Motors – Operating and Assembly Instructions

Safety and operating instructions for electric motors
(according to: Low Voltage Directive 2006/95/EEC (as of 20/04/2016: 2014/35/EU)

1 General
During operation, devices may, depending on their protection class, have live, bare, moving or rotating parts or hot surfaces.
Unauthorised removal of covers, improper use, incorrect installation or operation causes a risk of serious personal injury or material damage.
Further information can be found in this documentation.

All transportation, installation commissioning and maintenance work must be carried out by qualified personnel (compliant with IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national accident prevention regulations).

For the purposes of these basic safety instructions, qualified personnel are persons who are familiar with the assembly, installation, commissioning and operation of this product and who have the relevant qualifications for their work.

2. Proper use in Europe
The devices are components intended for installation in electrical systems or machines.

When installed in machines, the devices must not be commissioned (i.e. commencement of the proper use) until it has been ensured that the machine meets the provisions of the EC Directive 2006/42/EEC (Machinery Directive); EN 60204 must also be complied with.

Commissioning (i.e. implementation of proper use) is only permitted if the EMC directive (2004/108/EEC) is complied with (as of 20/04/2016: 2014/30/EU).

Devices with a CE label meet the requirements of the Low Voltage Directive 2006/95/EEC (as of 20/04/2016: 2014/35/EU). The stated harmonized standards for the devices are used in the declaration of conformity.

Technical data and information for connection conditions can be found on the rating plate and in the documentation, and must be complied with.

The devices may only be used for safety functions which are described and explicitly approved.

3. Transport, storage
Information regarding transport, storage and correct handling must be complied with.

4. Installation
The installation and cooling of the equipment must be implemented according to the regulations in the corresponding documentation.

The devices must be protected against impermissible loads. Especially during transport and handling, components must not be deformed and/or insulation distances must not be changed.
Electrical components must not be mechanically damaged or destroyed (this may cause a health hazard!).

5. Electrical Connection
When working on live devices, the applicable national accident prevention regulations must be complied with (e.g. BGV A3, formerly VBG 4).

The electrical installation must be implemented according to the applicable regulations (e.g. cable cross-section, fuses, earth lead connections). Further instructions can be found in the documentation.

Information regarding EMC-compliant installation – such as shielding, earthing, location of filters and installation of cables – can be found in the documentation for the devices. These instructions must be complied with even with CE marked devices. Compliance with the limiting values specified in the EMC legal regulations is the responsibility of the manufacturer of the system or machine.

6. Operation
Where necessary, systems in which the devices are installed must be equipped with additional monitoring and protective equipment according to the applicable safety requirements, e.g. legislation concerning technical equipment, accident prevention regulations, etc.

The parameterisation and configuration of the devices must be selected so that no hazards can occur.

All covers must be kept closed during operation.

7. Maintenance and repairs
The following applies in particular for operation with frequency inverters:
After the devices are disconnected from the power supply, live equipment components and power connections should not be touched immediately, because of possible charged capacitors.

Observe the applicable information signs located on the device.

Further information can be found in this documentation.

These safety instructions must be kept in a safe place!
Title: B 1091
Order – No.: 6051302
Series: Asynchronous motors / Synchronous motors

• 1 and 3-phase asynchronous motors
  SK 63*[1]*2) *3) up to SK 315*[1]*2) *3)
  - optionally supplemented with: H, P
  2) Pole number labelling: 2, 4, 6, 8, ...
  3) further options

• 3-phase synchronous motors
  SK 63*[1]*2) *3) *4) up to SK 132*[1]*2) *3) *4)
  1) Winding version: T, F, ...
  2) Power number: 1 to 9
  3) Pole number labelling: 4, 6, 8, ...
  4) further options

• Three-phase asynchronous motors
  SK 63*[1]*2) 2D *3) up to SK 200*[1]*2) 2D *3)
  - optionally supplemented with: H, P
  2) Pole number labelling: 2, 4, 6
  3) Options

  with ATEX labelling II 2D Ex tb IIIC T . . . °C Db

  SK 63*[1]*2) 3D *3) up to SK 200*[1]*2) 3D *3)
  - optionally supplemented with: H, P
  2) Pole number labelling: 2, 4, 6
  3) Options

  with ATEX labelling II 3D Ex tc IIIB T . . . °C Dc

  SK 63*[1]*2) 2G *3) up to SK 200*[1]*2) 2G *3)
  - optionally supplemented with: H, P
  2) Pole number labelling: 2, 4, 6
  3) further options

  with ATEX labelling II 2G Ex eb IIC T3 Gb

  SK 63*[1]*2) 3G *3) up to SK 200*[1]*2) 3G *3)
  - optionally supplemented with: H, P
  2) Pole number labelling: 2, 4, 6
  3) further options

  with ATEX labelling II 3G Ex ec IIC T3 Gc
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| B 1091, March 2016  | 6051302 / 1016 | • General corrections  
                      |                                                      | • Structural adjustments to document                   |
| B 1091, December 2016 | 6051302 / 4816 | • General corrections                                      |
| B 1091, June 2017   | 6051302 / 2417 | • Technical supplements                                    |
| B 1091, August 2017 | 6051302 / 3517 | • Technical supplements                                    |
| B 1091, June 2018   | 6051302 / 2318 | • General corrections  
                      |                                                      | • Update of EU/EC Declaration of Conformity 2D/3D       |
| B 1091, August 2018 | 6051302 / 3118 | • General corrections  
                      |                                                      | • Section for operation with frequency inverter removed  
                      |                                                      | • Section for special operating conditions, permissible surrounding area supplemented  
                      |                                                      | • Ignition protection type labelling and type plates updated  
                      |                                                      | • Update of EU/EC Declaration of Conformity 2G/3G          |

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Publisher

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Member of the NORD DRIVESYSTEMS Group
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1 General

These operating instructions must be read before NORD motors are transported, installed, commissioned, serviced or repaired. All persons who are involved in these tasks must observe these operating instructions. In order to prevent injury or damage, all of the safety information in these operating instructions must be strictly observed.

The information and instructions in the instructions, safety and commissioning information which is supplied, as well as all other instructions must be observed.

This is essential to prevent injury and damage.

The applicable national, local and plant-specific regulations and requirements and regulations must be observed.

Technical details may vary for special designs and constructions. In case of doubt, we urgently recommend that the manufacturer is contacted, giving details of the type designation and the motor number.

Qualified personnel are persons who due to their training, experience and instruction, and their knowledge of the relevant standards, accident prevention regulations and operating conditions are authorised to carry out the necessary activities.

This also includes knowledge of first aid measures and the local emergency services.

It is assumed that the work for transport, assembly, installation, commissioning, maintenance and repair will be performed by qualified staff.

In particular, the following must be observed:

• Technical data and information regarding permissible use, installation, connection, ambient and operating conditions, which are contained in the catalogue, the order documents and other documentation for the product.
• Local and plant-specific regulations and requirements
• Correct use of tools, lifting and transportation equipment
• Use of personal protective equipment

For reasons of clarity, the operating instructions do not contain detailed information about possible versions and therefore do not consider all possible cases of installation, operation or servicing.

Because of this, these operating instruction essentially only contain the information which is necessary for proper use by qualified personnel.

In order to prevent faults it is necessary that the prescribed service and inspection work is carried out by appropriately qualified personnel.

• For the operation on an inverter, the planning guideline B1091-1 forms a part of these operating instructions.
• The supplementary operating instructions must be observed if an external fan is present.
• For braking motors, the supplementary brake operating instructions must be observed.

If the operating instructions or the planning guide are lost for any reason, these documents must be obtained from NORD.
1 General

1.1 Safety and installation notes

The devices are operating materials intended for use in industrial high voltage systems, and are operated at voltages that could lead to severe injuries or death if they are touched.

The device and its accessories must only be used for the purpose which is intended by the manufacturer. Unauthorised modifications and the use of spare parts and additional equipment which has not been purchased from or recommended by the manufacturer of the device may cause fire, electric shock and injury.

All of the associated covers and protective devices must be used.

Installation and other work may only be carried out by qualified electricians with strict adherence to the operating instructions. Therefore keep these Operating Instructions at hand, together with all supplementary instructions for any options which are used, and give them to each user.

Local regulations for the installation of electrical equipment and accident prevention must be complied with.

1.1.1 Explanation of labels used

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER</td>
<td>Indicates an immediate danger, which may result in death or serious injury.</td>
</tr>
<tr>
<td>WARNING</td>
<td>Indicates a possibly dangerous situation, which may result in death or serious injury.</td>
</tr>
<tr>
<td>CAUTION</td>
<td>Indicates a possibly dangerous situation, which may result in slight or minor injuries.</td>
</tr>
<tr>
<td>NOTICE</td>
<td>Indicates a possibly harmful situation, which may cause damage to the product or the environment.</td>
</tr>
</tbody>
</table>

Note

Indicates hints for use and useful information.
### 1.1.2 List of safety and installation notes

#### DANGER! Electric shock

The motor is operated with a dangerous voltage. Touching certain conducting components (connection terminals and supply cables) will cause electric shock with possibly fatal consequences.

Even when the motor is at a standstill (e.g. due to the electronic block of a connected frequency inverter or a jammed drive unit) the connection terminals and supply cables may carry a dangerous voltage. A motor standstill is not identical to electrical isolation from the mains.

Even if the drive unit has been disconnected from the mains, a connected motor may rotate and possibly generate a dangerous voltage.

Installation and work must only be carried out when the motor is at a standstill and is disconnected (all phases disconnected from the mains).

Follow the **5 Safety Rules** (1. Switch off the power, 2. Secure against switching on, 3. Check for no voltage, 4. Earthing and short circuiting, 5. Cover or fence off neighbouring live components).

#### WARNING Hazard due to heavy loads

The large weight of the motor must be taken into account during any transportation or installation work.

Incorrect handling may cause the motor to fall or swing without control and therefore cause severe, and possibly fatal injuries due to impact, crushing and other physical injuries. In addition, severe damage to the motor and its surroundings are possible.

