



Assembly and Maintenance Instructions

Mechanical Sliding Calliper Disc Brake
Type **PAN 17**



1st Edition

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Table of Contents

| | Page |
|---|-------------|
| 1. Description of the Mechanical Sliding Calliper Disc Brake | 4 |
| 1.1 Introduction | 4 |
| 2. Service Instructions | 6 |
| 2.1 Safety tips during repair | 6 |
| 2.2 Checking brake function | 6 |
| 2.2.1 Checking the clearance | 7 |
| 2.2.2 Checking adjuster function | 7 |
| 2.3 Checking the brake pads | 8 |
| 2.4 Checking the brake discs | 9 |
| 3. Renewing brake pads | 10 |
| 4. Renewing brake | 17 |
| 5. Renewing gaiters | 18 |
| 5.1 Renewing guide pin gaiters and bushes | 19 |
| 5.2 Renewing adjuster screw gaiter | 24 |
| 6. Renewing brake cylinder | 26 |
| Table 1: Spanner widths [AF] and tightening torques [Nm] | 29 |
| Exploded view of the exchange units PAN 17 | 30 |

Note:

The Service Instruction focuses on trained specialists. Operations on the brake can only be carried out if the appropriate paragraphs have been read through and understood. The safety instructions according to paragraph 2.1 are to be considered and to be followed.

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1. Description of the Mechanical Sliding Calliper Disc Brake

1.1 Introduction

The brake **PAN** is a sliding calliper disc brake. The sliding calliper disc brake is supposed to be used in commercial vehicles on front and rear axle as service, auxiliary and parking brake. It is actuated mechanically via a diaphragm brake cylinder or a spring brake cylinder. This is mounted to the end cover of the brake calliper.

A very compact unit is achieved by the direct mounting of the brake cylinder onto the calliper. This enables optimal utilisation of the installation situations.

The complete disc brake including brake cylinder consists of two assemblies:

- Brake calliper (1)
- Brake carrier (2)

The brake calliper (1) moves axially on guide pins (8, 9) of the brake carrier (2). In the brake carrier the brake pads (35, 36) are guided and supported axially relocatable. The fastener of the brake pads works with a hold-

down hoop (38) and hold-down springs (37) - see pictures 1 to 3.

The radially open design of the brake calliper allows simple and quick changes of the brake pads.

For compensating the pad wear the actuating mechanism of the brake is equipped with an automatic adjuster mechanism. This maintains a predetermined clearance independent from overall load configuration and different operating conditions. This, together with a stable and stiff construction of the brake calliper, results in a safe control of the pedal travel and increases the distance reserve for emergency braking.

The internal moving components are lubricated for life and all sealing components are maintenance free unless damaged.

The disc brake is equipped with an electrical wear indicator / sensor (40).



Fig. 1

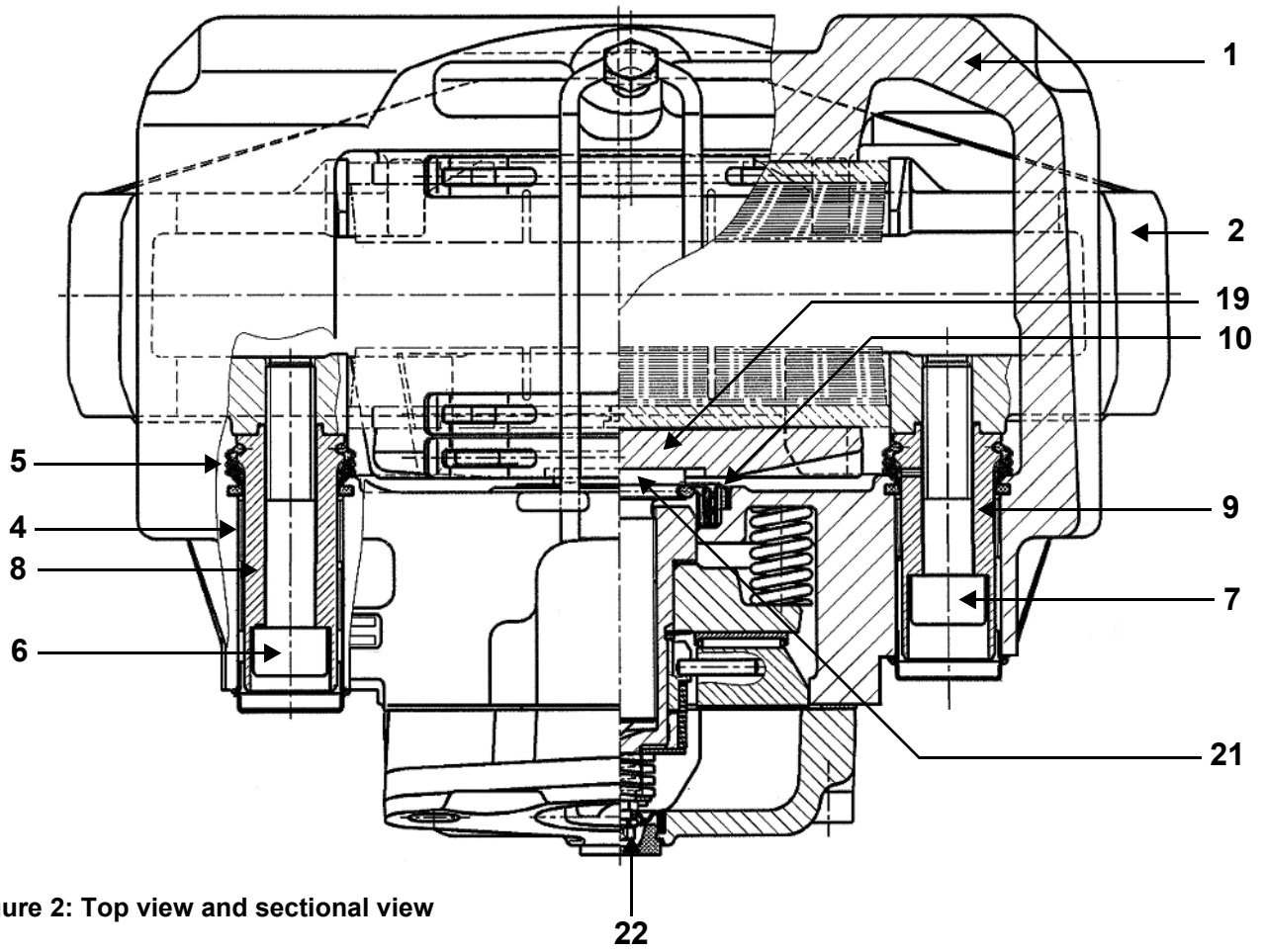


Figure 2: Top view and sectional view

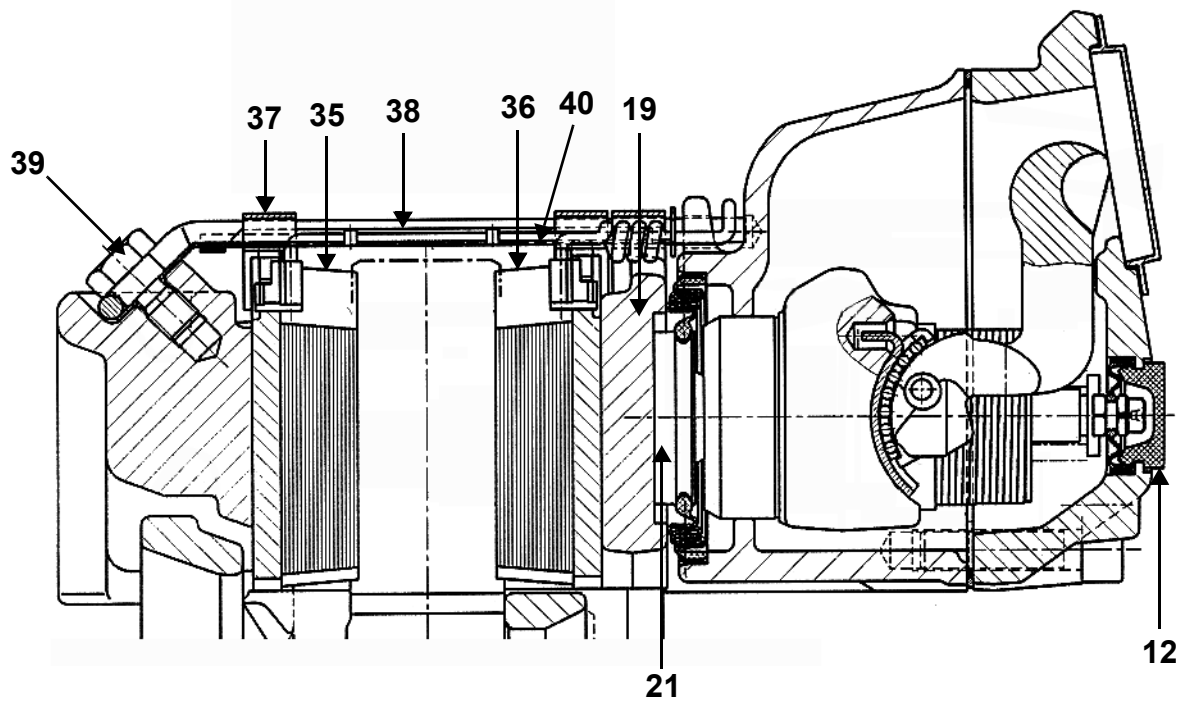


Figure 3: Page preview and sectional view

2. Service Instructions

This instruction with the following pictures contains the required steps and work sequences to replace the available repair kits. The spanner size and the tightening torques in the sequences are listed in table 1 (see page 29).

For lubrication use only the tube of grease supplied with the WABCO brake repair kit.

2.1 Safety tips to be considered during repair

The flawless technical condition of the disc brake is most important to ensure good driving and safe braking characteristics.



Observe brake pad and disc wear limits! Worn-out pads and discs reduce the brake effectiveness and cause brake failure! Danger of accidents! Burned, glazed or oil contaminated brake pads must be replaced immediately.

Always replace brake pads on a per axle basis!



During repairs on the brake the vehicle must be parked on a level surface and blocked to prevent rollaway. Only approved and suitable fixtures are to be used for the lifting and blocking of the vehicle. While working on the brake ensure that the brake cannot be actuated inadvertently.

Do not actuate the brake while the brake pads are removed. Danger of bodily injury!



Do not clean the brake with pressurised air or other high cleaning pressure apparatus. **Danger of bodily injury!** Danger of destruction of rubber parts!



Keep hands and fingers out of the inside of the calliper to avoid injury!



