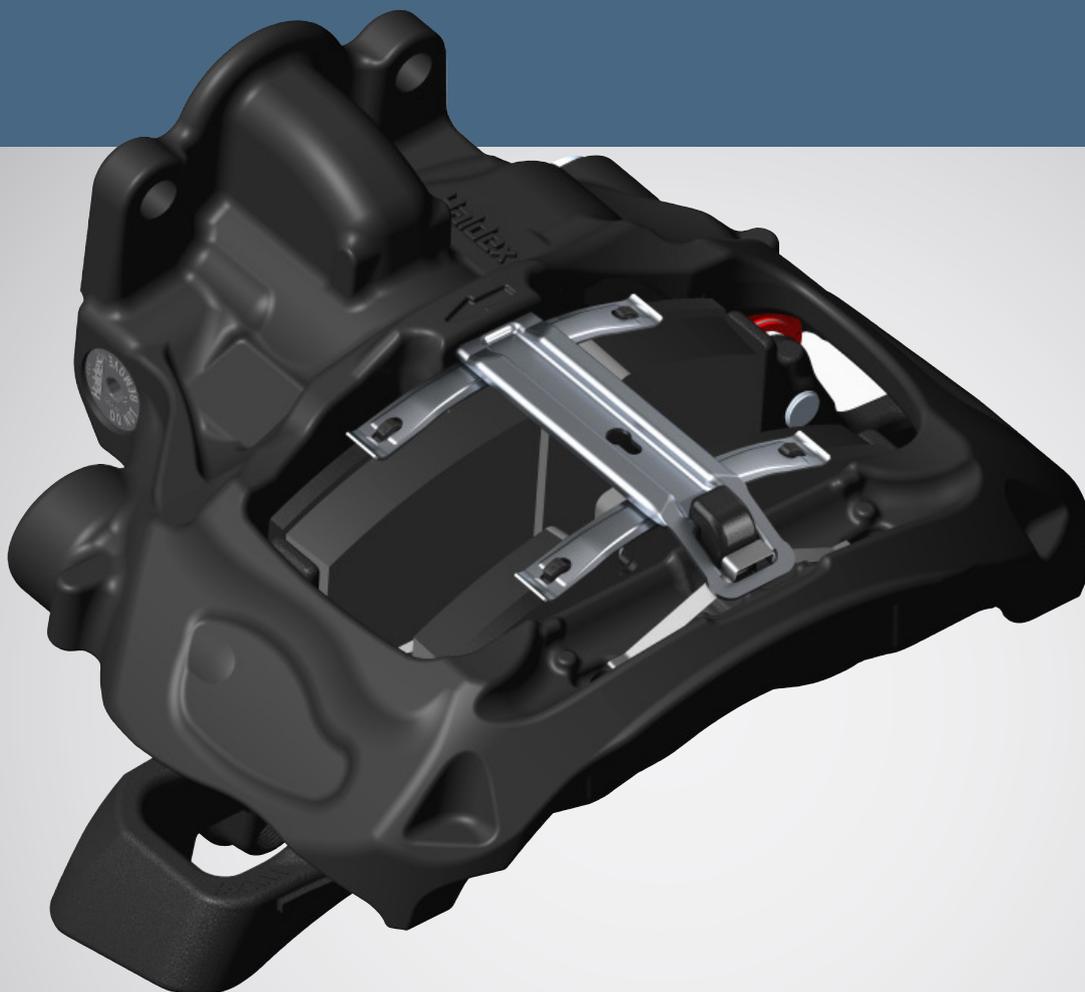


SERVICE GUIDE



Air disc brake ModuT



Innovative Vehicle Solutions

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Note

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No liability is assumed as a result of incorrect or inappropriate parts being fitted to the product or the omittance of appropriate tests after the servicing of the product. Use appropriate spare parts' documentation when obtaining spare parts. Use only genuine Haldex spare parts in repairs.

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1 Introduction

1.1 General information

This Haldex ModulT Service Guide is divided up into chapters, these chapters are sequenced in the same way that a user should read and follow the manual.

Chapter "1 Introduction" provides a general overview of this service guide and the ModulT air disc brake.

It is important to carefully read chapter "2 Safety precautions" before starting any workshop procedures. This is to inform the user about the safety measures and the potentially hazardous situations which, if not avoided, could result in serious injury or death!

Chapter "3 Initial and final procedures" describes the start and finish activities necessary to be able to carry out inspection and replacement work. It also describes the function test for the ModulT air disc brake.

Consult chapter "3.3 Inspection procedures" for information and instruction on inspecting the ModulT air disc brake. Chapter "3.3.2 Inspection intervals" is useful for the recommended disc brakes inspection intervals. Here the Inspection intervals table displays how frequent the different brake components shall be inspected and on which pages the check instructions are to be found.

If any inspection shows that a replacement activity needs to be performed, continue to the appropriate section in chapter "4 Replacement procedures".

Chapter "5 Specifications" contains technical data for the ModulT air disc brake.

Chapter "6 Tools" contains information about the Haldex ModulT tool kit, which is essential for carrying out much of the replacement procedure work described in this manual.

Chapter "7 Fault finding" should be used to help with the self diagnosis of any problem being experienced.

Finally Chapter "8 Components list and exploded view" lists and shows what spare part components are available for the ModulT air disc brake.

1.1.1 Spare parts

It is vital that only Haldex original spare parts are used during all service replacement activities.

The use of none Haldex original spare parts can affect the function, performance and/or lifetime of the parts.

The use of none Haldex original spare parts will immediately terminate any warranty of the disc brake unit.

1.1.1.1 Label description

A. Logo

B. Type Number

C. Part Number

D. Serial Number

(A)	
TYPE	(B)
P/N	(C)
S/N	(D) (Ex. 1404102252)

Figure 104. Label description

There will be variants in S/N numbers containing 8 or 10 digits.

Brakes produced after 10-05-2014 will contain 10 digits.

Serial Number explanation:										
Ch.no	1	2	3	4	5 *)	6 *)	7	8	9	10
Ex.	1	4	0	4	1	0	2	2	5	2
Comment	Year	Year	Week	Week	Haldex number	Haldex number	Serial No	Serial No	Serial No	Serial No

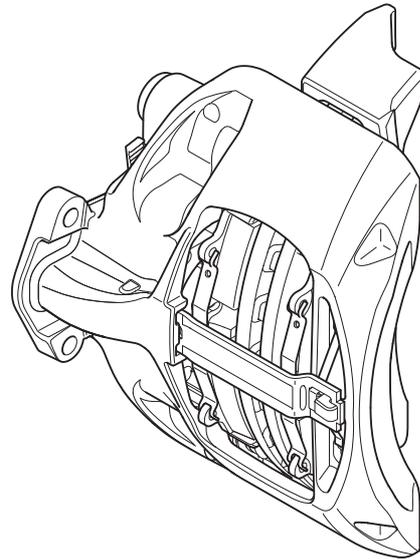
*) Ch.no 5 and 6 is the numbers that is added to the 10 digits alternative.

1.2 The Haldex ModulT

The Haldex ModulT is an air disc brake platform developed for the purpose of meeting increased customer demands on performance, robustness, service up-time and weight.

The ModulT superior design encompasses the following advantages:

- › Low weight
- › Single tappet mechanism with similar clamping force distribution as Haldex twin tappet mechanism
- › Simplified maintenance; boltless pad retainer and only two bolts in the complete brake
- › Modular; the same mechanism and sliding function design used on multiple brake sizes
- › Long service life; stainless sliding pins, PTFE coated steel bushings, and the mechanism bellows is folded inwards thus protected from external affection (stones/blister etc.)
- › High efficiency; the use of double roller bearings for the mechanism lever keeps the hysteresis low and thus a high efficiency is achieved



ModulT_063

Figure 1. The Haldex ModulT air disc brake

1.3 Functional description

The ModulT is designed to provide high performance coupled with low weight, durability and a minimum number of wearing parts.

The ModulT enhances a floating monobloc calliper (C) and an integrated adjustment unit which compensates for brake pad wear.

The unit, which is actuated by the mechanism lever (A), presses the inner brake pad (B) against the disc, which then causes the calliper (C) to slide laterally, so that the outer brake pad (D) also comes in contact with the disc, see figure 2.

The calliper moves on slide pins (E), see figure 3. Where the disc brake also serves as a parking brake, the unit is actuated by a spring brake chamber (F).

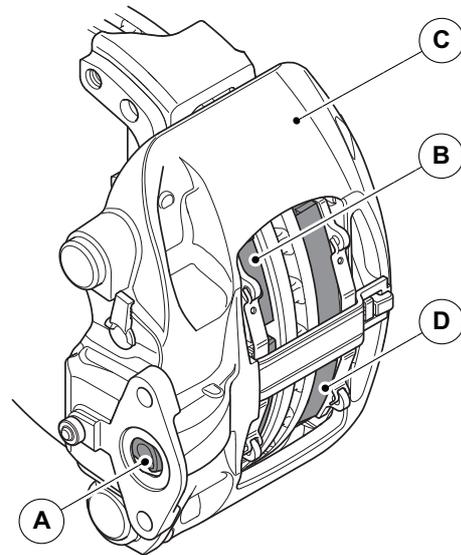


Figure 2. Functional description

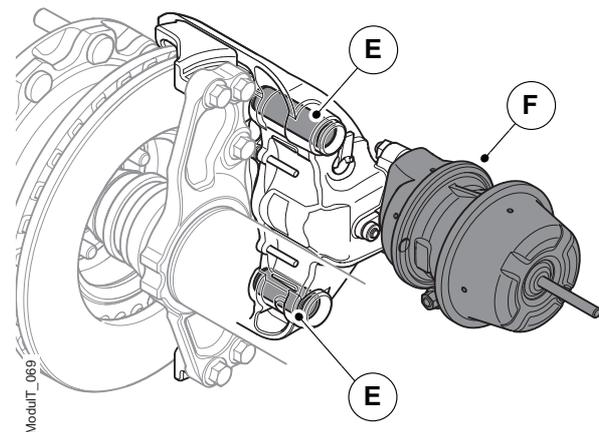


Figure 3. Slide pins and spring brake chamber

1.3.1 Technical information DBT19LT

The DBT19LT is a disc brake intended for a 375 mm disc and used for applications with dynamic axle loads up to 9 tonnes. Maximum rated brake torque is 18 kNm.

Specification

Characteristic Data:

- › Design rated max brake torque 18 kNm
- › Max axle load 9 tonnes*
- › For wheel size 19.5"
- › Max operation force 11 kN
- › Friction radius 152 mm
- › Max brake cylinder stroke 65 mm
- › Nominal brake ratio 15.4 : 1
- › Mechanical efficiency > 93 %
- › Running clearance (min-max) 0.7–1.1 mm
- › Weight of complete disc brake unit, including pads < 29 kg

Disc:

- › External diameter of brake disc 375 mm
- › Total thickness when new 45 mm
- › Residual thickness worn out 37 mm

Pad:

- › Total thickness 30 mm
- › Backplate thickness 8.0 mm

Options:

- › Pad Wear Indicator (PWI)
- › > Pad Wear Indicator Sensor (PWIS)
- › > Pad Wear Sensor (PWS)
- › Carrier hole pattern

* Can also be used with 10 tonne axle loads dependant on application.

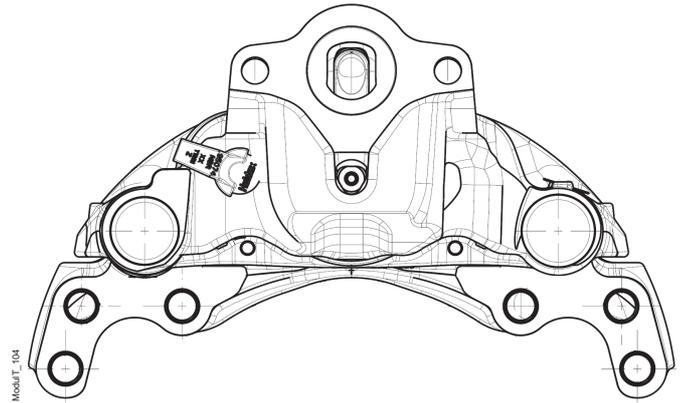


Figure 105. DBT19LT inner side

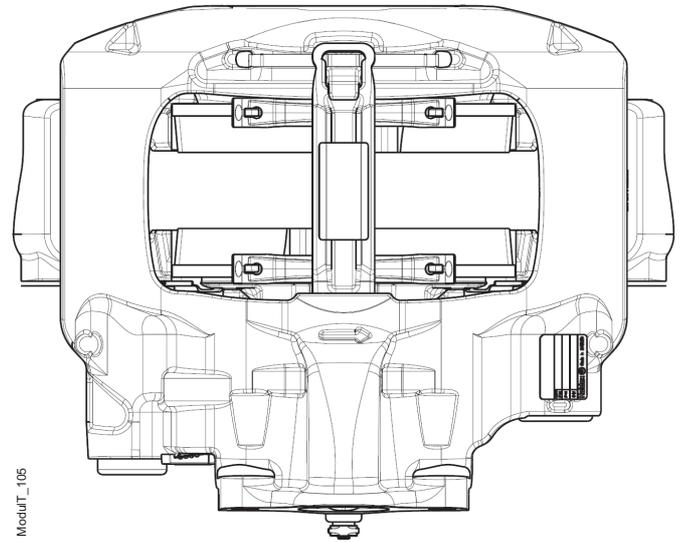


Figure 107. DBT19LT top view

1.3.2 Technical information DBT22LT

The DBT22LT is a disc brake intended for a 430 mm disc and used for applications with dynamic axle loads up to 9 tonnes*. Maximum rated brake torque is 20 kNm.

Specification

Characteristic Data:

- › Design rated max brake torque 20 kNm
- › Max axle load 9 tonnes*
- › For wheel size 22.5"
- › Max operation force 11 kN
- › Friction radius 173 mm
- › Max brake cylinder stroke 65 mm
- › Nominal brake ratio 15.4 : 1
- › Mechanical efficiency > 93 %
- › Running clearance (min-max) 0.7–1.1 mm
- › Weight of complete disc brake unit, including pads < 32 kg

Disc:

- › External diameter of brake disc 430 mm
- › Total thickness when new 45 mm
- › Residual thickness worn out 37 mm

Pad:

- › Total thickness 30 mm
- › Backplate thickness 8.0 mm

Options:

- › Pad Wear Indicator (PWI)
- › > Pad Wear Indicator Sensor (PWIS)
- › > Pad Wear Sensor (PWS)
- › Carrier hole pattern

* Can also be used with 10 tonne axle loads dependant on application.

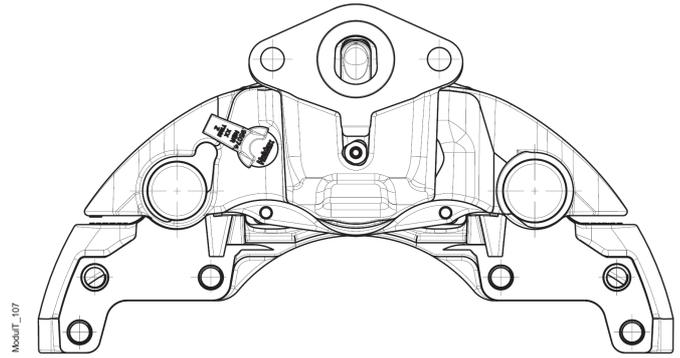


Figure 106. DBT22LT inner side

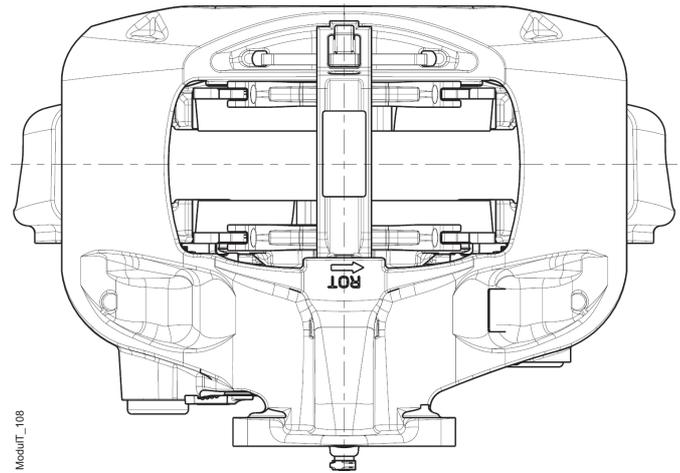


Figure 108. DBT19LT top view

2 Safety precautions

2.1 General information

This chapter comprehends the safety precautions that shall be read and followed before any Inspection/Removal/Installation procedure described in this Service Guide is started.

This Service Guide is intended for the exclusive use of trained persons within the commercial vehicle industry and related work shops.

Three different alert levels are used through out this Service Guide: Warning, Important and Note.

Their differences are explained below:



A Warning message is always accompanied by a safety alert symbol. The safety alert symbol is used to alert about potential personal injury hazards. To avoid hazards, obey all safety messages that follow this symbol. Failure to observe this information can cause serious personal injury or death!

IMPORTANT!

An important message is always accompanied by the signal word IMPORTANT! The Important sign means risk of damage to the brake! Failure to observe this information could result in damage to the whole brake or parts of it!

NOTE!

A notification message is always accompanied by the word NOTE! The Note sign is used to emphasize important information and is not to be regarded as hazard information.

2.2 Installation

The disc brake must not be installed or treated in such a way that exposes it to none normal thermal, mechanical or chemical influences that can cause reduced braking effect or damage to vital components in the brakes. These influences/damages may result in a shortened service life for the disc brake and its components, reduced brake effect or at worst total brake failure.

2.3 Adjustment of control system/valves

Failure to follow the instructions in this chapter may accelerate the wear to the brake pads and may cause damage/repeated damage to the disc brake, axle and/or wheel brake components.

2.3.1 Before entering the vehicle into service

Prior to first time use a vehicles disc brake operating systems must be checked and adjusted (if necessary) in accordance with the relevant brake calculations. Contact the vehicle manufacturer for relevant information.

2.3.2 Replacing spare parts

Always use spare parts that are approved for the vehicle, axle or disc brake. Following replacement of any essential components or spare parts in the disc brake operating system (such as brake valves or control units), the disc brake operating system must also be checked and adjusted (if necessary) in accordance with the relevant braking calculations.

2.3.3 Brake force distribution

It is very important that the distribution of brake force, between axles/vehicles, in a vehicle combination is adapted so that the brake force for each axle/vehicle is proportioned in accordance with the legally applied braking calculations.

If the brake force is not correctly distributed it can lead to excessive braking of a vehicle and/or one or more axles in the combination. This can result in overheating, accelerated wear and damage to the disc brake, pads, discs, tyres and wheel components.

Before a vehicle is entered into service it must be set up according to the specified values in the relevant brake calculations. After the pads/brake discs have been run in for a period of around 3,000-5,000 km the brake force distribution between the truck/tractor and trailer may require adjustment. Brake adjustment must also be carried out during repairs/changing spare parts when heating/overheating is suspected to damaged the axle/ brake components (e.g. rubber components, hub/wheel bearings and brake disc).

Contact the vehicle supplier for information on the appropriate action.

Following replacement of any essential components or spare parts in the disc brake operating system (e.g. brake valves or control units), the disc brake operating system must also be checked and adjusted in accordance with the relevant braking calculations.

Failure to follow these instructions may cause damage/repeated damage to the disc brake, axle and/or wheel brake components.

2.4 Brake chamber

Moisture/water ingress into the disc brake's mechanism housing will potentially affect the function of the disc brake and as a result shorten its life.

Therefore, to prevent water ingress it is important that the disc brake chamber is of the correct design and that the seal between the brake chamber and disc brake mating surface is undamaged correctly in place.

It is also important for the disc brake's function that the brake chamber housing is correctly ventilated.

As a minimum, the drain holes facing downwards must be open, see figure 4. Other drain plugs can remain in position in the brake chamber housing.

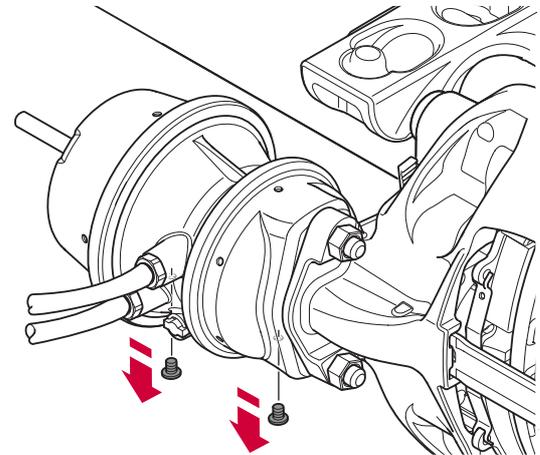


Figure 4. Brake chamber ventilation

IMPORTANT!

If all the drain plugs remain fitted, the brake chamber and disc brake will not operate correctly!

2.5 Recycling

When replacing the disc brake or parts thereof, the components removed must be recycled/destroyed in compliance with applicable environmental legislation, regulations and provisions.

2.6 Cleaning

For the air disc brake to function correctly it is important to ensure it is kept clean and that its normal movements are not restricted by mud, ice, snow, objects, etc. Damage may cause direct brake failure or damp/dirt penetration resulting in malfunction/shortening of the service life of the disc brake.

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

2.7 Surface finishing for disc brake

2.7.1 Painting

The disc brake can be finished with paint that has trade approval for this purpose (automotive paint). Care must be taken to ensure that the paint layer does not cause damage and/or restrict the natural movement or operation of the disc brake. All contact surfaces, friction and rubber parts must therefore be protected or masked.

The following areas must not be painted:

All bellows, reset shaft and its protection plug, complete brake pads, the swept area of the disc, the disc brake mounting surfaces to axle/brake chamber and all bolted connections.

2.7.2 Shot-blasting

IMPORTANT!

Failure to follow the instructions below could compromise safety and/or reduce the life of the disc brake and its components.

If the vehicle is shot blasted, all rubber parts and pads on the disc brake must be protected. The brake chamber must be fitted (or any protective parts that have a similar sealing function). The shipping seal fitted to the brake chamber opening on a new disc brake does not provide adequate protection during shot-blasting.

