1974-79 EXHAUST EMISSION SYSTEMS
Toyota Transmission Controlled Spark

1974-76 Models

NOTE: The Transmission Controlled Spark (TCS) system has been combined with the Spark Control System on 1977 models. See TOYOTA SPARK CONTROL/DELAY SYSTEMS article in this section.

DESCRIPTION

The Transmission Controlled Spark (TCS) system controls vacuum ignition timing in accordance with coolant temperature, vehicle speed, and catalytic converter temperature (4M engine only). System typically consists of speed sensor, computer, temperature sensor, vacuum switching valve, and vacuum unit on distributor.

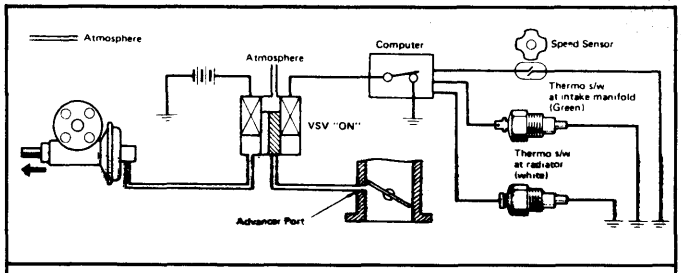

Fig. 1: 1975 TCS System (Calif. 2T-C Engine)

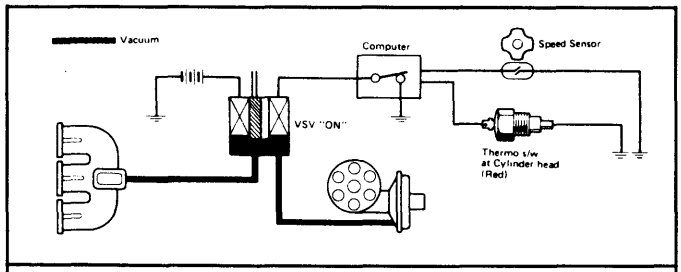

Fig. 2: 1975 TCS System (2F Engine)

OPERATION

When engine coolant temperature and speed sensor are under specified temperature and RPM range, the temperature and speed sensors close electrical circuit to computer. Circuit to vacuum switching valve is closed and coil is energized, turning on vacuum switching valve. See 1974 TEMPERATURE & SPEED SENSOR OPERATING RANGE table.

On 2F engine, vacuum switching valve allows vacuum to act on distributor retard diaphragm. On 4M engine, vacuum switching valve applies vacuum to distributor retard diaphragm and admits atmospheric pressure to advance side, retarding ignition timing. On all other engines, when vacuum switching valve is turned on it cuts off vacuum to distributor advance diaphragm.

NOTE: Operational description is for 1974 models only. Operational description for 1975-76 models not available at time of publication.

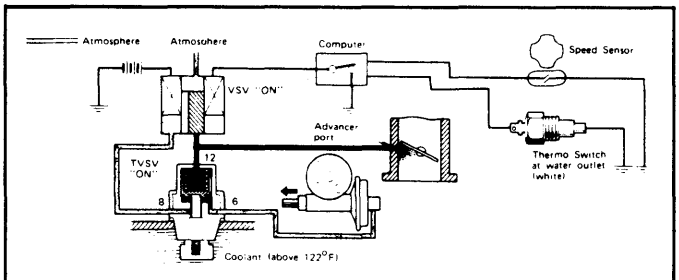

Fig. 3: 1975 TCS System (20R Engine)

TEMPERATURE & SPEED SENSOR OPERATING RANGE

Application	Thermo Sensor On At °F	Speed Sensor On At MPH
3K-C Engine	140-212	11-36
2T-C Engine		
Federal	140-221	31-41
Calif.		
Man. Trans.	140-221	16-41
Auto. Trans.	140-221	24-65
18R-C Engine		
Federal	140-217	16-62
Calif.	140-217	11-41
4M Engine		
Federal	140-221	16-62
Calif.	140-221	16-65
F Engine		
Federal	140-208	13-41
Calif.	113-217	13-41

