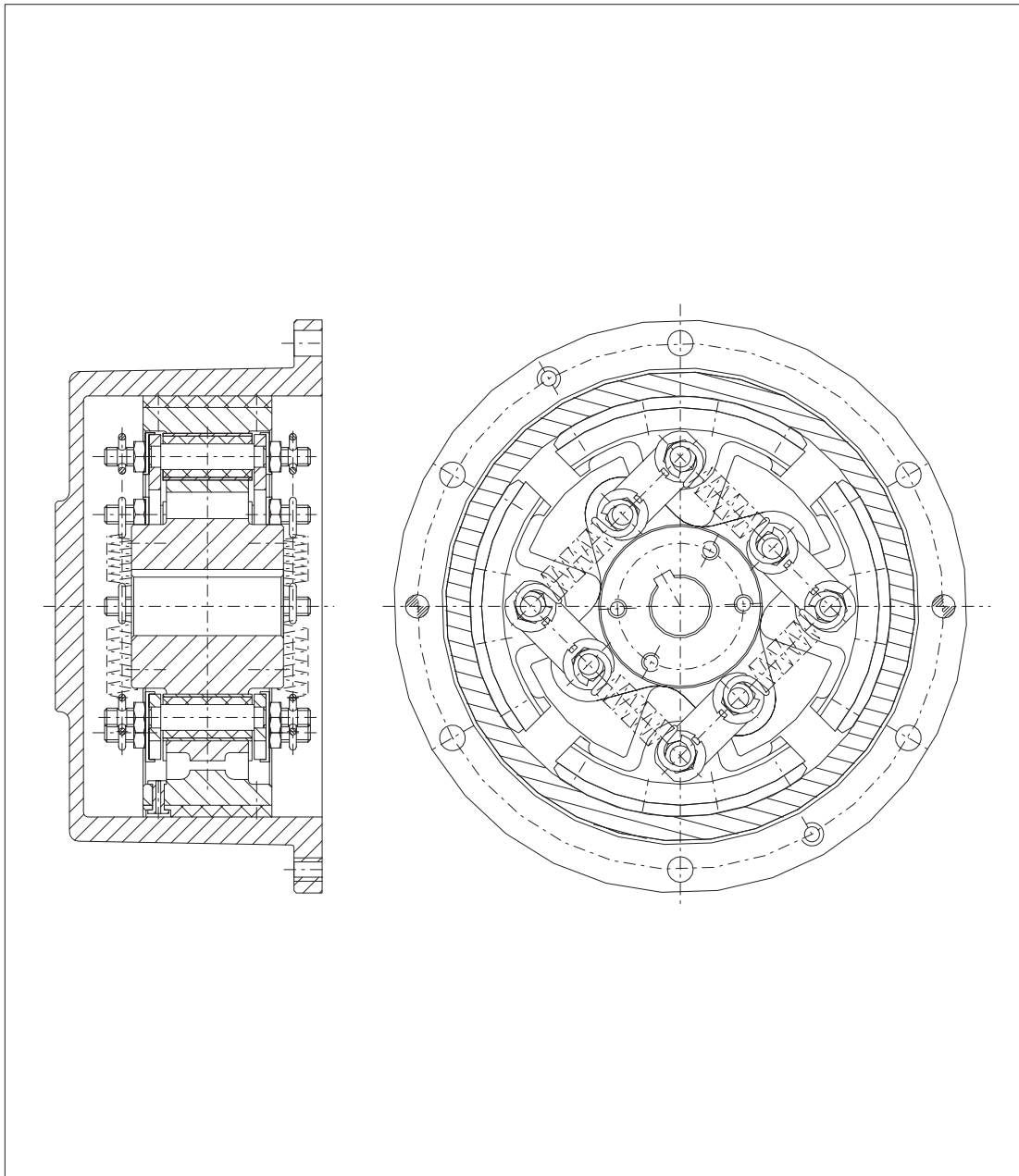


# Operating Instructions

## BA 3000 EN 02.97

Centrifugal brakes of type **FB**  
sizes 180 and 208



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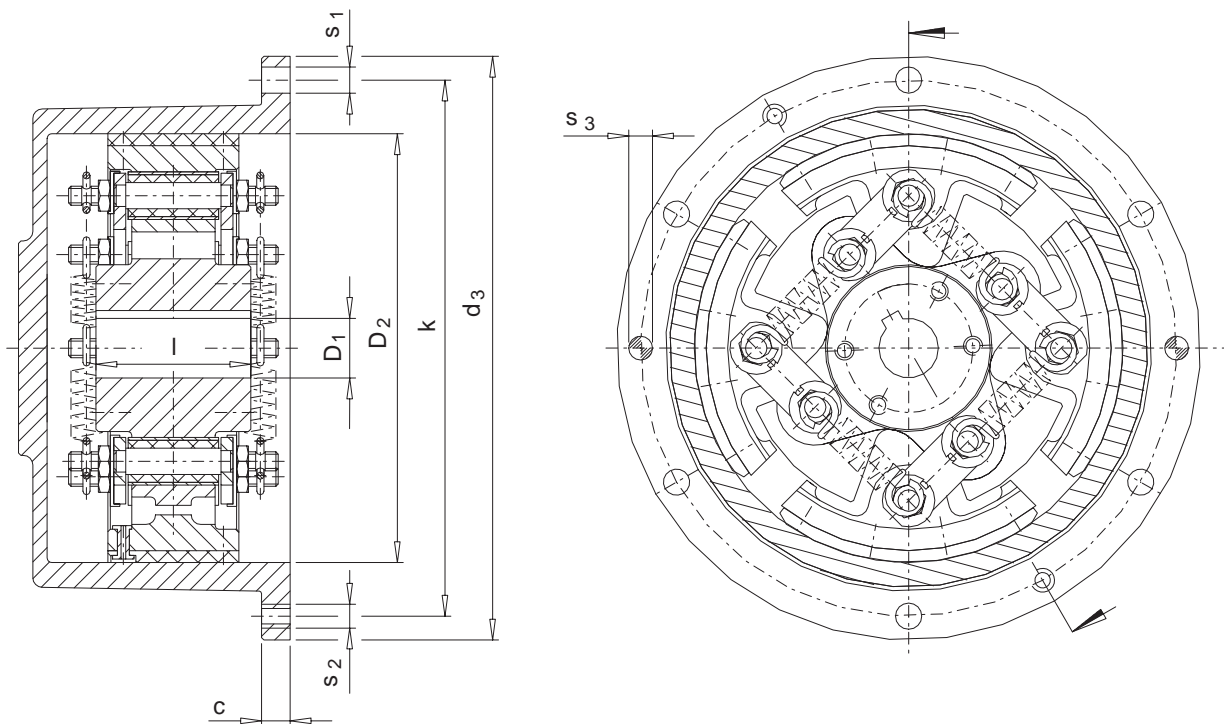
A. Friedr. Flender AG · 46393 Bocholt · Tel. 02871/92-0 · Telefax 02871/92-2596 · [www.flender.com](http://www.flender.com)

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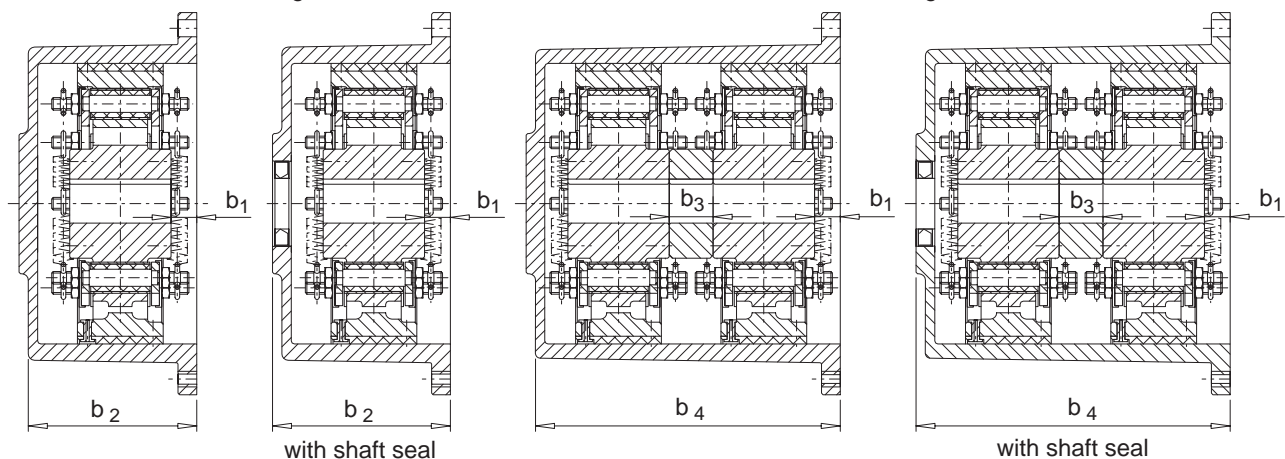
## 1. Technical data

### 1.1 General technical data



with one centrifugal unit

with two centrifugal units



Size	D <sub>1</sub>	l	D <sub>2</sub>	k	d <sub>3</sub>	c	s <sub>1</sub>		s <sub>2</sub>		s <sub>3</sub> 1)		b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	b <sub>4</sub>
	max. mm	mm	H7 mm	mm	mm	mm	mm	Quantity mm	Quantity mm	H7 mm	Quantity mm	mm	mm	mm	mm	
180	45	65	180	225	245	12	11	6	M 10	2	10	2	16.5	114	20	195
208	55	100	208	260	285	14	14	6	M 12	2	10	2	12	140	20	259

Table 1.1: Dimensions of the centrifugal brake

1) Bored and reamed together with the counterpart

### 1.2 Brake torque

When designing the centrifugal brake, the brake torque should be higher than the input torque of the auxiliary gear unit.

Brake torque per centrifugal unit (2-10):    Size 180:        300 Nm  
    Size 208:        500 Nm

## 1.3 Idling speed

When designing the centrifugal brake, the idling speed should be higher than the input speed of the auxiliary gear unit.

Size	Idling speed in 1/min				
180		1000	1200	1500	1800
208	900	1000	1200		

Table 1.2: Idling speeds

## 2. General notes

### 2.1 General

These Operating Instructions constitute part of the brake shipment and should be kept in the immediate vicinity of the brake at all times.

Only a precise knowledge of the Operating Instructions will ensure trouble-free operation of the brake. It is therefore in the interest of our customer that the Operating Instructions are read, understood and observed in all respects by the persons responsible for handling, installation and operation.

**Note:** We accept no liability for any damage or malfunction resulting from non-observance of the operating instructions.

The "**brake**" dealt with in these operating instructions was developed for stationary use in general engineering.

The centrifugal brake is only designed for the field of application as specified in Section 1. "Technical data". Operating conditions which differ from the stated will require fresh contractual agreements.