NOTE!

Do not forget to follow the recommendations of the brake chamber manufacturer.

The disc brake must be thoroughly cleaned after blasting to ensure that its natural movement is not obstructed by remnants of shot-blasting material. Check seals and rubber parts to make sure they have not been damaged. Also refer to the axle manufacturer's instructions.

3 Initial and final procedures

3.1 General Information

The objective of this chapter is to give guidelines on how initial and final procedures shall be performed in a standardised way.

Initial procedure is a recurring procedure that have to be performed **prior** to the Inspection and/or Replacement procedures covered in this Service Guide.

Final procedure is a recurring procedure that have to be performed **after** an inspection and/or replacement procedure covered in this service guide.

3.2 Initial procedure

3.2.1 Lift up and support the vehicle axle



At least one of the vehicle's axles shall be blocked prevent involuntary movement of the vehicle!

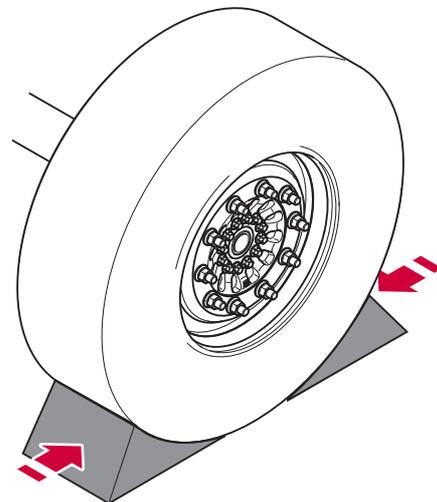


The vehicle manufacturer's safety precautions shall be followed when working on the vehicle!



Local safety precautions shall be complied!

1. On a flat and even surface, block the wheels, see figure 5.
2. Lift the axles and place on stands.



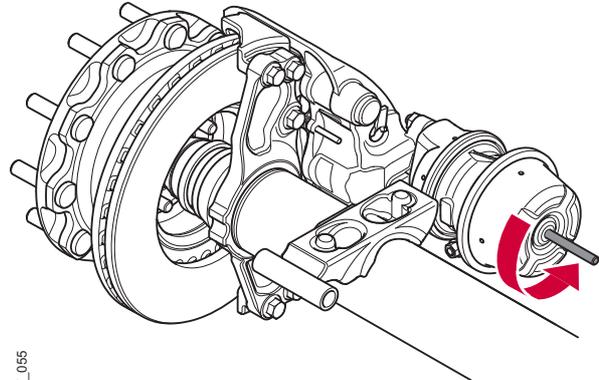
ModuT_004

Figure 5. Block the wheels



If the disc brake is equipped with a parking brake actuator. Ensure that the brake system is depressurised and the spring brake chamber is fully disengaged and mechanically secured in the released position.

See the vehicle manufacturer's instructions.



ModulT_055

Figure 6. Mechanically secure in the released position

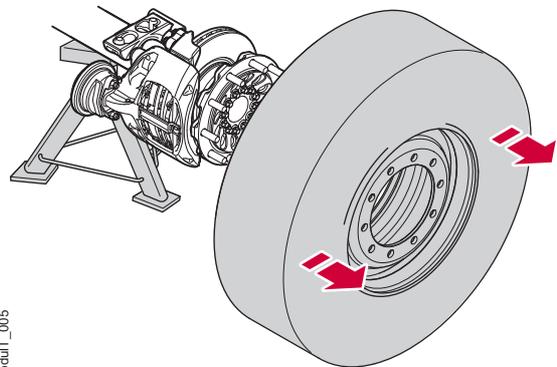
3. Release the parking brake.

3.2.2 Removing the wheel



Take all necessary safety precautions before wheel removal!
The vehicle manufacturer's safety precautions shall also be followed!

1. Check the free rolling resistance, if the resistance is higher than expected, tap the tyre to remove any normal rest tension. If the wheel still does not rotate freely then consult chapter "7 Fault finding" to assist further.
2. Remove the wheel nuts followed by the wheel, see figure 7.



ModulT_005

Figure 7. Remove the wheel

3.3 Inspection procedures

3.3.1 General Information

The objective of this chapter is to give guidance on how inspection of the brake components shall be conducted. Always start by consulting the Inspection interval table below in chapter Inspection intervals 3.3.2.

The Inspection interval table displays how frequent the different brake components shall be inspected and on which pages the check instructions are found.

The majority of the inspections demand that the wheel is removed from the vehicle. Before removing the wheel read chapter "2 Safety precautions" followed by "3.2 Initial procedure" and "3.5 Final procedure".

3.3.2 Inspection intervals

The check intervals specified in the table below are maximum intervals. Depending on the vehicle application, type of driving, adjustment to the vehicle manufacturer's service/inspection intervals etc, there may be a need for more frequent inspections.

1. Before starting to use vehicle
2. Daily
3. After 3000-5000 km
4. Every 3 month
5. Every 12 month
6. If parts are replaced in operating system
7. See Page

	1	2	3	4	5	6	7
Adjustment of control system/valves	C/A *)					C/A *)	10
Braking force distribution – tractor/trailer			C/A *)			C/A *)	10
Function test					C *)		31
Safety check		C *)					16
Brake pads				I *)			17
Brake disc				I *)			19
Plugs and protective cups					I *)		20
Thrust plate guide pins					I *)		21
Slide pin bellows					I *)		25
Adjustment spindle bellows					I *)		26
Slide function					I *)		28

*) C = Check, A = Adjustment and I = Inspection.

3.3.3 Daily safety check



Contact the Service Workshop immediately if there is any sign of reduced performance or the brakes do not work properly!

1. Check that the brakes function properly before driving and that they work effectively and smoothly.
2. Check that the service and parking brake function is effective by trying to drive the vehicle with the service and parking brake applied.
3. Make sure you have good lighting conditions.
4. Inspect visible parts of the brake and its components. Look for:
 - › Damage
 - › Collection of debris
 - › Corrosion
 - › Overheating signs
 - › Cracks and corrosion in brake discs
 - › Unusual wear etc

3.3.4 Inspections

3.3.4.1 Check brake pad wear



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

NOTE!

Step 1 in this procedure only indicate the pad wear of the outer pad! For a full examination do all steps.

1. Inspect the position of the Visual Wear Indicator (VWI), as located and shown in figure 14. This check can be done with either the wheel fitted or removed.
The VWI provides an indication of pad wear condition, it does not provide an accurate measurement of pad wear on both pads.
To obtain an accurate wear measurement of both pads continue with the instructions which follow.
2. Remove the wheel according to chapter "3.2 Initial procedure".
3. Remove brake pads according to chapter "4.2.2 Remove brake pads"
4. Look for unusual conditions like excessive corrosion and high heat cycles i.e. delamination, discolouration, etc. If found refer to chapter "7 Fault finding" for actions.
5. On both brake pads measure the distance from back plate (A) to wear surface (B) of the brake pad in four places, see figure 15. Minimum permitted lining thickness (friction material) is 2 mm.
6. Measure and compare differential brake pad thickness between the inner and outer brake pads. Up to 5 mm difference is normal, if the difference is >5 mm refer to chapter "7 Fault finding" for further information.
7. Check the condition of the back plate (A).
8. Replace brake pads if they are worn out or if they are expected to be so before the next inspection.
For replacement follow the instructions in chapter "4.2 Replacement of brake pads".
9. If the inspection is completed satisfactorily, conclude by following chapters "4.2.3 Install brake pads" and "4.2.4 Final procedure".

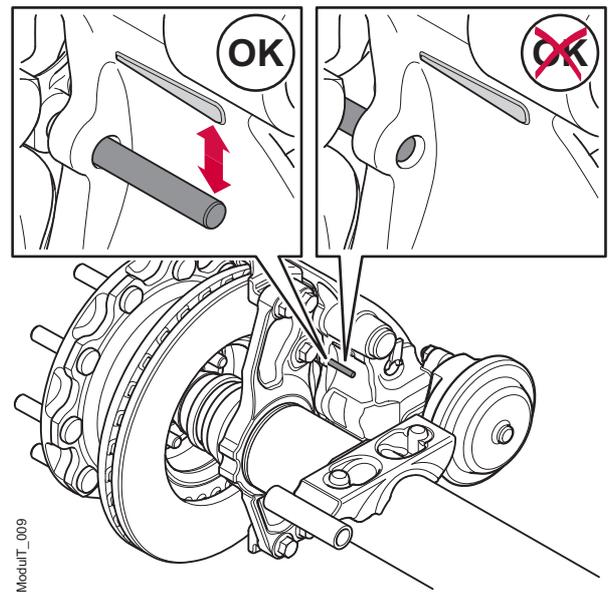


Figure 14. Inspection of the visual wear indicator

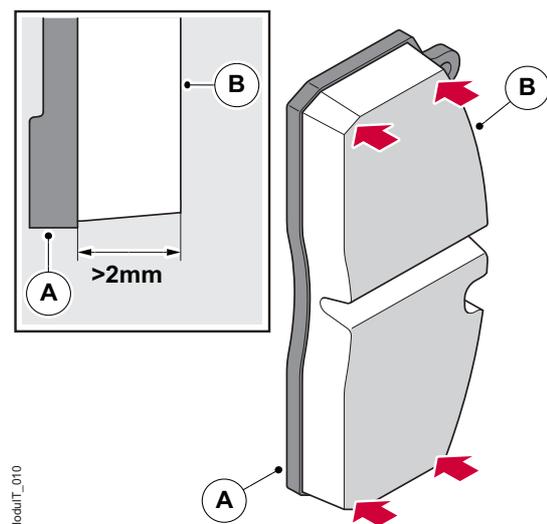


Figure 15. Measuring the pad wear condition

NOTE!

This brake disc inspection check procedure is only a general guide, refer to the vehicle manufacturers documentation for specific brake disc information and instruction.

3.3.4.2 General brake pad clearance inspection



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

NOTE!

If using PWS/PWIS

Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

Inspecting the clearance is only required for an approximation of the clearance between the brake disc and the brake pads.

The inspection can be carried out with or without the brake chamber fitted.

This inspection is best performed after the wheel is removed and before the brake is de-adjusted. For this situation the steps 2 and 3 below can be skipped.

1. Read and follow chapters "3.2 Initial procedure" and paragraph 4 from section "4.2.2 Remove brake pads prior to inspecting the pad clearance
2. Adjust the reset shaft by inserting and manually turning the Haldex special tool P/N 95232 (Torx 55) "6 Tools" clockwise until it comes to a stop. Then de-adjust the reset shaft by turning it anti-clockwise by 2 clicks.
3. Activate the brake until the Torx 55 male no longer rotates because any excessive clearance has been removed by the adjustment function.
4. Insert two feeler gauges in between the calliper and the outer brake pad to measure the clearance. Position the feeler gauges in the upper and lower part of the brake pad back plate so an average clearance is measured, see figure 16.
5. The normal running clearance is between 0,7 mm and 1,1 mm. If the measurement is outside of the normal running condition then refer to chapter "7 Fault finding" for further investigations.
6. Once the inspection is completed satisfactorily, conclude by reading and following chapters, paragraph 6 from "4.2.3 Install brake pads" and all from "4.2.4 Final Procedure".

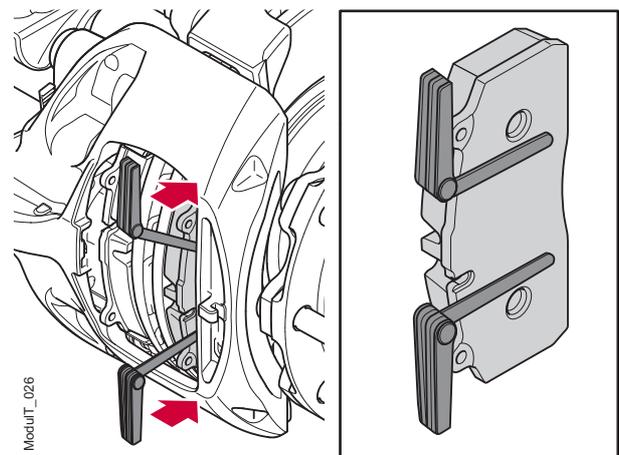


Figure 16. Correct location of the feeler gauges

3.3.4.3 Inspect brake disc

	<p>Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!</p>
--	--

1. Look for wear, damages and cracks, see figure 17. Also refer to the axle/vehicle manufacturer instructions. Cracks that enter the cooling ducts via the outer or inner radius are not permitted!

Acceptable crack length	Unacceptable crack length
< 75% of brake disc width	> 75% of brake disc width

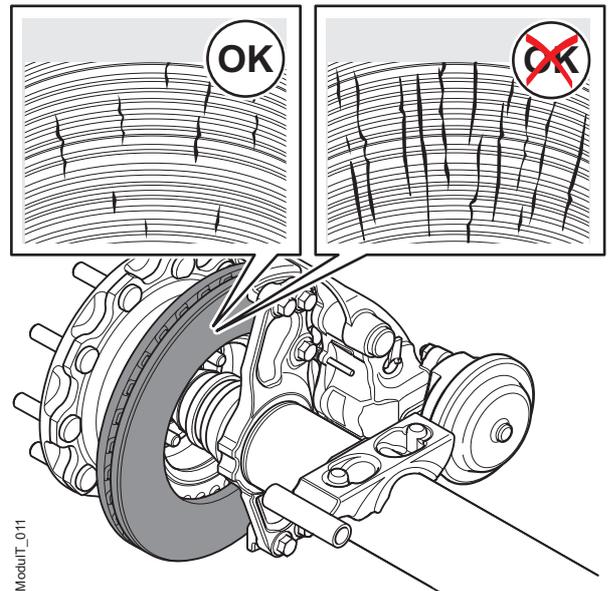


Figure 17. Inspection of the Brake Disc

2. Measure the thickness of the brake disc using a slide calliper. If the brake disc has a wear ridge, the measurement can be performed using two spacers (B) (e.g. 5 mm thick flat washers), see figure 18. Reduce the measured dimension by the total thickness of the two spacers (B).

Minimum permitted thickness of the brake disc is 37 mm.

The brake disc must be replaced if the wear limits have been exceeded.

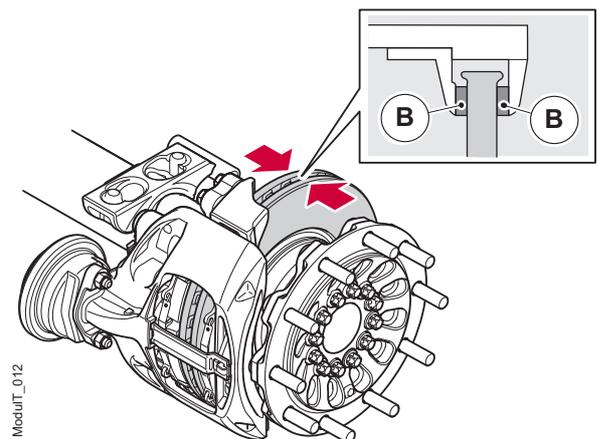


Figure 18. Measuring the Brake Disc thickness

<p>NOTE! This brake disc inspection check procedure is only a general guide, refer to the vehicle manufacturers documentation for specific brake disc information and instruction.</p>

3.3.4.4 Inspect plugs and protective cups



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

Failure to follow the instructions below could compromise safety and/or reduce the life of the air disc brake and its components.

NOTE!

If a PWS /PWIS is mounted read and follow chapter 4.4 Reset and installation of PWS (Pad Wear Sensor) and PWIS.

1. Read and follow chapter “3.2 Initial procedure” prior to inspecting the protective plugs and cups.
2. Remove dirt from surfaces if necessary.
3. Check for signs of excessive heat exposure, discolouration, debris etc.
4. The following plugs and protective cups shall be in place and intact:

The reset shaft protection plug identified as (A) and calliper seal (B), see figure 103 and 19.

Protection plug B is never removed.

5. The two protection cups for slide pin protection (C), see figure 20.
6. Once the inspection is completed satisfactorily, conclude by reading and following chapter “3.5 Final procedure”.

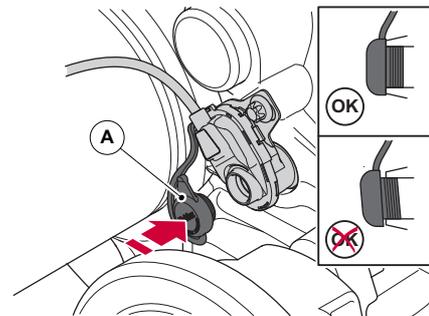


Figure 103. PWIS/PWS protection plug

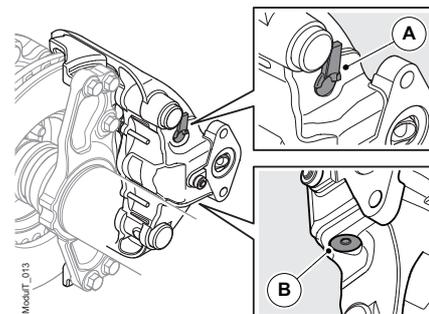


Figure 19. The two protection plugs

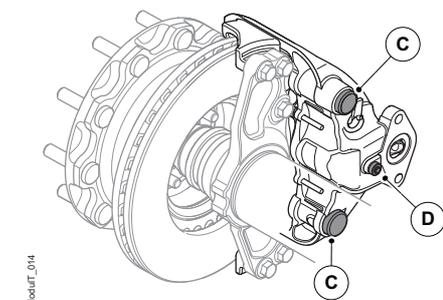


Figure 20. The three protection cups

IMPORTANT!

Never remove the protection plug (B) and never turn the special screw (D) on figures 19 and 20. If the protection plug (B) is removed and the Screw (D) is turned, it will void warranty and will compromise the life of the disc brake!

3.3.4.5 Inspect thrust plate guide pins

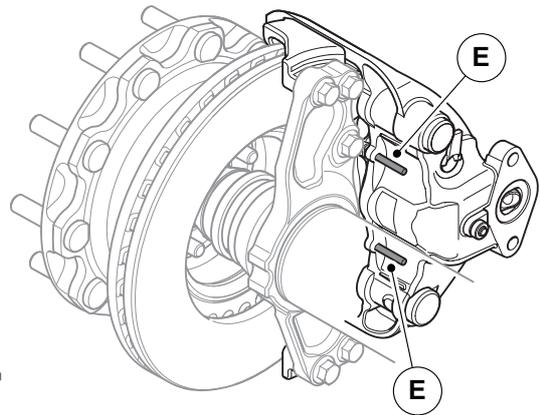


Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

1. Read and follow chapter "3.2 Initial procedure" prior to inspecting the thrust plate guide pins.
2. Remove dirt from surfaces as necessary.
3. Inspect that the two thrust plate guide pins (E), see figure 21, are in their correct position.
4. Inspect that the thrust plate with guide pins are free to move without obstruction.
5. Once the inspection is completed satisfactorily, conclude by reading and following chapter "3.4 Final procedure".



ModuT_015

Figure 21. The two thrust plate guide pins

3.3.4.6 Inspect actuation interface



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

IMPORTANT!

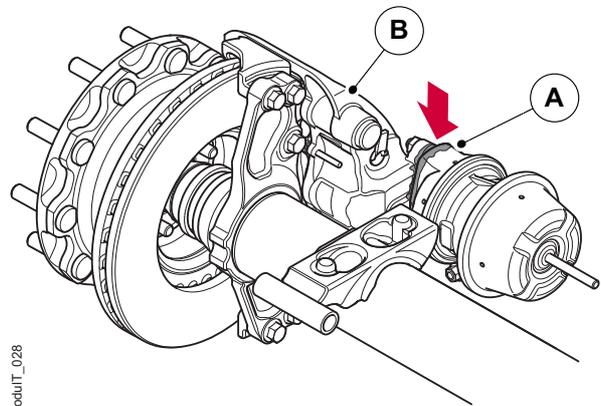
It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air

This inspection procedure covers both types of brake chamber; normal (service) and spring brake (parking) chambers.

1. Read and follow chapter "3.2 Initial procedure" prior to inspecting the actuation interface.
2. Thoroughly clean around the mating surfaces of the brake chamber (A) and calliper (B) to ensure that dirt does not get into the mechanism area when removing the brake chamber. See figure 22.



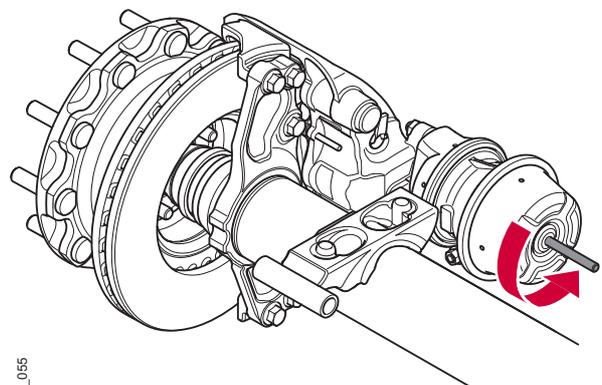
ModuT_028

Figure 22. The mating surfaces of the brake chamber and calliper



If the disc brake is equipped with a parking brake actuator. Ensure that the brake system is depressurised and the spring brake chamber is fully disengaged and mechanically secured in the released position.

See the vehicle manufacturer's instructions.



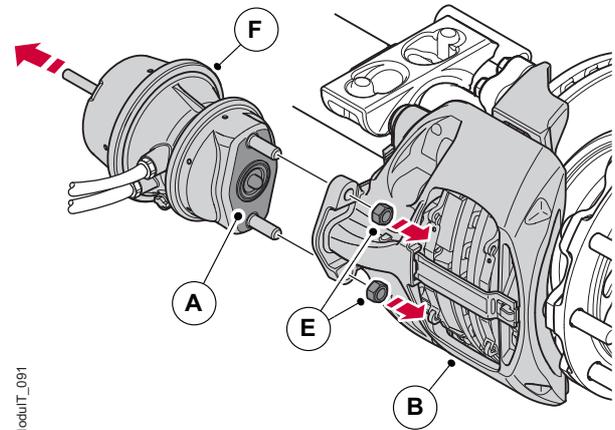
ModuT_055

Figure 6. Mechanically secure in the released position



Pressure from lines and components shall be released before opening them!

