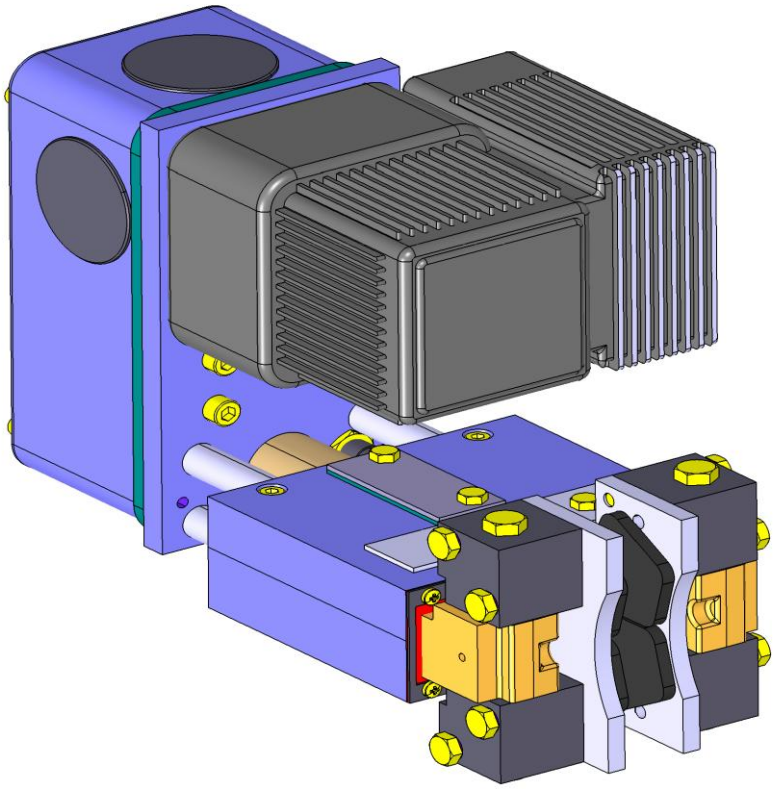

Installation and Maintenance Manual

CB8-E

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Contents

1 General Instructions

☞ PLEASE NOTE
The present manual is only valid in connection with SIBRE document General Notes B 06 20 176 E.

The present manual is an integral part of the brake as supplied.
It should always be kept near the brake.
Only precise knowledge of the manual can ensure trouble-free operation of the brake. It is therefore in the interests of the customer that the manual is read, understood and complied with in all respects by the personnel responsible for transport, assembly and operation.

☞ PLEASE NOTE
We shall not be liable for any damage or any operating faults resulting from non-compliance with the manual.

The brake described here corresponds to the state of the art at the date on which this manual went to print. In the interests of design progress, we reserve the right to make modifications deemed beneficial to increased efficiency and safety while preserving the main features.

2 Safety Directions

2.1 Safety Directions

- The brake has been built to the state of the art and is supplied safe for operation. Unauthorized modifications impairing operational safety are not permitted. This also applies to safety guards fitted to prevent contact with moving parts.

- The brake may only be used and operated within the limits of the conditions stipulated in the scope of services and supply.

- The customer must ensure that the personnel engaged in assembly, operation, care and maintenance have read and understood the operating instructions and are complying with them in every respect, in order to:
  - prevent risks to life and limb of the user and of third parties
  - to ensure operating safety of the brake and to rule out any loss of use and damage to the environment as a result of incorrect handling.

- During transport, assembly, dismantling, operation, care and maintenance, the relevant regulations for working safety and for environmental protection must be complied with.

- The brake may only be operated, maintained and repaired by authorized, trained and instructed personnel.

- All work must be performed with care and with a focus on the safety aspect.

- Work on the brake may only be performed while it is stationary. The drive unit must be secured against inadvertent switch-on (e.g. by locking of the key switch or by removing the fuses in the power supply). At the switch-on point, a warning sign must be put up indicating that work is in progress on the brake.
- The drive unit must be stopped immediately if changes are detected in the brake during operation, for example changes in operating noise.
- The brake must be safeguarded against inadvertent contact by appropriate safety guards.
- Before installation of the brake inside equipment or facilities, the manufacturers of the latter are under an obligation to incorporate the regulations, directions and descriptions contained in these operating instructions into their own operating instructions.
- Any work carried out on the brake, which is not mentioned in this manual, should be regarded as repair. In such cases, please contact your local SIBRE supplier.

2.2 Symbols used in the operating instructions

The important instructions contained in the operating instructions and relating to both safety and protection are highlighted as follows:

 **WARNING**
This symbol indicates safety measures that must be followed without fail to prevent injuries.

 **CAUTION**
This symbol indicates safety measures that must be followed without fail to prevent damages.

 **PLEASE NOTE**
This instruction refers to general operating directions which must be particularly noted.

3 Technical Data

3.1 Description

The CB8-E (see figure 1 and figure 2) is designed to transfer a braking torque to a brake disc in order to stop the rotation of the brake disc or to prevent the brake disc from rotating when stopped (parking brake). Any other use of the brake should be avoided.

CB8-E brakes are suitable for horizontal and vertical brake discs under any angular displacement.

The CB8-E is designed as a caliper brake which is activated / closed by the force of an integrated helical compression spring. The clamping force and so the brake torque can be adjusted by adjusting this spring force. An electro-hydraulic thrustor is used to open the brake.

