

## Electric Park Brake

General guide to renewing components of the electric parking brake from TRW.



*For safety reasons and to achieve an optimum effect, all maintenance and repair activities must only be carried out by trained professionals in accordance with the guidelines and specifications issued by the vehicle manufacturer. TRW accepts no liability for damage caused by inexpert fitting and assembling. When carrying out any work, TRW recommends wearing appropriate protective equipment.*

### 1. Important notes about this guide:

#### 1.1 Work flow

The workflow described here may vary depending on the vehicle type. The figures shown in the guide are there to give a better understanding and do not illustrate components specific to a particular vehicle. Only the removal of components is described. Instructions for special installation procedures are given separately. We reserve the right to make technical changes.

#### 1.2 Checks

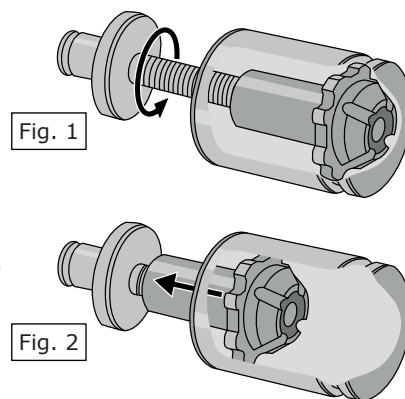
Before starting repairs, check that all the parts of the brake system that you will not be replacing are in perfect working order. These include the brake hoses and pipes, the condition of the brake fluid (boiling point), the seals and pistons of the brake caliper, the guide bolts on the brake carrier as well as the wheel hub and wheel bearings.

#### 1.3 Diagnosis



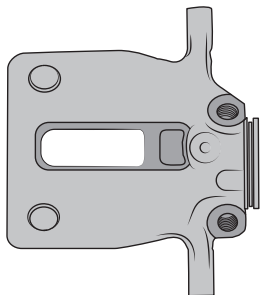
For professional repair, maintenance and diagnostic work on the electric parking brake, an electronic diagnostic instrument must be available that can be connected to the vehicle via the On-Board-Diagnosis (OBD).

Before replacing a component of the EPB, the system must be brought into the maintenance mode with the help of this diagnostic device. To do this, the controller rotates the spindle (Fig. 1), so that the pressure nut can be driven back to its starting position (Fig. 2). After the repair is completed, the system has to be calibrated.



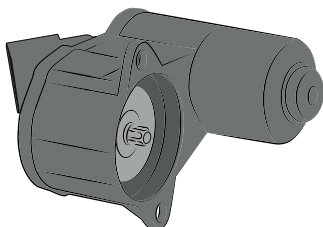
## 2. Components of the Electric Park Brake

### 2.1 Brake caliper



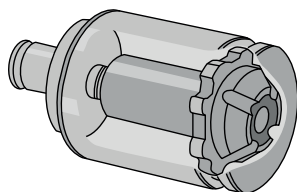
The caliper of the electric park brake is a one-piston fist caliper of the “Colette” type. The hydraulic function is the same, regardless of whether the caliper is without parking brake, or has a mechanical parking brake.

### 2.2 Actuator



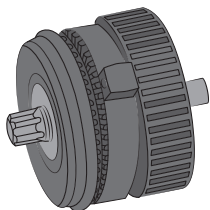
The electric motor drives the actuating gear box via a toothed belt. Gear box and spindle are connected together using a Torx® at the gearbox output.

### 2.3 Piston, spindle and pressure nut



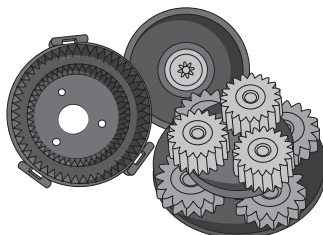
The spindle is connected to the pressure nut by a self-locking thread. The pressure nut is secured against rotating in the piston due to its shape and the corresponding flat portion in the inside of the piston. As soon as the spindle is rotated by the gearbox in the actuator, the pressure nut pushes the piston and, with it, the brake pad against the brake disc - the brake is activated. In the reverse direction, the brake is released by the deformation of the piston seal ring (rollback).

