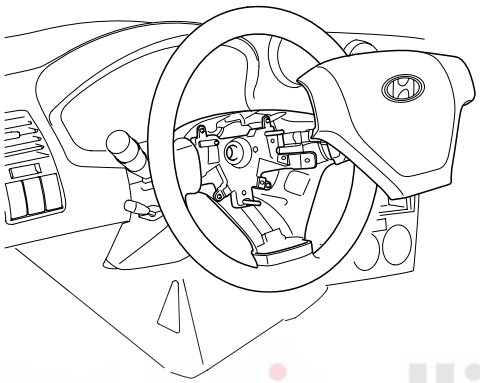
Body Electrical System

AUDIO SYSTEM

AUDIO REMOTE CONTROL

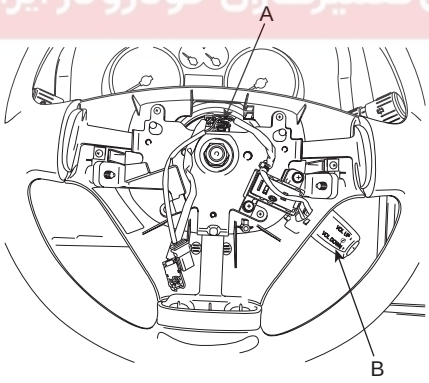
REPLACEMENT EC9CE3AE

1. Remove the driver airbag module. (Refer to the airbag group)



KROB210B

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

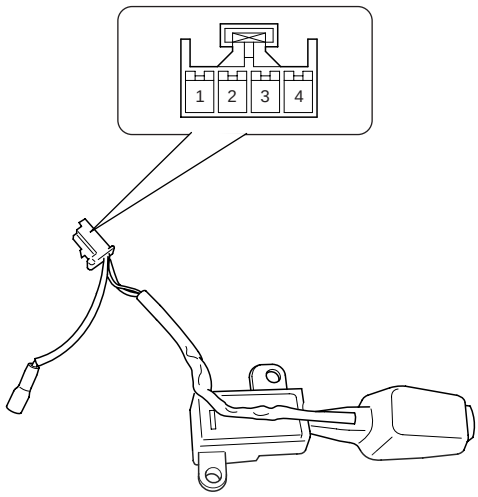


KTOF452A

3. Installation is the reverse of removal.

INSPECTION E9C8C6EF

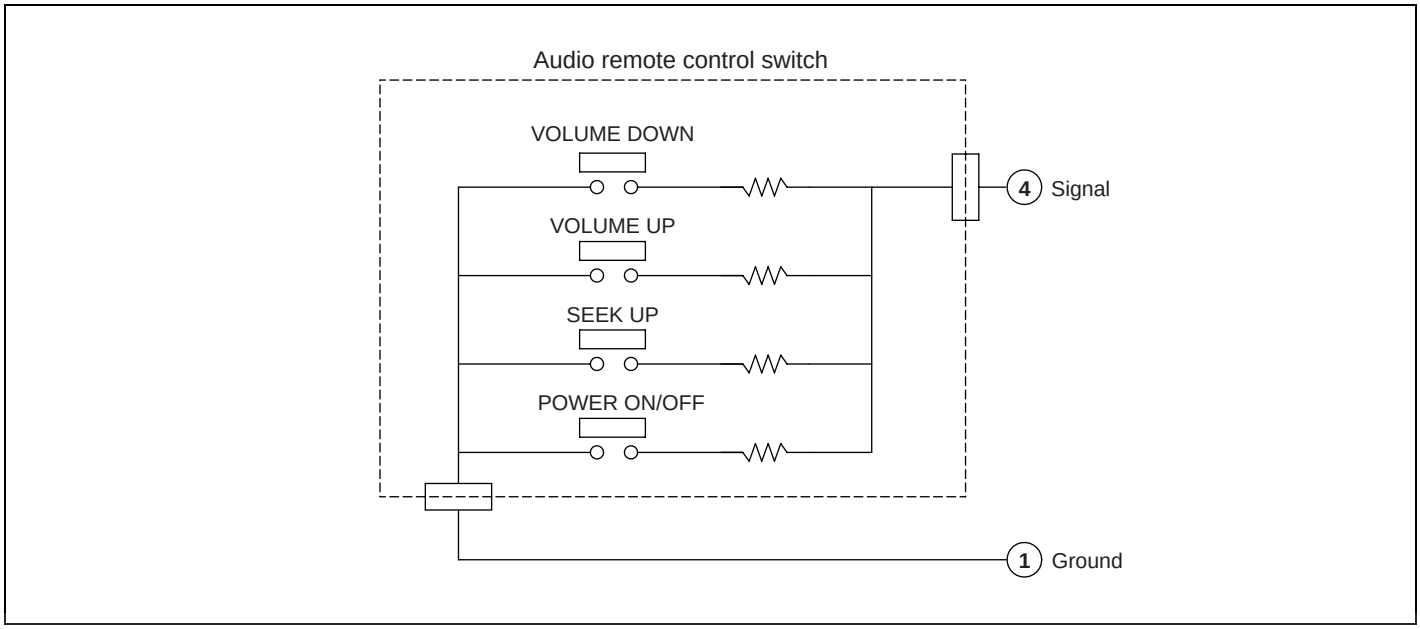
1. Check for resistance between No.1 and No.4 terminals in each switch position.



KTOF451D

Switch	Connector terminal	Resistance (±5%)
VOLUME DOWN	1 - 4	6.81 kΩ
VOLUME UP	1 - 4	4.61 kΩ
SEEK UP	1 - 4	430 Ω
POWER ON/OFF	1 - 4	100 Ω

CIRCUIT DIAGRAM EDA8D10A

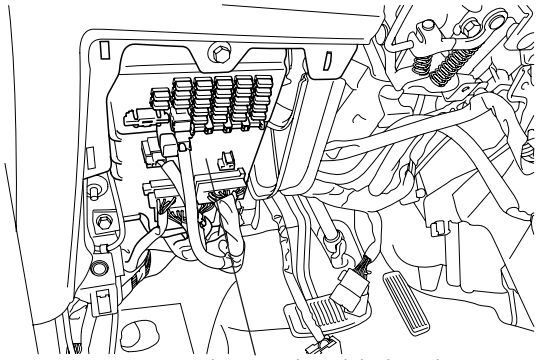


ETOF024C

ETACS (ELECTRONIC TIME AND ALARM CONTROL SYSTEM)

DESCRIPTION E2DEEB7A

Body Control Module (BCM) unify the functions of ETACS module, mirror folding unit, immobilizer unit, flasher unit, door lock relay, chime bell and keyless antenna.
BCM practices diagnosis with hi-scan to find out input or output error.

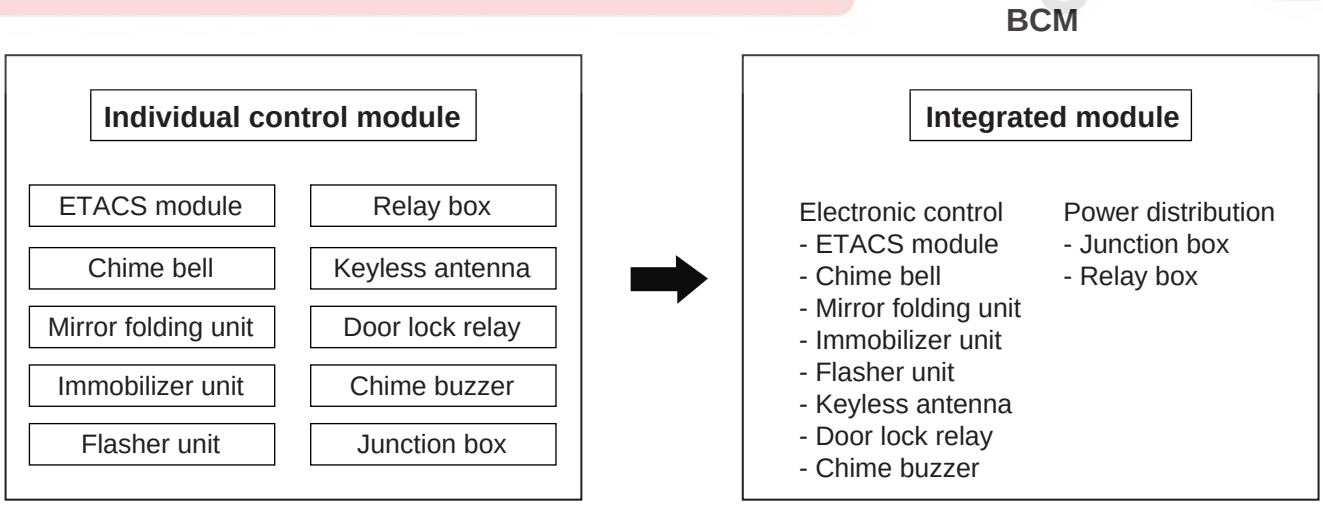


Body Control Module (BCM)

