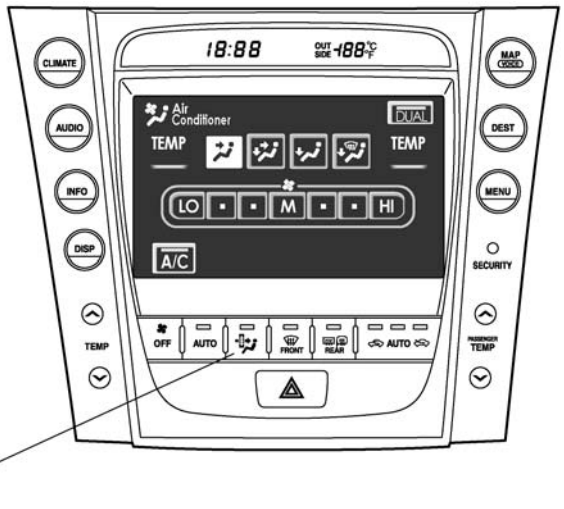
■CONSTRUCTION AND OPERATION

1. Air Conditioning Control Panel

- The control switches for the air conditioning have been concentrated on the integration panel, which is located in the center of the instrument panel.
- The operations associated with the air conditioning are controlled by the push switches on the integrated panel and the touch switches on the multi display.
- A right/left independent temperature control system is used. With this system, the air conditioning control provides temperature setting switches independently for the driver and the front passenger. In addition, it provides a dual switch to switch from the linked control to the left/right independent temperature control.



Micro Dust and Pollen Filter Switch

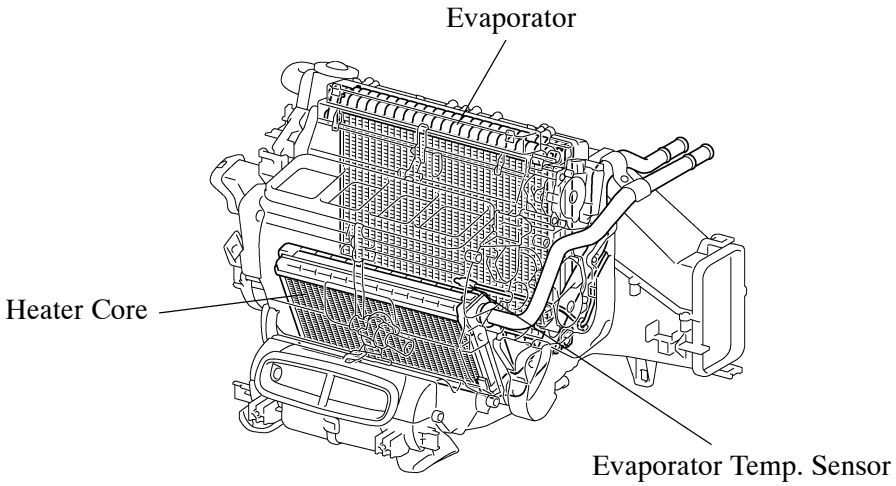
Multi Display

● **Air Conditioning Control Panel** 02DMO41Y

2. Air Conditioning Unit

General

A semi-center-located air conditioning unit, in which the evaporator and heater core are mounted transversely, is used. As a result, the air conditioning unit is made compact and lightweight.



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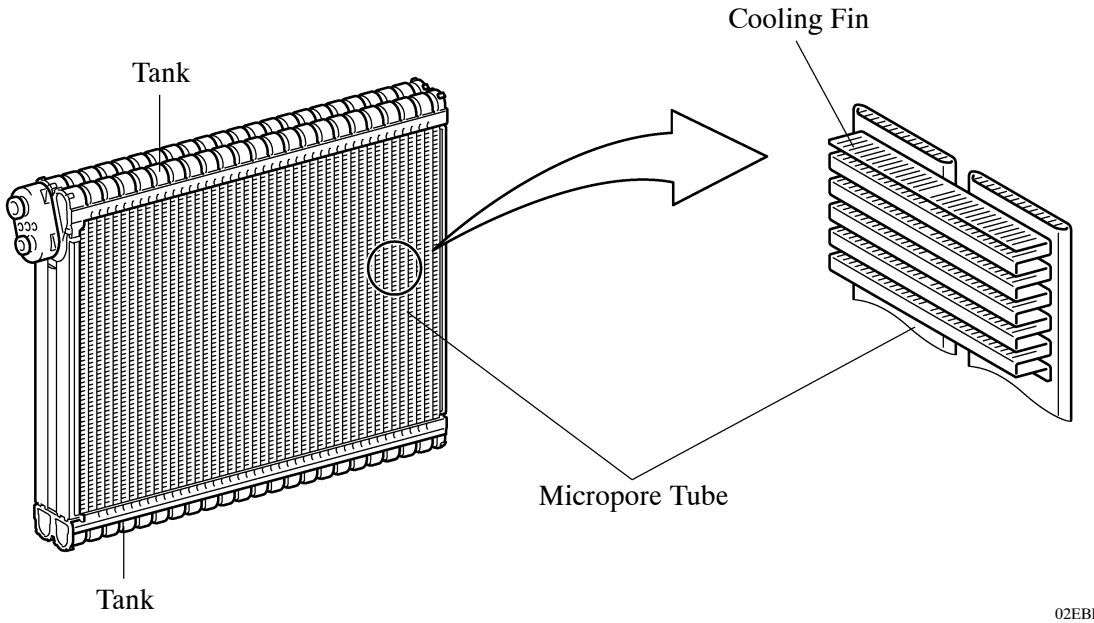
Evaporator

