Heating, Ventilation and Air Conditioning



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

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HEATING, VENTILATION AND AIR CONDITIONING



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GENERAL

GENERAL

SPECIFICATIONS EBEE798F

	Item		Specifie	cation
Heating	Heater	Туре	Air mix	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	\leftarrow
		Displacement (cm ³ /rev)	155.3	177.7
		Lubricating oil	ND-OIL8	\leftarrow
		Oil capacity (cc)	120 ~ 135	200 ~ 215
	لحم	Pressure relief valve (Kg/cm ²)	Working pressure : 35.2 ~ 42.2 Resealed pressure : Min. 28.1	
	Magnetic clutch	Туре	L50 (4K)	<i>←</i>
	و سامانه (مسئول	Rated voltage (V)	DC 12	←
		Consumed current (W)	40	Max. 48
	تعميركاران خود	Operating voltage Min. (A)	Max. 2.2	Max. <mark>2.66</mark>
		Torque (N·m)	Min. 53	\leftarrow
		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/cm ²)	ON 32.0 ± 2.0 OFF 26.0 ± 2.0	
		Middle pressure (kg/cm ²)	ON 18.0 OFF 14.0	
		Low pressure (kg/cm ²)	ON 2.3+0. OFF 2.0	
Heater control a	ssembly	MANUAL type, AUTOMATIC	type	

HEATING, VENTILATION AND AIR CONDITIONING

SPECIAL TOOLS E7FB079E

HA -4

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



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AIR FLOW DESCRIPTION E20B549B

HA -5







KQQE902A

KQQE903A

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AIR FLOW DISTRIBUTION OF MODE (%)

MODE	REC	FRESH			
OUTLET	COOL	1/2 WARM	WARM		
POSITION	VENT	BI/LEVEL	FLOOR	MIX	DEF
VENT	100	65 ± 10	-	-	-
FLOOR	-	35 ± 10	65 ± 5	45 ± 5	-
DEF	-	-	20 ± 5	40 ± 5	85 ± 10
SIDE VENT	-	-	15 ± 5	15 ± 5	15 ± 10

EQQE900C

LEFT-RIGHT DISTRIBUTION OF VENT & FLOOR (%)

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

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COOL WARM AIR FLOW VOLUME CHANGE RATE

•

- TEST MODE : RED - VENT

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

EQSE900D

021-62999292

GENERAL

COMPONENT SCHEMATIC



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ں تعمیرکار ⁰ خودرو در ایران	
	12

KQQE910B

ltem	Description	ltem	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		

HA -8

HEATING, VENTILATION AND AIR CONDITIONING

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

When PANEL is selected :

- Air inlet blend door : Fresh
- Air temperature control door : Enable to select
- Defrost airflow door : Close
- Panel airflow door : Open
- Floor airflow door : Close
- A/C compressor : Enable to select
- Blower motor : ON

OFF



حبتال خودرو سامانه (مسئوليت محدود

KQQE911B

KOOF911C

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 : ON
- Blower 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

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GENERAL

PANEL/FLOOR

FLOOR/DEFROST





KQQE911E

KQQE911G

When FLOOR is selected :

- Air inlet blend door : Fresh
- Air temperature control door : Enable to select
- Defrost airflow door : Close
- Panel airflow door : Close
- Floor airflow door : Open
- A/C compressor : Enable to select
- Blower motor : ON

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

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KQQE911F

HEATING, VENTILATION AND AIR CONDITIONING

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.

\Lambda 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.



GENERAL

TROUBLESHOOTING E58CAFAF

of the problem. Check each part in order. If necessary, replace these parts. **PROBLEM SYMPTOMS TABLE**

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 تعمیرکاران خودرو در ایران	 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 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 	- - - -	

HA -12

HEATING, VENTILATION AND AIR CONDITIONING

COMPONENT LOCATION INDEX EF0E47BE

ENGINE ROOM



GENERAL

INTERIOR



EQQE001B

HEATING, VENTILATION AND AIR CONDITIONING

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



EQQE001D

GENERAL

HA -15

HOW TO READ SELF-DIAGNOSTIC CODE

- 1. 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.





EQKE002D

EQKE002B 4. Checking each error code

2. One error code





EQKE002C

EQKE002E

HA -16

HEATING, VENTILATION AND AIR CONDITIONING

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
ت مـ20دود)	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

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ON-VEHICLE INSPECTION EGCC595D

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

🚺 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)



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HA -18

HEATING, VENTILATION AND AIR CONDITIONING

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 Evacuate the system and charge new refrigerant to specified amount.



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

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GENERAL

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 the system and charge new refrigerant to specified amount. For gas leakage from expansion valve, replace expansion valve

HEATING, VENTILATION AND AIR CONDITIONING

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. Evacuate the system and charge new refrigerant to specified amount.

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 the system and charge new refrigerant to specified amount.

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GENERAL

HA -21

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



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

HEATING, VENTILATION AND AIR CONDITIONING

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.

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:

- 1. 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 2. tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is slight.
- Check the compressor oil and add oil if required. 3.
- Charge the system and recheck for gas leaks. 4. lf no leaks are found, evacuate and charge the system

REFRIGERANT RECOVERY

🗥 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.

Connect a R-134a refrigerant recovery/recy-1 cling/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.



EQKE007A

EQKE004A

2. 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.

GENERAL

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.)
- 2. 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.

SYSTEM CHARGING

$\underline{} \qquad \underline{} \qquad \qquad \underline{} \qquad \qquad \underline{} \qquad \underline{} \qquad \underline{} \qquad \qquad \underline{}$

- 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.

 Connect a R-134a refrigerant recover/recycling/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

C

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).

HEATING, VENTILATION AND AIR CONDITIONING

REFRIGERATION CYCLE E98A7EDF



AIR CONDITIONING SYSTEM

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.)

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.





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.

<u>HA -26</u>

HEATING, VENTILATION AND AIR CONDITIONING

A/C COMPRESSOR CONTROLS (MANUAL)

REFRIGERANT LINE

COMPONENT LOCATION E9BCDB6C



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HA -27

A/C COMPRESSOR CONTROLS (MANUAL)

REPLACEMENT E522B973

- 1. 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

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

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HEATING, VENTILATION AND AIR CONDITIONING

COMPRESSOR

COMPONENT LOCATION EEDBCE87



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COMPONENTS EDBFCC9F



EQQE100B

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HA -30

REPLACEMENT E13AF1F3

- 1. 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).

E

5. 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.