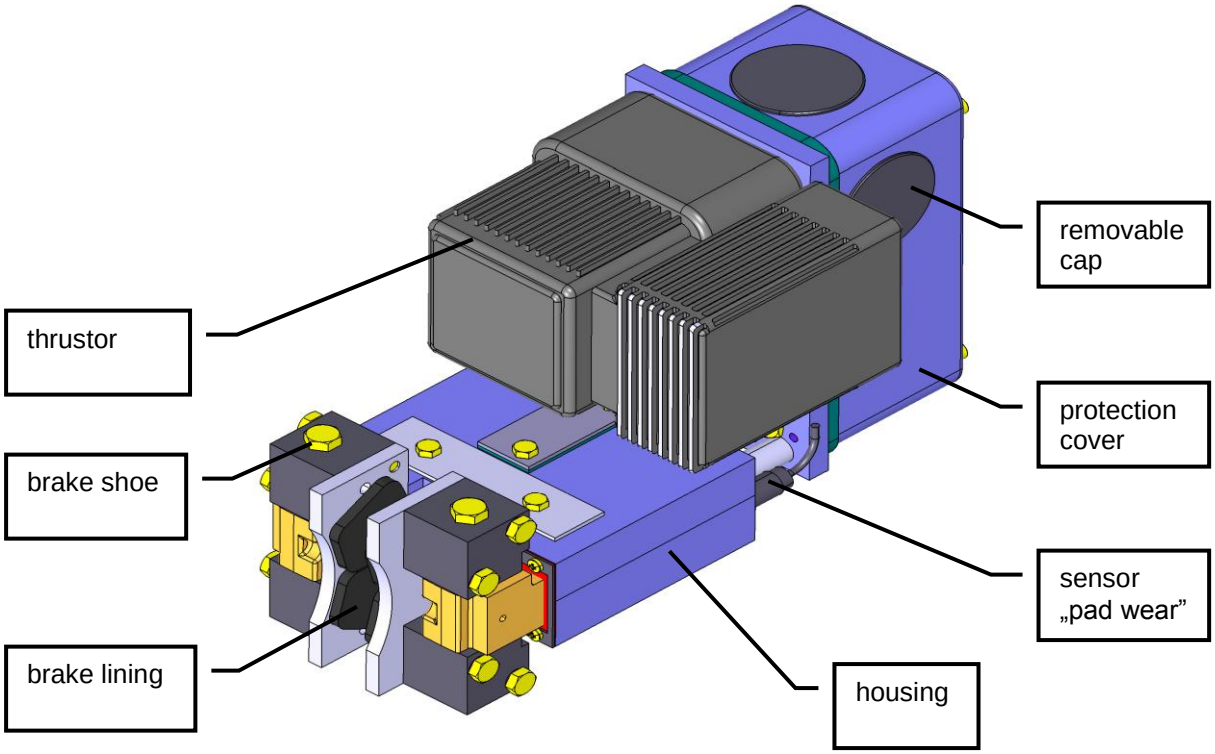


Fig. 1: CB8-E

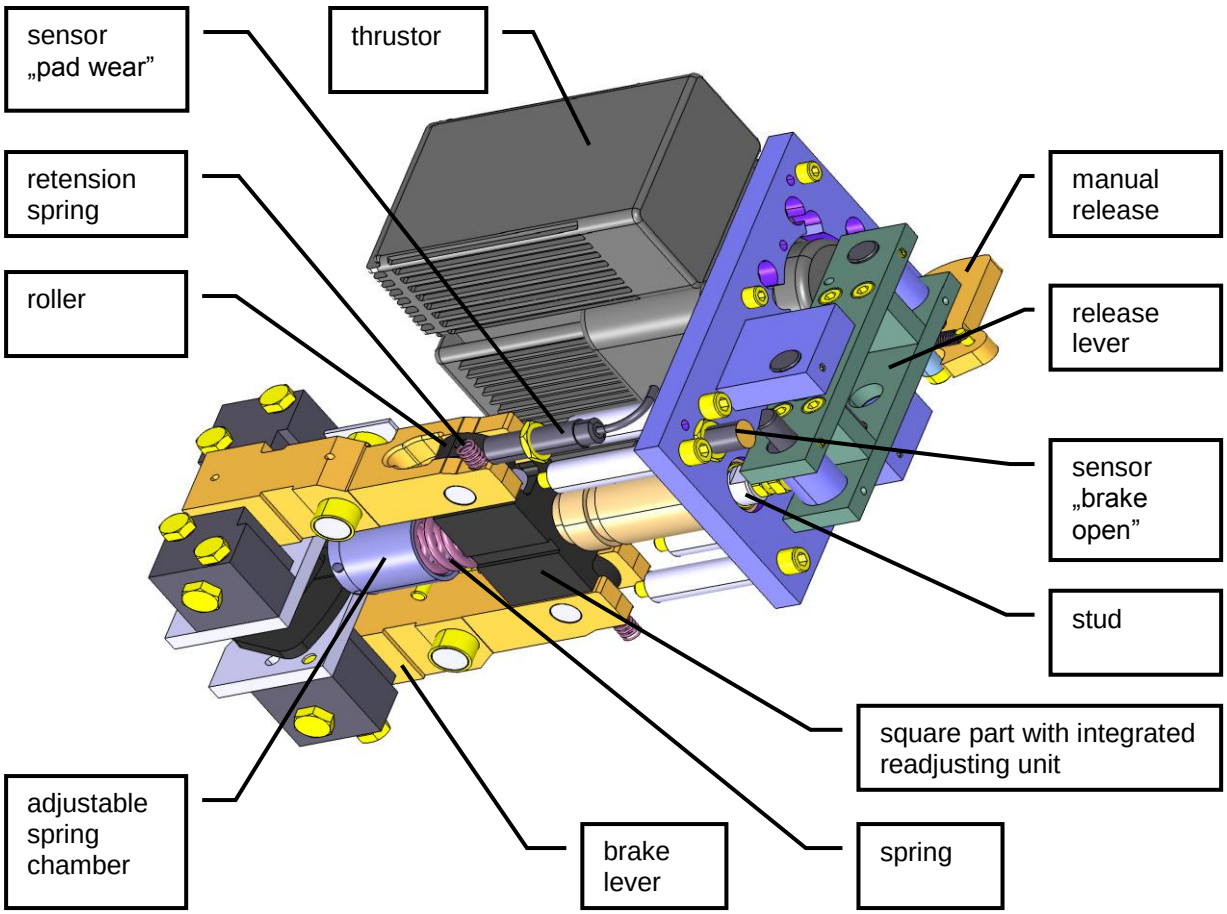


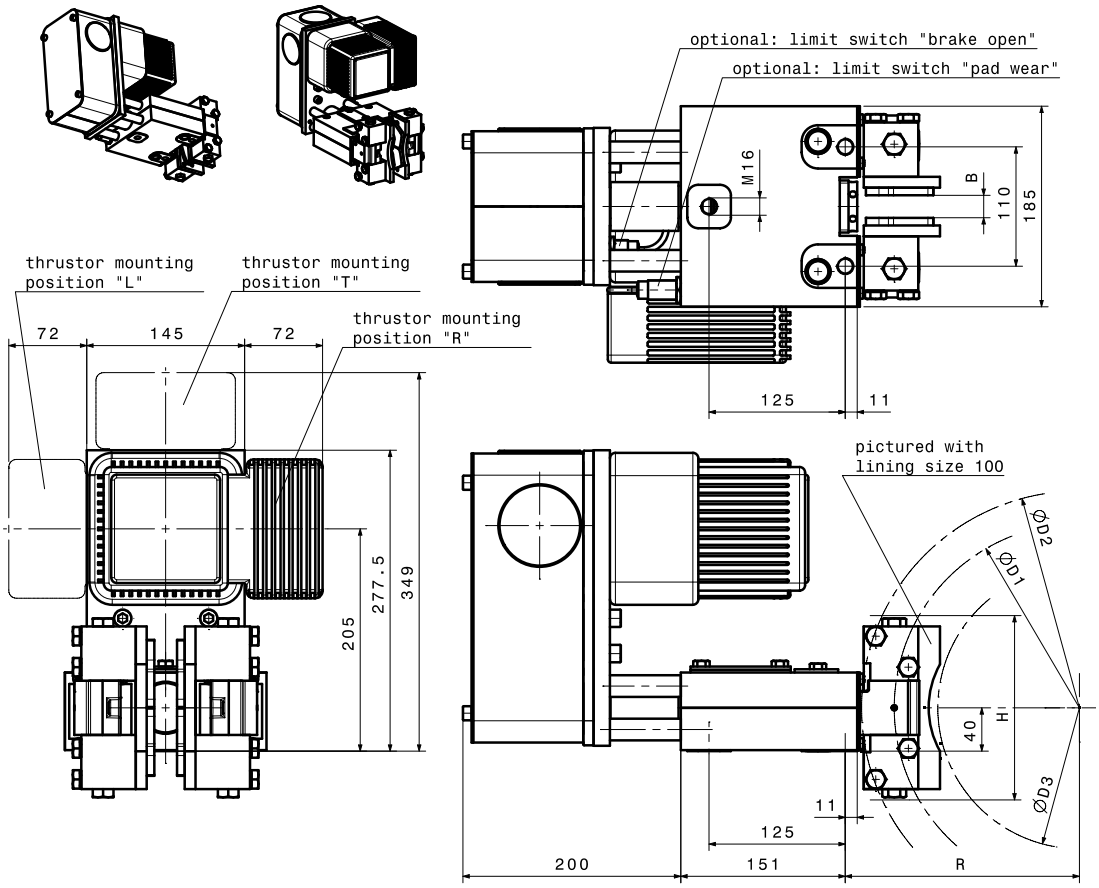
Fig. 2: CB8-E

The main components of the brake calliper are as follows:

Housing:	The brake is mounted with three bolts M16 on a base frame or sub-construction.
Brake lever:	Hinged with the brake shoes, they surround the brake disc and apply the braking force. When releasing the brake, the embedded restoring springs lift the brake shoes from the disc.
Thrustor:	The thrustor is used to open the brake and is acting against the spring force. The energy required for release is generated electro-hydraulically. The release force is transmitted to the square part by the release lever and the stud.
Readjusting unit:	The readjusting unit is used for compensation of lining wear, however its compensating capacity per braking cycle is limited. Therefore an additional manual wear compensation carried out by maintenance personnel is required according to the specific application.
Spring:	The helical compression spring generates the brake force and pushes the square part back. The rollers transmit the brake force with low friction to the brake levers.

Spring chamber:	Allows the continuous adjustment of spring torque, by adjusting the preload of the spring.
Protection cover:	The protection cover avoids the fouling of the release mechanism and guarantees the operational reliability of the brake even under rough environmental conditions. Removable caps allow the fast access to the manual release and enable the maintenance personnel easily to control the reserve stroke.
Sensors:	Sensors can be used to check the lining wear and to check if the brake is open.

3.2 Dimensions



Options protective cover, manual release, limit switches „brake open“ & „pad wear“
