

# 1975-79 EXHAUST EMISSION SYSTEMS

## Jeep Spark Control Systems

### 1979 Models

### DESCRIPTION

Jeep vehicles use 2 spark control devices to assist the ignition system in controlling exhaust emissions. They are the Coolant Temperature Override (CTO) system, and the Non-Linear Vacuum Regulator (NLVR) valve system. System application depends on engine size, emissions category and vehicle model.

### COOLANT TEMPERATURE OVERRIDE (CTO)

This system supplies carburetor ported vacuum or manifold vacuum to distributor vacuum advance, depending upon coolant temperature. Three types of CTO switches are used: a single-function switch for models with standard cooling, a single-function switch for models with heavy duty cooling and a dual-function switch. The CTO switch is threaded into the left rear of block on 6-cylinder models, and into the thermostat housing on V8 models. On some models a NLVR valve is used along with a CTO switch.

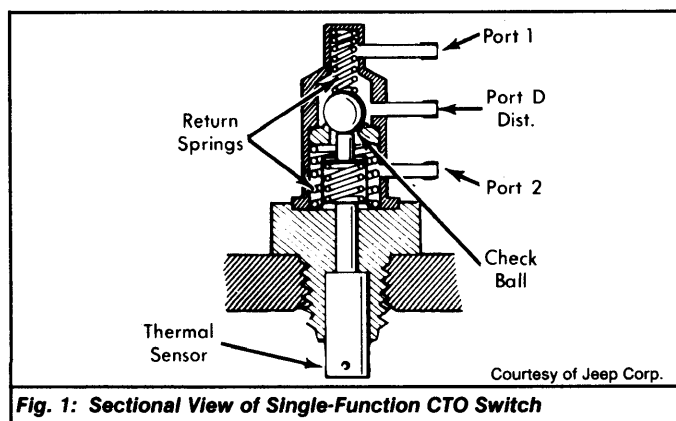


Fig. 1: Sectional View of Single-Function CTO Switch

### NON-LINEAR VACUUM REGULATOR VALVE

Used on some models, this valve supplies vacuum advance unit with a regulated combination of manifold and carburetor ported vacuum when engine load is low and switches to supply only carburetor ported vacuum as load increases.

### OPERATION

#### COOLANT TEMPERATURE OVERRIDE (CTO)

**Single-Function for Standard Cooling** – When coolant temperature is below 160°F, check ball is held against inner seat by spring pressure. Manifold vacuum enters port “1” and is applied through port “D”. This allows full manifold vacuum to distributor. Above 160°F, port “1” is blocked, and carburetor ported vacuum enters through port “2” and connects to port “D”. Ported vacuum then controls spark advance. See Fig. 1.

**Single-Function for Heavy Duty Cooling** – Valve is used to prevent engine overheating at high ambient temperatures. When coolant temperature is below 220°F, carburetor ported vacuum enters port “1” and is applied through port “D”. This allows full ported vacuum to distributor. Above 220°F, port “1” is blocked and manifold vacuum enters through port “2” and connects to port “D”. Manifold vacuum then controls spark advance. See Fig. 1.

**Dual-Function** – This valve supplies manifold vacuum to vacuum advance at both cold and hot coolant temperatures. At normal coolant temperatures, carburetor ported vacuum is supplied. When coolant temperature is below 149°F, manifold vacuum enters through port “3” and is applied through port “2”. This allows full manifold vacuum to distributor.

From 149-220°F, port “3” is blocked and ported vacuum enters through port “1” and connects to port “2”. This allows full ported vacuum to distributor. Above 220°F, port “1” is again blocked and full manifold is applied to distributor through port “2”. See Fig. 3.

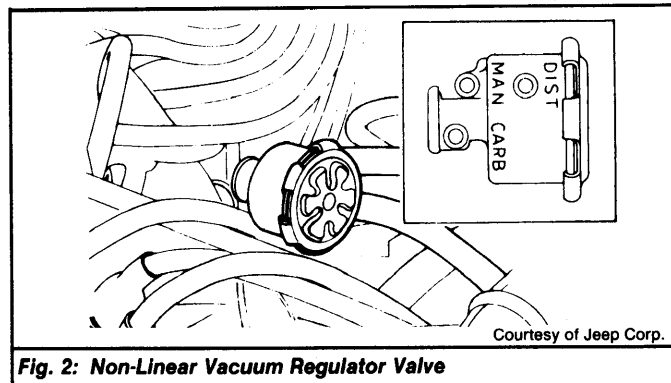


Fig. 2: Non-Linear Vacuum Regulator Valve

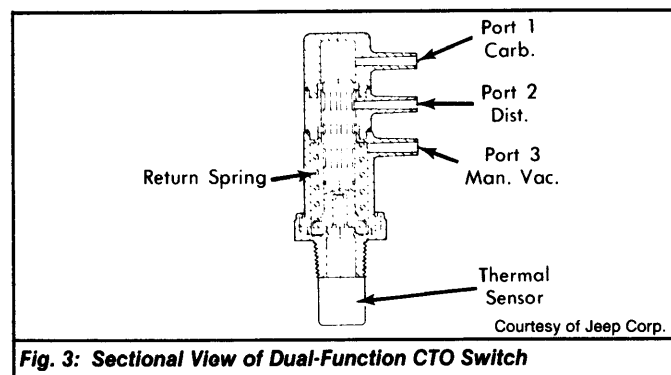


Fig. 3: Sectional View of Dual-Function CTO Switch

### NON-LINEAR VACUUM REGULATOR VALVE

There are 2 input ports on the NLVR: intake manifold vacuum and carburetor ported vacuum. One outlet port connects to the distributor vacuum unit. At curb idle, regulated vacuum is supplied to the advance unit. When manifold vacuum is high and ported vacuum is very low, the NLVR regulates the vacuum signal so it is between these two vacuum source levels at idle. As engine load increases and ported vacuum signal is above 7.5 in. Hg, regulator valve switch to ported vacuum output.

### TESTING

#### COOLANT TEMPERATURE OVERRIDE (CTO)

**Single-Function for Standard Cooling** – Connect a vacuum gauge to center port “D” of CTO switch. When coolant is below 160°F, manifold vacuum should register. Above 160°F, carburetor ported vacuum should be indicated. If valve does not respond, it must be replaced.

**Single-Function for Heavy Duty Cooling** – Connect a vacuum gauge to center port “D” of CTO switch. When coolant is below 220°F, carburetor ported vacuum should register. Above 220°F, manifold vacuum should be indicated.

**Dual-Function** – Connect a vacuum gauge to port “2” (distributor) of CTO switch. When coolant is below 149°F, manifold vacuum should register. From 149-220°F, carburetor ported vacuum should be indicated. Above 220°F, manifold vacuum should again be indicated.

### NON-LINEAR VACUUM REGULATOR VALVE

Connect vacuum gauge to distributor port (“DIST”) on NLVR. With engine at idle speed, a vacuum reading of 7 in. Hg should be shown. As throttle is opened and engine speed increases, ported vacuum level should be indicated. If not, replace NLVR.

### MAINTENANCE

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