SERVICE AND REPAIR INSTRUCTIONS FOR KNORR-BREMSE PNEUMATIC DISK BRAKE SB6000 / SB7000

MANUAL SECTION C

Service and Repair

WI-SB0001 EN

Pneumatic Disk Brake SB6000/SB7000

KNORR-BREMSE

Systems for Commercial Vehicles

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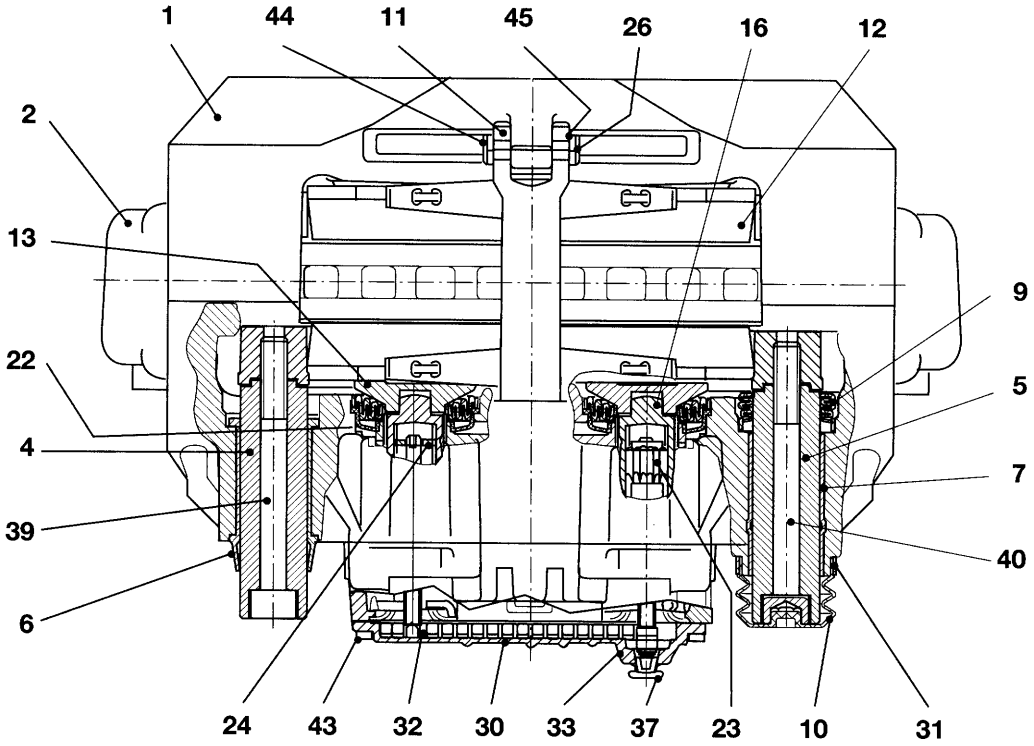
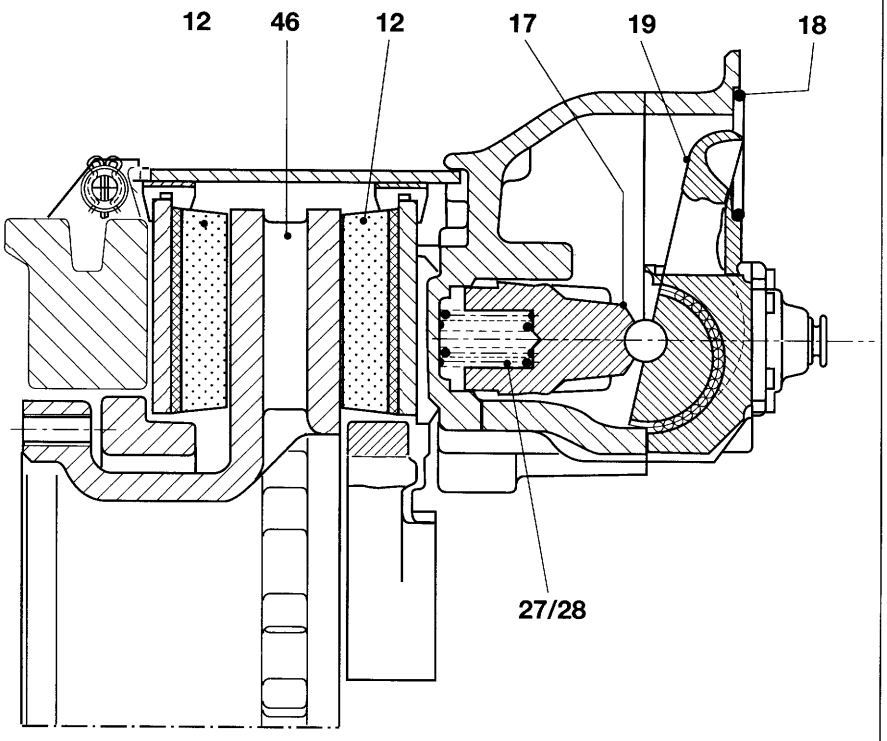
1. Construction and Function

1.1.1 Sectional Drawing



Key: (see Page 5)

1 Brake Caliper
2 Brake Carrier
4 Guide Bush
5 Guide Bush
6 Guide Sleeve
7 Bushing
9 Bellow for Guide Bush
10 Bellow Cap
11 Brake Pad Bracket
13 Thrust Member with Bellow
16 Threaded Tube
17 Beam
18 O-Ring
19 Lever
22 Cap
23 Clearance Adjuster
24 Driver
26 Spring Splint Pin
27 Compression Spring
28 Compression Spring
30 Roller Chain
31 Perforated Clip
32 Chain Drive Wheel
33 Shaft Sealing Ring
37 Cap
39 Cheese-Head Screw
40 Cheese-Head Screw
43 Cheese-Head Screw
44 Pin
45 Washer
46 Rotor Disc



