

# Body Electrical System

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**GENERAL****SPECIFICATIONS** ETKA0010**MULTIFUNCTION SWITCH**

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

**INSTRUMENTS AND WARNING SYSTEM**

Warning lamps	Bulb wattage (W)/Trip computer	Color
Illumination	3.4/LED	Yellow green/Blue
High beam	3.0/LED	Blue
Low fuel	3.0/LED	Amber
Turn signal (LH, RH)	1.4/LED	Green
Battery (charge)	1.4/LED	Red
Oil pressure	1.4/LED	Red
Air bag	1.4/LED	Red
Parking brake	1.4/LED	Red
Seat belt	1.4/LED	Red
Check engine	1.4/LED	Amber
ABS	1.4/LED	Amber
Door ajar	1.4/LED	Red

Warning lamps		Bulb wattage (W)/Trip computer	Color
Trunk lid open		1.4/LED	Red
Cruise		1.4/LED	Green
Fog lamp		1.4/LED	Green
Immobilizer		1.4/LED	Amber
TCS		1.4/LED	Amber
O/D OFF		1.4/LED	Amber
Glow (Diesel)		1.4/LED	Amber
Water separator (Diesel)		1.4/LED	Amber
Vacuum brake (Diesel)		1.4/LED	Red
A/T	P	1.4/LED	Green
	R	1.4/LED	Amber
	N	1.4/LED	Green
	D	1.4/LED	Green
	3	1.4/LED	Green
	2	1.4/LED	Green
	L	1.4/LED	Green

LED : Light Emitting Diode

## SERVICE SPECIFICATIONS

ETKA0100

## INDICATORS AND GAUGES

Items	Specifications																																																																																																						
Speedometer																																																																																																							
Type	o Cross - coil type / Stepper motor type (trip computer)																																																																																																						
Input spec.	o Hall IC type : 4 pulses/rev.																																																																																																						
Indication	o Km/h : 637 rpm x 4 pulses/rev. indicates 60 Km/h																																																																																																						
	o MPH : 1026 rpm x 4 pulses/rev. indicates 60 MPH																																																																																																						
Standard values	<table border="1"> <tr> <td>Velocity (Km/h)</td> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>100</td> <td>120</td> <td></td> </tr> <tr> <td>Tolerance (Km/h)</td> <td>20-24.4</td> <td>40-43</td> <td>60-64.4</td> <td>80-85.5</td> <td>100-105.5</td> <td>120.5-126</td> <td></td> </tr> <tr> <td>Tolerance (Km/h)</td> <td>20-24.4</td> <td>40-44.4</td> <td>61-65.4</td> <td>81-86.5</td> <td>102-107.5</td> <td>123-128.5</td> <td></td> </tr> <tr> <td>Velocity (Km/h)</td> <td>140</td> <td>160</td> <td>180</td> <td>200</td> <td colspan="3">Remarks</td> </tr> <tr> <td>Tolerance (Km/h)</td> <td>140.5-146</td> <td>160.5-166</td> <td>181-186.5</td> <td>201-206.5</td> <td colspan="3">EXCEPT EEC &amp; GENERAL</td> </tr> <tr> <td>Tolerance (Km/h)</td> <td>144-149.5</td> <td>165-170.5</td> <td>186-191.5</td> <td>207-212.5</td> <td colspan="3">EEC, GENERAL</td> </tr> </table> <table border="1"> <tr> <td>Velocity (MPH)</td> <td>10</td> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>100</td> <td></td> </tr> <tr> <td>Tolerance (MPH)</td> <td>10-13</td> <td>20-22</td> <td>40-43</td> <td>60-63.8</td> <td>80.3-84.1</td> <td>100.3-104.1</td> <td></td> </tr> <tr> <td>Tolerance (MPH)</td> <td>8.5-11.5</td> <td>18.5-21.5</td> <td>38.5-41.5</td> <td>58.3-61.7</td> <td>78.3-81.7</td> <td>98.3-101.7</td> <td></td> </tr> <tr> <td>Velocity (MPH)</td> <td>120</td> <td colspan="6">Remarks</td> </tr> <tr> <td>Tolerance (MPH)</td> <td>120.3-124.1</td> <td colspan="6">EXCEPT USA</td> </tr> <tr> <td>Tolerance (MPH)</td> <td>118.3-121.7</td> <td colspan="6">USA</td> </tr> </table>							Velocity (Km/h)	20	40	60	80	100	120		Tolerance (Km/h)	20-24.4	40-43	60-64.4	80-85.5	100-105.5	120.5-126		Tolerance (Km/h)	20-24.4	40-44.4	61-65.4	81-86.5	102-107.5	123-128.5		Velocity (Km/h)	140	160	180	200	Remarks			Tolerance (Km/h)	140.5-146	160.5-166	181-186.5	201-206.5	EXCEPT EEC & GENERAL			Tolerance (Km/h)	144-149.5	165-170.5	186-191.5	207-212.5	EEC, GENERAL			Velocity (MPH)	10	20	40	60	80	100		Tolerance (MPH)	10-13	20-22	40-43	60-63.8	80.3-84.1	100.3-104.1		Tolerance (MPH)	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78.3-81.7	98.3-101.7		Velocity (MPH)	120	Remarks						Tolerance (MPH)	120.3-124.1	EXCEPT USA						Tolerance (MPH)	118.3-121.7	USA					
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Input spec.	o 4 cyl : 2pulses/rev																																																																																																						
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Fuel gauge																																																																																																							
Type	o Cross - coil type (Fixed point type : Pointer should not fall into the "E" point but indicate remaining fuel level when the ignition is off)																																																																																																						
Standard values	<table border="1"> <tr> <th rowspan="2">Level</th> <th>Gauge</th> <th rowspan="2">Tolerance assembled with fuel sender (°)</th> </tr> <tr> <th>Resistance (Ω)</th> </tr> <tr> <td>E (Empty)</td> <td>97</td> <td>0 ± 2.5</td> </tr> <tr> <td>1/2</td> <td>32.5</td> <td>45 ± 5.0</td> </tr> <tr> <td>F (Full)</td> <td>6</td> <td>90 ± 2.5</td> </tr> </table>							Level	Gauge	Tolerance assembled with fuel sender (°)	Resistance (Ω)	E (Empty)	97	0 ± 2.5	1/2	32.5	45 ± 5.0	F (Full)	6	90 ± 2.5																																																																																			
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	o Inspection order : E → F → E																																																																																																						
	The level must be reached within 7 minutes after the resistance is set for Full or Empty.																																																																																																						
	o Point stability tolerance : Within ±6°																																																																																																						
	Apply power for 10 minutes. Then turn off the power for 24 hours and read the position of the pointer.																																																																																																						

Items	Specifications				
Temperature gauge Type Indication standard	o Cross - coil type (Intermedia stability type).				
	Temperature	Angle (°)	Assembled tolerance (°)		
	60°C	0	-		
	85°C ~ 110°C	38 <sup>+2</sup> <sub>-3</sub>	+3 -2		
	Red zone (over 125°C)	87±5	+7 -4		
Resistance of temperature sender (NTC)	o Inspection order : OFF → C → H				
	Temperature (°C)	60	85	110	125
	Resistance (Ω)	119.4	48.9	25	15.8

ETKA510B

## LIGHTING SYSTEM

Items	Bulb wattage(W)	
Head lamp	55W / 55W (High / Low beam)	
Front turn signal lamp	21W	
Front position lamp	5W	
Front fog lamp	55W	
Rear combination lamps	Tail/stop lamp	5W / 21W
	Back up lamp	21W
	Turn signal lamp	21W
Rear fog lamp	21W	
Side repeater lamp	5W	
Map lamp	10W	
Room lamp	10W	
Luggage lamp	5W	
High mounted stop lamp	21W	
Door courtesy lamp	5W	
License plate lamp	5W	

## AUDIO

Items	H210(H240)	H260	H290
Rated output	Max. 20W x 2 (Max. 20W x 4)	Max. 25W x 4	Max. 35W x 4
Load impedance	4ΩX4	4ΩX4	2ΩX4
Band	AM/FM, LW/MW/FM	AM/FM, LW/MW/FM	AM/FM, LW/MW/FM
Tuning type	PLL Synthesized type	PLL Synthesized type	PLL Synthesized type
Dark current	Max. 2mA	Max. 3.8mA	Max. 2mA

Items	H210(H240)	H260	H290
Frequency range / Channel	AM : 531~1602KHZ/ 9KHZ	AM : 531~1602KHZ/ 9KHZ	AM : 531~1602KHZ/ 9KHZ
	FM : 87.5~108MHZ/ 100KHZ	FM : 87.5~108MHZ/ 100KHZ	FM : 87.5~108MHZ/ 100KHZ
	LW : 153~279KHZ/1KHZ	LW : 153~279KHZ/1KHZ	LW : 153~279KHZ/1KHZ
	MW : 531~1602KHZ/ 9KHZ	MW : 531~1602KHZ/ 9KHZ	MW : 531~1602KHZ/ 9KHZ
	FM : 87.5~108MHZ/ 50KHZ	FM : 87.5~108MHZ/ 50KHZ	FM : 87.5~108MHZ/ 50KHZ

**WINDSHIELD WIPER AND WASHER**

Items	Specifications
<p>Wiper motor</p> <p>Speed/current at 10kg.cm load test (1.0 Nm, 0.7 lb-ft)</p> <p>Speed/current at 40kg.cm load test (3.9 Nm, 2.9 lb-ft)</p> <p>Current when parking</p>	<p>Low : 44-52 rpm/3.5A or less High : 66-80 rpm/4.5A or less</p> <p>Low : 39-47 rpm/7A or less High : 57-69 rpm/9A or less</p> <p>Low : 24A or less High : 28A or less</p>
<p>Rear wiper motor (5 Doors)</p> <p>Speed/current at no load test</p> <p>Speed/current at 10kg.cm load test (1.0 Nm, 0.7 lb-ft)</p> <p>Current when parking</p> <p>Wipping angle at no load</p>	<p>48 rpm/2.0A or less</p> <p>34-46 rpm/3.5A or less</p> <p>9A or less</p> <p>90°±3°</p>
<p>Windshield washer</p> <p>Motor type</p> <p>Pump type</p> <p>Current</p> <p>Discharge pressure</p> <p>Flow rate</p> <p>Overload capacity (Continuous operation)</p> <p>With water</p> <p>Racing (Without water)</p>	<p>DC ferrite magnet</p> <p>Centrifugal</p> <p>6.7A or less</p> <p>1.6 kg/cm<sup>2</sup> or more</p> <p>1,500 cc/min. or more</p> <p>60 sec. or less</p> <p>20 sec. or less</p>

## TROUBLESHOOTING ETKA0150

## INSTRUMENTS AND WARNING SYSTEM

Symptom	Possible cause	Remedy
Tachometer does not operate	No.12 fuse (10A) blown Tachometer faulty Wiring faulty	Check for short and replace fuse Check tachometer Repair if necessary
Fuel gauge does not operate	No.12 fuse (10A) blown Fuel gauge faulty Fuel sender faulty Wiring faulty	Check for short and replace fuse Check gauge Check fuel sender Repair if necessary
Low fuel warning lamp does not light	No.12 fuse (10A) blown Bulb burned out Fuel level sensor faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check sensor Repair if necessary
Water temperature gauge does not operate	No.12 fuse (10A) blown Water temperature gauge faulty Water temperature sender faulty Wiring or ground faulty	Check for short and replace fuse Check gauge Check sender Repair if necessary
Oil pressure warning lamp does not light	No.12 fuse (10A) blown Bulb burned out Oil pressure sender faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check sender Repair if necessary
Low brake fluid warning lamp does not light	No.12 fuse (10A) blown Bulb burned out Brake fluid level warning switch faulty Parking brake switch faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check switch Check switch Repair if necessary
Open door warning lamp does not light	No.12 fuse (10A) blown Bulb burned out Door switch faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check switch Repair if necessary
Seat belt warning lamp does not light	No.12 fuse (10A) blown Bulb burned out Buckle switch faulty Wiring or ground faulty	Check for short and replace fuse Replace bulb Check switch Repair if necessary

## LIGHTING SYSTEM

Trouble symptom	Possible cause	Remedy
One lamp does not light (all exterior)	Bulb burned out Socket, wiring or ground faulty	Replace bulb Repair if necessary
Head lamps do not light	Bulb burned out No.20 fuse (10A) blown Head lamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace bulb Replace fuse and check for short Check relay Check switch Repair if necessary
Tail lamps do not light	Tail lamp fuse blown (10A) Fusible link blown Tail lamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace fuse and check for short Replace fusible link Check relay Check switch Repair if necessary
Stop lamps do not light	No.16 fuse (15A) blown Stop lamp switch faulty Wiring or ground faulty Stop lamp relay faulty	Replace fuse and check for short Adjust or replace switch Repair if necessary Replace relay
Stop lamps stay on	Stop lamp switch faulty Stop lamp relay faulty	Adjust or replace switch Replace relay
Instrument lamps do not light (Tail lamps light)	Rheostat faulty Wiring or ground faulty	Check rheostat Repair if necessary
Turn signal lamp does not flash on one side	Bulb burned out Turn signal switch faulty Wiring or ground faulty	Replace bulb Check switch Repair if necessary
Turn signal lamps do not operate	No.7 fuse (10A) blown Flasher faulty Turn signal switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Hazard warning lamps do not oper- ate	No.1 fuse (10A) blown Flasher faulty Hazard switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Flasher rate too slow or too fast	Lamps' wattages are smaller or larger than specified Defective flasher	Replace lamps Replace flasher



Trouble symptom	Possible cause	Remedy
Back up lamps do not light up	No.1 fuse (10A) blown Back up lamp switch faulty Wiring or ground faulty	Replace fuse and check for short Check switch Repair if necessary
Overhead console lamp does not light up	No.25 fuse (10A) blown Wiring or ground faulty	Replace fuse and check for short Repair if necessary

**AUDIO**

the speaker, and the antenna. Troubleshooting enables you to confine the problem to a particular area.

There are six areas where a problem can occur: wiring harness, the radio, the cassette tape deck, the CD player,

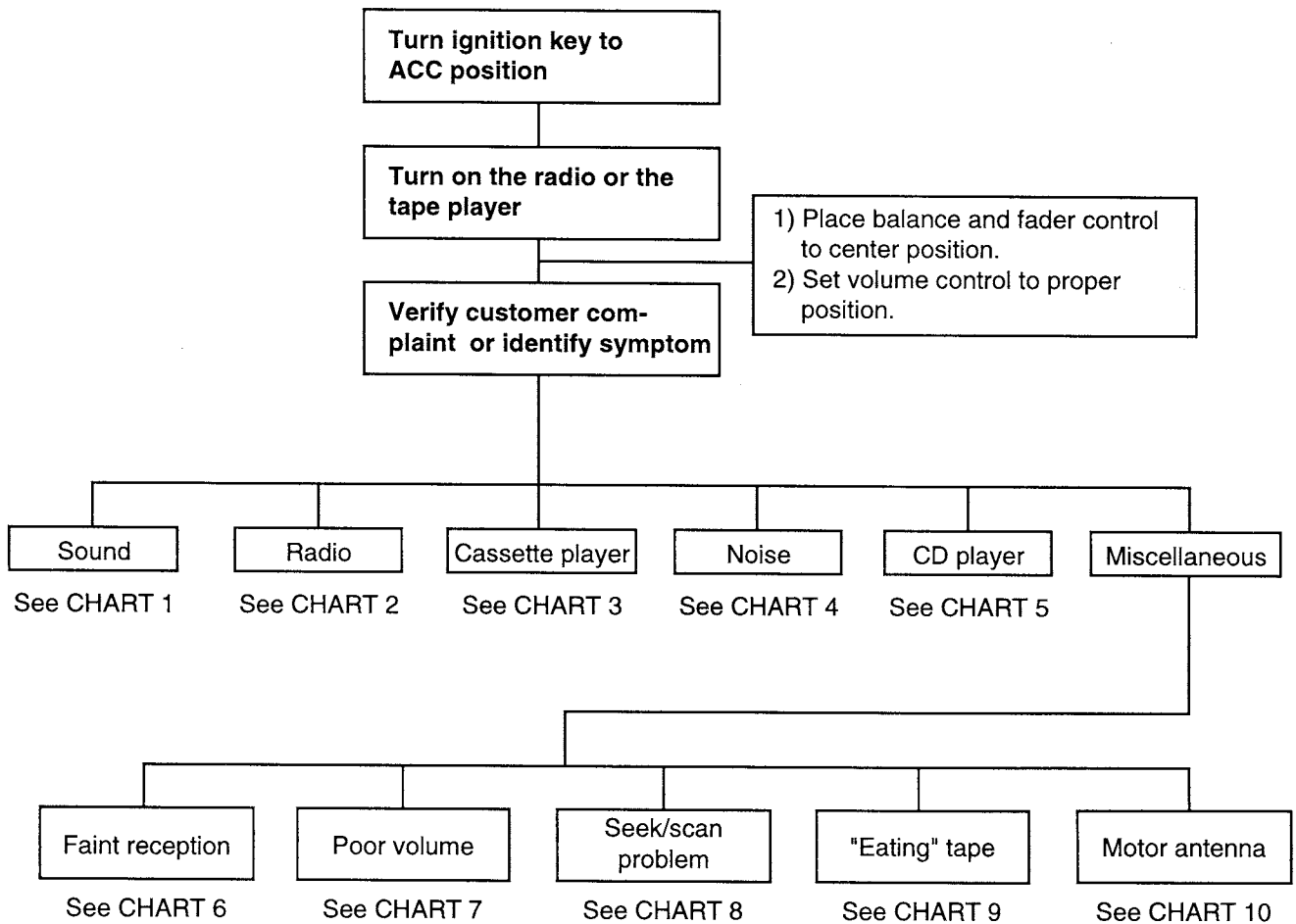
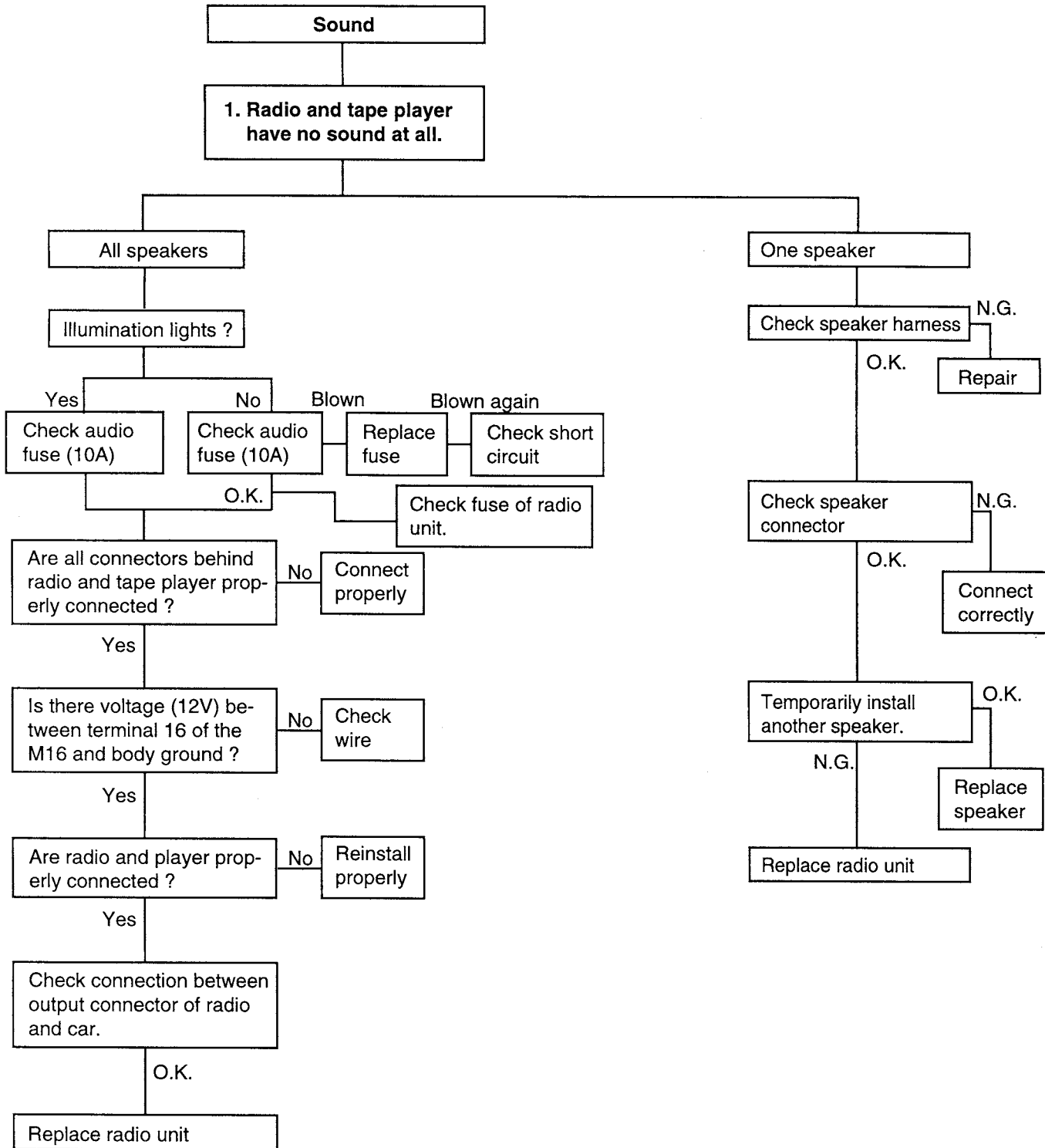
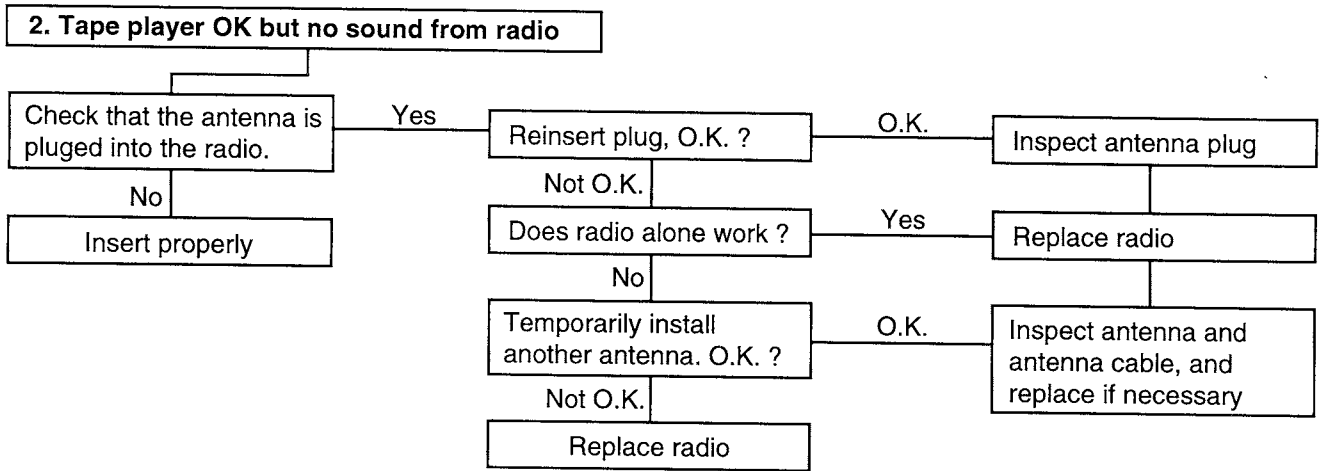


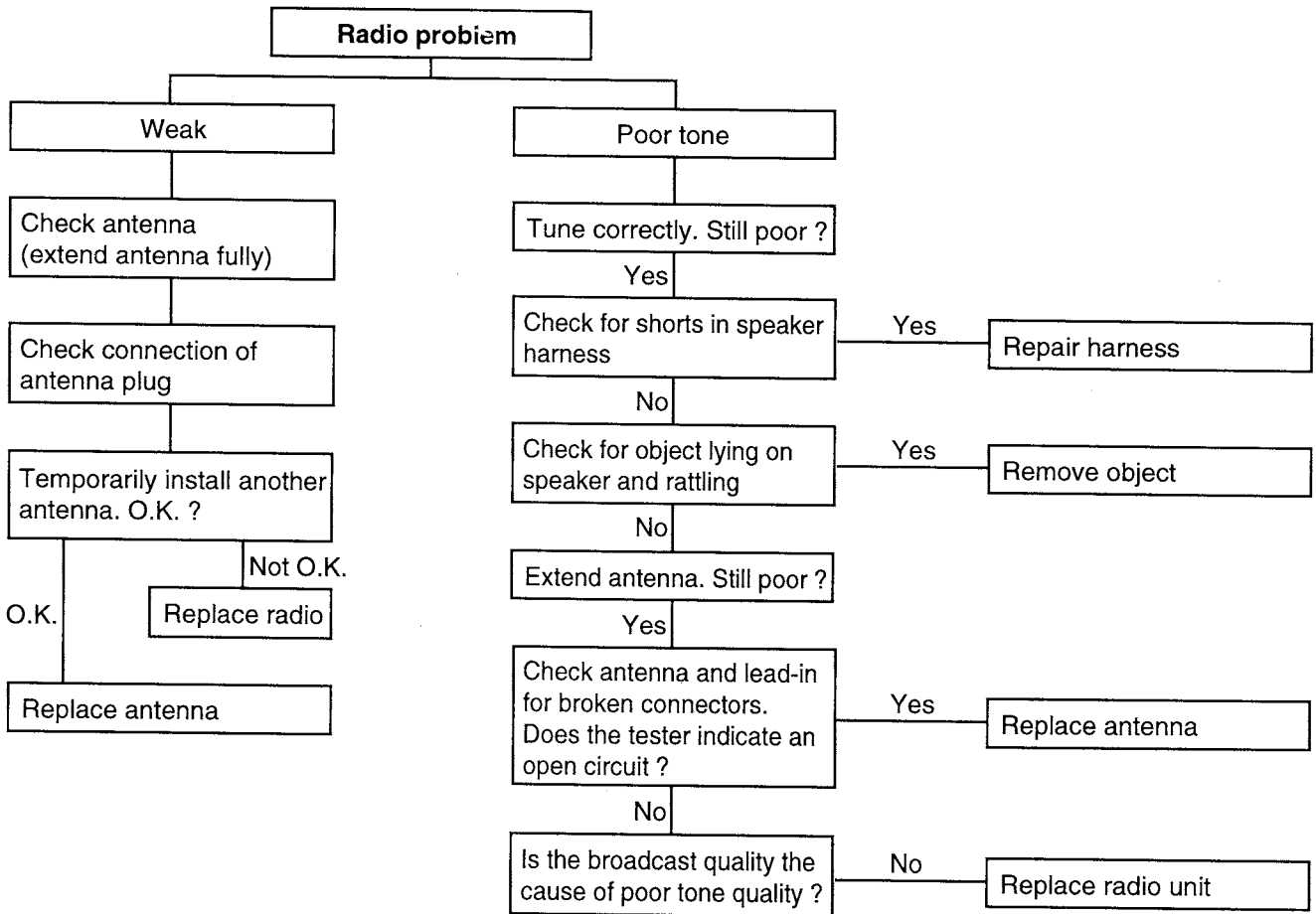
CHART 1





ETA9010C

CHART 2



ETA9010D

CHART 3

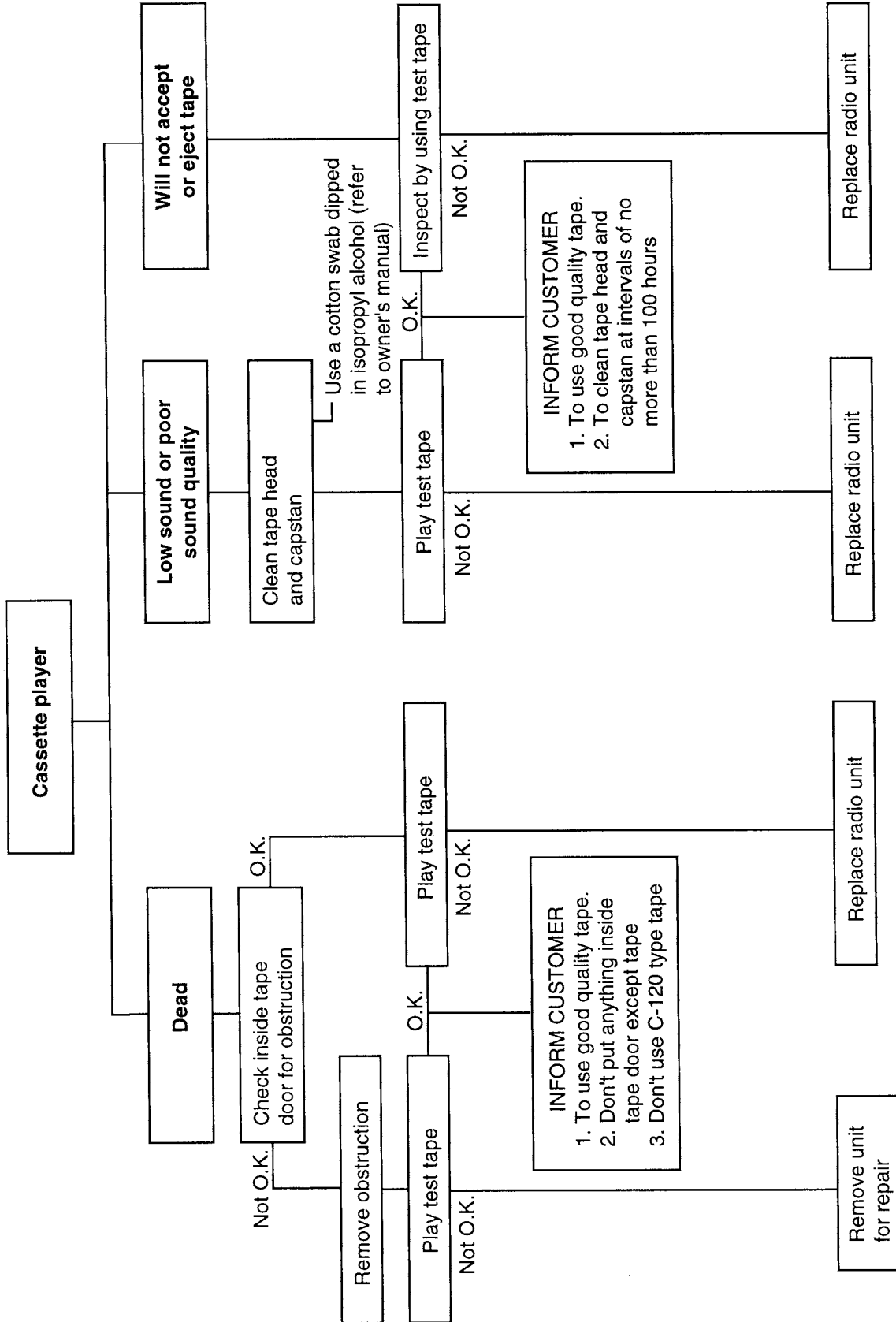
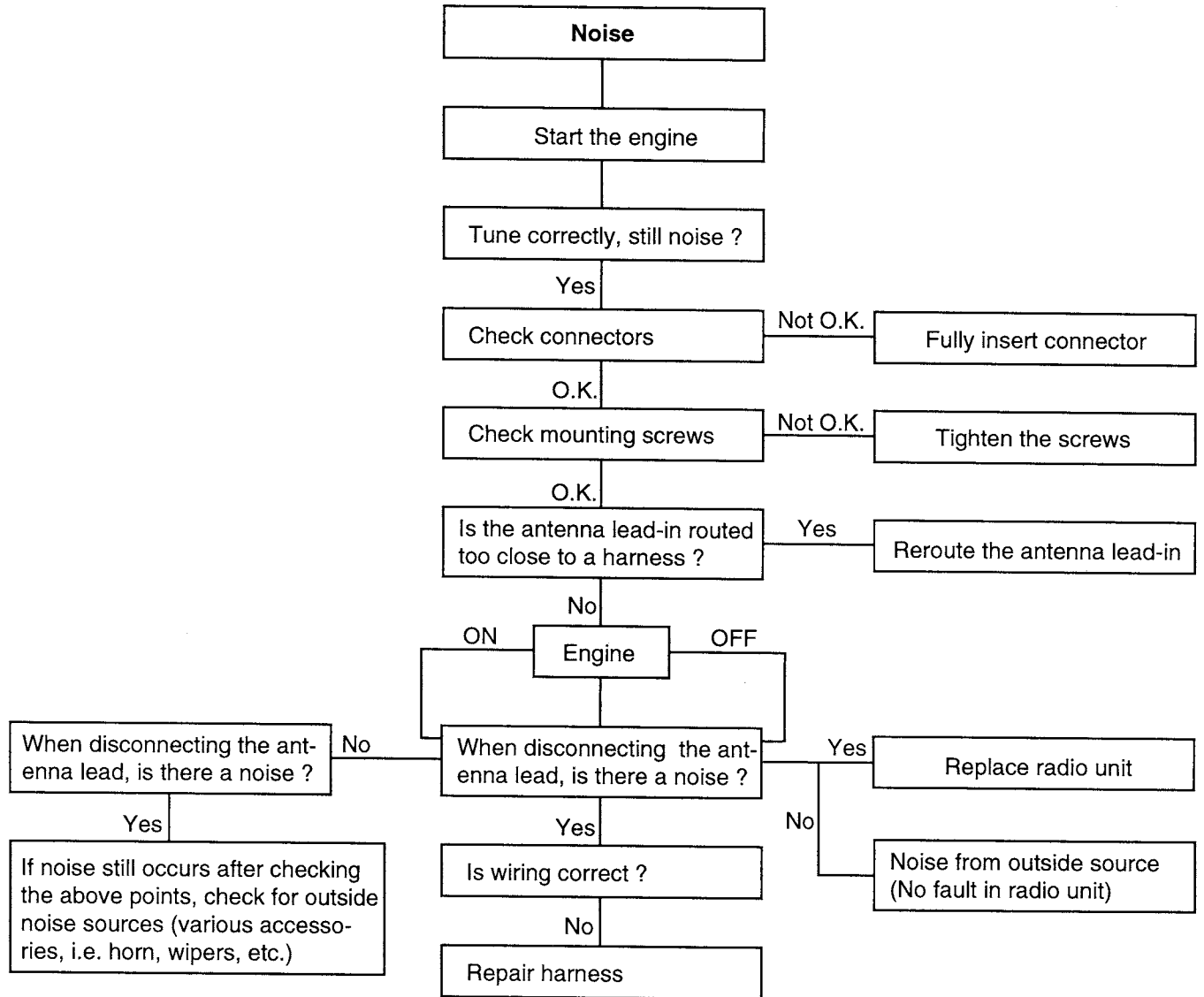
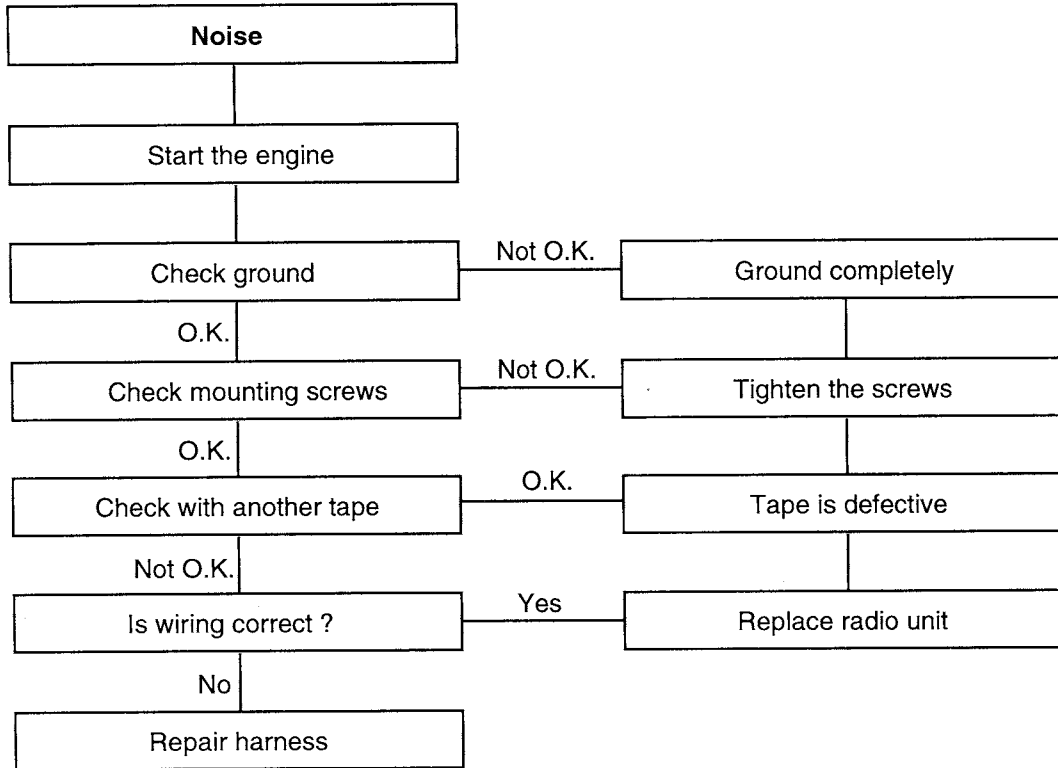


