


SIEMENS

For employment in zone 2 (IEC/EN 60079-10-1)

CE  II 3G Ex nA IIC T3 Gc

SIMOTICS TN Series N-compact

Induction motor

Type 1LA8

Operating Instructions

Edition

05/2014

Answers for industry.

Induction motor

SIMOTICS TN Series N-compact 1LA8

Operating Instructions


For employment in zone 2 (IEC/EN 60079-10-1)
CE II 3G Ex nA IIC T3 Gc


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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.

 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.

 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1.1 About these instructions

These instructions describe the machine and explain how to handle it, from initial delivery to final disposal of the equipment. Keep these instructions for later use.

Read these operating instructions before you handle the machine and follow the instructions to become familiar with its design and operating principles and thus ensure safe, problem-free machine operation and long service life.

If you have suggestions for improving the document, please contact the Service Center (Page 141).

Text format features

The warning notice system is explained on the rear of the inside front. Always follow the safety instructions and notices in these instructions.

In addition to the safety-related warning notices which you must read, you will find the text in these instructions is formatted in the following way:

1. Handling instructions are always formatted as a numbered list. Always perform the steps in the order given.
- Lists are formatted as bulleted lists.
 - Lists on the second level are hyphenated.

Note

A Note is an important item of information about the product, handling of the product or the relevant section of the document. Notes provide you with help or further suggestions/ideas.

Safety information

2.1 Information for the nominated person in control of the electrical installation

This electric machine has been designed and built in accordance with the specifications contained in Directive 2006/95/EC ("Low-Voltage Directive") and is intended for use in industrial plants. Please observe the country-specific regulations when using the electric machine outside the European Community. Follow the local and industry-specific safety and setup regulations.

The persons responsible for the plant must ensure the following:

- Planning and configuration work and all work carried out on and with the machine is only to be done by qualified personnel.
- The operating instructions must always be available for all work.
- The technical data as well as the specifications relating to the permissible installation, connection, ambient and operating conditions are taken into account at all times.
- The specific setup and safety regulations as well as regulations on the use of personal protective equipment are observed.


Note

Use the services and support provided by the appropriate Service Center (Page 141) for planning, installation, commissioning, and servicing work.

You will find safety instructions in the individual sections of this document. Follow the safety instructions for your own safety, to protect other people and to avoid damage to property.

Observe the following safety instructions for all activities on and with the machine.

This machine has been designed and built in accordance with Directive 94/9/EC ("Explosion Protection Directive") and is intended for use in industrial plants with potentially explosive atmosphere. Commissioning in the European Community is forbidden until the plant into which the machine will be installed has been shown to conform with this directive. Please observe the country-specific regulations when using the machine outside the European Community.

 WARNING
<p>Commissioning prior to determining the conformance</p> <p>If the machine is commissioned prior to determining the plant conformance, the explosion protection of the plant is not guaranteed. An explosion can result. This can result in death, serious injury or material damage.</p> <p>Commission the machine only when the plant conformance with the explosion protection directive has been confirmed.</p>

2.2 The five safety rules

For your personal safety and to prevent material damage when carrying out any work, always observe the safety instructions and the following five safety rules, according to EN 50110-1 "Dead working". Apply the five safety rules in the sequence stated before starting work.

Five safety rules

1. Disconnect completely.
Disconnect the auxiliary circuits, for example anti-condensation heating.
2. Secure against reconnection.
3. Verify absence of operating voltage.
4. Carry out earthing and short-short-circuiting.
5. Provide protection against adjacent live parts.

To energize the system, apply the measures in reverse order.

2.3 Qualified personnel

All work at the machine must be carried out by qualified personnel only. For the purpose of this documentation, qualified personnel is taken to mean people who fulfill the following requirements:

- Through appropriate training and experience, they are able to recognize and avoid risks and potential dangers in their particular field of activity.
- They have been instructed to carry out work on the machine by the appropriate person responsible.

2.4 Safe handling

Workplace safety depends on the attentiveness, care, and common sense of the personnel who install, operate, and maintain the machine. In addition to the safety measures cited, as a matter of principle, the use of caution is necessary when you are near the machine. Always pay attention to your safety.

Also observe the following to prevent accidents:

- General safety regulations applicable in the country where the machine is deployed.
- Manufacturer-specific and application-specific regulations
- Special agreements made with the operator
- Separate safety instructions supplied with the machine
- Safety symbols and instructions on the machine and its packaging

**WARNING****Live parts**

Electric machines contain live parts.

Fatal or severe injuries and substantial material damage can occur if the covers are removed or if the machine is not handled, operated, or maintained properly.

- Always observe the "five safety rules (Page 16)" when carrying out any work on the machine.
- Only remove the covers using the methods described by these operating instructions.
- Operate the machine properly.
- Regularly and correctly maintain the machine.

**WARNING****Rotating components**

Electric machines contain dangerous rotating parts.

Fatal or severe injuries and substantial material damage can occur if the covers are removed or if the machine is not handled, operated, or maintained properly.

- Only remove the covers using the methods described by these operating instructions.
- Operate the machine properly.
- Perform regular maintenance on the machine.
- Secure free-standing shaft ends.

**WARNING****Hot surfaces**

Electric machines have hot surfaces. Do not touch these surfaces. They could cause burns.


- Allow the machine to cool before starting work on the machine.
- Only remove the covers using the methods described by these operating instructions.
- Operate the machine properly.


**CAUTION****Hazardous substances**

Chemical substances required for the setup, operation and maintenance of machines can present a health risk.

Poisoning, skin damage, cauterization of the respiratory tract, and other health damage may result.

- Read the information in these operating instructions and the product information supplied by the manufacturer.
- Observe the relevant safety regulations and wear the personal protective equipment specified.

 CAUTION
Flammable substances Chemical substances required for the setup, operation and maintenance of machines may be flammable. Burns and other damage to health and material may result. <ul style="list-style-type: none">• Read the information in these operating instructions and the product information supplied by the manufacturer.• Observe the relevant safety regulations and wear the personal protective equipment specified.

 WARNING
Noise emissions During operation, the machine's noise emission levels can exceed those permitted at the workplace, which can cause hearing damage. Take steps to reduce noise, such as introducing covers and protective insulation or adopting hearing protection measures, so that the machine can be operated safely within your system.

2.5 For use in hazardous Zone 2 or Zone 22

Electrical systems in hazardous zones must be assembled, installed, and operated by the applicable responsible persons in accordance with the applicable rules and regulations.

Note

The basic requirements relating to electrical systems and their operation in hazardous areas are described, for instance, in EU Directive 1999/92/EC as well as in IEC / EN 60079-14.

Ignition hazards

The assessment of operating risks and local operating conditions and the necessary monitoring methods must be clarified and made binding by the system operator in consultation with the responsible supervisory authority. The required measures must be adhered to at all times. The machine manufacturer cannot provide any generally applicable recommendations. Please observe the information in these operating instructions.

Note

The basic requirements relating to the assessment of ignition hazards arising from electrical equipment and their operation in hazardous zones are specified, for instance, in 94/9/EC and 1999/92/EC directives as well as in the IEC / EN 60079 series of standards.

If a third-party certification is available for the machine, then carefully comply with the technical data defined in it and any special conditions.

The certificate must be available before commissioning.

2.6 Electrostatic sensitive devices

ESD protective measures



NOTICE

Electrostatic discharge

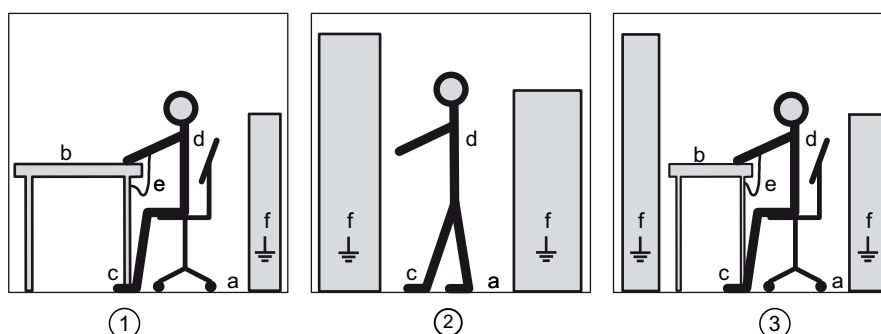
Electronic modules contain components that can be destroyed by electrostatic discharge.

These modules can be easily destroyed by improper handling.

To protect your equipment against damage, follow the instructions given below.

- Never touch electronic modules unless absolutely necessary in the course of maintenance and repair procedures.
- If the modules have to be touched, the body of the person concerned must be electrostatically discharged immediately beforehand and be grounded.
- Electronic modules should not be brought into contact with electrically insulating materials such as plastic film, plastic parts, insulating table supports or clothing made of synthetic fibers.
- Always place electrostatic sensitive devices on conductive bases.
- Always pack, store and transport electronic modules or components in conductive packaging, e.g. metallized plastic or metal containers, conductive foam material or domestic aluminum foil.

The necessary ESD protective measures for electrostatic sensitive devices are illustrated once again in the following drawings:



(1) Sitting

a = conductive floor surface

d = ESD overall

(2) Standing

b = ESD table

e = ESD wristband

(3) Standing/sitting

c = ESD shoes

f = cabinet ground connection

2.9 Influence on the line power supply through a strongly irregular torque



WARNING

Risk of explosion due to electrostatic discharge

Electrostatic discharge poses a potential ignition source. In an explosive atmosphere, there is a risk of an explosion. This can result in death, serious injury or material damage.

Please comply with ESD protective measures.

2.7 Electromagnetic compatibility

This machine is designed in accordance with IEC/EN 60034 and when used as prescribed it satisfies the requirements of European Directive 2004/108/EC on Electromagnetic Compatibility.

2.8 Interference immunity


The machine fulfills the requirements regarding interference immunity in accordance with IEC/EN 61000-6-2.

For machines with integrated sensors (e.g. PTC thermistors), the manufacturer of the complete system must ensure sufficient interference immunity by selecting suitable sensor signal leads and evaluation units.


2.9 Influence on the line power supply through a strongly irregular torque

A strongly irregular torque, for example with the drive of a reciprocating motor, forces a non-sinusoidal motor current. The emerging harmonics can have an impermissible influence on the line power supply via the connection lines.

2.10 Interference voltages when operating the converter

 WARNING
Interference voltages when operating the converter <p>When a converter is in operation, the emitted interference varies in strength depending on the converter (manufacturer, type, interference suppression measures undertaken). On machines with integrated sensors (e.g. PTC thermistors), interference voltages caused by the converter may occur on the sensor lead. This can cause faults which can result in eventual or immediate death, serious injury or material damage.</p> <p>In order to avoid exceeding the limit values set for the drive system (machine and converter) in IEC/EN 61000-6-3, the EMC information provided by the converter manufacturer must be observed. You must put appropriate EMC measures in place.</p>

2.11 Electromagnetic fields when operating electrical power engineering installations

 WARNING
Interference to electronic devices caused by electrical power equipment <p>Electrical power equipment generate electric fields during operation. Potentially lethal malfunctions can occur in medical implants, e.g. pacemakers, in the vicinity of electrical power equipment. Data may be lost on magnetic or electronic data carriers.</p> <ul style="list-style-type: none">• It is forbidden for people with pacemakers to enter the vicinity of the machine.• Protect the personnel working in the plant by taking appropriate measures, such as erecting identifying markings, safety barriers and warning signs and giving safety talks.• Observe the nationally applicable health and safety regulations.• Do not carry any magnetic or electronic data media.

Description

Applications

This electrical machine has been designed for a wide range of drive and energy conversion applications. The machines are characterized by extreme ruggedness, long service life, and overall reliability. They are also highly versatile, allowing them to be tailored to specific functions.

Details of the supplied machine and permissible operating conditions can be found in this documentation.

The machine was designed in accordance with the ordering party's specification and may only be used for the contractually agreed purpose. The permissible operating conditions are specified on the rating plate. The technical data are described in the catalog.

Type of protection Ex nA

This machine is designed in the "non-sparking" (Ex nA) type of protection according to IEC / EN 60079-15. It can therefore be operated in hazardous areas of **Zone 2** according to IEC / EN 60079-10-1.



WARNING

Explosion hazard

This machine is not designed for use in the presence of explosive dust or in areas where an explosion hazard exists due to hybrid mixtures. An explosion can occur if the machine is operated in these areas. This can result in death, serious injury or material damage.

Never operate this machine in the presence of explosive dust or in areas where an explosion hazard exists due to hybrid mixtures.

Machine design

The regulations and standards used as the basis to design and test this machine are stamped on the rating plate.

The machine design basically complies with the subsequent standards. Please refer to the EC Declaration of Conformity for the versions of the harmonized standards referenced.

Table 3-1 Machine design

Feature	Standard
Rating and performance	IEC/EN 60034-1
Degree of protection	IEC/EN 60034-5
Cooling	IEC/EN 60034-6
Type of construction	IEC/EN 60034-7
Terminal markings and direction of rotation	IEC/EN 60034-8
Noise emission	IEC/EN 60034-9
Starting characteristics, rotating electrical machines	IEC/EN 60034-12*
Vibration severity grades	IEC/EN 60034-14
Vibration limits	DIN ISO 10816-3

* For machines in line operation only

See also

Quality documents (Page 145)

The following standards additionally apply for explosion-proof motors:

Table 3-2 Machine version with type of protection Ex nA

Feature	Standard
Type of protection Ex nA ^①	IEC/EN 60079-0 IEC/EN 60079-15

^① Optional (depending on order)

Rating plate

The rating plate shows the identification data and the most important technical data. The data on the rating plate and the contractual agreements define the limits of proper usage.

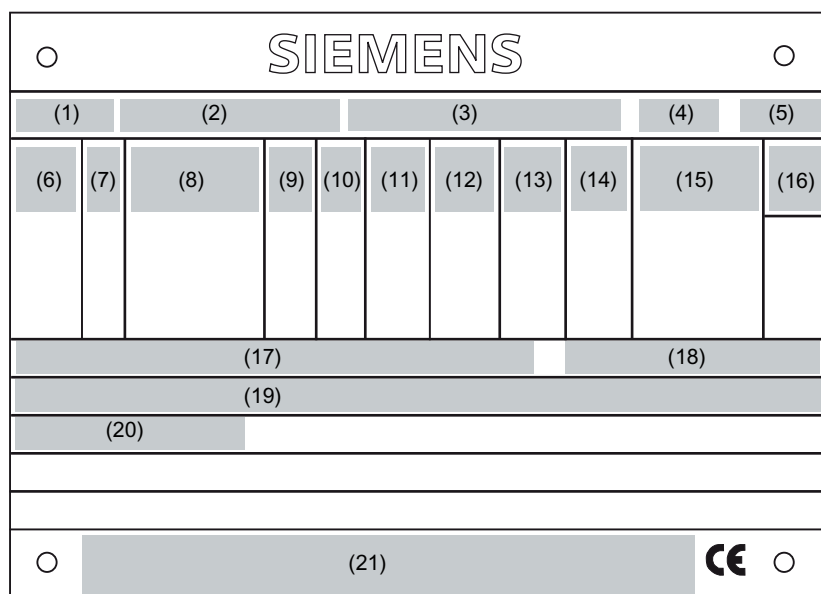


Figure 3-1 Schematic diagram of rating plate

Table 3-3 Data on the rating plate

Item	Description	Item	Description
(1)	Type of motor	(12)	Rated speed [rpm]
(2)	Motor type	(13)	Starting current ratio
(3)	Serial number	(14)	(empty)
(4)	Type of construction	(15)	Certificate number
(5)	Temperature class	(16)	Degree of protection
(6)	Rated voltage [V] and connections	(17)	Rotor class
(7)	Rated frequency [Hz]	(18)	Motor weight [kg]
(8)	(Content depending on the version)	(19)	Additional information (optional)
(9)	Rated current [A]	(20)	Maximum speed [rpm]
(10)	Rated power [kW]	(21)	Country of manufacture / City
(11)	Power factor [cos ϕ]		

Rotors

The rotor assembly is pressed onto the shaft together with the cage winding. The drive end of the shaft usually has a cylindrical shaft end. Dependent on the design, a second shaft end may be located at the non-drive end.

Cooling

The cooling system is designed as a closed, internal cooling circuit. The heat lost from the machine is dissipated to the ambient air via the machine's surface. A shaft-mounted fan moves the cooling air in the primary circuit. Movement of the cooling air in the secondary circuit is driven by a shaft-mounted fan.

Fan

- The internal fans are bidirectional.
- External fan:
 - Machines with four poles and more as well as 1L.831.-2: The external fans are **bidirectional**.
 - Two-pole machines except 1L.831.-2: The external fans are unidirectional. The machines have an additional label on the end shield and on the rating plate with an arrow indicating the direction of rotation.
The 1L.831.-2 can optionally also be equipped with a unidirectional external fan.

Rolling-contact bearings

The machines are equipped with different types of rolling-contact bearings depending on the version and the operating conditions described in the order. The different types are listed on the lubricant plate of the machine. In converter operation an insulated bearing is usually installed on the non-drive end. The following rolling-contact bearing variants are available:

Table 3-4 Rolling-contact bearing variants

Version	Rolling-contact bearing
Horizontal type of construction, coupling output	<ul style="list-style-type: none"> • Drive end: Deep-groove ball bearing as a fixed bearing • Non-drive end: Deep-groove ball bearing as a floating bearing with axial compression springs
Horizontal type of construction, for increased transverse forces e.g. in the case of belt coupling	<ul style="list-style-type: none"> • Drive end: Cylindrical-roller bearing as a floating bearing • Non-drive end: Deep-groove ball bearing as a fixed bearing
Vertical type of construction, shaft height 315, coupling output	<ul style="list-style-type: none"> • Drive end: Deep-groove ball bearing as a fixed bearing • Non-drive end: Deep-groove ball bearing as a floating bearing with axial compression springs
Vertical type of construction, shaft height 355 ... 450	<ul style="list-style-type: none"> • Drive end: Pairing of angular-contact ball bearing / deep-groove ball bearing as a fixed bearing • Non-drive end: Deep-groove ball bearing as a floating bearing with axial compression springs

Rolling-contact bearing design for "Increased degree of protection" (option)

Improved sealing of the bearing units to prevent dust and water from getting in can be achieved by positioning a grease chamber ahead of the actual bearing unit. Although the same grease is used in both cases for reasons of convenience, a distinction is made here between "lubricating grease" and "sealing grease" because of their different functions.

Layout

The spent lubricating grease collects in the space between the bearing housing and the outer bearing cap. The latter also forms the sealing grease chamber with the labyrinth sealing ring (optional). The second lubricating nipple containing the grease duct for pressing in the sealing grease is also located in the outer bearing cap. The chamber is sealed off from the space where the lubricating grease collects by a V-ring or a V-ring and felt ring combination which prevents the sealing grease in the chamber from penetrating into the lubricating grease collecting space. During operation, the sealing grease in the chamber slowly runs out via the labyrinth and seals it, additionally removing dust from inside and around the outside of the labyrinth ring.

Terminal box

The terminal box can be arranged either on the left or right of the machine. It is not possible to change the position to the other side of the machine at a later date.

If you wish to upgrade to the next largest terminal box at a later date, please contact the manufacturer.

Depending on the shaft height, the following terminal boxes are used for connecting the cables:

Table 3-5 Assignment of shaft heights to terminal boxes

Shaft height	Terminal box
315	GT640 ^①
315 ... 355	1XB1621
315 ... 450	1XB1631
315 ... 450	1XB1634
315 ... 450	1XB9600 ^①

^① Not for explosion-proof versions

Note

Rotating the terminal box

Depending on the version, the terminal box can be rotated. It can then be rotated through increments of 90° corresponding to the connection direction.

If required, contact your Service Center (Page 141).

Supplementary devices

Depending on the order, various supplementary devices can be installed or mounted. These include sensors for bearing temperature monitoring or winding monitoring, for example.

Anti-condensation heating (option)

The machine is fitted with anti-condensation heating. The connection data is listed on an additional plate on the machine.

Preparations for use

Good planning and preparation of machine applications are essential in terms of keeping installation simple and avoiding errors, ensuring safe operation, and allowing access to the machine for servicing and corrective maintenance.

This chapter outlines what you need to consider when configuring your plant in relation to this machine and the preparations you need to make before the machine is delivered.

4.1 Safety-related aspects to consider when configuring the plant

A number of residual risks are associated with the machine. These are described in the chapter titled "Safety information" (Page 15) and in related sections.

Take appropriate safety precautions (covers, barriers, markings, etc.) to ensure the machine is operated safely within your plant.

Observing the operating mode

Observe the machine's operating mode. Use a suitable control system to prevent overspeeds, thus protecting the machine from damage.

4.2 Ensuring cooling

Ensure that the machine is sufficiently cooled by the cooling air flow at the installation site:

- The cooling air can flow in and out freely.
The full air flow provided by the fan is only achieved if air can freely enter the impeller. A clearance of at least 1 times the air intake diameter must therefore be provided in the axial direction.
- Hot discharged air must not be drawn in again.
- If there is no protective canopy, then for vertical types of construction where the air enters from the top, the air entry openings must be protected against the ingress of foreign bodies and water.

4.3 Thermal motor protection

The machine is equipped with PTC thermistors for direct monitoring of the motor temperature to protect the machine against overheating during operation. Plan a corresponding circuit for monitoring.

See also

Setpoint values for monitoring the bearing temperature (Page 86)

Set values for monitoring the winding temperature (Page 86)

4.4 Interlock circuit for anti-condensation heating (option)

If the anti-condensation heating is operated while the machine is running, this can increase the temperatures inside the machine.

- Install an interlock circuit that switches off the anti-condensation heating once the main machine is switched on.
- Only operate anti-condensation heating when the machine is switched off.

See also

Switching off the anti-condensation heating (Page 91)



WARNING

Explosion hazard

If the anti-condensation heating is switched on directly after the machine is switched off, the temperature class or the maximum surface temperature of the machine can be exceeded.

In an explosive atmosphere, there is a risk of an explosion. This can result in death, serious injury or material damage.

Do not switch on the anti-condensation heating for at least one hour after the motor has been switched off.

4.5 Noise emissions




WARNING

Noise emissions

During operation, the machine's noise emission levels can exceed those permitted at the workplace, which can cause hearing damage.

Take steps to reduce noise, such as introducing covers and protective insulation or adopting hearing protection measures, so that the machine can be operated safely within your system.

4.6 Rotational speed limit values

 WARNING
Excessively high speeds Excessive rotational speed can lead to serious damage to the machine. This can result in death, serious injury, or material damage. <ul style="list-style-type: none"> • Avoid operation above the permissible speed by using the appropriate control function. • Observe the speeds stamped on the rating plate.

4.7 Space requirements

Observe the minimum dimension for the air inlet at the machine site:

Table 4-1 Minimum dimensions for air intake

Shaft height			
31.	35.	40.	45.
130 mm	140 mm	150 mm	160 mm

4.8 Voltage and frequency fluctuations during line operation

Unless stated otherwise on the rating plate, the permissible voltage fluctuation is $\pm 5\%$ and the permissible frequency fluctuation is $\pm 2\%$ in accordance with IEC / EN 60034-1 Range A. Any fluctuations that are permissible beyond these ranges are stated on the rating plate, e.g. voltage fluctuation $\pm 10\%$ in accordance with IEC / EN 60034-1 Range B.

The following applies: Under practical operating conditions a machine may sometimes have to be operated outside the limits of Range A. Exceptions of this sort should be limited with regard to the values that arise, how often and for how long they occur. Where possible and within a reasonable time take corrective actions such as reducing the power. Such actions can avoid thermal ageing leading to a reduction in the service life of the machine.

NOTICE
Overheating of the winding Exceeding the permissible tolerances for voltage and frequency can lead to an impermissibly high temperature rise in the windings and thus cause long-term damage to the machine.

4.9 System-inherent frequencies

NOTICE

Machine damage caused by system resonances

The system consisting of the foundation and machine set must be configured and matched in such a way that no system resonances can arise and result in the permissible vibration levels being exceeded. Excessive vibrations can damage the machine set. The vibration limit values according to DIN ISO 10816-3 must not be exceeded.

4.10 Torsional loading of the drive train due to faults in the electrical supply

In the event of faults in the electrical connection during operation, excessive air gap torques can lead to additional mechanical torsional load on the line shaft.

Note

The system planner is responsible for the entire drive train.



WARNING

Serious damage to the machine

If the configuration does not correctly recognize the mechanical torsional loadings of the shaft assembly, this can lead to serious damage to the machine. This can result in death, serious injury or material damage.

When planning the system, consider the configuration data.

Note

More information about this may be found in the catalog.

4.11 Transport and storage

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

4.11.1 Checking the delivery

The components are assembled on an individual basis. When you take receipt of the delivery, please check immediately whether the scope of the delivery matches up with the accompanying documents. No claims relating to defects/items missing from the delivery will be accepted if they are submitted at a later date.

- Report any apparent transport damage to the delivery agent immediately.
- Immediately report any apparent defects/missing components to your contact partner.

These Operating Instructions are part of the scope of delivery; keep them in a location where they can be easily accessed.

4.11.2 Requirements for safe lifting and transporting

To safely lift and transport the machine, the following requirements must be met:

- Personnel operating cranes and fork-lift trucks must be appropriately qualified.
- When lifting the machine, use only approved and undamaged sling guides and spreaders of sufficient rated capacity. Check the lifting equipment prior to its use. The weight of the machine is shown on the rating plate.
- When lifting the machine, refer to the information on the lifting plate.
 - Comply with the specified spreading angles.
 - Do not exceed the maximum lifting acceleration and lifting speed specified on the lifting plate. Lift the machine without jerking it.
Acceleration $a \leq 3.942 \text{ m/s}^2$
Velocity $v \leq 20 \text{ m/min}$
- Use only the load carrying device on the stator frame for lifting.



WARNING

The machine can tip over, slip or fall down during transport if a different construction is used

If you do not transport or lift the machine in a position appropriate for its construction, the machine can tip, slip into the lifting equipment or fall down. This can result in death, serious injury or material damage.

- Use only the load carrying device on the stator frame for lifting.
- Use the load carrying device appropriate for the machine position.
- Use suitable rope guiding or spreading devices. The weight of the machine is shown on the rating plate.

! WARNING

The machine can fall over, shift or fall down during transport if the center of gravity is not symmetrical

If the center of gravity of a load is not located centrally between the attachment points, the motor can tip over or slip out of the lifting equipment and fall when it is being transported or lifted. This can result in death, serious injury or material damage.