thrustor mounting position selectable between “L”, “T” or “R”

B = disc thickness in mm, Standard = 20, optional: 12.7; 16; 25; 30
ØD2 = outer disc diameter in mm
linings: = organic, size 50 (suitable for circum. disc speed v_{max}= 35 m/sec)
= sinter, size 100 (available for disc diameter ØD2 ≥ 250)

	dimensions depending on selected lining size			
	ØD1	ØD3	R	H
CB8-M3-50 with lining size 50	ØD2 – 46	ØD2 – 110	ØD2 /2 + 19.5	120
CB8-M4-100 with lining size 100	ØD2 – 60	ØD2 – 140	ØD2 /2 + 15	170

	Braking torque in Nm (μ = 0,4) on disc-Ø D2, adjustable from / to				
	Ø 200	Ø 250	Ø 315	Ø 400	Ø 500
CB8-M3-50	80-300	110-400	140-530	180-700	n.a.
CB8-M4-100	n.a.	350-680	460-910	620-1220	800-1580

Fig. 3: Dimensions of CB8-E

4 Installation

4.1 Scope of supply

The scope of supply is set out in the shipping documents. Completeness must be verified upon receipt. Any damage incurred in transit and/or missing parts must be reported immediately in writing.

The CB8-E brake is supplied ready to install.

4.2 Transport

When leaving the factory the brake is always packed in such a way to guarantee maximum security during transport.

4.3 To be noted before installation

During installation comply with the safety directions in §2.
All work must be performed with care and with a focus on the safety aspect.

WARNING
Non-compliance with these directions can lead to malfunction of the brake.

WARNING
Safeguard the disc against inadvertent rotation!

4.4 Lifting and Handling

The CB8-E brake is to be handled with care. The weight of the brake is approx. 42 kg including thrustor.

CAUTION
Ensure use of suitable lifting gear.
To avoid damaging component parts or paintwork do not place chains or wire around the caliper when lifting.
In order not to damage any parts on the brake do not fit any hook, rope, chain or strap around indicators, linings, etc.

