

Body Electrical System

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GENERAL

INSTRUMENTS AND WARNING
SYSTEM

ETHA0010

SPECIFICATIONS

Warning lamps		Bulb wattage (W)	Color
Illumination		3.4	Beige
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
Door ajar		1.4	Red
Tailgate open		1.4	Amber
Cruise		1.4	Green
Fog lamp		1.4	Green
Immobilizer		1.4	Amber
A/T	P	1.4	Green
	R	1.4	Amber
	N	1.4	Green
	D	1.4	Green
	3	1.4	Green
	2	1.4	Green
	L	1.4	Green

SERVICE SPECIFICATIONS

ETHA0050

Items	Specifications																																																																																				
Speedometer																																																																																					
Type	o Cross coil type.																																																																																				
Input spec.	o Hall IC type : 4 pulses/rev.																																																																																				
Indication	- o Km : At 637 rpm x 4 pulses/rev. indicate 60 Km/h - o MILE : At 1026 rpm x 4 pulses/rev. indicate 60 MPH																																																																																				
Standard values	<table><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>20-24.1</td><td>40-43</td><td>60-64.1</td><td>80-85.2</td><td>100-105.2</td><td>120.5-126.3</td></tr><tr><td>Tolerance (Km/ h)</td><td>20.8-25.4</td><td>40-44</td><td>60.8-65.4</td><td>81.4-86.8</td><td>102.6-108.2</td><td>123.5-129.6</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>140.5-146.7</td><td>160.5-167.5</td><td>181-188.4</td><td>201-209.1</td><td colspan="2">EXCEPT, EEC & GENERAL</td></tr><tr><td>Tolerance (Km/ h)</td><td>144.4-151</td><td>165.4-172.4</td><td>186.3-193.8</td><td>207.2-215.2</td><td colspan="2">EEC, GENERAL</td></tr></table> <table><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>10-12.5</td><td>20-22</td><td>40-42.6</td><td>60-63.4</td><td>80.3-84.1</td><td>100.3-104.7</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 colspan="5">Remarks</td></tr><tr><td>Tolerance (MPH)</td><td>120.3-125.3</td><td colspan="5">EXCEPT USA</td></tr><tr><td>Tolerance (MPH)</td><td>117.5-122.5</td><td colspan="5">USA</td></tr></table> o Must tap the speedometer with hand to prevent hysteresis effects when inspected.	Velocity (Km/ h)	20	40	60	80	100	120	Tolerance (Km/ h)	20-24.1	40-43	60-64.1	80-85.2	100-105.2	120.5-126.3	Tolerance (Km/ h)	20.8-25.4	40-44	60.8-65.4	81.4-86.8	102.6-108.2	123.5-129.6	Velocity (Km/ h)	140	160	180	200	Remarks		Tolerance (Km/ h)	140.5-146.7	160.5-167.5	181-188.4	201-209.1	EXCEPT, EEC & GENERAL		Tolerance (Km/ h)	144.4-151	165.4-172.4	186.3-193.8	207.2-215.2	EEC, GENERAL		Velocity (MPH)	10	20	40	60	80	100	Tolerance (MPH)	10-12.5	20-22	40-42.6	60-63.4	80.3-84.1	100.3-104.7	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	Remarks					Tolerance (MPH)	120.3-125.3	EXCEPT USA					Tolerance (MPH)	117.5-122.5	USA				
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Tachometer																																																																																					
Type	o Cross coil type. (4 cyl: 2pulses/ rev, 6 cyl: 3pulses/ rev)																																																																																				
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Fuel gauge																																																																																					
Type	- o Must tap the tachometer with hand to prevent hysteresis effects when inspected. - o Cross coil type (Fixed point type : Pointer should not fall into the "E" point but indicate remaining fuel level when I.G. off).																																																																																				
Standard values	<table><tr><td rowspan="2">Level</td><td>Gauge</td><td rowspan="2">Tolerance assembled with fuel sender (°)</td></tr><tr><td>Resistance (Ω)</td></tr><tr><td>E (Empty)</td><td>95</td><td>- 40 ^{+2.4}_{-2.2}</td></tr><tr><td>1/2</td><td>32.5</td><td>0±5.3</td></tr><tr><td>F (Full)</td><td>7</td><td>40±3.5</td></tr></table> - o Inspection order : E→F→E The indications must be read at least 7 minutes after the input of the datum resistance value to each measuring point. - o Point stability tolerance : Within 9° Apply the power for 10 minutes. Then turn off the power source for 30 minutes and read the position of the pointer.	Level	Gauge	Tolerance assembled with fuel sender (°)	Resistance (Ω)	E (Empty)	95	- 40 ^{+2.4} _{-2.2}	1/2	32.5	0±5.3	F (Full)	7	40±3.5																																																																							
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Items	Specifications				
Temperature gauge Type Indication standard	o Cross coil type (Intermedia stability type).				
	Temperature		Angle (°)		Assembled tolerance (°C)
	55°C		-40		-
	85°C~110°C		-7 ⁺² ₋₃		-7 ⁺³ ₋₂
	Red zone (over 125°C)		over 35±5		35 ⁺⁷ ₋₄
Resistance of temperature sender	o Inspection order : OFF→C→H				
	Temperature (°C)	55	85	110	125
	Resistance (Ω)	157	48.4	24	15.2

TROUBLESHOOTING ETHA0100

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.

AUDIO

There are six areas where a problem can occur: wiring

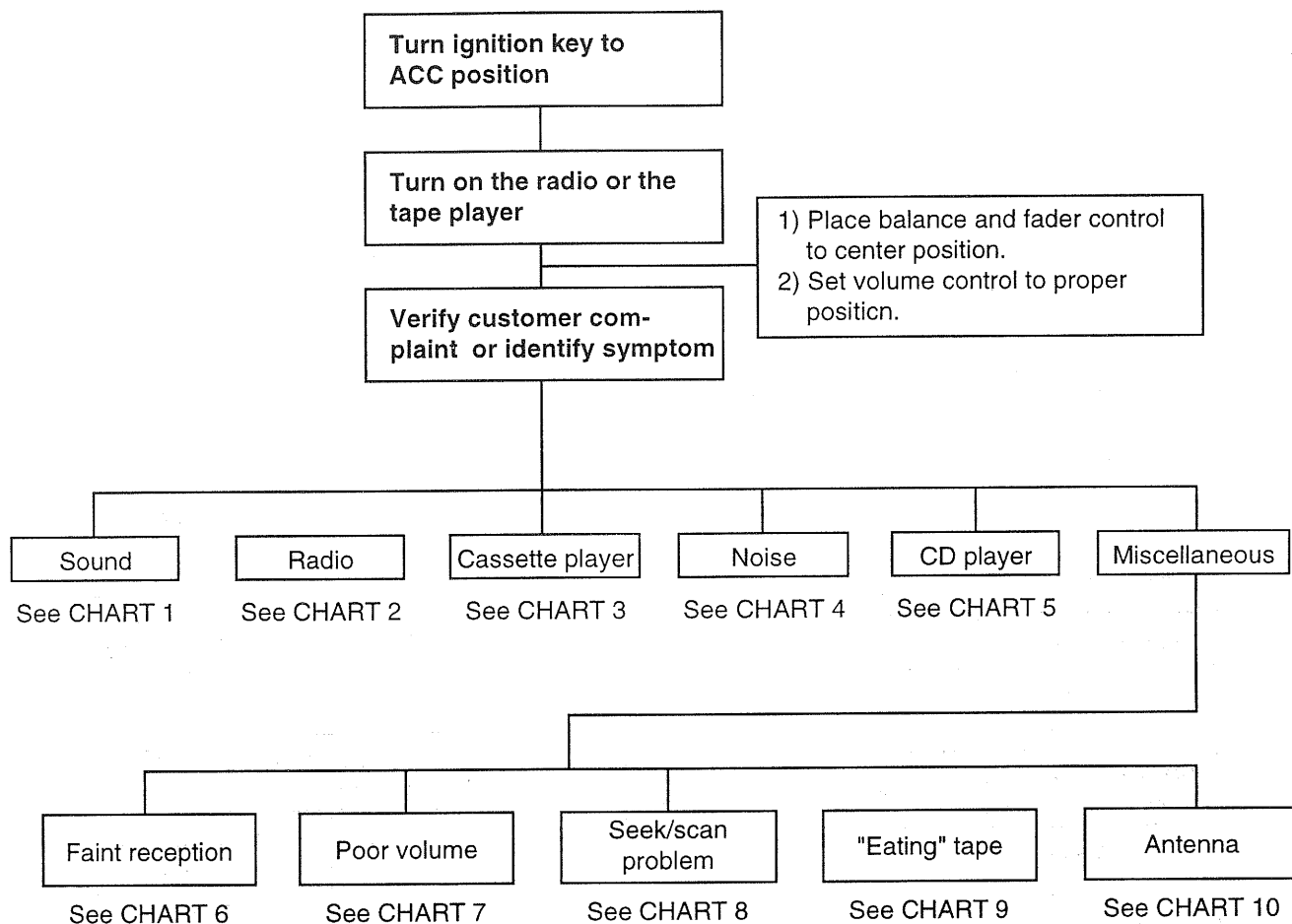
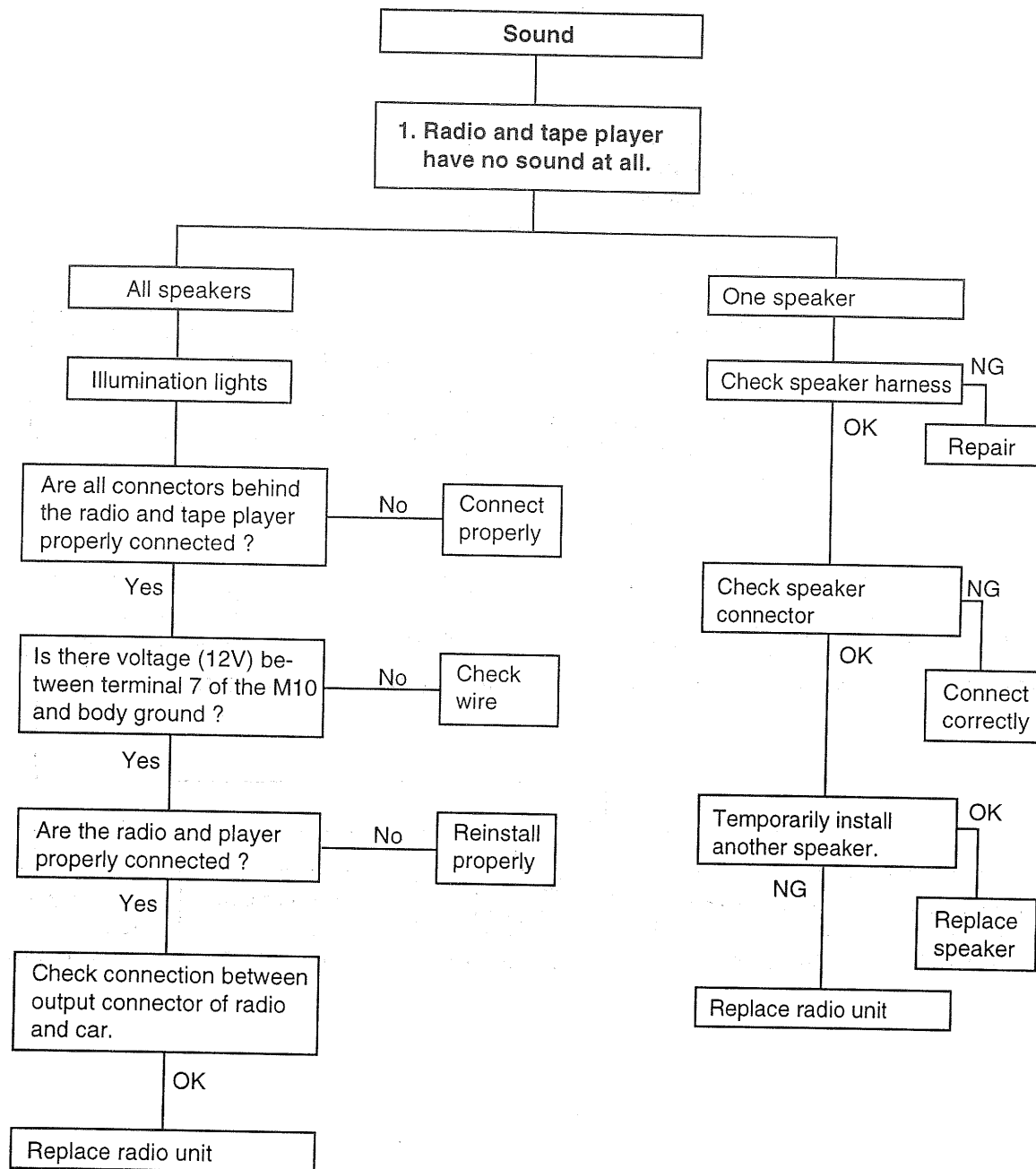
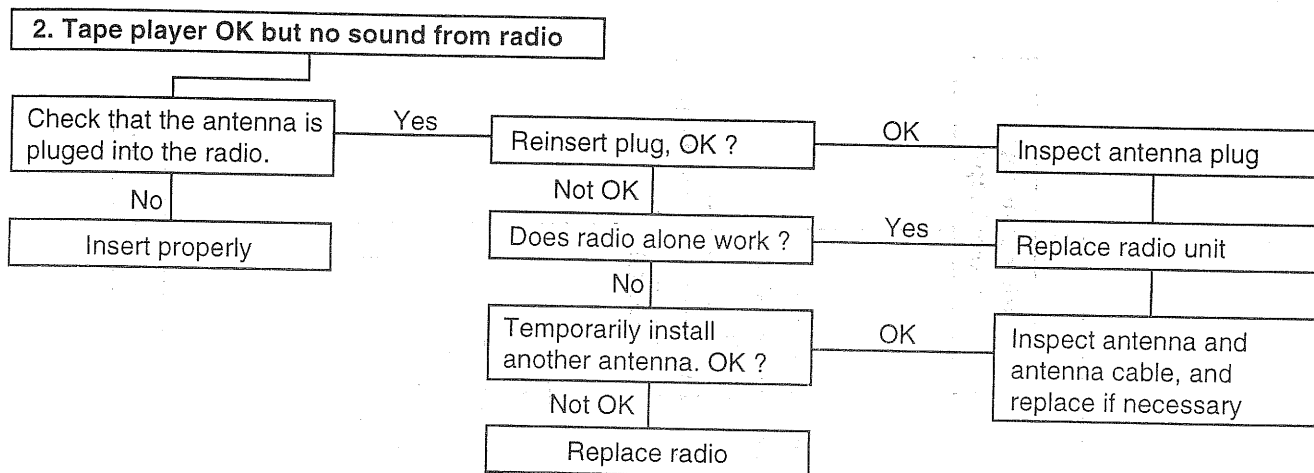


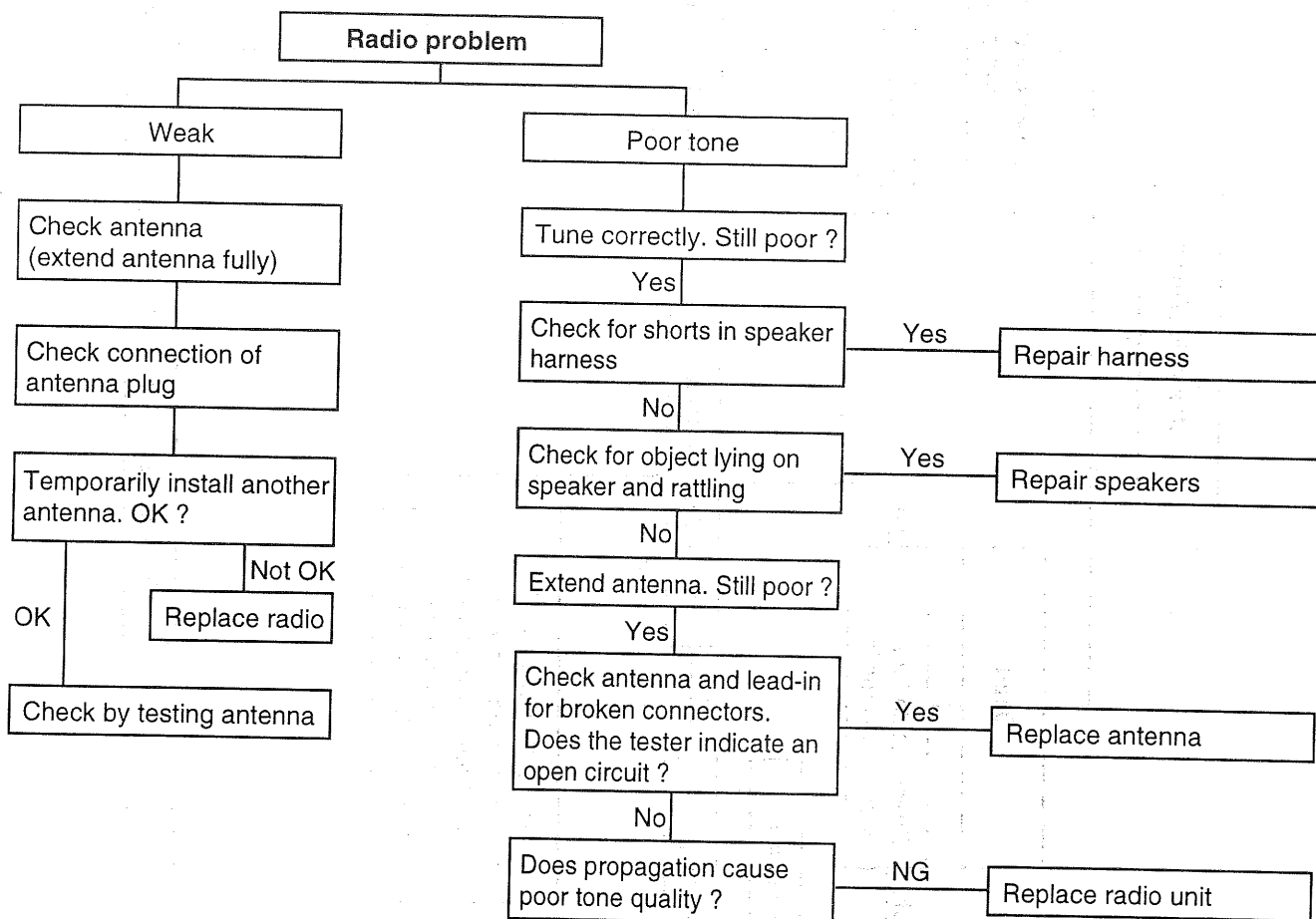
CHART 1 ETAA0110





ETA9010C

CHART 2 ETA90130



ETA9010D

CHART 3

ETA90140

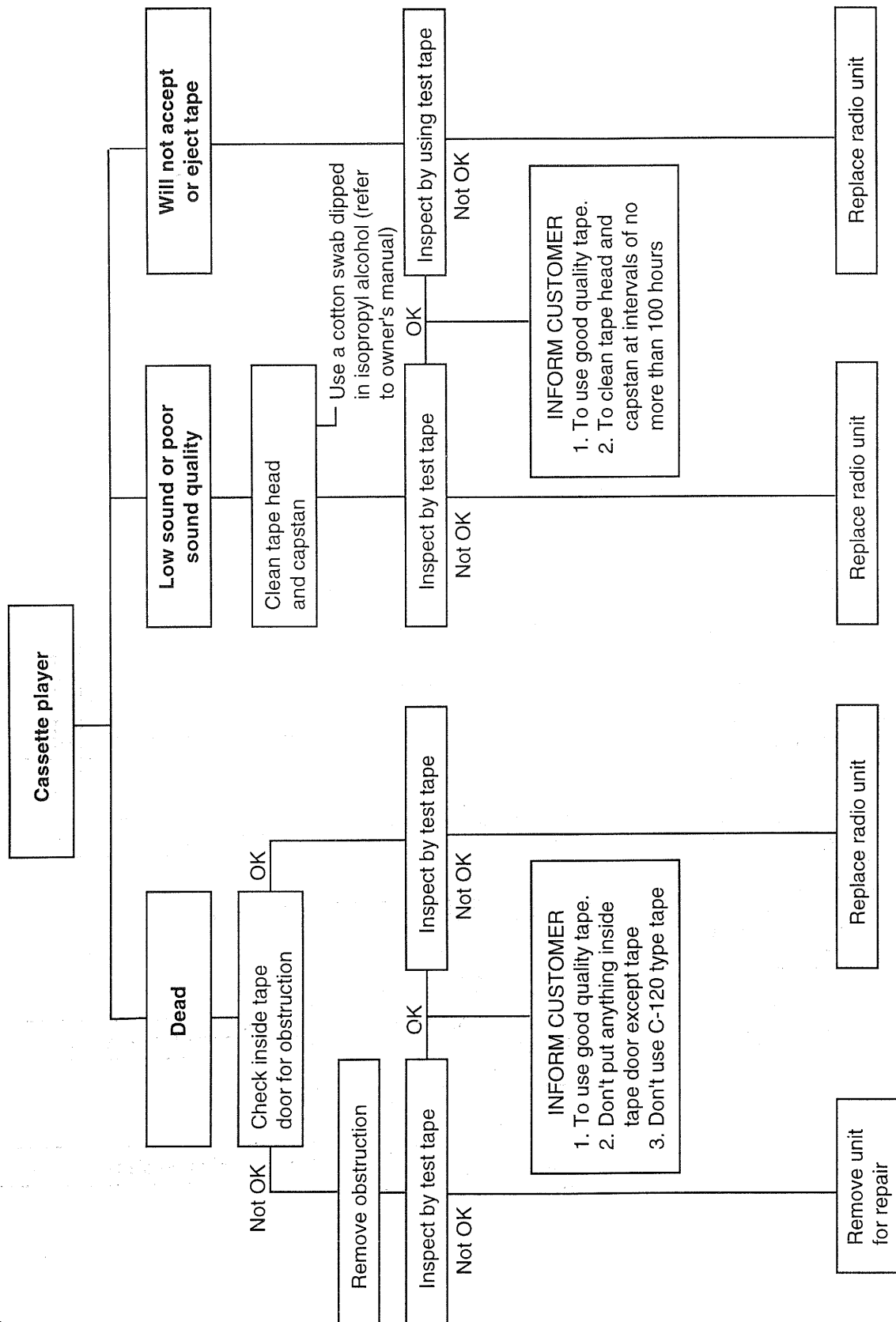


CHART 4 ETA90150

1. RADIO

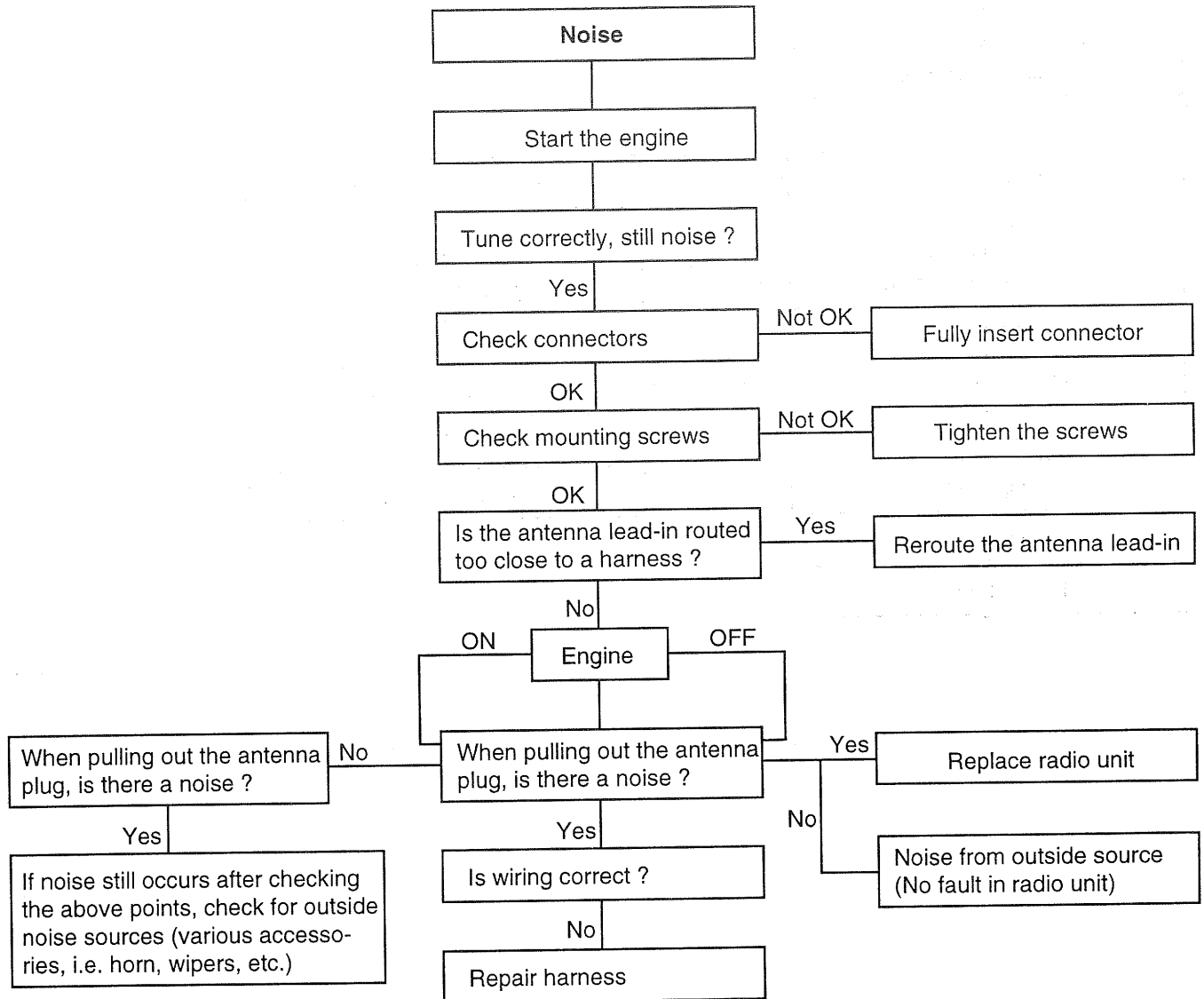


CHART 4 (CONTINUED) ETA90160

2. TAPE

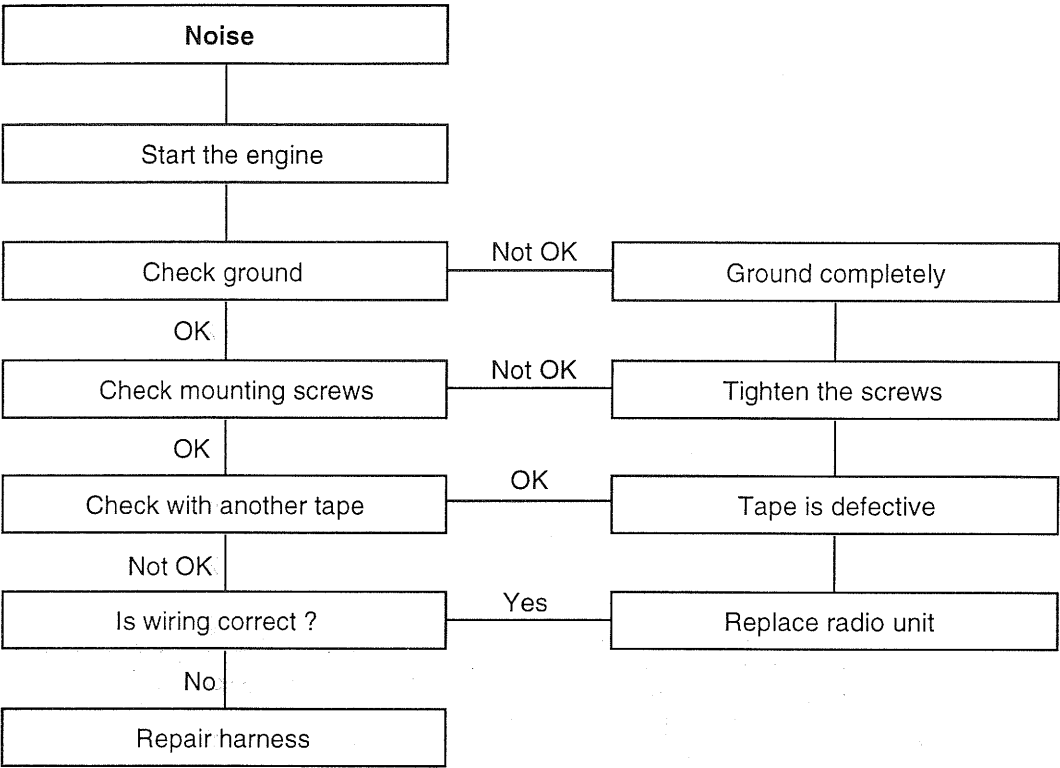
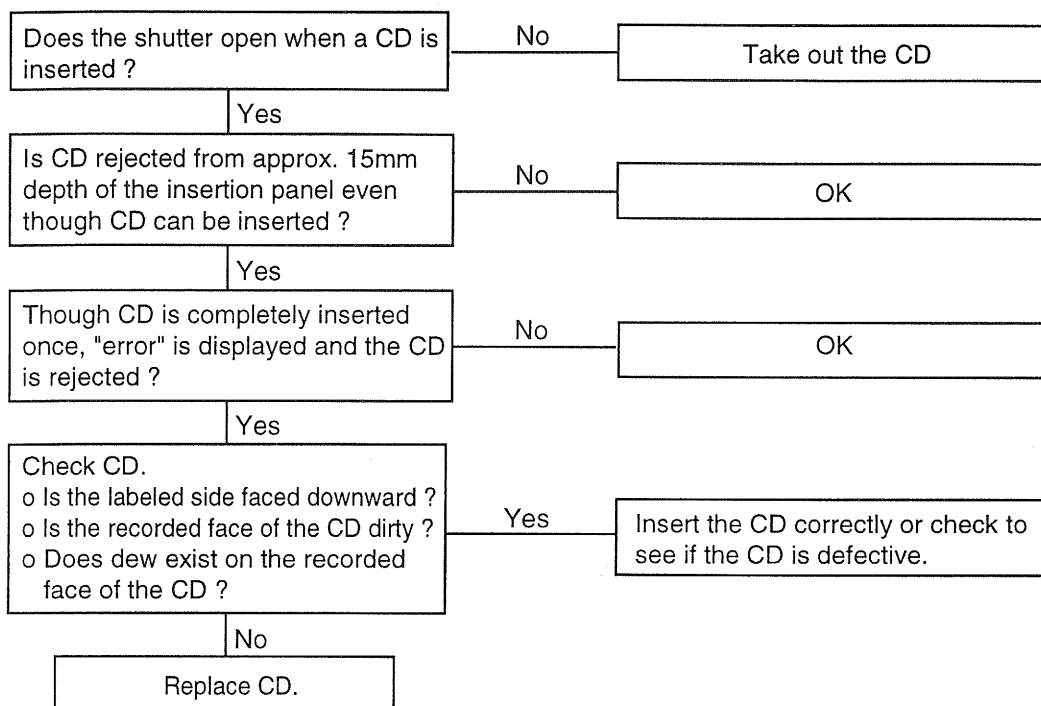


