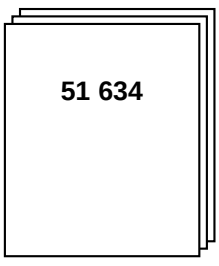
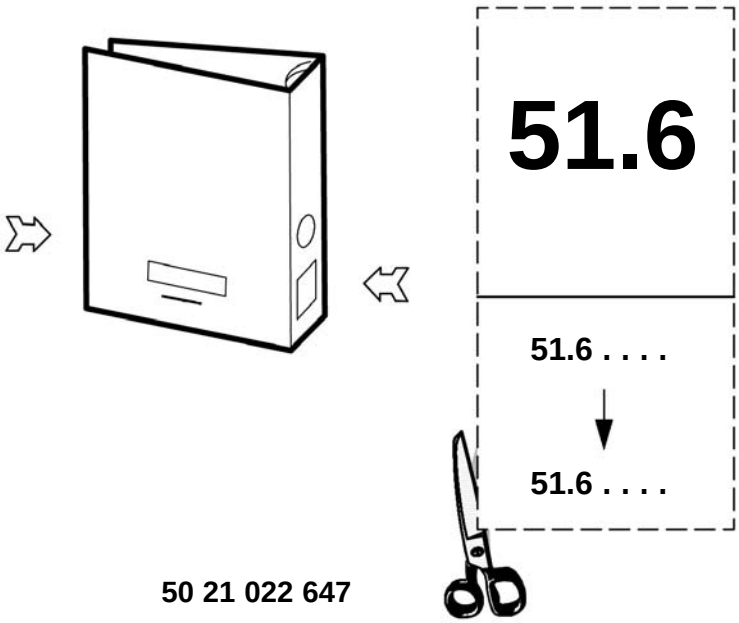
51 634 - AN - 10/2004

DISC BRAKE ELSA 22.5

RANGE	FAMILY	VARIANT
RENAULT MAGNUM DXi 12 440 - 480	17RD	
RENAULT MAGNUM DXi 12 440 - 480	17SD	
RENAULT MAGNUM DXi 12 440 - 480	17TD	

The above information may change in the course of time. Only the “Consult” section of the workshop manuals directory in standard N° 10320 serves as reference.





50 21 022 647

CONTENTS

GENERALITIES

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

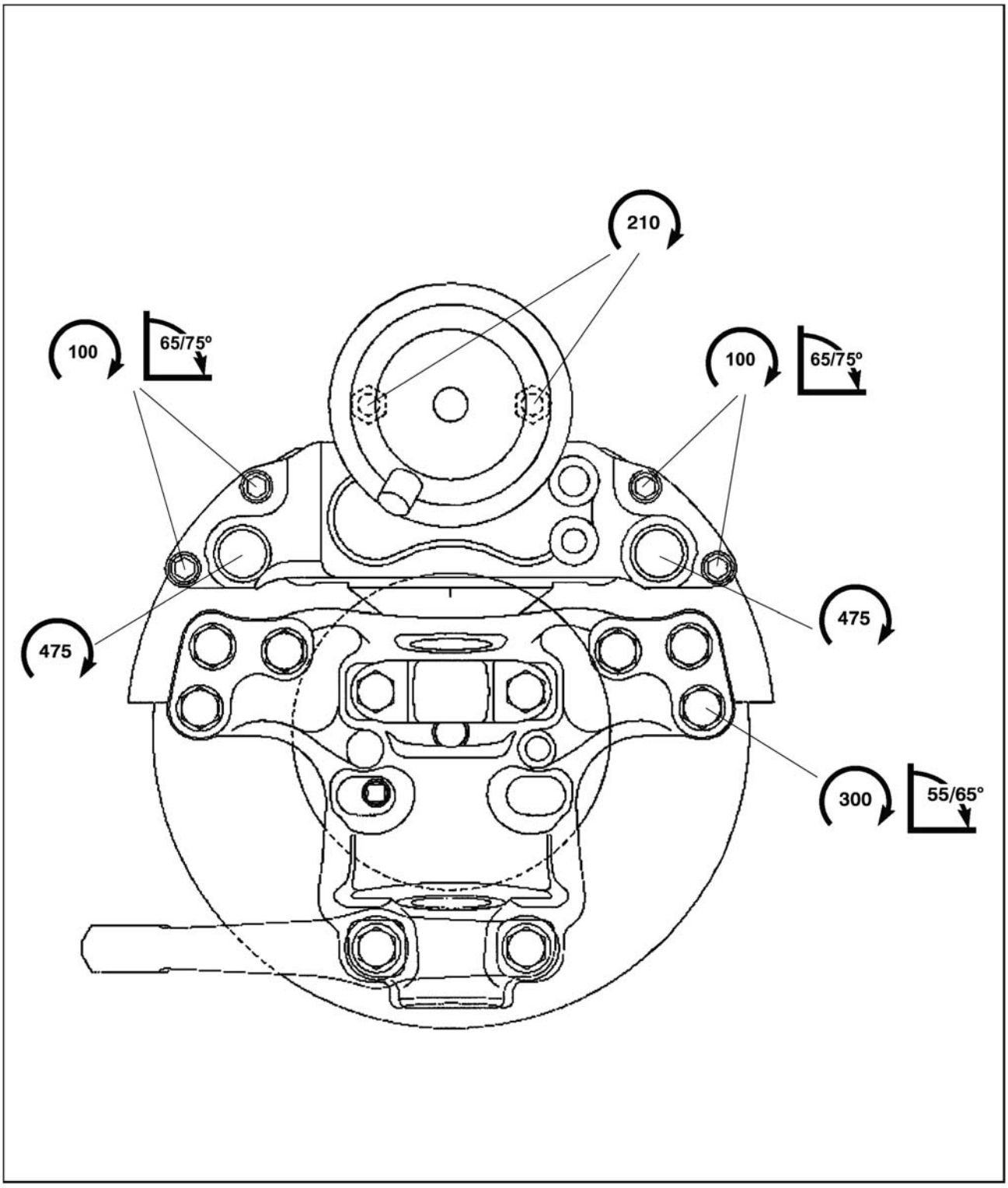
	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

