

1974 AMERICAN MOTORS & JEEP TRANSMISSION CONTROLLED SPARK (TCS) SYSTEM

DESCRIPTION & OPERATION

System purpose is to reduce emission of oxides of nitrogen by lowering peak combustion pressure and temperature during power stroke, TCS system consists of a Solenoid Vacuum Valve inserted in vacuum line leading to vacuum advance control unit and a Solenoid Control Switch. In addition, a Coolant Temperature Override Switch is used. Jeeps equipped with 360" or 401" engines and standard cooling also incorporate a Thermal Vacuum Switch.

Solenoid Vacuum Valve — Attached to ignition coil bracket (AMC V8) or to a bracket at the rear of intake manifold (AMC 6-Cyl. and Jeep). When valve is energized, carburetor ported vacuum is blocked and distributor vacuum line is vented to atmosphere through a port in the valve, resulting in no vacuum advance. When valve is de-energized, ported vacuum is applied to distributor resulting in normal vacuum advance.

Solenoid Control Switch — Switch, located at transmission (Jeep) or rear of engine block (AMC 6-Cyl.) and on a bracket at right rear of valve cover (AMC V8), opens or closes in relation to vehicle speed (automatic transmission) or gear range (manual transmission). At speeds above 34 MPH (AMC automatic transmission); 25-30 MPH (Jeep automatic transmission) or in high gear (manual transmission) the switch opens and breaks ground circuit to solenoid vacuum valve. At speeds under 25 