CHART 5

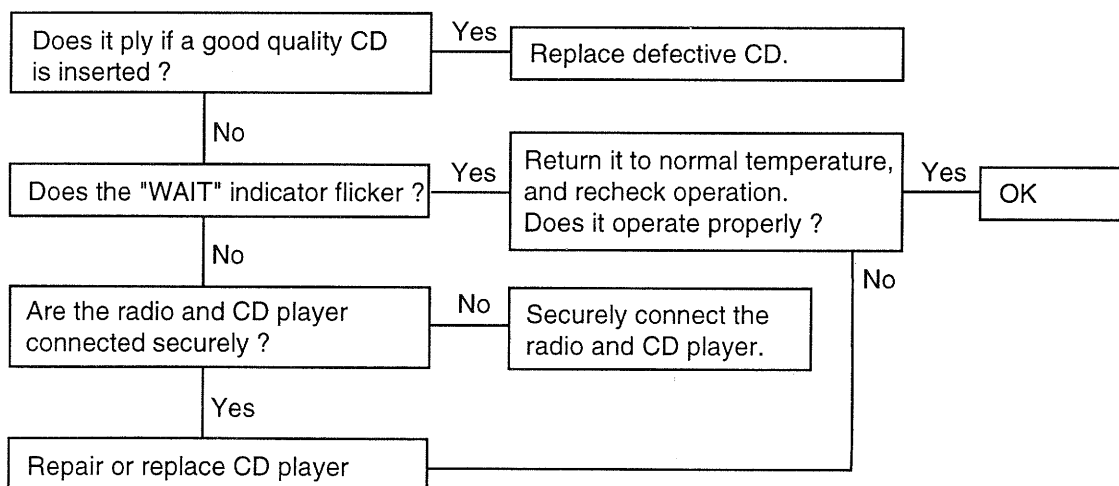
ETA90170

1. CD WILL NOT BE ACCEPTED



ETA9010H

2. NO SOUND

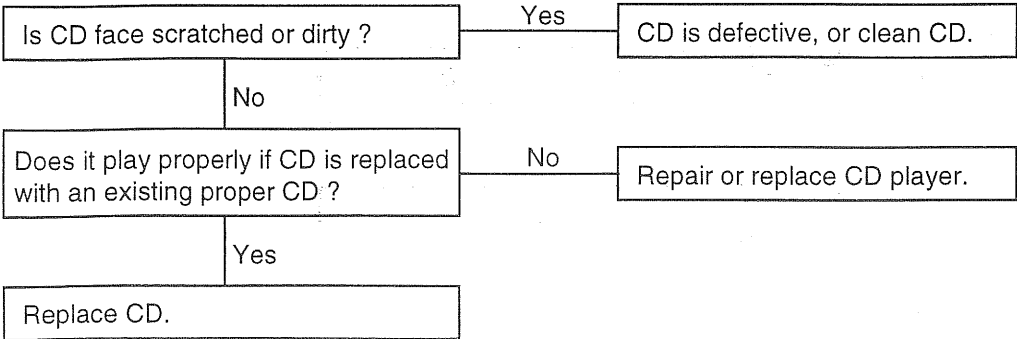


(The combined radio cassette must operate properly.)

ETA9010O

3. CD SOUND SKIPS

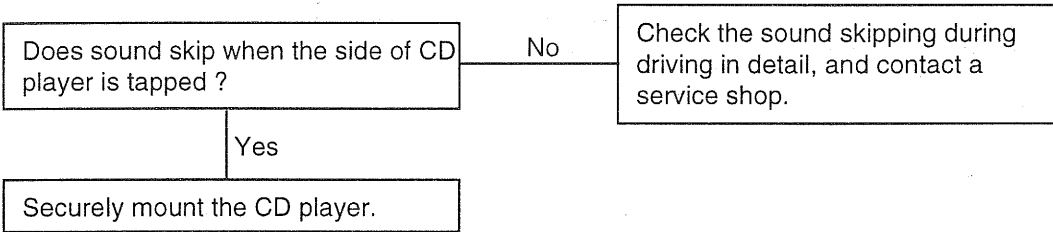
1. Sound sometimes skips during parking.



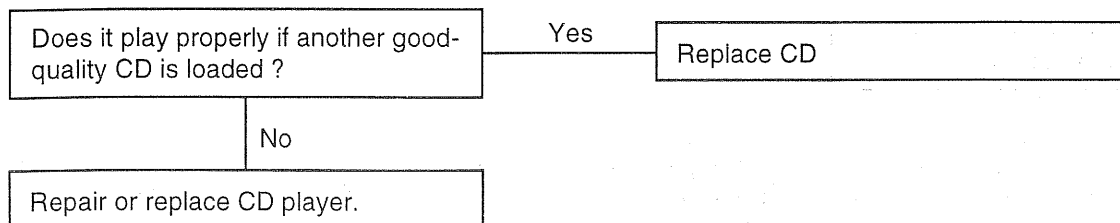
2. Sound sometimes skips during driving.

(Stop vehicle, and check it.)

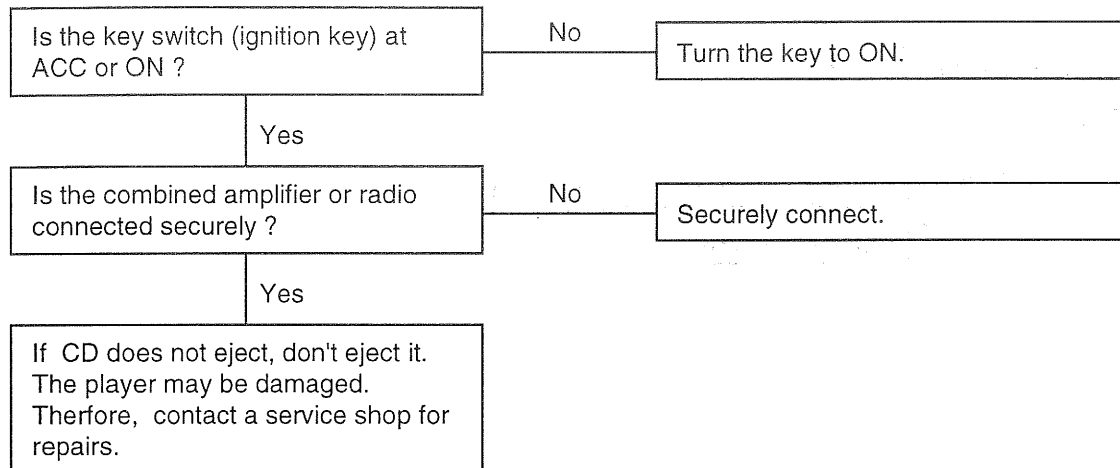
(Check by using a CD which is free of scratches, dirt or other abnormalities.)



4. SOUND QUALITY IS POOR



5. CD WILL NOT EJECT



6. NO SOUND FROM ONE SPEAKER

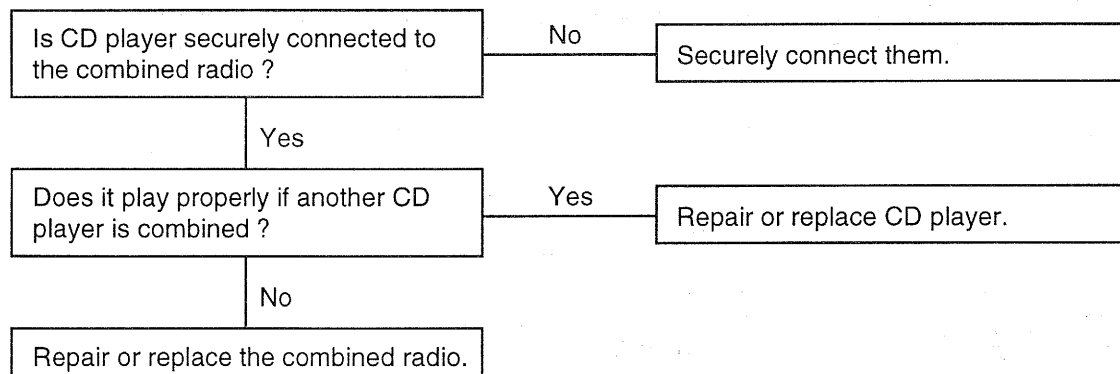
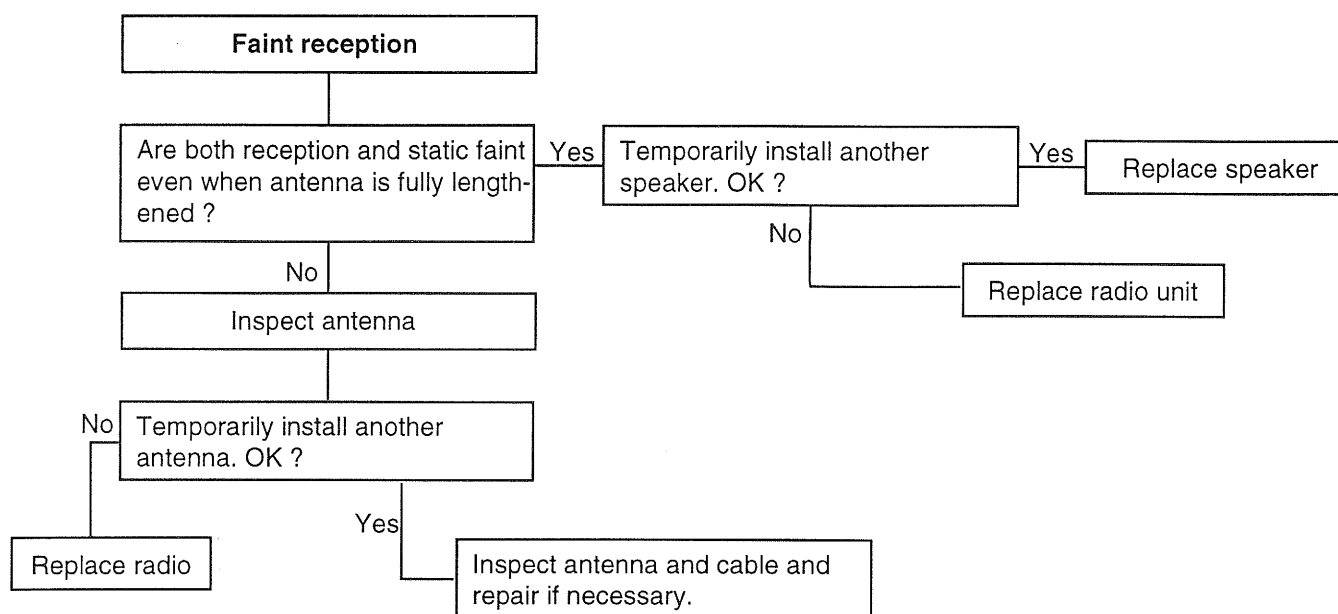
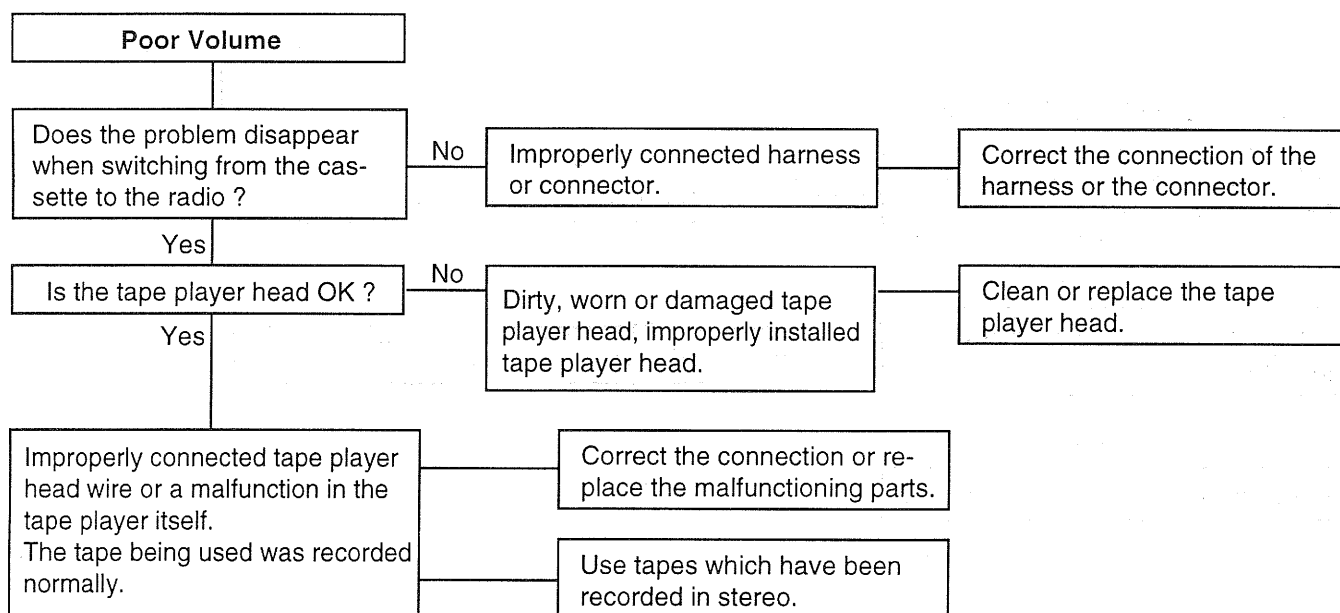


CHART 6 ETA90200

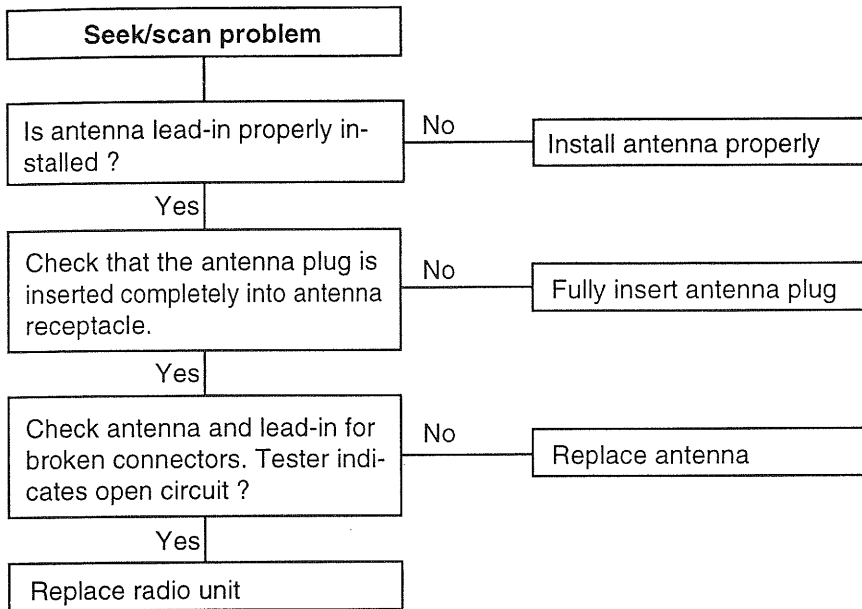


ETA9010K

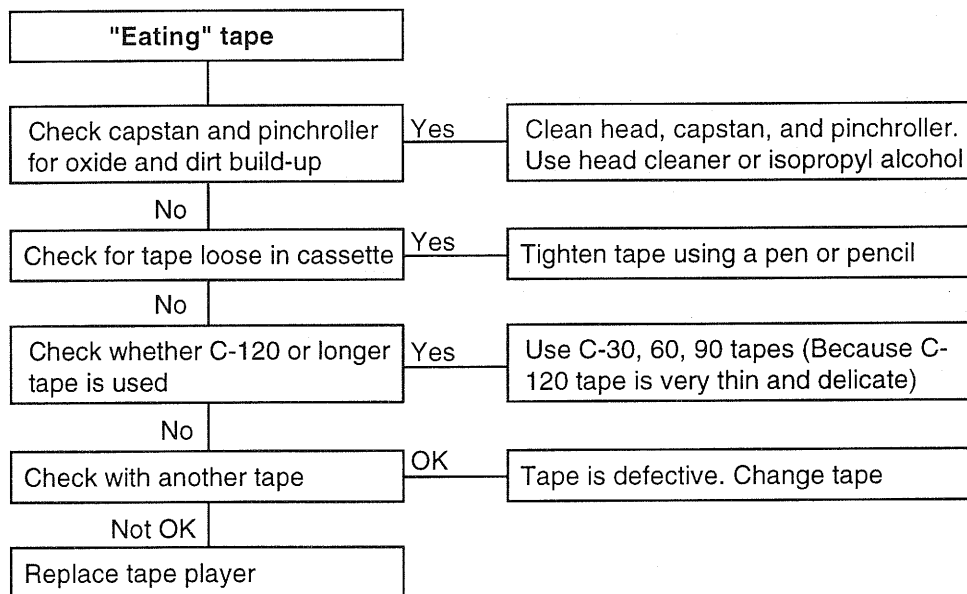
CHART 7 ETA90210.



ETA9010L

CHART 8 ETA90220

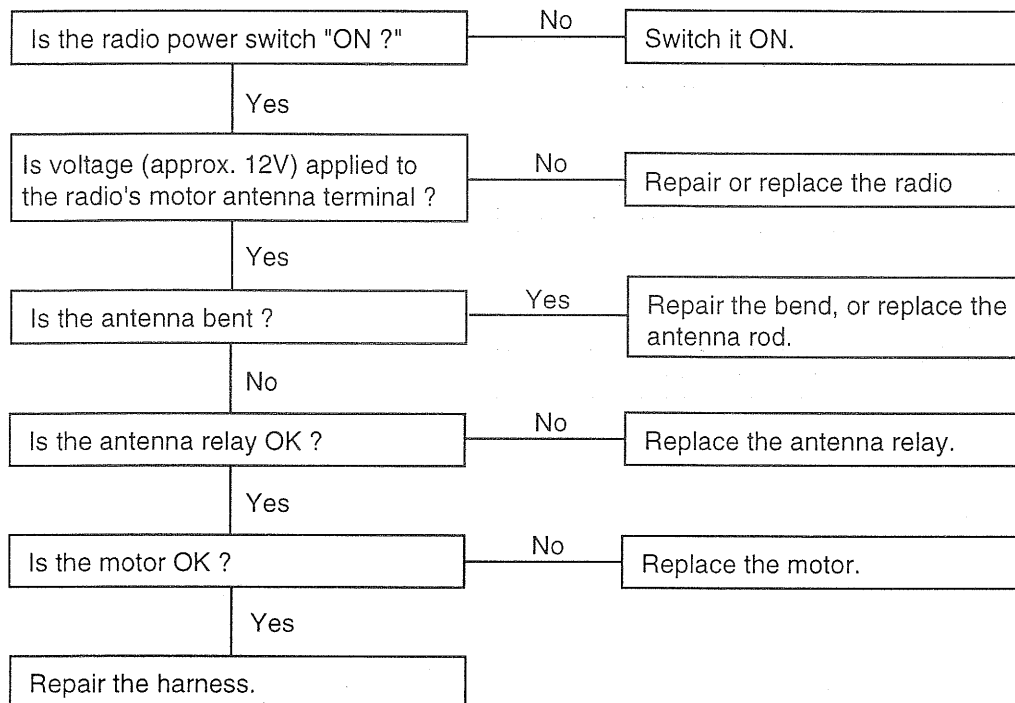
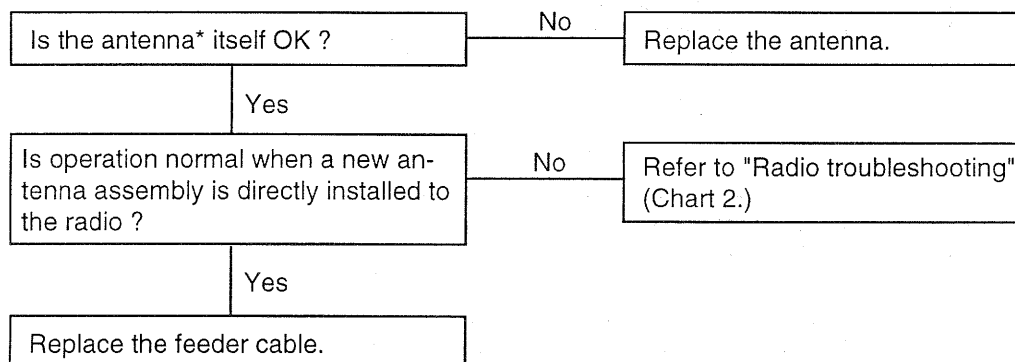
ETA9010M

CHART 9 ETA90230

ETA9010N

CHART 10 ETAA0240**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

TROUBLESHOOTING

ETHA0700

Trouble symptom	Possible cause	Remedy
One lamp does not light (all exterior)	Bulb burned out	Replace bulb
	Socket, wiring or ground faulty	Repair if necessary

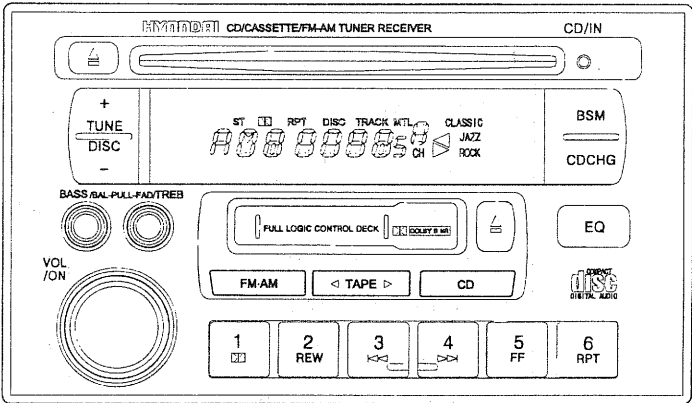
Trouble symptom	Possible cause	Remedy
Headlamps do not light	Bulb burned out Fuse 28 (10A) blown Headlamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace bulb Replace fuse and check for short Check relay Check switch Repair if necessary
Tail and license lamp do not light	Tail lamp fuse blown (10A) Fusible link blown Taillamp relay faulty Lighting switch faulty Wiring or ground faulty	Replace fuse and check for short Replace fusible link Check relay Check switch Repair if necessary
Stop lamps do not light	Fuse 24 (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 (taillamps 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 lamp does not operate	Fuse 3 (10A) blown Flasher faulty Turn signal switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Hazard warning lamps do not operate	Fuse 23 (10A) blown Flasher faulty Hazard switch faulty Wiring or ground faulty	Replace fuse and check for short Check flasher Check switch Repair if necessary
Flasher rate too slow or too fast	Lamps' wattage are smaller or larger than is specified for use Defective flasher	Replace lamps Replace flasher
Back up lamps do not light up	Fuse 11 (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 do not light up	Fuse 16 blown Wiring or ground faulty	Replace fuse and check for short Repair if necessary

