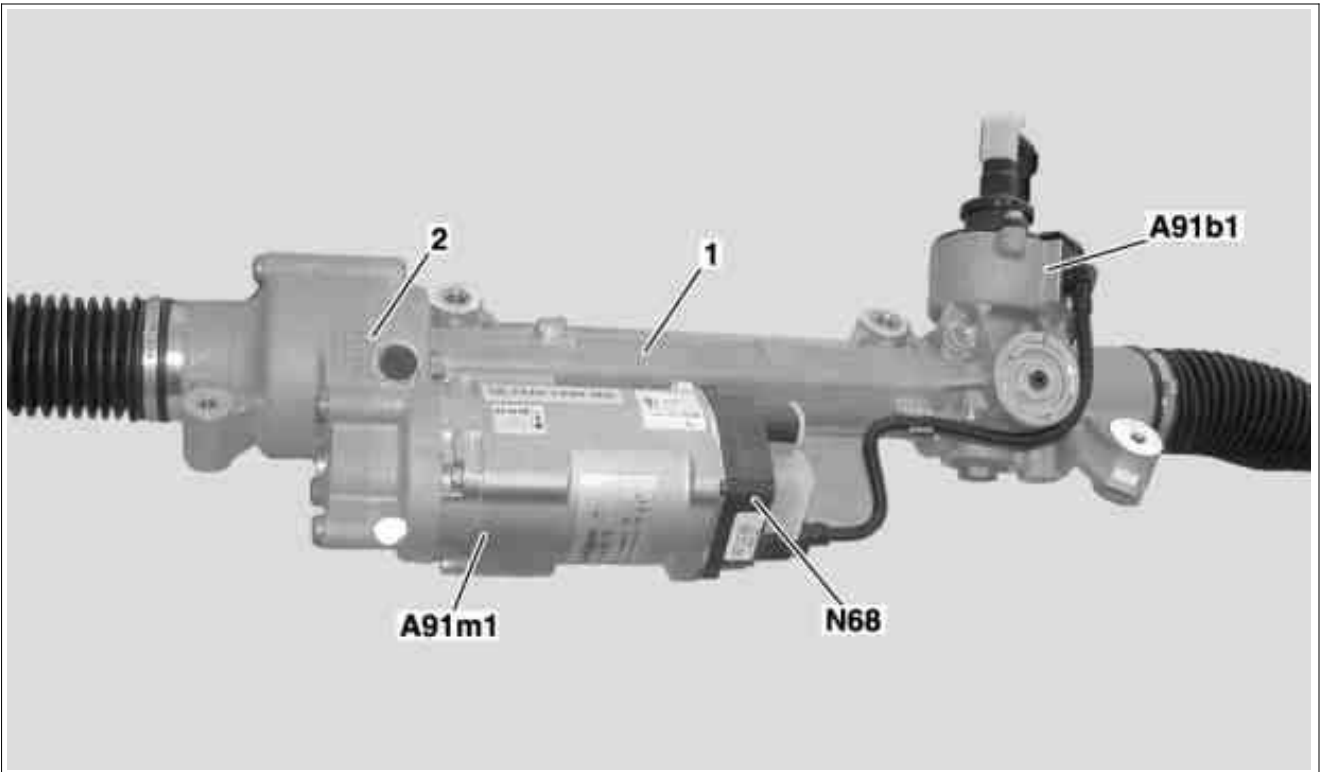


Document title Electric power steering (ES), function

Document number gf4635p0001flm

MODEL 212
as of model year 2014

- 1 Rack-and-pinion steering gear
- 2 Belt drive housing
- A91b1 Electric power steering torque sensor
- A91m1 Electric power steering actuator motor
- N68 Electrical power steering control unit



P46.35-2050-05

Function requirements, general

- Circuit 15 ON
- i** The status of circuit 15 ON is sent by the electronic ignition lock control unit (N73) via chassis CAN 1 (CAN E1) and chassis CAN 2 (CAN E2) with the front SAM control unit with fuse and relay module interface (N10/1) to the electrical power steering control unit. The engine speed is sent to the electrical power steering control unit via chassis CAN 1 and chassis CAN 2 with the front SAM control unit with fuse and relay module interface by the CDI control unit (N3/9) (with diesel engine) or ME-SFI control unit (N3/10) (with gasoline engine).