ETOC070A

ELECTRONIC TIME AND ALARM CONTROL MODULE

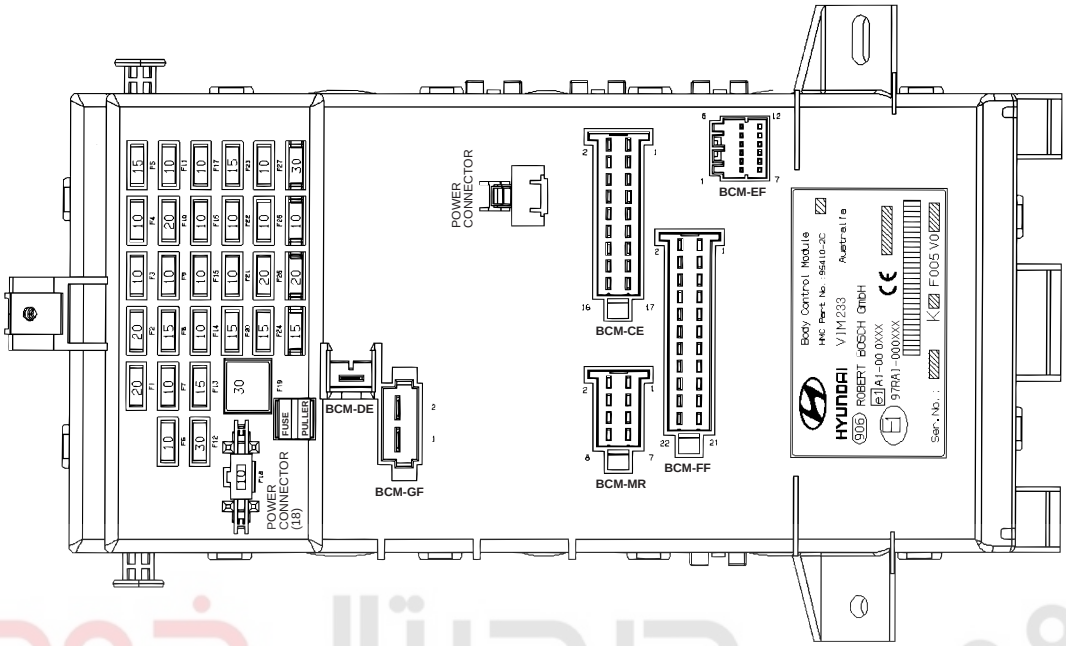
BCM BLOCK DIAGRAM EFAA490C



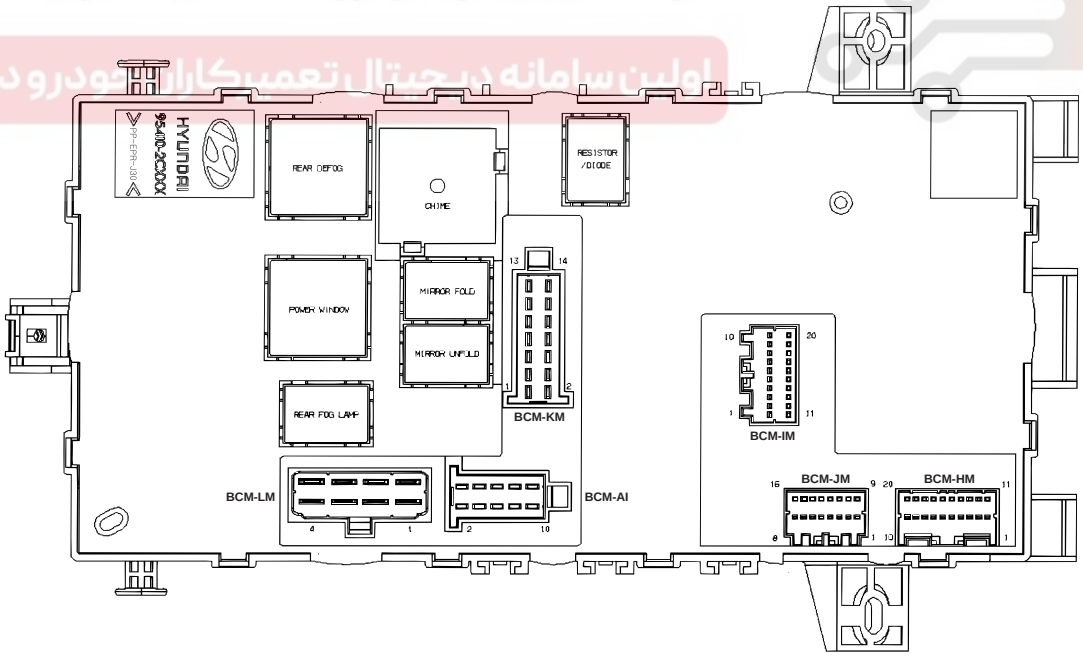
ETOC075A

BODY CONTROL MODULE (BCM)

[FRONT]



[REAR]



ETOF080A

BCM CONNECTOR TERMINAL

Connector	Pin	Description
BCM-AI	1	-
	2	-
	3	-
	4	SDM (IG1)
	5	RH seat belt buckle
	6	LH seat belt buckle
	7	Crash signal
	8	-
	9	Airbag diagnosis (From ESPS)
	10	Airbag warning lamp
BCM-CE	1	Head lamp low relay (S2)
	2	Rheostat
	3	Front wiper relay control
	4	Front fog relay (S1)
	5	Turn signal lamp (FR)
	6	Tail auto cut to DRL
	7	Tail relay (S2)
	8	Wiper switch power
	9	Turn signal lamp (FL)
	10	Position lamp (RH)
	11	Position lamp (LH)
	12	ABS module (IG1)
	13	ALT 'L'
	14	Fuse & relay box (IG2)
	15	Front wiper relay
	16	Washer motor
	17	-
	18	-
BCM-DE	1	B+50A
BCM-EF	1	Assist door key switch
	2	Tail gate unlock switch
	3	Assist door lock switch
	4	Assist door switch
	5	Folding switch
	6	Tail gate open switch
	7	Driver door key switch
	8	Driver door lock switch
	9	Driver door switch
	10	Seat belt switch
	11	-
	12	-
BCM-FF	1	Rear fog lamp relay
	2	Back up lamp
	3	-
	4	Outside mirror
	5	Tail lamp (RH)
	6	Sun roof lock
	7	-
	8	Sun roof unlock
	9	-
	10	Tail lamp (LH)
	11	4 Door switch
	12	Mirror unfolding
	13	Turn signal (RL)
	14	-
	15	Room lamp
	16	-
	17	Turn signal (RR)
	18	AMP
	19	Outside mirror heater
	20	Mirror folding
	21	Rear wiper motor (IG2)
	22	Tail gate switch
BCM-GF	1	Rear window defogger
	2	Power window switch

Connector	Pin	Description
BCM-HM	1	Immobilizer antenna 1
	2	2 Stage unlock GND
	3	Turn signal switch (RH)
	4	Door warning switch
	5	Tail lamp switch
	6	Rear fog lamp switch
	7	Code saver
	8	-
	9	Hood switch
	10	-
	11	Immobilizer antenna 2
	12	Option selection
	13	Turn signal lamp switch
	14	Auto light switch input
	15	-
	16	Head lamp switch
	17	Front fog lamp switch
	18	Hazard lamp switch
	19	Rear defogger switch
	20	Rear fog lamp indicator

Connector	Pin	Description
BCM-IM	1	Air conditioner switch
	2	Cluster battery charge
	3	-
	4	ESP switch (IG1)
	5	Cluster (IG1)
	6	Cluster (IG2)
	7	Cluster (Turn sig LH out)
	8	ECU (IG1)
	9	Cluster (Turn sig RH out)
	10	RR HTD switch
	11	Cluster (Airbag indicator)
	12	Diagnostic tool (B+)
	13	Digital clock (ACC)
	14	Immobilizer indicator
	15	External tail lamp (RH)
	16	Diagnostic tool (A/bag)
	17	Air conditioner (IG2)
	18	Auto light ground
	19	Diagnosis & code saving
	20	Immobilizer
BCM-JM	1	Multifunction switch- Intermittent wiper ground
	2	Siren control
	3	Key hole illumination
	4	Speed sensor
	5	Interior illumination
	6	Cluster (A/BAG warning indicator)
	7	DCT
	8	Door open indicator
	9	Multifunction INT
	10	Multifunction INT (T)
	11	Auto light signal
	12	Seat belt indicator
	13	Over speed ground
	14	-
	15	Auto light supply
	16	Tail gate open indicator

