

# Body Electrical System

<b>GENERAL .....</b>	<b>BE -2</b>
<b>AUDIO SYSTEM .....</b>	<b>BE -22</b>
<b>MULTI FUNCTION SWITCH .....</b>	<b>BE -28</b>
<b>HORNS .....</b>	<b>BE -32</b>
<b>KEYLESS ENTRY AND BURGLAR ALARM .....</b>	<b>BE -33</b>
<b>ETACS (ELECTRONIC TIME AND ALARM CONTROL SYSTEM) .....</b>	<b>BE -38</b>
<b>FUSES AND RELAYS .....</b>	<b>BE -43</b>
<b>INDICATORS AND GAUGES .....</b>	<b>BE -48</b>
<b>POWER DOOR LOCKS .....</b>	<b>BE -55</b>
<b>POWER DOOR MIRRORS .....</b>	<b>BE -57</b>
<b>POWER WINDOWS .....</b>	<b>BE -60</b>
<b>REAR WINDOW DEFOGGER .....</b>	<b>BE -64</b>
<b>WINDSHIELD WIPER/WASHER .....</b>	<b>BE -66</b>
<b>REAR WIPER/WASHER .....</b>	<b>BE -71</b>
<b>SEAT WARMER .....</b>	<b>BE -75</b>
<b>SUN ROOF .....</b>	<b>BE -76</b>
<b>LIGHTING SYSTEM .....</b>	<b>BE -79</b>
<b>HEAD LAMP LEVELLING DEVICE .....</b>	<b>BE -90</b>
<b>IMMOBILIZER CONTROL SYSTEM .....</b>	<b>BE -92</b>

**GENERAL****SPECIFICATIONS** ETMB0050**MULTIFUNCTION SWITCH**

Items	Specifications
Rated Voltage	DC 12V
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 switch	Low, High : 4.5A (Motor load) Int. : 0.22 ± 0.05A (Relay load) Lock : Max. 28A (Motor load)
Wiper mist switch	1A (Relay load)
Washer switch	4 A (Motor load)
Variable intermittent wiper volume switch	Max. 25mA
Front fog lamp switch	1A (Relay load)
Horn switch	1A (Relay load)

**INSTRUMENTS AND WARNING SYSTEM**

Warning lamps	Bulb wattage (W)	Color
Illumination	3.4W x 5EA	Yellow green
High beam	3.0	Blue
Low fuel	3.0	Amber
Turn signal (LH, RH)	1.4	Green
Battery (charge)	1.4	Red
Oil pressure	1.4	Red
Air bag	1.4	Red
Parking brake	1.4	Red
Seat belt	1.4	Red
Check engine	1.4	Amber
ABS	1.4	Amber
A/T temperature	1.4	Red
Snow	1.4	Amber
Door ajar	1.4	Red
Tailgate open	1.4	Amber
Cruise	1.4	Green
O/D OFF	1.4	Amber
Immobilizer	1.4	Amber
Front fog lamp	1.4	Green

Warning lamps	Bulb wattage (W)	Color
4WD	1.4	Green
4WD LOW	1.4	Green
Water separator (for DSL)	1.4	Red
Vacuum brake (for DSL)	1.4	Red
Glow (for DSL)	1.4	Amber
<b>A/T</b>		
P	1.4	Green
R	1.4	Amber
N	1.4	Green
D	1.4	Green
2	1.4	Green
L	1.4	Green

## SERVICE SPECIFICATIONS ETMB0100

## INDICATORS AND GAUGES

Items	Specifications																																																																						
Speedometer																																																																							
Type	<ul style="list-style-type: none"> <li>o Cross - coil type</li> </ul>																																																																						
Input spec.	<ul style="list-style-type: none"> <li>o Hall IC type : 4 pulses/rev.</li> </ul>																																																																						
Indication	<ul style="list-style-type: none"> <li>o Km/h : 637rpm x 4 pulses/rev. indicates 60Km/h</li> <li>o MPH : 1026 rpm x 4 pulses/rev. indicates 60MPH</li> </ul>																																																																						
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> </tr> <tr> <td>Tolerance (Km/h)</td> <td>20.5-24.5</td> <td>41-43.9</td> <td>61.1-64.9</td> <td>81.5-85.9</td> <td>102-106.8</td> <td>122.4-127.8</td> </tr> <tr> <td>Velocity (Km/h)</td> <td>140</td> <td>160</td> <td>180</td> <td>200</td> <td colspan="2">Remarks</td> </tr> <tr> <td>Tolerance (Km/h)</td> <td>142.8-148.8</td> <td>163.4-169.8</td> <td>183.4-190.2</td> <td>203.4-211</td> <td colspan="2">All area</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> </tr> <tr> <td>Tolerance (MPH)</td> <td>10.3-12.8</td> <td>20.5-22.5</td> <td>40.8-43.4</td> <td>61-64.4</td> <td>81.3-85.1</td> <td>101.8-106.2</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>78-82</td> <td>97.7-102.3</td> </tr> <tr> <td>Velocity (MPH)</td> <td>120</td> <td>140</td> <td colspan="4">Remarks</td> </tr> <tr> <td>Tolerance (MPH)</td> <td>122-127</td> <td>142.3-147.9</td> <td colspan="4">EXCEPT USA</td> </tr> <tr> <td>Tolerance (MPH)</td> <td>117.5-122.5</td> <td>137.3-142.7</td> <td colspan="4">USA</td> </tr> </table> <ul style="list-style-type: none"> <li>o Tap the speedometer to prevent hysteresis effects during inspection.</li> </ul>	Velocity (Km/h)	20	40	60	80	100	120	Tolerance (Km/h)	20.5-24.5	41-43.9	61.1-64.9	81.5-85.9	102-106.8	122.4-127.8	Velocity (Km/h)	140	160	180	200	Remarks		Tolerance (Km/h)	142.8-148.8	163.4-169.8	183.4-190.2	203.4-211	All area		Velocity (MPH)	10	20	40	60	80	100	Tolerance (MPH)	10.3-12.8	20.5-22.5	40.8-43.4	61-64.4	81.3-85.1	101.8-106.2	Tolerance (MPH)	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78-82	97.7-102.3	Velocity (MPH)	120	140	Remarks				Tolerance (MPH)	122-127	142.3-147.9	EXCEPT USA				Tolerance (MPH)	117.5-122.5	137.3-142.7	USA			
Velocity (Km/h)	20	40	60	80	100	120																																																																	
Tolerance (Km/h)	20.5-24.5	41-43.9	61.1-64.9	81.5-85.9	102-106.8	122.4-127.8																																																																	
Velocity (Km/h)	140	160	180	200	Remarks																																																																		
Tolerance (Km/h)	142.8-148.8	163.4-169.8	183.4-190.2	203.4-211	All area																																																																		
Velocity (MPH)	10	20	40	60	80	100																																																																	
Tolerance (MPH)	10.3-12.8	20.5-22.5	40.8-43.4	61-64.4	81.3-85.1	101.8-106.2																																																																	
Tolerance (MPH)	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78-82	97.7-102.3																																																																	
Velocity (MPH)	120	140	Remarks																																																																				
Tolerance (MPH)	122-127	142.3-147.9	EXCEPT USA																																																																				
Tolerance (MPH)	117.5-122.5	137.3-142.7	USA																																																																				
Tachometer																																																																							
Type	<ul style="list-style-type: none"> <li>o Cross - coil type (4cyl : 4pulses/rev, 6cyl : 3pulses/rev)</li> </ul>																																																																						
Standard values	<table border="1"> <tr> <td>Revolution (RPM)</td> <td>1,000</td> <td>2,000</td> <td>3,000</td> <td>4,000</td> <td>5,000</td> <td>6,000</td> <td>7,000</td> <td>Remarks</td> </tr> <tr> <td>Tolerance (RPM)</td> <td>±120</td> <td>±140</td> <td>±170</td> <td>±170</td> <td>±200</td> <td>-</td> <td>-</td> <td>Diesel</td> </tr> <tr> <td>Tolerance (RPM)</td> <td>±120</td> <td>±140</td> <td>±170</td> <td>±170</td> <td>±200</td> <td>±240</td> <td>±260</td> <td>Gasoline</td> </tr> </table> <ul style="list-style-type: none"> <li>o Tap the tachometer to prevent hysteresis effects during inspection.</li> </ul>	Revolution (RPM)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	Remarks	Tolerance (RPM)	±120	±140	±170	±170	±200	-	-	Diesel	Tolerance (RPM)	±120	±140	±170	±170	±200	±240	±260	Gasoline																																											
Revolution (RPM)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	Remarks																																																															
Tolerance (RPM)	±120	±140	±170	±170	±200	-	-	Diesel																																																															
Tolerance (RPM)	±120	±140	±170	±170	±200	±240	±260	Gasoline																																																															
Fuel gauge																																																																							
Type	<ul style="list-style-type: none"> <li>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)</li> </ul>																																																																						
Standard values	<table border="1"> <thead> <tr> <th rowspan="2">Level</th> <th>Gauge</th> <th rowspan="2">Gauge angle (°)</th> </tr> <tr> <th>Resistance (Ω)</th> </tr> </thead> <tbody> <tr> <td>E (Empty)</td> <td>95</td> <td>-40 ± 2.4</td> </tr> <tr> <td>1/2</td> <td>32.5</td> <td>0 ± 4.0</td> </tr> <tr> <td>F (Full)</td> <td>7</td> <td>40 ± 2.4</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>o Inspection order : E → F → E The level must be reached within 7 minutes after the resistance is set for Full or Empty.</li> <li>o Point stability tolerance : Within 9° Apply power for 10 minutes. Then turn off the power for 30 minutes and read the position of the pointer.</li> </ul>	Level	Gauge	Gauge angle (°)	Resistance (Ω)	E (Empty)	95	-40 ± 2.4	1/2	32.5	0 ± 4.0	F (Full)	7	40 ± 2.4																																																									
Level	Gauge		Gauge angle (°)																																																																				
	Resistance (Ω)																																																																						
E (Empty)	95	-40 ± 2.4																																																																					
1/2	32.5	0 ± 4.0																																																																					
F (Full)	7	40 ± 2.4																																																																					

Items	Specifications															
Temperature gauge	<ul style="list-style-type: none"> <li>o Cross - coil type (Intermedia stability type).</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Temperature</th> <th>Angle (°)</th> <th>Assembled tolerance (°)</th> </tr> </thead> <tbody> <tr> <td>55°C</td> <td>-40</td> <td>-</td> </tr> <tr> <td>85°C - 110°C</td> <td>-7<sup>+2</sup><sub>-3</sub></td> <td>+3 -2</td> </tr> <tr> <td>Red zone (over 125°C)</td> <td>over 35±5</td> <td>+7 -4</td> </tr> </tbody> </table>				Temperature	Angle (°)	Assembled tolerance (°)	55°C	-40	-	85°C - 110°C	-7 <sup>+2</sup> <sub>-3</sub>	+3 -2	Red zone (over 125°C)	over 35±5	+7 -4
Temperature					Angle (°)	Assembled tolerance (°)										
55°C					-40	-										
85°C - 110°C					-7 <sup>+2</sup> <sub>-3</sub>	+3 -2										
Red zone (over 125°C)	over 35±5	+7 -4														
Type																
Indication standard																
Resistance of temperature sender (NTC)	<ul style="list-style-type: none"> <li>o Inspection order : OFF → C → H</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Temperature (°C)</th> <th>55</th> <th>85</th> <th>110</th> <th>125</th> </tr> </thead> <tbody> <tr> <td>Resistance (Ω)</td> <td>157</td> <td>48.4</td> <td>24</td> <td>15.2</td> </tr> </tbody> </table>				Temperature (°C)	55	85	110	125	Resistance (Ω)	157	48.4	24	15.2		
Temperature (°C)	55	85	110	125												
Resistance (Ω)	157	48.4	24	15.2												

ETMB010B

## LIGHTING SYSTEM

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

## AUDIO

Items	H240	H260	H280
Rated output	Max. 20W x 4	Max. 25W x 4	Max. 20W x 4
Speaker impedance	4ΩX4	4ΩX4	4ΩX4
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	H240	H260	H280
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
Wiper motor Speed/current at 10kg.cm load test (1.0Nm, 0.7lb-ft) Speed/current at 40kg.cm load test (4.0Nm, 2.9lb-ft) Current when parking	Low : 44-52rpm/3.5A or less High : 64-78rpm/4.5A or less Low : 39-47rpm/5.5A or less High : 56-68rpm/7.0A or less Low : 24A or less High : 28A or less
Windshield washer Motor type Pump type Current Discharge pressure Flow rate Overload capacity (Continuous operation) With water Without water	DC ferrite magnet Centrifugal 5.0A or less 1.8kg/cm <sup>2</sup> or more 1,500cc/min. or more 60sec. or less 20sec. or less

**TROUBLESHOOTING** ETMB0150**INSTRUMENTS AND WARNING SYSTEM**

Symptom	Possible cause	Remedy
Tachometer does not operate	No.21 fuse (10A) blown Tachometer faulty Wiring faulty	Check for short and replace fuse Check tachometer Repair if necessary
Fuel gauge does not operate	No.21 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.21 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.21 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

Symptom	Possible cause	Remedy
Oil pressure warning lamp does not light	No.21 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.21 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	Power connector (10A) blown Bulb burned out Door switch faulty Wiring or ground faulty	Check for connection Replace bulb Check switch Repair if necessary
Seat belt warning lamp does not light	No.21 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

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 Fusible link (40A) blown Head lamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace bulb Replace fusible link 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.3 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.20 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

Symptom	Possible cause	Remedy
Hazard warning lamps do not operate	No.2 fuse (15A) blown Flasher faulty Hazard switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Flasher rate too slow or too fast	Lamps' wattages are smaller or larger than specified Defective flasher	Replace lamps Replace flasher
Back up lamps do not light up	No.18 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	Fusible link (50A) blown Wiring or ground faulty	Replace fusible link Repair if necessary



**AUDIO**

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

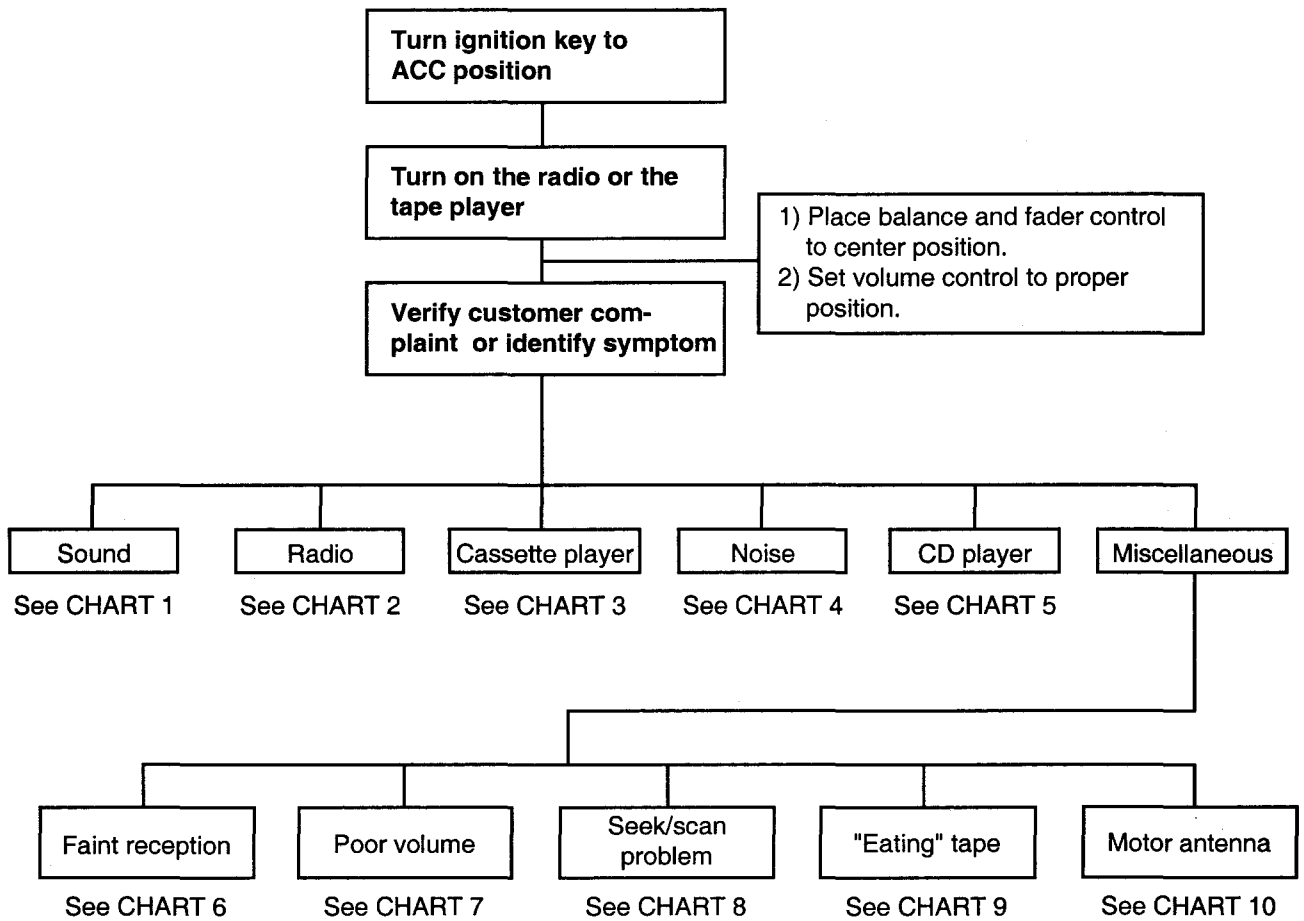
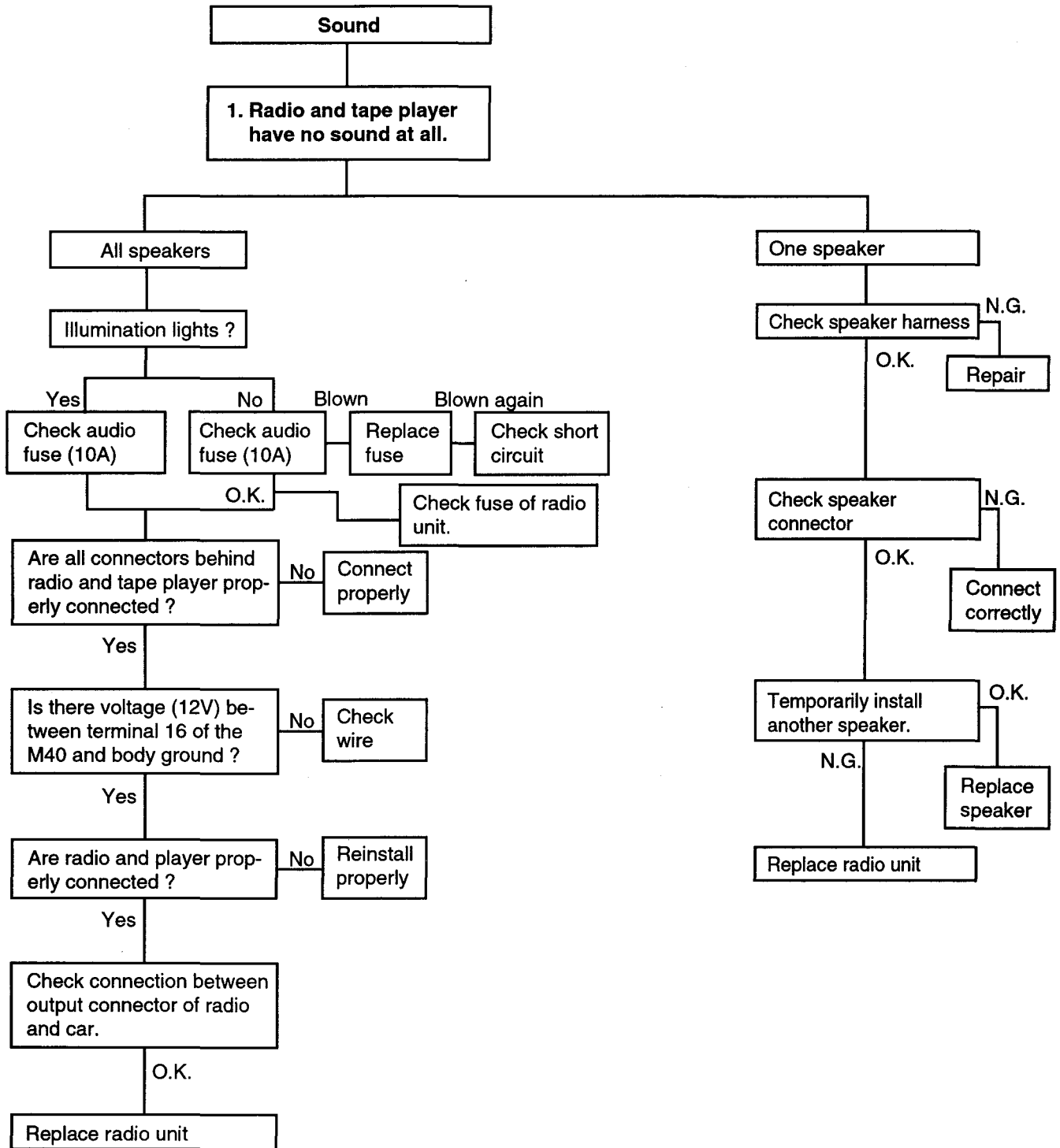
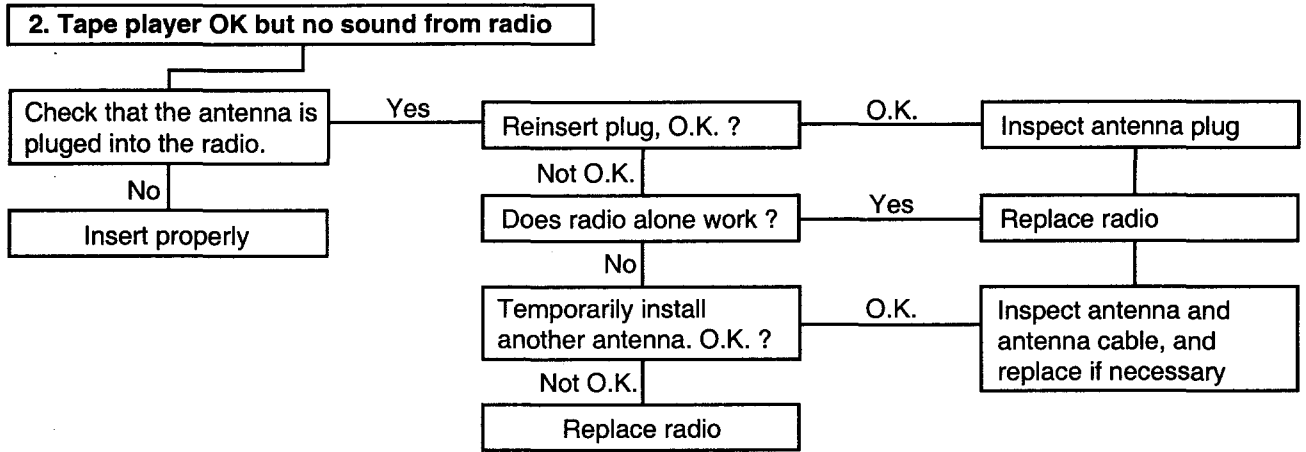


