Operating Manual – External Brake

NORDENHAM

Flameproof External Brake

II 2G Ex db IIC T3…T6 Gb
II 2G Ex db eb IIC T3…T6 Gb
II 2D Ex tb IIIC T85 °C…T200 °C Db

Ex db IIC T3…T6 Gb
Ex db eb IIC T3…T6 Gb
Ex tb IIIC T85 °C…T200 °C Db

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Printed on paper made from chlorine-free and acid-free bleached cellulose.

Warning

- Switch off the power to the device.
- Make sure that the device cannot be switched on again by accident.
- Make sure that the device is de-energised.
- Connect to earth and short out.
- Cover or close off any neighbouring live parts with a barrier.
- Follow the assembly instructions provided for the device.
- Only qualified personnel in accordance with EN 50110-1/-2 (VDE 0105, Part 100) may perform any work on this device/system.
- The electrical installation is to be carried out in accordance with the relevant specifications (e.g. cross-section of the supply cables, fuses, connection of protective conductor).
- Opening the brake - with the exception of the terminal box - during the warranty period without the manufacturer's permission shall invalidate the warranty.
- Original spare parts must be used for all repairs.
- Live and rotating parts of electrical machines can cause major or fatal injuries.
- All work involving transport, installation, start-up and maintenance may only be carried out by qualified experts. Please pay attention to the applicable explosion protection standards and the national accident prevention regulations.
- As regards any equipment subject to these guidelines, it is important to adopt the necessary safety precautions to protect the personnel against possible injuries.
- The personnel must be duly instructed to proceed with caution and according to regulations when transporting, lifting and positioning, re-starting and when repairing the brake.
- Do not lift the brake together with the drive unit using the eyebolts provided for transporting the brake.
- Do not use lifting eyebolts that comply with DIN 580 at ambient temperatures below –20°C. The eyebolts may break at lower temperatures.
- Do not load eyebolts that comply with DIN 580 at more than 45° to the screwing direction. The use of crossbeams is recommended. See the operating instructions for the layout dimensions of the lifting eyebolts and the minimum dimensions of the loading crossbeams and chain lengths.
- Safety precautions must be taken against possible failure of the brake, particularly in the case of applications associated with overhauling loads.
- Operating the brake with the supplied shaft protection cover alone is forbidden.
- If a high-voltage test is necessary, the procedures and precautionary measures laid out in the accident prevention regulations must be followed.

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About this manual

This operating manual applies to brakes with the type designation CM … and CM… N.

In addition to the general assembly instructions, these guidelines are to be followed for the installation, start-up and maintenance of flameproof external brakes with “flameproof” level of protection marked: Ex (II.), Ex db IIC T. Gb bzw. Ex db eb IIC T. Gb and Ex tb IIIC T. Db.

All units associated with the brake have their own additional operating manual which must be followed.

Target group

This manual is aimed at specialists responsible for installing, operating and servicing the brake. As well as conventional technical training, they must possess knowledge in the field of explosion protection.

Abbreviations and symbols

This manual uses abbreviations and symbols having the following meanings:

► Indicates handling instructions.

→ Draws your attention to interesting tips and additional information.

Attention!
Warns against minor damage to property.

Caution!
Warns against major damage to property and minor injuries.

All dimensions are in mm unless otherwise specified.

1. Flameproof brake

Intended use

The brake is to be operated only in accordance with the data specified on the rating plate. According to the relevant marking on the rating plate, it is suitable for use in areas at risk of explosion. The brake is intended for fitting to other motors. Start-up is forbidden until the conformity of the final product with directive 2006/42/EC has been determined.
If the test certificate number on the rating plate is followed by an "X", the "Special Requirements" for safe operation specified in these operating instructions and the supplements to these instructions must be complied with.

► Section "Explosion protection", page 20

Liability and warranty guarantee

We cannot be held liable for any damage or malfunctions resulting from installation errors, the failure to follow these operating instructions or improper repairs.

Original spare parts have been designed and tested specifically for this brake. We recommend that you obtain any spare parts and accessories only from the manufacturer.

We expressly point out that any spare parts and accessories not supplied by the manufacturer require our approval.

Under certain circumstances the fitting and use of third-party products can negatively affect the brake's specified design characteristics and impair safety for personnel, the brake, the motor or other material assets (explosion protection).

