

Resetting a Corolla ESP torque sensor

A 2007 Corolla was brought to A.D.S Ryan recently with no power steering assistance. Seamus Ryan recounts the steps needed to get the car back on the road, and explains some EPS basics.

The Corolla was brought to our garage because there was a problem with the electronic power steering system (EPS). The warning light on the dash was on, and the system was not providing any assist to steering.

A Vedis II was connected to the Corolla and all of the trouble codes were read. After checking all of the components and wiring, it was determined that the EPS ECU was faulty and needed to be replaced.

The EPS ECU, located under the dashboard on the driver's side, was replaced, but needed to be adjusted before it would function properly. A torque sensor zero point adjustment is required when either the EPS ECU or steering column have been replaced. This adjustment can be done with an Autoland Vedis II or iScan II wt, with step by step instructions from the Autoland website, autolandsciencetech.com.

Before explaining the procedure for a torque sensor zero point adjustment, a better understanding of the basic function and operation of the EPS will help you with diagnoses and repair.

EPS Modes

There are several modes in which the EPS operates, depending on operating conditions and driver demands.

Normal Mode: Left and right steering assist is provided in response to driver demands. The amount of assist varies with vehicle speed.

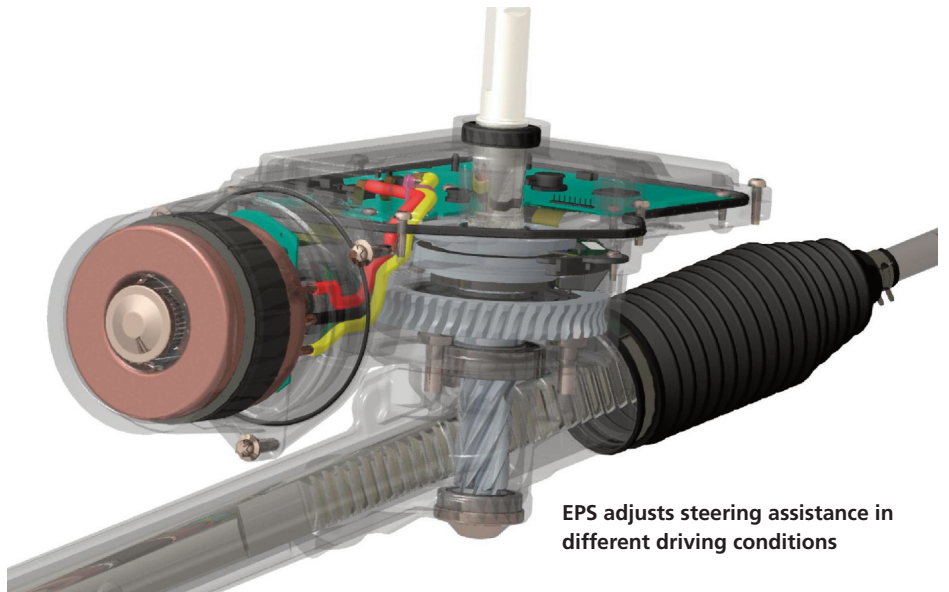
Return Mode: Used to assist steering to return to the neutral (driving straight ahead) position. Feedback from the steering position sensor prevents the EPS from overshooting the neutral position.

Damper Control Mode: Used to improve road feel and dampen kickback. This mode is usually only active at higher vehicle speeds.

Protection Mode: Used to protect electrical components in the EPS from thermal damage and excessive current flow, if the steering is held all the way to one side in the lock position for too long.

EPS Backup Protection

There are circumstances that will change the amount of assist provided to steering. The EPS may limit, suspend or even stop steering assist



completely, when certain situations arise. This is done to prevent one fault or failed component from causing further problems.

The EPS will limit assist if the:

- EPS motor is overheated.
- EPS ECU temperature is too high.
- EPS ECU temperature sensor of is faulty.
- vehicle speed sensor signal is faulty.
- engine speed sensor signal is faulty.

The EPS will stop assist if the:

- torque sensor is defective.
- EPS motor is overloaded.
- EPS motor is shorted.
- EPS ECU system has a fault.

The EPS will suspend assist if the voltage supply to the EPS is defective.

A torque sensor adjustment is required in the following circumstances:

- EPS ECU replacement
- Steering gear assembly replacement
- Difference in left/right steering force
- DTC C1515/C1516 only (Toyota only)

Torque Sensor Adjustment

Adjusting the torque sensor can only be done when all other EPS DTC faults have been cleared. The only DTCs that can be present are C1515 and C1516. Adjusting the torque sensor can be quickly and easily carried out with the use of an Autoland Verdis II or iScan II wt. After

plugging the scanner into the car, follow these steps:

- Select Vehicle Diagnostics
- Select Asian
- Select Japan
- Select Toyota
- Select OBD II and confirm the correct multiplexer
- Select Diagnosis
- Select Chassis System
- Select EMPS/EHPS
- Select Read Fault Codes
- Confirm that only DTCs are C1515 & C1516
- Select Adaptation and select proper type
- Follow all directions and confirm conditions
- Wait for sensor adjustment to complete
- Confirm that all DTCs have been cleared.

While these details are particular to a 2007 Toyota Corolla, many of the details of the operation and fundamentals of EPS are the same for most cars. EPS will become more common with every new model year, so a full understanding of the way in which it operates and controlled is vital.