

GENERAL TROUBLESHOOTING INFORMATION

Before Troubleshooting

1. Check applicable fuses in the appropriate fuse/relay box.
2. Using the battery checker (MCR-570 KIT), check the battery for damage, state of charge, and clean and tight connections.
(Refer to the Engine Electrical System - Battery)

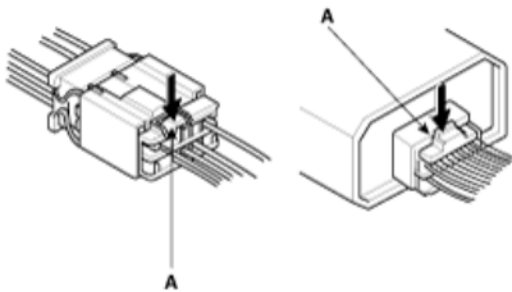
NOTICE

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

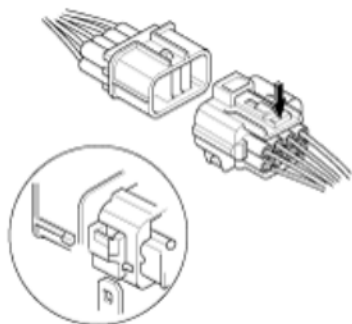
3. Check the alternator belt tension.

Handling Connectors

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



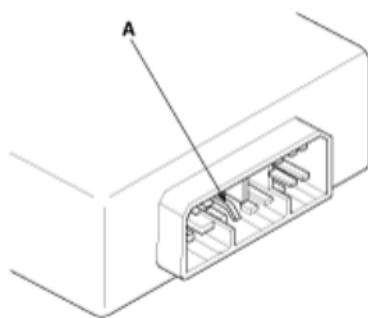
4. Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
5. Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket (A).



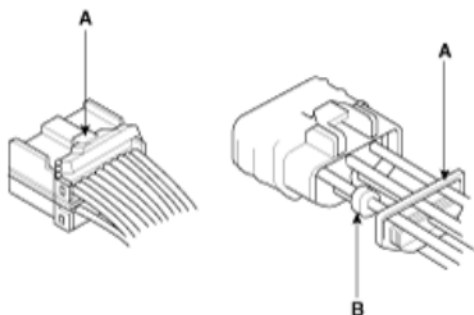
6. Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
7. Always reinstall plastic covers.



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

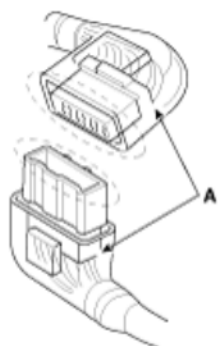


9. Check for loose retainer (A) and rubber seals (B).



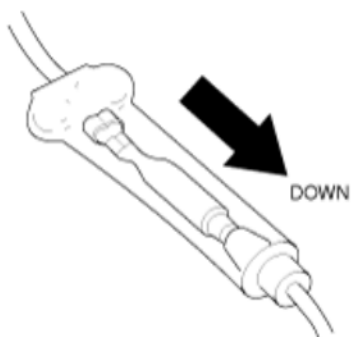
10. The backs of some connectors are packed with grease. Add grease if necessary. If the grease (A) is contaminated,

replace it.



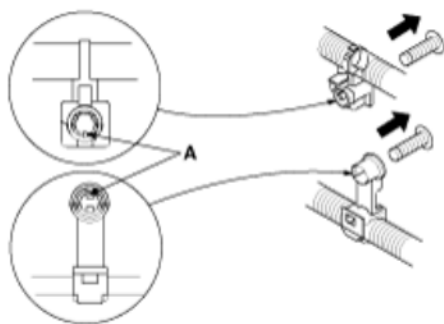
11. Insert the connector all the way and make sure it is securely locked.

12. Position wires so that the open end of the cover faces down.

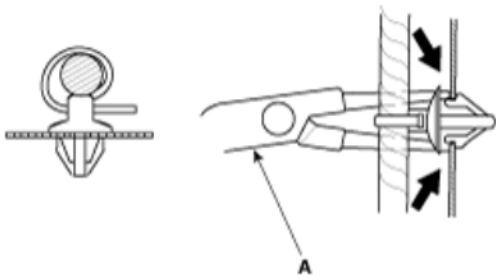


Handling Wires And Harnesses

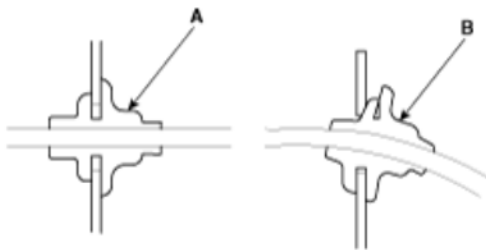
1. Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
2. Remove clips carefully; don't damage their locks (A).



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

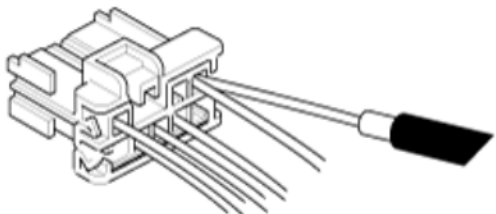


4. After installing harness clips, make sure the harness doesn't interfere with any moving parts.
5. Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.
6. Seat grommets in their grooves properly (A). Do not leave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



Testing And Repairs

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



5. Use a probe with a tapered tip.
Refer to the user's guide in the wiring repair kit (Pub No. : TRK 015.)



Five-step Troubleshooting

1. Verify the complaint

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

2. Analyze the schematic

Look up the schematic for the problem circuit.

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

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

3. Isolate the problem by testing the circuit.

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

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

4. Fix the problem

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

5. Make sure the circuit works

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

SPECIFICATION

Audio

Item		Specification
Model		RADIO/CD/MP3/RDS
Power supply		DC 14.4V
Load Impedance		4 Ohm x 4
Dark Current		2mA Max (Head unit only)
Antenna		50 Ohm
Tuning type		COURGAR TUNER
Frequency range / Channel space	FM	87.5 ~ 108.0 MHz/100 KHz
	AM	531 ~ 1602 KHz/9 KHz

* RDS : Radio Data System.

Speaker

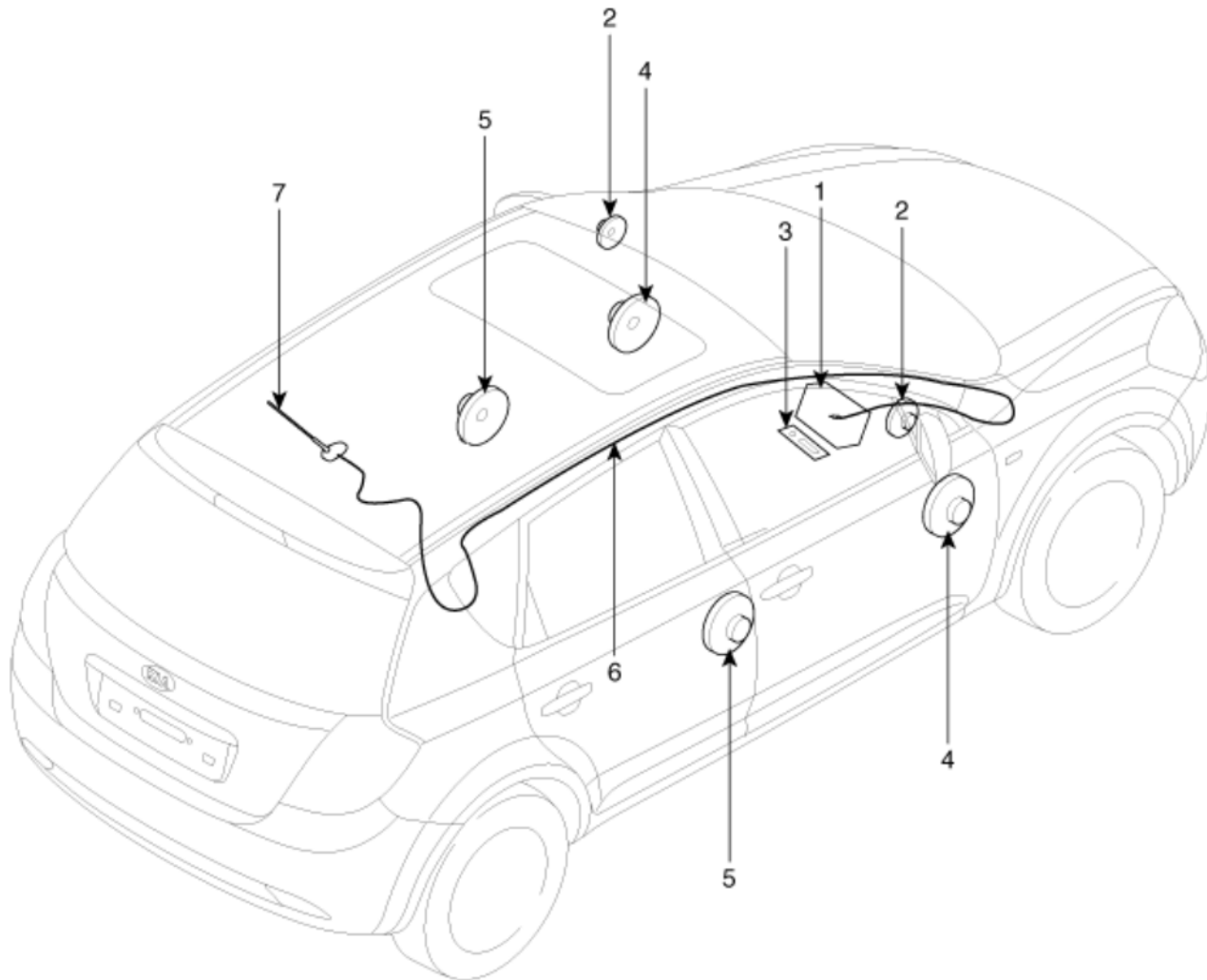
Item		Specification
Input Power (W)	Front	Max 40
	Rear	Max 40
	Tweeter	Max 40
Speaker Impedance (Ω)	Front	4.0 ± 0.6
	Rear	4.0 ± 0.6
	Tweeter	4.0 ± 0.6
Speaker Number		6

Antenna

Item	Specification
Installation Position	Roof
Input Voltage	DC 10.5V~16.0V
Rated Voltage	DC 12V (AM/FM) / DC 4.5V (GPS)
Output Impedance (Radio+GPS)	75Ω (AM/FM), 50Ω (GPS)
Output Impedance (Radio)	50Ω (AM/FM)

COMPONENT LOCATION

This illustration shows the LHD type.
RHD type is symmetrical.

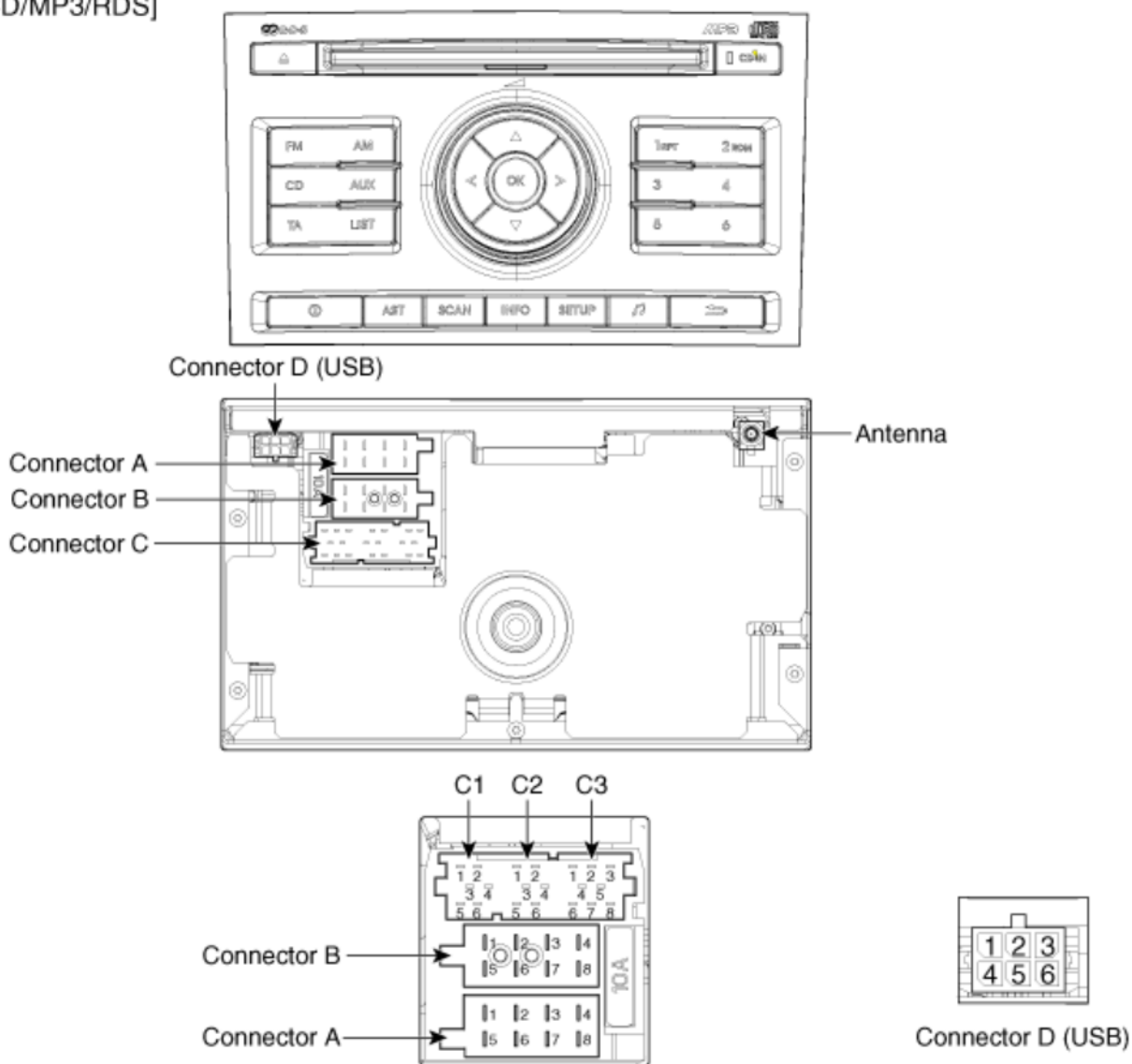


- 1. Audio unit
- 2. Tweeter speaker
- 3. AUX Jack / USB Port / iPod
- 4. Front door speaker

- 5. Rear door speaker
- 6. Antenna feeder cable
- 7. Roof antenna (Radio)

COMPONENTS

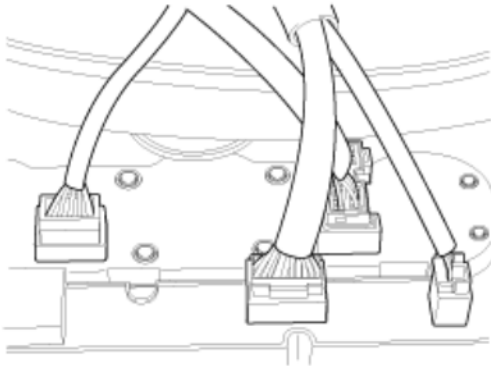
[RADIO/CD/MP3/RDS]



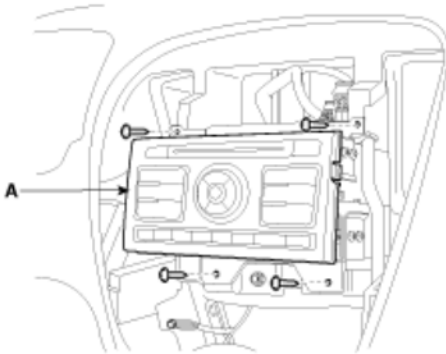
NO	Connector A	Connector B	Connector C1	Connector C2	Connector C3	Connector D
1	Speed signal	SPEAKER RR+	MIC + (Bluetooth)	AUX R- IN	-	D (-)
2	Tail switch (illumination +)	SPEAKER FR+	MIC - (Bluetooth)	AUX L- IN	-	D (+)
3	Remote antenna	SPEAKER FL+	-	AUX REF - IN	HS CAN L	V Bus
4	Supply (+12V)	SPEAKER RL+	-	AUX Detect -IN	-	Ground
5	-	SPEAKER RR-	-	SWRC	-	-
6	Accessory (+12V)	SPEAKER FR-	-	SWRC Ground	-	-
7	PWM illumination (-)	SPEAKER FL-			-	
8	Ground	SPEAKER RL-			HS CAN H	

REMOVAL

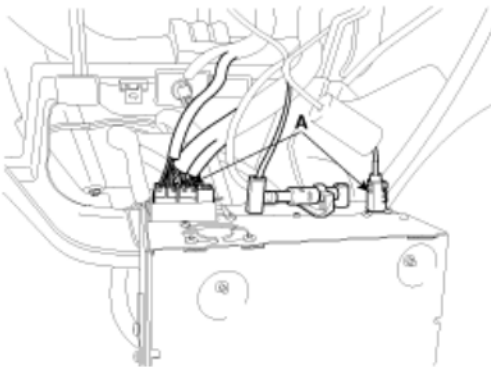
1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad center facia panel (A).
(Refer to the BD group - "Crash pad")
3. Disconnect the connectors from the crash pad center facia panel.



4. Remove the mounting bolts then remove the audio unit (A).



5. Disconnect the audio connectors and cable (A).



INSTALLATION

1. Connect the audio unit connectors and cable.

2. Install the audio unit.

English ▼

3. Install the crash pad center facia panel.

4. Check the audio system.

REMOVAL

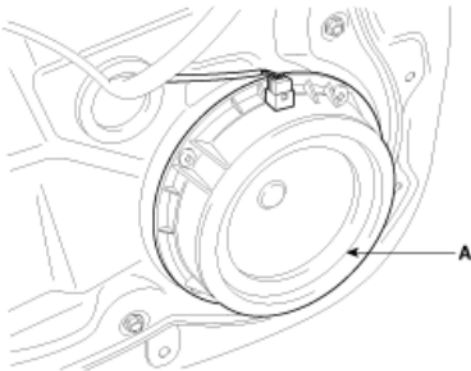
Front Speaker

1. Remove the front door trim.
(Refer to the BD group - "Front door")
2. Remove the front speaker (A) after removing 4 rivets.



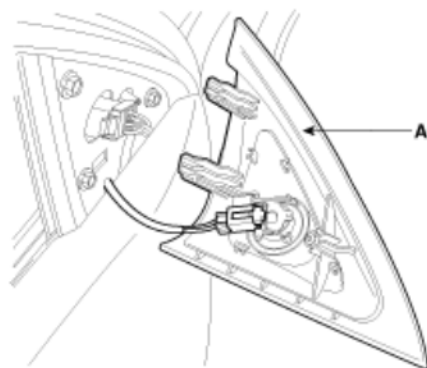
Rear Speaker

1. Remove the rear door trim.
(Refer to the BD group - "Rear door")
2. Remove the rear speaker (A) after removing 4 rivets.



Tweeter Speaker

1. Remove the front door delta cover (A).
(Refer to the BD group - "Front door")
2. Remove the tweeter speaker (A) after disconnecting the connector.



INSTALLATION

Front Speaker

1. Install the front speaker.
2. Install the front door trim.

Rear Speaker

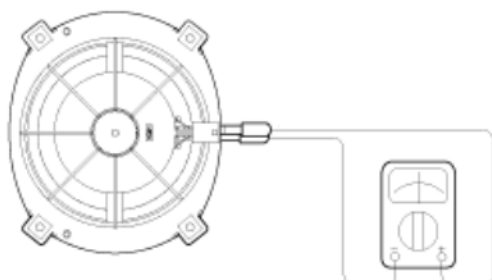
1. Install the rear speaker.
2. Install the rear door trim.

Tweeter Speaker

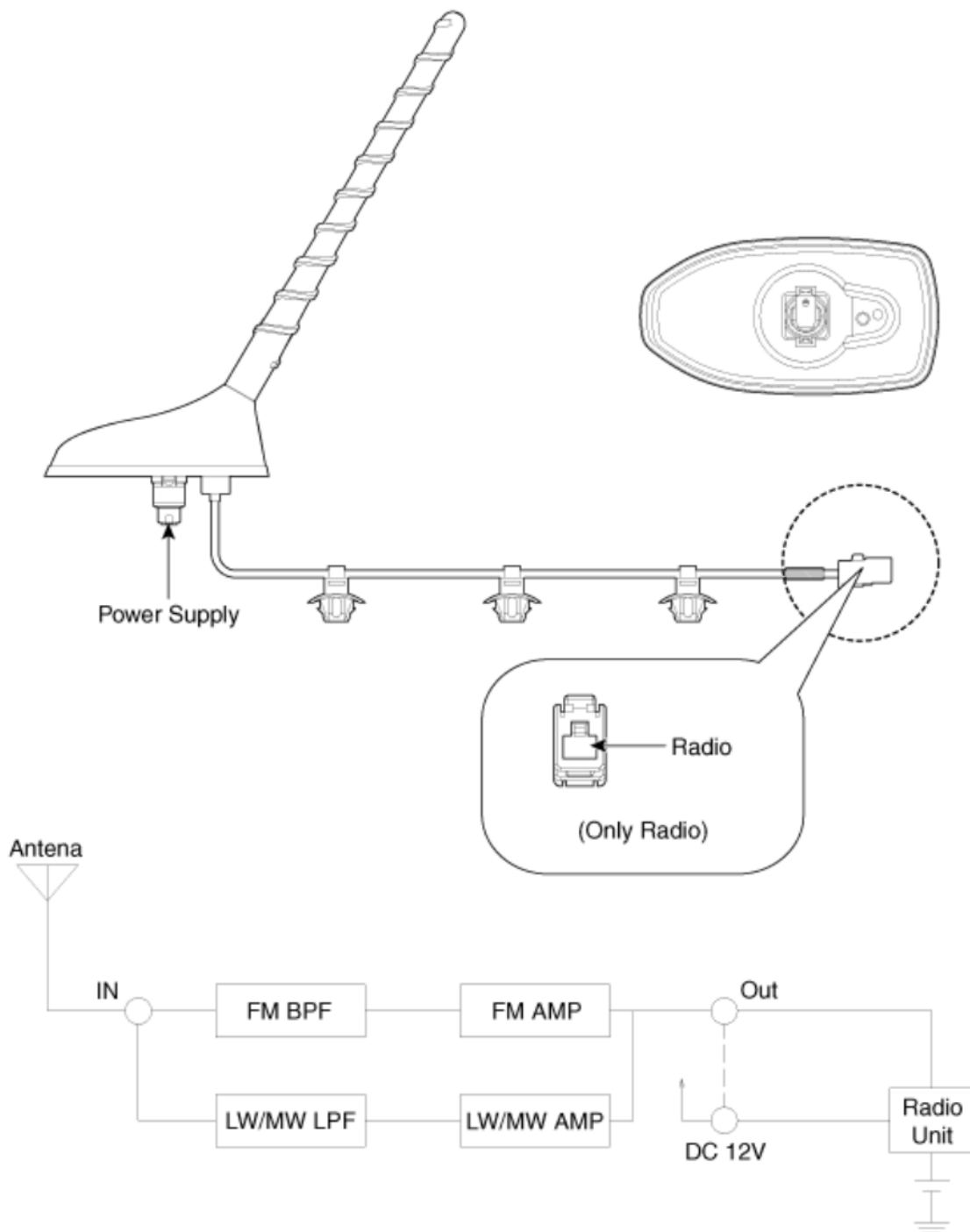
1. Install the tweeter speaker after connecting the tweeter speaker connector.
2. Install the front door delta cover.

INSPECTION

1. Check the speaker with an ohmmeter. If an ohmmeter indicates the correct impedance of the speaker when checking between the speaker (+) and speaker (-) of the same channel, the speaker is ok.
Specified impedance : 3.4 ~ 4.6Ω



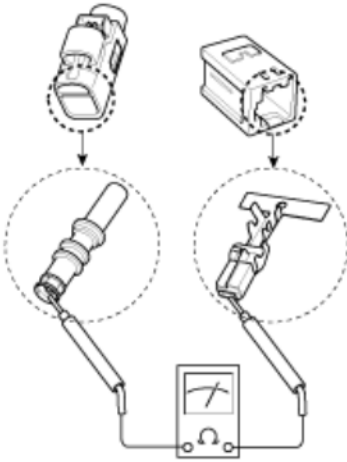
COMPONENTS



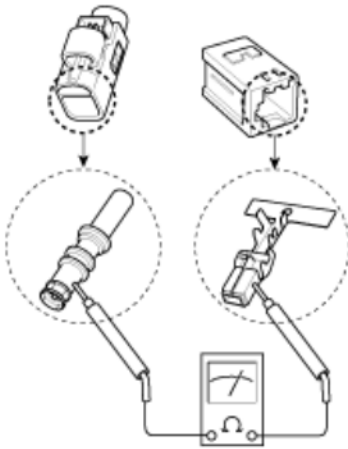
INSPECTION

Antenna Cable

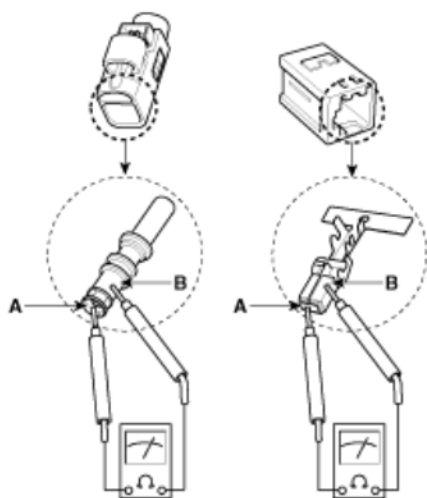
1. Remove the antenna jack from the audio unit and antenna.
2. Check for continuity between the center poles of antenna cable.



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



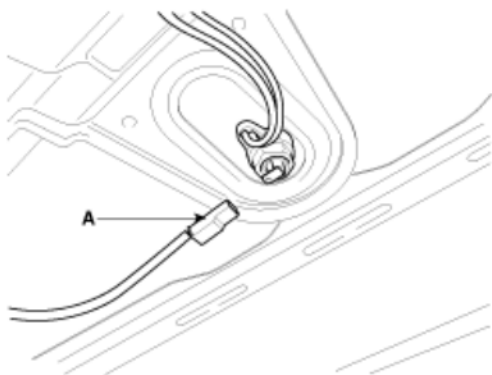
4. If there is no continuity, replace the antenna cable.
5. Check for continuity between the center pole (A) and outer pole (B) of antenna cable. There should be no continuity.



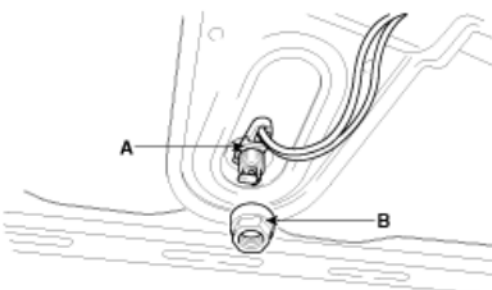
6. If there is continuity, replace the antenna cable.

REPLACEMENT

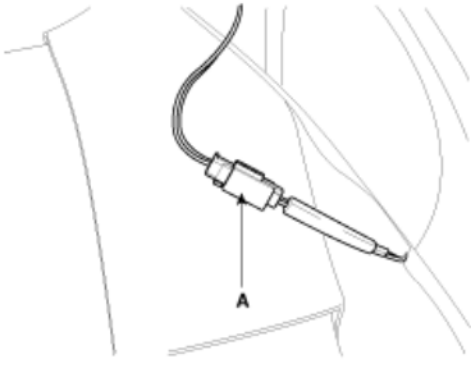
1. Remove the rear roof trim.
(Refer to the BD group - "Roof trim")
2. Disconnect the 1P power connector (A) from the roof antenna.



3. Remove the roof antenna(A) after removing a nut(B).



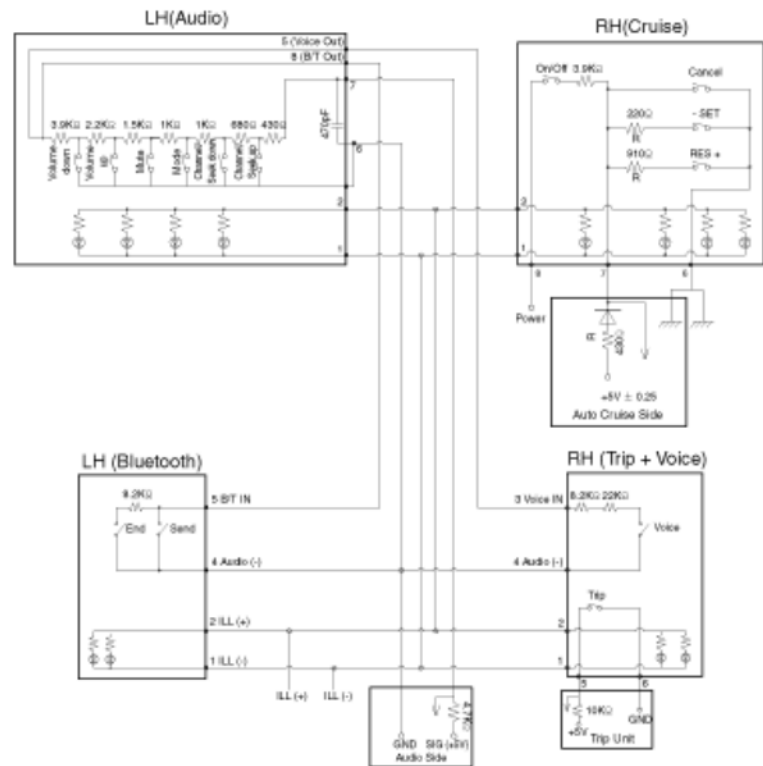
4. Disconnect the roof antenna feeder cable connector (A) on the quarter inner panel.



5. Installation is the reverse of removal.

CIRCUIT DIAGRAM

[Audio system + Auto cruise (Bluetooth switch + Trip/Voice switch)]



Audio system + Auto cruise

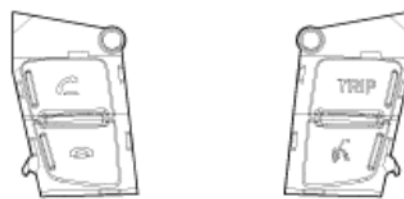


LH

RH

NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	ACC ground
7	Audio (+)	7	ACC signal
8	Bluetooth out	8	ACC power

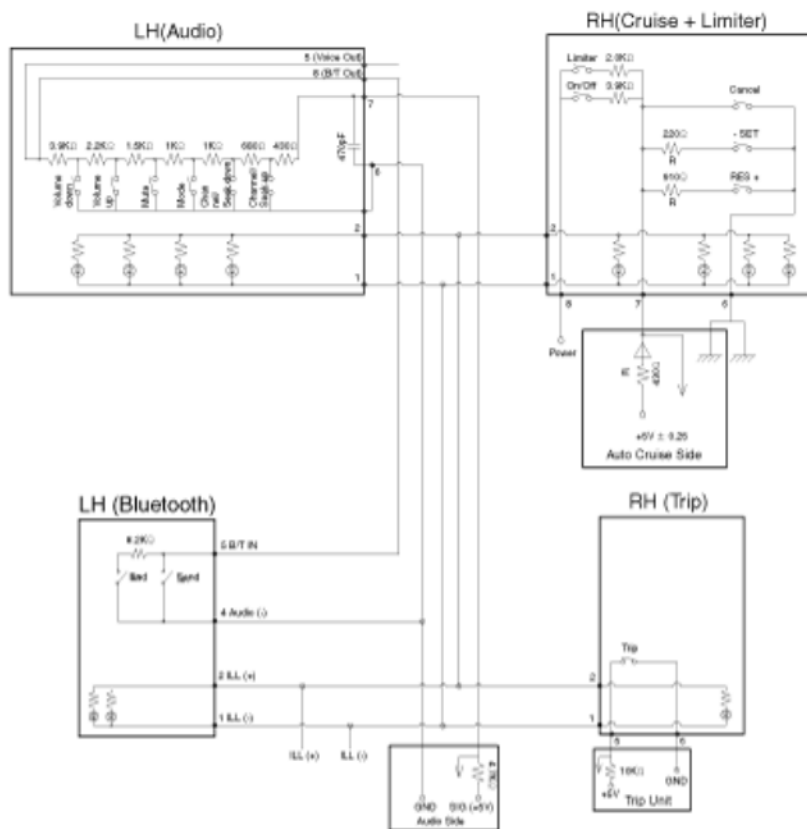
Bluetooth switch + Trip/Voice switch



LH

RH

NO	Connector	NO	Connector
1	ILL (-)	1	ILL (-)
2	ILL (+)	2	ILL (+)
3	-	3	Voice in
4	Audio (-)	4	Audio (-)
5	Bluetooth in	5	Trip in
6	-	6	Trip ground



Audio system + Auto cruise/Limiter

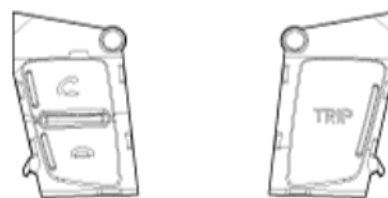


LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	ACC/Limiter ground
7	Audio (+)	7	ACC/Limiter signal
8	Bluetooth out	8	ACC/Limiter power

Bluetooth switch + Trip switch

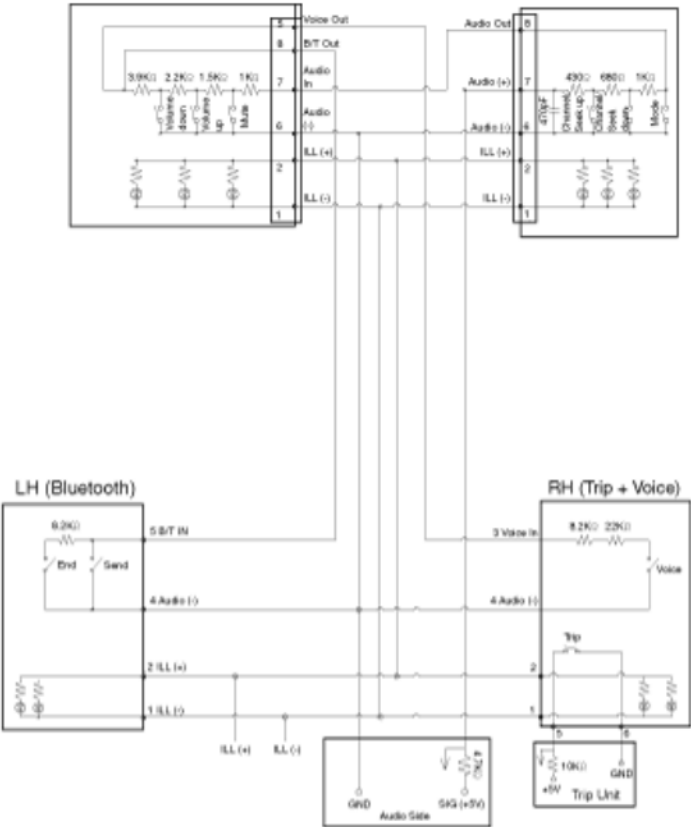


LH

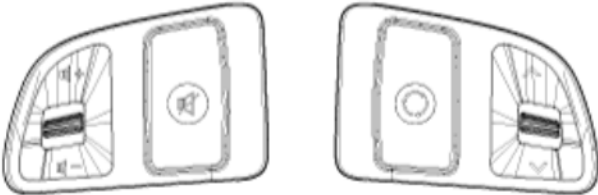
RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	Audio (-)	4	-
5	Bluetooth in	5	Trip in
6	-	6	Trip ground

[Audio system (Bluetooth switch + Trip/Voice switch)]



Audio system

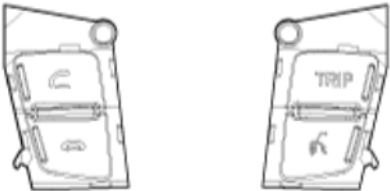


LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	Audio (-)
7	Audio in	7	Audio (+)
8	Bluetooth out	8	Audio out

Bluetooth switch + Trip/Voice switch

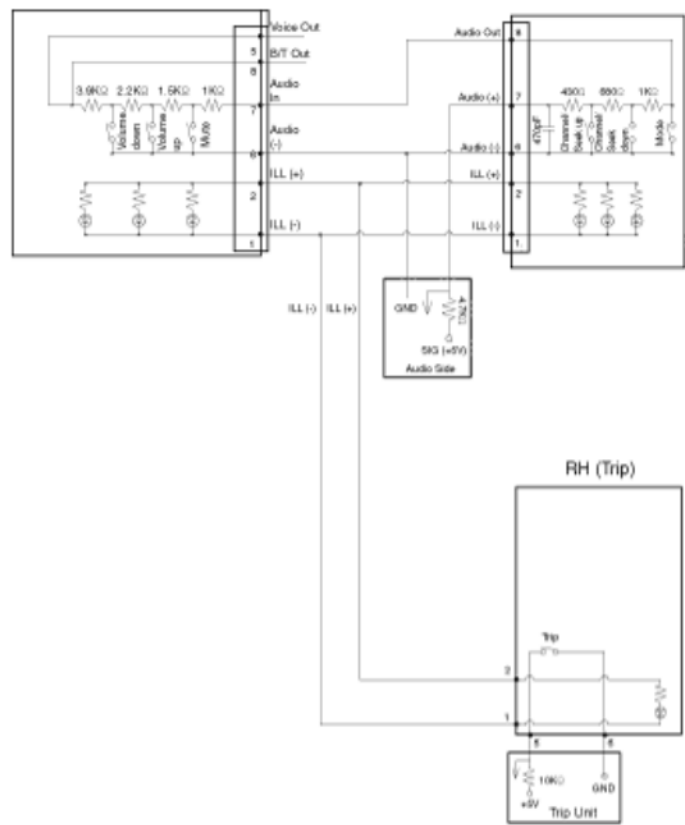


LH

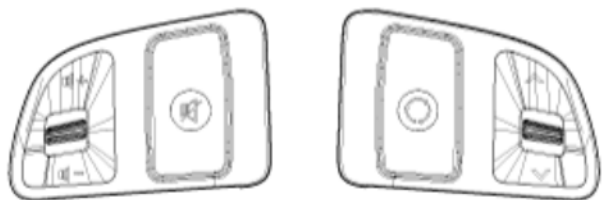
RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	Voice in
4	Audio (-)	4	Audio (-)
5	Bluetooth in	5	Trip in
6	-	6	Trip ground

[Audio system (Trip switch)]



Audio system



LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	Audio (-)
7	Audio in	7	Audio (+)
8	Bluetooth out	8	Audio out

Trip switch

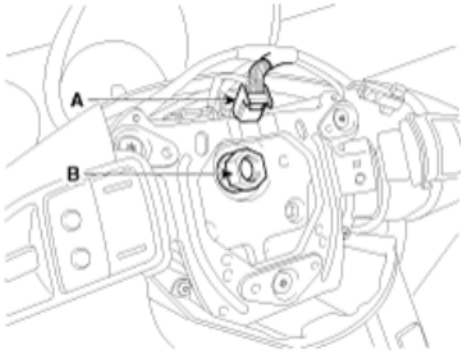


RH

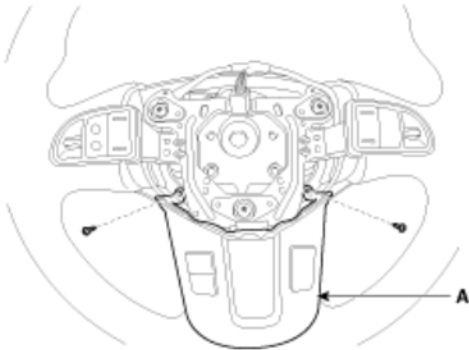
RH	
NO	Connector
1	Illumination (-)
2	Illumination (+)
3	-
4	-
5	Trip in
6	Trip ground

REMOVAL

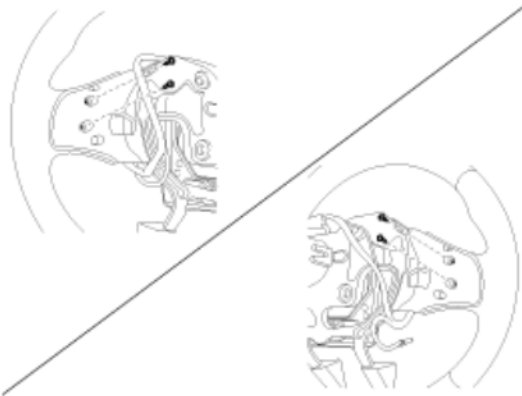
1. Disconnect the negative (-) battery terminal.
2. Remove the driver airbag module.
(Refer to the RT group - "Airbag module and clock spring")
3. Remove the steering wheel after loosening the nut (B) and disconnecting the connector (A).
(Refer to the ST group - "Steering column and shaft")



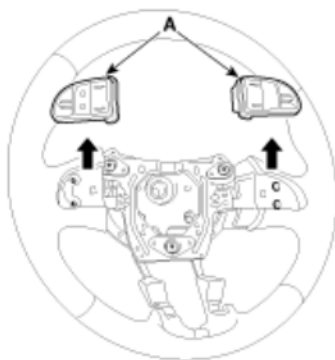
4. Remove the steering wheel lower cover (A) after loosening the 2 screws.



5. Loosen the screws (4EA) on the opposite side of the steering wheel.



6. Remove the audio remote control switch (A).

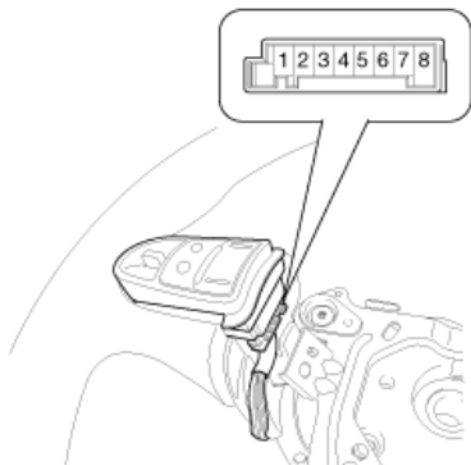


INSTALLATION

1. Install the audio remote control switch on the steering wheel.
2. Install the steering wheel.
3. Connect the audio remote control switch connector.
4. Install the driver airbag module.

INSPECTION

1. Check for resistance between No.6 and No.7 terminals in each switch position.



[Audio system + Auto cruise (Blue tooth switch + Trip/Voice switch)]

Switch	Connector terminal	Resistance ($\pm 5\%$)
Channel/Seek up	6-7 (Left)	430 Ω
Channel/Seek down	6-7 (Left)	1.1 k Ω
Mode	6-7 (Left)	2.11 Ω
Mute	6-7 (Left)	3.11 k Ω
Volume up	6-7 (Left)	4.61 k Ω
Volume down	6-7 (Left)	6.81 k Ω

[Audio system + Auto cruise/Limiter (Blue tooth switch + Trip switch)]

Switch	Connector terminal	Resistance (±5%)
Channel/Seek up	6-7 (Left)	430 Ω
Channel/Seek down	6-7 (Left)	1.1 kΩ
Mode	6-7 (Left)	2.11 Ω
Mute	6-7 (Left)	3.11 kΩ
Volume up	6-7 (Left)	4.61 kΩ
Volume down	6-7 (Left)	6.81 kΩ

[Audio system (Blue tooth switch + Trip/Voice switch)]

Switch	Connector terminal	Resistance (±5%)
Channel/Seek up	6-7 (Right)	430 Ω
Channel/Seek down	6-7 (Right)	1.1 kΩ
Mode	6-7 (Right)	2.11 Ω
Mute	6-7 (Left)	3.11 kΩ
Volume up	6-7 (Left)	4.61 kΩ
Volume down	6-7 (Left)	6.81 kΩ

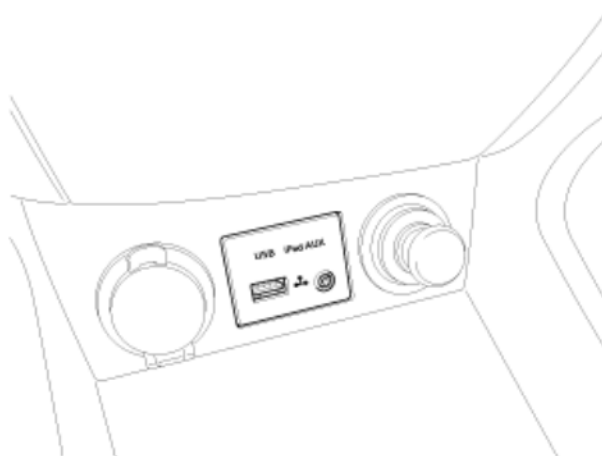
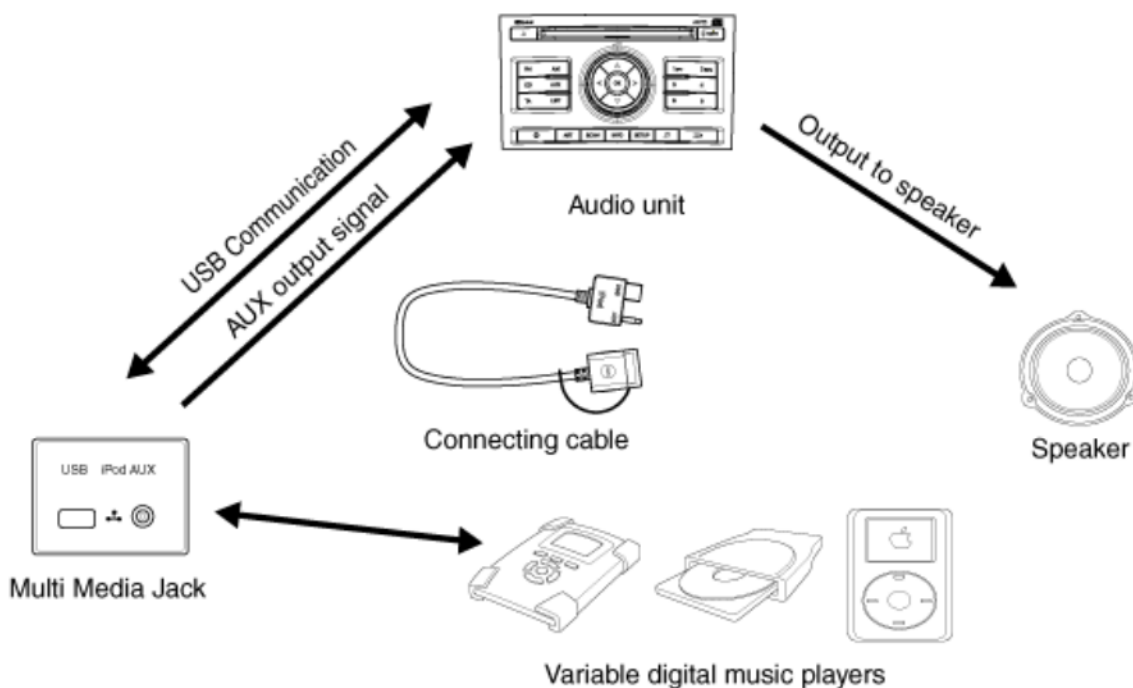
[Audio system (Trip switch)]

Switch	Connector terminal	Resistance (±5%)
Channel/Seek up	6-7 (Right)	430 Ω
Channel/Seek down	6-7 (Right)	1.1 kΩ
Mode	6-7 (Right)	2.11 Ω
Mute	6-7 (Left)	3.11 kΩ
Volume up	6-7 (Left)	4.61 kΩ
Volume down	6-7 (Left)	6.81 kΩ

DESCRIPTION

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

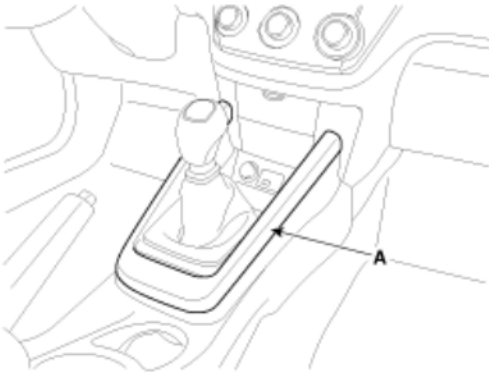
In case of distortions from media connected to the AUX source, the audio unit may not be defect but the output level of the used media does not match the specification of the AUX input.



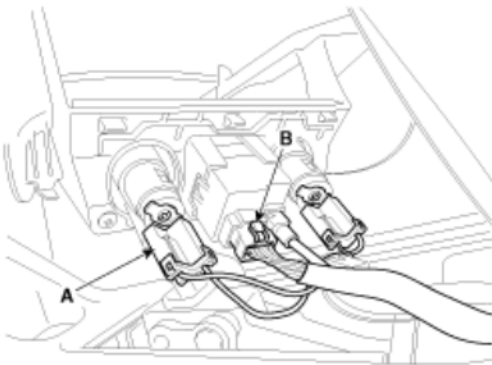
REMOVAL

Multi Media Jack

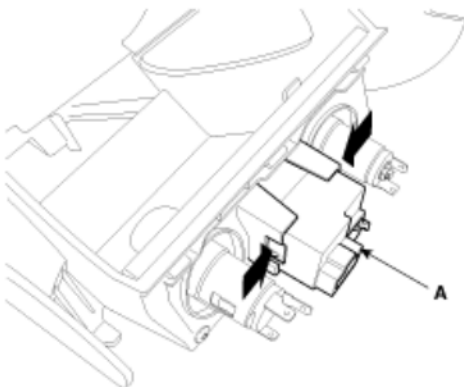
1. Remove the upper cover (A) on the floor console.
(Refer to the BD group - "Console")

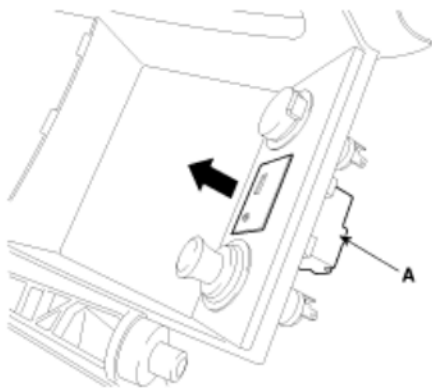


2. Disconnect the power outlet connector (A) and multi media jack connector (B) from under cover.



3. Remove the multi media jack (A) after disconnecting the multi media jack connector.





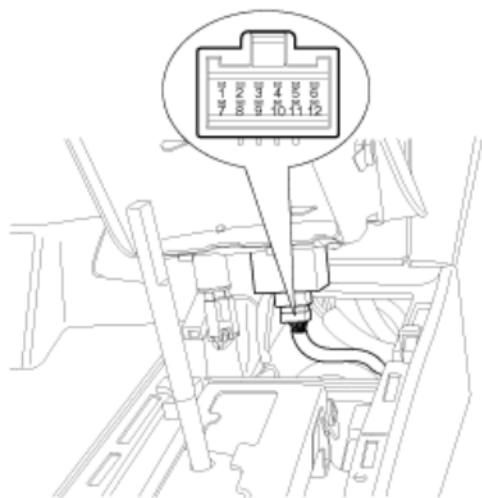
INSTALLATION

Multi Media Jack

1. Install the multi media jack.
2. Connect the multi media jack connector.
3. Install the under cover to the floor console.

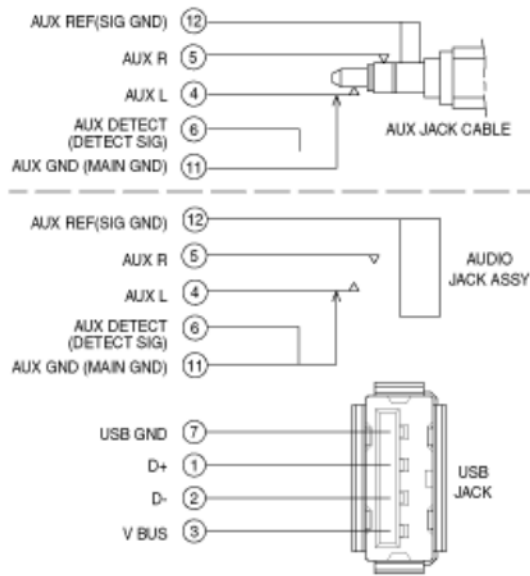
INSPECTION

1. Disconnect the negative(-) battery terminal.
2. Disconnect the multi media jack connector after removing the under cover.



3. To inspect USB / iPod port, check the voltage between NO.3 and 7 terminal of.
Standard value : 5V
4. To inspect AUX jack, check the voltage between NO. 6and 12 terminal of AUX jack / Audio jack input.
Standard value : 5V
5. Using an ohmmeter, check for continuity between the terminals of multi media jack connector.

< AUX JACK INSERT >

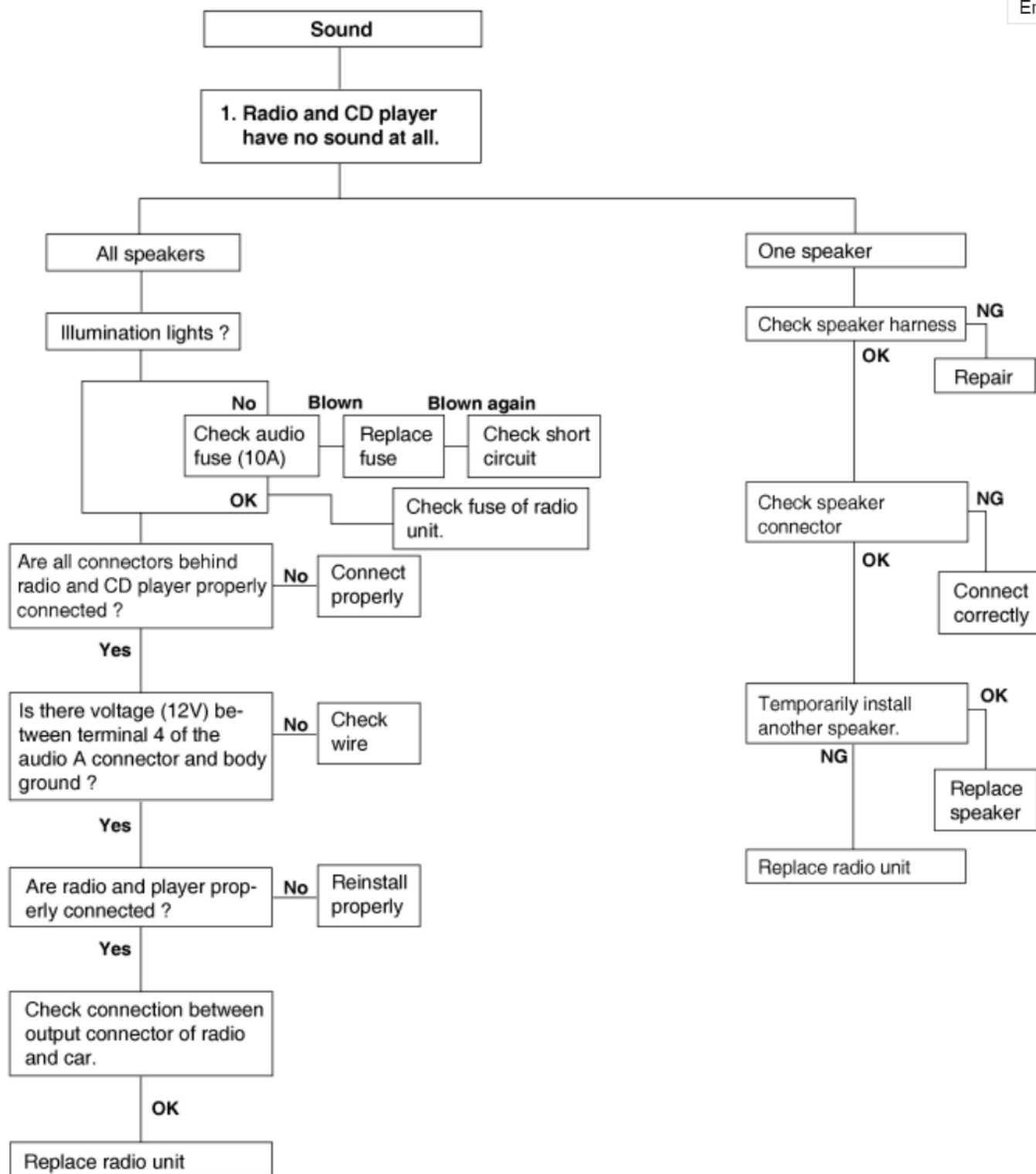


TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS CHECK SHEET

Item	Status	How to check
System	Audio is not functioning and no function of display	▶ Check the fuse audio unit and vehicle ▶ Check power connections
Radio	No radio reception	▶ Check if the antenna is completely and correctly connected.
	Poor radio reception	▶ Antenna (disc antenna) obscured, antenna rod bent or antenna defective. ▶ Please arrange for an authorized dealer to check the antenna.
	The frequency instead of the station name is displayed.	▶ The unit is tuned to a station that does not transmit RDS signals or the transmitter is too weak.
	The required station cannot be tuned to using automatic search	▶ Set desired station manually (manual tuning) ▶ Check whether the antenna is completely and correctly connected
	No traffic announcements are switched through (during CD playback)	▶ Activate the traffic announcement by pressing the TA button ※ TA : Traffic Announcement
CD	CD will not be accepted	▶ Clean CD with damp cloth ▶ The CD does not comply with the CD player specification ▶ See notes on Audio and MP3 CDs
	Distorted sound/skips during CD play	▶ With the set on, wait for 5 minutes until the condensation evaporates
	No sound during CD playback	▶ Some CDs contain multimedia data which is not recognized by the unit ▶ Advance the tracks until music is heard
USB	USB mode is not functioned	▶ Plug in USB drive again

1. System Check Procedure



2. Radio Check Procedure

Chart 1

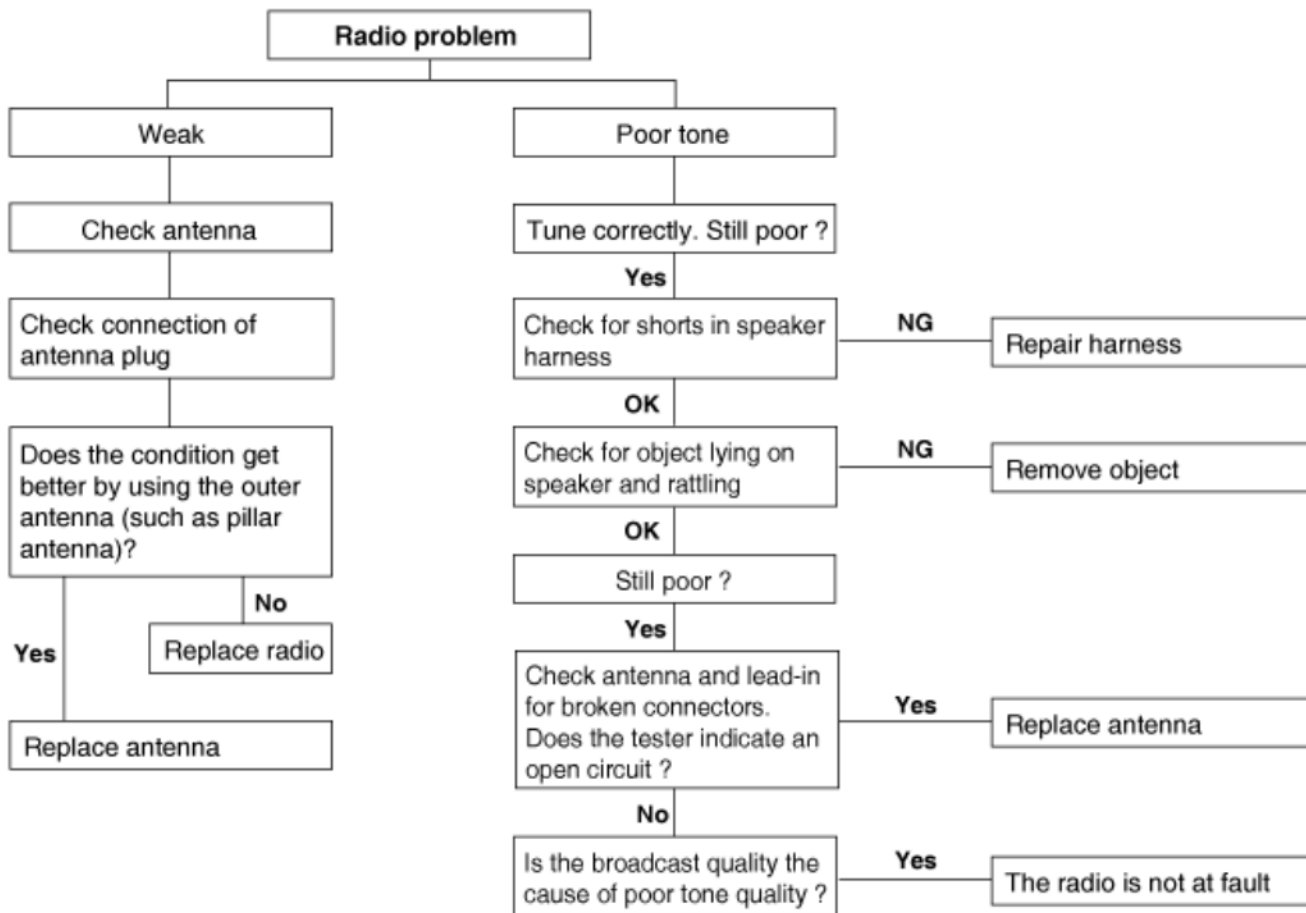


Chart 2

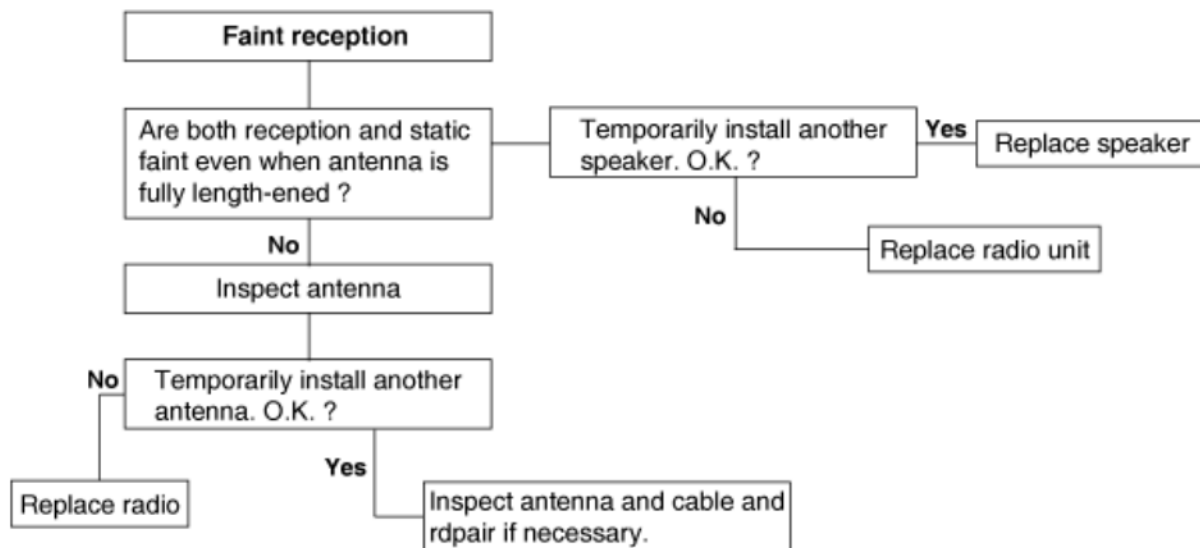


Chart 3

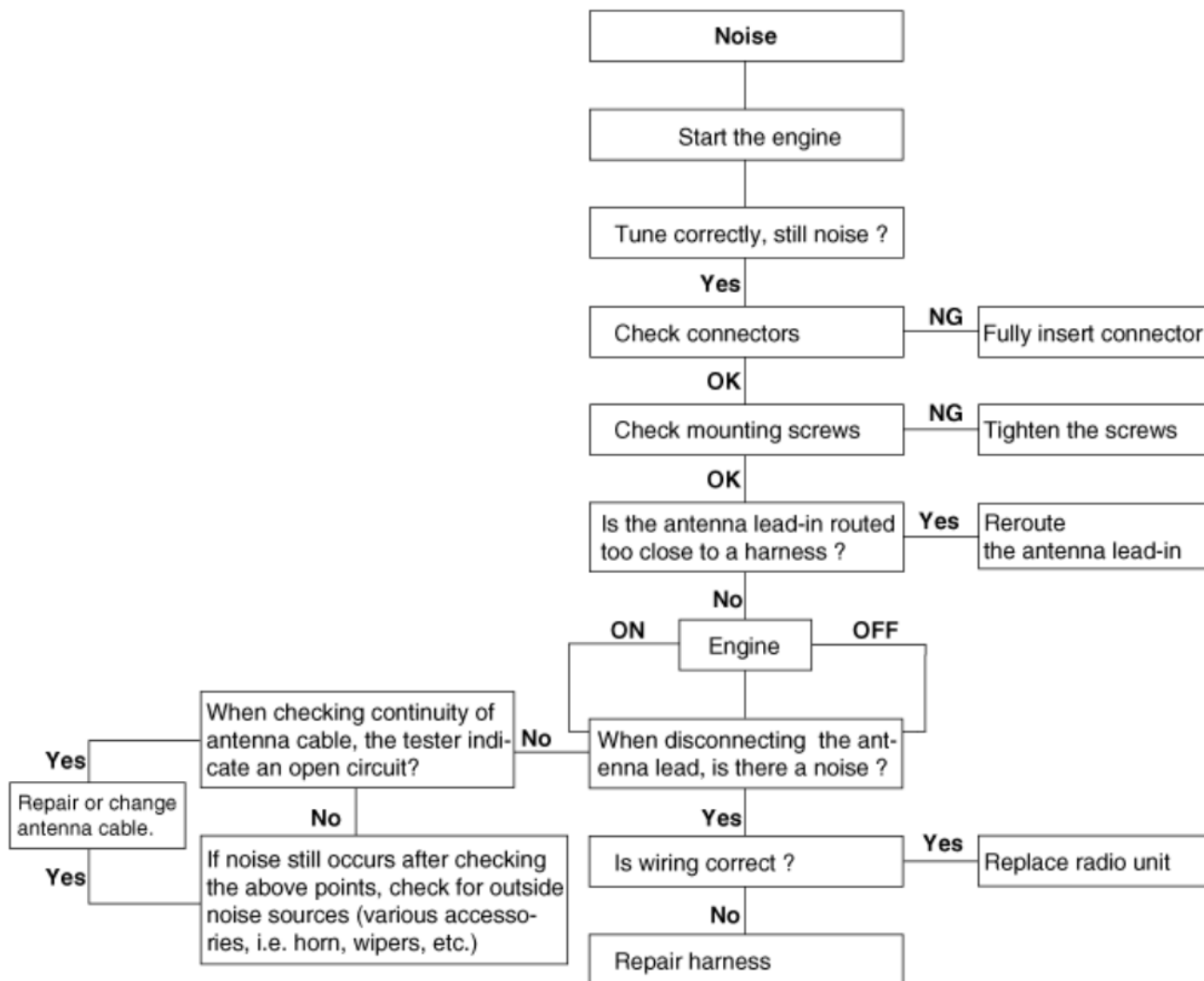


Chart 4

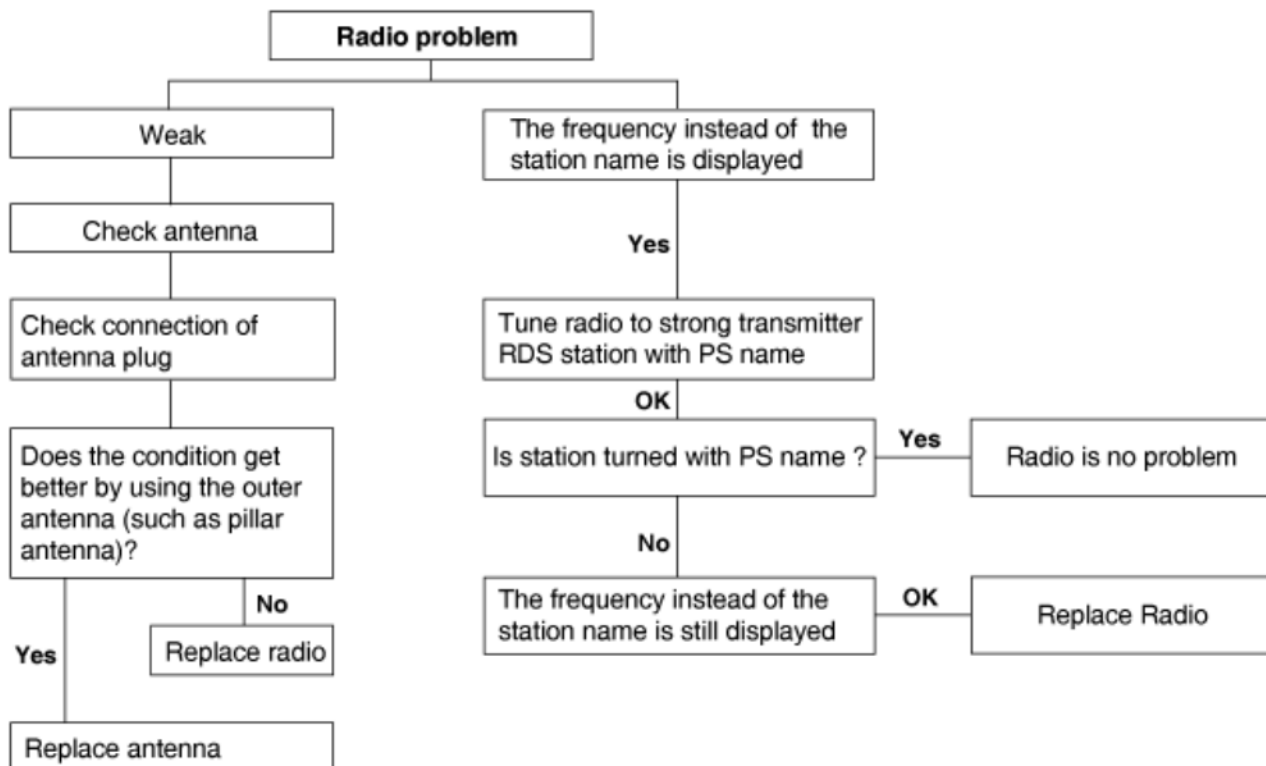


Chart 5

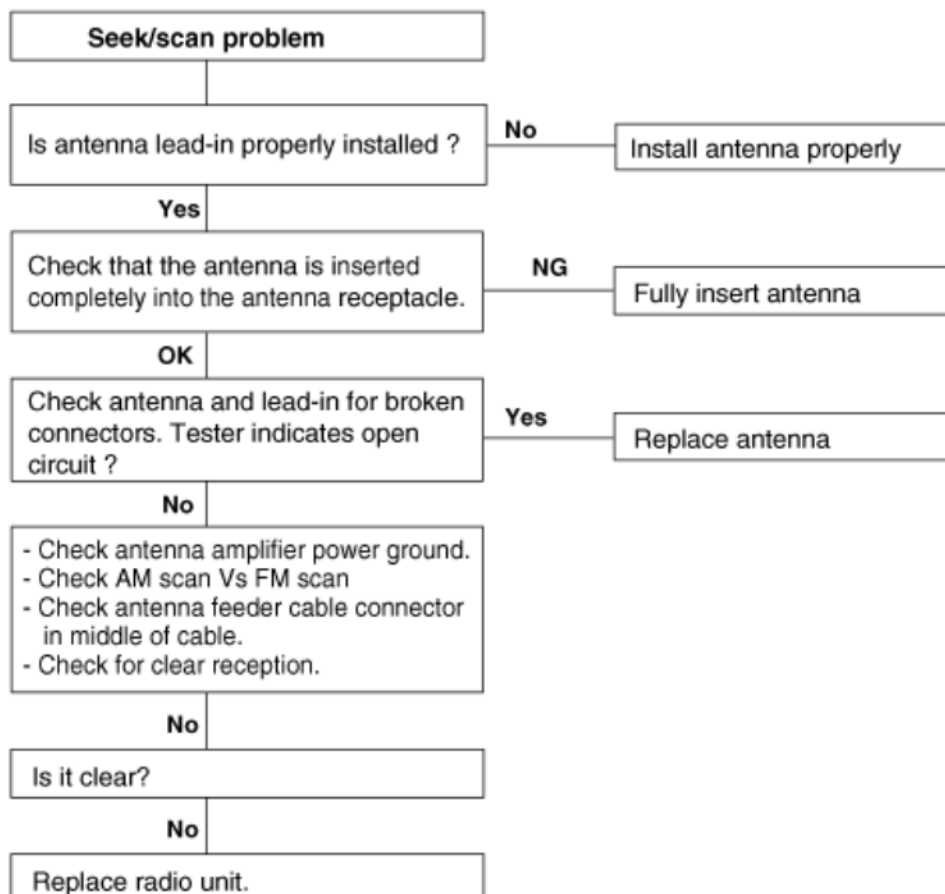
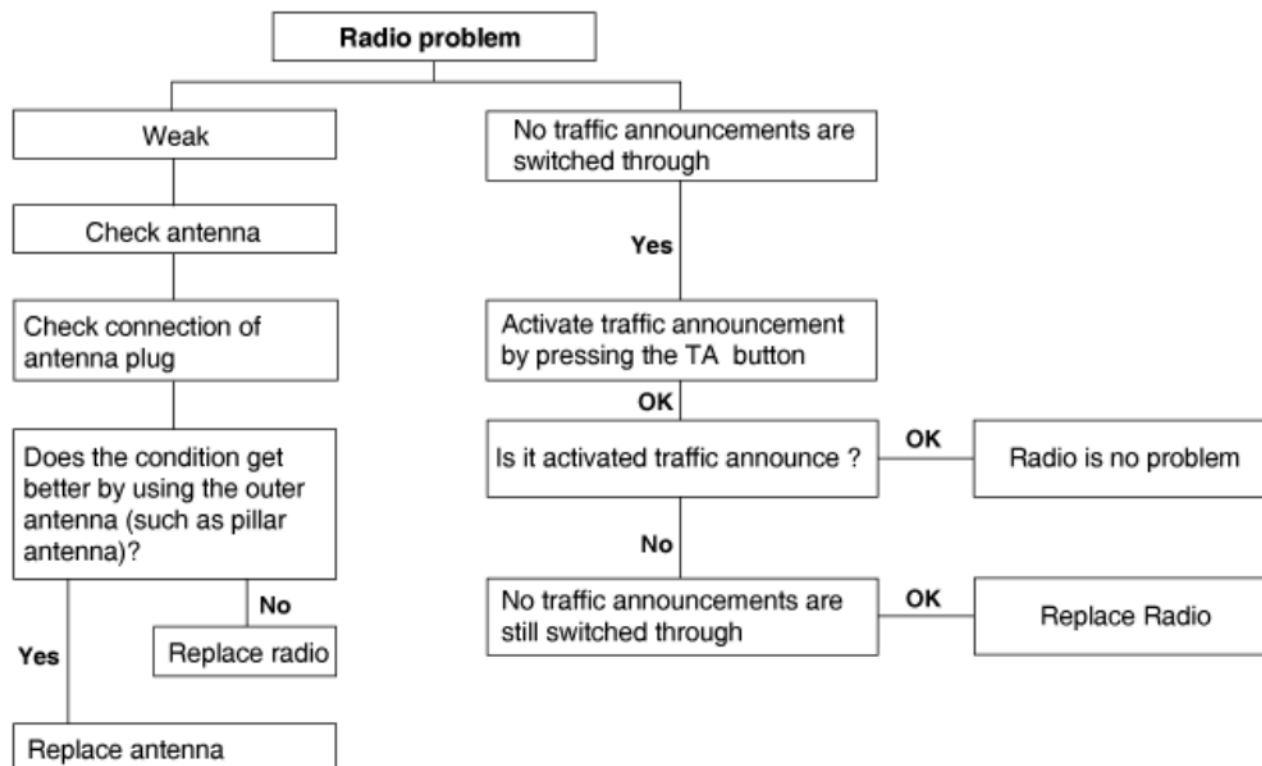


Chart 6



3. CD Check Procedure

Chart 1. CD Will Not Be Accepted

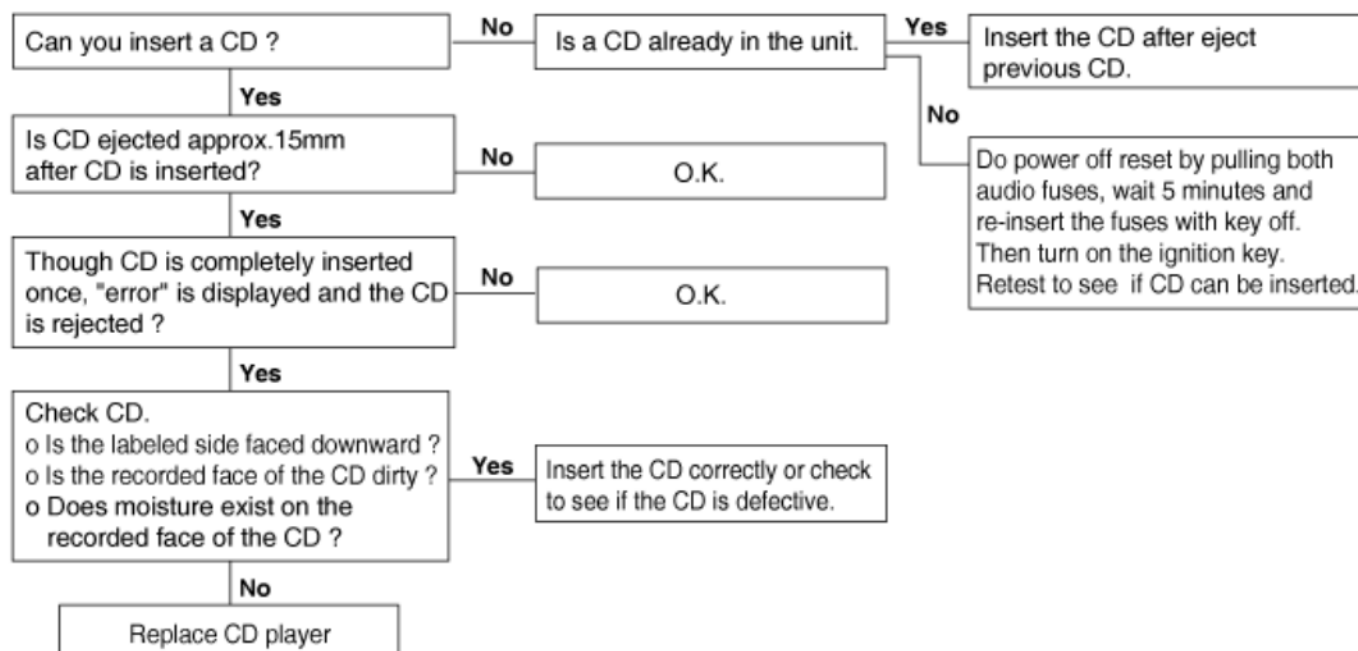
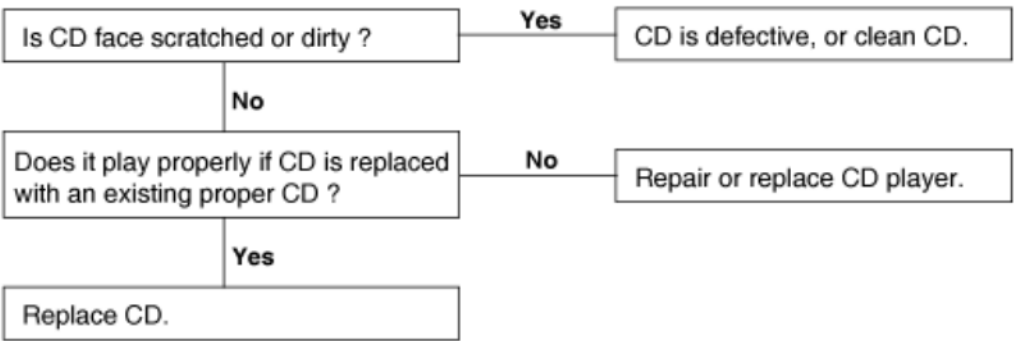


Chart 2. CD Sound Skips

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.)