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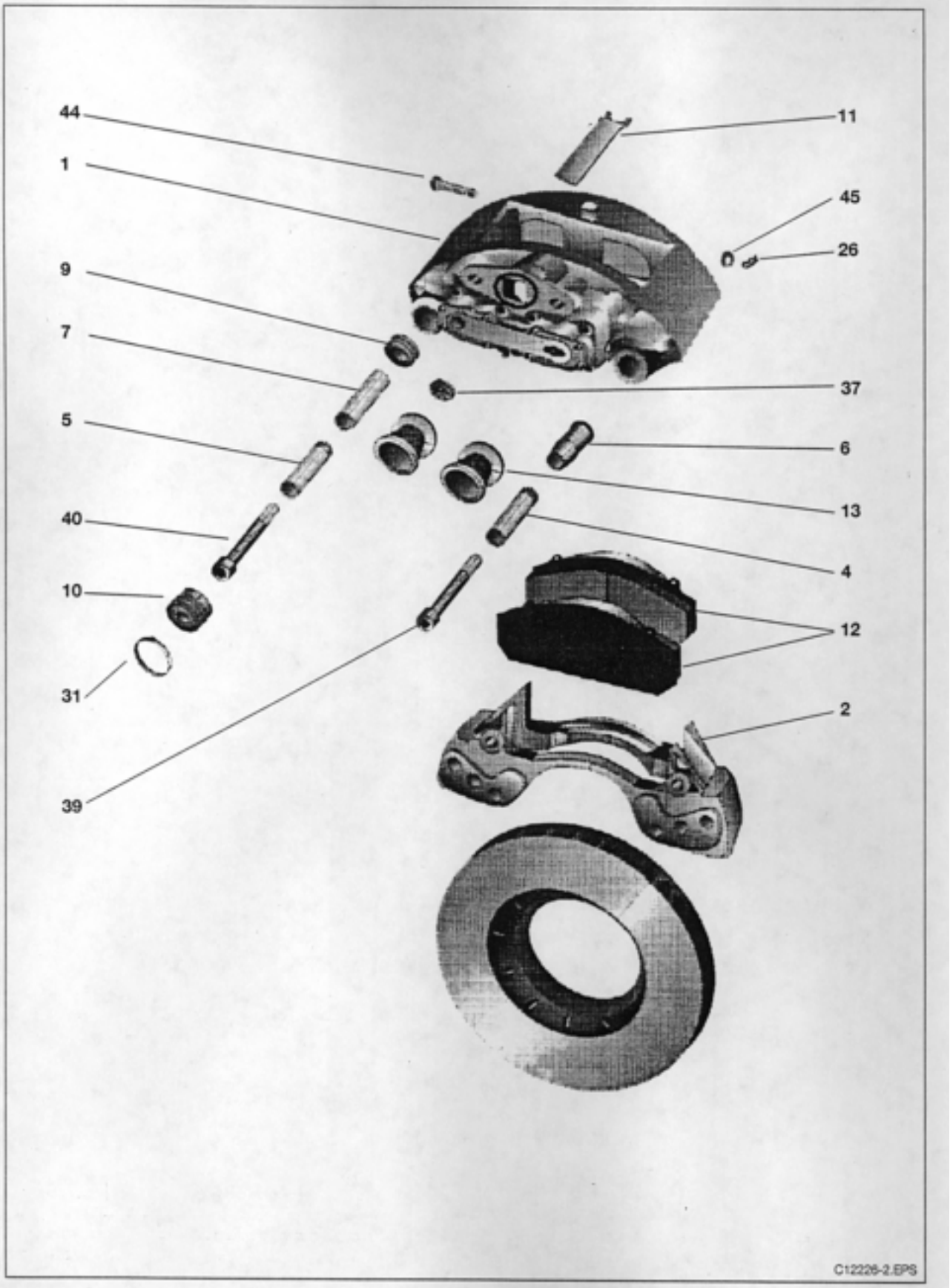
1.1.2 Exploded View of SB6000/SB7000



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1.2 Function

Principal: Floating Brake Caliper

1.2.1 Operation of the Brake

The piston rod of the brake chamber pushes the lever (19) during a brake application.

The force is transmitted via the excentric roller bearing mounted in the lever towards the beam (17).

The clamping force acts via the threaded tubes (16) and the thrust members (13) onto the inner brake pad (12).

After compensating for the clearance between brake pad and rotor disc (46) the reaction force is transmitted via the brake caliper onto the outer brake pad (12).

1.2.2 Release of the Brake

When the brake pressure is reduced, the two springs (27,28) push the beam with the threaded tubes and the lever (19) back into the original position.

1.2.3 Adjustment of the Brake

The brake is equipped with an automatic, wear free clearance adjuster, which keeps a constant clearance between brake pad and rotor disc.

With every brake application a simultaneous application is made by the clearance adjuster (23), which is connected to the lever (19).

The threaded tubes (16) are turned due to wear via the clearance adjuster (23) and driver (24), when the clearance due to brake pad and rotor disc wear is exceeded .

2. Maintenance Information

2.1 Brake Pads

The thickness of the brake pads have to be checked on a regular basis depending on the vehicle operation, according to the vehicle manufacturer's specification and to the legislation.

See also chapter **2.4.**

The remaining thickness of the brake pads should not be less than 2 mm. See **fig. 1**.

Due to the position of the brake caliper (1), in relation to the fixed guide bush (4), the brake pad condition can be checked visually,without dismantling the wheels. See **fig.2**.

In case the end of the guide sleeve (6) is in alignment with the fixed guide bush (4) the remaining brake pad thickness has to be checked exactly with dismantled wheels .

The replacement of the brake pads is described in chapter **3**.

