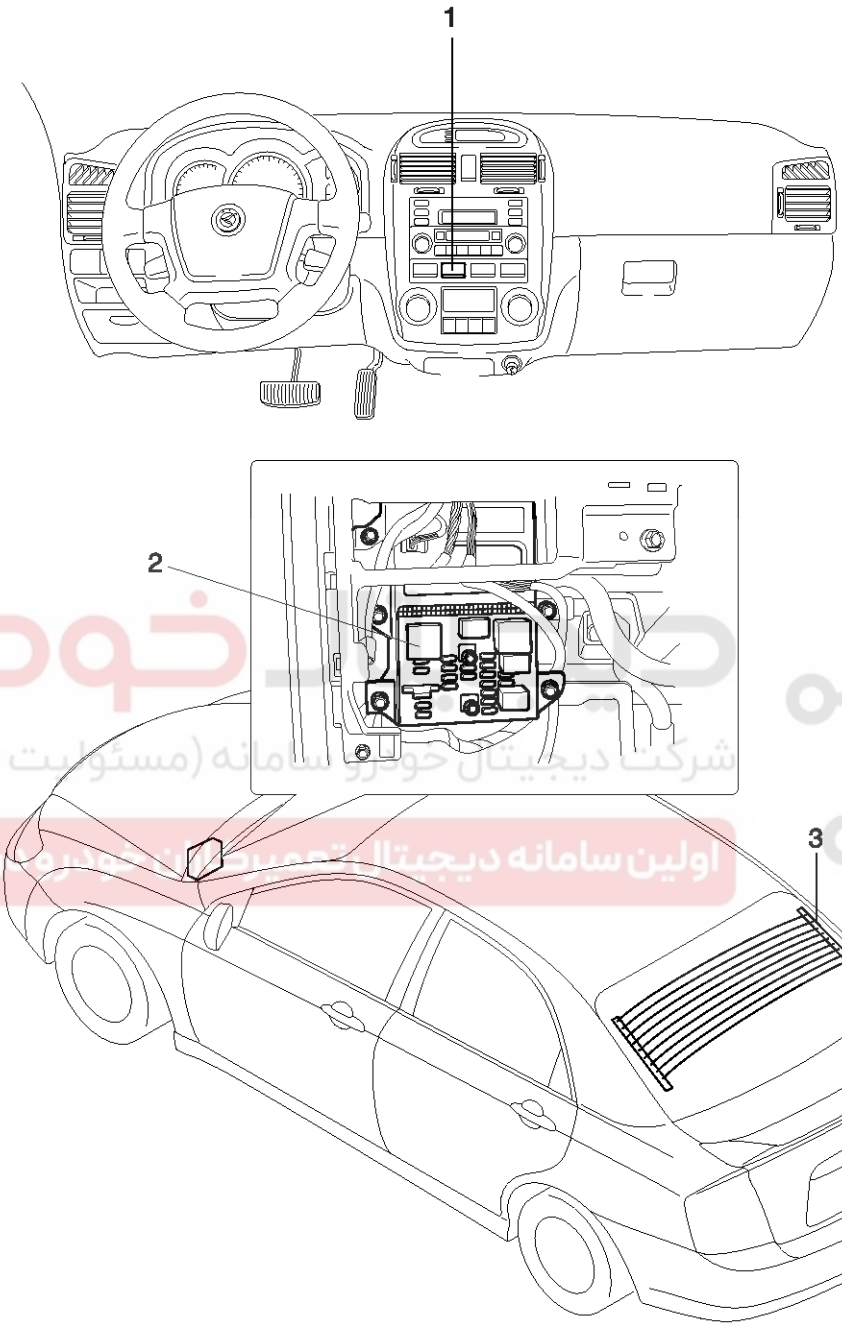
LTGE322G

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

LTGE221B

Rear Glass Defogger

COMPONENTS



1. Rear window defogger switch
2. Rear window defogger relay
3. Rear window defogger

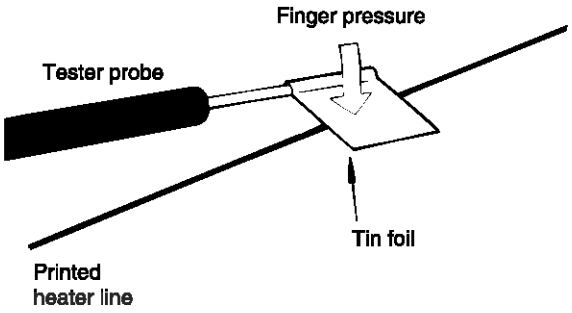
LTGE340B

Rear Glass Defogger Printed Heater

INSPECTION

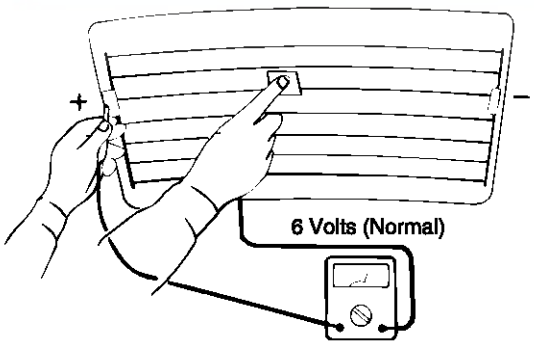
⚠CAUTION

Wrap tin foil around the end of the voltmeter test lead to prevent damaging the heater line. Apply finger pressure on the tin foil, moving the tin foil along the grid line to check for open circuits.



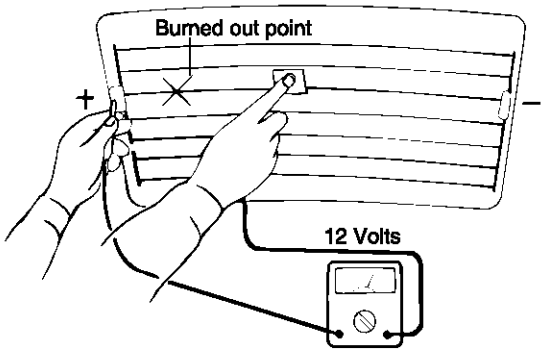
ETA9165A

1. Turn on the defogger switch and use a voltmeter to measure the voltage of each heater line at the glass center point. If a voltage of approximately 6V is indicated by the voltmeter, the heater line of the rear window is considered satisfactory.



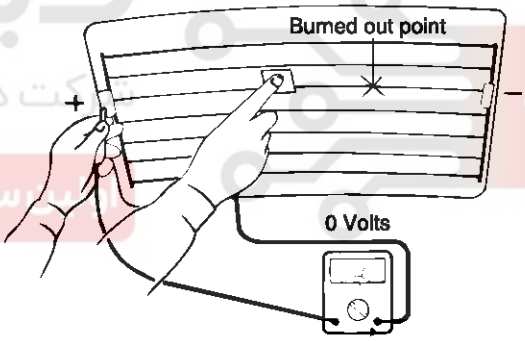
ETA9165B

2. If a heater line is burned out between the center point and (+) terminal, the voltmeter will indicate 12V.



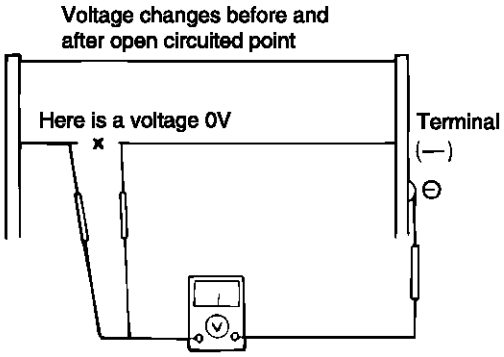
ETA9165C

3. If a heater line is burned out between the center point and (-) terminal, the voltmeter will indicate 0V.



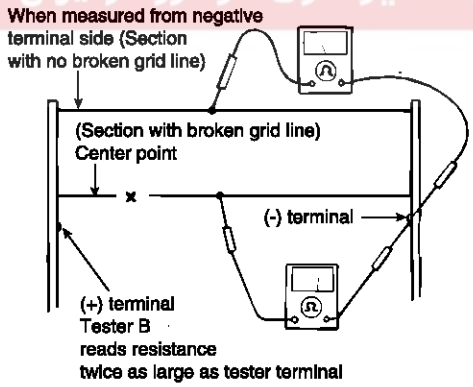
ETA9165D

4. To check for open circuits, slowly move the test lead in the direction that the open circuit seems to exist. Try to find a point where a voltage is generated or changes to 0V. The point where the voltage has changed is the open-circuit point.



ETA9165E

5. Use an ohmmeter to measure the resistance of each heater line between a terminal and the center of a grid line, and between the same terminal and the center of one adjacent heater line. The section with a broken heater line will have a resistance twice as that in other sections. In the affected section, move the test lead to a position where the resistance sharply changes.



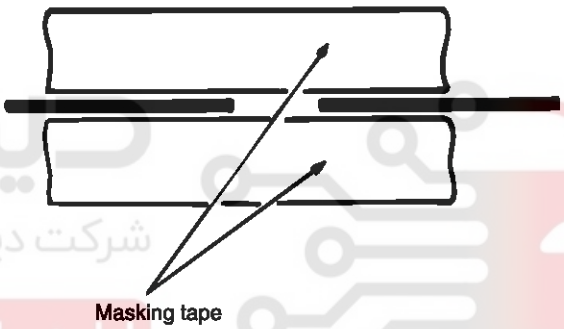
ETA9165F

REPAIR OF BROKEN HEATER LINE

Prepare the following items :

1. Conductive paint.
2. Paint thinner.
3. Masking tape.
4. Silicone remover.
5. Using a thin brush :

   Wipe the glass adjacent to the broken heater line, clean with silicone remover and attach the masking tape as shown. Shake the conductive paint container well, and apply three coats with a brush at intervals of about 15 minutes apart. Remove the tape and allow sufficient time for drying before applying power. For a better finish, scrape away excess deposits with a knife after the paint has completely dried. (Allow 24 hours).

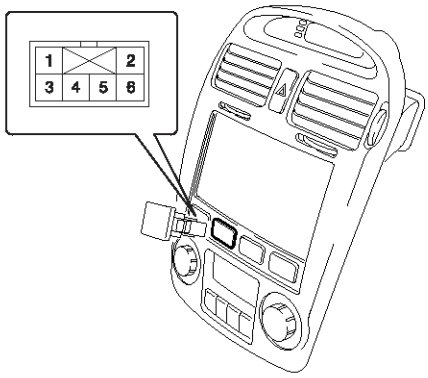


ETA9165G

Rear Glass Defogger Switch

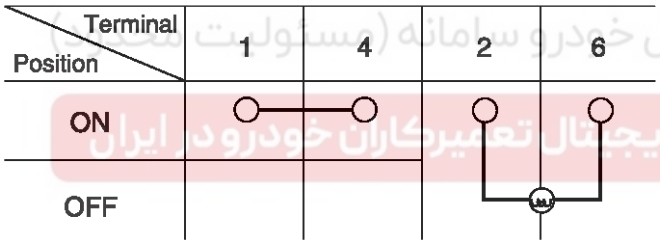
INSPECTION

1. Remove the negative (-) battery terminal.
2. Remove the rear window defogger switch after removing to the center crash pad.



ATGE341F

3. Using an ohmmeter, inspection the continuity between the terminals after removing to the switch connector.

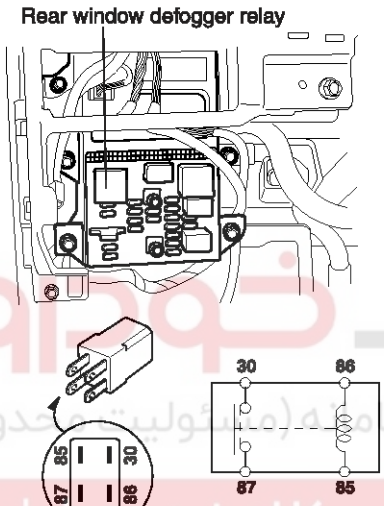


LTGE341G

Rear Glass Defogger Relay

INSPECTION

1. Remove the negative (-) battery terminal.
2. Remove the rear window defogger relay after removing to the driver's crash pad lower panel from passenger compartment.
3. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
4. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



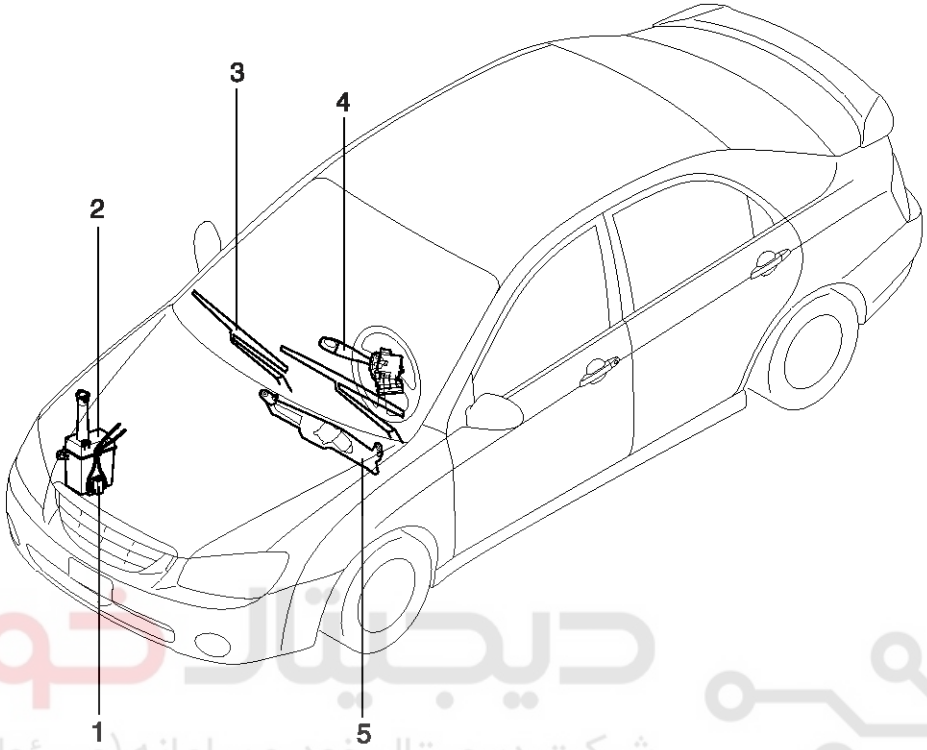
LTGE341H

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

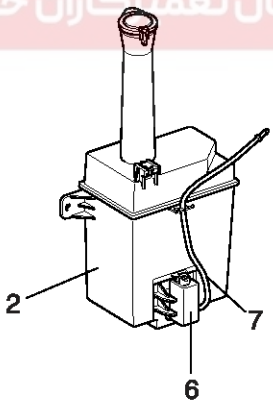
LTGE221B

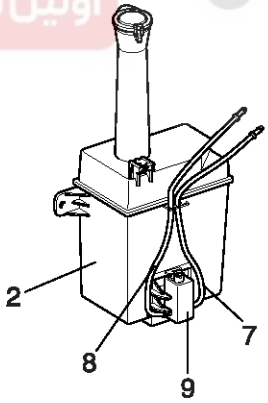
Windshield Wiper/Washer

COMPONENTS



[Windshield washer motor (4 doors)] [Windshield & rear washer motor (5 doors)]





1. Washer motor
2. Washer reservoir
3. Windshield wiper arm & blade
4. Wiper & washer switch
5. Windshield wiper motor & linkage
6. Windshield washer motor
7. Windshield washer hose
8. Rear washer hose
9. Windshield & rear washer motor

LTGE360A

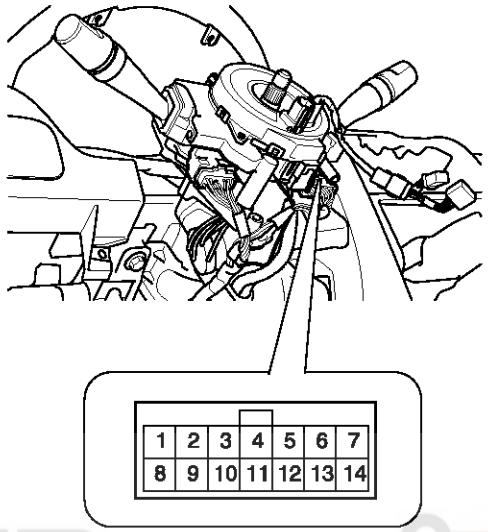
Windshield Wiper-Washer Switch

REMOVAL

1. Remove the windshield wiper/washer. (Refer to the multi function switch.)

INSPECTION

Check for continuity between the terminals while operating the wiper and washer switch.



KTDD075I

WIPER SWITCH

Position \ Terminal	1	2	3	4	5	6	13	14
MIST				○	○			
OFF		○	○					
INT		○	○		○	○	○	○
LOW		○			○			
HI	○				○			

ETDD075C

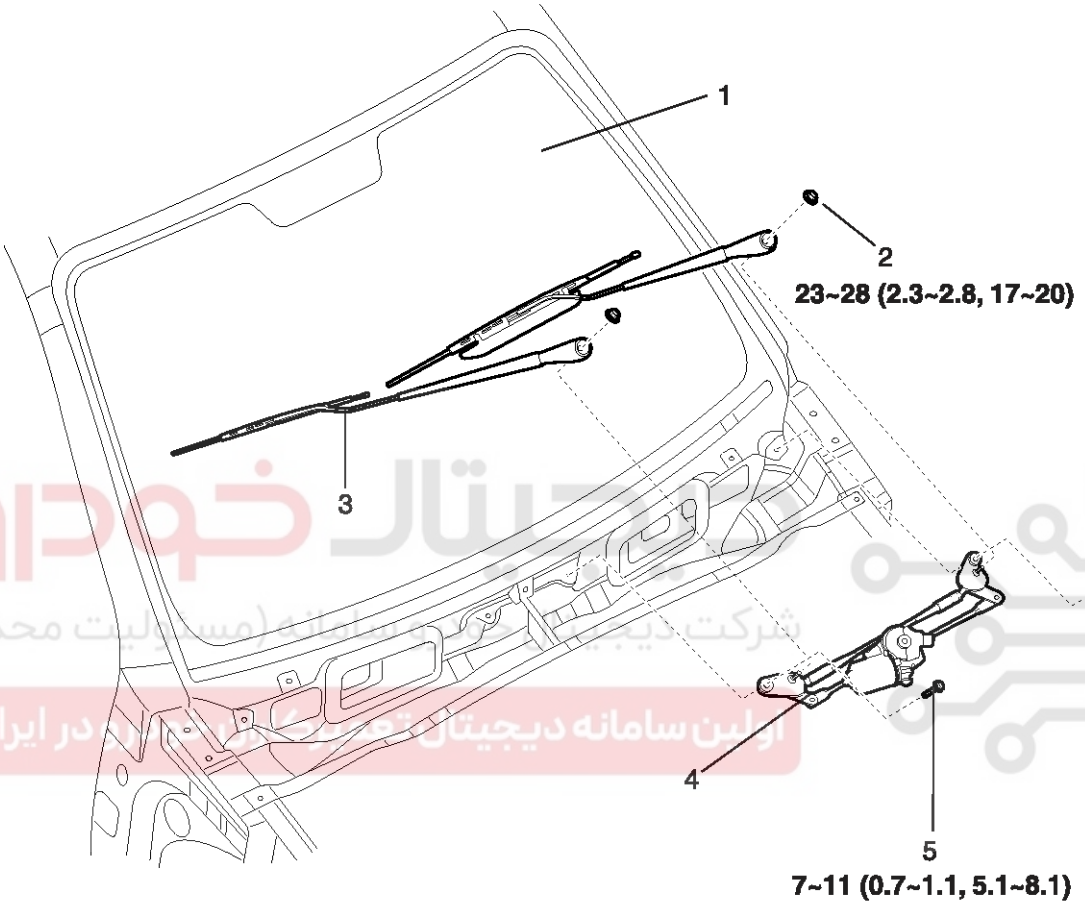
WASHER SWITCH

Position \ Terminal	5	7
OFF		
ON	○	○

ETDD075D

Front Wiper Motor

COMPONENTS



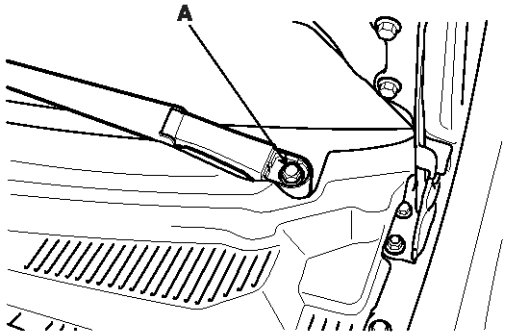
TORQUE : N·m (kg·m, lb·ft)

1. Windshield glass
2. Nut
3. Wiper arm & blade
4. Wiper motor & link assembly
5. Bolt

LTGE360B

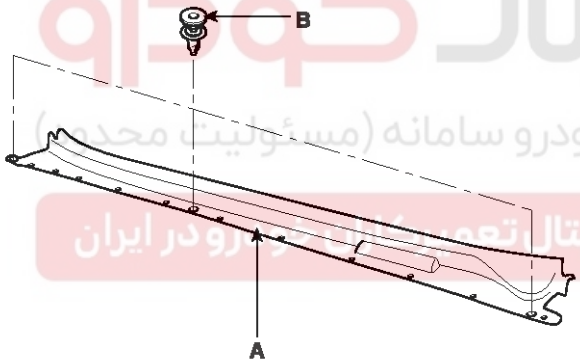
REMOVAL

1. Remove the windshield wiper arm and blade after removing a nut (A).



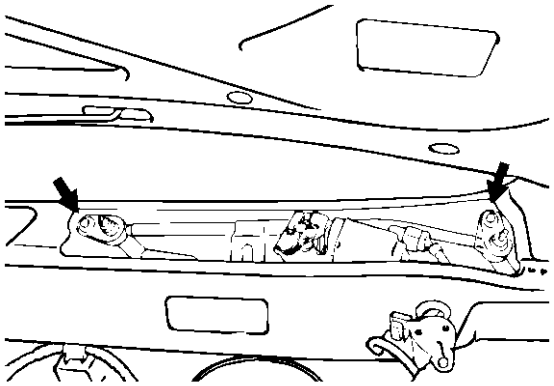
ETKE365A

2. Remove the weather strip then remove the cowl top cover (A) after removing 3 clips (B).



ETKE250B

3. Remove the windshield wiper motor and linkage assembly after removing 2 bolts (A).



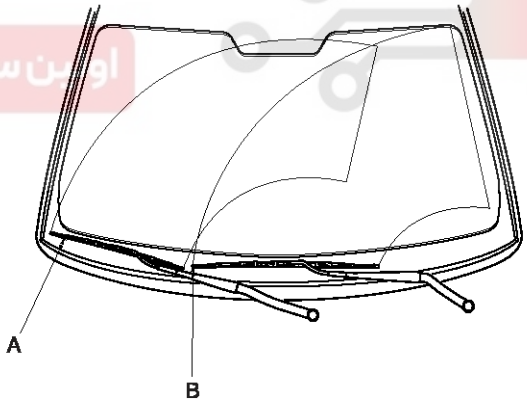
LTGE362A

4. Installation is the reverse of removal.

INSTALLATION

1. Install the wiper arm and blade to the specified position.

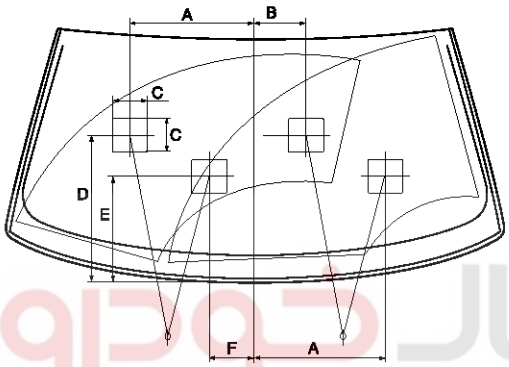
Specified position	A	B
Distance [in (mm)]	1.18 ~ 1.57 (30 ~ 40)	1.18 ~ 1.57 (30 ~ 40)



ATGE362C

2. Set the washer nozzle on the specified spray position.

Specified position	Distance [in (mm)]
A	11.8 (300)
B	4.3 (110)
C	3.9 (100)
D	15.7 (400)
E	15.2 (385)
F	3.1 (80)

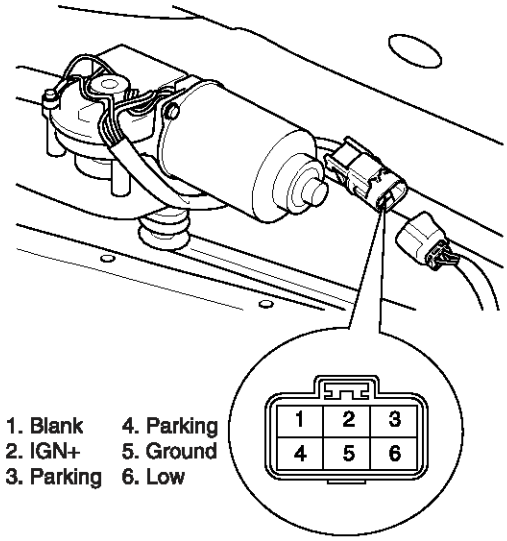


LTGE362E

INSPECTION

SPEED OPERATION CHECK

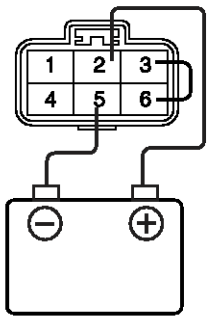
1. Remove the connector from the wiper motor.
2. Attach the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 5.
3. Check that the motor operates at low speed.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 5.
5. Check that the motor operates at high speed.



LTGE362B

AUTOMATIC STOP OPERATION CHECK

1. Operate the motor at low speed using the stalk control.
2. Stop the motor operation anywhere except at the off position by disconnecting terminal 6.
3. Connect terminals 6 and 3.
4. Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 5.
5. Check that the motor stops running at the off position.

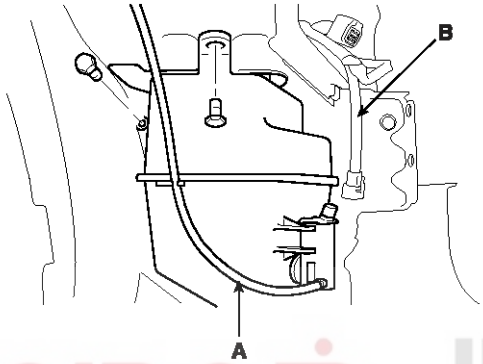


LTGE362D

Front Washer Motor

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper cover. (Refer to BD group - Front bumper)
3. Remove the washer hose (A) and the washer motor connector (B).
4. Remove the washer reservoir after removing 2 bolts.