Therefore:
- Do not stand under suspended loads
- Only use the attachment points provided
- Check that lifting equipment and lashings have adequate load capacity and are undamaged
- Avoid hectic movements
- Use personal protective equipment

#### WARNING Injury due to movement

Under certain conditions (e.g. switching on the power supply, releasing a holding brake) the motor may start to move. The machinery which it drives (press / chain hoist / roller / fan etc.) may then make an unexpected movement. This may cause various injuries, including to third parties.

Before switching on, secure the danger area by warning and removing all persons from the danger area.

#### WARNING Hazard due to loose parts

Care must be taken that there are no loose parts on the motor. Otherwise, these may cause injury during transportation and installation work, or when the motor is in operation.

Loose carrying or lifting eyes may cause the motor to fall during transportation.

Parallel keys on the motor shaft may be thrown out when the motor shaft rotates.

Fasten or remove loose parts and carrying or lifting eyes; secure or remove free parallel shaft keys on the motor shaft(s).
1 General

**CAUTION**  
Danger of burns

The surface of the motor may heat up to temperatures in excess of 70°C.
Touching the motor may cause local burns to the affected parts of the body (hands, fingers, etc.).
To prevent such injuries, allow sufficient time for cooling down before starting work - the surface temperature should be checked with suitable measuring equipment. In addition, keep sufficient distance from adjacent components during installation, or install protection against contact.

1.2 Field of use

*Use of the motors:*

The motors may only be used for their intended purpose (to drive machinery).
The motors are constructed with at least protection class IP55 (for the protection class: see rating plate). They may be installed in dusty or damp environments.
In principle the conditions of use and the ambient conditions determine the necessary protection class and any other additional measures. For outdoor installation and vertical versions, e.g. V1 or V5 with the shaft pointing downwards, Getriebebau NORD recommends the use of the double fan cover option [RDD].
Motors must be protected against intensive sunlight, e.g. by the use of a protective cover. The insulation is tropicalised.

<table>
<thead>
<tr>
<th>Installation altitude:</th>
<th>≤ 1000 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature:</td>
<td>-20°C...+40°C</td>
</tr>
</tbody>
</table>

For standard motors an extended ambient temperature range from -20°C...+60°C is permissible. In this case, the rated power must be reduced to 82% of the value stated in the catalogue. If the maximum ambient temperature is between +40°C and +60°C, the power output should be inversely linearly interpolated between 100% and 82%.

The motor connection cables and the cable glands must be suitable for temperatures ≥ 90°C.
1.3 Correct handling of electric motors

All work must only be carried out with the power to the system switched off.

1.3.1 Transport, storage

**WARNING**

Danger of falling

Incorrect handling during transport may cause the motor to fall or swing without control and therefore cause severe, and possibly fatal injuries due to impact, crushing and other physical injuries. In addition, severe damage to the motor and its surroundings are possible.

Therefore:

– Use all available carrying eyes on the motor during transport
– Do not attach any additional loads The lifting eyes are only designed for the weight of the motor
– Only use the intended carrying eyes or bolts for transporting attached machinery (e.g. gear unit attachments)
– Sets of machinery must not be lifted by suspension from the individual machines.

To prevent damage to the motor, the motor must always be used with suitable lifting equipment. The roller bearings should be replaced if the time from delivery to commissioning of the motor exceeds 4 years in good conditions (storage in dry, dust and vibration-free areas). This time is greatly reduced in case of unfavourable conditions. If necessary, unprotected machined surfaces (flange surfaces, shaft ends) must be treated with corrosion inhibitors. If necessary, the insulating resistance of the windings must be checked (1.3.8 "Checking the insulation resistance").

Changes in comparison with normal operation (higher current consumption, higher temperatures or vibrations, unusual noises or smells, triggering of monitoring devices, etc.) are indications that the function is impaired. To prevent injury and damage, the responsible maintenance personnel must be informed of these changes.

In case of doubt, switch off the motor as soon as the state of the plant permits.
1.3.2 Installation

- After installation, screwed-on lifting lugs must be tightened or removed.
- Smooth running: Precise alignment of the clutch and a well-balanced drive element (clutch, pulleys, fan, etc.) are prerequisites for smooth vibration-free running.
- Complete balancing of the motor and the drive elements may be necessary.
- The top section of the terminal box and the position of the terminal box can be rotated by 4 x 90 degrees.
- Even if not required, on IEC B14 motors all four fixing screws, must be screwed into the flanged bearing plate! The fixing screw threads must be inserted with a sealant, e.g. Loctite 242.

**WARNING**

*Electric shock*

The maximum depth for screwing into the type plate is $2 \times d$. There is a danger that the motor windings may be damaged if longer screws are used. This creates a danger of potential transfer to the housing and danger of electric shock if touched.

- The motor must be inspected for damage before installation and commissioning. A damaged motor must not be commissioned.
- Rotating shaft ends and unused shaft ends must be protected against contact. Unused parallel shaft keys must be secured against being thrown out.
- The motor must be suitable for the installation location. (requirements prescribed by standards, ambient conditions, installation altitude)
- Motor surfaces may become very hot during operation. Suitable protective measures must be taken if there is a danger of contact or a hazard to the vicinity of the installation.

1.3.3 Balancing, drive elements

The fitting and removal of drive elements (clutch, pulley, gear wheel,...) must be performed with suitable equipment. As standard the rotors are balanced with half key balancing. **The appropriate form of balancing must be observed if drive elements are installed on the motor shaft. Drive elements must be balanced according to ISO 1940.**

The generally required measures for protection against touching the drive elements must be observed. If a motor is started without a drive element, the parallel key must be secured against being thrown out. This also applies for any second shaft end. Alternatively, the parallel shaft key must be removed.
1.3.4 Alignment
In particular with direct coupling, the motor shafts and the driven machine must be axially and radially aligned to each other. Incorrect alignment may result in damage to the bearings, excessive vibration and breakage of the shaft.

1.3.5 Output shafts
The maximum permissible axial ($F_A$) and radial forces ($F_R$) for the A side end of the motor shaft can be obtained from the table below. Getriebebau NORD should be consulted if the radial force ($F_R$) is applied at a distance which is greater than the length $E/2$.

<table>
<thead>
<tr>
<th>Type</th>
<th>$F_R$ [N]</th>
<th>$F_A$ [N]</th>
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<tbody>
<tr>
<td>63</td>
<td>530</td>
<td>480</td>
</tr>
<tr>
<td>71</td>
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<td>80</td>
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<td>100</td>
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<td>112</td>
<td>1950</td>
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<td>132</td>
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<td>2360</td>
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<td>160</td>
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<td>3000</td>
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<td>180 .X</td>
<td>3500</td>
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<td>200 .X</td>
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<tr>
<td>225</td>
<td>8000</td>
<td>5000</td>
</tr>
</tbody>
</table>

No axial ($F_A$) and radial forces ($F_R$) are permissible for the B side shaft end.

NOTICE! Attachments must not cause rubbing (danger of excessive temperatures and sparking) or impair the necessary flow of cooling air.
### 1.3.6 Electrical connection

The connection cables must be passed through the cable glands in the terminal box. The terminal box must be sealed against dust and water. The mains voltage and frequency must conform to the data on the rating plate. ±5 % voltage or ±2 % frequency deviations are permissible without reduction of the power. The connection and configuration of the jumpers must be made according to the circuit diagram in the terminal box.

Please refer to the following table for the labelling of the auxiliary terminals:

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<th>Labelling of auxiliary terminals</th>
<th>Comments</th>
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<td></td>
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<td>TP1 – TP2</td>
<td>Switch-off</td>
</tr>
<tr>
<td></td>
<td>1TP1 – 1TP2</td>
<td>Warning Winding 1</td>
</tr>
<tr>
<td></td>
<td>2TP1 – 2TP2</td>
<td>Switch-off Winding 1</td>
</tr>
<tr>
<td></td>
<td>3TP1 – 3TP2</td>
<td>Warning Winding 2</td>
</tr>
<tr>
<td></td>
<td>4TP1 – 4TP2</td>
<td>Switch-off Winding 2</td>
</tr>
<tr>
<td></td>
<td>5TP1 – 5TP2</td>
<td>Brake</td>
</tr>
<tr>
<td><strong>Bi-metal temperature sensor</strong></td>
<td>Normally closed</td>
<td></td>
</tr>
<tr>
<td>Option: TW</td>
<td>1TB1 – 1TB2</td>
<td>Warning Winding 1</td>
</tr>
<tr>
<td></td>
<td>2TB1 – 2TB2</td>
<td>Switch-off Winding 1</td>
</tr>
<tr>
<td></td>
<td>3TB1 – 3TB2</td>
<td>Warning Winding 2</td>
</tr>
<tr>
<td></td>
<td>4TB1 – 4TB2</td>
<td>Switch-off Winding 2</td>
</tr>
<tr>
<td><strong>Bi-metal temperature sensor, normally open</strong></td>
<td>1TM1 – 1TM2</td>
<td>Warning Winding 1</td>
</tr>
<tr>
<td></td>
<td>2TM1 – 2TM2</td>
<td>Switch-off Winding 1</td>
</tr>
<tr>
<td></td>
<td>3TM1 – 3TM2</td>
<td>Warning Winding 2</td>
</tr>
<tr>
<td></td>
<td>4TM1 – 4TM2</td>
<td>Switch-off Winding 2</td>
</tr>
<tr>
<td><strong>PT100</strong></td>
<td>1R1 – 1R2</td>
<td>Winding 1 (Phase U)</td>
</tr>
<tr>
<td></td>
<td>2R1 – 2R2</td>
<td>Winding 1 (Phase V)</td>
</tr>
<tr>
<td></td>
<td>3R1 – 3R2</td>
<td>Winding 1 (Phase W)</td>
</tr>
<tr>
<td><strong>KTY</strong></td>
<td>(+) 4R1 – 4R2 (-)</td>
<td>Winding 1</td>
</tr>
<tr>
<td>Silicon temperature sensor</td>
<td>(+) 5R1 – 5R2 (-)</td>
<td>Winding 2</td>
</tr>
<tr>
<td><strong>Standstill heating</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option: SH</td>
<td>1HE1 – 1HE2</td>
<td>Motor heater</td>
</tr>
<tr>
<td></td>
<td>2HE1 – 2HE2</td>
<td>Brake heater</td>
</tr>
<tr>
<td><strong>Capacitor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor version:</td>
<td>1CA1 – 1CA2</td>
<td>with operating capacitor 1</td>
</tr>
<tr>
<td>EAR/EHB/EST</td>
<td>2CA1 – 2CA2</td>
<td>with operating capacitor 2</td>
</tr>
<tr>
<td></td>
<td>3CA1 – 3CA2</td>
<td>with starting capacitor 1</td>
</tr>
<tr>
<td></td>
<td>4CA1 – 4CA2</td>
<td>with starting capacitor 2</td>
</tr>
<tr>
<td><strong>Direct current brake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option: BRE...</td>
<td>BD1 – BD2</td>
<td></td>
</tr>
<tr>
<td>Option: DBR...</td>
<td>Brake1: BD1-BD2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brake2: BD3-BD4</td>
<td></td>
</tr>
</tbody>
</table>
1.3.7 Operation with frequency inverter

Type SK 63 /- SK 225 /- three phase asynchronous motors are qualified for operation with link circuit inverters according to DIN EN 60034-18-41 (2014).