4.5 Cleaning the brake disc

PLEASE NOTE
Before installing the brake the disc must be washed clean with white spirit and thereafter with thinners or tricolour ethylene. Any residual oil or anti-corrosion reparation will reduce the friction coefficient markedly.

WARNING
Solvent cleaners can be flammable, poisonous and can cause burns. To avoid serious personal injury, read the manufacturer's instructions carefully before using a solvent cleaner and follow these instructions. Also wear eye protection, protective clothing and work in well-ventilated areas.

4.6 Cleaning the mounting surfaces

PLEASE NOTE
The mounting surface for the base plate should be cleaned in a similar way as the brake disc.

WARNING
Solvent cleaners can be flammable, poisonous and can cause burns. To avoid serious personal injury, follow the manufacturer's instructions and see §4.5.

4.7 Handling of brake linings

The brake linings are an essential part of the brake system. They should be handled carefully to avoid damages or soiling of the friction material.

CAUTION
Brake linings should be kept as clean as possible especially from any kind of grease and oil. Even a small amount of oil can reduce the friction coefficient and cause a malfunction of the brake.

Brake linings can be supplied with several lining materials in two different types, depending on the brake size and/or application. All brake linings supplied by SIBRE are asbestos free and free of lead.

In general two types of lining materials are available:

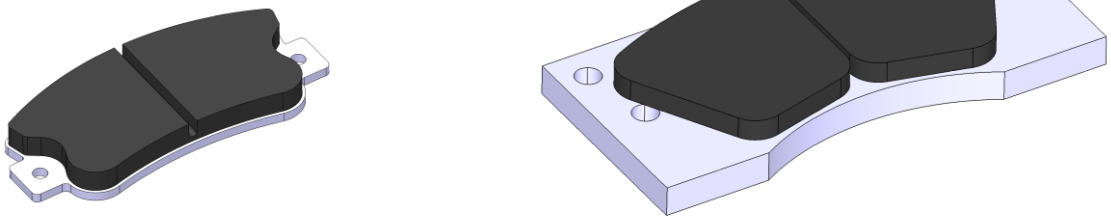
- Organic brake linings size 50 for CB8-E-50
- Sinter brake linings size 100 for CB8-E-100

CAUTION
Organic brake linings must be protected against grease and oil, which would significantly decrease the friction coefficient. Cleaning of organic lining material is not possible. If any grease or oil comes in contact with organic lining material, the lining must be discarded.

Sinter brake linings are less sensitive to dirt, grease and oil and can in some cases - where not fully soaked up with oil - be cleaned with solvent and re-used.

WARNING
Solvent cleaners can be flammable, poisonous and can cause burns. To avoid serious personal injury, follow the manufacturer's instructions and see §4.5.

The different types of linings can be seen in figure 4.



a) organic lining size 50 for CB8-E-50 b) sinter lining size 100 for CB8-E-100

Fig. 4: Different types of brake linings for CB8

4.8 Mounting of the brake – initial setup on site

Ex works the gap between the lining surfaces is adjusted to the disc thickness the customer has specified and fixed with a (wooden) distance piece.

The mounting of the brake should be done as follows.

1. Open the brake with the help of the manual release (see §4.9) and remove the distance piece.

2. Put the brake on the sub-construction and mount the three fastening bolts (figure 5). Tighten the bolts only by hand in order to enable the brake to centre itself when closing.

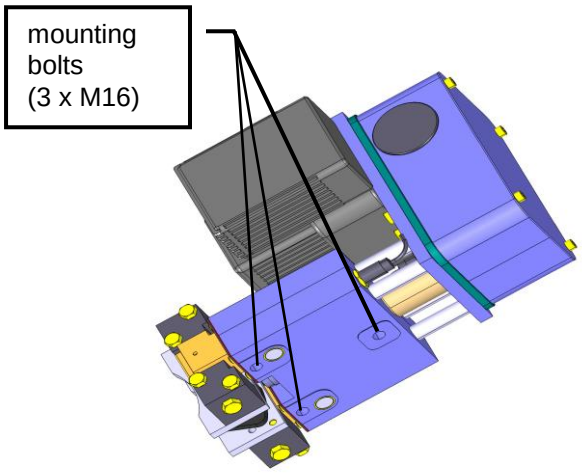


Fig. 5: Mounting of CB8-E

CAUTION
Choose bolt length so that bolts cannot jut inside the housing and block the square part (max. overhang 14 mm).

3. Close the brake with the manual release. The brake will align automatically when closed.

WARNING
The manual release is spring biassed to realize an auto-kickback functionality. The activated manual release will jump back in its initial position automatically by spring force, when the brake is released by solenoid the next time.

4. Tighten fastening bolts when brake is closed.

Position of bolt	Bolt size	Tightening torque (μ_G = 0.14)
Mounting bolts for housing	M16 - 8.8	200 Nm

Fig. 6: Tightening torque for mounting bolts

CAUTION
The force transmission between the housing and the mounting surface should take place by friction and not by the shear capacity of the mounting bolts. Therefore NO lubricant or other compound must be applied between housing and mounting surface. The needed friction is created by the clean, dry, lubricant free surface and by the accurate mounting of the bolts.

5. Connect the thrustor with the power supply.

CAUTION
Check the indications on the thrustor name plate before connecting it with the power supply.

6. **Adjustment of brake torque**: Check the installed brake torque. If necessary install the required brake torque following the instructions in §4.11.

7. **Adjustment of reserve stroke**: The adjustment of the reserve stroke (see §4.10) is carried out automatically by successive opening and closing the brake several times (approximately 40-50 cycles). Thus the readjusting unit sets the brake in working position.

8. Check by electronically opening of the brake, if the gap between brake linings and brake disc is the same on both sides. Otherwise adjust the position of the brake. The permissible misalignment for all brake axles is ± 0,1 mm

The brake is ready for operation now.

CAUTION
The brake linings and the disc must be free of oil and grease.

CAUTION
The full torque is only generated after bedding in of the linings. The contact pattern must be minimum 70% for operation.

4.9 Manual release

The disc brake CB8 is provided with an eccentric manual release in series.