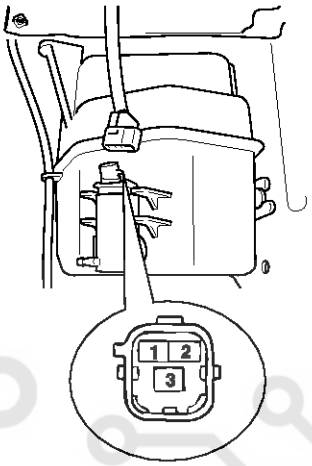


ETKE005L

5. Installation is the reverse of removal.

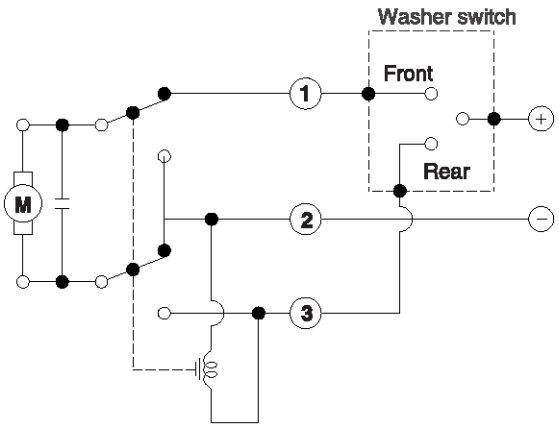
INSPECTION

1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Connect positive (+) and negative (-) battery cables to terminals 1 and 2 respectively to see that the washer motor runs and water sprays from the front nozzles.
3. Check that the motor operates normally.



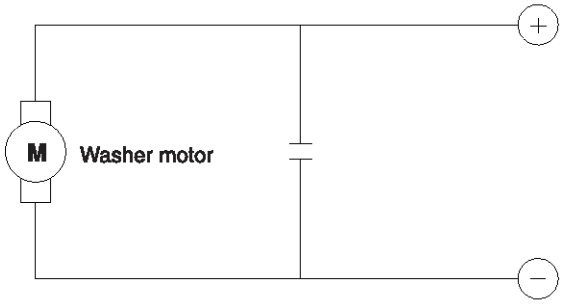
1. Windshield washer (+)
2. Ground
3. Rear washer (+) - 5 doors

LTGE363B



<Windshield & rear washer motor : 5 doors>

LTGE363C



[Windshield washer motor : 4 doors]

ETKE390C

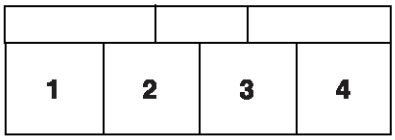
Rear Wiper/Washer

Rear Wiper Motor

INSPECTION

1. Remove the connector from the rear wiper motor.
2. Connect battery positive (+) and negative (-) cables to terminals 3 and 4 respectively.
3. Check that the motor operates normally.

   Replace the motor if operates abnormally.

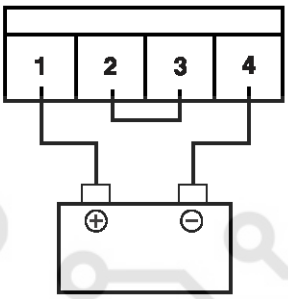


1. IGN +
2. Parking
3. Switch
4. Ground

LTGE381E

AUTOMATIC STOP OPERATION CHECK

1. Operate the motor at low speed using the stalk control.
2. Stop the motor operation anywhere except at the off position by disconnecting terminal 3.
3. Connect terminals 2 and 3.
4. Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 4.
5. Check that the motor stops running at the off position.



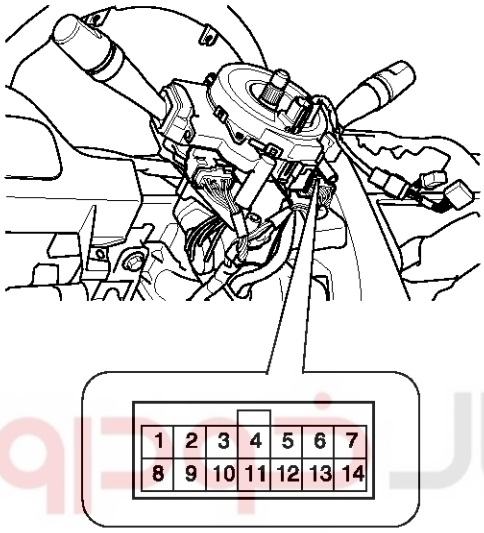
ATGE381F

Rear Washer Switch

INSPECTION

With the rear wiper & washer switch in each position, make sure that continuity exists between the terminals below.

If continuity is not as specified, replace the multifunction switch.



KTDD075I

REAR WIPER & WASHER SWITCH

[5 doors]

Terminal / Position	9	10	11	12
Rear washer	○	—	—	○
OFF				
INT			○	○
ON		○	—	○
Rear washer	○	—	—	○

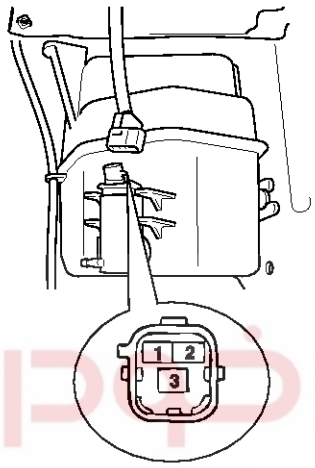
ETKE073A

Rear Washer Motor

INSPECTION

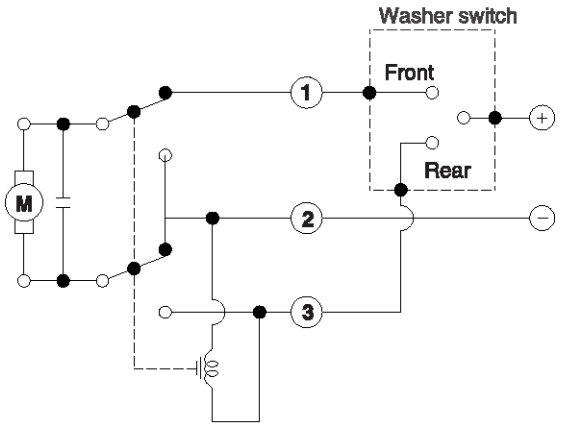
1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Connect positive (+) and negative (-) battery cables to terminals 2 and 3 respectively to see that the washer motor runs and water is pumped.
3. Check that the motor operates normally.

   Replace the motor if it operates abnormally.



1. Windshield washer (+)
2. Ground
3. Rear washer (+) - 5 doors

LTGE363B



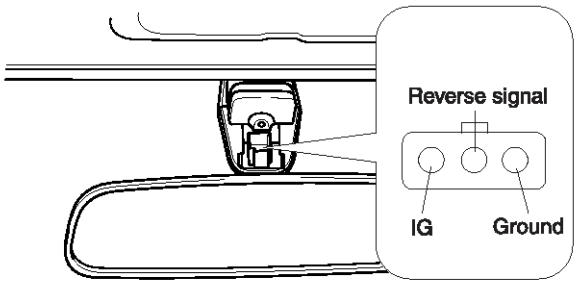
<Windshield & rear washer motor : 5 doors>

LTGE363C

Electro chromic Inside Rear View Mirror

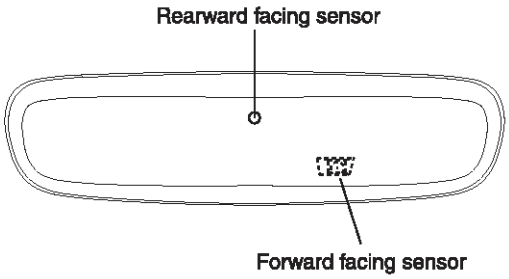
DESCRIPTION

The electrochromic(EC) inside rear view mirror receives power, ground, and a reverse signal on the three wires that connect to it. It uses two light sensors to sense glare.



LTGE405B

1. The forward facing sensor determines if the outside light levels are low enough for the mirror to operate.
2. The rearward facing sensor detects glare from lights behind the mirror. When glare is detected, it outputs a signal to the mirror to dim at the required level.
3. The mirror dims to the level as directed by the rearward facing sensor. When the glare is no longer detected, the mirror returns to normal.
4. When the vehicle is shifted into reverse, the mirror returns to normal.



LTCD405A

INSPECTION

To determine if the EC mirror will dim, check it as the below procedure.

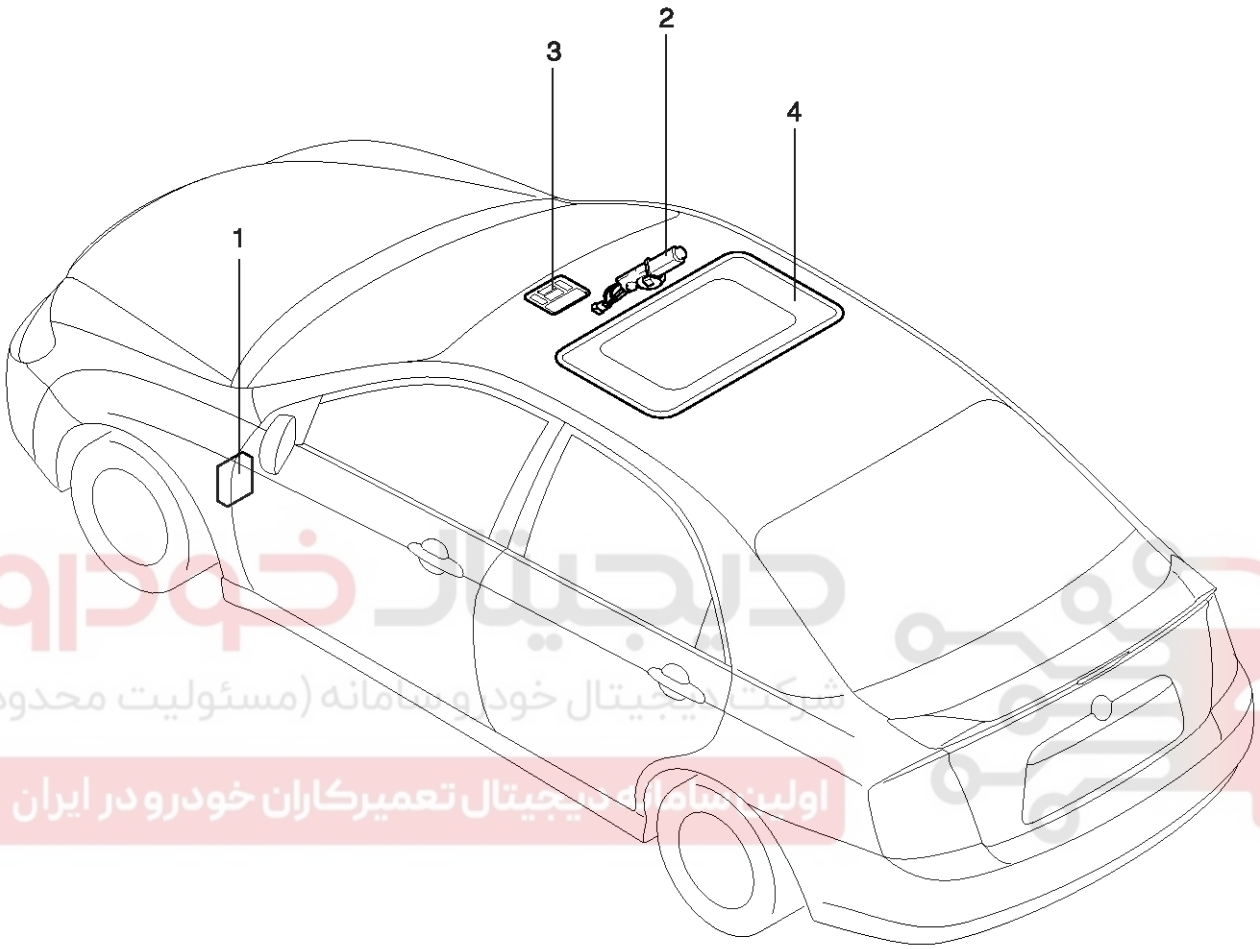
1. Turn the ignition key to the "ON" position.
2. Cover the forward facing sensor.
3. Shine a flashlight into the rearward facing sensor.
4. The mirror should dim as soon as the rearward facing sensor detects the high light level.

   NOTICE

   If this test is performed in a bright area, the mirror may darken as soon as the forward facing sensor is covered.
5. Put the vehicle into reverse, the mirror should not dim.
6. Aim a flashlight at the forward sensor and another flashlight at the rearward sensor. The mirror should not darken.

Sun Roof

COMPONENTS

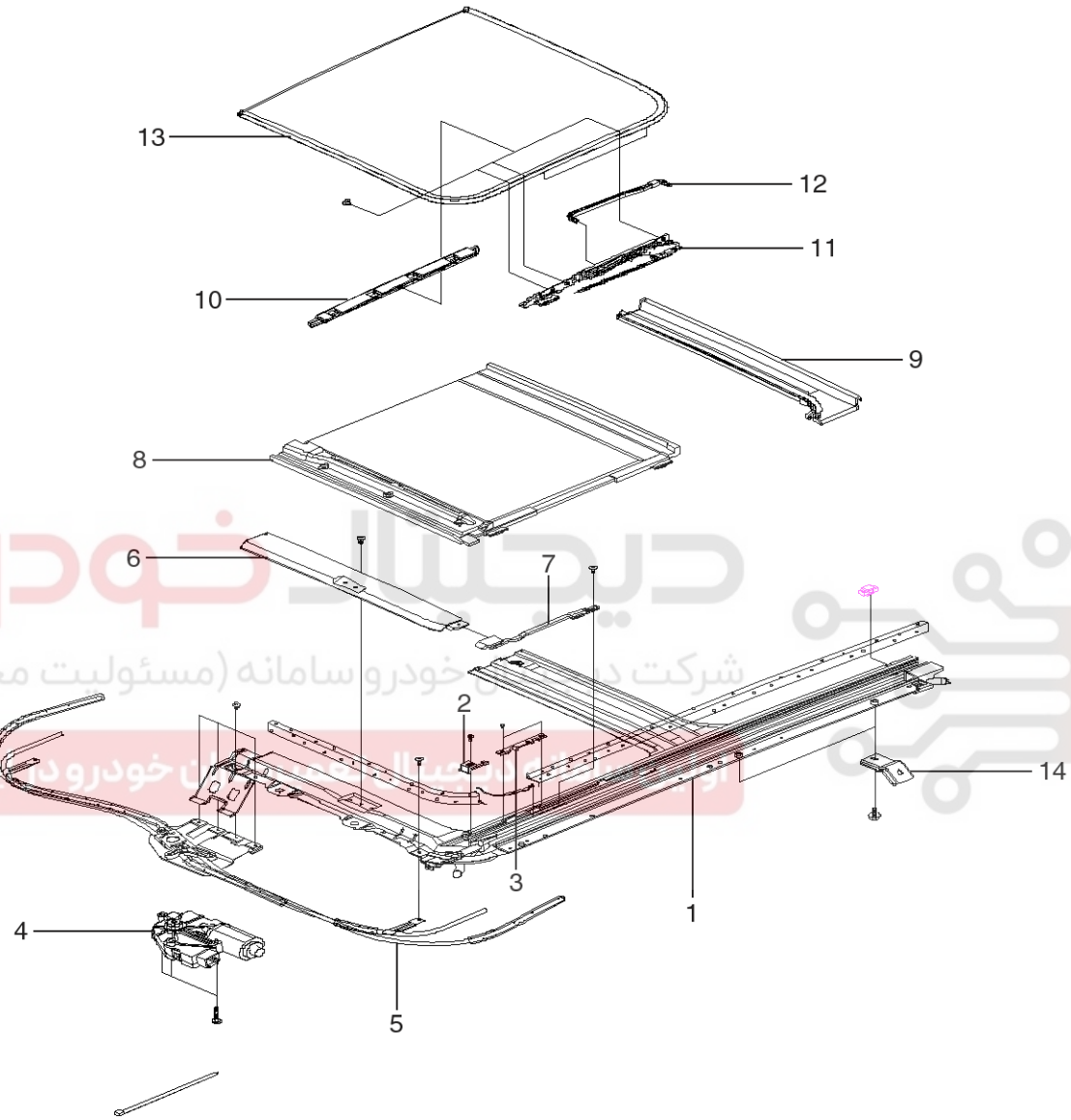


1. Passenger compartment junction box
2. Sunroof motor
3. Sunroof switch
4. Sunroof

LTGE480A

Sunroof Assembly

COMPONENTS

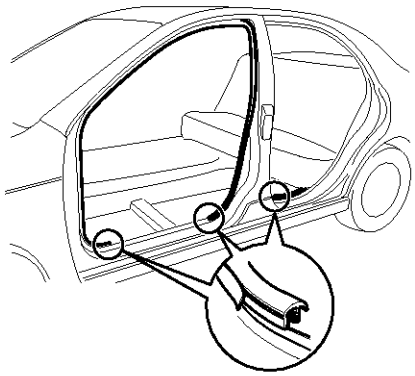


1. Sunroof sub frame
2. Front stopper
3. setting plate
4. Sunroof motor
5. Drive unit
6. Deflector
7. Deflector link
8. Sunshade
9. Drip rail
10. Decoration cover
11. guide
12. Drip link
13. Glass panel
14. Mounting bracket

BSGE008A

REMOVAL AND INSTALLATION

1. To remove the sunroof, first remove the following parts.
   1) Remove front pillar trims.
      a. Remove body side weatherstrip.

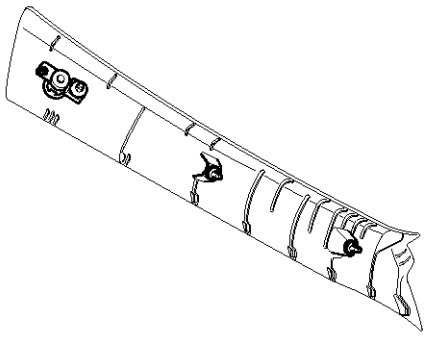


ASGE016B

      b. Remove pillar blanking cover and bolts.

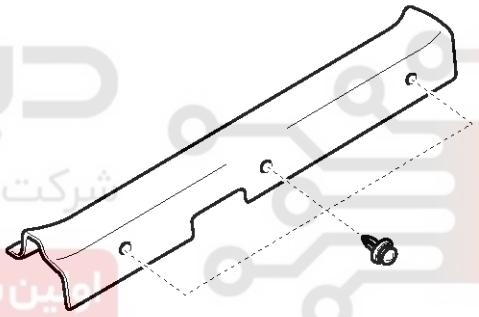
ASGE016C

      c. Remove trim from front pillar.

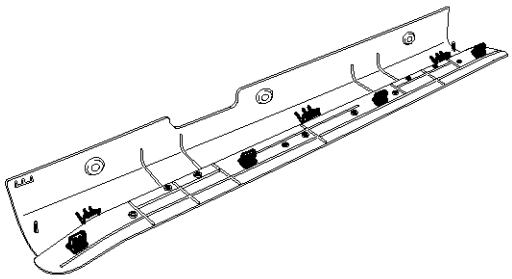


ASGE016D

   2) Remove center pillar lower trim.
      a. Remove front door scuff trim.

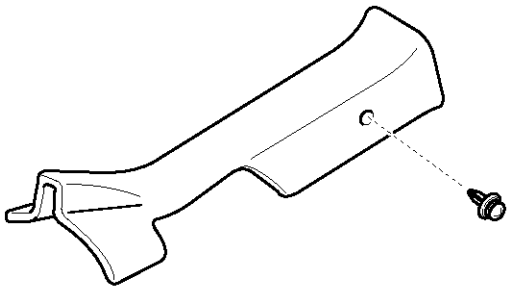


ASGE016E

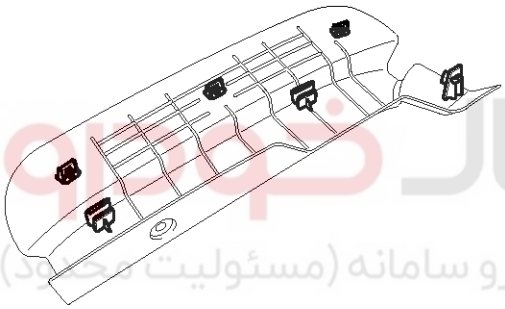


ASGE016F

b. Remove rear door scuff trim.



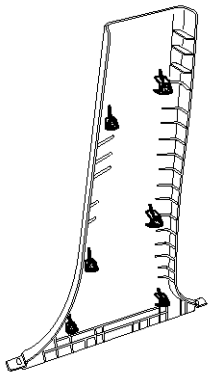
ASGE016J



ASGE016K

c. Remove center pillar lower trim.

ASGE016L

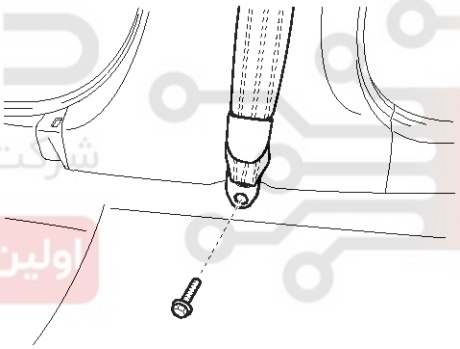


ASGE016M

3) Remove center pillar upper trim.

a. Remove front seat belt lower anchor bolt.

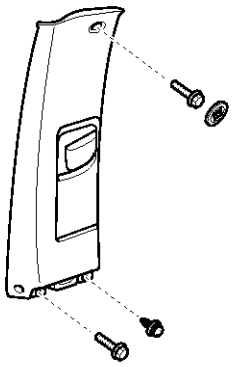
Tightening torque :
40~55 N·m (4.0~5.5 kg·m, 29~40 lb·ft)



ASGE016N

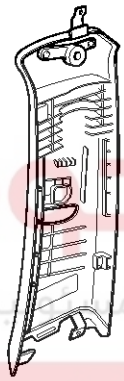
b. Remove pillar blanking cover.

c. Remove bolts(2) and fastener.



ASGE016P

d. Remove trim from center pillar.

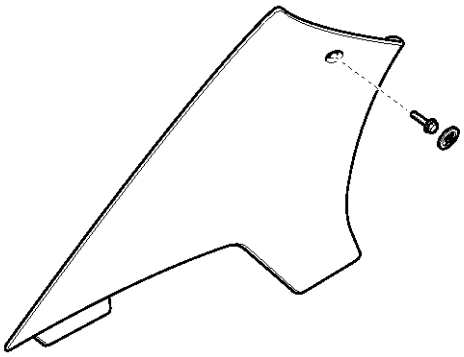


ASGE016Q

e. Remove seat belt from trim.

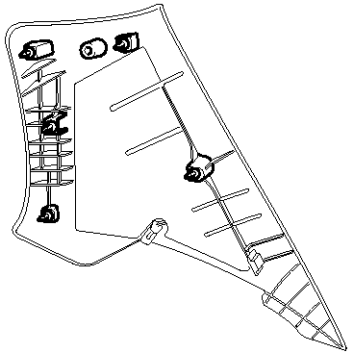
4) Remove rear pillar trim.

a. Remove pillar blanking cover and bolt.



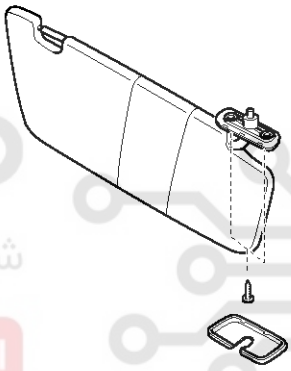
ASGE016R

b. Remove trim from rear pillar.



ASGE016S

5) Remove sunvisor(LH).



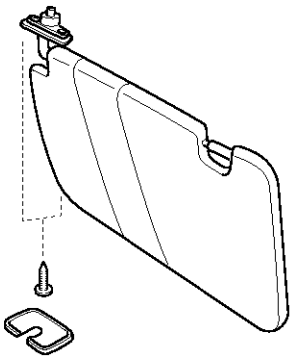
ASGE013B

a. Remove pivot mounting cover and screws(2).

b. Remove sunvisor retainer screw.

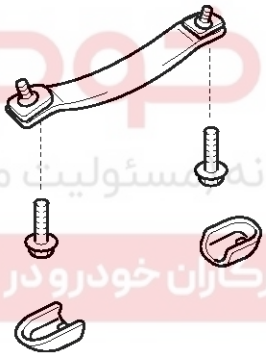
c. Remove sunvisor from headlining.

6) Remove sunvisor(RH).



ASGE013C

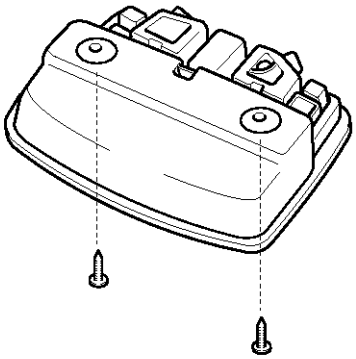
7) Remove roof assist handle.
   a. Remove front assist handle cover and bolts(2).



ASGE013D

   b. Remove front assist handle.
   c. Remove rear assist handles(2).

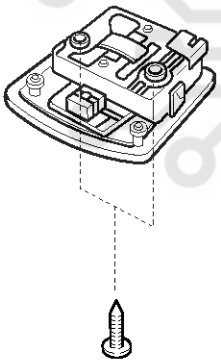
8) Remove overhead console lamp.
   a. Open sunglass case and remove screws(2).



ASGE013E

   b. Remove lamp from headlining and disconnect the connector.

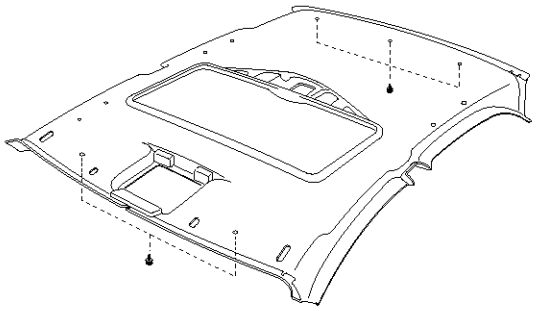
9) Remove room lamp.
   a. Remove cover.
   b. Remove screws(2).



ASGE013G

   c. Remove lamp from headlining and disconnect the connector.

10) Remove headlining assembly.
   a. Remove fasteners(5).

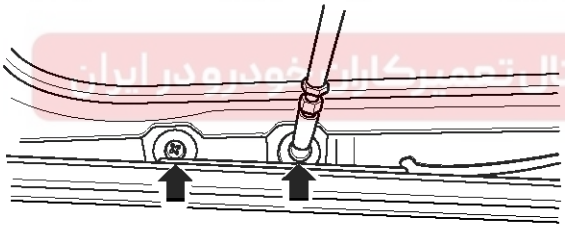


ASGE013H

   b. Remove headlining from vehicle.

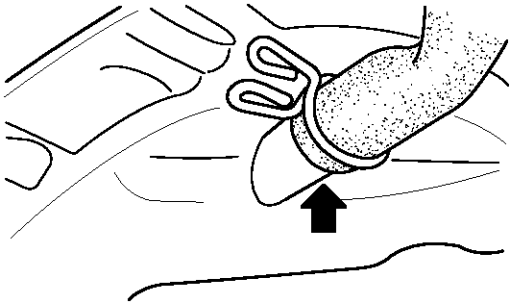
2. Remove glass panel.
   1) Remove screws(6).