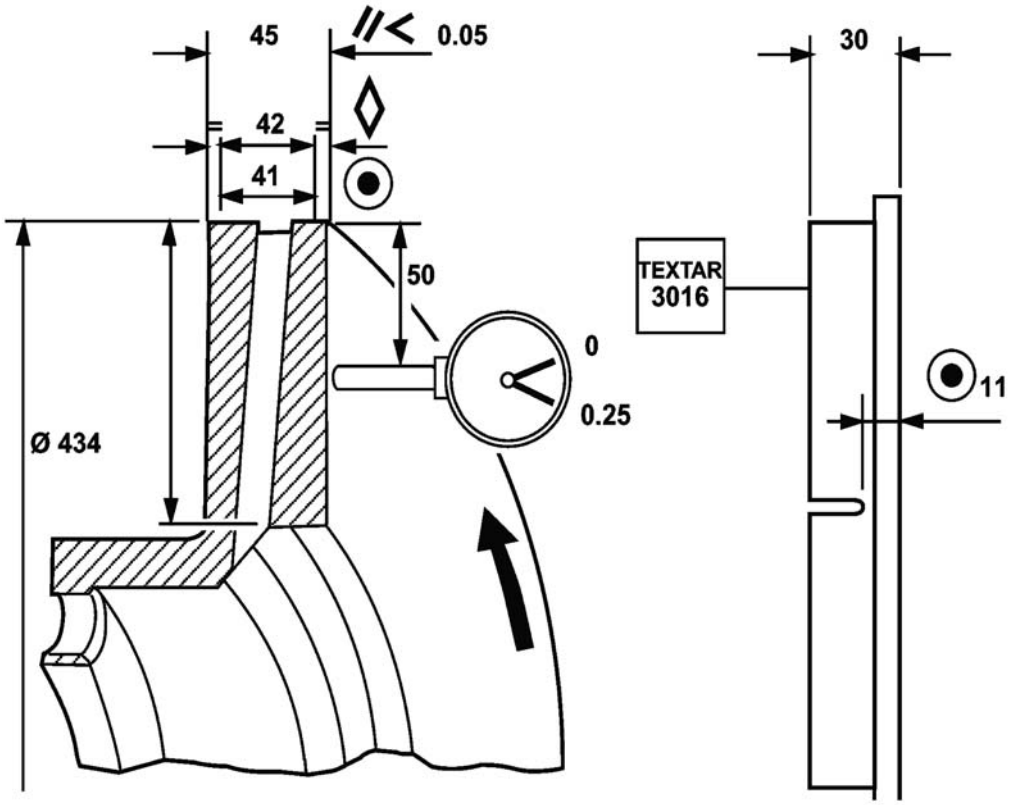
TECHNICAL DATA

Specific tightening torques (in Nm)



Technical data for brake pad discs

(for further information, consult Renault Trucks Workshop Manual 50.900).



FRONT ROTOR	VENTILATED
REAR ROTOR	VENTILATED

Brake pad Textar 3016

Original thickness including rear pad	30 mm
Minimum permissible thickness including rear pad	11 mm

Brake disc

Outside diameter	434 mm
Thickness new	45 mm
Minimum thickness after machining	42 mm
Minimum thickness	41 mm

TOOLS / CONSUMABLES

Generalities

RENAULT TRUCKS divides tools into three categories:

– **General-purpose tools:** proprietary tools
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts Department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

– **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department
  - **50 00 26 .... and 74 09 99 .... reference numbers** (possibility of purchasing through the RENAULT TRUCKS Spare Parts Department).

– **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number (represented by a drawing):** tools that are simple to make without need for special qualification.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts Department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:

– **Level 1 :** tools for servicing, maintenance and minor tasks.

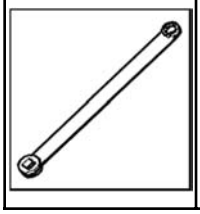
– **Level 2 :** tools for major repairs.

– **Level 3 :** tools for refurbishment.

Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

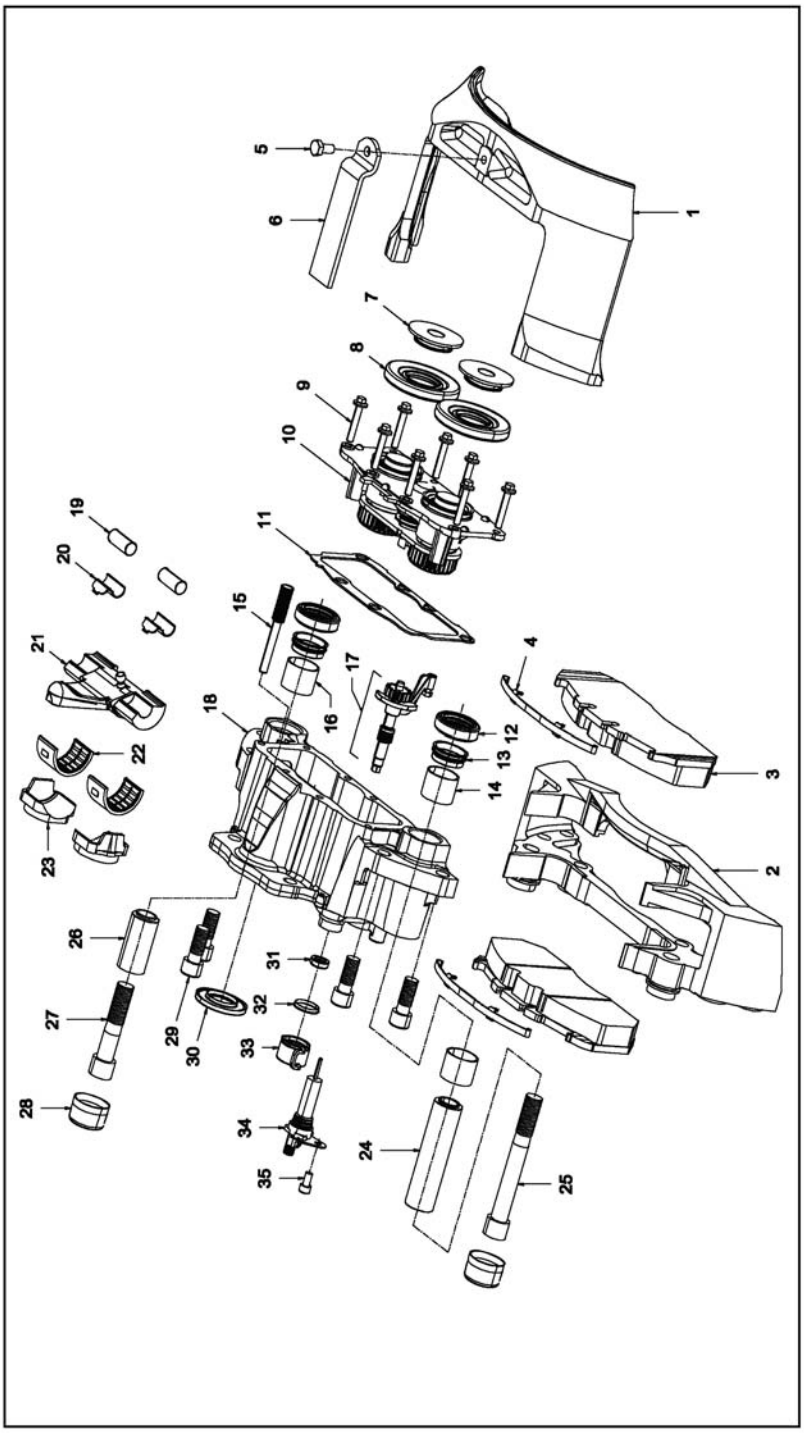
LIST OF TOOLS

Special tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer Code	Level	Qty
	**7409998573**	Wrench			1	1

