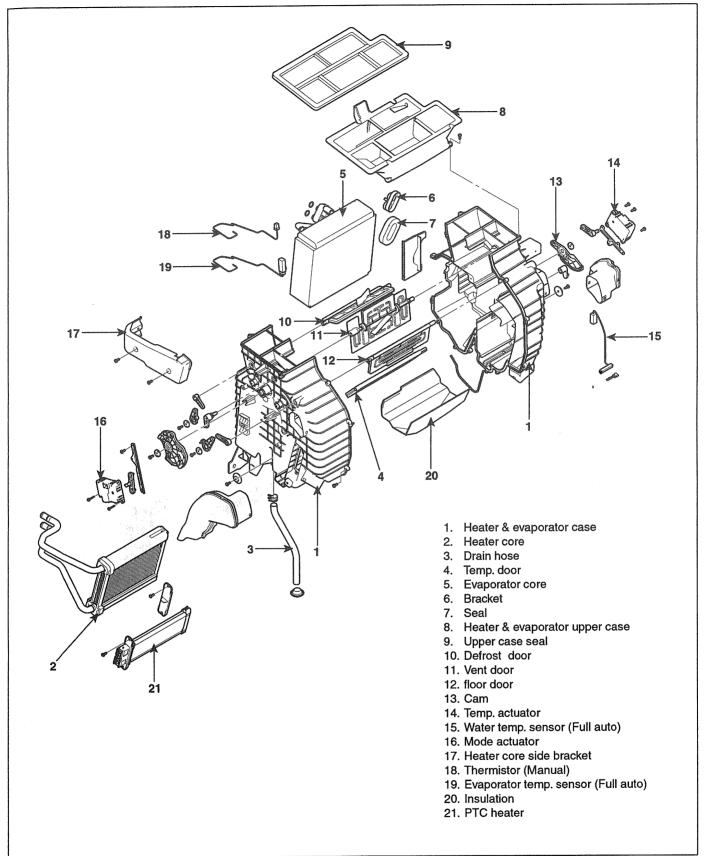
COMPONENTS EETDE9D9



EQQE300B

Heating, Ventilation and Air Conditioning

A/C COMPRESSOR CONTROLS

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INSPECTION	
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COMPONENT LOCATION	HΔ -73		
DESCRIPTION	 HΔ -73		
CONNECTOR	 H∆ -73		
CONNECTOR	۱ ۱/ - 1 3		

GENERAL

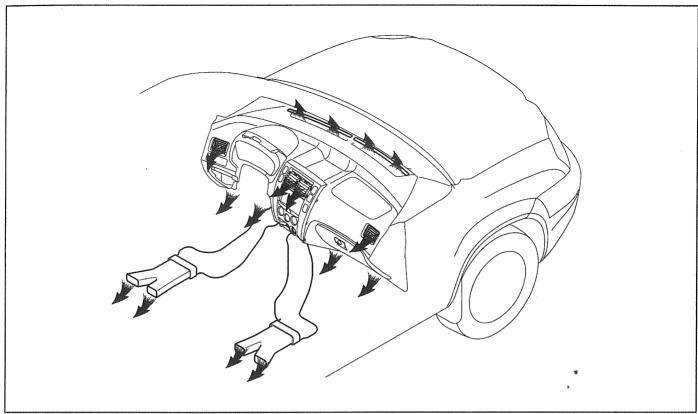
SPECIFICATIONS EBEE798F

	Item		Specif	ication
Heating	Heater	Туре	Air m	ix type
		Capacity (Kcal/h)	4,500	± 5%
	PTC heater	Capacity (W)	900+5	%/-10%
Air conditioning	Evaporator	Cooling capacity (Kcal/h)	4,500	± 10%
	Refrigerant	Туре	R-134a	
		Capacity (g)	510	± 25
	Compressor	Engine	BETA ENG.	DELTA, D-ENG.
		Model	10PA15C	10PA17C
		Туре	Swash plate	
		Displacement (cm³/rev)	155.3	177.7
		Lubricating oil	ND-OIL8	
		Oil capacity (cc)	120 ~ 135	200 ~ 215
		Pressure relief valve (Kg/cm²)	Working pressure: 35.2 ~ 42.2 Resealed pressure: Min. 28.1	
	Magnetic clutch	Туре	L50 (4K)	←
		Rated voltage (V)	DC 12	←
		Consumed current (W)	40	Max. 48
		Operating voltage Min. (A)	Max. 2.2	Max. 2.66
	,	Torque (N·m)	Min. 53	←
		Pulley pitch dia.	ø125	DELTA : ø125 D-ENG. : ø120
	Condenser	Heat rejection (Kcal/h)	13,500	± 5%
	Thermistor (manual)	ON	2.5 ± 0.5°C	
		OFF	0.5 ±	0.5°C
	Triple pressure switch	High pressure (kg/cm²)	ON 32.0 ± 2.0 OFF 26.0 ± 2.0	
		Middle pressure (kg/cm²)	ON 18.0 ± 0.8 OFF 14.0 ± 1.2	
		Low pressure (kg/cm²)	ON 2.3+0.25, -0.29 OFF 2.0 ± 0.2	
Heater control as	ssembly	MANUAL type, AUTOMATIC t	type	MC41040000000000000000000000000000000000

SPECIAL TOOLS E7FB079E

Tool (Number and name)	Illustration	Use
09977-29000 Pressure plate bolt remover		Removal and installation of pressure plate
	EQA9002A	

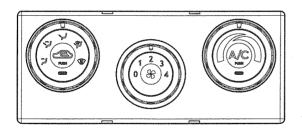
AIR FLOW DESCRIPTION E20B549B

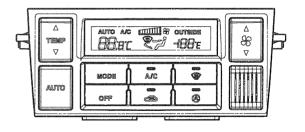


KQQE900A

MANUAL AIR CONDITION CONTROL PANEL

AUTOMATIC AIR CONDITION CONTROL PANEL





KQQE902A KQQE903A

AIR FLOW DISTRIBUTION OF MODE (%)

MODE	REC		FRE	SH	
OUTLET	COOL	1/2 WARM WARM		SM	
POSITION	VENT	BILEVEL	FLOOR	MIX	DEF
VENT	100	65 ± 10	•	-	•
FLOOR	### ##################################	35 ± 10	65 ± 5	45 ± 5	-
DEF	89	- :	20 ± 5	40 ± 5	85 ± 10
SIDE VENT		40 ·	15 ± 5	15 ± 5	15 ± 10

EQQE900C

LEFT-RIGHT DISTRIBUTION OF VENT & FLOOR (%)

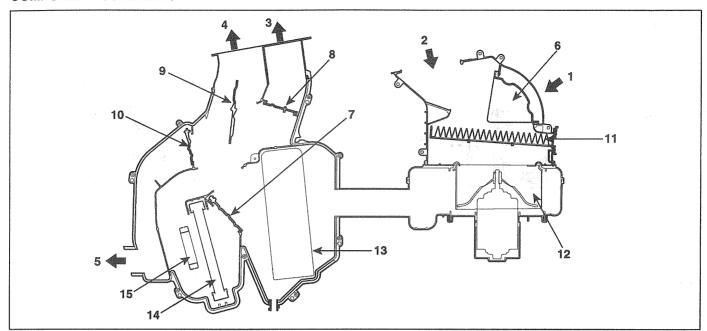
OUTLET	LH	LH - CTR	RH - CTR	RH
VENT	24 ± 5	26 ± 5	26 ± 5	24 ± 5
FLOOR	41 ± 5	18	± 5	41 ± 5

EQSE900D

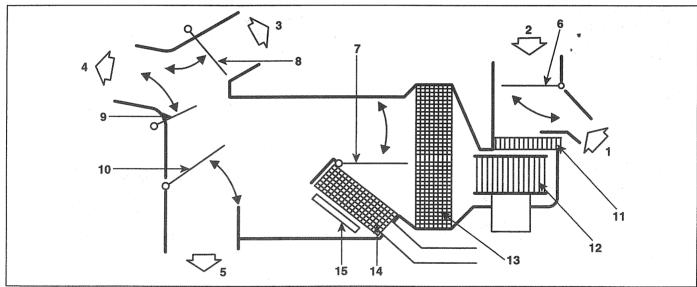
COOL ↔ WARM AIR FLOW VOLUME CHANGE RATE 23% Max

- TEST MODE: RED - VENT

COMPONENT SCHEMATIC



KQQE910A

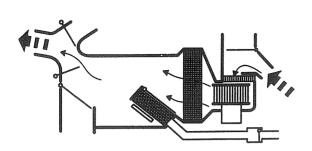


KQQE910B

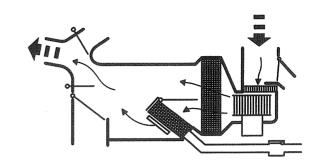
ltem	Description	Item	Description
1	Recirculating air port	9	Panel airflow door
2	Outside air port	10	Floor airflow door
3	Defrost air vent	11	Air filter
4	Panel air vent	12	Blower unit
5	Floor air vent	13	Evaporator core
6	Air inlet blend door	14	Heater core
7	Air temperature control door	15	PTC heater
8	Defrost airflow door		

SYSTEM AIR FLOW DESCRIPTION

MAX A/C



PANEL



KQQE911B

KQQE911A

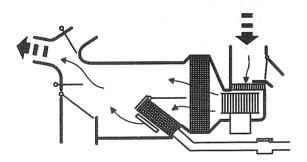
When MAX A/C is selected:

Air inlet blend door : Recirc

- Air temperature control door : Max. cold

Defrost airflow door: Close
 Panel airflow door: Open
 Floor airflow door: Close
 A/C compressor: ON
 Blower motor: ON

A/C



When PANEL is selected :