### 2.4 Gearbox



#### Swash plate gearbox

In the first generation of actuators, a single-stage swash plate gearbox assumed the task of activating the parking brake. With a clamping force of up to 19kN for an overall ratio of ~150:1, it fulfils the requirements of the parking brake on the majority of production vehicles.



#### Planetary gearbox

The two-stage, planetary gearbox integrated in the actuator, converts the rotary motion of the motor via the toothed belt with an overall gear ratio of ~120:1 into a clamping force of up to 25kN. These high clamping forces are required to fulfil the requirements of the parking brake for heavy vehicles.

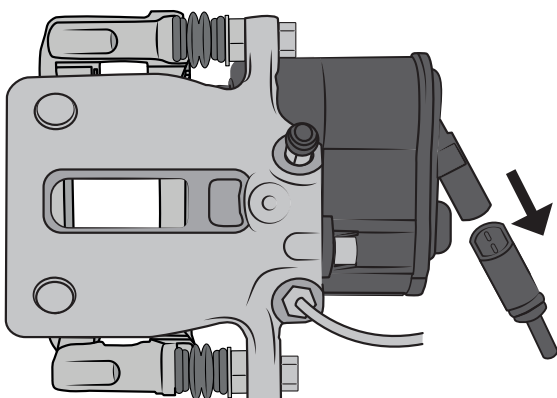
### 3. Replacement

#### 3.1 Housing-actuator unit



Before replacing the housing-actuator unit, the system must be brought into the maintenance mode with the help of a diagnostic device.

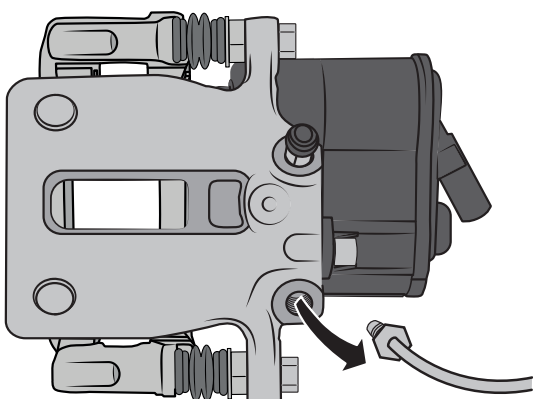
##### 3.1.1 Remove the connector



Undo the locking of the connector with a suitable tool, and pull off the connector from the actuator.

*NOTE: Some EPB systems use actuators with an integral cable. In this case, the plug connection must be disconnected on the cable harness of the vehicle. This is located, as a rule, in the relevant wheel housing!*

##### 3.1.2 Remove the brake hose/pipe

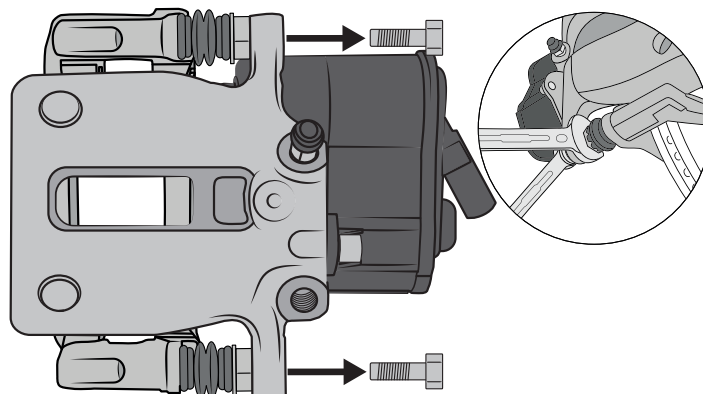


Remove the brake hose/pipe and close the end with a suitable plug to prevent brake fluid running out and emptying the system.

