General Information

SPECIFICATIONS

MULTIFUNCTION SWITCH

Items	Specifications
Rated Voltage	DC 12V
Operating temperature range	-30˚C - +80˚C (-22 - +176˚F)
Rated load Dimmer & passing switch Lighting switch Turn signal switch & lane change Front wiper switch Front washer switch Front fog switch Rear wiper Rear washer	 High : 1A (Relay load) Low : 1A (Relay load) Passing : 1A (Relay load) Lighting : 1A (Relay load) 6.6 ± 0.5A (Lamp load) Low, Int : 6.0A (Motor load) High : 6.5A (Motor load) Lock : Max. 25A (Motor load) 4 A (Motor load) 1.0A (Relay load) 1.0A 4.0A (Motor load)

INSTRUMENTS AND WARNING SYSTEM

Illumination	3.0w x 4EA	
Warning lamps	**Bulb wattage (w)**	**Color**
Turn signal (LH, RH)	1.4	Green
High beam	1.4	Blue
Sediment	1.4	Red
Rear fog	1.4	Amber
Rear defroster	1.4	Amber
Back door open	1.4	Red
Door ajar	1.4	Red
O/D OFF	1.4	Amber
Air bag	1.4	Red
Engine check	1.4	Amber
Auto cruise	1.4	Green
Oil pressure	1.4	Red
Parking brake	1.4	Red
Battery charge	1.4	Red
Snow	1.4	Amber
Glow	1.4	Amber
ABS	1.4	Amber
4WD	1.4	Green
Seat belt	1.4	Red
4WD Low	1.4	Green
Washer Low	1.4	Amber
Immobilizer	1.4	Amber
Low fuel	1.4	Amber
A/T R P, N, D, 2, L	 1.4 1.4	 Red Green

SERVICE SPECIFICATIONS
INDICATORS AND GAUGES

Speedometer

Type

- Cross - coil type

Input spec.

- Hall IC type : 4 pulses/rev.

Indication

- Km/h : 637rpm x 4 pulses/rev. indicates 60Km/h
- MPH : 1026 rpm x 4 pulses/rev. indicates 60MPH

Standard values

Velocity (Km/h)	20	40	60	80	100	120
Tolerance (%)	+0	+0	+0	+0	+0	+0
	-12.6	-7.3	-5.9	-5.2	-5	-5
Velocity (Km/h)	140	160	180	200	-	-
Tolerance (%)	+0	+0	+0	+0	-	-
	-5	-5	-5	-5	-	-

Velocity (MPH)	10	20	40	60	80	100
Tolerance (%)	+0	+0	+0	+0	+0	+0
	-13.6	-8.8	-5.7	-5	-5	-5
Velocity (MPH)	120	140	-	-	-	-
Tolerance (%)	+0	+0	-	-	-	-
	-5	-5	-	-	-	-

- Tap the speedometer to prevent hysterisis effects during inspection.

Tachometer

Type

- Cross - coil type (2.5D : 4pulses/rev, 3.5G : 3pulses/rev, 2.4G : 2pulses/rev)

Standard values

Revolution (RPM)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	Remarks
Tolerance (%)	+6	±6	±5	±4.5	±4.2	-	-	Diesel
	-12	-	-	-	-	-	-	
Tolerance (%)	+6	+7.5	+6	+6	+6	+6	+6	Gasoline
	-12	-1.5	-	-	-	-	-	

- Tap the tachometer to prevent hysterisis effects during inspection.

Fuel gauge

Type

- Cross - coil type (Fixed point type : Pointer should not fall into the "E" point but indicate remaining fuel level when the ignition is off)

Standard values

Level	Gauge Resistance (Ω)	Gauge angle (°)
E (Empty)	95	-30 ± 2.4
1/2	32.5	0 ±5.0
F (Full)	6.5	30 ± 2.4

- Inspection order : E → F → E
  The level must be reached within 7 minutes after the resistance is set for Full or Empty.
- Point stability tolerance : Within 9°
  Apply power for 10 minutes. Then turn off the power for 30 minutes and read the position of the pointer.

LTAC002A

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Temperature gauge
Type
Indication standard

Resistance of temperature sender (NTC)</td><td>o Cross - coil type (Intermedia stability type).
<table>
<tr><th>Temperature [°F (°C)]</th><th>Angle (°)</th></tr>
<tr><td>122 (50)</td><td>-30</td></tr>
<tr><td>181.4~221 (83~105)</td><td>-10 ~ 10</td></tr>
<tr><td>over 257 (over 125)</td><td>30</td></tr>
</table>
o Inspection order : OFF→C→H
<table>
<tr><th>Temperature [°F (°C)]</th><th>122 (50)</th><th>181.4 (83)</th><th>221 (105)</th><th>257 (125)</th></tr>
<tr><td>Resistance (Ω)</td><td>180.5</td><td>48.7±5</td><td>26.7±2</td><td>15.9</td></tr>
</table></td></tr>
</table>

LTAD002B

LIGHTING SYSTEM

Items	Bulb wattage(W)
Head lamp	55W / 55W (High / Low)
Front turn signal lamp	21W
Front position lamp	5W
Front fog lamp	27W
Rear combination lamps Tail/stop lamp Back up lamp Turn signal lamp	 5W / 21W 21W 21W
Rear fog lamp	21W
Side repeater lamp	5W
License plate lamp	5W
Sun visor illumi.lamp	5W
Room lamp (Center / Cargo)	10W
Over head lamp	10W
Courtesy lamp	5W
High mount stop lamp	5W
Position & side marker lamp	5W

AUDIO

Items	Specification
Rated output	Max. 41W x 4
Speaker impedance	4ΩX4
Band	AM/FM
Tuning type	PLL Synthesized type
Dark current	Max. 2mA

Items	General	Europe
Frequency range / Channel	AM : 531~1602KHZ/9KHZ	AM : 522~1620KHZ/9KHZ
	FM : 87.5~108MHZ/100KHZ	FM : 87.5~108MHZ/50KHZ

TROUBLESHOOTING

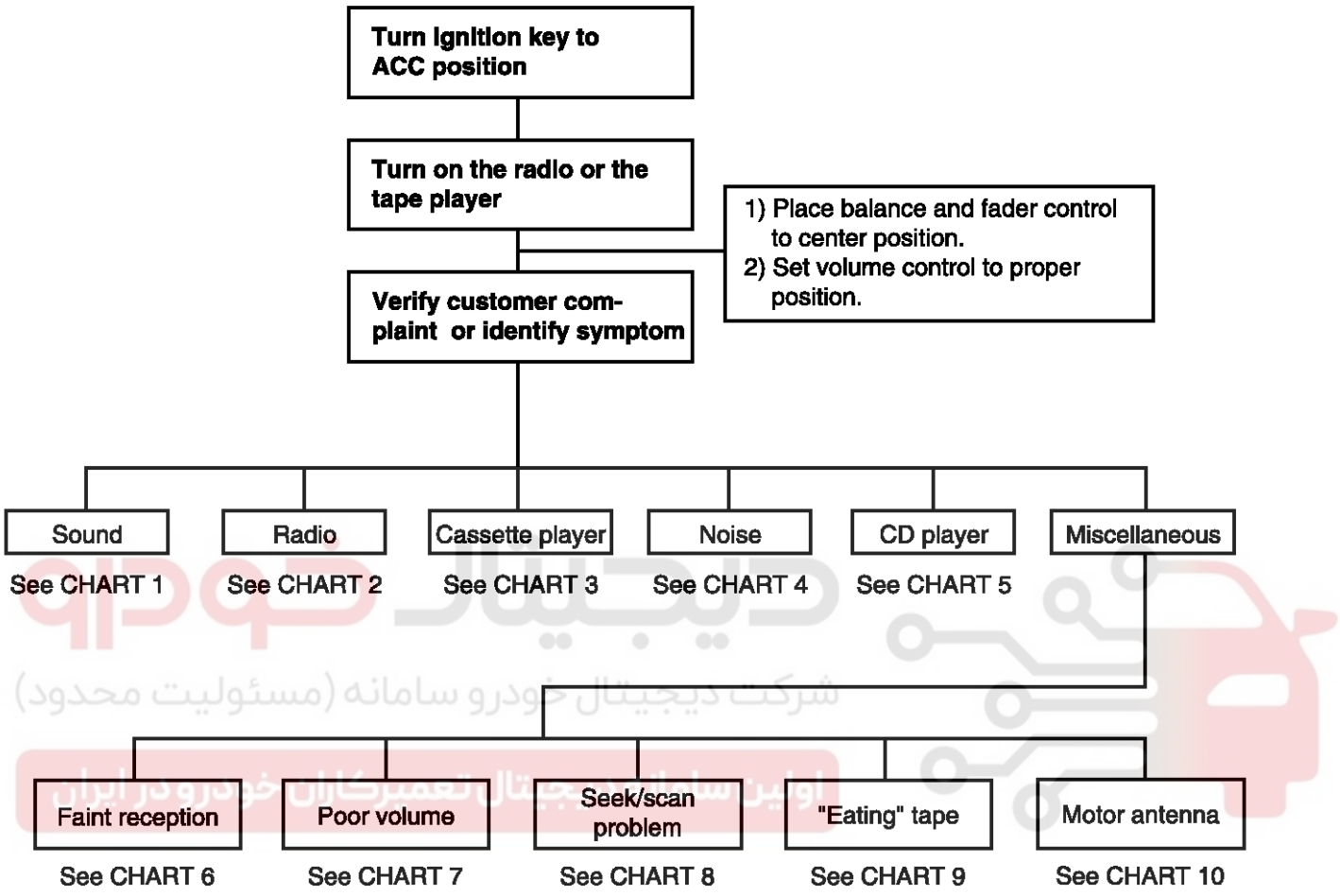
INSTRUMENTS AND WARNING SYSTEM

Symptom	Possible cause	Remedy
Tachometer does not operate	Fuse blown Tachometer faulty Wiring faulty	Check for short and replace fuse Check tachometer Repair if necessary
Fuel gauge does not operate	Fuse blown Fuel gauge faulty Fuel sender faulty Wiring faulty	Check for short and replace fuse Check gauge Check fuel sender Repair if necessary
Low fuel warning lamp does not light	Fuse blown Bulb burned out Fuel level sensor faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check sensor Repair if necessary
Water temperature gauge does not operate	Fuse blown Water temperature gauge faulty Water temperature sender faulty Wiring or ground faulty	Check for short and replace fuse Check gauge Check sender Repair if necessary
Oil pressure warning lamp does not light	Fuse blown Bulb burned out Oil pressure sender faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check sender Repair if necessary
Low brake fluid warning lamp does not light	Fuse blown Bulb burned out Brake fluid level warning switch faulty Parking brake switch faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check switch Check switch Repair if necessary
Open door warning lamp does not light	Power connector blown Bulb burned out Door switch faulty Wiring or ground faulty	Check for connection Replace bulb Check switch Repair if necessary
Seat belt warning lamp does not light	Fuse blown Bulb burned out Buckle switch faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check switch Repair if necessary

LIGHTING SYSTEM

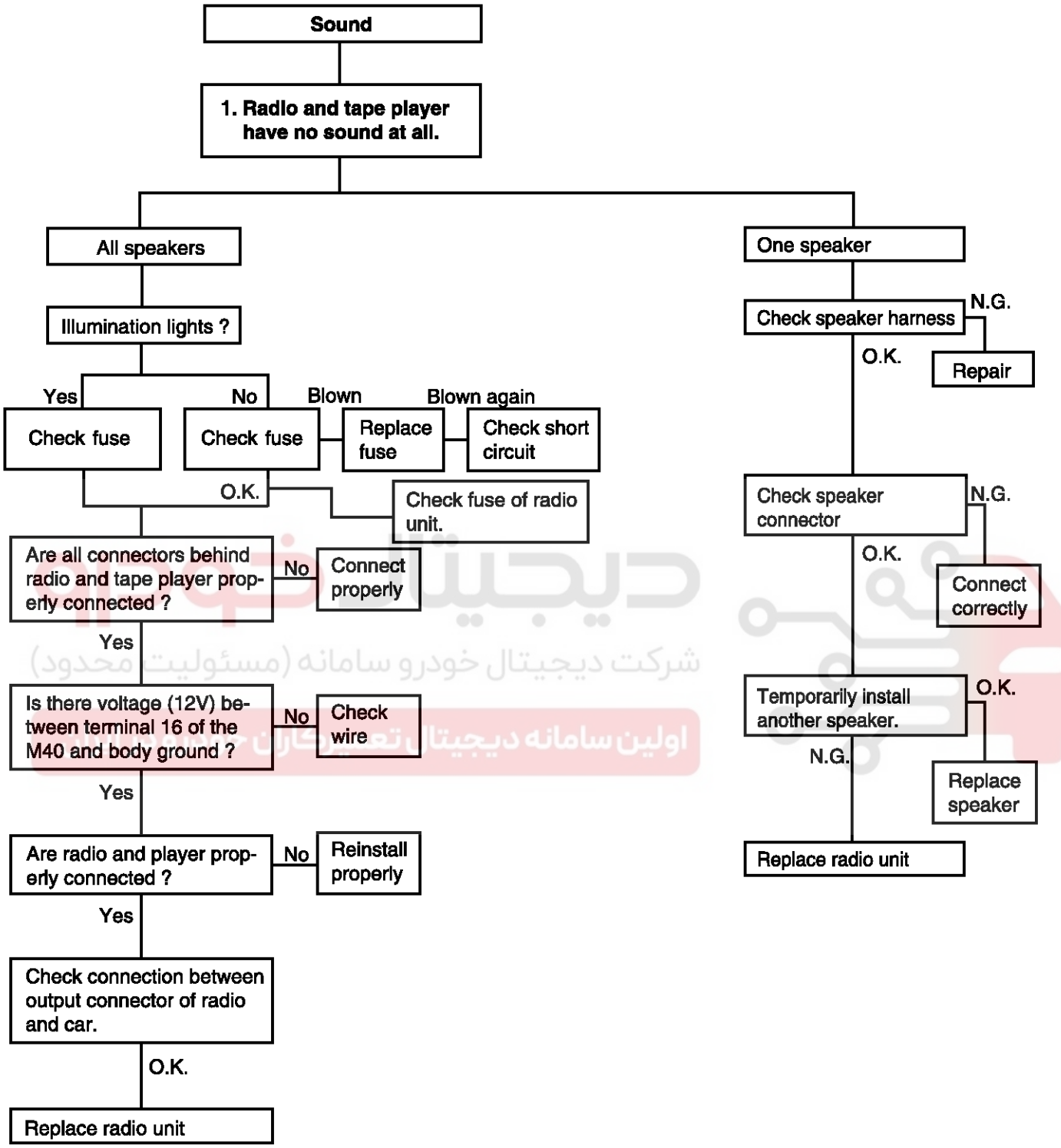
Symptom	Possible cause	Remedy
One lamp does not light (all exterior)	Bulb burned out Socket, wiring or ground faulty	Replace bulb Repair if necessary
Head lamps do not light	Bulb burned out Fuse blown - Low beam Fuse blown - high beam Head lamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace bulb Check for short and replace fuse Check for short and replace fuse Check relay Check switch Repair if necessary
Tail lamps do not light	Tail lamp fuse blown Fusible link blown Tail lamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace fuse and check for short Replace fusible link Check relay Check switch Repair if necessary
Stop lamps do not light	Fuse blown Stop lamp switch faulty Wiring or ground faulty Stop lamp relay faulty	Replace fuse and check for short Adjust or replace switch Repair if necessary Replace relay
Stop lamps stay on	Stop lamp switch faulty Stop lamp relay faulty	Adjust or replace switch Replace relay
Instrument lamps do not light (Tail lamps light)	Rheostat faulty Wiring or ground faulty	Check rheostat Repair if necessary
Turn signal lamp does not flash on one side	Bulb burned out Turn signal switch faulty Wiring or ground faulty	Replace bulb Check switch Repair if necessary
Turn signal lamps do not operate	Fuse blown Flasher faulty Turn signal switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Hazard warning lamps do not operate	Fuse blown Flasher faulty Hazard switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Flasher rate too slow or too fast	Lamps' wattages are smaller or larger than specified Defective flasher	Replace lamps Replace flasher
Back up lamps do not light up	Fuse blown Back up lamp switch faulty Wiring or ground faulty	Replace fuse and check for short Check switch Repair if necessary
Overhead console lamp does not light up	Fuse blown Wiring or ground faulty	Check for short and replace fuse Repair if necessary

AUDIO

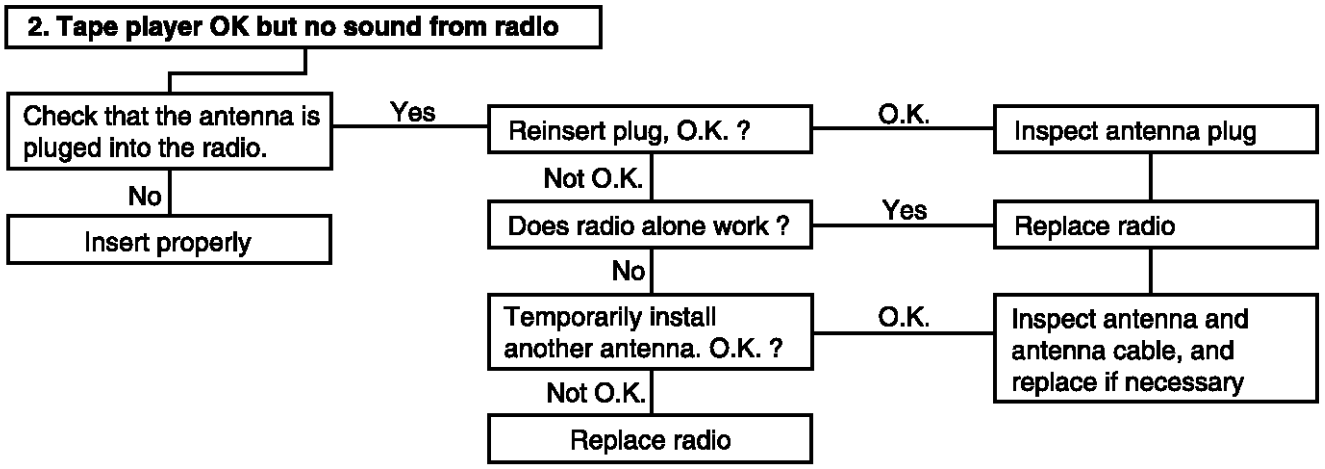


LTAC004A

CHART 1

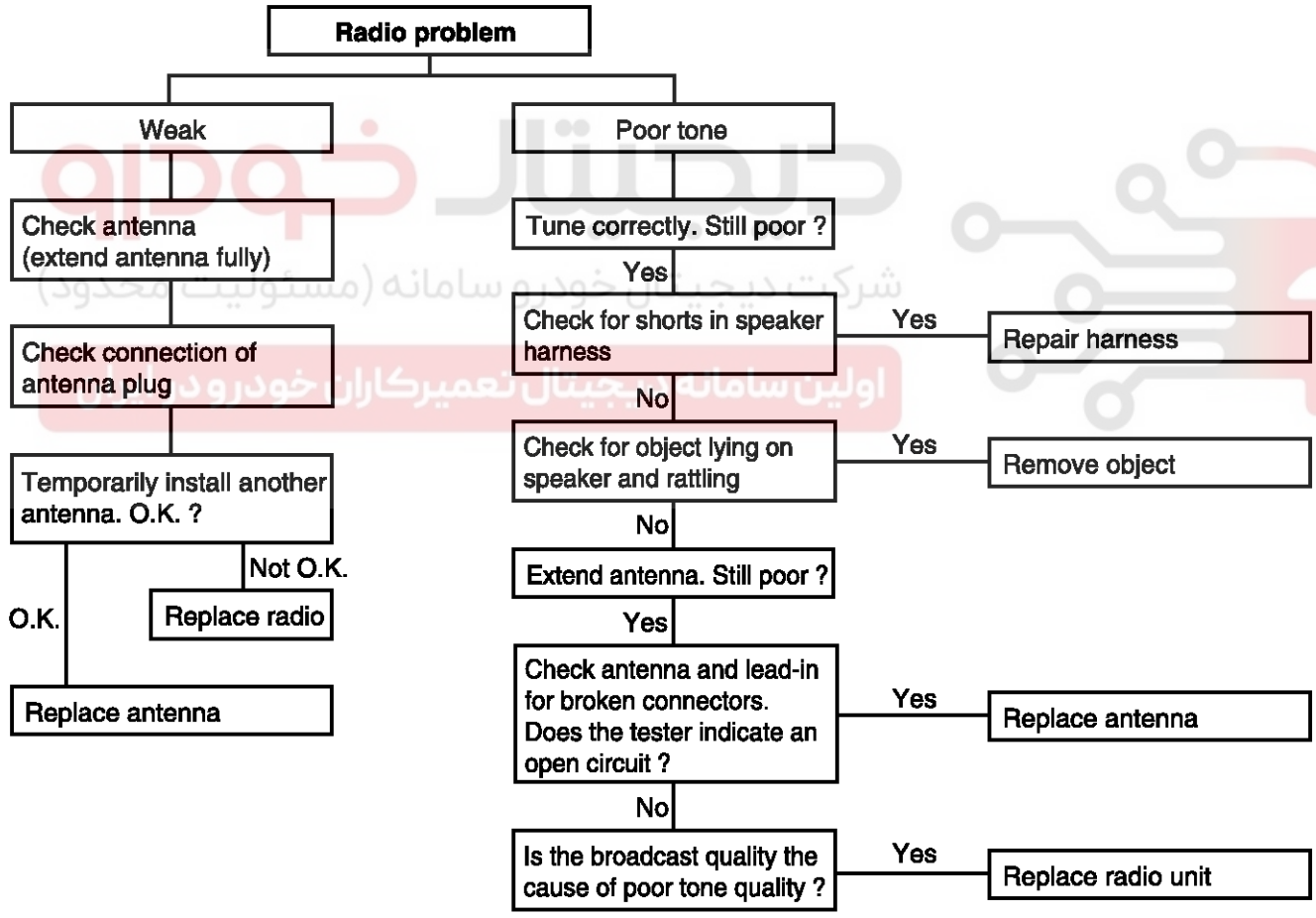


LTAD004B



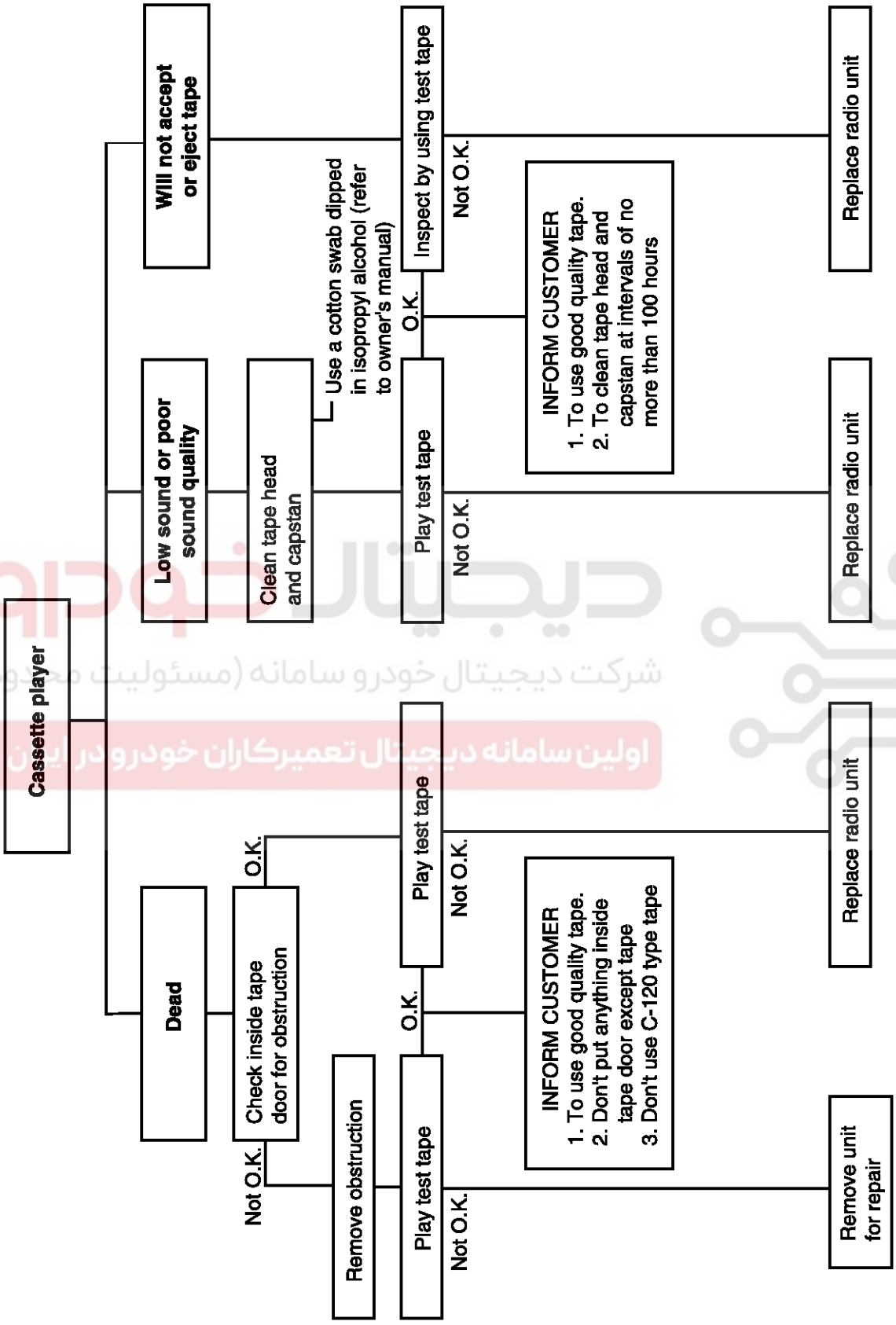
LTAC004C

CHART 2



LTAC004D

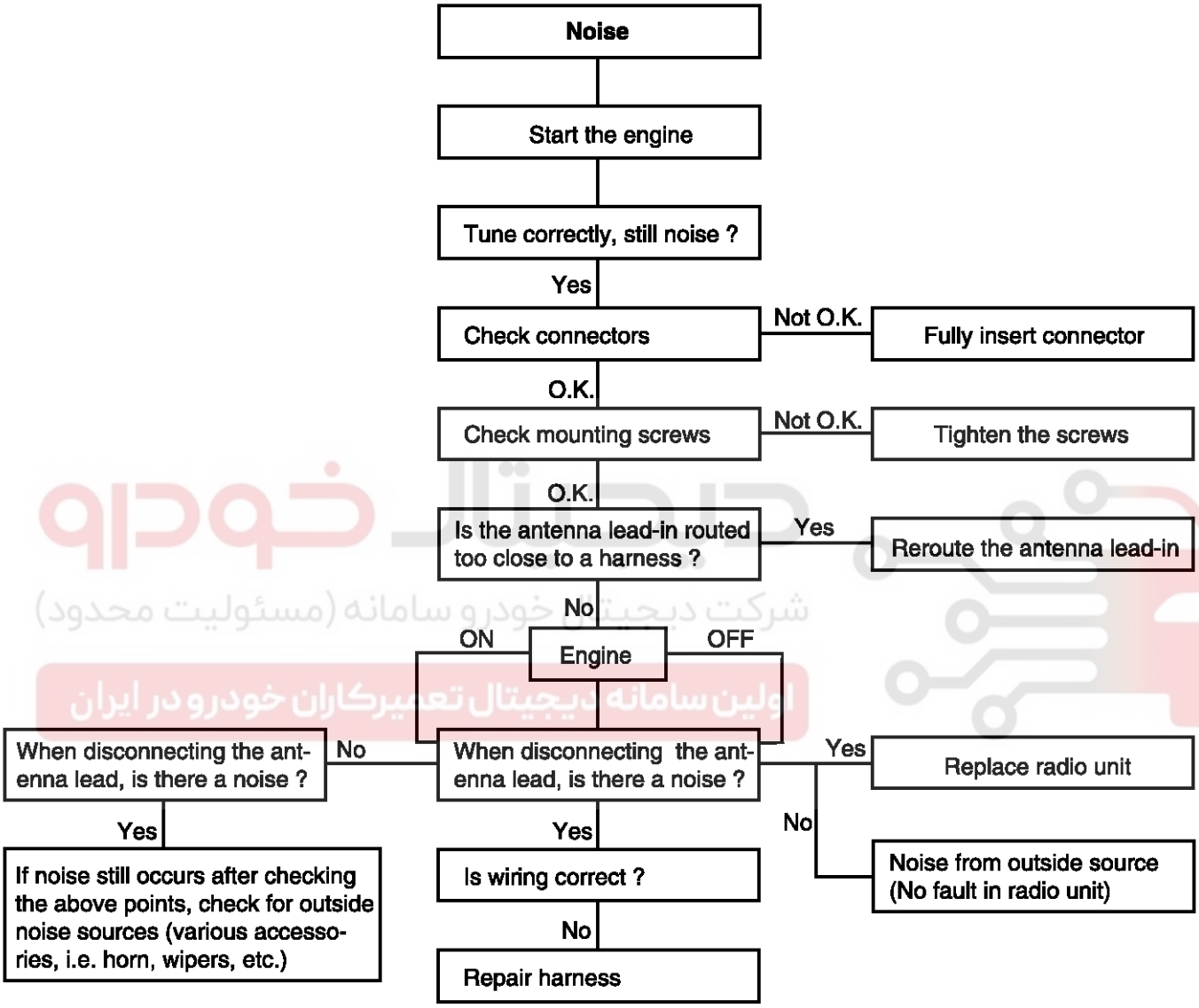
CHART 3



LTAC004E

CHART 4

1. RADIO



LTAC004F

2. TAPE

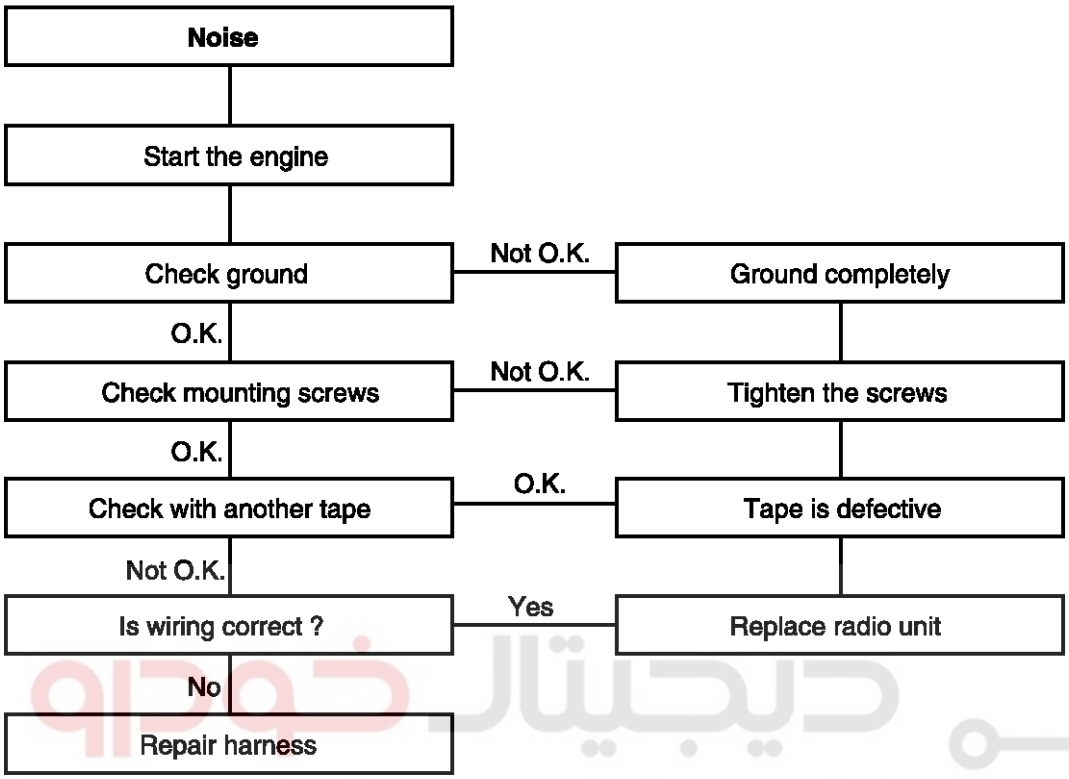
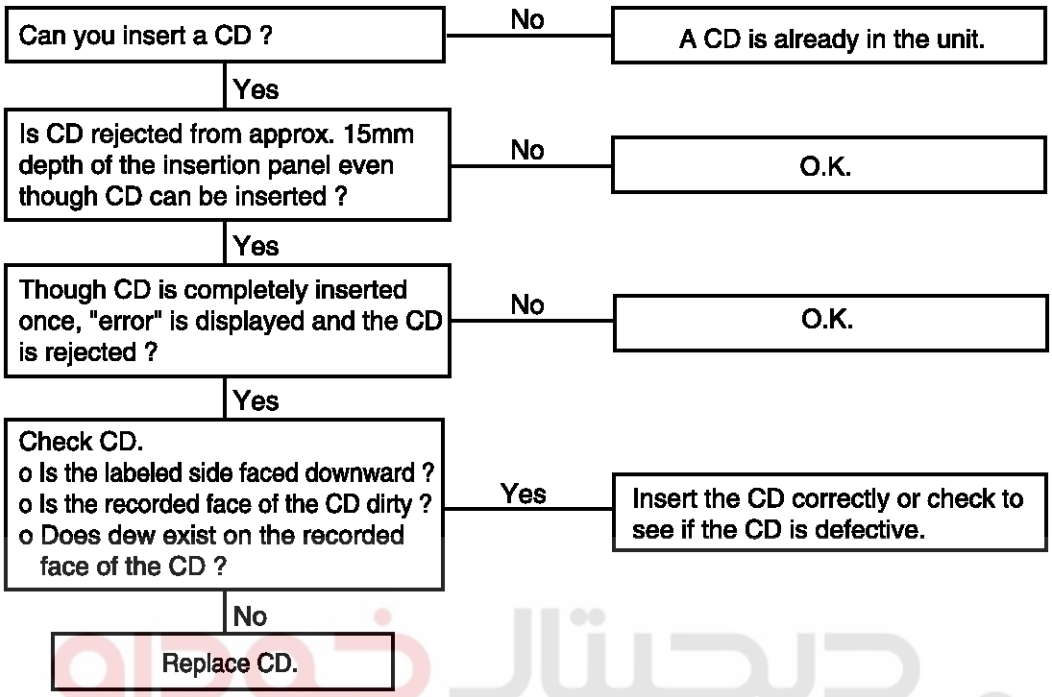


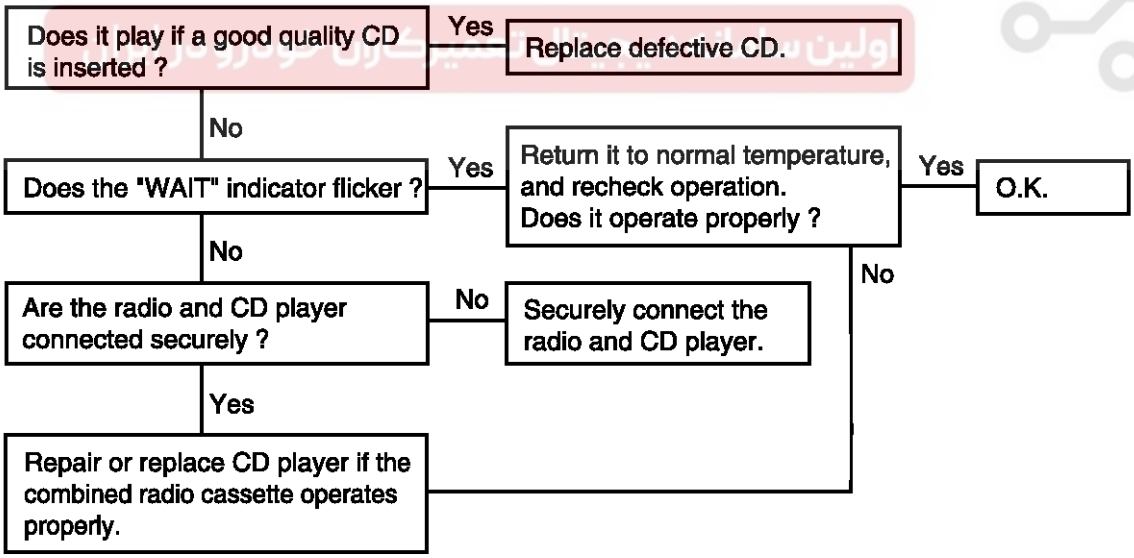
CHART 5

1. CD WILL NOT BE ACCEPTED



LTAC004H

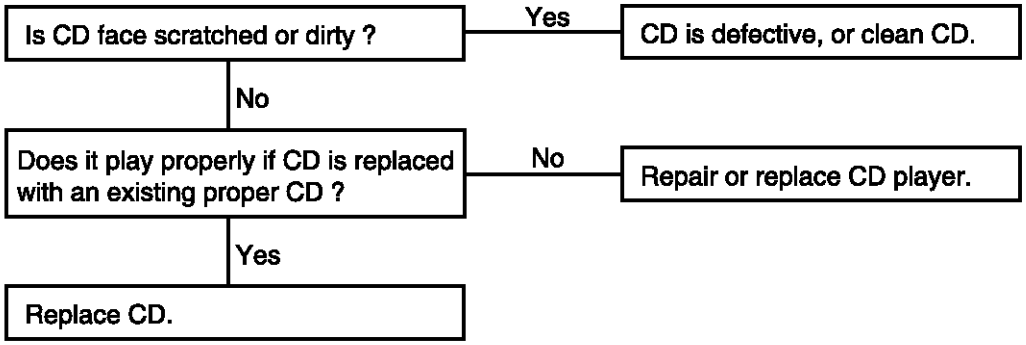
2. NO SOUND



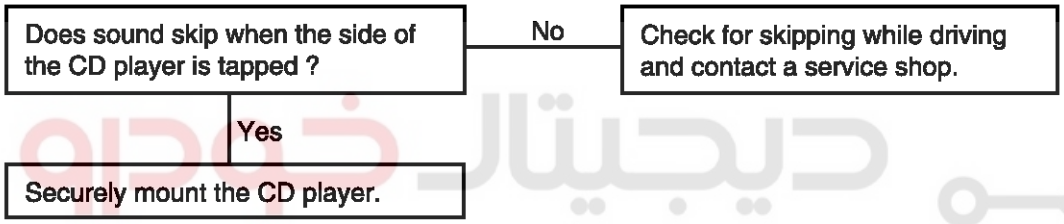
LTAC004I

3. CD SOUND SKIPS

1) Sound sometimes skips when parking.

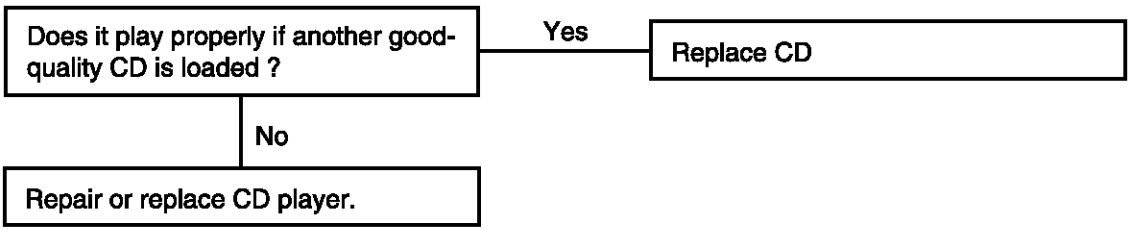


2) Sound sometimes skips when driving.
(Stop vehicle, and check it.)
(Check by using a CD which is free of scratches, dirt or other damage.)



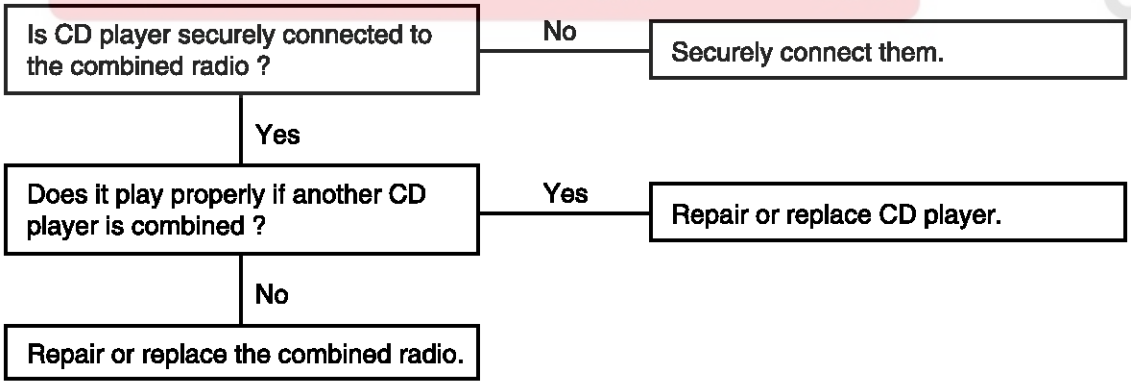
LTAC004J

4. SOUND QUALITY IS POOR



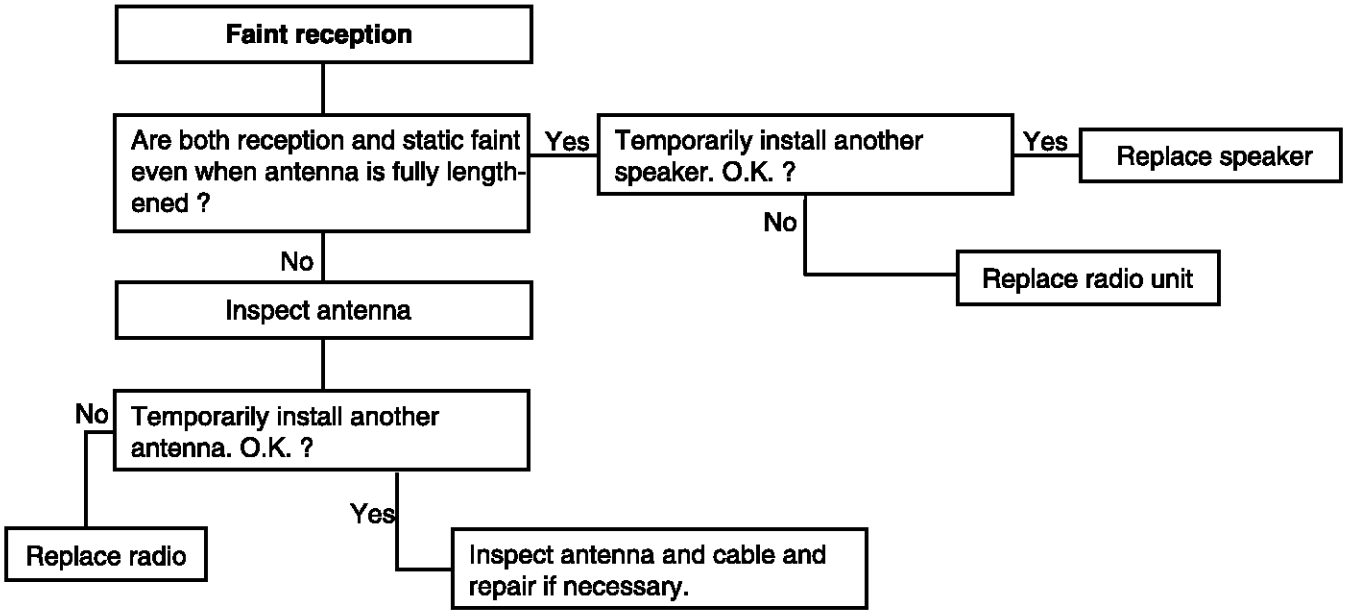
5. CD WILL NOT EJECT

6. NO SOUND FROM ONE SPEAKER



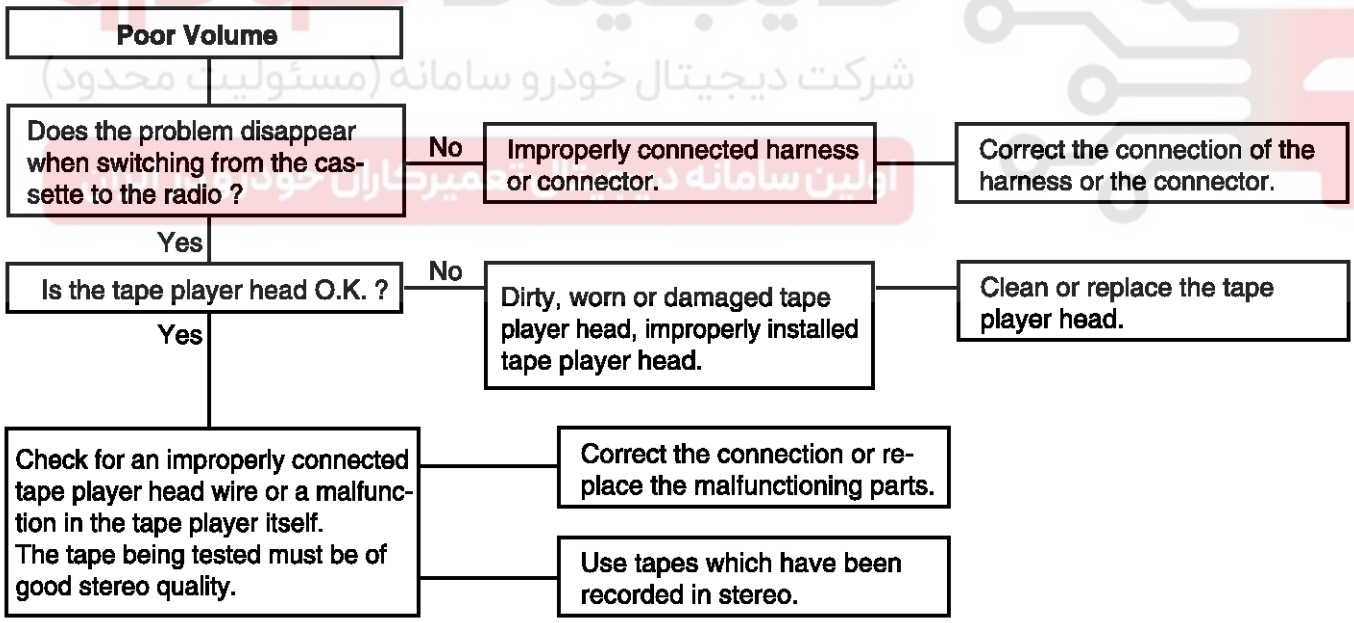
LTAC004K

CHART 6



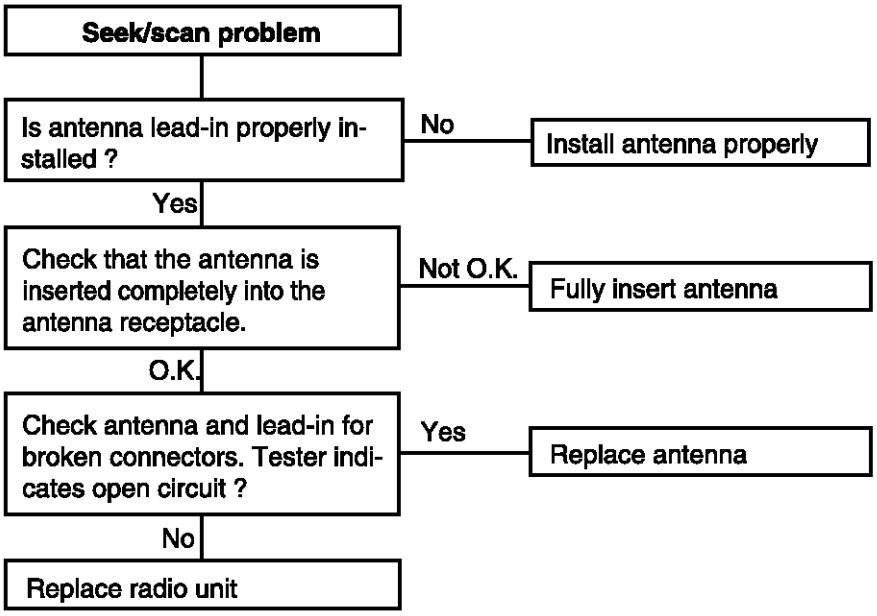
LTAC004L

CHART 7



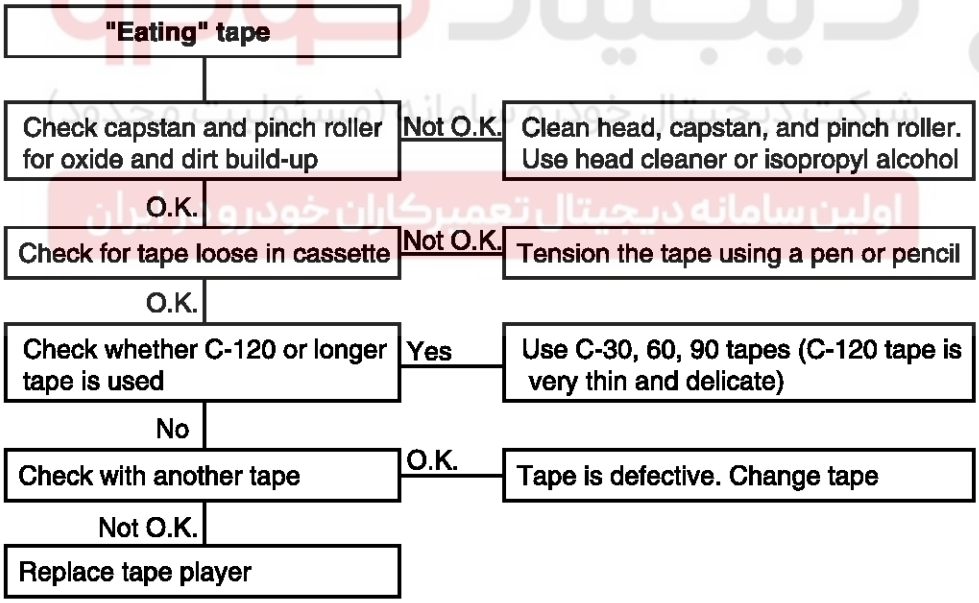
LTAC004M

CHART 8



LTAC004N

CHART 9

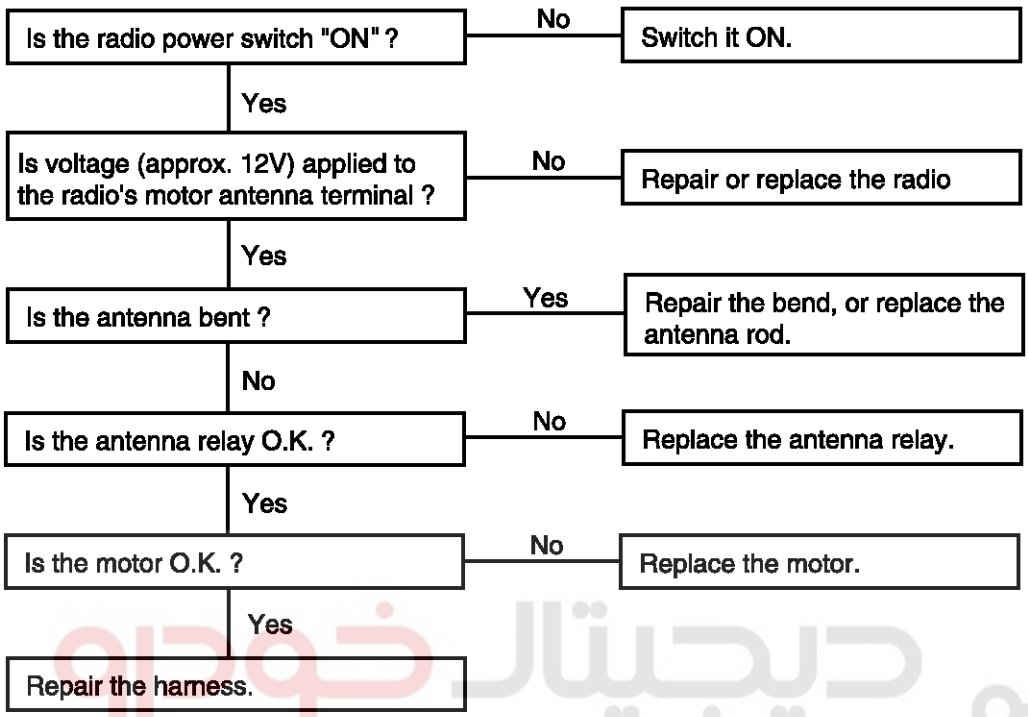


LTAC004O

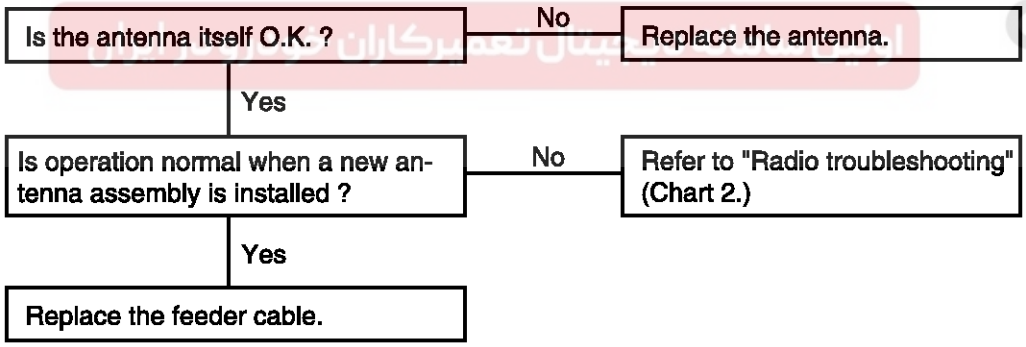
CHART 10

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



LTAC004P

WINDSHIELD WIPER

Symptom	Possible cause	Remedy
Wipers do not operate or return to off position.	Wiper fuse blown Wiper motor faulty Wiper switch faulty Wiring or ground faulty	Check for short and replace fuse Check motor Check switch Repair if necessary
Wipers do not operate in INT position	ETACS Module faulty Wiper switch faulty Wiper motor faulty Wiring or ground fautly	Check ETACS Module Check switch Check motor Repair if necessary

POWER WINDOW

Symptom	Possible cause	Remedy
No windows operate from the main switch on the driver's door	Fuse blown Poor ground Defective power window main switch Open circuit in wires or loose or disconnected connector	Check for short and replace fuse Clean and retighten the ground terminal mounting bolt Check the switch Replace if necessary Repair or replace
Driver's side window does not operate	Defective power window main switch Defective motor or circuit breaker Open circuit in wires or loose or disconnected connector	Check for driver's window switch Replace the motor Check the harness and the connector
Passenger's side window does not operate	Defective power window subswitch Defective motor or circuit breaker Wiring faulty or disconnected connector	Replace the switch Replace the motor Repair if necessary

POWER DOOR MIRROR

Symptom	Possible cause	Remedy
No mirrors operate	fuse blown Poor ground Defective mirror switch Open circuit in wires or loose or disconnected connector	Check the circuit and replace fuse Clean and retighten the gound terminal mounting bolt Check the switch Replace if necessary Repair or replace
One mirror does not operate	Defective mirror switch Defective mirror actuator Open circuit wires or loose or disconnected connector	Check the switch Replace if necessary Replace the actuator Repair or replace