The handling of the manual release is carried out as follows:

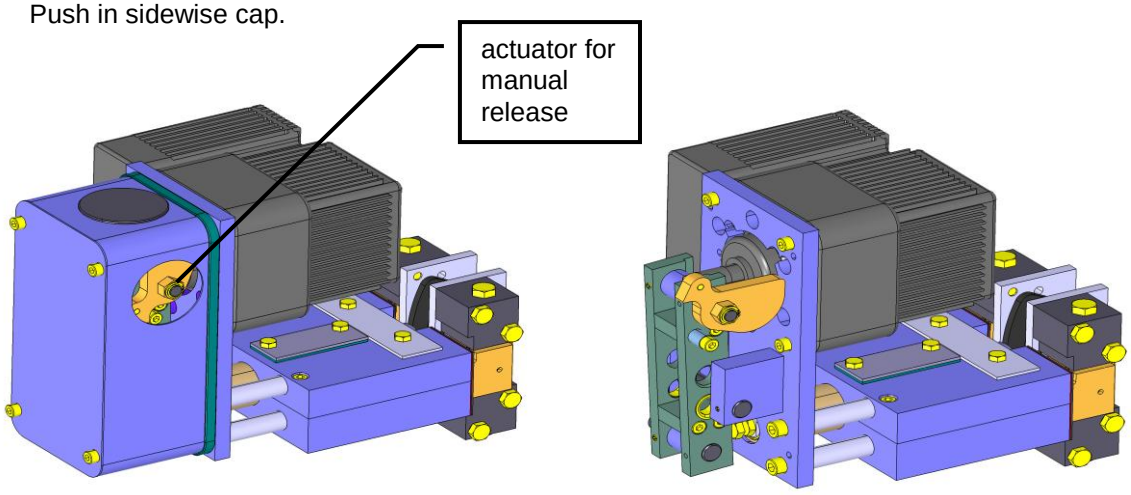
1. Remove the sidewise cap (figure 7a)

2. Rotate the eccentric shaft clockwise until the indexed position is reached (figure 7b). The brake is released now.

PLEASE NOTE
For the handling of the manual release a socket key wrench size 19 is recommended.

WARNING
The manual release is spring biassed to realize an auto-kickback functionality. The activated manual release will jump back in its initial position automatically by spring force, when the brake is released by solenoid the next time.

3. Push in sidewise cap.



a) Activating manual release

b) Activated manual release, view without protection cover

Fig. 7: Manual release

4.10 Adjustment of reserve stroke

The reserve stroke avoids, that the brake gets "on block" position and no more braking force is transmitted to the disc any more. Without counteraction the reserve stroke would decrease with increasing lining wear. Therefore the disc brake CB8-E is provided with an automatic readjusting unit by default.

As the compensating capacity per braking cycle is limited, a regular inspection of the reserve stroke of the closed brake is indispensable. Depending on the application a "manual" adjustment might be necessary.

CAUTION
An insufficient or not existing reserve stroke may lead to a failure of the brake.

To check the reserve stroke remove the cap at the top of the protection cover. Push in the piston rod of the thrustor manually against block. The reserve stroke can be measured between the roller of the release lever and the piston rod with a feeler gauge or by eye (see figure 8). It must be approx. 7 mm.

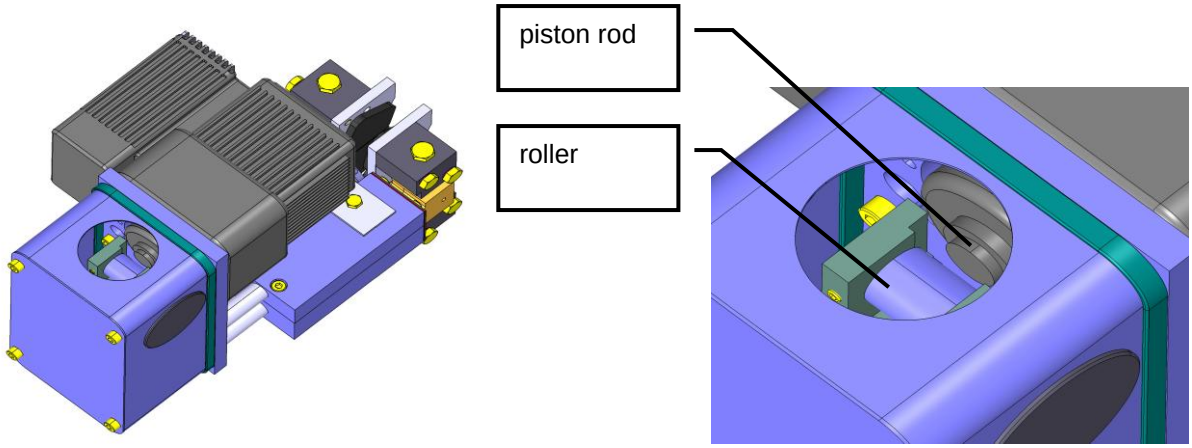


Fig. 8: Checking the reserve stroke indirectly at the thrustor piston rod

Alternatively the reserve stroke can be controlled directly by removing the cover and the sealing at the top of the brake housing. The distance between the square part and the housing can be measured through the control window with a feeler gauge or by eye. It must be approx. 3 mm (= 50% of control window, see figure 9).

PLEASE NOTE
If the reserve stroke falls below, a "manual" adjustment has to be made by opening and closing the brake against the stagnant disc until the required reserve stroke is reached again.