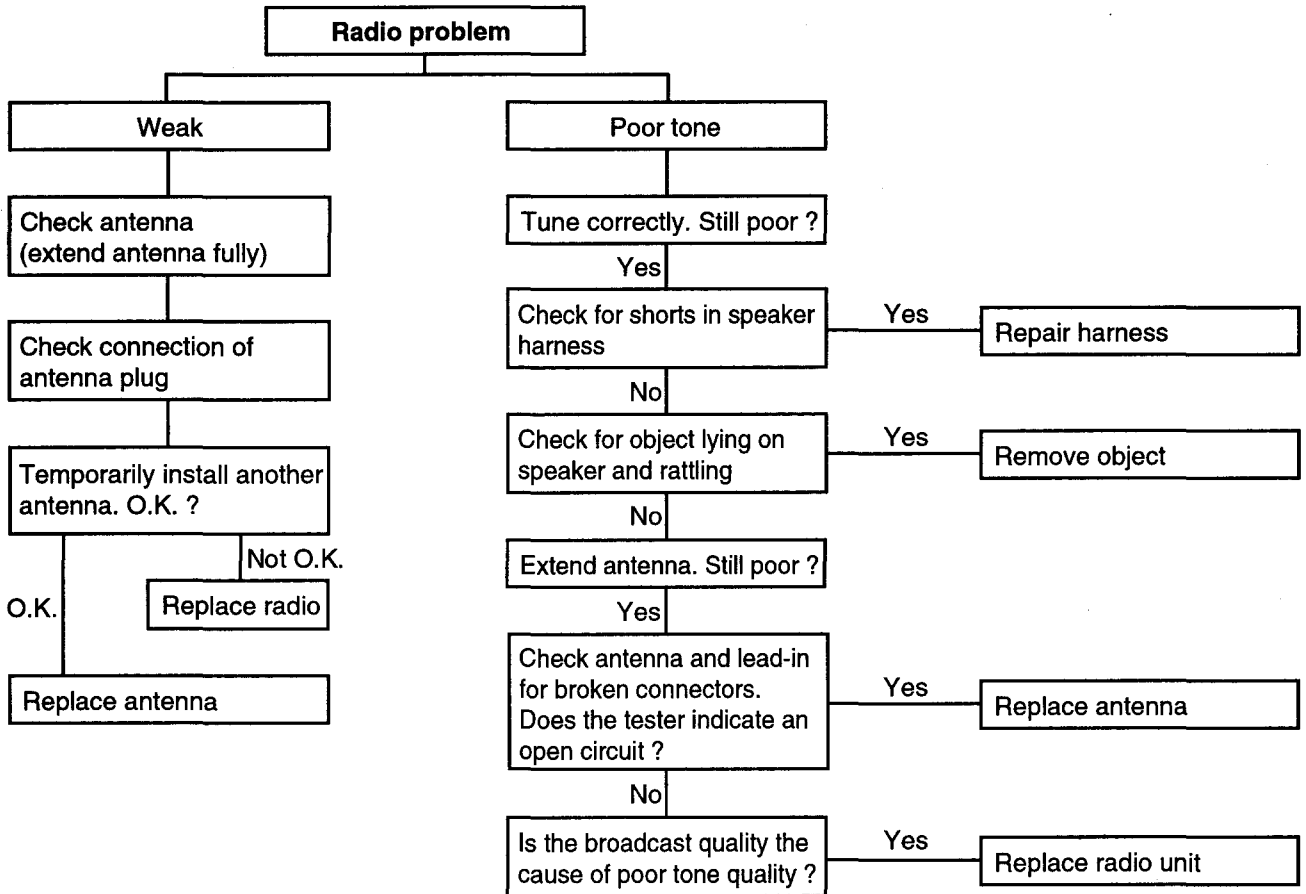
CHART 1





ETA9010C

CHART 2



ETA9010D

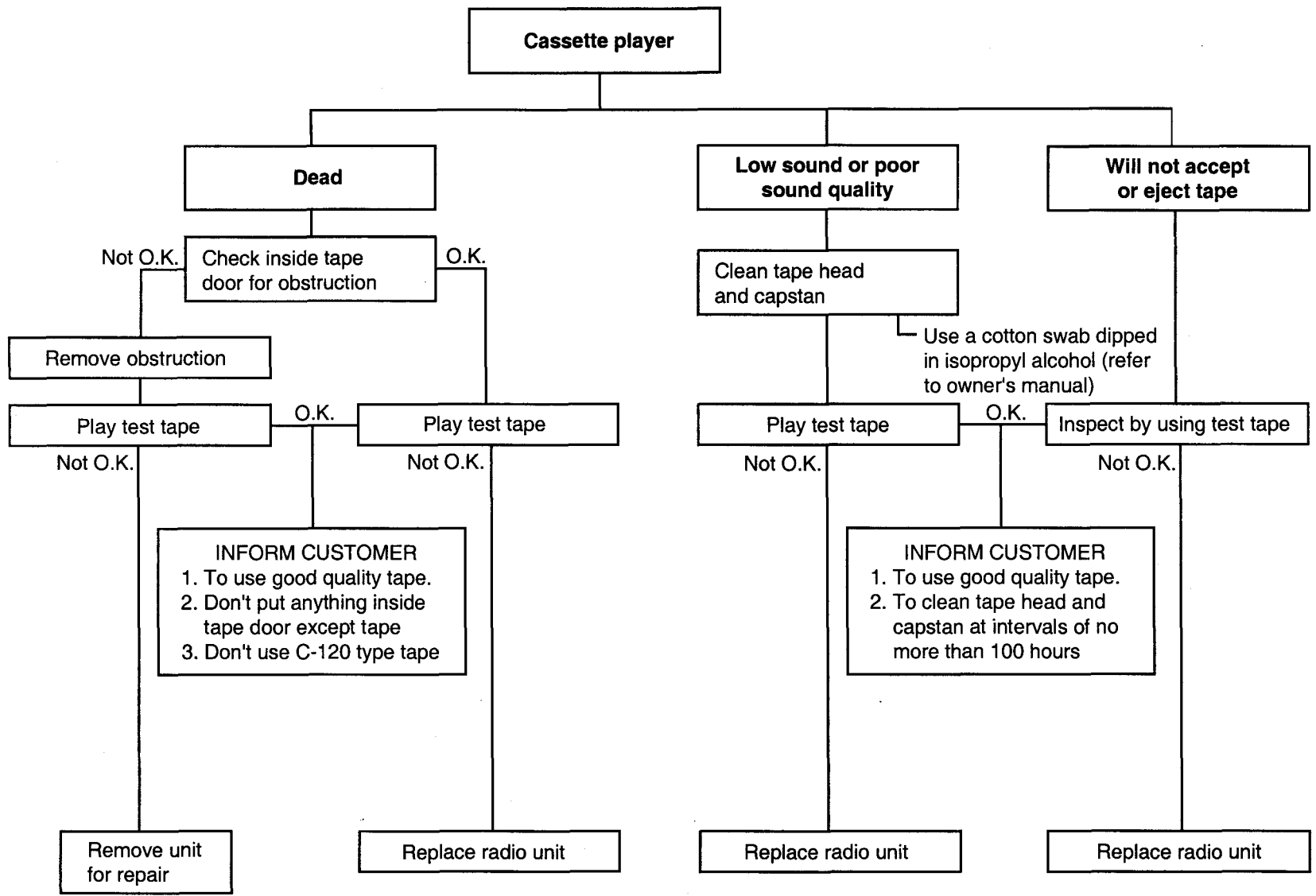
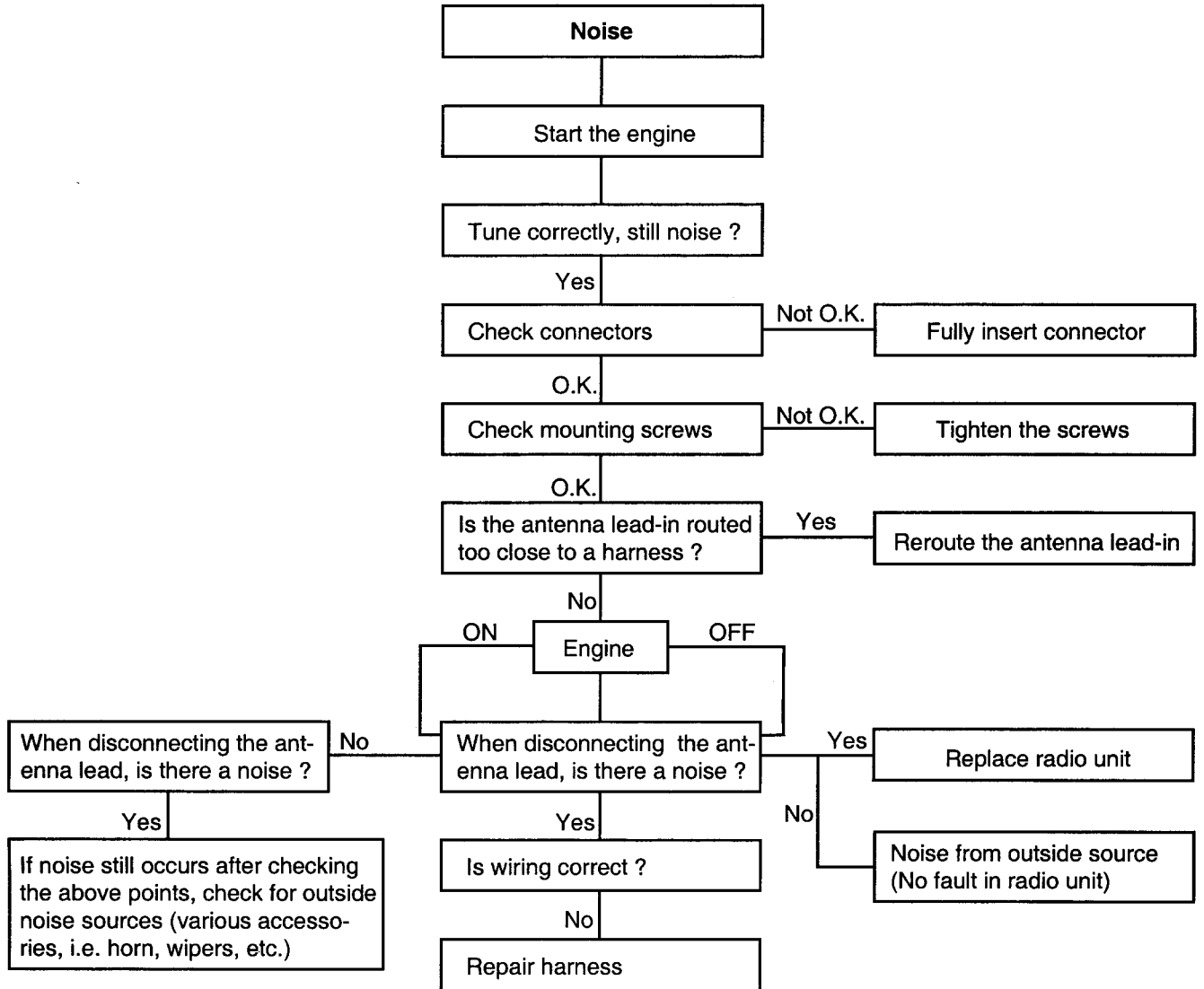
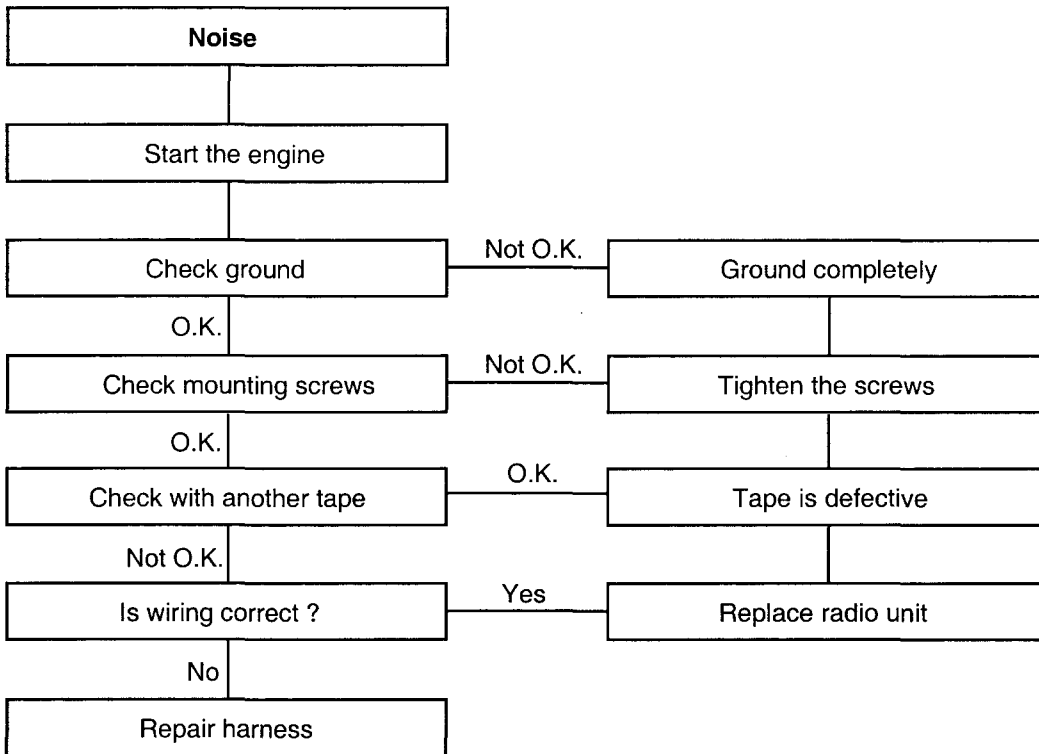


CHART 4

1. RADIO



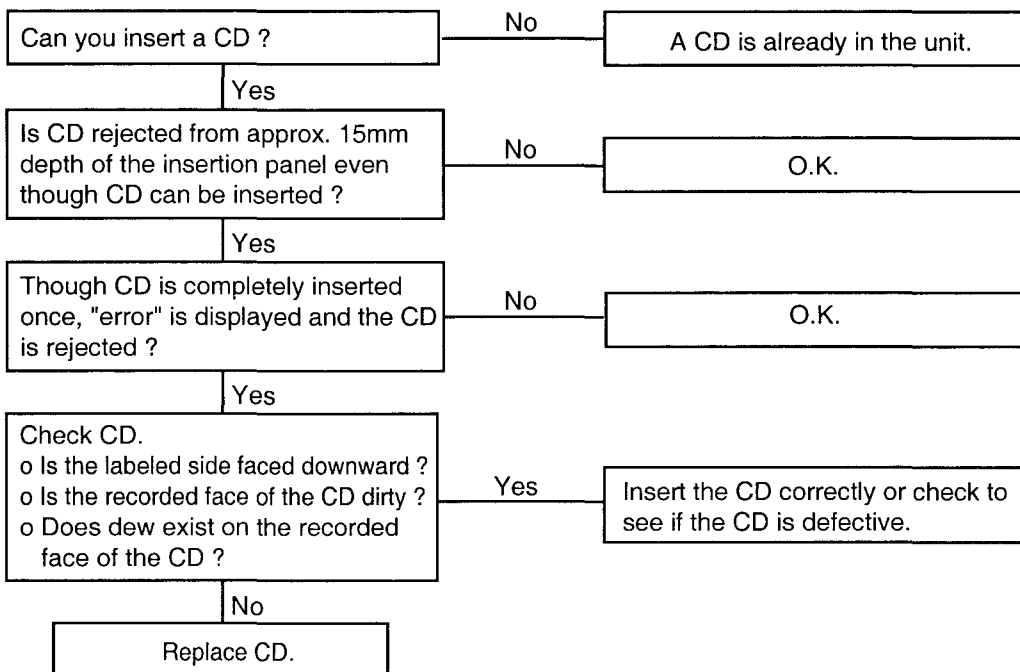
2. TAPE



ETA9010G

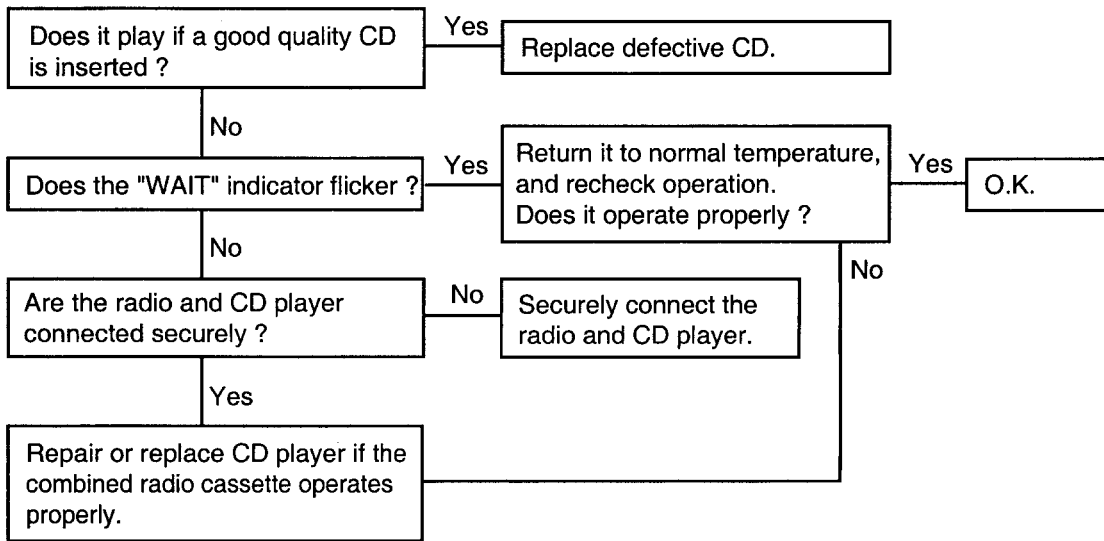
CHART 5

1. CD WILL NOT BE ACCEPTED



ETA9010H

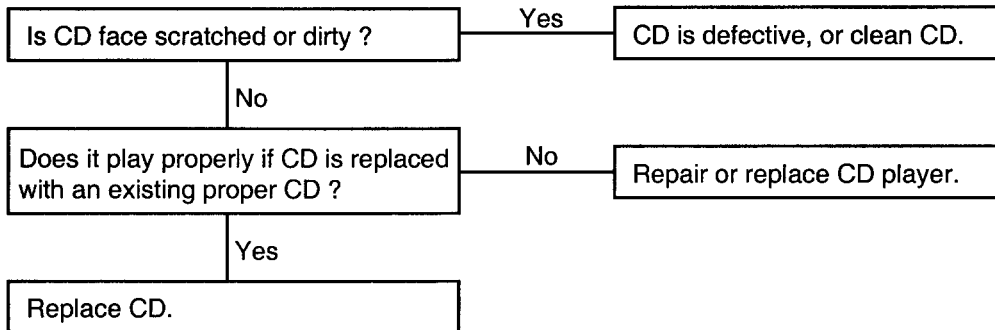
2. NO SOUND



ETA90100

3. CD SOUND SKIPS

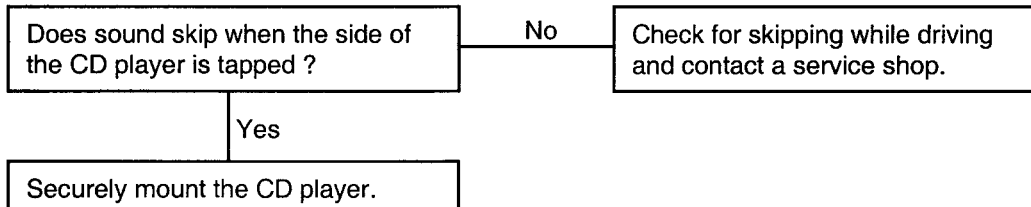
1. Sound sometimes skips when parking.



2. Sound sometimes skips when driving.

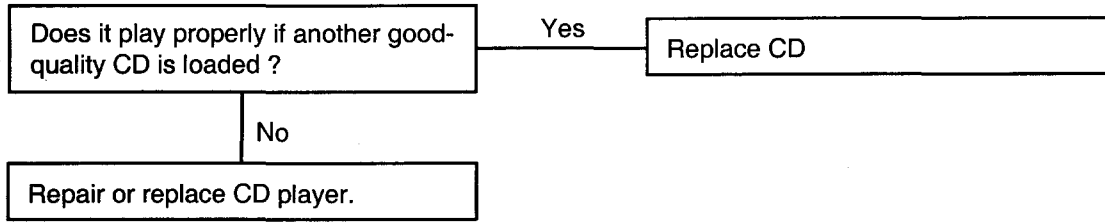
(Stop vehicle, and check it.)

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

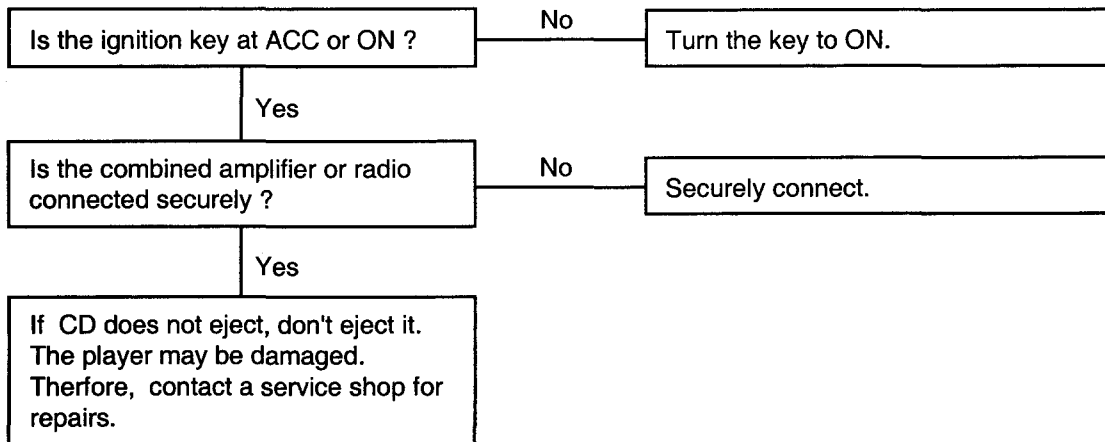


ETA90101

4. SOUND QUALITY IS POOR



5. CD WILL NOT EJECT



6. NO SOUND FROM ONE SPEAKER

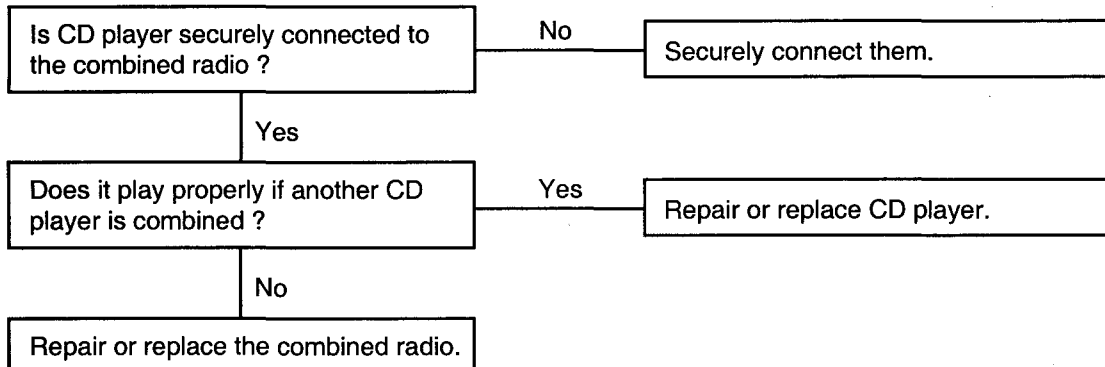
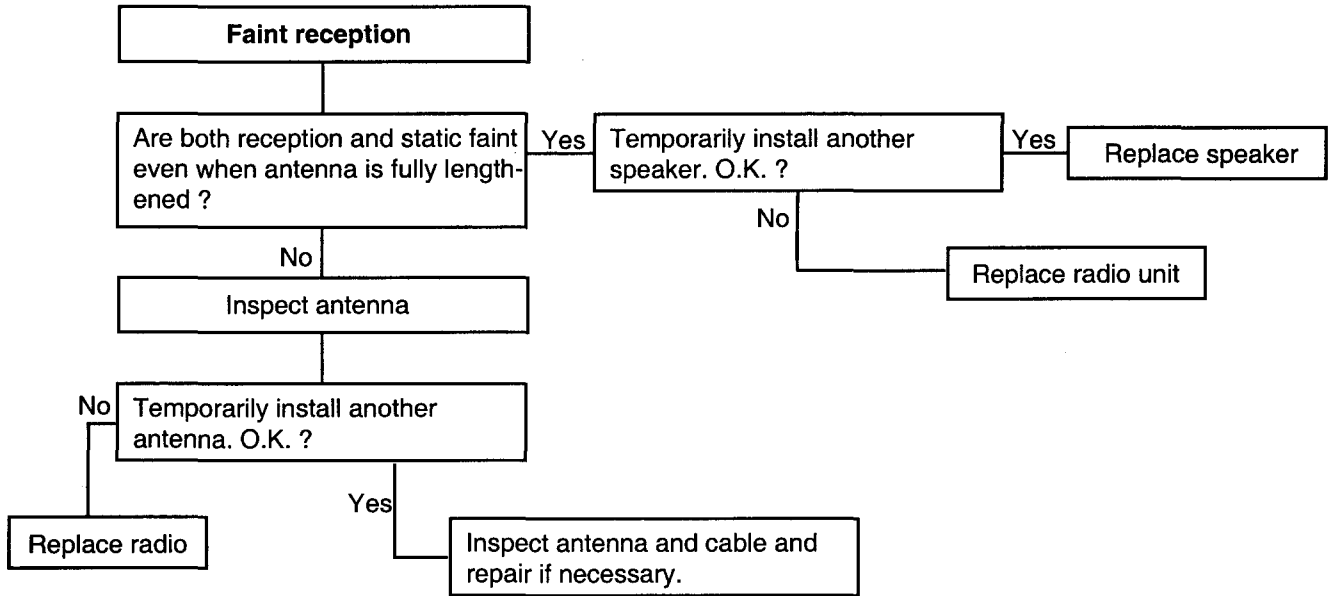


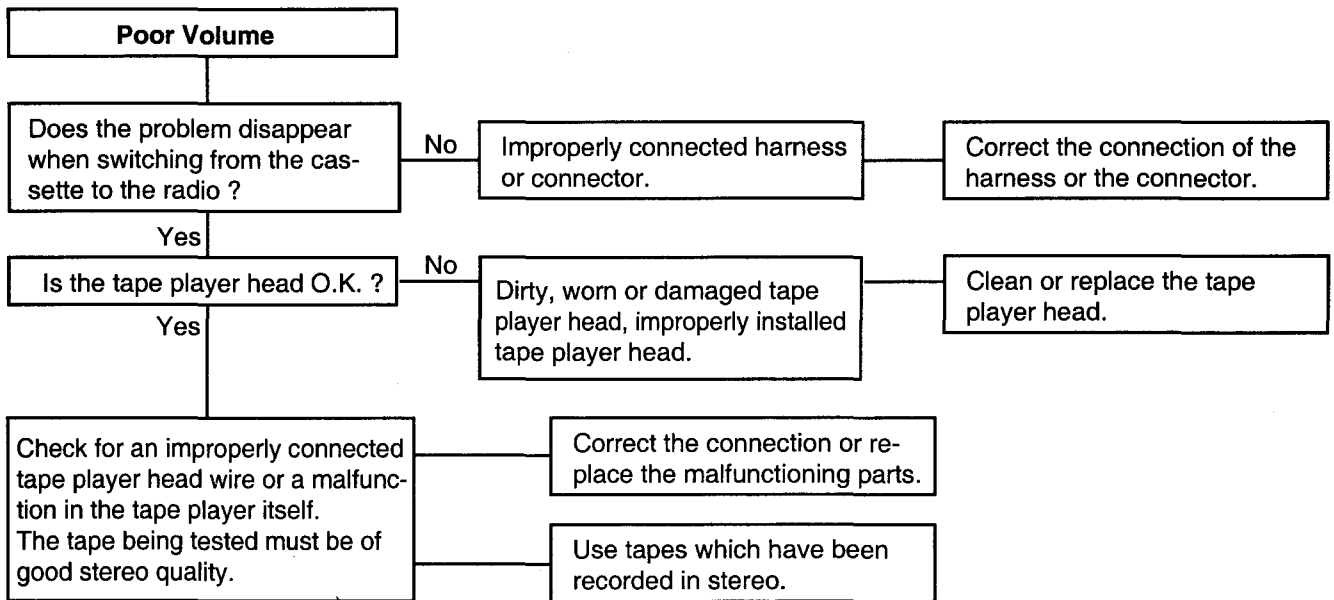


CHART 6



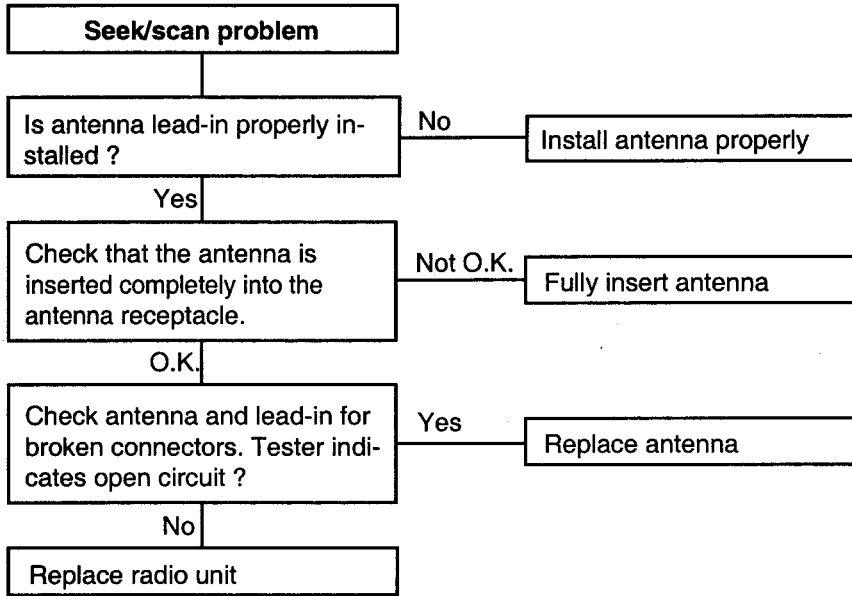
ETA9010K

CHART 7



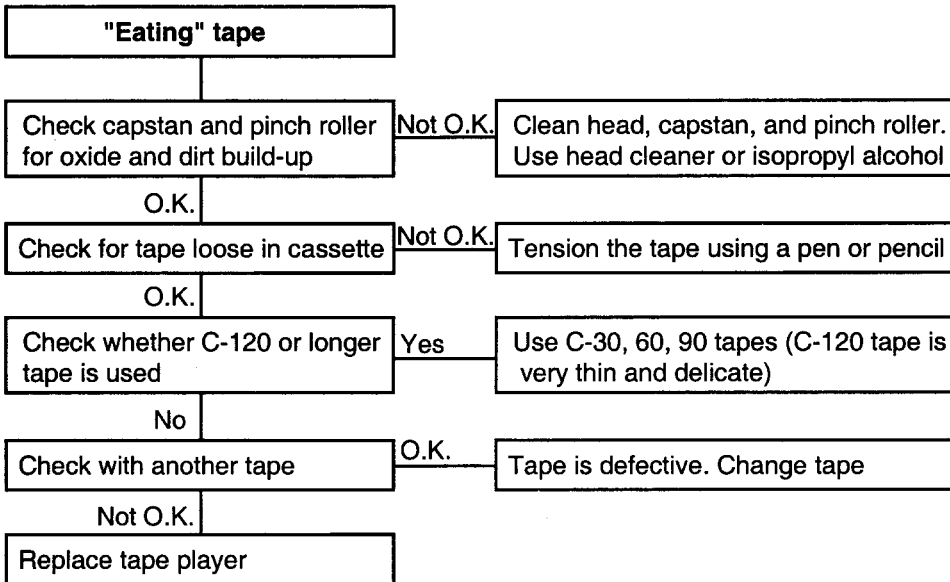
ETA9010L

CHART 8



ETA9010M

CHART 9

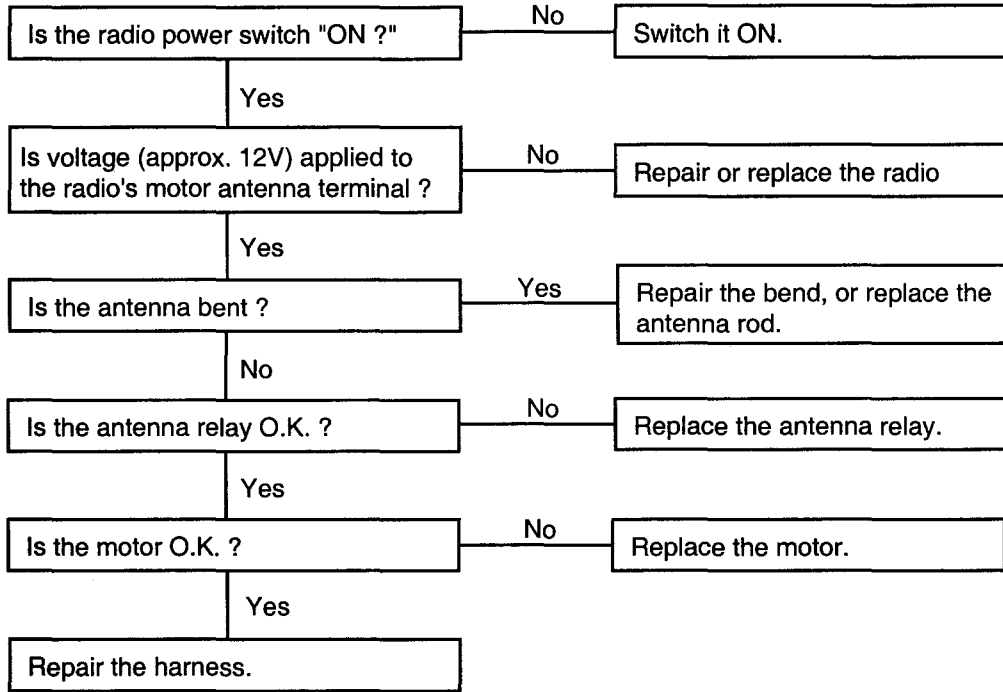


ETA9010N

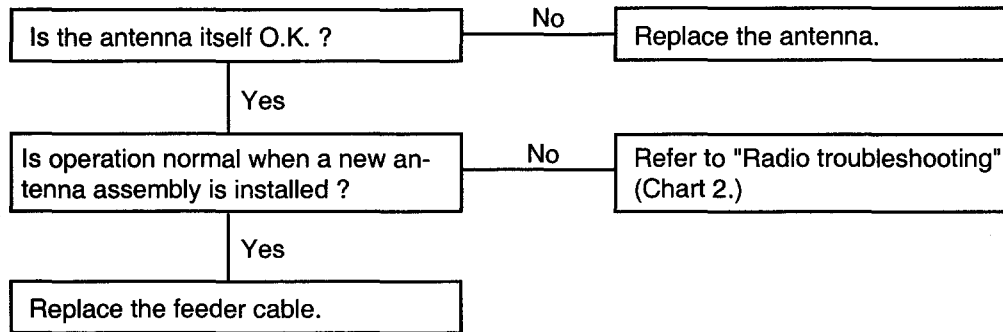
CHART 10

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.27; 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
Wipers do not operate in INT position	ETACS CM faulty Wiper switch faulty Wiper motor faulty Wiring or ground faulty	Check ETACS CM Check switch Check motor Repair if necessary

## POWER WINDOW

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

## POWER DOOR MIRROR

Symptom	Possible cause	Remedy
No mirrors operate	No.12 fuse (10A) blown Poor ground  Defective mirror switch  Open circuit in wires or loose or disconnected connector	Check the circuit and replace fuse Clean and retighten the ground terminal mounting bolt Check the switch Replace if necessary Repair or replace
One mirror does not operate	Defective mirror switch  Defective mirror actuator Open circuit wires or loose or disconnected connector	Check the switch Replace if necessary Replace the actuator Repair or replace

## ETACS

Symptom	Possible cause	Remedy
The system is not armed (The siren doesn't sound)	Transmitter faulty Receiver faulty Damaged or disconnected wiring of door switch input circuit ETACS module faulty	Replace the transmitter Replace the receiver Repair the harness  Replace the ETACS module
The siren sounds in error when a door or tailgate is unlocked with the key while the system is armed	Damaged or disconnected wiring of a door key cylinder and tailgate key cylinder switch input circuit ETACS module faulty	Repair the harness or replace a door key cylinder and the tailgate key cylinder switch Replace the ETACS module
Engine does not start in disarm state	Burglar alarm relay faulty Damage or disconnected wiring of burglar alarm relay activation circuit Malfunction of the ETACS module	Replace the burglar alarm relay Repair the harness  Replace the ETACS module

Symptom	Possible cause	Remedy
There is no alarm when, as an alarm test, a door is opened without using the key (The arming and disarming are normal, and the alarm is activated when the tailgate or hood is opened)	Damaged or disconnected wiring of door switch (all doors) input circuit Malfunction of the door switch Malfunction of the ETACS module	Repair the harness or replace the door switch Check the door switch Replace the ETACS module
There is no alarm when, as an alarm test, the tailgate is opened without using the key. (The alarm is activated, however, by opening a door or the hood)	Damaged or disconnected wiring of luggage compartment light switch input circuit Malfunction of the tailgate switch Malfunction of the ETACS module	Repair the harness or replace the gage compartment light switch  Check the tailgate switch Replace the ETACS module
There is no alarm when, as an alarm test the hood is opened from within the vehicle (The alarm is activated, however, by opening a door or tailgate)	Damaged or disconnected wiring of hood switch input circuit Malfunction of the hood switch Malfunction of the ETACS module	Repair the harness or replace the hood switch Check the hood switch Replace the ETACS module

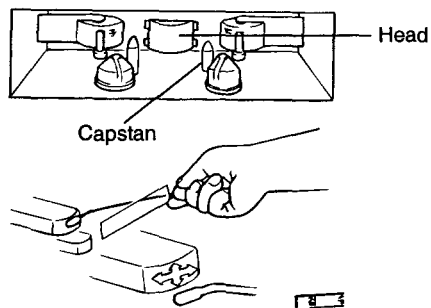
# AUDIO SYSTEM

## AUDIO UNIT

### SERVICE INSTRUCTIONS ETHA0750

#### TAPE HEAD AND CAPSTAN CLEANING

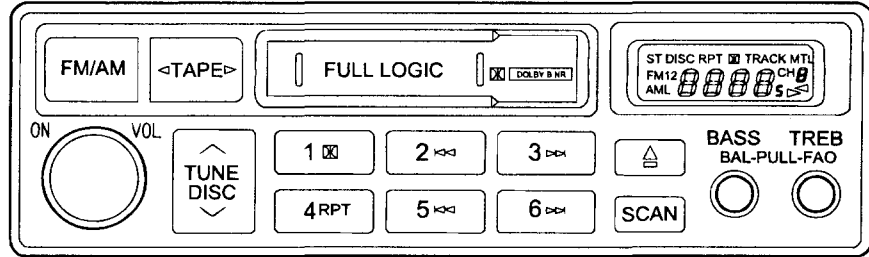
1. To obtain optimum performance, clean the head, and capstan as often as necessary, depending on frequency of use and tape cleanness.
2. To clean the tape head and capstan, use a cotton swab dipped in ordinary rubbing alcohol. Wipe the head and capstan.



