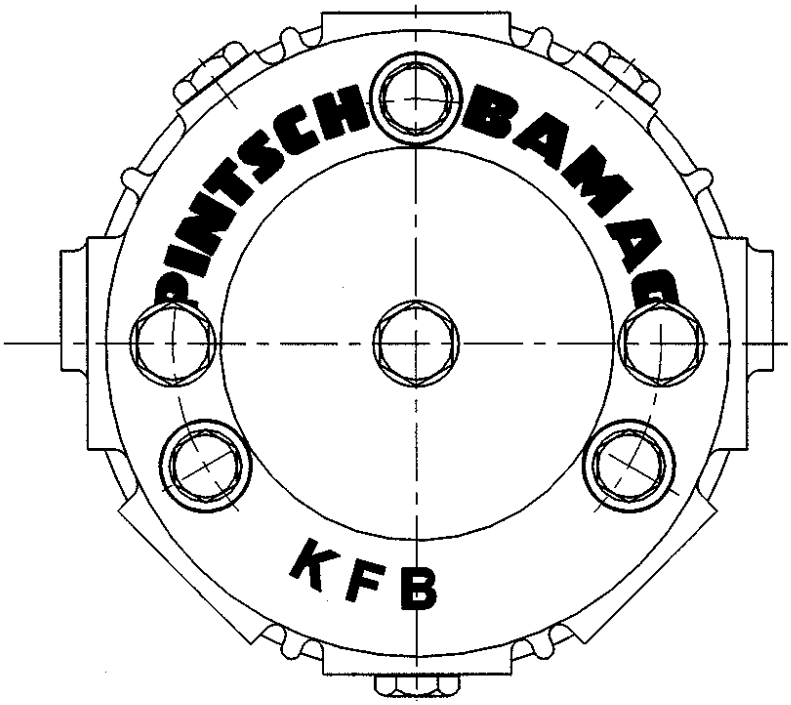
Installation and Usage Manual

Electro-Magnetic Spring-Set-Brake Series KFB



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Contents

This installation and usage manual...

... explains the procedures connected with the seawater-proof electro-magnetic spring-set-brake (KFB). It contains information on the safe and correct methods of

- Installation,
- Start-up and
- Maintenance.

The safety instructions for brake operation have been included in a separate chapter.

Before the brake assembly is installed it is in your own interest to familiarize yourself with this manual. You should acquire a comprehensive knowledge about the possible dangers which can occur during brake operation, and pay particular attention to the current safety regulations.

... the manual is aimed at:

- Installation engineers
- Maintenance fitters
- Persons who will operate the brake

You must be experienced in dealing with electro-magnetic brakes and be trained accordingly.

... the manual uses the following symbols:

Δ **Safety instructions are emphasized by a brightly-shaded triangle**

- indicates enumerated points

— stands for working steps which are carried out by you

General Information about the Product

Description

Seawater-proof electro-magnetic twin-friction-area spring-pressure brakes (KFB) are safety brakes in which the brakes are applied mechanically when the electrical power supply is switched off. This ensures that the brake still operates when the electrical power fails. The brakes have been designed for dry run operation, they may only be operated in a condition which is safe regarding function, and they must be installed, put into operation, operated and maintained exclusively by specially-trained installation personnel.

In its sealed form the brake conforms to protection type IP 67 in accordance with DIN VDE 0470 T1.

Brakes which have a voltage rating of 75V DC or above (low voltage guideline) bear the CE symbol.

Brakes in the KFB series are suitable for dynamic and static brake operation with little wear to the friction linings.

Stipulated Usage

KFB-series brakes are used in brake applications for electric motors, e.g. on ships, drilling rigs, crane plant, in steel rolling mills, in coal-mining, in the haulage business, industrial plants and cable railways, as well as in the general machine engineering industry. Any other usage is considered to be non-stipulated usage. If you are in any doubt as to whether the intended usage of the brake is stipulated or not, please get in touch with PINTSCH BAMAG.

Safety Instructions

The safety instructions included at this point are general safety instructions. You will find particular safety instructions at the beginning of each chapter or at the appropriate point in the text. Observing all safety instructions will help you to avoid accidents and to prevent damage to the brake assembly.

Always comply with the safety instructions, even in situations where you are under pressure time-wise. Once they occur, accidents cannot be undone.

Δ Electro-magnetic fields

The brake is not of the shielded type. In the direct vicinity of the brake, electro-magnetic fields can be produced, the strength of which is dependent upon the size of the brake. The user must ensure that DIN VDE 0848 Part 4, “Safety for electro-magnetic fields in the range 0 Hz - 30 kHz”, is maintained.

Δ Heart pace-makers or implants

Any person who has a heart pace-maker or implant may not under any circumstances come in the vicinity of electro-magnetic brakes. The strong electro-magnetic fields constitute a mortal danger for such persons!

Δ Safety rails

Mark out the working area around the brake in a sufficient manner. Erect safety rails at any points of public access to the working area.

Δ Safety distance

Maintain a sufficient safety distance to all danger areas. This is the only way in which the safety of personnel and the avoidance of damage to the brake can be guaranteed.

Δ Do not act in a negligent manner

Refrain from any actions which are in any way detrimental to the safety of the brake.

Δ Do not completely dismantle the brake assembly

The brake may only be stripped down to a point prescribed by this operating manual. Any further dismantling of the modules is prohibited.

Δ Do not put anything down or leave anything lying around

On account of the electro-magnetic fields nothing must be put down or left within the area of the brake. This regulation applies particularly to metallic objects.

Δ Do not store items

Do not store any inflammable objects in the direct vicinity of the brake assembly.

Δ Work in a judicious way

Before any work on the brake, carry out the measures necessary to combat any danger of personal injury or to health, and also any risk of damage to the brake:

- Only wear footwear which is in good condition and is fastened. Open sandals, damaged or unsuitable footwear is prohibited.
- Wear fastened, close-fitting workclothes. Loose-fitting working jackets and loose-fitting sleeves can be dangerous.
- If you have long hair, then tie it up in a bun.

Only start work on the brake, if:

- all movements which could cause danger have been curtailed
- the possibility of erroneous and unexpected operation of the brakes has been excluded by taking suitable measures
- in the event of a load of the brake, other safety devices take over the braking and halting function.

Δ Danger of crushing

During installation work on the brake you work with heavy tools. For this reason you should pay attention to possible crush situations when:

- Handling tools
- Fitting and dismantling of the brake, additional or spare parts
- Unbolting the brake from the pallet.

Δ Unusual changes

In the event of any unusual change during operation switch off the power supply to the brake without delay. Report any unusual changes, e.g. smells developing at the brake, to the person responsible immediately, or inform our customer service. They will help you to avoid further damage to the brake.

Δ Voltage overload protection

A voltage overload protection device is provided for brakes with a coil output of 100W or more. It prevents the coil from burning out when the braking current is switched off.

Technical Data

Brake Connection Dimensions

Component	Description	
Hub	Bore Keyway Keyway width	H7 DIN 6885 T1 P9
Brake adapter flange	Centring seat Inner centring Outer centring	 H7 f8

Torque settings for various bolt sizes

The following torque settings apply for nuts and bolts:

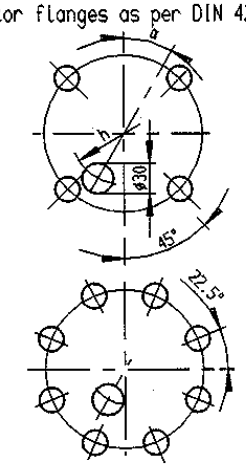
Bolt size	Torque setting MA (Nm) 8.8
M5	5,9
M6	10
M8	25
M10	49
M12	85
M14	135
M16	210
M18	300
M20	425

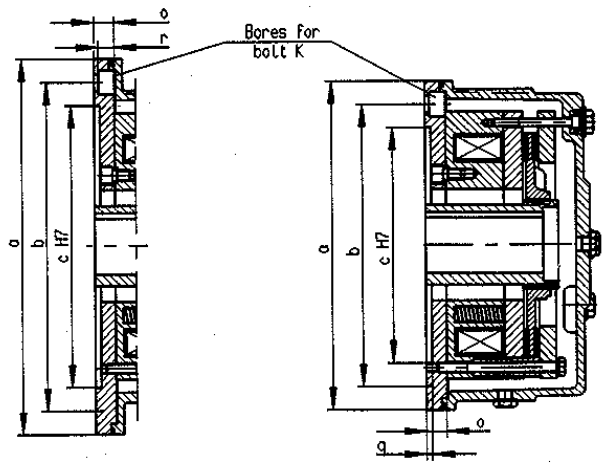
Bolt sizes and spanner widths (across the flats) for manual release bolts of various brake sizes