Audio

SPECIFICATION

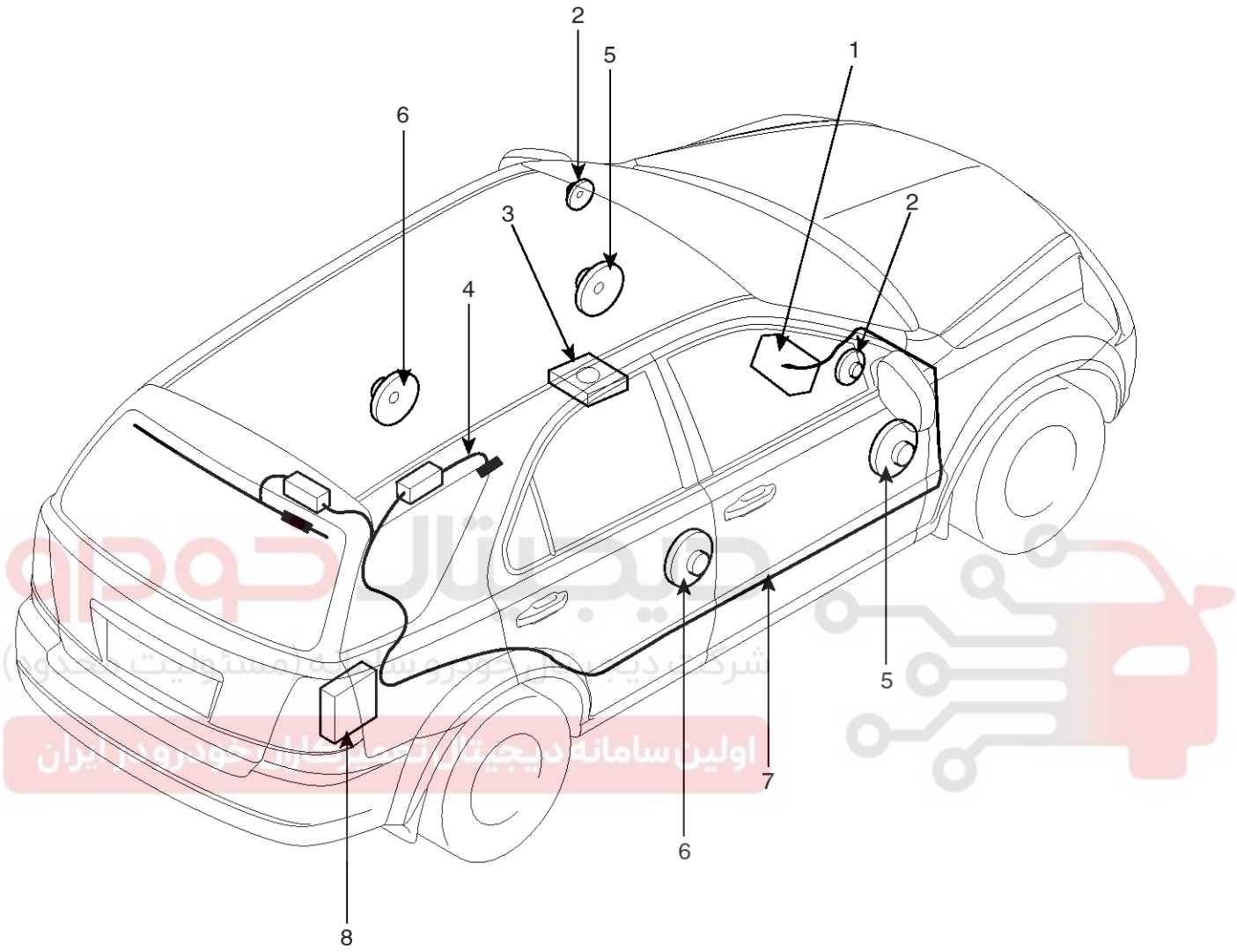
AUDIO

Item		Specification	
Model		RADIO/TAPE/CD/MP3 (M455)	RADIO/TAPE/6CDC (M465)
Power supply		DC 14.4V	
Rated output		Max 43W x 4	3.2Vrms
Speaker impedance		4Ω x 4	10Ω
Antenna		80PF 75Ω	
Tuning type		PLL synthesized type	
Amplifier		Internal amplifier	External amplifier
Frequency range / Channel space	FM	87.5~108 MHz / 100KHz (General), 50KHz(Europe)	
	AM	531~1602 KHz / 9KHz (General)	
	MW	522~1620 KHz / 9KHz (Europe)	
	LW	153~279 KHz / 1KHz (Europe)	

SPEACKER

Item		M455	M465
Input Power (W)	Front	43 (1WAY)	55 (2WAY)
	Rear	45 (2WAY)	45 (2WAY)
	Tweeter	30	30
Speaker Impedance(Ω)	Front	4.0 ± 0.6 (1WAY)	4.0 ± 0.6 (2WAY)
	Rear	4.0 ± 0.6 (2WAY)	4.0 ± 0.6 (2WAY)
	Tweeter	4.0 ± 0.6	4.0 ± 0.6
Speaker Number		6	6

COMPONENT LOCATION



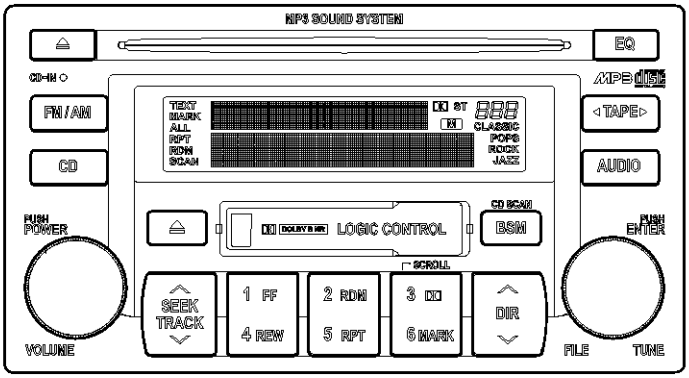
1. Audio unit
2. Tweeter speaker
3. External amplifier
4. Glass antenna
5. Front door speaker
6. Rear door speaker
7. Antenna feeder cable
8. Tuner unit

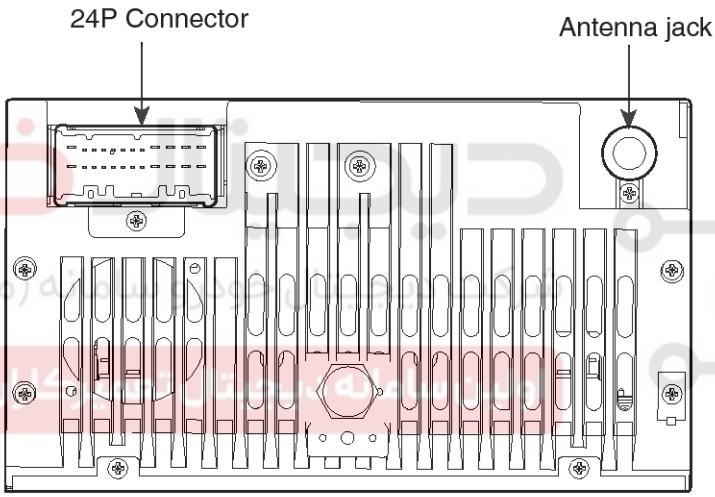
SBLBE6001L

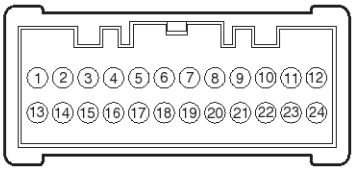
Audio Unit

COMPONENTS

[MP3 (M455)]

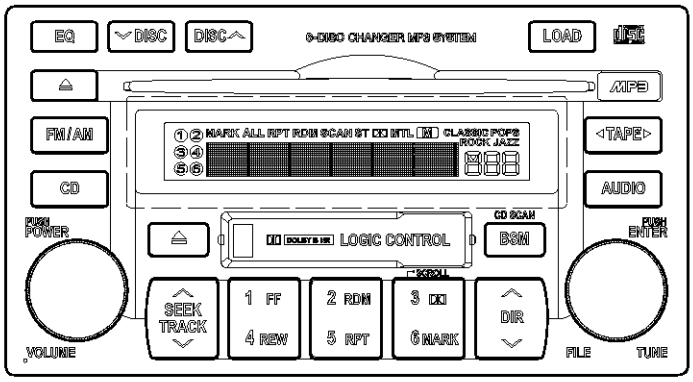


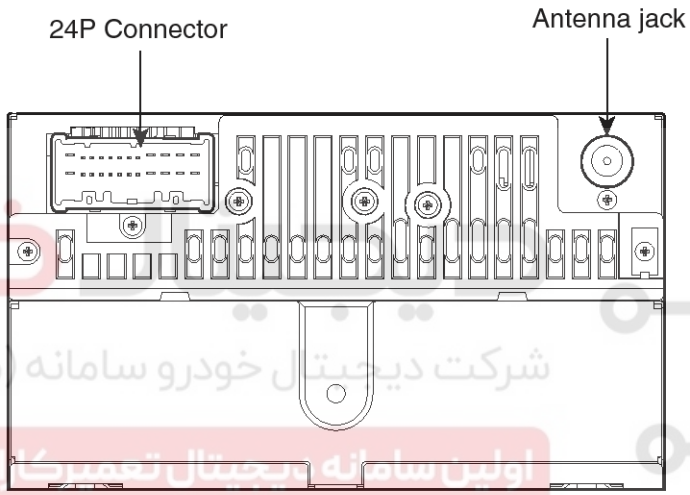


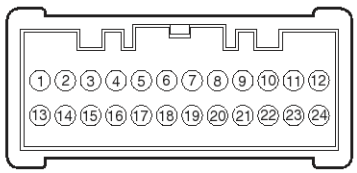
24P Connector	Pin	Name	Pin	Name
	1	Front left speaker (+)	13	Front left speaker (-)
	2	Front right speaker (+)	14	Front right speaker (-)
	3	Rear right speaker (+)	15	Rear right speaker (-)
	4	Rear left speaker (+)	16	Rear left speaker (-)
	5	Illumination (+)	17	Illumination (-)
	6	Steering remote control-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

SBLBE6003L

[6CDC (M465)]





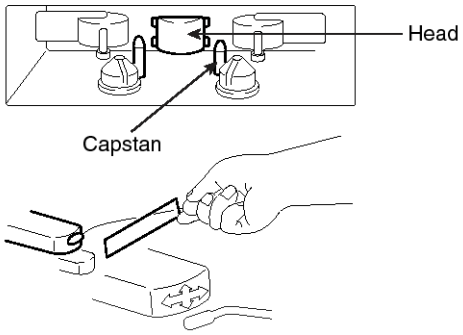
24P Connector	Pin	Name	Pin	Name
	1	Front left speaker (+)	13	Front left speaker (-)
	2	Front right speaker (+)	14	Front right speaker (-)
	3	Rear right speaker (+)	15	Rear right speaker (-)
	4	Rear left speaker (+)	16	Rear left speaker (-)
	5	Illumination (+)	17	Illumination (-)
	6	Steering remote control-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

SBLBE6004L

INSPECTION

TAPE HEAD AND CAPSTAN CLEANING

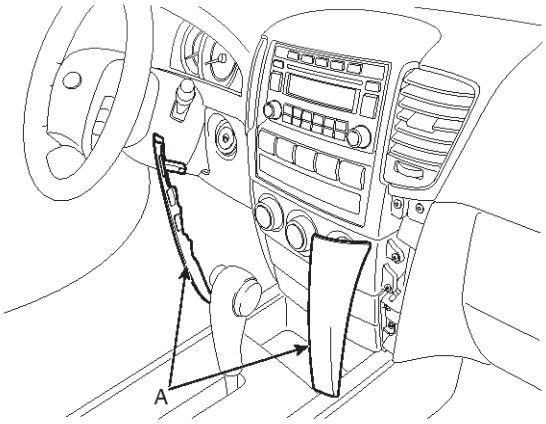
1. To obtain optimum performance, clean the head, and capstan as often as necessary, depending on frequency of use and tape cleanness.
2. To clean the tape head and capstan, use a cotton swab dipped in ordinary rubbing an alcohol. Wipe the head and capstan.



LTAC005A

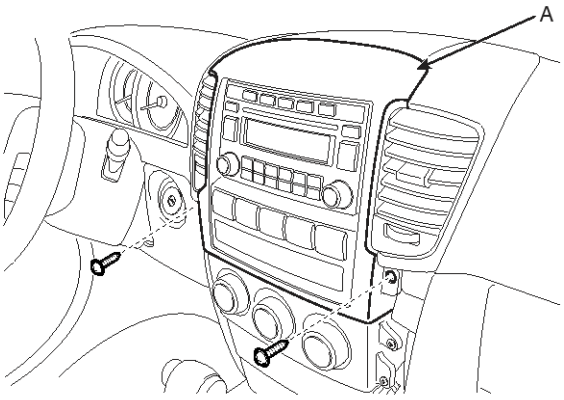
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the center fascia lower panel (A).(Refer to Crash pad in BD group.) after pulling it by using regular screw driver (-) at part (A). Take care of fixing clips (B).



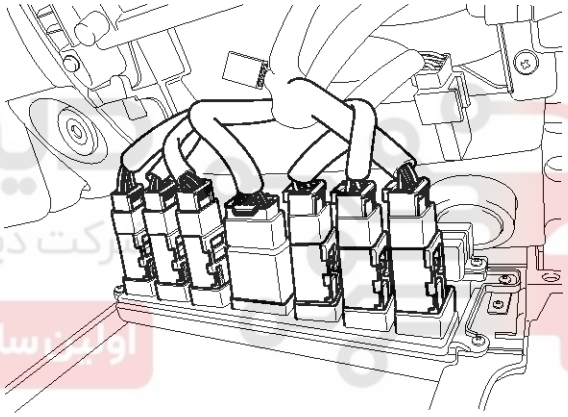
SBLBE6015D

3. Remove the center fascia panel (A) after loosening the screws. Avoid damaging retaining clips.



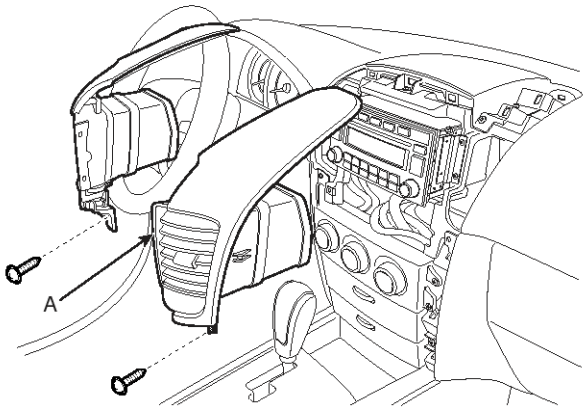
SBLBE6010D

4. Remove the connectors of center fascia panel.



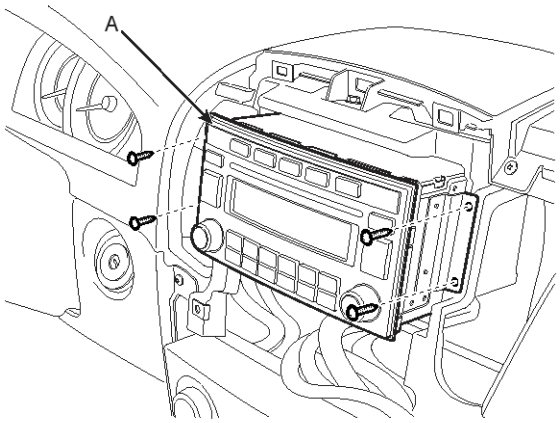
SBLBE6014D

5. Remove the mounting screws then remove the center air vent (A).



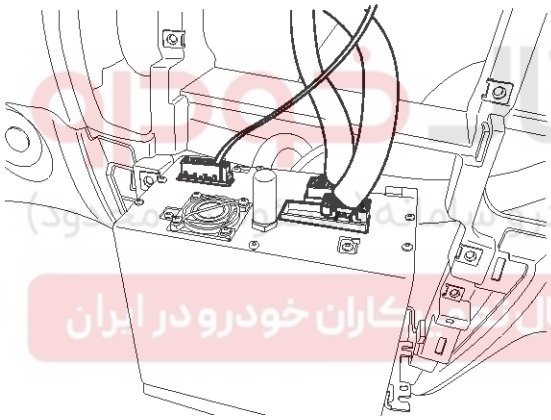
SBLBE6011D

6. Remove the mounting screws then remove the audio unit (A).



SBLBE6012D

7. Remove the audio unit after disconnecting the audio connectors and cable.



SBLBE6013D

INSTALLATION

1. Connect the audio connectors and cable to the audio unit
2. Fasten the audio mounting screws.
3. Reassemble the center air vent (A).
4. Reassemble the center fascia panel after connecting the connectors.
5. Reassemble the center fascia lower panel.
6. Connect the negative (-) battery terminal and then check the audio working.

Speakers

INSPECTION

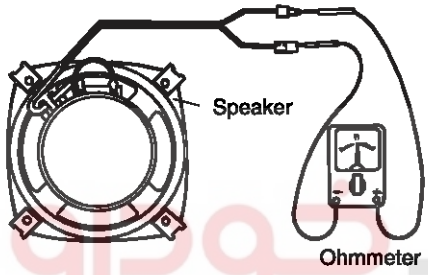
SPEAKER

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.

Specification impedance : 4 Ω

2. If a clicking sound is emitted from the speaker when the ohmmeter is connected to the speaker terminals, the speaker is OK.

Specification impedance : 4 Ω

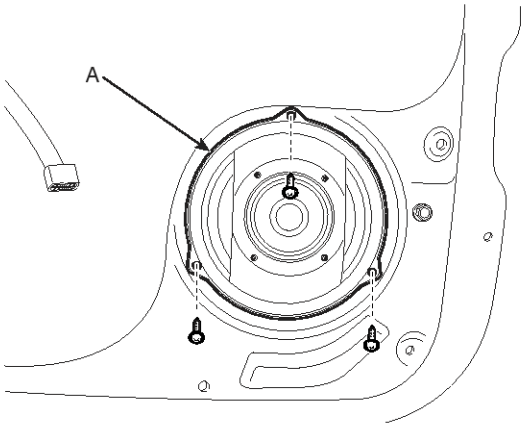


LTAC008A

REMOVAL

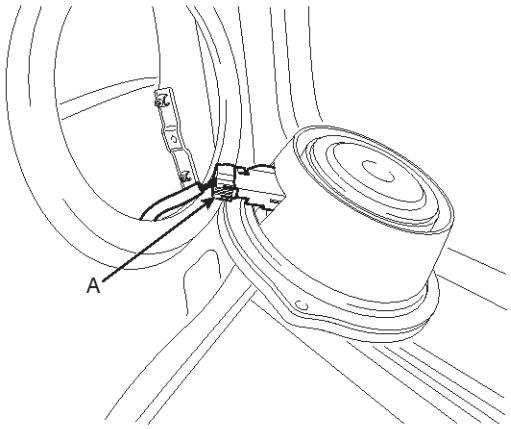
FRONT SPEAKER

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



SBLBE6022D

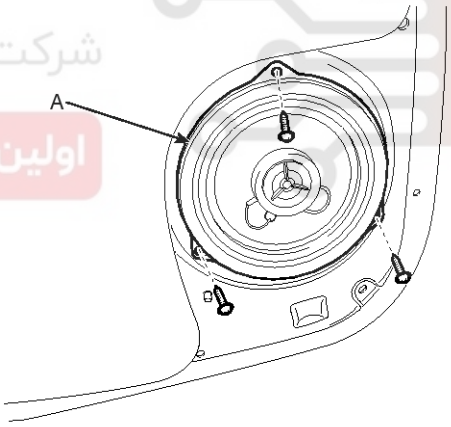
3. Remove the connector (A).



SBLBE6025D

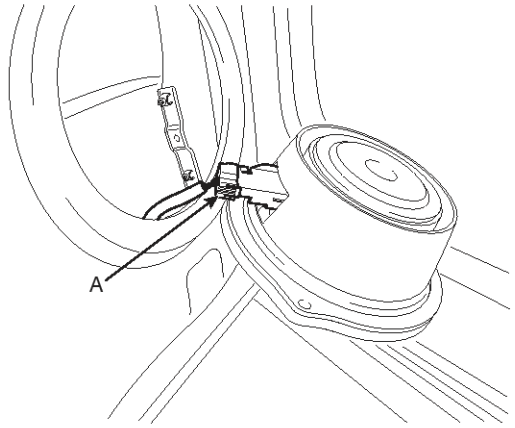
REAR SPEAKER

1. Remove the rear door trim panel (Refer to the Rear door in BD group).
2. Remove the rear speaker (A) after removing 3 screws rivets.



SBLBE6024D

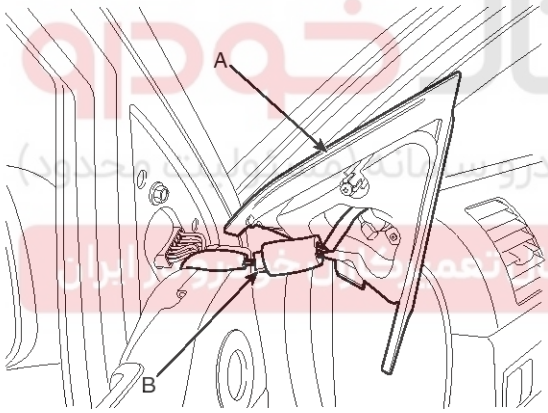
3. Disconnect the connector(A).



SBLBE6025D

TWEETER SPEAKER

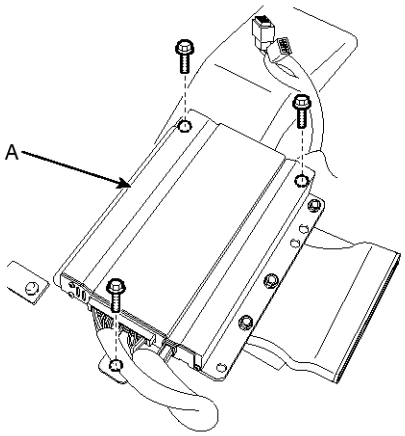
1. Remove the tweeter speaker cover (A) and then disconnect the connector (B) (Refer to the Front door in BD group).



SBLBE6026D

EXTERNAL AMPLIFIER

1. Remove the driver seat. (Refer to the Front seats in BD group)
2. Remove the external amplifier (A) from the driver seat floor inner panel (A) after removing 3 bolts.



SBLBE6027D

INSTALLAITION

FRONT SPEAKER

1. Connect the connectors to the front speaker.
2. Reassemble the front speaker.
3. Reassemble the front door trim panel.

REAR SPEAKER

1. Connect the connectors to the rear speaker.
2. Reassemble the rear speaker.
3. Reassemble the rear door trim panel.

TWEETER SPEAKER

1. Connect the connectors and then reassemble the tweeter speaker.

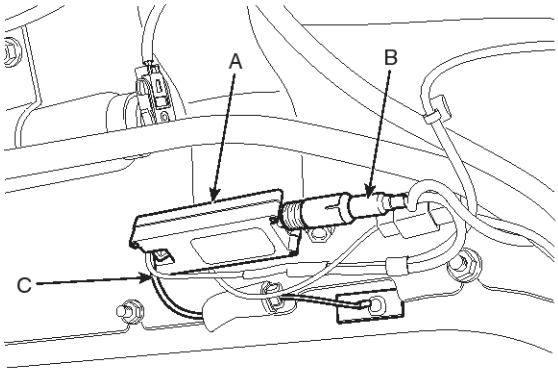
EXTERNAL AMPLIFIER

1. Reassemble the external amplifier on the driver seat floor
2. Reassemble the driver seat after connecting the connectors.

Antenna

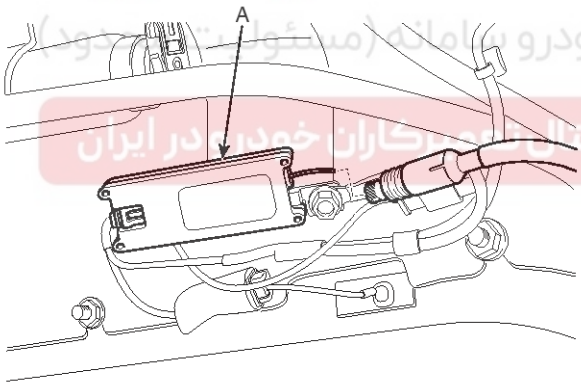
REMOVAL

1. Remove the rear right quarter trim.
2. Remove the radio feeder cable (B) and amplifier wiring (C) from the glass antenna radio amplifier (A).



SBLBE6030D

3. Remove the glass antenna radio amplifier (A) after removing fixing bolt(1EA).



SBLBE6031D

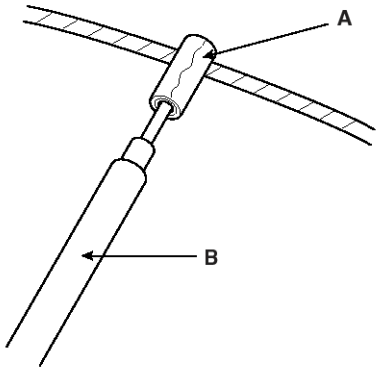
INSTALLATION

1. Reassemble the glass antenna radio amplifier
2. Connect the feeder cable and connector.
3. Reassemble the rear right quarter trim.

INSPECTION

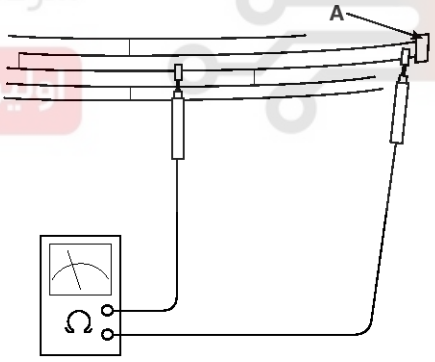
GLASS ANTENNA TEST

1. Wrap aluminum foil (A) around the tip of the tester probe (B) as shown.



ETKD003A

2. Touch one tester probe to the glass antenna terminal (A) hear, and move the other tester probe along the antenna wires to check that continuity exists.



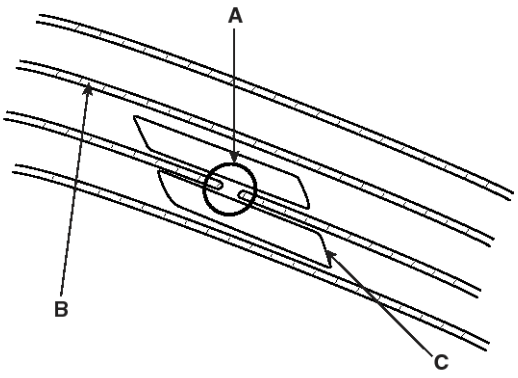
ETKD004A

GLASS ANTENNA REPAIR

NOTICE

To make an effective repair, the broken section must be no longer than one inch.

1. Lightly rub the area around the broken section (A) with fine steel wool, and then clean it with alcohol.

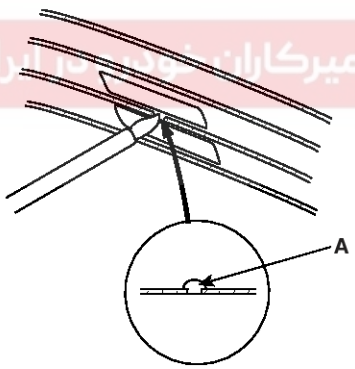


ETKD004K

2. Carefully mask above and below the broken portion of the glass antenna wire (B) with cellophane tape (C).
3. Using a small brush, apply a heavy coat of silver conductive paint (A) extending about 1/8″on both sides of the break. Allow 30 minutes to dry.

NOTICE

Thoroughly mix the paint before use.



ETKD006Z

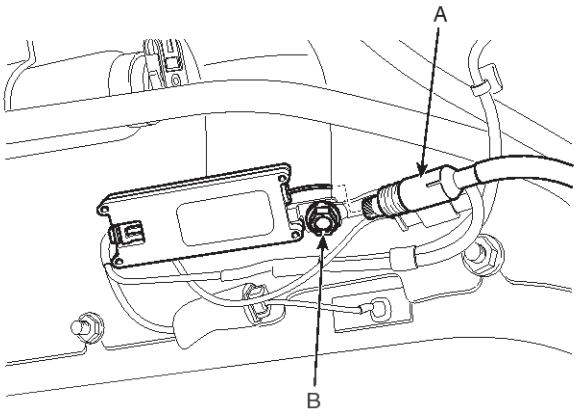
4. Check for continuity in the repaired wire.
5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

RADIO AMPLIFIER INSPECTION

1. Remove the radio feeder cable from the radio amp after removing the rear right quarter trim panel.
2. Turn the radio ON.

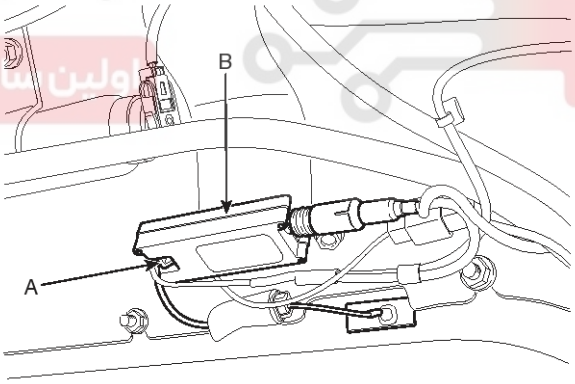
   Measure the voltage between radio amp feeder cable (A) and body ground (B).

OK : approximately 12V (ACC+)



SBLBE6032D

3. Check for continuity between grid wire connector (A) and radio amp (B) rightly.



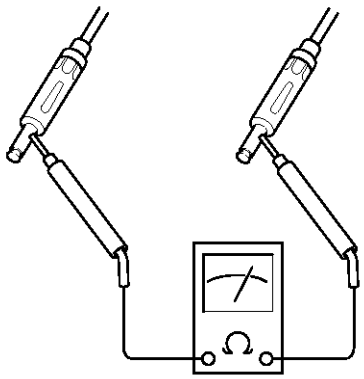
SBLBE6033D

4. Check the grid lines for continuity.
5. When a poor radio reception is not repaired through the above inspection methods, replace the amp.

   If the radio reception is still poor, check the radio cable for short and radio head unit for failure.

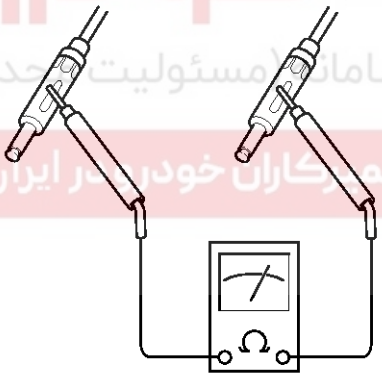
ANTENNA CABLE

1. Remove the antenna jack from the audio unit and antenna.
2. Check for continuity between the center poles of antenna cable.



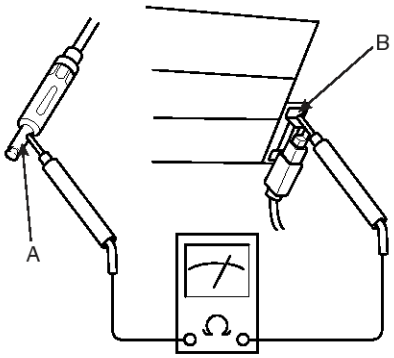
ATJF023C

3. Check for continuity between the outer poles of antenna cable. There should be continuity.



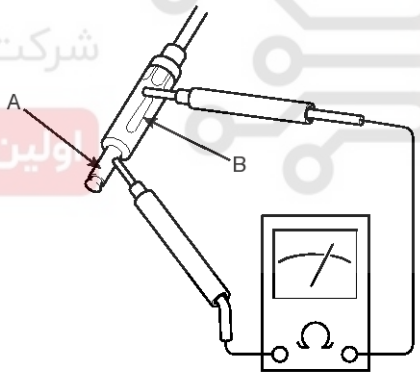
ATJF023D

4. If there is no continuity, replace the antenna cable.
5. Check for continuity between the center pole (A) of antenna cable and terminal of glass antenna (B). There should be continuity.



ATJF023E

6. If there is no continuity, replace the antenna amplifier.
7. Check for continuity between the center pole (A) and outer pole (B) of antenna cable. There should be no continuity.

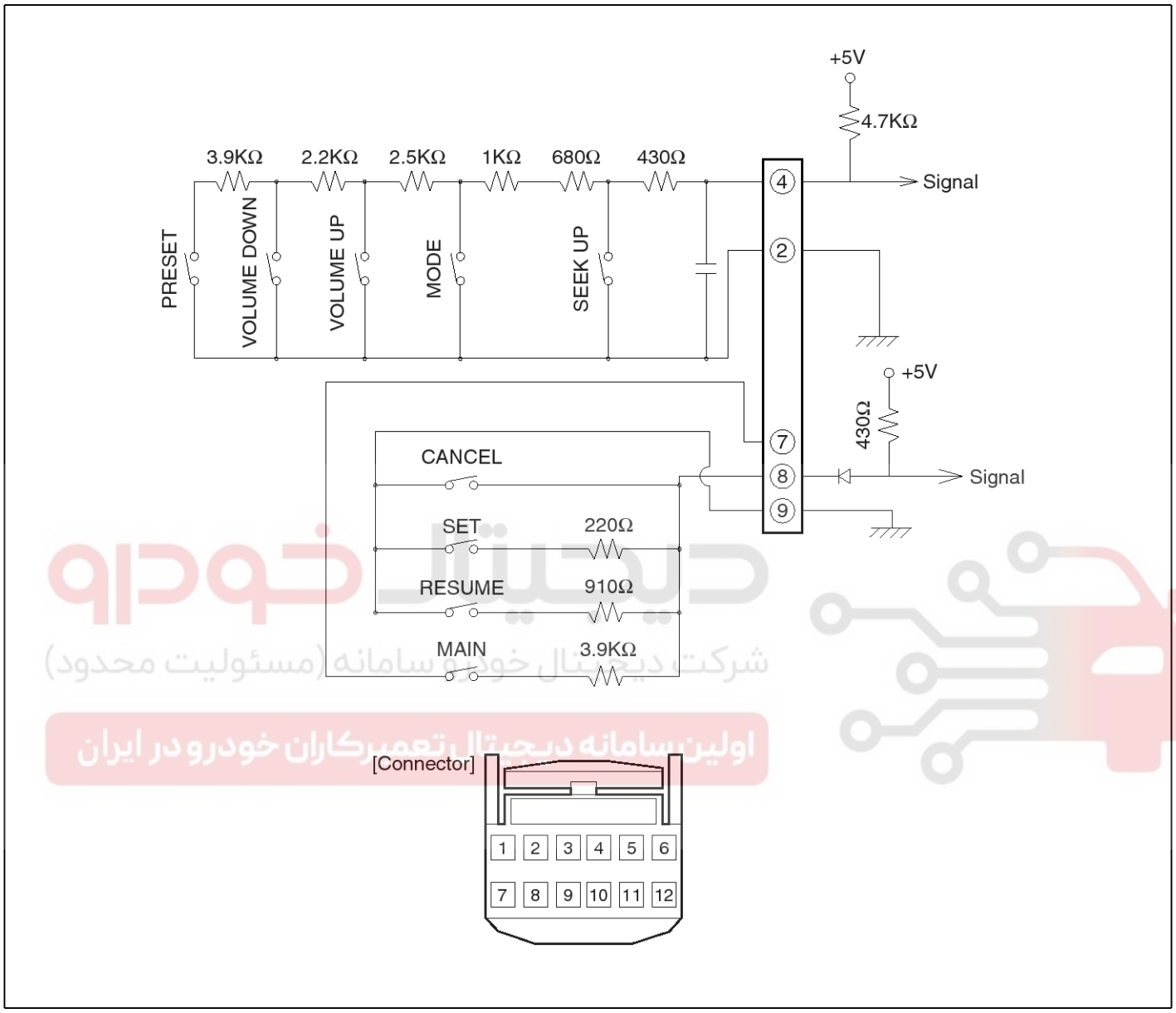


ATJF023F

8. If there is continuity, replace the antenna cable.

Audio Remote control

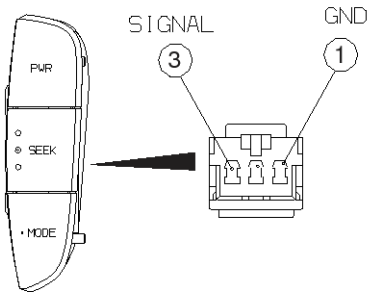
CIRCUIT DIAGRAM



SBLBE6037L

INSPECTION

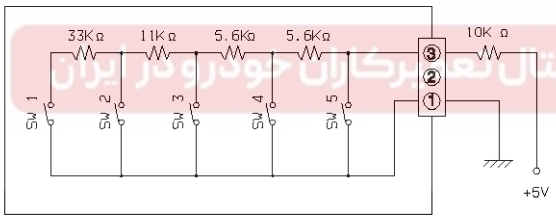
1. Connect an ohmmeter to the 1 and 3 terminal of remote control connector.



LTAC008C

2. Check the resistance between 1 and 3 terminal when each switch is operated.

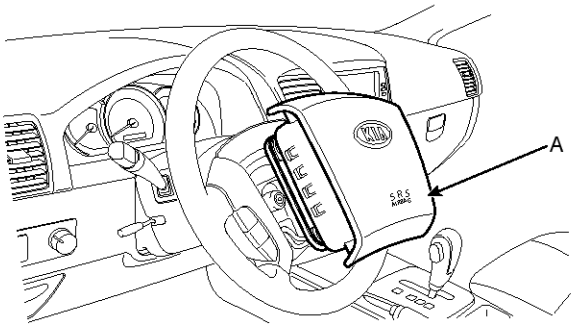
Function	Resistance
Power	55.3 kΩ ± 5%
Mode	22.3 kΩ ± 5%
Seek	11.3 kΩ ± 5%
Vol up	5.7 kΩ ± 5%
Vol down	0Ω



LTAC008B

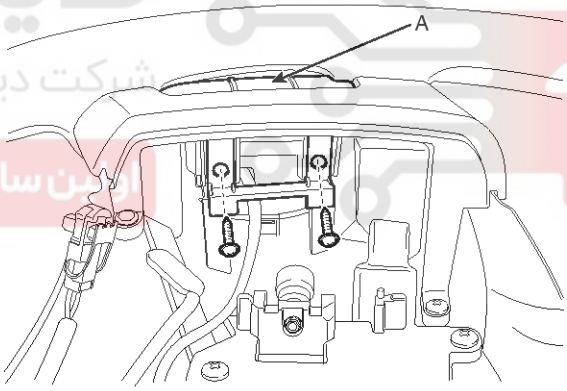
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the driver airbag module (A). (Refer to the airbag group)



SBLBE6034D

3. Remove the audio remote control switch (A) after remove the steering wheel remote control switch connector and 2 screws.



SBLBE6035D

INSTALLATION

1. Reassemble the audio remote control switch.
2. Connect the remote control switch connector.
3. Reassemble the driver airbag module and the negative (-) battery terminal.

TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS CHECK SHEET

TROUBLE IN	☐ ALL ☐ AM ☐ FM ☐ TAPE ☐ CD ☐ MP3 ☐ CD changer ☐ AMP ☐ Others
TROUBLE OCCURS	☐ Always ☐ Engine start ☐ Engine Running ☐ Cold ☐ Warm ☐ Sometimes ☐ Most of the time ☐ Engine off
TYPE OF TROUBLE	☐ Will not play ☐ Tape speed not proper ☐ Weak ☐ Squealing noise ☐ Eats tape ☐ Display/illumination poor ☐ CD skips & jumps ☐ Tape/CD will not eject or insert ☐ Others (Describe) :
OTHERS	▶ Customer complaint contents : ▶ Have you checked customer's defects :
* Using the customer complaint analysis check sheet for reference, ask the customer for as much detail as possible about the problem.	

BT1G001A

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.

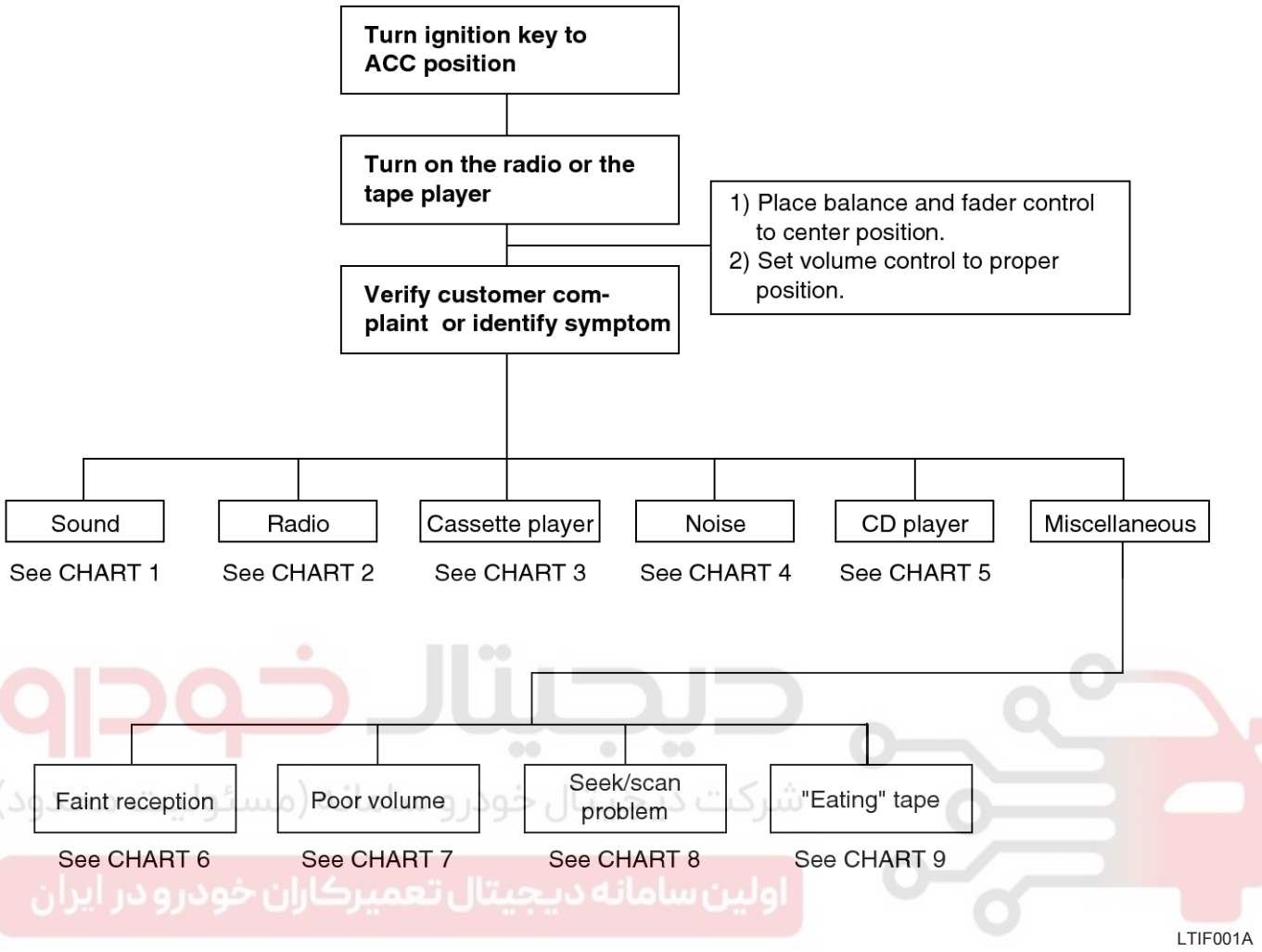
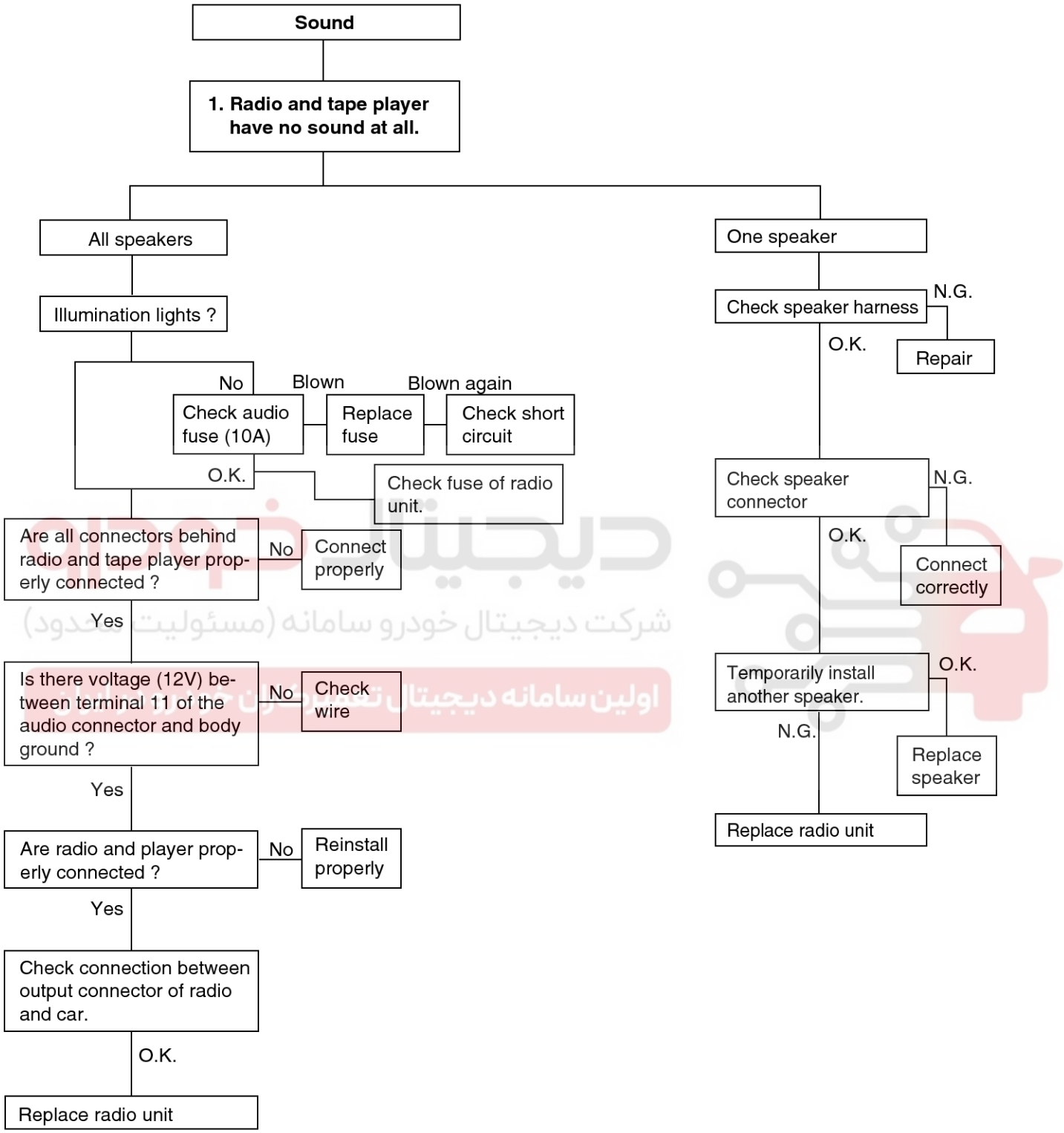
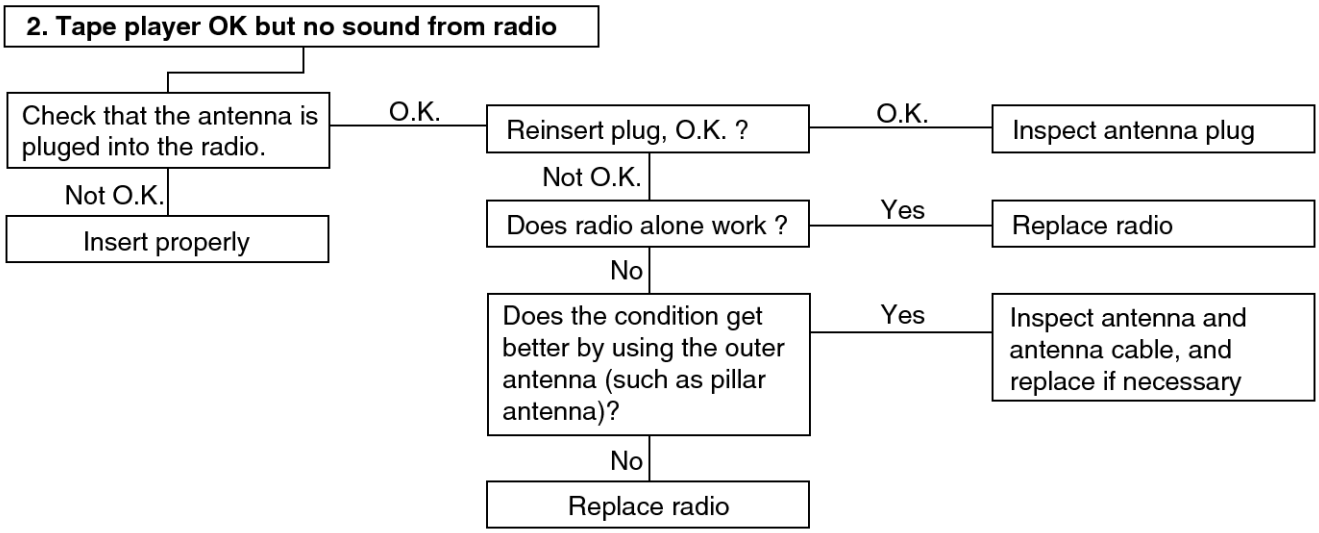