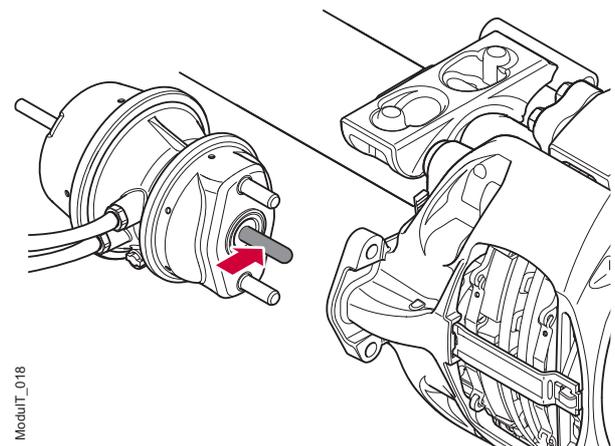
3. If applicable ensure that the spring brake chamber (F) is fully disengaged and mechanically secured in the released position.
4. Ensure that the brake chamber is depressurised.
5. Remove the two nuts (E) holding the brake chamber. Remove the brake chamber (A/F) from the calliper (B), see figure 23.



ModuIT_091

Figure 23. Removal of brake chamber items

6. With the brake chamber removed and secured, the brake chamber actuation rod should protrude ~15 mm in its rest position, See figure 24.
7. Activate the service brake, the brake chamber actuation rod should protrude ~80 mm.
8. Also check that the actuation rod extends perpendicular to the external seal flange.



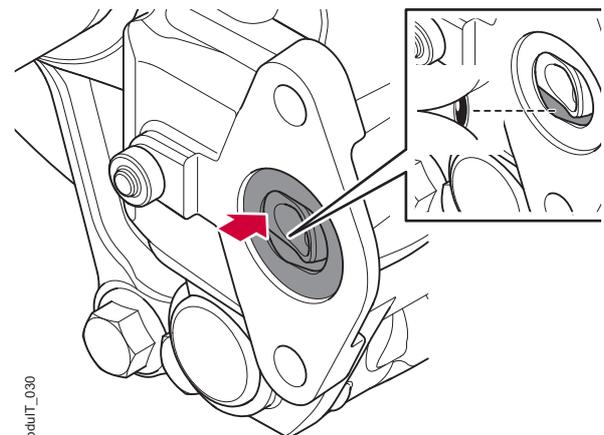
ModuIT_018

Figure 24. The actuation rod

9. Inspect through the aperture in the brake chamber attachment flange for moisture/corrosion, see figure 25. It's important to look inside the aperture and not just on the surface.

If corrosion is seen then further inspection is necessary. If concluded that water has ingressed causing internal corrosion/damages to the mechanism then replace the calliper complete to avoid operating problems.

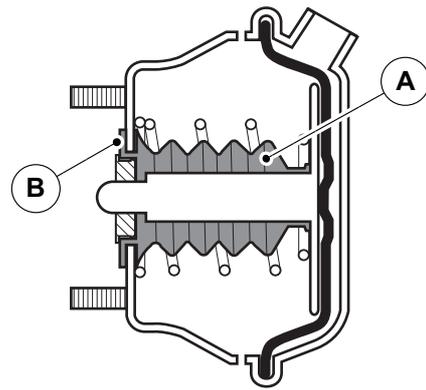
If action is required see chapter "4.9 Replacement of disc brake".



ModuIT_030

Figure 25. The brake chamber aperture

10. On the brake chamber, there must be an internal bellows (A) on the push rod, see figure 26.
11. Inspect that the bellows are complete and not damaged by looking around and down the push rod shaft. Also look for signs of water or corrosion which may be a sign that the bellows are damaged.
12. Inspect that the external seal flange (B) is correctly seated in place, intact and undamaged.
13. Once the inspection is completed satisfactorily, conclude by reading and following chapters "4.5.3 Install brake chamber" and "4.5.4 Final procedure".



ModulT_031

Figure 26. Internal view of a brake chamber

3.3.4.7 Inspect slide pin bellows



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

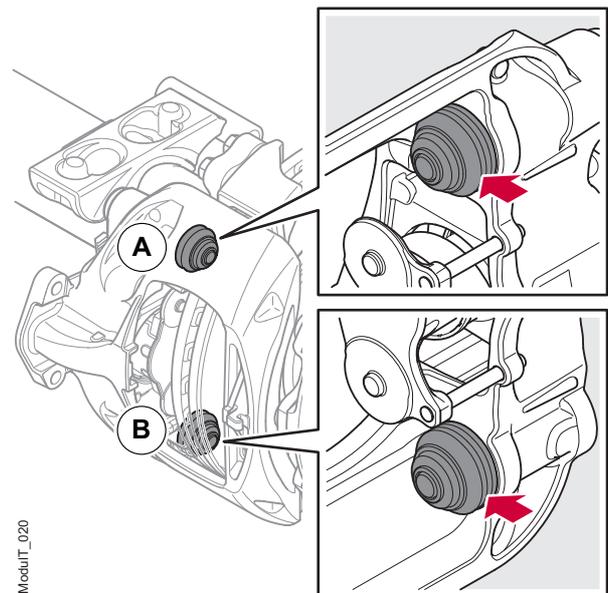
IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air

1. Read and follow chapters "3.2 Initial procedure" and "4.2.2 Remove brake pads" prior to inspecting the slide pin bellows.
2. Inspect the Leading slide pin bellows (A) and the Trailing slide pin bellows (B), see figure 27. Look all around the bellows for damage signs than could have been caused by debris, stones or overheating.



ModuT_020

Figure 27. Inspecting the slide pin bellows

3. If the bellows are damaged then they need replacing. For instructions on how to replace the bellows read and follow chapter "4.7 Replacement of slide function assembly".
4. Once the inspection is completed satisfactorily, conclude by reading and following "4.2.3 Install brake pads" and "4.2.4 Final procedure".

3.3.4.8 Inspect adjustment spindle bellows



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

1. Read and follow chapters "3.2 Initial procedure" and "4.2.2 Remove brake pads", prior to checking the adjustment spindle bellows.

IMPORTANT!

Never use an impact wrench or suchlike to turn the reset shaft. This may damage the disc brakes mechanism! Torque is 20 Nm max.

Note!

Do not over adjust/extend the thrust plate whilst carrying out the inspection. Over adjustment/extension will cause the thrust plate to disengage from the adjustment spindle and if done unintentionally may cause damage to the thrust plate bellows! Min distance between the calliper and thrust plate is 60 mm.

NOTE!

If using PWS/PWIS

Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

2. Using Haldex special tool P/N95232 "6 Tools" (Torx 55), manually turn the reset shaft clockwise to adjust the brake so that the thrust plate (A) is extended and the bellows can be viewed. Stop when the distance between the inner pad face of the thrust plate and outer pad face on the calliper is 60 mm, see figure 28.

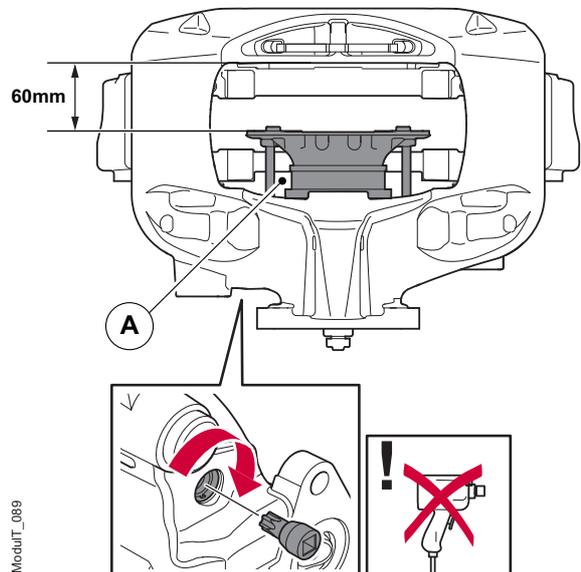


Figure 28. Max extension to check the thrust plate bellows

3. Inspect the adjustment spindle bellows, see figure 29. Look all around the bellows for damage signs that could have been caused by debris, stones or overheating.
4. If the bellow is damaged then it needs replacing. For instructions on how to replace the bellows read and follow "4.6 Replacement of adjustment spindle bellows".
5. If OK then manually de-adjust the thrust plate by turning the Torx 55/reset shaft anti-clockwise, until the position required to refit the brake pads.
6. Once the inspection is completed satisfactorily, conclude by reading and following chapters "4.2.3 Install brake pads" and "4.2.4 Final procedure".

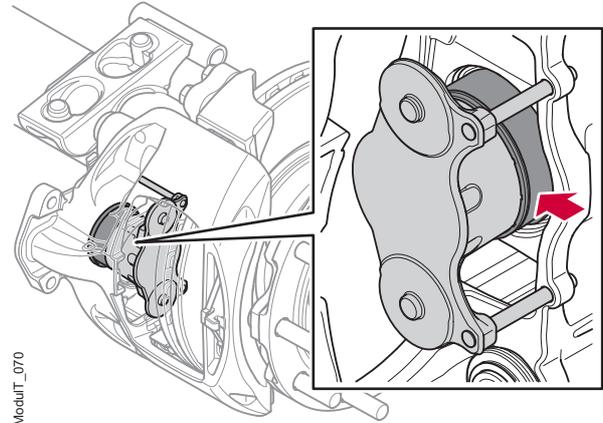


Figure 29. Inspect the adjustment spindle bellows

3.3.4.9 Inspect slide function



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

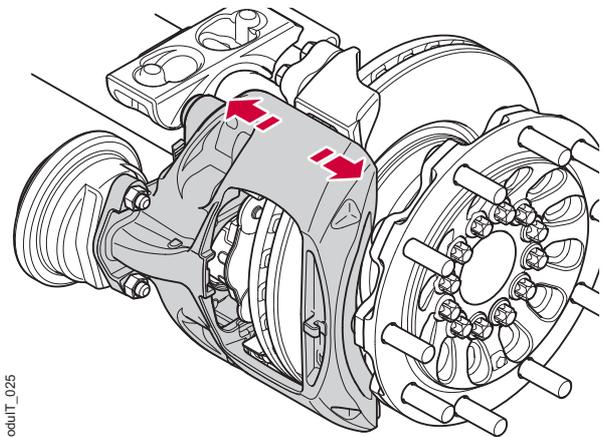
IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

1. Read and follow chapters "3.2 Initial procedure" and "4.2.2 Remove brake pads" prior to inspecting the slide function.
2. Once the brake pads are removed, move the calliper by hand back and forth to check its movement, see figure 30. The calliper must be free to slide on the leading and trailing slide pins.
3. If the movement is felt to be obstructed in some way then it is necessary to determine the root cause, see chapter "3.3.4.9.1 Measure slide function movement" for assistance in this.
4. If the root cause investigation concludes that the slide function needs replacing then follow chapter "4.7 Replacement of slide function assembly".
5. Once the inspection is completed satisfactorily, conclude by reading and following chapters "4.2.3 Install brake pads" and "4.2.4 Final procedure".



ModulT_025

Figure 30. Calliper free movement

IMPORTANT!

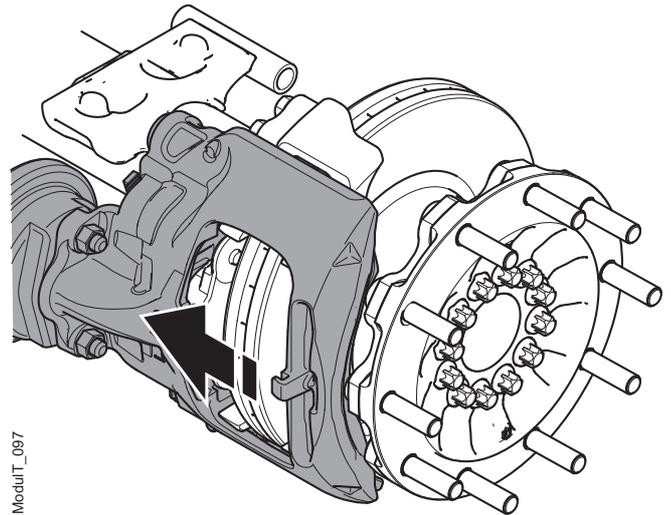
Obstruction of the slide function can cause operational problems like hot brakes and uneven brake pad wear.

3.3.4.9.1 Measure slide function movement

1. Read and follow chapter "3.2.1 Lift up and support the vehicle axle".
2. Read and follow chapter "3.2.2 Removing the wheel".
3. Read and follow chapter "4.2.2 Remove brake pads".

Measurement:

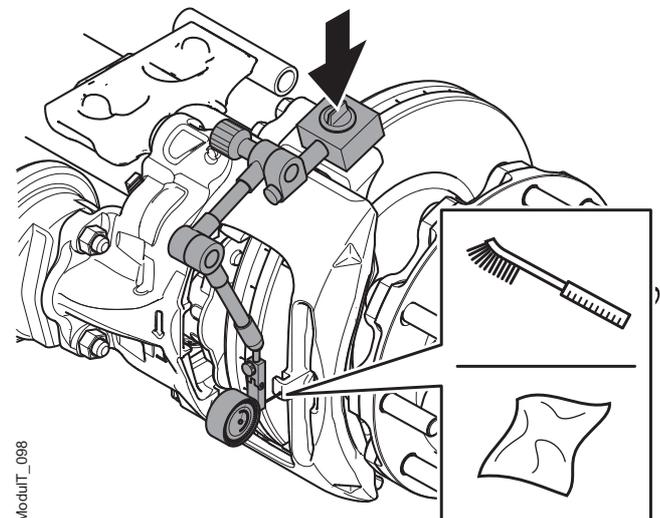
1. Push by hand the brake calliper as far as possible in the arrow direction, see figure 90.



ModuT_097

Figure 90. Brake calliper inner position

2. Place the dial indicator on the carrier (position A) and clean the measuring point. B with a cloth and place the dial indicator for measurement in position B, see figure 91.



ModuT_098

Figure 91. Dial indicator on calliper

3. Tilt the calliper as in figure 92 black arrows (no high force is needed).
4. Put the dial indicator to zero.
5. Now tilt the calliper as in figure 92 red arrows and read the measured play on the dial indicator.

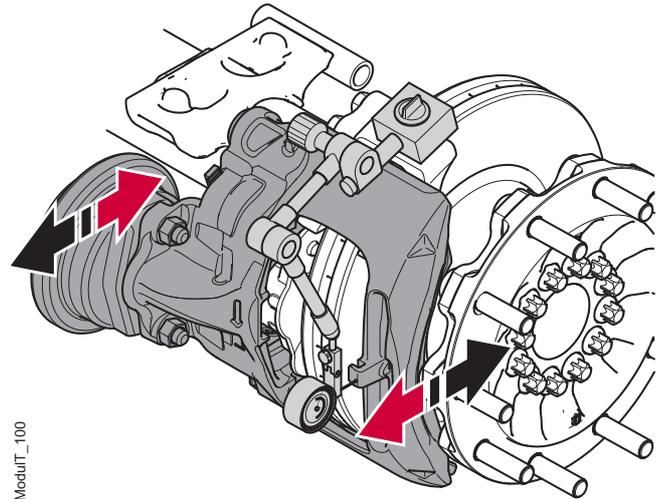
Measurement specifications:

If the bushing play measures over 2 mm; the bushing needs to be replaced. Chapter "4.7 Replacement of slide function assembly".

The trailing bush is made by a soft composite material. If a metallic sound appears from the trailing bush it must be replaced, see figure 93 and 94.

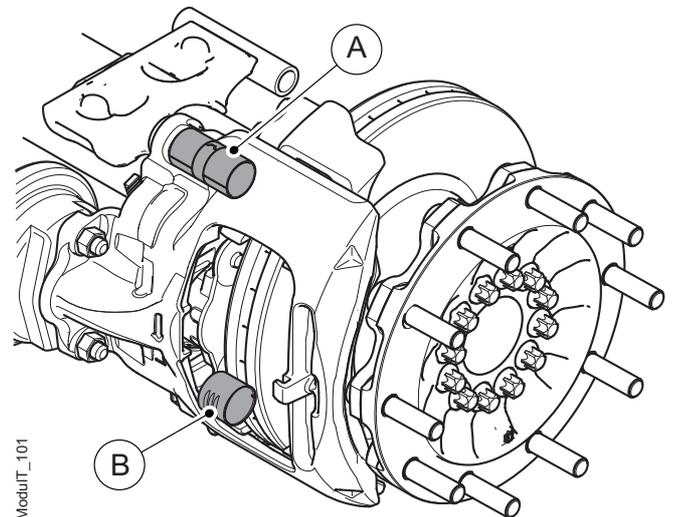
A = Leading bushing

B = Trailing bushing



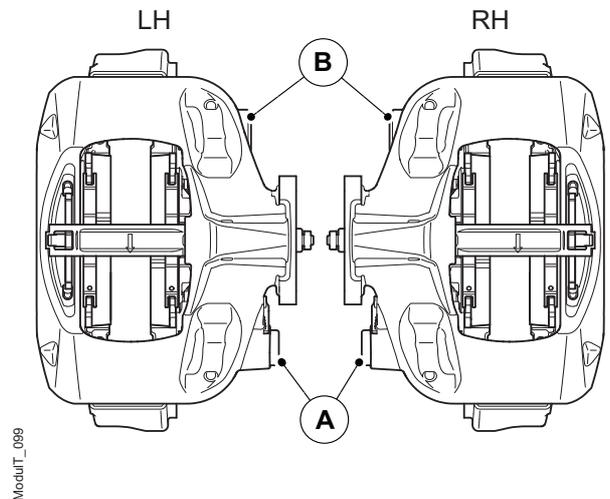
ModuT_100

Figure 92. Calliper measured play



ModuT_101

Figure 93. Calliper bushing



ModuT_089

Figure 94. Leading trailing bushing

3.4 Function test

3.4.1 Test of adjustment unit

The function test can be carried out with the wheel both fitted or removed.

1. Check that the wheel/hub can rotate freely. If it does not then first tap to remove any rest tension. If the wheel still does not rotate freely then consult chapter "7 Fault finding" to assist further.

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Make sure that dirt and impurities do not enter the opening for the reset shaft!

IMPORTANT!

Use recommended tools only!

NOTE!

The Torx 55 and the Thrust plate must be allowed to move unhindered!

NOTE!

If using a PWS/PWIS read chapter 4.4 about the function.

NOTE!

If using PWS/PWIS

Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

IMPORTANT!

Never use an impact wrench or similar to turn the reset shaft. This may damage internal parts of the mechanism! Torque is 20 Nm max.

2. Remove the reset shaft protection plug (A), see figure 8. (PWS / PWIS remove the black rubber plugg on the sensor.)
3. Using Haldex special tool P/N95232 (Torx 55) "6 Tools", de-adjust the brake by turning the reset shaft anti-clockwise by 4 clicks, or till the end stop, see (B) figure 8. A distinct clicking sound shall be heard and felt when de-adjusting.

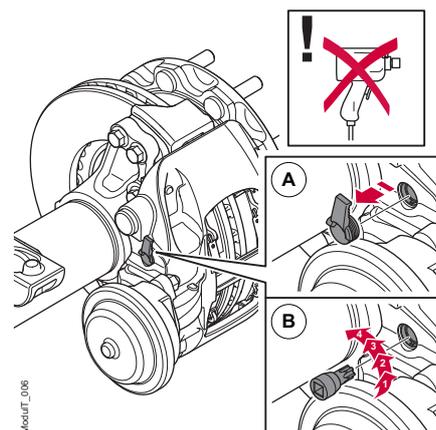


Figure 8. De-adjustment via the reset shaft

IMPORTANT!
When reaching the end stop position of de-adjustment, never tighten and leave. Leaving the reset shaft tightened in the de-adjust position could stop the adjustment function from working!
After reaching the end stop position always then adjust by turning the reset shaft clockwise 90 degrees, thus activating the adjustment function.

4. Leave the Torx 55 in position in the reset shaft.
5. Actuate the brakes 5 times by pressing and releasing the vehicles brake pedal through its full stroke. See figure 9. If no brake chamber is fitted then actuate the brake chamber lever manually with a suitable tool.
6. The Torx 55 must rotate clockwise only on each actuation, showing that the automatic adjustment function is working.
7. If the Torx 55 rotates back and forth or not at all, then the adjustment function is not working correctly.
8. To check further, manually adjust the reset shaft by turning the Torx 55 clockwise by 360 degrees, and then anti-clockwise by 180 degrees to ensure the adjuster is not jammed at the full de-adjust position.
9. Also note that once the excessive clearance is taken up by the adjuster the Torx 55 will naturally stop rotating. If in doubt, turn the Torx 55 anti-clockwise by 180 degrees and then press the brake pedal again to check.
10. If the Torx 55 still rotates back and forth during actuation then the adjustment function is defective and the calliper must be replaced.

See chapter "4.9 Replacement of disc brake".

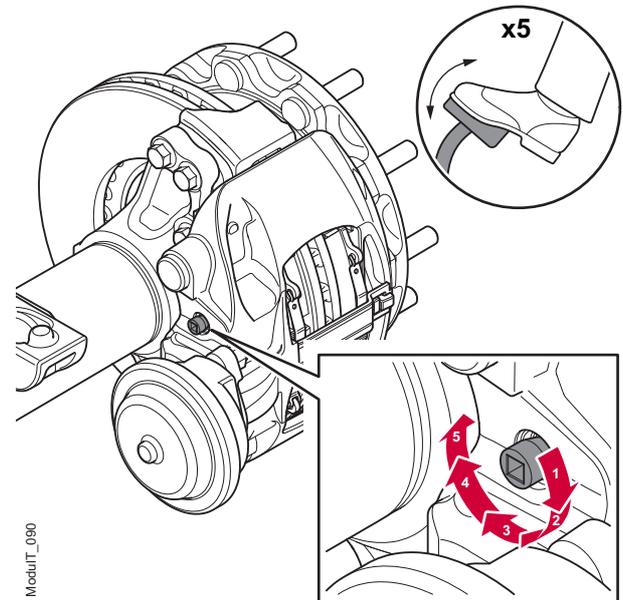


Figure 9. Brake actuation

3.5 Final procedure

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!

