5. SPARK DELAY SYSTEM

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5. SPARK DELAY SYSTEM (adopted only on 2T-C engines excluding those to California)

DESCRIPTION

The spark delay system serves to delay the vacuum advance for a given time for the purpose of minimizing the generation of NOx (nitrogen oxides) and HC (hydrocarbon).

OPERATION

1. Operation of spark delay system

- At the time the engine is warm (above 140°F), the thermostatic vacuum switching valve (TVSV) is closed so that opening the throttle valve and having the vacuum act on the advancer port will cause the check valve inside the vacuum transmitting valve (VTV) to close.
  Since the vacuum can only act on the distributor diaphragm through the orifice in the vacuum transmitting valve, the transmission of the vacuum will be delayed.

- On closing the throttle valve so that vacuum will no longer act on the advancer port, the check valve inside the vacuum transmitting valve will open.
  The low vacuum from the advancer port will then be acting on the distributor diaphragm so that the diaphragm will quickly return to the position corresponding to the vacuum.

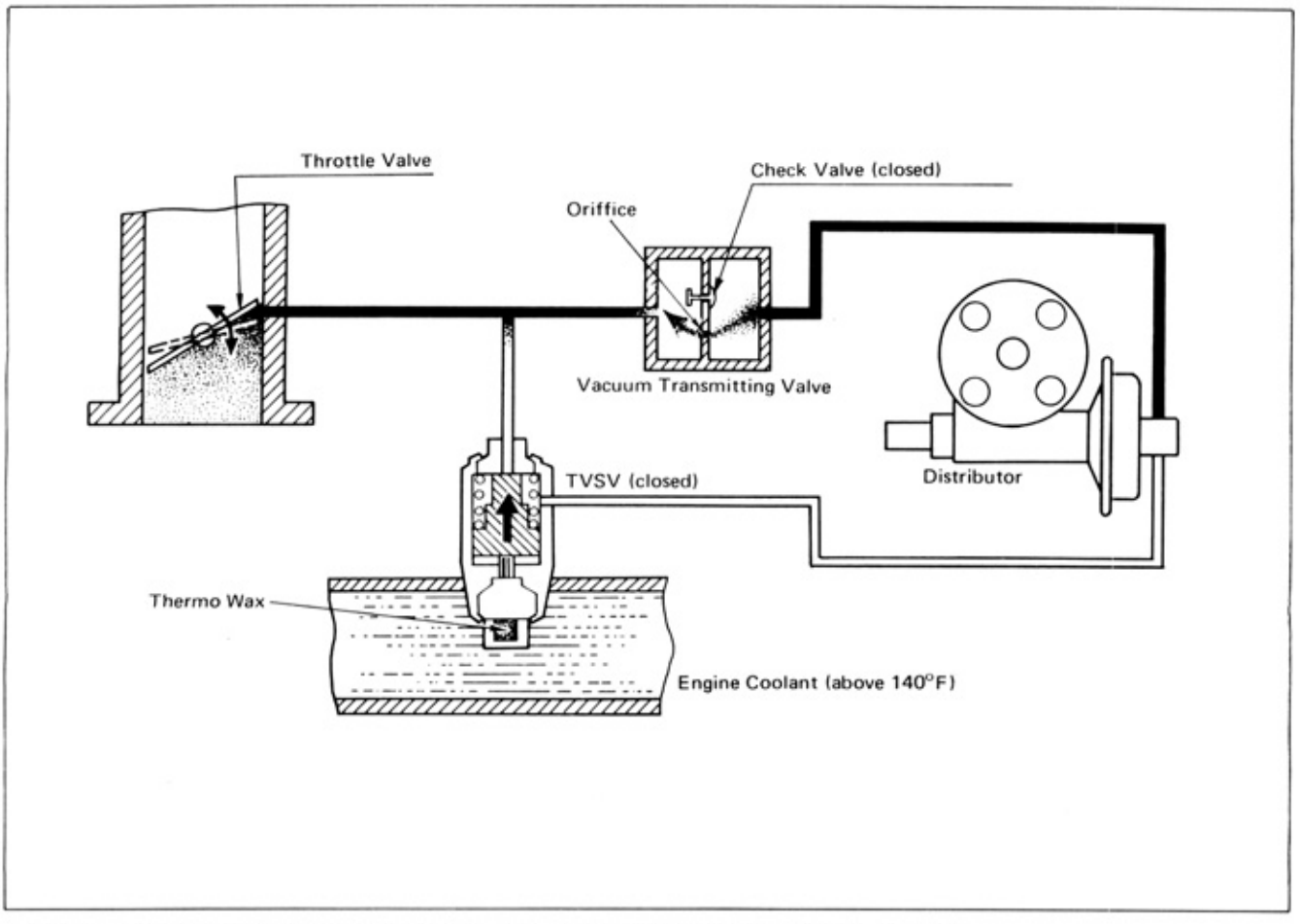

Fig. 5-1 Spark Delay System Operation (Coolant Temparature Above 140° F)

○ At the time the engine cold, the TVSV is open. Thus, the advancer port vacuum acts directly on the distributor diaphragm so that there will be no vacuum delay.