Chart 1

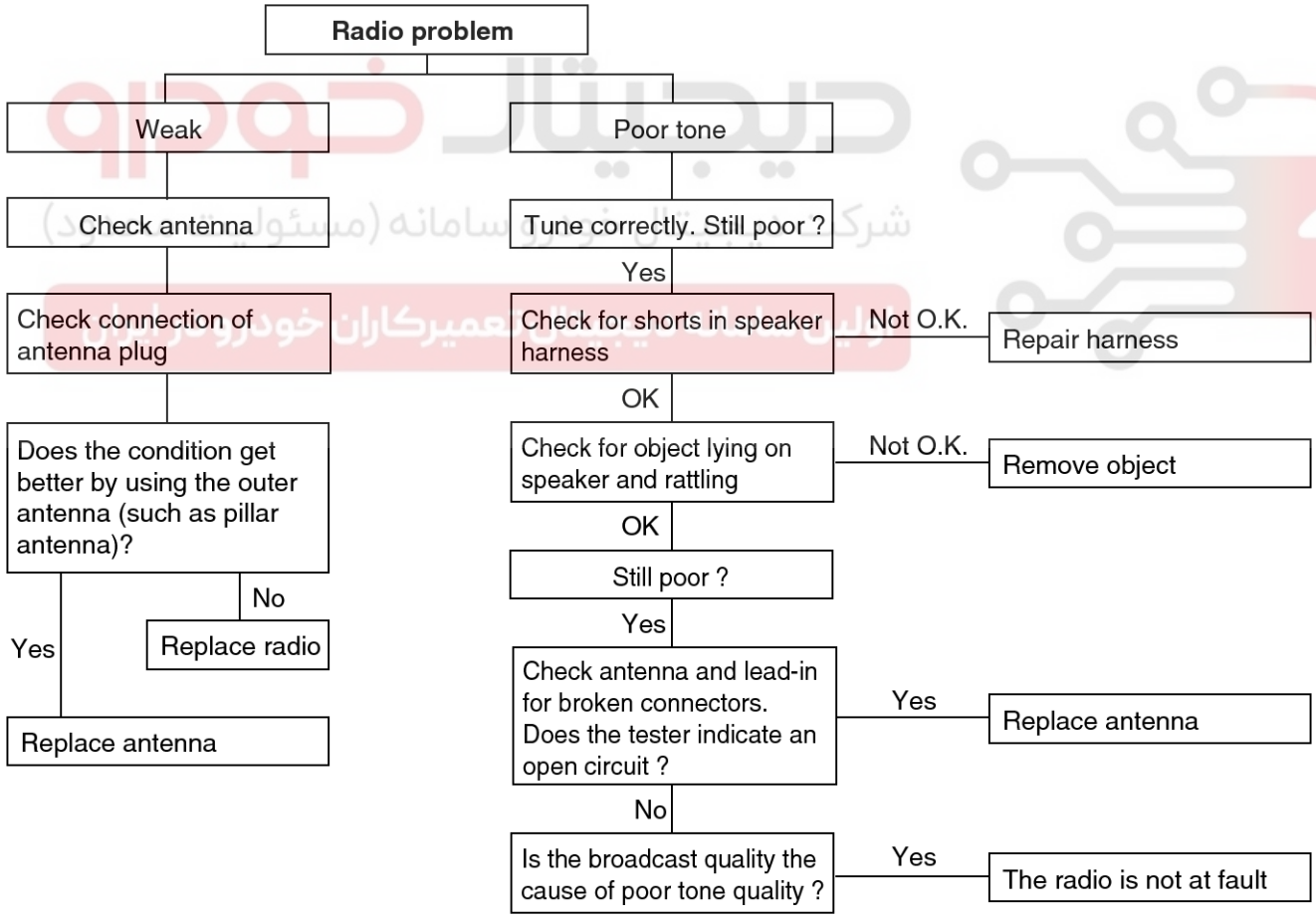


LTJF001B



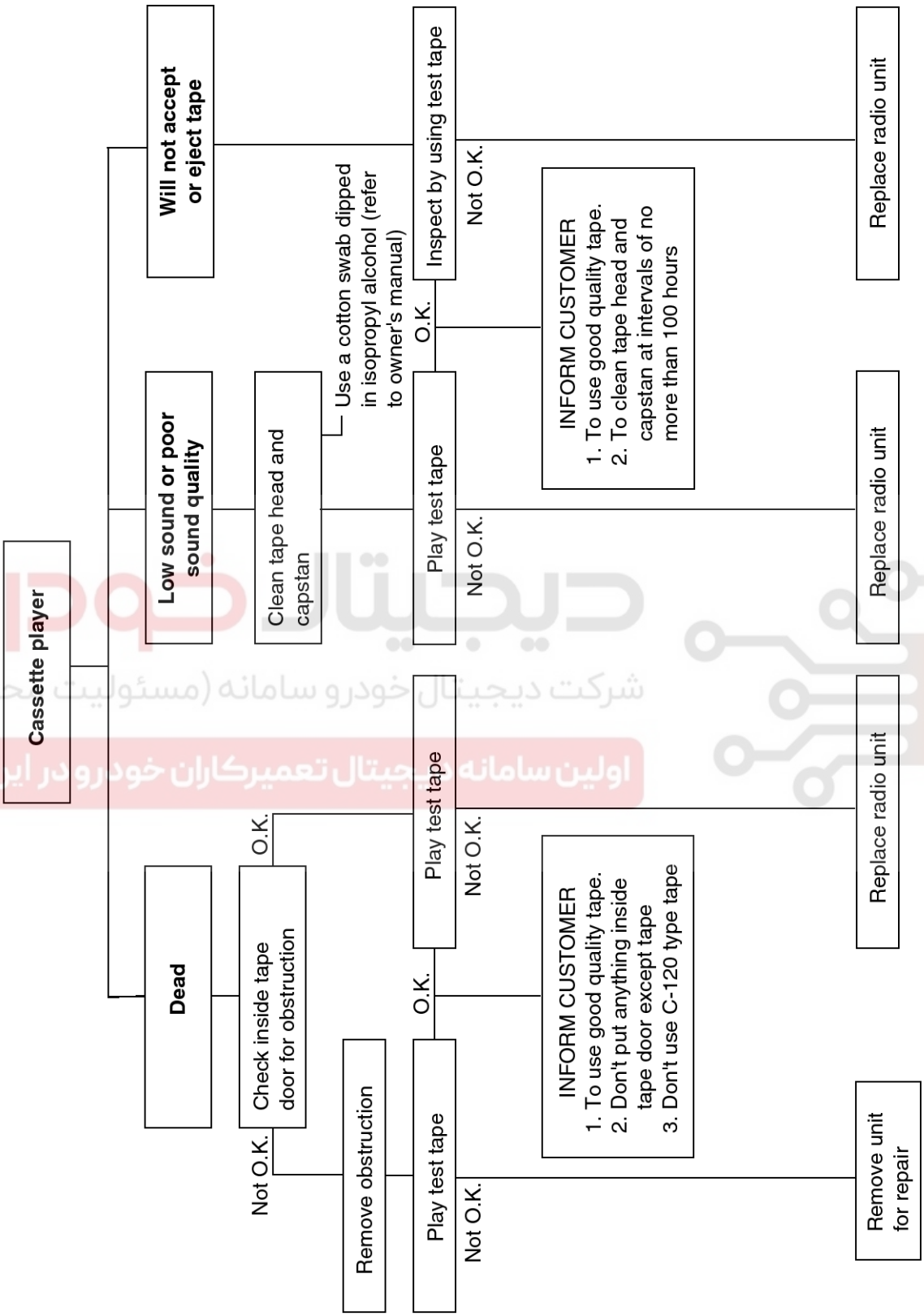
LTIF001C

Chart 2



BTIF001D

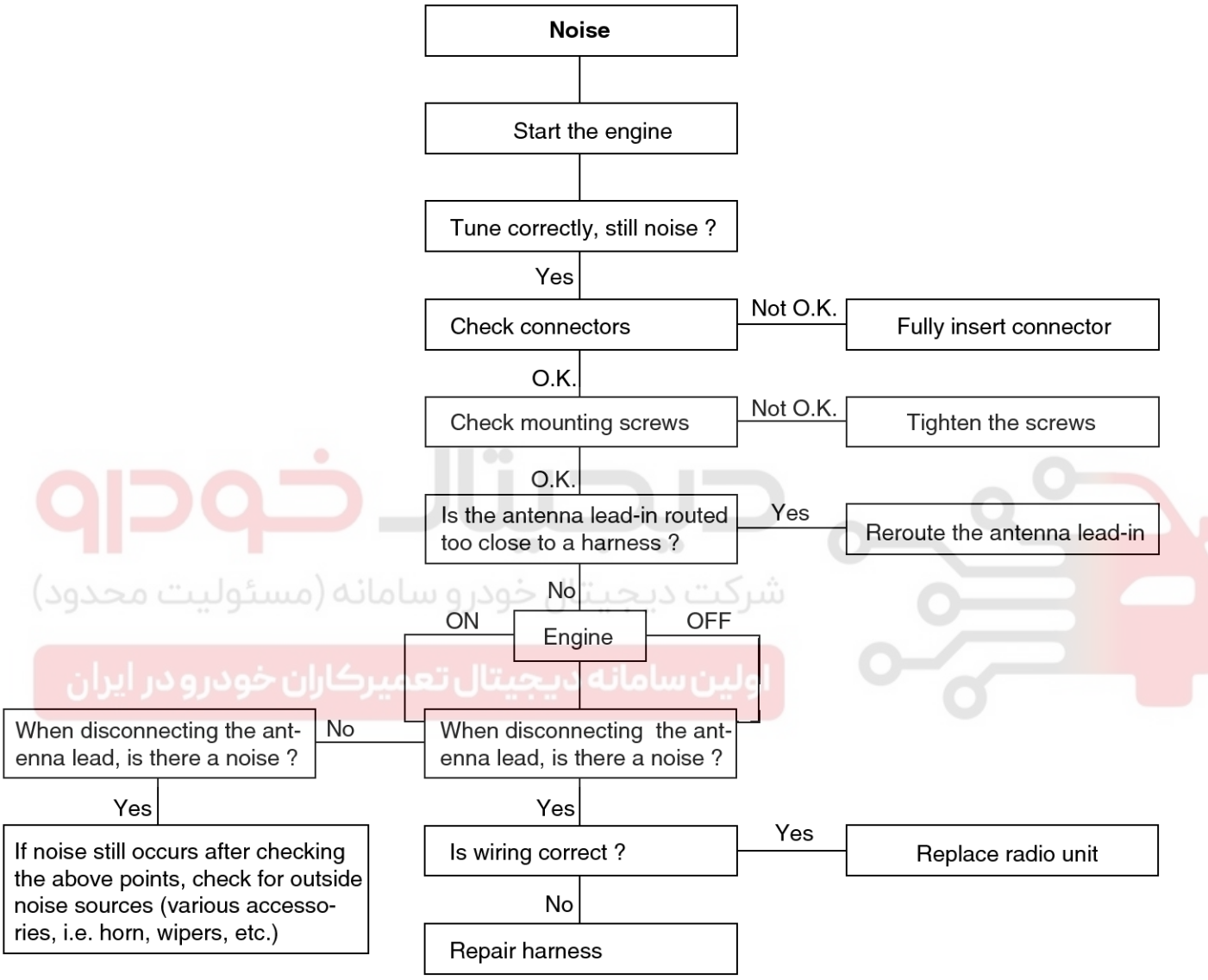
Chart 3



ETBF001E

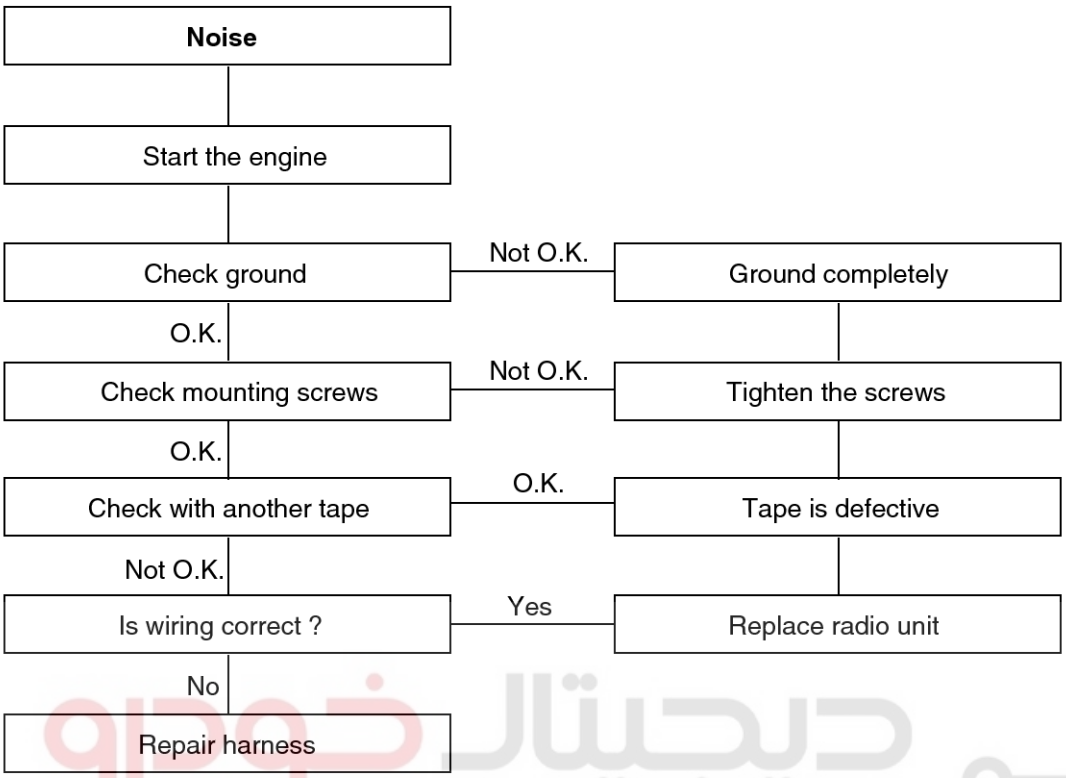
Chart 4

1. RADIO



LTIF001F

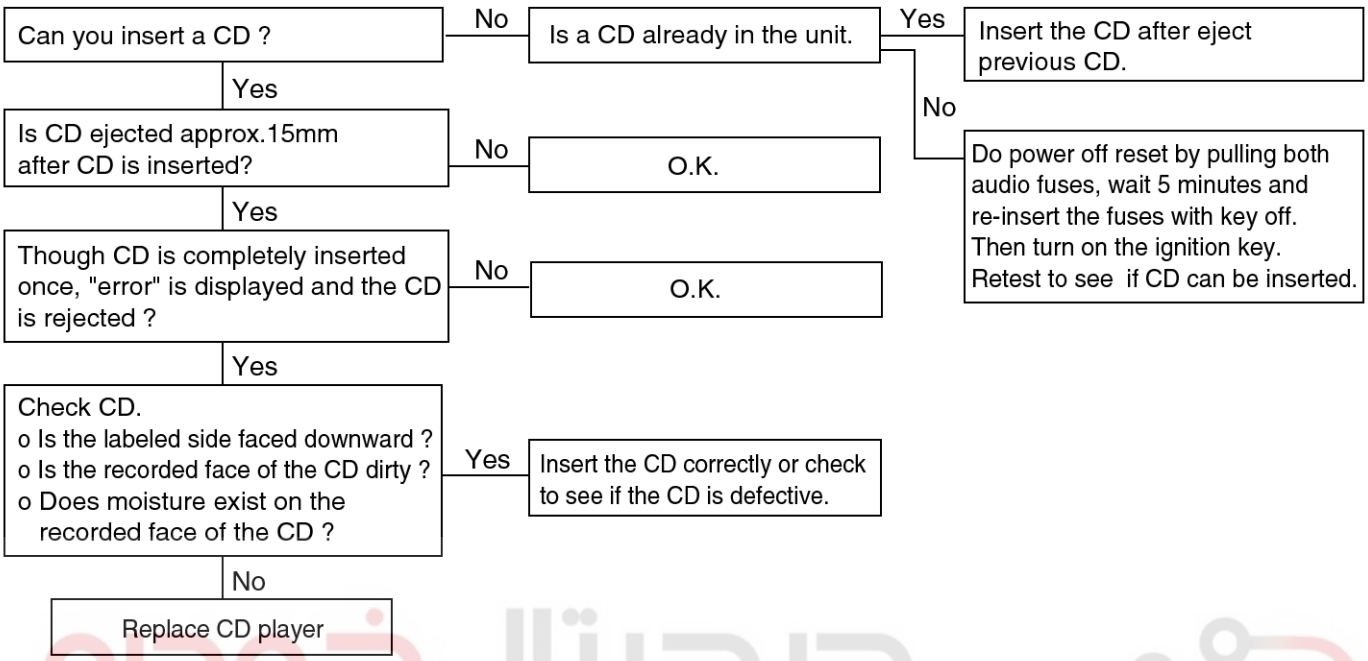
2. TAPE



LTIF001G

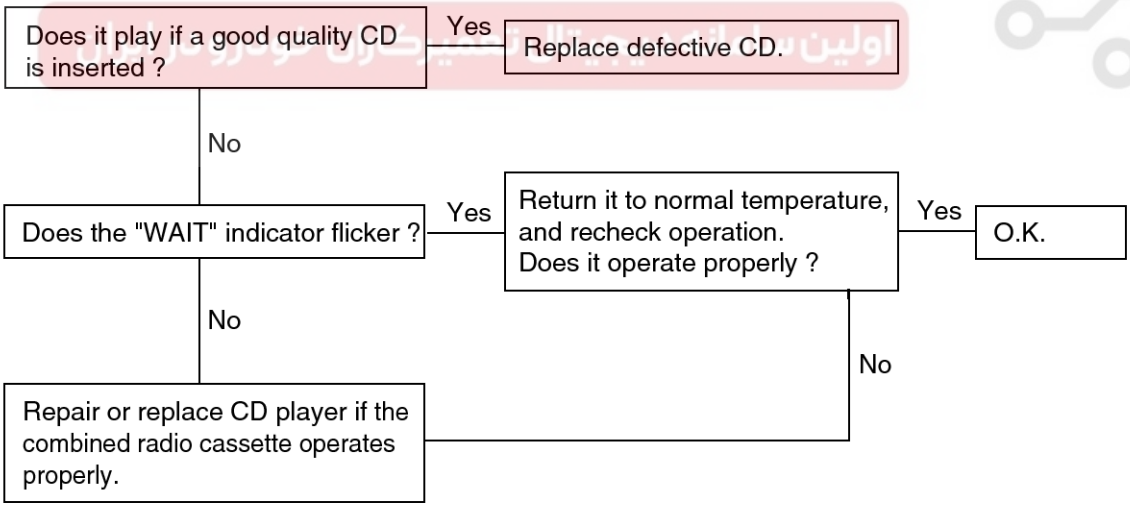
Chart 5

1. CD WILL NOT BE ACCEPTED



LTIF001H

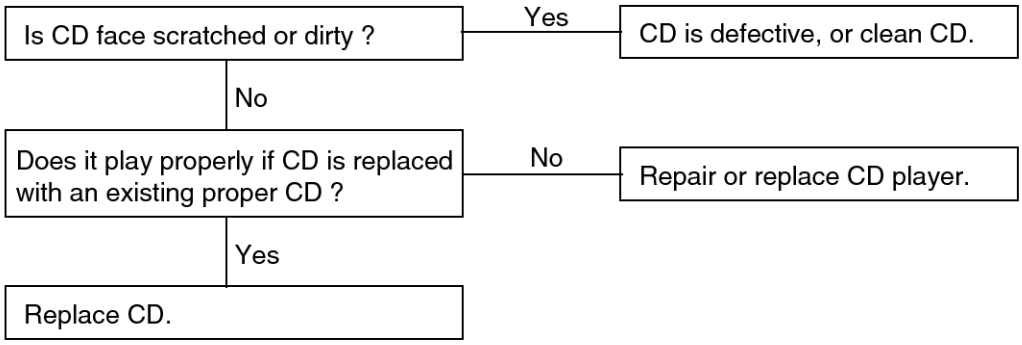
2. NO SOUND



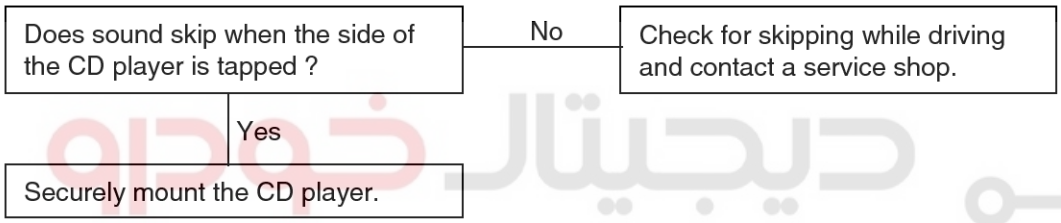
LTIF001I

3. CD SOUND SKIPS

1) Sound sometimes skips when parking.

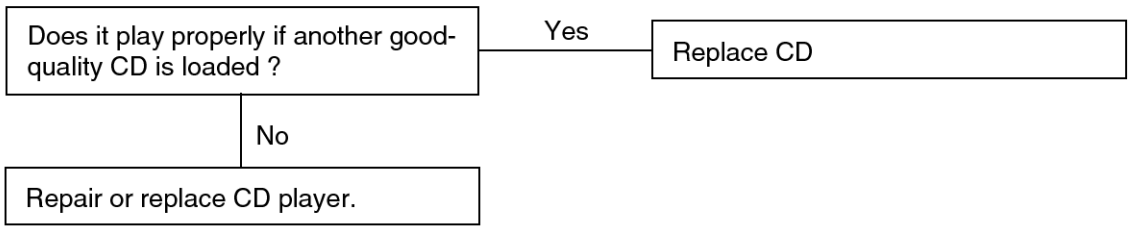


2) Sound sometimes skips when driving.
(Stop vehicle, and check it.)
(Check by using a CD which is free of scratches, dirt or other damage.)

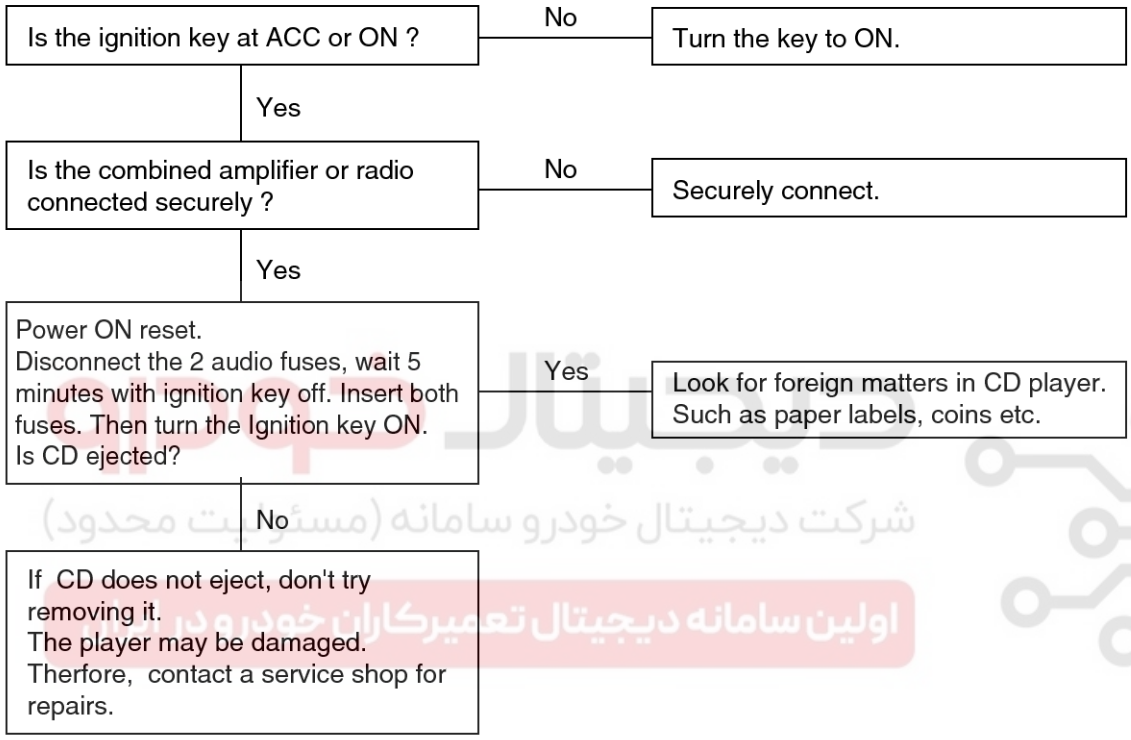


LTIF001J

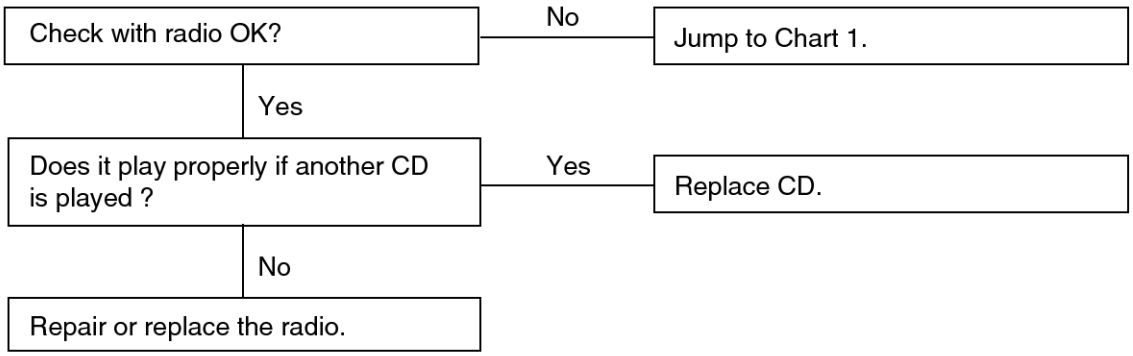
4. SOUND QUALITY IS POOR



5. CD WILL NOT EJECT

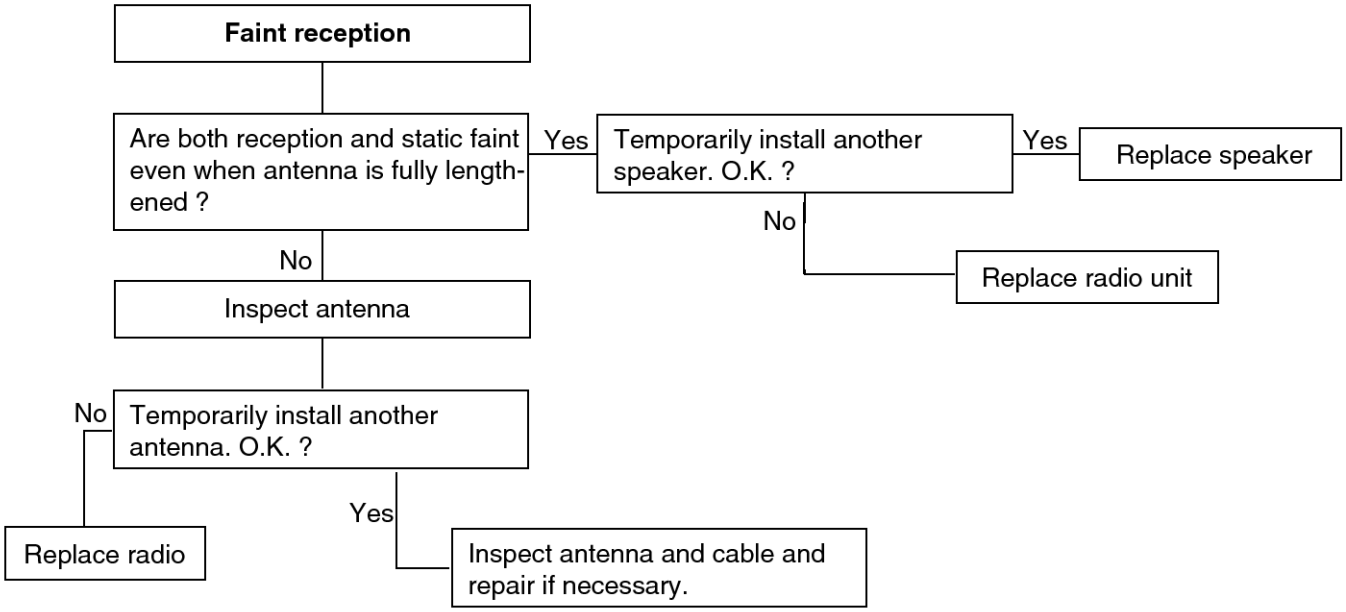


6. NO SOUND FROM ONE SPEAKER



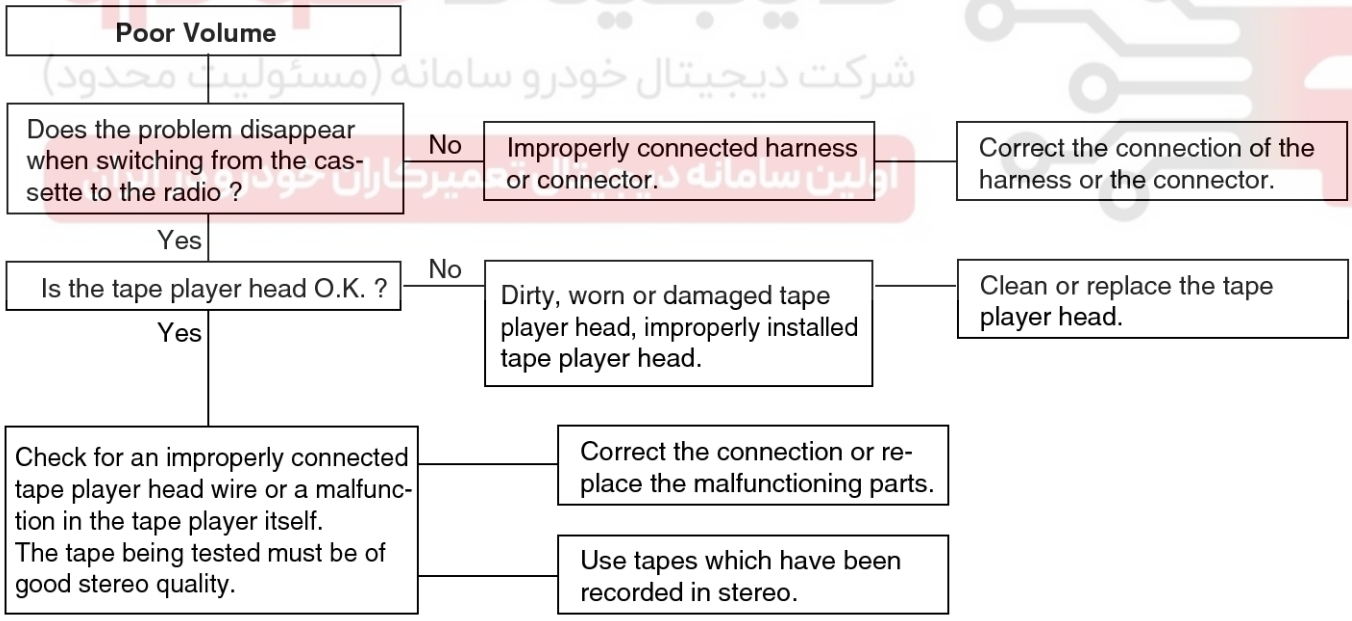
LTIF001K

Chart 6



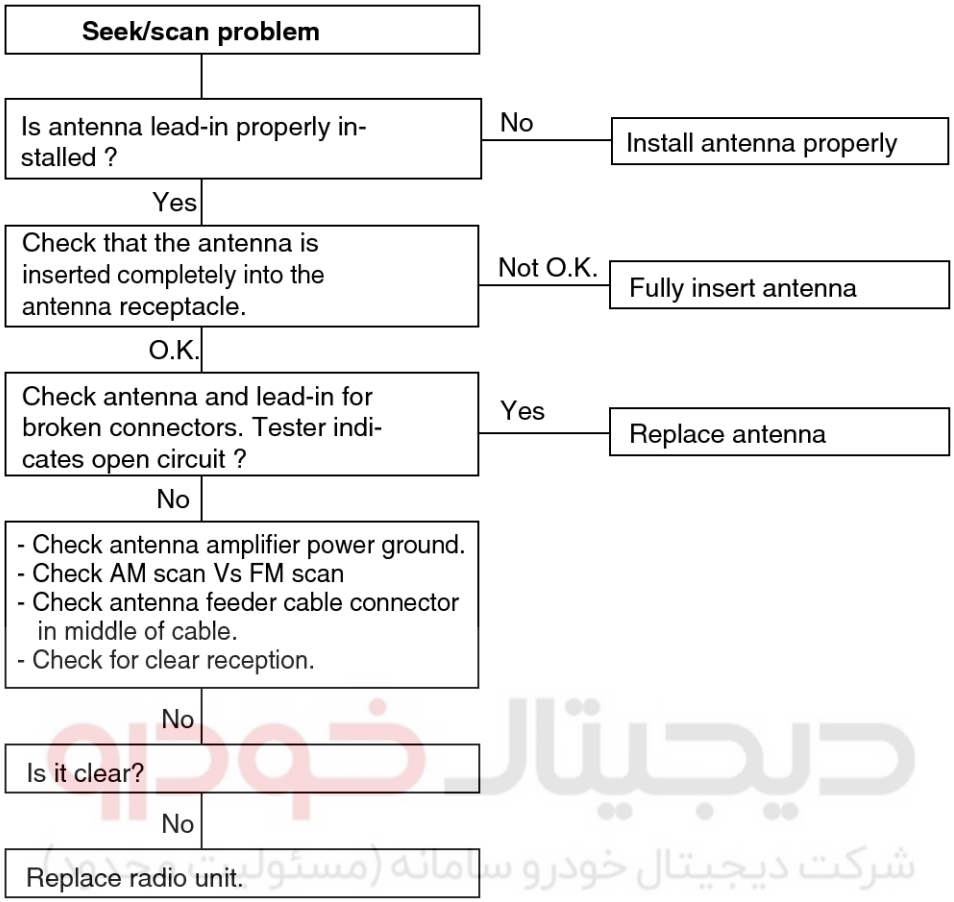
LTIF001L

Chart 7



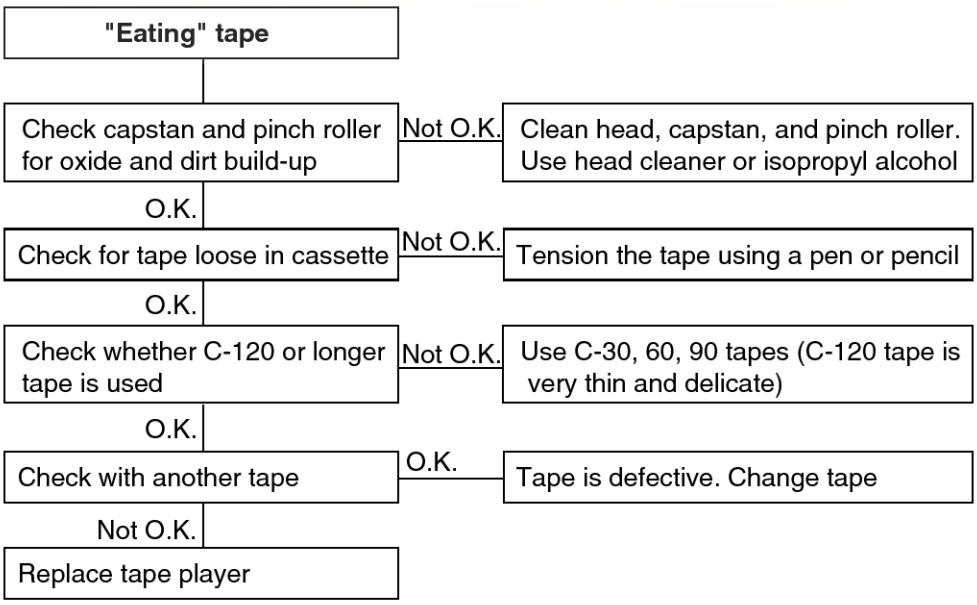
LTIF001M

Chart 8



LTIF001N

Chart 9

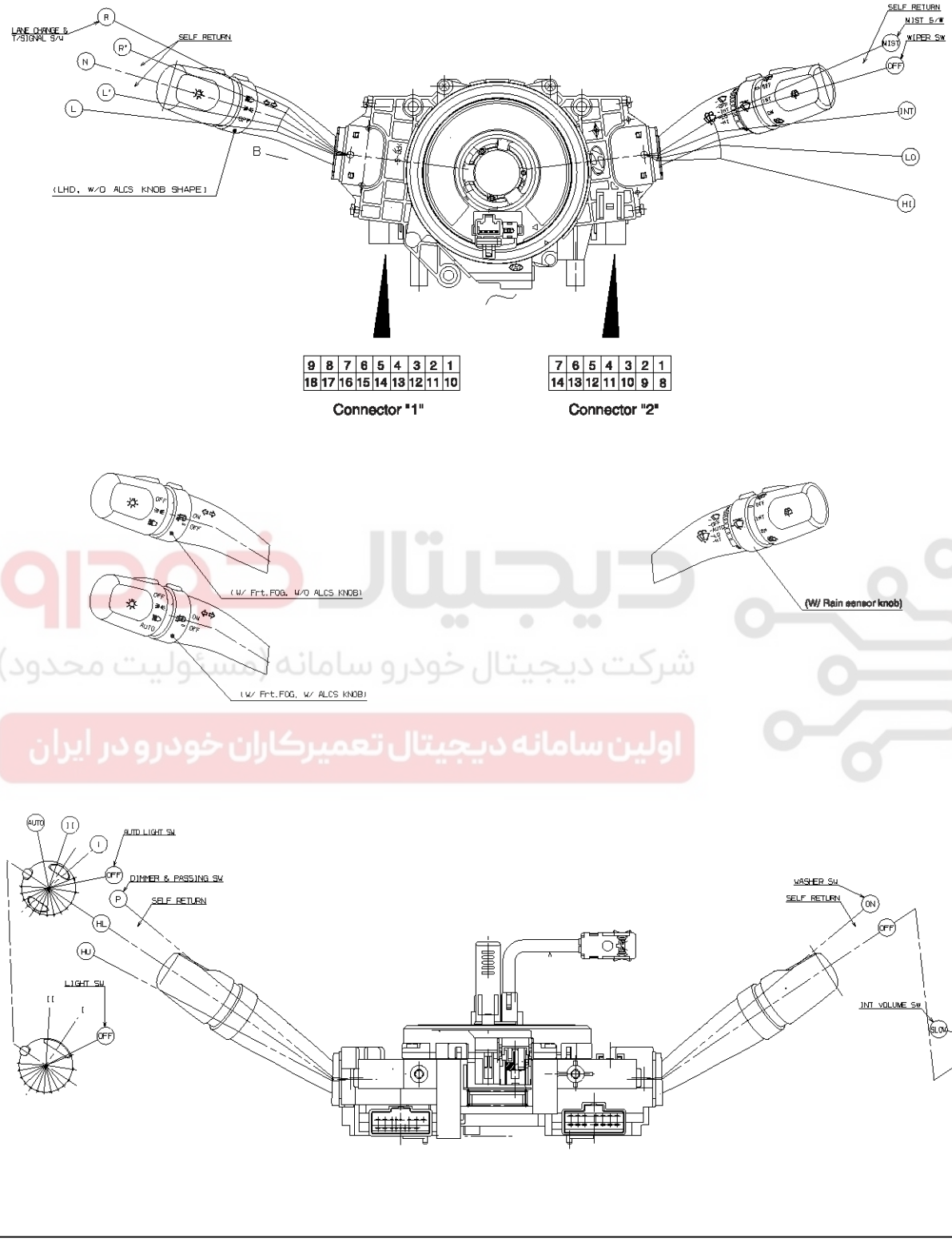


LTIF001O

Multifunction switch

Multi Function Switch

COMPONENTS



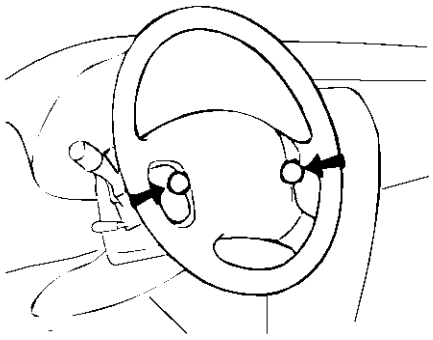
LTAC009A

REMOVAL AND INSTALLATION

CAUTION

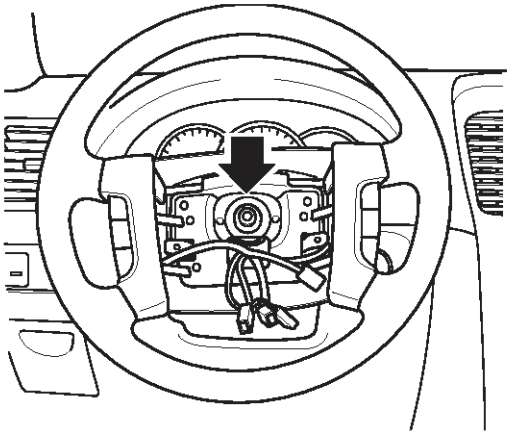
- **Never attempt to disassemble or repair the air bag module or clock spring. If faulty, replace it.**
- **Do not drop the air bag module or clock spring or allow contact with water, grease or oil. Replace if a dent, crack, deformation or rust is detected.**
- **The air bag module should be stored on 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 handing an air bag that has 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.**
- **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 broken 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. Remove the air bag module.



APAC011B

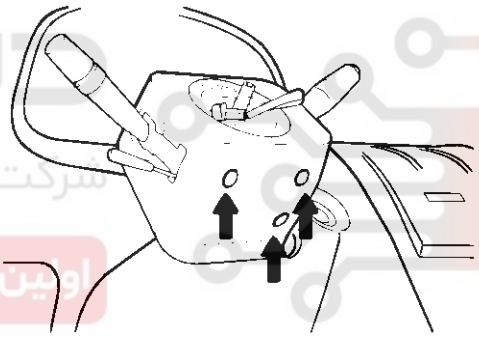
2. Remove the steering wheel.



APAC011C

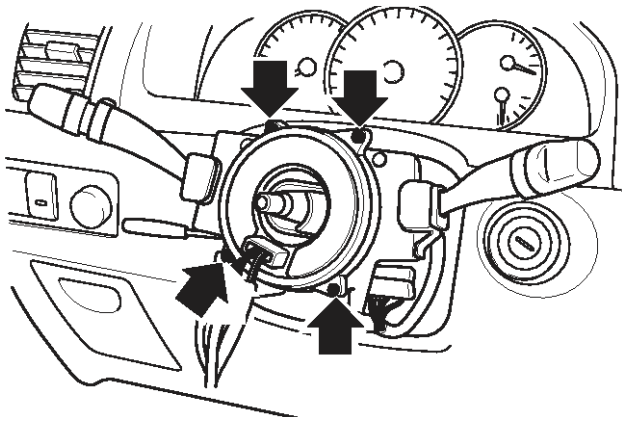
Tightening torque
40 - 50Nm (4.0-5.0kg·cm, 28-36lb·ft)

3. Remove the shroud side cover and then remove the steering column upper shroud and steering column lower shroud.



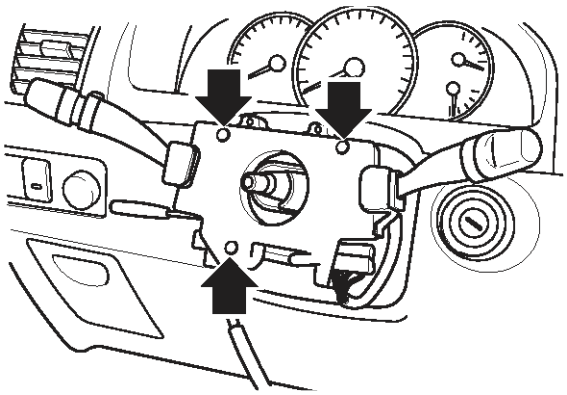
APAC011E

4. After removing the screws in the illustration, remove the clock spring.



APAC011Z

5. Remove the 3 screws holding the multi function switch and disconnect the connectors. Remove the multi function switch assembly.



APAC011F

6. Installation is the reverse of removal.

INSPECTION

LIGHTING SWITCH [Connector "1"]

Position \ Terminal	14	13	11	12
OFF				
I	○		○	
II	○	○	○	○

LTAC011H

LIGHTING SWITCH (With Auto light) [Connector "1"]

Position \ Terminal	14	13	11	12
OFF				
I	○		○	
II	○	○	○	
Auto			○	○

LTAC011A

DIMMER AND PASSING SWITCH [Connector "1"]

Position \ Terminal	9	8	18	17
HU		○		○
HL			○	○
P	○	○		○

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

LTAC011B

TURN SIGNAL AND LANE CHANGE SWITCH [Connector "1"]

Hazard switch	Turn signal switch \ Terminal	3	2	1
OFF	L		○	○
	N			
	R	○	○	

LTAC011C

WIPER AND INTERMITTENT SPEED SWITCH [Connector "2"]

Position \ Terminal	7	6	5	2	3	8	9
OFF		○	○				
INT		○	○	○	○	○	○
LOW		○			○		
HI	○				○		

LTAC011D

WASHER SWITCH [Connector "2"]

Position \ Terminal	1	3
OFF		
ON	○	○

LTAC011E

MIST SWITCH [Connector "2"]

Terminal / Position	3	4
OFF		
ON	○	○

LTAC011F

FRONT FOG SWITCH [Connector "1"]

Terminal / Position	15	16
OFF		
ON	○	○

LTAC011G

REAR WIPER & WASHER SWITCH [Connector "2"]

Terminal / Position	10	11	12	13
Washer	○			○
OFF				
INT	○	○		
ON	○		○	
Washer	○			○

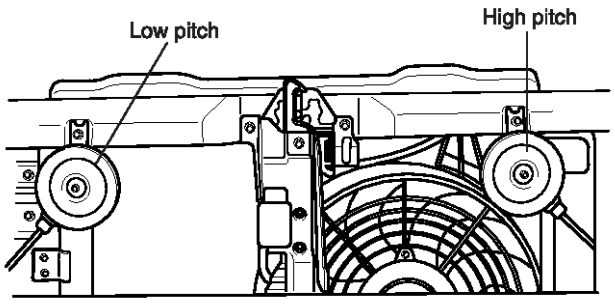
LTAC011I

Horn

Horn

REMOVAL AND INSTALLATION

1. Remove the bolts holding the horn and remove the horn assembly.



LTAC012B

2. Installation is the reverse of removal.

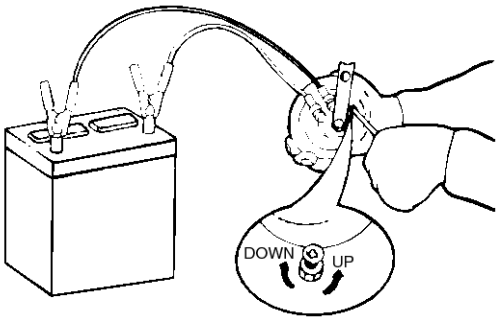
INSPECTION

1. Test the horn by connecting battery voltage to the 1 terminal and ground the 2 terminal.
2. The horn should make a sound. If the horn fails to make a sound, replace it.

ADJUSTMENT

NOTICE

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



LTAC013A

BCM (Body Control Module)

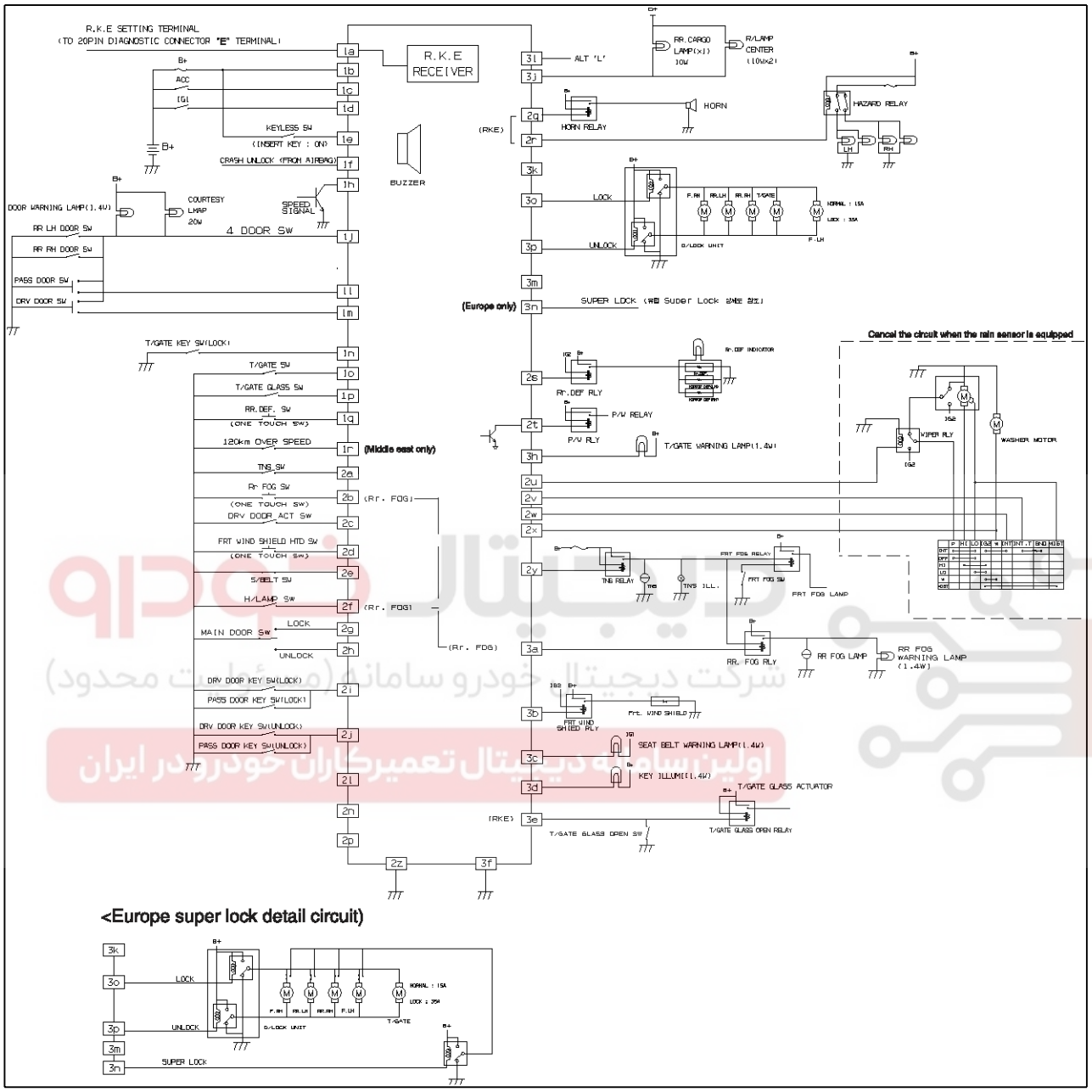
SPECIFICATIONS

Items	Specifications
Rated voltage	DC 12V
Operating voltage	DC 9 - 16V
Operating temperature	-30˚C - 80˚C
Insulation resistance	100MΩ or more
Rated load	
Tail lamp relay	DC 12V, 200mA (Relay load)
Rear defogger relay	DC 12V, 200mA (Relay load)
Hazard relay	DC 12V, 200mA (Relay load)
Power window relay	DC 12V, 200mA (Relay load)
Seat belt warning indicator	DC 12V, 1.4W (Lamp load)
Ignition key illumination	DC 12V, 1.4W (Lamp load)
Room lamp	DC 12V, 10W x 2(Lamp load)
Intermittent wiper relay	DC 12V, 200mA (Relay load)
Rear cargo lamp	DC 12V, 10W (Lamp load)
Room lamp (Center)	DC 12V, 10W (Lamp load)
Drive door unlock actuator	DC 12V, 7A

Items	Specifications
Keyless entry transmitter	
Power source	Lithium 3V battery (1EA)
Transmissible distance	5m or more
Life of battery	2 years or more (at 10 times per day)
Button	Door lock / unlock, Back glass open, panic
Frequency	433MHz ± 250MHz (Except Middle east) 315MHz ± 250 MHz (Middle east)

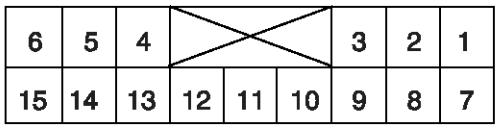
ETACS Module

CIRCUIT DIAGRAM

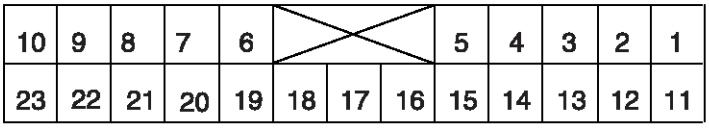


LTAC015A

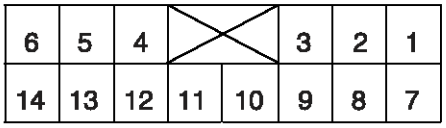
ETACS PIN NO. AND DESCRIPTION



Connetor "A"



Connetor "B"



Connetor "C"

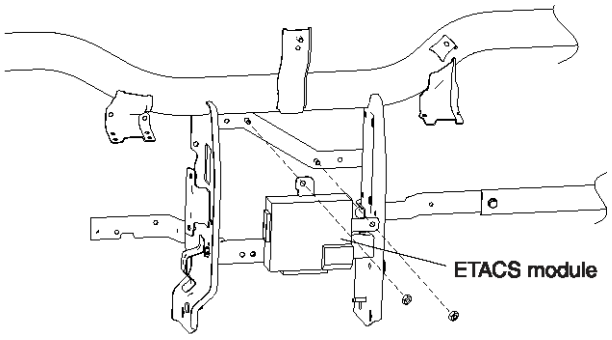
LTAD016A

PIN NO.	CONNECTOR "A"	PIN NO.	CONNECTOR "B"	PIN NO.	CONNECTOR "B"
A1	Remote key setting terminal	B1	TNS switch	C1	Rear fog lamp relay
A2	ACC	B2	Passenger door actuater switch	C2	Seat belt warning lamp
A3	Keyless switch	B3	Seat belt switch	C3	Tail gate open relay
A4	Driver door switch	B4	Main door switch (LOCK)	C4	Door lock fuse
A5	Tail gate switch	B5	Front door key switch (LOCK)	C5	Front left door unlock
A6	Rear defroster switch	B6	Horn relay	C6	Door lock relay (LOCK)
A7	B+	B7	Rear defroster relay	C7	Front windsheld heating relay
A8	IG1	B8	Wiper relay	C8	Ignition key hole lamp
A9	Crash unlock	B9	Wiper switch	C9	Ground
A10	Speed sensor	B10	TNS relay	C10	Tail gate open warning lamp
A11	4 door switch	B11	Drive door actuator switch	C11	Room lamp
A12	Passenger door switch	B12	Front windsheld heating switch	C12	ALT "L"
A13	Tail gate key switch (LOCK)	B13	Head lamp switch	C13	Super lock relay
A14	Tail gate glass switch	B14	Main door switch (UNLOCK)	C14	Door lock relay (UNLOCK)
A15	120 km over speed (Middle east)	B15	Front door key switch (UNLOCK)		
		B16	Door warning lamp		
		B17	-		
		B18	-		
		B19	Hazard relay		
		B20	Power window relay		
		B21	Wiper switch		
		B22	Wiper switch		

PIN NO.	CONNECTOR "A"	PIN NO.	CONNECTOR "B"	PIN NO.	CONNECTOR "B"
		B23	Ground		

REMOVAL AND INSTALLATION

1. Disconnect the negative (-) battery terminal.
2. Remove the audio unit (Refer to BD group).
3. Remove the 2 nuts holding the ETACS module and disconnect the connectors.



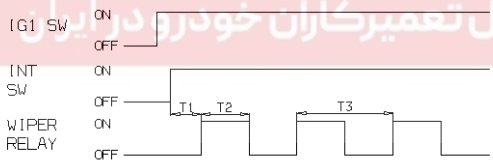
LTAC017A

4. Installation is the reverse of removal.

INSPECTION

ETACS FUCTION

1. **Intermittent wiper**



LTAC018A

Time specification

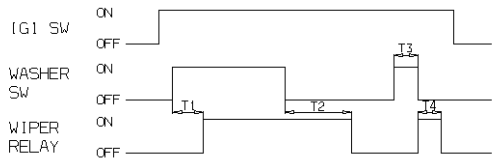
T1 : Max. 0.3 sec.

T2 : 0.7 ± 0.1 sec. (Time of wiper motor 1 rotaion)

T3 : (Intermittent time) : T2 + FAST (2.0 ± 0.2 sec.)

T2+SLOW (10 ± 1.0 sec.)

2. **Washer related wiper.**



LTAC018B

Time specification.

T1 : 0.6 ± 0.1 sec.

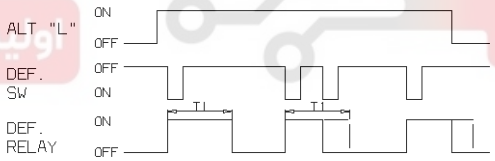
T2 : 2.5 - 3.8 sec.

T3 : 0.2 - 0.6 sec.

T4 : 0.7 ± 1.0 sec.

This function should be operated preferentially even though the variable intermittent wiper is operating.

3. **Rear window defogger and front windsheld defogger.**

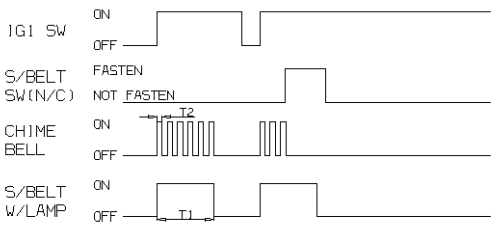


LTAC018C

Time specification

T1 : 20±1min.

4. **Seat belt warning**



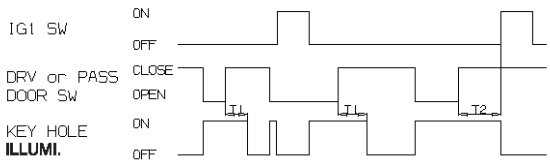
LTAC018D

Time specification

T1 : 6 ± 1.5 sec.

T2 : 0.5 ± 0.1 sec.

5. **Ignition key hole illumination**



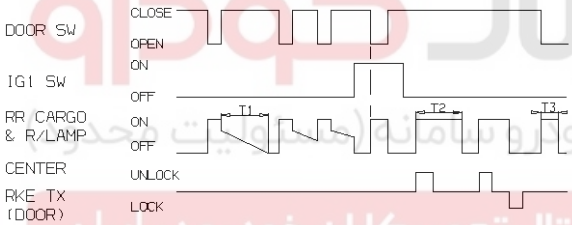
LTAC018E

Time specification

T1 : 10 ± 1sec.

T2 : 0 - 10 sec.

6. **Delayed out room lamp**



LTAC018F

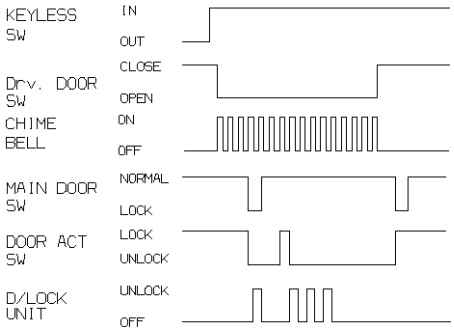
Time specification

T1 : 5 - 6 sec.

T2 : 30 ± 3 sec.

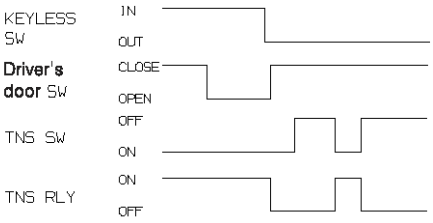
T3 : 20 ± 2 min.

7. **Ignition key reminder**



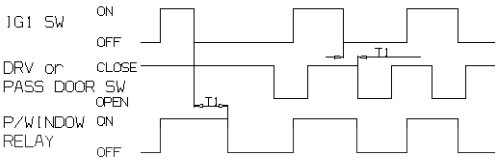
LTAC018G

8. **Battery saver.**



LTAC018H

9. **Power window timer**

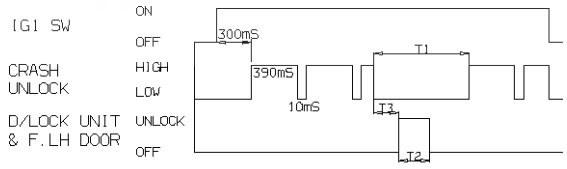


LTAC018I

Time specification

T1 : 30 ± 3 sec.

10. **Crash door unlock**



LTAC018J

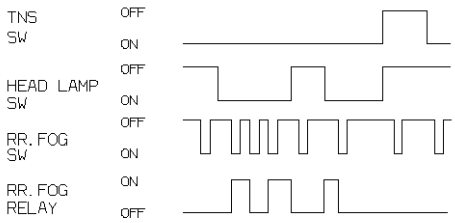
Time specification

T1 : 200msec.

T2 : 0.5 ± 0.1 sec.

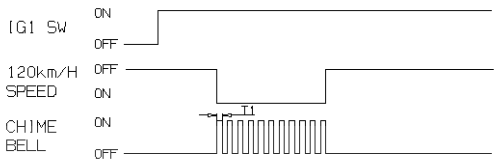
T3 : 60 ± 2 msec.

11. **Rear fog lamp control**



LTAC018K

12. **Over speed warning (Middle east area)**



LTAC018M

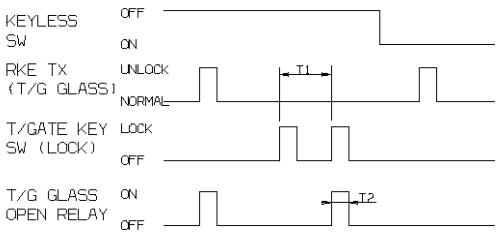
Time specification

T1 : 0.5 ± 0.1 sec.

13. **Door ajar**

Alarm occurs while the door or tail gate opened when the vehicle speed is 5km/h over.

14. **Tail gate glass open**



LTAC018N

Time specification

T1 : 3 ± 0.5 sec.

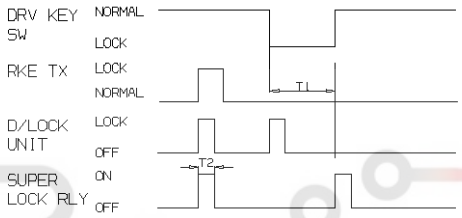
T2 : 0.5 ± 0.1 sec.

15. **Central door lock / unlock.**

Input	Door lock output
RKE TX	Lock / Unlock
Driver key switch or passenger key switch	↑
Main door lock / unlock switch	↑
Driver door knob	↑

LTAC018P

16. **Super lock (Europe area)**



LTAC018O

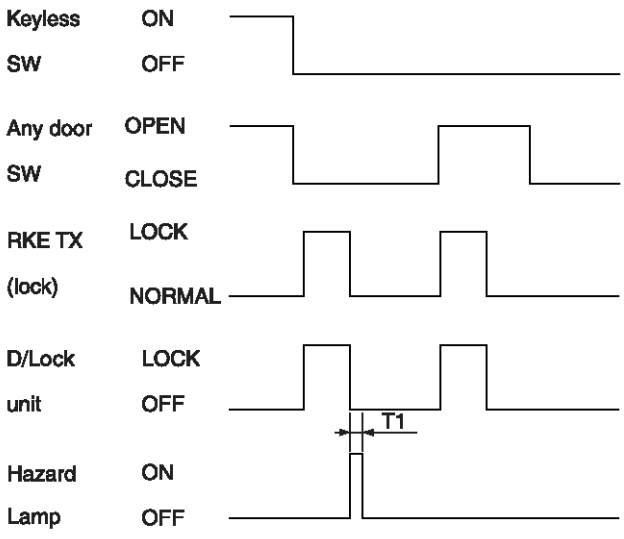
Time specification

T1 : 3 ± 0.5 sec.

T2 : 0.5 ± 0.1 sec.

17. **Remote keyless Entry system.**

1) Door lock



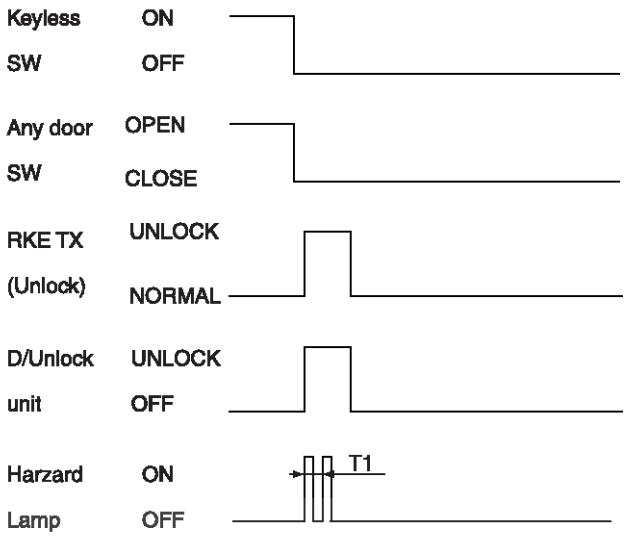
LTAD018V

Time specification

T1 : 1.0 sec.

T2 : 1 sec.

2) Door unlock.

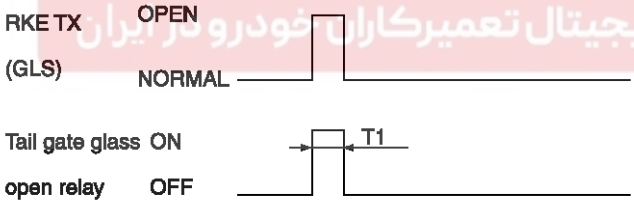


LTAD018Q

Time specification

T1 : 1.0 sec.

3) Tail gate glass open

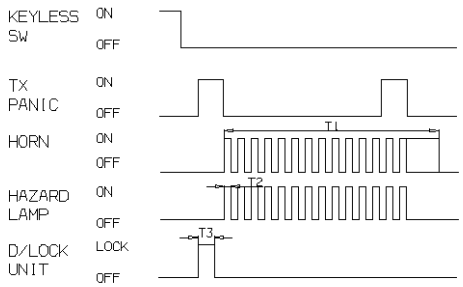


LTAC018R

Time specification

T1 : 0.5 sec.

4) Panic



LTAC018S

Time specification

T1 : 27 ± 2 sec.

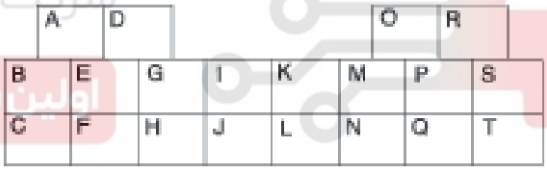
T2 : 0.5 ± 0.1 sec.

T3 : 0.5 ± 0.1 sec.