- Air inlet blend door: Fresh

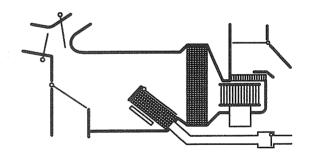
- Air temperature control door: Enable to select

Defrost airflow door : ClosePanel airflow door : OpenFloor airflow door : Close

- A/C compressor : Enable to select *

- Blower motor : ON

OFF



KQQE911C

KQQE911B

When A/C is selected:

Air inlet blend door : Fresh

Air temperature control door: Enable to select

Defrost airflow door: Enable to select
Panel airflow door: Enable to select
Floor airflow door: Enable to select

A/C compressor : ONBlower motor : ON

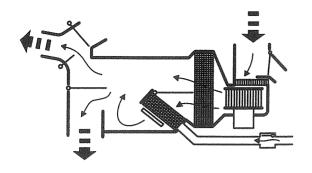
When OFF is selected:

Air inlet blend door: Recirc

Air temperature control door: Enable to select

Defrost airflow door: Open
Panel airflow door: Close
Floor airflow door: Close
A/C compressor: OFF
Blower motor: OFF

PANEL/FLOOR



KQQE911D

When PANEL/FLOOR is selected:

Air inlet blend door : Fresh

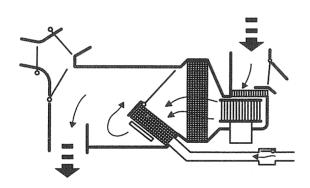
- Air temperature control door : Enable to select

Defrost airflow door : ClosePanel airflow door : OpenFloor airflow door : Open

- A/C compressor : Enable to select

Blower motor : ON

FLOOR



KQQE911E

When FLOOR is selected:

Air inlet blend door : Fresh

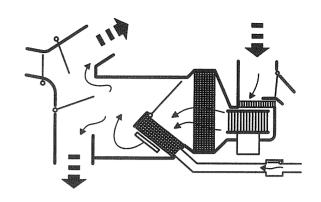
- Air temperature control door: Enable to select

Defrost airflow door : ClosePanel airflow door : CloseFloor airflow door : Open

- A/C compressor : Enable to select

Blower motor: ON

FLOOR/DEFROST



KQQE911F

When FLOOR/DEFROST is selected:

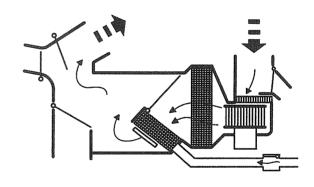
- Air inlet blend door: Fresh

- Air temperature control door: Enable to select

Defrost airflow door : Open
Panel airflow door : Close
Floor airflow door : Open
A/C compressor : ON

Blower motor: ON

DEFROST



KQQE911G

When DEFROST is selected:

Air inlet blend door : Fresh

- Air temperature control door : Enable to select

Defrost airflow door: Open
Panel airflow door: Close
Floor airflow door: Close
A/C compressor: ON
Blower motor: ON

PRECAUTIONS EFA92B03

The air conditioning system uses R-134a refrigerant and ND-OIL8 refrigerant oil, which are not compatible with R-12 refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioning system or your servicing equipment will result.

/!\ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- · Be careful when connecting service equipment
- · Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

WARNING

- Compressed air mixed with R-134a forms a combustible vapor.
- · The vapor can burn or explode causing serious injury.
- · Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

- Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
- Keep moisture and dirt out of the system, When disconnecting any lines, plug or cap the fittings immediately; don t remove the caps or plugs until just before you reconnect each line.
- Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
- When tightening or loosening a fitting, use a second wrench to support the matching fitting.
- When discharging the system, use a R-134a refrigerant recovery/recycling/charging station; don t release refrigerant into the atmosphere.

TROUBLESHOOTING E58CAFAF

PROBLEM SYMPTOMS TABLE

of the problem. Check each part in order. If necessary, replace these parts.

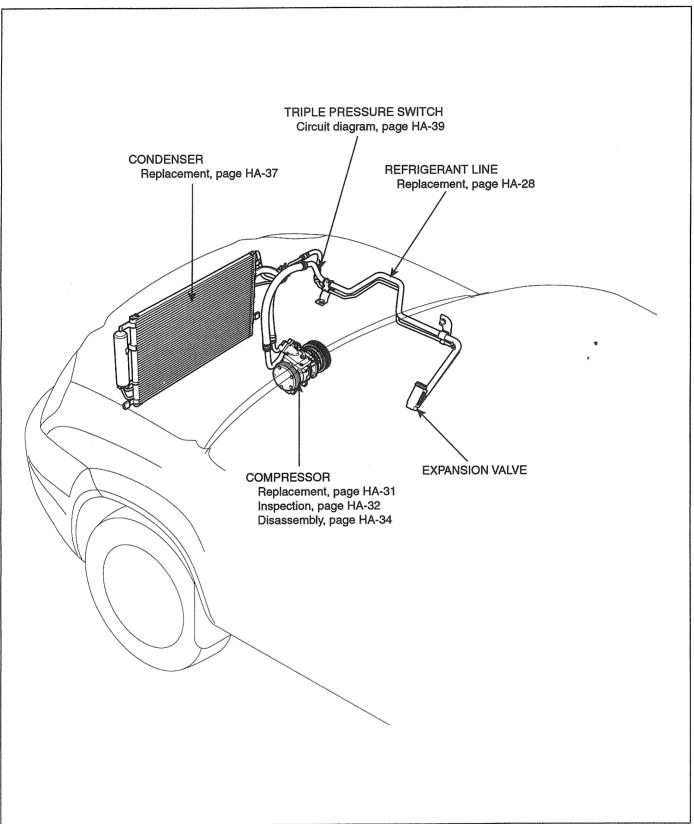
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause

STANDARD:

Symptom	Suspect Area	See page
No blower operation	 HTR Fuse Blower relay Blower motor Blower resistor Blower speed control switch Wire harness 	- HA-71 HA-69 HA-74 HA-81, 93
No air temperature control	Engine coolant capacity Heater control assembly	- HA-81, 93
No compressor operation	 Refrigerant capacity A/C Fuse Magnetic clutch Compressor Triple pressure switch A/C switch Thermistor, evaporator temp.sensor Wire harness 	HA-3, 24, 28 - HA-30 HA-29 HA-38 HA-81, 93 HA-40, 44
No cool comes out	 Refrigerant capacity Refrigerant pressure Drive belt Magnetic clutch Compressor Triple pressure switch Thermistor, evaporator temp. sensor A/C switch Heater control assembly Wire harness 	HA-3, 24, 28 HA-17 HA-26 HA-30 HA-29 HA-38 HA-40, 44 HA-81, 93
Insufficient cooling	 Refrigerant capacity Drive belt Magnetic clutch Compressor Condenser Expansion valve Evaporator Refrigerant lines Triple pressure switch Heater control assembly 	HA-3, 24, 28 HA-26 HA-30 HA-29 HA-36 HA-12 HA-56 HA-27 HA-38 HA-81, 93
No engine idle-up when A/C switch ON	Engine (and ECT) ECU Wire harness	- -
No air inlet control	Heater control assembly	HA-81, 93
No mode control	Heater control assembly	HA-81, 93
No condenser fan operation	 ECU-IG Fuse Fan motor Engine (and ECT) ECU Wire harness 	- - - -

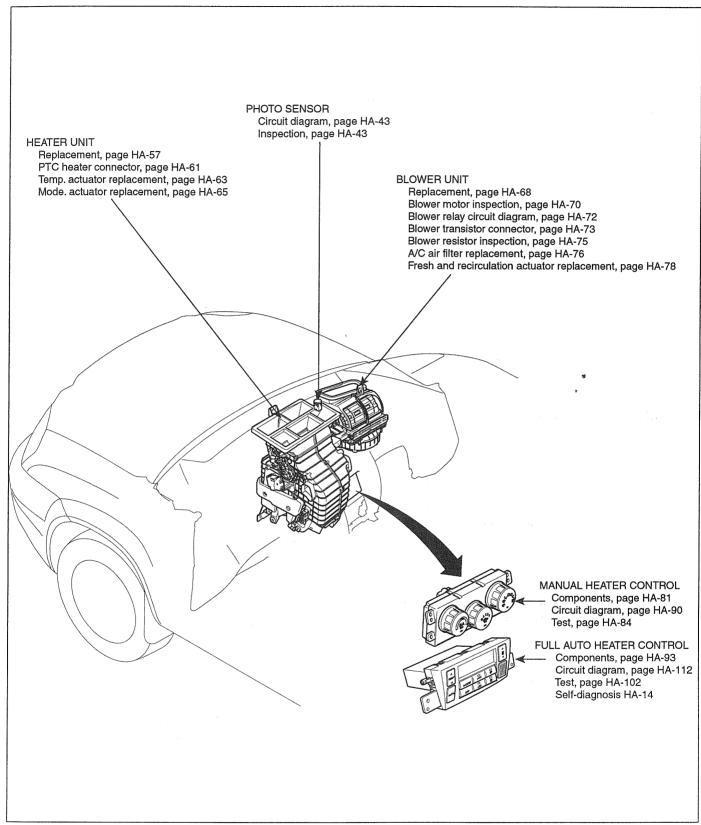
COMPONENT LOCATION INDEX EF0E47BE

ENGINE ROOM



EQQE001A

INTERIOR

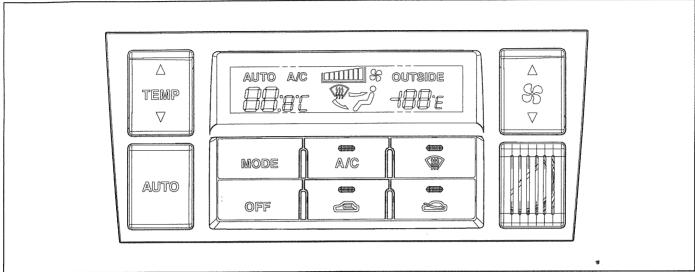


EQQE001B

SELF-DIAGNOSIS ECBE9C23

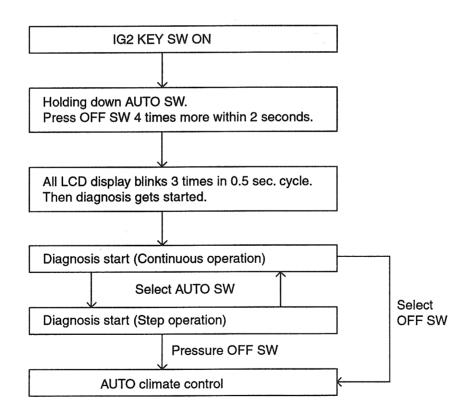
The Full Automatic Temperature Control (F.A.T.C) module self test feature will detect electrical malfunctions and provide error code for system components with suspected failures.