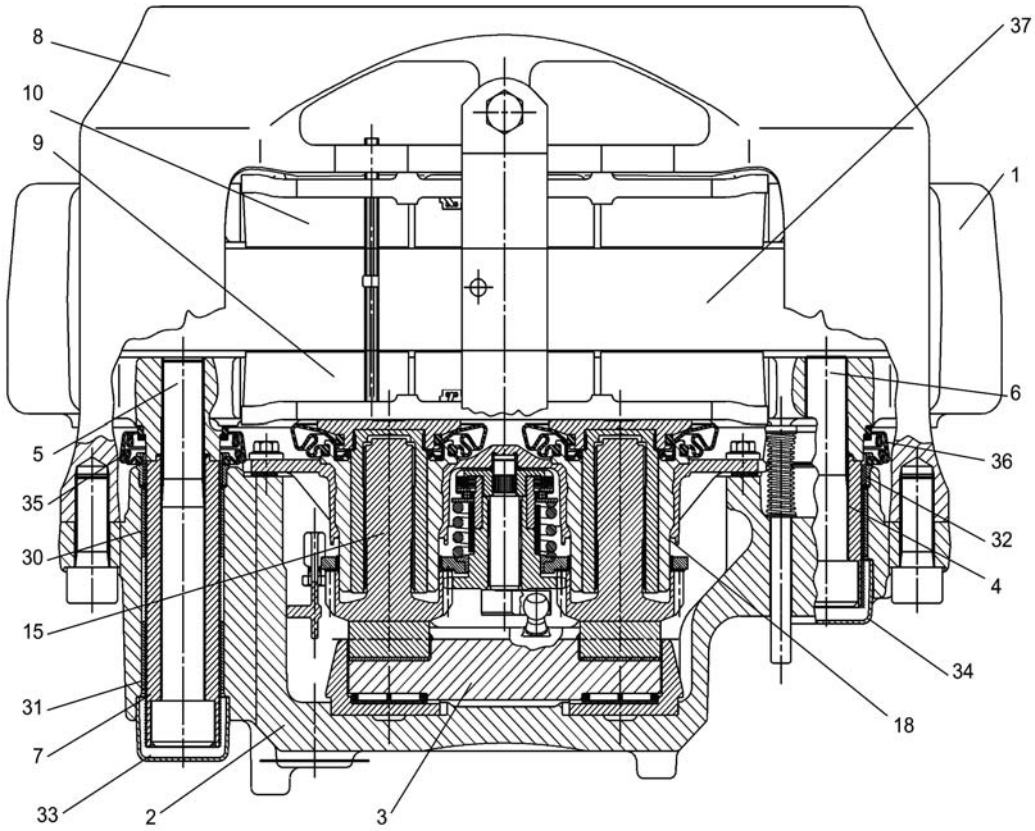
DESCRIPTION

ELSA 22.5 – Exploded illustration and parts list

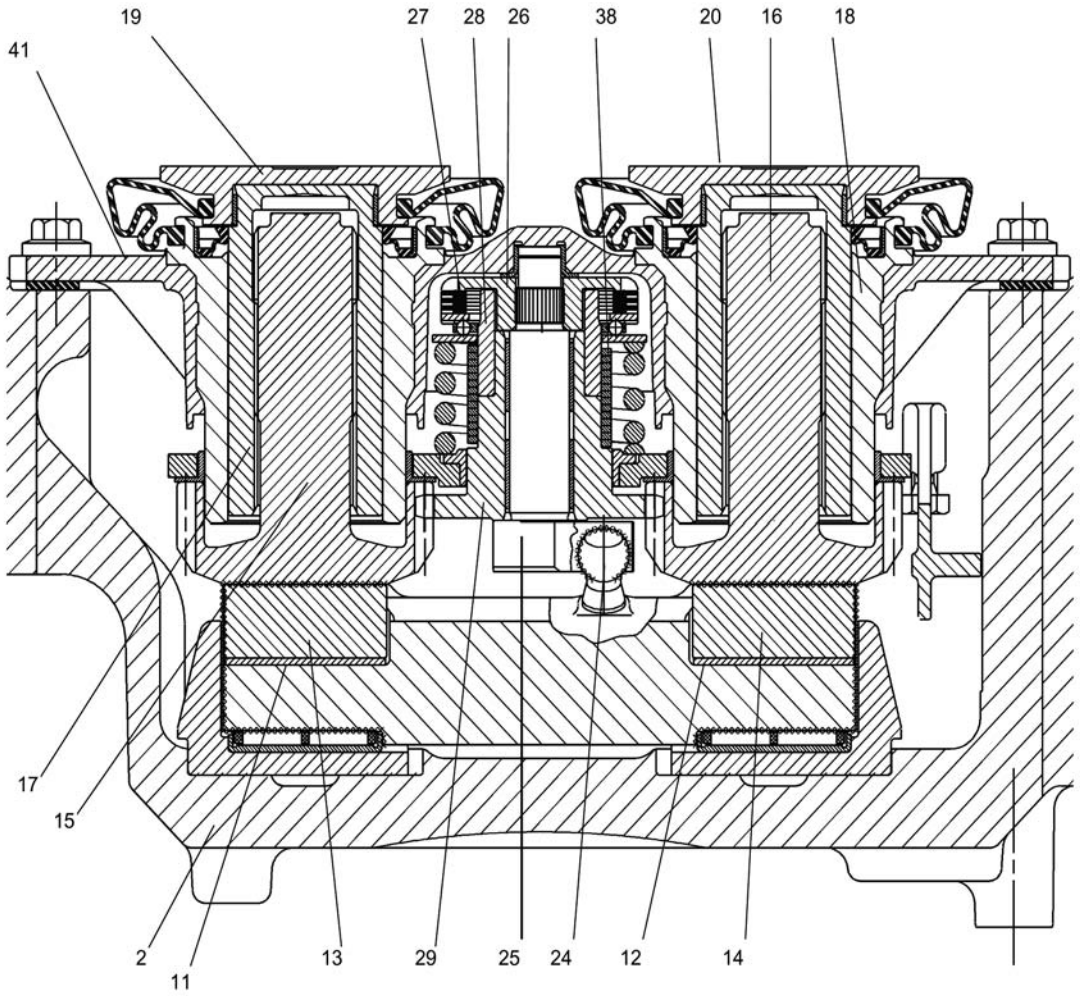


1 – Bridge
2 – Pad carrier
3 – Plate
4 – Pad spring
5 – Screw
6 – Pad securing strap
7 – Plunger head
8 – Plunger dust guard
9 – Piston casing securing bolt
10 – Piston casing
11 – Gasket
12 – Guide sleeve dust guard
13 – Guide sleeve dust guard fastening
14 – Guide sleeve bush (flat)
15 – Pad wear indicator
16 – Guide sleeve bush (oval)
17 – Emergency manual control rod
18 – Casing
19 – Roller
20 – Bearing
21 – Control shaft
22 – Bearing half-shell
23 – Saddle
24 – Guide sleeve (long)
25 – Guide sleeve (long) screw
26 – Guide sleeve (short)
27 – Guide sleeve (short) screw
28 – End cap
29 – Casing bolt
30 – Gasket
31 – Emergency manual control rod seal
32 – Emergency manual control rod cap fastening
33 – Emergency manual control rod cap
34 – Full-time wear detector or switch
35 – Securing bolt