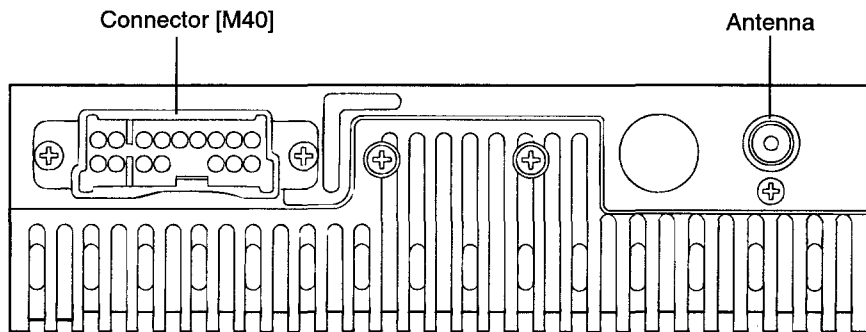
ETA9035A

COMPONENTS ETMB0200

<H240>



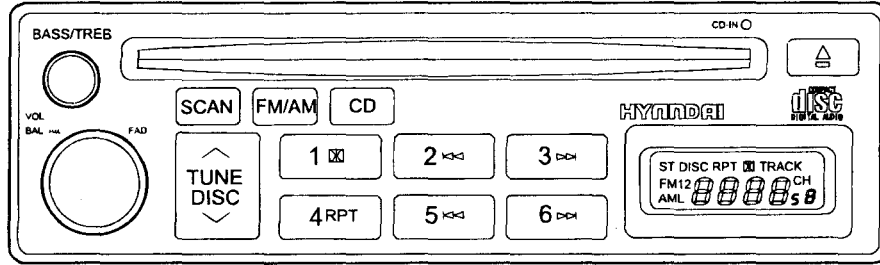
ETJA001B



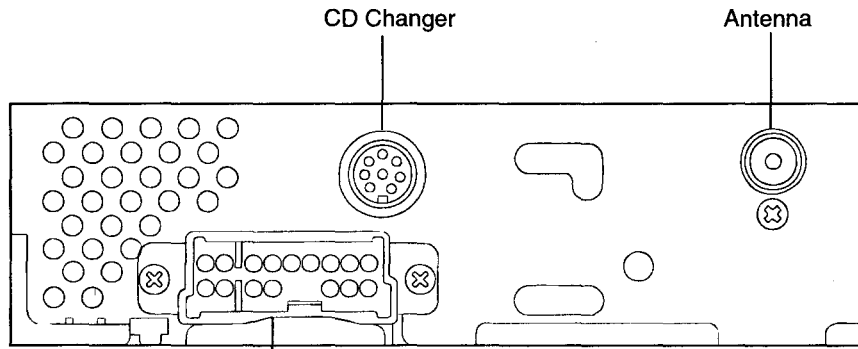
ETJA001A

Connector [M40]	Terminal	Description
<p>[M40]</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

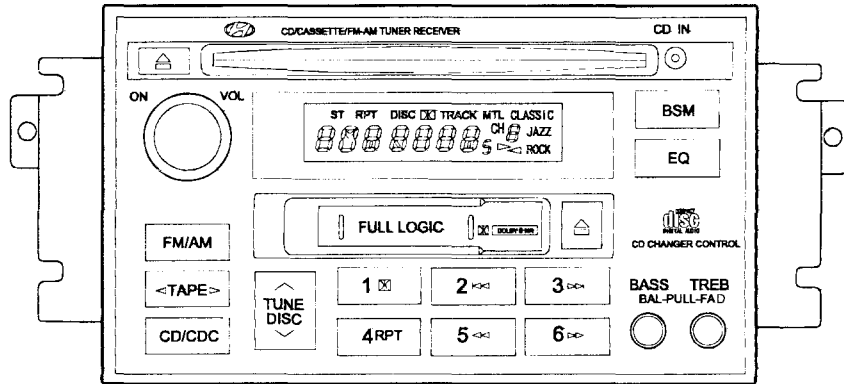
Connector [M40]

Connector [M40]	Terminal	Description
<p>[M40]</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(+)

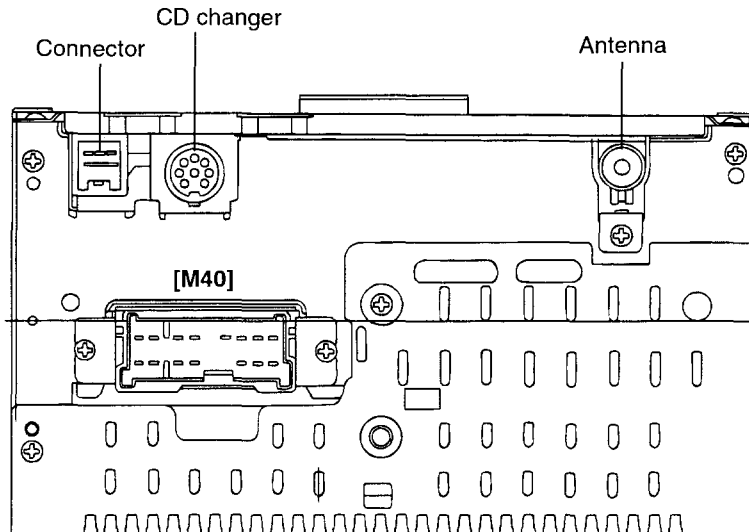
Connector	Terminal	Description
<p>(CD Changer)</p> <p>ETJA001G</p>	1	R
	2	CD ON
	3	BUS
	4	B+
	5	M. Ground
	6	N.C.
	7	L
	8	A.Ground



<H280>



KTMB001M



KTMB001L

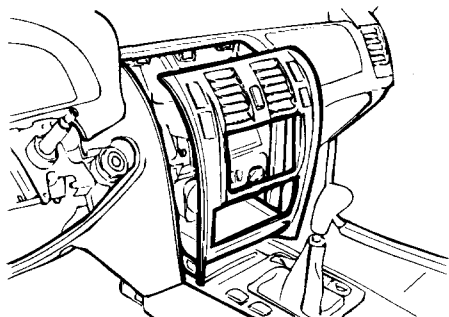
Connector [M40]	Terminal	Description
<p>ETJA001C</p>	1	Antenna
	2	Rear left speaker(-)
	3	Front left speaker(-)
	4	Front right speaker(-)
	5	Rear right speaker(-)
	6	Illumination(-)
	7	ACC(+)
	8	Ground
	9	Rear left speaker(+)
	10	Front left speaker(+)
	11	N.C.
	12	N.C.
	13	Front right speaker(+)
	14	Rear right speaker(+)
	15	Illumination(+)
	16	Battery(+)

Connector	Terminal	Description
<p>ETHA005F</p>	1	Ground
	2	Signal
	3	Rear signal

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

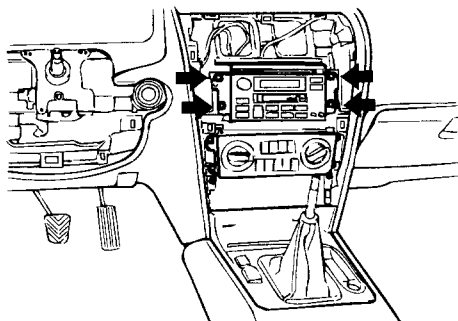
**REMOVAL AND INSTALLATION** ETMB0250

1. Disconnect the negative(-) battery terminal.
2. Remove the center facia panel and disconnect the wire connectors.



KSMB008L

3. Remove the 4 screws holding the audio unit then remove the audio assembly.



KTMB171A

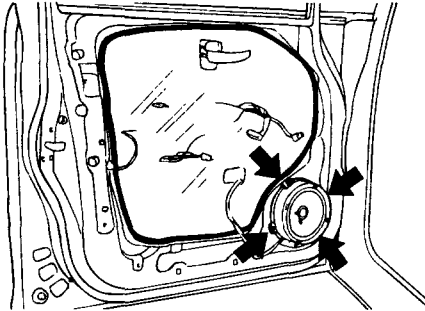
4. Installation is the reverse of removal.

## SPEAKERS

### REMOVAL AND INSTALLATION ETMB0300

#### FRONT SPEAKER

1. Remove the front door trim panel and remove the front speaker.

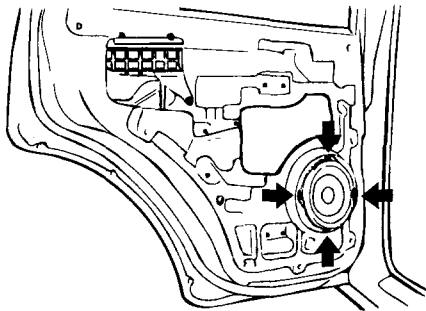


KTMB075A

2. Installation is the reverse of removal.

#### REAR SPEAKER

1. Remove the rear door trim panel and remove the rear speaker.

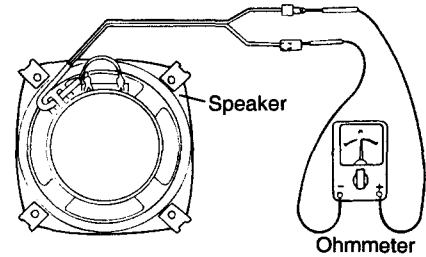


KSMB003D

2. 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.



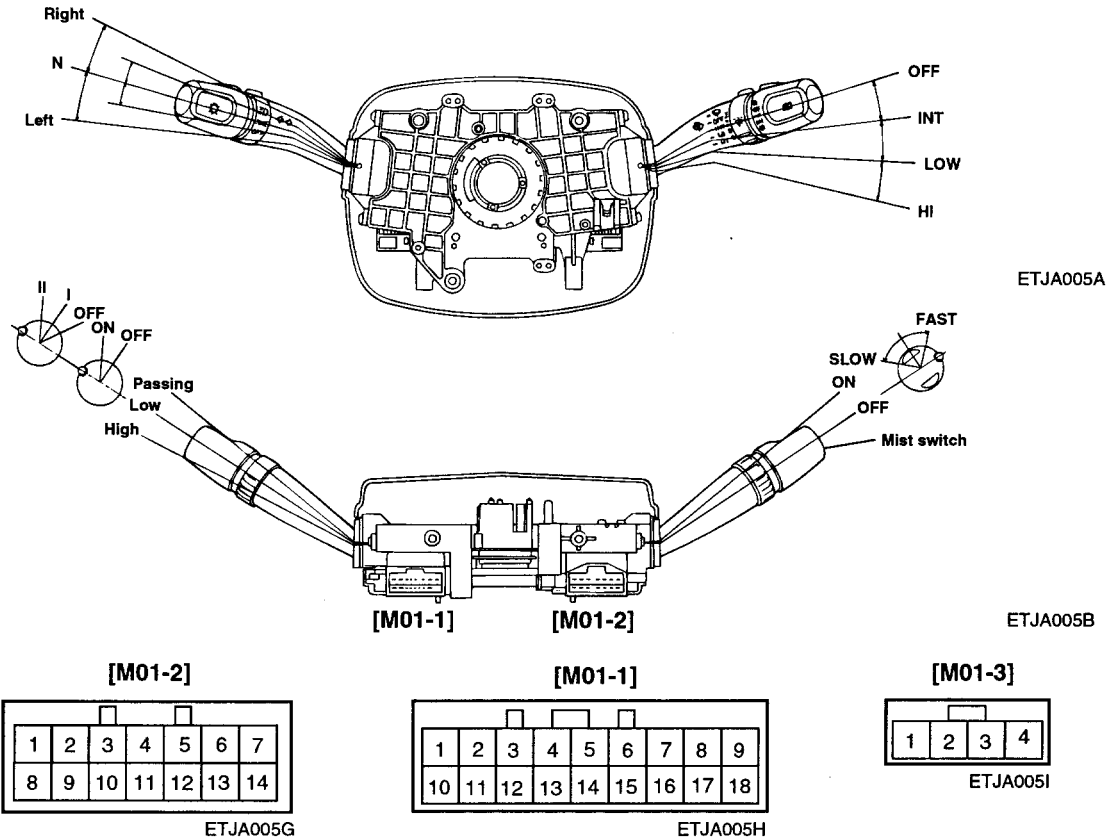
ETA9040A

# MULTI FUNCTION SWITCH

## MULTI FUNCTION SWITCH

### COMPONENTS ETMB0350

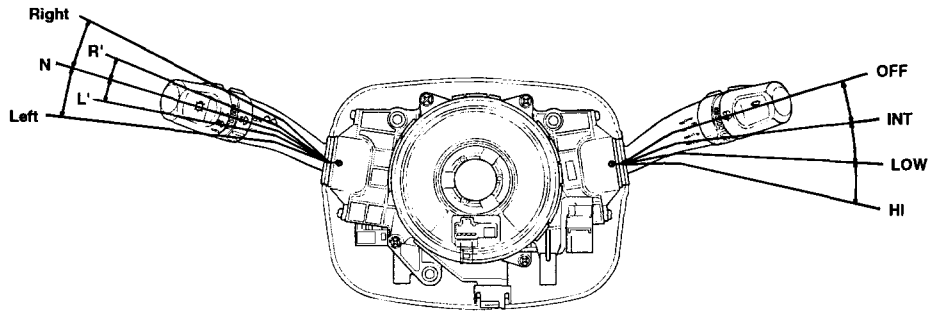
[WITHOUT AIR BAG]



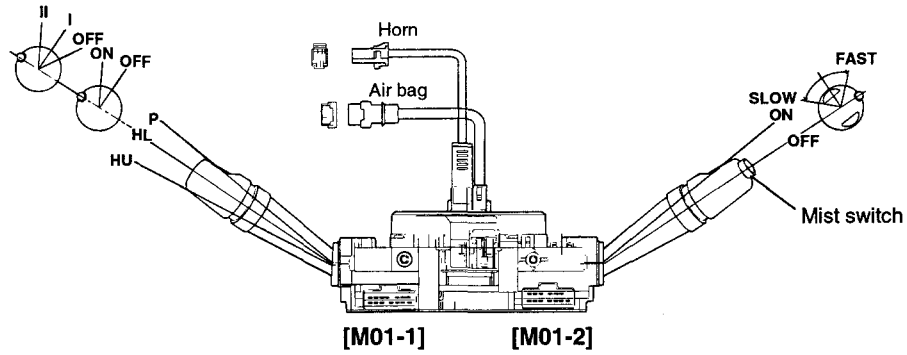
#### Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description
M01-1	1	Head lamp passing switch	M01-2	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
	9	Turn signal LH lamp switch		9	-
	10	Head lamp low beam power		10	Mist switch
	11	Dimmer & passing ground		11	Mist switch ground
	12	Front fog lamp switch		12	-
	13	Front fog lamp switch ground		13	Intermittent wiper volume
	14	Tail lamp switch		14	Intermittent wiper volume ground
	M01-3	15		Head lamp switch	1
16		-	2	Horn relay	
17		Lighting switch ground	3	-	
18		-	4	Remote control ground	

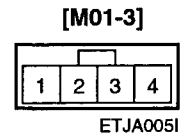
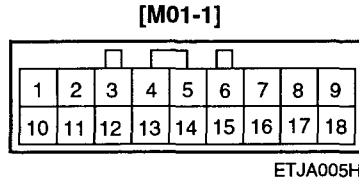
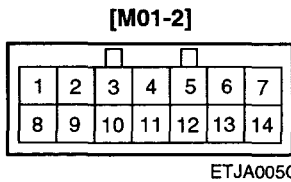
[WITH AIR BAG]



KTMB001Q



KTMB001R



Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description
M01-1	1	Head lamp passing switch	M01-2	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	-
	9	Turn signal LH lamp switch		9	-
	10	Head lamp low beam power		10	Mist switch
	11	Dimmer & passing ground		11	Mist switch ground
	12	Front fog lamp switch		12	-
	13	Front fog lamp switch ground		13	Intermittent wiper volume
	14	Tail lamp switch		14	Intermittent wiper volume ground
15	Head lamp switch	M01-3	1	Remote control signal	
16	-		2	Horn relay	
17	Lighting switch ground		3	-	
18	-		4	Remote control ground	

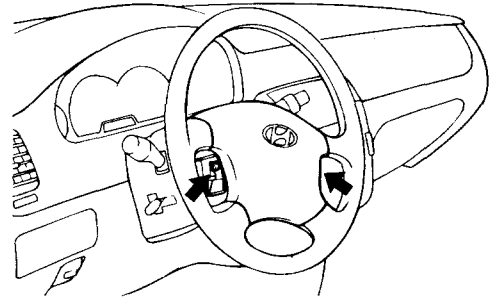
## REMOVAL AND INSTALLATION ETMB0400

Prior to removing of the multi function switch assembly in vehicles equipped with air bags, be careful to follow the following:

### 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.

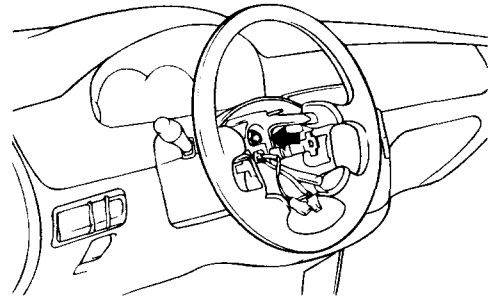


ESHA040M

### Tightening torque

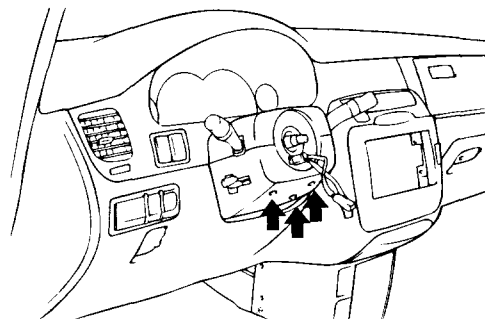
Air bag module mounting bolts :  
4-6Nm (40-60kg-cm, 2.9-4.4lb-ft)

2. Remove the steering wheel.



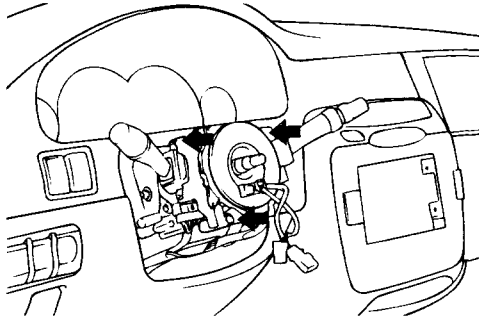
ESHA040N

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



ESHA040O

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



ESHA040P

- Installation is the reverse of removal.

**INSPECTION** ETMB0450

Check the continuity between the terminals while operating the switch.

**LIGHTING SWITCH [M01-1]**

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

KTJA040A

**DIMMER AND PASSING SWITCH [M01-1]**

Terminal Position	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 [M01-1]**

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

KTDA040C

**FRONT FOG LAMP SWITCH [M01-1]**

Terminal Position	12	13
OFF		
ON	○	○

ETMB045A

**WIPER AND INTERMITTENT VOLUME SWITCH [M01-2]**

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

ETMB045B

**WASHER SWITCH [M01-2]**

Terminal Position	5	6
OFF		
ON	○	○

ETMB045C

**MIST SWITCH [M01-2]**

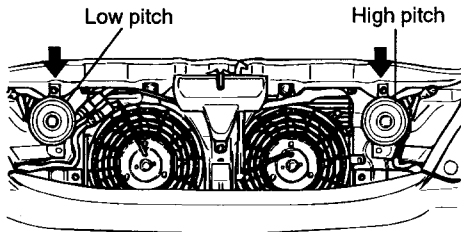
Terminal Position	10	11
OFF		
ON	○	○

ETMB045D

# HORNS

## REMOVAL AND INSTALLATION ETMB0500

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



ETMB050A

2. Installation is the reverse of removal.

## INSPECTION ETHA1200

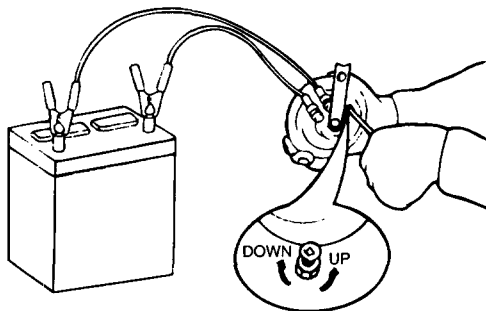
1. Test the horn by connecting battery voltage to the 1 terminal and ground the 2 terminal.
2. The horn should make a sound. If the horn fails to make a sound, replace it.

## 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.*



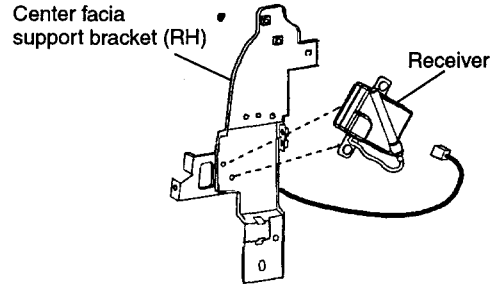
ETDA050A



# KEYLESS ENTRY AND BURGLAR ALARM

## DESCRIPTION ETMB0550

The keyless entry and burglar alarm system consists of ETACS components and some other parts. When anybody attempts to forcibly enter the car or open tailgate or engine hood without a key, or when the battery terminals are removed and reconnected, the burglar alarm system sounds the siren for about 30 seconds as an alert. At the same time, it locks all the door and electrically disconnects the starting system. Also, the keyless entry system is able to lock and unlock all the doors at a distance, transmitting a weak radio wave from a transmitter.



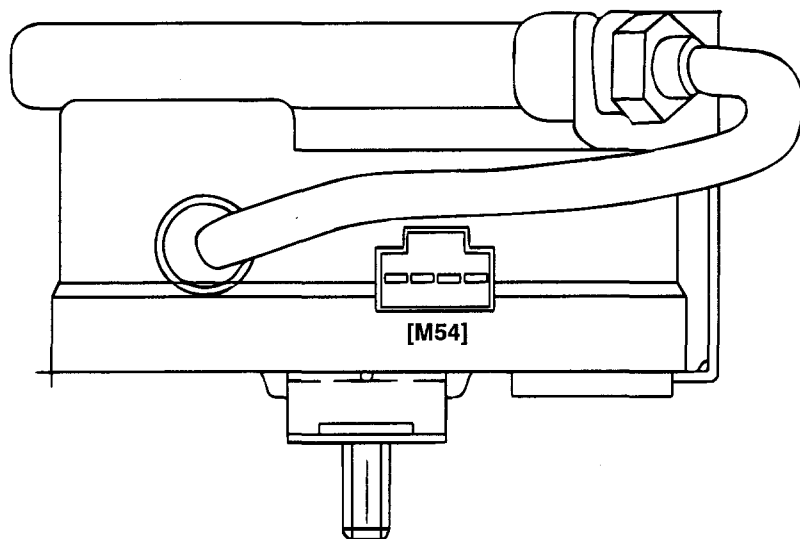
ETMB055A

## SPECIFICATIONS

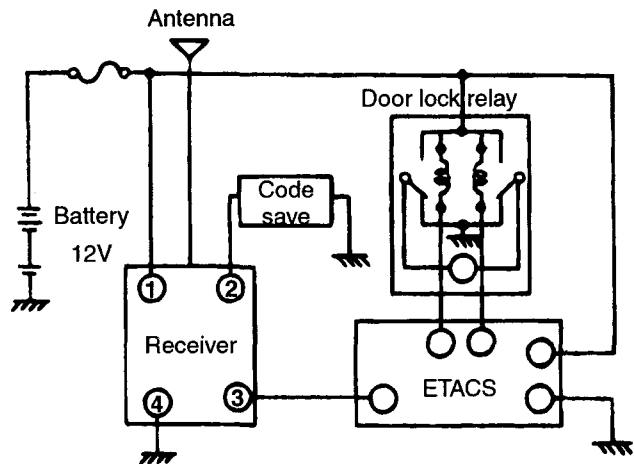
Items	Specifications
Keyless entry transmitter	
Power source	Lithium 3V battery(1EA)
Transmissible distance	5m or more
Life of battery	2 years or more (at 10 times per day)
Button	Door lock, unlock
Receiver	
Operating voltage	DC 9V - 16V
Operating temperature range	-30°C - +80°C
Maximum standby current	3mA or less
Output pattern	Door lock, unlock
Modulation type	FSK (Frequency Shift Keying)

CIRCUIT DIAGRAM

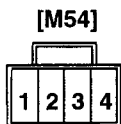
ETMB0600



KTMB001E



KTAB190A



PIN CONNECTION

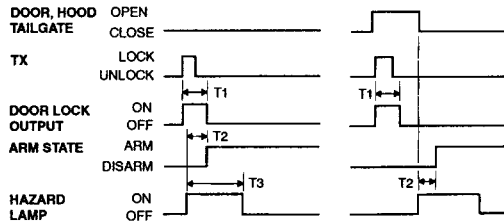
Pin No.	Description
1	Battery (B+)
2	Memory
3	Signal output
4	Ground

ANTI-THEFT FUNCTION

ETMB0650

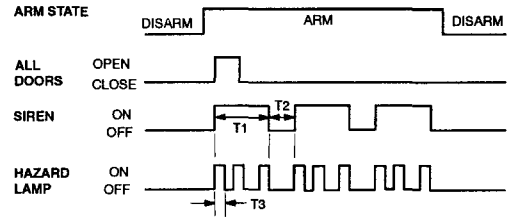
b. Except EC Area

1. Arm function



ETHA115Q

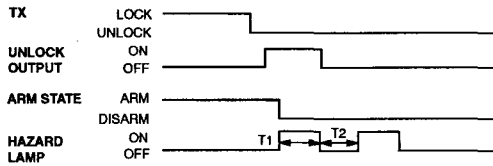
Time specification  
 T1 : 0.5sec.  
 T2 : Max 2sec.  
 T3 : 1.0±0.2sec.



ETHA115S

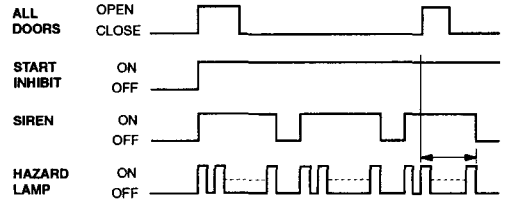
Time specification  
 T1 : 27±2sec.  
 T2 : 10±1sec.  
 T3 : 0.5±0.1sec.  
 c. New alarm occurs during the alarm state.

2. Disarm function



ETHA115R

Time specification  
 T1, T2 : 0.5±0.1sec.

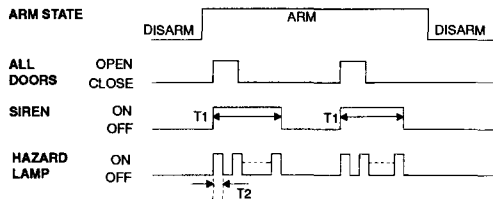


ETHA115T

d. Disarmed with TX (Transmitter) during the alarm state.

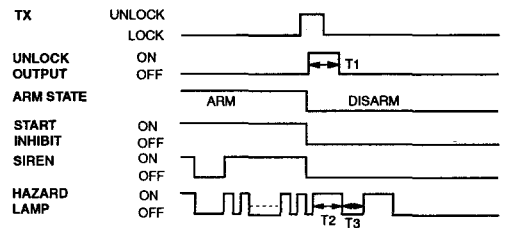
3. Alarm function

a. Only EC Area



ETHA120F

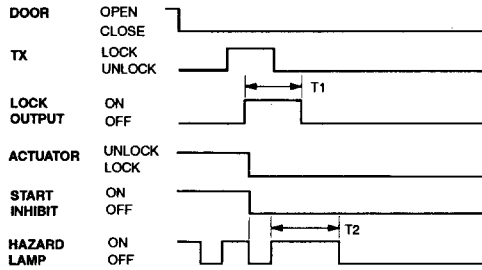
Time specification  
 T1 : 27±2sec.  
 T2 : 0.5±0.1sec.



ETHA115U

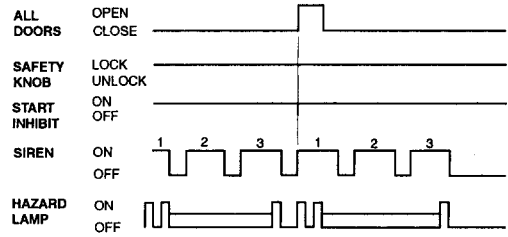
Time specification  
 T1, T2, T3 : 0.5±0.1sec.

- e. TX lock button pressed when the door closed during the alarm state.



ETHA115V

- h. Start inhibit is "ON" regardless of safety knob lock state.



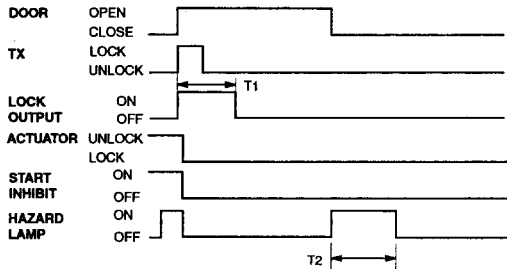
ETHA115Y

Time specification

T1 : 0.5sec.

T2 : 1.0±0.2sec.

- f. TX lock button pressed when the door opened during the alarm state.



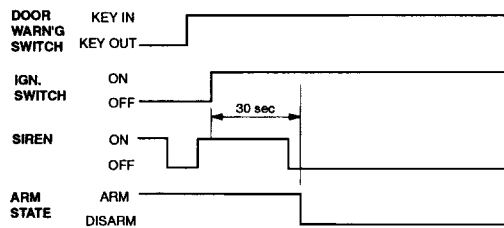
ETHA115W

Time specification

T1 : 0.5sec.

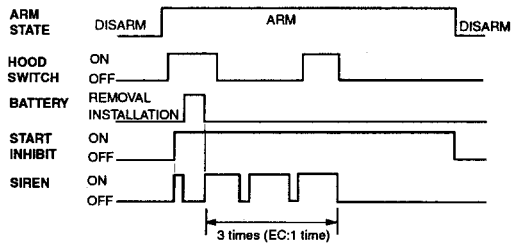
T2 : 1.0±0.2sec.

- g. Disarmed after 30 sec when the ignition switch turned on during the alarm state.



ETHA115X

- i. Battery is separated during the alarm state.



ETHA115Z

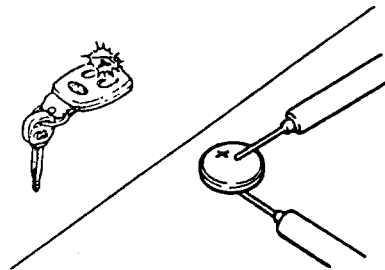
## INSPECTION OF COMPONENTS

ETMB0700

### TRANSMITTER

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

Standard voltage : 3V



KTAB195A

3. Replace the battery if voltage is below 3V and replace the remote control switch if it is inoperable after replacing the battery.