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

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EQQE101B

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

17.8~23.5Nm (178~235kgf·cm, 13.1~17.3lbf·ft)

EQQE101A

5~7Nm (50~70kgf·cm 3.7~5.2lbf·ft)



EQQE101C

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A/C COMPRESSOR CONTROLS (MANUAL)

- 8. 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

- 1. Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- 2. 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.

6

EOKE102A

HA -31

021-62999292

HA -32

3. 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 ± 0.15mm (0.020 ± 0.006 in.)

🚺 ΝΟΤΕ

B

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

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HEATING, VENTILATION AND AIR CONDITIONING

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 second s

Check the magnetic clutch operating noise to determine the condition.





EQKE102B

A/C COMPRESSOR CONTROLS (MANUAL)

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.



2. 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).

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

🔟 ΝΟΤΕ

- 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.



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



EQKE103B

4.

HA -34

HEATING, VENTILATION AND AIR CONDITIONING

- 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.





A/C COMPRESSOR CONTROLS (MANUAL)

CONDENSER

COMPONENTS EFB8DB1A



HA -35

021-62999292

HA -36

REPLACEMENT EDAD392B

- 1. Recover the refrigerant with a recovery/recycling/charging station (see page HA-23).
- Remove the coolant reservoir, but do not disconnect 2. the reservoir hose from the coolant reservoir and the radiator.
- Remove the bolt(A), then remove the radiator 3. bracket(B) from the radiator.



KQQE121A

Remove the bolts(A), then disconnect the discharge 4. line and condenser line from the condenser. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



KQQE121B

6.

- HEATING, VENTILATION AND AIR CONDITIONING
 - 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

- 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).

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TRIPLE PRESSURE SWITCH

COMPONENT LOCATION E85B5EBC



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HA -37

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 loacl 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. 100Ma at DC 500V

ON

Operating characteristics (kg/cm²)

Pressure

3	4	
		KQQE131C

HEATING, VENTILATION AND AIR CONDITIONING

E123A14B

CONNECTOR

2

							Redelioio
High	32.0 ± 2.0	26.0 ± 2.0	Pin No.	1	2	3	4
Low	2.3 + 0.25 / -0.29	2.0 ± 0.2			-		
			Circuit	High &	High &	Medium	Medium
Medium	18.0 ± 0.8	14.0 ± 1.2		Low	Low		

LOW & HIGH

OFF



KQQE131B

A/C COMPRESSOR CONTROLS (MANUAL)

THERMOSTATIC SWITCH (THERMISTOR)

COMPONENT LOCATION EAEEF65D



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

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HA -39

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HA -40

HEATING, VENTILATION AND AIR CONDITIONING

CIRCUIT DIAGRAM EDA94FEF



KQQE203C



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A/C COMPRESSOR CONTROLS (FULL AUTO)

A/C COMPRESSOR CONTROLS (FULL AUTO)

PHOTO SENSOR

COMPONENT LOCATION E69B5FB7



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

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- 2

KQQE207E

HA -42

CONNECTOR E3EBAC3F

HEATING, VENTILATION AND AIR CONDITIONING

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



300m ۲ſ \sim 510Ω 3

KQQE207C

Pin No.	1	7	8		
Circuit	GND	P <mark>h</mark> oto (+)	Photo (-)		

CIRCUIT DIAGRAM E8EBD244



Photo sensor Lamp

Dark room

KOOF207D

A/C COMPRESSOR CONTROLS (FULL AUTO)

HA -43

WATER TEMPERATURE SENSOR

COMPONENT LOCATION EBED1C52



DESCRIPTION EB414E90

CONNECTOR EE4AADC8

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



KQQE270A

HEATING, VENTILATION AND AIR CONDITIONING

INSPECTION EB6FE290

MEASURE THE RESISTANCE

Temp [[■] C]	Resistance [Kନ]	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		



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KQQE270B

A/C COMPRESSOR CONTROLS (FULL AUTO)

A.Q.S (AIR QUALITY SENSOR)

COMPONENT LOCATION E15COED1



DESCRIPTION ED8EC4D0

- 1. 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, NO , SO
 - 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)				

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HA -45

HA -46

CONNECTOR EAF89B75

HEATING, VENTILATION AND AIR CONDITIONING

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.



KQQE208C

- 5. Turn on the power of vacuum pump(B).
- 6. Supply the power to the AQS(A). (DC 12V)
- 7. 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".
- 11. 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".

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A/C COMPRESSOR CONTROLS (FULL AUTO)

Sensitivity of used gas sensor

- Sensitivity at NO 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.



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HA -47

HEATING, VENTILATION AND AIR CONDITIONING

AMBIENT TEMPERATURE SENSOR

COMPONENT LOCATION E0B2E78F



DESCRIPTION ECD6A48E

- 1. 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.
- 2. 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 : 30K[•] ± 3%
 - B(0/25) : 3754K ± 2%
 - Operation Temp. range : -30[°]C ~ 80[°]C



CONNECTOR E56CBFA2

EQKE209C

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A/C COMPRESSOR CONTROLS (FULL AUTO)

INSPECTION EF7DD2FB

Measure the resistance.

RESISTANCE-TEMP. CHARACTERISIC TABLE

Temp ([∎] C)	Rmin (kភ)	R (kជ)	Rmax (kភ)				
-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				





EQKE209D

CHARACTERISTICS

021-62999292

HA -49



EQKE209B



HEATING, VENTILATION AND AIR CONDITIONING

IN CAR SENSOR

COMPONENT LOCATION EBAAC70D



DESCRIPTION E2FA4A31

CONNECTOR EAB1E8C0

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

Pin No.	B1	B9
Circuit	Sensor IN	Sensor OUT

	ſ				՝ А							L				٦ E	۲ ۲			
		□ 3		□ 6		□ 8	□ 9	口 10	ロ 11	口 12	口 13		1	□ 2	□ 3	□ 4	□ 5	0 6	口 7	□ 8
					□ 20			口 23	ロ 24		口 26			ロ 10						

KQQE210B

A/C COMPRESSOR CONTROLS (FULL AUTO)

EVAPORATOR TEMPERATURE SENSOR

COMPONENT LOCATION EA89DC73



DESCRIPTION EFD2B0DB

- 1. 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

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HA -51

HEATING, VENTILATION AND AIR CONDITIONING

INSPECTION EDGAABOD

MEASURE THE RESISTANCE

Temp [[■] C]	Resistance [Kភ]	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		



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KQQE280B

A/C COMPRESSOR CONTROLS (FULL AUTO)

HUMIDITY SENSOR

COMPONENT LOCATION EB09B0BF



CONNECTOR

DESCRIPTION EC54E17A

1.

