

AIR CONDITIONING

■ DESCRIPTION

1. General

The following changes have been made to the air conditioning system on the '04 Prius:

- An ES18 type Electric Inverter Compressor has been newly adopted. This compressor is driven by an alternating current provided by the A/C inverter, which is built into the inverter of the hybrid system. As a result, the air conditioning system is actuated without depending on the operation of the engine, thus realizing a comfortable air conditioning system and low fuel consumption.
- The automatic air conditioning system, which automatically switches the air outlet in addition to the outlet air temperature and volume, has been adopted on all the models as standard equipment.
- A blower pulse controller, which regulates the speed of the blower motor by controlling the output voltage in accordance with the duty cycle signal provided by the A/C ECU, has been newly adopted. As a result, the power loss associated with the heat generation of the conventional blower linear controller has been reduced, thus realizing low fuel consumption.
- A humidity sensor function has been added to the room temperature sensor in order to optimize the amount of dehumidification effort during the operation of the air conditioning system.
- A compact, lightweight and highly efficient RS (Revolutionary Slim) evaporator has been adopted.
- A compact, lightweight and highly efficient MF-IV (Multi Flow-IV) condenser has been adopted.
- A compact, lightweight, and highly efficient electrical water pump has been adopted in order to ensure the proper heater performance while the engine is stopped.
- Fuzzy control has been adopted for calculating the required outlet air temperature (TAO: Temperature Air Outlet) and the blower volume in the automatic air conditioning control system. Accordingly, the air conditioning ECU is able to calculate the outlet air temperature, blower volume, air outlet, and compressor speed that is suited to the operating environment. As a result, the comfort level of the occupants has been improved.
- On the previous model, the air conditioning was controlled at the heater control panel. This control operation has been changed to the air conditioning screen display on the multi display and the steering pad switch, in order to improve the ease of use.

— REFERENCE —

Fuzzy Control: This control method is implemented on a computer to simulate the fuzzy decision-making process of humans. It uses mathematical functions consisting of “IF-THEN” control rules for determining the circumstances (such as “slightly large” or “considerably large”) that cannot be handled through ordinary calculations. Thus, this control simulates on a computer numerous information processing techniques of humans, using a language that is similar to the language used by humans.

► Performance ◀

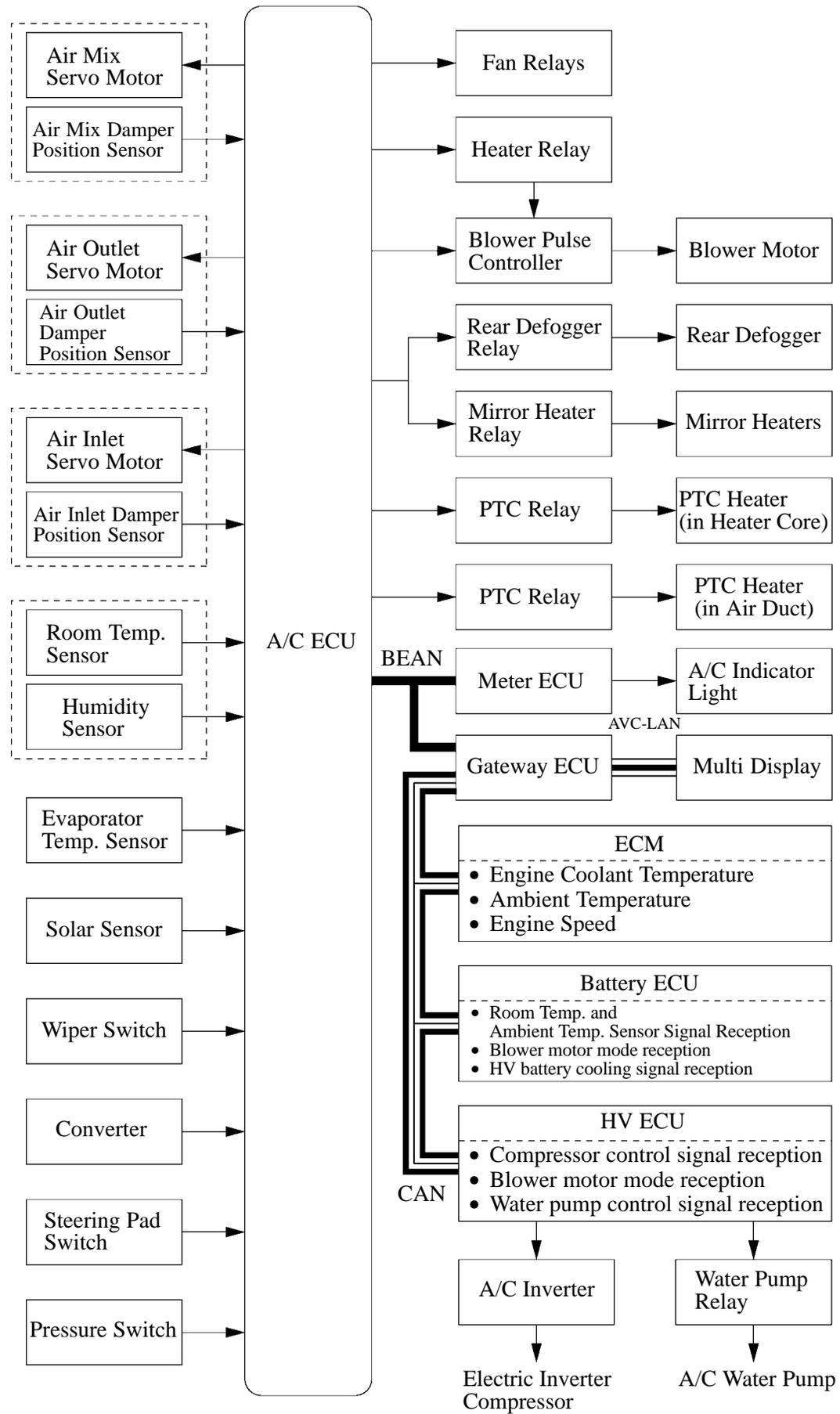
Model		'04 Prius	'03 Prius
Heater	Heat Output W	5300	←
	Air Flow Volume m ³ /h	330	←
	Power Consumption W	170	←
PTC Heater (Heater Core Integrated)	Heat Output W	330 (165 × 2)	←
PTC Heater (in the air duct at the footwell outlet)	Heat Output W	165 × 2	←
Air Conditioning	Cooling Capacity W	4500*	4200
	Air Flow Volume m ³ /h	450	←
	Power Consumption W	200	←