---

Battery : Lithium CR2032 (3V, 220mA/h)

---

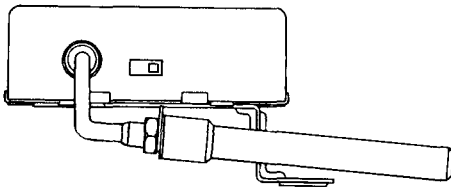
## CODE SAVING METHOD

1. Remove the center facia panel.

### NOTE

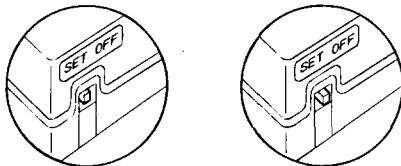
*Don't disconnect the negative (-) battery terminal.*

2. To store new codes :
  - Activate the keyless entry/receiver unit and change the 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

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



ETHA120D

4. Install the center facia panel.

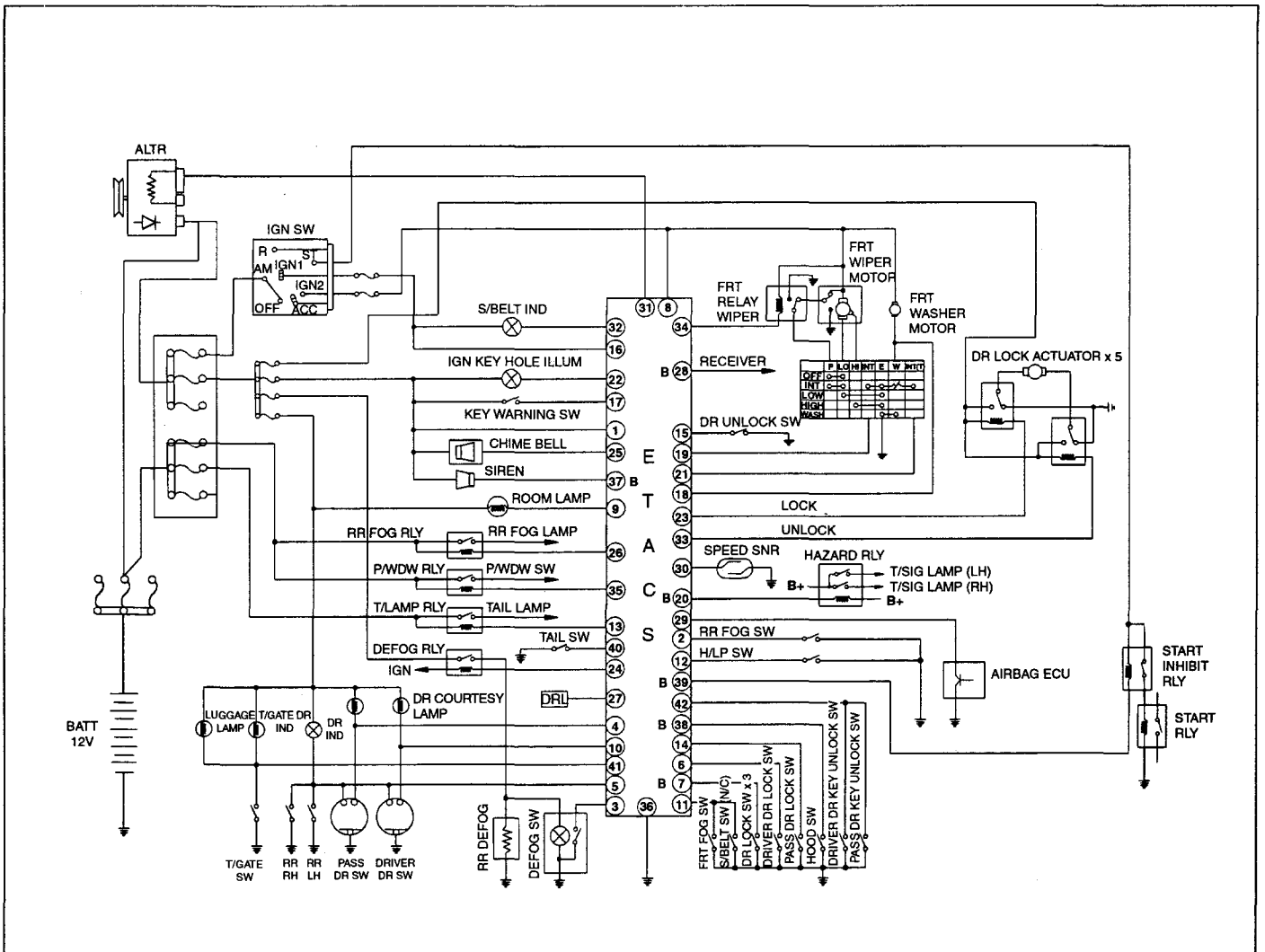
# ETACS (ELECTRONIC TIME AND ALARM CONTROL SYSTEM)

## SPECIFICATIONS ETMB0750

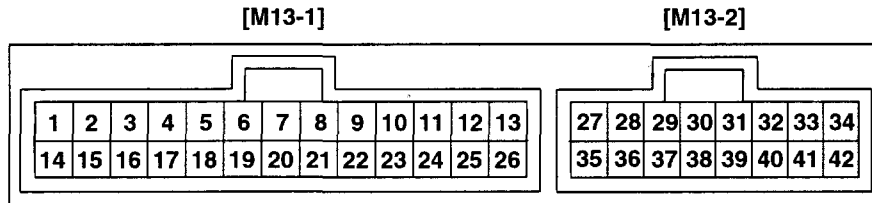
Items	Specifications
Rated voltage	DC 12V
Operating voltage	DC 9 - 16V
Operating temperature	-30°C - 80°C
Insulation resistance	100MΩ or more
Rated load	
Siren	DC 12V, 260mA (Relay load)
Chime bell	DC 12V, 350mA (Relay load)
Tail lamp relay	DC 12V, 200mA (Relay load)
Rear defogger relay	DC 12V, 200mA (Relay load)
Start inhibit relay	DC 12V, 200mA (Relay load)
Hazard relay	DC 12V, 200mA (Relay load)
Power window relay	DC 12V, 200mA (Relay load)
Seat belt warning indicator	DC 12V, 1.4W (Lamp load)
Ignition key illumination	DC 12V, 1.4W (Lamp load)
Room lamp	DC 12V, 10W x 2(Lamp load)
Intermittent wiper relay	DC 12V, 200mA (Relay load)
Rear fog lamp relay	DC 12V, 200mA (Relay load)

# ELECTRONIC TIME & ALARM CONTROL MODULE

## CIRCUIT DIAGRAM ETMB0800



KTMB001C



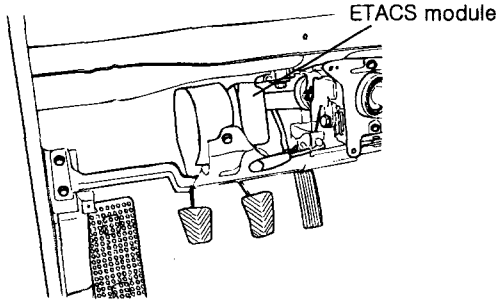
KTMB001D

**NOTE)**

**B : Keyless entry & Burglar alarm system**

**REMOVAL AND INSTALLATION** ETMB0850

1. Disconnect the negative (-) battery terminal.
2. Remove the lower crash pad (Refer to BD group).
3. Remove the 2 bolts holding the ETACS module and disconnect the connectors.



ETMB085A

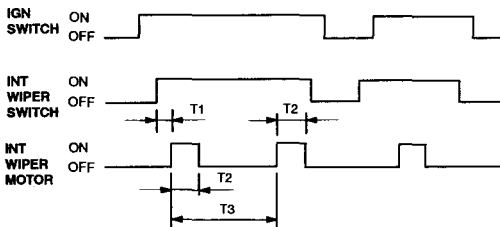
4. Installation is the reverse of removal.

**INSPECTION** ETMB0900

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

**ETACS FUNCTION**

1. Vehicle speed sensing intermittent wiper

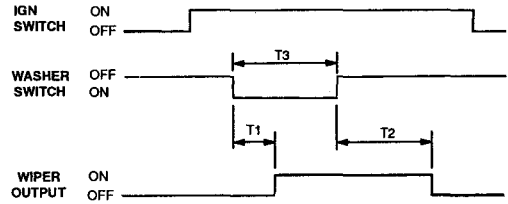


ETHA115C

Time specification

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

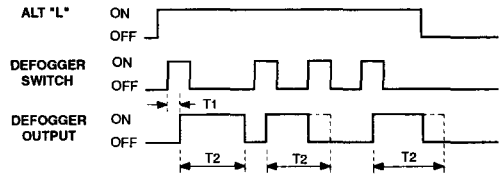
2. Washer



ETHA115D

- a. Time specification (at T2 : 0.2 - 0.6sec.)  
T1 : 0.3sec.  
T3 : 0.6-0.8sec.
- b. Time specification (at T2 : 0.6sec. or more)  
T1 : 0.3sec.  
T3 : 2.5-3.8sec.
- c. This function should be operated preferentially even though the variable intermittent wiper is operating.

3. Rear window defogger

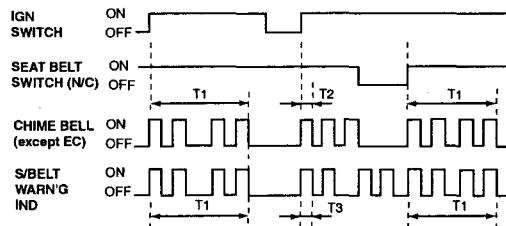


ETJA020B

Time specification

- T1 : 60msec
- T2 : 20±1min.

4. Seat belt warning

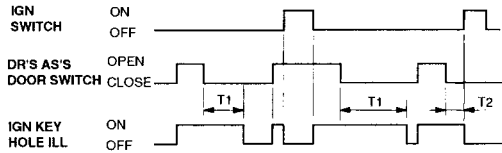


ETHA115F



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

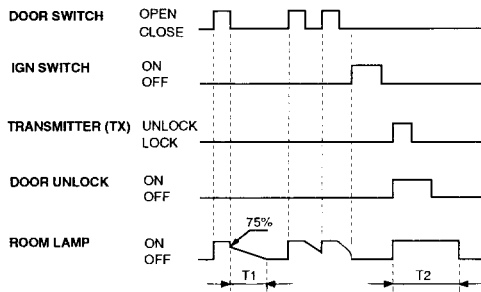
5. Ignition key hole illumination



ETJA070A

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

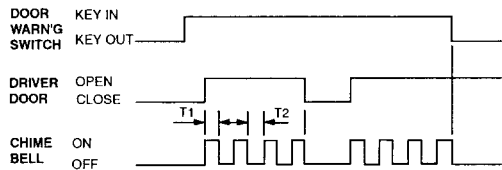
6. Delayed out room lamp&keyless unlock timer



ETJA020C

Time specification  
 T1 : 5.5±0.5sec.  
 T2 : 30±3sec.

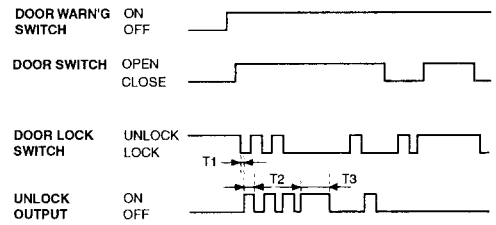
7. Key operated warning



ETHA115L

Time specification  
 T1, T2 : 0.45±0.1sec.

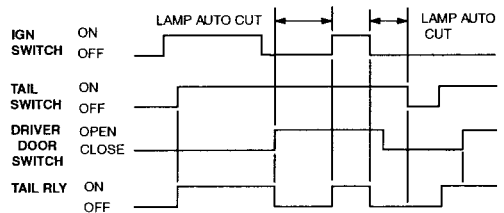
8. Ignition key reminder



ETJA020D

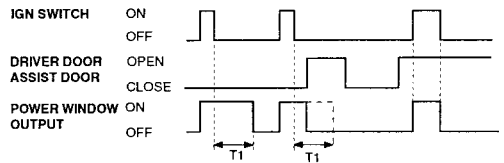
Time specification  
 T1 : 0.5sec.  
 T2 : 1sec.  
 T3 : 0.5sec., 3 times

9. Tail lamp auto cut



ETHA115M

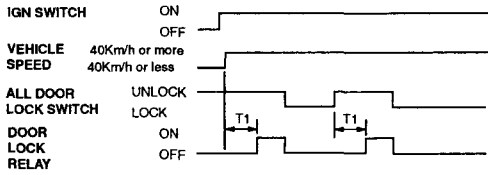
10. Power window timer



ETJA020E

Time specification  
 T1 : 30±3sec.

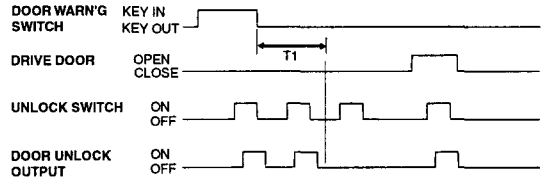
11. Auto door lock



ETHA115N

Time specification  
T1 : 2.5±0.5sec.

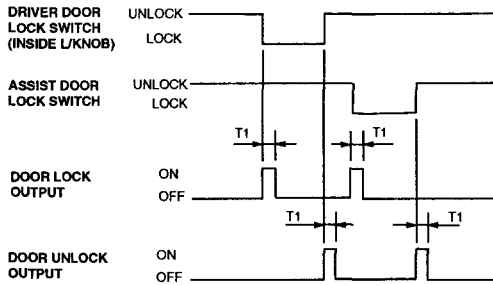
14. Dead central locking



ETMB090A

Time specification  
T1 : 30sec.

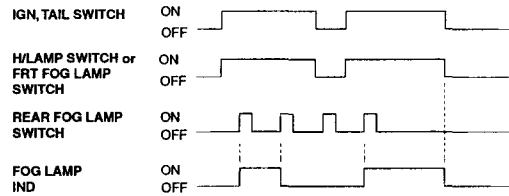
12. Central door lock/unlock



ETHA115H

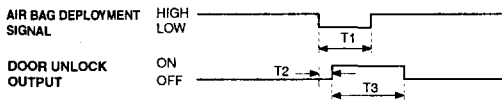
Time specification  
T1 : 0.5±0.1sec.

15. Rear fog lamp control



ETHA120E

13. Crash door unlock



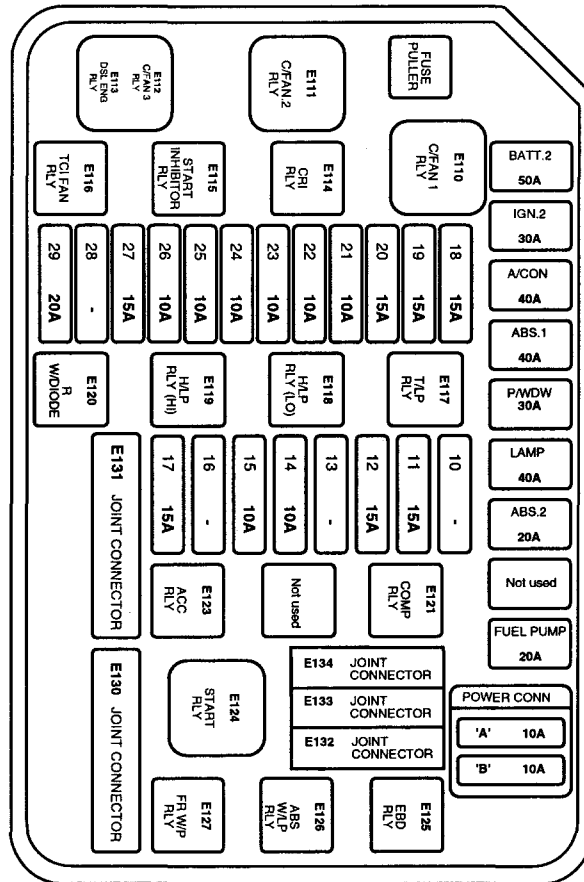
ETJA020F

Time specification  
T1 : 200msec  
T2 : 40msec  
T3 : 5±0.5sec.

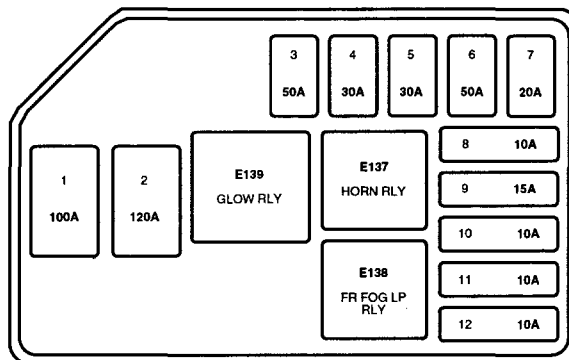
# FUSES AND RELAYS

## RELAY BOX (ENGINE COMPARTMENT)

### SPECIFICATIONS ETMB0950



E2MA001B



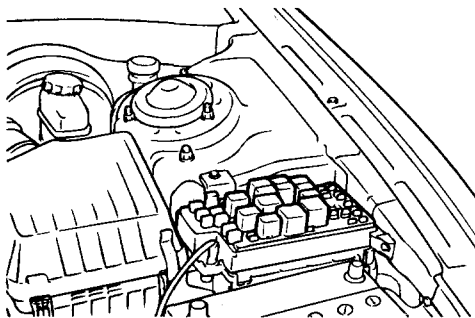
E2MA001C

**INSPECTION** ETMB1000

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**

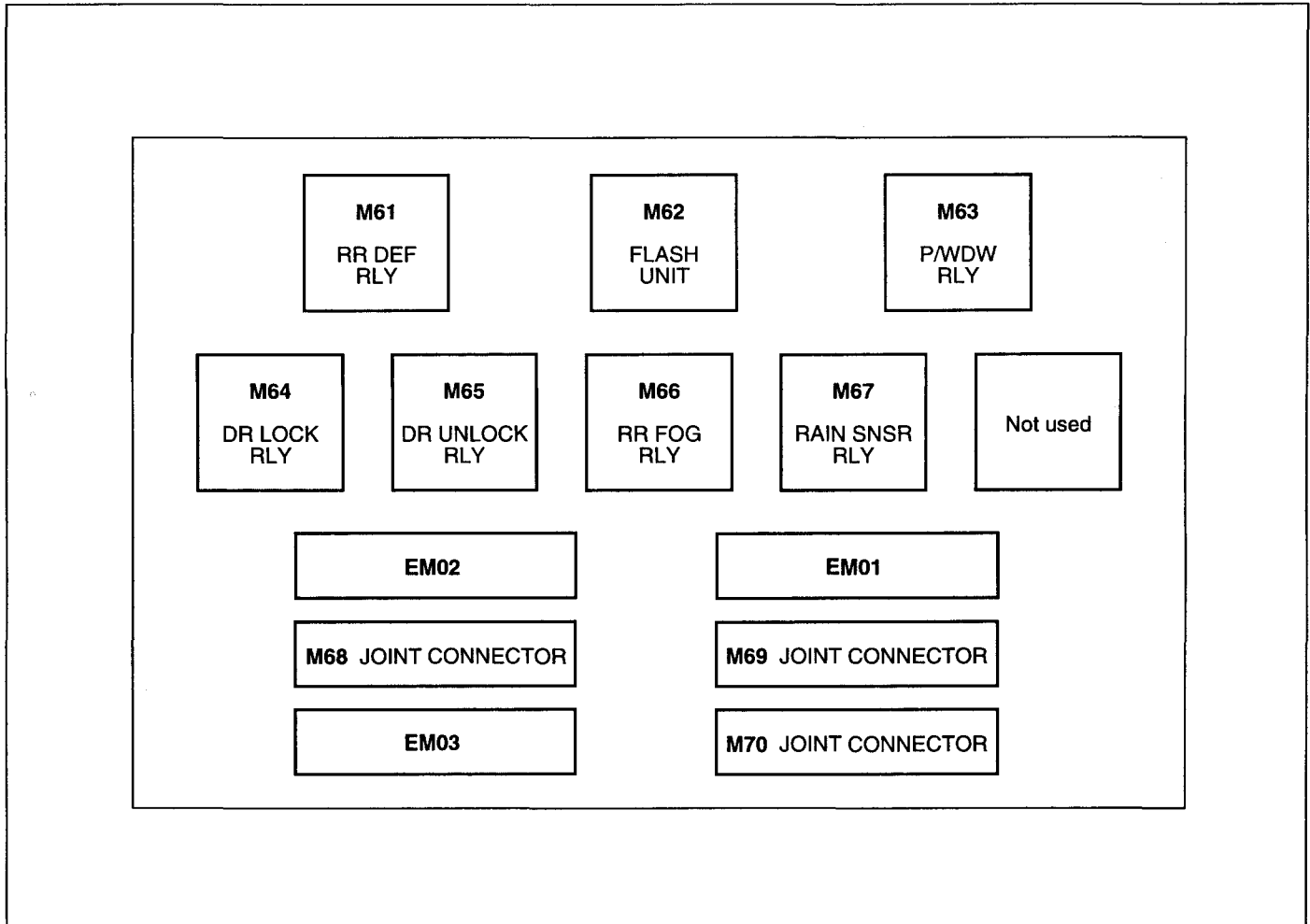
***The fusible link will burn out within 15 seconds if a higher than specified current flows through the circuit.***



KTMB510A

**RELAY BOX** ETMB1050

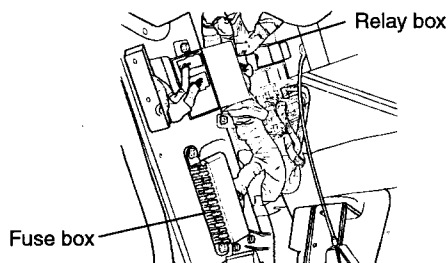
**SPECIFICATION**



ETMB105A

**INSPECTION** ETMB1100

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



ETMB110A

# FUSES

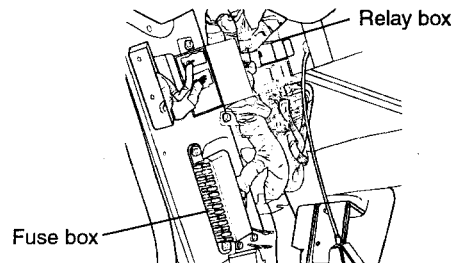
## SPECIFICATION ETMB1150

1 30A	15 10A
2 15A	16 10A
3 15A	17
4 20A	18 10A
5 10A	19 10A
6 15A	20 10A
7 30A	21 10A
8 20A	22 10A
9 10A	23 10A
10 10A	24
11 15A	25 10A
12 10A	26 15A
13	27 10A
14	28 10A

ETMB115A

## INSPECTION ETMB1200

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.



ETMB110A

### CAUTION

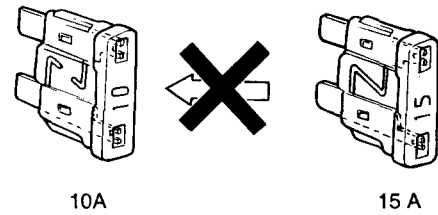
**Never use a fuse of higher capacity than specified.**

**INSPECTION OF FUSES**

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.

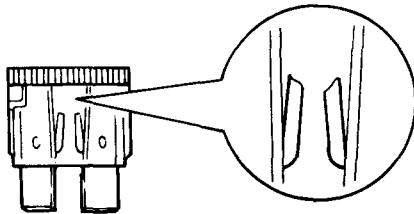
**1. Fuse blown due to over-current.**

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

Blown fuse due to overcurrent

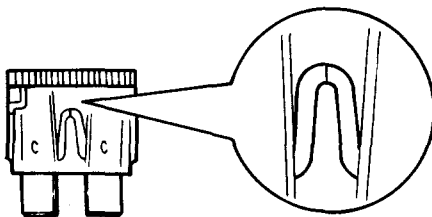


ETDA086A

**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.

Blown fuse due to thermal fatigue



ETDA086B

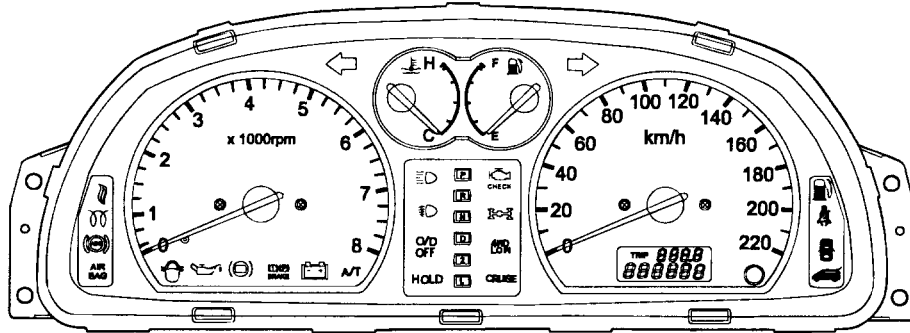
**⚠ CAUTION**

**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.**

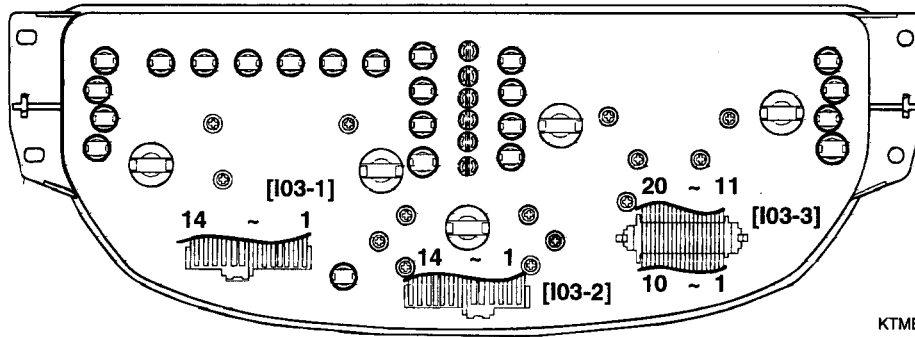
# INDICATORS AND GAUGES

## INSTRUMENT CLUSTER

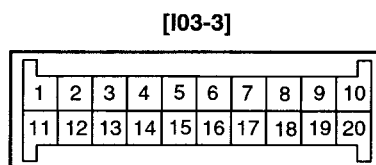
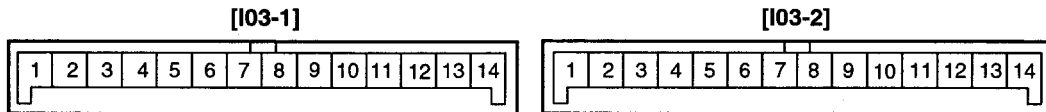
### COMPONENTS ETMB1250



KTMB002C



KTMB002B

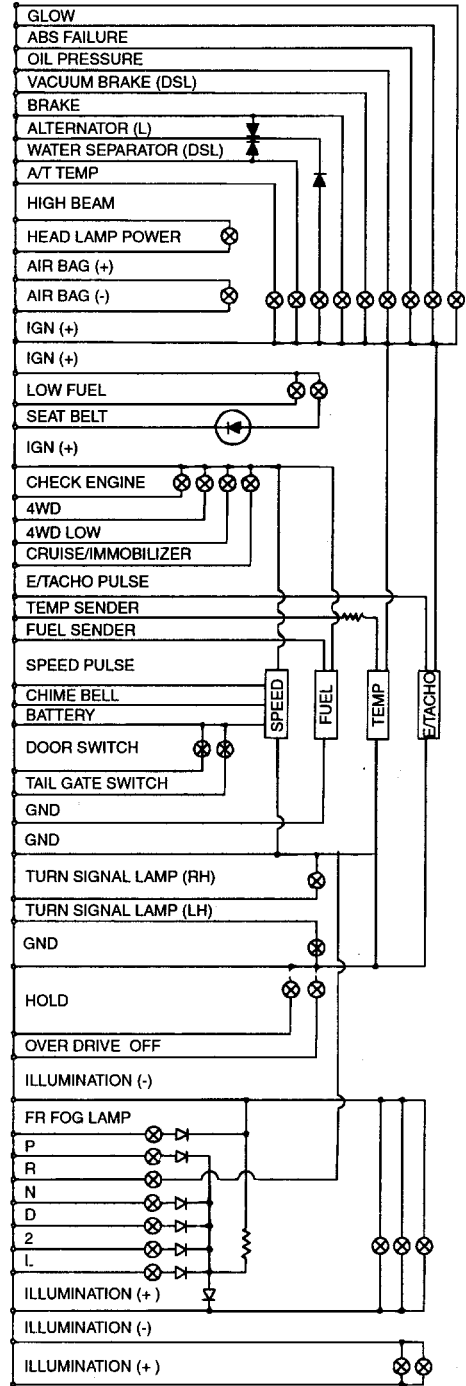




CIRCUIT DIAGRAM

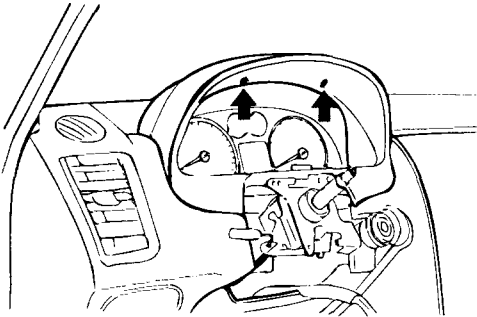
ETMB1300

I03-1	I03-2	I03-3
13		
12		
11		
6		
5		
4		
3		
7		
2		
	5	
	8	
10		
9		
14		
		4
		3
		2
		9
		20
		19
		18
		17
8		
	12	
	1	
		13
		10
		14
		5
		12
		6
	2	
		7
	14	
	13	
1		
	11	
		1
	10	
		8
	3	
	4	
	9	
		15
		16
		11
	6	
	7	



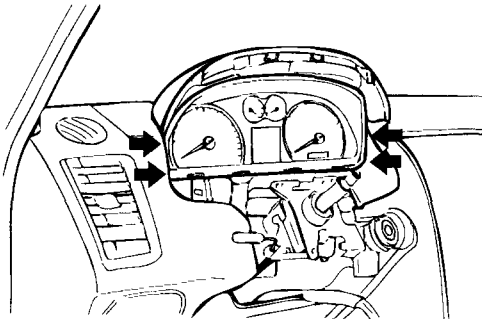
**REMOVAL AND INSTALLATION** ETMB1350

1. Disconnect the negative (-) battery terminal.
2. Remove the cluster housing after removing 2 screws.



KSMB008I

3. Remove the 4 screws holding the cluster and remove the instrument cluster.



KSMB008J

4. Installation is the reverse of removal.

**INSPECTION OF COMPONENTS** ETMB1400

**SPEEDOMETER**

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

**CAUTION**

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

**NOTE**

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

Velocity (Km/h)	20	40	60	80	100	120
Tolerance (Km/h)	20.5-24.5	41-43.9	61.9-64.9	81.5-85.9	102-106.8	122.4-127.8
Velocity (Km/h)	140	160	180	200	Remarks	
Tolerance (Km/h)	142.8-148.8	163.4-169.8	183.4-190.2	203.4-211	All area	

Velocity (MPH)	10	20	40	60	80	100
Tolerance (MPH)	10.3-12.8	20.5-22.5	40.8-43.4	61-64.4	81.3-85.1	101.8-106.2
Tolerance (MPH)	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78-82	97.7-102.3
Velocity (MPH)	120	140	Remarks			
Tolerance (MPH)	122-127	142.3-147.9	EXCEPT USA			
Tolerance (MPH)	117.5-122.5	137.3-142.7	USA			

**TACHOMETER**

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

**CAUTION**

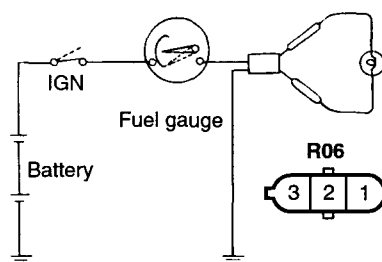
1. *Reversing the connections of the tachometer will damage the transistor and diodes inside.*
2. *When removing or installing the tachometer, be careful not to drop it or subject it to severe shock.*

Revolution (RPM)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	Remark
Tolerance (RPM)	±120	±140	±170	±170	±200	-	-	Diesel
Tolerance (RPM)	±120	±140	±170	±170	±200	±240	±260	Gasoline

**FUEL GAUGE**

**OPERATION CHECK**

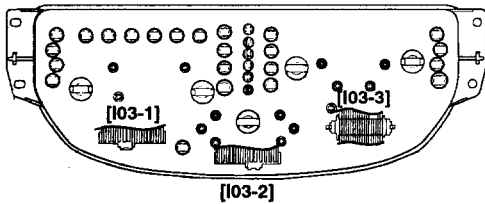
1. Disconnect the fuel sender connector from the fuel sender.
2. Connect a 3.4 watt, 12V test bulb to terminals 1 and 2 on the wire harness side connector.
3. Turn the ignition switch to the ON, and then check that the bulb lights up and the fuel gauge needle moves to full.