T4 : 2.7 ± 0.5 sec

18. **Code saving method**

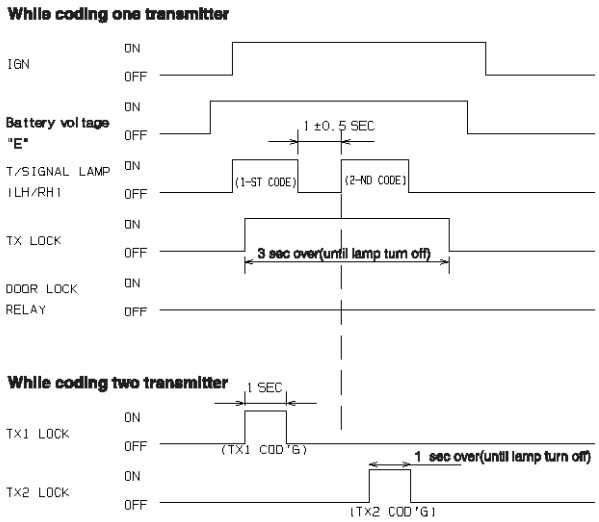
1) To store transmitter code, first apply the battery voltage to terminal "E" of DLC (Data Link Connector) and then operates as shown in the illustration.



LTAC018Z

NOTICE

Do not disconnect the negative(-) battery terminal.



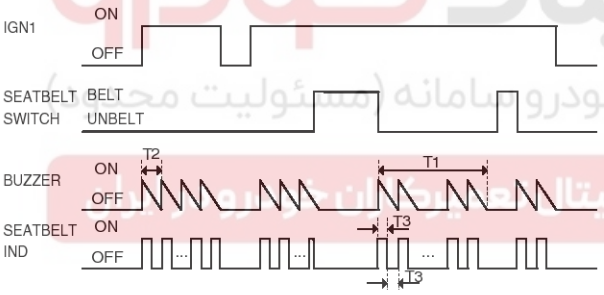
LTAD018T

2) Remove the battery voltage and then check the operation of the keyless entry system.

Body Control Module (BCM)

OPERATION

1. SEAT BELT WARNING TIMER (except for Europe AND Australia)
   1) In state of not wearing SEAT BELT, when IGN1 SWITCH is ON, the warning light is outputting for 0.6s and the alarm is outputting for 6s by 1s cycle.
   2) In state of not wearing SEAT BELT, after IGN1 SWITCH is ON and IGN1 SWITCH is OFF within 6s, OFF the warning light and alarm output.
   3) In state of not wearing SEAT BELT, after IGN1 SWITCH is ON and wearing SEAT BELT within 6s, and then OFF the alarm output immediately and output the warning light for the remained time only.
   4) In wearing SEAT BELT, when IGN1 SWITCH is ON, the warning light is outputting for 6s by 0.6s cycles and the alarm is not outputting.



SBLBE6100L

T1 : 6 ± 1 sec.

T2 : 1 ± 0.1 sec,

T3 : 0.3 ± 0.1 sec.

2. REMOTE KEYLESS ENTRY control

   Operate LOCK / UNLOCK of DOOR and TAIL GATE GLASS, PANIC by REMOCON.

   - Operate in state of KEY IN SWITCH OUT & ACC SWITCH OFF & IGN1 SWITCH OFF & IGN2 SWITCH OFF.
   - By receiving LOCK, UNLOCK, TAIL GATE GLASS, PANIC signal from transmitter, output LOCK / UNLOCK of DOOR and TAIL GATE GLASS OPEN, PANIC.

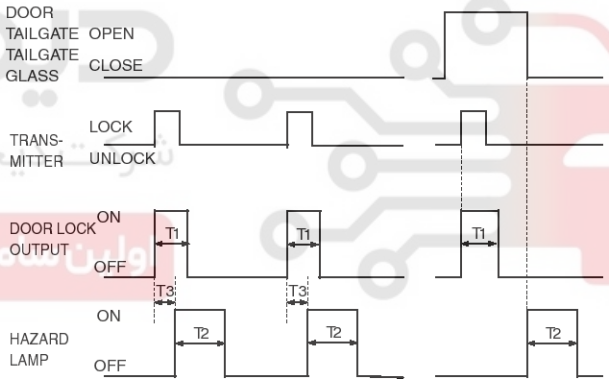
   1) TRANSMITTER LOCK FUNCTION

      a. In state of removing IGN KEY from CYLINDER and all Door is CLOSE, when receiving TRANSMITTER LOCK signal, start the operation of LOCK output and after T3 from the starting point of operation and then checking the state of LOCK SWITCH, ON the output of HAZARD LAMP for 1s one time.

      b. In state of any of DOOR, TAIL GATE, TAIL GATE GLASS is OPEN, when receiving TRANSMITTER LOCK signal, output LOCK only, don't output HAZARD LAMP.

      c. After b), in case of OPEN > CLOSE, ON the output of HAZARD LAMP one time.

      d. In state of Driver and Assist(North America ONLY) DOOR LOCK, when receiving TRANSMITTER LOCK signal, output HAZARD LAMP for 1s one time after re-outputting LOCK.



SBLBE6102L

T1 : 0.5 ± 0.1 sec,

T2 : 1.0 ± 0.2 sec,

T3 : 0.2 ± 0.04 sec.

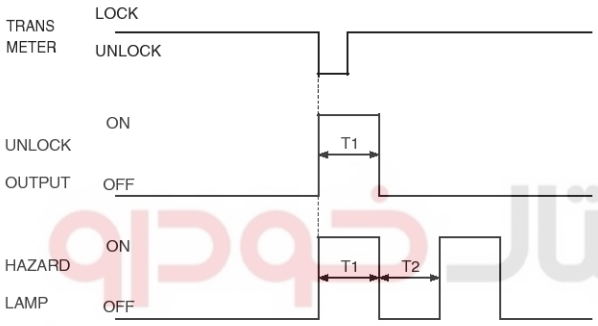
   2) TRANSMITTER UNLOCK FUNCTION

      a. When receiving TRANSMITTER UNLOCK signal, output UNLOCK and ON the output of HAZARD LAMP as cycles of 0.5s and 0.5s (ON/OFF) two times.

      b. In state of Driver and Assist(North America ONLY) DOOR UNLOCK, when receiving TRANSMITTER UNLOCK, ON the output of HAZARD LAMP as cycles of 0.5s and 0.5s (ON/OFF) two times after outputting UNLOCK.

c. After TRANSMITTER UNLOCK and then there are no inputs of Entering (DOOR, TAIL GATE, TAIL GATE GLASS) OPEN within 30s, lock them automatically and ON the output of HAZARD LAMP for 1s one time. And in case of TRANSMITTER UNLOCK within 30s once more, extend the time for about 30s. (regardless the state of KNOB within 30s)

But, after TRANSMITTER UNLOCK and then insetting KEY within 30s, cancel 30s TIMER. (After the initial TRANSMITTER UNLOCK without LOCK, HAZARD output, and after keeping the output of ROOM LAMP for 30s, turn out the light 2s)



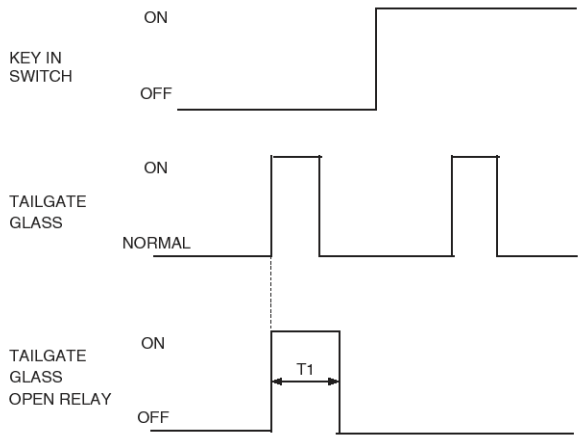
SBLBE6103L

T1, T2 : 0.5 ± 0.1 sec.

3) TRANSMITTER TAIL GATE GLASS OPEN FUNCTION

a. In state of removing IGN KEY from CYLINDER and inputting TAIL GATE GLASS OPEN signal of TRANSMITTER, ON the output of TAIL GATE GLASS OPEN RELAY for 0.5s.

b. In state of TAIL GATE GLASS OPEN, turn on TAIL GATE WARNING LAMP and ROOM LAMP.



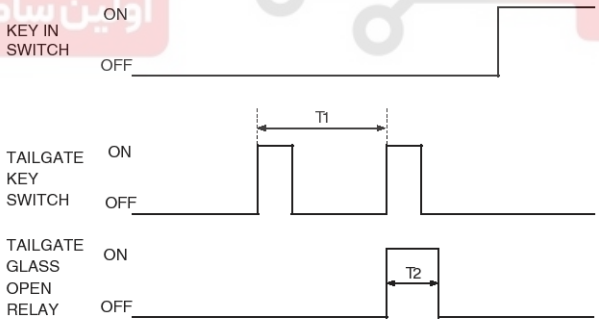
SBLBE6104L

T1 : 0.5 ± 0.1 sec.

4) TAIL GATE GLASS OPEN FUNCTION (NON-RKE)

a. In state of removing IGN KEY from CYLINDER and INPUT of TAIL GATE KEY SWITCH is inputting within T1 2 times, ON the output of TAIL GATE GLASS OPEN RELAY for 0.5s.

b. In state of TAIL GATE GLASS OPEN, turn on TAIL GATE WARNING LAMP and ROOM LAMP.



SBLBE6105L

T1 : 3.0 ± 0.5 sec,

T2 : 0.5 ± 0.1 sec.

5) TRANSMITTER LOCK OPERATION SOUND FUNCTION (DOMESTIC)

a. In state of removing IGN KEY from CYLINDER and all Door is CLOSE, when receiving TRANSMITTER LOCK signal, start the operation of LOCK output and after T3 from the starting point of operation and then

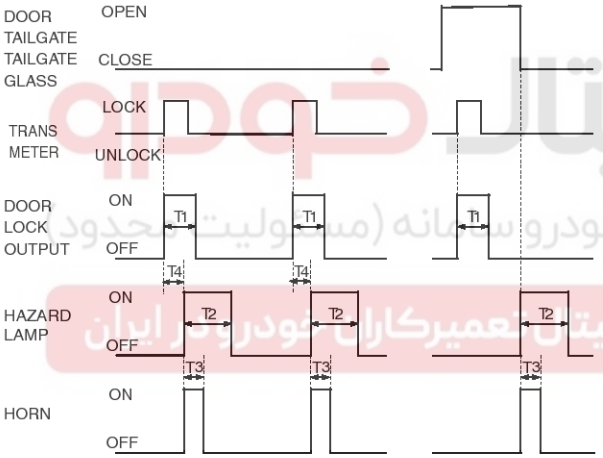
checking the state of LOCK SWITCH, ON the output of HAZARD LAMP for 1s one time and output HORN one time(30msec).

b. In state of any of DOOR, TAIL GATE is OPEN, when receiving TRANSMITTER LOCK signal, output LOCK only, don't output HAZARD LAMP or HORN.

c. After (2), in case of OPEN > CLOSE, ON the output of HAZARD LAMP or HORN one time (30msec).

d. In state of Driver and Assist(North America ONLY) DOOR LOCK, after re-outputting LOCK by TRANSMITTER, output HAZARD LAMP or HORN for one time (30msec).

e. After receiving UNLOCK signal by TRANSMITTER and there is no DOOR OPEN for 30s, output LOCK & HAZARD & HORN(30ms) one time.



SBLBE6106L

T1 : 0.5 ± 0.1 sec,

T2 : 1.0 ± 0.2 sec,

T3 : 30.0 ± 5 msec,

T4 : 0.2 ± 0.04 sec.

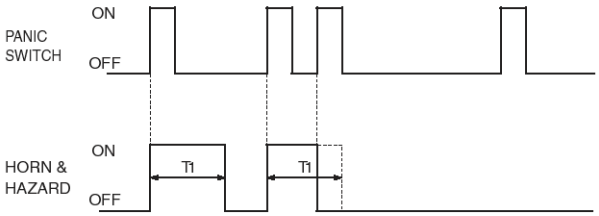
6) PANIC ALARM

a. When receiving TRANSMITTER PANIC signal, ON the PANIC ALARM by using HORN and HAZARD for T1.

b. During PANIC alarm, when receiving (TRANSMITTER LOCK / TRANSMITTER UNLOCK / TRANSMITTER PANIC / TRANSMITTER TAIL GATE GLASS OPEN / KEY IN / DRIVER KEY UNLOCK, DRIVER KEY LOCK) signal, OFF PANIC Alarm.

c. During PANIC alarm, even if receiving the other TRANSMITTER registered, regard it as the same TRANSMITTER.

d. After RELOCKING by TRANSMITTER UNLOCK, when all the door (4DOOR, TAIL GATE, TAIL GATE GLASS) is closed and all KNOB is LOCK, OFF PANIC Alarm.

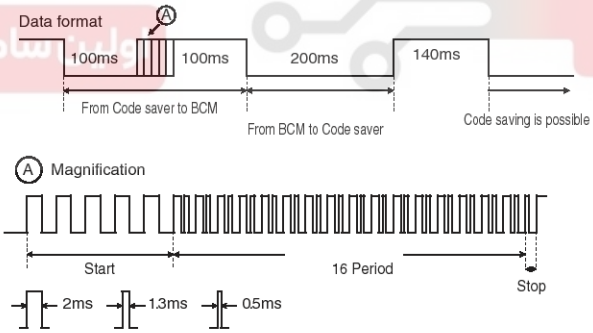


SBLBE6107L

T1 : 30 ± 3 sec.

3. RKE CODE SAVE function

1) CODE SAVER COMMUNICATION SPEC



SBLBE6111L

2) CODE SAVING PROCEDURE

a. Open Door

b. Connect the power of Code Saver (B+), GND, signal line.

c. If connecting normally, the communication line becomes activate and RED LED becomes ON.

d. If SW of Code Saver is ON, transfer the data of 3.8.1 through the communication line.

e. If BCM has received the data of 3.8.1 from Code Saver, it returns to Code Save mode and sends Code Save Start signal through the communication line.

f. If Code Saver has received Code Save Start signal, Green LED becomes ON.

g. When pushing LOCK button or UNLOCK button of transmission, BCM is saving Code.

h. If the transmission to save Code is two, register them by performing (7) term.

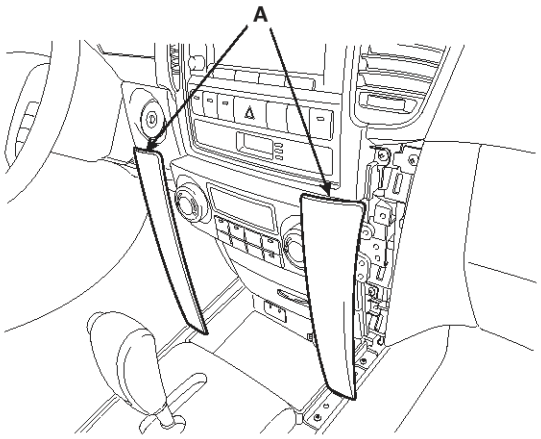
i. If Code Saver SW is off or the connection is CUT, Code Saving mode is ended.

3) CODE SAVING METHOD

No.	Current saved code	Code to register	Changed code
1	A	C	C (delete A)
2	A, B,C,D	E	E (delete A, B, C,D)
3	A, B	C, D, E	C, D
4	A, B	C, C, D	C

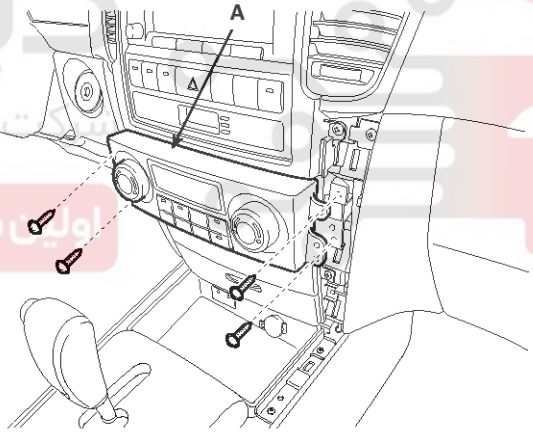
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the side pannel (A).
   (Refer to the Body group - Crash pad)



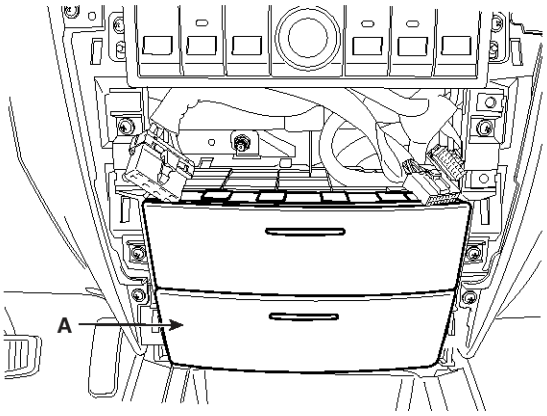
SBLBE6018L

3. Remove the heater control unit (A) after loosening the 4 screws.



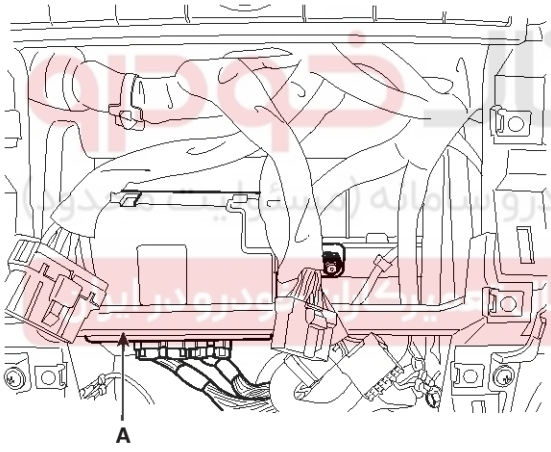
SBLBE6019L

4. Remove the center panel (A) after loosening the 6 screws.



SBLBE6016L

5. Remove the BCM (A) after loosening the 2 nuts and disconnecting the connector.



SBLBE6017L

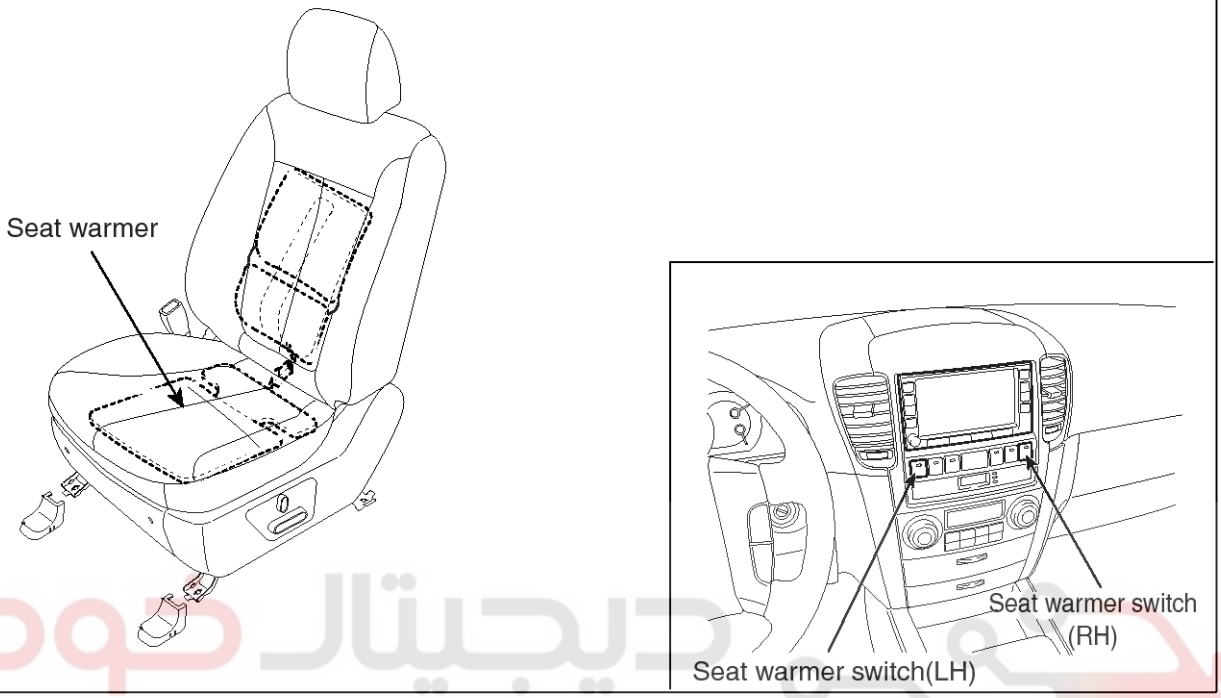
INSTALLATION

1. Connect the connector and reassemble the BCM.
2. Reassemble the center panel, heater control unit and side pannel.

Seat Electrical

Component Location

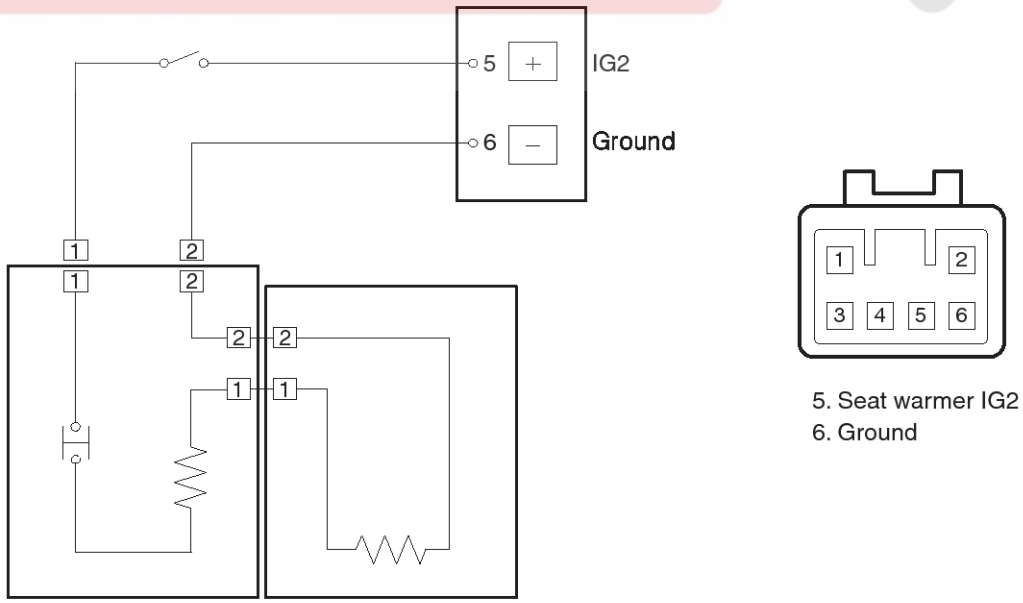
[FRONT SEAT]



SBLBE6380L

Circuit Diagram

[FRONT SEAT]



5. Seat warmer IG2
6. Ground

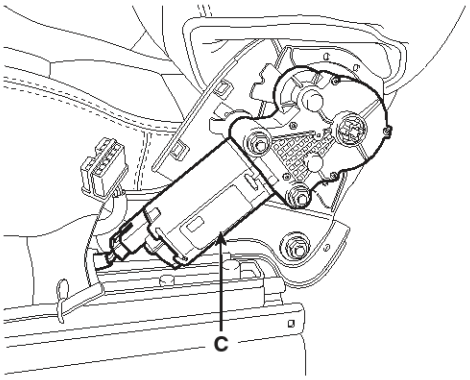
SBLBE6382L

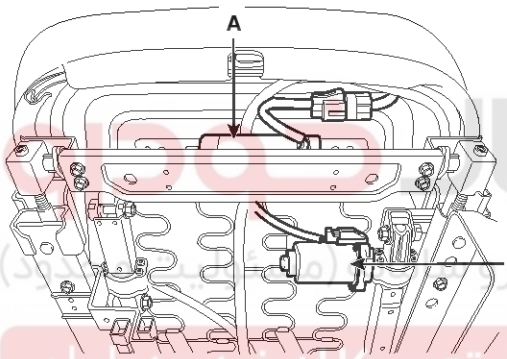
Power Seat Motor

Inspection

Power Seat Motor

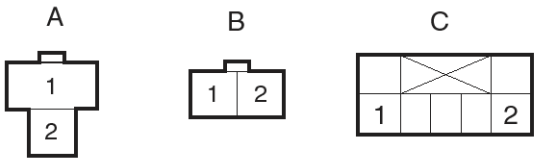
1. Disconnect the connectors for each motor.





SBLBE9010D

2. With the battery connected directly to the motor terminals, check if the motors run smoothly.
3. Reverse the connections and check that the motor turns in reverse.
4. If there is an abnormality, replace the motors.



Position \ Terminal		1	2
Slide motor A	Front ward	⊕	⊖
	Rear ward	⊖	⊕
Reclining motor C	For ward	⊕	⊖
	Rear ward	⊖	⊕

<Driver, Passenger>

Position \ Terminal		1	2
Rear height motor B	UP	⊕	⊖
	DOWN	⊖	⊕

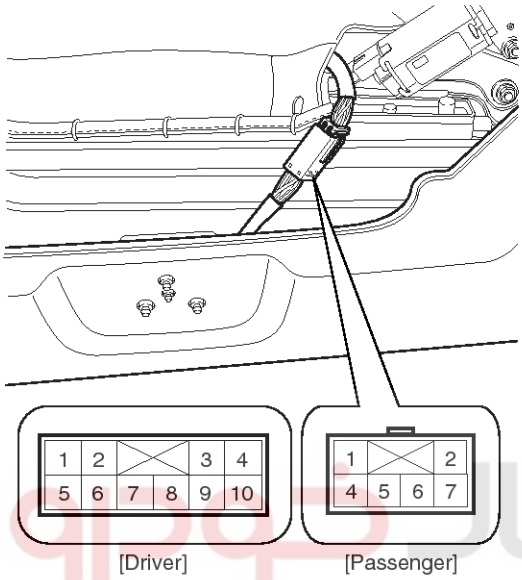
<Driver>

SBLBE9001N

Power Seat Control Switch

Inspection

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



SBLBE8022L

Position \ Terminal NO.		1	2	3	4	5	6	7	8	9	10
Slide switch	Front ward					○	—	—	—	—	○
	Back ward				○	○					
Rear height switch	UP					○	—	—	—	○	
	DOWN			○	—	○					
Reclining switch	Front ward					○	○				
	Back ward		○	—	—	○					

<Driver>

Position \ Terminal NO.		1	2	3	4	5	6
Slide switch	Front ward		○	○			
	Back ward			○	—	—	○
Reclining switch	Front ward			○	—	○	
	Back ward			○	○		

<Passenger>

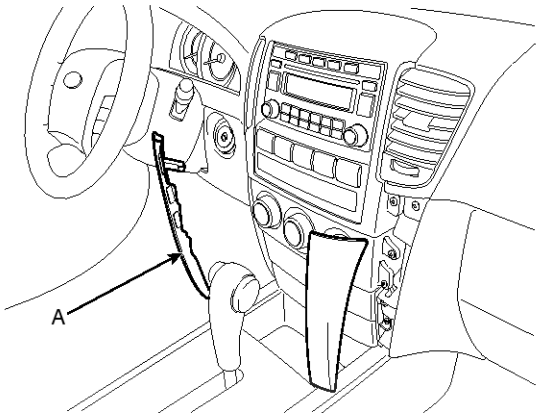
SBLBE9002N

Seat Heater Switch

Inspection

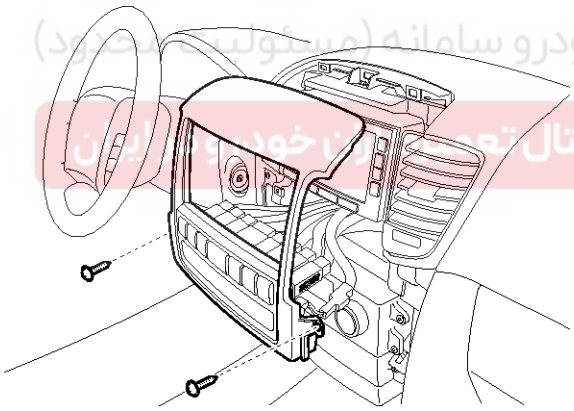
Front Seat Warmer Switch

1. Disconnect the negative (-) battery terminal.
2. Remove the center fascia panel (A) after loosening the screws. Avoid damaging retaining clips.



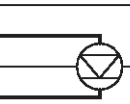
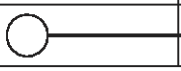
SBLBE6385D

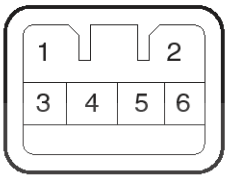
3. Remove the center fascia panel.



SBLBE6386D

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

P / T	ON (PUSH)	OFF	REMARK
1			Relay
4			Ground
3			LAMP (+)
6			ILL(+)
2			ILL(-)

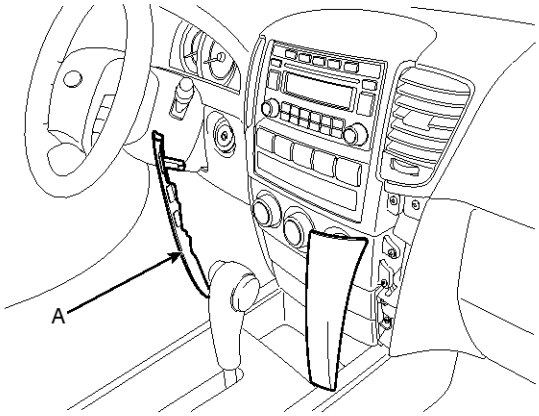


SBLBE6383L

Removal

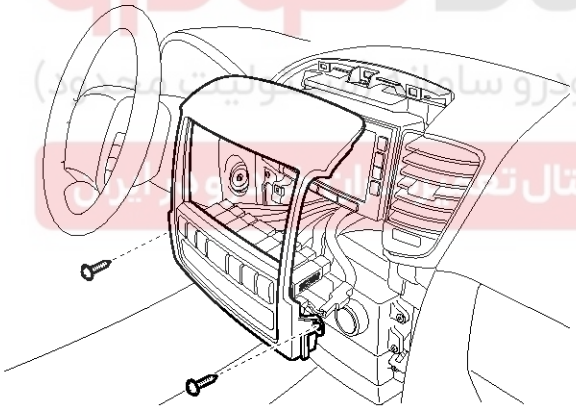
Front Seat Warmer Switch

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



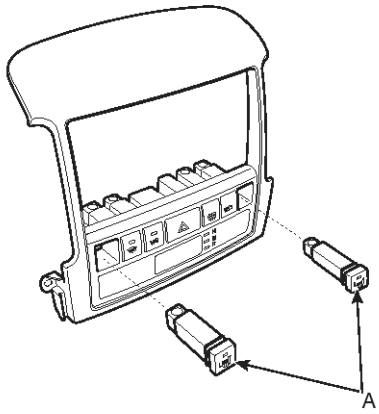
SBLBE6385D

3. Remove the front seat heater switch connector from the center fascia panel.



SBLBE6386D

4. Remove the front seat heater switch (A).



SBLBE6392D

Installation

Front Seat Warmer Switch

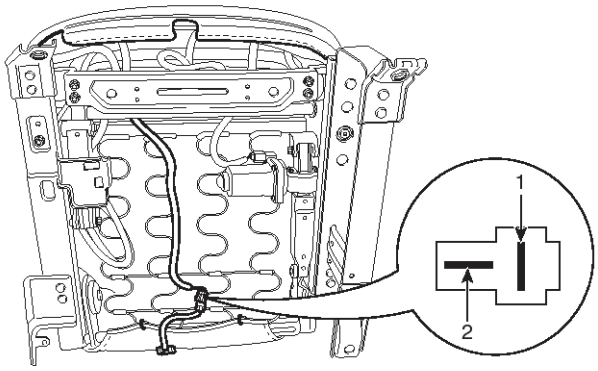
1. Reassemble the front seat warmer switch.
2. Connect the front seat warmer switch connector to the center fascia panel.
3. Reassemble the center fascia panel.

Seat Heater

Inspection

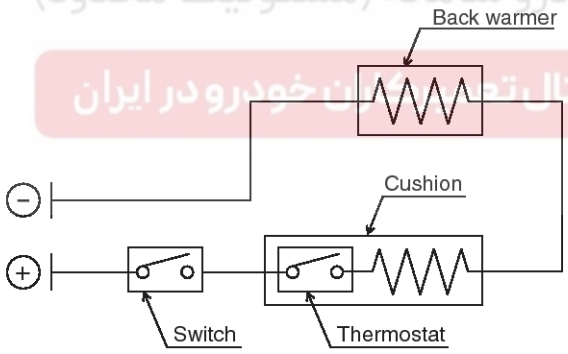
Front Seat

1. Check for continuity and measure the resistance between No.1 and NO.2 terminals.



SBLBE9003N

Standard value:
LEATHER (Cushion: 3.04Ω ± 10%, Back: 3.04Ω ± 10%)
CLOTH (Cushion: 3.04Ω ± 10%, Back: 3.04Ω ± 10%)



SBLBE6432L

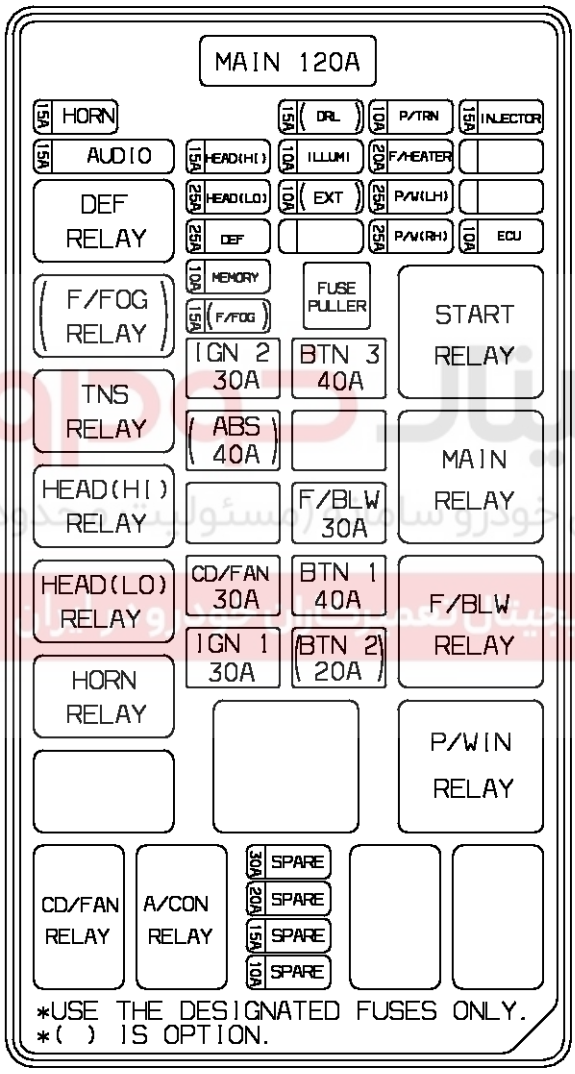
2. Operate the seat warmer after connecting the 2P connector, and then check the thermostat by measuring the temperature of seat surface.
3. Check for continuity between the terminals after disconnecting the 2P connector.

Standard value :
28 ±3.0˚C(Continuity), 37 ±3.0˚C(Short)

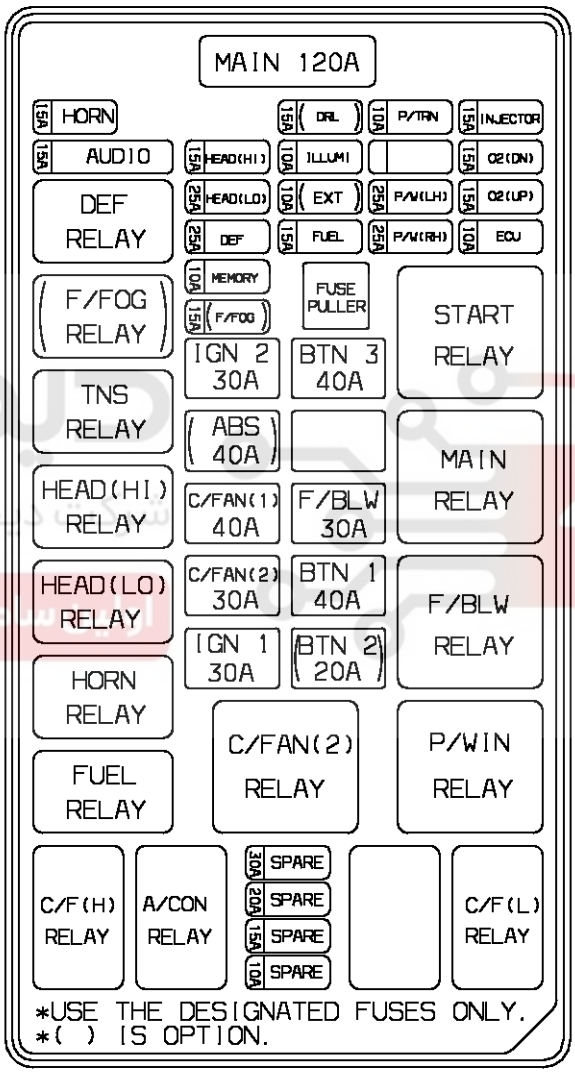
Fuses And Relays

Relay Box (Engine Compartment)

COMPONENTS



2.5D E/G

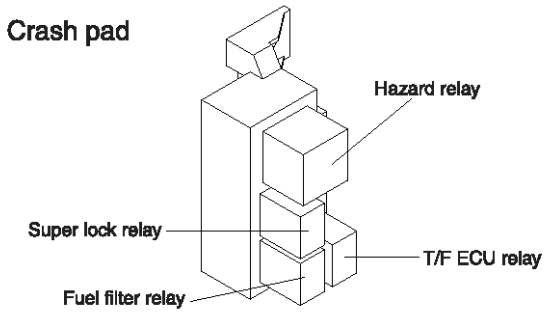


2.4G, 3.5G E/G

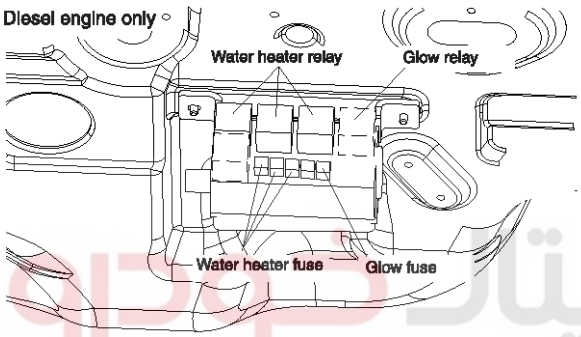
LTAC019A

RELAY

COMPONENTS



LTAC021A



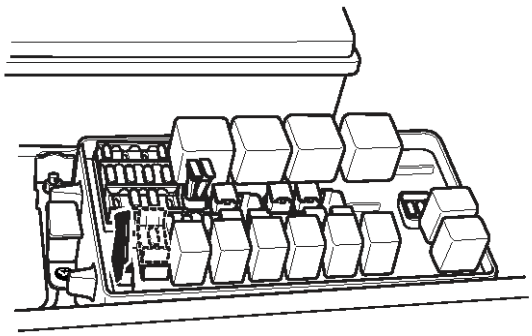
LTAC021B

INSPECTION

1. Check for a burnt fusible link with an ohmmeter.
2. If a fusible link burns out, there is a short or some other problem in the circuit. Carefully determine the cause and correct it before replacing the fusible link.

⚠CAUTION

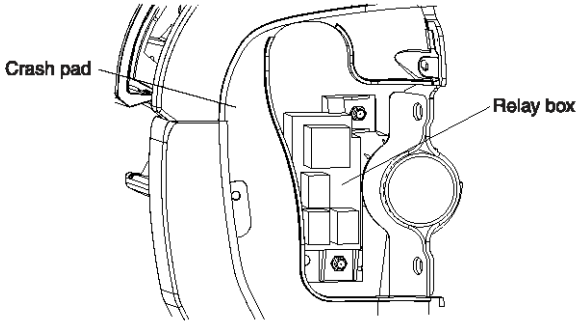
The fusible link will burn out within 15 seconds if a higher than specified current flows through the circuit.



LTAC020A

INSPECTION

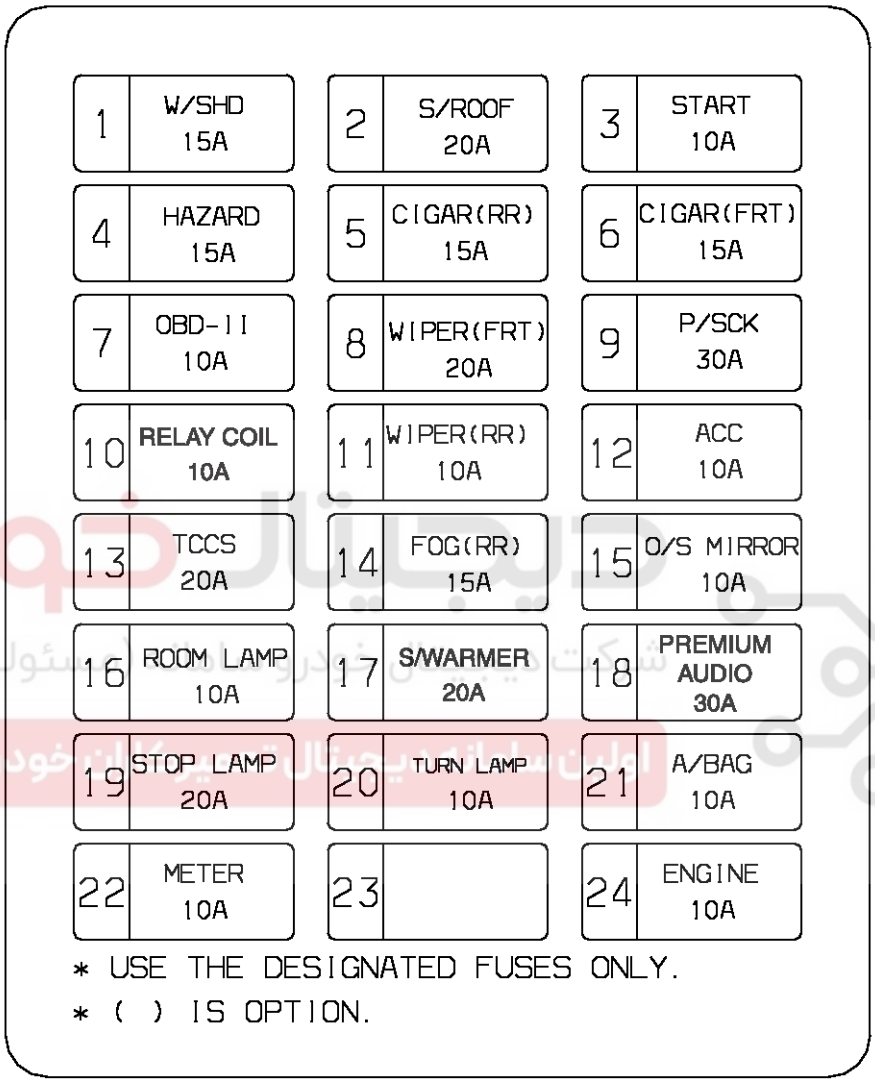
1. Check for a burnt relay with an ohmmeter.
2. If a relay burns out, there is a short or some other problem in the circuit. Carefully determine the cause and correct it before replacing the relay.



LTAC022A

Fuses

SPECIFICATION



LTAD023A

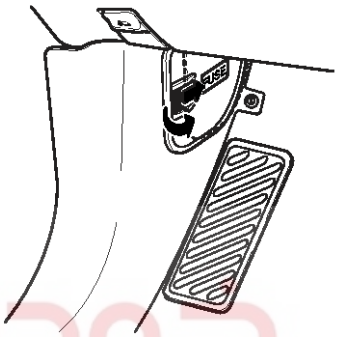
INSPECTION

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.

⚠CAUTION

Never use a fuse of higher capacity than specified.

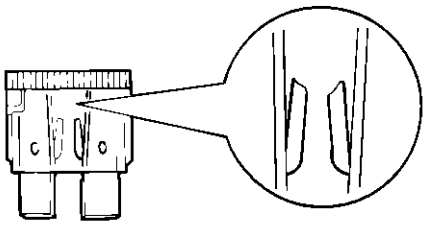


LTAC024D

INSPECTION OF FUSES

1. Prior to replacing the fuse with a new one, check the circuit for a short and the related parts for abnormal conditions. Only after the correction of a short or replacement of abnormal parts, should a fuse with the same ampere rating be installed.

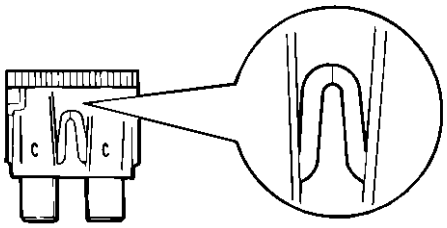
Blown fuse due to overcurrent



LTAC024A

Normally, this type of problem occurs after a fairly long period of use, and is less frequent than #1 above. In this case, you may simply replace with a new fuse of the same capacity.

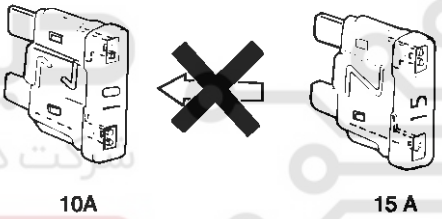
Blown fuse due to thermal fatigue



LTAC024B

⚠CAUTION

A blade type fuse is identified by the numbered value in amperes. If the fuse is blown, be sure to replace a fuse with the same ampere rating. If a fuse of higher capacity than specified is used, parts may be damaged and a danger of fire exists. To remove or insert a fuse, use the fuse puller in the fuse box.



LTAC024C

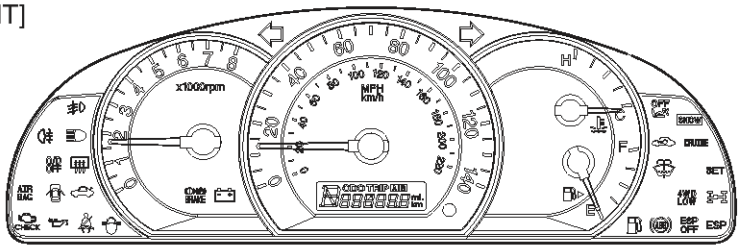
Indicators And Gauges

Instrument Cluster

Components

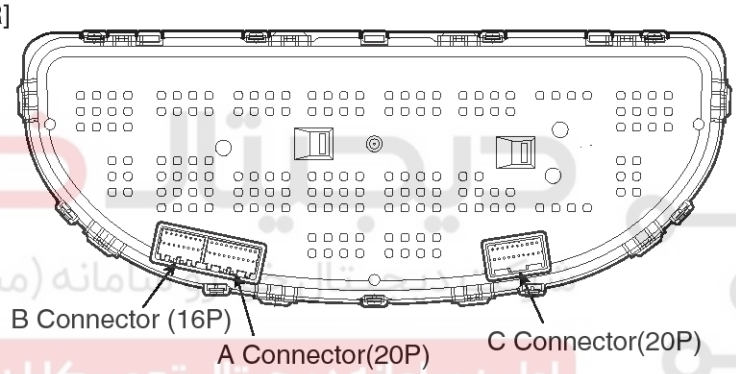
[Gasoline]

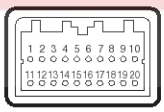
[FRONT]



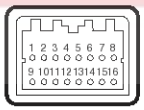
[MPH & km/h]

[REAR]

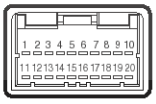



Connector A

NO.	CONECTION
1	IG+
2	TEMP INPUT
3	FUEL INPUT
4	FUEL GND
5	ILL (-)
6	ILL (+)
7	-
8	OVER SPEED WARN'G
9	-
10	-
11	B+
12	TURN-L
13	SIGNAL GND
14	TACHO INPUT
15	SPEED INPUT
16	4P OUT
17	-
18	-
19	PWM SIGNAL
20	EBD


Connector B

NO.	CONECTION
1	CHECK ENGINE
2	WATER SEPARATOR
3	O/D OFF
4	TRUNK OPEN
5	Rr-FOG
6	HIGH BEAM GND
7	HIGH BEAM INPUT (+)
8	FRONT FOG
9	CHARGE
10	PARKING BRAKE
11	SEAT BELT
12	OIL PRESSURE
13	AIR BAG SUPPLY(+)
14	AIR BAG INPUT
15	DOOR OPEN
16	Rr-DEF

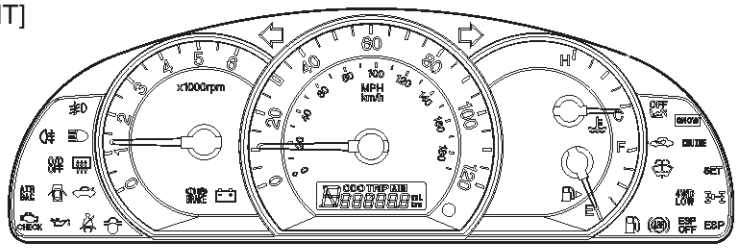

Connector C

NO.	CONECTION
1	SNOW
2	PAB
3	CRUISE
4	4WD LOW
5	4WD
6	ESP
7	ESP OFF
8	SET
9	-
10	TURN-R
11	-
12	4WD LOCK
13	ABS
14	WASHER LOW
15	IMMO
16	D
17	N
18	R
19	P
20	POWER GND

SBLBE9001L

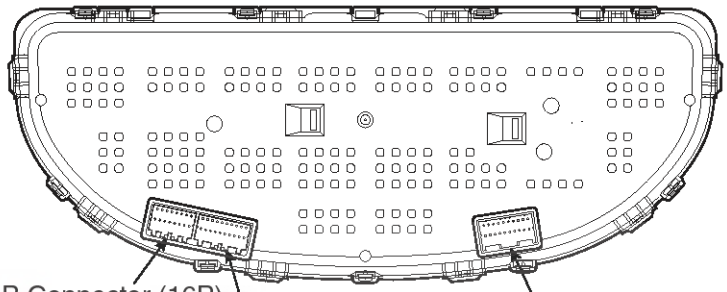
[Diesel]

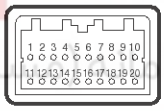
[FRONT]



[MPH & km/h]

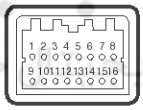
[REAR]





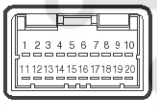
Connector A

NO.	CONECTION
1	IG+
2	TEMP INPUT
3	FUEL INPUT
4	FUEL GND
5	ILL (-)
6	ILL (+)
7	-
8	OVER SPEED WARN'G
9	-
10	-
11	B+
12	TURN-L
13	SIGNAL GND
14	TACHO INPUT
15	SPEED INPUT
16	4P OUT
17	-
18	-
19	PWM SIGNAL
20	EBD



Connector B

NO.	CONECTION
1	CHECK ENGINE
2	WATER SEPARATOR
3	O/D OFF
4	TRUNK OPEN
5	Rr-FOG
6	HIGH BEAM GND
7	HIGH BEAM INPUT (+)
8	FRONT FOG
9	CHARGE
10	PARKING BRAKE
11	SEAT BELT
12	OIL PRESSURE
13	AIR BAG SUPPLY(+)
14	AIR BAG INPUT
15	DOOR OPEN
16	Rr-DEF



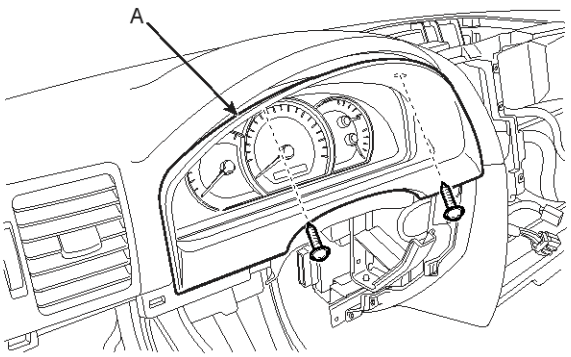
Connector C

NO.	CONECTION
1	SNOW
2	PAB
3	CRUISE
4	4WD LOW
5	4WD
6	ESP
7	ESP OFF
8	SET
9	-
10	TURN-R
11	-
12	4WD LOCK
13	ABS
14	WASHER LOW
15	IMMO
16	D
17	N
18	R
19	P
20	POWER GND

SBLBE9002L

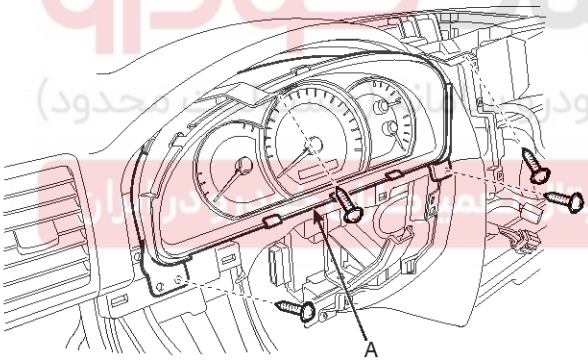
Removal

1. Disconnect the negative (-) battery terminal.
2. Remove the cluster fascia panel (A) after loosening 2 screws (Refer to Body group - Crash pad)



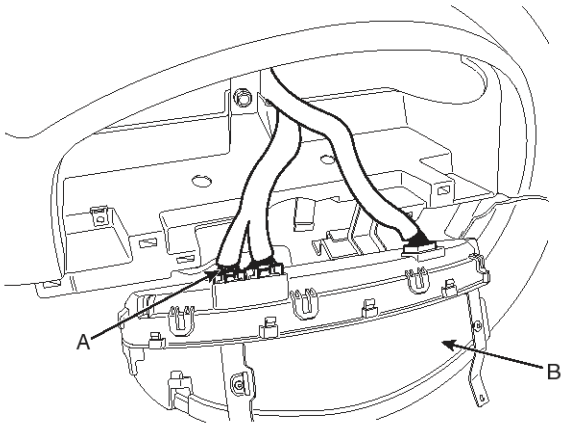
SBLBE6223D

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



SBLBE6224D

4. Disconnect the cluster connecter (A) and then remove the cluster (B).



SBLBE6225D

Installation

1. Reassemble the cluster after connecting the cluster connector.
2. Reassemble the cluster housing.
3. Reassemble the cluster fascia panel.

Inspection

Speedometer

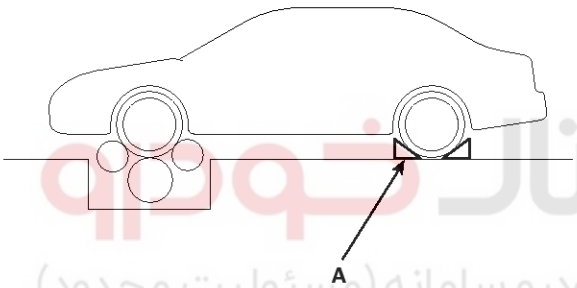
1. Adjust the pressure of the tires to the specified level.
2. Drive the vehicle onto a speedometer tester. Use wheel chocks as appropriate.
3. Check if the speedometer indicator range is within the standard values.

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.



ETKE100E

[km/h]

Velocity (km/h)	20	40	60	80	100	120
Tolerance (km/h)	+4 +1	+4.3 +1.3	+6 +2	+6.5 +2.5	+7 +3	+8 +4
Velocity (km/h)	140	160	180	200	220	-
Tolerance (km/h)	+9 +5	+10.5 +5.5	+11 +6	+12.5 +6.5	+11 +6	-

[MPH]

Velocity (km/h)	10	20	40	60
Tolerance (km/h)	+2.8 +0.3	+3.0 +0.5	+3.8 +3.0	+4.0 +1.0
Velocity (km/h)	80	100	120	140
Tolerance (km/h)	+4.5 +1.5	+6.5 +2.5	+7.0 +3.0	+7.5 +3.5

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.

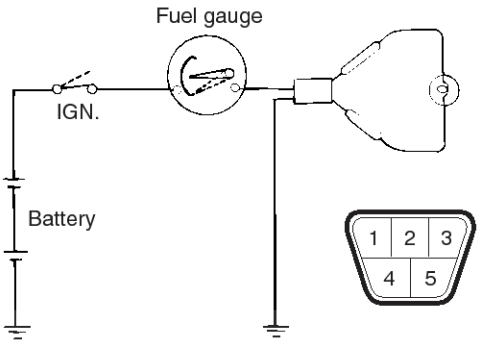
⚠CAUTION

- **Reversing the connections of the tachometer will damage the transistor and diodes inside.**
- **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	Engine
Tolerance (rpm)	±100	±125	±150	±150	Gasoline
Tolerance (km/h)	+6 -12	±6	±5	±4.5	Diesel
Revolution (rpm)	5,000	6,000	7,000	8,000	Engine
Tolerance (rpm)	±150	±180	±210	-	Gasoline
Tolerance (km/h)	±4.2	±4.2	-	-	Diesel

Fuel Gauge

1. Disconnect the fuel sender connector from the fuel sender.
2. Connect a 3.4 wattages, 12V test bulb to terminals 1 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.