- Comply with the handling instructions on the machine when transporting it.
- Be aware of the possibility of different loads on the sling ropes or lifting straps and the carrying capacity of the lifting equipment.
- Always take account of the center of gravity when transporting or lifting the motor. If the center of gravity is not located centrally between the attachment points, then position the hoisting hook above the center of gravity.

4.11.3 Rotor shipping brace

Depending on the version, the machine is fitted with a rotor shipping brace.

NOTICE

Damage during transport

Not using the rotor shipping brace can cause damage to the machine if it is jolted during transport. Material damage can result.

- If the machine is fitted with a rotor shipping brace, this should always be used when transporting the machine. It must be securely attached during transportation.
- Only remove it before pushing on the output element. If you transport the machine after the output element has been pushed on you must take other appropriate measures to fix the axial position of the rotor. Please refer to the illustration below.
- In the case of vertical design motors, disassemble the rotor shipping brace in the vertical position only. Fix the rotor in position before the machine is turned onto its side if a machine has to be transported in a horizontal position. Vertical motors are supplied from the manufacturing plant in the horizontal position.

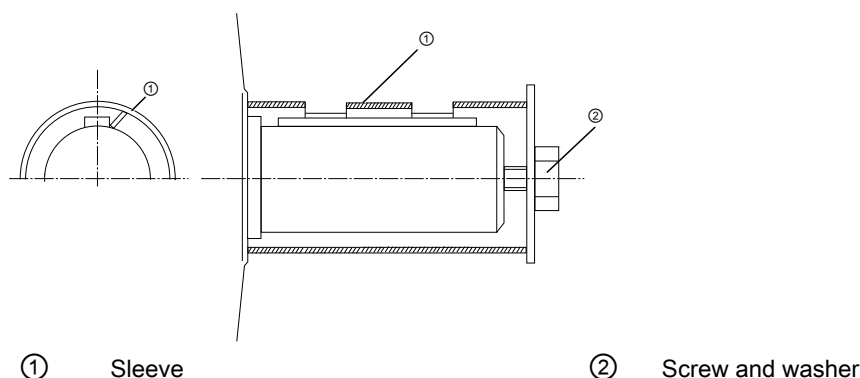


Figure 4-1 Axial location of the rotor

Table 4-2 Tightening torque for the shaft screw on the rotor shipping brace


Thread in the shaft end	Tightening torque	Preload
M20	50 Nm	12 kN
M24	100 Nm	20 kN
M30	180 Nm	32 kN

Note

Store the rotor locking device

Be sure to store the rotor locking device. It must be remounted for possible disassembly and transport.


4.11.4 Transporting the machine set

 WARNING
Falling down of the machine <p>The lifting lugs on the machine are designed only for the weight of the machine. If a machine set is lifted and transported on a single machine, this can lead to mechanical failure of the lifting lug. The machine or machine set may fall. This can result in death, serious injury or material damage.</p> <ul style="list-style-type: none">• Do not lift machine sets by attaching lifting tackle to the individual machines.• Use only the equipment provided, e.g. the openings or lugs on the base plates, for transporting machine sets. Note the maximum capacity of the lifting lug.

Note

Place the machine in a secure and raised position

In order to obtain easy and safe access to the underside of the machine, place it in a secure and raised position.

 DANGER
Standing under suspended loads <p>If the lifting gear or load handling attachments were to fail, the machine could fall. This can result in death, serious injury or material damage.</p> <p>Never remain under or in the immediate vicinity of the machine when it is raised.</p>

4.11.5 Storage

If the machine is not going to be commissioned soon after delivery, ensure that it is stored correctly.

NOTICE
Seizure damage to bearings
If the machine is stored incorrectly there is a risk that the bearings will suffer damage while out of use. Examples of resulting damage can include scoring and corrosion.
Read the following storage instructions.

Preconditions and preparations

- Only store goods in undamaged packaging. If goods are delivered in damaged packaging, unpack them and store appropriately according to the nature of the goods.
- Repair any damage to the packaging before putting the equipment into storage insofar as this is necessary to ensure proper storage conditions.

General instructions for storage

Wherever possible, store the machine in a storage room. The place of storage must satisfy the following general conditions:

- Select a sufficiently sized dry and horizontal place of storage that is above flood level and free of vibration ($v_{\text{eff}} \leq 0.2 \text{ mm/s}$).
 - The place of storage must be well ventilated as well as free of dust and frost. Provide protection against extreme weather conditions. Ensure that the temperature remains stable in the range from 10° C (50° F) to 50° C (120° F). The room temperature should be approx. 10 K above the outside temperature. The temperature should not fall below -20° C.
 - The relative humidity of the air should be less than 60%.
 - The floor of the place of storage must be sufficiently strong. The maximum permissible floor loading or storage compartment loading may not be exceeded.
 - The ambient air must not contain any harmful gases.
- Protect the motor from shocks and humidity.
- Position machines, devices and crates on pallets, wooden beams or foundations that protect them against rising damp and water.
- Ensure that the air circulation under the equipment is not impeded.
 - Place wooden spacer blocks between the covers and the motor.
 - Covers or tarpaulins must not trail on the floor around the machine.

Storing outdoors

For outdoor storage, the following additional conditions must be satisfied:

- The ground must be sufficiently strong. Prevent the motor from sinking into the ground.
- Covers or tarpaulins used to protect the equipment against the weather must not make contact with the surfaces of the equipment. Otherwise air circulation under the stored items will be prevented.

Protection against humidity

If a dry storage space is not available, protect the machine as follows against humidity:

- Wrap the machine in humidity-absorbent material.
- Wrap the machine in plastic film:
 - Place a humidity meter inside the plastic film.
 - Place desiccant within the plastic film.
 - Pack the machine air-tight.
- Inspect the machine regularly.

NOTICE
Damage to the roller bearings If storage conditions are inappropriate there is a risk of bearing seizure damage. This can result in material damage, such as damage to bearings caused by vibration. On machines that have been supplied with a rotor shipping brace, secure the rotor as per the notes on transportation (Page 34). Protect the machine against strong radial vibrations, since the rotor shipping brace might not absorb these completely.

NOTICE
Bearing damage If the customer has already mounted parts, for example coupling, belt pulley, etc., the bearing can be damaged during transport. In this case, make sure that the customer uses a rotor locking device.



WARNING

Risk of explosion due to damaged sealing materials

Storing the machine at temperatures that do not fall within the specified limits can damage the material of the seals and cause them to fail. As a result, a potentially explosive gaseous atmosphere can enter the machine and be ignited during commissioning. Explosions can occur. This can result in death, serious injury or material damage.

The materials used are specially designed for the temperature range required by the customer. Do not store the motor in conditions that lie outside the specified temperature limits. The relevant temperature limits are specified on the rating plate.

Long-term storage

If you are storing a machine for more than six months, you must check its condition every six months. Store the machine in accordance with the specifications in Section "Storage (Page 36)", and if possible, packed.

- Check the motor for damage.
- Carry out any necessary maintenance work.
- Make sure that the storage conditions are such that condensation cannot form in the motor.
- If the machine is not sealed in plastic film, continually and slightly heat the machine, e.g. with anti-condensation heating (if available), and ensure that the air circulates in the storage room.

Storage for longer than three months

Lubricate the machine after every two years of storage.

1. Unpack the machine.
2. Remove the rotor shipping brace, if one is being used.
3. When stored for longer than two years, lubricate with twice the grease quantity in accordance with the lubricant plate. This ensures that the grease is evenly distributed and covers all surfaces. Corrosion damage is avoided.

NOTICE

Damage to roller bearings

Roller bearings can be damaged when kept in the same or almost the same position.

Every three months, manually rotate the rotor through five revolutions. Make sure that the resting position of the roller bearings after the rotor has been turned is different from what it previously had been. Use the feather key as a reference point, if present.

4. Replace the corrosion protection.
5. Reattach the rotor shipping brace, if present.
6. Pack the machine again.

4.11.6 Protection against corrosion

If the machine is stored in dry conditions, then apply the subsequently listed anti-corrosion measures:

- Storage up to six months:
Apply a coat of corrosion protective compound to all accessible bare metal parts such as the exposed shaft extension, flange or machine feet.
- Storage for longer than six months:
Apply a coat of anti-corrosion compound which provides long-term protection, e.g. Tectyl 506.
- Inspect the machine regularly and apply an additional coating of corrosion protection if necessary.

Document all preservation measures taken so that they can be reversed before the machines are put back into service.

4.12 Converter operation

The following chapter is relevant only to machines of series 1PQ8 or if the machine was ordered for operation on the rectifier.

Note

The order number shows whether the machine was ordered for operation with converter: the 9th digit of the order number features the letter "P" or "Q".

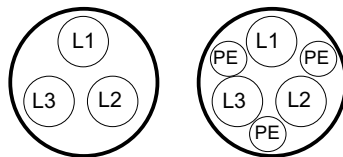
4.12.1 Converter operation of explosion-proof machines

The operation of the explosion-proof machine on the frequency converter is permitted, when the specifications for the speed control range and torque characteristic are observed, and if winding temperature monitoring is ensured via the integrated temperature sensors in conjunction with a tripping unit.

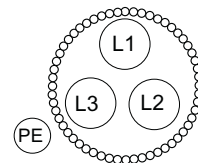
4.12.2 Reducing bearing currents

Taking the following actions will reduce the bearing currents:

- **Grounding:**
 - In addition to grounding the machines via the solid protective ground conductor, supplement the high frequency grounding using braided flat copper straps or high frequency stranded conductors.
 - Ensure that the contacts cover a large area. Solid copper cables are not suitable for high frequency grounding because of the skin effect.
- Use **equipotential bonding conductors**:
 - Between motor and driven machine
 - Between motor and converter
 - Between terminal box and RF grounding point at the motor enclosure
- Use a **separate RF equipotential bonding conductor**:
 - Between motor enclosure and protective ground rail of the converter
 - Between motor enclosure and driven machine
- **Selecting and connecting the cable:** As far as possible, use symmetrically arranged, shielded connection cables. The cable shielding, made up of as many strands as possible, must have good electrical conductivity. Braided shields made of copper or aluminum are very suitable.
 - The shield must be connected at both ends to the motor and the converter; unshielded cable ends must be kept as short as possible.
 - To ensure good discharging of high-frequency currents, provide contacting over a large surface area: with 360° contacting at the converter, at the motor for instance with EMC screw fastenings at the cable entries.



Concentric copper or aluminum shield



Steel armor

Measures to further reduce bearing currents

To specifically reduce and prevent damage caused by bearing currents, you must consider the system as a whole, which comprises the motor, converter, and driven machine. The following precautions help to reduce bearing currents:

- In the overall system, set up a properly meshed grounding system with low impedance for high-frequency currents.
- Use the common-mode filter (damping cores) at the converter output. The Siemens sales representative is responsible for selection and dimensioning.
- Limit the rise in voltage by using output filters. This dampens the harmonic content in the output voltage.

Note

Converter documentation

The operating instructions for the converter are not part of this documentation. Refer also to the configuration information for the converter.

4.12.3 Insulated bearings when operating the converter

If the machine is operated from a low-voltage converter, insulated bearings are fitted at the NDE and an insulated encoder with insulated bearings (option).

Comply with the plates on the machine relating to bearing insulation and possible bridges.

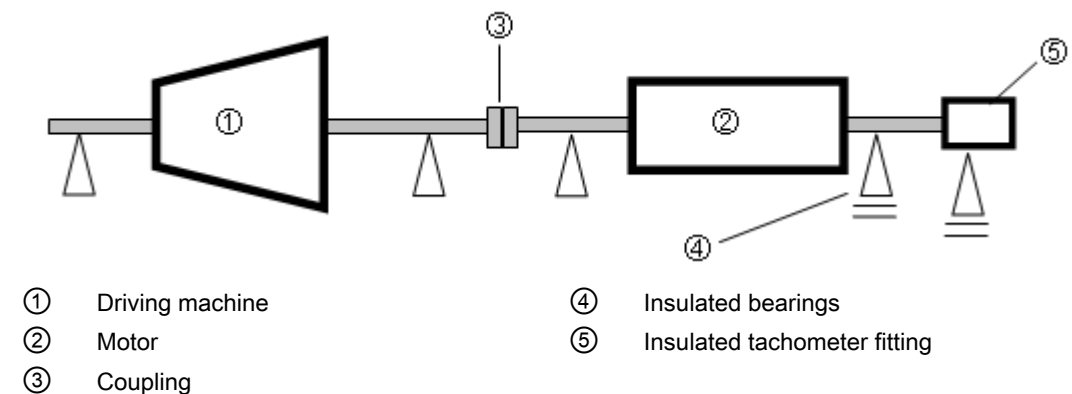


Figure 4-2 Schematic representation of a single drive

NOTICE

Bearing damage

The bearing insulation must not be bridged. Damage may be caused to the bearings if there is a flow of current.

- Also for subsequent installation work, such as the installation of an automatic lubrication system or a non-insulated vibration sensor, make sure that the bearing insulation cannot be bridged.
- Contact the Service Center, if necessary.

Tandem operation

If you connect two motors in series in "tandem operation", install an insulated coupling between the motors.

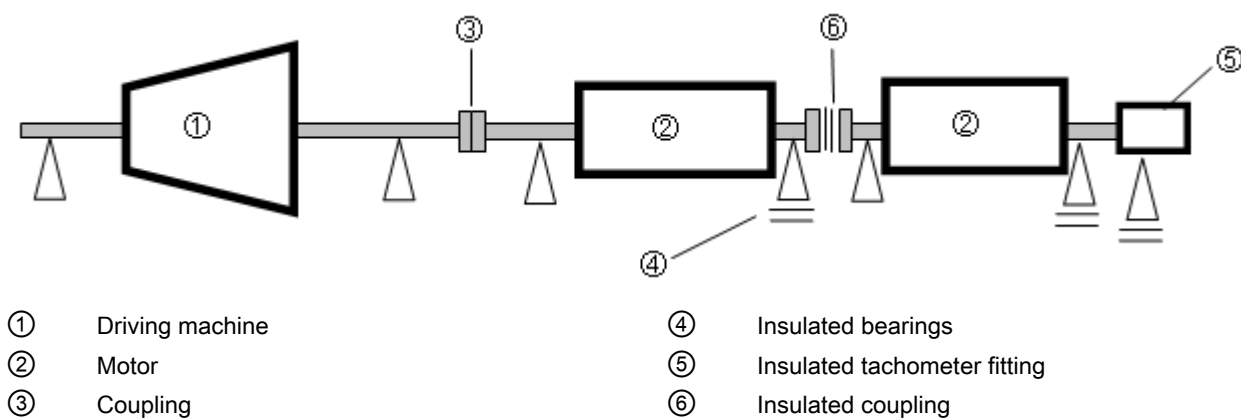


Figure 4-3 Schematic representation of a tandem drive

NOTICE

Bearing damage

If the coupling between the motors of the tandem drive is not insulated, bearing currents can cause damage to the drive-end bearings of both motors.

Use an insulated coupling to link the motors.

If you connect two motors in series in "tandem operation", fit a coupling between the motors; this coupling should satisfy Directive 94/9/EC or the regulations that apply in the country where the equipment is installed..

Assembly

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

Note

Loss of conformity with European directives

In the delivery state, the machine corresponds to the requirements of the European directives. Unauthorized changes or modifications to the machine lead to the loss of conformity with European directives and the loss of warranty.



WARNING

Explosion hazard when making modifications to the machine

Substantial modifications to the machine are not permitted – or may only be performed by the manufacturer. Otherwise an explosion can occur in an explosive atmosphere. This can result in death, serious injury or material damage.

Please contact the Service Center, if necessary.

5.1 Preparations for installation

5.1.1 Requirements for installation

The following requirements must be satisfied prior to starting installation work:

- Staff have access to the operating and installation instructions.
- The machine is unpacked and ready for mounting at the installation location.

Note

Measure the insulation resistance of the winding before starting installation work

Wherever possible, measure the insulation resistance of the winding before starting installation work. If the insulation resistance lies below the specified value, take appropriate remedial measures. These remedial measures may necessitate the machine being removed again and transported.

NOTICE

High temperatures

The motor components get very hot during operation. High temperatures can damage mounting parts such as the cable insulation.

- Temperature-sensitive parts such as normal cables or electronic components must not rest against or be attached to mounted machine parts.
- Only use heat-resistant mounting parts. The connecting cables and cable entries must be suitable for the ambient temperature.

5.1.2 Insulation resistance and polarization index

Measuring the insulation resistance and polarization index (PI) provides information on the condition of the machine. It is therefore important to check the insulation resistance and the polarization index at the following times:

- Before starting up a machine for the first time
- After an extended period in storage or downtime
- Within the scope of maintenance work

The following information is provided regarding the state of the winding insulation:

- Is the winding head insulation conductively contaminated?
- Has the winding insulation absorbed moisture?

As such, you can determine whether the machine needs commissioning or any necessary measures such as cleaning and/or drying the winding:


- Can the machine be put into operation?
- Must the windings be cleaned or dried?

Detailed information on testing and the limit values can be found here:

"Testing the insulation resistance and polarization index" (Page 45)

5.1.3 Testing the insulation resistance and polarization index



<p> WARNING</p> <p>Hazardous voltage at the terminals</p> <p>During and immediately after measuring the insulation resistance or the polarization index (PI) of the stator winding, hazardous voltages may be present at some of the terminals. Contact with these can result in death, serious injury or material damage.</p> <ul style="list-style-type: none"> • If any power cables are connected, check to make sure line supply voltage cannot be delivered. • Discharge the winding after measurement until the risk is eliminated, e.g. using the following measures: <ul style="list-style-type: none"> – Connecting the terminals with ground potential until the recharge voltage drops to a non-hazardous level – Connecting the connecting cable

Measure the insulation resistance

1. Before you begin measuring the insulation resistance, please read the manual for the insulation resistance meter you are going to use.
2. Make sure that no power cables are connected.
3. Measure the insulation resistance of the winding in relation to the machine enclosure and the winding temperature. The winding temperature should not exceed 40° C during the measurement. Convert the measured insulation resistances to the reference temperature of 40° C according to the formula in the following table. This thereby ensures that the minimum values specified can be compared.
4. Read out the insulation resistance one minute after applying the measuring voltage.

Limit values for the stator winding insulation resistance

The following table specifies the measuring voltage and limit values for the insulation resistance. These values correspond to IEEE 43-2000 recommendations.

Table 5-1 Stator winding insulation resistance at 40° C

$V_N [V]$	$V_{Meas} [V]$	$R_C [M\Omega]$
$U \leq 1000$	500	≥ 5
$1000 \leq U \leq 2500$	500 (max. 1000)	100
$2500 < U \leq 5000$	1000 (max. 2500)	
$5000 < U \leq 12000$	2500 (max. 5000)	
$U > 12000$	5000 (max. 10000)	

U_{rated} = rated voltage, see the rating plate

U_{meas} = DC measuring voltage

R_C = minimum insulation resistance at reference temperature of 40° C

For a winding temperature of approx. 25° C, the minimum insulation resistances are 20 MΩ (U ≤ 1000 V) or 300 MΩ (U > 1000 V). The values apply for the complete winding to ground. Twice the minimum values apply to the measurement of individual assemblies.

Note the following:

- When measuring with winding temperatures other than 40 °C, convert the measuring value to the reference temperature of 40 °C according to the following equations from IEEE 43-2000.

(1)	R_C	Insulation resistance converted to 40 °C reference temperature
	k_T	Temperature coefficient according to equation (2)
	R_T	Measured insulation resistance for measuring/winding temperature T in °C
$R_C = K_T \cdot R_T$		
(2)	40	Reference temperature in °C
	10	Halving / doubling of the insulation resistance with 10 K
	T	Measuring/winding temperature in °C
$K_T = (0.5)^{(40-T)/10}$		

In this case, doubling or halving the insulation resistance at a temperature change of 10 K is used as the basis.

- The insulation resistance halves every time the temperature rises by 10 K.
- The resistance doubles every time the temperature falls by 10 K.
- Dry, new windings have an insulation resistance of between 100 and 2000 MΩ, or possibly even higher values. An insulation resistance value close to the minimum value could be due to moisture and/or dirt accumulation. However, the size of the winding, the rated voltage and other characteristics affect the insulation resistance and may need to be taken into account when determining measures.
- Over its operating lifetime, the motor winding insulation resistance can drop due to ambient and operational influences. Depending on the rated voltage, the critical insulation resistance value is to be calculated by multiplying the rated voltage (kV) by the specific critical resistance value and then converted to the current winding temperature at the time of the measurement, see previous table.

Measuring the polarization index

1. To determine the polarization index, measure the insulation resistances after one minute and ten minutes.
2. Express the measured values as a ratio:

$$PI = R_{\text{insul } 10 \text{ min}} / R_{\text{insul } 1 \text{ min}}$$
 Modern measuring devices display these values automatically following the measurement.

For insulation resistances > 5000 MΩ, the measurement of the PI is no longer meaningful and consequently not included in the assessment.

$R_{(10 \text{ min})} / R_{(1 \text{ min})}$	Assessment
≥ 2	Insulation in good condition
< 2	Dependent on the complete diagnosis of the insulation

NOTICE**Damage to insulation**

If the critical insulation resistance is reached or undershot, this can damage the insulation and cause voltage flashovers.

- Contact the Service Center (Page 141).
- If the measured value is close to the critical value, you must subsequently check the insulation resistance at shorter intervals.

Limit values of the anti-condensation heating insulation resistance

The insulation resistance of the anti-condensation heating with respect to the machine housing should not be lower than 1 MΩ when measured at 500 V DC.

5.1.4 Preparing the mating faces

Prepare the foundation faces dependent on the machine type:

- Mounting on a foundation
 - Ensure that the foundation faces are flat and clean.
 - Check the dimensions of the mounting-foot holes, if necessary.
- Flange connection
 - Clean the flange before installation, and make sure that the flange faces are flat and clean.
 - Check the dimensions of the flange geometry, if necessary.
- Wall mounting
 - Make sure that the wall faces are flat and clean.
 - Check the dimensions of the mounting-foot holes, if necessary.

Note**Wall mounting**

Machines that are attached to the wall by their mounting feet because of their type must be supported from below by a wall strip, for example, or pinned.

5.2 Lift the machine to where it will be installed, and position it

5.2.1 Preconditions for correct alignment and secure attachment

Detailed specialist knowledge of the following measures is required in order to correctly align and securely fit the equipment.

- Preparing the foundation
- Selecting and mounting the coupling
- Measuring the concentricity and axial eccentricity tolerances
- Positioning the machine

If you are not familiar with the prescribed measures and procedures, then you can make use of the services offered by the local Service Center (Page 141).

5.2.2 Checking the load handling attachments

Inspect the load handling attachments such as the load stands, lifting eyes and ring bolts and also the lifting gear, before lifting the machine:

- Inspect the load handling attachments on the machine for possible damage. Replace any load handling attachments that are found to be damaged.
- Check before use that the load handling attachments are correctly secured.
- When lifting the machine, use only approved and undamaged lifting gear of sufficient rated capacity. Check these before using them.



WARNING

The machine can be dropped

If the load handling attachments and lifting gear are damaged or not correctly secured, the machine may be dropped during lifting. This can result in death, serious injury or material damage. Inspect the load handling attachments and lifting gear before use.

5.2.3 Removing the rotor shipping brace

If a rotor shipping brace is attached to the machine, remove it at the last possible moment, for example, when you are ready to push on the output or drive element.

Note

Store the rotor locking device

Be sure to store the rotor locking device. It must be remounted for possible disassembly and transport.

5.2 Lift the machine to where it will be installed, and position it
NOTICE**Damage to the bearing**

Dismantling the rotor shipping brace when the machine is in a horizontal position could damage the bearings.

Only remove the rotor shipping brace when the machine is in a vertical position.

NOTICE**Damage to the bearing**

Failure to fit the rotor shipping brace can result in damage to the bearings while the machine is being turned onto its side.

Fix the rotor in place before you turn the machine into a horizontal position.

5.2.4 Removing anti-corrosion protection

Machined, bright surfaces of machine parts and small components such as screws, bolts, wedges, feather keys and dowel pins, are treated with an anti-corrosion agent.

Carefully remove the anti-corrosion agent just before starting the installation work.

Bright surfaces on machine parts

- Use petroleum, petroleum ether, or a similar solvent or detergent to remove the anti-corrosion coating from the machined surfaces of machine parts and from small components.

NOTICE**Paintwork damage**

If painted surfaces come into contact with the detergent or solvent, the paintwork can be damaged.

- Use a suitable solvent to soften thick layers of anti-corrosion agent. Then push the softened layers off using a piece of hardwood approximately 10 x 10 x 1 cm. Do not sand the protective coating down or scrape it off.

NOTICE**Damage to the machine surface**

If you use metal objects such as scrapers, spatulas, or plates to remove the anti-corrosion protection, this could result in damage to the surfaces of the machine parts.

- Lightly oil the depreserved surfaces.

5.2.5 Mounting the output elements

Balance quality

The rotor is dynamically balanced. For shaft extensions with featherkeys, the balancing type is specified using the following coding on the face of the drive end of the shaft:

- "H" means balancing with a half feather key
- "F" means balancing with a whole feather key.

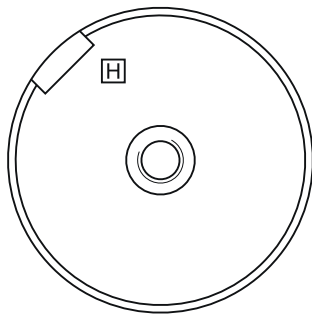


Figure 5-1 Balancing type on the drive-end side

Pushing on the power output elements

- Prerequisites:
 - The coupling and/or the output element must be appropriately dimensioned for the operating case at hand. The balance quality must satisfy the following requirements.
 - Comply with the coupling manufacturer's instructions.
 - Make sure that the balancing type of the transmission element correctly matches the type of balance of the rotor.
 - Use only ready drilled and balanced transmission elements. Check the hole diameters and the balancing status before pulling them on. Thoroughly clean the shaft extension.
- Pulling on:
 - Warm up the transmission elements to expand them before pulling them on. Select the temperature difference for the heating process to suit the coupling diameter, fit and material. See the coupling manufacturer's instructions.
 - Power output elements may only be pushed on or pulled off with the correct equipment. The transmission element must be pulled on in one continuous operation via the front thread holes in the shaft or pushed on by hand.
 - Do not strike it with a hammer, as this would damage the bearings.