**⚠ ATTENTION:** Brake fluid dissolves paint and is a danger to health.

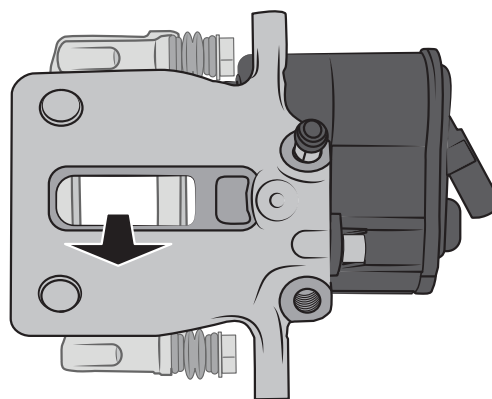
*It is mandatory to observe the safety instructions from the manufacturer when handling brake fluid.*

##### 3.1.3 Remove the fixing bolts



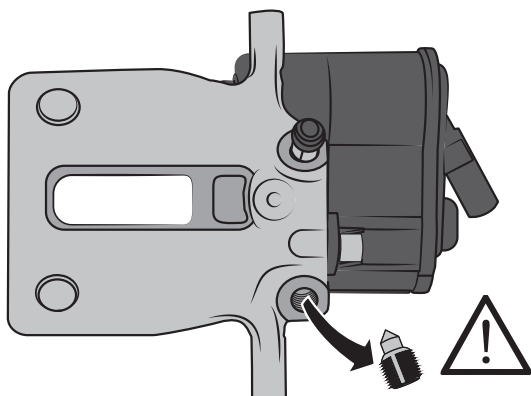
Loosen and remove both fixing bolts of the brake housing. During this and depending on the design of brake caliper, the guide pins on the brake carrier must be held fixed using a suitable tool.

##### 3.1.4 Remove the housing



The housing-actuator unit can now be pulled off the brake carrier in the direction of the arrow.

Installation takes place in the reverse order.



*NOTE: Pre-filled housings are fitted with a plug at the connection to the brake hose/pipe. This must be removed before the brake line is connected again!*

Bleed the air from the brake system!



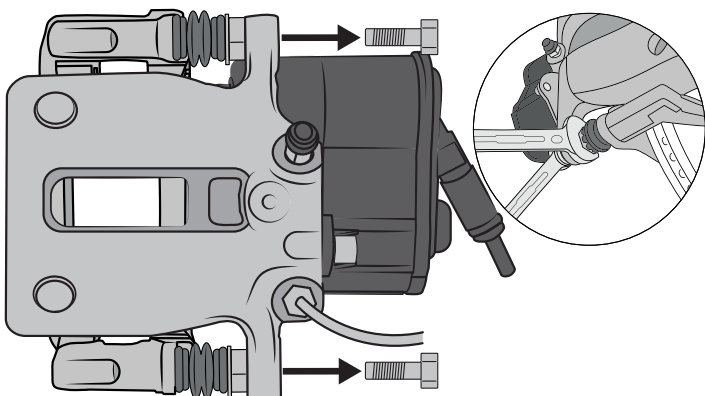
Once installed, the system must be calibrated using the diagnostic device. Follow the instructions from the vehicle manufacturer in this respect.

### 3.2 Brake carrier

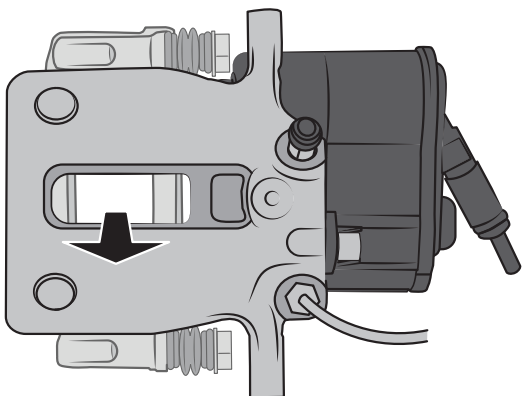


Before replacement of the carrier, the system must be brought into the maintenance mode with the help of a diagnostic device.

#### 3.2.1 Remove the brake housing



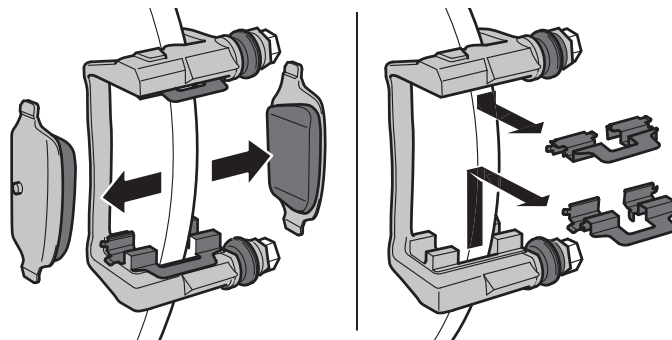
Loosen and remove both fixing bolts of the brake housing. During this and depending on the design of brake caliper, the guide pins on the brake carrier must be held fixed using a suitable tool.



