

Compressor Control

- The following types of compressor controls are used: refrigerant pressure failure judgment, external variable compressor capacity control, etc.

Target Post-Evaporator Temperature

- While maintaining the required outlet temperature, the front air conditioner ECU calculates the target post-evaporator temperature. This is necessary for preventing the discomfort associated with a difference in temperature between the inside and outside of the vehicle, the humidity inside the vehicle interior, or to keep the windows from fogging. Also, it calculates the target post-evaporator temperature to prevent the discomfort associated with the excessive rise in temperature at the outlets when the outlet mode is FACE or BI-LEVEL, or to defog the windows quickly in the DEF mode. By comparing these temperatures, the front air conditioner ECU determines a target post-evaporator temperature that can realize the most power savings in accordance with the operating conditions of the vehicle. This target post-evaporator temperature is used for controlling the compressor in order to meet both ample cooling capability and fuel economy requirements.

Refrigerant Pressure Failure Judgment

- If a refrigerant pressure failure signal is input while monitoring the refrigerant pressure, the front air conditioner ECU turns the compressor OFF during the failure.

Evaporator Temperature Sensor Judgment

- When the post-evaporator sensor detects a temperature below -4°C , the front air conditioner ECU turns the compressor OFF to prevent the evaporator from frosting.

60-Second Compressor ON Control (Window Fogging Prevention Control)

- Provided that the conditions for turning ON the compressor have been met, the air conditioner ECU will turn ON the compressor for 60 seconds in accordance with the variable capacity control value. The conditions for turning ON the compressor are the following: the air conditioner is operated for the first time after the front air conditioner ECU has been reset after the engine has started; the blowers are turned OFF by the warm-up control; post-evaporator sensor judgment; or outside temperature judgment. If any one of the foregoing conditions has not been met, the front air conditioner ECU will stop the 60-second compressor ON control. If the condition for turning OFF the compressor operation capacity is met through a refrigerant pressure failure judgment, the front air conditioner ECU will turn OFF the compressor even if it is operating under the 60-second control.

External Variable Compressor Capacity Control

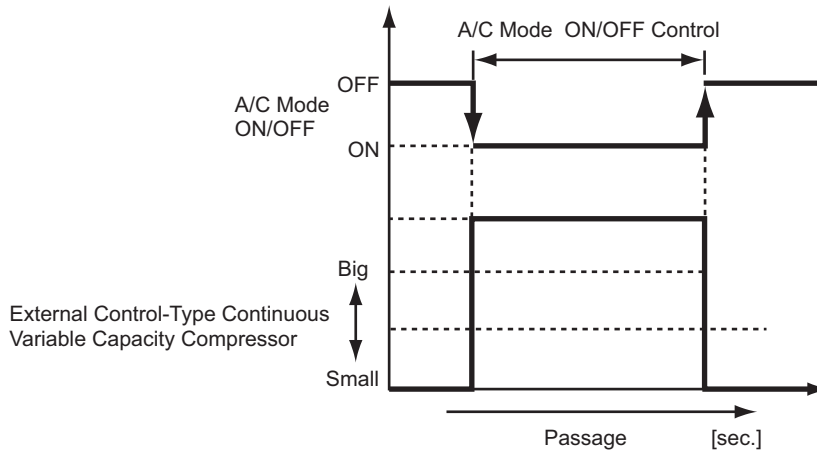
- The lowest compressor capacity control output that is calculated through the controls listed below, from the frost control to the low-speed cut control, is rendered as the compressor operation capacity. The front air conditioner ECU uses this compressor operation capacity to effect external variable compressor capacity control. This enables an efficient compressor control to suit the operating conditions of the air conditioner and the driving conditions of the vehicle, thus improving drive feel and fuel economy.

Frost Control

- The front air conditioner ECU uses the post-evaporator detection temperature and the refrigerant pressure to calculate the compressor capacity control output using the calculation formula indicated below, in order to effect frost control. Also, it calculates the target evaporator outlet temperature based on the ON/OFF operating condition in the manual DEF mode, the outside temperature, and the required outlet temperature (TAOB'i) obtained through the neural network. Then, it adds the post-evaporator detection temperature and the cooperative signal (input from the engine ECU via the gateway ECU) to the calculation.

A/C Mode ON/OFF Control

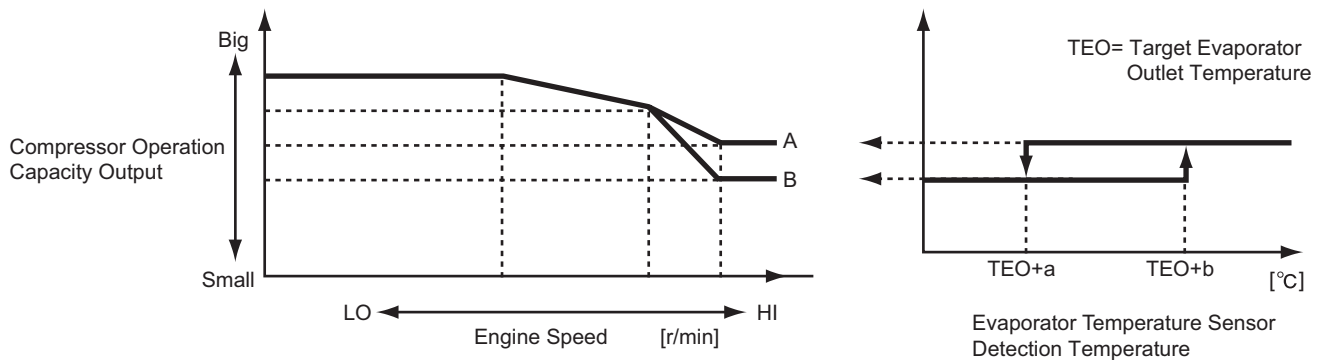
- This control outputs a compressor operation capacity as shown in the diagram, in accordance with whether the A/C mode is ON or OFF.