Brake size KFB brake	Manual release bolts DIN 912 self-locking	Off-set spanners DIN 911, spanner width:
10 to 16	M6	5
25 to 100	M8	6
160	M10	8

Standard fitting flange available for the KFB

Adaptor flanges as per DIN 42948





Brake size	KFB 10	KFB 16	KFB 25	KFB 40	KFB 63	KFB 100	KFB 160
relevant standard adaptor flanges	A200	A250	A300	A300	A350	A400	A450
	A250	A300	A350	A350	A400	A450	A550

Dimensions of the standard adaptor flange

Standard adaptor flange size		A200	A250	A300	A350	A400	A450	A550
diam. mm	a	200	250	300	350	400	450	550
	b	165	215	265	300	350	400	500
	c H7	130	180	230	250	300	350	450
length mm	o	18	20	22	22	22	24	24
	g	5	5	5	6	6	6	6
	r	11	13	13	17.5	17.5	17.5	17.5
bolt k		4xM10	4xM12	4xM12	4xM16	4xM16	8xM16	8xM16

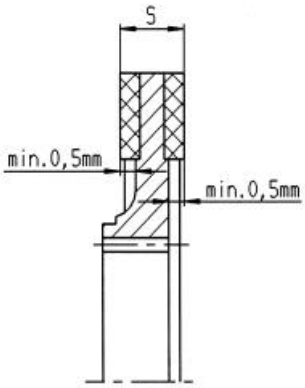
Air gap between coil body group and armature plate

Brake size KFB brake	Initial air gap [mm]	max. air gap [mm]
10	0,3	1,0
16	0,3	1,0
25	0,3	1,2
40	0,4	1,1
63	0,4	1,3
100	0,4	1,6
160		

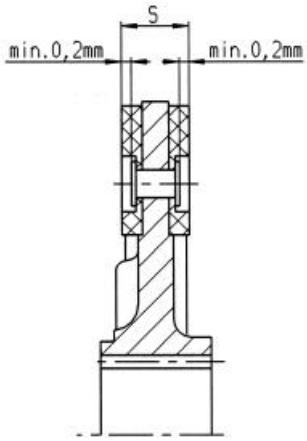
Min. thickness of the lining shoe

Brake size KFB brake	Min. thickness [mm]
10	8,5
16	8,5
25	8,5
40	11,3
63	11,7
100	11,2
160	13,6

KFB 10-25



KFB 40-160



Δ Ensuring that the friction linings wear down equally

The friction linings on each of the two sides of the lining shoe must be at least 0.2mm above the rivet heads. Only then is the full braking torque available and also the possibility of damage to the brake avoided.

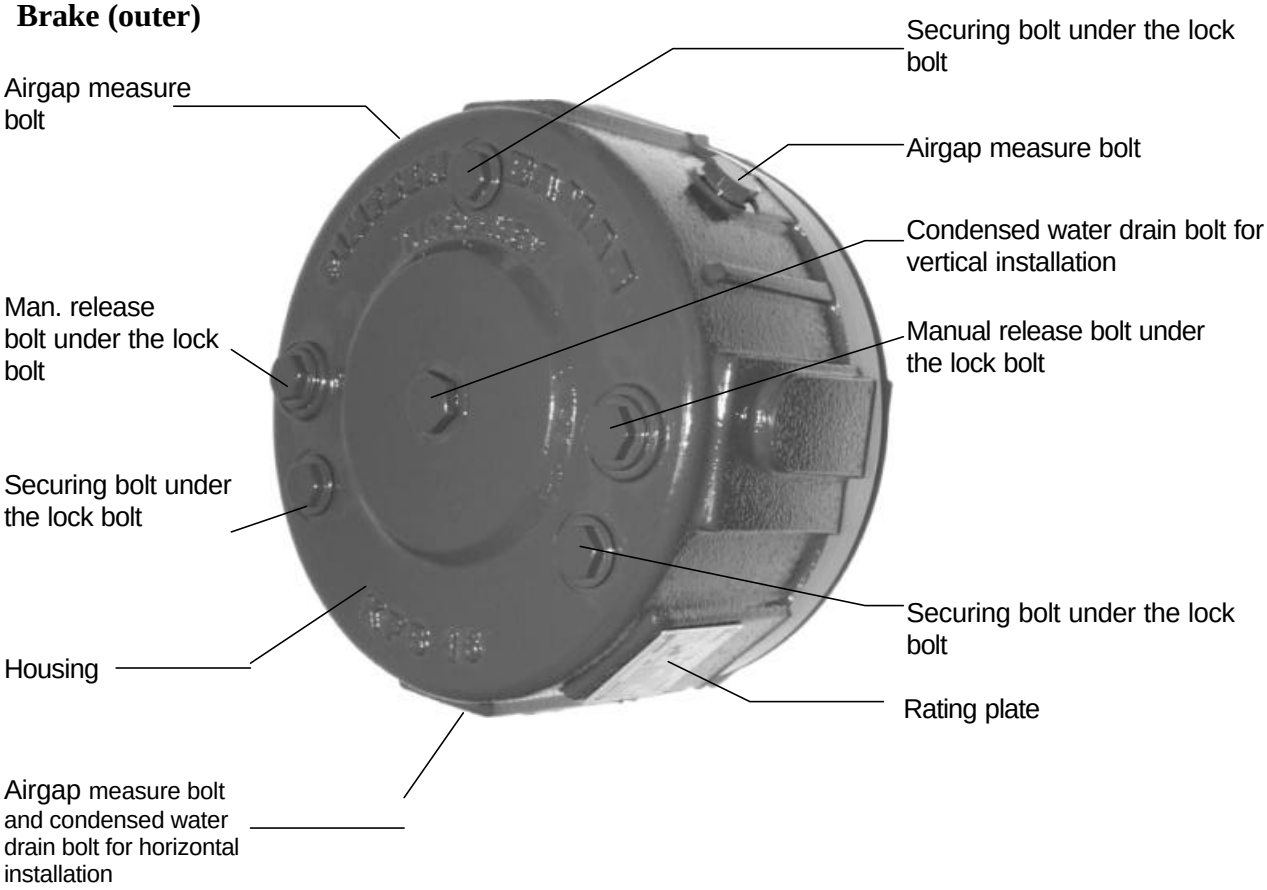
N.B: The friction linings for the KFB 10 to KFB 25 brake size are of the non-riveted type. In this case the linings on both side must be at least 0.5mm above the lining shoes.

Spanner widths (across the faces) for air gap adjustment bolts

Brake size KFB brake	Spanner width
10	10
16	13
25 to 100	17
160	

Overview

Brake (outer)