Connector	Pin	Description
BCM-KM	1	Cigar lighter
	2	Wiper low
	3	Wiper high
	4	Back up switch
	5	ACC
	6	Washer switch
	7	Back up lamp switch
	8	Start inhibit relay
	9	Seat heater switch (IG2)
	10	Room lamp
	11	Stop switch (B+)
	12	Ignition coil
	13	-
	14	Wiper parking
BCM-LM	1	Ground 1
	2	-
	3	A/CON Switch
	4	Ignition switch (IG1)
	5	Ground 2
	6	Wiper switch power
	7	Ignition switch (ACC)
	8	Ignition switch (IG2)
BCM-MR	1	Sunroof (IG2)
	2	Roof lamp (B+)
	3	Roof lamp decay control
	4	ECM
	5	-
	6	Sunroof & room lamp GND
	7	ECM mirror
	8	Sunroof (B+)

FUSE

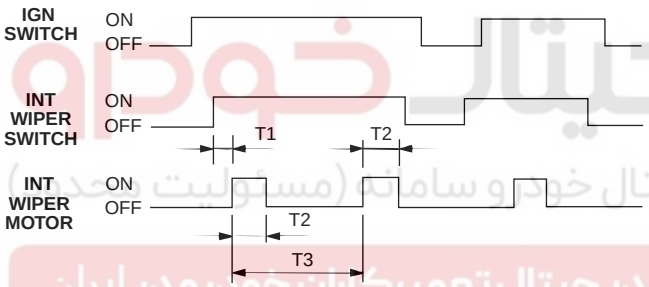
NO.	CAPACITY	DESCRIPTION
1	20A	Ignition coil (1.6L/2.7L), Electronic chrome mirror
2	20A	AMP
3	10A	Back-up lamp switch, Transaxle range switch, Stop lamp switch
4	10A	Instrument cluster (Airbag indicator)
5	15A	Airbag control module , Seat belt buckle switch
6	10A	Mirror defogger
7	10A	Hazard lamp relay
8	15A	Rear wiper motor, Rear intermittent wiper relay
9	10A	Right tail lamps, Glove box lamp
10	20A	Front wiper motor, Front wiper relay
11	10A	Blower relay, Blower motor
12	30A	Defogger relay
13	15A	Stop lamp switch, Folding /unfolding relay, Burglar alarm horn relay
14	10A	Left tail lamps
15	10A	A/C control module, Blower relay
16	10A	ECM, Multi gauge unit, TCM, Vehicle speed sensor
17	10A	Instrument cluster(Power), Alternator resister, DRL Control module, Pre-excitation resistor
18	10A	Room lamp, Clock, Audio, Data link connector, Multi gauge unit
19	30A	Power window relay
20	15A	Trunk lid switch
21	10A	AQS sensor, Head lamp relay, DRL Control module
22	10A	Rear fog lamp
23	15A	Cigar lighter, Outside mirror switch
24	15A	Sunroof , Power door lock/unlock relay
25	20A	Seat heater
26	10A	ESP/ABS control module
27	10A	Audio, Clock

INSPECTION EDCDAE0E

While operating the components, check whether the operations are normal with timing chart.

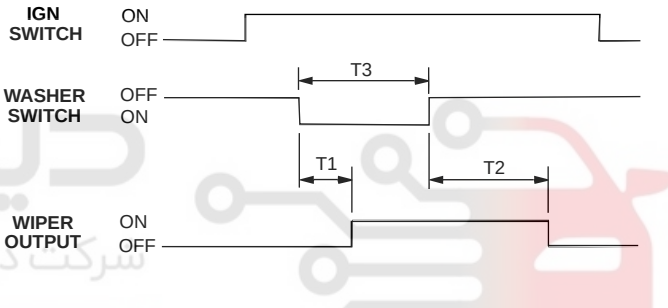
BCM FUNCTION

1. **Vehicle speed sensing intermittent wiper**
   Vehicle speed is determined by number of speed sensor pulses input in one second. The current speed and the previous speed for the vehicle is to be compared. The higher of the two values is to be used in the intermittenttime calculation. The previous value is updated every second.
   When Ignition 2 is on and the wiper switch is in the intermittent position, the wiper shall operate with speed dependant intermittent time. A single wipe is achieved by driving the wiper relay until the park switch is able to take over unless the dwell time between wipes is too short. In this case it wouldbe on all the time. This avoids unnecessary clicking of the wiper relay.



Time specification
T1 : Max. 0.5 sec.
T2 : 0.6~0.7 sec. (Time of wiper motor 1 rotation)
T3 : At vehicle speed = 0km/h.
2.6±0.7 sec. (VR=0kΩ)~18.0±1sec (VR=50KΩ)
At vehicle speed = 100km/h or more.
1.0±0.2sec (VR=0kΩ)~10.0±1sec (VR=50KΩ)

2. **Washer linkage wiper**
   IG2 must be on for this function to operate.
   When the washer switch is on for more than 0.3 sec, the wiper output is activated immediately. The length of time the washer switch is held foris then evaluated to determine the number of swipes required.
   If the washer switch is on for more than 0.2 but less than 0.6 sec, then wiper performs a single swipe. Alternatively, if the washer switch is held for more than 0.6s then the wipers must finish the current swipe theperform another two swipes.
   If washer switch is on less than 0.2 seconds make no wiper action.
   During intermittent wiping, a washer linkage wipe has higher priority.
   During start condition (IG1 on and IG2 off) washer input to be ignored. This is to prevent quality problem of single wipe occurring during startingof car.



a. Time specification
   T1 : 0.3 sec.
   T2 : 0.6~0.8 sec.
   (Time to complete current swipe only)
   T3 : 0.2 - 0.6 sec.
b. Time specification
   T1 : 0.3 sec.
   T2 : 2.5~3.8 sec.
   (Time to complete current swipe plus 2 swipes)
   T3 : 0.6 sec. or more

3. **Snow build up wiper bounce prevention (snow mode)**
Without this feature, as snow builds up at the base of the windscreen, it becomes more difficult for the wiper arms to completely reach the park position. Once the wipers have been turned off and the wipers have returned to the park position, the compacted snow is able to drive the wiper arms back up and reactivate the park switch. This, in turn, drives the wiper arms towardspark again and the cycle repeats itself.
This feature is required to prevent wiper bounce from happening when snow has accumulated on the windscreen.

Detection of wiper bounce
If the BCM detects that the wipers have parked more than a maximum amount times within a time period then wiper bounce is detected. The maximum amount of times can be set in EEPROM using the variable wipe snow parks. The time can also be set in EEPROM using the variable wipe snow time. The units ofwipe snow time is milliseconds.

Bounce prevention
If wiper bounce has been detected then the wiper bounce prevention relay is driven to open circuit. The wiper bounce relay is in series with the park switch and thus can prevent automatic parking. This relay is normally closed.

Termination of bounce prevention
Termination is achieved by ceasing to drive the wiper bounce relay to open circuit. Bounce prevention can be terminated in the following ways:
- Ignition off. The power source for the wiper motor is derived from IG2, thus there will be no drive to park with ignition off. As such bounceprevention is not required.
- The wiper stalk has moved from the OFF position.

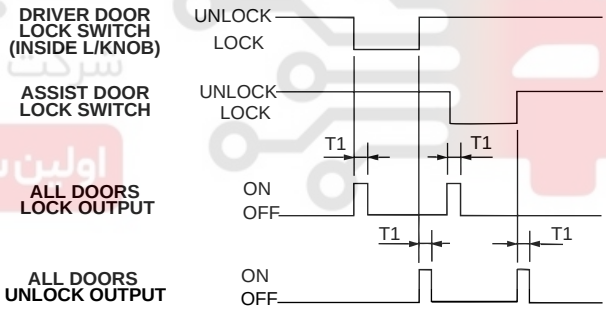
4. **Wiper motor stall protection**
This feature offers some protection to the wiper motor if ice has frozen the wiper blades to the windscreen or the wipers have jammed for some other reason. During low and high wiper selection, no protection is offered sincethe stalk drives the wiper motor directly.

If the wiper motor has not parked within wipe stall time, then wiper motor is considered to have stalled. In this case, the wiper bounce relayis driven to open circuit until either of the following events occurs:
- The ignition has been switched to the off position.
- The wipers have returned the park position by a manual operation (Low or high speed selected)
- The wiper stalk has moved from the OFF position.

Wipe stall time can be set in EEPROM and it's units are 100ms.

During INT operation, if the time between initiating and concluding a wipe is greater than Wipe stall time then the wiper motor is also considered to have stalled. In this case, the current wipe is terminated and INT operationis cancelled until either of the following events occurs:
- The wiper stalk has moved from the OFF position.
- The ignition has been switched off.