Please also observe the operating instructions for the frequency inverter which is used.

The insulation system used by NORD consists of suitable varnished copper wire, phase insulation, homogeneous impregnation and groove lining as insulation against earth, and in the standard version is designed for the increased requirements for link circuit inverters.

The maximum permissible FI input voltage is 500 V +10%. Link circuit voltages in excess of 750 V DC are not permissible. When the motor is warm due to operation, the peak voltages due to the system, the inverter, the cable or the motor must not exceed the following values.

If the values are outside of the permissible range, du/dt or sine wave filters may be used (not the additional voltage drop).

The cable lengths shown in the diagram are for guidance only and may deviate according to the specific conditions.

For additional information for operation with a frequency inverter, especially with regard to information about the maximum speed, thermal design and possible torques, please refer to the current NORD motor catalogue M7000.
1.3.8 Checking the insulation resistance

Prior to initial commissioning of the motor after a long period of storage or standstill (approx. 6 months) the insulation resistance of the windings must be checked. During and immediately after the measurements, the terminals have voltages which can be dangerous, and must not be touched.

**Insulation resistance**

The insulation resistance of new, cleaned, repaired windings against the housing and against each other is > 200 MΩ.

**Measurement**

The insulation of the windings against the housing for operation voltages up to 400 V must be measured with 500 V DC. For operating voltages up to 725 V the measurement must be made with 1000 V DC. The temperature of the windings should be 25°C ± 15°C.

**Testing**

If the minimum insulation resistance of the winding against earth is less than 50 MΩ, this may be due to moisture. The windings must then be dried.

The insulation resistance may reduce after long periods of operation. As long as the measured value does not fall below the calculated value for the critical insulation resistance of < 50 MΩ, operation of the motor may continue. If the value is less than this, the cause must be established and if necessary the windings or parts of the windings must be repaired, cleaned or dried.

1.3.9 Commissioning

<table>
<thead>
<tr>
<th>Information</th>
<th>Electromagnetic compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORD motors comply</td>
<td>NORD motors comply with the EU-Directive 2014/30/EU. Assembly or installation work must not cause impermissible interference. Immunity from interference must still exist.</td>
</tr>
</tbody>
</table>

**Production of interference:** In cases of large differences of torque (e.g. when driving a piston compressor) a non-sine wave motor current is induced, whose harmonics can cause an impermissible effect on the mains and therefore impermissible production of interference.

With supply by frequency inverters, various strengths of interference are produced according to the design of the frequency inverter (type, interference suppression, manufacturer). The EMC information of the inverter manufacturer must be observed. If a shielded motor supply cable is recommended, the shielding is most effective if a large area is electrically connected to the metal terminal box of the motor (with metal EMC cable gland). With motors with integrated sensors (e.g. thermistors) interference voltages due to the inverter may be produced in the sensor cables.
Interference immunity: For motors with integrated sensors (e.g. thermistors) the operator must ensure adequate immunity to interference by the selection of a suitable sensor cable (possibly with screening, with connection as for the motor supply cable) and evaluation device. The information and instructions in the operating instructions for the inverter and all other instructions must be observed before commissioning. After installation of the motor, it must be checked for correct functioning. In the case of brake motors, the correct function of the brake must also be checked.

1.3.10 Disposal

**NOTICE**

Environmental damage

Incorrect disposal of the product may cause damage to the environment.

- Ensure correct disposal
- Comply with current local regulations

**Content:** aluminium, iron, electronic components, copper

Please observe the additional documentation for the attachments
2 Maintenance and servicing

**DANGER!** Electric shock

The motor is operated with a dangerous voltage. Touching certain conducting components (connection terminals and supply cables) will cause electric shock with possibly fatal consequences.

Even when the motor is at a standstill (e.g. due to the electronic block of a connected frequency inverter or a jammed drive unit) the connection terminals and supply cables may carry a dangerous voltage. A motor standstill is not identical to electrical isolation from the mains.

Even if the drive unit has been disconnected from the mains, a connected motor may rotate and possibly generate a dangerous voltage.

Installation and work must only be carried out when the motor is at a standstill and is disconnected (all phases disconnected from the mains).


**WARNING** Injury due to movement

Under certain conditions (e.g. switching on the power supply, releasing a holding brake) the motor may start to move. The machinery which it drives (press / chain hoist / roller / fan etc.) may then make an unexpected movement. This may cause various injuries, including to third parties.

Before switching on, secure the danger area by warning and removing all persons from the danger area.

### 2.1 Safety measures

Before starting any work on the motor or the device, but especially before opening the covers of active components, the motor must be isolated according to regulations. In addition to the main power circuits, any additional or auxiliary circuits must be taken into account.

The usual "5 Safety Rules" e.g. according to DIN VDE 0105 are:

- Disconnect
- Secure to prevent reactivation
- Check for no voltage on all poles
- Earth and short circuit
- Cover or cordon off adjacent live components

These measures may only be removed when the maintenance work is complete.
Motors must be properly inspected at regular intervals; current national standards and regulations must be complied with. In particular, special attention must be paid to any mechanical damage, free path of the cooling air, abnormal noises and correct electrical connection.

Only original parts may be used as spare parts with the exception of standardised, commercially available and equivalent parts.

Swapping parts between motors of the same type is not permissible.

Information

If the motors are designed with closed condensation outlets, these must be opened occasionally in order to allow any accumulated condensation to drain off. Condensation outlets must always be located at the lowest point of the motor. During installation of the motor care must be taken that the condensation outlets point downwards and are closed. Open condensation outlets cause a reduction of the protection class.

2.2 Bearing replacement intervals

Under normal operating conditions, with horizontal installation of the motor, depending on the coolant temperature and the motor speed, the bearing replacement interval [h] for IEC motors is:

<table>
<thead>
<tr>
<th>RPM</th>
<th>25°C</th>
<th>40°C</th>
<th>60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 1,800 rpm</td>
<td>approx. 40,000 h</td>
<td>approx. 20,000 h</td>
<td>approx. 8,000 h</td>
</tr>
<tr>
<td>up to 3,600 rpm</td>
<td>approx. 20,000 h</td>
<td>approx. 10,000 h</td>
<td>approx. 4,000 h</td>
</tr>
</tbody>
</table>

Under special operating conditions, e.g. vertical motor installation, large stresses due to vibration and shock, or operation with frequent reversing, the operating hours stated above are significantly reduced.
2.3 Maintenance intervals
The motor must be checked weekly, or every 100 operating hours for unusual running noise and/or vibrations.

Please check the roller bearings at an interval of at least 10,000 h and replace them as required. In addition, the electric connections, cables and wires as well as the fan are firmly fastened and free from damage. Furthermore, the function of the insulation system must be checked.

Replace the shaft sealing rings every 10,000 hours.

The surface of the motor must not have any dirt deposits which could impair cooling.

A general overhaul of the motor must be carried out every 5 years.

2.4 General overhaul
For this the motor must be dismantled. The following work must be carried out:

• All components of the motor must be cleaned
• All components of the motor must be examined for damage
• All damaged components must be replaced
• All roller bearings must be replaced
• All seals and shaft sealing rings must be replaced

The general overhaul must be carried out by qualified personnel in a specialist workshop with appropriate equipment. We urgently recommend that the general overhaul is carried out by NORD Service.

If the drive unit is subjected to special operating conditions, the intervals stated above may be considerably reduced.
3 ATEX Explosion hazard areas

3.1 Motors with increased ignition protection, type Ex eb

**DANGER!**

Explosion hazard

All work must only be carried out with the machine at a standstill and the **power to the system switched off**.

Higher temperatures than the maximum permitted surface temperature of the housing may be present inside the motor. The motor must therefore never be opened in an explosive atmosphere!

Failure to comply with this may result in the ignition of an explosive atmosphere.

**WARNING**

Explosion hazard

Excessively heavy dust deposits must be avoided, as these impair the cooling of the device!

Impairment or obstruction of the flow of cooling air, for example due to partial or large area coverage of the fan cover or the entry of foreign bodies fall into the fan must be avoided in order to ensure adequate cooling.

Only cable glands and reducers which are approved for use in explosion hazard areas may be used.

All cable glands which are not used must be closed with blind screw plugs which are approved for potentially explosive areas.

Only the original seals may be used.

Failure to comply increases the risk of ignition of an explosive atmosphere.

The following supplementary or special information applies for these motors.

The motors are suitable for use in Zone 1 and correspond to Device Group II, Category 2G and may be used at an ambient temperature from -20 °C to +40 °C.

**Type suffix:** 2G  e.g.: 80 L/4 2G TF

**Labelling:** II 2G Ex eb IIC T3 Gb

If the motor is attached to a gear unit, the EX labelling of the gear unit must also be observed!

Explosive gas mixtures or dust concentrations may cause severe or fatal injuries in combination with hot, electrically live and moving components of electrical machines.
The increased danger in explosion hazard areas requires especially strict observance of the general safety and commissioning information. The person responsible must be qualified according to the national and local regulations.