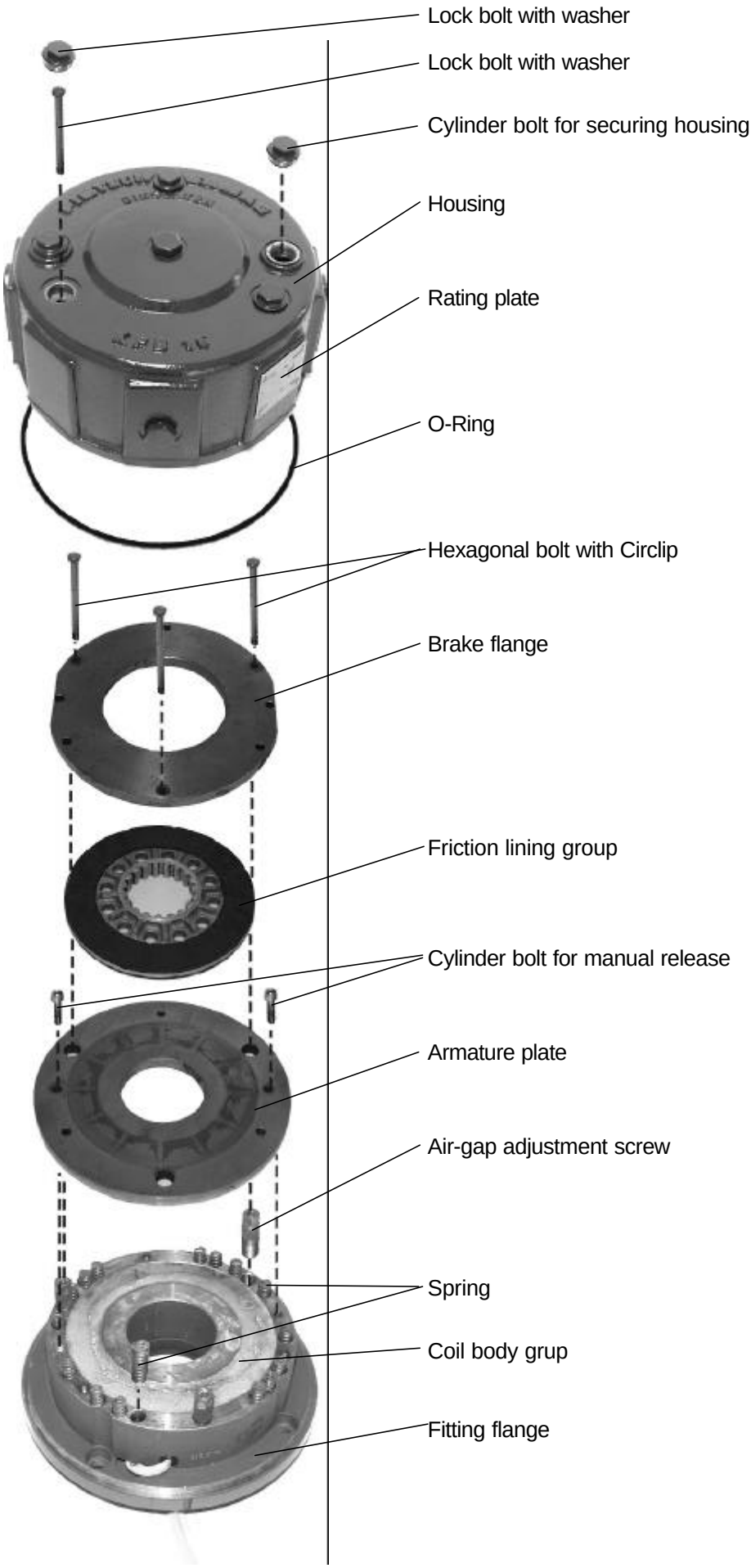


Brake assembly rating plate

Description of the brake
Braking torque

factory-set air-gap
maximum air-gap
Serial number of the brake

Brake (inner)


Lock bolt with washer
Lock bolt with washer
Cylinder bolt for securing housing
Housing
Rating plate
O-Ring
Hexagonal bolt with Circlip
Brake flange
Friction lining group
Cylinder bolt for manual release
Armature plate
Air-gap adjustment screw
Spring
Coil body grup
Fitting flange

Installation

The brake can be fitted either horizontally or vertically.

Before installing the brake please observe the following safety instructions:

Δ Bring the plant to a halt before fitting the brake

Before the brake is fitted one must ensure that the machinery, to which the brake is to be fitted,

- has been halted and
- is safeguarded against inadvertent start-up.

Δ Do not use grease

The brake has been designed to run dry. For this reason oils and grease are not to be used during the installation of the brake. The braking efficiency will be neutralized by grease and oils. The hub, in particular, must not be oiled or greased.

Δ Danger of crushing

During installation work on the brake you work with heavy tools. For this reason pay attention to possible crushing situations when:

- Handling tools
- Fitting and dismantling the brake, additional or spare parts
- Unbolting the brake from the pallet

Δ Using mechanical aids during installation

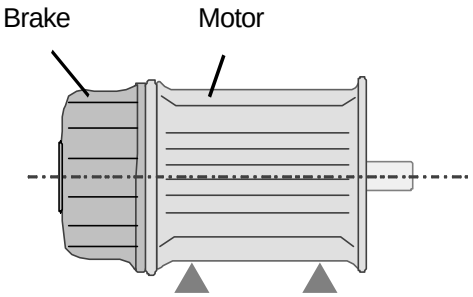
According to the model, the brake can weigh between 19 and 168kg. If necessary, use jacks or another crane to assist in installation.

Δ Do not use the crane involved in the maintenance work

Under no circumstances whatsoever must you use the crane, on the brakes of which you are working, as lifting gear.

Preparing the brake for fitting:

Alignment during fitting is orientated to the position of the axle either of the motor or gearbox.



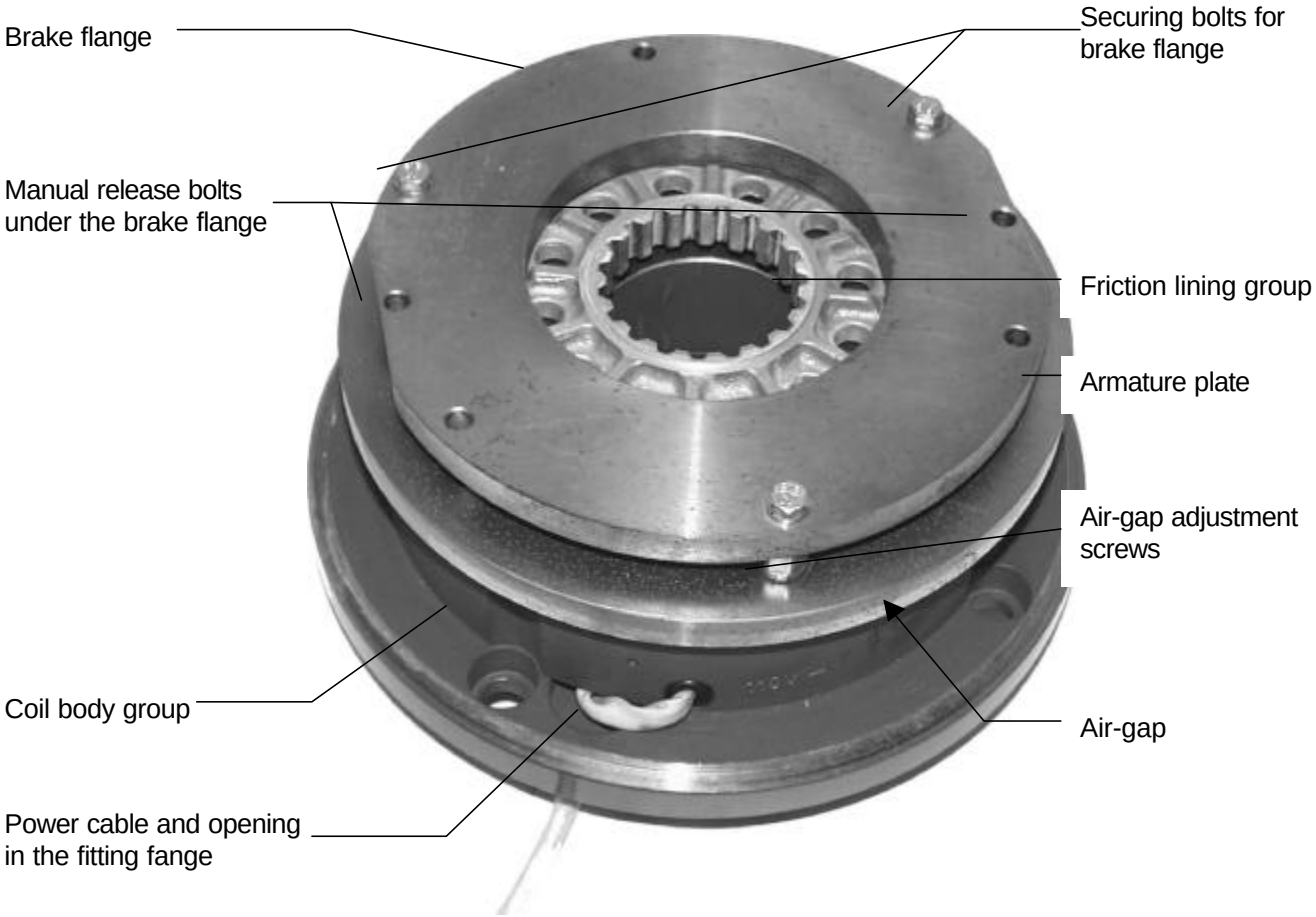
The brake must be prepared for fitting. i.e.

