



Tech TIPS

SUPPORTING TODAY'S PROFESSIONAL TECHNICIAN

What is Variable Assisted Power Steering, What is EVO?

What is EVO?

EVO means Electronic Variable Orifice. The EVO valve is a key component in variable assist systems. While vehicle manufacturer terminology may differ, a typical system works like this: At speeds below 40 MPH, the Electronic Variable Orifice valve (EVO) is completely open, allowing full hydraulic flow from the power steering pump through the steering unit for maximum power assist. Above that speed, a control module commands the EVO to partially close, restricting hydraulic flow. The reduced assist improves road feel while providing greater directional stability.

Problem:

A properly functioning system requires proper operation of the EVO valve (see below), control module and vehicle speed sensor. A malfunction in the EVO valve can result in loss of regulated assist or even complete loss of power assist. However, this problem often is mistakenly perceived to be a defective power steering pump or steering gear.



Pump-mounted
Ford EVO
valve



Pump-mounted GM
EVO valve and
adapter

Diagnostic Tip:

A scan tool should be used to determine if any variable effort system Diagnostic Trouble Codes (DTC) have been set. However, if the EVO has a mechanical or electrical failure or if foreign debris is trapped within the EVO orifices, a DTC may not be produced.

Test Tip:

Many EVO valves fail because the solenoid coil opens or develops an electrical short. This coil can be tested for continuity using a volt/ohm meter. Typical resistance is 10-15 ohms (refer to your vehicle's service manual for specific specs). An open or shorted coil indicates that the EVO is defective. DO NOT attempt to test the operation of the valve by applying direct battery voltage to the solenoid; the coil may draw too much current, causing it to fail. Even if the solenoid coil resistance is within range, the valve itself may malfunction due to debris or contamination. Simply shaking the EVO valve will allow the valve inside to move and rattle. If no rattle is heard, this indicates contamination or debris inside. In most cases, flushing is ineffective. Finally, remember that the ECM directly controls a pulse-width modulated signal to the valve. If the valve tests properly, it is possible that the ECM, vehicle speed sensor or related sensors are not working correctly. Sometimes simply disconnecting the connector from the ECM will restore unregulated assist.

Refer to the vehicle manufacturers' service manual for specific test procedures prior to changing any power system component.

Note:

NAPA Power Steering Pump numbers ending with "V1" or "V2" (i.e. 20-8747V1) are supplied with the EVO valve. Rack and Pinions ending with "E" are supplied with rack-mounted EVO valve.