



////// Tech Tips ////

A/C Amplifier / Belt Lock Controller

Many import vehicles use a compressor control module commonly known as an A/C amplifier or belt lock controller. The module controls compressor operation based on different inputs including evaporator temperature, low-pressure switch and A/C request.

The module also serves as a protection device. Any problems with the A/C system (example: excessive high side pressure) may cause compressor overheating and the belt to slip. These conditions would lead to compressor lock up and/or the belt to break. To prevent damage to the compressor or engine, the module compares both engine and compressor speeds and turns the compressor off when the two speeds are not within specifications.

The compressor control module receives a signal from a revolution (speed) sensor mounted on the compressor and an engine rpm (tach) signal. Depending on manufacturer, the compressor speed must remain within 5% and 30% of engine speed. If the two speeds are out of range for 2 to 20 seconds, the module will open the compressor relay circuit and shut the compressor off. On several vehicles, the A/C switch light will blink or change color to alert the driver but will not set a diagnostic trouble code (DTC).

To verify a customer's complaint of a flashing A/C light and no compressor operation, turn the vehicle off and then restart the engine. Most modules will reset when the ignition switch is turned off. If the compressor engages for only a few seconds and the light starts flashing again, there are two possibilities: 1) a mechanical problem allowing the belt to slip; 2) an electrical problem with the module sensor circuits. If the light starts flashing before the compressor engages, it usually is an electrical problem.

One quick test that can be performed is to jump battery voltage to the compressor with a fused jumper wire. If the compressor comes on and operates properly (including correct pressures and temperatures) refer to manufacturer's test procedures to diagnose the control module and related circuits. While diagnosing, pay close attention to the engine cooling fans. The ECM may not engage the fans while the compressor is jumped to operate.

Most test procedures include performing an ohm test of the compressor speed sensor. However, these tests do not always recommend repeating this step at the module connector. If the two readings don't match, then there is a problem with the wiring.

When replacing the compressor it may be necessary to use the original speed sensor. Not all remanufactured compressors are supplied with speed sensors.