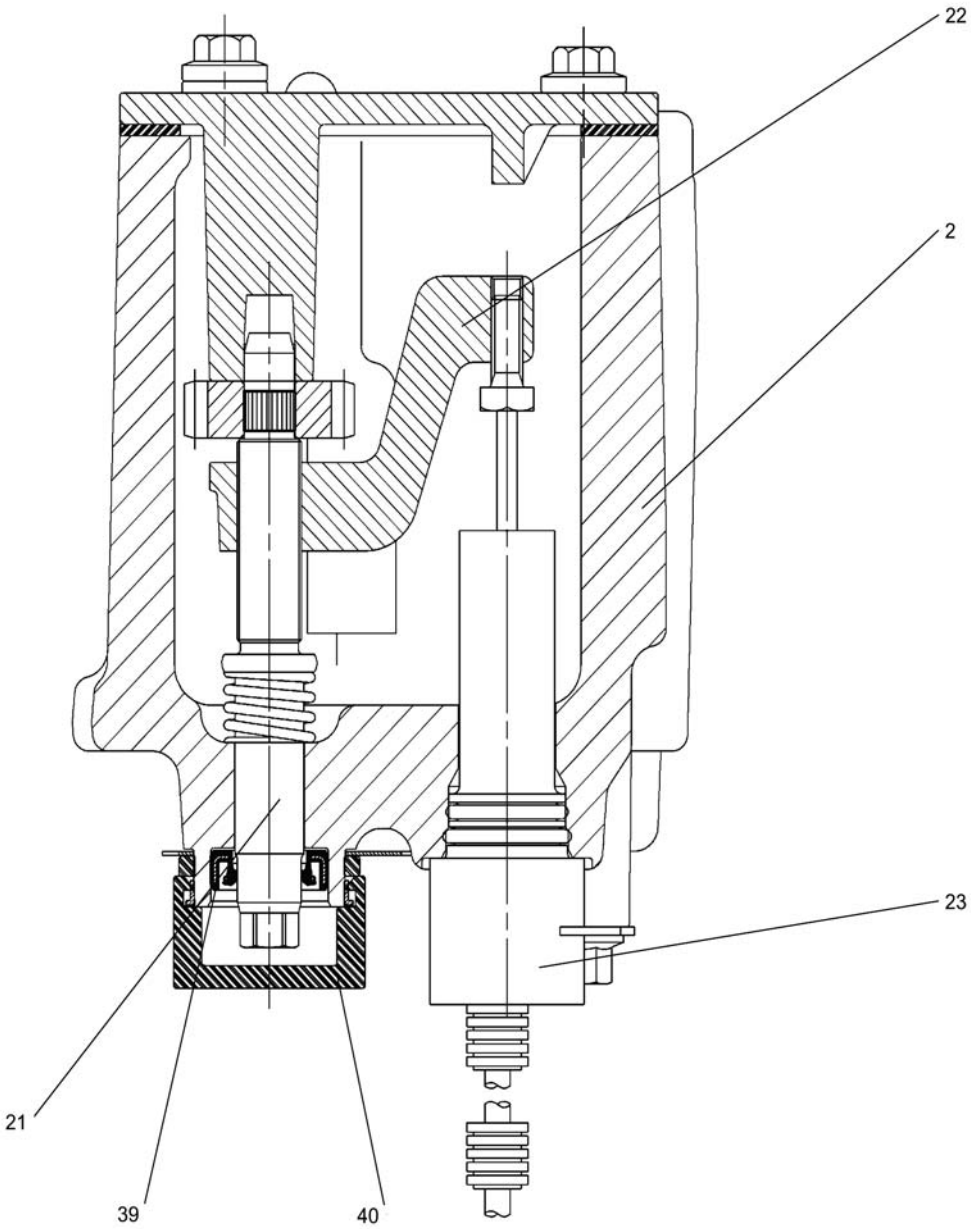
ELSA 22.5 Cross-sectional illustration



ELSA 22.5 Caliper body detail



ELSA 22.5 Cross-sectional illustration – Full-time electronic wear detector



Introduction

This air-operated disc brake has been designed to incorporate a directly assembled pneumatic actuator installed in the radial or axial direction, as illustrated in Figure 1.

1

The caliper, detailed in the exploded view, can be fitted to front or rear axles and can be used for parking the vehicle, if it is equipped with a service brake / spring actuator.
The basic operation of the caliper is simple, but it is important to clearly understand the characteristics of the automatic load-insensitive tensioner.
It is essential to observe correct maintenance procedures to guarantee that the caliper will ensure satisfactory service throughout its service life.

HOW IT WORKS (Consult cross-sections on pages D-3, D-4 and D-5).
The air chamber and the actuator are connected to the caliper body and act directly on the internal control shaft, thus eliminating the need for a conventional lever and linkage system. The seal between the actuator and the caliper is provided by gaskets in the caliper / actuator cover. The pad carrier, attached to the vehicle, straddles the disc and carries the brake pads. The body slides on two fully sealed guide pins bolted to the pad carrier.
As the pads wear, slack adjustment is automatic and insensitive to the load.
NOTE : "Insensitive to the load" means that adjustment takes place under very light application forces only, thus preventing over-tension and minimizing air consumption.
Two guide sleeves (4, 7) are bolted to the pad carrier (1) by means of guide sleeve bolts (5, 6). The pad carrier is connected to the half axle. The casing (2) is mounted so that it floats on the guide sleeves and a bridge (8) is fastened to the casing (2) to supply the reaction force on the outboard pad (10).
The casing and the bridge slide on 3 bushes (30, 31, 32) that are press fitted to the casing (2). At the short guide sleeve (7) end, clearance is provided in one direction to accommodate flexing of the brake when the brakes are applied, whereas the longer sleeve (7) supplies more positive positioning of the casing. The outer seal of the guide sleeves is provided by dust guards (35, 36) and 2 end caps (33, 34).

The brake is actuated via a pneumatic actuator (not shown in the drawing), which acts directly on the control shaft (3).

The force produced by the pneumatic actuator is amplified by the geometry of the control shaft (3). This application force is transmitted to the inboard pad (9) via half-shells (11, 12), rollers (13, 14), plungers (15, 16), pistons (17, 18) and piston heads (19, 20). Once the inboard pad (9) is engaged, the reaction force acting through the floating casing (2) and the bridge (8) pulls the outboard pad (10) against the brake disc (37). The forces produced by friction of the brake pads on the brake disc are transmitted to the ends of the pads on the pad carrier (1), mounted rigidly on the axle.

The brakes are wound off by the reduction in force exerted on the control shaft (3), thus reducing the braking application force. The pull-back spring (38) then returns the application mechanism and the control shaft to their initial positions, leaving the pads with a running clearance defined by the disc ratio.