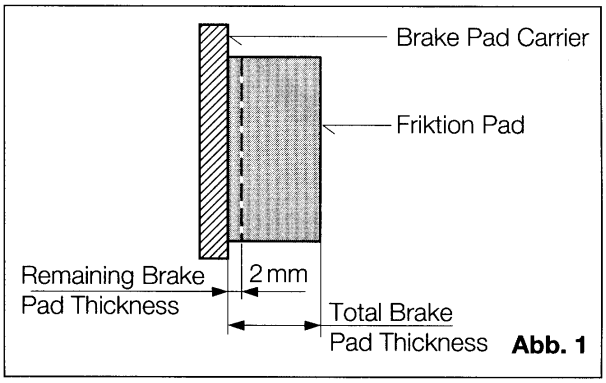


Abb. 1

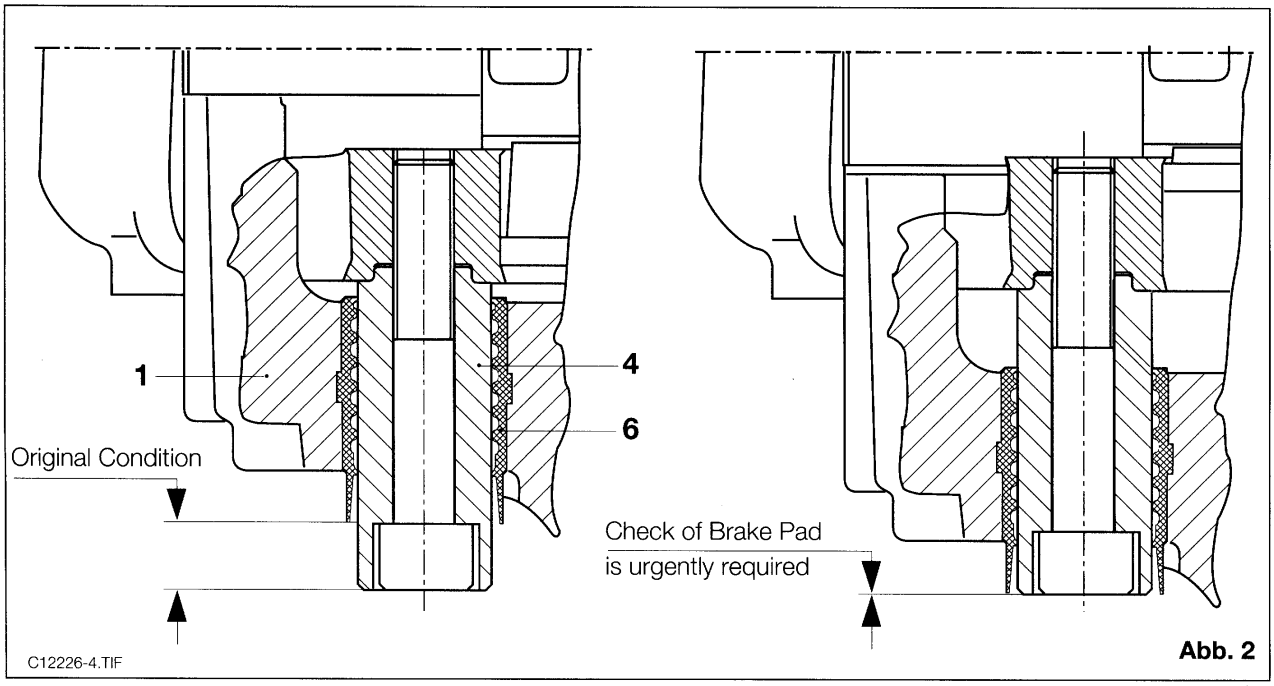


Abb. 2

2.2 Bellows on the Thrust Members

The bellows on the thrust members (13) and the caps (22) should not show any cracks or other damage. The penetration of dirt and humidity leads to corrosion and influences the function of the clamping mechanism and the clearance adjustment.

The replacement of bellows is described in chapter **3**.

2.3 Brake Caliper

The brake caliper (1) should move easily on the guiding parts (5) and (7), respectively (4) and (6).

The guide bush (5) is sealed with the bellow (9) and bellow cap (10) .

The parts (9) and (10) should not show any cracks or damage.

The replacement of the parts (9) and (10) (sealing) and the guiding parts are described in chapter 3.

2.4 Rotor Disc

Checking the Rotor Disc (46) Condition:

The sections A-D (fig.3) show possible rotor disc surface conditions:

A ➡ network cracks = permissible

B ➡ cracks from the outside towards the hub centre
cracks max. 1.5mm
(width and depth) = permissible

C ➡ uneven rotor disc surface
below 1.5 mm = permissible

D ➡ cracks crossing
the rotor disc = **not permissible**

Technical Specification:

- Rotor Disc Width, new = 45 mm
- Permissible Wear = 7 mm
- Absolute Wear Dimension = 38 mm

With rotor disc surface conditions **A to C** the rotor disc can be used until the absolute wear dimension is reached .

Turning off dimensions and exchange of rotor disc see **table 2** (next page).

The exchange of the rotor disc depends on its condition and wear dimension.

