



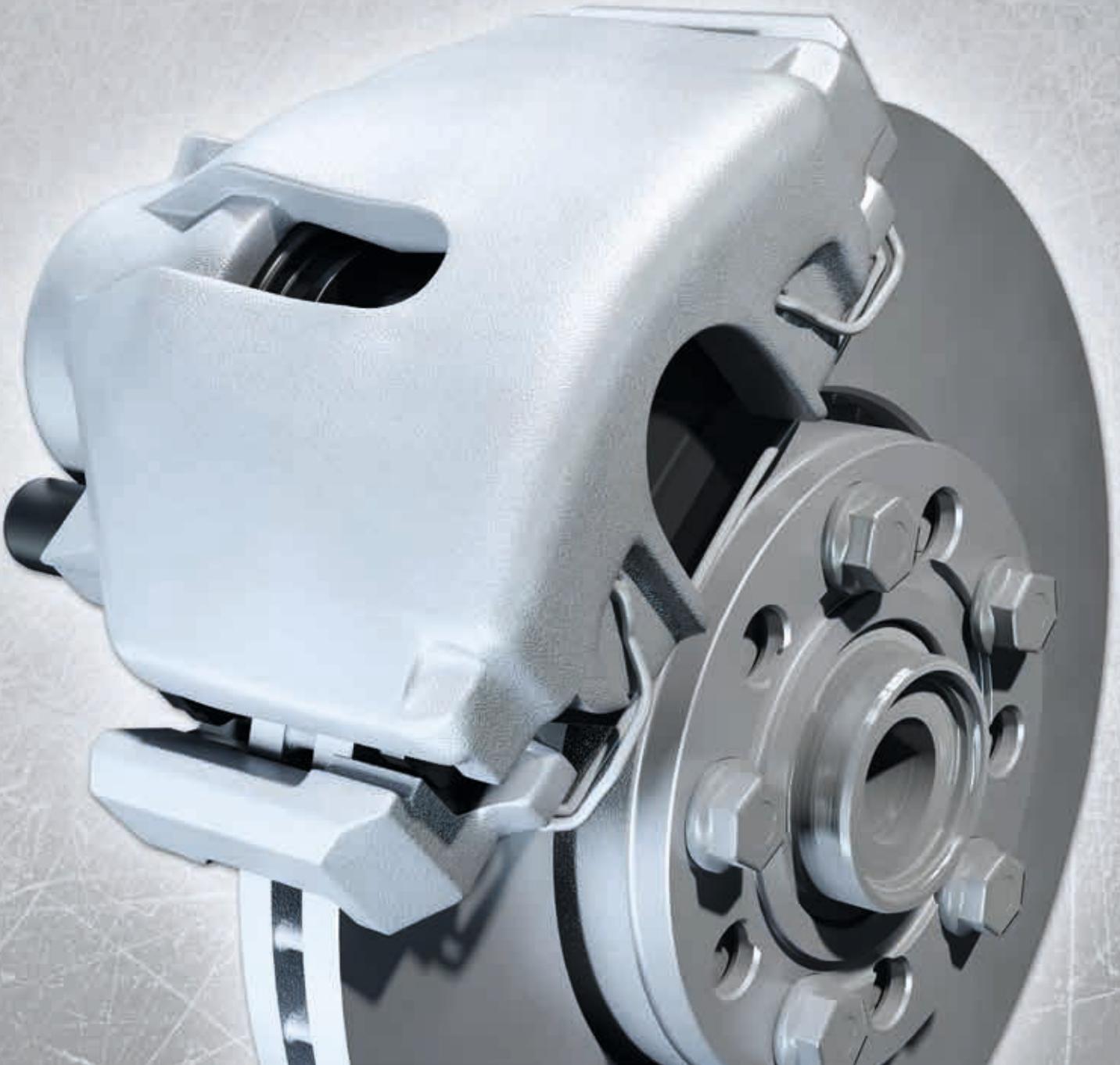
**PAGID**

BRAKE SYSTEMS

**SERVICE NOTE**

DISC BRAKE

SERVICE COMPENDIUM



## DISC BRAKE SERVICE COMPENDIUM

# Removing and installing the front disc brakes

For illustration purposes, a BMW 320i (E90) fitted with a Brake Caliper Type Teves FN is used in the following service note as an example, but this can also apply to other vehicle models equipped with brake calipers of the same type.

