COURIER SPARK TIMING CONTROL SYSTEM

Pickup

DESCRIPTION

The spark timing control system aids in reduction of exhaust emissions by delaying spark port vacuum to distributor vacuum advance unit during acceleration. On 2.0 Liter engines, the system consists of a vacuum delay valve, which is located in line between carburetor and distributor (Federal) or between thermo valve and distributor (Calif.). On 2.3 Liter engines (Calif. Only), the system consists of a vacuum delay valve (Man. Trans. Only), and a distributor solenoid vallve installed in line between intake manifold and distributor. The distributor solenoid valve is controlled by a timer and thermo switch.

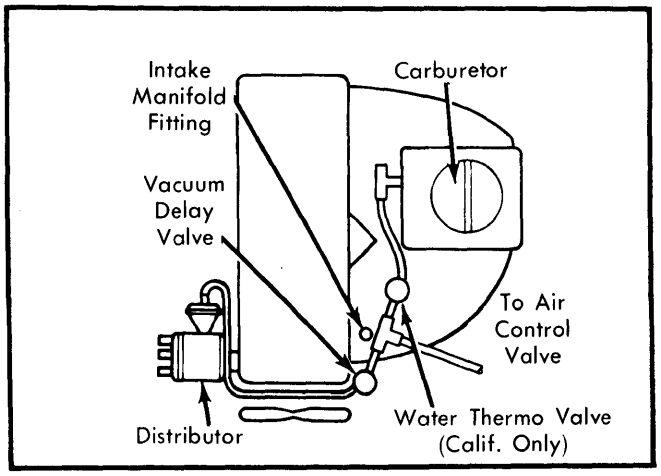

Fig. 1 Schematic of Spark Timing Control System

OPERATION

The vacuum delay valve has an internal restrictor to slow air flow in one direction and a check valve which allows free air flow in the opposite direction. During normal acceleration, spark port vacuum to distributor vacuum advance is delayed by the restrictor. This results in a delayed spark advance. Upon rapid acceleration, the pressure difference at the restrictor allows the check valve to open so the decreasing port vacuum is not delayed by restrictor. On California vehicles, thermo valve restricts vacuum advance until engine warm up is accomplished. This helps speed warm up of catalytic converter.

TESTING

VACUUM DELAY VALVE

2.0 Liter Engine – 1) Remove air cleaner. Disconnect vacuum line from distributor. Disconnect air by-pass valve line (California) or anti-afterburn valve (Federal) at intake manifold fitting. Install vacuum line removed from distributor to intake manifold fitting.

2) Remove vacuum line from carburetor side of vacuum delay valve, plug line and attach vacuum gauge to vacuum delay valve. *See Fig. 2.* Start engine and run at idle speed.

3) Disconnect vacuum line from intake manifold fitting. Note time required for vacuum reading to drop to 11.8 in. Hg. This should take 4-6 seconds. If system does not respond as indicated, replace vacuum delay valve. Reconnect all vacuum lines.

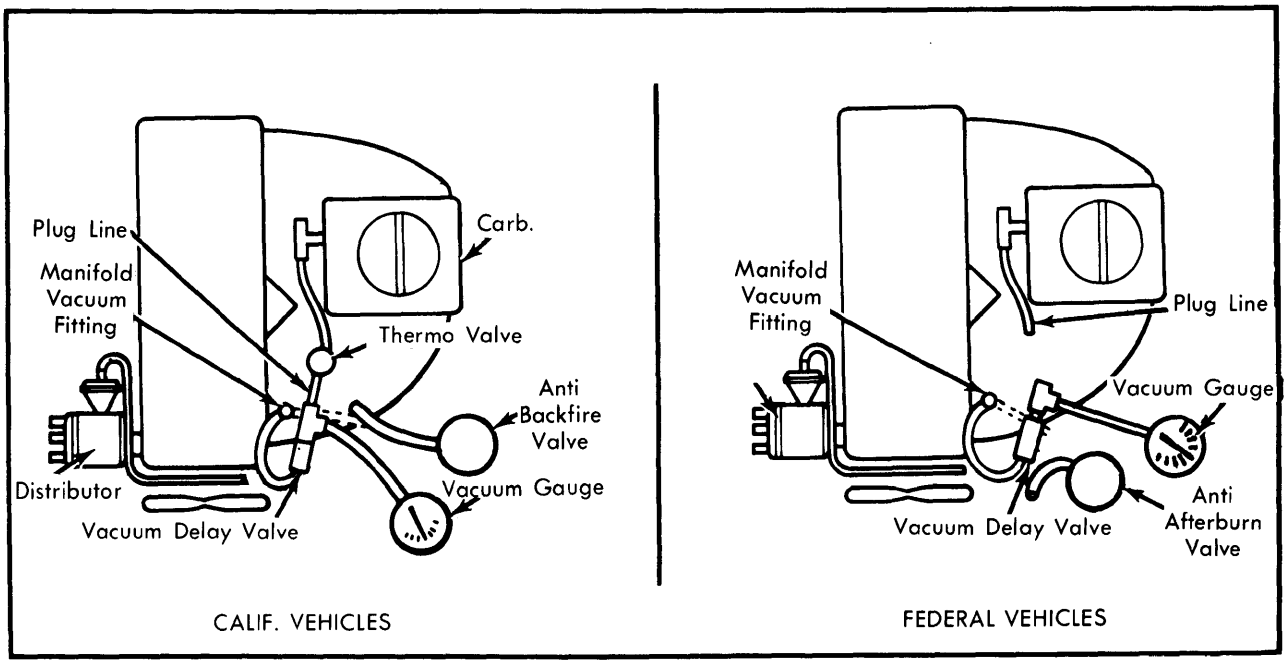

Fig. 2 Spark Timing Control System Test Connections (2.0 Liter Engine)

COURIER SPARK TIMING CONTROL SYSTEM (Cont.)