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

						՝ А	ſ				1					٦ E	۲ ۲			
	□ 1		□ 4	5	□ 6	口 7	8	9	口 10	ロ 11	口 12		1	2	□ 3	□ 4	□ 5	□ 6	口 7	□ 8
	ロ 14			ロ 18		□ 20			口 23	□ 24		□ 26		1 D 10						ロ 16

E9AE96C6

KQQE210B

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HA -53

HEATING, VENTILATION AND AIR CONDITIONING

HEATER

HEATER UNIT

COMPONENT LOCATION EBD5B15C



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HEATER

COMPONENTS EE7DE9D9

HA -55



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HA -56

REPLACEMENT E36BCDE9

- 1. Recover the refrigerant with a recovery/recycling/charging station (see page HA-23).
- 2. When the engine is cool, drain the engine coolant from the radiator.
- 3. Disconnect the negative cable from the battery.
- Remove the bolts(A) and the expansion valve(B) from the evaporator core.
 Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



HEATING, VENTILATION AND AIR CONDITIONING



KQQE301C

9. Remove the connector(A). (Only PTC heater type) Remove the self-tapping screws(B) and the PTC unit(C) or cover.

7. Remove the cross member.

KQQE301D

10. Remove the side bracket(D).

D

5. Disconnect the inlet(C) and outlet(D) heater hoses from the heater unit. Engine coolant will run out when the hoses are disconnected ; drain it into a clean drip pan. Be sure not to let coolant spill on electrical parts or painted surfaces. If any coolant spills, rinse it off immediately.
6. Remove the crash pad (see BD group - crash pad).

HEATER

- Remove the clip and lower cover. Be careful not to bend the inlet and outlet pipes during heater core and evaporator core removal.
- 12. Install the heater core and evaporator core in the reverse order of removal.
- 13. Install in the reverse order of removal, and note these items :
 - If you're installing a new evaporator, 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.
 - 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.
 - Apply sealant to the grommets.
 - Make sure that there is no air leakage.
 - Charge the system (see page HA-24), and test its performance (see page HA-22).
 - Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
 - Refill the cooling system with engine coolant.

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<u>HA -58</u>

HEATING, VENTILATION AND AIR CONDITIONING

PTC (POSITIVE TEMPERATURE COEFFICIENT) HEATER

COMPONENT LOCATION E7C9AB2E



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HEATER

COMPONENTS E76FEDE7



DESCRIPTION E12666CB

- Voltage range : 9 ~ 16V
- Normal voltage : 13.5
- Max. surface temperature : 165 C (Max.)
- Power : 900w +5%/-10%

< Condition of working >

- Temperature of ambient air : below 5^IC
- Temperature of cooling water : up to 70^IC
- Blower motor : ON
- Core size : 180.5L x 73.6W x 16.6T

Durability

POWER IN RATE (P) = VOLTAGE X CURRENT

	I (A)	P (W)
Total	90 ± 10%	900 ± 10%
1	30 ± 10%	300 ± 10%
2	30 ± 10%	300 ± 10%
3	30 ± 10%	300 ± 10%

< Test condition >

- Voltage : 13.5 ± 0.1V
- T (ambient) : 23 ± 3 C
- Humidity : 25 ~ 75%
- T (air intake) : 0 ± 2 C

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HA -60

HEATING, VENTILATION AND AIR CONDITIONING

CONNECTOR ETACEAFF



KQQE340A



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HEATER

HA -61

TEMPERATURE CONTROL ACTUATOR

COMPONENT LOCATION EEA2A3B4



DESCRIPTION E9FA7177

- Rate voltage : DC 12V
- Rate load : 1.5 kgf·cm
- Operating time : 4 + 1.0 sec.
- Rate current : Max. 0.1A
- Lock current : Max. 0.55A
- Locked torque : Max. 6kgf·cm
- Noise : Max. 43dB
- Use voltage : DC 10 ~ 15V
- Use temp. : -40 ~ 80^IC

CONNECTOR E33BDD4A



KQSE211D

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CIRCUIT DIAGRAM ECEF6BDD

HEATING, VENTILATION AND AIR CONDITIONING

REPLACEMENT EE7F6DED

Disconnect the 7P connector(A) from the temp. actuator(C). Remove the self-tapping screws(B) and the temp. actuator(C) from the heater unit.



HEATER

HA -63

MODE CONTROL ACTUATOR

COMPONENT LOCATION ECCC054E



DISCRIPTION E6F9A564

- Rate voltage : DC 12V
- Rate load : 1.5 kgf-cm
- Operating time : 4 + 1.0 sec.
- Rate current : Max. 0.1A
- Lock current : Max. 0.55A
- Locked torque : Max. 6kgf·cm
- Noise : Max. 43dB
- Use voltage : DC 10 ~ 15V
- Use temp. : -40 ~ 80 °C

CONNECTOR E228DD3D

 2
 1

 7
 6
 5
 4
 3

KQSE211D

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CIRCUIT DIAGRAM EC61E8DD

HEATING, VENTILATION AND AIR CONDITIONING

REPLACEMENT EAF3FA8A

 Remove the 7P connector(A) from the mode actuator(C). Remove the self-tapping screw(B) and the mode actuator(C) from the heater unit.



BLOWER CONTROLS

BLOWER CONTROLS

BLOWER UNIT

COMPONENT LOCATION E6AAD472



KQQE400A

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HA -65

HA -66

HEATING, VENTILATION AND AIR CONDITIONING

COMPONENTS EOCC9B81



EQQE400B

BLOWER CONTROLS

REPLACEMENT E5D4C986

- 1. Disconnect the negative cable from the battery.
- 2. Remove the crash pad (see BD group crash pad).

 Disconnect the connectors from the blower relay the blower motor, the blower resistor (or power transistor) and the fresh and recirculation actuator. Remove the self-tapping screws(A), the mounting nut(B), the mounting bolt(C) and the blower unit(D).





NOTE

Make sure that there is no air leaking out of the blower and duct joints.

4. Install in the reverse order of removal.



HEATING, VENTILATION AND AIR CONDITIONING

BLOWER MOTOR

COMPONENT LOCATION E6A3E42A



DESCRIPTION EAB7013F

CONNECTOR

Moter : Magnet ø68.2

ltem	Specifications
Time rating	Continuous
Rated voltage	DC 12V
Speed in rated load	3,000 ± 10% RPM
Power in rated	250W grade
Rotation direction	CCW



ED4E59C4

EQKE202B

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BLOWER CONTROLS

INSPECTION E1CC2EC4

Connect the battery voltage and check the blower motor rotation.