A second technician must assist during removal and installation of the brake. Heavy load - **Danger of bodily injury!**



During repairs outside of the vehicle, the brake must be secured in a fixture, such as a heavy vise as high torque is required during removal and installation of the bolts. Large loosening and tightening torques of the screw connexions - **Danger of bodily injury!**

The brake calliper with clamping unit shall not be opened. Therefore the bolts holding the cover shall not be loosened.

Only original and genuine WABCO Service Parts and approved brake pads are to be used.

During repairs use only recommended tools. Do not use a power-driven socket or tools! Tighten nuts and bolts only to specified torque limits.

With newly installed brake pads emergency stops should be avoided if possible for the first 50 km. Also avoid long braking cycles and forced brakings.

When wear of the cast brake parts such as cracks or heavy abrasion is noticed replace the entire brake assembly according to the instructions.

Upon completion of repairs the vehicle's braking system must be tested on a roller dynamometer. If no roller dynamometer is available a driving test with brake applications must be performed.

2.2 Checking brake function



Important:
Do not use a power-driven socket! While working at the brake or moving of the brake calliper handle the calliper only from outside to avoid injury!

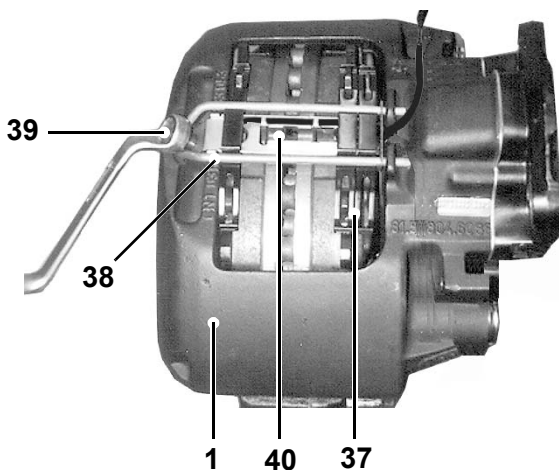


Fig. 4

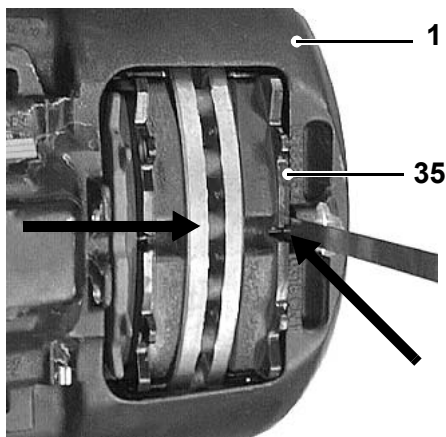


Fig. 5

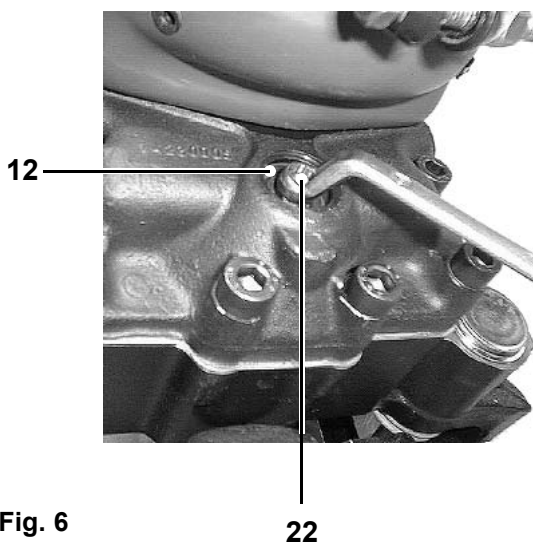


Fig. 6

2.2.1 Checking the clearance

General note:

The turning directions and the torques for the hexagon on the adjuster nut are given in table 1, position I. The actuation cylinder does not need to be removed for this check.

Work sequences:

- Remove hexagon bolt (39) with spanner SW 17 from pad hold-down hoop (38).
- Pad hold-down hoop (38) has to be withdrawn from the calliper (1).
- Remove three hold-down springs (37).
- Push cable guide (40) away to the side.

Note: Brake pads and spreader plate remain installed.

- Push the brake calliper towards the wheel side and check the clearance with the feeler gauge.
0,5 mm ≤ clearance ≤ 1,2 mm.

Note: Always insert the feeler gauge in the middle of the brake between brake calliper (1) and brake pad plate (35).

If the clearance is outside of the limit values, check the adjuster according to section 2.2.2.

2.2.2 Checking Adjuster Function

Work sequences:

- Remove plug (12) for the adjuster from the calliper.
- With a ring spanner set a clearance of 2 or 3 mm on the hexagon (22) of the adjuster.

Important: The check of the adjuster is only possible with a set clearance of 2 to 3 mm.

With the ring spanner mounted on the adjuster nut ensure that there is sufficient such that it will not be prevented from turning during the adjuster check.

Do not use an open-ended spanner for the hexagon (22) of the adjuster. Do not overload the adjuster hexagon!

- Actuate the brake 5 times (approx. 1 bar). The adjuster is functioning when the ring spanner turns anti-clockwise with every brake actuation.

Note: With increasing adjustment the angular movement of the attached ring spanner becomes smaller.

The attached ring spanner

- does not turn.
- turns only with the first actuation.
- moves back and forth with every actuation, which means the adjustment is not OK.

If so, replace the brake according to section 4!

- After checking the adjuster reset the clearance to 1 mm as described in section 3.
- Refit plug (12) and ensure that the plug is placed properly.

2.3 Checking brake pads

Work sequences:

Note: The brake pad thickness is to be checked regularly depending on operating conditions during maintenance intervals and under applicable local laws and regulations. Burned, glazed or oil contaminated brake pads must be replaced immediately.

Always replace brake pads on a per axle basis!

Work sequences:

Caution: To avoid damaging the brake disc, replace the brake pads at the latest, when they reach the wear limit with their weakest spot.

- A** = Pad thickness with friction material 9 mm minimum limit value.
Replace the brake pads according to section 3.
- B** = Pad thickness new without friction material 19 mm.
- C** = Total pad thickness with friction material 26 mm.

- After the checks reposition the cable guide (40), insert the hold-down springs (37) and attach the pad hold-down hoop (38) with the hexagon bolt (39) to the brake calliper (for required tightening torque see table 1, position II).



Fig. 7



Fig. 8

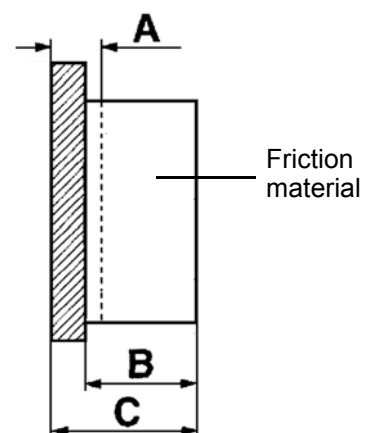


Fig. 9

With an electrical wear indicator on the brake pads:
When the control display lights up the minimum pad thickness is reached. Drive to a workshop where the worn pads can be replaced according to section 3.

2.4 Checking brake discs

Work sequences:

- Remove brake pads according to section 3.
- Measure disc thickness over the rubbing faces.

D = total disc thickness - new 34 mm.

E = wear allowance limit 28 mm, the brake disc must be renewed.



Important:

Observe brake pad and disc wear limits! Worn-out pads and discs reduce the brake effectiveness and cause brake failure! Danger of accidents!

Always replace brake discs on a per axle basis! Generally after the installation of new brake discs we recommend to replace the brake pads as well.

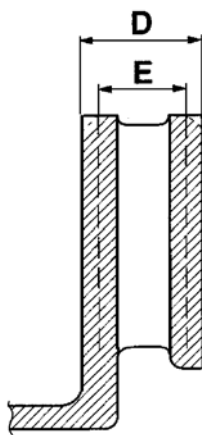


Fig. 10

Brake disc condition inspection:

Check brake disc for cracks, condition of the rubbing faces and maximum wear dimension.

- | | |
|---|-------------------|
| A = crazing | = permissible |
| B = Radial cracks to max: 0.5 mm width | = permissible |
| C = unevenness under 1.5 mm of the plate surface | = permissible |
| D = continuous cracks | = not permissible |
| a = braking surface | |

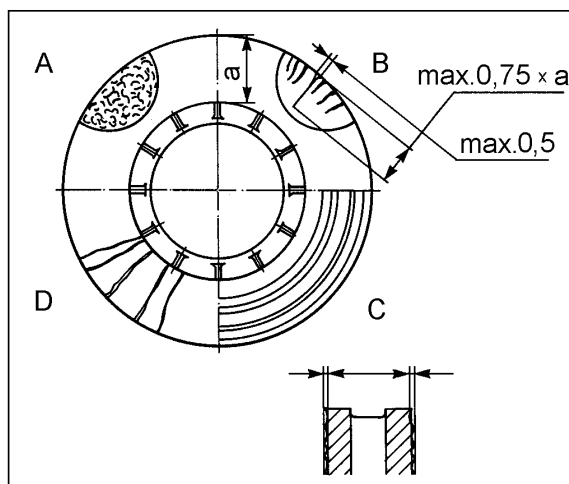


Fig. 11

Checking brake disc runout:

- Mount a dial indicator on the brake carrier.
- With the disc installed measure the runout by rotating the hub as shown in fig. 12. Limit 0.15 mm .
- At higher values renew the disc.
- Install brake pads and set clearance. Carry out according to section 3 and pay attention to notes.

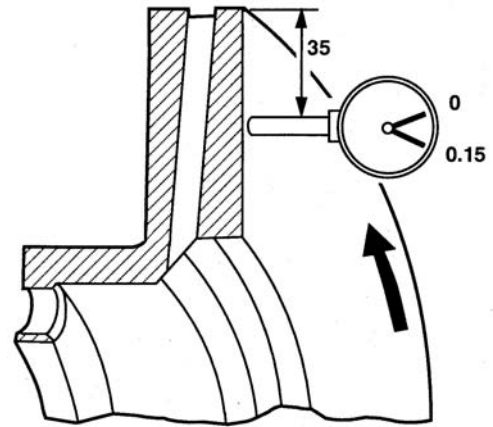


Fig. 12

3. Renewing brake pads



Important:
Do not use a power-driven socket. While moving the brake handle the calliper only from outside to avoid injury!

Working sequences for removal of pads:

Note: The cable position and their fastening on the brake might vary depending on the brake model. A use-case is described here. Therefore it is necessary to pay attention to the original position of the fastening for the following reinstallation!

- Loosen the connection (arrow) and unplug.