2.3 Liter Engine (Calif. Man. Trans.) – 1) Disconnect vacuum tube from vacuum delay valve at distributor solenoid valve. Connect a vacuum gauge to vacuum tube. *See Fig. 3.*

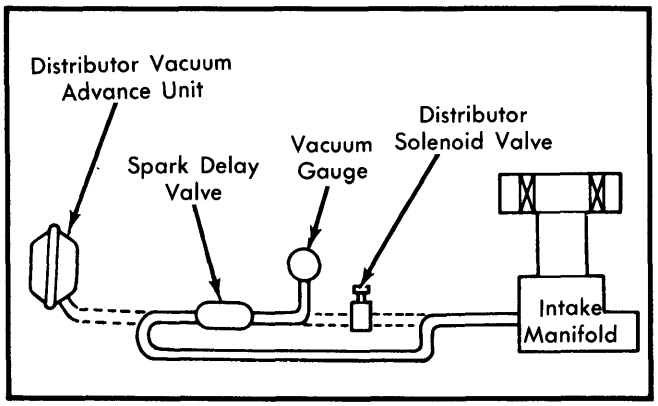

Fig. 3 Spark Timing Control System Test Connections (2.3 Liter Engine – Calif. Man. Trans.)

2) Disconnect vacuum tube from vacuum delay valve at distributor vacuum advance unit. Connect tube to intake manifold. Start engine and record vacuum gauge reading at idle.

3) Disconnect tube from intake manifold and check time required for vacuum gauge reading to decrease by 11.8 in. Hg. Specified time is 4-6 seconds. Replace valve if specifications are not met.

DISTRIBUTOR SOLENOID VALVE

2.3 Liter Engine (Calif.) – 1) Start engine and run at idle speed. Separate connector at distributor solenoid valve and apply battery power to terminals to energize valve.

2) Disconnect vacuum sensing tube from distributor solenoid valve at distributor vacuum advance unit. Remove battery power to solenoid valve. Valve is functioning properly if air is drawn into vacuum tube as soon as power is removed.

THERMO SWITCH

2.3 Liter Engine (Calif.) – 1) Remove thermo switch. Connect an ohmmeter across switch terminals and place sensor end of switch in a water-filled container. Heat or chill water gradually and use a thermometer to check temperature.

2) Continuity should exist between both terminals at 131°F (55°C) or above for thermo switch and 50°F (10°C) or above for distributor thermo switch (if so equipped). Replace switch if not within specification.

TIMER

2.3 Liter Engine (Calif.) – 1) Remove timer. Connect jumper wires to timer terminals "A", "B" and "C". Connect jumper wires with 30K ohm resistor to terminal "D". Connect jumper wire with 3.4W lamp to terminal "E". *See Fig. 4.*

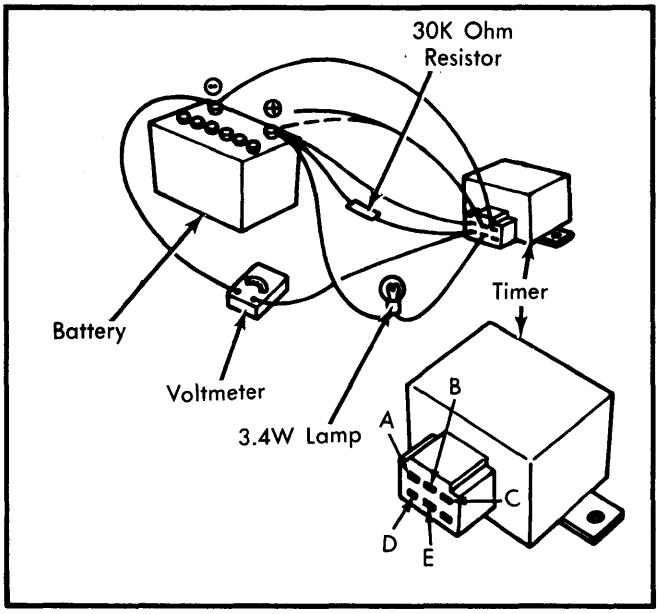

Fig. 4 Timer Test (2.3 Liter Engine – Calif.)

2) Connect positive test lead of a voltmeter to terminal "D" and negative test lead to battery negative terminal. Connect jumper wires from timer terminals "A", "D" and "E" to battery positive terminal. DO NOT connect wire from terminal "B" at this time.

3) Connect wire from terminal "C" to battery negative terminal. Voltmeter reading should now be 6 volts or above. Connect jumper wire from terminal "B" to battery positive terminal. Voltmeter should immediately drop to less than 1 volt and lamp should light up.

4) Maintain the connections for about 2 minutes and make sure voltmeter reads approximately 8 volts. If any specification is not met, replace timer.