Explosion protected electrical machines with ignition protection class Ex eb correspond to the standard series EN 60034 (VDE 0530), as well as EN 60079-0:2014 and EN 60079-7:2015. The degree of the explosion hazard determines the zone categorisation. DIN EN 60079, Part 10 A provides information with regard to this. The operator is responsible for the categorisation of the zones. The use of motors which are not certified for explosion hazard areas in explosion hazard areas is prohibited.

3.1.1 Cable gland

The cable glands must be approved for explosion hazard areas. Unused openings must be closed with approved blind plugs. When connecting the installation cables, the connections to the motor terminals and to the earth lead must use U shaped bent cables placed under the relevant terminals so that the clamping bars and the terminal bolts are equally loaded and are not deformed in any way. Alternatively, the connections may be made with a cable lug. If increased thermal requirements are made for the cables, these must be obtained from the information plate on the rotor.

For Sizes 63 to 132 an insulated cable lug must be used, if this is used to connect the earth lead in the terminal box.

The nuts of the terminal board bolts must be tightened according to the following table.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>1.2</td>
<td>2.0</td>
<td>3.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Use of aluminium connecting wires is not permitted.

3.1.2 Cable connections

All motors with ignition protection class Ex eb are delivered with a certified cable gland.

If the supplied cable glands are used, cables with a circular cross-section must be used. The clamping nuts of the cable gland must be tightened to the torque specified in the following table.

<table>
<thead>
<tr>
<th>Cable gland</th>
<th>M20x1.5</th>
<th>M25x1.5</th>
<th>M32x1.5</th>
<th>M40x1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>5.0</td>
<td>5.0</td>
<td>10.0</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Use of reduction adapters according to Directive 94/9 EEC or 2014/34/EU and/or cable glands with ignition protection class Ex eb is permissible. For this, a minimum certified temperature of 80°C is necessary.

When connecting, care must be taken that the permissible air gaps of at least 10 mm and the permissible leakage tracks of at least 12 mm between the electrically live components and components with the same potential as the housing, or between live components are maintained.

Check that the terminal nuts and the screw for the earth lead are tight before closing the terminal box. The terminal box seals and the seals of the cable glands must be correctly seated and must not be damaged.
3.1.3 Terminal box cover seals

The terminal box cover gasket is captively mounted on the terminal box cover. Please only use an original seal when replacing the seal.

If the terminal box is opened during installation, maintenance, repair, troubleshooting or overhaul, the terminal box cover must be re-fitted after the work is complete. There must be no dirt on the surface of the seal or the sealing surface of the terminal box frame.

The screws for the terminal box cover must be tightened with a torque according to the list below.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>0.8 - 1.2</td>
<td>1.2 - 1.8</td>
<td>1.5 - 2.5</td>
<td>3.0 – 5.0</td>
</tr>
</tbody>
</table>

3.1.4 Motor position – special features for IM V3, IM V6

If the end of the shaft faces upwards, e.g. version IMV3, IMV6, a cover must be provided by the operator / installer, which prevents foreign bodies from falling into the fan cover of the motor (see DIN EN 60079-0). This must not obstruct the fan from cooling the motor. If the end of the shaft faces downwards (AS), e.g. versions IMV1, IMV5, the motors are normally provided with a protective cover on the fan cover. A hand wheel on the second end of the shaft is not permitted.
3.1.5 Further operating conditions

The motors are designed for continuous operation and normal, non-recurring starting, in which no significant starting heat occurs.

Range A in EN 60034-1 (VDE 0530 Part 1) - Voltage ± 5%, Frequency ± 2%, curve form, mains symmetry - must be complied with so that the development of heat remains within the permissible limits. Any major deviations from the rated values can cause an impermissible increase in the development of heat in the motor.

The motor temperature class stated on the type plate must at least conform to the temperature class of any combustible gas that may occur.

3.1.6 Protective devices

Each machine must be protected against excess heating by means of a current-dependent delayed protection switch whose function is tested by a designated facility, with phase failure protection according to VDE 0660 or an equivalent device. Protective devices must be adjusted to the rated current. For windings with a delta circuit, the triggers are connected in series with the windings and adjusted to 0.58x the rated current. If this circuit is not possible, additional protective measures are necessary (e.g. thermal protection of the machine).

In case of a jammed rotor, the protective device must switch off within the specified t_E-time for the relevant temperature class.

Electrical machines with heavy starting (start-up time > 1.7 x t_E-time) must be protected by means of starting monitoring according to the details in the EEC type test certificate.

Thermal protection of the machine by means of direct temperature monitoring of the windings with a thermistor temperature sensor is permissible, if this is certified and stated on the rating plate.

Do not apply voltages greater than 30 V to the thermistor temperature sensor.

If the only protection is a PTC thermistor temperature sensor, a performance-tested, PTC tripping device certified by a designated body must be used. The PTC triggering device must be equipped with the following protection class label:

\[\text{Ex II (2) G}\]
Information for motor protection

<table>
<thead>
<tr>
<th>Type plate example: No sole means of protection via temperature sensor</th>
<th>Type plate example: Sole protection via temperature sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Type plate example: No sole means of protection via temperature sensor" /></td>
<td><img src="image2" alt="Type plate example: Sole protection via temperature sensor" /></td>
</tr>
</tbody>
</table>

**Notice! Danger!** If the time $t_A$ is not stated on the type plate, the thermistor is not permissible as the sole means of protection.

It is essential that the motor is protected with a motor protection relay which has been approved by a testing facility. The motor protection relay must be approved for the ignition protection class which is stated on the motor.

A thermistor is permissible as the sole

### 3.1.7 Operation with frequency inverter

Operation with a frequency inverter must be explicitly certified. The separate manufacturer's information must be observed. The EMC Directive must be complied with.
3.1.8 Repairs

Repairs must be carried out by Getriebebau NORD or by an officially recognised expert. The work must be indicated with an additional repair plate. With the exception of standard, commercially available and equivalent components, only original spare parts (see spare parts list) may be used. The particularly applies for seals and connecting components.

For motors with closed condensation outlets, the threads of the closing screws must be coated with Loctite 242 or Loxeal 82-21 after the condensation has been drained. The closing screws must be re-inserted immediately. The electrical connections must be checked at regular intervals.

Check that the connection terminals, and the electrical bonding terminal are firmly fastened. Check that the cable gland and the terminal box gasket are in good condition.

All work on electrical machinery must be performed when the machine is at a standstill and with all poles disconnected from the mains.

The motor must be removed for any measurement of the insulation resistance. The measurement must not be performed in the explosion hazard area. As soon as measurement has been completed, discharge the connecting terminals again immediately by shorting them in order to prevent any spark discharges occurring in the explosive area.

---

**DANGER!**

Explosion hazard

- Insulation measurements may cause sparks and therefore ignition of an explosive atmosphere.
  - Only perform insulation measurements outside of an explosive atmosphere.
  - Discharge the connection terminals by short circuiting them after the measurement and before returning to an explosive atmosphere.

---

3.1.9 Painting

Motors are provided with suitable painting ex-works. Subsequent painting may only be carried out after consultation with Getriebebau NORD or a workshop which is approved for the repair of explosion protected motors. Compliance with the valid standards and regulations is mandatory.
3.1.10 Type plate for NORD Ex eb motors according to EN 60079

Before commissioning, the type plate must be compared with the requirements of the aforementioned declaration, which result from the local regulations and operating conditions.

Explanation of standard specification in rating plate

EN 60034  (H),  (A)/ EN 60079

<table>
<thead>
<tr>
<th>Used range of standards for explosion protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Please pay attention to conformity declaration.)</td>
</tr>
<tr>
<td>Voltage range A in accordance with EN 60034-1</td>
</tr>
<tr>
<td>Half key balancing in accordance with EN 60034-14</td>
</tr>
<tr>
<td>Product standard</td>
</tr>
</tbody>
</table>

3.1.11 Applied standards

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60034-7</td>
<td>2001-12</td>
<td>IEC 60034-7</td>
<td>2001-02</td>
</tr>
<tr>
<td>EN 60034-6</td>
<td>1996-08</td>
<td>IEC 60034-6</td>
<td>1991-10</td>
</tr>
<tr>
<td>EN 60079-0</td>
<td>2014-06</td>
<td>IEC 60079-0</td>
<td>2011, modified; cor.:2012; cor.:2013</td>
</tr>
<tr>
<td>EN 60079-7</td>
<td>2015</td>
<td>IEC 60079-7</td>
<td>2015</td>
</tr>
</tbody>
</table>
3.2 Motors with ignition protection class Non Sparking Ex ec

**DANGER!**

Explosion hazard

All work must only be carried out with the machine at a standstill and the **power to the system switched off.**

Higher temperatures than the maximum permitted surface temperature of the housing may be present inside the motor. The motor must therefore never be opened in an explosive atmosphere!

Failure to comply with this may result in the ignition of an explosive atmosphere.

**WARNING**

Explosion hazard

Excessively heavy dust deposits must be avoided, as these impair the cooling of the device!

Impairment or obstruction of the flow of cooling air, for example due to partial or large area coverage of the fan cover or the entry of foreign bodies fall into the fan must be avoided in order to ensure adequate cooling.

Only cable glands and reducers which are approved for use in explosion hazard areas may be used.

All cable glands which are not used must be closed with blind screw plugs which are approved for potentially explosive areas.

Only the original seals may be used.

Failure to comply increases the risk of ignition of an explosive atmosphere.

The following supplementary or special information applies for these motors.

The motors are suitable for use in Zone 2 and correspond to Device Group II, Category 3G and may be used at an ambient temperature from -20 °C to +40 °C.

<table>
<thead>
<tr>
<th>Type suffix:</th>
<th>3G</th>
<th>e.g.:</th>
<th>80 L/4 3G TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labelling:</td>
<td>![CE]</td>
<td>![Ex]</td>
<td>II 3G Ex ec IIC T3 Gc With indication of the temperature class</td>
</tr>
</tbody>
</table>

If the motor is attached to a gear unit, the EX labelling of the gear unit must also be observed!