Shaft extensions with feather key

To maintain the balancing quality, you have the following options:

- If the transmission element is shorter than the feather key with balancing type "H", then you must machine off the section of feather key protruding from the shaft contour and transmission element in order to maintain the balance quality.
- If the transmission element is drawn up on to the shoulder of the shaft, you must ensure that the part of the coupling groove where the feather key is not inserted is taken into consideration when balancing the coupling.

The following applies for all 2-pole machines and 4-pole machines with a frequency ≥ 60 Hz:

- The feather key must be shortened if the coupling hub is shorter than the feather key.
- The center of gravity of the coupling half should be within the length of the shaft end.
- The coupling used must be prepared for system balancing.
The number of poles of the machine is specified on the rating plate (in the designation of the motor type).

 WARNING
<p>The feather key can fall out</p> <p>The feather keys are only locked against falling out during shipping. If a machine with two shaft extensions does not have an output element on one shaft extension, the feather key can fall out during operation.</p> <p>Death or serious injury can result.</p> <ul style="list-style-type: none"> • Do not operate the machine unless the transmission elements have been pulled on. • On shaft extensions without output element, make sure that the feather key cannot fall out and shorten it by approximately half for balance type "H".

5.2.6 Lifting and transporting the machine

To safely lift and transport the machine, the following requirements must be met:

- Personnel operating cranes and fork-lift trucks must be appropriately qualified.
- When lifting the machine, use only approved and undamaged sling guides and spreaders of sufficient rated capacity. Check the lifting equipment prior to its use. The weight of the machine is shown on the rating plate.
- When lifting the machine, refer to the information on the lifting plate.
 - Comply with the specified spreading angles.
 - Do not exceed the maximum lifting acceleration and lifting speed specified on the lifting plate. Lift the machine without jerking it.
Acceleration $a \leq 3.942 \text{ m/s}^2$
Velocity $v \leq 20 \text{ m/min}$
- Use only the load carrying device on the stator frame for lifting.



WARNING

The machine can tip over, slip or fall down during transport if a different construction is used

If you do not transport or lift the machine in a position appropriate for its construction, the machine can tip, slip into the lifting equipment or fall down. This can result in death, serious injury or material damage.

- Use only the load carrying device on the stator frame for lifting.
- Use the load carrying device appropriate for the machine position.
- Use suitable rope guiding or spreading devices. The weight of the machine is shown on the rating plate.



WARNING

The machine can fall over, shift or fall down during transport if the center of gravity is not symmetrical

If the center of gravity of a load is not located centrally between the attachment points, the motor can tip over or slip out of the lifting equipment and fall when it is being transported or lifted. This can result in death, serious injury or material damage.

- Comply with the handling instructions on the machine when transporting it.
- Be aware of the possibility of different loads on the sling ropes or lifting straps and the carrying capacity of the lifting equipment.
- Always take account of the center of gravity when transporting or lifting the motor. If the center of gravity is not located centrally between the attachment points, then position the hoisting hook above the center of gravity.

Note

Place the machine in a secure and raised position

In order to obtain easy and safe access to the underside of the machine, place it in a secure and raised position.



DANGER

Standing under suspended loads

If the lifting gear or load handling attachments were to fail, the machine could fall. This can result in death, serious injury or material damage.

Never remain under or in the immediate vicinity of the machine when it is raised.

5.2.7 Putting the machine down

Requirements

The following preconditions must be satisfied before setting down the machine at the installation location:

- The mating faces must be clean.
- The anti-corrosion protection paint has been removed from the mating faces, such as the machine mounting feet, flange, ...
- There is no condensation present within the machine.

Setting down the machine

- Set down the machine slowly and carefully at the installation location to avoid any impact.

See also

Draining condensation (Page 53)

5.2.8 Draining condensation

Under the following conditions it is possible that condensation may accumulate within the machine:

- Wide fluctuations in the ambient temperature, such as direct sunlight combined with high atmospheric humidity
- Intermittent operation or load fluctuations during operation

NOTICE
Damage due to condensate If the stator winding is damp, its insulation resistance will be reduced. This can result in voltage flashovers that can seriously damage the windings. Condensate can also cause rust to form within the machine. Ensure that condensate can drain away.

Ensure that condensate can drain away

In the bearing shields on the DE and NDE, water drainage holes are situated below or opposite the regreasing devices. They are sealed with screw plugs. Depending on the type of installation, the water drainage holes are located at the bottom.

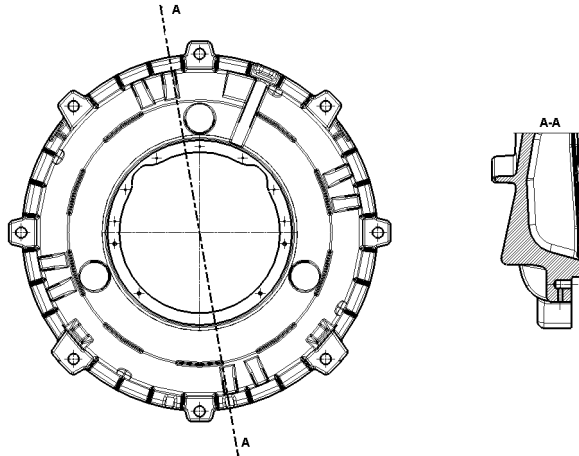


Figure 5-2 Schematic diagram of the water drain holes

1. Regularly remove the screw plugs to allow the condensate to drain away.
2. Replace them when you have finished.

NOTICE

The degree of protection is reduced

For machines with degree of protection IP65 and higher, the degree of protection is nominally reduced to IP44 by removing the screw plug.

5.2.9 Roughly aligning the machine

Requirement

The transmission element such as a coupling half has already been pulled on.

Roughly aligning the machine

- For horizontal positioning, push the motor sideways across the foundation. When doing so, ensure that the axial position is maintained.

5.3 Installing the machine

5.3.1 Safety instructions for installation



WARNING

Danger caused by inappropriate fastening material

If screws of an incorrect property class have been selected or if they have been fastened to an incorrect tightening torque, they may break or become loose. This will cause the machine to move, which could damage the bearings. The rotor could smash into the machine enclosure and machine parts could be flung out of place. This can result in death, serious injury or material damage.

- Comply with the required property classes for screwed connections.
- Tighten the screwed connections to the specified tightening torques.



WARNING

Tensions on the fastening parts

If the machine has not been properly aligned, this will mean the fastening parts are subjected to stress/distortion. Screws may become loose or break, the machine will move, machine parts could be flung out of place. This can result in death, serious injury or material damage.

- Carefully align the machine to the driven machine.

NOTICE

Damage to the mounted parts

Mounting parts such as temperature sensors or speed sensors are attached to the machine and could be ripped off or destroyed as a result of improper handling. This could lead to machine malfunctions, extending even to total loss of the machine.

- Where necessary, use suitable steps when performing installation work on the machine.
- Do not stand on cables or attachments during installation. Do not use attachments as steps.

5.3.2 Selecting fixing screws

- Unless specified otherwise, use fixing bolts with at least strength class 8.8 to ISO 898-1 to ensure that the machine is fastened and the torque-generated forces are transmitted securely.
- When selecting the bolts and the design of the foundation, take into account the maximum forces occurring in the case of a fault such as short circuit or system transfers in phase opposition.

See also

Tightening torques for screw and bolt connections (Page 143)

5.3.3 Preconditions for smooth, vibration-free operation

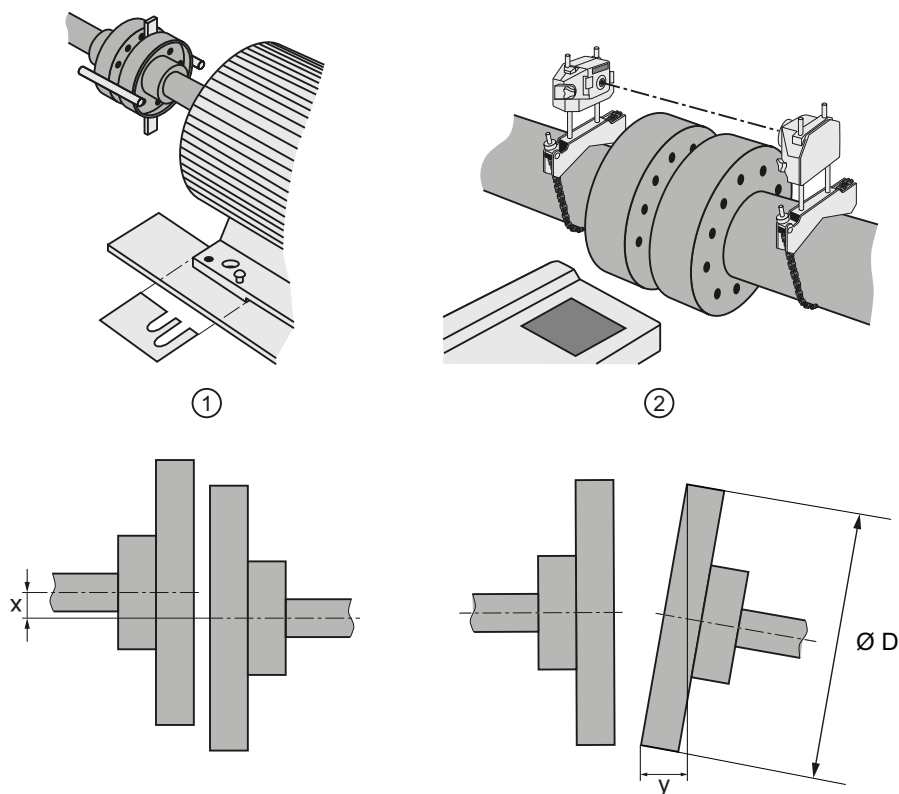
Preconditions for smooth, vibration-free operation:

- Stable foundation design
- Precise alignment of the machine
- Correct balancing of parts to be fitted to the shaft end.
- Maintaining the vibration velocity according to ISO 10816-3

5.3.4 Aligning the machine to the driven machine and attaching it to it (IM B3 / IM B35)

1. Refer to any instructions for aligning the driven machine and those of the coupling manufacturer.
2. Align the machines with coupling output to the driven machine in such a manner that the center lines of the shafts at the operating temperature do not have any parallel or angular offset. This ensures that no additional forces affect their bearings during operation. If the thermal change of the motor and the driven machine is different, couple in the cold state with an appropriate alignment offset. The alignment offset to be set in the cold state must be determined and specified by the system specialist.
3. For the vertical positioning ($x \rightarrow 0$), place thin shims over a large surface area under the machine feet. The number of shims should be kept as low as possible, i.e. stack as few as possible. This also prevents the machine being subjected to any stress/distortion. Use the existing tapped holes for the forcing-off bolts to raise the machine.
The balance state of the shaft (full-key or half-key balancing) and alignment errors primarily influence the service life of the bearing, especially for high motor speeds or when using rigid couplings.

4. When positioning the machine, ensure that a uniform axial gap ($y \rightarrow 0$) is maintained around the coupling.
5. Fix the machine to the foundation. The choice of fixing elements depends on the foundation and is the plant operator's responsibility.



- ① Plates placed under the motor for alignment
- ② Laser alignment

Figure 5-3 Schematic diagram: Aligning the machine to the driven machine

Table 5-2 Permissible deviations for aligning the machine with flexible coupling

Max. speed n_{\max}	Max. parallel offset x	Max. angular offset y
$n_{\max} \leq 1500 \text{ rpm}$	$x_{\max} = 0.08 \text{ mm}$	$y_{\max} = 0.08 \text{ mm} / 100 \text{ mm } \varnothing D$
$1500 \text{ rpm} < n_{\max} \leq 3600 \text{ rpm}$	$x_{\max} = 0.05 \text{ mm}$	$y_{\max} = 0.05 \text{ mm} / 100 \text{ mm } \varnothing D$

Note

Machine expansion

When performing alignment, make allowance for the thermal expansion of the machine due to rising temperature.

5.3.5 Aligning the machine to the driven machine and attaching it to it (IM B5)

The standard flange is provided with a centering. The choice of fit for the mating flange on the driven machine is the system manufacturer's or the plant operator's responsibility.

Note

If the machine is not fitted with a standard flange, align the machine to suit the driven machine.

Procedure

The machine axis must be horizontal when it is lifted and the flange must be parallel to the mating flange, so as to avoid seizing and stressing. Otherwise damage to the centering will result.

1. Grease the centering flange with assembly paste to make the process easier.
2. Screw three studs into tapped holes spaced about 120° apart around the driven machine flange. The studs act as positioning aids.
3. Position the machine so that its axis is aligned with that of the driven machine, but not yet quite touching. Advance the machine slowly towards the driven machine; advancing too quickly risks damaging the centering.
4. If necessary, rotate the machine into the right position so that the clearance holes in the flange are central to the tapped holes.
5. Move the machine fully up against the mating flange so that it is fully in contact.
6. Fix the machine using the flange fixing bolts, finishing by replacing the studs.

See also

Tightening torques for screw and bolt connections (Page 143)

5.3.6 Aligning the machine to the driven machine and attaching it to it (IM V1, IM V10)

The standard flange is provided with a centering. The choice of fit for the mating flange on the driven machine is the system manufacturer's or the plant operator's responsibility.

Note

If the machine is not fitted with a standard flange, align the machine to suit the driven machine.

Procedure

The machine axis must be vertical when it is lifted and the flange must be parallel to the mating flange, so as to avoid seizing and stressing. Otherwise damage to the centering will result.

1. Grease the centering flange with assembly paste to make the process easier.
2. Screw in two studs into tapped holes on opposite sides of the driven machine flange. The studs act as positioning aids.
3. Lower the machine slowly toward the driven machine and into the centering, so that the flanges do not quite touch. Lowering too quickly risks damaging the centering.
4. If necessary, rotate the machine into the right position so that the clearance holes in the flange are central to the tapped holes.
5. Lower the machine completely onto the mating flange so that it is fully in contact; then remove the studs.
6. Fix the machine using the flange fixing bolts.

See also

Tightening torques for screw and bolt connections (Page 143)

Alignment accuracy

The coaxial characteristic of the shafts of electrical machines and driven machine may not exceed 0.05 mm in diameter.

5.3.7 Axial and radial forces

You can obtain the permissible values for axial and radial forces by contacting the Siemens Service Center (Page 141) or referring to the machine catalog.

NOTICE
Damage to bearings or the shaft
Large output masses and their centers of gravity outside the shaft extensions can lead to resonance in operation. This can result in damage to the bearings and shaft.
Ensure that the permissible loads for the forces on the shaft extension are adhered to in accordance with the catalog data or configuration data.

Electrical connection


When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

Note

Service Center

If you require support when electrically connecting up the machine, please contact the Service Center (Page 141).

6.1 Safety instructions relating to the electrical connection

 WARNING	<p>Connected parts can loosen</p> <p>If you use fixing elements made from the wrong material or apply the wrong tightening torque, this could impair current transfer or cause connecting parts to become loose. Fastening elements can work loosely, so that the minimum air clearances are no longer maintained. Sparking formation may occur, in an explosive atmosphere it can lead to an explosion. This could result in death, serious injury or material damage to the machine or even in failure, which could in turn lead indirectly to material failure of the system.</p> <ul style="list-style-type: none"> • Tighten the screwed connections to the specified tightening torques. • Observe any specifications regarding the materials from which fixing elements must be made. • When performing servicing, check the fastenings.
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See also

Tightening torques for screw and bolt connections (Page 143)

6.2 Terminal box

Depending on the version, different terminal boxes may be installed on the machine.
Depending on the terminal box, different cable entries and options for the cable connection

6.2 Terminal box

are possible. You can identify the terminal box installed on the machine via the illustrations in the following chapters.

Terminal box 1XB1621 (Page 62)

Terminal box 1XB1631 (Page 63)

Terminal box 1XB1634 (Page 64)

6.2.1 Terminal box 1XB1621

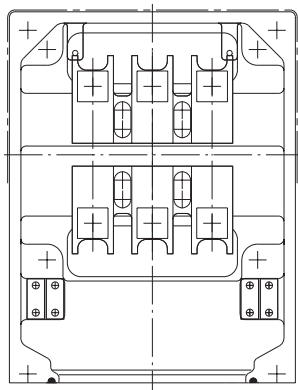


Figure 6-1 Terminal box 1XB1621

The connecting cables are introduced into the 1XB1621 terminal box through the cable glands with threaded holes 2 x M80 x 2 and 2 x M25 x 1.5. The cable glands are not included in the standard scope of supply. The version with sealing insert with break-off ring is optional.

You can find additional information here:

- Bringing cables into the terminal box 1XB16.. and routing them with gable gland (Page 69)
- Bringing cables into the terminal box 1XB.. and routing them with onion sealing ring (Page 70)
- Connecting cables with cable lugs (Page 71)

6.2.2 Terminal box 1XB1631

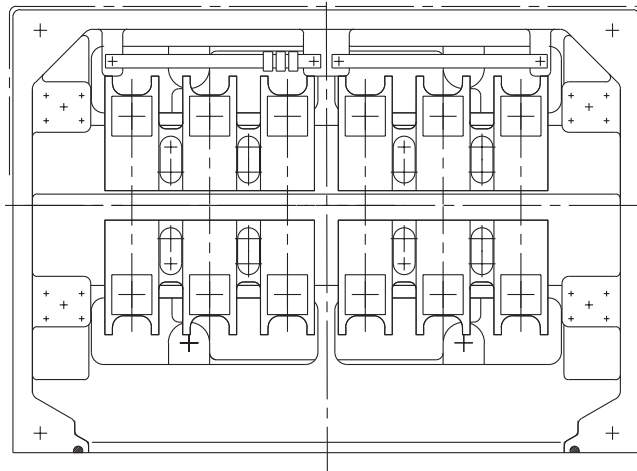


Figure 6-2 Terminal box 1XB1631

The connecting cables are introduced into the 1XB1631 terminal box through cable glands with threaded holes 4 x M80 x 2 and 2 x M25 x 1.5. The cable glands are not included in the standard scope of supply. The version with onion sealing ring is optional.

You can find additional information here:

- Bringing cables into the terminal box 1XB16.. and routing them with cable gland (Page 69)
- Bringing cables into the terminal box 1XB.. and routing them with onion sealing ring (Page 70)
- Connecting cables with cable lugs (Page 71)

6.2.3 Terminal box 1XB1634

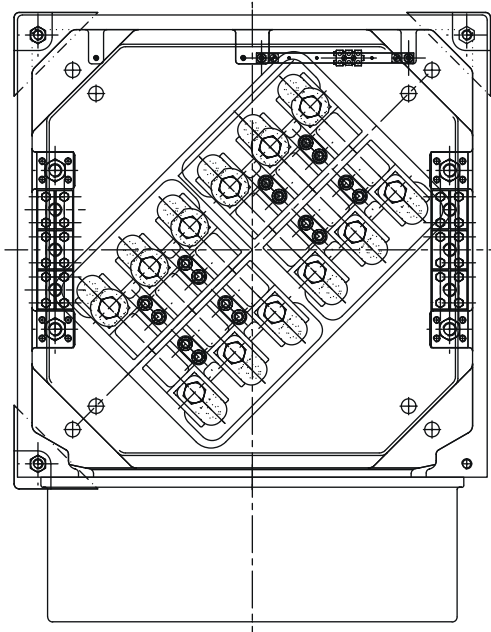


Figure 6-3 Terminal box 1XB1634

The connecting cables are introduced into the terminal box 1XB1634 through cable glands with threaded holes 4 x M80 x 2 and 2 x M25 x 1.5. The cable glands are not included in the standard scope of supply. The version with onion sealing ring is optional.

For more information, see:

- Bringing cables into the terminal box 1XB16.. and routing them with gable gland (Page 69)
- Bringing cables into the terminal box 1XB.. and routing them with onion sealing ring (Page 70)
- Connecting cables with cable lugs (Page 71)
- Connection without cable lugs (Page 72)

6.3 Preparation

6.3.1 Checking winding connections

With an open winding design, i.e. when the windings start and end directly at the terminal box (see the "Terminal marking" (Page 65) section), the connections are made using jumpers in

the terminal box. The jumpers for the open connection must not be removed when testing the winding; refer to the relevant circuit diagram.

- Check that the connections (star or delta) comply with the specifications on the rating plate.
- Ensure that the connection values correspond to the information on the rating plate.

6.3.2 Terminal designation

According to IEC / EN 60034-8, the following basic definitions apply to the terminal designations for 3-phase machines:

Table 6-1 Terminal designations using the 1U1-1 as an example

1	U	1	-	1	Designation
x					Index for pole assignment for pole-changing machines where applicable. A lower index signifies a lower speed. Special case for split winding.
	x				Phase designation U, V, W
		x			Index for winding start (1) or end (2) or if there is more than one connection per winding
				x	Additional indices for cases in which it is obligatory to connect parallel power feed cables to several terminals with otherwise identical designations

6.3.3 Selecting cables

Take the following criteria into account when selecting the connecting cables:

- Rated current
- Rated voltage
- If required, the service factor
- System-dependent conditions, such as ambient temperature, routing type, cable cross-section as defined by required length of cable, etc.
- Requirements according to IEC/EN 60204-1
- Requirements according to IEC/EN 60079-14
- Configuration notes

6.3.4 Connecting the grounding conductor

The grounding conductor cross-section of the machine must be in full conformance with the installation specifications, e.g. according to IEC / EN 60204-1.

Table 6-2 Determining the cross-section of the grounding conductor

Phase conductor cross-section S [mm ²]	Cross-section of grounding conductor [mm ²]
S > 35	S/2

There is a hexagon bolt with a flat washer and a spring washer on the stator frame at the designated connecting point for the grounding conductor. The grounding conductor can be connected as follows:

- With stranded cables with cable lugs
- With flat cables with cable end designed accordingly

As an alternative, you can connect the grounding conductor without cable lugs using a terminal plate at the marked connection point.

Connecting the grounding conductor

- Ensure that the connecting surface is bare and is protected against corrosion using a suitable substance, e.g. acid-free vaseline.
- Arrange the flat washer and spring washer under the bolt head.
- Check that the maximum permissible clamping thickness of 10 mm for the cable lug or strap is not exceeded.
- Fasten the clamping screw according to the following table. Screw-in depth and tightening torque are different depending on whether cable lugs or ground terminals are used.

	Screw	Screw-in depth	Tightening torque
When using cable lugs	M12 x 25	> 16 mm	38 Nm
	M16 x 35	> 20 mm	92 Nm
When using grounding terminals	M6	> 9 mm	8 Nm
	M8	> 12 mm	20 Nm
	M10	> 15 mm	40 Nm
	M12	> 18 mm	70 Nm
	M16	> 20 mm	170 Nm

- Use the connecting terminals designated for the grounding conductor in the terminal box.

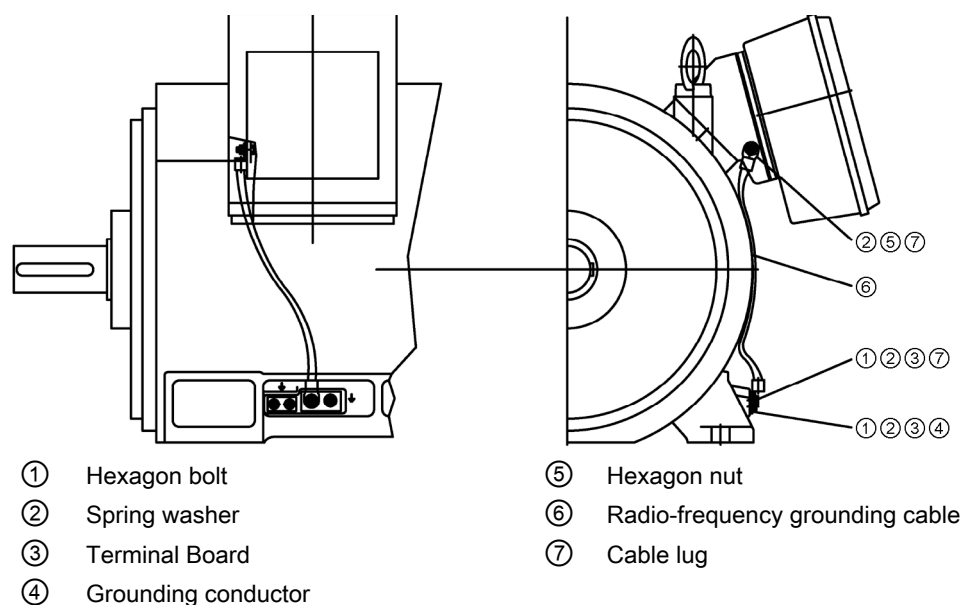
See also

Converter operation (Page 79)

6.3.5 Radio-frequency grounding for converter operation

In converter operation, the converter emits RF alternating currents. To establish an RF-specific optimal connection between motor terminal box and motor enclosure, you can use flexible braided copper flat cables with low impedance and a broad frequency range.

Establish the radio-frequency ground connection with flat cables. Alternatively you can establish the radio-frequency ground connection with cable lugs.



You find further information in the "Operation with converter (Page 79)" section.

6.3.6 Connection without terminal box

If the machine was ordered with brought-out cables, i.e. without terminal box, then the proper connection must be made in an external terminal box.

Ensure that the external terminal box is dimensioned according to the data on the rating plate and is suitable for the respective use.



WARNING

Faults as a result of incorrect technical design

Faults can occur if the appropriate technical data is not complied with when connecting up. For instance, degree of protection, minimum air and creepage distances. These faults can result in eventual or immediate death, serious injury or material damage.

Observe the data on the rating plate.

If the motor has been ordered with **brought-out leads**, in this case you must comply with the relevant conditions for **Zone 2**. It is assumed that the buyer, the installer and users of the installation are familiar with these conditions and will carefully observe them.

6.3.7 Connecting the machine for a specific direction of rotation

If the machine has one shaft extension or two shaft extensions with different diameters, the direction of rotation when looking at the front of the single or the thicker shaft extension is defined as follows:

- If you connect the power cables in the phase sequence L1, L2, L3 to U, V, W, the resulting rotation will be clockwise.
- If you interchange two connections, e.g. L1, L2, L3 to W, V, U, the resulting rotation will be counter-clockwise.

Note

On machines which are only allowed to run in one direction, the rating plate shows an arrow which indicates the permitted direction of rotation, and it also specifies the terminal connections in the required phase sequence.

NOTICE
Machine damage The machine will not be adequately cooled if it is operated other than how it was originally ordered or with the incorrect direction of rotation. This can result in machine damage. Observe the direction of rotation data on the nameplate.