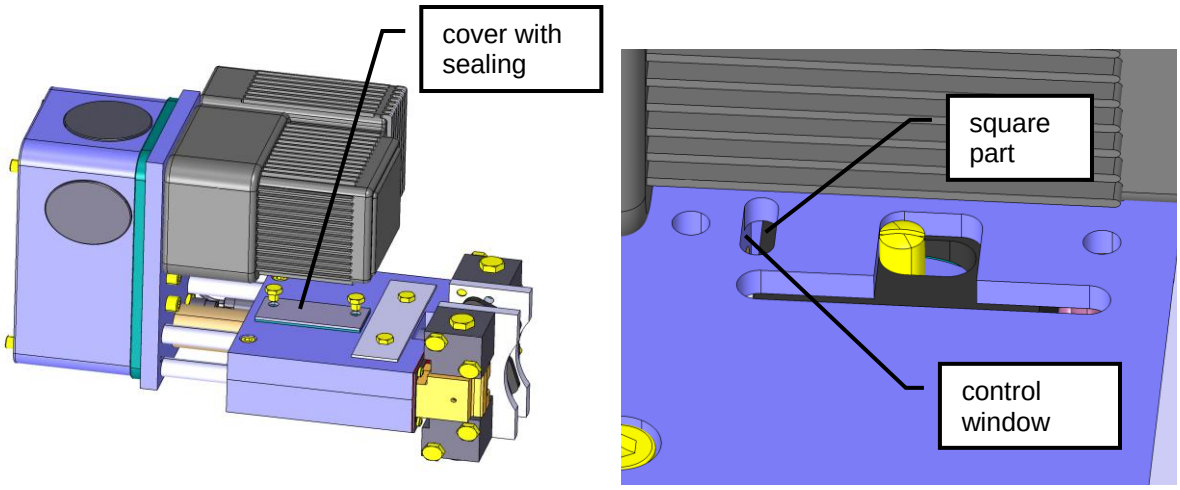


Fig. 9: Checking the reserve stroke directly at the square part

4.11 Adjustment of brake torque

The clamping force between the linings and the disc and so the brake torque is created by a helical compression spring.
The adjustment of the brake torque is done by increasing or decreasing the spring preload with the help of the adjustable spring chamber (see figure 10 and figure 11).

Ex works the clamping force is already adjusted to the brake torque the customer has specified in his order. If there is no specification the brake is adjusted to the minimum clamping force. In this case the brake torque has to be adjusted at site.

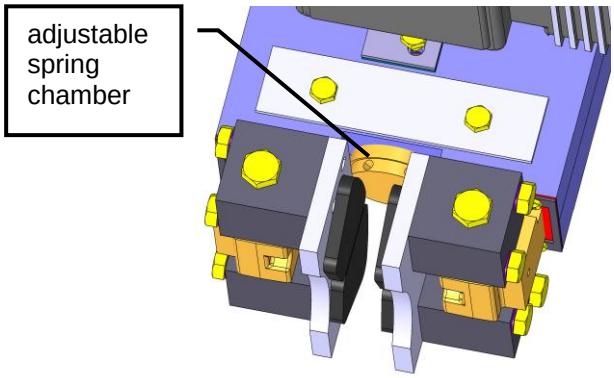


Fig. 10: Adjustment of brake torque

The adjustment of the brake torque is carried out as follows.

1. Calculate the braking torque M_{Br} respectively the clamping force F_C (see figure 3 for dimensions)

$$M_{Br} = F_C \cdot \mu \cdot D_1 \qquad F_C = \frac{M_{Br}}{\mu \cdot D_1} \qquad \mu = 0.4 \qquad D_1 = \begin{cases} D_2 - 46\ \text{mm} & \text{for CB8 - M3 - 50} \\ D_2 - 60\ \text{mm} & \text{for CB8 - M4 - 100} \end{cases}$$

2. Ascertain the required dimension x for the overhang of the adjustable spring chamber out of the housing acc. to figure 11.

3. Turn around the spring chamber (figure 10 and figure 11) with a hexagon key Ø5 mm till the ascertained overhang is reached.

PLEASE NOTE
Increasing the overhang will decrease the spring preload and so the clamping force / brake torque.
Decreasing the overhang will increase the spring preload and so the clamping force / brake torque.

4. Check and – if necessary – re-adjust the reserve stroke.

When the **clamping force** has been **increased** (overhang x has become smaller, figure 11) the reserve stroke might have become too small for a safe functionality of the brake.
In this case the re-adjustment of the reserve stroke can be done by successive opening and closing the brake several times (approximately 40-50 cycles). Thus the readjusting unit sets the brake in working position.

When the **clamping force** has been **decreased** (overhang x has become bigger, figure 11) the reserve stroke might have become too high. In this case proceed as described in §5.1 just without replacement of the brake linings.

CAUTION
Changing the spring preload and so the clamping force might influence the existing reserve stroke, too. Because of this a re-adjustment is absolutely necessary. An insufficient or not existing reserve stroke may lead to a failure of the brake.

The brake is ready for operation now.

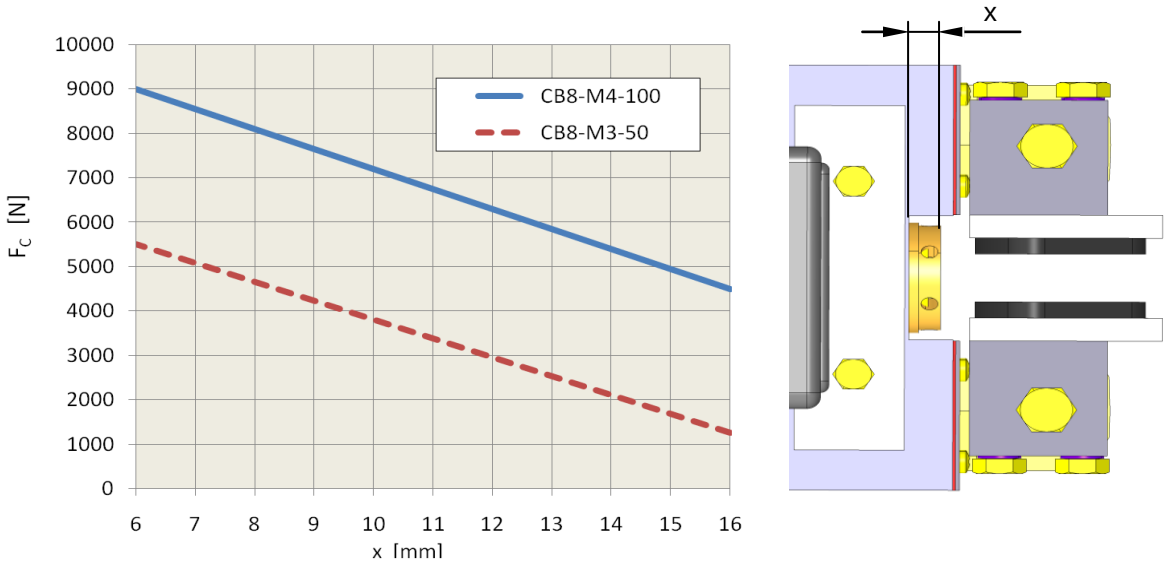


Fig. 11: Adjustment of brake torque

4.12 Limit switches

Optional the CB8 can be equipped with several kind of sensors.