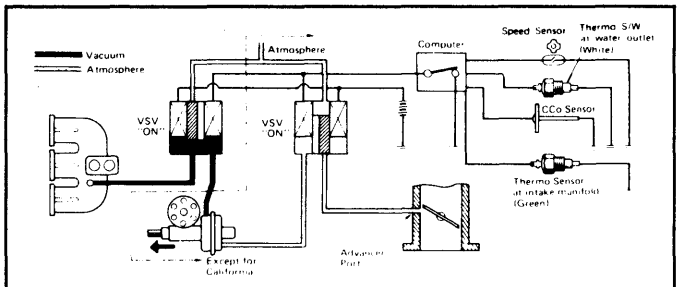

Fig. 4: 1975 TCS System (4M Engine)

TESTING

TRANSMISSION CONTROLLED SPARK SYSTEM

1974 Models (Vacuum Circuit Test) - Disconnect vacuum sensing hose from distributor. Connect vacuum gauge to hose and position gauge so it may be seen while driving vehicle. Road test vehicle. Operate vehicle speed at several speeds and observe vacuum gauge. Maximum vacuum gauge readings indicate transmission controlled spark system is off.

1974 Models (Electrical Circuit Test) - **1)** Pull off vacuum switching valve connector and plug Toyota TCS System Tester in its place. *See Fig. 5.* Attach ground connector to a known good ground and place tester on instrument panel.

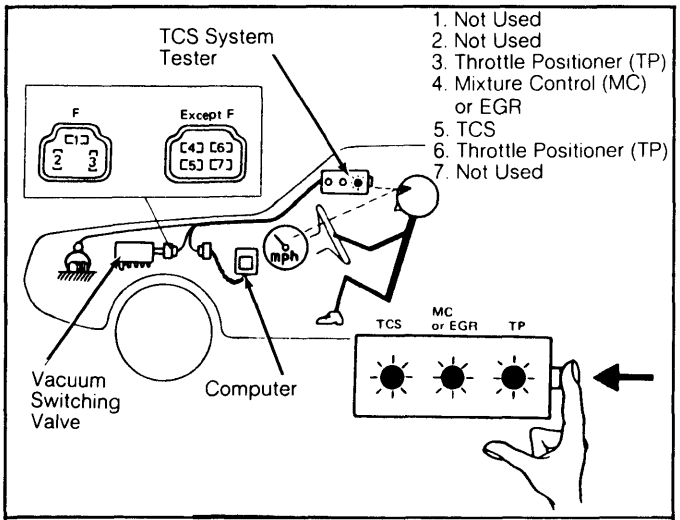

Fig. 5: 1974 TCS System Tester Hook-Up

1974-79 EXHAUST EMISSION SYSTEMS
Toyota Transmission Controlled Spark (Cont.)

2) Turn ignition on and push button on side of tester. All lights on tester will come on if tester is in proper working order. Road test vehicle at speed and temperature required to active transmission controlled spark system. See TEMPERATURE & SPEED SENSOR OPERATING RANGE table. The transmission controlled spark system is on whenever TCS indicator light on tester comes on.

1975-76 Models - See applicable transmission controlled spark system diagnostic chart and perform test as outlined. *See Figs. 7 through 11.*

SPEED SENSOR

1974 Models - 1) Disconnect speedometer cable at transmission. Disconnect connector harness from computer. Using a 10 ohm resistor, connect positive lead of ohmmeter to computer connector speed sensor terminal. Connect negative ohmmeter lead to a known good ground.

2) Have an assistant turn speedometer cable by hand and count number of needle sweeps at ohmmeter. Four needle sweeps should occur for every one revolution of speedometer cable.

1975-76 Models - 1) Check sensor terminals at back of speedometer for proper connections. Block front wheels and jack up one rear wheel off ground. Release parking brake and place transmission in Neutral.

2) Unplug wiring connector from computer. Using a 10 ohm resistor, connect positive lead of ohmmeter to computer connector speed sensor terminal. *See Fig. 6.* Connect negative ohmmeter lead to a known good ground.