Make sure that dirt and impurities do not enter the opening for the reset shaft!

NOTE!

If using a PWS/PWIS read chapter 4.4 about the function.

NOTE!

If using PWS/PWIS

Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

3.5.1 Final brake adjustment

- Using Haldex special tool P/N95232 (Torx 55) "6 Tools", manually adjust the brake by turning the reset shaft clockwise until the pads touch the disc and you feel an end stop.
- Then turn the reset shaft anti-clockwise by 2 clicks, see figure 9.1.

This procedure is the initial brake pad setting.

- Fit the reset shaft protective plug into the calliper, ensure it is correctly orientated and pushed fully into its correct sealing position. Failure to do so may compromise the life of the brake!

See Figure 10.

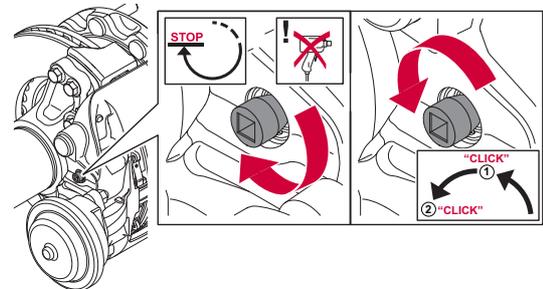


Figure 9.1. Initial brake pad setting

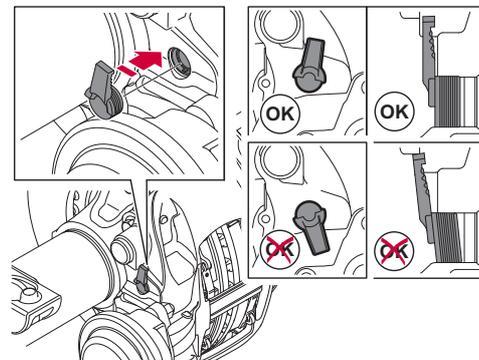


Figure 10. Correct fitment of the protective plug

3.5.2 Mounting of the wheel



Make sure that the brake hoses are in good condition, that they are layed/ducted and fastened correctly.

- Check the free rolling resistance. The disc brake must not be obstructed in any way.
- Mount the wheel, see Figure 11.

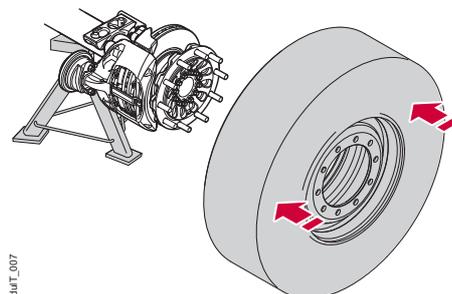


Figure 11. Mount the wheel

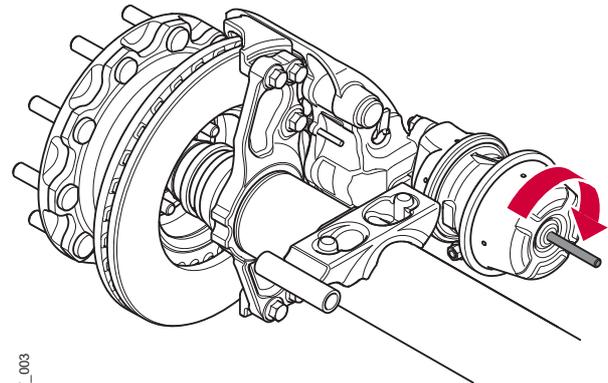
3.5.3 Lowering of the vehicle axle



If the disc brake is equipped with a parking brake actuator, ensure that the:

- brake system is pressurised.
- spring brake chamber is fully engaged and mechanically secured in the active position.

See the vehicle manufacturer's instructions.



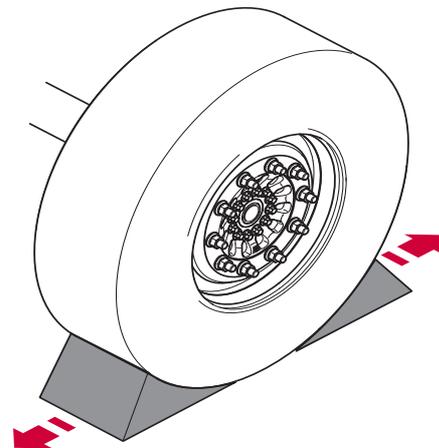
ModulT_003

Figure 12. Mechanically secure in the active position

IMPORTANT!

Apply air to the parking brake. Make sure that there is sufficient air in the system (min. 6 bar).

1. Activate the parking brake if fitted with a spring brake chamber.
2. Lift the axles so that the stands can be removed.
3. Carefully lower the vehicle to the ground.
4. Remove the wheel blocks, see Figure 13.



ModulT_056

Figure 13. Remove the stops

IMPORTANT!

After carrying out any work, always finish with a general checking operation followed by test drive to ensure that the brakes are working correctly!

4 Replacement procedures

4.1 General Information

The objective of this chapter is to give instruction and guidance on how the disc brake and/or its components shall be replaced. All the replacement procedures in this chapter require that the wheel is taken off to enable the replacement work to be carried out.

4.2 Replacement of brake pads

4.2.1 Initial procedure

Read and follow chapter "3.2 Initial procedure" prior to removing the brake pads.

4.2.2 Remove brake pads



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components

NOTE!

If using a PWS/PWIS read chapter 4.4 about the function.

1. If necessary remove dirt, dust and other possible obstruction.

IMPORTANT!
Only use Haldex special tools where specified!

IMPORTANT!
Never use an impact wrench or suchlike to turn the reset shaft. This will damage internal parts of the mechanism! Torque is 20 Nm max.

NOTE!
The thrust plate must be fully retracted to be able to fit new pads.

NOTE!
If using a PWI read chapter 4.3 about the function.

NOTE!
If using PWS/PWIS
Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

2. Remove the reset shaft protection plug.
See figure 31.
3. Using Haldex special tool P/N 95232 (Torx 55) "6 Tools", manually turn the reset shaft anti-clockwise to de-adjust the brake so that the thrust plate fully retracts to its inner position.

A clicking sound shall be heard and felt when de-adjusting.

The stop at fully retracted inner thrust plate position must be distinct, but do not exceed 20 Nm in torque or leave it tightened in this position.

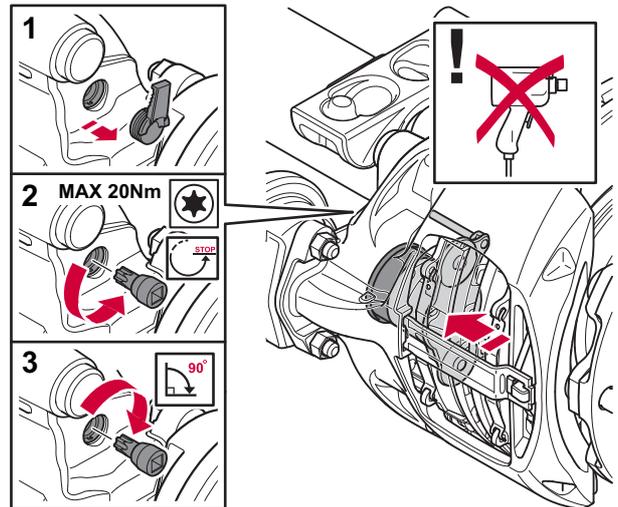


Figure 31. De-adjust the thrust plate via the reset shaft



Sudden release of tensioned springs can cause injury!



Do not actuate the brake when changing the brake pads!

Also, ensure the air brake system is pressurised during the replacement procedure, minimum 4bar! If the pressure drops below 4bar the park brake will be acutated.

IMPORTANT!

Always ensure the pad retainer spring bracket is fully held down whilst levering out the pad retainer

4. Remove the pad retainer by first pushing and holding down the spring bracket (A), see figure 32. Whilst the spring bracket (A) is held down, slide out and remove the pad retainer (B). A tool can be used to help slide out the pad retainer if unable to do so be hand. Continue to remove the two pad springs (C).

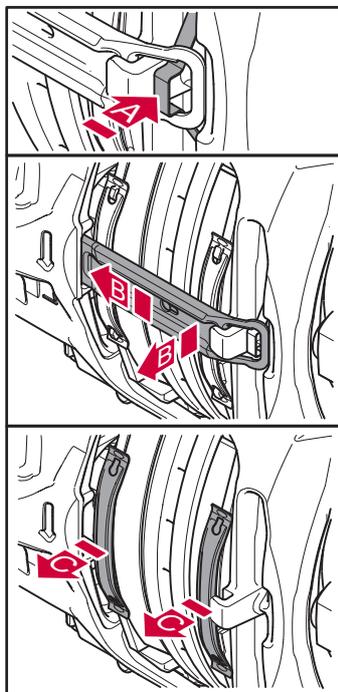
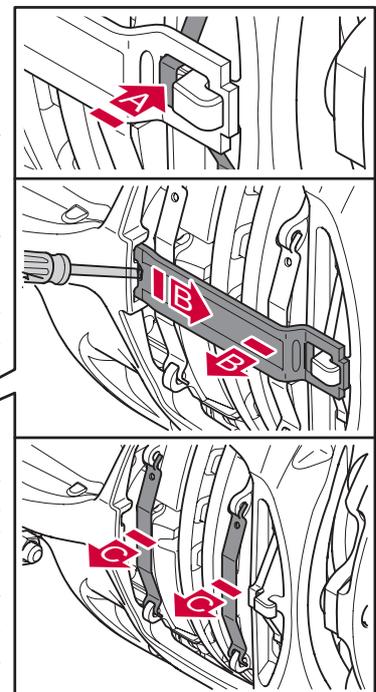
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Figure 32. Removal of brake pad components

IMPORTANT!
Always remove the outer brake pad first! You cannot directly pull out the inner brake pad with the outer still in place as the inner brake pad is located to the thrust plate on two points.

- Remove the brake pads; always remove the outer brake pad (A) first, followed by the inner brake pad (B). See figure 33.

This is because the inner brake pad back plate locates on two holes which mate to the thrust plate, therefore you cannot directly pull out the inner brake pad with the outer brake pad still being in place.

Once the outer brake pad is removed the calliper can be slid across to allow for the inner brake pad to be removed.

- Remove the pad retainer spring bracket (C).

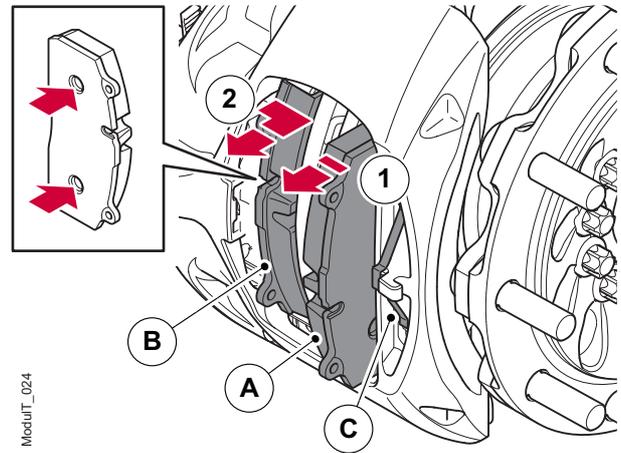


Figure 33. Removal of brake pads

4.2.3 Install brake pads

1. Make sure that the brake is fully de-adjusted before fitting new brake pads.
2. Check that the contact surfaces on the carrier, calliper and thrust plate are free from dirt and corrosion. Clean if necessary.

IMPORTANT!

The inner brake pad must always be installed first!

IMPORTANT!

Ensure that the friction material faces the brake disc!

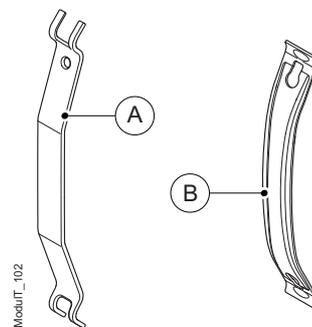
3. First install the inner brake pad (B) in the carrier, note that the inner brake pad locates onto the thrust plate on two points, see figure 34. Then fit the outer brake pad (A).
4. Check that the contact surfaces on the pad retainer spring bracket are free from dirt and corrosion. Clean if necessary.
5. Install the new spring bracket (C) into the calliper and ensure it is seated in position correctly.

NOTE!

When replacing the brake pads you shall use the new parts included in the kit. Dispose the old parts.

NOTE!

There are two versions of the pad springs, model A and model B. It is important to mount these with the right brake pads.

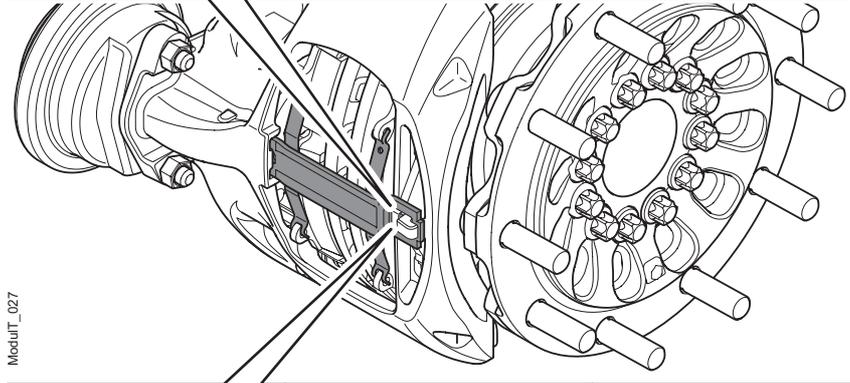
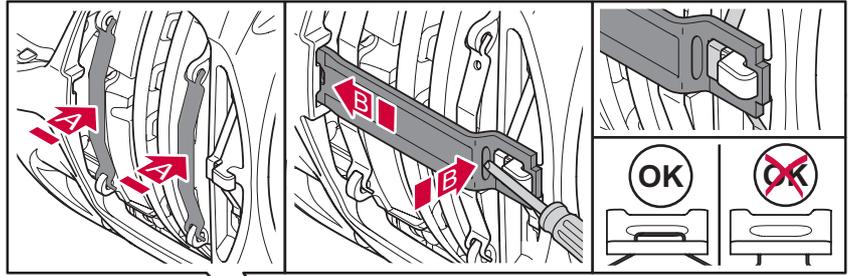


6. Fit the new pad springs (A) and the pad retainer (B).

The pad retainer is fitted by first locating the pad retainer in the housing end in the calliper aperture, then compressing the pad springs and locating the pad retainer slot over the calliper latch, finally slide the pad retainer under the calliper latch until the spring bracket pops into its locking position, see figure 35.

If necessary, use a tool to help push the pad retainer into position.

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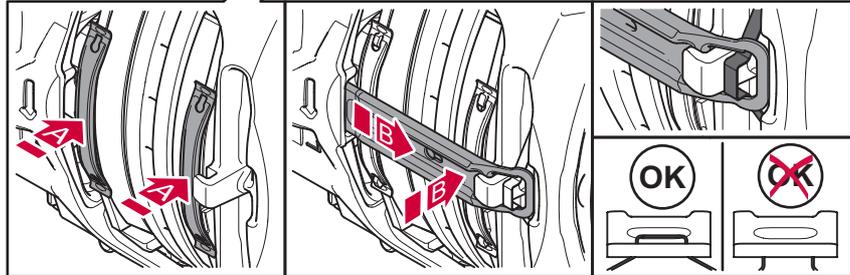


Figure 35. Installation brake pad components



Upon assembly, ensure the pad retainer spring bracket is in its correct locking position

4.2.4 Final Procedure

To conclude this procedure read and follow chapters:

1. "3.4 Function test" to ensure that the disc brake is working correctly;
2. "3.5 Final procedure".
3. If using PWS/PWIS read and follow chapter "4.4 Reset and installation of PWS and PWIS"

4.3 Replacement of PWI

4.3.1 Install brake pads and PWI (Pad Wear Indicator)

1. Make sure that the brake is fully de-adjusted before fitting new brake pads.
2. Check that the contact surfaces on the carrier, calliper and thrust plate are free from dirt and corrosion. Clean if necessary.

IMPORTANT!

The inner brake pad must always be installed first!

IMPORTANT!

Ensure that the friction material faces the brake disc!

3. First install the inner brake pad (B) in the carrier, note that the inner brake pad locates onto the thrust plate on two points, see figure 34. Then fit the outer brake pad (A).

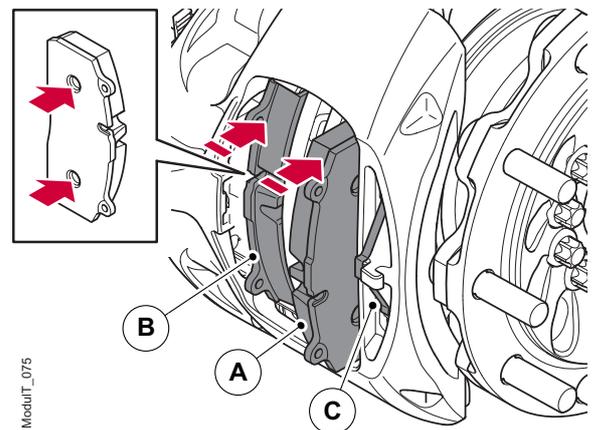


Figure 34. Install the brake pads

4. Fit PWI connectors (B and D) in place where appropriate in the (A) inner pad and (C) outer pad. See figure 109.

Note!

The PWI connectors (B and D) must be installed in the correct direction to fit the pads (A and C) and to obtain the correct function. Surface (B) on the same side as the brake pad material.

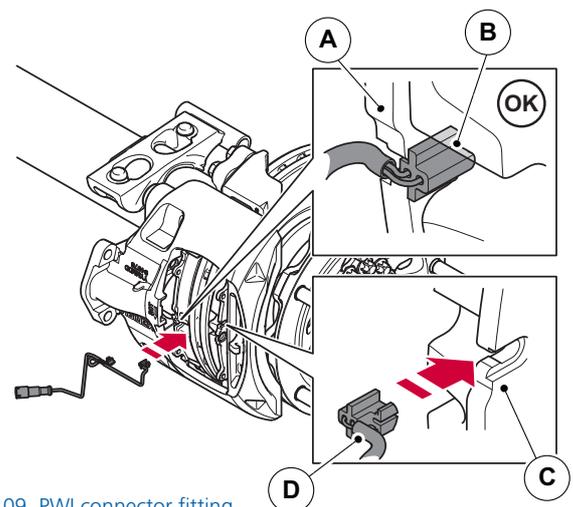


Figure 109. PWI connector fitting

5. Check that the contact surfaces on the pad retainer spring bracket are free from dirt and corrosion. Clean if necessary.
6. Install a new spring bracket (C) into the calliper and ensure it is seated in position correctly.
7. The PWI cable (D) for the outer brake pad (C) must be positioned correctly. Cable going out and over the Pad spring to avoid that the cable will be cut off. See figure 110.

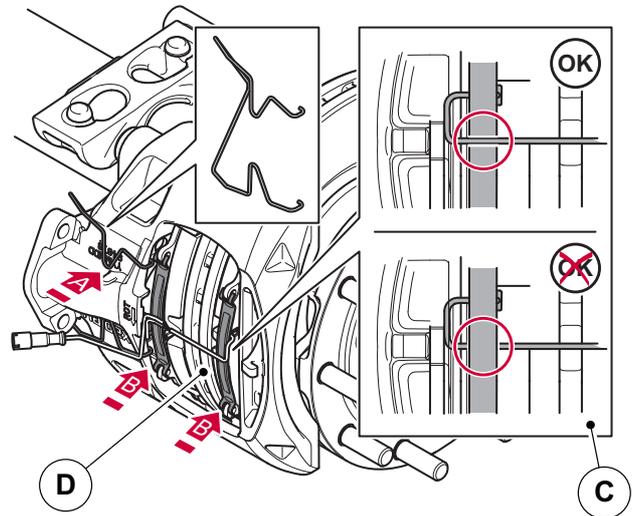


Figure 110. PWI cable fitting

NOTE!
 When replacing the brake pads you shall use the new parts included in the kit. Dispose the old parts.

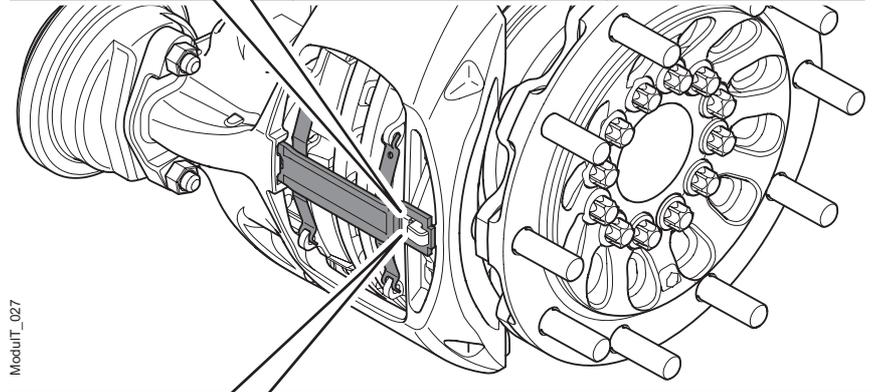
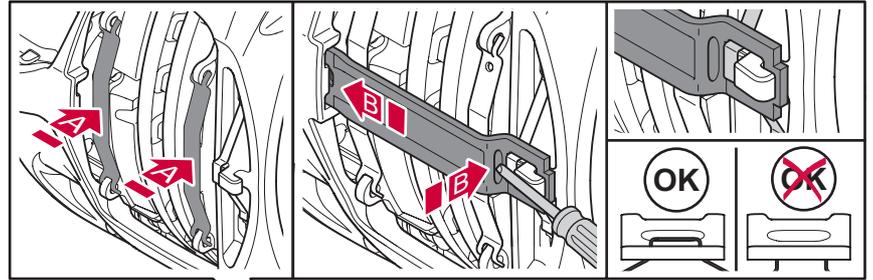
NOTE!
 This is because there are two versions of the pad springs, model A and model B.
 It is important to mount these with the right brake pads.