CONTROL PANEL



KQQE001C

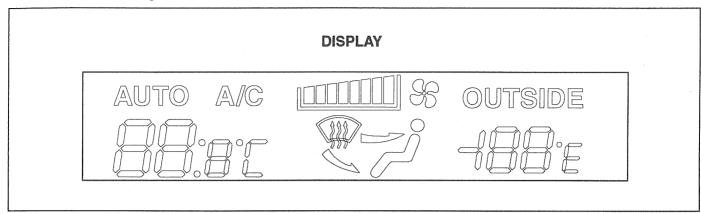
SELF-DIAGNOSIS METHOD



EQQE001D

HOW TO READ SELF-DIAGNOSTIC CODE

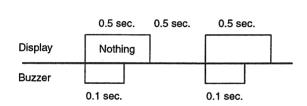
- After the display panel flickers three times every 0.5 second, the corresponding error code flickers on the setup temperature display panel every 0.5 second and will show two figures.
- 2. If error code is more than two, each code flicker 2 times in sequence.



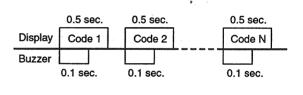
KQQE001E

FAULT CODE DISPLAY

1. Normal



3. More error codes than two

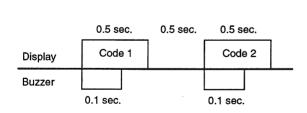


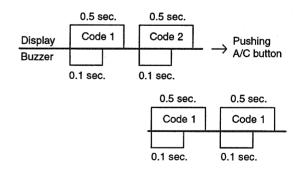
EQKE002D

EQKE002B

4. Checking each error code

2. One error code





EQKE002C

EQKE002E

DTC CHART

If malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below.

DTC code	Detection item	Trouble area
00	Normal	-
11	Open INCAR Sensor circuit	Incar sensor
12	Shorted INCAR Sensor circuit	Harness or connector between incar sensor and A/C control assembly A/C control assembly
13	Open Ambient sensor circuit	Ambient sensor
14	Shorted Ambient sensor circuit	 Harness or connector between ambient sensor and A/C control assembly A/C control assembly
15	Open water temp. sensor	Water temp. sensor
16	Shorted water temp. sensor	 Harness or connector between water temp. sensor and A/C control assembly A/C control assembly
. 17	Open evap. sensor	Evap. sensor
18	Shorted evap. sensor	 Harness or connector between evap. sensor and A/C control assembly A/C control assembly
19	Open or shorted temp. door potentiometer	 Harness or connector between temp. door potentiometer and A/C control assembly
20	Defective temp. door potentiometer	Temp. door potentiometer
21	Open or shorted mode door potentiometer	Harness or connector between mode door potentiometer and A/C control assembly
22	Defective mode door potentiometer	Mode door potentiometer
23	Open Humidity sensor circuit	Humidity sensor
24	Shorted Humidity sensor circuit	 Harness or connector between humidity sensor and A/C control assembly A/C control assembly

FAIL SAFE FUNCTION

No.	Item	Failure	FAIL SAFE Function
1	IN-CAR temperature sensor	Open/Short	25°C alternate value control
2	Ambient temperature sensor	Open/Short	20°C alternate value control
3	Evaporator sensor	Open/Short	-2°C alternate value control
4	Water temperature sensor	Open/Short	-20°C alternate value control
5	Temperature door potentiometer	Open/Short setup temperature	For 17°C to 24.5°C, set to maximum cooling position. For 25°C to 32°C, set to maximum heating position.
6	Mode door potentimeter	Open/Short setup mode	Vent mode, at vent mode Def mode, at except vent mode

ON-VEHICLE INSPECTION E6CC595D

This is a method in which the trouble is located by using a gauge set. Read the gauge pressure when these conditions are established.

TEST CONDITIONS

- Temperature at the air inlet with the switch set at RE-CIRC is 30~35°C (86~95°F)
- Engine running at 1,500rpm
- Blower speed control knob on "4" position
- Temperature control knob on "COOL" position

M NOTE

It should be noted that the gauge indications may vary slightly due to ambient temperature conditions

1. Normally functioning refrigeration system.

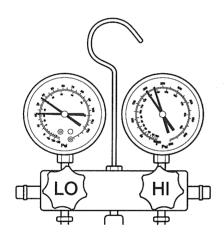
Gauge reading:

Low pressure side:

0.15~0.25 MPa (21.8~36.3 psi, 1.5~2.5 kgf/cm²)

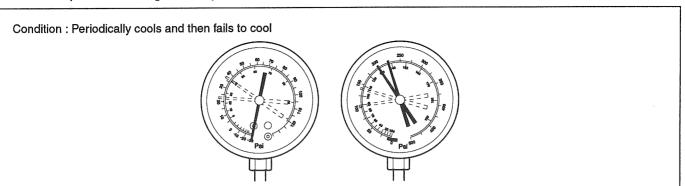
High pressure side:

1.37~1.57 MPa (199~228 psi, 14~16 kgf/cm²)



EQKE006A

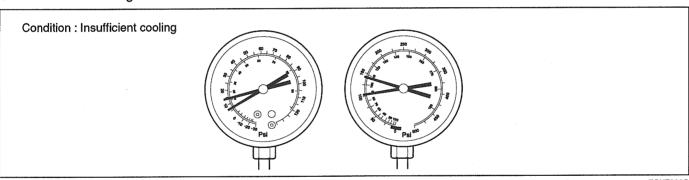
2. Moisture present in refrigeration system.



EQKE006B

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	 Drier in oversaturated state Moisture in refrigeration system freezes at expansion valve orifice and block circulation of refrigerant 	 Raplace drier Remove moisture in cycle through repeatedly evacuating air Charge proper amount of new refrigerant

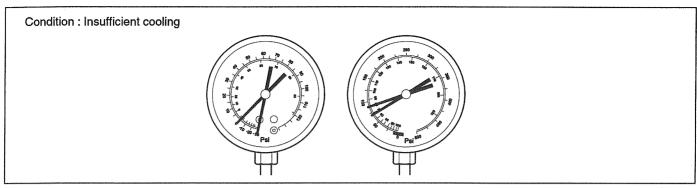
3. Insufficient cooling



EQKE006C

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Pressure low on both low and high pressure sides Insufficient cooling performance 	Gas leakage at some place in refrigeration system	 Insufficient refrigerant in system Refrigerant leaking 	 Check for gas leakage with gas leak detector and repair if necessary Charge proper amount of refrigerant If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

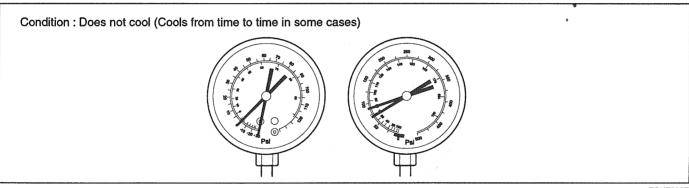
4. Poor circulation of refrigerant



EQKE006D

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Pressure low in both low and high pressure sides Frost on tube from receiver to unit 	Refrigerant flow obstructed by dirt in drier	Condenser clogged	Replace drier

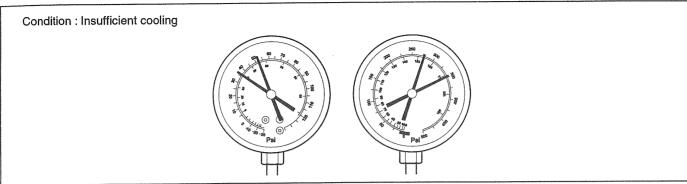
5. Refrigerant does not circulate



EQKE006E

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Vacuum indicated on low pressure side, very low pressure indicated on high pressure side Frost or dew seen on piping before and after receiver/drier or expansion valve 	 Refrigerant flow obstructed by moisture or dirt in refrigeration system Refrigerant flow obstructed by gas leakage from expansion valve 	Refrigerant does not circulate	 Check expansion valve Clean out dirt in expansion valve by blowing with air Replace drier Evacuate air and charge new refrigerant to proper amount For gas leakage from expansion valve, replace expansion valve

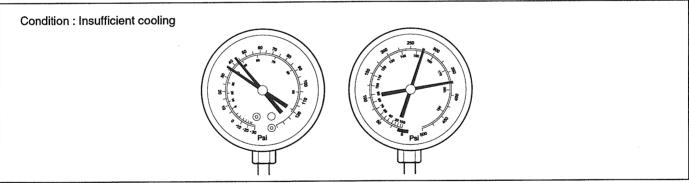
6. Refrigerant overcharged or insufficient cooling of condenser