3) Have an assistant turn rear wheel slowly and observe voltmeter. Ohmmeter should fluctuate near infinity mark. If not, replace speedometer assembly if wiring is not defective.

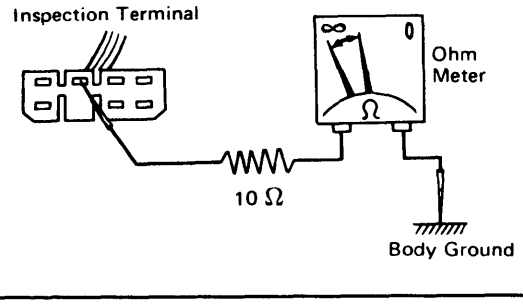

Fig. 6: 1975-76 Speed Sensor Test

1974-79 EXHAUST EMISSION SYSTEMS
Toyota Transmission Controlled Spark (Cont.)

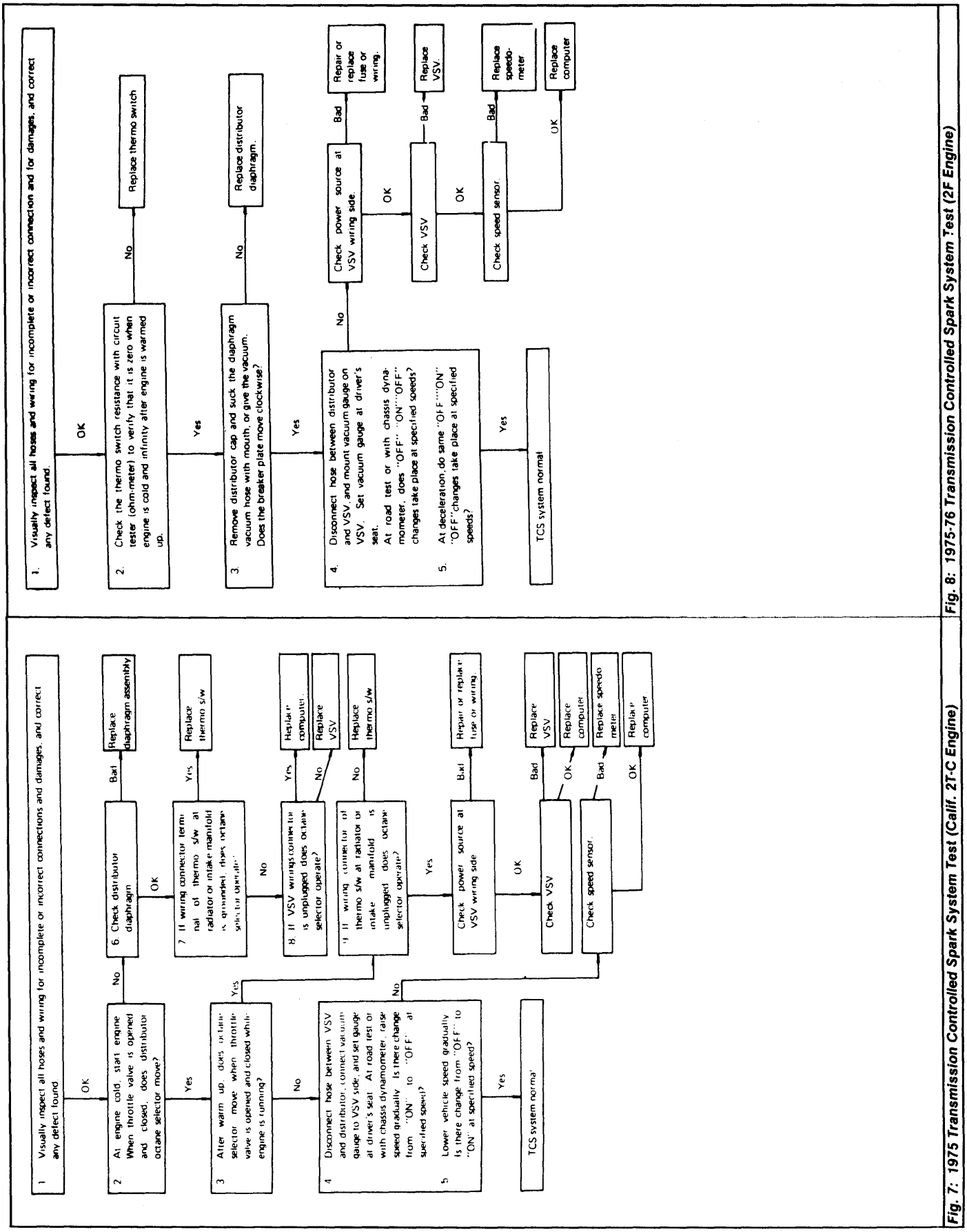

Fig. 8: 1975-76 Transmission Controlled Spark System Test (2F Engine)

Fig. 7: 1975 Transmission Controlled Spark System Test (Calif. 2T-C Engine)

1974-79 EXHAUST EMISSION SYSTEMS
Toyota Transmission Controlled Spark (Cont.)