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Compressor Protect Control

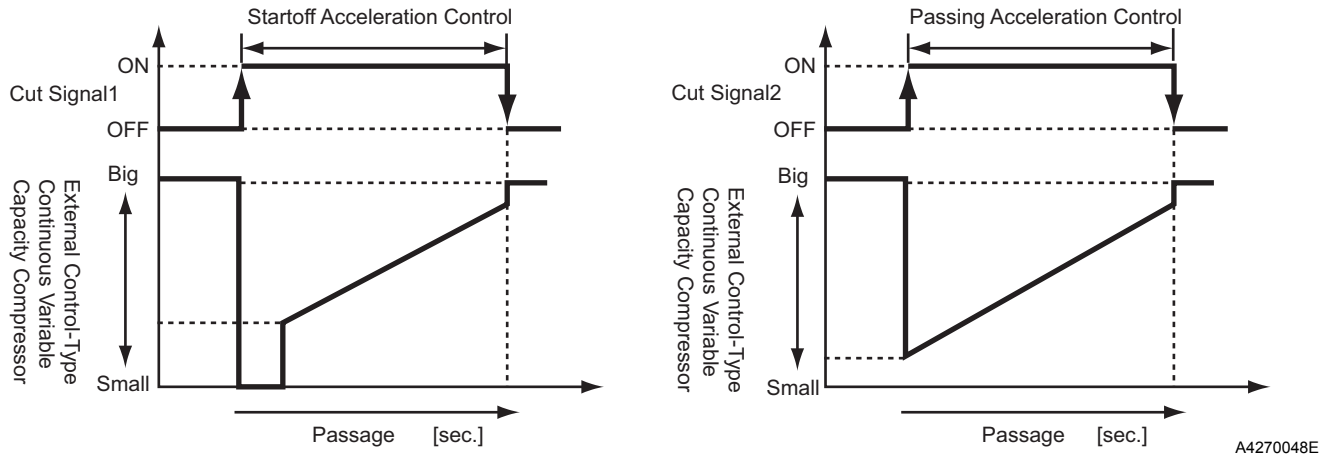
- This control outputs a compressor operation capacity as shown in the diagram, in accordance with the engine speed. Also, it outputs two types of compressor operation capacities in accordance with the post-evaporator sensor detection temperature and the target evaporator outlet temperature.



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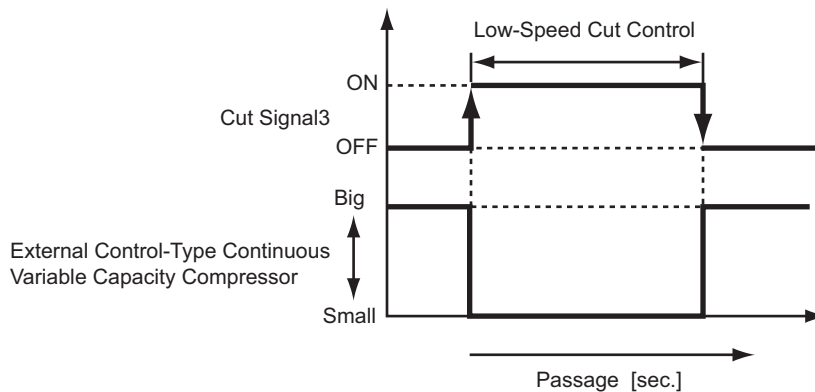
Startoff/Passing Acceleration Control

- As shown in the diagrams, the front air conditioner ECU reduces the operation capacity output of the compressor in order to lower the fuel injection volume during acceleration, while improving acceleration performance, under the following conditions: the front air conditioner ECU receives from the engine ECU the input of cut signal 1 during startoff acceleration, or cut signal 2 during passing acceleration. To reduce the operation capacity output of the compressor, the front air conditioner ECU makes gradual changes to suit the cooling load, without causing the occupants to feel a difference in effective temperature.



Low-Speed Cut Control

- When the engine speed is low, if the front air conditioner ECU receives the input of cut signal 3 from the engine ECU, the air conditioner ECU outputs a compressor operation capacity as shown in the diagram.



Rear Window Defogger Control

- While the rear window defogger can be turned ON or OFF manually, it will turn OFF automatically after the rear window defogger switch is left ON for 15 minutes.