HEATING, VENTILATION AND AIR CONDITIONING

BLOWER RELAY

COMPONENT LOCATION EC983CFA



DESCRIPTION EB5FC1A2

CONNECTOR

R EE69F91E

There should be continuity between No.3 and No.4 terminals when power and ground are connected to the No.1 and No.2 terminals, and there should be no continuity when power is disconnected.

- Rated voltage : DC 12V
- Rated load current : DC 12V, 25A (Motor lord)



EQKE201B

BLOWER CONTROLS

CIRCUIT DIAGRAM EF2F87B4

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0 2 4

EQKE201C







HEATING, VENTILATION AND AIR CONDITIONING

POWER TRANSISTOR

COMPONENT LOCATION E1B011E7



- Rated voltage : DC 12V
- Working voltage range : DC 9 ~ 16V
- Working temp. range : -30 ~ 60[°]C
- Resistance temp. range : -40 ~ 85 C



EQKE206C

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BLOWER CONTROLS

HA -73

BLOWER RESISTOR

COMPONENT LOCATION E48A4448



CONNECTOR

DESCRIPTION E34B4A50

- Rated voltage : DC 12V
- Rated load : Blower motor
- Standard test Temp. : 20^IC
- Operation Temp. : -30 ~ +70 °C



E8DBFF64

EQKE204C

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CIRCUIT DIAGRAM EOB2FE6B

Fuse temp 183 ± 5°C

HEATING, VENTILATION AND AIR CONDITIONING

INSPECTION EE9E8CE8

Measure terminal-to-terminal resistance of the blower resistor.

If measured resistance is not within specification, the blower resistor must be replaced. (After removing the resistor)

Terminal		2	3	4	Resistance
Ohmmeter Speed indication	ML	мн	LO	н	(Ω)
Continuity is			\circ	-0	2.30%
indicated	\circ			-0	1.00%
		0-		-0	0.35%

Note

○—○ : Indicates that there is continuity between points.

EQQE204E



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BLOWER CONTROLS

A/C AIR FILTER

REPLACEMENT E05F4BBE

- 1. Open the glove box, remove the glove box stopper(A) in the lower crash pad(assist seat side), and completely lower the glove box.
- 3. Remove the A/C air filter(B) from the filter housing(A). Replace the A/C air filter according to the maintenance schedule in the owner's manual.



- KQQE411C
- 4. Install in the reverse order of removal. Make sure that there is no air leaking out of the blower unit.

2. Remove the A/C air filter assembly(A).

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KQQE411B

KQQE411A

HEATING, VENTILATION AND AIR CONDITIONING

FRESH AND RECIRCULATION ACTUATOR

COMPONENT LOCATION EACBOC6D



DESCRIPTION E9FD434A

General performance

- Rate voltage : DC 12V
- Rate load : 1.5kgf·cm
- Operating time : 3.5 + 1.0 sec.
- Rate current : Max. 0.1A
- Lock current : Max. 0.55A
- Locked torque : Max. 6kgf.cm
- Noise : Max. 43dB
- Use voltage : DC 10 ~ 15V
- Use temp. : -40 ~ 80 °C

CONNECTOR E9396EE5



KQSE211D

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BLOWER CONTROLS

CIRCUIT DIAGRAM EBABEADB

REPLACEMENT EA9ADC27

 Disconnect the 7P connector(A) from the inlet actuator(C). Remove the self-tapping screws(B) and the inlet actuator(C) from the blower unit(D).



HEATING, VENTILATION AND AIR CONDITIONING

BLOWER AND A/C CONTROLS (MANUAL)

CIRCUIT DIAGRAM E7B294DD



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BLOWER AND A/C CONTROLS (MANUAL)





EQQE500B

HEATING, VENTILATION AND AIR CONDITIONING

CONTROL PANEL

COMPONENTS E4D0CF3F



EQQE501A

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BLOWER AND A/C CONTROLS (MANUAL)

DESCRIPTION EADEA649



1. BLOWER SWITCH

The blower switch controls the blowing level of the air conditioning system by controlling blower motor speed. The switch has an electrical circuit containing a resister that will regulate blower motor input voltage

to control the motor speed.

2. MODE SWITCH

The mode switch controls air conditioning system discharge location. The switch contains an electrical circuit to control an actuator that is connected to the mode door for discharge control.

3. TEMPERATURE SWITCH

The temperature switch controls the temperature door position that will be used to regulate the air conditioning system's discharge air temperature. The switch includes a rack & pinion and a cable.

4. INTAKE SWITCH

The intake switch controls the intake door used to regulate the intake air flow of the air conditioning system. The switch contains an electrical circuit used to control the actuator that is connected to the intake door.

5. AIR CONDITIONING SWITCH

The air conditioning switch controls the on/off position of the air conditioning system compressor. The switch contains an electrical circuit that will switch on/off the power supply to the relay that is connected to the compressor. KQQE501B



HEATING, VENTILATION AND AIR CONDITIONING

SWITCH OPERATION AND FEATURES

Switch	Feature	Switch selection	Function
A/C switch		A/C switch pushing	Indicator ONA/C operate
	KQQE590A	A/C switch pushing with A/C ON	 Indicator OFF A/C non-operate
Fresh and recirculation		Switch pushing	Indicator ONShift to recirculation mode
switch		Switch pushing with switch ON	Indicator OFFShift to fresh mode
	KQQE590B		





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BLOWER AND A/C CONTROLS (MANUAL)

CHECK POINT BY TYPE EBCAA3EE

BLOWER CHECK



When the blower is turned ON, blower relay becomes turned ON and battery voltage is supplied to the blower motor upper part. The current determined by the supplied battery voltage, blower motor, and register ground runs to GND through the blower motor and the selected blower single resister.

Symptoms	Possible causes	How to check
Blower malfunction	Short wire of register	
Blower wind is discharged despite switching OFF	Open circuit of blower switch	With switch OFF, check the connection between each terminal and GND/COMMON terminal

HEATING, VENTILATION AND AIR CONDITIONING





For A/CON output, blower must be basically operated. When blower speed 1 is selected, blower relay is turned ON and voltage is supplied to point "A".

When the supplied voltage at point "A" is entered into control connector C15 and at this moment when A/CON switch is turned ON, voltage is supplied to connector C5 at 9V or more. Thermistor value determines whether the input power at point "B" is supplied to point "C".

The state of ON/OFF of triple switch determines whether the input power at point "C" is supplied to point "D". Finally when the voltage is supplied to point "D", engine ECU determines whether A/CON and CONDENSER FAN turned ON/OFF.