The manufacturer shall not be liable for any damage resulting from the use of spare parts or accessories not authorised by the manufacturer.

Any unauthorised conversions and alterations to the brake are not allowed for safety reasons and the manufacturer cannot be held liable for any resulting damage.

Servicing

Our customer service department is available to provide any technical information relating to the brake.

Should any difficulties be encountered with our brake, please contact the factory or local branch office. You will find the address of your local branch office on our website.

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Spare parts

When ordering spare parts, as well as the description of the required part you must also specify the type of brake and the order number.

Delivery, storage, transport

Delivery

► Check the brake for damage in transit.

In the event of damage in transit, the damage must be investigated by the forwarding agent.

► Report any hidden damage to the forwarding agent or manufacturer no later than seven days from receipt of the brake.

The entire packaging material can be recycled by means of the Dual System.

Storage

Brakes can be stored for a maximum of 36 months after delivery under the following conditions.

- The cable entry points must be sealed with screw-in blanking plugs (The cable glands provided are not impervious to rain!).
- The environment must be dry and dust-free.
- The room temperatures must not drop below +5 °C or exceed +30 °C with an air humidity of < 50 % nor register changes in temperature greater than 10 °C/day.
- In order to prevent damage during storage, any vibration that occurs must be V_{eff} < 0.2 mm/s.
- For brakes with regreasing systems that are to be stored for longer than 6 months, regrease at standstill before storage with an amount of grease double that specified on the brake.

Attention!
If the storage conditions deviate from those specified above, the measures laid down in the separate AR9 storage instructions must be adopted.

Transport

Do not lift the brake with the driven machines attached, e.g. motor, pump, gearbox etc. by the brake lifting eyebolts.

Do not use eyebolts in accordance with DIN 580 at ambient temperatures lower than -20 °C. At these temperatures the eyebolts may break and hence injure personnel and/or damage machinery.

Do not load eyebolts that comply with DIN 580 at more than 45° to the screwing direction. The use of crossbeams is recommended. For layout dimensions of the lifting eyebolts and the minimum dimensions of the loading crossbeams and chain lengths cf. Figure 1 and Table 1.

Do not remove the shaft transport protection until the brake is finally mounted. The transport protection must be fitted again in the event of subsequent further transportation in order to protect the bearings.

Attention!
When righting vertical motors from the horizontal position, the brake shaft must not touch the floor to avoid damaging the bearings.

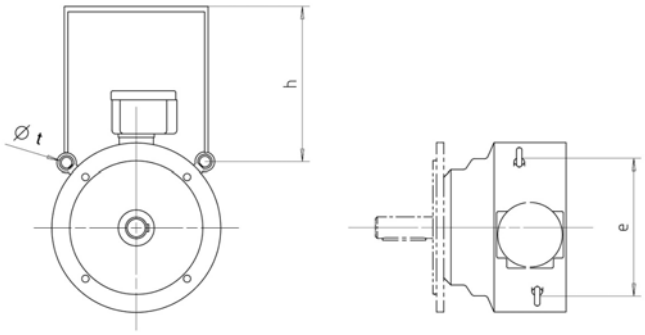


Figure 1: Dimensions for lifting eyebolts and crossbeams

Frame size	Øt	horizontal	
		e	h
80	20	138	200
90	20	138	200
100	20	170	200
112	20	170	200
132	25	217	200
160	25	190	200

Table 1: Minimum dimensions for lifting eyebolts and crossbeams

2. Installation

Mechanical checks

After removing the transport protection, first check the free rotation of the brake shaft. To release the brake, a voltage as shown in the circuit diagram (page 16) must be applied or the manual actuation lever operated (special design). It must now be possible to turn the shaft by hand. Pay attention to striking noise or unusual bearing clearance.

Location

The completely enclosed brake is intended for industrial premises in which it is exposed to soiling, humidity and other open air conditions in accordance with its degree of protection.
The brake must be installed in a place with ambient temperatures of -20 °C to a maximum of +40 °C and a max. of 1000 m above sea level. Any permissible ambient temperatures (T_{amb}) and heights (MSL) other than those indicated above must be specified on the rating plate.
The brake must not be allowed to stand in direct sunlight at ambient temperatures of above +30 °C.