The schematic illustrations, pictures and descriptions are for explanation and presentation of the document text only, and cannot be used as the basis for carrying out the repair.

### Note regarding installation:

Repair and service work to brake systems may only be carried out by qualified specialists.

When carrying out any repairs on the brake system, you must follow the maintenance and safety instructions of the vehicle manufacturer and the product-specific assembly instructions.



## DISC BRAKE SERVICE COMPENDIUM

# Removing and installing the front disc brakes

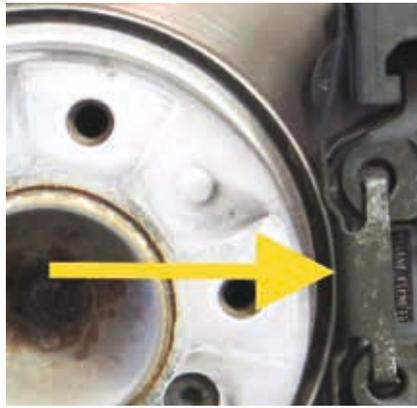
### Carry out a visual inspection



Before carrying out the repair, it is advisable to check all relevant components in the area of the axle and the wheel brake, such as the tyres, brake hose or transverse control arm for example, for damage.

- Defective parts are to be absolutely replaced.

### Remove the brake caliper, take out the housing retaining spring



- Push the retaining spring in the direction of the arrow against the spring force and remove sideways.
- Check the retaining spring for damage and replace if required.

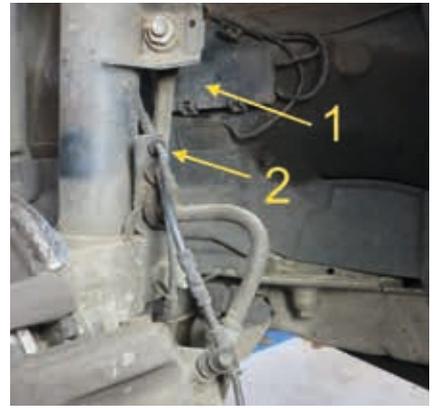
**! NOTE:**

When repairing the brakes of vehicles which are more than 48 months old, we also recommend you also replace the retaining spring.

**Warning:**

The retaining spring is pre-loaded. If it jumps sideways it can cause injury.

### Unclip the wiring harness of the brake pad wear indicator

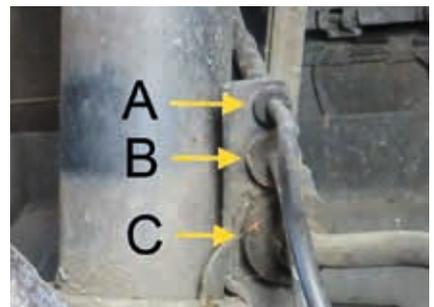


- To do so, open the connector housing (1) in the wheel well, release the connector and detach the wiring harness at the combination holder (2).

**! NOTE:**

The following component connections are securely fixed in the combination holder on the suspension strut:

- Wear indicator for brake pad (A)
- ABS sensor (B)
- Brake hose (C)

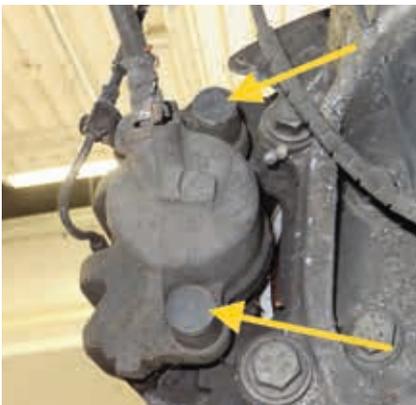




## Preparatory work

- Drive the vehicle onto a lifting platform
- Remove the front wheels

## Remove the protective plug of the guide bolt



Check the protective plugs and damping sleeves for damage.

- Defective parts must be replaced without fail

### ! NOTE:

The guide bolt can corrode as a result of water and dirt ingress which inhibits the function of the brake caliper. This in turn leads to one-sided braking behaviour and premature wear.

## Undo and remove the two fixing screws



### Tools required:

- Allan key 7mm

## Remove the brake caliper from the brake anchor plate



Pull the brake caliper back and off. Then take the outer brake pad out of the brake caliper.