Explosive gas mixtures or dust concentrations may cause severe or fatal injuries in combination with hot, electrically live and moving components of electrical machines.

The increased danger in explosion hazard areas requires especially strict observance of the general safety and commissioning information. The persons responsible must be qualified according to the national and local regulations.

Explosion protected electrical machines with ignition protection class Ex n correspond to the standard series EN 60034 (VDE 0530), as well as EN 60079-0:2014 and EN 60079-7:2015. The degree of the explosion hazard determines the zone categorisation. DIN EN 60079, Part 10 A provides information with regard to this. The operator is responsible for the categorisation of the zones. The use of motors which are not certified for explosion hazard areas in explosion hazard areas is prohibited.
3.2.1 Cable gland

The cable glands must be approved for explosion hazard areas. Unused openings must be closed with approved blind plugs. When connecting the installation cables, the connections to the motor terminals and to the earth lead must use U shaped bent cables placed under the relevant terminals so that the clamping bars and the terminal bolts are equally loaded and are not deformed in any way. Alternatively, the connections may be made with a cable lug. If increased thermal requirements are made for the cables, these must be obtained from the information plate on the rotor.

For Sizes 63 to 132 an insulated cable lug must be used, if this is used to connect the earth lead in the terminal box.

The nuts of the terminal board bolts must be tightened according to the following table.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>1.2</td>
<td>2.0</td>
<td>3.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Use of aluminium connecting wires is not permitted.

3.2.2 Cable connections

If the supplied cable glands are used, cables with a circular cross-section must be used. The clamping nuts of the cable gland must be tightened to the torque specified in the following table.

<table>
<thead>
<tr>
<th>Cable gland</th>
<th>M20x1.5</th>
<th>M25x1.5</th>
<th>M32x1.5</th>
<th>M40x1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>5.0</td>
<td>5.0</td>
<td>10.0</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Use of reduction adapters according to Directive 94/9 EEC or 2014/34/EU and/or cable glands with ignition protection class Ex ec is permissible. For this, a minimum certified temperature of 80°C is necessary.

When connecting, care must be taken that the permissible air gaps of at least 10 mm and the permissible leakage tracks of at least 12 mm between the electrically live components and components with the same potential as the housing, or between live components are maintained.

Check that the terminal nuts and the screw for the earth lead are tight before closing the terminal box. The terminal box seals and the seals of the cable glands must be correctly seated and must not be damaged.
3.2.3 Terminal box cover seals

The terminal box cover gasket is captively mounted on the terminal box cover. Please only use an original seal when replacing the seal.

If the terminal box is opened during installation, maintenance, repair, troubleshooting or overhaul, the terminal box cover must be re-fitted after the work is complete. There must be no dirt on the surface of the seal or the sealing surface of the terminal box frame.

The screws for the terminal box cover must be tightened with a torque according to the list below.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>0.8 - 1.2</td>
<td>1.2 - 1.8</td>
<td>1.5 - 2.5</td>
<td>3.0 – 5.0</td>
</tr>
</tbody>
</table>

3.2.4 Motor position – special features for IM V3, IM V6

If the end of the shaft faces upwards, e.g. version IMV3, IMV6, a cover must be provided by the operator / installer, which prevents foreign bodies from falling into the fan cover of the motor (see DIN EN 60079-0). This must not obstruct the fan from cooling the motor. If the end of the shaft faces downwards (AS), e.g. versions IMV1, IMV5, the motors are normally provided with a protective cover on the fan cover. A hand wheel on the second end of the shaft is not permitted.
3.2.5 Further operating conditions

The motors are designed for continuous operation and normal, non recurring starting, in which no significant starting heat occurs.

Range A in EN 60034-1 (VDE 0530 Part 1) - Voltage ± 5%, Frequency ± 2%, curve form, mains symmetry - must be complied with so that the development of heat remains within the permissible limits. Any major deviations from the rated values can cause an impermissible increase in the development of heat in the motor.

The motor temperature class stated on the type plate must at least conform to the temperature class of any combustible gas that may occur.

3.2.6 Protective devices

Protective devices must be adjusted to the rated current. For windings with a delta circuit, the triggers are connected in series with the windings and adjusted to 0.58x the rated current.

Alternatively, the motors can be protected with thermistor temperature sensors. Protection with thermistor temperature sensors is mandatory for inverter operation.

Do not apply voltages greater than 30 V to the thermistor temperature sensor.

We recommend the use of a functionally tested, certified PTC trigger device for protection with a thermistor temperature sensor.

The following standards must be observed for the installation of electrical systems in explosion hazard areas in Germany: DIN EN 60079-14 (VDE 0165-1), the Technical Rules for Operating Safety (TRBS), the Operating Safety Regulations (BetrSichV), the Hazardous Substances Regulation (GefStoffV) as well as the Explosion Protection Regulations (Ex-RL). Other regulations must be observed if applicable. The applicable national regulation must be observed outside of Germany.
3.2.7 Repairs

Repairs must be carried out by Getriebebau NORD or by an officially recognised expert. The work must be indicated with an additional repair plate. With the exception of standard, commercially available and equivalent components, only original spare parts (see spare parts list) may be used. The particularly applies for seals and connecting components.

For motors with closed condensation outlets, the threads of the closing screws must be coated with Loctite 242 or Loxeal 82-21 after the condensation has been drained. The closing screws must be re-inserted immediately. The electrical connections must be checked at regular intervals.

Check that the connection terminals, and the electrical bonding terminal are firmly fastened. Check that the cable gland and the terminal box gasket are in good condition.

All work on electrical machinery must be performed when the machine is at a standstill and with all poles disconnected from the mains.

The motor must be removed for any measurement of the insulation resistance. The measurement must not be performed in the explosion hazard area. As soon as measurement has been completed, discharge the connecting terminals again immediately by shorting them in order to prevent any spark discharges occurring in the explosive area.

---

**DANGER!**

**Explosion hazard**

Insulation measurements may cause sparks and therefore ignition of an explosive atmosphere.

- Only perform insulation measurements outside of an explosive atmosphere.
- Discharge the connection terminals by short circuiting them after the measurement and before returning to an explosive atmosphere.

---

3.2.8 Painting

Motors are provided with suitable painting ex-works. Subsequent painting may only be carried out after consultation with Getriebebau NORD or a workshop which is approved for the repair of explosion protected motors. Compliance with the valid standards and regulations is mandatory.
3.2.9 Type plate for NORD Ex ec motors according to EN 60079

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data Matrix Code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Number of phases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Type designation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Order number / motor number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Year of manufacture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Thermal class of the insulation system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>IP protection class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Operating mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Standard specifications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nominal frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Nominal voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Permissible voltage range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Power factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Speed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Explosion protection marking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Starting current / nominal current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Notice! Pay attention to operating instructions B1091</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Rated power (mechanical power delivered to shaft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Nominal current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Individual serial number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Before commissioning, the type plate must be compared with the requirements of the aforementioned declaration, which result from the local regulations and operating conditions.

**Explanation of standard specification in rating plate**

Used range of standards for explosion protection
(Please pay attention to conformity declaration.)
Voltage range A in accordance with EN 60034-1
Half key balancing in accordance with EN 60034-14
Product standard

### 3.2.10 Applied standards

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60034-7</td>
<td>2001-12</td>
<td>IEC 60034-7</td>
<td>2001-02</td>
</tr>
<tr>
<td>EN 60034-6</td>
<td>1996-08</td>
<td>IEC 60034-6</td>
<td>1991-10</td>
</tr>
<tr>
<td>EN 60079-0</td>
<td>2014-06</td>
<td>IEC 60079-0</td>
<td>2011, modified; cor.:2012; cor.:2013</td>
</tr>
<tr>
<td>EN 60079-7</td>
<td>2015</td>
<td>IEC 60079-7</td>
<td>2015</td>
</tr>
</tbody>
</table>
3.3 Motors for use in Zone 21 and Zone 22 according to EN 60079-0 and IEC 60079

**DANGER!**

Explosion hazard

All work must only be carried out with the machine at a standstill and the power to the system switched off.

Higher temperatures than the maximum permitted surface temperature of the housing may be present inside the motor. The motor must therefore never be opened in an explosive atmosphere!

Failure to comply with this may result in the ignition of an explosive atmosphere.

**WARNING**

Explosion hazard

Excessively heavy dust deposits must be avoided, as these impair the cooling of the device!

Impairment or obstruction of the flow of cooling air, for example due to partial or large area coverage of the fan cover or the entry of foreign bodies fall into the fan must be avoided in order to ensure adequate cooling.

Only cable glands and reducers which are approved for use in explosion hazard areas may be used.

All cable glands which are not used must be closed with blind screw plugs which are approved for potentially explosive areas.

Only the original seals may be used.

Failure to comply increases the risk of ignition of an explosive atmosphere.

The following supplementary or special information applies for these motors.

Motors which comply with EN 60079 and IEC 60079 are suitable according to their labelling for use in Zone 21 or Zone 22 - non-conductive dust.

<table>
<thead>
<tr>
<th>Type supplement:</th>
<th>Zone 21</th>
<th>2D</th>
<th>e. g.:</th>
<th>80 L/4 2D TF</th>
</tr>
</thead>
<tbody>
<tr>
<td>according to EN 60079</td>
<td>Zone 22</td>
<td>3D</td>
<td>e. g.:</td>
<td>80 L/4 3D TF</td>
</tr>
<tr>
<td>according to IEC 60079</td>
<td>Zone 21</td>
<td>EPL Db</td>
<td>e. g.:</td>
<td>80 L/4 IDB TF</td>
</tr>
<tr>
<td></td>
<td>Zone 22</td>
<td>EPL Dc</td>
<td>e. g.:</td>
<td>80 L/4 IDC TF</td>
</tr>
</tbody>
</table>

**Labelling:**

- according to IEC 60079 and 2014/34 EU (94/9 EC old)
  - II 2D Ex tb IIIC T125°C Db for category 2 (Zone 21)\(^1\)
  - II 3D Ex tc IIIB T125°C Dc for category 3 (Zone 22 – non-conducting dust)\(^1\)

- according to IEC 60079
  - EX tb IIIC T125°C Db for category 2 \(^1\)
  - Ex tc IIIB T125°C Dc for category 3 (Zone 22 – non-conducting dust)\(^1\)

\(^1\) The details of the surface temperature may deviate from 125 °C and may be obtained from the type plate.