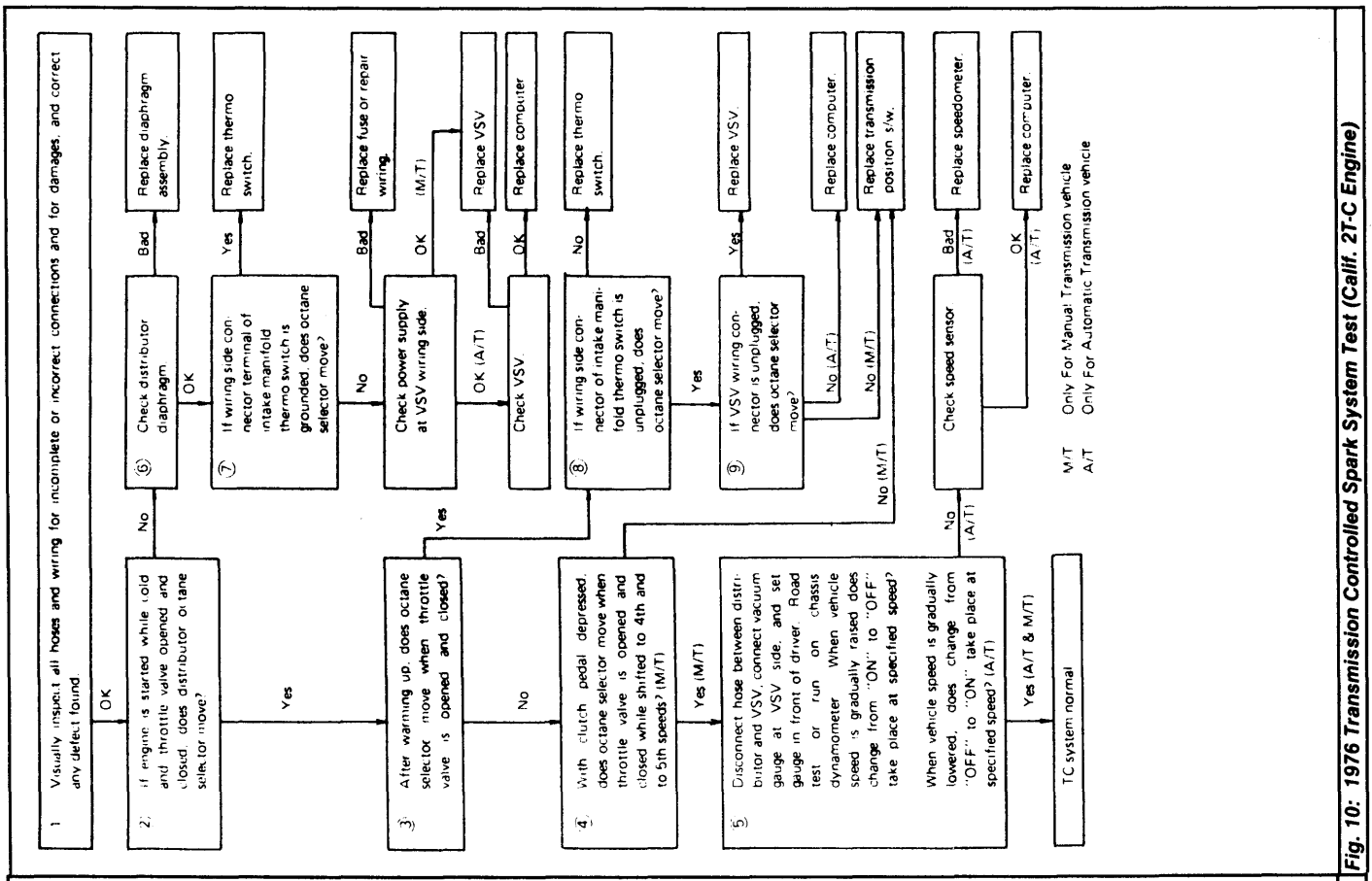

Fig. 10: 1976 Transmission Controlled Spark System Test (Calif. 2T-C Engine)

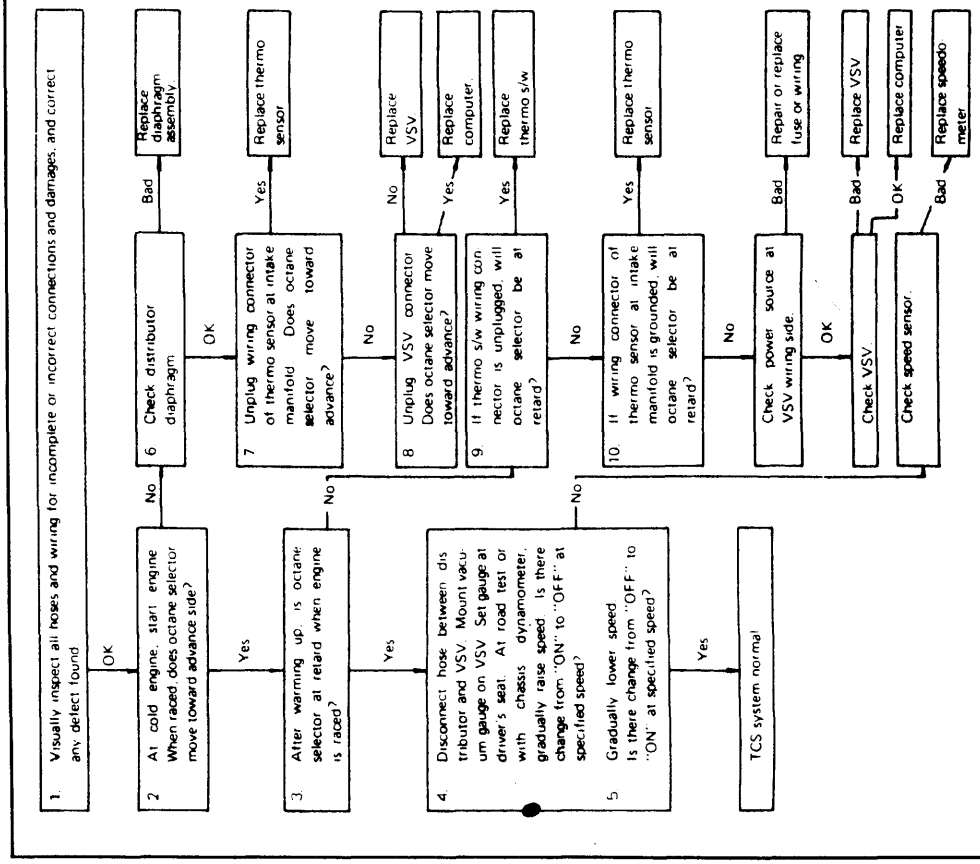

Fig. 9: 1975-76 Transmission Controlled Spark System Test (4M Engine)

1974-79 EXHAUST EMISSION SYSTEMS
Toyota Transmission Controlled Spark (Cont.)