AUDIO SYSTEM

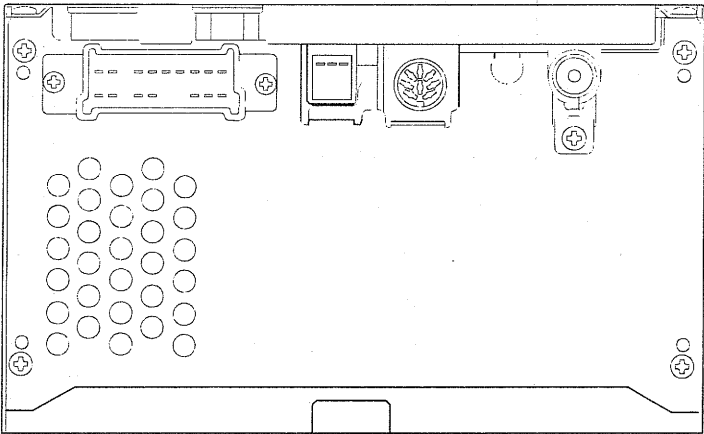
AUDIO UNIT

COMPONENTS ETHA0850

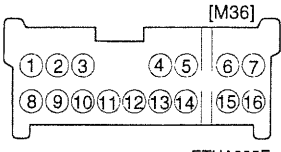
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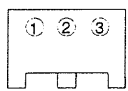


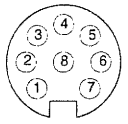
ETHA005C



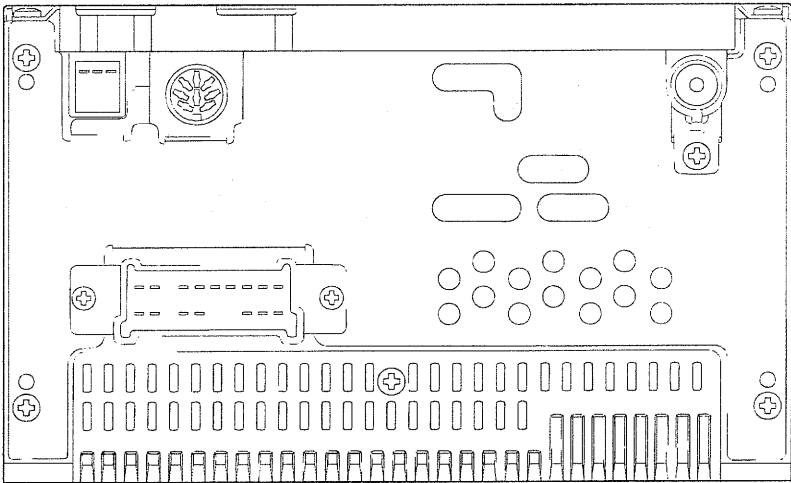
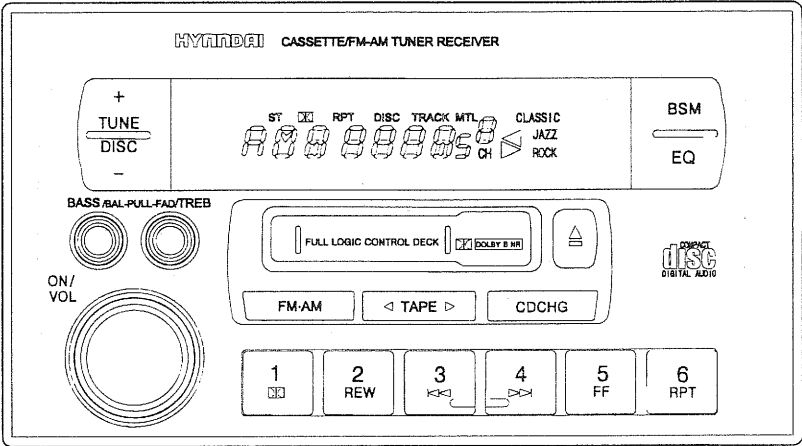
ETHA005D

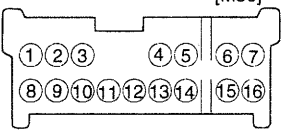
16P CONNECTOR	NO.	NOTE
	1	ANT B+
	2	EXT-AMP RR LH(-) INPUT
	3	EXT-AMP FRT LH(-) INPUT
	4	EXT-AMP FRT RH(-) INPUT
	5	EXT-AMP RR RH(-) INPUT
	6	ILL(-)
	7	ACC(+)
	8	GROUND
	9	EXT-AMP RR LH(+) INPUT
	10	EXT-AMP FRT LH(+) INPUT
	11	N.C
	12	AMP REMOTE
	13	EXT-AMP FRT RH(+) INPUT
	14	EXT-AMP RR RH(+) INPUT
	15	ILL(+)
	16	BACK UP(+)

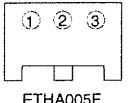
3P CONNECTOR	NO.	NOTE
	1	GROUND
	2	SIGNAL
	3	REAR SIGNAL

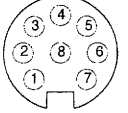
8P CONNECTOR	NO.	NOTE
	1	R
	2	CD ON
	3	BUS
	4	B+
	5	M.GROUND
	6	NC
	7	L
	8	A.GROUND

<H940B>

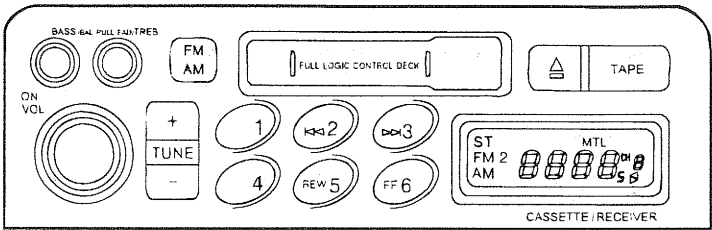


16P CONNECTOR	NO.	NOTE
	1	ANT B+
	2	EXT-AMP RR LH(-) INPUT
	3	EXT-AMP FRT LH(-) INPUT
	4	EXT-AMP FRT RH(-) INPUT
	5	EXT-AMP RR RH(-) INPUT
	6	ILL(-)
	7	ACC(+)
	8	GROUND
	9	EXT-AMP RR LH(+) INPUT
	10	EXT-AMP FRT LH(+) INPUT
	11	N.C
	12	AMP REMOTE
	13	EXT-AMP FRT RH(+) INPUT
	14	EXT-AMP RR RH(+) INPUT
	15	ILL(+)
	16	BACK UP(+)

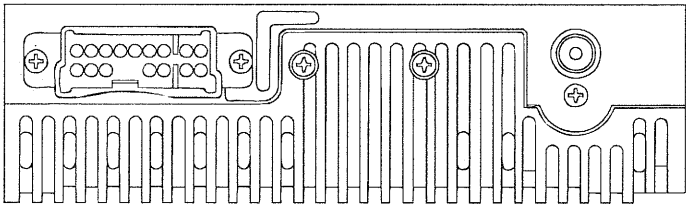
3P CONNECTOR	NO.	NOTE
	1	GROUND
	2	SIGNAL
	3	REAR SIGNAL

8P CONNECTOR	NO.	NOTE
	1	R
	2	CD ON
	3	BUS
	4	B+
	5	M.GROUND
	6	NC
	7	L
	8	A.GROUND

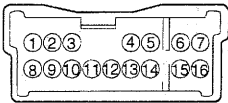
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ETHA005Q

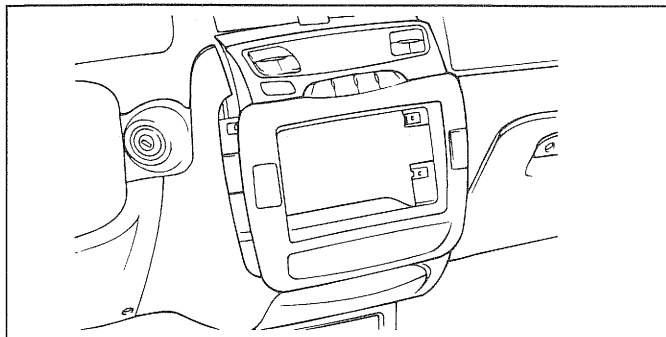


ETHA005R

16P CONNECTOR	NO.	NOTE
 ETHA005S	1	AUTO ANTENNA
	2	SPKR RR LH(-)
	3	SPKR FRT LH(-)
	4	SPKR FRT RH(-)
	5	SPKR RR RH(-)
	6	ILL(-)
	7	ACC(+)
	8	GROUND
	9	SPKR RR LH(+)
	10	SPKR FRT LH(+)
	11	N.C
	12	N.C
	13	SPKR FRT RH(+)
	14	SPKR RR RH(+)
	15	ILL(+)
	16	BACK UP(+)

REMOVAL AND INSTALLATION ETHA0900

1. Disconnect negative (-) battery terminal.
2. Remove the center facia panel and disconnect air temperature switch connector.

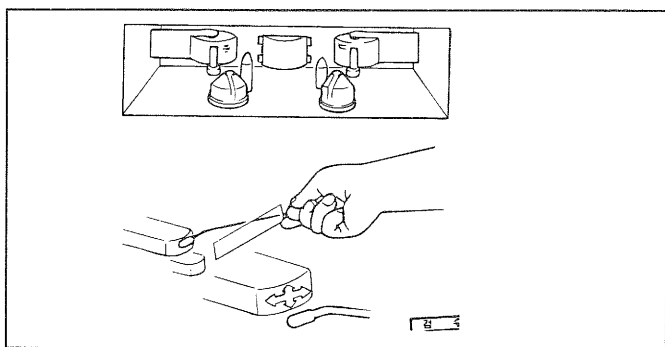


ESHA040Q

3. Loosen the screws holding the audio and remove the audio assembly from the mounting bracket.
4. Installation is the reverse of the removal process.

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



ETA9035A

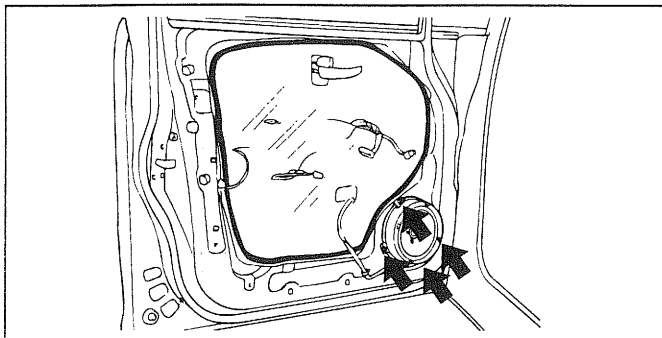
SPEAKERS

REMOVAL AND INSTALLATION

ETHA0950

FRONT SPEAKER

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

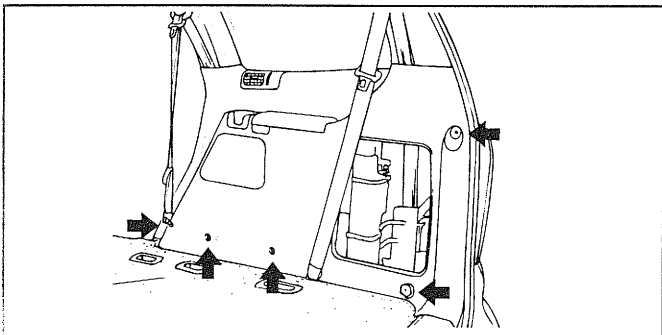


ESHA015E

2. Installation is the reverse of the removal process.

REAR SPEAKER

1. Remove the rear quarter trim (Refer to the BD group).



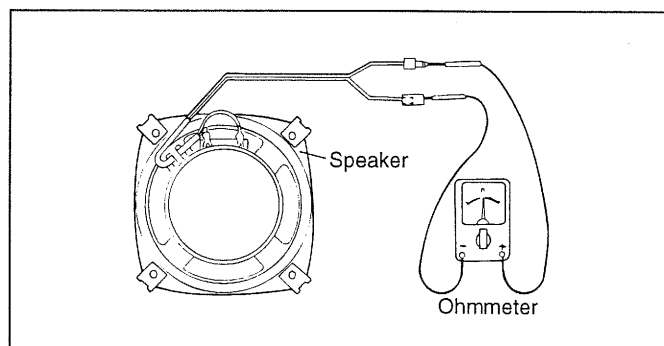
ESHA045D

2. Remove the rear speaker.

SPEAKER CHECKING

ETA90400

1. Check the speaker by using an ohmmeter. If an ohmmeter indicates the 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 plugs, touch the speaker terminals, the speaker is ok.

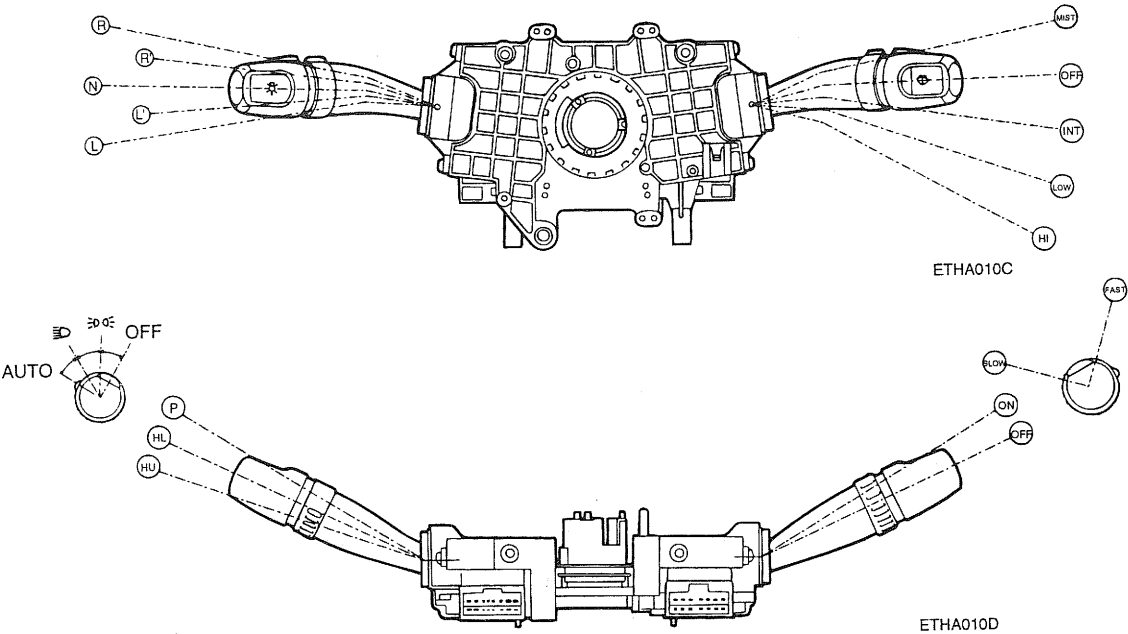


ETA9040A

MULTI FUNCTION SWITCH

MULTI FUNCTION SWITCH

COMPONENTS(WITHOUT AIR BAG) ETHA1000



M26-2

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

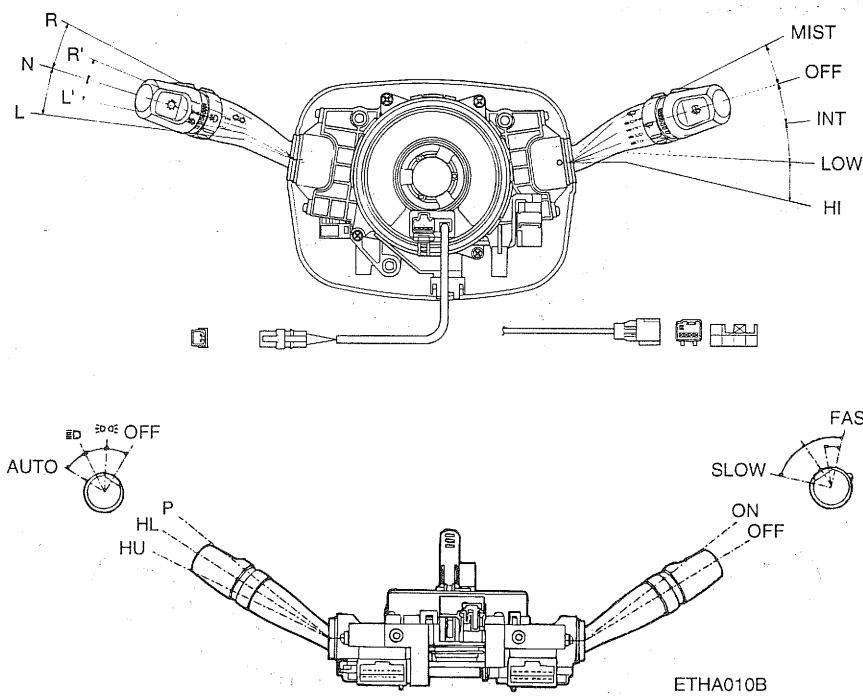
M26-1

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

Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description
M26-1	1	Head lamp passing switch	M26-2	1	Wiper high speed
	2	Head lamp high beam power		2	Wiper low speed
	3	-		3	Wiper parking
	4	-		4	Mist switch
	5	-		5	Wiper & washer ground
	6	-		6	Intermittent wiper
	7	Turn signal RH lamp switch		7	Front washer switch
	8	Flasher unit power		8	Horn
	9	Turn signal LH lamp switch		9	-
	10	Head lamp low beam power		10	-
	11	Dimmer & passing ground		11	-
	12	Front fog lamp switch		12	-
	13	Front fog lamp switch ground		13	Intermittent wiper
	14	Tail lamp switch		14	Intermittent wiper ground
	15	Head lamp switch			
	16	Auto light/Rear fog lamp switch			
	17	Lighting switch ground			
	18	-			

COMPONENTS(WITH AIR BAG)



M26-2

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

M26-1

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

M26-3

1	2	3	4
---	---	---	---

Circuit connection

Connector No.	Terminal No.	Description	Connector No.	Terminal No.	Description
M26-1	1	Head lamp passing switch	M26-2	1	Wiper high speed
	2	Head lamp high beam power		2	Wiper low speed
	3	-		3	Wiper parking
	4	-		4	Mist switch
	5	-		5	Wiper & washer ground
	6	-		6	Intermittent wiper
	7	Turn signal RH lamp switch		7	Front washer switch
	8	Flasher unit power		13	Intermittent wiper
	9	Turn signal LH lamp switch	M26-3	14	Intermittent wiper ground
	10	Head lamp low beam power		1	-
	11	Dimmer & passing ground		2	Horn relay
	12	Front fog lamp switch		3	-
	13	Front fog lamp switch ground		4	-
	14	Tail lamp switch			
	15	Head lamp switch			
	16	Auto light/Rear fog lamp switch			
	17	Lighting switch ground			
	18	-			

KTDA030Y

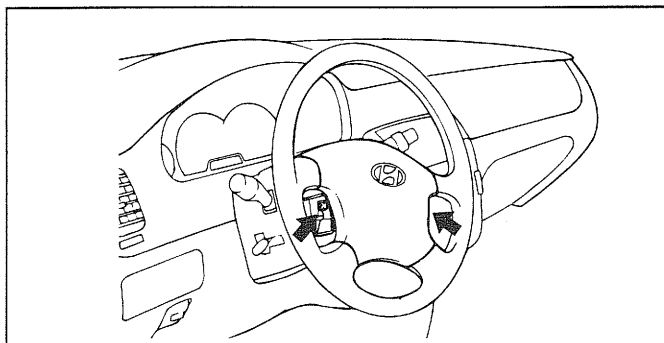
REMOVAL AND INSTALLATION ETHA1050

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

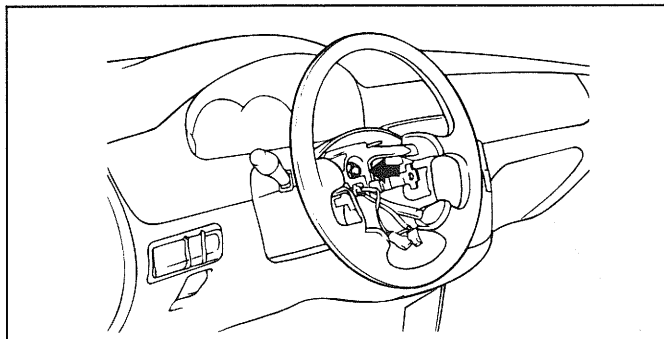
CAUTION

- 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 are 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 already 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 severed, 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.

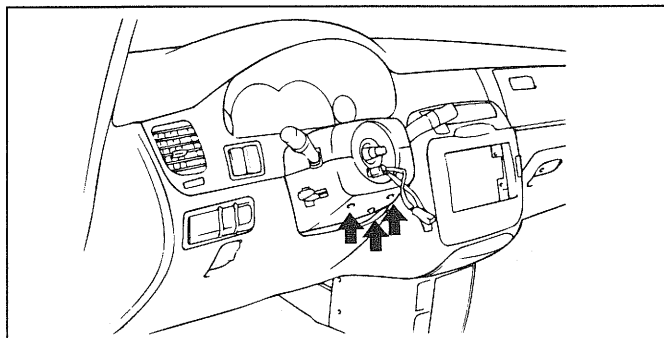
1. Remove the air bag module.



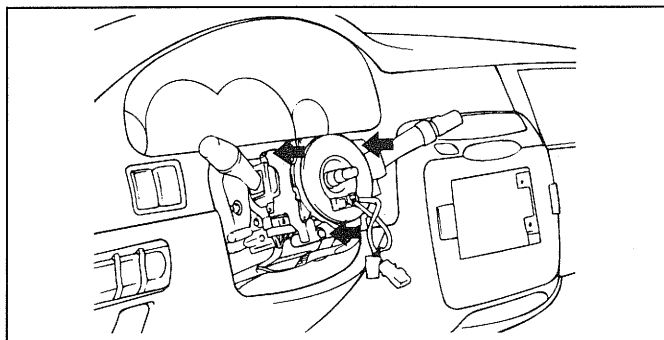
2. Remove the steering wheel.



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



4. Loosen the multifunction switch mounting screws and disconnect the connector. Remove the multifunction switch assembly.



5. Installation is the reverse of the removal process.

INSPECTION ETHA1100

Check the continuity between the terminals while operating the switch.

LIGHTING SWITCH [M26-1]

Terminal Position	14	15	16	17
OFF				
I	○	—		○
II	○	○	○	○
AUTO			○	○

KTDA040A

FRONT FOG LAMP SWITCH [M26-1]

Terminal Position	12	13
OFF		
INT	○	○

KTDA040F

DIMMER AND PASSING SWITCH [M26-1]

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

WIPER AND INTERMITTENT VOLUME SWITCH [M26-2]

Terminal Position	1	2	3	4	5	6	13	14
MIST				○	○			
OFF		○	○					
INT		○	○		○	○	○	○
LOW		○	—	○				
HI	○	—	—	○				

KTDA040D

WASHER SWITCH [M26-2]

Terminal Position	7	8
OFF		
ON	○	○

KTDA040E

TURN SIGNAL AND LANE CHANGE SWITCH [M26-1]

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

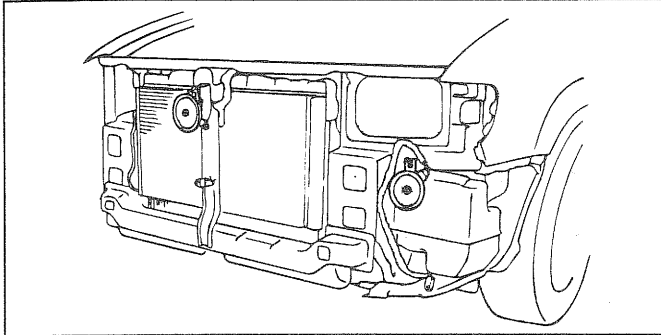
KTDA040C

HORNS

REMOVAL AND INSTALLATION

ETHA1150

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



ETHA015A

2. Installation is the reverse of the removal process.

INSPECTION

ETHA1200

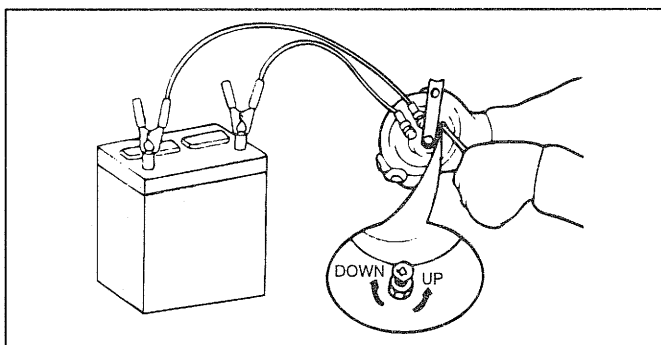
1. Test the horn by connecting battery voltage to the 1 and 2 terminals.
2. The horn should make a sound. If the horn fails to make a sound, replace it.

ADJUSTMENT

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

NOTE

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



ETDA050A

ETACS (ELECTRONIC TIME AND ALARM CONTROL SYSTEM)

ELECTRONIC TIME AND ALARM CONTROL MODULE OPERATION CHECK OF COMPONENTS

ETHA1250

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

ETACS FUNCTION

1. Vehicle speed sensing intermittent wiper

Time specification

T1 : Max. 0.6 sec.

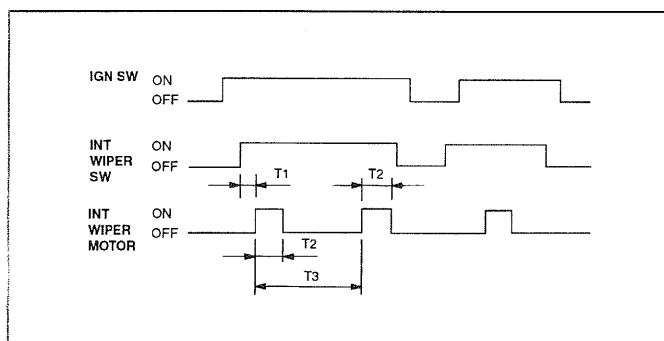
T2 : 0.6~0.7 sec. (Time of wiper motor 1 rotation)

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)



ETHA115C

2. Washer

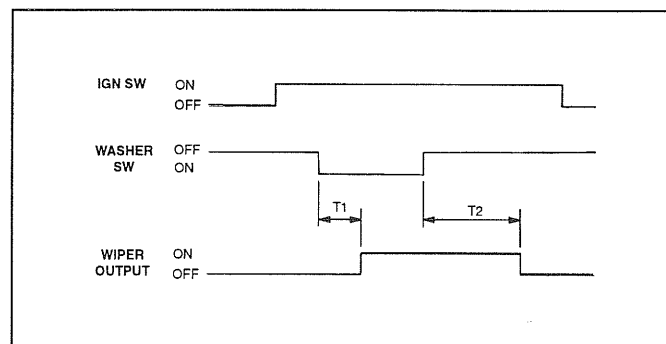
a. Time specification

T1 : 0.6 sec. or more

T2 : 2.5 - 3.8 sec.

T1 : 0.2 - 0.6 sec. (Mist)

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

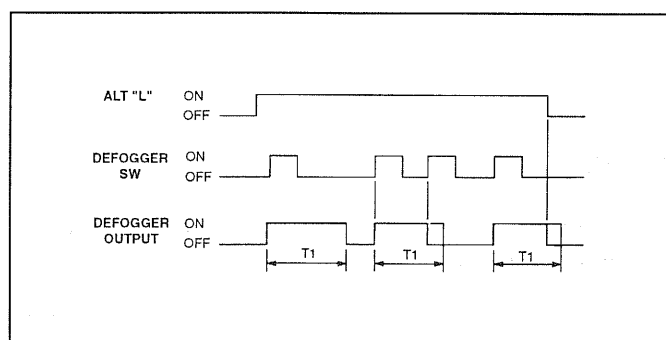


ETHA115D

3. Rear window defogger

Time specification

T1 : 20±1min.