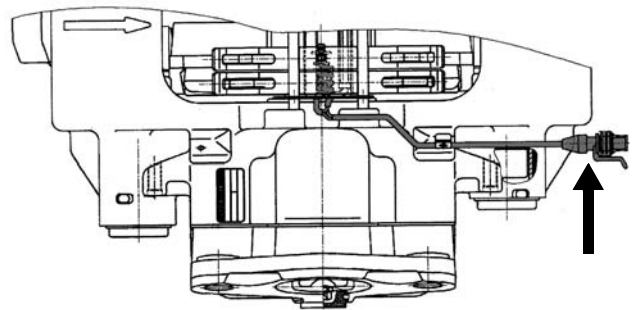


Fig. 13

- Remove hexagon bolt (39) with spanner SW 17 from pad hold-down hoop (38).

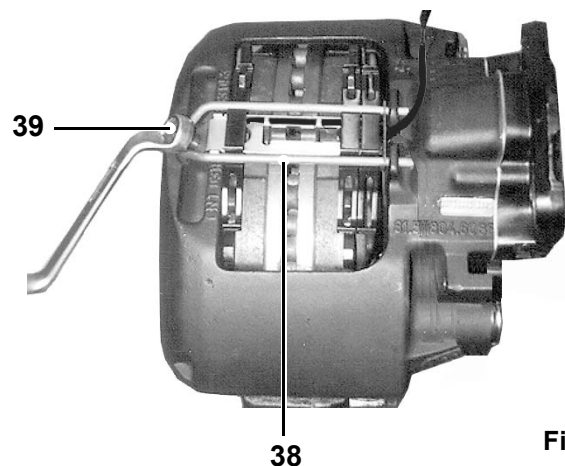


Fig. 14

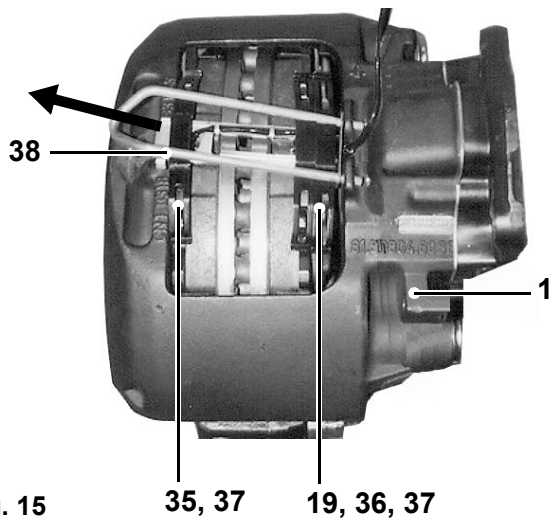


Fig. 15

- Pad hold-down hoop (38) has to be withdrawn from the calliper (1).
- Remove three hold-down springs (37) from the brake pads (35 and 36) and the spreader plate (19).

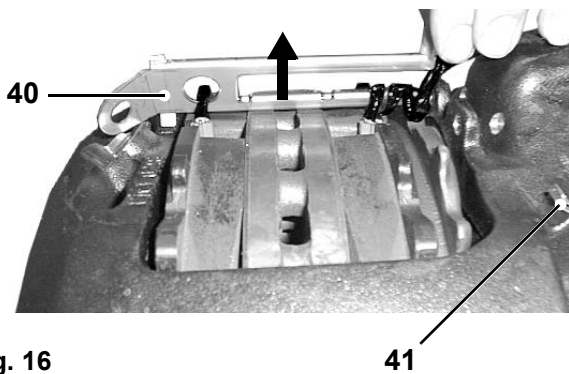


Fig. 16

- Remove cable guide (40) and contacts from the brake pads.
- Remove clip(s) (41) from the calliper (1).

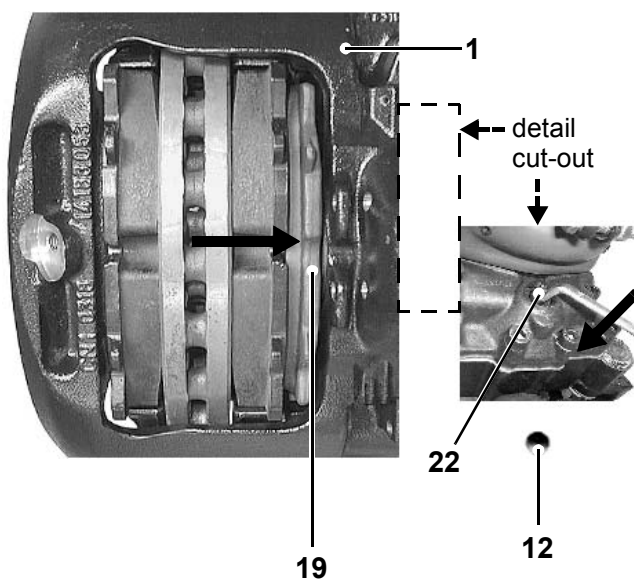


Fig. 17

- Remove plug (12) for the adjuster (22) of the calliper (1).
- De-adjust the brake by rotating the hexagon on the adjuster nut (22) with a ring spanner as far as it will go and then release it by approx. 1/4 turn.

Note: The turning direction to de-adjust is to the right, that means clockwise.

Caution: When de-adjusting push back the spreader plate (19) (arrow) by hand to ensure that the pin as torsion lock for the adjusting screw does not slip out of its groove. Otherwise the adjuster screw will turn and thereby damage its gaiter!

- Slide the calliper (1) by hand towards the wheel side (arrow) and remove the brake pad (35).

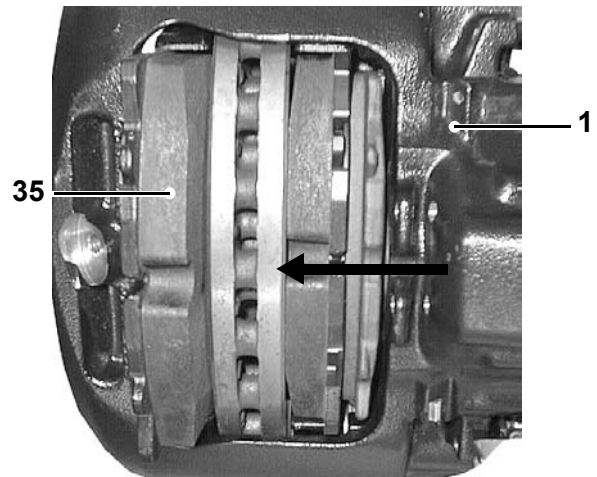


Fig. 18

- Slide the calliper (1) by hand towards the cylinder side (arrow) and remove the brake pad (36) and the spreader plate (19).



Important:
Do not actuate the brake while the brake pads are removed.
Danger of bodily injury!

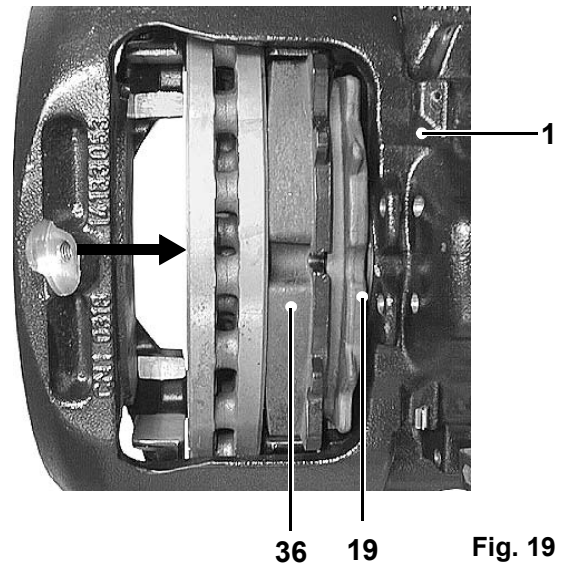


Fig. 19

- Using a wire brush remove any corrosion from the spreader plate, brake pad slot and brake pads guide surfaces.

Caution:
Take care not to damage the dust caps (5, 10). The guide surfaces must be free of grease!

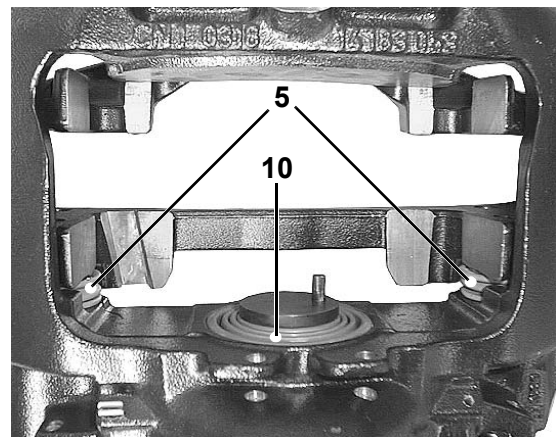


Fig. 20

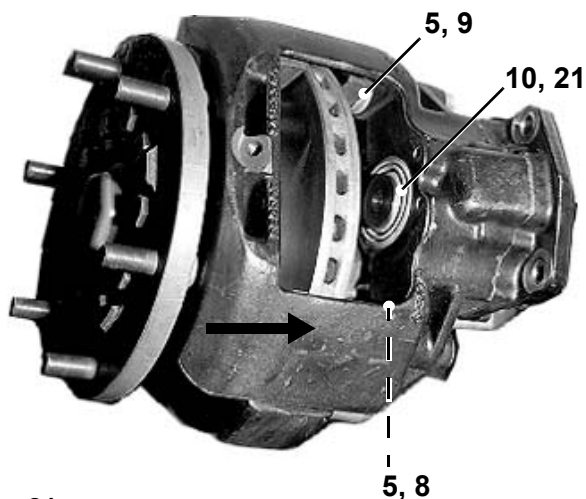


Fig. 21

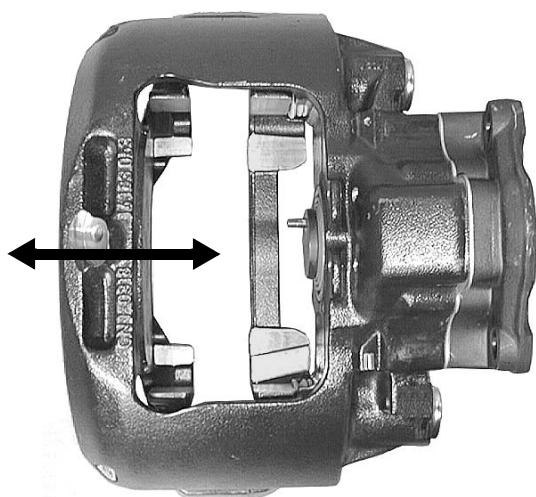


Fig. 22

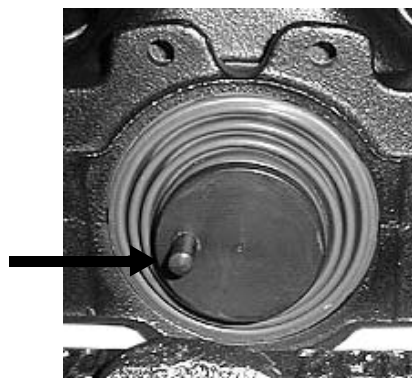


Fig. 23

Checking the dust caps (gaiters) and the brake calliper movement:

- Slide the calliper towards the side to allow examination of the gaiters (5, 10), the guide pins (8, 9) and the adjuster screw (21) for wear and damage. **Renew defective gaiters (see section 5.1 and 5.2)!**

Caution:
In case of a defective the gaiter (10) must be checked if dirt or water has already entered or damaged the inner parts of the brake or the gaiter seat in the calliper by corrosion. In case of doubt the brake must be renewed according to section 4. If the gaiter (10) is damaged while the brake is serviced, the gaiter must be renewed according to section 5.2.