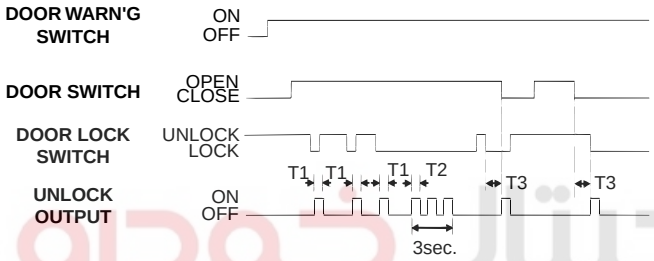
5. **Knob activated central locking**
If either the drivers door lock or the assistant door lock is moved from the locked position to the unlocked position then all other door locks will follow, but the tailgate will not change state. Conversely, if the drivers door lock or the assistant door lock is moved from the unlocked position to the locked position then all other door locks will follow. Locking and unlocking is achieved by driving the door lock motors in the respective direction for0.5 seconds.
Installation of the battery should not change the state of the locks.



ETHA115H

Time specification
T1 : 0.5±0.1 sec.

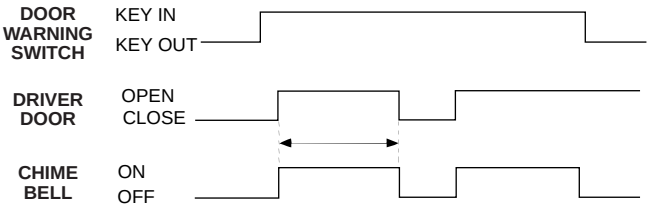
6. **Ignition key reminder (Locking of key in vehicle prevention)**
If the key is in the ignition and the driver's door or assist door is open and the vehicle is locked using driver's knob or assist knob, then the central locking system will issue an unlock pulse of duration 1 second tothe all doors thus preventing locking of the vehicle.
If a Knob remains locked, then the central locking shall issue a maximum of 3 pulses of 0.5 second duration to unlock the vehicle. If during thesepulses, the door lock knob becomes unlocked, stop the next pulse.
If vehicle speed is greater than 3 km/h, ignition key reminder function is disabled.
If door warning switch is off and ignition input is on then ignition key reminder function is disabled.



ETNC090A

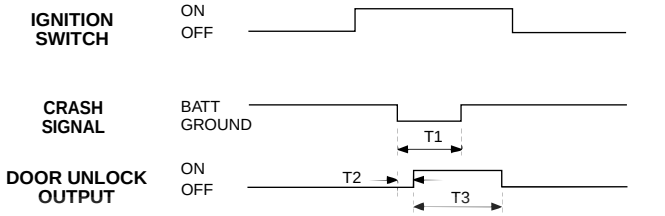
Time specification
T1 : 1 sec.
T2 : 0.5 sec.
T3 : Max. 0.5 sec.

7. **Key operated warning (key in ignition reminder chime)**
If the key is in ignition key cylinder and the drivers door is opened, the chime bell sounds. This tone is the same as the seatbelt warning chime and over speed warning chime. The chime sound is generated with a 800Hz drive, amplitude modulated with an exponentially decaying envelope of time constant 1±0.25 seconds. If the door is closed or the key is removed,the chime stops immediately.



ETOC100E

8. **Crash detection - Unlock**
If IG1 is on and a crash signal is received, send an unlock pulse to the door locks. Unlock signal must occur within 12 ±5 msec after crash signal is received. Unlock pulse is 5 sec period. If crash unlock is not usedin a particular variant then the crash input is to be left floating.
The crash sensor is normally high. A crash signal is defined as when voltage is below 1.5V. Crash input signal characteristic: Normal hi & 200msec period ground after crash. Only one crash unlock can occur duringone ignition on cycle.



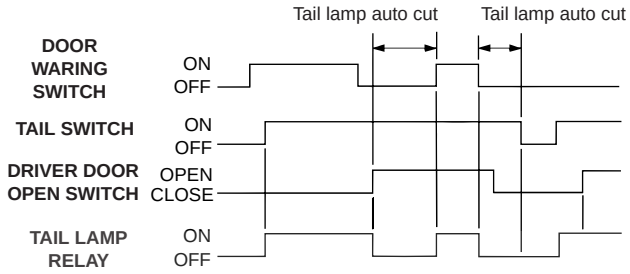
ETOC100F

Time specification
T1 : 200 msec.
T2 : 12 ± 5 msec.
T3 : 5 sec.

9. **Auto light control**
Lights must be turned on 500±100 msec. after the input light to the light sensor has been received.
Lights must be turned off 3±1 sec. after the input light to the light sensor has been removed. Head lamps must be turned off 300msec before the tail lamps are switched off. When the headlight switch is in the auto position and light intensity fulfilling the table below is detected, the tail lamp and the head lamps will be turned on. These figures are based upon theuse of untinted solar glass.
The headlamps must remain on when the headlamp switch is rotated from the ON to the AUTO position until such time that the light sensor input isevaluated as per the following table.
If the option select input is grounded, both the headlamps and the tail lamps shall illuminate when the voltage drops below the tail lamp threshold. When the voltage rises above the tail lamp threshold, both the headlampsand the tail lamps shall extinguish.

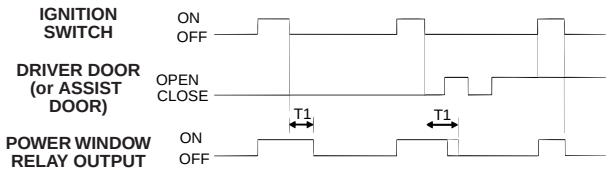
	Tail lamp	Head lamp
ON	1.77 ± 008V	0.61 ± 0.06V
OFF	3.47 ± 0.10V	1.00 ± 0.06V

10. **Tail lamp auto cut**
When key is in the ignition key cylinder and tail lamp switch is on, followed by removing key from ignition and then opening of the drivers doors will turn off the tail lamp relay. If driver door is opened first, followedby removing key from ignition, then tail lamp is switched off.
If tail lamps have been cut automatically, and then the tail lamp switch is turned off and on, then tail lamp is switched on and auto cut function is cancelled. If tail lamps have been cut automatically, and the ignition-key is inserted, then tail lamps are turned on.



ETOC100G

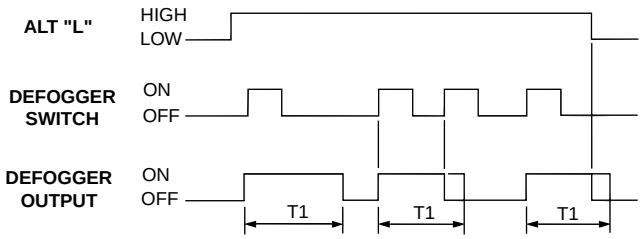
11. **Power window timer**
When Ignition 2 is on, the power window relay output is turned on.
When Ignition 2 is turned off the power window feed is maintained on for 30 seconds and then turned off.
If the driver door or assist door is opened during 30 sec interval the output shall be turned off immediately.
If doors are open and ignition 2 is then turned on, the output shall be turned on immediately. If doors are open and ignition 2 is then turnedoff, the output shall be turned off immediately.



ETOC100H

Time specification
T1 : 30±3 sec.

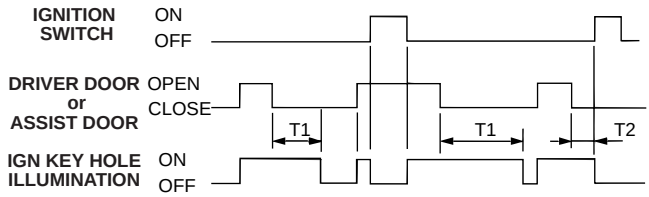
12. **Rear defog control (Rear demister control)**
When the engine is running (Alternator"L"is high) a contact of the rear defog switch (momentary action) will switch the rear defog relayoutput on for 20 minutes duration.
If the rear defog switch is pressed again during this time, or if the engine stops, the rear defog relay is immediately switched off.



ETOC100I

Time specification
T1 : 20±1 min.

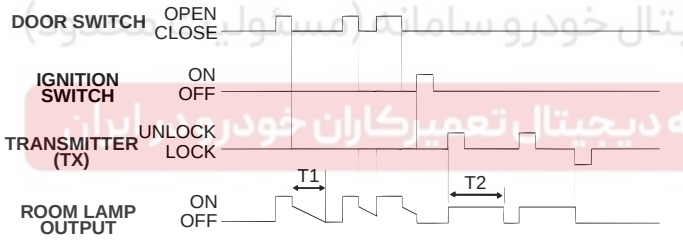
13. **Ignition key hole illumination**
When the drivers door is open, the ignition key illumination is turned on.
When driver door is closed, illumination is on for 10 sec., then off.
When the assist door is open, the ignition key illumination is turned on.
When assist door is closed, illumination is on for 10 sec., then off.
The key illumination is extinguished immediately when the ignition 1 comes on.
Locking of the vehicle from the transmitter (arm state) shall extinguish ignition key Illumination.