ETHA115E

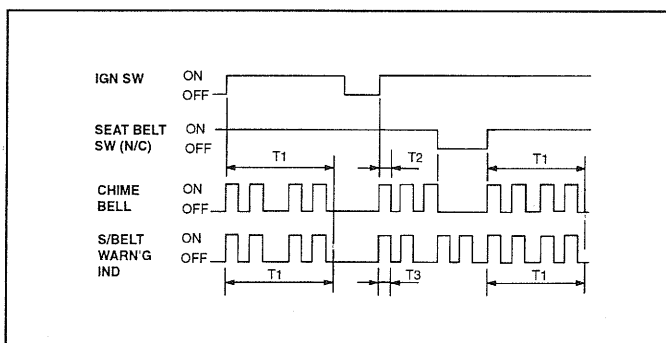
4. Seat belt warning

Time specification

T1 : 6 ± 1 sec.

T2 : 0.45±0.1 sec.

T3 : 0.3 ± 0.1 sec.



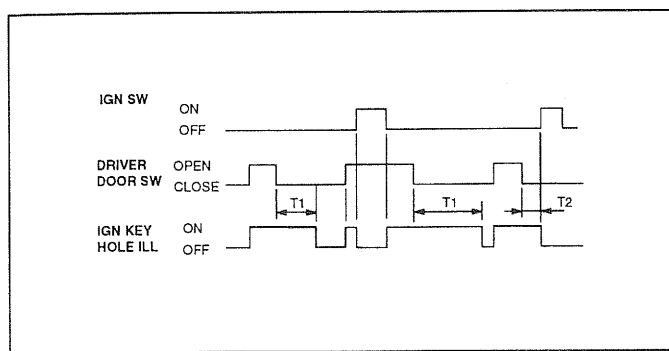
ETHA115F

5. Ignition key hole illumination

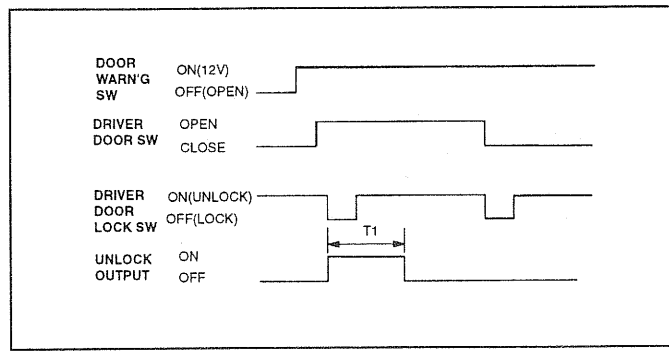
Time specification

T1 : 10 ± 1 sec.

T2 : 0 - 10 sec.



ETHA115J

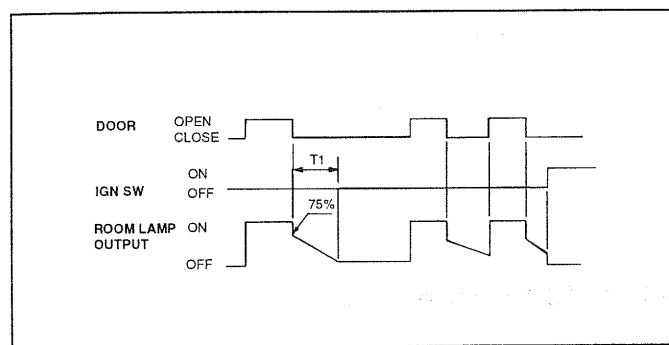


ETHA115I

6. Delayed out room lamp

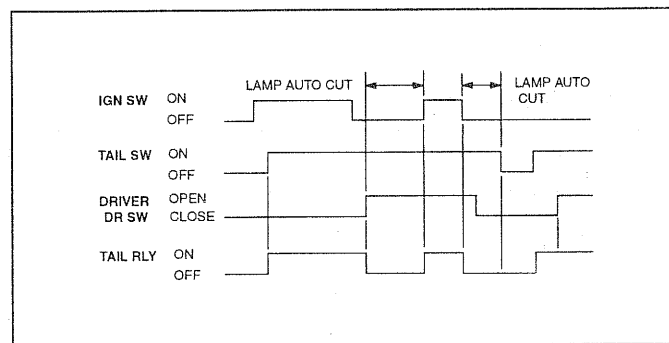
Time specification

$T1 : 5.5 \pm 0.5 \text{ sec.}$



ETHA115G

9. Tail lamp auto cut

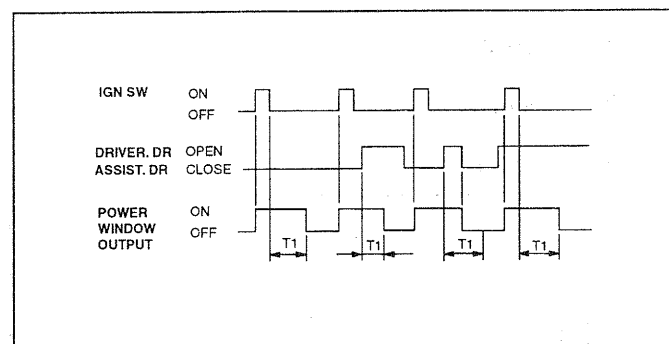


ETHA115M

10. Power window timer

Time specification

$T1 : 30 \pm 3 \text{ sec.}$

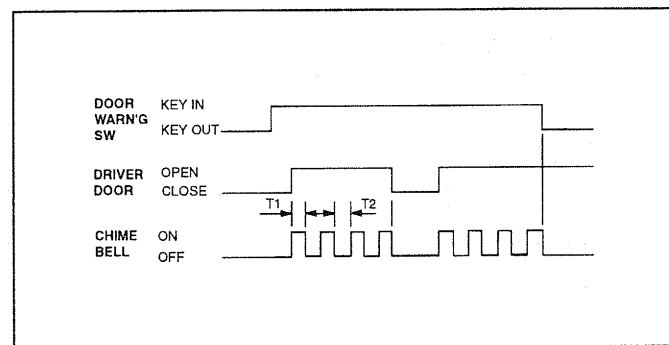


ETHA115K

7. Door warning

Time specification

$T1, T2 : 0.45 \pm 0.1 \text{ sec.}$



ETHA115L

8. Ignition key reminder

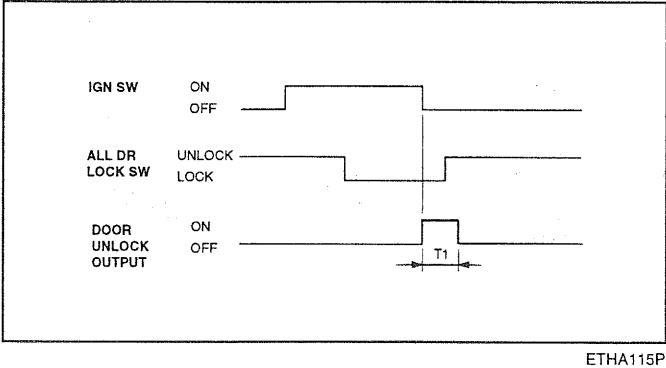
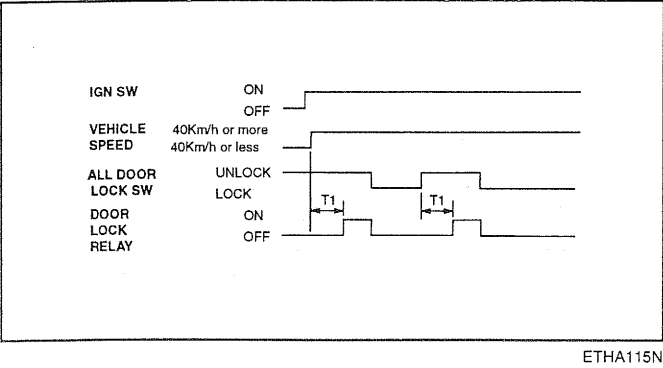
Time specification

$T1 : 5 \pm 0.5 \text{ sec.}$

11. Auto door lock

Time specification

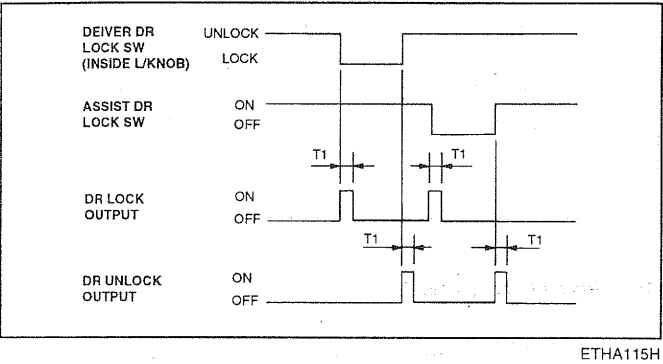
$T1 : 2.5 \pm 0.5 \text{ sec.}$



12. Central door lock/unlock

Time specification

T1 : 0.5±0.1 sec.

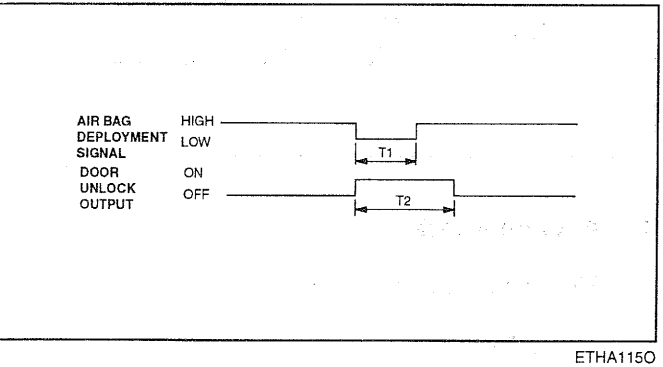


13. Auto door unlock

Time specification

T1 : 200ms

T2 : 1±0.2 sec.

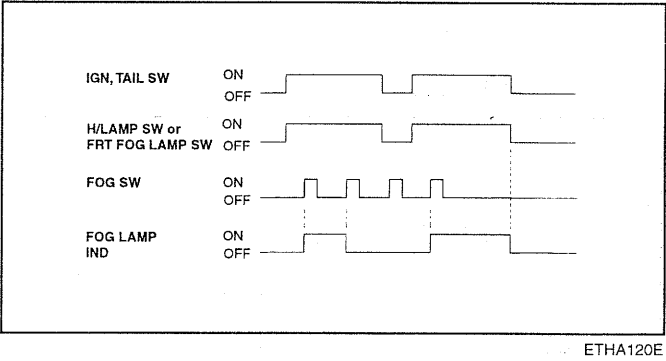


14. Ignition key off unlock.

Time specification

T1 : 0.5±0.5 sec

15. Rear fog lamp control



ANTI-THEFT FUNCTION

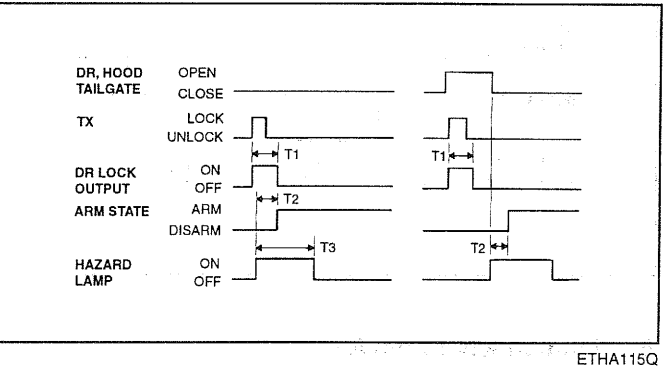
1. Arm function

Time specification

T1 : 0.5sec.

T2 : Max 2sec.

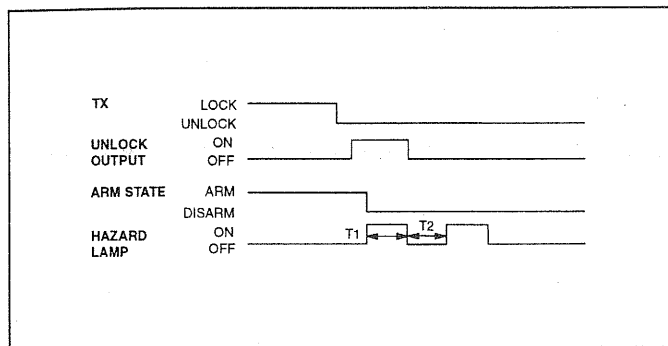
T3 : 1.0±0.2sec.



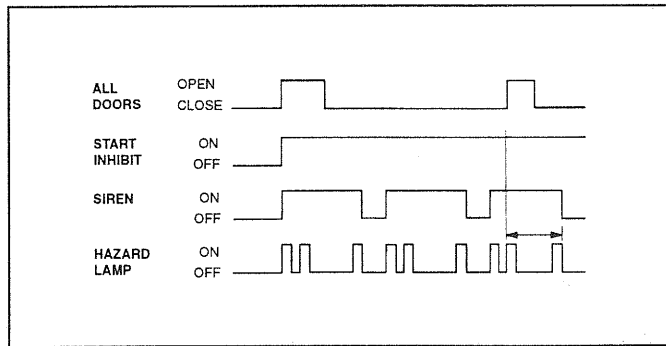
2. Disarm function

Time specification

T1, T2 : 0.5±0.1sec.



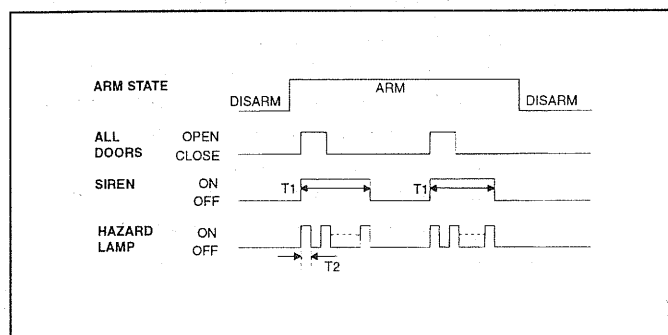
ETHA115R



ETHA115T

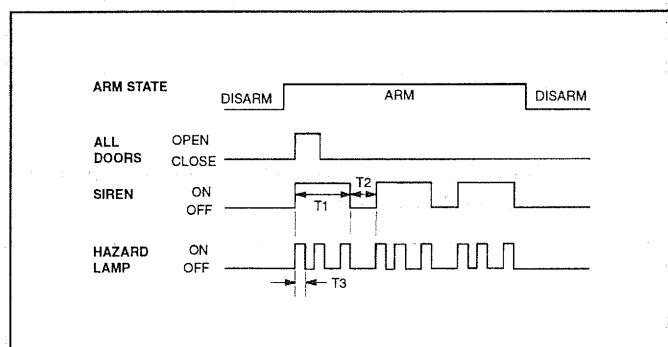
3. Alarm function

- a. Only EC Area
Time specification
T1 : 27 ± 2 sec.
T2 : 0.5 ± 0.1 sec.



ETHA120F

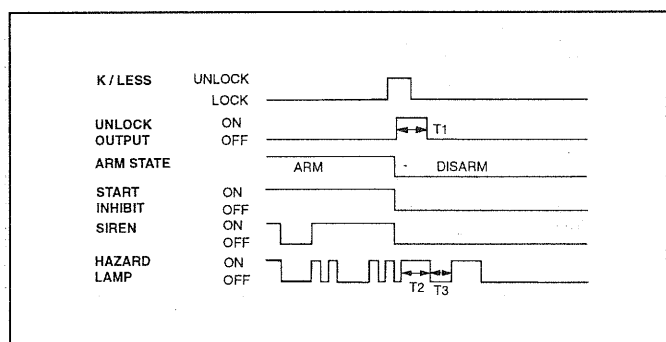
- b. Except EC Area
Time specification
T1 : 27 ± 2 sec.
T2 : 10 ± 1 sec.



ETHA115S

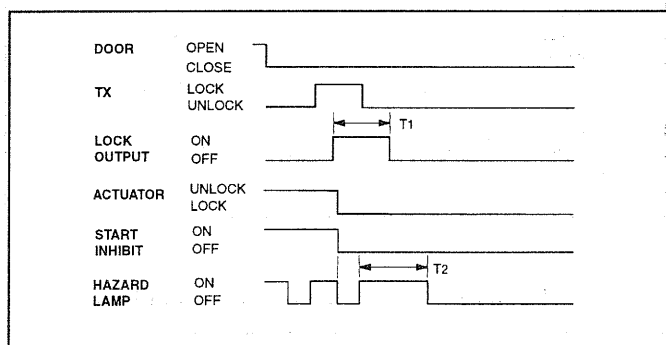
- c. New alarm occurs during the alarm state.

- d. Disarmed with TX (Transmitter) during the alarm state.
Time specification
T1, T2, T3 : 0.5 ± 0.1 sec.



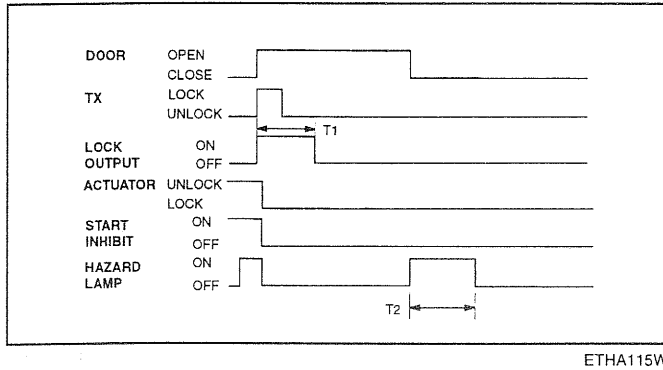
ETHA115U

- e. TX lock button pressed when the door closed during the alarm state.
Time specification
T1 : 0.5sec.
T2 : 1.0 ± 0.2 sec.

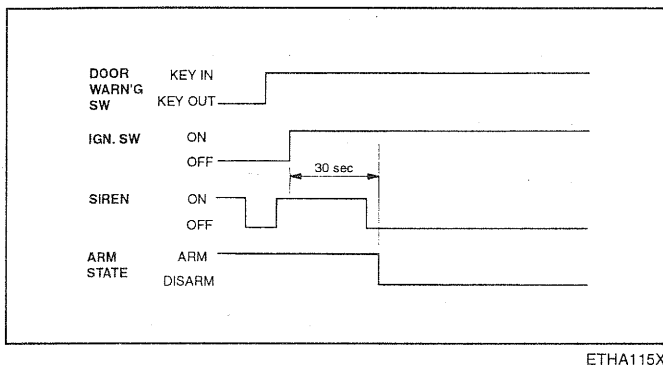


ETHA115V

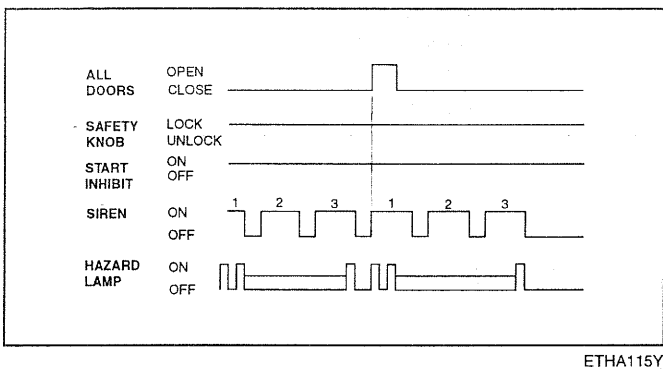
- f. TX lock button pressed when the door opened during the alarm state.
Time specification
T1 : 0.5sec.
T2 : 1.0 ± 0.2 sec.



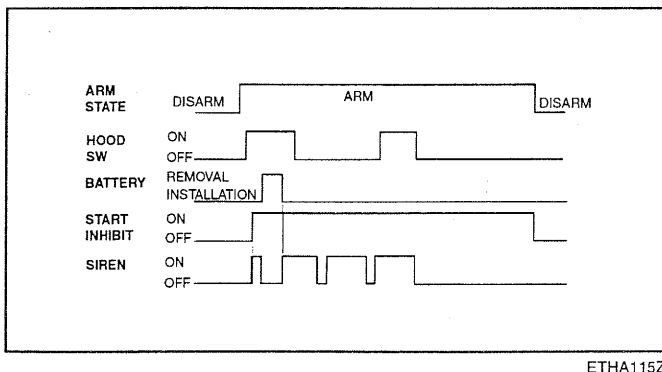
- g. Disarmed after 30 sec when the ignition switch turned on during the alarm state.



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



- i. Battery is separated during the alarm state.



- a. Remove the lower crash panel.

NOTE

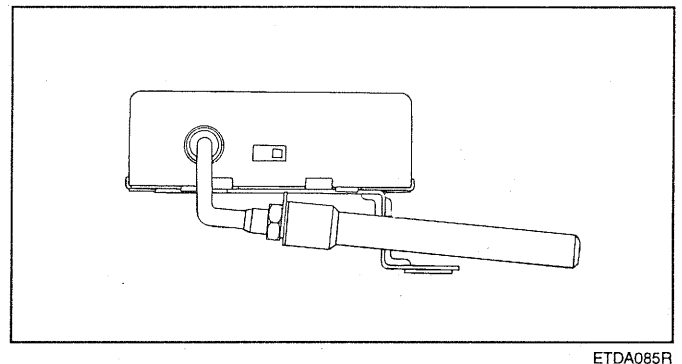
Don't disconnect the negative (-) battery terminal.

- b. Code saving :

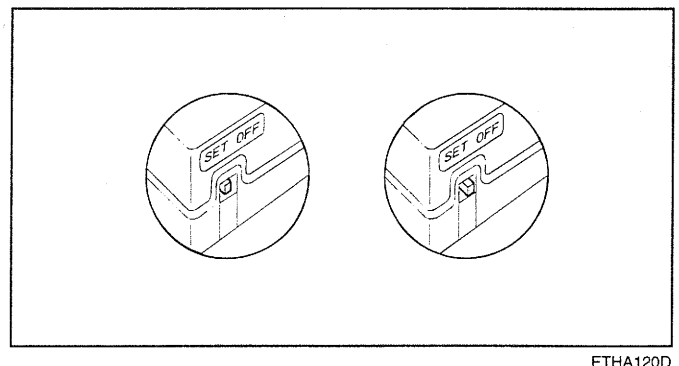
- Activating the keyless entry-receiver unit and change code saving switch of the receiver unit from "OFF" to "SET".
- The secret codes from the transmitter are stored into the receiver unit when the door lock button or unlock button pressed.

- c. Code saving :

- Change code saving switch of the receiver unit from "OFF" to "SET".
- The same secret code from transmitter are stored into the receiver unit when the door lock or unlock button from the changing transmitter are pressed.
- The code saving of 2nd transmitter unit will be achieved in the same method.



- d. Change code saving switch of the receiver unit from "SET" to "OFF".

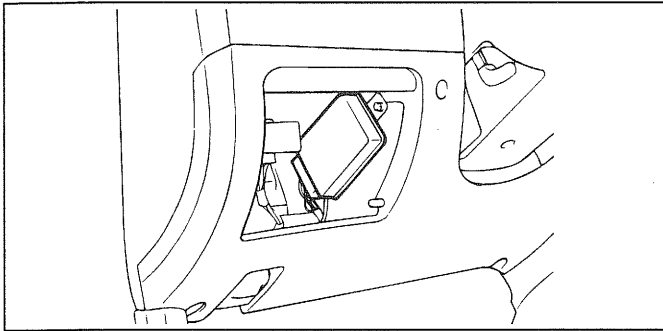


- e. Install the lower crash panel.

4. Code saving method.

REMOVAL AND INSTALLATION ETHA1300

1. Disconnect the negative (-) battery terminal
2. Remove the lower crash panel.
3. Remove the ETACM from the junction block and disconnect the connectors.



ETDA080A

4. Installation is the reverse of the removal process.

FUSES AND RELAYS

RELAY BOX (ENGINE COMPARTMENT)

FUSIBLE LINK ETHA1350

SPECIFICATIONS

Circuit	Rated Capacity	Circuit	Rated Capacity
Ignition switch 1	30A	ABS 1	30A
Ignition switch 2	50A	ABS 2	30A
Power window	30A	Radiator	30A
Condenser	20A		

INSPECTION

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

CAUTION

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

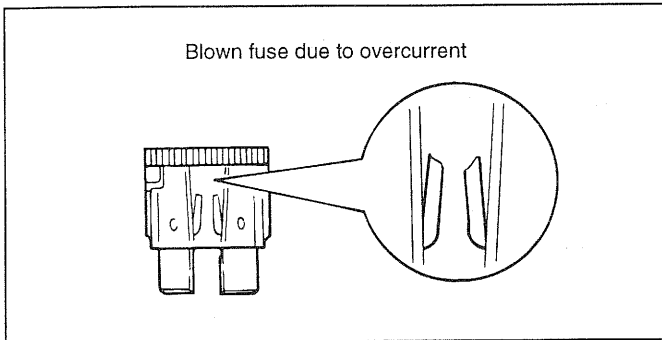
FUSES

INSPECTION ETDA0860

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

1. Fuse blown due to over-current.

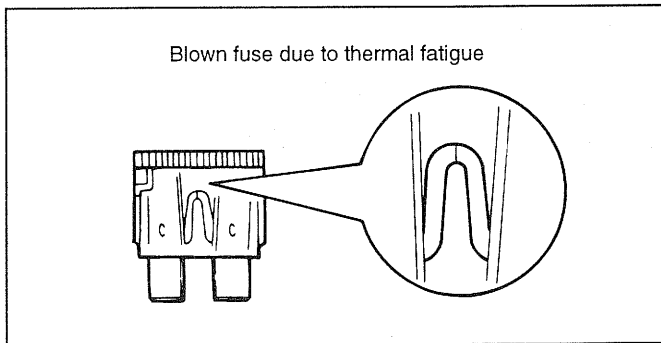
Prior to replacing the fuse with a new one, check the circuit for a short and the related parts for abnormal condition. Only after the correction of a short or replacement of abnormal parts, should a fuse with the same ampere rating be installed.