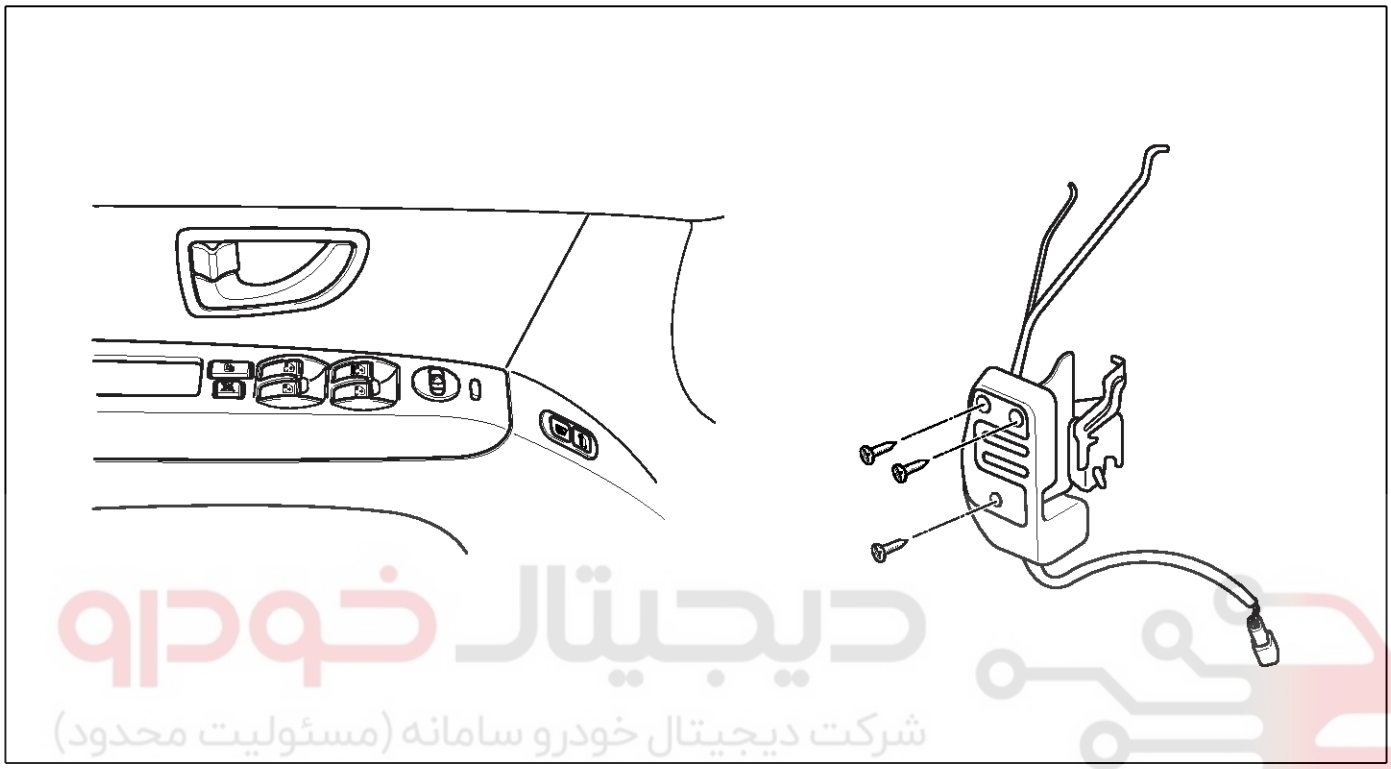


SCMBE6226L

Power Door Locks

Power Door Lock

COMPONENTS

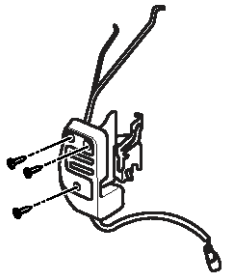


ATAC301A

Power Door Lock Actuators

INSPECTION

1. Disconnect the actuator connector from the wiring harness.
2. Apply battery voltage (12V) to each terminal as shown in the table and verify that the actuator operates correctly.



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

ATAC302A

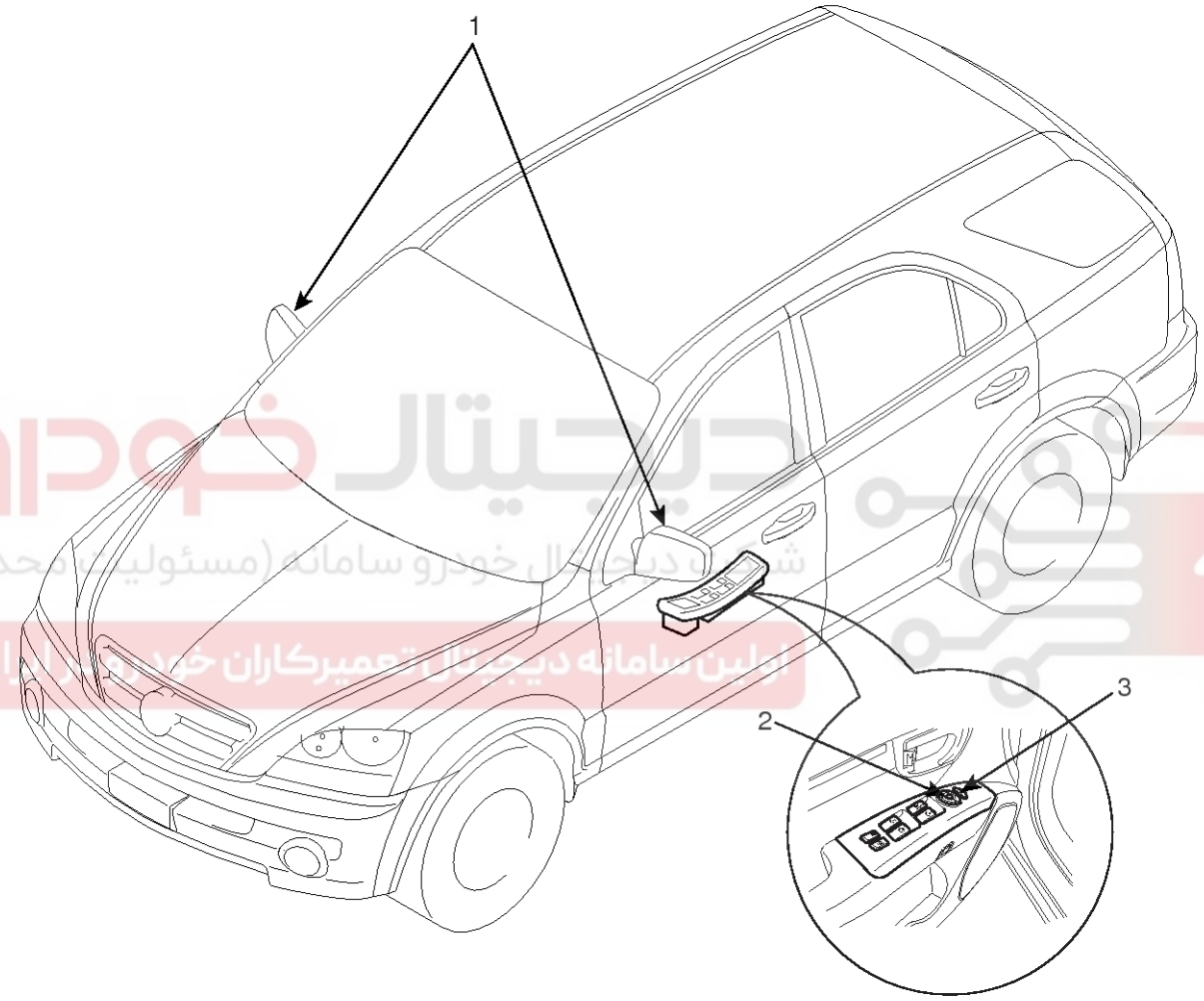
Terminal / Position	3	12	10
Open	⊕		⊖
Close		⊕	⊖

LTAC302A

Power Door Mirrors

COMPONENT LOCATION

RHD type is symmetrical.

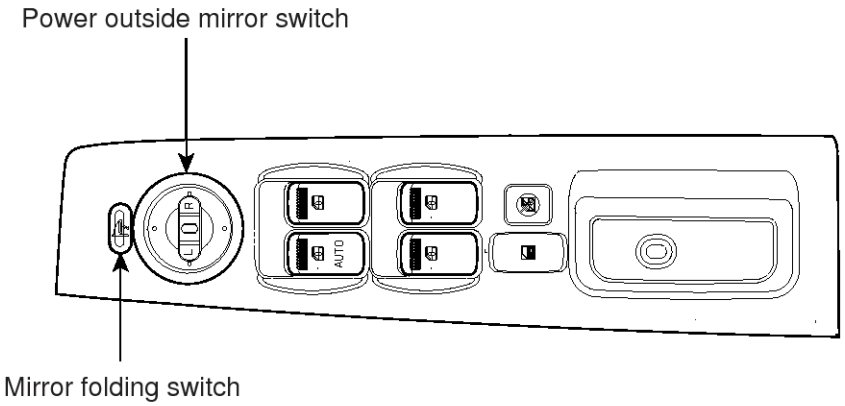


1. Power door mirror
2. Power door mirror switch
3. Mirror folding switch

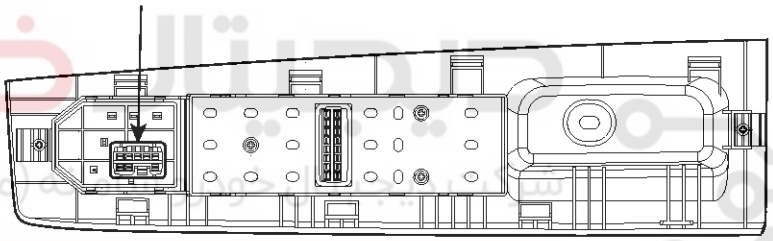
SBLBE8001L

Power Out Side Mirror Switch

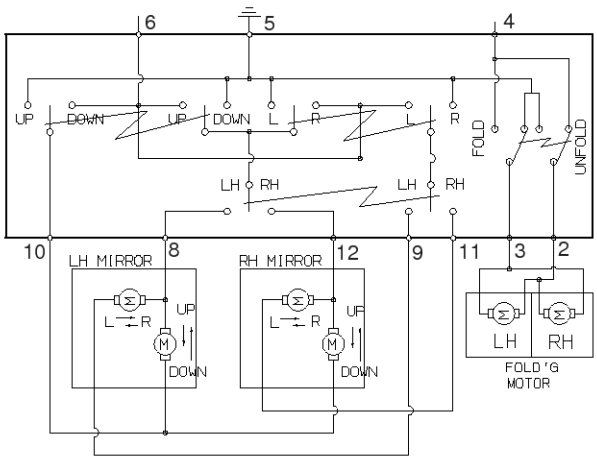
COMPONENTS



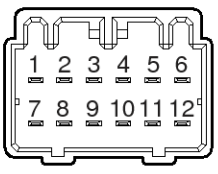
Power outside mirror switch connector (12 Pin)



[CIRCUIT DIAGRAM]



[Mirror folding switch Connector]

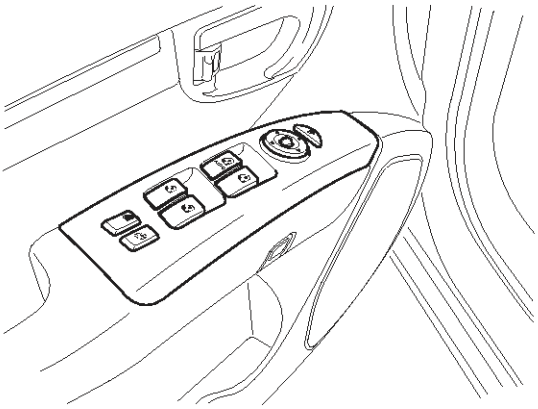


SBLBE8002L

INSPECTION

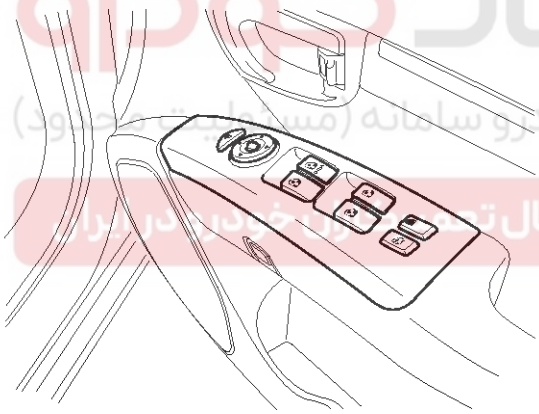
1. Disconnect the negative (-) battery terminal.
2. Remove the front door trim and power window switch module. (Refer to the Body group-front door)

[LHD]



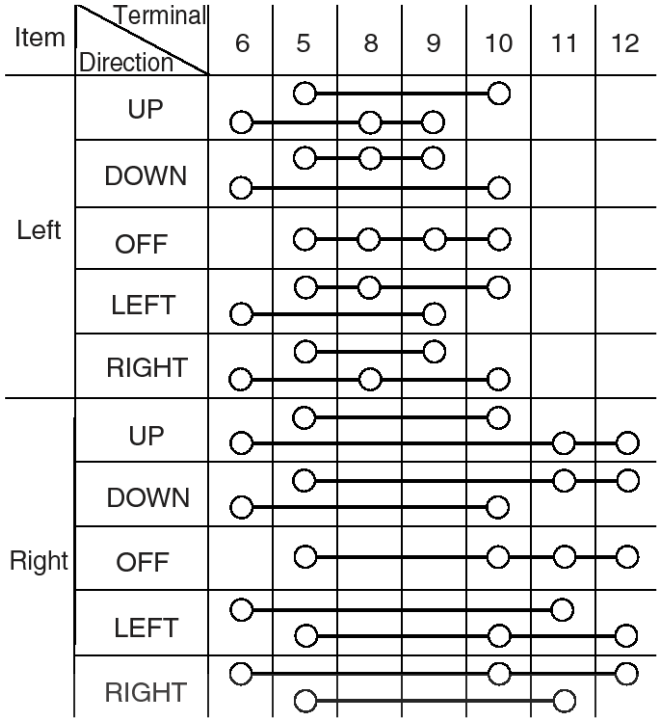
SBLBE8003D

[RHD]



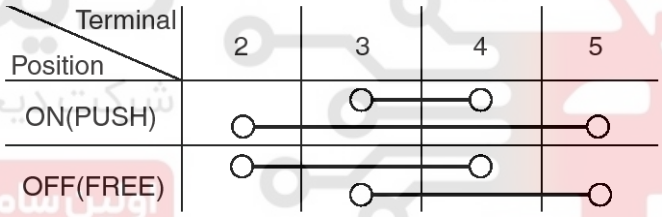
SBLBE8003L

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



SCMBE6256L

[Mirror folding switch]

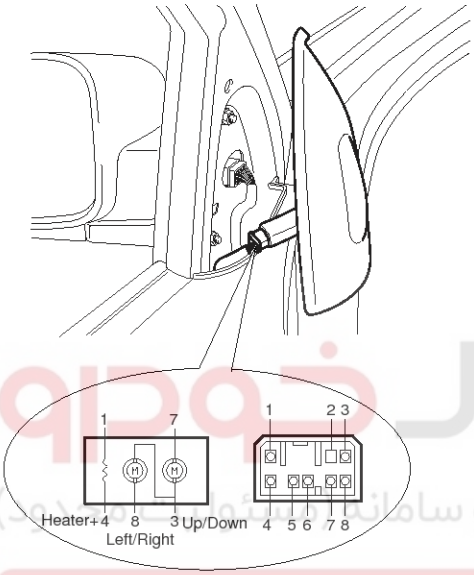


SCMBE6257L

Power Door Mirror Actuator

INSPECTION

1. Remove the front door quadrant inner cover (A). Take care not to damage fixing clips. (Refer to the Body group - front door)
2. Disconnect the power door mirror connector from the harness.
3. Apply battery voltage to each terminal as shown in the table and verify that the mirror operates properly.



SBLBE8005L

Position \ Terminal	7	8	3
UP	⊖	⊕	⊕
DOWN	⊕	⊖	⊖
OFF	⊖	⊕	⊕
LEFT	⊖	⊕	⊖
RIGHT	⊕	⊖	⊕

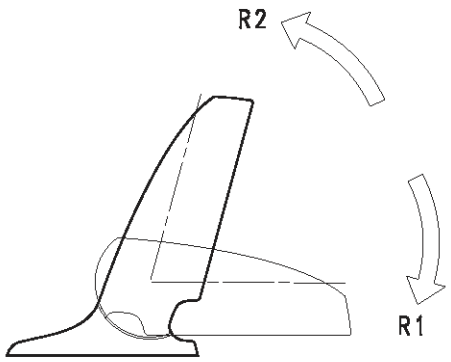
SBLBE8006L

MIRROR HEATER

Position \ Terminal	1	4
Heater	○	○

SBLBE8007L

MIRROR FOLDING



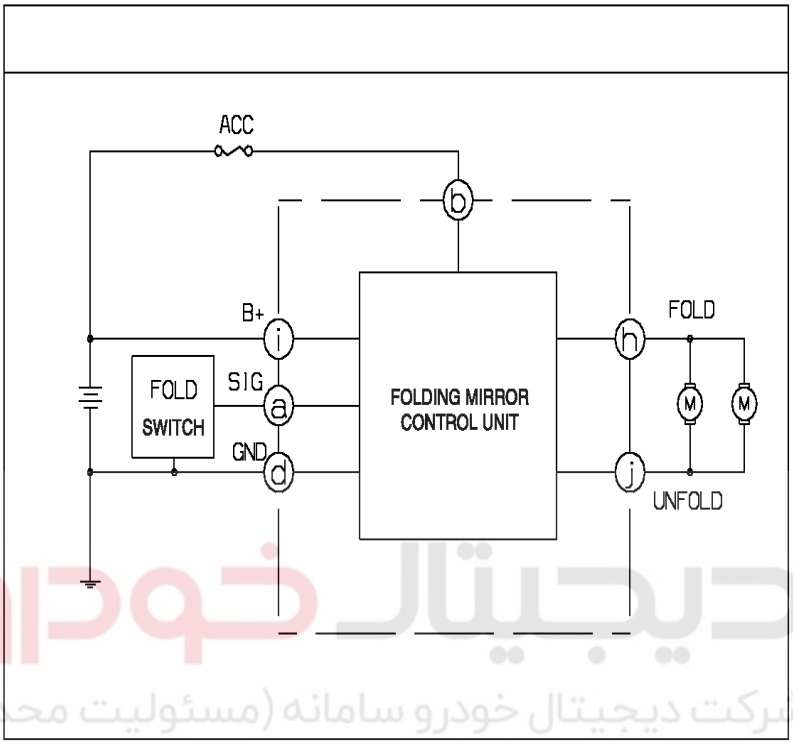
SBLBE8009D

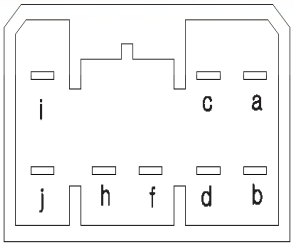
Position \ Terminal	B+	GND	6	5
Folding R1	○	○	○	○
Folding R2	○	○	○	○

SBLBE8008L

Door Mirror Folding Control Unit

CIRCUIT DIAGRAM



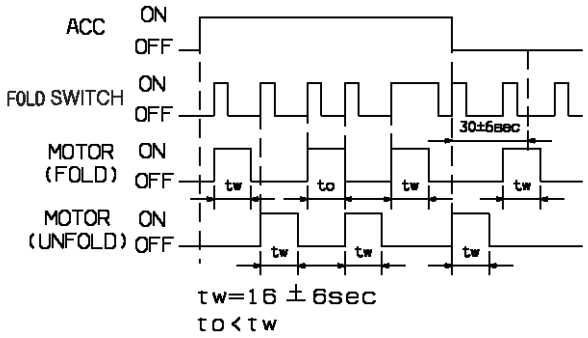


PIN NO.	DESCRIPTION
a	FOLDING SWITCH
b	ACC
c	BLANK
d	⊖
f	BLANK
h	FOLD
i	B+
j	UNFOLD

LTAC106A

INSPECTION

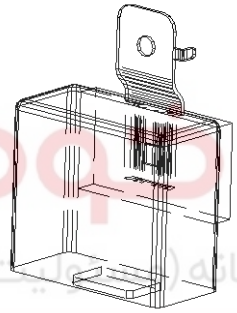
1. Check that the folding mirror operate according to the following timing chart.



ATAC107A

2. If operation is not normal, inspect the wire connector on the mirror folding control unit

   It is installed in the driver's door trim.



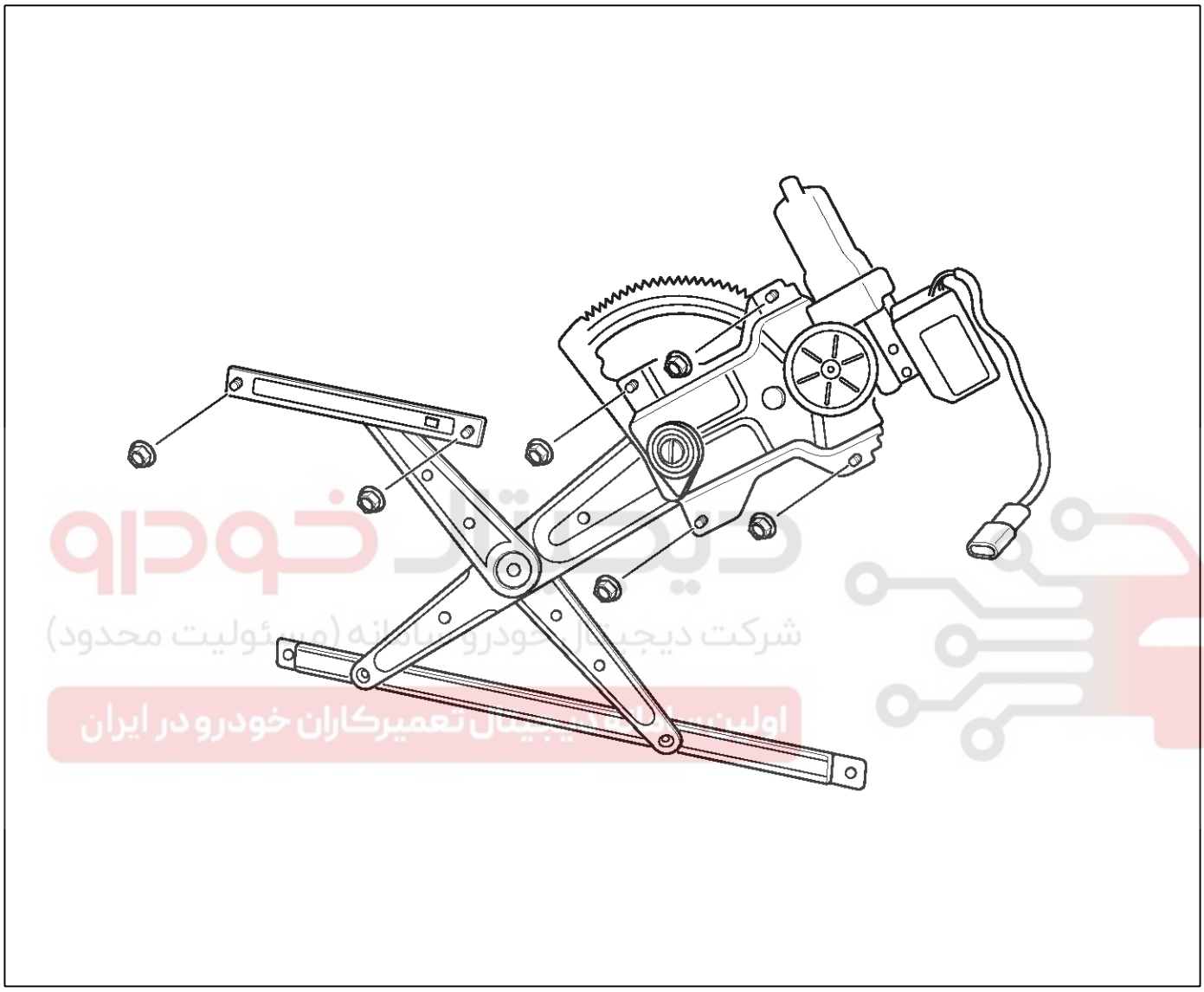
ATAC107B

Power Windows

Power Windows

Power Window Motor

COMPONENTS

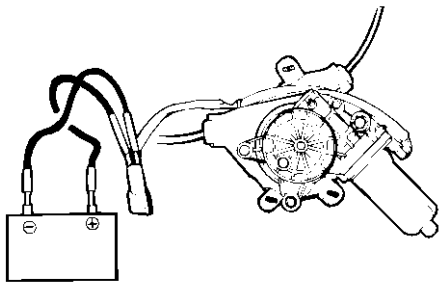


ATAC108A

INSPECTION

Connect the motor terminals directly to battery voltage(12V) and check that the motor operates smoothly.

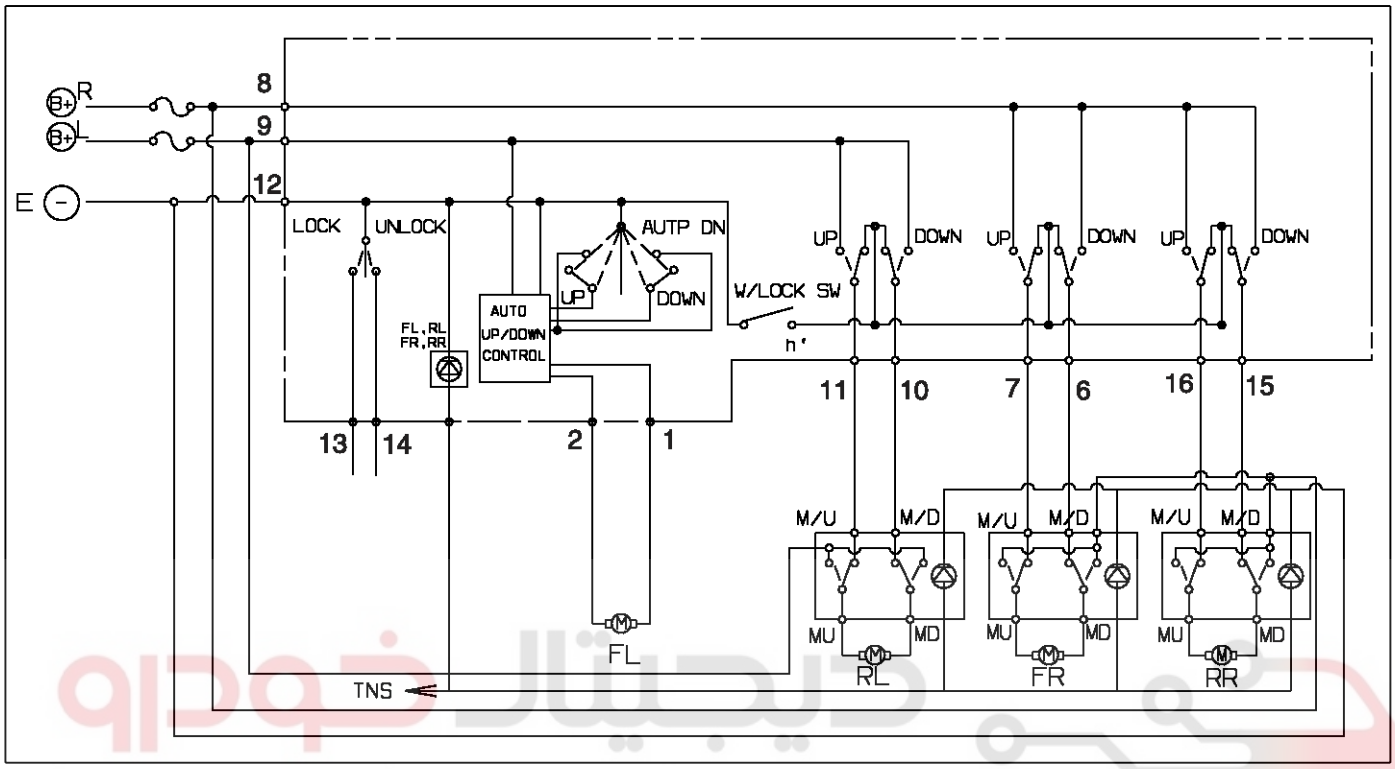
Next, reverse the polarity and check that the motor operates smoothly in the reverse direction. If the operation is abnormal, replace the motor.



ATAC108B

Power Window Switch

CIRCUIT DIAGRAM



LTAD110A

INSPECTION

1. Remove the switch from the door trim panel.
2. Check for continuity between the terminals. If continuity is not as specified in the table, replace the power window switch.

S/W TER / POSITION	POWER WINDOW SWITCH															
	FL				FR				RL				RR			
	9	2	1	12	7	8	6	12	11	9	10	12	16	8	15	12
UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
OFF		○	○	○	○		○	○	○		○	○	○		○	○
DOWN	○		○	○	○	○		○	○	○		○	○	○		○
AUTO DOWN	○		○	○												

LTAD111A

8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9

LTAD111B

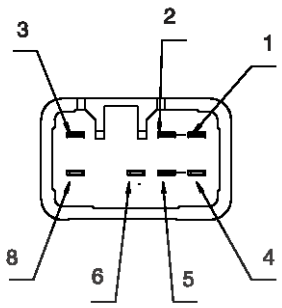
Terminal / Position	13	14	12
LOCK	○		○
OFF			
UNLOCK		○	○

LTAD111C

Power window sub switch

TERMINAL / POSITION	POWER WINDOW S/W						
	6	2	5	3	8	1	4
UP	○		○	○	○		
OFF		○	○	○	○	○⊗○	
DOWN	○	○		○	○		

LTAD112C



LTAD112D

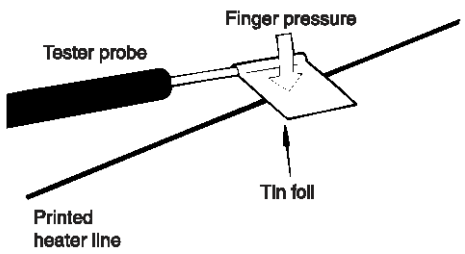
Rear Glass Defogger

Rear Glass Defogger Printed Heater

INSPECTION

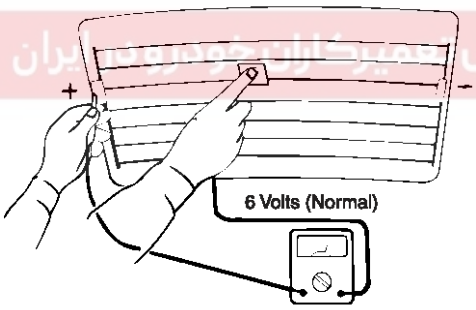
⚠CAUTION

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.



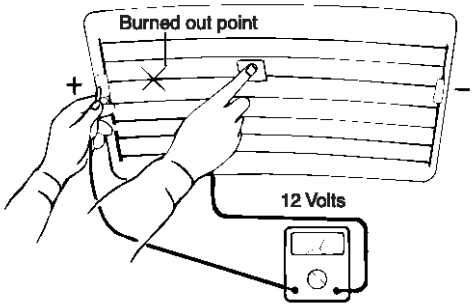
LTAC112A

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.



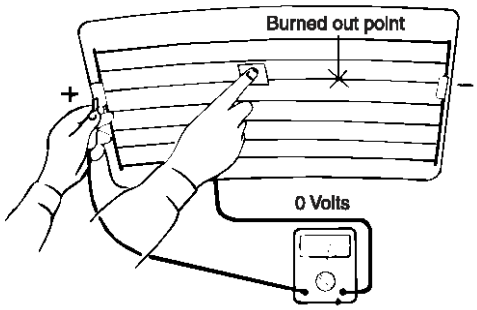
LTAC112B

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



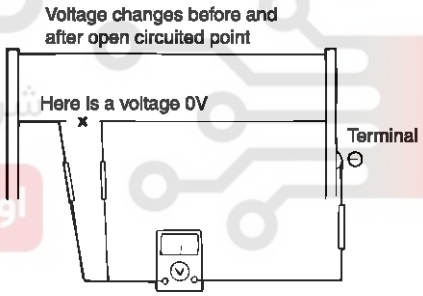
LTAC112C

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



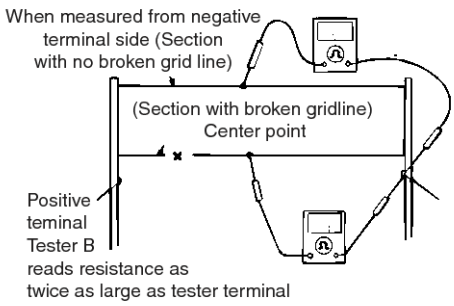
LTAC112D

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.



LTAC112E

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.



LTAC112F

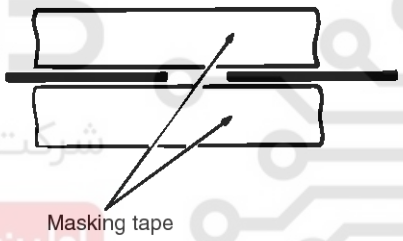
REPAIR OF BROKEN HEATER LINE

1. Conductive paint.
2. Paint thinner.
3. Masking tape.
4. Silicone remover.
5. 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).

⚠CAUTION

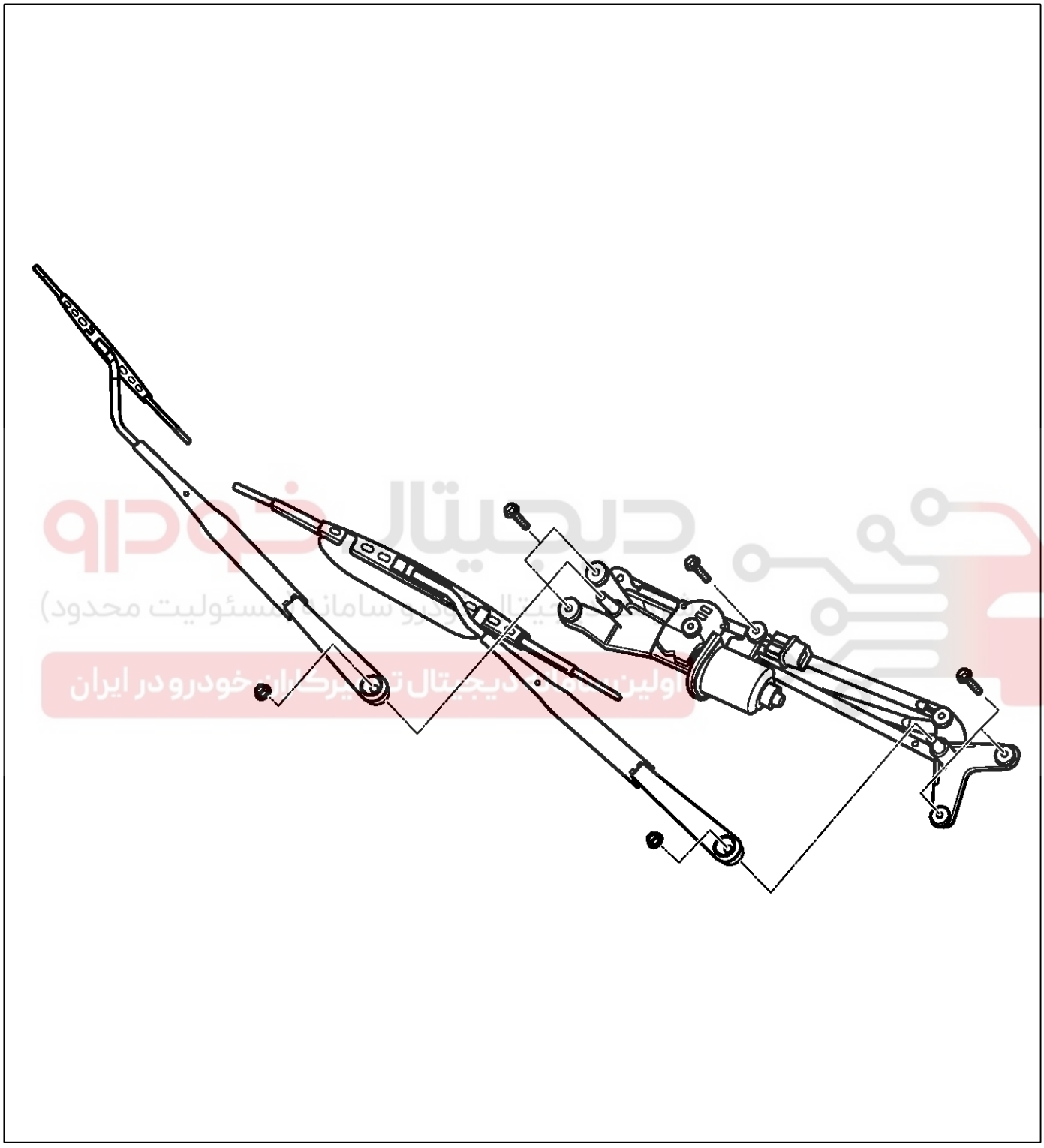
After repairing, clean the glass with a soft dry cloth or wipe along the grid line with a slightly moistened cloth.



LTAC112G

Windshield Wiper/Washer

COMPONENTS



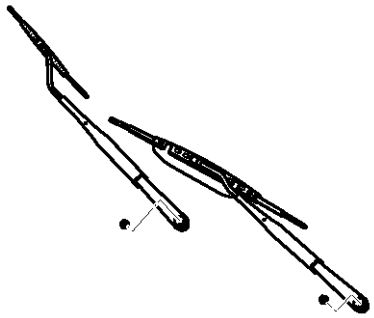
ATAC113A

Front Wiper Motor

REMOVAL

1. Remove the windshield wiper arm and blade after removing the 2 nuts.

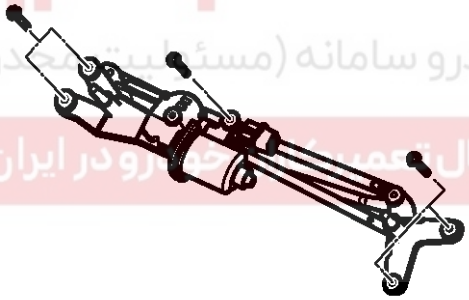
NOTICE
Care must be taken not to scratch the engine hood.



ATAC114A

Tightening torque :
19-28Nm (190-280kg·cm, 14-20.6lb·ft)

2. Remove the weatherstrip and the cowl top cover then remove the 5 bolts holding the linkage.



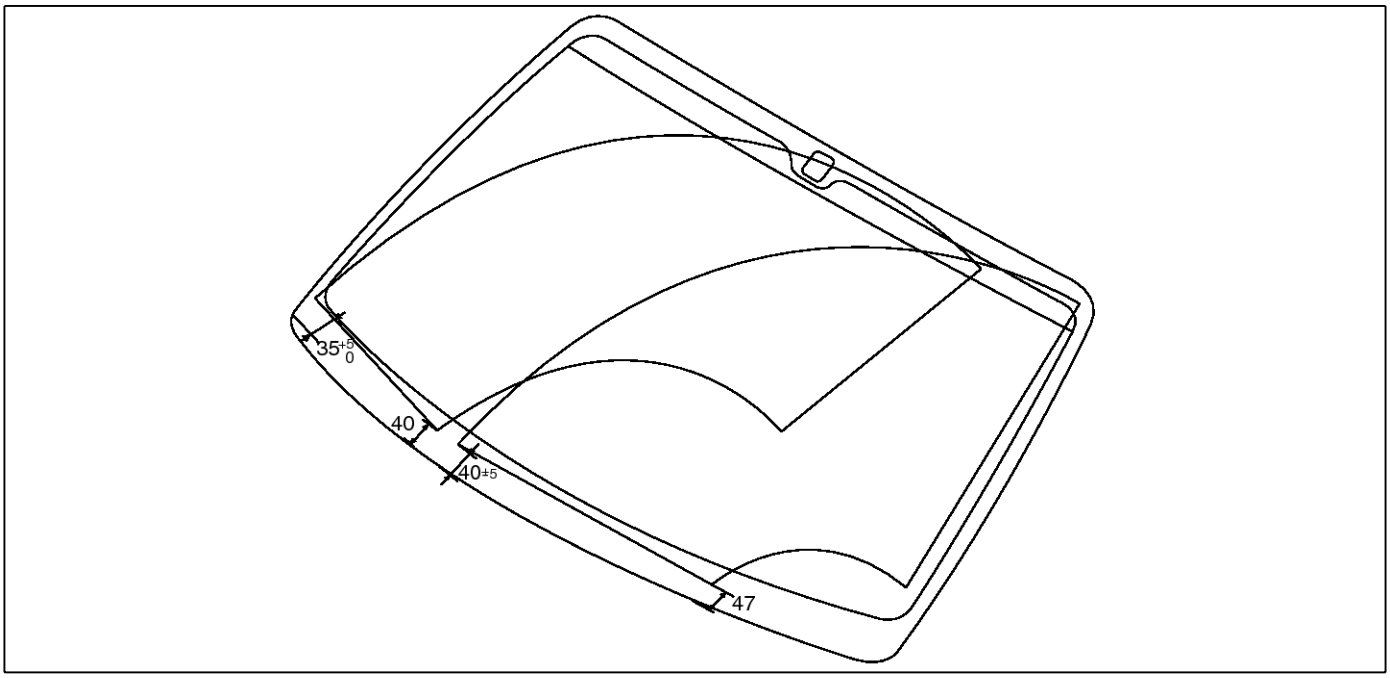
ATAC114B

Tightening torque :
4-6Nm (40-60kg·cm, 2.9-4.4lb·ft)

3. Disconnect the windshield wiper motor connector and remove the windshield wiper motor and the linkage.

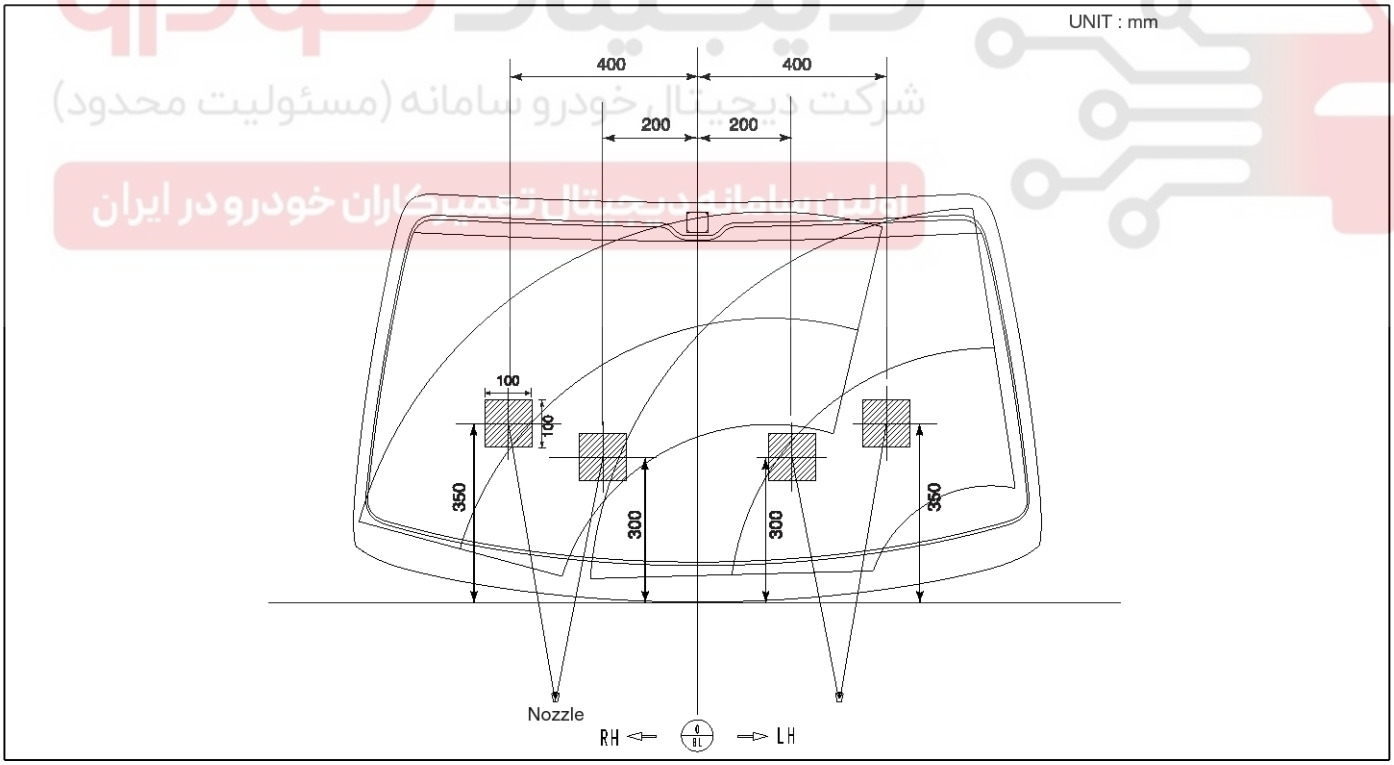
INSTALLATION

1. Install the wiper arm to the specified position.



ATAC116A

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

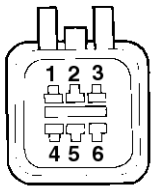


LTAC116A

INSPECTION

SPEED OPERATION CHECK

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

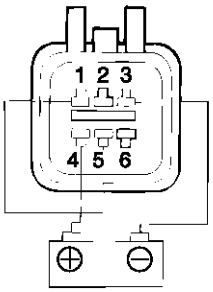


1. Low
2. High
3. Ground
4. IGN+
5. Parking
6. Blank

LTAC115A

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 1.
3. Connect terminals 1 and 5.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 3.
5. Check that the motor stops running at the off position.

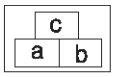


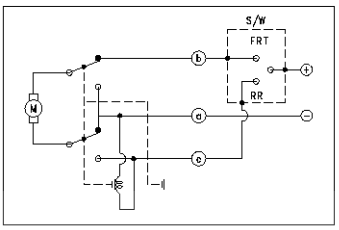
ATAC115B

Front Washer Motor

INSPECTION

1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Apply the battery voltage to the terminal a and ground the terminal b or c to see that the washer motor runs and water sprays from the front or rear nozzles.
3. Check that the motor operates normally.



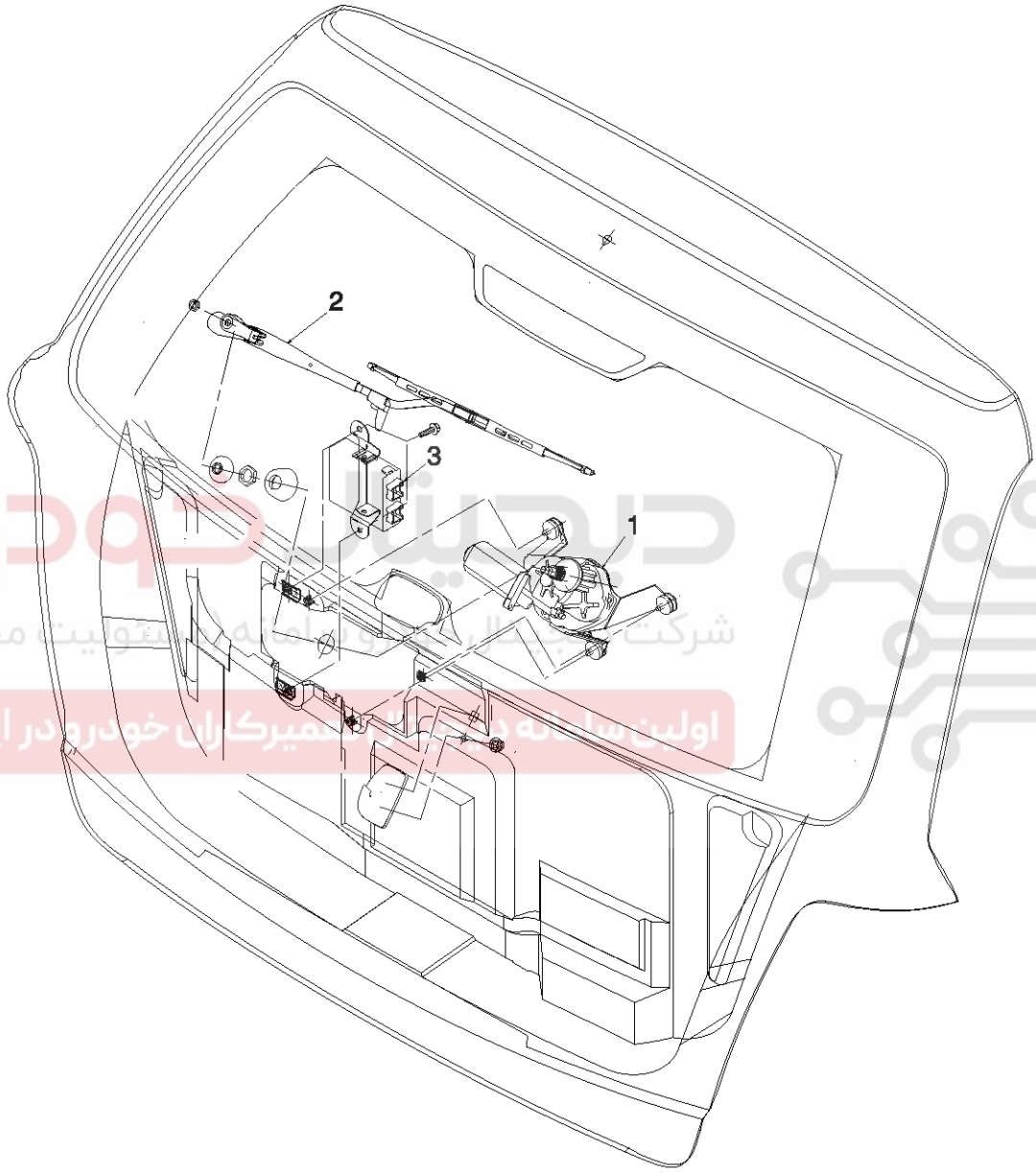


LTAD117A

Rear Wiper/Washer

Rear Wiper Motor

COMPONENT

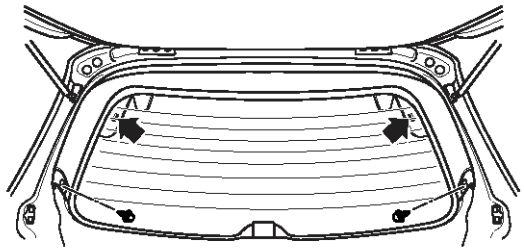


1. Rear wiper motor
2. Rear wiper arm & blade
3. Control unit

LTAD123A

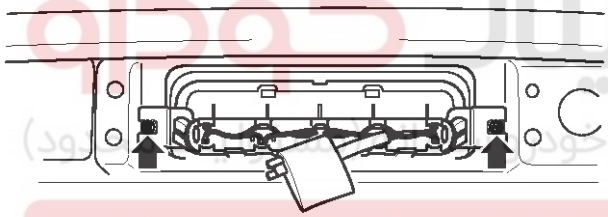
REMOVAL

1. Disconnect negative battery cable.
2. Remove Tailgate upper trim.
   1) Disconnect rear window defroster connector.
   2) Remove upper trim fastener.



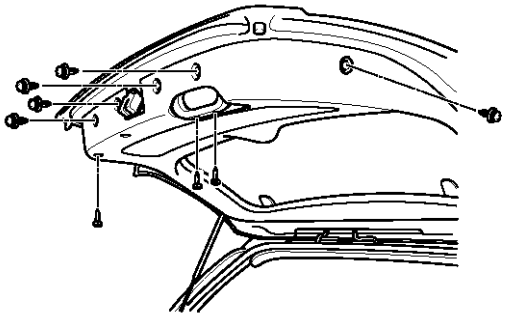
ATAC124A

3. Remove high-mounted brake light.
   1) Disconnect electrical connector.
   2) Remove high-mounted brake light screws(2).



ATAC124B

4. Remove tailgate trim.
   1) Remove tailgate fasteners(6) and screws(1).



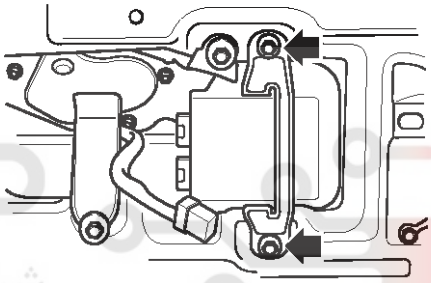
ATAC124G

   2) Remove inner assist handle screws(2).
5. Remove tailgate screen.
6. Remove rear wiper arm and wiper blade.
   1) Remove head cap.
   2) Remove wiper blade nut(1).

ATAC124D

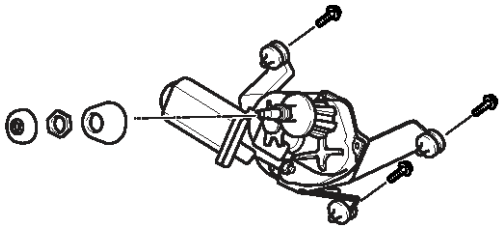
Tightening torque
18 - 22 N·m (1.8-2.2kg-m, 13-16 lb-ft)

7. Remove rear wiper control unit.
   1) Disconnect electrical connector.
   2) Remove wiper control unit bolts(2).



ATAC124E

8. Remove rear wiper motor.
   1) Remove wiper motor cover.
   2) Remove wiper motor unt.
   3) Remove wiper motor bolts(3).

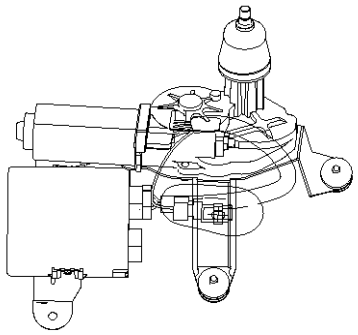


ATAC124F

Tightening torque : nut
3 - 6 N·m (0.3-0.6kg-m, 2-4 lb-ft)
Tightening torque : bolts
7 - 10 N·m (0.7-1.0 kg-m, 5-7 lb-ft)

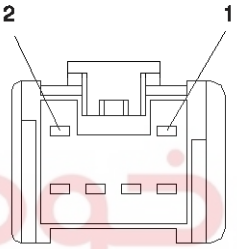
INSPECTION

1. Remove the connector from the rear wiper motor.



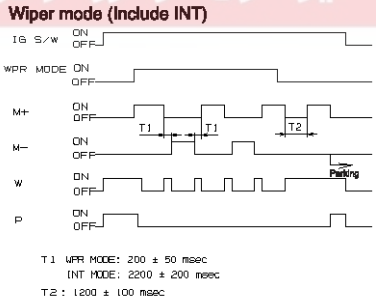
ATAC125A

2. Connect battery positive (+) and negative (-) cables to terminals 1 and 2 espectively.
3. Check that the motor operates normally. Replace the motor if it operates abnormally.

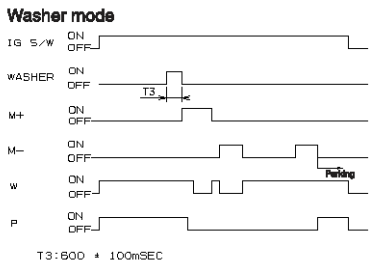


LTAD125E

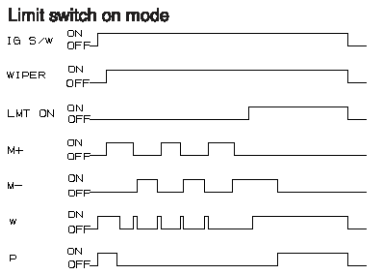
4. Check that the rear wiper operate according to the following time chart.



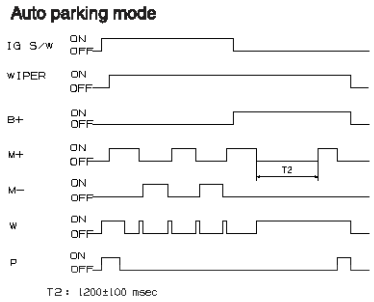
LTAD125A



LTAD125B

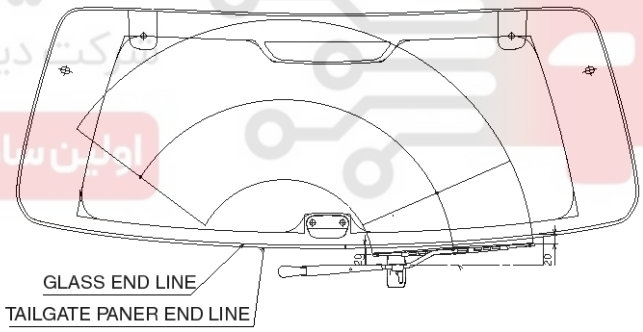


LTAD125C



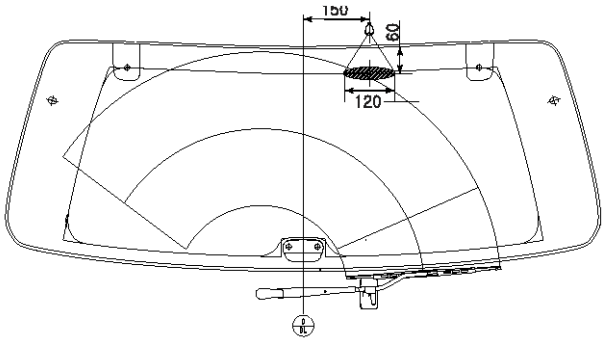
LTAD125D

5. After replacing all the removed components, install the rear wiper arm to the specified stop position.



LTAC125A

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



ATAC125D

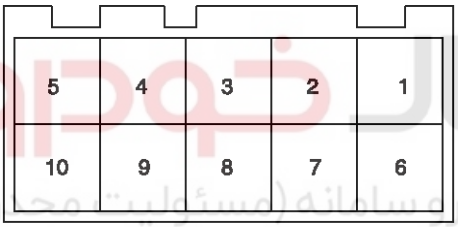
Sun Roof

Inspection

1. Apply the battery voltage to terminal 3, 4 and ground the terminal 5.
2. Apply the battery voltage to terminals as below table, and check that the sunroof unit operates as below table.