EQKE006F

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high on both low and high pressure sides	 Unable to develop sufficient performance due to excessive Insufficient cooling of condenser 	 Excessive refrigerant in cycle → refrigerant overcharged Condenser cooling → condenser fins clogged or condenser fan faulty 	 (1) Clean condenser (2) Check cooling fan with fluid coupling operation. (3) If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

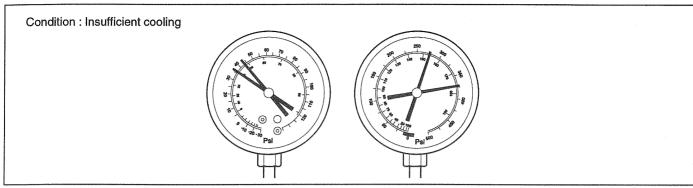
7. Air present in refrigeration system



EQKE006G

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Pressure too high on both low and high pressure sides The low pressure piping hot to the touch 	Air entered in refrigeration system	 Air present in refrigeration system Insufficient vacuum purging 	 Check compressor oil to see if it is see if it is dirty or insufficient Evacuate air and charge new refrigerant

8. Expansion valve improperly

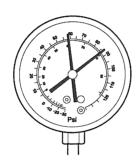


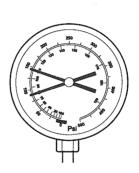
EQKE006G

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Pressure too high on both low and high pressure sides Frost or large amount of dew on piping on low pressure side 	Trouble in expansion valve	 Excessive refrigerant in low pressure piping Expansion valve opened too wide 	 Check expansion valve Replace if defective

9. Defective compression compressor

Condition : Does not cool





EQKE006H

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
 Pressure too high on low and high pressure sides Pressure too low to on high pressure side 	Internal leak in compressor	 Compression defective Valve leaking or broken sliding parts 	Repair or replace compressor

INSPECT FOR LEAKAGE OF REFRIGERANT

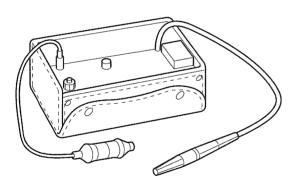
Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

[LI] NOTE

In order to use the leak detector properly, read the manual supplied by the manufacturer.

If a gas leak is detected, proceed as follows:

- Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
- If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is sliaht.
- Check the compressor oil and add oil if required.
- Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system again.



EQKE007A

A/C SYSTEM TESTS

PERFORMANCE TEST

The performance test will help determine if the air conditioner system is operating within specifications.



/!\ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equip-
- · Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

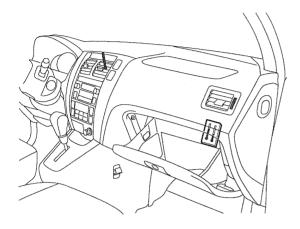
R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

WARNING

- · Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

- Connect a R-134a refrigerant recover/recycling/charging station to the high-pressure service port and the low-pressure service port, following the equipment manufacturer's instructions.
- Insert a thermometer in the center vent. Determine the relative humidity and air temperature.



KQQE003A

- Test conditions:
 - · Avoid direct sunlight.
 - Open the hood.
 - · Open the front doors.
 - · Set the temperature control dial on MAX COOL. the mode control switch on VENT and the recirculation control switch on RECIRCULATE.
 - Turn the A/C switch on and the fan switch on MAX.
 - Run the engine at 1,500 rpm.
 - · No driver or passengers in vehicle.
- After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent, the intake temperature near the blower unit behind the glove box and the high and low system pressure from the A/C gauges.

REFRIGERANT RECOVERY



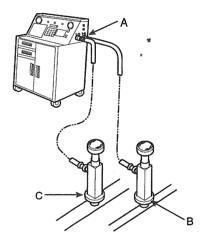
/!\ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equip-
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Connect a R-134a refrigerant recovery/recycling/charging station (A) to the high-pressure service port (B) and the low-pressure service port (C), as shown, following the equipment manufacturer's instruction.



EOKE004A

Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to put the same amount of new refrigerant oil back into the A/C system before charging.

SYSTEM EVACUATION

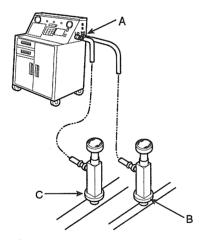
/!\ CAUTION

- · Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- · Be careful when connecting service equipment.
- · Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

- When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant recover/recycling/charging station (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
- Connect a R-134a refrigerant recovery/recycling/charging station(A) to the high-pressure service port(B) and the low-pressure service port(C), as shown, following the equipment manufacturer's instruction. Evacuate the system.



EQKE004A

If the low-pressure does not reach more than 93.3 kPa(700 mmHg, 27.6 in.Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system (see page HA-24), and check for leaks (see page HA-22).

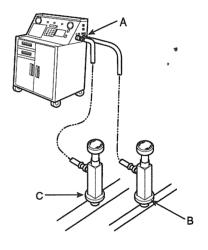
SYSTEM CHARGING

/!\ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- · Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

R-134a refrigerant recover/recy-Connect a cling/charging station (A) to the high-pressure service port (B) and the low-pressure service port (C), as shown, following the equipment manufacture's instructions.

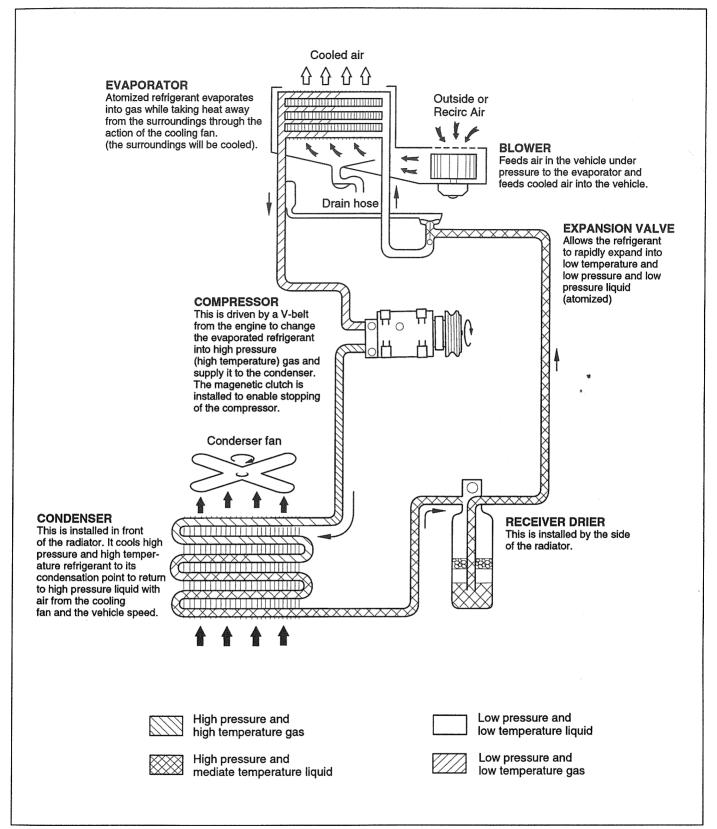


EQKE004A

- Add the same amount of new refrigerant oil to the system that was removed during recovery. Use only ND-OIL8 refrigerant oil.
- Charge the system with the specified amount of R-134a refrigerant. Do not overcharge the system; the compressor will be damaged.

Refrigerant capacity: 510 ± 25g

REFRIGERATION CYCLE E98A7EDF



EQDE008A

AIR CONDITIONING SYSTEM

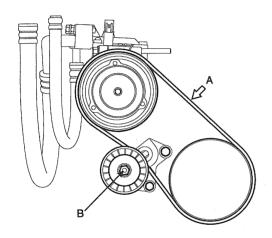
DRIVE BELT

INSPECTION EFAAC8A7

Only BETA ENG. Apply a force of 98N(10kgf, 22lbf), and measure the deflection at the mid point(A) between the air condition compressor and crankshaft pulley.

Deflection

Used belt: 6.0~7.0mm (0.24~0.28 in.) New belt: 5.0~5.5mm (0.20~0.22 in.)



EQQE005A

NOTE

These items when adjusting belt tension:

- If there are cracks or any damage evident on the belt, replace it with a new one.
- "Used belt" means a belt which has been used for five minutes or more.
- "New belt" means a belt which has been used for less than five minutes.

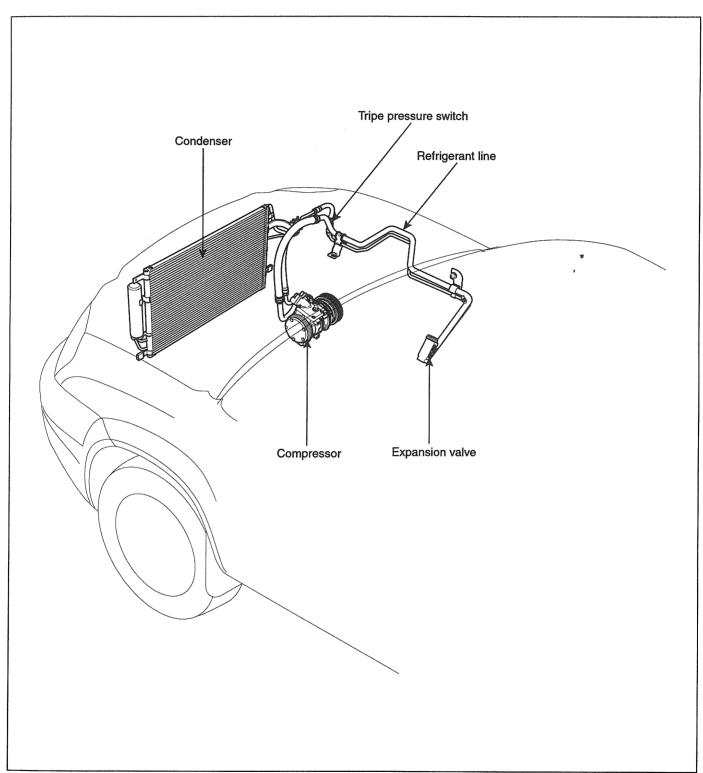
ADJUSTMENT E7AD59AA

- 1. Loosen the tension mounting bolt(B).
- 2. Turn the adjusting bolt to obtain the proper belt tension, then retighten the mounting bolt.
- 3. Recheck the deflection of the drive belt.