The brake described here is in accordance with the state-of-the-art at the time of these Operating Instructions go into print.

In the interest of further development, we reserve the right to introduce modifications which, while retaining the essential features, can be regarded as desirable to increase its efficiency and safety.

The copyright of these Operating Instructions remains the property of **FLENDER AG**.

These operating instructions may not be duplicated in part or whole, utilized for the purpose of publicity or communicated to third parties without our expressed consent.

Please contact our works listed below in respect of all technical queries.

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Telephon: 02871/92-2800  
Telefax: 02871/92-2801

or one of our service branches which are listed in Section 11. "Stocking spare parts, service facility addresses".

## 3. Safety notes

### 3.1 Safety notes

- The brake is constructed in accordance with the state-of-the-art and is reliable in the condition as shipped. Unauthorized modifications which impair its reliability are not permissible. This also applies to guards which are fitted as protection against accidental contact.
- The brake may only be used and operated within the scope of the condition specified in the contract of performance and supply.
- The customer should ensure that the persons entrusted with installation, operation, care and maintenance as well as repair have read and understood the operating instructions and observe them in all respects in order to:
  - prevent hazard to life and limb of the user and third parties
  - ensure the reliability of the brake

and

- prevent failure and environmental pollution due to incorrect handling.
- The relevant regulations concerning industrial safety and pollution control should be observed during handling, installation, operation as well as care and maintenance.
- The brake may only be operated, serviced and repaired by authorized, trained and properly instructed personnel.
- All works should be carried out with care with the safety aspect in mind.
- All works on the brake may only be carried out when it is stationary.  
The drive unit must be secured to prevent accidental startup (e.g. by locking the key switch or removing the fuses in the power supply). A notice should be displayed at the switch-on point stating that work is in progress on the brake.
- The drive unit should be shut off at once if changes in the brake are detected during operation, such as e.g. changed running noises.
- The brake must be protected by means of suitable guards to prevent accidental contact.
- During installation of the brake in units or systems, the manufacturer of the units or systems is obliged to incorporate the requirements, notes and descriptions contained in these Operating Instructions in his own operating instructions.

#### 3.1.1 Notes and symbols in the operating instructions

Instructions in the operating instructions which concern operating safety are emphasized as follows:



This symbol draws attention to safety measures which must be observed to prevent **personal injury**.

**Caution!**

This symbol draws attention to safety measures which must be observed to prevent **damage to the brake**.

**Note:**

This note draws attention to general **operating notes** which should be especially observed.

## 4. Handling and storage

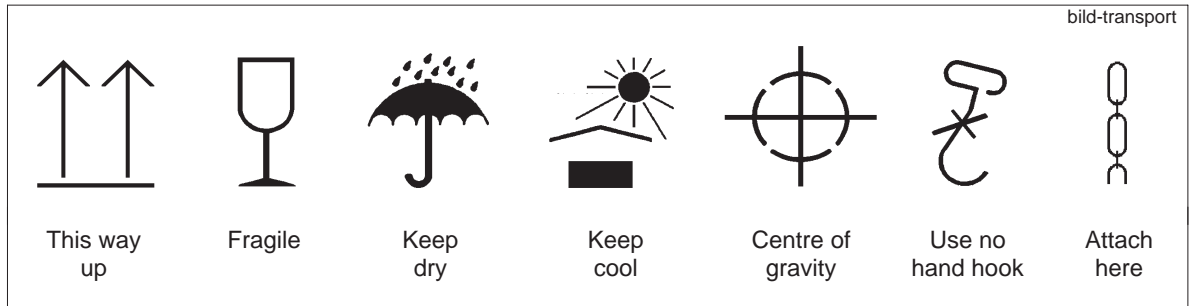
### 4.1 Scope of supply

The scope of the shipment is listed in the shipping documents. They should be checked for completeness on receipt. Any shipping damage and/or missing parts should be reported in writing at once. After consulting FLENDER an expert is to be called in.

## 4.2 Handling

The packing of the brake will differ depending on method of shipment and size. The packing, unless otherwise agreed contractually, complies with **HPE Packing Guidelines**.

The symbols shown on the packing should be noted. Their meaning is as follows:



**Caution!** Make sure that suitable hoists are used.

## 4.3 Storage

### 4.3.1 Storage of the centrifugal brake

The centrifugal brake is delivered in a preserved state and can be stored in a covered dry place up to 6 months. If the brake shall be stored for a longer period of time, an appropriate long-term preservation is necessary (consultation with FLENDER required).