### Remove the brake pad on the piston side



As the brake pad on the piston side is mounted with a retaining spring in the piston, this must be pulled forwards in order to remove it. Take the wear indicator out of the pad.

**| NOTE:**

As the wear indicator loses its adhesion once it has been removed from the brake pad, this must always be replaced once removed.

### Tie up the brake caliper on the suspension strut using a suitable hook

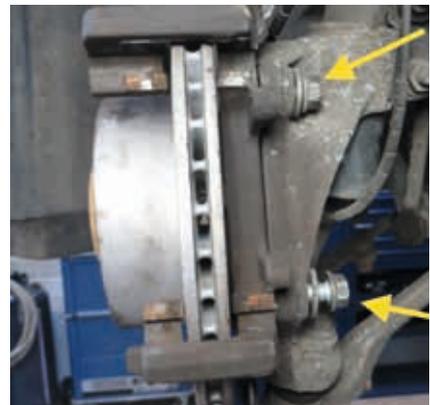


- Avoid twisting or buckling the brake hose during the procedure.
- Detach the brake hose at the holder on the suspension strut if necessary.

**| NOTE:**

To avoid damage, do not leave the brake caliper hanging from the brake hose!

### Slacken and unscrew the fixing screws of the caliper anchor bracket



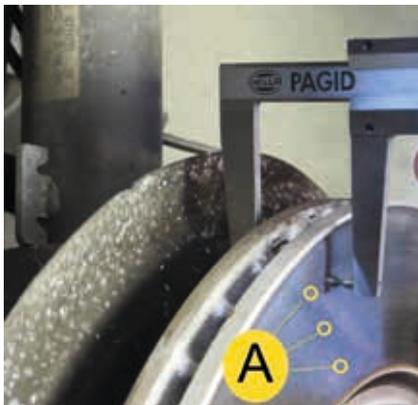
- Remove the caliper anchor bracket and check for damage.



## Always remove the brake discs in pairs

New brake pads may only be installed if the minimum thickness of the brake discs (MIN TH) has not been undercut.

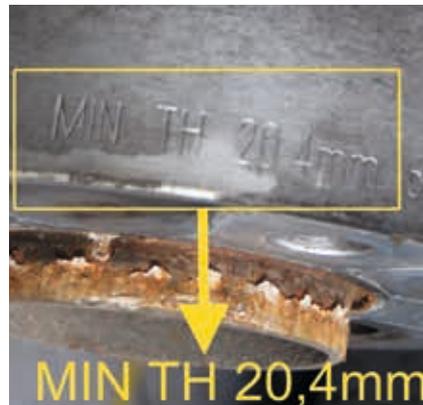
### Brake discs Checking the minimum thickness



Check the wear limit of the brake disc using a suitable tool.

- Place a gauge at several measuring points (A) on the brake disc and take measurements.
- Compare the lowest value with the desired value (minimum thickness).

### Target value



The desired value in millimeters is stamped on the outer edge or on the brake disc pot.

- MIN TH = Minimum Thickness
- If the desired value is undercut, the brake disc must be replaced.

#### ! NOTE:

The value is calculated so that under normal driving conditions and taking into account the previous brake pad replacement intervals, another set of brake pads could be installed. If the garage does not have any information on this, we recommend you replace the brake discs and pads

### Removing the brake disc



- Undo the fixing screw
- Remove the brake disc

#### | NOTE:

If the brake discs are sticking, carefully tap the bottom of the brake disc pot with a rubber hammer.

### Checking the wheel hub



- Check surface for corrosion and damage
- Check thread for damage

### Cleaning the contact face of the wheel hub



- Remove soiling and signs of corrosion using a suitable tool.

**NOTE:**  
Unevenness of the contact face can lead to warping of the brake disc and therefore axial runout!

### Protection against corrosion



The contact face of the wheel hub must be undamaged, rust-free, clean and bright. To protect against corrosion, apply a thin coating of spay oil to the contact face then wipe off with a lint-free cloth.

- NOTE:**
- Do not grease the surface of the wheel hub after cleaning!
  - The grease could come into contact with the brake during rotation.
  - The tightening torque of the rims could then no longer be ensured.

## Assembling the brake disc



Mount the brake disc and fasten with locating screw.

### NOTE:

- Observe the tightening torque!