Function \ Terminal	1	2	6
Tilt up		⊕	
Tilt down			⊕
Slide close			⊕
Slide open	⊕		

LTAD130C



LTAD130A

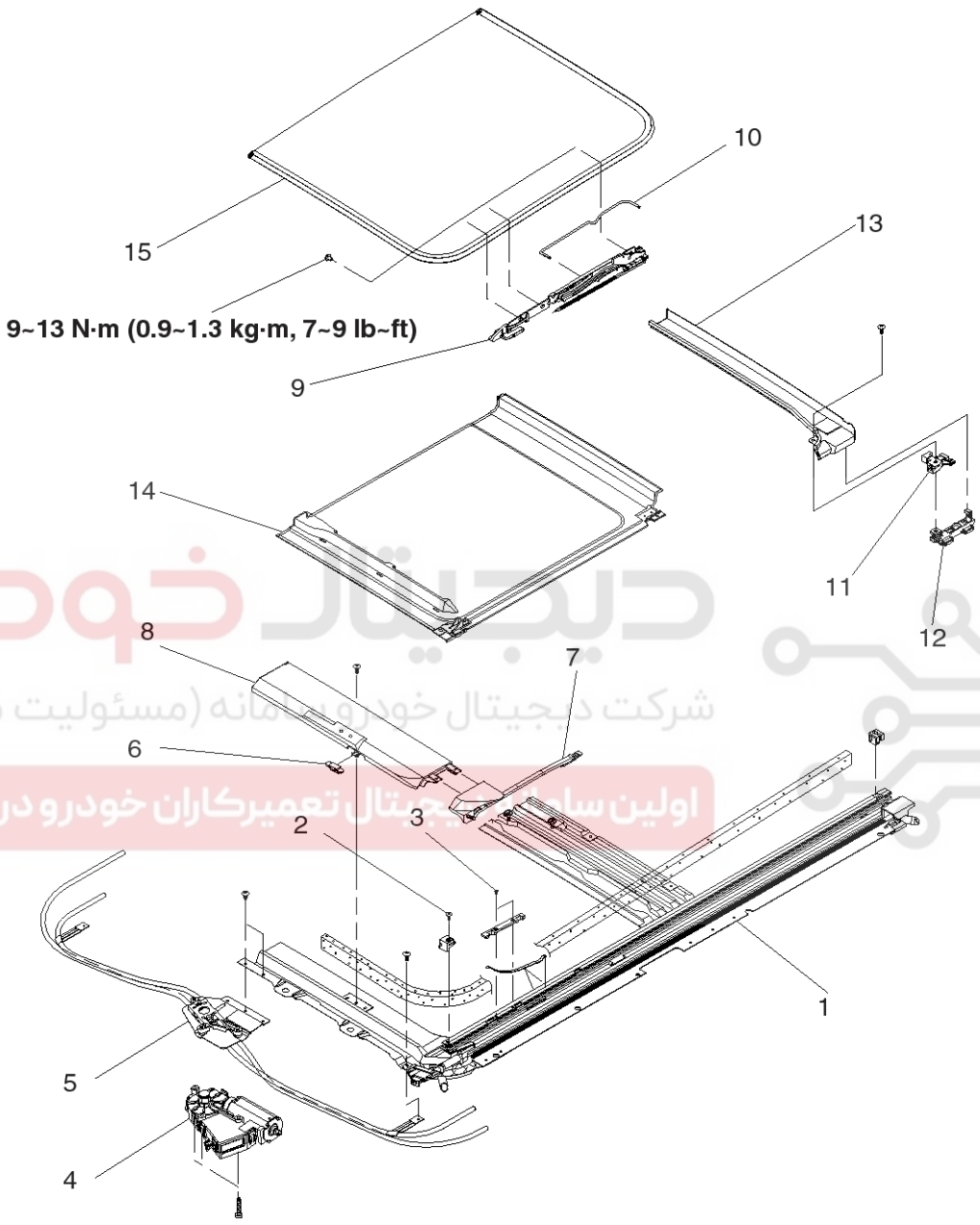
Resetting the Sunroof

When your battery happens to be disconnected or discharged, or you use the emergency handle to operate the sunroof, you have to reset your sunroof system as follows :

1. Turn the ignition key to the ON position.
2. In tilt-up position, press the tilt up switch more than 10 seconds, and let it memorize the initial value of the motor.
3. In above state, press the tilt up switch once again, and hold on until the sun roof system is reset comple<?Pub Caret>tely by automatically performing the following : Tilt down → Slide open → Slide close.

Sunroof Assembly

COMPONENTS

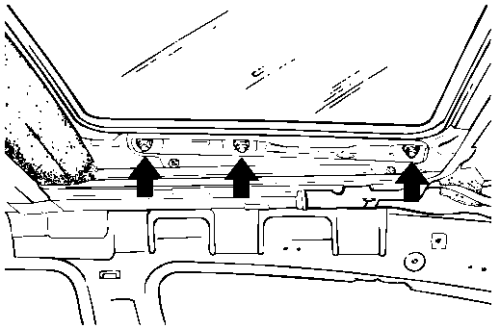


1. Sunroof sub frame
2. Front stopper
3. Setting plate
4. Motor
5. Drive unit
6. Stopper
7. Deflector link
8. Deflector
9. Guide
10. Drip link
11. Stopper
12. Drip shoe
13. Drip rail
14. Sunshade
15. Glass panel

LSAC180A

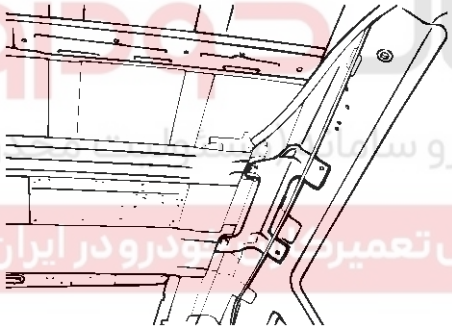
REMOVAL AND INSTALLATION

1. To remove the sunroof, first remove the following parts :
   1) Overhead console lamp
   2) Sunvisor and assist grip handle
   3) Pillar trims
2. Remove sunroof glass.
   1) Remove screw (6).



LSAC190A

3. Disconnect drain hose.

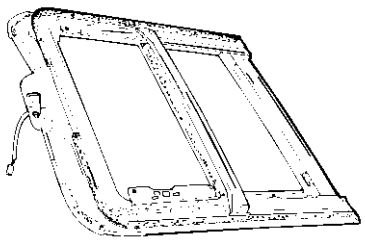


LSAC190B

4. Remove sunroof assembly.
   1) Remove bolt and nut.

NOTICE

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



LSAC190C

CHECK OPERATING CONDITION AFTER INSTALLATION

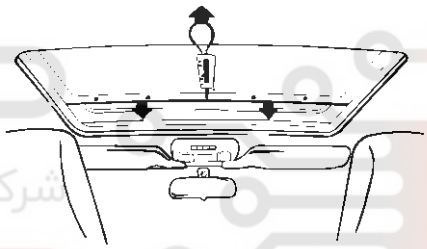
1. Make sure the battery is fully charged.
2. Make sure that the sunroof sliding unit is free of abrasive materials.
3. Make sure that, when the glass panel opens, the rear of the panel does not jam against the roof panel. If there is interference, fully openthe glass panel and move the stopper forward.

NOTICE

If the stopper is moved forward too far, it may cause malfunction or leaks. Make sure the gap between the glass paneland roof panel is not more than 0.3 mm (0.012 in.)

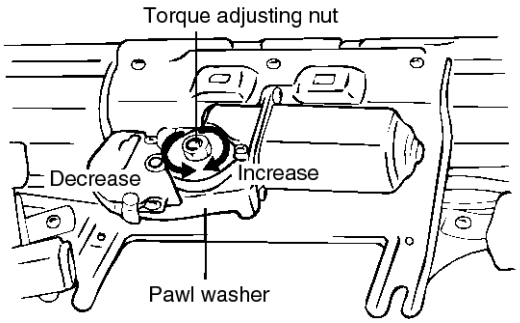
4. Measure the driving force of the motor, and adjust it to 15-25 kg (33.1-55.7 lb) with the torque adjustment nut on the motor.

15-25 Kg



LSAC210A

5. After adjustment, be sure to lock the nut with the pawl washer.



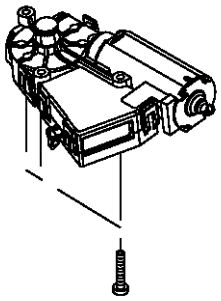
LSAC210B

DISASSEMBLY

1. Remove motor.

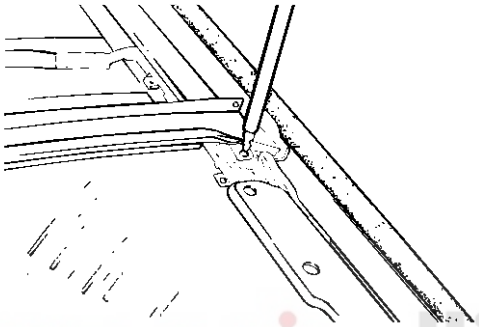
CAUTION

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



LSAC200A

2. Remove drip rail.

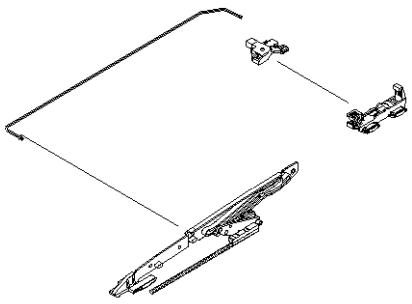


LSAC200B

3. Remove stopper.

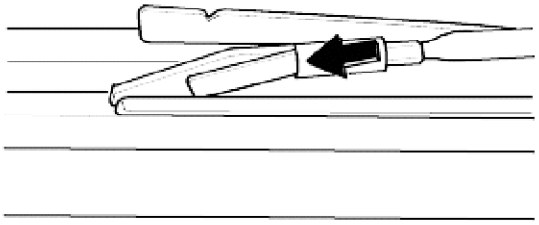
BSAD200A

4. Remove drip shoe and guide.

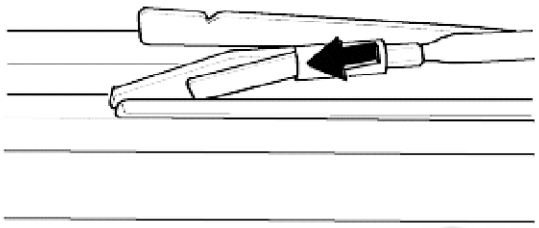


LSAC200D

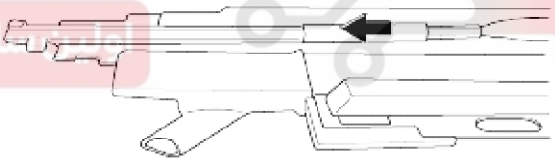
5. Remove slider.



BSAD200B

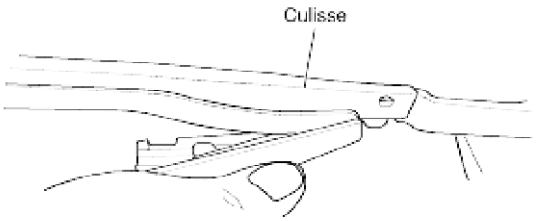


BSAD200B

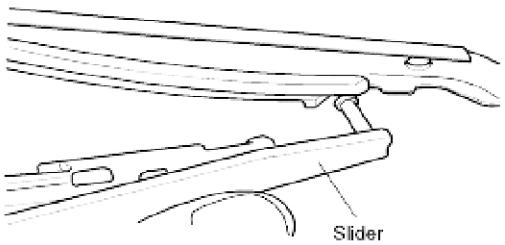


BSAD200D

6. Remove culisse and slider.

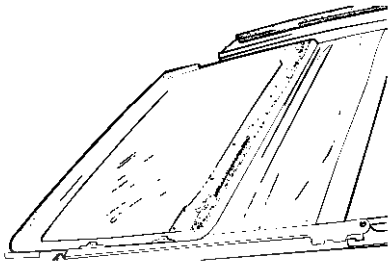


BSAD200E



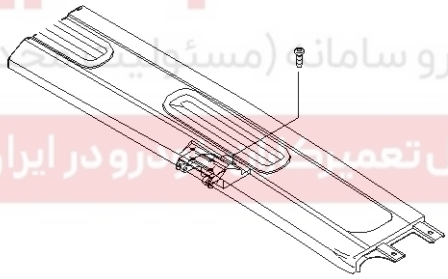
BSAD200F

7. Remove sunshade.



LSAC200C

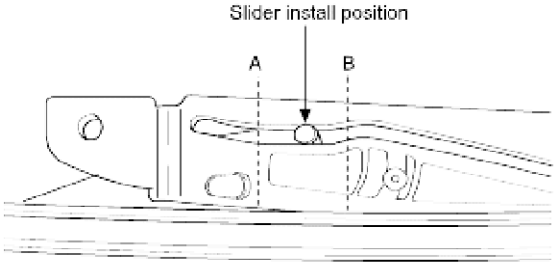
8. Remove deflector.



LSAC200E

REASSEMBLY

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

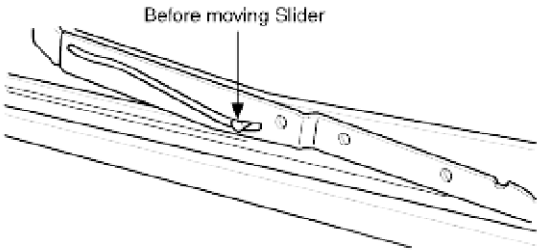


BSAD201A

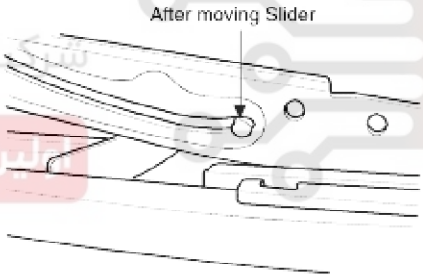
⚠CAUTION

Be sure to initiate the motor when removing and installing it.

3. Method of motor initialization.
   1) Confirm the installation of glass.
      : The state of finishing gap control.
   2) Press the "UP" switch. (The state of pressing switch).
      : After pressing "UP" switch for 3-5 seconds, the slider must be moved 5mm forward.



BSAD201B

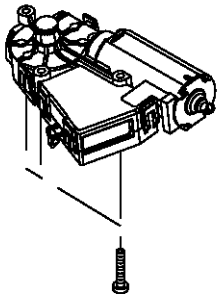


BSAD201C

   3) Switch OFF after the slider has been moved 5mm and switch "UP" again.(Switch is being pressed)
      : If all conditions are normal, Sunroof will open and close once.
   4) It makes initializing done to convert switch "UP" into "OFF" when the sunroof is closed.
4. The time to save initialization.
   1) When operate the sunroof is operated for the first time.
   2) When initial data is deleted or damaged by discharge or discontinuance of supply power.
   3) Driver's need.
   4) When the sunroof is operated manually.
5. In case that "TILT" doesn't operate when pressing

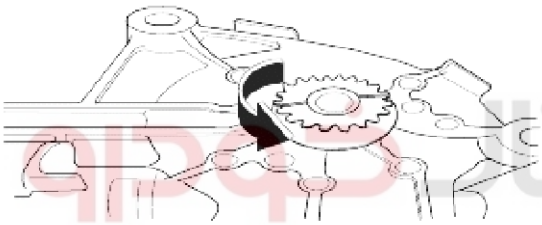
TILT switch after the sunroof is closed on vehicle, refer to the following procedures.

1) Remove motor.



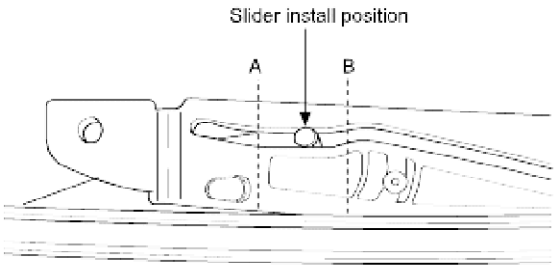
LSAC200A

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



BSAD201D

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

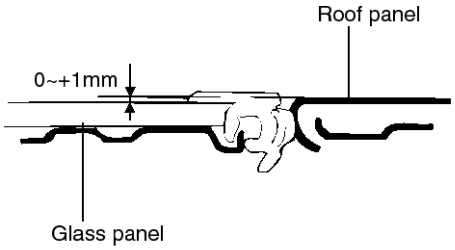


BSAD201A

4) Initialize motor according to the way of initialization.

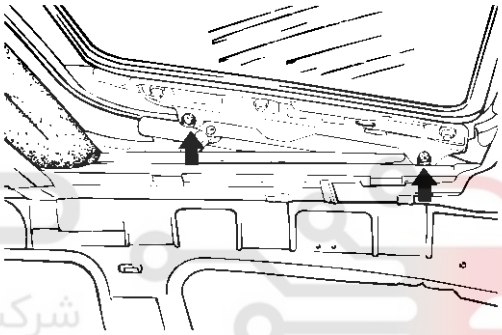
ADJUSTMENT

Front side : 0 (+0, -1.0) mm
Rear side : 0 (+1, +0) mm



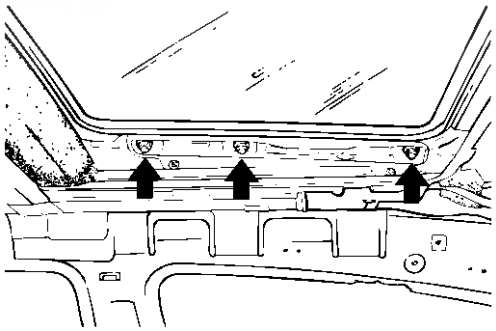
LSAC220A

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



LSAC220B

2. Loosen the nuts holding the glass panel and adjust the gap between the glass panel and roof panel.



LSAC220C

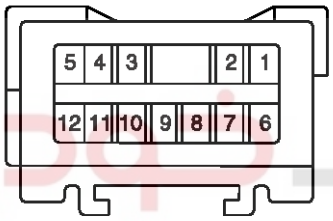
Sunroof Relay

Inspection

Check the continuity between the terminals while operating the switch.

Position \ Terminal	3	6	7	8	11	12
Map switch	○			○		
Slide open	○	○				
Slide close	○		○			
Tilt up	○				○	
Tilt down	○					○

LTAD129C



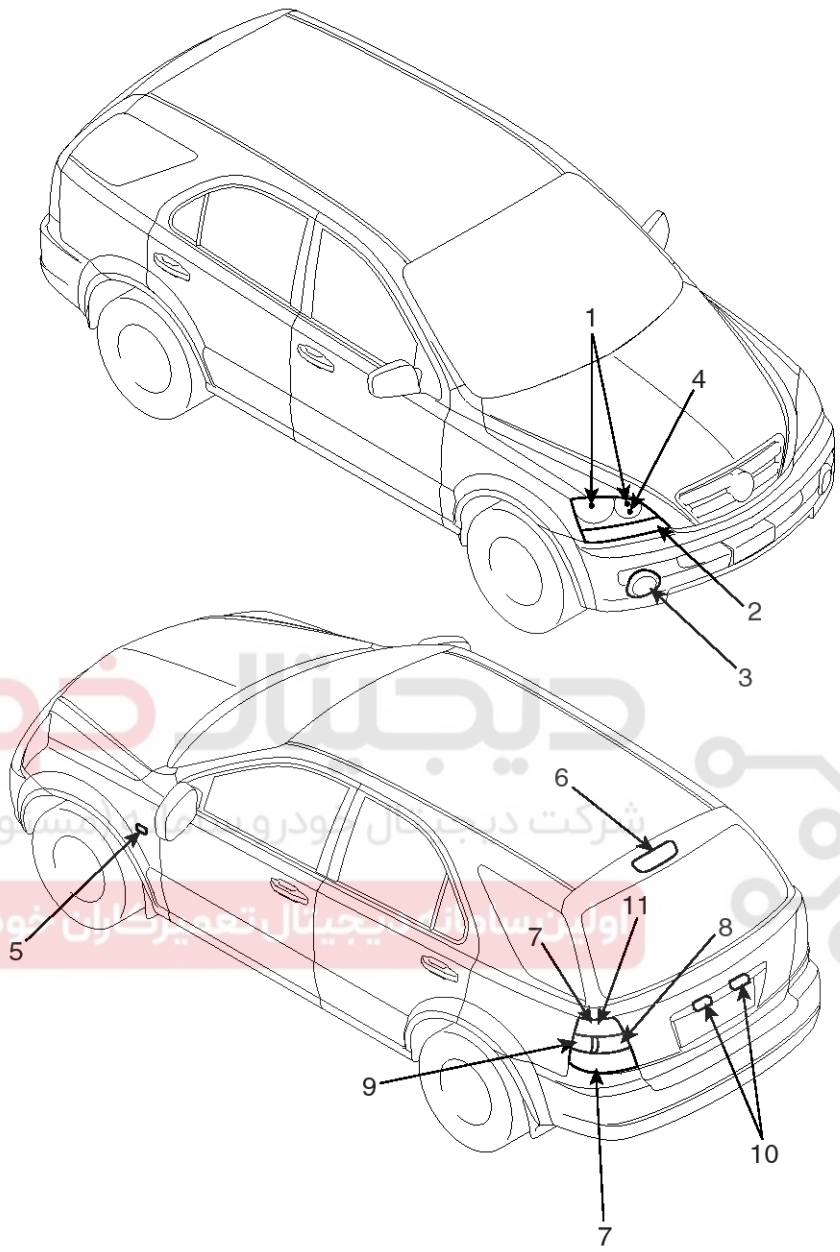
LTAD129A

Lighting System

SPECIFICATION

Items		Bulb Wattage (W)
FRONT	Head lamp (High)	55
	Head lamp (Low)	55
	Front turn signal lamp	21
	Front position lamp	5
	Front fog lamp	27
REAR	Rear stop/tail lamp (Outside)	21/5
	Back up lamp	16
	Rear turn signal lamp	21
	License plate lamp	5
INTERIOR	Room lamp	10 x 2
	Overhead console lamp	10 x 2
	Luggage lamp	5
	Door courtesy lamp	5

COMPONENT LOCATION



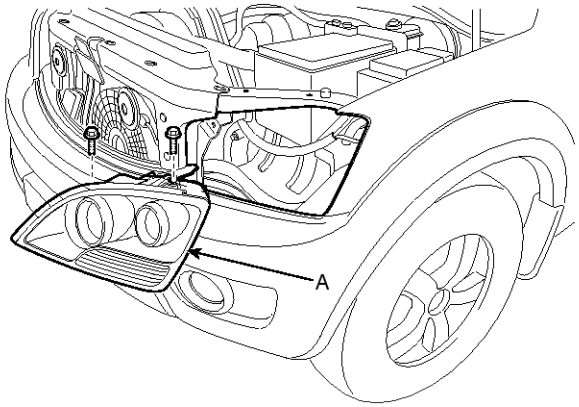
1. Head lamp (Low/High)
2. Front turn signal lamp
3. Front fog lamp
4. Front position lamp
5. Side turn signal lamp
6. High mounted stop lamp
7. Tail lamp
8. Back up lamp
9. Rear turn signal lamp
10. License plate lamp
11. Stop lamp

SBLBE6430L

Head Lamps

REMOVAL

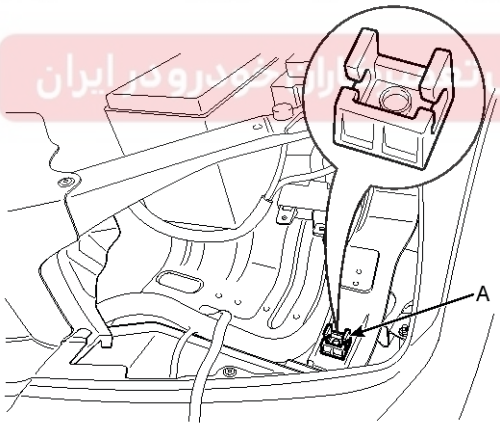
1. Disconnect the negative (-) battery terminal.
2. Loosen the mounting bolts (3EA). And remove the head lamp assembly (A) after disconnecting the lamp connectors.



SBLBE6431D

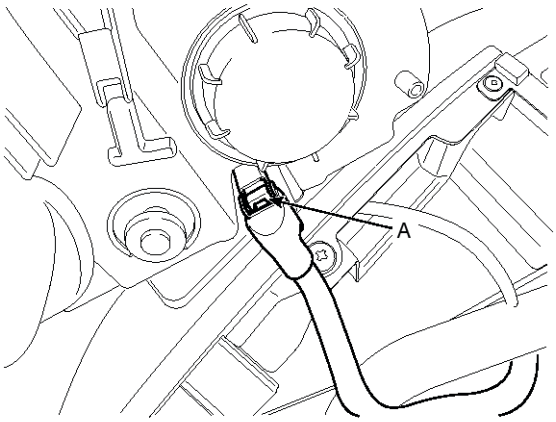
NOTICE

Take care that retaining clip (A) is not to be damaged.



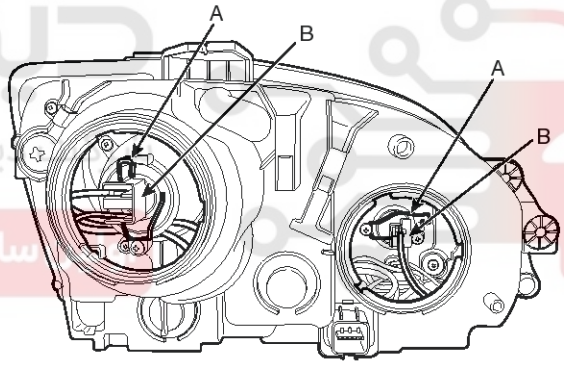
SBLBE6433D

3. Remove the power connector (A) of lamp assembly.



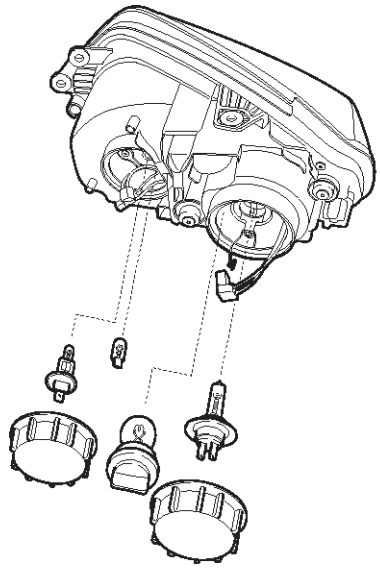
SBLBE6434D

4. Remove the fixing spring (A) and bulb connector (B) after loosening the cover.



SBLBE6435D

5. Remove the head lamp bulb.



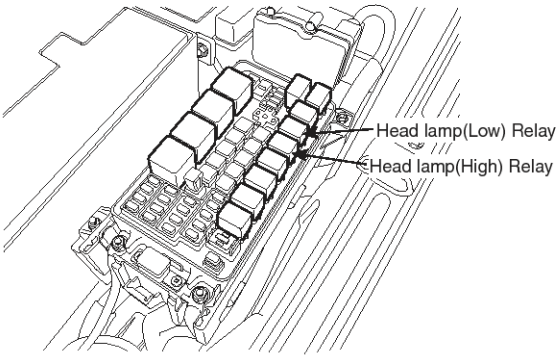
SBLBE6436D

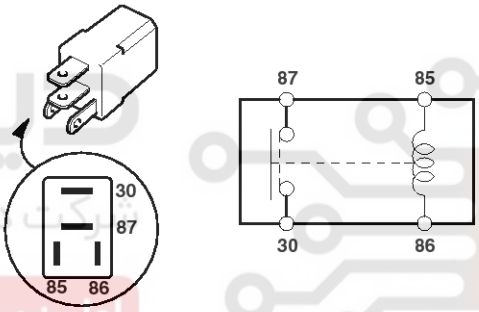
INSTALLATION

1. Reassemble the head lamp bulb.
2. Connect the bulb connector and fixing spring.
3. Connect the power connector to the lamp assembly
4. Reassemble the head lamp assembly to retaining clip.

HEAD LAMP RELAY INSPECTION

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





SBLBE6437L

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

SCMBE6195L

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.

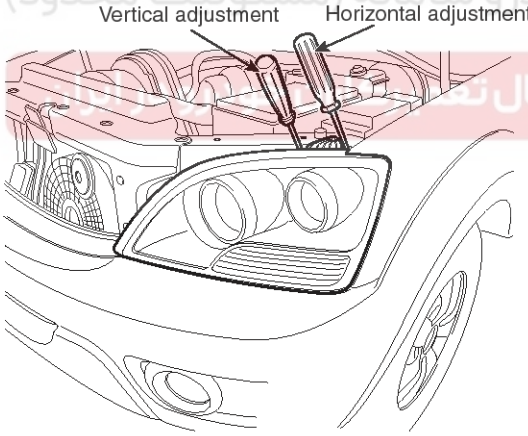
NOTICE

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.



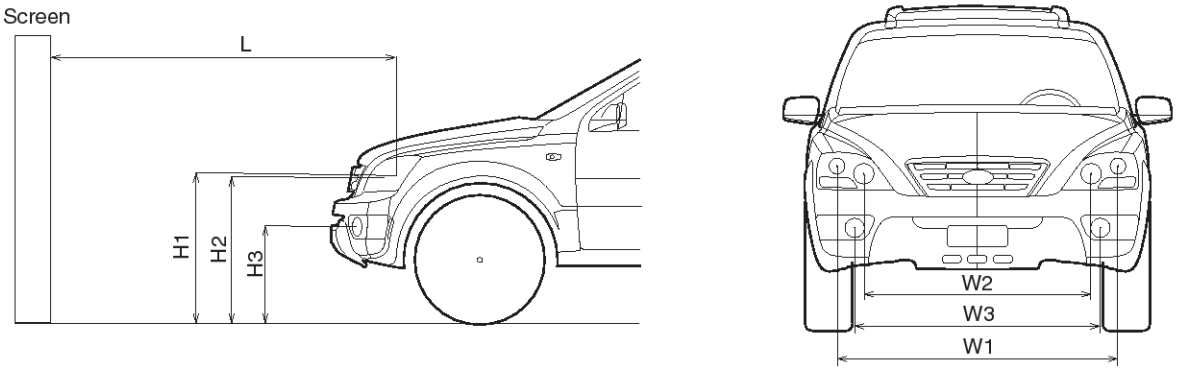
SBLBE6440L

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.

HEAD LAMP AND FOG LAMP AIMING POINT



H1 : Height between the head lamp bulb center and ground (Low beam)
H2 : Height between the head lamp bulb center and ground (High beam)
H3 : Height between the fog lamp bulb center and ground
W1 : Distance between the two head lamp bulbs centers (Low beam)
W2 : Distance between the two head lamp bulbs centers (High beam)
W3 : Distance between the two fog lamp bulbs centers
L : Distance between the head lamp bulb center and screen

SBLBE6443L

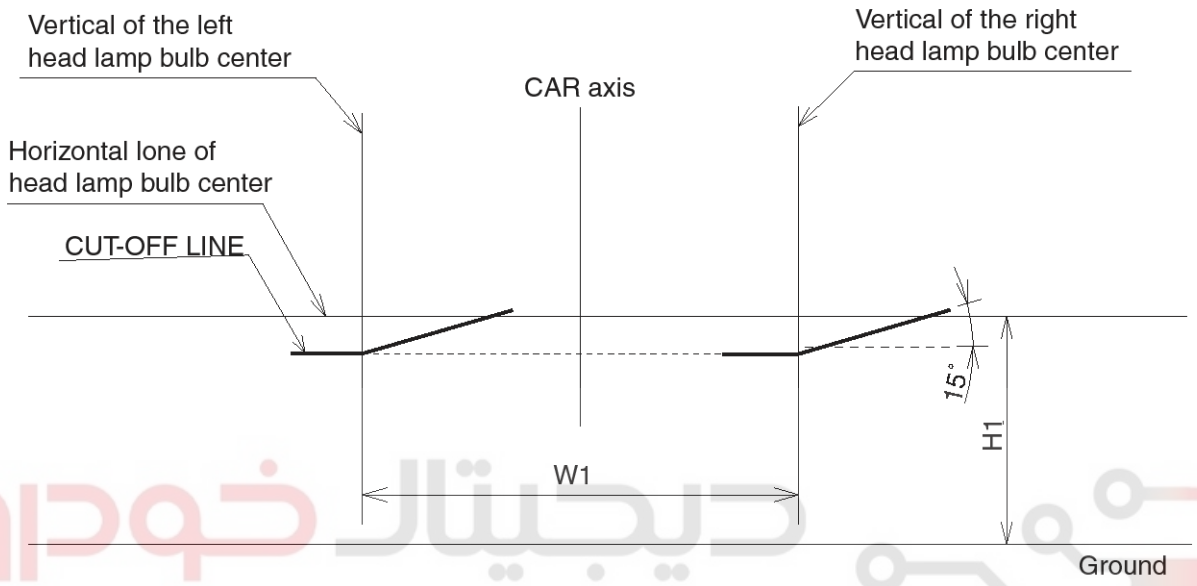
Unit : mm

Vehicle condition	H1	H2	H3	W1	W2	W3	L
Without driver	891	849	546	1,490	1,207	1,310	3,000
With driver	876	834	531				

SBLBE6444L

1. Turn the low beam on without the driver aboard.
   The cut-off line should be projected in the allowable range (shaded region).
   In case of equipping with the manual leveling device, set the leveling device switch on the "O" position.
   In case of equipping with the auto leveling device, set the initialization by using the diagnostic tool before aiming.
   * In case of high beam, head lamp do not need aiming with proper beam-setting equipment.

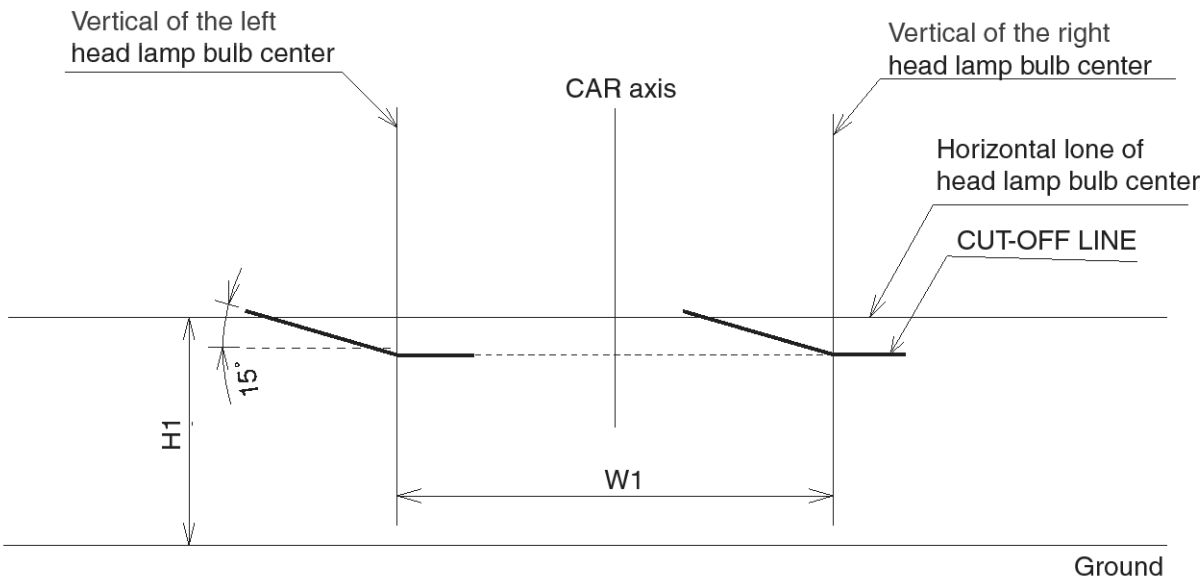
[LHD]



Unit : mm

SBLBE6445L

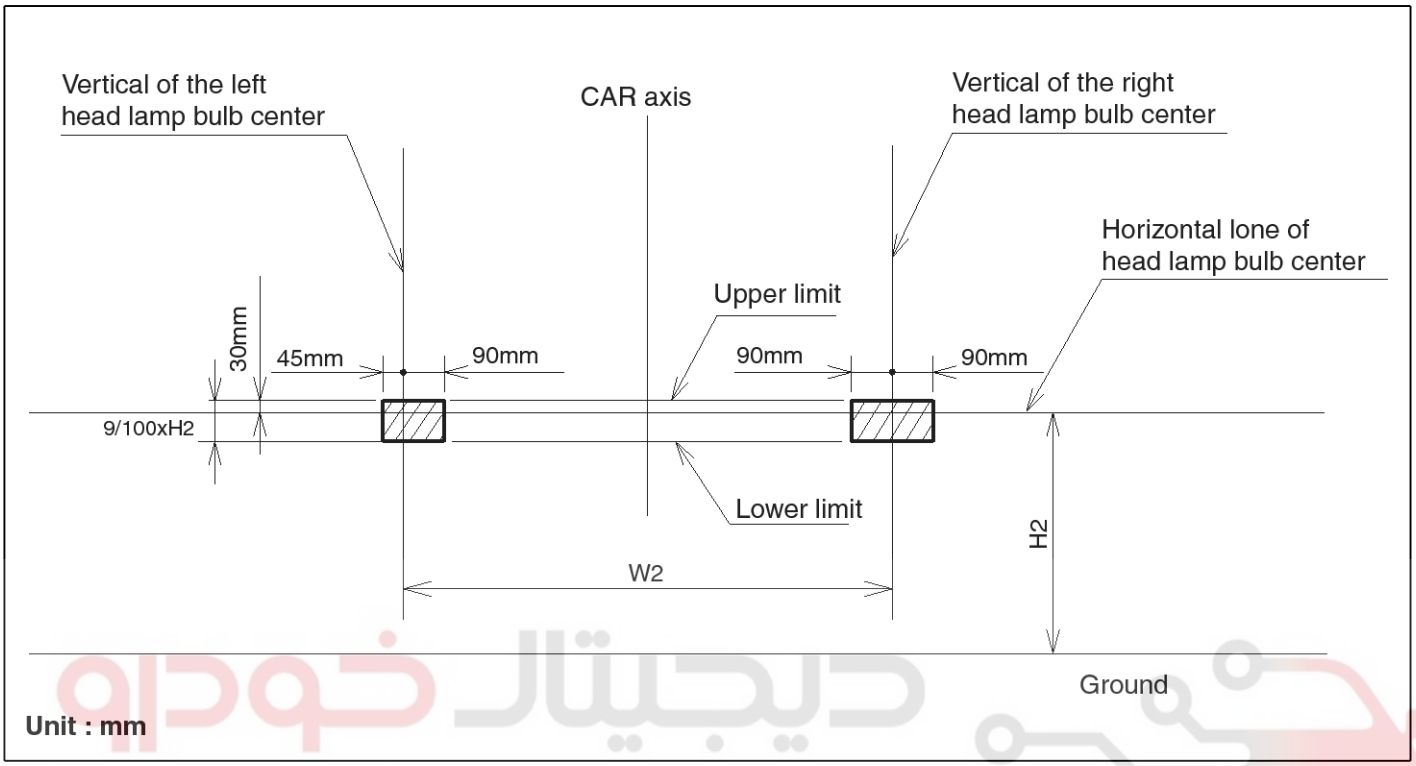
[RHD]



Unit : mm

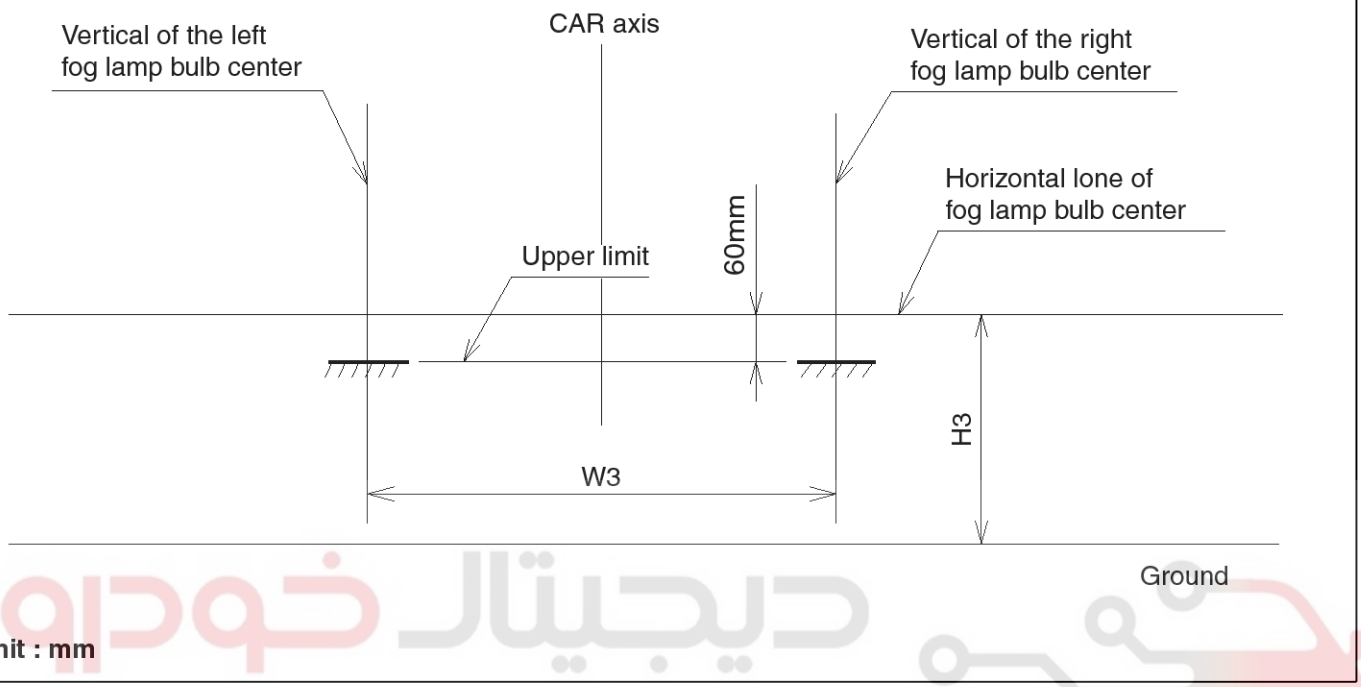
SBLBE6448L

2. Turn the high beam on without the driver aboard.
   The hot zone should be projected in the allowable range shown in the picture.



SBLBE9004L

3. Turn the front fog lamp on without the driver aboard.
   The cut-off line should be projected in the allowable range (shaded region)



Unit : mm

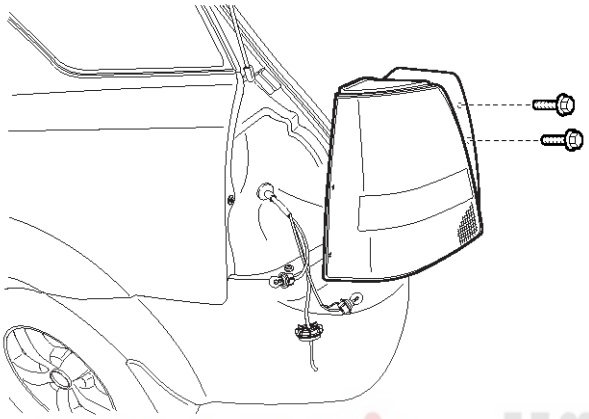
SBLBE6447L

Turn Signal Lamp

REMOVAL

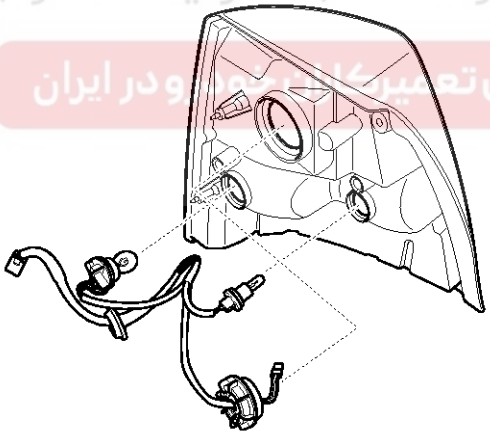
REAR LAMP

1. Disconnect the negative (-) battery terminal.
2. Loose the 2 screws holding the rear combination lamp then disconnect the connector. And then remove the outside rear combination lamp assembly.



SBLBE6449D

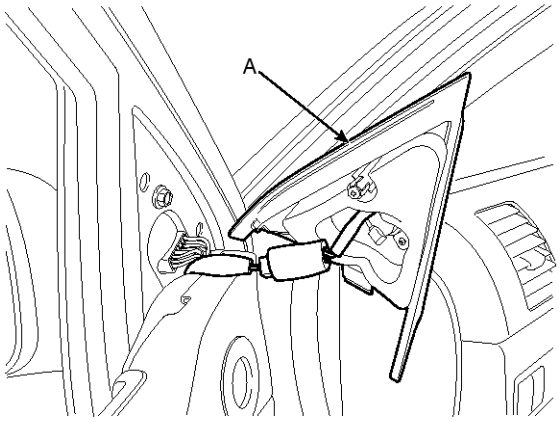
3. Remove the bulbs from the rear combination lamp assembly.



SBLBE6450D

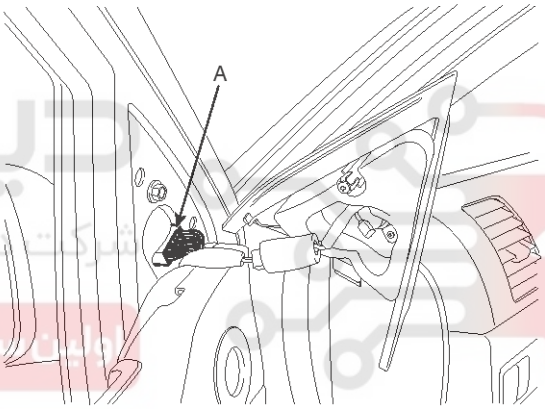
TURN SIGNAL LAMP(DOOR MIRROR)

1. Disconnect the negative (-) battery terminal.
2. Remove the tweeter speaker cover (A). (Refer to the Front Door in BD Group)



SBLBE6451D

3. Disconnect the door mirror connector (A).



SBLBE6452D

4. Loosen the 3 bolts then remove the door mirror.

⚠CAUTION
Turn signal lamp of door mirror is used LED (Light-emitting Diode).

INSTALLATION

REAR LAMP

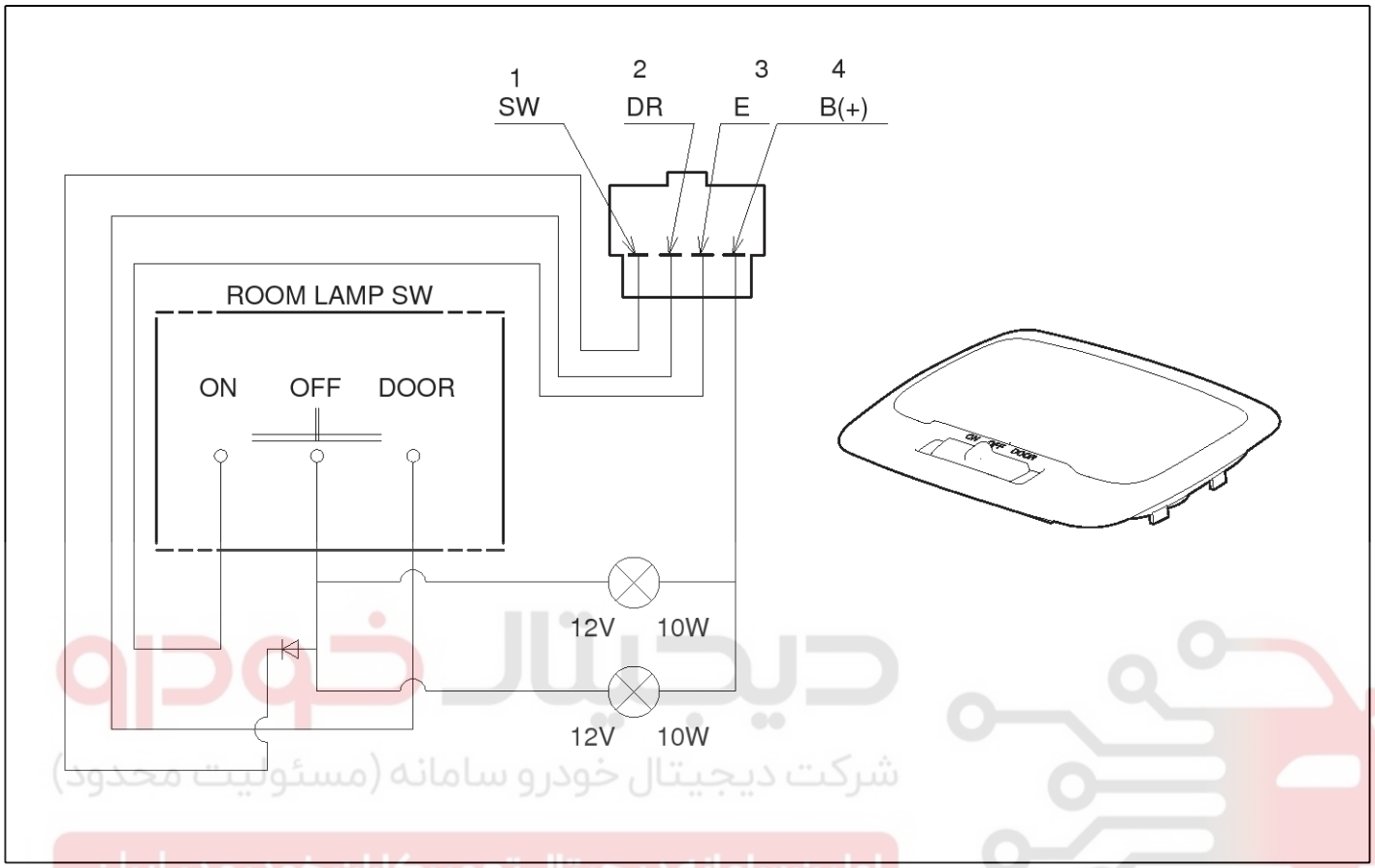
1. Connect the bulbs to the rear combination lamp assembly.
2. Connect the rear combination lamp connector.
3. Reassemble the rear combination lamp assembly.

TURN SIGNAL LAMP(DOOR MIRROR)

1. Reassemble the door mirror to the door.
2. Connect the door mirror connector.
3. Reassemble the tweeter speaker.

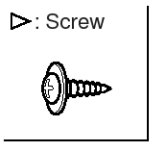
Room Lamp

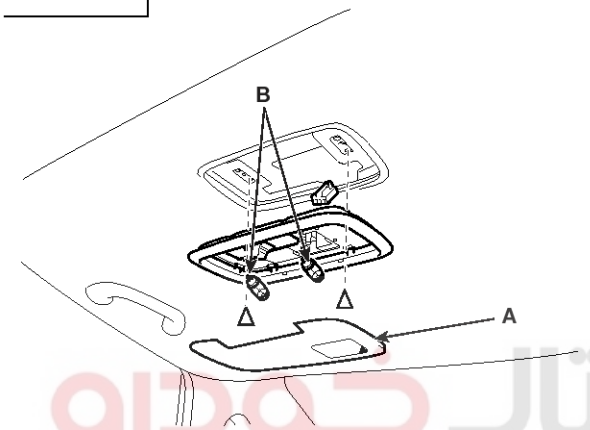
CIRCUIT DIAGRAM



REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Detach the lamp lens (A) from the room lamp with a flat-tip screwdriver then remove the bulb (B).
3. Loosen the fixing screw (2EA) and disconnect the 4P connector. And then remove the room lamp assembly.





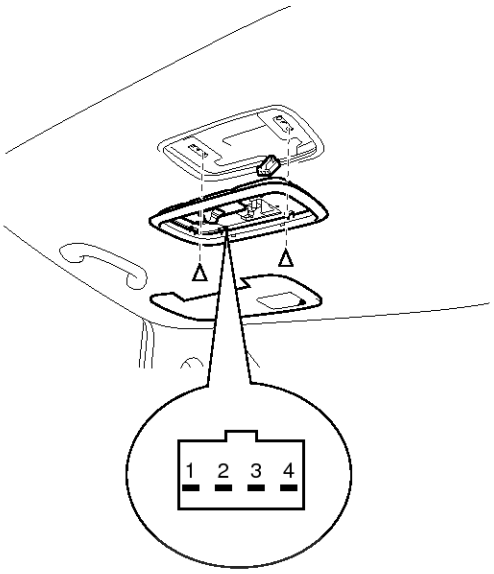
SBLBE6765L

INSTALLATION

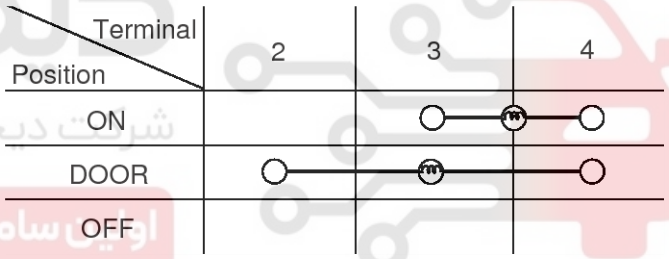
1. Install the room lamp assembly after connecting the lamp connector.
2. Install the lamp lens after assembling the bulb.