CHART 4

1. RADIO



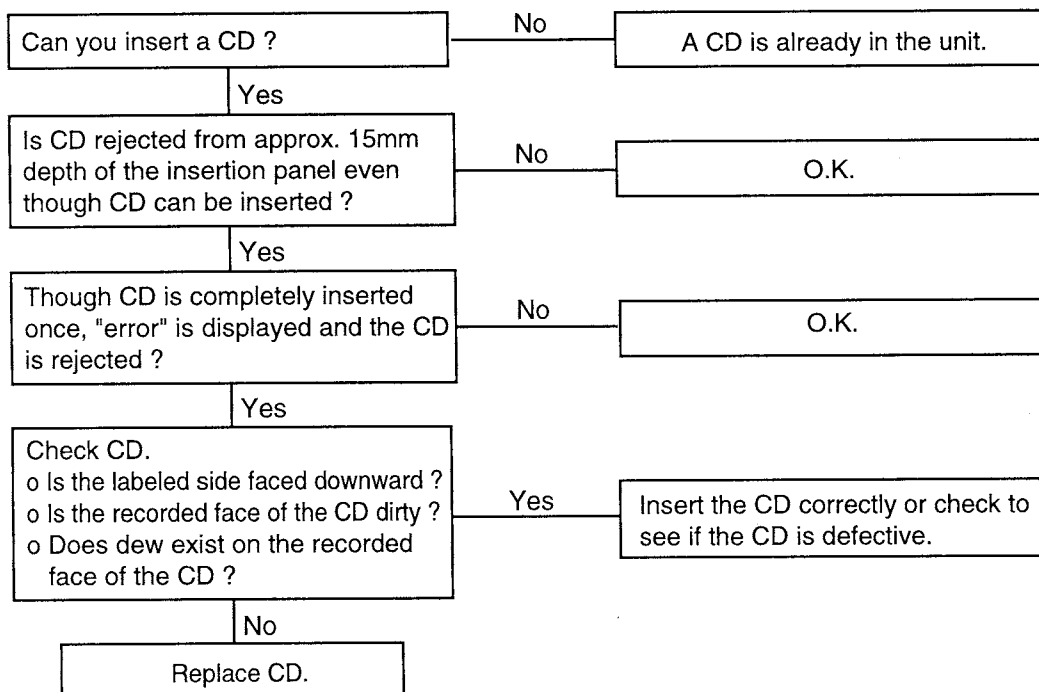
2. TAPE



ETA9010G

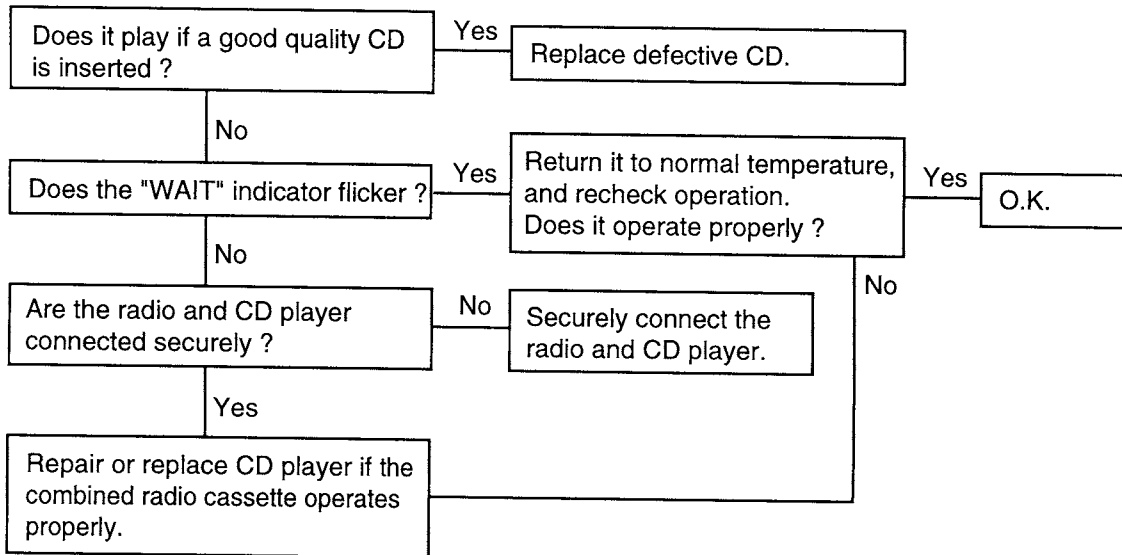
CHART 5

1. CD WILL NOT BE ACCEPTED



ETA9010H

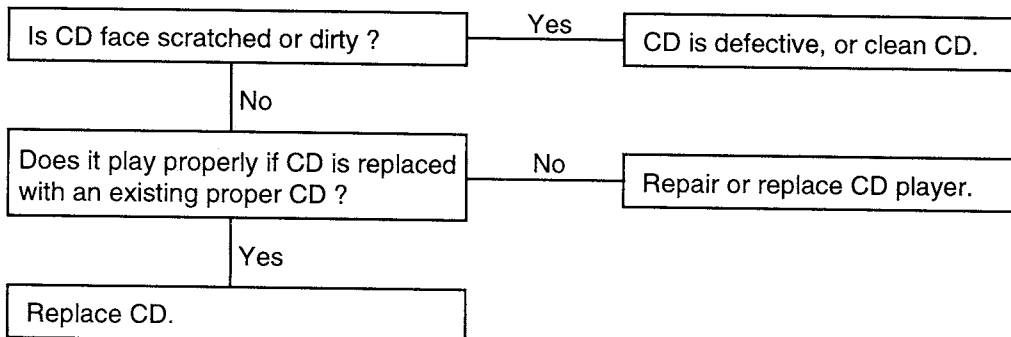
2. NO SOUND



ETA90100

3. CD SOUND SKIPS

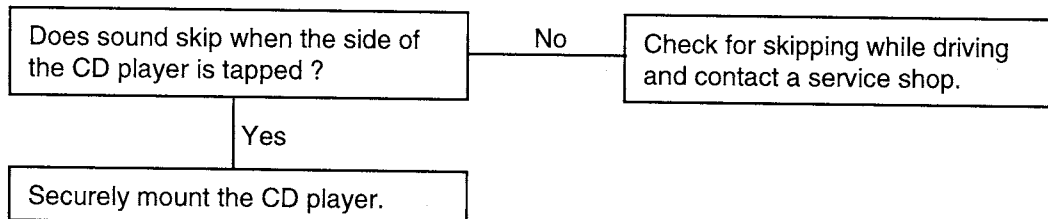
1. Sound sometimes skips when parking.



2. Sound sometimes skips when driving.

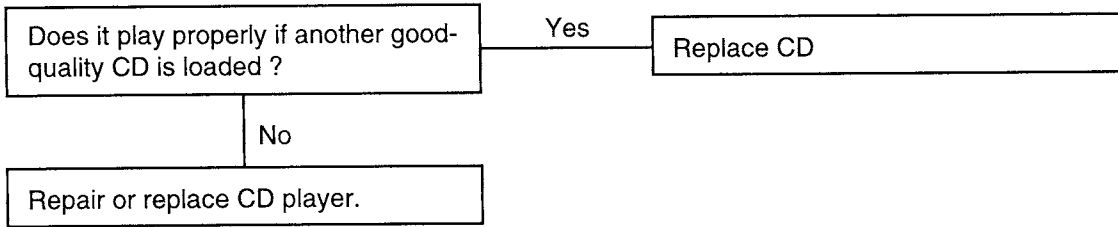
(Stop vehicle, and check it.)

(Check by using a CD which is free of scratches, dirt or other damage.)

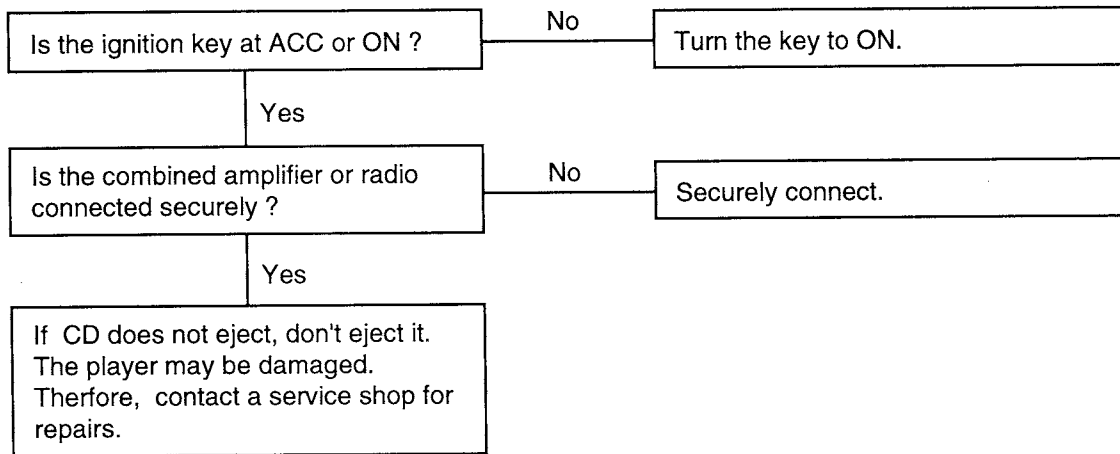


ETA90101

4. SOUND QUALITY IS POOR



5. CD WILL NOT EJECT



6. NO SOUND FROM ONE SPEAKER

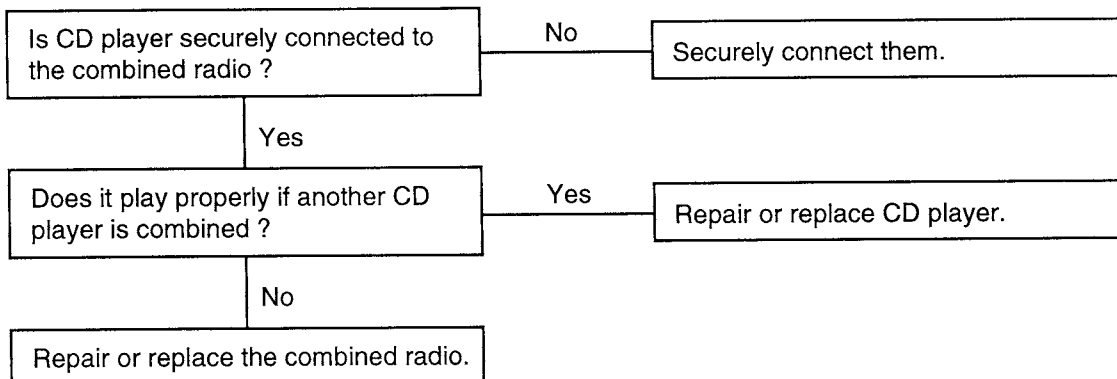
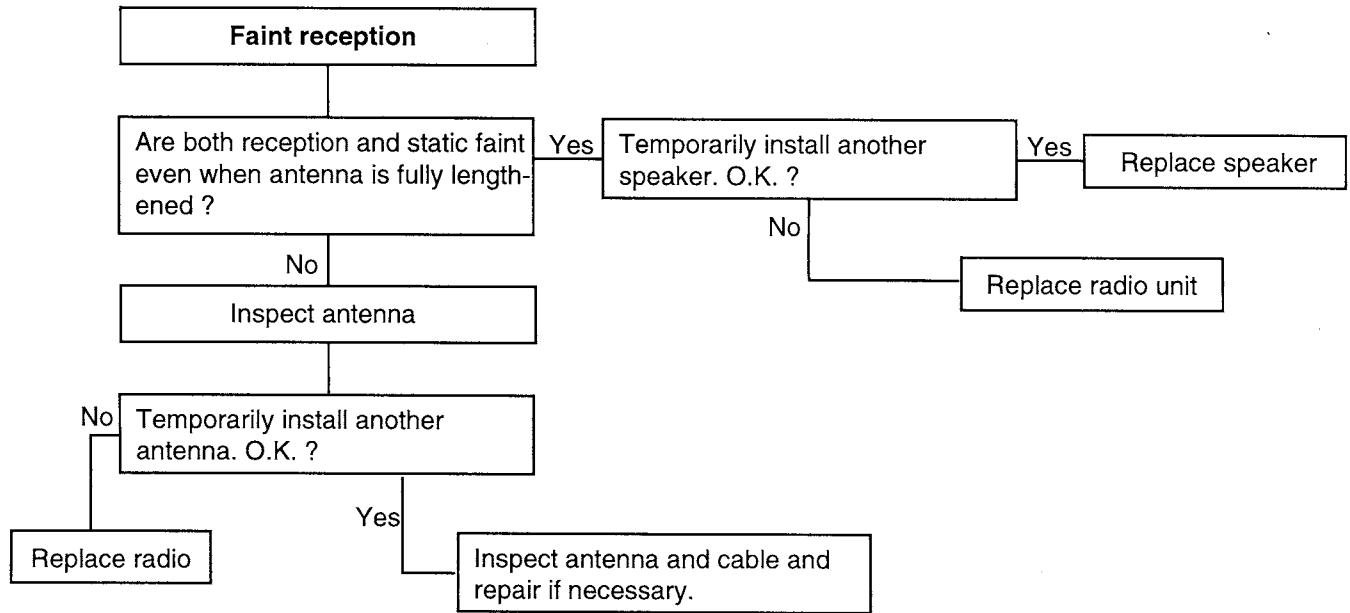


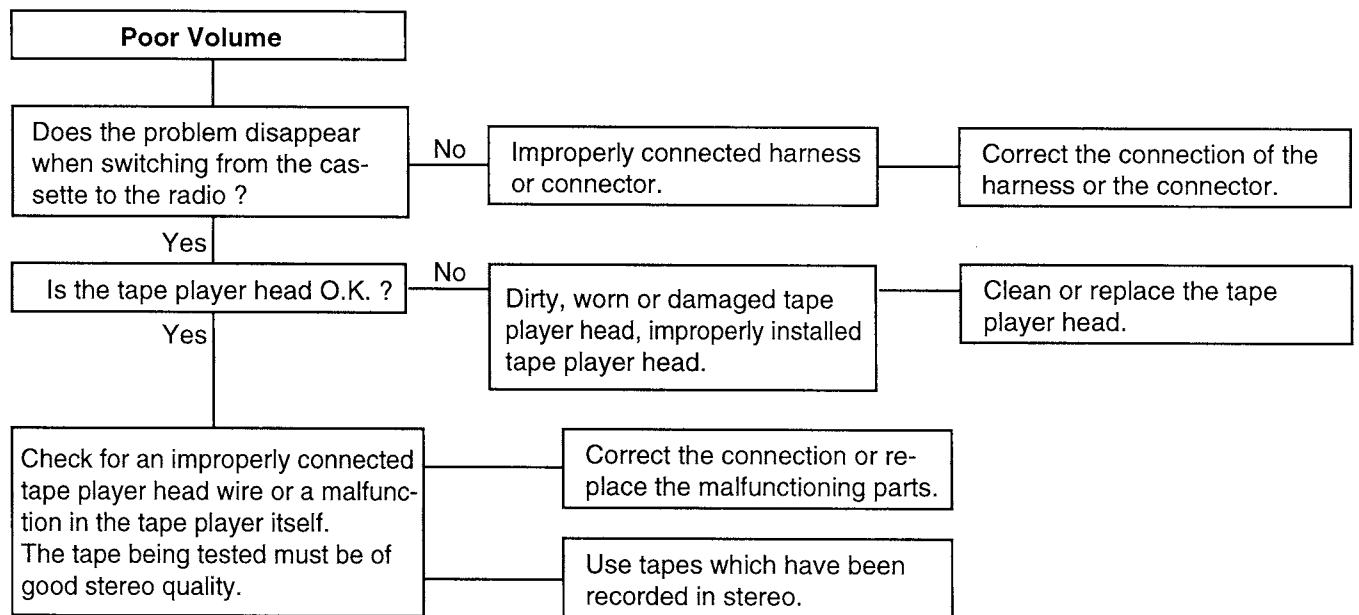


CHART 6



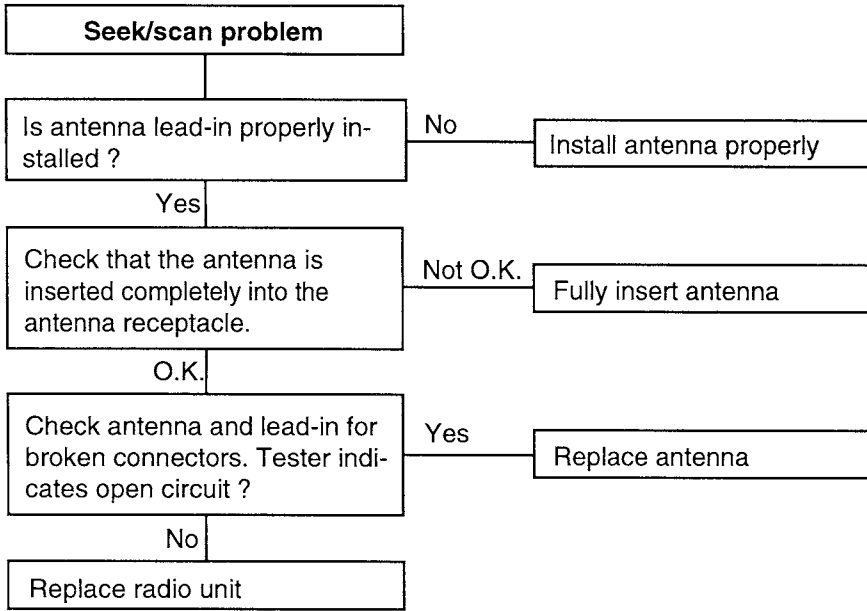
ETA9010K

CHART 7



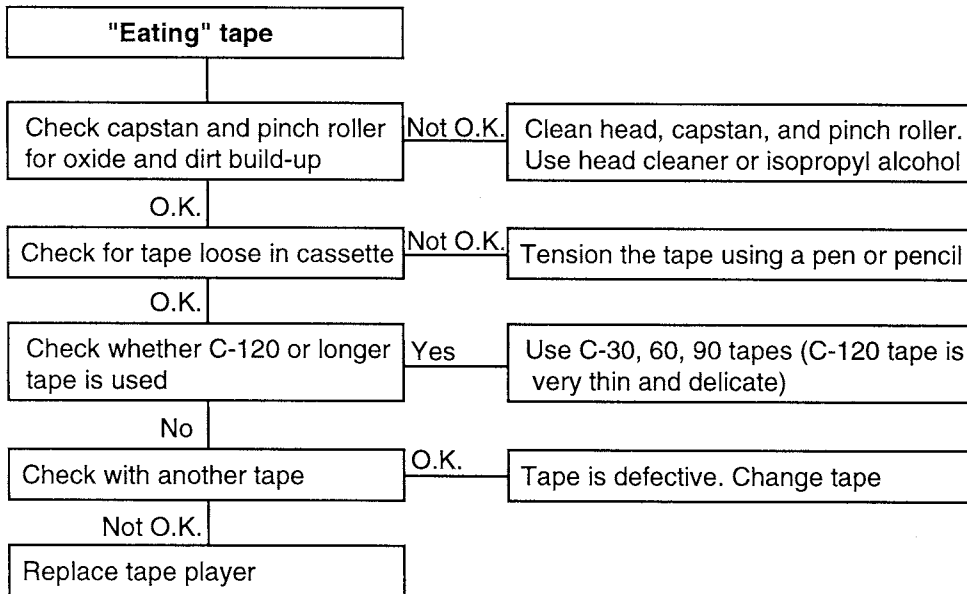
ETA9010L

CHART 8



ETA9010M

CHART 9

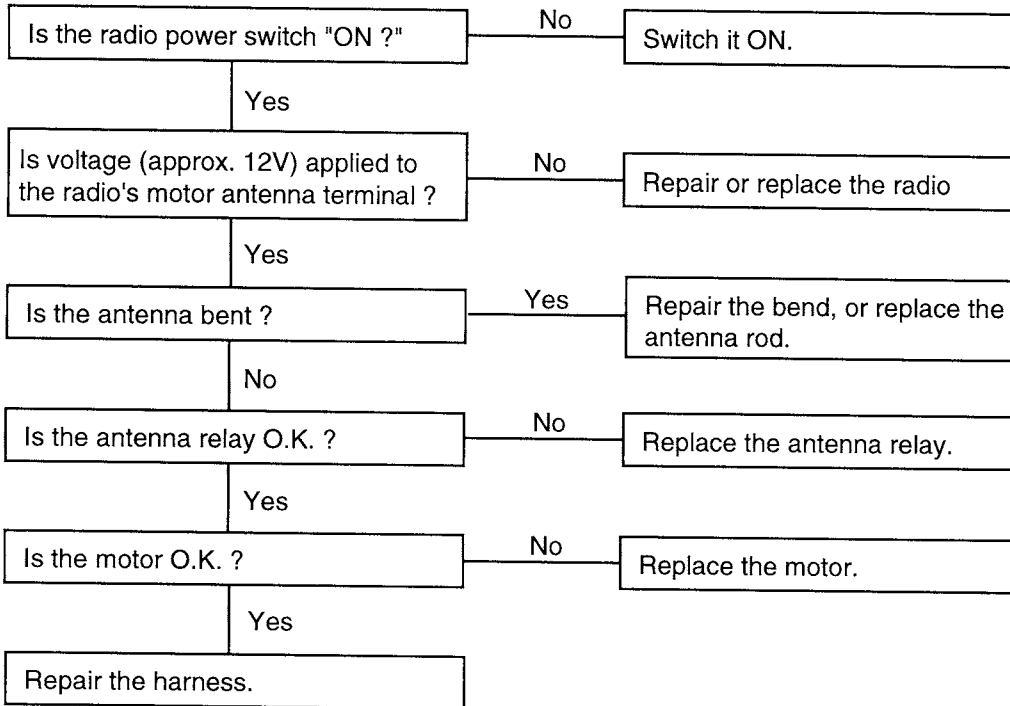


ETA9010N

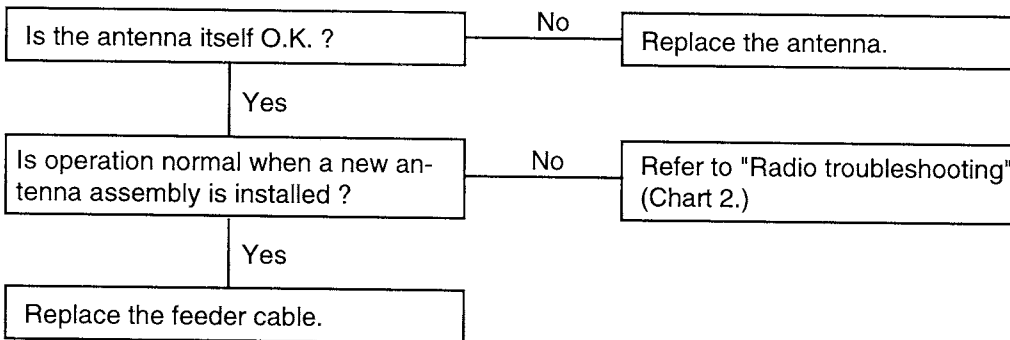
CHART 10

1. MOTOR ANTENNA WON'T EXTEND OR RETRACT

Clean and polish the surface of the antenna rod.



2. MOTOR ANTENNA EXTENDS AND RETRACTS BUT DOES NOT RECEIVE



ETAA010P

WINDSHILD WIPER

Symptom	Possible cause	Remedy
Wipers do not operate or return to off position.	Wiper fuse (No.22; 15A) blown Wiper motor faulty Wiper switch faulty Wiring or ground faulty	Check for short and replace fuse Check motor Check switch Repair if necessary

Symptom	Possible cause	Remedy
Wipers do not operate in INT position	ETACS CM faulty	Check ETACS CM
	Wiper switch faulty	Check switch
	Wiper motor faulty	Check motor
	Wiring or ground faulty	Repair if necessary

**POWER WINDOW**

Symptom	Possible cause	Remedy
No windows operate from the main switch on the driver's door	Fusible link (30A for P/Window) blown	Replace the fusible link
	Poor ground	Clean and retighten the ground terminal mounting bolt
	Defective power window main switch	Check the switch Replace if necessary
	Open circuit in wires or loose or disconnected connector	Repair or replace
Driver's side window does not operate	Defective power window main switch	Check for driver's window switch
	Defective motor or circuit breaker	Replace the motor
	Open circuit in wires or loose or disconnected connector	Check the harness and the connector
Passenger's side window does operate	Defective power window subswitch	Replace the switch
	Defective motor or circuit breaker	Replace the motor
	Wiring faulty or disconnected connector	Repair if necessary

**POWER DOOR MIRROR**

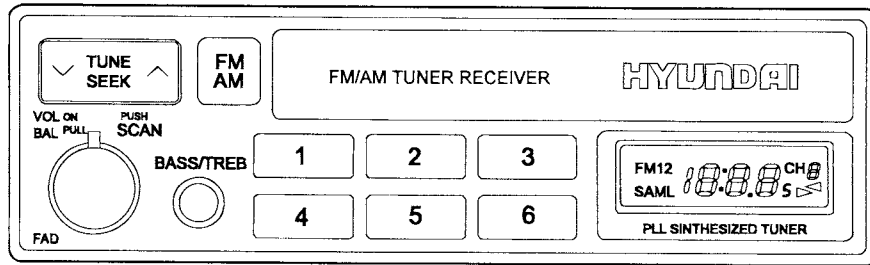
Symptom	Possible cause	Remedy
No mirrors operate	No.18 fuse (15A) blown	Check the circuit and replace fuse
	Poor ground	Clean and retighten the ground terminal mounting bolt
	Defective mirror switch	Check the switch Replace if necessary
	Open circuit in wires or loose or disconnected connector	Repair or replace
One mirror does not operate	Defective mirror switch	Check the switch Replace if necessary
	Defective mirror actuator	Replace the actuator
	Open circuit wires or loose or disconnected connector	Repair or replace

AUDIO SYSTEM

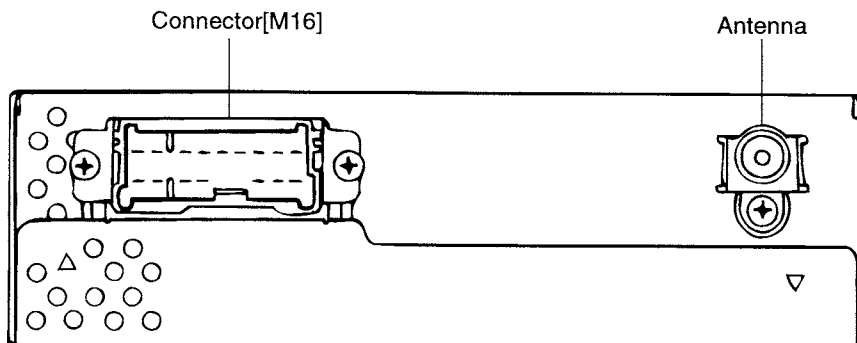
AUDIO UNIT

COMPONENTS ETKA0200

<H210>



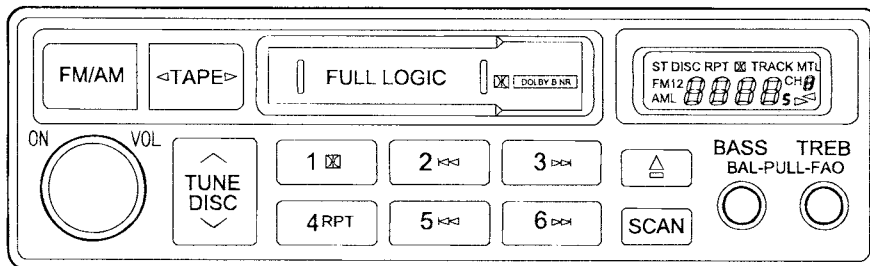
ETJA001W



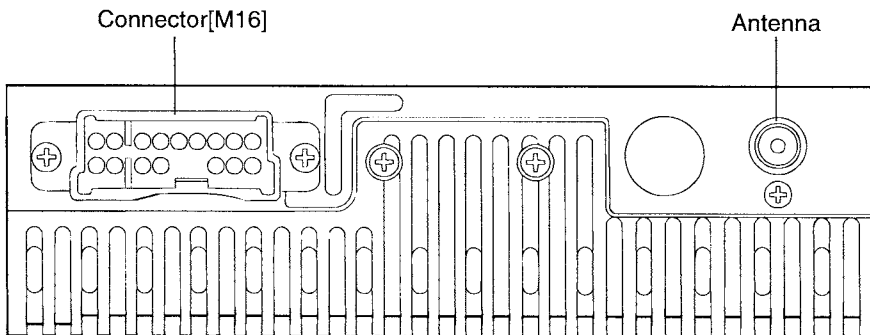
ETJA001X

Connector[M16]	Terminal	Description
<p>[M16]</p> <p>ETJA001C</p>	1	Antenna
	2	Rear left speaker(-)
	3	Front left speaker(-)
	4	Front right speaker(-)
	5	Rear right speaker(-)
	6	Illumination(-)
	7	ACC(+)
	8	Ground
	9	Rear left speaker(+)
	10	Front left speaker(+)
	11	N.C.
	12	N.C.
	13	Front right speaker(+)
	14	Rear right speaker(+)
	15	Illumination(+)
	16	Battery(+)

<H240>



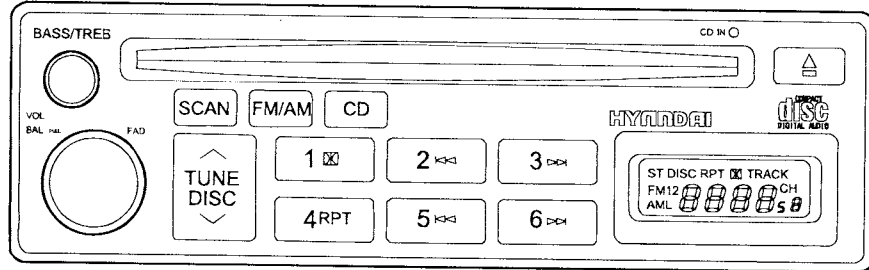
ETJA001B



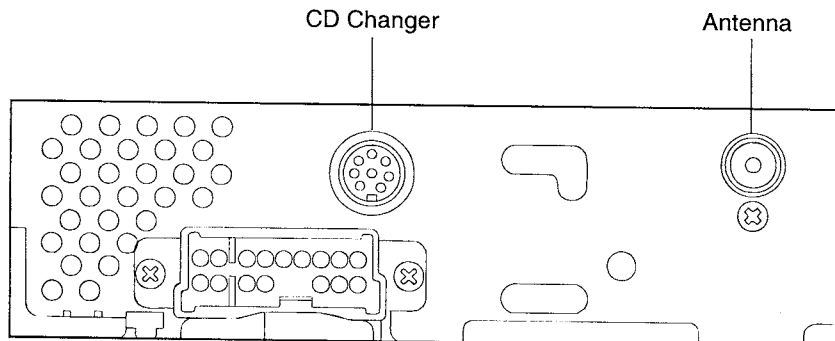
ETJA001A

Connector[M16]	Terminal	Description
<p>[M16]</p> <p>ETJA001C</p>	1	Antenna
	2	Rear left speaker(-)
	3	Front left speaker(-)
	4	Front right speaker(-)
	5	Rear right speaker(-)
	6	Illumination(-)
	7	ACC(+)
	8	Ground
	9	Rear left speaker(+)
	10	Front left speaker(+)
	11	N.C.
	12	N.C.
	13	Front right speaker(+)
	14	Rear right speaker(+)
	15	Illumination(+)
	16	Battery(+)

<H260>



ETJA001E



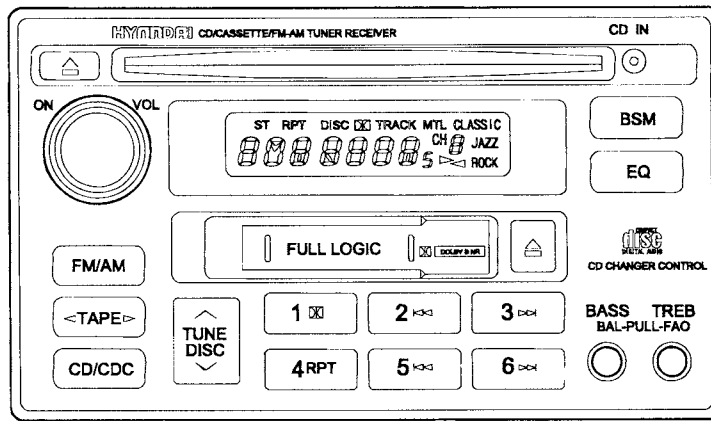
ETJA001D

Connector [M16]

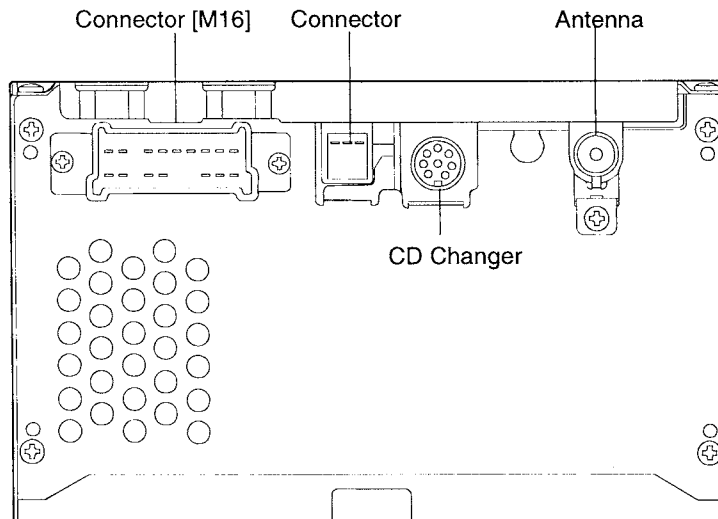
Connector[M16]	Terminal	Description
<p>[M16]</p> <p>ETJA001C</p>	1	N.C.
	2	Rear left speaker(-)
	3	Front left speaker(-)
	4	Front right speaker(-)
	5	Rear right speaker(-)
	6	Illumination(-)
	7	ACC(+)
	8	Ground
	9	Rear left speaker(+)
	10	Front left speaker(+)
	11	N.C.
	12	N.C.
	13	Front right speaker(+)
	14	Rear right speaker(+)
	15	Illumination(+)
	16	Battery(+)

Connector	Terminal	Description
<p>(CD Changer)</p> <p>ETJA001G</p>	1	R
	2	CD ON
	3	BUS
	4	B+
	5	M. Ground
	6	N.C.
	7	L
	8	A.Ground

<H290>



ETJA0011



ETJA001H

Connector[M16]	Terminal	Description
<p>[M16] ETJA001C</p>	1	Antenna
	2	Rear left amp(-)
	3	Front left amp(-)
	4	Front right amp(-)
	5	Rear right amp(-)
	6	Illumination(-)
	7	ACC(+)
	8	Ground
	9	Rear left amp(+)
	10	Front left amp(+)
	11	N.C.
	12	Amp remote
	13	Front right amp(+)
	14	Rear right amp(+)
	15	Illumination(+)
	16	Battery(+)

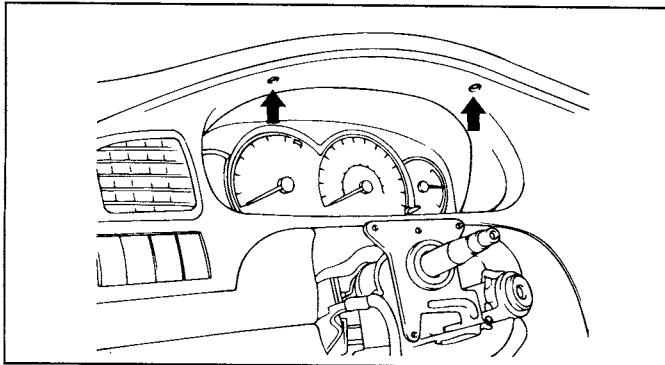
Connector	Terminal	Description
<p>ETJA001K</p>	1	Ground
	2	Signal
	3	Ground

Connector	Terminal	Description
<p>(CD Changer) ETJA001G</p>	1	R
	2	CD ON
	3	BUS
	4	B+
	5	M. Ground
	6	N.C.
	7	L
	8	A.Ground



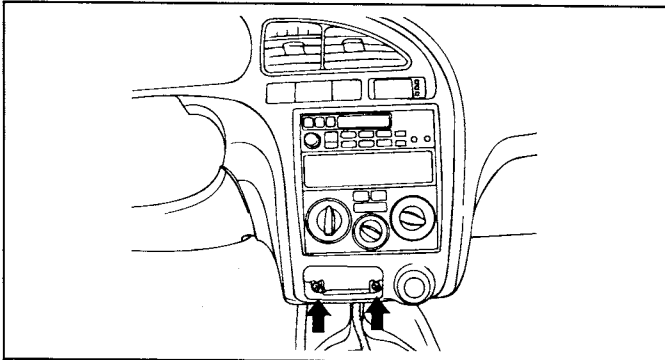
**REMOVAL AND INSTALLATION** ETKA0250

1. Disconnect the negative (-) battery terminal.
2. Remove the screws holding the instrument facia panel.



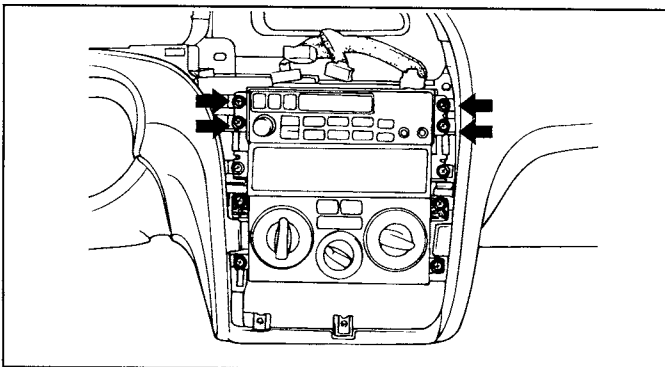
ESKA015F

3. After removal of the ash tray, remove the screws holding the instrument facia panel.



ESKA015G

4. Remove the instrument facia panel and disconnect the connectors from the instrument facia panel.
5. Remove the audio.



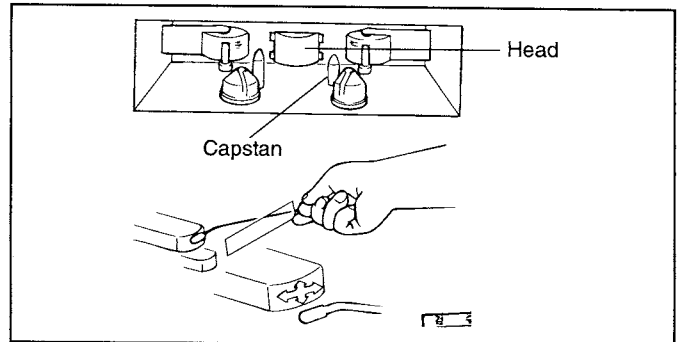
ETKA925A

6. Installation is the reverse of removal.

**SERVICE INSTRUCTIONS** ETHA0750

**TAPE HEAD AND CAPSTAN CLEANING**

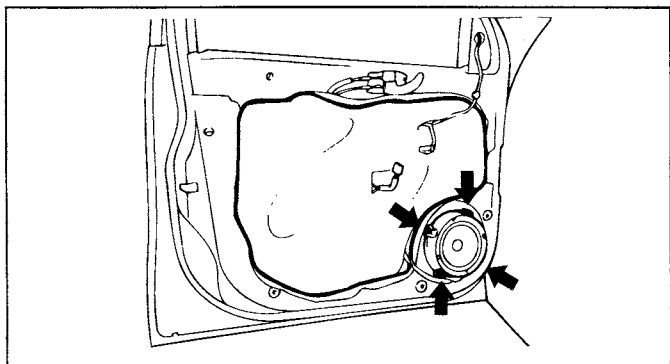
1. To obtain optimum performance, clean the head, and capstan as often as necessary, depending on frequency of use and tape cleanness.
2. To clean the tape head and capstan, use a cotton swab dipped in ordinary rubbing alcohol. Wipe the head and capstan.