Tightening torque :
2~4 N·m (0.2~0.4 kg·m, 1~3 lb·ft)



LT8C131A

3. Remove drain hose.



BSCE008C

4. Remove sunroof assembly.
   1) Remove bolts and screws.

Tightening torque :
9~13 N·m (0.9~1.3 kg·m, 7~9 lb·ft)

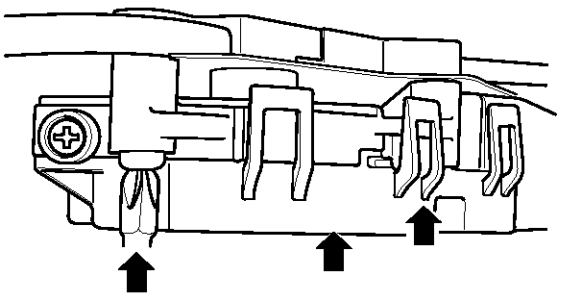
NOTICE
When removing the sunroof assembly, carefully pull out sunroof assembly to avoid damage to the other parts.

5. Install in reverse order of removal.

DISASSEMBLY

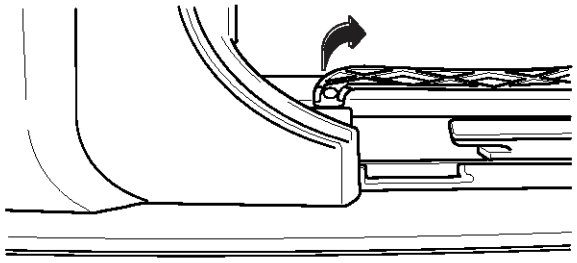
1. Remove motor.

NOTICE
When removing the motor, the guide assembly should always be in the fully closed position.



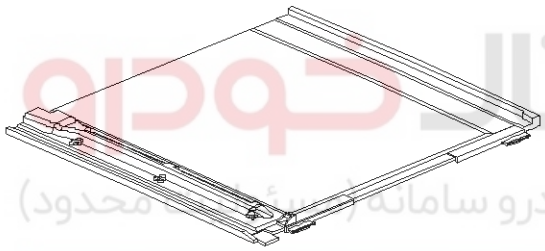
BSCE008E

2. Remove drip link.



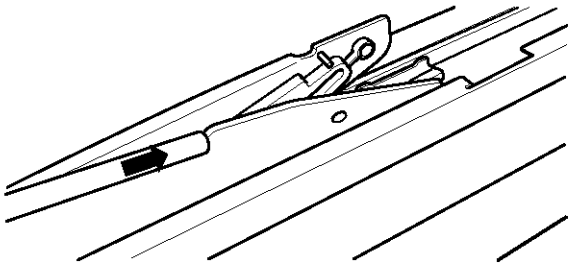
BSCE008F

3. Remove sunshade.

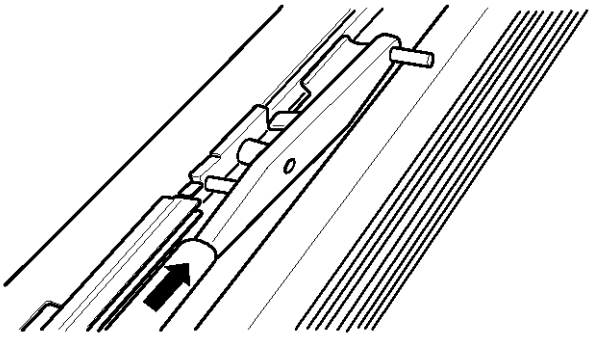


ASGE008C

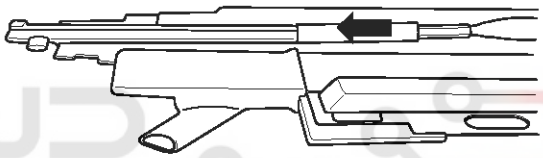
4. Remove guide.
   1) Remove slider.



BSCE008K

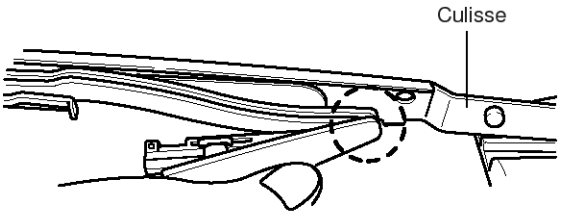


BSCE008L

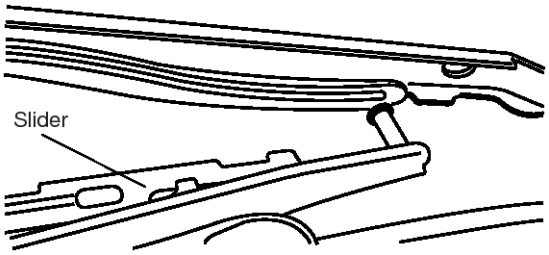


BSCE008M

   2) Remove coulisse and slider.

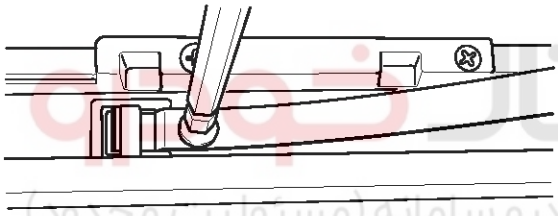


BSCE008N



BSCE008P

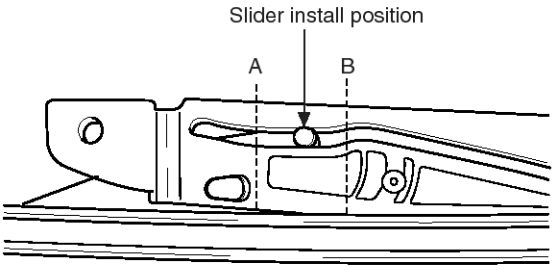
5. Remove deflector.



BSCE008Q

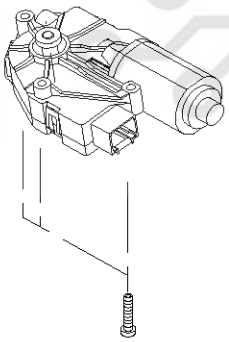
REASSEMBLY

1. Install in reverse order of removal.
2. Align the position of slider when installing sunroof motor.
   : Be sure to align it at the center of "A" and "B".



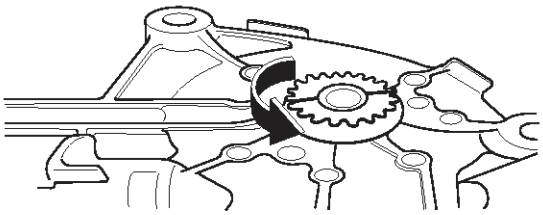
BSCE008R

3. In case that "TILT" doesn't operate when pressing TILT switch after sunroof is closed on vehicle, refer to the following procedures.
   1) Remove sunroof motor.



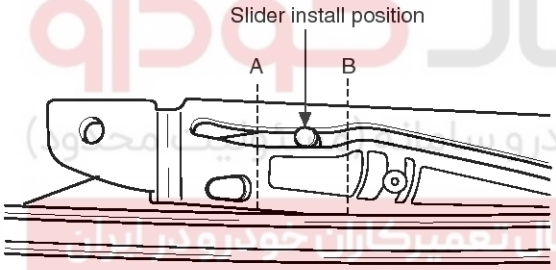
BSCE008U

2) Adjust the motor to the stopping point, pressing close switch.



BSCE008V

3) Install motor after adjusting the position of slide as shown in the figure.



BSCE008R

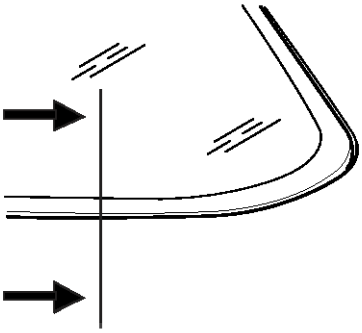
4) Initialize motor according to the way of initialization.

ADJUSTMENT

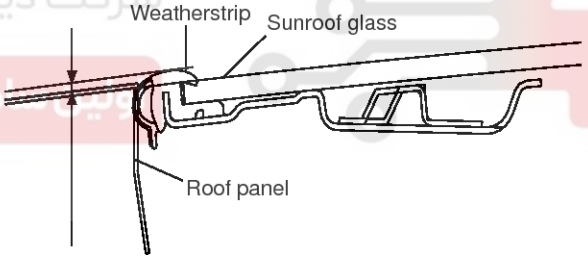
Adjust the difference between the height of glass weather strip and roof panel.

Front side : 0~1.4 mm
Rear side : 1.0~1.4 mm

If the difference is not as specified, adjust using the following procedure.

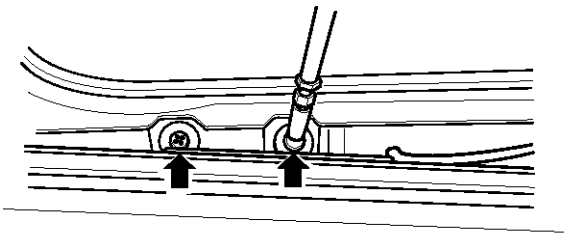


BSCE008W



BSCE008X

1. Loosen the front screw and rear screw. Adjust the height between the glass panel and roof panel.

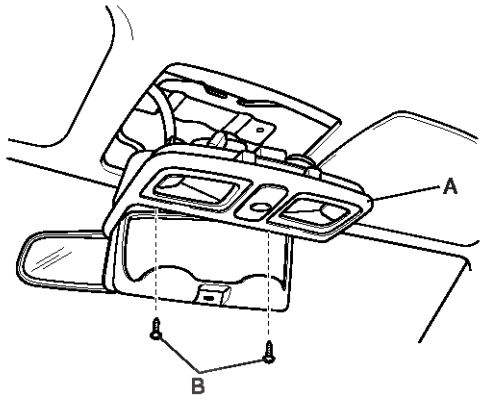


BSCE008B

Sunroof Switch

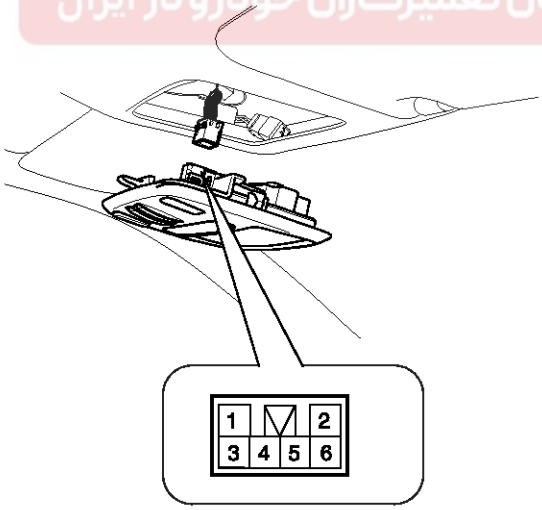
INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Open the sunglass case from the overhead console(A) then remove the 2 screws(B) holding the overhead console.



ATGE481A

3. Disconnect the 6P connector then remove the overhead console lamp assembly from the headliner. Check for continuity between the terminals. If the continuity is not as specified, replace the sunroof switch.



[Switch side connector]

LTGE481B

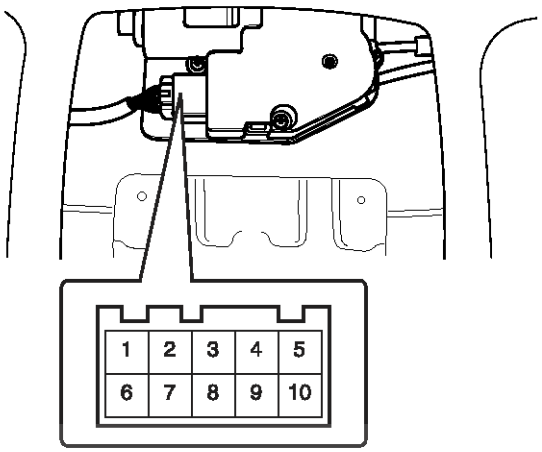
Position \ Terminal	2	4	5	6
Slide open	○			○
Slide close	○	○		
Tilt up	○		○	
Tilt down	○	○		

LTCD129C

Sunroof Motor

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Apply the battery voltage to terminal 3, 6 and ground the terminal 1.



ATGE483B

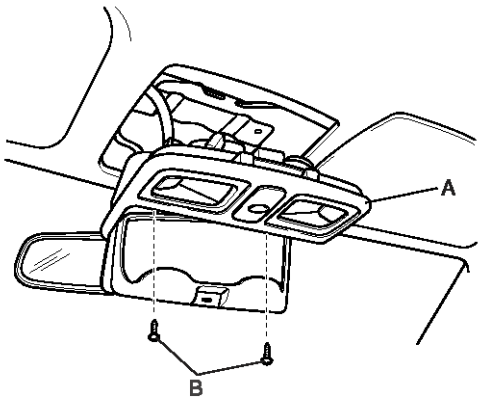
3. Ground the terminals as below table, and check that the sunroof unit operates as below table.

Function \ Terminal	5	10	4
Tilt up		⊖	
Tilt down			⊖
Slide close			⊖
Slide open	⊖		

LTGE483C

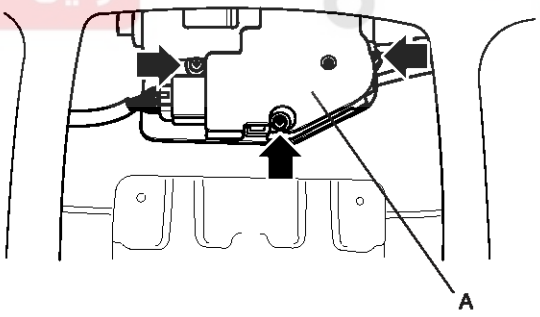
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Open the sunglass case from the overhead console(A) then remove the 2 screws(B) holding the overhead console. Disconnect the 6P connector then remove the overhead console lamp assembly from the headliner.



ATGE481A

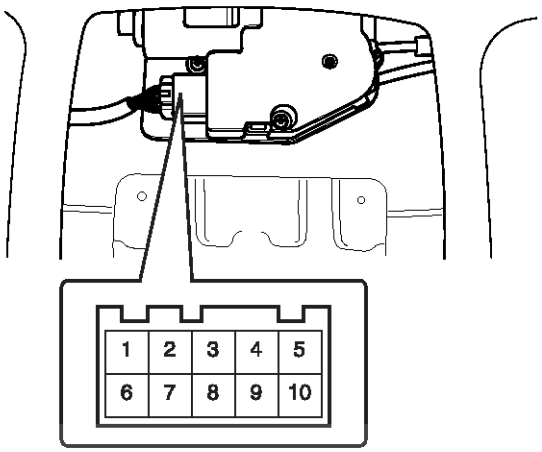
3. Remove the head lining. (Refer to BD group - Sun roof)
4. Remove the sun roof motor (A) after removing 3 screws and disconnect.



ATGE483A

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Apply the battery voltage to terminal 3, 6 and ground the terminal 1.



ATGE483B

3. Ground the terminals as below table, and check that the sunroof unit operates as below table.

Function \ Terminal	5	10	4
Tilt up		⊖	
Tilt down			⊖
Slide close			⊖
Slide open	⊖		

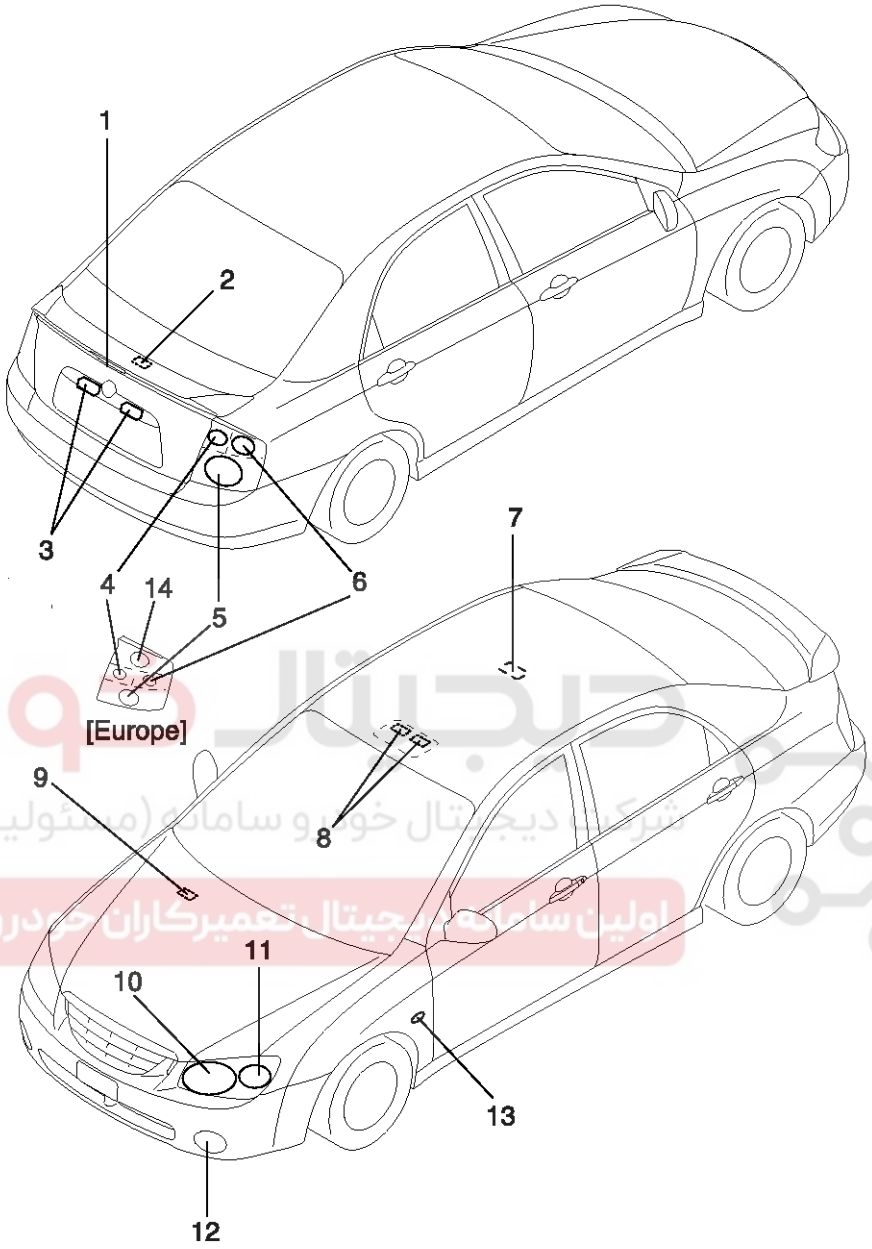
LTGE483C

Lighting System

SPECIFICATION

Items	Bulb Wattage (W)
Head lamp (High)	60
Head lamp (Low)	55
Front turn signal lamp	21
Front fog lamp	27
Rear stop/tail lamp (Outside)	21/5
Back up lamp	16
Rear turn signal lamp	21
Rear fog lamp - Europe	21
License plate lamp	5
Side repeater	5
Room lamp	10
Overhead console lamp	10 x 2
Glove box lamp	5

COMPONENTS



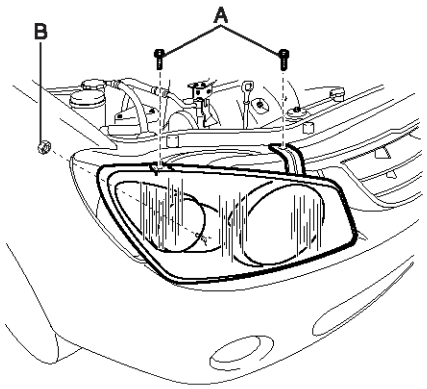
1. High mounted stop lamp
2. Trunk room lamp
3. License plate lamp
4. Back up lamp
5. Tail/stop lamp
6. Turn signal lamp
7. Room lamp
8. Overhead console lamp
9. Glove box lamp
10. Head lamp (High/Low)
11. Front turn signal lamp/position lamp
12. Front fog lamp
13. Side repeater lamp
14. Rear fog lamp

BTGE490A

Head Lamps

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the head lamp assembly after loosening the mounting bolts (A) and nut (B) and disconnecting the lamp connectors.



ATGE491A

3. Installation is the reverse of removal.

ADJUSTMENT

HEAD LAMP AIMING INSTRUCTIONS

The head lamps should be aimed with the proper beam-setting equipment, and in accordance with the equipment manufacturer's instructions.

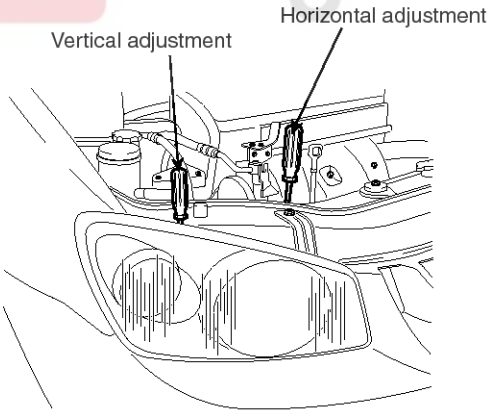
NOTICE

If there are any regulations pertinent to the aiming of head lamps in the area where the vehicle is to be used, adjust so as to meet those requirements.

Alternately turn the adjusting gear to adjust the head lamp aiming. If beam-setting equipment is not available, proceed as follows :

1. Inflate the tires to the specified pressure and remove any loads from the vehicle except the driver, spare tire, and tools.
2. The vehicle should be placed on a flat floor.
3. Draw vertical lines (Vertical lines passing through respective head lamp centers) and a horizontal line (Horizontal line passing through center of head lamps) on the screen.
4. With the head lamp and battery in normal condition, aim the head lamps so the brightest portion falls on the horizontal and vertical lines.

   Make vertical and horizontal adjustments to the lower beam using the adjusting wheel.

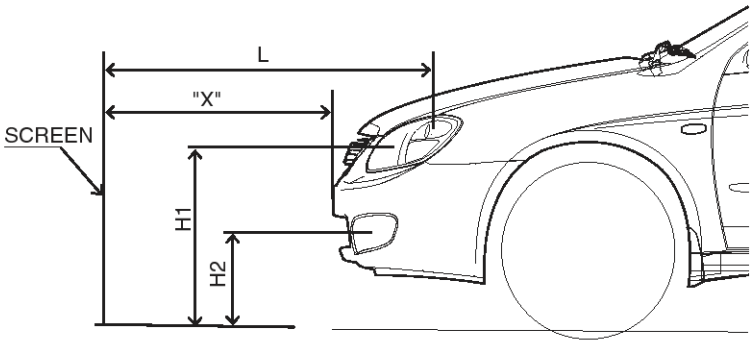


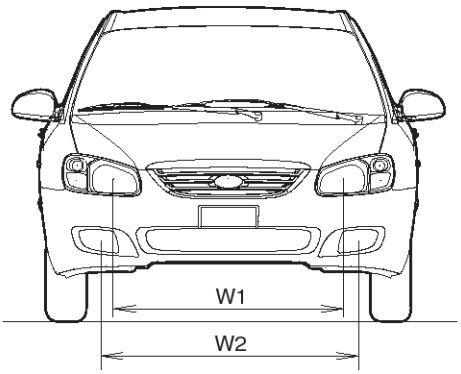
LTGE491B

FRONT FOG LAMP AIMING

The front fog lamps should be aimed as the same manner of the head lamps aiming.

With the front fog lamps and battery normal condition, aim the front fog lamps by turning the adjusting gear.





H1 : Height between the head lamp bulb center and ground (high/low beam)
H2 : Height between the fog lamp bulb center and ground

W1 : Distance between the two head lamp bulb's center (high/low beam)
W2 : Distance between the two fog lamp bulb's center

L : Distance between the head lamp bulb center and screen.