Upon assembly, ensure the pad retainer spring bracket is in its correct locking position

8. Fit the new pad springs (A) and the pad retainer (B). The pad retainer is fitted by first locating the pad retainer in the housing end in the calliper aperture, then compressing the pad springs and locating the pad retainer slot over the calliper latch, finally slide the pad retainer under the calliper latch until the spring bracket pops into its locking position, see figure 35.

If necessary, use a tool to help push the pad retainer into position.

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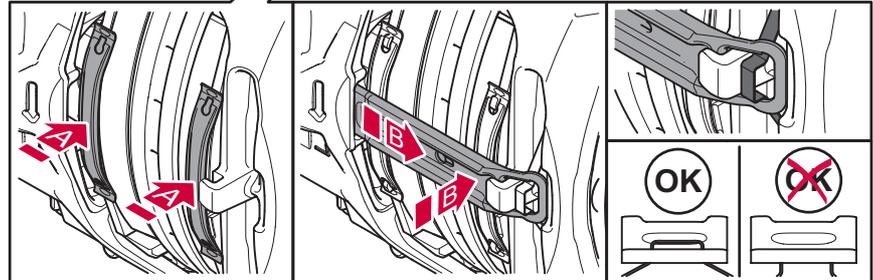


Figure 35. Installation brake pad components

9. Fit the PWI cable to the retainer so that the cable will not be cut, fit the cover plate. See figure 111.

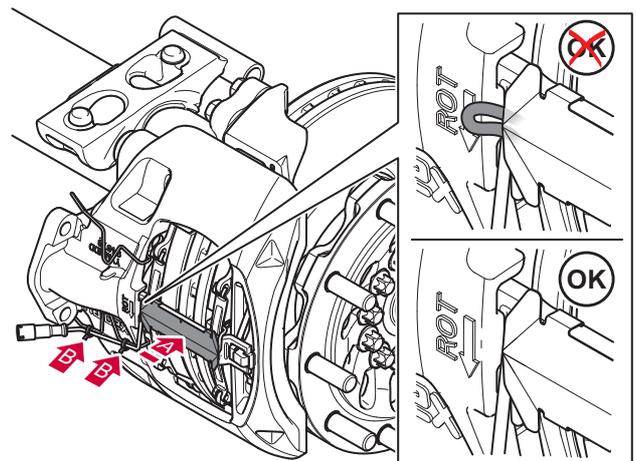


Figure 111. PWI cable to the retainer

10. To conclude this procedure read and follow chapter "4.2.4 Final procedure .

4.4 Reset and installation of PWS (Pad Wear Sensor) and PWIS (Pad Wear Indicator Sensor)

4.4.1 Function description:

PWS (Pad Wear Sensor = Black housing)

PWIS (Pad Wear Indicator Sensor = Grey housing)

PWS is a continuous wear sensor that monitors pad wear and provides continuous data to the vehicle system. PWIS is a digital sensor (switch type) that will give the vehicle system a signal when the brake pads reach their wear limits and need to be replaced.

The PWS /PWIS should always be manually set to its start position when changing to new brake pads, to be able to compensate for disc wear during each pad change.

There is no mechanical stop in either sensor, so the input shaft (C) can rotate freely without any risk of damage to the internal mechanism parts. The planetary gears inside the sensor mechanism allow 13 revolutions of the input shaft (C) until the start position is reached again.

To locate the sensors start position, see ref 4.4.2.4

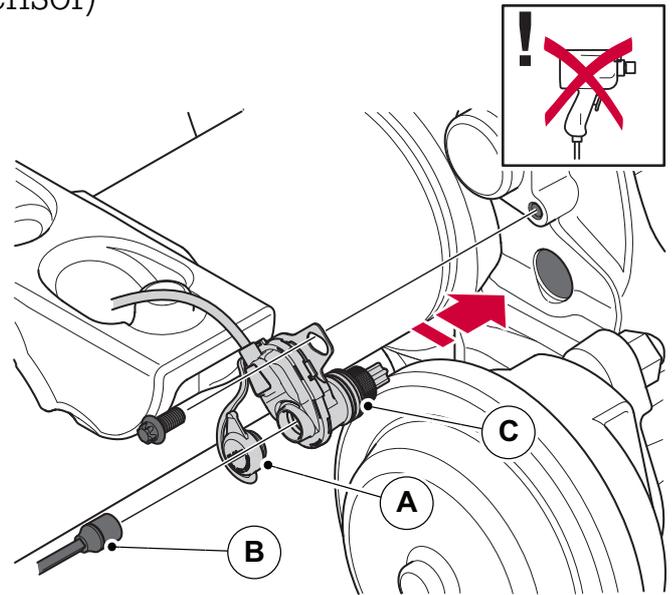


Figure 96. PWS/PWIS sensor

IMPORTANT!

Never use an impact wrench or suchlike to turn the reset shaft. This will damage internal parts of the mechanism! Torque is 20 Nm max.

To manually adjust or de-adjust the brake for changing the Pads, remove the protection plug (A) and use a standard 8 mm socket tool (B) can be used (see figure 96).

One M8 bolt fastens the sensor to the brake for easy mounting.

4.4.2 Replacement of brake pads with PWS/PWIS fitted

1. Replacement of brake pads
2. Final procedure
3. Remove PWS/PWIS
4. Set PWS/PWIS start position
5. Install PWS/PWIS after set start position

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

4.4.2.1 Replacement of brake pads

Read and follow chapter "4 Replacement procedures"

4.4.2.2 Final procedure

Read and follow chapter "3.5 Final procedure"

4.4.2.3 Remove PWS/PWIS

IMPORTANT!

Never use an impact wrench or suchlike to turn the reset shaft. This will damage internal parts of the mechanism! Torque is 20 Nm max.

1. If necessary remove dirt, dust and other possible obstruction.
2. Unscrew the M8 Bolt (C) and pull out the PWS/PWIS (D) from the calliper (see figure 97).

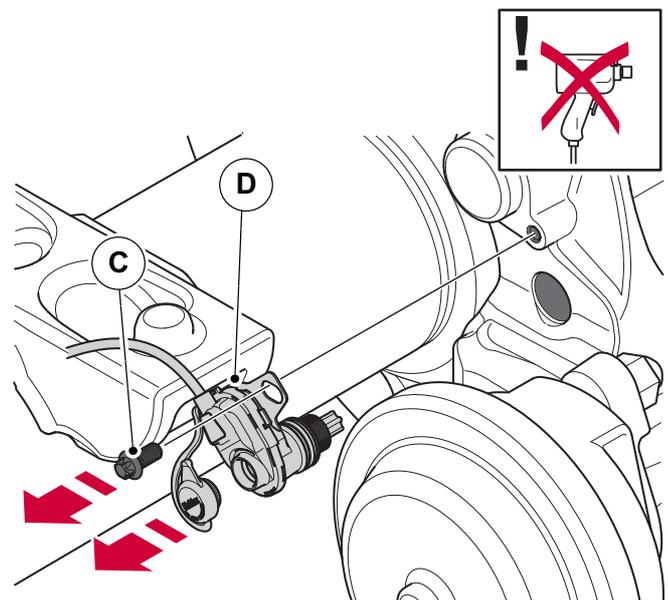


Figure 97. Remove PWS/PWIS

4.4.2.4 Set PWS/PWIS start position

IMPORTANT!

There will be 13 revolutions between start positions, then it will be two "clicks" within a half revolution. Between these clicks is the sensors start position.

1. Turn the input shaft clockwise until you hear two "clicks" (see figure 98). Note that it may take up to 13 full rotations of the input shaft before the clicks are reached.

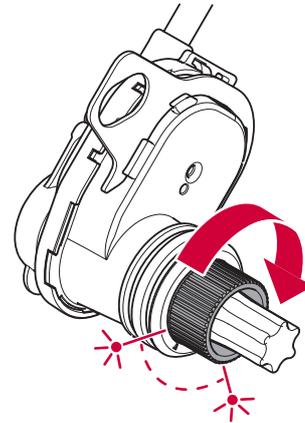


Figure 98. PWS/PWIS start position 1

2. Then turn anti-clockwise one "clicks" (see figure 98). Anywhere between these clicks is the PWS/PWIS start position.

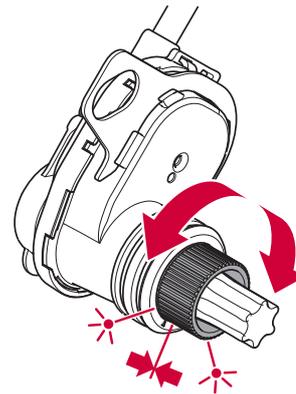


Figure 98. Start position 2

4.4.2.5 Install PWS/PWIS

1. Clean around the position of the sensor with a cloth (see figure 99).

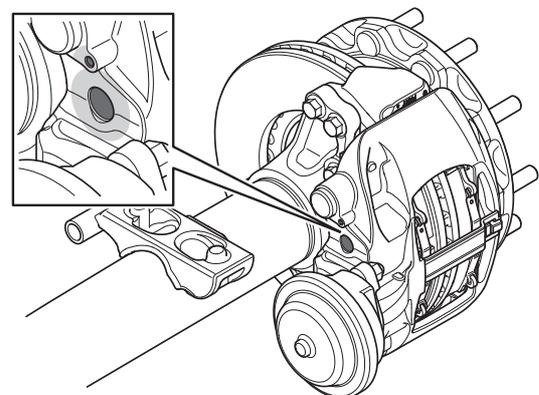


Figure 99. PWS/PWIS cleaning position

2. With a finger smear a thin layer of general purpose grease around the two o-rings on the Sensors (see figure 100).

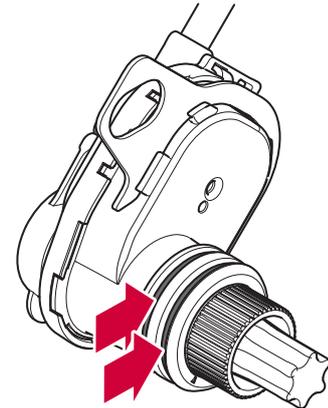


Figure 100. PWI/PWIS grease o-rings

3. Align the hole in the clip with the M8 hole in the caliper then push the sensor with the correct position into the calliper without changing the start position of the sensor.

(see figure 101).

To help fitting the sensor correctly into the reset shaft, without changing the sensors start position, an 8 mm socket with extension can be used. Use the tool to help guide the sensor into place and rotate the socket slightly to get the Input Shaft in position in the reset shaft. (see figure 102)

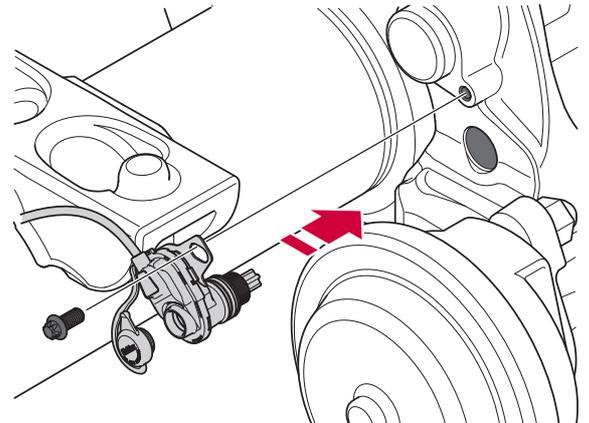


Figure 101. PWI/PWIS position into the calliper

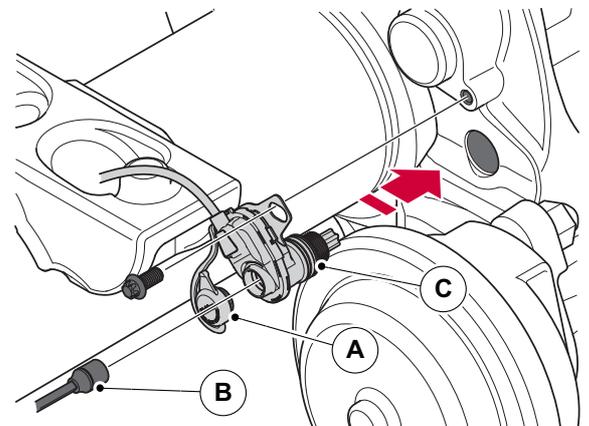


Figure 102. PWI/PWIS position into the calliper with 8 mm socket

Tighten the Bolt (24Nm). Do not over tighten or else you may damage the PWI/PWIS sensor.

Fit the reset shaft protective plug (A) into the sensor, ensure it is pushed fully into its correct sealing position (see figure 103). Failure to do so may compromise the life of the brake.

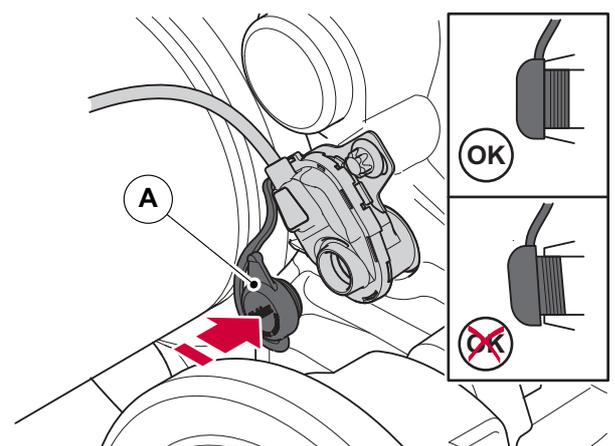


Figure 103. PWIS/PWS protection plug

4.5 Replacement of brake chamber

4.5.1 Initial procedure

Read and follow chapter "3.2 Initial procedure" prior to removing the spring brake chamber.

4.5.2 Remove brake chamber



Wear respiratory protection in order to avoid inhaling particles which can be hazardous to your health! Brake pad wear produce dust which can cause lung damage!

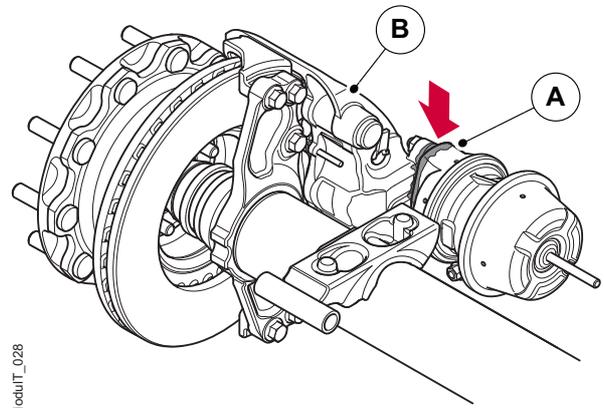
IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush etc). This to avoid damage or displacement of hoses, seals and other components.

1. Carefully clean around the mating surfaces of the brake chamber (A) and the calliper (B) to ensure that dirt does not get into the mechanism area when removing the brake chamber. See figure 36.



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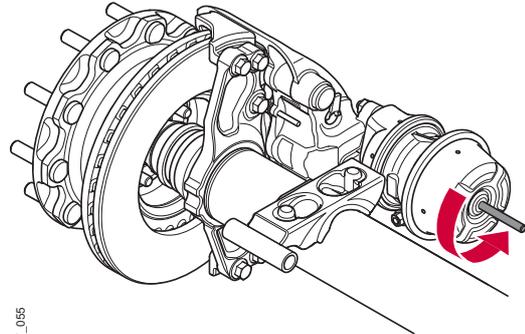
Figure 36. The mating surfaces of the brake chamber and calliper



If the disc brake is equipped with a parking brake actuator, ensure that the:

- brake system is depressurised.
- spring brake chamber is fully disengaged and mechanically secured in the released position.

See the vehicle manufacturer's instructions.



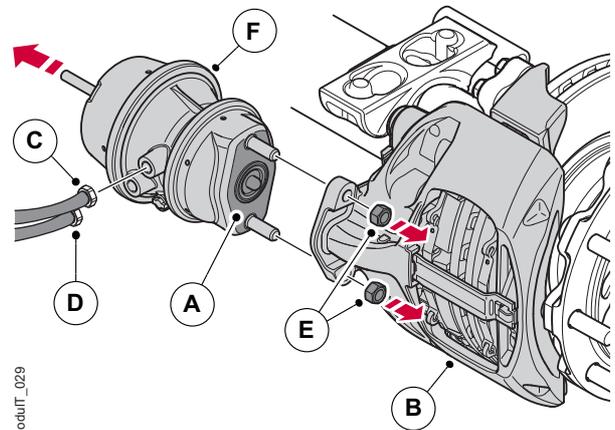
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Figure 6. Mechanically secure in the released position



Pressure from lines and components shall be released before opening them!

2. If applicable ensure that the spring brake chamber (F) is fully disengaged and mechanically secured in the released position. See figure 37.
3. Ensure that the brake chamber (A) is depressurised.
4. Mark and remove the hose connections of the service brake (C) and if applicable the parking brake (D).
5. Remove the two nuts (E) holding the brake chamber. Remove the brake chamber (A) from the calliper (B).
6. Once the brake chamber is removed it is good practice and highly recommended to read and follow chapter "3.3.3.8 Check actuation interface".



ModuT_029

Figure 37. Removal of brake chamber items

4.5.3 Install brake chamber

1. Check that the brake chamber being installed is the correct one for the application and vehicle. If a spring brake chamber is being installed, ensure that the parking brake spring is caged in accordance with the manufacturer's instructions.
2. Prior to fitting the brake chamber it is good practice and highly recommended to read and follow chapter "3.3.3.8 Check actuation interface".

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

3. Check that the surface of the calliper that mates with the brake chamber is free from dirt, moisture and corrosion. Do the same check on the brake chambers mating face (A) and seal. See figure 38.
Ensure the brake chamber seal is in the correct position and not damaged.
4. Put a knob of general purpose grease in the ball cup of the brake chamber lever. Do not overfill the cup or let grease fall inside the brake.

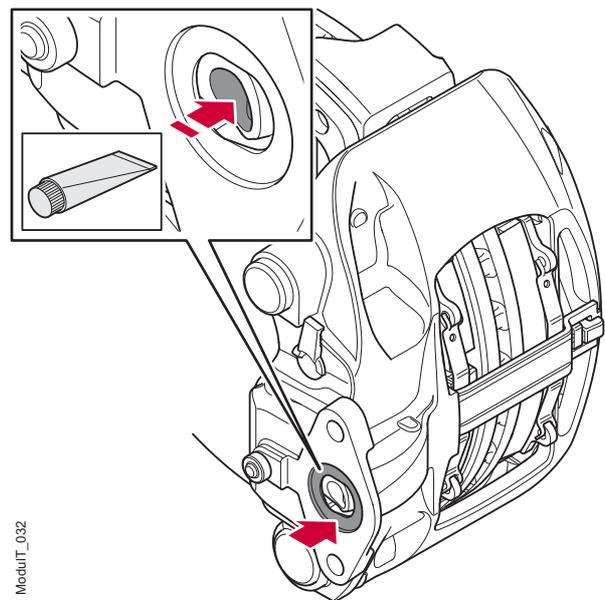


Figure 38. Pre-brake chamber mounting activity

5. Fit the new brake chamber (A) to the calliper (B) with nuts (E), see figure 39. Screw the nuts home first before torque tightening to ensure the brake chamber seats parallel.

Brake chamber fixation nut tightening torque is $180 \pm 20 \text{ Nm}$.*)

- *) Follow the vehicle/axle manufacturers recommendations.

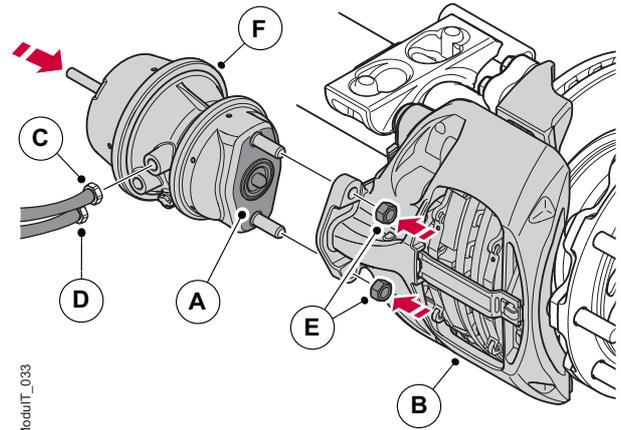


Figure 39. Installation of brake chamber items

IMPORTANT!

Do not mix up the hoses!

6. Fit the brake chamber hose connection of the service brake (C) and if applicable the parking brake (D). If fitting both hoses, ensure connections (C) and (D) are the correct way around. See figure 39.

7. Remove the ventilation drain plug that faces downwards from the brake chamber housing, see figure 40. Also from the spring brake chamber if applicable.

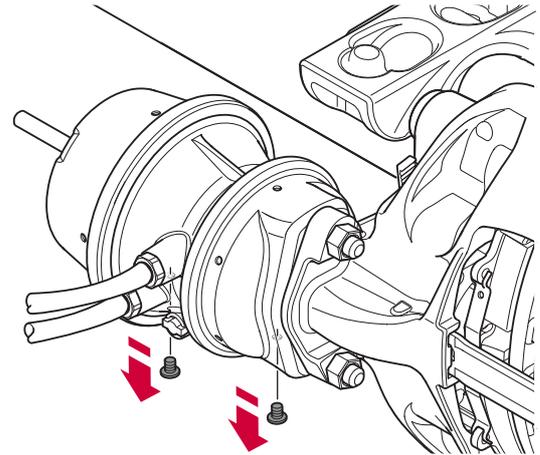


Figure 40. Remove the ventilation drain plug

IMPORTANT!

Apply air to the parking brake. Make sure that there is sufficient air in the system (min. 6 bar).

8. If applicable, release the parking brake and disengage the spring brake chamber's caging mechanism so that the spring is released.
Min. 6 bar in compressed air system.
9. With the service brake engaged and, where applicable, with the parking brake released, check the brake chambers, hoses and connections for leaks or damage.