— remove the three 180° off-set lock bolts and washers located on the face surface of the housing,

— remove the socket head bolts underneath it,

— take off the housing,

N.B.: If the housing jams when being removed, under no circumstances is a tool to be used as a lever between the fitting flange and the housing. The sealing surface of the O-ring could be damaged by this action. The drilled bores used to secure the housing are threaded for just this purpose. By using three bolts, the housing can be pressed off equally from the centring in the fitting flange.



— Tighten the manual release bolts clockwise and equally, until the friction lining group can move freely.

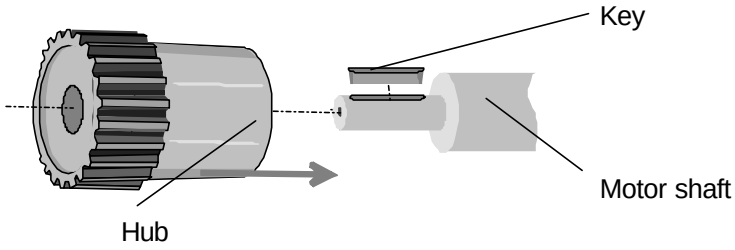
— Now check that the friction lining group is free to move.

If the friction lining group is not free to move:

— Continue to tighten the manual release bolts clockwise and equally.

Before fitting the brake:

— Push on the hub as far as the stop on the motor shaft



— Secure the hub axially by means of a shaft end washer or circlip.

Fitting the brake:

Using appropriate lifting gear, raise the brake assembly to enable you to clean the adapter flange and smear it with a sealing agent - e.g. Curil K2.

— Then clean the motor flange and smear it with sealing agent.

— Use the lifting gear to raise the brake, and carefully mesh in the teeth of the friction lining group over those of the hub.

— Feed the power cable through the opening in the adapter flange.

— Have the power supply connected up by an electrician.
Ensure that the safety instructions contained in the chapter, “Electric Power Supply”, are observed.

— After connecting the power supply, bolt on the brake adapter plate to the motor flange.

Δ Observe the specified torque settings for bolts.

When tightening bolts please ensure that you comply with the specified torque settings (see “Technical Data”).

— Undo the manual release bolts anti-clockwise and in equal amounts until they just make contact against the brake flange.

Δ Do not use excessive force whilst undoing the manual release bolts

If the manual release bolts are undone by using excessive force against the resistance offered, the brake can be irreparably damaged.

Δ Ensuring the braking effect

Please check that the manual release bolts have been unscrewed correctly. When the manual release bolts are tight the brake produces little or no braking effect.

Δ Remove any foreign bodies on the O-ring and assembly surfaces

When the housing is re-fitted onto the unit, no foreign bodies must find their way onto the O-ring of the housing or onto the assembly surface, otherwise the housing will not be sealed properly.

— O-ring and assembly surface must be cleaned.

— Re-fit the housing whilst paying careful attention to the fitting position in the centring on the adapter flange. The lock bolts for the manual release on the face side of the housing must be in alignment with the manual release bolts.

— Insert the securing bolts for the housing and tighten in compliance with the torque settings.

— Screw in the lock bolts and their washers.

Electrical Power Supply

During installation the electrical power supply must be connected to the brake.

Δ Only electricians

Only electricians may connect the brake to a D.C. power supply and then check the current flow whilst complying with all safety measures. Improper connection poses a mortal danger!

Δ Earthing the equipment

The brake must be earthed in accordance with the regulations.

Δ Provision of zero voltage potential

All work on the electrics may only be carried out in a state of zero voltage potential.

Δ Provision of voltage overload protection

An voltage overload protection device is to be fitted for brakes with a coil output of 100W or above. This prevents the coil from burning out when the braking current is switched off.

Δ Avoid overheating the brake

In order to avoid overheating the brake, ensure that the motor to be braked does not continue to run should the braking power supply fail unintentionally.

Δ Do not switch on

Before connecting the brake, interrupt the power supply to the motor.

— Erect a “Do not switch on” sign at the switching point.
— Connect the electrical power supply.
— Remove the sign.

Start-up

Before putting the brake into operation please observe the following safety instructions:

Δ Overloading the brake

The owner of the equipment is obliged to set up the motor for the brake in such a way that a brake overload is not possible. In the event of the brakes being overloaded, the brake lining is subject to severely increased wear.

Advice: The brake flange and armature plate may have a bluish discolouration which is due to being stored in grease at the factory. This does not indicate any thermal overload.

Δ Fire hazard!

During operation the brake can reach a temperature of 80 °C. The brake housing constitutes a possible fire hazard.

Δ Maintaining the maximum RPM range

In order to avoid damage to the brake, the brake must only be operated, and this includes start-up, within the permissible range of rotary speeds.

Instruction: The load example and the technical data sheets must be observed.

Function check

Each initial start-up is to be preceded by a function check. Please observe the safety instructions prior to the function check:

Δ Do not put down or leave anything lying around

Remove all metallic or flammable objects from within the working area of the brake.

Δ Do not reach inside the brake when it is turning

If the function check is carried out when the housing is removed, on no account reach into the brake as it is turning .

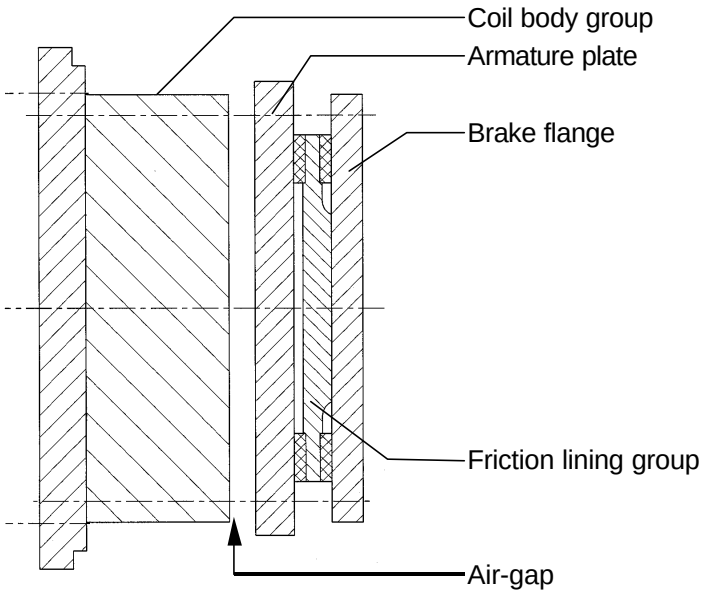
Δ Replacing seals

All seals, which are removed for the purpose of the function check, must be replaced by new seals.

Performing a function check

— If the housing has been removed, switch the brake power supply on and off several times.

— During the switching procedure, the armature plate moves between the coil body group and the friction lining group.



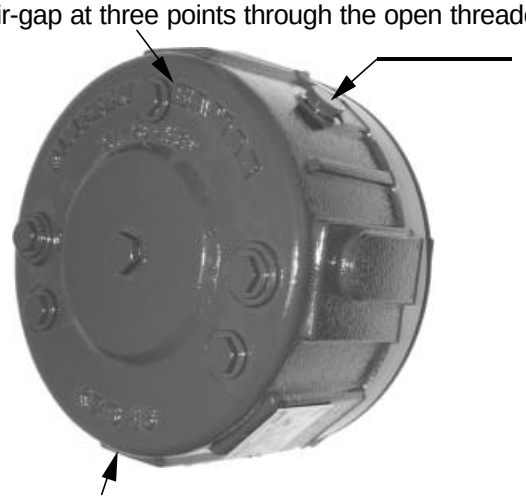
After the function check has been carried out:

— In order to clean and re-fit the housing proceed as described in the chapter, “Installation”, section, “Fitting the Brake”.

Check the air-gap

In order to guarantee correct brake operation, the air-gap between the coil body group and the armature plate must be set to the specified size. The minimum and maximum air-gap can be found in the table under “Technical Data”, or simply read off from the rating plate on the brake assembly. The brake is supplied from the factory with the minimum air-gap.

