

## Electromechanical Power Steering (EPS)

The difference between Electromechanical Power Steering (EPS) and conventional power steering lies in the type of servo-assist that the system provides. The EPS supports the driver using an electrical servomotor instead of a hydraulic electric motor. The servomotor is only active when the vehicle is being steered. This means that the servomotor consumes no power during straight-ahead driving.

Electromechanical power steering offers the following advantages:

- lower steering forces on parking
- integrated, driving-speed-dependent steering servo (Servotronic)
- lower bumpiness when cornering as well as lower steering wheel vibrations
- Fuel economy up to 0.3 l/100 km and therefore lower carbon dioxide emissions (CO<sub>2</sub> emissions)
- no hydraulic fluid necessary

## Functional description

The EPS unit consists of the following components:

- EPS control unit
- Servomotor with rotor position sensor
- Steering-torque sensor



### Note!

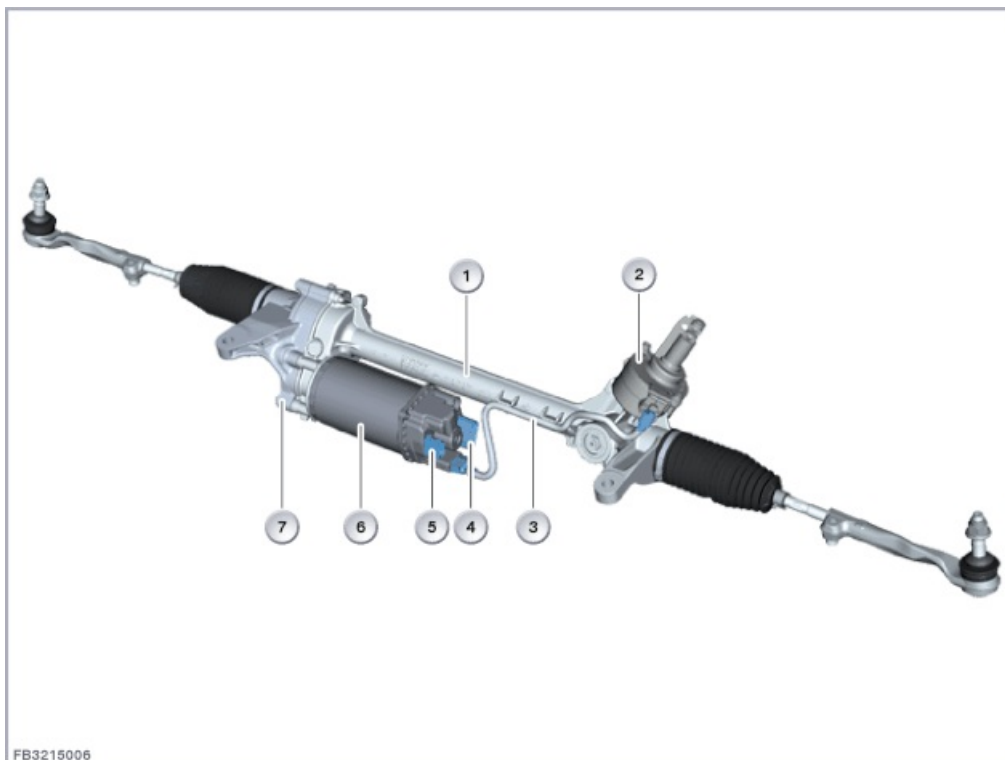
The EPS unit can only be replaced as a complete unit.

The EPS control unit is a component of the electromechanical power steering. The EPS control unit is connected to the vehicle electrical system with 2 plug connections. The steering-torque sensor is integrated into the EPS unit.

Several characteristic curves for power assistance, active steering wheel return as well as damping characteristics are stored in the EPS control unit. The values calculated from the input variables added to each characteristic curve result in the necessary steering servo.