SLDBE7491L

HEAD LAMP AND FOG LAMP AIMING POINT

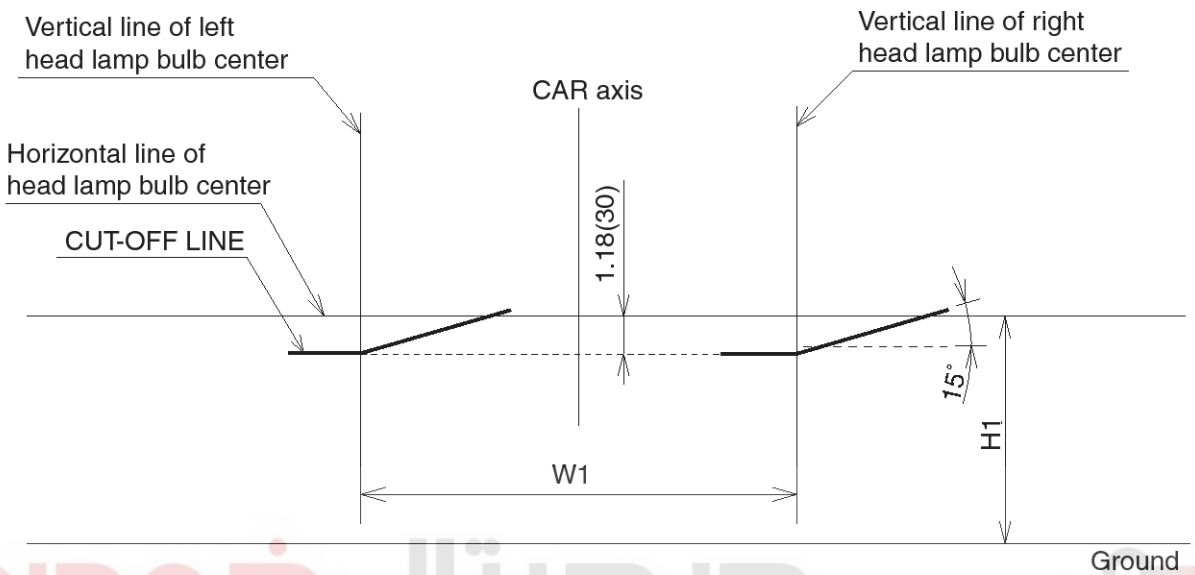
Unit : in.(mm)

Vehicle condition	H1	H2	W1	W2	L
Without driver	25.5(647.6)	13.9(353)	42.1(1,070)	54.8(1,392)	118.1(3,000)
With driver	25.1(637.6)	13.5(343)			

SLDBE7492L

1. Turn the low beam on with driver.
   The cut-off line should be projected in the allowable range (shaded region).

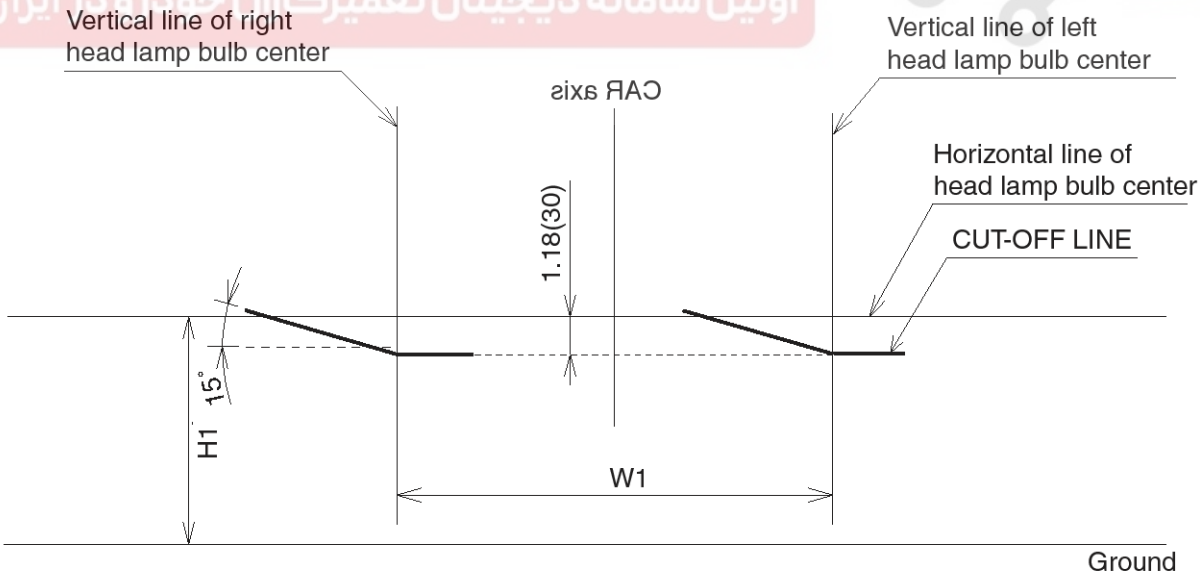
[LHD]



Unit : in.(mm)

SLDBE7493L

[RHD]

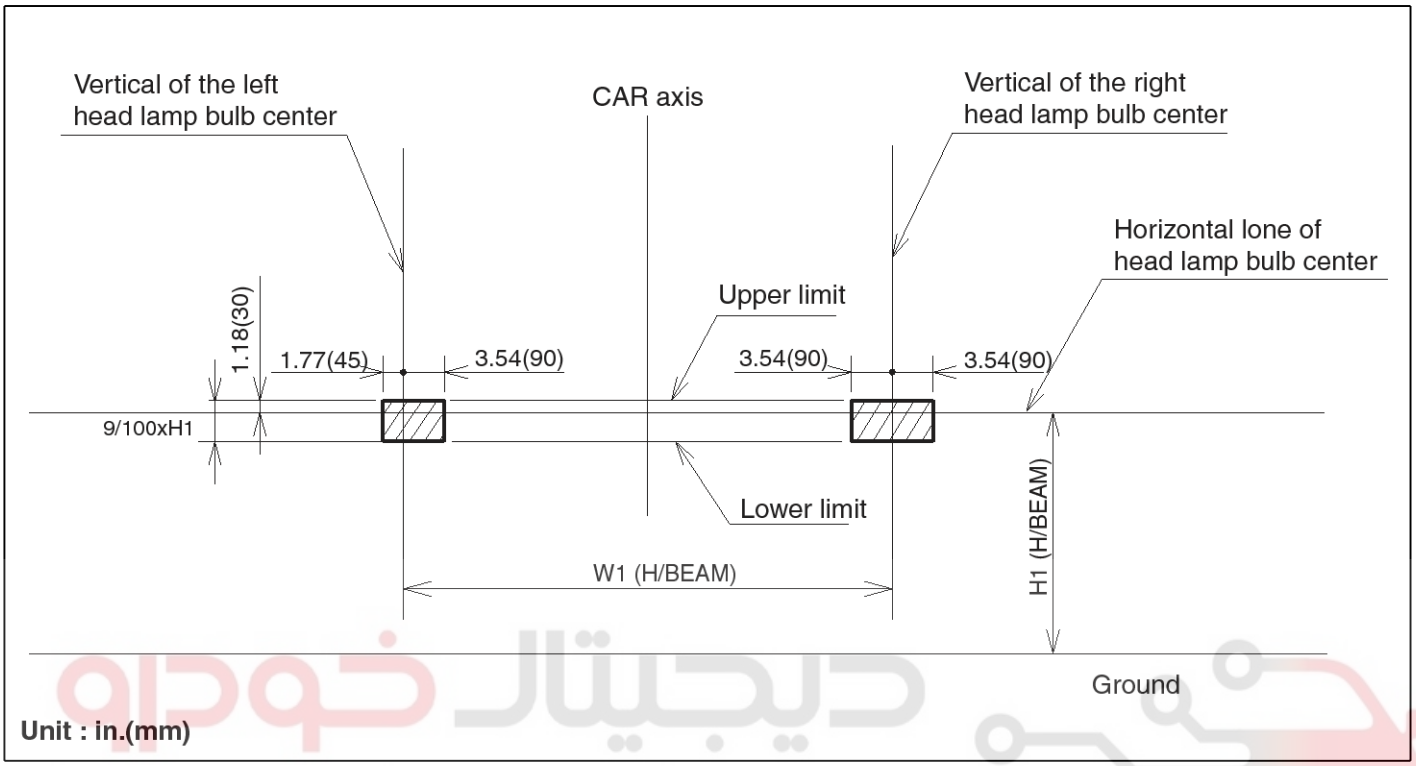


Unit : in.(mm)

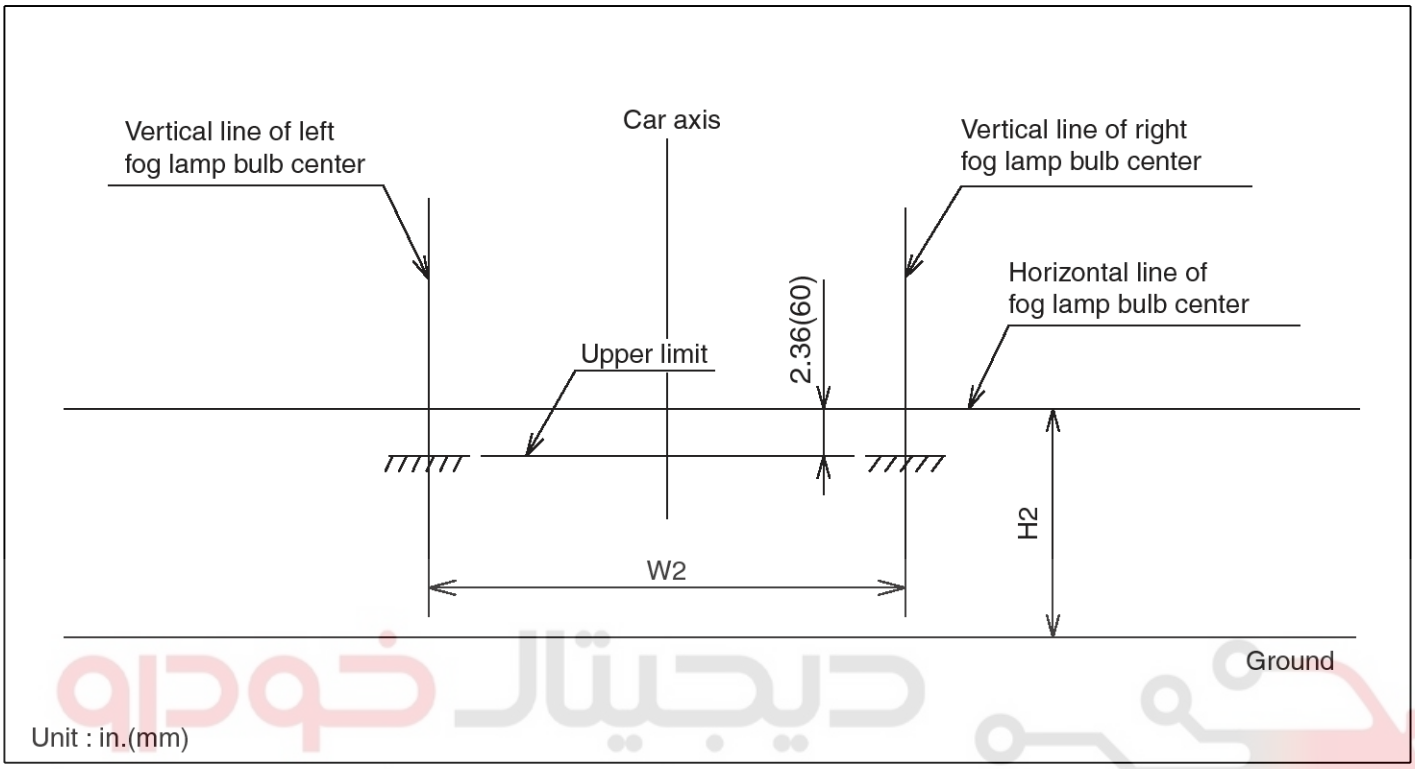
SLDBE7494L

2. Turn the high beam on with driver.

   The hot point should be projected in the allowable range (shaded region).



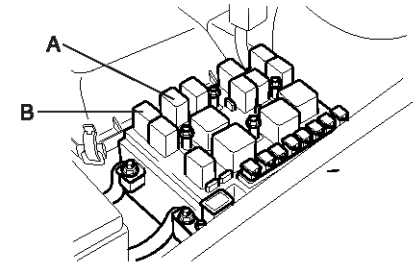
3. Turn the front fog lamp on with driver.
   The cut-off line should be projected in the allowable range (shaded region)

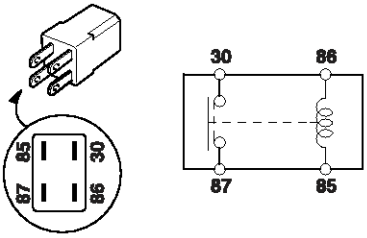


BTGE491G

HEAD LAMP RELAY INSPECTION

1. Pull out the head lamp relay (Low) (A) and head lamp relay (High) (B) from the engine compartment relay box.





LTGE491I

2. Check for continuity between terminals.

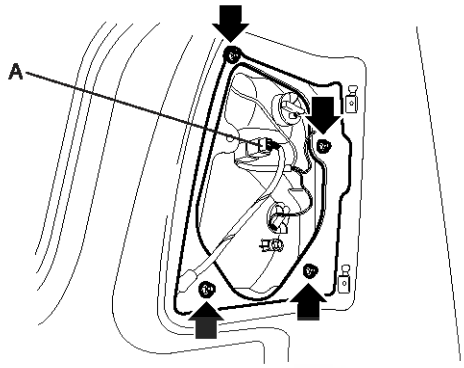
Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

LTGE221B

Turn Signal Lamp

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the cover in the trunk room after removing 2 screws.
3. Remove the 4nuts holding the rear combination lamp then disconnect the 6P connector (A).



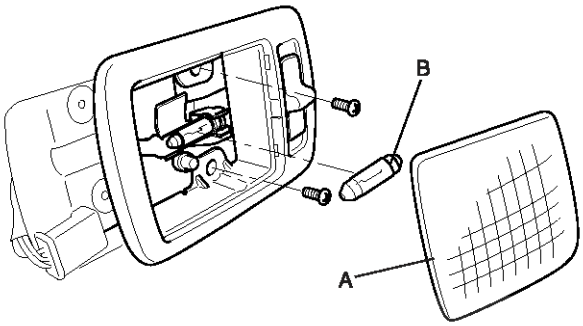
ATGE491J

4. Remove the rear combination lamp and replace the bulbs; stop & tail lamp, turn signal lamp, back up lamp.
5. Installation is the reverse of removal.

Room Lamp

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Detach the lamp lens (A) from the room lamp with a flat-tip screwdriver then replace the bulb (B).
3. Remove the room lamp assembly after removing 2 screws and disconnecting the 3P connector.

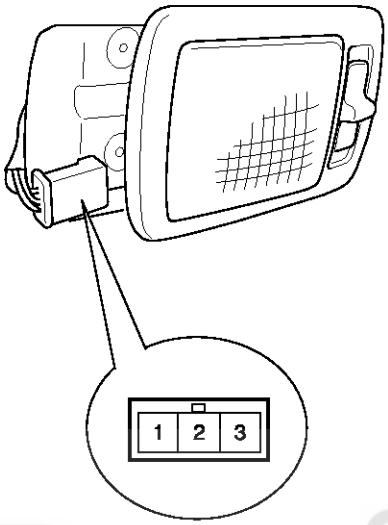


KTKD008A

4. Installation is the reverse of removal.

INSPECTION

Remove the room lamp assembly then check for continuity between terminals.



KTKD087A

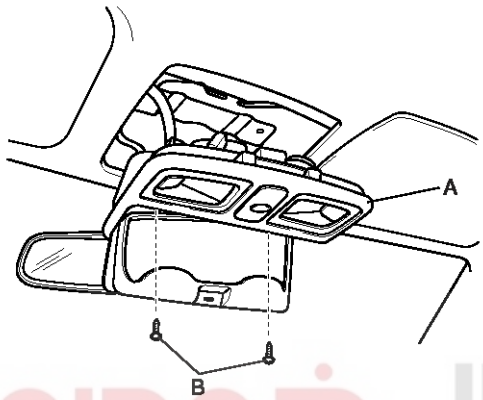
Terminal / Position	1	2	3
ON		●	●
DOOR	○	●	○
OFF			

ETKE088A

Overhead Console Lamp

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Open the sunglasses case from the overhead console.
3. Remove the overhead console lamp assembly (A) after removing 2 screws (B) and disconnecting the connector.



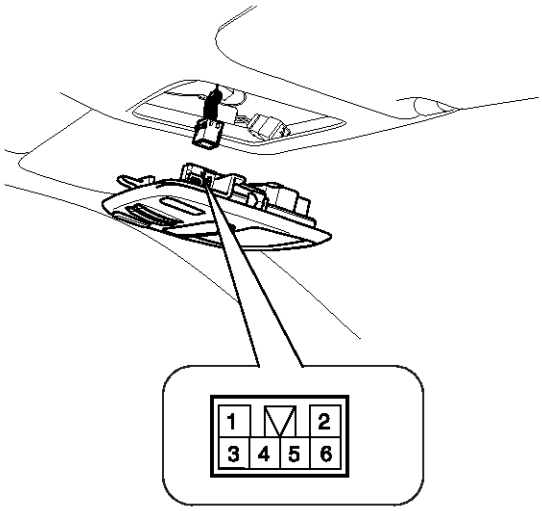
ATGE481A

4. Installation is the reverse of removal.

INSPECTION

Remove the overhead console lamp assembly then check for continuity between terminals.

[WITH SUNROOF]



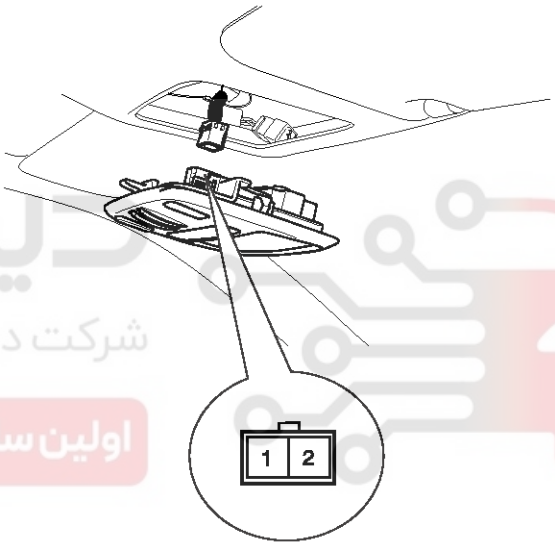
[Switch side connector]

LTGE481B

Sort / Position / Terminal	Map lamp switch			
	LH		RH	
	ON	OFF	ON	OFF
1	●		●	
2	●		●	

ETKE007M

[WITHOUT SUNROOF]



KTKD090A

Sort / Position / Terminal	Map lamp switch			
	LH		RH	
	ON	OFF	ON	OFF
1	●		●	
2	●		●	

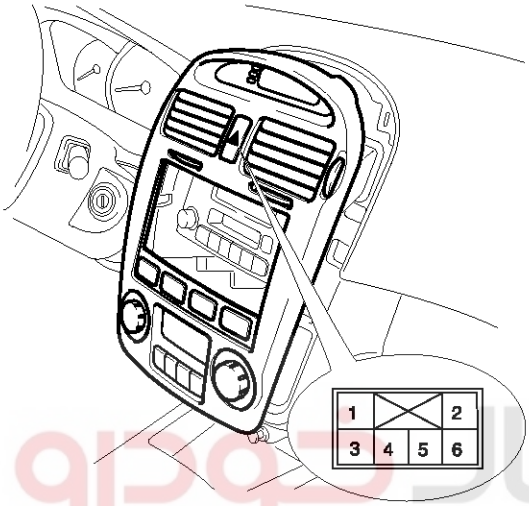
ETKE007M

Hazard Lamp Switch

INSPECTION

HAZARD LAMP SWITCH

1. Disconnect the negative (-) battery terminal.
2. Remove the hazard lamp switch from the center facia panel and disconnect the 6P connector.



ATGE495A

3. Operate the switch and check for continuity between terminals with an ohmmeter.

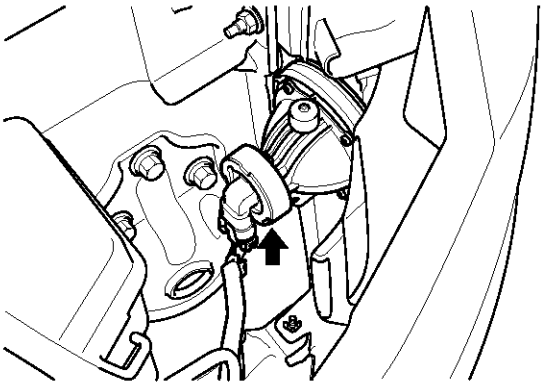
Terminal / Position	2	5	3	4
OFF				
ON		Illumination		

LTGE491M

Front Fog Lamps

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the front fog lamp after loosening the screws and disconnecting the fog lamp connector.



KTOB007H

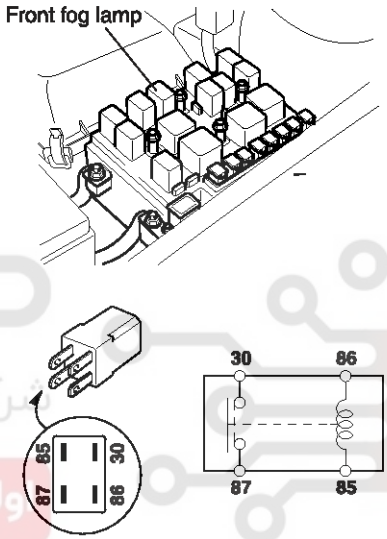
3. Installation is the reverse of removal.

INSPECTION

FRONT FOG LAMP RELAY

Check for continuity between the terminals.

1. Remove the front fog lamp relay from the relay box (engine compartment).
2. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
3. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



LTGE496A

Terminal / Position	30	87	85	86
Disconnected			○	○
Connected	○	○	⊖	⊕

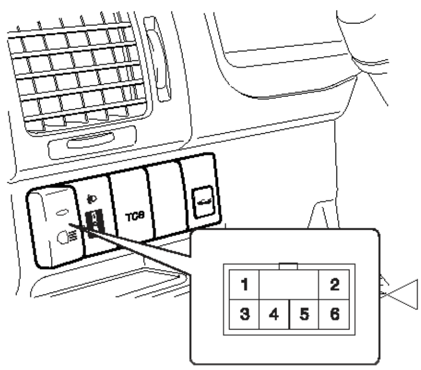
LTGE221B

Rear Fog Lamps

INSPECTION

REAR FOG LAMP SWITCH

1. Disconnect the negative (-) battery terminal.
2. Remove the rear fog lamp switch (A) from the side crash pad and disconnect the 6P connector.



LTGE497A

3. Check for continuity between the terminals in each switch position according to the table.

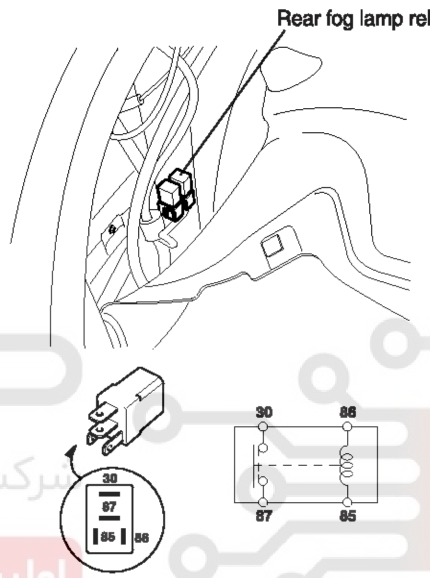
Position \ Terminal	2	5	1	4	3
ON	○—(Illumination)	—○	○—(IND.)—	—○—	—○
OFF					

LTGE441B

REAR FOG LAMP RELAY

Check for continuity between the terminals.

1. Remove the rear fog lamp relay after removing the left luggage side trim (Refer to the Body group).
2. There should be continuity between the No.30 and No.87 terminals when power and ground are connected to the No.85 and No.86 terminals.
3. There should be no continuity between the No.30 and No.87 terminals when power is disconnected.



LTGE497B

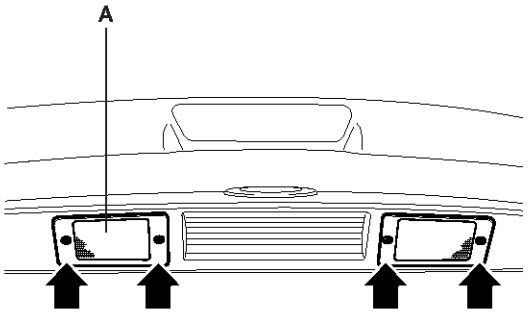
Position \ Terminal	30	87	85	86
Disconnected			○—	—○
Connected	○—	—○	⊖—	—⊕

LTGE221B

License Lamps

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the license plate lamp (A) after removing 2 screws.



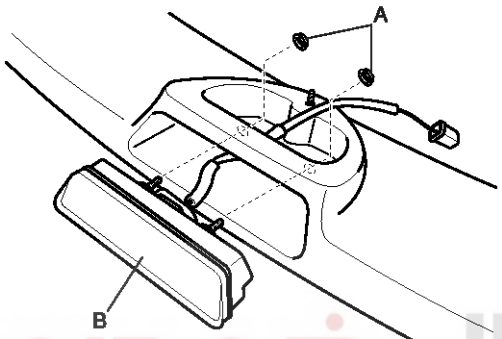
ATGE498A

3. Replace the bulb.
4. Installation is the reverse of removal.

High Mounted stop lamp

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Open the trunk lid and then disconnect the connector of high mounted stop lamp.
3. Remove the spoiler after loosening the mounting screws.
4. Remove the high mounted stop lamp (B) after loosening the nuts (A).



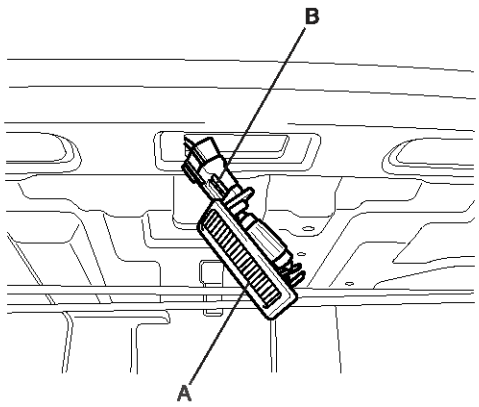
ATGE499A

5. Installation is the reverse of removal.

Trunk Lamps

REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Open the trunk lid, then remove the trunk room lamp (A) with a flat-tip screwdriver and disconnect the 2P connector (B).



ATGE499B

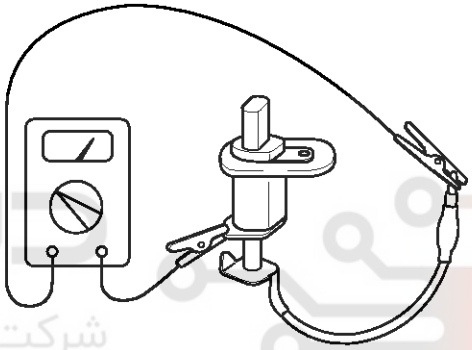
3. Replace the bulb.
4. Installation is the reverse of removal.

INSPECTION

TRUNK ROOM LAMP SWITCH

1. Disconnect the negative (-) battery terminal.
2. After opening the trunk, disconnect the 1P connector from the rear harness.
3. Check for continuity between the terminal and body while pushing the rod.