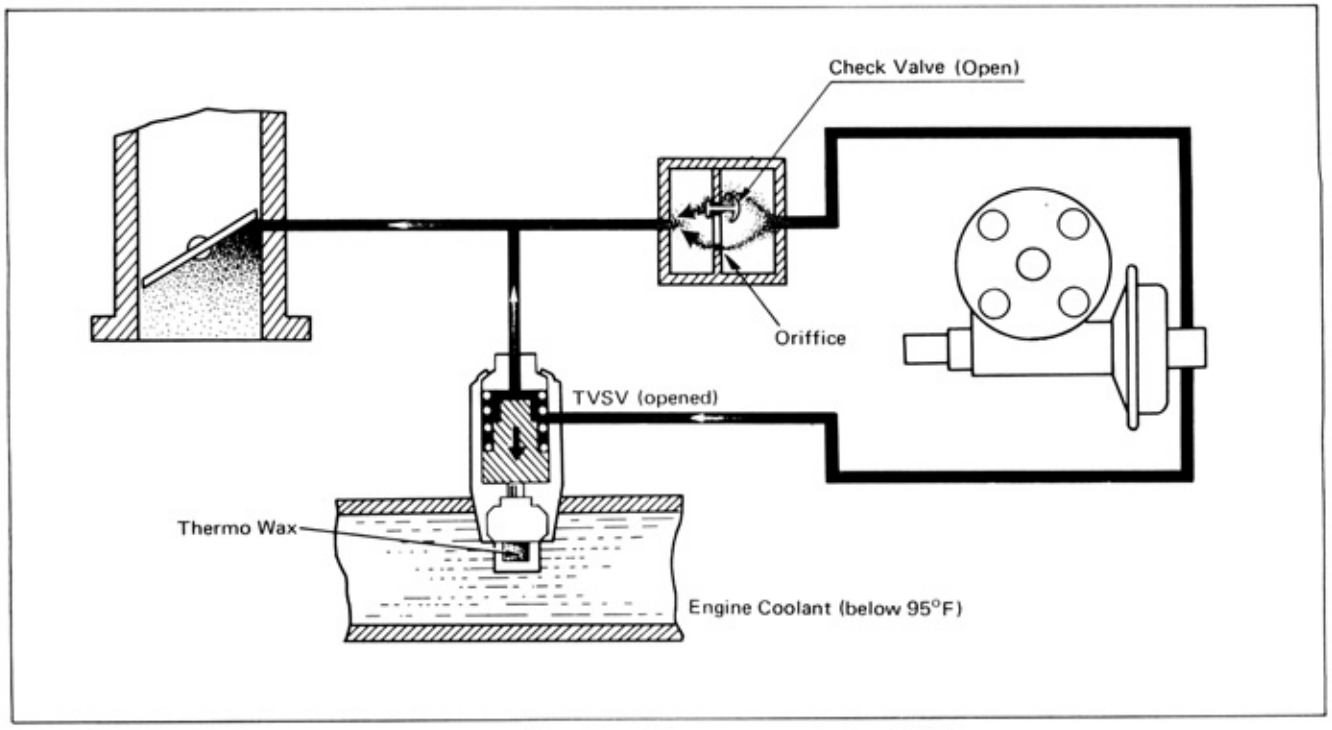

Fig. 5-2 Spark Delay System Operation (Coolant Temperature Below 95° F)

2. Operation of vacuum transmitting valve

As shown in Fig. 5-3, in case of air flowing from "A" to "B", the check valve opens to allow quick passage of air, but when flowing from "B" to "A", the check valve closes to allow the air to flow only through the orifice, thus retarding the transmission of air.

3. TVSV operation

At coolant temperature above 140°F, the wax expands and closes the valve.
At below 95°F, the valve opens and clears the vacuum passage.