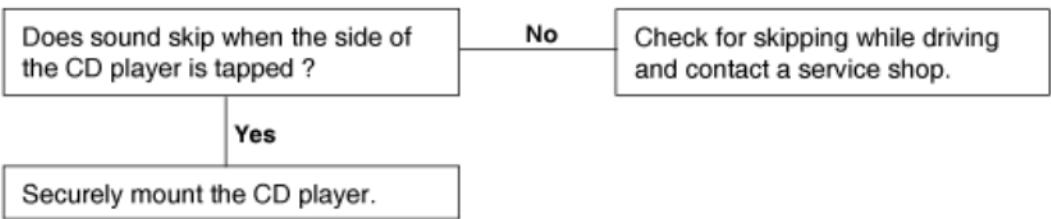
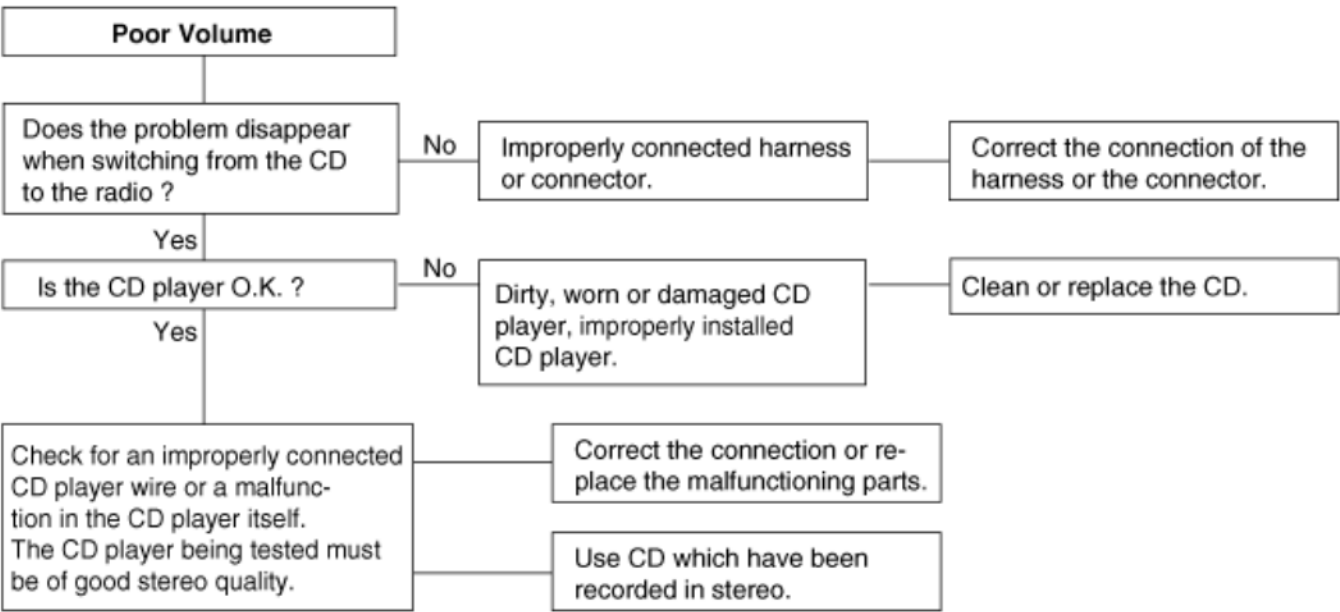
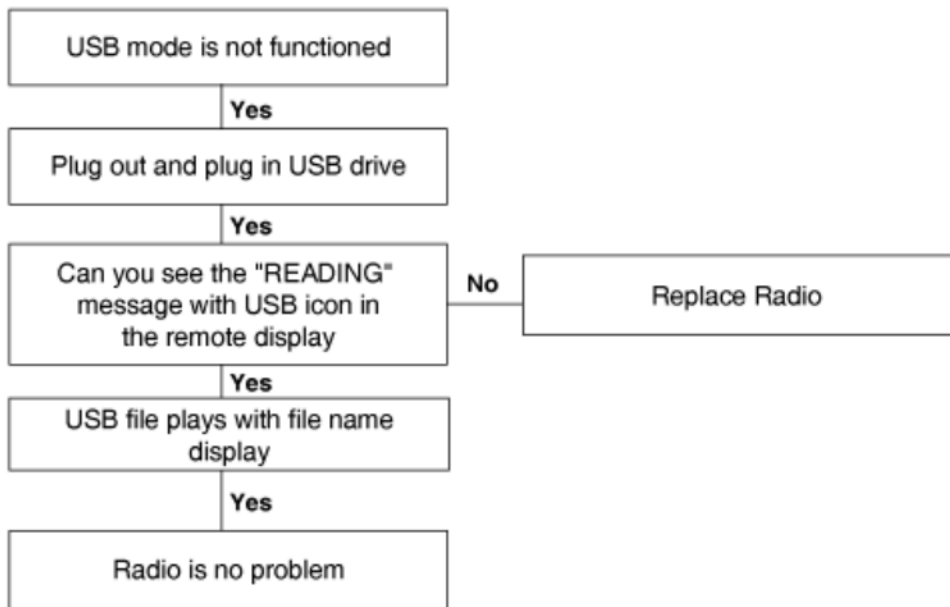


Chart 3



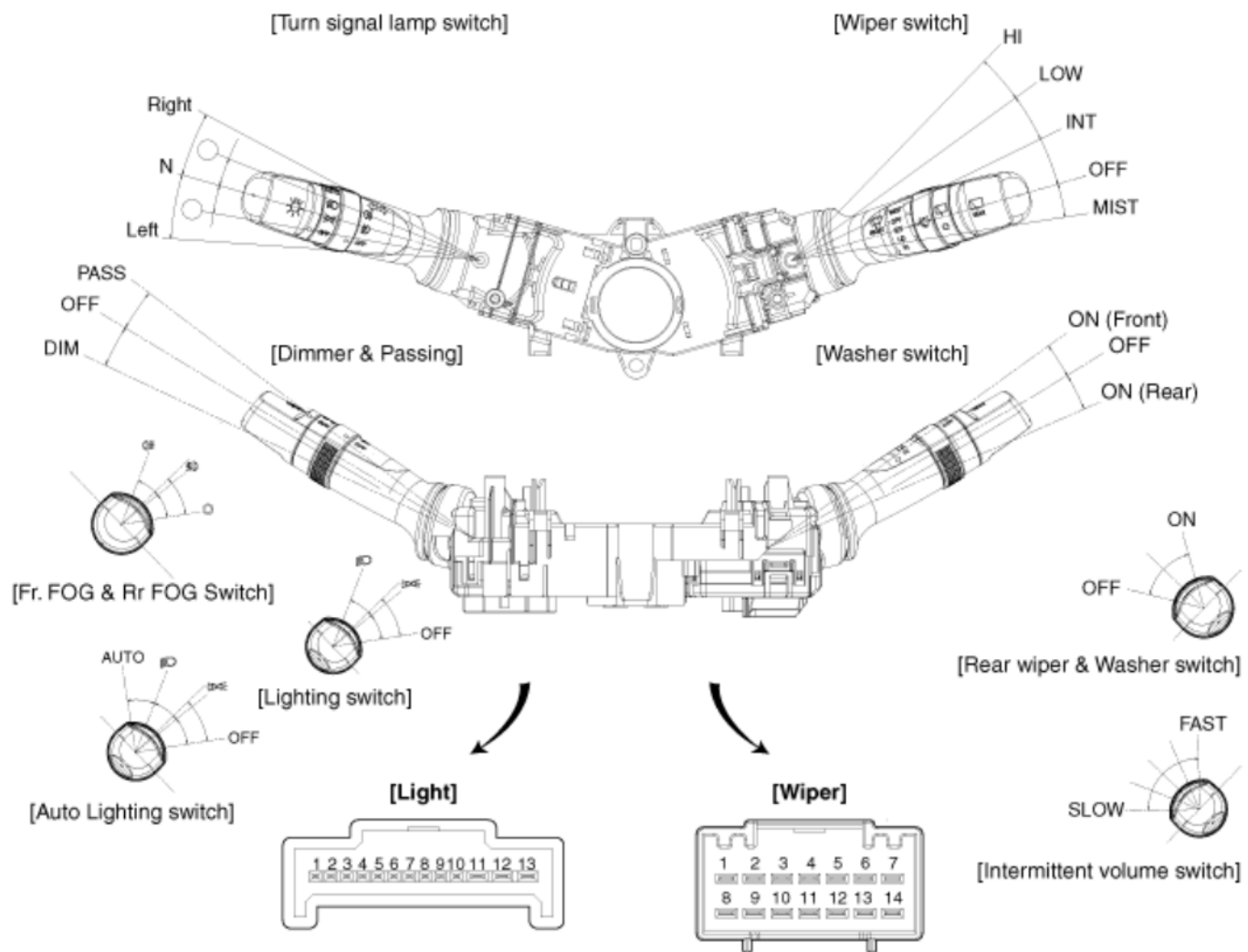
4. USB Check Procedure



SPECIFICATIONS

Items		Specifications
Rated voltage		DC 12V
Operating temperature range		-30°C ~ +80°C (-22 ~ +176°F)
Rated load	Dimmer & passing switch	High : 0.2A (Relay load) Low : 0.2A (Relay load) Passing : 0.2A (Relay load)
	Lighting switch	Lighting : 0.2A (Relay load)
	Turn signal switch	6.6 ± 0.5A (Lamp load)
	Wiper & mist switch	High : 4.5A (Motor load) Low : 4.5 A (Motor load) Intermittent : 0.22±0.05A(Relay Load) Lock : Max. 28A (Motor load) Mist : 4A (Motor load)
	Front & Rear fog lamp switch	0.2A (Relay load)
	Rear wiper & Washer	Wiper : 1A (Relay load) Washer : 4A (Motor load)

COMPONENT



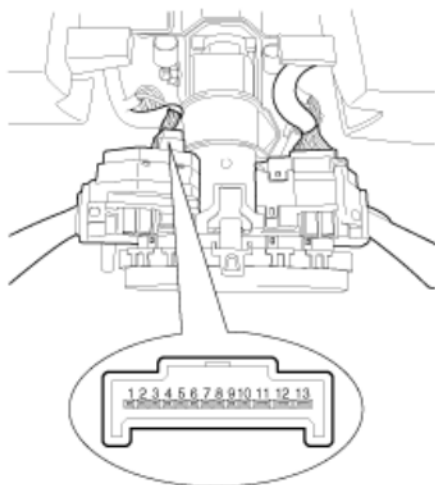
Circuit connection

Connector Name	Terminal No.	Description	Connector Name	Terminal No.	Description
Light	1	Tail lamp switch	Wiper	1	-
	2	Lighting switch ground		2	Rear wiper switch
	3	Auto light switch		3	Intermittent time base
	4	Head lamp switch		4	Intermittent volume base
	5	Fog switch base		5	Wiper Low speed
	6	Front fog lamp switch		6	Wiper parking
	7	Rear fog lamp switch		7	Mist switch
	8	Head lamp low beam		8	-
	9	Head lamp high beam		9	Rear washer
	10	Dimmer switch base		10	Rear wiper & washer IGN
	11	Turn signal lamp (LH) switch		11	Front washer switch
	12	Turn signal base		12	Front washer & wiper IGN
	13	Turn signal lamp (RH) switch		13	Wiper High speed
				14	Intermittent wiper switch

INSPECTION

Lighting Switch Inspection

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



Lighting Switch (Auto Light)

Terminal Position	1	4	3	2
OFF				
I	○	—	—	○
II	○	○	—	○
AUTO			○	○

Lighting Switch

Terminal Position	1	4	2
OFF			
I	○	—	○
II	○	○	○

Dimmer And Passing Switch

Terminal Position	2	9	8	10
HU		○	—	○
HL			○	○
P	○	○	—	○

HU : Head lamp high beam

HL : Head lamp low beam

P : Head lamp passing switch

Turn Signal Switch

Terminal		13	11	12
Hazard switch	Turn signal switch			
OFF	L		○—○	
	N			
	R	○—○		

Front Fog Lamp

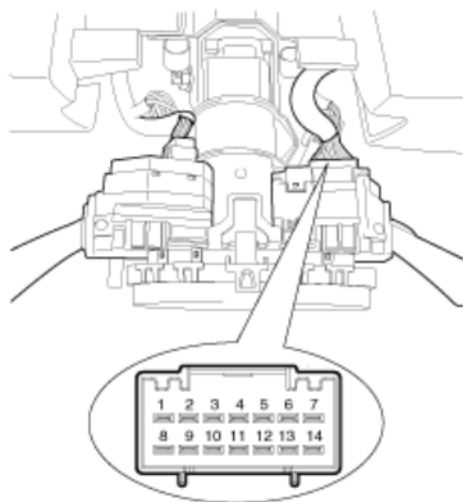
Terminal		5	6
Position			
OFF			
ON		○—○	

Rear Fog Lamp

Terminal		5	7
Position			
OFF			
ON		○—○	

Wiper And Washer Switch Inspection

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



Wiper Switch

Terminal		5	13	6	14	12	7	4	3
Position									
MIST		○—○				○—○			
OFF		○—○							
INT		○—○			○—○			○—○	
LOW		○—○			○—○				
HI			○—○		○—○				

Washer Switch

Terminal	11	12
Position		
OFF		
ON		

Rear Wiper & Washer Switch

Terminal	10	2	9
Position			
WIPER(ON)			
OFF			
WASHER(ON)			

REMOVAL

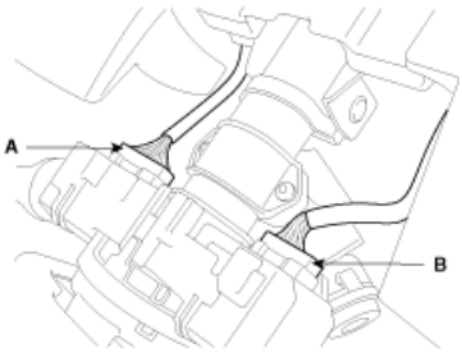
1. Disconnect the negative (-) battery terminal.
2. Remove the steering column upper and lower shrouds after removing 3 screws.



NOTICE

Remove the 2 screws (A,B) after turning the steering left and right.

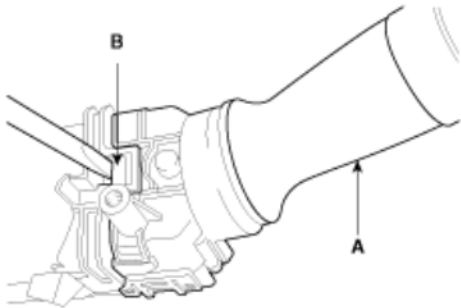
3. Disconnect the light switch connector (A) and the wiper switch connector (B).



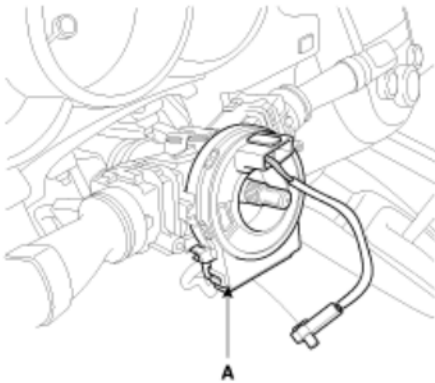
4. Remove the wiper switch (A) by releasing the lock (B).

NOTICE

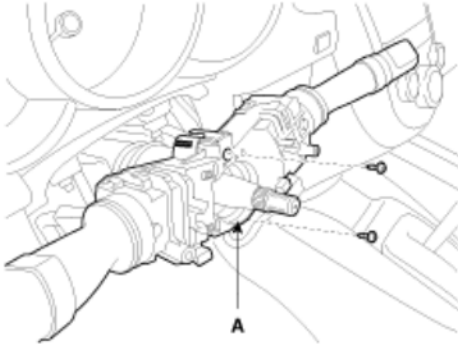
when removing the wiper & washer switch only, release the lock of wiper switch without removing the steering wheel.



5. Remove the clock spring(A).



6. Loosen the screws from the multifunction switch assembly (A).



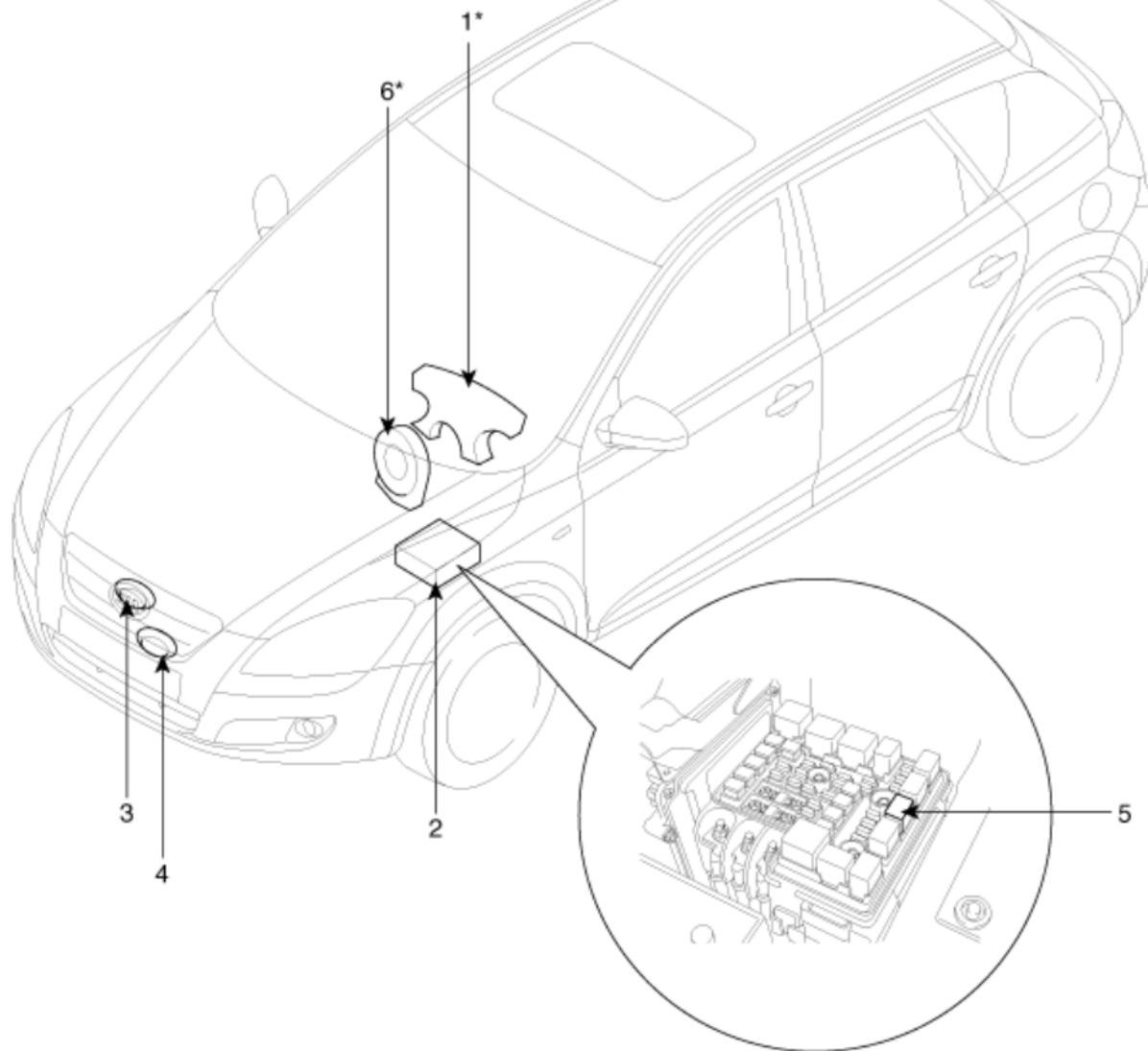
7. Remove the multifunction switch assembly after loosening the connectors.

INSTALLATION

1. Install the wiper switch then connect the lighting switch connector.
2. Install the lighting switch then connect the wiper switch connector.
3. Install the steering column upper and lower shrouds.

COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.

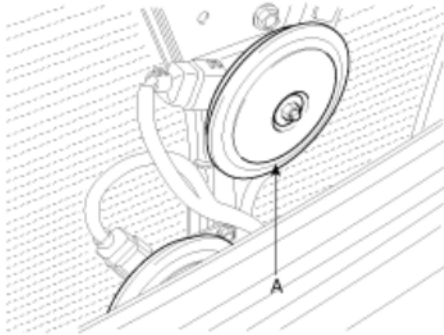


- 1. Horn switch
- 2. Relay box (Engine room compartment)
- 3. Horn (Low pitch - Single)

- 4. Horn (High pitch)
- 5. Horn relay
- 6. Clock spring

REMOVAL

1. Remove the front bumper. (Refer to the BD group - front bumper).
2. Remove the bolt and disconnect the horn connector, then remove the horn (A).



INSTALLATION

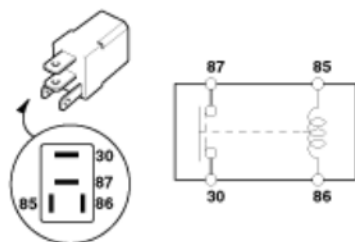
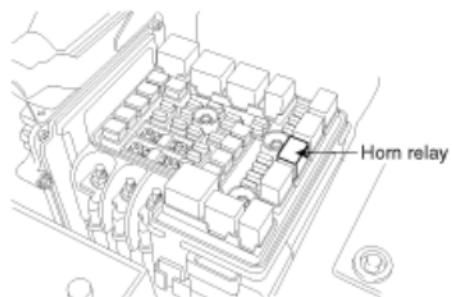
1. Install the horn after connecting the horn connector.
2. Install the front bumper.
(Refer to the BD group - Front bumper).

INSPECTION

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

HORN RELAY Inspection

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



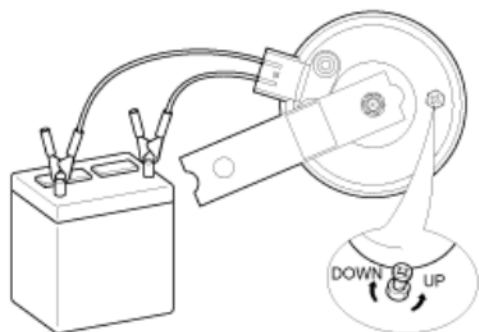
Terminal	30	87	85	86
Power				
Disconnected			○ — ○	
Connected	○ — ○		⊖ — ⊕	

ADJUSTMENT

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

NOTICE

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



SPECIFICATIONS

Item		Specification
Power supply		DC 14.4V (-) Negative ground
Load impedance		4 Ohm
Frequency range / Channel space		FM : 87.5~108.0MHz, AM : 522~1620KHz
Tuning type		PLL SYNTHESIZED TUNING
Antenna		FM/AM : 75 Ohm / GPS : 50 Ohm
Dark current		Max 2mA (Head unit)
S/N		FM : MIN 50 dB / AM : MIN 40 dB
Temperature range	CD	Operating : -4°F~ +158°F (-20°C~ +70°C) Storage : -22°F~ +185°F (-30°C~ +85°C)
	Radio	Operating : -4°F~ +149°F (-20°C~ +65°C) Storage : -22°F~ +176°F (-30°C~ +80°C)
	SET	Esouthecon & button : -40°F~ +176°F (-40°C~ +80°C) Storage : -40°F~ +176°F (-40°C~ +80°C)

CD Deck

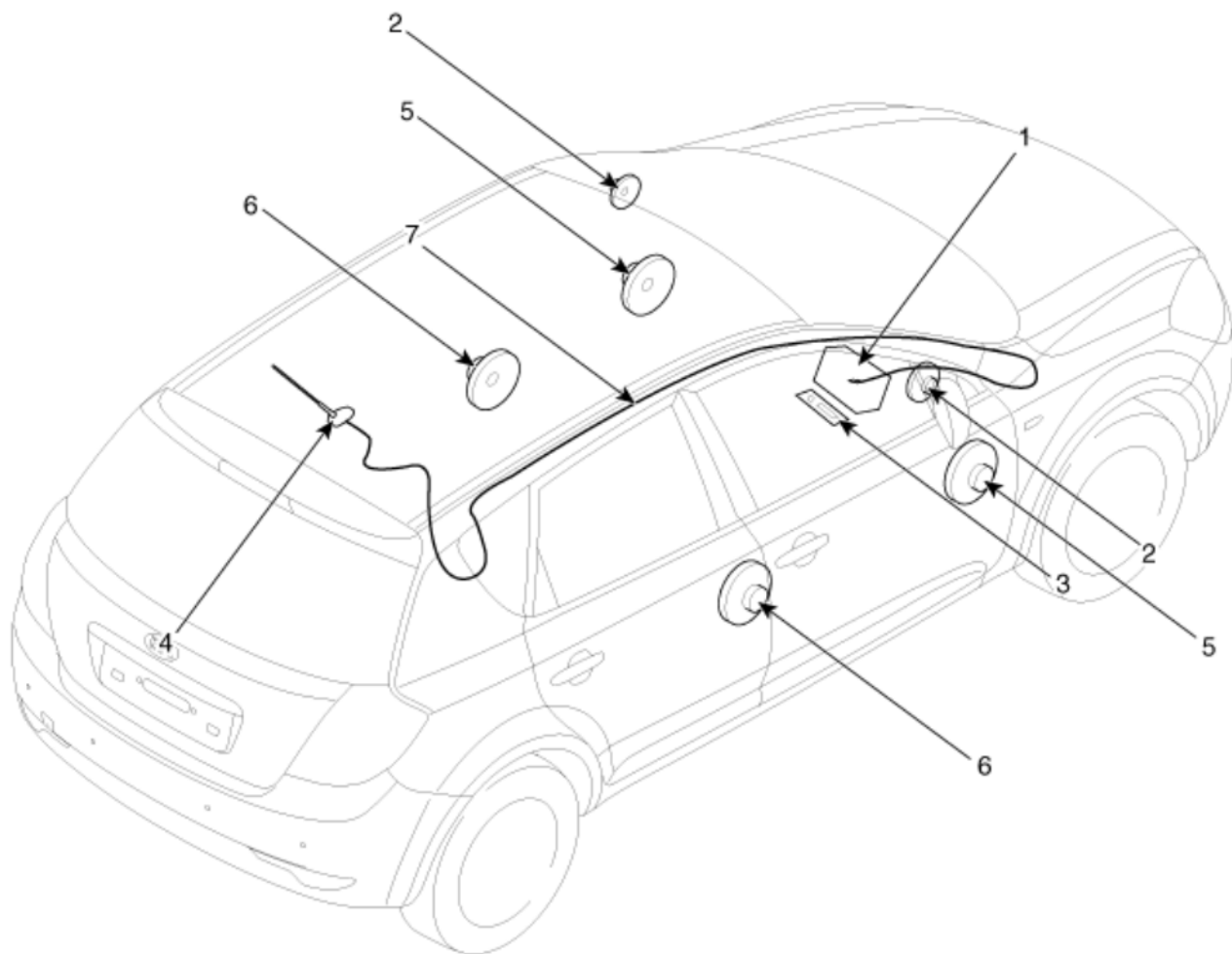
Item	Specification
Power supply	8V (1800mA)
Distorion	Max 0.3%

Speaker

Item		Specification
Input Power (W)	Front	40
	Rear	40
	Tweeter	40
Speaker Impedance (Ω)	Front	4.0 ± 0.6
	Rear	4.0 ± 0.6
	Tweeter	4.0 ± 0.6
Speaker Number		6

COMPONENT LOCATION

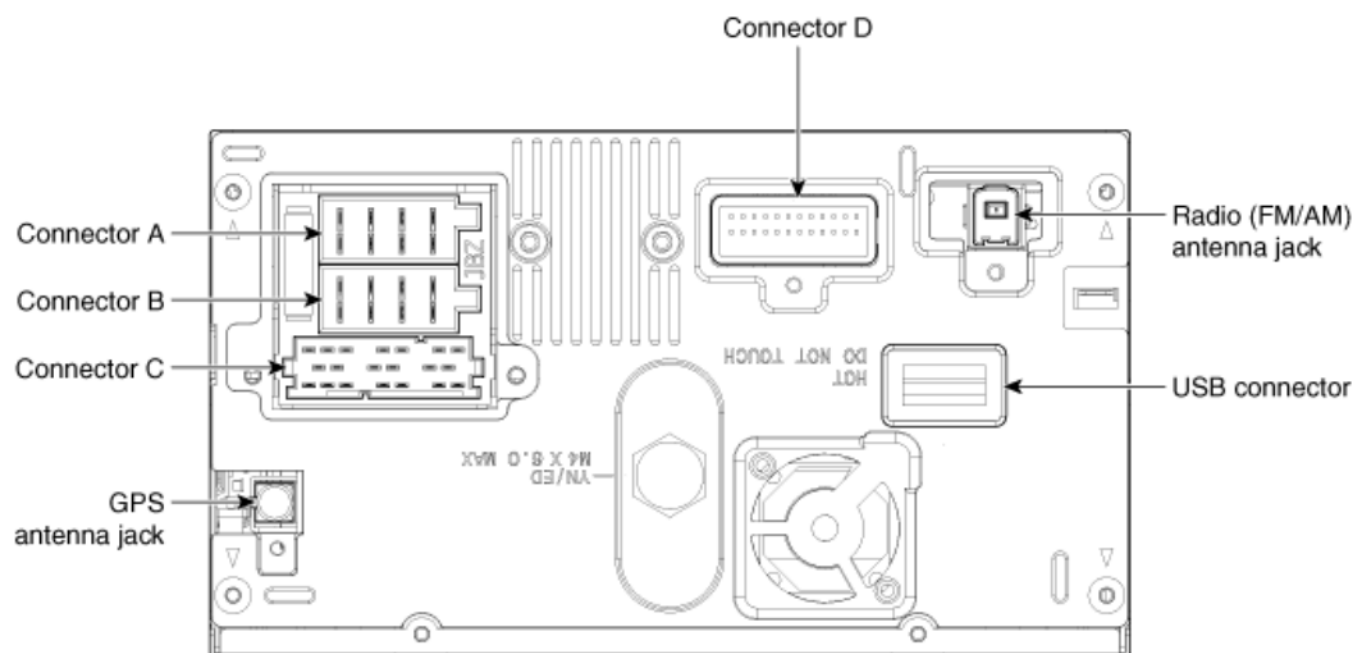
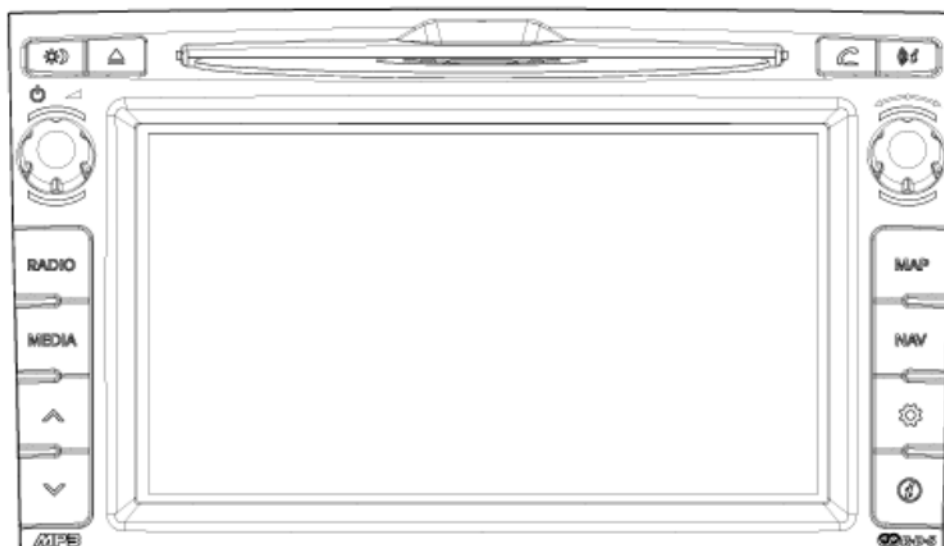
This illustration shows the LHD type.
RHD type is symmetrical.

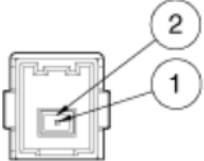


- | | |
|-------------------------------------|-------------------------|
| 1. AVN (A/V & Navigation) head unit | 5. Front door speaker |
| 2. Tweeter speaker | 6. Rear door speaker |
| 3. AUX Jack / USB Port | 7. Antenna feeder cable |
| 4. Roof antenna (Radio/GPS) | |

COMPONENTS

AVN (A/V & Navigation) Head Unit



Connector A	NO	Description	NO	Description
	1	Speed	5	R Inhibit
	2	Illumination (+)	6	ACC
	3	Remote antenna	7	Illumination (-)
	4	Battery (=)	8	Power GND
Connector B	NO	Description	NO	Description
	1	Speaker RR (+)	5	Speaker RR (-)
	2	Speaker FR (+)	6	Speaker FR (-)
	3	Speaker FL (+)	7	Speaker FL (-)
	4	Speaker RL (+)	8	Speaker RL (-)
Connector C	NO	Description	NO	Description
	1	Mic +	11	Aux Input DET
	2	Mic -	12	-
	3	Aux input right	13	LIN
	4	Aux input left	14	Parking
	5	Aux V GND	15	Door unlock
	6	-	16	Remote control
	7	HS CAN low	17	Remote control GND
	8	-	18	Aux video input
	9	Auto light input	19	-
	10	Aux GND	20	HS CAN high
Radio antenna	No.	Description	No.	Description
	1	Signal (FM/AM)	2	Ground
USB connector	No.	Description	No.	Description
	1	USB D (+) / iPod ground	3	USB D (-) / iPod TX (Navigation iPod)
	2	USB D (+) / iPod RX (Navigation iPod)	4	USB D (+) / iPod 5V

Connector D	No.	Description	No.	Description
	1	SPDIF output (+)	13	Camera B (+)
	2	SPDIF output (-)	14	Camera P ground
	3	SPDIF ground	15	Camera video
	4	Camera ON	16	Camera V ground
	5	Hands free voice (+)	17	Hands free voice (-)
	6	Navigation voice (+)	18	Navigation voice (-)
	7	-	19	-
	8	-	20	-
	9	Ambent (-)	21	-
	10	Audio (+)	22	Audio (-)
	11	Camera front / rear	23	CAN ground
	12	CAN High	24	CAN Low

LIMITATIONS OF THE NAVIGATION SYSTEM

GPS Signal Reception State

As the GPS satellite frequency is received/transmitted in straight lines, reception may not work if external devices are placed on or near the GPS antenna or when travelling through the following locations.

- Tunnels
- Basement parking structures
- Underneath an overpass
- Roads within forested areas
- Areas near high rise buildings
- Roads within canyons

Vehicle Position Display

1. If multipass errors occur due to reflections from buildings or related causes, the current position mark on the navigation may differ from the actual position of the vehicle.
2. The position of the vehicle on the navigation may be different from the actual position. If the vehicle is under the occurrence, driving for a short period of time will allow vehicle to go through map matching or GPS information (several minutes may be necessary in certain cases).
 - When driving on a Y-shaped road with a narrow angle, the current position may be displayed in the opposite direction.
 - If the vehicle is loaded onto a car transport vehicle, the current position mark may be stalled on the last position prior to loading.
 - When driving on a spiral-shaped road.
 - When driving in mountain regions with sharp turns or sudden brakes.
 - When entering a road after having been in an underground parking structure, building parking structure, or turnable with many rotations.
 - When the tires have recently been replaced (Especially upon use of spare or studless tires)
 - If the battery terminal is removed.
 - When driving in city streets, the current position may be displayed on the opposite side or on an off-road position.
 - When changing the zoom level from the maximum zoom in level to a different zoom level, the current position mark may be displayed on a different road.
 - When driving in heavy traffic with frequent stop and go in traffic or intersections.
 - When driving under slippery conditions, such as heavy sand, snow, etc.
 - When driving with the tire chain in place.
 - When using a tire with an incorrect size specification.
 - When the tire pressure for the 4 tires are different.
 - When the replacement tire is a worn or used tire (Especially studless tires having passed a 2nd seasons, etc.)
 - When driving near high-rise buildings
 - If a roof carrier has been installed
 - When driving under high speeds or having calculated a long-distance route.

Route Guidance

Suitable route guidance may not occur caused by search conditions or the driving position.

English ▼

- Guidance to go straight may be given while driving on a straight road.
- Guidance may not be given even when having turned at an intersection.
- There are certain intersections in which guidance may not occur.
- A route guidance signaling entrance into a no enter zone may occur (No enter zone, road under construction, etc.)
- Guidance may be given to a position removed from the actual destination if roads to reach the actual destination do not exist or are too narrow.
- Faulty voice guidance may be given if the vehicle breaks from the designated route (ex : if a turn is made at an intersection while the navigation provided guidance to go straight).
- Map Data may be missing or incorrect causing route guidance to not be given.

Route Re-calculation

The following phenomena may occur after conducting route recalculation.

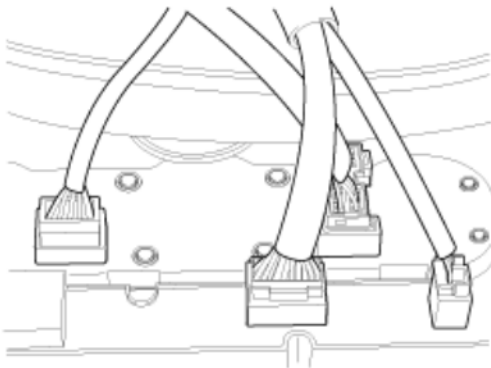
- Guidance may be given to a position differing from the current position when turning at an intersection.
- Route recalculation may take a longer period of time when driving under high speeds.
- A route guidance signaling for a U-Turn in a No U-Turn location may occur.
- A route guidance signaling entrance into a no enter zone may occur (No enter zone, road under construction, etc).
- Guidance may be given to a position removed from the actual destination do not exist or are too narrow.
- Faulty voice guidance may be given if the vehicle breaks from the designated route (ex : if a turn is made at an intersection while the navigation provided guidance to go straight)

REMOVAL

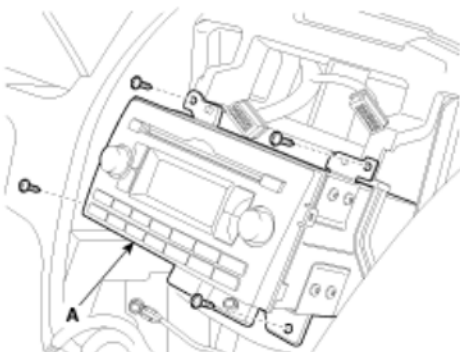
1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad center facia panel (A).
(Refer to the BD group - "Crash pad")



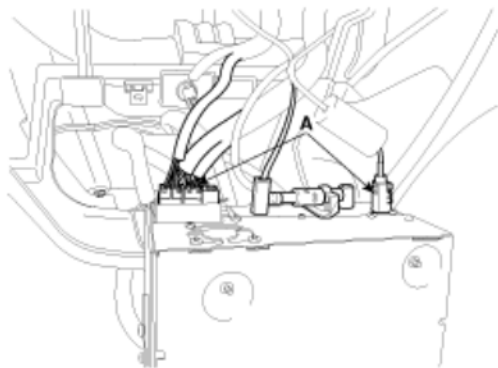
3. Disconnect the connectors from the crash pad center facia panel.



4. Remove the mounting bolts then remove the AVN head unit (A).



5. Disconnect the AVN head unit connectors and cable (A).

**NOTICE**

When the compact disc is not ejected, do not remove it forcibly.

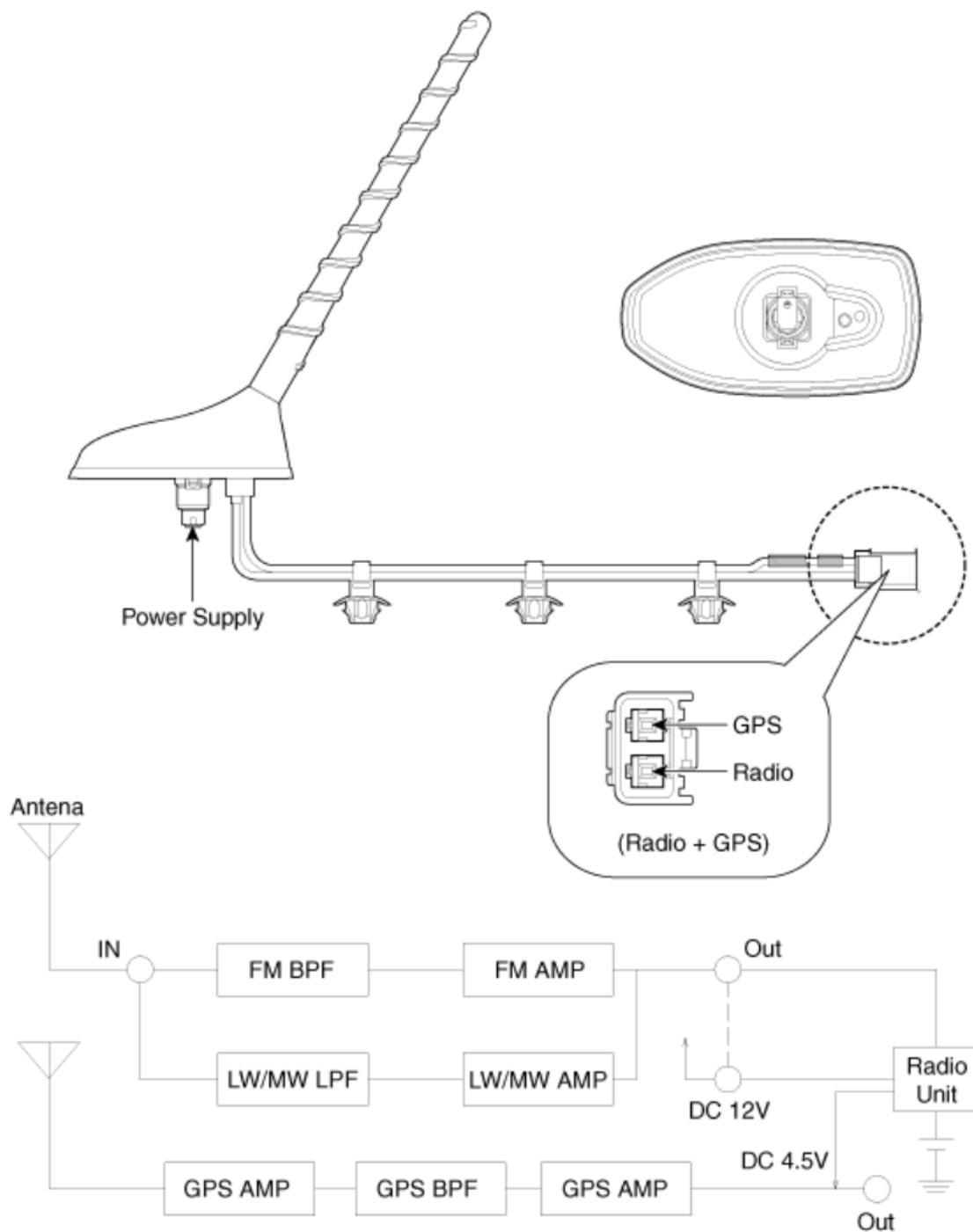
INSTALLATION

1. Connect the AVN head unit connectors and cable.
2. Install the AVN head unit.
3. Install the crash pad center facia panel.
4. Connect the negative (-) battery terminal.

NOTICE

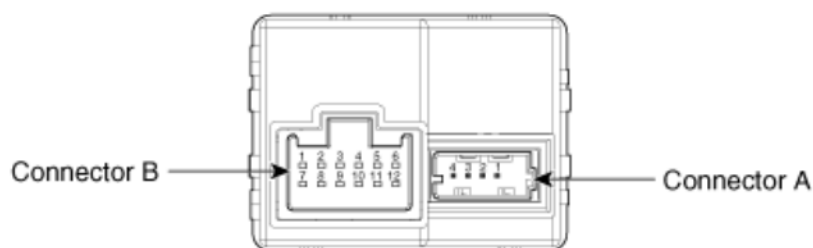
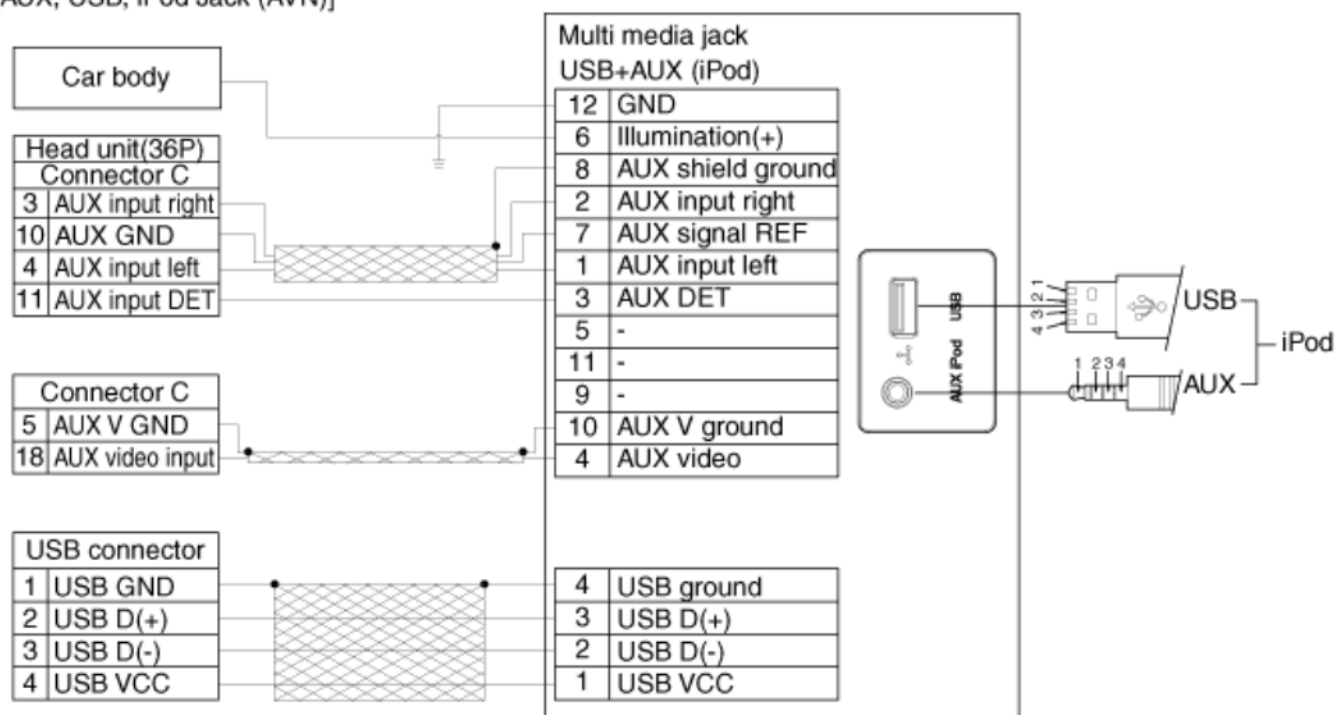
- 1) Make sure the connector are connected in properly.
- 2) Check the AVN system.

COMPONENTS



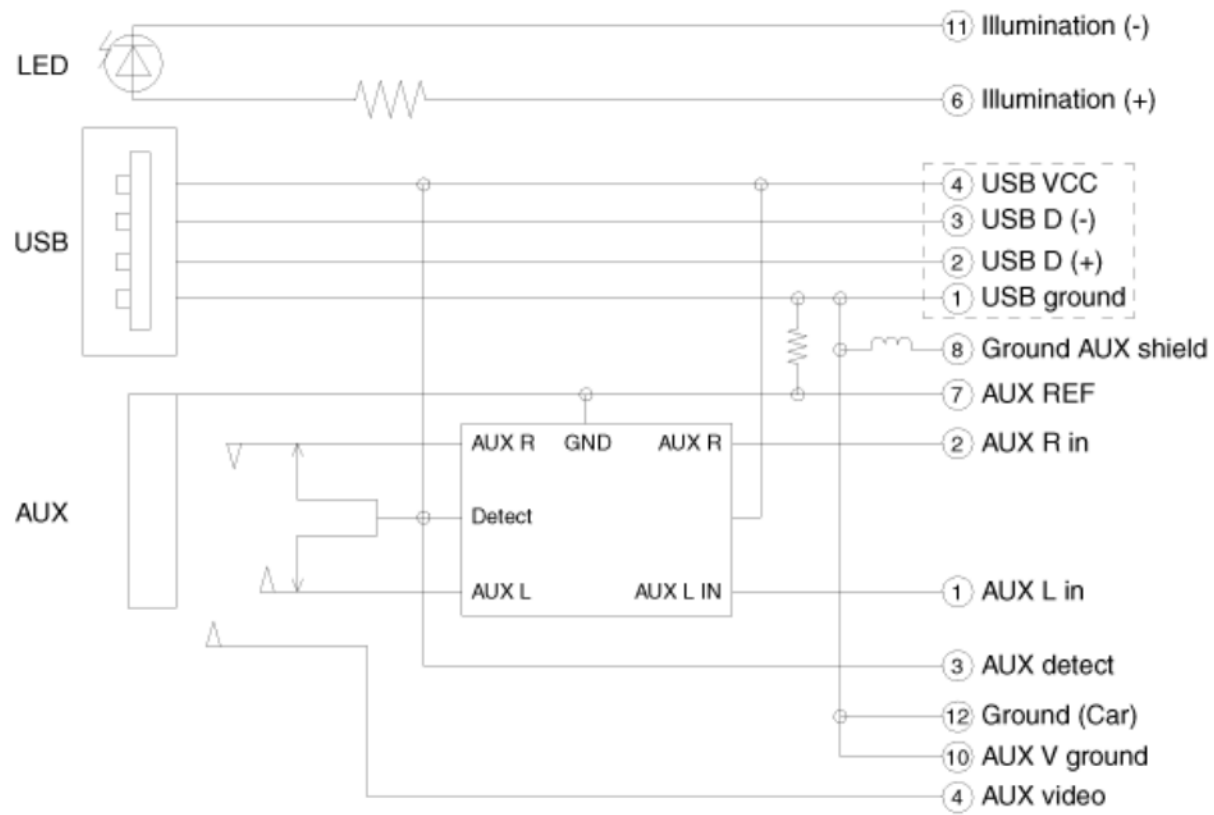
CIRCUIT DIAGRAM

[AUX, USB, iPod Jack (AVN)]



Connector A	No.	USB Connector
	1	USB ground
	2	USB D (+)
	3	USB D (-)
	4	USB VCC

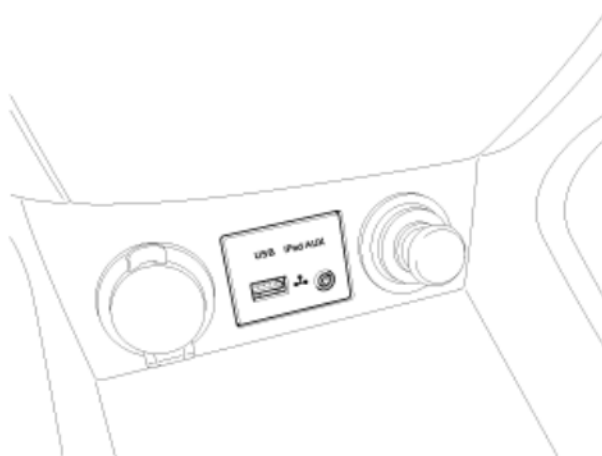
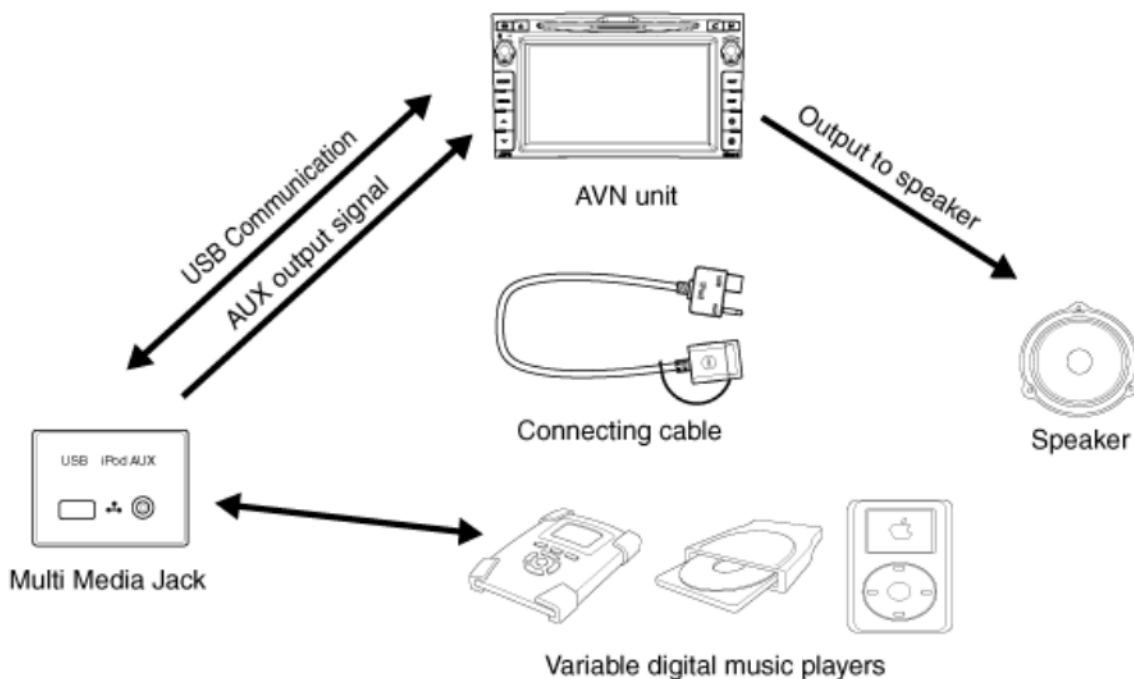
Connector B	No.	AUX(iPod) Connector
	1	AUX input left
	2	AUX input right
	3	AUX detect
	4	AUX video
	5	-
	6	Illumination(+)
	7	AUX signal REF
	8	AUX shield ground
	9	-
	10	AUX V ground
	11	Illumination(-)
	12	ground



DESCRIPTION

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

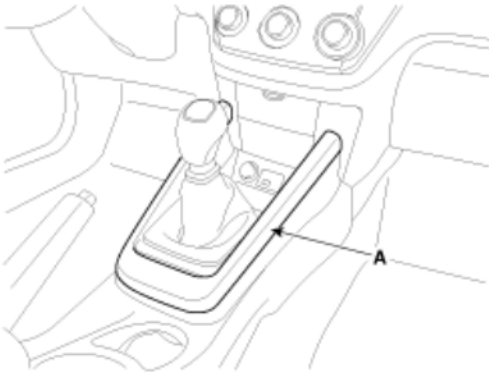
In case of distortions from media connected to the AUX source, the audio unit may not be defect but the output level of the used media does not match the specification of the AUX input.



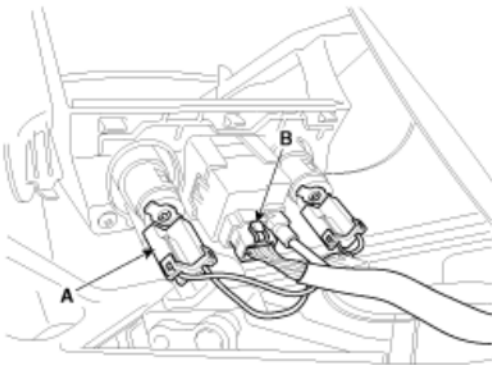
REMOVAL

Multi Media Jack

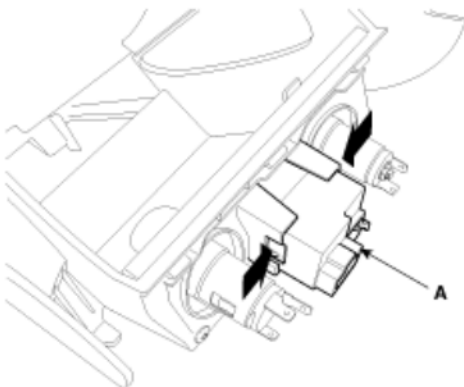
1. Remove the upper cover (A) on the floor console.
(Refer to the BD group - "Console")

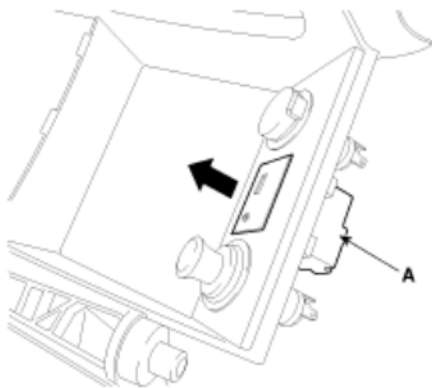


2. Disconnect the power outlet connector (A) and multi media jack connector (B) from under cover.



3. Remove the multi media jack (A) after disconnecting the multi media jack connector.





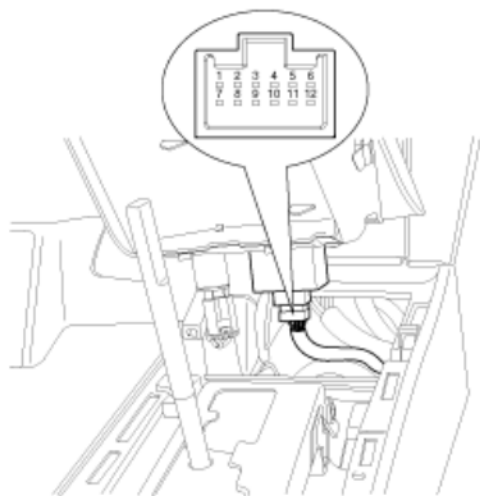
INSTALLATION

Multi Media Jack

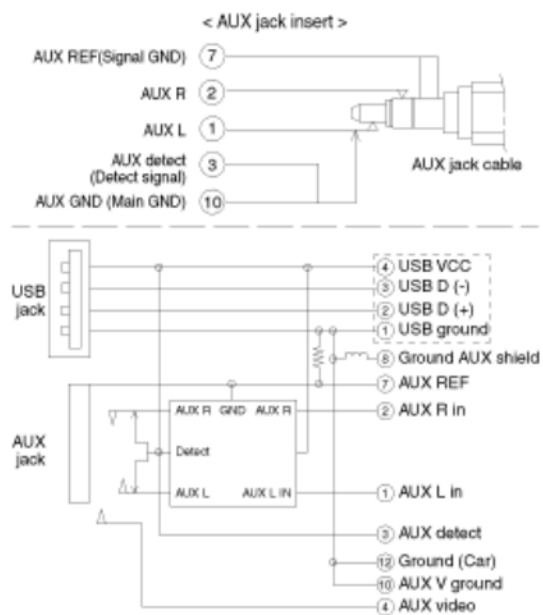
1. Install the multi media jack.
2. Connect the multi media jack connector.
3. Install the under cover to the floor console.

INSPECTION

1. Disconnect the negative(-) battery terminal.
2. Disconnect the multi media jack connector after removing the under cover.



3. To inspect USB / iPod port, check the voltage between NO.1 and 4 terminal of.
Standard value : 5V
4. To inspect AUX jack, check the voltage between NO. 3 and 7 terminal of AUX jack / Audio jack input.
Standard value : 5V
5. Using an ohmmeter, check for continuity between the terminals of multi media jack connector.



TROUBLESHOOTING

Check Procedure

Status	Cause	How to check
Audio/ MP3 rejected by the unit.	1) CD may be dirty	1) Clean CD with damp cloth. 2) The CD does not comply with the CD player specification. 3) See notes on Audio and MP3 CDs
The operating panel generates some heat.	1) No error	1) Normal. The unit feels warm.
The volume decreases automatically.	1) An integrated safety circuit prevents the temperature in the unit from exceeding a certain value.	1) Allow the unit to cool down (set low volume)
Navigation radio not functioning, no function of display	No power supply	Check the fuse (unit and vehicle) and the connections
No radio reception		1) Check if the antenna is completely and correctly connected.
Poor radio reception		1) Antenna (disc antenna) obscured, antenna rod bent or antenna defective. 2) Please arrange for an authorized dealer to check the antenna.
The frequency instead of the station name is displayed.		1) The unit is tuned to a station that does not transmit RDS signals or the transmitter is too weak.
The required station cannot be tuned to using automatic search.	1) The desired station is too weak.	1) Set desired station manually (manu. tuning) 2) Check whether the antenna is completely and correctly connected.
No traffic announcements are switched through (during CD playback)		1) Activate the traffic announcement by pressing the TA button
Distorted sound/skips during CD play.		1) Player cannot read CD. CD is damaged or soiled.
CD player does not work	1) In cold weather conditions, condensation may occur on the laser.	1) With the set on, wait for 5 minutes until the condensation evaporates.
No sound during CD playback		1) Some CDs contain multimedia data which is not recognized by the unit.

		2) Advance the tracks until music is heard. 3) See notes on Audio and MP3 CDs.
Problems with new copyprotected audio CDs.	1) See notes on Audio and MP3 CDs.	1) Some copy protection procedures are incompatible with acceptable standards for audio CDs. This is not a fault on the unit.

Navigation Check Procedure

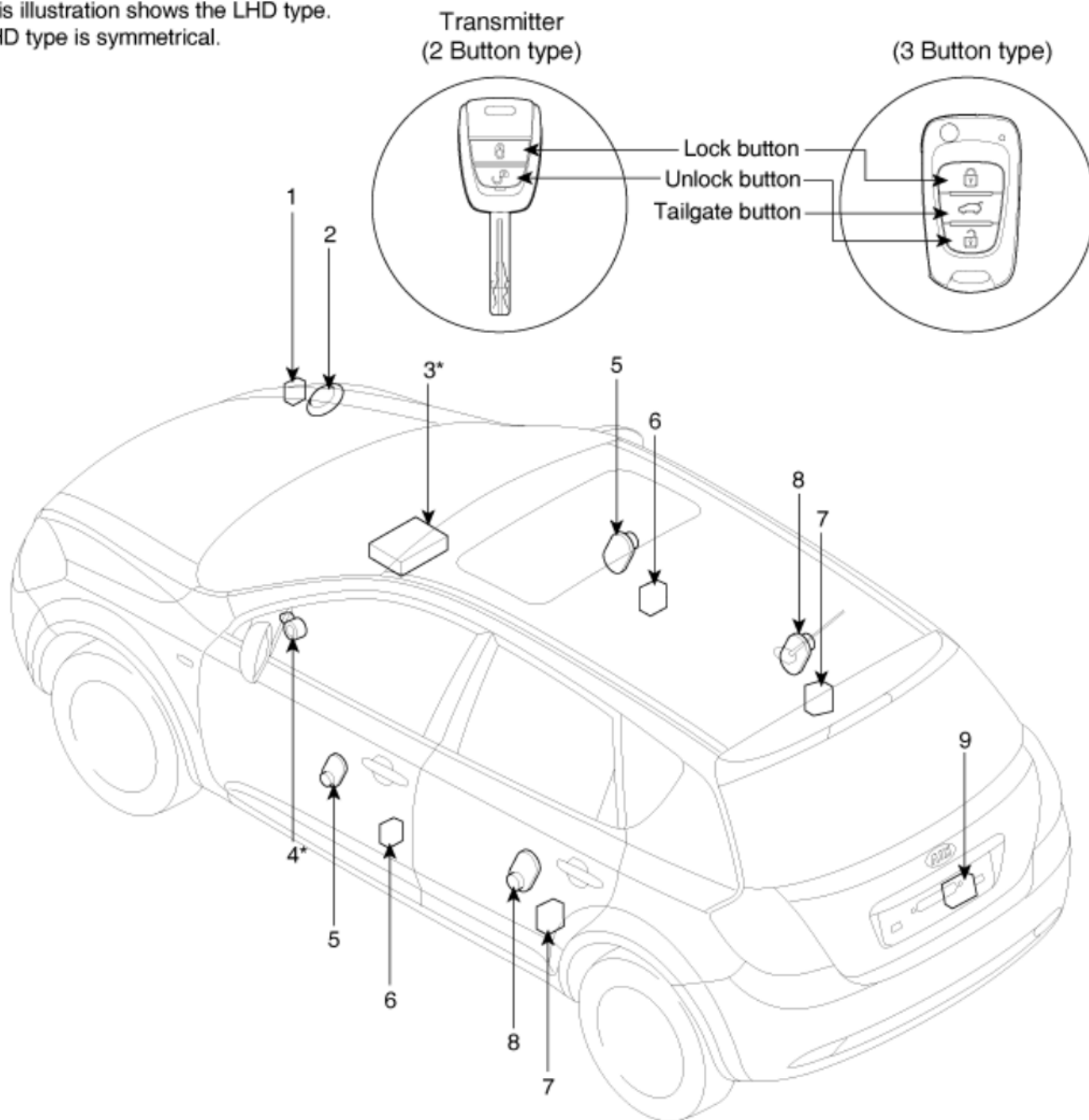
Status	Cause	How to check
Display shows "Please insert map CD"	The map CD is required for some functions in navigation mode.	Insert the C-IQ map CD into the radio CD drive with the label facing upwards.
The direction advices cannot be heard or are very quiet.	Navi volume too low	Set the navigation volume in the setup menu under "Navigation → Navi volume"
Guidance is not accurate	An inaccuracy of approx. 30 m is within the tolerance limits.	1) If greater inaccuracies occur repeatedly, please contact your dealer. 2) The displayed distance to the turning point is calculated to the centre of the junction (especially for extended junctions and mainroad exits).
Display position does not correspond to the actual traffic conditions.	It is possible that the car's position as calculated by the navigation system is not currently correct.	The routing may have been changed and does not correspond with the information stored on the map CD.
Displayed time is incorrect.		Adjust the time zone using the "Clock/Date → Time Zone" option in the setup menu
Estimated time of arrival displayed on the guidance screen is incorrect.		Check the time zone using the "Clock/Date → Time Zone" option in the setup menu

SPECIFICATIONS

ITEM	
Rated voltage	DC 3V
Service voltage range	DC 2.7V ~ 3.5V
Temperature range	-4°F ~ 140°F (-20°C ~ +60°C)
Storage temperature range	-22°F ~ 176°F (-30°C ~ +80°C)
DARK CURRENT	MAX 0.1mA
Modulation method	FM(Frequency Modulation)
FREQUENCY	433.92MHz
CODE	Rolling Code
Lifetime of a dry cell	20 years (20 times/day)

COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



1. Hood switch
2. Burglar horn
3. Body control module
4. Key warning switch
5. Front door switch

6. Front door lock actuator & switch
7. Rear door lock actuator & switch
8. Rear door switch
9. Tailgate actuator & switch

DESCRIPTION

Burglar Alarm System

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

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

- A door is forced open.
- The tailgate is opened.
- The hood is opened.

When the system is set off, the alarm sounds and the hazard lamp flash for about 30 seconds or until the system is disarmed by unlocking the transmitter or door key.

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

The door switches, hood switch and tailgate switch are all close and lock the doors with the remote transmitter and then the system arms immediately.

If anything is opened after the system is armed, the body control module gets a ground signal from that switch, and the system is set off.

If one of the switches is misadjusted or there is a short in the system, the system will not arm. As long as the body control module continues to get a ground signal, it thinks the vehicle is not closed and locked and will not arm.

Keyless Entry System

The burglar alarm system is integrated with the keyless entry system. The keyless entry system allows you to lock and unlock the vehicle with the remote transmitter. When you push the LOCK button, all doors lock. When you push the UNLOCK button again, all doors unlock. The room lamp, if its switch is in the center position, will come on when you press the UNLOCK button. If you do not open a door, the light will go off in about 30 seconds, the doors will automatically relock, and the burglar alarm system will rearm. If you relock the doors with the remote transmitter within 30 seconds, the light will go off immediately.

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

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

FUNCTION

Keyless Entry Function

DOOR LOCK / UNLOCK and Tailgate (Folding key only) operation are performed with remocon

1. Keyless entry function is performed in a state that key in SW is eliminated from key cylinder
2. LOCK / UNLOCK and tailgate signals are received from the transmitter and DOOR LOCK / UNLOCK and Tailgate signals are output.

Transmitter(tx) Spec

1. Transmission Distance : 30m or more from outside of the car
2. Registration procedure of the transmitter
 - (1) In registration mode, it shall be possible to register up to Max 4EA.
 - (2) At re-registration, data are registered newly after deleting the previous TX DATA

No.	Saved CODE	CODE to change	Changed CODE
1	-	A	A
2	A	B	B (A is deleted)

3	B	C, D	C, D (B is deleted)
4	C, D	E, F, G	E, F, G (C, D is deleted)
5	E, F, G	H, I, J, K	H, I, J, K (E, F, G are deleted)
6	A, B	C, F, E, F, G	C, F, E, F
7	A, B	C, C, D, E, F	C, D, E, F
8	A, B, C, D	A	A
9	A, B, C, D	E	E

(3) For the registration procedures by using Hi-scan tool, refer to "TRANSMITTER CODE REGISTRATION".

3. Transmitter signal & Receiver Spec

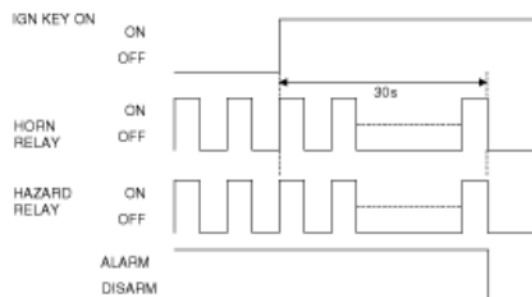
(1) Transmission signal

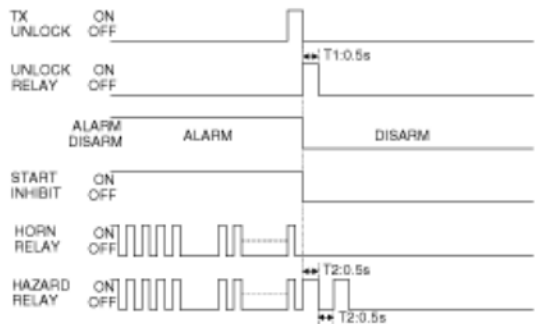
- Transmit relevant transmission DATA (Transmission frame) twice by pushing TX SW.
- Only LOCK signal is output when pushing TX LOCK SW and UNLOCK SW at the same time.

DISARM

Condition 1

State	Description
Initial Condition	ALARM state
Event	• IGN KEY ON during 30sec or ALT"L" = ON • TX(Transmitter) Unlock & Any Door open(4Door SW ON) • TX(Transmitter) Lock & Lock confirm failed • Driver door key unlock switch ON. • Driver door key lock SW ON & Lock confirm failed • TX tailgate ON (Folding key type only : 3 button).
Action	• The state goes to DISARM state • Hazard relay off, Horn relay off and start inhibit relay off. • TX Unlock – Unlock relay on for 0.5 sec. – Hazard relay on (TWICE)





Condition 2

State	Description
Initial Condition	DISARM state & (IGN KEY OUT) & Any Door open
Event	TX Unlock
Action	- No state change - TX UNLOCK - Unlock relay on for 0.5 sec - Hazard relay on (Twice)

Condition 3

State	Description
Initial Condition	ARMWAIT state
Event	- At least one entrance opened - Any door is unlocked - Key in SW ON - Driver door key unlock SW ON
Action	The state goes to DISARM state

Condition 4

State	Description
Initial Condition	AUTOLOCKTIMER1 state
Event	- At least one entrance opened - Key in SW ON - Lock by AUTOLOCK, but Lock confirmation failure - Tx Lock, but Lock confirmation failure - Driver door key unlock SW ON, but Lock confirmation failure
Action	The state goes to DISARM state

Condition 5

State	Description
Initial Condition	AUTOLOCKTIMER2 state
Event	- Any Door open - Key in SW ON - Lock by AUTOLOCK, but Lock confirmation failure - Tx Lock, but Lock confirmation failure - Driver door key lock SW ON, but Lock confirmation failure
Action	The state goes to DISARM state

Condition 6

State	Description
Initial Condition	ARM state
Event	- IGN KEY ON - Driver door key unlock SW ON
Action	The state goes to DISARM state

Condition 7

State	Description
Initial Condition	REARM state
Event	- IGN KEY ON during 30sec or ALT"L" = ON - Tx Lock, but Lock confirmation failure - Driver door key unlock SW ON - Driver door key lock SW ON & Lock confirmation failure - TX tailgate ON (Folding key type only : 3 button).
Action	- The state goes to DISARM state - Start Inhibit relay OFF

Condition 8

State	Description
Initial Condition	PREARM state
Event	- Key in SW ON - All entrance closed & Any Door is unlocked - Any Door open & Tx Unlock
Action	- The state goes to DISARM state - TX UNLOCK - Unlock relay on for 0.5sec

– Hazard relay on (Twice)

Condition 9

State	Description
Initial Condition	AutoLockTimer3 state
Event	• Key in SW ON • Hood open • Any Door open • Lock confirm failed
Action	• The state goes to DISARM state

ARM

– LED is Blinking

Condition 1

State	Description
Initial Condition	ARM state
Event	• Tx Lock
Action	• No state change • Hazard relay 1Time on(1sec)

Condition 2

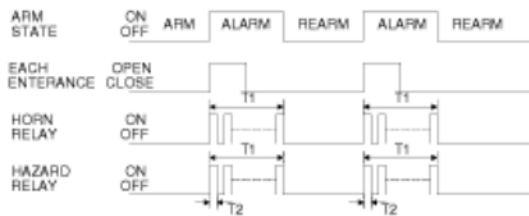
State	Description
Initial Condition	ARMWAIT state
Event	• ARMWAITTIMER is expired
Action	• The state goes to ARM state

ALARM

– LED is Blinking

Condition 1

State	Description
Initial Condition	ARM state
Event	• Any entrance open (DOORS, TAILGATE, or HOOD)
Action	• The state goes to ALARM state • The horn is ON one time for 27sec(±2sec) • The hazard is driven also (During Horn driving) • Engine Start Inhibit is ON



T1 : 27s ± 2sec, T2 : 0.5s ± 0.1sec.

NOTICE

Horn Output : Period : 1sec(Can be calibrated Horn Period), 50% Duty

Condition 2

State	Description
Initial Condition	REARM state
Event	Any door open or Hood open or tailgate open
Action	- The state goes to ALARM state - The horn is ON one time for 27sec (±2sec.) - The hazard is driven also (During horn driven)

ARM WAIT MODE

- LED is turn on

Condition 1

State	Description
Initial Condition	ARMWAIT state
Event	Tx Lock
Action	- The state goes to State - TX LOCK - Hazard relay 1 Time on(1sec)

Condition 2

State	Description
Initial Condition	DISARM state & IGN KEY OUT & All entrances closed (DOORS, HOOD and TAILGATE)
Event	- Tx Lock & locked confirmed - Driver door key lock SW ON & Locked confirmed

Action	• The state goes to ARMWAIT State • Start ARMWAITTIMER • TX LOCK & locked confirmed. – Hazard relay 1 Time on (1 sec.)
--------	---

Condition 3

State	Description
Initial Condition	ALARM state & All entrances closed(DOORS, HOOD and TAILGATE)
Event	• Tx Lock & locked confirmed • Driver door key lock SW ON & Locked confirmed
Action	• The state goes to ARMWAIT state • Start ARMWAITTIMER • Horn relay off • Start inhibit relay off • Hazard relay 1Time on(1sec)

Condition 4

State	Description
Initial Condition	AUTOLOCKTIMER1 state
Event	• AUTO LOCK confirmed • Tx Lock & locked confirmed • Driver door key lock SW ON & Locked confirmed
Action	• The state goes to ARMWAIT state • Start ARMWAITTIMER • Hazard relay 1Time on(1sec)

Condition 5

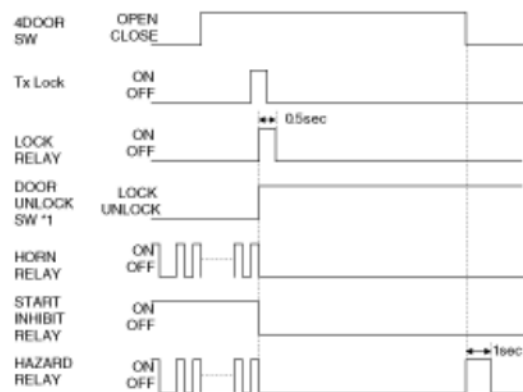
State	Description
Initial Condition	PREARM state
Event	• Hood and 4door are closed & All doors locked & Tailgate closed.
Action	• The state goes to ARMWAIT state • Start ARMWAITTIMER • Hazard relay 1Time on(1sec) • Dead lock • Tailgate mark = set

Condition 6

State	Description
Initial Condition	REARM state
Event	• Tx Lock & locked confirmed • Drive door key lock SW ON & locked confirmed
Action	• The state goes to ARMWAIT state • Start ARMWAITTIMER • Start inhibit relay off • Hazard relay 1Time on(1sec)

Condition 7

State	Description
Initial Condition	Auto Lock Timer3 state
Event	• Tx Lock & locked confirmed • Drive door key lock SW ON & locked confirmed
Action	• The state goes to ARMWAIT state • Start ARMWAITTIMER • Start inhibit relay off • Hazard relay 1Time on(1sec)



*1 : Lock : Driver door unlock SW or Passenger door unlock SW or Rear door unlock SW is LOCK
 Unlock : Driver door unlock SW or Passenger door unlock SW or Rear door unlock SW is UNLOCK

REARM MODE

- LED is Blinking

Condition 1

State	Description
Initial Condition	ALARM state
Event	• All entrance is closed & Alarm Patten finished
Action	• The state goes to REARM state

AUTOLOCKTIMER1 MODE

– LED is Blinking

Condition 1

State	Description
Initial Condition	ARM state
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1 • Hazard relay Twice on(0.5s ON/0.5s OFF)

Condition 2

State	Description
Initial Condition	AUTOLOCKTIMER1 state
Event	• Timer is expired • Tx Unlock
Action	• The state goes to State • Tx Unlock – Hazard relay Twice on(0.5s ON/0.5s OFF) – Restart AUTOLOCKTIMER1 • Expire AUTOLOCKTIMER1 – AUTOLOCK

Condition 3

State	Description
Initial Condition	ARMWAIT state
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1 • Hazard relay Twice on(0.5s ON/0.5s OFF)

Condition 4

State	Description
Initial Condition	DISARM state & All entrances closed (DOORS, HOOD & TAILGATE) & IGN KEY OUT
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1

- Hazard relay Twice on(0.5s ON/0.5s OFF)

Condition 5

State	Description
Initial Condition	ALARM state & All entrances are closed (DOORS, HOOD & TAILGATE)
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1 • Hazard relay Twice on(0.5s ON/0.5s OFF) • Start inhibit relay off • Horn relay off

Condition 6

State	Description
Initial Condition	REARM state
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1 • Hazard relay Twice on(0.5s ON/0.5s OFF) • Start inhibit relay off

Condition 7

State	Description
Initial Condition	Auto Lock Timer3 state
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER1 state • Start AUTOLOCKTIMER1 • Hazard relay Twice on(0.5s ON/0.5s OFF)

AUTOLOCKTIMER2 MODE

- LED is blinking

Condition 1

State	Description
Initial Condition	AUTOLOCKTIMER2 state
Event	• Timer is expired • Tx Unlock

Action	• No State change • Tx Unlock – Hazard relay Twice on(0.5s ON/0.5s OFF) – The timer restart • Expire AUTOLOCKTIMER2 – AUTOLOCK
--------	---

Condition 2

State	Description
Initial Condition	DISARM state & All Doors are closed & (HOOD is opened) & IGN KEY OUT
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER2 state • Start AUTOLOCKTIMER2 • Hazard relay Twice on(0.5s ON/0.5s OFF)

Condition 3

State	Description
Initial Condition	ALARM state & All Door are closed & (HOOD is opened)
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER2 state • Start AUTOLOCKTIMER2 • Hazard relay Twice on(0.5s ON/0.5s OFF) • Start inhibit relay off • Horn relay off

Condition 4

State	Description
Initial Condition	PREARM state All Doors are closed & (HOOD is opened)
Event	• Tx Unlock
Action	• The state goes to AUTOLOCKTIMER2 state • Start AUTOLOCKTIMER2 • Memorize Hood and Tailgate state • Hazard relay Twice on(0.5s ON/0.5s OFF)

AUTO LOCK TIMER3 MODE

- LED is blinking

Condition 1

State	Description
Initial Condition	ARM state
Event	• Tx TAILGATE Unlock
Action	• The state goes to AUTO LOCK RELAY TIMER3 state • Start AUTO LOCK RELAY TIMER3 • Hazard relay Twice on(0.5s ON/0.5s OFF) • TAILGATE Mark=set • Dead unlock

Condition 2

State	Description
Initial Condition	AutoLockTimer3 state
Event	• Tx TAILGATE Unlock
Action	• Restart AUTO LOCK TIMER3 state

Condition 3

State	Description
Initial Condition	ARMWAIT state
Event	• Tx TAILGATE Unlock
Action	• The state goes to AUTO LOCK RELAY TIMER3 state • Start AUTO LOCK RELAY TIMER3 • Dead Unlock • Hazard relay Twice on(0.5s ON/0.5s OFF) • TAILGATE Mark=set

PREARM MODE

- LED is blinking

Condition 1

State	Description
Initial Condition	AUTOLOCKTIMER2 state
Event	• AUTOLOCK confirmed • Tx Lock & locked confirmed • Driver door key lock SW ON & Locked confirmed
Action	• The state goes to PREARM state

Condition 2

State	Description
Initial Condition	DISARM state & IGN KEY OUT
Event	• ((4Door Not Closed = ON & Tailgate SW = OFF or (Hood SW = ON)) & Tx Lock & Locked confirmed • ((4Door Not Closed = ON & Tailgate SW = OFF or (Hood SW = ON)) & driver door key lock SW ON on & Locked confirmed
Action	• The state goes to PREARM state

Condition 3

State	Description
Initial Condition	ALARM state & Hood SW = ON
Event	• Tx Lock & Locked confirmed • Driver door key lock SW ON & Locked confirmed
Action	• The state goes to PREARM state • Start inhibit relay off • Horn relay off • Hazard relay 1Time on (1sec.)

Condition 4

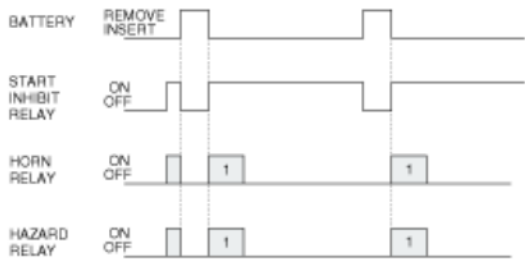
State	Description
Initial Condition	AUTOLOCKTIMER3 state
Event	• Expire Auto Lock Timer3 • Tailgate open
Action	• The state goes to PREARM state.

RESET

1. In case of taking the battery out during the ALARM state

Condition 1

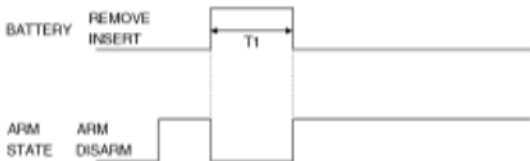
State	Description
Initial Condition	During ALARM, REARM
Event	• TAKING THE BATTERY OUT (Cold or Warm RESET)
Action	• The state goes to ALARM mode • Horn relay 1 Times on (No remained time of warning signal) • Hazard lamp is flashing during making horn



2. In case of taking the battery out during arm

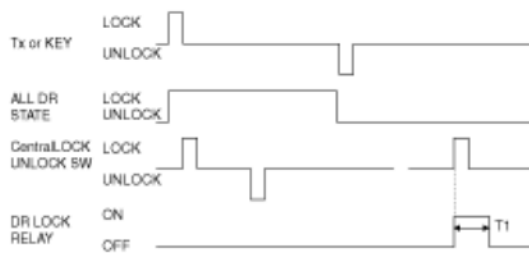
Condition 2

State	Description
Initial Condition	ARM state
Event	• TAKING THE BATTERY OUT (Cold or Warm RESET)
Action	• The state goes to ARM mode • Maintained ARM state



The Restricted Function Of Unlock By Control Door Lock Sw

1. In IGN Key OUT, UNLOCK is restricted by Central Door Lock SW if All DR LOCK & CLOSED when TX LOCK.
2. In IGN Key OUT, UNLOCK is restricted by Central Door Lock SW if All DR LOCK & CLOSED when DR LOCK by DRV DR Key.
3. The restricted function of UNLOCK is canceled when TX UNLOCK signal output during the restricted function of Central Door Lock SW.
4. The restricted function of UNLOCK is canceled when DR UNLOCK signal output during the restricted function of Central Door Lock SW.