6.4 Connection

The following generally applies to electrical connections:

- Ensure that there is a safe and reliable PE ground connection before starting any work.
- The connecting cables can be sealed and secured at every cable entry point into the terminal box.
- Lay the connecting cables and in particular the PE conductor in the terminal box in an open arrangement so that chafing of the cable insulation is prevented.
- Connect the machine in such a way that a permanent, safe electrical connection is maintained. Avoid protruding wire ends.
- Lay and secure external auxiliary cables separately from the main cable. Elements with cable ties may be present for this purpose.

Table 6-3 Connection technology (with cable lug / connection without cable lug)

Terminal box	Connection	
GT640	With cable lug (Page 71)	Without cable lug (Page 72)
1XB1621		
1XB1631		
1XB1634		
1XB9600		Connection without cable lug not possible

6.4.1 Bringing cables into the terminal box 1XB16.. and routing them with cable gland

The connection cables are inserted into the terminal box via an exchangeable cable entry plate or cable entry support. The cable entry plate is drilled by default. The cable glands are not included in the standard scope of supply.

For the explosion-proof version, the cable entry plate is not drilled by default. This enables you to adapt the number and size of the boreholes to the rated conditions.

The cable entry can be turned by 180°.

Table 6-4 Cable entry plate versions

Terminal box	Standard	Explosion-proof version
1XB1621	Cable entry plate with 2 x M80 x 2 + 2 x M25 x 1.5 boreholes	Undrilled
1XB1631	Cable entry plate with 4 x M80 x 2 + 2 x M25 x 1.5 boreholes	Undrilled
1XB1634		
1XB9600	Onion ring only	-

Insert the cable into the terminal box

1. Unscrew the cable entry plate.
2. Drill the required number of holes or tapped holes in the required size into the cable entry plate, if necessary. Ensure that the cable entry plate can be assembled after drilling and that it features sufficient stiffness.
3. Fit the required cable glands.
4. Route the cables through the cable glands.
5. Fit the cable entry plate to the terminal box with the assembled cables.
6. Connect the ends of the cables to the terminals in accordance with the circuit diagram. The circuit diagram is located in the cover of the terminal box.

Refer to the "Connecting cables..." section for more information.

- If you are using cable glands, use only **certified** cable glands with strain relief. Comply with the installation and operation conditions specified in the certificate for these cable glands and check that they have been complied with.
- Correctly close unused threads or holes, maintaining the IP degree of protection. The IP degree of protection is stamped on the rating plate.
- Replace any unused cable glands by certified screw plugs.

6.4.2 Bringing cables into the terminal box 1XB.. and routing them with onion sealing ring

The following terminal boxes may be equipped with an onion sealing ring.

Table 6-5 Terminal boxes with onion sealing ring

Terminal box	Onion sealing ring
1XB9600	Standard design
1XB1621, 1XB1631, 1XB1634	Optional

The connecting cable is sealed at the cable entry location using a cut-out sealing insert and is fastened using a strain relief device.

Bringing cables into the terminal box and connecting them

The terminal box is opened, the cable cut to the correct length and stripped back. Make sure that no external forces are acting on the cable connection.

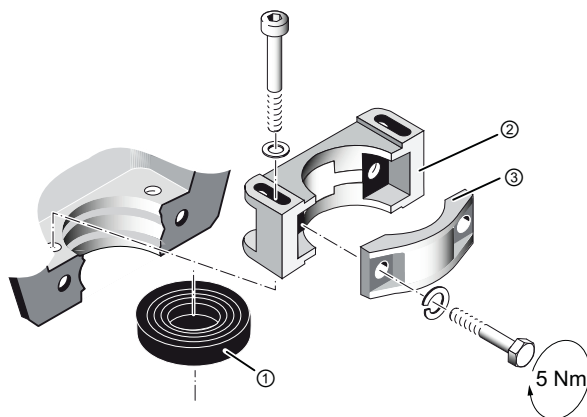


Figure 6-4 Strain relief device and sealing insert

1. Remove the top part of the strain relief (3) and release the fixing screws for the bottom part of the strain relief (2). The strain relief device can be located either in the terminal box or externally. If necessary, switch the direction sense of the strain relief device.
2. Cut the seal insert (1) so that its opening is 1 to 3 mm smaller than the diameter of the cable.
3. Pull the sealing insert over the end of the cable.

4. Prepare the end of the cable depending on the cable and its use, e. g. with a cable lug.
5. Connect the ends of the cables to the terminals in accordance with the circuit diagram.
The circuit diagram is located in the cover of the terminal box.
Refer to the "Connecting cables..." section for more information.
6. You might need to use a sleeve made of suitable sealing tape to modify the diameter where it passes through the sealing insert. Push the sealing insert onto the prepared sleeve.
7. Insert the cable with the seal insert in position into the gland opening. Screw the strain relief device together once the cable is in a concentric position in the gland opening.
8. Secure the strain relief device.
9. Tighten the clamping screws of the strain relief device so that the cable is clamped as necessary, but do not damage the cable insulation. We recommend a torque of 5 Nm.
10. Retighten the clamping screws after 24 hours.

**WARNING****Clamping screws for the strain relief clip**

Tightening the strain relief clip clamping screws too tightly can damage the insulation. This can cause a voltage flashover. This can result in death, serious injury, or material damage. Tighten the strain relief clip clamping screws to the specified torque.

Use only sealing plugs, cable entries and conductor entries, that are certified and marked for use in the respective hazardous area (the zone).

6.4.3 Connecting cables with cable lugs

1. Select the cable lugs according to the required cable cross-section and fixing screw or stud size. Information about the maximum cross-section for the respective standard terminal box design can be found in the catalog.
A sloped/angular arrangement of the supply cables is only permitted provided the required minimum air clearances are met.
2. Remove the insulation from the conductor ends so that the remaining insulation reaches almost up to the cable lug ①. Connect only one conductor per cable lug.
3. Fasten the cable lug to the end of the conductor correctly, e.g. by squeezing.

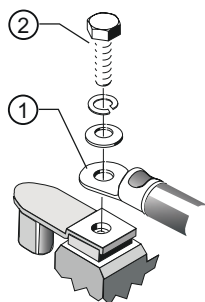


Figure 6-5 Connection with cable lug and fixing screw (schematic diagram)

6.4 Connection

4. Insulate the cable lug sleeves where necessary to ensure minimum air clearances and the creepage distance are maintained.
5. Place the cable lug on the terminal support. If you are using a disconnecting link, check its positioning.
For terminal box 1XB7740 place the cable lug on the busbar.
6. Tighten the fixing element ② with the corresponding tightening torque:

Fixing element	Tightening torque
Fastening screw M12	20 Nm
Fixing screws M16	40 Nm
Fixing nuts M12	20 Nm



WARNING

Explosion hazard if cable lugs without side guards are used

For cable cross-sections under 70 mm², cable lugs without side guard may twist. The minimum air clearances may be underrun and cause an explosion.

This can result in death, serious injury, or material damage.

- For cable cross-sections under 70 mm², use only cable lugs with side guard.
- Make sure that the minimum air clearances (Page 76) are observed.

6.4.4 Connection without cable lugs

Lug terminal connections - which are suitable for connecting flexible and stranded conductors without the use of wire end ferrules - may be installed if ordered accordingly. If you wish to use wire end ferrules, then before connecting the cable, attach these so as to form a technically correct, current-carrying crimped joint at the end of the conductor.

NOTICE

Overheating of the conductor ends

If the end of the conductor is not correctly enclosed by the wire end ferrule, but is trapped by it, this can lead to overheating.

- Insert only one conductor end into each wire end ferrule, and attach the wire end ferrule correctly.
- Insert only one conductor end into each terminal.

Procedure

Ensure that the minimum air clearances of 10 mm and the creepage distance of 20 mm are maintained for the connection.

1. Open the terminal box and cut the cable to the correct length.
2. Prepare the end of the cable depending on the cable and its use. Make sure that no external forces are acting on the cable connection.
3. Insulate the conductor ends in such a way that the remaining insulation reaches almost up to the cable lug.
4. Make sure the terminal clamps ③, ④ are arranged correctly for the size of the conductor. Insert the cable into the terminal clamps. Tighten the clamping nuts ⑤ to a tightening torque of 8 Nm.
5. If you have loosened the terminal body clamping bolts ②, then retighten them to a torque of 40 Nm.

For terminal box GT640, the fixing of the terminal element ① is done using a terminal nut M12 on the threaded stud of the terminal support with a torque of 20 Nm.

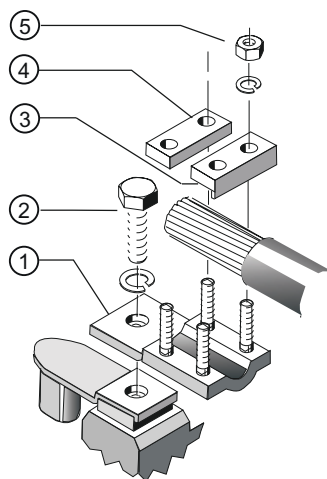


Figure 6-6 Connection using terminal clamps (schematic diagram)

Lug terminal connections may be installed if ordered accordingly, which are suitable for connecting flexible and stranded conductors without the use of wire end ferrules. If you wish

6.4 Connection

to use wire end ferrules, then before connecting the cable, attach these so as to form an appropriate, current-carrying crimped joint at the end of the conductor.



WARNING

Danger of explosion if the conductor ends become too hot

If the end of the conductor is not correctly enclosed by the wire end ferrule, but is trapped by it, this can lead to overheating. The temperature class of the machine can be exceeded. This can trigger ignition of an explosive mixture. This can result in death, serious injury or material damage.

- Insert only one conductor end into each wire end ferrule. Attach the wire end ferrule correctly.
- Insert only one conductor end into each terminal.

6.4.5 Use of aluminum conductors

If you are using aluminum conductors, comply in addition with the following:

- Use only cable lugs that are suitable for connecting aluminum conductors.
- Immediately before inserting the aluminum conductor, remove the oxide layer from the contact areas on the conductor and/or the mating piece, by brushing or filing.
- Then grease the contact areas immediately using neutral vaseline in order to avoid re-oxidation.

NOTICE

Aluminum flow due to contact pressure

Aluminum flows following installation due to the contact pressure. The connection with the clamping nuts can loosen as a result. The contact resistance would increase and the current-carrying impeded; as a consequence the terminal box and the surrounding components could burn. This could result in material damage to the machine or even in total failure, which could in turn lead to indirect material damage to the system.

Retighten the clamping nuts after approximately 24 hours and then again after approximately four weeks. Make sure that the terminals are de-energized before you tighten the nuts.

6.4.6 Using single-stranded cables



WARNING

High temperatures from induced eddy currents

With high currents and where several single-stranded cables are used instead of multiple-stranded cables, high temperatures can result in the cable entry area due to induced eddy currents. A short-circuit and an explosion may occur. This can result in death, serious injury, or material damage.

- After commissioning, ensure that the temperature limits of the connected power cables are not exceeded during operation. This temperature effect can be reduced by altering the conditions at the entry points or by using modified cable entry plates after consultation with the manufacturing plant.
- Use a cable entry plate made of non-ferrous metal.

6.4.7 Internal equipotential bonding

Between the ground terminal in the terminal box enclosure and the machine enclosure, the fixing screws of the terminal box serve as PE conductor connection.

Between terminal box cover and terminal box enclosure, the cover fixing screws serve as equipotential bonding.

A special external ground conductor is only installed if, for example, flat seals are mounted without additional support.

When performing any installation work, you must always take care to ensure that all equipotential bonding measures remain effective.

6.4.8 Stepless mating face for sealing in the terminal box cover (not for GT640)

The sealing face of the terminal box cover is formed by the terminal box enclosure and the cable entry element. Therefore make sure these parts are correctly aligned, so as to ensure the seal and hence the degree of protection.

Align the cable entry support and the cable entry plate to the terminal box enclosure so that the sealing surface between the terminal box and the terminal box cover form a flat face. There must be no steps in the sealing area.

6.4.9 Minimum air clearances

After proper installation, verify that the minimum air clearances between non-insulated parts are maintained. Be aware of any protruding wire ends.

Table 6-6 Minimum air clearance dependent on rms value of the alternating voltage U_{rms}

Rms value of the alternating voltage V_{rms}	Minimum air clearance
$\leq 500 \text{ V}$	8 mm
$\leq 630 \text{ V}$	10 mm
$\leq 800 \text{ V}$	12 mm
$\leq 1000 \text{ V}$	14 mm

Values apply at an installation altitude of up to 2000 m.

When determining the required minimum air clearance, the voltage value in the table may be increased by a factor of 1.1, so that the rated input voltage range is taken into account during general use.

6.4.10 Finishing connection work

- Before closing the terminal box, please check that:
 - The electrical connections in the terminal box have been made in accordance with the specifications above and tightened with the correct tightening torque.
 - The machine is connected in such a way that it rotates in the direction specified.
 - The inside of the terminal box is clean and free of any cable debris, dirt and foreign bodies.
 - All of the seals and sealing surfaces of the terminal box are intact and in a good condition.
 - Any unused cable entries are sealed with **glued-in ferrous or certified sealing elements**. The sealing elements can only be removed with a tool.
 - The connecting cables are laid in an open arrangement, so that the cable insulation cannot be damaged during operation.
- Close the terminal box with the cover fixing screws, see chapter Tightening torques for screw and bolt connections (Page 143).

6.5 Connecting the auxiliary circuits

6.5.1 Selecting cables

Take the following criteria into account when selecting the connecting cables for the auxiliary circuits:

- Rated current
- Rated voltage

- System-dependent conditions, such as ambient temperature, routing type, cable cross-section as defined by required length of cable, etc.
- Requirements according to IEC/EN 60204-1
- Requirements according to IEC/EN 60079-14

Use only sealing plugs, cable entries and conductor entries, that are certified and marked for use in the respective hazardous area (the zone).

6.5.2 Bringing cables into the auxiliary terminal box and routing them

The required data for connecting the auxiliary circuits is located on the terminal diagram on the inside of the respective auxiliary terminal or terminal box cover.

- In some cases a terminal strip is installed in the main terminal box for the auxiliary circuit connections.
- The required stripped length on conductors for auxiliary terminals differs according to terminal type (6 to 9 mm). When the length is correct, the conductor should reach the stop in the terminal and at the same time the conductor insulation should reach the contact part of the terminal.

Adapting the cable glands

A plate is bolted to the terminal box enclosure via a rectangular cutout through which the connecting cables enter. The plate is generally delivered with threaded holes and cable glands.

1. Open the auxiliary terminal box and undo the cable entry plate screws.
2. For the undrilled version, drill the required number of holes or threads in the required size of the cable gland into the cable entry plate.
3. Mark the cables if necessary for subsequent assignment.
4. Pull the cables through the cable glands and the cable entry plate, and connect the cables.
5. Fit the cable entry plate.
6. Make sure that the seal on the screwed sockets for the cable glands satisfies the degree of protection.

See also

Tightening torques for screw and bolt connections (Page 143)

Spare parts (Page 123)

6.5.3 Connect metal shield in the terminal box

If you are using metal-armored cables that are inserted into the terminal or auxiliary terminal boxes with non-intrinsically safe circuits, then ground the metal shield in the terminal box. Additional grounding points are permissible.

- In terminal boxes **with** internal grounding part, connect the metal shield to the internal grounding point.
- In terminal boxes **without** internal grounding part, connect the metal shield to one of the green-yellow grounding terminals.

6.5.4 Connecting temperature monitoring for the stator winding

The stator winding is monitored for thermal loading by resistance thermometers embedded in the stator winding.

The connecting leads of the temperature sensors are routed to the main or auxiliary terminal box. The connection and assignment of the terminals is shown on the terminal diagram in the particular terminal box.



WARNING

Hazard due to electric shock

The installation of the temperature sensors for the winding monitoring with respect to the winding is implemented according to the requirements for basic insulation. The temperature sensor connections are located in terminal boxes, safe to touch, and have no protective separation. This is the reason that in the case of a fault, a hazardous voltage can be present at the measuring sensor cable. When touched, this can result in death, severe bodily injury and material damage.

When connecting the temperature sensor to external temperature monitoring devices, when required, apply additional measures to fully comply with the requirement "Hazard due to electric shock", see IEC 60664-1 or IEC 61800-5-1.

6.5.5 Terminating the connection work (auxiliary circuit)

1. Before closing the auxiliary terminal box, please check that:
 - The cables are connected in accordance with the terminal diagram.
 - The cables are arranged so that they do not come into contact with the machine, and the cable insulation cannot be damaged.
 - The inside of the terminal box is clean and free of any cable debris, dirt and foreign bodies.
 - The cable glands are firmly tightened, are suitable with respect to the degree of protection, type of cable routing, permissible cable diameter, etc., and have been mounted in full compliance with specifications and regulations
 - The tapped holes in the terminal plate have been sealed using cable entries or sealing plugs that achieve the respective degree of protection.
 - Any unused entry points are sealed. The sealing elements are firmly screwed in i. e. they can only be removed with a tool.
 - All of the seals/gaskets and sealing surfaces of the terminal box are in good condition
 - The clamping screws and any screw clamps are fully tightened, even if they are not being used.
2. Close the auxiliary terminal box using the cover supplied for this purpose. See section "Tightening torques for screw and bolt connections (Page 143)" for the tightening torque of the fixing bolts for the cover.

6.5.6 Converter operation

The following chapter is relevant only to machines of series 1PQ8 or if the machine was ordered for operation on the rectifier.

Note

The order number shows whether the machine was ordered for operation with converter: the 9th digit of the order number features the letter "P" or "Q".

6.5.6.1 Operation on a converter with a low pulse frequency

NOTICE

Increased motor temperature

For operation on a converter with a low pulse frequency, increased losses occur in the motor. This results in a higher motor temperature.

Reduce the power to prevent exceeding the temperature class and to avoid consequential premature thermal aging of the insulation.



WARNING

Dangerous voltage via the converter

As long as the feeding converter is switched on, or the DC link of the converter is not discharged, there can be a voltage at the motor terminals even when the rotor is not moving. The voltage is up to 1000 V, depending on the converter type.

Ensure that the five safety rules (Page 16) are followed before working on the motor.

6.5.6.2 Converter peak voltage

The values for the maximum converter peak voltage as limit values for the insulation system are given in the table below:

Table 6-7 Maximum converter peak voltage

Rated converter voltage [V]	Maximum converter peak voltage \hat{U}_{\max}		
	Phase-to-phase	Phase-to-ground	DC link
≤ 500 V	1500 V Rise time 0.5 μ s	1100 V Rise time 0.5 μ s	750 V
> 500 to 690 V	2250 V Rise time 0.4 μ s	1500 V Rise time 0.4 μ s	1125 V

NOTICE

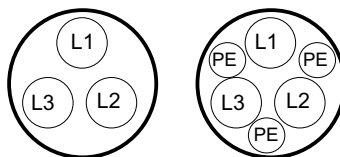
Insulation damage caused by cable reflections

Cable reflections can double the voltage load at the motor or at the terminals. This can damage the insulation system and result in complete destruction of the machine.

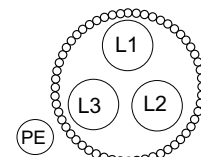
6.5.6.3 Reducing bearing currents

Taking the following actions will reduce the bearing currents:

- **Grounding:**
 - In addition to grounding the machines via the solid protective ground conductor, supplement the high frequency grounding using braided flat copper straps or high frequency stranded conductors.
 - Ensure that the contacts cover a large area. Solid copper cables are not suitable for high frequency grounding because of the skin effect.
- Use **equipotential bonding conductors:**
 - Between motor and driven machine
 - Between motor and converter
 - Between terminal box and RF grounding point at the motor enclosure
- Use a **separate RF equipotential bonding conductor:**
 - Between motor enclosure and protective ground rail of the converter
 - Between motor enclosure and driven machine
- **Selecting and connecting the cable:** As far as possible, use symmetrically arranged, shielded connection cables. The cable shielding, made up of as many strands as possible, must have good electrical conductivity. Braided shields made of copper or aluminum are very suitable.
 - The shield must be connected at both ends to the motor and the converter; unshielded cable ends must be kept as short as possible.
 - To ensure good discharging of high-frequency currents, provide contacting over a large surface area: with 360° contacting at the converter, at the motor for instance with EMC screw fastenings at the cable entries.



Concentric copper or aluminum shield



Steel armor

Measures to further reduce bearing currents

To specifically reduce and prevent damage caused by bearing currents, you must consider the system as a whole, which comprises the motor, converter, and driven machine. The following precautions help to reduce bearing currents:

- In the overall system, set up a properly meshed grounding system with low impedance for high-frequency currents.
- Use the common-mode filter (damping cores) at the converter output. The Siemens sales representative is responsible for selection and dimensioning.
- Limit the rise in voltage by using output filters. This dampens the harmonic content in the output voltage.

Note

Converter documentation

The operating instructions for the converter are not part of this documentation. Refer also to the configuration information for the converter.

6.5.6.4 Converter operation on a grounded network

NOTICE
Damage resulting from protective conductor currents <p>When the machine is operated on a converter with current limiter, but without ground-fault monitoring, protective conductor currents of up to 1.7 times the external conductor current can arise if there is a ground fault on the output side. Neither the PE conductors of normally rated multi-core connecting cables nor the PE connecting points of normal terminal boxes are suitable for this purpose. Material damage can result.</p> <ul style="list-style-type: none">• Use an appropriately sized PE conductor.• Connect the PE conductor to the grounding terminal on the motor enclosure.

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

7.1 Checks to be carried out prior to commissioning

Once the system has been correctly installed, you should check the following prior to commissioning:

Note

Checks to be carried out prior to commissioning

The following list of checks to be performed prior to commissioning does not claim to be complete. It may be necessary to perform further checks and tests in accordance with the specific situation on-site.

- The machine is undamaged.
- The machine has been correctly installed and aligned, the transmission elements are correctly balanced and adjusted.
- All fixing screws, connection elements, and electrical connections have been tightened to the specified tightening torques.
- The operating conditions match the data provided in accordance with the technical documentation, such as degree of protection, ambient temperature, etc..
- Moving parts such as the coupling move freely.
- If the second shaft extension is not in use, its feather key is secured to prevent it from being thrown out, and cut back to roughly half its length if the rotor has balancing type "H" (standard type).
- All touch protection measures for moving and live parts have been taken.

Electrical connection

- The grounding and equipotential bonding connections have been made correctly.
- The machine is connected so that it rotates in the direction specified.
- Appropriately configured control and speed monitoring functions ensure that the motor cannot exceed the permissible speeds specified in the technical data. For this purpose, compare the data on the rating plate or, if necessary, the system-specific documentation.
- The minimum insulation resistance values are within tolerance.

- Minimum air clearances have been maintained.
- Any supplementary motor monitoring devices and equipment have been correctly connected and are functioning correctly.
- All brakes and backstops are operating correctly.
- At the monitoring devices, the values for "Warning" and "Shutdown" are set.

See also

Setpoint values for monitoring the bearing temperature (Page 86)

Set values for monitoring the winding temperature (Page 86)

Converter operation

- If the design of the motor requires connection to a particular converter type, the rating plate will contain corresponding additional information.
- The converter is correctly parameterized. The parameterization data is specified on the rating plate of the machine. Information about the parameters is available in the operating instructions for the converter.
- The specified limit speed n_{\max} is not exceeded. Limit speed n_{\min} is not fallen below.

Cooling

- Check that the machine cooling is available for commissioning.
- The bearing insulation should be executed as shown on the plates.

7.2 Measurement of the insulation resistance and polarization index before commissioning

Measuring the insulation resistance and polarization index (PI) provides information on the condition of the machine. It is therefore important to check the insulation resistance and the polarization index at the following times:

- Before starting up a machine for the first time
- After an extended period in storage or downtime
- Within the scope of maintenance work

The following information is provided regarding the state of the winding insulation:

- Is the winding head insulation conductively contaminated?
- Has the winding insulation absorbed moisture?

As such, you can determine whether the machine needs commissioning or any necessary measures such as cleaning and/or drying the winding:

- Can the machine be put into operation?
- Must the windings be cleaned or dried?

Detailed information on testing and the limit values can be found here:

"Testing the insulation resistance and polarization index" (Page 45)

7.3 Greasing the roller bearings prior to commissioning

The following information assumes that the specified storage conditions have been complied with.

General specifications

- Pay attention to the instructions on the lubricant plate.
- Regrease in portions. The shaft must rotate so that the new grease can be distributed in the bearings.

Regreasing the roller bearings prior to commissioning

- If the period between delivery and commissioning is more than a year and less than four years:
 - Re-grease the roller bearings with twice the amount of grease specified on the lubricant plate.
 - Check the bearing temperature, as far as possible.

Regreasing roller bearings before commissioning

You must regrease the roller bearings under the following conditions:

- If the machine has been in storage for more than four years.
- If the machine has not been stored in accordance with the specifications in the "Storage" section.

Procedure

1. Remove the bearing, regreasing pipes, grease nipples and the bearing cap.
2. Flush out the old grease.
3. Check the bearings before regreasing. If necessary, install new bearings.
4. Lubricate the bearings and reinstall the bearing components.

See also

Regreasing intervals and types of grease for operating roller bearings (Page 103)

Stoppages (Page 92)

Transport and storage (Page 32)

7.4 Setpoint values for monitoring the bearing temperature

Prior to commissioning

If the machine is equipped with bearing thermometers, set the temperature value for disconnection on the monitoring equipment before the first machine run.

Table 7-1 Set values for monitoring the bearing temperatures before commissioning

Set value	Temperature
Disconnecting during commissioning	120 °C

Normal operation

Measure the normal operating temperature T_{op} at the installation site in °C. Set the values for disconnection and warning according to operating temperature T_{op} .

Table 7-2 Set values for monitoring the bearing temperatures in normal operation

Set value	Temperature
Warning in normal operation	$T_{op} + 5 \text{ K}$
Disconnection in normal operation	$T_{op} + 10 \text{ K}$

7.5 Set values for monitoring the winding temperature

Prior to commissioning

Before running the machine for the first time, set the temperature value for shutdown on the monitoring device.

Table 7-3 Set values for monitoring the winding temperatures during commissioning

Set value	Temperature
Shutdown	145 °C

Normal operation

Measure the normal operating temperature $T_{operation}$ at the installation site in °C. Set the values for shutdown and warning according to the operating temperature $T_{operation}$.