The brake is intended for use in areas at risk of explosion. The following information on the rating plate identifies the brake as flameproof equipment and provides information on its intended use:

- Device group
- Device category
- Degree of protection
- Protection class IP
- Max. surface temperature (temperature class)
- Equipment Protection Level (EPL)

This information assigns the brake to the relevant zone of the industrial premises.

Mounting

The brake is fitted to the motor by means of the flange. Brakes with cylindrical roller bearings (→ see note on brake) must be operated with a minimum load to ensure that the anti-friction bearings operate correctly. (→ Table 2)

Frame size	80	90	100	112	132	160
Minimum load [N]	220	220	277	277	475	600

Table 2: Minimum load on the shaft collar for brakes with cylindrical roller bearings

The bearings may be damaged if the minimum load is not achieved. Even test runs in an unloaded condition can cause damage.
The max. permissible loads can be found in our technical documentation "Flameproof Three-Phase Motors" or requested from the manufacturer.

Attention!
Make sure that the fixing screws are adequately sized.

Because of the pressure-resistant design of the brake, a maximum vibration speed of only 3.5 mm/s is permitted. The fixing screws must be tightened and secured in accordance with their rating to prevent loosening during operation and hence damage to the drive (→ Table 3, page 12).

The balance of the brake is specified on the shaft end plate and/or on the rating plate after the brake number (H = half key).

The design of the coupling or pulley must match the balance of the brake.

Attention!
For designs with half key (H), machine protruding (visible) parts of the key down to shaft diameter or cover them with washers with keyway along the relevant length.
If the coupling is longer than the key, the keyway in the overlapping part of the coupling must be filled.
Failure to comply with the above will result in out-of-balances which may lead to excessive vibration.

Attention!
Fit pulleys or couplings only by means of the threaded holes in the shaft end to avoid damaging the anti-friction bearings (→ Figure 2).

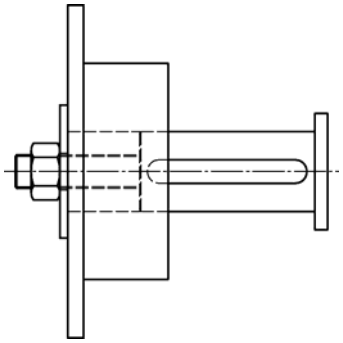


Figure 2: Fixing of pulleys or couplings

- ► Screw the threaded bolt into the threaded hole.
- ► Then mount the pulley or coupling on the shaft end by screwing a nut with a washer having at least the same diameter as the pulley hub or coupling onto the threaded bolt.
  Fit only carefully dynamically balanced pulleys or couplings on the shaft end. Machines which are to be connected to the brake by

means of couplings must be aligned according to the specifications of the coupling manufacturer.

→ Only use flexible couplings!

Mains supply and connections

The brakes operate in accordance with EN/IEC 60034 with mains voltage variations of up to ±10 % and frequency variations of up to –5 % to +3 %. The mains ratings must match the voltage and frequency data specified on the rating plate.
Connect the brake according to the connection diagrams included in the terminal box (→ Connection diagrams; page 16). Use only the supplied original connection components for this purpose (→ Figure 5: Cable connection, page 14).

Attention!
Connect the brake, controller, overload protection and earthing in compliance with local installation requirements.

Attention!
A monitoring device that has been activated must not switch itself on again automatically.

Mains connection of flameproof brakes

As well as any general installation regulations, EN/IEC 60079-14 must be complied with. Overload protection must be subsequently provided either by means of a circuit breaker or similar protective device. This may also include PTC thermistors with tripping device (→ Section "Brake with temperature monitoring", page 15). These must be specified on the rating plate together with a tripping time t_A.
If the test certificate number on the rating plate is followed by an "X", the "Special Requirements" for safe operation specified in these operating instructions and the supplements to these instructions must be complied with.
(→ Section "Explosion protection", page 20)

Terminal box

Open the box by removing the screws on the cover (Figure 3: Terminal box with fixing screws ①, page 12) or, in the case of models with grub screw (Figure 4: Terminal box with grub screw ②, page 12), by turning the grub screw counter-clockwise and then unscrewing the threaded cover. Seal the terminal box again in the same way after connecting the mains.

The terminal box can be rotated through 4x90°.

Attention!
You may only unscrew terminal boxes which are secured as shown in Figure 4 by a maximum of one turn away from the thread end stop.

- ► Subsequently retighten the fixings to the relevant torque for the thread, see the following Table 3.
- ► Secure the screws with a low-strength anaerobic screw locking adhesive.