T1 : 0.5s ± 0.1s

Tailgate Release Function

Permissive Mode State

State	Description
Initial Condition	PROHIBITIONAL MODE STATE
Event	Any Door Unlocked
Operating	MOVE TO PERMISSIVE MODE STATE

State	Description
Initial Condition	30s PERMISSIVE MODE STATE
Event	Any Door Unlocked
Operating	MOVE TO PERMISSIVE MODE STATE

State	Description
Initial Condition	PERMISSIVE MODE STATE
Event	TAILGATE RELEASE SW = ON
Operating	- TAILGATE RELEASE RELAY 0.5SEC ON - MOVE TO PERMISSIVE MODE STATE

30s Permissive Mode State

State	Description
Initial Condition	PROHIBITIONAL MODE STATE
Event	TAILGATE UNLOCK
Operating	- START TAILGATE TIMER - HAZARD 2 FLASHING - MOVE TO 30s PERMISSIVE MODE STATE

State	Description
Initial Condition	30s PERMISSIVE MODE STATE
Event	TAILGATE UNLOCK

Operating	• RESTART TGATE TIMER • HAZARD 2 times FLASHING • MOVE TO 30s PERMISSIVE MODE STATE
-----------	---

State	Description
Initial Condition	30s PERMISSIVE MODE STATE
Event	TAILGATE RELEASE SW = ON
Operating	• TAILGATE RELEASE RELAY OUTPUT FOR 0.5s • MOVE TO 30s PERMISSIVE MODE STATE

Prohibitional Mode State

State	Description
Initial Condition	30s PERMISSIVE MODE STATE
Event	• TAILGATE OPEN→CLOSE • 4Door Lock Confirm
Operating	MOVE TO PROHIBITIONAL MODE STATE

State	Description
Initial Condition	30s PERMISSIVE MODE STATE
Event	TAILGATE TIMER IS EXPIRED
Operating	MOVE TO PROHIBITIONAL MODE STATE

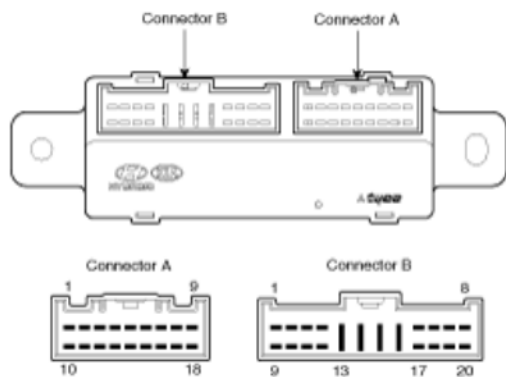
State	Description
Initial Condition	PERMISSIVE MODE STATE
Event	4Door Lock Confirm
Operating	MOVE TO PROHIBITIONAL MODE STATE

INSPECTION

Burglar Alarm Horn Relay

Check for continuity between the terminals.

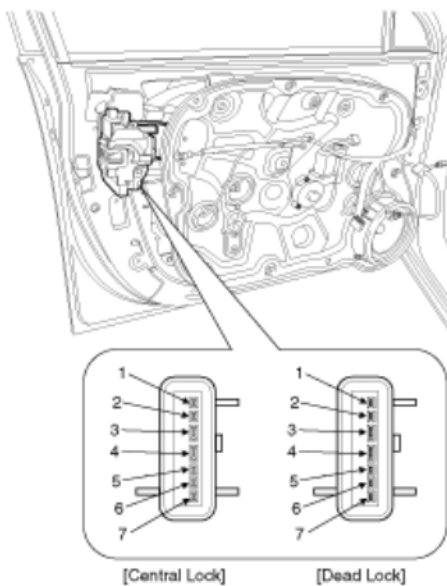
1. There should be continuity between the No.3 and No.11 terminals when power and ground are connected to the No.11 and No.12 in the ICM-A.
2. There should be no continuity between the No.3 and No.11 terminals when power is disconnected.



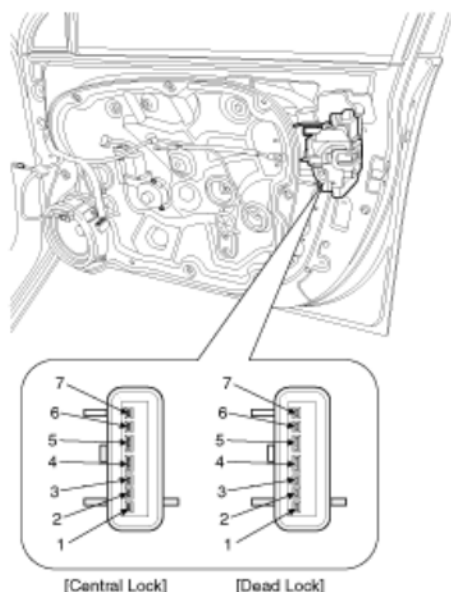
Front Door Lock Actuator

1. Remove the front door trim.
(Refer to the BD group - Front door)
2. Remove the front door module.
(Refer to the BD group - Front door).
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



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

[Central Lock]

() : RHD

Terminal		5(3)	6(2)
Position			
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		2(6)	3(5)
Position			
Front right	Lock	⊖	⊕
	Unlock	⊕	⊖

[Dead Lock]

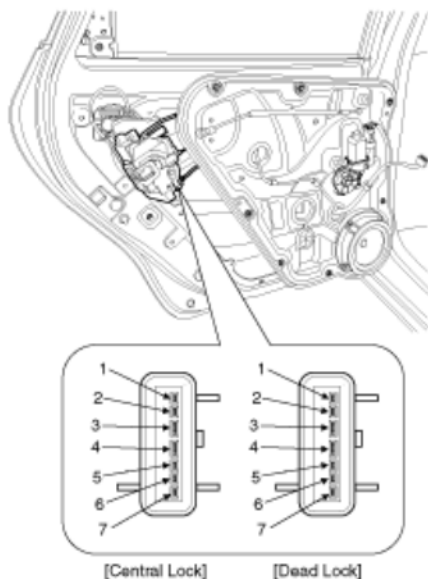
RHD only

Terminal		1	2
Position			
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		7	6
Position			
Front right	Lock	⊕	⊖
	Unlock	⊖	⊕

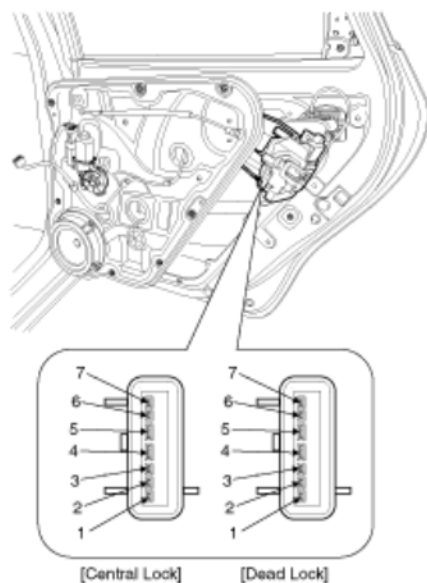
Rear Door Lock Actuator

- Remove the rear door trim.
(Refer to the BD group - Rear door)
- Remove the rear door module.
(Refer to the BD group - Rear door)
- Disconnect the connectors from the actuator.

[LHD]



[RHD]



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

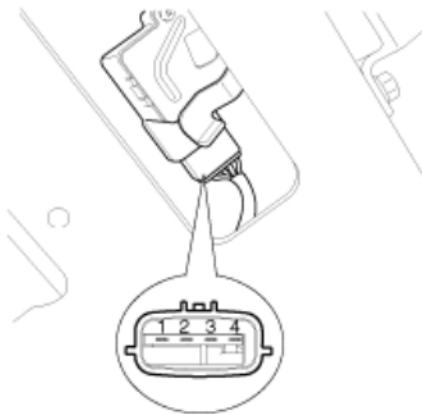
[Central Lock] () : RHD

Terminal		5(3)	6(2)
Position			
Rear left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		2(6)	3(5)
Position			
Rear right	Lock	⊖	⊕
	Unlock	⊕	⊖

[Dead Lock]		RHD only	
Position	Terminal	1	2
Rear left	Lock	⊕	⊖
	Unlock	⊖	⊕
Position	Terminal	7	6
Rear right	Lock	⊕	⊖
	Unlock	⊖	⊕

Tailgate Lock Actuator Inspection

1. Remove the tailgate trim. (Refer to the BD group - tailgate)
2. Disconnect the 4P connector from the actuator.



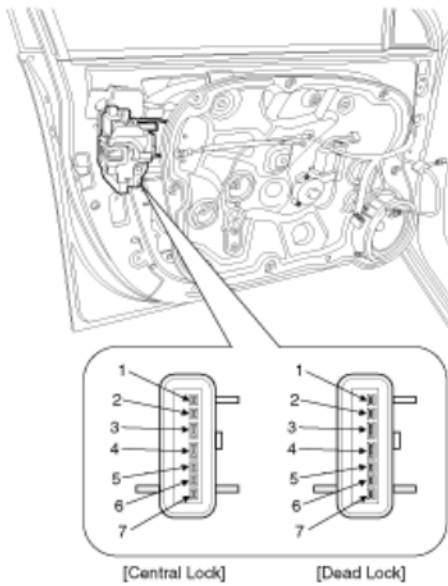
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position	Terminal	3	4
Unlock		⊕	⊖

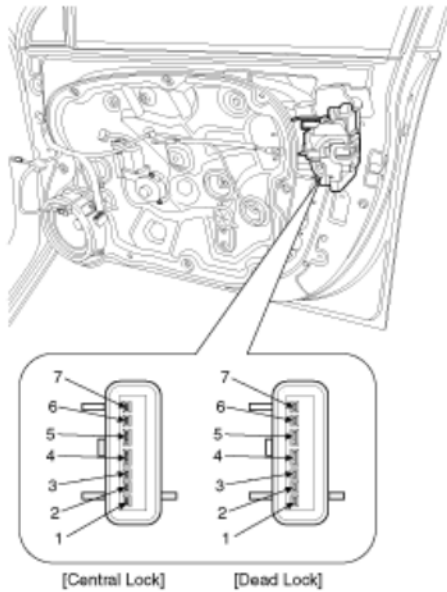
Front Door Lock Switch

1. Remove the front door trim.
(Refer to the BD group - Front door)
2. Remove the front door module.
(Refer to the BD group - Front door).
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



4. Check for continuity between the terminals in each switch position when inserting the key into the door according to the table.

[CENTRAL LOCK]			() : RHD		
Terminal			2(6)	3(5)	4(4)
Position					
Central door lock	Front left	Clockwise	○	○	
		Counter-clockwise		○	○
Terminal			4(4)	5(3)	6(2)
Position					
Central door lock	Front right	Clockwise	○	○	
		Counter-clockwise		○	○

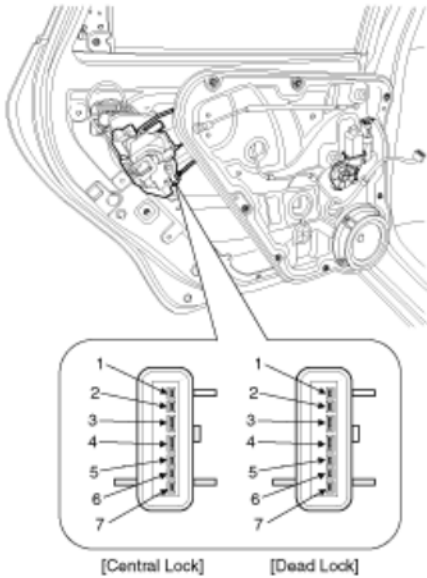
[DEAD LOCK] () : RHD

Terminal			2(6)	3(5)	4(4)	
Position						
Central door lock	Front left	Clockwise				
		Counter-clockwise				
Terminal			4(4)	5(3)	6(2)	
Position						
Central door lock	Front right	Clockwise				
		Counter-clockwise				

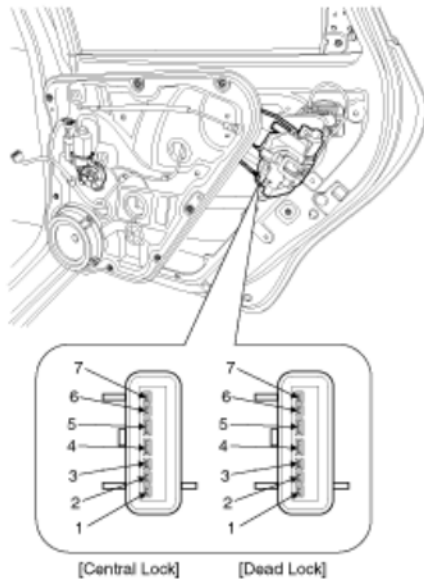
Rear Door Lock Switch

- 1. Remove the rear door trim.
(Refer to the BD group - Rear door)
- 2. Remove the rear door module.
(Refer to the BD group - Rear door)
- 3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



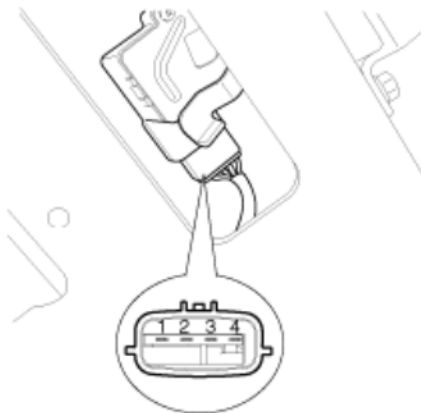
4. Check for continuity between the terminals in each switch position according to the table.

[CENTRAL LOCK]			() : RHD	
Position		Terminal	1(7)	3(5)
Central door lock	Front left	lock		
		Unlock	○ — ○	

[DEAD LOCK]			() : RHD	
Position		Terminal	1(7)	3(5)
Central door lock	Front left	lock		
		Unlock	○ — ○	

Tailgate Switch

1. Remove the tailgate trim. (Refer to the BD group - Tailgate)
2. Disconnect the 4P connector from the actuator.

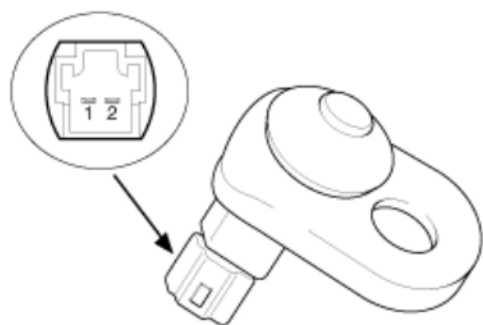


3. Check for continuity between the terminals in each switch position according to the table.

Position		Terminal	1	2
Lock				
Unlock			○ — ○	

Door Switch

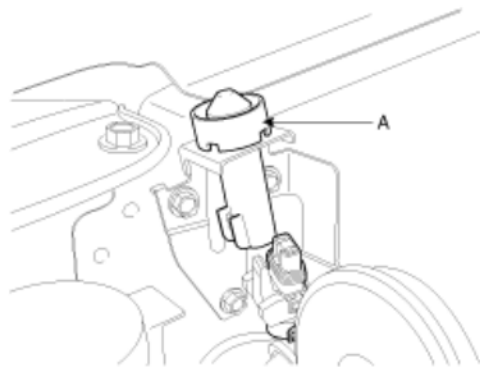
Remove the door switch and check for continuity between the terminals.



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

Hood Switch

- 1. Disconnect the connector from the hood switch (A).

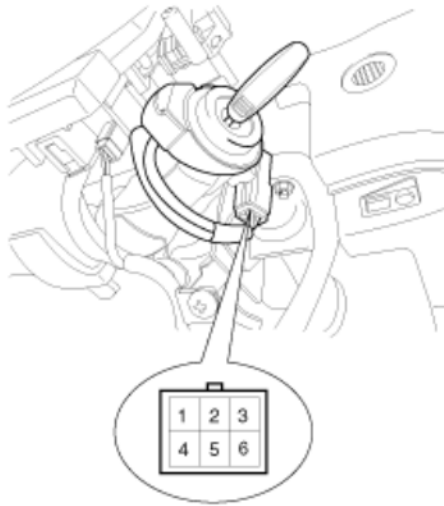


- 2. Check for continuity between the terminals and ground according to the table.

Terminal Position	1	2
Hood open (Free)	○	○
Hood close (Push)		

Key Warning Switch

- 1. Remove the crash pad lower panel. (Refer to Body group-Crash pad)
- 2. Disconnect the 6P connector from the key warning switch.

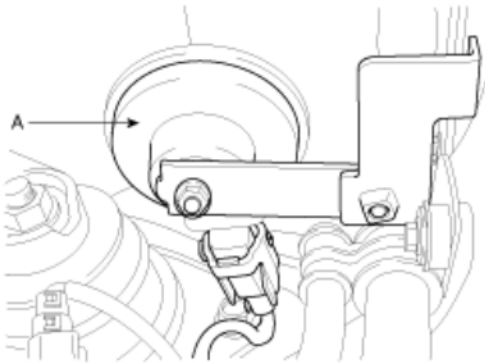


3. Check for continuity between the terminals in each position according to the table.

Terminal Key position	2	4
Insert	○ ————— ○	
Removal		

Burglar Horn

1. Remove the burglar horn(A) after removing 1 bolt and disconnect the 2P connector from the burglar horn.



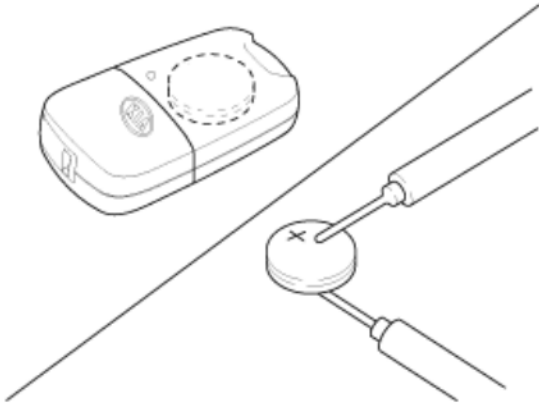
2. Test the burglar horn by connecting battery power to the terminal 1 and ground the terminal 2.
3. The burglar horn should make a sound. If the burglar horn fails to make a sound replace it.

SPECIFICATION

Items		Specifications
Keyless entry transmitter Power source		Lithium 3V battery (1EA)
Transmissible distance		30m or more
Life of battery		2 years or more (at 20 times per day)
Button	2 Button Type	2 (Door lock, Door unlock)
	3 Button Type (Folding key)	3 (Door lock, Door unlock, Tailgat)
Transmission frequency		433.92 MHz

INSPECTION

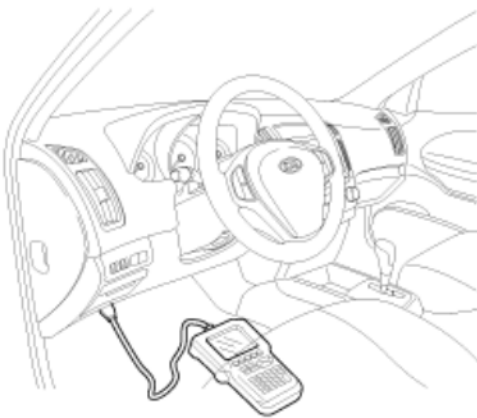
1. Check that the red light flickers when the door lock or unlock button is pressed on the transmitter.
2. Remove the battery and check voltage if the red light doesn't flicker.
Standard voltage : 3V



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

TRANSMITTER CODE REGISTRATION

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



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

1. KIA VEHICLE DIAGNOSIS	
MODEL	: ED
01. ENGINE (GASOLINE)	
02. ENGINE (DIESEL)	
03. AUTOMATIC TRANSAXLE	
04. ABS/ESP	
	:
	:
	:
09. CODE SAVING	

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

TRANSMITTER CODE SAVE
REMOVE THE IG. KEY FROM THE KEY CYLINDER. CONNECT THE DLC CABLE AND 16 PIN CONNECTOR OF THE VEHICLE.
PRESS [ENTER], IF YOU ARE READY!

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

TRANSMITTER CODE SAVE
1ST. TRANSMITTER SAVE PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.
* NO. OF CODED KEY : 0 EA

TRANSMITTER CODE SAVE
1ST. TRANSMITTER SAVE PRESS THE TRANSMITTER [LOCK] BUTTON OR [UNLOCK] BUTTON FOR 1 SECOND.
1ST. TRANSMITTER SAVE SUCCESS! IF YOU WANT TO SAVE THE 2ND KEY PRESS [YES], OR NOT PRESS [NO]
* NO. OF CODED KEY : 1 EA

TRANSMITTER CODE SAVE

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

* NO. OF CODED KEY : 1 EA

TRANSMITTER CODE SAVE

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

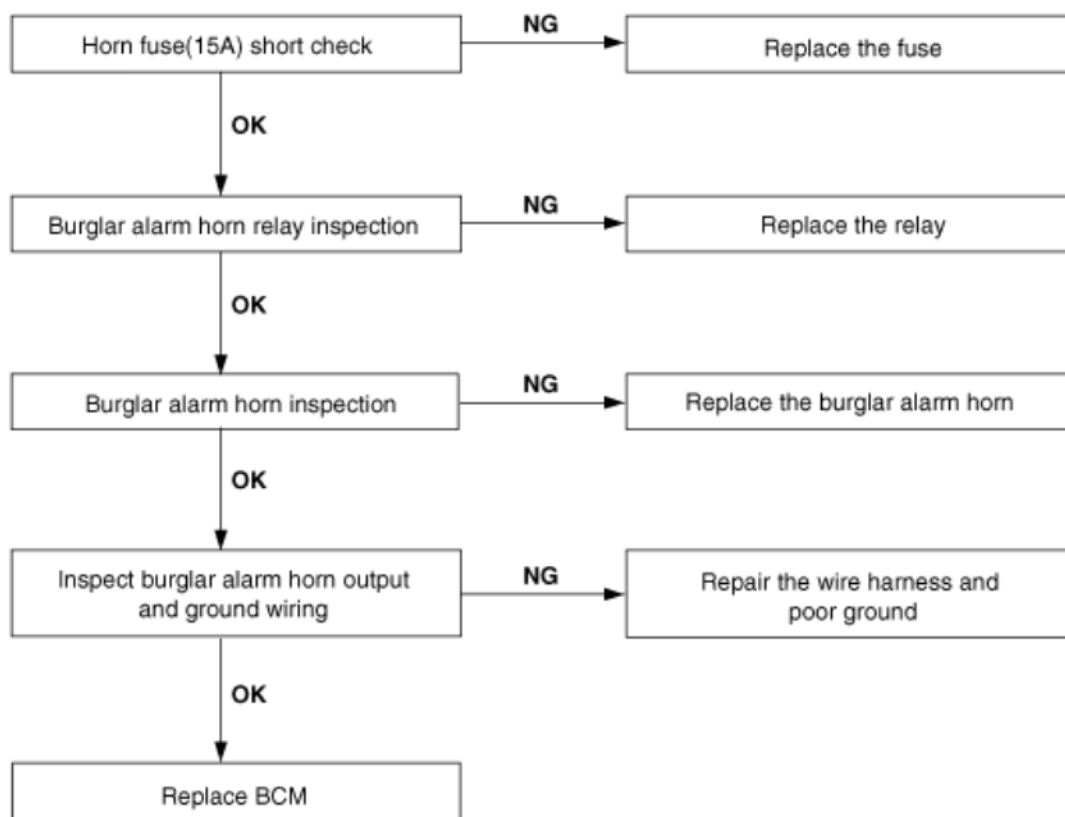
2ND. TRANSMITTER SAVE SUCCESS!

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

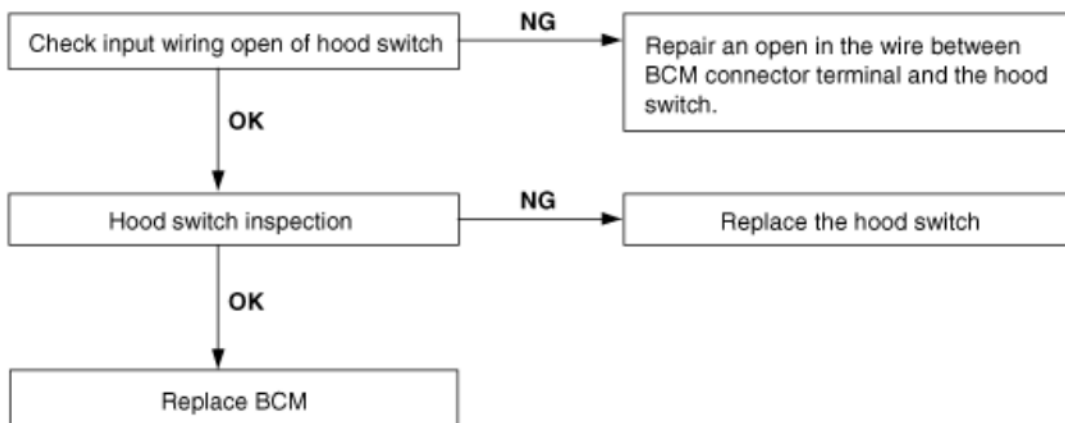
* NO. OF CODED KEY : 2 EA

TROUBLESHOOTING

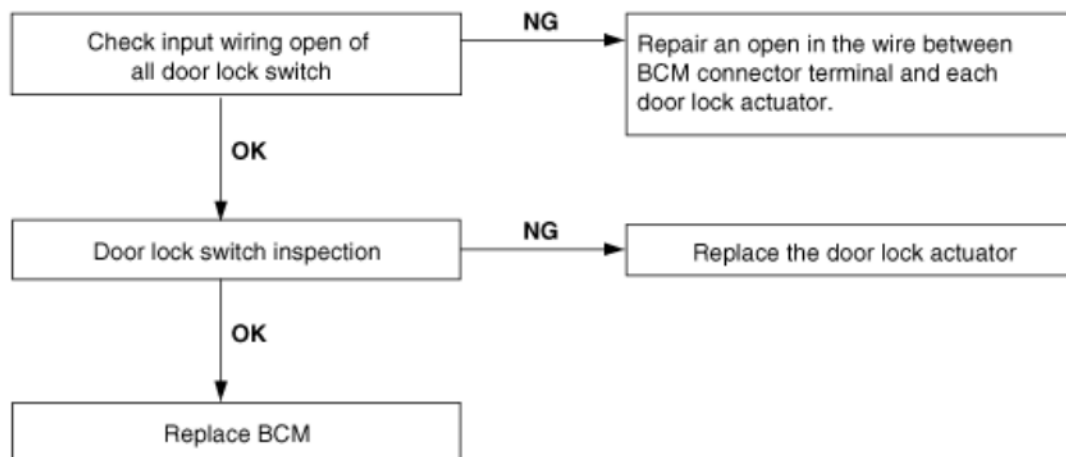
1. Alarm does not work. (Hazard lamps work)



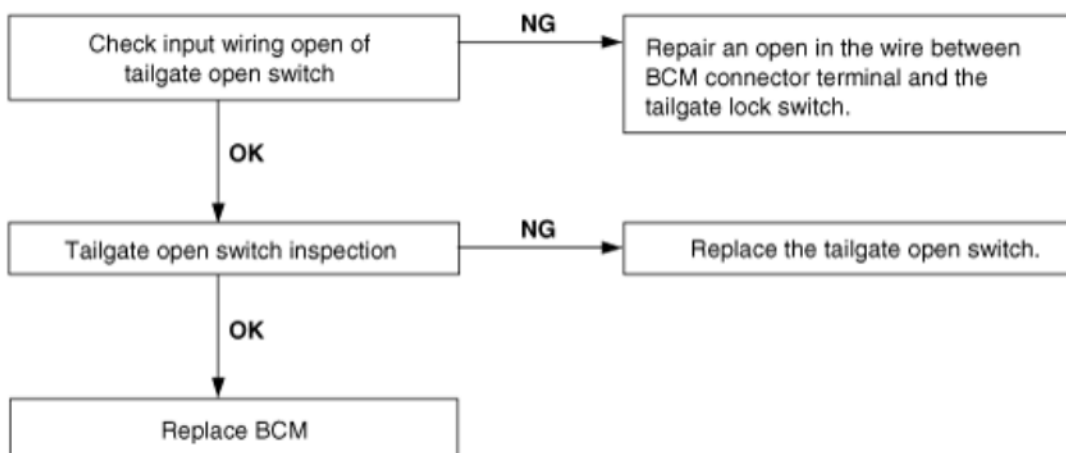
2. When hood is opened in ARM mode, burglar horn does not work.



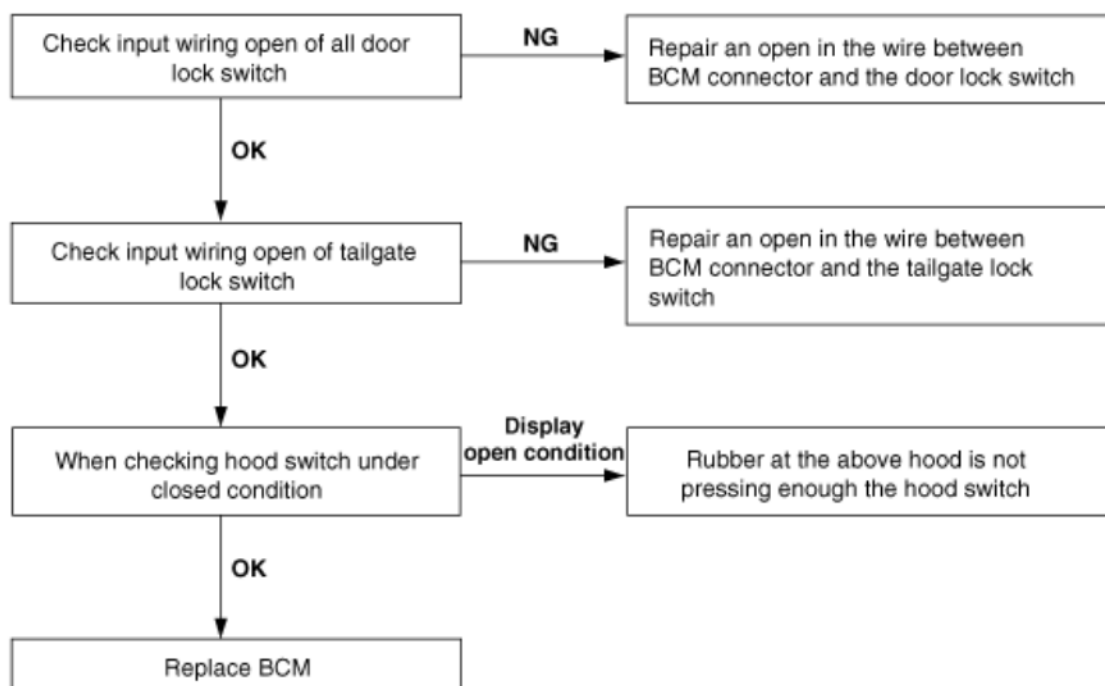
3. When door is opened, burglar horn does not work. (If tailgate and hood is opened, alarm works)



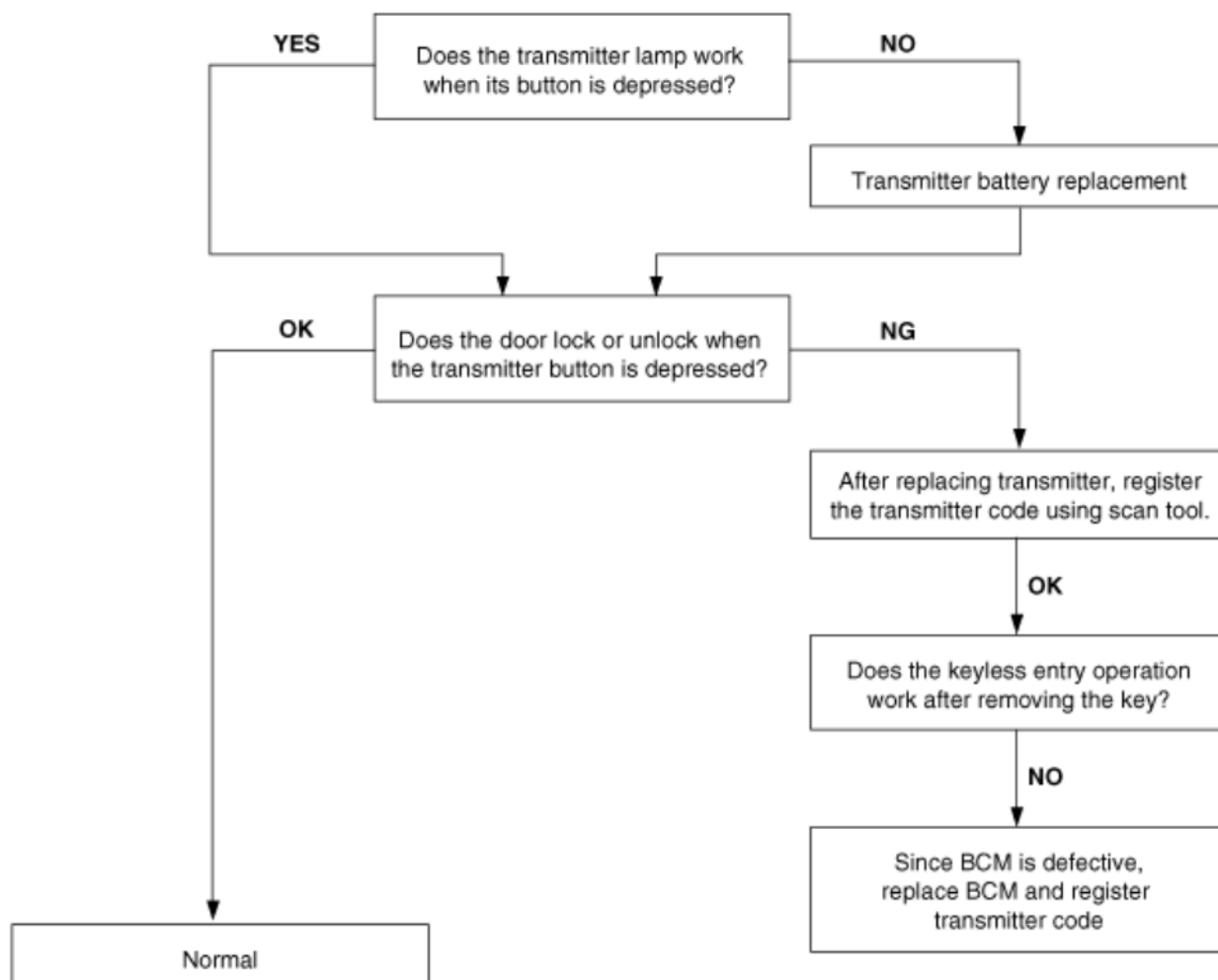
4. When tailgate is opened in ARM mode, burglar horn does not work.



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



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



SPECIFICATIONS

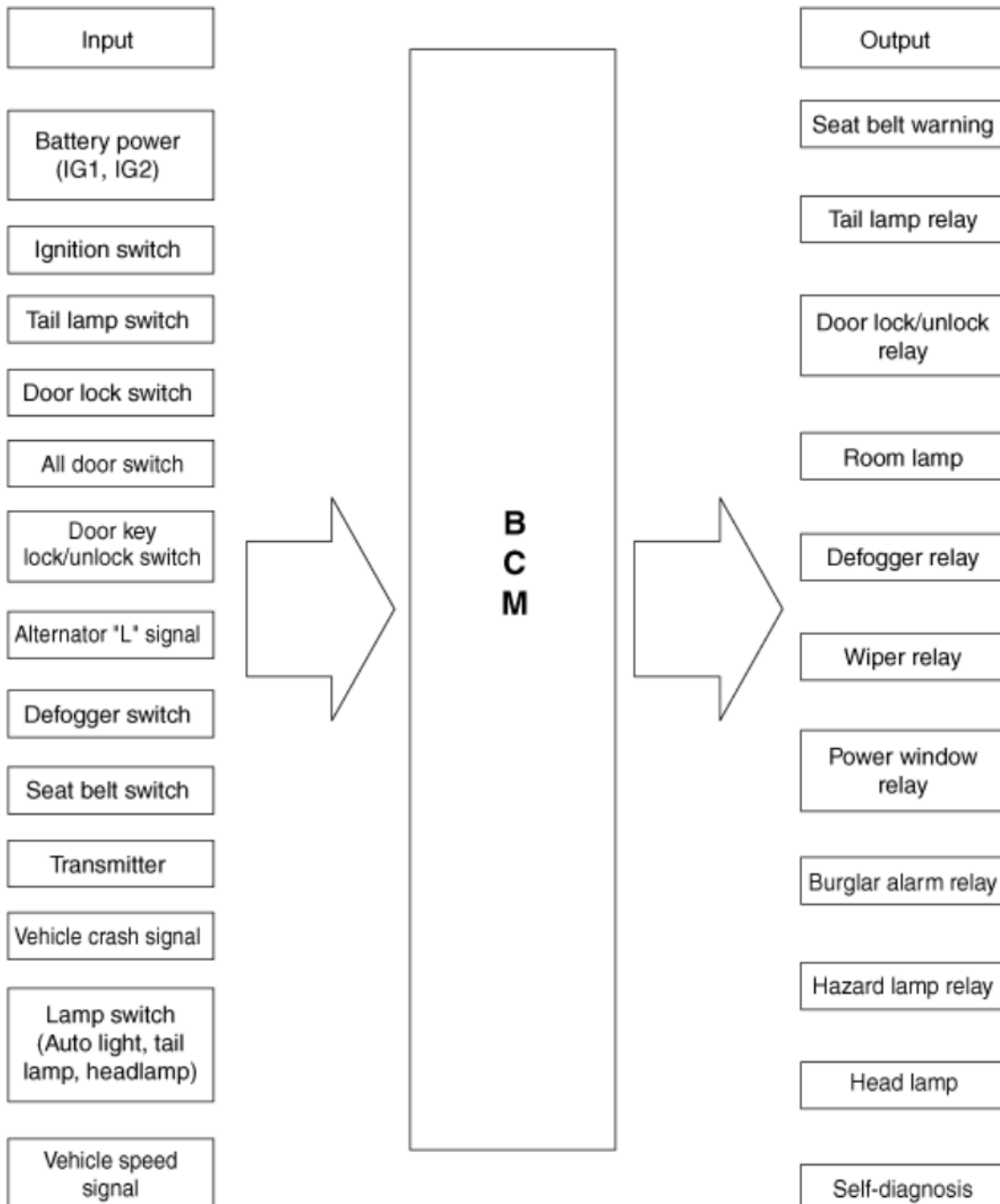
Item	Requirement	Remark
Rated voltage	DC 12V	Shall activate normally in these range.
Operating voltage range	DC 9 ~ 16V	
Operating temperature range	-30°C ~ +80°C	
storage temperature range	-40°C ~ +85°C	
Max humidity in use	95%	
High voltage resistance	24V	
Insulation resistance	100Mohm or more (measured with 500V MEGGER)	Specify as well as parts that insulation like PCB, moisture-proof COATING is required
Dark Current	Max 5.5mA (KEYLESS) (Included security IND Mean value) Max 3mA (NON-KEYLESS)	Measure when the state, all output loads excepted security IND are OFF and there are no Input SW(including TX operation) changes, continues 2sec.
Voltage drop	1.2V or less	Output terminals for TAIL LAMP RELAY, POWER WINDOW RELAY, SAFETY POWER WINDOW, BURGLAR ALARM RELAY shall be 2.0V or less, DRL, Wiper, Relay

Rated Load

Item	Rated load
Room lamp	DC 12V 28W (LAMP load)
Key hole illumination	DC 12V 2W (LAMP load)
Seat belt indicator	DC 12V 1.2W (LED load)
Door lock relay	DC 12V 200mA (Inductive load)
Door unlock relay	DC 12V 200mA (Inductive load)
Dead lock relay	DC 12V 200mA (Inductive load)
Hazard relay	DC 12V 200mA (Inductive load)
Rear wiper relay	DC 12V 200mA (Inductive load)
Power window relay	DC 12V 200mA (Inductive load)
Wiper relay	DC 12V 200mA (Inductive load)
Defogger relay	DC 12V 200mA (Inductive load)
Tailgate relay	DC 12V 200mA (Inductive load)
Tail lamp relay	DC 12V 200mA (Inductive load)
Head lamp relay	DC 12V 200mA (Inductive load)
Front deicer relay	DC 12V 200mA (Inductive load)
Front fog relay	DC 12V 200mA (Inductive load)
Rear fog relay	DC 12V 200mA (Inductive load)

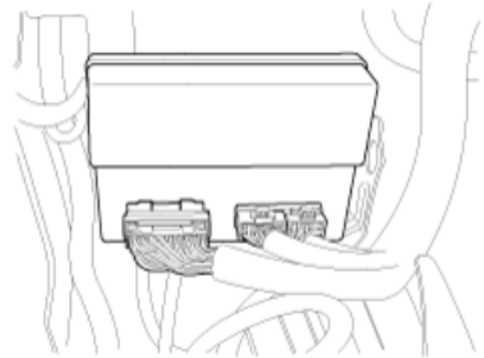
Horn relay	DC 12V 200mA (Inductive load)	English ▼
Security indicator	DC 12V 1W (LED load)	
Central door lock indicator	DC 12V 1W (LED load)	
Door open indicator	DC 12V 1W (LED load)	

CIRCUIT DIAGRAM



DESCRIPTION

Body control module (A) receives various input switch signals controlling time and alarm functions for tail lamp, rear fog lamp, wiper control, buzzer warning, front deicer timer, tail lamp auto cut, central door lock, seat belt warning, key operated warning, over speed warning, ignition key hole illumination, room lamp control, power window timer, keyless entry control, burgular alarm control, crash door unlock, key reminder.

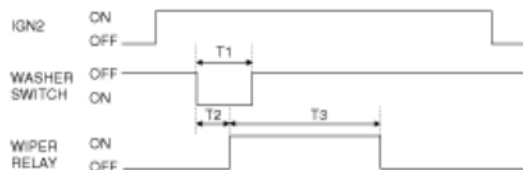


FUNCTION

Wiper control

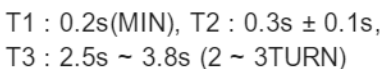
1. WIPER Control coupled with Washer

- (1) Under IGN2 SW ON, WIPER RELAY is turned ON after T2 from WASHER SW ON if WASHER SW is ON for T1 and WIPER RELAY is turned OFF after T3.



T1 : 0.06s ~ 0.2s, T2 : 0.3s ± 0.1s,
T3 : 0.7s ± 0.1s

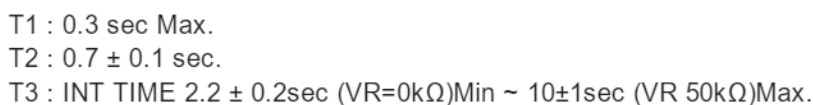
- (2) Under IGN2 SW ON, WIPER RELAY is turned ON after T2 from WASHER SW ON if WASHER SW is ON for T1 or more, and WIPER RELAY is turned OFF after T3 from the moment that WASHER SW is turned OFF.



- T1 : 0.2s(MIN), T2 : 0.3s $\pm$ 0.1s,
T3 : 2.5s ~ 3.8s (2 ~ 3 times rotation),
T4 : T5 - 0.7s, T5 : INT TIME,
T6 : 0.2s ~ 0.59s, T7 : 0.7s $\pm$ 0.1s

- (4) Operation is canceled in case IGN is OFF during T3.
- (5) Give priority to WASHER interlocking WIPER than Speed sensing INT WIPER function.
- (6) WASHER SW signal input shall be ignored at start-up (IGN1 ON & IGN2 OFF states).

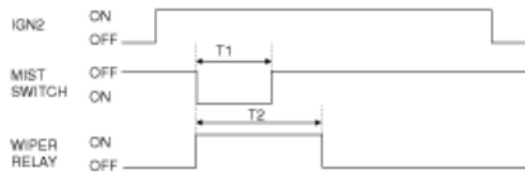
(1) Under IGN2 SW = ON & INT SW = ON states, and INT VOLUME value are acquired and intermittent time is calculated. Then, WIPER intermittent time is automatically converted.



M-F SW	0~1 Kohm	13 Kohm $\pm$ 10%	24 Kohm $\pm$ 10%	38 Kohm $\pm$ 10%	50 Kohm $\pm$ 10%
INT TIME (T3)	2.2 sec ($\pm$ 0.2)	3.9 sec ($\pm$ 0.4)	6.1 sec ($\pm$ 0.6)	8.3 sec ($\pm$ 0.8)	10.0 sec ($\pm$ 1.0)

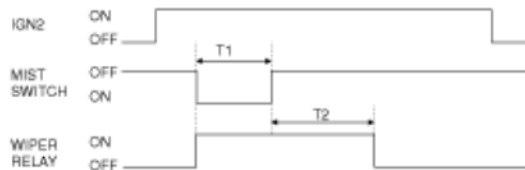
3. MIST Control coupled with WIPER

- (1) Under IGN2 SW ON, WIPER RELAY is turned ON directly from MIST SW ON if MIST SW is ON for T1 and WIPER RELAY is turned OFF after T2.



T1 : 0.7s (Max.), T2 : 0.7s ± 0.1s

- (2) Under IGN2 SW ON, WIPER RELAY is turned ON directly from MIST SW ON if MIST SW is ON for at least T1, and WIPER RELAY is turned OFF after T3 from the moment that MIST SW is turned OFF.

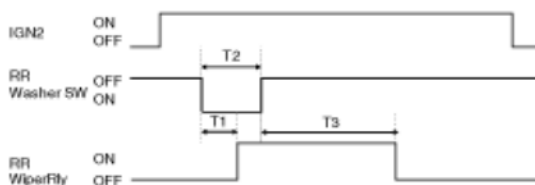


T1 : 0.7s(Min), T2 : 0.7s ± 0.1s

Rear Wiper & Washer Control (Non Variable)

1. Rear WIPER Control coupled with Rear Washer

- (1) when Rr Washer SW Input is T2 or more at) IGN2 ON Condition, Rr Wiper Rly is truned ON directly after T1 at the time that Rr Washer SW ON and is turned OFF after operating 2.5s~3.8s(2~3 Times) from Rr Washer SW is turned OFF.

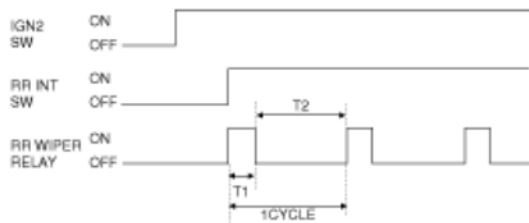


T1: 0.3s±0.1s, T2: 0.2s(MIN)
T3: 2.5s~3.8s (2~3 rotation)

- (2) Rear WIPER Control coupled with Rear Washer is prior to at RR INT WIPER Function .

2. REAR INT WIPER

- (1) REAR WIPER RELAY is turned ON by 1 CYCLE (0.7s ON / 7.5s OFF) when rear INT wiper SW ON.

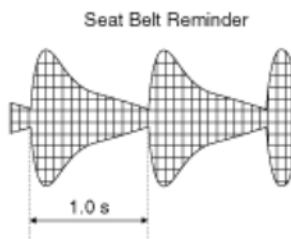


T1 : $0.7 \pm 0.1\text{sec}$,
T2 : $7.5 \pm 1\text{sec}$.

Buzzer Control

1. Buzzer Sound

	Frequency	Frequency(Duty)	Cycle	Sound Pressure	Remark
Seat Belt reminder	800Hz	50%	1.0s	$70 \pm 10\text{dB}$	Diminished sound
Speed Limit	800Hz	50%	1.0s	$70 \pm 10\text{dB}$	Diminished sound



- Output continues up to OFF cycle when output is OFF.
- Sound pressure measurement distance: 1.0 m

Seat Belt Reminder Function

1. Driver & Passenger seat

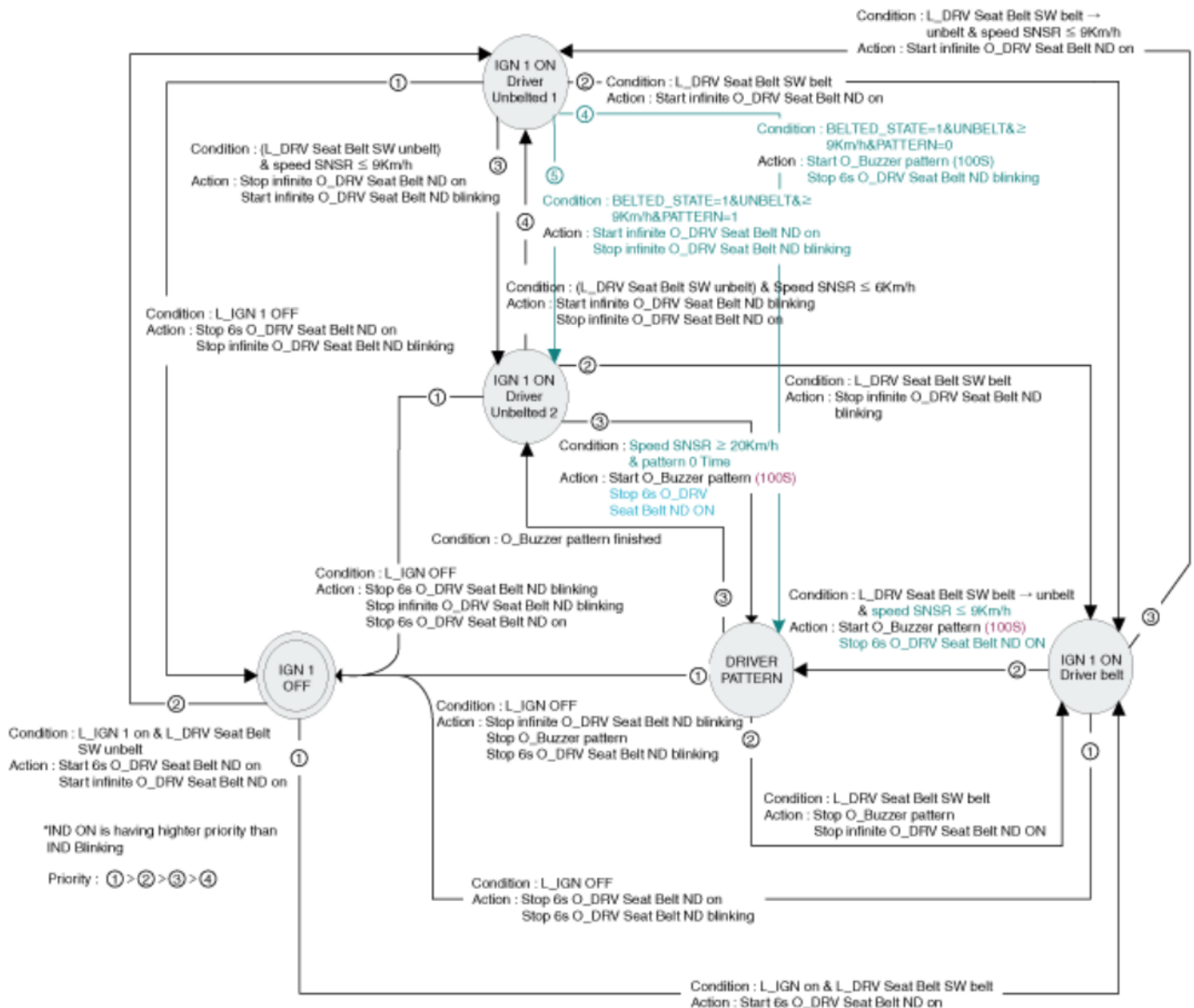
- Warning lamp is turned ON when First is IGN1 ON seat belt is not fastened.
- In the above (1), Warning lamp is turned OFF when seat belt is fastened.
(But Warning lamp continues to light for 6sec if SEAT BELT is fastened within 6sec)
Warning lamp is turned ON continually If seat belt is not fastened Warning lamp output to pattern stop to light for 6sec when Pattern approach condition completion among Warning lamp continues to light for 6sec.
- In the above (2), Warning lamp is turned ON when above 9KPH and seat belt is not fastened.
(Warning lamp continues to flash for 6sec if SEAT BELT is refastened within 6sec)
- In the above (3), Warning lamp is turned ON when above 6KPH and seat belt is not fastened.
- In the above (3), The warning lamp continues to flash and BUZZER output follows the PATTERN once and seat belt is not fastened.
(but, Warning lamp continues to light for 6sec if SEAT BELT is refastened within 6sec)
The warning lamp continues to flash and BUZZER is turned OFF after output completion.
PATTERN do not output when above 20KPH after PATTERN output once completion(Never entering Pattern)
- In the above (3),(4),(5), the warning lamp and BUZZER OFF are turned OFF when seat belt is fastened.
- 6) clause After Selt belt=belted,Driver Selt belt Switch Belt→Unbelted & above 9KPH case of spped, It outputs one PATTERN. Between Pattern outputs Selt belt at the time of fastened A Pattern output stop is carried out.
Under a Driver Pattern output If the conditions of an Assist Pattern output are realized, it will be at the driver's seat point. After a Pattern output end passenger seat remainder A Pattern output is performed.

(8) In the above (6), Selt/belt is fastened→unfastened and when vehicle speed becomes under 9KPH, warning lamp is turn on.

(9) In the above (3),(4),(5), warning alarm is operated, warning lamp is turned off when IGN OFF.

- Chime Buzzer:1SEC Cycle, Seat belt Indicator : 1SEC Cycle
- Buzzer Operating Cycle & Seat Belt indicator Operating Cycle are synchronized.
- Speed recognition error
6KMPH : 5.6KMPH ± 1.4 Km/h
9KMPH : 8.5KMPH ± 1.4 Km/h
20KMPH: 19.6KMPH ± 1.4 Km/h

2. Seat Belt Reminder Logic



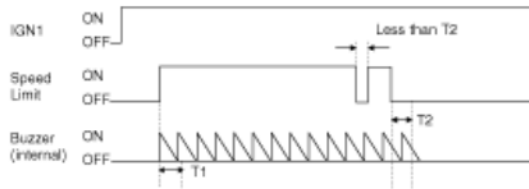
Speed Limited Warning

Speed Limit is On from, IGN1 On when conditions Buzzer On.

When the next condition is satisfied From IGN1 On condition, it executes Speed Limit Warning.

(1) When speed limit turn on, alarm start immediately.

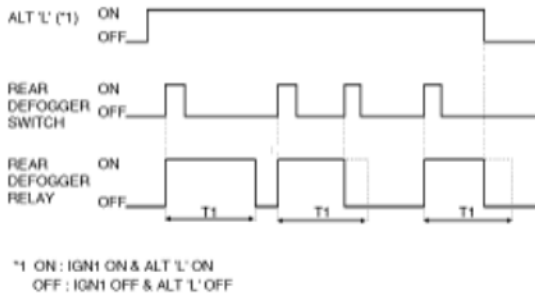
(2) When speed limit turn off, remainder outputs alarm executes and ends after 1 second filtering time.



T1, T2: 1s $\pm$ 0.1sec

Rear Defogger Timer

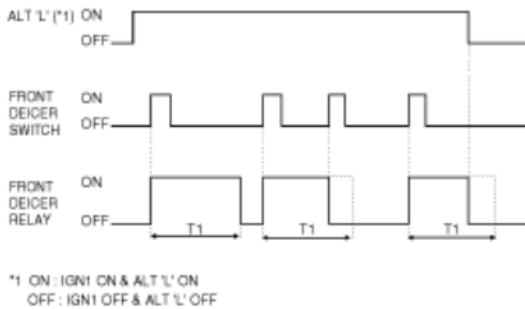
1. Defogger relay is turned for T1 if defogger SW is turned ON under ALT "L" ON.
2. Defogger relay is turned OFF if defogger SW is turned ON again under output ON or ALT"L" OFF.



T1 : 20MIN $\pm$ 1MIN

Front Deicer Timer

1. DEICER RELAY is turned for T1 if DEICER SW is turned ON under ALT "L" ON.
DEICER RELAY is turned OFF if DEICER SW is turned ON again under output ON or ALT"L" OFF.

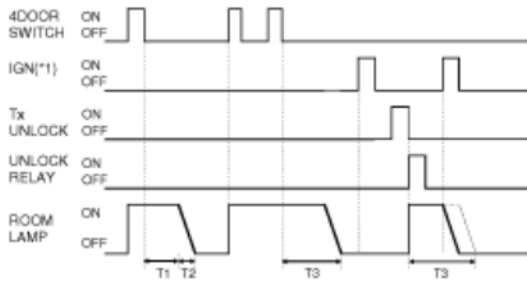


T1 : 20MIN $\pm$ 1MIN

Delayed Room Lamp

1. ROOM LAMP lights 100% at DOOR OPEN.
(But, the lamp phases out lighting up to 0% in 2sec after lighting 100% for 20minute.)
2. Resolution is 32 STEP or more.
3. The lamp is immediately turned OFF at ALL DOOR LOCK or IGN SW is ON during T1(phasing out lighting for 2sec).
4. Should be no phasing out lighting if 4DOOR SW ON time is 0.08sec or less.
5. Should be no flashing.

- Should be no flashing under 4DOOR OPEN and ROOM LAMP ON at IGN1 ON.
- ROOM LAMP is turned ON for T3 when Tx UNLOCK signal is received under DOOR CLOSE.
ROOM LAMP signal output is extended for T3 if Tx UNLOCK signal is received under ON state.
The lamp lights continuously at DOOR OPEN under ON state. Operation in (1) is performed at DOOR CLOSE. ROOM LAMP signal is turned OFF at ALL DOOR LOCK during ROOM LAMP ON.(phasing out for 2sec).

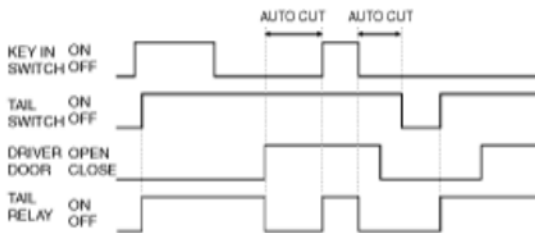


*1 ON : IGN1 ON, OFF : IGN1 OFF

T1 : 30s $\pm$ 3s, T2 : 2 $\pm$ 0.2s,
T3 : 32 $\pm$ 3.2s

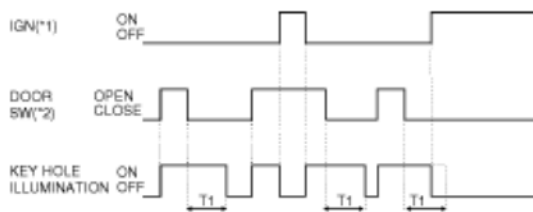
Tail Lamp Auto Cut

- TAIL RELAY is turned ON when changing TAIL SW from OFF to ON.
- TAIL RELAY is turned OFF when TAIL SW is OFF.
- TAIL RELAY is turned OFF if the state is changed from KEY IN SW ON and TAIL SW ON to KEY IN SW OFF, TAIL SW ON and Dr DOOR OPEN.(automatic light out)
- TAIL RELAY is turned ON when KEY IN SW is turned ON after the operation in (3).
- TAIL RELAY is not turned ON if Dr DOOR is closed after the operation in (3).
- The previous MODE is held at BATTERY ON/OFF after the operation in (3).



IGN Key Hole Illumination

- KEY ILLUMI LAMP is turned ON at IGN SW OFF and DOOR OPEN
- KEY ILLUMI LAMP is turned ON for T1 at DOOR CLOSE after the operation in (1).
- KEY ILLUMI LAMP is immediately turned OFF at IGN SW ON during output
- KEY ILLUMI LAMP is immediately turned OFF at transition to warning MODE during output



*1 ON : IGN1 ON, OFF : IGN1 OFF

*2 OPEN : DRIVER DOOR OPEN & PASSENGER SIDE DOOR OPEN
CLOSE : DRIVER DOOR CLOSE & PASSENGER SIDE DOOR CLOSE

T1 : 30s ± 3s

Rear Fog Lamp

1. Rear fog relay is turned ON if pushing rear fog Switch under head lamp Output ON and front fog SW ON after IGN ON and Tail lamp Output ON.
2. Output is turned OFF if pushing rear Front fog lamp switch again under REAR FOG RELAY ON
3. REAR FOG RELAY is turned OFF unless the condition "IGN ON, TAIL Lamp Output ON & Head lamp Output ON (and front fog SW ON)" is met.
4. Head Lamp Relay after Front fog lamp switch off Front Fog Lamp Relay=ON and Rear Fog Lamp Relay=ON it does from on conditons and Rear Fog Lamp Relay off.
5. Rear FOG LAMP Switch is Self-Return Type.



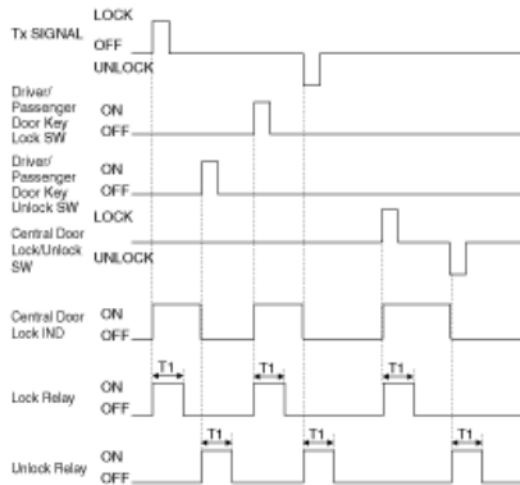
*1 ON : IGN1 = ON

OFF : IGN1 = OFF

Central Door Lock/unlock

1. All door lock relay signal is output for T1(0.5s) if Dvrer/Assist DOOR UNLOCK SW is locked within 3s, central door lock indicator signal is output when All DOOR LOCKED.
2. All door unlock relay signal is output for T1(0.5s) if DR DOOR UNLOCK SW is unlocked within 3s, central door lock indicator signal is not output when All DOOR UNLOCKED.
3. All door lock relay signal is output for T1(0.5s) when AS DR Key Lock SW is turned ON and if AS DOOR UNLOCK SW is unlocked within 3s, Center DR Lock IND signal is not output when All DOOR LOCKED.
4. Change of UNLOCK(LOCK) → LOCK(UNLOCK) is ignored during LOCK(UNLOCK) signal ouput by other functions.
5. All door lock relay signal is output for T1 when TX LOCK signal is received, central door lock indicator signal is output when All DOOR LOCKED.
6. All Door Unlock Relay signal is output for T1 if TX UNLOCK signal is received, central door lock indicator signal is not output when any DOOR UNLOCKED or ALL DOOR UNLOCKED.
7. ALL DOOR UNLOCKed, All door lock relay signal is output for T1 if central door Lock/UNLOCK SW is turned ON, Central door lock indicator signal is output when All DOOR LOCKED.

8. ALL DOOR Locked, All door unlock relay signal is output for T1 if central door Lock/UNLOCK SW is turned ON, Central door lock indicator signal is not output when All DOOR UNLOCKED.
9. Any DOOR LOCKED, All door lock relay signal is output for T1 if central door Lock/UNLOCK SW is turned ON, Central door lock indicator signal is output when All DOOR LOCKED.
10. At The condition Key In SW OFF(OUT) & central door Lock IND signal output is turned ON, central door Lock IND signal is output for 1 minute then OFF.
11. Shall be no malfunction at BATTERY connection.(shall be no malfunction even at KEY IN position)
12. Inputs which are 40msec or less shall not be received.
(Door Key Lock/Unlock SW)
13. LOCK signal is not output by DOOR KEY LOCK SW when IGN turn ON.
14. Lock output is forbidden During IGN KEY REMINDER signal output by C/DOOR LOCK/UNLOCK SW or DOOR KEY.

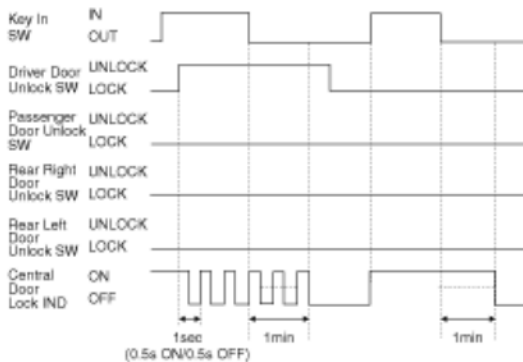
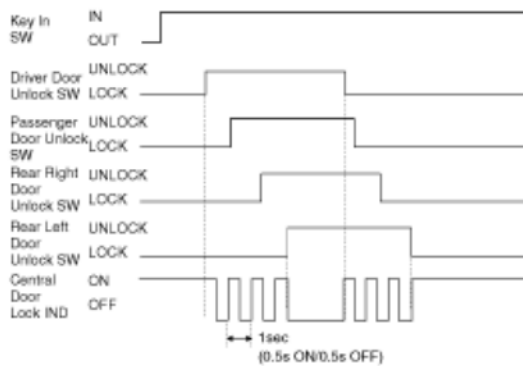


T1 : 0.5 ± 0.1 sec.

* The changes of NOBE by LOCK/UNLOCK output signal do not displayed.

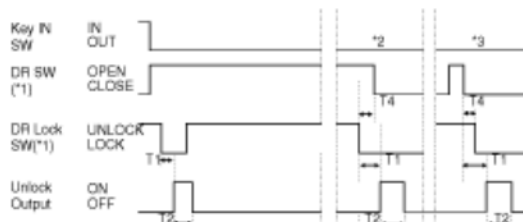
Central Door Lock Indicator

1. KEY OUT, when All DOOR LOCK & TAILGATE CLOSED, LOCK & TAIL GATE CLOSE is turned OFF after lighting 100% for 1 minute.
2. KEY IN, when All DOOR LOCK & TAILGATE CLOSED, CENTRAL DOOR LOCK INDICATOR lighting 100% continuously. Under operation, Continuation blink is carried out by 1cycle.in ANY DOOR UNLOCK or ALL DOOR LOCK&TAIL GATE OPEN. When ALL DOOR UNLOCK A output is turned off immediately.
3. Above 2), if KEY OUTED, CENTRAL DOOR LOCK INDICATOR is turned OFF after lighting for 1 minute. Under operation, Continuation blink is carried out by 1cycle.in ANY DOOR UNLOCK or ALL DOOR LOCK&TAIL GATE OPEN. When ALL DOOR UNLOCK A output is turned off immediately.
4. After above 3), when DR UNLOCK is changed and All DOOR LOCK & TAILGATE CLOSED, follow above 3).
5. When The changes of DOOR LOCK/UNLOCK state by AUTO DOOR LOCK function occure, follow above 2)~4).



The Reminder Unlock Function By Central Door Lock Sw Or Keyless Or Door Key

1. When Door UNLock SW LOCK by Key In SW OUT & Door SW OPEN & Central door LOCK/UNLOCK SW or KEYLESS or DOOR KEY, Unlock relay output for 1sec after 0.5sec.



T1, T3 : $0.5 \pm 0.1 \text{sec}$, T2 : $1 \pm 0.1 \text{sec}$,

T4 : 0.5sec MAX.

*1 OPEN : Driver Door OPEN or Passenger side Door OPEN or Rear Right Door OPEN or Rear Left Door OPEN or Tailgate OPEN

CLOSE : Driver Door Close and Passenger side Door Close and Rear Right Door Close and Rear Left Door Close

TAILGATE CLOSE

*2 Key In SW OUT, if door is closed within 0.5sec from the change that Door Unlock SW UNLOCK → LOCK by Central door Lock/UNLOCK SW or KEYLESS or DOOR KEY, Unlock relay output for 1sec.(once)

*3 Key In SW OUT, if Door UNLOCK SW is LOCKED within 0.5sec from the change that DOOR OPEN → CLOSE by Central door Lock/UNLOCK SW or KEYLESS or DOOR KEY, Unlock relay output for 1sec.(once)

* RETRY output is or is not which is decided RETRY output start point.(after 1.5sec from Unlock relay output at first time)

* Unlock relay output even if the condition is not maintained for 0.5sec after condition is valid.

* Above Time Chart, output by Door LOCK/UNLOCK Function is not displayed.

* The case LOCK & REMINDER UNLOCK by KEYLESS, HARZARD is not by ARM entry.

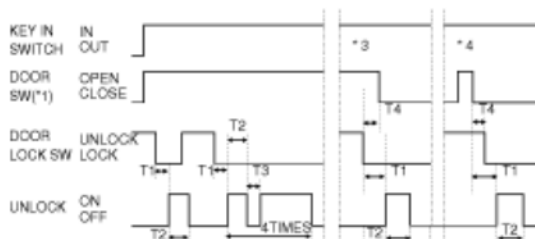
* This function is valid when enter LOCK mode by Central DR LOCK SW or KEYLESS or DOOR KEY.(When DOOR OPEN & UNLOCK, REMINDER UNLOCK is not output by OVERRIDE.)

* REMINDER UNLOCK output once only, Monitoring of DOOR LOCK/UNLOCK state is not exercised additionally.

(NEED OF DIVISION WITH KEY REMINDER UNLOCK When DRV Or ASS Or RL Or RR DR OPEN & DR LOCK, if LOCK state is maintained after output one time by above function, output three times additionally.)

IGN Key Reminder

1. This function is not performed when vehicle speed is 3km/h or more. Only, after AUTO DOOR LOCK operating the vehicle speed from 3Km/h under hour KEY REMINDER conditions.
2. ALL DOOR UNLOCK signals are output for 1s after 0.5s from when the state becomes KEY IN SW IN & Driver DOOR OPEN & Driver DOOR LOCK SW LOCK
3. ALL UNLOCK signal is output for 1s after 0.5s from when the state becomes KEY IN SW IN, Passenger side DOOR OPEN and Passenger side DOOR LOCK SW LOCK
4. ALL UNLOCK signal is output for 1s after 0.5s from when the state becomes KEY IN SW IN, Rear right DOOR OPEN and Rear right DOOR LOCK SW LOCK
5. ALL UNLOCK signal is output for 1s after 0.5s from when the state becomes KEY IN SW IN, Rear left DOOR OPEN and Rear left DOOR LOCK SW LOCK
6. Even though UNLOCK output for 1sec by above (2)~(5), if the LOCK state is maintained Unlock relay output maximum three times(except output for 1sec) ; (1sec cycle : 0.5sec ON/OFF)
7. If Key In SW IN, Tailgate SW OPEN and ALL DOOR Lock SW LOCK, Unlock relay output for 1sec after 0.5sec. (Unlock relay is not output when ANY DOOR Lock SW UNLOCK)
*Even though UNLOCK output for 1sec by above (7), if the LOCK state is maintained Unlock relay output maximum three times(except output for 1sec)
8. IGN KEY REMINDER outputting C/DOOR LOCK in compliance with LOCK/UNLOCK SW or DOOR KEY The output forbids.



T1, T3 : 0.5±0.1sec, T2 : 1±0.1sec,
T4 : 0.5sec MAX.

*1. OPEN : Dr DOOR OPEN or PASSENGER SIDE DOOR OPEN or RR DOOR OPEN or RL DOOR OPEN
CLOSE : Dr DOOR CLOSE or PASSENGER SIDE DOOR CLOSE or RR DOOR CLOSE or RL DOOR CLOSE

*2. UNLOCK : Dr DOOR or PASSENGER SIDE DOOR or RR DOOR or RL DOOR Lock SW UNLOCK
LOCK : Dr DOOR or PASSENGER SIDE DOOR or RR DOOR or RL DOOR Lock SW LOCK

*3. UNLOCK signal is output (only once) within 1s if DOOR is closed within 0.5s from DOOR LOCK SW(DR or PASSENGER or RR or RL) UNLOCK → LOCK under KEY IN SW IN.

*4. UNLOCK signal is output (only once) within 1s if DOOR LOCK SW is locked within 0.5s from DOOR (DR or PASSENGER or RR or RL) OPEN → CLOSE under KEY IN SW IN. But, Performance followed above *9 when C/DOOR LOCK, UNLOCK SW is turned ON within 0.5s.

*5. ALL DOOR UNLOCK signal is output at CTL DOOR LOCK after Dr DOOR & AsDOOR & RR DOOR & RL DOOR under KEY IN.

*6. Judgment of the possibility of RETRY signal output is performed at RETRY signal output start. (after 1.5s from the first UNLOCK signal output)

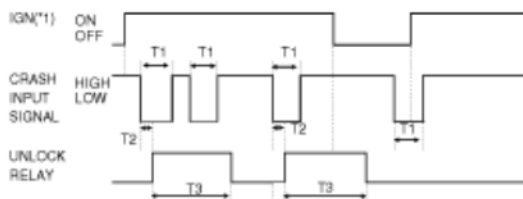
*7. After the condition if UNLOCK is met, UNLOCK signal is output if the condition is not held for 0.5s. But, UNLOCK signal is not output if KEY IN SW is OUT at the moment that 0.5s passes after the condition is met by DOOR LOCK SW change from UNLOCK to LOCK.

*8. Output by DOOR LOCK/UNLOCK functions is not displayed in the above TimeChart

- *9. Signal is Output by Central door LOCK,UNLOCK or Driver DOOR KEY LOCK/UNLOCK Switch or Assist DOOR KEY UNLOCK Switch input signal and IGN KEY REMINDER UNLOCK signal is not output(IGN KEY REMINDER function is reseted) when Central DOOR LOCK,UNLOCK Switch or Driver DOOR KEY LOCK/UNLOCK Switch or Assist DOOR KEY UNLOCK Switch is turned ON within 0.5s after IGN KEY REMINDER condition is validated.
- *10. Central DOOR LOCK,UNLOCK Switch or Driver DOOR KEY LOCK/UNLOCK Switch or As DOOR KEY UNLOCK Switch input signal is ignored during IGN KEY REMINDER UNLOCK output

Impact Sensing Door Unlock

1. UNLOCK signal is always output when Crash Input signal is input under IGN SW ON.
2. UNLOCK signal is output for the remaining time even when IGN SW ON is turned to OFF during UNLOCK output.
3. UNLOCK signal is not output when IGN SW OFF is turned to ON after Crash Input signal is input in advance.
4. UNLOCK signal is output for T3 when Driver or passenger or rear right or rear left DOOR LOCK SW is locked from UNLOCK after UNLOCK signal is output.
5. AUTO DOOR LOCK function is not performed when CRASH UNLOCK condition is met.
6. CENTRAL DOOR LOCK function is not performed during or after CRASH UNLOCK signal output.
But, CENTRAL DOOR LOCK function is performed normally if CRASH UNLOCK function is reset after IGN OFF.



* T1 is the time when AIR BAG signal is output

- T1: 0.2s
T2: 40ms
T3: 5s ± 0.5s

NOTICE

- Output at that time is immediately stopped and 100ms is extended when there is reverse direction output request during output, then the reverse direction output is performed.
But, output is performed for the last received output request when there is output request during extending 100ms.
(200ms in DEAD LOCK Spec)
- LOCK signal output is performed and UNLOCK signal output request is ignored when LOCK signal output and UNLOCK signal output are performed at the same time.
- CRASH DOOR UNLOCK function is given priority than LOCK/UNLOCK control by other functions.
- LOCK/UNLOCK signal request by other functions is ignored during and after CRASH DOOR UNLOCK signal output.
But, LOCK/UNLOCK signal control by other functions are performed in case of IGN1 SW OFF & IGN2 SW OFF.
- LOCK (UNLOCK) signal request is not output again when All LOCK(UNLOCK) SW is LOCK (UNLOCK) state.
But, Driver DOOR UNLOCK signal request is not output again when Dr DOOR LOCK SW is UNLOCK state.
- Dr DOOR UNLOCK signal is output as well as ALL DOOR UNLOCK signal when there is ALL DOOR UNLOCK signal output request during Dr DOOR UNLOCK output.
- TAILGATE LOCK/UNLOCK CONTROL CONDITION

TAILGATE LOCK COGNITIVE CONDITION : ALL DOOR LOCK & TAILGATE CLOSE

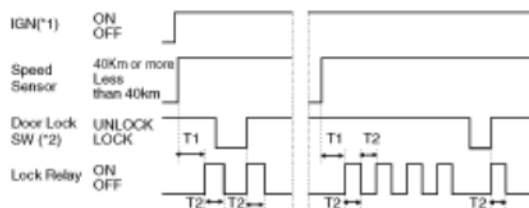
TAILGATE UNLOCK COGNITIVE CONDITION :

1) When one DOOR of All DOOR is UNLOCK

2) When TAILGATE OPEN

Speed Sensing Auto Door Lock (Unlock When Key Out)

1. This does not activate when vehicle speed is less than 15km/h.
2. LOCK signal is output if vehicle speed is 15km/h or more for at least 1s under ALT"L" ON, IGN SW = ON. But, LOCK signal is not output if all DOORs are locked or all DOORs are FAIL in advance.
3. LOCK signal is output 3 times as Max ((2) is ignored) if either one door is unlocked after LOCK signal output in (2). (1s cycle) But, DOOR, which is locked from UNLOCK state during 3-time output, is ignored.
4. Relevant DOOR is FAIL if the state is UNLOCK after 3-time output.
5. After Lock relay output above (2), Lock relay output one time if LOCKED DR is changed Unlock. But After Lock relay output, relevant Door Lock relay output three times if UNLOCK state is maintained.
6. FAIL DOOR is cleared at IGN SW = OFF or DOOR UNLOCK SW changed (UNLOCK → LOCK)
7. AUTO DOOR LOCK function is not performed when CRASH UNLOCK condition is met.
8. All DOOR UNLOCK signal is output when KEY OUT After IGN1 ON → OFF in LOCK condition.
But, when KEY OUT, UNLOCK function is relevant when AUTO DOOR LOCK function is performed.



T1 : $1 \pm 0.1\text{sec}$, T2 : $0.5 \pm 0.1\text{sec}$.

*1 ON : IGN1 ON, OFF : IGN1 OFF

*2 LOCK : Driver & Passenger & Rear Door Lock SW = LOCK

UNLOCK : Driver or Passenger or Rear Door Lock SW = UNLOCK

Dead Lock / Unlock

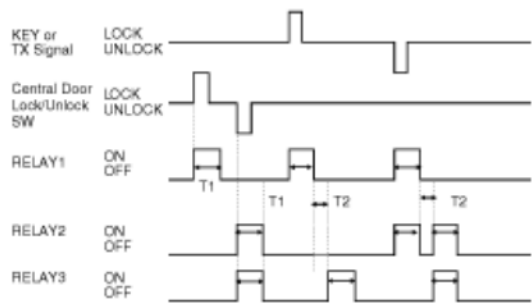
1. Central Door LOCK signal is output for 0.5s if Central Door LOCK is performed with Driver/Passenger KEY or TX. Then, DEAD LOCK signal is output for 0.5s after checking the state (after 200msec).
2. Not DEAD LOCK but only Central Door LOCK is performed after Central Door LOCK output for 0.5s when Central Door is LOCKED by Central Door Lock SW.
3. Central Door UNLOCK output for 0.5s after DEAD UNLOCK output for 0.5s and after 200ms when Central Door UNLOCK SW is turned ON by Door KEY or TX after DEAD UNLOCK output for 0.5s.
4. Not DEAD UNLOCK but only Central Door UNLOCK is performed when Central Door UNLOCK is turned ON by Central Door Lock SW.
(In DR, the relevant DOOR is performed Door UNLOCK & DEAD UNLOCK mechanically when UNLOCK by KEY)
5. DEAD LOCK/UNLOCK is performed when only DOOR CLOSED.
(But, except the state of DEAD LOCK by TX or Door Key. All DOOR Unlock signal is output when Door OPEN by

REMINDER function by TX or Dr Key.)

- 6. LOCK function is performed first when both LOCK/UNLOCK functions are performed at the same Time.
- 7. Priority is decided in order of TX>KEY>Door LOCK SW in case of simultaneous input with KEY/TX/Door LOCK SW. If (7),(8) is happened simultaneously, priority is given to (8).
- 8. DEAD LOCK is canceled (DEAD UNLOCK signal output for 0.5SEC) at KEY IN & IGN ON after DEAD LOCK.
- 9. In the condition of IGN ON, DEAD LOCK is not output when DOOR KEY LOCK.
- 10. Door LOCK/UNLOCK signal output is ignored by TX, Central Door Lock/Unlock SW during DEAD LOCK/UNLOCK signal output.

Functional Relay Output Condition

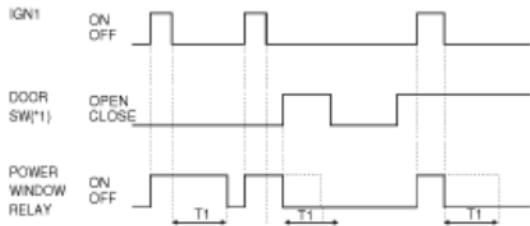
	Relay 1	Relay 2	Relay 3
Central/Lock	ON	OFF	OFF
Dead/Lock	OFF	OFF	ON
Dead/Unlock	ON	ON	OFF
Central/Unlock	OFF	ON	ON



T1 : 0.5s±0.1s. T2 : 0.2s±0.05s.

Power Window Timer

- 1. POWER WINDOW RELAY it turned ON at IGN SW ON
- 2. POWER WINDOW RELAY is turned ON for T1 at IGN SW OFF
- 3. POWER WINDOW RELAY is immediately turned OFF if DOOR is opened under P/WINDOW RELAY ON for T1.
- 4. POWER WINDOW RELAY is immediately turned OFF at IGN SW ON→OFF under DOOR OPEN.

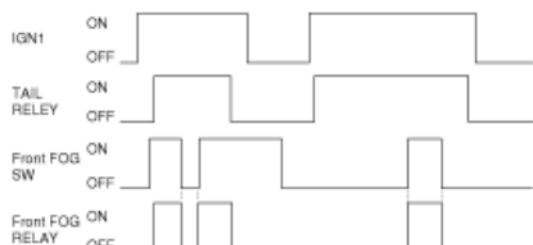


*1 OPEN : DRIVER & PASSENGER SIDE DOOR OPEN
CLOSE : DRIVER AND PASSENGER SIDE DOOR CLOSE

T1 : 30 ± 3sec.