Table 7-4 Set values for monitoring the winding temperatures in normal operation

Set value	Insulation class 155(F)
Warning	$T_{op} + 10 \text{ K} \leq 145 \text{ °C}$
Shutdown	$T_{op} + 15 \text{ K} \leq 155 \text{ °C}$

7.6 Power on

After installation or inspection, carry out a test run:

1. Start up the machine without a load. To do this, close the circuit breaker and do not, if at all possible, switch off prematurely. Check whether it is running smoothly.
Maximum number of permissible consecutive starts for machines on the power supply:
Three cold / two warm
The start conditions for converter machines can be found in the catalog.
Switching the machine off again while it is starting up and still running at slow speed should be kept to a bare minimum, for example for checking the direction of rotation or for checking in general. Allow the machine to run down before switching it on again.
2. Continue to observe the machine for a while in no-load operation.
3. If it runs perfectly, connect a load.
 - Check whether it is running smoothly.
 - Read the values for voltage, current, and output and log them.
 - If possible, read and log the corresponding values for the working machine.
 - If this is possible using the available measuring equipment, check the bearing and stator winding temperatures until they have reached steady-state values.
 - Check the machine for noise or vibrations on the bearings or bearing shields as it runs.
4. In case of uneven running or abnormal noise, switch off the machine. As the machine runs down, identify the cause.
 - If the mechanical operation improves immediately after the machine is switched off, then the cause is magnetic or electrical.
 - If the mechanical operation does not improve immediately after switching the machine off, then the cause is mechanical. For example, this can be caused by imbalance in the electrical machine or the driven load, inadequate alignment of the machine set, operation of the machine at the system resonance point (system = motor, base frame, foundation etc.).

NOTICE

Serious damage to the machine

The vibration values encountered during operation must be satisfied in accordance with DIN ISO 10816-3, otherwise the machine could be damaged or destroyed.

During operation, observe the vibration values in accordance with DIN ISO 10816-3.

7.7 De-energizing

- If the controller does not do this automatically, switch on any anti-condensation heating during stoppages. This will avoid the formation of condensation.
- Do not switch on the anti-condensation heating until at least one hour after the motor has been switched off. This prevents damage to the winding insulation.

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

8.1 Safety guidelines in operation



WARNING

Live parts

Terminal boxes contain live electrical parts. If you open the terminal box cover, this can result in death, serious injury or material damage.

When the machine is in operation, the terminal boxes must remain closed at all times. Terminal boxes may be opened only when the machine is stopped and de-energized.



WARNING

Rotating and live parts

Rotating or live parts are dangerous. If you remove the required covers, this can result in death, serious injury or material damage.

Any covers that prevent live electrical or rotating parts from being touched, ensure compliance with a particular degree of protection or are required for ensuring proper air flows, and hence effective cooling, must not be opened during operation.



WARNING

Fire hazard resulting from hot surfaces

Certain parts of the machine become hot during operation. Severe burns can result from contact with these parts.

- Check the temperature of parts before touching them. If required, apply suitable protective measures.
- Allow the machine to cool before starting work on the machine.



WARNING

Faults in operation

Deviations from normal operation such as increased power consumption, temperatures or vibrations, unusual noises or odors, tripping of monitoring devices, etc., indicate that the machine is not functioning properly. This can cause faults which can result in eventual or immediate death, serious injury or material damage.

- Immediately inform the maintenance personnel.
- If you are in doubt, immediately switch off the motor, being sure to observe the system-specific safety conditions.

NOTICE

Risk of corrosion due to condensate

Humid air can condense inside the machine during operation as a result of intermittent duty or load fluctuations. Condensate can collect inside the motor. Damage such as rust can result.

Make sure that any condensation can drain away freely.



DANGER

Explosion hazard if the bridging is removed from the insulated bearing

Removing the factory-fitted bridging of the insulated bearing leads to potential differences between the rotor and the grounded motor. This can cause the generation of sparks, which especially in an explosive atmosphere can ignite surrounding dust or combustible gases. Explosions can occur. There is also a risk of an electric shock. Death, serious injury, or material damage will result.

Do not open the bridging of the bearing insulation during operation.

8.2 Operation in hazardous areas

Safe handling

In addition to the danger notices in the previous section, the following also applies:

Electrical systems in hazardous areas must be assembled, installed, and operated in accordance with the applicable rules and regulations. It is assumed that system operators can ensure that these rules and regulations are observed during assembly, installation, and operation, and that the appropriate tests are carried out. We recommend that these tests be carried out and documented in coordination with the authorities responsible.

System-specific ignition hazards

The criteria for the respective zonal classification are not harmonized and the assessment of the operational risks, the local operating conditions and the various monitoring methods is not uniform. Accordingly, the remedial measures recommended by the supervisory authorities also differ in some cases, depending on the authority's area of responsibility. The motor manufacturer cannot provide general recommendations in this regard.

Note

Binding clarification of the on-site risks and of any required measures can only be provided by the system operator in agreement with the supervisory authority responsible. The risk assessments from IEC / EN 60079-15 can be used to assess system-specific ignition hazards.

8.3 Switching off the anti-condensation heating

NOTICE

Excessive machine temperature

If the anti-condensation heating is operated while the machine is running, this can increase the temperatures inside the machine. This can result in material damage.

- Make sure that the anti-condensation heating is switched off before the machine is switched on.
- Only operate anti-condensation heating when the machine is switched off.

See also

Interlock circuit for anti-condensation heating (option) (Page 30)

8.4 Switching on the machine

1. If at all possible, run the machine without load and check that it is running smoothly.
Maximum number of permissible consecutive starts for machines on the power supply:
Three cold / two warm
The start conditions for converter machines can be found in the catalog.
2. If it runs perfectly, connect a load.
3. If this is possible using the available measuring equipment, check the bearing and stator winding temperatures.

8.5 Regreasing roller bearings

Refer to the regreasing instructions for the roller bearings on the lubricant plate.

8.6 Switching on again after an emergency switching-off

- Check the motor before restarting the driven machine after an emergency off.
- Eliminate all the causes that have led to the emergency off

8.7 Stoppages

The stoppage is a shutdown for a period of time, during which the machine is stopped but remains at the location of use.

Under normal ambient conditions, e. g. the stopped machine is not exposed to any vibration, no increased level of corrosion, etc. in general, the following measures are necessary during stoppages.

Measures for operational motors during stoppages

- If the stoppage lasts longer than one month, start up the machine regularly, that is, approximately once a month. Alternatively, turn the rotor as a minimum. If a rotor shipping brace has been fitted to the machine, remove it before you spin the rotor.
- If the machine has anti-condensation heating, then switch it on when the machine is not in operation.
Do not switch on the anti-condensation heating for at least one hour after the motor has been switched off. This prevents damage to the winding insulation.
- Please refer to the section "Energizing" before restarting the motor.

NOTICE
Damage due to improper storage
Damage may occur to the motor if it is not stored properly.
If the machine is to be taken out of operation for more than 12 months, suitable anti-corrosion, preservation, packaging, and drying measures must be taken.

Taking the machine out of service

You will find detailed information about the necessary measures to be taken in the "Transportation and storage (Page 32)" section.

Recommissioning

- When restarting the motor after a long stoppage, carry out the measures recommended in the chapter titled "Commissioning (Page 83)".
- Regrease the bearings prior to commissioning if the machine has been out of operation for more than a year. The shaft must rotate so that the new grease can be distributed throughout the bearings.
- Pay attention to the instructions on the lubricant plate.



WARNING

Explosion hazard

If the anti-condensation heating is switched on directly after the machine is switched off, the temperature class or the maximum surface temperature of the machine can be exceeded.

In an explosive atmosphere, there is a risk of an explosion. This can result in death, serious injury or material damage.

Do not switch on the anti-condensation heating for at least one hour after the motor has been switched off.

8.7.1 Avoidance of condensation or formation of condensation within the machine

- If the controller does not do this automatically, switch on any anti-condensation heating during stoppages. This will avoid the formation of condensation.
- Do not switch on the anti-condensation heating until at least one hour after the motor has been switched off. This prevents damage to the winding insulation.

8.7.2 Avoidance of damage to roller bearings during stoppages

Extended stoppages at the identical or almost identical resting position of the roller bearings can lead to damage such as brinelling or formation of corrosion.

- During stoppages, regularly start the machine up for a brief period once a month, or at least turn the rotor over several times.
If you have uncoupled the machine from the driven machine and secured the rotor with a rotor shipping brace, then remove this before turning the rotor over or starting the machine up.
Make sure that the resting position of the roller bearings after the rotor has been turned over is different from what it previously had been. Use the fitted key or the coupling halves as reference markers.
- During re-commissioning, refer to the information in the "Commissioning" section.

See also

Start-up (Page 83)

Greasing the roller bearings prior to commissioning (Page 85)

8.7.3 Shaft grounding brushes (optional)

With non-encapsulated and non-sealed shaft grounding brushes, rust may form on the brushes' running surface on the shaft after extended breaks in operation.



WARNING

Live parts

If the shaft grounding does not function correctly, the shaft can carry high voltages which do not dissipate quickly enough when the machine comes to a standstill. This can lead to death or serious injury as a result of electric shock, or bearing damage caused by current flowing through the bearing.

- Regularly inspect the shaft grounding brushes and replace them if necessary.
- Keep the brushes' running surface clean: Regularly inspect the brushes' running surface and remove any rust before starting the machine up.

8.7.4 Measurement of the insulation resistance after an extended stoppage

Measuring the insulation resistance and polarization index (PI) provides information on the condition of the machine. It is therefore important to check the insulation resistance and the polarization index at the following times:

- Before starting up a machine for the first time
- After an extended period in storage or downtime
- Within the scope of maintenance work

The following information is provided regarding the state of the winding insulation:

- Is the winding head insulation conductively contaminated?
- Has the winding insulation absorbed moisture?

As such, you can determine whether the machine needs commissioning or any necessary measures such as cleaning and/or drying the winding:

- Can the machine be put into operation?
- Must the windings be cleaned or dried?

Detailed information on testing and the limit values can be found here:

"Testing the insulation resistance and polarization index" (Page 45)

8.8 Decommissioning the machine

NOTICE
Damage as a result of an extended period out of service
If the machine is going to be out of service for longer than six months, then take the necessary measures for preservation and storing. Otherwise damage to the machine will result.

Record the decommissioning steps. This log will be useful upon recommissioning.

8.9 Re-commissioning the machine

When you re-commission the machine, proceed as follows:

- Study the record made when the machine was decommissioned, and reverse the measures that were taken for conservation and storage.
- Perform the measures listed in the "Commissioning" section.

See also

Start-up (Page 83)

8.10 faults

8.10.1 Inspections in the event of faults

Natural disasters or unusual operating conditions, such as overloading or short circuit, are faults that overload the machine electrically or mechanically.

Immediately perform an inspection after such faults.

Correct the cause of the fault as described in the respective remedial measures section. Repair any damage to the machine.

8.10.2 Electrical faults

Note

If you are operating the motor with a converter, the operating instructions of the converter must also be observed if electrical faults occur.

Table 8-1 Electrical faults

↓ Motor fails to start						
↓ Motor accelerates sluggishly						
↓ Rumbling noise during startup						
↓ Rumbling noise during operation						
↓ High temperature rise during no-load operation						
↓ High temperature rise with load						
↓ High temperature rise of individual winding sections						
						Possible causes of faults
						Remedial measures
X	X		X		X	Overload
X						Interrupted phase in the supply cable
	X	X	X		X	Interrupted phase in the feeder cable after switching on
	X					Mains voltage too low, frequency too high
				X		Mains voltage too high, frequency too low
X	X	X	X		X	Stator winding incorrectly connected
	X	X	X		X	Winding short circuit or phase short circuit in stator winding
					X	Incorrect direction of rotation

8.10.3 Mechanical faults

The following table shows the possible causes of and remedial measures for mechanical faults.

Table 8-2 Mechanical faults

↓ Grinding noise				
	↓ Overheating			
		↓ Radial vibrations		
		↓ Axial vibrations		
			Possible causes of faults	Remedial measures
X			Rotating parts are grinding	Establish the cause and realign the parts.
	X		Reduced air supply, direction of rotation of fan possibly incorrect	Check the air ducts; clean the machine.
		X	Rotor not balanced	Decouple the rotor and then rebalance it.
		X	Rotor out of true, shaft bent	Please consult the manufacturer.
		X X	Poor alignment	Align the machine set and check the coupling [Ⓢ] .
		X	Coupled machine not balanced	Rebalance the coupled machine.
		X	Shocks from coupled machine	Investigate the coupled machine.
		X X	Fault originating from gearing	Fix the gearing.
		X X	Resonance of the overall system comprising motor and foundation	Reinforce the foundation after consultation with the manufacturer.
		X X	Changes in foundation	Determine the cause and rectify it. Realign the machine.

[Ⓢ] Note any changes taking place during warm up

8.10.4 Roller bearing faults

Note

Damage to roller bearings can be difficult to detect in some cases. If in doubt, replace the bearing. Use other bearing designs only **after consulting the manufacturer**.

Table 8-3 Roller bearing faults

↓ Bearing overheats			
	↓ Bearing "whistles"		
		↓ Bearing "knocks"	
		Possible causes of faults	Remedial measures
X		High coupling pressure	Align the machine more accurately.
X		Belt tension too high	Reduce the drive belt tension.
X		Bearing contaminated	Clean the bearing or replace it. Check the seals.
X		High ambient temperature	Use a suitable high-temperature grease.
X	X	Insufficient lubrication	Grease the bearings as instructed.
X	X	Bearing canted	Properly install the bearing.
X	X	Insufficient bearing play	Only after consultation with the manufacturer: Fit a bearing with greater play.
	X	Excessive bearing play	Only after consultation with the manufacturer: Fit a bearing with lower play.
X	X	Bearing corroded	Replace the bearing. Check the seals.
X		Too much grease in bearing	Remove surplus grease.
X		Wrong grease in the bearing	Use the correct grease.
	X	Friction marks on raceway	Replace the bearing.
	X	Scoring (brinelling)	Replace the bearing. Avoid any vibration at standstill

Maintenance

Through careful and regular maintenance, inspections, and overhauls you can detect faults at an early stage and resolve them. This means that you can avoid consequential damage.

Operating conditions and characteristics can vary widely. For this reason, only general maintenance intervals can be specified here. Maintenance intervals should therefore be scheduled to suit the local conditions (dirt, starting frequency, load, etc.).

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

Comply with the IEC / EN 60079-17 standard during all servicing and maintenance work on the machine.


Note

Service Center

Please contact the Service Center (Page 141), if you require support with servicing, maintenance or repair.

9.1 Inspection and maintenance

9.1.1 Safety instructions for inspection and maintenance

 WARNING
<p>Rotating and live parts</p> <p>Electric machines contain live and rotating parts. Fatal or serious injuries and substantial material damage can occur if maintenance work is performed on the machine when it is not stopped or not de-energized.</p> <ul style="list-style-type: none"> • Perform maintenance work on the machine only when it is stopped. The only operation permissible while the machine is rotating is regreasing the roller bearings. • When performing maintenance work, comply with the five safety rules (Page 16).



WARNING

Machine damage

If the machine is not maintained it can suffer damage. This can cause faults which can result in eventual or immediate death, serious injury or material damage.

Perform regular maintenance on the machine.



CAUTION

Dust disturbances when working with compressed air

When cleaning with compressed air, dust, metal chips, or cleaning agents can be whirled up. Injuries can result.

When cleaning using compressed air, make sure you use suitable extraction equipment and wear protective equipment (safety goggles, protective suit, etc.).

NOTICE

Damage to insulation

If metal swarf enters the winding head when cleaning with compressed air, this can damage the insulation. Clearance and creepage distances can be undershot. This may cause damage to the machine extending to total failure.

When cleaning with compressed air, ensure there is adequate extraction.

NOTICE

Machine damage caused by foreign bodies


Foreign bodies such as dirt, tools or loose components, such as screws etc., can be left by accident inside the machine after maintenance is performed. These can cause short circuits, reduce the performance of the cooling system or increase noise in operation. They can also damage the machine.

- When carrying out maintenance work, make sure that no foreign bodies are left in or on the machine.
- Securely attach all loose parts again once you have completed the maintenance procedures.
- Carefully remove any dirt.

Note

Operating conditions and characteristics can vary widely. For this reason, only general intervals for inspection and maintenance measures can be specified here.

9.1.2 Risk of explosion when cleaning with compressed air

 WARNING
Risk of explosion when cleaning with compressed air
If you clean the machine with compressed air, plastic components may become statically charged and ignite a potentially explosive atmosphere; an explosion can occur. This can result in death, serious injury or material damage.
Do not use compressed air to clean plastic parts in an explosive atmosphere. When cleaning the machine, make sure that the air in the vicinity of the motor is free of gas and dust.

9.1.3 Measurement of the insulation resistance and polarization index in the context of maintenance work

Measuring the insulation resistance and polarization index (PI) provides information on the condition of the machine. It is therefore important to check the insulation resistance and the polarization index at the following times:

- Before starting up a machine for the first time
- After an extended period in storage or downtime
- Within the scope of maintenance work

The following information is provided regarding the state of the winding insulation:

- Is the winding head insulation conductively contaminated?
- Has the winding insulation absorbed moisture?

As such, you can determine whether the machine needs commissioning or any necessary measures such as cleaning and/or drying the winding:

- Can the machine be put into operation?
- Must the windings be cleaned or dried?

Detailed information on testing and the limit values can be found here:

"Testing the insulation resistance and polarization index" (Page 45)

9.1.4 Inspections in the event of faults

Natural disasters or unusual operating conditions, such as overloading or short circuit, are faults that overload the machine electrically or mechanically.

Immediately perform an inspection after such faults.

9.1.5 First service after installation or repair

Perform the following checks after approximately 500 operating hours or one year, whichever comes first:

Table 9-1 Checks after assembly or repair

Check	When the motor is running	At standstill
The stated electrical characteristics are being observed	X	
The permissible bearing temperatures are not exceeded (Page 86).	X	
The smooth running characteristics and machine running noise have not deteriorated	X	
The motor foundation has no cracks and indentations. (*)	X	X

(*) You can perform these checks while the motor is running or at a standstill.

Additional tests may also be required according to the system-specific conditions.

NOTICE

If you detect any deviations during the inspection, you must rectify them immediately. They may otherwise cause damage to the machine.

9.1.6 General inspection

Check that the installation conditions are observed. We recommend that the following checks are performed after approx. 16 000 operating hours or at the latest after two years:

Table 9-2 Checks that have to be performed during the general inspection

Checking	When the motor is running	At standstill
The electrical parameters are maintained	X	
The permissible bearing temperatures are not exceeded (Page 86)	X	
The smooth running characteristics and machine running noise have not deteriorated	X	
The motor foundation has no cracks and indentations (*)	X	X
The machine is aligned within the permissible tolerance ranges		X
All the fixing bolts/screws for the mechanical and electrical connections have been securely tightened		X
All the potential connections, grounding connections and shield supports are correctly seated and properly bonded		X
The winding insulation resistances are sufficiently high		X

Checking	When the motor is running	At standstill
Any bearing insulation is fitted as shown on the plates and labels		X
The CABLES and insulating parts and components are in good condition and there is no evidence of discoloring		X

(*) You can perform these checks while the motor is at standstill or, if required, while running.

NOTICE
If you detect any deviations during the inspection, you must rectify them immediately. They may otherwise cause damage to the machine.

See also

Set values for monitoring the winding temperature (Page 86)

9.1.7 Servicing the roller bearings

When inspecting rolling-contact bearings, it is generally not necessary to dismantle the machines. The motor only has to be dismantled if the bearings are to be replaced.

9.1.8 Servicing and maintaining the anti-condensation heating

The anti-condensation heating is maintenance-free. If it is defective, contact the Service Center (Page 141).

9.1.9 Regreasing intervals and types of grease for operating roller bearings

The specified grease data applies to the data specified on the rating plate and for high-quality grease in accordance with the specifications in these operating instructions. Because these greases exceed significantly the requirements according to DIN 51825 and ISO 6743-9, they permit the specified relubrication intervals.

Initial lubrication

The grease specified on the lubricant plate is selected according to the operating conditions known at the time of ordering and should be used for initial lubrication.

Grease selection criteria

High quality ISO-L-X BDEA3 lubricating grease according to ISO 6743-9 and K3K-20 lubricating grease according to DIN 51825 with lithium soap as a thickener and an upper service temperature of at least +130° C / +266° F are permissible for standard applications without special requirements.

9.1 Inspection and maintenance

When selecting the lubricating grease, ensure that the technical data of the grease is suitable for the application.

The lubricating grease must satisfy the criteria listed in the table below and must match the operating conditions.

Table 9-3 Criteria for selecting roller bearing greases

Criteria	Standard	Property, characteristic value	Unit
Type of base oil	-	Mineral oil	-
Thickener	-	Lithium	-
Consistency in accordance with NLGI class	DIN 51818	<ul style="list-style-type: none"> "3" for vertical and horizontal types of construction "2" alternatively for horizontal type of construction with reduced lubrication interval 	-
Operating temperature range	-	At least -20° C ... +130° C	°C
Dropping point	DIN ISO 2176	At least +180° C	°C
Basic oil viscosity	DIN 51562-1	<ul style="list-style-type: none"> Approx. 100 mm²/s at 40° C Approx. 10 mm²/s at 100° C 	mm ² /s
Additives	-	<ul style="list-style-type: none"> Anti-Oxidation (AO), Anti-Wear (AW) No solid lubricants Alternative: Extreme-pressure (EP) only after consultation with grease and bearing manufacturers 	-
FE9 test: A/1500/6000	DIN 51821-1/-2	F10 ≥ 50 h at +130° C F50 ≥ 100 h at +130° C	H
Behavior in the presence of water	DIN 51807	0 or 1 at a test temperature of +90° C	-
Corrosive effect on copper	DIN 51811	0 or 1 at a test temperature of +120° C	Corr. °
Resistance to corrosion (EMCOR)	DIN 51802 / ISO 11007	0 - 0	Corr. °
Solid matter content, particle sizes > 25 µm	DIN 51813	< 10 mg/kg	mg/kg
Suitability of bearings Speed characteristic nxdm	-	Suitable for the built-in motor bearings, seals and these speeds	- mm/min

If different special lubricating greases are stated on the lubricant plate, then different criteria apply.

Note**Deviating operating conditions and characteristics**

Only those greases named on the lubricant plate may be used.

If the operating conditions and characteristics differ from those mentioned, other greases may be used only after consultation with the manufacture.

Note**Use of other greases**

If greases other than those named on the lubricant plate are used, it cannot be guaranteed that they are compatible with the complete system.

If you use greases that satisfy only the minimum requirements of DIN 51825 or ISO 6743-9, then reduce the lubrication intervals by half or adapt them as appropriate. If in doubt, consult the manufacturer.

Recommended greases for roller bearings

For standard applications, the following high-quality greases are recommended for roller bearings for vertical and horizontal motor constructions due to their technical properties:

Table 9-4 Roller bearing greases for vertical and horizontal types of construction

Manufacturer	Grease type
Shell	Gadus S2 V100 3
ExxonMobil	Unirex N3
Esso	
BP	Energrease LS3
Fuchs	Renolit H443 HD88
Lubcon	Turmoplex 3
Addinol	LM 3 EP
FAG	Arcanol Multi 3

For motors of horizontal construction you can alternatively use greases with NLGI class 2. However, this reduces the lubrication interval by 20%.

Table 9-5 Alternative greases with NLGI class 2 for motors of horizontal construction

Manufacturer	Grease type
Shell	Gadus S2 V100 2
ExxonMobil	Unirex N2
Esso	
BP	Energrease LS2
Castrol	Longtime PD2
Lubcon	Turmogrease L 802 EP plus
Shell	Retinax LX2
FAG	Arcanol Multi 2

NOTICE

Damage due to mixing grease types

The lubrication properties will be impaired if you mix different greases. This can result in material damage.

Avoid mixing greases. Only the manufacturer can provide a guarantee for the miscibility of particular greases.

Regreasing

Regreasing data are stated on the lubricant plate of the machine:

- Regreasing intervals in operating hours
- Regreasing amount in grams
- Grease type

Independent of the actual number of operating hours, the roller bearings must be regreased every 12 months at the latest.

NOTICE

Damage to roller bearings

The regreasing intervals for roller bearings are different from the servicing intervals for the machine. The roller bearings may be damaged if the relubrication intervals are not adhered to.

Pay attention to the instructions on the lubricant plate.

Grease replacement intervals

The grease replacement intervals in these operating instructions or the regreasing intervals indicated on the plate apply to the following conditions:

- Normal load
- Operation at speeds in accordance with rating plate
- Low-vibration operation
- Neutral ambient air
- High-quality roller bearing greases

In the case of unfavorable operating conditions, the regreasing intervals must be reduced after consultation with the manufacturer.

Regreasing

Pay attention to the instructions on the lubricant plate.

1. The shaft must rotate during regreasing, so that the new grease can be distributed throughout the bearing. For motors operated with a converter, regreasing should be carried out at low to medium speed where possible ($n_{\min} = 250 \text{ rpm}$, $n_{\max} = 3600 \text{ rpm}$) to ensure an even distribution of grease.



! WARNING

Rotating components

The shaft must rotate to allow the grease to be distributed. This can result in death, serious injury or material damage.

When regreasing, pay attention to all rotating components.

2. Clean the grease nipples before regreasing and then gradually press in an appropriate type and amount of grease, as described on the lubricant plate and by the specifications in these operating instructions.
The roller bearing temperature rises sharply at first, then drops to the normal value again after the excess grease has been displaced out of the bearing.
3. The used grease collects outside each bearing in a spent grease chamber.

Lubricating roller bearings prior to commissioning

When properly stored prior to commissioning for a longer period of time, normally the grease in the bearings does not deteriorate within two years. Please note the information regarding long-term storage.

When commissioning, the bearings must be relubricated with twice the amount of lubricating grease. When doing this, the shaft must rotate so that the grease is replaced in the bearings.

! WARNING

Overheating of the rolling bearings

If the roller bearings are not regularly regreased, local overheating may be possible, and, as a consequence, an explosion in an explosive atmosphere. This can result in death, serious injury or material damage.

- Regrease the roller bearings regularly according to the lubrication plate.
- Implement bearing temperature monitoring if not yet in existence.

9.1.10 Sealing the rolling-contact bearings ("Increased degree of protection" option)

Relubricating the grease tank

In order to achieve optimum sealing of the rolling contact bearings and to reliably seal the labyrinth joints with grease, the chamber must be relubricated at regular intervals. The

procedure is the same as that for lubricating grease. The sealing effect during operation is optimum as long as a small amount of relatively clean grease is forced out.