The slight out-of-round of the brake disc and the hub/bearing clearances will then generate a slight clearance for the outboard pad (10) after just a few revolutions of the disc.

In certain applications, a full-time electronic wear detector (23) is installed, illustrated on page 6 (Elsa 2 cross-sectional view). This constantly monitors the distance between the pads and the disc, giving an output signal proportional to the total wear of the pad and of the disc. The wear detector (23) is driven by an arm (23) that moves up and down on a fine screw-thread on the manual tensioner rod (21). The arm can only turn with the housing (2) and when adjustment of the braking mechanism takes place. The manual tensioner rod (21) turns and the arms climbs along the shaft, driving the detector.

AUTOMATIC ADJUSTMENT

The automatic tensioner makes an adjustment to the operation of the brake to compensate for pad wear. Every time the brake is applied, the system senses whether adjustment is required or whether the running clearance between the brake pads and the brake disc is still within the built-in tolerance and does not need to be adjusted.

The built-in tolerances are determined in the design by the play between the spherical end driving shaft (24) fastened rigidly to the control shaft, and the fork at the end of the adjusting shaft (25).

a) Operation without adjustment

Starting from the rest position, the air-operated ram push rod advances, turning the control shaft. As soon as pistons (17, 18) have travelled the design running clearance, the spherical ended driving shaft (24) begins to touch the drive side of the fork at the end of the adjusting shaft (25).

The continuation of the movement of the actuator push rod turns the control shaft (3), thus generating rotation of the adjusting shaft (25) because the design running clearance has been taken up. The outer driving sleeve (26) is fastened to the adjusting shaft (25) and turns the inner driving sleeve (28) via the clutch lining (28). The inner driving sleeve (28) is connected to the intermediate pinion (29) by a one-way friction spring (38), which tries to turn the plungers (15, 16). However, the friction in the screw-threads of the plungers (15, 16) and pistons (17, 18) has begun to increase because of the clamping force exerted on the pads and this prevents the pistons and the plungers from turning in relation to one another. The pistons can only turn in their housing (41) and because of the high torque necessary to turn the plungers (15, 16) the clutch lining slips, preventing adjustment of the mechanism below the correct running clearance.

b) Operation with adjustment
As a result of pad or rotor wear, the running clearance is now greater than the built-in tolerance and adjustment of the mechanism is thus necessary.

Starting from the rest position, the air-operated ram push rod advances, turning the control shaft (3). As soon as pistons (17, 18) have travelled the design running clearance, the spherical ended driving shaft (24) begins to touch the drive side of the fork at the end of the adjusting shaft (25).

The continuation of the movement of the control shaft now generates rotation of the adjusting shaft (25) via the spherical ended driving shaft (24). The intermediate pinion (29), driven by the clutch lining (27) and the one-way friction spring (38), turns. Because of the excessive running clearance, the plungers now turn in the pistons. The pistons (17, 18) cannot turn and are subsequently driven out of their housing (14). When the pads finally touch the disc, the clamping force increases the friction in the screw-threads of the plungers (15, 16) and pistons (17, 18). The torque necessary to turn the plungers (15, 16) increases and the clutch lining (27), driving he intermediate pinion (29), begins to slip, preventing further adjustment.

The amount of adjustment is not reset during the return of the actuating mechanism. As the control shaft (3) now returns the brakes to the inactive position, the spherical ended driving shaft (24) climbs along the gap in the fork at the end of the adjusting shaft (25). Once the running clearance is taken up, the adjusting shaft (25) turns in the opposite direction, turning the inner driving sleeve (28) via the clutch lining (27). However, in this direction, the one-way friction spring (38) cannot drive the intermediate pinion (29), leaving the plungers (15, 16) and the intermediate pinion (29) adjusted. The system is now once again in its starting position.

c) Manual adjustment and winding off the spring brake when changing a brake pad
The brake must only be adjusted by hand when changing a brake pad. No manual action is required between pad changes.

A manual tensioner shaft (21) rotates in full-time mesh with the gear teeth on the outside of the plungers (15, 16). The end of his shaft emerges from the brake casing through a seal (39) and is in addition protected by a tensioner cap (40).

To increase the clearance between the piston heads (19, 20) and the bridge (8) in order to fit new pads, remove the tensioner cap (40) and turn the shaft (21) anticlockwise.

After fitting new pads, an initial running clearance must be set and some manual adjustment may be necessary. To reduce the clearance between the piston heads (19, 20) and the bridge (8), remove the tensioner cap (40) and turn the shaft (21) clockwise until the required clearance is obtained. Put back the tensioner cap (40).

REMOVAL / FITTING OF PADS

Removal / fitting of brake pads

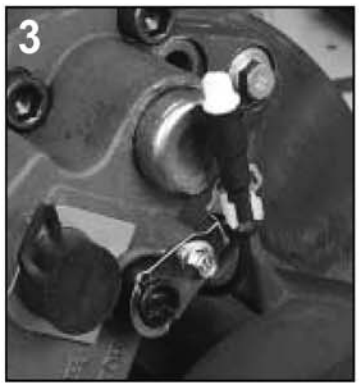
The ELSA 22.5 air-operated disc brake uses a certain number of devices to monitor pad wear.
These are divided into 2 categories:
1. Device fitted to brake body.
2. Devices installed in the pads zone.

Variations depend on the vehicle technical data.
Variations that will be encountered during brakes maintenance are listed hereafter.

Category 1

A. Full-time wear detector

This device is used in combination with electronic braking systems. Its job is to continually monitor pad and rotor wear and send this information to the electronic system.
Figure 2 identifies a brake equipped with a full-time wear detector.

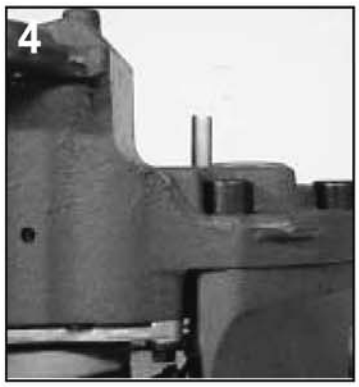


B. Wear switch

This wear switch is installed in the place of a full-time wear detector. The wear switch signals a fully worn brake pad via an instrument panel warning light.
Figure 3 identifies a brake equipped with a wear switch.

C. Pad wear limit indicator (visual indication)

This is a simple device indicating the amount of material remaining on the pad in relation to a plunger protruding from the casing.
Figure 4 presents a brake equipped with a pad wear limit indicator.
On a new pad, the end of the indicator rod protrudes beyond the cast-iron surface of the brake casing.
As soon as the pads wear, the visible length of the indicator above the top of the cast-iron surfaces gets shorter.
When the amount protruding past the surface reaches a dimension of 4 mm, detailed inspection of the material remaining on the pad is necessary.



