ECV AC COMPRESSORS (EXTERNALLY CONTROLLED)

ALL ENGINE/VEHICLE MODELS **WITH ECV AC COMPRESSOR**

PROBLEM

COMPRESSOR DOES NOT START/OPERATE

E.G FAULTY/STUCK TEMPERATURE/PRESSURE SENSOR,
AN OPEN OR GROUNDED CIRCUIT IN THE WIRING
> IMPROPER IMPUT SIGNAL TO THE AC CONTROL MODULE/COMPRESSOR

BACKGROUND

Improper or interrupted electrical signal input is one of the common failures that may affect operation of the AC system. Erratic readings and signals generated by the system's various sensors will cause abnormal or no operation of the ECV AC compressor.

Example: AC compressor does not start. Reason: faulty readings from the engine coolant temperature sensor indicating engine overheating.

RECOMMENDED DIAGNOSTICS

Make sure you have the proper vehicle data. Obtain an electrical circuit diagram for the HVAC system for the vehicle model you work on. The electrical circuit diagram and its understanding is a major part of the troubleshooting. It enables the operator to define which components must be taken into consideration, how they operate and how they are related to other inputs and signals.

1. Test performance of the compressor as well as inspect the variable control solenoid
2. If the inspection process confirms that the solenoid and the compressor are intact and the unit still does not operate, further troubleshooting of the control signals sent to the unit must follow the service
3. Diagnose the system-related control devices such as pressure and temperature sensors and the HVAC-system related electrical circuit for possible failures
4. Monitor and analyze input signals sent to the AC compressor

COMMON TROUBLESHOOTING METHODS

AC COMPRESSOR OPERATION – if the clutch engages (compressors with electromagnetic clutches) and the clutch's coil relay operation.

ECV SOLENOID - the electromagnetic coils resistance, 3,6 OHM is correct for 12V systems, coil performance thus the AC compressor capacity changes provoked by a dedicated tester

OBD DIAGNOSTICS - HVAC module registered errors

CONTROL SWITCHES AND RELAYS - if send the proper signals to the HVAC module

VOLTAGE – if generated on the proper level and according to the car manufacturer specification

FUSES – condition of these related to the AC system components. Keep in mind, a burned fuse is a sign of some improper condition within the circuit. A loosened contact of the fuse stick can also provoke the fuse failure.

WIRING – conductivity – inspect the suspect component harness insulation and connectivity to power/ground

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INPUT SIGNALS CONTROL DEVICES – pressure switches, transducers, temperature sensors

LAB SCOPE - tracking the AC compressor input signals, provoking changes to observe the signal changes, e.g. instant changes in the engine throttle opening (gas pedal pushed) should reduce the compressor output or shut it off completely - the correct pulse-width signal on the scope should momentarily change or drop to 0%

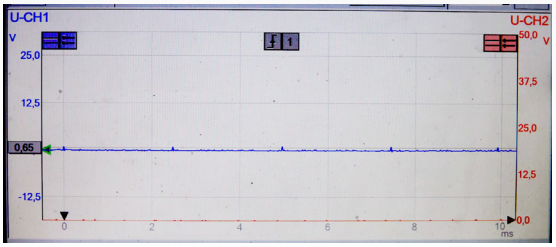
Too low variable voltage signal to the compressor or close to 10% on time may indicate that some other signal commands the compressor off.

RELATED MEDIA

A dedicated ECV compressor tester enables a thorough troubleshooting of the solenoid in various aspects.

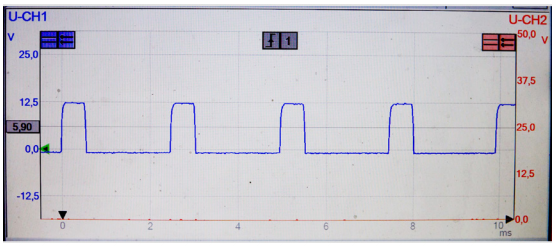
Resistance measurement can confirm if the solenoid is in operational condition.

Furthermore, the tester enables manual control of the compressor performance settings.

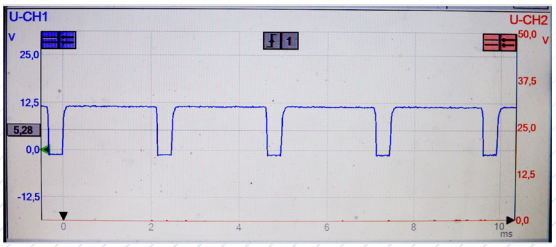


Use of a lab scope can track input signals at the variable control solenoid on the compressor.

Too low variable voltage signal to the compressor or close to 10% on time may indicate that something commands the system off.



Scope pulse-width modulated signal by the AC compressor by about 20% of the pumping capacity



Scope pulse-width modulated signal by the AC compressor by its full pumping capacity

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