4.5.4 Final procedure

To conclude this procedure read and follow chapters:

1. "3.4 Function test" to ensure that the disc brake is working correctly
2. "3.5 Final procedure"

4.6 Replacement of adjustment spindle bellows

4.6.1 Initial procedure

Read and follow the chapters below prior to removing the adjustment spindle bellows:

1. "3.2 Initial procedure"
2. "4.2.2 Remove brake pads"
3. "4.5.2 Remove brake chamber"
4. "4.9.2 Remove disc brake"

4.6.2 Remove adjustment spindle bellows

1. Fasten the disc brake securely in a vice with soft jaws, see figure 41 for clamping arrangement. Ensure that the jaws of the vice do not damage the disc brake.

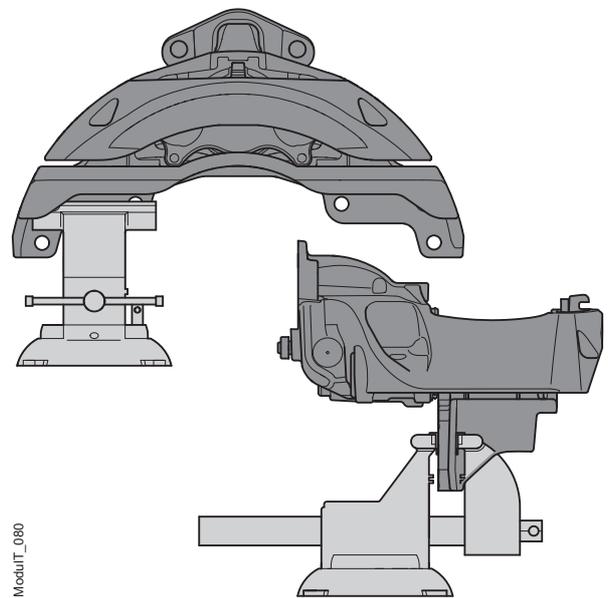


Figure 41. Clamping arrangement for replacing adjustment spindle bellows

NOTE!
If using PWS/PWIS read chapter 4.4 about functions

NOTE!
If using PWS/PWIS
Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

- Using Haldex special tool P/N 95232 (Torx 55) "Tools", manually turn the reset shaft clockwise to extract the thrust plate (A). Continue extracting until the thrust plate unscrews fully and becomes detached from the adjustment spindle, see figure 42.

The point at which the thrust plate becomes detached is when the gap between the thrust plate inner pad face and the calliper outer pad face becomes smaller than 52 mm.

Be careful when removing the thrust plate not to damage its internal threads or the external threads on the adjustment spindle.

- Once the thrust plate becomes detached from the adjustment spindle, by hand pull off the adjustment spindle bellows from the thrust plate and calliper. Do not use any tools for this removal because damaging the sealing surfaces could cause water penetration leakage or seal corrosion upon re-assembly!

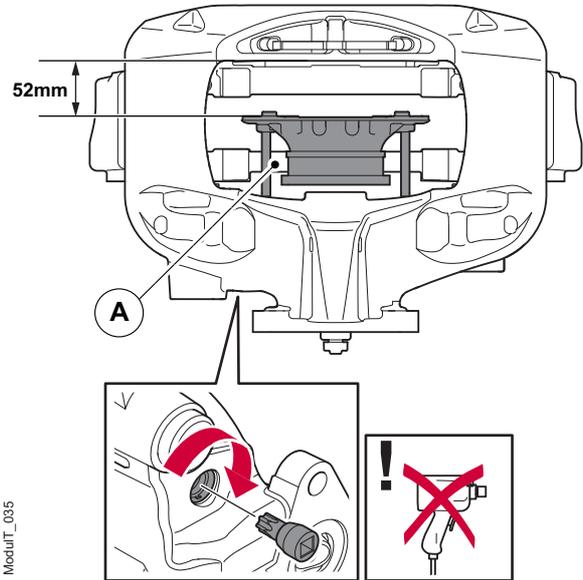


Figure 42. Extract the thrust plate

4.6.3 Cleaning

IMPORTANT!
Use a vacuum cleaner to clean surfaces. Do not use compressed air!

IMPORTANT!
It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

IMPORTANT!
Make sure that dirt and impurities do not enter the opening for the adjustment spindle!

Clean the thrust plate, the adjustment spindle and the adjustment spindle bellows sealing surfaces in the calliper. Ensure the parts are free from dirt, dust, debris, moisture and corrosion.

4.6.4 Install adjustment spindle bellows

1. Fasten the thrust plate in a vice fitted with soft jaws, see figure 43 for the clamping arrangement. Do not over tighten or damage the thrust plate whilst clamping!
2. Clean the internal threaded surface of the thrust plate.
3. Ensure that the contact surfaces between the thrust plate and the bellows are clean and free from dirt, moisture and corrosion.

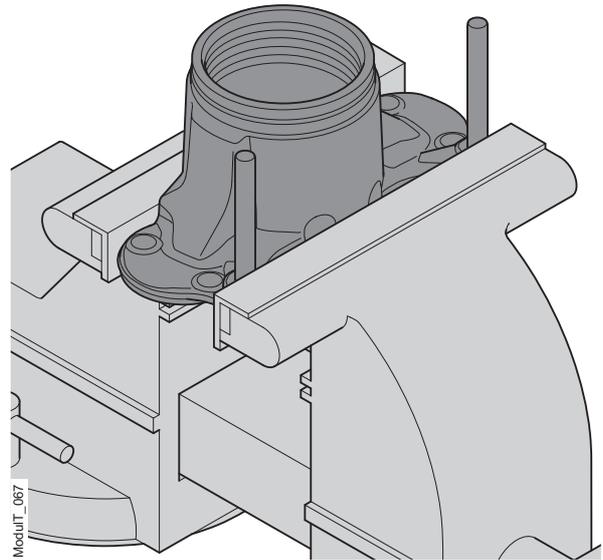


Figure 43. Clamping arrangement for thrust plate

IMPORTANT!

Only use Haldex special tools where specified!

4. By hand, using Haldex special tool P/N 95224 (C) "6 Tools", firmly press the adjustment spindle bellows (A) into position on the thrust plate (B), see figure 44.

Check that the bellows is correctly seated in position on the thrust plate.

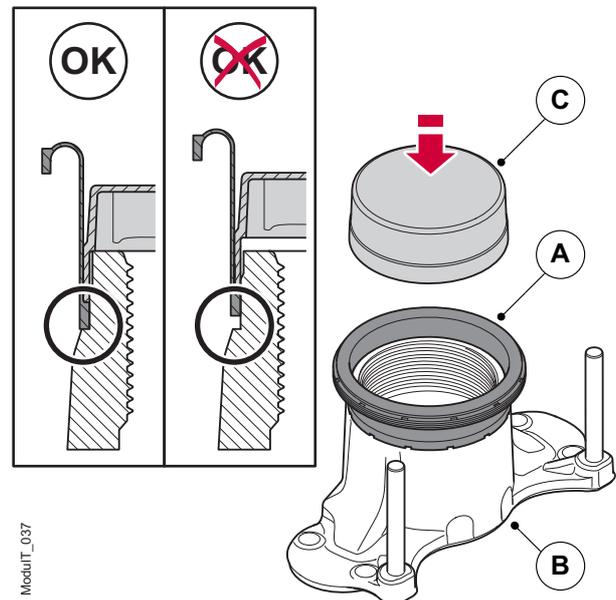


Figure 44. Fitting the adjustment spindle bellows

5. Clean the external threaded surface of the adjustment spindle. Ensure the parts are free from dirt, dust, debris, moisture and corrosion.
6. Apply the grease supplied with the spare parts kit, to the internal thread of the thrust plate and the external thread of the adjustment spindle.
7. Remove the thrust plate from the vice.

IMPORTANT!

Do not cross thread the thrust plate and the adjustment spindle!

NOTE!

If using a PWI read chapter 4.3 about the function.

NOTE!

If using PWS/PWIS read chapter 4.4 about functions

NOTE!

If using PWS/PWIS

Use an 8 mm socket with extension wherever the text "Torx 55" is used in the instruction below.

8. By hand, hold the thrust plate in position against the adjustment spindle. Insert Haldex special tool P/N 95232 (Torx 55) "6 Tools" into the reset shaft and carefully turn anti-clockwise, as the adjustment spindle turns, carefully engage the thrust plate threads onto the adjustment spindle.

Be careful not to cross thread the parts, if the thread becomes tight or locks, turn the reset shaft clockwise to release the thrust plate, then try again.

A clicking sound will be heard and felt when turning the reset shaft anti-clockwise.

See figure 45.

9. Shortly after the threads are engaged ensure that the two thrust plate guide pins correctly locate in their calliper holes.
10. Continue to retract the thrust plate until the dimension between the thrust plate inner pad face and the calliper outer pad face is 70 mm, as per figure 45.

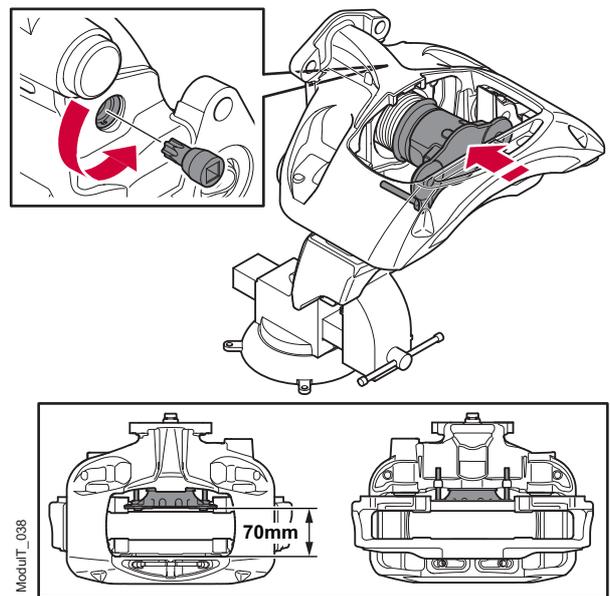


Figure 45. Loading the thrust plate

IMPORTANT!

Ensure that the bellows is correctly seated and undamaged. Failure to do so may compromise the life of the disc brake.

11. Assemble Haldex special tool .P/N 95225 (F) and P/N 95226 (G) "6 Tools", load the assembled special tools into the calliper end of the adjustment spindle bellows. See figure 46.
12. By hand, firmly press on the special tool with equal and parallel force so that the adjustment spindle bellows is pressed into position within the calliper.
13. The special tool can be removed, rotated, and then reapplied to aid the equal and parallel bellows seating.
14. Remove the special tool. Check that the bellows is correctly seated all around within the calliper, see figure 47.

Also, re-check the bellows is seated correctly on the thrust plate, see previous figure 44.

Failure to seat the bellows correctly will compromise the life of the brake!

15. Retract the thrust plate fully to its inner position by manually turning the reset shaft anti-clockwise. A clicking sound shall be heard and felt when retracting. The stop at fully retracted inner thrust plate position must be distinct, but do not exceed 20 Nm in torque or leave it tightened in this position.

4.6.5 Final procedure

To conclude this procedure read and follow chapters:

1. "4.9.3 Install disc brake"
2. "4.2.3 Install brake pads"
3. "4.5.3 Install brake chamber"
4. "3.4 Function test" to ensure that the disc brake is working correctly
5. "3.5 Final procedure"

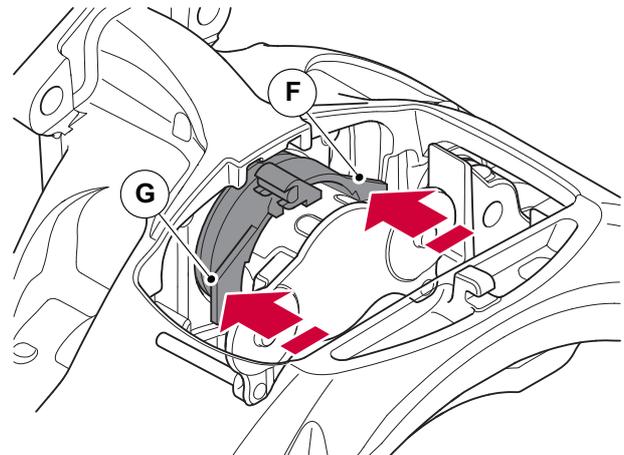


Figure 46. Pressing in the adjustment spindle bellows

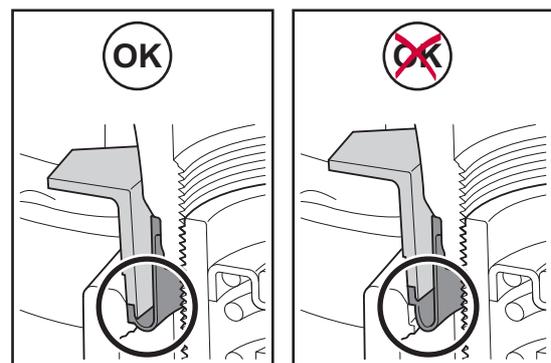


Figure 47. Adjustment screw bellows seated OK/NOK

4.7 Replacement of slide function assembly

4.7.1 Initial procedure

Read and follow the chapters below prior to removing the slide function assembly:

1. "3.2 Initial procedure"
2. "4.2.2 Remove brake pads"
3. "4.5.2 Remove brake chamber"
4. "4.9.2 Remove disc brake"

4.7.2 Remove slide function assembly

IMPORTANT!
Where specified only use Haldex ModulT tool kit!

1. Fasten the calliper securely in a vice with soft jaws, see figure 48 for clamping arrangement. Ensure that the jaws of the vice do not damage the calliper.

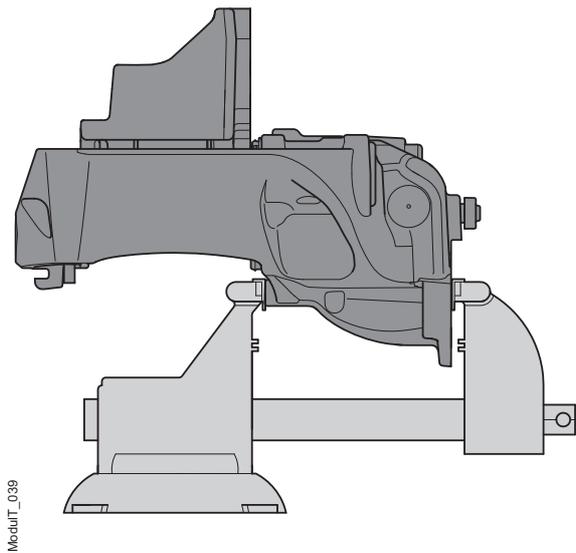


Figure 48. Clamping arrangement for replacing the slide function assembly

2. Use a small hammer and chisel to remove the leading and trailing protective cups (A), see figure 49. The protective cups are not to be re-used.

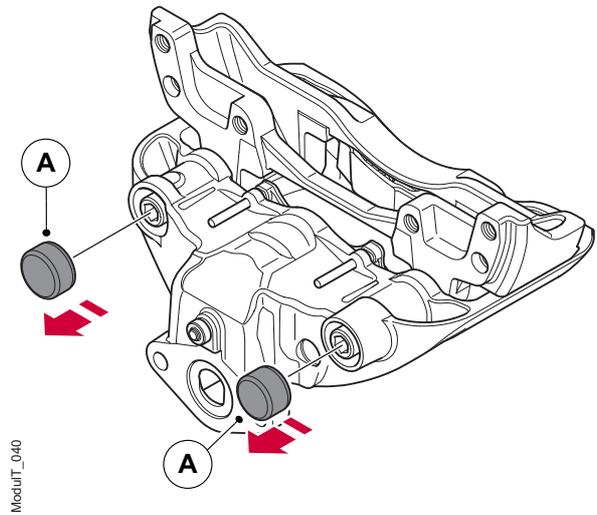


Figure 49. Remove slide protection cups .

3. Using Haldex special tool P/N95233 (3/4" long drive 14 mm hexagon) "6 Tools", remove the two bolts (B), see figure 50. The bolts are not to be re-used.

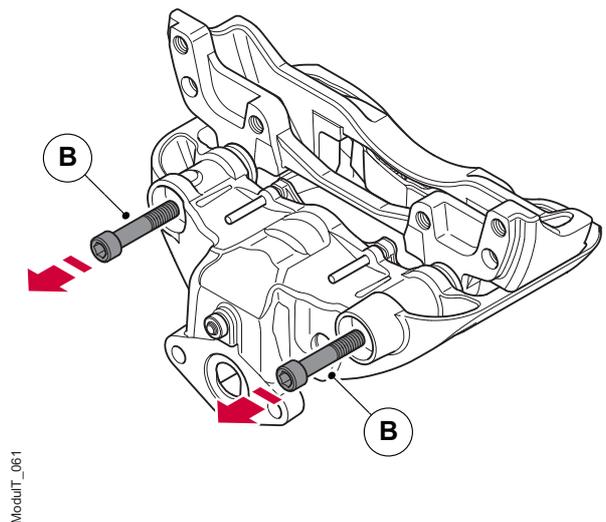
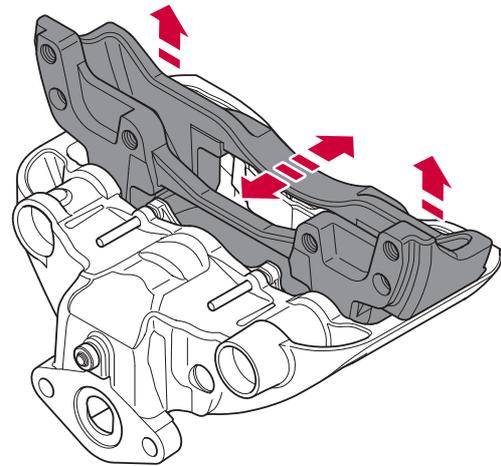


Figure 50. Remove the slide pin bolts

- Remove the carrier from the calliper by gently rocking the carrier to release it from the slide pins and bellows. Once released press slide pins back enough to be able to lift out the carrier, see figure 51.



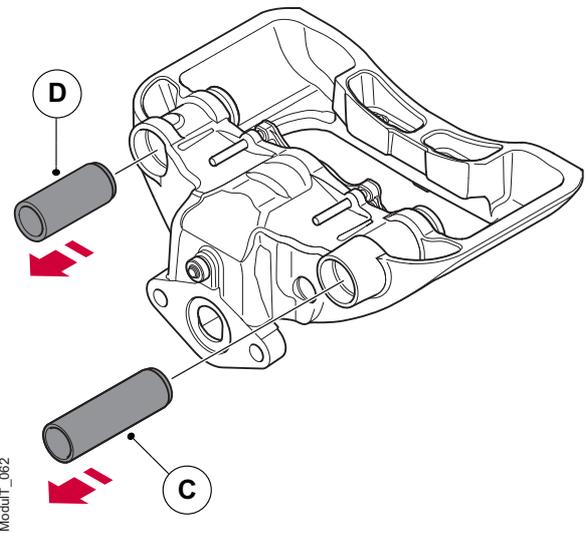
ModulT_041

Figure 51. Remove the carrier

IMPORTANT!

Be careful not to damage the slide pin bellows sealing surfaces in the calliper!

- By hand push out and remove the leading slide pin (C) and the trailing slide pin (D), see figure 52.



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Figure 52. Remove the slide pins

- By hand, carefully remove the two slide pin bellows (E), see figure 53. If required, use a small screwdriver to assist by levering them out. Be careful not to damage the slide pin bellows sealing surfaces if using a tool to levering out the bellows.

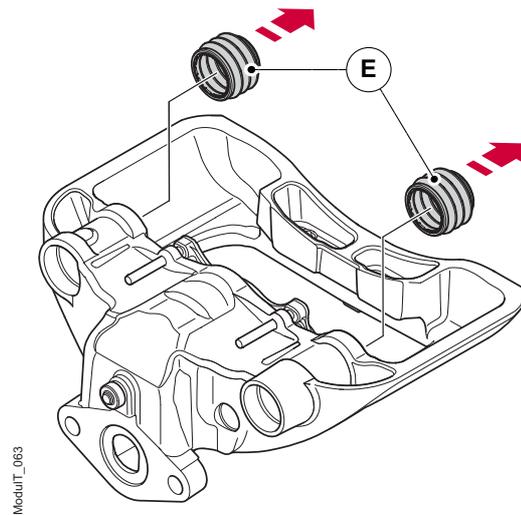


Figure 53. Remove the slide pin bellows.

- Carefully follow steps 8 and 9 below to remove the two leading bearings (F) and the spacer (G) and trailing composite bushing (H), see figure 54.

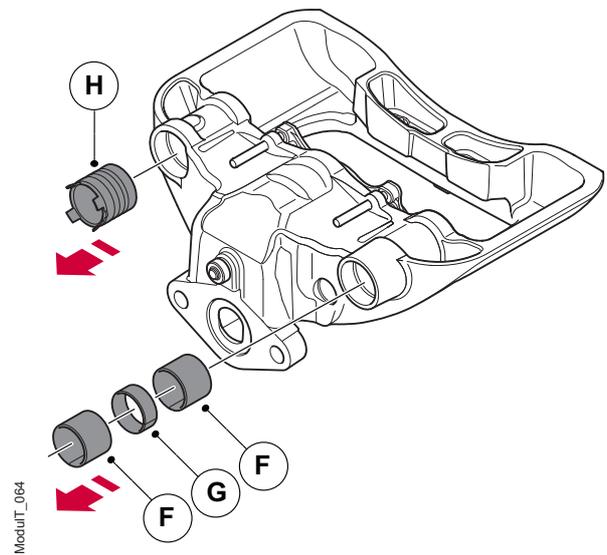


Figure 54. Remove the slide bearings and composite side bushing

IMPORTANT!

To secure correct function:

Verify that the rotating bearing surface on (L) is facing towards the flange on (K).

IMPORTANT!

Only use Haldex special tools where specified! See section "6 Tools"!

8. To remove the two bearings (F) and the spacer (G) on the leading side, assemble in sequence Haldex special tool (K), (L), (D), (A) and (B) "Tools", as shown in figure 55.

9. Once fitted correctly, turn the threaded tool clockwise which will pull out the two bearings (F) and the spacer (G).

If required, rotate the mandrel (A) half way through the extraction process so the nut (B) can be held.