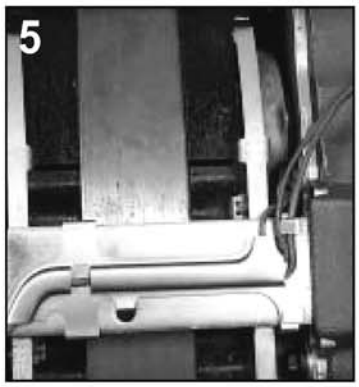
Category 2

Brake pad wear indicator (PWWI – first version (two types)

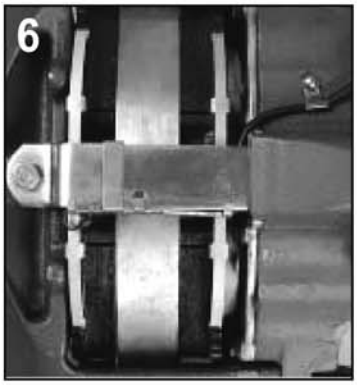
This device illuminates an instrument panel warning light to signal that the brake pads should be changed (Fig. 5).

NOTE:

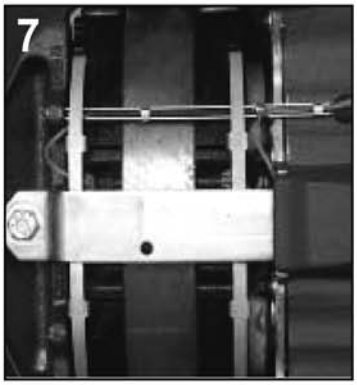
The first version is interchangeable with the second version below and should be used as replacement wherever possible.



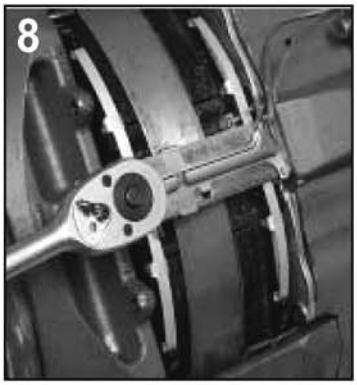
Brake pad wear indicator
Figure 6 presents another assembly.
Both these versions can be replaced by a single, more recent version.



Brake pad wear indicator PWWI – second and most recent version
This version is a direct replacement for the preceding version (Fig. 7).
When a PWWI brake pad wear indicator has to be replaced, the most recent version should be used. This new version is interchangeable with the old version.



Replacement of brake pads
The brake pads must be replaced when the lining thickness is worn down to 1.5 mm.
Always replace all the brake pads on a given axle.
Park the vehicle on hard flat ground and scotch the roadwheels.
With the parking brake in the "released" position, fully load the system to guarantee full release of the parking brake.
Loosen the spring brake wind-off bolt (if need be).
Raise the axle on the jack and solidly place axle stands under the axle. Remove the roadwheels and drive out all the air from the compressed air system.
Remove all dirt from the brake unit. Check that the rubber dust guards installed on the plunger heads and guide sleeves are free from damage.
WARNING: *Never use compressed air to get rid of dust from the brake/disc surfaces. If you breathe in any of the dust, it may be irritating in the best of cases and prove dangerous in the worst case. Insofar as possible, get rid of dust from the dry brake using a vacuum cleaner brush. Otherwise, try to speed up drying using a jet of compressed air.*



Removal of brake pads
Remove the bolt from the pad securing plate (Fig. 8).
Withdraw the strap from the pad through the slot in the caliper body, without trying to separate it for the moment.
Remove the 2 pad springs.
Carefully take out the 2 plastic shims from their housing in the pads. Do not force them too much as this might cause damage (Fig. 9).
The securing strap can now be removed and the PWWI brake pad wear indicator taken out as far as the connecting cable will permit. Watch out not to stretch the cable.

Removal of PWWI brake pad wear indicator

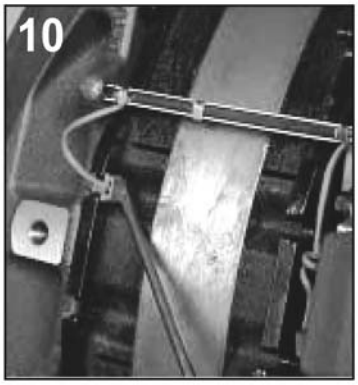
The brake pad wear indicator is now separated from the securing strap.

Take out the pad securing bolt and remove the strap from the pad as described earlier.

Remove the 2 pad springs. Carefully take out the 2 plastic shims from their housing in the pads. Do not force them too much as this might cause damage (Fig. 10).

Gently lift up the rivet holding the brake pad wear indicator unit to the caliper body (Fig. 11).

The complete brake pad wear indicator can now be taken out, taking care not to stretch the connecting cable.

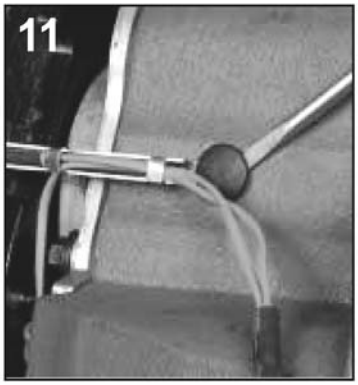


Removal of brake pads

It may be necessary to wind off the brake initially so as to remove the worn brake pads.

Remove the end cap from the tensioner rod. Apply a suitable 10 mm socket wrench to the adjusting rod and turn the wrench anticlockwise as seen from the pneumatic actuator end (Fig. 12).

Remove the brake pads.



CAREFUL:

Always wind off / wind up the brake carefully by hand using a suitable wrench. Never exceed a maximum torque of 40 Nm neither in one direction nor the other and NEVER use electric tools.

Cleaning and inspection

Once the brake pads have been removed, check the integrity of the guide sleeve and plunger dust guards. They should be properly in place and present no signs of damage. Check that the caliper casing slides freely on the guide sleeves.

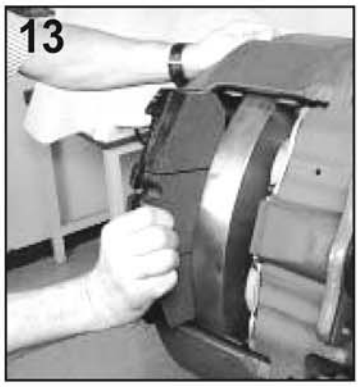
WARNING: Pay attention to not trap your fingers when checking operation of the brake.

Inspect the brake disc for signs of corrosion, pitting and deep cracks. If in doubt on the capability of using any component whatsoever, consult the vehicle manufacturer to find out what corrective actions can be taken.

While wearing suitable goggles, remove all traces of deposits, dirt, etc… from pad openings / contact faces and from the periphery of the disc, especially incrustations in the braking surface. Press a scraper or an old screwdriver onto the caliper body and rotate the disc to remove most traces of corrosion. Finish off with emery paper, if necessary. Remove all traces of deposits, dirt, etc… from pad openings / contact faces that may restrict movement of the pads and consequently prevent sufficient adjustment of the brake.