ETOC100J

Time specification
T1 : 10±1 sec.
T2 : 0~10 sec.

14. **Decayed room lamp (Illuminated entry with fade out)**
When the first door (driver, or assist) is opened, the interior light shall brighten to full intensity in less than 0.5 seconds.
When the last door is closed, the room lamp will drop to 75% intensity then fade out over 5.5±0.5 seconds.
If the ignition 2 is switched on when room light is fading out, the room lights switch off immediately.
If the door open signal is on for less than 0.1 seconds, then no illumination occurs.
Lamps must not flicker during fade operation, If a door open or ignition on.
When transmitter (TX) unlock is received, room lamps are turned on in less than 0.5 second for maximum 30 seconds.
While room lamp is on due to TX unlock, if another TX unlock is received, then room lamp is again on for 30 sec.
When TX lock(arm state) is received during 30 second from TX unlock, lamp is turned off immediately.
If TX lock (arm state) is received during fade out, the room lamp is switched off immediately.
Door locking functions should not be influenced by room lamp decay functions.



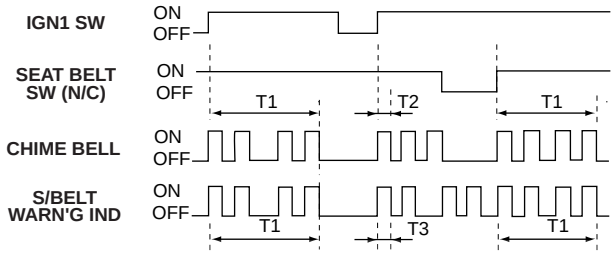
ETOC100K

Time specification
T1 : 5.5±0.5 sec.
T2 : 30 sec.

15. **Seat belt warning**

1) **Seat belt warning indicator**
Whenever the ignition 1 is turned on the seat belt warning indicator is illuminated for total time 6 seconds, with period 0.6 sec and duty rate50%. It is not extinguished if the seat belt is sensed as fastened.
If ignition 1 is already on and the seat belt is removed, the indicator is illuminated for total time 6 seconds, with period 0.6 sec and duty rate50%.
If ignition 1 is switched off in while the indicator is illuminated, the illumination is switched off immediately.

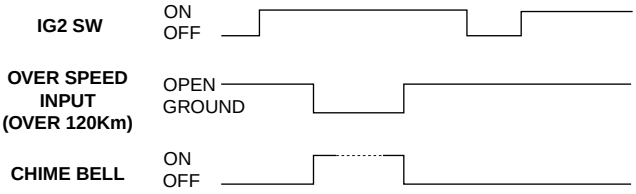
2) **Seat belt warning chime**
Whenever the ignition 1 is turned on the seat belt warning chime is sounded for total time 6 seconds, with period 0.9 sec and duty rate 50%. Itis silenced immediately if the seat belt is sensed as fastened.
If ignition 1 is already on and the seat belt is removed, the chime is sounded for total time 6 seconds, with period 0.9 sec and duty rate 50%.
If ignition 1 is switched off in while the chime is sounding, the chime is switched off immediately.



ETOC100L

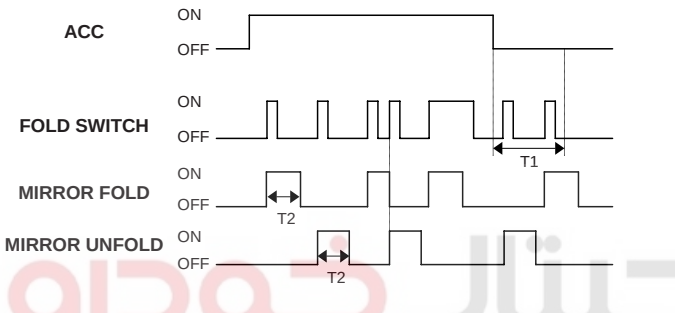
Time specification
T1 : 6±1 sec.
T2 : 0.45±0.1 sec.
T3 : 0.3±0.1 sec.

16. **Over speed warning chime**
If the IGN2 is on, and the over speed input is grounded by cluster, chime is sounded until over speed input by cluster is opened.



ETOC100A

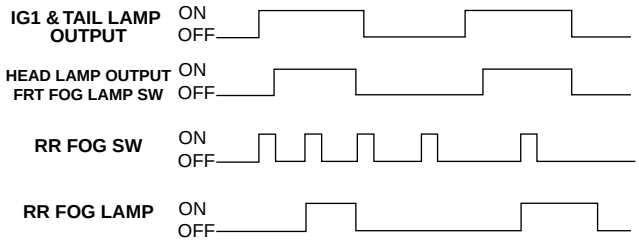
17. **Folding mirror unit**
If ACC is on, with each press of the folding mirror switch, the mirror fold and unfold outputs will operate alternatively for 16±6 sec. A second press of the fold switch during an output shall cause the oppositeoutput to occur.
If the folding mirror switch is pressed within 30 seconds after the ACC signal is removed, the mirror outputs (folding or unfolding) will operate for 16±6 sec. If during the mirror operation, the folding mirror switch is pressed again then the opposite operation will commence again. If after the ACC signal is removed, the folding mirror switch is repressed within the 16±6 sec, the mirror outputs will operate for a further 16±6sec.



ETOC100M

Time specification
T1 : 30 sec.
T2 : 16±6 sec.

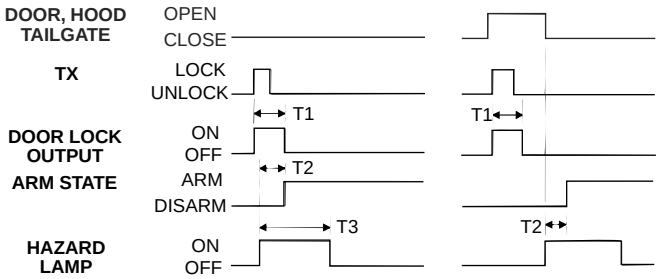
18. **Rear fog lamp control**
When IGN1 is on and:
- Tail lamps are on by switch or auto light
- Headlamps are on by switch or auto light or front fog switch is on, then if rear fog switch is contacted the rear fog lamps are turned on.



ETOC100B

ANTI-THEFT FUNCTION

1. **Arm function**
Pressing the remote key lock button will result in a 0.5-second pulse issued to lock all doors.
Pressing the remote keypad unlock button once will result in a 0.5-second unlock pulse issued to unlock all doors.
As part of the arming sequence the alarm first enters a pre-armed state before falling into the armed state. During this pre-armed state alarm triggers are ignored. Pre-armed state can be reached from the alarmed state, the start inhibit state or the disarmed state. Pre-Arming of the alarm can be achievedby a press of the lock button on the remote key.
In the pre-armed state the visible and audible warnings are disabled.
This system enters the armed state if it is in the pre-armed state and, after 0.6 sec, check actuator lock and each door, hood and tail gate close,and no door warning switch (no key in ignition).
On entering the arm state, a single flash of the hazard lamps is given, period of cycle 2 second, duty rate 50%.
If TX lock signal is received when a door, tail gate or hood is open, then lock output is given and a flash of hazard is not given.
After the armed state is entered, if a lock signal is received then a single flash of the hazard lamps is given, period of cycle 2 second, dutyrate 50%.
The armed state cannot be reached by locking the car with the keys.

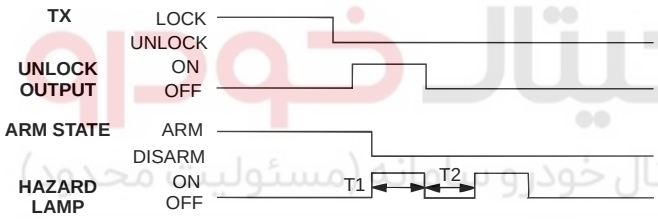


ETHA115Q

Time specification
T1 : 0.5sec.
T2 : Max 2sec.
T3 : 1.0±0.2sec.

2. **Disarm function**
Disarming can be performed while the alarm is armed, or alarming, or after alarming. The alarm can be disarmed by the following methods:
- Pressing the unlock button on the TX key. The hazard lamps shall be flashed twice for 1sec period (of cycle), 50% duty rate.
- If door warning switch is on, IGN1 and IGN2 are on in arm state, then arm state should be immediately cancelled. This means that the driveris inside the vehicle before pushing TX lock, so system should not arm.