An RS (Revolutionary super-slim Structure) type evaporator is used. Placing the tanks at the top and the bottom of the evaporator and adopting a micropore tube construction have realized the following effects:

- The heat exchange efficiency is improved.
- The temperature distribution is made more uniform.
- The evaporator is made thinner: 58 mm (2.3 in.) → 38 mm (1.5 in.)



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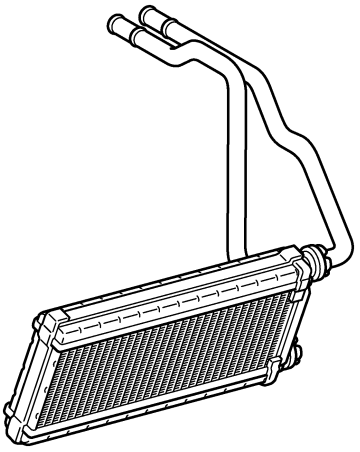
Evaporator Temperature Sensor

Evaporator temperature sensor detects the temperature of the cool air that immediately past the evaporator in the form of resistance changes, and outputs it to the A/C ECU.

Heater Core

A compact, lightweight, and highly efficient SFA (Straight Flow Aluminum)-II type heater core is used.



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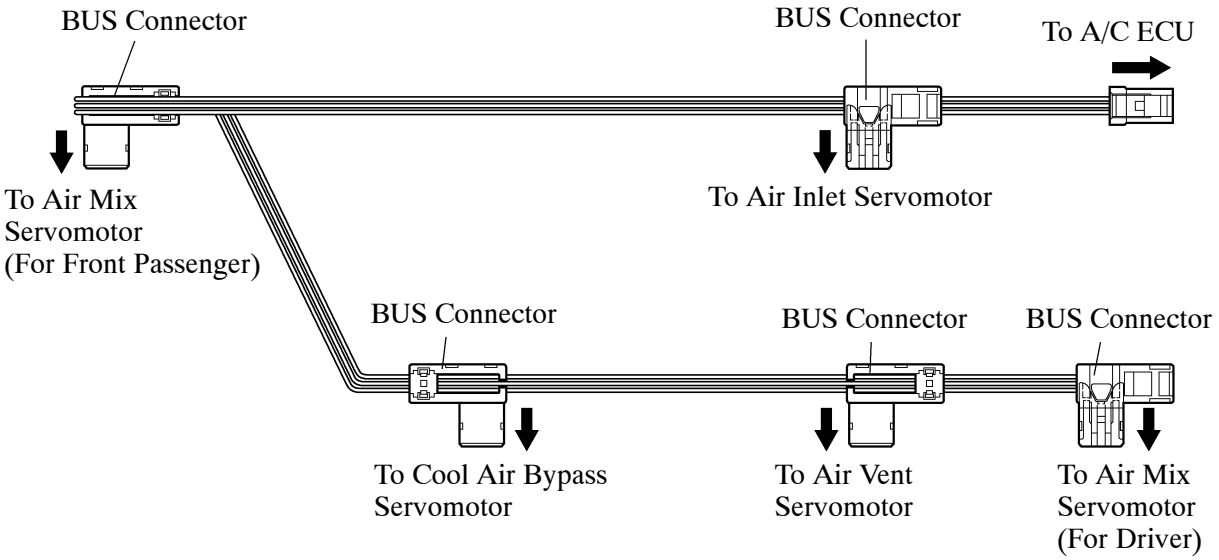
Blower Motor

The blower motor has a built-in blower controller, and is controlled using duty control performed by the A/C ECU.

BUS Connector

- A BUS connector is used in the wire harness connection that connects the servomotor with the A/C ECU.



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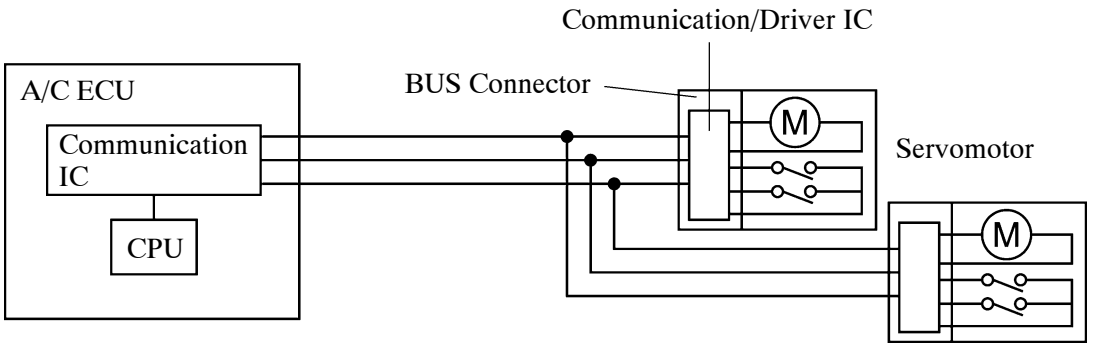
- The BUS connector has a built-in communication/driver IC which communicates with each servomotor and A/C ECU actuates the servomotor, and has a position detection function. This realizes a more lightweight construction and a reduced number of wires.