Switch rod condition	Continuity
Pushed (OFF)	Non-conductive (∞Ω)
Released (ON)	Conductive (0Ω)



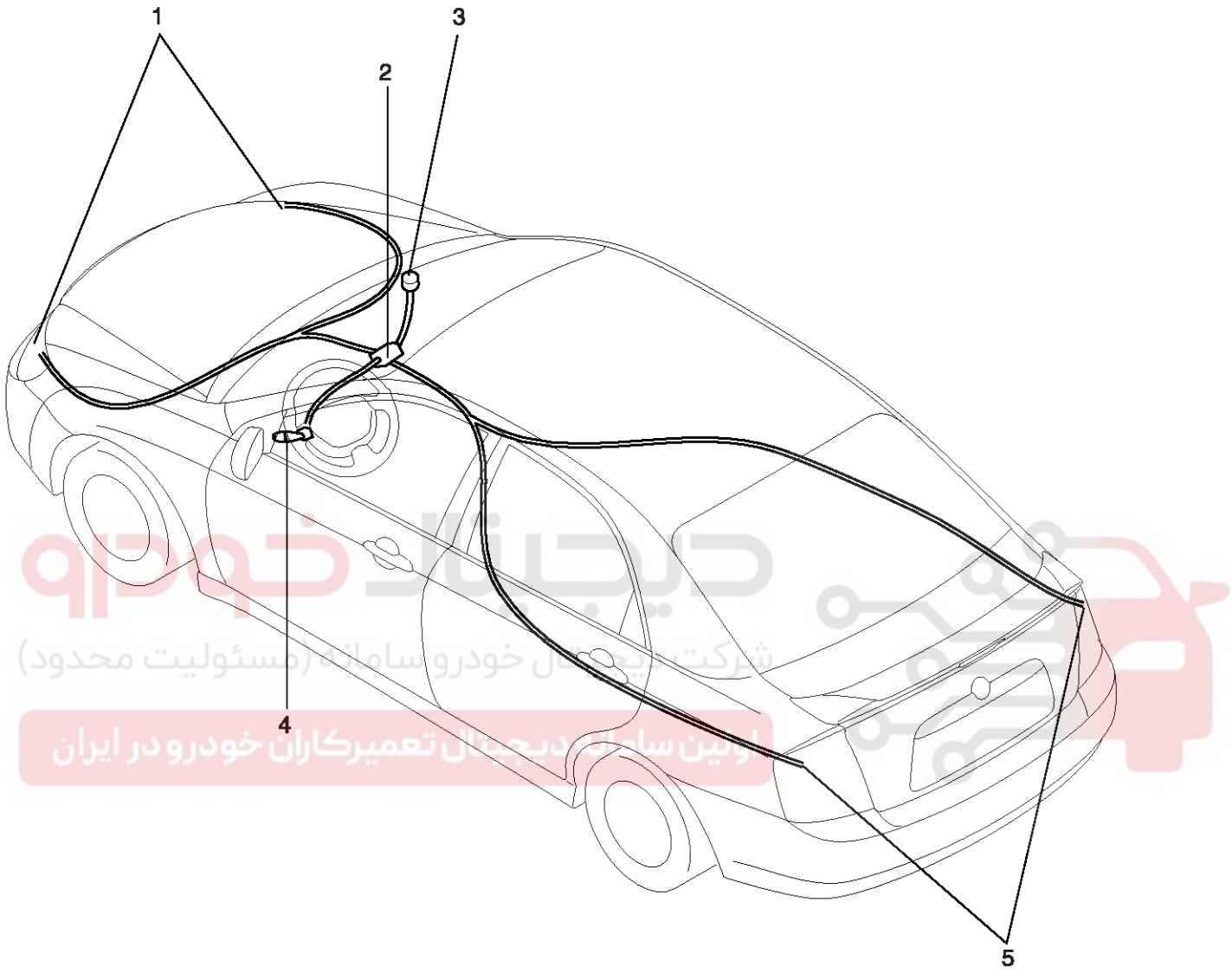
KTBC455E

Auto Lighting Control System

SPECIFICATIONS

Items	Specifications
Rated voltage	12V
Load	Max. 200mA (Relay load)
Detection illuminations Tail lamp/Head lamp	ON : 24±5.2 (Lux), 0.81±0.05 (V) OFF : 48±10.5 (Lux), 1.41±0.05 (V)

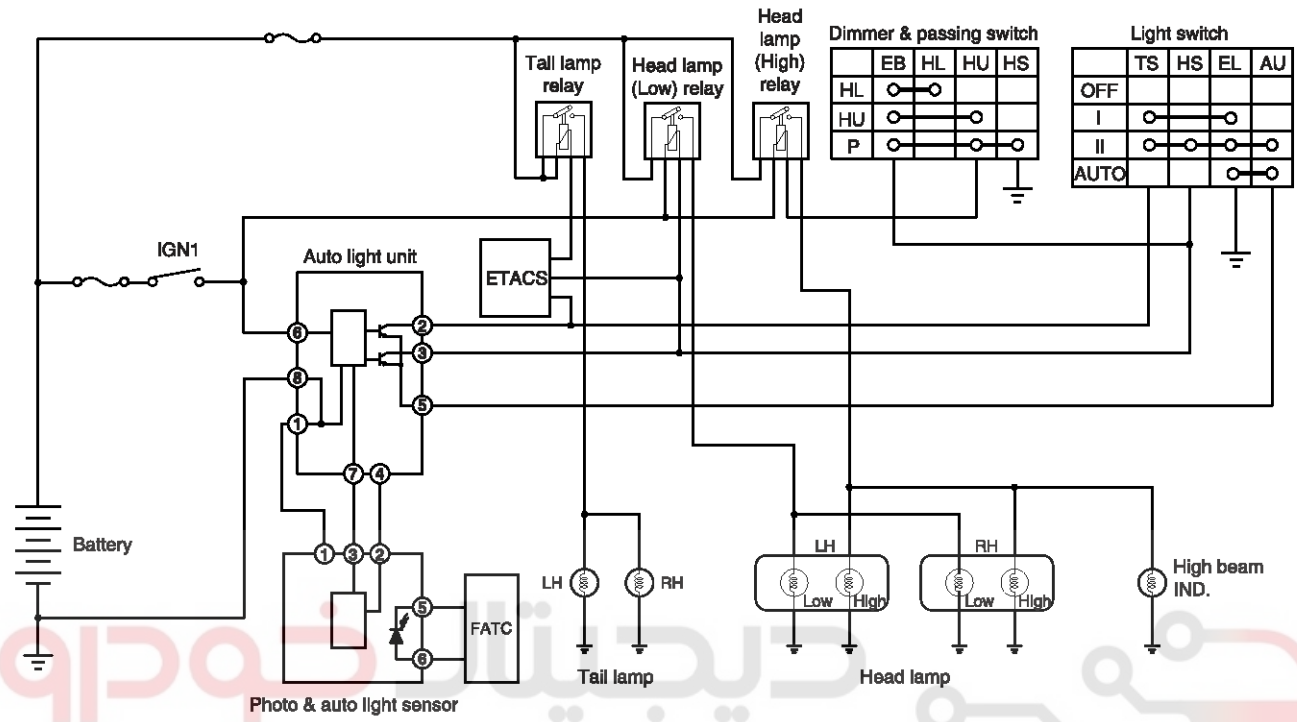
COMPONENTS

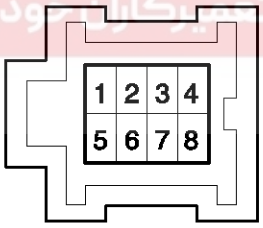


1. Head lamps
2. Auto light unit
3. Auto light sensor
4. Lighting switch
5. Tail lamps

LTGE510A

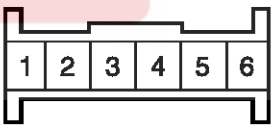
CIRCUIT DIAGRAM





[Auto light unit side connector]

1. Sensor ground
2. Tail lamp relay
3. Head lamp relay
4. Sensor power
5. Auto light switch
6. IGN 1
7. Signal input
8. Ground



[Auto light sensor side connector]

1. Sensor ground
2. Sensor power
3. Signal
4. Blank
5. Blank
6. Blank

BTGE511C

DESCRIPTION

The auto light control system operates by using the auto light switch.

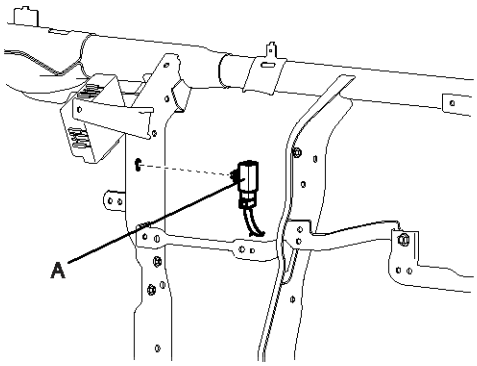
If you set the multi-function switch to "AUTO" position, the tail lamp and head lamp will be turned automatically on or off according to external illumination.

Auto Light Contorl unit

INSPECTION

AUTO LIGHT UNIT

1. Remove the auto light unit (A) from the center support bracket left side after removing the center facia panel and audio unit.



ATGE511A

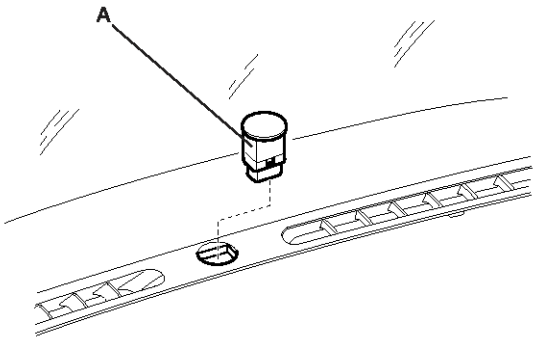
2. Disconnect the 8P connector (B) from the auto light unit then inspect the connector on the wire harness side, as shown in the chart.

Tester co-nnection	Condition	Specified condition
2-Ground	Constant	5V
	Tail lamp switch ON	0V
3-Ground	Ignition switch ON	12V
4-Ground	Sensor power	5V
5-Ground	Auto light switch ON	Continuity
6-Ground	Ignition switch ON	12V
8-Ground	Constant	Continuity

3. If the circuit is not as specified, inspect the circuits connected to other parts.

AUTO LIGHT SENSOR

1. Remove the auto light sensor (A) after removing the defroster center cover from upper the crash pad.



ATGE511B

2. After ignition switch ON, measure the voltage between terminal No.2 of the auto light sensor harness side connector (B) and body ground.

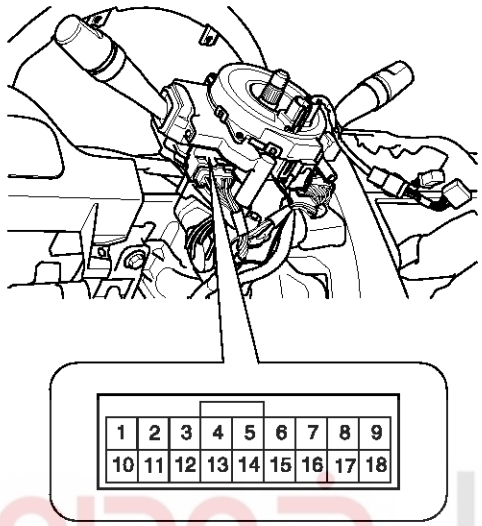
OK : Sensor power (+5V)

3. Check for continuity between terminal No.1 of the auto light sensor harness side connector (B) and body ground.
4. If the circuit is not as specified, inspect the circuits connected to other parts.

Auto Light Switch

INSPECTION

Operate the auto light switch, then check for continuity between terminals of 18P multi-function switch connector.



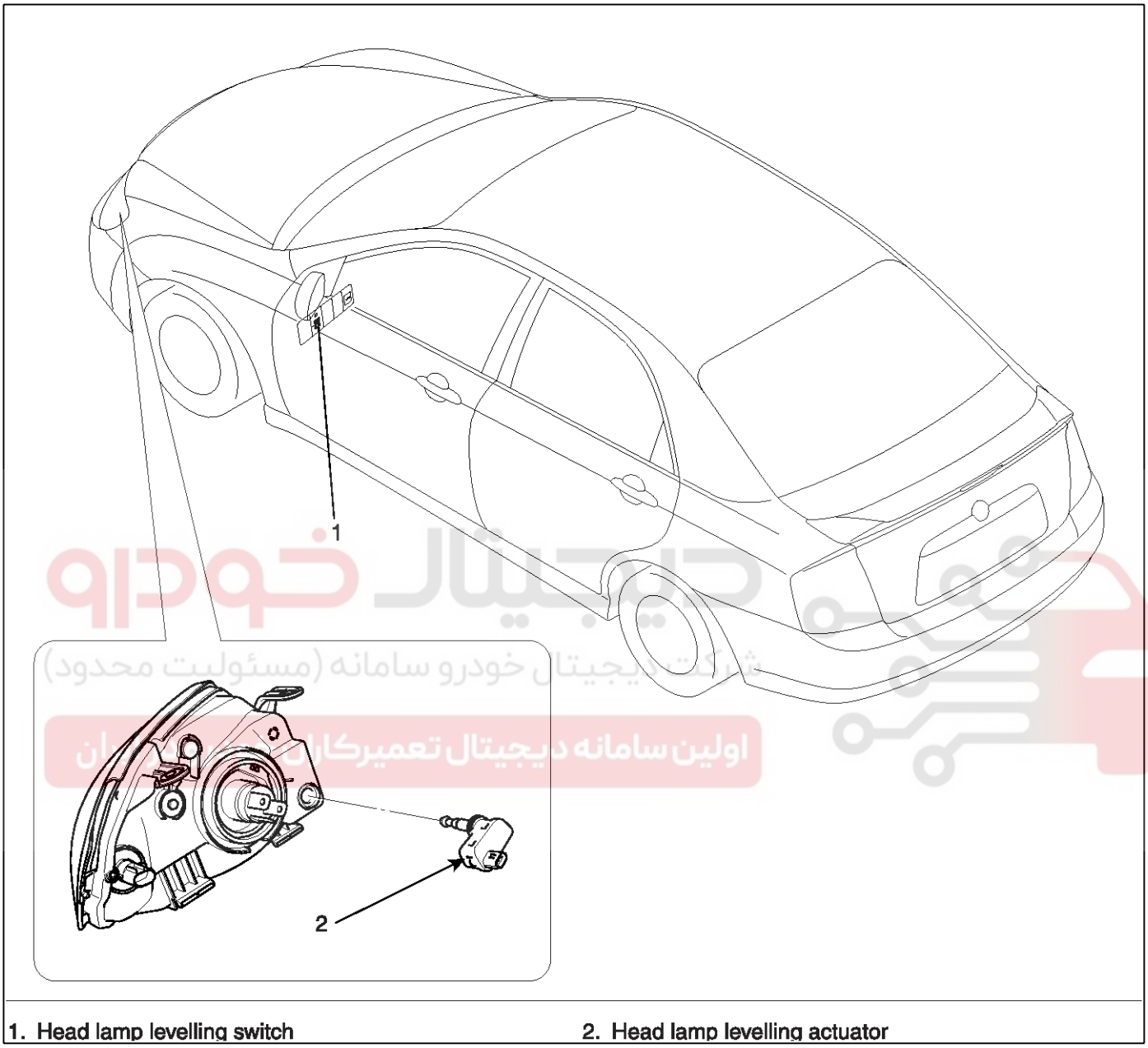
KTDD075G

Position \ Terminal	14	15	16	17
OFF				
I	○			○
II	○	○		○
AUTO			○	○

LTGE031E

Head lamp leveling Device

COMPONENTS

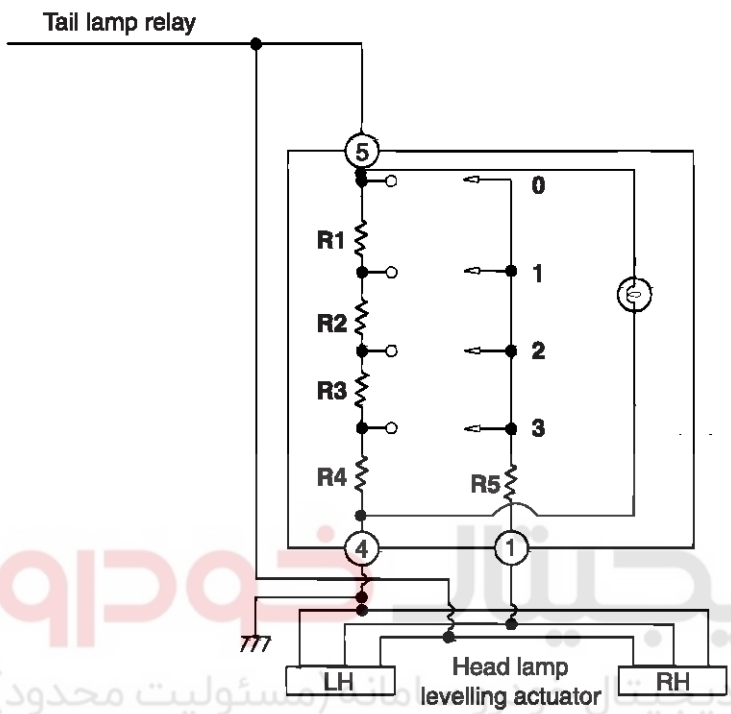


1. Head lamp levelling switch
2. Head lamp levelling actuator

LTGE540A

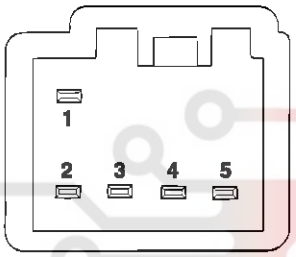
Head Lamp Leveling Switch

CIRCUIT DIAGRAM



PIN CONNECTION

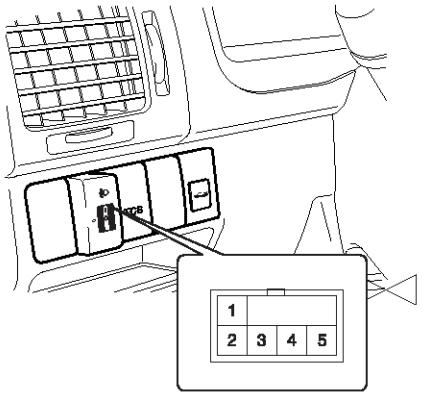
PIN NO	Description
1	Actuator(+)
2	-
3	-
4	Ground
5	Tail lamp relay



LTGE542A

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the head lamp leveling switch (A) from the side crash pad and disconnect the 5 pin connector.



LTGE542B

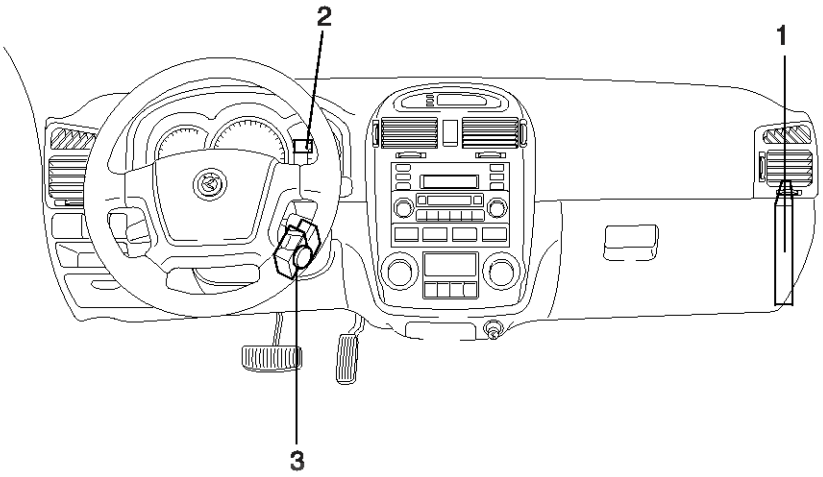
3. Connect the battery voltage between terminals 5 and 4 (reference voltage Vb).
4. Measure the voltage between terminals 1 and 4 (Vb).
5. Check the percent ratio (V/Vb x 100) between voltage Vb and V at each position.

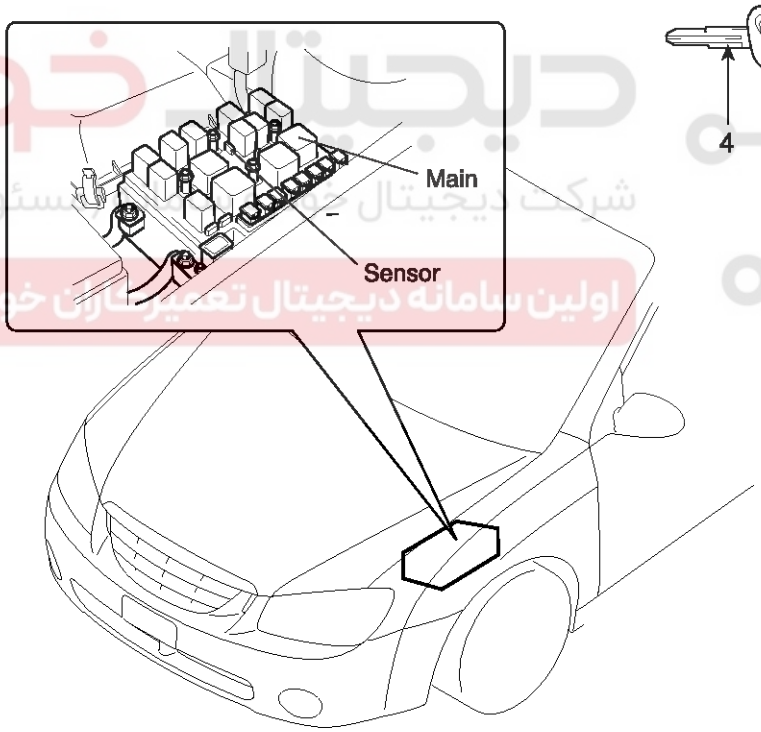
Position No.	Rotation	Ratio ± 5	Voltage (V)
0	0°	85%	11.05 ± 0.5 V
1	20°	70%	9.5 ± 0.5V
2	40°	60%	8.15 ± 0.5V
3	60°	50%	6.82 ± 0.5V

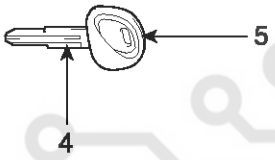
6. If the voltage is not as specified, replace the head lamp leveling switch.

Immobilizer System

COMPONENTS







1. ECM
2. Immobilizer indicator light
3. Immobilizer antenna unit (SMARTRA)
4. Ignition key
5. Transponder

LTGE740A

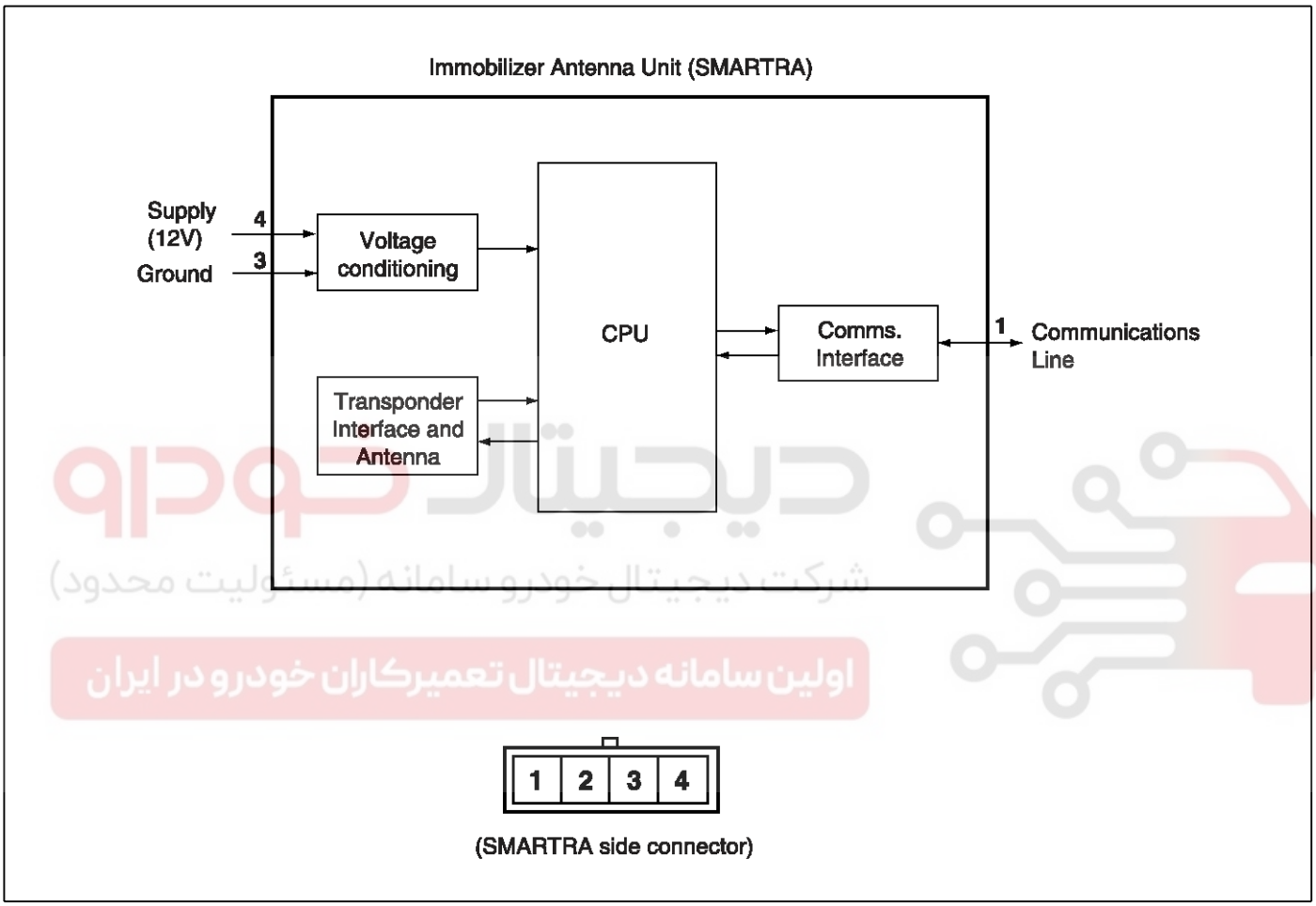
DESCRIPTION

The vehicle is equipped with an immobilizer system that will disable the vehicle unless the proper ignition key is used.This system consists of a transponder located in the ignition key, an immobilizer antenna unit (SMARTRA), an indicator light and the ECM/PCM.

The SMARTRA unit contains an integrated inductive antenna and electronics around the lock assembly. The SMARTRA communicates to the ECM (Engine Control Module) via a dedicated communications line.

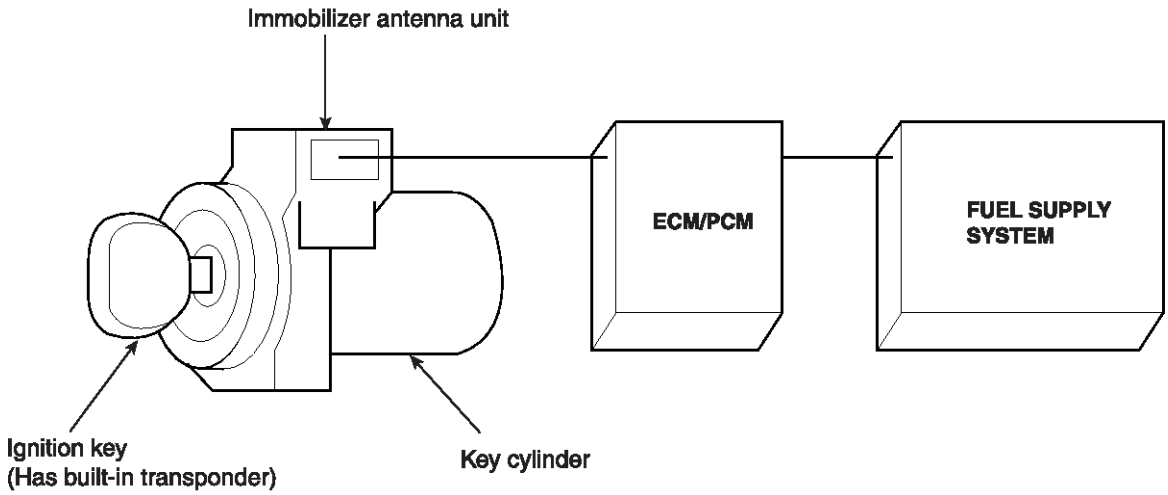
Since the vehicle engine management system is able to control engine mobilization, it is the most suitable unit to control the SMARTRA.

SYSTEM BLOCK DIAGRAM



ETKE270A

When the key is inserted in the ignition and turned to the ON position, the immobilizer antenna unit sends power to the transponder in the ignition key. The transponder then sends a coded signal back through the immobilizer antenna unit to the ECM/PCM.



ETKD920B

- The immobilizer system can store up to four key codes.
- If it is necessary to rewrite the ECM/PCM to learn a new key, the dealer needs the customer's vehicle, all its master keys and the Hi-scan(pro) equipped with an immobilizer program card. Any key that is not learned during rewriting will no longer start the engine.
- If the customer has lost his key, and cannot start the engine, contact Kia motor service station.
- If the proper key has been used, the ECM/PCM will energize the fuel supply system. The immobilizer indicator light in the gauge assembly will simultaneously come on for about two seconds, then go off, indicating that the immobilizer antennaunit has recognized the code sent by the transponder.
- If the wrong key has been used and the code was not received or recognized by the ECM/PCM the indicator light will come on for about two seconds, then it will continue blinking until the ignition switch is turned OFF.

PROBLEMS AND REPLACEMENT PARTS:

Problem	Part set	Hi-scan (pro) required?
Master key has been lost or additional master key is required	Blank key	YES
All master keys have been lost	Blank key (4)	YES
Immobilizer antenna unit does not work	Immobilizer antenna unit	NO
ECM/PCM does not work	ECM/PCM	YES
Ignition switch does not work	Ignition switch with immobilizer antenna unit Master key	YES
Unidentified vehicle specific data occurs	Ignition switch with immobilizer antenna unit Master key ECM/PCM	YES

COMPONENTS OPERATIONS

The vehicle immobilizer system consists of the ECM/PCM, the Immobilizer antenna unit (SMARTRA) and transponder built into the ignition key.

