AIR CONDITIONING

■DESCRIPTION

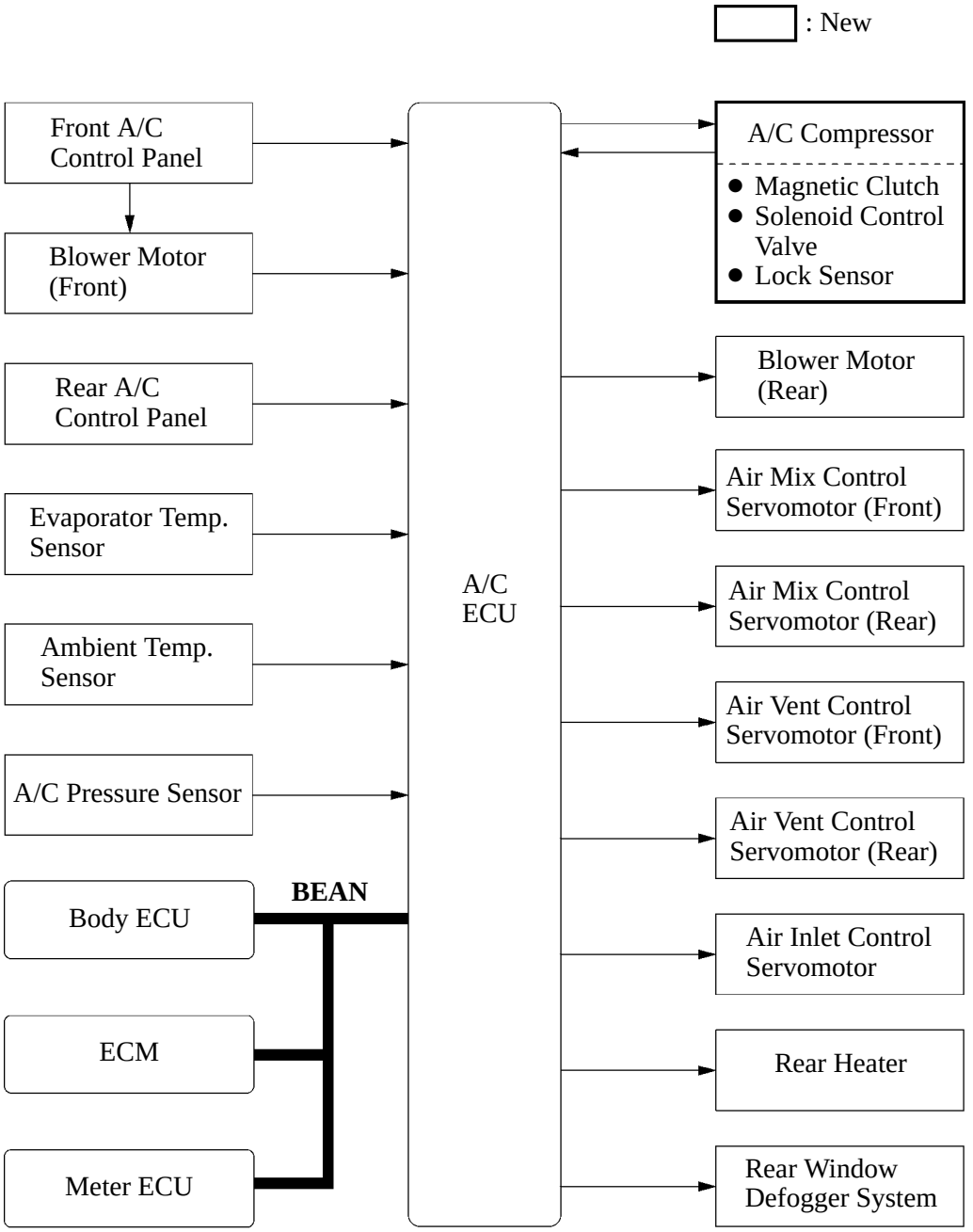
1. General

A variable capacity type A/C compressor has been provided to the air conditioning of the ’07 Sienna.