## Preparing the brake caliper anchor bracket for assembly



The recommended way to do this is to remove the anchor bracket and clamp it in a vise.

- Clean the anchor bracket with brake cleaner
- Carefully remove any corrosion on the guide surfaces using a wire brush or file

### Warning:

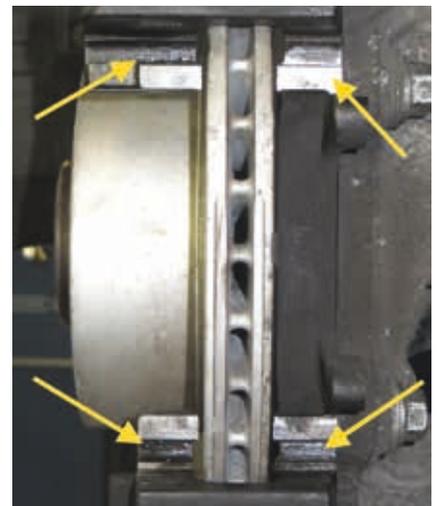
It is essential to avoid mechanical damage to the guide surfaces!

## Installing the brake caliper anchor bracket



- Insert screws and tighten
- **Observe tightening torque!**

Finally, apply a thin coating of non-conductive non-metallic anti-squeal paste to the clean contact faces of the caliper anchor bracket.



## BRAKE CALIPER TYPE TEVES FN

# Mounting the brake caliper

### Push the brake piston right back



Push the brake piston right back using the reset tool.

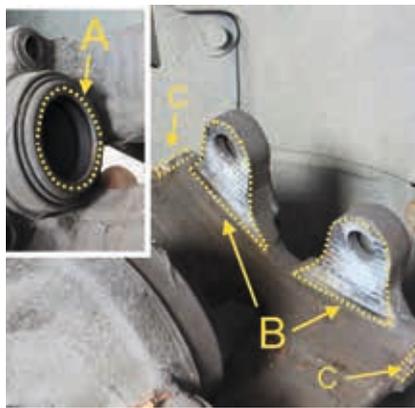
- Check the dust protection boot of the piston for damage.

**NOTE:**

Observe the brake fluid level in the expansion tank when pushing back the piston.

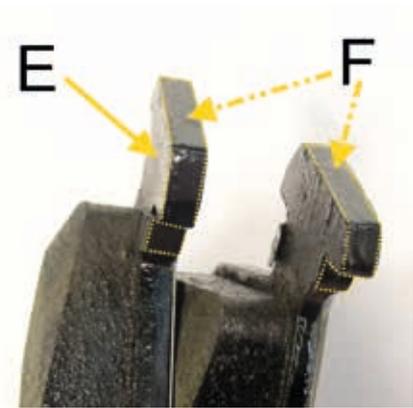
Drain the tank beforehand if necessary.

### Clean the brake caliper with brake cleaner



- Thinly coat the contact face (A) of the brake piston with anti-squeal paste.
- Clean the contact face (B) and also thinly coat with brake paste.
- Clean the contact face (C) of the hammer heads / brake calipers and thinly coat with anti-squeal paste.

### Installing the brake pads



- Thinly lubricate the brake pads only at the hammer head (E) and in the area of the contact faces (F) on the brake caliper using a non-metallic anti-squeal paste.
- Insert the outer brake pad in the caliper anchor bracket
- Insert the pad on the piston side in the brake caliper.
- Fit the brake caliper on the caliper anchor bracket.

**NOTE:**

New brake pads may only be installed if the brake disc is thicker than the minimum brake disc thickness (MIN TH).

## Clean and check the guide screws



- Check thread
- Replace damaged screws without fail

After cleaning, thinly coat the sliding surfaces of the guide screws with grease. Only use silicone-based grease in this area.

### Warning:

The dust protection boot of the brake piston and the protective plugs and damping sleeves of the caliper guide must not come into contact with mineral oil-based oils or greases. They could be damaged due to swelling of the elastomers.

## Mounting the brake caliper



- Mount the brake caliper and fasten with the guide screws.
- Re-attach the brake hose and wear indicator cable in the combination holder
- Insert the retaining spring

**NOTE:**  
Observe the tightening torque!

## Install and connect a new wear indicator



- Make sure the wear indicator is seated correctly in the brake pad

Clip the wiring and brake hose back on to the combination holder.