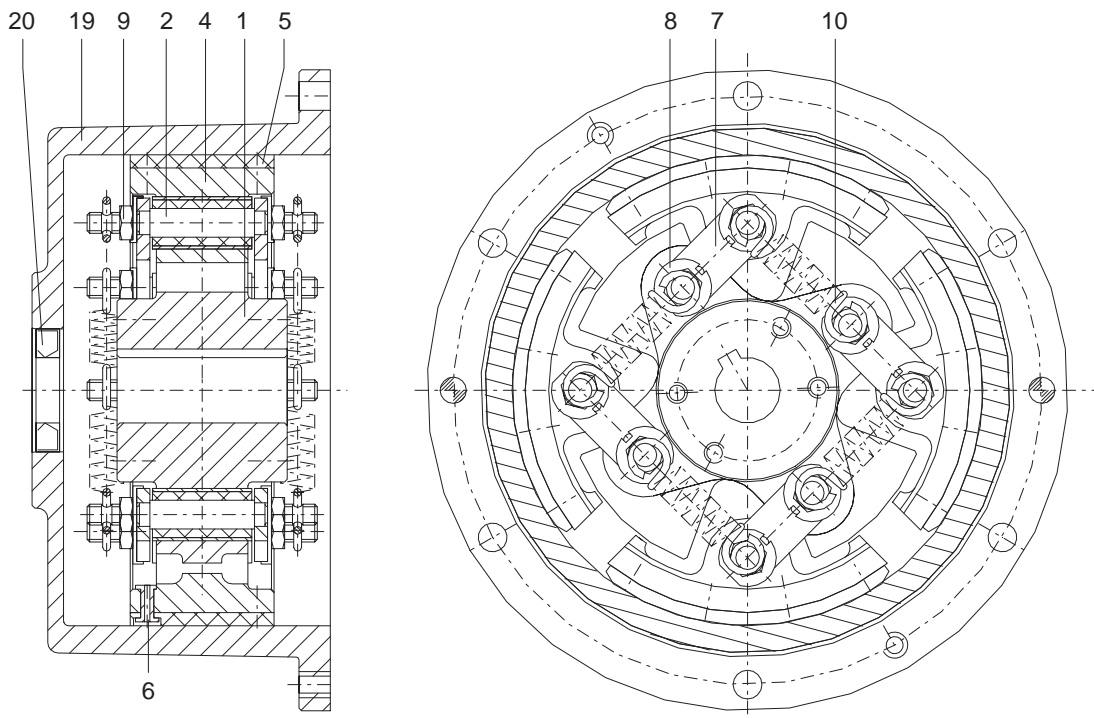
**Caution!** The friction linings (5) must be absolutely free from grease.

### 4.3.2 Storage room

The storage room should be dry and dust-free. Most storage rooms are unsuitable. Make sure that no condensation develops. The relative humidity of air is most favourable below 65 %.

## 5. Technical description

### 5.1 General description



The centrifugal brakes are dependent on speed and direction of rotation.

The centrifugal brake limits the runaway speed on the input shaft of the auxiliary drive when the machine swings back (reverse operating direction of rotation and auxiliary drive switched on).

Mount the cam part (1) onto the input shaft of the auxiliary drive.

## 6. Assembly

### 6.1 General installation notes

For the installation the safety notes in Section 3. are to be observed.

The installation has to be carried out with utmost care by trained personnel.

Already during the planning phase it is to be observed that sufficient room is to be provided for the installation and later inspection and maintenance work.

Before starting the installation a sufficient number of hoists must be provided for.

### 6.2 Mounting the centrifugal brake

Before starting the assembly, thoroughly clean the shaft end as well as the parts of the centrifugal brake.



**Observe the manufacturer's instructions on handling the solvents.**

#### Caution!

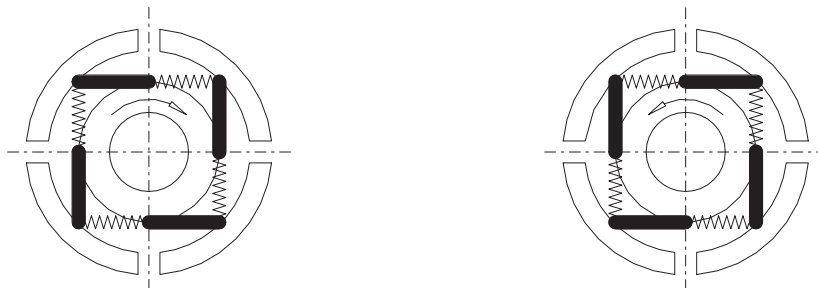
**The friction linings (5) as well as the braking surface inside the brake drum (19) must be absolutely free from grease.**

Slightly grease the remaining parts of the centrifugal brake as well as the shaft end.

#### Caution!

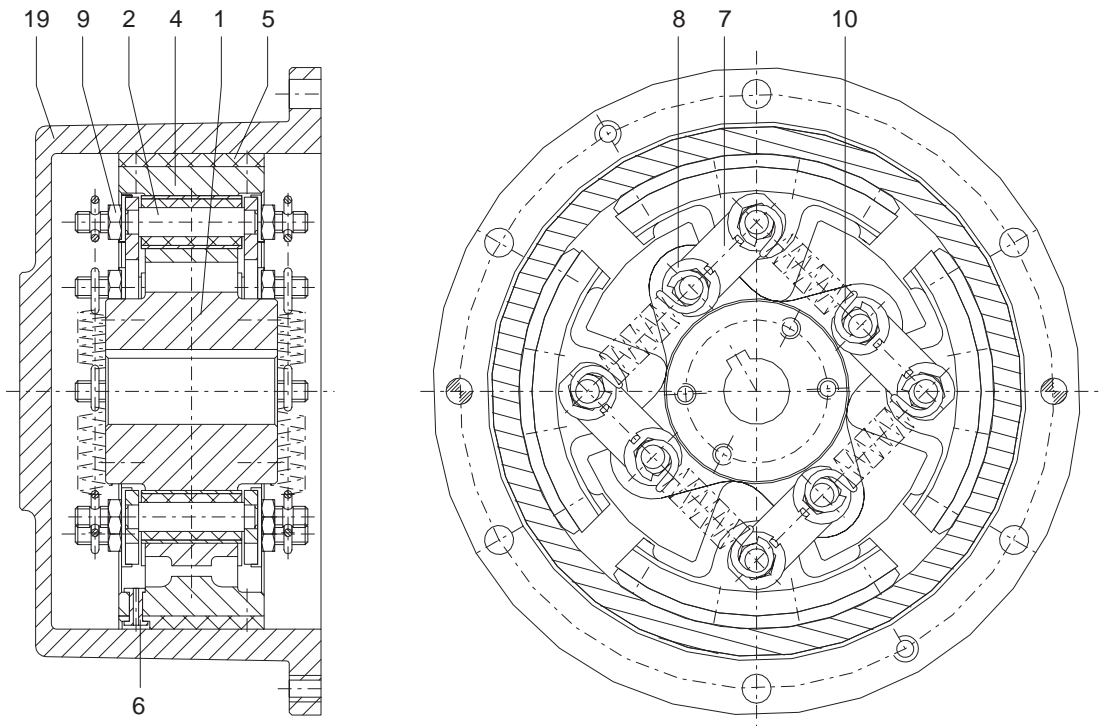
**Before mounting the centrifugal brake onto the gear unit shaft, check the position of the tension springs (10).**