Front Fog Lamp Control

1. IGN1 ON & TAIL Relay ON, if Front FOG SW is turned ON then Front FOG Relay is ON.
2. Above (1), Front FOG SW is turned ON then Front FOG Relay is OFF.
3. IGN1=ON & TAIL Relay ON & Front FOG SW ON when conditions are not formed, Front FOG Relay off.

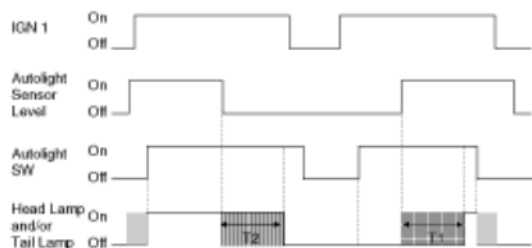


Auto Light Control

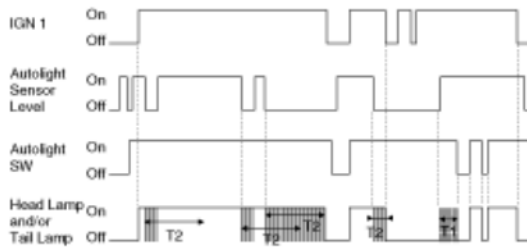
1. AUTO LIGHT SENSOR value is always read at IGN1 ON.
2. LIGHT is turned ON after $2\text{sec} \pm 0.2\text{sec}$ when AUTO LIGHT SENSOR value is same as LIGHT ON input value.
3. LIGHT is turned OFF after $2\text{sec} \pm 0.2\text{sec}$ when AUTO LIGHT SENSOR value is same as LIGHT OFF input value.
4. LIGHT ON value of SENSOR is based on the below table.
5. Head Lamp signal is output when Head Lamp OUTPUT is ON.
6. After Head Lamp is turned OFF, Head Lamp signal output is kept if Head Lamp and Tail Lamp ON.
luminance condition is met at Auto Light SW ON.
7. After Head Lamp is turned OFF, Head Lamp signal output is immediately stopped if HEAD LAMP and Tail Lamp OFF
luminance condition is met at Auto Light SW ON.
8. After Head Lamp is turned OFF, Head Lamp signal output is immediately stopped at TAIL SW signal input.
9. After Head Lamp is turned OFF, Head Lamp signal output is stopped if there is no input of Auto Light SW or TAIL SW.
(shall be no flashing of Head Lamp)
10. Head Lamp signal output is stopped when SW position is changed from AUTO to Head Lamp SW during Head Lamp ON
with Auto Light. (shall be no flashing of Head Lamp)

Light Sensor Reading

	Head lamp & Tail lamp
ON	1.10 V
OFF	2.80 V



T1 : ON Filtering Time
T2 : OFF Filtering Time



T1 : ON Filtering Time
T2 : OFF Filtering Time

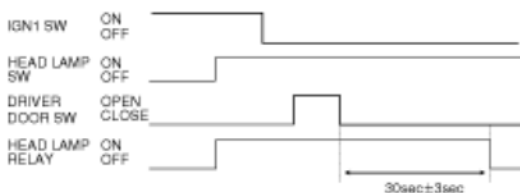
Head Lamp Escort

1. If Head Lamp is lighting by Head Lamp SW or AUTOLIGHT, Head Lamp lighting is maintained when IGN1 is changed ON to OFF.
2. Following stste, Head Lamp lighting is truned off.
But, TAIL LAMP keep up lighting when KEY IN in the condition of lighting off after IGN ON→OFF and lighting.
(the condition of TAIL LAMP lighting off follows TAIL LAMP AUTOCUT function.)
 - When Driver DOOR SW OPEN→CLOSE and after 30sec.
 - When Head Lamp SW ON or not the case of AUTO LIGHT SW ON.
(ALC ; When Head Lamp ON, Head Lamp SW ON within Multi-function SW during ESCORT → Lighting keeping up when SW is moned to AUTO LIGHT SW ON or reverse.)
 - When Driver DOOR OPEN state is maintained after 5minute.
 - When IGN1 ON→IGN OFF and sfter 5minute.
 - When received TX LOCK signal two times during output.

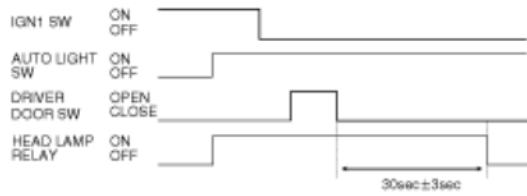
NOTICE

- Head Lamp RELAY output of TIMING CHART contains the condition of TAIL LAMP ON.
- Head Lamp RELAY output by - Head Lamp SW and HEAD LAMP RELAY output by AUTO LIGHT is regarded identical condition.
That is, the explaining of HEAD LAMP RELAY ouput contains two cases.
- AUTO LIGHT SW ON : HEAD LAMP and TAIL LAMP signal by AUTO LIGHT is output.
- AUTO LIGHT SW OFF: HEAD LAMP and TAIL LAMP signal by AUTO LIGHT is not output.

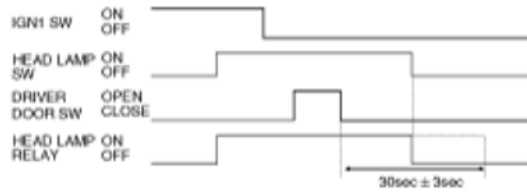
<CASE 1>



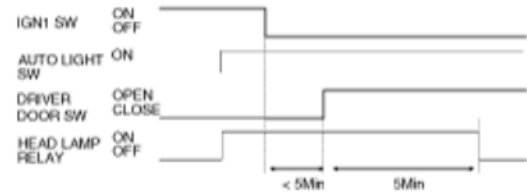
<CASE 2>



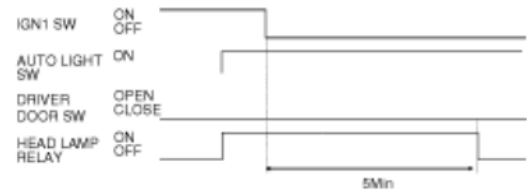
<CASE 3>



<CASE 4>



<CASE 5>

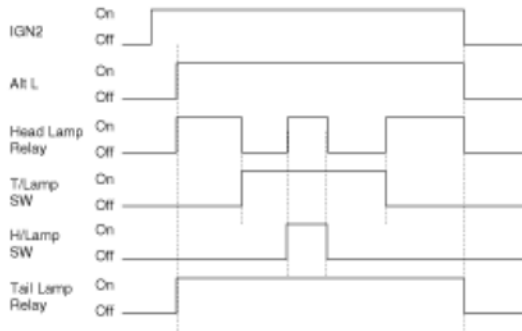


Daytime Running Light

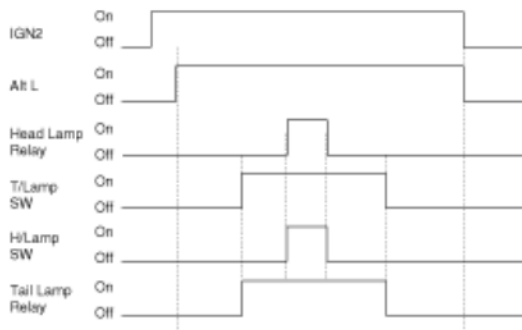
1. If IGN2 & ALT "L" ON & HEAD LAMP SW = OFF & TAIL LAMP SW=OFF, TAIL LAMP RELAY and HEAD LAMP RELAY is output.
2. After above 1), HEAD LAMP RELAY output is OFF when TAIL LAMP SW=ON.
3. After above 2), HEAD LAMP RELAY output is ON when HEAD LAMP SW=ON again.

- If TAIL LAMP Switch= ON and IGN2 & ALT "L" OFF→ON, only TAIL LAMP RELAY is ON.
- HEAD LAMP ESCORT is performed when LAMP is turn on by HEAD LAMP Switch after IGN1 OFF, but HEAD LAMP ESCORT is not performed when LAMP is turn on by DRL function after IGN1 OFF.
(HEAD LAMP SW=OFF)
- DRL is not performed when DRL Deactivation INPUT=ON(GND).
- During DRL operating, DRL function id stopped when DRL_Deactivation INPUT=ON(GND).

■ When DRL _ Deactivation INPUT = OFF (OPEN)

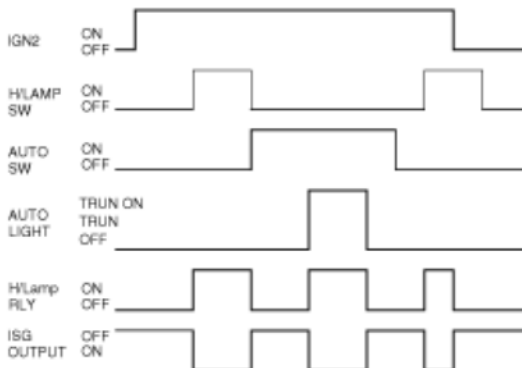


■ When DRL _ Deactivation INPUT = ON (GND)



Alternator Management System Control

- HeadLamp in compliance with Switch ON/OFF or Auto light functions Head Lamp Relay at the time of ON/OFF percentage AMS identically, ON/OFF it controls.
- DRL in compliance with a functions Head Lamp Relay at the time of ON , It does not AMS ON.

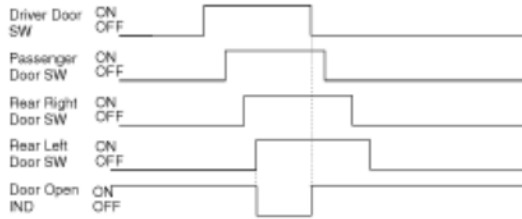


Door Open Indicator

- One more DOOR Open
Door Open IND is turned on when ("Driver Door SW OFF" or "Passenger side Door SW OFF" or "Rear Right Door SW OFF")

or "Rear left Door SW OFF")

2. Door Open IND is turned off when All DOOR CLOSE ("Driver Door SW ON" & "Passenger side Door SW ON" & "Rear Right Door SW=ON" & "Rear Left DoorSW=ON")
 - DOOR SW"ON" = DOOR CLOSE
 - DOOR SW"OFF"= DOOR OPEN

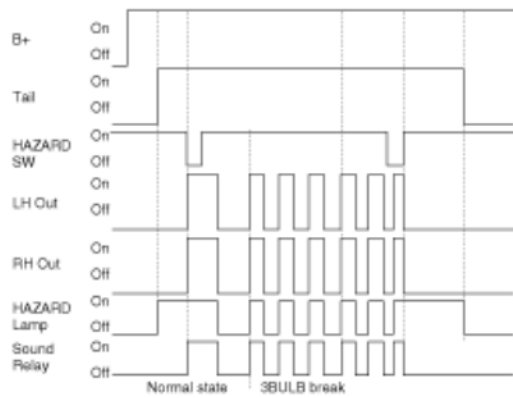


CENTER FACIA PANEL SWITCH



Turn Signal And Hazard Control

1. Flashing function
 - (1) On the state of Tail Switch ON, Hazard symbol light ON.
 - (2) On the state of Tail Switch OFF, Hazard symbol light OFF.
 - (3) On the state of Hazard Switch ON, Micom sense the bulbs status that is normal, removed more than 3 bulbs , over load or short to GND. At each state output signal is as follow.
 - Normal : 85 ± 10 C/M, DUTY RATIO 50%
 - More than 3 Bulbs are removed : more than 120C/M, DUTY RATIO 50%
 - Over Load or Short to GND: DO NOT OPERATE
 - (4) Hazard symbol light(LED;RED COLOR) is same as (3).
 - (5) SOUND R/Y output signal is same as (3).
 - (6) The state of GND Short is terminated by the input OFF signal signal for all Turn_Lamp
 - (7) RKE signal is prior to Hazard signal.



2. Turn Left/Right signal flashing function

(1) On the state of IGN1, TURN_SIGNAL switch is LOW ACTIVE .

(2) On the state of Turn_Signal Switch ON, Micom sense the bulbs state that is normal, removed more than 1 bulbs, over load or short to GND. At each state output signal is as follow.

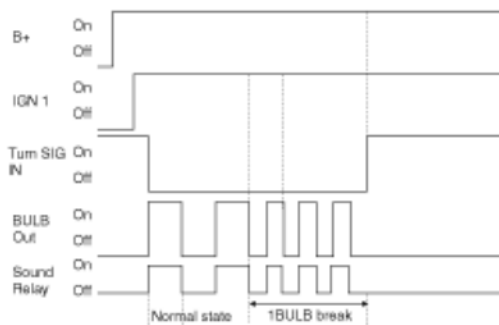
- Normal : 85 ± 10 C/M, DUTY RATIO 50%
- More than 1 BULBs are removed : more than 120C/M, DUTY RATIO 50%
- Over Load or Short to GND: DO NOT OPERATE

(3) SOUND R/Y output signal is same as (3).

(4) The state of GND Short is terminated by the input OFF signal signal for all Turn_Lamp

(5) Hazard signal is prior to Turn_signal.

(6) RKE signal is prior to Turn_signal.



3. Lane change

(1) If Both IGN1 and Turn_signal SW are ON and then Turn_signal SW is under 1.8S, SW's Turn_signal print out 3 time .

(2) Lane Change is stopped in case of as follows.

- The Opposite side T/Sig SW ON
- Hazard SW ON

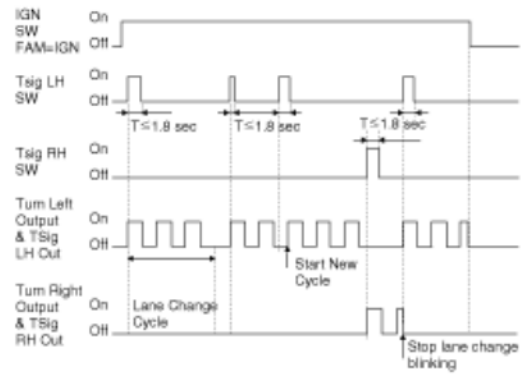
(3) During Lane change is running through LH Turn signal SW, when RH Turn signal SW's input is under 1.8s, cut output of LH Turn signal and do output of RH Turn signal.

(4) During Lane change is running, when Lamp failure detection as follows.

- Before output the case lamp failure : Do normal output 1 time and Do output of Double blinking 3 time.
- During output the case lamp failure : After output completing Do output of Double blinking 3 time.
- During output and Turn signal lamp OFF the case lamp failure : Do normal output 1 time and Do output of Double

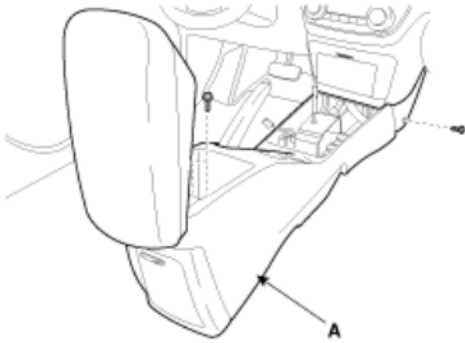
blinking 3 time.

(5) During Lane change is running, when short is happened, stop output at once.



REMOVAL

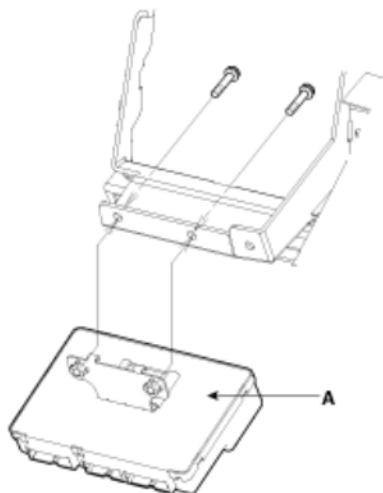
1. Disconnect the negative (-) battery terminal.
2. Remove the floor console assembly (A) after loosening the console mounting screws.
(Refer to the BD group - "Console")



3. Remove the center facia lower try (A) after loosening the mounting screws.



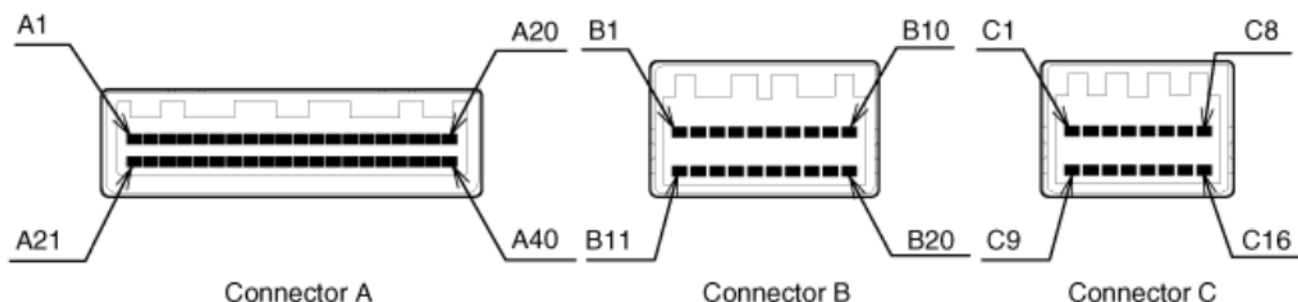
4. Remove the body control module (A) after loosening 2 bolts and disconnecting connector.



1. Install the body control module.
2. Install the center facia lower try.
3. Install the floor console assembly.

INSPECTION

BCM Connectors



Pin NO.	Connector A	Connector B	Connector C
1	Battery Voltage	Auto Light Signal	Room Lamp
2	IGN1	Auto Light (Ground)	-
3	Alternator 'L'	Rear Right Door Unlock Switch	Defogger Relay
4	Key In Switch	Rear Defogger Switch	Tail Lamp Relay
5	Speed Limit	Rear Fog Lamp Switch	Wiper Relay
6	Rear Left Door Lock Switch	Front Fog Lamp Switch	DRL Lock Relay 1
7	Carsh Input	Auto Light (Power)	Dead Lock Relay 1
8	Driver Door Unlock Switch	-	Horn Relay
9	Passenger Side Door Unlock Switch	-	Hazard Relay
10	Rear Wiper Switch	EMS	Key Illumination Lamp
11	-	Safety Power Window ECU	Driver Seat Belt Indicator
12	Ground	Power Window Relay	Ground(power)
13	IGN2	Front Deicer Relay	Rear Fog Relay
14	Washer Switch	Head Lamp Relay	Diagnosis
15	INT Wiper Switch	Door Lock Relay 2	Central Door Lock Indicator
16	Code Save	Security Indicator	Door Open Indicator
17	Rear Right Washer Switch	Front Fog Lamp Relay	
18	Tailgate Relay	Rear Wiper Relay	
19	Tailgate Handle Switch	Head Lamp Escort	
20	Driver Door Switch	Passenger Seat Belt Indicator	
21	Assist Door Switch		
22	Rear Left Door Switch		
23	Tailgate Door Switch		

24	Hood Switch		
25	Driver Door Key Lock Switch		
26	Driver Door Key Unlock Switch		
27	-		
28	Tail Lamp Switch		
29	INT Wiper Volume Switch		
30	Speed Sensor		
31	Auto Light Switch		
32	Driver Seat Belt Switch		
33	Head Lamp Switch		
34	Assist Door Key Unlock Switch		
35	Central Door Lock/unlock Switch		
36	Assist Seat Belt Signal		
37	Front Deicer Switch		
38	MIST Switch		
39	Rear Door Switch		
40	-		

Terminal Voltage

No	Input signal name	Logic state	ON/OFF voltage recognition LEVEL(V)	Remarks
1	B+	ON = BAT	9V~16V	
2	IGN1	ON = BAT (IGN KEY is ON or START position)	7V or more/4V or less	BAT= BATTERY
3	IGN2	ON = BAT (IGN KEY is ON position)	7V or more/4V or less	
4	Alt L	ON = BAT(starting state)	7V or more/4V or less	
5	Key In Switch	IN = BAT (KEY insertion state)	7V or more/4V or less	
6	Rear Left Door Switch	OPEN = GND	1V or less/OPEN (Reference value: 4V or more)	
7	Driver door switch	OPEN = GND	1V or less/OPEN (Reference value: 4V or more)	
8	Passenger side door Switch	OPEN = GND	1V or less/OPEN (Reference value: 4V or more)	
9	Driver door unlock switch	LOCK = OPEN, UNLOCK = GND	1V or less/OPEN (Reference value: 4V or more)	
10	Passenger side door Unlock Switch	LOCK = OPEN, UNLOCK = GND	1V or less/OPEN (Reference value: 4V or more)	
11	Center door lock/unlock switch	ON=GND	1V or less/OPEN (Reference value: 4V or more)	
12	Rear door switch	OPEN = GND	1V or less/OPEN (Reference value: 4V or more)	
			1V or less/OPEN (Reference value: 4V or more)	

13	Tail gate switch	OPEN = GND	more)	
14	Hood Switch	OPEN = GND	1V or less/OPEN (Reference value: 4V or more)	
15	Driver door key lock switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
16	Driver door key unlock switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
17	Passenger door key unlock switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
18	Front deicer switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
19	Washer switch	ON = BAT	7V or more/4V or less	
20	Wiper INT switch	ON = BAT	7V or more/4V or less	
21	Wiper INT volume switch	0V ~ 2.5V	-	0Ω~ 50KΩ
22	Rear washer switch	ON = BAT	7V or more/4V or less	
23	Rear wiper Int switch	ON = BAT	7V or more/4V or less	
24	Rear defogger switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
25	Tail switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
26	L_Driver seat belt switch	Fasten = OPEN, Unfasten = GND	1V or less/OPEN (Reference value: 4V or more)	
27	Crash Input (Impact sensor)	ON = GND(at crash detection)	1V or less/OPEN (Reference value: 4V or more)	
28	Speed sensor	Speed input = PULSE(0~5V)	1V or less/4V or more	OPEN COLLECTOR
29	Head lamp switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
30	Front fog switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
31	Rear fog switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
32	Tail gate handle switch	ON = GND	1V or less/OPEN (Reference value: 4V or more)	
33	Code save unit	ON = GND	1V or less/4V or more	
34	Rear right door Unlock switch	LOCK = OPEN, UNLOCK = GND	1V or less/OPEN (Reference value: 4V or more)	
35	Rear left door Unlock switch	LOCK = OPEN, UNLOCK = GND	1V or less/OPEN (Reference value: 4V or more)	
36	Mist switch	ON = BAT	7V or more/4V or less	
37	Auto light sensor Signal	-	-	

BCM Actuator Operation

SCAN tool can operates all actuators controlled by BCM by force.

NO.	BCM DISPLAY

1	DOOR LOCK RELAY
2	DOOR UNLOCK RELAY
3	TAILGATE RELEASE RELAY
4	POWER WINDOW RELAY
5	WIPER RELAY
6	HAZARD RELAY (+RK)
7	BURGLAR HORN RELAY (+RK)
8	STARTER INHIBIT RELAY (+RK)
9	TAIL LAMP RELAY/DRL UNIT
10	HEAD LAMP RELAY
11	REAR FOG RELAY
12	FRONT DEICER RELAY
13	REAR DEFOGGER RELAY
14	DRIVER SEAT BELT INDICATOR
15	IGN KEY HOLE ILLUMINATION
16	ROOM LAMP

BCM Diagnosis With Scan Tool

1. It will be able to diagnose defects of BCM with scan tool quickly. Scan tool can operate actuator forcefully, input/output value monitoring and self diagnosis.
2. Select model and menu.

1. KIA VEHICLE DIAGNOSIS ▼

MODEL : ED
01. ENGINE (GASOLINE)
02. ENGINE (DIESEL)
03. AUTOMATIC TRANSAXLE
04. ABS/ESP
05. SRS-AIRBAG
06. FULL AUTO AIR/CON.
07. ELEC.POWER STEERING
08. BODY CONTROL MODULE

3. Select "Current data", if you will check current data of BCM. It provides power supply status, multi function status, lamp status, door status, lock system status, wiper, auto light status and so on.

1. KIA VEHICLE DIAGNOSIS

MODEL : ED
SYSTEM : BODY CONTROL MODULE
01. CURRENT DATA
02. FLIGHT RECORD
03. ACTUATION TEST
04. SIMU-SCAN
05. IDENTIFICATION CHECK
06. USER OPTION
07. DATA SETUP (UNIT CONV.)

1.11 CURRENT DATA 04/66	
KEY IN SW	OFF
START INHIBIT RLY (+RK)	OFF
POWER WINDOW RELAY	OFF
TAIL LAMP SW	OFF
AUTO LIGHT SW	OFF
REAR FOG SW	OFF
HEAD LAMP SW	OFF
FRONT FOG SW	OFF
FIX SCRN FULL PART GRPH HELP	

4. If you will check BCM data operation forcefully, select "Actuation test".

1. KIA VEHICLE DIAGNOSIS
MODEL : ED
SYSTEM : BODY CONTROL MODULE
01. CURRENT DATA
02. FLIGHT RECORD
03. ACTUATION TEST
04. SIMU-SCAN
05. IDENTIFICATION CHECK
06. USER OPTION
07. DATA SETUP (UNIT CONV.)

1.3 ACTUATION TEST 01/16
DOOR LOCK RELAY
DURATION 0.5S 1 TIMES
METHOD ACTIVATION
CONDITION IG. KEY ON ENGINE OFF
PRESS [STRT], IF YOU ARE READY ? SELECT TEST ITEM USING UP/DOWN KEY
STRT STOP

5. You can turn ON/OFF as below option function with the user option program.

- (1) LOCK / UNLOCK confirming alarm: Alarm sound ON/OFF control when you LOCK/UNLOCK doors with transmitter.
- (2) Mechanical LOCKING system: Arm/Disarm ON/OFF when you lock the door with the mechanical key.
- (3) AUTO DOOR LOCK/UNLOCK system ON/OFF.
 - Vehicle speed gearing AUTO DOOR LOCK (more than 20km/h)
 - AUTO DOOR LOCK non application
 - Shift lever gearing AUTO DOOR LOCK
 - Driver seat AUTO DOOR LOCK
 - AUTO DOOR UNLOCK non application
 - All doors UNLOCK in the case of driver door UNLOCK
 - All doors UNLOCK in the case of IGN key separation.
- (4) Riding & Getting off gearing
 - Seat installation state ON/OFF

- Seat riding & getting off gearing ON/OFF
- Column installation state ON/OFF
- Column riding & getting off gearing ON/OFF

User Option Mode

The BCM offers 1 items user option mode for a user convenience (AUTO DOOR LOCK)

- It is able to set up the enable or disable of AUTO DOOR LOCK function or AUTO DOOR LOCK operation vehicle speed when using it.

1. Select option "ED" and press ENTER.
2. Select option "BODY CONTROL MODULE" and press ENTER.

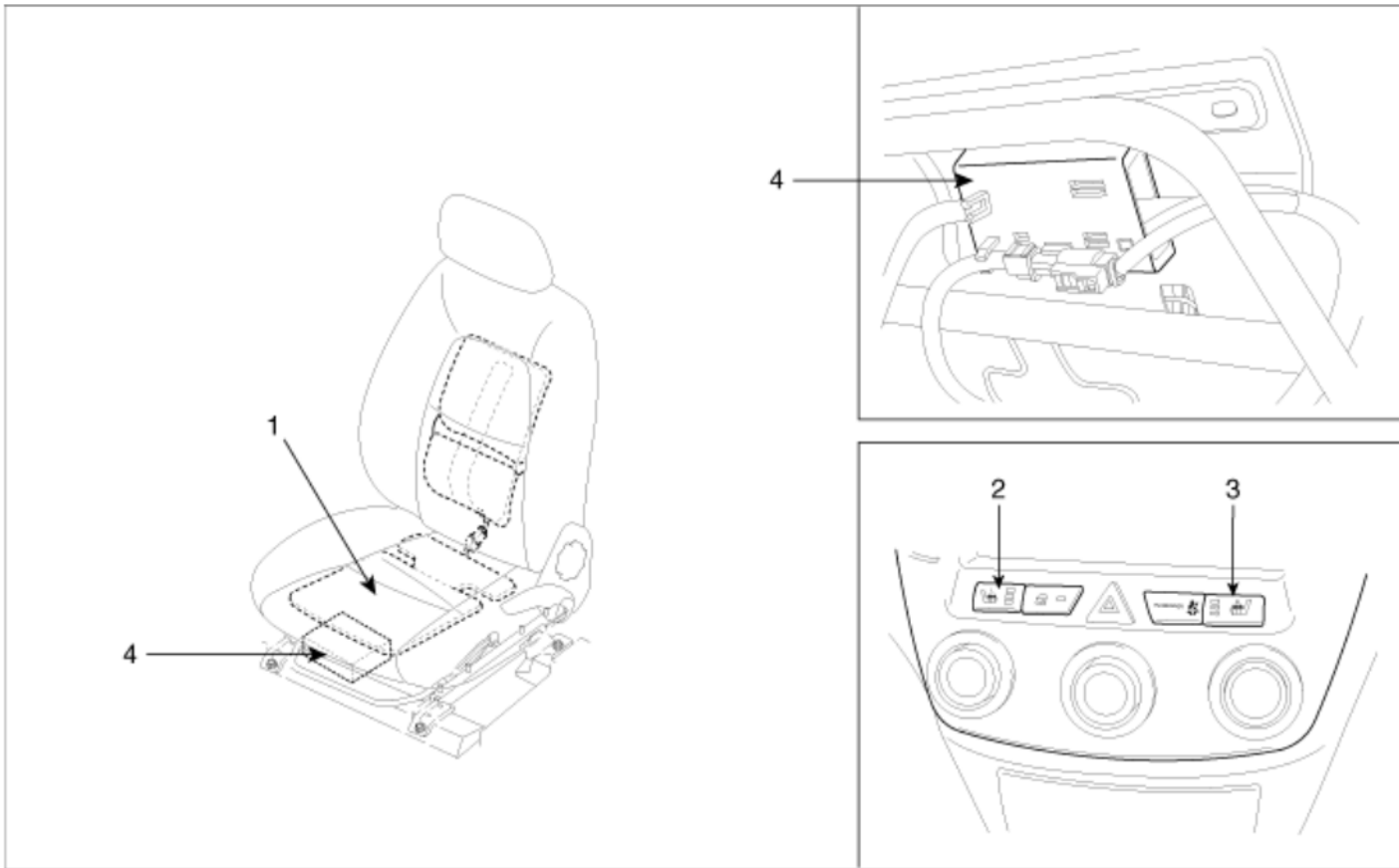
1. KIA VEHICLE DIAGNOSIS ▼
MODEL : ED
01. ENGINE (GASOLINE)
02. ENGINE (DIESEL)
03. AUTOMATIC TRANSAXLE
04. ABS/ESP
05. SRS-AIRBAG
06. FULL AUTO AIR/CON.
07. ELEC.POWER STEERING
08. BODY CONTROL MODULE

3. Select option "USER OPTION" and press ENTER.

1. KIA VEHICLE DIAGNOSIS
MODEL : ED
SYSTEM : BODY CONTROL MODULE
01. CURRENT DATA
02. FLIGHT RECORD
03. ACTUATION TEST
04. SIMU-SCAN
05. IDENTIFICATION CHECK
06. USER OPTION
07. DATA SETUP(UNIT CONV.)

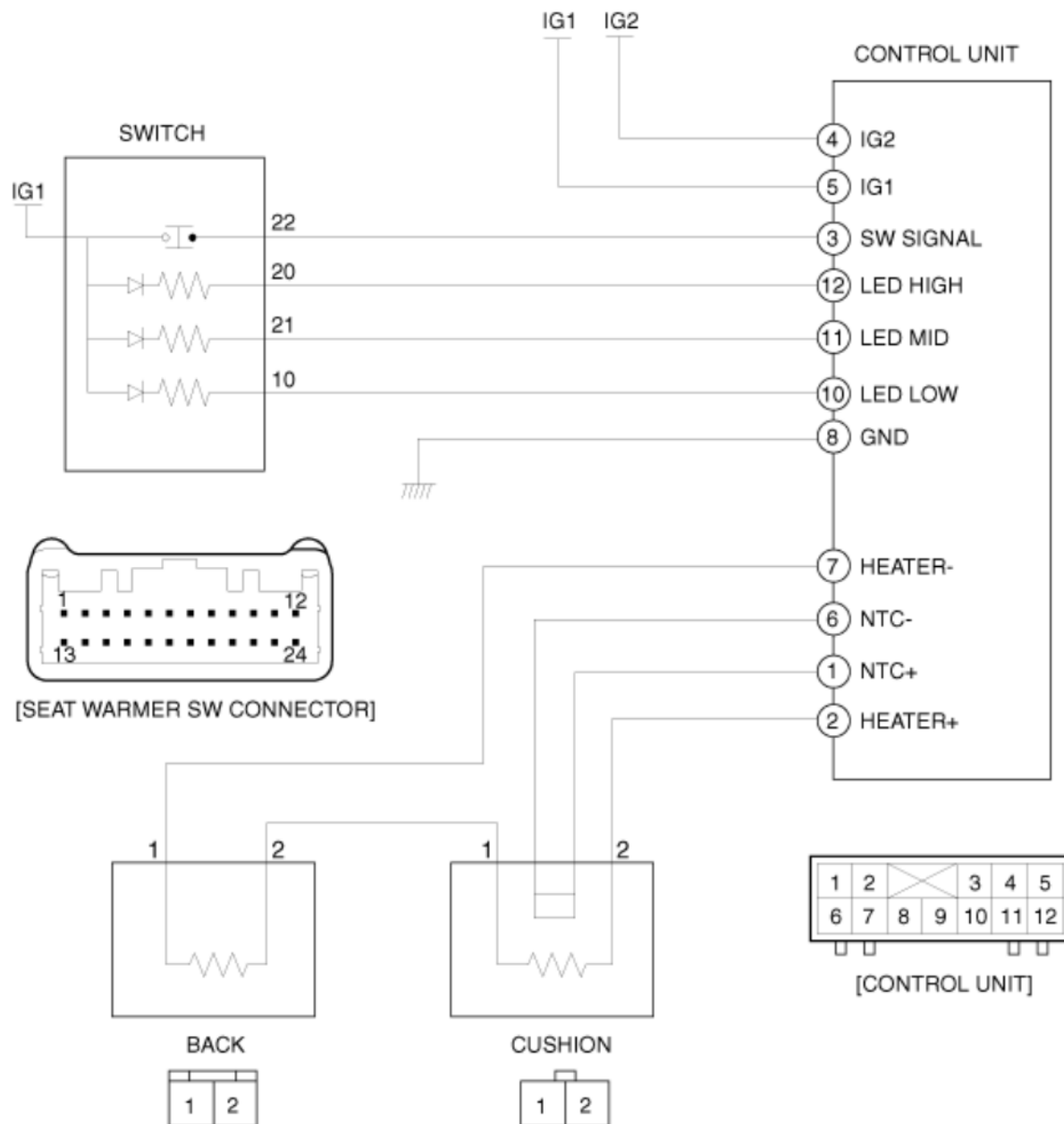
4. Select option "AUTO DOOR LOCK STATUS by using the direction button(▲ / ▼).
5. Select the parameter by using the direction button(◀ / ▶) and press ENTER to save it.
(Disable / FIXING)

COMPONENT LOCATION



- 1. Seat warmer
- 2. Seat warmer switch (LH)

- 3. Seat warmer switch (RH)
- 4. Control unit

CIRCUIT DIAGRAM

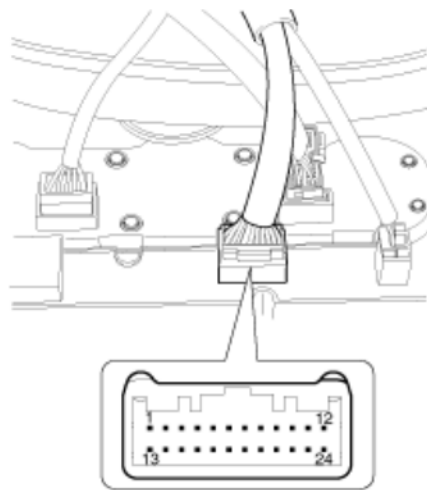
INSPECTION

Front Seat Warmer Switch

1. Disconnect the negative (-) battery terminal.
2. Remove the center fascia panel(A) from the crash pad.
(Refer to the BD group - "Crash pad")



3. Disconnect the seat warmer switch connector.

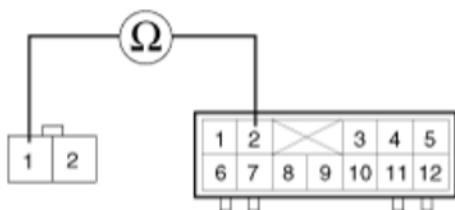


4. Check that continuity exists between the terminals.

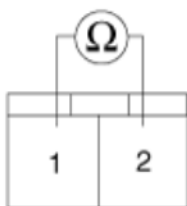
Terminal		2	22	GND
Direction	Front Left		○ — ○	
	OFF			
Front Right	ON	○ — ○		
	OFF			

INSPECTION

1. For cushion side of seat warmer, check for continuity and measure the resistance between No.2 terminal of control unit harness connector and No.1 terminal of cushion connector.



2. For back side of seat warmer, check for continuity and measure the resistance between No.1 and No.2 terminal of back connector.



Standard value

Cushion : $1.43\Omega \pm 10\%$, Back : $1.01\Omega \pm 10\%$

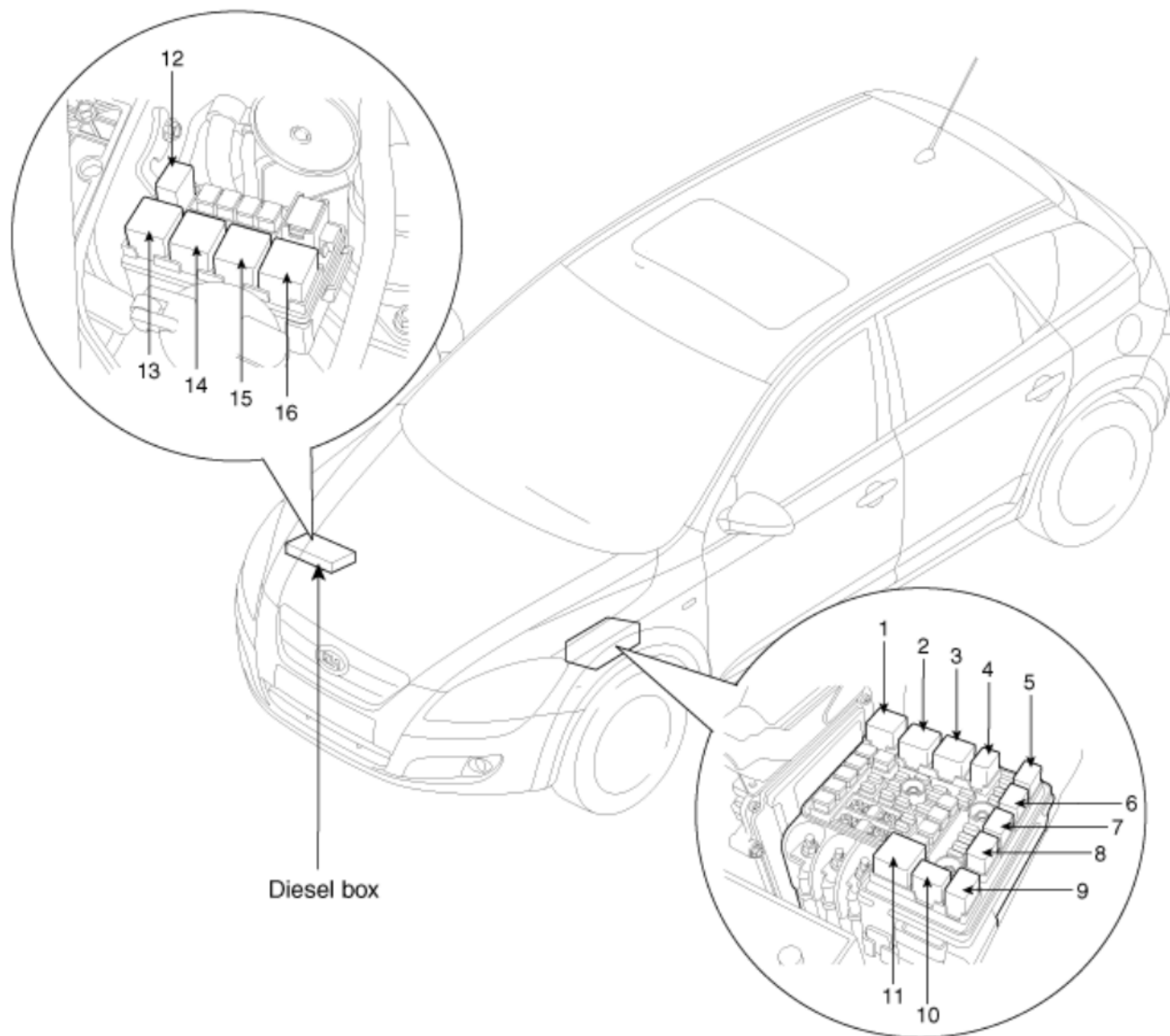
3. Operate the seat warmer after connecting the connectors, and then check the NTC(Negative Temperature Coefficient) thermostat by measuring the temperature of seat surface.

Standard value

Item	Cushion	Back	Remark
LOW	97°F (36°C)	104°F (40°C)	±36°F (±2°C)
MID	100°F (38°C)	109°F (43°C)	±36°F (±2°C)
HIGH	104°F (40°C)	115°F (46°C)	±36°F (±2°C)

COMPONENT LOCATION

[Engine room relay box]



1. Condenser pan 2 relay
2. Condenser pan 1 relay
3. Start relay
4. Fuel pump relay
5. A/C relay
6. Head lamp relay (Low-left side)
7. Horn relay
8. Head lamp relay (High)

9. Front fog lamp relay
10. Wiper relay
11. Main relay
12. Fuel filter heater relay
13. PTC heater relay #3
14. PTC heater relay #2
15. PTC heater relay #1
16. Glow relay

[Passenger compartment relay]

English ▼

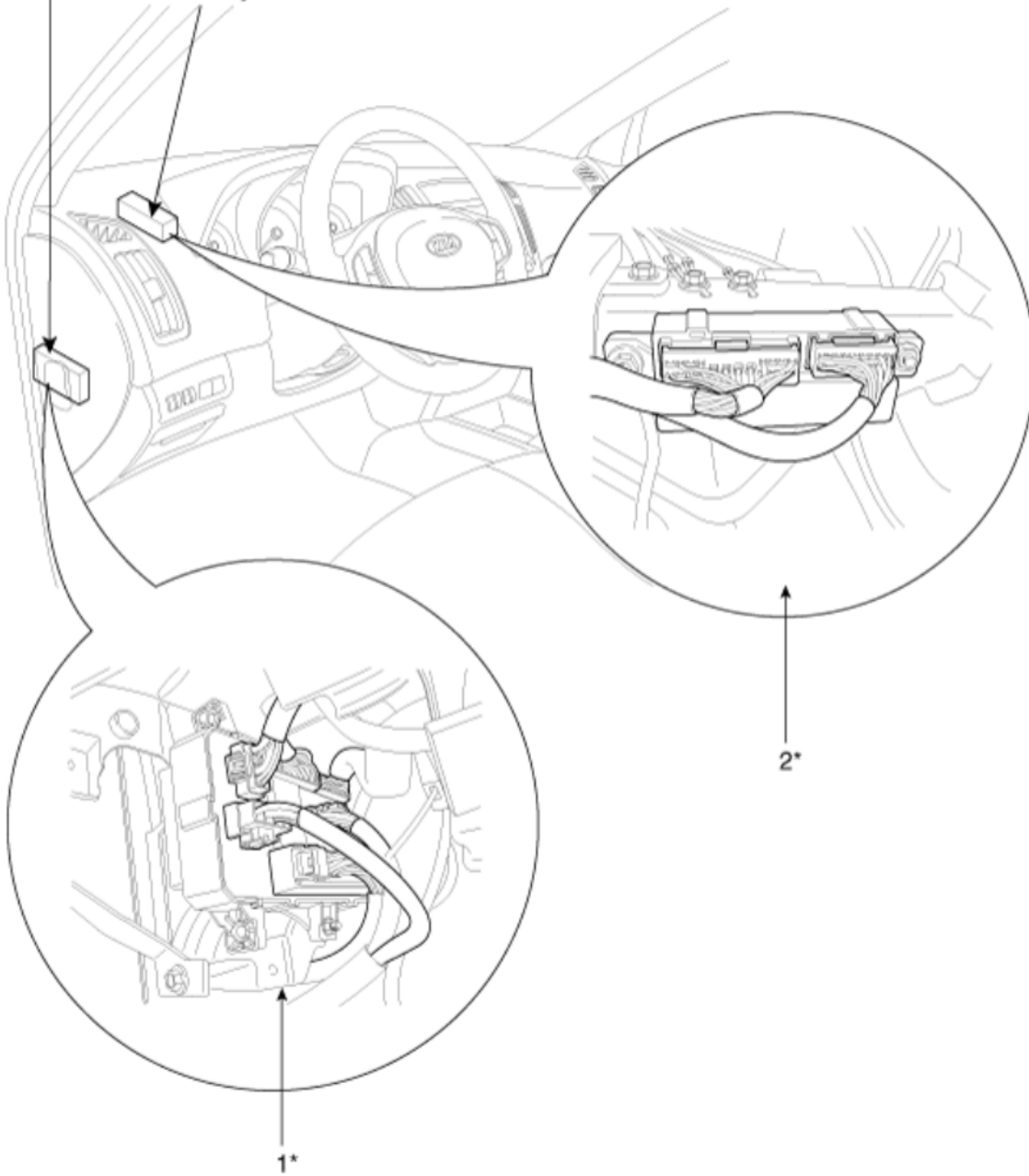
The parts with asterisk(*) :

This illustration shows the LHD type.

RHD type is symmetrical.

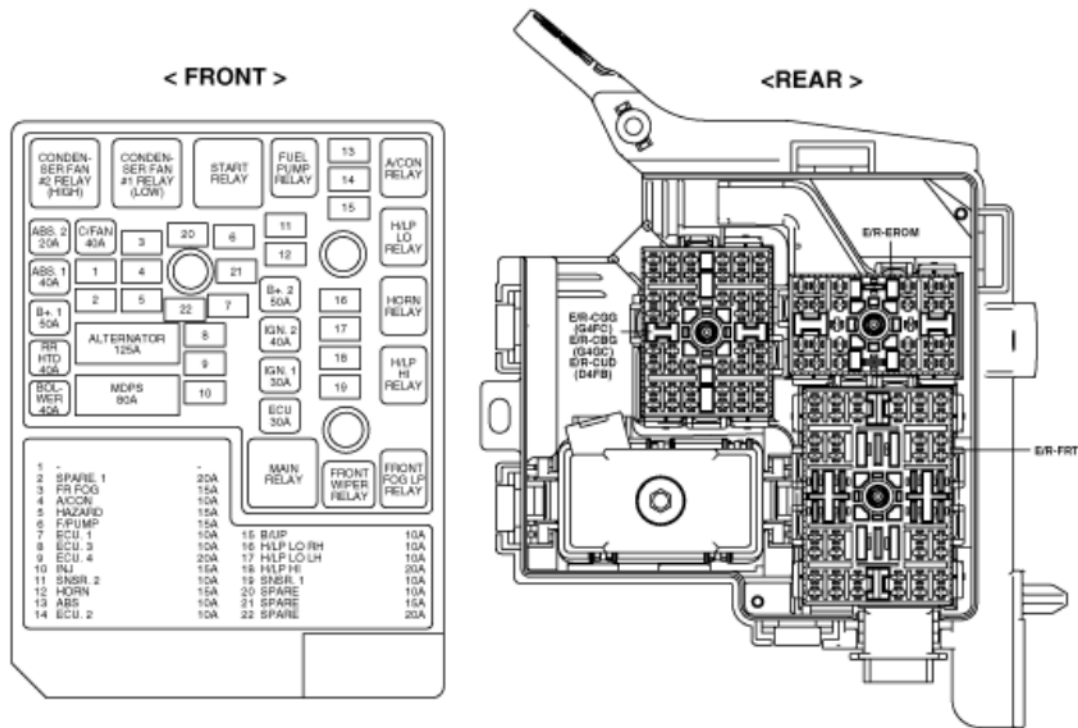
Passenger compartment junction box*

ICM relay box*



1. Tail lamp relay, Power window relay, Rear heater relay, Tailgate relay (Built-in-Junction box)
2. Door unlock relay, Door lock relay, Front decier relay, Rear fog relay, Buglar alarm horn relay, Rain sensor relay, Dead lock relay (Built-in-ICM relay Box)

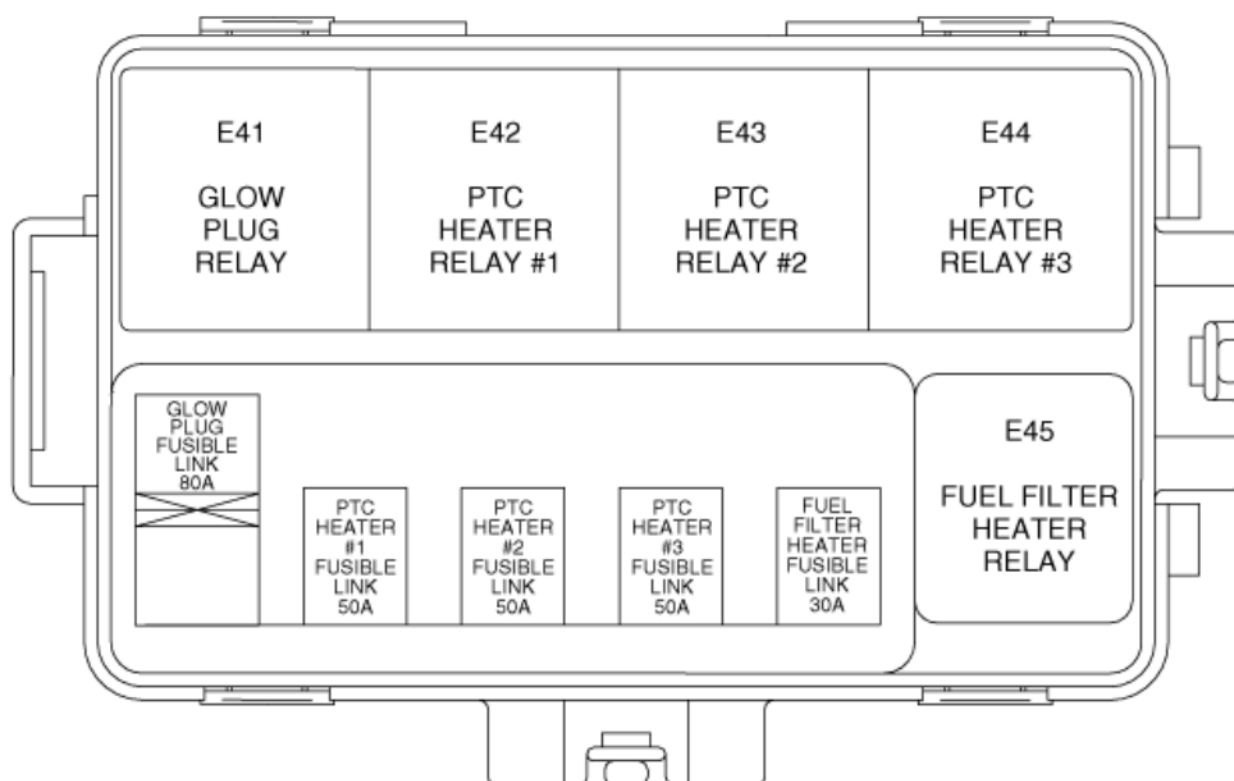
COMPONENT LOCATION



CIRCUIT

	Description	(A)	Circuit Protected
FUSIBLE LINK	ALTERNATOR	125A	Generator, Fusible Link Box (D4FB)
	IGN. 1	30A	Ignition Switch
	IGN. 2	40A	Ignition Switch, Start Relay
	B+ 2	50A	I/P Junction Box
	ECU	30A	Main Relay, PCM (G4GC)
	C/FAN	40A	Condenser Fan #1 Relay (Low), Condenser Fan #2 Relay (High)
	RR HTD	40A	I/P Junction Box
	B+ 1	50A	I/P Junction Box
	BLOWER	40A	Blower Relay
	ABS. 1	40A	ESP Control Module, ABS Control Module, Multipurpose Check Connector
	ABS. 2	20A	ESP Control Module, ABS Control Module, Multipurpose Check Connector
	MDPS	80A	MDPS Control Module
FUSE	SNSR. 1	10A	Immobilizer Module (G4FC/G4GC), Oxygen Sensor (G4FC/G4GC), PCM (G4FC), Camshaft Position Sensor (G4FC/G4GC), Purge Control Solenoid Valve (G4FC), Crankshaft Position Sensor (G4GC), Stop Lamp Switch (D4FB), Lambda Sensor (D4FB)
	INJ	15A	A/Con Relay, Fuel Pump Relay, Injector #1, 2, 3, 4 (G4FC/G4GC), PCM (G4FC/G4GC), Oil Control Valve (G4FC/G4GC), Idle Speed Actuator (G4FC/G4GC), ECM (G4FC), Purge Control Solenoid Valve (G4GC), Camshaft Position Sensor (D4FB), Throttle Flap Actuator (D4FB), EGR Actuator (D4FB), VGT Actuator (D4FB), Immobilizer Module (D4FB), Fusible Link Box (D4FB)
	HAZARD	15A	Hazard Switch, ICM Relay Box (Hazard Relay)
	F/PUMP	15A	Fuel Pump Relay
	HORN	15A	Horn Relay, ICM Relay Box (Burglar Alarm Horn Relay)
	SNSR. 2	10A	Pulse Generator 'A', Pulse Generator 'B', TCM (D4FB), Air Flow Sensor (D4FB), Stop Lamp Switch (G4FC/G4GC), Fuel Filter Warning Switch (D4FB), PCM (G4FC/G4GC), ECM (G4FC/D4FB), Vehicle Speed Sensor
	H/LP HI	20A	H/LP Hi Relay
	H/LP LO LH	10A	Head Lamp LH, Head Lamp Leveling Actuator LH, Head Lamp Leveling Switch
	H/LP LO RH	10A	Head Lamp RH, Head Lamp Leveling Actuator RH
	ECU. 1	10A	ECM (G4FC), PCM (G4FC), TCM (D4FB)
	ECU. 3	10A	ECM (D4FB)
	ECU. 4	20A	ECM (D4FB)
	FR FOG	15A	Front Fog Lp Relay
	A/CON	10A	A/Con Relay
	ABS	10A	ESP Control Module, ABS Control Module, Yaw Rate Sensor, Multipurpose Check Connector
	B/UP	10A	Back-up Lamp Switch, Transaxle Range Switch, Multifunction Switch, Cruise Control Module
	ECU. 2	10A	Condenser (G4FC), Ignition Coil #1, 2, 3, 4 (G4FC), PCM (G4GC)
	SPARE. 1	20A	-
	SPARE	10A	-
	SPARE	15A	-
	SPARE	20A	-

※USE THE DESIGNATED FUSE ONLY



※ USE THE DESIGNATED FUSE ONLY

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Pull out the relay from the engine compartment relay box.

Power Relay (Type A)

Check for continuity between the terminals.

A : Fuel pump relay

B : A/C relay

C : Head lamp relay (Low)

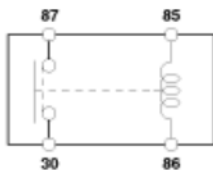
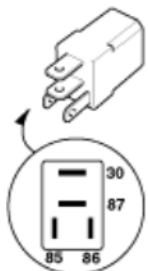
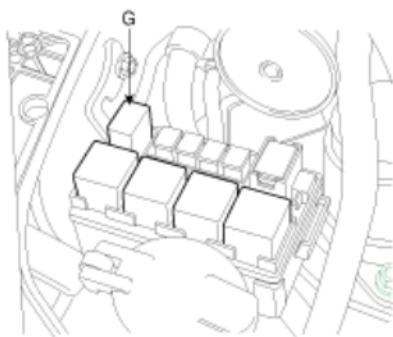
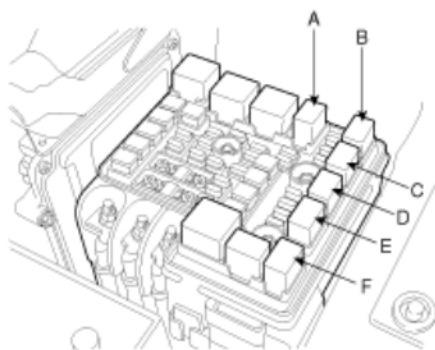
D : Horn relay

E : Head lamp relay (High)

F : Front fog lamp relay

G : Fuel filter heater relay

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



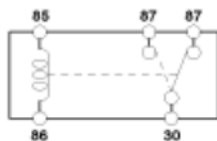
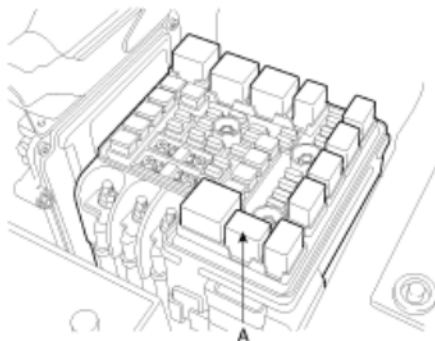
Terminal	30	87	85	86
Power				
Disconnected			○	○
Connected	○	○	⊖	⊕

Power Relay (Type B)

Check for continuity between the terminals.

A : Wiper relay

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



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

Power Relay (Type C)

Check for continuity between the terminals.

A : Condenser pan2 relay

B : Condenser pan 1 relay

C : Start relay

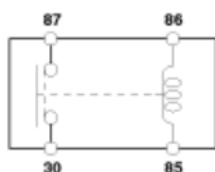
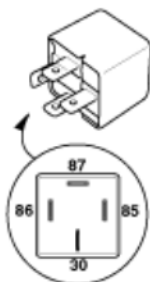
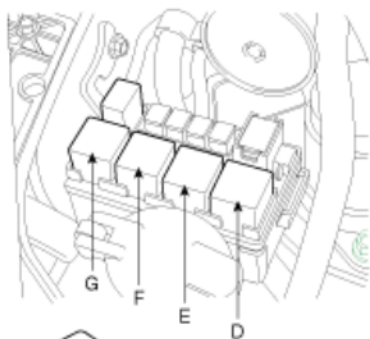
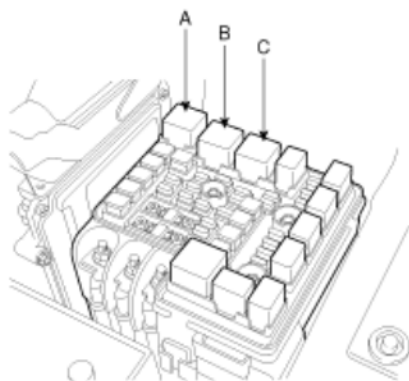
D : Glow relay

E : PTC heater relay #1

F : PTC heater relay #2

G : PTC heater relay #3

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



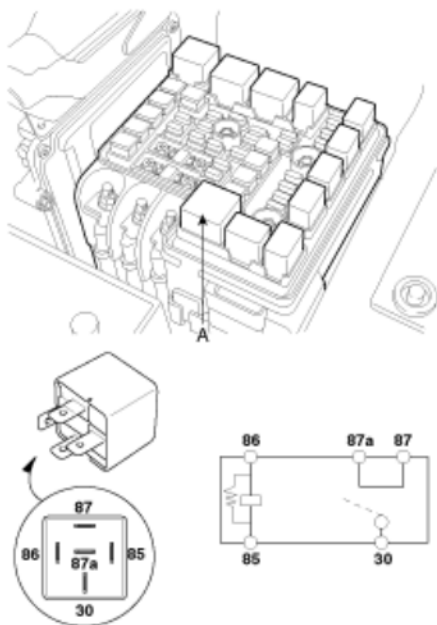
Terminal	86	85	87	30
Power				
Disconnected	○	○		
Connected	⊖	⊕	○	○

Power Relay (Type D)

Check for continuity between the terminals.

A : Main relay

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



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

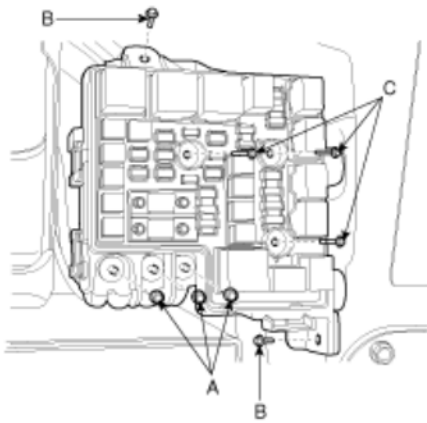
Fuse

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?

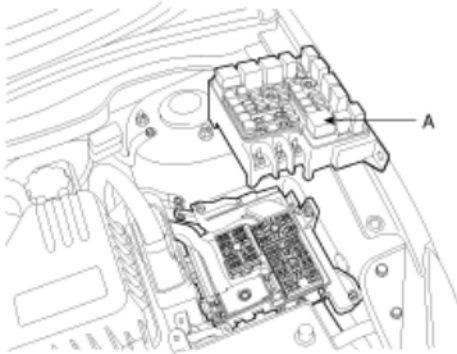
If a fuse is to be replaced, be sure to use a new fuse of the same capacity. Always determine why the fuse blew first and completely eliminate the problem before installing a new fuse.

REMOVAL

1. Disconnect the negative(-) battery terminal.
2. Remove the engine room junction box upper cover.
3. Loosen the ring terminal mounting 3 nuts(A) then remove the ring terminal cables.
4. Loosen the body and lower cover 2 bolts(B).
5. Loosen the connector 3 bolts(C).



6. Remove the fuse and relay box(A) from the lower cover.



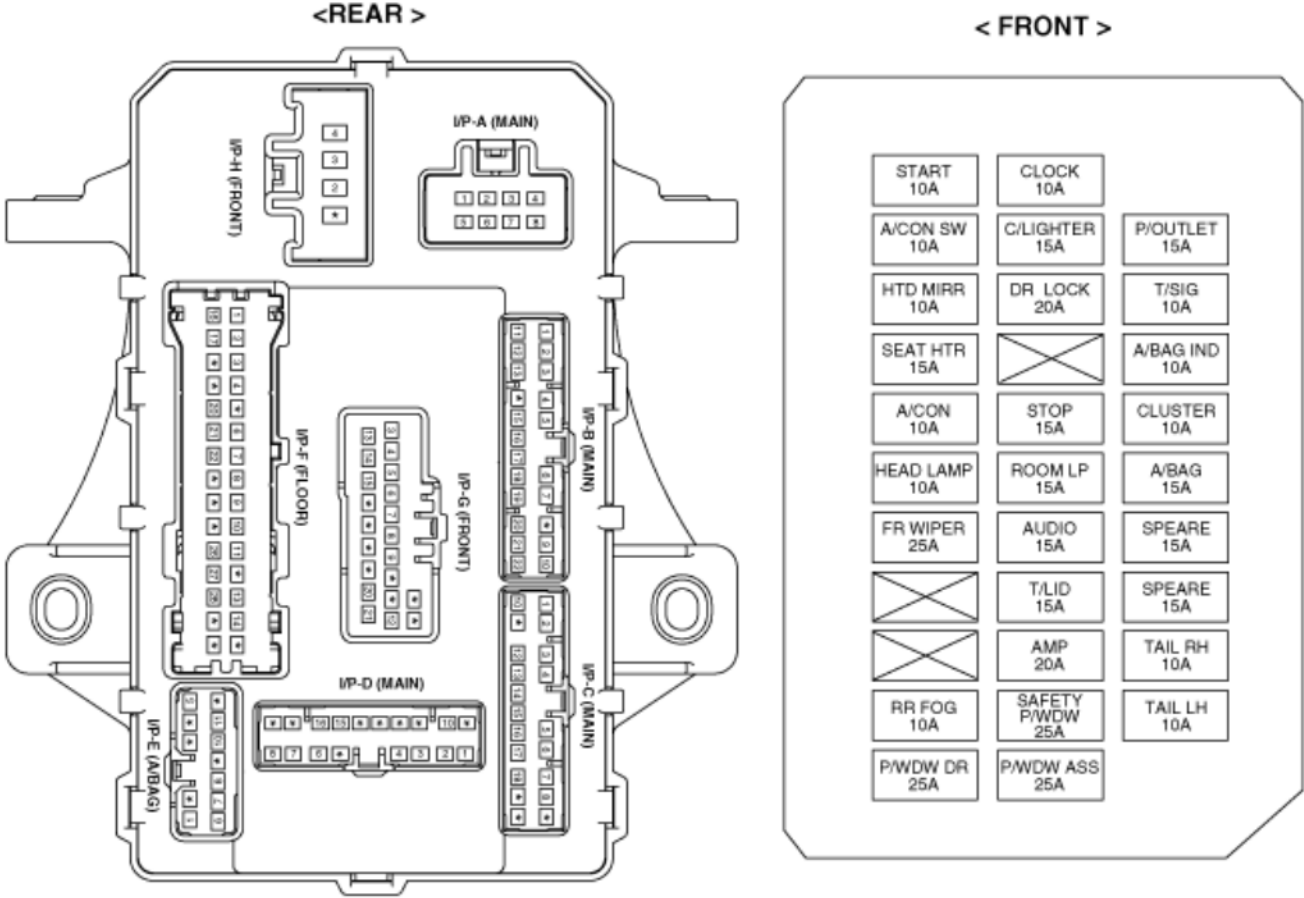
7. Remove the lower cover and mating connectors after loosening the box mounting 2 bolts.



INSTALLATION

1. Install the lower cover.
TORQUE : 10 ~ 12Nm (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lbf.ft)
2. Install the fuse and relay box to the lower cover.
TORQUE :
Connector bolt : 10 ~ 12Nm (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lbf.ft)
Ring terminal mounting nut : 10 ~ 12Nm (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lbf.ft)
Body and lower cover bolt : 10 ~ 12Nm (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lbf.ft)
3. Install the junction box upper cover.

COMPONENT LOCATION



※USE THE DESIGNATED FUSE ONLY

CIRCUIT

FUSE	(A)	Circuit Protected
CLOCK	10A	Audio, ATM Key Lock Control Module, Digital Clock, Power Outside Mirror Switch
C/LIGHTER	15A	Power Outlet
P/OUTLET	15A	Power Outlet
A/BAG	15A	SRS Control Module
A/BAG IND	10A	Instrument Cluster
T/SIG	10A	Hazard Switch
CLUSTER	10A	Instrument Cluster, MDPS Control Module, ESP Switch, BCM, Steering Angle Sensor, ATM Key Lock Control Module
A/CON SW	10A	A/C Control Module
A/CON	10A	A/C Control Module, Blower Relay, BCM, Incar & Humidity Sensor (Auto), Fusible Link Box (D4FB), AQS & AMB Sensor (Auto), Sunroof Control Module, Electro Chromic Mirror
FR WIPER	25A	Multifunction Switch, Front Wiper Relay
HEAD LAMP	10A	H/LP Lo Relay, H/LP Hi Relay
HTD MIRR	10A	A/C Control Module, ECM (G4FC), PCM (G4FC), Power Outside Mirror Motor
POWER CONNECTOR	AUDIO	15A Audio
	ROOM LP	15A Room Lamp, Data Link Connector, Instrument Cluster, Room Lamp, Map Lamp, Vanity Lamp Switch, A/C Control Module, Digital Clock, BCM, Ignition Key ILL. & Door Warning Switch
DR LOCK	20A	Sunroof Control Module, ICM Relay Box (Door Unlock/Lock Relay)
STOP	15A	Key Solenoid, ATM Lever Switch, Stop Lamp Switch
TAILGATE	15A	Tailgate Relay
RR FOG	10A	ICM Relay Box (Rear Fog Lamp Relay)
AMP	20A	AMP
SAFETY P/WDW	25A	Safety Power Window Module
START	10A	Ignition Lock Switch, Start Relay, Transaxle Range Switch, ICM Relay Box (Burglar Alarm Relay)
P/WDW DR	25A	Power Window Main Switch, Rear Power Window Switch LH
P/WDW ASS	25A	Power Window Main Switch, Rear Power Window Switch RH, Passenger Power Window Switch
TAIL LH	10A	Head Lamp LH, Power Window Main, Switch Power Window Switch, License Lamp Rear, Combination Lamp LH (OUT)
TAIL RH	10A	License Lamp, Rear Combination Lamp RH (OUT), Glove Box Lamp, Head Lamp RH, Shunt Connector, Front Fog Lp Relay
SEAT HTR	15A	Front Seat Warmer Switch

✂ USE THE DESIGNATED FUSE ONLY

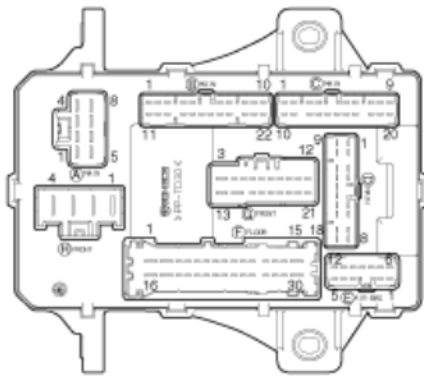
INSPECTION

Fuse

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.

Passenger Compartment Relay

1. Disconnect the negative(-) battery terminal.
2. Remove the crash pad lower panel.
(Refer to the BD group - "Crash pad")
3. Remove the junction box.



Power Window

Check for continuity between the terminals.

1. There should be continuity between the No.2 terminal in the I/P-H and the No.16 or 17 terminal in the I/P-F when power and ground are connected to the No.2 terminal in the I/P-H and the No.17 terminal in the I/P-B.
2. There should be no continuity between the No.2 terminal in the I/P-H and the No.16 or 17 terminal in the I/P-F when power and ground are connected to the No.2 terminal in the I/P-H and the No.17 terminal in the I/P-B.

Tail Lamp

Check for continuity between the terminals.

1. There should be continuity between the No.2 terminal in the I/P-H and the No.15(LH) or 4(RH) terminal in the I/P-G when power and ground are connected to the No.2 terminal in the I/P-H and the No.6 terminal in the I/P-D.
2. There should be no continuity between the No.2 terminal in the I/P-H and the No.15(LH) or 4(RH) terminal in the I/P-G when power and ground are connected to the No.2 terminal in the I/P-H and the No.6 terminal in the I/P-D.

Tailgate Lid Open

Check for continuity between the terminals.

1. There should be continuity between the No.3 terminal in the I/P-H and the No.2 terminal in the I/P-D when power and ground are connected to the No.3 terminal in the I/P-H and the No.28 terminal in the I/P-F.

2. There should be no continuity between the No.3 terminal in the I/P-H and the No.2 terminal in the I/P-D when power and ground are connected to the No.3 terminal in the I/P-H and the No.28 terminal in the I/P-F.

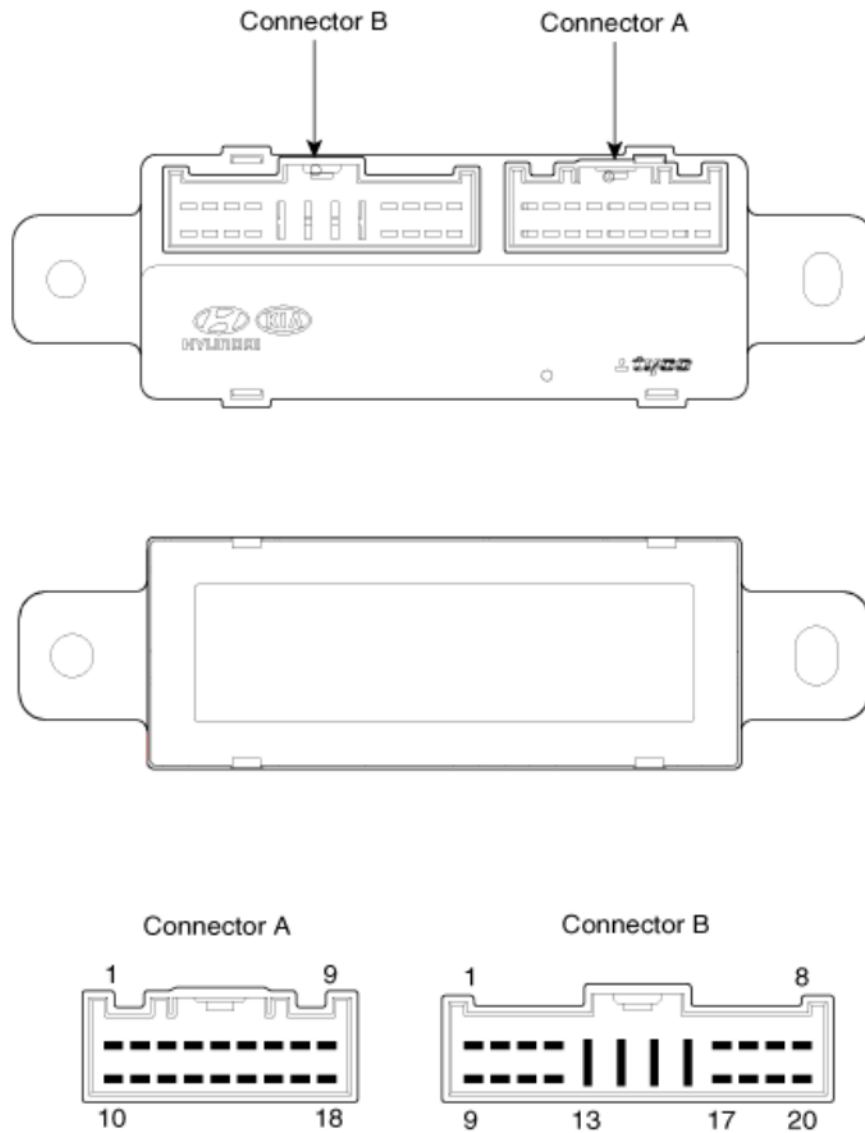
English ▼

Rear Heater

Check for continuity between the terminals.

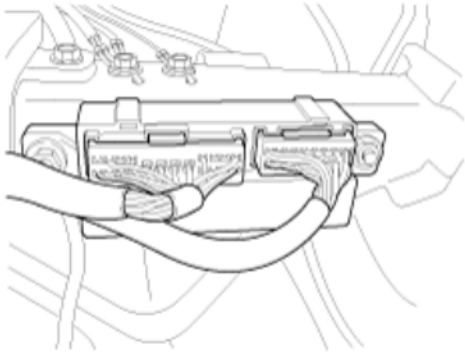
1. There should be continuity between the No.3 terminal in the I/P-G and the No.2 or 4 terminal in the I/P-F when power and ground are connected to the No.3 terminal in the I/P-G and the No.16 terminal in the I/P-B.
2. There should be no continuity between the No.3 terminal in the I/P-G and the No.2 or 4 terminal in the I/P-F when power and ground are connected to the No.3 terminal in the I/P-G and the No.16 terminal in the I/P-B.

COMPONENT



DESCRIPTION

The ICM is united with many kinds of relays and installed over the instrument panel box.



INSPECTION

1. Disconnect the negative(-) battery terminal.
2. Remove the ICM relay box.

Door Lock

Check for continuity between the terminals.

1. There should be continuity between the No.15 and No.6(or 16) terminals when power and ground are connected to the No.15 and No.17 in the ICM-B.
2. There should be no continuity between the No.15 and No.6(or 16) terminals when power is disconnected.

Door Unlock

Check for continuity between the terminals.

1. There should be no continuity between the No.15 and No.4(or 14) terminals when power and ground are connected to the No.12 and No.15 in the ICM-B.
2. There should be continuity between the No.15 and No.4(or 14) terminals when power is disconnected.

Burglar Alarm Horn

Check for continuity between the terminals.

1. There should be continuity between the No.11 and No.12 terminals when power and ground are connected to the No.3 and No.11 in the ICM-A.
2. There should be no continuity between the No.11 and No.12 terminals when power is disconnected.

Front Deicer

Check for continuity between the terminals.

1. There should be continuity between the No.1 and No.10 terminals when power and ground are connected to the No.2 and No.10 terminals in the ICM-A.
2. There should be no continuity between the No.1 and No.10 terminals when power is disconnected.

Rear Fog Lamp

Check for continuity between the terminals.

1. There should be continuity between the No.2(or 10) and No.11 terminals when power and ground are connected to the No.9(or 10) and No.11 terminals in the ICM-B.
2. There should be no continuity between the No.2(or 10) and No.11 terminals when power is disconnected.

Rain Sensor

Check for continuity between the terminals.

1. There should be continuity between the No.9 and No.16 terminals when power and ground are connected to the No.8 and No.18 terminals in the ICM-A.
2. There should be no continuity between the No.9 and No.16 terminals when power is disconnected.

Dead Lock

Check for continuity between the terminals.

1. There should be continuity between the No.5 and No.14 terminals when power and ground are connected to the No.7 and

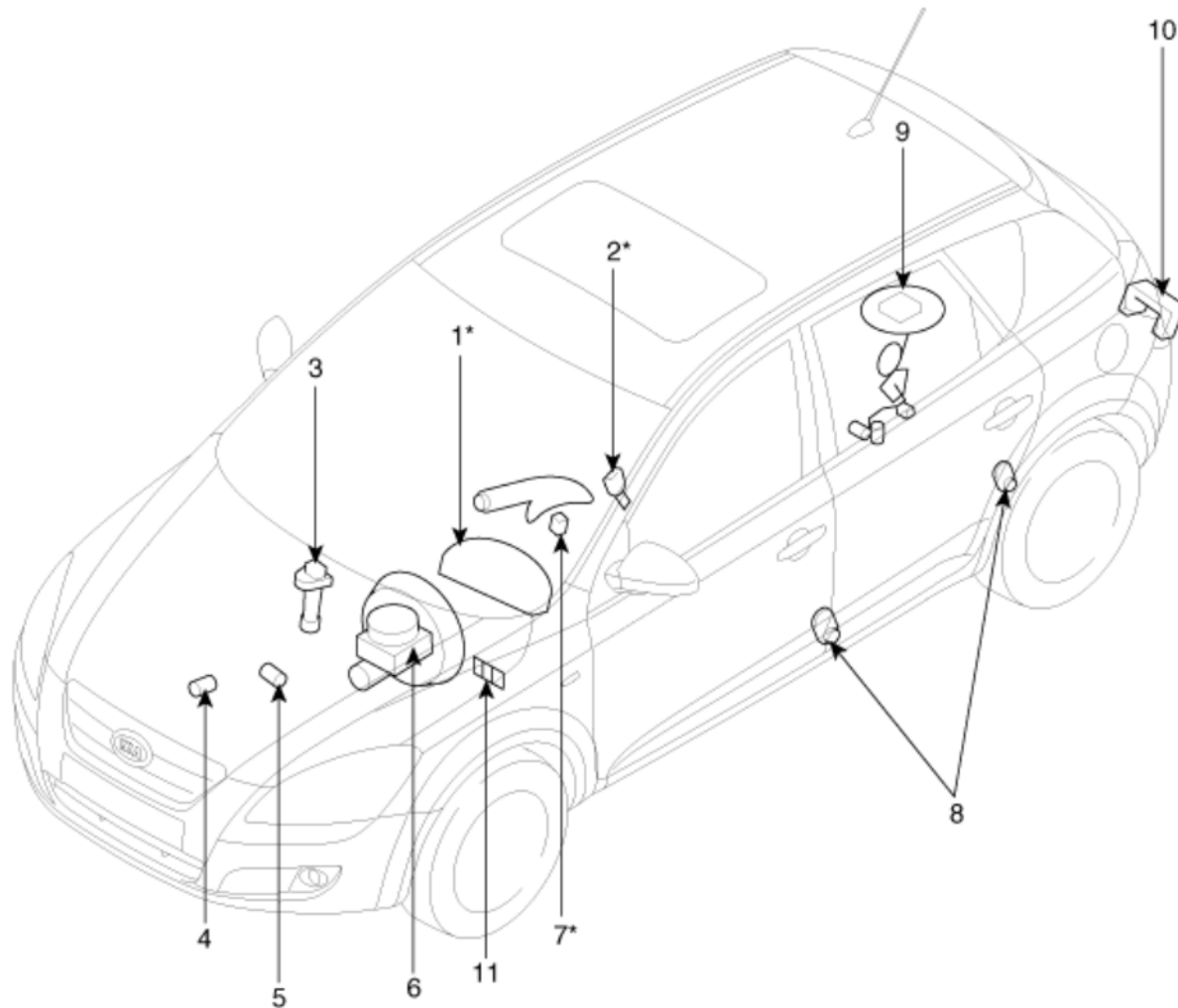
No.14 terminals in the ICM-A.