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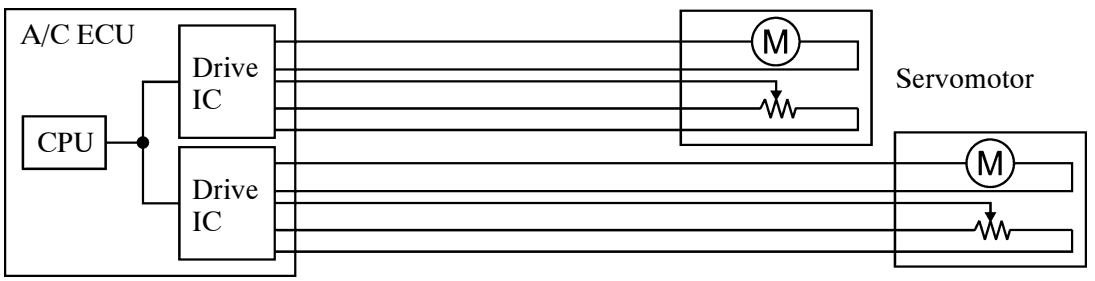
With BUS Connector



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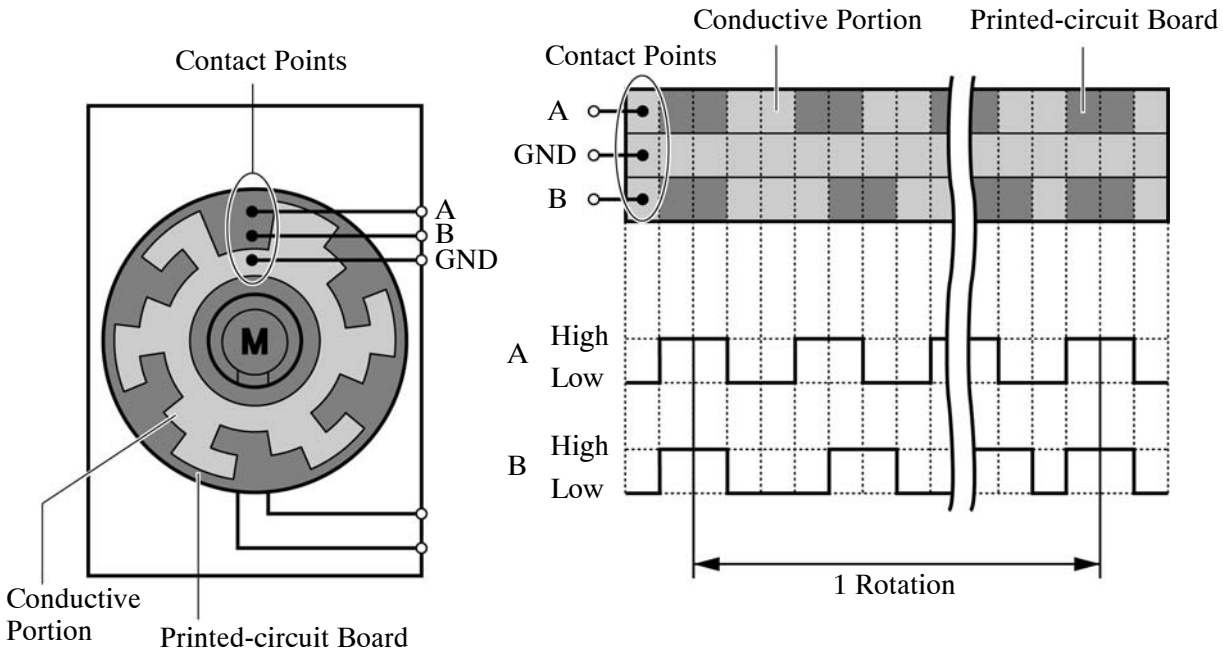
Without BUS Connector

Servomotor

- The pulse pattern type servomotor consists of a printed-circuit board and servomotor.
- The printed-circuit board has three contact points, and transmits the two ON/OFF signals with different pulse phases to the bus connector. The bus connector detects the damper position and movement direction with these signals, and transmits the results to the air conditioning ECU.