- Slide the calliper on the guide pins by hand over its total displacement and check for freedom of movement. **If the movement is restricted renew the guide pins bushes and gaiters according to section 5.1**

Caution:
Do not squeeze the dust caps of the guide pins against the torque plate!

- Checking the adjuster according to section 2.2.2.

Caution:
Secure the adjuster nut during checking and turning on the hexagon from twisting, e.g. by holding the pin (see arrow).

- Checking the brake discs according to section 2.4.

Working sequence for pad installation:

- Slide the calliper until there is sufficient space between the actuation side and the disc to insert the brake pad.
- Insert spreader plate (19) in the brake carrier and engage with the adjuster screw (21).

Important:

The spreader plate always has to be placed in the guide-way (arrow) of the brake carrier correctly and overlie the entire surface of the guide bar of the brake carrier. Otherwise the spreader plate might slide out of the guiding. If necessary, move the calliper a little towards the wheel side! The pin of the adjuster nut has to engage with the groove of the spreader plate. Otherwise the function of the adjuster mechanism is not ensured! The adjuster screw can be turned to obtain alignment. The gaiter may not be twisted!

- **New** brake pad (36) has to be inserted on the actuating side
- Slide the calliper toward the wheel until the brake pad (36) contacts the disc.

- **New** brake pad (35) has to be inserted on the wheel side.
- Using a 1 mm thick feeler gauge (arrow) inserted between the backing plate of the brake pad on the wheel side and the brake calliper, turn the hexagon (22) of the adjuster nut with a ring spanner until both brake pads contact the brake disc.

Note: Insert the feeler gauge approx. in the middle of the brake pad between the contact surface and the brake calliper. The turning direction to adjust the break is to the left, that means anti-clockwise. Do **not** fit pad hold-down hoop before adjusting air gap.

Caution:

Do not overload the adjuster hexagon (22)!

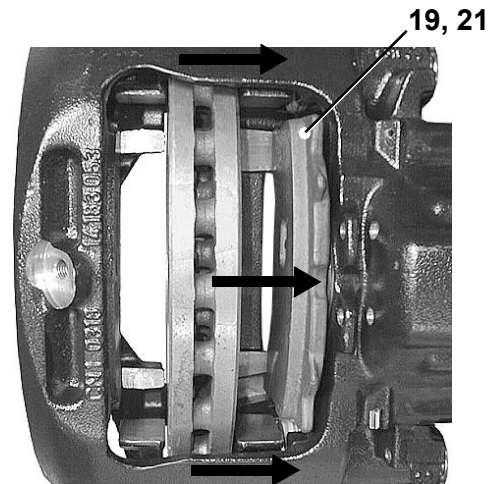


Fig. 24

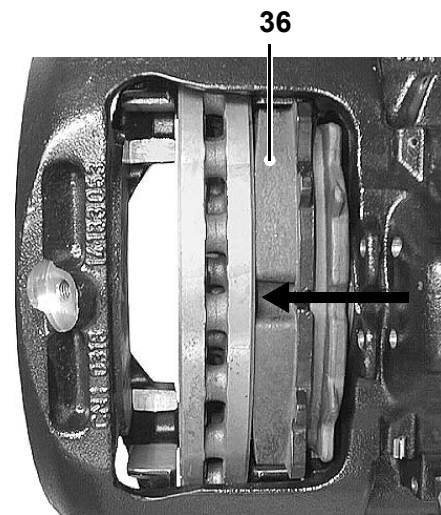


Fig. 25

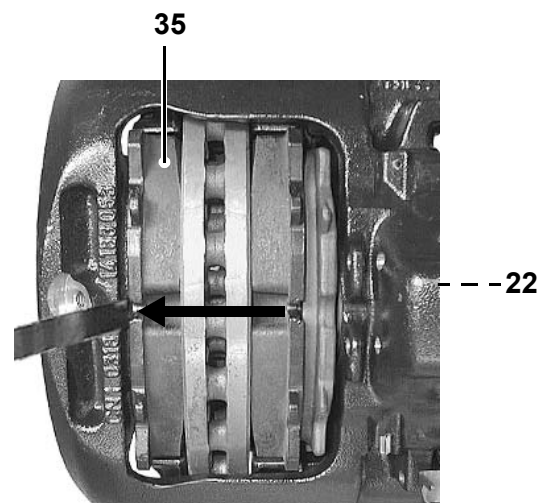


Fig. 26

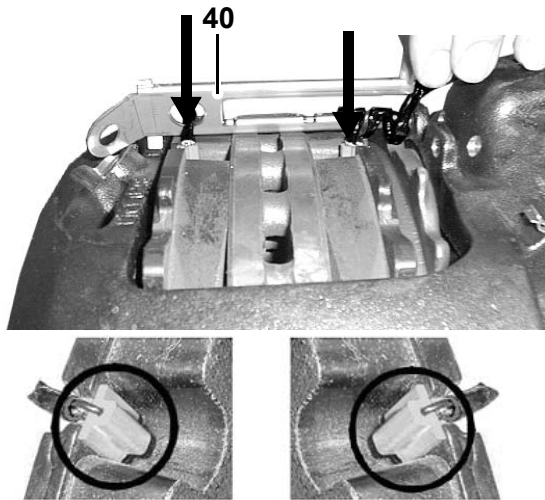


Fig. 27

- Place the **new** pre-assembled wear indicators and the cable guide (40) on the calliper and insert the sensor contact (see arrows) into the brake pads.

Important:

The cable side of the sensor contacts need to point towards the brake disc and the sensor contact needs to be inserted in the brake pad correctly!

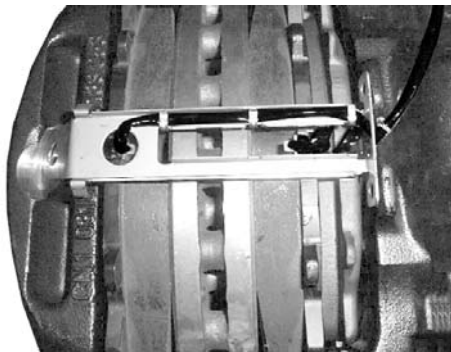


Fig. 28

- Position cable guide and cable exit of the wear indicators on the brake calliper.

Caution:

Twist and position the cable wrappings on the actuation side, so that no cable touches the brake pad.

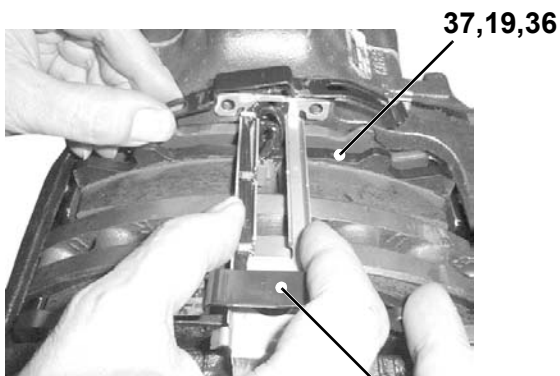


Fig. 29

- Put the three **new** hold-down springs (37) on the brake pads (35 and 36) and the spreader plate (19).

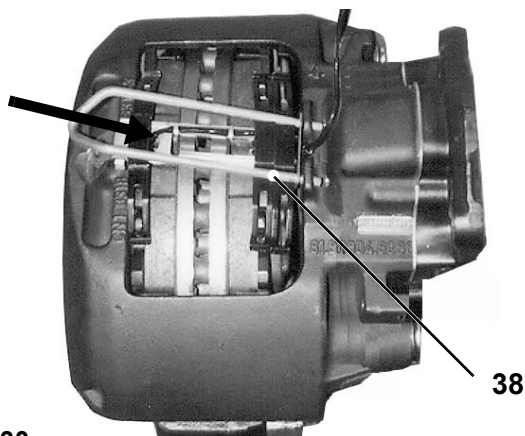


Fig. 30

- Slide **new** hold-down hoop (38) through opening in the cable guide and openings in the brake calliper, then push downward so that the radial corners of the hold-down springs snap into the hold-down hoop.

- Fit the **new** hexagon bold (39) to the brake calliper (tightening torque see table 1, position II) with spanner SW 17.
- If available, remove the transport protection cap (arrow) from the plug connection of the wear indicator.

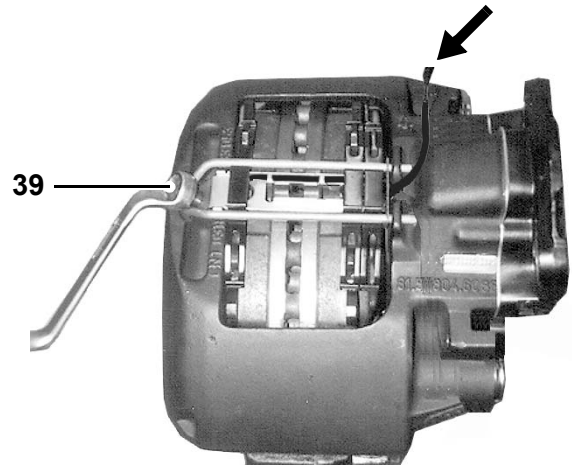


Fig. 31

- Insert the **new** clip (41) in the brake calliper and inlay the cable inside.
- Plug in the plug of the wear indicator in the connector coupling (arrow).

