INTERNATIONAL HARVESTER CO. SPEED CONTROLLED SPARK

DESCRIPTION

Road Speed Controlled Spark Advance (SCS) System was first introduced in 1971 California light duty vehicles. In 1972 all states incorporated SCS system. Purpose of system is to reduce level of carbon monoxide (CO) and oxides of nitrogen (NOx) by delaying vacuum spark advance until a preset vehicle speed is reached (34±2 MPH). SCS system consists of solenoid vacuum valve, speed sensor unit (centrifugal switch), low temperature vacuum control valve, high temperature vacuum control valve (all V8's except 400" V8).

OPERATION

Distributor vacuum advance is controlled by solenoid vacuum valve which is, in turn, controlled by speed sensor in speedometer cable. On some vehicles with model T-407 transmission, speed sensor unit is mounted on transmission. At vehicle speeds below vacuum advance cut-in speed (34±2 MPH), speed sensor switch is closed, allowing electrical current from ignition switch to activate solenoid and open valve. Air then passes from air cleaner through valve into intake manifold. Flow of air bleeds (weakens) vacuum in distributor vacuum advance unit, preventing vacuum advance ignition timing. As vehicle accelerates past cut-in speed, speed sensor switch opens. This shuts off electrical current to solenoid valve and allows valve to close, stopping flow of bleed air. This permits manifold vacuum to advance ignition in normal manner. When vehicle decelerates through cut-in speed 25±3 MPH, speed sensor switch closes. This activates solenoid, opening valve to bleed vacuum from distributor and cancels vacuum advance.

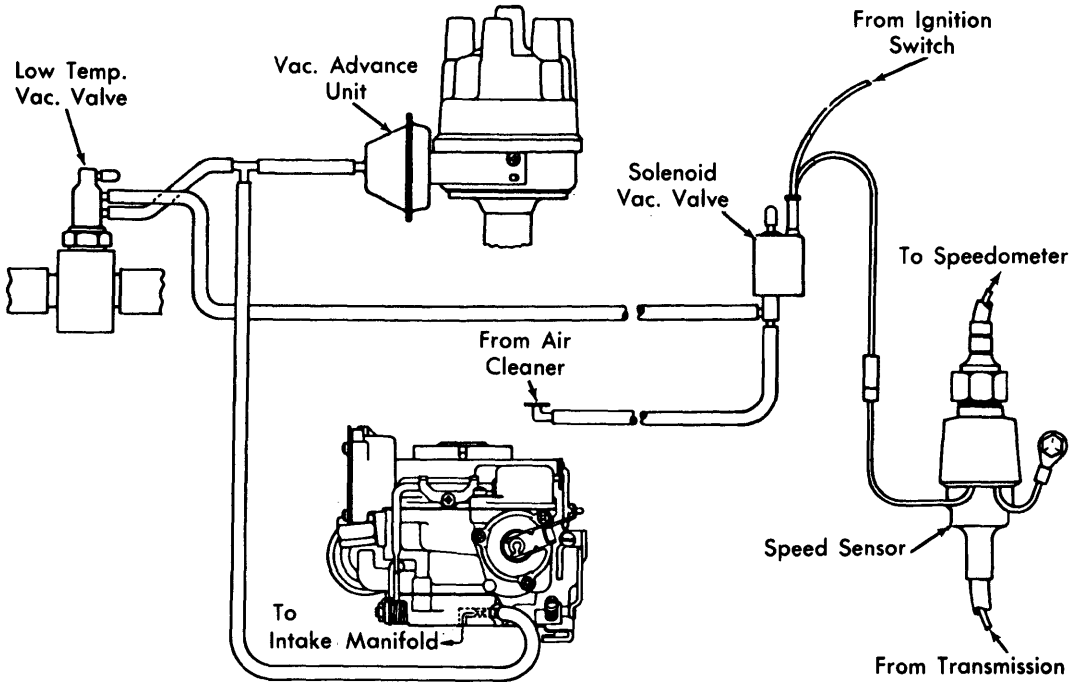
Low Temperature Vacuum Control Valve (All Engines) – Valve allows vacuum advance when engine coolant temperatures are below 60°F. When temperature is below 60°F, valve is closed, blocking flow of bleed air from solenoid vacuum valve. Manifold vacuum advances ignition timing in normal manner. When temperature exceeds 60°F valve opens and allows SCS system to control vacuum advance. Low temperature vacuum control valve has a blue exterior color.