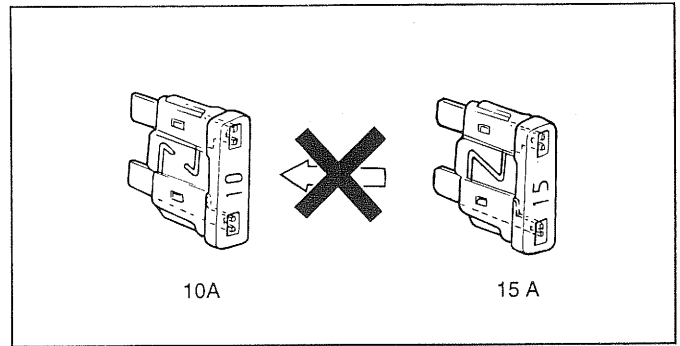
ETDA086A

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

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



ETDA086B



ETDA086C

CAUTION

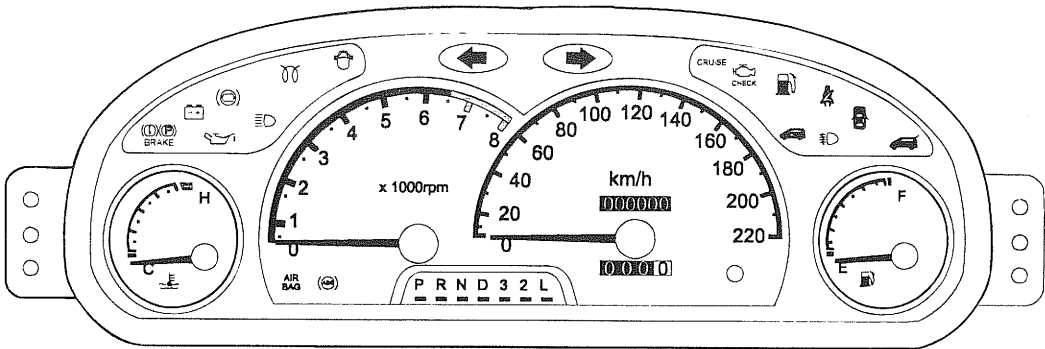
A blade type fuse is identified by the numbered value in amperes. If the fuse is blown, be sure to replace a fuse with the same ampere rating. If a fuse of higher capacity than specified is used, parts may be damaged and a danger of fire exists. To remove or insert a fuse, please use the fuse puller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

INDICATORS AND GAUGES

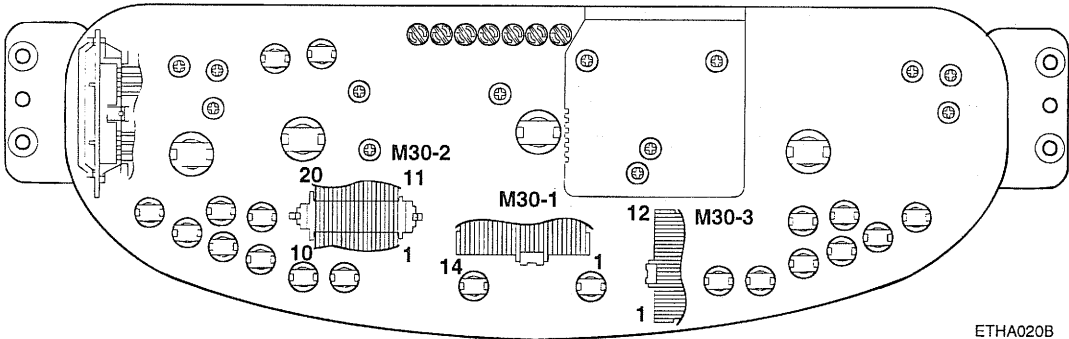
INSTRUMENT CLUSTER

COMPONENTS

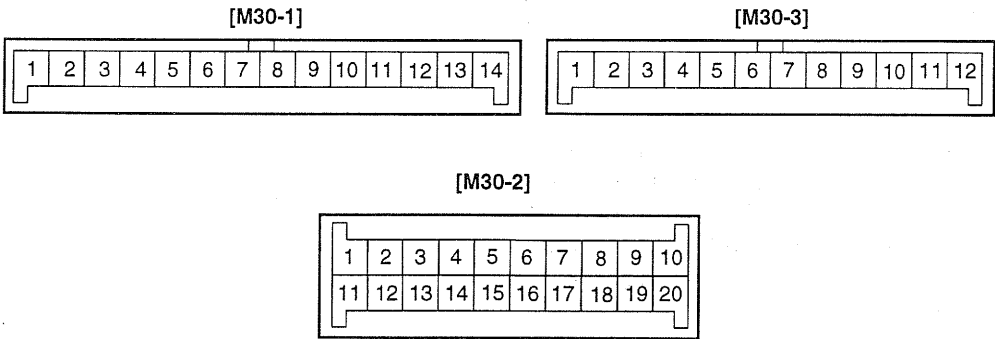
ETHA1450



ETHA020D



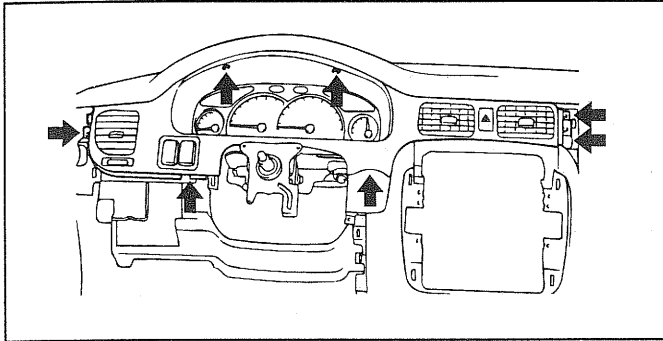
ETHA020B



KTDA095C

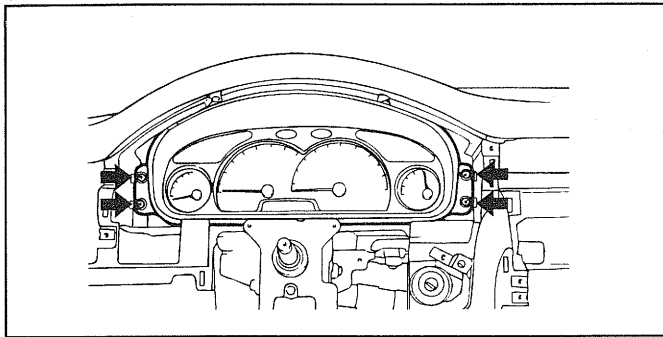
REMOVAL AND INSTALLATION ETHA1500

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



ESHA040V

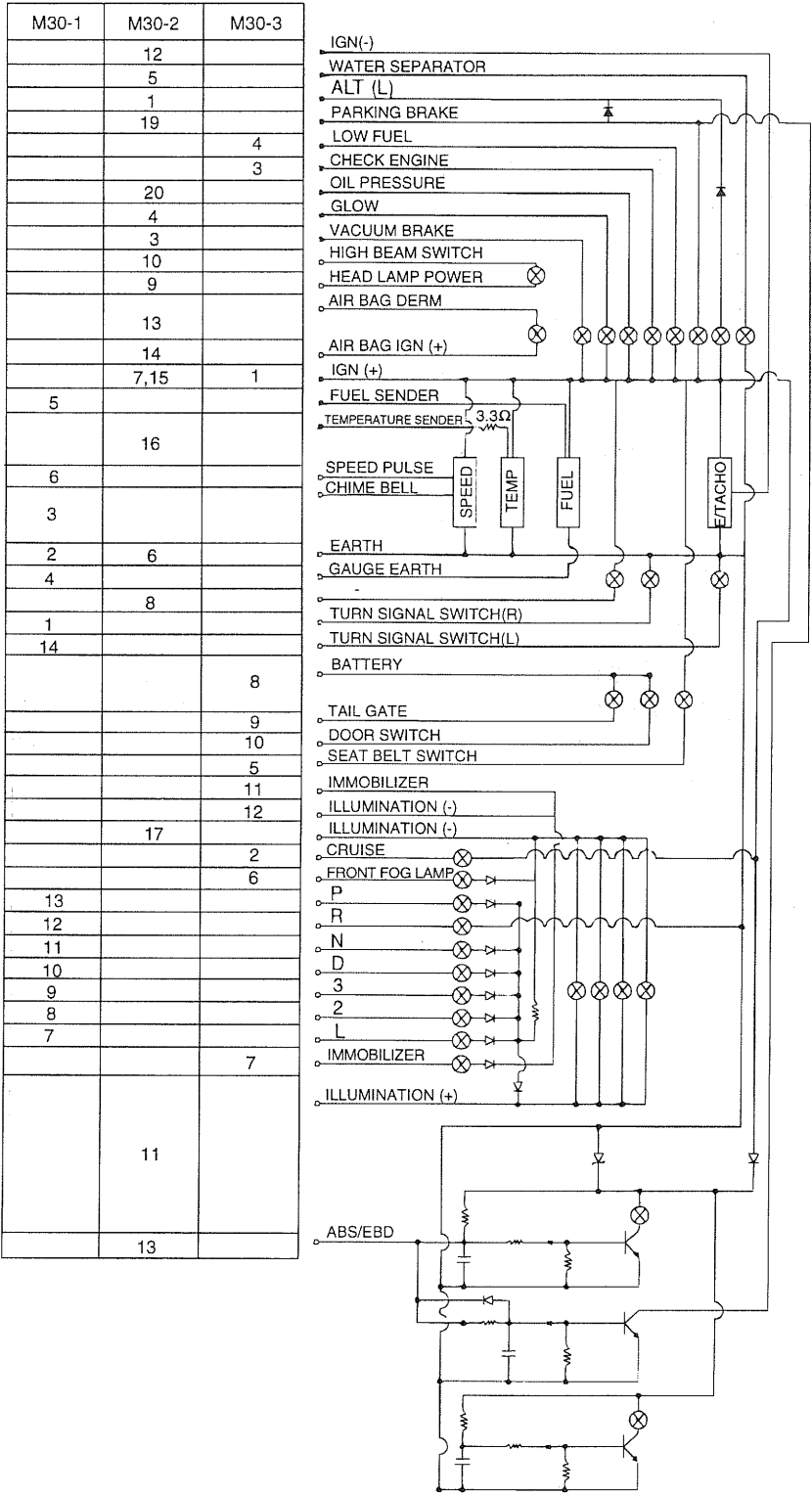
3. Loosen the screws holding the cluster and remove the instrument cluster



ESHA040W

4. Installation is the reverse of the removal process.

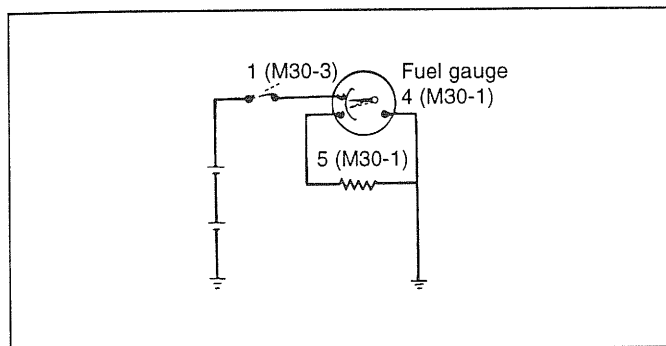
CIRCUIT DIAGRAM ETHA1550



FUEL GAUGE

INSPECTION

ETHA1600



ETHA160A

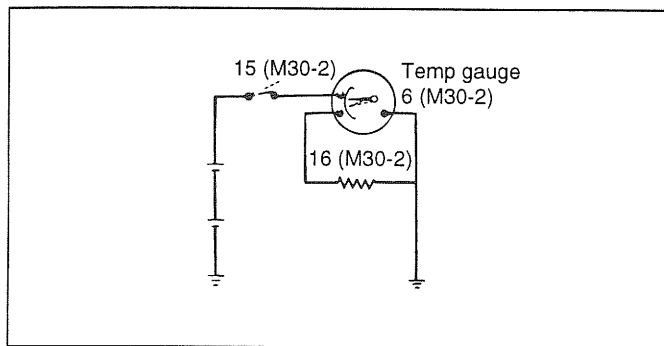
1. Connect the positive (+) lead from battery to terminal 1 (M30-3) and negative (-) lead to terminal 4 (M30-1).
2. Connect the variable resistance to terminal 5 (M30-1) and terminal 4 (M30-1).
3. Vary the variable resistance.
4. Check that the fuel gauge pointer moves. If the operation is not as specified, replace the gauge.

Resistance (Ω)	Gauge level
95	E
32.5	1/2
7	F

ENGINE COOLANT TEMPERATURE GAUGE

INSPECTION

ETHA1650



ETHA165A

1. Connect the positive (+) lead from battery to terminal 15 (M30-2) and negative (-) lead to terminal 6 (M30-2).
2. Connect the variable resistance to terminal 16 (M30-2) and terminal 6 (M30-2).
3. Vary the variable resistance.
4. Check that the temperature gauge pointer moves. If the operation is not as specified, replace the gauge.

Resistance (Ω)	Gauge level
157	-40°
48.4-24	-7°
15.2	+30°

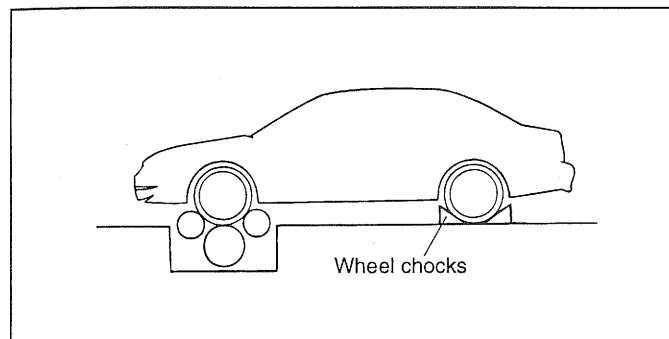
TACHOMETER**INSPECTION** ETHA1700

1. Connect the tune-up test tachometer and start the engine.
2. Compare the tester and tachometer indications. If the difference is excessive, replace the tachometer.

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)	±100	±125	±150	±200	±250	±300	±350	

SPEEDOMETER**COMPONENT CHECK** ETHA1750**SPEEDOMETER**

ETA9100A

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

Velocity (Km/ h)	20	40	60	80	100	120	140	160	180	200	Remark
Tolerance (Km/ h)	20-24.1	40-43	60-64.1	80-85.2	100-105.2	120.5-126.3	140.5-146.7	160.5-167.5	181-188.4	201-209.1	Except EEC& GENERAL
	20.8-25.4	40-44	60.8-65.4	81.4-86.8	102.6-108.2	123.5-129.6	144.4-151	165.4-172.4	186.3-193.8	207.2-215.2	EEC, GENERAL

Velocity (MPH)	10	20	40	60	80	100	120	Remark
Tolerance (MPH)	10-12.5	20-22	40-42.6	60-63.4	80.3-84.1	100.3-104.7	120.3-125.3	EXCEPT U.S.A
	8.5-11.5	18.5-21.5	38.5-41.5	58.3-61.7	78-82	97.7-102.3	117.5-122.5	U.S.A

2. Set the vehicle onto a speedometer tester and use wheel chocks to hold the front wheels.
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.

Pointer vibration can be caused by a loose or dry speedometer cable.

POWER DOOR MIRRORS

POWER DOOR MIRROR SWITCH

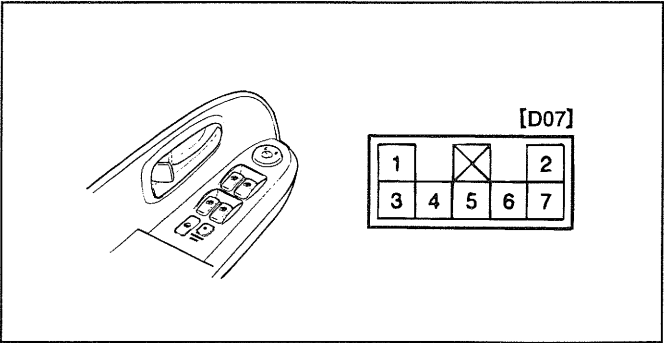
INSPECTION ETHA1800

- 1. Remove the power window main switch from the door trim panel.
- 2. Disconnect the outside rear view mirror connector from the harness.
- 3. Operate the switch and check for continuity between the terminals. If continuity is not as specified, replace the mirror switch.

[D07]

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

ETHA025B



ETHA180A

POWER DOOR MIRROR ACTUATOR

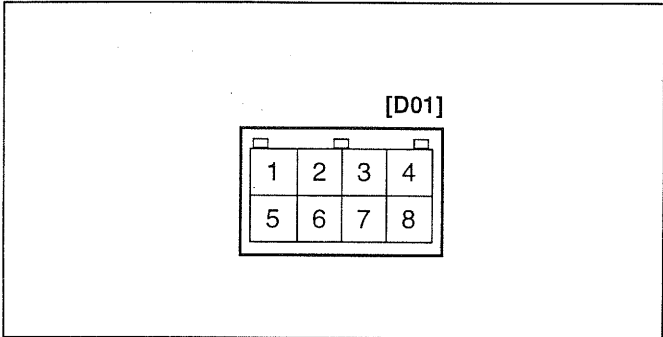
INSPECTION ETHA1850

- 1. Disconnect the outside rear view mirror connector from the harness.
- 2. Apply battery voltage to each terminal as shown in the table and confirm that the mirror operates properly.

[D01]

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

ETHA030B



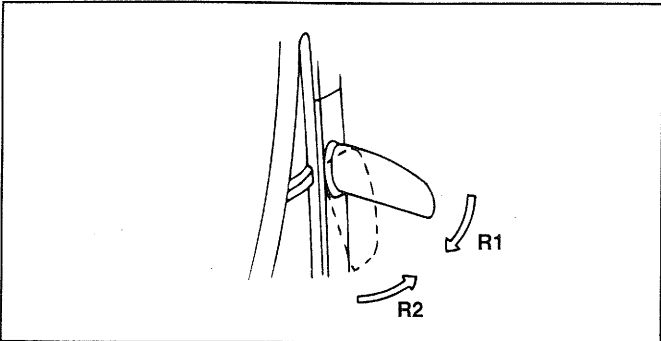
ETHA185A

MIRROR FOLDING

[D01]

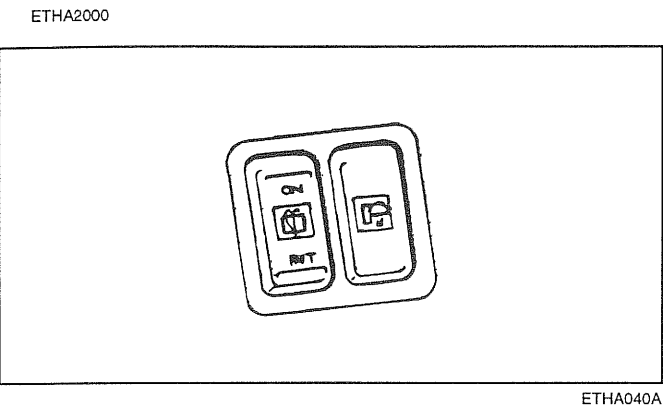
Terminal Direction	3	4
R1	⊖	⊕
R2	⊕	⊖

ETHA030D



ETHA030A

OUTSIDE MIRROR FOLDING SWITCH



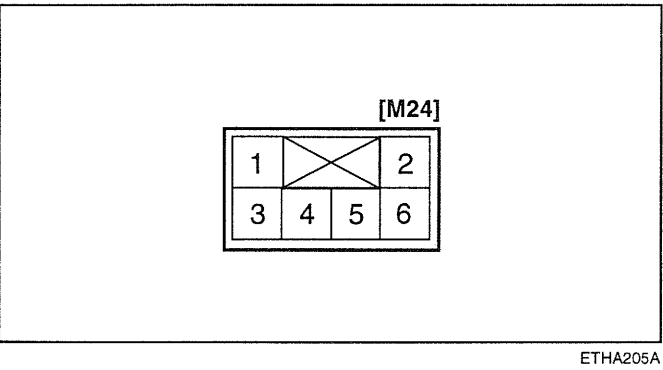
INSPECTION ETHA2050

- 1. Remove the cluster facia panel.
- 2. Disconnect the outside mirror folding switch and check for continuity between the terminals.

[M24]

Terminal Position	2	3	4	5
ON (PUSH)		○	○	
OFF (FREE)	○	○	○	○

ETHA040B



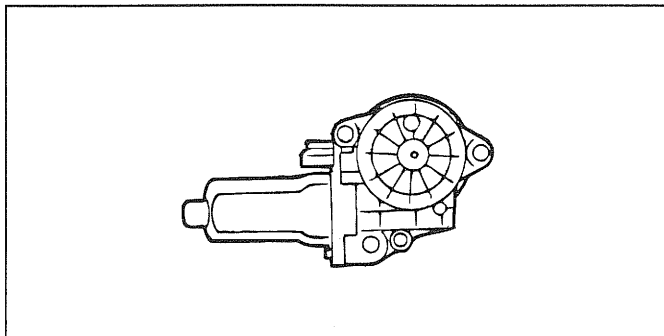
POWER WINDOWS

POWER WINDOW MOTOR

INSPECTION

ETHA1900

Connect the motor terminals directly to the battery 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.



ETHA035A

POWER WINDOW SWITCH

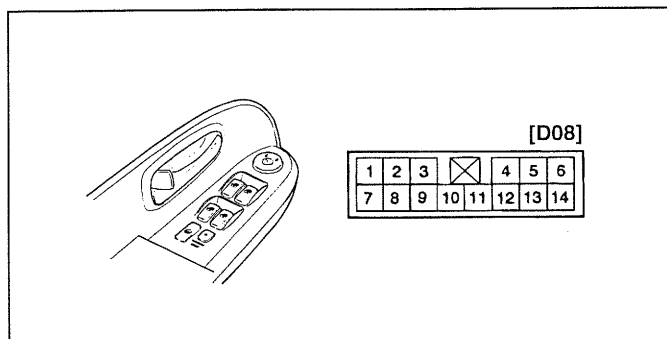
INSPECTION ETHA1950

1. Remove the power window main switch from the door trim panel.
2. Operate the switch, and check for continuity between the terminals.
3. If continuity is not as specified, replace the switch.

[D08]

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	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

ETDA035C



ETHA195A

DOOR LOCK SWITCH [D08]

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

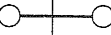
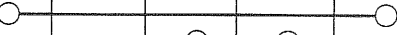
ETHA035D

WINDOW LOCK SWITCH [D08]

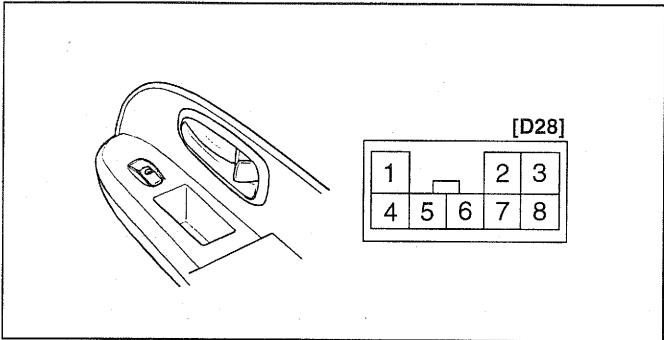
Terminal Position	1	11
NORMAL	○	○
LOCK		

ETHA035E

POWER WINDOW SUB SWITCH [D28]

Terminal Position	1	2	3	5	7
UP					
OFF					
DOWN					

ETHA035F



ETHA195B

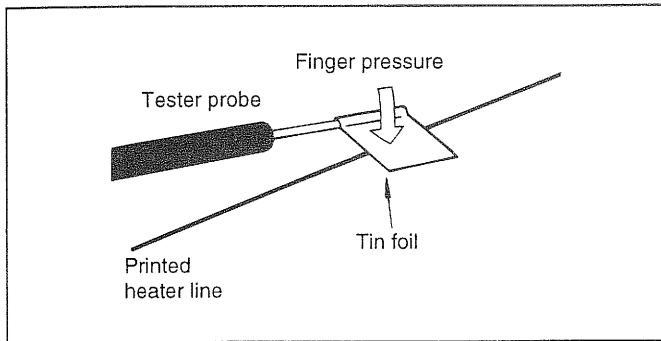
REAR WINDOW DEFOGGER

REAR WINDOW DEFOGGER PRINTED HEATER

INSPECTION ETA91650

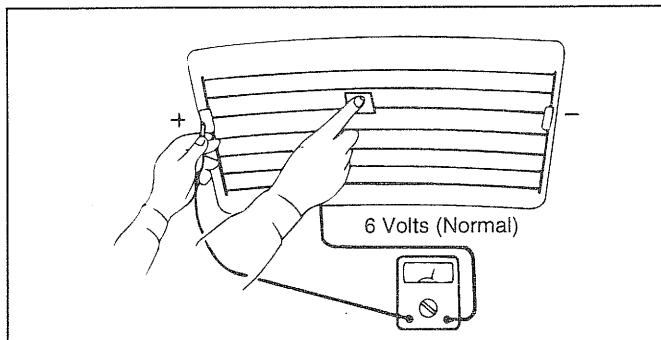
CAUTION

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.



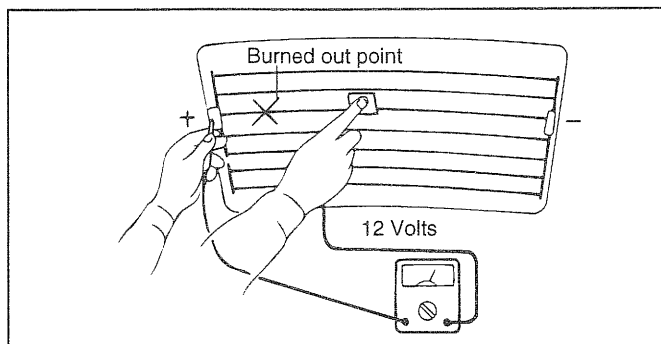
ETA9165A

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.



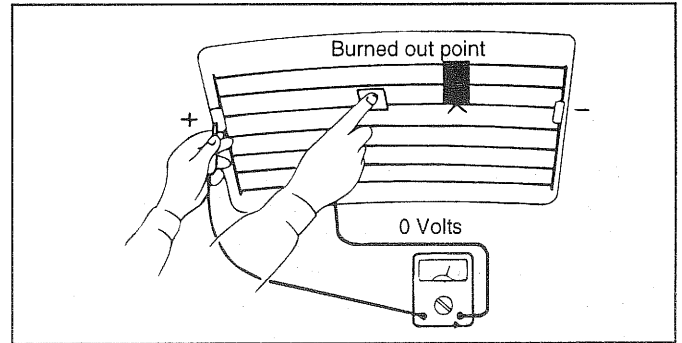
ETA9165B

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



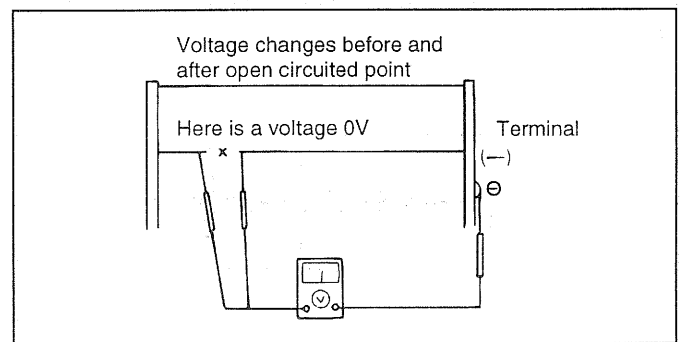
ETA9165C

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



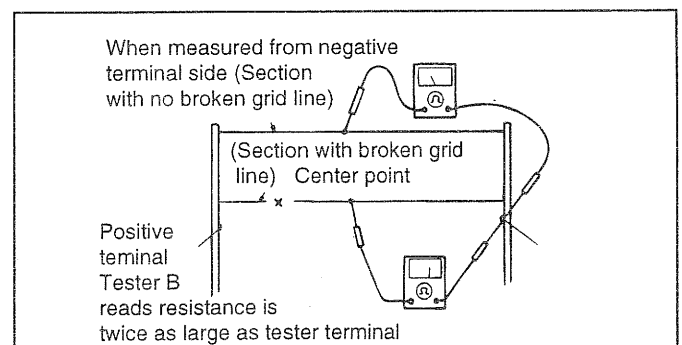
ETA9165D

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-circuited 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 after another. The section involving a broken heater line indicates resistance twice as that in other section. In the affected section, move the test lead to a position where resistance sharply changes.