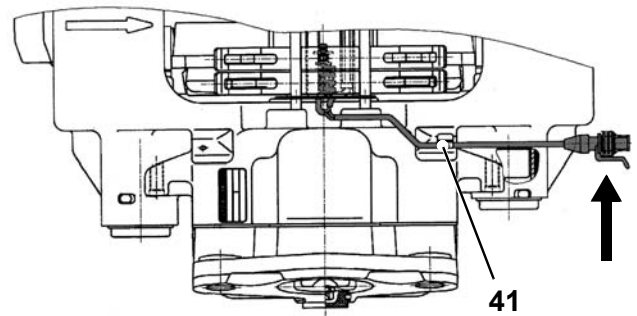


Fig. 32

- **Visually check the correct cable position.**
- Fit the **new** plug (12) to the opening in the brake calliper! **Check and make sure the correct seat!**
- Ensure that the wheel hub turns freely.

Caution:
Upon completion test the brakes on the roller dynamometer!



12

Fig. 33

4. Renewing brake



Important:
Do not use a power-driven socket! While working at the brake or moving of the brake calliper handle the calliper only from outside to avoid injury!

Note: The new brake is supplied as a pre-assembled unit and may be mounted to the vehicle's axle via the brake carrier. Do not exchange left brake (fig. A) and right brake (fig. B) on the axle! Identify the correct placement of the brakes on the left or the right side of the axle through the position of the hold-down hoop (38) and the hexagon bolt (39) in the brake.

Use the following scheme: The retaining opening in the calliper for the hold-down hoop (38) and the thread opening in the calliper for the hexagon bolt (39) are always relocated for an offset V compared with the axle M in the middle of the brake in the rotating direction of the brake disc driving forward towards brake disc trailing side.

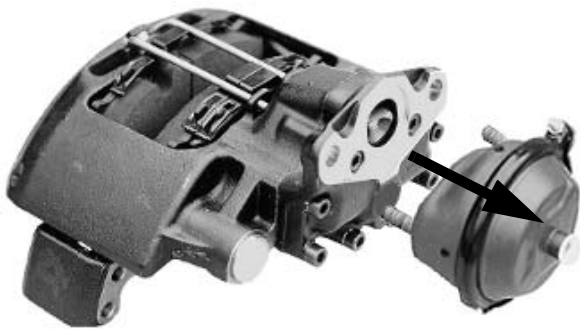
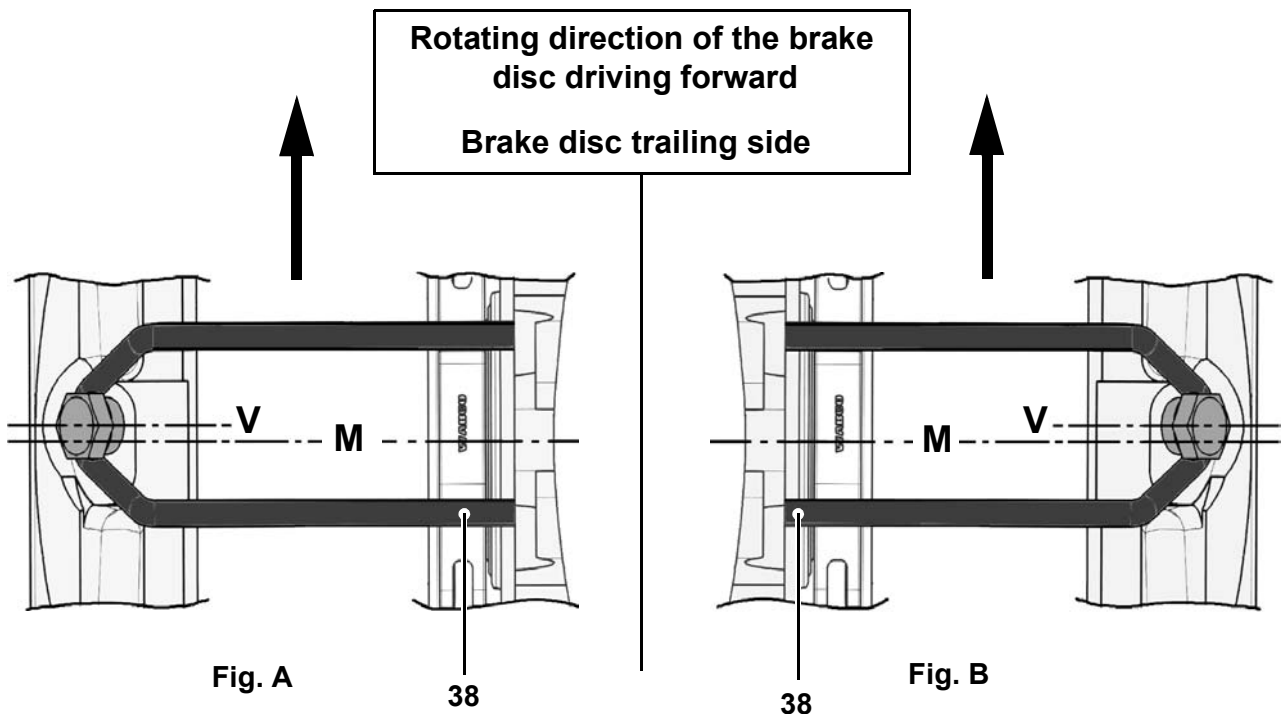


Fig. 34

Work sequences for brake removal:

- Remove brake pads according to section 3.
- Remove brake cylinder from brake calliper according to section 6.
- Dismantle the calliper with the carrier from the axle (see table 1, position III).
- Check brake disc according to section 2.4.
- The removed brake pads must be tested for wear according to section 2.3.

Work sequences for installing brake:

- Remove the transportation lock from the **new** brake calliper.
- Place the brake with the brake carrier over the brake disc and mount on the axle. Tighten hexagon bolts with spanner (table 1, position III).

Note: Observe vehicle manufacturer's special assembly instructions when assembling brakes.

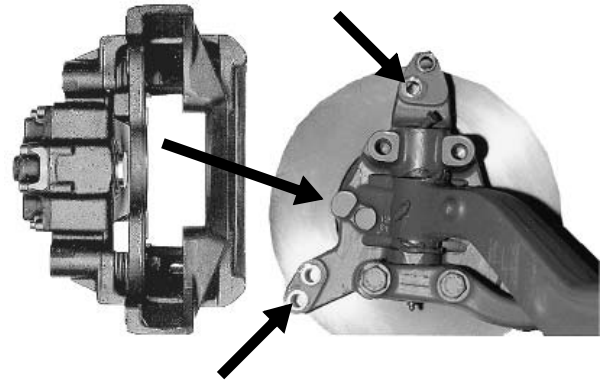


Fig. 35

- Remove the transport protection cap from the cylinder flange on the brake calliper.
- Refit brake pads and sprader plate according to section 3.
- Refit the brake cylinder on the calliper according to section 6.

Caution:

With the brake cylinder in its installed position, ensure that the lower drainage hole facing the ground is open! All other holes must be plugged!

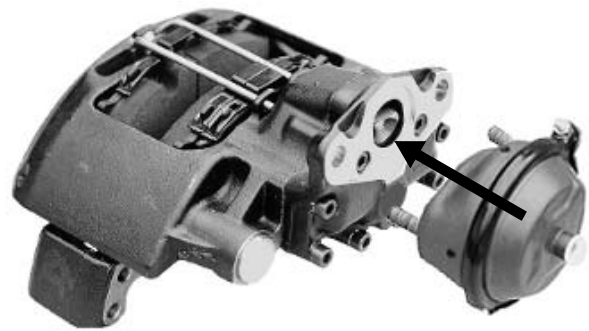


Fig. 36

5. Renewing gaiters



Important:

Do not use a power-driven socket! While working at the brake or moving of the brake calliper handle the calliper only from outside to avoid injury!

Note: When replacing all of the gaiters in the calliper, the work sequences 5.1 and 5.2 are to be combined. In this case work sequences do not need to be repeated several times.

When replacing individual gaiters, follow the corresponding work sequences of the sections 5.1 and 5.2.

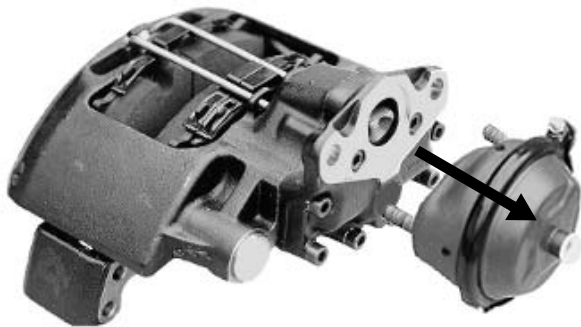


Fig. 37

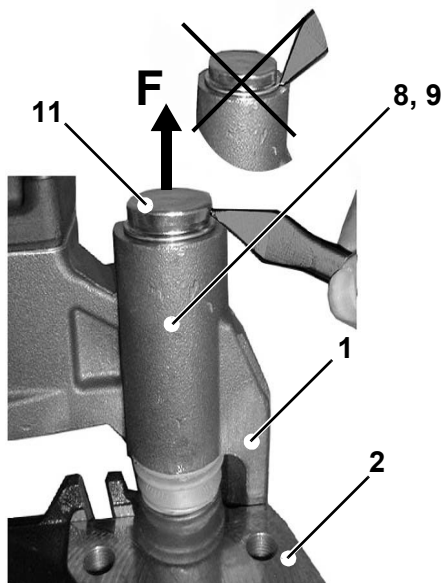


Fig. 38

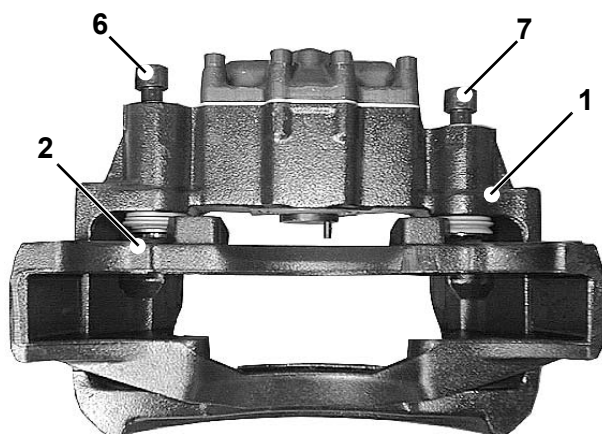


Fig. 39

5.1 Renewing guide pin gaiters and bushes

Important:

The position of the guide pins in the brake may vary depending on the case of operation. An example of installation with a long guide pin (8) (plug gauge) driving forward on the brake disc leading side is shown here. The renewal can also be carried out with a shorter guide pin (9) (clearance fit) on the brake disc trailing side.

Working sequences for removal:

- Remove brake pads according to section 3.
- Remove brake cylinder from brake calliper according to section 6.
- Dismantle the calliper with the carrier from the axle according to section 4.