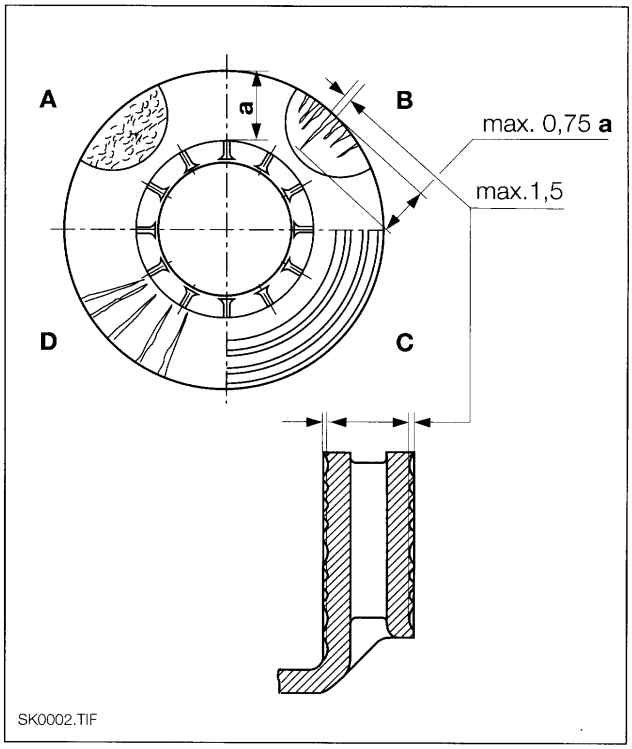
The new rotor disc has a width of 45 mm.

The minimum permissible width of the rotor disc is 38 mm and should not be exceeded.

The wear dimension is 7mm (3.5 mm per rotor disc . side), it can only be exceeded when an oversize brake pa~l is,fitted.

When the width of the rotor disc reaches 41 mm an oversized brake pad should be used.

The dimensions of the individual brake pads are shown in **table 1** (see page 8).



Attention !
To prevent damage of the rotor disc, the brake pads should be replaced when the brake pad shows a minimum dimension of 2 mm on the thinnest position above the brake pad carrier.

Table 1:
Brake Pad Dimensions

	Dimension	Standard Brake Pad [mm]	Oversized Brake Pad [mm]
Brake Pad Carrier Thickness	**T**	7	9
Brake Pad Thickness	**S**	23	23
Total Thickness	**h**	30	32

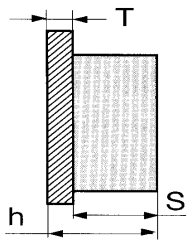
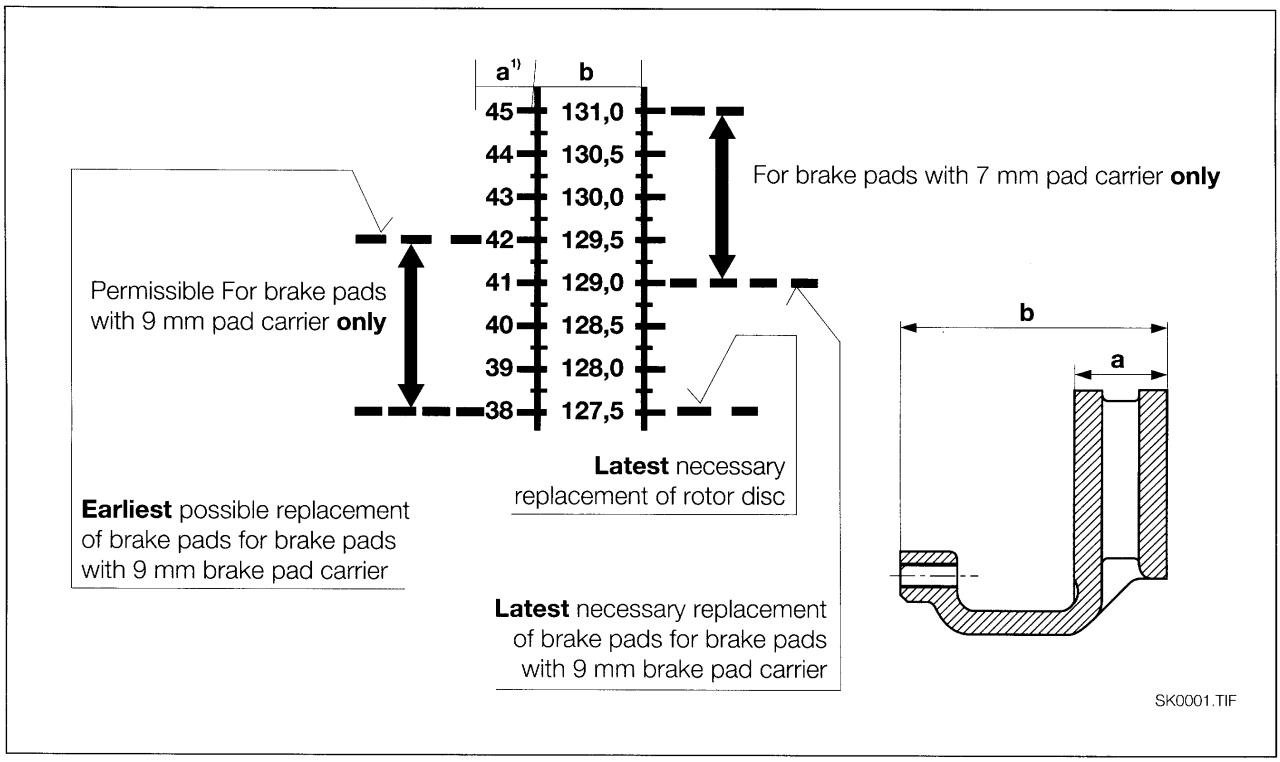


Table 2:
Adjustment of the rotor disc dimensions for the individual wear conditions and the timing of the brake pad replacement.



Attention !
If these instructions are not followed, there is a danger,
that with worn out brake pads the rotor disc will be damaged
and therefore the braking
efficiency will be reduced or will be even lost.

2.5 Brake Chamber

The brakes are only to he allowed to be configured with brake chambers, which must have an inner

This means, that the pressure rod, which acts towards the lever (19) must be sealed to the secondary area of the brake chamber, otherwise the clamping mechanism would be completely open to atmosphere.

1) Attention: Please note the vehicle manufacturer's specification!