High Temperature Vacuum Control Valve (All V8's Except 400" V8) – Valve allows vacuum advance when engine coolant temperature exceeds 195°F. When temperature exceeds 195°F valve is closed, blocking flow of bleed air from solenoid vacuum valve. Manifold vacuum advances ignition timing in normal manner, allowing increased engine RPM during idle or low vehicle speed to increase engine cooling. High temperature control valve has a red paint mark or red exterior color for identification.

TESTING

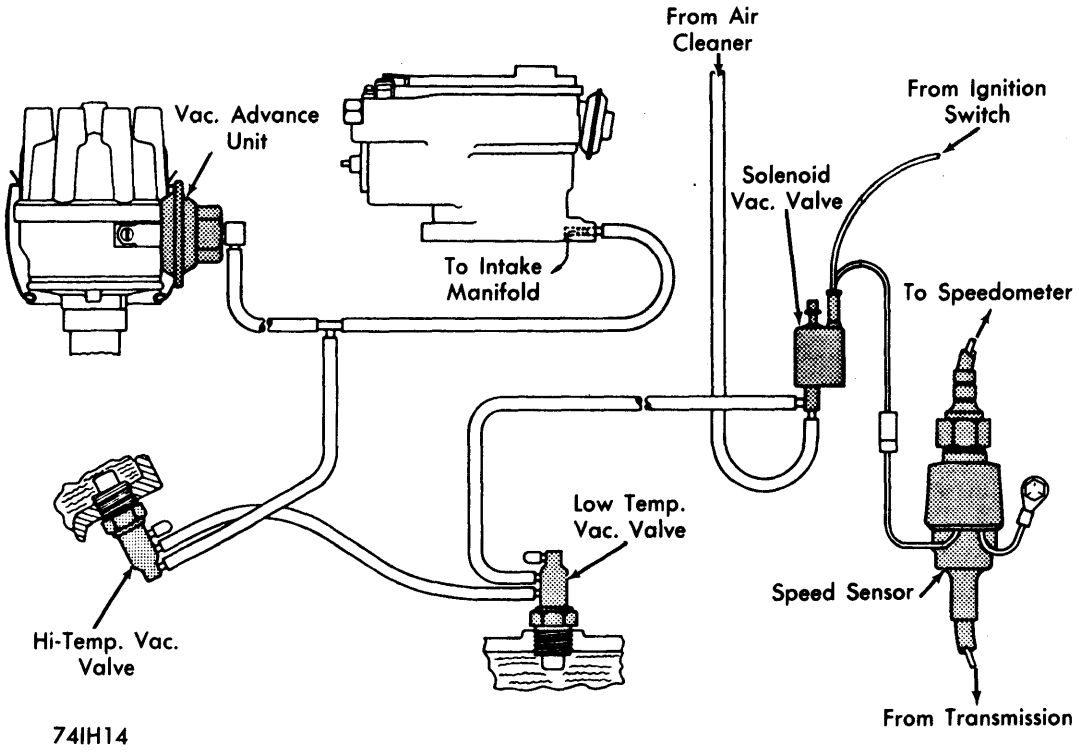
1) With engine at normal operating temperature, ignition timing and idle speed set to specifications, connect a vacuum gauge between distributor advance unit and vacuum hose. With engine at idle speed observe vacuum gauge. If vacuum reading is low (0-2 in. Hg), disconnect hose from high or low temperature vacuum control valve at "T" fitting between carburetor port and distributor vacuum advance unit hose. Plug open "T" fitting, engine timing should increase and vacuum gauge should read approximately full manifold vacuum. If it does not, inspect vacuum unit, vacuum hoses and carburetor for plugging or damage. Reconnect temperature control vacuum hose to "T" fitting.