ETA9035A

**SPEAKERS****REMOVAL AND INSTALLATION** ETKA0300**FRONT SPEAKER**

1. Remove the front door trim panel and remove the front speaker. (Refer to page BD-14.)

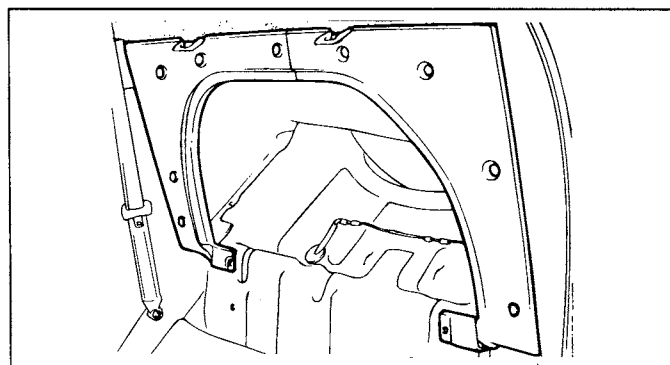


ESJA060D

2. Installation is the reverse of removal.

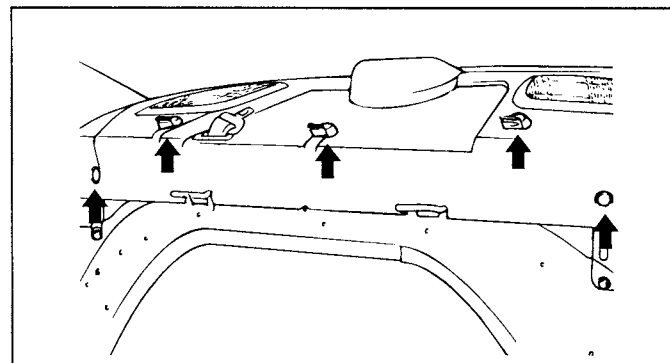
**REAR SPEAKER**

1. Remove the rear seat. (Refer to page BD-54.)
2. Remove the partition trim.



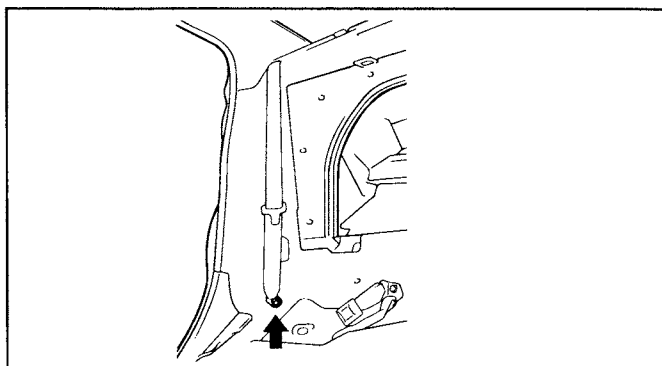
ESKA045G

3. Remove the plugs and bolts holding the rear package tray trim.



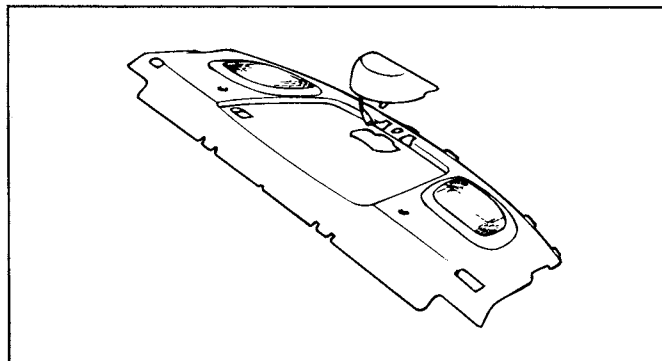
ESKA045H

4. Remove the bolt holding the rear seat belt lower anchor.



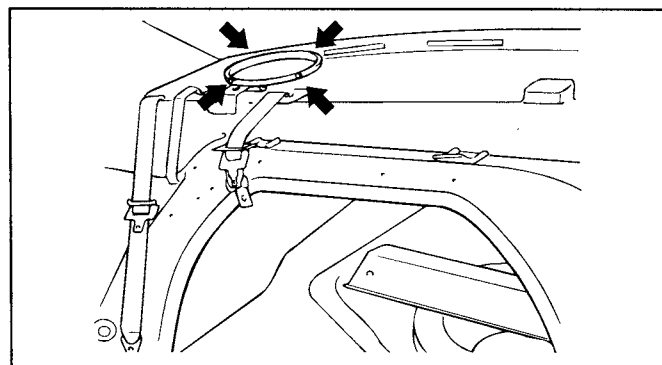
ESKA045I

5. Remove the rear package tray trim and disconnect the connectors.



ESKA045J

6. Remove the rear speaker.

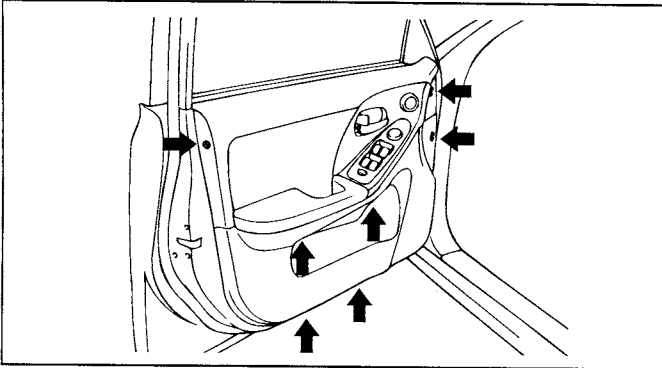


ETKA060A

7. Installation is the reverse of removal.

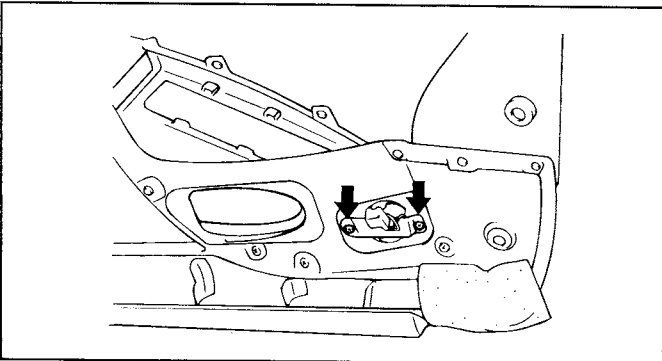
**TWEETER SPEAKER**

1. Remove the trim panel from the front door.



ESKA030B

2. Disconnect the connectors and remove the tweeter speaker.



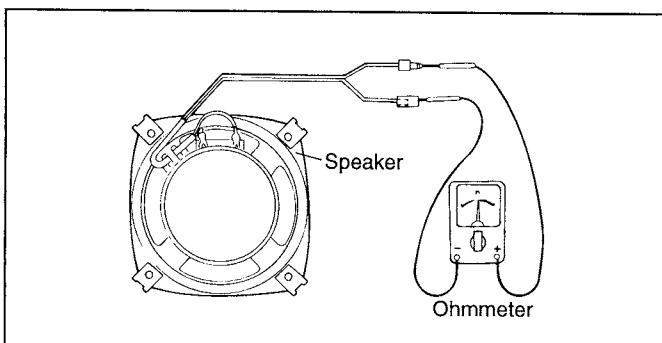
ETKA060B

3. Installation is the reverse of removal.

**SPEAKER CHECKING**

ETA90400

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

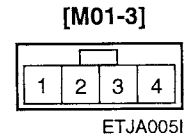
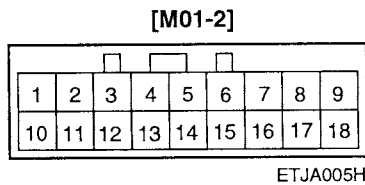
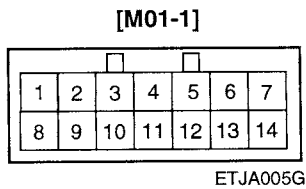
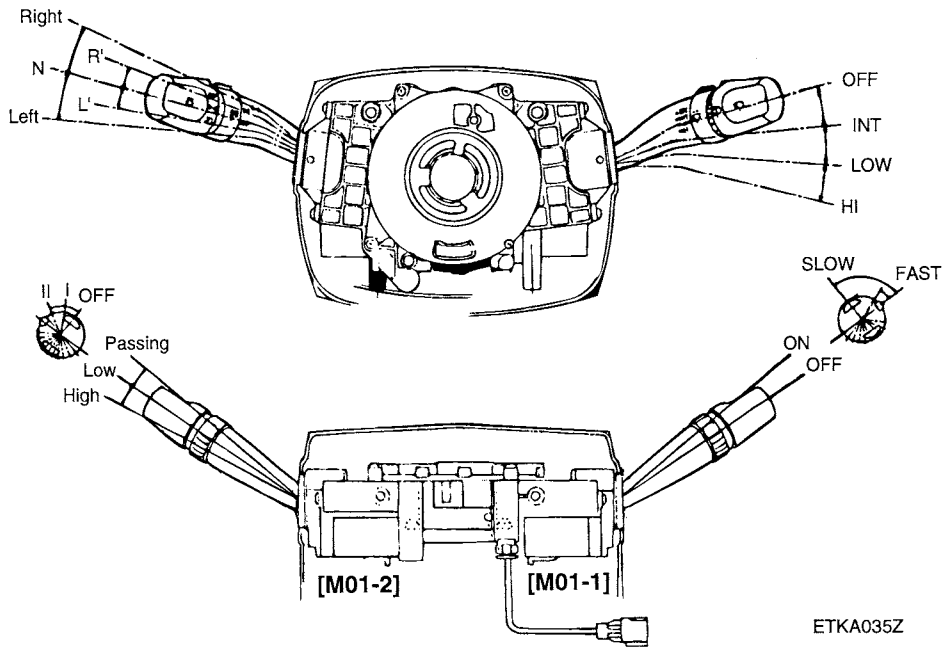


ETA9040A

MULTI FUNCTION SWITCH

COMPONENTS ETKA0350

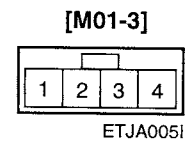
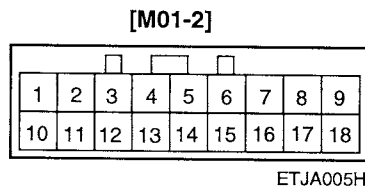
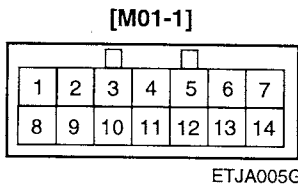
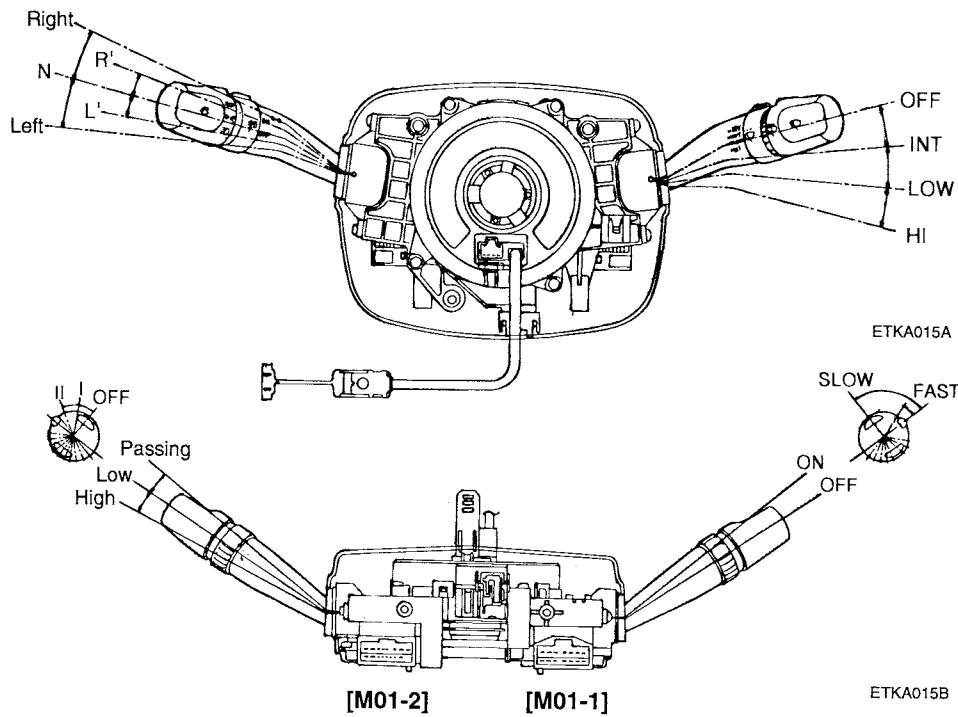
WITHOUT AIR BAG



Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description
M01-2	1	Head lamp passing switch	M01-1	1	Wiper high speed
	2	Head lamp high beam power		2	Wiper low speed
	3	-		3	Wiper parking
	4	-		4	Intermittent wiper
	5	-		5	Wiper & washer ground
	6	-		6	Front washer switch
	7	Turn signal RH lamp switch		7	-
	8	Flasher unit power		8	Horn relay
	9	Turn signal LH lamp switch		9	-
	10	Head lamp low beam power		10	Mist switch
	11	Dimmer & passing ground		11	Mist ground
	12	Front fog lamp switch		12	-
	13	Front fog lamp switch ground		13	Intermittent wiper volume
	14	Tail lamp switch		14	Intermittent wiper ground
	15	Head lamp switch	M01-3	1	Remote control signal
	16	Rear fog lamp switch		2	Horn relay
	17	Lighting switch ground		3	Remote control power
	18	-		4	Remote control ground

WITH AIR BAG



Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description	
M01-2	1	Head lamp passing switch	M01-1	1	Wiper high speed	
	2	Head lamp high beam power		2	Wiper low speed	
	3	-		3	Wiper parking	
	4	-		4	Intermittent wiper	
	5	-		5	Wiper & washer ground	
	6	-		6	Front washer switch	
	7	Turn signal RH lamp switch		13	Intermittent wiper volume	
	8	Flasher unit power		14	Intermittent wiper ground	
	9	Turn signal LH lamp switch		M01-3	1	Remote control signal
	10	Head lamp low beam power			2	Horn relay
	11	Dimmer & passing ground			3	Remote control power
	12	Front fog lamp switch			4	Remote control ground
	13	Front fog lamp switch ground				
	14	Tail lamp switch				
	15	Head lamp switch				
	16	Rear fog lamp switch				
	17	Lighting switch ground				
	18	-				

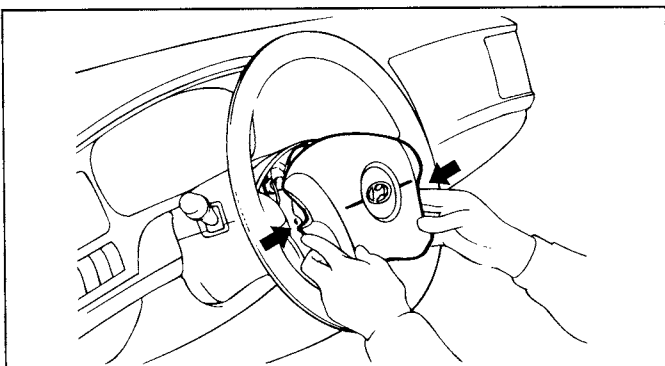
## REMOVAL AND INSTALLATION ETKA0400

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

### CAUTION

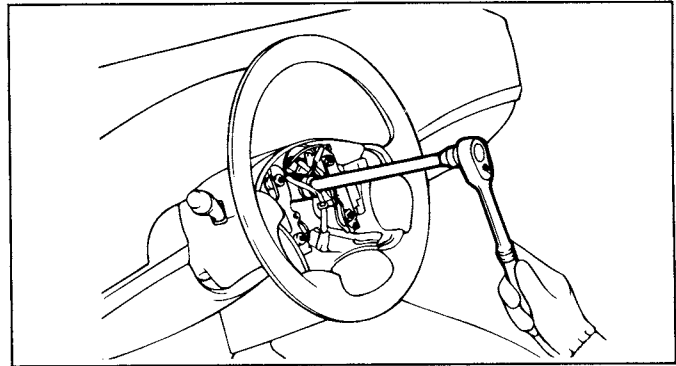
- Never attempt to disassemble or repair the air bag module or clock spring. If faulty, replace it.
- Do not drop the air bag module or clock spring or allow contact with water, grease or oil. Replace if a dent, crack, deformation or rust is detected.
- The air bag module should be stored on a flat surface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

1. Remove the air bag module.



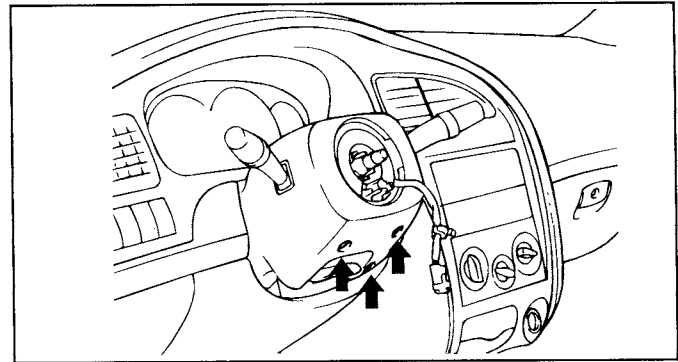
ESKA015A

2. Remove the steering wheel.



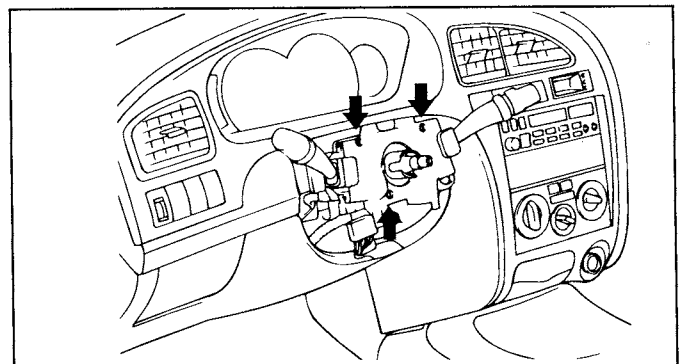
ESKA015B

3. Remove the upper shroud and lower shroud from the steering column.



ESKA015C

4. Remove the screws holding the multifunction switch and disconnect the connectors. Remove the multifunction switch assembly.



ESKA015E

5. Installation is the reverse of removal.

**INSPECTION** ETKA0450

Check the continuity between the terminals while operating the switch.

**LIGHTING SWITCH [M01-2]**

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

KTJA040A

**DIMMER AND PASSING SWITCH [M01-2]**

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

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

KTDA040B

**TURN SIGNAL AND LANE CHANGE SWITCH [M01-2]**

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

KTDA040C

**WIPER AND INTERMITTENT VOLUME SWITCH [M01-1]**

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

ETKA545D

**WASHER SWITCH [M01-1]**

Position \ Terminal	5	6
OFF		
ON	○	○

ETKA545E

**FRONT FOG LAMP SWITCH [M01-2]**

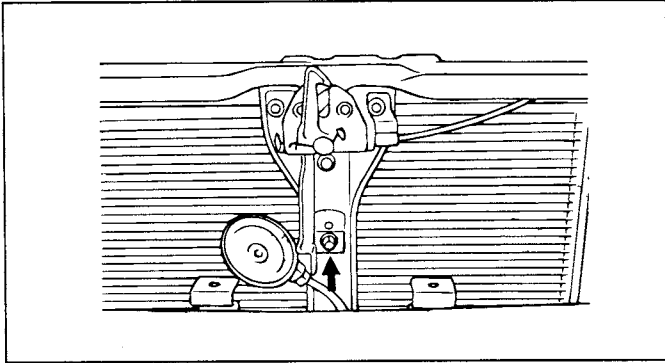
Position \ Terminal	12	13
OFF		
ON	○	○

ETKA545F

## HORNS

### REMOVAL AND INSTALLATION ETKA0500

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



ETKA020A

2. Installation is the reverse of removal.

### INSPECTION ETHA1200

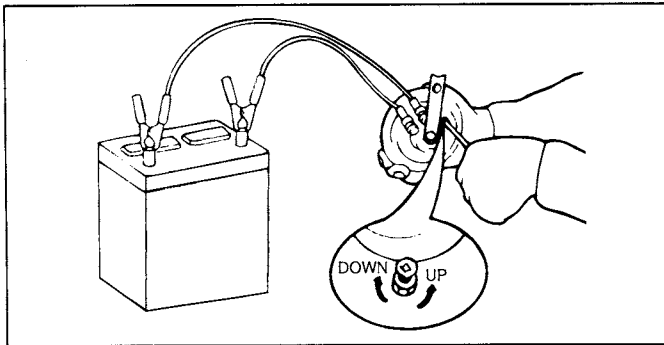
1. Test the horn by connecting battery voltage to the 1 terminal and ground the 2 terminal.
2. The horn should make a sound. If the horn fails to make a sound, replace it.

### ADJUSTMENT

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

### NOTE

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

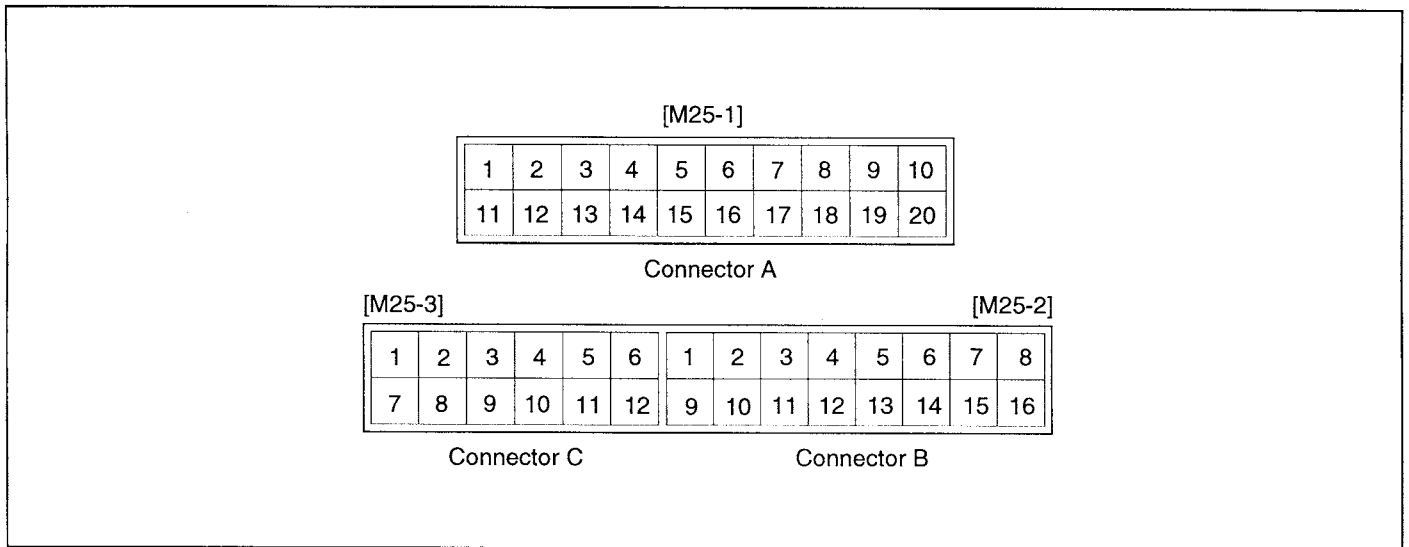


ETDA050A



**ETACS (ELECTRONIC TIME AND ALARM CONTROL SYSTEM)**

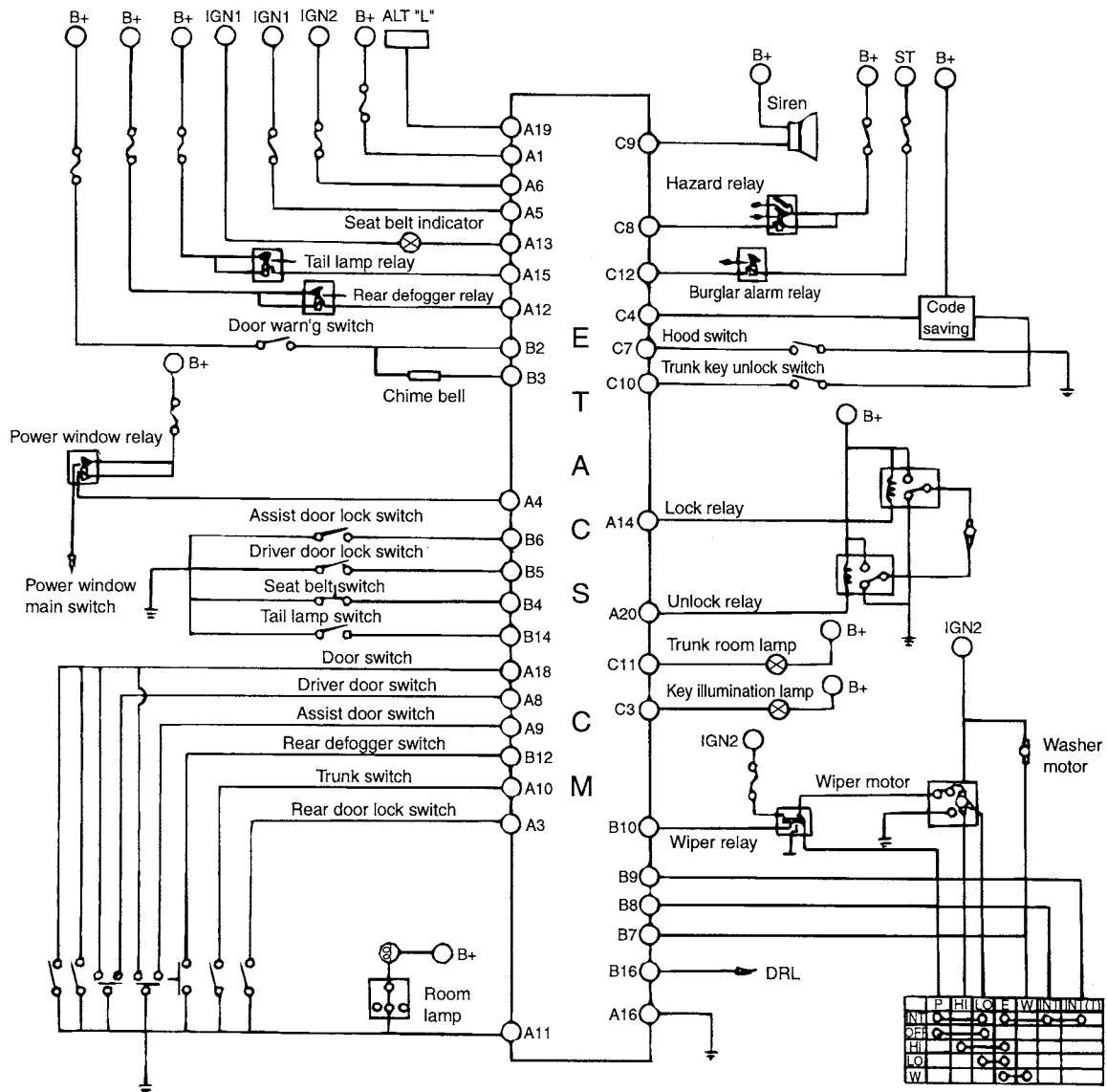
**ETACS CM PIN CONNECTION** ETKA0550



ETKA555A

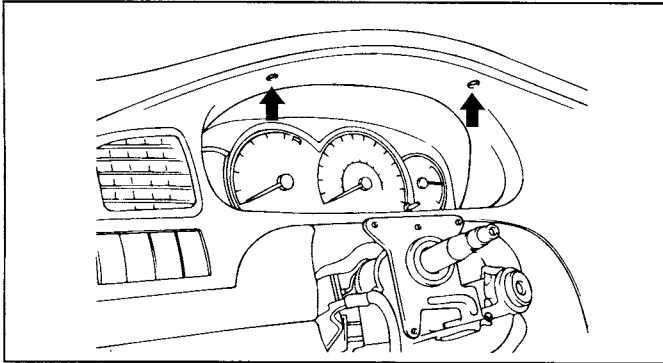
Terminal No.	Connector A (20 pin)	Connector B (16 pin)	Connector C (12 pin)
1	B+	-	-
2	-	Door warning switch	-
3	Rear door lock switch	Chime bell	Key illumination
4	Power window relay	Seat belt switch	Code saving
5	IGN1	Driver door lock switch	-
6	IGN2	Assist door lock switch	-
7	-	Washer switch	Hood switch
8	Driver door switch	Intermittent switch	Hazard relay
9	Assist door switch	Intermittent volume	Siren
10	Trunk switch	Wiper relay	Trunk key unlock switch
11	Room lamp	-	Trunk room lamp
12	Rear defogger relay	Rear defogger switch	Burglar alarm relay
13	Seat belt indicator	-	
14	Door lock relay	Tail lamp switch	
15	Tail lamp relay	-	
16	Ground	Day time running light	
17	-		
18	Door switch		
19	Alternator <sup>TM</sup> L		
20	Door unlock relay		

CIRCUIT DIAGRAM ETKA0600



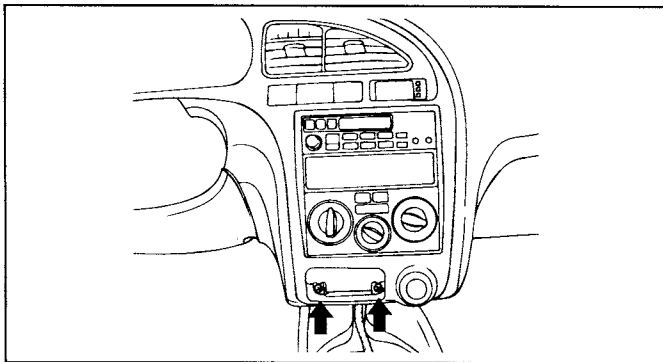
**REMOVAL AND INSTALLATION** ETKA0650

1. Disconnect the negative (-) battery terminal.
2. Remove the screws holding the instrument facia panel.



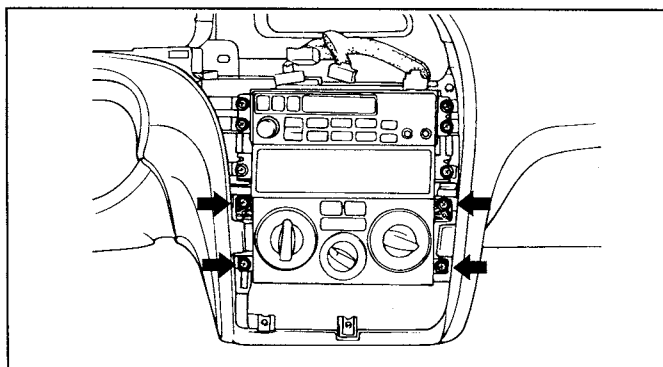
ESKA015F

3. After removal of the ash tray, remove the screws holding the instrument facia panel and remove the instrument facia panel.



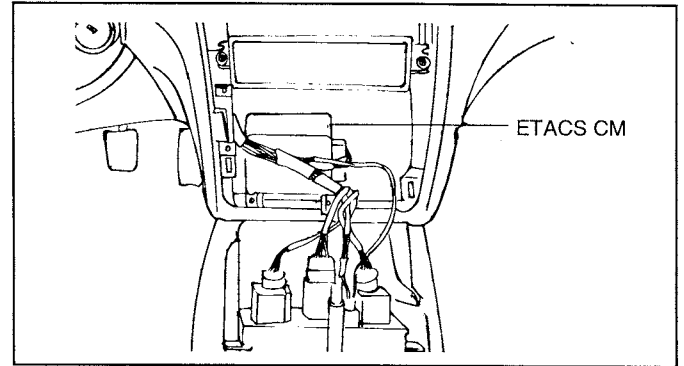
ESKA015G

4. Remove the air conditioner and disconnect the connectors.



ETKA965A

5. Remove the ETACS CM.



ETKA005R

6. Installation is the reverse of removal.

**INSPECTION** ETKA0700

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

**ETACS FUNCTION**

1. **Variable intermittent wiper**

Time specification

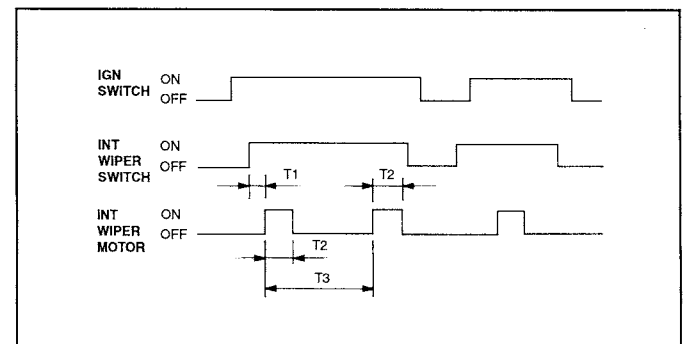
T1 : Max. 0.3 sec.

T2 : 0.6 ~ 0.8 sec. (Time of wiper motor 1 rotation)

T3 : Intermittent time

Min.  $2.2 \pm 0.2$  sec. (at VR=0k $\Omega$ )

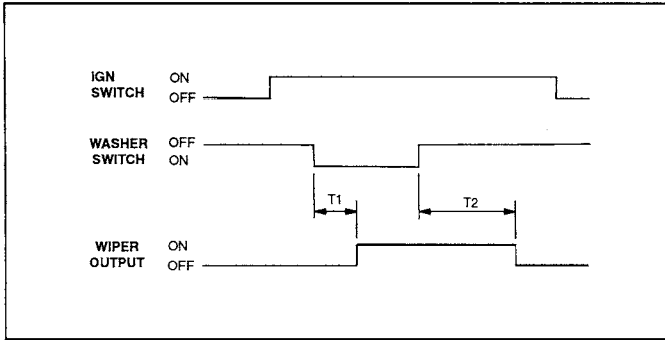
Max.  $10 \pm 1$  sec. (at VR=50k $\Omega$ )



ETHA115C

2. Washer

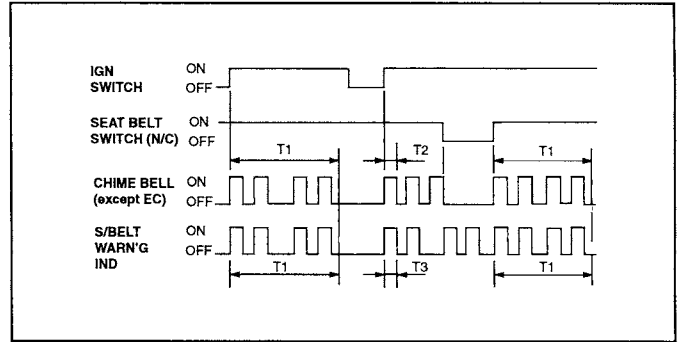
- a. Time specification  
 T1 : 0.6 sec.  
 T2 : 2.5 - 3.8 sec.
- b. This function should be operated preferentially even though the variable intermittent wiper is operating.