- Dismantle brake calliper (1) from brake carrier (2) by removing sealing caps (11) of the guide pins (8, 9) from the calliper (1) with a suitable tool, e.g. chisel.

Caution:

Take care not to damage cover bores in calliper. Position the proper tool on the cover.

- Release the screws (6, 7) with a spanner (table 1, position IV) and separate the calliper (1) from the carrier (2).



Important:

Moving brake calliper: danger of bodily injury!

- Clean the mating surfaces (collars) of the carrier (2).

- Remove the guide pins (8, 9) from the brake calliper (1) and the gaiters (5) from the ring groove.



Fig. 40

- Place the calliper (1) on a firm base to push out the bushes (4), so that the calliper opening is facing upwards.



Fig. 41

For replacing the bushes use the tools from **WABCO tool box 12 851 022** and pay attention to the detailed mounting instructions in the tool box.

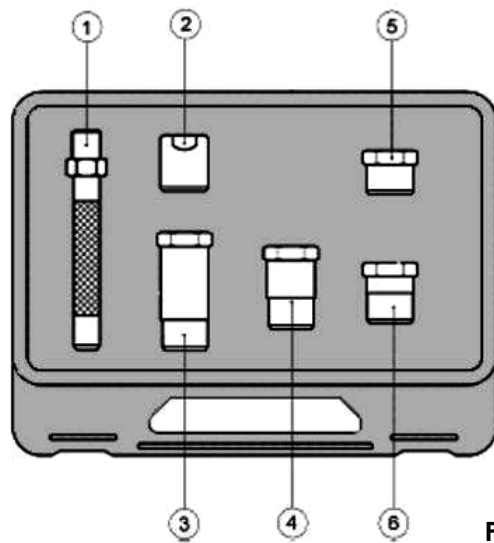


Fig. 42

- Press the bushes out of the brake calliper using press and mandrel (tool 1 and 5).
- Clean the bores in the calliper.

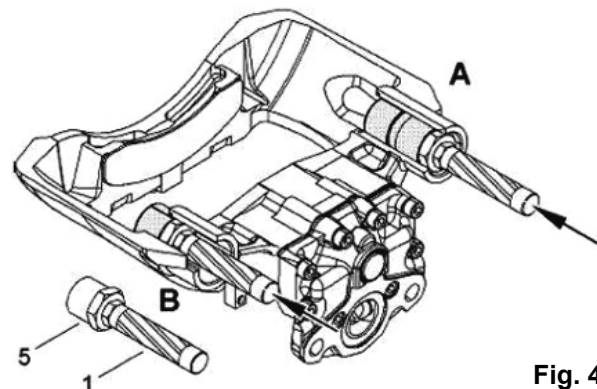


Fig. 43

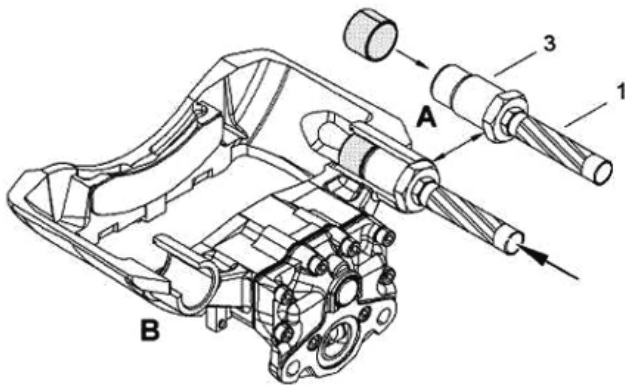


Fig. 44

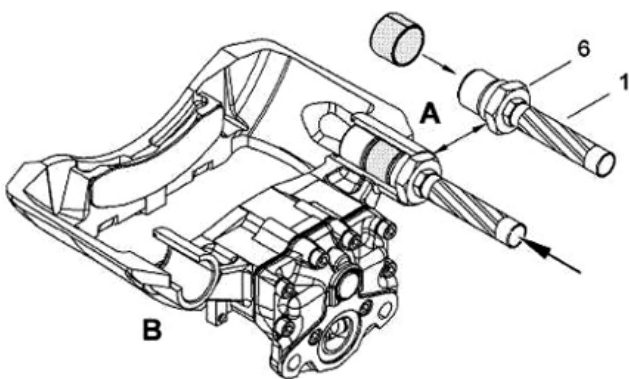


Fig. 45

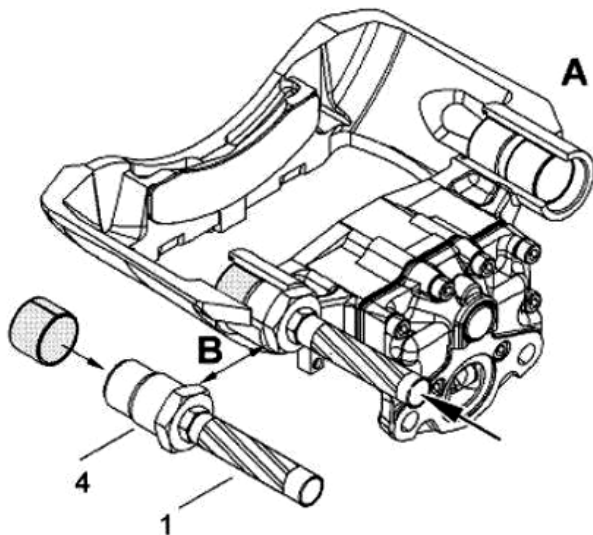


Fig. 46

Working sequence for installation:

Press in two **new** bushes for the longer guide pin.

- First press in the inner bush with mandrel (tool 1 and 3) as far as the mandrel will go.

- Then press in the outer bush with mandrel (tool 1 and 6) as far as the mandrel will go.
- Grease the bushes and the space between them.

- Push in a new bush for the shorter guide pin with mandrel (tool 1 and 4) as far as the mandrel will go.
- Grease the bush.

- Push **new** gaiters (5) in the sealing seats (ring groove) of the brake calliper (1).

Note: Clean gaiter seats before fitment. The **sealing seats** must be **free of grease**. It is possible to fit the gaiters by hand. **Ensure that the gaiter lip in the annular groove in the calliper sits free of folds!**

- Grease the sliding surface for the guide pins (8, 9).
- Insert **new** guide pins into the calliper (1).
- Assemble guide pins with gaiters (5) and insert them into the guide pin seat (8, 9).

Caution:

On this brake model the longer guide pin is located (8) on the brake disc leading side as a close fit. The shorter guide pin (9) is a clearance fit and is located at the brake disc trailing side.

This description also applies in principle for the assembling of a shorter guide pin as a clearance fit on the brake disc leading side.

Remove all excess grease. The brake carrier end of the guide pins and the mating surfaces of the carrier must be free of grease!

- Place the calliper (1) on the carrier (2) and insert the guide pins (8, 9) into the collars in the carrier.
- Insert **new** bolts (6) (long for close fit pin 8), (7) (short for clearance fit pin 9) into the guide pins in the brake calliper (1) and screw with spanner (see table 1, position IV) on the carrier (2).

Caution:

Do not damage the gaiters (5) during the assembly.

Firstly, always tighten the bolt for the close fit longer pin (8), followed by the bolt for the clearance fit shorter pin (9).

If during the maintenance work the guide pin (8 and 9) fastening to the carrier (2) is loosened, then new bolts (6 and 7) must be used when reassembling!