3. Reference for Repair

- Note, that the vehicle must be lifted and secured!
- Dismantle wheels!
- Make sure, that the brake can not be operated during repair

Attention ! Brake pads to be replaced for the whole axle!

- During installation of wheels,check if the tyre valve has enough space to the brake caliper.
- With the wheel mounted, there has to be enough space, otherwise the tyre valve can be damaged as well as the tyre.

3.1 Replacement of Brake Pads

Take away the spring splint pin (26) and washer (45) (fig.4).

Pre-load brake pad bracket (11) with a driver and push the pin (44) out of the bore hole (fig.5).

To remove the brake pads (12) easily out of the brake pad shaft, the threaded tubes (16) must be screwed out.

Therefore remove cap (37) with a screw driver **(fig.6)**.

3.1.1 Reversal of the Threaded Tubes

Turn with the hexagonal part (SW=8mm) of the clearance adjuster (23) the threaded tube anti-clock-wise until stop **(fig.7)**.

During reverse (anti-clockwise) the overload clutch inside the clearance adjuster generates a "click"-noise caused by the torque.

Remove brake pads (12) from the brake pad shaft.

After the brake pads are removed check the brake condition.

Consider chapter **2.2** to **2.5** for the inspection.

If no malfunctions are discovered, new brake pads can be installed.

Attention !

Use only original brake pads, which are released by the vehicle manufacturer and/or Knorr Bremse granted replacement parts.

Failure to follow these instructions will invalidate any guarantees or warranty !

Attention !

With used rotor disc (46) the new brake pads need to be chamfered on the inside and outside radius (4x45 degree).

The brake pad carrier must have a thin covering of copper paste in the area of the contact to the brake caliper (1) and brake carrier (2).

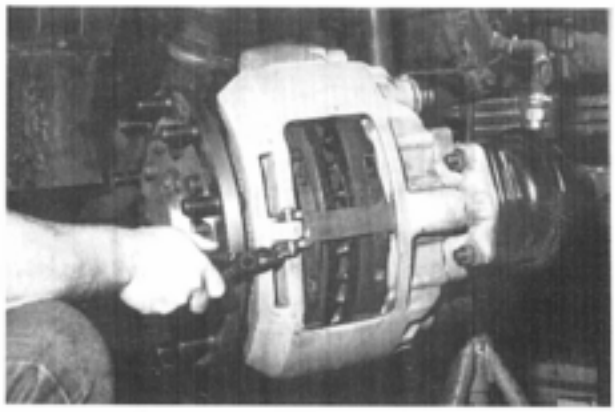


Fig. 4

Fig. 5

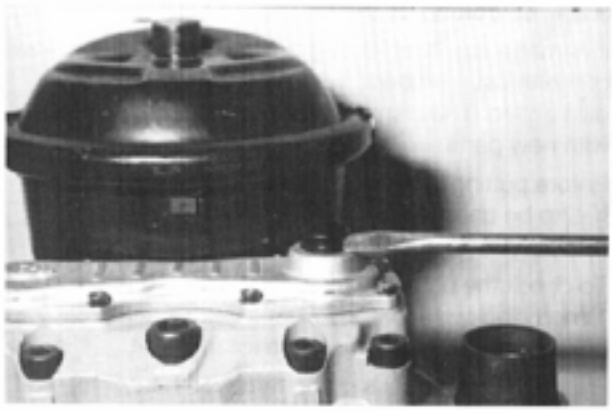


Fig. 6

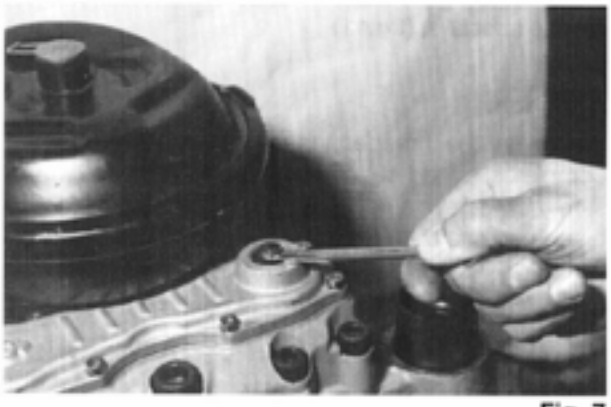


Fig. 7

The assembly of the brake pads (12) has to be done in the reverse way to dismantling.

Push brake caliper (1) to the vehicle outside direction and put in the outer brake pad (12).

Push the brake caliper in the direction to the vehicle inside and put in the inner brake pad (12) **(fig.8)**.

3.1.2 Clearance Adjustment

Slide a feelergauge in between the thrust member (13) and brake pad carrier and adjust the clearance to 0.7 mm by turning the hexagonal (SW=8) of the clearance adjuster (23) clockwise **(fig.9)**.

Put on cap (37).

After brake operation the wheel and/or the hub should turn easily, when the brake is released.

Put in the brake pad bracket (11) into the brake caliper and pre-load it with a screw driver, so that the pin can be easily mounted into the bore hole **(fig.10)**. Put in pin (44) and washer (45) and secure with a spring splint pin (26).

Attention !

Run in the brake pads, avoid long brake applications as well as harsh braking.

3.2 Replacement of the Thrust Members with Bellows and Checking of Clamping Unit

3.2.1 Checking of the Clamping Unit

If damage is noticed during the checking of the bellows of the thrust members (13), both bellows have to be dismantled. The dismantled parts must be replaced with new parts.

Before putting in the new parts the clearance adjuster has to be checked for corrosion and for easy operation.

To check the parts the threaded tubes (16) have to be turned clockwise with the clearance adjuster (23) hexagonal (SW=8) towards the rotor disc.

By turning the threads of the threaded tubes (16), check for corrosion.

Rust on the threads of the threaded tubes indicate the need for an overhaul of the brake by a Knorr service specialist **(fig.11)**.