In the disarm state the visible and audible warnings are disabled and start is enabled.
In the disarm state, if TX key unlock command is received, then the hazard lamps shall be flashed twice for period of cycle 1 sec, 50% duty rate.
Disarm state cannot be reached using the door locks by key.



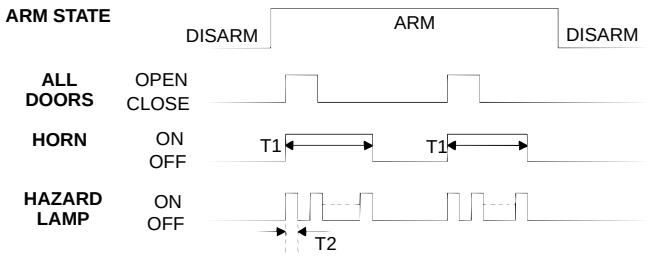
ETHA115R

Time specification
T1, T2 : 0.5±0.1sec.

3. **Alarm function**

1) European countries
Once armed, should any door, hood or the tailgate be opened, then:
- Start relay drive output is disabled, so starting is inhibited.
- Audible (horn) and visual (hazard lamp) warnings are issued, for 27seconds duration. The horn warning is continuously occurring in this period.The hazard lamps operate with 1 sec period, 50 % duty rate.

The alarm is given in the case where a door is opened with a key.

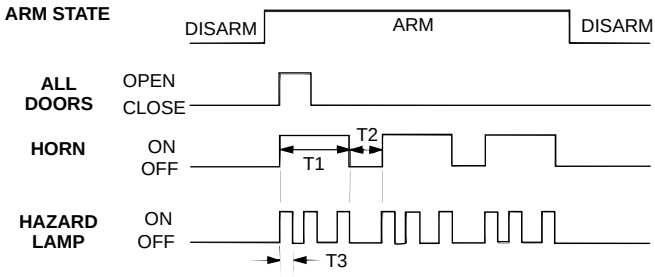


ETOC100C

Time specification
T1 : 27±2 sec.
T2 : 0.5±0.1 sec.

2) Non European countries
Once armed, should any door, hood or the tailgate be opened, then:
- Start relay drive output is disabled, so starting is inhibited.
- Audible (horn) and visual (hazard lamp) warnings are issued, for three cycles, each cycle 27±1 sec. duration on, 10±1 sec. off. The horn warning is continuously occurring during the on period. The hazardlamps operate with 1 sec period, 50 % duty rate during the on period.

The alarm is given in the case where a door is opened with a key.
After this time, the system maintains the start inhibit state, where no audible and visual warnings are issued but engine starting is not possible.



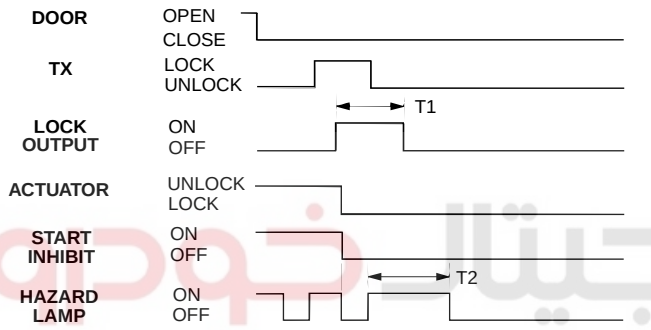
ETOC100D

Time specification
T1 : 27±2 sec.
T2 : 10±1 sec.
T3 : 0.5±0.1 sec.

4. **Operation during alarm conditions**

1) **Cancelling audible alarm with the remote transmitter**

CASE 1 : Door closed
During or after alarming and then closing all doors and a TX lock signal is received Then
- The lock command is executed with 0.5 sec. ON
- Horn and start inhibition are OFF
- Hazard lamp is flashed one time (period : 2 sec., duty: 50%, within 2 sec.)
- The state goes to arming mode (after a lock state check)
- The start is enabled

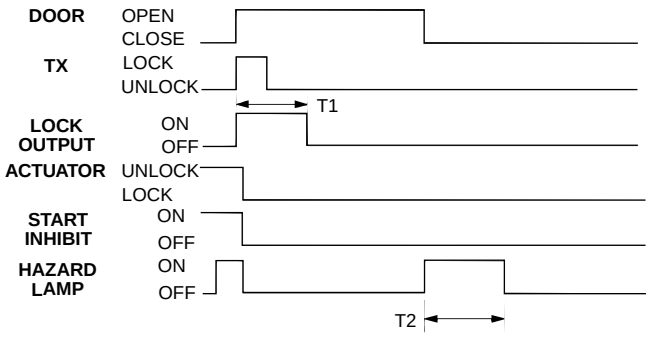


ETHA115V

Time specification
T1 : 0.5 sec.
T2 : 1.0±0.2 sec.

CASE 2 : Door Open
During or after alarming, with a door open and a TX lock signal is received Then
- The lock command is executed with 0.5 sec. ON
- Horn is disabled and start is enabled after confirmation of actuator lock

At this time, when the door is closed,
- Hazard lamp is flashed one time (period : 2 sec., duty 50%)
- The state goes to arming mode

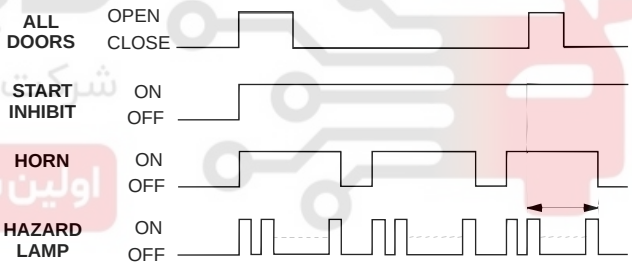


ETHA115W

Time specification
T1 : 0.5 sec.
T2 : 1.0±0.2 sec.

2) **New alarm conditions**
Second alarm condition during alarming.
When another alarm occurs during alarming, the starting is disabled, and the alarm continues to sound for the remained time of warning signal. The alarm continues to sound after the second alarm condition is removed.
New alarm condition occurs after alarming (with all entrances closed)
If any entrance is opened again then
- The horn is ON 3 times (EC area : one time for 27sec.)
- Start is disabled
- Hazard lamps flash during the ON time of horn

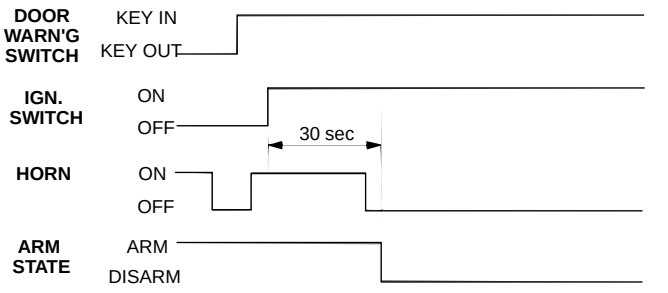
New alarm condition occur after alarming (with any entrance open).
If another entrance is opened, the BCM keeps start disabled and there is no horn output.



ETOC100N

3) **Key operation during alarm**
After the alarm state or start inhibit state are entered, if door warning switch on (key in ignition) & IGN 2 ON, if IGN 2 state is changed to OFFwithin 30sec, remain in alarm state.

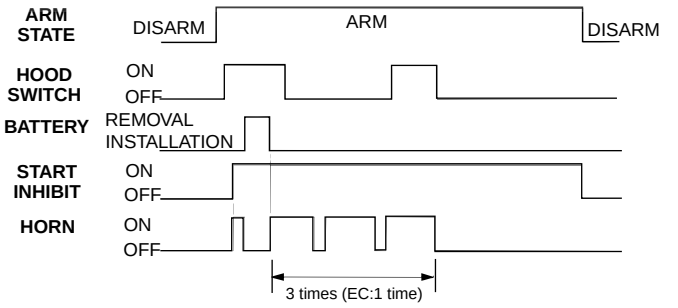
4) **Disarming using the key**
During alarming, in case that door warning switch (key in) is ON and then IGN1 and IGN2 are both ON for 30 sec continuously, the alarm is cancelled,and the system enters the disarm state.
After alarming, in case that door warning switch (key in) is ON and then IGN1 and IGN2 are both ON for 30 sec continuously, the alarm is cancelled,and the system enters the disarm state.



ETOC100O

5. **Alarm state in power down**
If the battery is disconnected to the BCM in the following states:
- Alarm
- After alarming

Upon restoring the battery, the alarm state shall be entered and the alarm cycle shall restarted (timer reset to 0).
If the battery is disconnected in arm state, upon restoring the battery, arm state is resumed.