Regreasing intervals

The necessary relubrication intervals depend essentially on the level of dirt in the environment and on the ON time of the motor. For this reason, they can only be defined taking into account the respective operating conditions. Make sure that the groove in the seal is full of grease at all times.

9.1.11 Keeping the cooling air flow clean

The cooling ducts must be free of any pollution in order that the machine is adequately cooled. Regularly clean the grids, ducts, ribs, pipes etc. to remove dust and pollution.

9.1.12 Touch up any damaged paintwork

If the paint is damaged, it must be repaired in order to protect the unit against corrosion.

Note

Paint system

Contact the Service Center (Page 141) before you repair any paint damage. They will provide you with more information about the correct paint system and methods of repairing paint damage.

9.1.13 Repainting



WARNING

Explosion danger caused by incorrect painting

The paint coat can become electrostatically charged where there is a thick coat. Electrostatic discharges can occur. There is a risk of explosion if potentially explosive mixtures are also present at this moment. This can result in death, serious injury or material damage.

You must comply with one of the following requirements when you repaint painted surfaces:

- Limit the total paint coating thickness according to the explosion protection group:
 - IIA, IIB: Total paint coating thickness ≤ 2 mm
 - IIC: Overall coating thickness ≤ 0.2 mm for motors of group II (gas)
- Limit the surface resistance of the paint used:
 - Surface resistance ≤ 1 G Ω for motors of groups II and III (gas and dust)
- Charge transfer limit
 - 60 nC for Group I or Group IIA devices
 - 30 nC for Group IIB devices
 - 10 nC for Group IIC devices
 - 200 nC for Group III devices
- Breakdown voltage ≤ 4 kV for explosion group III (dust only)

Suitability test of the paint system for hazardous areas

Proof is available for the electrostatic suitability with explosion-proof machines for the paint systems ordered by default. Such evidence is not available for paint systems that are non-standard or specifically requested by customers. Take into consideration that the provided evidence is not valid for repaintings.

9.1.14 Maintaining terminal boxes

Requirement

The machine is de-energized.

Checking the terminal box

- Terminal boxes must be regularly checked for tightness, undamaged insulation, and tight terminal connections.
- If dust or humidity have infiltrated the terminal box, this should be cleaned and dried (particularly the insulators).
Check all the seals and sealing surfaces and address the cause of the leakiness.

- Check the insulators, connectors and cable connections in the terminal box.
- Replace the damaged components if necessary.



WARNING

Short-circuit hazard

Damaged components can cause short circuits, possibly resulting in death, serious injuries and property damage.

Replace damaged components.

9.2 Corrective Maintenance



WARNING

Explosion hazard when carrying out repair work

Repairs are only permissible within the scope of the work described in these operating instructions. Otherwise an explosion can occur in an explosive atmosphere. This can result in death, serious injury or material damage.

For repairs to go beyond this scope, please contact the Service Center.

When carrying out any work on the machine, observe the general safety instructions (Page 15) and the specifications contained in EN 50110-1 regarding safe operation on electrical equipment.

Comply with the IEC / EN 60079-17 standard during all service and maintenance work on the machine.

Note

If the motor has to be transported, please observe the information and instructions in the "Transport" (Page 33) section.

9.2.1 Prepare servicing work

- The drawings and parts lists do not contain any detailed information about the type and dimensions of fixing elements and components. For this reason, you should establish this information when dismantling them and make a note of it for the purpose of reassembly.
- Document the type, dimensions and arrangement of the parts so that you will be able to reassemble the machine to its original state.

- Use suitable tools to disassemble the machine.
- Take measures to prevent parts from dropping down before you dismantle them, e.g. by replacing fastening elements with extra-long screws, threaded bolts or similar. This ensures that the part is supported after it is pulled off.
- The centerings in the shaft extensions have reset threads. Use lifting gear which is suitable for the rotor weight and direction of loading.

**WARNING****Rotor can fall down**

Eyebolts in accordance with DIN 580 are unsuitable for suspending the rotor. The rotor can fall off. This can result in death, serious injury or material damage.

Use lifting gear which is suitable for the rotor weight and direction of loading.

**WARNING****Machine damage caused by improper repair work**

Improper servicing work can damage the machine. This can cause damages and/or faults which can result in eventual or immediate death, serious injury, or property damage.

- Properly assemble or disassemble the machine.
- Use only suitable tools and equipment.
- Immediately replace damaged components.
- Contact the Service Center (Page 141), if necessary.

**WARNING****Rotor can fall out**

If the motor is in a vertical position, the rotor can fall out while work is being performed on the locating bearing. This can result in death, serious injury or damage.

- Support or unload the rotor when carrying out work with the machine in a vertical position.

9.2.2 Seal the motor

Extreme caution and attention to cleanliness are vital to installation.

- Clean all bare joints between parts such as housings, bearing shields and bearing bushes etc., and remove old sealant material.
- Smear bare joints between parts with non-hardening, permanently flexible sealant, such as "Hylomar M". Follow the manufacturer's application and safety instructions when doing this.
- Check all sealing elements, such as those on the terminal boxes, for elasticity, aging or damage, and renew them if they are no longer effective.

Replace the seals if necessary with original parts or with tested sealing elements. The seals must be fully bonded to the motor and the air intake housing. It is impermissible to have gaps and holes where seals make contact.

- Surfaces whose mating faces are sealed using liquid sealant can be resealed by applying the original liquid sealant (Hylomar M).
- Surfaces whose mating faces are sealed using sealings that adhere to one side only can be resealed with the original sealing using the original adhesives (Loctite).

If you are installing covers that are sealed with liquid gasket, proceed as follows to maintain the IP degree of protection of the machine before closing it again:

1. Use only approved liquid sealants.
2. Clean the sealing surfaces according to the technical data sheet of the liquid gasket. The sealing surfaces must be clean and dry before reassembly.
3. Apply the liquid gasket as a continuous bead with a diameter of approx. 3 mm.
4. Assemble the components after venting the solvent, if necessary while maintaining a restriction on the assembly time.
5. Retighten the fixing screws of the cover after a few minutes after the liquid gasket has set.

Note

Service Center

If you have any questions, contact the Service Center.

See also

Service and Support (Page 141)

9.2.3 Anti-condensation heating



WARNING

Explosion hazard when repairing the anti-condensation heating

If repairs to the anti-condensation heating are not carried out correctly, e.g. if unauthorized or untested spare parts are used, explosions can occur when the machine is operated in an explosive atmosphere. This can result in death, serious injury or material damage.

The anti-condensation heating must be repaired and the necessary routine testing that follows repair must always be undertaken by experts from the Service Center (Page 141), as this work requires extensive specialist knowledge. Only authorized and tested spare parts may be used.

9.2.4 Fan cowl

To remove or replace the external fan, the fan cowl must be disassembled. The fan cowl is fixed on the machine enclosure with screws.

Disassembly

1. Secure the fan cowl against falling before you start working.
2. Loosen the fixing screws that secure the fan cowl on the enclosure.
3. Observe existing retaining components and retain them for the reassembly.

Assembly

Proceed in the reverse order to assemble the fan cowl.

1. Position the fan cowl and tighten the fixing screws.
2. Ensure that the retaining components are undamaged and correctly installed.

9.2.5 External fan made of metal

External metal fans have a keyway connection and are prevented from axially shifting using a locking ring.

Disassembly

1. The external fan ① is fixed on the shaft with a locking ring ②. Remove the locking ring. Pliers according to DIN 5254 should preferably be used for this purpose.
2. Use a suitable device to pull off the external fan.
3. Avoid using a hammer.
4. Secure the parallel key from falling out or remove it.

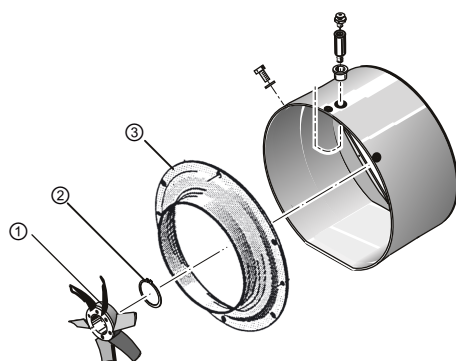


Figure 9-1 Ventilation (schematic diagram with axial fan)

Assembly

1. Remove the parallel key lock or insert it in the keyway.
2. Check the correct seating.
3. Then push the external fan ① onto the shaft up to its stop. Use a suitable device for this purpose.
4. Insert the retaining ring ② into the corresponding groove and check its fit.

Air inlet nozzle

Two-pole machines are equipped with an air inlet nozzle ③. The spacing between external fan and air inlet nozzle must measure ≥ 2 mm evenly over the circumference.



WARNING

Explosion hazard from grinding fan

If the fan impeller comes into contact with another component, it can cause sparking and an explosion. This can result in death, serious injury, or material damage.

- Remove any dirt.
- Regularly check and after any work check the spacing between fan and adjacent components, such as air inlet nozzle. Correct the alignment of the components, if necessary. The gap between the air inlet nozzle and the fan impeller should be at least 2 mm around the complete circumference.
- Please contact the Service Center, if you require any support when aligning the components.

9.2.6 External fan made of plastic

External fans made of plastic feature a cast-on driver similar to a parallel key. The external fan is secured using a retaining ring to prevent axial movement.

Disassembly

1. The external fan ① is fixed on the shaft with a retaining ring ②. Remove the retaining ring. Pliers according to DIN 5254 should preferably be used for this purpose.
2. Pull off the external fan by hand.

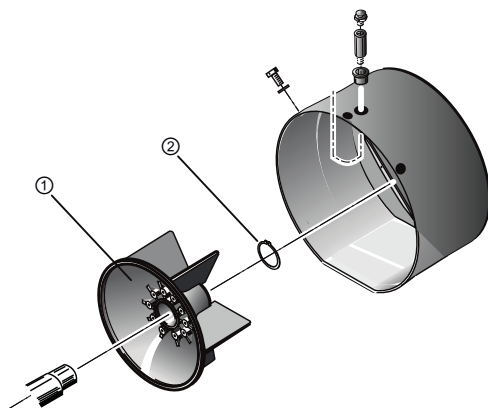


Figure 9-2 Ventilation (schematic diagram with radial fan)

Assembly

1. Push the external fan ① up to the end stop on the shaft extension.
2. Insert the retaining ring ② into the corresponding groove and check its fit.

9.2.7 Internal fan

The internal fan is located on the rotor inside the machine. If the internal fan is defective or must be replaced, please contact the Service Center (Page 141).

9.2.8 Roller-contact bearings

9.2.8.1 Uninstalling roller-contact bearings

Preparation

- Remove any grease feeders, shock pulse measurement equipment and possibly mounted instrumentation at the DE and NDE.
- Remove the coupling on the drive end or make the shaft extension freely accessible.
- At the NDE, proceed as follows:
 - First, uninstall the fan cowl or external fan cowl.
Fan cowl (Page 113)
External fan cowl
 - Remove the external fan.
External fan made of metal (Page 113)
External fan made of plastic (Page 114)

Note

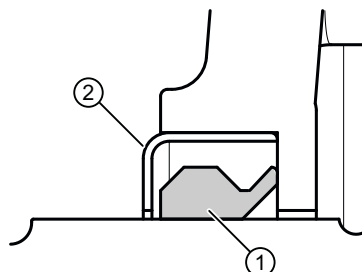
For a schematic diagram of the respective component layout, see the chapter "Spare parts (Page 123)".

Procedure

1. Remove the bearing mounting components.
 - Remove the outer bearing cover if one is being used.
Remove V ring (Page 117).
Removing the labyrinth sealing ring (Page 117).
 - Ensure that the inner bearing cover is no longer attached to the bearing housing or end shield.
 - Support the rotor for the removal of bearing housing or end shield.
 - If necessary, remove the bearing housing from the end shield.
 - Remove the end shield. Depending on the shaft height, roller bearing type and design, it is either a bearing head version or a bearing housing version.
 - Remove the locking ring from the shaft.
2. Pull off the roller bearing together with the grease slinger.

9.2.8.2 Remove V ring

Depending on the particular version, there is a V ring. It must be replaced if unusual amounts of grease escape from the roller bearing or the V ring is visibly damaged.



1. Mark the components so that they can be correctly assembled.
2. Remove the V ring ① with the bearing cap – or by using a suitable tool from the shaft.

Removing the protective ring for degree of protection IP56 (non-heavy-sea)

The V ring for the outer bearing seal is fitted with a protective ring ② for the degree of protection IP56 (non-heavy-sea). The protective ring does not have to be removed for disassembling the bearing bush.

Remove the protective ring together with the V ring and the outer bearing cover or end shield from the shaft.

See also

Install the V ring (Page 119)

9.2.8.3 Removing the labyrinth sealing ring

Note

For the "Increased degree of protection" option, the machine is equipped with a labyrinth sealing ring on the drive side and the non-drive side.

Before uninstalling the roller bearing, the labyrinth sealing ring must be removed.

The labyrinth sealing ring ③ is fixed with three grub screws that are separately secured with adhesive such as Loctite 243.

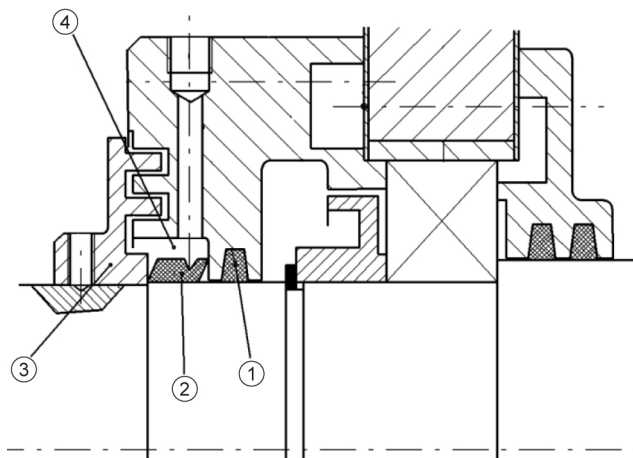


Figure 9-3 Disassembling the labyrinth sealing ring (schematic diagram)

1. Mark the components of the bearing units so that they can be assembled correctly.
2. Remove the protective coating from the shaft in front of the labyrinth sealing ring.
3. Unscrew the three radially arranged set screws for fixing the ring axially.
4. Screw suitable bolts or screws into the radial threads for pulling off. Note the length of engagement to avoid clamping to the shaft or damaging the thread.
5. Warm the labyrinth sealing ring as you pull it off.

See also

Installing the labyrinth sealing ring (Page 121)

9.2.8.4 Assembling the rolling-contact bearings

- Extreme caution and attention to cleanliness are vital to installation. Observe the correct assembly sequence of the components.
- Attach all components with the specified tightening torques (Page 143).

Note

For further information about mounting the roller bearing, please refer to the catalog or the information provided by the roller bearing manufacturer.

Procedure

1. Remove the required components and replace damaged components.
2. Remove any dirt from the components. Remove any grease and the remains of sealant or liquid threadlocker.

3. Prepare the bearing journals:
 - Lightly oil the inner ring seat.
 - Grease the outer ring seat with solid lubricant such as the anti-fretting paste Altemp Q NP 50.
4. Warm the roller bearing.
5. Push the inner ring of the warmed roller bearing onto the shaft. Avoid any blows that might damage the bearing.
6. Make sure that the roller bearing is resting against the shaft shoulder or the second bearing. Otherwise, axial vibrations may occur.
7. Fill the bearing to the top with the specified lubricating grease.
8. Warm the grease slinger and push it onto the shaft.
9. Locate the locking ring in the shaft groove or attach the bearing using the shaft nut.
10. Support the rotor for the installation of bearing housing or end shield.
11. Grease the bearing locations (bearing shield/bearing cartridge) with solid lubricant such as the anti-fretting paste Altemp Q NP 50.
12. Use a suitable sealant when assembling.
13. Install the bearing shield or bearing housing together with the bearing shield.
14. Install the outer bearing cover if one is being used.
15. Install the sealing elements:
 - V ring (Page 119)
 - Labyrinth sealing ring (special design) (Page 121)

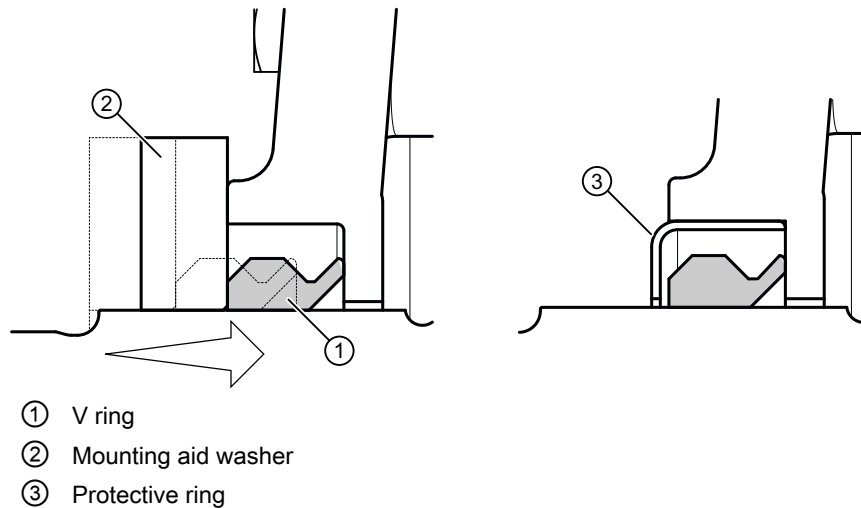
9.2.8.5 Install the V ring

Requirement

The roller bearing is already fitted. The V ring can now be installed for the bearing seal.

Install the V ring

1. Grease the axial sealing surface. The shaft seating remains ungreased.



2. Push the V ring ① onto the shaft using an assembly disk ②.
The V ring is in the correct axial position when the face surface is flush with the outer edge of the V ring.

Install the protective ring for degree of protection IP56 (non-heavy-sea)

For degree of protection IP56 (non-heavy-sea), the V ring for the outer bearing seal is fitted with a protective ring ③ in the bearing cover made of sheet metal.

1. Push the protective ring onto the shaft.
2. Verify that the ring is sufficiently pretensioned. Replace the protective ring, if necessary.
3. Position the protective ring so that one of the longitudinal grooves meets the corresponding water separation groove at the bottom in the bearing cover flange or end shield.

9.2.8.6 Installing the V ring ("Increased degree of protection" option)

The grease chamber of the labyrinth sealing ring together with the V ring ensures compliance with degree of protection IP65.

When installing the V ring, proceed in the same way as when installing the labyrinth ring.

-
- ① Felt ring
- ② V ring
- ③ Labyrinth sealing ring
- ④ Grease chamber

3. Warm up the labyrinth sealing ring. Push the labyrinth sealing ring to approx. 3 mm before the bearing cover before the paint or adhesive cures on the set screws.

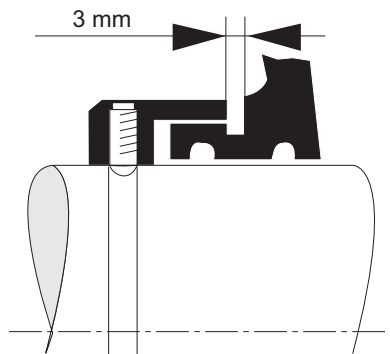


Figure 9-5 Position the set screws for the labyrinth sealing ring on the outer bearing cover

4. Locate the labyrinth sealing ring in position by screwing the set screws in. Check that the tips of the set screws engage with the keyway with a short axial movement. The correct axial position is obtained when the locating setscrews screwed into the keyway engage.

Spare parts

10.1 Ordering data

In addition to the exact part designation, please specify the machine type and serial number in all orders for spare parts. Ensure that the spare part designation matches that on the spare parts list and make sure you use the appropriate part number as well.


Example

- Bearing shield, drive end (Part 5.00)
- Machine type
- Serial number

The machine type and serial number can be found on the rating plate. The serial number is also stamped on the end face of the shaft extension at the drive end.

Note

The graphical representations in this chapter show schematic diagrams of the basic versions. They are used for spare parts definitions. The supplied version may differ in details from these representations.

 WARNING
<p>Risk of explosion</p> <p>If you use parts other than the original spare parts, the type of protection can no longer be guaranteed. This can result in an explosion during operation in a potentially explosive gaseous atmosphere. This can result in death, serious injury or material damage.</p> <ul style="list-style-type: none"> • Use only original spare parts for explosion-proof machines; this also applies to components such as seals, terminals, cables and cable entries. Should you have any questions, please contact the Service Center (Page 141). • Commercially available equivalent standard parts such as screws may be used.

Rolling-contact bearings

When ordering roller bearings, in addition to the bearing identification code, the supplementary specifying code is also necessary for the bearing version. Both of these codes are stamped on the lubricant plate and specified in the motor documentation, or can also be taken from the installed bearings.

If roller-contact bearings with an insulated design are installed, use roller bearings of the same type as spare parts. This will prevent any bearing damage being caused by bearing currents.

10.2 Anti-condensation heating



WARNING

Risk of explosion

If repairs to the anti-condensation heating are not carried out correctly, e.g. if unauthorized or untested spare parts are used, this can result in explosions during operation in a potentially explosive gaseous atmosphere. This can result in death, serious injury or material damage.

Repairing and mounting the anti-condensation heating and the subsequent routine testing must always be undertaken by experts from the Service Center, because this work requires extensive specialist knowledge. Only authorized and tested spare parts may be used.

10.3 Stator and rotor

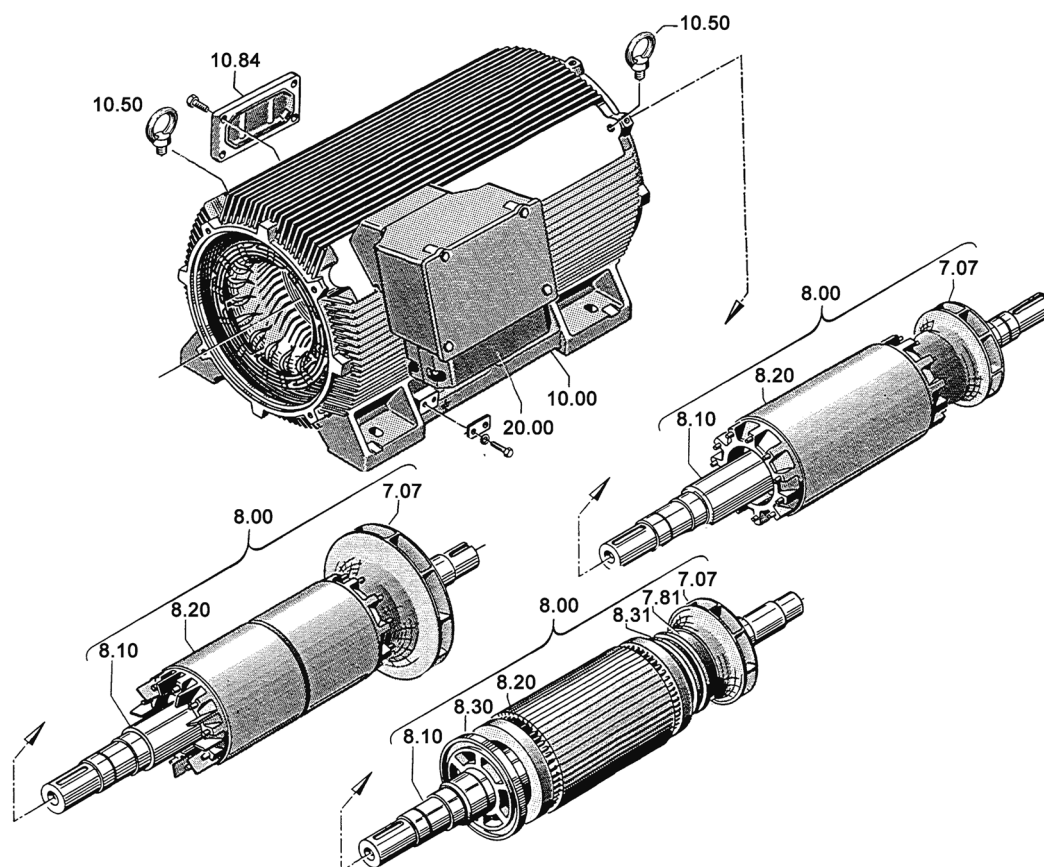
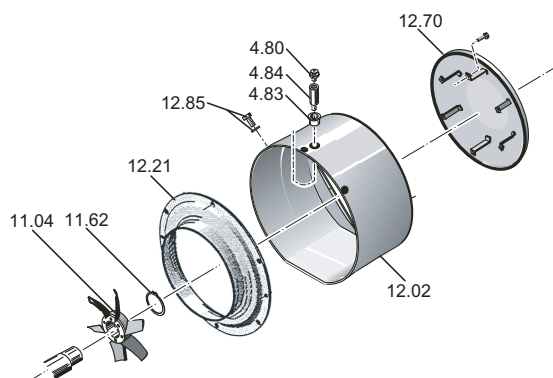


Figure 10-1 Stator and rotor

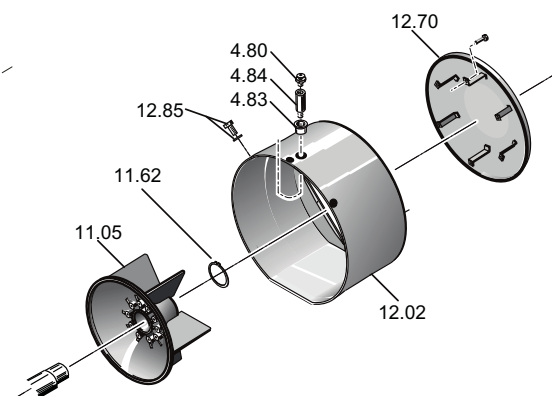
Table 10-1 Spare parts for stators and rotors

Part	Description	Part	Description
7.07	Internal fan	8.31	Non-drive end balancing ring
7.81	Air guide insert	10.00	Stator frame with laminated core and winding
8.00	Rotor, complete	10.50	Lifting lug
8.10	Shaft	10.84	Cover with seal
8.20	Rotor core with winding	20.00	Terminal box
8.30	Drive-end balancing ring		

10.4 Ventilation



Version for two-pole motors



Version for motors with four or more poles

Table 10-2 Spare parts for cooling components

Part	Description	Part	Description
4.80	Grease nipple	12.02	Fan cowl
4.83	Rubber bush	12.21	Air inlet nozzle
4.84	Grease supply extension tube	12.35	Protective grille
11.04	External fan, unidirectional	12.70	Protective cover, optional for design IM V1
11.05	External fan, bidirectional	12.85	Fixing elements
11.62	Locking ring		