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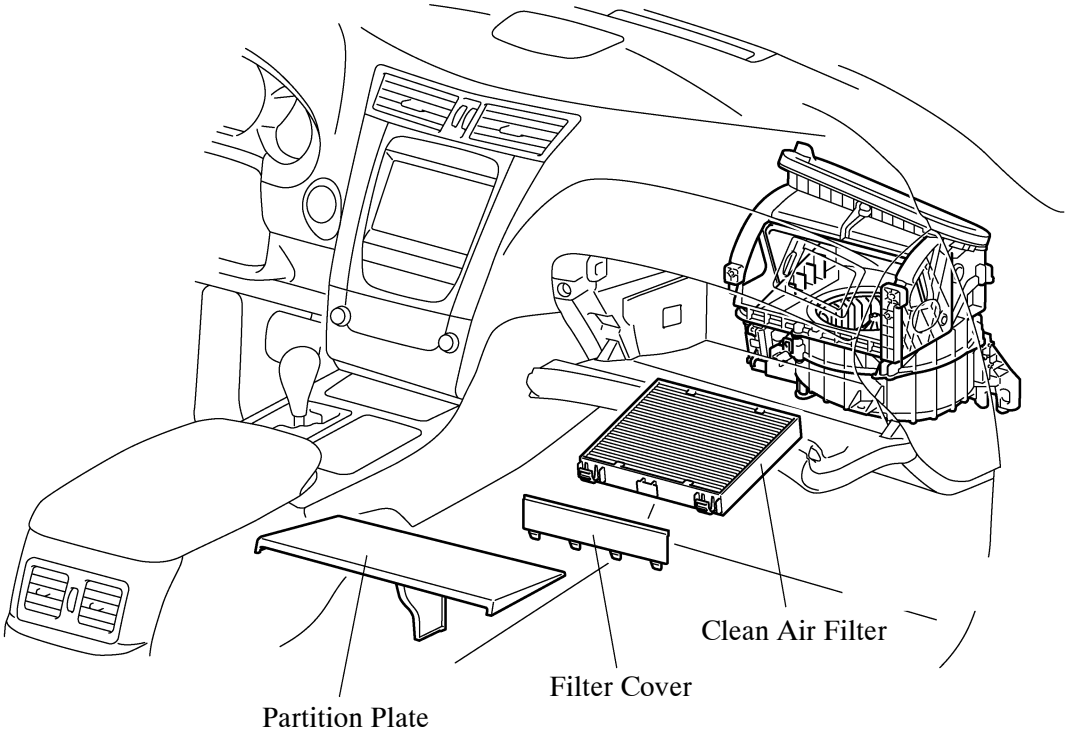
Clean Air Filter

A micro dust and pollen filter is used. This filter excels in the removal of dust and pollen. The filter made of polyester.
Thus, it can be disposed of easily as a non hazardous combustible material, a feature that is provided in consideration of the environment.



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Service Tip

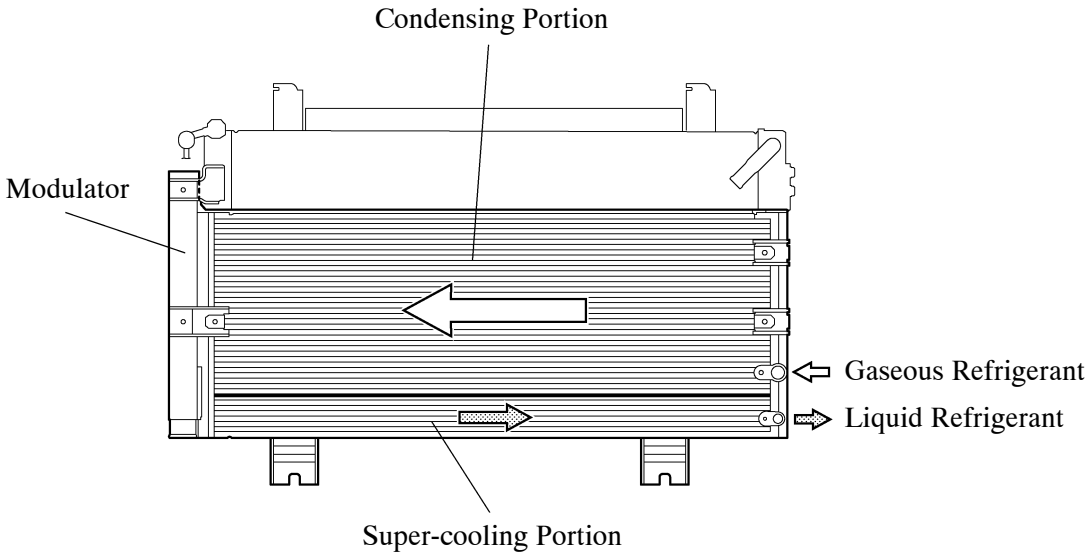
- The maintenance intervals are shown in the chart on the right.
- Replace the clean air filter after the RECIRC mode is selected and the power source mode is selected to OFF.

	Maintenance Interval
Cleaning	30,000 miles
Replacement	15,000 miles

3. Condenser

An MF (Multi-Flow) type condenser is used. The condenser consists of three portions: a condensing portion, super-cooling portion, and gas-liquid separator (modulator) are integrated together. This condenser uses a sub-cool cycle that offers excellent heat-exchange performance.