COMPONENTS	FUNCTION
ECM	The ECM carries out a check of the ignition key using a special encryption algorithm, which is programmed into the transponder as well as the ECM simultaneously. Only if the results are equal, the engine can be started. The data of all transponders, which are valid for the vehicle, are stored in the ECM.
SMARTRA	The SMARTRA carries out communication with the built-in transponder in the ignition key. This wireless communication runs on RF(Radio frequency of 125 kHz). The SMARTRA is mounted at the ignition lock close to the antenna coil for RF transmission and receiving. The RF signal from the transponder, received by the antenna coil, is converted into messages for serial communication by the SMARTRA device. And, the received messages from the ECM are converted into an RF signal, which is transmitted to the transponder by the antenna. The SMARTRA does not carry out the validity check of the transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to the ECM and vice versa.
TRANSPONDER (built-in keys)	The transponder has an advanced encryption algorithm. During the key teaching procedure, the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is once only; therefore, the contents of the transponder can never be modified or changed.

TEACHING PROCEDURES

Key teaching procedures need to be done, by the dealer, after replacing a defective ECM (Electronic Control Module), or when providing additional key(s) to the vehicle owner.

Key teaching procedures start with an ECM request for vehicle specific data from the tester. The "virgin" ECM stores thevehicle specific data, and then the compares the data in the "learnt" ECM to the original data in the tester. If the data loaded correctly then key teaching can begin. (See "virgin" vs "learnt" section below for related information.)

If vehicle specific data is incorrectly sent to the ECM three times, the ECM will reject the key teaching request for 1 full hour.

NOTICE

The one-hour timer limitation cannot be reduced by any user actions. For instance, if the battery is disconnected and reconnected during this period, the one-hour timer will restart.

Key teaching requires the ignition (w/key) on while a series of specific tester commands are run. The ECM stores the relevant data in the EEPROM and in the transponder. The ECM then runs an authentication process. If the authentication process indicates that the teaching process was successful a confirmation signal is then sent to the tester.

NOTICE

KIA recommends setting the User Password when the car is initially sold.

ADDITIONAL KEYS

- If the ECM recognizes a key from a previous key teaching process, the authentication will be accepted and the EEPROM data updated. The transponder content will not be changed.
- Attempts to re-teach the ECM will reject a key, which has already been sent through the same teaching cycle. A notification message is then sent to the tester.
- The ECM can also recognize and reject invalid keys when they are presented for teaching. Keys can be invalid due to faults in the transponder or other unsuccessfully programmed data. If the ECM detects different ECM and transponder authenticators, the key will be rejected.
- The maximum number of keys that can be taught is 4.

FAULT CODES

- If an error occurs during Immobilizer Service, the ECM status remains unchanged and a fault code will display.
- If the ECM status and the key status do not match for teaching of keys, the tester procedure will be stopped

and a specific fault code will be stored in the ECM.

USER PASSWORD TEACHING PROCEDURE

Dealer service representatives set user Passwords for "limp home" mode. The owner of the vehicle can select a number with four digits.

User password teaching can only be accepted by "learnt" ECMs.

"virgin" vs "learnt"

Prior to initial teaching procedures the ECM user password is "virgin". Once the initial teaching procedure is successful, the status of the user password changes from "virgin" to "learnt".

User password teaching begins with the ignition turned on, using a valid key. The user password, "virgin" is then sent by the tester. After a successful teaching procedure is run the user password changes from "virgin" to "learnt".

The "learnt" password can also be changed. This can be accomplished if the user password is "learnt" and the tester sends either an authorization of access, which would be the old password, or the vehicle specific data. Once authorization is complete, the ECM requests the new user password. The status remains "learnt" and the new user password will be valid for the next "Limp Home" mode.

If incorrect user passwords or wrong specific data are sent to the ECM three (3) times, the ECM will reject further requests for pass word change, for one (1) hour.

NOTICE

The one-hour timer limitation cannot be reduced by any user actions. For instance if the battery is disconnected and reconnected during this period, the one-hour timer will restart.

THE USER PASSWARD CAN BE IN THE STATUS

00. Not yet checked

System status is stored in the EEPROM. If incorrect data or non-plausible data is provided the ECM cannot check the status and the ECM sends 00.

01. Learned

The ECM has successfully learned the password.

02. Virgin

Password status, at end of the ECM production line, prior to final customer delivery.

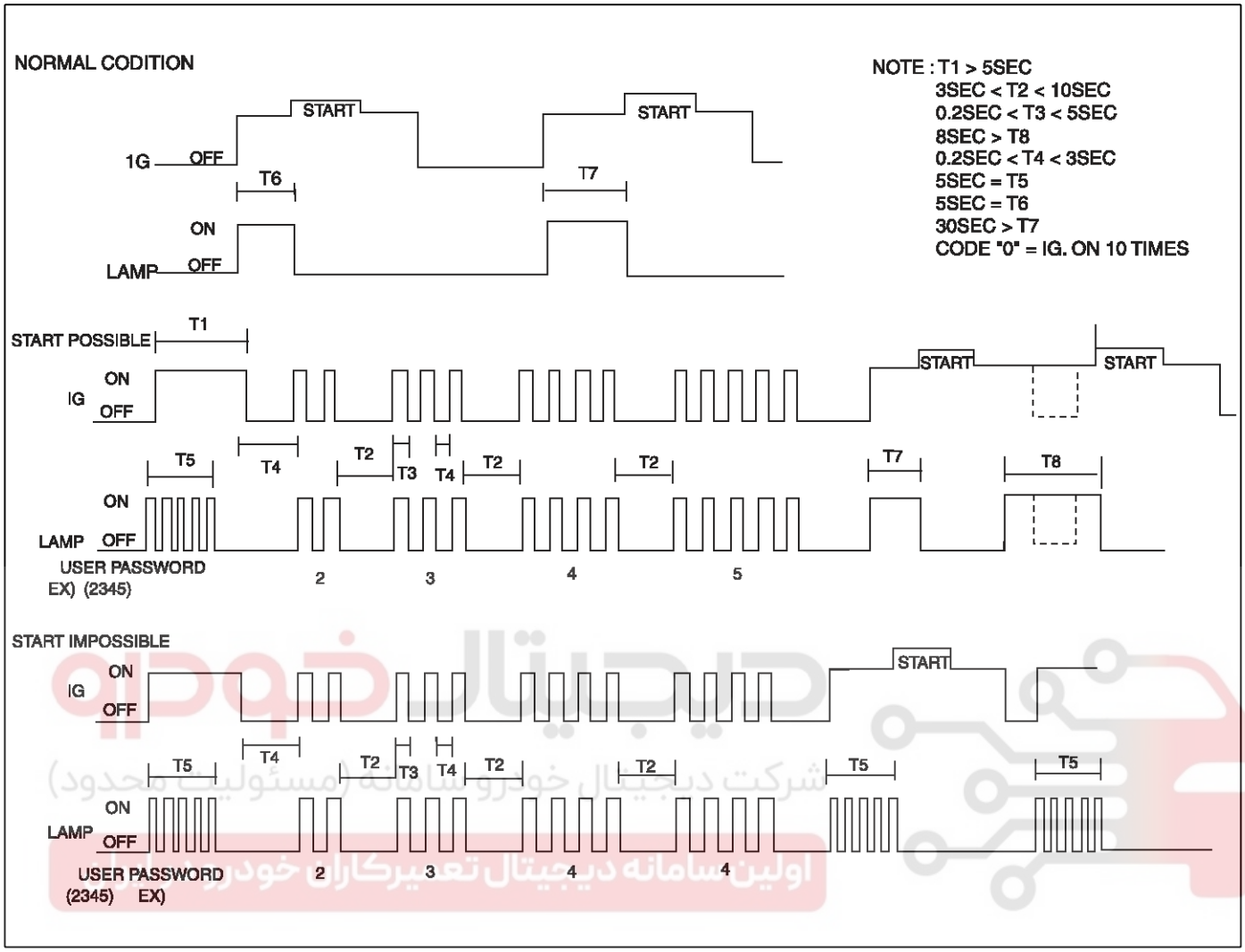
04. Locked by timer

After 3 unsuccessful teaching, no inputs are accepted and the ECM is locked for one (1) hour.

05. Teaching not accepted

This status is set if, for example, the ECM is in neutral status.

LIMP HOME FUNCTION



LTAC065A

1. LIMP HOME BY TESTER

   The ECM provides a "limp home" function, for the immobilizer, which allows starting the engine in cases where the ECM detects a SMARTRA or transponder fault. Limp home mode is only possible if the user password (4 digits) has been programmed into the ECM prior to the fault. This 4 digit password can be selected by the vehicle owner and programmed into the ECM by the dealer service representative. The user password is sent to the ECM via the special tester menu.

   Starting the engine. (Read completely prior to attempting vehicle start).

   The ECM must be in "learnt" status and the user password must be correct to start the vehicle.

   - If the "learnt" password is correct the ECM will be unlocked, and the engine started for a period of 30 seconds. Once the 30 seconds has elapsed the vehicle WILL NOT start.
   - If the password, sent to the ECM, is incorrect, the "limp home" request will be rejected for a period of 1 hour.

   NOTICE

   The The one-hour timer limitation cannot be reduced by any user actions.

   For instance if the battery is disconnected and reconnected during this period, the one-hour timer will restart.

2. LIMP HOME BY IGNITION KEY

   The "limp home" mode can also be activated using the ignition key. The user password can be input to the ECM by using a special ignition sequence

(ON/OFF).

If the "learnt" password is correct the ECM will be unlocked, and the engine started for a period of 30 seconds. Once the 30 seconds has elapsed the vehicle WILL NOT start.

NOTICE

After a new password has been input, the timer (30 sec.) will start again.

If the ignition is turned OFF for a period of 8 seconds, the ECM will once again be locked. To restart the vehicle after the 8 second period the user password will once again be required.

NOTICE

KIA recommends setting the User Password when the car is initially sold. Auto-theft can easily occur since a secure userpassword has not been set allowing the vehicle limp to the wrong home.

DIAGNOSIS OF IMMOBILIZER FAULTS

- Communication between the ECM and the SMARTRA.
- Function of the SMARTRA and the transponder.
- Data (stored in the ECM) related to the immobilizer function.

There are four different faults that are assigned to the immobilizer system. Every fault is broken down into four different types (circuit malfunction, circuit range / performance problem, low input, high input). The following table shows the assignment of immobilizer related faults to each type :

Immobilizer Related Faults	Fault types	Diagnostic codes
Transponder Fault	Invalid transponder data	P1693
	Transponder not in password mode or transport data has been changed	
	Programming error	
SMARTRA Fault	Antenna error	P1691
	Invalid request from ECM or corrupted data	P1694
	No answer from SMARTRA	P1690
	Invalid message from SMARTRA to ECM	P1690
EEPROM	Inconsistent data of EEPROM	P1695
	Invalid write operation to EEPROM	
Immobilizer indicator of ECM Faults	Not plausible immobilizer indicator stored at ECM	P1695
	No valid data from SMARTRA after 3 attempts by ECM	P1695
	Invalid tester message or unexpected requests by tester	
Immobilizer indicator lamp error	Faulty immobilizer indicator lamp (Cluster)	P1692
Invalid tester request	Invalid tester message or unexpected requests by tester (e.g. exceeding the maximum limit of teaching trials)	P1697
Key IDE not valid	Invalid key or virgin key	P1698

REPLACEMENTS OF ECM

If the ECM fails or is defective, the unit must be replaced with a "virgin" or "neutral" ECM. All keys will have to be registered (taught) to the new ECM. Keys not taught to the new ECM WILL NOT work with the ECM. (Refer to

Teaching Method).

NOTICE

The The vehicle specific data will have to be left unchanged with regards to the unique programming for the transponder.

REPLACEMENT OF SMARTA

In the case of a defective SMARTA, no special procedure is required. Anew SMARTA device simply replaces the existing device. Transponder-related data is not stored in this device.

NEUTRALIZING THE ECM

The ECM can be set to a "neutral" state using a tester.

Once a valid ignition key is inserted and started, the ECM requests the vehicle specific data from the tester. Communication messages are described in "Neutral MODE". After successfully receiving the data the ECM is neutralized.

The ECM will remain locked. Neither "limp home" mode nor the "twice ignition" function will be accepted by the ECM.

The key teaching follows procedures described for a "virgin" ECM. Vehicle specific data must remain unchanged due to unique programming of the transponder. If data changes, new keys with a "virgin" transponder will be required.

IMMOBILIZER (SMARTRA) DTC LIST

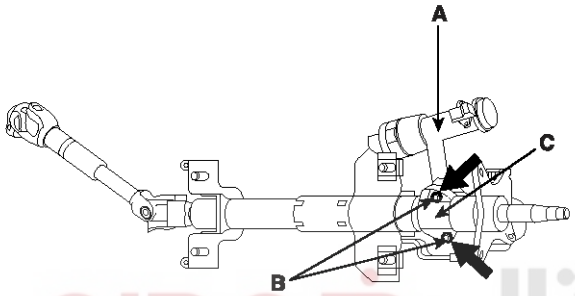
No.	Fault co-de	Monitor strategy description	Remark
1	P1610	Non-Immobilizer-EMS connected to an Immobilizer	
2	P1674	Transponder status error	
3	P1675	Transponder programming error	
4	P1676	SMARTRA message error	
5	P1690	SMARTRA no response	
6	P1691	Antenna coil error	
7	P1693	Transponder no response error / Invalid response	
8	P1694	EMS message error	
9	P1695	EMS memory error	
10	P1696	Authentication fail	
11	P1699	Twice overtrial	

Ignition Switch Assembly

Ignition Switch

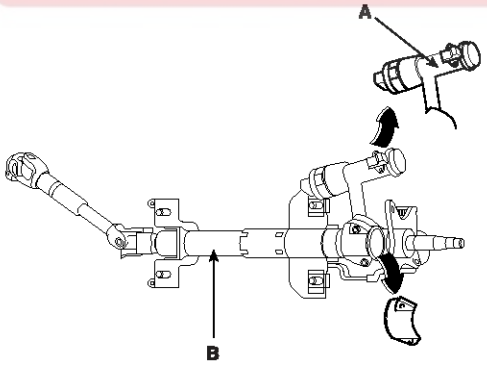
REPLACEMENT

1. Remove the steering column shaft (Refer to the ST group).
2. If it is necessary to remove the key lock assembly (A), use a punch to make a groove on the head of the special bolt (B), and then use a screwdriver to remove the key lock assembly mounting bracket (C).



EPKE021A

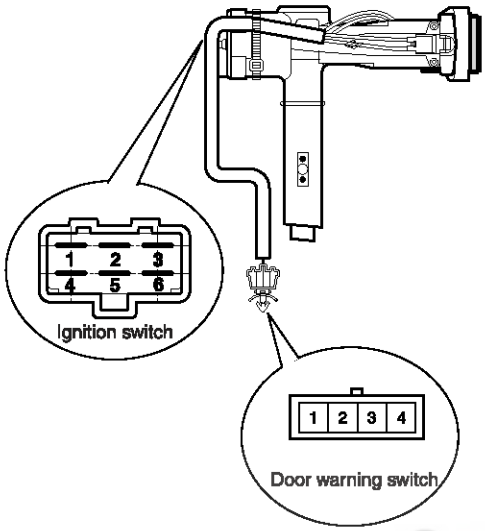
3. Disassembly the key lock assembly (A) from the steering column and shaft assembly (B).



EPKE022A

4. Installation is the reverse of removal procedure.

INSPECTION



ETKE093A

1. Disconnect the ignition switch connector and door warning switch connector from under the steering column.
2. Check for continuity between the terminals.
3. If continuity is not specified, replace the switch.

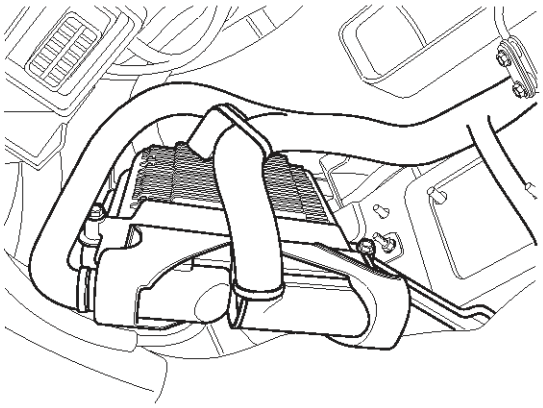
TERMINAL / POSITION / KEY		IGNITION SWITCH						STEERING		DOOR WARNING SWITCH		KEY HOLE ILLUMINATION	
		5	3	1	2	4	6	TRAVEL	TRAVEL	3	4	1	2
LOCK	REMOVAL							LOCK					
	INSERT							LOCK	UNLOCK				
ACC		○—○						UNLOCK		○—○			
ON		○—○—○			○—○								
START		○—○—○			○—○—○								

ETKE094A

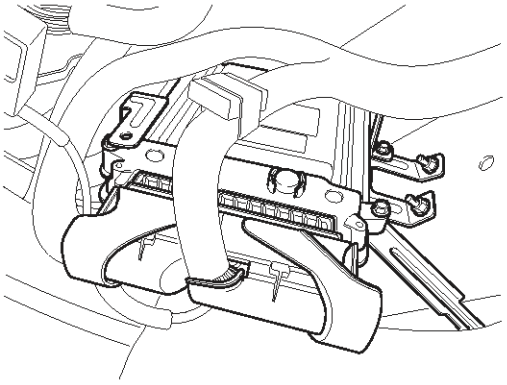
P1610

COMPONENT LOCATION

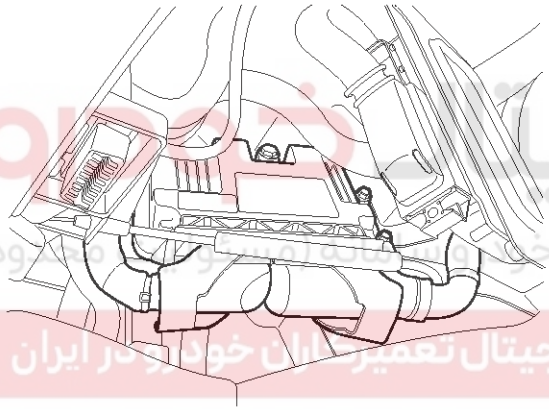
Gasoline 2.0



Gasoline 1.6



Diesel 1.6



SLDBE7740L

GENERAL DESCRIPTION

Immobilizer is device that prevents car from being thieved by reproduced key. Major components of immobilizer are ECM(Engine Control Module) and SMARTRA. Besides them, Immobilizer has transponder and coil antenna in it. If driver inserts key into key hole, SMARTRA gets tansponder signal by wireless communications via coil antenna and delivers it to ECM through K-line communication line. then ECM deciphers code in it. If inserted key has invalid transponder with incorrect code or doesn't have transponder in it, ECM judges that inserted key is reproduced key and prohibits engine starting.

DTC DESCRIPTION

The ECM sets DTC P1610 if Non Immobilizer EMS is installed on vehicle equipped with Immobilizer.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Invalid ECM
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)"mode and monitor "DTC Status" parameter
4. Is the DTC B1610 present?

Substitute with a known-good ECM with immobilizer and check for proper operation.If the problem is corrected, replace ECU and then go to "Verification of Vehicle Repair" procedure.

Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

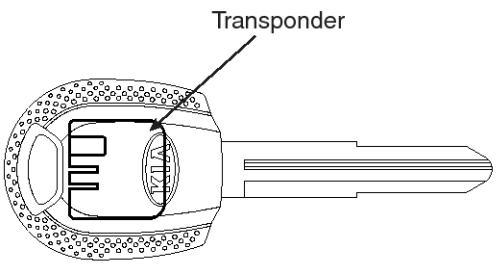
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

Go to the applicable troubleshooting procedure.

System is performing to specification at this time.

P1674

COMPONENT LOCATION



SLDBE7744L

GENERAL DESCRIPTION

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.The transponder memory is split into two strings called authenticator and key password After this programming the transponder memory is locked and the data(PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit. Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser.Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION

The ECM sets DTC P1674 if transponder key that can't be register(TP not in the password mode or whose transport data has been changed) is inserted for registration procedure.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Invalid transponder. ※ Key not in 'VIRGIN' Status or with invalid ID code
Enable Conditions	• IG ON (On Registering TP Procedure)	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1674 present?

Go to "Inspection & Repair" procedure.

Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION

1. Check transponder status
   1) IGN "ON" & Engine "OFF" with key intended to register.
   2) Monitor the "KEY STATUS" Parameter on the Scantool.

■ Specification : 'VIRGIN' or 'LEARNT'

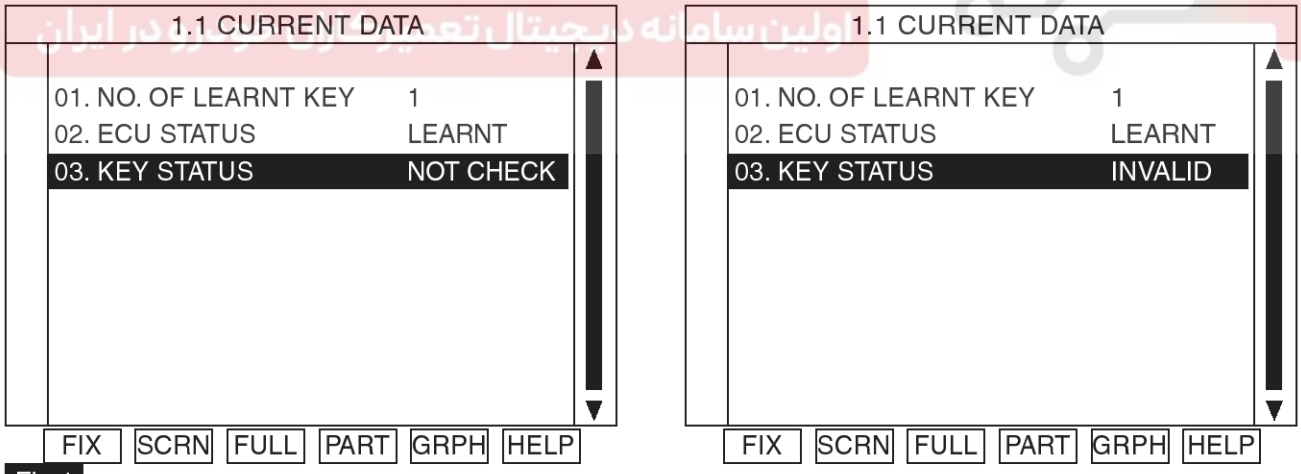


Fig 1

Fig 1) The current data in abnormal state

LTKG742C

3) Is the measured voltage within specifications?

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Substitute with a known-good transponder and check for proper operation.

If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

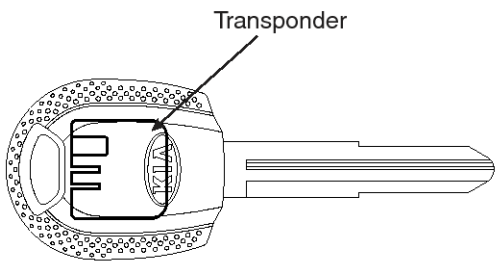
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

P1675

COMPONENT LOCATION



SLDBE7744L

GENERAL DESCRIPTION

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.The transponder memory is split into two strings called authenticator and key password After this programming the transponder memory is locked and the data(PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit. Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser.Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION

The ECM sets DTC P1675 if characteristic data of transponder doesn't coincide with that of ECM owing to transponder programming error.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Invalid transponder. ※ Invalid characteristic data ※ No transponder or more than two transponder is detected by coil antenna
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1675 present?

   Go to "Inspection & Repair" procedure.

   Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

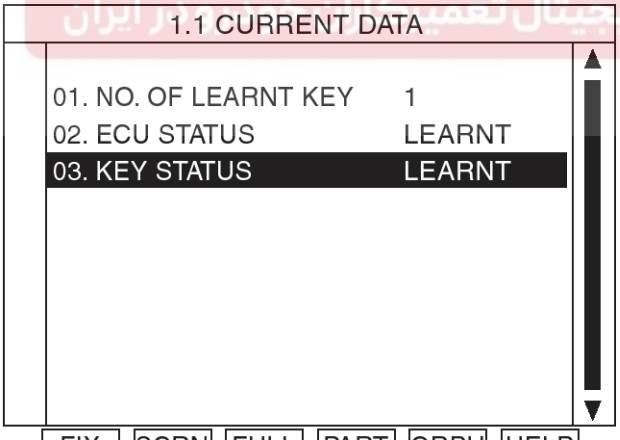


Fig 1

Fig 1) The current data in abnormal state

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF" with key intended to register.
   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'

SCMBE6752L

3) Is the measured voltage within specifications?

   Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

   Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Go to "Check transponder" procedure.

2. Check transponder
   1) IGN "ON" & Engine "OFF".
   2) Neutralize ECM and Register transponder key by scantool.

      NOTICE
      Pin code is requied to Neutralize ECM and to Register transponder key

   3) Are Neutralizing and Registering completed normally?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Substitute with a known-good transponder and check for proper operation.

      If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

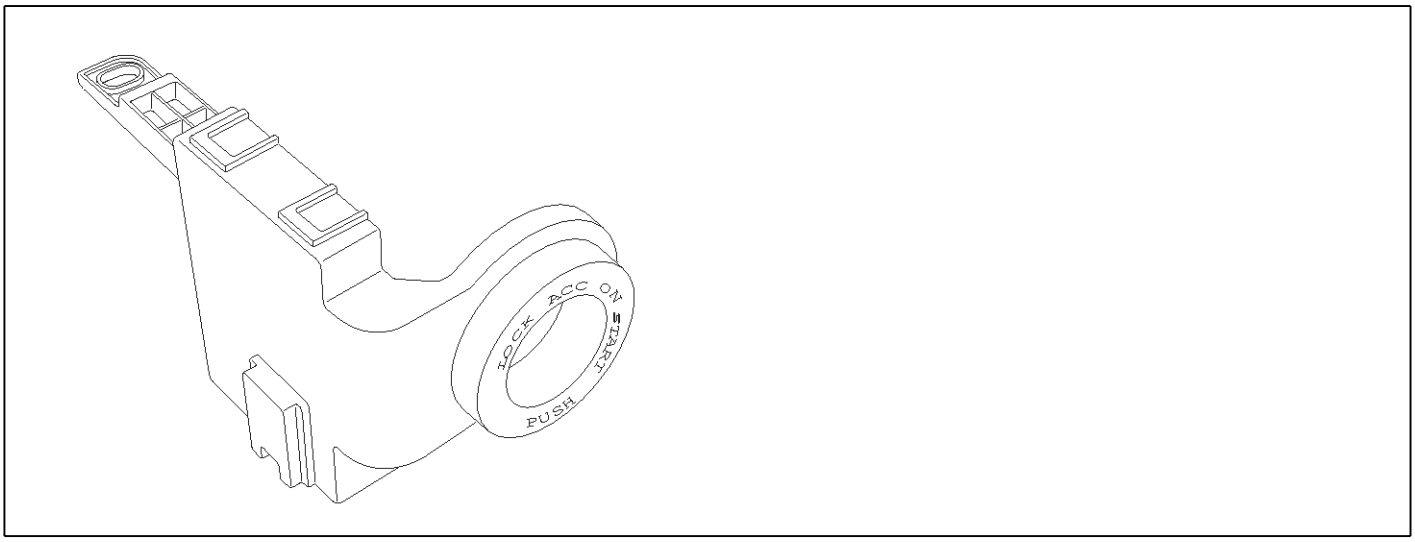
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

P1676

COMPONENT LOCATION



SLDBE6751D

GENERAL DESCRIPTION

The SMARTRA carries out communication with the built-in transponder of the ignition key. This wireless communication runs on RF (Radio frequency of 125 kHz). The SMARTRA is mounted at the ignition lock close to the antenna coil for RF transmission and receiving. The RF signal from the transponder received by the antenna coil is converted into messages for serial communication by the SMARTRA device. And the received messages from the ECM are converted into an RF signal, which is transmitted to the transponder by the antenna. The SMARTRA does not carry out the validity check of transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to ECM and vice versa.