Braking direction opposite to the operating direction



Mounting position for clockwise direction of rotation    Mounting position for counterclockwise direction of rotation  
View on the shaft face of the shaft onto which the brake is mounted.

## 6.2.1 Assembly with one centrifugal unit



The cam part (1) is delivered complete with assembled centrifugal units (2-10).

### Caution!

**The complete cam part (1) should be fitted by means of suitable devices in order to prevent damage to the shaft bearing arrangement by the axial fitting force. Make sure that suitable hoists are used.**

### Caution!

**Observe the position of the tension springs (10) according to item 6.2.**

Warming up the cam part (1) (max. +50 °C) might make the fitting easier.

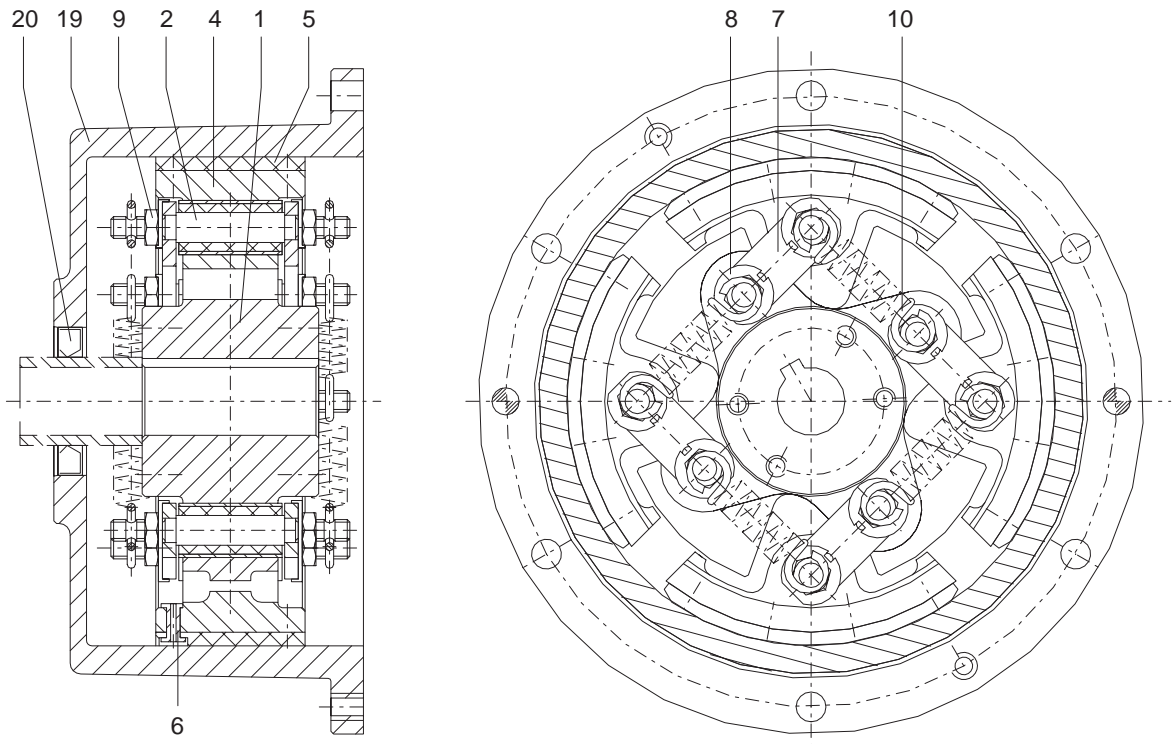


**Protect yourself against burns by hot parts!**

Axially secure the cam part (1) with an end plate or a circlip according to DIN 471.

Push the brake drum (19) over the friction linings (5) flush against the gear unit cover and secure it to the gear unit cover with screws and pins. Observe the data on the pin holes in Section 1., item 1.1.

## 6.2.2 Assembly with one centrifugal unit and shaft seal



The cam part (1) is delivered complete with assembled centrifugal units (2-10).

### Caution!

The complete cam part (1) should be fitted by means of suitable devices in order to prevent damage to the shaft bearing arrangement by the axial fitting force. Make sure that suitable hoists are used.

### Caution!

Observe the position of the tension springs (10) according to item 6.2.

Warming up the cam part (1) (max. +50 °C) might make the fitting easier.



**Protect yourself against burns by hot parts!**

Slide the bush over the shaft flush against the cam part (1).