English ▼

2. There should be no continuity between the No.5 and No.14 terminals when power is disconnected.

COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



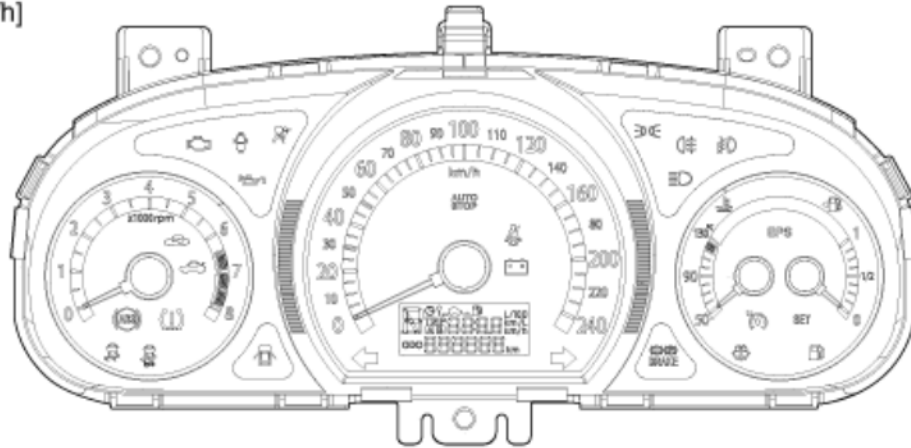
1. Cluster assembly
2. Seat belt switch
3. Vehicle speed sensor
4. Engine coolant temperature sender
5. Oil pressure switch
6. Brake fluid level warning switch

7. Parking brake switch
8. Door switch
9. Fuel gauge sender
10. Tailgate switch
11. ISG OFF switch / ESP OFF switch

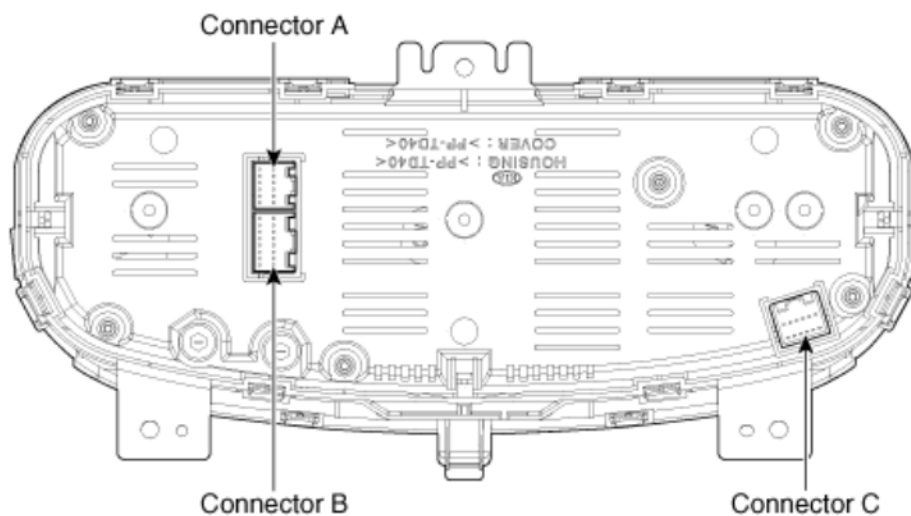
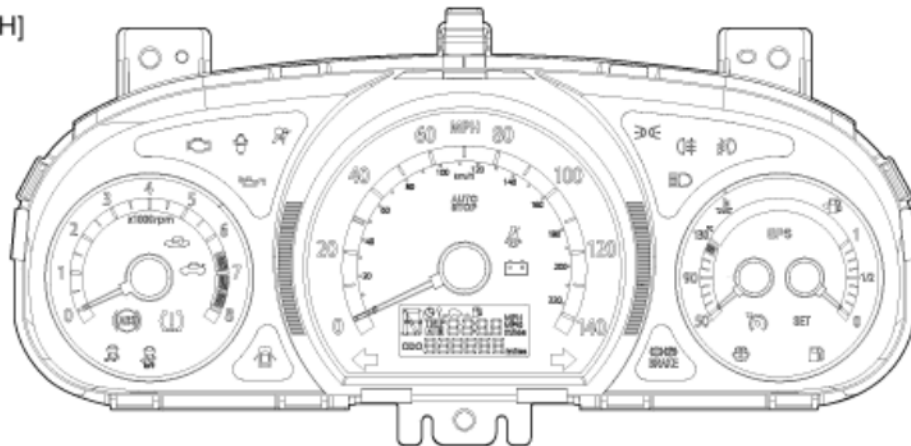
COMPONENTS

[General (Gasoline)]

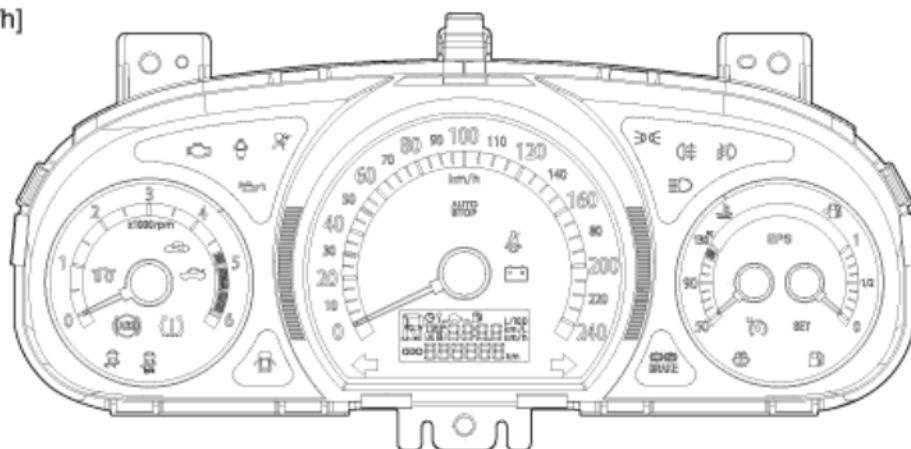
[km/h]



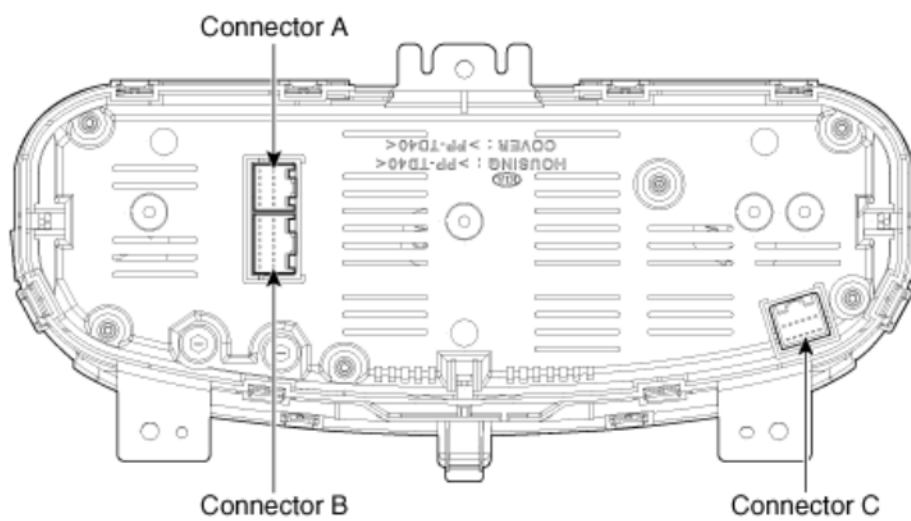
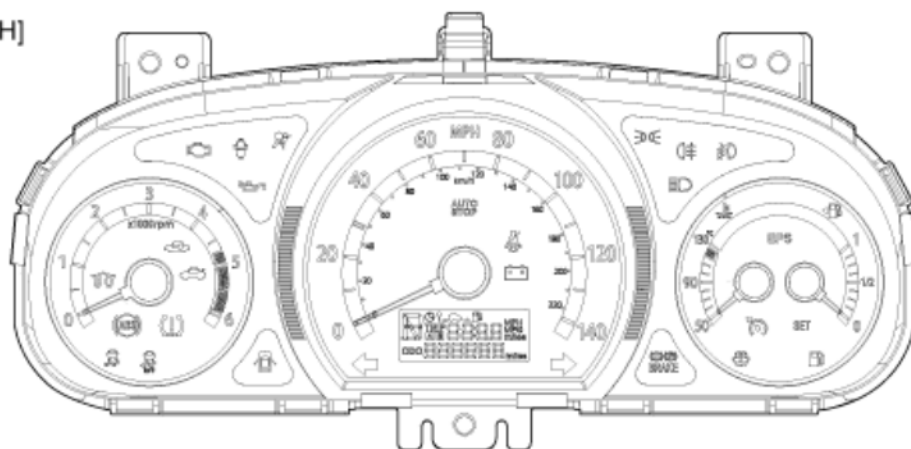
[MPH]



[km/h]



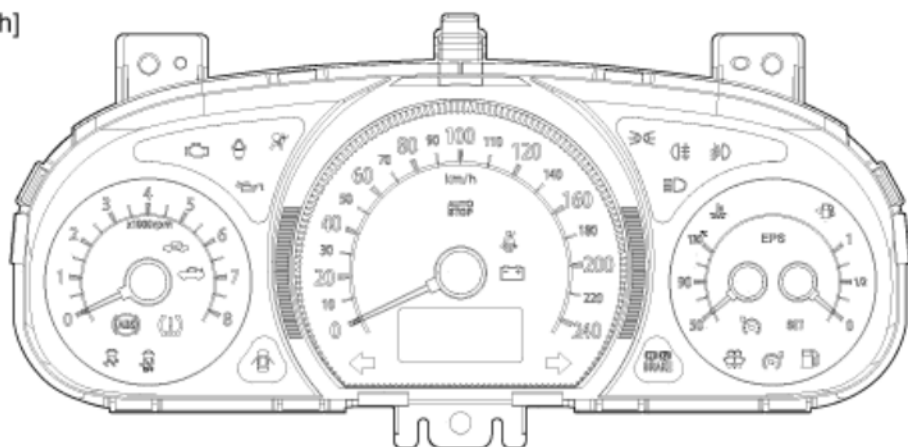
[MPH]



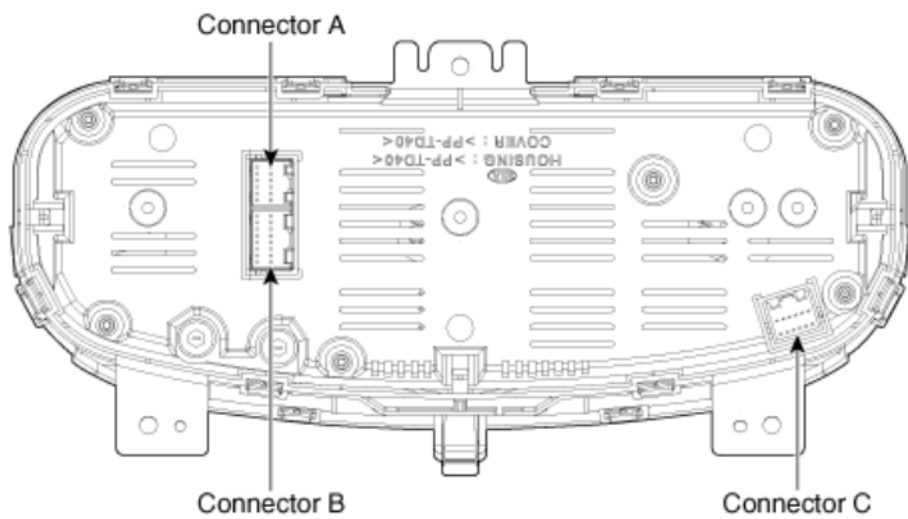
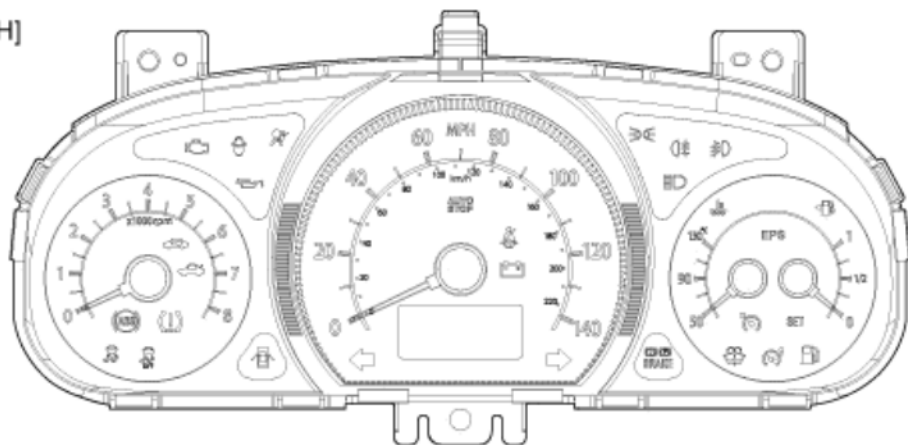
Pin	Connector A	Connector B	Connector C
1	Illumination (+)	Speed	Pground
2	Illumination (-)	Hood open (ISG)	CAN (-)
3	Diagnosis	Driver door (ISG)	CAN (+)
4	Alternator	Sground	Alternator L out (ISG)
5	Oil pressure	Fground	Washer low
6	Seat belt	Fuel input	Cruse (BETA-Engine)
7	Mode switch	IGN	Front fog
8	Parking breake	B+	Rear fog
9	Turn right	-	Tail lamp on
10	Turn left	Glow (Diesel)	High beam input (+)
11	Door open	Trunk open	MT R
12	DC Illumination (ISG)	Immoblizer	Cruse set (BETA-Engine)
13		Airbag (-)	
14		Airbag (+)	
15		Water separator	
16		Check engine	

[Super Vision (Gasoline)]

[km/h]

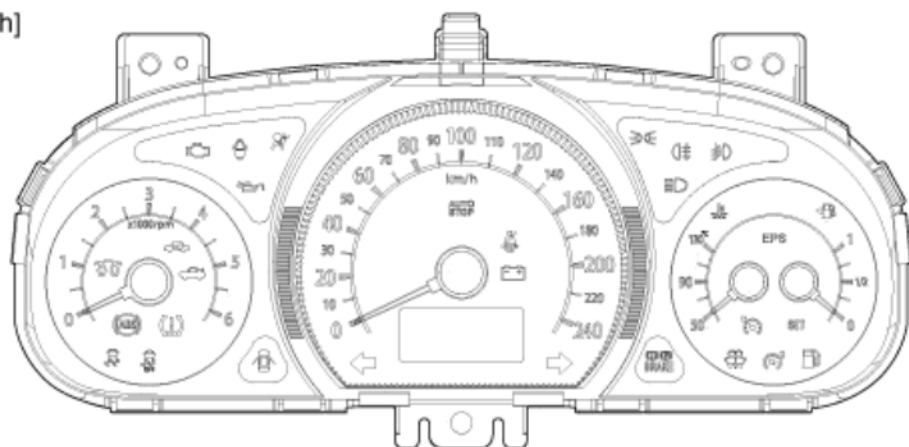


[MPH]

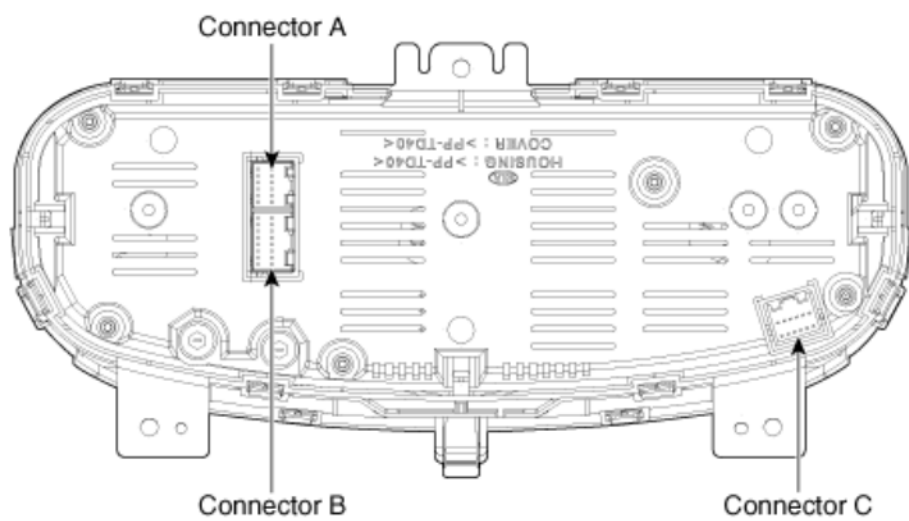
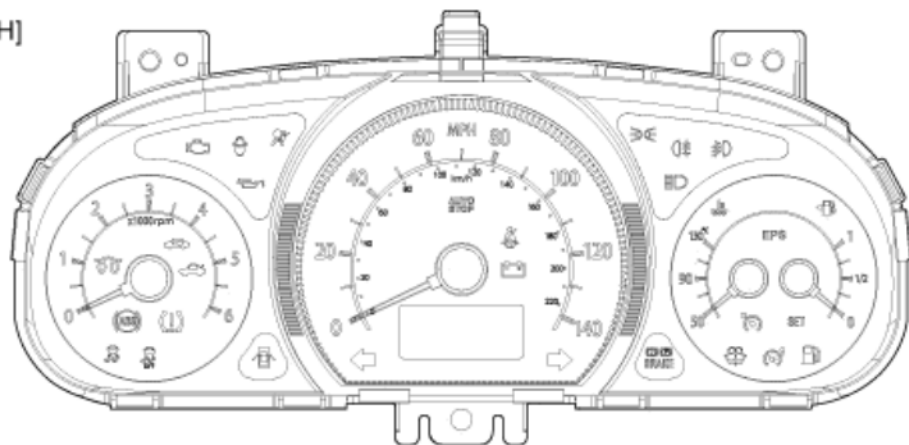


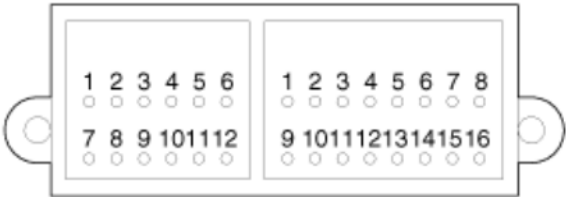
[Super Vision (Diesel)]

[km/h]



[MPH]

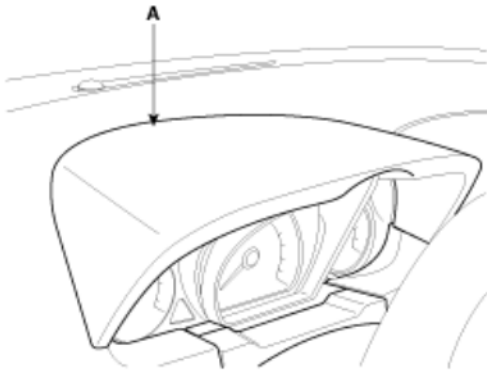


			
Pin	Connector A	Connector B	Connector C
1	Illumination (+)	Speed	Pground
2	Illumination (-)	Hood open (ISG)	CAN (-)
3	Diagnosis	Driver door (ISG)	CAN (+)
4	Alternator	Sground	Alternator L out (ISG)
5	Oil pressure	Fground	Washer low
6	Seat belt	Fuel input	Cruse (BETA-Engine)
7	Mode switch	IGN	Front fog
8	Parking breake	B+	Rear fog
9	Turn right	Over speed out	Tail lamp on
10	Turn left	Glow (Diesel)	High beam input (+)
11	Door open	Trunk open	MT R
12	DC Illumination (ISG)	Immoblizer	Cruse set (BETA-Engine)
13		Airbag (-)	
14		Airbag (+)	
15		Water separator	
16		Check engine	

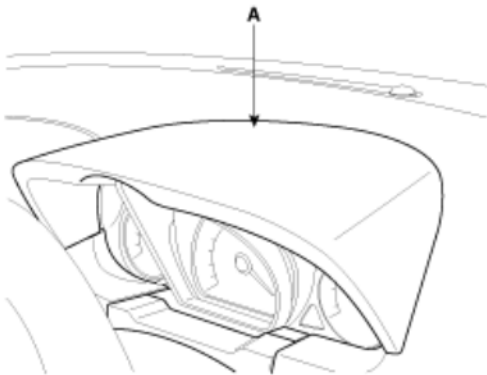
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the cluster fascia panel (A).
(Refer to the BD group - "Crash pad")

[LHD]

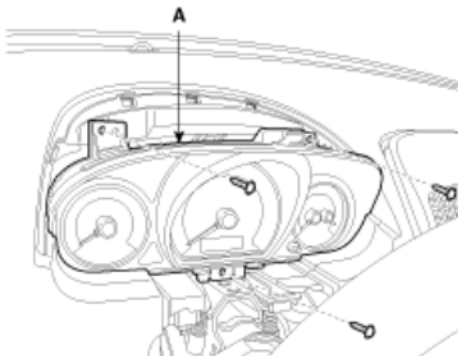


[RHD]

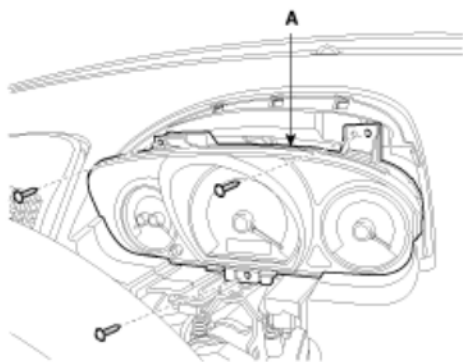


3. Remove the cluster fascia (A) from the housing after removing 4 screws.

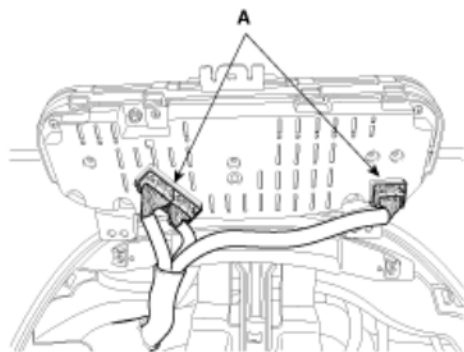
[LHD]



[RHD]



4. Disconnect the cluster fascia connectors (A) and then remove the cluster.



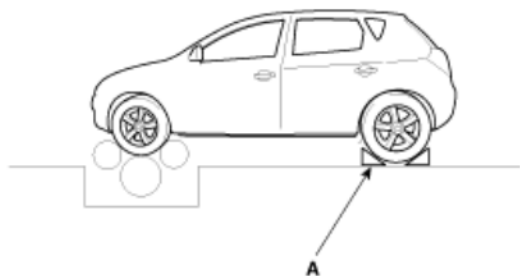
INSTALLATION

1. Connect the cluster connector.
2. Install the cluster assembly.
3. Connect the trip switch connector.
4. Install the center facia 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(A) as appropriate.



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

⚠ CAUTION

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

NOTICE

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

[km/h]

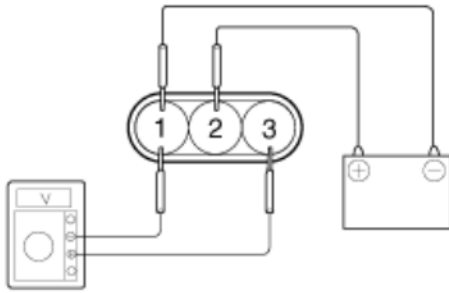
Velocity (km/h)	20	40	60	80	100
Tolerance (km/h)	+3.6 +0.6	+5.9 +2.4	+7.0 +3.5	+8.2 +4.5	+8.9 +5.9
Velocity (km/h)	120	160	200	220	240
Tolerance (km/h)	+10.5 +6.5	+12.7 +8.3	+15.0 +10.0	+16.1 +11.1	-

[MPH]

Velocity (MPH)	10	20	40	60
Tolerance (MPH)	+3.2 +1.2	+3.5 +1.6	+4.5 +2.4	+5.3 +3.3
Velocity (MPH)	80	100	120	140
Tolerance (MPH)	+6.1 +4.1	+7.3 +4.5	+8.6 +5.1	-

Vehicle Speed Sensor

1. Connect the positive (+) lead from battery to terminal 2 and negative (-) lead to terminal 1.
2. Connect the positive (+) lead from tester to terminal 3 and the negative (-) lead to terminal 1.
3. Rotate the shaft.
4. Check that there is voltage change from approx. 0V to 11V or more between terminals 3 and 1.
5. The voltage change should be 4 times for every revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.



Tachometer

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

CAUTION

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

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

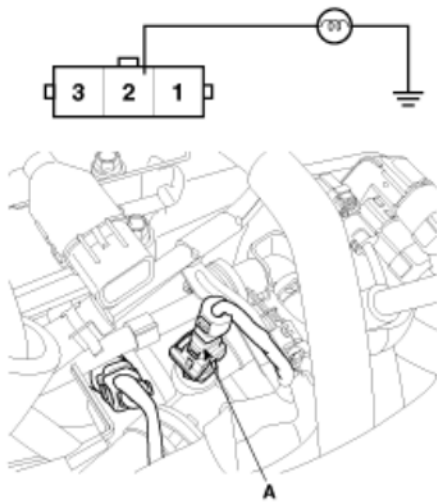
Revolution (rpm)	1,000	2,000	3,000	4,000	Remark
Tolerance (rpm)	±100	±100	±100	±100	Gasoline
Tolerance (rpm)	±100	±100	±100	±100	Diesel
Revolution (rpm)	5,000	6,000	7,000	8,000	Remark
Tolerance (rpm)	±100	±100	±100	±100	Gasoline
Tolerance (rpm)	±100	±100	-	-	Diesel

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.

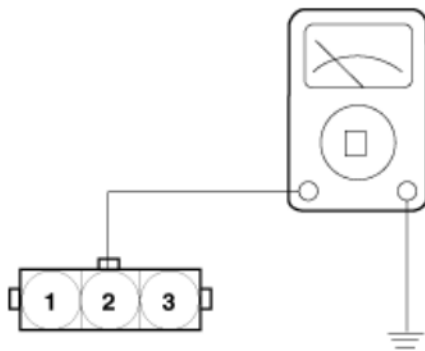


1. Disconnect the wiring connector (A) from the engine coolant temperature sender in the engine compartment.
2. Connect a 12V, 3.4 wattages test bulb between the harness side connector 2 terminal and ground.
3. Turn the ignition switch ON.
4. Verify that the test bulb flashes and that the indicator moves to HOT position.
If operation is not as specified, replace the cluster (Engine coolant temperature gauge). Then recheck the system.



Engine Coolant Temperature Sender

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



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

[Super Vision]

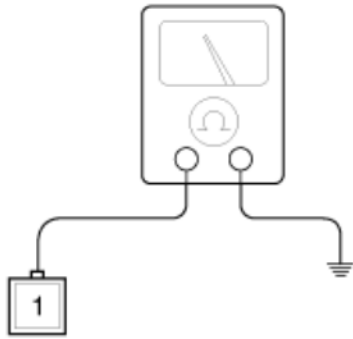
Temperature [°F(°C)]	131 (55)	159.8 (71)	230 (110)	257 (125)	E/G
Deflection(°)	0°±3°	35°±3°	35°±3°	75°±3°	Gasoline
	0°±3°	35°±3°	35°±3°	75°±3°	Diesel

[General]

Temperature [°F(°C)]	122 (50)	185 (85)	230 (110)	257 (125)	E/G
Deflection(°)	0°±3°	35°±3°	35°±3°	75°±3°	Gasoline
	0°±3°	35°±3°	35°±3°	75°±3°	Diesel

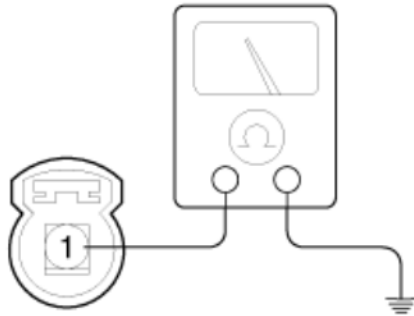
Oil Pressure Switch

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



Oil Pressure Warning Lamp

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



Brake Fluid Level Warning Switch

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



Brake Fluid Level Warning Lamp

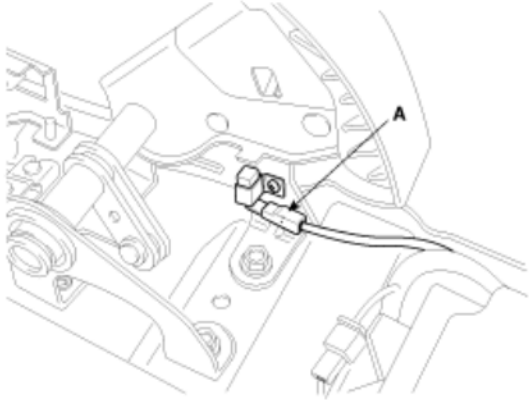
1. Ignition "ON".
2. Release the parking brake.
3. Remove the connector from the brake fluid level warning switch.
4. Ground the connector at the harness side.

5. Verify that the warning lamp lights.

Parking Brake Switch

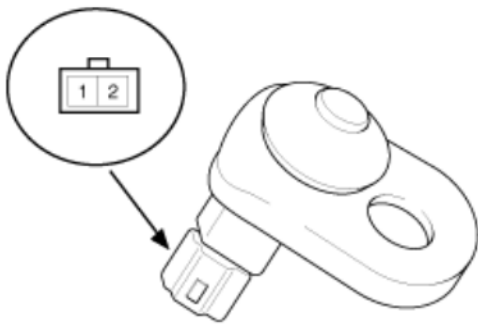
The parking brake switch is a pull type. It is located at the side of the parking brake lever.

- 1. Check that there is continuity between the terminal and switch body with the switch (A) ON.
 - 2. Check that there is no continuity between the terminal and switch body with the switch OFF.
- If continuity is not as specified, replace the switch or inspect its ground connection.



Door Switch

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

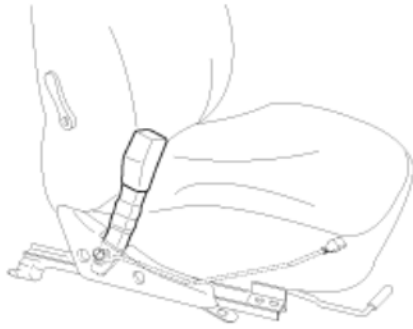


Terminal Position	1	2	Body (Ground)
Free(Door open)	○	○	○
Push(Door close)			

Seat Belt Switch

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

Seat belt condition	Continuity
Fastened	Non-conductive ($\infty\Omega$)
Not fastened	Conductive (Ω)



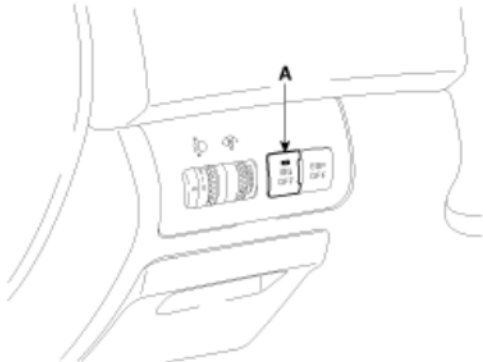
Seat Belt Warning Lamp

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

Seat belt condition	Warning lamp
Fastened	OFF
Not fastened	ON

ISG OFF Switch

1. Remove the lower side crash pad switch assembly(A).

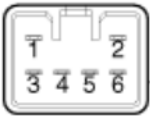


2. Disconnect the ISG off switch connector(A).



3. Check the continuity between switch terminals.

Position Terminal	ON	OFF	REMARKS
1			
3			IND+
4			
5			IND-
6			
2			ILL-



TROUBLESHOOTING

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

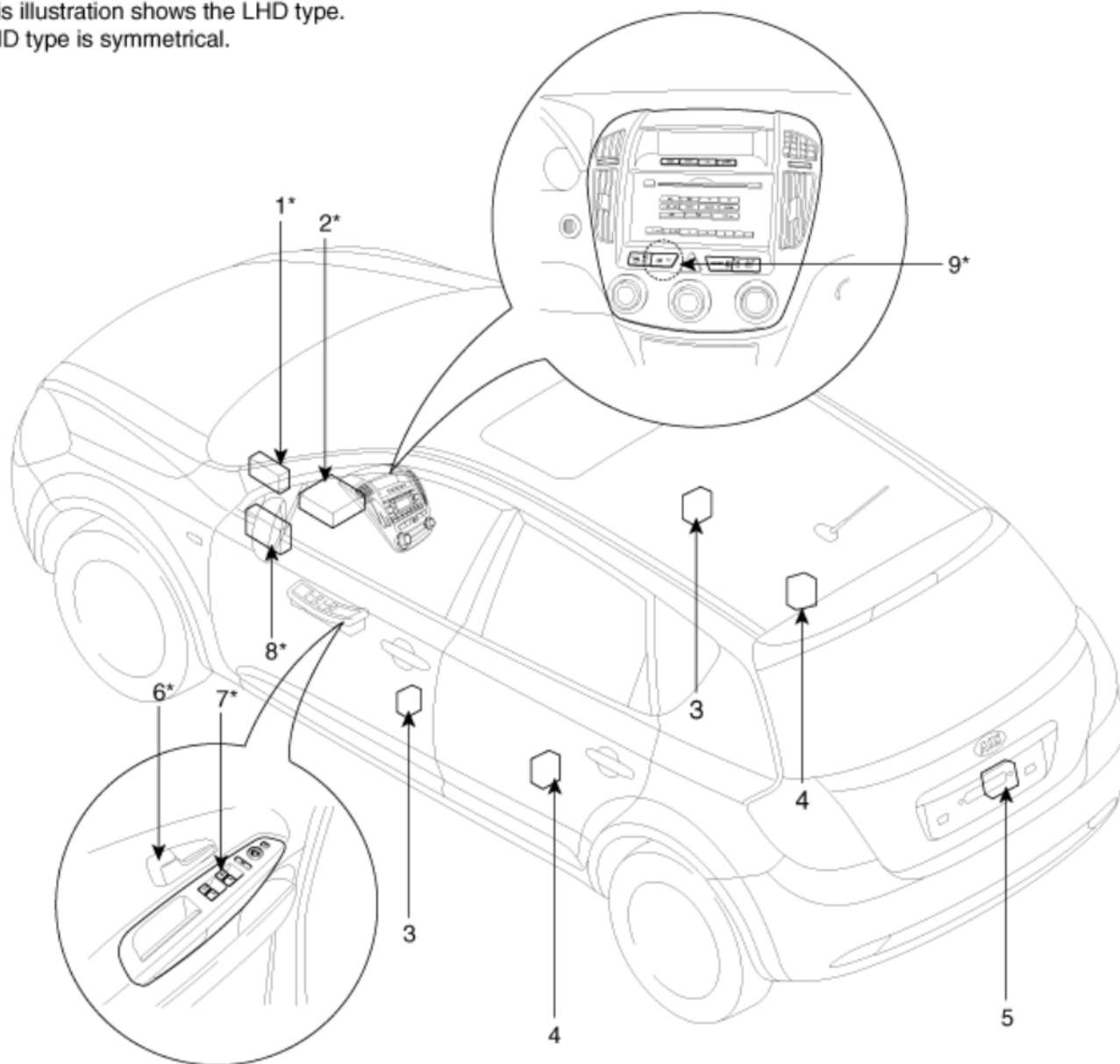
Wiring or ground faulty

Repair if necessary

English ▼

COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



1. ICM relay box (Door lock/unlock relay)
2. Body control module (BCM)
3. Front door lock actuator & switch
4. Rear door lock actuator & switch
5. Tailgate actuator & switch

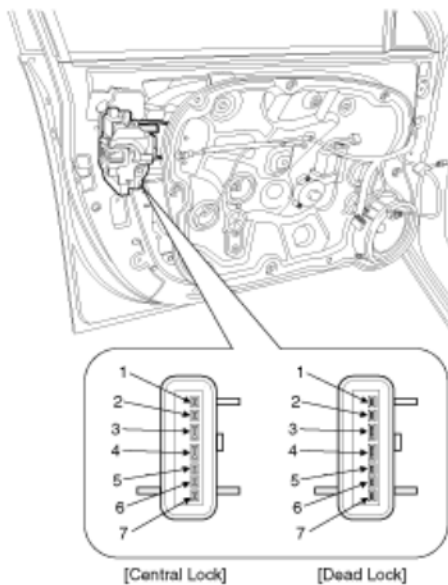
6. Door lock knob
7. Door lock switch
8. Passenger compartment junction box (Tailgate relay)
9. Door unlock switch

INSPECTION

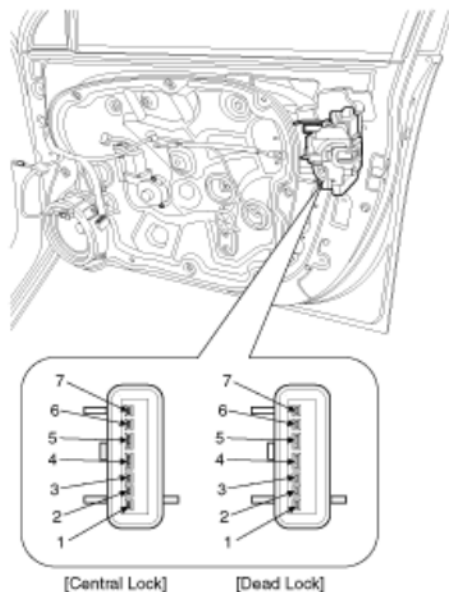
Front Door Lock Actuator

1. Remove the front door trim.
(Refer to the BD group - Front door)
2. Remove the front door module.
(Refer to the BD group - Front door).
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



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

[Central Lock] () : RHD

Terminal		5(3)	6(2)
Position			
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		2(6)	3(5)
Position			
Front right	Lock	⊖	⊕
	Unlock	⊕	⊖

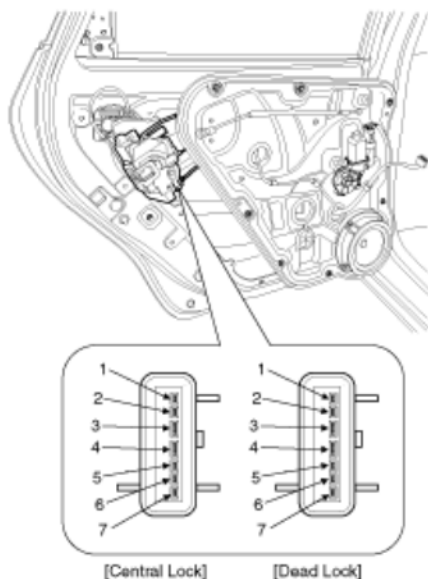
[Dead Lock] RHD only

Terminal		1	2
Position			
Front left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		7	6
Position			
Front right	Lock	⊕	⊖
	Unlock	⊖	⊕

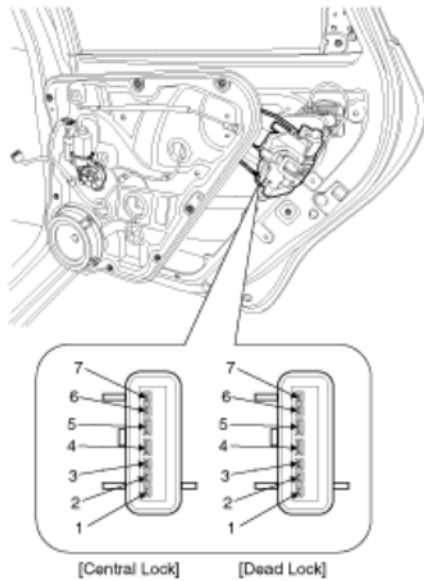
Rear Door Lock Actuator

1. Remove the rear door trim.
(Refer to the BD group - Rear door)
2. Remove the rear door module.
(Refer to the BD group - Rear door)
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



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

[Central Lock] () : RHD

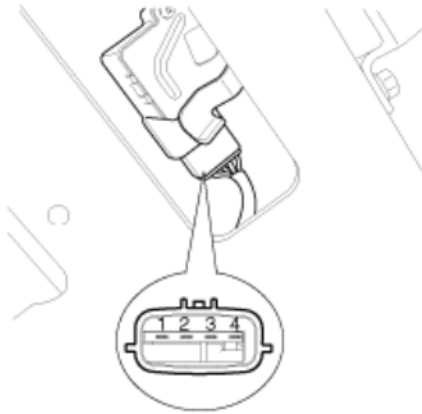
Terminal		5(3)	6(2)
Position			
Rear left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		2(6)	3(5)
Position			
Rear right	Lock	⊖	⊕
	Unlock	⊕	⊖

[Dead Lock] RHD only

Terminal		1	2
Position			
Rear left	Lock	⊕	⊖
	Unlock	⊖	⊕
Terminal		7	6
Position			
Rear right	Lock	⊕	⊖
	Unlock	⊖	⊕

Tailgate Lock Actuator Inspection

1. Remove the tailgate trim. (Refer to the BD group - tailgate)
2. Disconnect the 4P connector from the actuator.



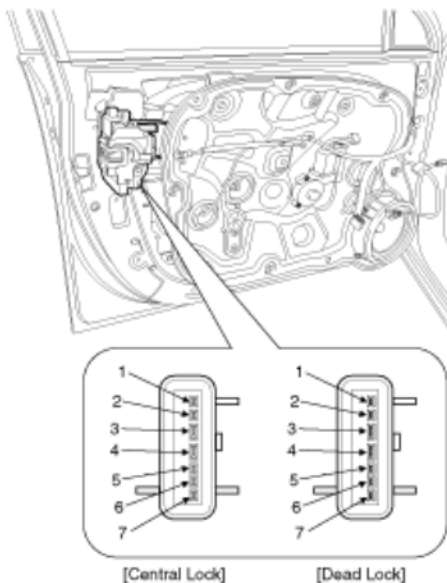
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Terminal Position	3	4
Unlock	⊕	⊖

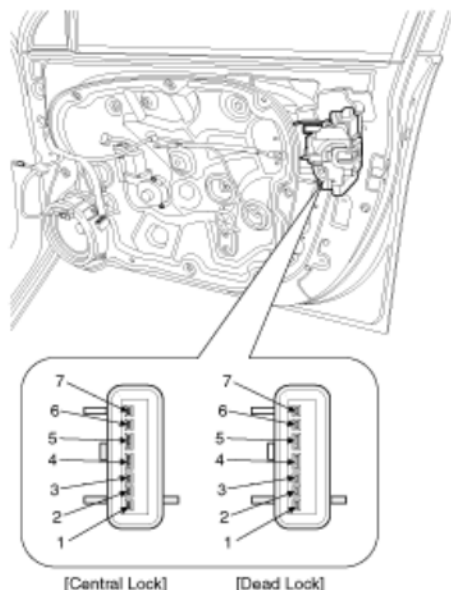
Front Door Lock Switch

1. Remove the front door trim.
(Refer to the BD group - Front door)
2. Remove the front door module.
(Refer to the BD group - Front door).
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



4. Check for continuity between the terminals in each switch position when inserting the key into the door according to the table.

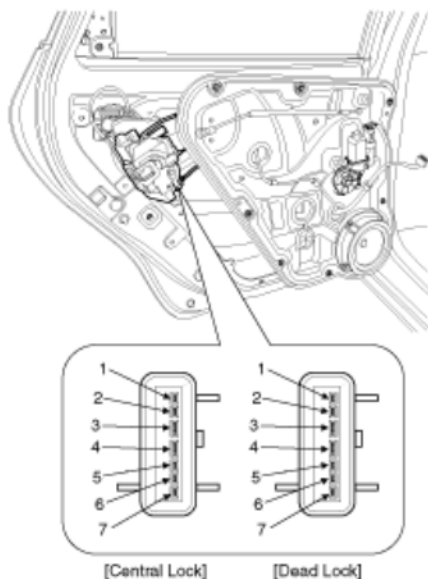
[CENTRAL LOCK]			() : RHD			
Terminal			2(6)	3(5)	4(4)	
Position						
Central door lock	Front left	Clockwise				
		Counter-clockwise				
Terminal			4(4)	5(3)	6(2)	
Position						
Central door lock	Front right	Clockwise				
		Counter-clockwise				

[DEAD LOCK]			() : RHD			
Terminal			2(6)	3(5)	4(4)	
Position						
Central door lock	Front left	Clockwise				
		Counter-clockwise				
Terminal			4(4)	5(3)	6(2)	
Position						
Central door lock	Front right	Clockwise				
		Counter-clockwise				

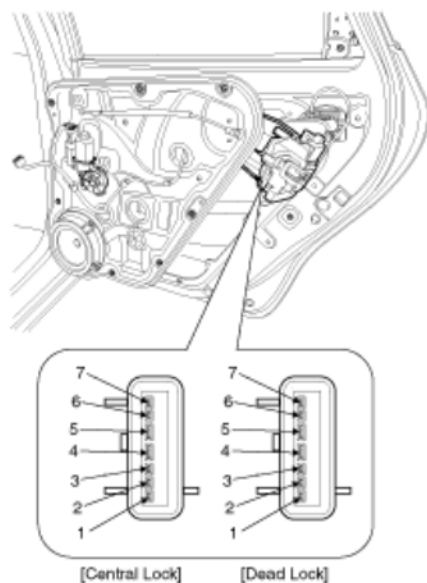
Rear Door Lock Switch

1. Remove the rear door trim.
(Refer to the BD group - Rear door)
2. Remove the rear door module.
(Refer to the BD group - Rear door)
3. Disconnect the connectors from the actuator.

[LHD]



[RHD]



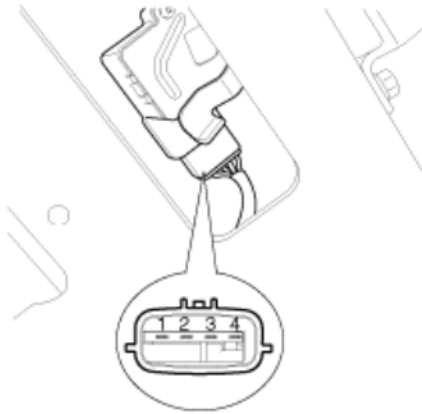
4. Check for continuity between the terminals in each switch position according to the table.

[CENTRAL LOCK]			() : RHD	
Position		Terminal	1(7)	3(5)
Central door lock	Front left	lock		
		Unlock	○ — ○	

[DEAD LOCK]			() : RHD	
Position		Terminal	1(7)	3(5)
Central door lock	Front left	lock		
		Unlock	○ — ○	

Tailgate Switch

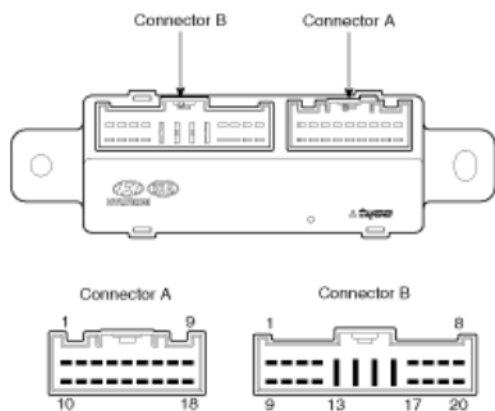
1. Remove the tailgate trim. (Refer to the BD group - Tailgate)
2. Disconnect the 4P connector from the actuator.



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

Terminal Position	1	2
Lock		
Unlock	○ —	○

INSPECTION



Door Lock

1. Disconnect the negative (-) battery terminal.
2. Remove the ICM relay box.
3. Check for continuity between the terminals.
4. There should be continuity between the No.15 terminal and No.6(or 16) terminals in the ICM-B when power and ground are connected to the No.15 terminal and No.17 terminal in the ICM-B.
5. There should be no continuity between the No.15 terminal and No.6(or 16) terminal in the I/P-D when power is disconnected.

Terminal	ICM-B (15)	ICM-B (17)	ICM-B (6or16)	ICM-B (15)
Power				
Disconnected			○ — ○	
Connected	○ — ○		⊖ — ⊕	

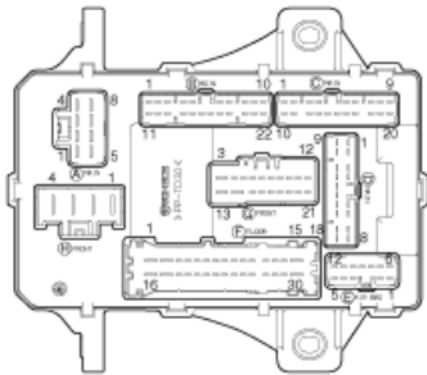
Door Unlock

1. Disconnect the negative (-) battery terminal.
2. Remove the ICM relay box.
3. Check for continuity between the terminals.
4. There should be continuity between the No.15 terminal and No.4(or 14) terminal in the ICM-B when power and ground are connected to the No.12 terminal and No.15 terminal in the ICM-B.
5. There should be no continuity between the No.15 terminal and No.4(or 14) terminal in the ICM-B when power is disconnected.

Terminal	ICM-B (4or14)	ICM-B (15)	ICM-B (12)	ICM-B (15)
Power				
Disconnected			○ — ○	
Connected	○ — ○		⊖ — ⊕	

Tailgate Open

1. Disconnect the negative (-) battery terminal.
2. Remove the passenger compartment junction box.
3. Check for continuity between the terminals.
4. There should be continuity between the No.3 terminal in the I/P-H and the No.2 terminal in the I/P-D when power and ground are connected to the No.3 terminal in the I/P-H and the No.28 terminal in the I/P-F.
5. There should be no continuity between the No.3 terminal in the I/P-H and the No.2 terminal in the I/P-D when power and ground are connected to the No.3 terminal in the I/P-H and the No.28 terminal in the I/P-F.



Terminal	H-3	F-28	H-3	D-2
Power				
Disconnected			○	○
Connected	○	○	+	-

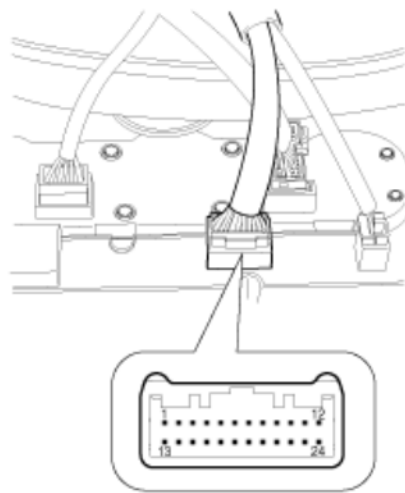
INSPECTION

Driver Door Lock Switch

- 1. Disconnect the negative (-) battery terminal.
- 2. Remove the center fascia panel from the crash pad. (Refer to the BD group - "Crash pad")



- 3. Disconnect the connector from the center fascia panel.

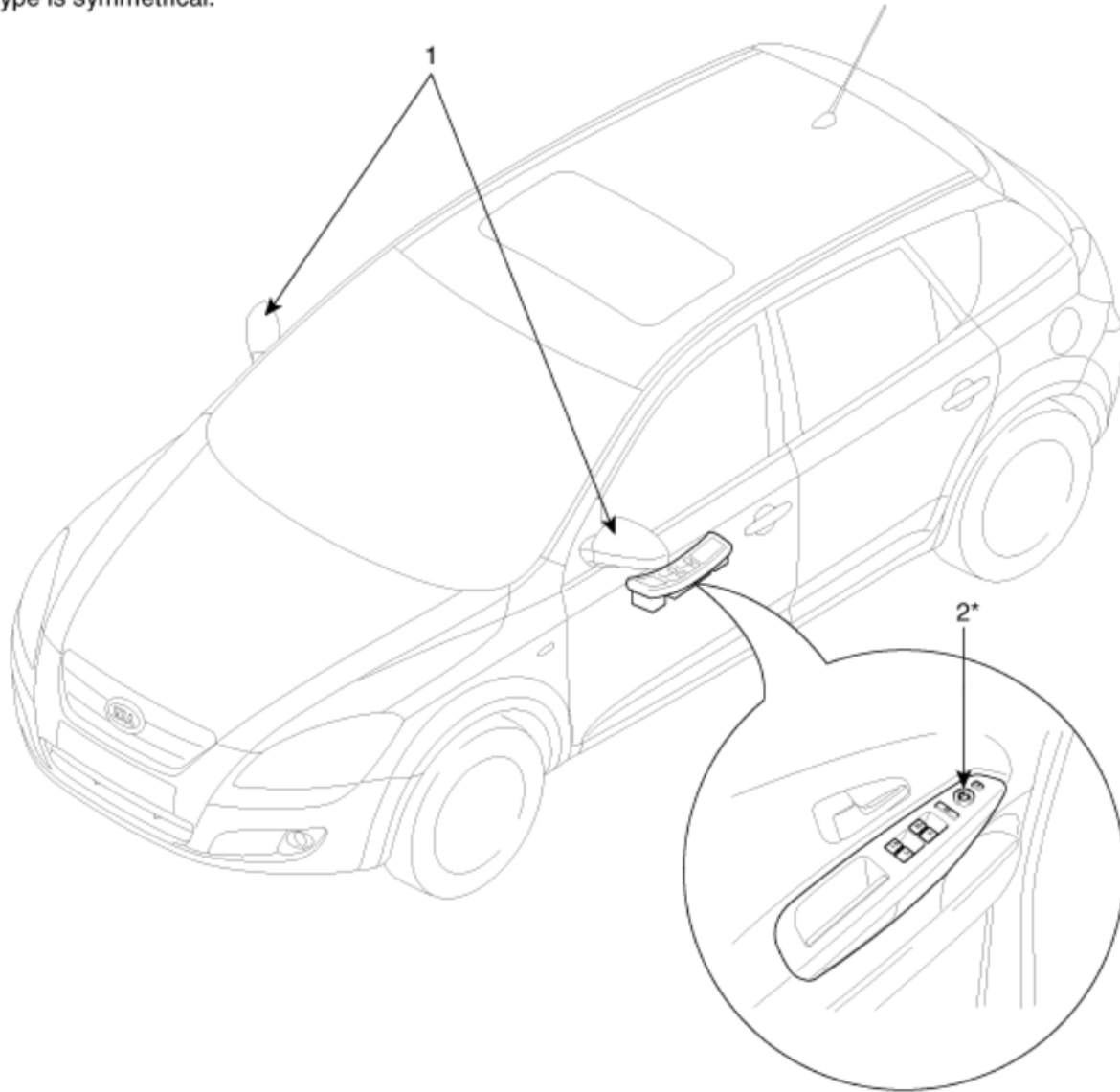


- 4. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	Terminal	
	9	GND
ON		
OFF		

COMPONENT LOCATION

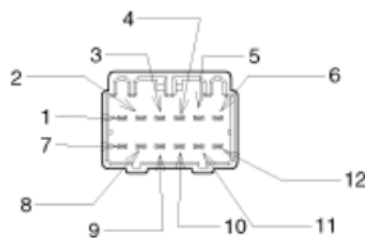
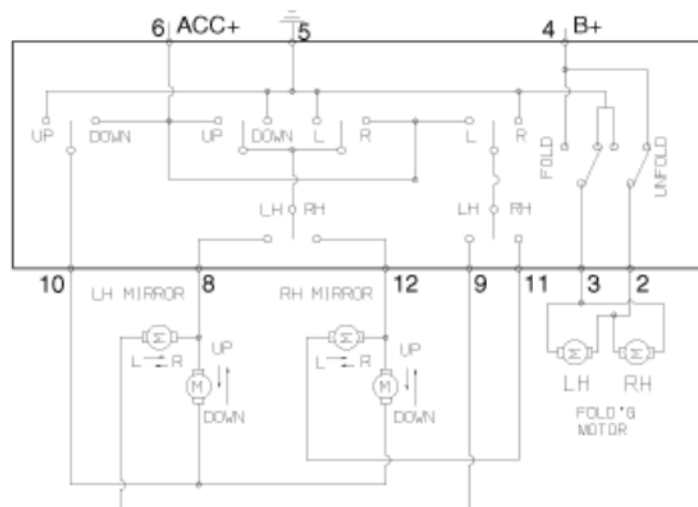
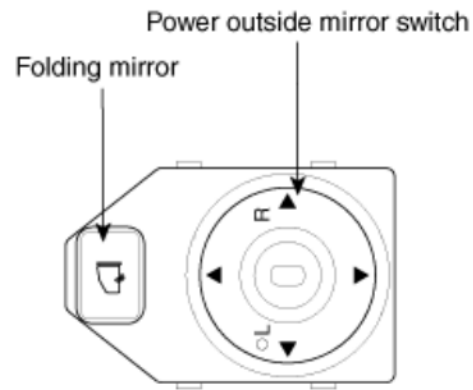
The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



1. Power door mirror

2. Power door mirror switch

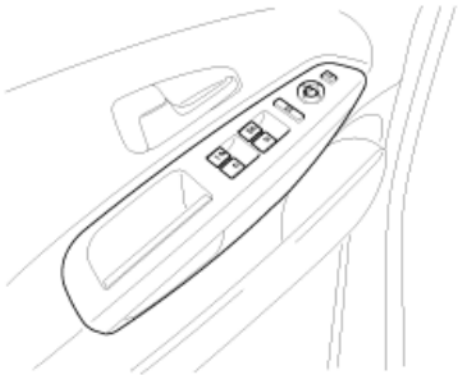
COMPONENTS



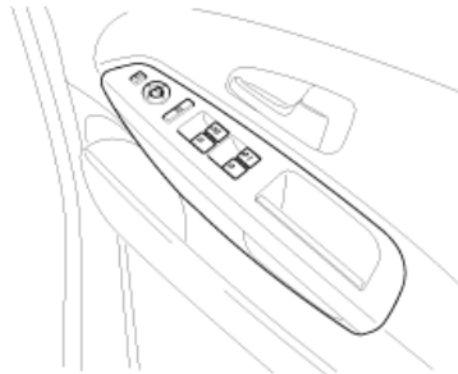
INSPECTION

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

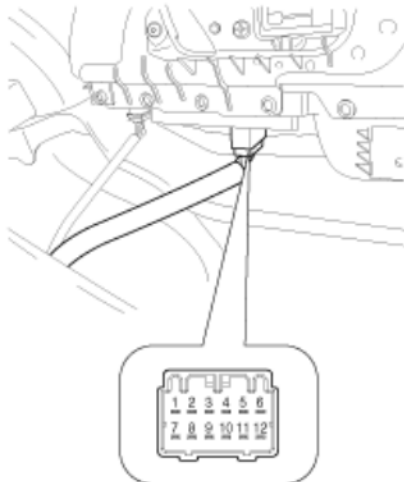
[LHD]



[RHD]



3. Check for the continuity between terminals of power door mirror switch according to the table.



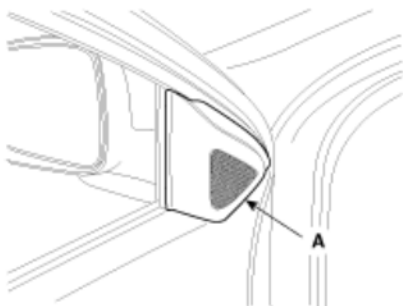
4. Check for continuity between the terminals in each switch position according to the table.

Item	Terminal	6	5	8	9	10	11	12
	Direction							
Left	UP							
	DOWN							
	OFF							
	LEFT							
	RIGHT							
Right	UP							
	DOWN							
	OFF							
	LEFT							
	RIGHT							

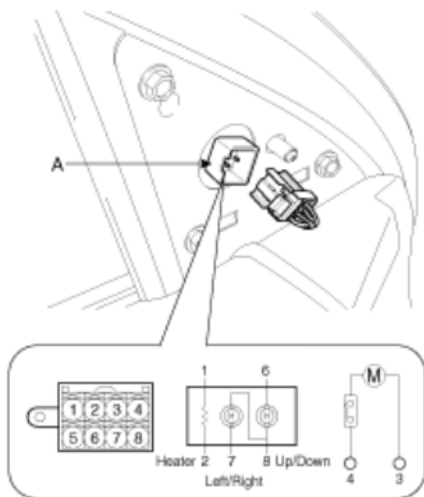
Direction	Terminal	2	3	4	5
Folding					
Unfolding					

INSPECTION

1. Remove the front door quadrant inner cover (A). Take care not to damage fixing clips. (Refer to the BD 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.

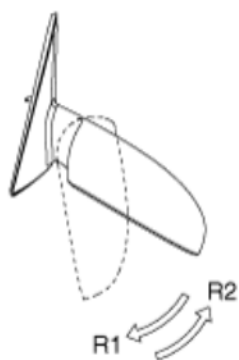


Terminal Position	8	7	6	1	2
UP	○	○	○	○	○
DOWN	○	○	○	○	○
OFF	○	○	○	○	○
RIGHT	○	○	○	○	○
LEFT	○	○	○	○	○

Mirror Heater

Terminal Position	1	2
Heater	○	○

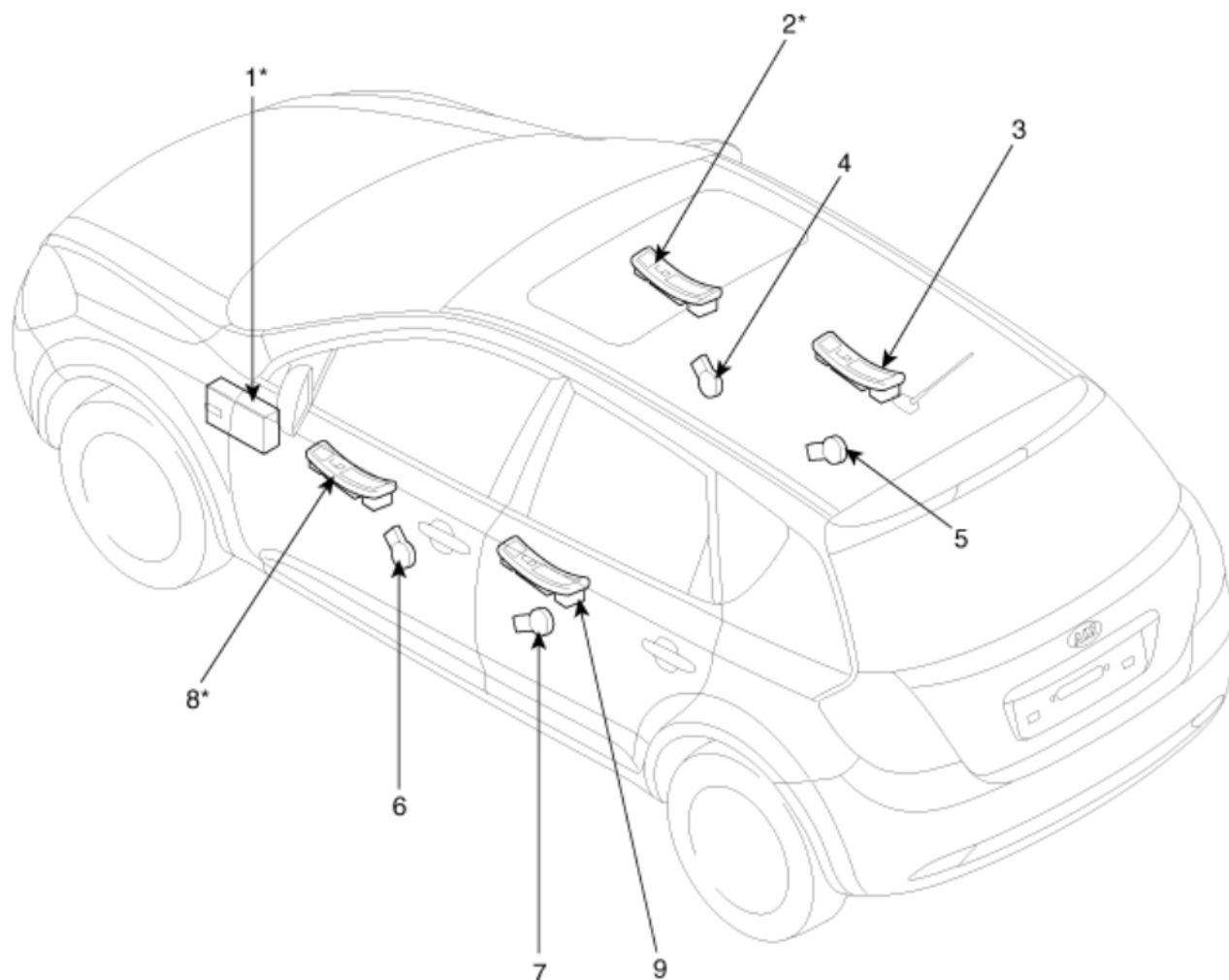
Folding Mirror



Terminal Direction	1	2	3	4
Folding R1	○	○	○	○
Folding R2	○	○	○	○

COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



1. Instrument panel junction box (Power window relay)
2. Passenger window switch
3. Rear window switch
4. Front window motor & Safety power window unit
5. Rear window motor & Safety power window unit

6. Front window motor & Safety power window unit
7. Rear window motor & Safety power window unit
8. Driver power window main switch
9. Rear window switch

OPERATION

Function Of Safety Power Window

When all door (Front, Rear) power window auto-up switch is operated, safety function is activated.

1. Safety function condition

When detect the force of 100N during the window rising, window is reversed.

2. Length of window reversing (except holding the auto-up switch)

- When detect the jamming during the 4mm ~ 250mm from top of the door.
→ Window is reversed until 300mm from top of the door.



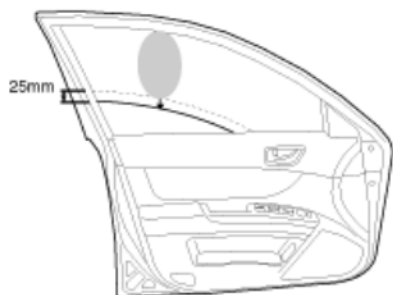
- When detect the jamming over the 250mm from top of the door.
→ Window is reversed until 50mm from jamming position.
→ Window is reversed 50mm or bottom position in case of 50mm reversing distance.



- When detect the jamming over 300mm from top of the door.
→ Window stops at reverse point.

3. Length of window reversing (holding the auto-up switch)

- When detect the jamming during holding the auto-up switch.
→ Window is reversed until 25mm from jamming position.
- Auto-up function is not available during the 5 seconds from above condition.
→ When holding the auto-up switch, window is operated as a manual-up function. (Safety function is not activated.)
- When detect the jamming during holding the auto-up switch again.
→ Window is reversed until 25mm from jamming position.
- When holding the auto-up switch after 5 seconds from above condition.
→ Window is reverse until 25mm from jamming position.



4. Safety function is not available area
Safety function is not available during the 4mm from top of the door.

Initializing Method Of The Safety Power Window

1. Position counter and position initialization

(1) Position counter

Window position counting is implemented by use of one Hall Effect sensor (HEF) connected to timer capture unit of the ?Controller with a resolution of 180° electrical.

Even the battery was separated from the car, it must keep the window position information.

(2) Position initialization

For position initialization, position counter detect the upper mechanical stop and lower mechanical Position. Motor control unit (MCU) allow only Manual mode activity (without ASD Anti-Squeeze Detection algorithm) feature) before to be initialized.

Initialization means the condition to move the window system with full anti-pinch function and related functions by detecting the window travel distance (Upper/Lower mechanical limits).

Conditions for initialization are

- de-initialized position counter
- Power window switch Up activated
- block condition detected
(no motor movement of more than 1 count during 1sec/ SW dependent)

Switch action with De-initialized condition :

- Up direction : Manual & Auto P/WDW sw input → manual mode;
- Down direction : Manual P/WDW sw input → manual mode, + Auto s/w input → auto mode

(3) Re-initialization

During re-initialization, position counter is set to "zero" at upper block position to compensate counting errors by software, mechanical tolerances or physics. Conditions for re-initialisation are

- initialized position counter.
- window at upper block position (capture range EEPROM programmable)
- block condition detected
(no motor movement of more than 1 count during 1 sec/ SW dependent)

(4) De-initialization

The system initialization/calibration will be lost in the following cases:

- After parameter modification via diagnostic
- Wrong EEPROM checksum at ECU wake-up or power-on
- Movement outside predefined window stroke (above learned top position, below predefined bottom position)
- De-initialisation after a defined number (EEPROM) of reversals without re-initialisation in the upper seal

(activation /de-activation controlled by EEPROM value). A window down movement or switching off the window lifter permission resets the reversal counter value(activation by EEPROM bit).

- De-initialisation after a defined number of movements (EEPROM) without re-initialisation in the upper seal (activation /de-activation controlled by EEPROM value)
- Special de-initialization procedure :
The special window lifter de-initialization procedure works as follows:
 - System is initialized
 - Move window below soft-stop position (position EEPROM adjustable)
 - Press MANU-down switch and keep it pressed
 - Apply permission signal (serial-link = PIN 6) ON → OFF → ON within 2 seconds (time EEPROM adjustable)

(5) Soft stop function

In order to reduce noise and mechanical stress, the window movement is stopped under control of the ECU before the bottom position is reached.

The clearance is 0 / +10 mm (at 11.5 V to 14.5 V).

To activate the soft bottom stop function, the top reference position and bottom reference position have to be initialized. Therefore, the window is lifted into the top position until the block condition is detected. This position is taken as top reference position.

Afterwards, the window is moved to the bottom position until the block condition is detected (mechanical stop). This position is taken as bottom reference position.

The bottom reference position is re-initialized :

- When window is operated down starting from soft stop position
- Every "9" stops at soft stop position.

(6) Thermal protection

Thermal protection by software module is implemented to prevent from destruction of motor during overload condition. Motor temperature is estimated by integrating squared motor current as an estimate for heating power integral. When estimated motor temperature exceeds EEPROM programmable upper limit, motor is deactivated for fixed delay time (default value = 30 sec.)

Thermal shutdown during a window operation will not interrupt the operation due to safety reasons.

(7) Operation time limiter

Maximal operation time of power window motor is limited to 15 sec (EEPROM programmable).

(8) Continuous reverse

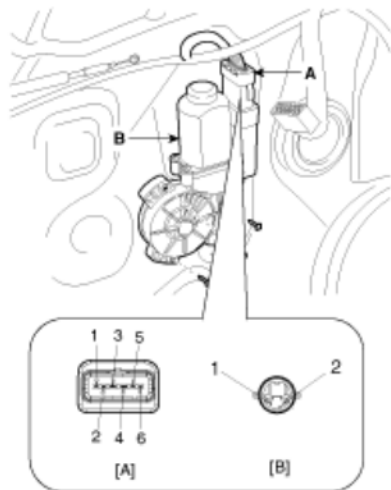
Current Number of Continuous reverse of window is 5. With the below condition, this counter Will be initialized.

- IG OFF
- DOWN signal ON
- WINDOW CLOSE

INSPECTION

Front Power Window Motor

- Remove (-) negative battery terminal.
- Remove the front door trim. (Refer to the BD group-front door)
- Disconnect the connector from the motor.
(A : Safety, B : Standard)

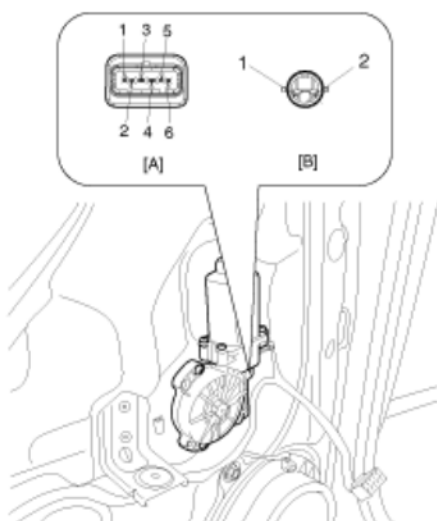


- Connect the motor terminals directly to battery voltage (12V) and check that the motor operates smoothly. Next, reverse the polarity and check that the motor operates smoothly in the reverse direction. If the operation is abnormal, replace the motor.

Terminal			1	2
Position				
Left	UP	Clockwise	⊕	⊖
	DOWN	Counter-clockwise	⊖	⊕
Right	DOWN	Clockwise	⊖	⊕
	UP	Counter-clockwise	⊕	⊖

Rear Power Window Motor

- Remove (-) negative battery terminal.
- Remove the rear door trim. (Refer to the BD group-rear door)
- Disconnect the connector from the motor.
(A : Safety, B : Standard)

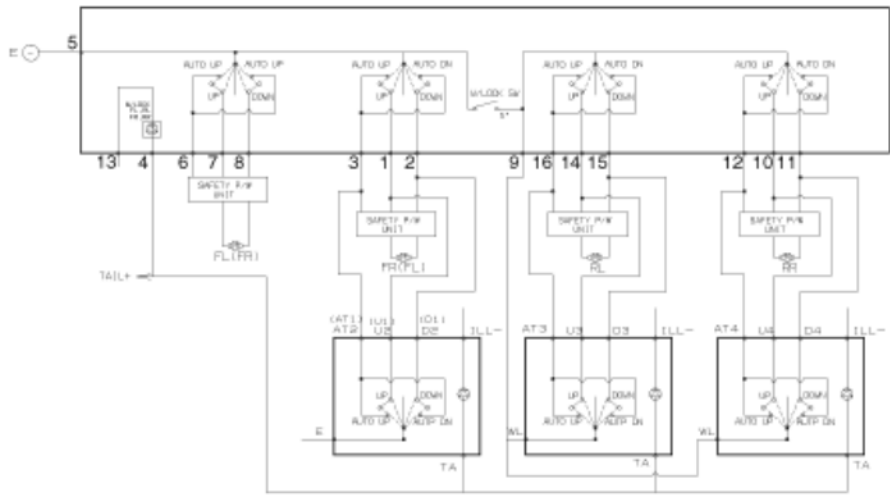
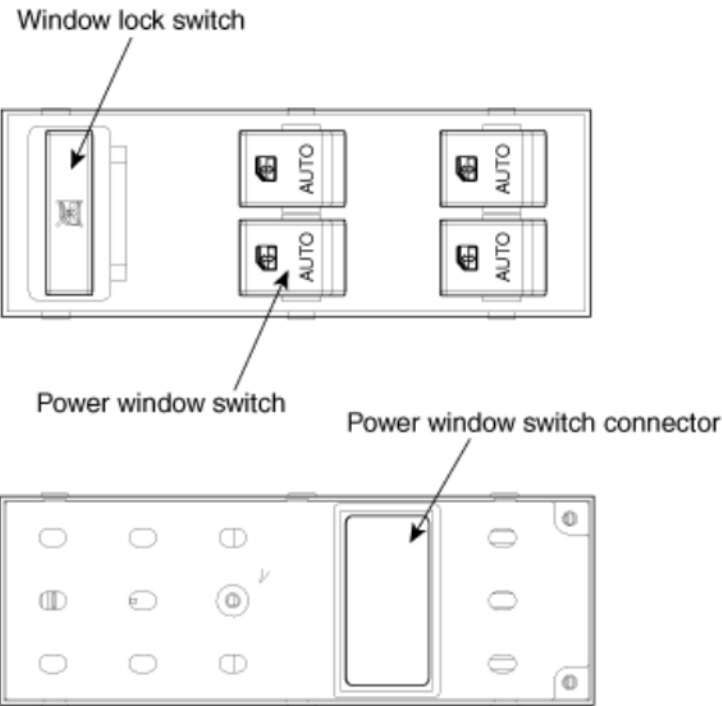


4. Connect the motor terminals directly to battery voltage (12V) and check that the motor operates smoothly. Next, reverse the polarity and check that the motor operates smoothly in the reverse direction. If the operation is abnormal, replace the motor.

Terminal			1	2
Position				
Left	UP	Clockwise	⊕	⊖
	DOWN	Counter-clockwise	⊖	⊕
Right	DOWN	Clockwise	⊖	⊕
	UP	Counter-clockwise	⊕	⊖

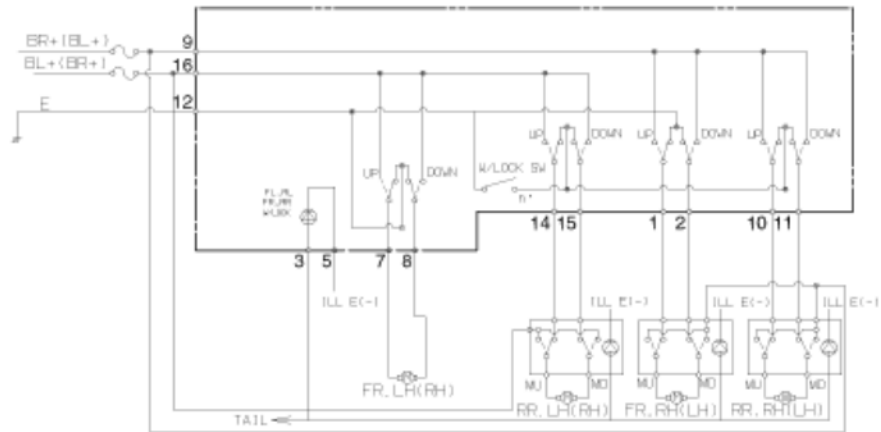
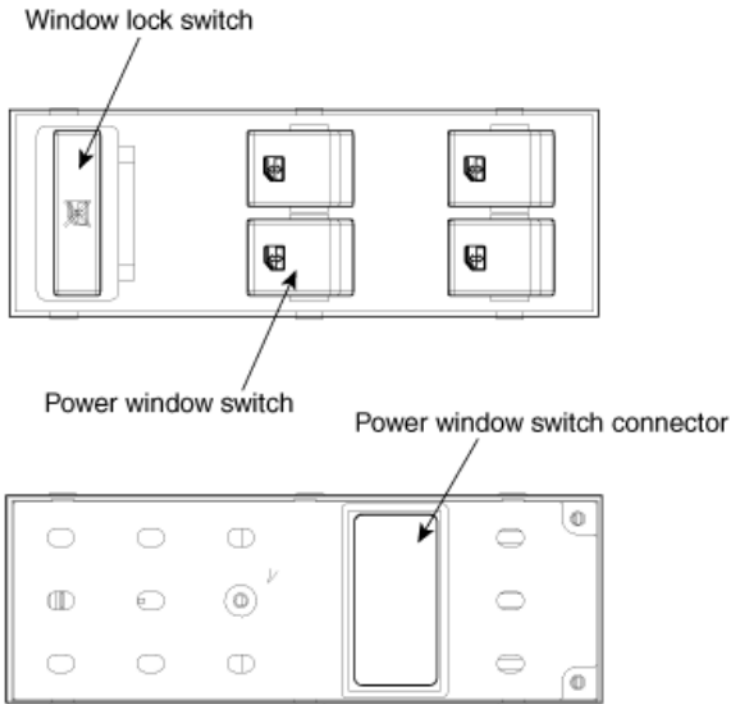
COMPONENTS

POWER WINDOW MAIN SWITCH



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

[MANUAL POWER WINDOW]

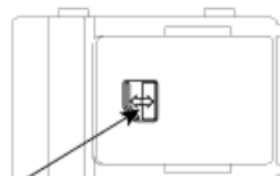
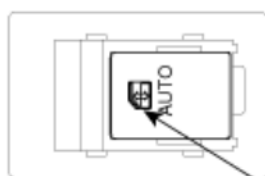


1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

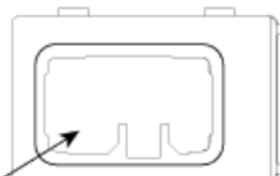
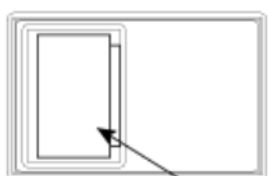
PASSENGER/REAR POWER WINDOW SWITCH

[SAFETY P/W]

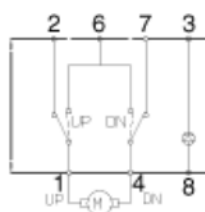
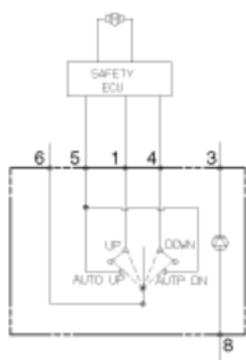
[MANUAL P/W]



Power window switch



Passenger power window switch connector



1	X	2	3
4	5	6	7

1	X	2	3
4	5	6	7

INSPECTION

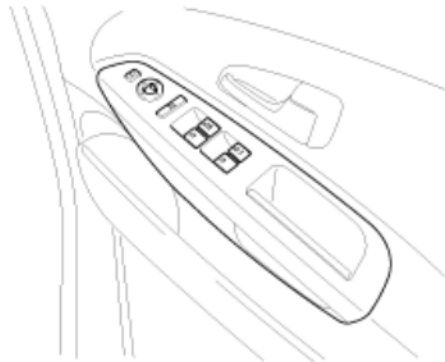
Power Window Main Switch Inspection

1. Disconnect the negative (-) battery terminal.
2. Remove the front door trim. (Refer to the BD group - front door)
3. Disconnect the 16P connector from the switch.

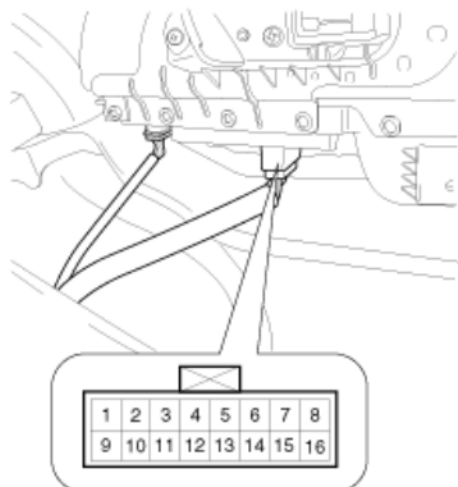
[LHD]



[RHD]



4. Check for continuity between the terminals in each switch position according to the table. If the continuity condition is not normal, replace the switch.



[SAFETY WINDOW]

Terminal Position	5	9
Lock		
Unlock	○ — ○	○ — ○

[MANUAL POWER WINDOW]

Terminal Position	12	14
Lock		
Unlock	○ — ○	○ — ○

[SAFETY WINDOW]

Position	Terminal	Front left				Front right			
		6	7	8	5	1	2	3	5
AUTO UP		○	○	○	○	○	○	○	○
UP		○	○	○		○	○	○	○
OFF									
DOWN				○	○	○	○	○	○
AUTO DOWN		○	○	○	○	○	○	○	○
Position	Terminal	Rear left				Rear right			
		5	14	15	16	5	10	11	12
AUTO UP		○	○	○	○	○	○	○	○
UP		○	○			○	○		
OFF									
DOWN		○	○	○		○	○	○	○
AUTO DOWN		○	○	○	○	○	○	○	○

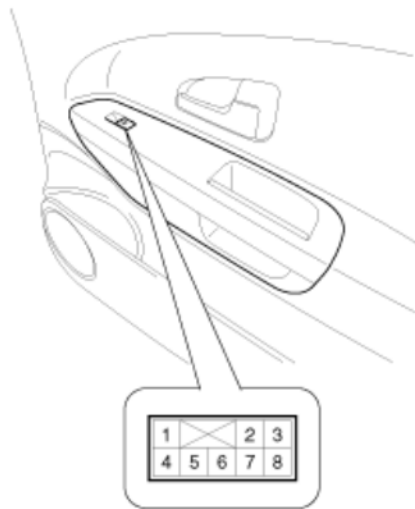
[MANUAL POWER WINDOW]

Position	Terminal	Front left				Front right			
		7	8	12	16	1	2	9	12
UP		○	○	○	○	○	○	○	○
OFF		○	○	○		○	○	○	○
DOWN		○	○	○	○	○	○	○	○
Position	Terminal	Rear left				Rear right			
		12	14	15	16	9	10	11	12
UP		○	○	○	○	○	○	○	○
OFF		○	○	○		○	○	○	○
DOWN		○	○	○	○	○	○	○	○

Passenger Power Window Switch Inspection

1. Disconnect the negative (-) battery terminal.

- 2. Remove the front door trim. (Refer to the BD group - front door)
- 3. Disconnect the 8P connector from the switch.



