




Steering System

Special Tool(s)

 ST138A	Flex Probe Kit 300-NUD105-R025DE or equivalent
 ST200A	Fluke 77-IV Digital Multimeter FLU77-4 or equivalent
 ST284A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Principles of Operation

Electronic Power Assist Steering (EPAS) System

The Electronic Power Assist Steering (EPAS) system provides power steering assist to the driver by replacing the conventional hydraulic valve system with an electric motor coupled to the steering rack by a toothed belt. The motor is controlled by the Power Steering Control Module (PSCM) that senses steering effort/use through an internally mounted steering shaft torque sensor. Steering assist is provided in proportion to the steering input effort and vehicle speed.

The EPAS system requires a 12-volt, hot at all times feed for system operation. The PSCM is activated when power is applied to the hard-wired ignition/run input. After activation, the PSCM monitors the High Speed Controller Area Network (HS-CAN) bus to determine if the vehicle is operating in a manner capable of supporting the EPAS system.

Once this is determined, vehicle speed sent by the PCM over the HS-CAN bus, steering shaft speed and direction sent by the steering shaft torque sensor and steering wheel angle/position determined by the motor position all provide the necessary information for the PSCM to determine the amount or level of assist provided by the EPAS system.

Assist is primarily based off of vehicle speed. As vehicle speed increases, the amount of assist provided by the system is decreased to improve and enhance road feel at the steering wheel. As vehicle speed decreases, the amount of assist provided by the system is increased to ease vehicle maneuvering. If the vehicle speed is missing or out of range, the PSCM defaults to a safe level of assist for all driving conditions. If the vehicle speed returns to the correct in-range values, the PSCM adjusts the level of assist accordingly. Steering wheel/shaft speed, torque and direction information allows the PSCM to determine how much assist is needed to turn the wheels right and left.

The PSCM continually monitors and adjusts steering efforts based on the torque sensor inputs to enhance the feel of the steering. Compensation is made to reduce the effect of pull or drift that may be experienced when driving on roads with a high degree of camber. Active nibble control is also employed by the PSCM to reduce the vibrating movement felt at the steering wheel that can be caused by driving on rough surfaces or out of balance wheels.

The PSCM is self-monitoring and has the capability of setting and storing DTCs. Depending on the DTC set, the control module enters into a "safe mode" of manual steering. In addition, the PSCM may send a request to the Instrument Panel Cluster (IPC) module over the HS-CAN bus to display a message in the message center to alert the driver of a potential EPAS concern.

Interactive Diagnostics

   VIN required to access Guided Routine (EPAS)