ETHA115Z

6. **Automatic relocking**
If either:
a. Car is unlocked but all doors closed, or
b. Car is closed and locked by keys, or
c. Car is closed, locked and in armed state.

Then if an unlock command sent from the TX key is received by the BCM, and within 30 seconds no door, hood or tail gate has been opened or TX lock received, then the BCM will instigate a lock doors function and enter arm state. A single flash of the hazard lamps is given, period of cycle 2 second,duty rate 50%.
If another unlock command is sent within this time then reset timer.
If a door is already open and an unlock command is received, then the auto relocking function shall be disabled. Even in the case where the dooris closed within 30 seconds.

7. **Tail gate alarm triggers**
During the armed state, if the tail gate is opened by the key switch, the car remains in the armed state and does not enter the alarm state. Whilst the tailgate is open, the hood, drivers and passenger doors are still armed and capable of causing an alarm trigger. Once the tail gate is closed, the tailgate trigger rearms after two seconds. If the interior tailgate release switch is pressed whilst the car is armed and the tailgate has been closedand armed, the alarm state will be entered.
If the tailgate is unlocked and not opened within 25 seconds, the tailgate section will once again be armed and capable of trigger.

8. **PANIC**
If the BCM is alarm has not been triggered, pressing the remote keypad panic button once will result in audible (horn) and visual (hazard lamp) warnings for 30 seconds.
The horn sounding is be synchronised to the indicator flash.

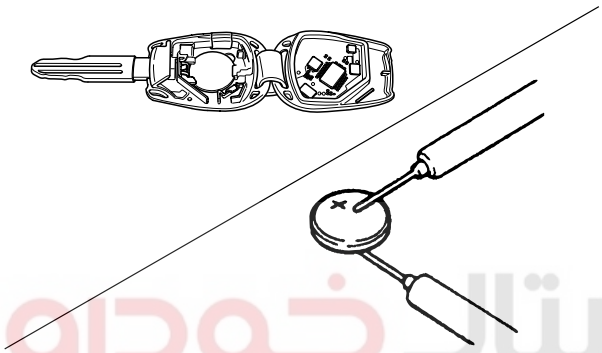
The sounding is immediately cancelled by the following conditions:
- A press of the Transmitter, Panic button
- A press of the Transmitter, lock button
- A press of the Transmitter, unlock button
- Automatic re-locking
- Key in ignition
- Alarm triggered

TRANSMITTER

INSPECTION E11906B9

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

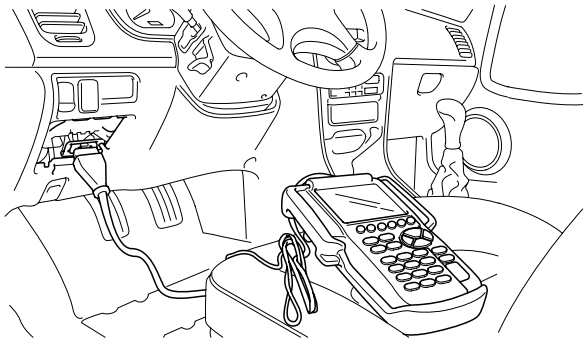


KTOF029A

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 door lock still does not operates, register the transmitter code, then try to lock and unlock the doors.
5. If the door lock still does not operates, replace the transmitter.

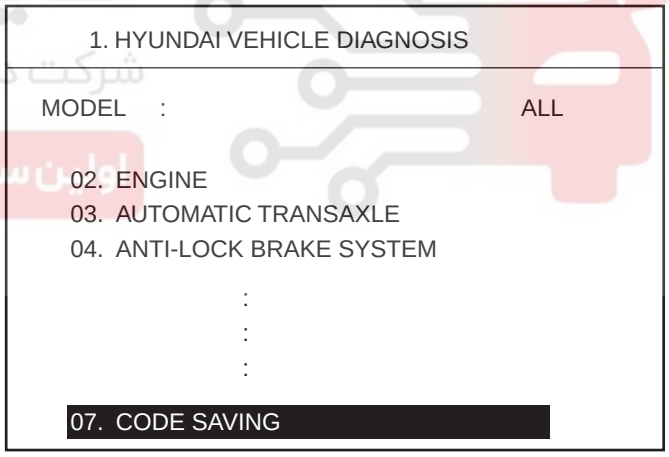
TRANSMITTER CODE REGISTRATION E7F8EA0A

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



KTOB211A

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



ETOF211B

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

KEYLESS ENTRY CODE SAVING
1. REMOVE THE IG.KEY FROM KEY CYLINDER. 2. CONNECT THE DLC CABLE TO THE 16 PIN DATA LINK CONNECTOR. 3. AFTER PRESSING [ENTER], FINISH CODE SAVING WITHIN 10 SECONDS. 4. PRESS [ENTER], IF YOU ARE READY!

ETQF065M

4. After removing the ignition key from key cylinder, push "ENTER" key to proceed to the next mode for code saving. Follow steps 1 to 3 and then code saving is completed.

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

ETQF065N

CAUTION

Take care when you remove the diagnostic tool connector. Don't remove it with holding the wiring by hand. Please hold the body of it.

LIGHTING SYSTEM

HEAD LAMPS

SPECIFICATION E89E250F

Items	Bulb wattage (W)
Head lamp	55W (High / Low beam)
Front turn signal/position lamp	28W / 8W
Front position lamp	5W
Front fog lamp	51W
Rear combination lamps Tail/stop lamp Back up lamp Turn signal lamp	 8W / 27W 21W 21W
Side marker lamp	5W
Luggage lamp	5W
Center high mounted stop lamp	Internal type : 2.4W (LED) External spoiler type : 3.5W (LED)
Overhead console lamp	10W x 2
License plate lamp	5W x 2

ADJUSTMENT EE60E9A0

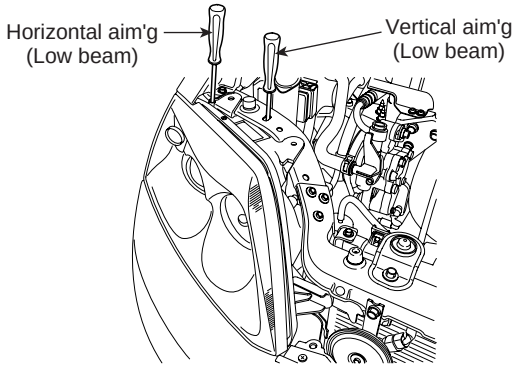
HEAD LAMP AIMING

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

> ***NOTE***
>
> *If there are any regulations pertinent to the aiming of headlamps 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 headlamp aiming. If beam-setting equipment is not available, proceed as follows:

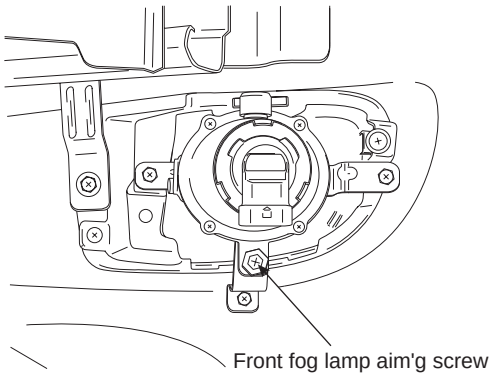
1. Inflate the tires to the specified pressure and remove any loads from the vehicle except the driver, spare tire, and tools.
2. The vehicle should be placed on a flat floor.
3. Draw vertical lines (Vertical lines passing through respective headlamp centers) and a horizontal line (Horizontal line passing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



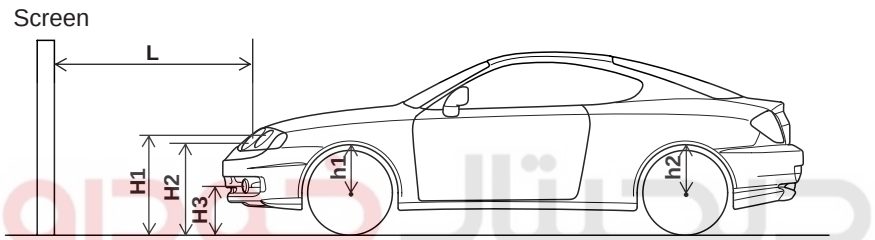
ETOF100A

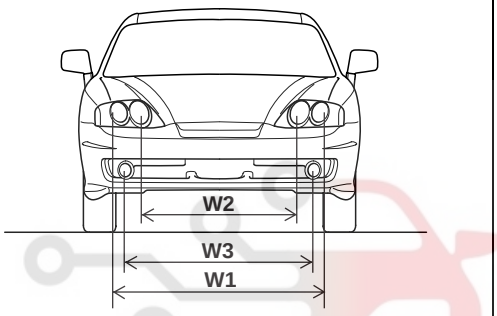
FRONT FOG LAMP

The front fog lamps should be aimed in the same manner as the head lamps.
With the front fog lamps and battery normal condition, aim the front fog lamps by using the adjusting wheel.