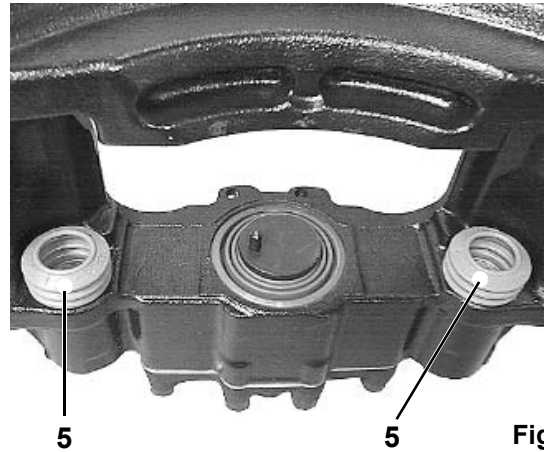


Fig. 47

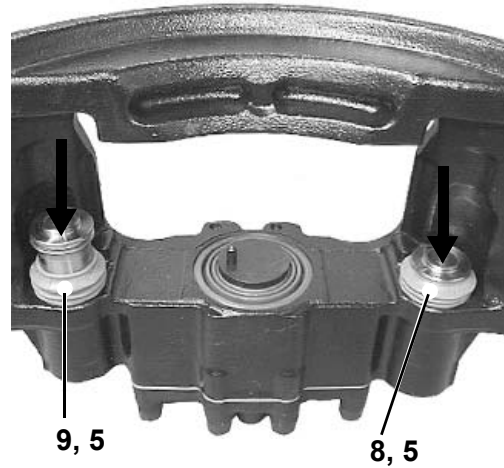


Fig. 48

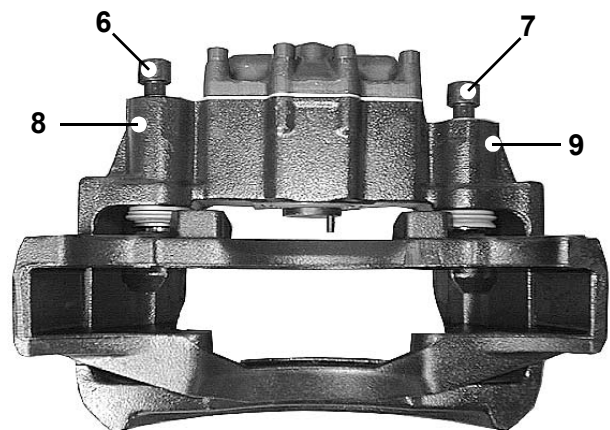


Fig. 49

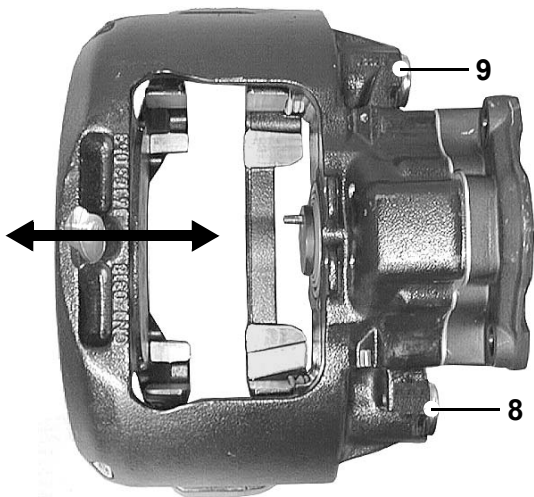


Fig. 50

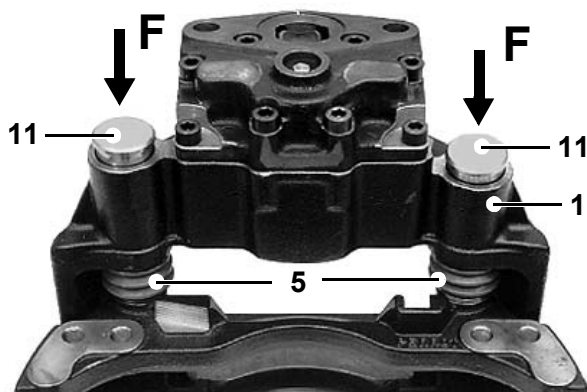


Fig. 51

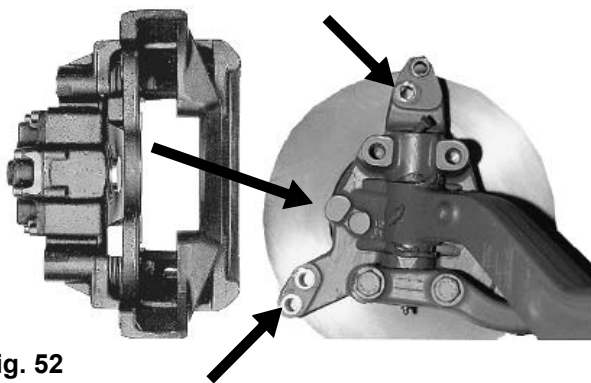


Fig. 52

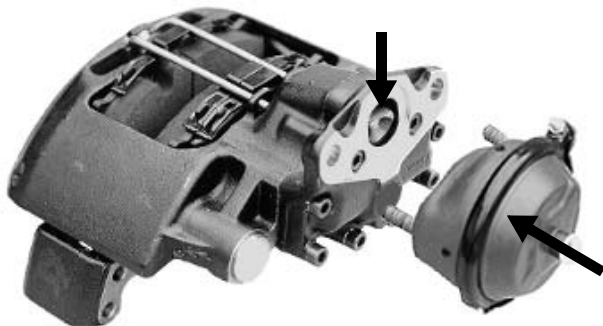


Fig. 53

- Move brake calliper backwards and forwards on guide pins (8, 9) several times. Check for ease of movement.

Caution:

Do not squeeze the dust caps of the guide pins against the torque plate!

- Grease the boreholes for the covers (11) in the brake callipers (1).
- Insert **new** gaiters (11) in the bores of the calliper (1) and press in with tool 2 from **WABCO toolbox 12 851 022** as far as it will go.

Note: Take care to avoid damaging the covers.

- For air pressure equalisation lift the gaiters (5) in the range of the ring groove and reinsert them.

- Place the brake with the brake carrier over the brake disc and mount on the axle. Tighten hexagon bolts with spanner (tightening torque see table 1, position III).

Note: Observe vehicle manufacturer's special assembly instructions when assembling brakes.

- Install brake pads and set clearance. Carry out according to section 3 and pay attention to notes.
- Before refitting the brake cylinder clean the mounting flange on the calliper and grease the concave seat (arrow) in the brake lever.
- Refit the brake cylinder on the calliper according to section 6.

Caution:

With the brake cylinder in its installed position, ensure that the lower drainage hole facing the ground is open! All other holes must be plugged!

5.2 Renewing adjuster screw gaiter

Note: If the gaiter only is to be renewed it is not necessary to dismantle the brake calliper and cylinder.

Working sequences for removal:

- Remove brake pads and spreader plate according to section 3.
- Pull brake calliper to actuation / cylinder side by hand.
- Pull the gaiter (10) out the annular groove in the adjuster screw (21).
- Remove the gaiter from the seat in the brake calliper by means of a screwdriver.
- Check the adjuster screw thread.

Note: For this purpose refit the wheel side brake pad so that the adjuster screw cannot be screwed completely out of the adjuster. After the thread check remove the brake pad.

- Secure adjuster screw (21) against turning (arrow) and screw out the adjuster screw approx. 30 mm by turning the adjuster hexagon in the anti-clockwise direction with a ring spanner.
- Examine the thread for corrosion and damage whilst screwing out.

Caution:

The gaiter (10) can be renewed, if definitely no dirt or water has penetrated into the brake calliper, or if the gaiter has been directly damaged during servicing the brake. In case of doubt the brake must be replaced according to section 4, if internal parts are corroded.

- After examination grease the thread and partly screw back the adjuster screw in clockwise sense.

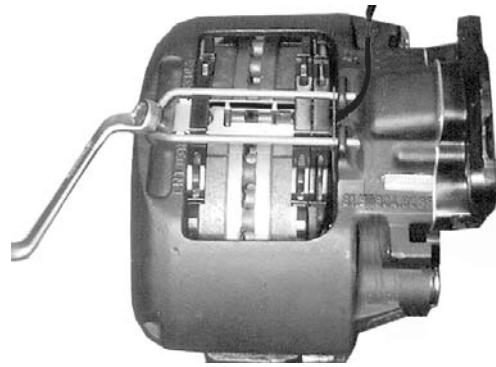


Fig. 54

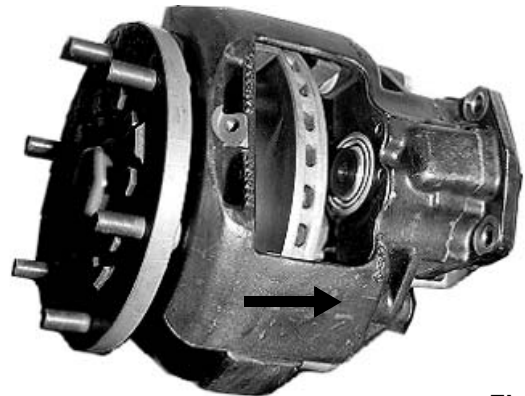


Fig. 55

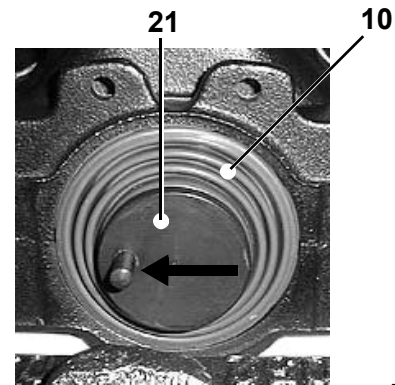


Fig. 56

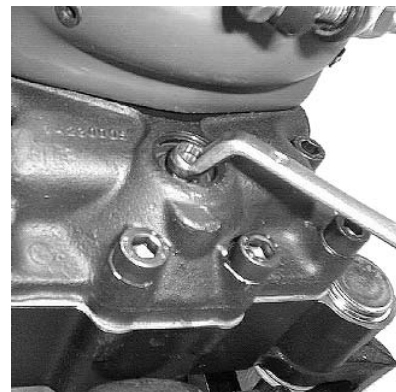


Fig. 57



Fig. 58

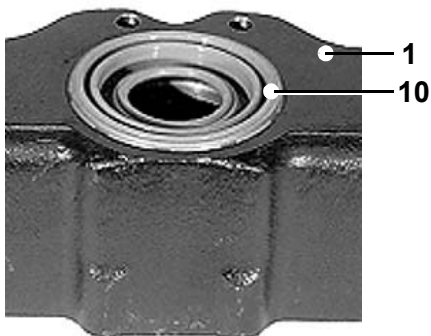


Fig. 59

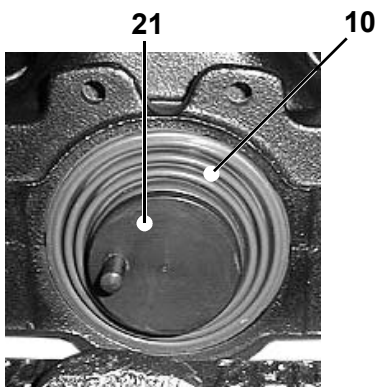


Fig. 60

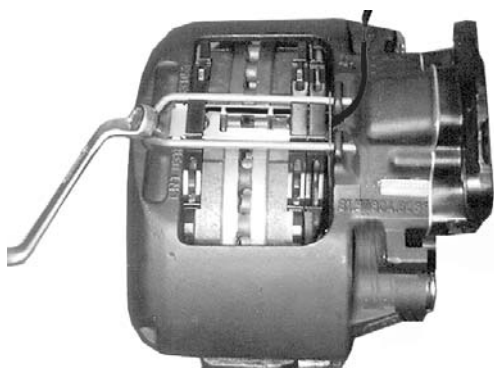


Fig. 61

Working sequence for installation:

- Clean the gaiter seat (10) (arrow) in the calliper (fig. without adjuster screw).

- Push **new** gaiter (10) over the adjuster screw, centre it and push down the gaiter into the seat of the calliper (1) manually (fig. without adjuster screw).

- Grease the gaiter lips (10) and insert the gaiter (10) into the seat of the adjuster screw (21).
- Visually check gaiter for proper seat.

Note: Ensure that the gaiter lip in the annular groove in the adjuster screw sits free of folds!

- Install brake pads and set clearance. Carry out according to section 3 and pay attention to notes.

6. Renewing brake cylinder



Important:
Do not use a power-driven socket! While working at the brake or moving of the brake calliper handle the calliper only from outside to avoid injury!

Note: Only use cylinders as specified by vehicle manufacturer.

Detailed assembly and check instructions have to be used according to the cylinder type and the instructions of the cylinder manufacturer.

Working sequences for removal:

- Make sure that the brake hoses are pressureless.
- Disconnect air line to cylinder (according to cylinder manufacturer's data).
- Remove brake cylinder from calliper by releasing cylinder nuts (table 1, position V).

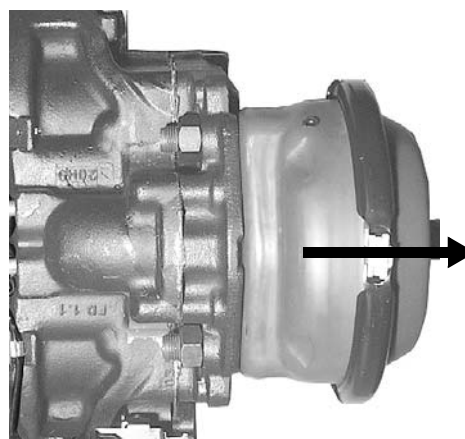


Fig. 62

Working sequence for installation:

Caution:
With the brake cylinder in its installed position, ensure that the lower drainage hole facing the ground is open!