74IH13

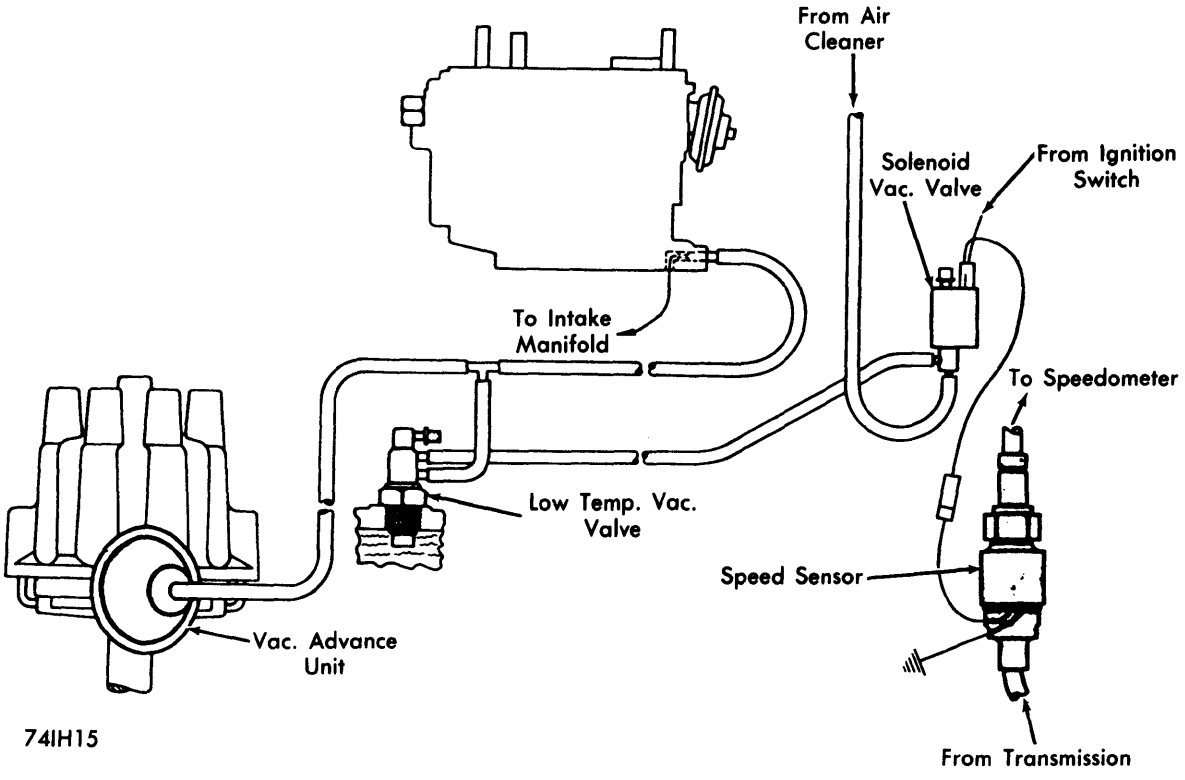


SPEED CONTROLLED SPARK SYSTEM (6-CYL.)

INTERNATIONAL HARVESTER CO. SPEED CONTROLLED SPARK (Cont.)



SPEED CONTROLLED SPARK SYSTEM (304", 345" & 392" V8)



SPEED CONTROLLED SPARK SYSTEM (400" V8)

INTERNATIONAL HARVESTER CO. SPEED CONTROLLED SPARK (Cont.)

2) If vacuum is still low after preceeding test, place both rear wheels on floor stands so they may be spun freely. With transmission in second gear (auto. trans. in "2"), operate vehicle (spin wheels) under light acceleration while observing vacuum gauge and speedometer. At 34±2 MPH vacuum gauge reading should increase from zero to show engine manifold vacuum. Allow vehicle to decelerate (throttle closed), vacuum gauge should drop to zero at 25±3 MPH. If these events occur, system is functioning properly. If manifold vacuum cannot be obtained at any speed, first check for leaking vacuum hoses. Then check for faulty solenoid valve, speed sensor or electrical circuit. Repeat test after any repairs to verify correct operation. If solenoid valve operation occurs at speeds other than those specified, replace speed sensor.

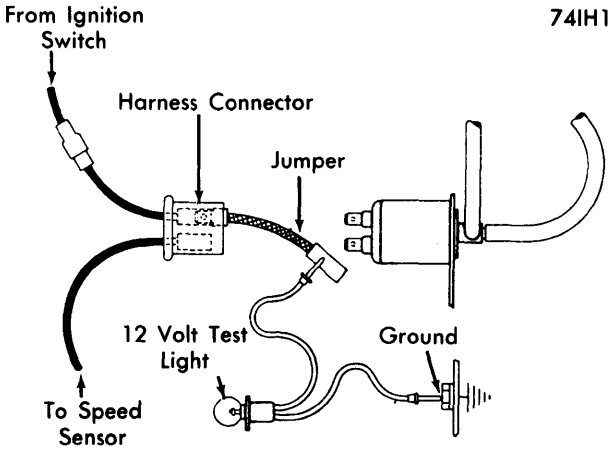
3) If vacuum reading is high (approximately full manifold vacuum) with engine at idle speed, shut off engine and check for restrictions in air bleed hoses or faulty operation of solenoid valve, low or high temperature vacuum control valves.