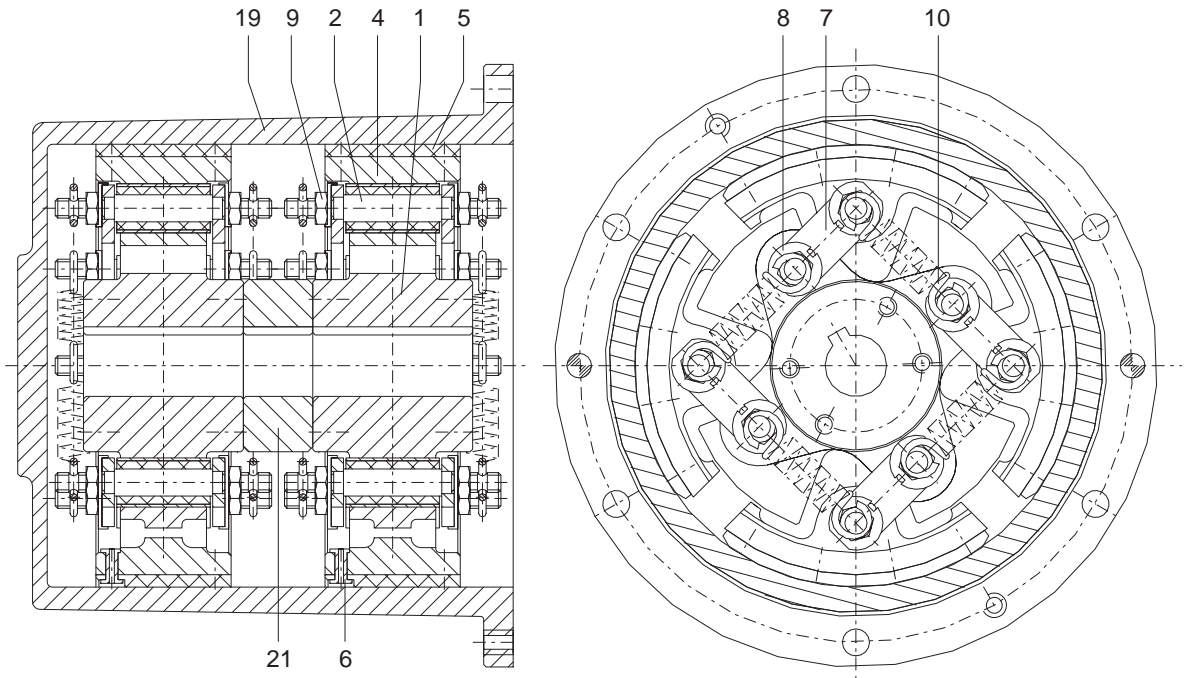
### Caution!

Insert the sealing lip of the shaft seal (20) with grease.

Install the shaft seal (20) into the brake drum (19). Slide the assembly (19, 20) over the friction linings (5) flush against the housing cover. Secure the brake drum (19) to the gear unit cover with screws and pins. Observe the data on the pin holes in Section 1., item 1.1.

Axially secure the cam part (1) through the bush by means of an end plate.

## 6.2.3 Assembly with two centrifugal units



The cam parts (1) are delivered complete with centrifugal units (2-10).

### Caution!

The complete inside cam part (1), the distance ring (21) and the complete outside cam part (1) should be fitted by means of suitable devices in order to prevent damage to the shaft bearing arrangement by the axial fitting force. Make sure that suitable hoists are used.

### Caution!

Observe the position of the tension springs (10) according to item 6.2. The two cam parts must be in the same position.

Warming up the cam parts (1) (max. +50 °C) might make the fitting easier.

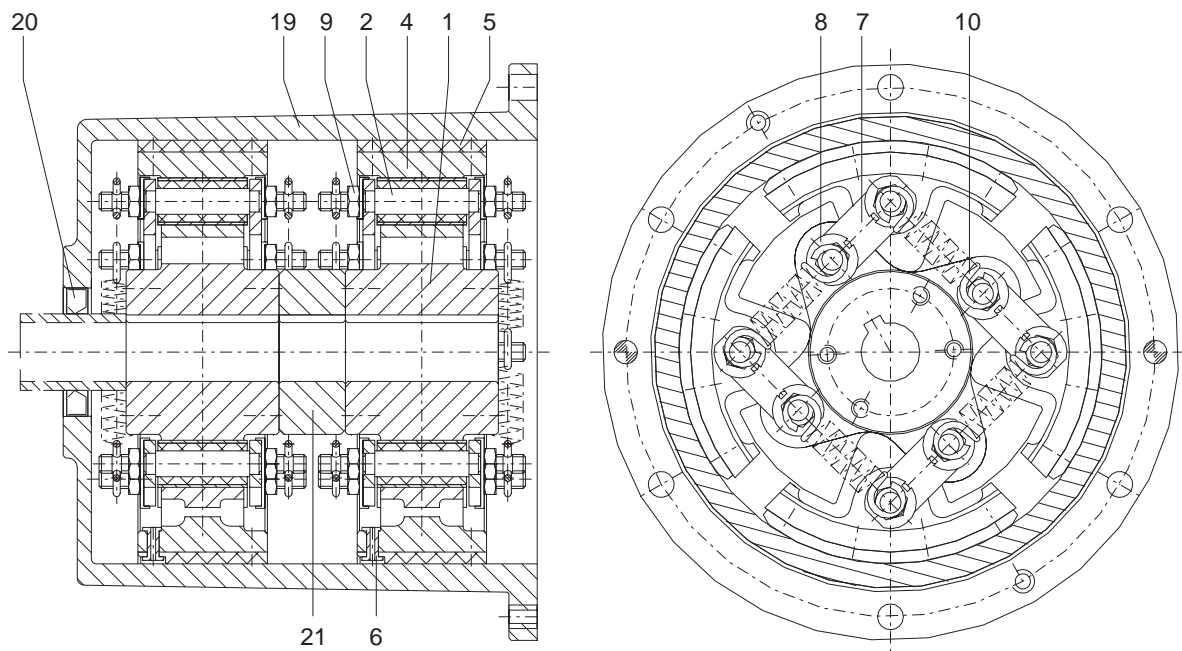


**Protect yourself against burns by hot parts!**

Axially secure cam parts (1) and distance ring (21) with an end plate or a circlip according to DIN 471.