ETKA371K

5. Seat belt warning

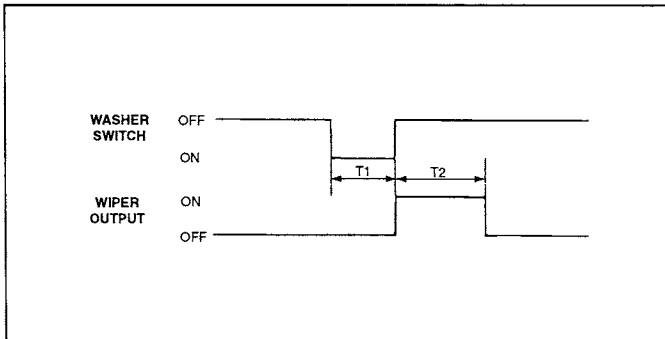
- Time specification
- T1 :  $6 \pm 1$  sec.
  - T2 :  $0.45 \pm 0.1$  sec.
  - T3 :  $0.3 \pm 0.1$  sec.



ETHA115F

3. Wiper mist

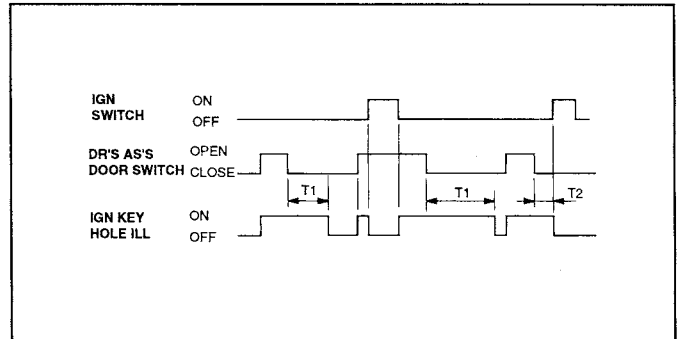
- Time specification
- T1 : 0.2 - 0.6 sec.
  - T2 :  $0.7 \pm 0.1$  sec.



ETKA370A

6. Ignition key hole illumination

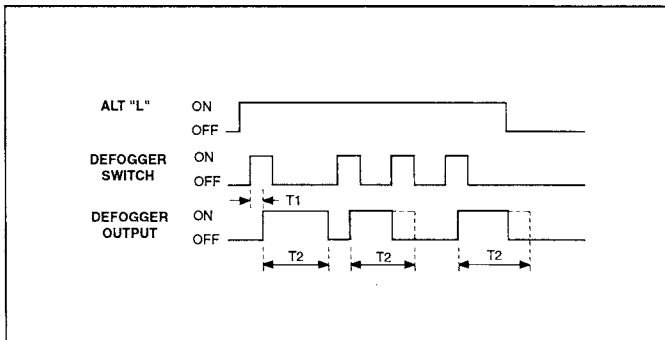
- Time specification
- T1 :  $10 \pm 1$  sec.
  - T2 : 0 - 10 sec.



ETJA070A

4. Rear window defogger

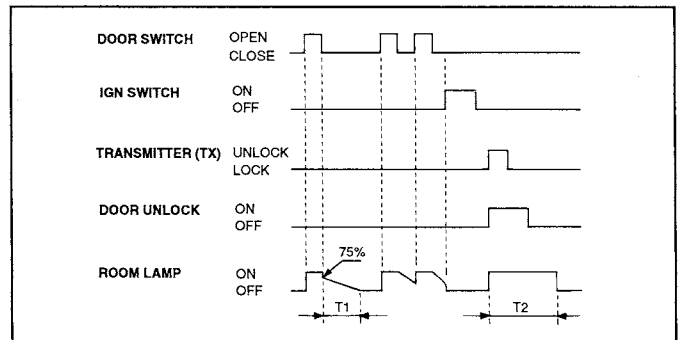
- Time specification
- T1 : 60 msec
  - T2 :  $20 \pm 1$  min.



ETJA020B

7. Delayed out room lamp

- Time specification
- T1 :  $5.5 \pm 0.5$  sec.
  - T2 : 30 sec.

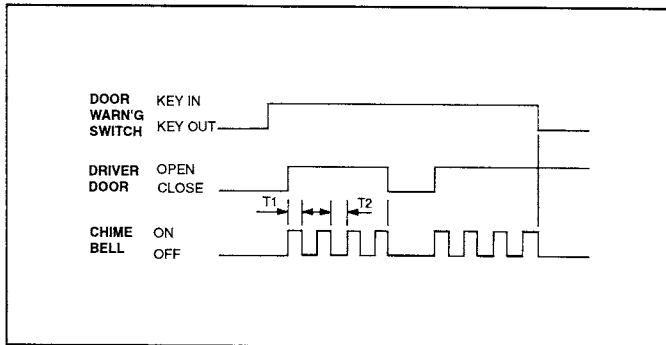


ETJA020C

8. Door warning

Time specification

T1, T2 : 0.45 ± 0.1 sec.

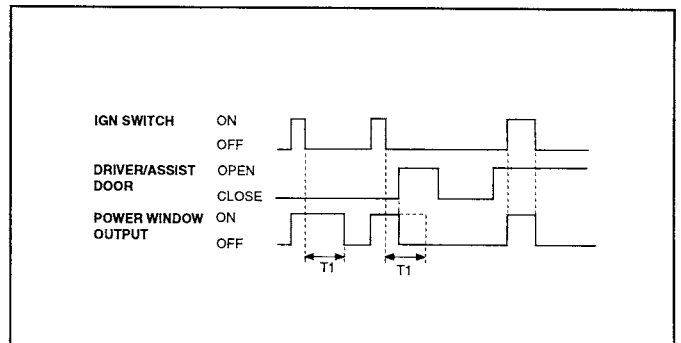


ETHA115L

11. Power window timer

Time specification

T1 : 30 ± 3 sec.



ETKA005Y

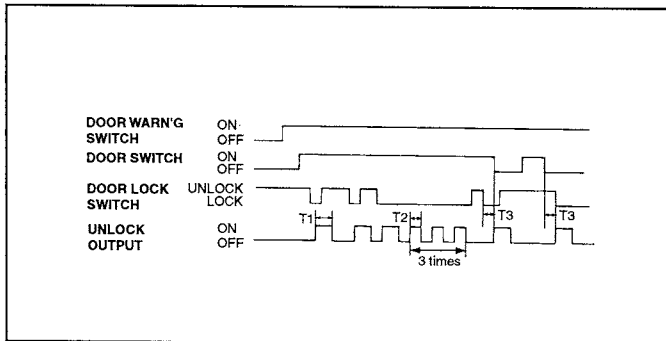
9. Ignition key reminder

Time specification

T1 : 1 sec.

T2 : 0.5 sec.

T3 : Max. 0.5 sec.

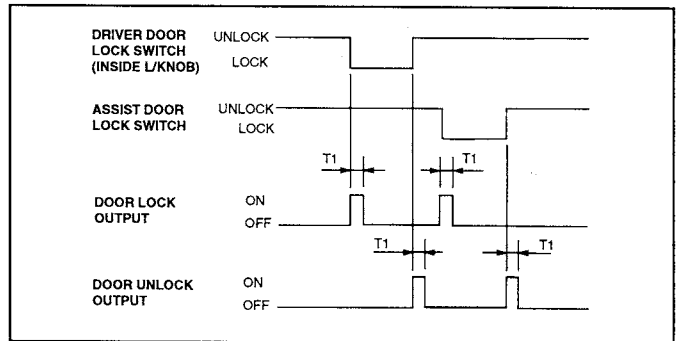


ETKA005Z

12. Central door lock/unlock

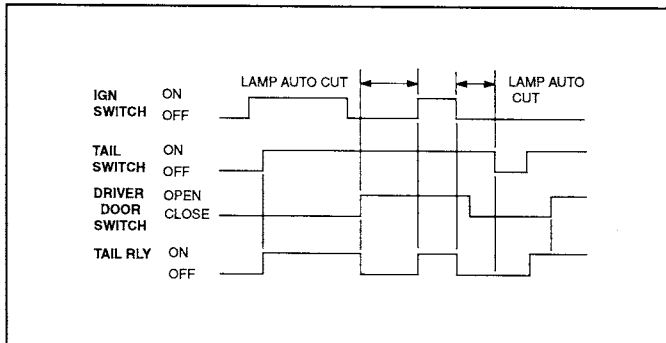
Time specification

T1 : 0.5 ± 0.1 sec.



ETHA115H

10. Tail lamp auto cut

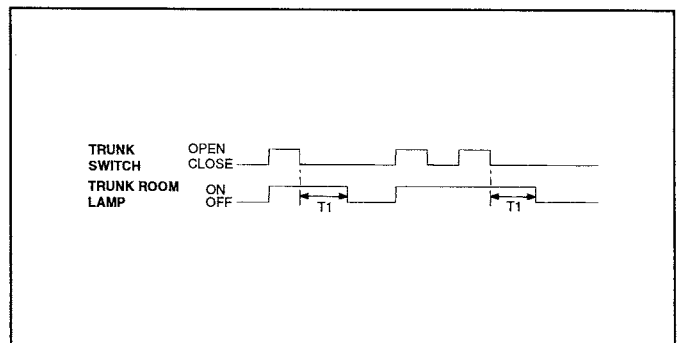


ETHA115M

13. Trunk room lamp

Time specification

T1 : 10 ± 1 min.



ETKA370B

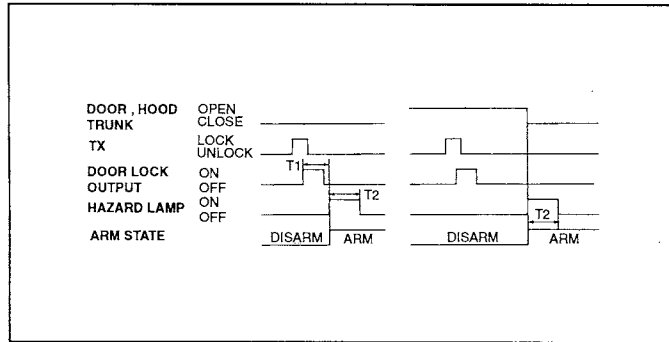
**ANTI-THEFT FUNCTION**

**1. Arm function**

Time specification

T1 : 0.6 sec.

T2 : 1 ± 0.2 sec.

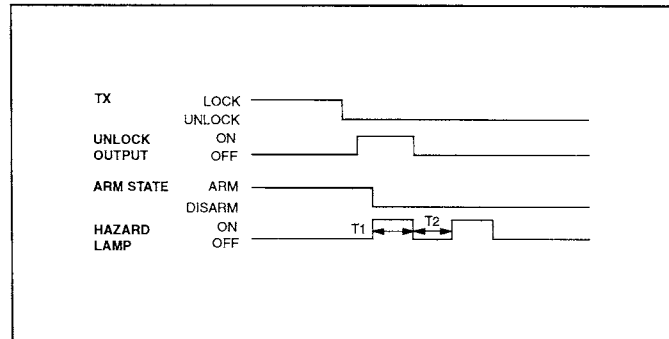


ETKA370C

**2. Disarm function**

Time specification

T1, T2 : 0.5 ± 0.1sec.



ETHA115R

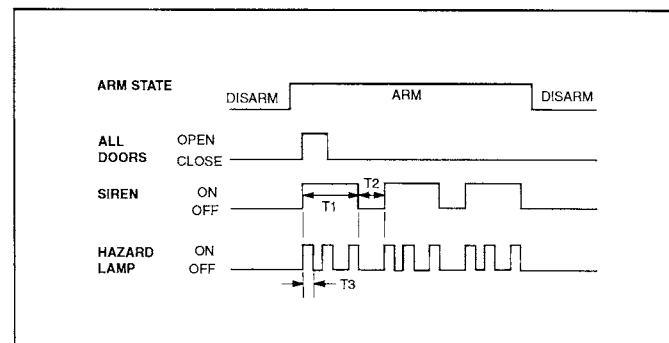
**3. Alarm function**

a. Time specification (Except EC area)

T1 : 27 ± 2sec.

T2 : 10 ± 1sec.

T3 : 0.5 ± 0.1sec.

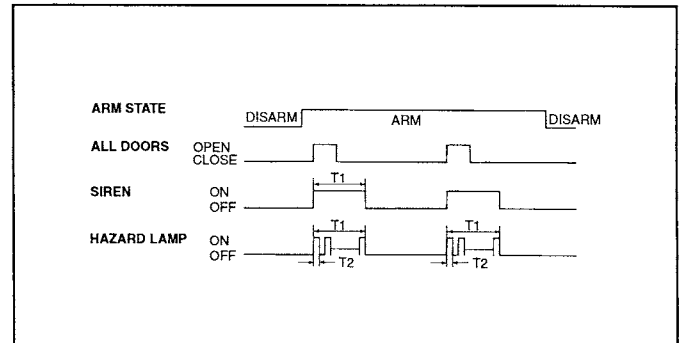


ETHA115S

b. Time specification (Only EC area)

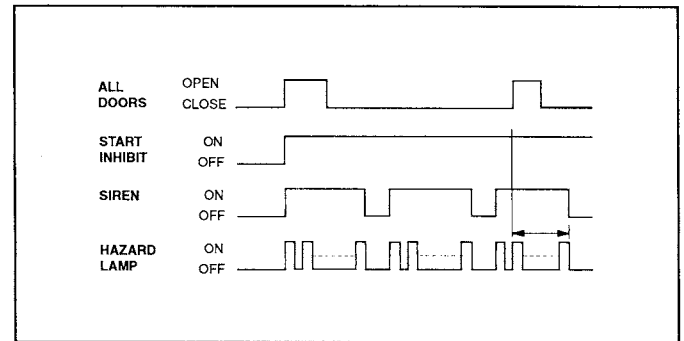
T1 : 27 ± 2 sec.

T2 : 0.5 ± 0.1 sec.



ETKA370D

c. New alarm occurs while the alarm is sounding.

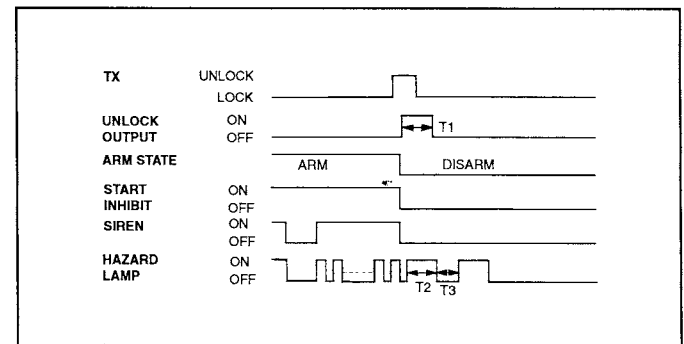


ETHA115T

d. Disarmed with TX (Transmitter) while the alarm is sounding.

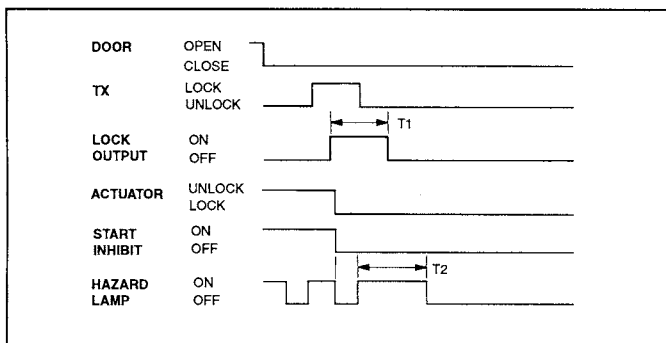
Time specification

T1, T2, T3 : 0.5 sec.



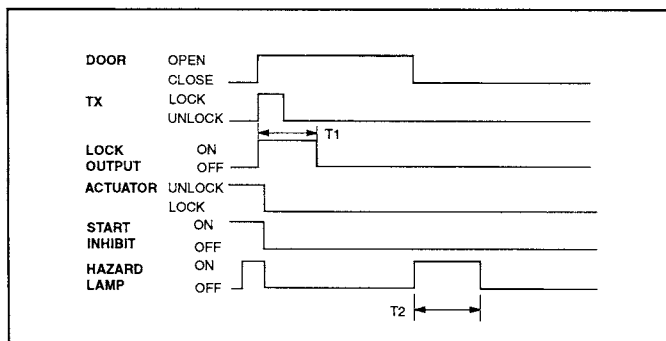
ETHA115U

- e. TX (Transmitter) lock button pressed when the door closed while the alarm is sounding.  
Time specification  
T1 : 0.5 sec.  
T2 : 1.0 sec.



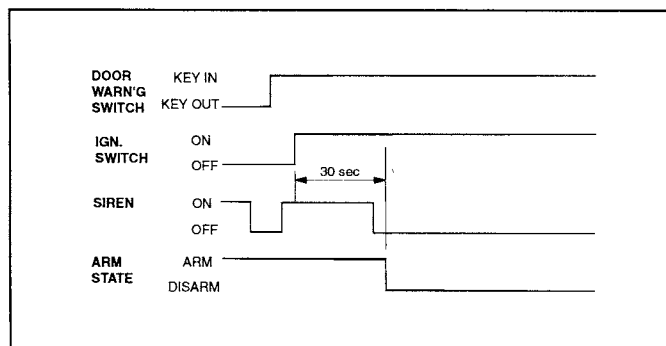
ETHA115V

- f. TX (Transmitter) lock button pressed when the door opened while the alarm is sounding.  
Time specification  
T1 : 0.5 sec.  
T2 : 1.0 ± 0.2 sec.



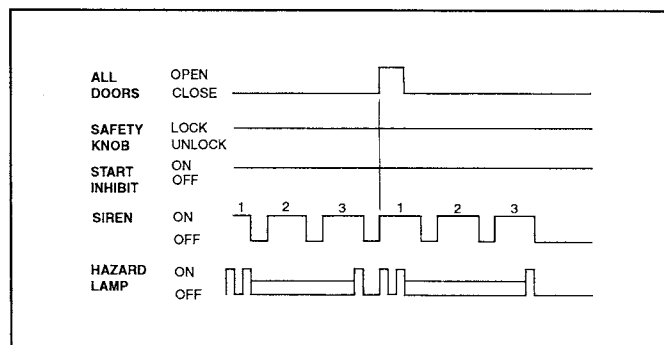
ETHA115W

- g. Disarmed after 30 sec when the ignition switch is turned on while the alarm is sounding.



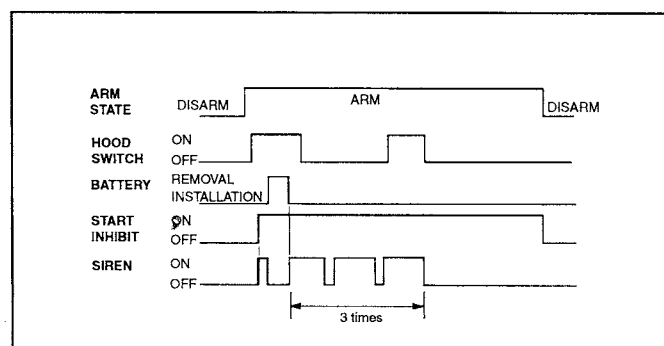
ETHA115X

- h. After finished siren 3 times (only 1 time in case of EC area) start inhibit is "ON" if door is opened regardless of door latch lock state.



ETHA115Y

- i. Battery is disconnected during the alarm state.



ETHA115Z

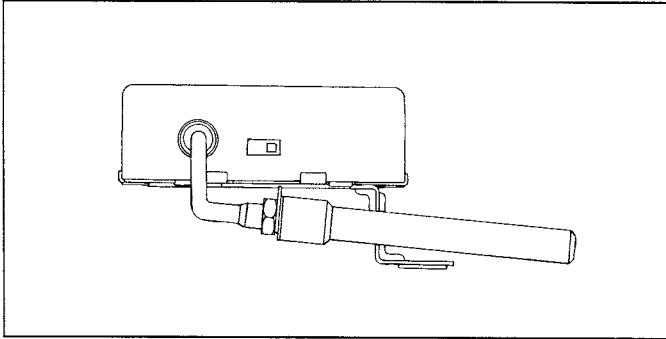
#### 4. Code saving method.

- a. Remove the center facia panel.

#### NOTE

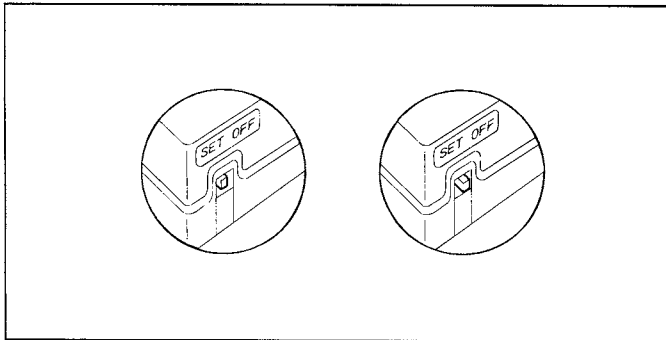
**Don't disconnect the negative (-) battery terminal.**

- b. To store new codes:
  - Activate the keyless entry/receiver unit and change code saving switch of the receiver unit from "OFF" to "SET".
  - The secret codes from the transmitter will be stored into the receiver unit when the door lock button or unlock button is pressed on the transmitter.
  - Save the 2nd transmitter codes in the same manner.



ETDA085R

- c. Return the code saving switch of the receiver unit from "SET" to "OFF".

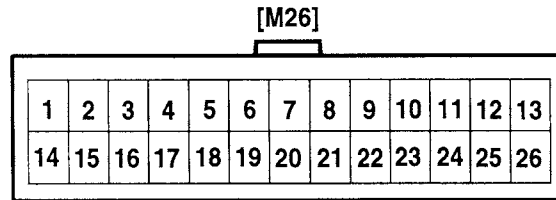


ETHA120D

- d. Install the center facia panel.



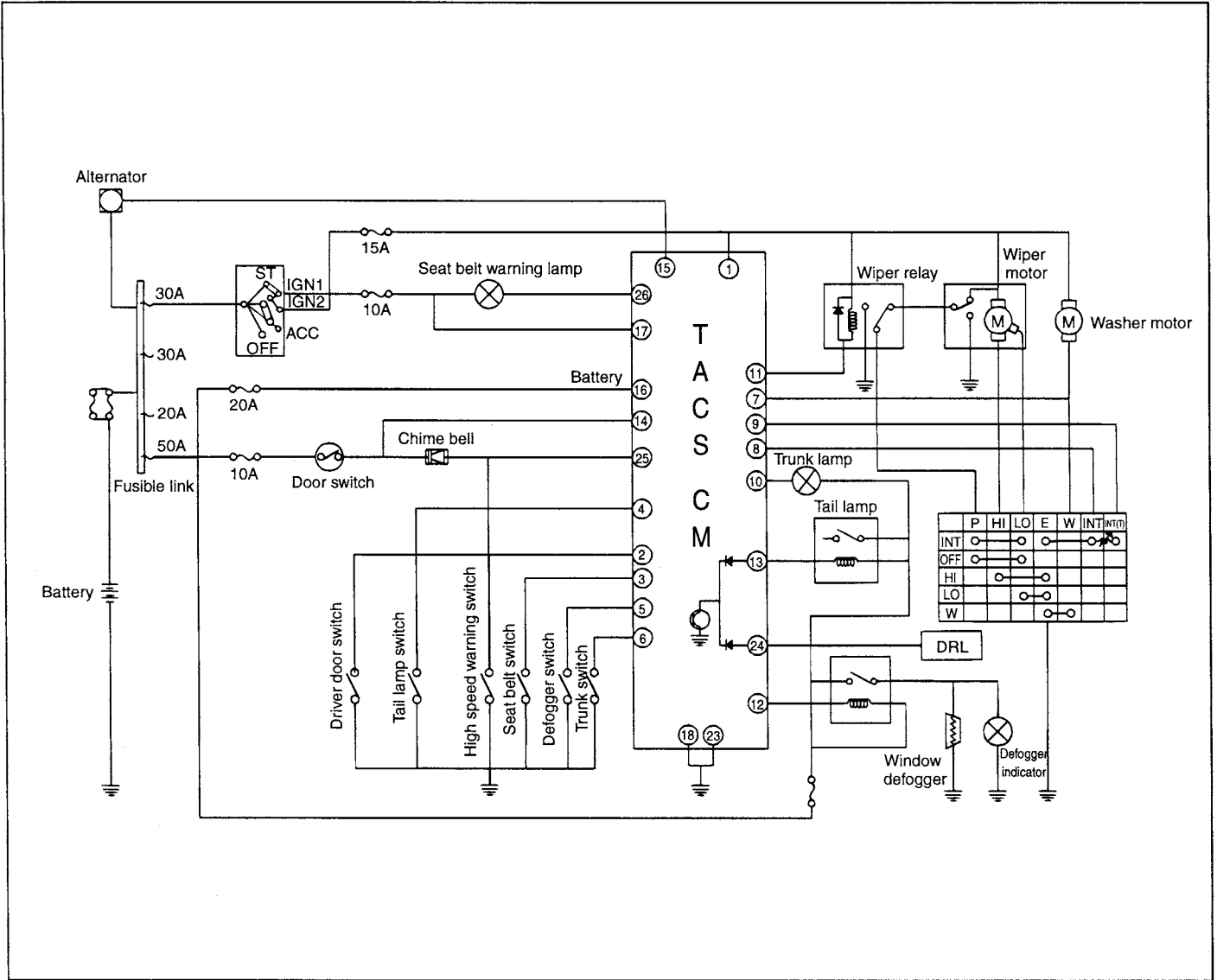
TACS CM PIN CONNECTION ETKA0750



ETKA005E

Terminal No.	Description	Terminal No.	Description
1	IGN2	14	Door switch
2	Driver door switch	15	Alternator "L"
3	Seat belt switch	16	B+
4	Tail lamp switch	17	IGN1
5	Defogger switch	18	Ground
6	Trunk switch	19	-
7	Washer switch	20	-
8	Intermittent switch	21	-
9	Intermittent volume switch	22	-
10	Trunk lamp	23	Ground
11	Wiper relay	24	Daytime running light
12	Defogger relay	25	Chime bell
13	Tail lamp relay	26	Seat belt warning lamp

CIRCUIT DIAGRAM ETKA0800



ETKA005W

INSPECTION ETKA0850

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

TACS FUNCTION

1. Variable intermittent wiper

Time specification

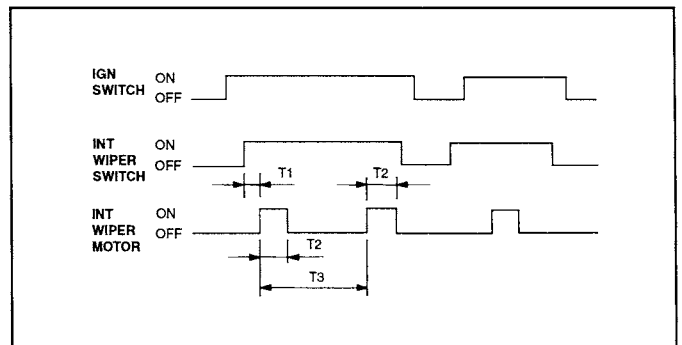
T1 : Max. 0.3 sec.

T2 : 0.6 ~ 0.8 sec. (Time of wiper motor 1 rotation)

T3 : Intermittent time

Min. 2.2 ± 0.2 sec. (at VR=0kΩ)

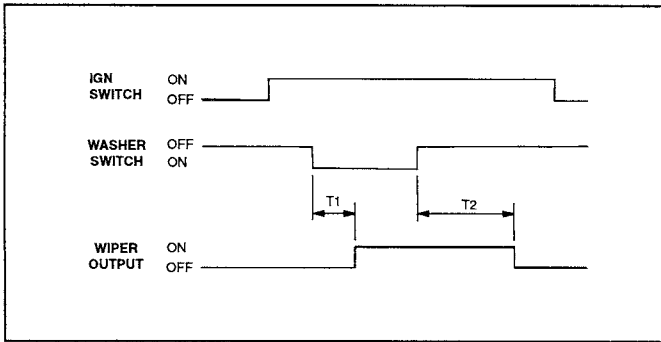
Max. 10 ± 1 sec. (at VR=50kΩ)



ETHA115C

2. Washer

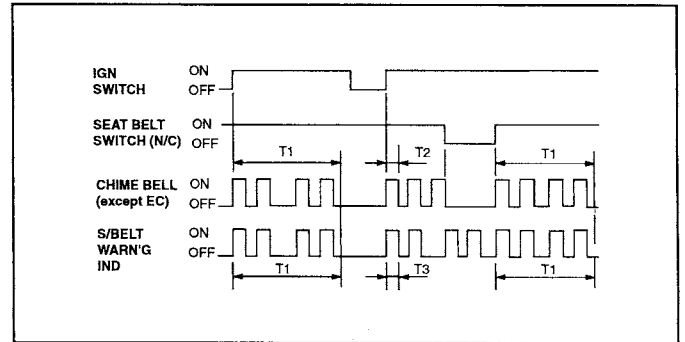
- a. Time specification  
 T1 : 0.6 sec.  
 T2 : 2.5 - 3.8 sec.
- b. This function should be operated preferentially even though the variable intermittent wiper is operating.



ETKA371K

5. Seat belt warning

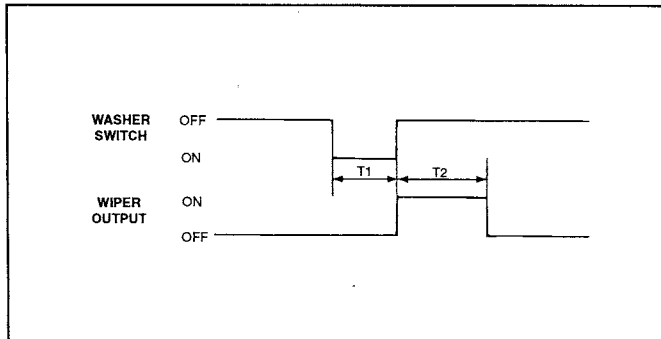
- Time specification
- T1 : 6 ± 1 sec.
  - T2 : 0.45 ± 0.1 sec.
  - T3 : 0.3 ± 0.1 sec.



ETHA115F

3. Wiper mist

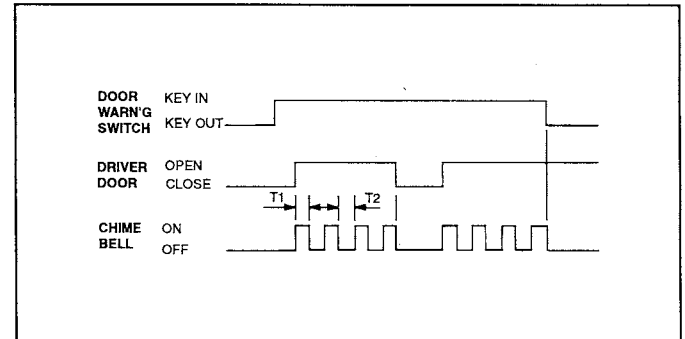
- Time specification
- T1 : 0.2 - 0.6 sec.
  - T2 : 0.7 ± 0.1 sec.



ETKA370A

6. Door warning

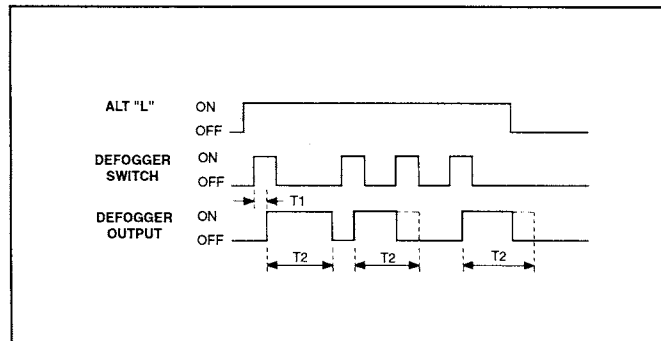
- Time specification
- T1, T2 : 0.45 ± 0.1 sec.



ETHA115L

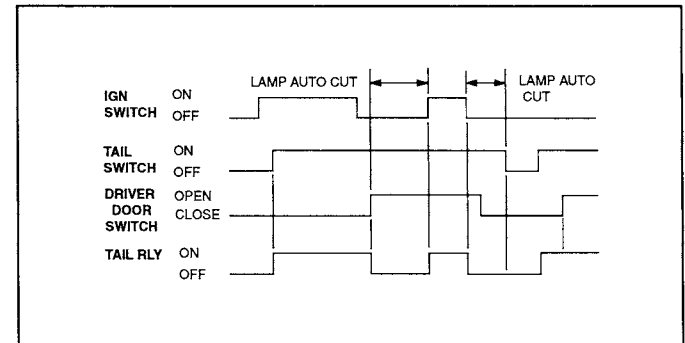
4. Rear window defogger

- Time specification
- T1 : 60 msec
  - T2 : 20 ± 1min.



ETJA020B

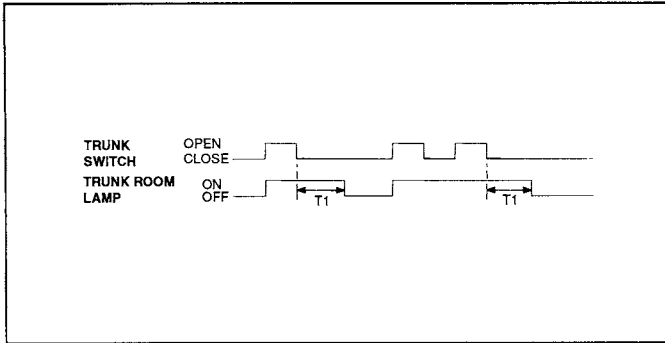
7. Tail lamp auto cut



ETHA115M

## 8. Trunk room lamp

Time specification

T1 :  $10 \pm 1$  min.