Attention:

To prevent the threaded tubes (16) not being completely turned out of the beam (171, make sure that there is a new brake pad in the outer brake pad shaft.

If the threaded tubes are withdrawn from the beam, the reassembly and adjustment must be carried out by a Knorr Service Specialist.

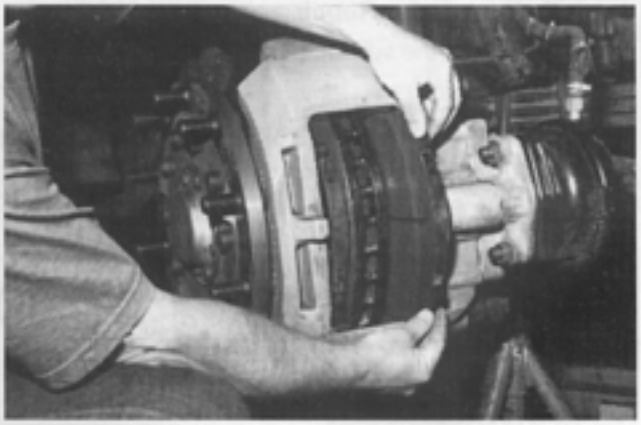


Fig.8

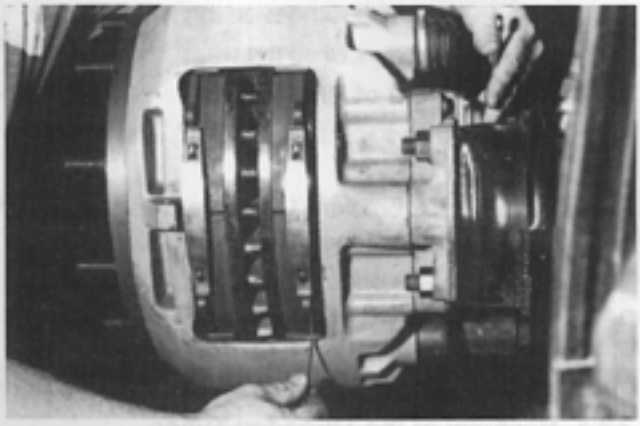


Fig. 9

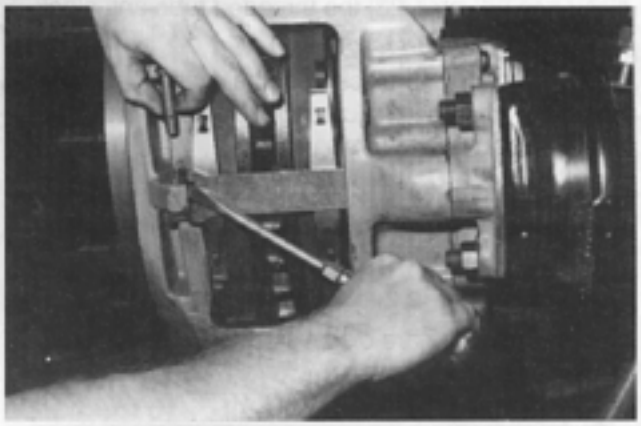


Fig. 10

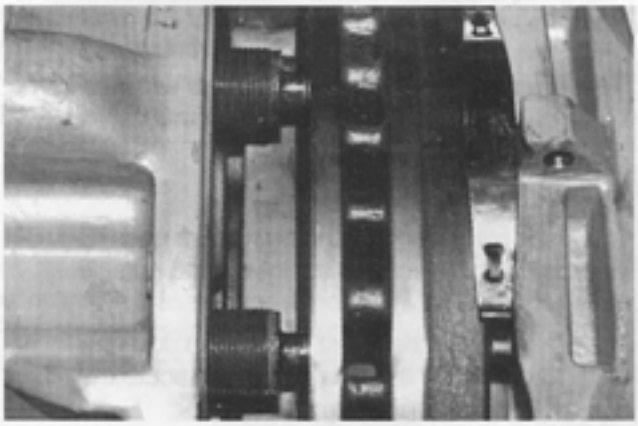
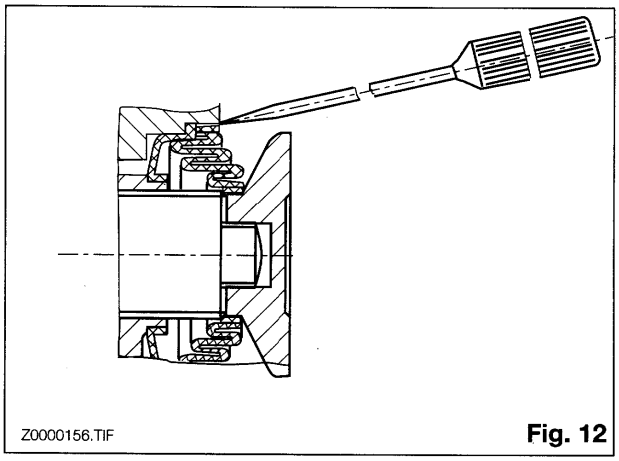


Fig. 11

3.2.2 Removal of defective Bellows

It is possible to remove defective bellows with the brake installed on the vehicle.

Push a screw driver in between the outer diameter and brake caliper bore and remove bellow **(fig.12).**



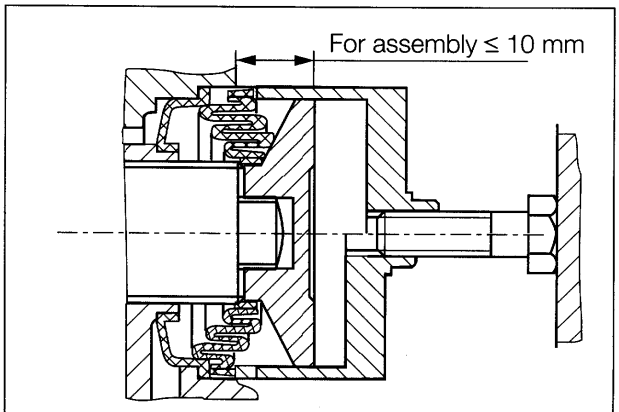
Z0000156.TIF **Fig. 12**

3.2.3 Installation of the Thrust Members with Bellow

Place the thrust memberwith bellow (13) onto the exposed mating part of the threaded tube (16).