- In the sub-cool cycle, after the refrigerant passes through the condensing portion of the condenser, both the liquid refrigerant and the gaseous refrigerant that could not be liquefied are cooled again in the super-cooling portion. Thus, the refrigerant is sent to the evaporator in an almost completely liquefied state.



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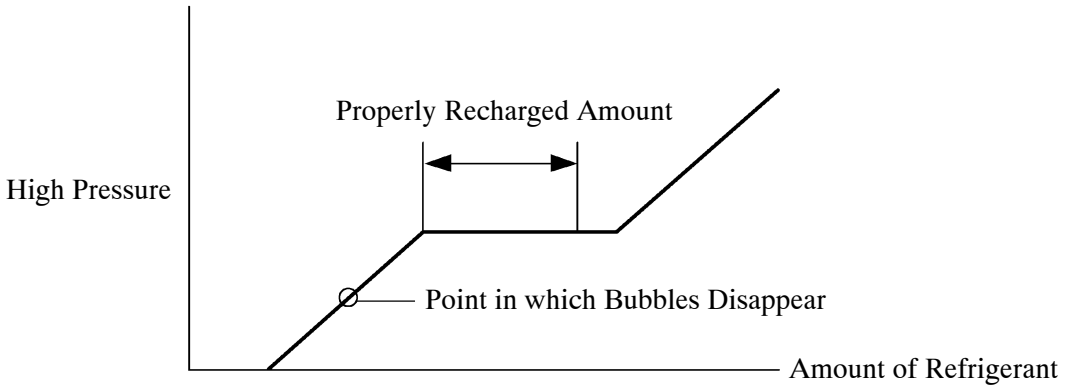
Service Tip

The point at which the air bubbles disappear in the refrigerant of the sub-cool cycle is lower than the proper amount of refrigerant with which the system must be filled. Therefore, if the system recharged with refrigerant based on the point at which the air bubbles disappear, the amount of refrigerant would be insufficient. As a result, the cooling performance of the system will be affected. If the system is overcharged with refrigerant, this will also lead to a reduced performance.
For the proper method of verifying the amount of the refrigerant and for instructions on how to recharge the system with refrigerant, see the 2007 LEXUS GS450h Repair Manual (Pub. No. RM02D0U).



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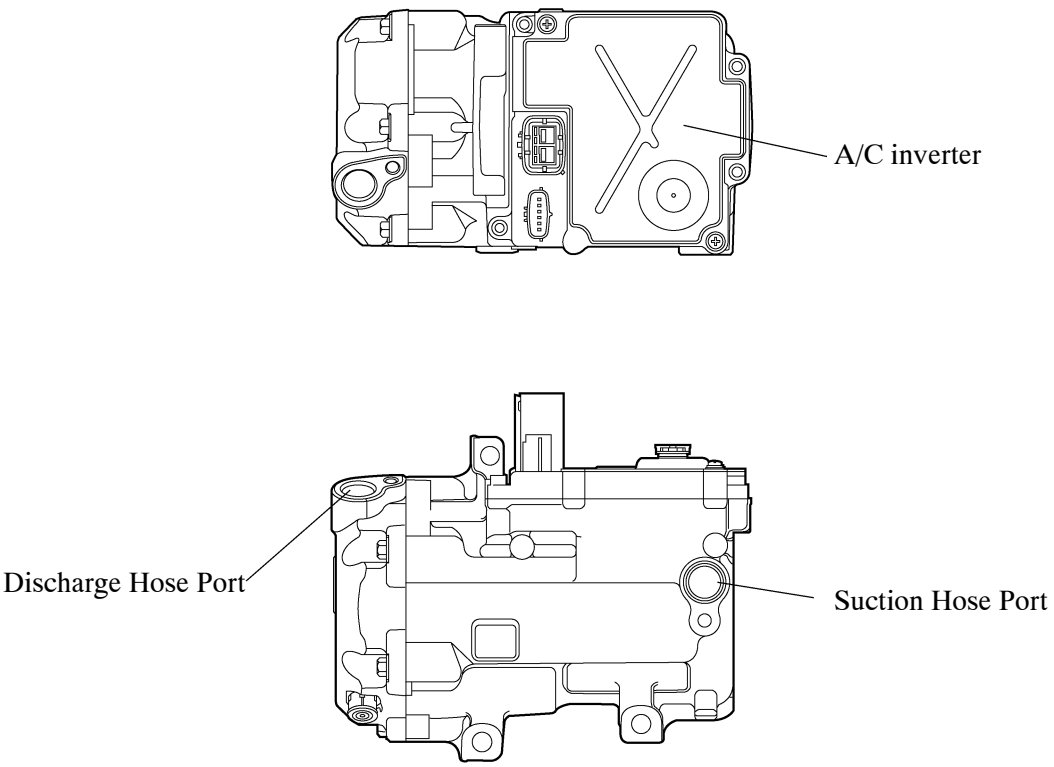
4. A/C Compressor