Check the air-gap at three points through the open threaded bores:



— Feed the feeler gauges into the threaded bores

— Measure the air-gap between the armature plate and the coil body group

— If the air-gap does not correspond to the specified values, adjust the air-gap as described in the chapter, “Maintenance”, section, “Re-adjusting the Air-gap“.

— Replace and tighten the bolts using new washers. The use of old washers may allow water to penetrate into the assembly.

Mode of Operation of the Brake

Switching on the power supply to the brake

When the power supply to the brake is switched on, an elector-magnetic field is produced which in turn pulls the armature plate against the coil body group and thus neutralizes the braking effect. The friction lining group of the brake is now free to turn between the armature plate and brake flange.

Switching off the power supply to the brake

When the power supply to the brake is switched off, the electro-magnetic field collapses and the brake is applied.

The pressure of the springs presses the armature plate against the friction lining group. At the same time the friction lining group now applies pressure against the brake flange.

The mechanical friction effect is transferred to the motor shaft via the lining shoe and hub. The motor is now braked.

Running in the friction linings

At initial start-up of the brake assembly or after the friction lining group has been replaced, the friction linings need to be run in. Only when this has been done can the specified braking torque be completely transferred.

Carry out a few controlled braking procedures, whilst ensuring that the full brake effect is not available initially. Do not carry out any of these braking procedures under full load.

Operation

Observe the following safety instructions when operating the brake:

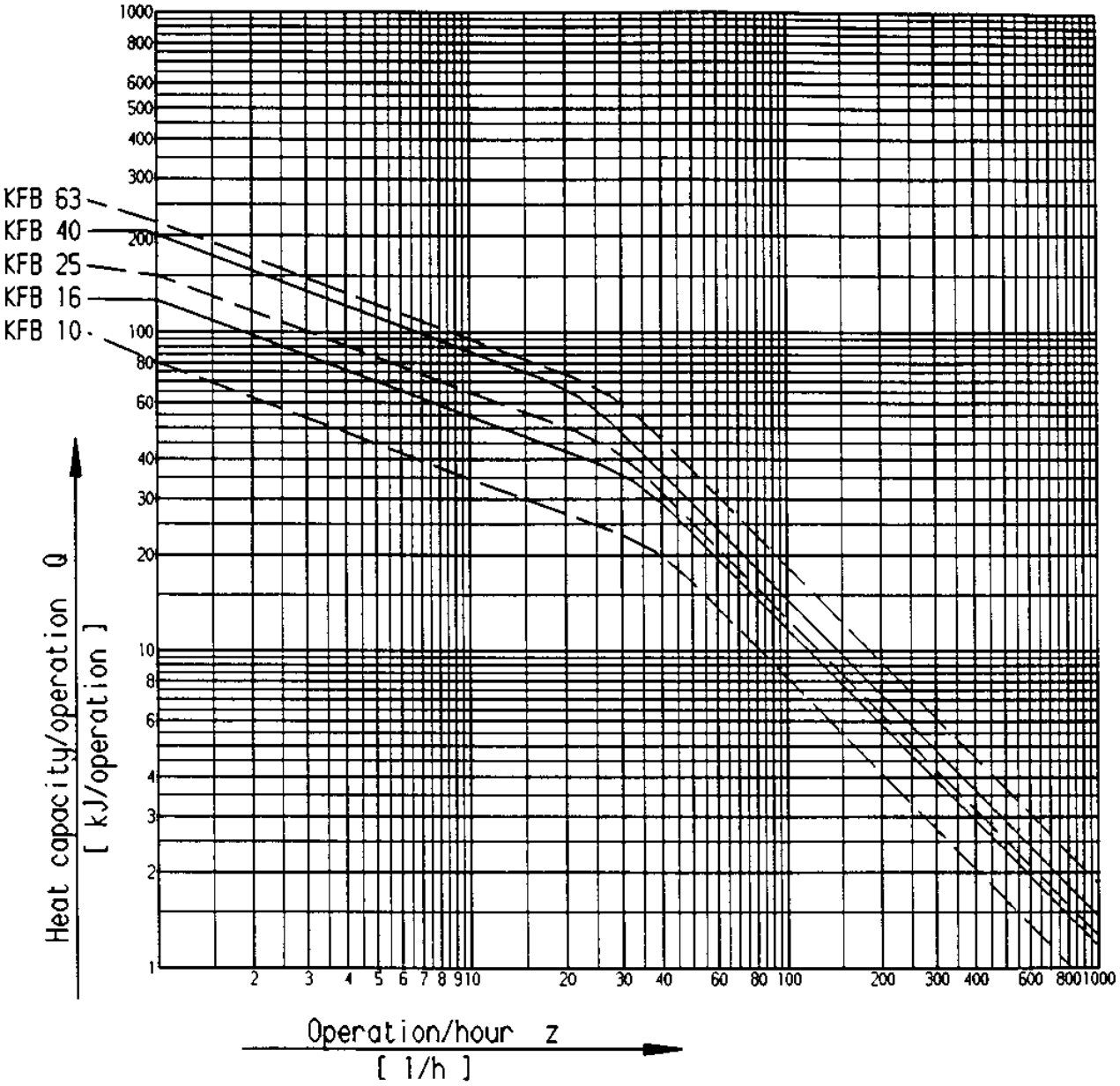
Δ Unusual changes

Should any unusual changes occur during operation switch off the power supply to the brake immediately. Report any unusual changes, e.g. smells developing at the brake, to the person responsible immediately, or inform our customer service. They will help you to avoid further damage to the brake.

Δ Permissible brake energy

The permissible brake energy can be determined from the heat load diagram.

Braking RPM n = 1500 min^{-1}



Manual Release

Manual release of the brake means neutralizing the brake for a short time by manual means and is exclusively reserved for emergency use, e.g. when a suspended load needs to be lowered carefully.

Before operating the manual release ensure that the following safety regulations are observed:

Δ Manual release is reserved for emergencies

Under no circumstances is the manual release to be used in maintaining any kind of makeshift operation. Its use is designated exclusively for emergencies.

Ensure that the power supply to the brake remains switched off during manual release operation and cannot be inadvertently switched back on.

Δ Note carefully the position of the load

Ensure that you make careful note of the position of the load during manual release operation, and make sure that the area is clear before the load is lowered.

Δ High brake temperature

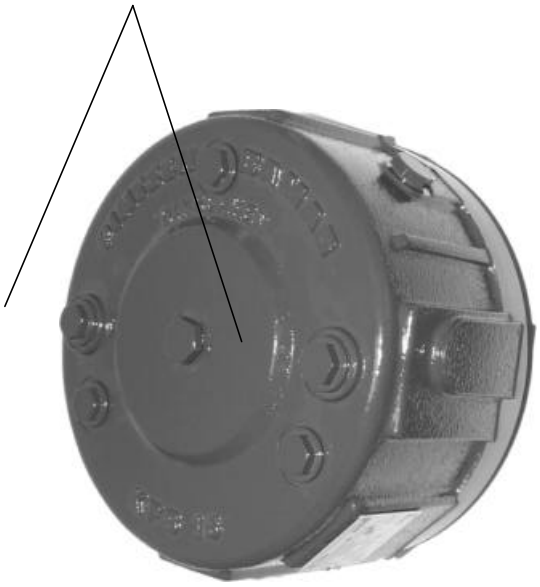
According to the type of operation, it is possible that the brake may heat up. For this reason it may be necessary to put on a pair of protective gloves before carrying out manual release. Avoid contact with the hot brake during manual release operations. There is a danger of burns.

Activating manual release

The housing does not have to be removed for manual release operations.