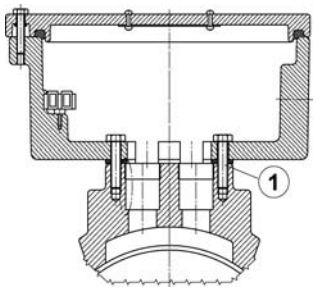


Figure 3: Terminal box with fixing screws ①

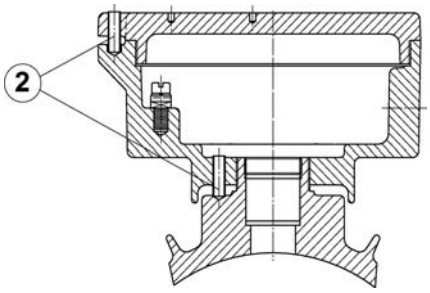


Figure 4: Terminal box with grub screw ②

Thread size	Torque
M5	6 Nm
M6	10 Nm
M8	25 Nm
M10	49 Nm

Table 3: Torque values for 8.8-type screws

Attention!
The grub screws as anti-rotation protection for the terminal box are part of the flameproof protection and may only be replaced with genuine spare parts.

Attention!
Screwed-on covers must also be secured to prevent them from unintentionally working themselves open.

The surfaces of flash-proof gaps, particularly for terminal box covers with “flameproof” ignition protection, “marking Ex db IIC" must be protected from corrosion.
(→ Section "Explosion protection", page 20)

Attention!
In the case of terminal boxes with "increased safety" and "dust protection" level of ignition protection, the gaskets used are included in the approval. Only original gaskets are to be used.

When sealing terminal boxes, tighten the cover screws in a crosswise manner.

Attention!
Do not damage the flat surface of the Ex-gap with sharp tools (screwdrivers) when opening the cover of terminal boxes with "flameproof" ignition protection. Use jacking screws.

Cable and conduit entry points

Connect brakes by means of cable glands or by means of a conduit system in accordance with EN/IEC 60079-14. These must meet the following requirements:

- EN/IEC 60079-7 for terminal boxes with "increased safety" level of ignition protection, (Ex db eb IIC T. Gb marking on the component)
- EN/IEC 60079-1 for "flameproof" level of ignition protection, (Ex db IIC T. Gb marking on the component)

Specific test certificates must be provided for cable glands.

Attention!
Any openings that are not used must be closed with sealing plugs for which the relevant test certificates and/or the aforementioned markings must also be provided.

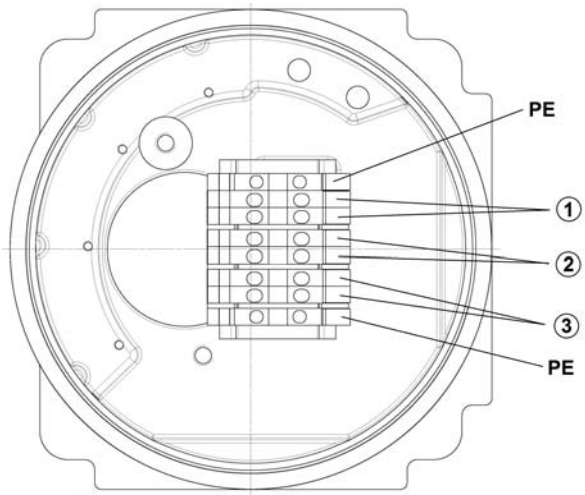
Attention!
The supplied sealing plugs for the cable entry points serve only as protection during transportation and are not an approved sealing means. This also applies to the storage of brakes outdoors. In this case additional rain protection is required.
The glands supplied as a standard (version 1) are used for the entry of permanently laid cables.

Attention!
Cable glands and sealing plugs that fail to meet these requirements are prohibited. The cable and conductor diameters used must comply with the clamping range specified on the gland. Follow the instructions for using the cable glands.

Mains and monitoring cable connection

With both the rail-mounted terminal or the mini terminal design, the power feed can be connected either with or without cable lugs (cf. Figure 5, page 14)

► Connect the power cable to the relevant terminals in accordance with the supplied wiring diagram.



①	Brake	BA1-BA2
②	Brake	BA3-BA4
③	Thermistor	2TP1-2TP2

Figure 5: Cable connection

Take note of the maximum connectable conductor cross-section for the terminals. If no other data is available on the terminals, refer to the following table.