The housing, including the actuator, can now be pulled off the brake carrier in the direction of the arrow.

**NOTE:** Fix the housing so that the brake hose / brake pipe and cable of the actuator connector are not damaged.

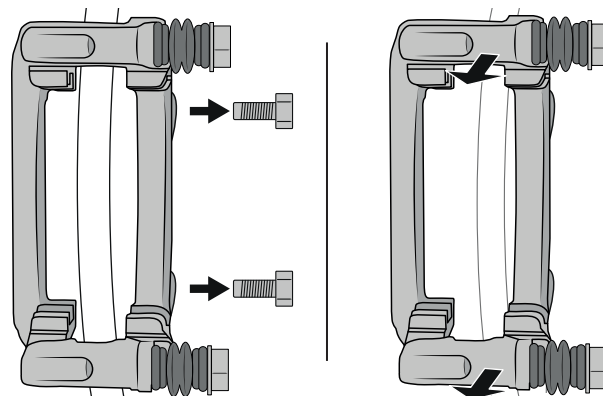
#### 3.2.2 Remove the brake pads



Remove the brake pads and pad retaining springs from the brake carrier.

**NOTE:** The exact procedure and special instructions for changing the brake pads are described in Section 3.3.

#### 3.2.3 Remove the brake carrier



Loosen and remove both fixing bolts holding the brake carrier to the steering knuckle. The brake carrier can now be removed from the steering knuckle.

Installation takes place in the reverse order.

**NOTE:** Observe the manufacturer information in terms of torques and the use of thread-locking means for bolts.



Once installed, the system must be calibrated using the diagnostic device. Follow the instructions from the vehicle manufacturer in this respect.

### 3.3 Brake pads



Before replacement of the brake pads, the system must be brought into the maintenance mode “Pad changing” with the help of a diagnostic device.

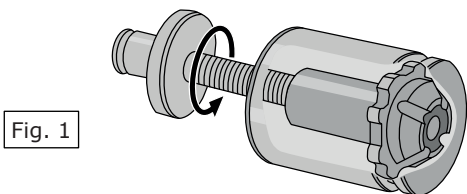


Fig. 1

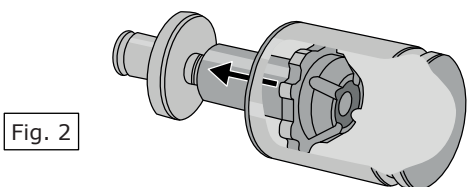
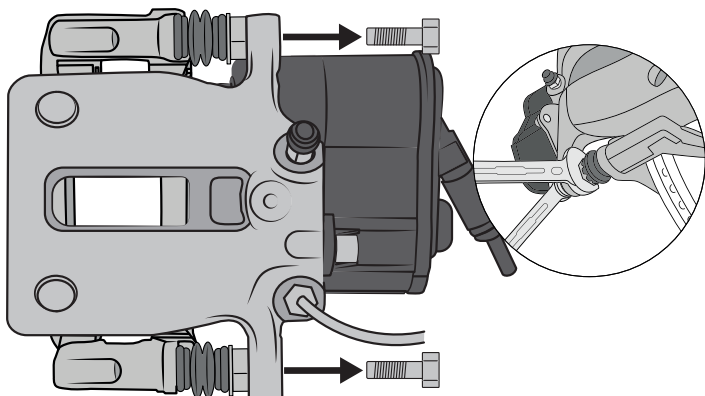


Fig. 2

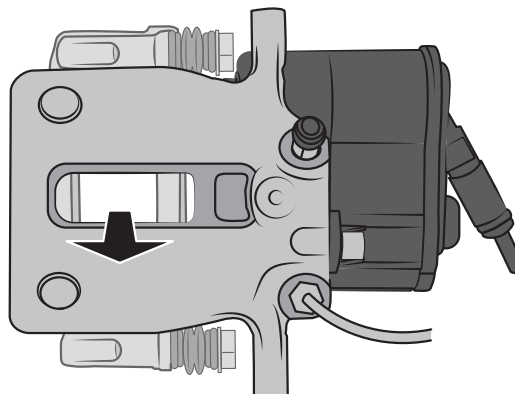
In this maintenance mode, the controller rotates the spindle (Fig. 1) so that the pressure nut is driven back to its starting position (Fig. 2).