- Before refitting the brake cylinder clean the mounting flange on the calliper and grease the concave seat (arrow) in the brake lever.
- Fit brake cylinder to the calliper and tighten nuts crossed using a spanner (table 1, position V). Screw brake hose to brake cylinder.

Note: The brake hose must not be twisted or lacated such that it will rub against anything! The brake hose of the air supply is not allowed to have an influence on the moveability of the brake calliper.

- Check air connection of the device for tightness.
- Carry out function and effectiveness check. Pay attention to the regulations of the cylinder manufacturer!



Fig. 63

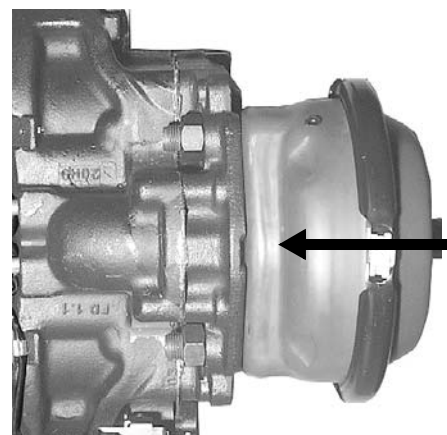


Fig. 64

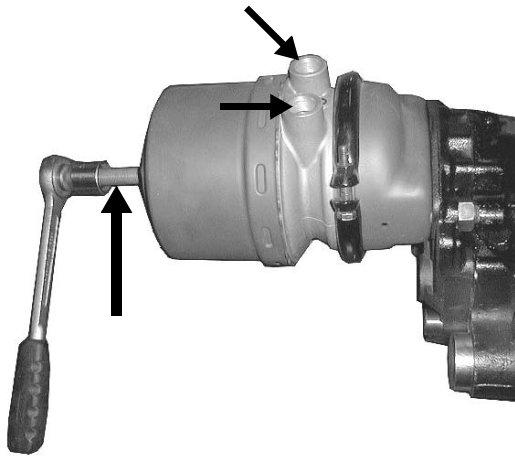


Fig. 65

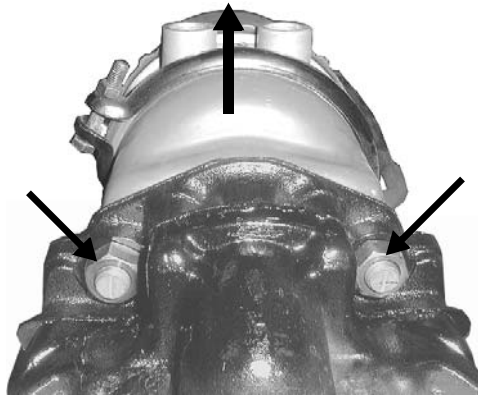


Fig. 66



Fig. 67

Work sequences for spring brake cylinder removal:

- Secure vehicle against rolling.
- Loosen hand brake.
- Screw out release mechanism.
- Apply hand brake.

Caution: Brake hose connection 12 = pressureless

- Mark both brake hoses for proper assembly.
- Screw brake hoses out of the connection.

Caution:

Do not remove brake cylinder with screwed on brake hoses. Brake hoses might be damaged!

- Dismantle the brake cylinder from the calliper. To do this, loosen the hexagon bolts and take off the the brake cylinder (table 1, position V).

Work sequences for spring brake cylinder assembly:

Caution:

With the brake cylinder in its installed position, ensure that the lower drainage hole facing the ground is open!

- Before refitting the brake cylinder clean the mounting flange on the calliper and grease the concave seat (arrow) in the brake lever.

- Fit brake cylinder to the calliper and tighten nuts crossed using a spanner (table 1, position V).
- Screw both brake hoses to brake cylinder. Pay attention to the regulations of the cylinder manufacturer!

Important: Pay attention to the correct connections!

Connection 11 = foot brake.

Connection 12 = hand brake.

- Loosen hand brake.
- Screw in release mechanism.

Note: The brake hoses must not be twisted or located such that they will rub against anything. The brake hoses of the air supply are not allowed to have an influence on the moveability of the brake calliper.

- Check air connection of the device for tightness.
- Carry out function and effectiveness tests (according to cylinder manufacturer's data).

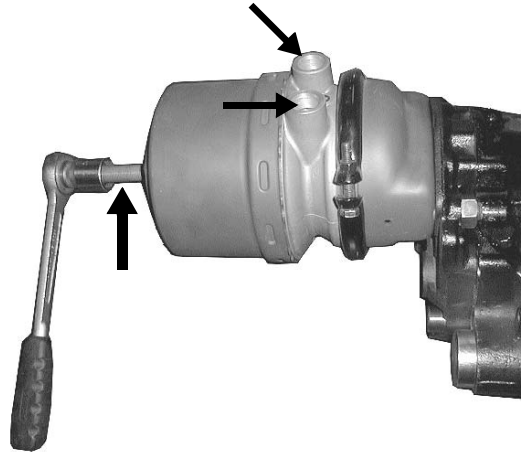
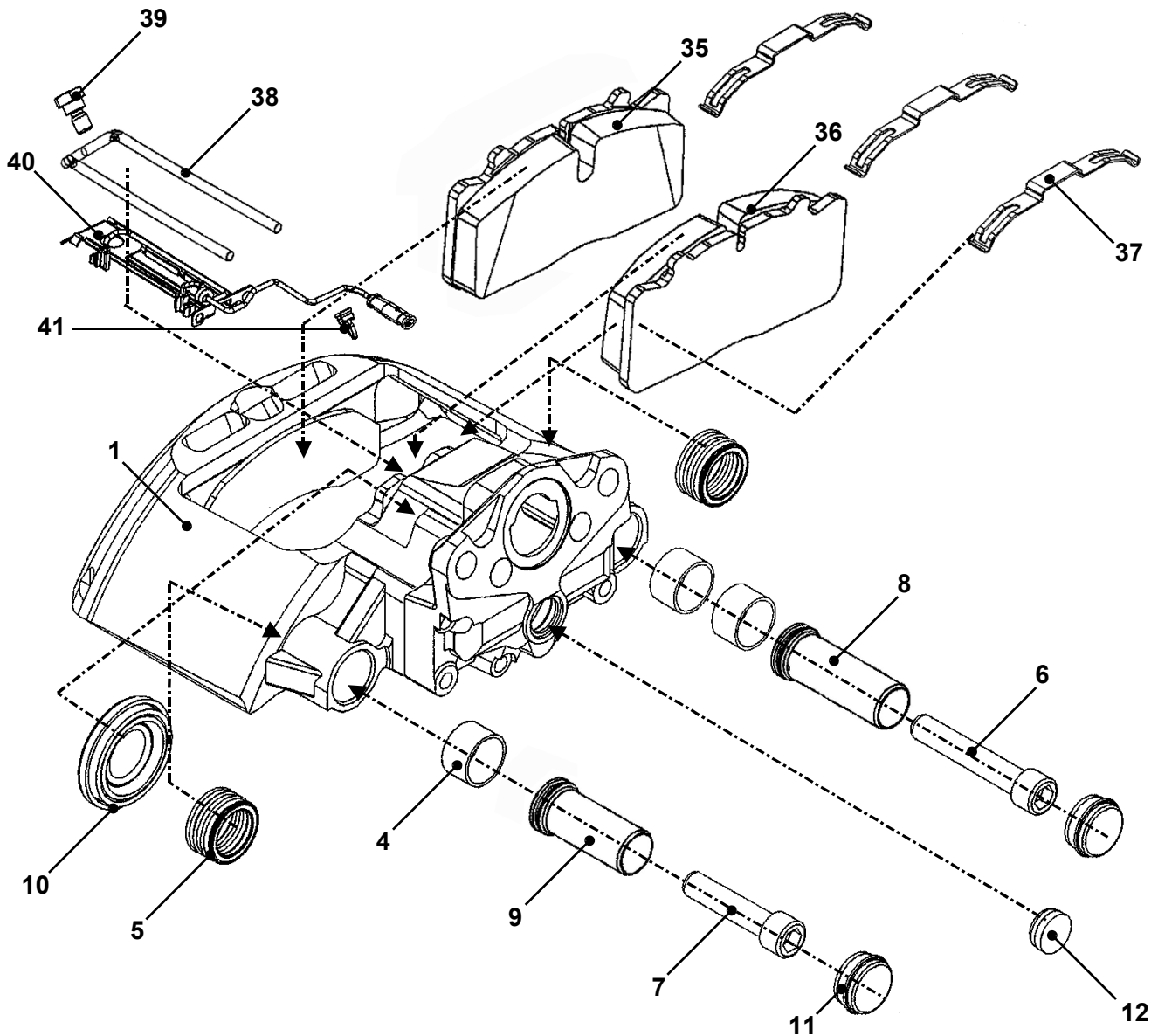


Table 1: Tightening torques

| Position | Name | Spanner width [AF] | Hexagon | | Tightening torque: [Nm] |
|----------|---------------------------|-----------------------|---------------|----------|--|
| | | | Exter- nal | Internal | |
| I | Hexagon adjuster | 8 | X | – | Turning direction of the hexagon: <ul style="list-style-type: none"> • Adjust, anti-clockwise (left) maximum 3, clearance decreases. • De-adjust, clockwise (right), maximum 12, clearance increases. Caution: Do not use a power-driven socket! |
| II | Screw / Pad hold down pin | 17 | X | – | 20 ± 2 |
| III | Brake fixation | – | X | – | Please pay attention to special assembly instructions and if applicable to wrench size of the vehicle manufacturer! |
| IV | Coupling guide pin | 14 | – | X | 340 ± 20 Tightening order for guide pins: 1. 1. Close fit pin (long internal hexagon bolt) 2. 2. Clearence fit pin (short internal hexagon bolt) |
| V | Coupling brake cylinder | – | X | – | Please pay attention to special assembly instructions and if applicable to wrench size of the cylinder manufacturer! |

Exploded view of the exchange units:



Key:

| | | | |
|----|---|----|--|
| 1 | Brake calliper with brake carrier (not shown) | 12 | Plug |
| 4 | Bushes for guide pins | 35 | Brake pad wheel side with wear indicator |
| 5 | Gaiters for guide pins | 36 | Brake pad actuation side with wear indicator |
| 6 | Internal hexagon bolt (long) | 37 | Hold-down springs |
| 7 | Internal hexagon bolt (short) | 38 | Pad hold down pin |
| 8 | Guide pin (long) | 39 | Hexagon Bolt |
| 9 | Guide pin (short) | 40 | Cable guide with wear indicator |
| 10 | Gaiter for adjuster screw | 41 | Clip |
| 11 | Cover plate | | |