General

- Along with the installation of the hybrid unit on the ’07 GS450h, an ES27 electric inverter compressor that is driven by a motor is used. The basic construction and operation of this compressor are the same as the ordinary scroll compressor, except that it is driven by an electric motor.
- The A/C (Air Conditioning) inverter is integrated with the compressor.
- The electric motor is actuated by 3-phase alternating current (288 V) supplied by the A/C inverter. As a result, the air conditioning control system on the ’07 GS450h is actuated without depending on the operation of the engine, thus realizing a comfortable air conditioning system and low fuel consumption.
- Due to the use of an electric inverter compressor, the compressor speed can be controlled at the required speed calculated by the A/C ECU. Thus, the cooling and dehumidification performance and power consumption have been optimized.
- Low-moisture permeation hoses are used for the suction and discharge hoses at the compressor in order to minimize the entry of moisture into the refrigeration cycle.
- The compressor uses high-voltage alternating current. If a short or open circuit occurs in the compressor wiring harness, the HV ECU will cut off the A/C inverter circuit in order to stop the power supply to the compressor.
- For details on the electric inverter compressor control effected by the A/C ECU, see page BE-96.

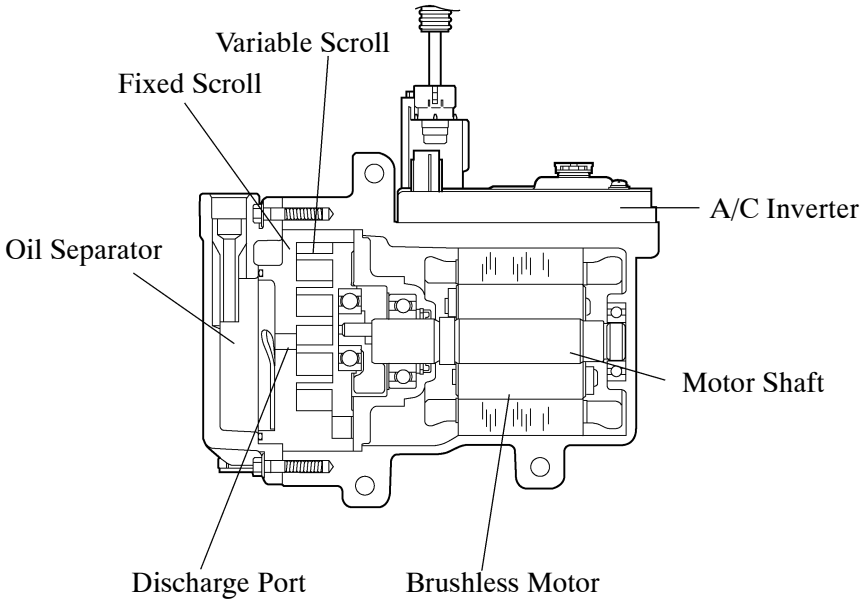


Service Tip

In order to ensure the proper insulation of the internal high-voltage portion of the compressor and the compressor housing, the ’07 GS450h use a compressor oil (ND11) with a high level of insulation performance. Therefore, never use a compressor oil other than the ND11 type compressor oil or its equivalent.

Construction

- The electric inverter compressor consists of a spirally wound fixed scroll and variable scroll that form a pair, a brushless motor, an oil separator, a motor shaft and A/C inverter.
- The fixed scroll is integrated with the housing. Because the rotation of the shaft causes the variable scroll to revolve while maintaining the same posture, the volume of the space that is partitioned by both scrolls varies to perform the suction, compression, and the discharge of the refrigerant gas.
- Locating the suction port directly above the scrolls enables direct suction, thus realizing improved suction efficiency.
- Containing a built-in oil separator, this compressor is able to separate the compressor oil that is intermixed with the refrigerant and circulates in the refrigeration cycle, thus realizing a reduction in the oil circulation rate.
- This inverter converts the HV battery's nominal voltage of DC 288V into AC 288 V and supplies power to operate the compressor.



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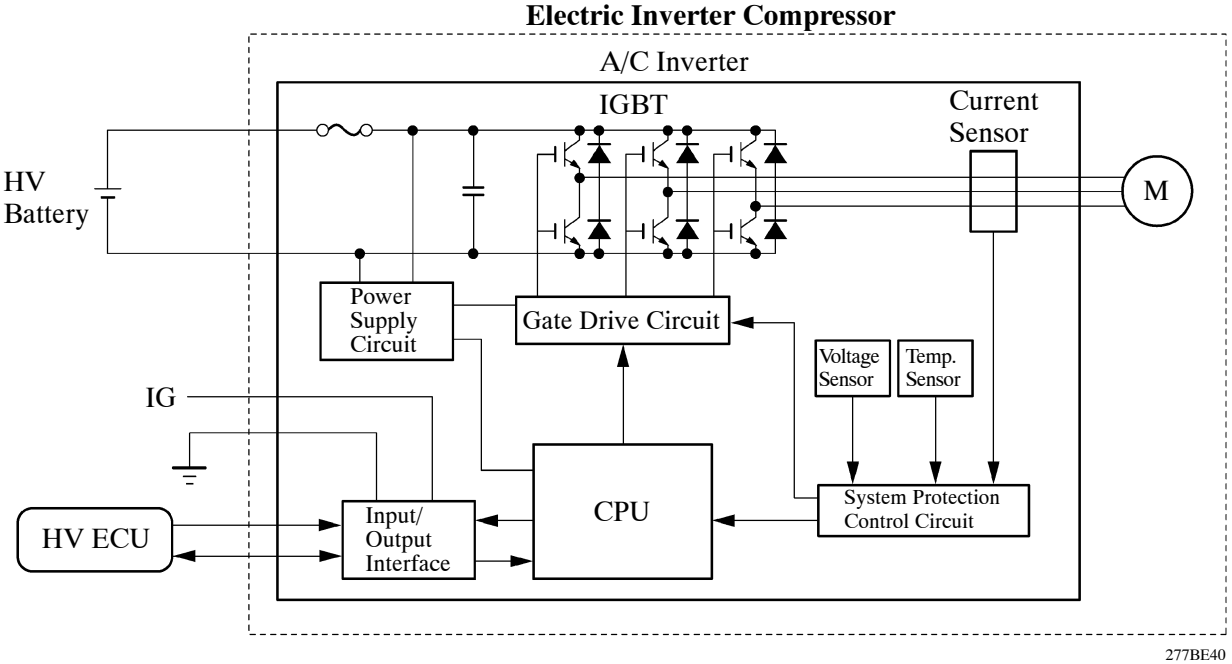
▶ System Diagram ◀