A/C COMPRESSOR CONTROLS (MANUAL)

REFRIGERANT LINE

COMPONENT LOCATION E9BCDB6C



EQQE009A

REPLACEMENT E522B973

- Discharge refrigerant from refrigeration system (see page HA-23).
- 2. Replace faulty tube or hose.



Cap the open fittings immediately to keep moisture or dirt out of the system.

3. Tighten joint of bolt or nut to specified torque

	CAUTION
• \	

Connections should no be torqued tighter than the specified torqued.

4. Evacuate air in refrigeration system and charge system with refrigerant (see page HA-24).

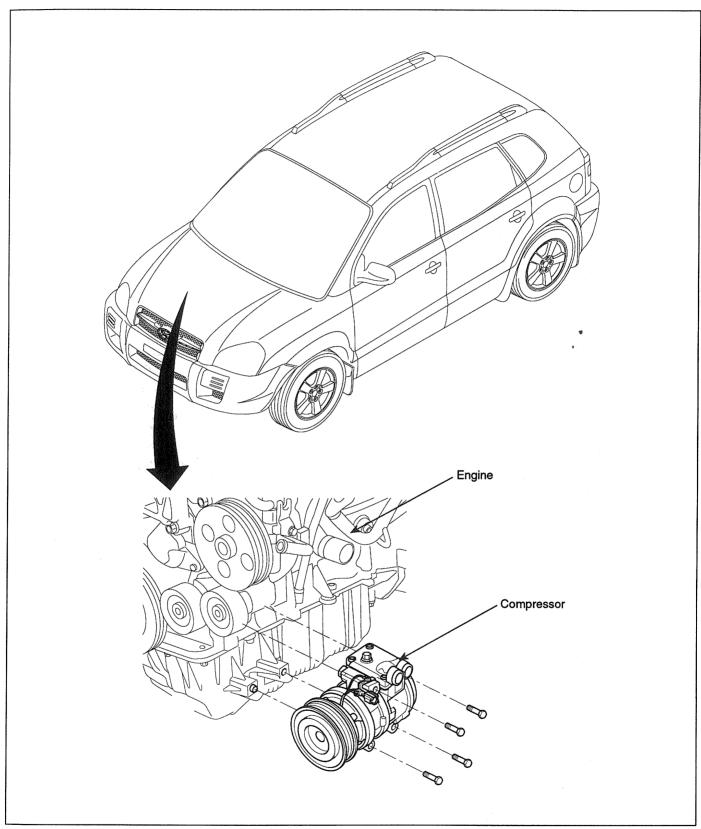
Specified amount: 510 ± 25g

- Inspect for leakage of refrigerant.
 Using a gas leak detector, check for leakage of refrigerant (see page HA-22).
- 6. Inspect A/C operation.

Part tightened	N·m	kgf-cm	lbf-ft
Condenser x Discharge hose	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Condenser x Liquid tube	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Compressor x Discharge hose	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Compressor x Suction hose	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Expansion valve x Evaporator	5 ~ 7	50 ~ 70	3.7 ~ 5.2

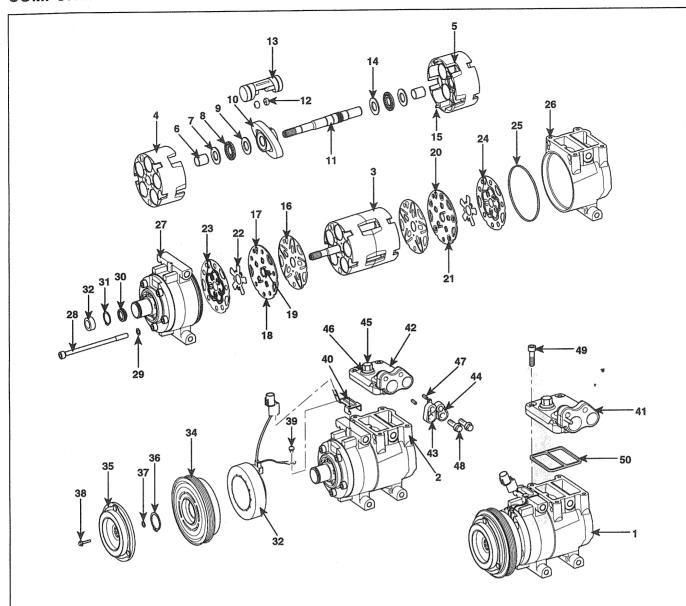
COMPRESSOR

COMPONENT LOCATION EED8CE87



EQQE100A

COMPONENTS EDBFCC9F



- 1. Compressor & clutch assembly
- 2. Compressor assembly
- Cylinder & shaft assembly
 Front cylinder
- 5. Rear cylinder
- 6. Bushing7. Thrust bearing race A~K
- Thrust bearing
- 9. Thrust bearing race L
- 10. Swash plate
- 11. Shaft
- 12. Shoe
- 13. Piston
- 14. Thrust bearing race E
- 15. Pin spring
- 16. Inlet reed
 17. Front plate assembly

- 18. Front plate 19. Pin
- 20. Rear plate assembly
- 21. Rear plate 22. Discharge reed
- 23. Front gasket 24. Rear gasket 25. O-ring 26. Rear head

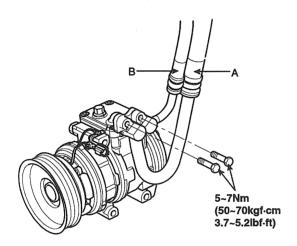
- 27. Front head
- 28. Bolt
- 29. Flat washer
- 30. Shaft seal
- 31. Retainer ring
- 32. Seal felt
- 33. Field coil
- 34. Pulley

- 35. Disc & hub
- 36. Retainer ring
- 37. Spacer
- 38. Bolt
- 39. Screw
- 40. Connector bracket
- 41. Manifold assembly
- 42. Manifold
- 43. Suction cap
- 44. Discharge cap
- 45. Relief valve
- 46. O-ring 47. Pin knurling
- 48. Flange head bolt
- 49.Bolt wrench
- 50. Gasket

EQQE100B

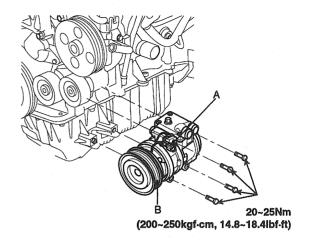
REPLACEMENT E13AF1F3

- If the compressor is marginally operable, run the engine at idle speed, and let the air conditioning work for a few minutes, then shut the engine off.
- 2. Disconnect the negative cable from the battery.
- 3. Recover the refrigerant with a recovery/charging station (see page HA-23).
- 4. Loosen the drive belt (see page HA-26).
- Remove the nuts, then disconnect the suction line (A) and discharge (B) line from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



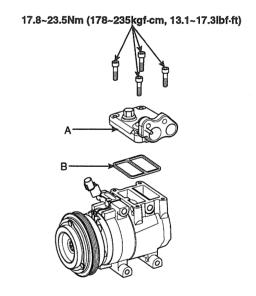
EQQE101A

Disconnect the compressor clutch connector (A), then remove the mounting bolts and the compressor (B).



EQQE101B

7. Using a hexagon wrench (6mm) remove the bolts, the manifold assembly (A) and the gasket (B) from the compressor.

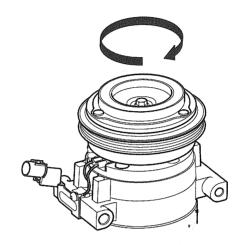


EQQE101C

- Install in the reverse order of removal, and note these items.
 - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume, Subtract the volume of drained oil from 200ml the result is the amount of oil you should drain from the new compressor (through the suction fitting).
 - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
 - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
 - Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.
 - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
 - Adjust the drive belt (see page HA-26).
 - Charge the system (see page HA-24), and test its performance (see page HA-22).

INSPECTION E30A99FA

- Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



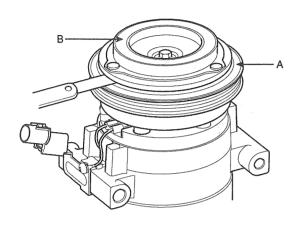
EQKE102A

 Measure the clearance between the pulley (A) and the pressure plate (B) all the way around. If the clearance is not within specified limits, remove the pressure plate (see page HA-34) and add or remove shims as needed to increase or decrease clearance.

Clearance: 0.5 ± 0.15 mm $(0.020 \pm 0.006 in.)$

NOTE

The shims are available in seven thicknesses : 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm and 1.3mm.

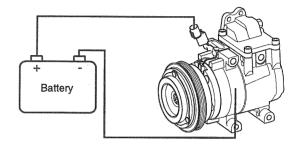


4. Check operating of the magnetic clutch.

Connect the compressor side terminals to the battery

(+) terminal and the ground battery (-) terminal to the compressor body.

Check the magnetic clutch operating noise to determine the condition.