10.5 Drive end rolling-contact bearings with bearing housing

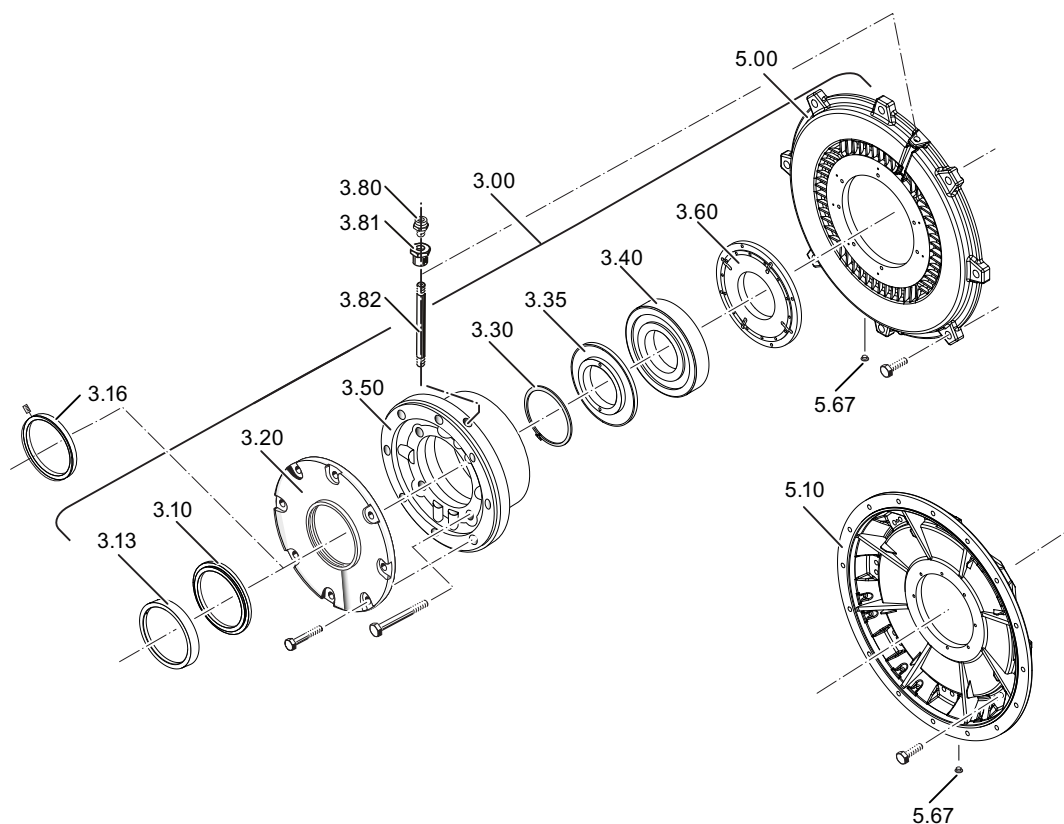


Figure 10-2 Drive end roller bearings with bearing housing

Table 10-3 Spare parts for drive end roller bearings with bearing housing

Part	Description	Part	Description
3.00	Roller bearing cartridge (locating bearing)	3.50	Bearing housing
3.10	V ring	3.60	Inner bearing cover
3.13	Protective ring	3.80	Grease nipple
3.16	Labyrinth ring (optional)	3.81	Nut
3.20	Outer bearing cover	3.82	Grease tube
3.30	Locking ring	5.00	End shield, design B3
3.35	Grease slinger	5.10	Flanged end shield
3.40	Deep-groove ball bearing (locating bearing)	5.67	Sealing plug

10.6 Drive end rolling-contact bearings without bearing housing

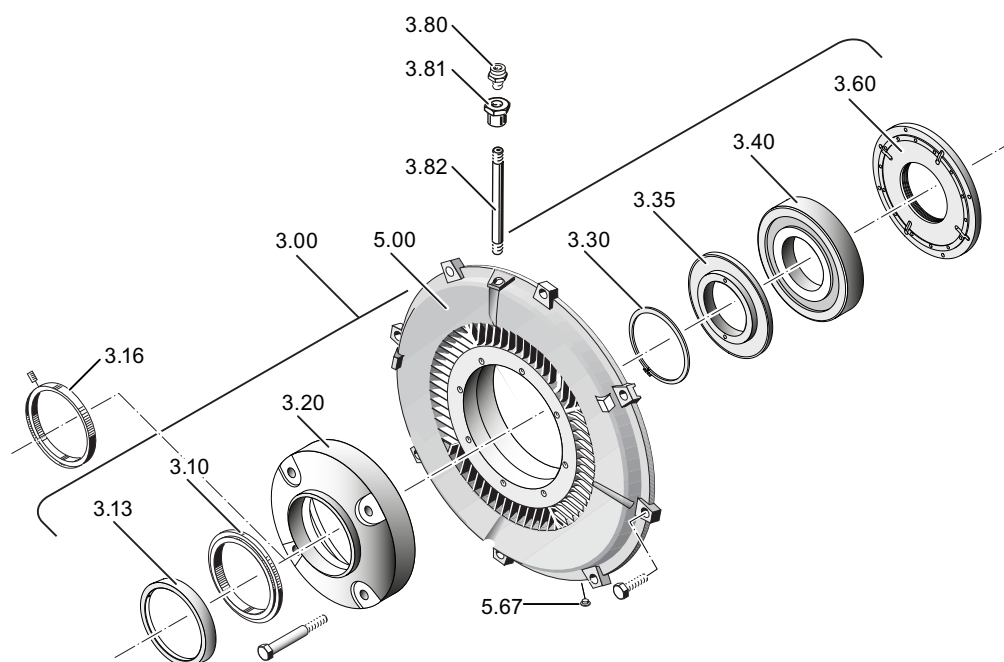


Figure 10-3 Drive end roller bearings without bearing housing

Table 10-4 Spare parts for drive end roller bearings without bearing housing

Part	Description	Part	Description
3.00	Roller bearing cartridge (locating bearing)	3.50	Bearing housing
3.10	V ring	3.60	Inner bearing cover
3.13	Protective ring	3.80	Grease nipple
3.16	Labyrinth ring (optional)	3.81	Nut
3.20	Outer bearing cover	3.82	Grease tube
3.30	Locking ring	5.00	End shield
3.35	Grease slinger	5.67	Sealing plug
3.40	Deep-groove ball bearing (locating bearing)		

10.7 Roller bearings, DE - end shield with integrated bearing cover

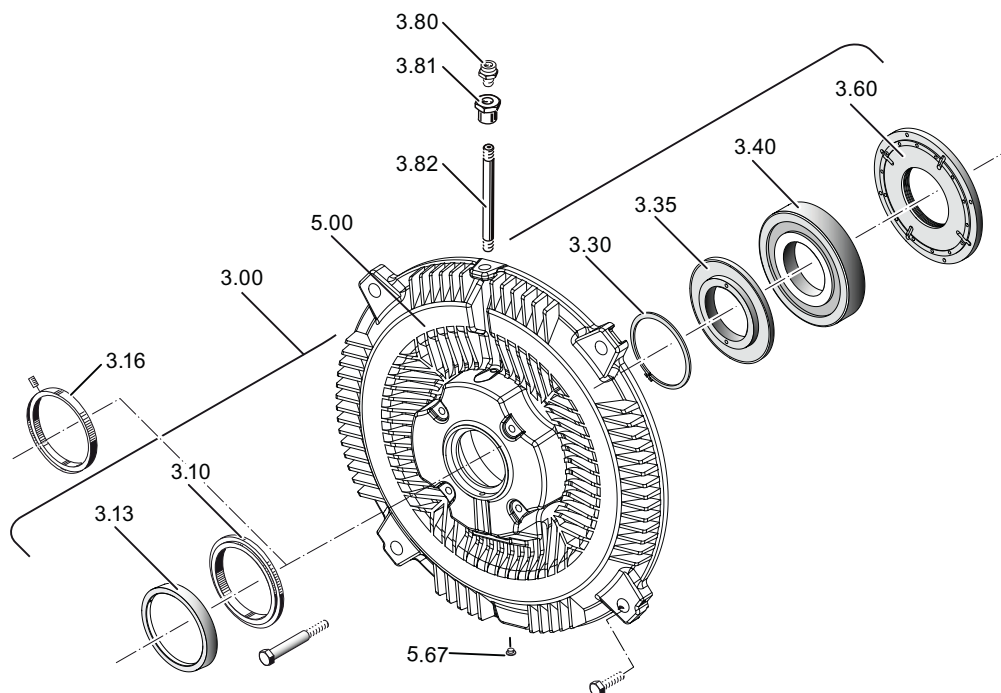


Figure 10-4 Roller bearings, DE - end shield with integrated bearing cover

Table 10-5 Spare parts for roller bearings, DE

Part	Description	Part	Description
3.00	Roller bearing cartridge (locating bearing)	3.50	Bearing housing
3.10	V ring	3.60	Inner bearing cover
3.13	Protective ring	3.80	Grease nipple
3.16	Labyrinth ring (optional)	3.81	Nut
3.30	Locking ring	3.82	Grease tube
3.35	Grease slinger	5.00	End shield
3.40	Deep-groove ball bearing (locating bearing)	5.67	Sealing plug

10.8 Non-drive end rolling-contact bearings with bearing housing

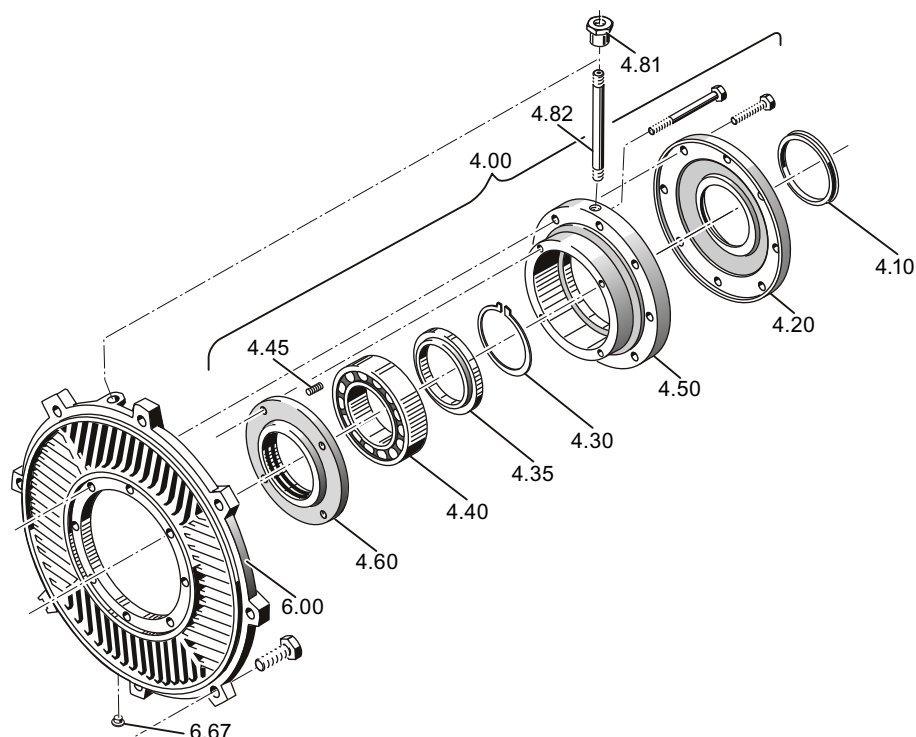


Figure 10-5 Non-drive end roller bearings with bearing housing

Table 10-6 Spare parts for non-drive end roller bearings with bearing housing

Part	Description	Part	Description
4.00	Roller bearing cartridge (floating bearing)	4.50	Bearing housing
4.10	V ring	4.60	Inner bearing cover
4.20	Outer bearing cover	4.81	Nut
4.30	Locking ring	4.82	Grease tube
4.35	Grease slinger	6.00	End shield
4.40	Deep-groove ball bearing	6.67	Sealing plug
4.45	Compression spring		

10.9 Non-drive end rolling-contact bearings without bearing housing

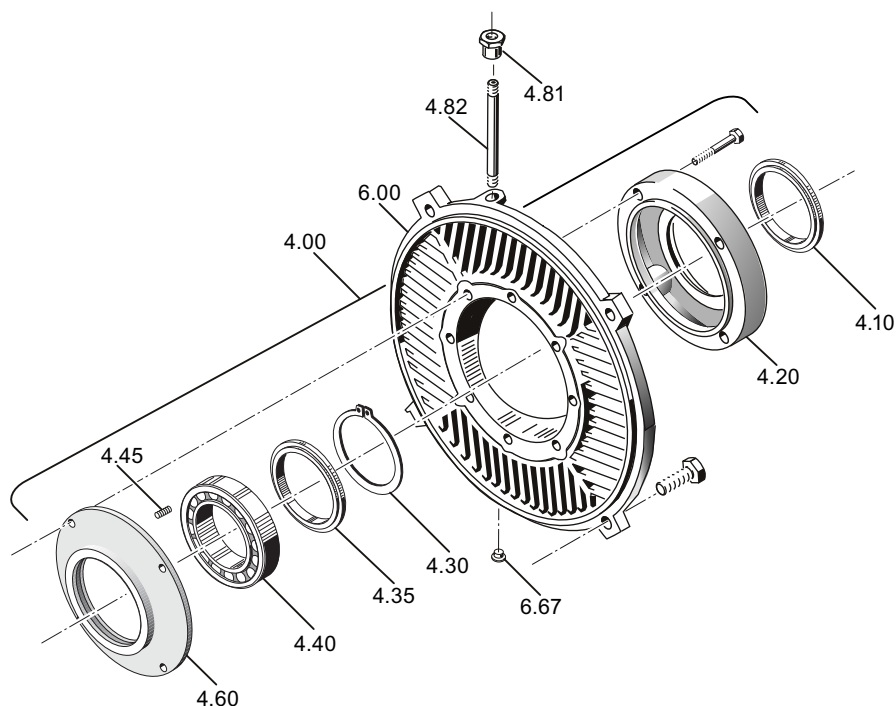


Figure 10-6 Non-drive end roller bearings without bearing housing

Table 10-7 Spare parts for non-drive end roller bearings without bearing housing

Part	Description	Part	Description
4.00	Roller bearing cartridge (floating bearing)	4.45	Compression spring
4.10	V ring	4.60	Inner bearing cover
4.20	Outer bearing cover	4.81	Nut
4.30	Locking ring	4.82	Grease tube
4.35	Grease slinger	6.00	End shield
4.40	Deep-groove ball bearing	6.67	Sealing plug

10.10 Roller bearings, NDE - end shield with integrated bearing cover

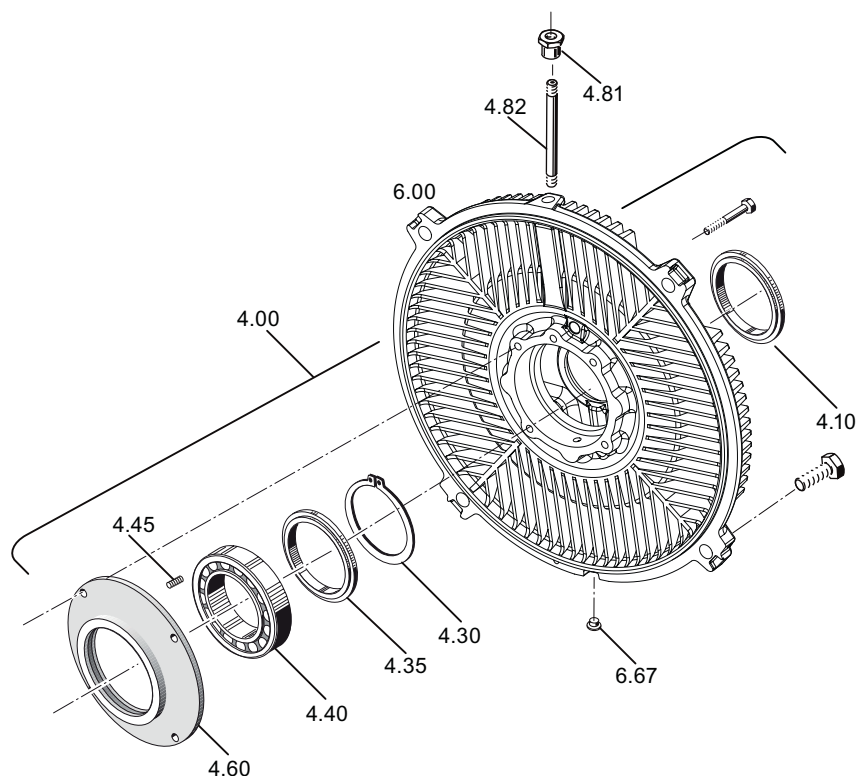


Figure 10-7 Roller bearings, NDE - end shield with integrated bearing cover

Table 10-8 Spare parts for roller bearings, NDE

Part	Description	Part	Description
4.00	Roller bearing cartridge (floating bearing)	4.60	Inner bearing cover
4.10	V ring	4.81	Nut
4.30	Locking ring	4.82	Grease tube
4.35	Grease slinger	6.00	End shield
4.40	Deep-groove ball bearing	6.67	Sealing plug
4.45	Compression spring		

10.11 Terminal box 1XB1621

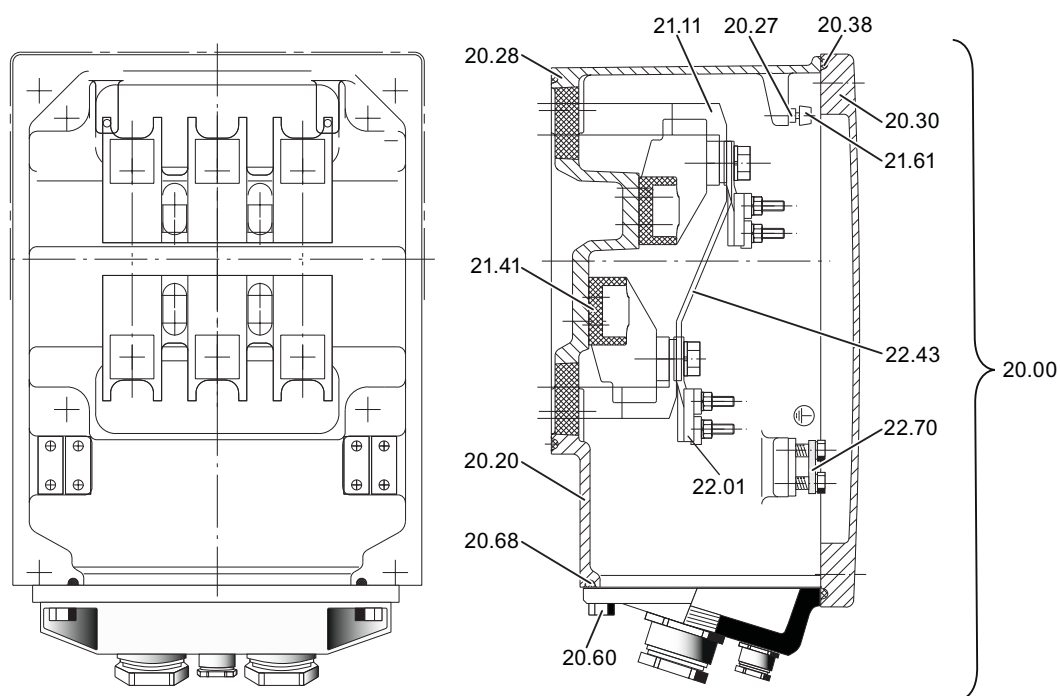


Figure 10-8 Terminal box 1XB1621 with standard cable entry

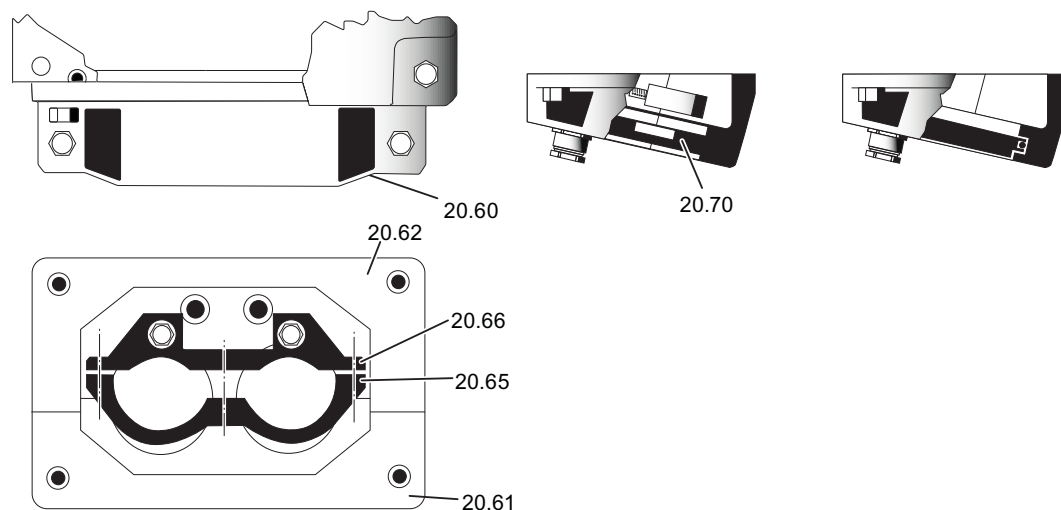


Figure 10-9 Two-part cable entry

Table 10-9 Terminal box 1XB1621 spare parts

Part	Description	Part	Description
20.00 Terminal box without cable entry comprising the following components:			
20.20	Terminal box housing	21.41	Terminal supports
20.27	Mounting rail	21.61	Terminal strip for auxiliary circuit

Spare parts

10.11 Terminal box 1XB1621

Part	Description	Part	Description
20.28	Seal	22.01	Saddle terminal, complete
20.30	Cover	22.43	Terminal link, stepped with two holes
20.38	Seal	20.70	Fixing lug for PE conductor
21.11	Connecting plate with internal cable		

Table 10-10 Additional spare parts

Part	Description	Part	Description
20.60	Cable gland	20.66	Strain relief - lower part
20.61	Cable gland - upper part	20.68	Seal
20.62	Cable gland - lower part	20.70	Sealing insert for cable entry
20.65	Strain relief - upper part		

10.12 Terminal box 1XB1631

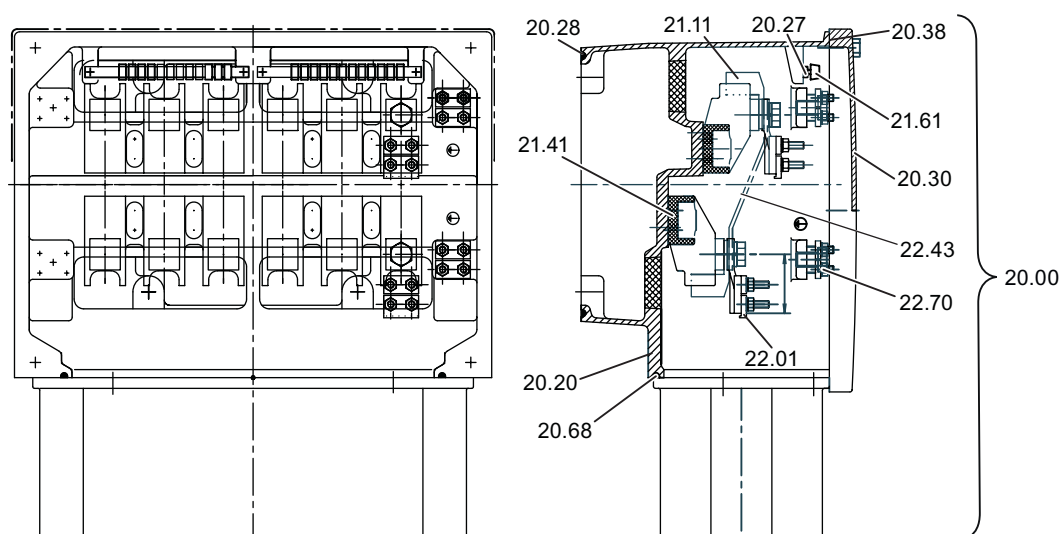


Figure 10-10 Terminal box 1XB1631 with standard cable entry

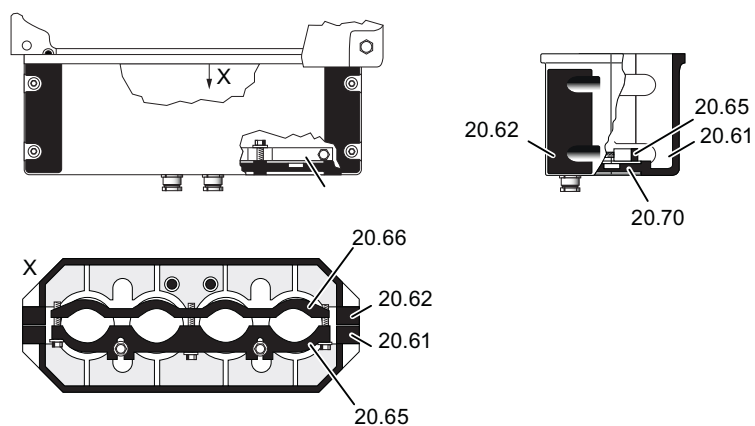


Figure 10-11 Two-part cable entry

Table 10-11 Spare parts for terminal box 1XB1631

Part	Description	Part	Description
20.00 terminal box without cable entry comprising the following components:			
20.20	Terminal box housing	21.41	Terminal supports
20.27	Mounting rail	21.61	Terminal strip for auxiliary circuit
20.28	Seal	22.01	Saddle terminal, complete
20.30	Cover	22.05	Terminal body
20.38	Seal	22.43	Terminal link, stepped with two holes
21.11	Connecting plate with internal cable	22.70	Fixing lug for PE conductor

You can order the terminal box just as one component.