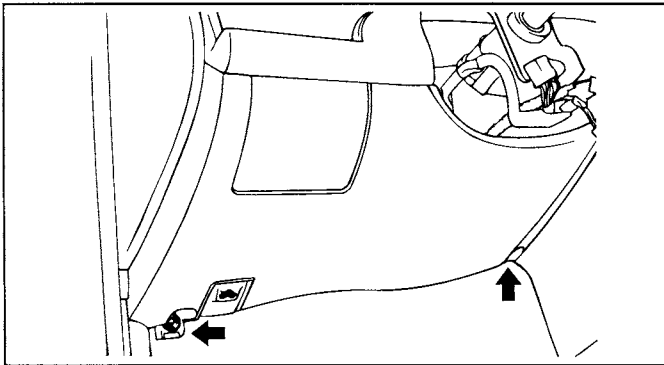
ETKA370B

**FUSES AND RELAYS**

**FUSE BOX** ETKA0950

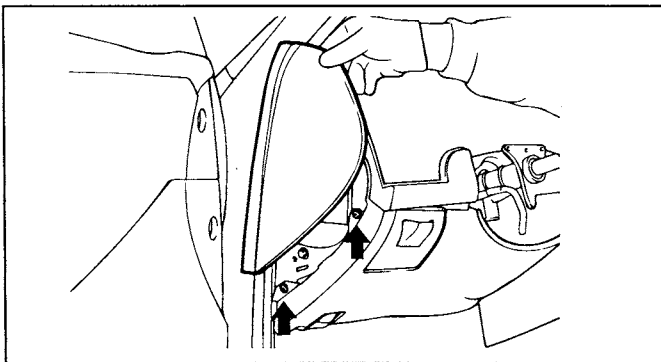
**REMOVAL**

1. Disconnect the negative (-) battery terminal.
2. Remove the bolts holding the lower crash pad panel.



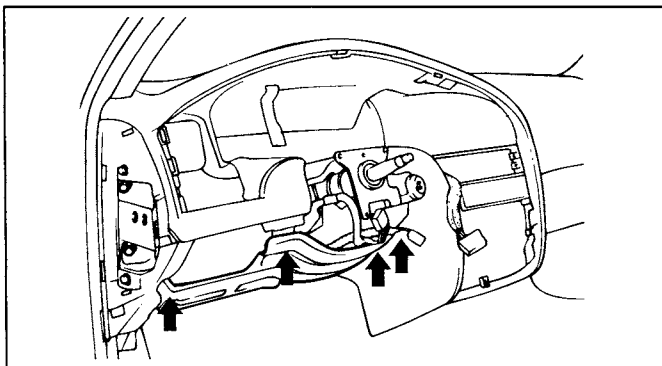
ESKA015J

3. Remove the screws holding the lower crash pad panel and remove it.



ESKA015K

4. Remove the bracket holding the lower crash pad panel.



ESKA015L

5. Disconnect the connectors from the fuse box.

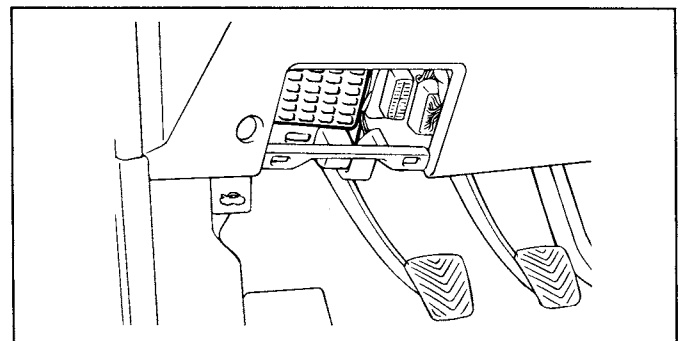
**INSPECTION**

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

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

**CAUTION**

**Never use a fuse of higher capacity than specified.**



ETJA075E

**RELAY BOX (ENGINE COMPARTMENT)****FUSIBLE LINK** ETKA0900**SPECIFICATIONS**

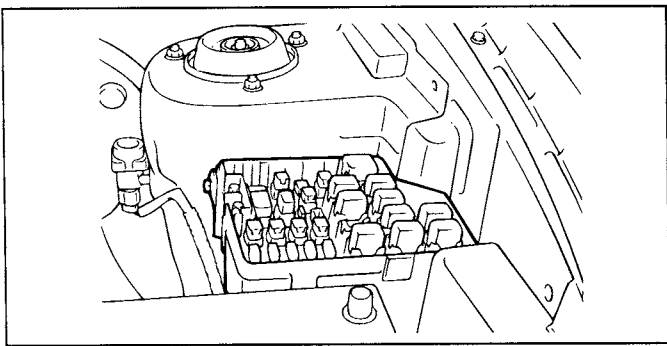
Circuit	Rated Capacity	Circuit	Rated Capacity
Battery	50A	ABS 2	30A
Generator	100A	Radiator	20A
Condenser	20A	ECM	20A
Ignition	30A	Blower	30A
ABS 1	30A		

**INSPECTION**

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

**CAUTION**

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



ETJA075D

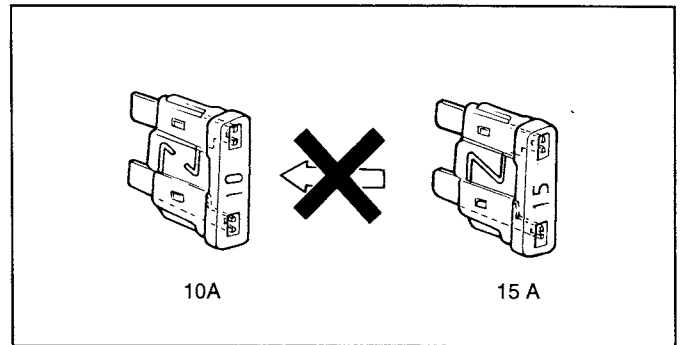
FUSES

INSPECTION ETDA0860

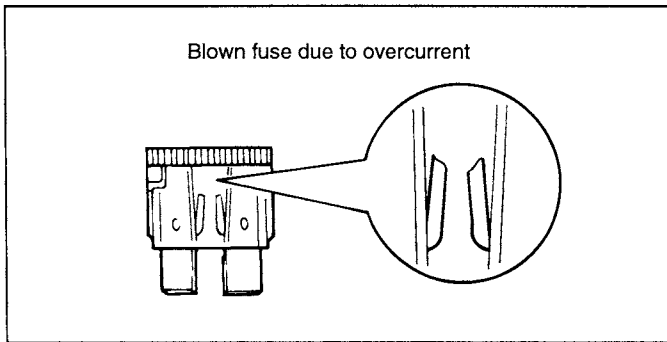
When a fuse is blown, there are two probable causes. The two causes can easily be determined by a visual check after removing the fuses.

1. **Fuse blown due to over-current.**

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



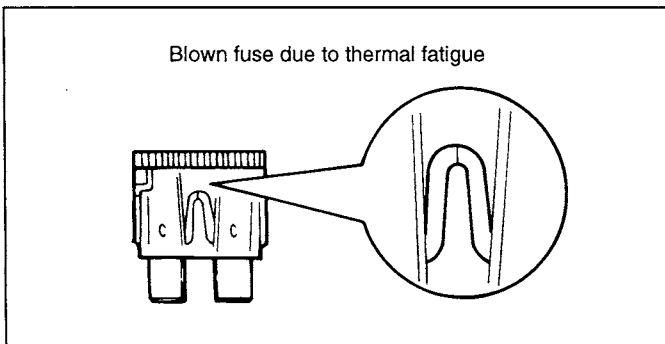
ETDA086C



ETDA086A

2. **Fuse blown due to repeated on-off current.**

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



ETDA086B

CAUTION

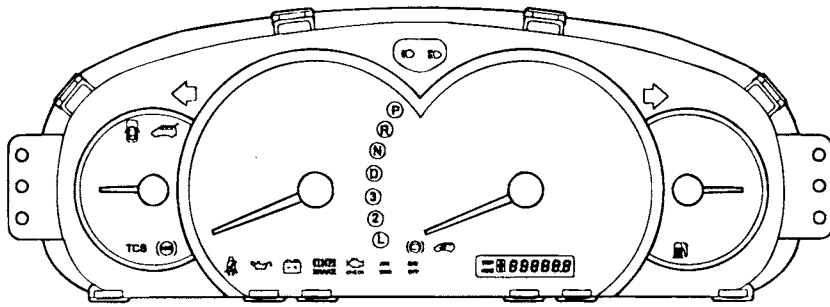
A blade type fuse is identified by the numbered value in amperes. If the fuse is blown, be sure to replace a fuse with the same ampere rating. If a fuse of higher capacity than specified is used, parts may be damaged and a danger of fire exists. To remove or insert a fuse, use the fuse puller in the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

# INDICATORS AND GAUGES

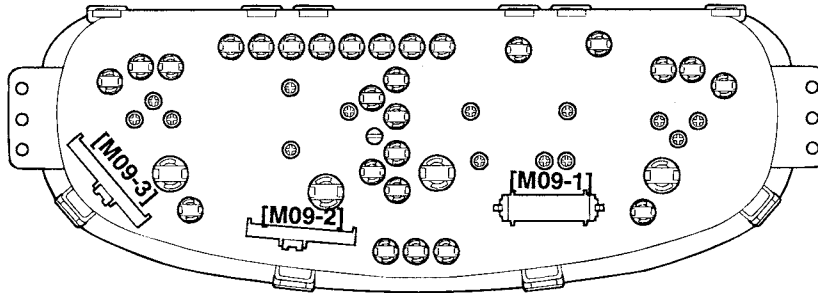
## INSTRUMENT CLUSTER

### COMPONENTS ETKA1000

[ WITHOUT TRIP COMPUTER ]

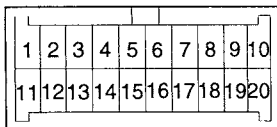


ETKA050M



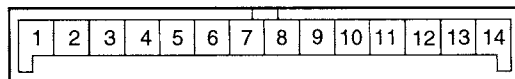
ETKA050B

[M09-1]



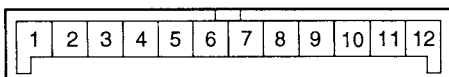
ETKA050C

[M09-2]



ETJA015E

[M09-3]



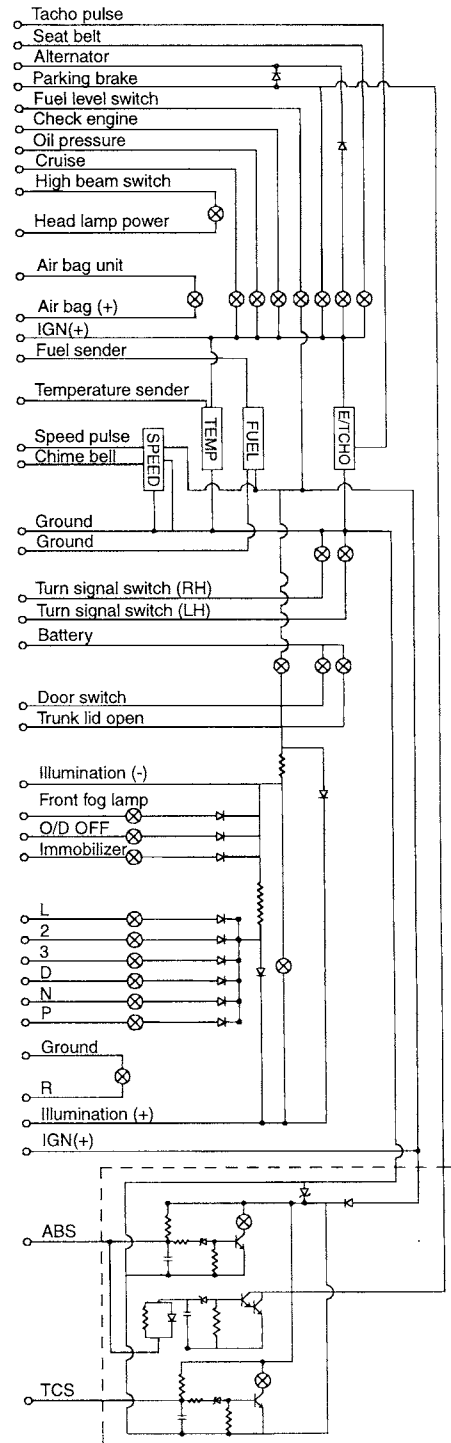
ETJA015F



CIRCUIT DIAGRAM ETKA1050

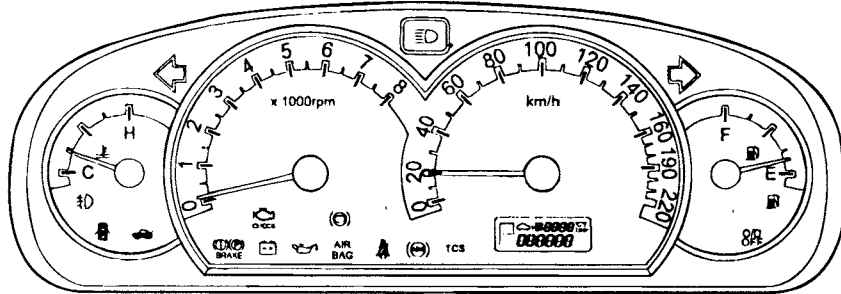
[ WITHOUT TRIP COMPUTER ]

M09-1	M09-2	M09-3
	9	
		12
	13	
	14	
16		
	12	
		11
2		
	2	
	1	
20		
7		
1		
13		
		5
15		
12		
17		
11		
4		2
9		
		4
		3
5		
6		
19		
18		
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	5	
	7	
	6	
		8
		7
		9
		10

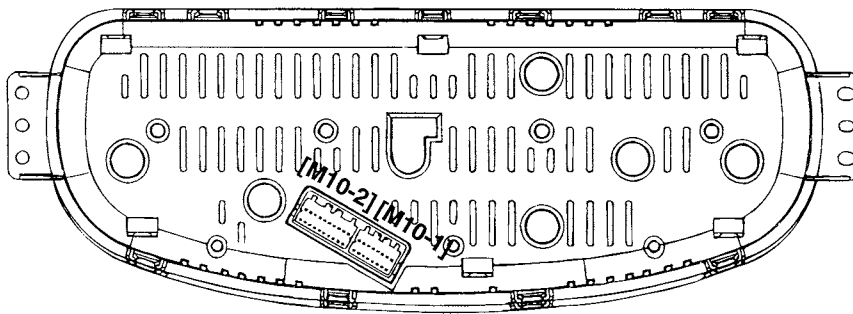


COMPONENTS ETKA1100

[ WITH TRIP COMPUTER ]

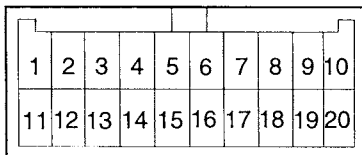


ETKA050L



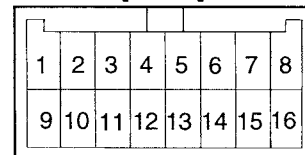
ETKA050E

[M10-2]



ETKA050F

[M10-1]

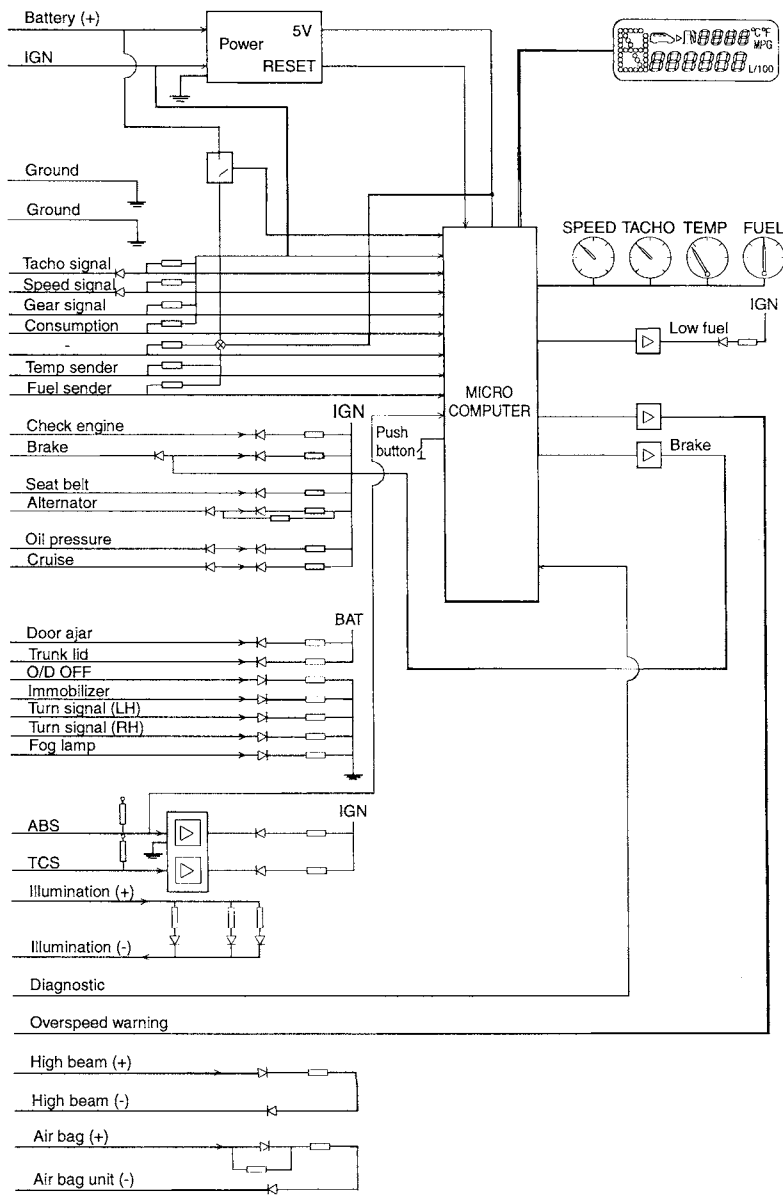


ETKA050G

CIRCUIT DIAGRAM ETKA1150

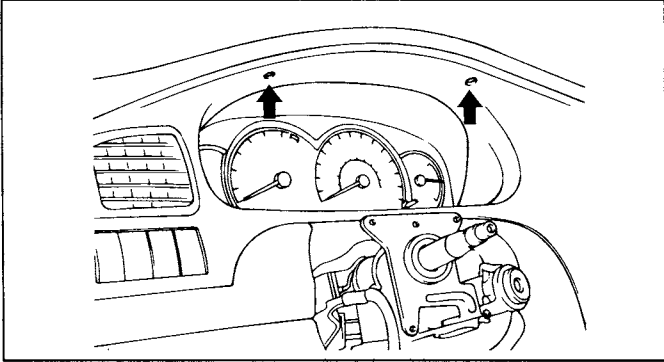
[ WITH TRIP COMPUTER ]

M10-1	M10-2
	5
9	
	6
	4
2	
3	
	9
1	
4	
5	
6	
11	
	15
7	
	17
	18
	13
	19
	16
	1
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	3
12	
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16	
14	
13	



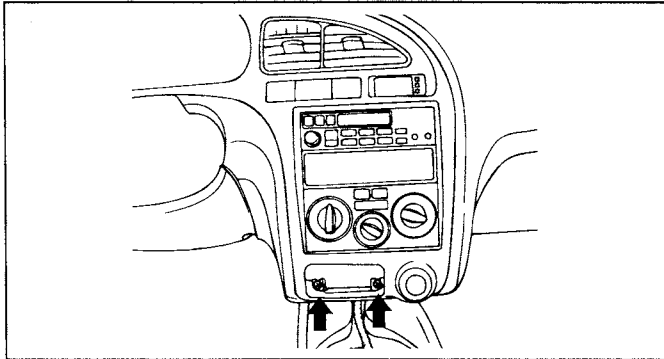
**REMOVAL AND INSTALLATION** ETKA1200

1. Disconnect the negative (-) battery terminal.
2. Remove the screws holding the instrument facia panel.



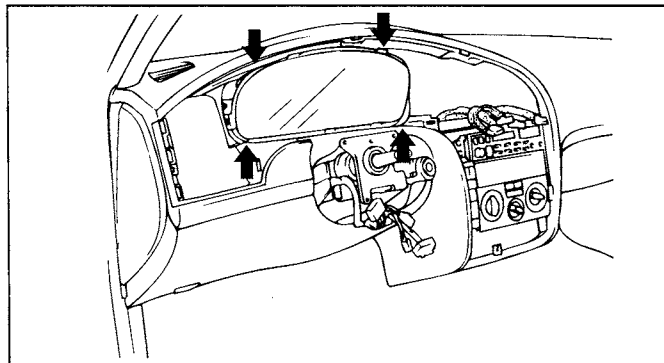
ESKA015F

3. After removal of the ash tray, remove the screws holding the instrument facia panel and remove.



ESKA015G

4. Remove the cluster.

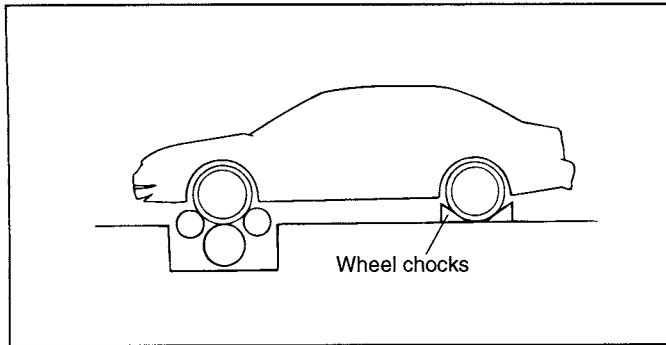


ESKA015H

5. Installation is the reverse of removal.

**INSPECTION OF COMPONENTS** ETKA1250

**SPEEDOMETER**



ETA9100A

2. Drive the vehicle onto a speedometer tester. Use wheel chocks as appropriate.
3. Check if the speedometer indicator range is within the standard values.

**CAUTION**

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

**NOTE**

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

1. Adjust the pressure of the tires to the specified level.

Velocity (Km/ h)	20	40	60	80	100	120	140	160	180	200	Remark
Tolerance (Km/ h)	20-24.4	40-43	60-64.4	80-85.5	100-105.5	120.5-126	140.5-146	160.5-166	181-186.5	201-206.5	Except EEC& GENERAL
	20-24.4	40-44.4	61-65.4	81-86.5	102-107.5	123-128.5	144-149.5	165-170.5	186-191.5	207-212.5	EEC, GENERAL

Velocity (MPH)	10	20	40	60	80	100	120	Remark
Tolerance (MPH)	10-13	20-22	40-43	60-63.8	80.3-84.1	100.3-104.1	120.3-124.1	EXCEPT U.S.A
	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78.3-81.7	98.3-101.7	118.3-121.7	U.S.A

**TACHOMETER**

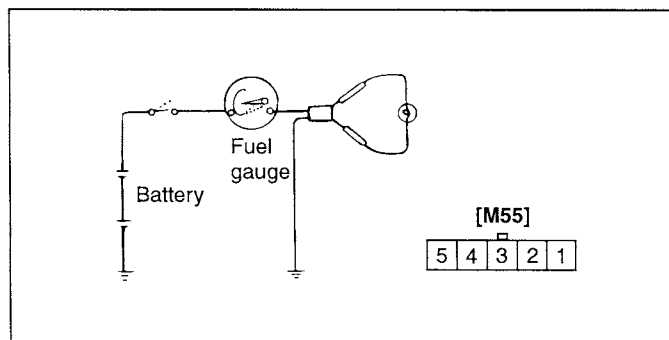
1. Connect the scan tool to the diagnostic link connector or install a tachometer.
2. With the engine running, compare the readings of the tester with that of the tachometer. Replace the tachometer if the tolerance is exceeded.

Revolution (rpm)	1,000	2,000	3,000	4,000	5,000	6,000	Remark
Tolerance (rpm)	±100	±125	±150	±170	±200	±240	DOHC

**FUEL GAUGE**

**OPERATION CHECK**

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



ETKA325A

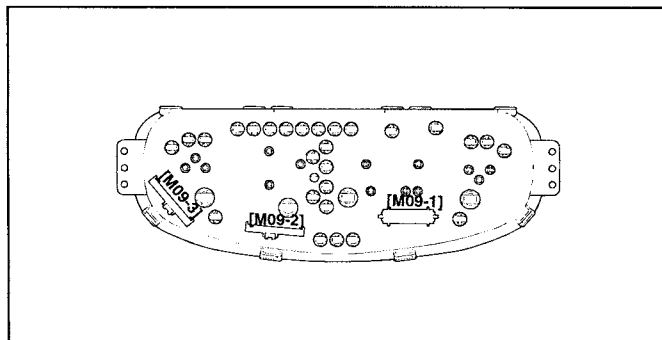
**RESISTANCE CHECK**

1. Remove the instrument cluster (see page BE-52).
2. Measure the resistance between terminal 11 (M09-1) and terminal 13 (M09-1).

Resistance (Ω)	Gauge level
97	E(Empty)
32.5	1/2
6	F(Full)

**CAUTION**

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



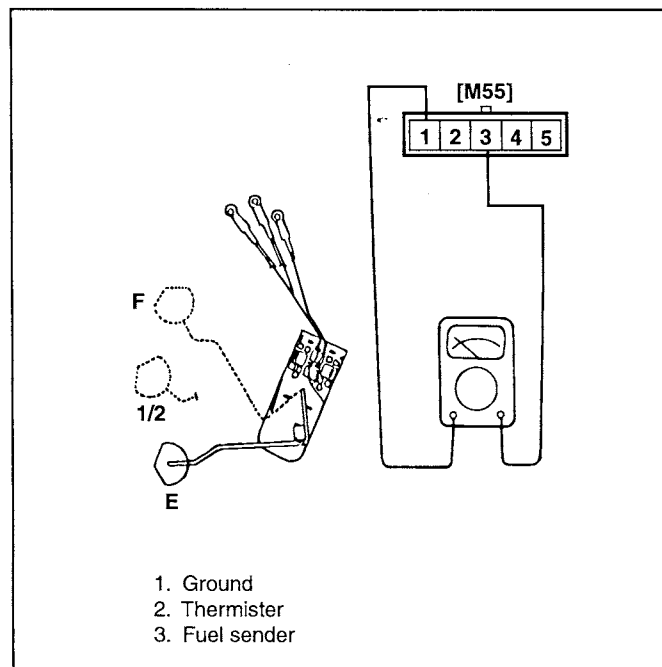
ETKA050B

**FUEL SENDER**

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

Float position	F	1/2	E
Resistance (Ω)	3	32.5	110

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



1. Ground
2. Thermister
3. Fuel sender

ETKA325B

**LOW FUEL LEVEL SENSOR**

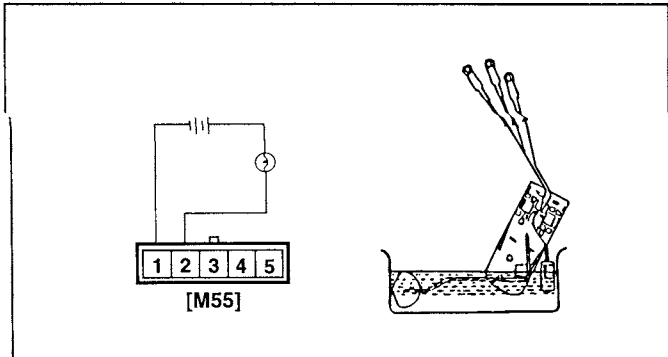
1. Connect a test lamp (12V, 3.4W) and battery to the sender and immerse it in water as shown in the illustration.
2. The lamp should be off while the thermister is submerged in water, and should illuminate when the sender is taken out of the water.

**NOTE**

If there is a malfunction, replace the fuel sender as an assembly.

**CAUTION**

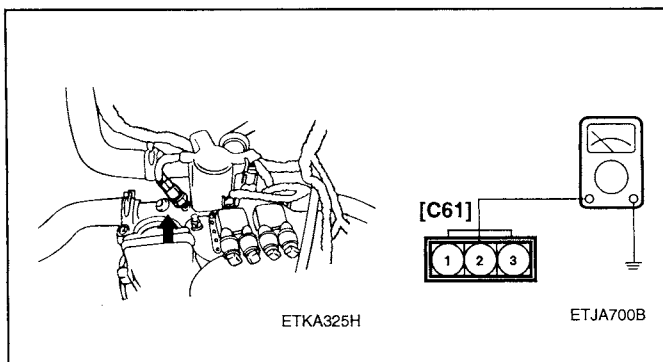
After completing this test, wipe the sender dry and reinstall it in the fuel tank.



ETKA325C

**ENGINE COOLANT TEMPERATURE SENDER**

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



ETKA325H

ETJA700B

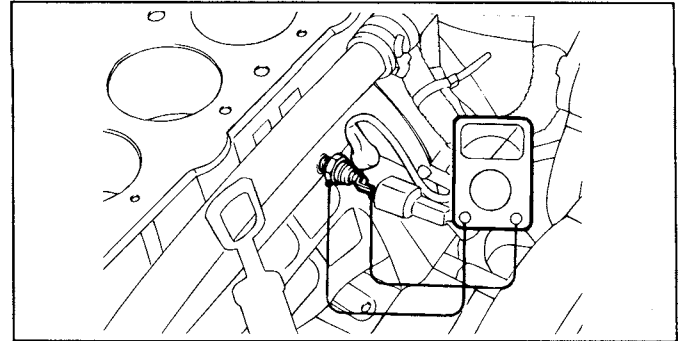
ETKA325D

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

Temperature (°C)	60	85	110	125
Resistance (Ω)	119.4	48.9	25	15.8

**OIL PRESSURE SWITCH**

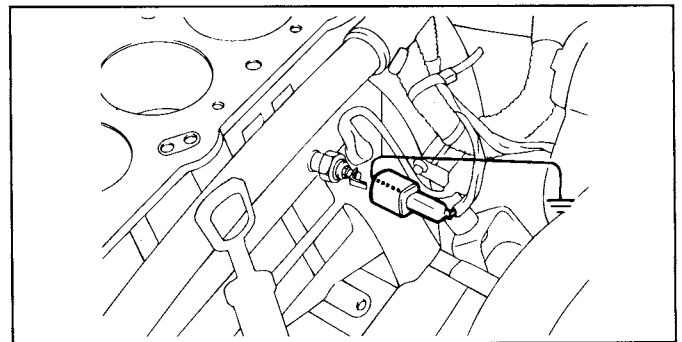
1. Check that there is continuity between the terminal and ground with the engine off.
2. Check that there is no continuity between the terminal and ground with the engine running.
3. If operation is not as specified, replace the switch.



V5BE060K

**OIL PRESSURE WARNING LAMP**

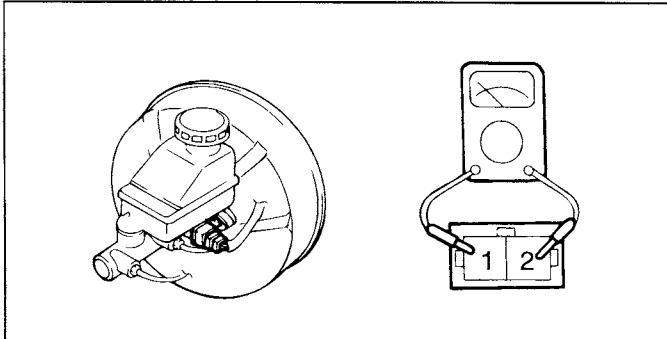
1. Disconnect the connector from the warning switch and ground the terminal on the wire harness side connector.
2. Turn the ignition switch ON. Check that the warning lamp lights up. If the warning lamp doesn't light, test the bulb or inspect the wire harness.



V5BE060L

**BRAKE FLUID LEVEL WARNING SWITCH**

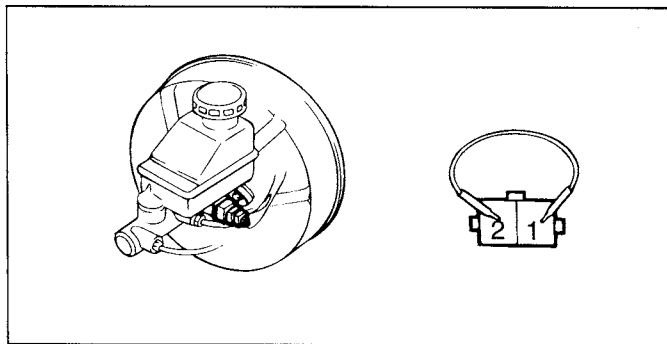
1. Remove the connector from the switch located at the brake fluid reservoir.
2. Verify that continuity exists between switch terminals 1 and 2 while pressing the switch (float) down with a rod.



V5BE060M

**BRAKE FLUID LEVEL WARNING LAMP**

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



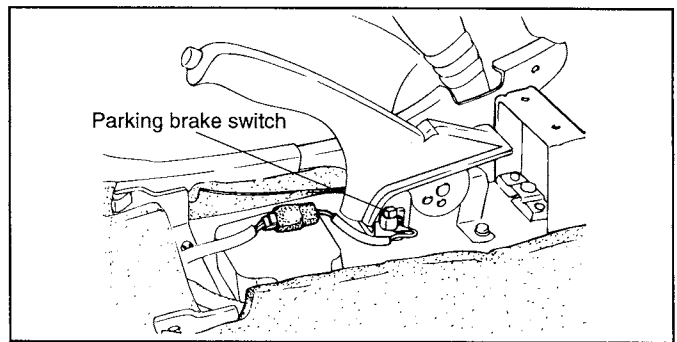
V5BE060N

**PARKING BRAKE SWITCH**

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

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

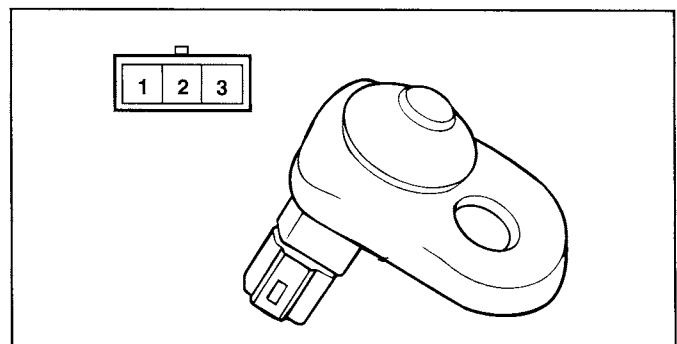
If continuity is not as specified, replace the switch or inspect its ground connection.



V5BE060O

**DOOR SWITCH**

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



ETKA325E

**FRONT DOOR SWITCH**

Lead wire	1	2	3 (Ground)
Position			
Free	○	○	○
Push			

ETKA325F



**REAR DOOR SWITCH**

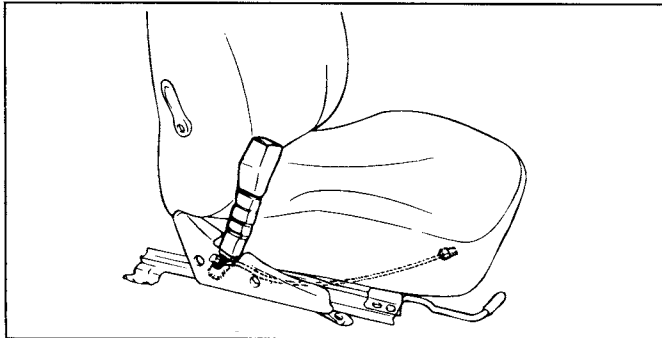
	Lead wire	2	3 (Ground)
Position			
Free		○	○
Push			

ETKA325G

**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( $0\Omega$ )



V5BE060Q

**SEAT BELT WARNING LAMP**

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

Seat belt condition	Warning lamp
Fastened	OFF
Not fastened	ON

## POWER DOOR LOCKS

### POWER DOOR LOCK ACTUATORS

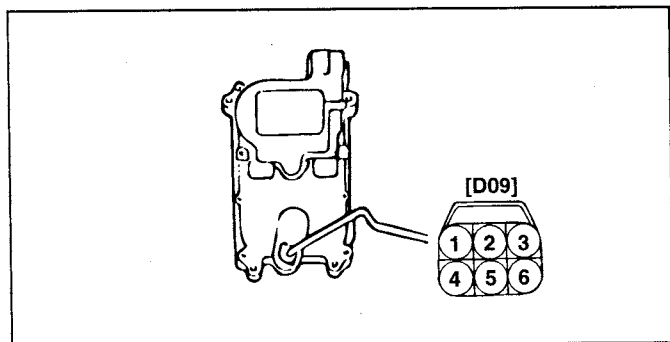
#### INSPECTION ETKA1300

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

[D09]

Terminal	4	6
Position		
Unlock	⊕	⊖
Lock	⊖	⊕

ETKA330B



ETKA330A

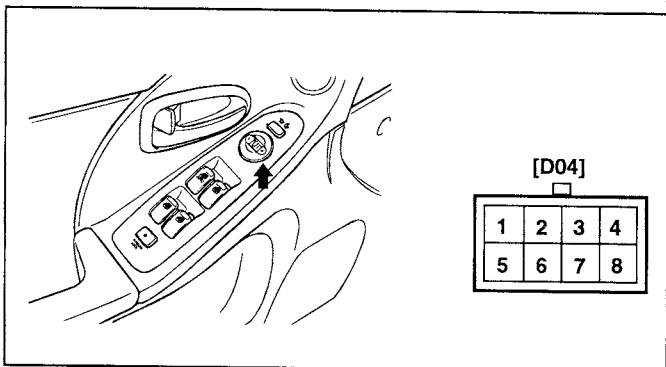
**POWER DOOR MIRRORS**

**POWER DOOR MIRROR SWITCH**

**INSPECTION** ETKA1350

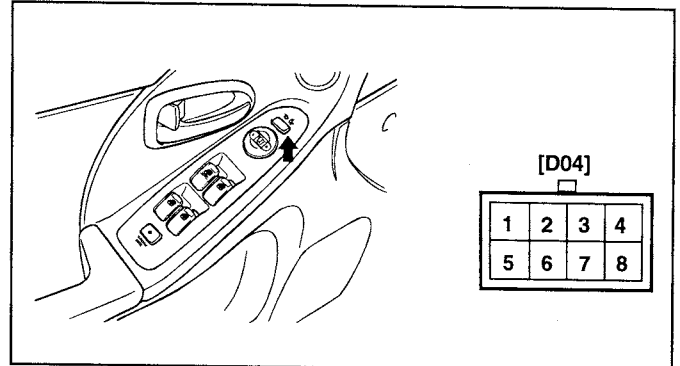
1. Remove the power door mirror switch from the door trim panel.
2. Check for continuity between the terminals in each switch position according to the table.

If continuity is not as specified, replace the power door mirror switch.