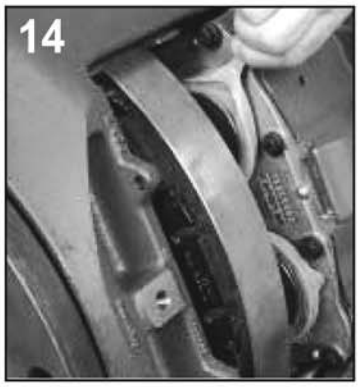
Fitting of new brake pads

Wind off the brake until there is a big enough opening to fit the outboard pad once the casing is moved aside. Fit the new outboard pad (Fig. 13).



Push the casing towards the disc until the new pad touches the surface of the disc. Continue winding off the brake until the opening between the plunger heads and the surface of the disc is big enough to take the new pad.

Once the brake is fully wound off, it may be necessary to lift up the plunger dust guards to free any air that might inflate them (Fig. 14).



Fit the inboard pad.

To adjust the brake, apply a suitable 10 mm socket wrench to the adjusting rod and turn the wrench clockwise as seen from the rear of the brake.

Continue adjusting the brake until the pads lightly grip the rotor.

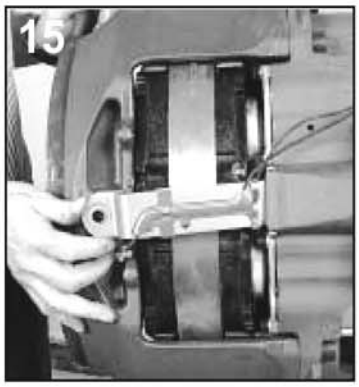
Wind off the brake through 1/2 a turn of the wrench. Check that the disc rotates freely.

NOTE: Do not exceed a torque of 40 Nm on the adjusting rod.

Refit the PWWI brake pad wear indicator and the pad securing strap (old version).

NOTE: The old versions are no longer available and should only be re-used if the wires and plastic shims do not show signs of damage or wear.

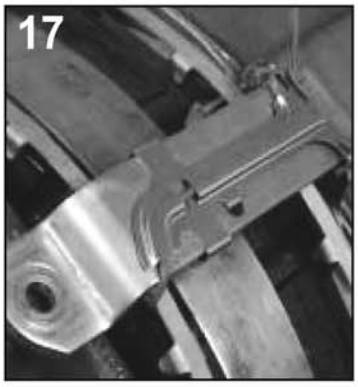
Carefully hold the pad securing strap, complete with brake pad wear indicator, in its housing to allow the plugs to be fitted (Fig. 15).



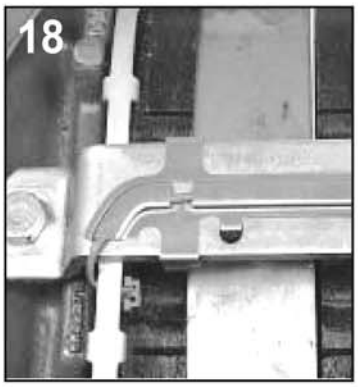
Fit the plastic shims of the brake pad wear indicator in the pads.

Do not exert excessive force but check that they are correctly seated in the bottom of their slots (Fig. 16).

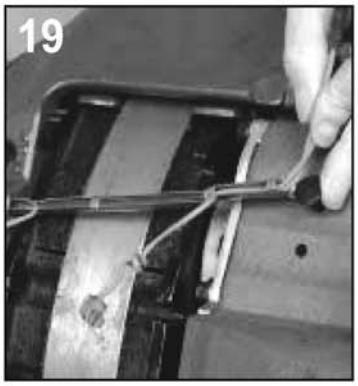
Refit the 2 pad springs taking care that they are correctly housed in the rear plates of the pads (Fig. 17).



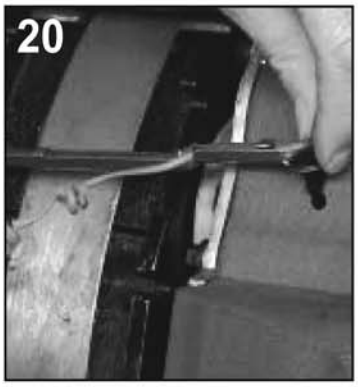
Check that the wires leave towards the rear of the pad.
Insert the pad securing strap and the brake pad wear indicator into the slot in the brake casing.
Insert the pad securing bolt and tighten to a torque of 33 to 40 Nm (Fig. 18).



PWWI brake pad wear indicator – new version
NOTE: If a new PWWI brake pad wear indicator replaces the old version, lift up the rivet and clip the cable 5 mm above the caliper casing. To do this, use a small screw-driver.
Insert the brake pad wear indicator into the hole in the brake frame (Fig. 19).

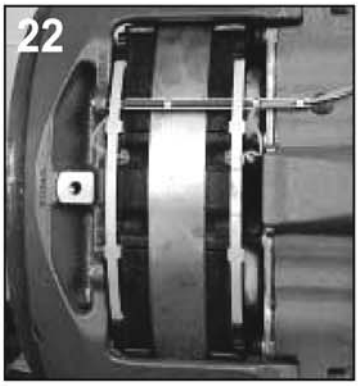


Drive in the plastic rivet holding the brake pad wear indicator to the brake casing (Fig. 20).

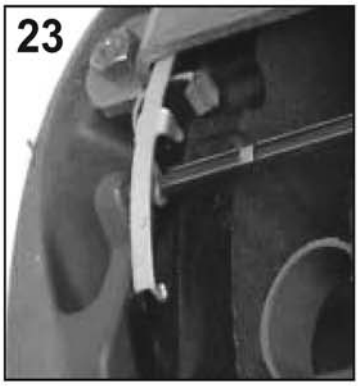


Fit the brake pad wear indicator plastic shims into the pads. Do not exert excessive force (Fig. 21).

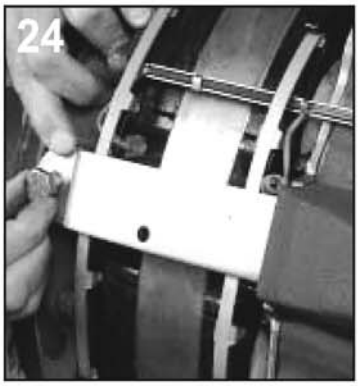
Refit the 2 pad springs, watching that they are correctly housed in the pads (Fig. 22).



The brake pad wear indicator is not a reversible assembly unit – the passage of wires is therefore different on the left from on the right. Figure 23 illustrates a brake pad wear indicator fitted on a left-hand brake.



Fit the pad securing strap and tighten to a torque of 33 to 40 Nm (Fig. 24).
Reconnect the brake pad wear indicator to the vehicle wiring.
Insert the wear detector or wear switch, as applicable, and tighten the securing bolt to a torque of 33 to 40 Nm.
Load the compressed air circuit and apply the brakes 5 times to settle the pads into position and allow the automatic tensioner to adjust the correct running clearance. Check that the rotor rotates freely.