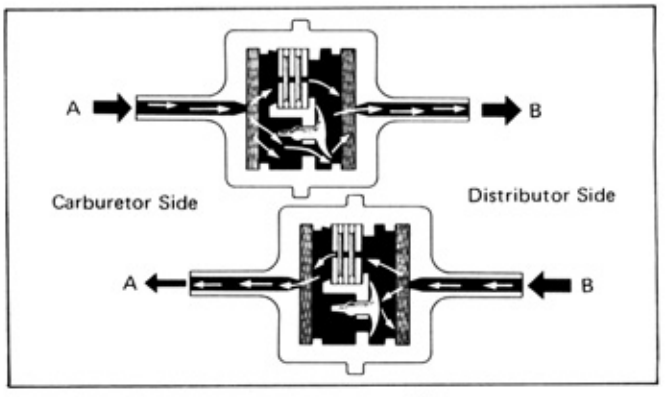

Fig. 5-3 Vacuum Transmitting Valve

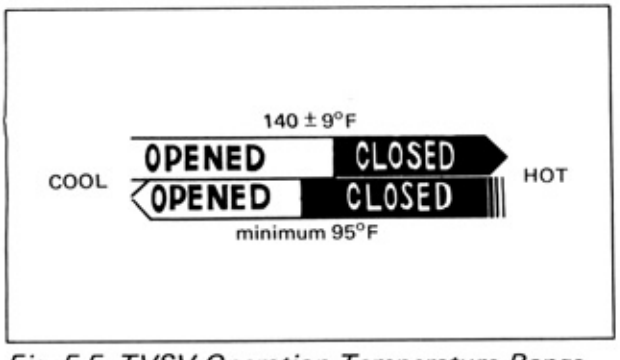

Fig. 5-5 TVSV Operation Temperature Range

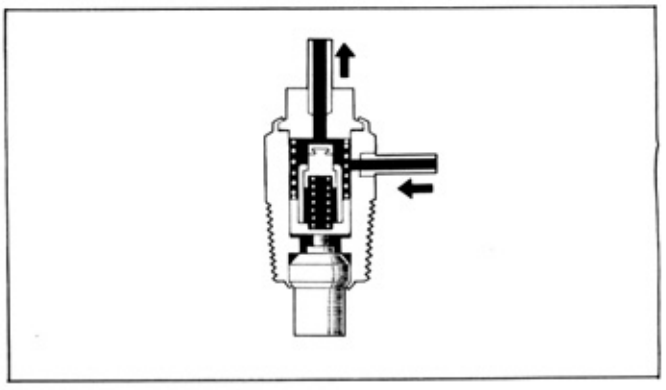

Fig. 5-4 TVSV

SPARK DELAY SYSTEM INSPECTION PROCEDURE

1. Visually check hose to see if damaged or disconnected.
   - Defective → Repair or replace hose.
   - OK ↓
2. When hose at one side of distributor is closed by pinching and the other hose sucked in with mounth, does octane selector operate ?
   - No → Distributor defective. Repair or replace.
   - Yes ↓
3. With coolant temperature below 95°F, start engine. Close hose "A" shown in Fig. 5-6 or Fig. 5-8. Does octane selector operate in accord with throttle valve operation at low temperature and then stop functioning when temperature rises above 140°F ?
   - No → Replace TVSV
   - Yes ↓
4. With engine idling, close hoses at "B" part shown in Fig. 5-6 or Fig. 5-9. Raise speed to 2000 rpm and verify that octane selector operates in 4 to 12 seconds after "B" part only is opened.
   When returned to idling speed, does octane selector return quickly?
   - No → Replace vacuum transmitting valve.
   - Yes ↓