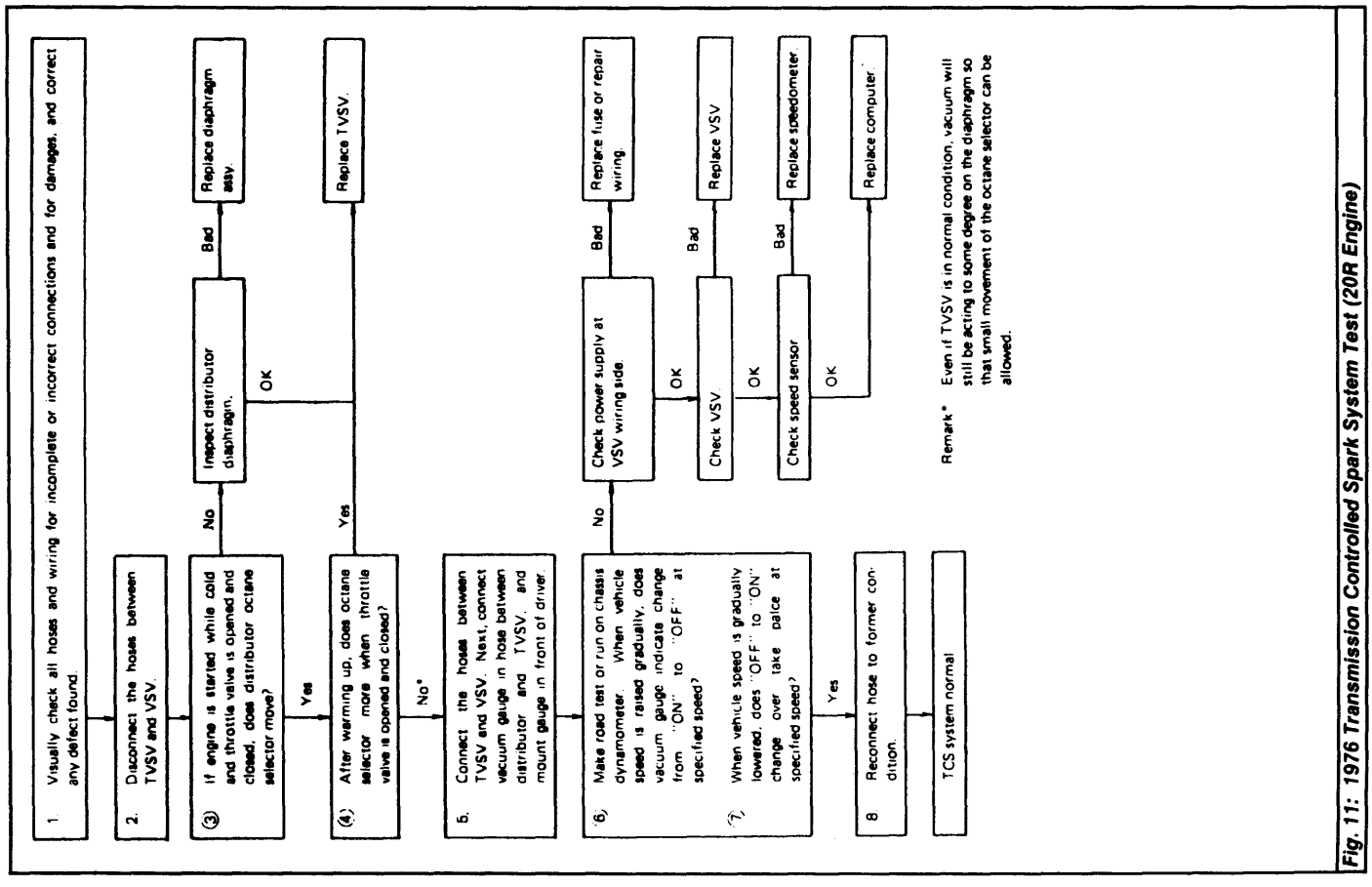

Fig. 11: 1976 Transmission Controlled Spark System Test (20R Engine)