ETA9165F

REPAIR OF BROKEN HEATER LINE

Prepare the following items:

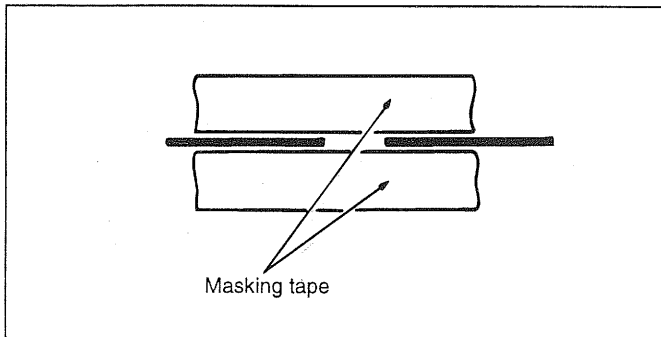
1. Conductive paint.

2. Paint thinner.
3. Masking taps.
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 completely dried. (allow 24 hours).

CAUTION

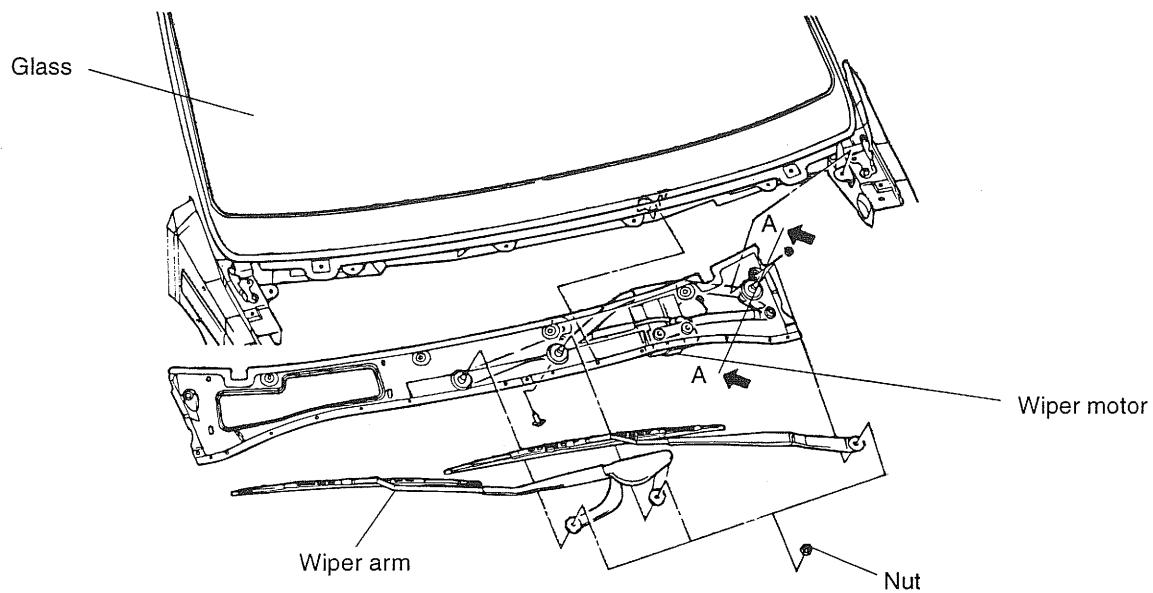
After repairing, clean the glass with a soft dry cloth or wipe along the grid line with a slightly moistened cloth.



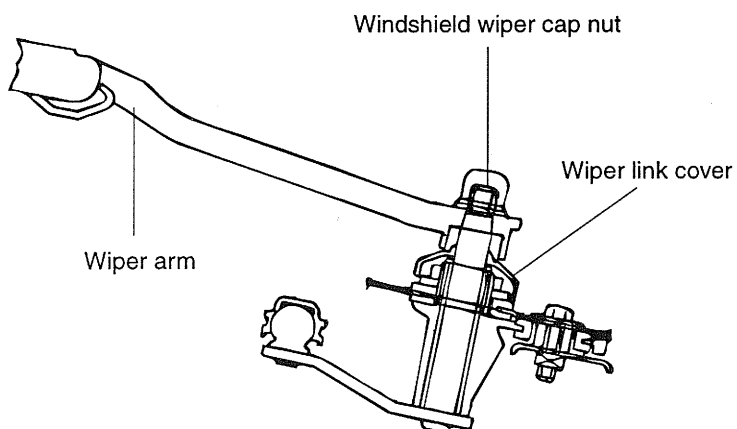
ETA9165G

WINDSHIELD WIPER/WASHER

COMPONENTS ETHA2300



ETHA065A



SECT. A-A

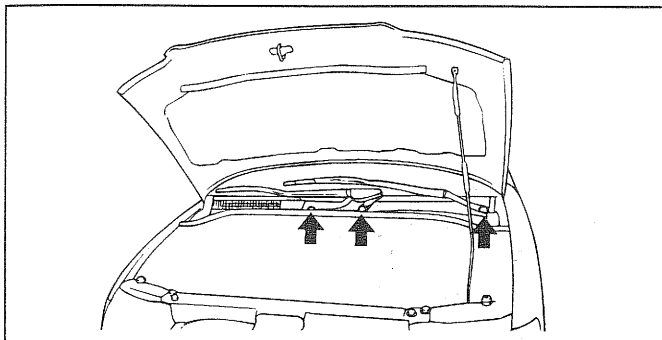
ETHA065B

REMOVAL ETHA2350

1. Remove the windshield wiper arm and blade.

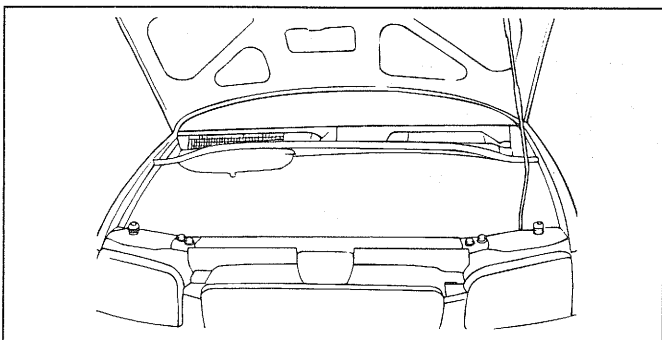
NOTE

Care must be taken not to scratch the engine hood.



ESHA040A

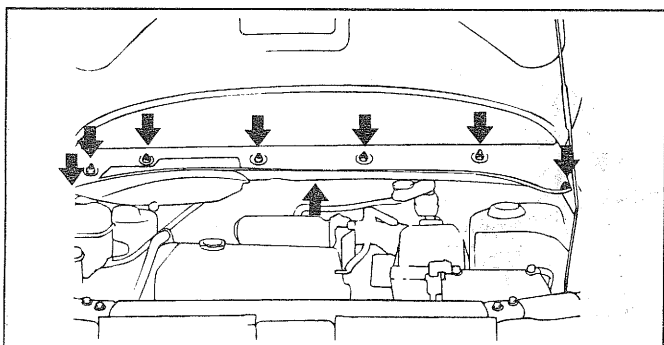
2. Remove the cowl top cover.



ESHA040B

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

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



ESHA040C

RAINSENSING WINDSHIELD WIPER SYSTEM

ETHA3000

DESCRIPTION

The Rainsensing windshield wiper system is a wiper system that, in addition to providing normal wiper

functions off, mist, manual low speed, manual high speed, and wash, provides automatic control of automatic int, automatic low, and automatic high speeds.

When the ignition key is in the ON position, the rainsensor will be activated.

OPERATING MODES

MULTIFUNCTION SWITCH POSITION	RAINSENSOR OPERATING MODE	SENSOR ACTION
MIST	MIST	Mist is controlled by the column switch. The sensor has no affect on this function.
OFF	OFF	If not already parked, wiper motor moves with low speed until blades are in the depressed park position.
AUTOMATIC Automatic mode has 5 sensitivity settings	AUTOMATIC	Automatic INT/speed control The sensitivity to raindrop accumulation on the windshield is set by the multifunction switch sensitivity adjustment.
LOW SPEED	MANUAL	Wiper motor runs continuously in low speed, for example 45 wipes/minute. The sensor has no affect on this function.
HI SPEED	MANUAL	Wiper motor moves continuously with high speed, for example 60 wipes/minute. The sensor has no affect on this function.
WASH When washer switch is turned on during 0.6 sec or more	WASH	If washer switch is turned on during 0.6 sec or more, the wiper operate during 2.5~3.8 sec
WASH When washer switch is turned on during 0.6 sec or less	WASH	If washer switch is turned on during 0.6 sec or less, the wiper operate only one time

1. OFF MODE

With the wiper switch "OFF" and the ignition switch "ON", the rainsensor is considered to be in the "OFF" mode. In this mode, the sensor commands the wiper motor to be "OFF".

2. AUTOMATIC MODE

When the multifunction switch is moved to auto position and the ignition switch is in the run or accessory positions, the rainsensor is considered to be in "automatic" mode. Once a single "instant wipe" has occurred, the wipers remain at "innerwipe/park" until the rainsensor determines that the dwell time at that position is appropriate for the amount of precipitation on the windshield, rainsensor provides input to the wiper motor to activate the wipers to clear the precipitation from the windshield.

3. AUTOMATIC INT

For all automatic int. operations the rainsensor commands the wipers to operate in low speed for one wipe, followed by a variable dwell period in the inner wipe position.

4. AUTOMATIC LOW

Automatic low speed operation is utilized when the amount of precipitation impinging on the windshield exceeds the automatic int to automatic low threshold. This threshold includes sufficient hysteresis to prevent cycling between automatic int and automatic low speed operation with a steady amount of precipitation accumulation on the windshield.

5. AUTOMATIC HIGH

Automatic high speed operation utilized when the amount of precipitation impinging on the windshield exceeds the automatic low to automatic high threshold. This threshold includes sufficient hysteresis to prevent cycling between automatic low and automatic high speed operation with a steady amount of precipitation accumulation on the windshield.

6. WASH MODE

The rainsensor monitors the multifunction switch to determine if the wash function is selected. Rainsensor enables the wiper motor to run in low speed during the wash mode and performs wipes from 2.5 to 3.8 sec.

7. MANUAL MODE

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

REPLACEMENT

The rainsensor module is mounted to the optocoupler using two snap fit stainless steel clips.

This allows the rainsensor module to be easily removed and replaced in the event of a rainsensor module failure.

If the windshield requires replacement, the existing rainsensor module may be unsnapped from the original windshield and reinstalled onto the new windshield. It is snap-fit to the new optocoupler, an integral portion of the replacement windshield as delivered by the replacement windshield manufacturer.

TROUBLESHOOTING

The rainsensor has two levels of fault detection as described below:

1. FAULT A

Fault A is indicated when the sensor has detected that the sensor servo operating point is above the expected limits. This is an indication of damage to the windscreen in the area of the coupler or the sensor has been removed from the coupler.

2. FAULT B

Fault B is indicated when the sensor has detected that it no longer is responding to rain signals.

This is an indication of damage to the windscreen in the area of the coupler or, more likely, that the sensor has detected an electrical failure within the sensor.

3. ATTACHMENT GRADE VALUE

Attachment grade is used to determine when a fault in A is detected. The attachment grade value is set at 140. This allows the product to operate in all conditions other than the most severe damage the windscreen.

4. USE SENSITIVITY ADJUSTMENT TO INDICATE FAULT

A method to indicate detected faults is available to a service garage technician by using the sensitivity input and the wipers as an indicator. The service method is described as follows:

- With ignition "ON", move the sensitivity adjustment to the high sensitivity setting.
- Decrease the sensitivity by one setting.
- If a wipe occurs, then Fault A has been detected and the service technician should assure that the coupler area on the windscreen is not damaged and the sensor is secured to the coupler.
- Decrease the sensitivity one more setting.
- If a wipe occurs, then Fault B has been detected and the sensor should be removed and replaced with a known good sensor.

CAUTION

When the ignition key is "ON" and the multifunction switch is in the auto position the wiper could operate in the following conditions.

- **Be careful not to touch the upper sensor front window glass.**
- **Be careful not to scrub the upper sensor front window glass with a cloth.**
- **Be careful not to vibrate the front window glass.**

WINDSHIELD WIPER/WASHER
SWITCH

ETHA2400

INSPECTION

Check the switch for continuity between the terminals.

WIPER AND INTERMITTENT VOLUME SWITCH
[M26-2]

Terminal Position	1	2	3	4	5	6	13	14
MIST				○	○			
OFF		○	○					
INT		○	○		○	○	○	○
LOW		○	○	○	○			
HI	○	○	○	○	○			

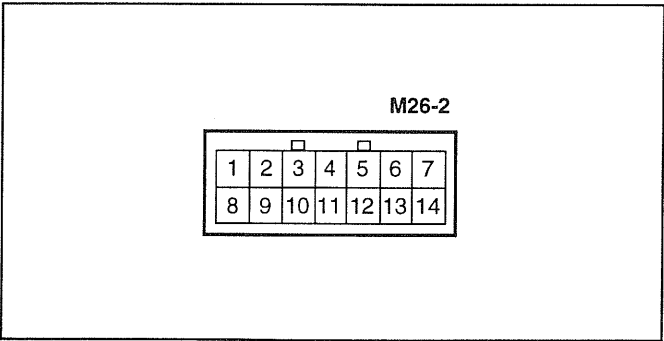
KTDA040D

WASHER SWITCH [M26-2]

Terminal Position	7	8
OFF		
ON	○	○

KTDA040E

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



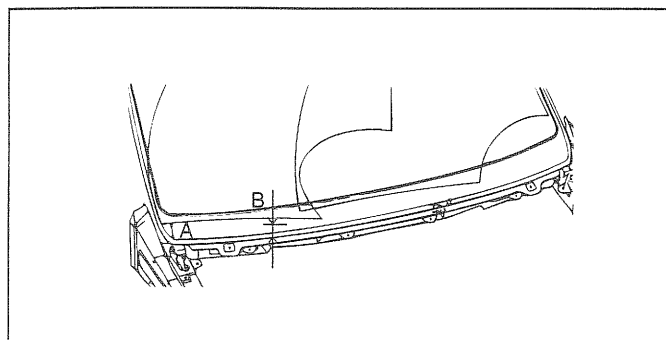
ETHA240A

INSTALLATION

ETHA2550

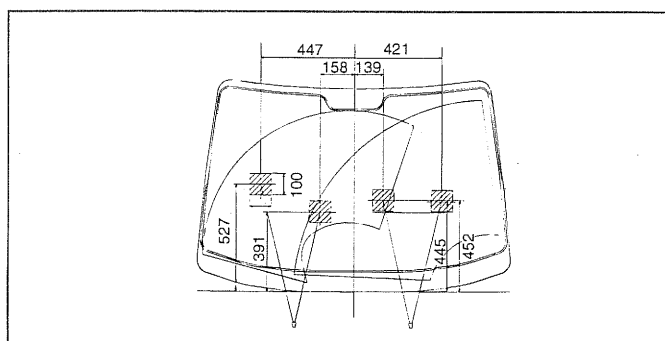
1. Install the wiper arm to the specified position.

Specified position	A	B
Distance (mm)	50	45



ETHA065C

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



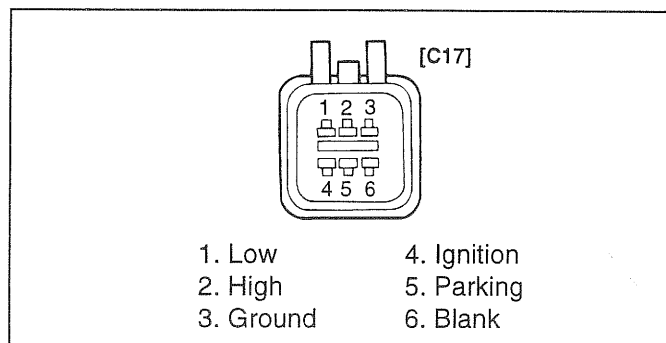
ETHA065D

FRONT WIPER MOTOR**INSPECTION**

ETHA2450

SPEED OPERATION CHECK

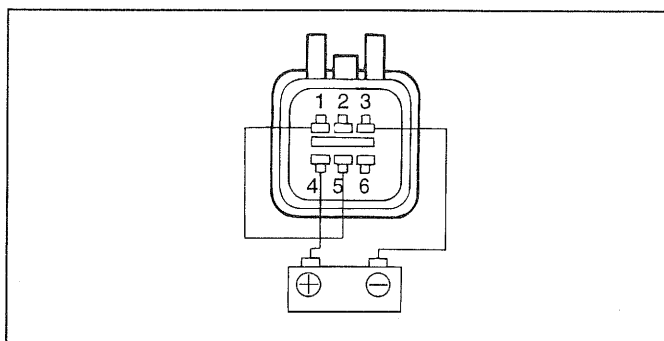
1. Remove the connector from the wiper motor.
2. Attach the positive (+) lead from the battery to terminals 4 and the negative (-) lead to terminal 1.
3. Check that the motor operates at low speed.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 2.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



ETHA245A

AUTOMATIC STOP OPERATION CHECK

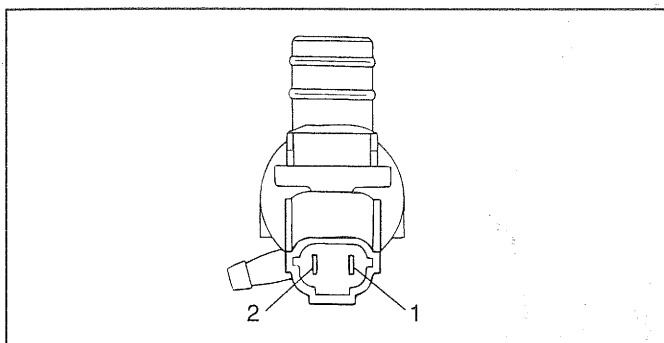
1. Operate the motor at low speed.
2. Stop the motor operation anywhere except at the off position by disconnecting terminal 1.
3. Connect terminals 5 and 1.
4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 3.
5. Check that the motor stops running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



ETDA155B

FRONT WASHER MOTOR**INSPECTION** ETA91800

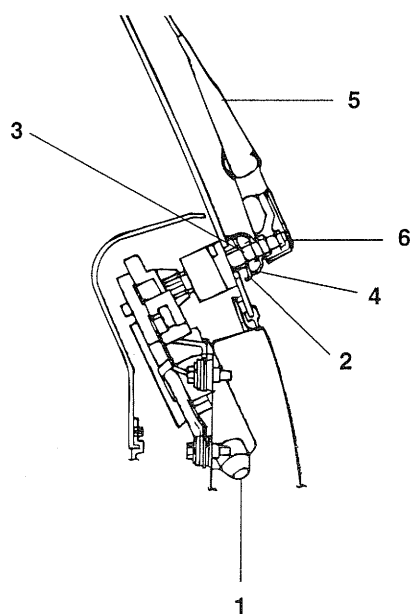
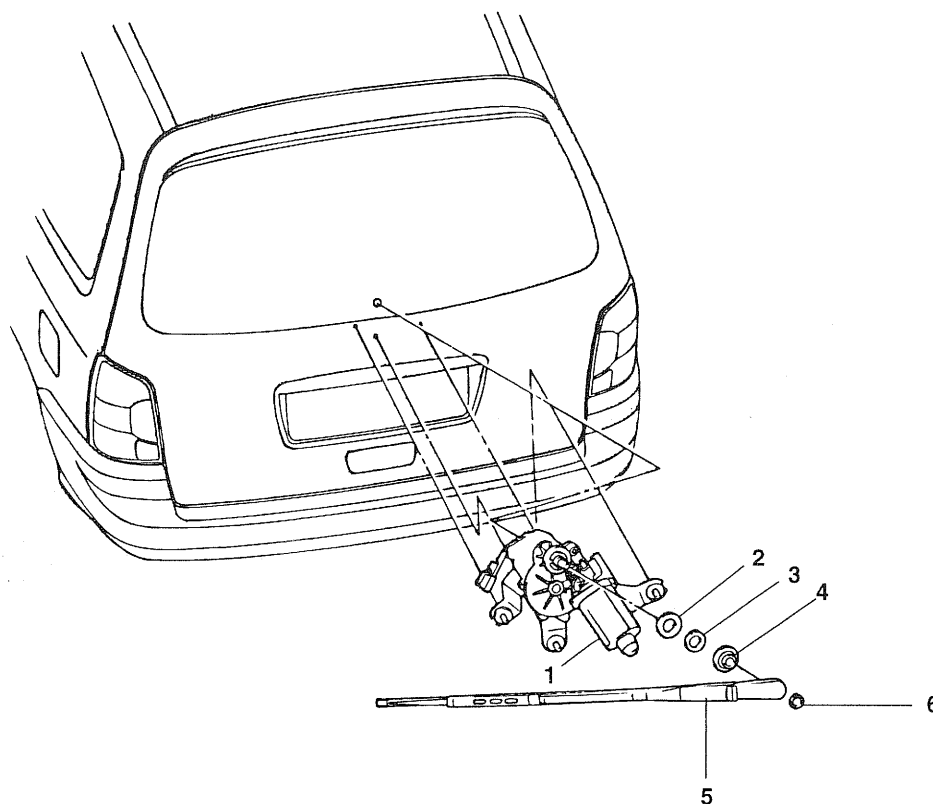
1. With the washer motor connected to the reservoir tank, fill the reservoir tank with water.
2. Connect positive (+) and negative (-) battery cables to terminals 2 and 1 respectively to see that the washer motor runs and water is pumped.



ETA9180A

REAR WIPER/WASHER

COMPONENTS ETHA2600

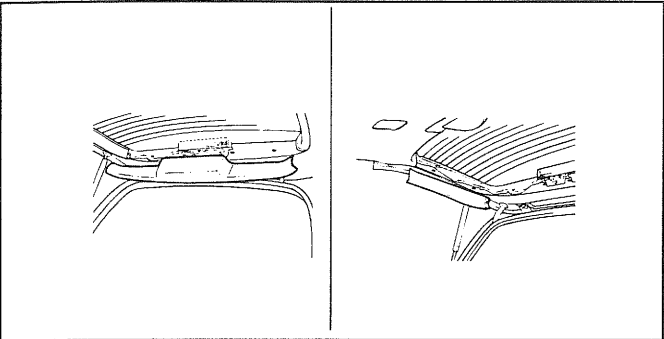


1. Rear wiper motor and link
2. Cap
3. Nut
4. Cover
5. Rear wiper arm and blade
6. Nut

REAR WIPER MOTOR

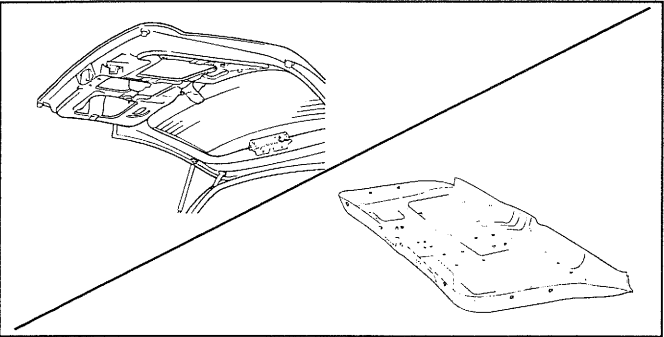
REMOVAL ETHA2650

1. Remove the tailgate frame upper and side trim.



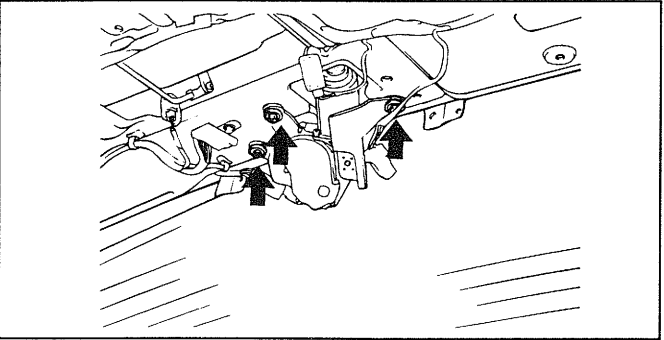
ETHA265A

2. Remove the tailgate trim panel.



ESHA010C

3. Remove the rear wiper motor.

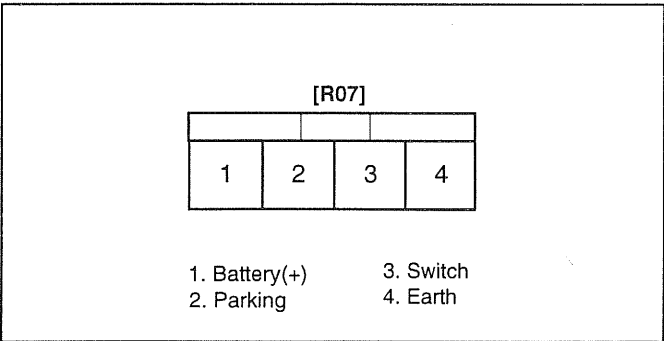


ESHA010J

4. Installation is the reverse of the removal process.

INSPECTION ETHA2700

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

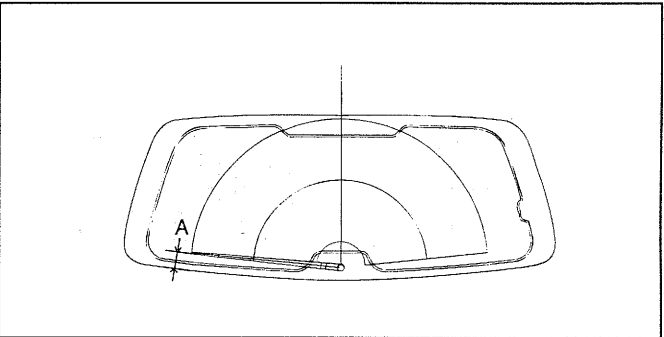


KTDA170A

INSTALLATION ETHA2800

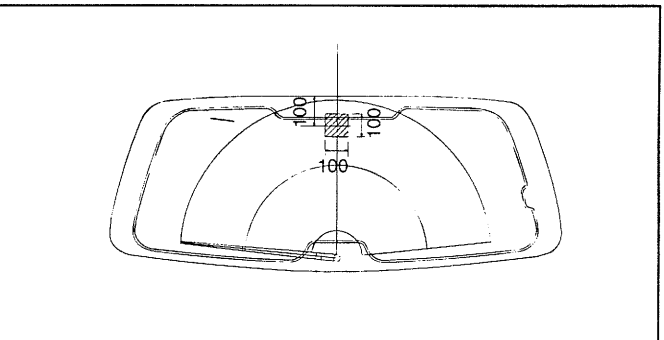
1. Install the rear wiper arm to the specified stop position.