Shaft height	Rated cross-section [mm^2]
71-112	1
132-160	1

Table 4: Rated cross-sections

In the case of "increased safety" terminal boxes, be sure to comply with the clearances specified in EN/IEC 60079-7 (→ Table 5) between conductive parts having different potentials. Tighten the screws and nuts on the live parts to the specified torque.

Rated voltage U [V]	Minimum clearance [mm]
175 < U ≤ 275	5
275 < U ≤ 440	6
440 < U ≤ 550	8
550 < U ≤ 690	10
690 < U ≤ 880	12

Table 5: Clearances

Additional terminals, e.g. for temperature monitoring or anti-condensation heaters, are located in the main terminal box; see circuit diagram supplied.

Attention!
Pay attention to the rating data printed on the terminals.

Attention!
Only use separately approved components inside Ex e housings.

Attention!
Keep the circuit diagram supplied in the terminal box with the documents associated with the machine.
The circuit diagram must not be left in the terminal box during operation!

Brake with temperature monitoring

Terminals 2TP1-2TP2

The brakes are equipped with thermistors in accordance with DIN 44081 or other temperature sensors. Please note the specifications on the rating plate.

The sensors must be included in the safety chain for the driven machine and must shut down the whole drive.

Connect the thermistors to an approved tripping device with marking PTB 3.53-PTC/A or Ex II(2) GD.
(For more information, read Section 3 "Operation and repair", page 18 ff.)

Attention!
Pay attention to the operating instructions for the tripping device.

Brake with anti-condensation heater

The rating data for the anti-condensation heater is specified on a label on the brake. Heating is by means of heater bands. These are energised via terminals 1HE1-1HE2.

Attention!
Make sure by means of the electric control that the brake voltage and the heater voltage cannot be connected simultaneously.

→ The brake must be used in accordance with the design. For more information, please refer to the rating label.

→ The heater bands that are used are made from a self-limiting semiconductor material. It is not possible to perform a function test using a resistance measurement. The testing takes place by measuring the activation current. Specific values for a particular brake must be obtained from the manufacturer.

Fitting to the motor

Figure 6: Flameproof external brake CM …

Figure 7: Flameproof external brake CM … N

This operating manual is applicable to both the CM … with facility for attaching to the drive end and to the CM… N with facility for attaching to the non-drive end. Please refer to the brake rating plate for the type of brake supplied.

The mains cable is connected in the brake terminal box. Pay attention to the connection diagram supplied and the rated voltage shown on the rating plate.

Please refer to the brake rating plate for the actual brake torque. The stated values in the following table are standard values.

		Frame size						
		71	80	90	100	112	132	160
Brake torque [Nm]	Standard brake	4	8	16	30	60	100	150
Max. speed [rpm]		3600	3600	3600	3000	3000	3000	1500

Table 6: Technical data for external brake CM … (N)

→ The temperature sensors fitted in the brake must be connected in accordance with Section "Brake with temperature monitoring", page 15.

Connection diagrams

The circuit diagram supplied with the brake is definitive.

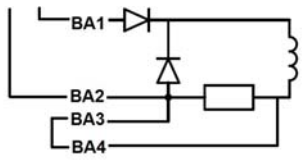


Figure 8: Brake supply

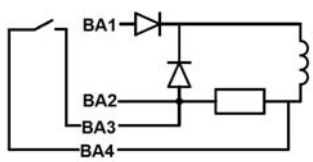


Figure 9: Switching off on the DC side

Brake supply

The supply can be connected to terminals BA1 and BA2. Pay attention to the brake voltage. Terminals BA3 and BA4 must be bridged. (→ Figure 8)

Switching off on the DC side

For a rapid engagement of the brake, the bridge between BA3 and BA4 can be replaced by a contact. The contact must be opened at the same time as the brake power supply. (→ Figure 9)

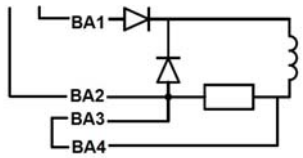


Figure 10: Emergency brake release

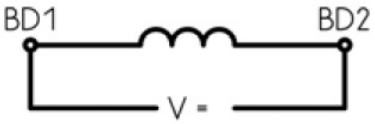


Figure 11: DC operation

Emergency brake release

Apply DC to terminals BA1 and BA4, remove other wiring and observe polarity.
DC voltage ≈ 0.45 x AC voltage according to rating plate.
(→ Figure 10)

DC operation

A protection circuit must be provided when operating with DC (connection BD1 and BD2). (→ Figure 11)
Note peak withstand voltage of 2.15 kV!