“Pad wear”

An optional inductive limit switch (see figure 1 and figure 2) allows to detect lining wear. With increasing lining wear the rotating angle of the two brake levers increases, too, when the brake is closed. When the maximum allowed pad wear is reached, the brake lever will activate the limit switch and a signal is send out. The sensor is chosen as “normally closed”, so that in case of a damage like e. g. broken cable a signal is send out, too.

“Brake open”

An optional inductive limit switch (see figure 2) allows to control, if the brake is open. The sensor is activated directly by the release lever. The sensor type “normally open” ensures, that in case of an electronic or sensor defect there is no signal for “brake open”.

4.13 Removing the brake

1. Disconnect the thrustor from the power supply. Open the brake by using the manual release.

WARNING
The manual release is spring biassed to realize an auto-kickback functionality. The activated manual release will jump back in its initial position automatically by spring force, when the brake is released by solenoid the next time.

2. Unscrew the mounting bolts (3 x M16). The brake is now ready to be removed from the mounting place.

WARNING
The weight of the brake is approx 42 kg including solenoid. Ensure use of suitable lifting gear.

3. Deactivate the manual release by hand.

WARNING
The manual release is spring biassed to realize an auto-kickback functionality.

5 Maintenance

5.1 Replacing the brake linings

CAUTION
When the linings are worn, they must be replaced. Worn out linings can cause a failure of the brake.

The maximum allowed lining wear of 5 mm per side is reached, when the remaining thickness of the lining has reached a value of 2 mm for sinter linings or 7 mm for organic linings. The brake pad thickness can always be checked with a gauge. All brake linings for the CB8 consist of a steel back plate and the friction material. The linings have a total thickness of 17 mm, i.e. linings must be replaced when the thickness of friction material + back plate is minimum 12 mm.

The brake linings can be replaced without dismounting of the brake.

CAUTION
See §4.7 for proper handling of brake linings.

To replace the linings follow the below mentioned steps.

1. Ensure that the whole drive system is secured against unintentional movement.

WARNING
Prior to commencing any repair or other work, the owner must guarantee for a standstill of the whole drive system. Especially the drive motors must be locked against unintentional switching. Further we draw your attention to the specific rules for prevention of accidents of the plant.

WARNING
Never place your fingers between the brake linings and the brake disc.

2. Remove cover and sealing from topside of housing (figure 9).

3. Turn the threaded pin out of the free wheel ring (figure 12).

4. Open the brake with manual release (see §4.9).

5. Turn around the adjusting nut (figure 12) with a hexagon key Ø4 mm in direction of brake disc until block or until the distance between brake shoes and disc is wide enough to mount new linings.

6. Turn the threaded borehole inside the free wheel ring into the upper position by pumping the adjusting nut with the hexagon key Ø4 mm. Mount threaded pin (figure 12).

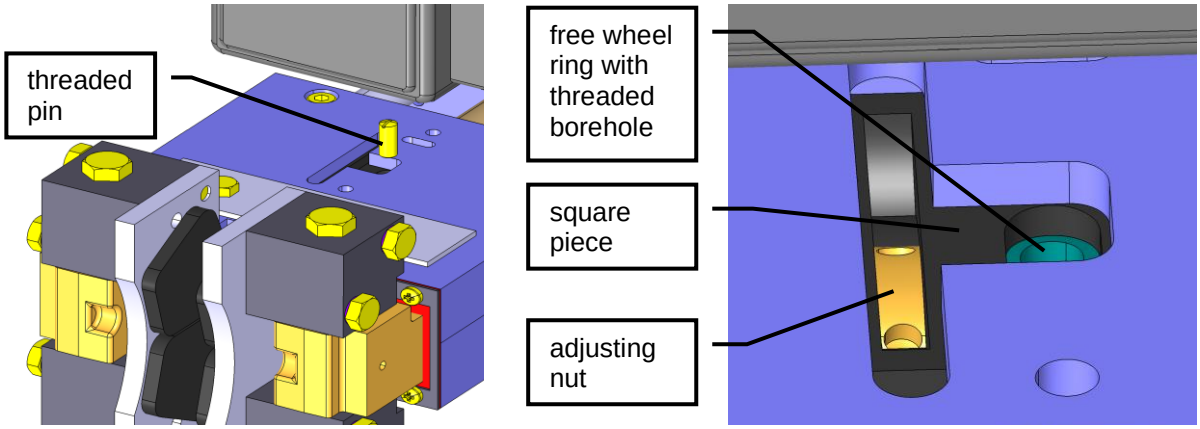


Fig. 12: Handling of the readjusting unit

7. Loosen the bolts for the brake linings on the brake shoes. The linings can be removed upwards, downwards or in front direction (figure 13).

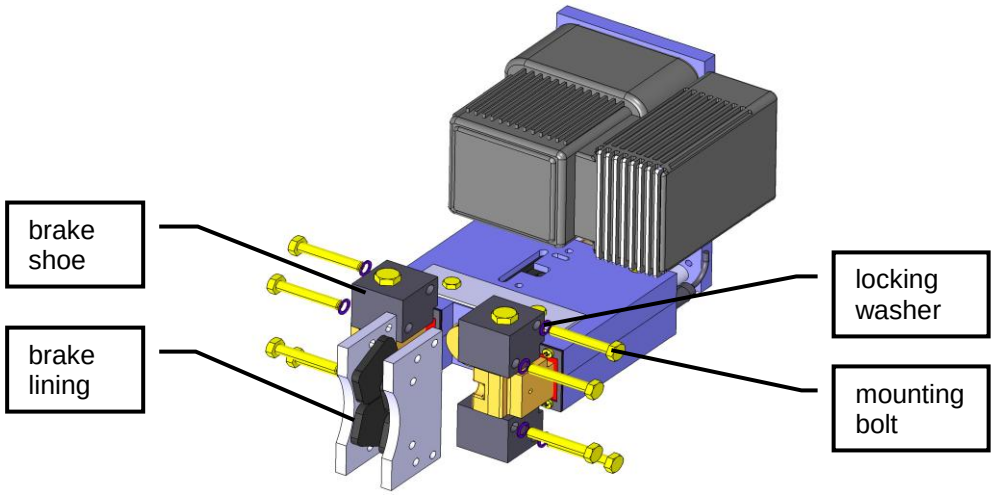


Fig. 13: Replacing the brake linings

8. Put new linings on the brake shoes and fix them with bolts and locking washers .

Position of bolt	Bolt size	Tightening torque (μ_G =0.14)
Mounting bolts for linings CB8-M3-50	DIN961-M8x1x55 - 8.8	25 Nm
Mounting bolts for linings CB8-M4-100	DIN 933 M10x60 - 8.8	50 Nm