If the motor is attached to a gear unit, the EX labelling of the gear unit must also be observed!
Explosion hazard

The increased danger in areas with inflammable dust demands the strict observation of the general safety and commissioning information. Explosive concentrations of dust may cause explosions if ignited by hot or sparking objects. Such explosions may cause serious or fatal injuries to persons or severe material damage.

The persons responsible must be qualified according to the national and local regulations.

3.3.1 Commissioning information / Field of application

If the motors are required for use with frequency inverters, this must be stated in the order. The supplementary operating instructions B1091-1 must be observed. The motors must be protected against overheating with suitable monitoring equipment! The thickness of dust deposits must not exceed 5 mm! The motors are designed for the voltage and frequency range B of EN 60034 Part 1.

Exception: Size 132MA/4 2D, 132MA/4 3D, 132LH/4 2D, 132LH/4 3D motors comply with the voltage and frequency range A.

Motors for use in Zone 21 and Zone 22, with labelling TF may be thermally monitored via the built-in PTC in combination with a suitable triggering device as the sole protection.

Electrical equipment for use in areas with inflammable dust comply with the standards DIN EN 60079-0, IEC 60079-0, EN 60079-31, IEC 60079-31, as well as DIN EN 60034 and IEC 60034.

The valid version of the standard can be obtained from the EC Declaration of Conformity or the IECEx CoC. The degree of the explosion hazard determines the zone categorisation. The operator / employer is responsible for the assignment of zones (in Europe: RL 1999/92/EC).

If the certification is supplemented with an "X" the special conditions in the EC prototype certification, the IECEx CoC and/or the relevant documentation must be observed. The use of standard motors which are not certified for explosion hazard areas in explosion hazard areas is prohibited.
3.3.2 Terminal box cover seals
The terminal box cover gasket is captively mounted on the terminal box cover. Please only use an original seal when replacing the seal.

If the terminal box is opened during installation, maintenance, repair, troubleshooting or overhaul, the terminal box cover must be re-fitted after the work is complete. There must be no dirt on the surface of the seal or the sealing surface of the terminal box frame.

The screws for the terminal box cover must be tightened with a torque according to the list below.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>0.8 - 1.2</td>
<td>1.2 - 1.8</td>
<td>1.5 - 2.5</td>
<td>3.0 – 5.0</td>
</tr>
</tbody>
</table>

3.3.3 Electrical Connection
The electrical connections of the terminal board are protected against twisting. The voltage supply to the terminal board must be made by means of suitable ring terminals. The ring terminals are installed between the two brass washers below the lock washer. The nuts must be tightened with a torque according to the table below. The contact pressure is permanently maintained by means of the specified torque and the lock washer. In addition, twisting of the ring terminals of the voltage supply is prevented. The connection elements are corrosion-proof.

<table>
<thead>
<tr>
<th>Thread diameter</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque (Nm)</td>
<td>0,8 - 1,2</td>
<td>1,8 - 2,5</td>
<td>2,7 - 4,0</td>
<td>5,5 - 8,0</td>
</tr>
</tbody>
</table>

Exploded diagram of electrical connection

3.3.4 Cable and wiring glands
For Zone 21, the cable glands must be approved for Ex areas (minimum protection class IP 66) and must be secured against accidental loosening. Unused apertures must be sealed with authorised plugs (minimum protection class IP 66).

For Zone 22, the cable glands which are implemented according to EN 60079-0 and IEC 60079-0 must as a minimum correspond to the protection type specified on the type plate. Unused openings must be closed with plugs, which as a minimum correspond to the protection class of the motor and...
Motors – Operating and Assembly Instructions

the requirements of EN 60079-0 and IEC 60079-0. The cable glands and blank plugs must be suitable for a temperature of at least 80 °C.

The motor must not be opened under hazardous atmospheres to connect the electrical cables or for any other work. The voltage must always be switched off and secured against being switched on again before opening the motor!

The motors are equipped with cable glands according to the following overview.

<table>
<thead>
<tr>
<th>Assignment of Cable Glands to Motor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable glands for standard motors</td>
</tr>
<tr>
<td>Number</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>63</td>
</tr>
<tr>
<td>71</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>112</td>
</tr>
<tr>
<td>132</td>
</tr>
<tr>
<td>160/180/..X</td>
</tr>
<tr>
<td>180/200/..X</td>
</tr>
<tr>
<td>225</td>
</tr>
<tr>
<td>250WP</td>
</tr>
</tbody>
</table>

If the motor is supplied with a certified cable gland, the clamping nuts of the cable gland must be tightened to the torque specified in the following table.

| Cable gland |
3 ATEX Explosion hazard areas

<table>
<thead>
<tr>
<th>Clamping nut tightening torques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable gland</td>
</tr>
<tr>
<td>Tightening torque (Nm)</td>
</tr>
</tbody>
</table>

3.3.5 Permissible ambient temperature range

For all motors, the permissible ambient temperature range is -20 °C...+40 °C. For motors for operation in Zones 21 and 22, an extended ambient temperature range from -20 °C...+60 °C is permissible. In this case, the rated power must be reduced to 72% of the value stated in the catalogue.

If the maximum ambient temperature is between +40 °C and +60 °C, the power output should be inversely linearly interpolated between 100% and 72%. In this case thermal protection of the motor by means of a thermistor sensor is essential. The motor connection cables and the cable glands must be suitable for temperatures of at least 80 °C.

The extended ambient temperature range does not apply for optional conversions such as a brake and/or external fan. Contact the manufacturer in case of doubt with regard to permissibility!

3.3.6 Painting

Motors are provided with suitable painting ex-works. Subsequent painting may only be carried out after consultation with Getriebebau NORD or a workshop which is approved for the repair of explosion protected motors. Compliance with the valid standards and regulations is mandatory.

3.3.7 IEC-B14 motors

Please comply with the information in Section 1.3.2. Otherwise, explosion protection is not ensured.

3.3.8 Motor position – special features for IM V3, IM V6

If the end of the shaft faces upwards, e.g. version IMV3, IMV6, a cover must be provided by the operator / installer, which prevents foreign bodies from falling into the fan cover of the motor (see DIN EN 60079-0). This must not obstruct the fan from cooling the motor. If the end of the shaft faces downwards (AS), e.g. versions IMV1, IMV5, the motors are normally provided with a protective cover on the fan cover. A hand wheel on the second end of the shaft is not permitted.
3.3.9 Further operating conditions

Unless otherwise specified for operating modes and tolerances in the test certificate, the power rating plate or in IECEx CoC, electrical machinery is designed for continuous operation and normal infrequent start-ups where insignificant start-up heating occurs. The motors may only be used for the type of operation stated on the name plate.

The installation instructions must be strictly observed.

3.3.10 Structure and method of use

The motors are self-cooling. Shaft sealing rings are fitted both on the output side (DS) and on the ventilation side (VS). Motors for Zone 21 and Zone 22 have metal fans. Motors with brakes for Zone 22 (Category 3D, non-conducting dust) have a special plastic fan. The motors have protection class IP55, optionally protection class IP 66 (Zone 22, non-conducting dust, EPL Dc) or IP 66 (Zone 21, EPL, Db). Under normal operating conditions, the surface temperature does not exceed the surface temperature stated on the name plate.

3.3.11 Minimum cross section of bonding conductors

<table>
<thead>
<tr>
<th>Cross section of the phase conductor of the installation S [mm²]</th>
<th>Minimum cross section of the associated protective conductor S_p [mm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S ≤ 16</td>
<td>S</td>
</tr>
<tr>
<td>16 &lt; S ≤ 35</td>
<td>16</td>
</tr>
<tr>
<td>S &gt; 35</td>
<td>0.5 S</td>
</tr>
</tbody>
</table>
3.3.12 Maintenance

The voltage must always be switched off and secured against being switched on again before opening the motor!

Notice! Higher temperatures than the maximum permitted surface temperature of the housing may be present inside the motor. The motor must therefore never be opened in hazardous dust atmospheres! The motors must be checked and tested regularly for functional safety! The applicable national standards and regulations must be complied with!

Impermissibly thick dust deposits > 5 mm must not be allowed to build up! If functional safety cannot be ensured, the motor may not be operated! When the ball bearings are replaced, the rotary shaft seals must also be replaced. FKM rotary shaft seals as specified by Getriebebau NORD must be used. Ensure that they are fitted correctly! The rotary shaft seals must be lubricated on the external rings and on the seal lips. If an explosion protected gear is flanged dust-tight to the motor, an NBR rotary shaft seal can be used on the drive side of the motor if the gear oil temperature does not exceed 85°C. Only original parts may be used as spare parts with the exception of standardised, commercially available and equivalent parts. This particularly applies to seals and connection components. Parts for terminal boxes or spare parts for external grounding must be ordered as per the spare parts list in the operating instructions.

The functionality of seals, rotary shaft seals and cable glands must be regularly checked!

Maintaining dust protection for the motors is of paramount importance for explosion protection. Maintenance must be carried out by qualified personnel in a specialist workshop with appropriate equipment. We urgently recommend that the general overhaul is carried out by NORD Service.
3.4 Options for motors for use in Zone 21 and Zone 22

**DANGER!** **Explosion hazard**

All work must only be carried out with the machine at a standstill and the power to the system switched off.

Higher temperatures than the maximum permitted surface temperature of the housing may be present inside the motor. The motor must therefore never be opened in an explosive atmosphere!

Failure to comply with this may result in the ignition of an explosive atmosphere.

**WARNING** **Explosion hazard**

Excessively heavy dust deposits must be avoided, as these impair the cooling of the device!

Impairment or obstruction of the flow of cooling air, for example due to partial or large area coverage of the fan cover or the entry of foreign bodies fall into the fan must be avoided in order to ensure adequate cooling.

Only cable glands and reducers which are approved for use in explosion hazard areas may be used.