3. Operation and repair

Duty types and thermal protection

The temperature sensors must be connected as specified in the Section "Brake with temperature monitoring“, page 15

Attention!
A monitoring device that has been activated must not switch itself on again automatically.

Special operating conditions

Ambient temperature

Unless otherwise specified on the brake rating plate, the standard temperature range is –20 °C to +40 °C.

Heat input through the driven machine

It must be ensured that no quantities of heat greater than the maximum heating values specified in Table 7 are transmitted from an external machine to the interface with the brake (i.e. shaft and brake flange). In this way, it is ensured that no point on the brake exceeds the temperature class.

	Temperature class		
	T6 = 85 °C	T5 = 100 °C	T4 = 135 °C
Permissible heating on the shaft	30 K	40 K	65 K
Permissible heating on the flange	30 K	40 K	65 K

Table 7: Permissible surface heating at an ambient temperature of 40°C

Brake with drain screws (optional)

Condensation that has collected in the brake can be drained by unscrewing the drain screws. This opens the flameproof housing. After switching off the brake, a waiting time as specified on the label on the brake must elapse. Only then may be drain screw be removed. Brakes must only be operated if the drain screw is fully tightened. Tightening torque in accordance with Table 3, page 12. Drain screw M6x12.

Start-up

Attention!

The brake must be run in before operation. 15 dynamic braking operations must be carried out at 30% of maximum speed and 50% of maximum friction work. Running-in must not take longer than 30 minutes.

Attention!

When putting the brake into operation, it must be ensured that the

external motor does not work against the brake. For more information, refer to the circuit diagrams on page 16 f.

Starting up following storage

If the brake has been put into storage and an additional quantity of grease has been applied to the anti-friction bearings, the brake must be run at no load for at least 30 minutes to ensure an adequate distribution of grease and to avoid overheating of the bearings. Compare the electrical power with the information on the rating plate. The required protective devices must be set to the brake rating according to the rating label. The specified current value on the rating plate must not be exceeded in continuous duty conditions.

Attention!
Run the machine unit for at least 1 hour and check that there is no unusual noise or heating which exceeds the specified temperature class. In doing so, do not allow the brake to engage.

During start-up, lubricate brakes with regreasing device with the amount of grease specified on the brake.
Vibration severity values of V_{eff} < 2.3 mm/s for rigid foundations and V_{eff} < 2.8 mm/s for flexible foundations in accordance with EN/IEC 60034-14 are harmless in coupled operating mode. In the event of changes to normal operation, e.g. increased temperatures, noise, and vibration, determine the cause and consult the manufacturer if necessary.

Attention!
The protective equipment must always be kept in service, even during trial runs. In case of doubt switch off the machine.

Maintenance

Inspection

- Brakes are to be constantly monitored depending on the operating conditions.
- Keep brakes clean and the ventilation openings free.

Any national regulations applicable to the maintenance and repair of electrical equipment in areas at risk of explosion, e.g. in Germany the Ordinance on Industrial Safety and Health, EN/IEC 60079-19 etc., are to be complied with.

During maintenance especially those parts on which the degree of protection depends must be checked; these include, for instance, the integrity of the cable entry components, gaskets and shaft seals.

Storage and lubrication

Attention!
In order to avoid damage the bearings and grease must be kept clean.

The calculated service life of the bearings is 50,000 operating hours with coupling operation only. The maximum permitted radial and axial loads can be found in our technical documentation "Flameproof AC motors". The brakes are equipped with deep groove ball bearings as standard; with reinforced bearings (roller bearings) the bearing type is specified on the rating plate.

The grooved ball bearings of brakes up to Size 160 are sealed on both sides as standard and filled with grease by the bearing manufacturer. With horizontal installation, this is suitable for 40,000 operating hours up to +40 °C ambient temperature and a maximum of 1500 rpm, and for 20,000 operating hours at a maximum of 3000 rpm.

The shaft seals must also be changed when the bearings are replaced. Disassembly and assembly must be carried out in accordance with the separate manufacturer repair instructions.