**RESISTANCE CHECK**

1. Remove the instrument cluster.
2. Measure the resistance between terminal 1(I03-2) and terminal 6(I03-3).

Resistance ( $\Omega$ )	Gauge level
95	E(Empty)
32.5	1/2
7	F(Full)



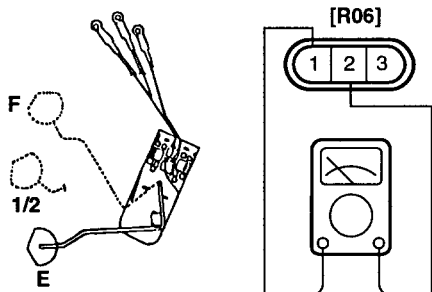
KTMB002B

**FUEL SENDER**

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

Float position	F	1/2	E
Resistance ( $\Omega$ )	4	32.5	105

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



ETMB140B

**LOW FUEL LEVEL SENSOR**

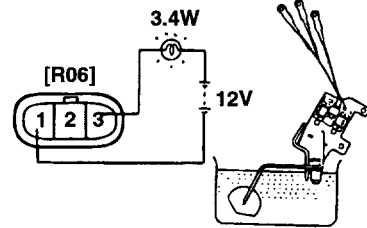
1. Connect a test lamp (12V, 3.4W) and the battery to the sender. Immerse the sender in water.
2. The lamp should be off while the thermister is submerged in the water, and should illuminate when the sender is taken out of the water.

**NOTE**

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

**CAUTION**

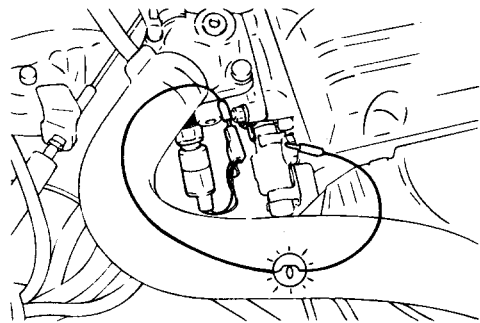
After completing this test, wipe the sender dry and reinstall it in the fuel tank.



ETLA060E

**ENGINE COOLANT TEMPERATURE GAUGE**

1. Disconnect the wiring connector from the engine coolant temperature sender in the engine compartment.
2. Turn the ignition switch ON. Check that the gauge needle indicates cool. Turn the ignition switch OFF.
3. Connect a 12V, 3.4 watt test bulb between the harness side connector and ground.



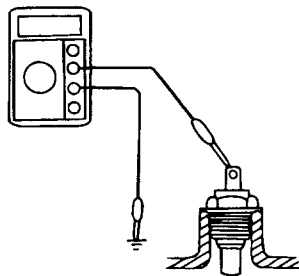
ETLA605D

4. Turn the ignition switch ON.
5. Verify that the test bulb flashes and that the indicator moves to HOT.

If operation is not as specified, replace the sender. Then recheck the system.

**ENGINE COOLANT TEMPERATURE SENDER**

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



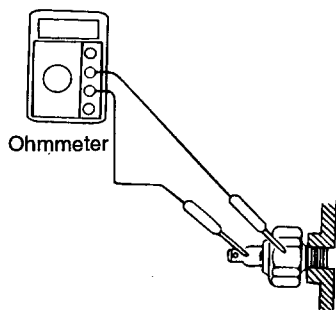
ETLA605E

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

Temperature (°C)	55	85	110	125
Resistance (Ω)	157	48.4	24	15.2

**OIL PRESSURE SWITCH**

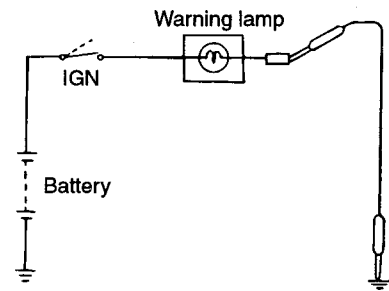
1. Check that there is continuity between the switch's terminal and ground with the engine stopped.
2. Check that there is no continuity between the terminal and ground with the engine running.
3. If operation is not as specified, replace the switch.



ETMB140C

**OIL PRESSURE WARNING LAMP**

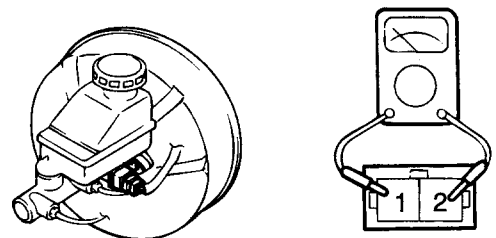
1. Disconnect the connector from the warning switch and ground the terminal on the wire harness side connector.
2. Turn the ignition switch ON. Check that the warning lamp lights up. If the warning lamp doesn't light, test the bulb or inspect wire harness.



ETMB140D

**BRAKE FLUID LEVEL WARNING SWITCH**

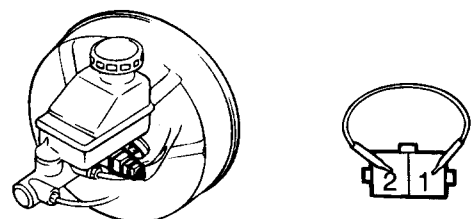
1. Remove the connector from the switch located at the brake fluid reservoir.
2. Verify that continuity exists between switch terminals 1 and 2 while pressing down the switch (float) with a rod.



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.



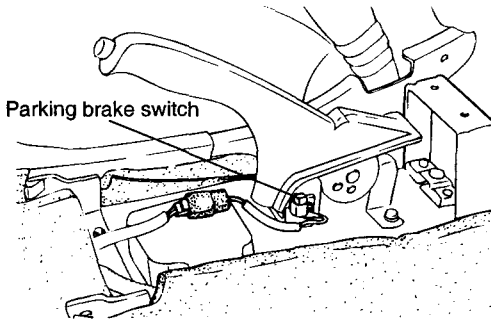
V5BE060N

**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).

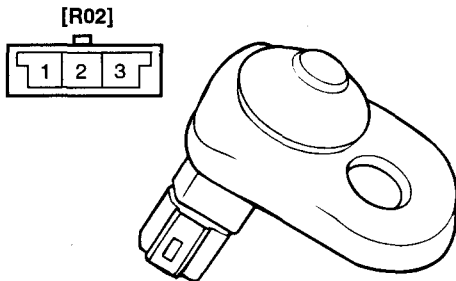
If continuity is not as specified, replace the switch or inspect its ground connection.



V5BE0600

**DOOR SWITCH**

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



KTMB501A

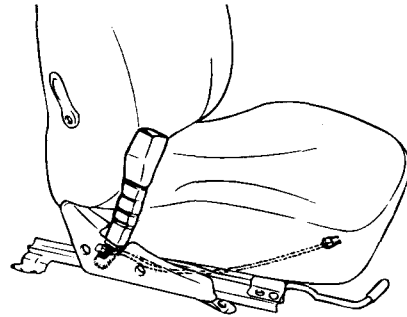
Lead wire	1	2	3
Position			
Free (Door open)	○	○	○
Push(Door close)			

ETMB140E

**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( $0\Omega$ )



V5BE0600

**SEAT BELT WARNING LAMP**

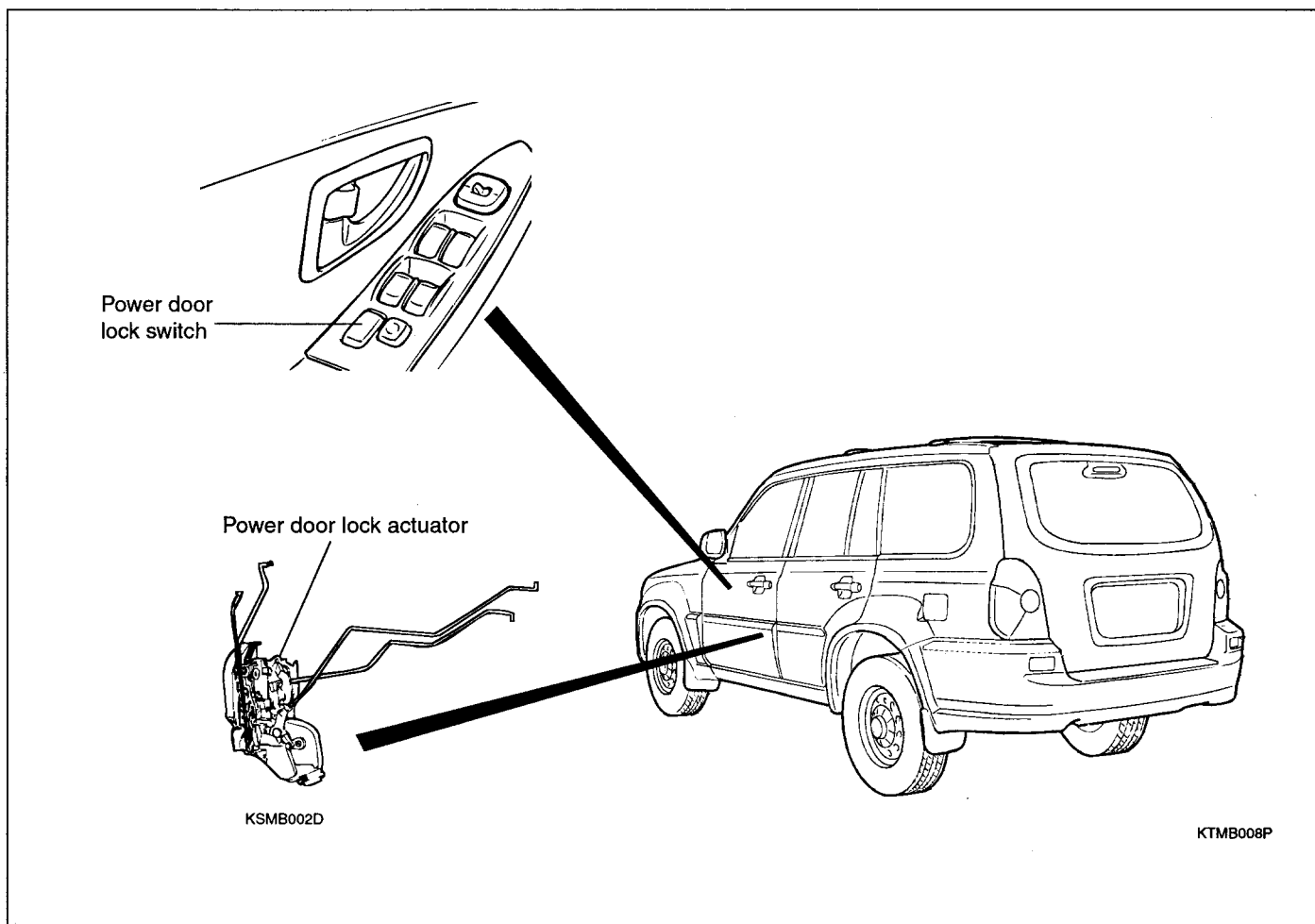
With the ignition switch turned ON, verify that the lamp glows.

Seat belt condition	Warning lamp
Fastened	OFF
Not fastened	ON

# POWER DOOR LOCKS

## POWER DOOR LOCK ACTUATORS

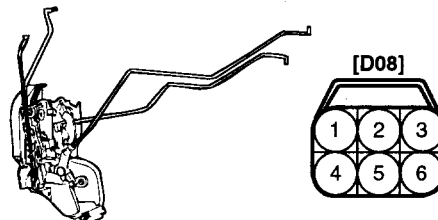
### COMPONENTS ETMB1450



ETMB145A

### INSPECTION ETMB1500

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.



KTMB275B

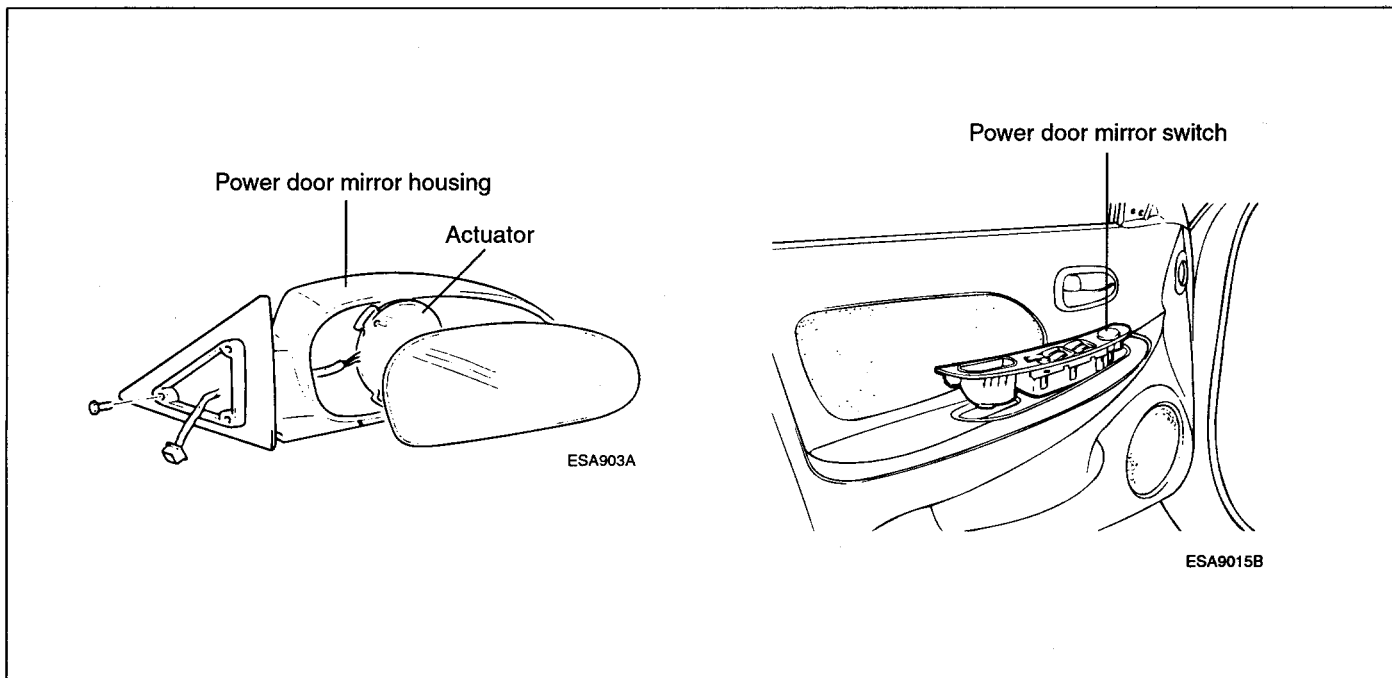
Position \ Terminal		Terminal			
		2	3	4	6
Front Left [D08]	LOCK			⊖	⊕
	UNLOCK			⊕	⊖
Front Right [D18]	LOCK			⊕	⊖
	UNLOCK			⊖	⊕
Rear Left [D21]	LOCK	⊖	⊕		
	UNLOCK	⊕	⊖		
Rear Right [D31]	LOCK	⊕	⊖		
	UNLOCK	⊖	⊕		

ETMB150A



# POWER DOOR MIRRORS

## COMPONENTS ETMB1550

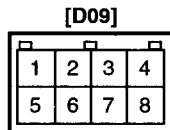
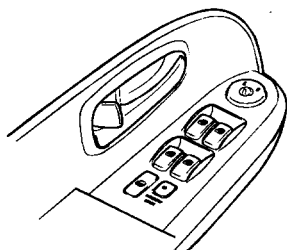


ETMB155A

## POWER DOOR MIRROR SWITCH

### INSPECTION ETMB1600

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.



KTMB240B

[D09]

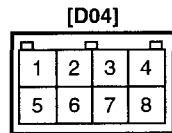
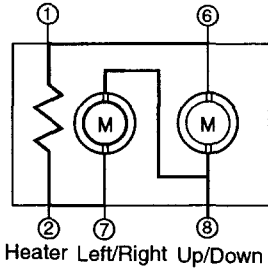
Class	Terminal	1	2	3	4	5	6	7	8	
	Direction									
LEFT HAND	UP			○	—	○	—	○	—	○
	DOWN			○	—	○	—	○	—	○
	OFF			○	—	○	—	○	—	○
	LEFT			○	—	○	—	○	—	○
	RIGHT			○	—	○	—	○	—	○
RIGHT HAND	UP		○	—	○	—	○	—	○	
	DOWN		○	—	○	—	○	—	○	
	OFF		○	—	○	—	○	—	○	
	LEFT		○	—	○	—	○	—	○	
	RIGHT		○	—	○	—	○	—	○	

ETMB160A

# POWER DOOR MIRROR ACTUATOR

## INSPECTION ETMB1650

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.



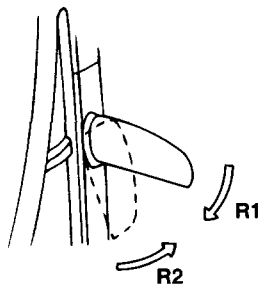
ETMB165A

[D04]

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

ETMB165B

## MIRROR FOLDING INSPECTION



ETHA030A

[D04]

Terminal Direction	3	4
R1	⊖	⊕
R2	⊕	⊖

ETMB165C

## MIRROR HEATER INSPECTION

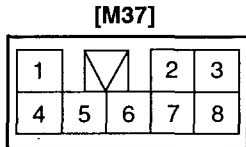
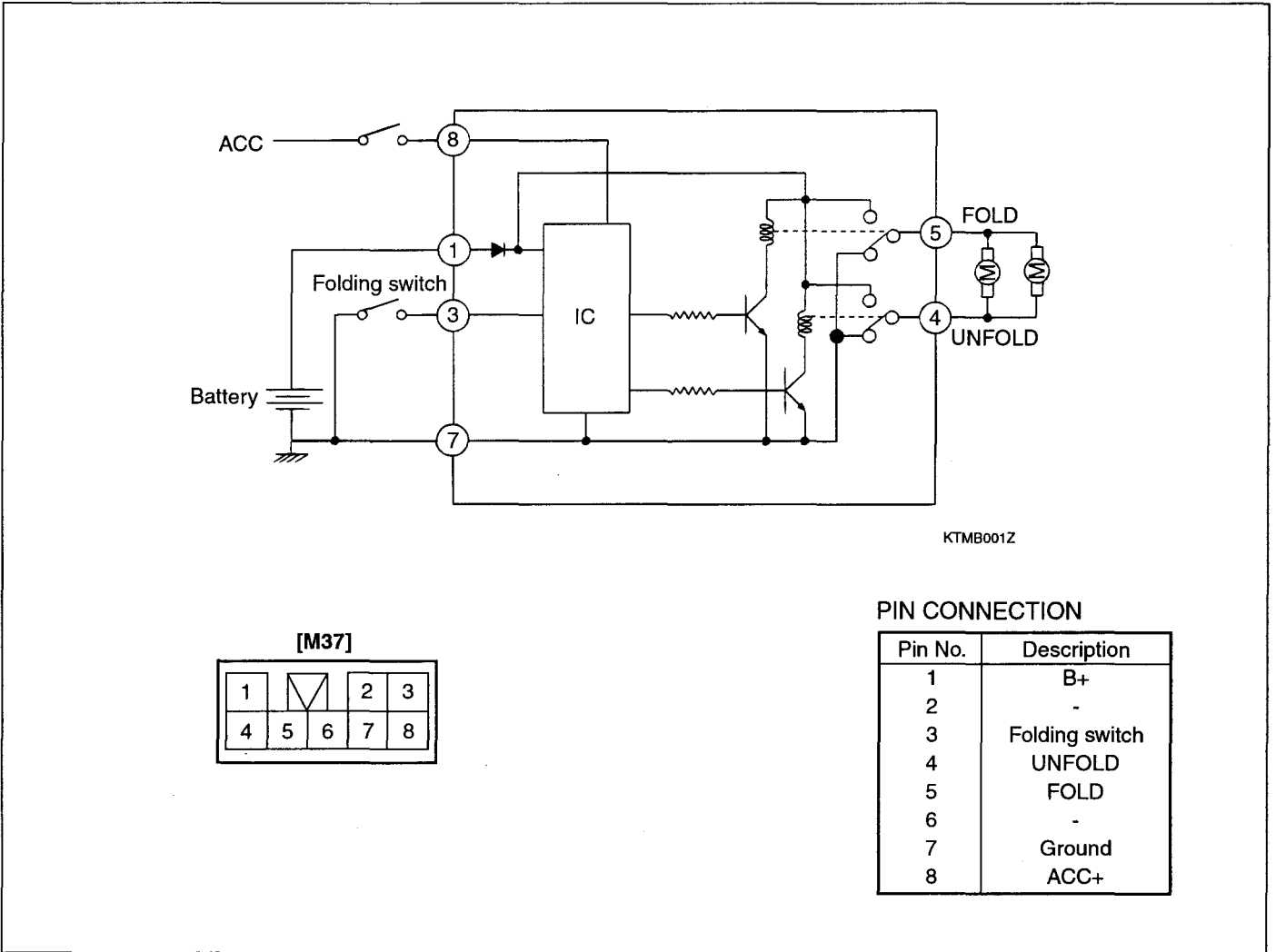
[D04]

Terminal Position	1	2
Heater	No polarity	

ETMB165D

# DOOR MIRROR FOLDING CONTROL MODULE

## CIRCUIT DIAGRAM ETMB1700



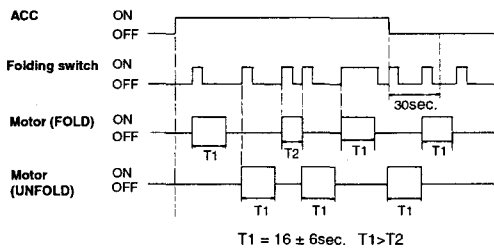
### PIN CONNECTION

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

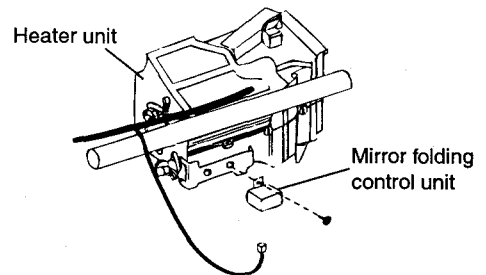
ETMB170A

## INSPECTION ETMB1750

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



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

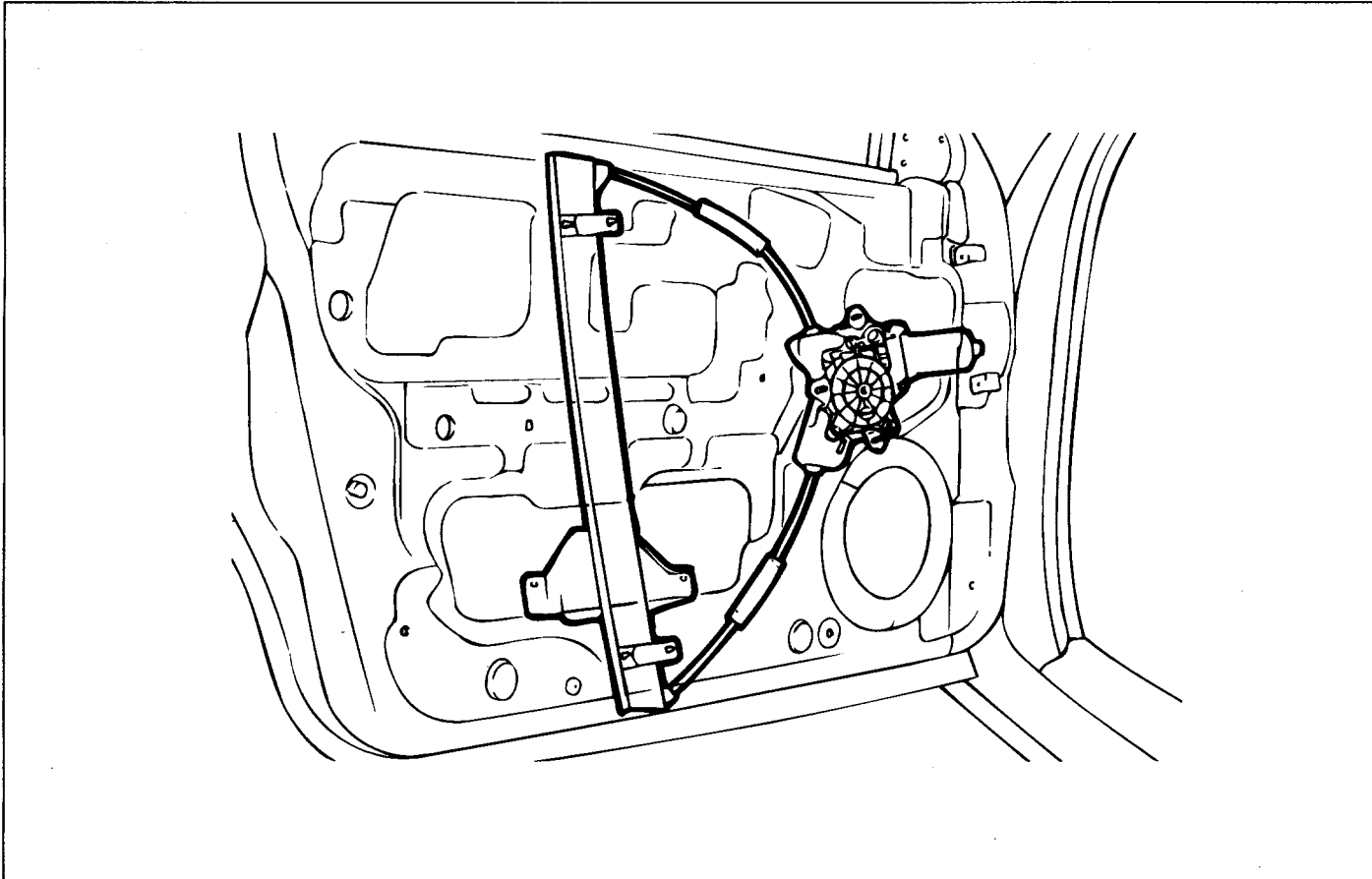


ETMB175B

# POWER WINDOWS

## POWER WINDOW MOTOR

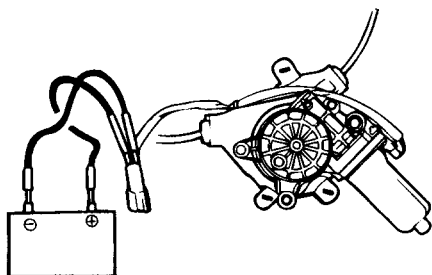
### COMPONENTS ETMB1800



KTMB250A

### 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.

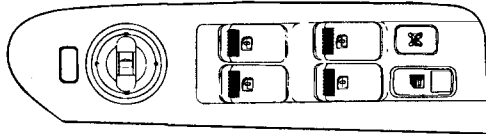


ETDA135A

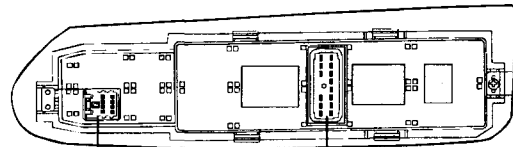
# POWER WINDOW SWITCH

## CIRCUIT DIAGRAM ETMB1850

### [POWER WINDOW MAIN SWITCH]



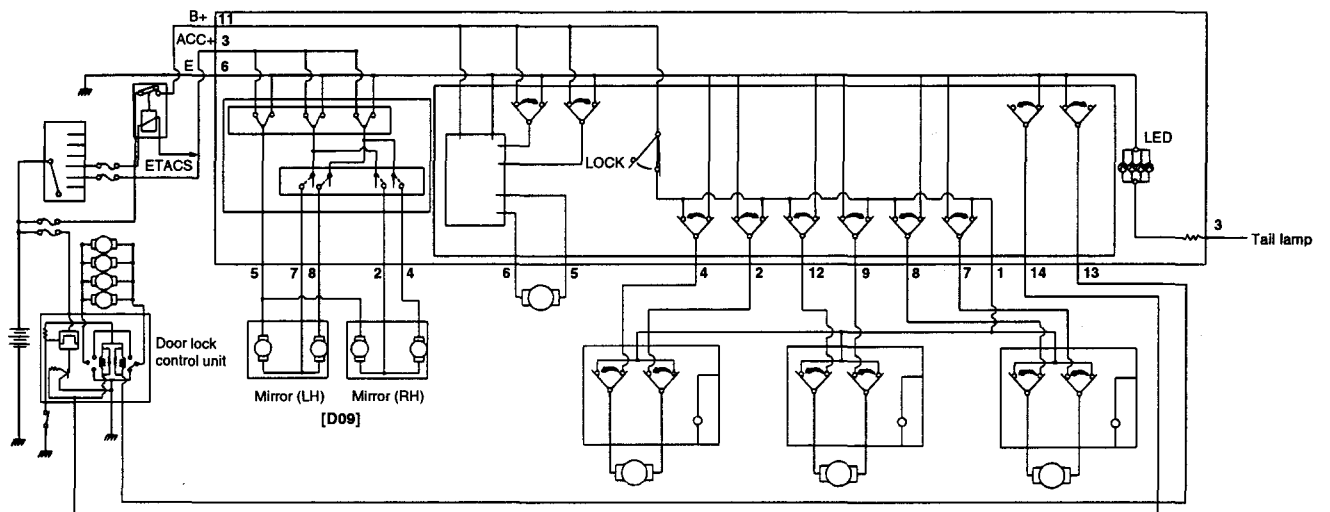
KTMB003S



KTMB001T

[D09]

[D10]

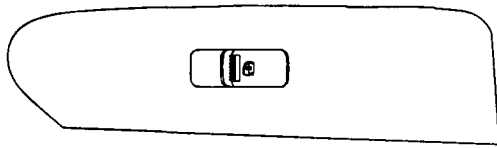


[D09]

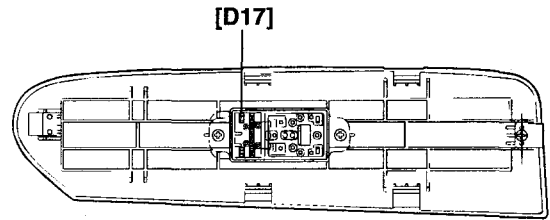
[D10]

KTMB001U

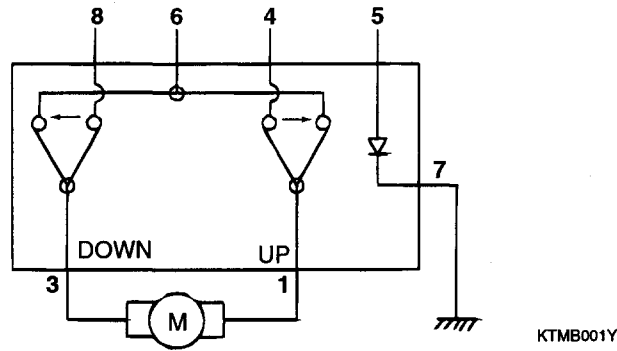
[POWER WINDOW SUB SWITCH]



KTMB001W



KTMB001X



KTMB001Y

ETMB185B

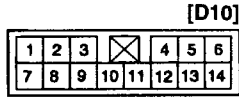
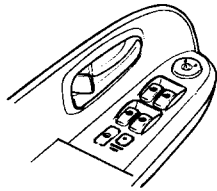
**INSPECTION** ETMB1900

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.