ETKA335A

**MIRROR FOLDING SWITCH**



ETKA335R

[D04]

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

ETKA335D

**MIRROR SWITCH**

[D04]

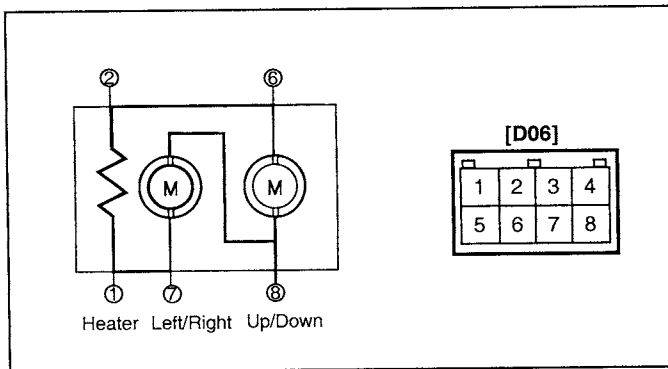
Class	Terminal Position	1	3	4	5	6	7	8
	LEFT HAND	UP		○ ————— ○		○ ————— ○		○ ————— ○
DOWN			○ ————— ○		○ ————— ○		○ ————— ○	
OFF			○ ————— ○		○ ————— ○		○ ————— ○	
LEFT			○ ————— ○		○ ————— ○		○ ————— ○	
RIGHT			○ ————— ○		○ ————— ○		○ ————— ○	
RIGHT HAND	UP	○ ————— ○	○ ————— ○		○ ————— ○			
	DOWN	○ ————— ○	○ ————— ○		○ ————— ○			
	OFF	○ ————— ○	○ ————— ○		○ ————— ○			
	LEFT	○ ————— ○	○ ————— ○		○ ————— ○			
	RIGHT	○ ————— ○	○ ————— ○		○ ————— ○			

ETKA335B

### POWER DOOR MIRROR ACTUATOR

#### INSPECTION ETKA1400

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



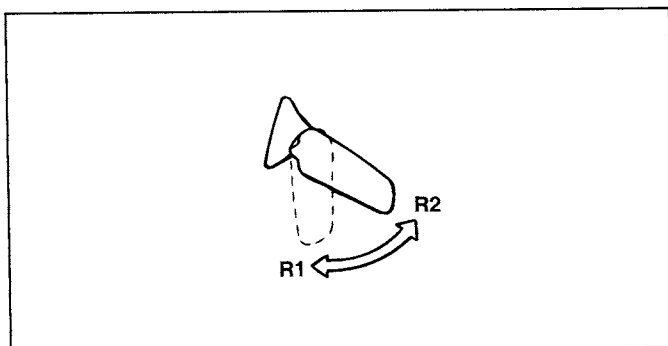
ETKA340A

#### [D06]

Terminal Position	6	7	8
UP	⊖	M	⊕
DOWN	⊕	M	⊖
LEFT	⊖	M	⊕
RIGHT	⊕	M	⊖

ETKA340B

#### MIRROR FOLDING INSPECTION



ETJA055B

#### [D06]

Terminal Position	3	4
R1	⊖	⊕
R2	⊕	⊖

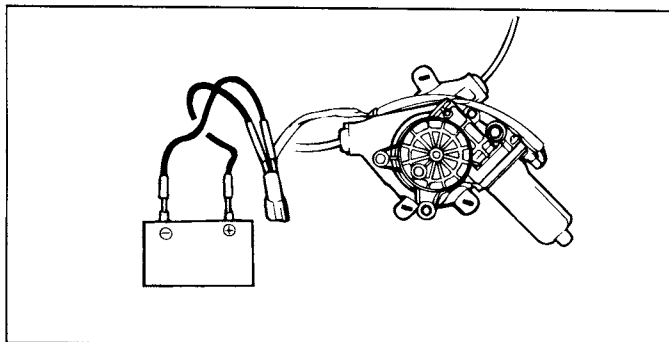
ETKA340C

## POWER WINDOWS

### POWER WINDOW MOTOR

#### INSPECTION ETJA1200

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.



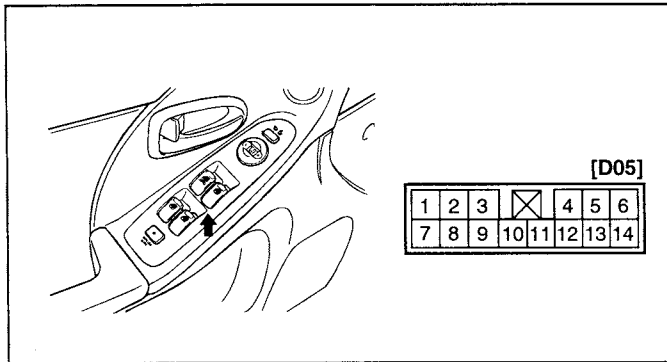
ETDA135A

**POWER WINDOW SWITCH**

**INSPECTION** ETKA1450

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

**POWER WINDOW MAIN SWITCH**



ETKA345T

[D05]

Terminal Position	FRONT LEFT				FRONT RIGHT				REAR LEFT				REAR RIGHT			
	5	6	10	11	2	4	10	11	9	10	11	12	7	8	10	11
UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
OFF	○	○	○		○	○	○		○	○	○	○	○	○	○	
DOWN	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

ETKA345B

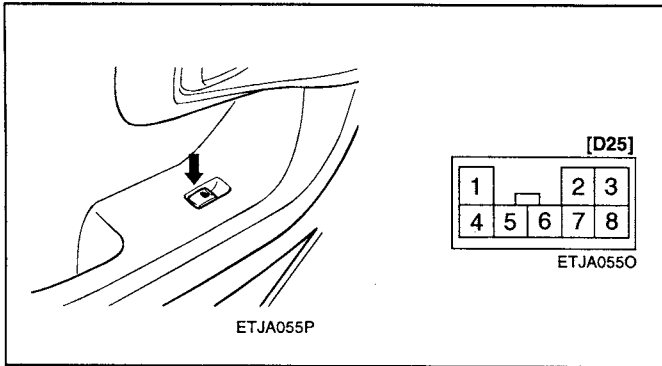
**WINDOW LOCK SWITCH**

[D05]

Terminal Position	1	11
UNLOCK	○	○
LOCK		

ETKA345C

POWER WINDOW SUB SWITCH



ETKA345D

[D25]

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

ETKA345E

# REAR WINDOW DEFOGGER

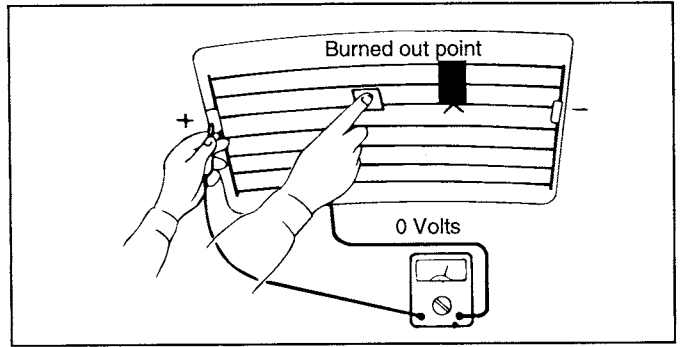
## REAR WINDOW DEFOGGER PRINTED HEATER

### INSPECTION ETA91650

### CAUTION

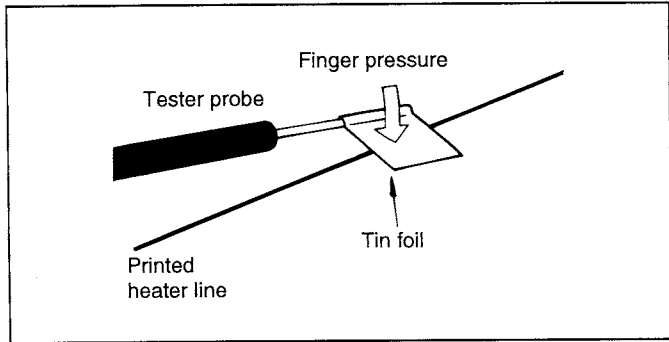
Wrap tin foil around the end of the voltmeter test lead to prevent damaging the heater line. Apply finger pressure on the tin foil, moving the tin foil along the grid line to check for open circuits.

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

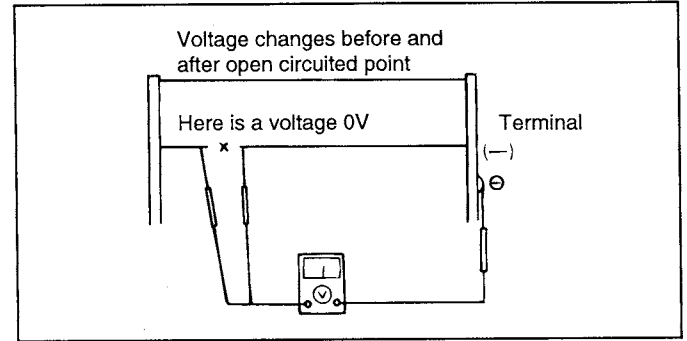


ETA9165D

- 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.



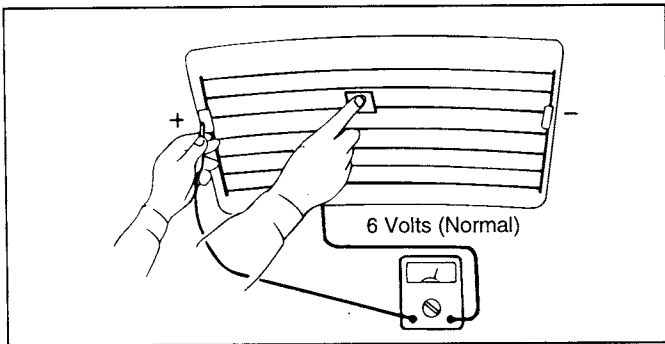
ETA9165A



ETA9165E

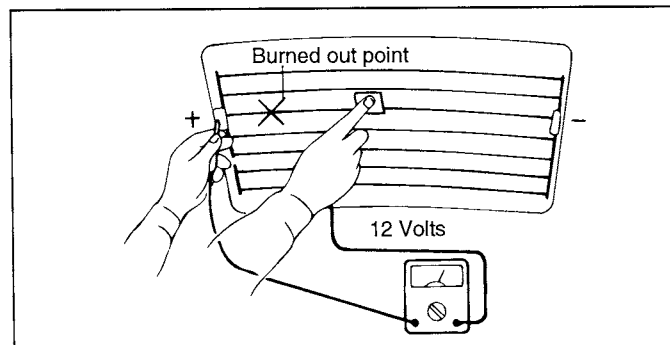
- Use an ohmmeter to measure the resistance of each heater line between a terminal and the center of a grid line, and between the same terminal and the center of one adjacent heater line. The section with a broken heater line will have a resistance twice as that in other sections. In the affected section,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

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

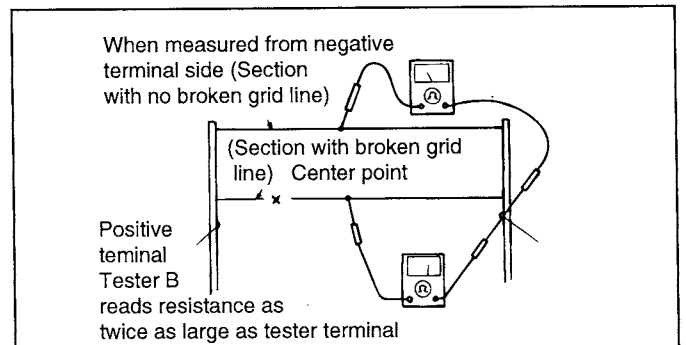


ETA9165B

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



ETA9165C



ETA9165F



**REPAIR OF BROKEN HEATER LINE**

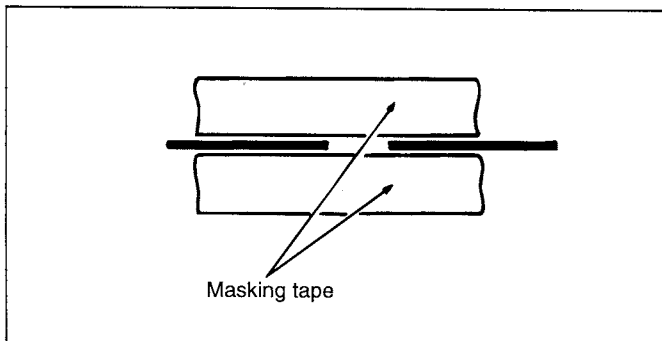
Prepare the following items:

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

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

**CAUTION**

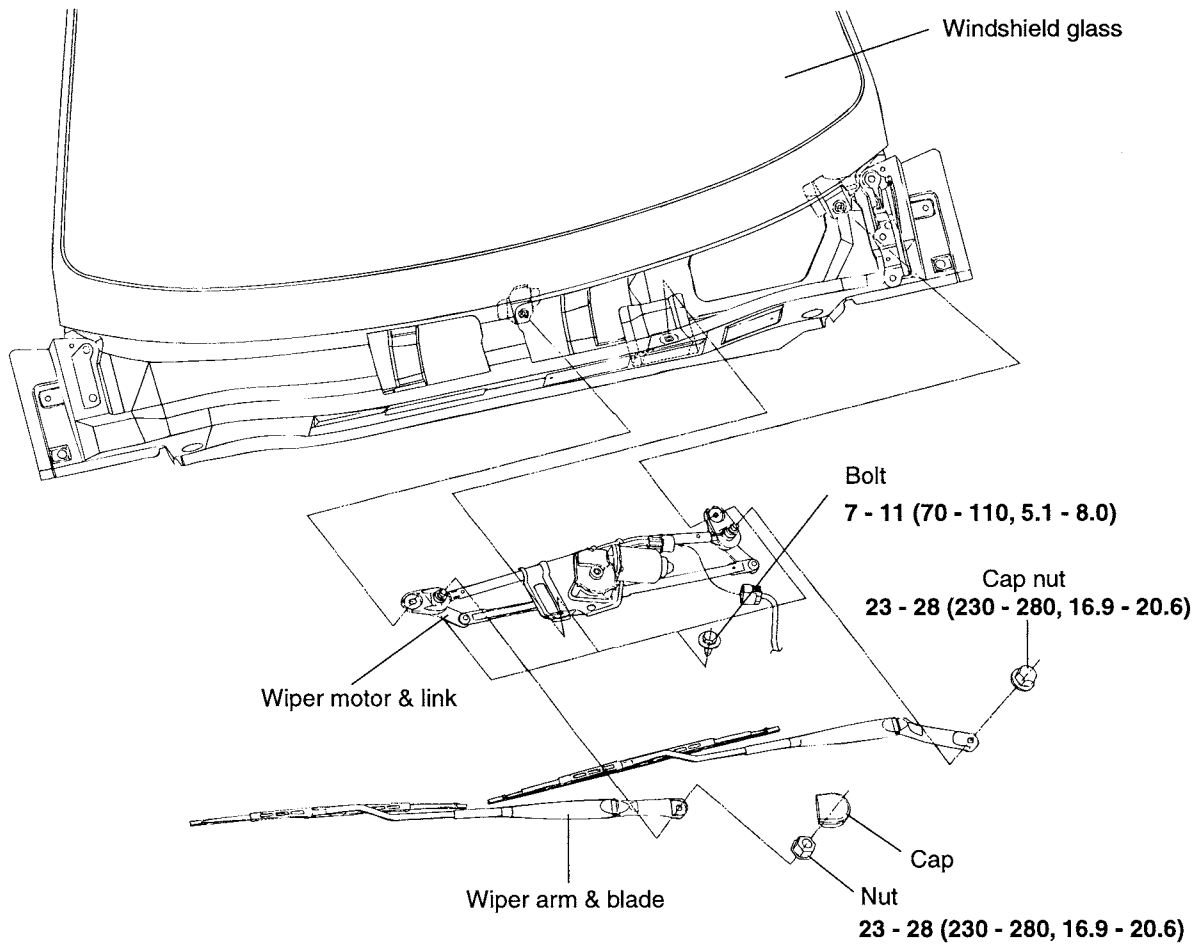
After repairing, clean the glass with a soft dry cloth or wipe along the grid line with a slightly moistened cloth.



ETA9165G

# WINDSHIELD WIPER/WASHER

## COMPONENTS ETKA1500



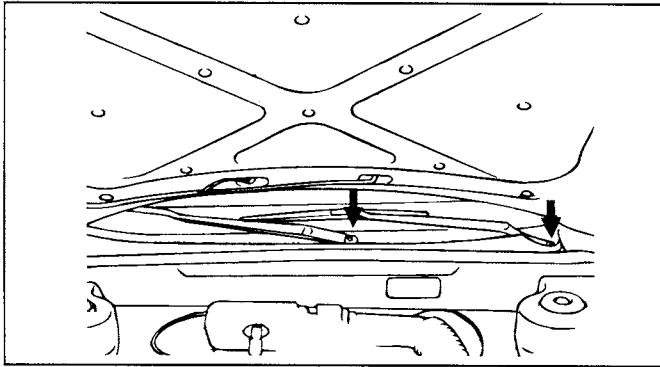
**TORQUE : Nm (kg-cm, lb-ft)**

**REMOVAL** ETKA1550

1. Remove the windshield wiper arm and blade.

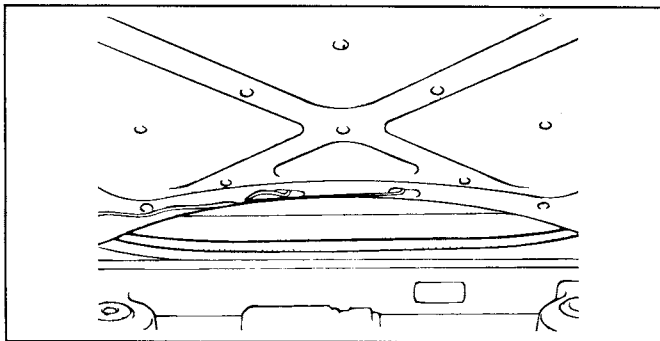
**NOTE**

Care must be taken not to scratch the engine hood.



ETKA030A

2. Remove the weather strip and the cowl top cover.

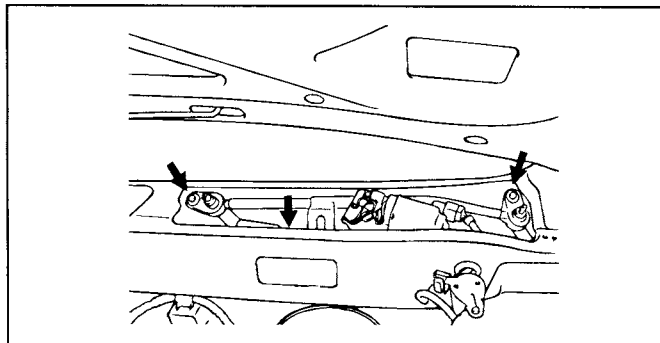


ETKA030B

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

Tightening torque :

7-11Nm (70-110kg.cm, 5.1-8.0lb.ft)

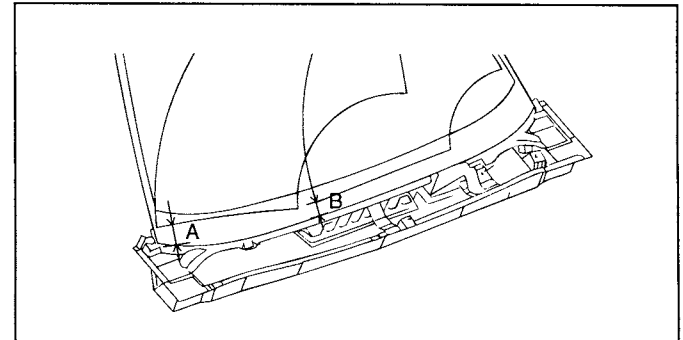


ETKA030C

**INSTALLATION** ETKA1600

1. Install the wiper arm to the specified position.

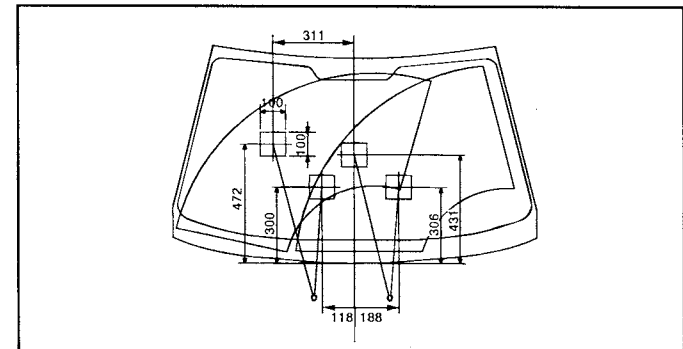
Specified position	A	B
Distance (mm)	35 ± 5	35 ± 5



ETJA0601

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

Unit : mm



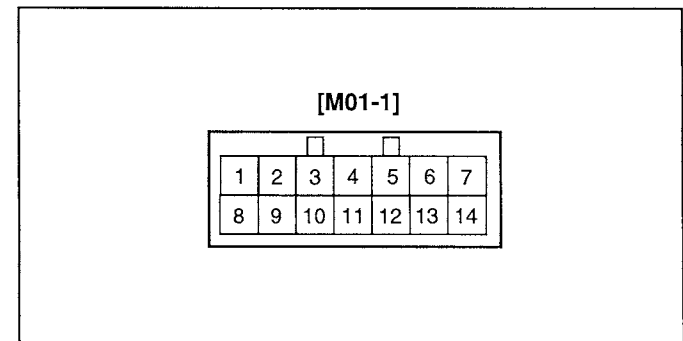
ETKA030G

**INSPECTION** ETKA1650

**WINDSHIELD WIPER/WASHER SWITCH**

Check the switch for continuity between the terminals.

If continuity is not as specified, replace the wiper and washer switch.



ETKA365A

**WIPER AND INTERMITTENT VOLUME SWITCH [M01-1]**

Terminal Position	1	2	3	4	5	13	14
OFF		○—○					
INT		○—○	○—○	○—○	○—○	○—○	○—○
LOW		○—○	○—○	○—○	○—○		
HI	○—○	○—○	○—○	○—○	○—○		

ETKA365B

**WASHER SWITCH [M01-1]**

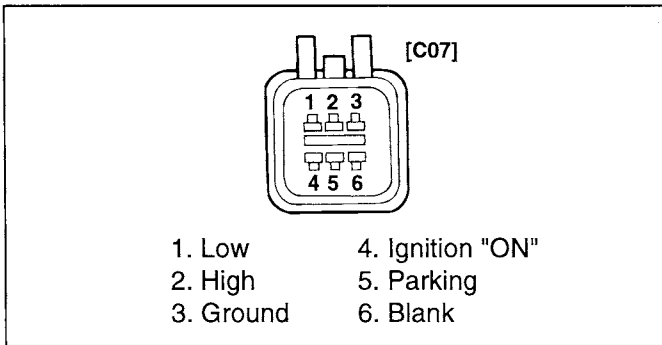
Terminal Position	5	6
OFF		
ON	○—○	○—○

ETKA365C

**FRONT WIPER MOTOR** ETKA1700

**SPEED OPERATION CHECK**

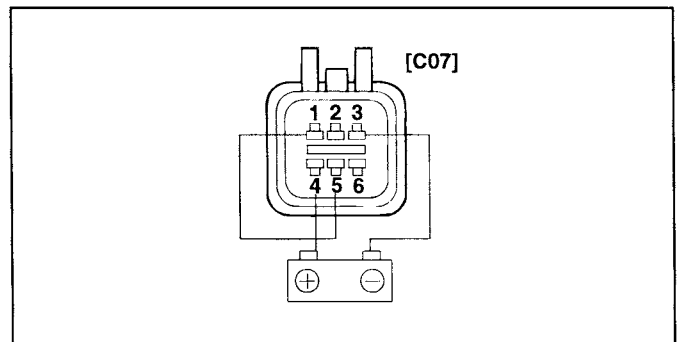
1. Remove the connector from the wiper motor.
2. Attach the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1.
3. Check that the motor operates at low speed.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 2.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



ETKA570A

**AUTOMATIC STOP OPERATION CHECK**

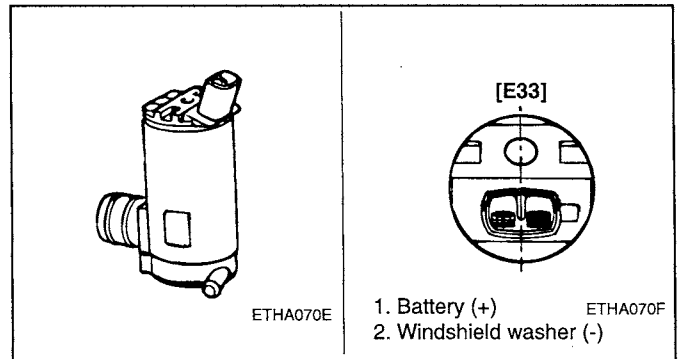
1. Operate the motor at low speed using the stalk control.
2. Stop the motor operation anywhere except at the off position by disconnecting terminal 5.
3. Connect terminals 1 and 5.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 3.
5. Check that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



ETKA030H

**WASHER MOTOR [4DOORS]** ETKA1750

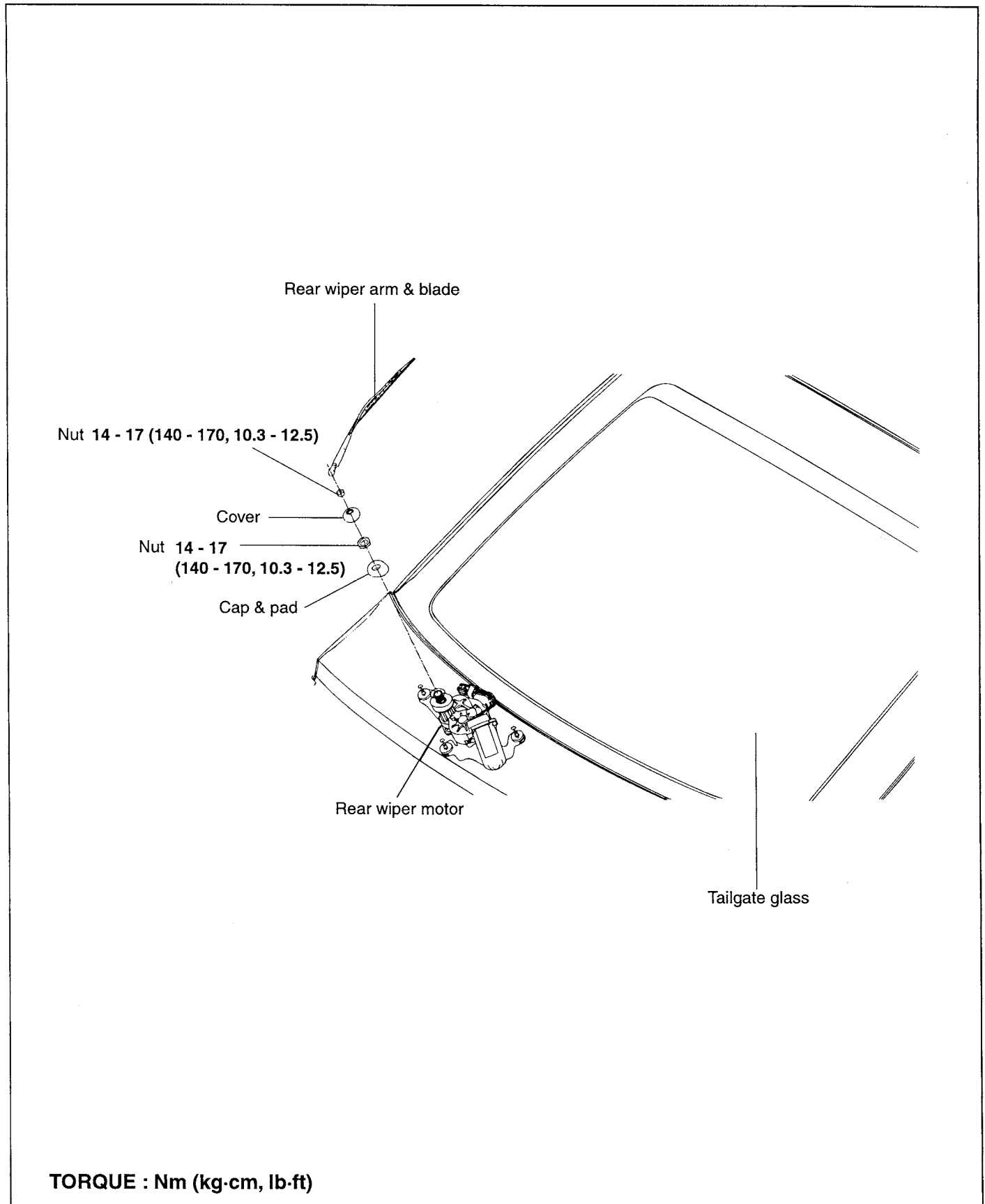
1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Connect positive (+) and negative (-) battery cables to terminals 1 and 2 respectively to see that the washer motor runs and water sprays from the nozzles.



ETKA575A

REAR WIPER/WASHER

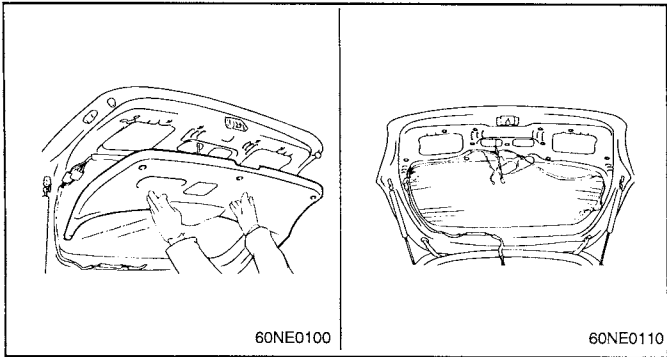
COMPONENTS ETKA1800



TORQUE : Nm (kg·cm, lb·ft)

**REMOVAL** ETKA1850

1. Remove the trim from the tailgate.

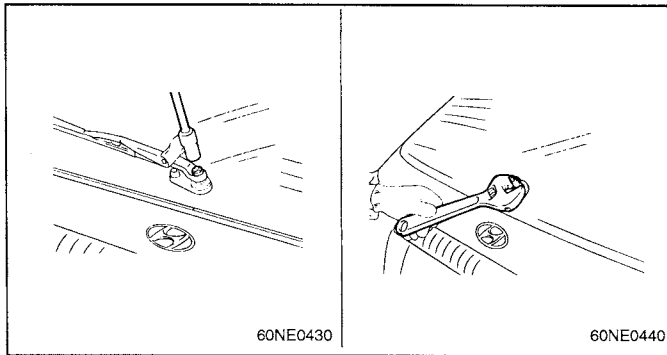


60NE0100

60NE0110

ETKA385A

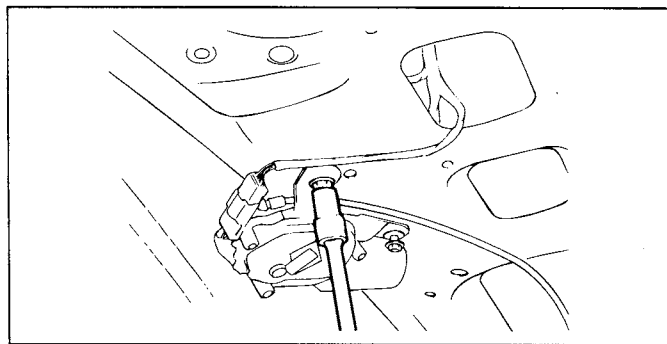
2. Remove the rear wiper and the rear motor.



60NE0430

60NE0440

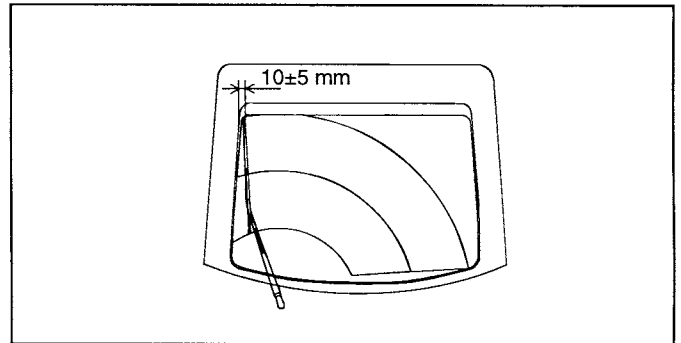
ETKA385B



ETKA385C

**INSTALLATION** ETKA1900

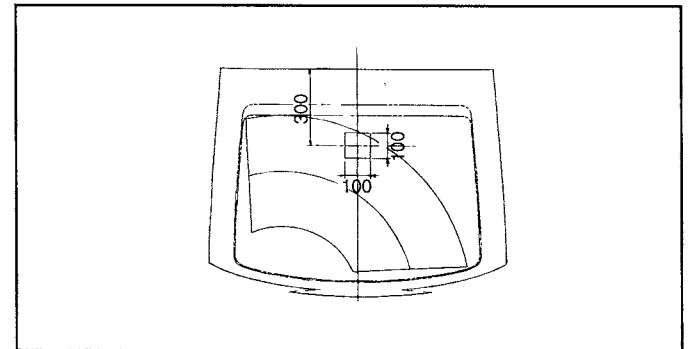
1. Install the rear wiper arm to the specified stop position.



ETKA040C

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

Unit : mm

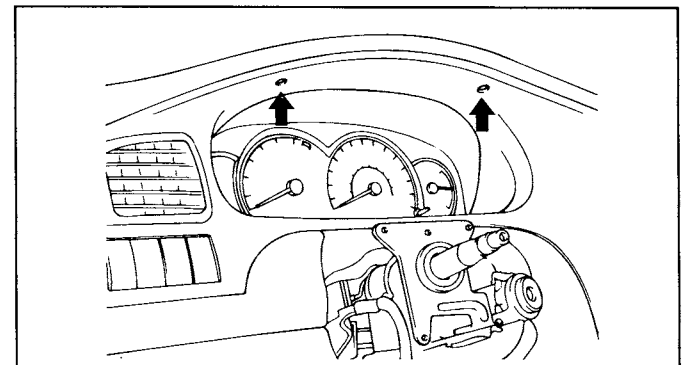


ETKA030Y

**INSPECTION** ETKA1950

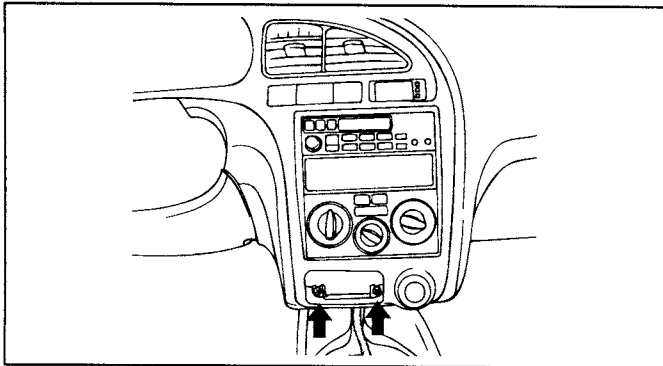
**REAR WIPER/WASHER SWITCH**

1. Disconnect the negative (-) battery terminal.
2. Remove the screws holding the instrument facia panel.



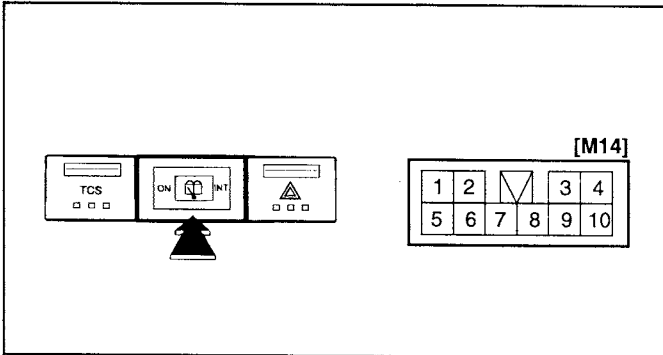
ESKA015F

- After removal of the ash tray, remove the screws holding the instrument facia panel and remove that.



ESKA015G

- Disconnect the connectors from the rear wiper & washer switch.



ETKA040D

- Check for continuity between the terminals.

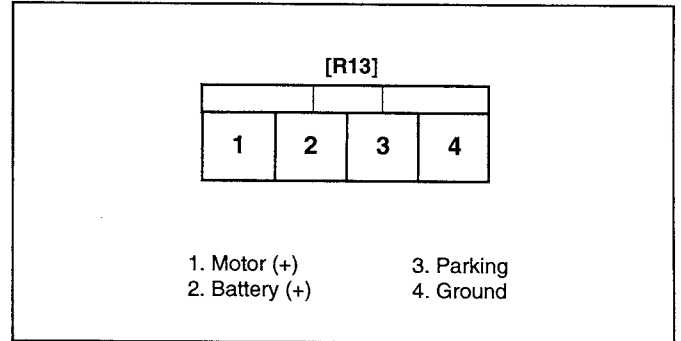
[M14]

Terminal Position		5	6	7	8	9	10
		Wiper switch	ON	○	○	○	○
OFF							
INT				○	○	○	
Washer switch	ON		○	○			
	OFF						

ETKA395A

### REAR WIPER MOTOR ETKA2000

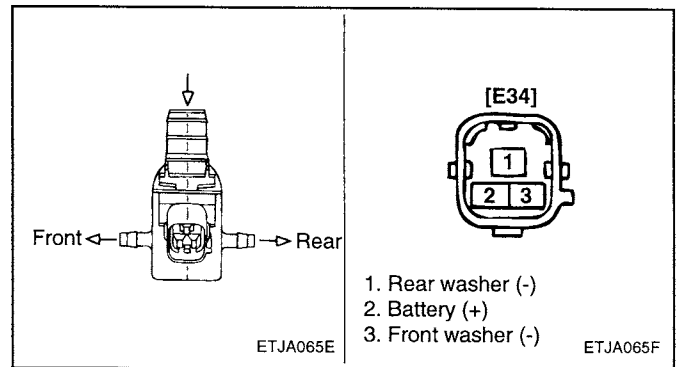
- Remove the connector from the rear wiper motor.
- Connect battery positive (+) and negative (-) cables to terminals 1 and 4 respectively.
- Check that the motor operates normally. Replace the motor if it operates abnormally.