Caution!
If regreasing is carried out while the brake is running, provide adequate protection against rotating parts!
Only resin-free and acid-free anti-friction bearing grease with a drop point of approx. 200 °C is to be used.

→ Longer down times must be taken into consideration in the usage period for the grease. This can be reduced considerably depending on the external load.
This also applies to bearings which are greased for life. It is recommended that these bearings be changed after 5-6 years. In the event of longer down times, it is recommended that the shaft be turned once per month to avoid bearing damage.

Explosion protection

Markings such as Ⓔx (II2G) Ex db eb IIC T4 Gb indicate where the brake may be used and that it has been designed, built and approved according to the relevant IEC and European standards required for operation in potentially explosive areas.

Attention!
The brake must not be modified in any way and these operating instructions must be complied with in all cases.

If the brake is modified or repairs need to be made, this must only be carried out by the manufacturer or by repair workshops that possess the necessary explosion protection know-how. Before restarting the brake, conformity with the requirements is to be ascertained by a nominated body in accordance with EC directives 2014/34/EU and 99/92/EC and confirmed by means of an appropriate marking on the brake or by issuing a test report.

If these requirements are not met, the brake is no longer classified as flameproof and the marking - see above - must be removed.

Special conditions for ensuring explosion protection during operation

- All contact screws and nuts for the electrical connections are to be tightened securely to prevent excessively high contact resistance values that may lead to an inadmissible degree of heating at the point of contact.
  (→ Table 3: Torque values for 8.8-type screws, page 12).
- Use the utmost caution when connecting the mains cable. Observe the creepage distances and clearances. Use the seals provided at the cable entry points and terminal boxes as well as the strain and torsion-relief components for the mains cables in order to maintain the degree of protection for the terminal boxes.
  (→ Mains supply and connections, page 11).
- Rectify any damage immediately and use only original spare parts. A nominated body must check that the work has been properly carried out in accordance with the relevant EC directives. In Germany this must be undertaken by a qualified expert in accordance with the “Ordinance on Industrial Safety and Health”, and in other countries in accordance with the applicable national regulations, and confirmed by means of an appropriate marking on the brake or by issuing a test report.
- In order to avoid electrostatic charging of the painted surface of the brake, in accordance with EN/IEC 60079-0 for group IIC, the thickness of the coating must either be no more then 200 µm or appropriate evidence that it cannot be charged must be provided. Original brakes fulfil these requirements. Subsequent overpainting with any coating system is possible up to a maximum coating thickness of 200 µm.
  Thicker coatings are only possible using the original coating systems after consulting the manufacturer.
  Processes that generate extreme amounts of charging must be avoided with special offshore and NORSOK systems when used in Zone 1 and Zone 21.
- The surfaces of ignition-protected gaps must not be reworked and must be protected from corrosion. Grease used for protecting the surfaces of the joints against corrosion must not harden with age, must not contain volatile solvents and must not cause the surfaces to corrode. Other approved sealing materials are: Hylomar, by Marston-Domsel or Admosit and Fluid-D, by Teroson (follow the manufacturer's instructions for use). This must be observed in particular for openings in the cover of terminal boxes having a flameproof degree of protection, marking Ex db IIC.
- The mechanical connection of the brake must be smeared with assembly paste which prevents frictional corrosion.
- All screws must be tightened to the specified torque (→ Table 3, page 12) and the full number of screws for the fixing holes provided must be fitted. Damaged screws must only be replaced with screws of the same dimensions and quality (at

least A2-70) unless otherwise specified on the rating plate.

- With vertical designs, the manual actuation lever must be removed during operation.

Repair

Repairs and modifications to explosion-protected machines are to be carried out by a nominated body in accordance with EC directives 2014/34/EU and 99/92/EC, in Germany in compliance with the “Ordinance on Industrial Safety and Health”, as well as with the safety regulations and descriptions in our repair instructions.
Any works relating to the explosion protection must be carried out by the manufacturer or by a specialised workshop for electrical machinery. If the work is not performed by the manufacturer, it must be inspected by a recognised qualified person.
In Germany, written confirmation according to the "Ordinance on Industrial Safety and Health" is required before restarting. In foreign countries the applicable national regulations must be complied with.
Repairs to the flash-proof joint may only be carried out in accordance with the manufacturer's design specification. Repairs in accordance with the values in Tables 1 and 2 of EN/IEC 60079-1 are not permitted.