- 4. Check for continuity between the terminals in each switch position according to the table. If the continuity condition is not normal, replace the switch.

[Safety Window]

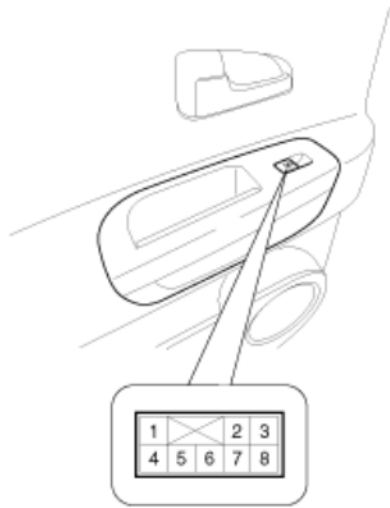
Terminal Position	6	4	1	5
AUTO UP	○	—	○	○
UP	○	—	○	
OFF				
DOWN	○	○		
AUTO DOWN	○	○	—	○

[Manual Power Window]

Terminal Position	6	1	2	7	4
UP	○	○		○	○
OFF		○	○	○	○
DOWN	○	○	○		○

Rear Power Window Switch Inspection

- 1. Disconnect the negative (-) battery terminal.
- 2. Remove the rear door trim. (Refer to the BD group - rear door)
- 3. Disconnect the 8P connector from the switch.



4. Check for continuity between the terminals in each switch position according to the table. If the continuity condition is not normal, replace the switch.

[Safety Window]

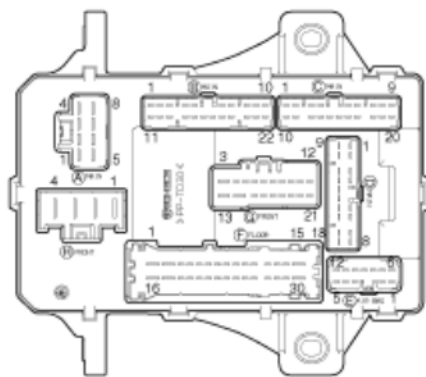
Terminal Position	6	4	1	5
AUTO UP	○	—	○	○
UP	○	—	○	
OFF				
DOWN	○	○		
AUTO DOWN	○	○	—	○

[Manual Power Window]

Terminal Position	6	1	2	7	4
UP	○	○		○	○
OFF		○	○	○	○
DOWN	○	○	○		○

INSPECTION

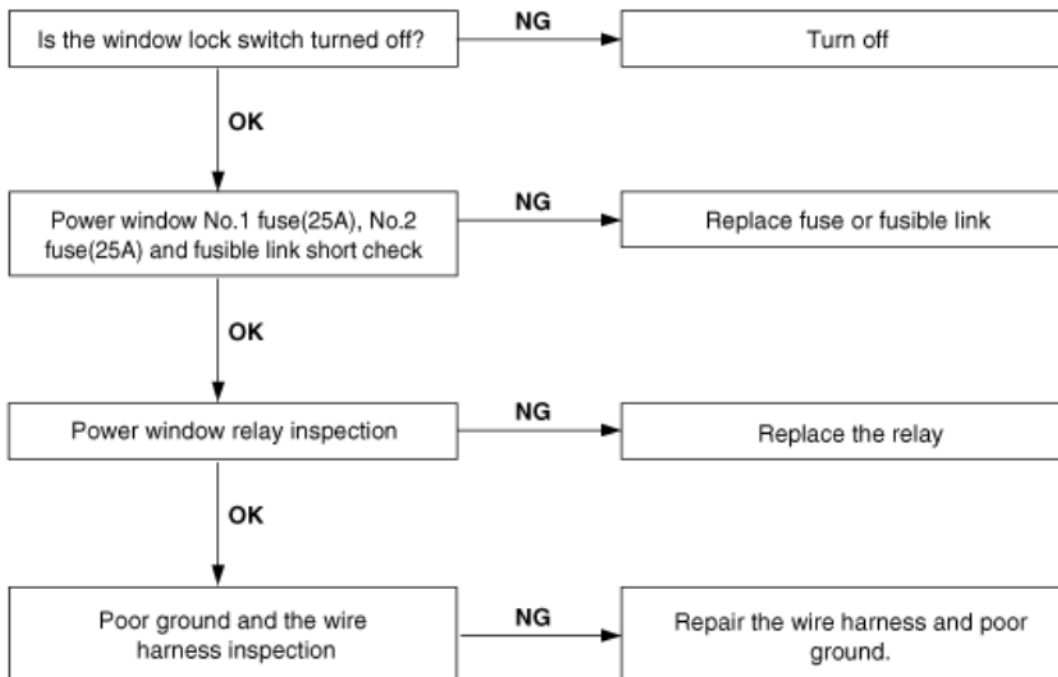
1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower panel.
(Refer to Body group - "Crash pad")
3. Remove the junction box.
4. Check for continuity between the terminals.
5. There should be continuity between the No.2 in the I/P-F and No.17 terminal in the I/P-B when power and ground are connected to the No.2 terminal in the I/P-H and No.17 terminal in the I/P-B.
6. There should be no continuity between the No.2 terminal in the I/P-F and No.17 terminal in the I/P-B when power is disconnected.



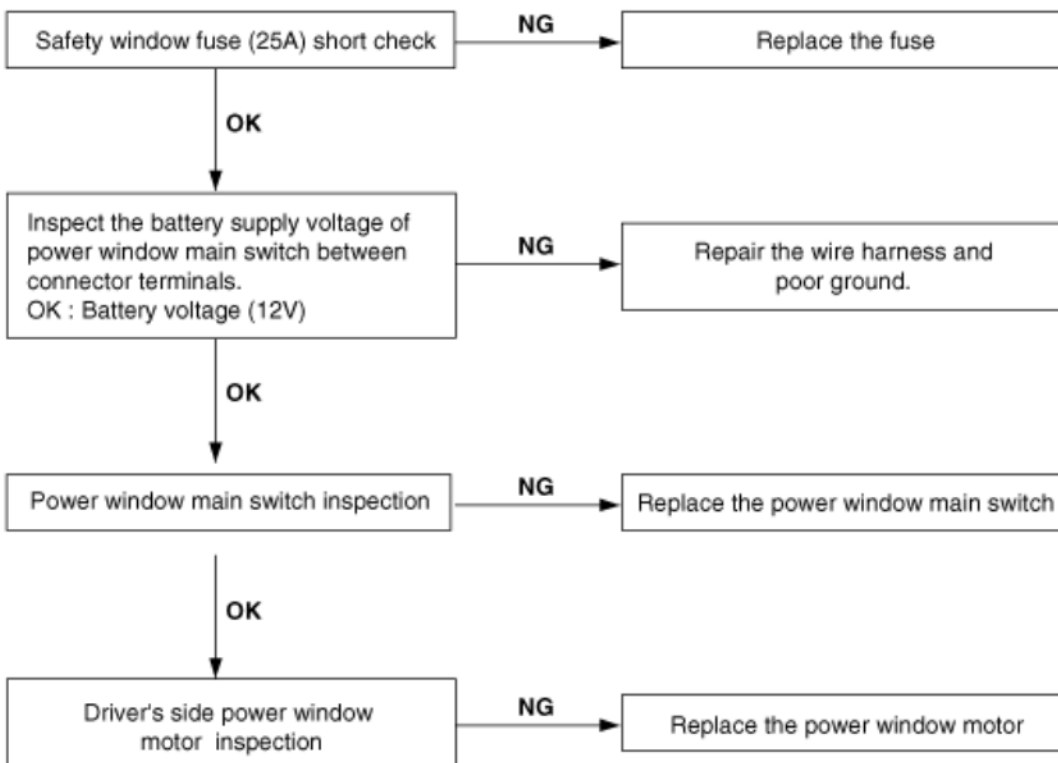
Terminal	I/P-H (2)	I/P-F (17)	I/P-H (2)	I/P-B (17)
Power				
Disconnected			○	○
Connected	○	○	+	-

TROUBLESHOOTING

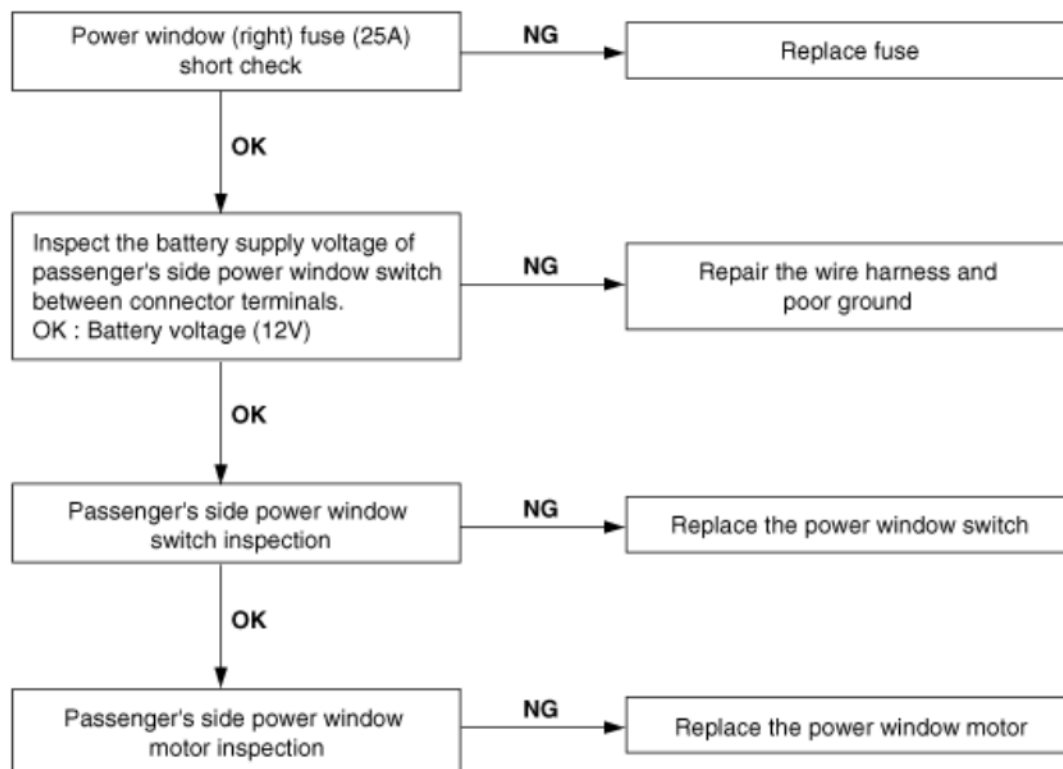
1. No windows operate from the main switch on the driver's door.



2. Driver's side window does not operate.

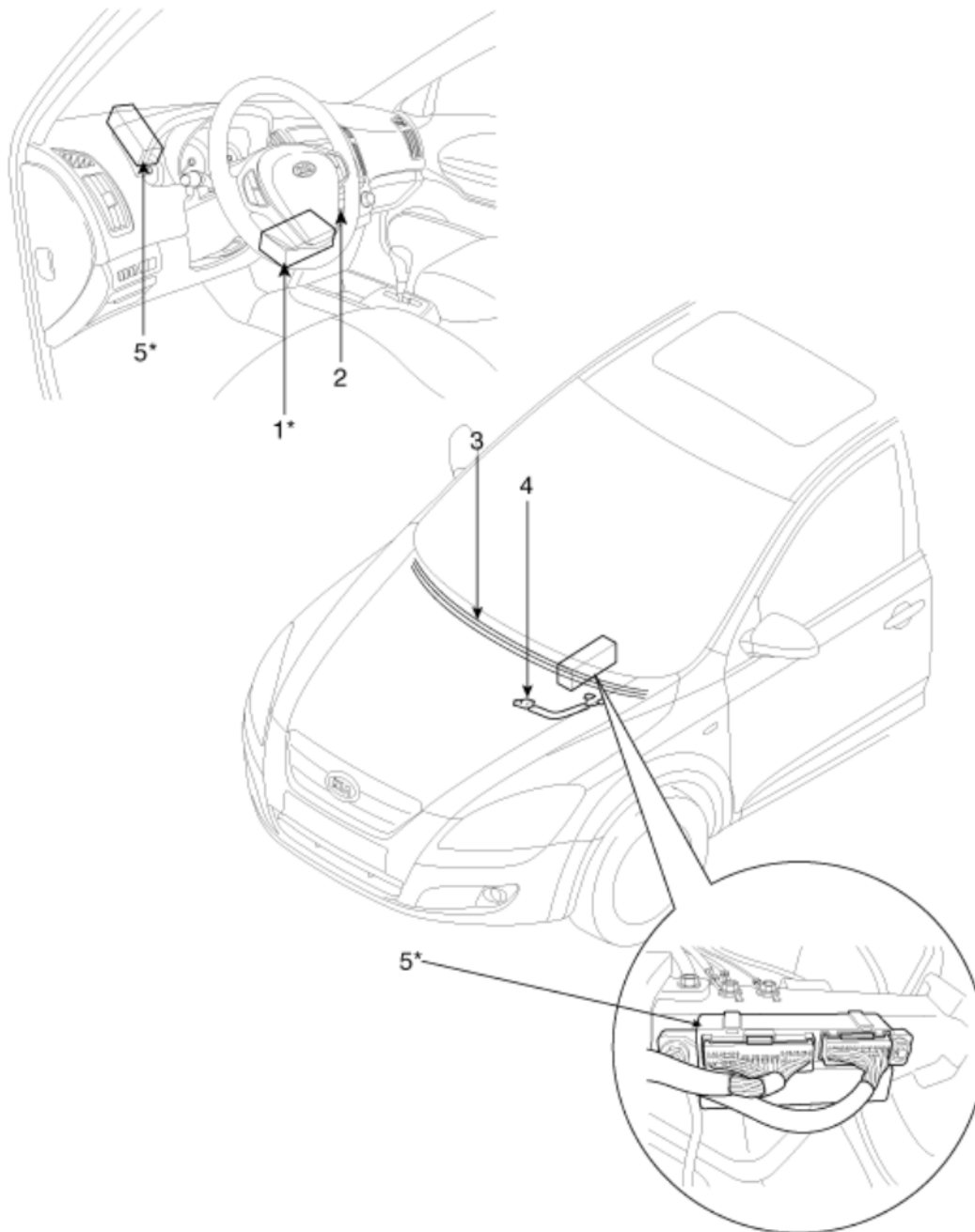


3. Passenger's side window does not operate.



COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



- 1. Body control module
- 2. Windshield deicer switch
- 3. Windshield deicer

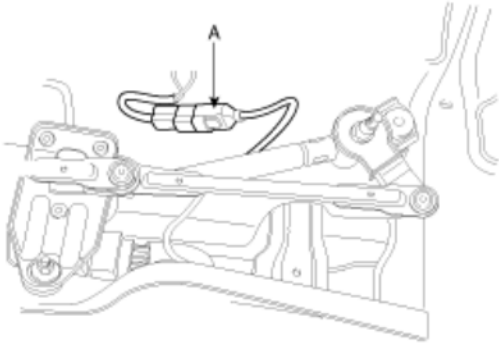
- 4. Deicer connector
- 5. Windshield deicer relay (in ICM relay box)

DESCRIPTION

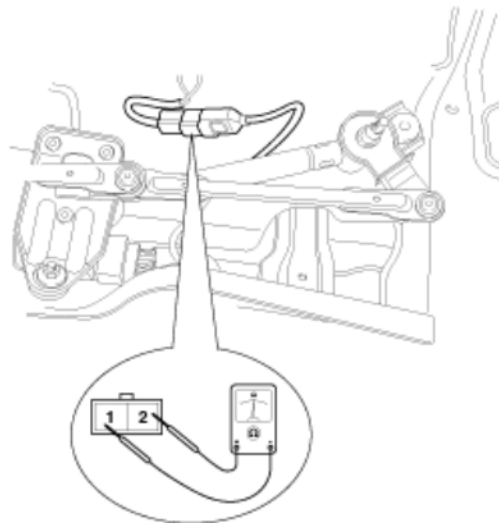
Windshield deicer system prevent windshield wiper from freezing in the winter season. It consists of deicer in the lower part of windshield, switch and relay. Body control module receives an input signal from the deicer switch, then controls relay. Since the generator "L" is switched ON, if the deicer switch is ON, then deicer output is ON for 20 minutes.

INSPECTION

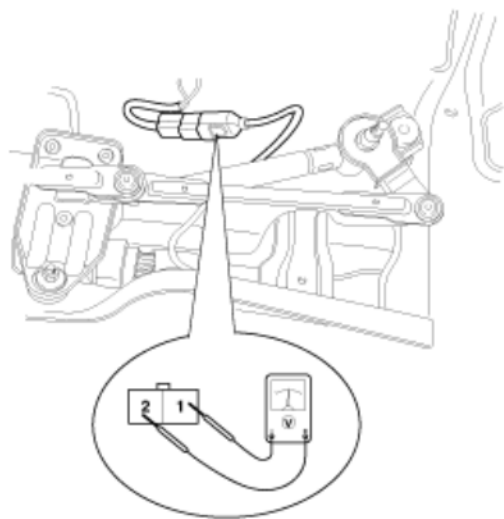
1. Remove the cowl top cover.(Refer to the wiper)
2. Disconnect the windshield deicer connector (A) from the wiper motor linkage.



3. Check for continuity between the terminals of deicer lines.



4. Turn the ignition switch ON and the windshield deicer switch ON, then measure the voltage between the terminals of harness side deicer connector.
O K : approx. Battery voltage (12V)



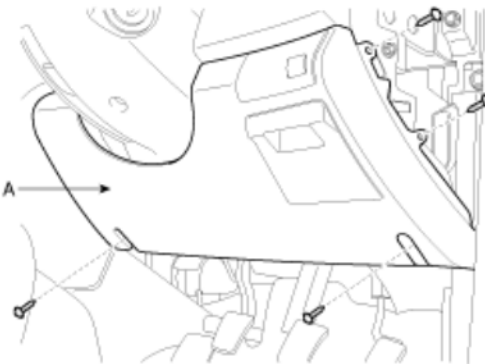
INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower panel (A).
(Refer to the BD group - "Crash pad")

[LHD]



[RHD]



3. Disconnect deicer switch connectors.

[LHD]

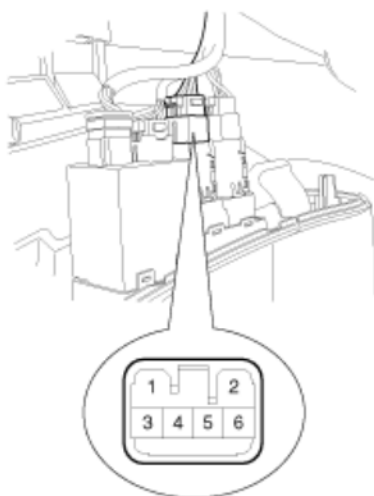


[RHD]

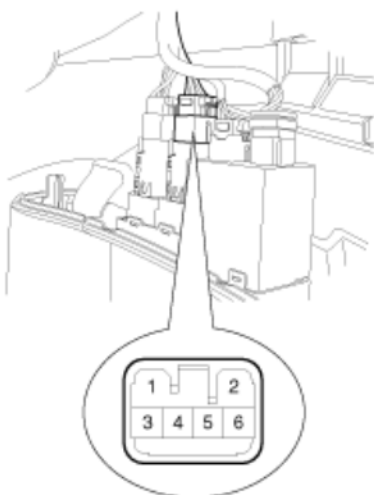


4. Using an ohmmeter, inspect the continuity between the terminals.

[LHD]



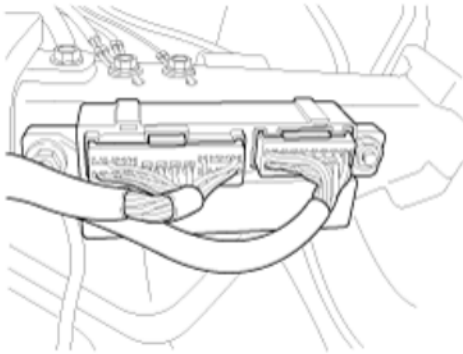
[RHD]



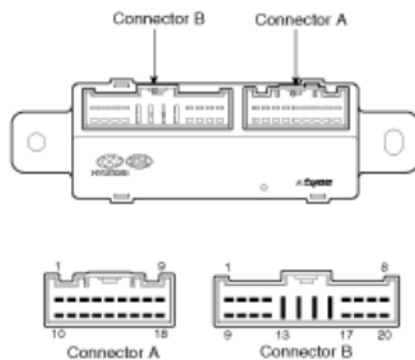
Position Terminal	ON(PUSH)	OFF(FREE)	Remark
1			
4			
3			IND+
2			ILL-
6			ILL+

INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the ICM relay box to check the windshield deicer relay.

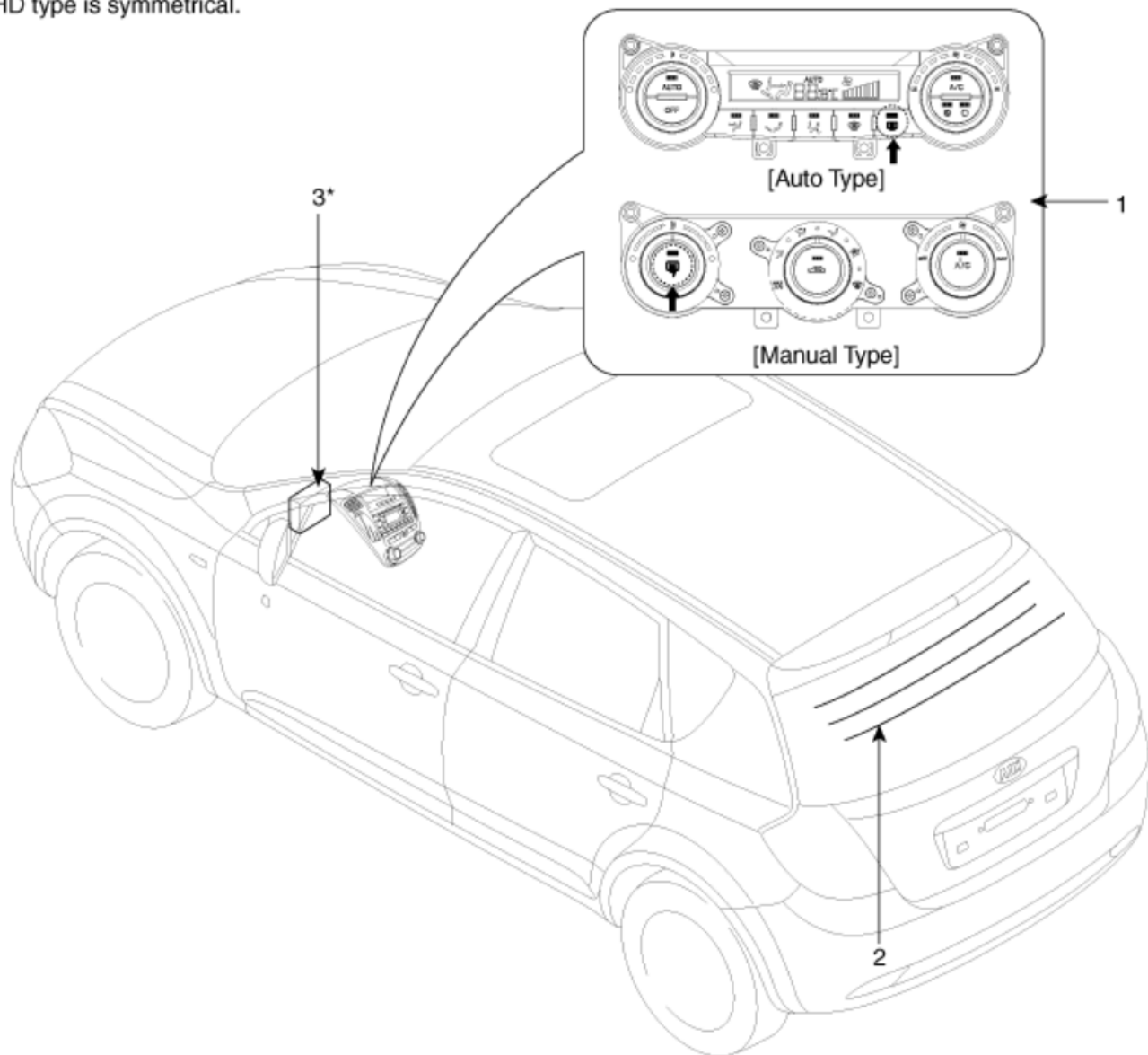


3. There should be continuity between the No.1 and No.10 terminals when power and ground are connected to the No.2 and No.10 terminals in the ICM-A.
4. There should be no continuity between the No.1 and No.10 terminals when power is disconnected.



COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



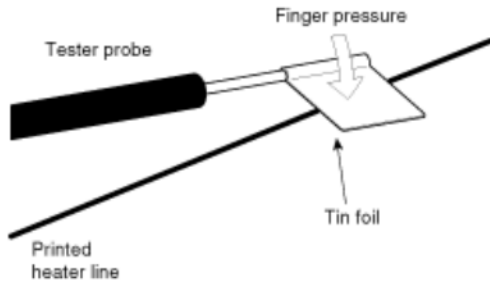
1. Rear window defogger switch
2. Rear window defogger

3. Body control module

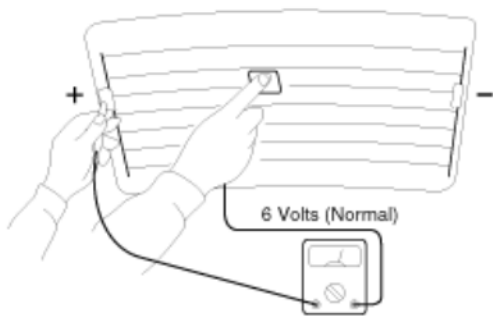
INSPECTION

⚠ CAUTION

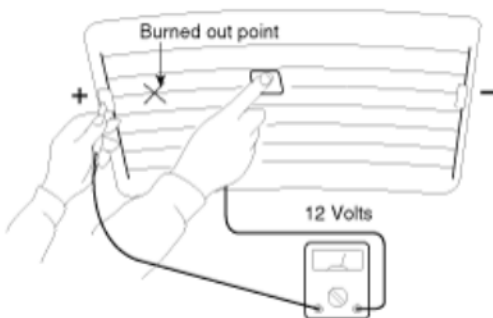
Wrap tin foil around the end of the voltmeter test lead to prevent damaging the heater line. Apply finger pressure on the tin foil, moving the tin foil along the grid line to check for open circuits.



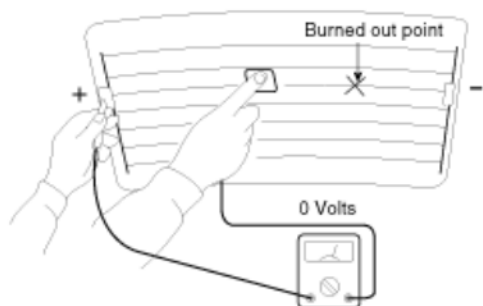
1. Turn on the defogger switch and use a voltmeter to measure the voltage of each heater line at the glass center point. If a voltage of approximately 6V is indicated by the voltmeter, the heater line of the rear window is considered satisfactory.



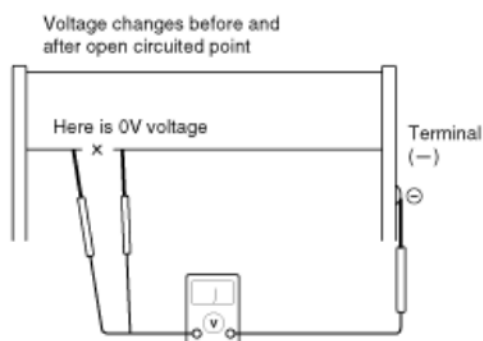
2. If a heater line is burned out between the center point and (+) terminal, the voltmeter will indicate 12V.



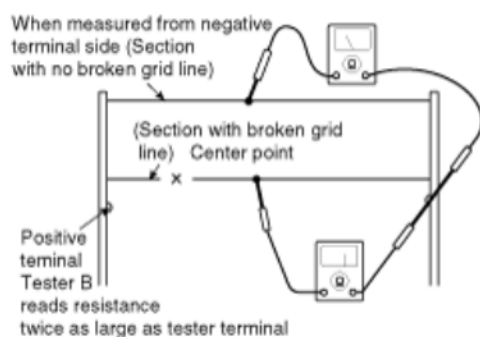
3. If a heater line is burned out between the center point and (-) terminal, the voltmeter will indicate 0V.



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.



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.

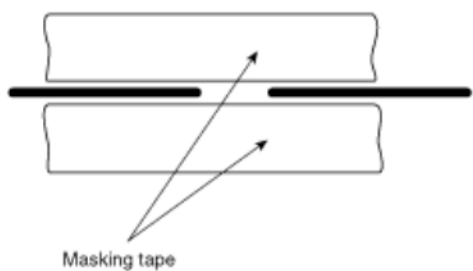


Repair Of Broken Heater Line

Prepare the following items :

1. Conductive paint.
2. Paint thinner.
3. Masking tape.
4. Silicone remover.
5. Using a thin brush :
Wipe the glass adjacent to the broken heater line, clean with silicone remover and attach the masking tape as shown. Shake the conductive paint container well, and apply three coats with a brush at intervals of about 15 minutes apart.

Remove the tape and allow sufficient time for drying before applying power. For a better finish, scrape away excess deposits with a knife after the paint has completely dried. (Allow 24 hours).

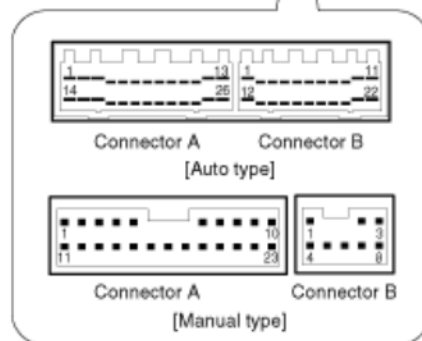


INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel(A). Take care not to damage fixing clips.
(Refer to the BD group - Crash pad)



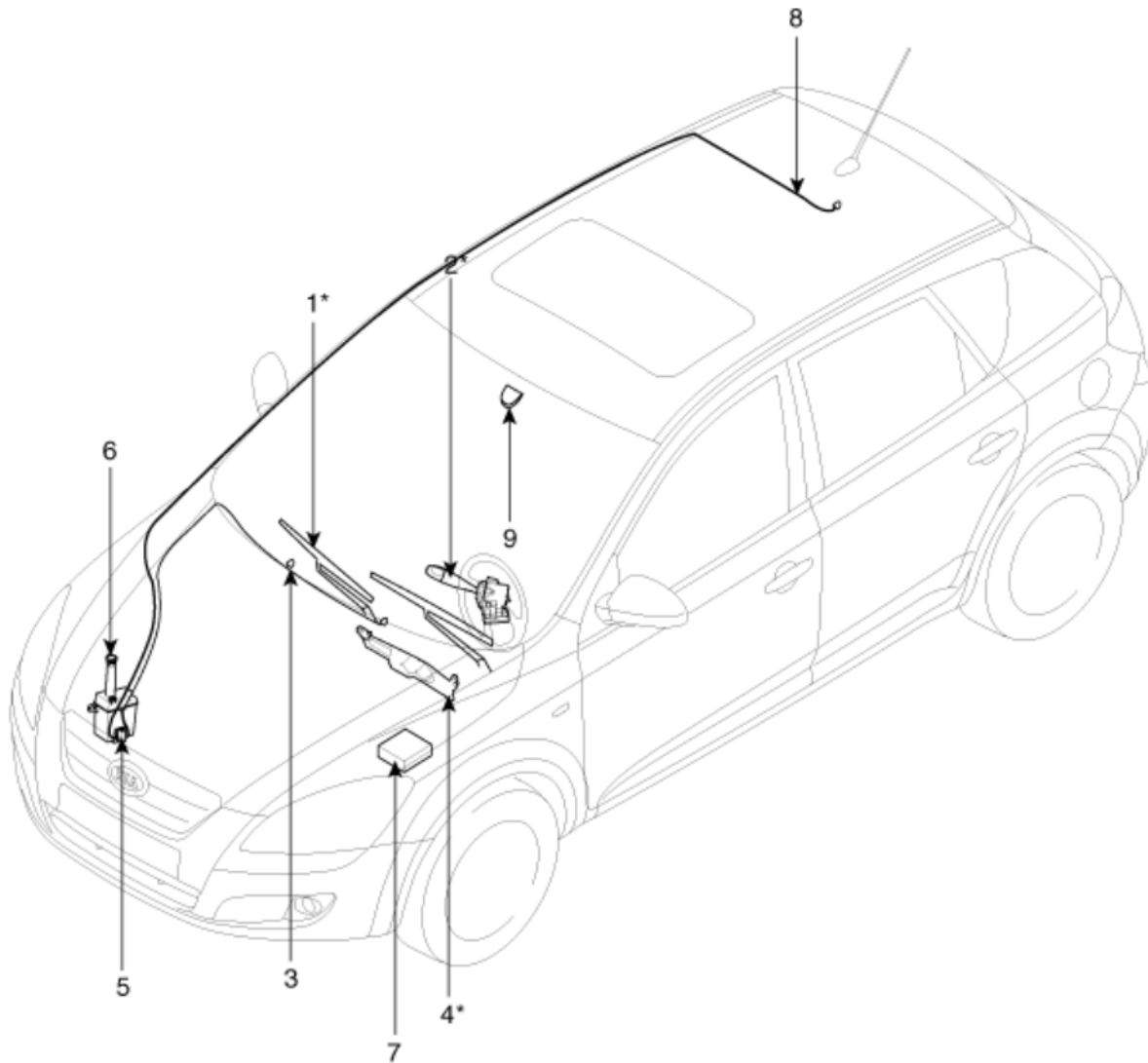
3. Disconnect connectors.
4. Using an ohmmeter, inspect the continuity between the terminals after removing controller.



Terminal		A10	Ground
Position			
Auto Heater	ON		
	OFF		
Terminal		A20	Ground
Position			
Manual Heater	ON		
	OFF		

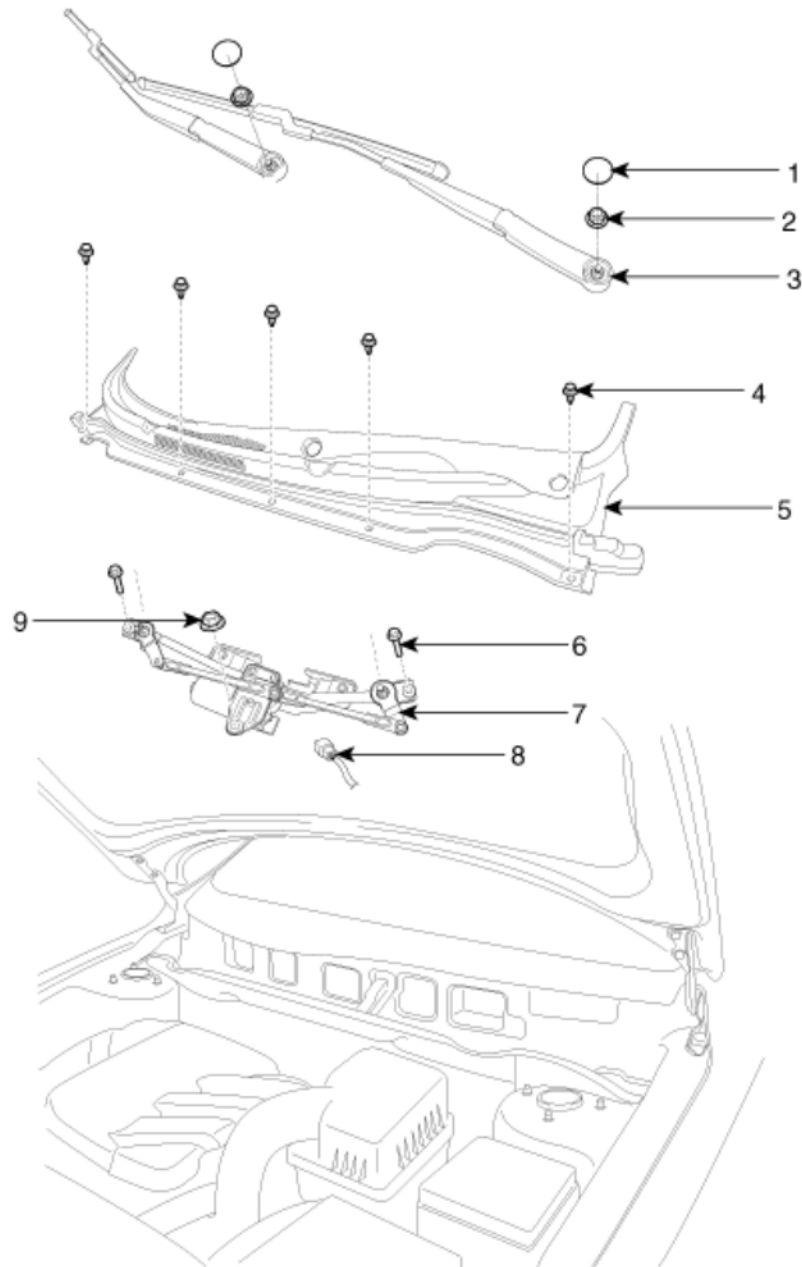
COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



- | | |
|-------------------------------------|--|
| 1. Windshield wiper arm & blade | 6. Washer reservoir |
| 2. Wiper & washer switch | 7. Wiper relay (Engine room relay box) |
| 3. Windshield washer hose | 8. Rear washer hose |
| 4. Windshield wiper motor & linkage | 9. Rain sensor |
| 5. Washer motor | |

COMPONENT LOCATION



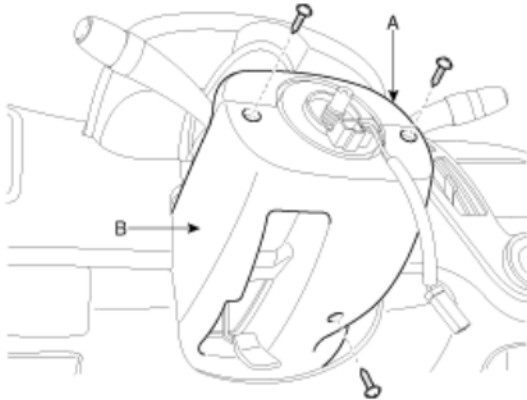
- 1. Cap
- 2. Nut
- 3. Wiper arm & blade
- 4. Retainer
- 5. Cowl top cover

- 6. Bolt
- 7. Wiper motor & linkage assembly
- 8. Wiper motor connector
- 9. Nut

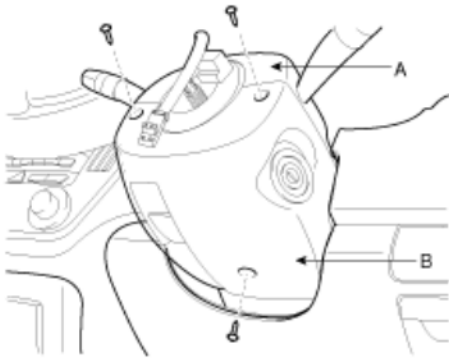
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the steering column upper(A) and lower (B) shrouds after loosening 3 screws.

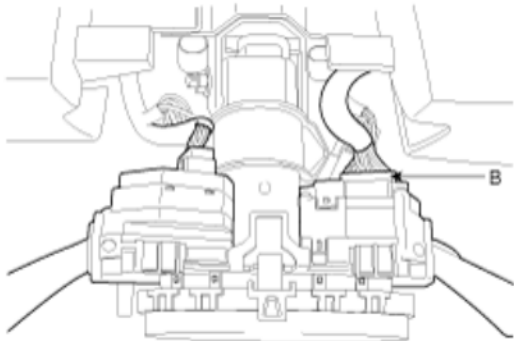
[LHD]



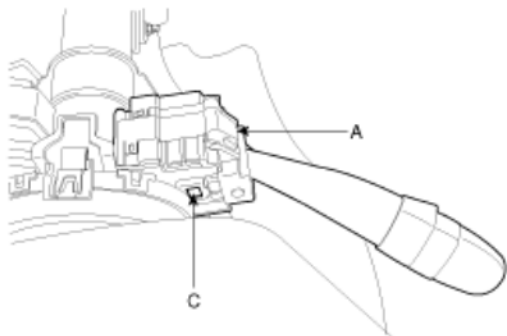
[RHD]



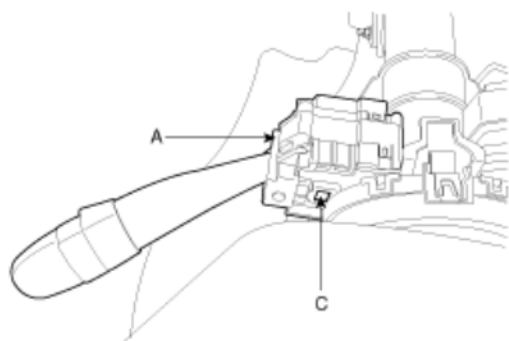
3. Remove the wiper switch (A) after disconnecting the connector(B) with pushing the lock pin (C) and loosening 2 screws.



[LHD]



[RHD]

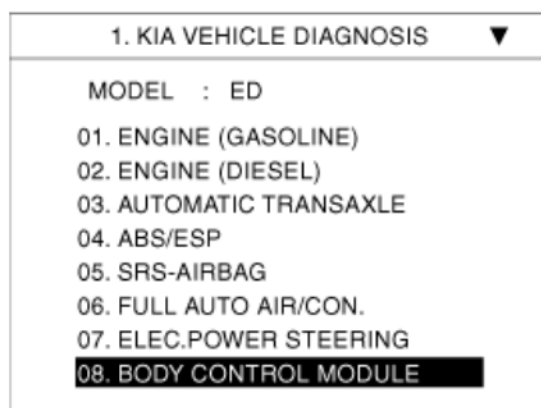


INSTALLATION

1. Install the windshield wiper switch.
2. Connect the wiper switch connector.
3. Install the steering column upper and lower shrouds.

INSPECTION

1. Multifunction switch operates head lamps and wiper by communicating with BCM through LIN communication.
2. Check BCM input/output value of each position of multifunction switch when you inspect the module whether faulty or not.
3. Select model and BCM menu.



4. Select "Current data" and wiper.

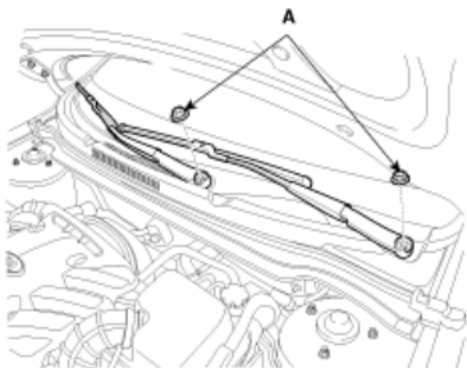
1. KIA VEHICLE DIAGNOSIS	
MODEL	: ED
SYSTEM	: BODY CONTROL MODULE
01. CURRENT DATA 02. FLIGHT RECORD 03. ACTUATION TEST 04. SIMU-SCAN 05. IDENTIFICATION CHECK 06. USER OPTION 07. DATA SETUP (UNIT CONV.)	

5. Check input/output value of washer & wiper switch.

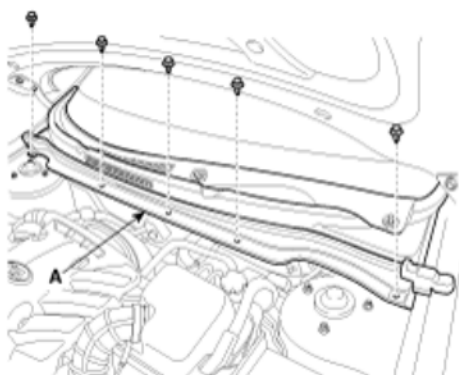
1.1 CURRENT DATA		45/66
WASHER SW	OFF	▲ ■ ▼
WIPER INT SW	OFF	
DEFROSTER SW	OFF	
WIPER RELAY	OFF	
DEFROSTER REPLAY	OFF	
MIST SW	OFF	
DRIVE SEAT BELT SW	OFF	
FIX SCRN FULL PART GRPH HELP		

REMOVAL

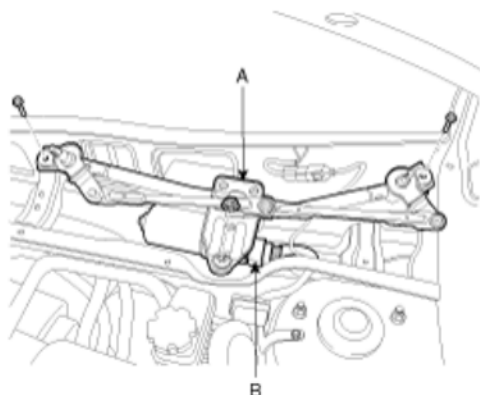
1. Remove the windshield wiper arm and blade after removing a nut (A).



2. Remove the weather strip and the cowl top cover (A) after removing 5 retainers.



3. Remove the windshield wiper motor and linkage assembly(A) after removing 2 bolts and 1 nut. Disconnect the wiper motor connector (B) from the wiper motor & linkage assembly.



INSTALLATION

1. Install the wiper motor and linkage assembly and then connect the wiper motor connector.
TORQUE : 7-11Nm (0.7-1.1, kgf.m, 5.0-7.9 lbf.ft)
2. Install the cowl top cover.

3. Install the windshield wiper arm and blade.

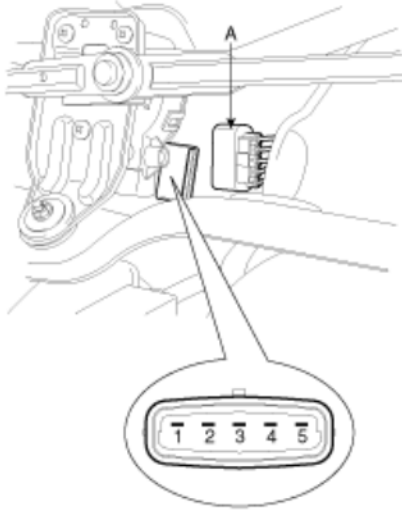
TORQUE : 28~33 Nm (2.8~3.3 kgf.m, 20~23.1 lbf.ft)

English ▼

INSPECTION

Speed Operation Check

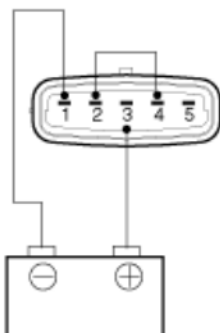
1. Remove the connector(A) from the wiper motor.



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

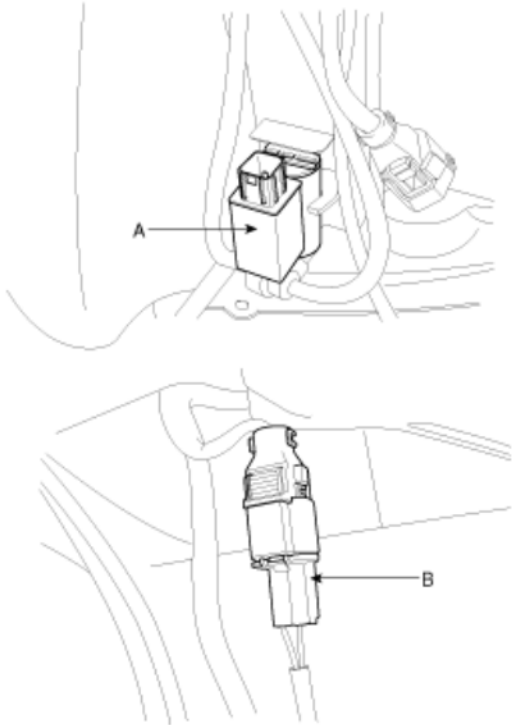
Automatic Stop Operation Check

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 4.
3. Connect terminals 4 and 2.
4. Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 1.
5. Check that the motor stops running at the off position.

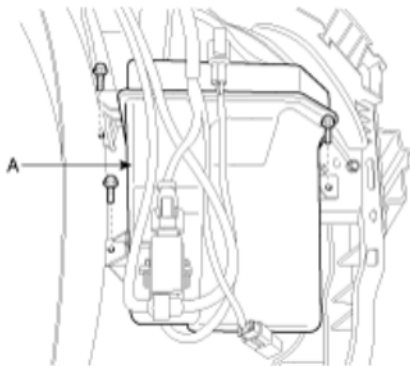


REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper cover. (Refer to Body group - Front bumper)
3. Remove the washer hose and the washer motor connector (A) and level sensor connector(B).



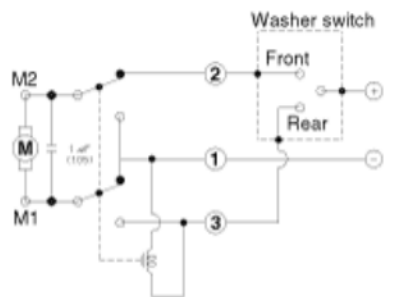
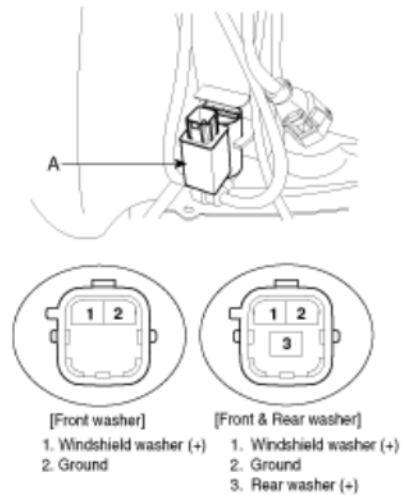
4. Remove the washer reservoir (A) after removing 3 bolts.



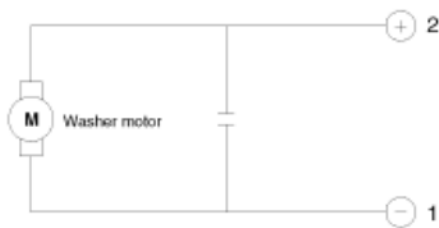
INSTALLATION

1. Install the washer reservoir.
2. Install the washer motor and connect the washer hose, the motor and level sensor connector.
3. Install the front bumper cover.

1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Connect positive (+) battery cables to terminal 2 and negative (-) battery cables to terminal 1 respectively.
3. Check that the motor operates normally and the washer motor runs and water sprays from the front nozzles.
4. If they are abnormal, replace the washer motor (A).



<Windshield & Rear washer motor>



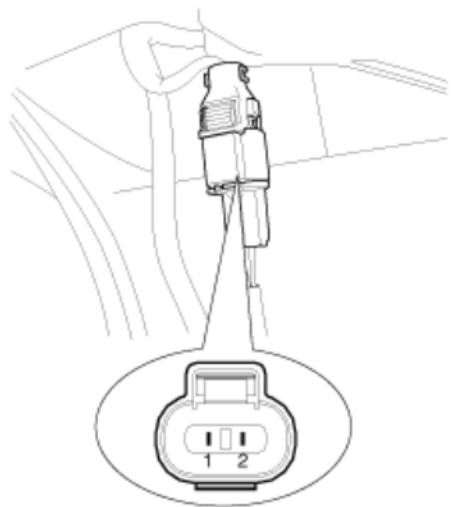
[Windshield washer motor]

Washer Fluid Level Sensor Switch

1. Disconnect the negative(-) battery terminal.
2. Drain the washer fluid less than 700 cc.
3. Check for continuity between the No. 1 and No.2 terminal in each float position.
There should be continuity when the float is down.

There should be no continuity when the folat is up.

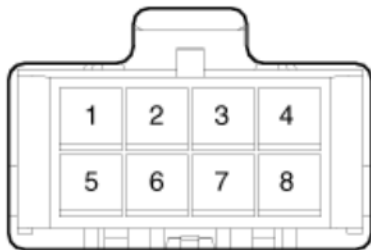
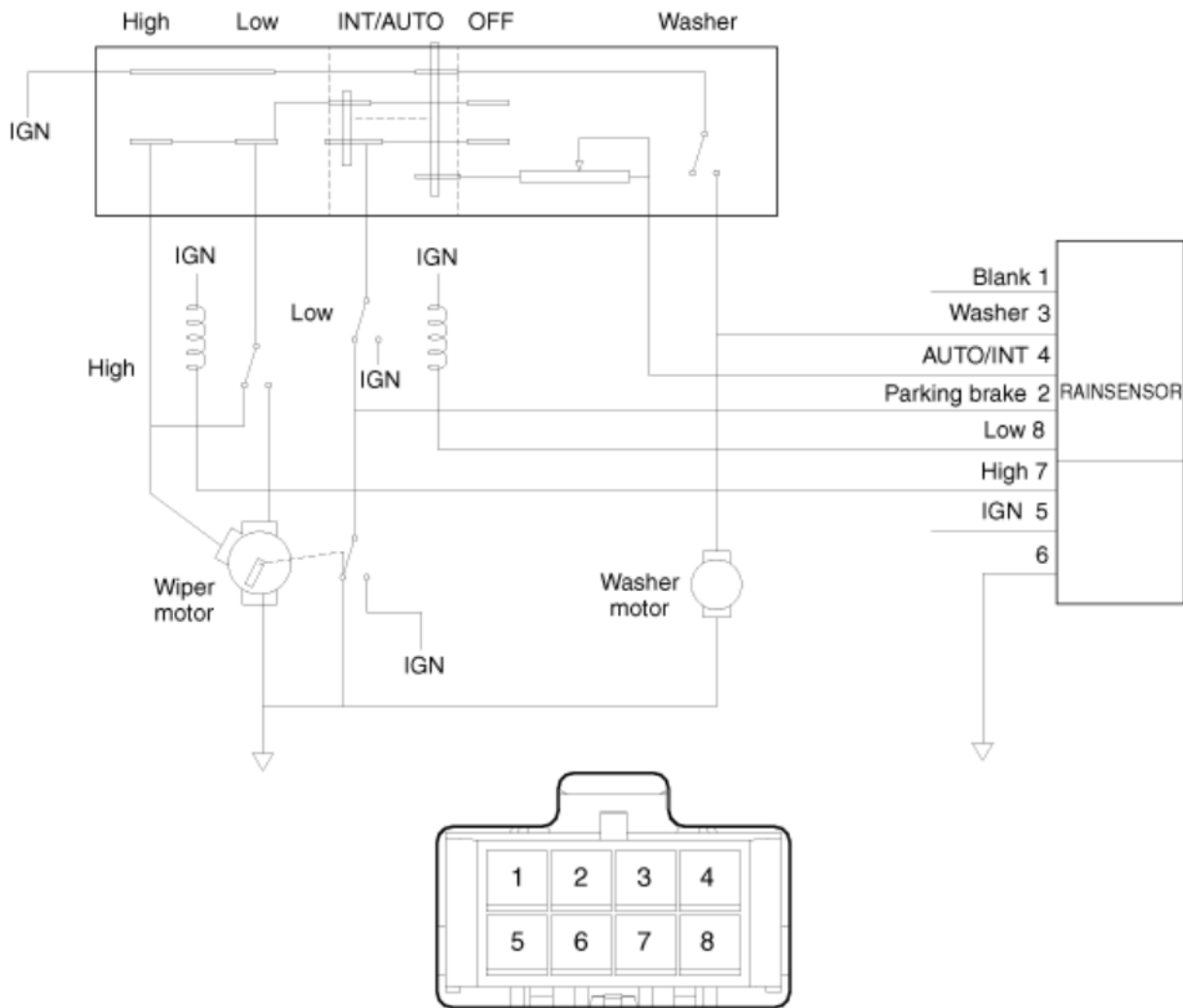
4. If the continuity is not as specified, replace the washer fluid level switch



Terminal Position	1	2
Over 700cc		
Under 700cc		

(Tolerance : -50cc ~ +100cc)

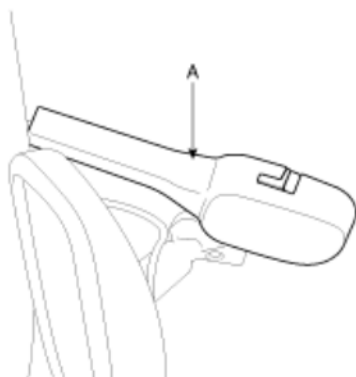
CIRCUIT DIAGRAM



Terminal Position	2	8	7	4	3	6
Washer					○	○
Low		○	○	○	○	○
High			○	○	○	○
OFF	○	○				
AUTO/INT	○	○		○	○	○

DESCRIPTION

The Rain sensing windshield wiper system is a wiper system that, in addition to providing normal wiper functions off, mist, manual low speed, manual high speed, and wash, provides automatic control of automatic intermittent, automatic low, and automatic high speeds. When the ignition key is in the ON position, the rain sensor (A) will be activated.



OPERATING MODES - RAINSENSING WINDSHIELD WIPER SYSTEM

MULTIFunction SWITCH POSITION	RAINSENSOR OPERATING MODE	SENSOR ACTION
MIST	MIST	Mist is controlled by the column switch. The sensor has no affect on this function
OFF	OFF	If not already parked, wiper motor runs in low speed until blades are in the depressed park position.
AUTOMATIC Automatic mode has 5 SENSITIVITY settings.	AUTOMATIC	AUTOMATIC Automatic INT/speed control. The sensitvity to raindrop accumulation on the windshield is set by the MULTIFunction SWITCH sensitivity adjustment.
LOW SPEED	MANUAL	Wiper motor runs continuously in low speed, for example 45 wipes/minute. The sensor has no affect on this function
HI SPEED	MANUAL	Wiper motor runs continuously in high speed, for example 60 wipes/minute. The sensor has no affect on this function
WASH - DEMAND WASHER SW ≥ 0.6 SEC	WASH	If washer sw on after 0.6 sec then wipes during 2.5 to 3.8 sec. The rain sensor enables the wipers and controls the after wipes.
WASH - DEMAND WASHER SW < 0.6 SEC	WASH	If washer sw on less than 0.2 to 0.6 sec then once wipes

Off Mode

With the wipe switch in the OFF position and the ignition switch in the ON positions, the Rainsensor is considered to be in "OFF" mode. In this mode, the sensor commands the wiper to be off.

The Rainsensor monitors the state of the windshield during OFF mode so that knowledge of the state of the windshield is present when the MULTIFunction SWITCH is moved to any SENSITIVITY setting. This optimizes the performance of the sensor when moving from the

OFF condition to an AUTOMATIC mode. The algorithm assumes the nominal sensitivity setting when in the OFF mode.

English ▼

Automatic Mode

When the MULTIFunction SWITCH is moved to AUTO position and the ignition switch is in the RUN or ACCESSORY positions, the Rainsensor is considered to be in "AUTOMATIC" mode. Once a single "Instant wipe" has occurred, the wipers remain at "Innerwiper/park" until the Rainsensor determines that the dwell time at that position is appropriate for the amount of precipitation on the windshield, considering the driver input from the switch SENSITIVITY setting. After the dwell time the Rainsensor provides input to the wiper motor to activate the wipers to clear the precipitation from the windshield.

Automatic Int

For all AUTOMATIC INT operations the Rainsensor commands the wipers to operate in LOW SPEED for one wipe, followed by a variable dwell period in the inner wipe position.

Automatic Low

AUTOMATIC LOW SPEED operation is utilized when the amount of precipitation imping on the windshield exceeds the AUTOMATIC INT TO AUTOMATIC LOW threshold. This threshold includes sufficient hysteresis to prevent cycling between AUTOMATIC INT and AUTOMATIC LOW SPEED operation with a steady amount of precipitation accumulation on the windshield.

Automatic High

AUTOMATIC HIGH SPEED operation is utilized when the amount of precipitation imping on the windshield exceeds the AUTOMATIC LOW to AUTOMATIC HIGH threshold. This threshold includes sufficient hysteresis to prevent cycling between AUTOMATIC LOW to AUTOMATIC HIGH operation with a steady amount of precipitation accumulation on the windshield.

Wash Mode

The Rainsensor monitors the MULTIFunction SWITCH to determine if the wash Function is selected. Rainsensor enables the wiper motor to run in low speed during the wash mode and performs follow up wipes during 2.5 to 3.8 sec.

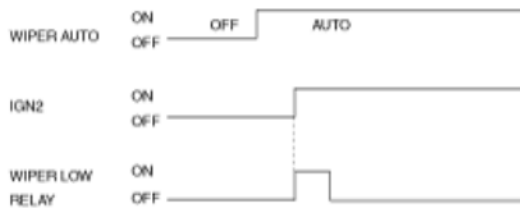
Manual Mode

The Rainsensor determines when a manual mode such as manual low, Mist, Off or manual high is selected. The column switch performs these modes and the rain sensor has no affect.

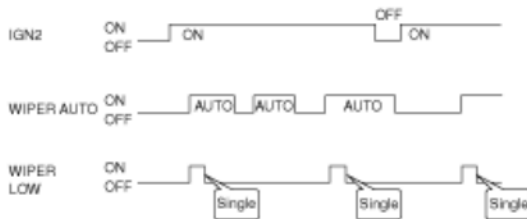
INSPECTION

Rain Sensing Wiper

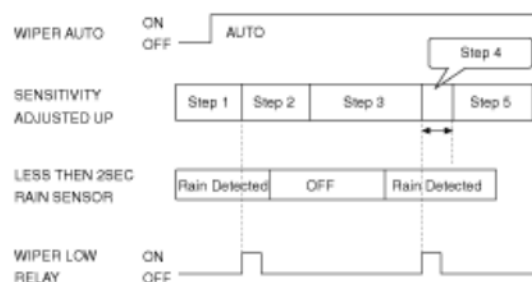
1. In IGN2 ON state, if auto switch input (LIN communication) is ON then both wiper low relay and wiper high relay outputs are controlled by the rain sensor input signal.
2. If the wiper switch has been left in automatic mode with the vehicle ignition OFF, and then the vehicle ignition switch is turned on, a single wipe will be performed.



3. A single wipe will be performed whenever rain has been detected (Rain Detected signal from Rain sensor) and the wiper switch is moved to the AUTO position. But a single wipe will not be performed when the wiper switch is moved to the AUTO position and OFF signal is being received from Rain sensor. But if the wiper switch is moved to AUTO position for the first time since vehicle ignition switch is turned on then a single wipe will be performed regardless of Rain Detected or OFF signal.



4. The drive may adjust the rain sensor performance by adjusting the sensitivity input. When in automatic mode, the BCM will perform a single wipe each time the sensitivity is adjusted upward to a more sensitive setting (downward more than one step). This single wipe will only be performed if Rain Detected signal is being received from the Rain sensor. If the sensitivity adjustment is adjusted upward more than one sensitivity, the BCM will only perform a single wipe unless the time between Increases is more than 2 seconds.

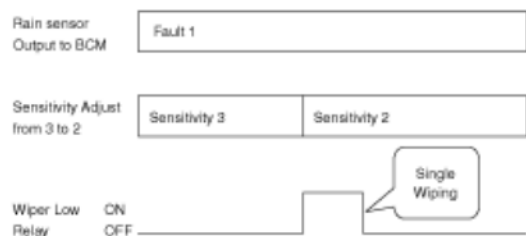


5. Fault strategy for the rain sensor

Rain Sensor Fault 1 - Internal Fault Detected

This failure is detected when the wiper is in automatic mode and the input faulty rain sensor from the rain sensor has a duty cycle corresponding to Fault 1. The confirmation delay for the failure is of 1 sec.

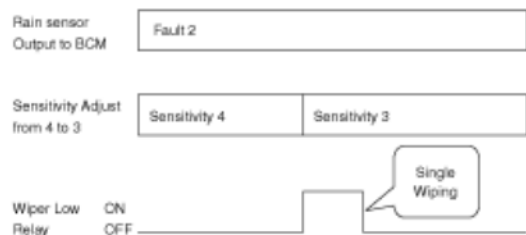
When this failure is detected, the wiper outputs are OFF and the wiper will also do a wipe in slow speed on the transition from sensitivity 3 to sensitivity 2 (Step 2 to 3) in order to signal the presence of this fault. If another sensitivity is set, the wiper won't make any additional wipe.



Rain Sensor Fault 2 - Glass Attachment Fault Detected

This failure is detected when the wiper is in automatic mode and the input faulty rain sensor from the rain sensor has a duty cycle corresponding to Fault 2. The confirmation delay for the failure is of 1 s.

When this failure is detected, the wiper outputs are OFF and the wiper will also do a wipe on the transition from sensitivity 4 to sensitivity 3 (Step 1 to 2) in order to signal the presence of this fault. If another sensitivity is set, the wiper won't make any additional wipe.



Rain Sensor Fault 3 - No Input Signal Present

This failure is detected when the wiper is in automatic mode and the input faulty rain sensor from the rain sensor has a duty cycle corresponding to Fault 3 or in case the duty cycle of the input faulty rain sensor is 0% or 100%. The confirmation delay for the failure is of 1 s.

When this failure is detected, the wiper outputs are OFF.

REMOVAL

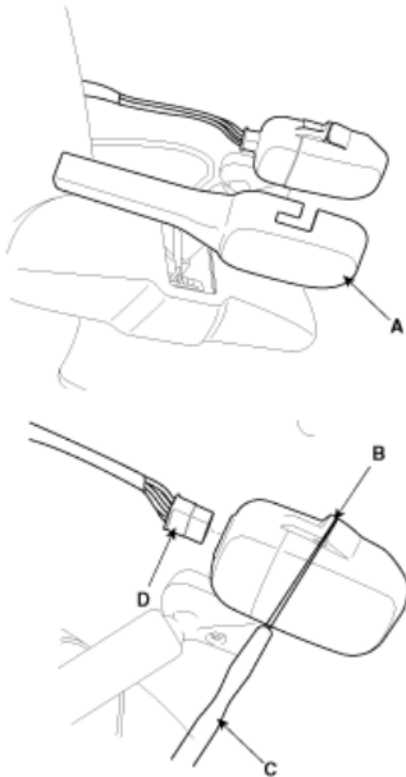
⚠ CAUTION

The dust or foreign substance on the rain sensor have a bad effect upon the rain sensor capability,so protect the sensor surface with protection cover until installing the rain sensor to bracket for accurate funtion.

The coupling pad on the rain sensor surface has adhereive strength, so the coupling pad could stick to the windshield by environment condition during the using time.

If separate it by force, it could be damaged. So make sure to separate the rain sensor from the windshield carefully.

1. Remove the rain sensor cover(A) first. Be careful not to damage the cover latch by applying excessive force. To remove the latch, pull aside the latch using the cover hole (B) with the little (-) screwdriver (C).



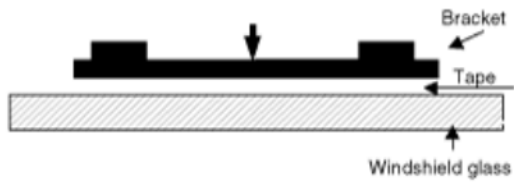
2. Remove the wiring harness connector (D) from sensor.
3. Rain sensor module is attached to the front windshield by glue replacing the front windshield, remove the rain sensor module from the existing front windshield and install on the new front windshield.

INSTALLATION

NOTICE

- In case of the windshield with reflection layer which reflects the infrared rays in sensing field, should install the rain sensor into the field removed the reflection layer.
- Install the rain sensor after some time and be care not to be settled the dust after installation.

1. Install the rainsensor bracket to the windshield glass using the tape.



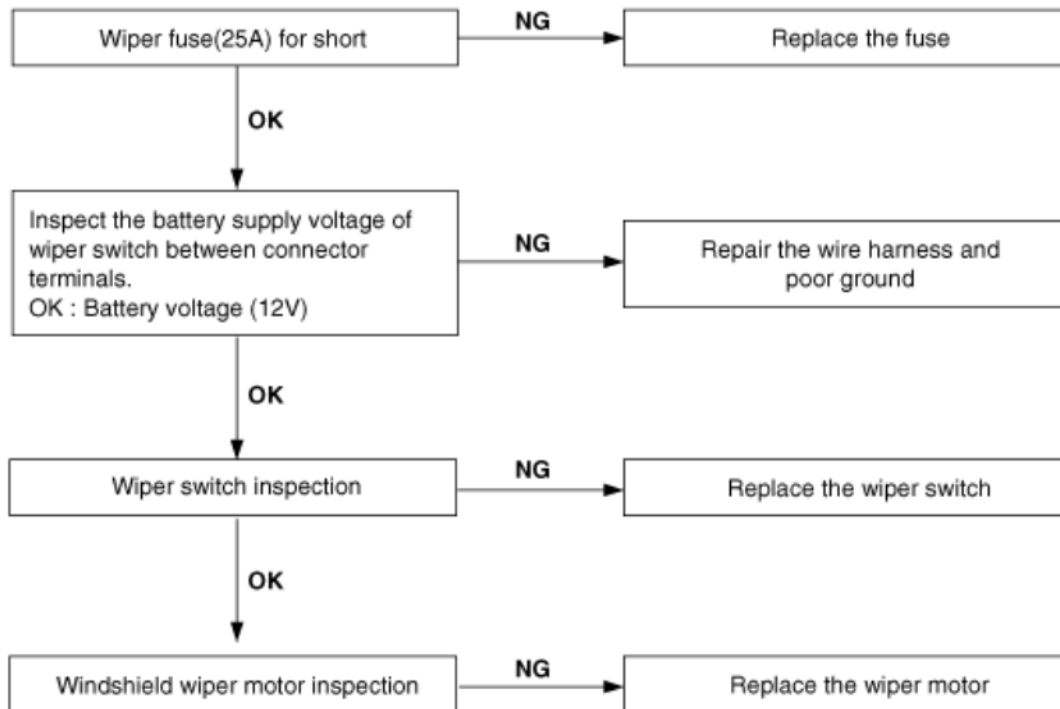
⚠ CAUTION

It is very important that the coupling pad pushes the windshield completely to stick to each other without bubbles.

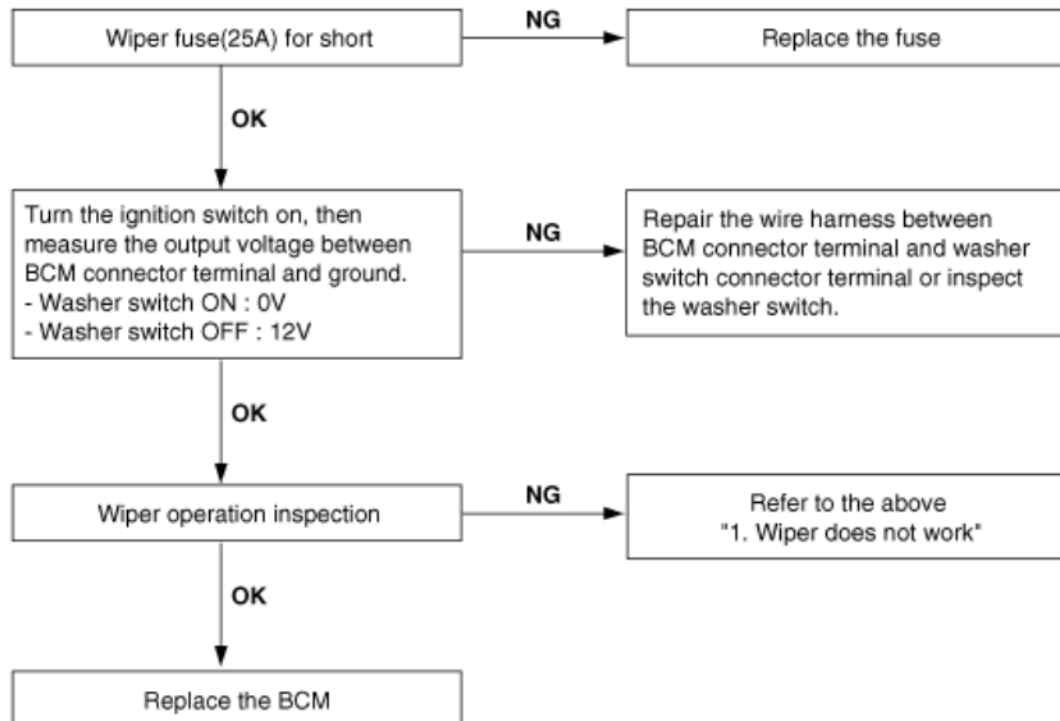
2. Connect the rainsensor connector, and then install the sensor cover.

TROUBLESHOOTING

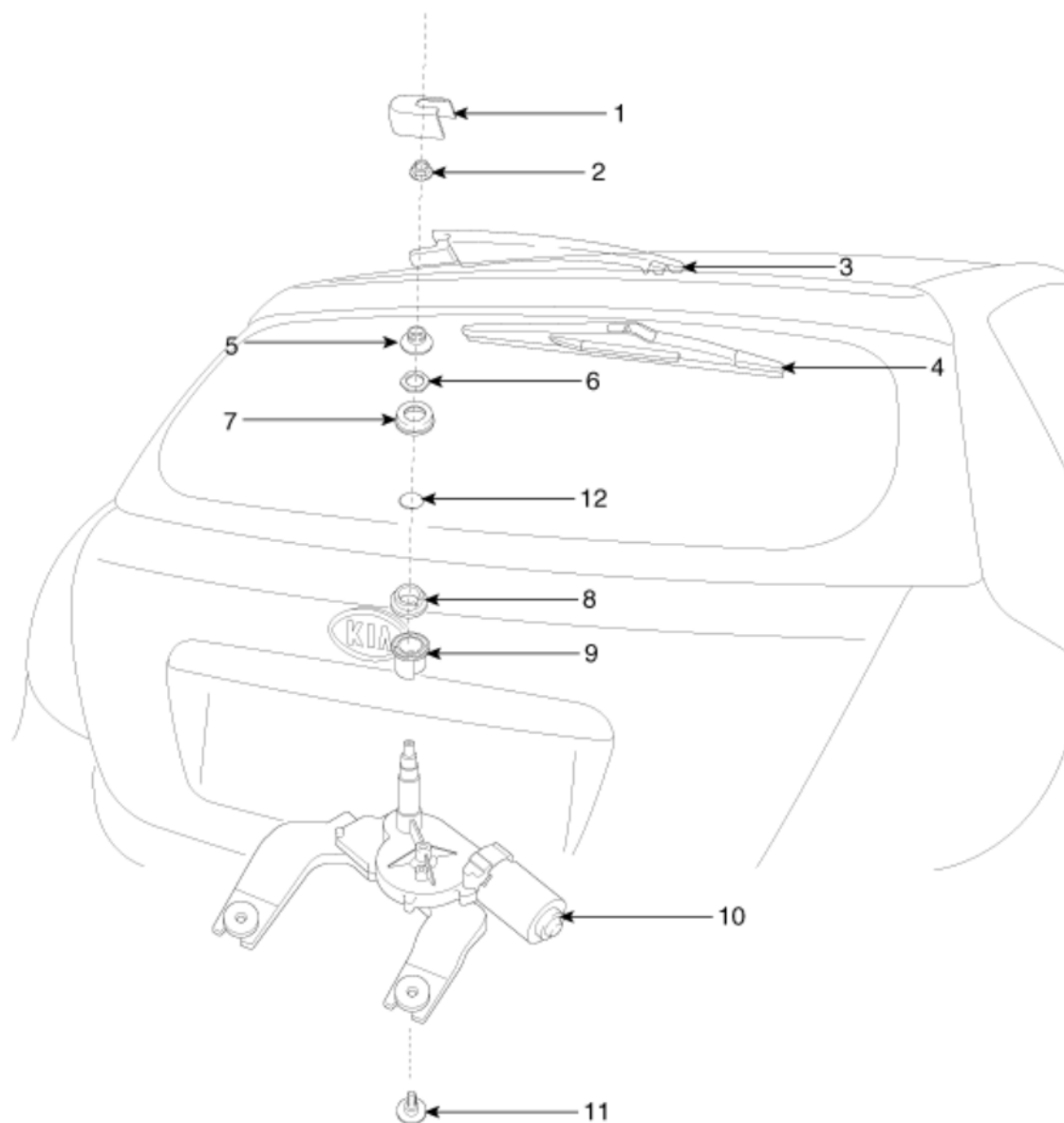
1. Wiper low and wiper high do not work.



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



COMPONENT LOCATION



TORQUE : N.m (kg.cm, lb.ft)

1. Head cap
2. Nut
3. Rear wiper arm
4. Rear wiper blade
5. Cover
6. Nut

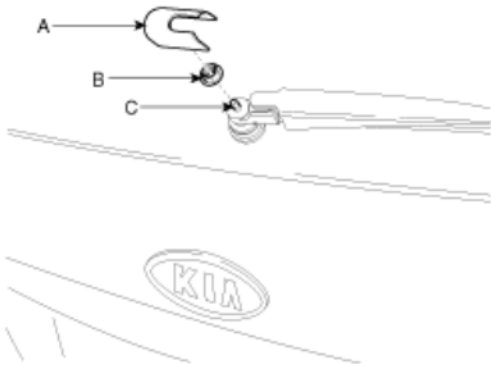
7. Rear wiper cap & Pad
8. Pad
9. Support
10. Rear wiper motor assembly
11. Bolt
12. Glass hole

REPLACEMENT

1. Detach the wiper cap (A), then remove the rear wiper arm (C) after removing a nut (B).

Tightening torque Nut(B) :

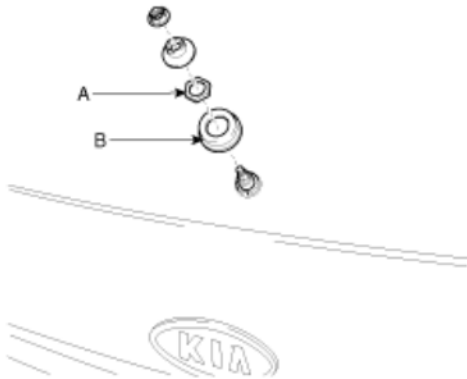
10~14 Nm (1.0~1.4 kgf.m, 7~10 lbf.ft)



2. Remove the rear wiper cap & pad (B) after removing a nut (A).

Tightening torque Nut (A) :

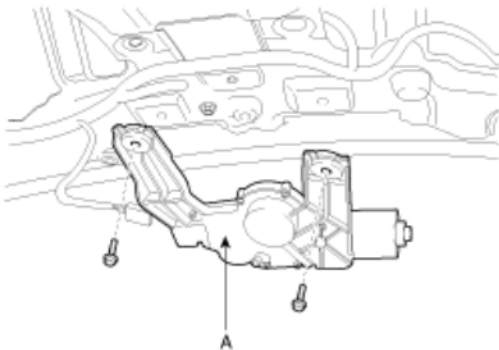
10~14 Nm (1.0~1.4 kgf.m, 7~10 lbf.ft)



3. Open the tailgate then remove the tailgate trim.
4. Disconnect the rear wiper motor connector then remove the rear wiper motor (A) after removing 2 bolts.

Tightening torque Nut :

10~14 Nm (1.0~1.4 kgf.m, 7~10 lbf.ft)

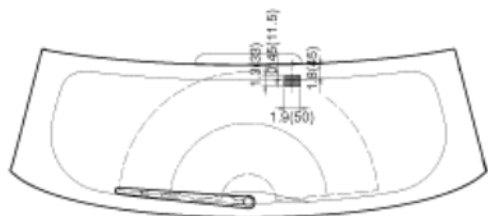


5. Installation is the reverse of removal.

INSPECTION

Rear Wiper And Nozzel Setting

1. Set the rear washer nozzle on the specified spray position.

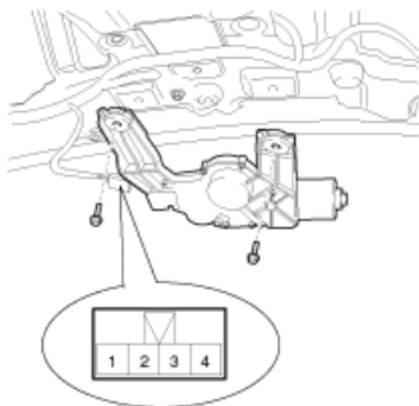


Unit : in(mm)

2. Set the rear wiper blade and to the lowest defogger heat line and tailgate glass.

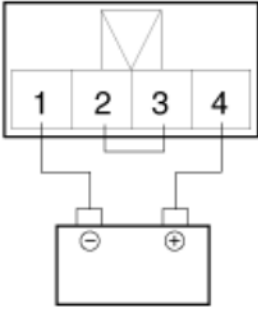
Rear Wiper Motor

1. Remove the 4P connector from the rear wiper motor.
2. Connect battery positive (+) and negative (-) cables to terminals 4 and 1 respectively.
3. Check that the motor operates normally. Replace the motor if it operates abnormally.
(1. GND, 2. Switch, 3. Parking, 4. B+)



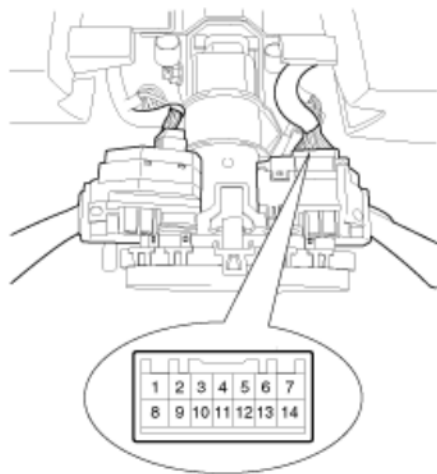
Automatic Stop Operation Check

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 2.
3. Connect terminals 2 and 3.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1.
5. Check that the motor stops running at the off position.



INSPECTION

1. With the rear wiper & washer switch in each position, make sure that continuity exists between the terminals below. If continuity is not as specified, replace the multifunction switch.



Rear Wiper & Washer Switch

() : RHD

Terminal Position	4(5)	3(4)	2(3)	1(2)
WIPER				
OFF				
INT				
ON				
WASHER				

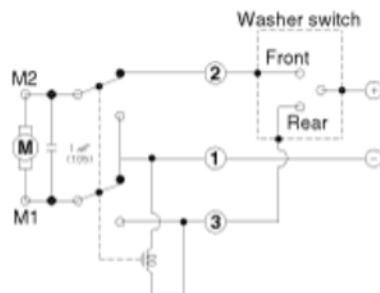
INSPECTION

1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Remove the front bumper cover. (Refer to the BD group- Front bumper)
3. Connect positive (+) and negative (-) battery cables to terminals 3 and 1 respectively to see that the washer motor runs and water is pumped.
4. Check that the motor operates normally.
Replace the motor if it operates abnormally.