ETKA400A

### WASHER MOTOR ETKA2050

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



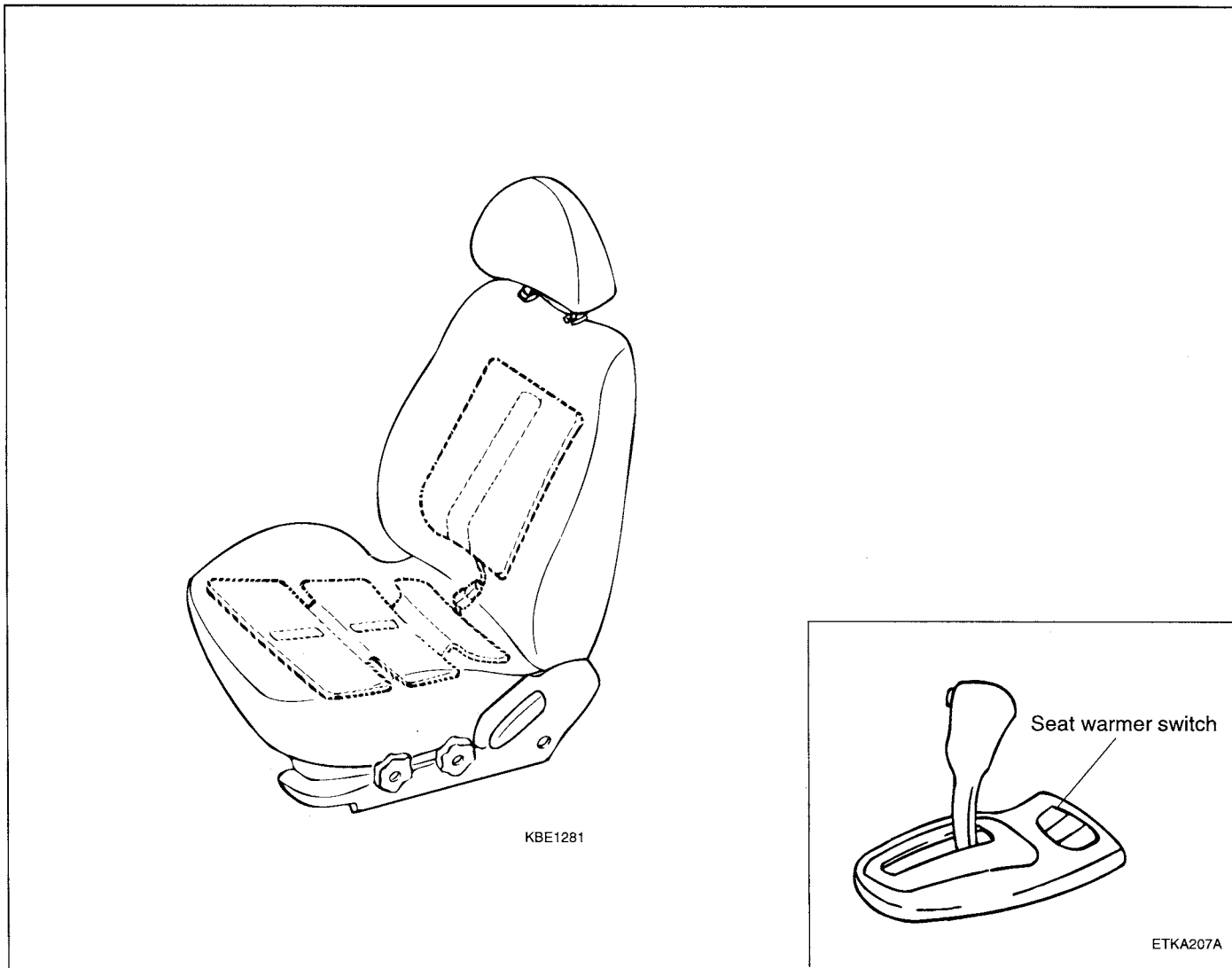
ETJA065E

ETJA065F

ETKA405A

# SEAT WARMER

## COMPONENTS ETKA2060

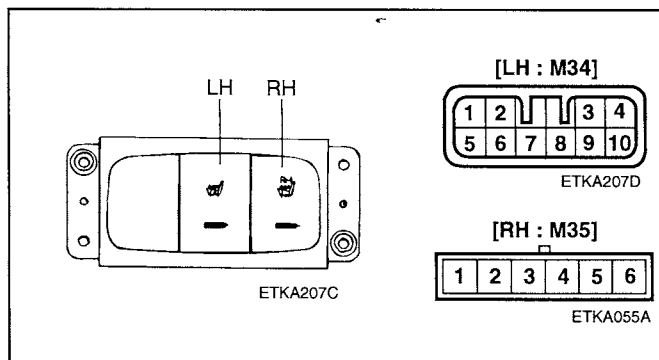


ETKA207B

## SEAT WARMER SWITCH

### INSPECTION ETKA2070

1. Disconnect the negative (-) battery terminal.
2. Remove the seat warmer switch from the floor console upper cover.



ETKA207E



3. Check for continuity between terminals.

[LH : M34]

Terminal Position	7	5	6	8	9
ON					
OFF					

ETKA207F

[RH : M35]

Terminal Position	3	1	2	4	5
ON					
OFF					

**NOTE**

- ⑧——⑨ : Indicates that the symbol illumination
- ④——⑤ lights up when the tail switch is turned on.
- ⑤——⑥ : Indicates that the indicator lamp lights
- ①——② up when the seat warmer switch is turned on.

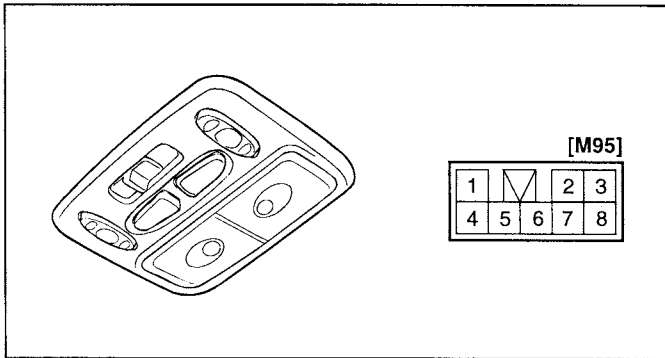
ETKA207G

# SUN ROOF

## SUN ROOF SWITCH

### INSPECTION ETKA2100

1. Using an ohmmeter, check for continuity between the terminals.
2. If continuity is not as specified, replace the switch.



ETKA065B

[M95]

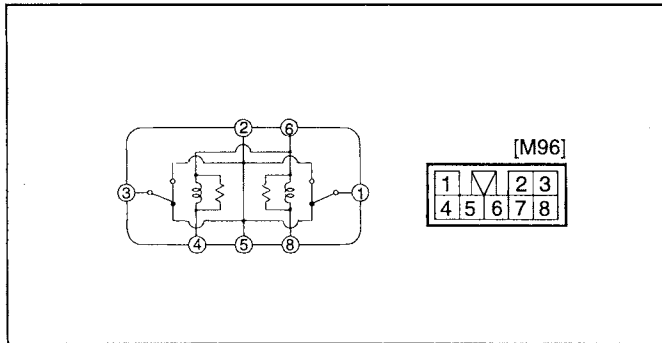
Terminal Position		Terminal							
		1	2	3	4	5	6	7	8
Slide switch	Open		○	○	—			○	
	Off		○		—			○	
	Close			○	—		○		
Tilt switch	Up			○	—	○			
	Off		○		—			○	
	Down			○	○				

ETKA410A

SUN ROOF RELAY

INSPECTION ETKA2150

Check for continuity between the terminals.



ETKA065D

[M96]

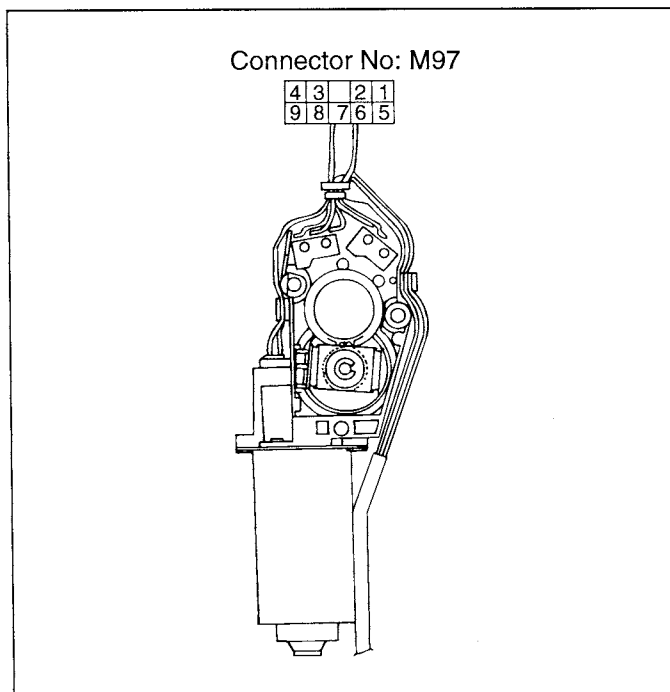
Terminal Position	1	2	3	4	5	6	7	8
Battery voltage not supplied (coils not energized)	○		○	○	○	○		○
Battery voltage supplied (coils energized)	○	○		○	○	○		○

ETKA415A

## SUN ROOF MOTOR

### INSPECTION ETKA2200

1. Remove the overhead console.
2. Disconnect the motor connector from the sun roof harness.
3. After applying 12V DC to terminal 8, connect terminal 3 to ground.
4. Check that the motor turns in the direction of the sunroof when tilted down and is open.
5. Reverse the connections and check that the motor turns in the direction when the sunroof is closed and tilted up.



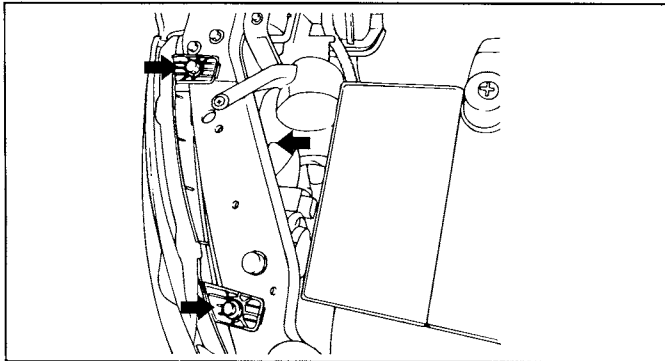
ETKA420A

**LIGHTING SYSTEM**

**REPLACEMENT OF LAMPS** ETKA2250

**HEAD LAMP/TURN SIGNAL LAMP**

1. Disconnect the negative (-) battery terminal.
2. Remove the head lamp mounting bolts and nut. Remove the head lamp assembly.

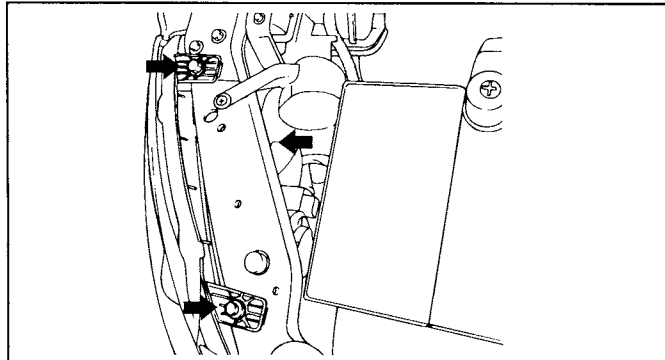


ESKA005A

3. Installation is the reverse of removal.

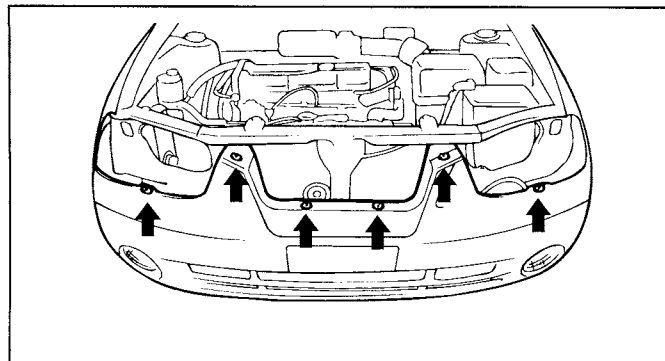
**FRONT FOG LAMP/SIDE REPEATER**

1. Disconnect the negative (-) battery terminal.
2. Remove the head lamp mounting bolts and nut. Remove the head lamp assembly.



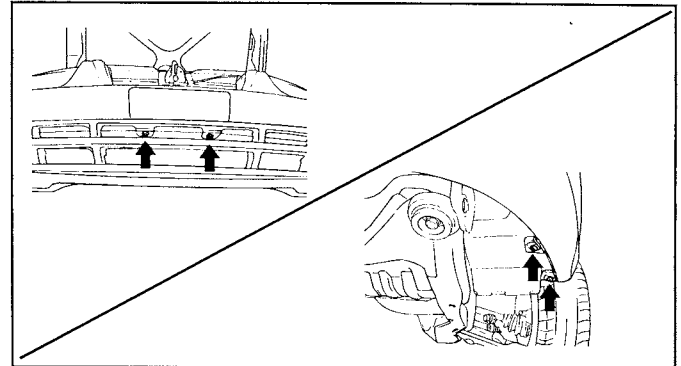
ESKA005A

3. Remove the screws in the front bumper cover.



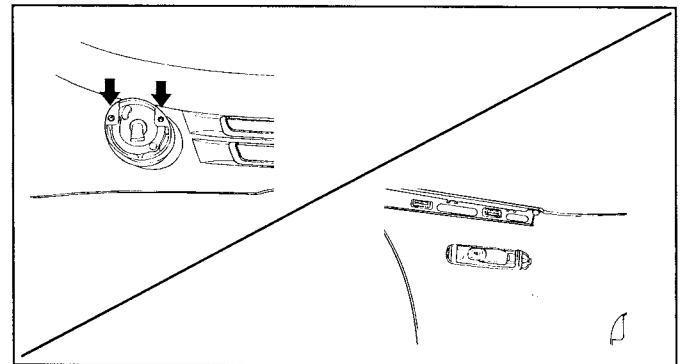
ESKA005B

4. Raise the vehicle then remove the screws that secure the front bumper and the front wheel guard.



ETKA225T

5. Disconnect the connectors and then remove the front fog lamp and the side repeater lamp from the bumper cover.

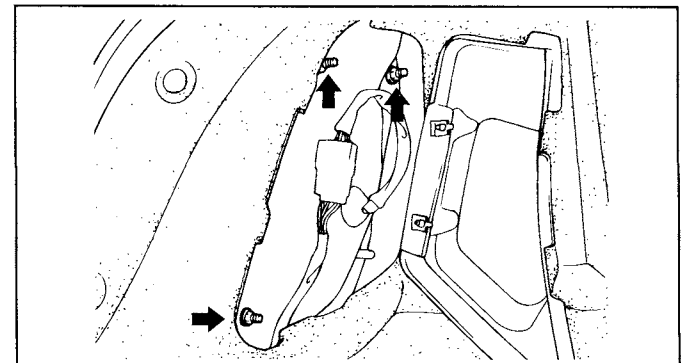


ETKA225U

6. Installation is the reverse of removal.

**REAR COMBINATION LAMP**

1. Disconnect the negative (-) battery terminal.
2. Remove the nuts holding the rear combination lamp.
3. Disconnect the connector and remove the lamp assembly.

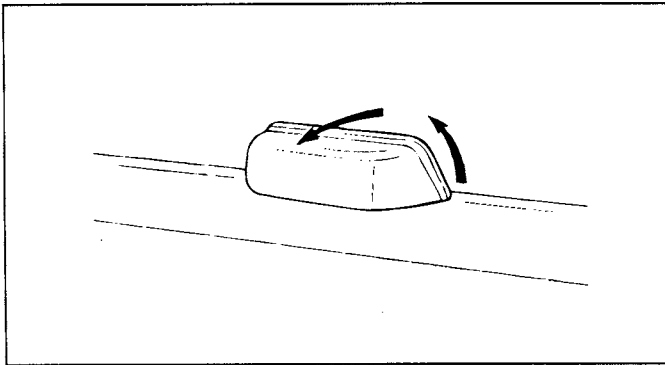


ESKA001B

4. Installation is the reverse of removal.

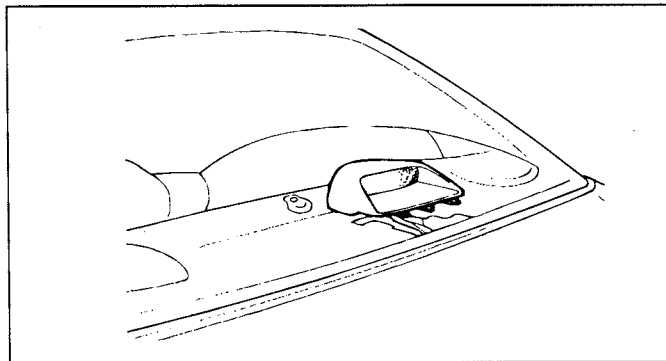
**CENTER HIGH MOUNTED STOP LAMP**

1. Disconnect the negative (-) battery terminal.
2. Pull up slightly and pull back the center high mounted stop lamp.



ETKA425A

3. Disconnect the connector from the harness and remove the lamp assembly.

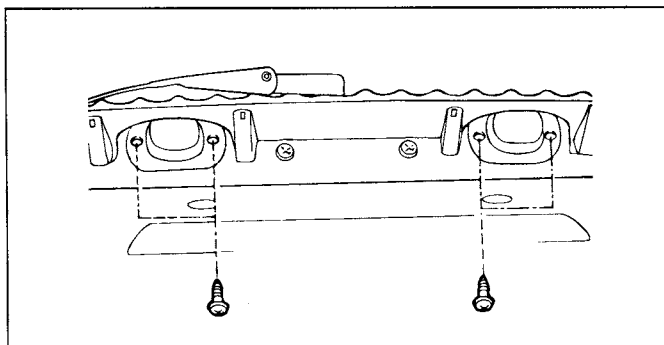


ETKA425B

4. Installation is the reverse of removal.

**LICENSE PLATE LAMP**

1. Disconnect the negative (-) battery terminal.
2. Remove the mounting bolt, and disconnect the lamp connector from the license plate lamp.

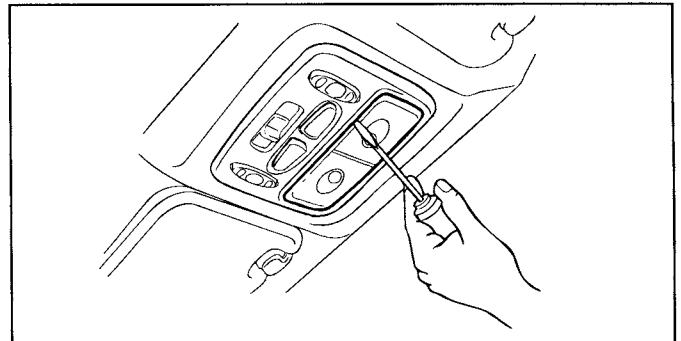


V5BE075L

3. Installation is the reverse of removal.

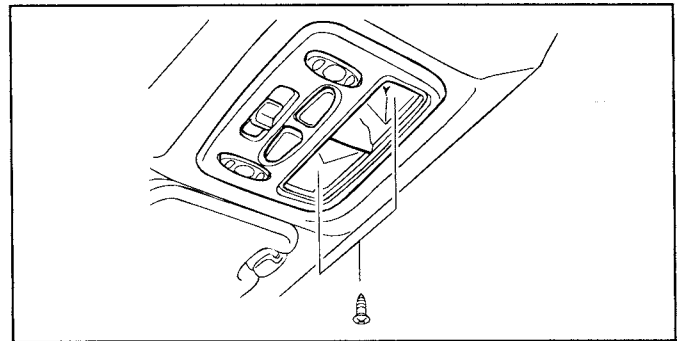
**MAP LAMP (WITH SUN ROOF)**

1. Disconnect the negative (-) battery terminal.
2. Using a flat - tipped screwdriver, detach the map lamp lens.



ETKA065A

3. Detach the lamp assembly from the headliner after removing the screws.

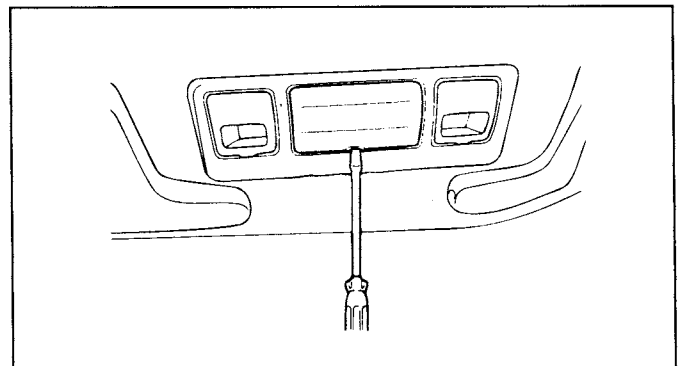


ETKA001F

4. Installation is the reverse of removal.

**MAP LAMP (WITHOUT SUN ROOF)**

1. Disconnect the negative (-) battery terminal.
2. Using a flat - tipped screwdriver, detach the map lamp lens.



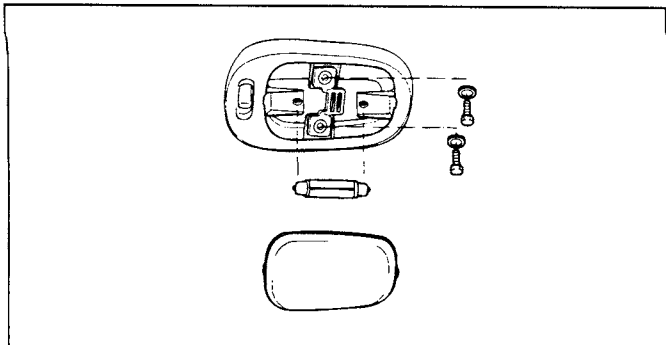
ETKA425C

3. Detach the lamp assembly from the headliner after removing the screws.

4. Installation is the reverse of removal.

**ROOM LAMP**

1. Disconnect the negative (-) battery terminal.
2. Using a flat - tipped screwdriver, detach the room lamp lens.



ETKA425D

3. Detach the lamp assembly from the headliner after removing the screws.
4. Disconnect the connector from the roof harness.
5. Installation is the reverse of removal.

**INSPECTION OF COMPONENTS**

ETJA1950

**HEAD LAMP RELAY**

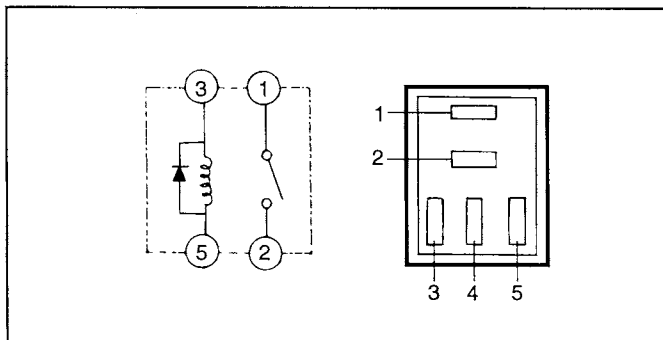
1. Remove the head lamp relay from the engine compartment relay box.
2. Check for continuity between terminals.

Terminal	1	2	3	5
Position				
When de-energized			○ — ○	
When energized	○ — ○		⊕ — ⊖	

**NOTE:**

1. ○ — ○ : Indicates that there is continuity between the terminals.
2. ⊕ — ⊖ : Indicates that power is supplied.

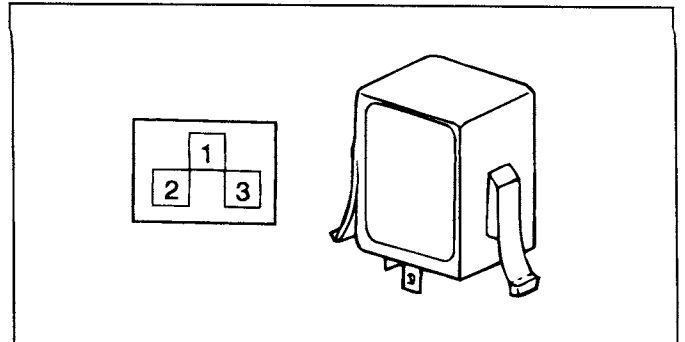
ETHA305A



ETDA211B

**FLASHER UNIT**

1. Remove the flasher unit from the relay box.
2. Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 3.



KTDA212A

3. Connect the two turn signal lamps in parallel to each other to terminals 2 and 3. Check that the bulbs turn on and off.

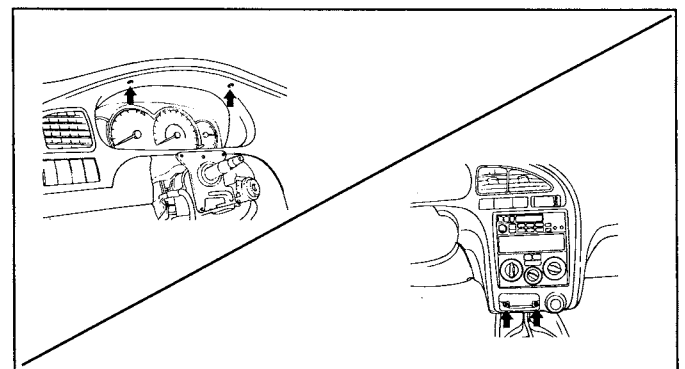
**NOTE**

The turn signal lamps should flash 60 to 120 times per minute. If one of the front or rear turn signal lamps has an open circuit, the number of flashes will be more than 120 per minute. If operation is not as specified, replace the flasher unit.

**HAZARD SWITCH**

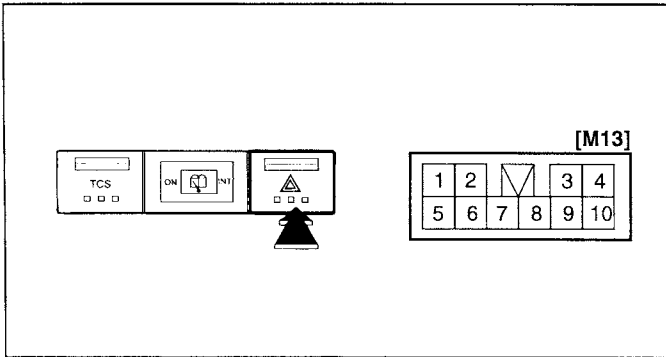
ETKA2350

1. Disconnect the negative (-) battery terminal.
2. Remove the screws holding the instrument facia panel.



ETKA435A

- After removal of the instrument facia panel, disconnect the connector from the hazard lamp switch.



ETKA435B

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

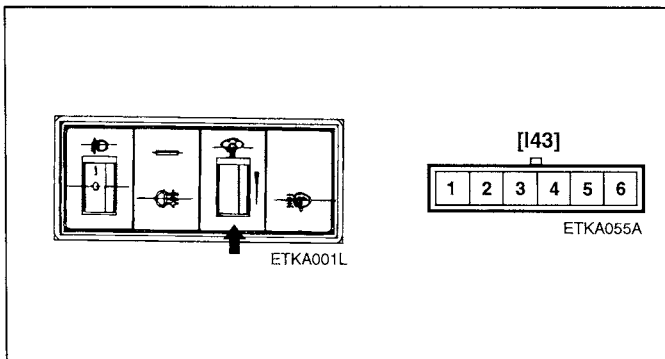
[M13]

Terminal Position	1	3	4	6	8	9	10	11
OFF					○	○	○	○
ON	○	○	○	○	○	○	○	○

ETKA435C

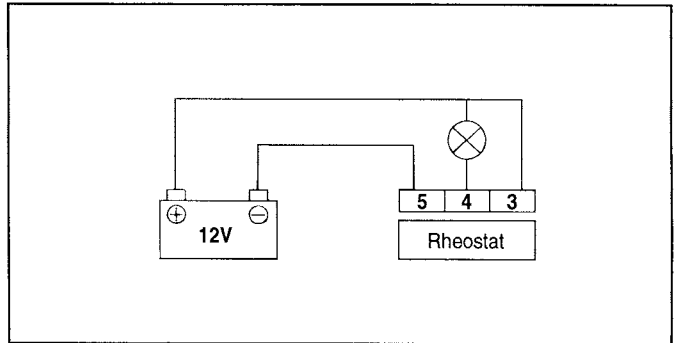
**RHEOSTAT** ETKA2400

- Disconnect the negative (-) battery terminal.
- Remove the instrument facia panel.
- Disconnect the connector from the rheostat.



ETKA440A

- Check for intensity. 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.



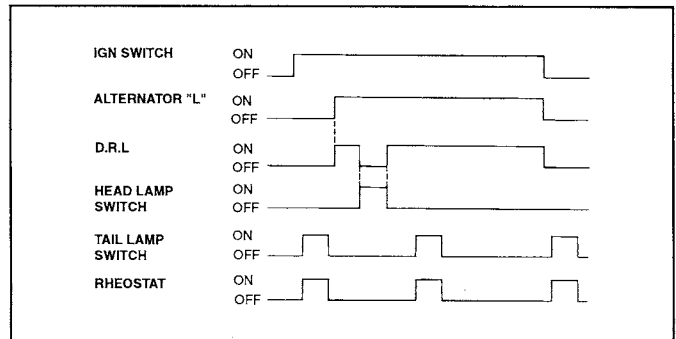
ETKA440B

**DAYTIME RUNNING LIGHT (DRL)** ETKA2410

**OPERATION CHECK**

Check that the lights operate according to the following timing chart.

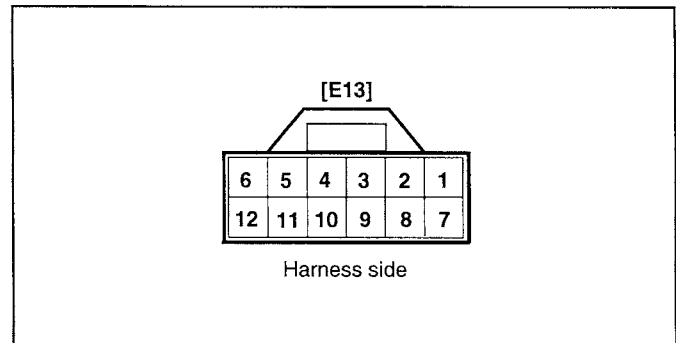
**TIMING CHART**



ETKA241A

**INSPECT CIRCUITS FOR DAYTIME RUNNING LIGHT SYSTEM**

Disconnect the connector from the DRL module and inspect the connector on the wire harness side as shown.



ETJA215A

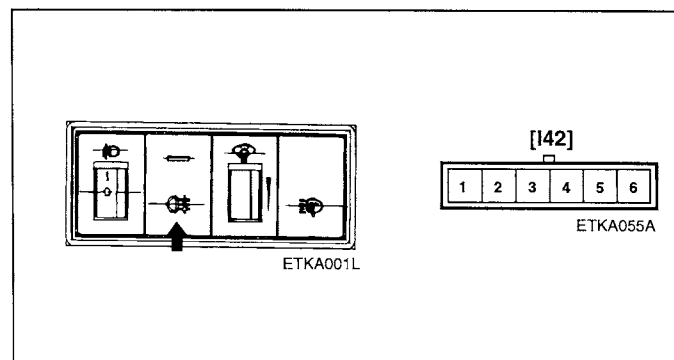


Check For	Test Connection	Condition		Test Specification
Continuity	5-Ground	Head lamp switch	OFF	No continuity
			ON	Continuity
	6-Ground	Constant		Continuity
	9-Ground	Dimmer&passing switch	Head light ON	Continuity
Head light OFF			No continuity	
Voltage	9-Ground	Ignition switch	ON	Battery voltage
			ACC or LOCK	No voltage
	5-Ground	Ignition switch	ON	Battery voltage
			ACC or LOCK	No voltage
	7-Ground	Constant		Battery voltage
	3-Ground	Engine	Stop	No voltage
Running			Battery voltage	

If the circuit is not as specified, refer to the schematic diagram and inspect for short circuits.

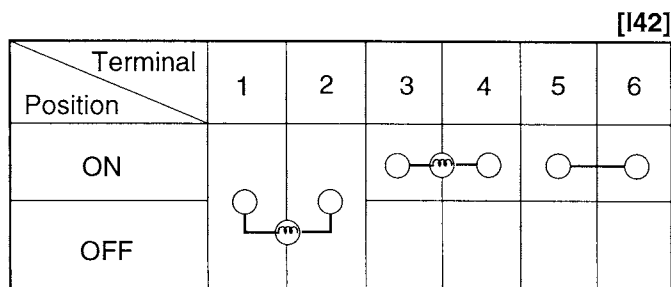
**REAR FOG LAMP SWITCH** ETKA2450

1. Disconnect the negative (-) battery terminal.
2. Remove the instrument facia panel.
3. Disconnect the connector from the rear fog lamp switch.



ETKA445A

4. Operate the switch and check for continuity between the terminals.

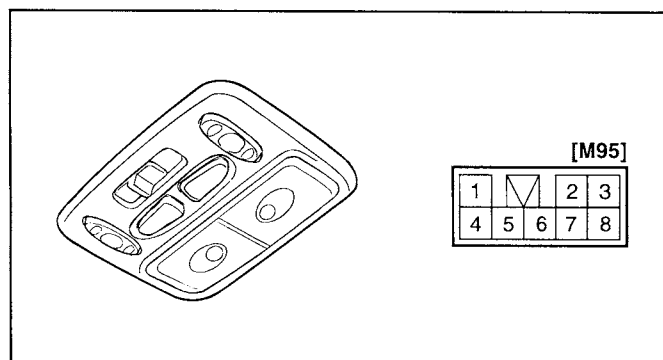


ETKA445B

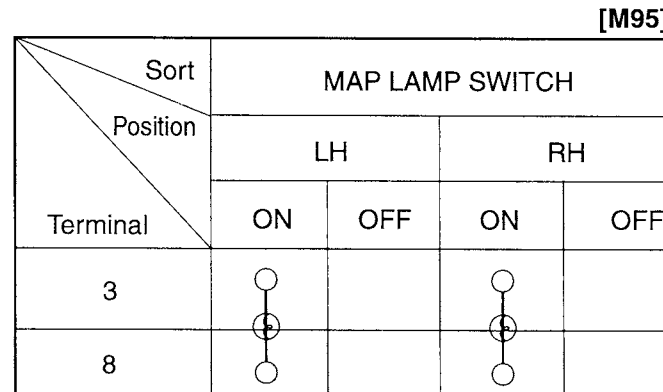
**MAP LAMP SWITCH** ETKA2500

1. Disconnect the negative (-) battery terminal.
2. Remove the overhead console.
3. Disconnect the connector from the map lamp switch and then check for continuity between the terminals.

**[WITH SUN ROOF]**

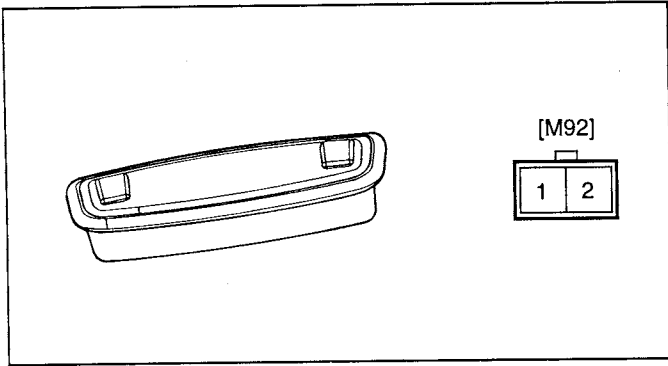


ETKA065B



ETKA450A

[WITHOUT SUN ROOF]



ETKA001G

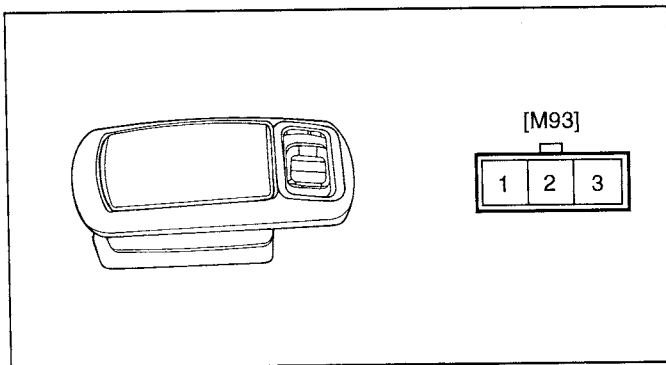
[M92]

Terminal	MAP LAMP SWITCH			
	LH		RH	
	ON	OFF	ON	OFF
1				
2				

ETKA450B

ROOM LAMP SWITCH ETKA2550

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector from the room lamp switch and then check for continuity between the terminals.