Symptoms	Possible causes	How to check
Wind of A/CON isn't discharged into in-car despite switching OFF of A/CON	Signal output error of A/CON	With switch OFF of A/CON, and measure voltage of connector C5 as shown in the above figure. If the voltage is 9V or more, check the triple switch, ENG ECU, and wires.

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MODE CHECK



As shown in the above figure, in adjusting mode switch from VENT to DEF, 12V is outputted from connector B4, 0V is supplied for B5 and mode motor works in direction of DEF. In adjusting mode switch from DEF to VENT, 12V is outputted from connector B5, 0V is supplied for B4 and mode motor works in direction of VENT. When mode actuator has to move to a certain location for its automatic control, mode feedback signal terminal moves equally in mode actuator and informs controller of location of mode actuator through mode connector B6. Comparing original value with the inputted value, it works until they are same.

Symptoms	Causes	How to check
Mode actuator running error	Power supply error in mode actuator	After altering VENT to DEF, measure voltage of connector B4, and after altering DEF to VENT, measure voltage of connector B5. If both of them are 9V and more, check mode actuator and peripheral wiring state and if one or both of them are 9V and less, its cause is internal failure of control.

HEATING, VENTILATION AND AIR CONDITIONING

INTAKE CHECK



In turning on IG and selecting indoor mode with indoor switch, 12V is outputted from connector B12, 0V is supplied for C1 and motor works in direction of indoor. In selecting outdoor mode with indoor switch, 12V is outputted from connector C1, 0V is supplied for B12 and motor works in direction of outdoor.

کاران <symptoms th="" یران<=""><th>ین سامان Causes بتال تعمیر</th><th>How to check</th></symptoms>	ین سامان Causes بتال تعمیر	How to check
Indoor mode running error	Power supply error in actuator	Separate connector linked with actuator, select indoor mode with indoor switch and measure voltage of connector B12. If 9V and more, check actuator or wiring state and if 9V and less, check the inside of controller.
Outdoor mode running error	Power supply error in actuator	Select outdoor mode in the above method and measure voltage of connector C1. If 9V and more, check actuator or wiring state and if 9V and less, check the inside of controller.

BLOWER AND A/C CONTROLS (MANUAL)

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TEMP.CHECK



As shown in the above figure, in adjusting temp. switch from WARM to COOL, 12V is outputted from temp. connector B7, 0V is supplied for B8 and temp. motor works in direction of COOL. In adjusting temp. switch from COOL to WARM, 12V is outputted from temp. connector B8, 0V is supplied for B7 and temp. motor works in direction of WARM. When temp. actuator has to move to a certain location for its automatic control, temp. feedback signal terminal moves equally in temp. actuator and informs controller of location of temp. actuator through temp. connector B9. Comparing original value with the inputted value, it works until they are same

Symptoms	Causes	How to check
Temp actuator running error	Power supply error in temp actuator	After altering COOL to WARM, measure voltage of B7, and after altering WARM to COOL, measure voltage of B8. If Both of them are 9V and more, check temp actuator and peripheral wiring state and if one or both of them are 9V and less, its cause is internal failure of control.

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HEATING, VENTILATION AND AIR CONDITIONING

CONNECTOR E2E93DBB

		<u> </u>
A1	A2	A3
A4	A5	A6

B1	B2	B3	B4	B5	B6
B7	B8	B9	B10	B11	B12

C1	C2	C3	C4	C5	C6	C7	C8
C9	C10	C11	C12	C13	C14	C15	C16

Α

В

С

KQQE501C

Connec- tor	Pin No.	Circuit	Connec- tor	Pin NO.	Circuit
	1	MIDDLE HIGH		1	REC
	2	MIDDLE LOW		2	ILL +
٨	3	LOW		3	ILL -
A	4	HIGH		4	BLOWER ON (+)
	5	GND		5	A/C OUTPUT
	6	BLOWER COMMON OUT		6	A
	1	IGN		7	
	2	BAT +	C	8	
(1010)		GND		9	PTC ON SIGNAL
(39320	4	MODE ACTUATOR (VENT)	یت دیے	10	BLOWER RELAY ON
	5	MODE ACTUATOR (DEF)		11	PTC RELAY 2
B	6	MODE F/BACK	یں سم	12	PTC RELAY 3
В	7	TEMP ACTUATOR (WARM)		13	-
	8	TEMP ACTUATOR (COOL)		14	-
	9	TEMP F/BACK		15	BLOWER SELECT SIGNAL
	10	VCC	1	16	BLOWER COMMON IN
	11	SENSOR GND			
	12	FRE			

BLOWER AND A/C CONTROLS (MANUAL)

CIRCUIT DIAGRAM E940FBBC

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BLOWER AND A/C CONTROLS (AUTOMATIC)

CIRCUIT DIAGRAM EA0581BE



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BLOWER AND A/C CONTROLS (AUTOMATIC)

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HEATING, VENTILATION AND AIR CONDITIONING

CONTROL PANEL

COMPONENTS EEF94B96



EQQE601A

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DESCRIPTION EB79FCF1



SWITCH OPERATION AND FEATURES

Switch	Feature	Switch selection	Function
Temp switch		Push DOWN button at set temperature of 25 [°] C while operating	Select at intervals of 0.5 [°] C from 17 [°] C to 25 [°] C
		Indication screen	
رو در ایران	KQQE690A	اولین سامانه دیج	
			KQQE693A
		Push DOWN button at set temperature of 25 [°] C while operating	Selecte at intervals 0.5 [°] C from 17 [°] C to 25 [°] C
		Indication screen	
			H 8
			KQQE693B

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HEATING, VENTILATION AND AIR CONDITIONING

Switch	Feature	Switch selection	Function
AUTO switch	AUTO	Push AUTO switch under system OFF or manual opeation	Control automatically all outlet by input value of each sensor
	KQQE690B	Indication screen	AUTO
			KQBC026E
		Push AUTO switch under automatic operation	Unchanged
		Indication screen	
			AUTO
			KQBC026E
MODE switch	MODE	Push MODE switch while operating	Indicate the followings repeatedly wheneverpushing the switch under set condition. Vent By level Floor Mix
و در ایران	_{۲۵۵۶6990} تال تعمیرکاران خودر	اولین سامانه دیدهد	
			$\overrightarrow{} \overleftarrow{} \phantom{$
			EQQE692A
		Push MODE switch under system OFF	Release AUTO mode and keep system OFF
OFF switch	OFF	Push OFF switch while operating	System OFF (keep TEMP and MODE intake in original condition and turn OFF blower and compressor
	KQQE690D	Indication screen	
			outside 2011
			EQQE693C