Spark delay system normal

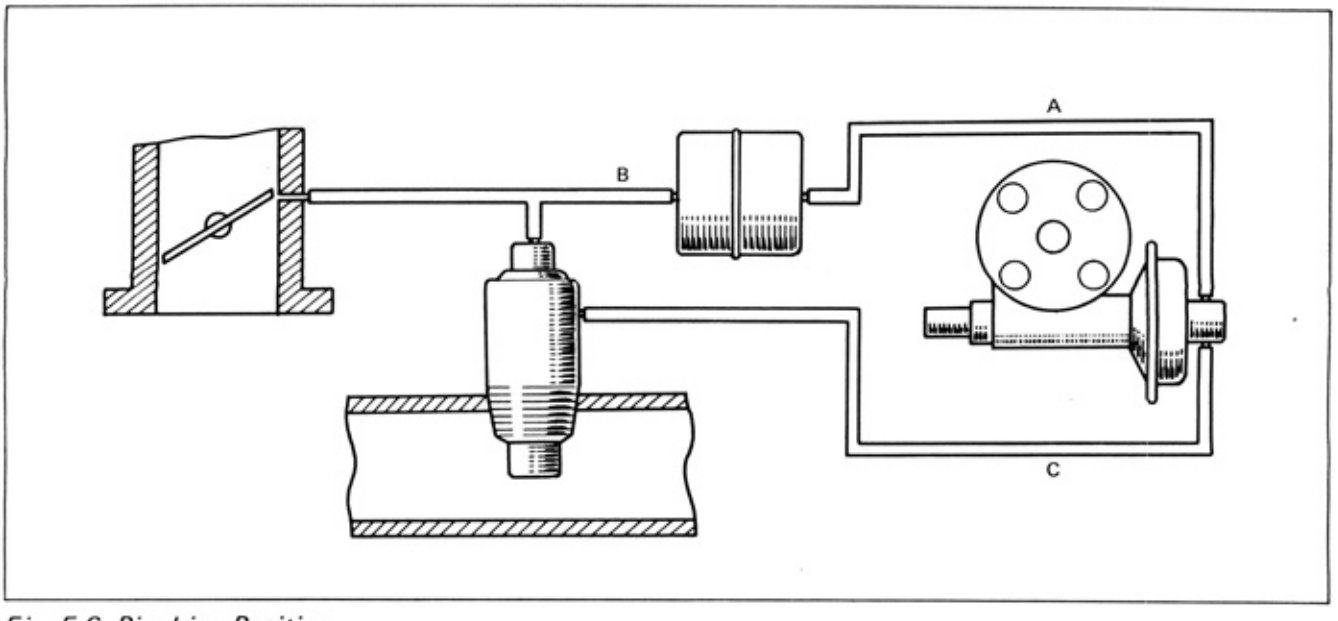

Fig. 5-6 Pinching Position

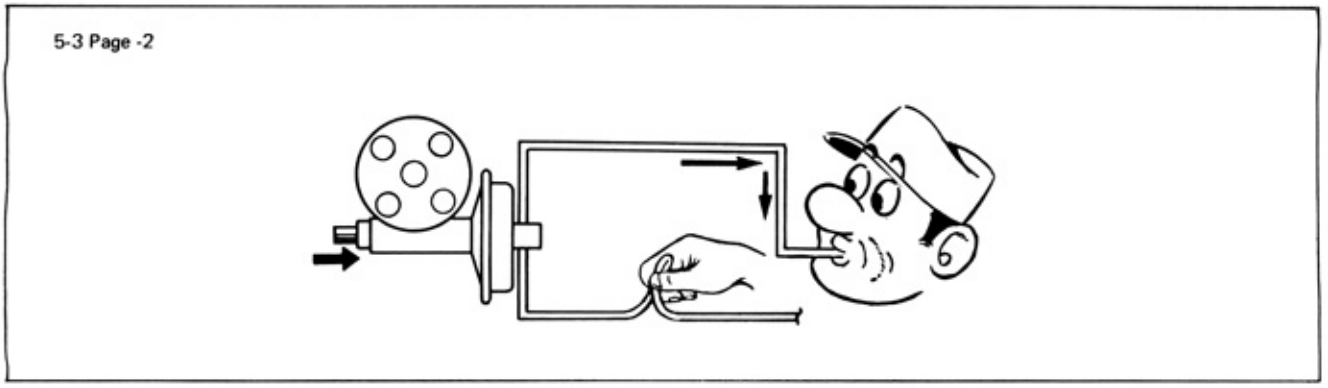

Fig. 5-7 Distributor Inspection

