Ford Motor Co. Ported Vacuum Switches

DESCRIPTION

A Ported Vacuum Switch (PVS) is a temperature sensitive vacuum controlling device. PVS valves are either 2, 3 or 4-port design, depending on application. An electric PVS switch is also used. The electric PVS is a combined vacuum switching and electric signaling device.

There are 2 types of electric PVS switches, one with normally open contacts and one with normally closed contacts. The 2-port and 3-port PVS switches have 3 temperature ranges. Green valves are calibrated at 68°F, Black valves are calibrated at 100°F and Blue valves are calibrated at 133°F. All 4-port switches are calibrated at 125°F.

OPERATION

2-Port PVS - The 2-port PVS is a vacuum on or vacuum off switch, depending on engine coolant temperature. When coolant temperature is below PVS temperature range, vacuum is shut off. When coolant temperature is above PVS temperature range, vacuum will pass through PVS. *See Fig. 1.*

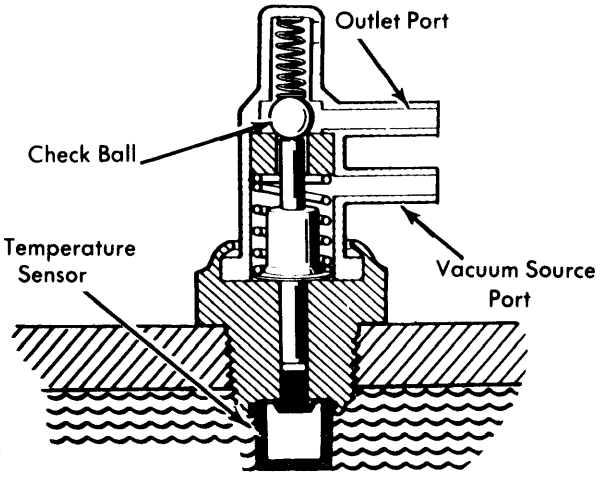

Fig. 1: Sectional View of 2-Port PVS

3-Port PVS - On a 3-port PVS valve, the center port is connected to a vacuum source. The top port is open to vacuum source and bottom port is closed when coolant temperature is below PVS temperature range. The bottom port is open to vacuum source and top port is closed when coolant temperature is above PVS temperature range. *See Fig. 2.*

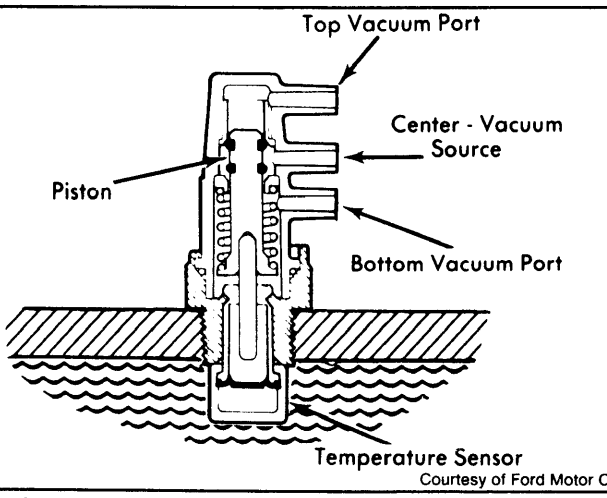

Fig. 2: Sectional View of 3-Port PVS

4-Port PVS - On a 4-port PVS valve, the top 2 ports are open and the bottom 2 are closed when coolant temperature is below PVS temperature range. The 2 bottom ports are open and the 2 top ports are closed when coolant temperature is below PVS temperature range. *See Fig. 3.*

