

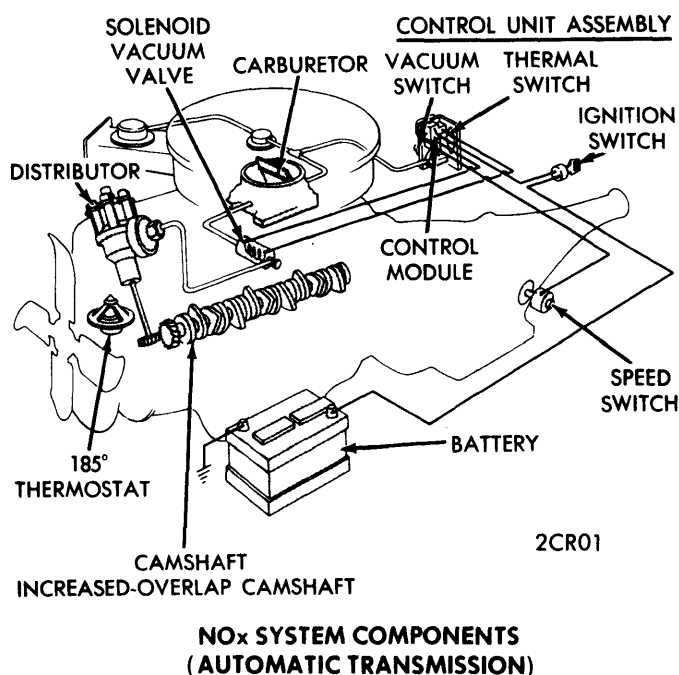
CHRYSLER CORP. NO_x SYSTEM

DESCRIPTION

Chrysler Corp. 1971-72 light duty trucks sold in California are equipped with a NO_x System for control of oxides of nitrogen in exhaust emissions. System controls distributor vacuum advance in lower gear ranges. NO_x system consists of a special camshaft designed to give increased valve overlap, 185° coolant thermostat, solenoid vacuum valve and on 1972 models, an Exhaust Gas Recirculation system (EGR). For additional information on E.G.R., see *Exhaust Gas Recirculation* in this Section. Depending on transmission type, the following components control operation of solenoid vacuum valve:

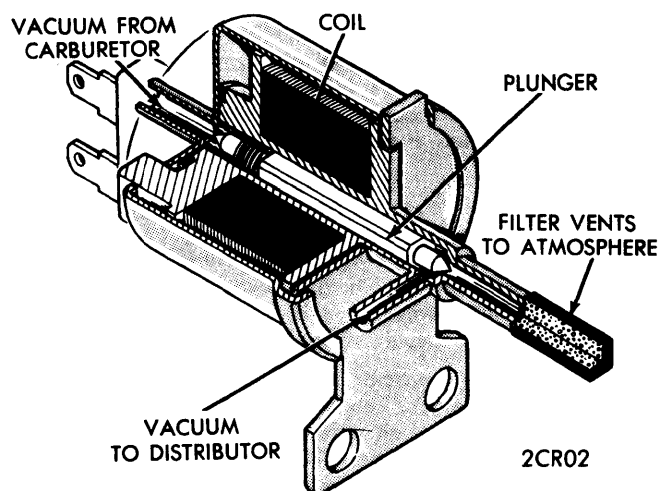
Manual Transmission — A transmission switch, mounted on transmission housing, is used to sense gear selection. A thermal switch is also used on 1971 models.

Automatic Transmission — A speed switch mounted on transmission housing in-line with speedometer is used to sense vehicle speed. A control unit, mounted on firewall contains three parts: a control module, thermal switch and vacuum switch. It senses ambient temperature and manifold vacuum. Trucks with 383" engine have a temperature operated vacuum by-pass valve which senses engine overheat conditions. Heat causes valve to operate by-passing NO_x control and normal spark advance continues until engine cools.



OPERATION

Solenoid Vacuum Valve — Solenoid vacuum valve is interconnected in hose between carburetor and distributor vacuum advance unit. When solenoid is de-energized, spring loaded plunger shuts off vent to atmosphere and allows normal vacuum advance. When solenoid is energized, plunger is drawn to opposite end of its travel. This action shuts off vacuum from carburetor and opens vent to atmosphere. This prevents vacuum advance and allows any vacuum that may be trapped in distributor advance unit to be vented to atmosphere. Solenoid vacuum valve is identical for both manual and automatic transmission installations, however, components which control it are different as follows:



SOLENOID VACUUM VALVE

Manual Transmission — Solenoid valve is controlled by transmission switch. Transmission switch remains closed in any gear selected except high gear and opens whenever high gear is selected. When in lower gears, an electrical circuit to ground will be completed, which energizes solenoid valve and cancels out normal vacuum advance. When high gear is selected, circuit will be broke de-energizing solenoid valve and allowing normal vacuum advance. On 1971 models with thermal switch, if ambient temperature is below 70°F, switch will open leaving NO_x system inoperative. At temperatures above 70°F, NO_x system will function normally.