INSPECTION

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



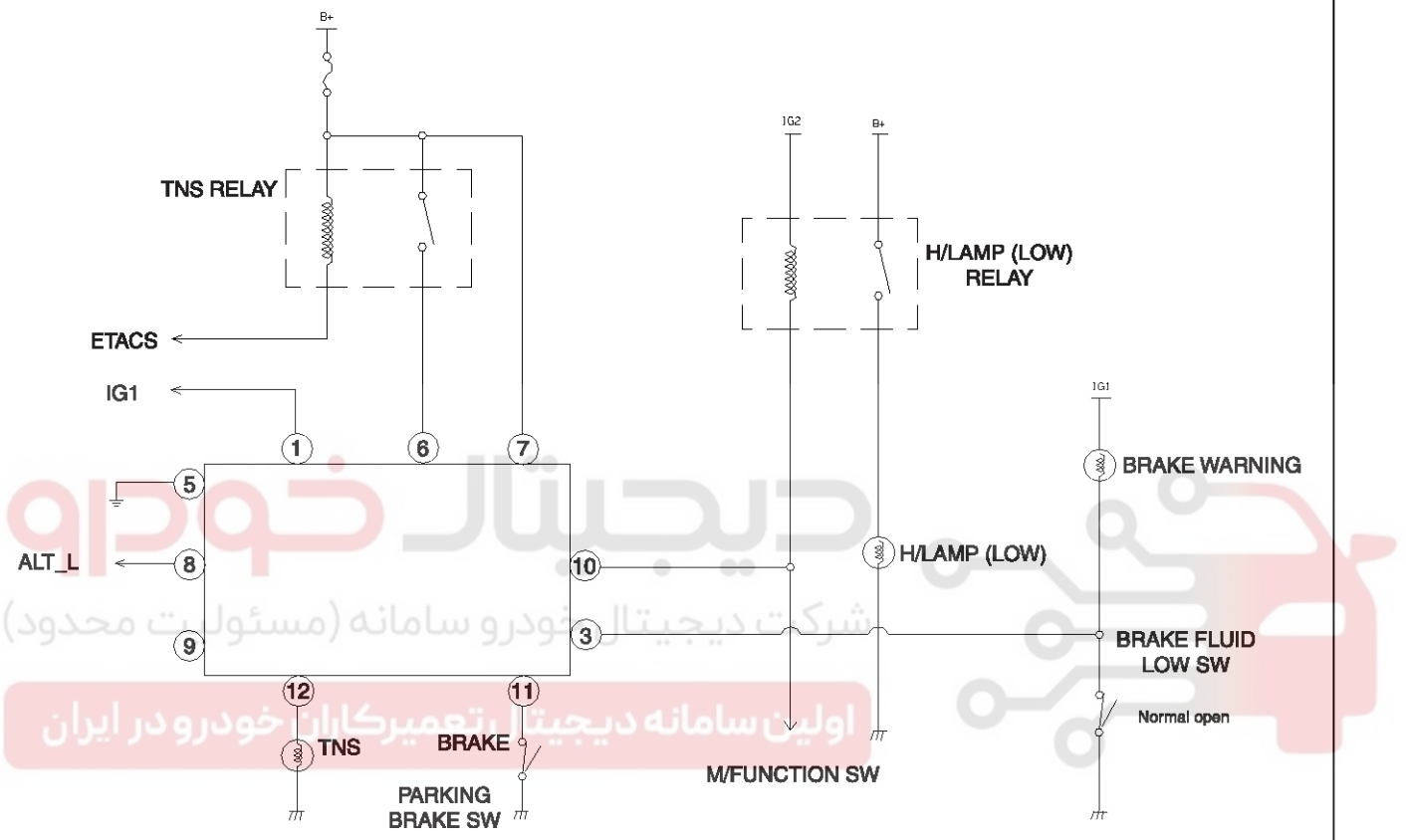
SBLBE7381D

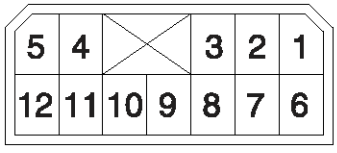


SBLBE6766L

Daytime Running Lights

CIRCUIT DIAGRAM

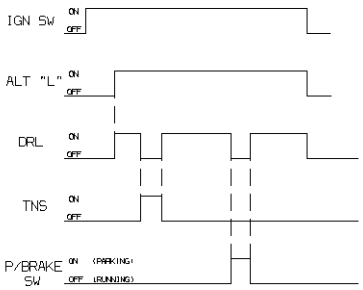




LTAC050A

INSPECTION

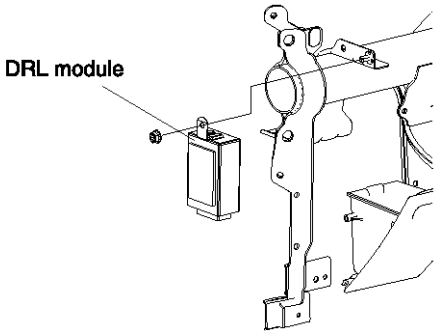
OPERATION CHECK



LTAC051A

REMOVAL AND INSTALLATION

1. Remove the driver side lower crash pad panel and disconnect the wire connector to DRL module.

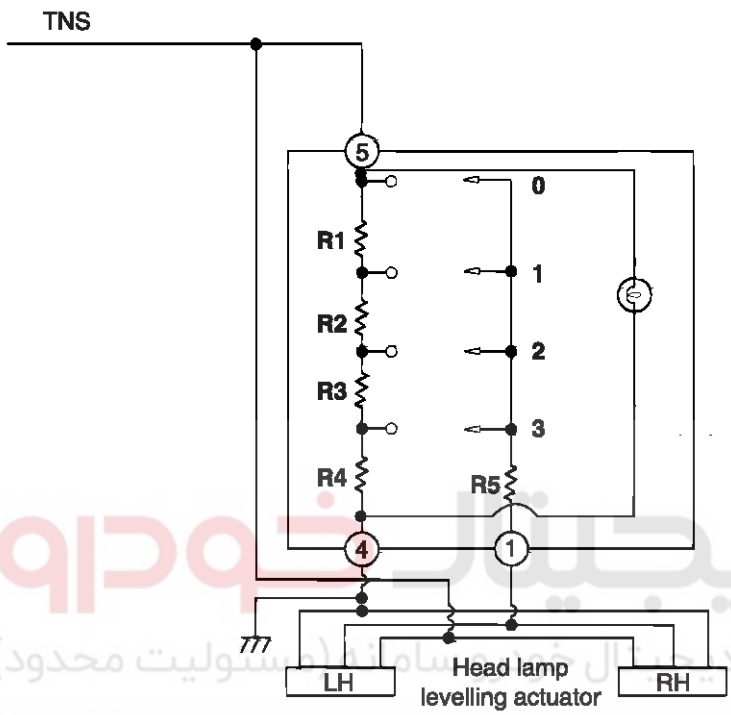


LTAC052A

Head lamp leveling Device

HEAD LAMP LEVELLING SWITCH

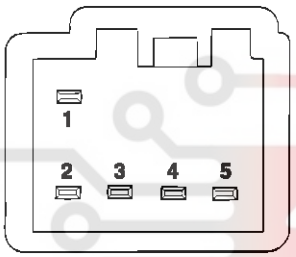
CIRCUIT DIAGRAM



PIN CONNECTION

PIN NO	Description
1	Actuator(+)
2	-
3	-
4	Ground
5	TNS

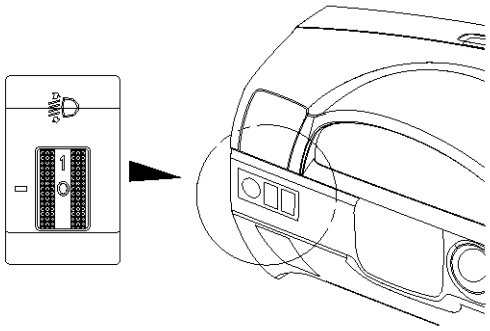
[I09]



LTAC053A

INSPECTION

1. Disconnect the switch from harness side, lower panel.



LTAC054A

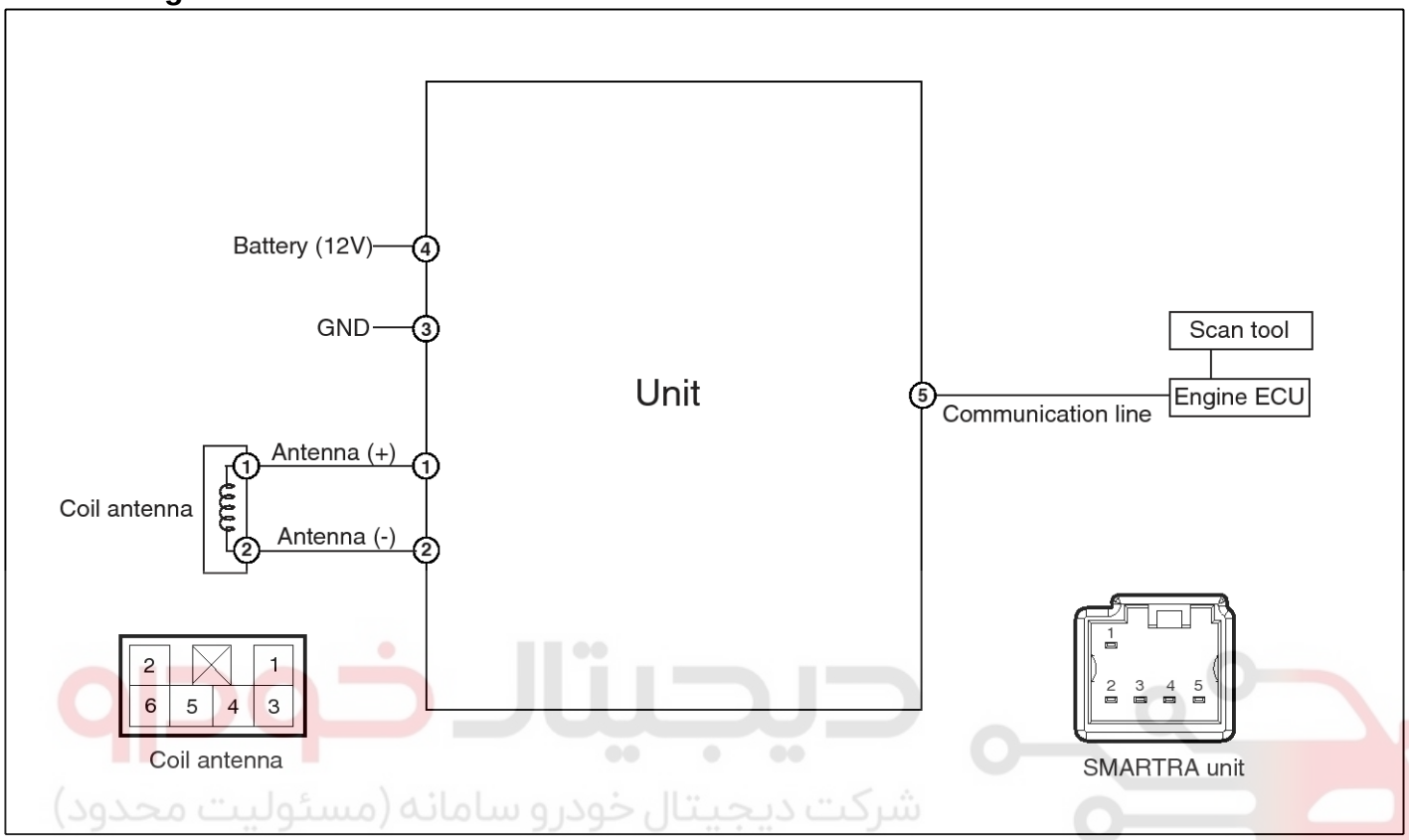
2. Measure the voltage between terminals 1 and 4 (V).

Position No.	Rotation	Ratio (±5%)	Voltage (V)
0	0°	99.52%	11.94 ± 0.5V
1	20°	82.67%	9.92 ± 0.5V
2	40°	68.58%	8.23 ± 0.5V
3	60°	58.33%	7.00 ± 0.5V

3. If the voltage is not as specified, replace the head lamp levelling switch.

Immobilizer System

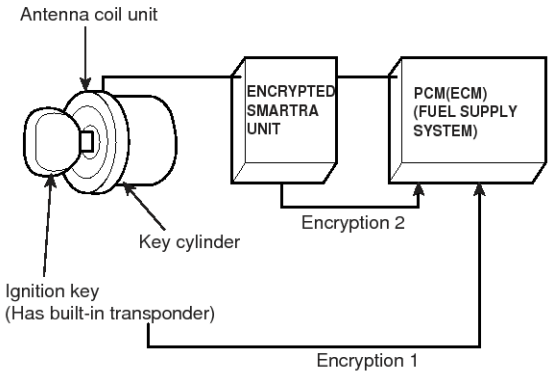
Circuit Diagram



Description

The immobilizer system will disable the vehicle unless the proper ignition key is used, in addition to the currently available anti-theft systems such as car alarms, the immobilizer system aims to drastically reduce the rate of auto theft.

1. Encrypted SMARTRA type immobilizer
   - The SMARTRA system consists of a passivie challenge - response (mutual authentication)transponder located in the ignition key, an antenna coil, a encoded SMARTRA unit, an indicator light and the PCM(ECM).
   - The SMARTRA communicates to the PCM(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.
   - When the key is inserted in the ignition and turned to the ON position, the antenna coil sends power to the transponder in the ignition key. The transponder then sends a coded signal back through the SMARTRA unit to the PCM(ECM).
   - If the proper key has been used, the PCM(ECM) will energize the fuel supply system. The immobilizer indicator light in the cluster will simultaneously come on for more than five seconds, indicating that the SMARTRA unit 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 PCM(ECM) the indicator light will continue blinking for about five seconds until the ignition switch is turned OFF.
   - If it is necessary to rewrite the PCM(ECM) to learn a new key, the dealer needs the customer's vehicle, all its 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.
   - The immobilizer system can store up to eight key codes.
   - If the customer has lost his key, and cannot start the engine, contact Hyundai motor service station.



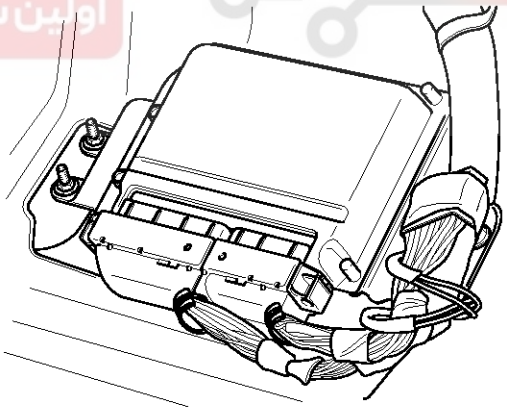
SFDBE8404L

Components Operations

PCM (Power Train Control Module)

1. The PCM(ECM) (A) carries out a check of the ignition key using a special encryption algorithm, which is programmed into the transponder as well as the PCM(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 PCM(ECM).

   ERN (Encrypted Randorn Number) value between EMS and encrypted smartra unit is checked and the validity of coded key is decided by EMS.



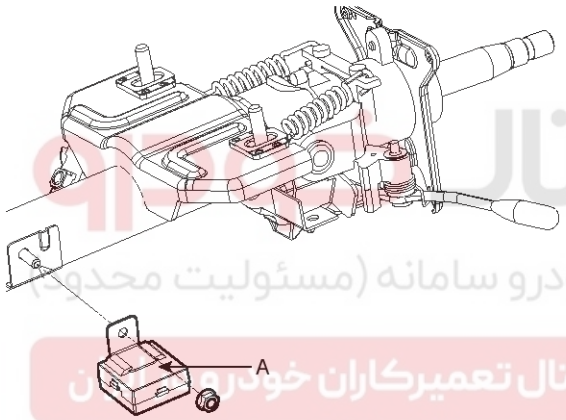
ATAF741C

Encrypted SMARTRA unit (A)

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 behind of the crash pad close to center cross bar.

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 PCM(ECM) are converted into an RF signal, which is transmitted to the transponder by the antenna.

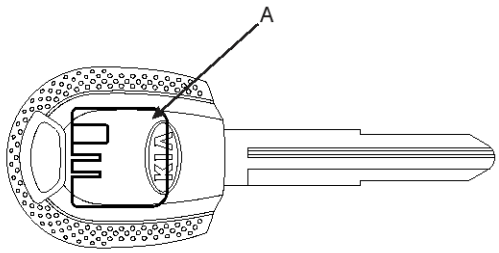
The SMARTRA does not carry out the validity check of the transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to the PCM(ECM) and vice versa.



SBLBE8102L

Transponder (Built-in keys)

The transponder (A) 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.



SBLBE8103L

Antenna coil

The antenna coil has the following functions.

- The antenna coil supplies energy to the transponder.
- The antenna coil receives signal from the transponder.
- The antenna coil sends transponder signal to the SMARTRA.

It is located directly in front of the steering handle lock.

TEACHING PROCEDURES

1. Key Teaching Procedure

Key teaching must be done after replacing a defective PCM(ECM) or when providing additional keys to the vehicle owner.

The procedure starts with an PCM(ECM) request for vehicle specific data (PIN code: 6digits) from the tester. The "virgin" PCM(ECM) stores the vehicle specific data and the key teaching can be started. The "learnt" PCM(ECM) compares the vehicle specific data from the tester with the stored data. If the data are correct, the teaching can proceed.

If incorrect vehicle specific data have been sent to the PCM(ECM) three times, the PCM(ECM) will reject the request of key teaching for one hour. This time cannot be reduced by disconnecting the battery or any other manipulation. After reconnecting the battery, the timer starts again for one hour.

The key teaching is done by ignition on with the key and additional tester commands. The PCM(ECM) stores the relevant data in the EEPROM and in the transponder. Then the PCM(ECM) runs the authentication required for confirmation of the teaching process. The successful programming is then confirmed by a message to the tester.

If the key is already known to the PCM(ECM) from a previous teaching, the authentication will be accepted and the EEPROM data are updated. There is no changed transponder content (this is impossible for a learnt transponder).

The attempt to repeatedly teach a key, which has been taught already during the same teaching cycle, is recognized by the PCM(ECM). This rejects the key and a message is sent to the tester.

The PCM(ECM) rejects invalid keys, which are presented for teaching. A message is sent to the tester. The key can be invalid due to faults in the transponder or other reasons, which result from unsuccessful programming of data. If the PCM(ECM) detects different authenticators of a transponder and an PCM(ECM), the key is considered to be invalid.

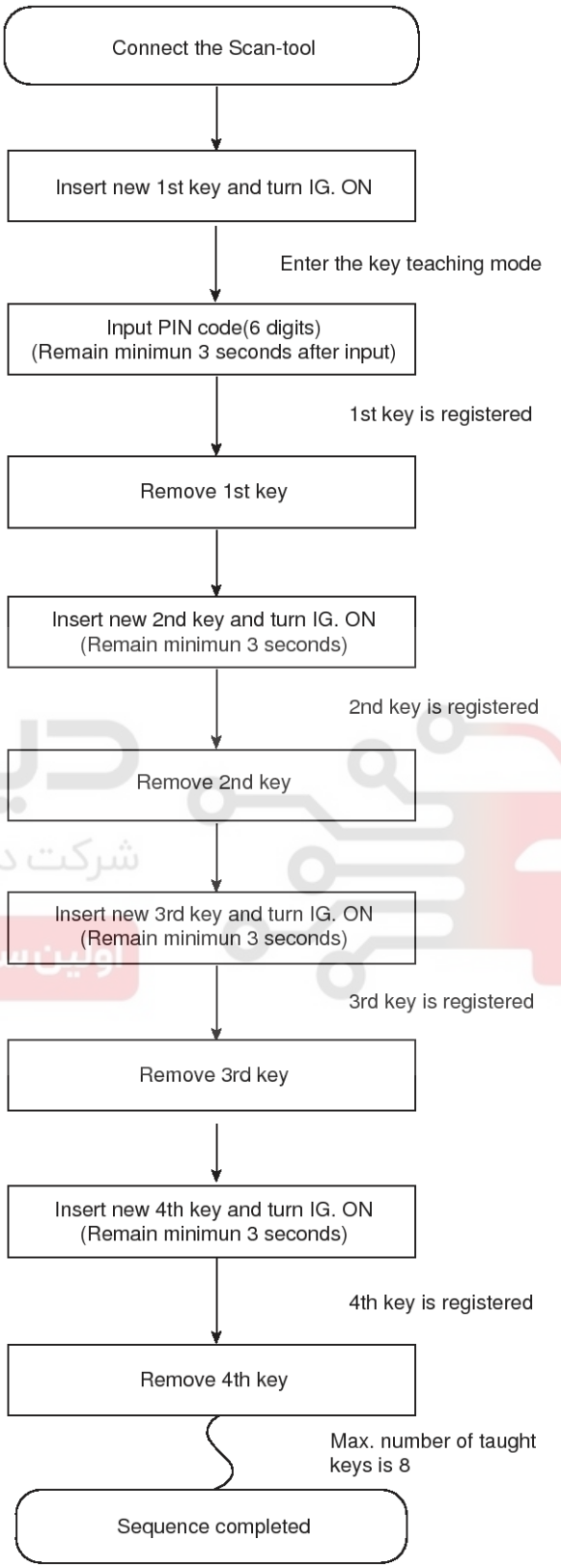
The maximum number of taught keys is 8

If an error occurs during the Immobilizer Service Menu, the PCM(ECM) status remains unchanged and a specific fault code is stored.

If the PCM(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 at PCM(ECM).

NOTICE

When teaching the 1st key, Smartra regists at the same time.



SFDBE8405L

1) PCM(ECM) learnt status.

1. KIA VEHICLE DIAGNOSIS ▼

MODEL : BL

03. AUTOMATIC TRANSAXLE
04. ABS/ESP
05. SRS-AIRBAG
06. FULL AUTO AIR/CON
07. ELEC. POWER STEERING
08. BODY CONTROL MODULE
09. CODE SAVING
10. IMMOBILIZER

SBLBE8070L

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMARTRA NEUTRAL

SBLBE8071L

1.3 TEACHING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT PIN OF SIX
FIGURE AND PRESS [ENTER] KEY

CODE : 234567

SBLBE8072L

1.3 TEACHING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

1st KEY TEACHING
ARE YOU SURE ? [Y/N]

CODE : 234567

SBLBE8073L

1.3 TEACHING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

1st KEY TEACHING
COMPLETED

CODE : 234567

SBLBE8074L

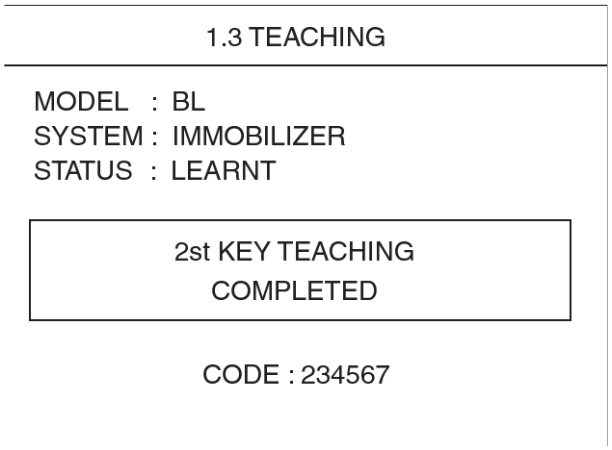
1.3 TEACHING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

2st KEY TEACHING
ARE YOU SURE ? [Y/N]

CODE : 234567

SBLBE8075L

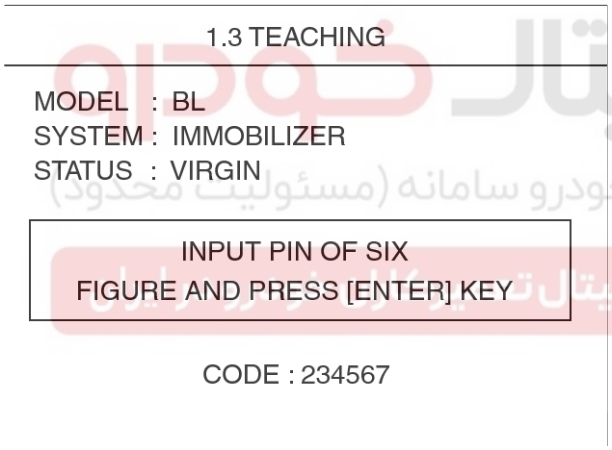


SBLBE8076L

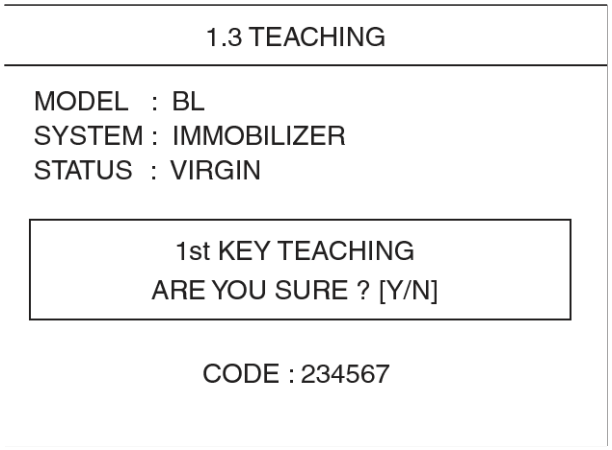
2) PCM(ECM) virgin status.

After replacing new "PCM(ECM)" scantool displays that PCM(ECM) is virgin status in Key Teaching mode.

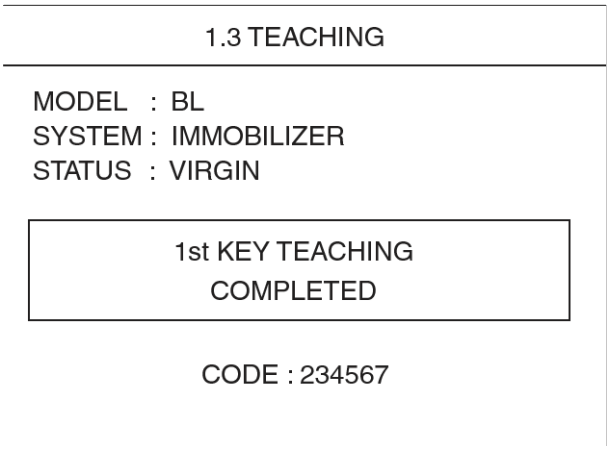
"VIRGIN" status means that PCM(ECM) has not matched any PIN code before.



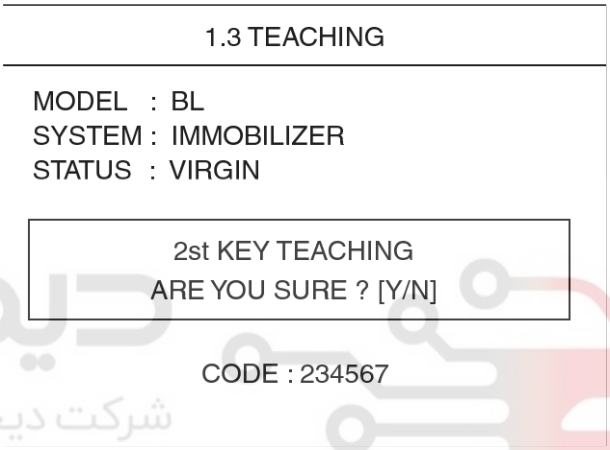
SBLBE8077L



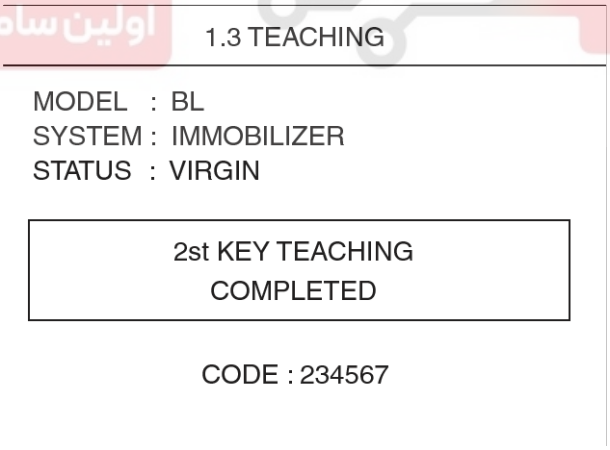
SBLBE8078L



SBLBE8079L



SBLBE8080L



SBLBE8081L

2. User Password Teaching Procedure

The user password for limp home is taught at the service station. The owner of the vehicle can select a number with four digits.

The user password teaching is only accepted by a "learnt" PCM(ECM). Before first teaching of user password to an PCM(ECM), the status of the password is "virgin" No limp home function is

possible.

The teaching is started by ignition on, with a valid key(learnt key) and sending the user password by tester. After successful teaching, the status of the user password changes from "virgin" to "learnt"

The learnt user password can also be changed. This can be done if the user password status is "learnt" and the tester sends authorization of access, either the old user password or the vehicle specific data. After correct authorization, the PCM(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 wrong user passwords or wrong vehicle specific data have been sent to the PCM(ECM) three times continuously or intermittently, the PCM(ECM) will reject the request to change the password for one hour. This time cannot be reduced by disconnecting the battery or any other actions. After reconnecting the battery, the timer starts again for one hour.

1) User password teaching

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMARTRA NEUTRAL

SBLBE8082L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

INPUT NEW PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY

NEW PASSWORD :

SBLBE8083L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

INPUT NEW PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY

NEW PASSWORD : 2345

SBLBE8084L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

ARE YOU SURE ? [Y/N]

NEW PASSWORD : 2345

SBLBE8085L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

COMPLETED
PRESS [ESC] TO EXIT

NEW PASSWORD : 2345

SBLBE8086L

※ In case of putting wrong password, retry from first step after 10 seconds.

2) User password changing

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMARTRA NEUTRAL

SBLBE8082L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT OLD PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY

OLD PASSWORD :

SBLBE8087L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT OLD PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY

OLD PASSWORD : 2345

SBLBE8088L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT NEW PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY

NEW PASSWORD : 1234

SBLBE8089L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

ARE YOU SURE ? [Y/N]

NEW PASSWORD : 1234

SBLBE8090L

1.2 PASSWORD TEACHING/CHANGING

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

COMPLETED
PRESS [ESC] TO EXIT

NEW PASSWORD : 1234

SBLBE8091L

Replacement

Problems And Replacement Parts:

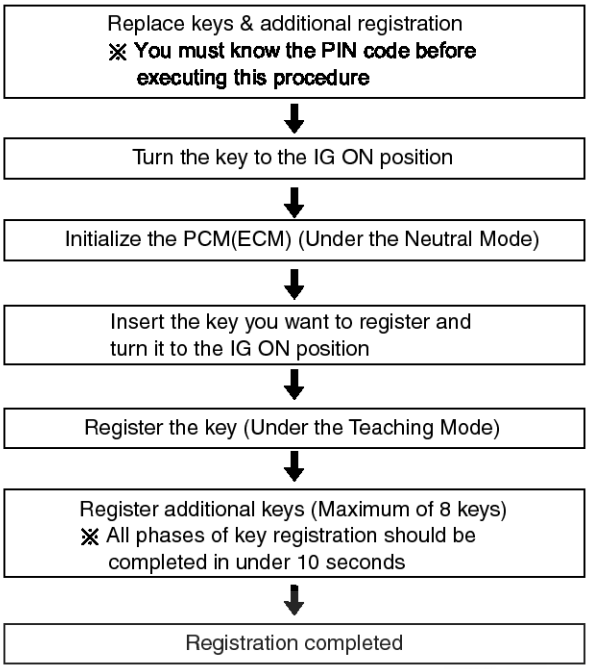
Problem	Part set	Scan tool required?
All keys have been lost	Blank key (4)	YES
Antenna coil unit does not work	Antenna coil unit	NO
ECM does not work	PCM(ECM)	YES
Ignition switch does not work	Ignition switch with Antenna coil unit	YES
Unidentified vehicle specific data occurs	Key, PCM(ECM)	YES
SMARTRA unit does not work	SMARTRA unit	YES

Replacement Of Ecm And Smartra

In case of a defective ECM, the unit has to be replaced with a "virgin" or "neutral" ECM. All keys have to be taught to the new ECM. Keys, which are not taught to the ECM, are invalid for the new ECM (Refer to key teaching procedure). The vehicle specific data have to be left unchanged due to the unique programming of transponder.

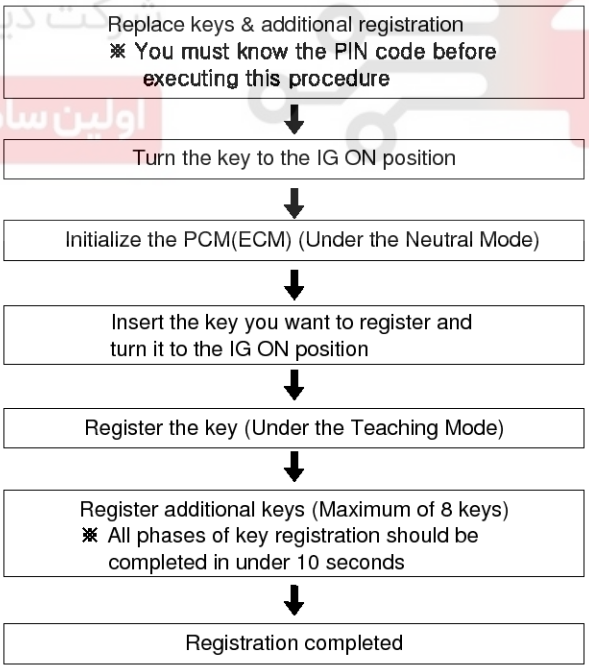
In case of a defective SMARTRA, it needs teaching the smartra. A new SMARTRA device replaces the old one and smartra need teaching.

1. Things to remember before a replacement (PCM(ECM))



SEDBE7592L

2. Things to remember before a replacement (Keys & Additional registration)



SFDBE8406L

NOTICE

1. *When there is only one key registered and you wish to register another key, you need to re-register the key which was already registered.*

2. *When the key #1 is registered and master key #2 is not registered, Put the key #1 in the IG/ON or the start position and remove it. The engine can be started with the unregistered key #2.*

   (Note that key #2 must be used within 10 seconds of removing key #1)

3. *When the key #1 is registered and key #2 is not registered, put the unregistered master key #2 in the IG/ON or the start position.*

   The engine cannot be started even with the registered key #1.

4. *When you inspect the immobilizer system, refer to the above paragraphs 1, 2 and 3.*

   Always remember the 10 seconds zone.

5. *If the pin code & password are entered incorrectly on three consecutive inputs, the system will be locked for one hour.*

6. *Be cautious not to overlap the transponder areas.*

7. *Problems can occur at key registration or vehicle starting if the transponders should overlap.*

NEUTRALISING OF ECM

The PCM(ECM) can be set to the "neutral" status by a tester.

A valid ignition key is inserted and after ignition on is recorded, the PCM(ECM) requests the vehicle specific data from the tester. The communication messages are described at "Neutral Mode" After successfully receiving the data, the PCM(ECM) is neutralized.

The ECM remains locked. Neither the limp home mode nor the "twice ignition on" function, is accepted by the PCM(ECM).

The teaching of keys follows the procedure described for the virgin PCM(ECM). The vehicle specific data have to be unchanged due to the unique programming of the transponder. If data should be changed, new keys with a virgin transponder are requested.

This function is for neutralizing the PCM(ECM) and Key. Ex) when lost key, Neutralize the PCM(ECM) then teach keys.

(Refer to the Things to do when Key & PIN Code the PCM(ECM) can be set to the "neutral" status by a scanner.If wrong vehicle specific data have been sent to SMATRA three times continuously or intermittently, the SMATRA will reject the request to enter neutral mode for one hour. Disconnecting the battery or other manipulation cannot reduce this time. After connecting the battery the timer starts again for one hour.

NOTICE

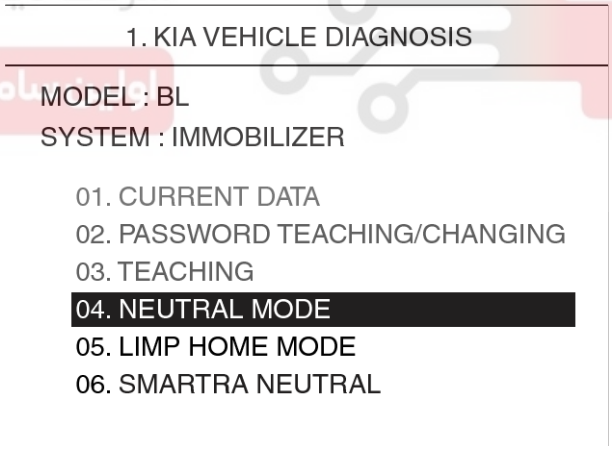
- *Neutralizing setting condition*
  - *In case of PCM(ECM) status "Learnt" regardless of user password "Virgin or Learnt"*
  - *Input correct PIN code by scanner.*
  - *Neutralizing meaning .*

    : PIN code (6) & user password (4) deletion.

    : Locking of ECM (except key teaching permission)
- *Neutralizing meaning:*
  - *PIN Code(6) & User P/Word(4) deletion*
  - *Locking of EMS(except Key Learning permission)*

Function / EMS	Engine Running			Learning	
	Learnt Key	Limp home	Twice Ignition	Key	User Password
Neutral	No	No	No	Yes	No

SFDBE8407L



SBLBE8092L

1.4 EMS NEUTRAL

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT PIN OF SIX
FIGURE AND PRESS [ENTER] KEY

CODE : 234567

SBLBE8093L

1.4 EMS NEUTRAL

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : NEUTRAL

COMPLETED
PRESS [ESC] TO EXIT

SBLBE8094L

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMARTRA NEUTRAL

SBLBE8095L

1.1 CURRENT DATA

01. NO. OF LEARNT KEY	0
02. ECU STATUS	NEUTRAL
03. KEY STATUS	NOT CHECK

FIX | SCRN | FULL | PART | GRPH | HELP

SEDBE7577L

NEUTRALISING OF SMARTRA

The EMS can be set to the status "neutral" by tester

Ignition key (regardlss of key status) is inserted and after IGN ON.If receiving the correct vehicle password from GST, SMARTRA can be neutralized.The neutralization of SMARTRA is possible if DPN is same as the value inputted by GST.

In case that the SMARTRA status is neutral, the EMS keeps the lock state. And the start is not possible by "twice ignition".

In case of chaging the vehicle password, new virgin transponder must be only used. And in case of virgin key, after Learning the key of vehicle password, it can be used.

If wrong vehicle specific data have been sent to SMATRA three times continuously or intermittently, the SMATRA will reject the request to enter neutral mode for one hour. Disconnecting the battery or other manipulation cannot reduce this time. After connecting the battery the timer starts again for one hour.

NOTICE

- *Neutralizing Setting condition :*
  - *In case of "SMARTRA status", "Learnt"*
  - *Input correct Pin code by tester*
- *Neutralizing meaning :*
  - *Vehicle password(DPN Code) & SEK Code deletion.*
  - *Permission of New DPN Learning.*

Function / SMARTRA	Engine Running			Learning	
	Learnt Key	Limp home	Twice Ignition	Key	User Password
Neutral	No	Yes (EMS learnt)	No	Yes	No

SFDBE8408L

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMARTRA NEUTRAL

SBLBE8096L

1.6 SMARTRA3 NEUTRAL

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : LEARNT

INPUT PIN OF SIX
FIGURE AND PRESS [ENTER] KEY

CODE : 234567

SBLBE8097L

1.6 SMARTRA3 NEUTRAL

MODEL : BL
SYSTEM : IMMOBILIZER
STATUS : NEUTRAL

COMPLETED
PRESS [ESC] TO EXIT

SBLBE8098L

1.1 CURRENT DATA

01. NO. OF LEARNT KEY 0
02. EMS STATUS
03. KEY STATUS VIRGIN
04. SMARTRA3 STATRS

FIX | SCRN | FULL | PART | GRPH | HELP

SFDBE8412L

LIMP HOME FUNCTION

1. LIMP HOME BY TESTER

If the PCM(ECM) detects the fault of the SMARTRA or transponder, the PCM(ECM) will allow limp home function of the immobilizer. Limp home is only possible if the user password (4 digits) has been given to the PCM(ECM) before. This password can be selected by the vehicle owner and is programmed at the service station.

The user password can be sent to the PCM(ECM) via the special tester menu.

Only if the PCM(ECM) is in status "learnt" and the user password status is "learnt" and the user password is correct, the PCM(ECM) will be unlocked for a period of time (30 sec.). The engine can only be started during this time. After the time has elapsed, engine start is not possible.

If the wrong user password is sent, the PCM(ECM) will reject the request of limp home for one hour. Disconnecting the battery or any other action cannot reduce this time. After connecting the battery to the PCM(ECM), the timer starts again for one hour.

1. KIA VEHICLE DIAGNOSIS

MODEL : BL
SYSTEM : IMMOBILIZER

01. CURRENT DATA
02. PASSWORD TEACHING/CHANGING
03. TEACHING
04. NEUTRAL MODE
05. LIMP HOME MODE
06. SMATRA NEUTRAL

SBLBE8099L

1.5 LIMP HOME MODE

MODEL : FD
SYSTEM : IMMOBILIZER

INPUT PASSWORD OF FOUR
FIGURES AND PRESS [ENTER] KEY

PASSWORD :

SFDBE8247L

1.5 LIMP HOME MODE

MODEL : BL
SYSTEM : IMMOBILIZER

INPUT PASSWORD OF FOUR
FIGURES AND PRESS [ENTER] KEY

NEW PASSWORD : 2345

SBLBE8100L

1.5 LIMP HOME MODE

MODEL : BL
SYSTEM : IMMOBILIZER

COMPLETED
PRESS [ESC] TO EXIT

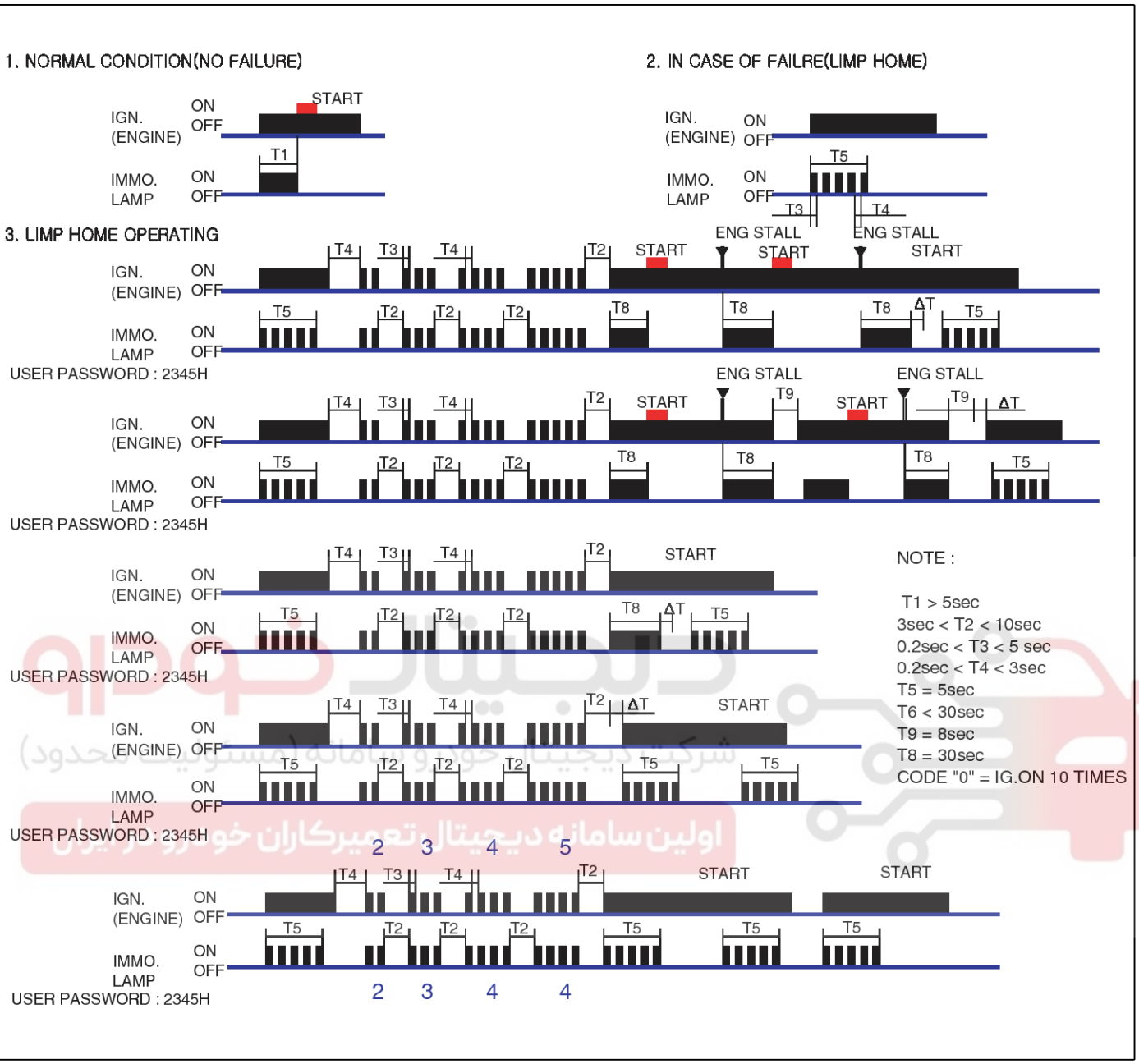
SBLBE8101L

2. LIMP HOME BY IGNITION KEY

The limp home can be activated also by the ignition key. The user password can be input to the PCM(ECM) by a special sequence of ignition on/off.

Only if the PCM(ECM) is in status "learnt" and the user password status is "learnt" and the user password is correct, the PCM(ECM) will be unlocked for a period of time (30 sec.). The engine can be started during this time. After the time has elapsed, engine start is not possible. After a new password has been input, the timer (30 sec.) will start again.

After ignition off, the PCM(ECM) is locked if the timer has elapsed 8 seconds. For the next start, the input of the user password is requested again.



LTIF740N

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.

The following table shows the assignment of immobilizer related faults to each type:

Immobilizer Related Faults	Fault types	Diagnostic codes
PCM(ECM) fault	1. Non-Immobilizer-EMS connected to an Immobilizer	P1610
Transponder key fault	1. Transponder not in password mode 2. Transponder transport data has been changed.	P1674 (Transponder status error)
Transponder key fault	1. Transponder programming error	P1675 (Transponder programming error)
SMARTRA fault	1. Invalid message from SMARTRA to PCM(ECM)	P1676 (SMARTRA message error)
SMARTRA fault	1. Virgin SMARTRA at learnt EMS 2. Neutral SMARTRA at learnt EMS 3. Incorect the Authentication of EMS and SMARTRA 4. Locking of SMARTRA	P169A (SMARTRA Authentication f-ail)
SMARTRA fault	1. No response from SMARTRA 2. Antenna coil error 3. Communication line error (Open/Short etc.) 4. Invalid message from SMARTRA to PCM(ECM)	P1690 (SMARTRA no response)
Antenna coil fault	1. Antenna coil open/short circuit	P1691 (Antenna coil error)
Immobilizer indicator lamp f-ault	1. Immobilizer indicator lamp error (Cluster)	P1692 (Immobilizer lamp error)
Transponder key fault	1. Corrupted data from transponder 2. More than one transponder in the magnetic field (Ante-nna coil) 3. No transponder (Key without transponder) in the magn-etic field (Antenna coil)	P1693 (Transponder no response error/invalid response)
PCM(ECM) fault	1. Request from PCM(ECM) is invalid (Protocol layer violation- Invalid request, check sum err-or etc.)	P1694 (PCM(ECM) message error)
PCM(ECM) internal perman-ent memory (EEPROM) fault	1. PCM(ECM) internal permanent memory (EEPROM) fa-ult 2. Invalid write operation to permanent memory (EEPROM)	P1695 (PCM(ECM) memory error)
Invalid key fault	1. Virgin transponder at PCM(ECM) status "Learnt"Learnt (Invalid) Transponder at PCM(ECM) status "Learnt"(Au-thentication fail)	P1696 (Authentication fail)
Hi-Scan fault	1. Hi-Scan message error	P1697
Locked by timer	1. Exceeding the maximum limit of Twice IGN ON (≧ 32 t-imes)	P1699 (Twice IG ON over trial)

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		

MONITOR DTC STATUS

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

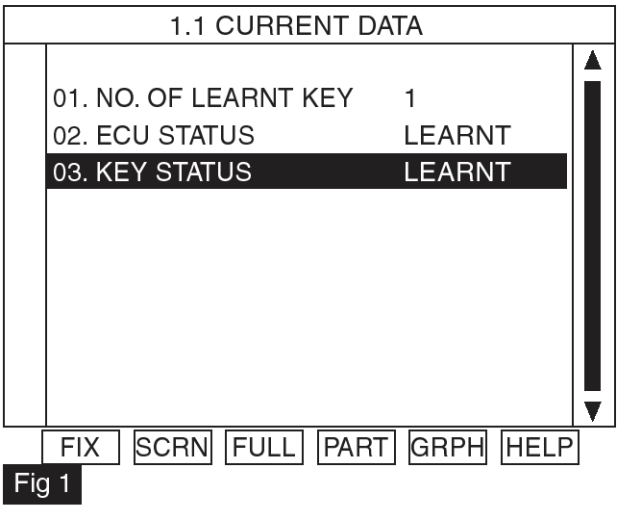


Fig 1

Fig 1) The current data in abnormal state

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

Specification : 'LEARNT'

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.

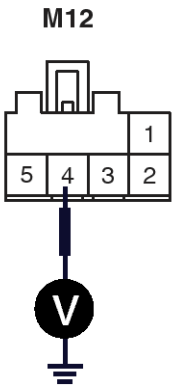
   Go to "W/Harness Inspection" procedure .

SCMBE6752L

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



1. Coil antenna
2. Coil antenna
3. Ground
4. Power
5. Signal

SBLBE6753L

5) Is the measured voltage within specifications?

Go to "Signal circuit Inspection" procedure

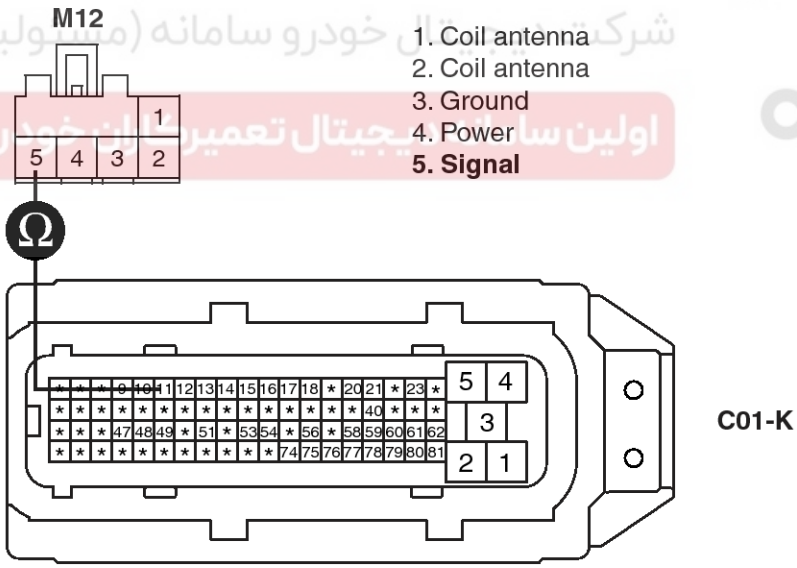
Check for open or short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

SIGNAL CIRCUIT INSPECTION

1. Check for open in harness
   1) Ignition "OFF"
   2) Disconnect SMARTRA.
   3) Measure resistance between terminal "5" of SMARTRA and terminal C01-K-11(WGT) or C02-K-47(VGT) or C144-A-45(GSL)

Specification : 1 Ω or less

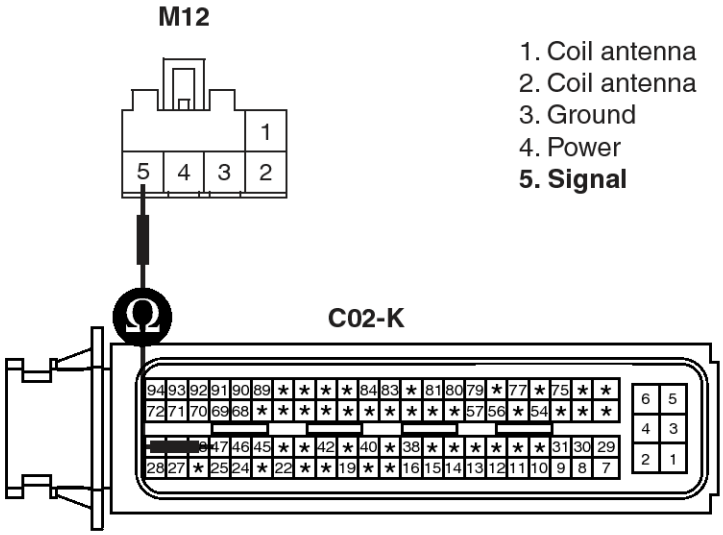
[WGT]



1. Coil antenna
2. Coil antenna
3. Ground
4. Power
5. Signal

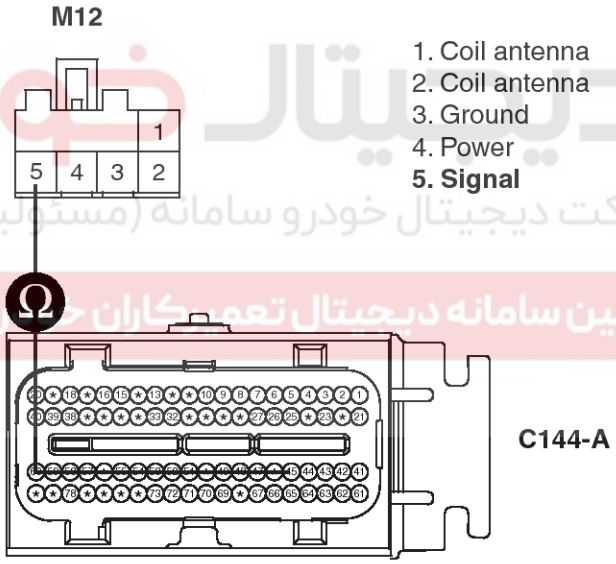
SBLBE6754L

[VGT]



SBLBE6755L

[GSL]



SBLBE6759L

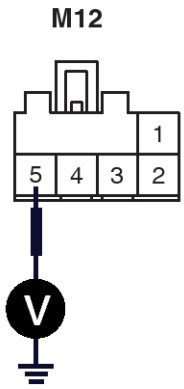
4) Is the measured resistance within specifications?

Go to "Check for short in harness" procedure.

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

2. Check for short in harness
   1) Ignition "OFF"
   2) Disconnect SMARTRA.
   3) Ignition "ON" & Engine "OFF"
   4) Measure voltage value between terminal "5" of SMARTRA and chassis ground.

Specification :Approx. 5.48V



1. Coil antenna
2. Coil antenna
3. Ground
4. Power
5. Signal

SBLBE6756L

5) Is the measured voltage within specifications?

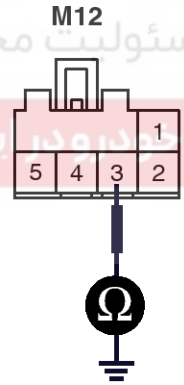
Go to "Signal circuit Inspection" procedure

Check for short in harness. Repair as necessary and go to "Verification of Vehicle Repair" 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
2. Coil antenna
3. Ground
4. Power
5. Signal

SBLBE6757L

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?

   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

GENERAL DESCRIPTION

When driver inserts key and IGN "ON", Immobilizer informs status of system and result of Authentication by blinking of immobilizer lamp on instrument cluster. through Authentication procedure immobilizer lamp keep lighting up till engine starts. In normal status. Immobilizer lamp lights up for 30sec Right after ignition "ON". If there's any fault in immobilizer system or in Authentication, lamp blinks 5 times after ignition "ON".

DTC DESCRIPTION

The ECM sets DTC P1692 if there's short circuit in immobilizer lamp circuit.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible Cause
DTC Strategy		• Short Circuit in immobilizer lamp circuit. • Open/Short in control harness • Faulty 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 B1692 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.

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

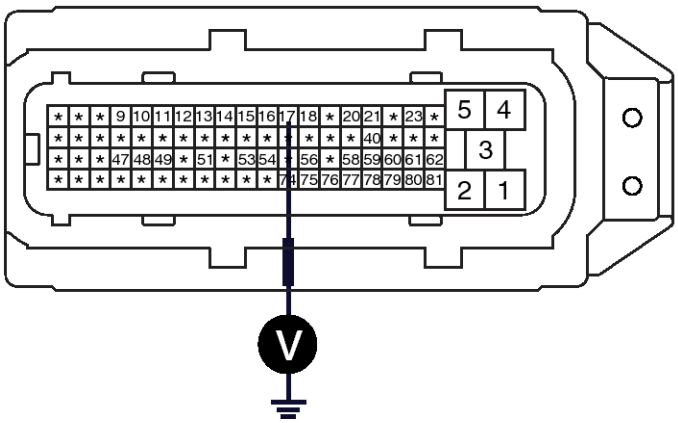
   Go to "W/Harness Inspection" procedure

CONTROL 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 C01-K-17(WGT) or C02-K-92(VGT) or C144-A-72(GSL) and chassis ground.

Specification : Approx. 11V

[WGT]

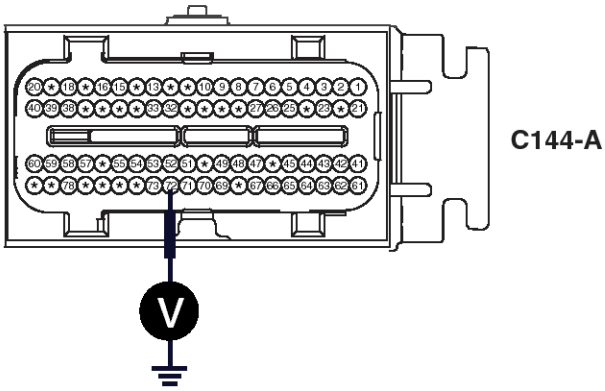


SBLBE6760L

[VGT]

SBLBE6761L

[GSL]



SBLBE6762L

5) Is the measured voltage within specifications?

Go to "Component Inspection" procedure

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

VISUAL / PHYSICAL INSPECTION

1. Check immobilizer lamp circuit.
   1) Ignition "ON" & Engine "OFF"
   2) Check if immobilizer lamp operates properly.

      NOTICE
      Right after ignition "ON", Immobilizer lamp lights up for 30sec.

      If lamp blinks 5 times after ignition "ON", there's any fault in immobilizer system.
   3) Is immobilizer lamp operates properly?

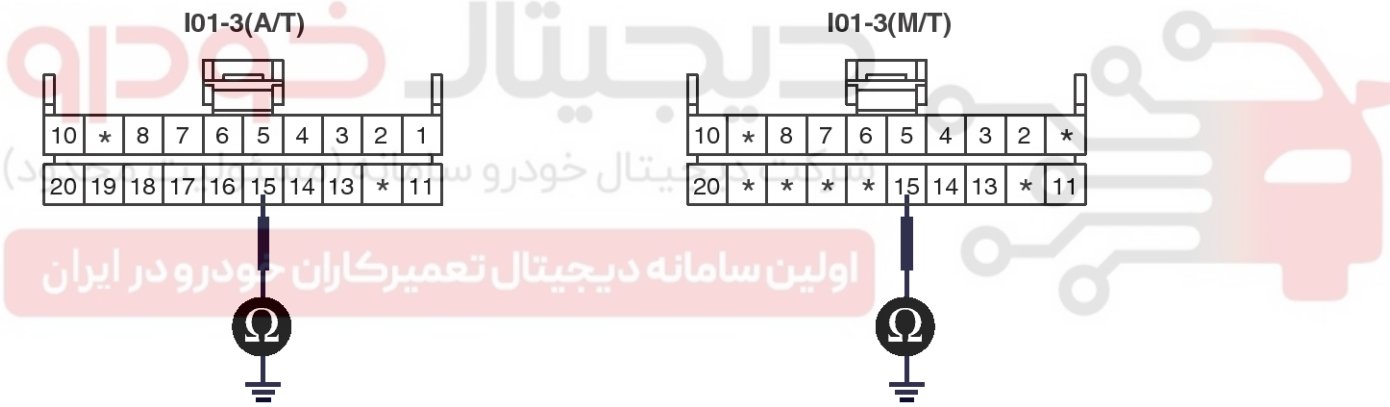
      Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

      Go to "Component Inspection" procedure

COMPONENT INSPECTION

1. Check immobilizer lamp.
   1) Ignition "OFF"
   2) Disconnect ECM.
   3) Ground terminal "15" of immobilizer lamp.
   4) Ignition "ON" and Monitor operation of immobilizer lamp.

Specification : Immobilizer lamp "ON"



SBLBE6763L

   5) Is the Immobilizer lamp "ON"?

      NOTICE
      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.

      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

      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.

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	
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'

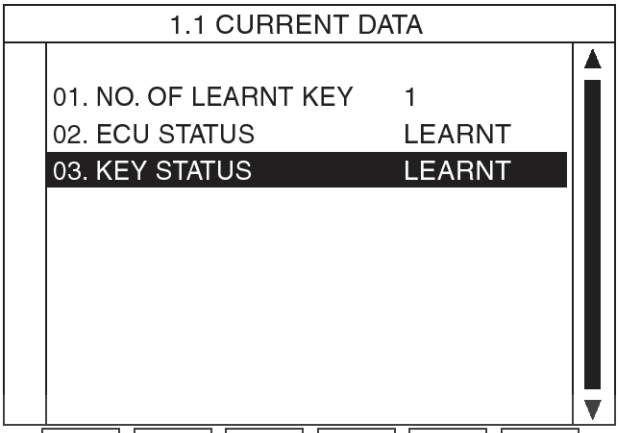


Fig 1

Fig 1) The current data in abnormal state

   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
      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.