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Switch	Feature	Switch selection	Function
A/C switch		When air conditioner is OFF, push A/C switch under system OFF or operating	Turn ON air conditioner outlet
	KQQE690E	A/C KQQE690E	A/C
			KQQE691B
		Push A/C switch under air conditioner ON	Turn OFF air conditioner outlet
		KQQE691A	
			KQBC026G
Air intake switch		When system is OFF, push intake switch under air outlet condition	Keep system OFF na intake door turn to air intake mode
یت محدود)	وی رولسمی می می میور ««بیتال تعمیر کاران خود	When system OFF, push intake switch under air intake condition	Keep ststem OFF and intake door turn to air outlet mode
0.0		Push intake switch under air outlet when operating	Air intake mode
		When operating, push intake switch under air intake condition	Air outlet mode
		Air outlet mode indicator condition	
			KQQE690F
		Air intake mode indicator condition	
			KQQE691F

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HEATING, VENTILATION AND AIR CONDITIONING

Switch	Feature	Switch selection	Function
DEF switch	KQQE690H	Push DEF switch when operating DEF mode or system OFF	Mode door : to DEF mode A/C : ON Intake : Outlet mode Others : Condition before OFF
	Indicator and indication screen		A/C KQQE691G
		Push DEF switch when operating DEF mode	Return to the condition before DEF mode
			KQQE691H
AQS switch		Push AQS switch under AQS stopped	Control intake door by AQS signal while turning on AQS indicator
4		Push AQS switch when operating AQS	Return to the state before selecting AQS while turning off AQS indicator
ت محدود)	^{KQQE690G} ودرو سامانه (مسئولی	Push OFF switch when operating	Turn off indication screen and AQS indicator, and intake door fixes to air intake mode
و در ایران	تال تعميركاران خودر	اولين سامانه ديجي	Able to select AQS, air intake, and air outlet when system OFF
		Indicator condition while operating AQS	
			KQQE690G
		Indicator condition under AQS stopped	
			KQQE6911

Switch	Feature	Switch selection	Function
Blower switch		Push blower switch while operating	Voltage between both edges of blower motor goes down to 3.8V
	SS ▼	Indication screen	<u>۳۳۳۳</u> %
	KQQE6901		Level 8,7 Level 6,5 Level 4,3 Level 2,1
			EQQE691C
		Push blower switch while operating	Votage between both edges of blower motor goes up to Max high
		Indication screen	Level 1,2 Level 3,4 Level 5,6 Level 7,8
	• •		EQQE691D
QD	بالرحم	Push blower switch under system OFF	Operate with 3.8V between both edges of blower motor
یت محدود)	ودرو سامانه (مسئول	Indication screen	
رو در ایران	یتال تعمیرکاران خود	اولین سامانه دیج	
			KQQE691E

HEATING, VENTILATION AND AIR CONDITIONING

CONTROL SPECIFICATION

Control item	Control features	Remarks
Required discharge temperature	Required temperature determined by the set temperature and the inputted sensor value.	
Auto control	Required discharge temperature is determined by the set temperature and the inputted sensor value. The feature will use the required discharge temperature to perform the auto control of temp. actuator, mode actuator, intake actuator, blower motor and compressor, and maintain the set temperature stably.	
IN-CAR temperature correction	Upon detecting rapid changes of temperature from the INCAR sensor, it will gradually correct the incar temperature value.	 1'C UP/4sec delay 1'C DOWN/4sec delay
AMB temperature correction	Upon detecting rapid changes of temperature from the AMB sensor, it will gradually correct the ambient temperature value.	Logic of the correction speed sensor
Photo correction	Upon detecting rapid changes of photo intensity from the PHOTO sensor, it will gradually correct the photo intensity value.	 350 1000(W/m²)/1min delay 350 1000(W/m²)/5min delay
TEMP door control	It does the automatic control to maintain the optimum TEMP door opening (0%-100%). It will be computed by the temperature set and the input signal from each sensor.	The set temperature range 17'C 32'C, 0.5'C step (62'F 90'F, 1'F step)
Blower speed	Automatic control of the blower speed. The target value will be computed by the set temperature and the input signal from each sensor. (8 levels may be selected in case of manual selection.)	 Auto mode blower low voltage (Manual low voltage: 3.8) Auto mode heater blower HI speed: 10.6V
Electro-motive mode control	During auto control, it will raise the permitted voltage of blower motor gradually in order to improve comfortability.	12 seconds for shifting LO MAX HI
Photo compensation	During auto control, it will compensate the blower level and the discharge temperature according to the photo intensity detected from the PHOTO sensor. PHOTO compensation will begin after 5 seconds when ignition on.	
Mode door control	Automatic control of air discharge based on the required discharge temperature. It will be computed by the temperature setting and the input signal from each sensor. (VENT B/L FLOOR VENT) In case of manual selection (VENT B/L FLOOR MIX VENT)	 At OFF, MODE door will fix the current condition. At OFF in manual mode, MODE door will maintain the manual control condition.
MIX mode control (in auto control)	If the ambient temperature is -13 ^I C or less in AUTO mode, discharge mode will be controlled at MIX. (When front window glass is defogged.)	Entering MIX mode, A/C will operate.
INTAKE door control	Auto control of intake mode based on the required discharge temperature that will be computed by the temperature setting and the input signal from each sensor.	 Shift to REC when selecting REC button at FRE condition (LED on). Shift to FRE when selecting FRE button at REC condition (LED off).

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Control item	Control features	Remarks
INTAKE control at OFF	The intake door will fix to the FRE. position when switching the system off.	 FRE./REC. manual selection will be enabled at OFF REC indicator will come out at OFF.
Compressor auto control	Control automatically the compressor on/off state corresponding to the set temperature and the input signal from each sensor.	 When selection the AUTO SW, the compressor is controlled to ON/OFF. When selection the DEF SW, the compressor is controlled to "ON".
Compressor clutch on/off control based on refrigerant temperature	If EVAP sensor temperature is below than 0.5 [°] C, the compressor will be ON and the temperature is 3 [°] C, or higher, with the compressor OFF.	
MAX HOT	When selecting the set temperature HI at AUTO mode, MAX HOT will be performed. It will prevail over MIX mode control.	 TEMP door: MAX HOT MODE door: FLOOR mode INTAKE door: FRE mode Compressor: OFF Blower speed: AUTO HI(10.6V)
MAX COOL	When selecting the set temperature LO at AUTO mode, MAX COOL will be performed.	 TEMP door: MAX COOL MODE door: FLOOR mode INTAKE door: REC mode Compressor: ON Blower speed: MAX HI
Electromotive heating control	If the ambient temperature is 5 [°] C or more and the in-car temperature is 10 [°] C or less than the ambient temperature at B/L or FLOOR in AUTO mode, it will effect the electromotive heating control to prevent outside cold air from flowing toward the feet of passengers.	- Blower speed: Controlled at AUTO LOW (4.5V)
	As the coolant temperature rises, the MODE door will shift to DEF AUTO.	Operation release In-car temp. > ambient
	MODE: Manual selection is enabled. INTAKE door: At AUTO control or at man- ual selection mode.	+10'C Max cool In pressing MODE switch. In pressing DEF switch.
	Blower speed: Manual selection is enabled (No re-entry).	
Electromotive cooling control	In order to prevent hot air from the VENT or B/L in AUTO mode (A/C on mode blower auto), the blower speed will be operated at LOW for approx. 9 seconds before entering the AUTO control if the EVAP sensor detection is temperature 30 [°] C or higher.	
MAX HOT	If the above condition is satisfied, electromotive cooling control will operate at any time.	