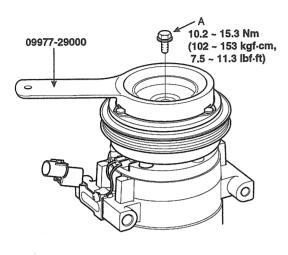


EQKE102C

EQKE102B

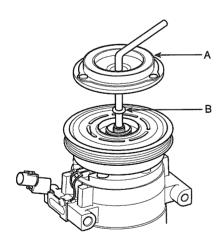
DISASSEMBLY E074E607

1. Remove the center bolt (A) while holding the pressure plate with a commercially available pressure plate bolt remover; Special tool number 09977-29000.



EQKE103A

 Remove the pressure plate (A) and shim (B), taking care not to lose the shims. If the clutch needs adjustment, increase or decrease the number and thickness of shims as necessary, then reinstall the pressure plate, and recheck its clearance (see page HA-33).

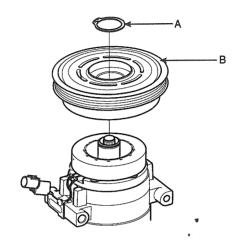


EQKE103B

3. If you replacing the field coil, remove snap ring (A) with snap ring pliers.

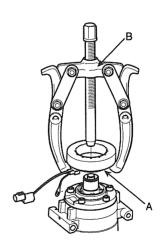
M NOTE

- Be careful not to damage the pulley (B) and compressor during remove/installation.
- Once snap ring (A) is removed, replace it with a new one.



EOKE103C

 Remove the screw from the field coil ground terminal. Remove the field coil (A) from the shaft with a puller (B). Be careful not to damage the coil and compressor.

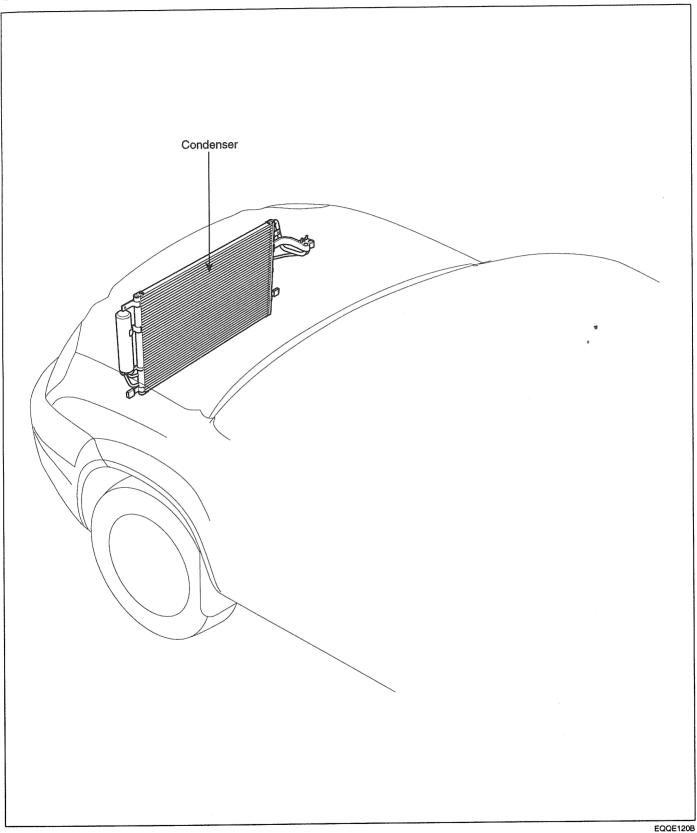


EQKE103D

- 5. Reassemble the compressor clutch in the reverse order of disassembly, and note these items:
 - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
 - Install new snap rings, and make sure they are fully seated in the groove.
 - Make sure that the pulley turns smoothly after it's reassembled.

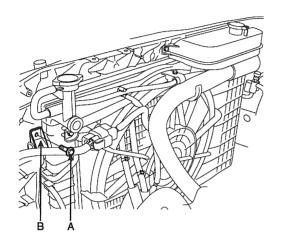
CONDENSER

COMPONENTS EFB8DB1A



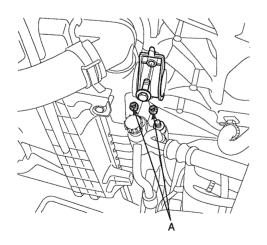
REPLACEMENT EDAD392B

- 1. Recover the refrigerant with a recovery/recycling/charging station (see page HA-23).
- Remove the coolant reservoir, but do not disconnect the reservoir hose from the coolant reservoir and the radiator.
- Remove the bolt(A), then remove the radiator bracket(B) from the radiator.

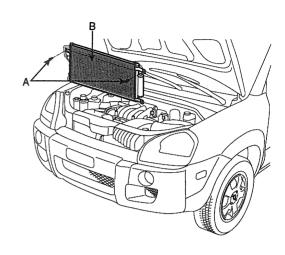


KQQE121A

 Remove the bolts(A), then disconnect the discharge line and condenser line from the condenser.
 Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



5. Remove the bolts(A), then remove the condenser(B) by lifting it up. Be careful not to damage the radiator and condenser fins when removing the condenser.



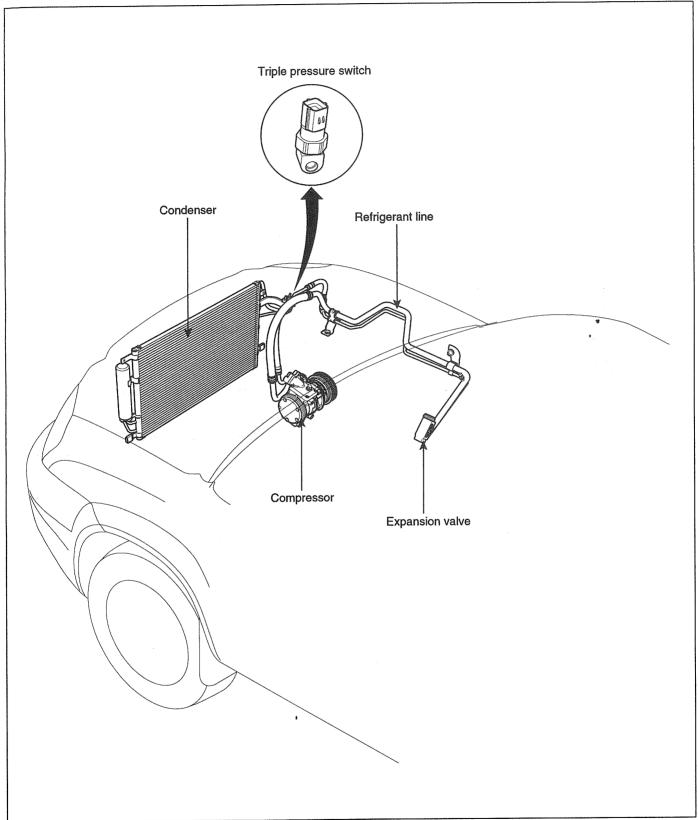
KQQE121C

- 6. Install in the reverse order of removal, and note these items:
 - If you're installing a new condenser, add refrigerant oil.
 - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
 - Be careful not to damage the radiator and condenser fins when installing the condenser.
 - Be sure to install the lower mount cushions of condenser securely into the holes.
 - Charge the system (see page HA-24), and test its performance (see page HA-22).

KQQE121B

TRIPLE PRESSURE SWITCH

COMPONENT LOCATION E85B5EBC



EQQE130A

DESCRIPTION E6B3D4CE

The triple switch is a combination of a medium switch as well as conventional low pressure and high pressure switches. The low pressure switch will turn off to stop compressor operation if refrigerant pressure is low. The high pressure switch will turn off to stop compressor operation if refrigerant pressure is too high. The medium switch will it turn on at a medium level pressure to determine the A/C system is overheating. It will cool the A/C system by operating the radiator fan and the condenser fan at high speed.

- Rating load: Inductive load DC 12V, 10~250mA

- Applicable voltage range : DC 8V ~ DC 16V

- Applicable temperature range : -30°C ~ 120°C

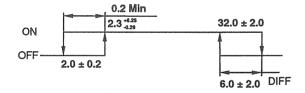
Applicable refrigerant : R-134a

- Insulation resistance : Min. 100MΩ at DC 500V

Operating characteristics (kg/cm²)

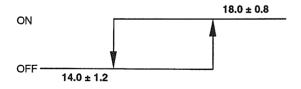
Pressure	ON	OFF
High	32.0 ± 2.0	26.0 ± 2.0
Low	2.3 + 0.25 / -0.29	2.0 ± 0.2
Medium	18.0 ± 0.8	14.0 ± 1.2

LOW & HIGH



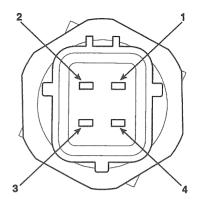
EQKE130B

MEDIUM



KOOF131B

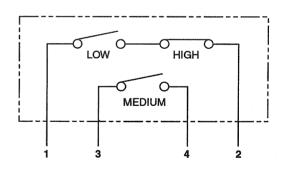
CONNECTOR E123A14B



KQQE131C

Pin No.	1	2	3	4
Circuit	High & Low	High & Low	Medium	Medium

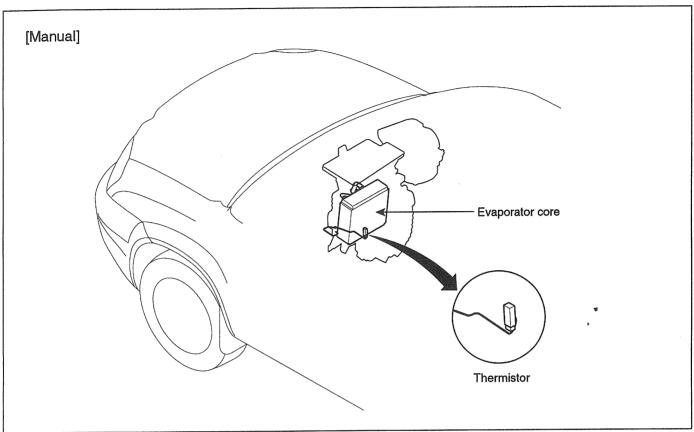
CIRCUIT DIAGRAM E39309DS



EQKE130E

THERMOSTATIC SWITCH (THERMISTOR)

COMPONENT LOCATION EAEEF65D



EQQE203A

DESCRIPTION E4FA2C6C

The thermistor will detect the core temperature and interrupt the compressor relay power to prevent evaporator freezing by excessive cooling.

