GENERAL MOTORS COMBINED EMISSION CONTROL

DESCRIPTION

CEC system used on 1971 General Motors vehicles is designed to regulate distributor vacuum advance. Exhaust emissions are reduced by eliminating distributor advance in low forward gears. System consists of a CEC solenoid, cold temperature override switch, time delay relay, reversing relay and a transmission switch. In addition, on vehicles equipped with air conditioning an anti-dieseling device is provided.

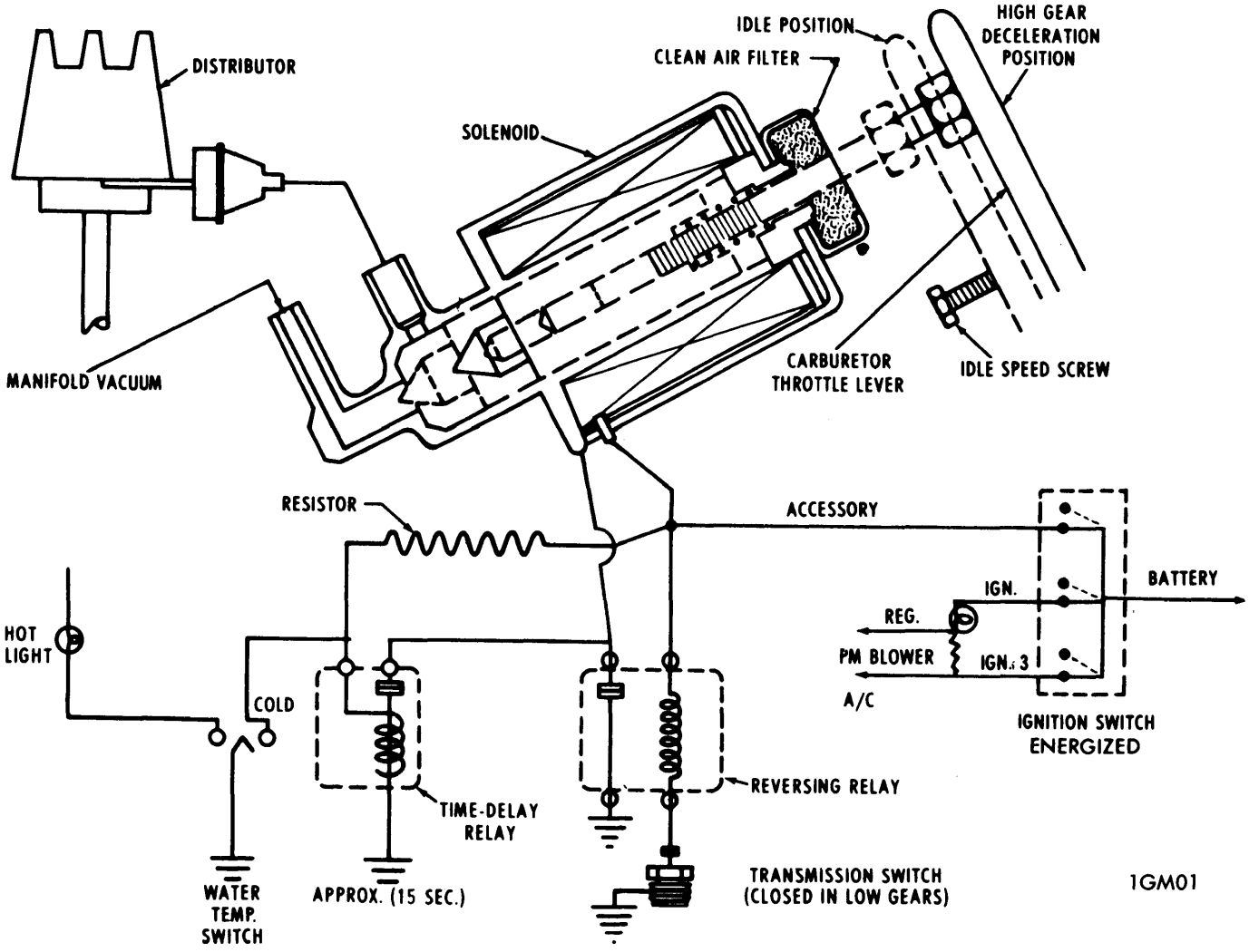
OPERATION

CEC Solenoid – CEC solenoid controls deceleration rate and routing of vacuum to distributor. CEC solenoid maintains a preset RPM during deceleration until transmission is downshifted. When downshifted, circuit is broken to CEC solenoid, allowing plunger to de-energize, thus blocking vacuum to distributor during idle and low gear operation.