— Undo the two lock bolts and seals located centrally opposite to each other on the face surface of the housing. Diagram 1

Lock bolts with washers



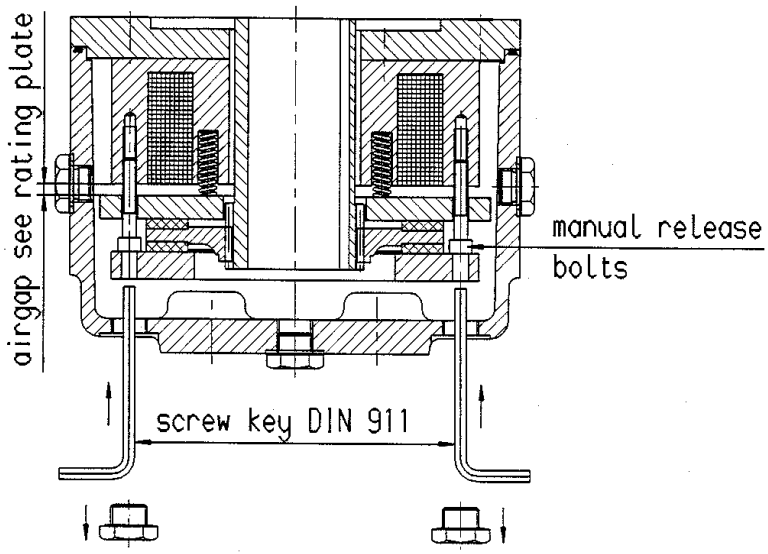
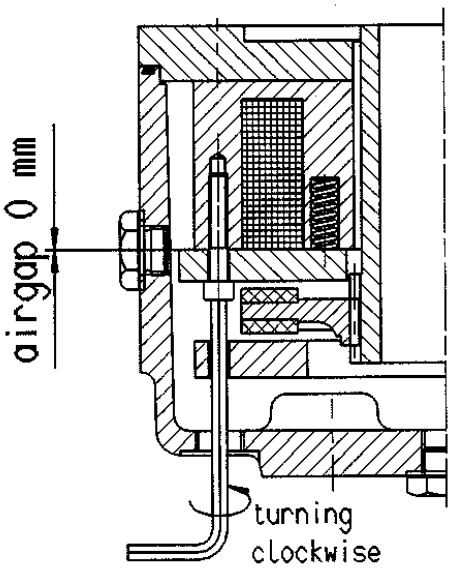


Diagram 1

Diagram 2



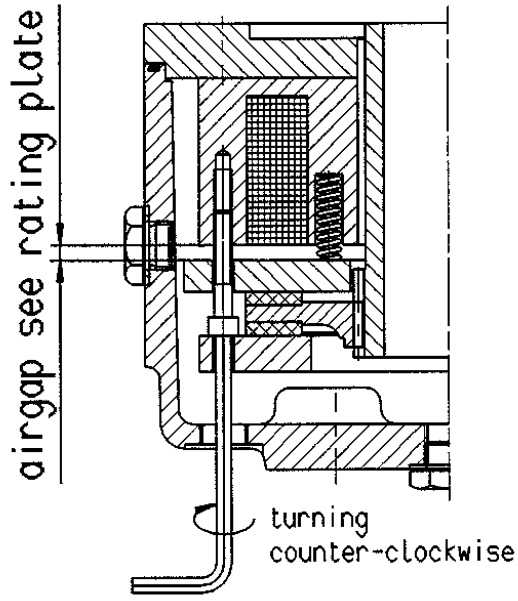
No braking effect

Diagram 3

— Turn both manual release bolts clockwise at equal intervals and in equal measure. Diagrams 2 and 3 Against the pressure of the spring, the armature plate is now pulled slowly against the coil body group and the brake is released. Monitor any possibly suspended load carefully when the brake is loosened.

— With the aid of the manual release bolts, carefully lower the load. The load's speed of descent is accelerated by turning the bolts clockwise and decelerated by turning anti-clockwise.

— Set down the load.



Positive braking effect

Diagram 4

Cancel manual release

— Turn the manual release bolts anti-clockwise at equal intervals and in equal measure and undo them until the bolt head just makes contact with the brake flange. Diagram 4

— Replace the lock bolts using new seals.

Δ Operational readiness

After the load has been set down, put the brake back to a state of operational readiness immediately. Please note: The brake is only ready to operate after you have turned back the manual release bolts to their original position. Diagram 4

Maintenance

You may carry out the maintenance work described herein yourself only in strict compliance of the safety instructions cited here.

Δ Improper maintenance is dangerous to life and limb!

Brakes which are incorrectly maintained can lead to mortally dangerous situations. This is why only trained personnel may open the brake and carry out maintenance work.

Δ Switch off the power supply

Ensure that the power supply is switched off before commencing maintenance work, and that a sign is erected at the switch point.

Δ Danger of crushing

During assembly work on the brake you work with heavy tools. For this reason you must pay attention to possible crush situations when:

- Handling tools
- Assembly and dismantling of the brake, additional or spare parts
- Unbolting the brake from the pallet

Δ Only electricians

The replacement of parts like coil bodies, circuit breakers etc., must be carried out exclusively by electricians. Replacement of parts as such is not described in this operating manual on the grounds of safety.

Δ Using mechanical aids during installation

According to the model, the brake may weigh between 19 and 168kg. If necessary, use jacks or another crane to assist in installation.

Δ Do not use the crane involved in the maintenance work

Under no circumstances whatsoever must you use the crane, on the brakes of which you are working, as lifting gear.

Δ Energized electro-magnetic field

The first thing to do upon completion of the maintenance work is to remove all tools from the operational area of the brake.

When the power supply for the brake is switched on, the electro-magnetic field of the brake is energized

The maintenance work for the KFB is restricted to:

- Checking and re-adjusting the air-gap
- Measuring the thickness of the friction lining group
- Replacing the friction lining group
- Turning round or replacing the brake flange and armature plate
- Draining off condensed water

Checking the air-gap

Regular checks of the air-gap form part of the maintenance activities. The time interval for the checks varies according to the demands made on the brake. They must be adapted according to the conditions of usage in order to ensure that the brake functions correctly.

See the chapter, “Start-up”, section, “Check Air-gap”.

— Should the check show that the air-gap exceeds the maximum specified size, the air-gap must be adjusted as described in the following section, “re-adjusting the air-gap”.

Re-adjusting the air-gap

In order to ensure correct brake operation, the air-gap between the coil body group and the armature plate must be set within the specified tolerances. Values for the minimum and maximum air-gap can be found in the table under “Technical Data”, or simply read off from the rating plate.

If the air-gap does not correspond to the specified values, then it must be adjusted as follows:

— Remove the housing as described in the chapter “Installation“, section „Preparing the Brake for Fitting“.

— Slightly loosen the brake flange securing bolts.

— Using an open-ended spanner, turn the adjusting bolt in equal amounts.

— To reduce the air-gap: Turn the adjusting bolt clockwise (when looking at the brake flange).

— To increase the air-gap: Turn the adjusting bolt anti-clockwise (when looking at the brake flange).

— Re-tighten the brake flange securing bolts, whilst observing the torque settings.

— Check the air-gap again and, if necessary, re-adjust as described above.

— The thickness of the friction lining group must not be allowed to fall below the specified minimum thickness for the respective type of brake (see table under „Technical Data“). A simple method of calculating the friction lining group thickness is to measure the distance between the armature plate and brake flange.

— Clean the O-ring and assembly surface.

Δ Remove foreign bodies from the O-ring and assembly surface

When re-fitting the housing, there must be no foreign bodies on the housing O-ring or on the assembly surface, otherwise the housing will not be sealed properly.

— Re-fit the housing whilst paying careful attention to the fitting position in the centring at the adapter flange. The lock bolts for the manual release located in the face side of the housing must be aligned with the manual release bolts.

— Re-fit the securing bolts for the housing whilst paying close attention to the torque settings.

— Screw in the lock bolts using new washers. Using old washers may allow water to penetrate the assembly.

Measure the thickness of the friction lining group

The thickness of the friction lining group is to be measured at regular intervals within the framework of maintenance work. In this area, great care must be taken to ensure even wear on both sides of the friction lining shoe. Check intervals vary according to the demands made on the brake, and these intervals must be established for each individual case.

Δ Note carefully the minimum thickness of the friction lining shoe.

Should the lining shoe fall below its minimum thickness, which is specified in the table under "Technical Data", the lining shoe will have to be replaced. Replacement is also necessary if there is no more than a minimum of 0.2mm of lining above the rivet heads on one side of the lining shoe. The brake linings for the KFB 10 to KFB 25 brake size are not riveted. In this case the linings on both sides must show at least 0.5mm above the lining shoe. Only by observing these specifications can the full brake torque be made available, and damage to the brake avoided.