#### 3.3.1 Remove the fixing bolts



Loosen and remove both fixing bolts of the brake housing. During this and depending on the design of brake calliper, the guide pins on the brake carrier must be held fixed using a suitable tool.

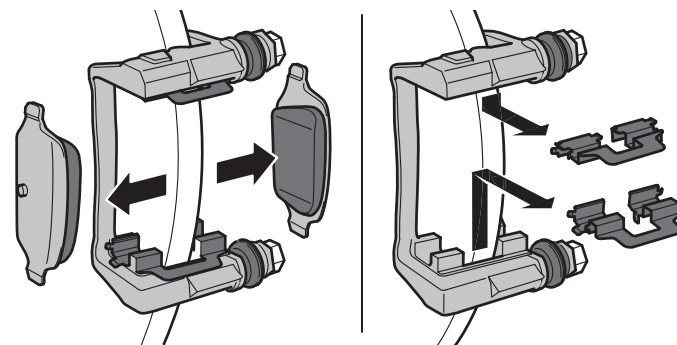
#### 3.3.2 Remove the housing



The housing, including the actuator, can now be pulled off the brake carrier in the direction of the arrow.

*NOTE: Fix the housing so that the brake hose / brake pipe and cable of the actuator connector are not damaged.*

#### 3.3.3 Remove the pads

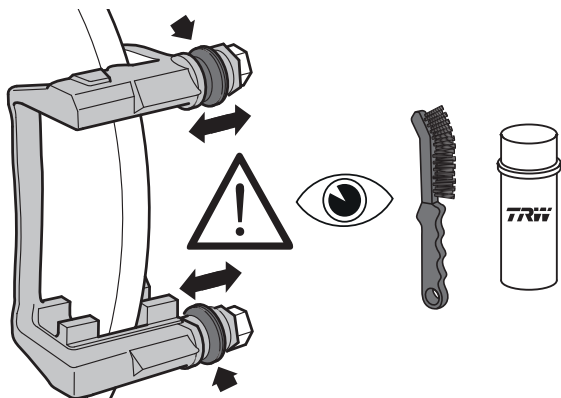


Remove the brake pads and pad retaining springs from the brake carrier.

*NOTE: The pad-retaining springs should always be renewed as they are largely responsible for noise-free operation of the brakes. Should the retaining springs be used again, however, care is absolutely necessary to ensure that no deformation takes place during their fitting and removal!*



### 3.3.4 Inspect and clean the brake carrier

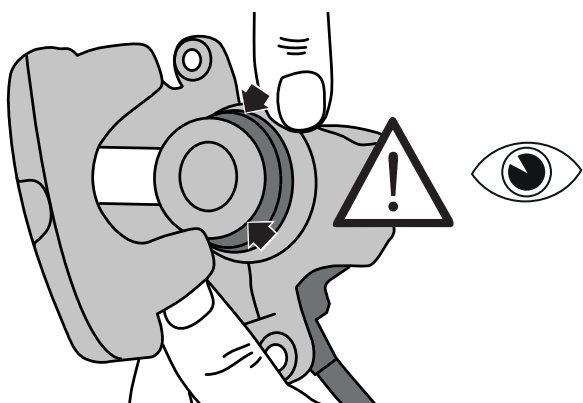


Before assembling the brake, the following components of the brake carrier must be examined:

- Guide pins for ease of movement and radial clearance
- Dust covers for cracks and sealing quality
- Contact surfaces of the pad retaining springs or of the pads for damage due to increased corrosion

The brake carrier must then be thoroughly cleaned.