All cable glands which are not used must be closed with blind screw plugs which are approved for potentially explosive areas.

Only the original seals may be used.

Failure to comply increases the risk of ignition of an explosive atmosphere.

3.4.1 Operation with frequency inverter

The design of the insulation of NORD ATEX motors with ignition protection class tb and tc is suitable for operation with a frequency inverter. Due to the variable speed range, temperature monitoring by means of thermistors or temperature sensors is necessary. For safe planning and use, the planning guide for the operating and installation instructions B1091-1 must be observed. The planning guide provides information regarding the necessary conditions for inverter operation and the approved speed ranges. Option Z (additional high inertia cast iron fan) is not permitted for inverter operation.

If the frequency inverter is not approved for operation within the explosive atmosphere, the frequency inverter must be installed outside of the explosive atmosphere.
3.4.2 External fan

Motors with the additional labelling F (e.g. 80S/4 3D F) are equipped with an external fan and must be monitored with the integrated temperature sensor.

**WARNING**

**Explosion hazard**

The motor must only be operated together with the external fan. Failure of the external fan may cause the motor to overheat and therefore cause damage and/or injury up to and including ignition of the explosive atmosphere.

The operating instructions for the external fan must be observed.

The power supply to the external fan is provided separately via the terminal box of the external fan. The supply voltage of the external fan must comply with the voltage which is stated on the type plate. The external fan must be protected against overheating with suitable monitoring equipment! The IP protection class of the external fan may differ from that of the motor. The lower protection class applies for the drive unit. The cable glands must as a minimum correspond to the protection class which is specified on the type plate. Unused openings must be closed with plugs, which as a minimum correspond to the protection class of the motor.

External fans and motors for use in explosion hazard areas have Ex labelling according to RL 94/9 EEC or 2014/34/EU. The labelling must be present on both the external fan and the motor. If there is a difference between the labelling on the external fan and the motor, the lower labelled explosion protection applies for the entire drive unit. The details of surface temperatures apply for the entire drive unit; the stated max, temperature applies for the individual components. Any gear unit which is present must also be taken into account. Please contact Getriebebau NORD in case of doubt. If any component of the entire drive unit is not provided with Ex labelling, the entire drive unit may not be used in an explosion hazard area.
3.4.3 Second temperature sensor 2TF
Category 3D motors (Zone 22, non-conducting dust) can be supplied with a second temperature sensor (2TF). This option can be used to implement a warning signal (overheating in the winding). It should be noted that the temperature sensor with the lower trigger temperature should be used for the warning; the temperature sensor with the higher trigger temperature must be used to evaluate the switch-off signal.

3.4.4 Back stop
Motors with the additional code RLS (e.g. 80S/4 3D RLS) are equipped with a back stop. For motors with a back stop, the direction of rotation is indicated by an arrow on the fan cover. The head of the arrow points in the direction of the drive shaft. When connecting the motor and during motor control, it must be ensured that the motor can only operate in the rotation direction, e.g. by means of a rotary field test. Switching of the motor into the blocked direction of rotation, i.e. the wrong direction of rotation may cause damage.

Back stops operate without wear above a speed of approx. 800 rpm. To prevent excessive heating and premature wear of the back stop, back stops must not be operated below a speed of 800 rpm. This must be observed for motors with a frequency of 50 Hz and pole numbers ≥ 8 as well as for motors with a frequency inverter.

3.4.5 Brake
Motors with the additional labelling BRE (e.g. 80S/4 3D BRE 10) are equipped with a brake and must be monitored with the integrated temperature sensor. Triggering of the temperature sensor of one of the components (motor or brake) must result in the safe shut-down of the entire drive unit. The motor and brake thermistors must be connected in series.

If the motor is operated with a frequency inverter, an external fan must be used for stator frequencies less than 25 Hz. Operation with stator frequencies of 25 Hz is not permissible without an external fan.

The brake may be used as a holding brake with up to 4 activations per hour.

An optional manual release (with a lockable manual release lever) may only be used if no explosive atmosphere is present.

NOTICE! The operating instructions for the brake must also be observed.

The DC supply for the brake is via a rectifier in the motor terminal box or via a direct DC supply. The brake voltage which is stated on the type plate must be complied with.

The power supply cables must not be laid in the same cable as the temperature sensor lines. The function of the brake must be checked before commissioning. No rubbing noises may occur, as impermissibly high heating could occur.
### 3.4.6 Overview of brake installation for NORD ATEX motors

#### Permissible brake sizes for Category 3D motors

<table>
<thead>
<tr>
<th>Size</th>
<th>LKZ</th>
<th>Braking torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>S, L</td>
<td>5</td>
</tr>
<tr>
<td>71</td>
<td>S, L</td>
<td>5</td>
</tr>
<tr>
<td>80</td>
<td>S, SH</td>
<td>5 10</td>
</tr>
<tr>
<td>80</td>
<td>L, LH</td>
<td>5 10</td>
</tr>
<tr>
<td>90</td>
<td>S, SH</td>
<td>10 20</td>
</tr>
<tr>
<td>90</td>
<td>L, LH</td>
<td>10 20</td>
</tr>
<tr>
<td>100</td>
<td>L, LH</td>
<td>20 40</td>
</tr>
<tr>
<td>100</td>
<td>LA, AH</td>
<td>20 40</td>
</tr>
<tr>
<td>112</td>
<td>M, SH, MH</td>
<td>20 40</td>
</tr>
<tr>
<td>132</td>
<td>S, SH</td>
<td>60</td>
</tr>
<tr>
<td>132</td>
<td>M, MH</td>
<td>60</td>
</tr>
<tr>
<td>132</td>
<td>MA</td>
<td>60</td>
</tr>
<tr>
<td>160</td>
<td>MH</td>
<td>100 150 250</td>
</tr>
<tr>
<td>160</td>
<td>LH</td>
<td>100 150 250</td>
</tr>
<tr>
<td>180</td>
<td>MH</td>
<td>250</td>
</tr>
<tr>
<td>180</td>
<td>LH</td>
<td>250</td>
</tr>
<tr>
<td>200</td>
<td>XH</td>
<td>250</td>
</tr>
<tr>
<td>225</td>
<td>SP, MP</td>
<td>400</td>
</tr>
<tr>
<td>250</td>
<td>WP</td>
<td>400</td>
</tr>
</tbody>
</table>
3.4.7 NORD Ex motor type plate (Ex tb, EX tc) according to EN 60079 for operation with a frequency inverter

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data Matrix Code</td>
</tr>
<tr>
<td>2</td>
<td>Code number of the designated facility (only for Ex tb)</td>
</tr>
<tr>
<td>3</td>
<td>Number of phases</td>
</tr>
<tr>
<td>4</td>
<td>Type designation</td>
</tr>
<tr>
<td>5</td>
<td>Order number / motor number</td>
</tr>
<tr>
<td>6</td>
<td>Year of manufacture</td>
</tr>
<tr>
<td>7</td>
<td>Thermal class of the insulation system</td>
</tr>
<tr>
<td>8</td>
<td>IP protection class</td>
</tr>
<tr>
<td>9</td>
<td>Operating mode</td>
</tr>
<tr>
<td>10</td>
<td>Standard specifications</td>
</tr>
<tr>
<td>11</td>
<td>Stator frequency</td>
</tr>
<tr>
<td>12</td>
<td>Stator voltage</td>
</tr>
<tr>
<td>14</td>
<td>EC prototype test certificate number</td>
</tr>
<tr>
<td>15</td>
<td>Power factor</td>
</tr>
<tr>
<td>16</td>
<td>Speed</td>
</tr>
<tr>
<td>17</td>
<td>Explosion protection marking</td>
</tr>
<tr>
<td>21</td>
<td>Notice! Pay attention to operating instructions B1091</td>
</tr>
<tr>
<td>22</td>
<td>Rated power (mechanical power delivered to shaft)</td>
</tr>
<tr>
<td>23</td>
<td>Rated current at operating point</td>
</tr>
<tr>
<td>24</td>
<td>Individual serial number</td>
</tr>
<tr>
<td>25</td>
<td>Efficiency</td>
</tr>
<tr>
<td>26</td>
<td>Weight</td>
</tr>
<tr>
<td>27</td>
<td>Brake information (option only for Ex tc)</td>
</tr>
<tr>
<td>28</td>
<td>Note: Supply by frequency inverter</td>
</tr>
<tr>
<td>29</td>
<td>Maximum permissible stator frequency</td>
</tr>
<tr>
<td>30</td>
<td>Minimum pulse frequency of frequency inverter</td>
</tr>
<tr>
<td>31</td>
<td>Frequency inverter modulation method</td>
</tr>
<tr>
<td>32</td>
<td>Data field for operation with frequency inverters</td>
</tr>
<tr>
<td>33</td>
<td>Data field for mains operation</td>
</tr>
<tr>
<td>34</td>
<td>Rated torque on the motor shaft</td>
</tr>
</tbody>
</table>

Before commissioning, the type plate must be compared with the requirements of the aforementioned declaration, which result from the local regulations and operating conditions.
3.5 Explosion protected motors according to TP TC012/2011 for the Eurasian Economic Union

In addition to the information which is stated in the operating and maintenance instruction B1091, the following information must be noted for EAC EX motors. If the motor is supplied with further components or devices, the associated operating and maintenance instructions must also be observed.

3.5.1 Type plates / Labelling

Motors with the labelling listed below have EAC Ex approval according to TP TC 012/2011 for the Eurasian Economic Union.

These motors have two type plates. One type plate complies with ATEX Directive 2014/34 EU and the relevant standards from the standard series EN 60079; the second type plate contains the additional specifications according to Directive TP TC 012/2011.