Automatic Transmission — If ambient temperature is below 70°F, temperature switch (in control unit assembly) will be open and NO_x system will be inoperative. When ambient temperature is above 70°F, temperature switch will be closed and circuit will continue to speed switch and vacuum switch. At speeds below 30 MPH, speed switch will be closed completing a circuit to ground. This will energize solenoid vacuum valve, shutting off vacuum to distributor advance unit. At speeds above 30 MPH, speed switch will be open, de-energizing solenoid vacuum valve which allows vacuum to reach distributor advance unit. Vacuum switch (located in control unit assembly) is controlled by intake manifold vacuum. During periods of acceleration when intake manifold vacuum is low, vacuum switch energizes solenoid vacuum valve which shuts off vacuum to distributor advance unit. Therefore, when temperature is above 70°F at speeds below 30 MPH or during periods of acceleration there will be no vacuum to distributor advance unit.

Temperature Operated, Vacuum By-Pass Valve — Valve senses rise in coolant temperature. When coolant temperature indicates engine is overheating, valve opens allowing manifold vacuum to pass to distributor and advance ignition timing. This causes an increase in engine RPM which promotes better cooling. Condition will continue until overheat condition is corrected. As engine cools, valve shuts off manifold vacuum to distributor and restores NO_x system to normal operation.

TESTING

Manual Transmission — **NOTE** — To test system for operation be sure ambient temperature is above 70°F. Place transmission in Neutral and turn ignition on. Disconnect wire

CHRYSLER CORP. NO_x SYSTEM (Cont.)

from B+ terminal of ballast resistor while holding solenoid vacuum valve. You should feel valve de-energize. Reconnect wire and you should feel solenoid energize. Place transmission in high gear, solenoid should not energize when wire is disconnected or connected. If system does not function correctly, check the following:

1) Remove electrical connector from solenoid vacuum valve. Place a jumper from the piggy back connector on ballast resistor to one of the solenoid vacuum valve terminals. Place a second jumper from the remaining vacuum valve terminal to ground. With ignition switch on, solenoid should energize. If not, replace solenoid vacuum valve.

2) Remove electrical connector from thermal switch. Using a short wire, jump electrical connector. Place transmission in Neutral and turn ignition on, solenoid vacuum valve should energize. If temperature is above 70°F and solenoid vacuum valve does not energize when thermal switch is connected, but does energize when plug is jumped, thermal switch is defective and should be replaced.

3) Place transmission in Neutral and turn ignition switch on. Remove electrical connector from transmission switch; using a piece of wire connect transmission switch connector to ground. If solenoid vacuum valve functions when this is done, replace transmission switch. **NOTE** — Make sure transmission switch is properly torqued to 180 INCH lbs. to insure proper grounding.

Automatic Transmission — With engine at normal operating temperature and ambient temperature above 70°F, check the following:

1) Using a "T" fitting, place a vacuum gauge between distributor and solenoid vacuum valve. Raise rear wheels. Disconnect and plug vacuum line at vacuum switch on control unit assembly. Start engine and run at fast idle (above 850 RPM). Vacuum gauge should read zero. Remove electrical lead from control unit "T" connector, vacuum gauge should indicate vacuum. Reconnect wire and gauge should drop to zero.

2) Unplug and reconnect vacuum line to vacuum switch, and disconnect single wire lead from control unit to speed switch. Gauge should indicate vacuum. A sharp acceleration will cause vacuum gauge to drop to zero sharply. Limit speed to 40

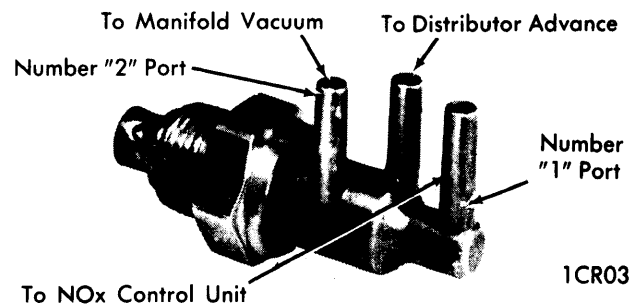
MPH. As engine RPM stabilizes, vacuum should be restored and gauge should indicate vacuum advance. Reconnect speed switch lead.

3) Disconnect and plug vacuum line at vacuum switch. Vacuum gauge should be zero. Accelerate engine to above 30 MPH, vacuum gauge should indicate normal vacuum advance when about 30 MPH is reached.

If no solenoid action occurred in foregoing procedures, replace control unit assembly. Repeat tests to be sure problem was corrected. Reconnect vacuum lines as before test and be sure all wires are securely connected.

Temperature Operated Vacuum By-Pass Valve — 1) Check vacuum hose routing and coolant level. Attach tachometer to engine and adjust idle to 600 RPM for test only. Disconnect hose from number "2" port (manifold inlet), and plug hose (see illustration). No change in idle speed indicates valve is holding and is satisfactory at this point. If idle speed drops 100 RPM or more, valve must be replaced. Reconnect number "2" port vacuum hose.

2) Cover radiator to increase engine coolant temperature. **CAUTION** — Do not overheat engine. Idle engine until temperature is approximately 225°F. If engine speed has not increased 100 RPM by the time temperature reaches 235°F, valve is defective and must be replaced. Uncover radiator and idle engine until it reaches normal temperature and readjust idle RPM to specifications.



TEMPERATURE-OPERATED VACUUM BY-PASS VALVE