* SMARTRA : SMARt TRansponder Antenna

DTC DESCRIPTION

The ECM sets DTC P1676 if there's any fault in message from SMARTRA to ECU.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Faulty SMARTRA
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1676 present?

   Go to "Inspection & Repair" procedure.

   Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

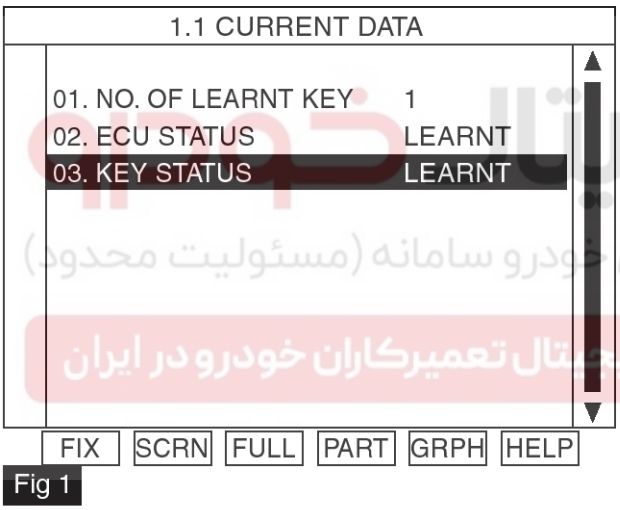


Fig 1

Fig 1) The current data in abnormal state

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF" with key intended to register.
   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'

SCMBE6752L

   3) Are "KEY STATUS" and "ECU STATUS' Parameter within specifications?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Go to "Check SMARTRA" procedure.
2. Check SMARTRA
   1) IGN "ON" & Engine "OFF".
   2) Neutralize ECM and Register transponder key by scantool.

      NOTICE

      Pin code is requied to Neutralize ECM and to Register transponder key

   3) Are Neutralizing and Registering completed normally?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Substitute with a known-good transponder and check for proper operation.

If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

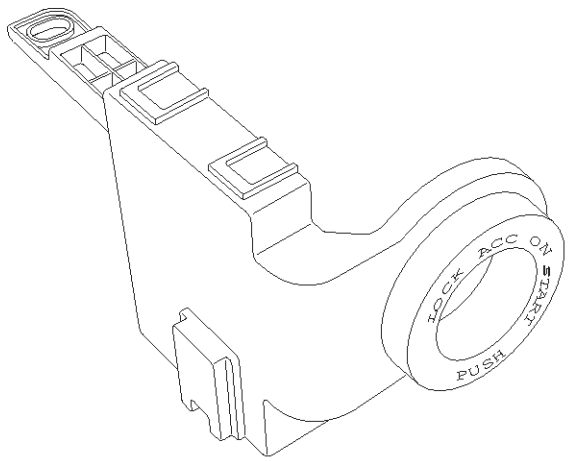
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

P1690

COMPONENT LOCATION



SLDBE6751D

GENERAL DESCRIPTION

The SMARTRA carries out communication with the built-in transponder of the ignition key. This wireless communication runs on RF (Radio frequency of 125 kHz). The SMARTRA is mounted at the ignition lock close to the antenna coil for RF transmission and receiving. The RF signal from the transponder received by the antenna coil is converted into messages for serial communication by the SMARTRA device. And the received messages from the ECM are converted into an RF signal, which is transmitted to the transponder by the antenna. The SMARTRA does not carry out the validity check of transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to ECM and vice versa.

* SMARTRA : SMARt TRansponder Antenna

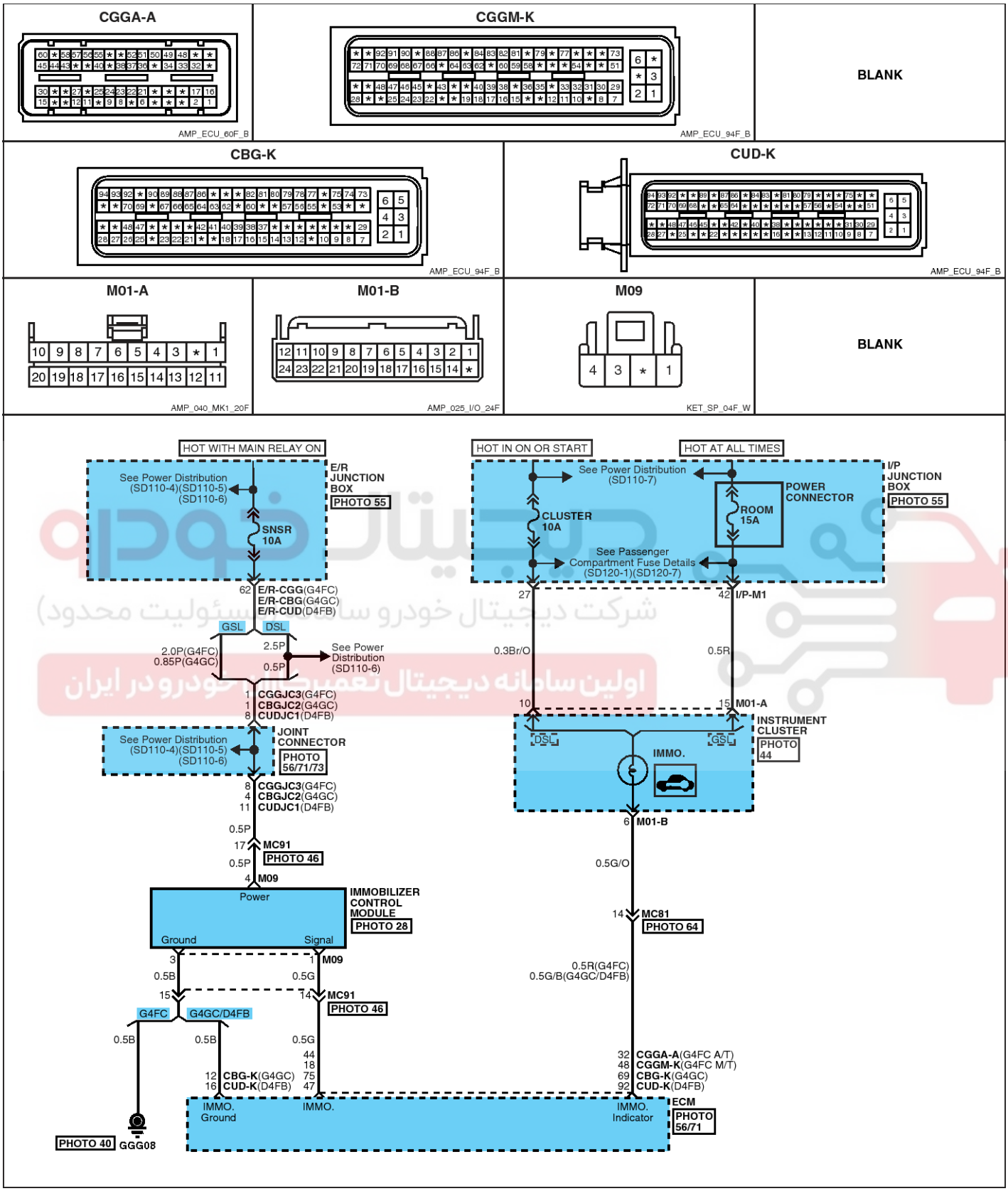
DTC DESCRIPTION

The ECM sets DTC P1690 if there's No Response from SMARTRA.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Open Circuit in signal harness • Short Circuit in signal harness • Faulty SMARTRA
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

SCHEMATIC DIAGRAM



SLDBE7743L

MONITOR SCANTOOL DATA

3. Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

1. Connect scantool to Data Link Connector(DLC).
2. IGN "ON" & Engine "OFF".

■ Specification : 'LEARNT'

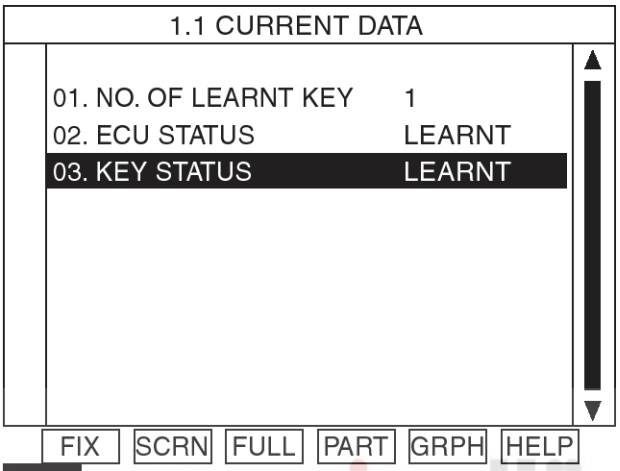


Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

4. Are "KEY STATUS" and "ECU STATUS' Parameter within specifications?

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Go to "Inspection & Repair" procedure.

TERMINAL AND CONNECTOR INSPECTION

1. Many malfunctions in the electrical system are caused by poor harness and terminals.

   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

   Repair as necessary and go to "Verification Vehicle Repair" procedure.

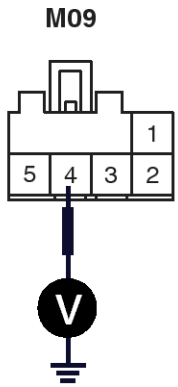
   Go to "W/Harness Inspection" procedure .

POWER SUPPLY CIRCUIT INSPECTION

1. Check for open in harness
   1) Ignition "OFF".
   2) Disconnect SMARTRA.
   3) Ignition "ON" & Engine "OFF".
   4) Measure voltage value between terminal "4" of SMARTRA and chassis ground.

■ Specification : 9~16V

SLDBE7753L



1. Coil antenna
3. Ground
4. Power

5) Is the measured voltage within specifications?

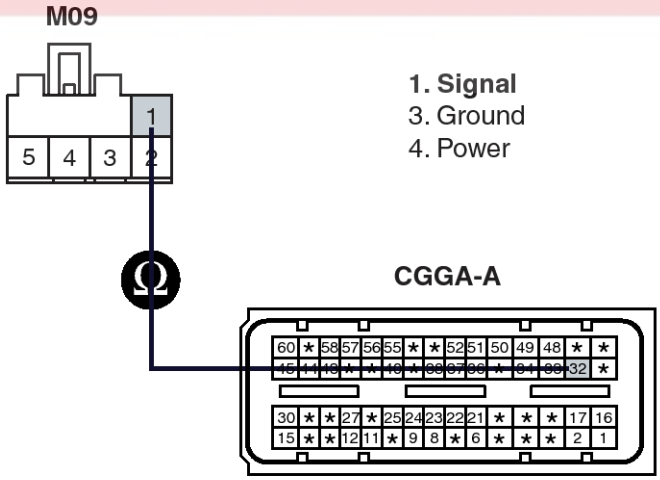
Go to "Signal circuit Inspection" procedure.

Check for open or short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

SIGNAL CIRCUIT INSPECTION

1. Check for open in harness
   1) Ignition "OFF".
   2) Disconnect SMARTRA.
   3) Measure resistance between terminal "1" of SMARTRA and terminal "32" of ECM.

■ Specification : 1 Ω or less



1. Signal
3. Ground
4. Power

SLDBE7754L

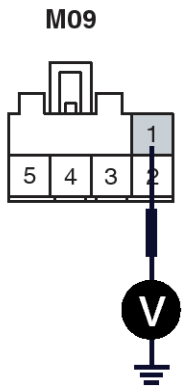
4) Is the measured resistance within specifications?
4) Measure voltage value between terminal "1" of SMARTRA and chassis ground.

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

Go to "Check for short in harness" procedure.

2. Check for short in harness
   1) Ignition "OFF".
   2) Disconnect SMARTRA.
   3) Ignition "ON" & Engine "OFF".

■ Specification :Approx. 5.48V



1. **Signal**
3. Ground
4. Power

SLDBE7756L

5) Is the measured voltage within specifications?

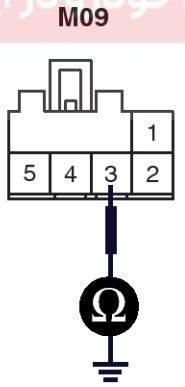
Check for short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

Go to "Signal circuit Inspection" procedure

GROUND CIRCUIT INSPECTION

1. Check for open in ground harness
   1) Ignition "OFF".
   2) Disconnect SMARTRA.
   3) Measure resistance between terminal "3" of SMARTRA and chassis ground.

■ Specification : 1 Ω or less



1. Coil antenna
3. Ground
4. Power

SLDBE7757L

4) Is the measured resistance within specifications?

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

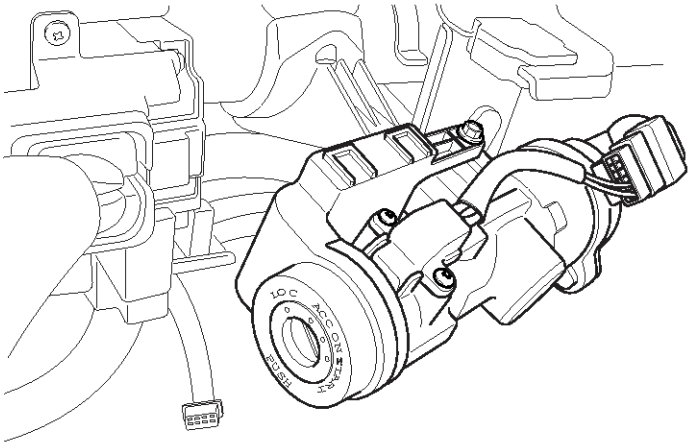
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   System is performing to specification at this time.

   Go to the applicable troubleshooting procedure.

P1691

COMPONENT LOCATION



SLDBE6752D

GENERAL DESCRIPTION

This wireless communication runs on RF. The SMARTRA is mounted at the ignition lock for RF transmission and receiving. The RF signal from the transponder received by the antenna coil is converted into messages for serial communication by the SMARTRA device. And the received messages from the EMS are converted into an RF signal,which is transmitted, to the transponder by the antenna.

DTC DESCRIPTION

This DTC is defined as Antenna coil open or short circuit.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
Enable Conditions	• IG ON	• Open or short in coil circuit • Faulty Antenna Coil • Faulty SMARTRA • Faulty ECM
Detecting factors	• Antenna signal error	
Detecting window	• Before transponder communications	
Detecting criteria	• Antenna open/short circuit	

SIGNAL WAVEFORM

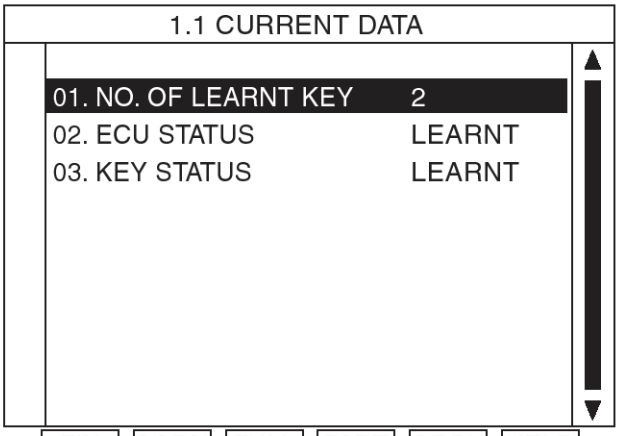


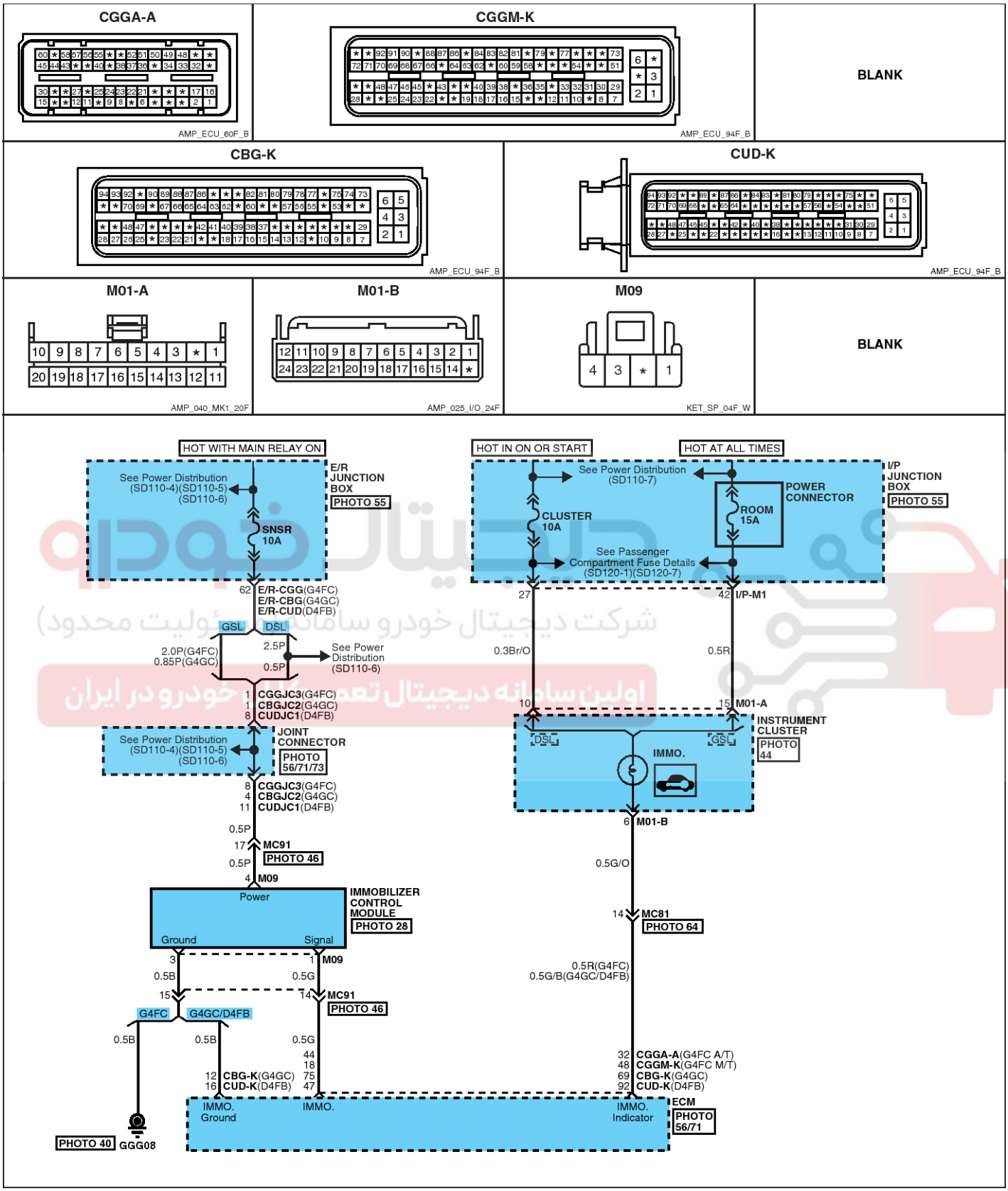
Fig 1

EMS Status	Engine start with valid key	Engine start by limp home	Teaching of key	Teaching or changing of user password	Twice ignition of function
Not yet checked	No	No	No	No	No
Virgin	No	No	Yes	No	Yes, with virgin key
Learnt	Yes	Yes, with learnt user password	Yes	Yes	No
Neutral	No	No	Yes	No	No
Locked by timer	No	No	No	No	No

Fig 2

SLDBE7745L

SCHEMATIC DIAGRAM



SLDBE7743L

MONITOR SCANTOOL DATA

1. Ignition "ON" & Engine "OFF".
2. Connect Scan tool and cleare the DTCs
3. If the DTCs are retrived again, monitor "CURRENT DATA" to check No. of Learnt key, ECM and KEY status.

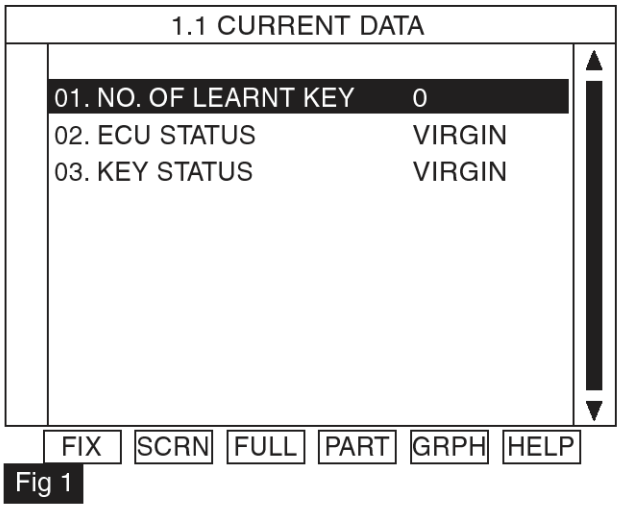


Fig 1

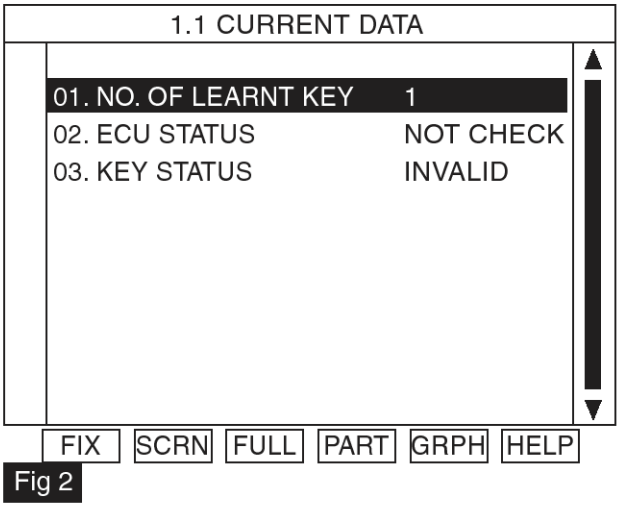


Fig 2

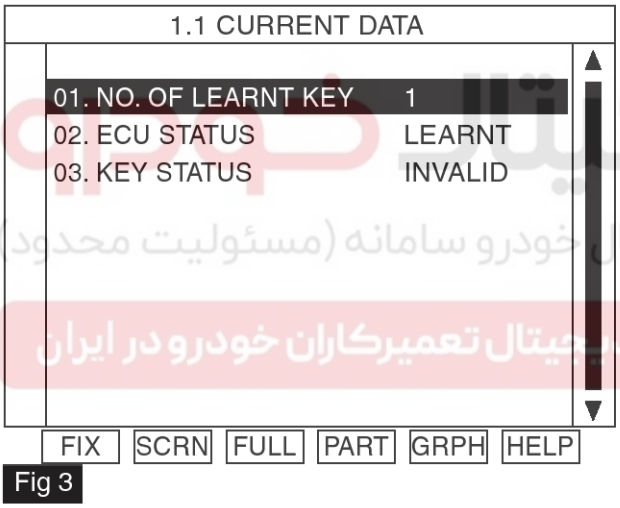


Fig 3

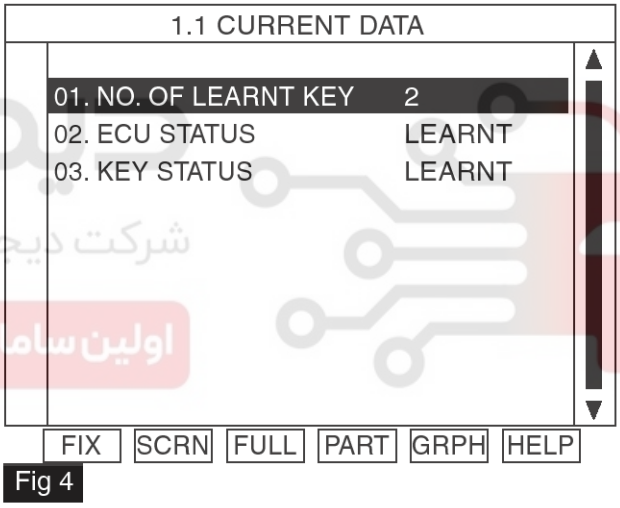


Fig 4

Fig. 1 : ECM has not matched with any Key yet.
Fig. 2 : ECM Internal Failure.
Fig. 3 : IG On with unmatched key.
Fig. 4 : 2(two) Keys have been matched with ECM.

SLDBE7746L

4. Are both Key and ECM status learnt?

   Fault is intermittent caused by poor contact in the SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

   Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

   Go to "W/Harness Inspection" procedure.

TERMINAL AND CONNECTOR INSPECTION

1. Many malfunctions in the electrical system are caused by poor harness and terminals.

   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

Repair as necessary and go to "Verification of Vehicle Repair" procedure.

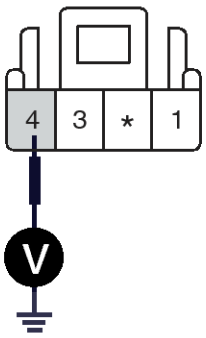
Go to " Power Circuit Inspection " procedure.

POWER SUPPLY CIRCUIT INSPECTION

1. Ignition "OFF"
2. Disconnect SMARTRA connector.
3. Ignition "ON" & Engine "OFF".
4. Measure voltage between terminal "4" of the SMARTRA harness connector and chassis ground.

■ Specification : B+

M09



1. Signal
2. -
3. Ground
4. Power

SLDBE7747L

5. Is the measured voltage within specifications?

Go to "Signal Circuit Inspection" procedure.

Check open or short in power harness

Check that sensor fuse 10A located between Control relay and Smartra is open or blown off

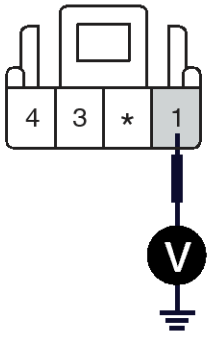
Repair as necessary and go to "Verification of Vehicle repair" procedure.

SIGNAL CIRCUIT INSPECTION

1. Check for short in harness
   1) Ignition "OFF"
   2) Disconnect SMARTRA connector
   3) Ignition "ON" & Engine "OFF"
   4) Measure voltage between terminal "1"of the SMARTRA harness connector and chassis ground.

■ Specification : Approx. 6.0V

M09



1. Signal
2. -
3. Ground
4. Power

SLDBE7748L

5) Is the measured voltage within specifications?