4. Additional dust protection requirements

Intended use

The flameproof external brake is intended for operation in Zone 21 and 22. The marking Ⓔx II 2D Ex tb IIIC T… °C Db must be included on the brake rating plate.

Installation and operation

Cable and conduit entry point
Separately approved entry points belonging to protection by housing “tb” with at least IP 65 or category 2D are to be used. Any openings that are not used are to be sealed with duly approved plugs.

Operation and repair
Brakes must be operated in accordance with the requirements of EN/IEC 60079-31. They must not be operated with excessive dust deposits, as these may lead to the permissible surface temperature being exceeded. Regular cleaning must be ensured.

The radial shaft sealing rings are included in the approval. Only original gaskets are to be used.

For brakes with a roller bearing re-greasing facility, it must be ensured that the greasing channels are always filled with grease, as otherwise the explosion protection will be null and void.

Processes that generate extreme amounts of charging must be avoided with special offshore and NORSOK coating systems when used in zone 21.

Deutsch: Sollten Sie die Angaben in dieser Betriebsanleitung in der vorliegenden Sprache nicht lesen können, so wenden Sie sich bitte an das Herstellerwerk.

Dansk: Hvis denne brugsanvisning ikke er skrevet på et sprog, som du forstår, så henvend dig venligst til fabrikanten.

Suomi: Ellette pysty lukemaan tämän käyttöohjeen tietoja olemassa olevalla kielellä, ottakaa yhteyttä valmistajaan.

Français: Si vous ne pouvez pas lire la langue dans laquelle sont écrites les indications contenues dans les présentes instructions de service, veuillez vous adresser au fabricant.

Español: Si no puede leer las indicaciones en estas instrucciones de funcionamiento editadas en el presente idioma, diríjase por favor a la empresa fabricante.

Elinika: Εάν δεν μπορείτε να διαβάσετε στην υπάρχουσα γλώσσα τα στοιχεία σε αυτές τις οδηγίες λειτουργίες, σας παρακαλούμε να απευθυνθείτε στον κατασκευαστή.

English: If you cannot understand the operating instructions in the language provided please contact the manufacturers.

Italiano: Se non potete leggere le informazioni contenute nelle istruzioni per l'uso nella lingua in cui sono formulate, vi preghiamo di rivolgervi allo stabilimento di produzione.

Nederlands: Wanneer u op grond van de gebruikte taal de gegevens in deze bedrijfshandleiding niet kunt lezen, verzoeken wij u om contact op te nemen met de fabrikant.

Portugês: Caso não lhe seja possível compreender as indicações neste manual de instruções no presente idioma, queira contactar o fabricante, por favor.

Svenska: Om du inte förstår innehållet i instruktionsboken på det aktuella språket, kontakta tillverkaren.

Čeština: Pokud byste informace v tomto návodu k obsluze nemohli číst ve stávajícím jazyce, obraťte se prosím na výrobce.

Magyar: Ha a használati útmutató adatai ezen a nyelven nem érthetőek, akkor kérjük, forduljon a gyártóhoz.

Slovenščina: V primeru, da podatkov v priloženih navodilih za uporabo v danem jeziku ne razumete, se obrnite na proizvajalca.

Slovenčina: Pokiaľ by ste údaje v tomto návode na použitie v danom jazyku nevedeli prečítať, obráťte sa prosím na výrobný závod.

Lietuviškai: Jei negalite perskaityti šioje naudojimo instrukcijoje tam tikra kalba pateiktų duomenų, kreipkitės į gamintoją.

Latviski: Ja šajā lietošanas pamācībā informācija sniegta Jums nezināmā valodā, lūdzam Jūs vērsties ražotājfirmā.

Polski: Jeżeli nie możecie Państwo przeczytać instrukcji obsługi w tym języku, prosimy o zwrócenie się z tym do zakładu produkcyjnego.

Eesti: Kui te ei suuda selle tegevusjuhendi andmeid antud keeles lugeda, siis palun pöörduge tootjatehase poole.

Български: Ако не можете да разберете инструкциите за експлоатация на дадения език, моля обърнете се към производителите.

Română: Dacă nu înţelegeţi instrucţiunile de exploatare în limba în care sunt furnizate, vă rugăm să contactaţi producătorul.

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