Push the brake drum (19) over the friction linings (5) flush against the gear unit cover and secure it to the gear unit cover with screws and pins. Observe the data on the pin holes in Section 1., item 1.1.

## 6.2.4 Assembly with two centrifugal unit and shaft seal



The cam parts (1) are delivered complete with centrifugal units (2-10).

### Caution!

The complete inside cam part (1), the distance ring (21) and the complete outside cam part (1) should be fitted by means of suitable devices in order to prevent damage to the shaft bearing arrangement by the axial fitting force. Make sure that suitable hoists are used.

### Caution!

Observe the position of the tension springs (10) according to item 6.2. The two cam parts must be in the same position.

Warming up the cam parts (1) (max. +50 °C) might make the fitting easier.



**Protect yourself against burns by hot parts!**

Axially secure cam parts (1) and distance ring (21) with an end plate or a circlip according to DIN 471.

Slide the bush over the shaft flush against the cam part (1).

Install the shaft seal (20) into the brake drum (19). Slide the assembly (19, 20) over the friction linings (5) flush against the housing cover. Secure the brake drum (19) to the gear unit cover with screws and pins. Observe the data on the pin holes in Section 1., item 1.1.

### Caution!

**Insert the sealing lip of the shaft seal (20) with grease.**

Axially secure the cam part (1) through the bush by means of an end plate.

## 7. Startup

### 7.1 Measures before startup

Before startup, check the screw connection of brake drum (19) and housing cover.

## 8. Operation

### 8.1 General operating data

During operation, the centrifugal brake should be checked for

- any changes in running noises
- a sudden temperature rise during operation in operating direction of rotation.

#### Caution!

**If irregularities are detected during operation, the drive assembly should be set off immediately. The cause of the malfunction should be determined with the aid of the Troubleshooting Table (Section 9.).**

**The Troubleshooting Table lists possible malfunctions, their causes and suggestions for remedying them.**

**If the cause cannot be determined or there is no facility for repair with suitable equipment, we recommend calling in one of our service fitters (see Section 11.).**

## 9. Disturbances, reasons and remedy

### 9.1 General

The malfunctions listed below can only be hints for a troubleshooting.

In case of a complex plant, all other components have always to be included in the troubleshooting.

The centrifugal brake has to run with low noise and without shaking in operating direction of rotation. Any deviating behaviour is to be regarded as malfunction and should be removed immediately.



**Before maintenance work, repairs or other work, the operator should make sure that the whole drive train is stationary. Especially the drive motors are to be secured against accidental start up.**

**Futhermore, we refer to the relevant regulations on the prevention of accidents at the place of installation.**

### 9.2 Possible malfunctions

Malfunction	Possible cause	Remedy
Sudden change in noise level and/or temperature rise of the brake drum (19) when turning in operating direction of rotation	Friction linings (5) worn and/or tension springs (10) overstretched	Shut down the plant  Check friction linings (5) and tension springs (10) and replace damaged parts

## 10. Maintenance and repair

### 10.1 General

**Caution!**

Carry out maintenance work only with the complete machine system stationary.

If provided with shaft seal (20), the sealing lip of the shaft seal (20) should be relubricated every three months.

After every second or third braking (swinging back of the machine), check the friction linings (5). For this purpose, the brake drum (19) has to be dismantled.

The friction linings (5) must have a min. thickness of 2.5 mm.

**Caution!**

When less than 2.5 mm, replace the friction linings (5).  
We recommend to replace the tension springs (10) at the same time.

**Caution!**

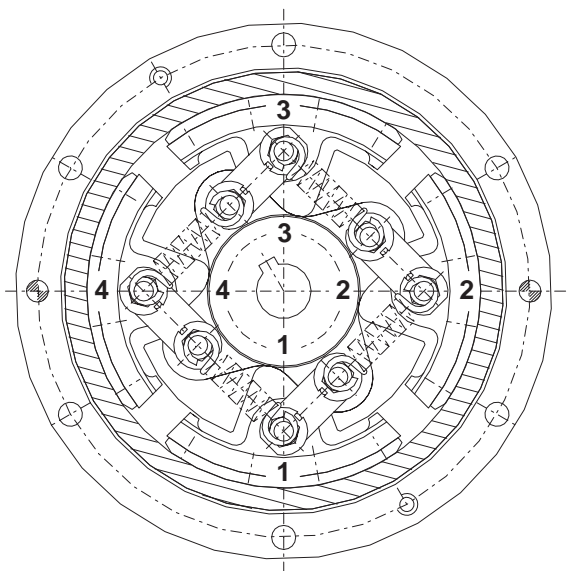
Replace the friction linings (5) in sets for the complete centrifugal brake.

### 10.2 Replacing the friction linings (5)

Remove the brake drum (19) from the gear unit cover.