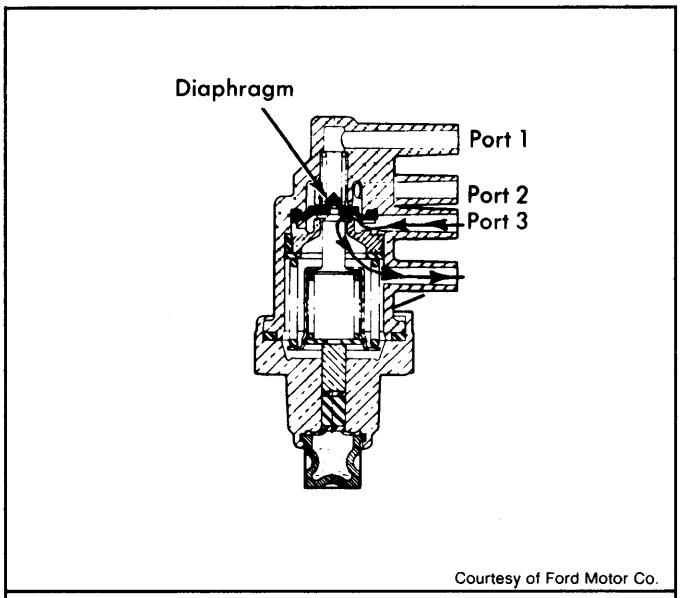

Fig. 3: Sectional View of 4-Port PVS

Electric PVS - Electric PVS is used on some engines with air injection and a catalytic converter. Two different electric PVS valves are used. One with normally closed contacts and one with normally open contacts. On both types of valves, the center and bottom ports operate in the same manner as a regular 3-port PVS. On normally closed contacts valve, the contacts are closed until coolant temperature reaches 235°F, at which time the contacts open. On normally open contacts valve, the contacts are open until coolant temperature reaches 235°F, at which time the contacts close. *See Fig. 4.*

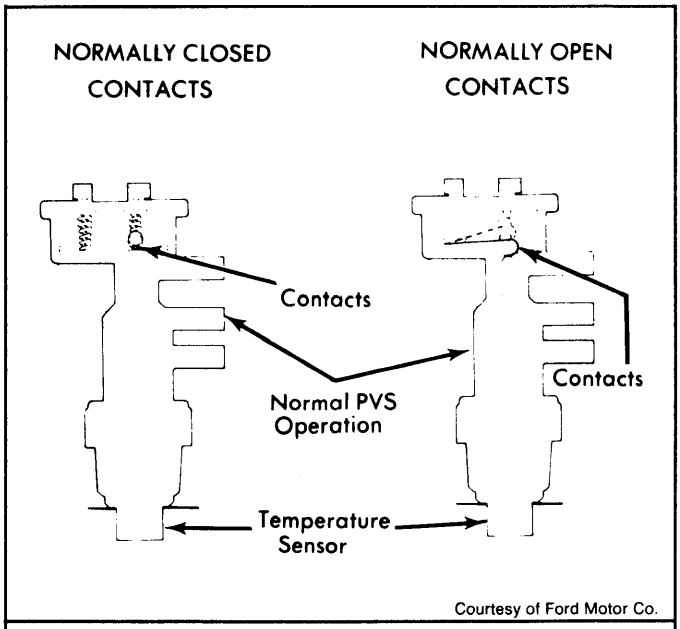

Fig. 4: Sectional View of Electric PVS

1975-79 EXHAUST EMISSION SYSTEMS
Ford Motor Co. Ported Vacuum Switches (Cont.)

TESTING

2-Port PVS - With engine cold, disconnect both vacuum lines at PVS valve. Connect a remote vacuum source to one port and a vacuum gauge to other. Apply 10 in. Hg of vacuum. With engine cold, vacuum gauge should show no vacuum. Start and warm engine. As engine reaches calibrated temperature, valve should open and show same reading on vacuum gauge and vacuum source. See PVS COLOR CODES table. Replace PVS valve if it does not function as outlined.

PVS COLOR CODES

PVS Color	Temp.
Green	68°F
Black	100°F
Plain or Blue	133°F

3-Port PVS - With engine cold, disconnect vacuum lines at PVS valve. Connect an external vacuum source to center port and vacuum gauges to other 2 ports. Apply 10 in. Hg of vacuum. Vacuum gauge connected to upper port should read 10 in. Hg. Start and warm engine. As engine reaches calibrated temperature, vacuum should close to top port and open to bottom port. Replace PVS valve if it does not function as outlined.

4-Port PVS - 1) Disconnect vacuum hoses at PVS valve. Ensure engine coolant temperature is below PVS opening temperature. See 4-PORT PVS OPENING TEMPERATURES table.

2) Using a vacuum gauge and external vacuum source, check that vacuum flows through ports 1 and 2. No vacuum should flow through ports 3 or 4. *See Fig. 3.*

3) Start and run engine until engine coolant temperature is above PVS opening temperature. Check that vacuum flows through ports 3 and 4. Vacuum should not flow through ports 1 or 2. If PVS valve fails either test, replace valve and retest.

4-PORT PVS OPENING TEMPERATURES

Color Code	Temp. (°F)
Pink	Above 90
Black	Above 100
Blue, Natural	Above 133
Yellow, Gray	Above 155

Electric PVS - 1) Electric PVS is used on some pre-1979 models to control air injection for catalytic converter protection. The vacuum part of this PVS operates identical to 3-port PVS. See 3-PORT PVS for testing procedures.

2) There are 2 electric PVS valves used. One with normally open contacts, and one with normally closed contacts. The normally open type will not have continuity across connectors until engine coolant temperature reaches 235°F.

3) The normally closed type will have continuity across connectors until engine coolant temperature reaches 235°F. Using an ohmmeter, verify continuity of electric PVS switch as described. *See Fig. 4.*