- The A/C compressor is a continuously variable capacity type in which its capacity can varies in accordance with the cooling load of the air conditioning.

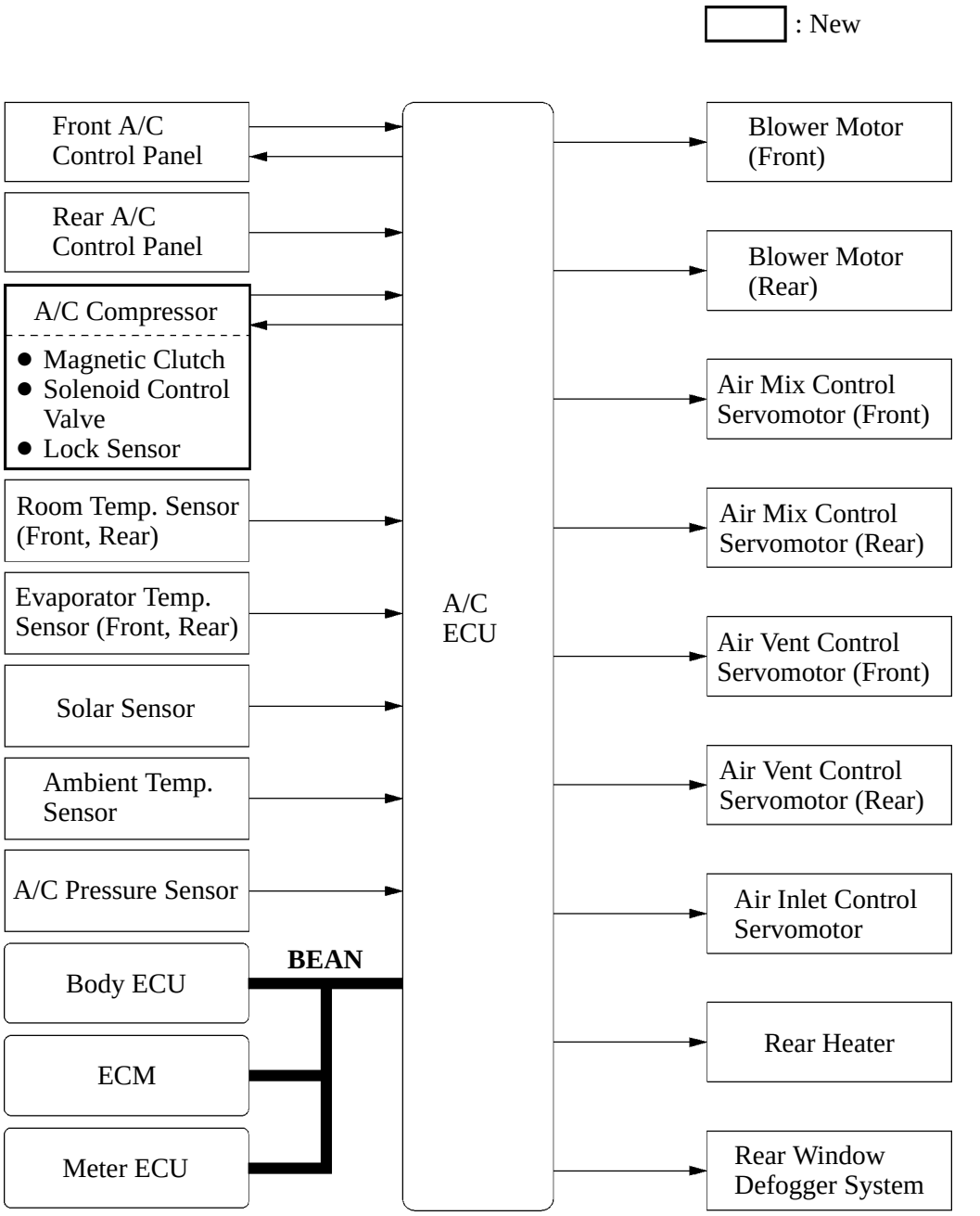
2. System Diagram

▶ Manual Air Conditioning ◀



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▶ Automatic Air Conditioning ◀