HEATING, VENTILATION AND AIR CONDITIONING

Control item	Control	features		Remarks
Air Quality System (AQS)	The AQS system will detect the hazardous elements and odors contained in the air. If the harmful element concentration is higher than standard, the system will output a LOW signal (1.0V or less) to the FATC.		-	When the initial battery connection and ignition is ON, it will operate at AUTO mode. (AQS will not operate.)
	If the concentration is within system will output a HI signa		-	When IGN 2 ON, the AQS assembly will be preheated for 34.5±5seconds.
	Corresponding to the signal from the AQS, it will control the INTAKE door as follows to prevent the inflow of harmful gas in FATC:		-	IGN2 ON: It will check circuit break on the AQS assembly's signal line for approx. 7 seconds during the preheating, irrespective to the AQS switch condition.
	Condition	INTAKE door position	-	When AQS is selected prior
	LOW	REC		to IGN2 OFF and IGN2 is turned OFF ON: AQS
		FRE		indicator will come on, and the system will operate at AQS mode. (Store the previous condition before IGN 2 OFF)
Initialization Upon battery-on	When supplying the initial power, it will operate in the initial condition.		-	When the initial ignition ON after battery connection, the system will operate at the set temperature 25 [°] C and at AUTO mode.
ودرو در ایرن	When removing ignition key, it will store FATC'S operating condition.		0	When IGN ON after IGN OFF during FATC operation, the system will operate at the previous before the ignition off.

BLOWER AND A/C CONTROLS (AUTOMATIC)

CHECK POINT BY TYPE E5F4341B



in the above chart, it is impossible to conclude its reason at the occurrence of failure.All possibilities of failure shall be considered for the purpose of efficient. How to check.

- 1. Power supply check
- 2. Back light check
- 3. Blower check
- 4. Air conditioner check
- 5. Intake check and AQS check
- 6. Mode check
- 7. Temp check
- 8. Sensor check

HEATING, VENTILATION AND AIR CONDITIONING

POWER SUPPLY CHECK



In turning off IGN, battery supplies power for ordinary power, FATC connector A3 through battery fuse. FATC performs memory function by means of battery power supplied as described above. In turning on IGN, alternator is driven. At this time, IG2 power generated in alternator FATC connector A12 and A25 terminal through IG2 fuse and air conditioner fuse 10A. FAT carried out actual system operation by means of IG2 power supplied as described above.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
When IG is ON, memory function error occurs	Battery power supply error	Check voltage of battery after turning off IG. If 10V and more, check FATC connector and if no problem, check the inside of controller. If 10V and less, check fuse or wiring state of battery power source.
When IG is ON, system running error occurs	IG2 power supply error	Check voltage of IG2 after turning on IG. If 10V and more, check FATC connector and if no problem, check the inside of controller. If 10V and less, check fuse or wiring state of IG2 power source.

BACK LIGHT CHECK



In turning on IG and then light switch, battery power is supplied for FATC connector A2 terminal through wiring. The supplied power passes connector A1 terminal through light bulb in FATC and flows into reostart as shown in the above figure. The brightness is adjusted according to resistance value of reostart.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check	
When light switch is ON, partial error occurs in back light	Light bulb lighting error in FATC		
When light switch is ON, entire error occurs in back light	Light power supply error	Measure voltage of tail light shown in the above figure after switching on light. If 10V and more, check FATC connector and if no problem, measure signal voltage of reostart shown in the above figure. If 8V and more, check reostart wiring and reostart.	
		If tail light is below 1V, check tail light wiring.	

HEATING, VENTILATION AND AIR CONDITIONING

BLOWER CHECK



Perform the blower check in manual blower running state because it is difficult to check blower at automatic control. Blower is controlled from level I to level 8 equally as in button operation and running logic. In turning on IG, blower relay is ON and voltage of 0.1 to 1.4V is transferred from FATC connector A4 terminal to base source of power TR according to FATC control (selectable from level 1 to level 8). At this time, voltage of blower motor's both ends is determined according to collector voltage of FATC connector A5 terminal. If FATC is controlled in level 8, GND(0V) is supplied for FATC connector A18 terminal and high blower relay is driven.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Amount of wind is wrong at manual selection of blower	Power TR error	Check voltage of blower motor's both ends. (Level 1: 3.8V, Level 2: 5.2V, Level 3: 6.5V, Level 4: 7.9V, Level 5: 9.2V, Level 6: 10.6V, Level 7: 12.0V, Level 8: 13.5V [high-relay operation]) Measure voltage of each terminal and if there is difference more than ±0.6V, check power TR.
Blower wind is discharged despite pressing OFF switch	Power TR error	Power TR change

AIR CONDITIONER CHECK



11V is outputted from connector A17 terminal in turning on INSULATING and pressing air conditioner switch. However, although 11V is outputted from FATC connector A17 terminal, compressor clutch isn't driven. Wind of air conditioner is discharged if only compressor clutch works. Output signal from air conditioner is inputted in engine computer through triple switch. Then, the engine computer considers several conditions and when output of air conditioneris judged to be practical, it gives GND to signal terminal of air conditioner relay. Accordingly, relay of air conditioner is ON and compressor clutch works. Triple switch checks pressure of refrigerant flowing through pipe and turns on/off switches in it according to standard. So, it controls that output signalof air conditioner outputted from FATC is inputted into engine computer, and also speed of condenser fan according to pressure level. (For high pressure, high-speed and for low pressure, low-speed.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check	
Wind of air conditioner isn't discharged into vehicle despite switching on air conditioner.	Signal output error of air conditioner	Switch on air conditioner and measure voltage of FATC connector A17 terminal as shown in the above figure. If 9V and more, check triple switch,air conditioner relay and ECM.	
		Switch on air conditioner and measure voltage of FATC connector A17 terminal as shown in the above figure. If 1V and less, check input value of evaporator sensor.	
	Input error of evaporator sensor	If evaporator sensor is disconnected or short or voltage of its inputsource is more than 3.0V (below 0.5 [°] C), output of air conditioner isn't made.	