Electric power steering (ES), general

The ES consists of the rack-and-pinion steering gear, the electric power steering torque sensor, the electric power steering actuator motor and the electrical power steering control unit. The ES performs stepless, speed-dependent regulation of the power steering. The advantages compared to hydraulic power steering are:

- Enhanced steering feel
- Fuel saving
- Hydraulic fluid not required
- Compact design
- Speed-dependent steering power assistance
- Steering return is assisted
- Diagnosis capability

The ES comprises the following subfunctions:

- Power steering function sequence
- Steer Assist function sequence
- Function sequence for limp-home mode
- Function sequence for display in instrument cluster (A1)

Power steering function sequence

The electrical power steering control unit requires the following information to calculate the steering power assistance required:

- Current steering moment, from electric power steering torque sensor

- Current wheel speeds, detected via left front axle rpm sensor (L6/1), right front axle rpm sensor (L6/2), left rear axle rpm sensor (L6/3) and right rear axle rpm sensor (L6/4) and sent via chassis CAN 1 and chassis CAN 2 with front SAM control unit with fuse and relay module interface by Electronic Stability Program control unit (N30/4) (except CODE 233 (DISTRONIC PLUS), except CODE 990 (AMG vehicles), except hybrid) or Premium Electronic Stability Program control unit (N30/7) (with CODE 233 (DISTRONIC PLUS) or with CODE 990 (AMG vehicles), except hybrid) or regenerative braking system control unit (N30/6) (with hybrid)
- Steering angle and steering speed, via chassis CAN 1 and chassis CAN 2 with front SAM control unit with fuse and relay module interface from steering angle sensor (N49) in steering column tube module control unit (N80)
- Current engine speed > 400 rpm, via chassis CAN 1 and chassis CAN 2 with front SAM control unit with fuse and relay module interface from CDI control unit (with diesel engine) or ME-SFI control unit (with gasoline engine)

The electric power steering control unit uses this information to calculate the steering force support to be applied from a stored characteristics map and activates the electric power steering actuator motor accordingly. The steering force assistance is transmitted from the electric power steering actuator motor to the rack-and-pinion steering gear via a belt drive, supporting the steering moment applied by the driver. The direction of rotation of the electric power steering actuator motor depends on the direction of movement of the steering wheel.

i When the vehicle is at a standstill, no steering force support is available if the engine and ignition are switched off. If the vehicle is parked using the ECO start/stop function, a limited degree of steering power assistance is available at a standstill. The steering power assistance is deactivated after the ignition is switched off. Steering assistance is active if the vehicle is maneuvered when the engine is off and the ignition is switched on.

Steer Assist function sequence

Steer Assist is intended to help the driver achieve the optimal steering characteristics in critical situations. The Steer Assist function is realized with the aid of the electric power steering control unit and by means of the Electronic Stability Program control unit (except CODE 233 (DISTRONIC PLUS), except CODE 990 (AMG vehicles), except hybrid) or the Premium Electronic Stability Program control unit (with CODE 233 (DISTRONIC PLUS) or with CODE 990 (AMG vehicles), except hybrid) or the regenerative braking system control unit (with hybrid). The following functions are performed here:

- Driver support through countersteering for a vehicle with oversteer
- Driver support when braking on alternating road surfaces

The current driving status is acquired by the Electronic Stability Program control unit (except CODE 233 (DISTRONIC PLUS), except CODE 990 (AMG vehicles), except hybrid) or the Premium Electronic Stability Program control unit (with CODE 233 (DISTRONIC PLUS) or with CODE 990 (AMG vehicles), except hybrid) or the regenerative braking system control unit (with hybrid).

If necessary, the "steering assistance torque request" message is sent over the chassis CAN 1 and chassis CAN 2 with the front SAM control unit with fuse and relay module interface to the electrical power steering control unit, which actuates the electric power steering actuator motor.

Function sequence for limp-home mode

When the ES is switched on (via "circuit 15 ON"), the electric power steering control unit carries out a self-test. If a fault is detected, the steering force assistance is not switched on. The vehicle can be steered with increased force of the hand.

During driving operation, the electrical power steering control unit checks the signals from the electric power steering torque sensor and the current sensor in the electric power steering actuator motor. If these signals are outside the defined upper or lower limit, the ES is switched off by the electrical power steering control unit.

The vehicle can be steered with increased force of the hand.

Display on instrument cluster function sequence

The electrical power steering control unit control unit transmits the request for a warning message via chassis CAN 2 to the instrument cluster.

The warning message "Power Steering Defective! Service Required!" is then displayed in the instrument cluster.

	Electrical function schematic for electric power steering		PE46.35-P-2050-97DAB
	Electric power steering (ES), location of components		GF46.35-P-0001-02FL
	Electric power steering (ES), block diagram		GF46.35-P-0001-03FL
	Overview of system components of electric power steering (ES)		GF46.35-P-9997FL