Solenoid Vacuum Control Valve – Disconnect vacuum hose between solenoid valve and air cleaner hose. Disconnect vacuum hose from solenoid valve to low temperature vacuum control valve. With ignition switch "OFF", blow orally through valve. No air should pass through valve. If air passes through valve, replace valve. Turn ignition switch "ON" and recheck for air flow through valve. If air flow is present, solenoid valve and electrical supply are operating properly. If air flow cannot be felt through solenoid valve with ignition switch "ON", See *Solenoid Valve and Speed Sensor Electrical Tests.*

Low Temperature Vacuum Control Valve (Blue Color) – Disconnect hoses from valve and blow through valve. When temperature is below 60°F, no air should pass through valve. Above 60°F valve will be open and pass air through valve. If valve fails test replace valve.

High Temperature Vacuum Control Valve (Red Color) – Disconnect hoses from valve and blow through valve. If temperature is below 195°F, air will pass through valve and if temperature is above 195°F valve will be closed and air will not pass through valve. If valve fails test, replace valve.

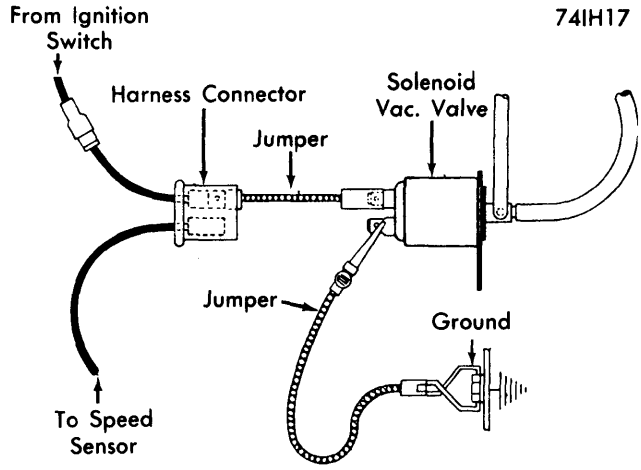
NOTE – Keep ignition switch turned "OFF" except when making electrical current test to avoid damage to ignition system in the following tests.



ELECTRICAL SUPPLY CIRCUIT TEST

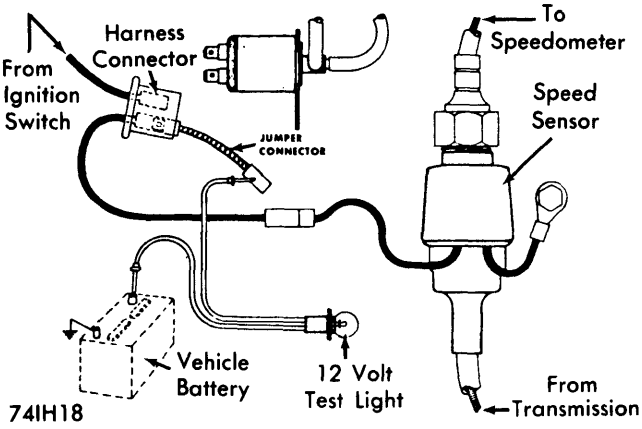
Solenoid Valve and Speed Sensor Electrical Tests – **1)** Check electrical supply circuit (from ignition switch) by disconnecting wiring harness connector from solenoid valve. Insert a test light between connector and ground (see illustration). Turn ignition switch to "ON", test light should light if circuit is operating properly. If test light does not light, supply circuit from ignition switch is faulty and should be repaired.

2) Check solenoid valve by disconnecting wiring harness connector from valve. Install a short jumper between harness connector and solenoid valve (see illustration). Install a second jumper between remaining solenoid terminal and ground. Turn ignition switch to "ON", solenoid valve should open (a distinct click should be heard). Recheck air flow through solenoid valve, See *Vacuum Control Valve*. If solenoid does not operate properly, replace solenoid valve.



SOLENOID VACUUM VALVE ELECTRICAL TEST

3) Check continuity of speed sensor by disconnecting harness connector from solenoid valve. Install a test light from harness connector to vehicle battery (see illustration). If test lamp lights, speed sensor and associated wiring are satisfactory. If test light did not light and associated wiring is good, replace speed sensor.



SPEED SENSOR CONTINUITY TEST

MAINTENANCE

Inspect and test SCS system every 12,000 miles. No adjustment to system is required. Replace any faulty components.