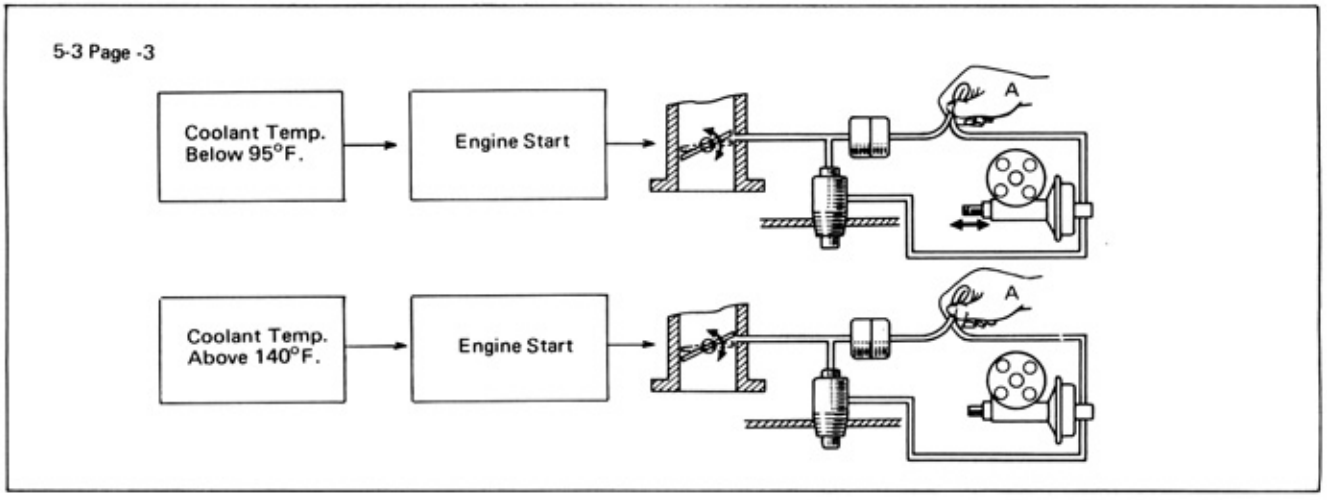

Fig. 5-8 TVSV Inspection

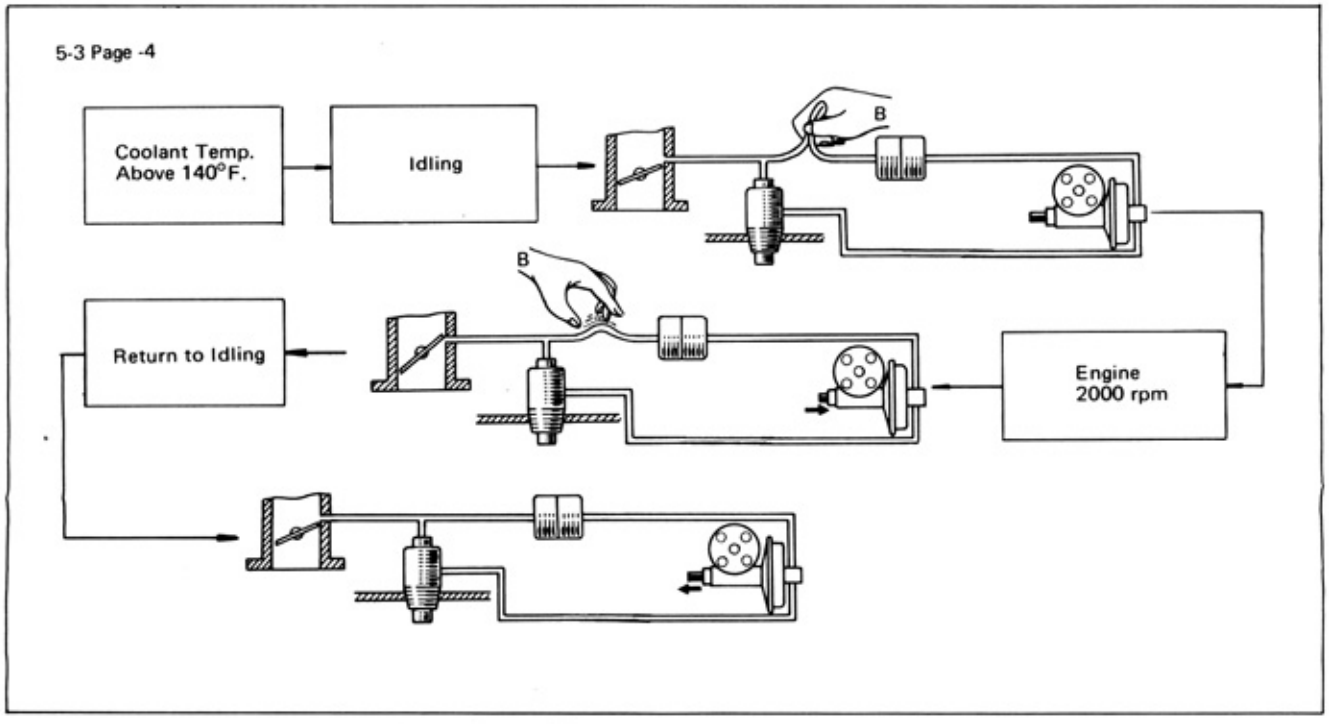

Fig. 5-9 Vacuum Transmiting Valve Inspection