

2022 CHEVROLET CORVETTE SERVICE MANUAL

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Power Steering System Description and Operation

Belt Driven Electronic Power Steering

The belt driven electronic power steering system consists of the following components:

- A belt drive and a ball nut mechanism
- A power pack; containing the K43 Power Steering Control Module, its sensors, the power steering motor
- A torque sensor
- The steering gear (rack and pinion)

The belt driven electric power steering system reduces the amount of effort needed to steer the vehicle by utilizing the power steering control module to control the power steering motor to maneuver the steering rack. The power steering control module uses input from the torque sensor, motor rotational sensor, battery voltage circuit and GMLAN serial data circuit to determine the level of motor assist. Vehicle speed and engine speed from the GMLAN serial data circuit is also used to adjust the amount of steering assist needed to steer the vehicle. At low speeds more assist is provided for easy turning during parking maneuvers. At higher speeds less assist is provided for improved road feel and directional stability.

The torque sensor is attached to the steering gear housing near the input shaft, and is critical to proper operation of the electronic power steering system. As the steering wheel is turned and torque is applied to the steering shaft, the torque sensor monitors the amount of input torque.

The K43 Power Steering Control Module responds to the torque sensor and motor rotational sensor by commanding current to the power steering motor.

The K43 Power Steering Control Module and motor are attached to the base of the steering gear housing, and applies power assist through the belt drive and ball nut mechanism to the steering rack. The ball nut mechanism translates the rotational movement of the belt drive system to lateral movement of the steering rack. The K43 Power Steering Control Module has the ability to detect malfunctions within the electric power steering system. Any malfunction detected that disables steering assist will cause the SERVICE POWER STEERING message to be displayed on the driver information center. Additionally, the K43 Power Steering Control Module calculates an internal system temperature which is used to protect the power steering system from damage caused by high temperature. When the calculated temperature exceeds a pre-determined level the amount of current commanded to the power steering motor is reduced. This will result in a temporary reduced level of assist. Full assist will return once the calculated temperature drops below the pre-determined level.

Dynamic Rack Travel

Dynamic rack travel feature utilizes of the following components:

- K43 Power Steering Control Module
- K19 Suspension Control Module
- B152LF Front Suspension Automatic Forward Lighting Position Sensor - Left
- B11RF Front Suspension 4 Corner Leveling System Position Sensor - Right

The feature dynamically manages the vehicle's maximum road wheel angle controlling the steering gear rack travel. Under tightly defined events (i.e. parking lots), the subsystem will allow additional steering angle to the wheels, which reduces the turning radius of the vehicle.

With this additional steering angle, the risk of tire/wheel contacting nearby parts increases if the vehicle position or wheel speed changes rapidly. Dynamic Rack Travel will understeer the road wheels to prevent part contact. For example, if the road wheels relative motion data exceeds a threshold while in this additional travel, the system will understeer the wheels to a position that will avoid the tire from contacting nearby parts.

The B152LF Front Suspension Automatic Forward Lighting Position Sensor - Left and B11RF Front Suspension 4 Corner Leveling System Position Sensor - Right provide the K19 Suspension Control Module with suspension position information. The sensors are connected to the front suspension control arms. As the vehicle travels, the suspension compresses and rebounds moving the front position sensors. This causes the signal output of the sensor to change. The K19 Suspension Control Module sends this information through serial data to the K43 Power Steering

Control Module to manage steering gear rack travel.

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