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Operation

1) Suction

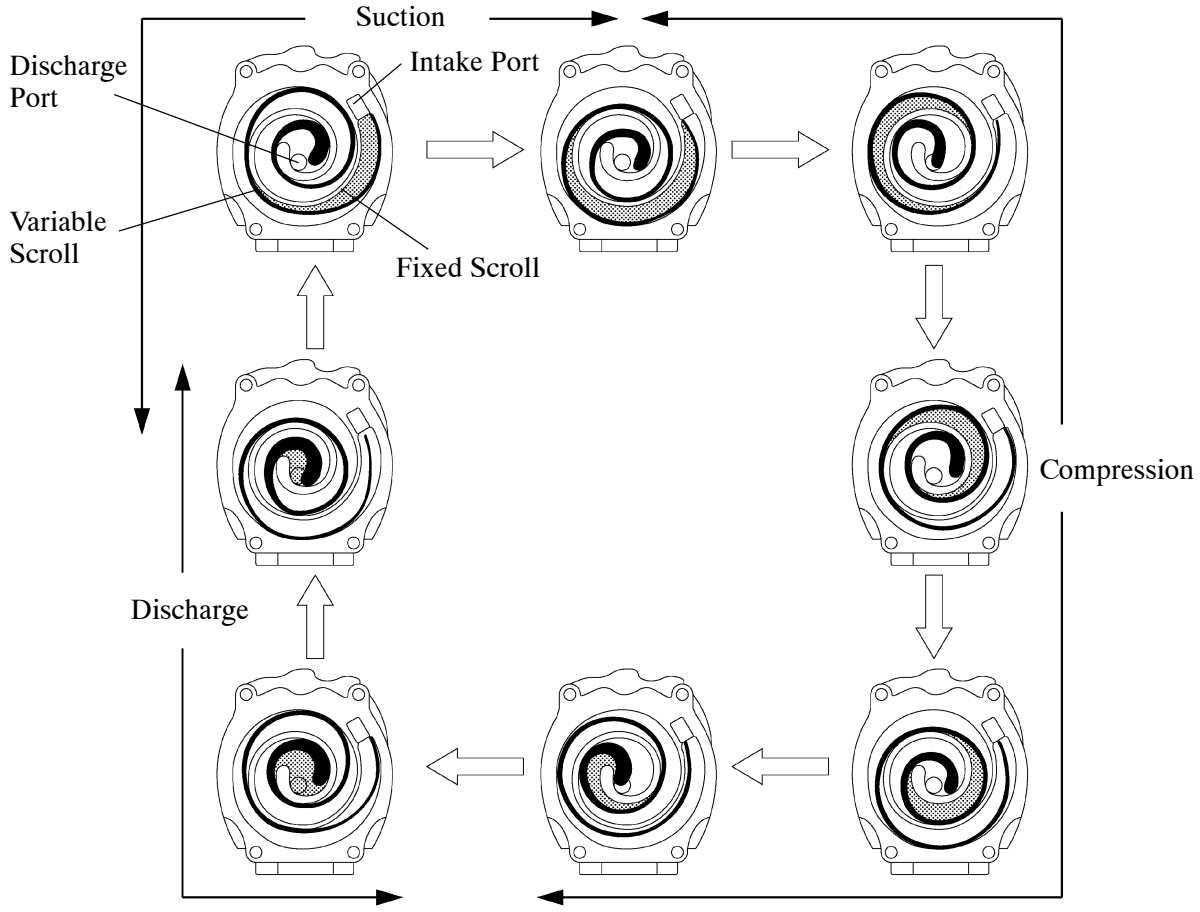
As the capacity of the compression chamber, which is created between the variable scroll and the fixed scroll, increases in accordance with the revolution of the variable scroll, refrigerant gas is drawn in from the intake port.