Fig. 14: Tightening torque for mounting bolts

CAUTION
The force transmission between brake shoes and linings should take place by friction and not by the shear capacity of the mounting bolts. Therefore NO lubricant or other compound must be applied between brake shoe and lining carrier plate. The needed friction is created by the clean, dry, lubricant free surface and by the accurate mounting of the bolts.

9. Adjust reserve stroke by successive opening and closing of the brake several times (approximately 40- 50 cycles). Control reserve stroke.

CAUTION
An insufficient or not existing reserve stroke may lead to a failure of the brake.

10. Mount cover and sealing on topside of housing.

11. Bed in the new linings. The brake is ready for operation again.

CAUTION
The full torque is only generated after bedding in of the linings. The contact pattern must be minimum 70% for operation.

5.2 Replacing other components

Although some minor components might be replaced with the brake mounted on site, generally it is highly recommended to take the brake to a SIBRE workshop for repairs. For removing the brake follow the instructions given in §4.13.

5.3 Lubrication

Lubrication is not required for this type of brake. All bearings are equipped with self-lubricating bushings and so virtually free of maintenance.

5.4 Spare parts

Maintaining a supply of the most important spare and wear parts at the location is an important factor in assuring continuous readiness of the brake for use. For required spare parts see figures 15 and 16.

When ordering spare parts please advice:

- Complete brake ident-no.
  (e.g. CB8-E-100)
- Fabrication no. acc. to
  name plate
  (e.g. 131904)
- Quantity, position and
  description
  (e.g. 2 pcs. pos. 2,
  brake lining 10 0000 1816)

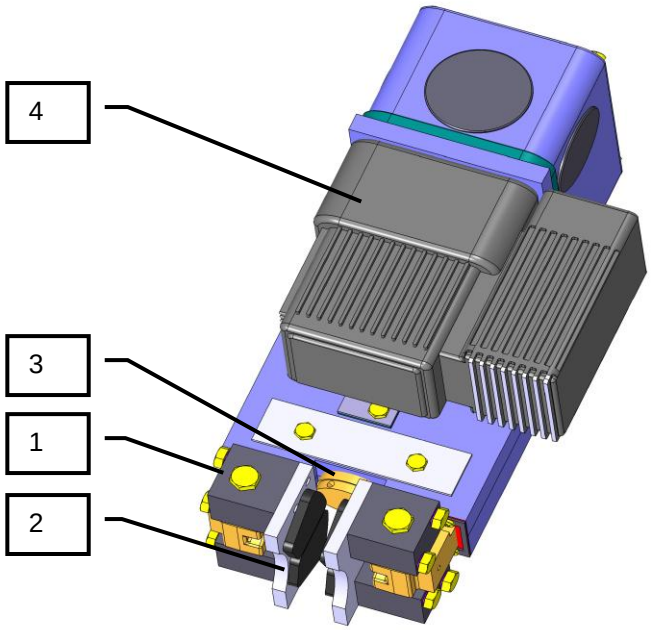


Fig. 15: Spare parts for CB8-E

Pos..	Quantity	Description	Article No.	
			CB8-E-50	CB8-E-100
1	2	brake shoe (complete set)	10 0000 2006	10 0000 1993
2	2	brake lining	00 2302 0131	10 0000 1816
3	1	brake spring	10 0000 5383	
4	1	thrustor	10 0000 0569	

Fig. 16: Spare parts for brake caliper CB8-E

Use only original spare parts, because these components are relevant for safety and have to meet specified quality.

CAUTION
Liability or warranty is ruled out for any damage resulting from the use of non-original spare parts.

6 Trouble shooting

The following disturbances may be a clue for the cause of trouble. In a complex plant, all other components must be considered as well when trouble shooting.

WARNING
Prior to commencing any repair or other work, the owner must guarantee for a standstill of the whole drive system. Especially the drive motors must be locked against unintentional switching. Further we draw your attention to the specific rules for prevention of accidents of the plant.

Fault	Cause	Action
slipping of brake disc	braking torque not adjusted or adjusted too low	adjust braking torque according to the OM
	reserve stroke not adjusted	adjust reserve stroke according to the OM and check during operation
	contact pattern of linings too small	bed-in the linings against the rotating disc
	linings are worn, possibly inadmissible scoring of brake disc	replace linings and/or brake disc
	when closing, the brake is acting against mechanical limit stop (manual release, limit switch etc. not adjusted)	check adjustment of optional features and readjust if necessary
severe wear of lining or non-parallel wear of linings	brake is not mounted centrical or is jammed	amend misalignment
brake instable when opened	possible wear of bushings after many years in operation	return the brake to SIBRE for refurbishment

7 Disposal

General

The operator and / or user are responsible for the proper disposal of the brake and the associated components. If any doubts about the correct disposal exist, please do not hesitate to contact SIBRE or your local dealer or regional disposal enterprises for further information.

Brake linings

The brake linings are made of a steel back plate and the lining material, which is either made of an organic compound or of sinter material. Each type is asbestos free and free of lead. The brake linings can be treated as steel waste/scrap.

Brake

The brake is in general made of cast iron and machined steel. Once the solenoid and the other electronic equipment have been removed, the brake can be treated as steel waste/scrap.

Electronics

The thrustor and other electronic equipment (e.g. sensors) should be treated as electronic waste.

Seals

The seals and o-rings used in the brake can be treated as normal waste.