MPH (automatic transmission) or when in lower gear ranges (manual transmission) switch closes and completes ground circuit to solenoid vacuum valve. On automatic transmission, switch is operated by oil pressure. On manual transmission switch is operated by shifter shaft.

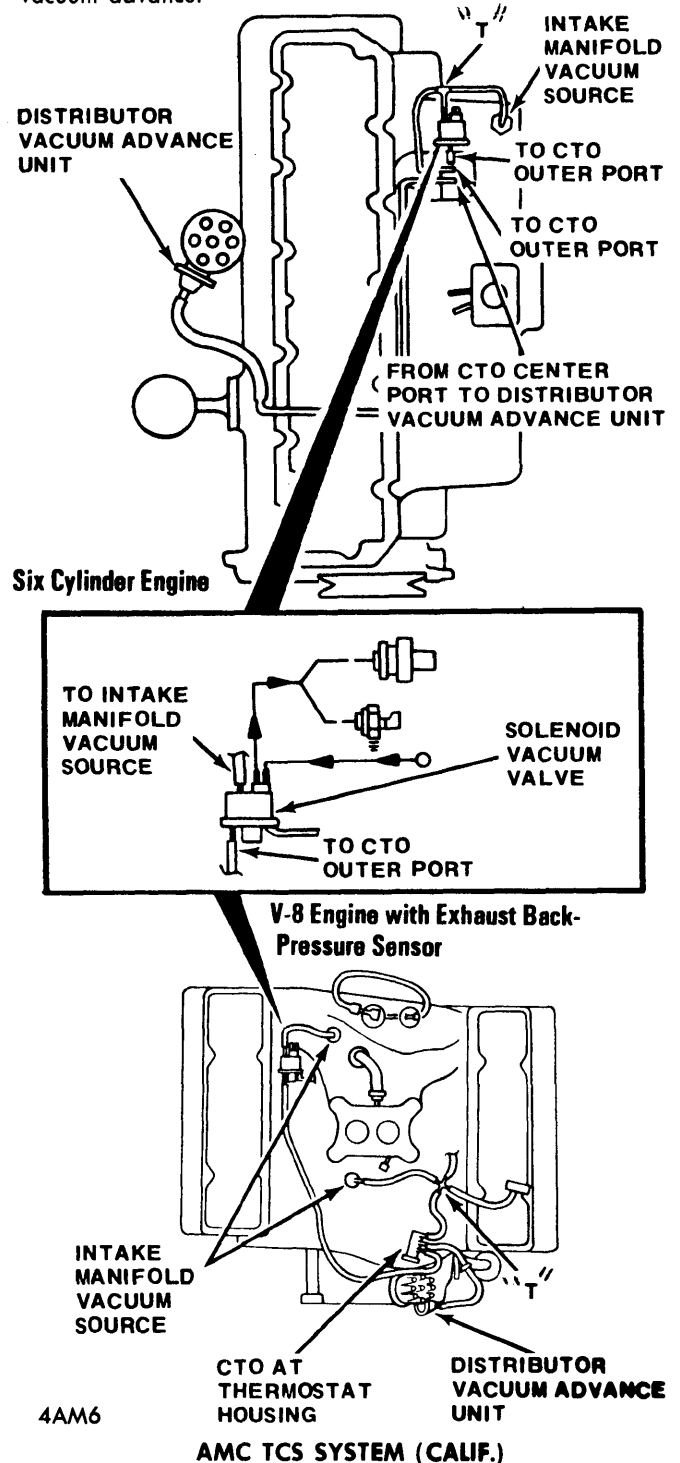
Coolant Temperature Override Switch — Switch is threaded into thermostat housing and incorporates a thermal unit which reacts to coolant temperatures to route either intake manifold or carburetor ported vacuum to distributor vacuum advance diaphragm. **NOTE** — Another Coolant Temperature Override switch is located in intake manifold (V8 engines) just behind thermostat housing. This switch is part of Exhaust Gas Recirculation (EGR) System. When coolant temperature is below 160°F, ports "1" and "D" are open and port "2" is closed. This allows intake manifold vacuum to be applied through a hose connection to distributor advance diaphragm, resulting in full vacuum advance. When coolant temperature reaches 160°F, port "1" closes and ports "2" and "D" are open. Intake manifold vacuum is then blocked off and carburetor ported vacuum is applied through solenoid vacuum valve to distributor advance diaphragm, resulting in decreased vacuum advance. Coolant temperature override switch is used on some cars not equipped with a TCS system. In this case, port "2" is connected directly to carburetor ported vacuum connection.