[D10]

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	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

ETMB190A



KTMB265F

[D17]

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

ETMB190D

DOOR LOCK SWITCH

[D10]

Terminal Position	10	13	14
LOCK	○	○	○
OFF			
UNLOCK	○	○	

ETMB190B

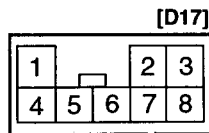
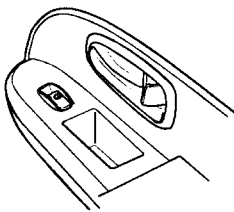
WINDOW LOCK SWITCH

[D10]

Terminal Position	1	11
NORMAL	○	○
LOCK		

ETMB190C

POWER WINDOW SUB SWITCH



KTMB265B

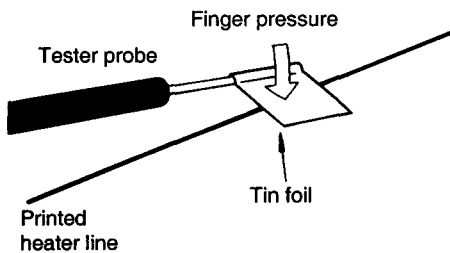
# REAR WINDOW DEFOGGER

## REAR WINDOW DEFOGGER PRINTED HEATER

### INSPECTION ETA91650

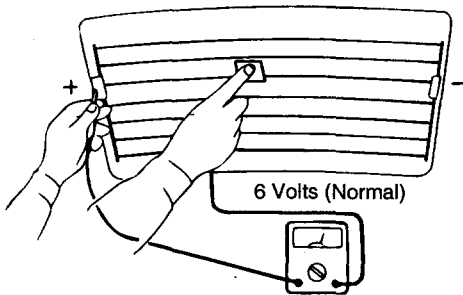
**CAUTION**

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.



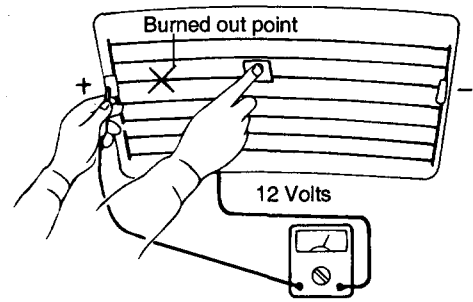
ETA9165A

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



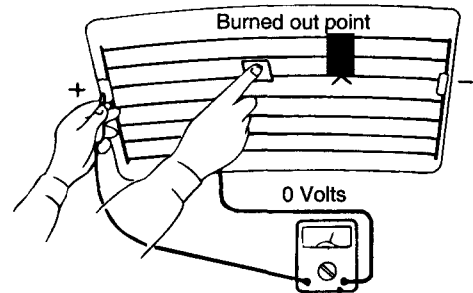
ETA9165B

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



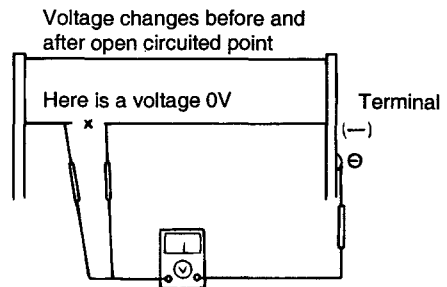
ETA9165C

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



ETA9165D

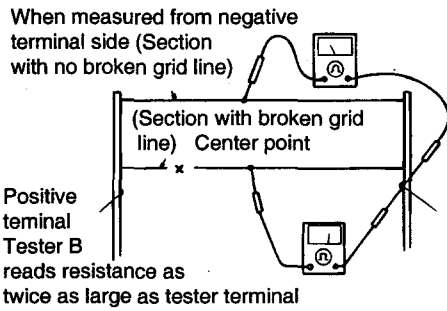
4. To check for open circuits, slowly move the test lead in the direction that the open circuit seems to exist. Try to find a point where a voltage is generated or changes to 0V. The point where the voltage has changed is the open-circuit point.



ETA9165E

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





ETA9165F

**REPAIR OF BROKEN HEATER LINE**

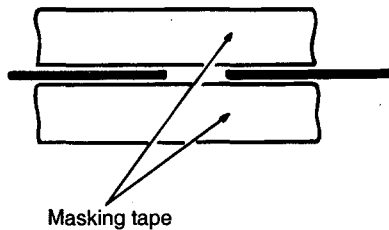
Prepare the following items:

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

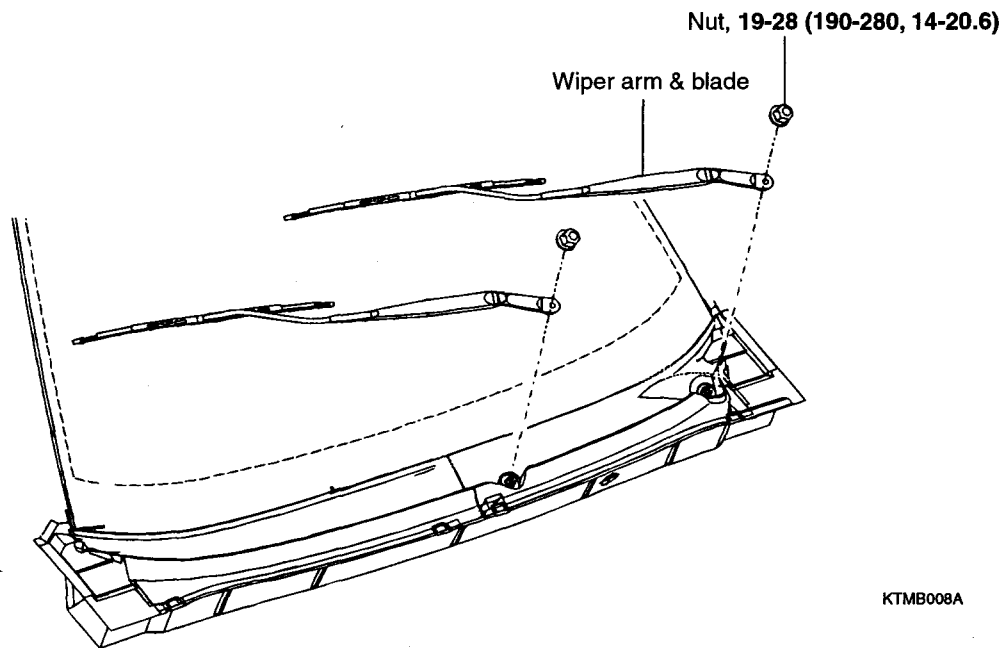
*After repairing, clean the glass with a soft dry cloth or wipe along the grid line with a slightly moistened cloth.*



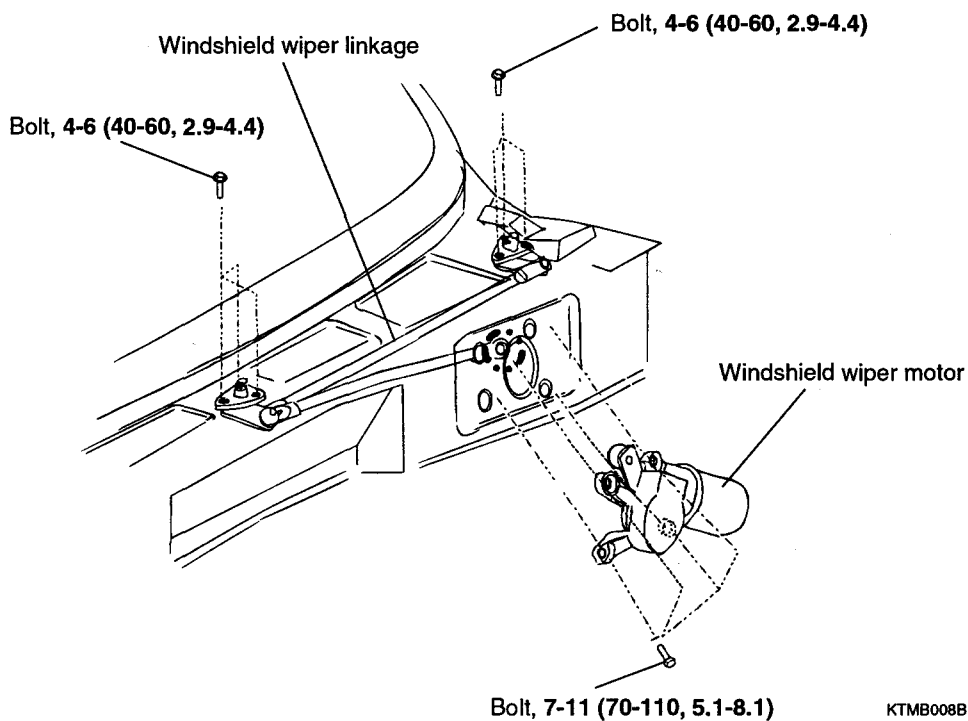
ETA9165G

# WINDSHIELD WIPER/WASHER

## COMPONENTS ETMB1950



KTMB008A



KTMB008B

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

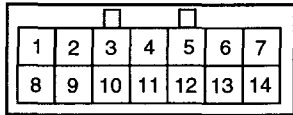
# WINDSHIELD WIPER/WASHER SWITCH

## INSPECTION ETMB2120

Remove the multifunction switch and disconnect the wire connectors.

Check the switch for continuity between the terminals.  
If continuity is not as specified, replace the wiper and washer switch.

[M01-2]



ETMB212A

## WIPER AND INTERMITTENT VOLUME SWITCH [M01-2]

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

ETMB045B

## WASHER SWITCH [M01-2]

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

ETMB045C

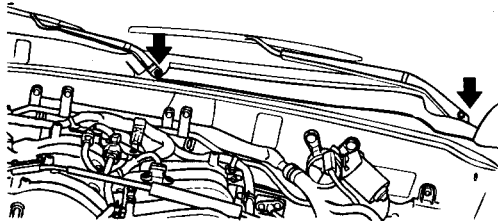
# FRONT WIPER MOTOR

## REMOVAL ETMB2000

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

**NOTE**

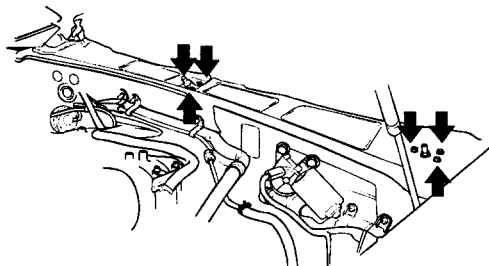
Care must be taken not to scratch the engine hood.



KTMB007H

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

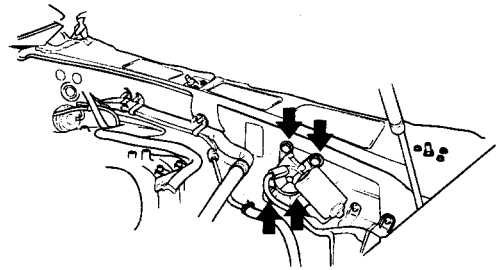
2. Remove the weatherstrip and the cowl top cover then remove the 6 bolts holding the linkage.



KTMB007I

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

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

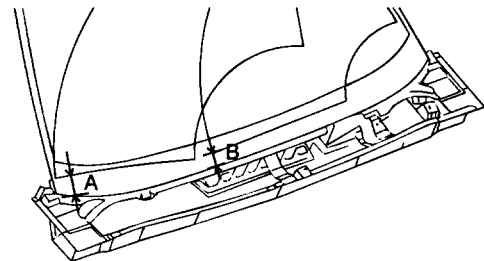


KTMB290A

## INSTALLATION ETMB2050

1. Install the wiper arm to the specified position.

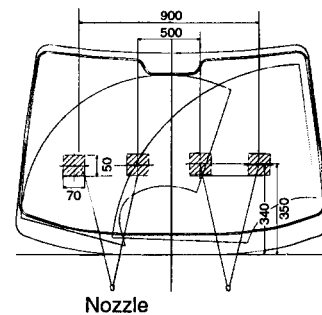
Specified position	A	B
Distance (mm)	40-50	38-42



ETJA060I

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

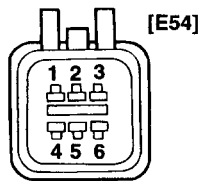
Unit : mm



ETMB205A

**INSPECTION** ETMB2100**SPEED OPERATION CHECK**

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

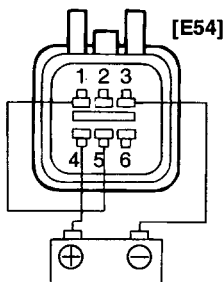


- |           |            |
|-----------|------------|
| 1. Low    | 4. IGN+    |
| 2. High   | 5. Parking |
| 3. Ground | 6. Blank   |

ETMB210A

**AUTOMATIC STOP OPERATION CHECK**

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

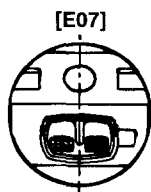
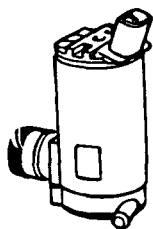


KTMB295B

## FRONT WASHER MOTOR

### INSPECTION ETMB2150

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

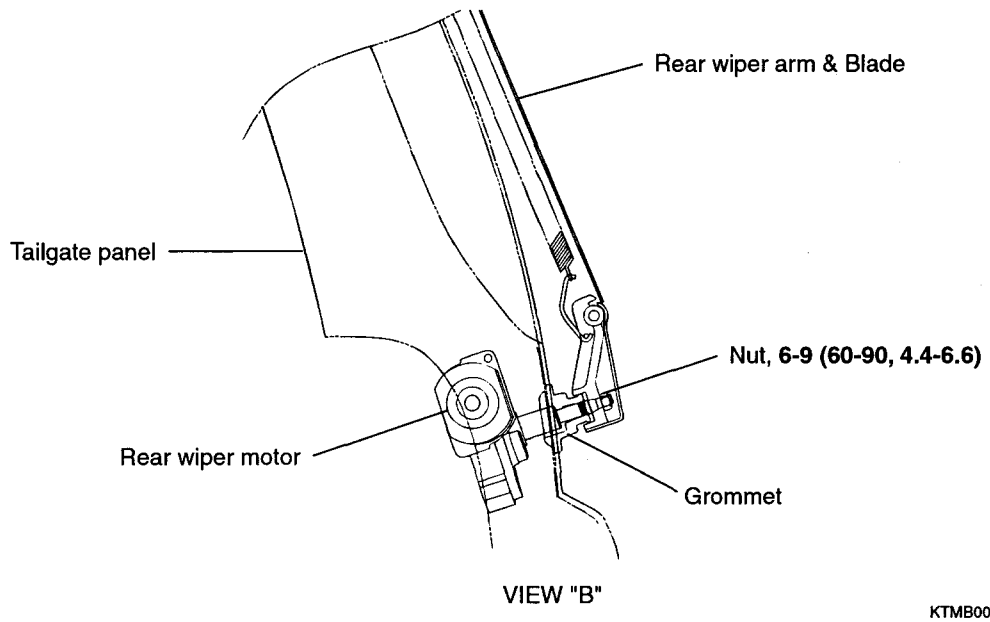
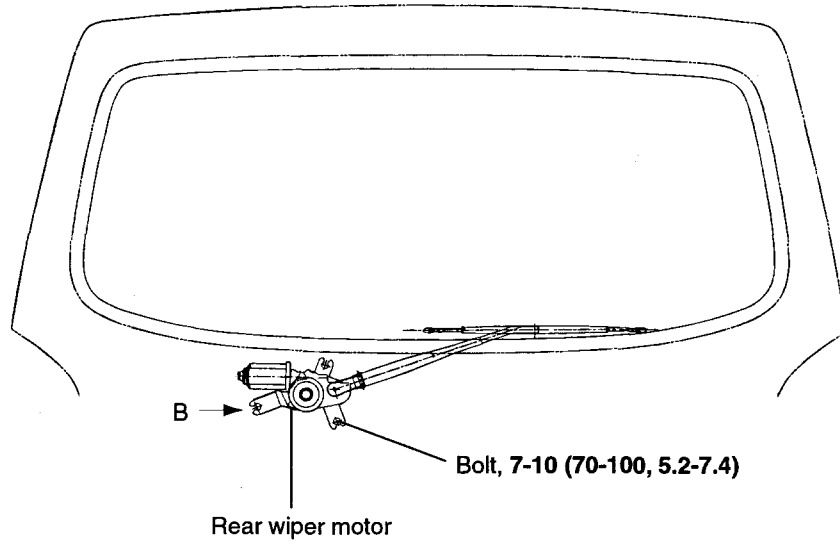


1. Washer(-)
2. IGN(+)

ETMB215A

# REAR WIPER/WASHER

## COMPONENTS ETMB2200

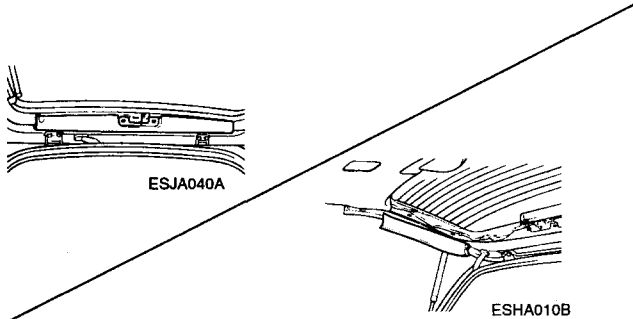


**TORQUE : Nm (kg·cm. lb·ft)**

# REAR WIPER MOTOR

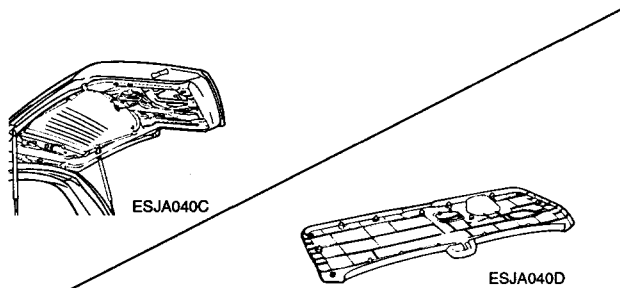
## REMOVAL ETMB2250

1. Pry the upper and side trim loose from the tailgate frame.



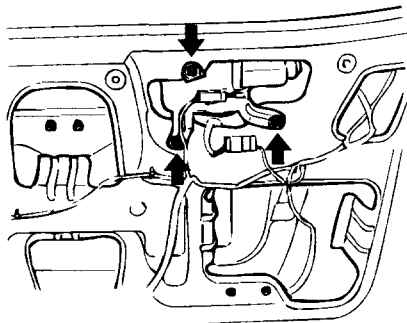
KTMB310A

2. Remove the screws and the trim grip and then remove the tailgate trim panel.



KTMB310B

3. Remove the 3 bolts holding the rear wiper motor and disconnect the wire connector.



KSMB004D

4. Installation is the reverse of removal.

## INSPECTION ETMB2300

1. Remove the connector from the rear wiper motor.

2. Connect battery positive (+) and negative (-) cables to terminals 1 and 4 respectively.
3. Check that the motor operates normally. Replace the motor if it operates abnormally.

[R34]			
1	2	3	4

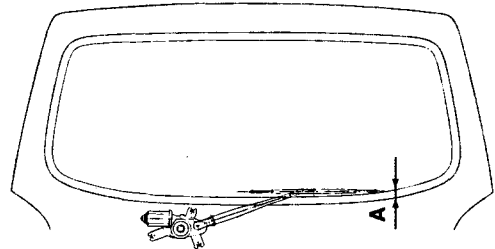
- |            |           |
|------------|-----------|
| 1. IGN(+)  | 3. Switch |
| 2. Parking | 4. Ground |

ETMB230A

## INSTALLATION ETMB2260

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

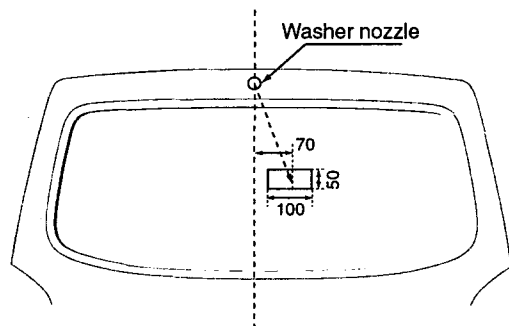
Specified position	A
Distance	30mm



KTMB008C

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

Unit : mm



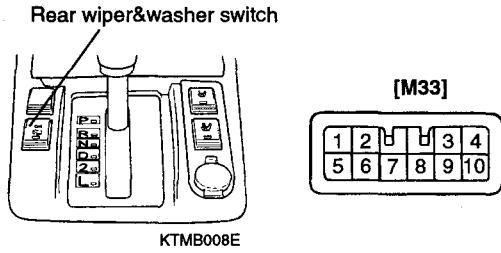
ETMB226A



# REAR WASHER SWITCH

## INSPECTION ETMB2400

1. Disconnect the connector from the rear wiper&washer switch.
2. Check for continuity between the terminals.



ETMB240A

[M33]

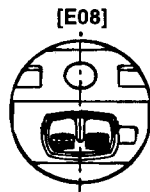
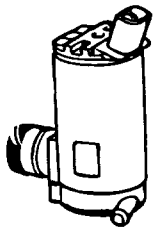
Rear wiper		Terminal		1	2	3	4	9	10
		Rear wiper	Rear washer						
Rear wiper switch	ON	ON		○	○		○	○	○
		OFF				○	○		
	OFF	ON			○	○	○	○	
		OFF			○	○	○		

ETMB240B

## REAR WASHER MOTOR

### INSPECTION ETMB2350

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

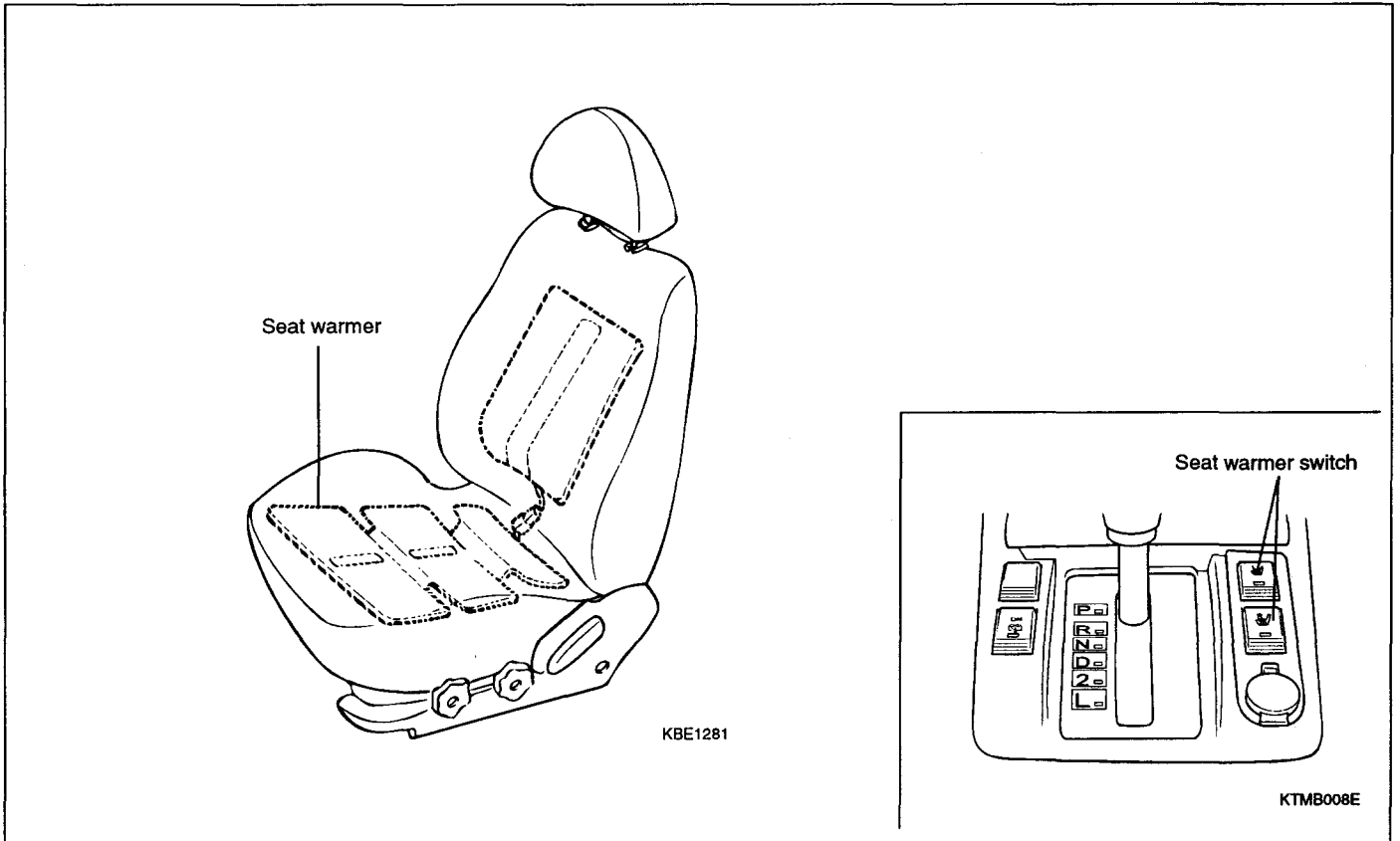


1. Rear washer(-)
2. IGN(+)

ETMB235A

# SEAT WARMER

## COMPONENTS ETMB2450



ETMB245A

## SEAT WARMER SWITCH

### INSPECTION ETMB2500

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

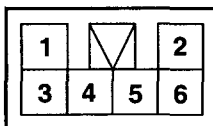
3. Check for continuity between the terminals.

[M49 / M50]

Terminal Position	2	5	1	4	3
ON	○	○	○	○	○
OFF	○ — (M) — ○				

ETMB250A

[LH : M49/ RH : M50]

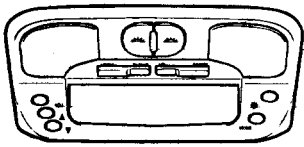


# SUN ROOF

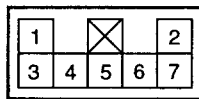
## SUN ROOF SWITCH

### INSPECTION ETMB2550

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



KTMB008F



KTMB341A

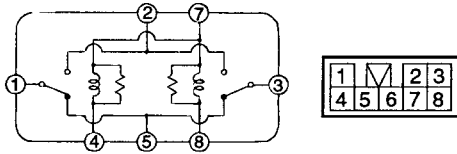
Terminal		Position						
		1	2	3	4	5	6	7
Slide switch	Open	○	○	—	—	—	○	
	Off		○	—	—	—	○	
	Close	○	○	—	—	○	○	
Tilt switch	Up	○	○	—	○	—	○	
	Off		○	—	—	—	○	
	Down	○	○	○	—	—	○	

ETMB255A

# SUN ROOF RELAY

## INSPECTION ETMB2600

1. Check for continuity between the terminals.



KTMB342A

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

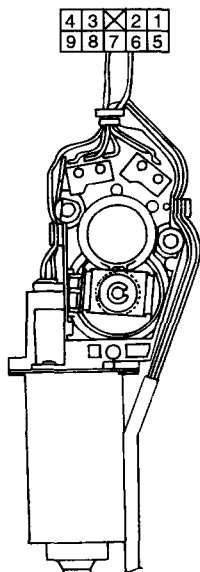
⊕ - ⊖ Indicates battery connection

ETMB260A

## SUN ROOF MOTOR

### INSPECTION ETMB2650

1. Remove the overhead console.
2. Disconnect the motor connector from sun roof harness.
3. After applying DC 12V to the terminal 8, apply the terminal 3 to the ground.
4. Check that the motor turns in the direction of the sun-roof 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.



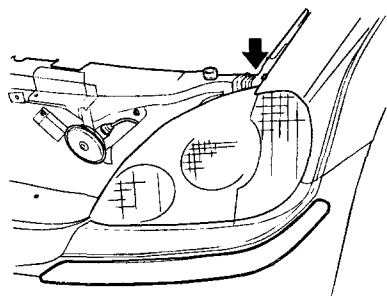
KTMB343A

# LIGHTING SYSTEM

## REPLACEMENT OF LAMPS ETMB2700

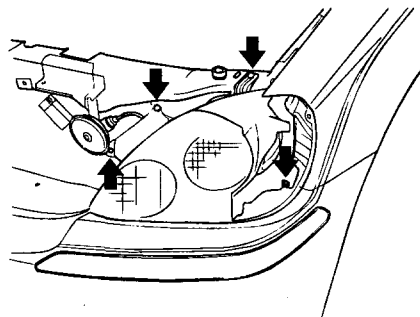
### HEAD LAMP/TURN SIGNAL LAMP

1. Disconnect the negative battery terminal.
2. Remove the turn signal lamp mounting screw(1EA) and remove the lamp assembly.