2) Compression

From the state at which the suction process has been completed, as the revolution of the variable scroll advances further, the capacity of the compression chamber decreases gradually. Consequently, the refrigerant gas that has been drawn in becomes compressed gradually and is sent to the center of the fixed scroll. The compression of the refrigerant gas is completed when the variable scroll completes approximately 2 revolutions.

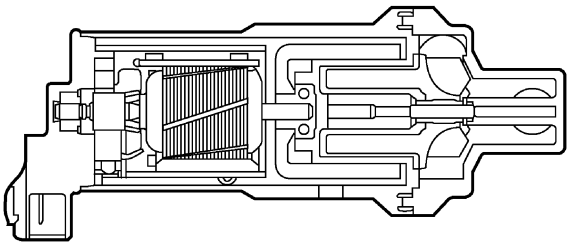
3) Discharge

When the compression of the refrigerant gas is completed and the refrigerant pressure becomes high, the refrigerant gas discharges through the discharge port located in the center of the fixed scroll by pushing the discharge valve.



5. Water Pump

- An electric water pump for air conditioning is used. This provides a stable heater performance even if the engine is stopped because of a function of the THS II.
- A new type of electrical water pump in which the water flow resistance has been reduced is used.



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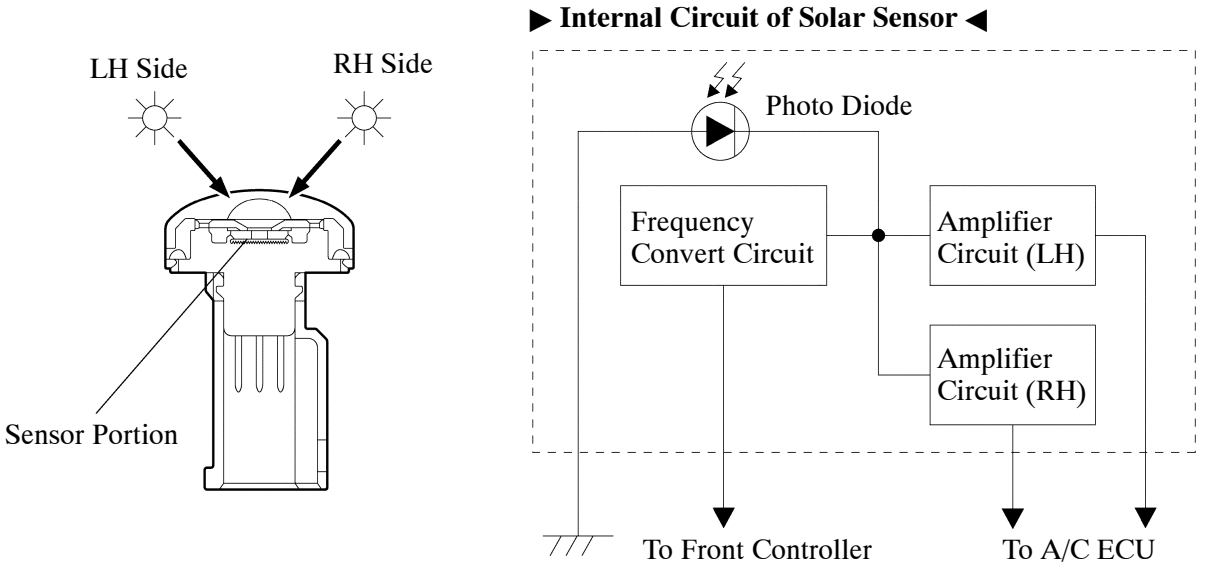
6. Room Temperature Sensor and Ambient Temperature Sensor

- The room temperature sensor detects the room temperature based on changes in the resistance of its built-in thermistor and sends a signal to the A/C ECU.
- The ambient temperature sensor detects the outside temperature based on changes in the resistance of its built-in thermistor and sends a signal to the A/C ECU.

7. Solar Sensor

The solar sensor consists of a photo diode, two amplifier circuits for the solar sensor, and a frequency converter circuit for the light control sensor.

- A solar sensor detects (in the form of changes in the current that flows through the built-in photo diode) the changes in the amount of sunlight from the LH and RH sides (2 directions) and outputs these sunlight strength signals to the A/C ECU.



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8. A/C Pressure Sensor

The A/C pressure sensor detects the refrigerant pressure and outputs it to the A/C ECU in the form of voltage changes.

9. Smog Ventilation Sensor

The smog ventilation sensor detects harmful elements such as CO, HC, and NOx, which are present in the air outside of the vehicle. The sensor outputs it to the A/C ECU.

- The sensitivity of the smog ventilation sensor can be adjusted. Adjustment can be done using the heater control panel or multi display.

Service Tip

Sensitivity Adjust Method of Smog Ventilation Sensor

1) Press and hold the air inlet button for 2 seconds or more.
2) The sensitivity level adjustment screen appears on the multi display.
3) The sensitivity level can be adjusted to seven different levels from HI to LO by touching the screen.
4) Pressing the air inlet button again or pressing another switch ends the setting adjustment mode.