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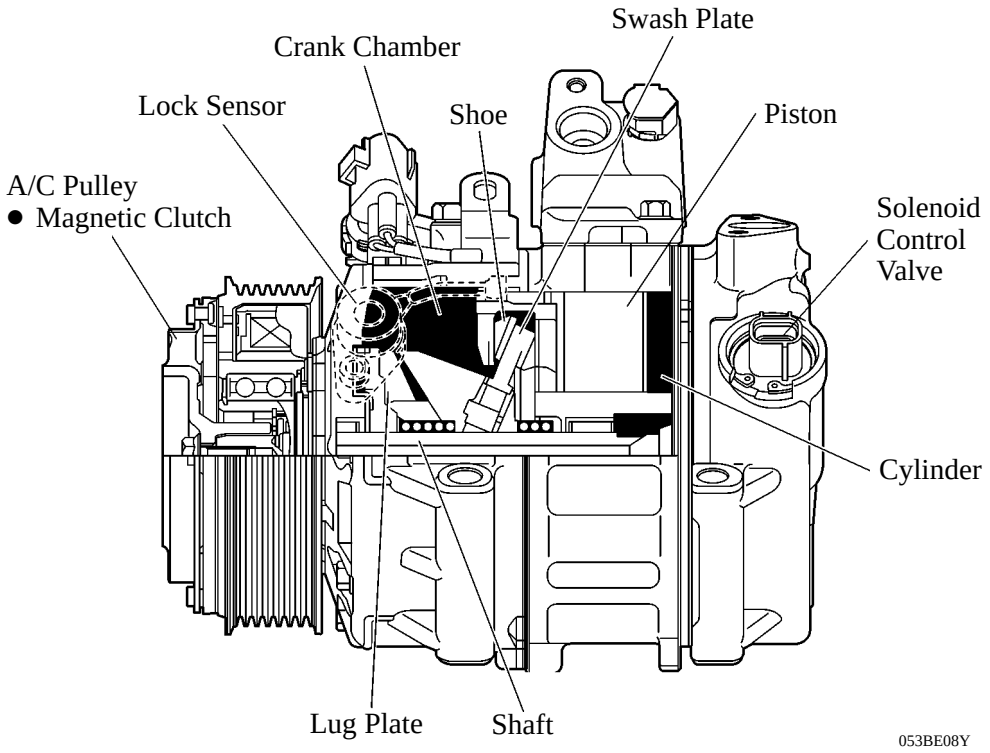
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3. Air Conditioning Unit

A/C Compressor

1) General

- The A/C compressor is a continuously variable capacity type in which its capacity can varies in accordance with the cooling load of the air conditioning.
- This compressor consists of the A/C pulley, shaft, lug plate, swash plate, piston, shoe, crank chamber, cylinder, and solenoid control valve.
- A solenoid control valve that adjusts the suction pressure so that the suction pressure can be controlled as desired is provided.