[Front & Rear washer]

1. Windshield washer (+)
2. Ground
3. Rear washer (+)

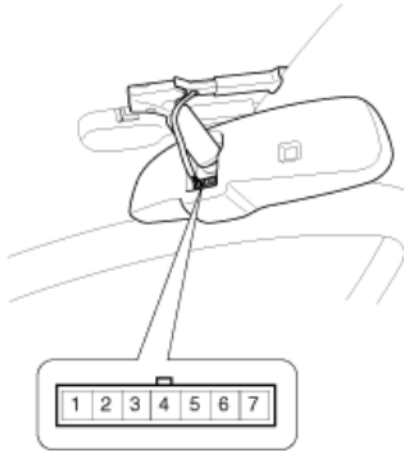


<Windshield & Rear washer motor>

DESCRIPTION

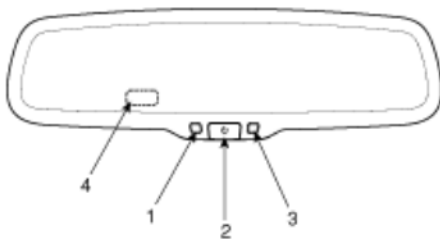
The ECM (Electro Chromic inside rear view Mirror) is for dimming the reflecting light from a vehicle behind at night, in order the user not to be dazzled by the light. The front looking sensor detects brightness of the surroundings, while the rearward looking sensor the strength of the reflecting light so that adjusts the reflexivity of the mirror in the range of 10~70%. But, when the reverse gear is engaged, it stops functioning.

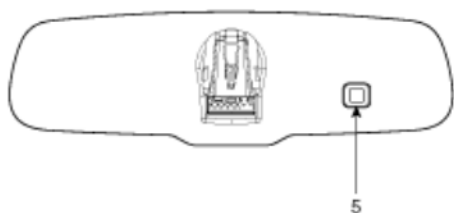
(1. IGN(12V), 2. Reverse gear signal, 3. GND)



1. The front looking sensor sees if the brightness of the surroundings is low enough for the mirror to operate its function.
2. The rearward looking sensor detects glaring of the reflecting light from a vehicle behind.
3. The ECM is darkened to the level as determined by the rearward looking sensor. When the glaring is no longer detected, the mirror stops functioning.

(1. Status indicator LED, 2. Bottom, 3. Rear indicator, 4. Front light sensor, 5. Front light sensor)





AUTOMATIC-DIMMING FUNCTION

To protect your vision during nighttime driving, your mirror will automatically dim upon detecting glare from the vehicles traveling behind you. The auto-dimming function can be controlled by the Dimming ON/OFF Button :

1. Pressing and holding the Feature Control button for more than 3 but less than 6 seconds turns the auto-dimming function OFF which is indicated by the green Status Indicator LED turning off.
2. Pressing and holding the Feature Control button again for more than 3 but less than 6 seconds turns the auto-dimming function ON which is indicated by the green Status Indicator LED turning on.

NOTICE

The mirror defaults to the "ON" position each time the vehicle is started.

INSPECTION

Check it by the procedure below to see if the function of the ECM is normal.

1. Turn the ignition key to the "ON" position.
2. Cover the forward looking sensor to stop functioning.
3. Head a light to the rearward looking sensor.
4. The ECM should be darkened as soon as the rearward looking sensor detects the light.

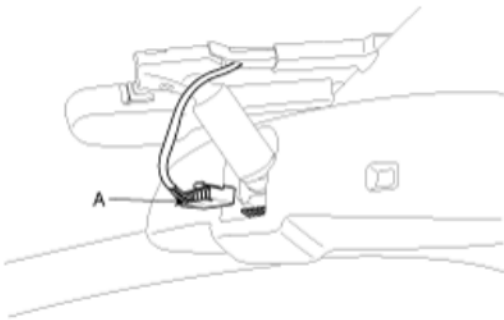
NOTICE

If this test is performed in daytime, the ECM may be darkened as soon as the forward looking sensor is covered.

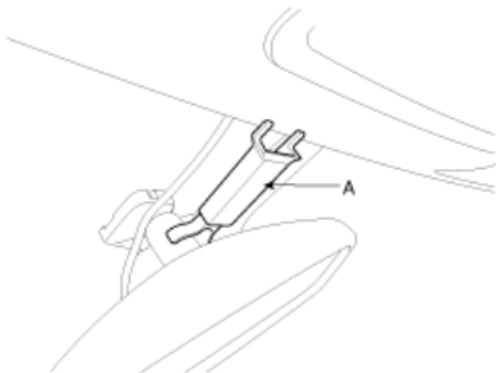
5. When the reverse gear is engaged, the ECM should not be darkened.
When heading lights to both the forward looking and rearward looking sensors, the ECM should not be darkened.

REMOVAL

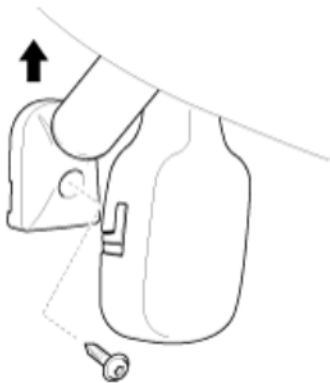
1. Disconnect the inside rear view mirror connector(A).



2. Remove the mirror wire cover(A).



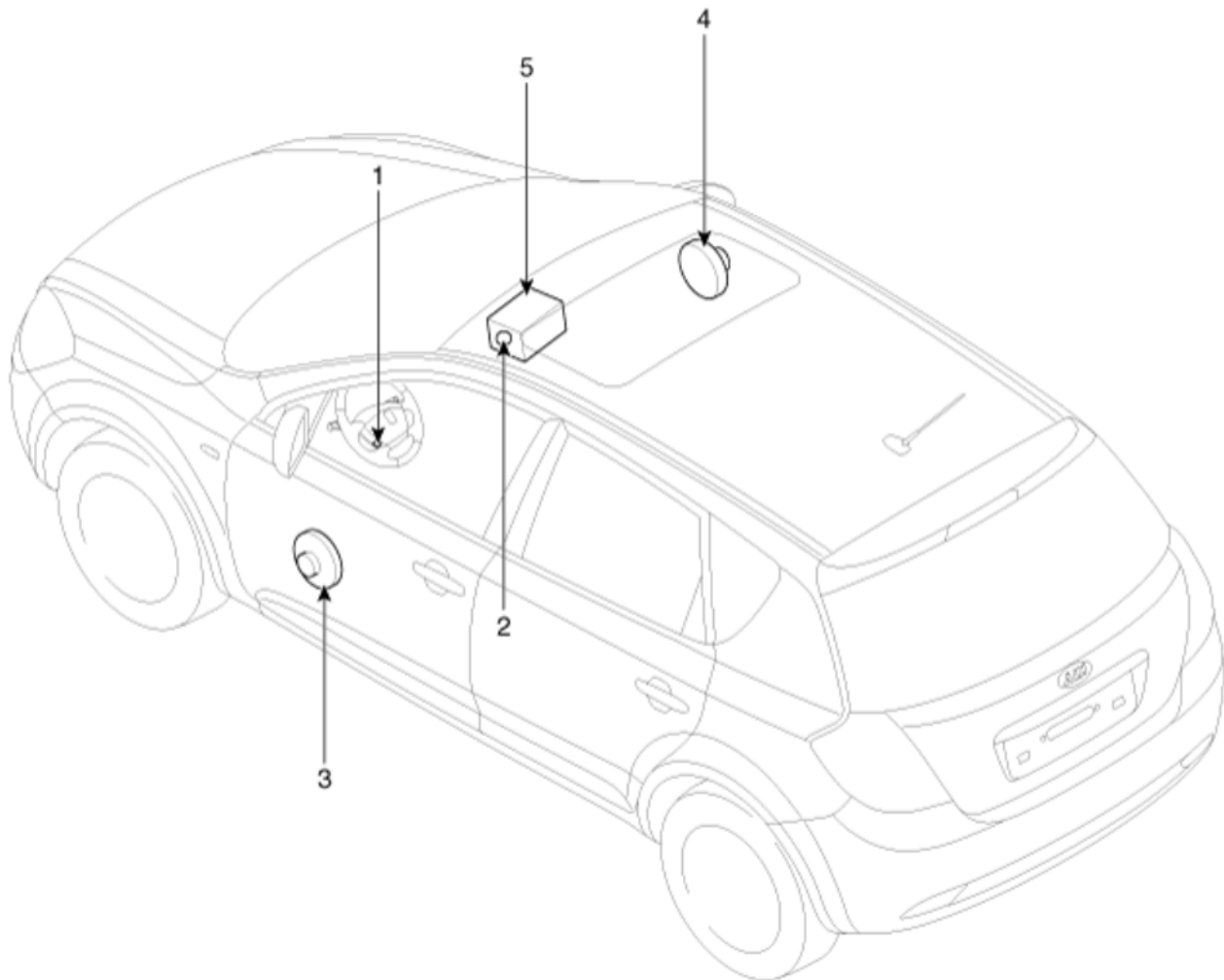
3. Remove the inside rear view mirror pulling it upside carefully after loosening the mirror base mounting screw.



INSTALLATION

1. Install the inside rear view mirror.
2. Install the mirror wire cover.
3. Connect the inside rear view mirror connector.

COMPONENTS



- 1. Hands free call switch
- 2. Mic
- 3. Front left speaker

- 4. Front right speaker
- 5. Audio head unit (hands free control)

※ There is no hands free jack. This system supports Bluetooth(wireless system).

FUNCTION

Bluetooth

You can use a Bluetooth device in your car to make a hands-free phone call or to stream music onto your in-car speakers (via this Head Unit). This Head Unit supports HFP, A2DP and AVRCP connection.

Advanced Audio Distribution Profile (A2DP)

This profile defines how high quality audio (stereo or mono) can be streamed from one device to another over a Bluetooth connection. For example: music streamed from a mobile phone to a wireless headset or car audio.

Audio/Video Remote Control Profile (AVRCP)

This profile is designed to provide a standard interface to control TVs, Hi-fi equipment, etc. to allow a single remote control (or other device) to control all of the A/V equipment to which a user has access. It may be used in concert with A2DP or VDP.

Hands-Free Profile (HFP)

This is commonly used to allow car handsfree kits to communicate with mobile phones in the car.

Notes for mobile phones

Some functions (e.g. starting of speech recognition) are not supported by all mobile phones. We cannot guarantee that all functions described will be supported by all mobile phones with Bluetooth.

New device

This function allows you to add a new phone to the Head Unit's Bluetooth Device List. Maximum of 5 devices can be added to the list. If the list is full, the oldest device will be replaced by the newly added Bluetooth device, based on last pairing date.

Pairing

To pair your Bluetooth-enabled device to this Head Unit, make sure that no device is currently streaming to this Head Unit first.

- Short press the SETUP button to enter the Setup menu.
- Short press the ▼ or ▲ button to access the Bluetooth sub-menu.
- Now select "New Device".
- Press the ▼ or ▲ button to select the number of the first digit.
- Press the < or > button to select the next digit.
- Repeat the above steps for the other three digits.
- Press the OK button to confirm the 4-digit PIN for authentication and activate the "Discoverable Mode".
- In "Discoverable Mode" the Head Unit broadcasts a Bluetooth ID.
- Look for the "KIA-BLUETOOTH" on your Bluetooth device.
- Enter identically the same PIN in your Bluetooth device and authenticate pairing on your Bluetooth device.
- When pairing is established, the ID of the Bluetooth device and the service list info will be stored in the Head Unit Bluetooth Device List.

Device List

With this function you can browse through and select Bluetooth devices that are stored in the Head Unit Bluetooth Device List.

- Short press the SETUP button to enter the Setup menu.
- Short press the ▼ or ▲ button to access the Bluetooth sub-menu.
- Press the > button to browse the Device List to select the required device.
- Press the OK button to start pairing between the selected device and the Head Unit.

Whenever there is at least one connected device active, in the display the Bluetooth icon is visible.

Delete Device

This function allows you to delete a Bluetooth device ID from the Head Unit Bluetooth Device List.

- Short press the SETUP button to enter the Setup menu.
- Short press the ▼ or ▲ button to access the Bluetooth sub-menu.
- Press the > button to select Delete Device.
- Press the OK button to delete the selected device from the Head Unit Bluetooth Device List.

Phone Volume

- Short press the SETUP button to enter the Setup menu.
- Short press the ▼ or ▲ button to access the Bluetooth sub-menu.
- Select the option "Phone Volume".
- Press the < or > button to decrease or increase the phone volume setting.
Default setting: 12
Setting range: 3 ... 25
- During an ongoing call, user is allowed to adjust the BT Phone volume. The adjusted volume is memorized into Phone Volume setting.

Answering a Call

- Press the Call button on the Steering Wheel Remote Control to accept an incoming call.

Terminate / Reject Call

- Press the End Call button on the Steering Wheel Remote Control to terminate or reject a call.

Last Call Re-dial

- Short press the Call button on the Steering Wheel Remote Control to re-dial last dialled number (one attempt).
- Long press the Call button on the Steering Wheel Remote Control to re-dial last dialled number (two attempts).

Private Call

This function allows you to have a private call even if the phone is connected to the Head Unit.

- Press the Call button on your phone to start a private call.

OR

- Press the End Call button on your phone to end a private call.

Transferring a Call

This function allows you to transfer a call during an ongoing call.

- From the tuner to the phone
- From the phone to the tuner
- Long press the Call button on the Steering Wheel Remote Control to transfer the ongoing call back to the phone or back to the tuner again.

Audio Streaming

Start Audio Streaming

This function allows the Head Unit to start streaming music from phone.

- The Bluetooth device must be connected with the Head Unit.

- Press the AUX button and select BT AUDIO.
- The Head Unit starts streaming the audio from the phone and will start playing the audio files.
- The Head Unit has no control on the sequence of track playback in phone.

Next/Previous Track

This function allows you to select the next/ previous track of phone's music player by using the next/previous track buttons on the Head Unit or Steering Wheel Remote Control.

- Short press the < or > button on the Head Unit or the Steering Wheel Remote Control.

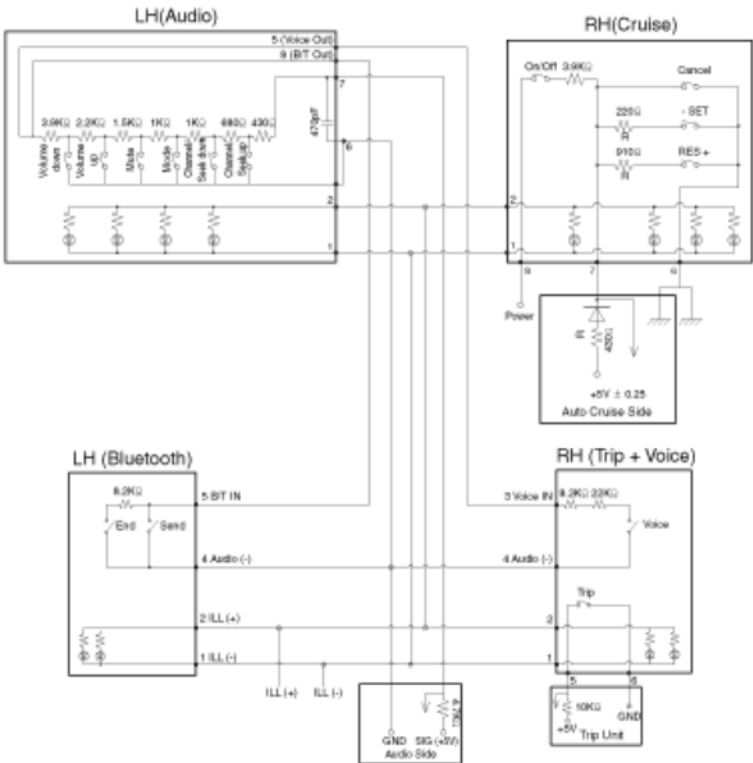
Suspend Audio Streaming

This function allows you to suspend streaming music from the phone to the Head Unit.

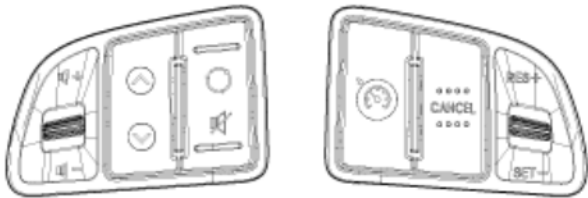
- Short press the Mute button on the Steering Wheel Remote Control.
- Press the AUX button and de-select BT AUDIO.

CIRCUIT DIAGRAM

[Audio + Auto cruise + Bluetooth hand free + Voice + Trip]



Audio system + Auto cruise

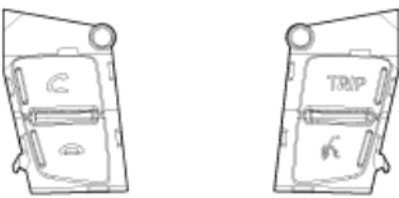


LH

RH

NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	ACC ground
7	Audio (+)	7	ACC signal
8	Bluetooth out	8	ACC power

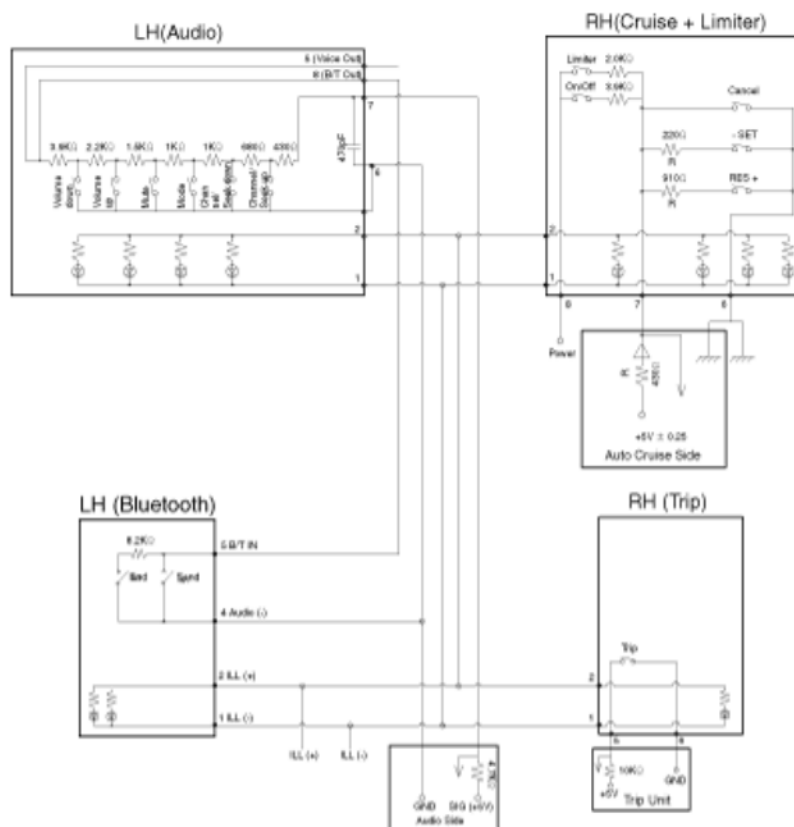
Bluetooth switch + Trip/Voice switch



LH

RH

NO	Connector	NO	Connector
1	ILL (-)	1	ILL (-)
2	ILL (+)	2	ILL (+)
3	-	3	Voice in
4	Audio (-)	4	Audio (-)
5	Bluetooth in	5	Trip in
6	-	6	Trip ground



Audio system + Auto cruise/Limiter

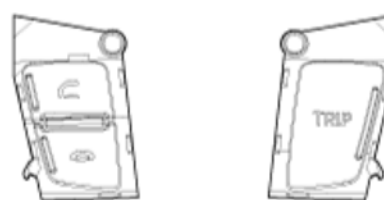


LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	ACC/Limiter ground
7	Audio (+)	7	ACC/Limiter signal
8	Bluetooth out	8	ACC/Limiter power

Bluetooth switch + Trip switch

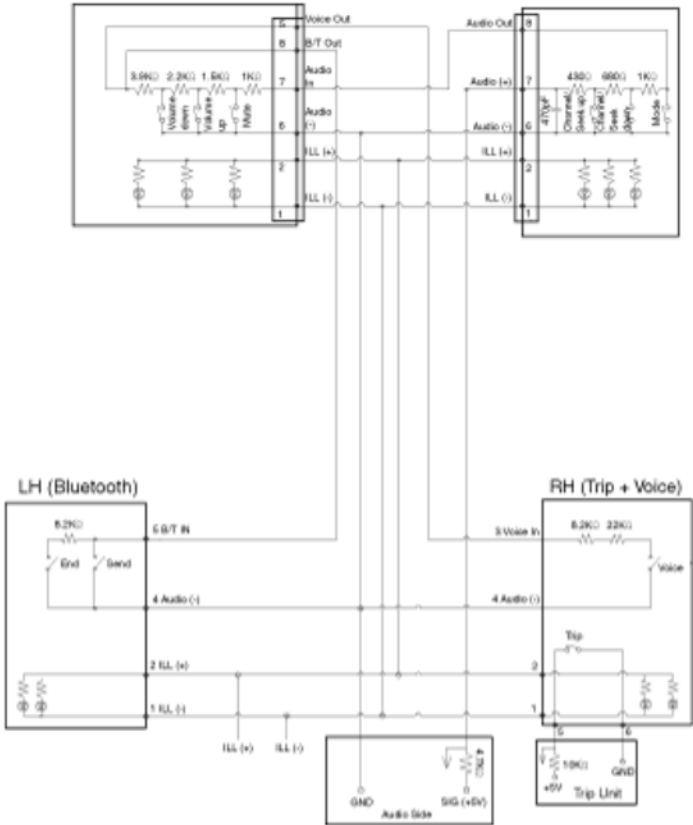


LH

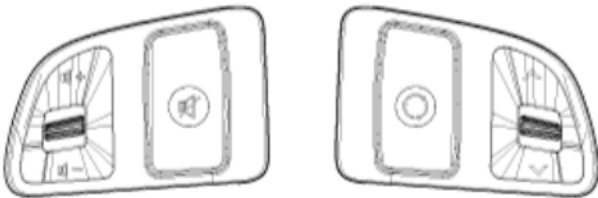
RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	Audio (-)	4	-
5	Bluetooth in	5	Trip in
6	-	6	Trip ground

[Audio + Bluetooth hand free + Voice + Trip]



Audio system

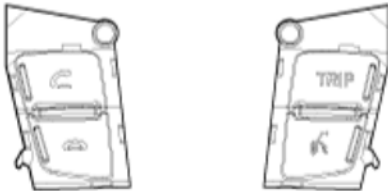


LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	-
4	-	4	-
5	Voice out	5	-
6	Audio (-)	6	Audio (-)
7	Audio in	7	Audio (+)
8	Bluetooth out	8	Audio out

Bluetooth switch + Trip/Voice switch



LH

RH

LH		RH	
NO	Connector	NO	Connector
1	Illumination (-)	1	Illumination (-)
2	Illumination (+)	2	Illumination (+)
3	-	3	Voice in
4	Audio (-)	4	Audio (-)
5	Bluetooth in	5	Trip in
6	-	6	Trip ground

INSPECTION

1. Check the hands free remote control switch for resistance between No.3 and No.4 terminals in each switch position.



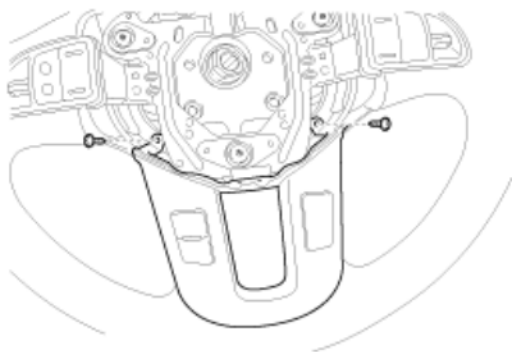
Switch	Connector terminal	Resistance (±5%)
SEND	4 - 5 (LH)	10.71 kΩ
END	4 - 5 (LH)	18.91 kΩ

REMOVAL

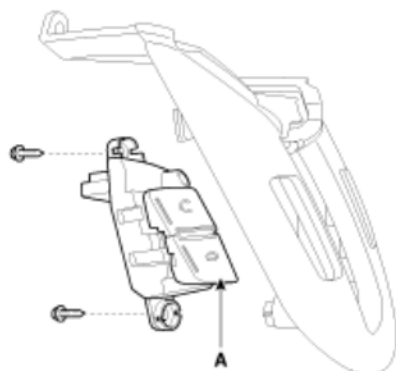
1. Disconnect the negative (-) battery terminal.
2. Remove the driver airbag module (A).
(Refer to the RT group)



3. Remove the steering wheel lower cover after loosening the 2 screws.



4. Remove the hands free remote control switch (A) after removing the steering wheel remote control switch connector (B) and 2 screws.



INSTALLATION

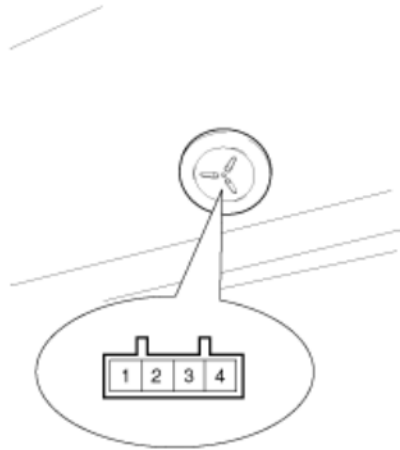
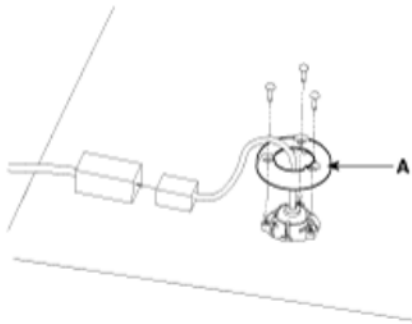
1. Reassemble the steering wheel remote control switch after connecting the connector.
2. Reassemble the steering wheel.
3. Reassemble the driver airbag module.

NOTICE

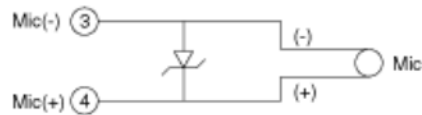
Make sure the hands free remote control switch and the airbag module connectors are plugged in properly.

INSPECTION

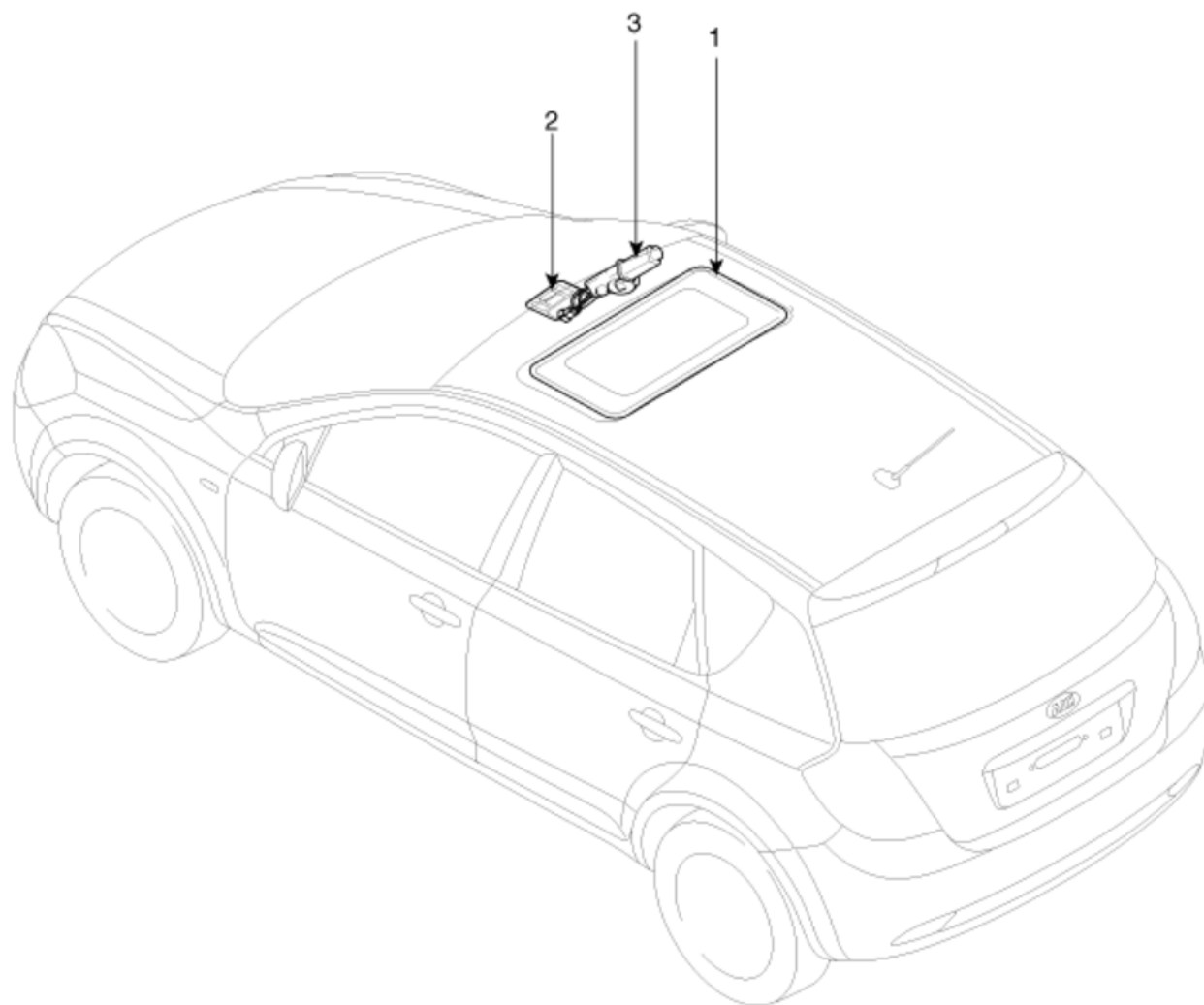
1. Disconnect the negative(-) battery terminal.
2. Remove the roof trim (A).
(Refer to the BD group - "Roof trim")
3. Remove the hands free mic (A) after loosening the connector and screw (3EA) from loof top.



4. Check the continuity of Mic between terminals.

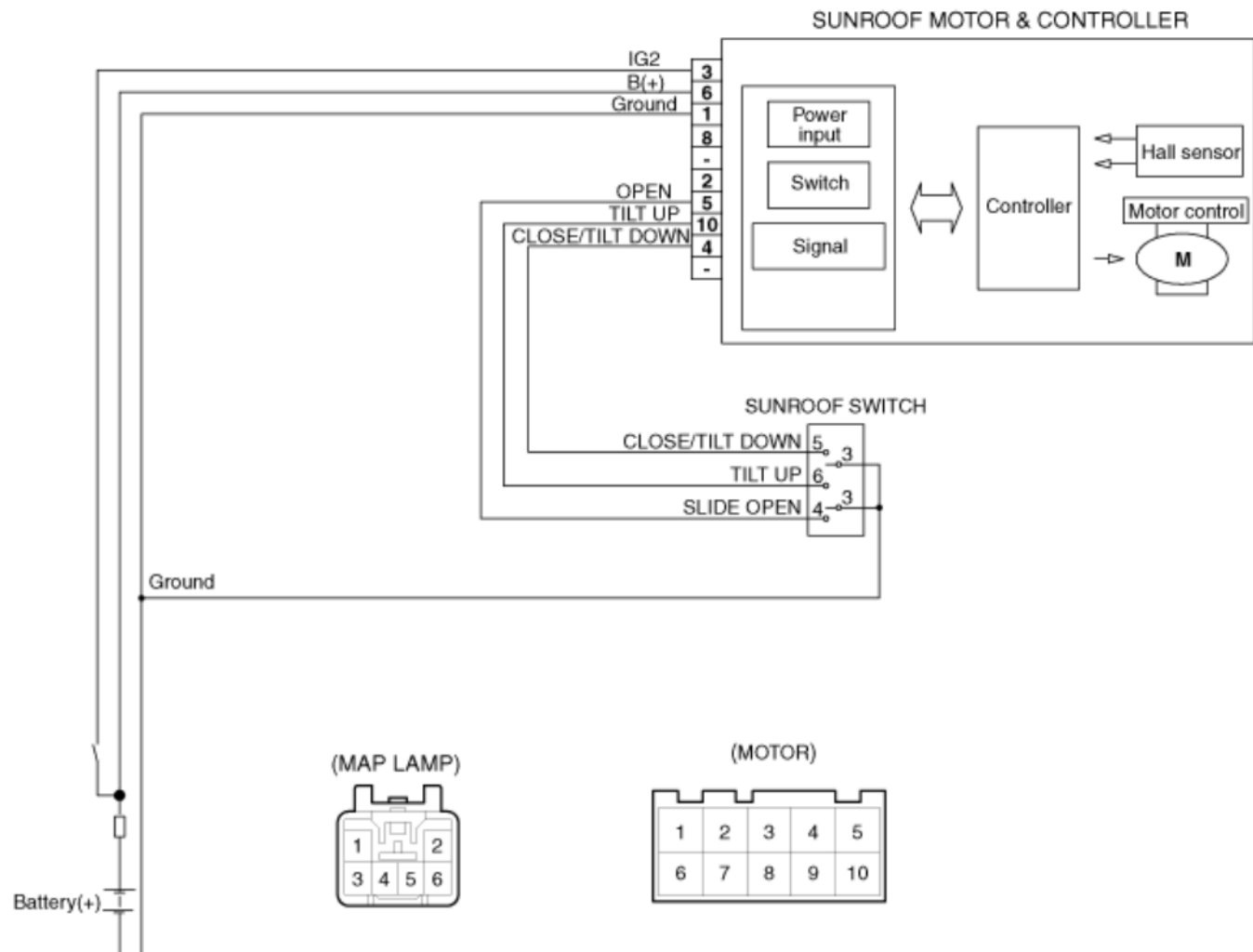


COMPONENT LOCATION



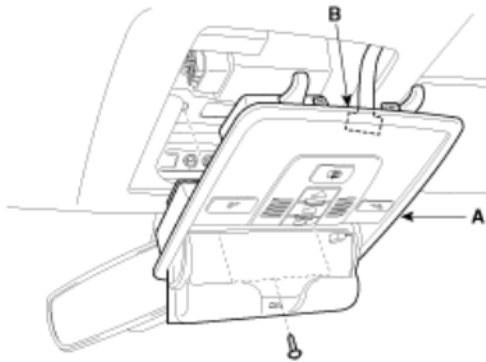
- 1. Sunroof
- 2. Sunroof switch

- 3. Sunroof motor & controller

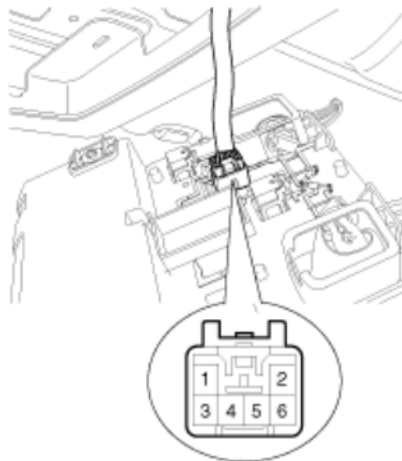
CIRCUIT DIAGRAM

INSPECTION

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



3. Check for continuity between the terminals. If the continuity is not as specified, replace the sunroof switch.



[Switch side connector]

Terminal	3	4	5	6
Position				
TILT UP	○	—	—	○
CLOSE/ TILT DOWN	○	—	○	
SLIDE OPEN	○	○		

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the overhead console then remove the sun roof motor mounting screws (3EA). And then remove the sunroof motor after disconnecting the connector (10 Pin).



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

Position \ Terminal	3	4	5	10
TILT UP	⊕			⊖
SLIDE CLOSE/DOWN	⊕	⊖		
SLIDE OPEN	⊕		⊖	

4. Make these input tests at the connector
if any test indicates a problem, find and correct the cause, then recheck the system.
If all the input tests prove OK, the sunroof motor must be faulty; replace it.

Terminal	Test condition	Test : Desired result
3	IG2 ON	Check for voltage to ground : There should be battery voltage
1	Under all conditions	Check for continuity to ground : There should be continuity.
6	Under all conditions	Check for voltage to ground : There should be battery voltage.

Resetting The Sunroof

Whenever the vehicle battery is 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. According to the position of the sunroof, do as follows.
 - (1) In case that the sunroof has closed completely or been tilted :
Press the TILT button until the sunroof has tilted upward completely.

(2) In case that the sunroof has slide-opened :

Press and hold the CLOSE button for more than 5 seconds until the sunroof has closed completely.

Press and hold the CLOSE button for more than 5 seconds after the sunroof has closed completely. Press the TILT button until the sunroof has tilted upward completely.

3. Release the TILT button.

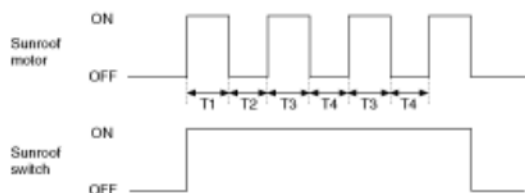
4. Press and hold the TILT button once again until the sunroof has returned to the original position of TILT after it is raised a little higher than the maximum TILT position.

When this is complete, the sunroof system is reset.

Protecting Motor From Overheating

In order to protect the sunroof motor from overheating from continuous motor operation, the sunroof ECU controls the Run-time and Cool-time of the motor as follows:

1. The Sunroof ECU detects the Run- time of motor
2. Motor can be operated continuously for the 1st run-time($120 \pm 10\text{sec.}$).
3. The continuous operation of motor stops after the 1st Run-time($120 \pm 10\text{sec.}$).
4. Then Motor is not operated for the 1st Cool-time($18 \pm 2\text{sec.}$).
5. Motor is operated for the 2nd Run-time($10 \pm 2\text{sec.}$) at the continued motor operation after 1st Cool-time($18 \pm 2\text{sec.}$)
6. The continuous operation of motor stops operating after the 2nd Run-time($10 \pm 2\text{sec.}$)
7. Motor is not operated for the 2nd Cool-time($18 \pm 2\text{sec.}$).
8. Motor repeats the 2nd run-time and 2nd cool-time at the continued motor operation.
 - In case that motor is not operated continuously, the run-time is increased.
 - The Run-Time of motor is initialized to "0" if the battery or fuse is reconnected after being disconnected, discharged or blown.



T1 : $120 \pm 10 \text{ sec.}$, T2 : $18 \pm 2 \text{ sec.}$,

T3 : $10 \pm 2 \text{ sec.}$, T4 : $18 \pm 2 \text{ sec.}$

SPECIFICATION

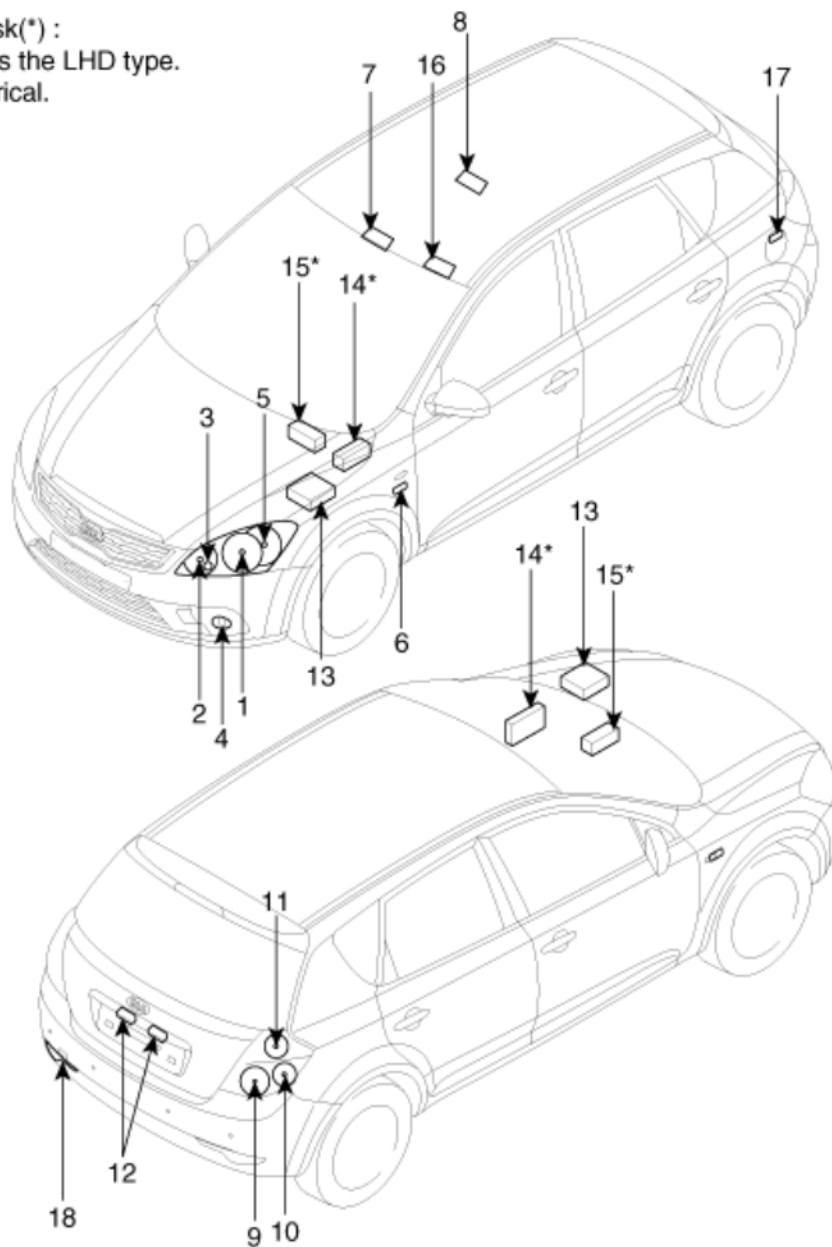
Items	Bulb Wattage (W)
Head lamp (High)	55
Head lamp (Low)	55
Front turn signal lamp	21
Front fog lamp	27
Rear stop/tail lamp (Outside)	21/5
Back up lamp	16
Rear turn signal lamp	21
Rear fog lamp - Europe	21
License plate lamp	5
Side repeater	5
Room lamp	8
Overhead console lamp	10
High mounted stop lamp	1.6
Glove box lamp	5
Map lamp	10

COMPONENT LOCATION

The parts with asterisk(*) :

This illustration shows the LHD type.

RHD type is symmetrical.



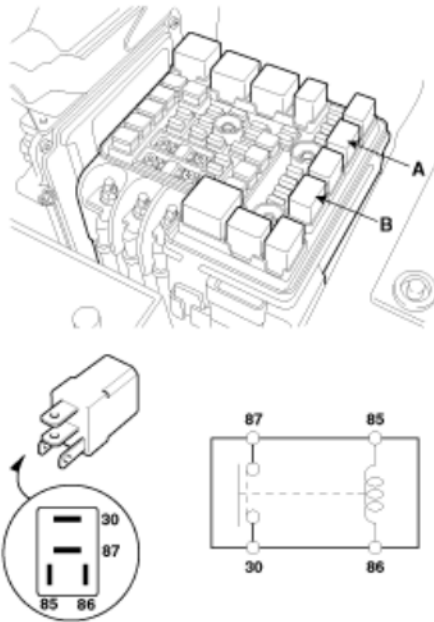
1. Head lamp (Low)
2. Head lamp (High)
3. Position lamp
4. Front fog lamp
5. Front turn signal lamp
6. Side repeater
7. Over head lamp
8. Room lamp(Center)
9. Tail/Stop lamp

10. Rear turn signal lamp
11. Back up lamp
12. License plate lamp
13. Engine room junction box
(Head lamp Low/High, Fog lamp relay)
14. Passenger compartment junction box (Tail lamp relay)
15. ICM relay box (Hazard relay)
16. Vanity lamp
17. Luggage room lamp
18. Rear fog lamp & Rear reflector

INSPECTION

Head Lamp Relay / Front Lamp Relay

1. Disconnect the negative(-) battery terminal.
2. Pull out the relay from the engine compartment relay box.
 A : Head lamp(Low) relay
 B : Head lamp (High) relay

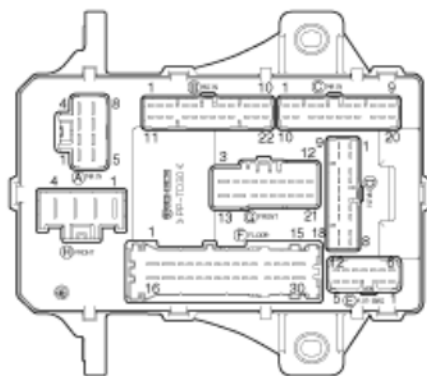


3. Check for continuity between terminals. There should be continuity between the No.87 and No.30 terminals when power and ground are connected to the No.86 and No.85 terminals.
4. There should be no continuity between the No.87 and No.30 terminals when power is disconnected.

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

Tail Lamp

1. Disconnect the negative(-) battery terminal.
2. Remove the crash pad lower panel.
(Refer to the BD group - "Crash pad")
3. Remove the junction box.



4. Check for continuity between the terminals.

- (1) There should be continuity between the No.2 terminal in the I/P-H and the No.15(LH) or 4(RH) terminal in the I/P-G when power and ground are connected to the No.2 terminal in the I/P-H and the No.6 terminal in the I/P-D.
- (2) There should be no continuity between the No.2 terminal in the I/P-H and the No.15(LH) or 4(RH) terminal in the I/P-G when power and ground are connected to the No.2 terminal in the I/P-H and the No.6 terminal in the I/P-D.

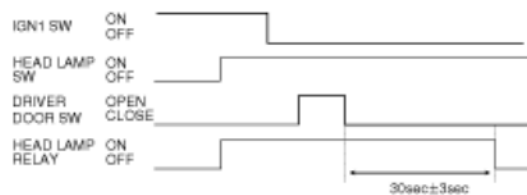
Head Lamp Escort

1. If Head Lamp is lighting by Head Lamp SW or AUTOLIGHT, Head Lamp lighting is maintained when IGN1 is changed ON to OFF.
2. Following stste, Head Lamp lighting is truned off.
But, TAIL LAMP keep up lighting when KEY IN in the condition of lighting off after IGN ON→OFF and lighting.
(the condition of TAIL LAMP lighting off follows TAIL LAMP AUTOCUT function.)
 - When Driver DOOR SW OPEN→CLOSE and after 30sec.
 - When Head Lamp SW ON or not the case of AUTO LIGHT SW ON.
(ALC ; When Head Lamp ON, Head Lamp SW ON within Multi-function SW during ESCORT → Lighting keeping up when SW is moned to AUTO LIGHT SW ON or reverse.)
 - When Driver DOOR OPEN state is maintained after 5minute.
 - When IGN1 ON→IGN OFF and sfter 5minute.
 - When received TX LOCK signal two times during output.

NOTICE

- Head Lamp RELAY output of TIMING CHART contains the condition of TAIL LAMP ON.
- Head Lamp RELAY output by - Head Lamp SW and HEAD LAMP RELAY output by AUTO LIGHT is regarded identical condition.
That is, the explaining of HEAD LAMP RELAY ouput contains two cases.
- AUTO LIGHT SW ON : HEAD LAMP&TAIL LAMP signal by AUTO LIGHT is output.
- AUTO LIGHT SW OFF: HEAD LAMP&TAIL LAMP signal by AUTO LIGHT is not output.

<CASE 1>



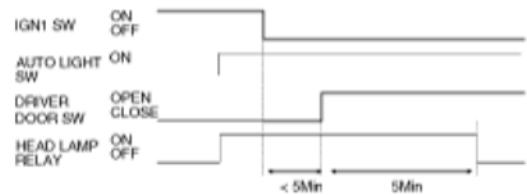
<CASE 2>

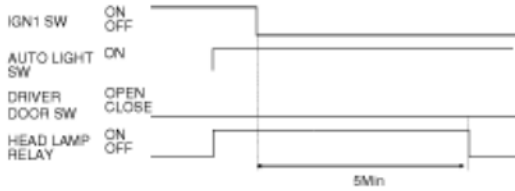


<CASE 3>



<CASE 4>





ADJUSTMENT

Head Lamp Aiming Instructions

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

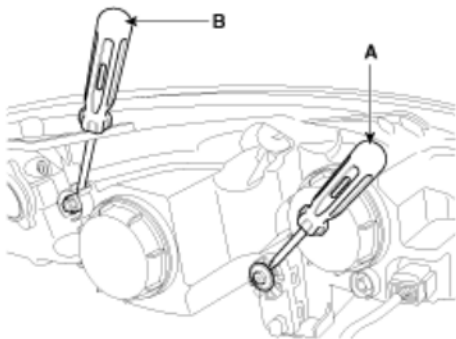
NOTICE

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

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

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

Make vertical (A) and horizontal (B) adjustments to the lower beam using the adjusting wheel.

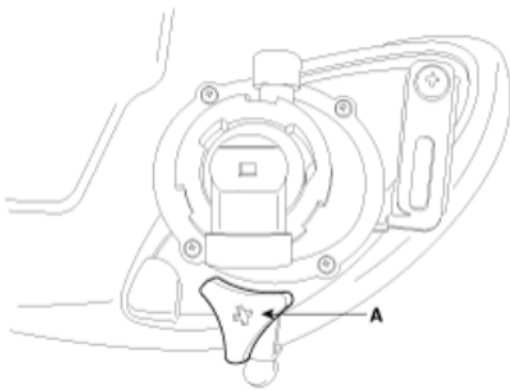


Front Fog Lamp Aiming

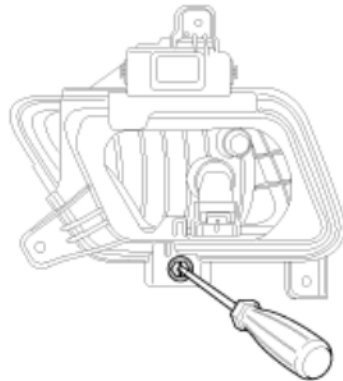
The front fog lamps should be aimed as the same manner of the head lamps aiming.

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

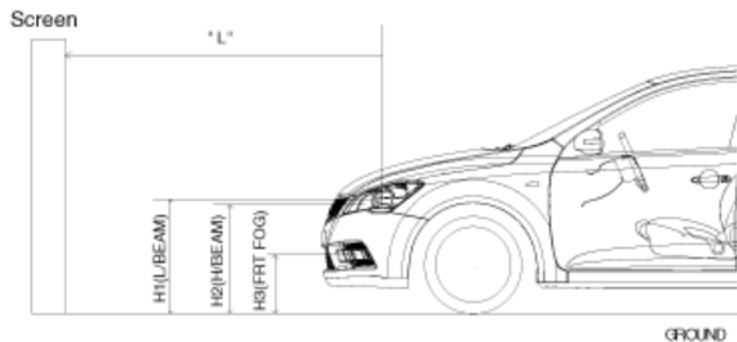
[3Door]



[5Door/Wagon]



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

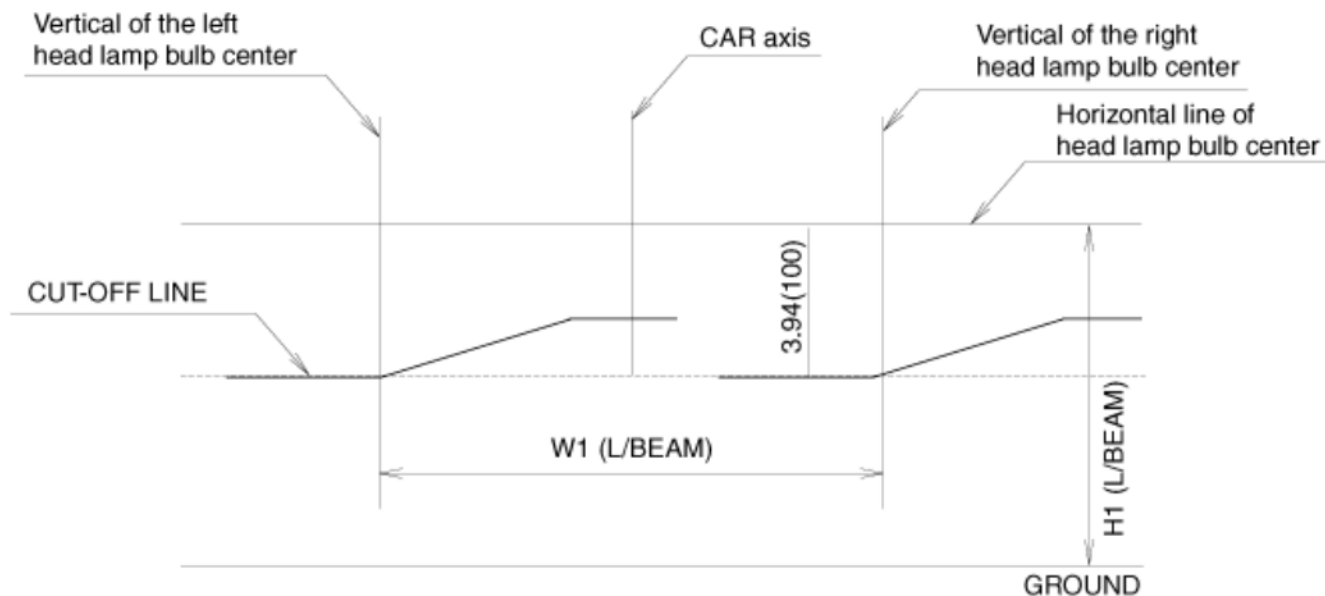
Unit : in (mm)

Vehicle condition	H1	H2	H3	W1	W2	W3	L
Without driver	26.8(681)	26.2(666)	14.2(361)	54.2(1,376)	45.3(1,150)	51.6(1,310)	393.7(10,000)
With driver	26.5(673)	25.9(658)	14.0(358)				

1. Turn the low beam on with driver.

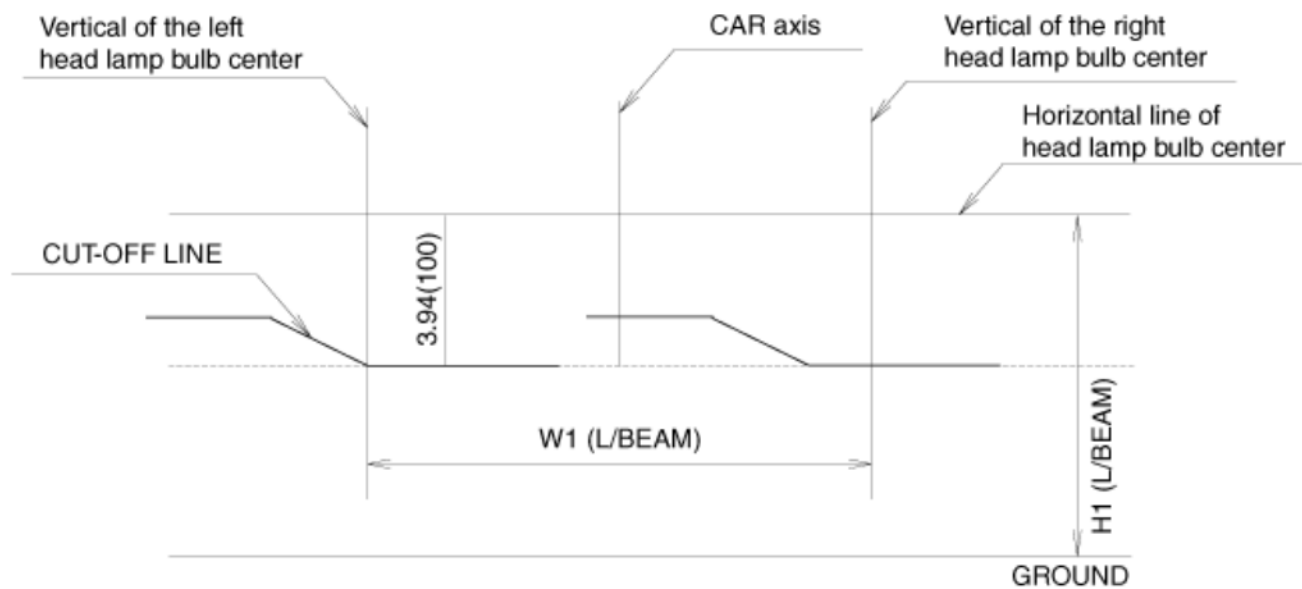
The cut-off line should be projected in the allowable range.
 In case of equipping with the manual leveling device, set the leveling device switch on the "O" position.
 In case of equipping with the auto leveling device, set the initialization by using the diagnostic tool before aiming.

[LHD]



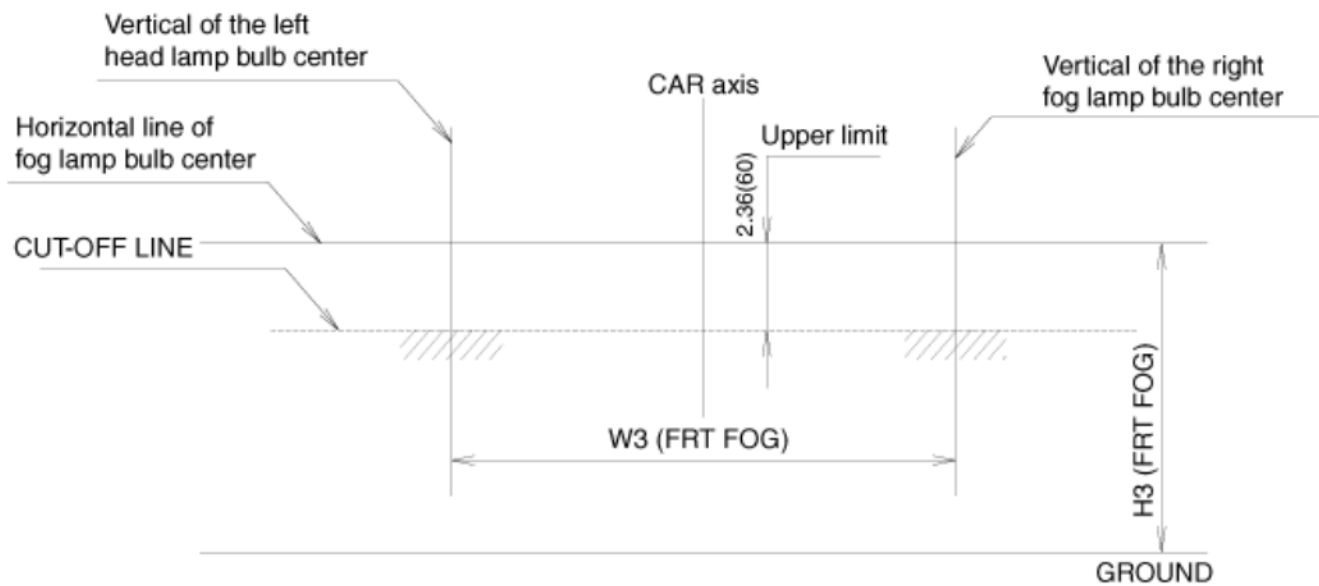
Unit : in.(mm)

[RHD]



Unit : in.(mm)

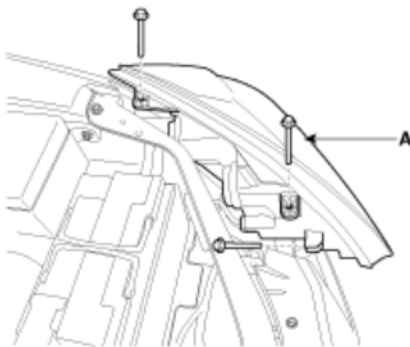
- Turn the front fog lamp on with driver.
 The cut-off line should be projected in the allowable range



Unit : in.(mm)

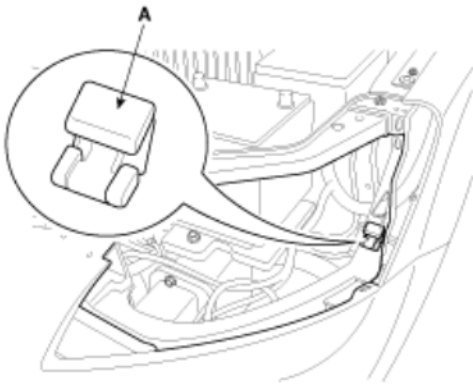
REMOVAL

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



NOTICE

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

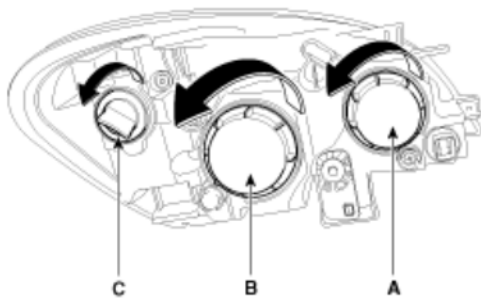


3. Remove the bulb caps from the head lamp assembly.

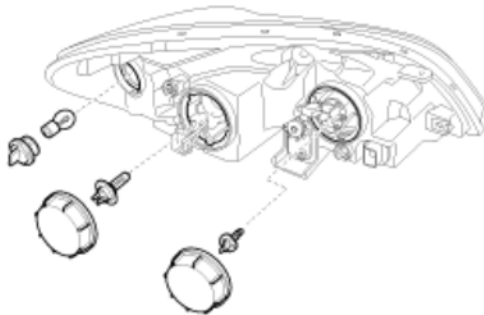
A : Head lamp high bulb & position bulb cap

B : Head lamp low bulb cap

C : Turn signal bulb cap



4. Remove the head lamp bulbs.

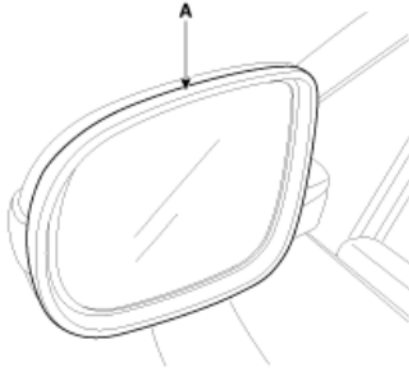


INSTALLATION

1. Install the head lamp bulbs.
2. Install the head lamp bulb caps.
3. Install the head lamp assembly after connecting the lamp connector.

REMOVAL

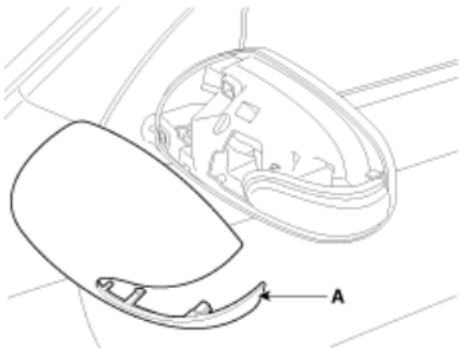
1. Disconnect the negative (-) battery terminal.
2. Remove the mirror (A) from mirror holder.



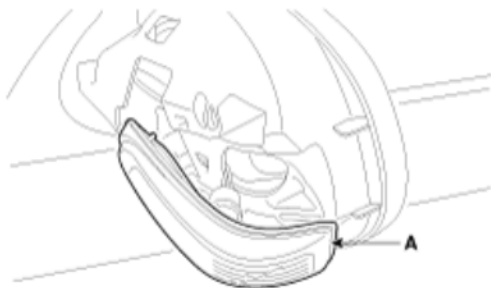
3. Remove the turn signal lamp fixing screw (A).



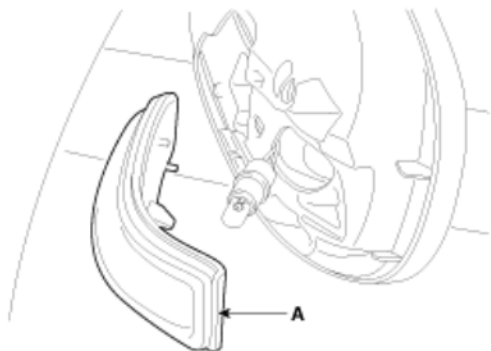
4. Remove the door mirror cover (A).



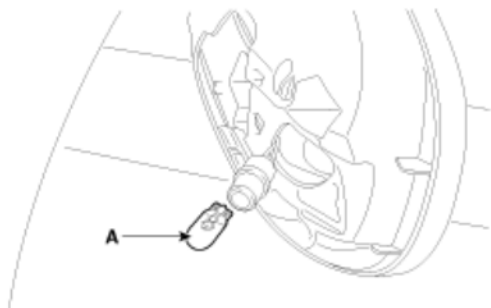
5. Remove the bulb and lens (A) from door mirror.



6. Remove the lens (A).



7. Replace the bulb (A).

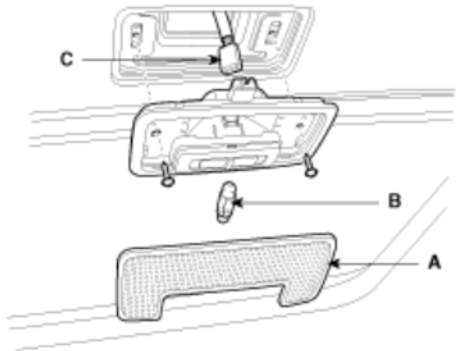


INSTALLATION

1. Install the bulb and lens.
2. Install the door mirror cover.
3. Install the door mirror.
4. Connect the negative (-) battery terminal.

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).



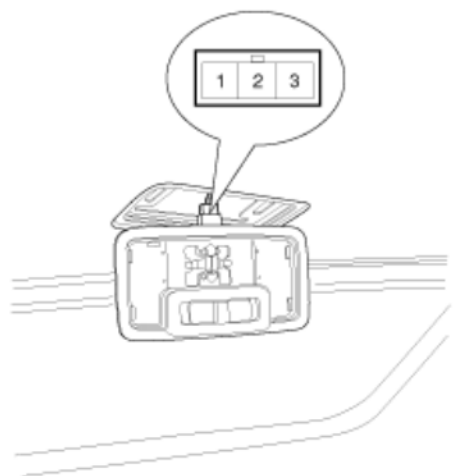
3. Loosen the fixing screw (2EA) and disconnect the 3P connector (C). And then remove the room lamp assembly.

INSTALLATION

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

INSPECTION

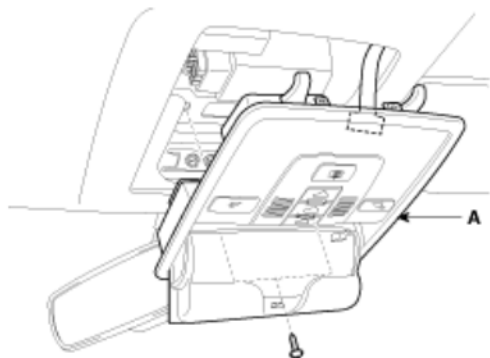
1. Remove the room lamp assembly then check for continuity between terminals.



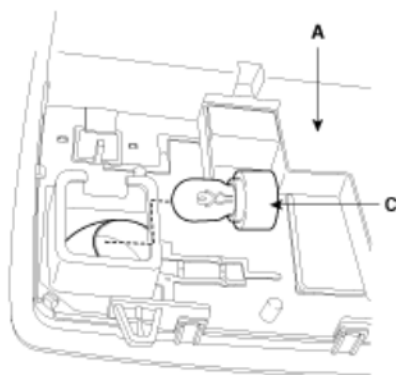
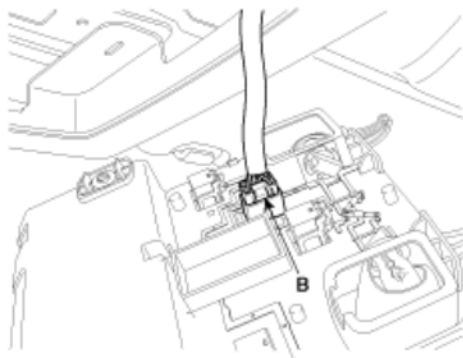
Terminal Position	1	2	3
ON		○ — ● — ○	
DOOR	○ — ● — ○		
OFF			

REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the overhead console lamp (A) after loosening the overhead console lamp screw (2EA).



3. Disconnect the sunroof switch and lamp connector (B) and then remove the overhead console (A) lamp (C).



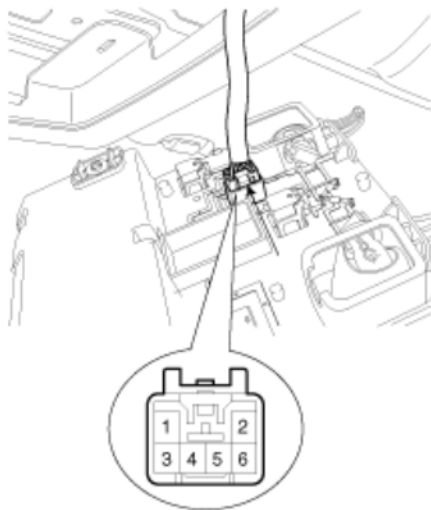
INSTALLATION

1. Install the overhead console lamp after connecting the sunroof switch and lamp connector.
2. Install the lens after tightening 2 screws.

INSPECTION

English

Remove the overhead console lamp assembly then check for continuity between terminals. If the continuity is not as specified, replace the map lamp switch.



Terminal	Sort		Map lamp switch			
	Position		LH		RH	
			ON	OFF	ON	OFF
3			○		○	
4			⊕		⊕	

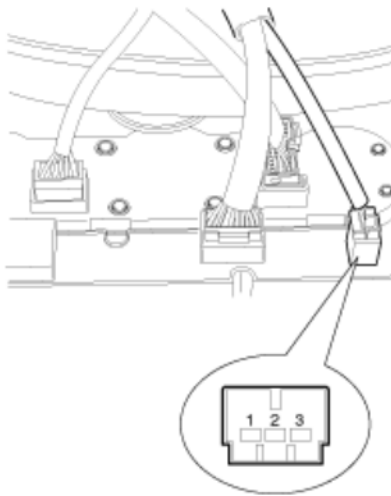
INSPECTION

Hazard Lamp Switch

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (A).
(Refer to the BD group - "Crash pad")



3. Disconnect the hazard lamp switch connector.
4. Operate the switch and check for continuity between terminals with an ohmmeter.

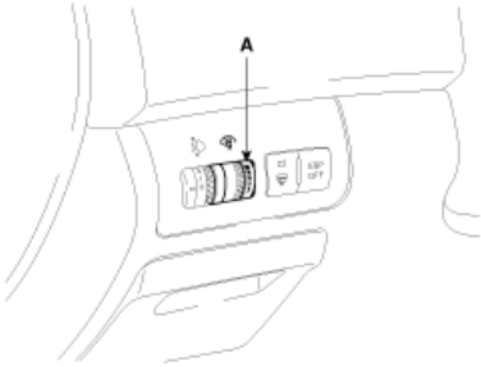


Terminal Position	1	2	GND
ON	○	○	○
OFF			

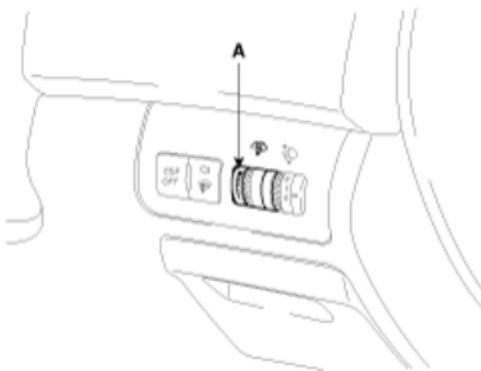
INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the lower side crash pad switch assembly (A) by using the trim remover tool.

[LHD]

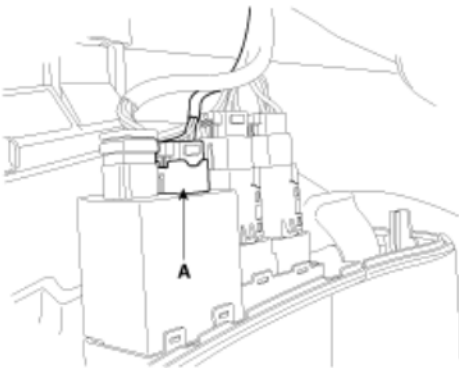


[RHD]

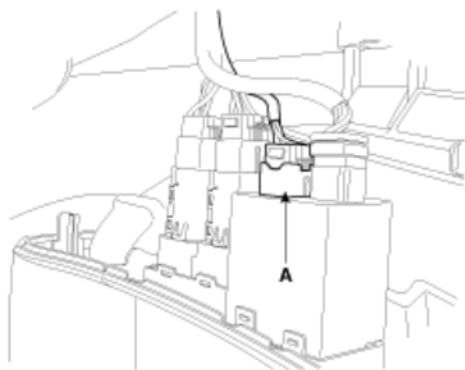


3. Disconnect the rheostat switch connector (A).

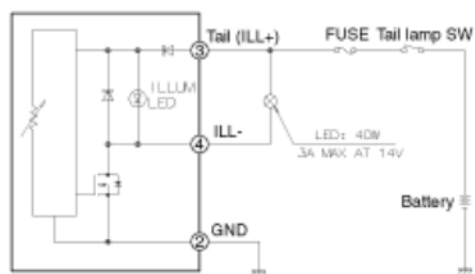
[LHD]



[RHD]



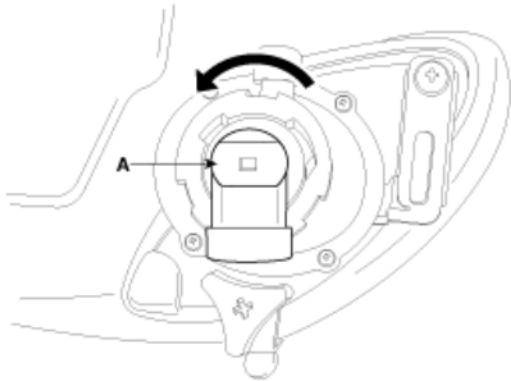
4. Check for intensity of new rheostat switch. If the light intensity of the lamps changes smoothly without any flickering when the rheostat is turned, it can be assumed that the rheostat is normal.



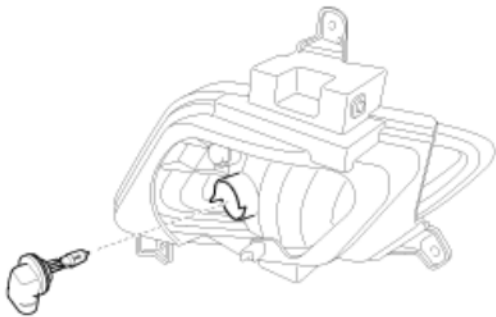
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the front side cover screw.
3. Remove the front fog lamp assembly connector.
4. Remove the front fog lamp bulb (A).

[3Door]



[5Door/Wagon]



INSTALLATION

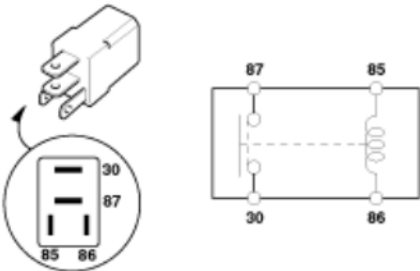
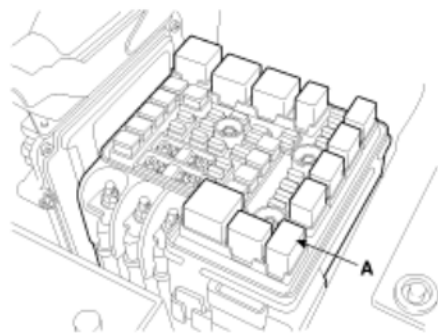
1. Install the front fog lamp bulb.
2. Connect the front fog lamp connector.
3. Install the front side cover.

INSPECTION

Front Fog Lamp Relay

1. Disconnect the negative(-) battery terminal.
2. Pull out the front fog lamp relay (A) from the engine compartment relay box.

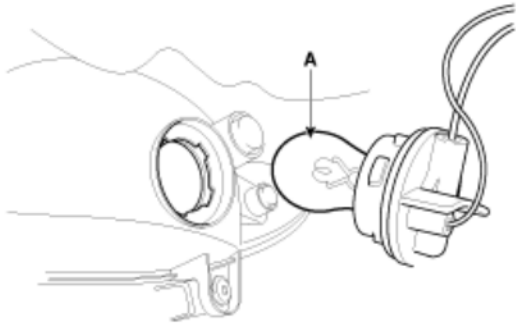
- English ▼
3. Check for continuity between terminals. There should be continuity between the No.87 and No.30 terminals when power is connected. There should be no continuity between the No.85 and No.86 terminals when power is connected.
4. There should be no continuity between the No.87 and No.30 terminals when power is disconnected.



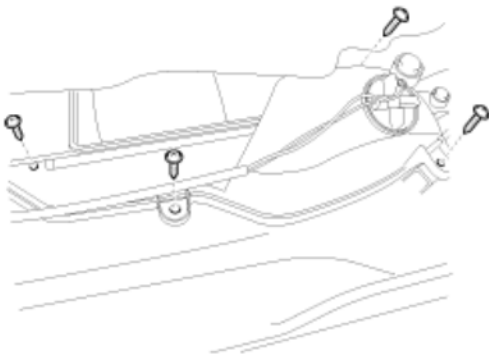
Terminal	30	87	85	86
Power				
Disconnected			○ — ○	
Connected	○ — ○		⊖ — ⊕	

REMOVAL

1. Disconnect the negative(-) battery terminal.
2. Remove the rear bumper.
(Refer to the BD group - "Rear Bumper")
3. Remove the rear lamp (A) after loosening the cap.



4. Remove the rear lamp assembly after loosening the screws (4EA).



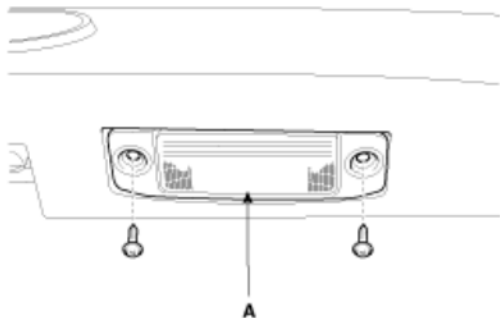
INSTALLATION

1. Install the rear lamp assembly.
2. Install the rear lamp
3. Install the rear bumper.

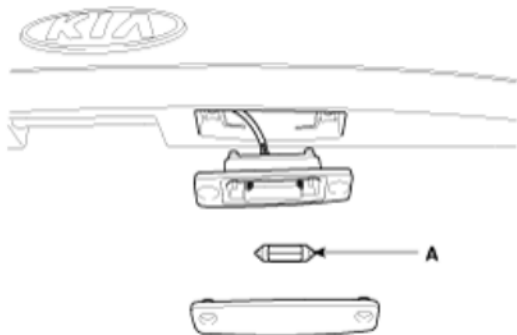
REMOVAL

Licence Lamp

1. Disconnect the negative (-) battery terminal.
2. Remove the license lamp lens (A) from the panel after loosening a screw (2EA).

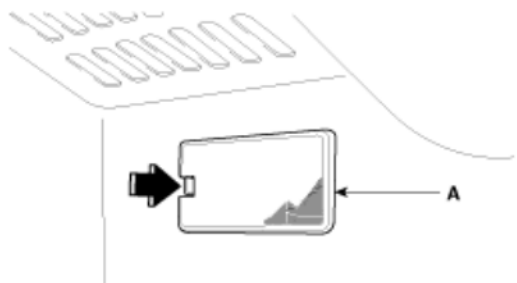


3. Replace the bulb (A).

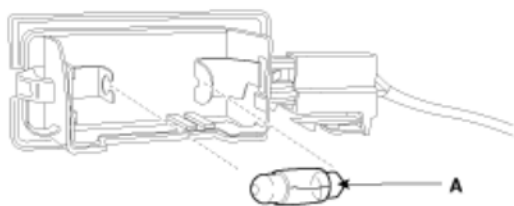


Tailgate Room Lamp

1. Disconnect the negative(-) battery terminal.
2. Remove the tailgate room lamp len(A) from the luggage side trim.



3. Remove the bulb (A).



INSTALLATION

Licence Lamp

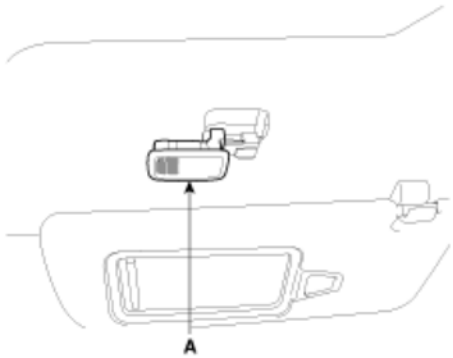
1. Install the bulb.
2. Install the license lamp lens.

Tailgate Room Lamp

1. Install the bulb.
2. Install the tailgate room lamp len.

REMOVAL

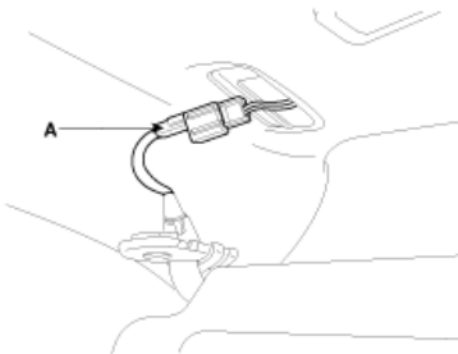
1. Disconnect the negative(-) battery terminal.
2. Remove the vanity lamp lens (A) and then remove the bulb.