**NOTE:**  
Make sure that the brake hose is not twisted and is correctly fastened in the holder.

## Establishing the working position



Press the brake pedal several times up to two thirds of the way down, and not further, to enable the brake pads and pistons to take up their working positions.

**! NOTE:**

If you press the pedal down fully, this can damage the brake master cylinder!

## Check the level of brake fluid in the expansion tank



Check the brake fluid level at the expansion tank, top up to the "MAX" mark if necessary.

→ Replace brake fluid if necessary.

**! NOTE:**

Only use new brake fluid that has been approved for the vehicle type.

## Cleaning the brake disc



Clean the brake disc after mounting the brake caliper.

- The friction ring must be free of dirt and grease.
- The disc pot and thread must be clean and free of foreign particles.

## Mounting the wheels



- Clean the rim contact face before mounting the wheel
- Observe the tightening torque of the wheel bolts!

## Service reset



Once the brake pad and wear indicator have been replaced, the Condition Based Service indicator must be reset using a suitable diagnostic unit as specified by the vehicle manufacturer.

### INFO:

The CBS maintenance system analyses the actual service requirement of the vehicle. It measures the condition of the most important wear parts and operating fluids and monitors the individual service scopes.

## Function check and test drive



Once the repair has been carried out, it is essential to perform a functional check of the brake system.

- Carry out a test drive to run in the brake system according to the specifications of the vehicle manufacturer
- Check the functions of the brake system on the brake test stand

### Warning:

In this case, please observe the general information on braking in new brake discs and brake pads!

## BRAKE CALIPER TYPE TEVES FN

# Additional information

When carrying out the repair, test procedures may be required, such as checking the concentricity (lateral runout) and thickness difference (varying disc thickness) of the brake disc.

## Checking the concentricity of the brake disc



- The check is performed in the installed condition.
- Fasten the brake disc with all wheel nuts and corresponding washers to the wheel hub.
- Fasten the dial gauge with holder to the suspension strut.
- Place the dial gauge approx. 10 - 15 mm below the outer radius of the disc and align with "zero".
- Turn the brake disc in the direction of travel.
- Measured over several wheel revolutions, deviations should not exceed 0.070 mm for new vehicles and 0.10 mm for older vehicles.
- **The test only produces meaningful results for new brake discs. If deviations are found, the state of the wheel hub and bearing should be considered as additional sources of error.**

## Checking the concentricity of the wheel hub



- Attach the dial gauge and align it at the outer edge of the wheel hub.
- Turn the wheel hub at a constant speed in the direction of travel.
- Measured over several wheel revolutions, deviations should not exceed 0.03 mm.
- If the deviations are greater, the hub should be replaced

### ! NOTE

If hub eccentricity exists, the lateral runout at the outer edge of the disc will be twice as much.

## Checking the friction ring for variation in thickness



The thickness difference measurement of a brake disc can only be verified using special measuring tools. However, sufficiently accurate results can be ensured using micrometer calipers with a measurement accuracy of  $\pm 0.001$  mm. In this case the measurement should be taken at 12 to 15 points on the circumference at approx. 10 - 15 mm below the outer friction radius. Depending on the vehicle type, judder phenomena can be caused by thickness differences as small as 0.012 mm to 0.015 mm. These values must therefore not be exceeded on new brake discs.

### Warning:

Please always observe the model-specific technical specifications of the vehicle manufacturer in this regard.



For more information please see our BrakeGuide

## Tightening torque



### Example vehicle BMW E90 /320i/ N46

Wheel brake on the front axle

- Screw, brake disc on wheel hub (16 Nm)
- Screw, M 12x1.5 on brake anchor plate (110 Nm)
- Guide screw, brake caliper / hexagon socket wrench size 7 (30 Nm)
- Wheel bolt (120 Nm)

## Brake tools



We recommend you use the following brake tools in order to carry out the repair safely:

- Brake disc vernier caliper: 8PE 355 290-001
- Brake caliper brush: 8PE 355 290-031
- Brake piston pressure tool: 8PE 355 290-081
- Brake caliper file: 8PE 355 290-091

## Cleaning agents and lubricants



The following products were used:

- Brake cleaner: 8DX 355 370-001 / 500ml
- Non-metallic permanent lubricant for disc brakes: 8DX 355 370-011 / 75ml
- Brake fluid: 8DF 355 360-021 / 1l

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