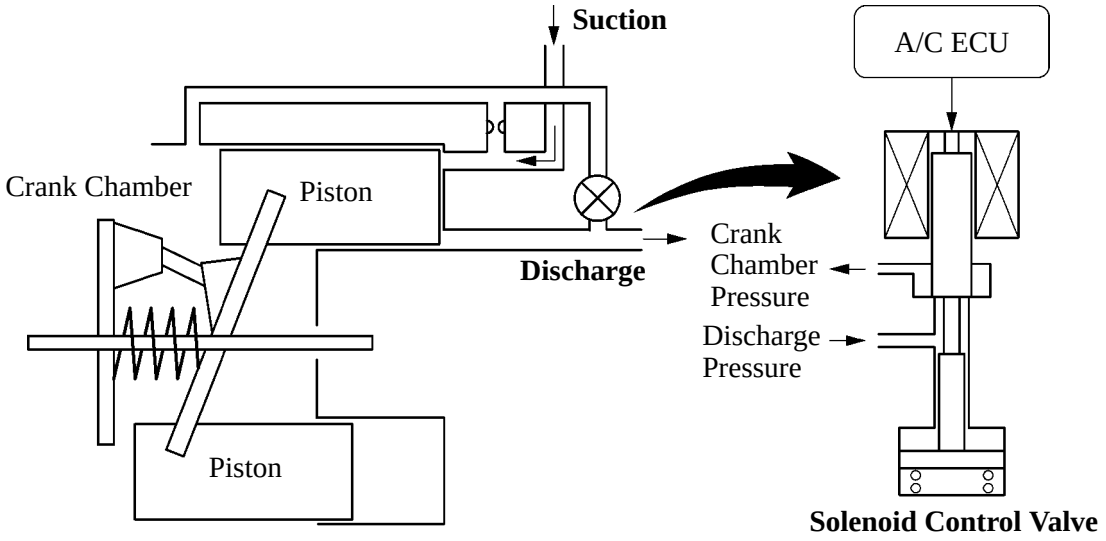


2) Lock Sensor

The lock sensor sends A/C pulley speed signals to the A/C ECU. The A/C ECU determines whether the magnetic clutch is locked or not by using those signals and engine speed signals.

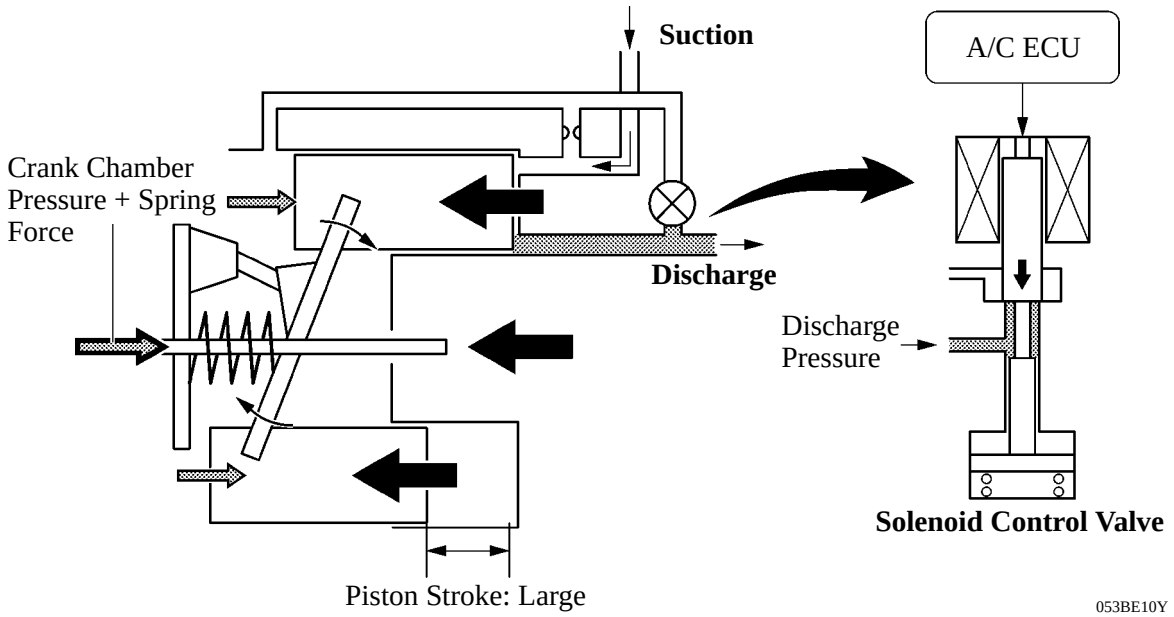
3) Operation

- The crank chamber is connected to the suction passage. A solenoid valve is provided between the suction passage (low pressure) and the discharge passage (high pressure).
- The solenoid control valve operates under duty cycle control in accordance with the signals from A/C ECU.



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- When the solenoid control 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 control 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.