ETOF100B





KTOB001H/I

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 head lamp bulb center (low beam)
W2 : Distance between the head lamp bulb center (high beam)
W3 : Distance between the fog lamp bulb center

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

h1 : Height of front ride
h2 : Height of rear ride

ETOC310B

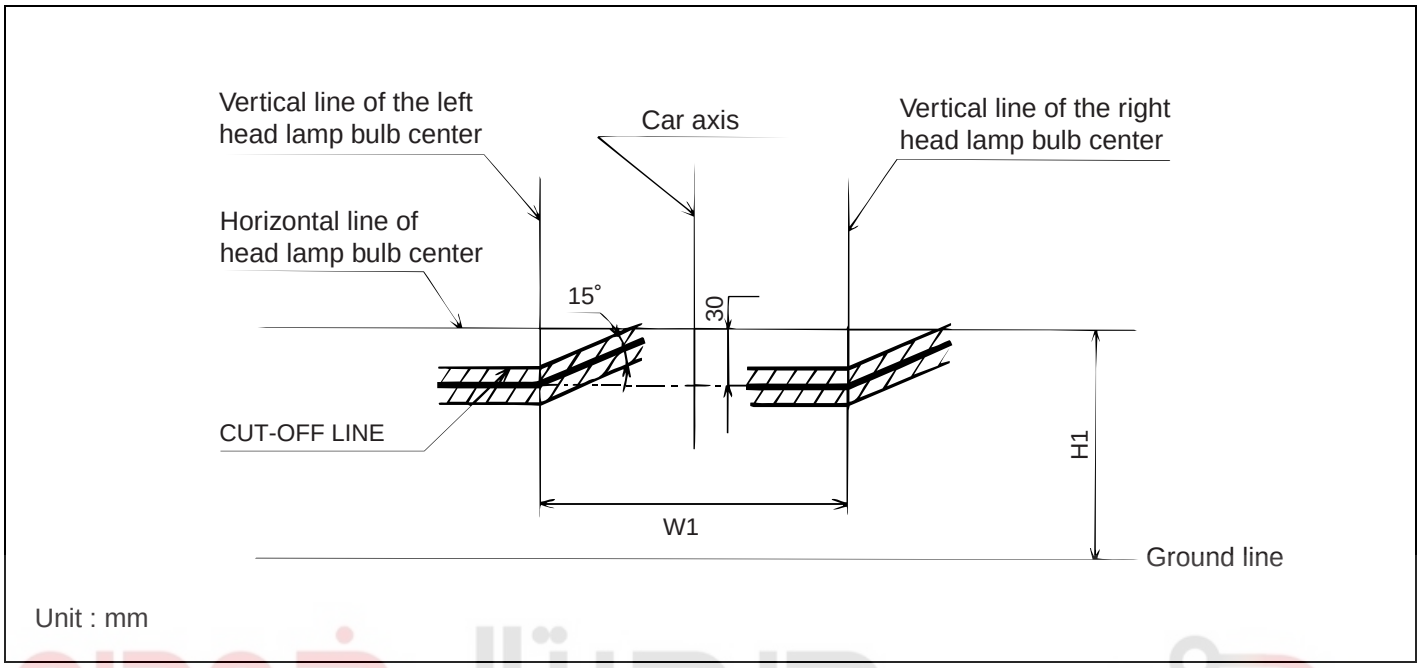
HEAD LAMP AND FOG LAMP AIMING POINT

Unit : mm

Vehicle condition	H1	H2	H3	h1	h2	W1(STD)	W2	W3	L
Without a driver	679	672	354	366	349	1202	966	1,240	3,000
With a driver	673	666	348	-	-				

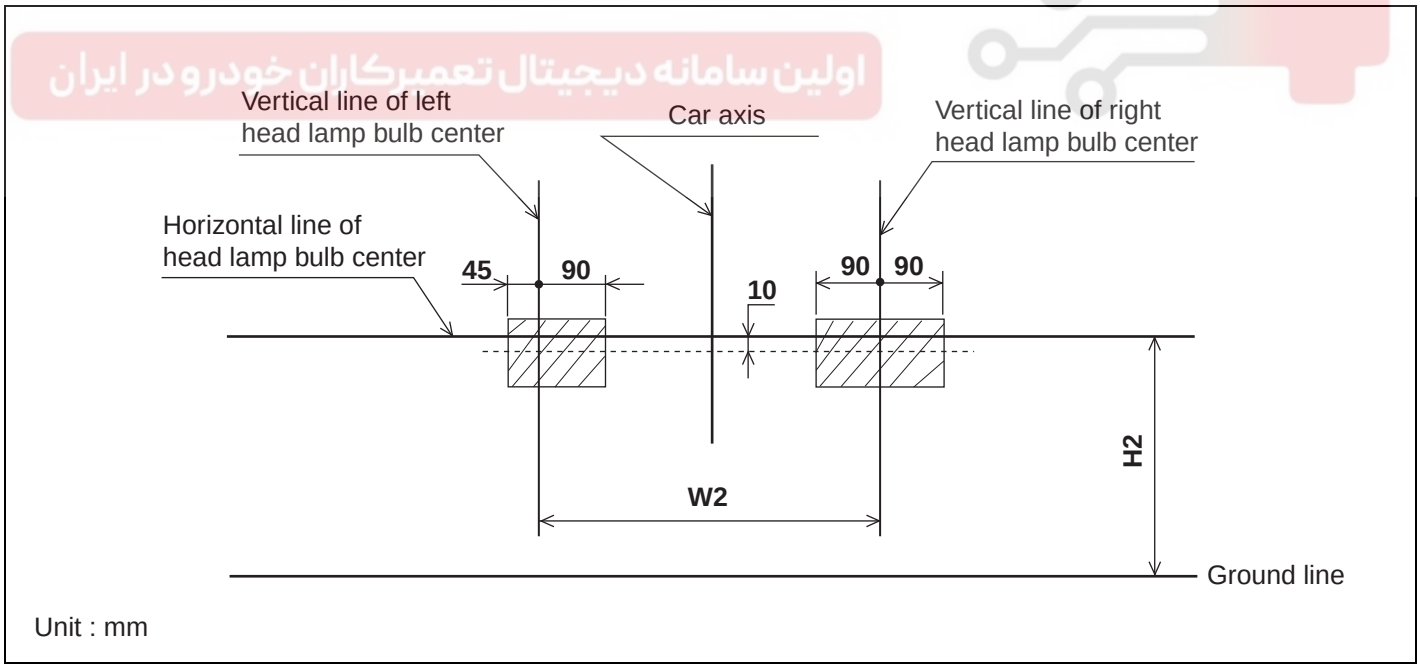
ETOF295B

1. Turn the low beam on without driver aboard.
   The cut-off line should be projected in the allowable range (shaded region).



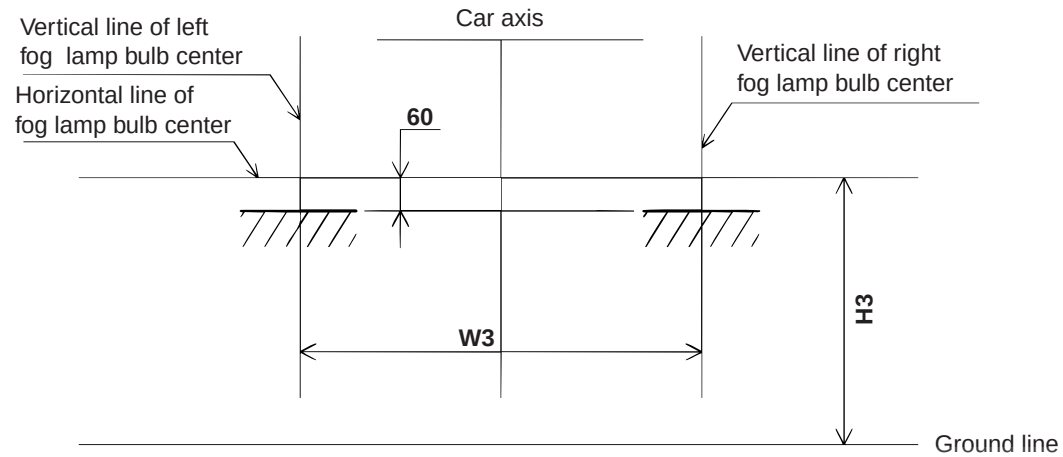
ETOF295C

2. Turn the high beam on without driver aboard.
   The hot-zone should be projected in the allowable range (shaded region).



ETOF310E

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



Unit : mm

ETOF310F