GENERAL MOTORS IGNITION SYSTEMS WITH C-4 EMISSIONS

AMC (4-Cyl.)
Buick
Cadillac
Chevrolet
Oldsmobile
Pontiac

DESCRIPTION

Many General Motors vehicles are equipped with the C-4 Emissions System (Computer-Controlled Catalytic Converter). Although basically an electronically-controlled emissions system, the C-4 also provides a self-diagnosis system affecting the ignition system.

Components include a 3-way catalytic converter, an exhaust gas oxygen sensor, an electronic control module, an electronically-controlled air/fuel ratio carburetor and other optional sensor-type components which supply information to the electronic control module.

OPERATION

The electronic control module monitors the voltage output of oxygen sensor and other sensors to generate a control signal to the carburetor solenoid. The signal continually cycles the solenoid on and off.

On 3.8 liter V-6 engines, the ECM controls electronic spark timing. On 5.7 liter V-8 engines (VIN R), the ECM also controls the electronic module retard system. On Cadillac vehicles, the system works with the electronic spark selection system. If a problem exists, the built-in self-diagnosis system can detect and record failures in the electrical input circuits and within the micro-computer itself. This helps to pinpoint a particular circuit for further testing.

Should a problem exist, a "CHECK ENGINE" light on the instrument panel lights and a numerical code is stored in the computer memory to indicate why the light came on. The computer will temporarily adjust the system to continue vehicle operation. If the problem corrects itself, the light will go out, but the trouble code will be preserved in the computer's memory until the battery is disconnected or until the 20 amp. fuse has been removed momentarily.

The stored memory is programmed to erase itself after a preset number of trouble codes are accumulated. When "CHECK ENGINE" light appears, an under-dash black/white "test lead" with a green plastic connector and integral clip, should be grounded with the ignition "ON". This will cause the system to display any stored trouble codes by flashing the "CHECK ENGINE" light repeatedly to "spell out" each 2-digit trouble code.

For example, "Trouble Code 12" would be displayed by flashing the light one time, pausing, and then flashing two more times. After a longer pause, the code would repeat itself 2 more times. The code number flashed, identifies location of the problem.

TESTING

NOTE — *For further information on testing, see articles in this section on DELCO-REMY HIGH ENERGY IGNITION and articles on specific ignition systems.*

To determine why "CHECK ENGINE" light is on, ground test lead under dash (black/white wire with green connector, attached to electronic control module — not HEI module). The following is a list of trouble codes and their identifications:

Code	Problem Area
12	No tach or reference signal to ECM.
13	Oxygen sensor circuit.
13 & 14	At same time, refer to code 43
14	Shorted coolant sensor circuit.
15	Open coolant sensor circuit.
21	Shorted wide open throttle circuit (if used). Throttle position sensor circuit.
22	Grounded closed throttle or wide open throttle switch circuit.
21 & 22	At same time, grounded wide open throttle circuit switch.
23	Open or grounded carburetor solenoid circuit.
32	Barometric pressure sensor output low.
32 & 55	At same time, grounded +8V, V (REF) or faulty ECM.
34	Manifold absolute pressure sensor output high.
43	Throttle position sensor adjustment.
44	Lean oxygen sensor.
45	Rich oxygen sensor.
44 & 45	At same time, faulty oxygen sensor or open sensor.
51	Faulty calibration (PROM) unit or improper PROM installation.
52 & 53	"CHECK ENGINE" light off — intermittent ECM problem, "CHECK ENGINE" light on — faulty ECM.
54	Faulty carburetor solenoid and/or ECM.
55	Faulty oxygen sensor, open manifold absolute pressure sensor or ECM (3.8L V6), faulty ECM or throttle position sensor (exc. 3.8L V6).