Ensure that the press tool is centerlized on thrust member (13) and press it in with the assembly tool (SW= 13) **(fig. 13)** .

Assembly tool order-no.: ll 19252



Z0000159.TIF **Fig.13**

3.3 Repair of Brake Caliper Bearing

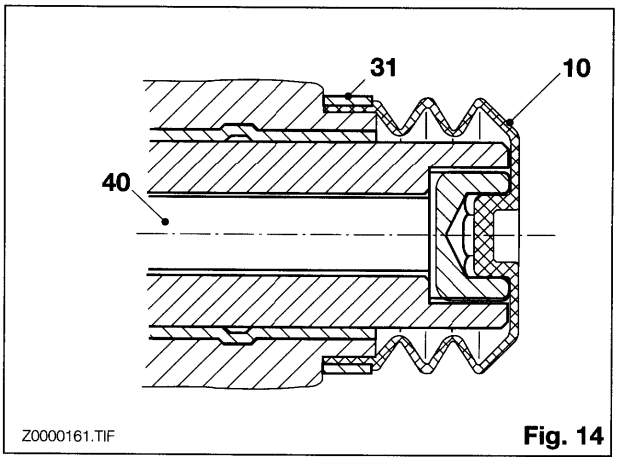
3.3.1 Removal of the Brake Caliper from the Brake Carrier

Take out brake pads as described in chapter **3.1**.

Release perforated clip (31) and remove it.

Remove bellow cap (10).

Release screws (39) and (40) with hexagonal wrench (SW=14) and remove them **(fig.14).**



Z0000161.TIF **Fig. 14**

3.3.2 Replacement of the Inner Bellows

3.3.2.1

Pull out bellow (9) with screwdriver **(fig.15)**.

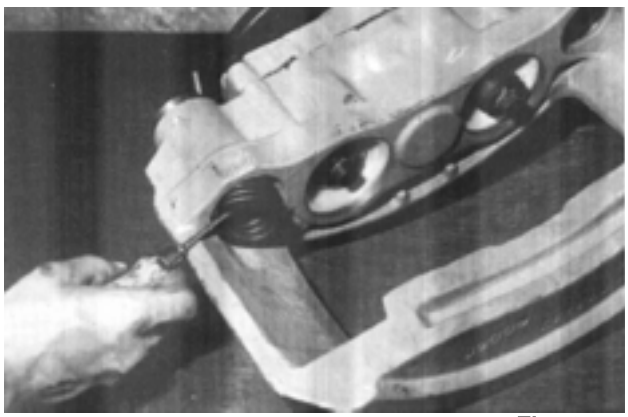


Fig. 15

3.3.2.2

Insert bellow (9) into assembly tool.
Order-no.: II 19253 **(fig.16)**.

Fig. 16

3.3.2.3

Press in new bellow (9~ with assembly tool.
Order-no.: II 19253 **(fig.17)**.

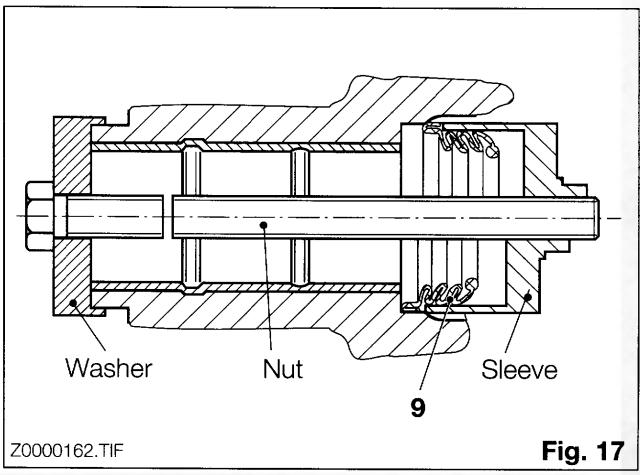


Fig. 17

3.3.3 Replacement of Guide Sleeve (Elastic Guiding)

3.3.3.1

Press out defect guide sleeve (6) from the brake caliper bore.

Squeeze the new guide sleeve at the collar and insert it from the inside of the brake caliper into the bore (**fig.18**) .

Fig. 18

3.3.3.2

Push guide sleeve through until it can be touched on the other end.

Note that the collar of the guide sleeve fits tightly against the bore shoulder, so that there is no movement **(fig.19).**

Grease guide sleeve inside with 3 to 5 grams grease „Syntheso GI EP1" (branch Klüber).