*: When the Electric Inverter Compressor revolves at its maximum speed.

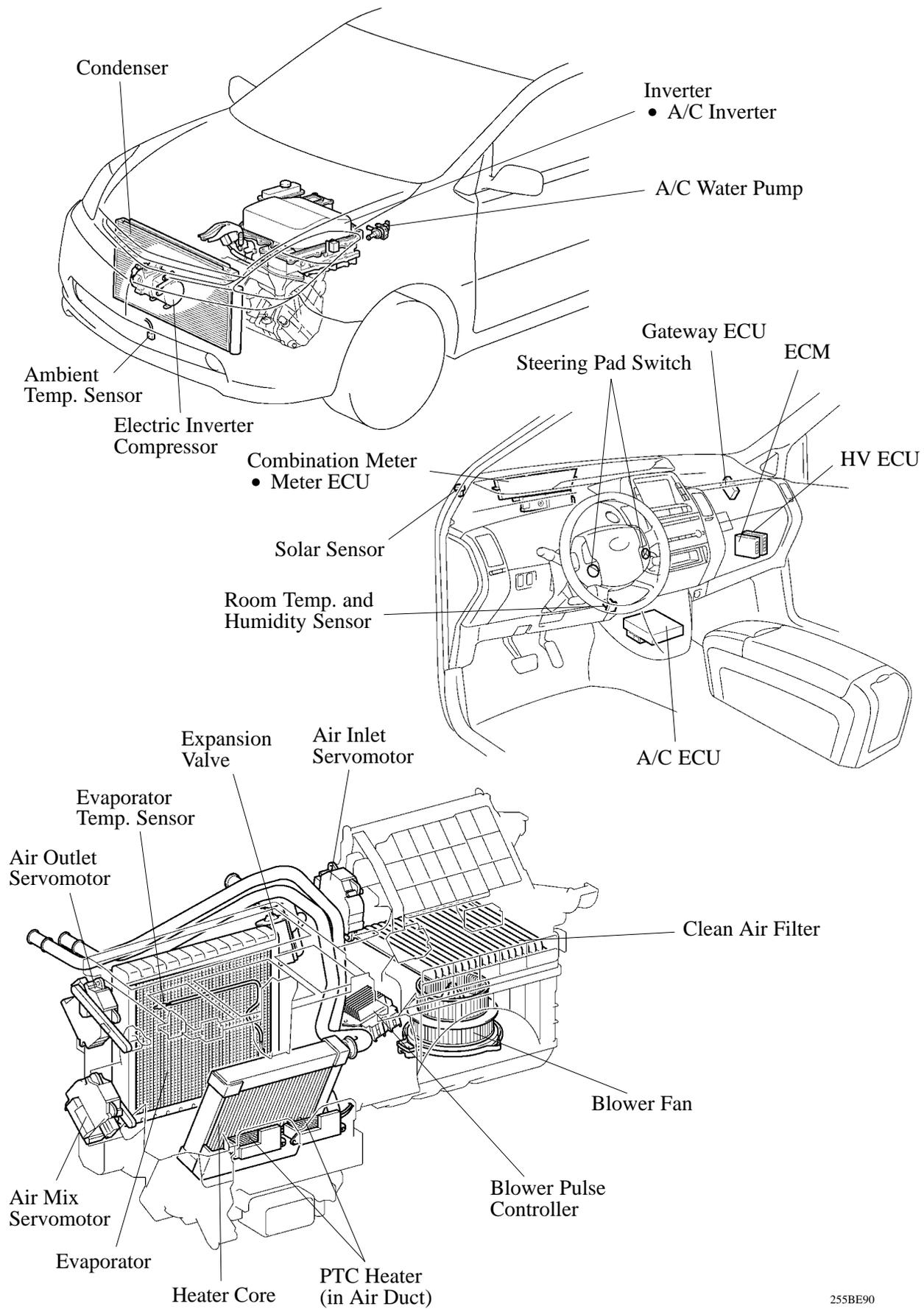
► Specifications ◀

Model		'04 Prius	'03 Prius	
Ventilation and Heater Core	Heater Core	Type	Straight Flow (Full-path Flow)	←
		Size W × H × L mm (in.)	216.9 × 140 × 27 (8.5 × 5.5 × 1.1)	←
		Fin Pitch mm (in.)	1.8 (0.07)	←
	Blower	Motor Type	S70F-13T	←
		Fan Type	Shroud Fan	←
		Fan Size Dia. × H mm (in.)	132 × 41 (5.2 × 1.6) 150 × 36 (5.9 × 1.4)	←
Air Conditioning	Condenser	Type	Multi Flow-IV (Sub-cool)	Multi Flow-III (Sub-cool)
		Size W × H × L mm (in.)	600 × 351 × 16 (23.6 × 13.8 × 0.6)	600 × 349.8 × 37.5 (23.6 × 13.8 × 1.5)
		Fin Pitch mm (in.)	2.75 (0.11)	2.8 (0.11)
	Evaporator	Type	Revolutionary Slim Structure	Multi-tank, Super-slim Structure
		Size W × H × L mm (in.)	252.9 × 215 × 38 (10 × 8.5 × 1.5)	253.2 × 215 × 58 (10 × 8.5 × 2.3)
		Fin Pitch mm (in.)	3.0 (0.12)	3.5 (0.14)
	Compressor	Type	ES18	SCS06
		Compressor Oil Type	ND11	ND8
	Refrigerant	Type	HFC134a (R134a)	←
Volume g		450	500	