Specified position	A
Distance	60mm



ETHA070C

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



ETHA070D

REAR WASHER SWITCH

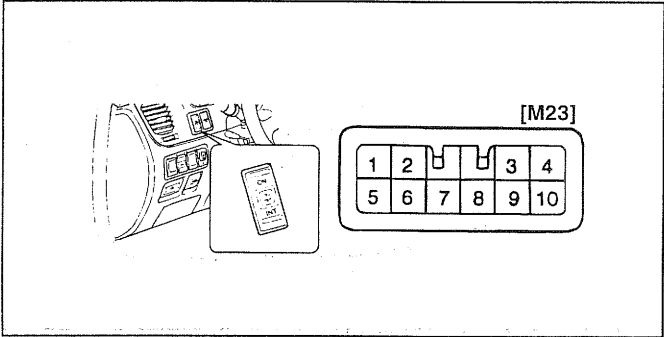
INSPECTION ETHA2850

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

[M23]

Terminal		1	2	3	4	6	9	10
Wiper switch	ON							
	OFF							
	INT							
Washer switch	ON							
Illumination	Tail							

KTDA171C

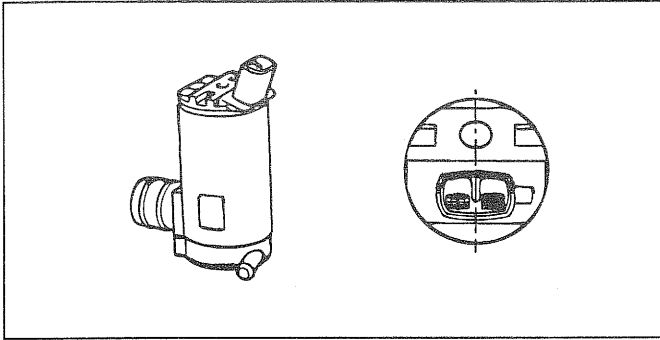


ETHA285A

REAR WASHER MOTOR

INSPECTION ETHA2750

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

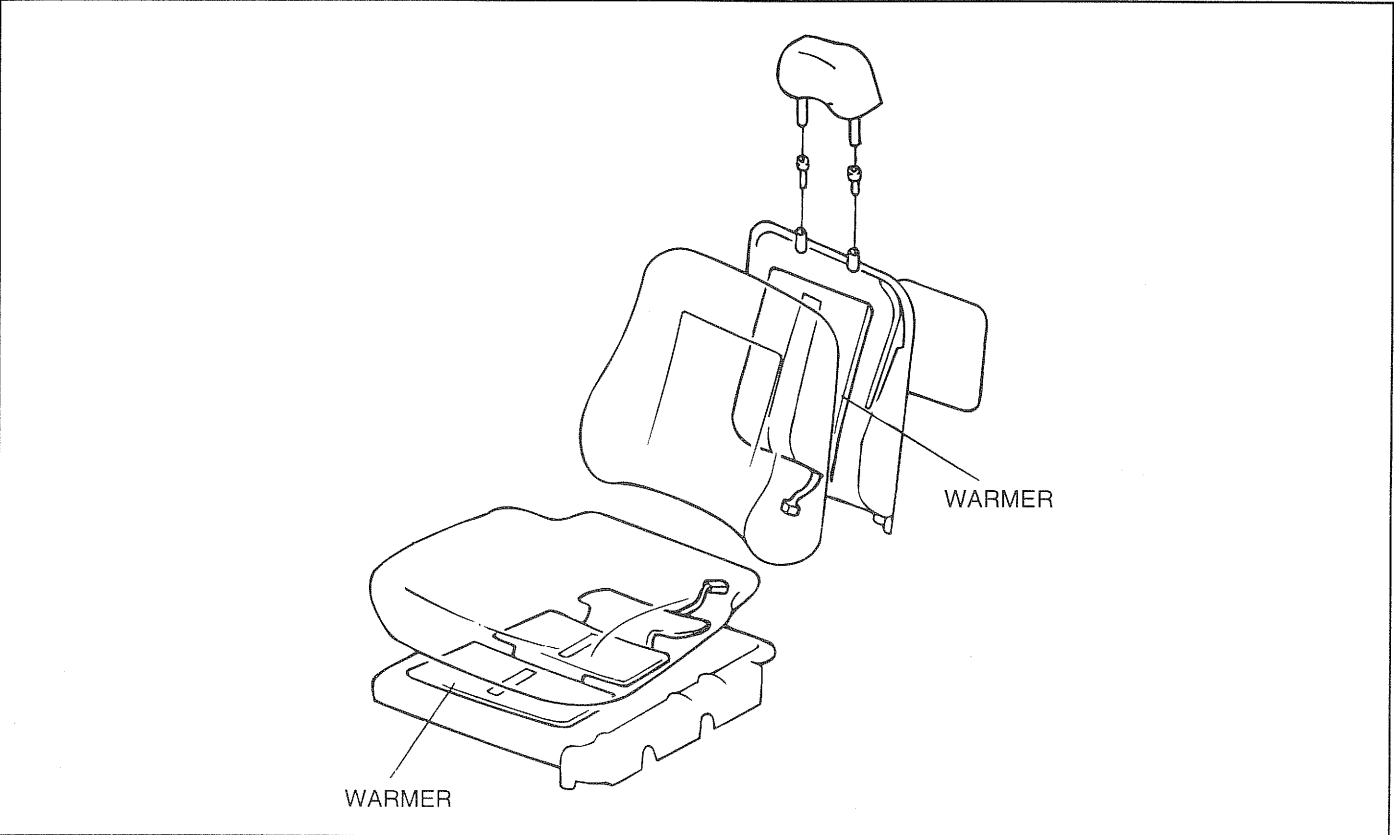


ETHA275A

SEAT WARMER

SEAT WARMER SYSTEM

ETA92050



ETA9205A

SEAT WARMER SWITCH

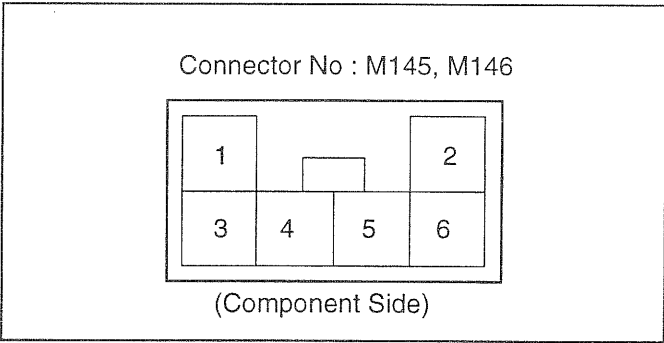
INSPECTION

ETHA3250

Inspect the switch continuity between terminals as below.

Terminal	1	2	3	4	5	6
Switch position						
ON	○	—	○	—	○	
OFF	○	—	○			

ETHA325A



ETHA325B

If the continuity is not as specified, replace the switch.

SUNROOF

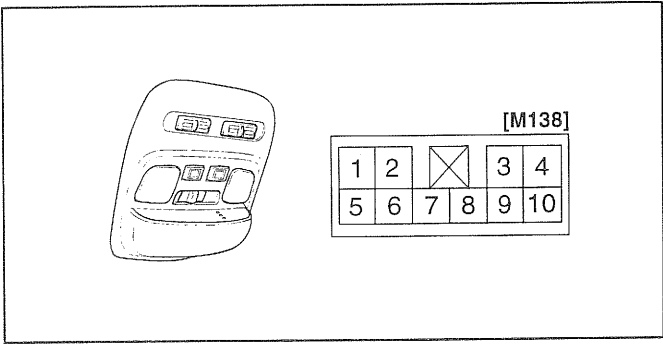
SUN ROOF SWITCH

INSPECTION ETHA3300

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

Terminal		1	2	3	4	5	6	7	8	9	10
Condition											
Slide switch	Open		○	○							
	Close			○	—	○					
Tilt switch	Up			○	—	○					
	Down	○	—	○							

ETHA330A



ETHA045C

SUN ROOF RELAY

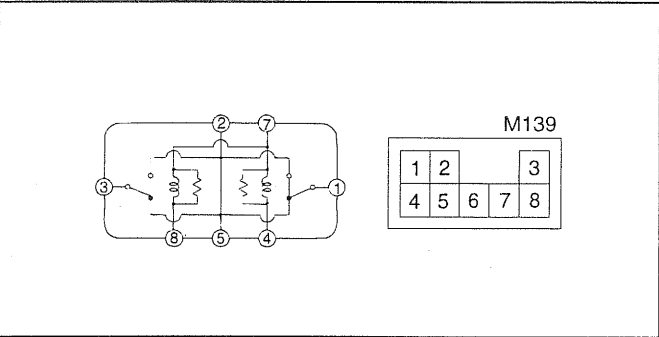
INSPECTION ETHA3350

Check for continuity between the terminals.

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

⊕ --- ⊖ Indicates battery connection

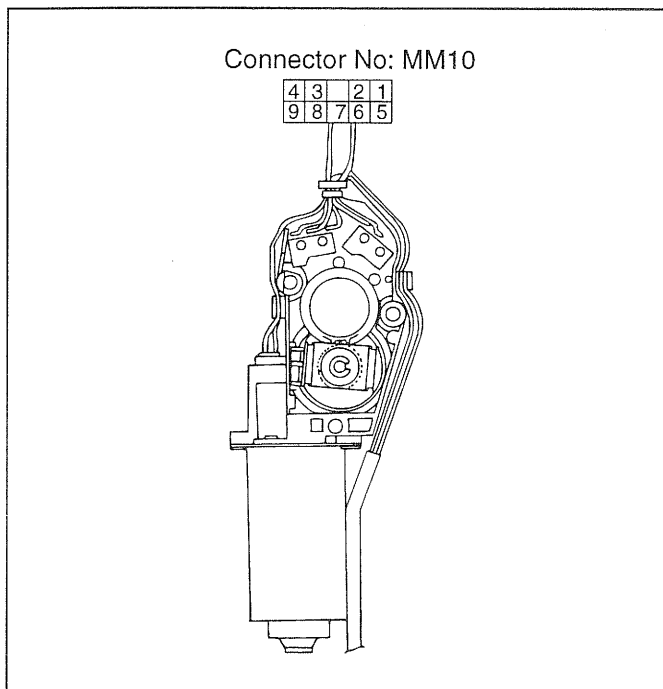
ETHA335A



ETHA130A

SUN ROOF MOTOR**INSPECTION** ETHA3400

1. Remove the overhead console lamp.
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 sunroof when tilted down and is open.
5. Reverse the connections and check that the motor turns in the direction when the sunroof is closed and tilted up.



ETAA215B

HEAD LAMPS

LIGHTING SYSTEM ETHA2900

PRE-AIMING INSTRUCTIONS

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

NOTE

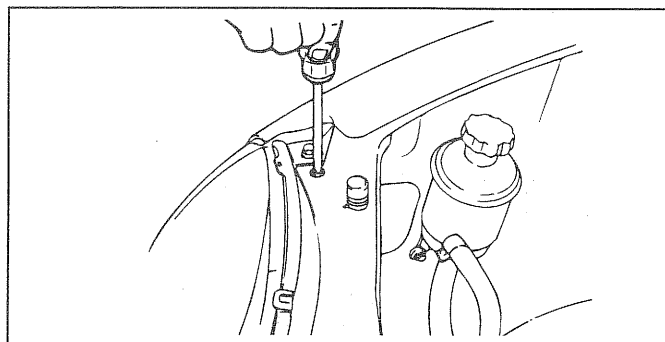
If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust to as to meet those requirements.

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

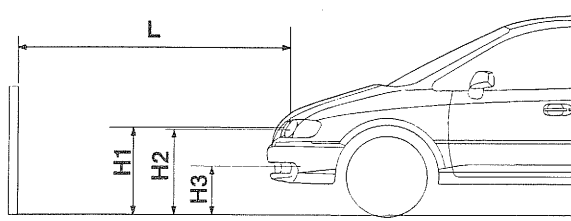
1. Inflate the tires to the specified pressure and remove the load from the vehicle except a driver, spare tire, and tool.
2. The vehicle should be placed on the flat floor.

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.

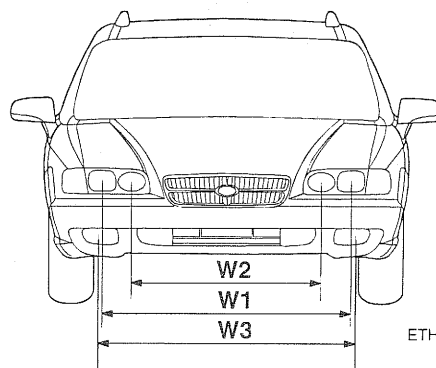
Make the vertical and horizontal adjustment of the lower beam to the standard values by using the adjusting knobs.



ETA9230A



ETHA075B



ETHA075A

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

ETHA290A

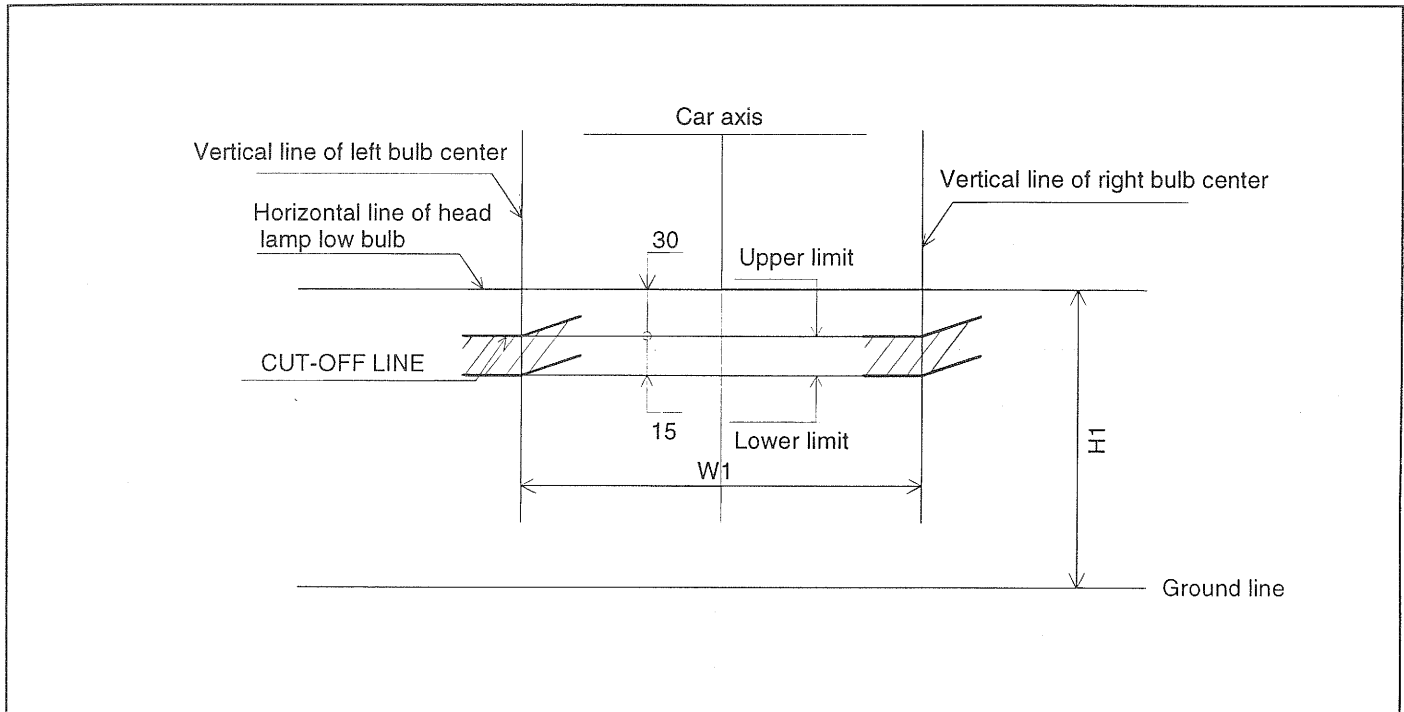
HEAD LAMP AND FOG LAMP AIMING POINT

Unit : mm

Vehicle condition	H1	H2	H3	W1	W2	W3	L
Without driver	700	694	365	1,254	978	1,270	3,000
With driver	685	679	350				

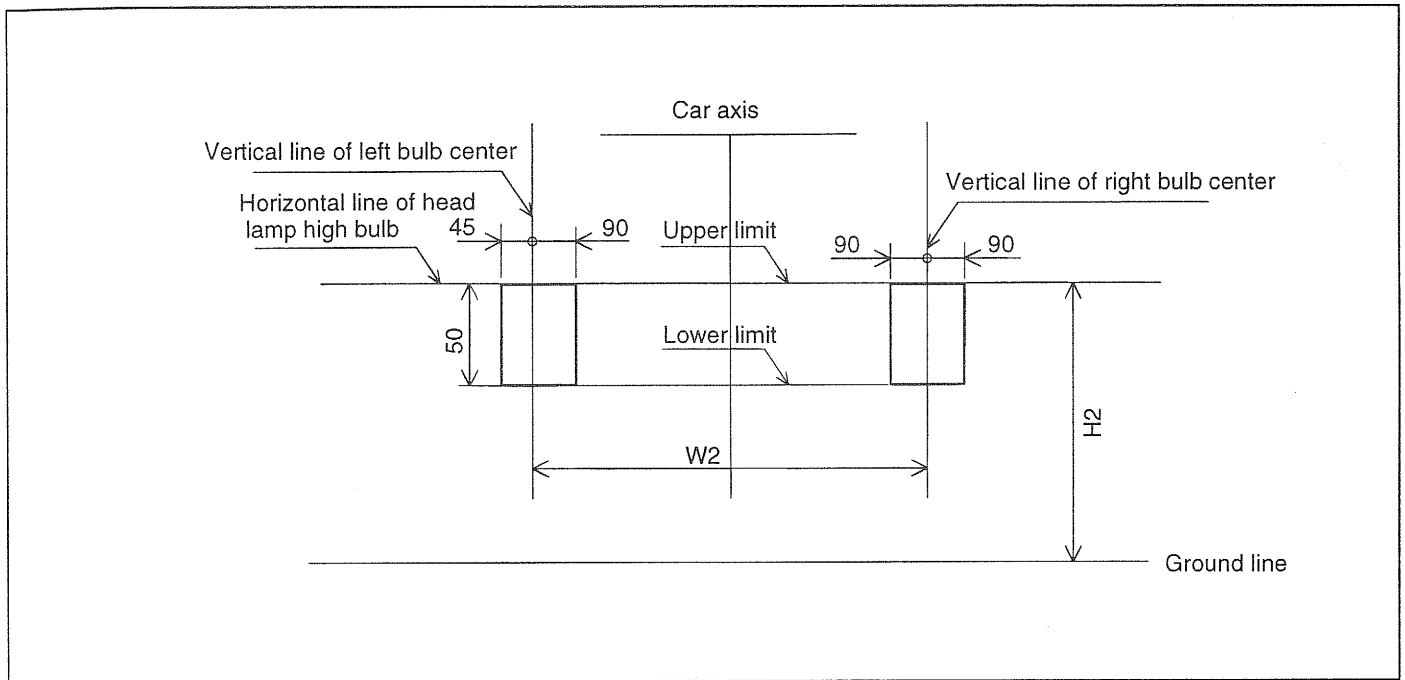
ETHA290B

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



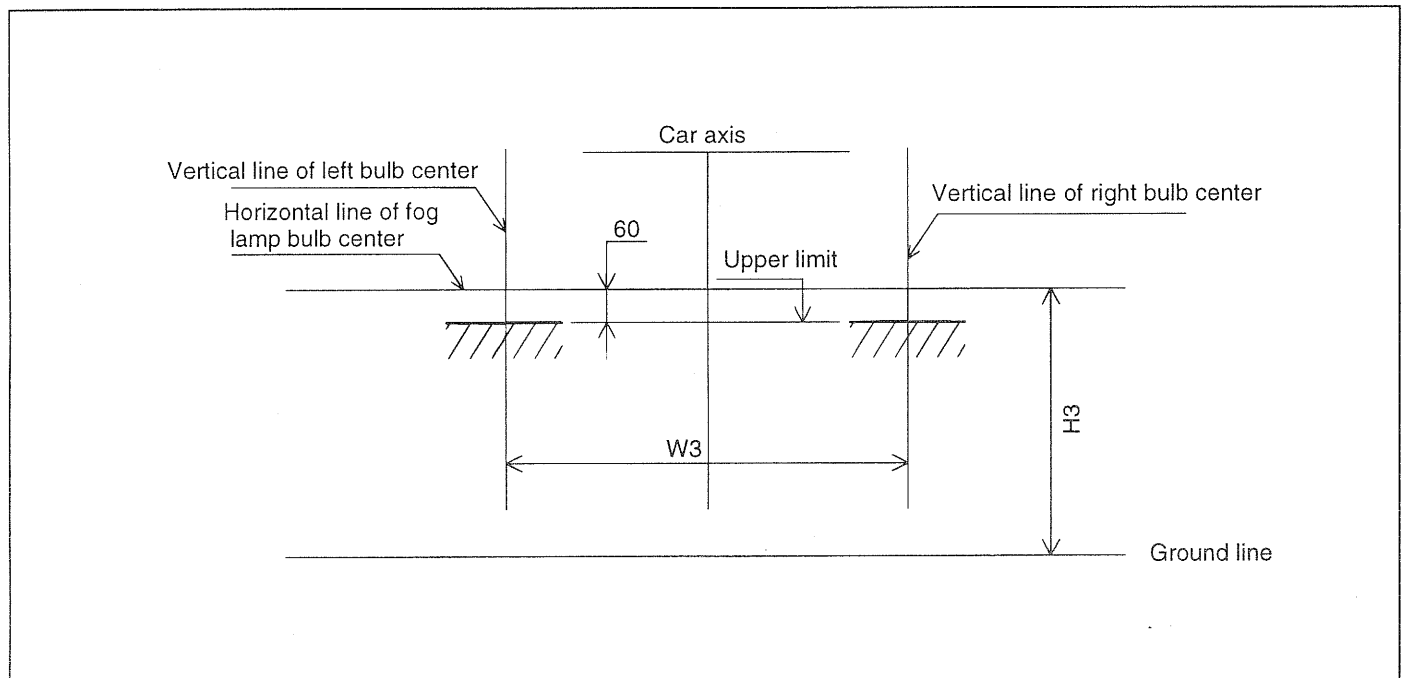
ETHA075C

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



ETHA075D

- Turn the front fog lamp on without driver. The cut-off line is projected in the allowable range.



ETHA075E

HEAD LAMP RELAY ETHA3050

INSPECTION

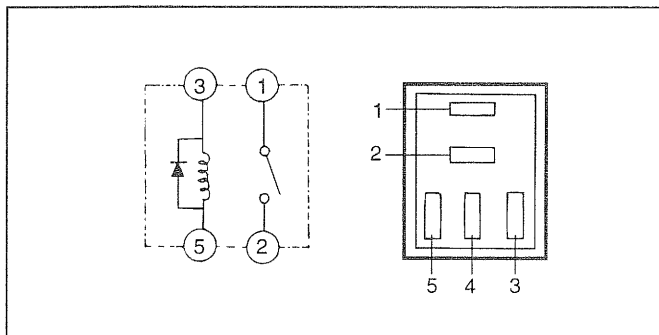
1. Pull out the headlamp relay from the relay box in the engine compartment.
2. Check for continuity between terminals.

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.

ETHA305A



ETDA211B

AUTO LIGHT CONTROL MODULE ETHA2950

or off automatically in accordance with the detection illumination.

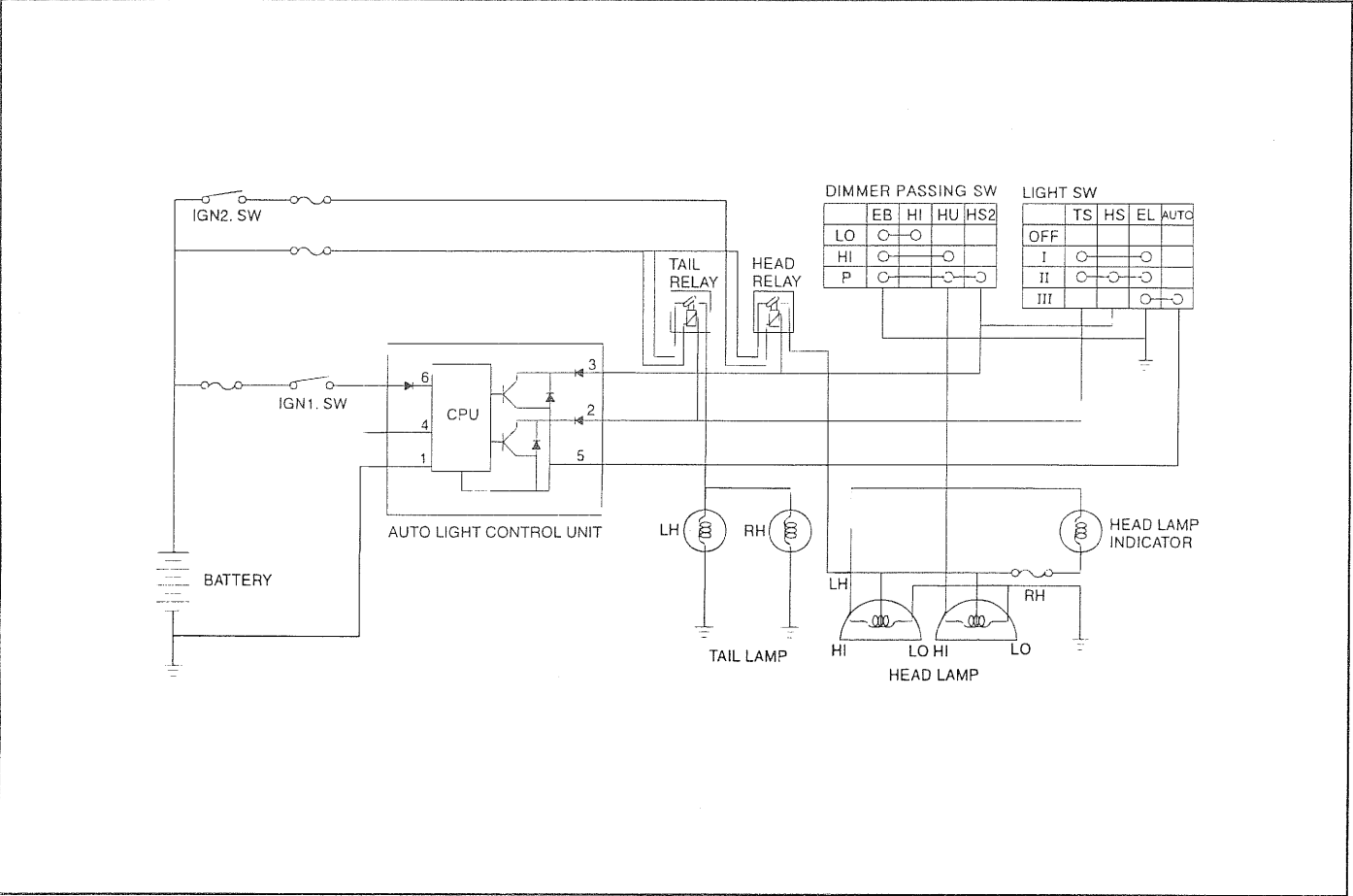
DESCRIPTION

The auto light control system operates by using the auto light switch, and turns the head lamp and tail lamp on

SPECIFICATIONS

Items	Specifications
Rated voltage	DC 12V
Operating voltage	DC 9V~16V
Load	Max. 200mA (Relay)
Operating temperature range	-30°C~+80°C

CIRCUIT DIAGRAM



PIN CONNECTION

[M65]

1

2

3

4

5

6

1. Ground

2. Tail lamp relay

3. Head lamp relay

4. Detection illumination input

5. Auto light switch

6. IGN. switch

Terminal	Voltage
1	Earth
2	5V(Normal), 0V(Tail lamp relay)
3	12V(Ignition ON)
5	5V(Normal), 0V(Switch ON)
6	12V(Ignition ON)

ETHA295A

DETECTION ILLUMINATION

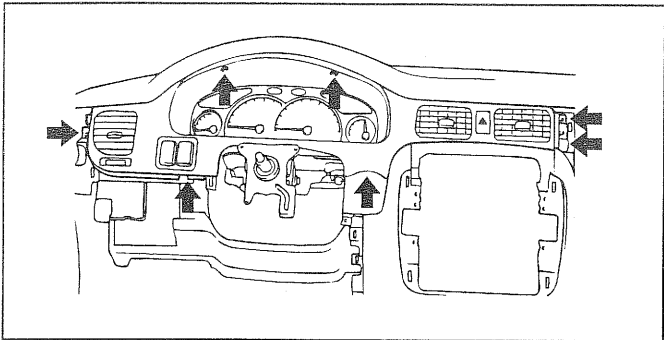
TYPE	CONDITION	TAIL LAMP	HEAD LAMP
Non solar glass	ON	50.8±3(LUX)	13.6±1.4(LUX)
	OFF	99.4±6(LUX)	25.9±3(LUX)
Solar glass	ON	23.8±3(LUX)	5.7±1.4(LUX)
	OFF	46.7±3(LUX)	12.2±1.4(LUX)

TURN/HAZARD LAMPS

TURN/HAZARD SWITCH

INSPECTION ETHA3100

- 1. Disconnect the negative (-) battery terminal.
- 2. Remove the cluster facia panel.
- 3. Disconnect the connector from the hazard lamp switch.