**Caution!**

Before continuing the disassembly of the centrifugal brake, mark the position of the centrifugal weights (4) in relation to the cam part (1) in continuous order.



Pull off the complete cam part (1) together with the centrifugal unit (2-10) from the gear unit shaft by means of a suitable pull-off device.

Remove tension springs (10).

**Caution!**

Be careful with the recoiling tension springs (10).

Loosen locking plates (8), screw off nuts (9), remove centrifugal weight (4) together with assembled rubber-metal bolt (2) and lever (7).

Remove tubular rivet (6) and friction linings (5).

Clean all parts from abraded particles.



Observe the manufacturer's instructions on handling the solvents.

Rivet the new friction linings (5) to the centrifugal weights (4, 7) with new tubular rivets (6).

**Caution!**

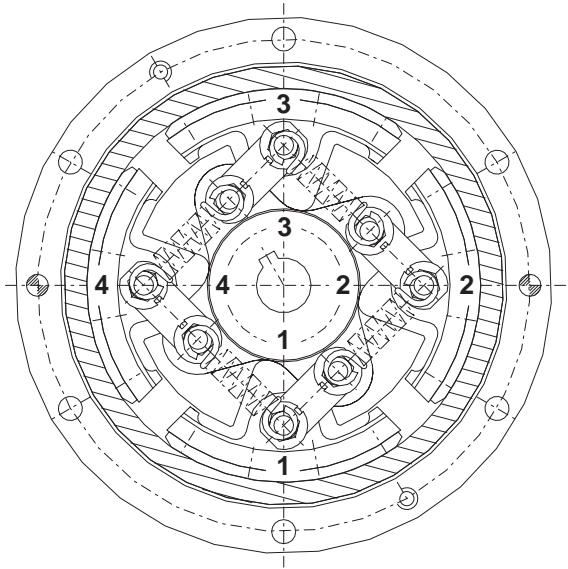
The friction linings (5) as well as the braking surface inside the brake drum (19) must be absolutely free from grease.

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Slightly grease the remaining parts of the centrifugal brake as well as the shaft end.

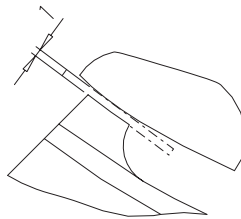
Place the centrifugal weights (4, 7) into the recesses in the cam part (1).

**Caution!** Observe the marks on the cam part (1) and the centrifugal weights.



Mount the locking plates (8) and slightly tighten the nuts (9).

**Caution!** Before tightening the nuts (9) securely, place strips of 1 mm between the locating surfaces of cam part (1) and centrifugal weight (4).



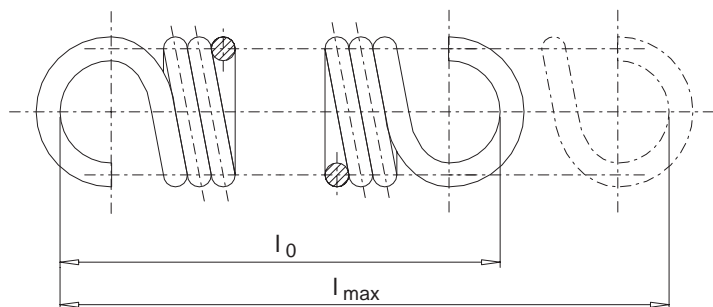
Tighten the nuts (9) and secure them with locking plates (8).

Tightening torque  $T_A$  :      Size 180:      25 Nm  
    Size 208:      86 Nm

**Caution!** Remove strips.

Install tension springs (10).

**Caution!** Do not overstretch the tension springs (10).



Length  $l_{max}$  of tension springs: Size 180:      60 mm  
    Size 208:      75 mm

Mount the cam part (1) complete with centrifugal units (2-10) and assemble the brake drum (19) with/without shaft seal (20) according to Section 6.

## 11. Spare parts stock, service facility addresses

Maintaining a stock of the most essential spare and wear parts is an important prerequisite for the permanent serviceability of the centrifugal brake.

When ordering spare parts, the following data should be stated:

- Part No. (see Section 5.)
- Description / Size
- Quantity

We assume warranty only for original spare parts supplied by us.

### Caution!

**We would expressly draw attention to the fact that spare parts and accessories not supplied by us have not been tested or approved by us either. Fitting and/or use of such products can therefore under certain circumstances adversely affect structurally specified properties of the centrifugal brake and will thus impair active and/or passive safety. No form of reliability or warranty will be assumed by FLENDER for damage occasioned by use of non-original spare parts and accessories.**

Please note that production and supply specifications frequently exist for components and we will always offer spare parts in accordance with the state of the art and in accordance with the latest legal requirements.

### 11.1 Service facility addresses

When ordering spare parts or requesting a service fitter, please contact FLENDER AG first of all.

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## 12. Declaration by the manufacturer

### Declaration by the manufacturer

in accordance with EC Engineering Guideline 98/37/EC, Appendix II B

We hereby declare that the

### Centrifugal brakes of type **FB** sizes 180 and 208

described in these Operating Instructions are intended for incorporation in a machine, and that it is prohibited to put them into service before verifying that the machine into which they are incorporated complies with the EC Guidelines (original edition 98/37/EC including any subsequent amendments thereto).

This Manufacturer's Declaration takes into account all the unified standards (inasmuch as they apply to our products) published by the European Commission in the Official Journal of the European Community.



Bocholt, 1997-02-24

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Signature (person responsible for products)