

Fit TRW True Originals in your workshop.



The TRW Electric Park Brake

TRW is the leading supplier of advanced parking brake systems worldwide and was first-to-market with its Electric Park Brake (EPB) on a mass production vehicle in 2001. The system functions as a conventional hydraulic brake for standard service brake applications and as an electric brake for parking. The EPB caliper is composed of one electro-mechanical actuator integrated into the disc brake caliper and an electronic control unit which is activated from inside the vehicle cabin by a simple rocker switch.

Here are some of the benefits of an electrically operated parking brake:

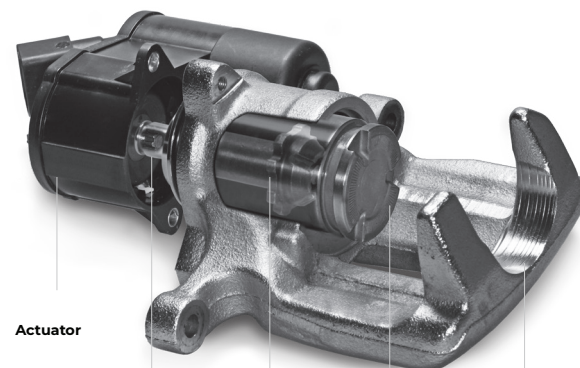
- Maximum brake power in all operating conditions
- High safety level and a wide range of comfort functions due to the use of state of the art software
- Parking brake cables are replaced by electric wires (no freezing or tearing of cables)
- Pad wear detection and temperature model (retensioning when the brake cools down)
- Automatic clamping when opening the doors or ignition off

The EPB system's communication interface with other vehicle systems means that a number of design features can be added as specified by the vehicle manufacturer.

Here are some examples for the technology enhancement features of an EPB system*:

- Drive Away Assist – This system enables the driver to start on an incline without the vehicle rolling back unintentionally. The control unit calculates the time of opening using the information on the gear selected, the accelerator pedal position and the engine torque as well as the tilt angle sensor integrated in the control unit
- If the hydraulic brake system is working properly and the EPB is activated while driving, the stability program takes over braking with a maximum deceleration of 8 m/s² up to a speed of approx. 8 km/h. Below this speed, the EPB system takes over further deceleration. The operation corresponds to that of the handbrake lever. As long as the switch is pulled, the vehicle is decelerated. Releasing the switch stops braking.
- If the switch on the electric parking brake is actuated while driving due to a failure of the hydraulic braking system, the system interprets this as an event of emergency and initiates a control process. Since the complete and immediate closing would block the rear axle and cause the vehicle to swerve, the parking brake is instead closed and opened in quick succession (similar to the function of the ABS). This mode safely brakes the vehicle to a standstill.

*When troubleshooting, the information provided by the vehicle manufacturer must be observed precisely, since the safety and comfort functions can vary.



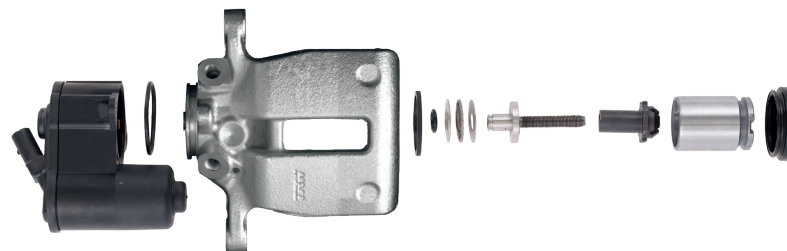
Actuator

Spindle

Pressure nut

Piston

Caliper housing

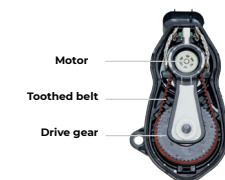


TRW EPB and Actuator Repair Kit

The spindle has a thread with the pressure nut screwed on. Spindle and pressure nut are integrated in the brake piston. With a flattened area and a corresponding shape of the piston the nut is locked against turning. If the spindle is turned via the connection to the gear mechanism in the actuator, the pressure nut will move the piston towards the brake pads and thereby towards the brake disc – the brake is applied.

Brake caliper

The brake caliper is of the single-piston "Colette" fist type design. The hydraulic function of the brake caliper is not at all different from the function of a conventional brake system.



Motor

Toothed belt

Drive gear

Actuator

The motor drives a toothed belt which drives the gear (swash plate or planetary mechanism) on the other side. With the integrated output Torx**, the gear is directly plugged onto the spindle of the brake.

**Torx is a registered trade mark of Textron Inc.



Planetary gear

The double stage planetary gear integrated in the actuator, transmits the rotary movement of the toothed belt with an overall ratio of ~120:1 in at least up to 25 kN clamping force. These high forces are necessary to last for the growing number of bigger cars using the EPB system.

Technical data:

- Transmission ratio ~120:1 (in 3 stages)
- Stage 1 ~3:1 (belt drive)
- Stage 2/3 ~40:1 (planetary gear).

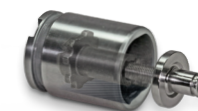


Swash plate gear

The single stage swash plate gear is the first generation of gear, actuating the electric park brake. With a climbing force of up to 19 kN by a transmission ratio of ~150:1, it nevertheless fulfills the demands on a park brake system for a wide range of cars.

Technical data:

- Transmission ratio ~150:1 (in 2 stages)
- Stage 1 ~3:1 (belt drive)
- Stage 2 ~50:1 (swash plate gear).



Piston, spindle and pressure nut

The actuator, as an electrical component, is always subject to extreme wear and tear and can therefore fail before the caliper.

TRW offers the EPB as a pre-assembled unit consisting of caliper housing and actuator and, as a cost-effective alternative for a quick repair, our OE quality actuator is also available as a standalone part with repair kit including two screws and one O-ring.