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'

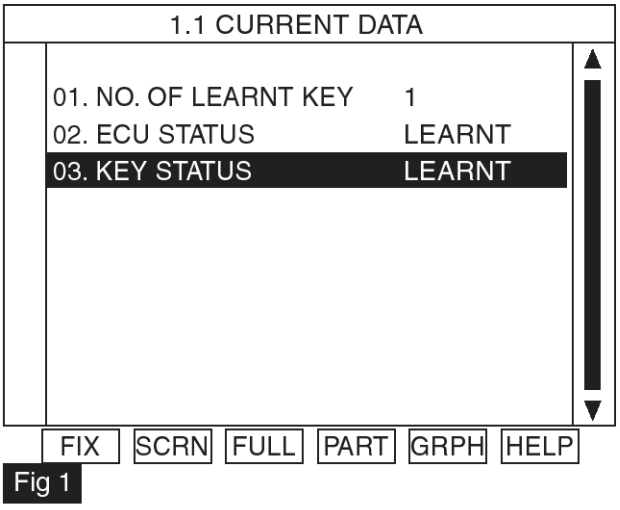


Fig 1

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
      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 ECM and check for proper operation.

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

      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.

GENERAL DESCRIPTION

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.

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.

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'

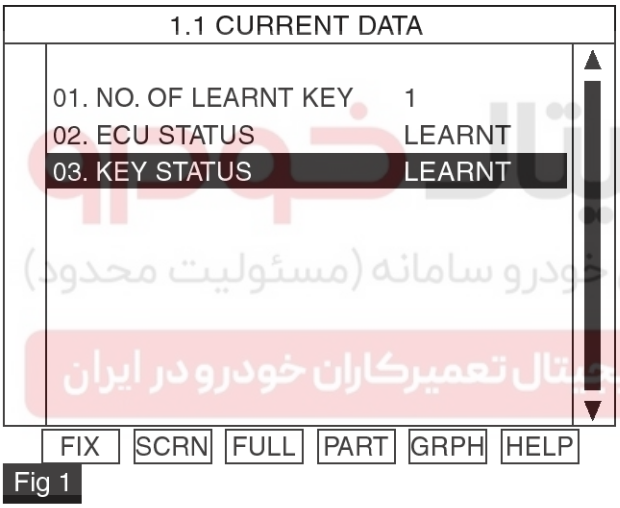


Fig 1

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.

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.

System is performing to specification at this time.

GENERAL DESCRIPTION

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	
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.

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.

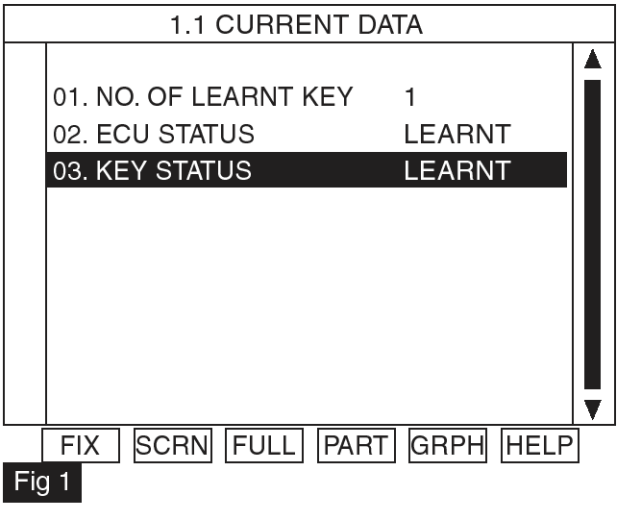


Fig 1

Fig 1) The current data in abnormal state

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

3. Are any DTCs present?

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.

Go to the applicable troubleshooting procedure.

System is performing to specification at this time.

A transponder is incorporated in the head section of the key. The antenna coil supplies energy to the transponder.

GENERAL DESCRIPTION

The transponder 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).

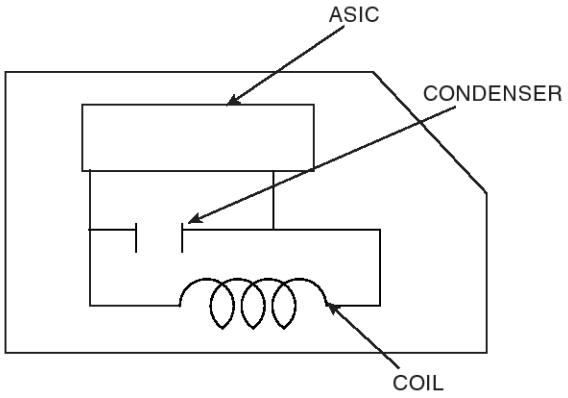
When Ignition is set 'ON' the ICM receives a request signal from the ECM and starts ID Code registering sequence.

If the ID code format from the transponder is not correct, the ICM repeatedly performs the registering sequence.

When the correct ID code format is registered, the code is verified by the ICM.

If the code is not verified, the registering sequence is repeated a maximum of 5 times which is equivalent to 1 second duration.

Once the correct ID code is registered and verified after Ignition is turned ON, the registering sequence is not reperformed until Ignition is turned OFF.



LTIF743K

DTC DESCRIPTION

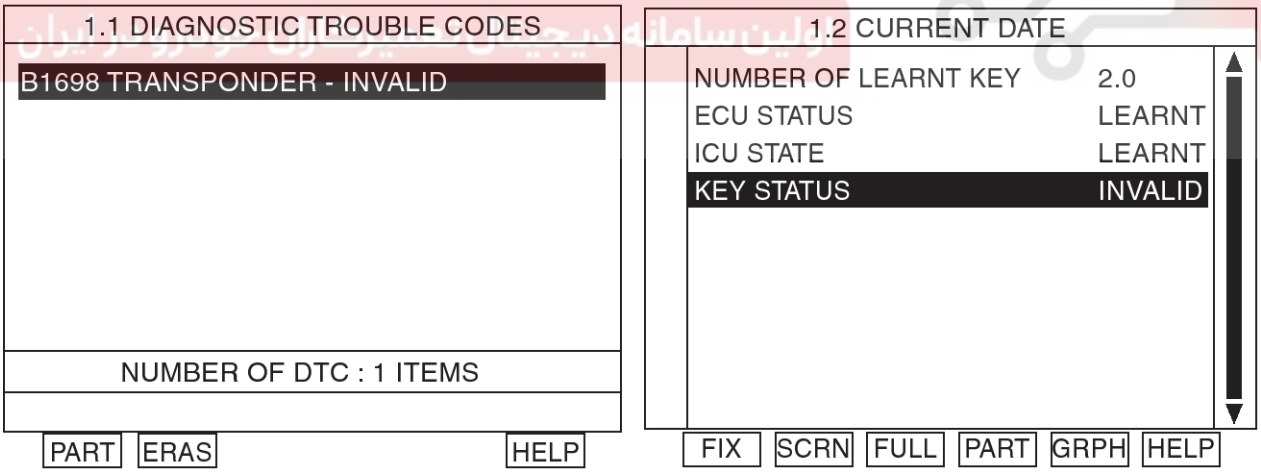
This DTC is defined as Invalid(virgin or invalid) Transponder Data.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause
Enable Condition	• IG ON	• Faulty TP(Virgin or Invalid)
Detecting factors	• Invalid TP	
Detecting Criteria	• Virgin TP at EMS STATUS "Learnt" • Learnt(Invalid) TP at EMS status "Learnt"(Authentication fail)	

MONITOR SCANTOOL DATA

1. Ignition "ON" & Engine "OFF"
2. After connecting Scantool, Monitor the DTCs and CURRENT DATA to check key status.



LTIF743G

3. Are DTSs and CURRENT DATA displayed as above? If key status is "invalid" is displayed, check transponder(key) and then go to "Verification of Vehicle Repair" procedure.

NOTICE

1. *Be sure that P1698 is displayed, when transponder(key) is unintentionally exchanged with another key.*
2. *Be sure that P 1698 is displayed, when using virgin transponder(key) with lernt ICU.*
3. *Be sure that P1698 is displayed by arbnormal stop when key theaching is performed by learnt key(with same PIN code)*

Fault is intermittent caused by poor contact in the ICU and/or the antenna coil connector or was repaired and ICU 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?

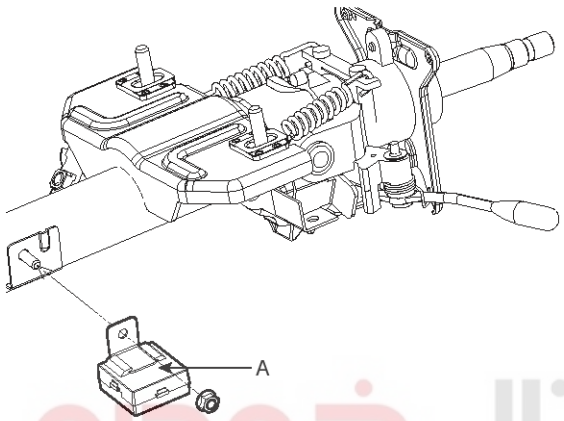
   Go to the applicable troubleshooting procedure.

   System is performing to specification at this time.

Immobilizer Control Unit

REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad. (Refer to the Body group - "Crash pad").
3. Disconnect the 5P connector of the SMARTRA unit and then remove the SMARTRA unit (A) after loosening a nut.



SBLBE8102L

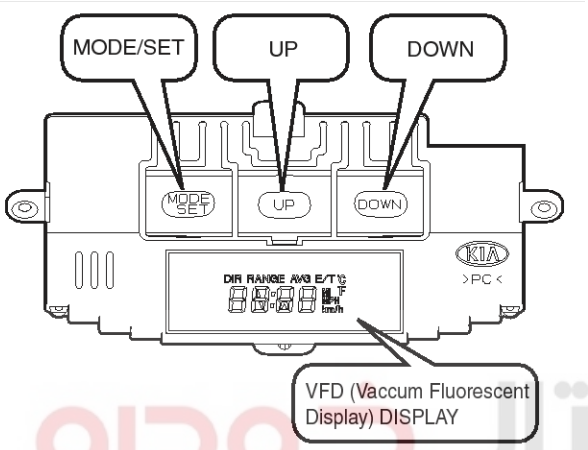
INSTALLATION

1. Install the immobilizer control unit after connecting the unit connector.
2. Install the crash pad.

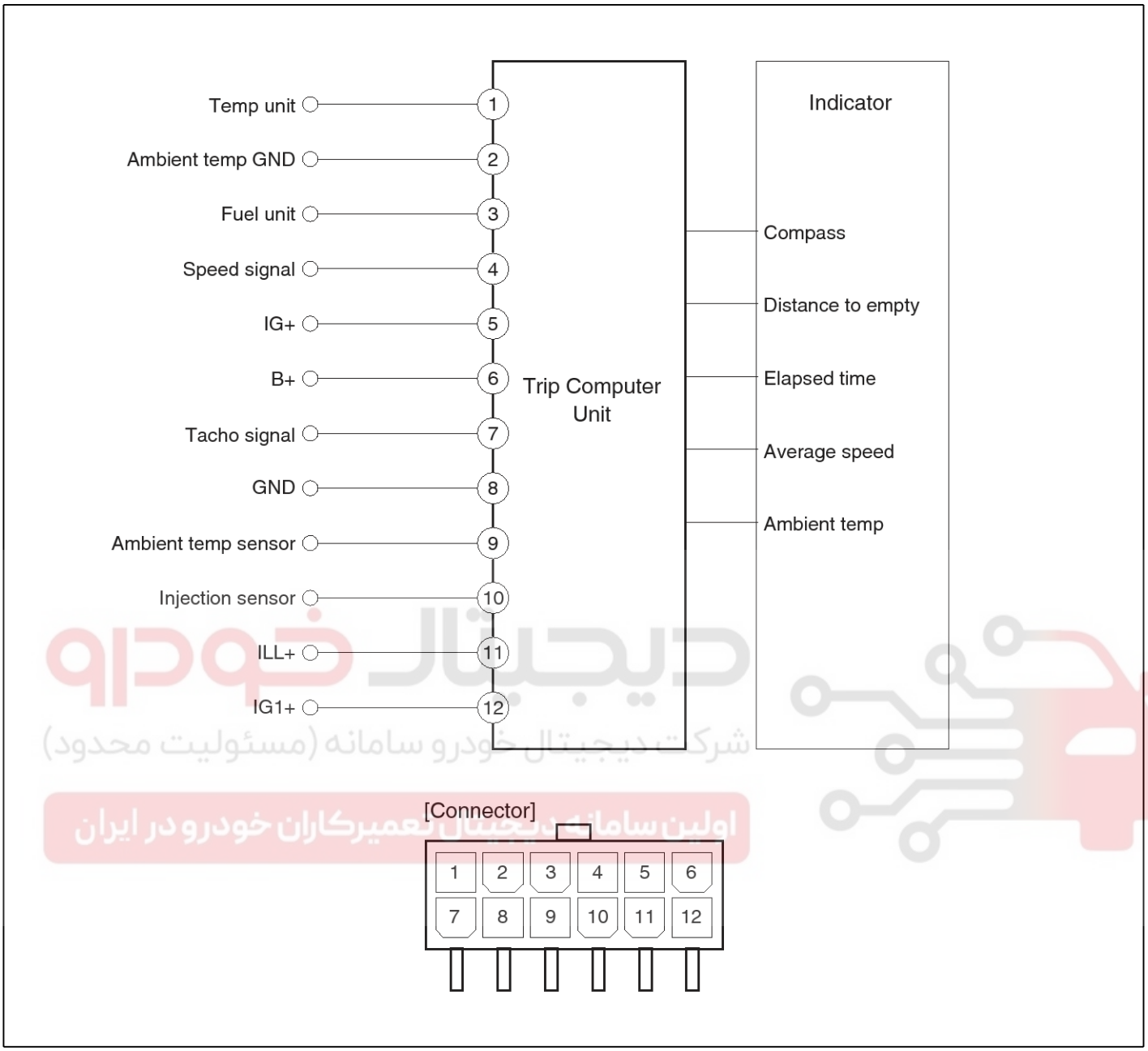
Trip Computer

DESCRIPTION

The trip computer displays information related to driving, including compass, distance to empty, elapsed time, average fuel consumption and outside temperature on the display. To change the function as described below, push the MODE/SET button lesser than 2 sec. Distance to empty → elapsed time → average fuel consumption → outside temperature → OFF.



SBLBE6460L



SBLBE6461L

OPERATION

SWITCH FUNCTION

Switch	Function	Remark
MODE / SET	Selection of modes	
	Correction of relative azimuth compass indicator	
	Correction of terrestrial deviation of azimuth compass	
	Clear the average vehicle speed or driving time to "0"	
UP / DOWN	Correction of the terrestrial deviation angle of azimuth compass	
	Conversion of the units (Distance to empty, Temperature, Average vehicle speed)	

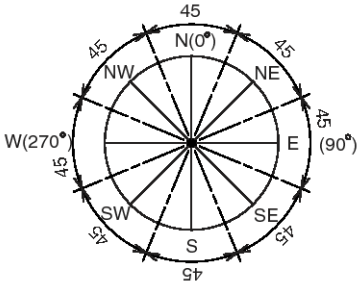
COMPASS

The vehicle compass displays the direction (8 directions) where the vehicle is heading. Compass is displayed when driving.

SBLBE6462D

[Compass display]

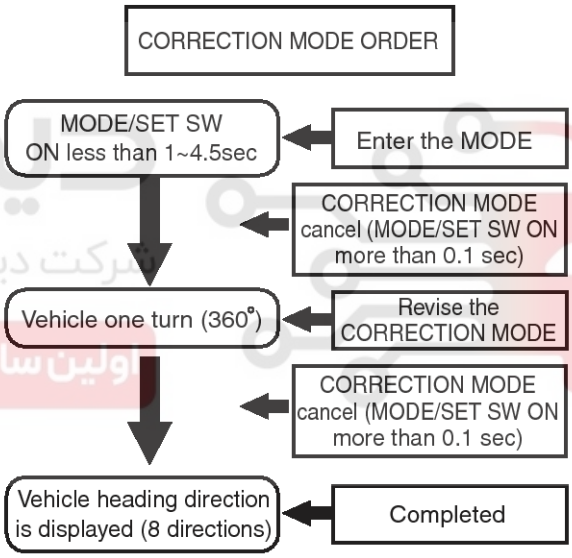
NO	Switch point	Heading(±22.5°)	2nd line	3rd line
1	N	0	N	
2	NE	45°	N	E
3	E	90°		E
4	SE	135°	S	E
5	S	180°	S	
6	SW	225°	S	W
7	W	270°		W
8	NW	315°	N	W



SBLBE6463L

1. CORRECTION MODE

1) If you push the MODE/SET switch and hold for more than 1 second and less than 4.5 seconds, the azimuth indicator (DIR) will start blinking with the vehicle's present direction.

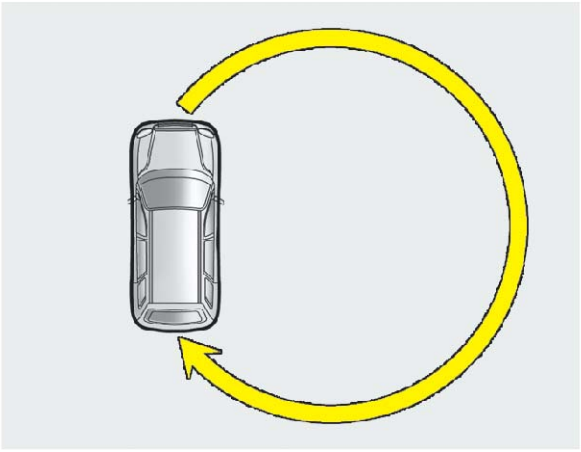


SBLBE6464L

2) Slowly (about 5km/h, 3mph) rotate the vehicle one turn(360 degree) within 128 seconds.

The rotation could be made at any direction(left or right) in an open space.

- The correction data is updated if the automatic correction data is better than the present correction data
- Turning direction is not important
- If the correction process is not finished after the vehicle turns 360°, turn the vehicle some more degree.



ETJF241D

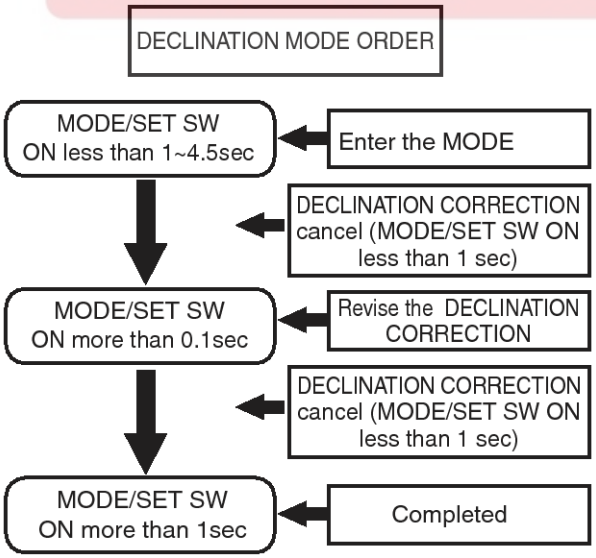
3) When the rotation is finished, the azimuth compass indicator (DIR) will stop blinking and the error correction is completed.

If the indicator continues to blink, rotate the vehicle a bit more until the blinking stops.

2. DECLINATION CORRECTION (VARIANT REGION CHANGE MODE)

Change the "Declination Setting Value" according to the regional declination to synchronize the true north and vehicle's north.

1) Push the mode button longer than 4.5 Sec to enter the declination correction mode. ('DIR' is blinking 4 times)

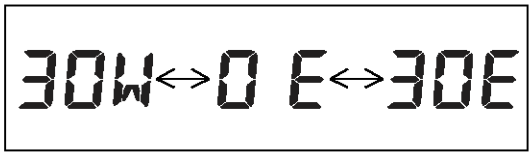


SBLBE6466L

- Screen after blinking 4 times.

SBLBE6467D

2) Push the UP or DOWN button longer than 0.1 Sec to change the declination setting Value (Steps by 5° to East or WEST ; After East 30, wraps to West 30)



SBLBE6468D

3) Cancellation conditions of Declination correction

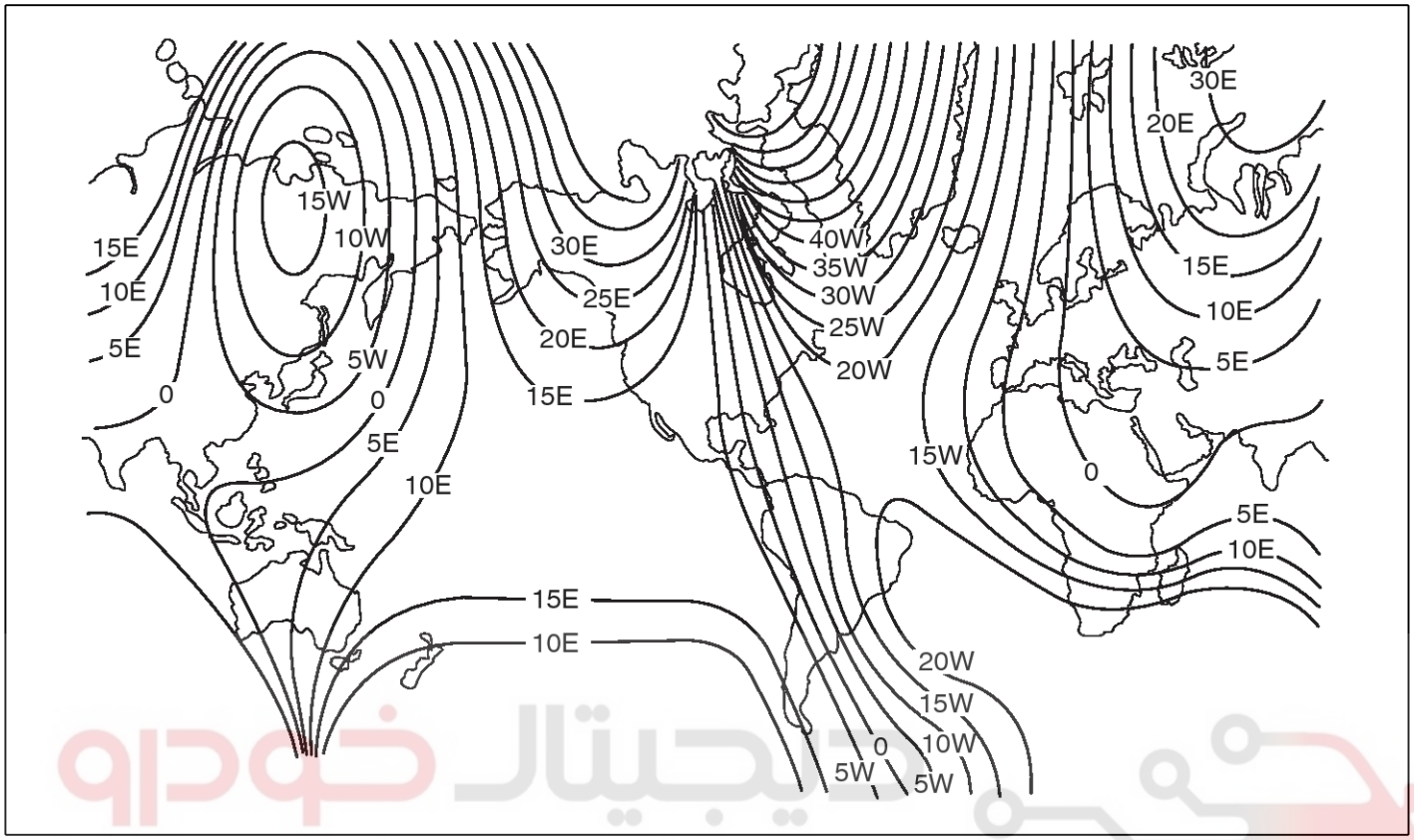
a. If you push the MODE/SET switch and hold for more than 0.1 and less than 45 seconds.

b. Without any effective input for 30 seconds.

⚠CAUTION

- **Do not install a ski rack, antenna, etc. that are attached to the vehicle using a magnet as anything attached to the roof of the vehicle with a magnet will effect compass operation.**
- **If the compass deviates from the correct indication soon after repeated adjustment, have the compass checked at an authorized dealer.**
- **The compass may not indicate the correct compass point in tunnels or while driving up or down a steep hill. (The compass returns to the correct compass point when the vehicle moves to an area where the geomagnetism is stabilized.)**
- **Declination correction and correction setting value is not deleted during the B(+) OFF.**

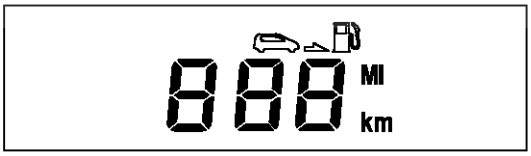
The Contour Line Map for Terrestrial Deviation Angle Correction



SBLBE6469D

Distance to Empty

This mode indicates the estimated distance to empty from the current fuel in the fuel tank.



SBLBE6470D

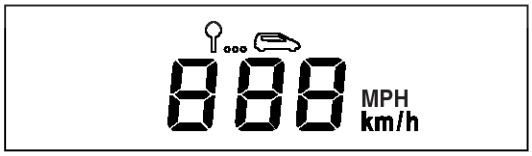
1. When the remaining distance is below 50 km (30 miles), a blinking "---" symbol will be displayed.
2. If you press the "DOWN" switch for more than 5 seconds, the distance unit would transfer to "Km" from "Ml (mile)" or "MI" from "Km".

⚠CAUTION

The figure of distance to empty is estimated driving distance, so it can be different from the driving distance really is.

Average Speed

This mode indicates the average speed from the starting of the vehicle to the ignition key "OFF".

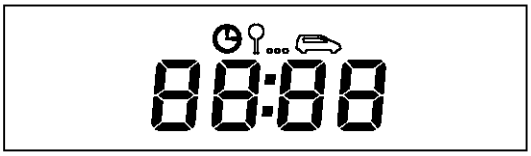


SBLBE6471D

1. When the ignition key is "OFF", it will initialize to 0 km/h (0 mph).
2. If you press the "DOWN" switch for more than 5 seconds, the speed unit would transfer to "Km/h" from "MPH" or "MPH" from "Km/h".

Elapsed Time

This mode indicates the total time from the starting of the vehicle to the ignition key "OFF" after resetting.



SBLBE6472D

1. Push "MODE/SET" for more than 1.5 seconds to initialize the displayed information such as average speed and driving time.

Outside Ambient Temperature

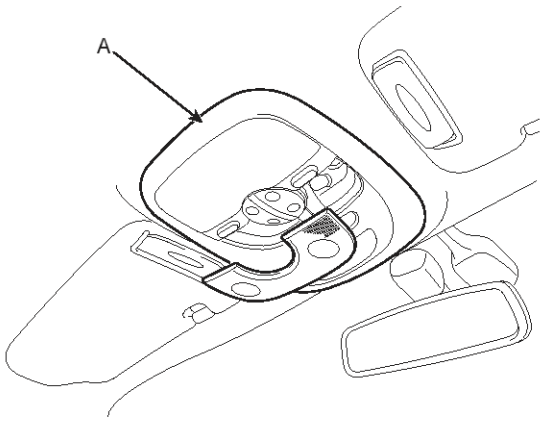
This mode indicates the current ambient temperature. The meter's working range -30˚C (-40˚F) to 65˚C (149˚F).

SBLBE6473D

1. If you press the "DOWN" switch for more than 5 seconds, the temperature unit would transfer to "˚C" from "˚F" or "˚F" from "˚C".

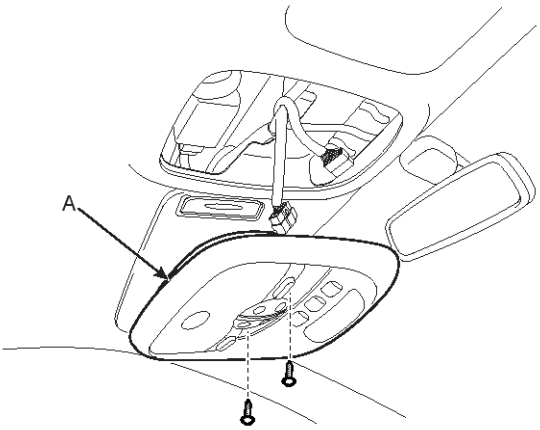
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the overhead console lamp cover(A).



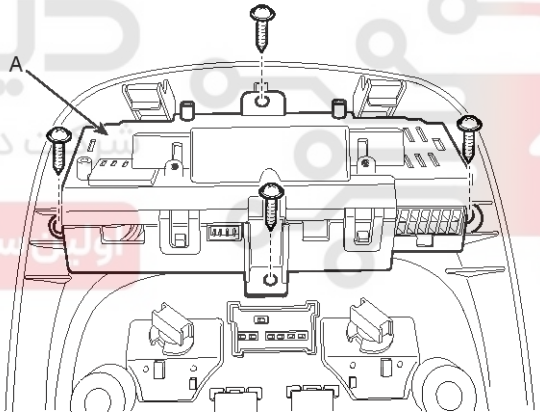
SBLBE6481D

3. Disconnect the sunroof switch connector and trip computer connector after loosening the screws (2EA) and then remove the overhead console lamp (A) from the head lining.



SBLBE6482D

4. Remove the trip computer (A) from overhead console after removing the fixing screws (4EA).



SBLBE6483D

INSTALLATION

1. Reassemble trip computer to the overhead console.
2. Connect the sunroof switch connector and trip computer connector.
3. Reassemble the overhead console.

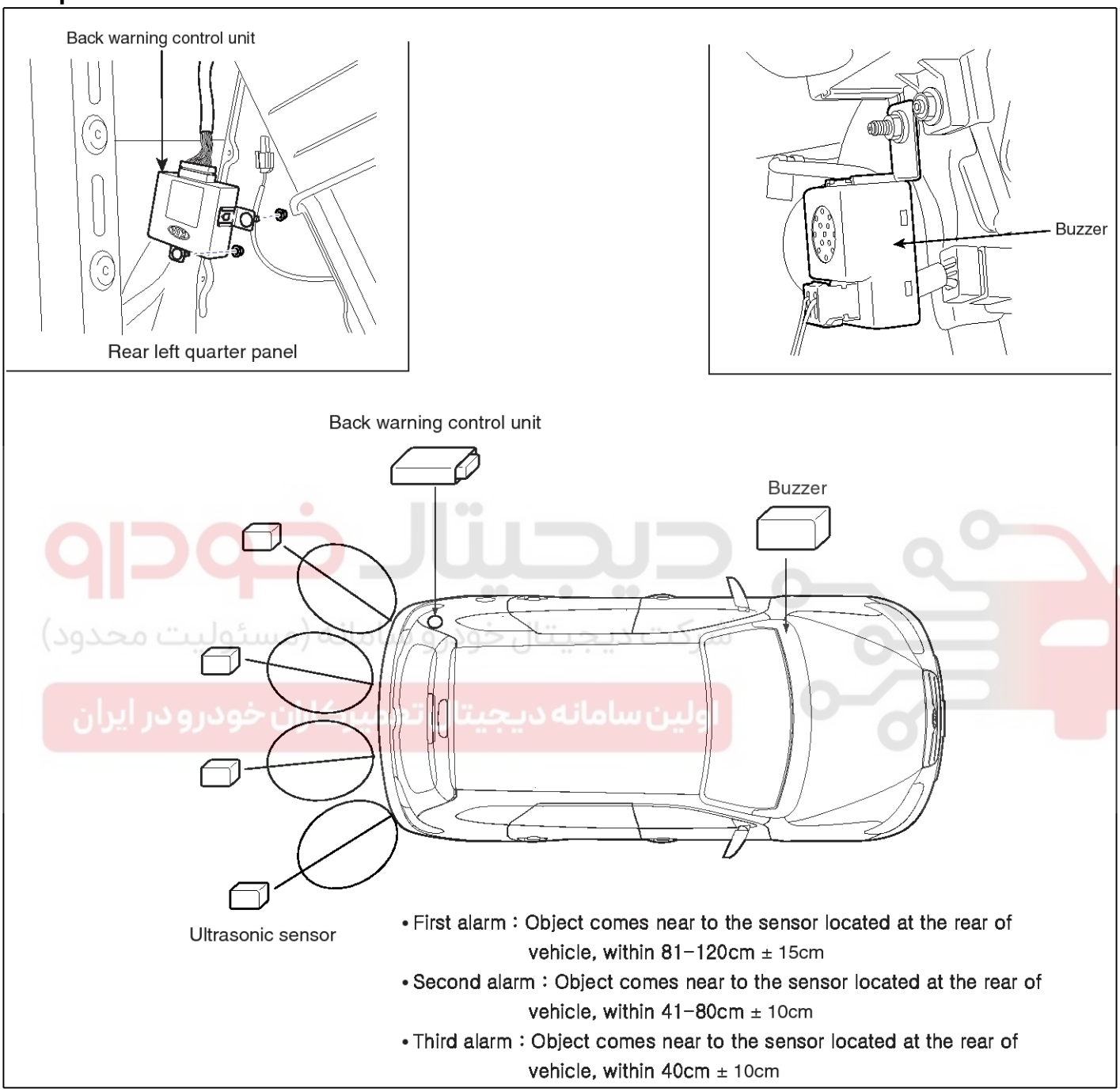
Rear Parking Assist System

SPECIFICATION

Item		Specification
Back warning control unit	Voltage rating	DC 12V
	Operation voltage	DC 9 ~ 16 V
	Operation temperature	-30˚C ~ + 80˚C
	Operation current	MAX 600 mA
	Operation frequency	40 ± 5 KHz
	Detective method	Direct and indirect detection
Ultrasonic sensor	Voltage rating	DC 8 V
	Detecting range	40 cm ~ 120 cm
	Operation voltage	DC 7.5~8.5 V
	Operation current	MAX 20 mA
	Operation temperature	-30˚C ~ + 80˚C
	Conservation temperature	-40˚C ~ + 85˚C
	Operation frequency	40 ± 5 KHz
	Number of sensors	4 (Rear Left, Right, Side Left, Right)
Piezo buzzer	Voltage rating	DC 12 V
	Operation voltage	DC 9 ~ 16 V
	Operation temperature	-30˚C ~ + 80˚C
	Operation current	MAX 60 mA
	Sound, tone	Oscillation frequency : 2.2±0.5 KHz
		Sound level : 70 dB (DC 13V, 1m)

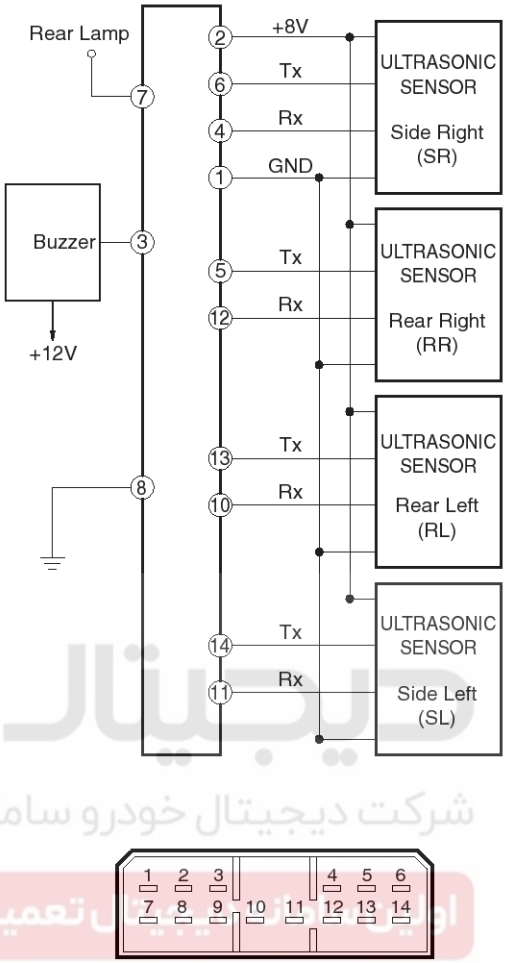
Rear Parking Assist System Control Unit

Component Location



SBLBE9003L

CIRCUIT DIAGRAM



(Connector)

Pin No.	Signal	Test : Desired result
1	GND SENSOR	0V
2	+8V SENSOR	8V (While operating)
3	PIEZO BUZZER	0V (While operating)
4	RX-SR SENSOR	0~1V Voltage change (Inspect waveform)
5	TX-RR SENSOR	0~3V Voltage change (Inspect waveform)
6	TX-SR SENSOR	0~3V Voltage change (Inspect waveform)
7	BACK UP LAMP POWER	12V (While shifting to "R")
8	GND	0V
10	N.C	0~1V Voltage change (Inspect waveform)
11	RX-RL SENSOR	0~1V Voltage change (Inspect waveform)
12	RX-SL SENSOR	0~1V Voltage change (Inspect waveform)
13	TX-RL SENSOR	0~3V Voltage change (Inspect waveform)
14	TX-SL SENSOR	0~3V Voltage change (Inspect waveform)

SBLBE6528L

DESCRIPTION

When reversing, the driver is not easy to find objects in the blind spots and to determine the distance from the object. In order to provide the driver safety and convenience, back warning system will operate upon shifting to "R" Ultrasonic sensor will emit ultrasonic wave rearward and detect the reflected wave. Control unit will calculate distance to the object using the sensor signal input and output buzzer alarm in three steps (first, second and third alarm).

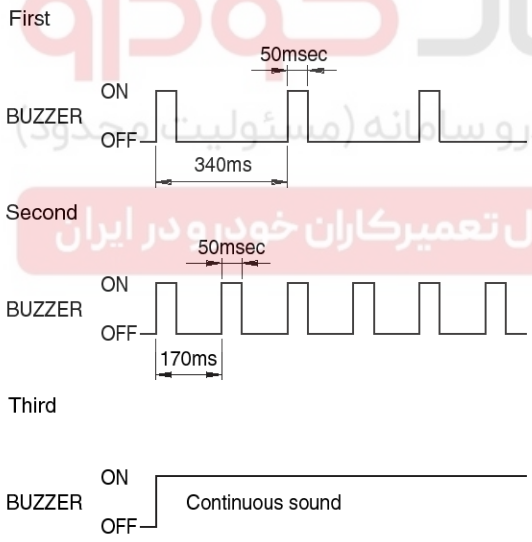
ALARM RANGE

Upon detecting an object at each range out of 3 ranges as stated below within the operation range, it will generate alarm.

First alarm : Object comes near to the sensor located at the rear of vehicle, within 81-120cm ± 15cm

Second alarm : Object comes near to the sensor located at the rear of vehicle, within 41-80cm ± 10cm

Third alarm : Object comes near to the sensor located at the rear of vehicle, within 40cm ± 10cm



LTKG976C

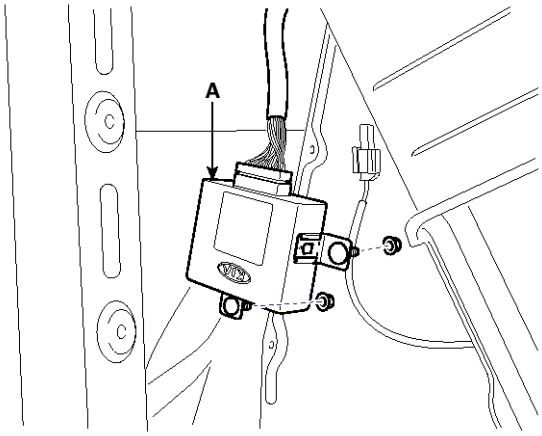
NOTICE

1. *Time tolerance of the above waveform : Time ± 10%*
2. *At nearer distance than 40cm, detection may not occur.*
3. *Alarm will be generated with vehicle reversing speed 10km/h or less.*

   For moving target, maximum operation speed shall be target approach speed of 10km/h.
4. *When the vehicle or the target is moving, sequential alarm generation or effective alarm may be failed.*
5. *False alarm, or failure of the alarm to trigger may occur in the following conditions.*
   - *Irregular road surface, gravel road, reversing toward grass.*
   - *Horn, motor cycle engine noise, large vehicle air brake, or other object generating ultrasonic wave is near.*
   - *When a wireless transmitter is used near to the sensor.*
   - *Dirt on the sensor.*
   - *Sequential alarm may not occur due to the reversing speed or the target shape.*

Replacement

1. Remove the left quarter trim of the trunk (Refer to the Interior trim in the BD group.)
2. Loosen the mounting nuts (2EA) and remove the back warning control unit (A) from the quarter panel.



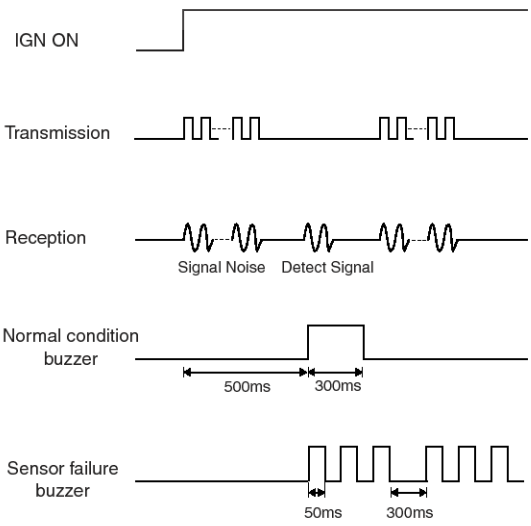
SBLBE9016D

DIAGNOSIS

1. DIAGNOSIS

   Turn the ignition switch ON, then shift the transaxle lever to 'R'. The Back Warning System is then checked.

   If no trouble, it generates buzzer alarm sound for 0.3 seconds after 0.5 seconds from power approval. In case of system failure, buzzer alarm is generated 3 times continuously with the interval of 0.3 seconds.



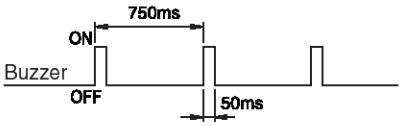
LTKG760B

2. DIAGNOSIS MODE

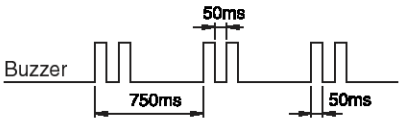
   Switch on diagnosis mode upon system failure.

   In case of system failure, then it indicates the failed point as follows.

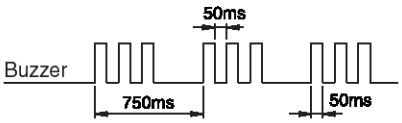
(1) Left side sensor failure buzzer



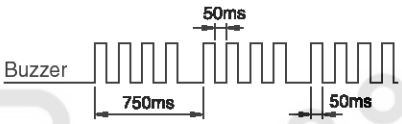
(2) Rear left side sensor failure buzzer



(3) Rear right side sensor failure buzzer



(4) Right side sensor failure buzzer



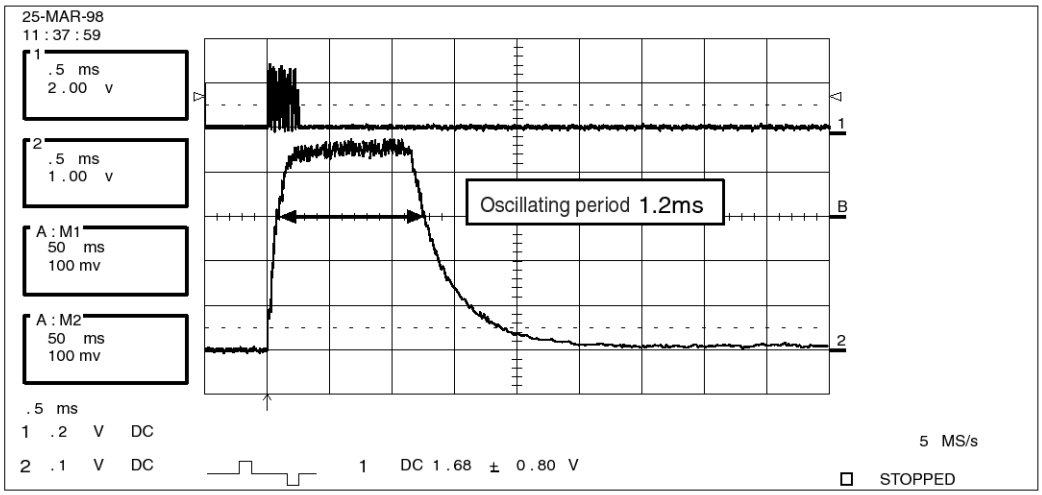
LTKG760C

SENSOR CONNECTION CHECKING

Transmit ultrasonic wave to the sensors, boost input signal, and detect wave.

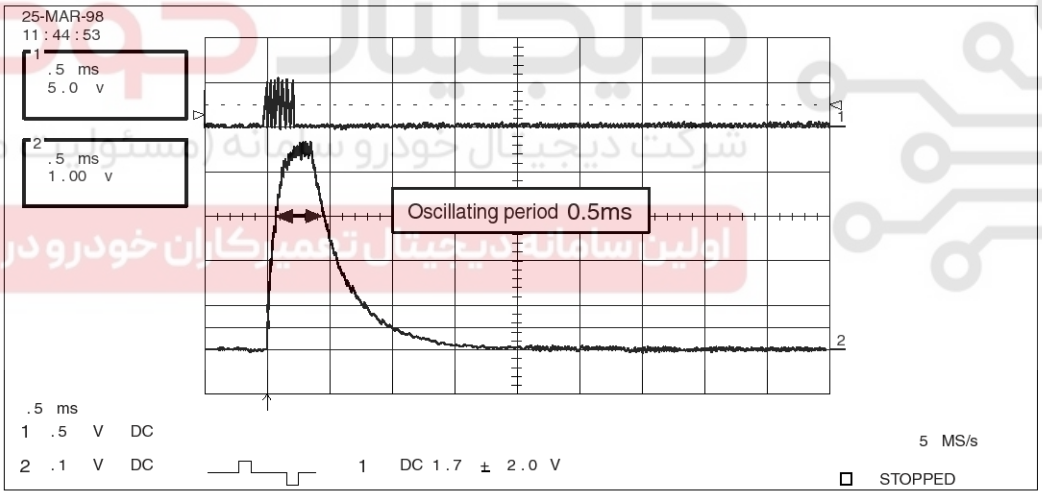
Waveform will be found, oscillating for a certain period of time.

1. Waveform for a normal sensor connection



BTKG230F

2. Waveform for a failed sensor connection



BTKG230G

NOTICE

Sensor connection will be checked for oscillating period of input signal 3V. If oscillating period is more than 0.8ms, it is normal.

a. Left sensor failure : beep-beep-beep

b. Right sensor failure : beep beep-beep beep-beep beep

c. Rear-right sensor failure : beep beep beep-beep beep beep-beep beep beep

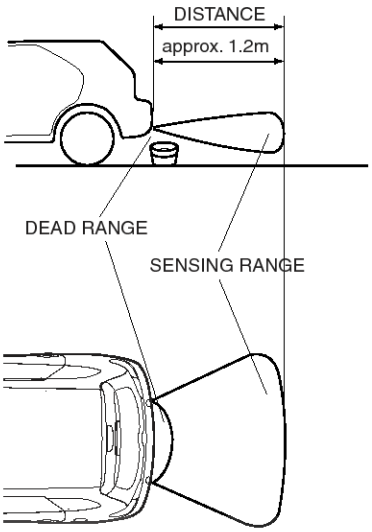
d. Right side sensor failure : beep beep beep beep-beep beep beep beep-beep beep beep

WARNING

1. Range detected by back sensors is limited.
   Watch back before reversing
2. There is a blind spot below the bumper. Low objects (for example boundary barrier) may be detected from minimum 1.5m away unable to detect at nearer.
3. Besides there are some materials unable to be detected even in detection range as follows.
   1) Needles, ropes, rods, or other thin objects.
   2) Cotton, snow and other material absorbing

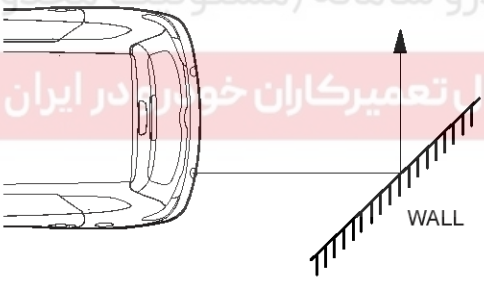
ultrasonic wave

(for example, fire extinguisher device covered with snow)



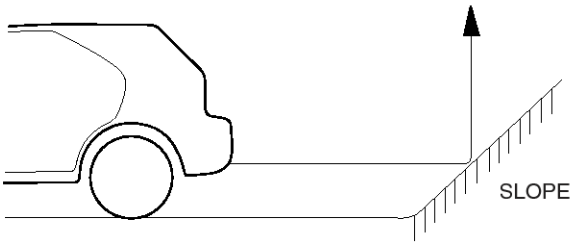
SBLBE6524L

3) Reversing toward the sloped walls.



SBLBE6525L

4) Reversing toward the sloped terrain.



SBLBE6526L

4. False alarm may operate in the following condition: irregular road surface, gravel road, sloped road and grass. Upon alarm generation by grass the alarm may be generated by rock behind grass. Always visually check the area behind the vehicle before backing up.

   The sensors cannot discriminate between materials.

5. Sensors may not operate correctly in the below conditions.

   Ensure sensors are clean from mud or dirt

   1) When spraying the bumper, the sensor opening is covered with something in order not to be contaminated. If sensor opening is contaminated with mud, snow, or dirt, detection range will be reduced and alarm may not be generated under the crash condition. Dirt accumulated on the sensor opening shall be removed with water.

      Do not wipe or scrape sensor with a rod or a hard object.

   2) If the sensor is frozen, alarm may not operate until sensor thaws.

   3) If a vehicle stays under extremely hot or cold environment, the detection range may be reduced. It will be restored at the normal temperature.

   4) When heavy cargo is loaded in rear cargo area, it changes the vehicle balance, which reduces the detection range.

   5) When other vehicle's horn, motor cycle engine noise, or other ultra-sonic wave sources are near.

   6) Under heavy rain.

7) When reversing towards a vertical wall and the gap between the vehicle and the wall is 15cm. (Alarm may sound despite the absence of a barrier)
8) If radio antenna is installed at the rear.
9) If the vehicle rear wiring is re-routed or electrical component is added at the rear part.
10) Vehicle balance is changed due to the replacement of the rear spring.
11) The unit will operate normally when the vehicle speed is 5km/h or less.

    Above this speed, the unit may not operate normally

6. Check the rear bumper for installation condition and deformation. If installed improperly or the sensor orientation is deviated, it may cause malfunction.
7. Be careful not to apply shock during sensor installation on the transmission or reception unit.
8. When adding electrical devices or modifying harness at the rear body of the vehicle, ensure not to change the transmission and reception unit wiring.

   Tagging the transmission side and reception side, it may cause malfunction.
9. High power radio transmitter (above 10W) may cause malfunction. Do not install it on the vehicle.
10. Be careful that excessive heat or sharp objects shall not touch ultrasonic sensor surface.

    Do not cover the sensor opening or press the sensor.

Parking Assist Sensor

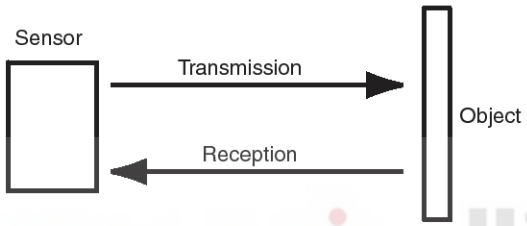
Operation principle

The sensor emits ultrasonic wave to the objects, and it measures the time until reflected wave returns, and calculates the distance to the object.

Distance detection type

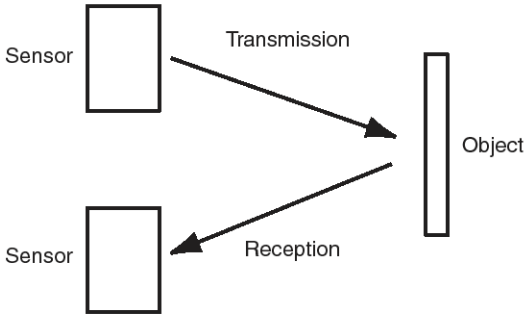
Direct detection type and indirect detection type are used together for improving effectiveness of the detection.

1. Direct detection type: One sensor transmits and receives signals to measure the distance.



ETRF762A

2. Indirect detection type: One sensor transmits signals and the other sensor receives the signals to measure the distance.



ETRF762B

Measurement principle

Back warning system (BWS) is a complementary device for reversing. BWS detects objects behind vehicle and provides the driver with buzzer alarm finding objects in a certain area, using ultrasonic wave propagation speed and time.

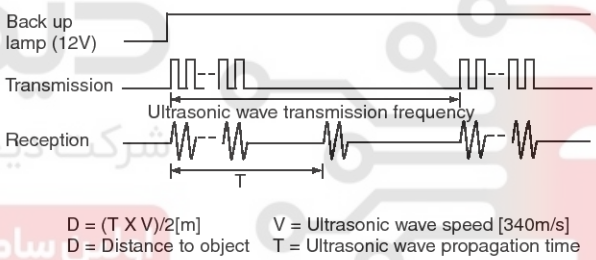
The propagation speed formula of ultrasonic wave in air is following :

$v=331.5 + 0.6t$ (m/s)

v=ultrasonic wave propagation speed

t=ambient temperature

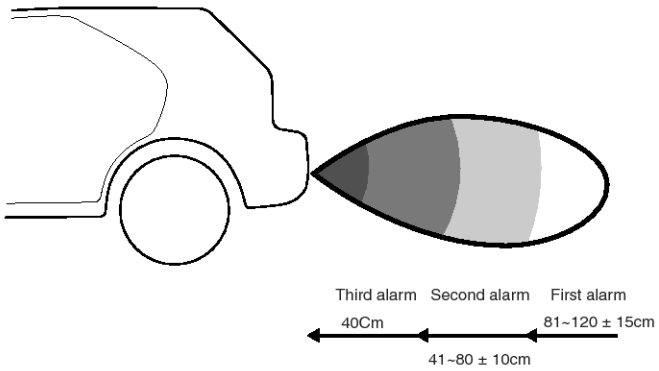
The basic principle of distance measurement using ultrasonic wave is :



ETRF762C

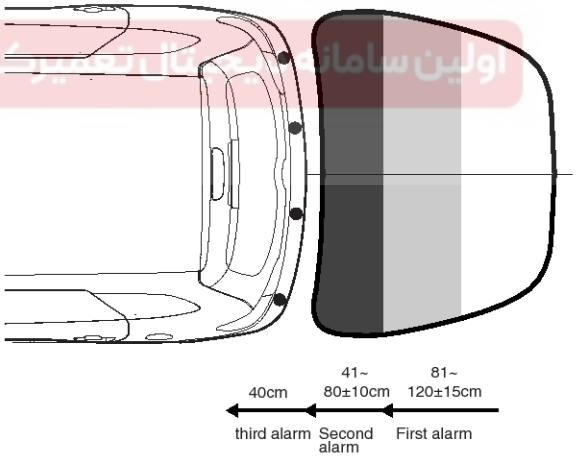
Sensor detection range

[Vertical range]



1. Distance tolerance(Messured at the front of sensor)
   - 81~120cm : ±15cm
   - 41~80cm : ±10cm
   - 40cm : ±10Cm
2. Detection tolerance
   - At 40cm :45° ± 15°
   - At 80cm : 30° ± 15°
   - At 120cm : 20° ± 15°
3. At nearer distance than 40cm detection may occur.
4. Measurement condition : Room temperature (20℃), 90mm diameter, 3m length rod.

[Horizontal range]



1. Distance tolerance(Messured at the front of sensor)
   - 81~120cm : ±15cm
   - 41~80cm : ±10cm
   - 40cm : ±10cm
2. Detection tolerance
   - At 80cm : 90° ± 20°
   - At 120cm : 10° ± 20°
3. At nearer distance than 40Cm detection may occur.
4. Measurement condition : Room temperature (20℃), 90mm diameter, 3m length rod.

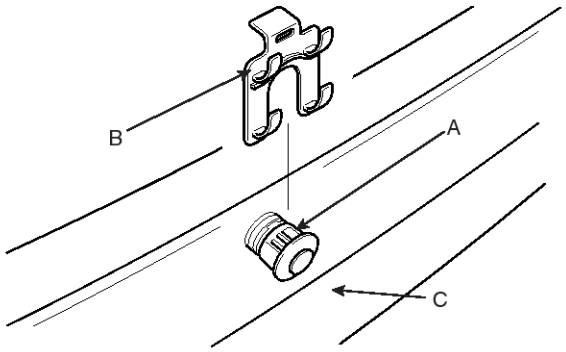
SBLBE6522L

NOTICE

1. *14cm (Diameter) plastic rod is used for the test target.*
2. *The test result may differ by a different target object.*
3. *Detection range may be reduced by dirt accumulated on sensor, and extremely hot or cold weather.*
4. *The following object may not be detected.*
   - *Sharp object or thin object like rope.*
   - *Cotton, sponge, snow or other materials absorbing sonic wave.*
   - *Smaller objects than 14cm (Diameter), 1m length.*

REMOVAL

1. Remove the rear bumper (Refer to the Rear bumper in the BD group.)
2. Disconnect the sensor connector at the inside of the rear bumper (C), and then remove the sensor (B) from the housing (A).



LTJF762E

INSTALLATION

1. Reassemble the sensor to the rear bumper, and then connect the connector.
2. Reassemble the rear bumper.

Buzzer

INSPECTION

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

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

REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the audio unit. (Refer to the audio in this group).
3. Remove the buzzer (A) after loosening the bolt and disconnecting the connector.

KTRE763A

INSTALLATION

1. Reassemble the buzzer after connecting the connector.
2. Reassembly the audio unit.
3. Connect the negative(-) battery terminal.B