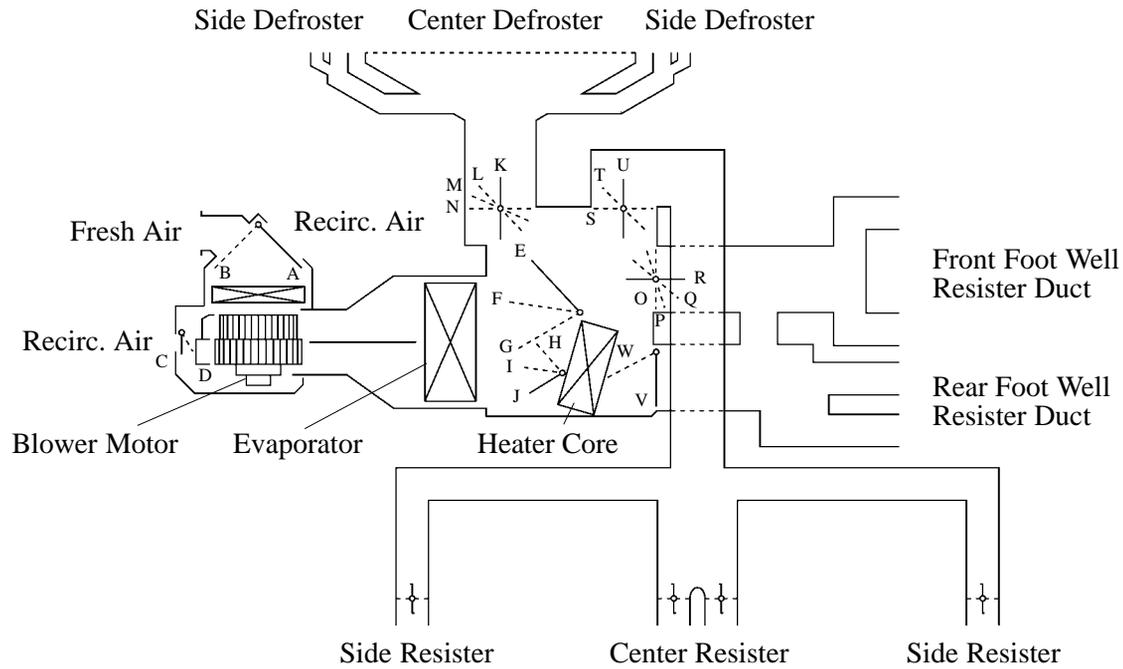
2. System Diagram



3. Layout of Main Component



4. Model Position and Damper Operation



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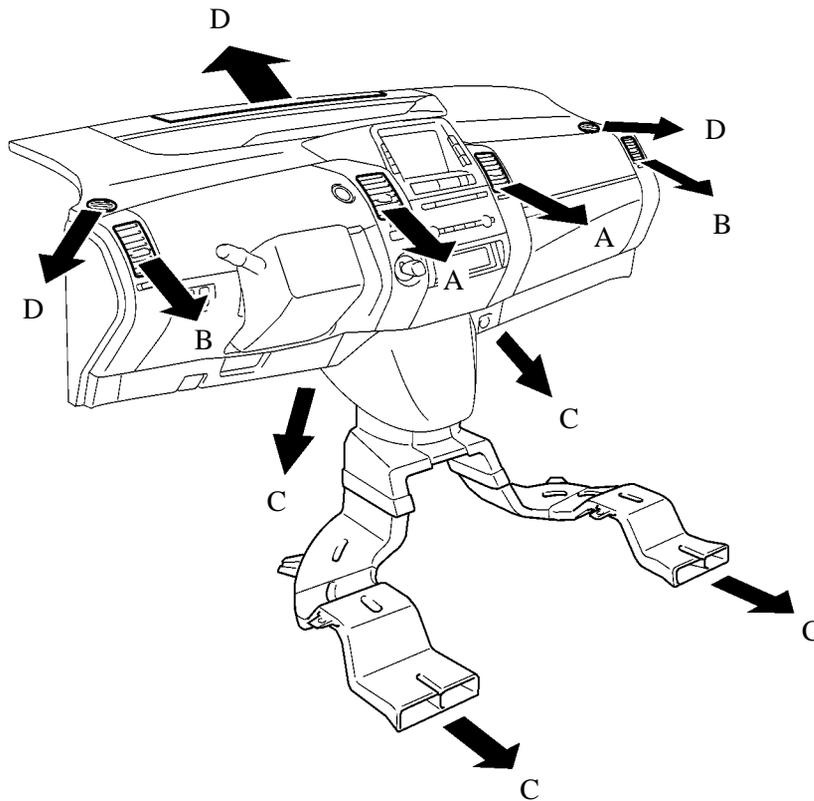
► Function of Main Damper ◀

Control Damper	Control Position	Damper Position	Operation
Air Inlet Control Damper	FRESH	A, C	Brings in fresh air.
	FRESH (During 2-way flow control)	A, D	Brings in fresh air and recirculates internal air.
	RECIRC	B, D	Recirculates internal air.
Air Mix Control Damper	WARM - COOL	E ~ F ~ G H ~ I ~ J	Varies the mixture ratio of the cool air and the warm air in order to regulate the temperature continuously from WARM to COOL.
Mode Control Damper	DEF 187BE28	K, O, S, V	Defrosts the windshield through the center defroster, side defroster and side register.
	FOOT/DEF 187BE27	L, Q, S, V (K, O, S, W)*1	Defrosts the windshield through the center defroster, side defroster and side register, while air is also blown out from the front and rear foot well register ducts.
	FOOT 187BE26	M, R, S, V (L, Q, S, W)*1	Air blows out of the front and rear foot well register ducts and side register. In addition, air blows out slightly from the center defroster.
	BI-LEVEL 187BE25	N, Q, T, V	Air blows out of the center register, side registers, and front and rear foot well register ducts.
	FACE 187BE24	N, O, U, V (N, P, U, V)*2	Air blows out of the center register, and side register.

*1: During 2-way Flow Control

*2: Early Stages of COOL During AUTO

5. Air Outlets and Air Volume Ratios



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Air Outlet Position Symbol		A	B	C	D
Air Outlet Mode	Air Mix Position	Center Face	Side Face	Foot	Defroster
FACE  187BE24	Max Cool	○	○	— (○)*	—
BI-LEVEL  187BE25	Center	○	○	○	—
FOOT  187BE26	Max Hot	—	○	○	○
FOOT/DEF  187BE27	Max Hot	—	○	○	○
DEF  187BE28	Max Hot	—	○	—	○

The size of the circle ○ indicates the proportion of airflow volume.

*: Early Stage of COOL During AUTO