Order-no.: 503880

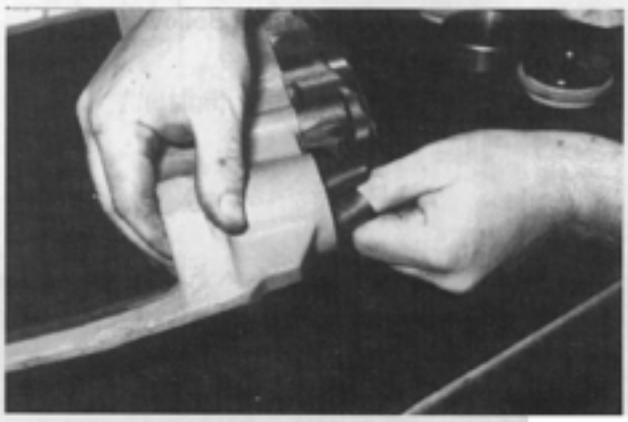


Fig. 19

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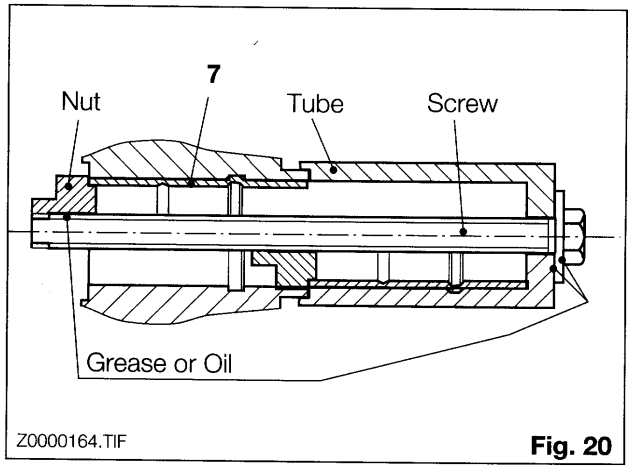
3.3.4 Replacement of the Bushing (Fixed Guiding)

3.3.4.1

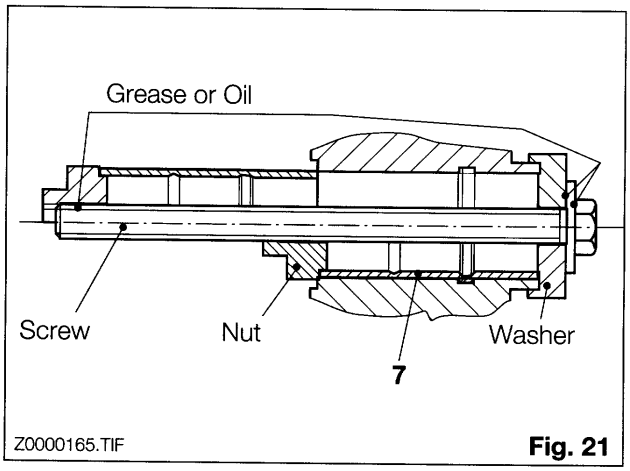
Pull out bushing (7) with assembly tool.
Order-no.: ll 19254 **(fig.20)**.



Z0000164.TIF **Fig. 20**

3.3.4.2

Draw in new bushing (7) with assembly tool until stop **(fig.21)**
Order-no.: ll 19254



Z0000165.TIF **Fig. 21**

3.4 Replacement of the Brake Chamber

3.4.1

Unscrew Air Connector from the Brake Chamber.

Release the two fixing nuts (M16x1.5-SW24) on the brake housing.

Take away brake chamber **(fig.22)**.

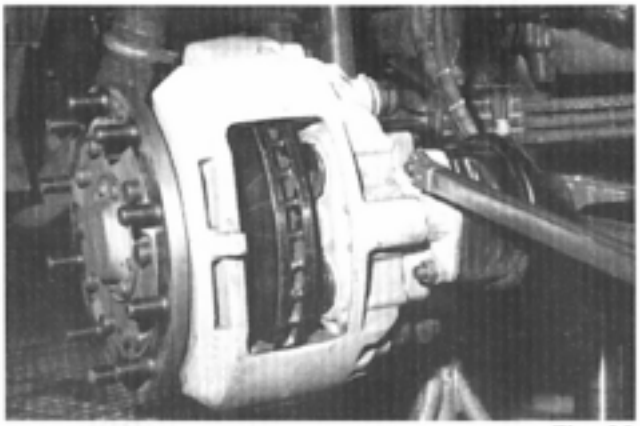


Fig. 22

3.4.2

Before installing the new brake chamber, the cup in the lever (19) has to be greased with multipurpose grease, e.g. "**RENOLIT HLT 2**", **(fig.23)**.

Attention!
Do not use a molybdenumsulphite combined grease!
Use brake chambers with „inner sealing“ see chapter 2.5!
Ensure that the o-ring is in the correct position between the brake caliper and brake brake chamber!

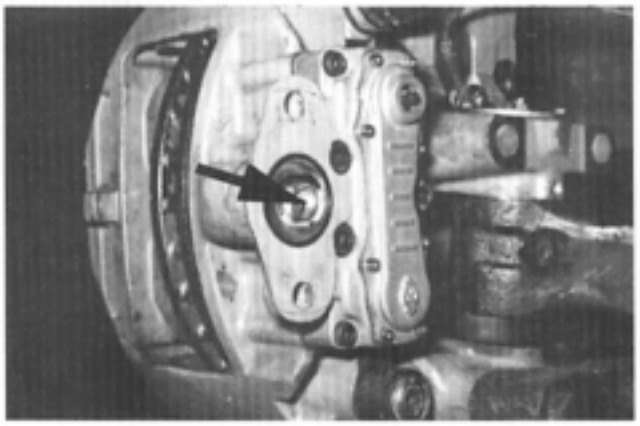


Fig. 23

4. Screw tightening torques of pneumatic disc brake SB6000 SB7000

Position no. (s. p. 4 a. 5)		Tightening Torque [Nm]	ScrewWidth (SW)	Hexagonal Outer-	Hexagonal Inner-
39 + 40	Guide Bushing on Brake Caliper 2 Screws M 16x1.5-10.9	279 +31	14		X
—	Brake Chamber 2 Nuts M16x1.5	180 ±20	24	X	

Assembly Tools

Order- No.	Contents
II 19252	Installation Thrust Member with Bellow
II 19253	Inner Bellow for Brake Caliper Guiding
II 19254	Bushing for Caliper Guiding

6 Wearing Parts

Attention!
Use only original Knorr parts!

Please contact your Knorr Bremse authorized distributor, because the brake discs have different parts depending on the individual vehicle manufacturer's requirements.