The thermistor will use the thermal negative characteristic.

Rated voltage : DC 12V

Operating voltage: 9V ~ 16V

Reserved temp. range : -40 ~ 90°C

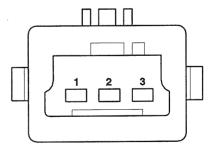
Using temp. range : -30 ~ 85°C

Electric load : ECU

ELECTRIC CHARACTERISTICS ACCORDING TO TEMP

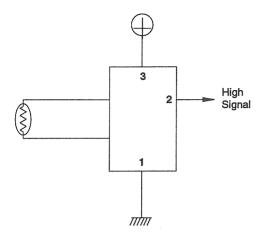
Mode	Operating temperature
A/C ON	2.5 ± 0.5°C
A/C OFF	0.8 ± 0.5°C

CONNECTOR E00B72E9



KQQE203B

CIRCUIT DIAGRAM EDA94FEF

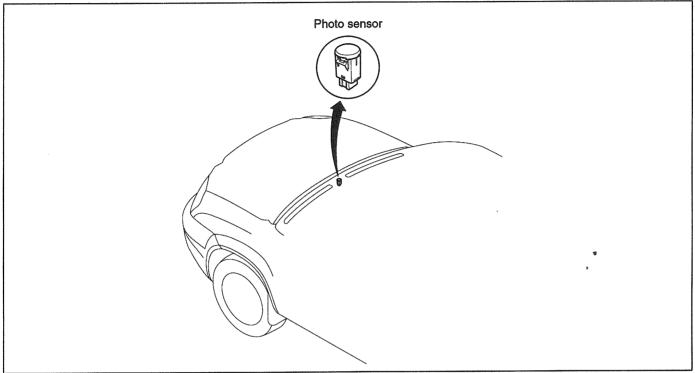


KQQE203C

A/C COMPRESSOR CONTROLS (FULL AUTO)

PHOTO SENSOR

COMPONENT LOCATION E69B5FB7

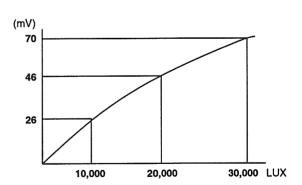


EQQE207A

DESCRIPTION EFCF673A

The photo sensor is located by the driver side defrost nozzle. In response to the photo intensity level in the vehicle, the sensor will send signals to control module to control the blower level and discharge temperature.

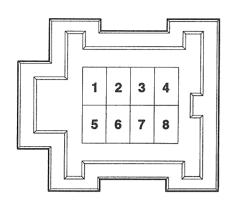
CHARACTERISTICS



KQQE207B

KQQE207E

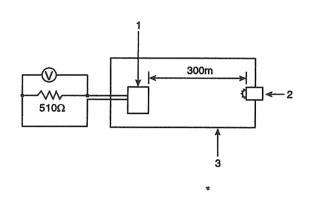
CONNECTOR ESEBACSF



INSPECTION E4E0BF5D

Install the lamp and the photo sensor in the dark room. Then measure the output current.

LUX	10000	20000	30000
Voltage (mV)	26	46	70



KQQE207C

Pin No.	1	7	8
Circuit	GND	Photo (+)	Photo (-)

CIRCUIT DIAGRAM E8EBD244

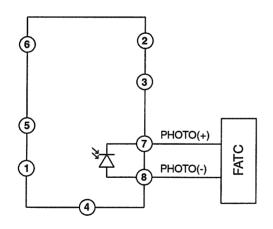


Photo sensor 1.

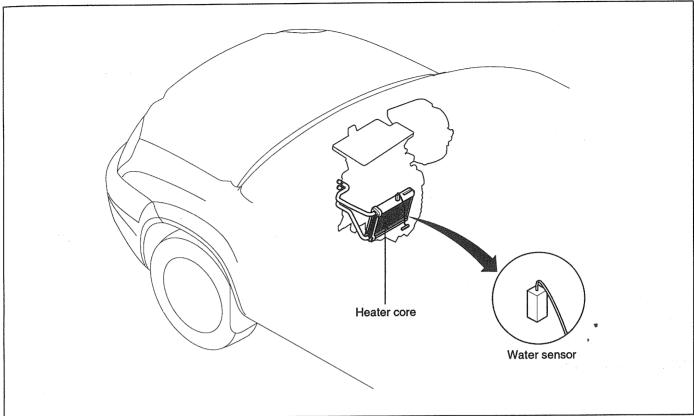
2. Lamp

3. Dark room

KQQE207D

WATER TEMPERATURE SENSOR

COMPONENT LOCATION EBED1C52

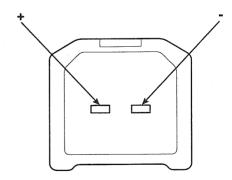


EQQE271A

DESCRIPTION EB414E90

- 1. The water sensor, located at the heater core.
- It will detect water temperature, the sensor will send signal to control module.

CONNECTOR EE4AADC8

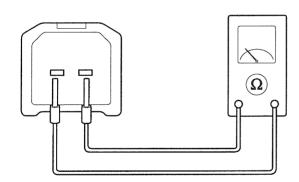


KQQE270A

INSPECTION EB6FE290

MEASURE THE RESISTANCE

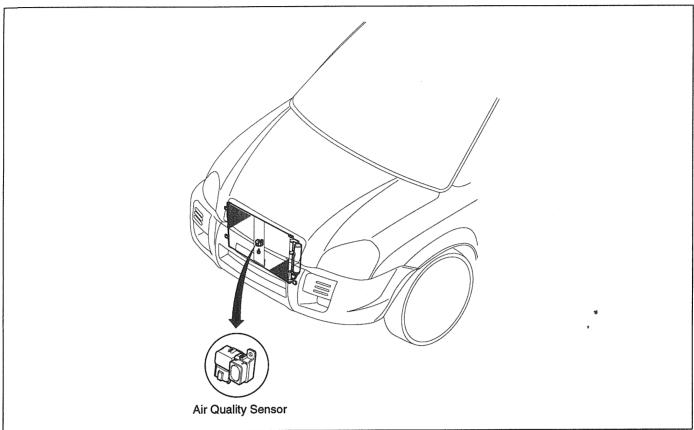
Temp [°C]	Resistance [KΩ]	Voltage [V]
-40	327.2	4.88
-30	176.3	4.78
-30	97.75	4.62
-10	55.85	4.37
0	32.91	4.02
10	19.99	3.56
20	12.51	3.04
30	8.047	2.50
40	5.311	1.99
50	3.588	1.54
60	2.476	1.18
70	1.742	0.89
80	1.246	0.67



KQQE270B

A.Q.S (AIR QUALITY SENSOR)

COMPONENT LOCATION E15C0ED1



EQQE208A

DESCRIPTION ED8EC4D0

 The A.Q.S. sensor, located at the center support in front of the engine radiator, detects hazardous elements in ambient air and provides output signals to the control module.

2. Detectable cases

Diesel engine exhaust gases: NO, NO₂, SO₂
 Gasoline/LPG engine exhaust gases: CxHy, CO

3. Electrical specification

Operating voltage : DC 9 ~ 16V

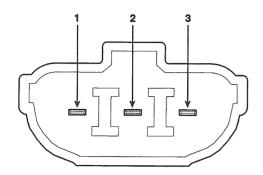
- Rated voltage : DC 12V

Consumed current : less than 200mA
 Operating temperature : -30 ~ 105°C
 Storage temperature : -40 ~ 125°C

SENSOR OUTPUT

Condition	Voltage
Normal condition	5V
Hazardous gas detection	0V (GND)

CONNECTOR EAF89B75



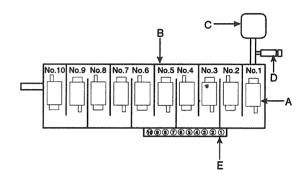
INSPECTION EBDF99EB

CHECKING METHOD OF GAS DETECTING BENCH

- 1. Put the sensor part of AQS(A) toward the air inflow (intake) direction.
- 2. Connect all of the power supply line and output line to AQS(A).
- 3. Close the chamber(B) lid after putting the lines in order.
- 4. Connect the air outlet part of vacuum pump(C) with the air inlet door of chamber(B) by using air hose.

KQQE208B

Pin No.	1	2	3
Circuit	DC 12V (IGN)	GND	SIGNAL OUTPUT



KQQE208C

- 5. Turn on the power of vacuum pump(B).
- 6. Supply the power to the AQS(A). (DC 12V)
- LED of AQS(A) is kept "ON" for the first 35 ± 2 seconds after supplying the power.
- 8. Wait until all of the LEDs are "OFF". Put the diesel engine exhaust gas into the chamber. Then check the LEDs of number 1 to 10 are "ON".
- 9. After check LEDs are "ON". Put the clean air into the chamber. Then check LEDs are "OFF".
- 10. Wait until all of the LEDs are "OFF".
- And then put the gasoline engine exhaust gas into the chamber, then check the LEDs of number 1 to 10 are "ON".
- 12. After check LEDs are "ON". Put the clean air into the chamber. Then check LEDs are "OFF".