NOTE — CTO switch on California 6 cylinder engine with manual transmission is 115°F.

NOTE — Various combinations of components are used to route vacuum hoses depending on engine application. See VACUUM DIAGRAMS in this Section.

Thermal Vacuum Switch (TVS) — Used only on Jeep 360" and 401" engines with standard cooling system. Switch is located at the intake manifold heater coolant outlet. When coolant temperature is below 225°F, carburetor ported vacuum is routed through ports "1" and "D" of the switch and distributor vacuum advance is controlled by TCS system and coolant temperature override switch. If coolant temperature reaches 225°F, port "1" closes and port "2" opens. This allows

intake manifold vacuum to be routed through ports "2" and "D". Port "D" is connected by a hose to port "2" at coolant temperature override switch, therefore, intake manifold vacuum is applied to distributor vacuum advance diaphragm resulting in full vacuum advance. This causes engine speed to increase approximately 200 RPM. When coolant temperature drops below 225°F, port "2" of TVS switch closes and carburetor ported vacuum is again routed through ports "1" and "D". Engine speed decreases due to reduced distributor vacuum advance.

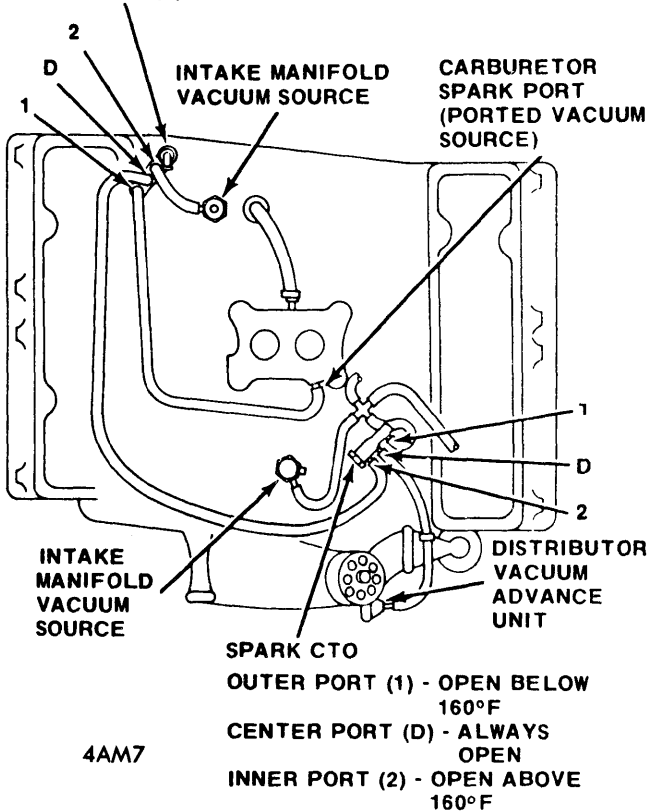


Exhaust Emission Systems

1974 AMERICAN MOTORS & JEEP TRANSMISSION CONTROLLED SPARK (TCS) SYSTEM (Cont.)

TVS

OUTER PORT (1) - OPEN BELOW 225°F
 CENTER PORT (D) - ALWAYS OPEN
 INNER PORT (2) - OPEN ABOVE 225°F



OPERATING CHARACTERISTICS

- A. BELOW 160°F - MANIFOLD VACUUM
- B. ABOVE 160°F, BELOW 225°F - CARB. PORTED VACUUM
- C. ABOVE 225°F - MANIFOLD VACUUM

JEEP SPARK CTO (ALL PORTS USED) & TVS SYSTEM (TYPICAL)

MAINTENANCE

Periodic maintenance is not normally required; should any switch or valve fail to function properly it should be replaced.

ADJUSTMENT

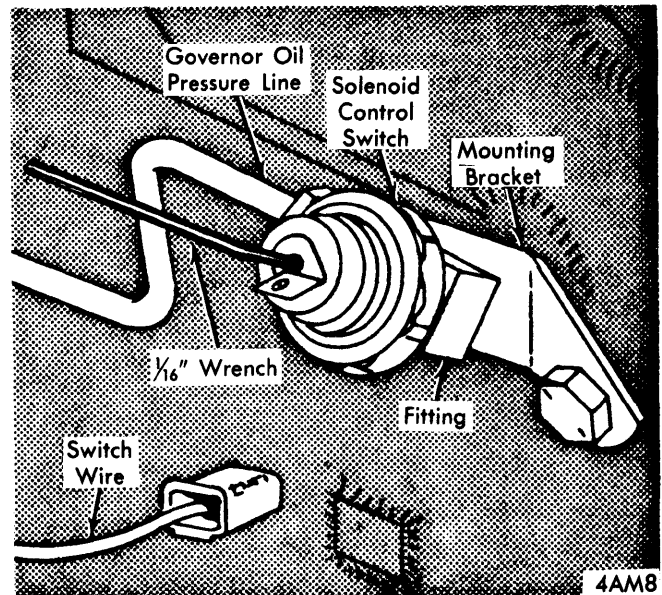
Solenoid Control Switch - 1) Disconnect switch wire from terminal and connect a 12 volt test lamp in series between switch wire and terminal.

2) Raise and support vehicle so rear wheels are free to rotate, apply brakes and start engine. Test lamp should come ON.

3) Place transmission in "D" position, release brakes and gradually depress accelerator pedal. Observe speedometer and test lamp. At a speed of 33-37 MPH, switch should open and test lamp go OFF.

4) Adjust switch opening speed to 35 MPH if test lamp goes OFF at speed outside of 33-37 MPH. Turn Allen head adjusting screw, located in switch terminal, clockwise to increase speed and counterclockwise to decrease speed.

NOTE - If equipped with thermal vacuum switch (TVS), intake manifold vacuum is applied to distributor when engine coolant temperature reaches 225°F.



SOLENOID CONTROL SWITCH ADJUSTMENT