ETKA001H

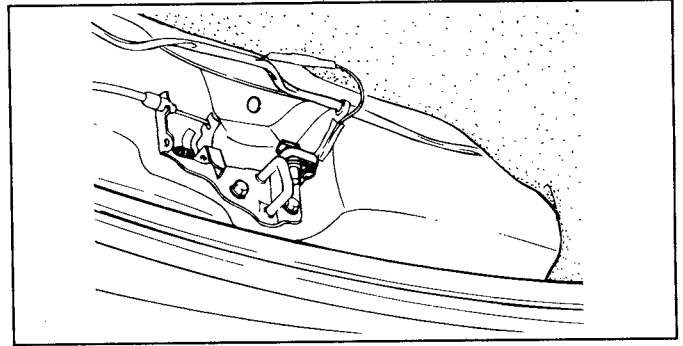
[M93]

Terminal	1	2	3
ON			
DOOR			
OFF			

ETKA455A

LUGGAGE ROOM LAMP SWITCH ETKA2600

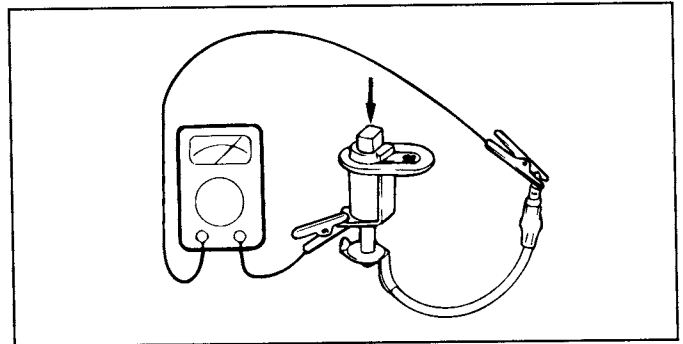
1. Disconnect the negative (-) battery terminal.
2. After opening the trunk, disconnect the connector from the rear harness.



V5BE080F

3. Check for continuity between the terminal and body while pushing the rod.

Switch rod condition	Continuity
Pushed (OFF)	Non-conductive ( $\infty\Omega$ )
Released (ON)	Conductive ( $0\Omega$ )



ETDA215B

HEAD LAMP ETKA2650

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.

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

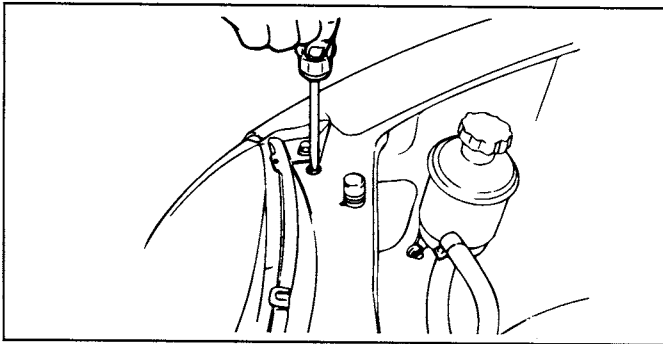
1. Inflate the tires to the specified pressure and remove any loads from the vehicle except the driver, spare tire, and tools.
2. The vehicle should be placed on a flat level surface.
3. Draw vertical lines (vertical lines passing through respective headlamp centers) and a horizontal line (horizontal line passing through center of headlamps) on a screen.
4. With the headlamp and battery in normal condition, aim the headlamps.

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

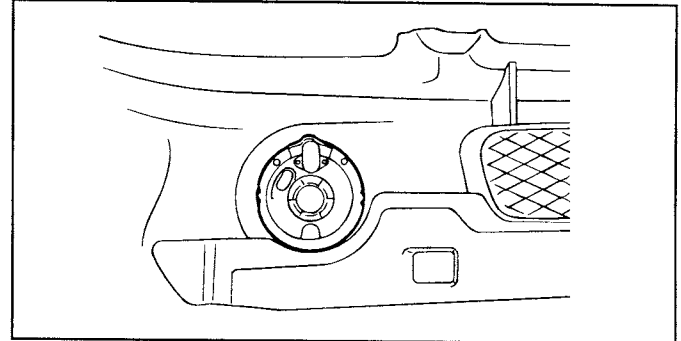
**FRONT FOG LAMP**

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

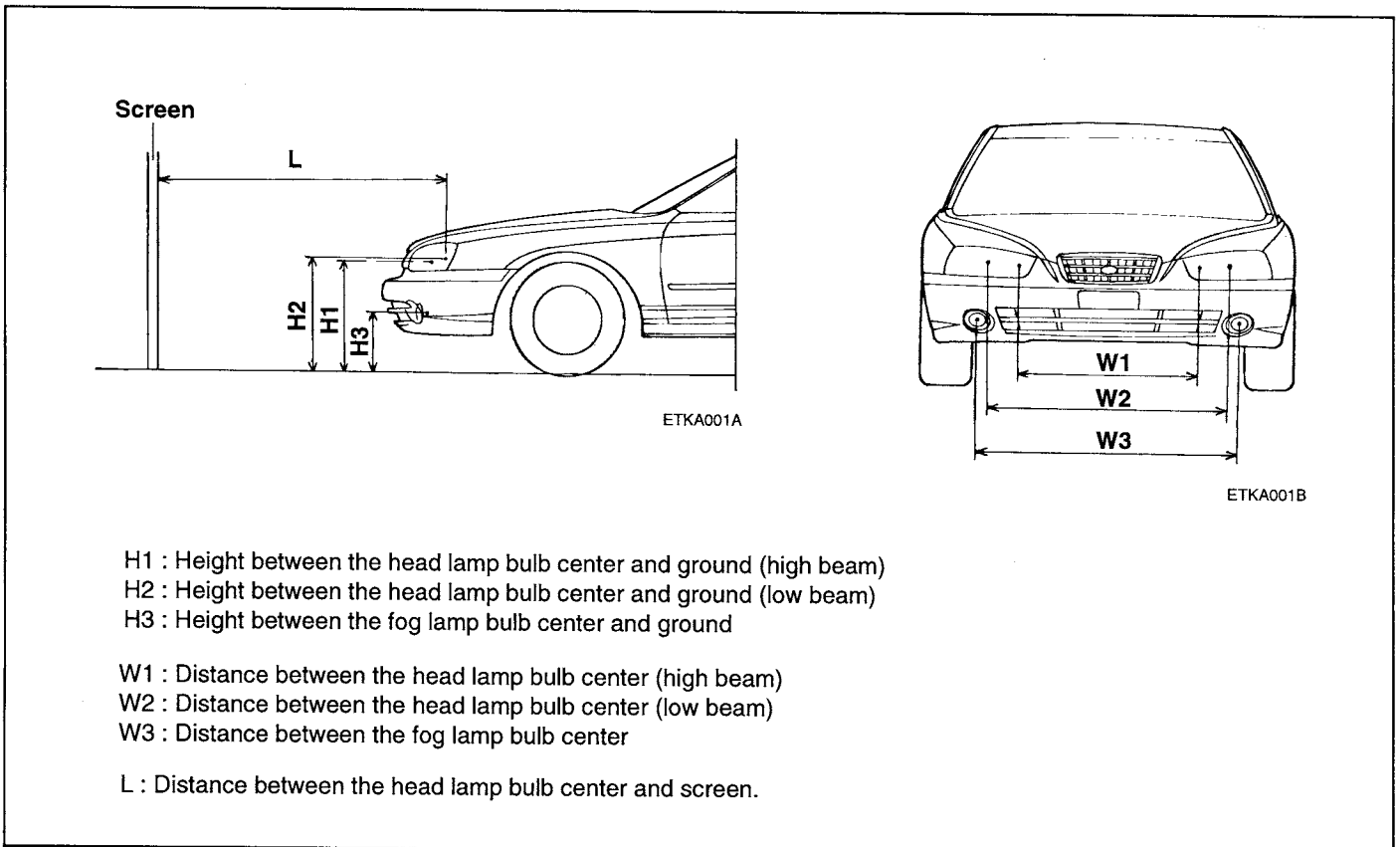
With the front fog lamps and battery normal condition, aim the front fog lamps by using the adjusting wheel.



ETA9230A



ETJA010H



ETKA001A

ETKA001B

- H1 : Height between the head lamp bulb center and ground (high beam)
- H2 : Height between the head lamp bulb center and ground (low beam)
- H3 : Height between the fog lamp bulb center and ground
- W1 : Distance between the head lamp bulb center (high beam)
- W2 : Distance between the head lamp bulb center (low beam)
- W3 : Distance between the fog lamp bulb center
- L : Distance between the head lamp bulb center and screen.

HEAD LAMP AND FOG LAMP AIMING POINT

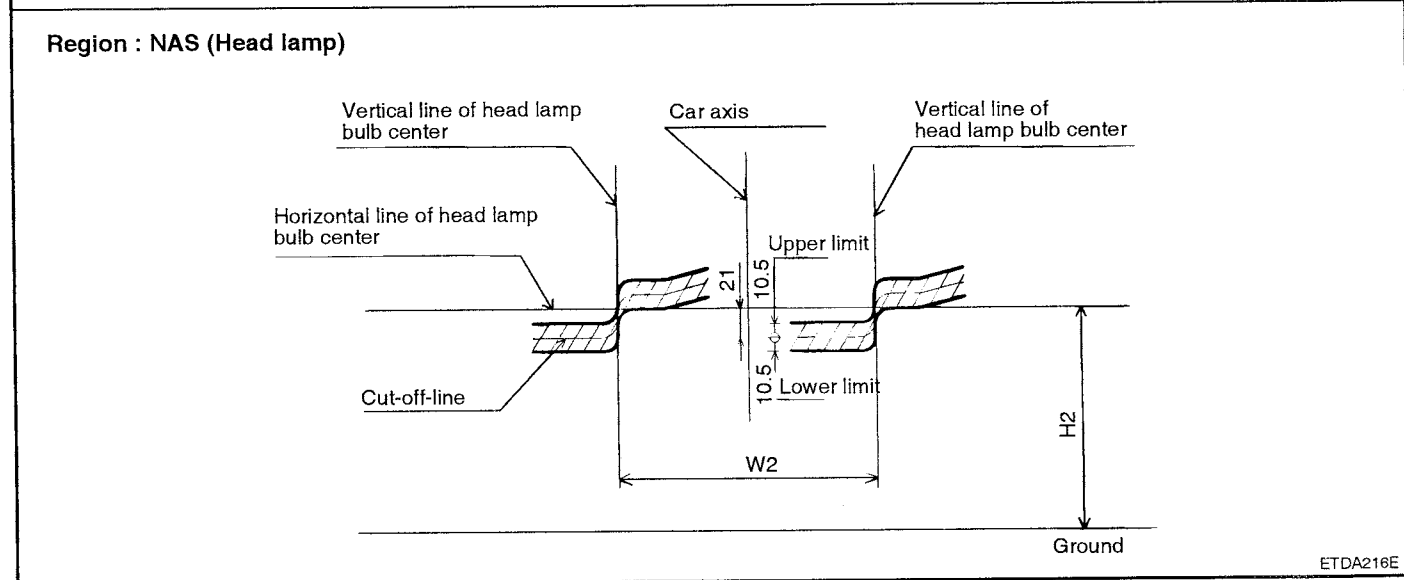
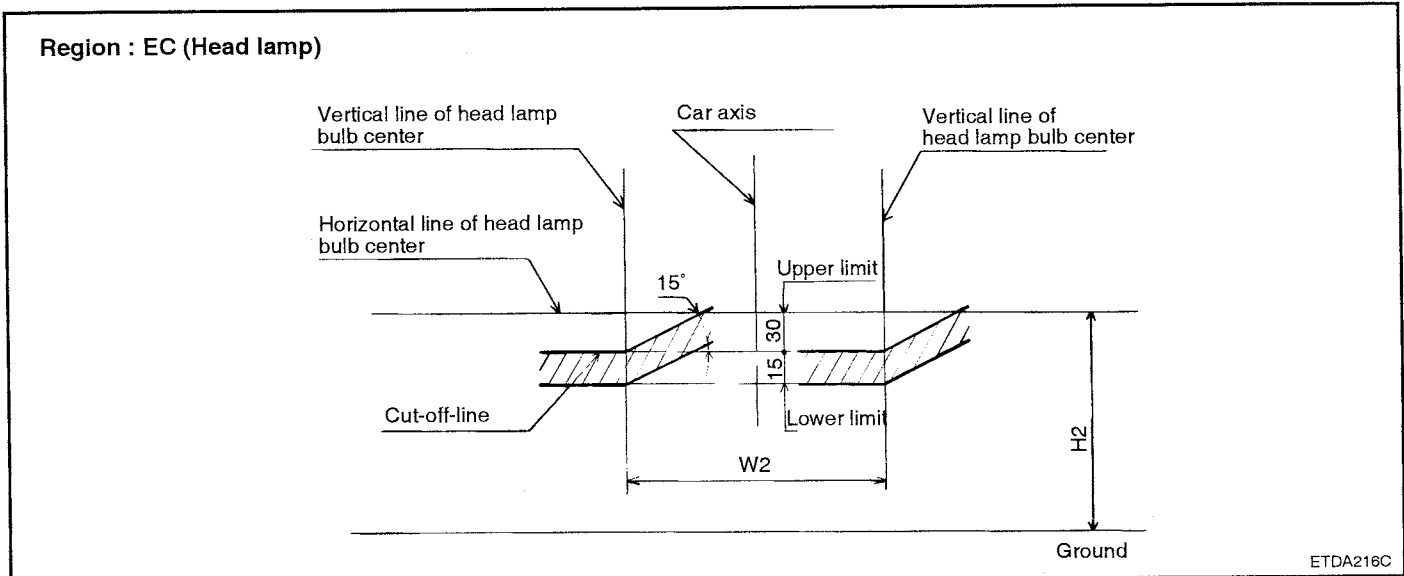
Unit : mm

Vehicle condition	H1	H2	H3	W1	W2	W3	L
Without driver	630	640	336	840	1,120	1,216	3,000
With driver	617	628	324				

ETKA266Z

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

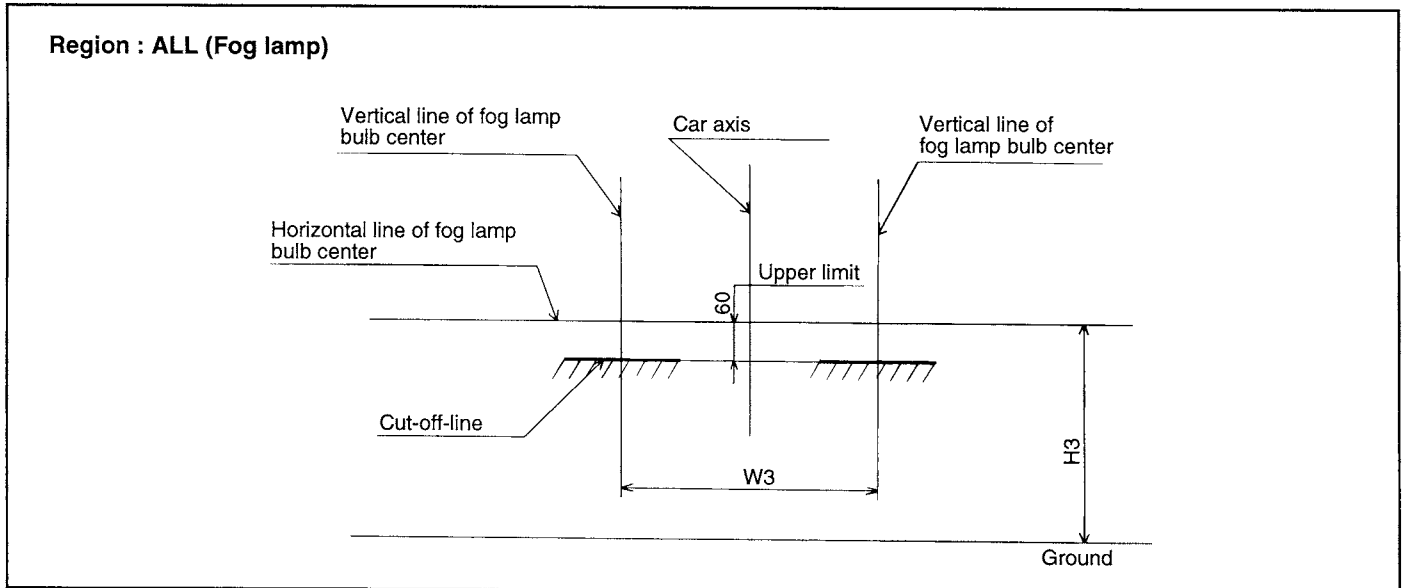
Unit : mm



ETKA465B

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

Unit : mm

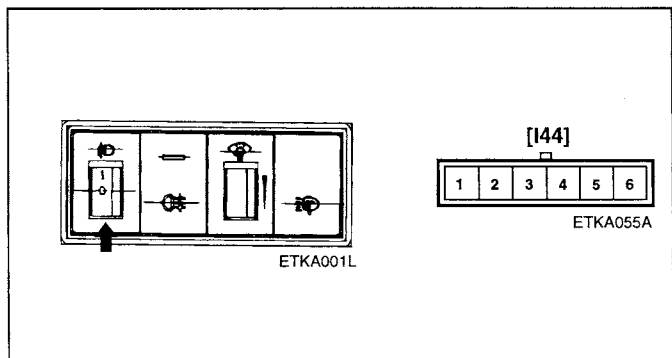


## HEAD LAMP LEVELLING DEVICE

### HEAD LAMP LEVELLING SWITCH

#### INSPECTION ETKA2660

1. Remove the instrument facia panel.
2. Disconnect the switch from the instrument facia panel.



ETKA266A

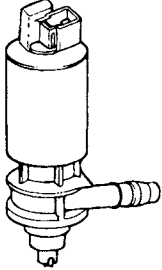
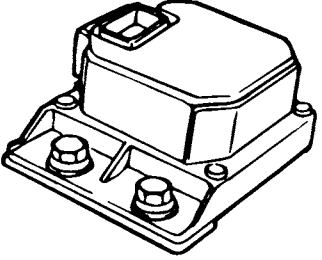

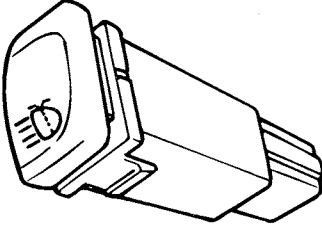
3. Turn ignition ON to supply power to the switch.
4. Measure the voltage between terminals 4 and 5. If the voltage is not as specified, replace the head lamp levelling switch.

Position No.	Voltage (V)
0	11.05
1	9.1
2	7.28
3	5.85

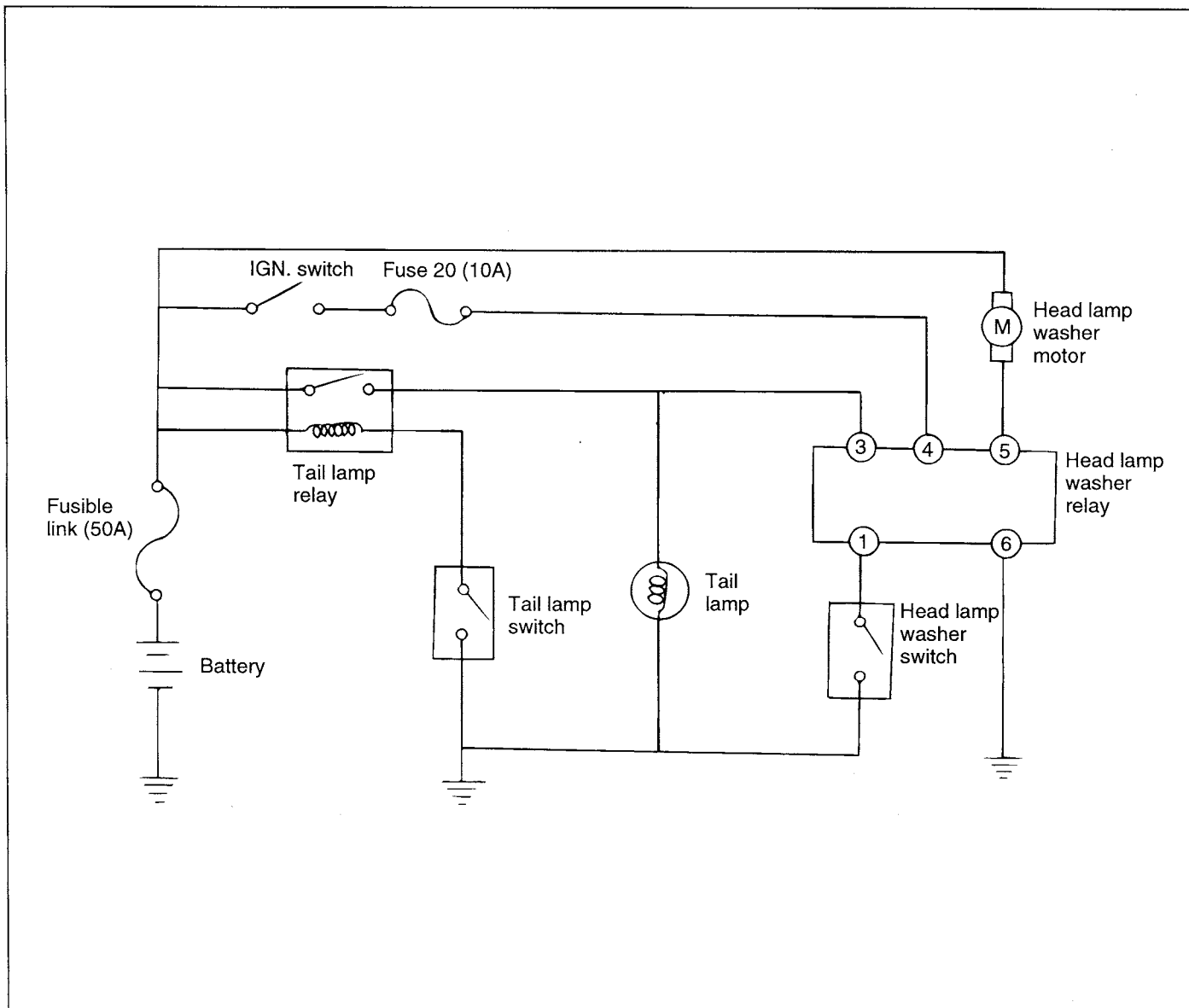
HEAD LAMP WASHER

ETKA2750

COMPONENTS

A. HEAD LAMP WASHER MOTOR	B. HEAD LAMP WASHER RELAY
 <p>ETKA275A</p>	 <p>ETKA275B</p>
C. HEAD LAMP WASHER NOZZLE	D. HEAD LAMP WASHER SWITCH
 <p>ETKA275C</p>	 <p>ETKA275D</p>

**CIRCUIT DIAGRAM** ETKA2800

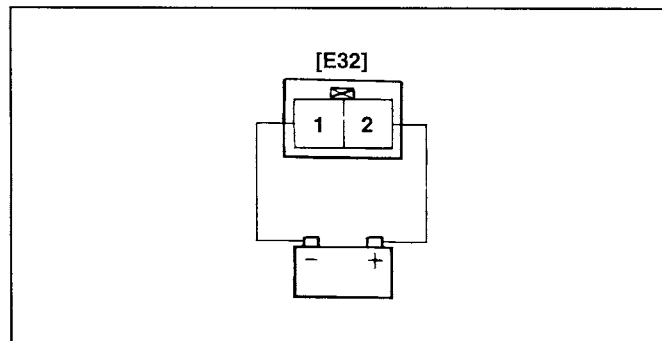


ETKA280A

**INSPECTION** ETKA2850

**HEAD LAMP WASHER MOTOR**

1. Disconnect the head lamp washer motor connector from the reservoir tank.
2. Connect battery positive (+) lead and negative (-) lead to terminals 2 and 1.
3. Check that the motor operates and washer fluid is ejected.

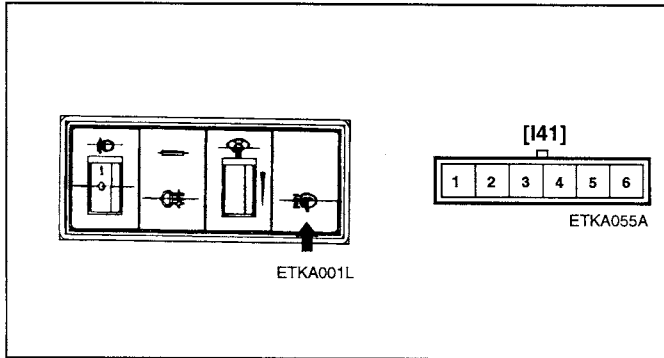


ETKA280B



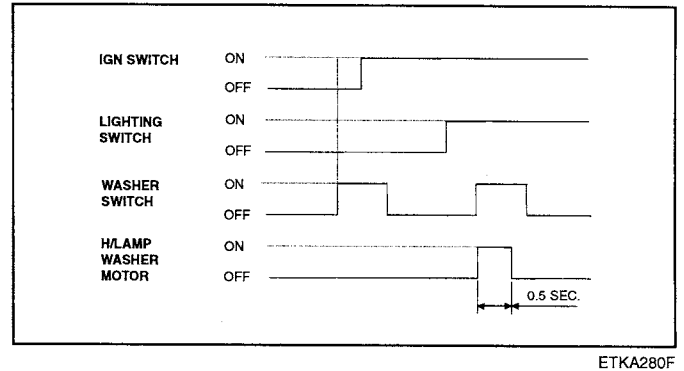
**HEAD LAMP WASHER SWITCH**

1. Disconnect the negative (-) battery terminal.
2. Remove the instrument facia panel.
3. Disconnect the connector from the head lamp washer switch.



**Operating characteristic**

Check that components operate according to the following timing chart.



4. Check for continuity between the terminals.

Terminal Position \	5	6	1	4	2	3
ON(PUSH)	○—○		○—(M)—○			
OFF(FREE)						

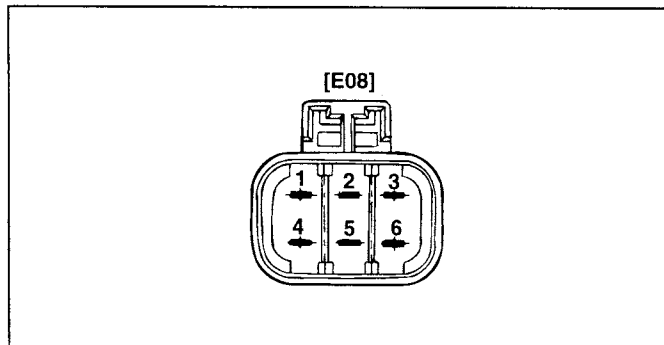
**NOTE**

①—(M)—④ : Indicates that the indicator lamp lights up when tail lamp switch is turned on.

ETKA280D

**HEAD LAMP WASHER RELAY**

1. Connect the battery positive (+) lead to terminals 3 and 4, and ground terminal 1.



2. Check for continuity between terminals 5 and 6.

## IMMOBILIZER CONTROL SYSTEM

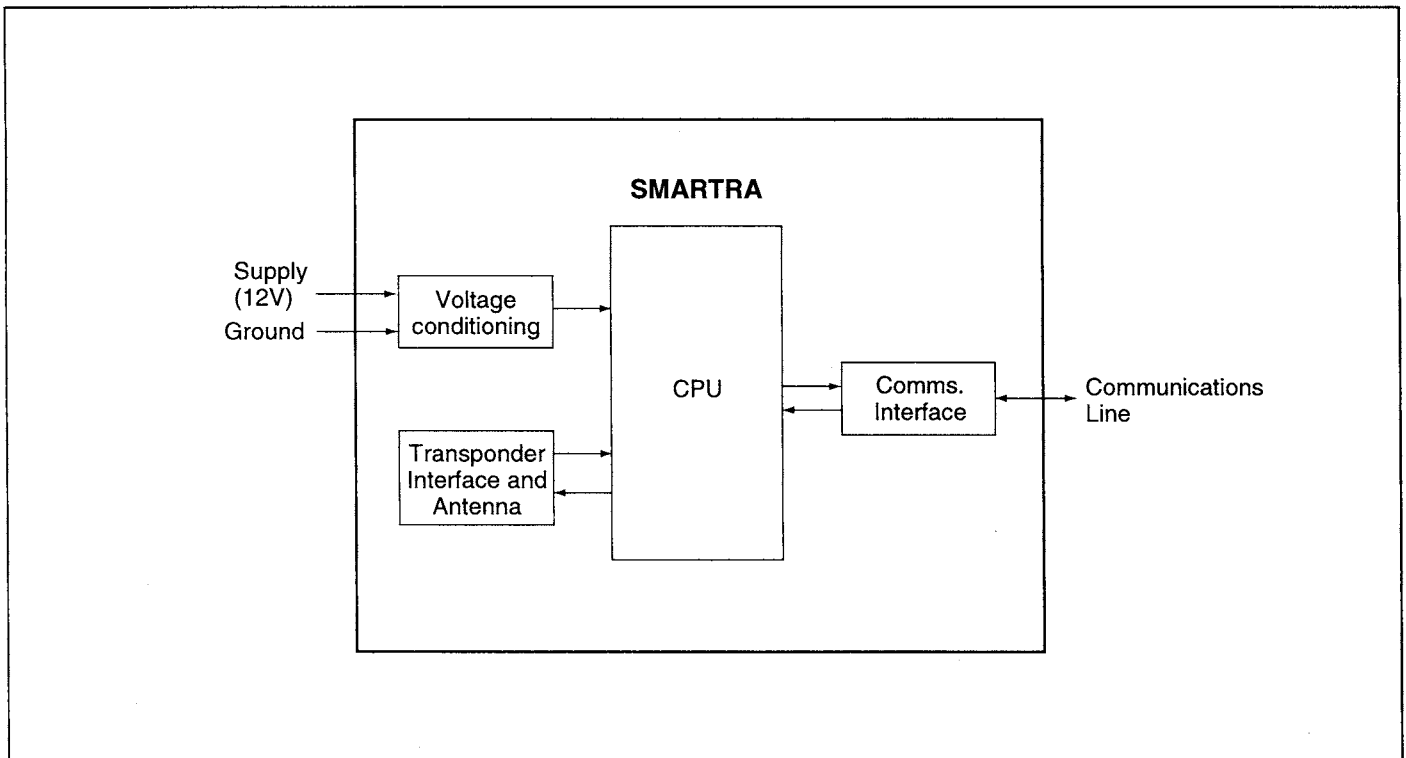
### GENERAL ETKA2700

The immobilizer system consists of a passive challenge-response (mutual authentication) transponder inside the key head and the SMARTRA (SMARt Transponder Antenna) unit.

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

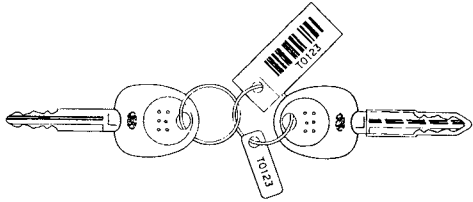
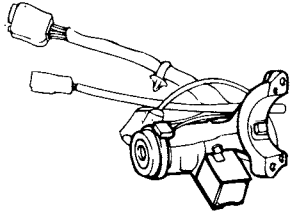
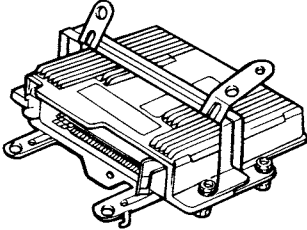
Since the vehicle engine management system is able to control engine mobilization, it is the most suitable unit to control the SMARTRA.

### SYSTEM BLOCK DIAGRAM



ETKA470B

COMPONENT

<p>A. TRANSPONDER KEY</p>  <p style="text-align: right;">ETKA470C</p>	<p>B. SMARTRA</p>  <p style="text-align: right;">B6BE225C</p>
<p>C. ENGINE CONTROL MODULE</p>  <p style="text-align: right;">B6BE710E</p>	

DESCRIPTION

The vehicle immobilizer system consists of the ECM, the SMARTRA and ignition keys with built-in TRANSPONDER.

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

## TEACHING PROCEDURES

### 1. Key Teaching Procedure

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

The procedure starts with an ECM request for vehicle specific data from the tester. The "virgin" ECM stores the vehicle specific data and the key teaching can be started. The "learnt" 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 ECM three times, the 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 ECM stores the relevant data in the EEPROM and in the transponder. Then the 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 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 ECM. This rejects the key and a message is sent to the tester.

The 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 ECM detects different authenticators of a transponder and an ECM, the key is considered to be invalid.

The maximum number of taught keys is 4.

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

If the ECM status and the key status do not match for teaching of keys, the tester procedure will be stopped and a specific fault code will be stored at ECM.

### 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" ECM. Before first teaching of user password to an 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 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 ECM three times, the 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.

### THE USER PASSWORD CAN BE IN THE STATUS

#### 00. Not yet checked

The status is stored in the EEPROM. In case of incorrect or no plausible data from this circuit, the ECM cannot check the status and the ECM sends 00.

#### 01. Learnt

The password has been taught successfully to the ECM.

#### 02. Virgin

This is the status at the end of the ECM production line before delivery to the final customer.

#### 04. Locked by timer

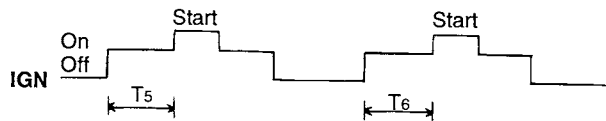
After a certain number of incorrect inputs, the ECM is locked for one hour and no inputs are accepted during this time.

#### 05. Teaching not accepted

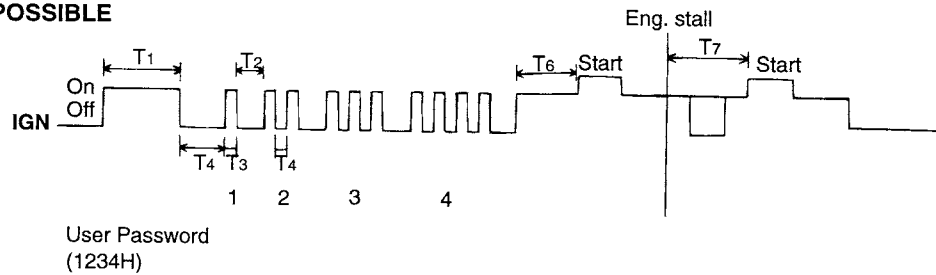
This status is set if, for example, the ECM is in neutral status.

LIMP HOME FUNCTION

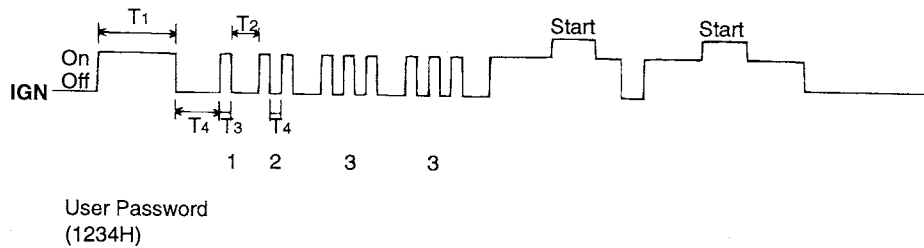
o NORMAL CONDITION



o START POSSIBLE



o START IMPOSSIBLE



**NOTE**

- $T_1 > 5 \text{ sec}$
- $3 \text{ sec} < T_2 < 10 \text{ sec}$
- $0.2 \text{ sec} < T_3 < 5 \text{ sec}$
- $0.2 \text{ sec} < T_4 < 3 \text{ sec}$
- $T_5 < 5 \text{ sec}$
- $T_6 < 30 \text{ sec}$
- $T_7 < 8 \text{ sec}$

ETKA470A

**1. By tester**

If the ECM detects the fault of the SMARTRA or transponder, the 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 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 ECM via the special tester menu.

Only if the ECM is in status "learnt" and the user password status is "learnt" and the user password is

correct, will the ECM 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 ECM will reject the request of limp home for one hour. Disconnecting the battery or any other action cannot reduce this time. After reconnecting the battery to the ECM, the timer starts again for one hour.

## 2. By ignition key

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

Only if the ECM is in status "learnt" and the user password status is "learnt" and the user password is correct, will the ECM 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 ECM is locked if the timer has elapsed 8 seconds. For the next start, the input of the user password is requested again.

### DIAGNOSIS OF IMMOBILIZER RELATED FAULTS

The diagnosis monitors :

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

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

Immobilizer Related Faults	Fault types	Diagnostic Codes
Transponder Fault	Invalid transponder data	P1801
	Passive mode invalid	P1801
	Programming error	P1801
SMARTRA Fault	Antenna error	P1800
	Invalid request from ECM or corrupted data	P1803
	No answer from SMARTRA	P1610
	Invalid message from SMARTRA to ECM	P1610

Immobilizer Related Faults	Fault types	Diagnostic Codes
EEPROM	Inconsistent data of EEPROM	P1805
	Invalid write operation to EEPROM	P1805
ECM Fault	No valid data from SMARTRA after 3 attempts by ECM	P1805
	Invalid tester message or unexpected requests by tester	P1805

### 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 programmed into the new ECM. Keys, which are not programmed into 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, there is no special procedure required. A new SMARTRA device simply replaces the old one. There are no transponder - related data stored in this device.

### NEUTRALISING ECM

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

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

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

The teaching of keys follows the procedure described for the virgin 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.