The friction lining group is dismantled for this measurement procedure. Dismantling is described further down in this chapter in the section "Replacing the friction lining group".

If monitoring sensors, either micro- or proximity switches, are used, a signal is emitted when the maximum air-gap is reached.

Replacing the brake flange, friction lining group and armature plate

Δ Observe the safety regulations

Before replacement ensure that the safety regulations found at the beginning of this chapter on maintenance are observed.

Δ Ensuring the brake is effective

Provided that it is necessary to tighten up the manual release bolts (manual release activated) for the maintenance work, these bolts must be undone properly upon completion of the work. The brake has little or no effect when the manual release bolts are tightened up.

The friction lining group consists of:

- a friction lining shoe
- a friction lining

This is subject to wear and tear through the braking action and must be replaced when worn. The exact moment for replacement depends upon the demands made on the brake. Replacement is also necessary if the friction lining group comes into contact with;

- Oil
- Grease
- or similar substances

Brake flange and armature plate

Like the friction lining group, both parts are subject to wear. We recommend that the brake flange and the armature plate are turned round or replaced at every second lining group replacement. Excessive wear reduces the service life of the new friction linings.

Turning round or replacing the brake flange

— Switch off the power supply.

— Remove the housing as described in the chapter „Installation", section „Preparing the brake for fitting".

— Tighten the manual release bolts clockwise at equal intervals and in equal measure. The lining group is now free to move.

— Undo the brake flange securing bolts.

— Take off the brake flange and turn round or replace. Dispose of the old brake flange.

— Re-fit the turned or new brake flange so that the bores for the action of the manual release bolts line up with the manual release bolts.

— Tighten up the brake flange securing bolts whilst paying close attention to the torque settings.

— Undo the manual release bolts anti-clockwise at equal intervals and in equal measure until the bolt heads just come in contact with the brake flange.

— Check and, if necessary, re-adjust the air-gap as described above in this chapter.

— Assemble the housing as described in the chapter, “Installation”, section, “Fitting the brake”.

Replacing the friction lining group

— Switch off the power supply.

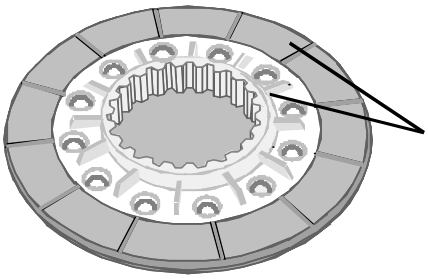
In order to replace the friction lining group, the brake flange has to be dismantled. See section, “Turning round or replacing the brake flange”, in this chapter above.

— Subsequently, the friction lining group may be pulled off the hub.

— Clean the armature plate and brake flange as described in the chapter, “Cleaning”.

— Push the new friction lining group onto the hub.

Δ **After replacement, the cooling ribs of the friction lining group must point towards the brake flange.**



Cooling ribs

— Assemble the brake flange. See previous section.

— Undo the manual release bolts anti-clockwise at equal intervals and in equal measure until their bolt heads just come in contact with the brake flange.

— Check and, if necessary, re-adjust air-gap as described above in this chapter.

— Assemble housing, see chapter, “Installation”, section, “Fitting the brake”.

After the friction lining group has been changed, you must prepare the brake for normal operation. See chapter, “Start-up“.

Turning round or replacing the armature plate

— Switch off the power supply.

In order to turn round or replace the armature plate, the brake flange and friction lining group must be dismantled. The operational steps required for this are described in the two previous sections

Δ **Position yourself to one side next to the brake**

When the armature plate is replaced, the full spring pressure of the brake is being applied. If you do not carry out this work correctly, parts of the brake could work loose because of the pressure and hit you. For this reason position yourself at the side next to the brake when carrying out the following work.

— Undo the manual release bolts equally and remove them.

— Remove and replace the armature plate. When replacing the armature plate, take care that the pressure springs do not fall out of the coil body group.

— Re-fit the new or turned armature plate so that the bores for the manual release bolts are lined up in the armature plate and the coil body group.

— Tighten the armature plate using the manual release bolts.

— Assemble the friction lining group and the brake flange as described in the previous sections. Ensure that the parts are fitted in the correction position.

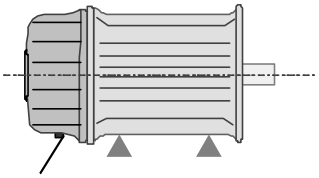
— Undo the manual release bolts anti-clockwise at equal intervals and in equal measure until their bolt heads just come in contact with the brake flange.

— Check and, if necessary, re-adjust air-gap as described above in this chapter.

— Assemble housing, see chapter, “Installation”, section, “Fitting the brake”.

Draining condensed water

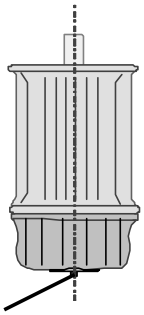
The condensed water must be drained from the brake annually. According to site location and climatic conditions in which the brake is operated, draining the condensed water may have to be carried out more frequently. For this reason the correct maintenance interval for your site location has to be determined by carrying out trial drainings.



Δ Fitting new seals

Always fit a new seal after draining the condensed water.

— Undo the drain plug and remove the seal.



If the brake is fitted horizontally the condensed water can be drained from the screw located underneath.

If the brake is fitted vertically the condensed water can be drained from the screw located underneath.

— Drain condensed water

— Replace and tighten the water drain screw using a new seal.

The brake is now once again ready for operation

Dismantling the Brake

Δ An incorrectly dismantled brake is extremely dangerous

A brake which has been incorrectly dismantled can lead to situations which endanger life and limb. For this reason only trained personnel may open and dismantle the brake.

Δ Before maintenance work halt and secure the equipment

Before starting work bring the equipment to a halt and safeguard the equipment against any inadvertent start-up.

Δ Switch off the power supply

Before starting work on the brake ensure that the power supply is switched off and that a sign is erected at the switch point. Make sure that the electricity cannot be inadvertently switched on.

Δ Danger of crushing

During assembly work on the brake you work with heavy tools. For this reason pay close attention to possible crush situations when:

- Handling tools
- Fitting and dismantling of the brake, additional and spare parts
- Unbolting the brake from the pallet

Δ Aid to assembly

According to the model, the brake may weigh between 19 and 168kg. If necessary, use lifting gear for maintenance work.

Δ Do not use the crane you are working on as lifting gear

Under no circumstances whatsoever must you use the crane on whose brake you are working as lifting gear for brake parts.

In order to dismantle the whole brake proceed in reverse sequence to the procedure described in the chapter, “Installation”. Electrical supply connections may only be made by an electrician.

Cleaning

After longer operating times debris from the lining can collect within the brake assembly itself. No particular maintenance is necessary. We recommend that the cleaning of the internal areas is carried out within the framework of other maintenance work.

Δ Switch off power supply

Before commencing cleaning work on the brake ensure that the power supply is switched off and a sign is erected at the switch point.

Δ Wear protective goggles

Wear protective goggles when blowing out the brake, as this will prevent debris from going in your eyes.

Δ Do not use corrosive chemicals

Do not use corrosive chemicals for cleaning the armature plate and brake flange. Only use cleaning agents which dissolve grease and suitable cleaning materials.

Δ Danger of crushing

Even during cleaning work on the brake you use heavy tools. For this reason pay close attention to possible crush situations when:

- Handling tools
- Fitting and dismantling of the brake, additional and spare parts

To blow out the brake:

— Switch off the power supply.

— Remove housing as described in the chapter, “Installation”, section, “Preparing the brake for fitting”.

— Blow out the brake.

Δ Remove any foreign bodies from the O-ring and assembly surface

When re-fitting the housing, ensure that no foreign bodies are on the housing O-ring or the assembly surface.

— In order to clean and re-fit the housing, proceed as described in the chapter, “Installation”, section, “Fitting the brake”.

Subsequently, check and, if necessary, re-adjust the air-gap. See chapter, “Maintenance”.

Rectifying Malfunctions

In this chapter you will find instructions on rectifying possible malfunctions of the brake. You can remedy some malfunctions yourself, whilst in order to remedy other malfunctions you will have to call in an electrician.

Δ Before maintenance bring the plant to a halt and safeguard it

Before work commences bring the plant to a halt, and safeguard it from being inadvertently switched on.