AIR BRAKE CALIPER

Replacement of the caliper
Park the vehicle on hard flat ground and scotch the roadwheels. Apply pneumatic pressure to release the parking brake and loosen the spring brake wind-off bolt (if need be). Raise the axle on the jack and solidly place axle stands under the axle. Remove the roadwheels and drive out all the air from the compressed air system. Remove all dirt from the caliper. Check that the rubber dust guards are free from damage.

WARNING: *Never use compressed air to get rid of dust from the brake/disc surfaces. If you breathe in any of the dust, it may be irritating in the best of cases and prove dangerous in the worst case. Insofar as possible, get rid of dust from the dry brake using a vacuum cleaner brush. Otherwise, try to speed up drying using a jet of compressed air.*

The brake unit may be equipped with one of the following pad wear indicators that will have to be disconnected before you remove the caliper.

1. Full-time wear detector
Remove the wear detector securing bolt and carefully lift out the unit (Fig. 25).

2. Brake pad wear indicator (PWWI)
If a brake pad wear indicator is installed, unplug the wear indicator.

Remove the 2 nuts and take out the pneumatic actuator from the caliper casing (Fig. 26).

Blank off the pneumatic actuator assembly aperture in the casing to prevent the ingress of debris, etc… Remove the brake pads as described in § 3 "Replacement of brake pads".
The caliper can now be removed from the vehicle by taking out the pad carrier securing bolts according to the vehicle manufacturer's instructions.

CAREFUL : *The caliper unit is heavy, weighing around 49 kg.*

Ask for the help of an assistant to relieve the weight of the caliper when removing the securing bolts, to avoid damaging the screw-threads.

WARNING: *At the moment of lifting the caliper unit, take care not to trap your fingers between the caliper casing and the pad carrier, which may slide freely one against the other. Also avoid any sudden movements that may cause the components to slide rapidly and cause damage to the rubber dust guard surfaces.*

Fitting of the caliper
Check that all the joint faces are clean and free from corrosion. With the help of an assistant, carefully lower the caliper unit into the assembly position on the half shaft. Avoid excessive movement of the caliper at the time of installation and do not let the caliper fall into position on the half axle – either action may damage the dust guards. Fit new securing bolts and tighten them according to the vehicle manufacturer's recommendations. Withdraw the blanking plate placed over the pneumatic actuator assembly opening. Lightly grease the pocket in the control shaft with suitable grease (Fig. 28).
NOTE : Only use grease supplied with the spare parts kits. Under no circumstance should any other type of grease be used.

Offer up the pneumatic actuator to the casing unit taking care that the joint faces and the push rod are clean and that the push rod is housed correctly in the control shaft pocket. Tighten the nuts at a torque of between 180 and 210 Nm. Refit the brake pads as described in § 3 "Replacement of brake pads".

Refit the wear detector, wear switch or brake pad wear indicator, as applicable.

Removal / fitting of the caliper

Removal of one of the caliper bolts on the rear drive axle requires the use of tool **8573**.

MAINTENANCE

Maintenance

Although no regular maintenance is necessary on the brake caliper, it is important to inspect the brakes at the following specified intervals or according to the instructions detailed in the vehicle manufacturer's servicing handbook.

Every 3 months or every 20,000 km
A visual assessment of the remaining service life of brake pads must be made. The brake pads should be replaced when the lining thickness is worn down to 1.5 mm.
Visually examine the general state of the brake and check there is no damage or corrosion. If in doubt on the capability of using the brake any longer, replace or grind the brake in accordance with the vehicle manufacturer's recommendations.

Every 12 months
Remove the roadwheels and the brake pads as described in § 3 "Replacement of brake pads".
Inspect the guide sleeve and plunger dust guards and check that they are in good state and locked in position. If one of the dust guards is detached or damaged, the corresponding area of the brake should be dismantled and the parts checked for corrosion and damage.
Replace or grind in accordance with the vehicle manufacturer's recommendations.
Check that the casing slides freely on the guide sleeves fastened to the pad carrier. If the casing does not slide freely on the guide sleeves as described in the section "Replacement of casing". Check that the guide sleeves and the bores of the sleeve bushes do not present any signs of corrosion or wear. If in doubt on the capability of using them any longer, replace them with new components.

WARNING : *Pay attention to not trap your fingers when checking operation of the brake.*

Inspect the brake disc for signs of corrosion, pitting and deep cracks and check that the thickness complies with the vehicle manufacturer's recommendations.
Replace, if necessary.

CAREFUL:
Only use grease supplied with the spare parts kits or that stipulated by the vehicle manufacturer. Under no circumstance should any other type of grease be used.

Tightening torques:

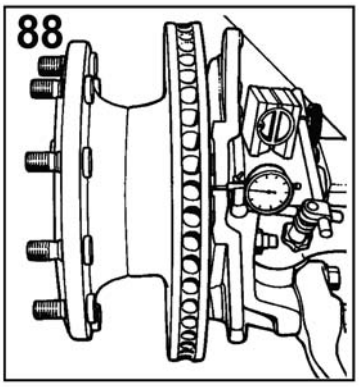
Guide sleeve bolts	475 Nm
Tensioner rod, maximum	40 Nm
Pad strap securing bolts	33 to 40 Nm
Detector / switch securing bolts	33 to 40 Nm
Pneumatic actuator securing bolt	180 to 210 Nm
Drive axle securing bolts	95 to 105 Nm → 65 to 75°

BRAKE DISC

Brake disc

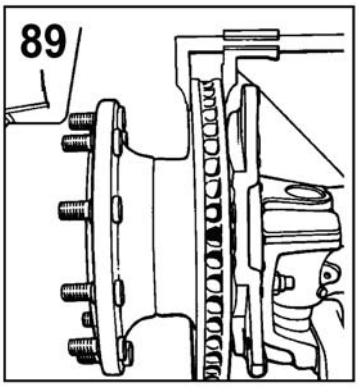
Checking the out-of-round

Remove the brake caliper as described in § 4 " Replacement of the caliper". Place a dial gauge on a magnetic support 50 mm from the outer edge of the disc.
Slowly rotate the rotor.
The out-of-round of the disc should not exceed 0.25 mm (Fig. 88).



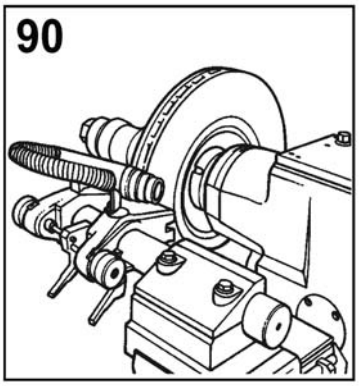
Checking the wear

Measure the thickness.
Comply with the wear limit (Fig. 89).
Refer to § 1 "Technical data".



Checking the surface finish

Wear should be regular and evenly distributed over each surface.
Grind, if necessary (Fig. 90).
Comply with the grinding tolerances.
Grinding tolerances.
Grinding should be distributed evenly over each surface.
Comply with the rotor minimum thickness.
Refer to § 1 "Technical data".



Removal

Consult RENAULT TRUCKS Workshop Manual section 50 900.