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INTAKE AND AQS CHECK



switch, 12V is outputted from FATC connector A10 terminal, 0V is supplied for A23 terminal and motor works in direction of indoor.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Indoor mode running error	Power supply error in actuator	Separate connector linked with actuator, select indoor mode with indoor switch and measure voltage of FATC connector A23 terminal. If 8V and more, check actuator or wiring state and if 9V and less, check the inside of controller.
Outdoor mode running error	Power supply error in actuator	Select outdoor mode in the above method and measure voltage of FATC connector A10 terminal. If 8V and more, check actuator or wiring state and if 9V andless, check the inside of controller
Fixed in outdoor or indoor mode at AQS selection	AQS signal terminal output error	Select AQS switch and measure AQS signal terminal as shown in the above figure. If there is no change of voltage over 10 min, check AQS.

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MODE CHECK



In turning on IG and selecting mode switch, sequential operation begins in order of Vent Bi-level Blower Mix. DIP mode works regardless of order at selecting it. As shown in the above figure, in adjusting mode switch from VENT to DEF, 12V is outputted from connector B4, OV is supplied for B5 and mode motor works in direction of DEF. In adjusting mode switch from DEF to VENT, 12V is outputted from connector B5, 0V is supplied for B4 and mode motor works in direction of VENT. When mode actuator has to move to a certain location for its automatic control, mode feedback signal terminal moves equally in mode actuator and informs controller of location of mode actuator through mode connector B6. Comparing original value with the inputted value, it works until they are same.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Mode actuator running error	Power supply error in mode actuator	After altering VENT to DEF, measure voltage of connector A15, and after altering DEF to VENT, measure voltage of connector A14. It both of them are 9V and move, check mode actuator an peripheral wiring state and if one or both of them are 9V and less, its cause is internal failure of control.
	Sensor(+5) power supply error	If automatic control isn't operated smoothly, measure voltage of FATC connector B8 terminal, If under 4.8V or over 5.2V, its cause is internal failure of FATC.
	Driver error of mode actuator	If NO.22 is outputted as result of self-diagnostic, check mode actuator driver.

HEATING, VENTILATION AND AIR CONDITIONING

TEMP CHECK



In adjusting temp switch from 32[°]C to 17[°]C, 12V is outputted from FATC connector A22 terminal, 0V is supplied for A9 terminal and temp motor works in direction of COOL. In adjusting temp switch from 17[°]C to 32[°]C, 11V is outputted from FATC connector A9 terminal, 0V is supplied for A22 terminal and temp motor works in direction of WARM. When temp actuator has to move to a certain location for its automatic control, temp feedback signal terminal moves equally in temp actuator and informs controller of location of temp actuator through FATC connector B10 terminal. Comparing original value with inputted value, it works until they are same. If 4.9V and more is inputted in B10 terminal, it is regarded as disconnection. If 0.1V and less is inputted in B10 terminal, it is regarded as short-circuit. In the case of disconnection or short-circuit as a result of self-diagnostic, substitute control is carried out as follows.

- If setup temperature is 17[°]C to 24.5[°]C, set to MAX COOL.
- If setup temperature is 25[°]C to 32.0[°]C, set to MAX WARM.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check	
Temp actuator running error	Power supply error in temp actuator	After altering 17 [°] C to 32 [°] C and adversely, measure voltage of A9 and after altering 32 [°] to 17 [°] C and adversely, measure voltage of A22. If Both of them are 9V and more, chec temp actuator and peripheral wiring state and if one or both of them are 5V and less, its cause is internal failure of FATC.	
	Sensor (+5) power supply error	If automatic control isn't operated smoothly, measure voltage of FATC connector B8 terminal. If under 4.8V or over 5.2V, its cause is internal failure of FATC.	
	Driver error of temp actuator	If No. 20 is outputted as a result of self-diagnostic, check temp actuatordriver.	

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SENSOR CHECK



Resistance value set according to temperature of each part is inputted in FATC controller.

Internal temperature of vehic is automatically controlled by operating the inputted values.

It is recommended to refer to resistance value and voltage value corresponding to each temperature and the followings explains essential functions of each sensor required for repair and self-diagnostics and substitute functions at disconnection or short-circuit.

- If 4.9V and more is inputted in connectors B1, B3, B4, B7, B12 terminal, it is regarded as disconnection.
- If 0.1V and less is inputted in connectors B1, B3, B4, B7, B12 terminal, it is regarded as short-circuit.

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CONNECTOR ECFEA90E



KQQE601C

Connec- tor	Pin No.	Circuit	Connec- tor	Pin No.	Circuit
	1	RHEOSTAT		1	INCAR SENSOR IN
-	2	TAIL LAMP (+)		2	A/C SELECT SIGNAL
	3	BATT (+)		3	AMB SENSOR (+)
	4	P/TR (BASE)		4	EVA SENSOR (+)
	5	P/TR (COLLECTOR)	کت دید B لین ساما	5	SPEED SENSOR
	6	PTC ON SIGNAL		6	HI SCAN
محدود)		HUMIDITY SNR IN		7	WATER TEMP SENSOR(+)
	8	AQS		8	SENSOR REF. (+5V)
ر ایران	9	TEMP ACT'R (CCW)		9	INCAR SENSOR OUT
	10	INTAKE ACT'R (CCW)		10	TEMP F/B SIGNAL
A	11	-		11	MODE F/B SIGNAL
	12	IGN2	-	12	PHOTO SENSOR (+)
	13	GND		13	PHOTO SENSOR (+)
	14	MODE ACT'R (CW)		14	HUMIDITY SENSOR OUT
	15	MODE ACT'R (CCW)		15	-
	16	-		16	SENSOR GND
	17	A/C OUTPUT			
	18	HIGH SPEED RELAY			
	19	PTC RELAY 2			
	20	PTC RELAY 3			
	21	-			
	22	TEMP ACT'R (CW)			
	23	INTAKE ACT'R (CW)			
	24	BLOWER SELECT SIGNAL			
	25	IGN2			
	26	GND			

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CIRCUIT DIAGRAM E1D106AC



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