Sensitivity of used gas sensor

Sensitivity at NO_2 0.3ppm : More than 2.8 Sensitivity at Gasoline 10ppm : Less than 0.45

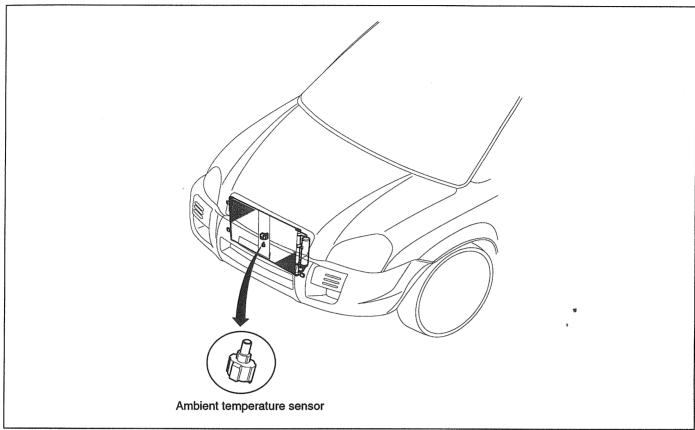
Delay time

ON TIME (T on): 5 sec.

OFF TIME (T off): 0 sec.

AMBIENT TEMPERATURE SENSOR

COMPONENT LOCATION FORZET/RE



EQQE209A

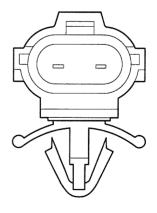
DESCRIPTION ECD6A48E

- The air temperature sensor, located at the front of the engine radiator, detects ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperatures, and decrease with higher temperatures.
- The sensor output will be used for discharge temperature sensor, sensor fail-safe, temperature regulation door control, blower motor level control, mix mode control and in-car humidity control.

R25°C : 30KΩ ± 3%
 B(0/25) : 3754K ± 2%

Operation Temp. range : -30°C ~ 80°C

CONNECTOR E56CBFA2



EQKE209C

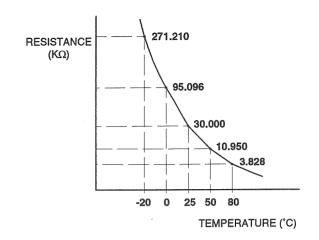
INSPECTION EF7DD2FB

Measure the resistance.

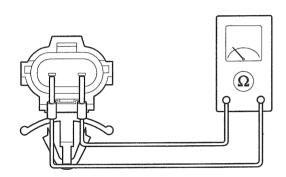
RESISTANCE-TEMP. CHARACTERISIC TABLE

Temp (°C)	Rmin (kΩ)	R (kΩ)	Rmax (kΩ)
-20	251.740	271.210	291.920
0	90.139	95.096	100.240
25	29.100	30.000	30.900
50	10.410	10.950	11.508
80	3.563	3.828	4.109

CHARACTERISTICS



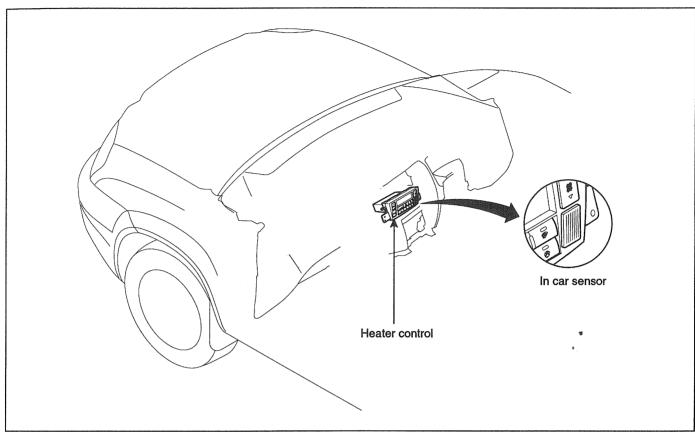




EQKE209D

IN CAR SENSOR

COMPONENT LOCATION E8AAC70D



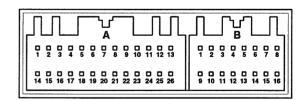
EQQE210A

DESCRIPTION E2FA4A31

- The incar sensor, located at the heater control module.
- It will detect interior temperature, the sensor will send signal to control module.

Pin No.	B1	В9
Circuit	Sensor IN	Sensor OUT

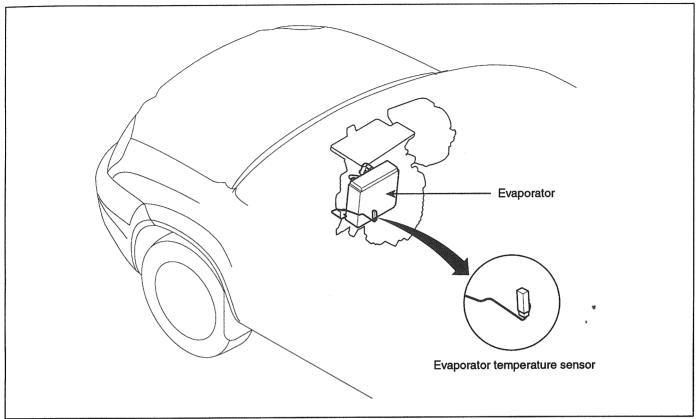
CONNECTOR EAB1E8CO



KQQE210B

EVAPORATOR TEMPERATURE SENSOR

COMPONENT LOCATION EA89DC73

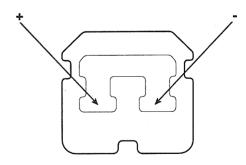


EQQE281A

DESCRIPTION EFD2B0DB

- The evaporator temp. sensor, located at the evaporator core.
- 2. It will detect evaporator temperature, the sensor will send signal to control module.

CONNECTOR EC40F7D7

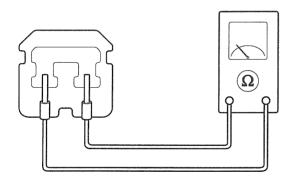


KQQE280A

INSPECTION EDGAABOD

MEASURE THE RESISTANCE

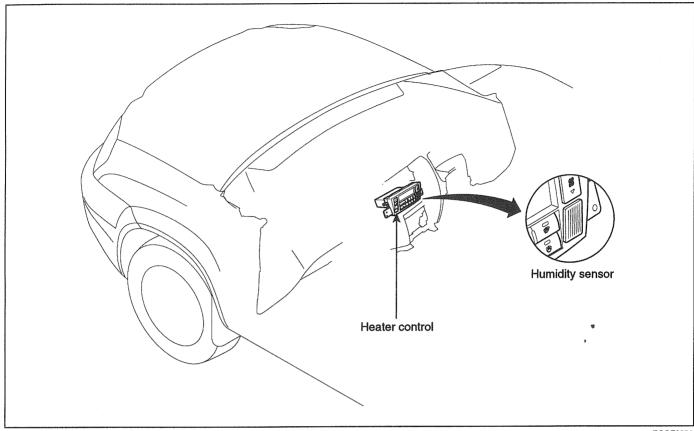
Temp [°C]	Resistance [K Ω]	Voltage [V]
-10	13.56	3.14
-5	10.37	2.81
0	8.000	2.49
5	6.222	2.18
10	4.877	1.88
15	3.851	1.62
20	3.063	1.38
25	2.453	1.17
30	1.978	0.99
35	1.605	0.83
40	1.310	0.70
45	1.075	0.59
50	0.888	0.50



KQQE280B

HUMIDITY SENSOR

COMPONENT LOCATION EB09B0BF



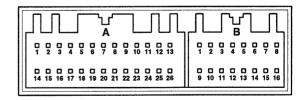
EQQE205A

DESCRIPTION EC54E17A

- The humidity sensor, located at the heater control module.
- 2. It will detect interior humidity, the sensor will send signal to control module.

Pin No.	A7	B14
Circuit	Sensor IN	Sensor OUT

CONNECTOR E9AE96C6

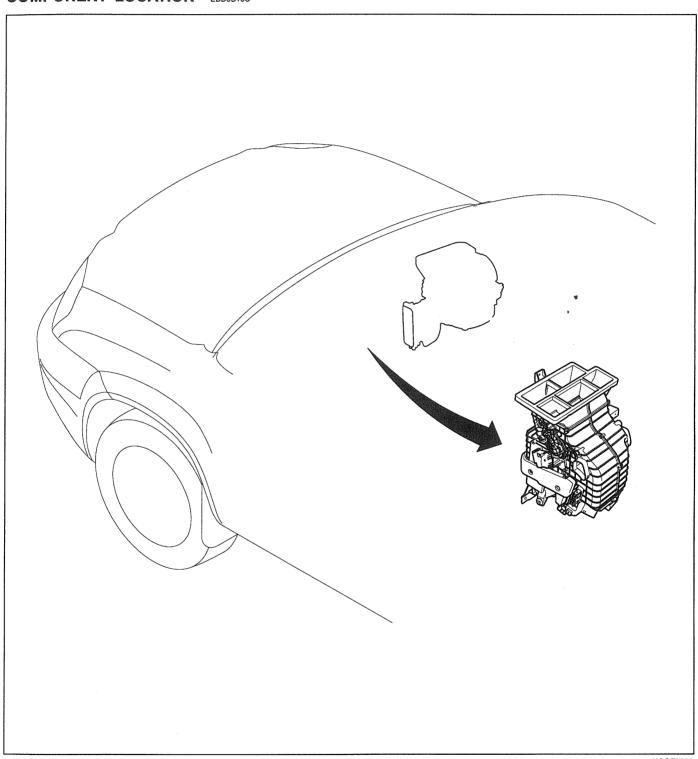


KQQE210B

HEATER

HEATER UNIT

COMPONENT LOCATION EBD5B15C



KQQE300A