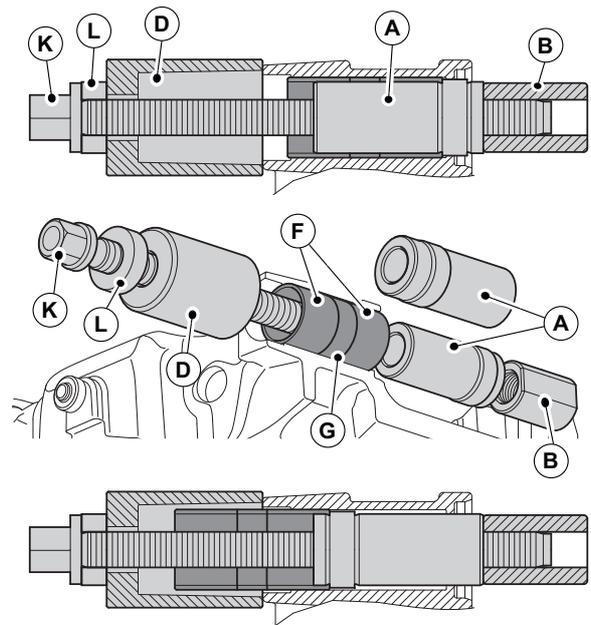


Figure 55. Remove the leading slide bearing

10. The composite bushing (H) on the trailing side should be removable by hand.

11. However if this is not possible, assemble in sequence Haldex special tool (K), (L), (D), (A) and (B), as shown in figure 56.

12. Once fitted correctly, turn the threaded tool clockwise which will pull out the composite bushing.

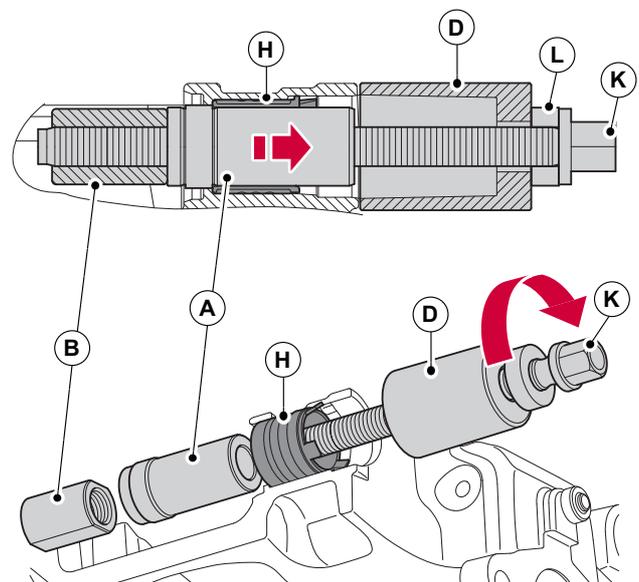


Figure 56. Remove the trailing side composite bushing

4.7.3 Cleaning

IMPORTANT!

Use a vacuum cleaner to clean surfaces. Do not use compressed air.

IMPORTANT!

It is important to take care when using chemicals and/or cleaning tools (e.g. knife, brush, etc). This to avoid damage or displacement of hoses, seals and other components.

1. Clean the bearing/bush/bellows sealing surfaces of the calliper to ensure they are free from dirt, moisture, corrosion and damage. See figure 57.
2. If the sealing surfaces have lost their protective surface coating, apply/smear a small amount of general purpose grease over the whole area so when parts are refitted the grease will provide corrosion protection.

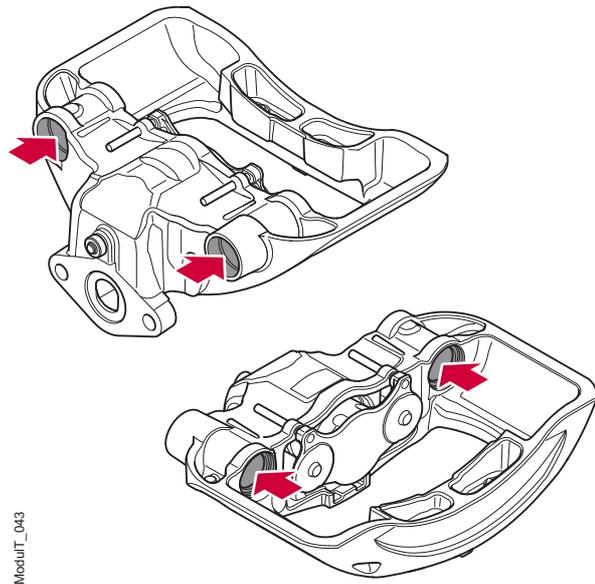


Figure 57. Clean the calliper bearing/bushing mating surfaces

4.7.4 Install slide function assembly

IMPORTANT!

To secure correct function:

Verify that the rotating bearing surface on (L) is facing towards the flange on (K).

IMPORTANT!

Only use Haldex special tools where specified! See section "6 Tools"!

- Carefully follow steps 2-4 below to install the two leading bearings (F) and the spacer (G) and step 5 to install the trailing composite bushing (H), see figure 58.

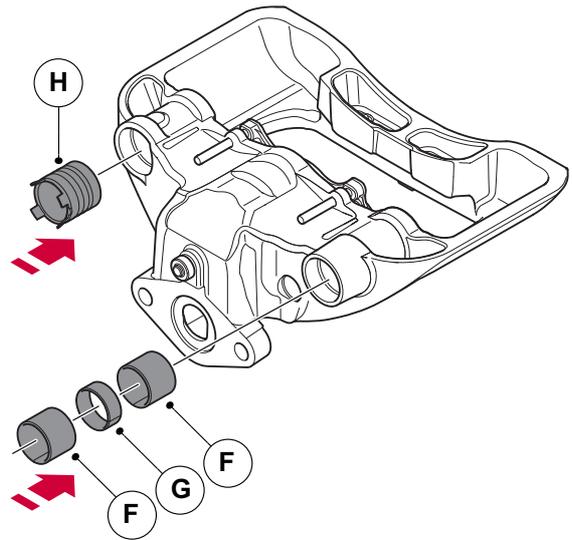


Figure 58. Install the leading slide bearings and trailing side bushing

- To install the two new bearings (F) and the new spacer (G) on the leading side, assemble in sequence Haldex special tool P/N's 95230 (K), 95423 (L), 95219 (A), 95221 (C) and 95220 (B), preloaded with the new parts, as shown in figure 59.
- Once fitted correctly, turn the threaded tool clockwise which will pull into position the two bearings (F) and spacer (G) complete.

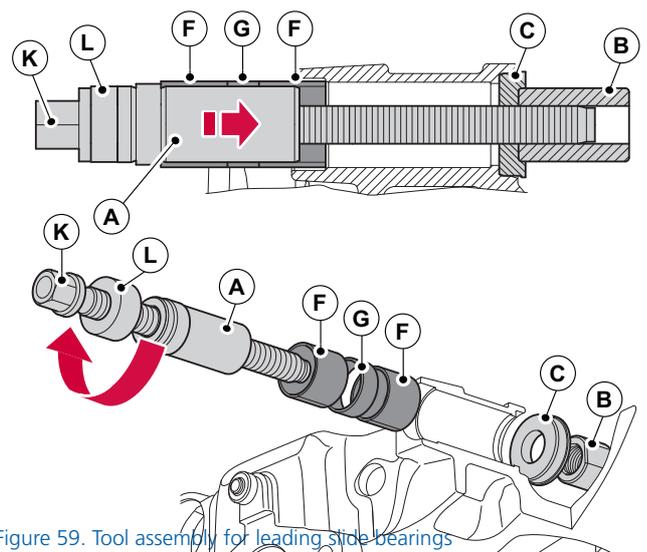


Figure 59. Tool assembly for leading side bearings

- Stop once the bearings are seated in the correct position up to the inside lip of the bearing location surface, see figure 60.

It is important the bearings are seated correctly but not over tightened as this may cause damage.

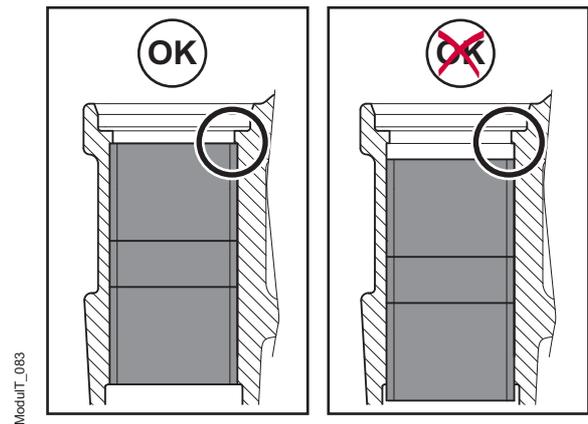


Figure 60. Leading side bearings installed OK/NOK

IMPORTANT!
The trailing side composite bushing must be indexed correctly when being installed into position by hand. If not correctly indexed the slide function of the brake will not be correct.

- To install the new composite bushing (H) on the trailing side, by hand, push the composite bushing into place, until it bottoms out. Ensure the index lug locates correctly in the calliper slot, see figure 61.

No tools or high forces are required for this fitting process, nor should they be used! If used they may cause damage!

If the bushing is not indexed correctly the slide pin and protective cup may not fit!

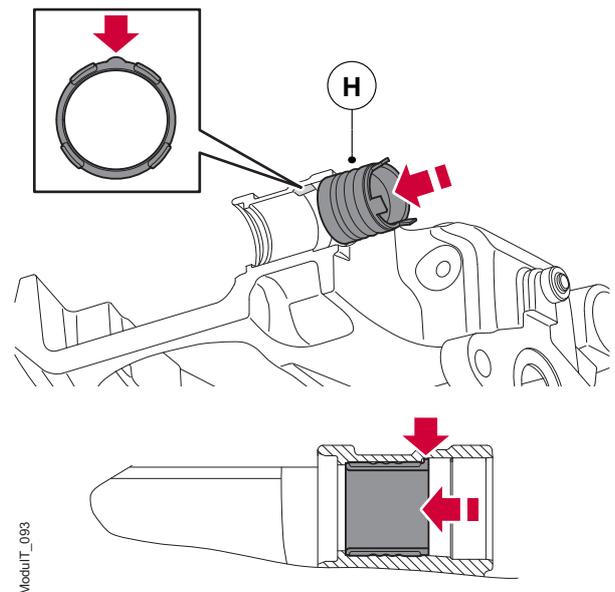


Figure 61. Inserting the trailing side composite bushing

IMPORTANT!

When inserted the slide pin bellows must seat correctly, bottoming out against the calliper location shoulder.

- By hand, firmly push the two new slide pin bellows into their calliper locations ensuring that the bellows are seated correctly in position, see figure 62.

It is important to check that the bellows is correctly seated within the calliper, do so by looking inside the bellows to see their seating.

Failure to do so may compromise the sliding function of the brake.

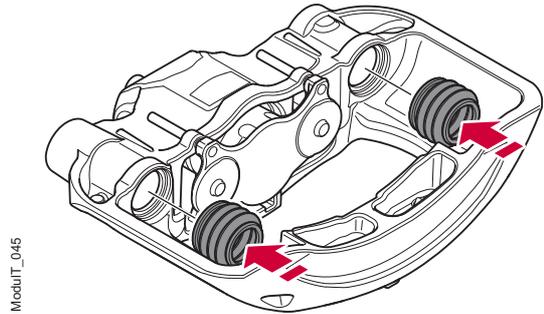
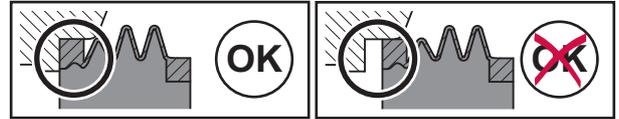


Figure 62. Installing slide pin bellows.

- By hand, insert the leading slide pin (C) into the bearings and the trailing slide pin (D) into the composite bushing, see figure 63.

The longer slide pin (C) is fitted into the leading side.

Note that one end of the slide pins has a machined groove, this side is inserted first.

No grease is required.

- Check that the bellows location ring is fitted correct and in one piece. By hand, locate the bellows onto the end of the slide pins.

Ensure the bellows and the bellows location ring seat correctly on the slide pins. Failure to do so may compromise the sliding function of the brake.

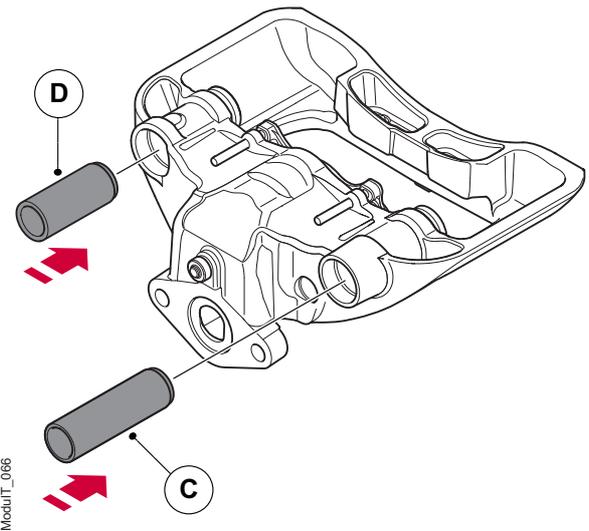


Figure 63. Insert the slide pins.

9. Clean the brake pad contact surfaces on the carrier, the calliper and the thrust plate. A wire brush can be used but be careful not to damage any of the bellows. Do not grind!



Never re-fit used bolts!

10. Lift the carrier into position in the calliper ensuring that the slide pins fitted with bellows do not interfere or obstruct.

If necessary push out the slide pins slightly by hand whilst lowering in the carrier.

Hold the carrier in position whilst the two bolts are inserted and screwed home. See figure 64.

11. Using Haldex special tool P/N 95233 (3/4" long drive 14 mm hexagon), screw home and then tighten the slide pin bolts (B). Their torque setting is defined in chapter "5.2.2 Haldex ModulT ADB".

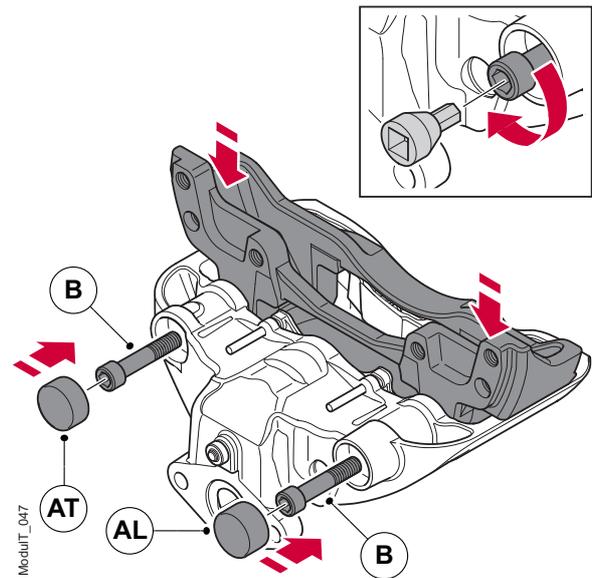


Figure 64. Refit the carrier and its fixing bolts

IMPORTANT!

The protective cups are different sizes and when fitted must be seated correctly. The leading cup is smaller than the trailing cup. The leading cup must bottom out against the bearing and the trailing cup must bottom out against the calliper shoulder

12. Carefully and squarely tap the protective cups (AT and AL) in place into the calliper using a soft headed mallet.

Note that the cups are different sizes, the larger cup is fitted to the trailing side (AT) and the smaller to the leading side (AL).

The leading protective cup (AL) seats raised from the casting surface whilst the trailing protective cup (AT) sits nearly flush.

13. Do not strike the cups hard or at an angle as this may damage them and therefore compromise the sliding function of the brake.

14. Ensure the protective cups are correctly seated and bottomed out, see figure 65.

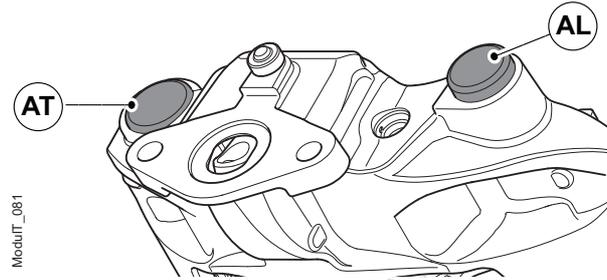


Figure 65. Correctly seating the protection cups

4.7.5 Final procedure

To conclude this procedure read and follow chapters:

1. "4.9.3 Install disc brake"
2. "4.2.3 Install brake pads"
3. "4.5.3 Install brake chamber"
4. "3.4 Function test" to ensure that the disc brake is working correctly
5. "3.5 Final procedure"

4.8 Replacement of reset shaft complete

4.8.1 Initial procedure

Read and follow chapter "3.2 Initial procedure" prior to removing the reset shaft complete.

IMPORTANT!

Only use Haldex special tools where specified! See section "6 Tools"!

4.8.2 Remove reset shaft complete

1. If necessary remove dirt, dust and other possible debris from around the reset shaft area. Ensure the area is clean prior to removing the reset shaft protection plug. (With PWS/PWIS the area around the sensor needs to be clean.)
2. Remove the reset shaft protection plug (A). (With PWI/PWIS you need to remove the sensor. Remove the screw and pull the sensor straight out without changing the setting of the sensor, follow chapter "4.4.2.3 Remove PWS/PWIS".)
3. Insert Haldex special tool P/N 95210 and pull out the reset shaft (B) with x-ring complete, see figure 66.

The x-ring is always fitted to the reset shaft and never removed.

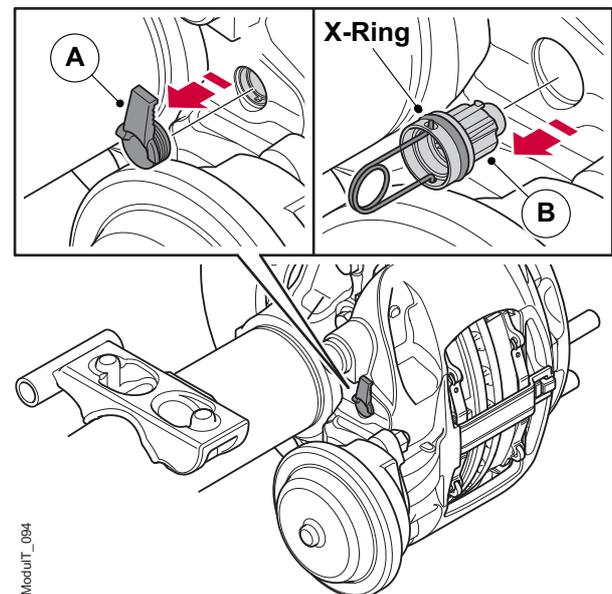


Figure 66. Removing the reset shaft

4.8.3 Install reset shaft complete

1. Clean the reset shaft location surfaces in the calliper housing. Ensure the areas are free from dirt, dust, debris, moisture and corrosion.
2. Insert Haldex special tool P/N 95232 (Torx 55) "6 Tools" into the new reset shaft and by hand insert it into the calliper. Whilst doing so make sure the x-ring is correctly in place.

The reset shaft complete with x-ring already fitted is supplied ready lubricated, no additional grease or other lubrication is required.

3. Push the reset shaft into position by hand, no impact or high forces are required as they may damage the reset shaft.

The reset shaft will click into its position in the center of the gear wheel when fully engaged. See figure 67.

4. (With PWS/PWIS install the Sensor in the same position as you took it out so that the setting will be the same as before taking the sensor out, follow chapter "4.4.2.5 Install PWS/PWIS.)

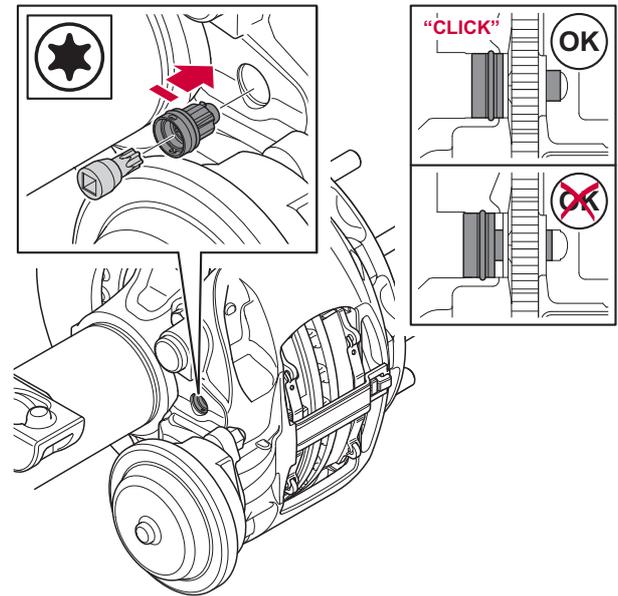


Figure 67. Installing the reset shaft

4.8.4 Final procedure

To conclude this procedure read and follow chapters:

1. "3.4 Function test" to ensure that the disc brake is working correctly
2. "3.5 Final procedure"

4.9 Replacement of disc brake

4.9.1 Initial procedure

Read and follow the chapters below prior to removing the disc brake.

1. "3.2 Initial procedure"
2. "4.2.2 Remove brake pads", instruction 1 through to 5 only
3. "4.5.2 Remove brake chamber"

4.9.2 Remove disc brake

IMPORTANT!