Cold Override Temperature Switch – Cold override temperature switch is a three way switch. Points can be closed to provide cold override, hot light activation or neutral position. At engine temperatures below 82° F, bi-metal post contacts "cold" terminal, closing circuit to CEC solenoid. At approximately 82°F, contact is broken, and post will remain in neutral position during normal operating conditions. When normal operating temperature is exceeded (275°F), post contacts "hot" terminal to activate dash mounted "hot light".

Time Delay Relay – Time delay relay is a normally closed bi-metallic switch. It is grounded through its housing and completes a circuit from battery through ignition switch or from battery through ignition switch and CEC solenoid, depending upon engine temperature and transmission gear position. Bi-metallic coil opens approximately 20 seconds after ignition key is turned on, providing engine temperature is above 82°F, or for approximately 20 seconds after engine temperature switch "cold" override points open. Vacuum to distributor for this time interval improves driveaway and eliminates stall after start tendencies.

Reversing Relay – Reversing relay is a magnetically controlled two position switch. In its normally closed position lever makes contact with ground terminal and completes a circuit through CEC solenoid. Contact is broken when transmission mounted switch points are closed which completes a circuit from battery through ignition switch. This circuit sets up a magnetic field in relay which pulls points open and breaks circuit to CEC solenoid, de-energizing it and blocking vacuum to



1971 COMBINED EMISSION CONTROL (CEC) SYSTEM

GENERAL MOTORS COMBINED EMISSION CONTROL (Cont.)

distributor advance unit. When transmission is in high gear, transmission switch points open, breaking circuit from battery through ignition switch and reversing relay. Reversing relay points close, thus providing a circuit through grounded relay to CEC solenoid, energizing solenoid and providing vacuum to distributor advance unit.

Transmission Switch – Transmission mounted spark control switch is a two-way switch actuated by shifter shaft on manual transmissions, and by oil pressure on automatic transmissions. In low gear(s) points are closed. In high gear points open, breaking circuit to reversing relay and permitting vacuum to distributor advance unit.

MAINTENANCE & TESTING

NOTE – No maintenance is required of any component in system, other than testing for proper operation. If any component is not functioning properly, it should be replaced.

CEC Solenoid – Check for free movement of solenoid plunger and for incorrectly adjusted plunger (out too far). With ignition off, solenoid should de-energize. Remove one lead from solenoid, turn ignition on and solenoid should de-energize. If solenoid does not de-energize it should be replaced.

Cold Override Temperature Switch – To test temperature switch with engine cold: Turn ignition switch on. If CEC solenoid plunger does not energize, or, if it energizes and retracts after 25 seconds, remove green and white wire at temperature switch and ground it. This will activate solenoid plunger, indicating a defective temperature switch. To test temperature switch with engine warm: Allow engine to cool. Then, with wires connected and unit grounded, solenoid should energize and remain energized. If it does not, switch is defective.

Time Delay Relay – Remove temperature switch wire at temperature switch. Turn ignition switch on. Solenoid should energize for 20-25 seconds and then de-energize. If it does not de-energize, remove purple lead from delay relay. Solenoid will de-energize, delay relay is faulty.

Reversing Relay – Make sure all wires are connected to reversing relay and to transmission switch. A loose wire could cause solenoid to remain energized. Turn ignition on and remove purple wire from reversing relay, solenoid should de-energize. If solenoid de-energizes, reversing relay is faulty.

Transmission Switch – Start engine and put transmission in reverse (Turbo Hydra-matic) or high (manual). *NOTE – Power-glide equipped cars must have rear wheels off ground.* When transmission is placed in position required for test, CEC solenoid should energize. If it does not, check transmission switch by removing double connect at reversing relay. If solenoid energizes, replace transmission switch.