### 3.3.5 Inspect and clean the brake housing

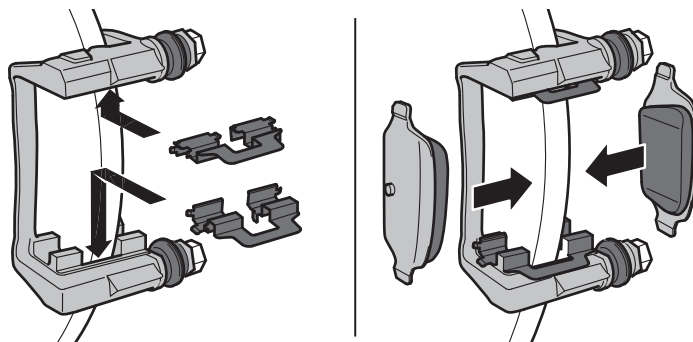


Before assembling the brake, the following components of the brake housing must be examined:

- Piston boot for cracks and sealing quality
- Pistons for ease of movement
- Housing for mechanical damage

The brake housing must then be thoroughly cleaned.

### 3.3.6 Fitting the brake pads



Fit the pad-retaining springs and brake pads to the brake carrier.

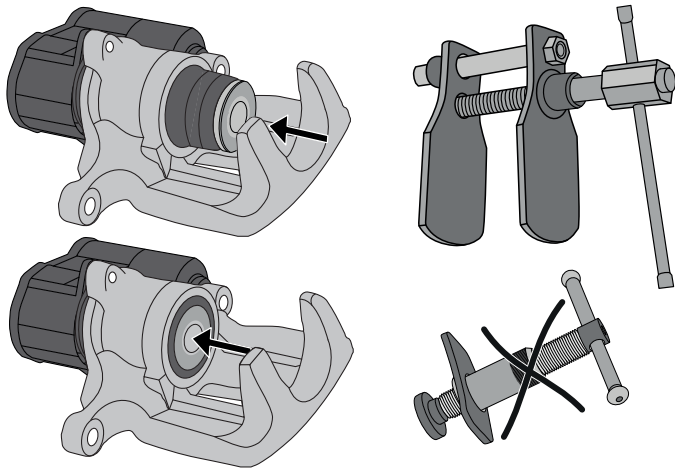
*NOTE: Lubricants such as grease or copper paste may not be used unless they are expressly specified! Should the pad retaining springs or the pads jam during the fitting, the brake carrier must be cleaned again or, in case of doubt, replaced. Do not machine the pad or carrier under any circumstances!*

*To guarantee perfect functioning of the brake system, observe precisely all additional information on the pads, such as pulling off adhesive films or the direction of installation of the pads, for example!*



Brake pad with recess and details of the fitting direction on the back plate of the pad

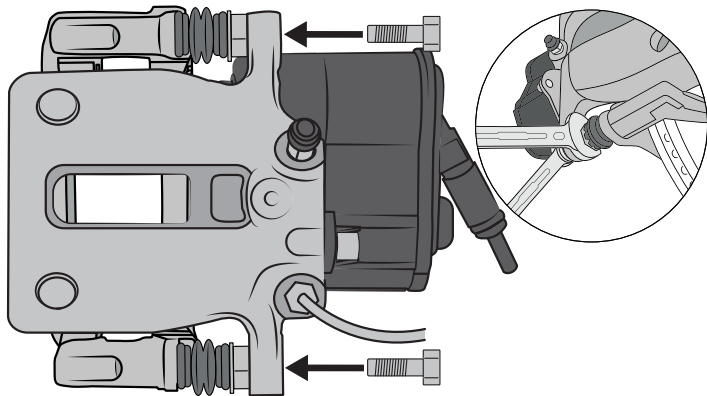
### 3.3.7 Push back the brake piston



Before fitting the housing to the brake carrier, the piston must be pushed back to its original position using a suitable tool.

**NOTE:** *The brake piston in an EPB brake calliper must not be rotated back to the start position, in contrast to the practice with mechanical hand brakes. This leads to damage to the pressure nut and/or spindle!*

### 3.3.8 Fit housing



Insert fixing bolts for the housing and tighten to the torque specified by the manufacturer. During this and depending on the design of brake calliper, the guide pins on the brake carrier must be held fixed using a suitable tool.



Once installed, the system must be calibrated using the diagnostic device. Follow the instructions from the vehicle manufacturer in this respect.