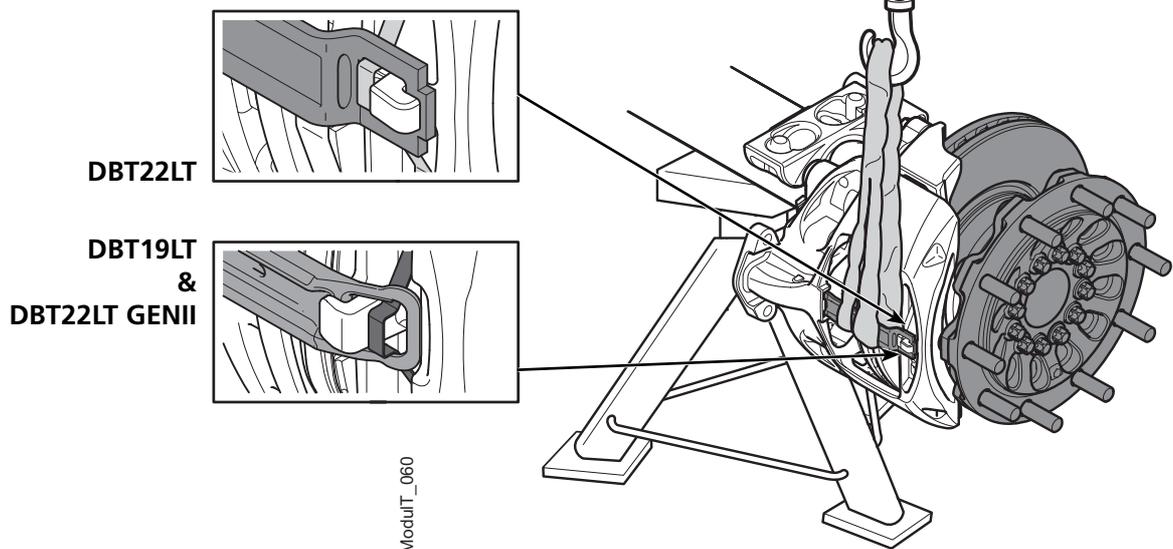
Do not remove the disc brakes retaining bolts until the brakes weight is supported by the lifting straps!

1. Refit the old pad retainer by first locating the housing end in the calliper aperture, then locating the pad retainer slot over the calliper latch, finally slide the pad retainer under the calliper latch until the pad retainer spring pops into locking position. See figure 68.



Check that the spring bracket is correctly engaged!

2. Attach a lifting strap around the pad retainer. Tension the lifting strap so taking the full weight of the brake.



3. Remove the retaining bolts holding the disc brake and lift away from the axle.

Figure 68. Disc brake removal

4.9.3 Install disc brake

1. Clean the mating faces of the new disc brakes carrier and axle. Ensure the faces are free from dirt, debris, moisture and corrosion.
2. Fit the old pad retainer spring, then refit the old pad retainer by first locating the housing end in the calliper aperture, then locating the pad retainer slot over the calliper latch, finally slide the pad retainer under the calliper latch until the pad retainer spring pops into locking position.



Check that the spring bracket is correctly engaged!

3. Attach a lifting strap around the pad retainer and then lift the brake into position.
4. Follow the vehicle/axle manufacturer's recommendations for fitting/tightening the retaining bolts, or follow the general method described hereafter.
5. Fit and screw home the retaining bolts, alternating from side to side of the carrier.
6. Tighten all retaining bolts to the torque settings defined by the vehicle/axle manufacturers specifications.
7. Remove the lifting strap, old pad retainer and pad retainer spring. Scrap the old pad retainer and pad retainer spring as they are not to be used again.

4.9.4 Final procedure

To conclude this procedure read and follow chapters:

1. "4.2.3 Install brake pads"
2. "4.5.3 Install brake chamber"
3. "3.4 Function test" to ensure that the disc brake is working correctly
4. "3.5 Final procedure"

5 Specifications

The Haldex ModulT air disc brake come both left and right handed, it is important the correct hand is fitted in relation to the normal wheel/disc rotation.

Figure 69 below shows a general overview of both variants and their relation to the normal wheel/disc rotation, shown as a red arrow, and their leading (AL) and trailing (AT) slide functions.

Each calliper also has a rotation arrow formed on the cast surface where the pad retainer seats on the inboard side, see figure 69.

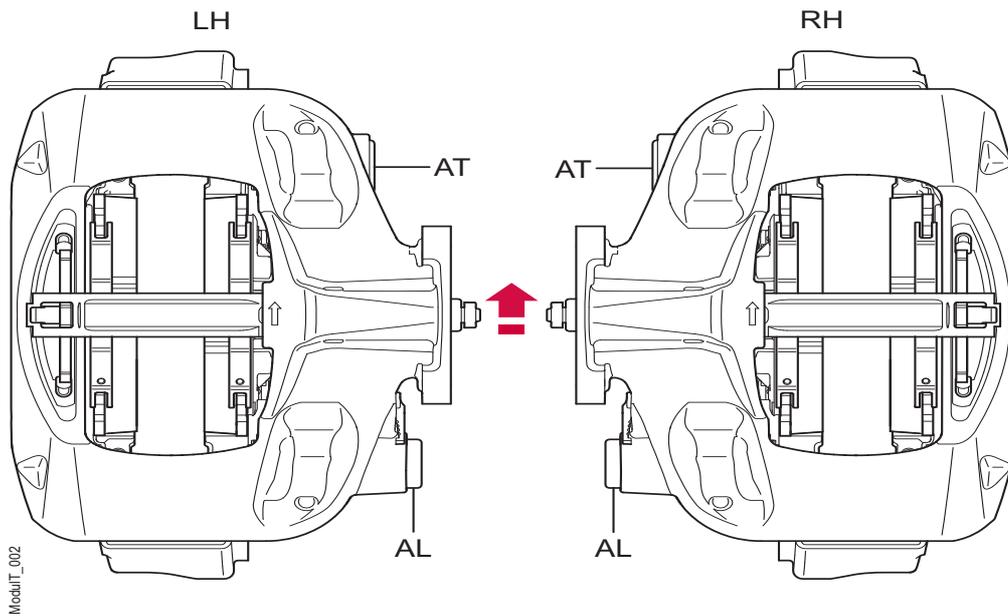


Figure 69. Haldex ModulT orientation

5.1 Wear Limits

- Brake pads, min. lining thickness 2 mm
- Brake pad, max. uneven wear ±1.5 mm
- Brake disc, min. thickness 37 mm *

* Note. always refer to vehicle/axle manufacturers recommendations.

5.2 Tightening Torques

5.2.1 General

Follow the vehicle/axle manufacturers recommendations.

5.2.2 Haldex ModulT ADB

- Bolts x2 for slide pins 180 Nm + 70°
- Brake chamber fixation nuts 180 ±20 Nm
- PWS/PWIS screw 24 Nm

6 Tools

6.1 Haldex ModulT tool kit complete

Part number (P/N) 95231

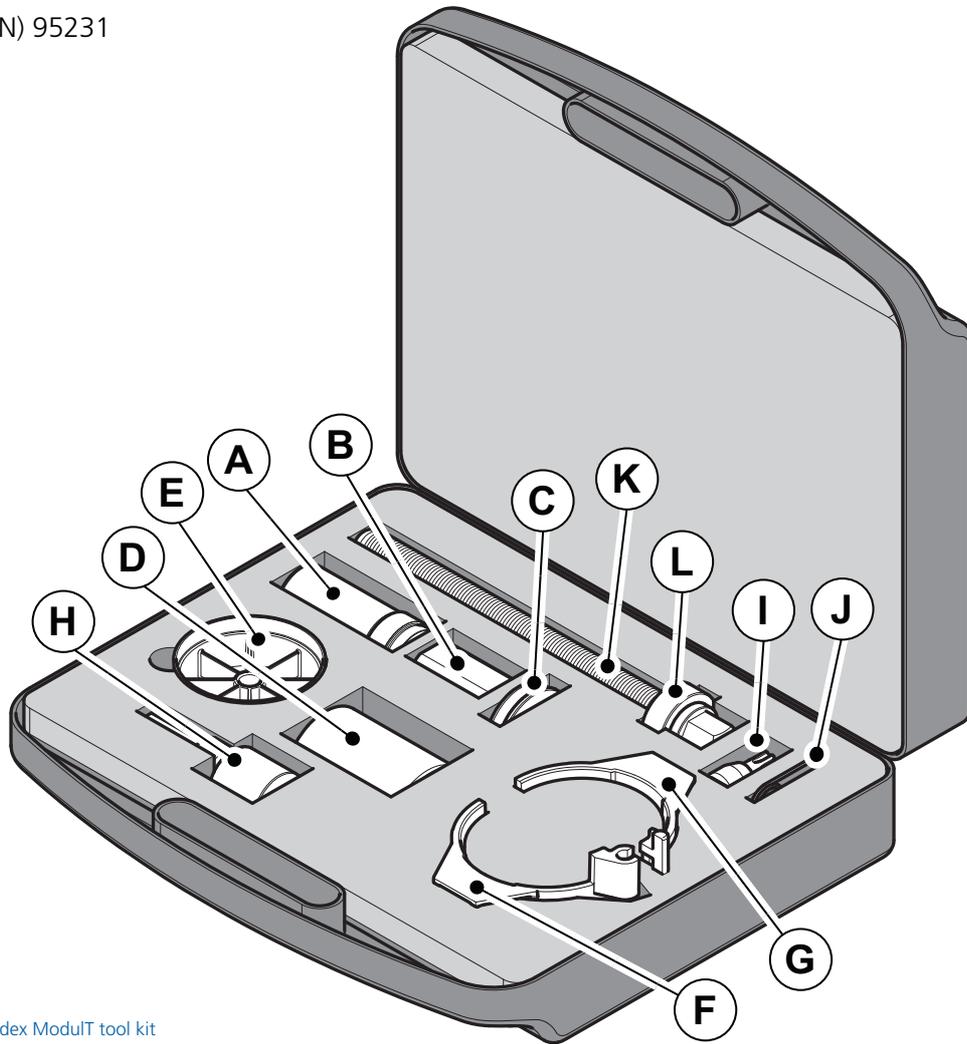


Figure 70. Haldex ModulT tool kit

6.2 Special tools for Haldex ModulT

Contents of tool kit Haldex P/N 95231.

A	P/N 95219	Mandrel for the removal and assembly of slide function bearings and composite bushing
B	P/N 96820	Nut for the removal and assembly of slide function bearings and composite bushing
C	P/N 95221	Clamp washer for the assembly of slide function bearings and composite bushing
D	P/N 95222	Cup for the removal of slide function bearings and composite bushing
E	P/N 95224	Mounting tool for adjustment spindle bellows onto the thrust plate
F	P/N 95225	Mounting tool for adjustment spindle bellows into the calliper – left
G	P/N 95226	Mounting tool for adjustment spindle bellows into the calliper – right
H	P/N 95233	3/4" drive long reach 14 mm hexagon for slide pin bolts
I	P/N 97240	3/8" drive Torx T55 for the Reset Shaft
J	P/N 95210	Special tool for removing reset shaft complete
K	P/N 96819	Threaded spindle used with pull-out/pull-in tool pieces
L	P/N 95423	Axial bearing used with the threaded bar

7 Fault finding

Take all necessary safety precautions before wheel removal!
Read the safety precautions carefully.
The vehicle manufacturer's instructions shall also be followed!

Symptoms **Actions**

See the relevant chapters for remedial measures

No or low brake force

Are the pads worn out?	Replace the pads.
Is the difference between inner/outer pad wear >5 mm?	<p>This is not necessarily a fault and will not normally have any negative effect on the ADB function. But if the difference is >5 mm you need to be aware why to ensure continued correct running and service operations. What you need to consider and check is:</p> <p>ADB installation</p> <p>Sliding functions: check that nothing is blocking the callipers full movement (strapped hoses).</p> <p>On steering axle, check that nothing is forcing the calliper to brake in steering end positions.</p> <p>Mechanical wear</p> <p>A Pad used in wet, dirty and/or salty environment will wear faster than pads running in dry clean conditions. Differential pad wear can occur even on the same wheel end where the wheel rim shields the outer pad, so the inner wears faster. Do you use dirt shields on your vehicle? If not, this could be one reason of this pad wear difference.</p> <p>Driving input</p> <p>If the driver brakes aggressively then as a result it could run higher than average running temperatures and cause differential pad wear.</p> <p>Driving conditions</p> <p>Driving with frequent stops and high running temperatures will inevitably cause higher than average pad wear and in some cases differential pad wear.</p> <p>If it is not possible to find the reason for differential pad wear >5 mm then perform chapters 3.3.3 Inspections & 3.4 Function test to ensure correct ADB operation and function.</p>
Is pad/disc clearance OK?	Conduct initial setting + function checks.
Is the brake disc OK?	Replace the brake disc (See vehicle manufacturer's instructions.)

No or low brake force

Is air pressure in the brake chamber OK? (Measure with a pressure gauge at the brake chamber)	Implement remedial measures according to vehicle manufacturer's instructions.
Has the drain plug been removed from the brake chamber housing?	Remove the drain plug located at the lowest point of the brake chamber.
Does the mechanism and calliper move freely?	Conduct initial settings and function check.

The brakes pull to one side

Are the pads worn on one side?	Replace the pads.
Is pad/disc clearance OK?	Conduct initial setting + function checks.
Can the pads move freely in the carrier?	Remove the brake pads, clean the pads, carrier and calliper.
Is there the same pressure in both brake chambers of the axle during braking? (Measure with pressure gauge at the brake chambers.)	See the vehicle manufacturer's instructions for more information.
Has one of the drain plugs been removed from the brake chamber housing?	Remove the drain plug located at the lowest point.

Brakes are binding/not releasing/have heat-damaged components /brake pads wear out quickly.

Does brake pressure remain in the brake chamber when the brakes are released?	See the vehicle manufacturer's instructions for information.
Are all of the spring brake chambers released when the parking brake is off?	See the vehicle manufacturer's instructions for information.
Is pad/disc clearance OK?	Conduct initial setting + function checks.
Can the pads move freely in the carrier?	Remove the brake pads, clean the pads, carrier and calliper.
Is the calliper slide function OK?	Conduct check slide function.
Is the wheel bearing clearance OK?	See the vehicle manufacturer's instructions for information.
Has one of the drain plugs been removed from the brake chamber housing?	Remove the drain plug located at the lowest point.
Has valve adjustment/brake force distribution been carried out correctly?	Adjust brake valves/carry out brake force adaptation. Refer also to vehicle manufacturer's instructions.
Uneven pad wear or pads wearing out too quickly?	Work through the inspections chapter to ensure the brake is functioning correctly and thus identify any operational problems requiring rectification.
	Also check that genuine Haldex brake pads are being used, only use Haldex original spare parts!
	Check that the correct brake pad friction material is being used for the specific application.
	Check the brake harmonisation between the truck and trailer is correctly setup.

Noise/ vibrations from the brake

Can the pads move freely in the carrier?	Remove the brake pads, clean the pads, carrier and calliper, then refit.
Are there non-permitted cracks/grooves on the brake disc?	Probably need to change the brake disc. See the vehicle manufacturer's instructions for more information.
Is the brake disc's run-out within specified parameters?	If not then probably need to change the brake disc. See the vehicle manufacturer's instructions for more information.
Is the disc brake and its components fixed to the axle as specified?	See the vehicle manufacturer's instructions for more information.

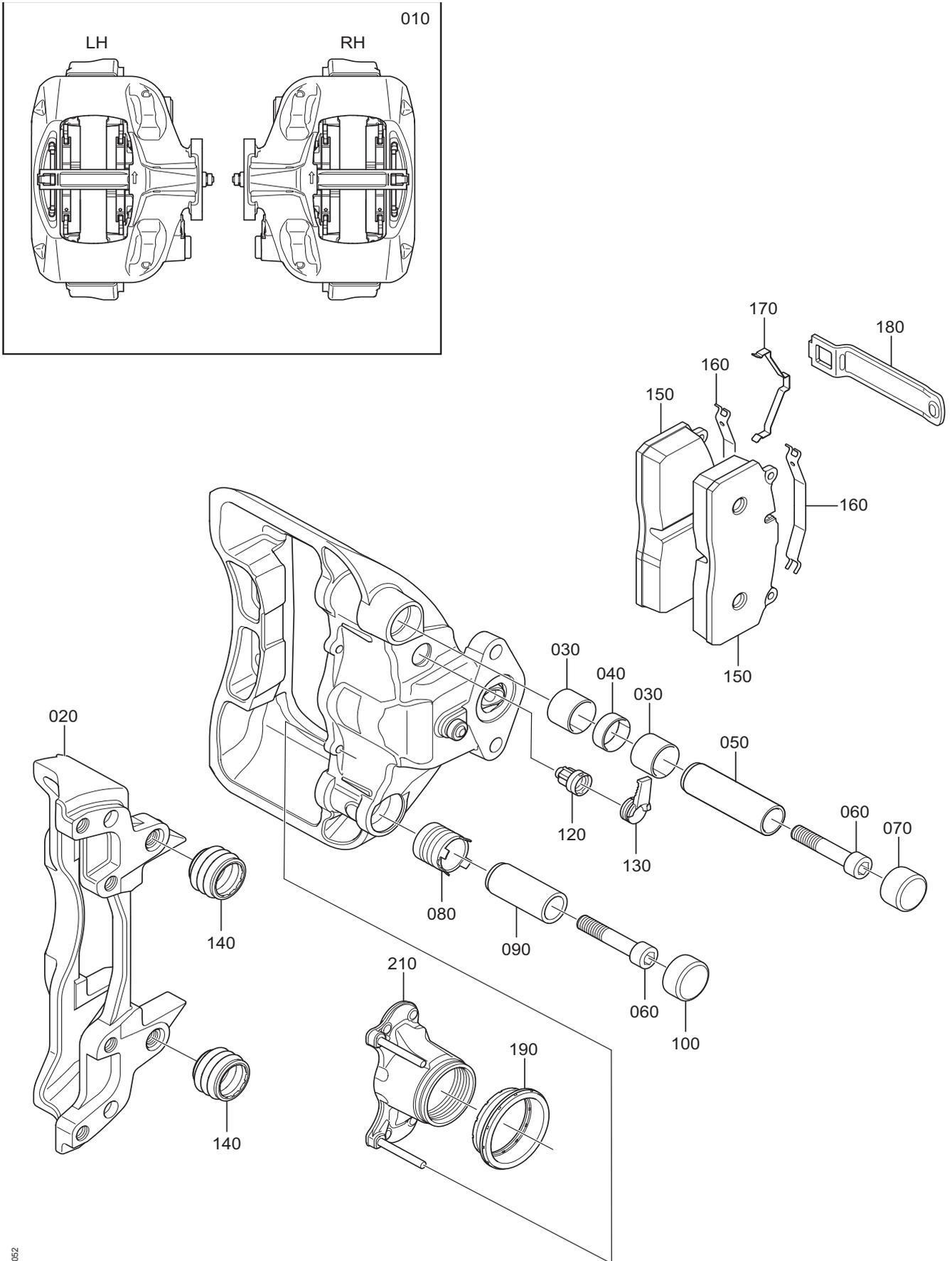
8 Component list and exploded view

8.1 Component list

Haldex ModulT air disc brake

010	Air disc brake assemblies complete – left hand & right hand
020	Carrier
030	Bearings – leading slide function
040	Spacer
050	Leading slide pin
060	Slide pin bolt
070	Leading protective cup
080	Composite bushing – trailing slide function
090	Trailing slide pin
100	Trailing protective cup
120	Reset shaft complete
130	Reset shaft protection plug
140	Bellows – slide function
150	Brake pads
160	Pad springs
170	Spring bracket
180	Pad retainer
190	Adjustment spindle bellow
210	Thrust plate

8.2 Exploded view



ModulT_052

Haldex develops and provides reliable and innovative solutions focused on brake and air suspension products to the global commercial vehicle industry. In 2019, the company had net sales of approximately SEK 5.1 billion and employed 2,172 people.



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Innovative Vehicle Solutions

Australia

Haldex Brake Products Pty Ltd
Victoria
Tel.: +61 3 9579 7070
Fax: +61 418 170 879

Austria

Haldex Wien Ges.m.b.H.
E-Mail: info.at@haldex.com

Belgium

Haldex N.V.
E-Mail: info.be@haldex.com

Brazil

Haldex do Brasil Ind. E Com. Ltda
São José dos Campos
Tel.: +55 12 3935 4000
E-Mail: info.brasil@haldex.com

Canada

Haldex Ltd
Cambridge, Ontario
Tel.: +1 519 621 6722
Fax: +1 519 621 3924

China

Haldex Vehicle Products Co. Ltd.
Suzhou
Tel.: +86 512 8885 5301
Fax: +86 512 8765 6066
E-Mail: info.cn@haldex.com

France

Haldex Europe SAS
Weyersheim
Tel.: +33 3 88 68 22 00
Fax: +33 3 88 68 22 09
E-Mail: info.eur@haldex.com

Germany

Haldex GmbH
Heidelberg
Tel.: +49 6 221 7030
Fax: +49 6 221 703400
E-Mail: info.de@haldex.com

Hungary

Haldex Hungary Kft
Szentlőrincváta
Tel.: +36 29 631 400
Fax: +36 29 631 401
E-Mail: info.hu.eu@haldex.com

India

Haldex India Private limited
Nashik
Tel.: +91 253 66 99 501
Fax: +91 253 23 80 729

Italy

Haldex Italia Srl.
Lissone
Tel.: +39 039 47 17 02
Fax: +39 039 27 54 309
E-Mail: info.it@haldex.com

Korea

Haldex Korea Ltd.
Seoul
Tel.: +82 2 2636 7545
Fax: +82 2 2636 7548

Mexico

Haldex de Mexico S.A. De C.V.
Monterrey
Tel.: +52 81 8156 9500

Poland

Haldex Sp. z.o.o.
Praszka
Tel.: +48 34 350 11 00
Fax: +48 34 350 11 11
E-Mail: info.pl@haldex.com

Russia

OOO "Haldex RUS"
Moscow
Tel.: +7 495 747 59 56
Fax: +7 495 252 77 56
E-Mail: info.ru@haldex.com

Spain

Haldex España S.A.
Granollers
Tel.: +34 93 84 07 239
Fax: +34 93 84 91 218
E-Mail: info.es@haldex.com

Sweden

Haldex Brake Products AB
Landskrona
Tel.: +46 418 47 60 00
Fax: +46 418 47 60 01
E-Mail: info.se@haldex.com

United Kingdom

Haldex Ltd.
Newton Aycliffe
Tel.: +44 1325 310 110
E-Mail: info.gb@haldex.com

Haldex Brake Products Ltd.
MIRA Technology Park
Tel.: +44 2476 400 300
E-Mail: info.gb@haldex.com

USA

Haldex Brake Products Corp.
Kansas City
Tel.: +1 816 891 2470
Fax: +1 816 891 9447
E-Mail: info.us@haldex.com



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