KTMB007E

3. Remove the head lamp mounting bolts(4EA). Disconnect the wire connector and remove the head lamp assembly.

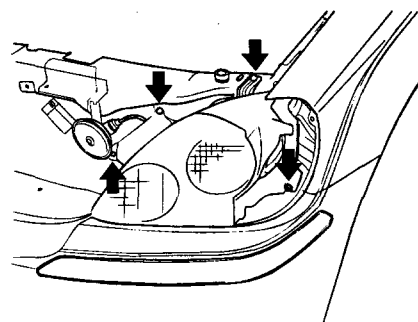


KTMB007F

4. Installation is the reverse of removal.

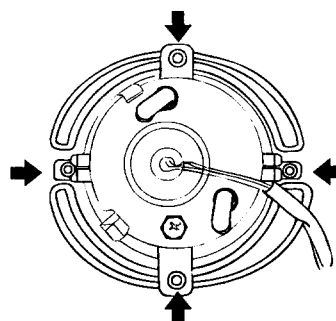
### FRONT FOG LAMP

1. Disconnect the negative battery terminal.
2. Remove the turn signal lamp and head lamp assembly.



KTMB007F

3. Remove the front bumper cover (Refer to BD group). Disconnect the wire connector and remove the front fog lamp.

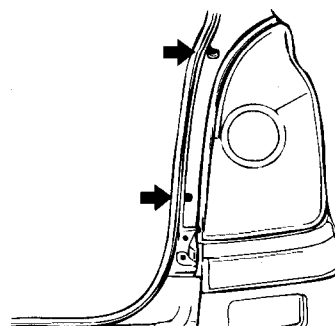


KTMB007A

4. Installation is the reverse of removal.

### REAR COMBINATION LAMP

1. Disconnect the negative battery terminal.
2. Remove the 2 bolts holding the rear combination lamp.

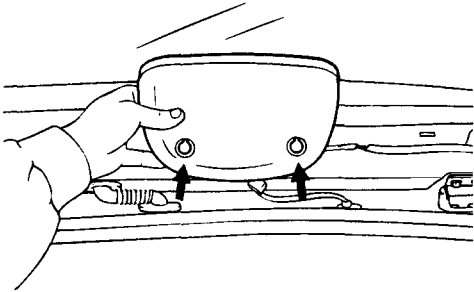


KTMB350A

3. Disconnect the connector and remove the lamp assembly.
4. Installation is the reverse of removal.

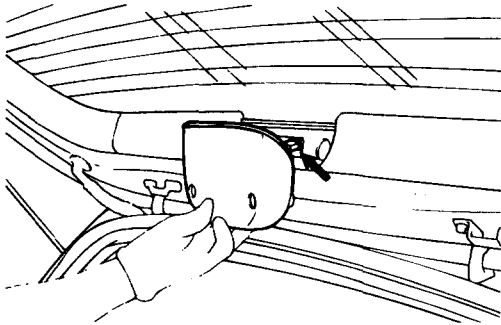
**CENTER HIGH MOUNTED STOP LAMP**

1. Disconnect the negative battery terminal.
2. Using a flat-bladed screwdriver detach 2 blanking covers on both sides of the lamp.
3. Remove the two mounting bolts.



ESJA040N

4. Disconnect the connector and then remove the lamp assembly.

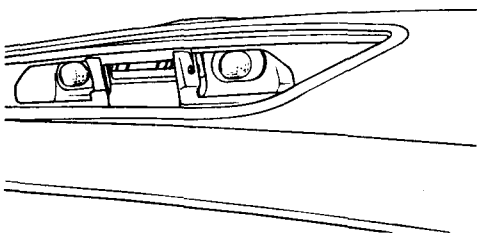


V5BE075I

5. Installation is the reverse of removal.

**LICENSE PLATE LAMP**

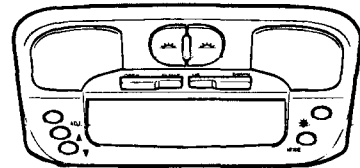
1. Disconnect the negative battery terminal.
2. Detach the lamp assembly and disconnect the lamp connector.
3. Installation is the reverse of removal.



KSMB004B

**OVERHEAD CONSOLE LAMP**

1. Disconnect the negative battery terminal.
2. Detach the lamp assembly from the headliner after removing the 2 screws.

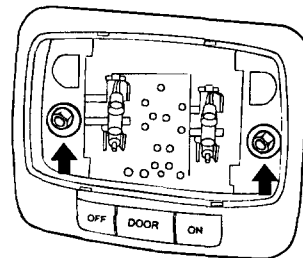


KTMB008F

3. Installation is the reverse of removal.

**ROOM LAMP**

1. Disconnect the negative battery terminal.
2. Using a flat-bladed screwdriver detach the room lamp lens.
3. Detach the lamp assembly from the headliner after removing the 2 bolts.



KTMB008G

4. Disconnect the connector from the roof harness.
5. Installation is the reverse of removal.

**LUGGAGE LAMP**

1. Using a flat-bladed screwdriver detach the luggage lamp lens.
2. Detach the lamp assembly from the headliner.



**INSPECTION OF COMPONENTS** ETMB2750

**HEAD LAMP RELAY**

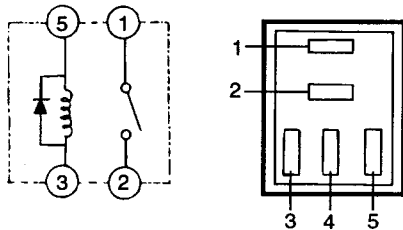
1. Remove the headlamp relay from the relay box in the engine compartment.
2. Check for continuity between terminals on the relay.

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

**NOTE:**

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

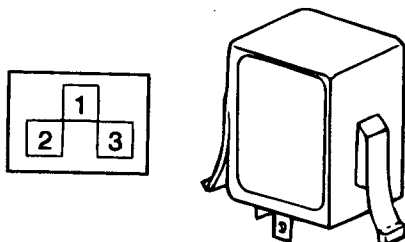
ETMB275A



KTMB385B

**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

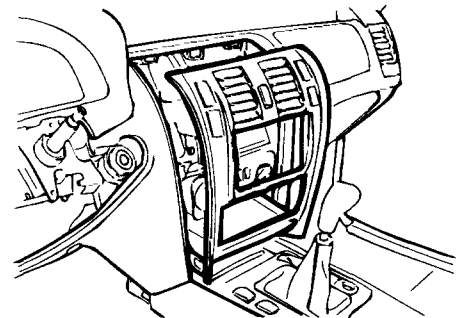
3. Connect the two turn signal lamps in parallel to terminals 2 and 3. Check that the bulbs turn on and off.

**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.

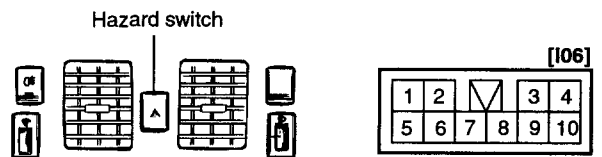
**HAZARD SWITCH**

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



KSMB008L

3. Disconnect the connector from the hazard lamp switch.



KTMB008K

ETMB275B

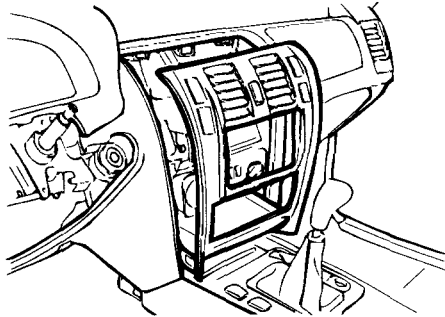
4. Operate the switch and check for continuity between terminals with an ohmmeter.

Terminal Position	2	3	5	6	7	8	9	10
OFF			○ — ○			○ — ○		
ON	○ — ○				○ — ○		○ — ○	

ETMB275C

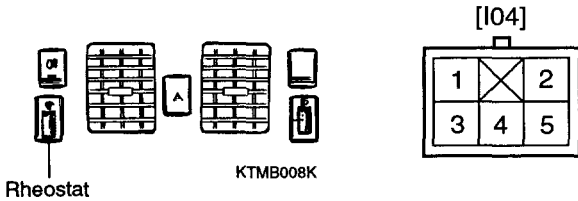
**RHEOSTAT**

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel.



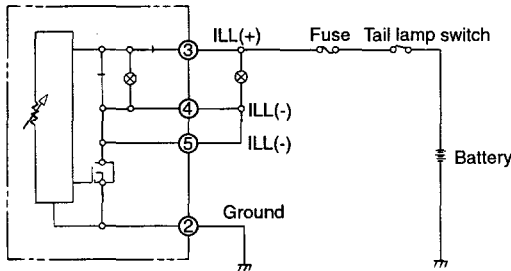
KSMB008L

3. Disconnect the connector from the rheostat.



ETMB275D

4. 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.



ETMB275E

**REAR FOG LAMP SWITCH**

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

**Rear fog lamp switch**



KTMB008K

ETJA045B

ETMB275F

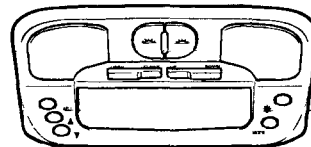
4. Operate the switch and check for continuity between the terminals with an ohmmeter.

Terminal Position	1	2	3	4	5
ON	○	○	○	○	○
OFF		○	○	○	○

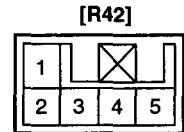
ETMB275G

**MAP LAMP**

Remove the overhead console and check for continuity between terminals.



KTMB008F



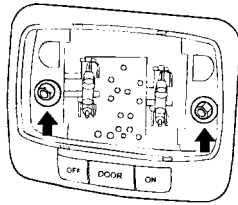
KTMB400A

Terminal Position	Map lamp switch			
	LH		RH	
	ON	OFF	ON	OFF
2	○		○	
5	○		○	

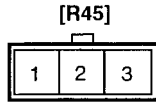
ETMB275H

**ROOM LAMP**

Remove the room lamp and check for continuity between terminals.



KTMB008G



KTMB401A

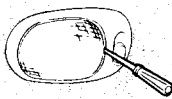
[R45]

Terminal Position	1	2	3
ON		○ — (m) — ○	
DOOR	○ —	(m) —	○
OFF			

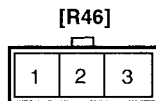
ETMB275I

**TAILGATE LAMP**

Remove the tailgate lamp and check for continuity between terminals.



KTMB911A



KTMB405A

[R46]

Terminal Position	1	2	3
ON	○ —	(m) —	○
DOOR		○ — (m) —	○
OFF			

ETMB275J

**HEAD LAMPS**

**HEAD LAMP AIMING INSTRUCTIONS** ETMB2800

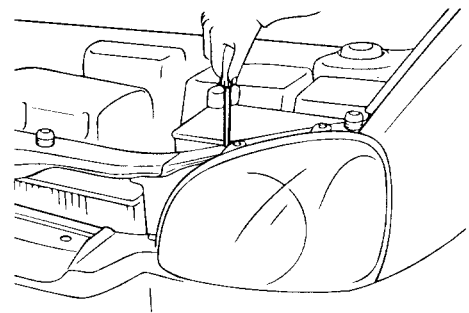
The headlamps should be aimed with the proper beam-setting equipment, and in accordance with the equipment manufacturer's instructions.

**NOTE**

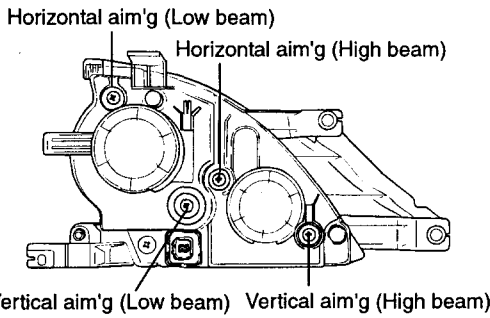
*If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.*

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

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

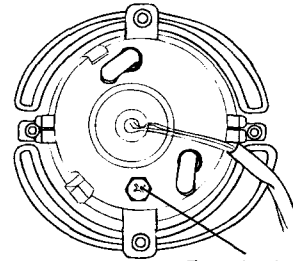


ETJA010F



ETMB280B

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

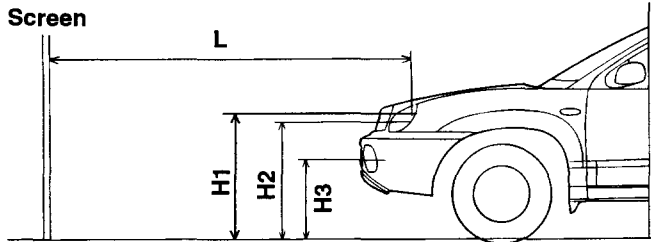


Front fog lamp aim'g screw

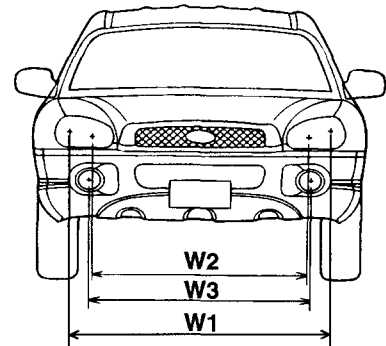
ETMB280A

**FRONT FOG LAMP**

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



KTMB117C



KTMB117D

- H1 : Height between the head lamp bulb center and ground (low beam)
- H2 : Height between the head lamp bulb center and ground (high beam)
- H3 : Height between the fog lamp bulb center and ground

- W1 : Distance between the head lamp bulb center (low beam)
- W2 : Distance between the head lamp bulb center (high beam)
- W3 : Distance between the fog lamp bulb center

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

ETMB280C

**HEAD LAMP AND FOG LAMP AIMING POINT**

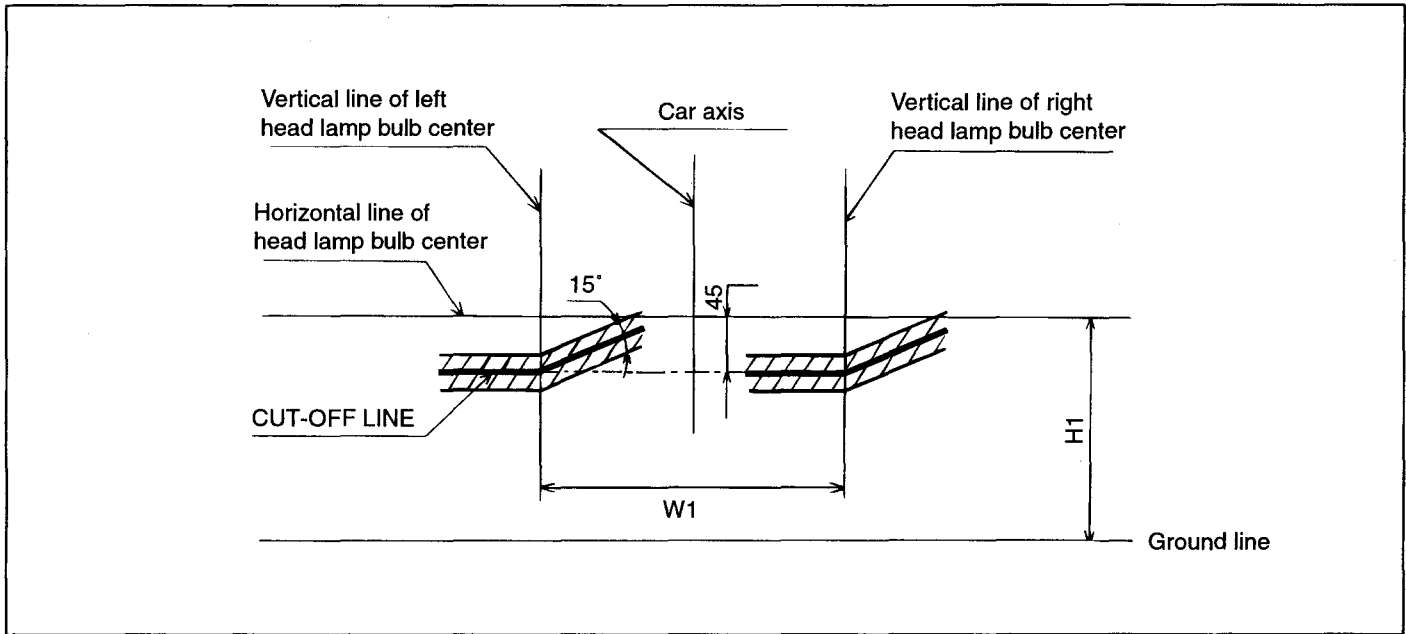
Unit : mm

Vehicle condition	H1	H2	H3	W1	W2	W3	L
Without driver	908	853	559	1,316	1,076	1,254	3,000
With driver	894	839	545				

ETMB280D

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

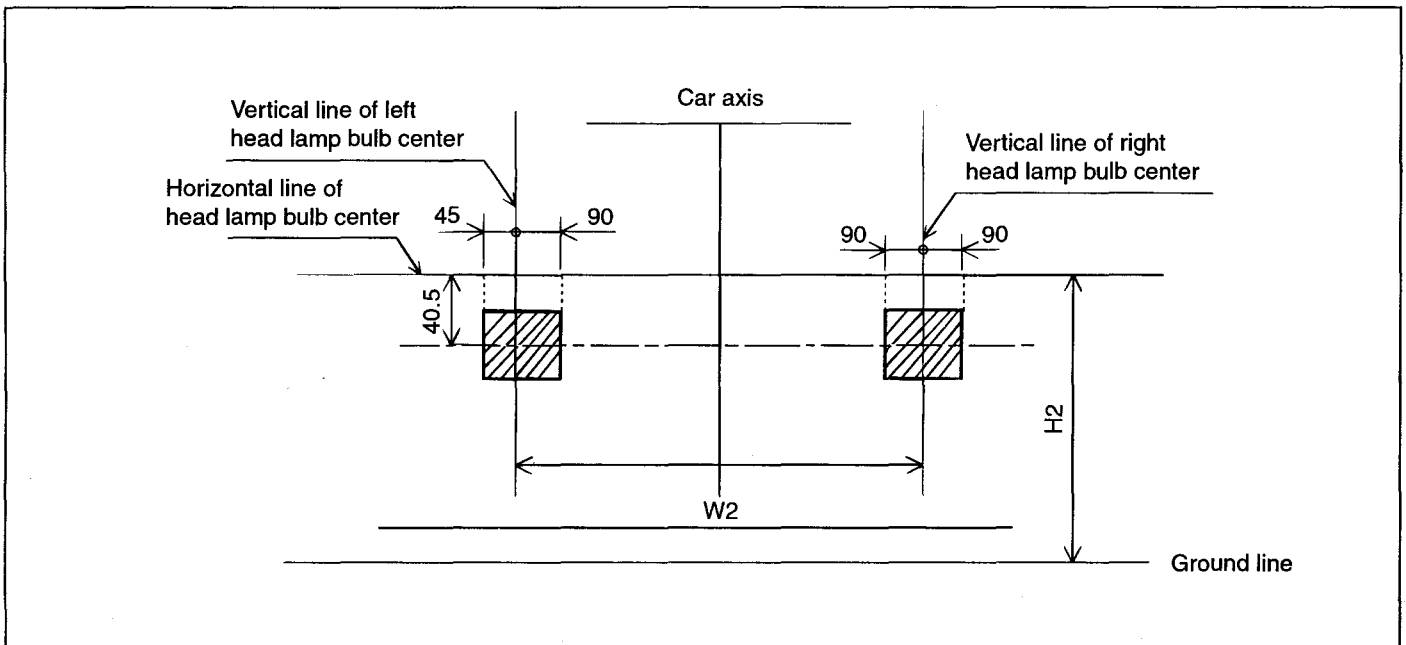
Unit : mm



ETMB280E

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

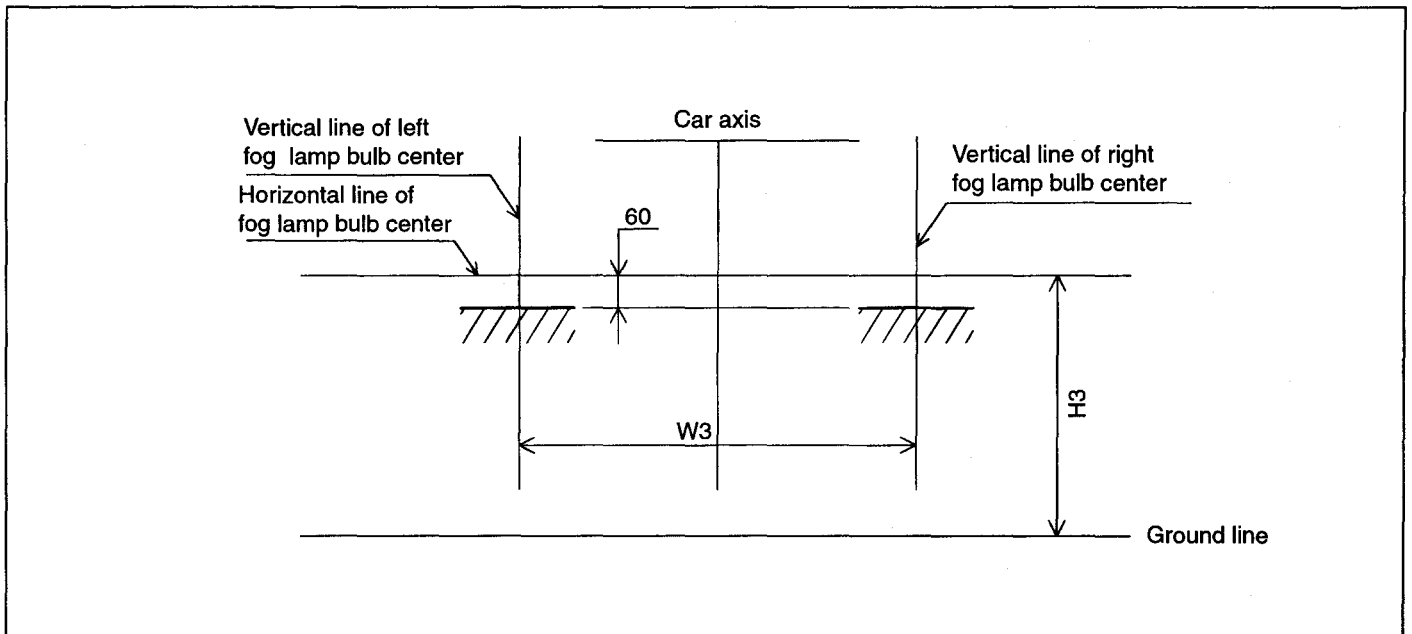
Unit : mm



ETMB280F

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

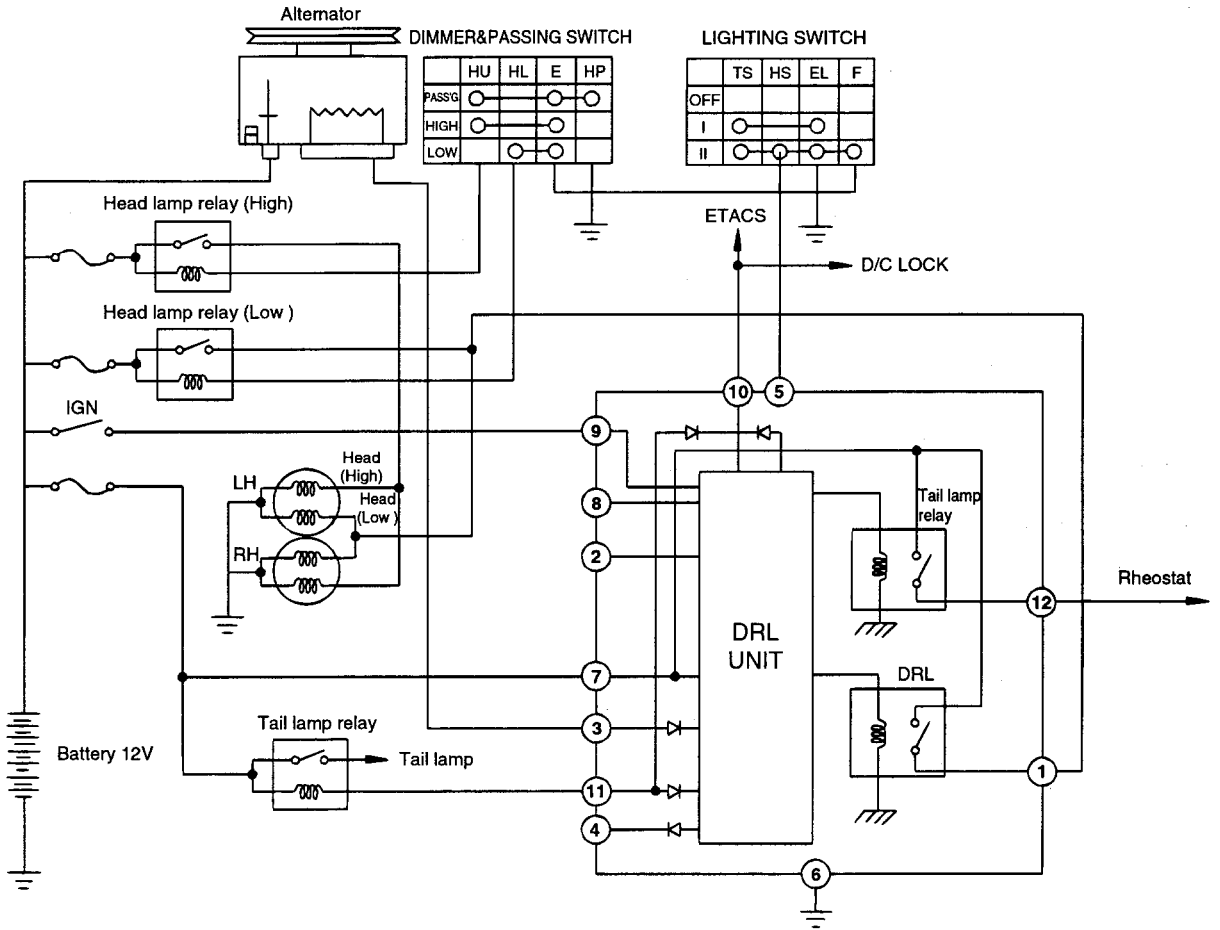
Unit : mm



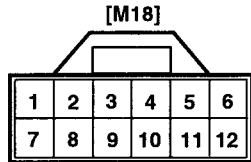
ETMB280G

DAYTIME RUNNING LIGHTS

CIRCUIT DIAGRAM ETMB2850



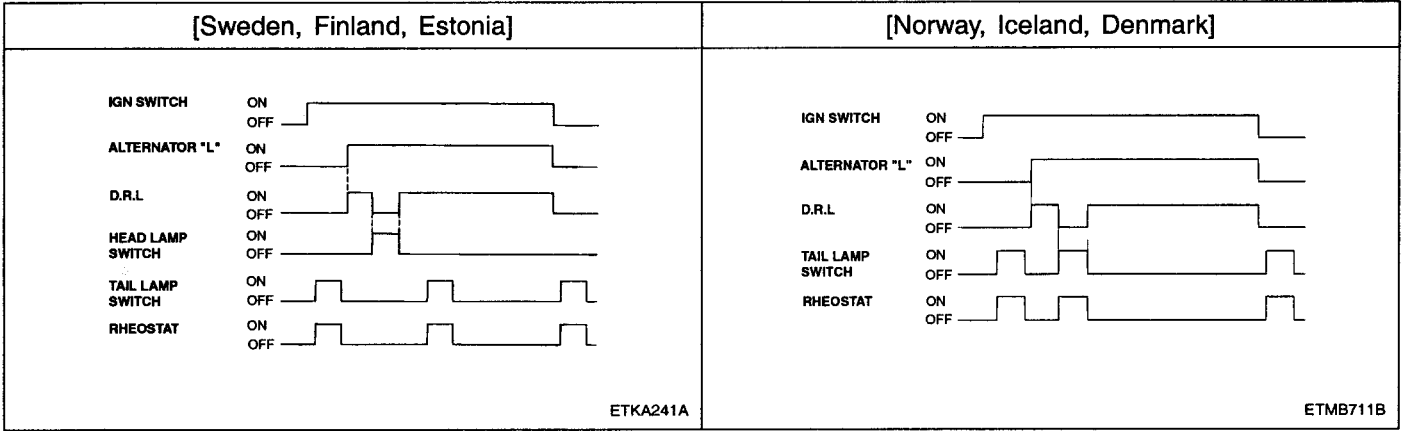
ETMB711A



**INSPECTION** ETMB2900

**OPERATION CHECK**

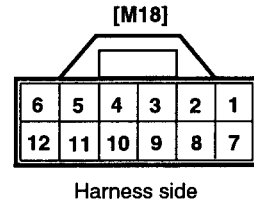
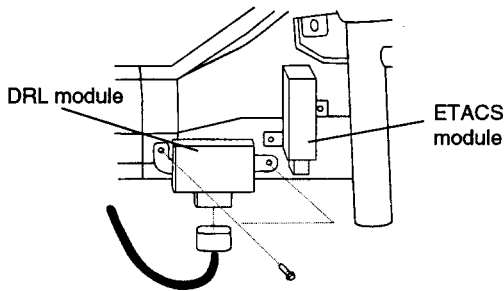
Check that the lights operate according to the following timing chart.



**INSPECT CIRCUITS FOR DAYTIME RUNNING LIGHT SYSTEM**

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

2. Inspect the connector on wire harness side as shown.



ETMB290A

ETMB711F

Check For	Test Connection	Condition	Test Specification	
Continuity	10-Ground	Tail lamp switch	OFF	No continuity
			ON	Continuity
	5-Ground	Head lamp switch	OFF	No continuity
ON			Continuity	
	6-Ground	Constant	Continuity	
Voltage	7-Ground	Constant	Battery voltage	
	9-Ground	Ignition switch	ON	Battery voltage
			ACC or LOCK	No voltage
	11-Ground	Constant	Battery voltage	
3-Ground	Engine	Stop	No voltage	
		Running	Battery voltage	

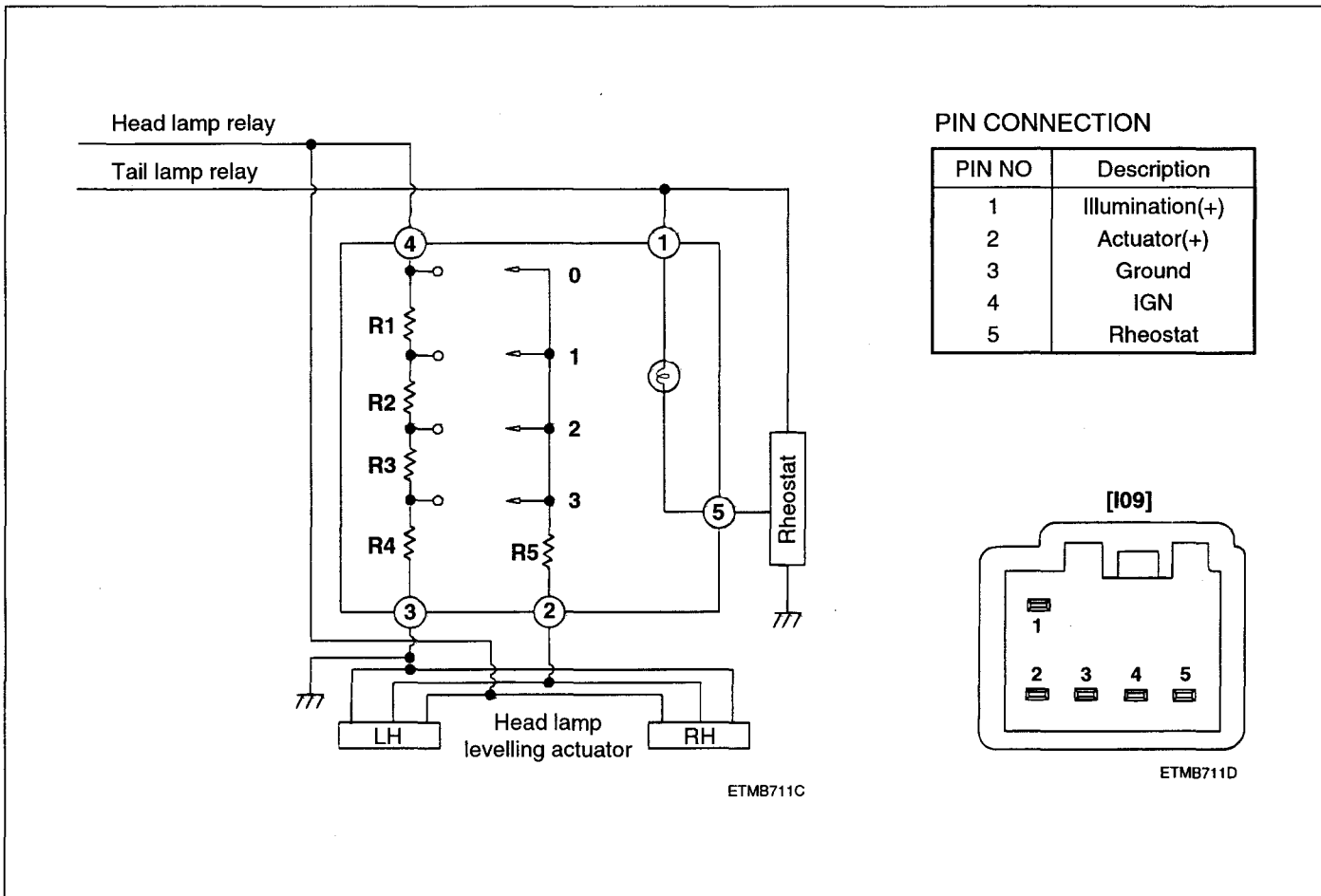


If circuit is not as specified, refer to schematic diagram and inspect short or circuits.