ESHA040V

- 4. Operate the switch and check for continuity between terminals by using an ohmmeter.

[M55]

Terminal Position	1	2	3	5	6	7	8	9	10
OFF		○	○	○	○	○	○		
ON					○	○	○	○	○

KTDA213C

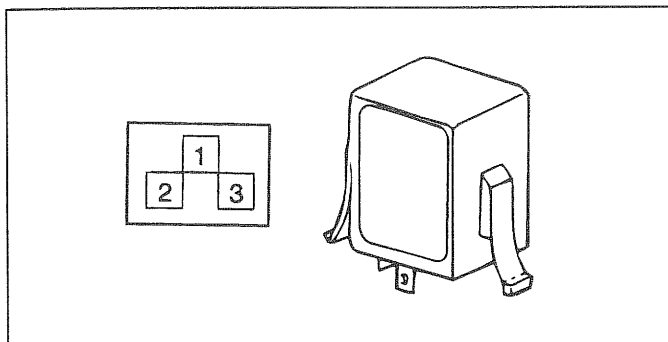
[M55]

1	2		3	4	
5	6	7	8	9	10

KTDA213B

FLASHER UNIT**INSPECTION** ETHA3150

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 parallel to each other to terminals 2 and 3. Check that the bulbs turn on and off.

NOTE

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

COURTESY AND TRUNK LAMPS

OVERHEAD CONSOLE LAMP

INSPECTION ETHA2100

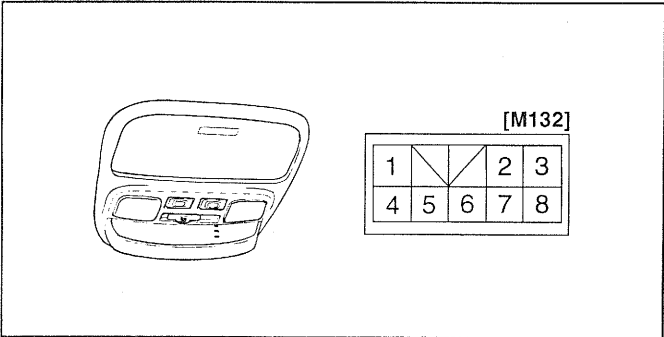
Remove the overhead console lamp and check for continuity between the terminals.

- VEHICLES WITHOUT SUNROOF

[M132]

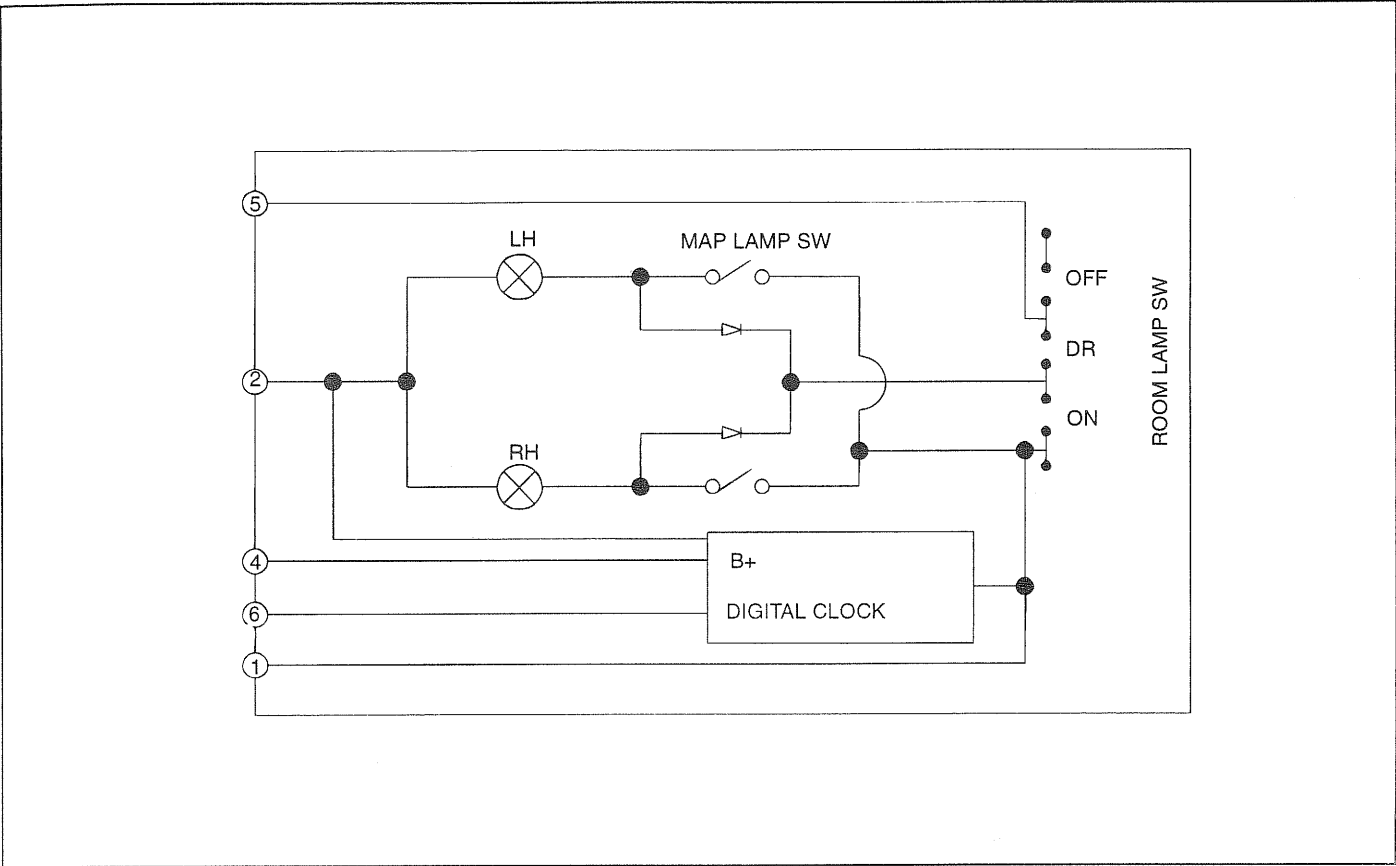
Sort Position Terminal	ROOM LAMP SWITCH			MAP LAMP SWITCH			
	ON	DR	OFF	LH		RH	
				ON	OFF	ON	OFF
1							
2							
5							

ETHA045E



ETHA045A

CIRCUIT DIAGRAM ETHA2150



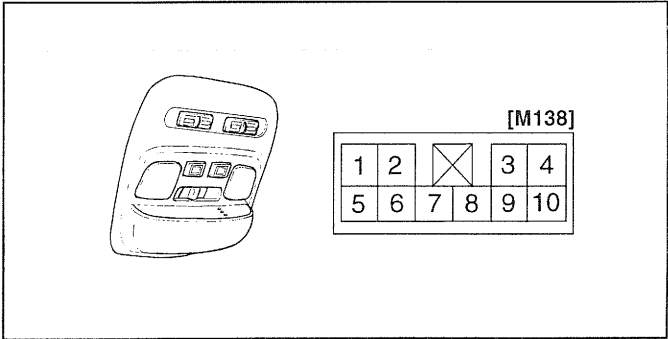
ETHA045B

• VEHICLES WITH SUNROOF

[M138]

Terminal	Sort	ROOM LAMP SWITCH			MAP LAMP SWITCH			
		Position			LH		RH	
		ON	DR	OFF	ON	OFF	ON	OFF
3								
4								
7								

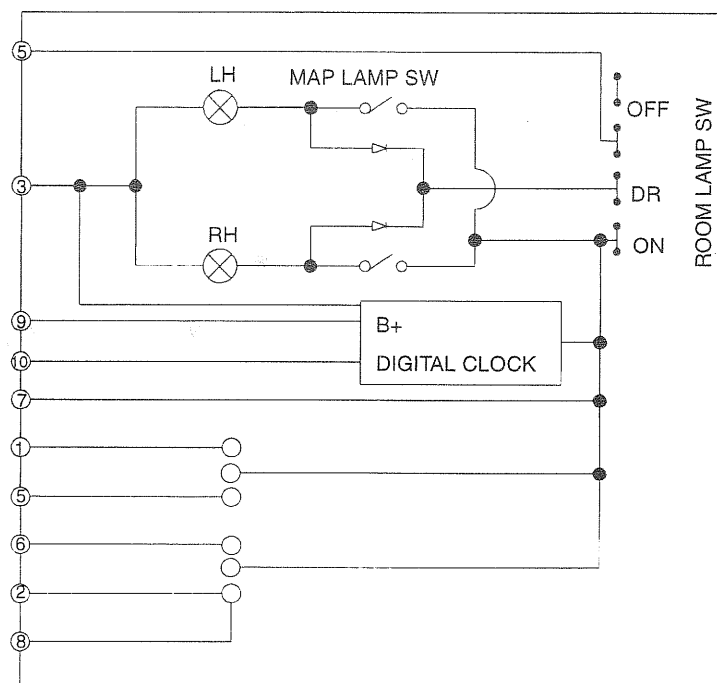
ETHA045F



ETHA045C

CIRCUIT DIAGRAM

ETHA2200



ETHA045D

IMMOBILIZER CONTROL SYSTEM

IMMOBILIZER SYSTEM ETHA3450

DESCRIPTION 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.

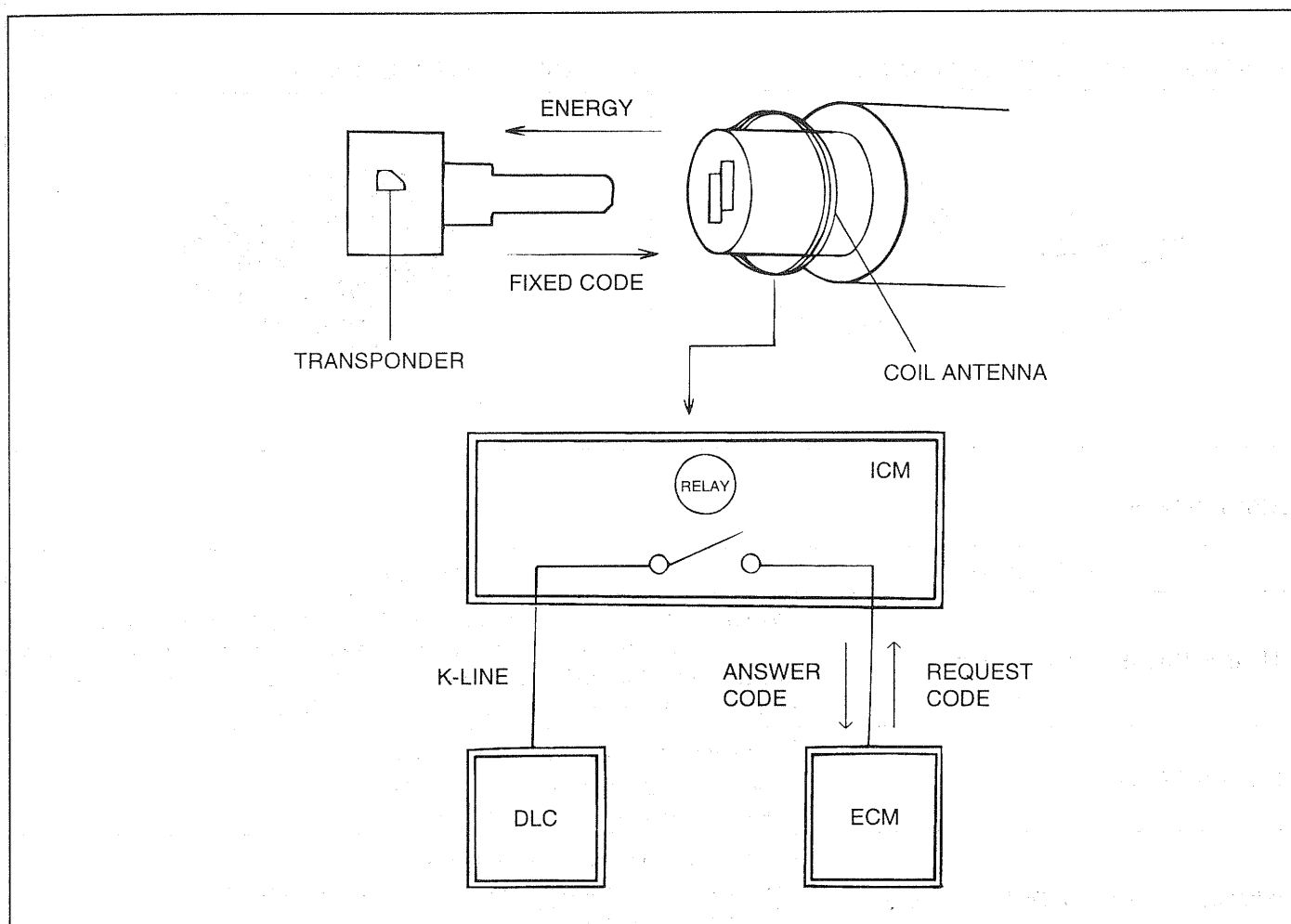
The transponder built in the ignition key signals its unique frequency code and at this time the ICM compares it with the memorized code.

When the codes are aligned, the ICM sends signals to the ECM so that starting is possible.

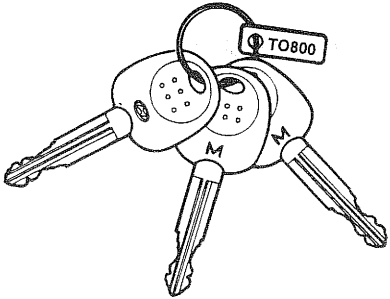
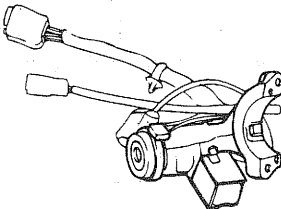
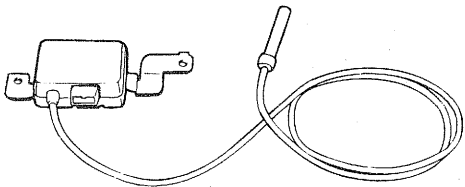
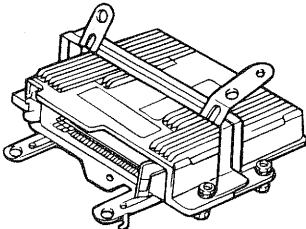
ICM : Immobilizer Control Module

ECM : Engine Control Module

SYSTEM BLOCK DIAGRAM



COMPONENT

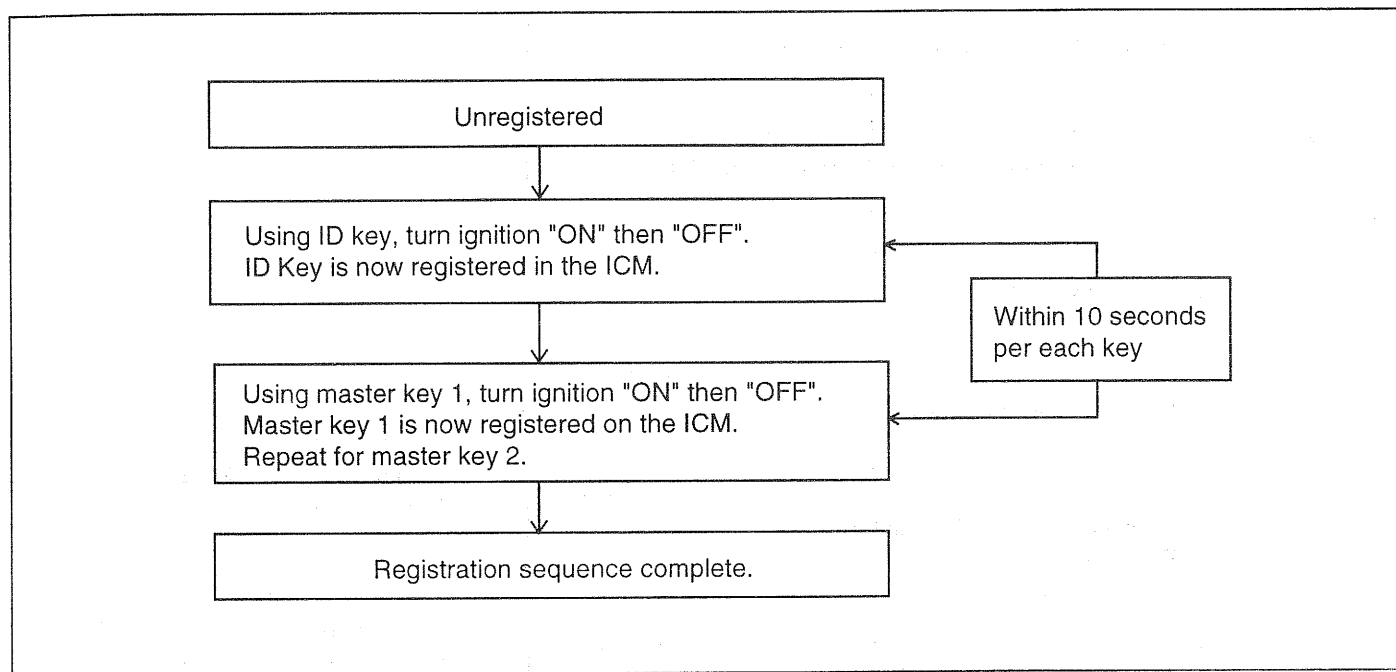
A. TRANSPONDER KEY	B. COIL ANTENNA
 B880B01A	 B6BE225C
C. IMMOBILIZER CONTROL MODULE	D. ENGINE CONTROL MODULE
 B6BE710D	 B6BE710E

DESCRIPTION

COMPONENT		DESCRIPTION
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 supply 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.
IMMOBILIZER CONTROL MODULE		Supplies power to the coil antenna. Receives and analyzes signal from the coil antenna. Transmits signal to ICM Stores VIN which composes of the ID CODE and password.
ENGINE CONTROL MODULE		With the ignition "ON", the ECM receives information from the ICM and permits injection to take place.
KEYS	ID KEY	Must be used first to register the unique ID CODE in the ICM. This ID CODE is then recorded into the master keys.
	MASTER	Once the ID CODE is recorded into the MASTER KEY, this key is for general use.
DATA LINK CONNECTOR		By connecting the voltmeter or HI-SCAN, control module diagnostic code can be read.

KEY REGISTRATION

1. ID Code registration sequence

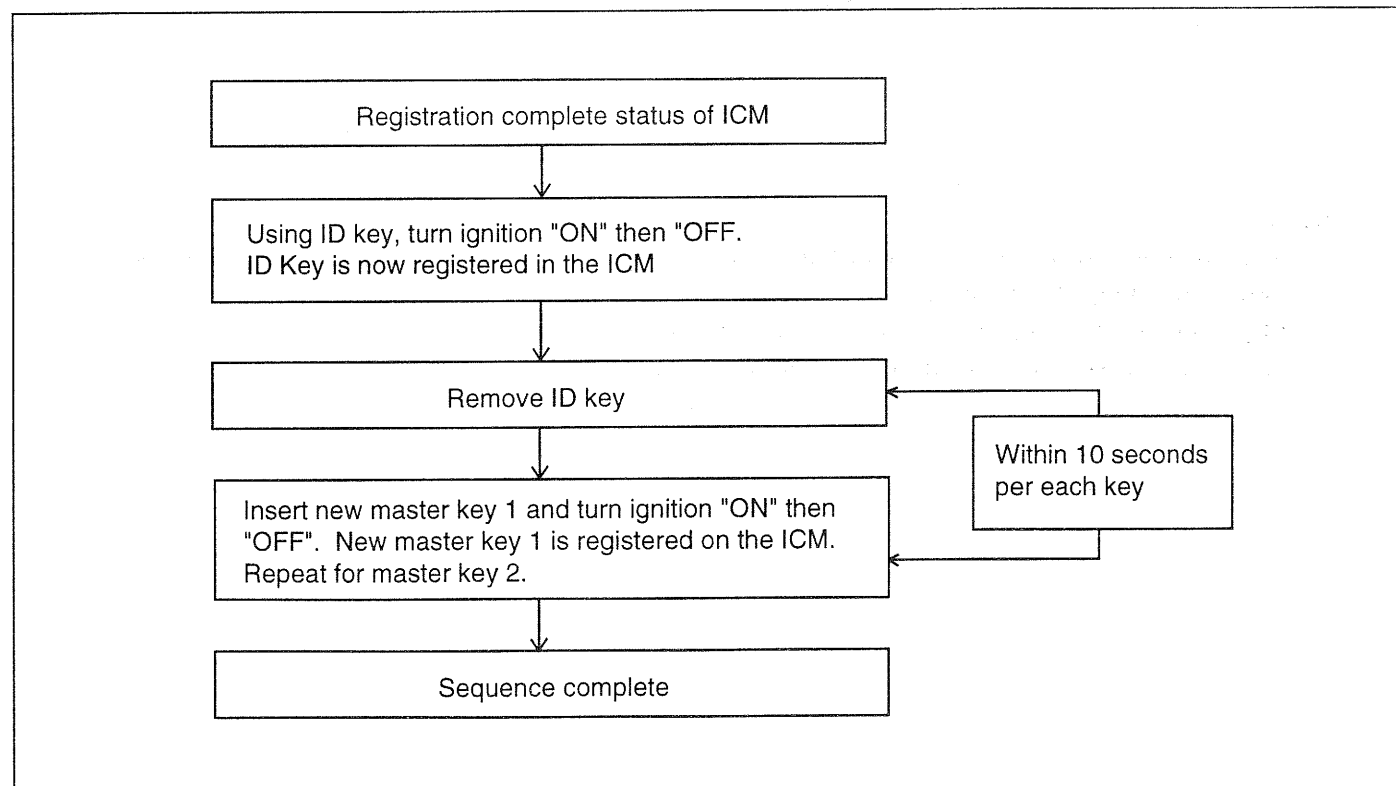


ETHA345A

2. Master key correction

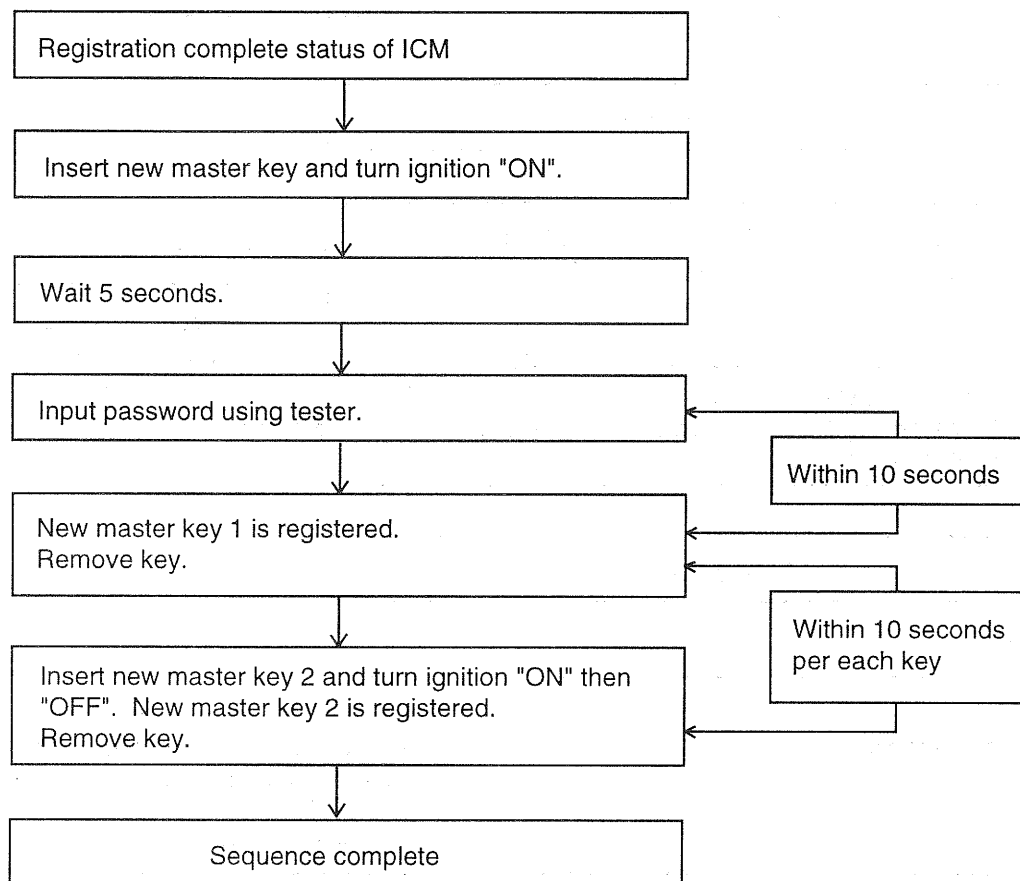
If a new set of master keys needs to be produced, it can be done by two methods:

a. Using ID key



ETHA345B

b. Using password

**NOTE**

- o Once the password is mis-registered, it is impossible to register new password during 10 seconds regardless of ignition ON/OFF.
- o When the master 3 keys have been registered, the codes for existing master keys are all cleared.
- o The password should consist of 4 numbers among ten (0~9) numbers.