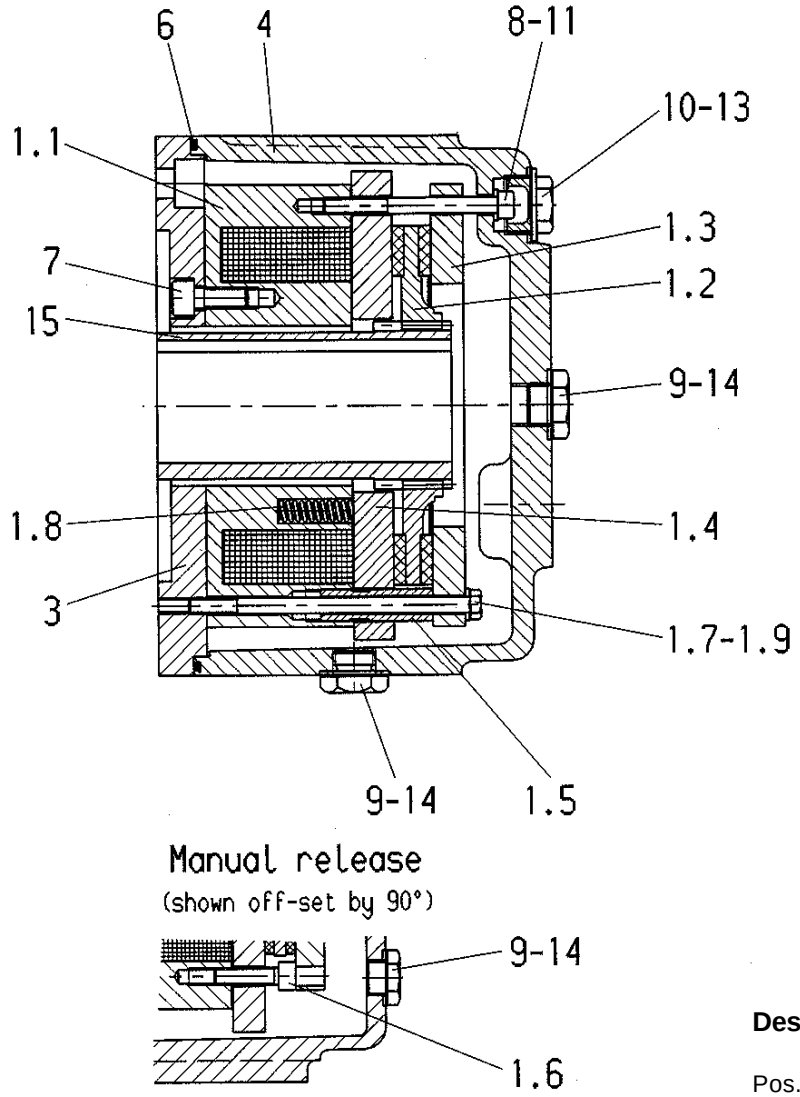
	Malf'tion	Possible cause	Remedy
1	Brake only partly or incorrectly releases	Armature plate sticking on one side	Replace armature plate
2	Excess friction lining wear	Brake is working against the motor	Notify an electrician
		too many switching operations	Lower switching frequency or reduce load to be braked
		Brake too small for the job	Fit larger brake. Check load rating
3	Brake does not transfer full braking torque	Pressure springs missing	Check the number of pressure springs, if necessary fit the correct number
		Lining shoe has been contaminated with oil, grease or similar	Renew friction lining group, clean the armature plate and brake flange carefully, if necessary, renew also.
		Brake is still in the running- in phase	Execute a few dynamic braking operations appropriate for the brake usage

	Malfunction	Possible cause	Remedy
4	No braking effect	Manual release bolts have not been loosened	Turn the manual release bolts anti-clockwise at equal intervals and in equal measure, until the bolt heads just come into contact with the brake flange.
		Circuit breaker contacts do not open	Notify an electrician
5	Brake takes too long to take effect	It has been connected into an A.C. circuit	Notify an electrician
		Circuit breaker contacts do not open	Notify an electrician
		Incorrect voltage overload protection	Notify an electrician
6	Braking effect not cancelled	Power supply failure	Notify an electrician
		Maximum air-gap has been exceeded	Re-adjust air-gap, or replace friction lining group
		Coil burnt out	Notify an electrician
7	Braking effect is cancelled too slowly	Coil voltage too low	Notify an electrician
		It has been connected into an A.C. circuit	Notify an electrician
		Insufficient switching time at rated excitation	Notify an electrician
		Maximum air-gap has been exceeded	Re-adjust air-gap, or replace friction lining group
8	Coil burnt out		Notify an electrician in all cases and ensure that the coil body is replaced.
		Coil voltage too great	Adjust to rated voltage
		Brake was fitted without voltage overload protection.	Voltage overload protection is to be provided for coil outputs in excess of 100W.

Spare Parts

Only use genuine original spare parts, because otherwise the guarantee becomes null and void, and PINTSCH BAMAG accepts no liability in such cases.

You can order spare parts for the KFB brake type from PINTSCH BAMAG, Dinslaken:



Please supply the following details when ordering spare parts:

Dimension of the brake (type)

Brake serial number

Position and description of the spare part

Quantity required

Type and serial number of the brake,
and the coil voltage are specified on the rating plate.

Hub: Specify bore, keyway and length

Adapter flange: Specify outside diameter and thickness

Description of the individual parts

Pos.	Description
1.1	Coil body group
1.2	Friction lining group
1.3	Brake flange
1.4	Armature plate
1.5	Adsustable
1.6	Cylinder bolt
1.7	Hexagon bolt
1.8	Pressure spring
1.9	Circlip
3	Adaptor flange
4	Housing
6	O-Ring
7	Cylinder bolt
8	Cylinder bolt
9	Lock bolt
10	Lock bolt
11	Circlip
13	Washer
14	Washer
15	Hub (Pinion)

Housing: Specify the outside diameter at its greatest point

Additional Equipment for the Brakes

The following additional parts are obtainable for all brakes in the KFB series:

- Function monitoring and / or wear monitoring by micro-switches
- Function monitoring and / or wear monitoring by proximity-switches
- Side-fitting connection box
- Side fitting connection box with rectifier (possible up to KFB 100)
- Preliminary tacho fitting
- Anti-condensation heater (provides heat when plant is idle)
- Manual lever for manual release device
- Reduced braking torque

Please observe the corresponding operating instructions for the additional equipment.

Waste Disposal

Dispose of the brake in accordance with scrapping procedures. Observe all currently valid regulations on the disposal of waste.

Guarantee

PINTSCH BAMAG guarantees its products within the framework of its General Conditions of Sale (GCS) as well as the General Supply Conditions of the Electrical Industry (GSCEI).

The following invalidate the guarantee:

- ❑ User faults caused by damage, incorrect connection, incorrect operation or improper maintenance.
- ❑ Damage caused by the use of excessive force,.
- ❑ Damage caused by using the brake for purposes other than those described in the operating manual.

EC Declaration of Conformity

Seawater-proof electro-magnetic twin-surface Spring-Set-Brake - KFB Series

This declaration refers to your brake. It applies only to the original condition of the brake manufactured by us. Any kind of alteration to the brake, which has not been agreed with us in writing, shall result in invalidating this declaration.

Type	
Serial number	

The brake corresponds to the following standards and directives of the European Community Council:

The conformity of the described product to electrically-operated equipment within definite voltage limits as dealt with in Directive 73/23/EWG of the 19th. February 1973 for the standardization of the statutory regulations of the member states, and the protective requirements specified in their supplements, has been demonstrated by compliance with the following standards:

harmonized European Standards:

EN 60204-1 Date of Issue 1993.6

DIN VDE 0580 Date of Issue 1994.10

IEC-Standards

Provision of the CE symbol in accordance with the low-voltage directive. Year of first provision 1997

Issued by PINTSCH BAMAG Antriebs- und Verkehrstechnik GmbH

Place, Date Dinslaken, the 5.11.1997

Legally binding signatures

Managing Director Commercial Director

This declaration certifies conformity to the specified directives, but, however, contains no guarantee of characteristics.

The safety instructions contained in the enclosed product documentation are to be observed.

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