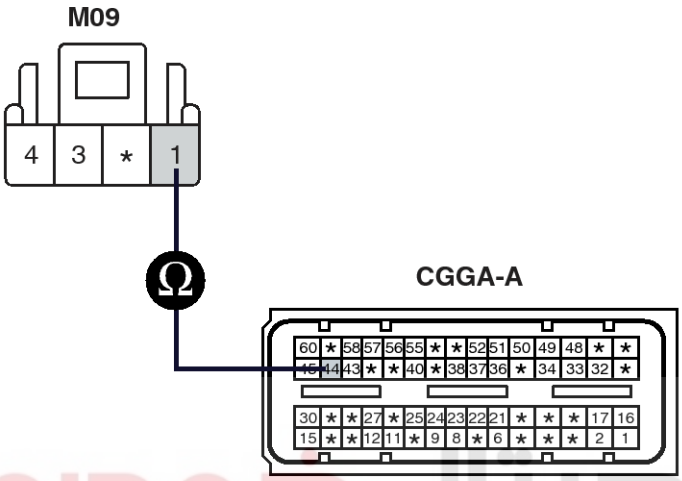
Go to "Check for open in harness" as below

Check short in signal harness

Repair as necessary and go to "Verification of Vehicle repair" procedure.

2. Check for open in harness
   1) Ignition "OFF"
   2) Disconnect SMARTRA connector.
   3) Measure resistance between terminal "1" of the SMARTRA harness connector and terminal "44" of ECM harness connector.

■ Specification : Approx. below 1Ω



SLDBE7749L

4) Is the measured resistance within specifications?

Go to "Ground Circuit Inspection" procedure

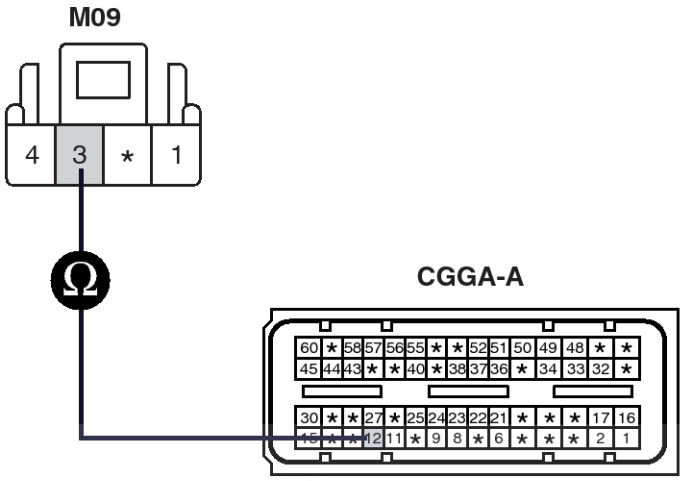
Check for open in signal harness

Repair as necessary and go to "Verification of Vehicle repair" procedure.

GROUND CIRCUIT INSPECTION

1. Check for open in harness between SMARTRA and ECM
   1) Ignition "OFF"
   2) Disconnect SMARTRA connector
   3) Measure resistance between terminal "3" of the SMARTRA harness connector and terminal "12" of ECM harness connector.

■ Specification : Approx. below 1Ω



SLDBE7750L

   4) Is the measured resistance within specifications?

      Go to "Check for open in harness between ECM and Chassis ground" as below

      Check for open in ground harness

      Repair as necessary and go to "Verification of Vehicle repair" procedure.

2. Check for open in harness between ECM and Chassis ground
   1) Ignition "OFF"
   2) Disconnect SMARTRA connector
   3) Measure resistance between terminal 61 of ECM harness connector and chassis ground(G19)

■ Specification : Approx. below 1Ω

COMPONENT INSPECTION

1. Check SMARTRA
   1) Ignition "ON" & Engine "OFF"
   2) Perform neutral mode, key teaching/changing and password teaching according to description in "System inspection" procedure.

      NOTICE
      Be sure that PIN code is prepared before performing neutral mode.

   3) Is Key teaching completed?

      Go to "Check ECM" as below

      Substitute with a known-good SMARTRA and check for proper operation. If the problem is corrected, replace SMARTRA and Go to "Verification of Vehicle Repair" procedure.

      NOTICE
      In case of faulty SMARTRA, there are no special procedures required. A new SMARTRA device simply replaces the old one. (There are no transponder-related data stored in this device.)

2. Check ECM
   1) Ignition "ON" & Engine "OFF"
   2) Perform Key teaching/changing mode again

3) Is the Key teaching completed?

Go to "Verification of Vehicle Repair" procedure.

Substitute with a known-good ECM and check for proper operation. If the problem is corrected, replace ECM and then go to "Verification of Vehicle repair" procedure.

NOTICE

1. *Don't forget to prepare for the PIN of the vehicle before removing ECM from the vehicle.*
2. *Remember that substituting with a known-good ECM should be followed "The things to remember before repair(1)" in "System Inspection" procedure. (In case of faulty ECM, it has to be replaced with "VIRGIN" or "NEUTRAL" ECM.)*
3. *Strongly recommend to register PIN which is given by HMC or the regional office when replacing a new ECM.*

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

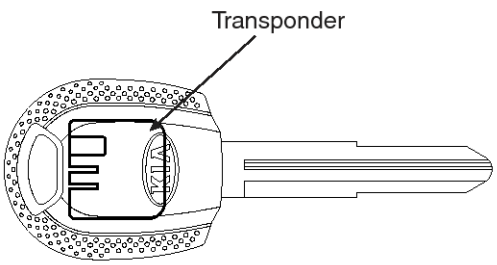
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

Go to the applicable troubleshooting procedure.

System is performing to specification at this time.

P1693

COMPONENT LOCATION



SLDBE7744L

GENERAL DESCRIPTION

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.The transponder memory is split into two strings called authenticator and key password After this programming the transponder memory is locked and the data(PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit. Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser.Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION

The ECM sets DTC P1693 if there's abnormal response from transponder.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Corrupted data from Transponder • More than one TP in the magnetic field • No TP(Key without TP) in the magnetic field
Enable Conditions	• IG ON (On Registering TP Procedure)	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF".
   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'

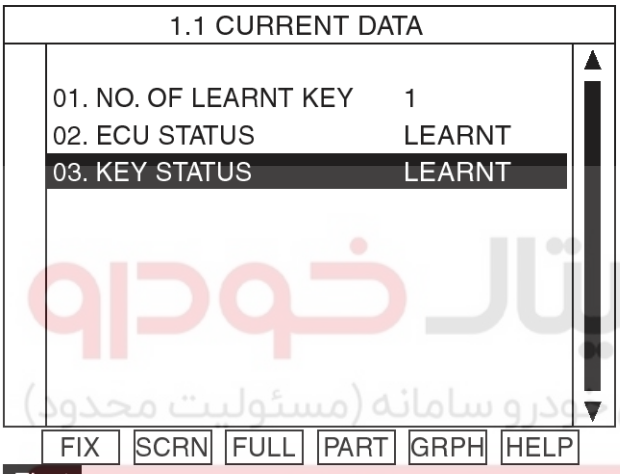


Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

3) Are "KEY STATUS" and "ECU STATUS' Parameter within specifications?

   Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

   Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

   Go to "Check transponder" procedure.

2. Check transponder
   1) IGN "ON" & Engine "OFF".
   2) Neutralize ECM and Register transponder key by scantool.

   NOTICE

   Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

   Pin code is requied to Neutralize ECM and to Register transponder key

   3) Are Neutralizing and Registering completed normally?

   Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

   Substitute with a known-good transponder and check for proper operation.

   If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

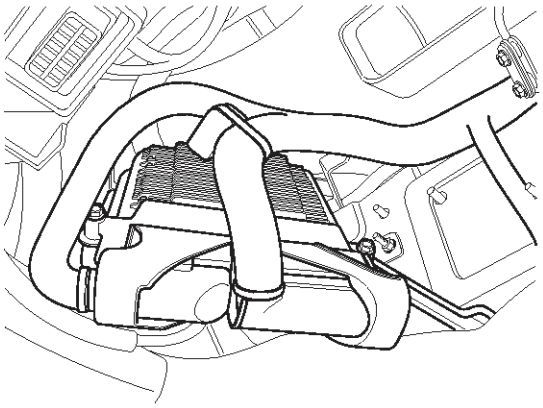
   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

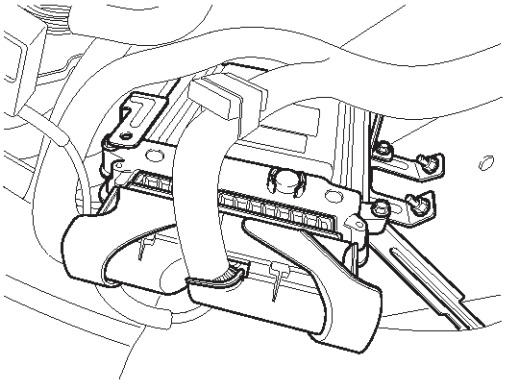
P1694

COMPONENT LOCATION

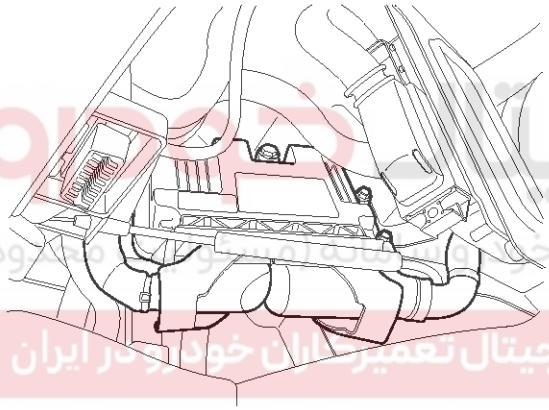
Gasoline 2.0



Gasoline 1.6



Diesel 1.6



SLDBE7740L

GENERAL DESCRIPTION

The ECM and the SMARTRA communicate by dedicated line. During this communication of ECM and SMARTRA the K line of ECM cannot be used for communication. The ECM controls the communication either to SMARTRA or to other devices(e.g. scanner) on K line by switching of a multiplexer and specific communication procedures. The multiplexer is a part of ECM H/W.

DTC DESCRIPTION

The ECM sets DTC P1694 if Request from EMS is invalid.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Faulty EMS ※ Protocol layer violation - Invalid request - Check sum error
Enable Conditions	• IG ON (On Registering TP Procedure)	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF".

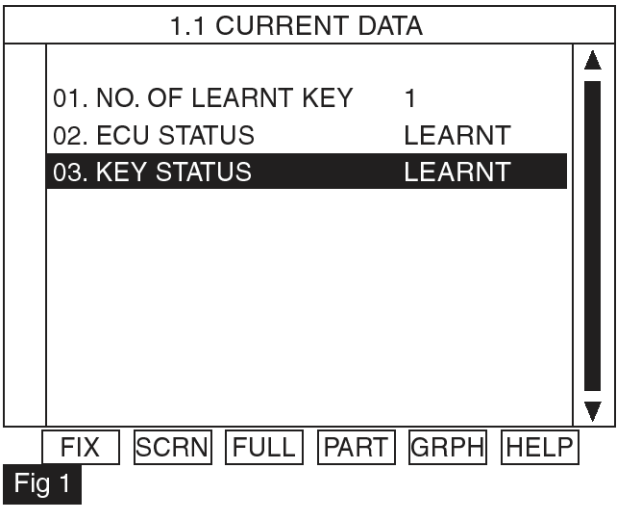


Fig 1

Fig 1) The current data in abnormal state

   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'

   3) Are "KEY STATUS" and "ECU STATUS' Parameter within specifications?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Go to "Check transponder" procedure.

2. Check ECM
   1) IGN "ON" & Engine "OFF".
   2) Neutralize ECM and Register transponder key by scantool.

      NOTICE
      Pin code is requied to Neutralize ECM and to Register transponder key

   3) Are Neutralizing and Registering completed normally?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

SCMBE6752L

      Substitute with a known-good transponder and check for proper operation.
      If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

      NOTICE
      ECM substitued for old one must be in "Virgin" or "Neutral" status and Pin code is requied to Neutralize ECM and to Register transponder key.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

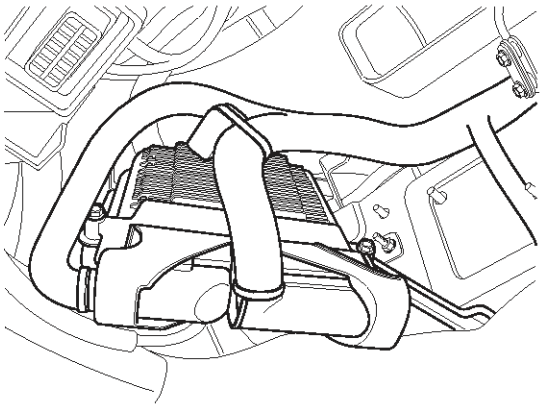
   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

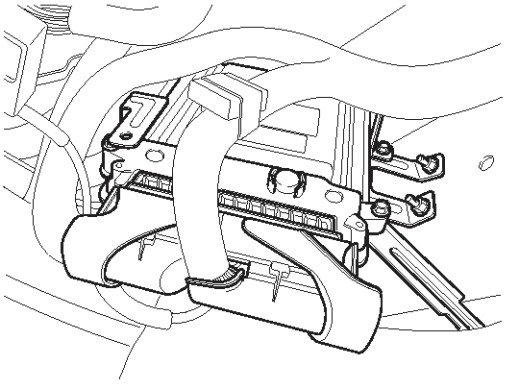
P1695

COMPONENT LOCATION

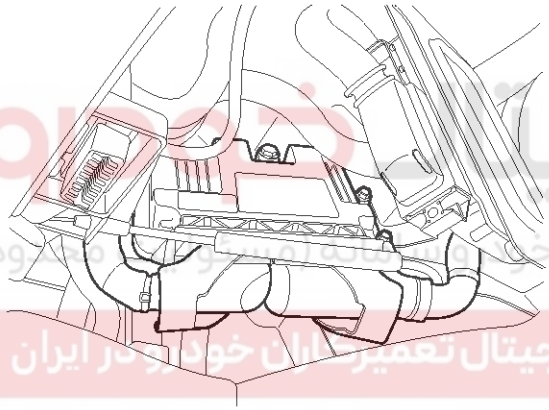
Gasoline 2.0



Gasoline 1.6



Diesel 1.6



SLDBE7740L

GENERAL DESCRIPTION

The relevant data for the immobilizer function are stored at permanent memory (EEPROM or Flash etc.).

The immobilizer data are stored by three independent entries.

The data from EEPROM are evaluated by "2 of 3 decision". That means all three entries are read and the content is compared before authentication process.

If the contents of all entries are equal, the authentication will run without additional measures.

If only the contents of two entries are equal, the authentication will run and fault code "EEPROM defective" is stored at ECM.

If the contents of all three entries are different from each other, no authentication will be possible and the fault code "EEPROM defective" will be stored. The limp home function cannot be activated. The ECM shall be replaced if the EEPROM related fault occurs again after new teaching of all keys.

DTC DESCRIPTION

The ECM sets DTC P1694 if there's any fault in EMS internal permanent memory(EEPROM or Flash etc.).

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Faulty EMS
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF".
   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'

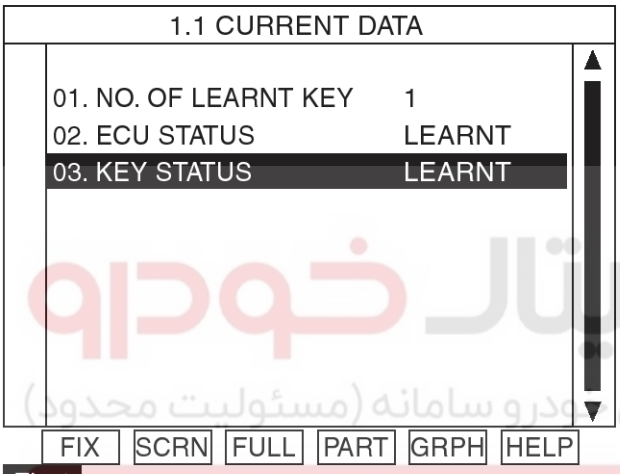


Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

   3) Are "KEY STATUS" and "ECU STATUS' Parameter within specifications?

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Go to "Check transponder" procedure.

2. Check ECM
   1) IGN "ON" & Engine "OFF".
   2) Neutralize ECM and Register transponder key by scantool.

      NOTICE

      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

      Pin code is requied to Neutralize ECM and to Register transponder key

   3) Are Neutralizing and Registering completed normally?

      Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Substitute with a known-good transponder and check for proper operation.

      If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

      NOTICE

      ECM substitued for old one must be in "Virgin" or "Neutral" status and Pin code is requied to

Neutralize ECM and to Register transponder key.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

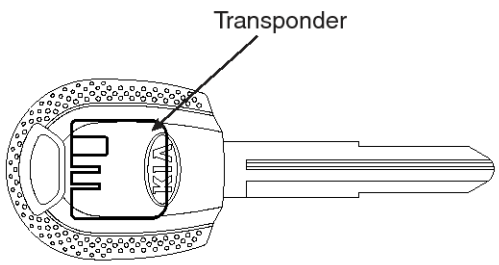
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

P1696

COMPONENT LOCATION



SLDBE7744L

GENERAL DESCRIPTION

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.The transponder memory is split into two strings called authenticator and key password After this programming the transponder memory is locked and the data(PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit. Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser.Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION

The ECM sets DTC P1696 if invaild key is inserted into key hole for Authentication.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Virgin TP at EMS status "Learnt". • Learnt(Invalid) TP at EMS status "Learnt".
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF".
   2) Monitor the "KEY STATUS" and "ECU STATUS' Parameter on the Scantool.

■ Specification : LEARNT'

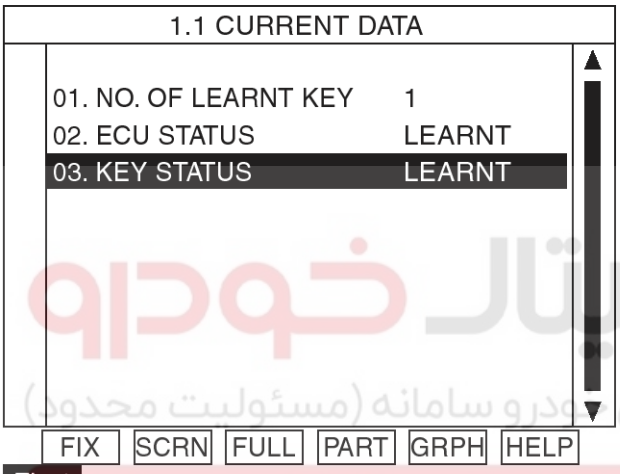


Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

3) Are "KEY STATUS" and "ECU STATUS" Parameter within specifications?

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

Register as necessary and then go to "Verification of Vehicle Repair" procedure.

CASE 1. KEY STATUS "VIRGIN" : Register transponder key now inserted

CASE 2. KEY STATUS "INVAILD" : Register all transponder key

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

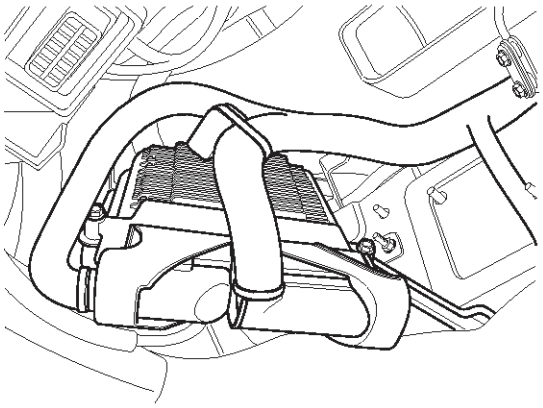
Go to the applicable troubleshooting procedure.

System is performing to specification at this time.

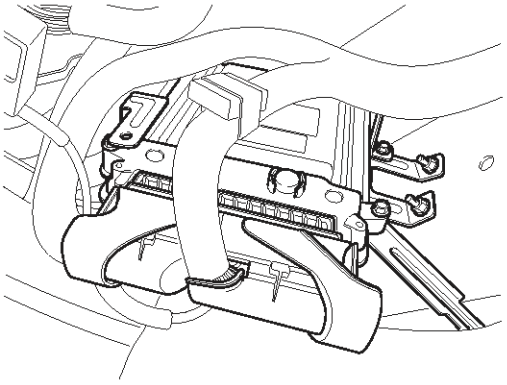
P1697

COMPONENT LOCATION

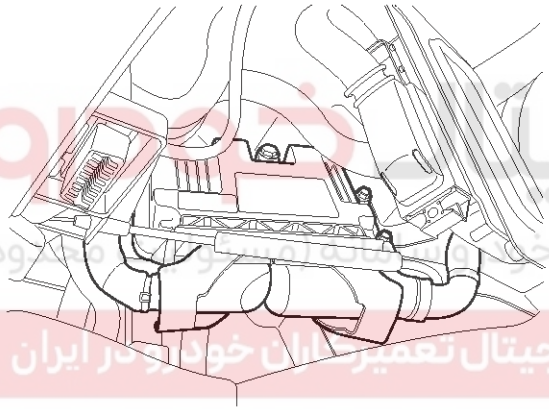
Gasoline 2.0



Gasoline 1.6



Diesel 1.6



SLDBE7740L

GENERAL DESCRIPTION

In immobilizer system, scantool is mainly used for diagnosis. besides this, registration of key and neutralization of ECM is executed by scantool. For ECM communicate with other components such as SMARTRA and scantool by changing type of communication through just one line, K-line communication between scantool and ECM is unavalible while communication between ECM and SMARTRA is in progress.

DTC DESCRIPTION

The ECM sets DTC P1696 if Request from Tester is Invalid.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Invalid request. - Protocol layer violation - Check sum error
Enable Conditions	• IG ON (On Registering TP Procedure)	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1697 present?

   Go to "Inspection & Repair" procedure.

   Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

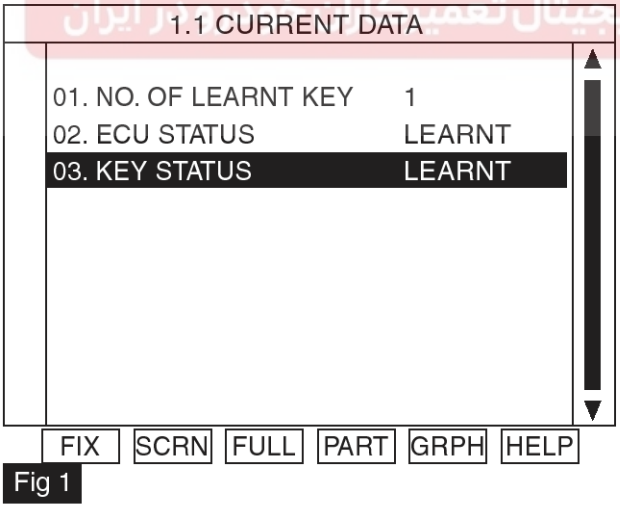


Fig 1

Fig 1) The current data in abnormal state

COMPONENT INSPECTION

1. Check communication between ECM and scantool
   1) IGN "ON" & Engine "OFF".
   2) Connect scantool to Data Link Connector(DLC).
   3) Erase the DTC and Monitor Parameter of immobilizer on the Scantool.

      ※ Try one more time from "select car model " even if "Communication error" is present on the scantool

SCMBE6752L

4) Is the communication between ECM and scantool normal?

   If ECM is in "Locked by Timer" status. Keep "KEY ON" status for 1 hours to withdraw "Locked by Timer" status.

   Then repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

Substitute with a known-good scantool and check for proper operation.

If the problem is corrected, Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

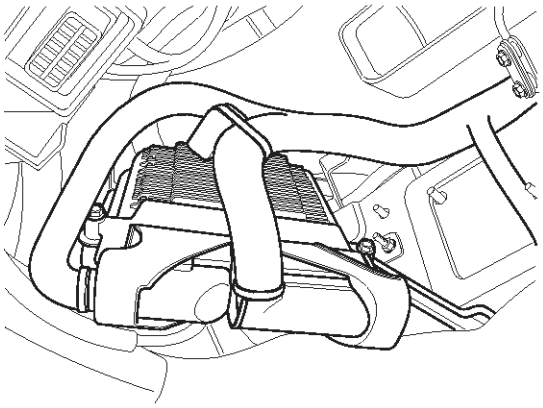
   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

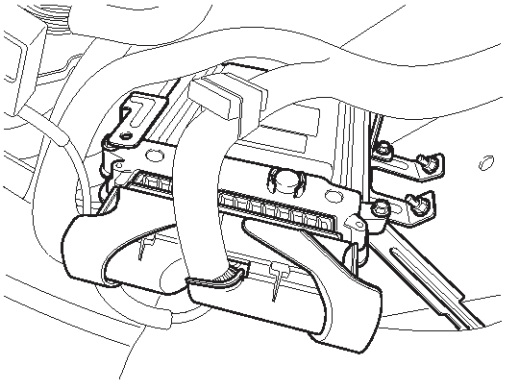
P1699

COMPONENT LOCATION

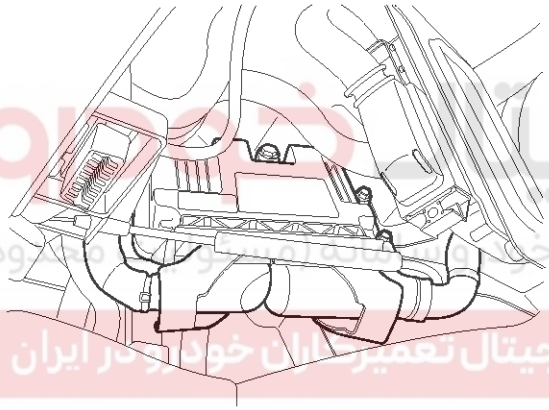
Gasoline 2.0



Gasoline 1.6



Diesel 1.6



SLDBE7740L

GENERAL DESCRIPTION

This is a special function for engine start by vehicle manufacturer. The engine can be started for moving from the production line to an area where the key teaching is proceeded.

DTC DESCRIPTION

The ECM sets DTC P1697 if the maximum limit of Twice IGN is Exceeded.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Twice IGN ≥ 32 times.
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

1. Connect scantool to Data Link Connector(DLC)
2. Ignition "ON" & engine "OFF"
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1699 present?

   Go to "Inspection & Repair" procedure.

   Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

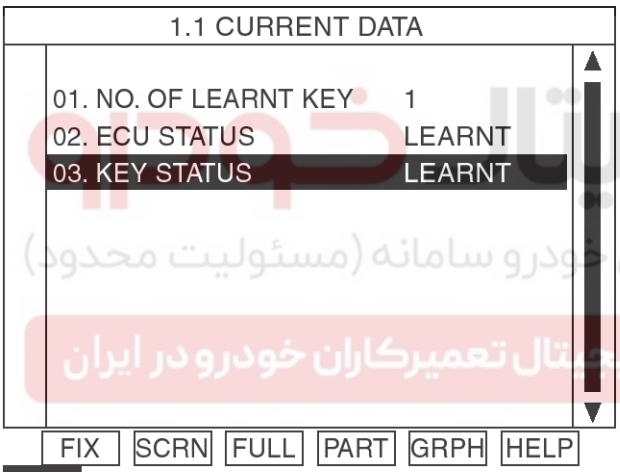


Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

4) Is "ECU STATUS' Parameter "Locked"?

   Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

   Keep "KEY ON" status for 1 hours to withdraw "Locked by Timer" status. Then register transponder and go to "Verification of Vehicle Repair" procedure.

   Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.2

COMPONENT INSPECTION

1. Check transponder and ECU status
   1) IGN "ON" & Engine "OFF".
   2) Connect scantool to Data Link Connector(DLC).
   3) Erase the DTC and Monitor the "ECU STATUS' Parameter on the Scantool.

■ Specification : 'LEARNT'