The motors may only be operated in areas in which the ignition protection type stated on the motor type plate is permissible. In addition, compliance with the temperature class and the maximum surface temperature as stated on the type plate is mandatory.
### 3.5.2 Standards

<table>
<thead>
<tr>
<th>ГОСТ Standard</th>
<th>IEC Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>ГОСТ 31610.0-2014</td>
<td>IEC 60079-0:2011</td>
</tr>
<tr>
<td>ГОСТ Р МЭК 60079-31-2013</td>
<td>IEC 60079-31:2013</td>
</tr>
<tr>
<td>ГОСТ Р МЭК 60079-7-2012</td>
<td>IEC 60079-7:2006</td>
</tr>
<tr>
<td>ГОСТ 31610.15-2014</td>
<td>IEC 60079-15:2010</td>
</tr>
</tbody>
</table>

### 3.5.3 Service life

In addition to the service intervals which are stated in the operating and maintenance instructions, it should be noted that the use of motors which are more than 30 years old is not permitted.

The year of manufacture of the motor is stated on the type plate.

**WARNING**

**Danger to persons**

The motors must be disconnected from the mains before opening the terminal box.

**WARNING**

**Explosion hazard**

Opening the terminal box in an explosive atmosphere is prohibited.

### 3.5.4 Special operating conditions (X-labelling)

**Permissible ambient temperature range**

For all motors with ignition protection type tb or tc, the permissible ambient temperature range is -20°C...+40°C. For motors for operation in Zones 21 and 22, an extended ambient temperature range from -20°C...+60°C is permissible. In this case, the rated power must be reduced to 72 % of the value stated in the catalogue.

If the maximum ambient temperature is between +40 °C and +60 °C, the power output should be inversely linearly interpolated between 100 % and 72 %. In this case thermal protection of the motor by means of a thermistor sensor is essential. The motor connection cables and the cable glands must be suitable for temperatures of at least 80 °C.

The extended ambient temperature range does not apply for optional attachments such as a brake and/or external fan. Contact the manufacturer in case of doubt with regard to permissibility!
4 Synchronous motors – special information

The following supplementary or special information applies for these motors.

**DANGER! Electric shock**

The motor is operated with a dangerous voltage. Touching certain conducting components (connection terminals and supply cables) will cause electric shock with possibly fatal consequences.

Even when the motor is at a standstill (e.g. due to the electronic block of a connected frequency inverter or a jammed drive unit) the connection terminals and supply cables may carry a dangerous voltage. A motor standstill is not identical to electrical isolation from the mains.

Even if the drive unit has been disconnected from the mains, a connected motor may rotate and possibly generate a dangerous voltage.

Installation and work must only be carried out when the motor is at a standstill and is **disconnected** (all phases disconnected from the mains).

Follow the 5 **Safety Rules** (1. Switch off the power, 2. Secure against switching on, 3. Check for no voltage, 4. Earthing and short circuiting, 5. Cover or fence off neighbouring live components).

### 4.1 Type designation

<table>
<thead>
<tr>
<th>80</th>
<th>D</th>
<th>1</th>
<th>/4</th>
</tr>
</thead>
</table>

**Number of poles**

**Package length:** The 1..9 code depends on the axis height and the length of the active component

**Winding type:** T=2100 rpm in Y circuit, 3000 rpm in ∆ circuit

**Axis height:** 80, 90, 100

### 4.2 Connection

**Notice! Hazardous voltages occur at the motor terminals when the motor shaft is rotating!**

The motors must only be operated with suitable inverters. For energy-efficient operation, the inverter must detect the position of the rotor. Various methods both with and without encoders are available for this. See also TI80_0010

Motors are normally supplied with a star circuit. Some operating points can only be used in a delta circuit. For this, the bridges must be changed according to the circuit diagram in the terminal box cover.
4.3 Encoders

Incremental encoder with zero track

The incremental encoder is located under the fan cover and is attached to this. After installation, the zero point offset is measured in the final test. The offset is provided with an adhesive label in the terminal box.

Absolute encoders

The synchronisation of the encoder is adjusted by NORD prior to delivery of the geared motor and does not require determination of the offset.

If the encoder is not synchronised, or has come out of adjustment due to an impact or removal of the motor, the zero track of the encoder must be synchronised to the rotor position.

4.4 Commissioning

The choice of inverter must be checked with regard to the motor allocation. In addition to the information in Section 1 "General" the operating manual for the frequency inverter must be observed. Further information can be obtained from T180_0010.

4.5 Maintenance and servicing

CAUTION! The motors contain magnetic components. Dismantling without specialist knowledge and suitable aids may result in injuries. This type of work must only be carried out by trained personnel.
5 Replacement parts

We will be pleased to send you the spare parts catalogue on request.
6 Declarations of Conformity

Getriebebau NORD GmbH & Co. KG as manufacturer in sole responsibility hereby declares, that the three-phase asynchronous motors from the product series

- SK 63**/4** to SK 100**/4** 2D **


   2) Number of poles: 2, 4, 6

   3) Additional options

with ATEX labeling II 2D Ex tb IIIC T...°C Db

comply with the following regulations:

- ATEX Directive for products 2014/34/EU
- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU

Applied standards:

EN 60079-0:2012 + A11:2013
EN 60079-1:2010 + AC:2010
EN 60079-6-1:1995
EN 60034-2-1:2014
EN 60034-11:2004
EN 60034-30-1:2014
EN 62041-2:2006+AC:2010
EN 61000-6-3:2007+A1:2011
EN 50581:2012

EU-Type-Examination Certificates: BVS 04 ATEX E 037

Notified body for the assessment of the quality management system:

Physikalisch-Technische Bundesanstalt PTB) Bundesallee 100
Identity number: 0102
38116 Braunschweig

Notified body to issue for the EU-Type-Examination Certificate:

DEKRA EXAM GmbH Dinnendahlstraße 9
Identity number: 0158
44809 Bochum

First marking was carried out in 2004.

Bargteheide, 27.03.2018

U. Küchenmeister
Managing Director

Dr. O. Sadi
Technical Director
Getriebebau NORD GmbH & Co. KG as manufacturer in sole responsibility hereby declares, that the three-phase asynchronous motors from the product series

- SK 63**[1]** to 250**[2]** 3D


2) Number of poles: 2, 4, 6

3) Additional options

with ATEX labeling Ex eIIB T... °C Dc

comply with the following regulations:

**ATEX Directive for products**

- 2014/34/EU

**Eco-design Directive**

- 2009/125/EG (VO Nr. 640/2009)

**EMC Directive**

- 2014/30/EU

**RoHS Directive**

- 2011/65/EU

**Applied standards:**

- EN 60079-0:2012 + A11:2013
- EN 60079-1:2010 + AC:2010
- EN 60079-6:1993
- EN 60079-36:2014
- EN 60079-31:2014
- EN 60034-2-1:2014
- EN 60034-11:2004
- EN 50581:2012

First marking was carried out in 2011.

Bargteheide, 25.04.2019

[Signature]

U. Küchenmeister
Managing Director

[Signature]

Dr. O. Sadi
Technical Managing Director
Motors – Operating and Assembly Instructions

GETRIEBEBAU NORD
Member of the NORD DRIVESYSTEMS Group

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Getriebebau-Nord-Str. 1
22541 Bargteheide, Germany
Tel.: +49(0)4632 285-0
Fax: +49(0)4632 285-2253
info@nord.com

EC/EU Declaration of Conformity

Getriebebau NORD GmbH & Co. KG as manufacturer hereby declares,
that the three-phase asynchronous motors from the product series

- SK 63*11/12* 2G - 7G - 9G to SK 200*11/12* 2G - 9G

*2 Number of poles: 2, 4, 6
*3 Additional options

with ATEX labeling EX II 2G Ex ed IIC T3 Gb

Comply with the following regulation

ATEX Directive for products 2014/34/EU

Eco-design Directive 2009/125/EG (VO Nr. 640/2009)

EMC-Directive 2014/30/EU (ab 20. April 2016)
Abl. L 96 vom 29.3.2014, S. 79-106

RoHS-Directive 2011/65/EU
Abl. L 174 vom 1.7.2013, S. 88-110

Applied standards:
EN 60079-6:2012+A1:2013
EN 60079-2-1:2010
EN 60334-1:1993
EN 6034-30-1:2014
EN 61000-6-4:2007+A1:2011
EN 60079-7:2015
EN 60334-2-1:2014
EN 6034-11:2004
EN 55011:2009+A1:2010
EN 61000-6-3:2007+A1:2011
EN 50581:2012

EC-Type-Examination Certificates:
PTB 14 ATEX 3090, PTB 14 ATEX 3032, PTB 08 ATEX 3024-2, PTB 14 ATEX 3034,
PTB 14 ATEX 3036, PTB 14 ATEX 3038, PTB 14 ATEX 3040, PTB 14 ATEX 3042
PTB 14 ATEX 3046, PTB 14 ATEX 3046

Notified body for the assessment of the quality management system:
Physikalisch-Technische Bundesanstalt (PTB) Bundesallee 100
Identity number: 0102
38116 Braunschweig

Notified body to issue for the EC-Type-Examination Certificate:
Physikalisch-Technische Bundesanstalt (PTB) Bundesallee 100
Identity number: 0102
38116 Braunschweig

First marking was carried out in 2008.

Bargteheide, 01.08.2018

U. Küchenmeister
Managing Director

Dr. O. Sadi
Technische Geschäftsleitung
EC/EU Declaration of Conformity


Getriebebau NORD GmbH & Co. KG as manufacturer hereby declares, that the three-phase asynchronous motors from the product series

- SK 63*1/*2 3G *3) to SK 200*1/*2 3G *3)

*3) number of poles: 2, 4, 6
*3) Additional options

with ATEX labeling Ex II 3G Ex ec IIC T5 Gc

comply with the following regulations:

  - ABL L 096 vom 29.3.2014, S. 309–356
  - ABL L 96 vom 29.3.2014, S. 79–106
- RoHS-Directive: 2011/65/EU
  - ABL L 174 vom 1.7.2011, S. 88–110

Applied standards:

- EN 60079-0:2012+A11:2013
- EN 60034-1:2010+AC:2010
- EN 60034-6:1993
- EN 60034-30:2014
- EN 60079-7:2015
- EN 60034-2-1:2014
- EN 60034-11:2004

First marking was carried out in 2014.

Bargteheide, 01.08.2018

U. Küchenmeister
Managing Director

DR. O. Sadi
Technische Geschäftsleitung
NORD DRIVESYSTEMS Group

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