# HEAD LAMP LEVELLING DEVICE

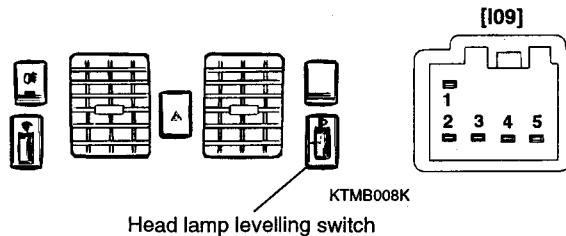
## HEAD LAMP LEVELLING SWITCH

### CIRCUIT DIAGRAM ETMB2950



### INSPECTION ETMB3000

1. Disconnect the switch from harness side, center facia panel.



2. Connect the battery voltage between terminals 3 and 4(Reference voltage =  $V_B$ ).
3. Measure the voltage between terminals 2 and 3(V).

4. Check the percent ratio( $V/V_B \times 100\%$ ) between voltages  $V_B$  and  $V$  at each position.

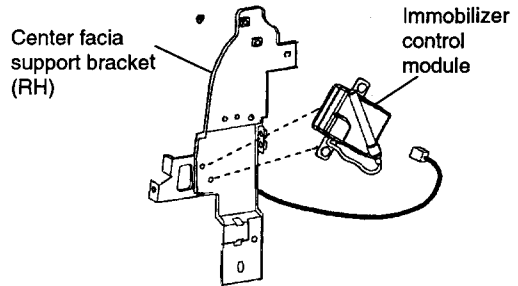
Position No.	Rotation	Ratio( $\pm 5\%$ )	Voltage(V)
0	0°	99.52%	11.94 $\pm$ 0.5V
1	20°	82.67%	9.92 $\pm$ 0.5V
2	40°	68.58%	8.23 $\pm$ 0.5V
3	60°	58.33%	7.00 $\pm$ 0.5V

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

# IMMOBILIZER CONTROL SYSTEM

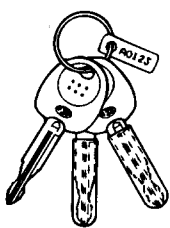
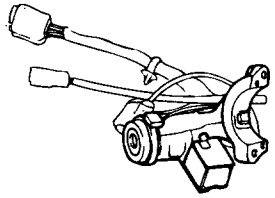
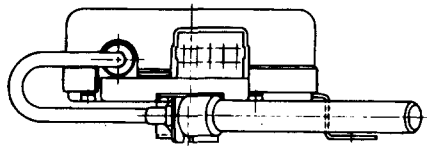
## DESCRIPTION ETMB3050

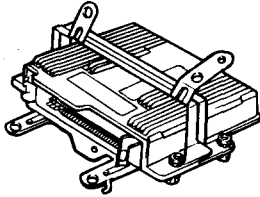
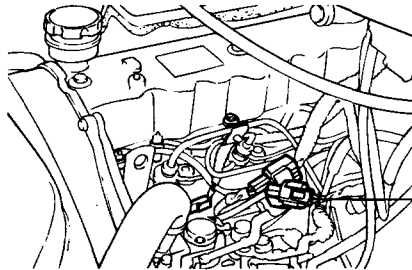
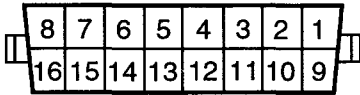

The immobilizer system is an anti-theft device which enables starting to be possible only when the mechanical and wireless secret codes are aligned simultaneously. The transponder built in the ignition key signals its unique frequency code and at this time the ICM compares it with the memorized code. When the codes are aligned, the ICM sends signals to the ECM so that starting is possible.  
 ICM : Immobilizer Control Module  
 ECM : Engine Control Module



ETMB305A

## SYSTEM COMPONENTS ETMB3100

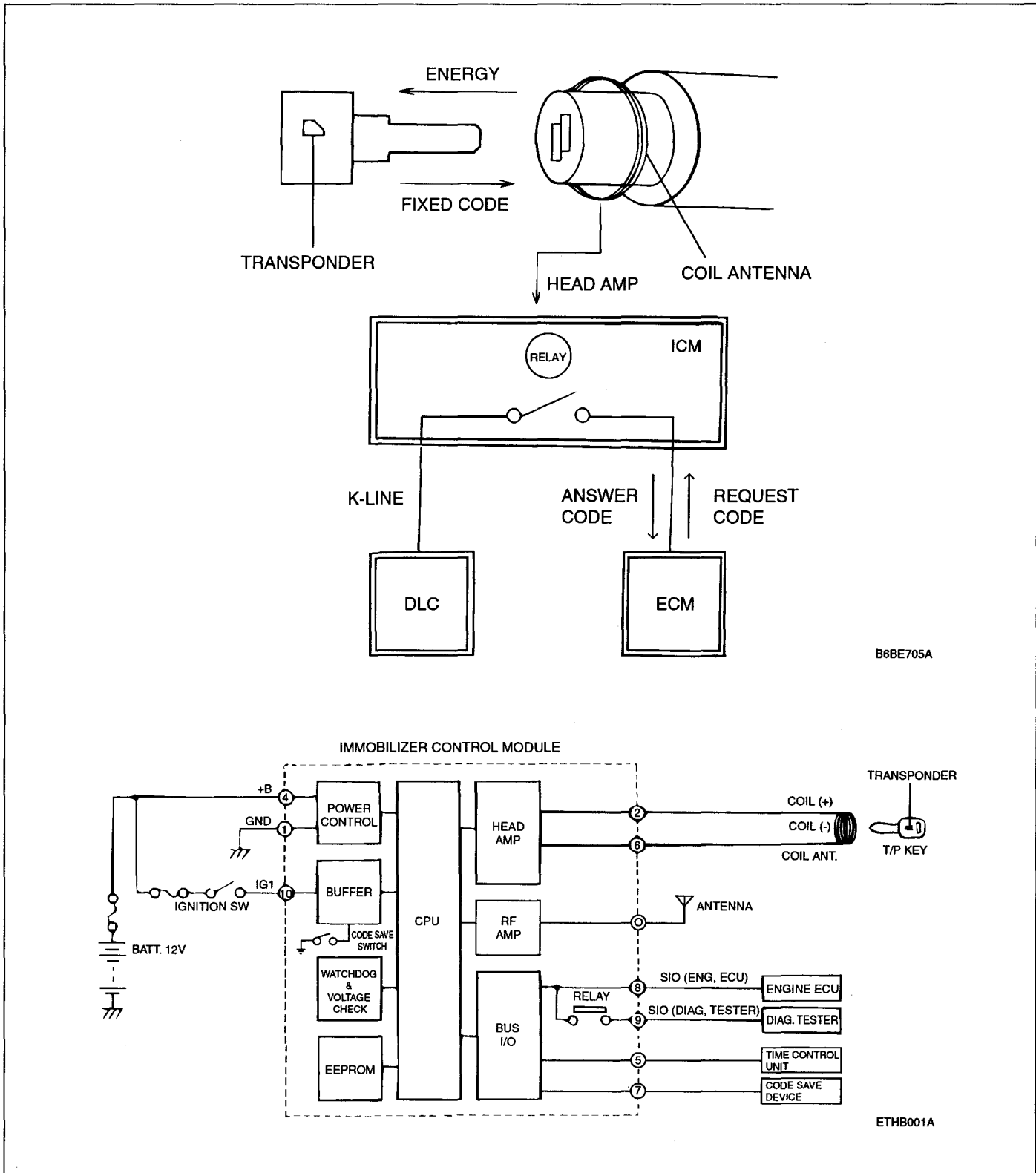
COMPONENT		DESCRIPTION
KEYS	ID KEY	Must be used first to register unique ID code in the ICM. This ID code is then recorded into the master keys.
 <p>TH600043</p>	MASTER KEY	Once the ID code is recorded into the MASTER KEY, this key is for general use.
	TRANSPONDER (built-in-keys)	When ignition is ON , the coil supplies energy to the transponder, which in turn accumulates energy in the condenser. Once the energy supplied from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID code.
COIL ANTENNA		Supplies energy to the transponder. Receives signal from the transponder. Sends transponder signal to the ICM.
 <p>B6BE225C</p>		
IMMOBILIZER CONTROL MODULE		Supplies power to the coil antenna. Receives and analyses signal from the coil antenna. Transmits signal to ECM. Stores VIN which is composed of ID code and password.
 <p>ETHB001E</p>		

COMPONENT	DESCRIPTION
<p data-bbox="136 196 635 227">ENGINE CONTROL MODULE (COVEC-F)</p>  <p data-bbox="589 476 665 497">B6BE710E</p>	<p data-bbox="687 238 1421 300">In the ignition ON position, the ECM receives information from the ICM and permits injection to take place.</p>
<p data-bbox="219 518 551 549">FCVC (EXCEPT COVEC-F)</p>  <p data-bbox="582 756 642 777">FCVC</p> <p data-bbox="589 859 665 880">H8CL004A</p>	<p data-bbox="687 559 1323 652">In the ignition ON position, the FCVC (Fuel cut valve controller) receives information from the ICM and permits injection to take place.</p>
<p data-bbox="234 901 536 932">DATA LINK CONNECTOR</p>  <p data-bbox="589 1170 665 1191">B6BE710F</p>	<p data-bbox="687 942 1383 1004">By connecting the voltmeter or Hi-scan, the control module diagnostic code can be read.</p>
<p data-bbox="249 1212 521 1243">DIAGNOSTIC TESTER</p>  <p data-bbox="589 1491 665 1512">ETHB001T</p>	<p data-bbox="687 1253 1428 1295">Has the function of ICM, ECM, and keys diagnosis and change.</p>

# IMMOBILIZER CONTROL MODULE

## SYSTEM BLOCK DIAGRAM ETMB3150

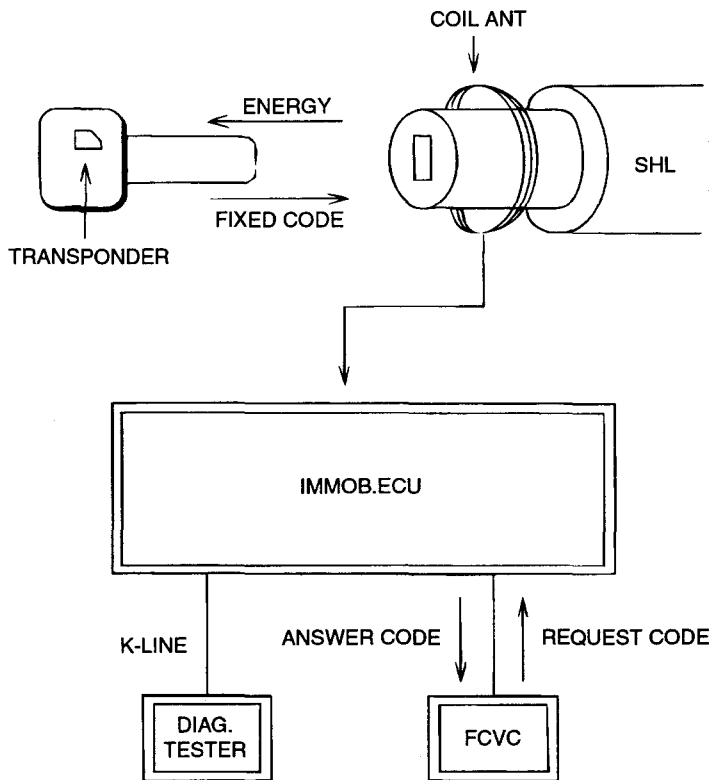
### 1. COVEC-F (WITH ECM)



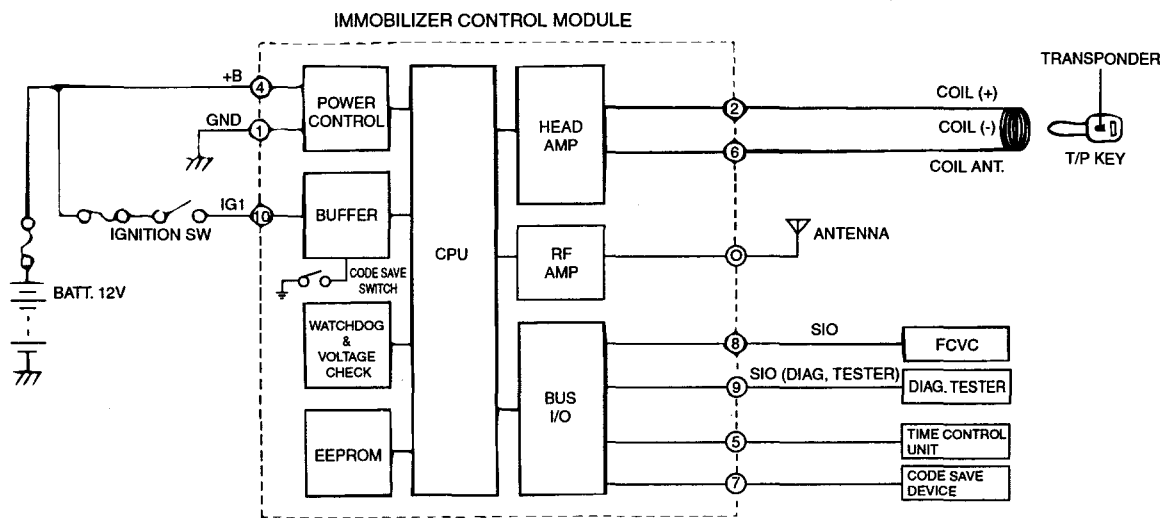
B6BE705A

ETHB001A

2. EXCEPT COVEC-F (WITHOUT ECM)

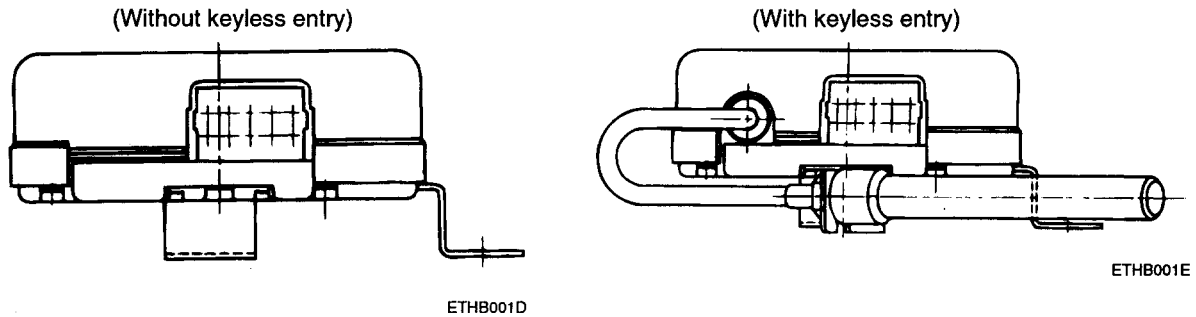


H7BE080B

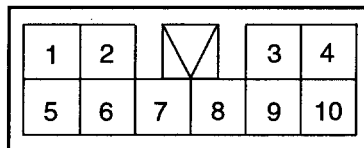


ETHB001B

3. PIN CONNECTION



[M55]



ETHB001F

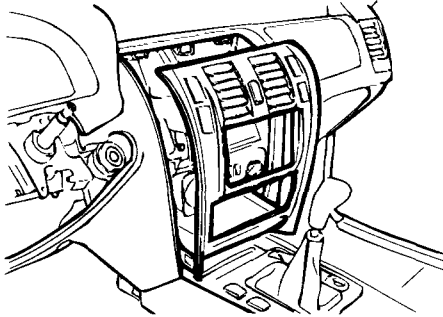
PIN CONNECTION

Terminal	Type	EXCEPT COVEC-F (WITHOUT ECM)		COVEC-F (WITH ECM)	
		WITHOUT KEYLESS ENTRY	WITH KEYLESS ENTRY	WITHOUT KEYLESS ENTRY	WITH KEYLESS ENTRY
1		Ground	Ground	Ground	Ground
2		Coil antenna (+)	Coil antenna (+)	Coil antenna (+)	Coil antenna (+)
3		-	-	-	-
4		Battery (+)	Battery (+)	Battery (+)	Battery (+)
5		-	Time control code	-	Time control code
6		Coil antenna (-)	Coil antenna (-)	Coil antenna (-)	Coil antenna (-)
7		-	Time control save	-	Time control save
8		SIO (FCVC)	SIO (FCVC)	SIO (ECM)	SIO (ECM)
9		SIO (DIAG. Tester)	SIO (DIAG. Tester)	SIO (DIAG. Tester)	SIO (DIAG. Tester)
10		IGN. 1	IGN. 1	IGN. 1	IGN. 1



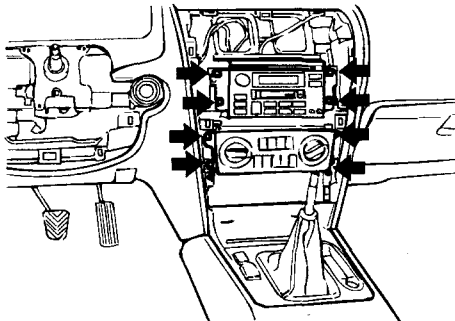
**REMOVAL** ETMB3200

1. Remove the center facia panel using a screwdriver and disconnect the switch connectors.



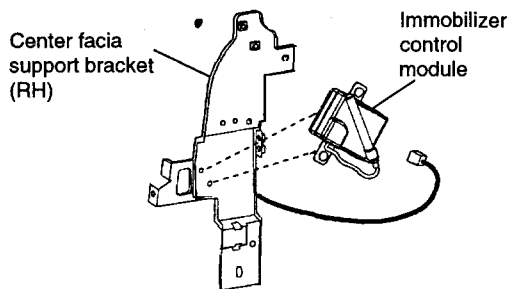
KSMB008L

2. Remove the audio unit.



KSMB008M

3. Remove the flange nuts(2EA) holding the ICM(Immobilizer Control Module) from right hand center facia support bracket.



ETMB305A

**PASSWORD SETTING** ETMB3250

Password can be used to register the master keys when you lost the ID key by using a tester (such as Hi-scan).

**1. INITIAL PASSWORD**

The initial password for ICM has been set by the manufacturer as 2345.

Key can be registered and corrected by using the initial password until a new password is registered.

**2. PASSWORD REGISTRATION AND CHANGE**

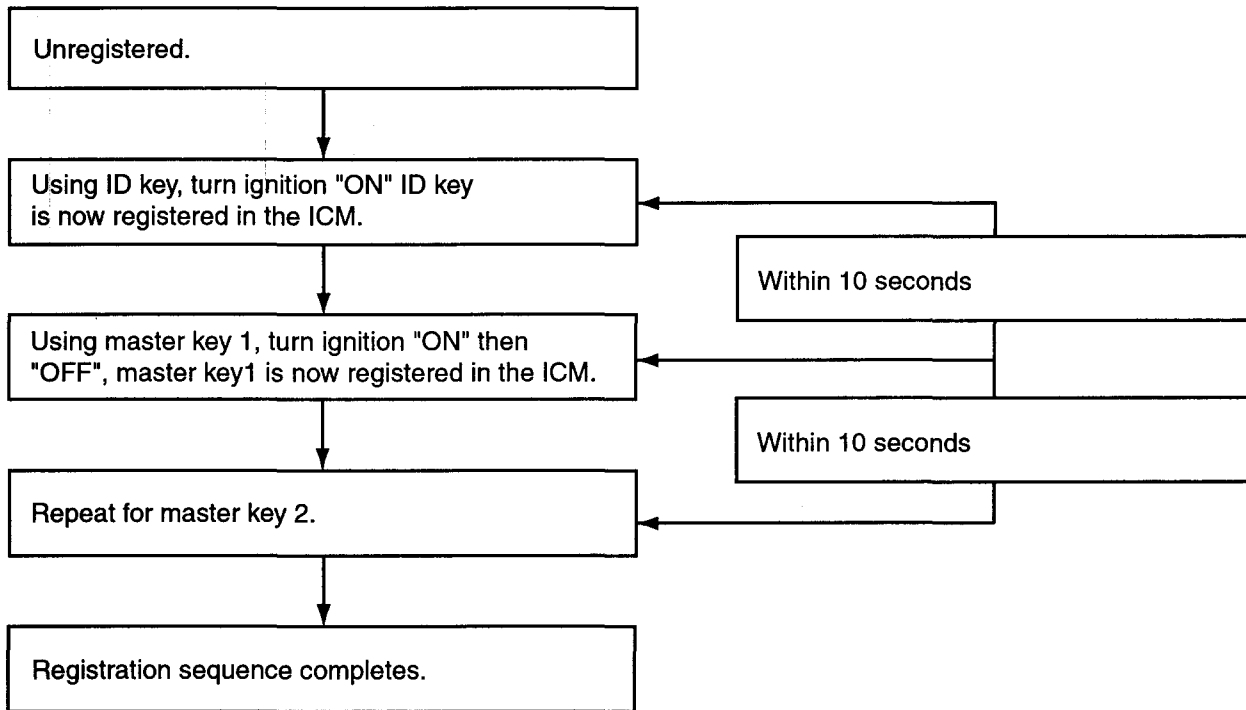
Using a tester(Hi-scan), the initial password(preset as 2345 all) can be replaced by a new password nominated by the owner.

4 numbers among 0-9 can be registered as password. Once the password has been changed from 2345, the ICM is ready to record the ID code.

# KEYS REGISTRATION AND CORRECTION

ETMB3300

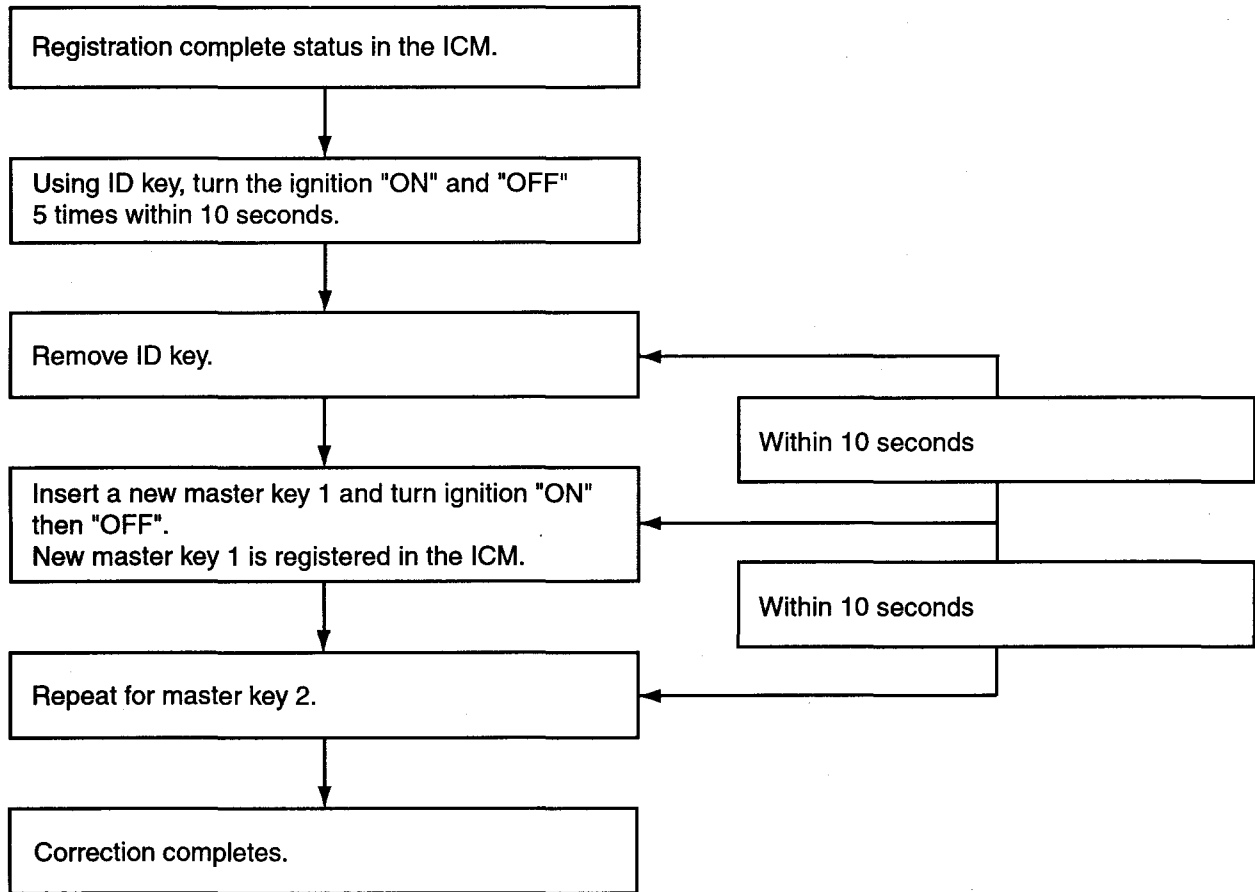
## 1. INITIAL REGISTRATION METHOD



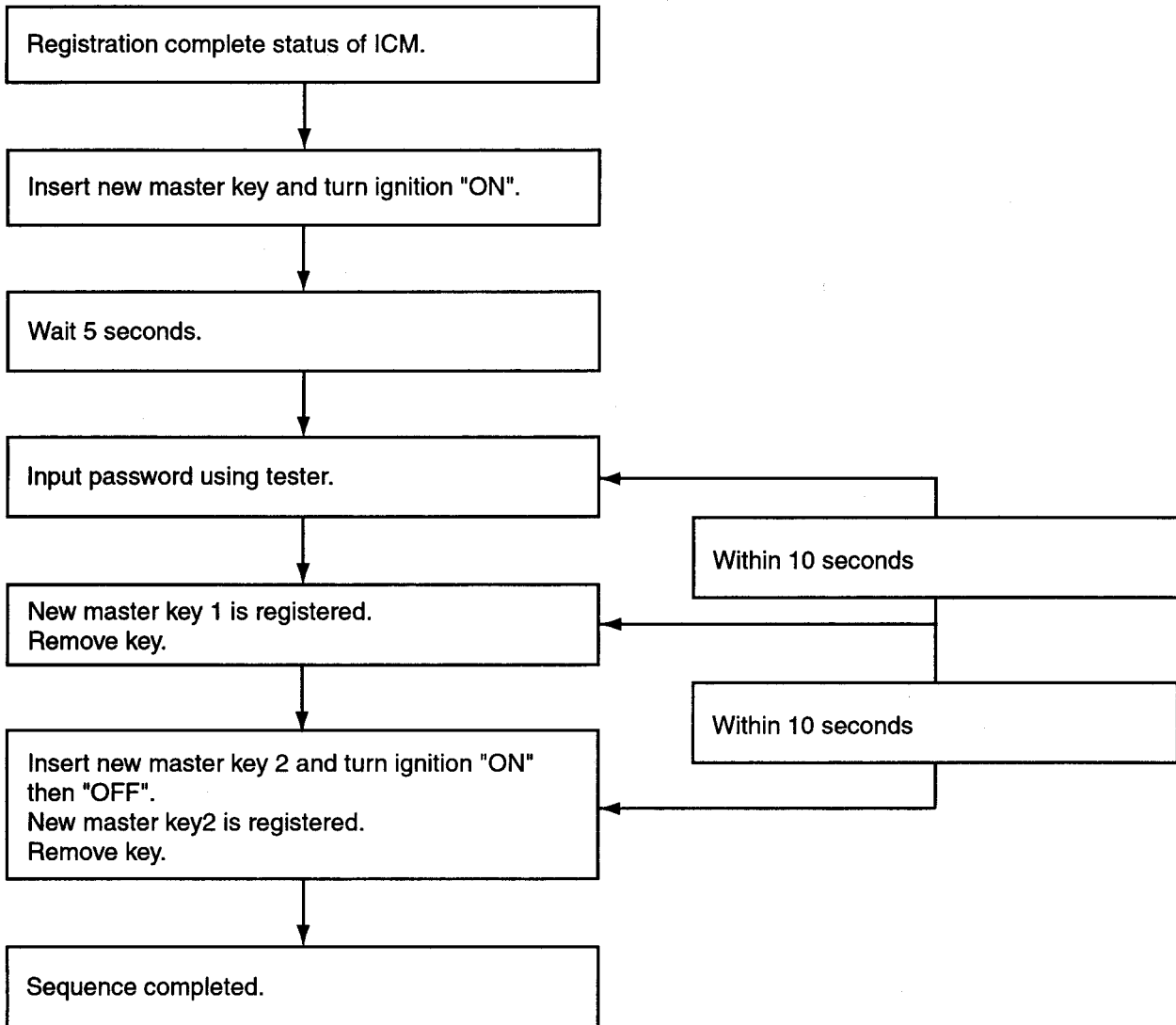
2. REGISTRATION CORRECTION FOR MASTER KEYS

1) Using ID key

In cases when the master key is lost or where a new set of master keys need to be produced, it can be achieved using two methods.



- 2) Using password  
 When the customers lost the ID key, new master keys can be registered by using Hi-scan only.  
 ID key can not be corrected and reproduced.



ETMB330C

 **NOTE**

*Once the password is mis-registered, it is impossible to register new password during 10 seconds regardless of ignition ON/OFF.*

*When the new master keys have been registered, the codes for existing master keys are all cleared.*

*The password should consist of 4 numbers among ten (0-9) numbers.*

**DIAGNOSIS OF IMMOBILIZER RELATED FAULTS** ETMB3350

Type	Immobilizer related faults	Possible cause
COVEC-F (WITH ECM)	Transponder communication error	- Invalid transponder data
	ECM communication link error	- Invalid request from ECM or corrupted data
	ETACS RF communication error (with ETACS)	- Keyless code is not received normally - Code saver receives a code except door lock or unlock data
	ETACS C/S communication error (with ETACS)	- Invalid memorized data from code save device (Start Format, Stop Format, ID Format)
	EEPROM communication error	- Inconsistent data of EEPROM - Invalid write operation to EEPROM
	ECM request signal error	- There is no request code from ECM for 5 sec after ignition on
EXCEPT COVCE-F (WITHOUT ECM)	Transponder communication error	- Invalid transponder data
	FCVC (Fuel Cut Valve Controller) request signal error	- There is no request code from FCVC for 5 sec after ignition on
	ETACS RF communication error (with ETACS)	- Keyless code is not received normally - Code saver receives a code except door lock or unlock data
	ETACS C/S communication error (with ETACS)	- Invalid memorized data from code save device (Start Format, Stop Format, ID Format)
	EEPROM communication error	- Inconsistent data of EEPROM - Invalid write operation to EEPROM