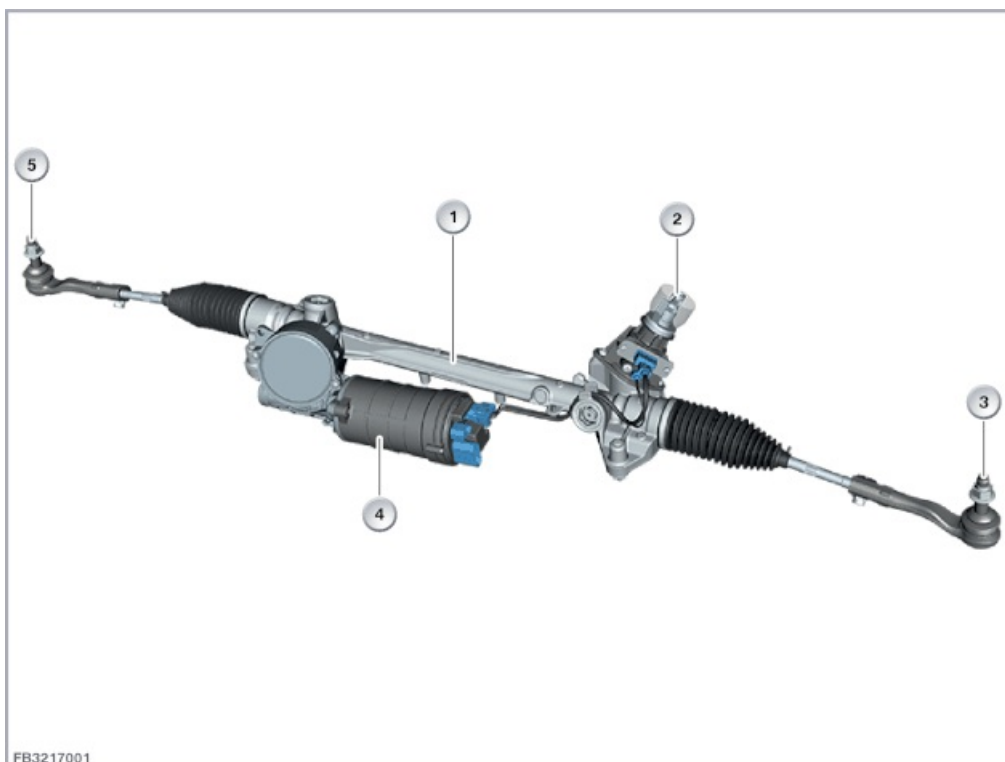
The most important input factor for the EPS is the driving speed.

Different versions of the electromechanical power steering can be used.



ThyssenKrupp EPS

Index	Explanation	Index	Explanation
1	Steering box	2	Steering-torque sensor
3	Electrical line between steering-torque sensor and EPS control unit (not replaceable)	4	two-pin plug connection
5	six-pin plug connection	6	EPS unit
7	spindle drive		



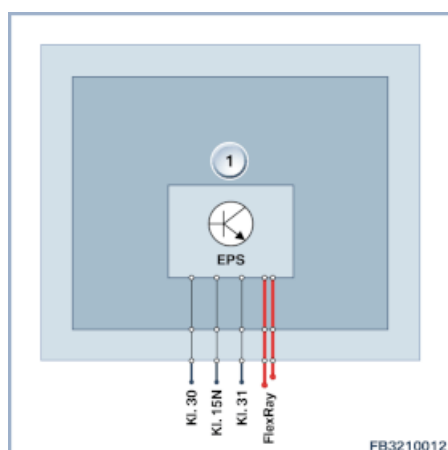
Index	Explanation	Index	Explanation
1	Steering box	2	Connection to the steering column
3	Left track rod	4	EPS unit
5	Right track rod		

## Structure and inner electrical connection

The EPS control unit is connected to the vehicle electrical system with 2 plug connections.

The steering-torque sensor is connected via another plug connection to the EPS control unit. Depending on the model series, the plug connection has 6 pins (2 pins assigned) or 5 pins (5 pins or 3 pins assigned).

The EPS control unit is a bus user on the FlexRay. The EPS unit is supplied with terminal 30 by the power distribution box of the engine compartment.



Index	Explanation
1	Control unit for electromechanical power steering

### Pin assignments

The graphic above shows only the supply and bus connection. The current pin assignment is located in the wiring diagrams in the ISTA diagnosis system. Click on the component code in the wiring diagram to activate the "Installation location" and "Pin assignment" tabs.

## Nominal values

Observe the following setpoint values for the electromechanical power steering (EPS) control unit:

Variable	Value
Supply voltage	9 to 16 volts
Temperature range	-40 °C to 80 °C

## Diagnosis instructions

### Failure of the component

If the communication to the EPS control unit fails, run the standard checks (global procedure). If there is an internal control unit fault, the following behaviour is to be expected:

- Fault entry in the control unit for electromechanical power steering (EPS)
- The fixed warning and indicator light lights up in the instrument panel
- Check Control message in the instrument panel

## General notes

**Note!**

After replacement of the steering, the limit positions of the steering box have to be relearned. Incorrectly learned end stops can lead to sudden elimination of the steering servo in the end stop.

The following preconditions must be met on learning the end stops:

1. Vehicle parked on a level surface.
2. Front wheels free for steering wheel movements.
3. Brake pedal not pressed and parking brake not engaged.
4. No fault code entry in the Dynamic Stability Control (DSC).
5. Indicator light and Check Control symbol light up in the instrument panel.
6. Steering wheel in straight-ahead position.

On learning the end stops, the steering wheel must be fully turned slowly once to the left and once to the right. The steering speed must be below one steering wheel turn per second. In the end stops, slowly increase the steering force until the steering wheel no longer turns.

Then return steering wheel to its centre position and let go of the steering wheel.

After about 5 seconds, the indicator lights and the Check Control symbol in the instrument cluster go out.

Since a data exchange between the diagnosis system and the EPS control unit is required for the start-up of the steering, the diagnosis provided service function "EPS: steering start-up" must be **mandatorily** used.

Path: **Service functions > chassis and suspension > electromechanical power steering**

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