■ CONSTRUCTION AND OPERATION

1. Heater Control Panel

A push-button type heater control panel is used. Temperature control switches for the driver and front passenger are provided on the heater control panel to enhance their ease of use.

- On the models without multi display, the air conditioning status is displayed on an LCD (Liquid Crystal Display).
- On the models with multi display, the air conditioning status is displayed on the multi display.
- Along with the adoption of the pollen removal mode, a pollen removal switch is provided.



Models without Multi Display



Models with Multi Display

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2. Air Conditioning Unit

General

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



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Evaporator

A 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.



Evaporator Temperature Sensor

The evaporator temperature sensor detects the temperature of the evaporator in the form of resistance changes, and outputs it to the air conditioning amplifier assembly.

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 air conditioning amplifier assembly.

BUS Connector

BUS connectors are used in the wire harness connections that connect the servo motors to the air conditioning amplifier assembly.



The BUS connectors have built-in/driver ICs which communicate with the servo motors, actuate the servo motors, and have a position detection function. This enables bus communication for the servo motor wire harness, lightweight construction and a reduced number of wires.





Servo Motor

The pulse pattern type servo motors consist of a printed circuit board and a servo motor. The printed circuit board has three contact points, and can transmit two signals (each having either an on or off state) to the air conditioning amplifier assembly. Based on the difference of the pulse phases the BUS connector can detect the damper position and movement direction.



Clean Air Filter

A pollen removal type clean air filter is used. This filter excels in the removal of dust and pollen. The filter is 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.



Service Tip

The replacement interval for the clean air filter is 30000 km or 18000 mile in normal conditions, and 15000 km or 9000 miles in dusty or severe conditions. Observation of these guidelines should depend on the actual usage conditions (or environment).

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3. Condenser

A MF (Multi-Flow) type condenser is used. The condenser consists of two cooling portions: a condensing portion and a 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.



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 is 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 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 LEXUS IS F Repair Manual (Pub. No. RM08E0E).



4. Compressor and Pulley

General

- The compressor is a continuously variable capacity type in which its capacity can be varied in accordance with the cooling load of the air conditioning.
- This compressor consists of the DL (Damper Limiter) type A/C pulley, shaft, lug plate, swash plate, piston, shoe, crank chamber, cylinder, and solenoid valve.
- A solenoid valve that adjusts the suction pressure so that the compressor capacity can be controlled as desired is provided.
- An internal valve is provided to improve the compressor and pulley durability under the high speed and large thermal load conditions. The internal valve is integrated into the solenoid valve.



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Solenoid Valve Operation

- The crank chamber is connected to the suction passage. A solenoid valve is provided between the suction passage (LO pressure) and the discharge passage (HI pressure).
- The solenoid valve operates under duty cycle control in accordance with the signals from air conditioning amplifier assembly.



• When the solenoid valve closes (solenoid coil is energized), a difference in pressure is created and the pressure in the crank chamber decreases. Then, the pressure that is applied to the right side of the piston becomes greater than the pressure that is applied to the left side of the piston. This compresses the spring and tilts the swash plate. As a result, the piston stroke increases and the discharge capacity increases.



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- When the solenoid valve opens (solenoid coil is not energized), the difference in pressure disappears. Then, the pressure that is applied to the left side of the piston becomes the same as the pressure that is applied to the right side of the piston. Thus, the spring elongates and eliminates the tilt of the swash plate. As a result, there is no piston stroke and the discharge capacity is reduced.



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Internal Valve Operation

The internal valve operates when compressor and pulley speed has increased rapidly, the compressor and pulley speed is high, or when thermal load has suddenly changed. As a result, the compressor and pulley capacity is reduced, increasing the durability of the compressor and pulley.



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5. Room Temperature Sensor and Outside Air Temperature Sensor

- The room temperature sensor detects the interior temperature of the vehicle based on changes in the resistance of its built-in thermistor and sends a signal to the air conditioning amplifier assembly.
- The outside temperature sensor detects the outside temperature based on changes in the resistance of its built-in thermistor and sends a signal to the air conditioning amplifier assembly.

6. Solar Sensor

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

• The 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 air conditioning amplifier assembly.



7. A/C Pressure Sensor

A/C pressure sensor detects the refrigerant pressure and outputs it to the air conditioning amplifier assembly in the form of voltage changes.

8. 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 this information to the air conditioning amplifier assembly.

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



Multi Display

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