3. Remove the sunvisor (A) after loosening the screws (2EA).



4. Disconnect the sunvisor connector (A).



1. Install the vanity bulb.
2. Install the vanity lamp lens.
3. Install the sunvisor assembly.

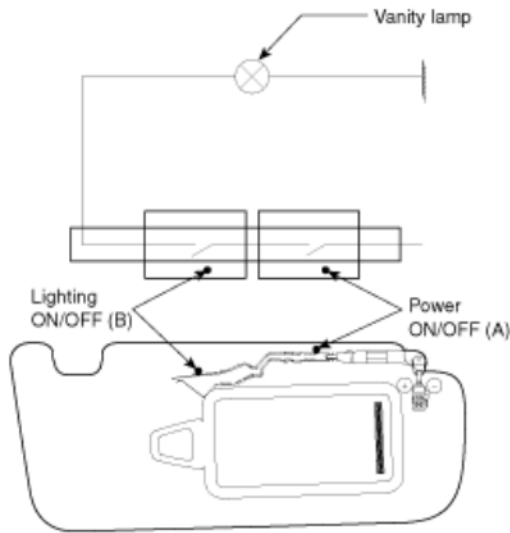
INSPECTION

Bulb

1. Disconnect the vanity lamp connector and check for continuity between terminals.

Sunvisor

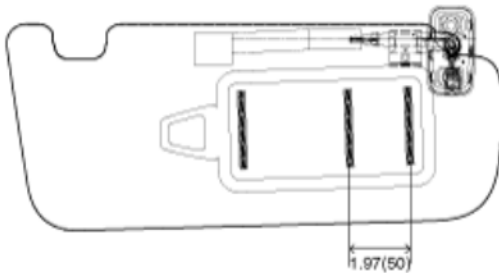
1. Remove the sunvisor assembly and check for continuity between terminals. If the continuity is not as specified, replace the vanity lamp or sunvisor.



Terminal	Condition		
	OFF	A or B	A and B
1			○
2			○

(1) Condition A

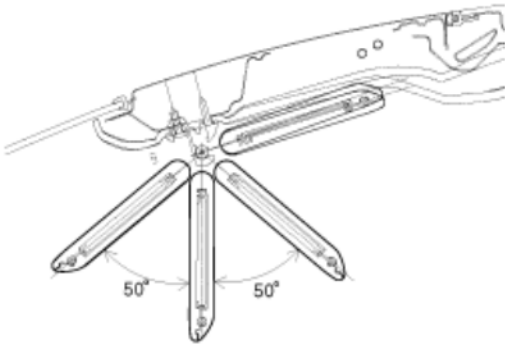
- Power ON : When mirror frame in the sunvisor is opened over 1.97in(50mm)



Unit : in(mm)

(2) Condition B

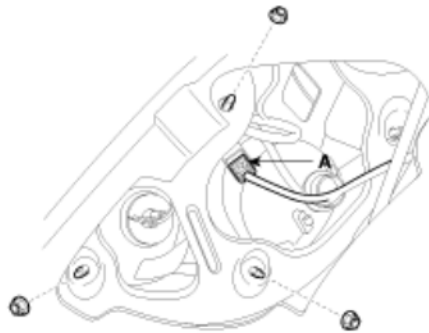
- Lighting ON : When sunvisor is positioned within the vertical angle $\pm 50^\circ$ range.



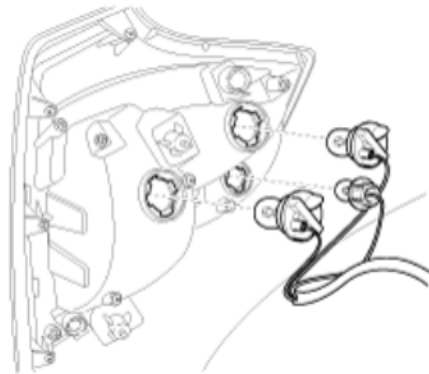
REMOVAL

[5Door]

1. Disconnect the negative (-) battery terminal.
2. Loose the nut (3EA) holding the rear combination lamp then disconnect the 4P connector (A) then remove the outside rear combination lamp.

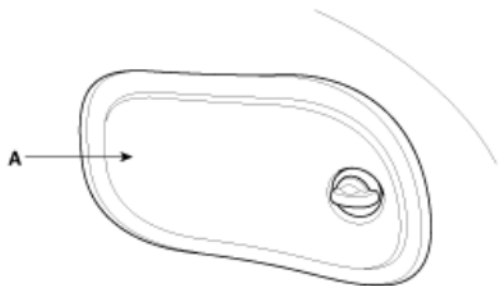


3. Replace the bulbs (3EA) turning in the counter clockwise direction after disconnecting the rear combination lamp assembly.

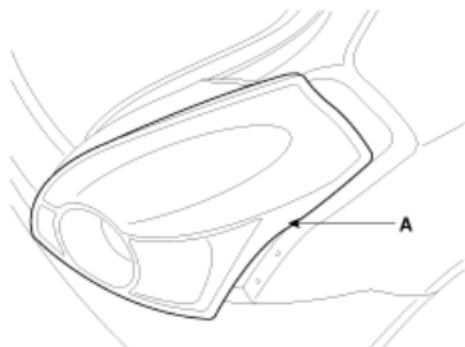
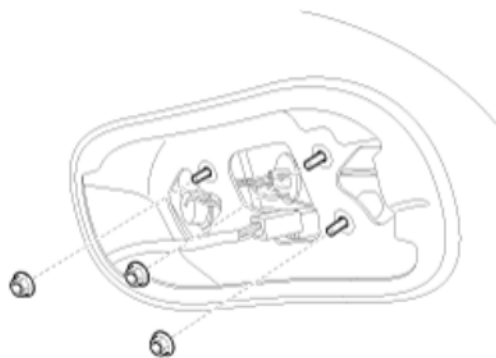


[3 Door]

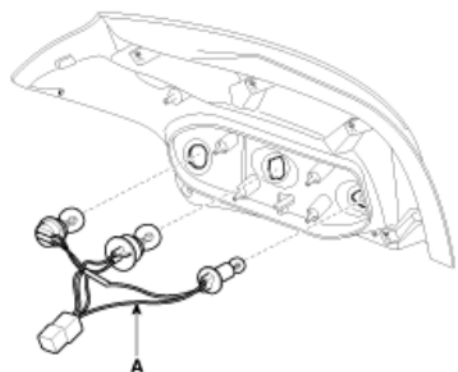
1. Disconnect the negative (-) battery terminal.
2. Remove the trim cover (A).



3. Loose the nuts (3EA) holding the rear combination lamp then remove the rear combination lamp (A).

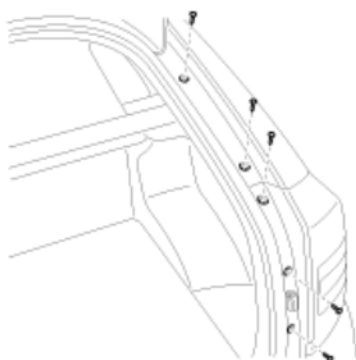


4. Replace the bulbs (3EA) (A) turning in the counter clockwise direction after disconnecting the rear combination lamp assembly.

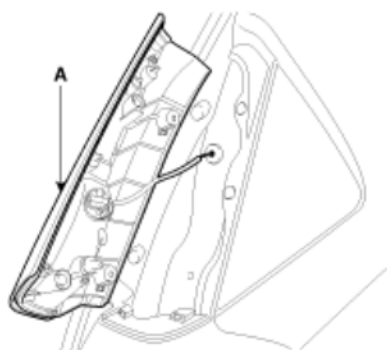


[Wagon]

1. Disconnect the negative (-) battery terminal.
2. Remove the screws (5EA).



3. Remove the rear combination upper lamp (A).

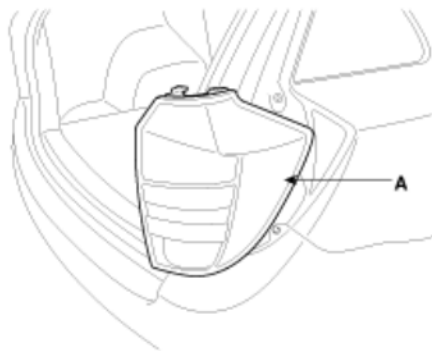


⚠ CAUTION

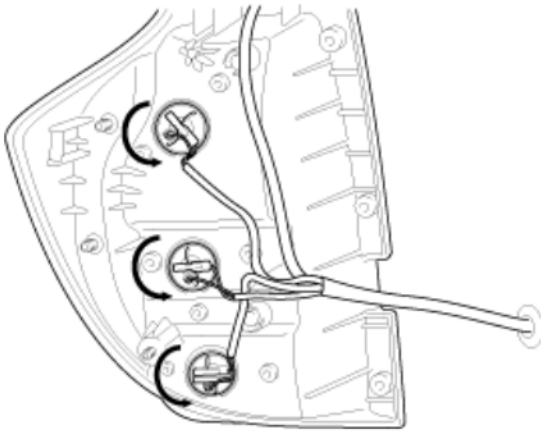
Be careful not to damage the fixing hook.



4. Remove the rear combination lower lamp (A).



5. Replace the bulbs (3EA) turning in the counter clockwise direction after disconnecting the rear combination lamp assembly.



INSTALLATION

1. Install the rear combination lamp assembly after assembling the bulb and connector.

TROUBLESHOOTING

Symptom	Possible cause	Remedy
One lamp does not light (all exterior)	Bulb burned out	Replace bulb
	Socket, wiring or ground faulty	Repair if necessary
Head lamps do not light	Bulb burned out	Replace bulb
	Head lamp fuse (LOW:10A, HIGH:20A) blown	Check for short and replace fuse
	Head lamp fuse (10A) blown	Check for short and replace fuse
	Head lamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Tail lamps and license plate lamps do not light	Bulb burned out	Replace bulb
	Tail lamp fuse (10A) blown	Check for short and replace fuse
	Tail lamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Stop lamps do not light	Bulb burned out	Replace bulb
	Stop lamp fuse (15A) blown	Check for short and replace fuse
	Stop lamp switch faulty	Adjust or replace switch
	Wiring or ground faulty	Repair if necessary
Stop lamps do not turn off	Stop lamp switch faulty	Repair or replace switch
Instrument lamps do not light (Tail lamps light)	Rheostat faulty	Check rheostat
	Wiring or ground faulty	Repair if necessary
Turn signal lamp does not flash on one side	Bulb burned out	Replace bulb
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Turn signal lamps do not light	Bulb burned out	Replace bulb
	Turn signal lamp fuse (10A) blown	Check for short and replace fuse
	Flasher unit faulty	Check flasher unit
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Hazard warning lamps do not light	Bulb burned out	Replace bulb
	Hazard warning lamp fuse (15A) blown	Check for short and replace fuse
	Flasher unit faulty	Check flasher unit
	Hazard switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Flasher rate too slow or too fast	Lamps' wattages are smaller or larger than specified	Replace lamps

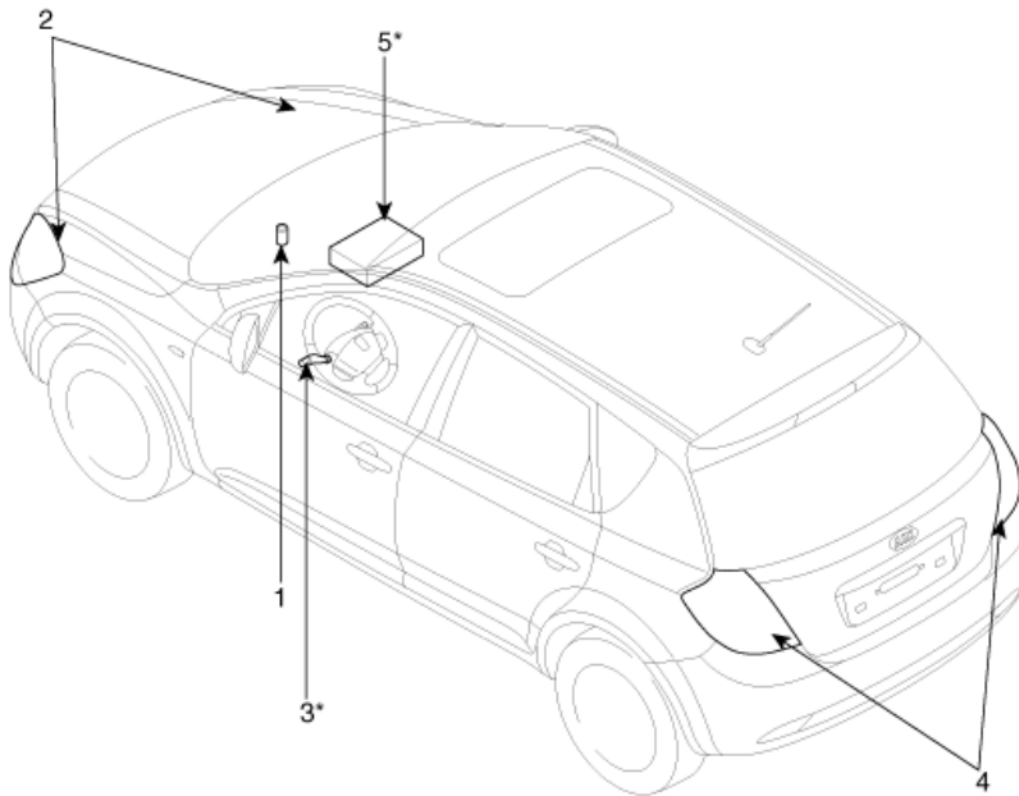
	Flasher unit faulty	Check flasher unit
Back up lamps do not light	Bulb burned out	Replace bulb
	Back up lamp fuse (10A) blown	Check for short and replace fuse
	Back up lamp switch (M/T) faulty	Check switch
	Transaxle range switch (A/T) faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Room lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (15A) blown	Check for short and replace fuse
	Room lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Front fog lamps do not light	Bulb burned out	Replace bulb
	Front fog lamp fuse (15A) blown	Check for short and replace fuse
	Front fog lamp relay faulty	Check relay
	Front fog lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Rear fog lamps do not light	Bulb burned out	Replace bulb
	Rear fog lamp fuse (10A) blown	Check for short and replace fuse
	Rear fog lamp fuse (10A) blown	Check for short and replace fuse
	Rear fog lamp switch faulty	Check switch
	Rear fog lamp relay faulty	Check relay
	Wiring or ground faulty	Repair if necessary
Room lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (10A) blown	Check for short and replace fuse
	Map lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Tailgate room lamp does not light	Bulb burned out	Replace bulb
	Room lamp fuse (10A) blown	Check for short and replace fuse
	Tailgate room lamp switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

SPECIFICATIONS

Item			Specifications
Rated voltage			5V
Operating current	Auto light		Max. 2.62mA ± 10%
	Solar		Max. 0.88mA ± 10%
Signal output	Head lamp & Tail lamp	ON	4.33V
		OFF	3.23V

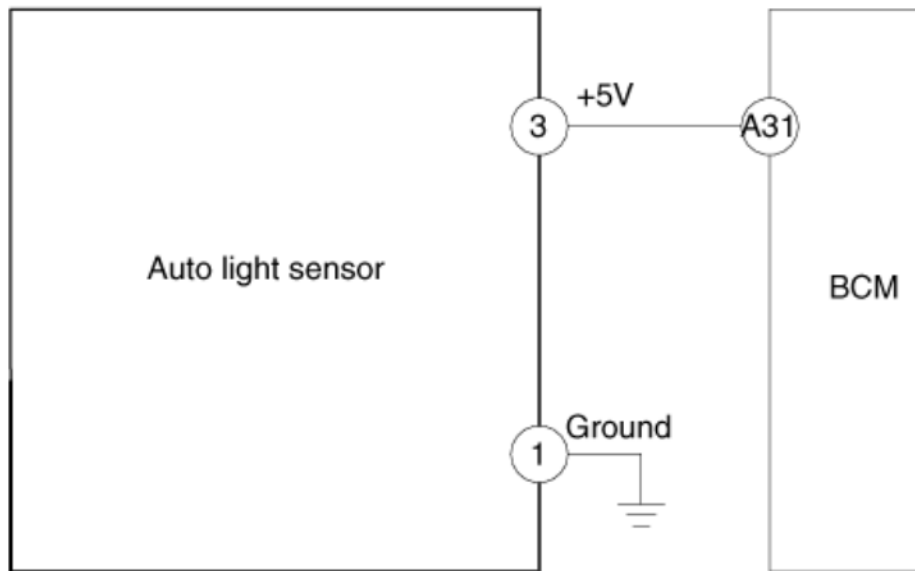
COMPONENT LOCATION

The parts with asterisk(*) :
This illustration shows the LHD type.
RHD type is symmetrical.



- 1. Auto light sensor unit
- 2. Head lamps
- 3. Lighting switch (Auto)

- 4. Tail lamps
- 5. Body control module

CIRCUIT DIAGRAM

[Autolight unit connector]



DESCRIPTION

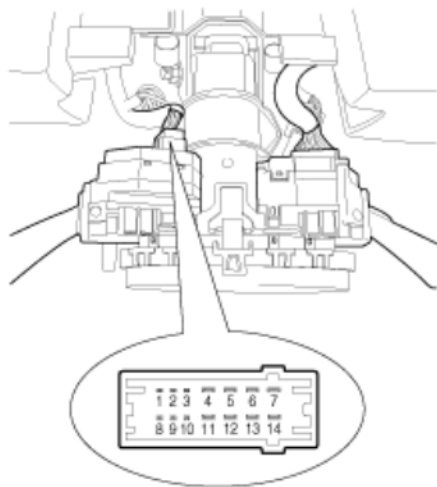
The auto light control system operates by using the auto light switch.

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

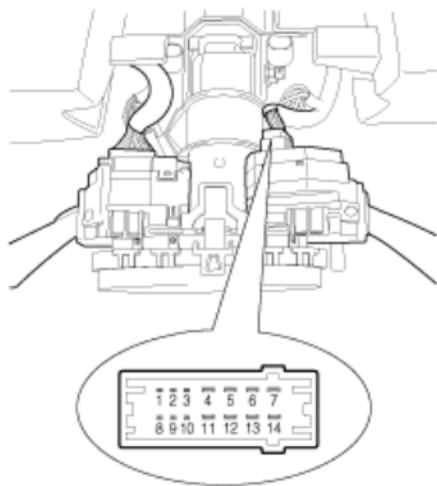
INSPECTION

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

[LHD]



[RHD]



Lighting Switch (Auto Light)

() : RHD

Terminal Position	8(9)	9(10)	10(14)	1(8)
OFF				
I	○			○
II	○	○		○
AUTO			○	○

INSPECTION

1. AUTO LIGHT SENSOR value is always read at IGN1 ON.
2. LIGHT is turned ON after $2\text{sec} \pm 0.2\text{sec}$ when AUTO LIGHT SENSOR value is same as LIGHT ON input value.
3. LIGHT is turned OFF after $2\text{sec} \pm 0.2\text{sec}$ when AUTO LIGHT SENSOR value is same as LIGHT OFF input value.
4. LIGHT ON value of SENSOR is based on the below table.
5. Head Lamp signal is output when Head Lamp OUTPUT is ON.
6. After Head Lamp is turned OFF, Head Lamp signal output is kept if Head Lamp&Tail Lamp ON.
luminance condition is met at Auto Light SW ON.
7. After Head Lamp is turned OFF, Head Lamp signal output is immediately stopped if HEAD LAMP&Tail Lamp OFF
luminance condition is met at Auto Light SW ON.
8. After Head Lamp is turned OFF, Head Lamp signal output is immediately stopped at TAIL SW signal input.
9. After Head Lamp is turned OFF, Head Lamp signal output is stopped if there is no input of Auto Light SW or TAIL SW.
(shall be no flashing of Head Lamp)
10. Head Lamp signal output is stopped when SW position is changed from AUTO to Head Lamp SW during Head Lamp ON
with Auto Light. (shall be no flashing of Head Lamp)

Light Sensor Reading

	Head lamp & Tail lamp
ON	4.33V
OFF	3.23V



T1 : $2.5 \pm 0.25\text{sec}$.

REPLACEMENT

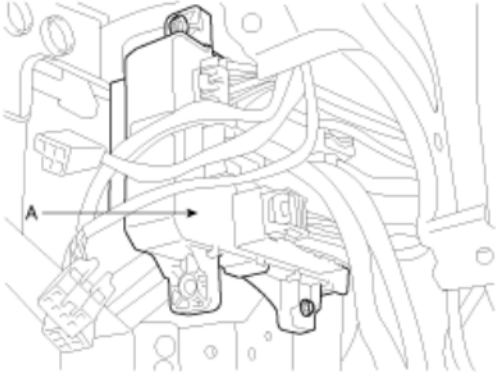
1. Disconnect the negative (-) battery terminal.
2. Remove the Photo & auto light sensor (A) using screw (-) driver.



3. Remove the auto light connector.
4. Installation is the reverse of removal.

INSPECTION

1. The daytime running unit (A) is integrated in the I/P Junction box.



2. Check that the light operate according to the following timing chart.

(1) Operation condition

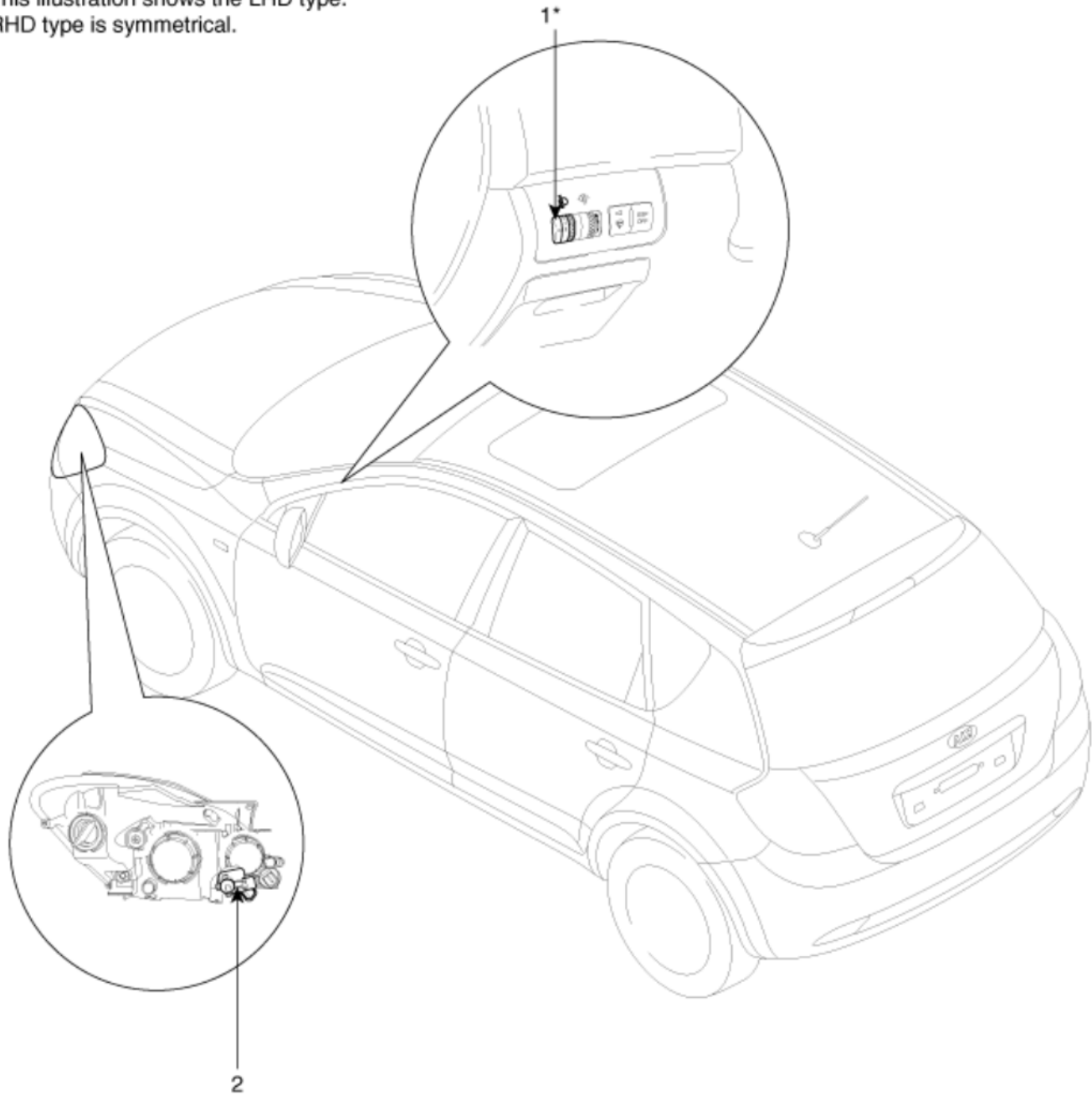
- a. DRL ON
 - ALT L signal and IGN2 signal input
- b. DRL operation
 - The head lamp low beam and tail lamp ON.
- c. DRL OFF
 - Tail lamp SW ON.



3. If the daytime running light is not operated well, Inspect the connector and terminals to be sure they are all making good contact.
If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
If the terminals look OK, go to step 4.
4. Make these input tests at the connector by using ETM.
If any test indicates a problem, find and correct the cause, then recheck the system.
If all the input tests prove OK, the I/P (Instrument panel) junction box must be faulty; replace it.

COMPONENT LOCATION

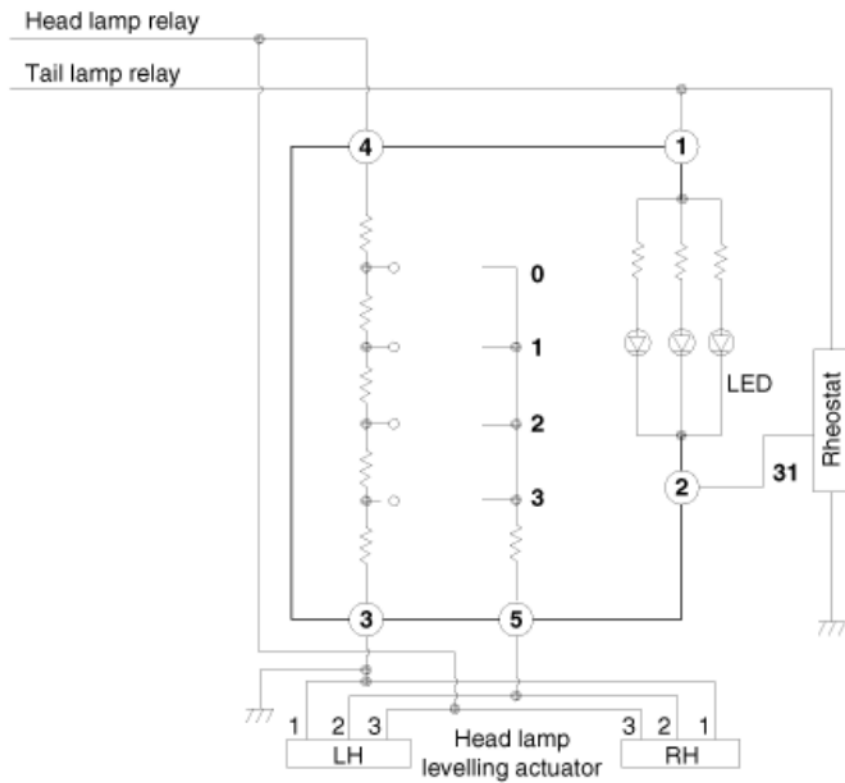
The parts with asterisk (*) :
This illustration shows the LHD type.
RHD type is symmetrical.



1. Headlamp leveling switch

2. Headlamp leveling actuator

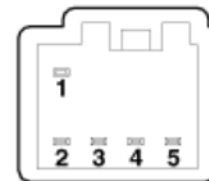
CIRCUIT DIAGRAM



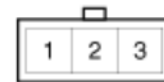
PIN CONNECTION

PIN NO	Description
1	Illumination(+)
2	Rheostat
3	Ground
4	IGN
5	Actuator (+)

Head lamp leveling SW connector

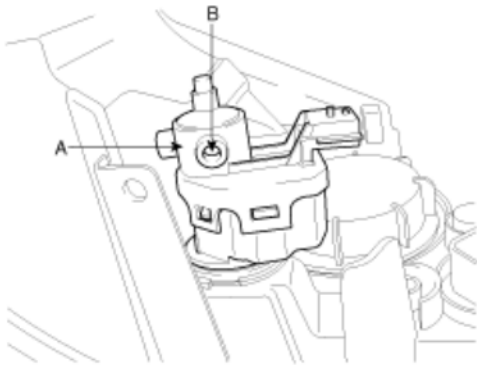


Head lamp leveling actuator connector



REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the head lamp assembly (Refer to the head lamp).
3. Remove the head lamp leveling actuator (A) by turning the adjusting gear in the hole(B) using the adjusting wheel or screw driver.



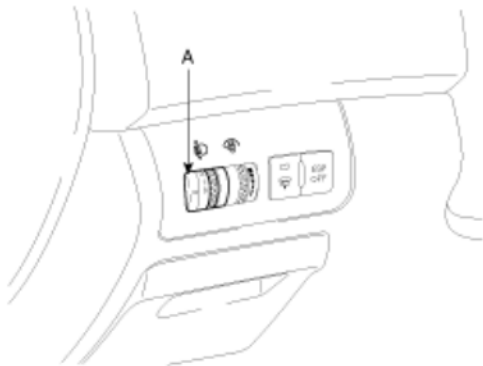
INSTALLATION

1. Install the head lamp leveling actuator by turning the adjusting gear.
2. Install the head lamp assembly.
3. Adjust the head lamp in accordance with the head lamp aiming instructions.

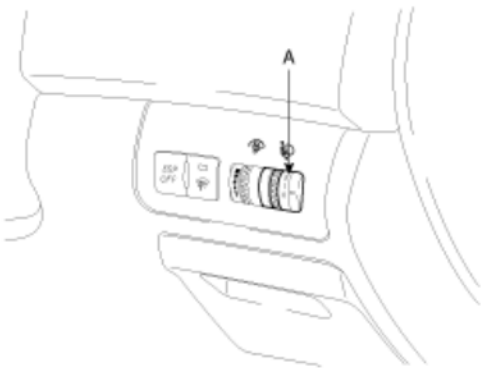
INSPECTION

1. Disconnect the negative (-) battery terminal.
2. Remove the side crash pad cover.
(Refer to the BD group - "Crash pad")
3. Remove the lower side crash pad switch (A) from the side crash pad cover by using the trim removal tool.

[LHD]

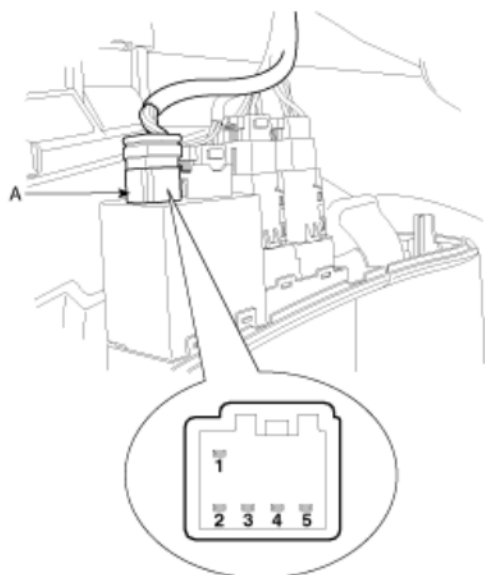


[RHD]

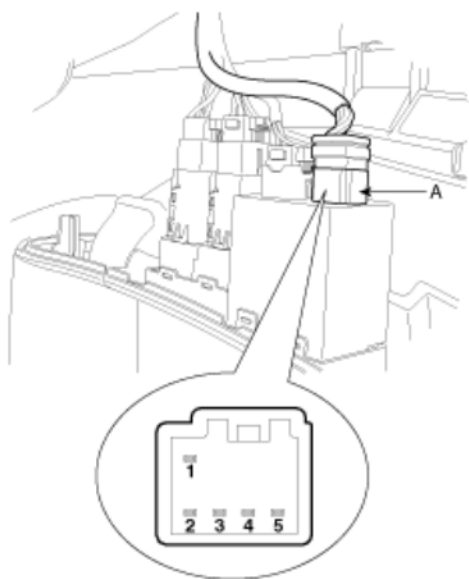


4. Remove the head lamp leveling switch connector from the lower crash pad switch.

[LHD]



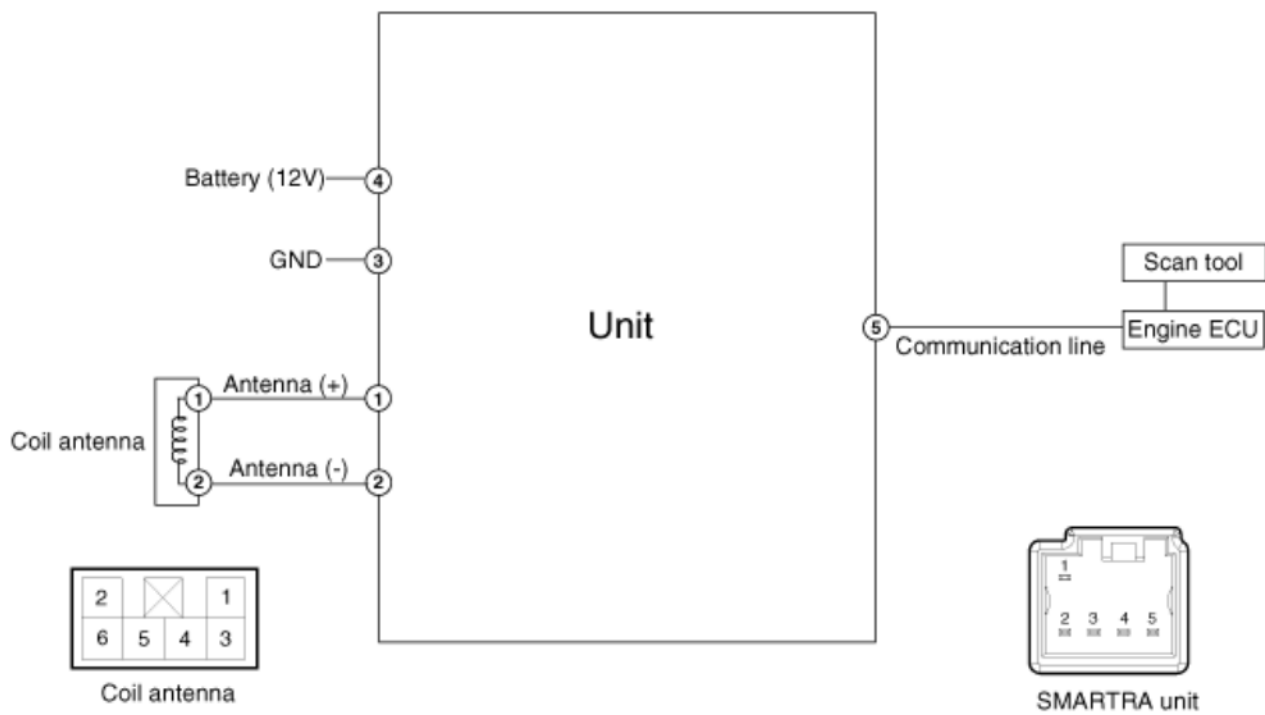
[RHD]



5. Connect the battery voltage between terminals 3 and 4.
6. Measure the voltage between terminals 4 and 5 at each position.

Position No.	Rotation	Voltage (V) ($\pm 5\%$)
0	0°	11.55
1	20°	9.21
2	40°	7.52
3	60°	6.63

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

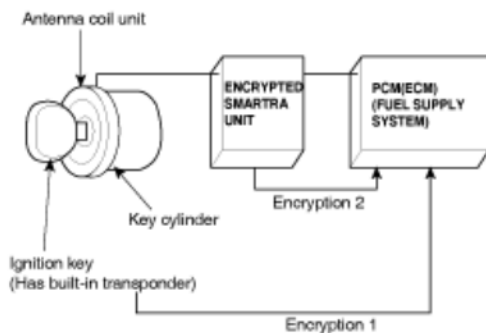
CIRCUIT DIAGRAM

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

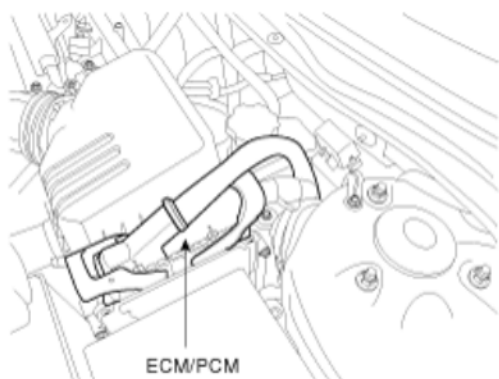
- The SMARTRA system consists of a passive challenge - response (mutual authentication) transponder located in the ignition key, an antenna coil, an encoded SMARTRA unit, an indicator light and the PCM(ECM).
- The SMARTRA communicates to the PCM(ECM) (Engine Control Module) via a dedicated communications 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.



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 Random Number) value between EMS and encrypted smartra unit is checked and the validity of coded key is decided by EMS.

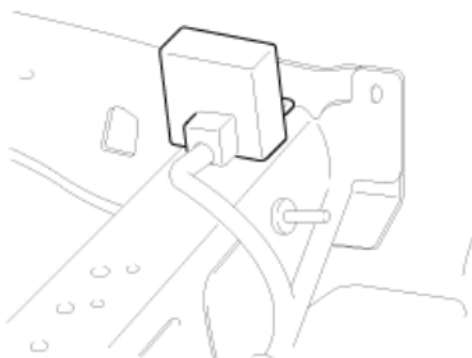


Encrypted SMARTRA unit (A)

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.

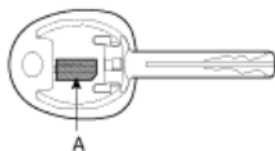
The SMARTRA does not carry out the validity check of the transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to the PCM(ECM) and vice versa.



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.

[Master key]



[Folding key]

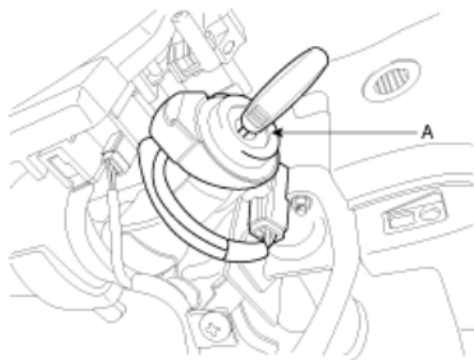


Antenna coil

The antenna coil (A) 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.

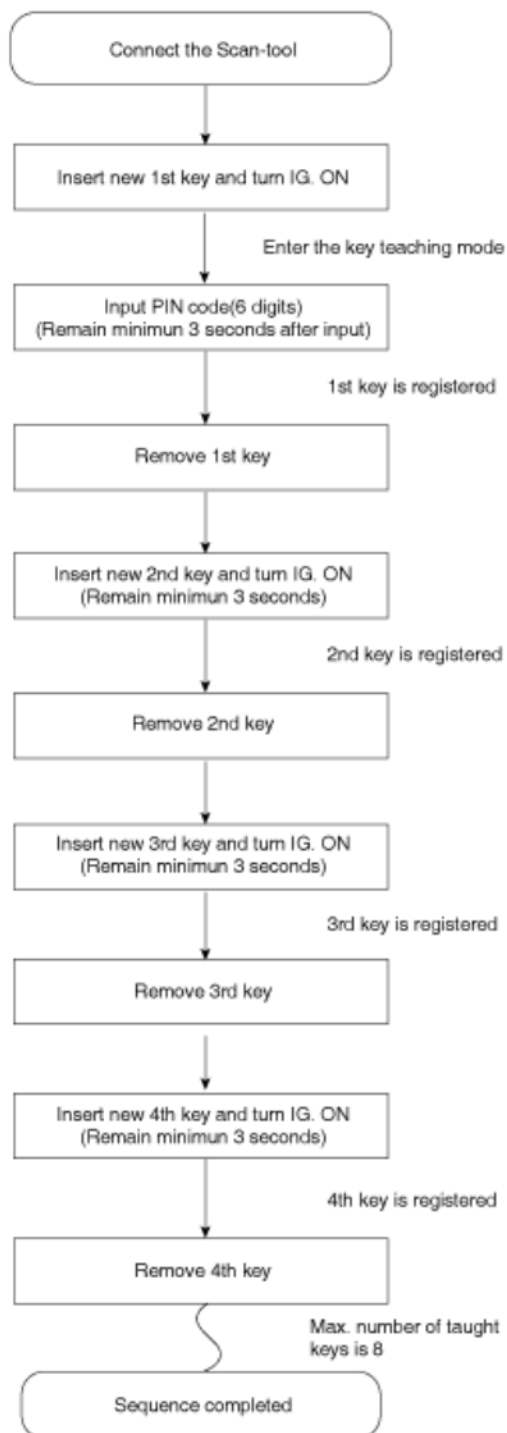
The maximum number of taught keys is 8

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 registers at the same time.



(1) PCM(ECM) learnt status.

1. KIA VEHICLE DIAGNOSIS ▼
MODEL : ED
04. ABS/ESP
05. SRS-AIRBAG
06. TPMS
07. FULL AUTO AIR/CON
08. ELEC. POWER STEERING
09. BODY CONTROL MODULE
10. CODE SAVING
11. IMMOBILIZER

1. KIA VEHICLE DIAGNOSIS

MODEL : ED

SYSTEM : IMMOBILIZER

01. CURRENT DATA

02. PASSWORD TEACHING/CHANGING

03. TEACHING

04. NEUTRAL MODE

05. LIMP HOME MODE

06. SMARTRA NEUTRAL

1.3 TEACHING

MODEL : ED

SYSTEM : IMMOBILIZER

STATUS : LEARNT

INPUT PIN OF SIX
FIGURE AND PRESS [ENTER] KEY

CODE : 234567

1.3 TEACHING

MODEL : ED

SYSTEM : IMMOBILIZER

STATUS : LEARNT

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

CODE : 234567

1.3 TEACHING

MODEL : ED

SYSTEM : IMMOBILIZER

STATUS : LEARNT

1st KEY TEACHING
COMPLETED

CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
2st KEY TEACHING ARE YOU SURE ? [Y/N]
CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
2st KEY TEACHING COMPLETED
CODE : 234567

(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.

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
INPUT PIN OF SIX FIGURE AND PRESS [ENTER] KEY
CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
1st KEY TEACHING ARE YOU SURE ? [Y/N]
CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
1st KEY TEACHING COMPLETED
CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
2st KEY TEACHING ARE YOU SURE ? [Y/N]
CODE : 234567

1.3 TEACHING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
2st KEY TEACHING COMPLETED
CODE : 234567

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.

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 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 incorrect user passwords or wrong vehicle specific data have been sent to the PCM(ECM) three times, 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 : ED
SYSTEM : IMMOBILIZER

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

1.2 PASSWORD TEACHING/CHANGING

MODEL : ED
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

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

NEW PASSWORD :

1.2 PASSWORD TEACHING/CHANGING

MODEL : ED
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

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

NEW PASSWORD : 2345

1.2 PASSWORD TEACHING/CHANGING

MODEL : ED
SYSTEM : IMMOBILIZER
STATUS : VIRGIN

ARE YOU SURE ? [Y/N]

NEW PASSWORD : 2345

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : VIRGIN
COMPLETED PRESS [ESC] TO EXIT
NEW PASSWORD : 2345

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

(2) User password changing

1. KIA VEHICLE DIAGNOSIS
MODEL : ED SYSTEM : IMMOBILIZER 01. CURRENT DATA 02. PASSWORD TEACHING/CHANGING 03. TEACHING 04. NEUTRAL MODE 05. LIMP HOME MODE 06. SMARTRA NEUTRAL

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
INPUT OLD PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY
OLD PASSWORD :

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
INPUT OLD PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY
OLD PASSWORD : 2345

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
INPUT NEW PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY
NEW PASSWORD : 1234

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
ARE YOU SURE ? [Y/N]
NEW PASSWORD : 1234

1.2 PASSWORD TEACHING/CHANGING
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
COMPLETED PRESS [ESC] TO EXIT
NEW PASSWORD : 1234

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

1.5 LIMP HOME MODE
MODEL : ED SYSTEM : IMMOBILIZER INPUT PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY PASSWORD :

1.5 LIMP HOME MODE
MODEL : ED SYSTEM : IMMOBILIZER INPUT PASSWORD OF FOUR FIGURES AND PRESS [ENTER] KEY NEW PASSWORD : 2345

1.5 LIMP HOME MODE
MODEL : ED SYSTEM : IMMOBILIZER COMPLETED PRESS [ESC] TO EXIT

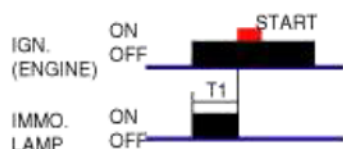
2. LIMP HOME BY IGNITION KEY

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.

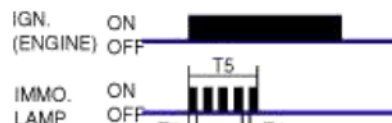
Only if the PCM(ECM) is in status "learnt" and the user password status is "learnt" and the user password is correct, the PCM(ECM) will be unlocked for a period of time (30 sec.). The engine can be started during this time. After the time has elapsed, engine start is not possible. After a new password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

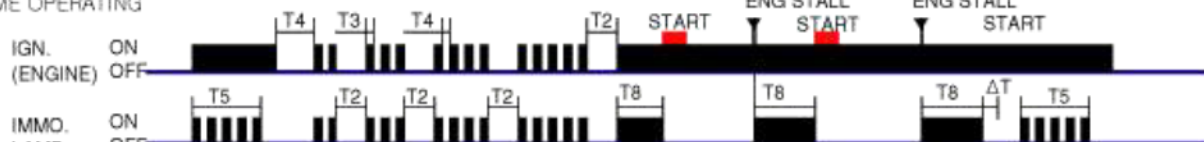
1. NORMAL CONDITION(NO FAILURE)



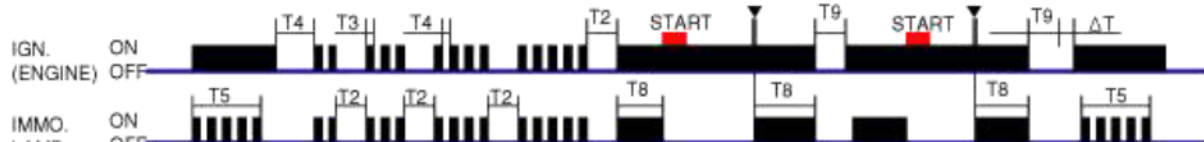
2. IN CASE OF FAILURE(LIMP HOME)



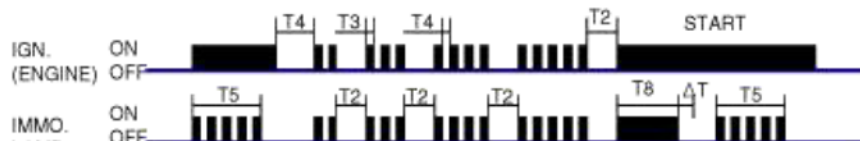
3. LIMP HOME OPERATING



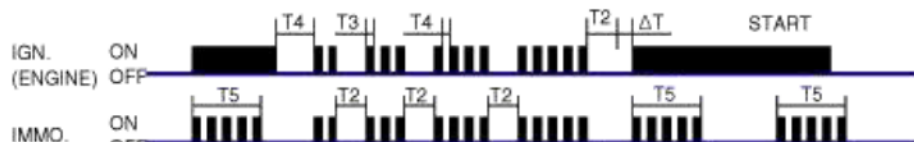
USER PASSWORD : 2345H



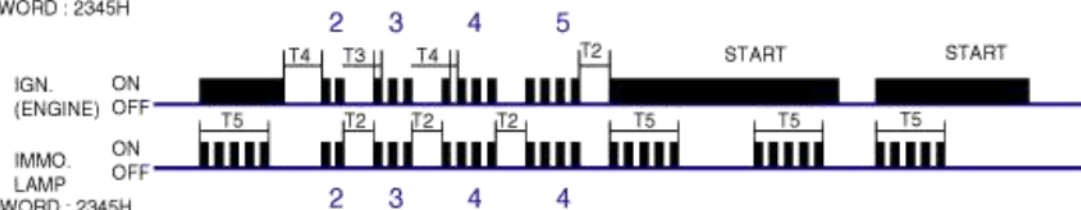
USER PASSWORD : 2345H



USER PASSWORD : 2345H



USER PASSWORD : 2345H



USER PASSWORD : 2345H

NOTE :

T1 > 5sec
3sec < T2 < 10sec
0.2sec < T3 < 5 sec
0.2sec < T4 < 3sec
T5 = 5sec
T6 < 30sec
T9 = 8sec
T8 = 30sec
CODE "0" = IG.ON 10 TIMES

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

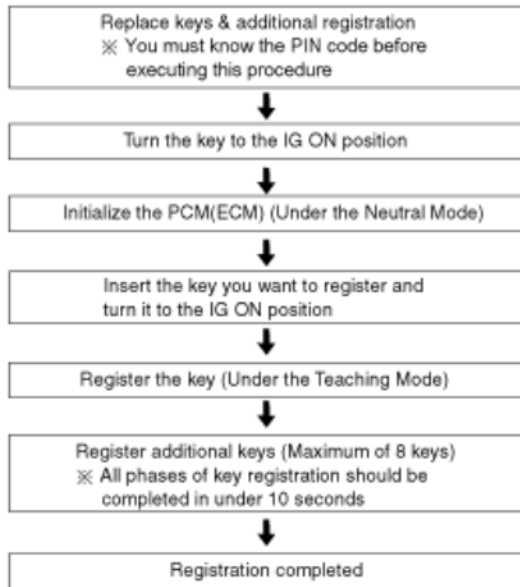
Replacement Of Ecm And Smartra

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,

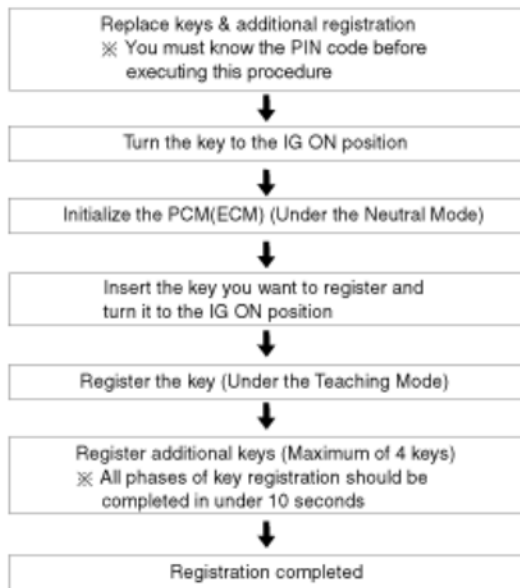
which are not taught to the ECM, are invalid for the new ECM (Refer to key teaching procedure). The vehicle specific data have to be left unchanged due to the unique programming of transponder.

In case of a defective SMARTRA, it needs teaching the smartra. A new SMARTRA device replaces the old one and smartra need teaching. There are no transponder-related data stored in this device.

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



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



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

1. KIA VEHICLE DIAGNOSIS

MODEL : ED

SYSTEM : IMMOBILIZER

01. CURRENT DATA

02. PASSWORD TEACHING/CHANGING

03. TEACHING

04. NEUTRAL MODE

05. LIMP HOME MODE

06. SMARTRA NEUTRAL

1.4 NEUTRAL MODE
MODEL : ED SYSTEM : IMMOBILIZER STATUS : LEARNT
INPUT PIN OF SIX FIGURE AND PRESS [ENTER] KEY
CODE : 234567

1.4 NEUTRAL MODE
MODEL : ED SYSTEM : IMMOBILIZER STATUS : NEUTRAL
COMPLETED PRESS [ESC] TO EXIT

1. KIA VEHICLE DIAGNOSIS
MODEL : ED SYSTEM : IMMOBILIZER
01. CURRENT DATA 02. PASSWORD TEACHING/CHANGING 03. TEACHING 04. NEUTRAL MODE 05. LIMP HOME MODE

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

Neutralising Of SMARTRA

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

Ignition key (regardless 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 changing 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	Engine Running			Learning	
	Learnt Key	Limp home	Twice Ignition	Key	User Password
SMARTRA					
Neutral	No	Yes (EMS learnt)	No	Yes	No

1. KIA VEHICLE DIAGNOSIS

MODEL : ED

SYSTEM : IMMOBILIZER

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

1.6 SMARTRA3 NEUTRAL

MODEL : ED

SYSTEM : IMMOBILIZER

STATUS : LEARNT

INPUT PIN OF SIX
FIGURE AND PRESS [ENTER] KEY

CODE : 234567

1.6 SMARTRA3 NEUTRAL

MODEL : ED

SYSTEM : IMMOBILIZER

STATUS : NEUTRAL

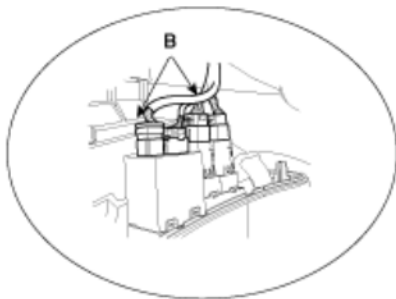
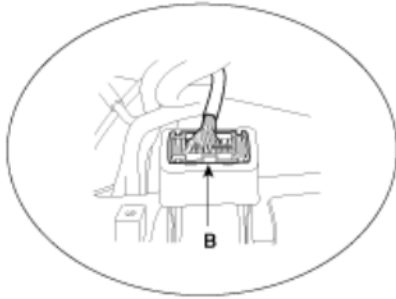
COMPLETED
PRESS [ESC] TO EXIT

1.1 CURRENT DATA	
01. NO. OF LEARNED KEY	0
02. EMS STATUS	
03. KEY STATUS	VIRGIN
04. SMARTRA3 STATUS	

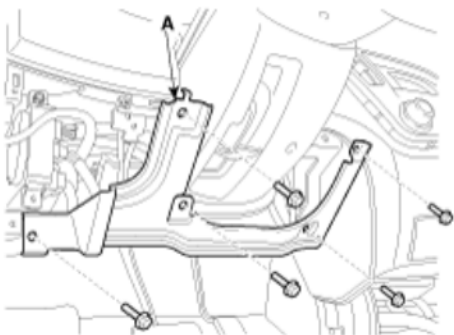
FIX SCRN FULL PART GRPH HELP

REMOVAL

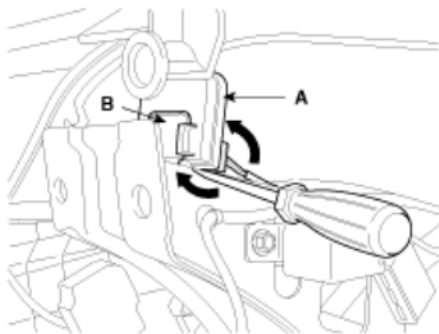
1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower panel (A) and disconnect the connectors (B). (Refer to the BD group - "Crash pad").



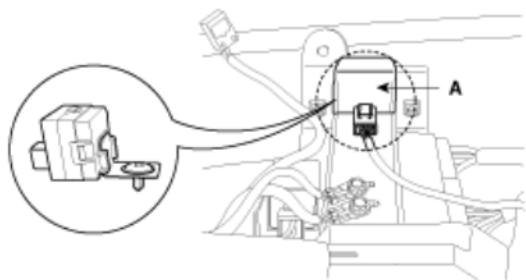
3. Remove the reinforcing panel (A).



4. Insert a flat-up screwdriver between immobilizer unit and mounting bracket located on the inside of crash pad.
5. Move a flat-up screwdriver up and down slowly to loose the immobilizer unit (A) from bracket (B).



6. Remove the immobilizer unit (A) after disconnecting the connector.



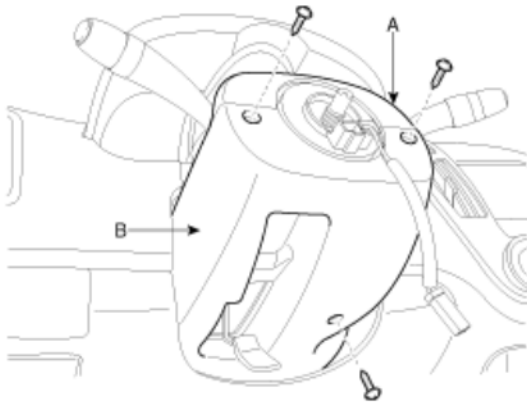
INSTALLATION

1. Install the immobilizer control unit after connecting the unit connector.
2. Install the reinforcing panel.
3. Install the crash pad lower panel.

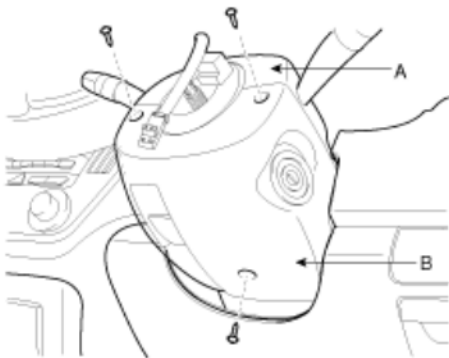
REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the steering column upper(A) and lower(B) shrouds. (Refer to the ST group - "Steering column and shaft").

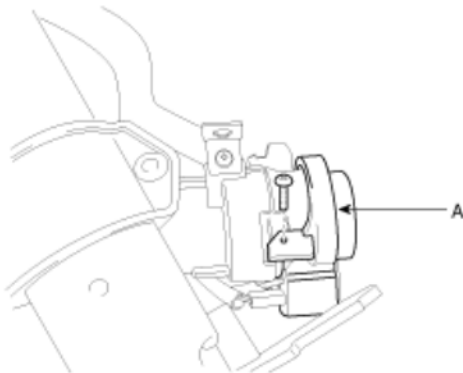
[LHD]



[RHD]



3. Disconnect the 6P connector of the coil antenna and then remove the coil antenna (A) after loosening the screw.



INSTALLATION

1. Install the coil antenna and connect the 6P connector.

2. Install the steering column upper and lower shrouds.

English ▼

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).

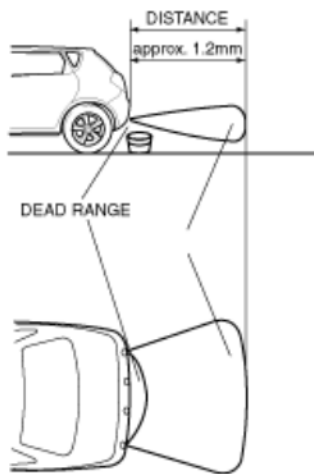
The following table shows the assignment of immobilizer related faults to each type:

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) Incorrect the Authentication of EMS and SMARTRA 4) Locking of SMARTRA	P169A (SMARTRA Authentication fail)
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 fault	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 (Antenna coil) 3) No transponder (Key without transponder) in the magnetic 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 error etc.)	P1694 (PCM(ECM) message error)
PCM(ECM) internal permanent memory (EEPROM) fault	1) PCM(ECM) internal permanent memory (EEPROM) fault 2) Invalid write operation to permanent memory (EEPROM)	P1695 (PCM(ECM) memory error)
	1) Virgin transponder at PCM(ECM) status "Learnt" Learnt	P1696

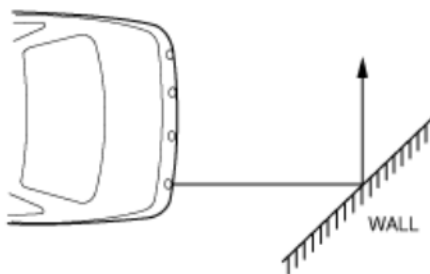
Invalid key fault	(Invalid) Transponder at PCM(ECM) status "Learnt" (Authentication fail)	(Authentication fail) English ▼
Hi-Scan fault	1) Hi-Scan message error	P1697
Locked by timer	1) Exceeding the maximum limit of Twice IGN ON (≥ 32 times)	P1699 (Twice IG ON over trial)

WARNING

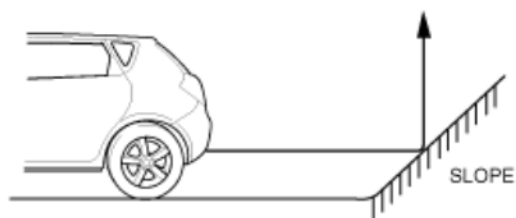
1. Range detected by back sensors is limited.
Watch back before reversing.
2. There is a blind spot below the bumper. Low objects (for example boundary barrier) may be detected from minimum 1.5m away unable to detect at nearer.
3. Besides there are some materials unable to be detected even in detection 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)



4. Reversing toward the sloped walls.



5. Reversing toward the sloped terrain.

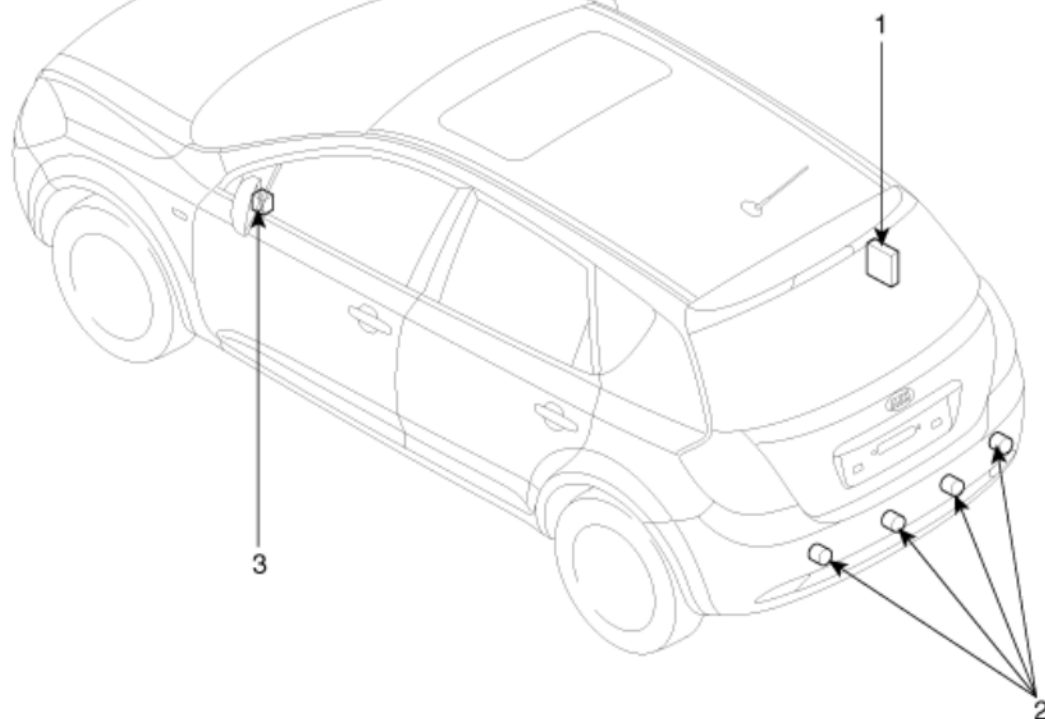


6. False alarm may operate in the following condition: irregular road surface, gravel road, sloped road and grass. Upon alarm generation by grass the alarm may be generated by rock behind grass. Be sure to check for the safety. Ultrasonic sensor cannot discriminate among glass, stake, and rock.
7. Sensors may not operate correctly in the below conditions.
Ensure sensors 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 tailgate, 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 of no 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 the speed, the unit may not operate normally.
8. Check the rear bumper for installation condition and deformation. If installed improperly or the sensor orientation is deviated, it may cause malfunction.
9. Be careful not to apply shock during sensor installation on the transmission or reception unit.
10. When adding electrical devices or modifying harness at the rear body of the vehicle, ensure not the change the transmission and reception unit wiring. Tagging the transmission side and reception side, it may cause malfunction.
11. High power radio transmitter (above 10W) may cause malfunction. Do not install it on the vehicle.
12. Be careful that heating or sharp objects shall not touch ultrasonic sensor surface.
Besides do not cover the sensor opening or press the sensor.

SPECIFICATION

Item		Specification
Rear parking assist system 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	25 cm ~ 120 cm
	Operation voltage	DC 7 ~ 9 V
	Operation current	MAX 20 mA
	Operation temperature	-30°C ~ + 80°C
	Beam width	Horizontal : 40±5°, Vertical : 60±5°
	Number of sensors	4 (Right, Right center, Left center, Left)
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 : MIN 70 dB (DC 13V /m)

COMPONENT LOCATION

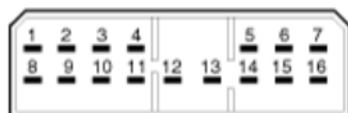
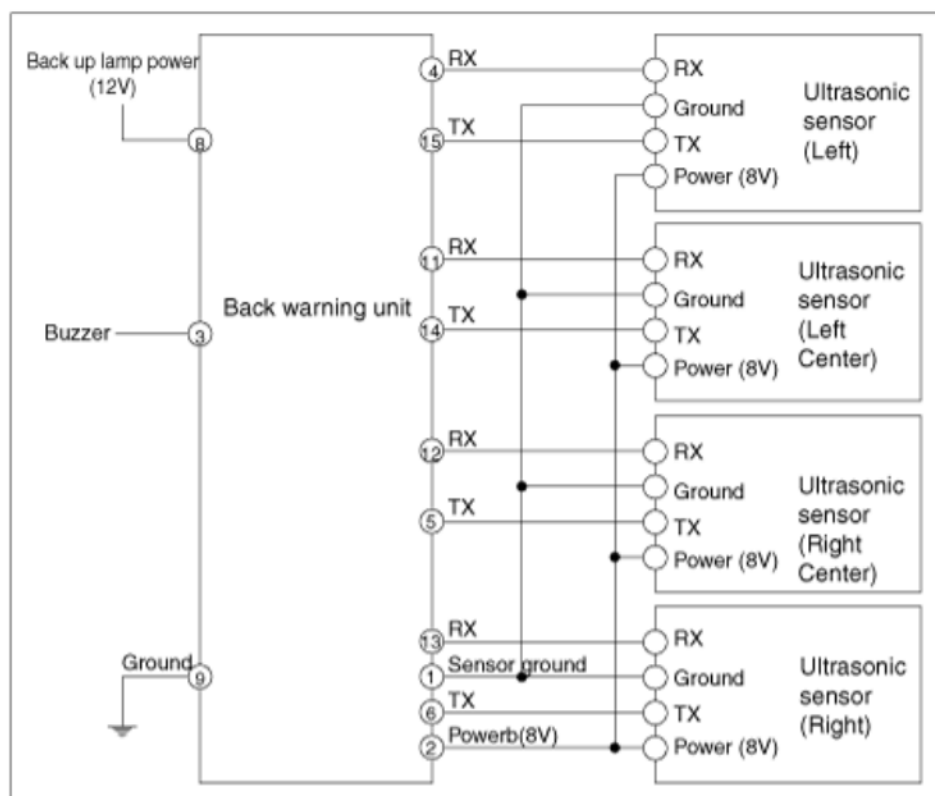


1. Rear parking assist system control unit

3. Buzzer

2. Ultrasonic sensor

CIRCUIT DIAGRAM



(Rear parking assist system control unit connector)

Pin configuration

Pin No.	Signal	Test : Desired result
1	Sensor ground	0V
2	Sensor power	8V (While operating)
3	Buzzer	0V (While operating)
4	RX - Sensor(Left)	0~1V voltage change (Inspect waveform)
5	TX - Sensor(Right center)	0~3V voltage change (Inspect waveform)
6	TX - Sensor(Right)	0~3V voltage change (Inspect waveform)
8	Back up lamp power	12V (While shifting to "R")
9	Ground	0V
11	RX - Sensor(Left center)	0~1V voltage change (Inspect waveform)
12	RX - Sensor(Right Center)	0~1V voltage change (Inspect waveform)
13	RX - Sensor(Right)	0~1V voltage change (Inspect waveform)
14	TX - Sensor(Left center)	0~3V voltage change (Inspect waveform)
15	TX - Sensor(Left)	0~3V voltage change (Inspect waveform)



(Ultrasonic sensor connector)

PIN NO	SIGNAL
1	8V
2	GND
3	TX
4	RX

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, rear parking assist 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).

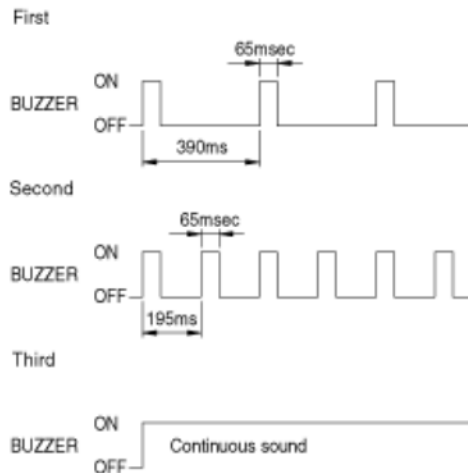
ALARM RANGE

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 $\pm$ 15cm

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

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

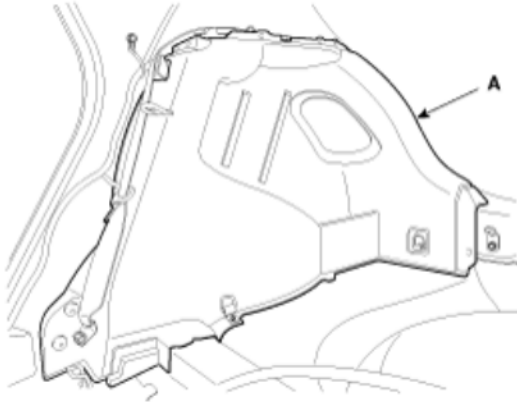


NOTICE

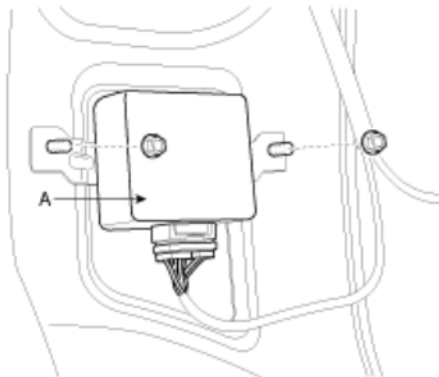
- 1) Time tolerance of the above waveform : Time $\pm$ 10%
- 2) At nearer distance than 40cm, detection may not occur.
- 3) Alarm will be generated with vehicle reversing speed 10km/h or less.
For moving target, maximum operation speed shall be target approach speed of 10km/h.
- 4) When the vehicle or the target is moving, sequential alarm generation or effective alarm may be failed.
- 5) Misalarm 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. Disconnect the negative (-) battery terminal.
2. Remove the right side trim(A) of the trunk room.
(Refer to the BD group - "Interior trim")



3. Loosen the mounting nuts and disconnect the connector.
4. Remove the rear parking assist system control unit (A).



5. Installation is the reverse of removal procedure.

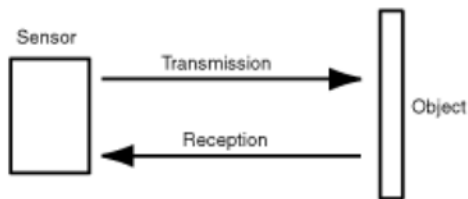
OPERATION PRINCIPLE

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

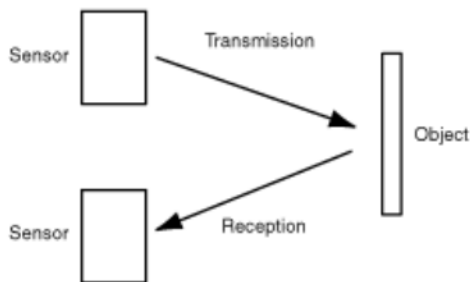
Distance Detection Type

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.



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



Measurement Principle

Rear parking assist system is a complementary device for reversing. Rear parking assist system detects objects behind vehicle and provides the driver with buzzer alarm finding objects in a certain area, using ultrasonic wave propagation speed and time.

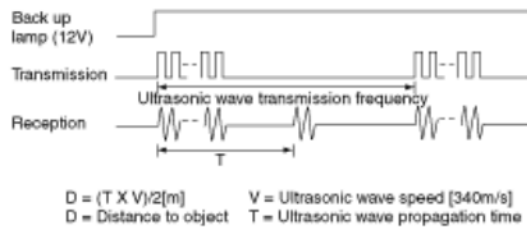
The propagation speed formula of ultrasonic wave in air is following :

$$v = 331.5 + 0.6t \text{ (m/s)}$$

v=ultrasonic wave propagation speed

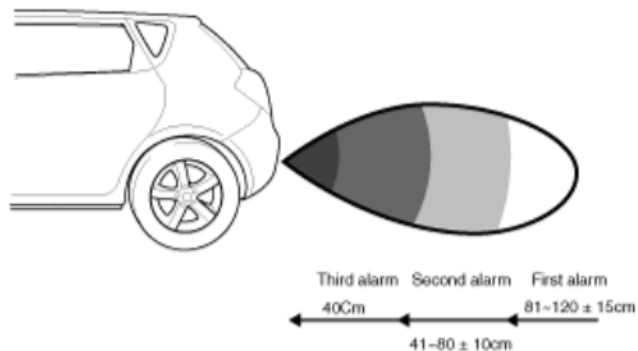
t=ambient temperature

The basic principle of distance measurement using ultrasonic wave is :



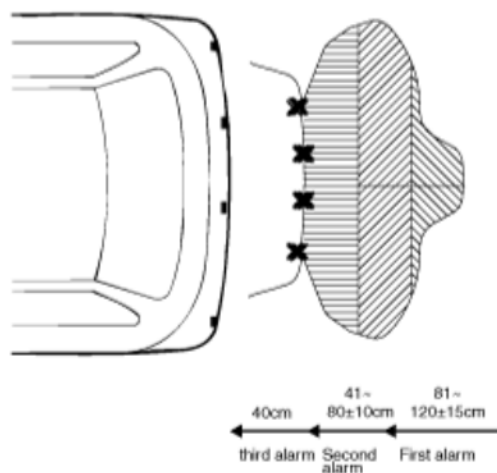
Sensor detection range

[Vertical range]



1. Distance tolerance(Measured at the front of sensor)
 81~120cm : $\pm 15\text{cm}$
 41~80cm : $\pm 10\text{cm}$
 40cm : $\pm 10\text{cm}$
2. Detection tolerance
 At 40cm : $45^\circ \pm 15^\circ$
 At 80cm : $30^\circ \pm 15^\circ$
 At 120cm : $20^\circ \pm 15^\circ$
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(Measured at the front of sensor)
 81~120cm : $\pm 15\text{cm}$
 41~80cm : $\pm 10\text{cm}$
 40cm : $\pm 10\text{cm}$
2. Detection tolerance
 At 80cm : $90^\circ \pm 20^\circ$
 At 120cm : $10^\circ \pm 20^\circ$
3. At nearer distance than 40cm detection may occur.
4. Measurement condition : Room temperature (20℃), 90mm diameter, 3m length rod.

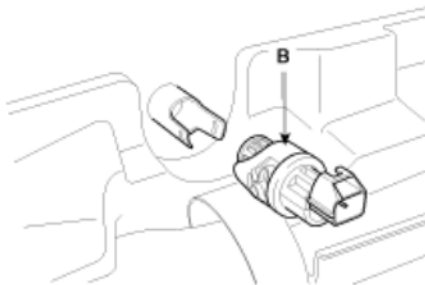
NOTICE

- 1) 14cm (dia.) 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 (dia.), 1m length.

REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the rear bumper (Refer to the Body group - "Rear bumper")
3. Disconnect the sensor connector (A) at the inside of the rear bumper, and then remove the sensor (B) from the housing.



4. Installation is the reverse of removal procedure.

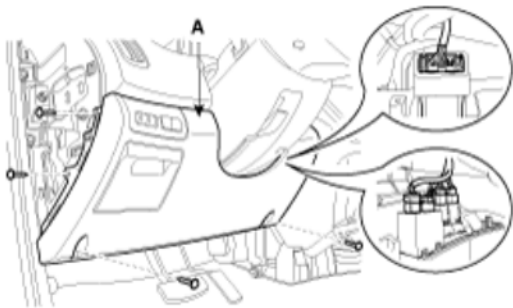
INSPECTION

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

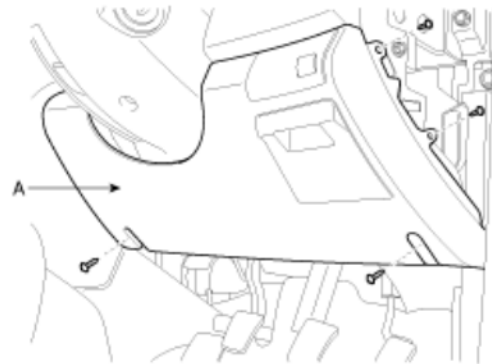
REPLACEMENT

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad side lower panel (A).
(Refer to the BD group - "Crash pad")

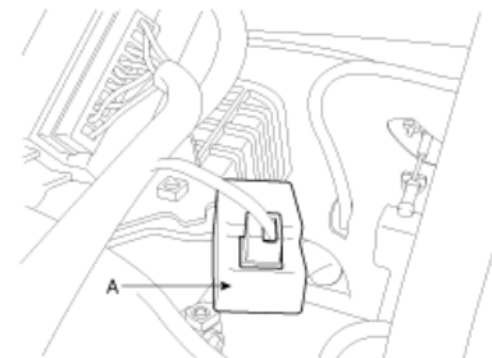
[LHD]



[RHD]



3. Remove the buzzer (A) after loosening the nut and disconnecting the 2P connector.

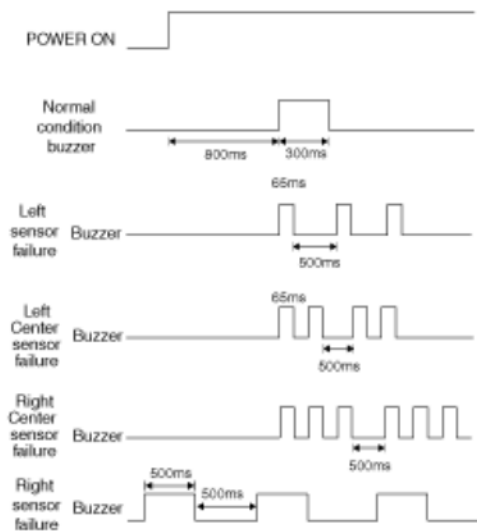


4. Installation is the reverse of removal procedure.

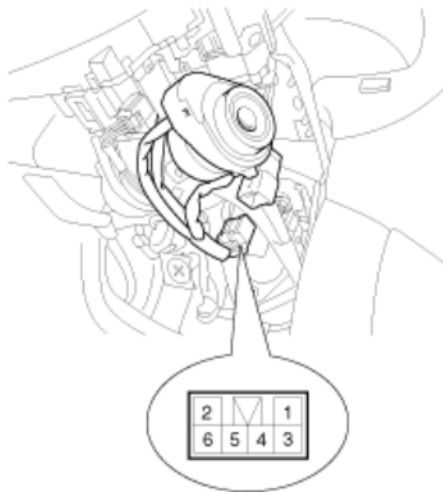
English ▼

DIAGNOSIS

1. Operate with ignition switch on and shift the lever to position "R"
2. Then it checks the system condition.
If no trouble, it generates buzzer alarm sound for 0.3 seconds after 0.8 seconds from power approval. In case of system failure, then it indicates the failed point as follows.
 - Left sensor failure : beep-beep-beep
 - Left center sensor failure : beep beep-beep beep-beep beep
 - Right center sensor failure: beep beep beep-beep beep beep-beep beep beep
 - Right sensor failure : beep - beep - beep
3. Alarm is generated 3 times sequentially.
4. Effective operation range is 10km/h or less for the vehicle speed.



INSPECTION

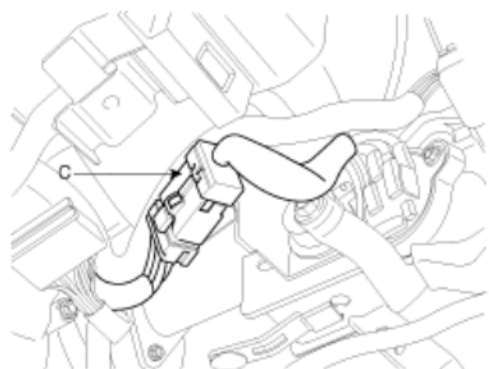
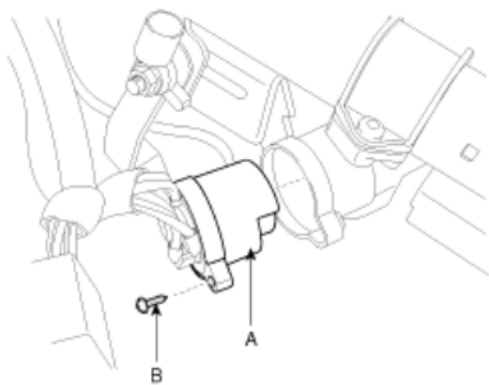


1. Disconnect the ignition switch connector and key warning switch connector from under the steering column.
2. Check for continuity between the terminals.
3. If continuity is not specified, replace the switch.

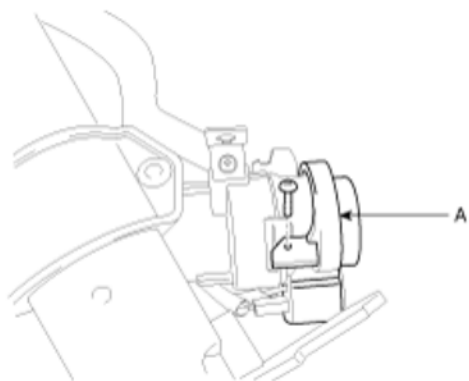
TERMINAL POSITION KEY		IGNITION SWITCH						STEERING		KEY WARNING SWITCH		KEY HOLE ILLUMINATION	
		2	4	6	5	3	1	TRAVEL	TRAVEL	5	6	3	4
LOCK	REMOVAL							LOCK					
								LOCK	UNLOCK				
ACC	INSERT							UNLOCK					
ON													
START													

REMOVAL

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower panel (Refer to the BD group - "Crash pad").
3. Remove the ignition switch (A) after loosening the screw (B) with IG ON and disconnecting the 6P connector (C).



4. Remove the steering column cover (Refer to the ST group - steering column and shaft).
5. Remove the door warning switch and key illumination lamp (A) after loosening the screw and disconnecting the 6P connector.



6. If it is necessary to remove the key lock cylinder (A), Remove the key lock cylinder after pushing lock pin (B) with key ACC.



INSTALLATION

1. Install the key lock cylinder.
2. Install the door warning switch and key illumination lamp.
3. Install the steering column cover.
4. Install the ignition switch.
5. Install the crash pad lower panel.