Spare parts

10.12 Terminal box 1XB1631

Table 10-12 Additional spare parts

Part	Description	Part	Description
20.61	Cable gland - upper part	20.66	Strain relief - lower part
20.62	Cable gland - lower part	20.70	Sealing insert for cable entry
20.65	Strain relief - upper part		

10.13 Terminal box 1XB1634

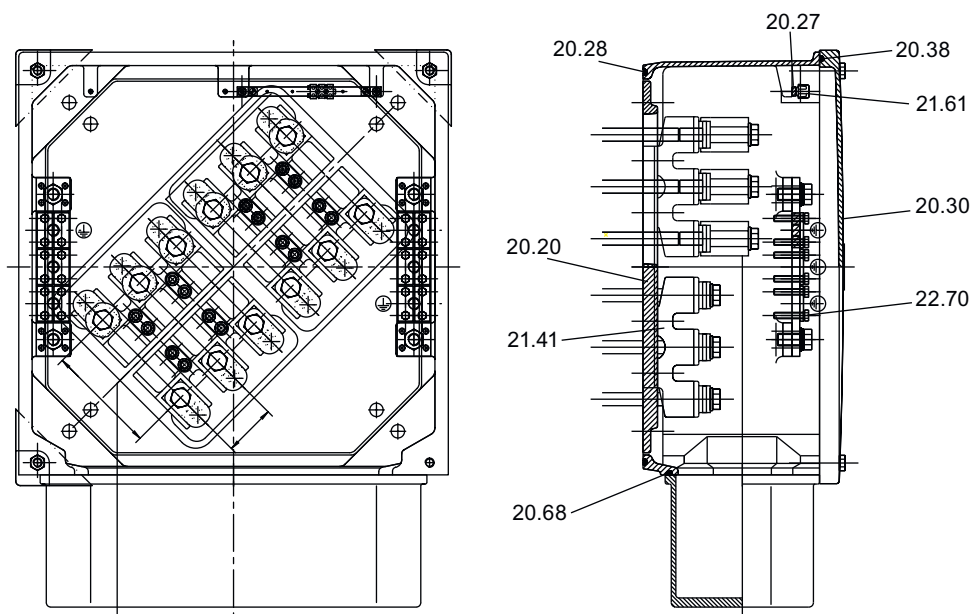


Figure 10-12 Terminal box 1XB1634 with standard cable entry

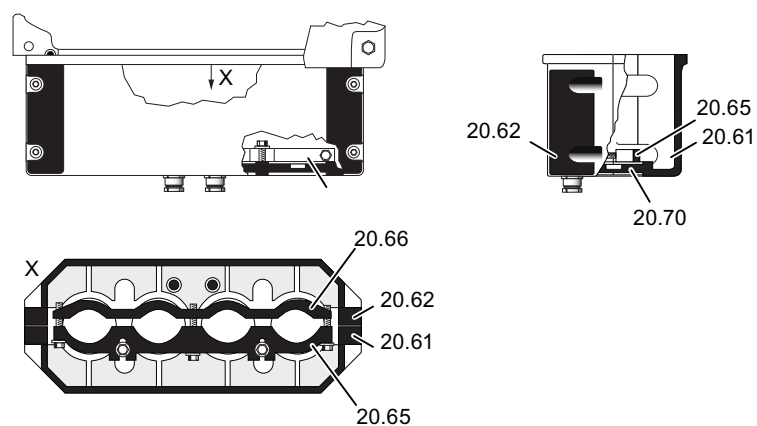


Figure 10-13 Two-pane cable entry

Table 10-13 Spare parts for terminal box 1XB1634

Part	Description	Part	Description
20.20	Terminal box enclosure	20.65	Strain relief (upper part)
20.27	Mounting rail	20.66	Strain relief (lower part)
20.28	Seal	20.68	Seal
20.30	Cover	20.70	Sealing insert for cable entry
20.38	Seal	21.41	Terminal supports
20.60	Cable gland	21.61	Terminal strip for auxiliary circuit

Spare parts

10.13 Terminal box 1XB1634

Part	Description	Part	Description
20.61	Cable gland (upper part)	22.70	Fixing lug for PE conductor
20.62	Cable gland (lower part)		

Disposal

11.1 Introduction

Protecting the environment and preserving its resources are corporate goals of the highest priority for us. Our worldwide environmental management system to ISO 14001 ensures compliance with legislation and sets high standards in this regard. Environmentally friendly design, technical safety and health protection are always firm goals even at the product development stage.

Recommendations for the environmentally friendly disposal of the machine and its components are given in the following section. Be sure to comply with local disposal regulations.

11.2 National statutory regulations

Note

Observe national statutory regulations

When disposing of the machine or of waste that is created during the individual phases of the life cycle, please observe the statutory requirements that apply in the country of use.

11.3 Dismantling the machine

Dismantle the machine using the general procedures commonly used in mechanical engineering.



WARNING

Machine parts can fall

The machine is made up of heavy parts. These parts are liable to fall during dismantling. This can result in death, serious injury or material damage.

Before you release any machine parts, secure them so that they cannot fall.

11.4 Disposal of components

Components

The machines consist mainly of steel and various proportions of copper and aluminum. Metals are generally considered to be unlimitedly recyclable.

11.4 Disposal of components

Sort the components for recycling according to whether they are:

- Iron and steel
- Aluminum
- Non-ferrous metal, e.g. windings
The winding insulation is incinerated during copper recycling.
- Insulating materials
- Cables and wires
- Electronic waste

Process materials and chemicals

Sort the process materials and chemicals for recycling according to whether they are for example:

- Oil
- Grease
- Cleaning substances and solvents
- Paint residues
- Anti-corrosion agent
- Coolant additives such as inhibitors, antifreeze or biocides

Dispose of the separated components according to local regulations or via a specialist disposal company. The same applies for cloths and cleaning substances which have been used while working on the machine.

Packaging material

- If necessary, contact a suitable specialist disposal company.
- Wooden packaging for sea transport consists of impregnated wood. Observe the local regulations.
- The foil used for water-proof packaging is an aluminum composite foil. It can be recycled thermally. Dirty foil must be disposed of via waste incineration.

Service and Support

A.1 Siemens Industry Online Support

Details regarding the design of this electrical machine and the permissible operating conditions are described in these instructions.

On-site service and spare parts

If you wish to request local service or order spare parts, please contact your local Siemens sales office. This office will contact the responsible service center on your behalf.

Technical queries or additional information

If you have any technical queries or you require additional information, please contact the Siemens Service Center.

Please have the following machine data ready:

- Machine type
- Machine number

You can find this data on the rating plate of the machine.

Contact at Central Technical Support for our customers in Germany



+49 911 895 7222



+49 911 895 7223



support.automation@siemens.com (<mailto:support.automation@siemens.com>)

Outside Germany, you can find your contact partners here:

<http://support.automation.siemens.com/WW/view/de/16604999> (<http://support.automation.siemens.com/WW/view/en/16604999>)

You can also call the following numbers directly during local working hours to reach a contact partner who speaks the corresponding national language.

Americas



+1 423 262 5710



+1 423 262 2231



support.america.automation@siemens.com
(<mailto:support.america.automation@siemens.com>)

Asia/Pacific



+86 10 6475 7575



+86 10 6474 7474



support.asia.automation@siemens.com
(<mailto:support.asia.automation@siemens.com>)

See also

<http://www.siemens.com/automation/support-request> (<http://www.siemens.de/automation/support-request>)

A.2 Reduction of hazardous substances

"Reduction of hazardous substances"

Based on the latest technology, we are replacing environmentally hazardous materials with non-hazardous materials. In doing so, safety in operation and handling will take priority at all times.

Technical data

B.1 Tightening torques for screw and bolt connections

Bolt locking devices

- Refit nuts or bolts that are mounted together with locking, resilient, and/or force-distributing elements with identical, fully-functional elements when re-assembling. Always renew keyed elements.
- When screwing together threads secured with a liquid adhesive, use a suitable medium such as Loctite 243.
- Always use suitable securing devices or removable adhesives (e.g., Loctite 243) when installing fixing bolts with a clamping length of less than 25 mm. The clamping length is taken as the distance between the head of the bolt and the point at which the bolt is screwed in.

Tightening torques

The bolted connections with metal contact surfaces, such as end shields, bearing cartridge parts, terminal box parts bolted onto the stator frame, should be tightened to the following torques, depending on the thread size:

Table B-1 Tightening torques for bolted connections with a tolerance of $\pm 10\%$.

Case	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	
A	1.2	2.5	4	8	13	20	40	52	80	150	-	-	-	-	Nm
B	1.3	2.6	4.5	11	22	38	92	180	310	620	1080	1700	2600	4200	Nm
C	3	5	8	20	40	70	170	340	600	1200	2000	3100	4700	7500	Nm

Applications

The above-mentioned tightening torques apply for the following applications:

B.1 Tightening torques for screw and bolt connections

- **Case A**
Applies to electrical connections in which the permissible torque is normally limited by the bolt materials and/or the current carrying capacity of the insulators, with the exception of the busbar connections in case B.
- **Case B**
Applies to bolts screwed into components made from materials with lower property class (e. g. aluminum) and to bolts with property class 8.8 according to ISO 898-1.
- **Case C**
Applies to bolts with property class 8.8 or A4-70 according to ISO 898-1, however only to bolts screwed into components made from materials with higher property class, e.g. cast iron, steel or cast steel.

Note

Non-standard tightening torques

Different tightening torques for electrical connections and bolted connections for parts with flat seals or insulating parts are specified in the relevant sections and drawings.

See also

Rotor shipping brace (Page 34)

Quality documents

C.1 EC Declaration of Conformity 2006/95/EC

SIEMENS

EG-Konformitätserklärung / EC declaration of Conformity

(nach der EG-Richtlinie 2006/95/EG, NSR) (in accordance with the EC Directive 2006/95/EC)

No. A5E33632169A

Hersteller/Manufacturer: Siemens Aktiengesellschaft
Sector Industry Drive Technologies Large Drives DT LD
Anschrift/Address: Postfach 4743 Vogelweiherstr. 1-15
D-90025 Nürnberg D-90441 Nürnberg

Produktbezeichnung/Product designation: Drehstrom-Asynchronmotoren mit Käfigläufer /
Three-phase induction motor with squirrel cage motor
Typ / Type : 1LA8, 1PQ8, 1PP8, 1LP8
Achshöhen / Shaft heights: 315 ... 450 mm

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:
2006/95/EG Richtlinie des Europäischen Parlaments und des Rates vom 12. Dezember 2006 zur
Angleichung der Rechtsvorschriften der Mitgliedsstaaten betreffend elektrische
Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen

The product is in accordance with the specifications of the following European directives.
2006/95/EC Directive of the European Parliament and of the Council of 12 December 2006 on the
harmonisation of the laws of Member States relating to electrical equipment designed for
use within certain voltage limits

Wir bestätigen die Konformität des oben genannten Produktes mit den Normen:

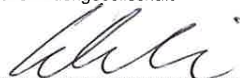
We confirm conformity of the product indicated above with the standards:

Referenznummer / Reference number	Ausgabedatum / Output date	Referenznummer	Ausgabedatum
EN 60034-1	2010	EN 60034-5	2001
EN 60034-6	1993	EN 60034-9	2005
EN 60204-1	2006		

Anbringung der CE-Kennzeichnung / affixing of the CE-marking: 1996

Nürnberg, den 19.02.2014

Siemens Aktiengesellschaft

i.V. 
Werbinek, Thomas Unterschrift/Signature
Leiter Forschung & Entwicklung R&D2
Head Research & Development R&D2

i.V. 
Dr. Kullig, Michael Unterschrift/Signature
Produktsicherheitsbeauftragter
Product safety representative

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder
Haltbarkeitsgarantie nach §443 BGB.

This declaration confirms conformity with the guidelines mentioned. However, this is neither a quality nor a durability warranty.

Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
Please take notice of the safety notes supplied with the product documentation.

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender; Roland Busch, Brigitte Ederer, Klaus
Helmrich, Barbara Kux, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen, Michael Süß; Sitz der Gesellschaft: Berlin und München, Deutschland;
Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684; WEEE-Reg.-Nr. DE 23691322

SIEMENS

Englisch

EC declaration of Conformity (In accordance with the EC Directive 2006/95/EC)

Manufacturer: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

The product is in accordance with the specifications of the following European directives.

2006/95/EC Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

We confirm conformity of the product indicated above with the standards: see page 1

Affixing of the CE-marking: 1996

This declaration confirms conformity with the guidelines mentioned. However, this is neither a quality nor a durability warranty.

Please take notice of the safety notes supplied with the product documentation.

Französisch

Déclaration CE de conformité (selon la directive 2006/95/CE)

Constructeur: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Le produit sus-mentionné est conforme aux prescriptions des directives européennes suivantes :

2006/95/CE Directive du Parlement européen et du Conseil du 12 décembre 2006 concernant le rapprochement des législations des États membres relatives au matériel électrique destiné à être employé dans certaines limites de tension.

Nous certifions la conformité du produit mentionné ci-dessus avec les normes: page 1

Apposition du marquage « CE »: 1996

Ce certificat atteste la conformité aux directives mentionnées, mais ne tient pas lieu de garantie de qualité ni de longévité.

Respecter les consignes de sécurité figurant dans la documentation produit fournie.

Spanisch

Declaración de conformidad CE (según la Directiva 2006/95/CE)

Fabricante: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

El producto arriba mencionado cumple con lo especificado en las Directivas Europeas siguientes:

2006/95/CE Directiva del Parlamento Europeo y del Consejo, de 12 de diciembre de 2006, relativa a la aproximación de las legislaciones de los Estados sobre el material eléctrico destinado a utilizarse con determinados límites de tensión.

Confirmamos que el producto especificado cumple las siguientes normas: véase página 1

Colocación de la marca "CE": 1996

Esta declaración certifica el cumplimiento de las directivas mencionadas pero no garantiza las características ni la durabilidad. Deben observarse las consignas de seguridad de la documentación de producto suministrada.

SIEMENS

Italianisch

Dichiarazione di conformità CE (secondo la Direttiva CE 2006/95/CE)

Costruttore: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Il prodotto indicato soddisfa le norme delle seguenti Direttive Europee.

2006/95/CE Direttiva del Parlamento Europeo e del Consiglio del 12 dicembre 2006 concernente il ravvicinamento delle legislazioni degli Stati membri relative al materiale elettrico destinato ad essere adoperato entro taluni limiti di tensione

Si certifica la conformità del prodotto denominato alle norme seguenti: vedi pagina 1

Apposizione del marchio CE : 1996

Questa dichiarazione certifica la conformità con le direttive citate, non costituisce però alcuna garanzia di caratteristiche di prodotto oppure di durata.

Le avvertenze di sicurezza riportate nella documentazione di prodotto allegata devono essere rispettate.

Schwedisch:

EG-konformitetsförklaring (enligt EG-direktiv 2006/95/EG)

Tillverkare: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Den märkta produkten överensstämmer med föreskrifterna i följande europeiska direktiv:

2006/95/EG Europaparlamentets och rådets direktiv av den 26 December 2006 om harmonisering av medlemsstaternas lagstiftning om elektrisk utrustning avsedd för användning inom vissa spänningsgränser.

Vi bekräftar ovan angivna produkts överensstämmelse med standarderna: 1

Placering av CE-märkning: 1996

Denna förklaring garanterar överensstämmelse med nämnda standarder, men gäller inte som garanti av något slag.

Beakta säkerhetsanvisningarna i den medföljande produktdokumentationen.

Finnisch:

EY-vaatimuksenmukaisuustodistus (EY-direktiivin 2006/95/EY mukaan)

Valmistaja: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Mainittu tuote on seuraavien Euro-direktiivien määräysten mukainen:

2006/95/EY Euroopan parlamentin ja neuvoston direktiivi 2006/95/EY, annettu 12 päivänä joulukuuta 2006, tietyllä jännitealueella toimivia sähkölaitteita koskevan jäsenvaltioiden lainsäädännön lähentämisestä.

Todistamme, että edellä mainittu tuote on seuraavien standardien mukainen: ks. sivu 1

CE-merkin kiinnittäminen: 1996

Tämä selostus todistaa, että tuote vastaa mainittuja direktiivejä, mutta se ei ole ominaisuus- tai kestävyystakuu.

Tuotteen mukana toimitettavan dokumentaation turvallisuusohjeita on noudatettava.

SIEMENS

Dänisch:

EF-overensstemmelsesattest (i henhold til EF-direktiv 2006/95/EF)

Producent: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Det angivne produkt opfylder forskrifterne fra følgende europæiske direktiver:

2006/95/EF: Direktiv fra det Europæiske Parlament og Rådet af 12. december 2006 til tilpasning af medlemslandenes retsforordninger vedrørende elektriske driftsmidler til anvendelse indenfor bestemte spændingsgrænser.

Vi bekræfter det ovennævnte produkts overensstemmelse med standarderne: 1

Anbringelse af CE-tegnet: 1996

Denne erklæring gælder som dokumentation for overensstemmelse med de nævnte direktiver men er dog ingen beskaffenheds- eller holdbarhedsgaranti.

Sikkerhedshenvisningerne i den medleverede produktinformation skal overholdes.

Nederlandisch:

EG-conformiteitsverklaring (volgens de EG-richtlijn 2006/95/EG)

Fabrikant: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Het omschreven produkt stemt overeen met de voorschriften van de volgende Europese richtlijnen:

2006/95/EG Richtlijn van het Europees Parlement en de Raad van 12 december 2006 betreffende de onderlinge aanpassing van de wettelijke voorschriften der lidstaten inzake elektrisch materiaal bestemd voor het gebruik binnen bepaalde spanningsgrenzen.

Wij bevestigen de conformiteit van bovengenoemd produkt met de normen: zie pagina 1

Aanbrengen van CE-keurmerk: 1996

Deze verklaring bevestigt de conformiteit met de genoemde richtlijnen, maar geeft geen garantie betreffende de gesteldheid of de houdbaarheid.

De veiligheidsaanwijzingen in de meegeleverde productdocumentatie dienen te worden nageleefd.

Portugiesisch:

Declaração de conformidade CE (segundo a Diretiva 2006/95/CE)

Fabricante: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

O produto especificado está em conformidade com o disposto nas seguintes Directivas Europeias:

2006/95/CE Diretiva do Parlamento Europeu e do Conselho, de 12 de Dezembro de 2006, relativa à harmonização das legislações dos Estados-Membros no domínio do material eléctrico destinado a ser utilizado dentro de certos limites de tensão

Certificamos a conformidade do produto supracitado com as seguintes normas: ver pág. 1

Aposição da classificação CE: 1996

A presente declaração atesta a conformidade com as directivas mencionadas, no entanto, não constitui uma garantia de qualidade ou durabilidade.

Respeitar as indicações de segurança da documentação do produto juntamente fornecida.

SIEMENS

Griechisch

Δήλωση συμμόρφωσης ΕΚ (σύμφωνα με την Οδηγία της ΕΚ 2006/95/ΕΚ)

Κατασκευαστής: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Το περιγραφόμενο προϊόν συμφωνεί με τις διατάξεις των ακόλουθων Ευρωπαϊκών Οδηγιών:
2006/95/ΕΚ Οδηγία του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της 12ης Δεκεμβρίου 2006 για την
εναρμόνιση των νομικών διατάξεων των κρατών μελών αναφορικά με ηλεκτρικά μέσα λειτουργίας
για χρήση εντός καθορισμένων ορίων τάσης.

Με το παρόν πιστοποιούμε τη συμμόρφωση του άνω αναφερόμενου προϊόντος με τα πρότυπα: 1

Τοποθέτηση της σήμανσης CE: 1996

Αυτή η δήλωση πιστοποιεί την συμμόρφωση με τις αναφερόμενες Οδηγίες, ωστόσο δεν αποτελεί εγγύηση καλής
κατάστασης ή διάρκειας ζωής.

Πρέπει να τηρούνται οι υποδείξεις ασφαλείας της συνοδευτικής τεκμηρίωσης προϊόντος.

Polnisch:

Deklaracja zgodności (wg dyrektywy WE 2006/95/WE)

Producent: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Produkt odpowiada wymaganiom następujących dyrektyw Unii Europejskiej:
2006/95/WE Dyrektywa Parlamentu Europejskiego i Rady z dnia 12 grudnia 2006 r. w sprawie
harmonizacji ustawodawstw państw członkowskich odnoszących się do sprzętu
elektrycznego przewidzianego do stosowania w określonych granicach napięcia

Producent deklaruje niniejszym, że opisany produkt jest zgodny z następującymi standardami: patrz
strona 1

Używanie znaku CE: 1996

Niniejsza deklaracja zaświadcza zgodność z wymienionymi dyrektywami, jednak nie stanowi gwarancji o właściwościach
lub trwałości produktu.

Należy zapoznać się ze wskazówkami bezpieczeństwa zawartych w dołączonej dokumentacji produktu.

Litauisch:

EB atitikties deklaracija (pagal EB direktyvą 2006/95/EB)

Gamintojas: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Gaminys atitinka toliau nurodytą Europos direktyvų specifikaciją:
2006/95/EB 2006 m. gruodžio 12 d. Europos Parlamento ir Tarybos direktyva 2006/95/EB dėl valstybių
narių įstatymų, susijusių su elektrotechnikais gaminiais, skirtais naudoti tam tikrose
įtampos ribose, suderinimo

Patvirtiname, kad pirmiau nurodyti gaminiai atitinka šiuos standartus: žr. p. 1.

Paženklintas CE ženklui: 1996

Ši deklaracija patvirtina atitikimą nurodytoms direktyvoms, tačiau negarantuoja jokių ypatybių ar tinkamumo
naudoti termino.

Būtina laikytis pridedamoje gaminio dokumentacijoje pateiktų įspėjamųjų nurodymų.

SIEMENS

Lettisch:

EK atbilstības deklarācija (saskaņā ar EK Direktīvu 2006/95/EK)

Ražotājs: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Ražojums atbilst turpmāk minēto Eiropas direktīvu specifikācijām:

2006/95/EK Eiropas Parlamenta un Padomes Direktīva 2006/95/EK (2006.gada 12.decembris) par dalībvalstu tiesību aktu saskaņošanu attiecībā uz elektroiekārtām, kas paredzētas lietošanai noteiktās sprieguma robežās

Ar šo dokumentu apliecinām, ka iepriekš aprakstītais izstrādājums atbilst šādām prasībām: skatīt 1. lappusi.

CE zīmes uzlikšana: 1996

Šī deklarācija apliecina atbilstību norādītajām direktīvām, bet tā negarantē atbilstību norādītajām izstrādājuma īpašībām vai kalpošanas ilgumam.

Jāievēro drošības norādījumi, kas ietverti piegādes komplektā iekļautajā izstrādājuma dokumentācijā.

Estnisch:

EÜ vastavusdeklaratsioon (EÜ direktiivi 2006/95/EÜ alusel)

Tootja: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Toode vastab järgmise Euroopa direktiivide spetsifikatsioonidele:

2006/95/EÜ Euroopa Parlamendi ja Nõukogu direktiiv 12. detsembrist 2006 liikmesriikides teatud pinge vahemikes käitatavaid elektriseadmeid käsitlevate õigusaktide ühtlustamise kohta

Käesolevaga avaldame, et eespool kirjeldatud toode vastab järgmistele normidele: vt lk 1.

Näidatud on CE-märgistus: 1996

Käesolev deklaratsioon tõendab vastavust nimetatud direktiividele, ei kujuta endast aga tootemodus- ega vastupidavusgarantiid.

Tarnimisel kaasaantud tootedokumentatsioon is äratoodud ohutusjuhistest tuleb kinni pidada.

Tschechisch:

ES Prohlášení o shodě (podle směrnice Evropského parlamentu a Rady 2006/95/ES)

Výrobce: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Dotyčný výrobek odpovídá specifikacím následujících evropských směrnic:

2006/95/ES směrnice Evropského parlamentu a Rady ze dne 12. prosince 2006 o harmonizaci právních předpisů členských států týkajících se elektrických zařízení určených pro používání v určitých mezích napětí

Prohlašujeme tímto, že výše popsaný výrobek splňuje následující normy: viz str. 1

Zobrazení značky CE: 1996

Toto prohlášení osvědčuje shodu s uvedenými směrnici, neznamená však záruku vlastností nebo trvanlivosti. Dodržujte bezpečnostní pokyny podle dodané dokumentace k výrobku.

SIEMENS

Slowakisč:

ES Prehlásenie o zhode (podľa smernice Európskeho parlamentu a Rady 2006/95/ES)

Výrobca: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Daný výrobok zodpovedá špecifikáciám nasledovných európskych smerníc:
2006/95/ES smernica Európskeho parlamentu a Rady zo dňa 12. decembra 2006 o harmonizácii
právných predpisov členských štátov týkajúcich sa elektrických zariadení určených pre
používanie v určitých rozmedziach napätia

Týmto prehlasujeme, že vyššie opísaný výrobok spĺňa nasledovné normy: viď str. 1

Zobrazenie označenia CE: 1996

Toto prehlásenie osvedčuje zhodu s uvedenými smernicami, neznamená však záruku vlastností alebo
trvanlivosti.

Dodržiavajte bezpečnostné pokyny podľa dodanej dokumentácie k výrobku.

Ungarisch:

EK Megfelelőségi nyilatkozat (a 2006/95/EK irányelv szerint)

Termék gyártója: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Az itt megnevezett termék megfelel a következő európai irányelvek előírásainak:
2006/95/EK Az Európai Parlament és a Tanács 2006 december 12-én elfogadott irányelve a meghatározott
feszültséghatáron belüli használatra tervezett elektromos berendezésekre vonatkozó tagállami
jogszabályok összehangolásáról

Ezennel kijelentjük, hogy a fenti termék megfelel a következő szabványoknak: lásd 1. oldal

A CE jelölés feltüntetése: 1996

Ez a nyilatkozat tanúsítja a nevezett irányelveknek való megfelelést, de semmilyen minőségi- vagy tartóssági
garanciát nem jelent.

A csatolt termékdokumentációban szereplő biztonsági utasításokat figyelembe kell venni.

Slowenisch:

Izjava o skladnosti ES (v skladu z ES-direktivo 2006/95/ES)

Proizvajalec: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Opisani izdelek ustreza zahtevam naslednjih smernic Evropske Unije:
2006/95/ES Direktiva evropskega parlamenta in posveta z dne 12. decembra 2006 zaradi izenačitve
pravnih predpisov držav evropske skupnosti, ki se nanaša na električna obratna sredstva
za uporabo znotraj določenih napetostnih mej

Izjavljamo, da se zgoraj opisan izdelek sklada z naslednjimi standardi: glej stran 1

Uporaba znaka CE: 1996

Ta izjava potrjuje skladnost z navedenimi direktivami, vendar pa ni garancija za samo sestavo ali garancija za
vsebnost.

Treba je upoštevati varnostna opozorila priložene dokumentacije produkta.

SIEMENS

Rumänisch:

Declarație de conformitate CE (conform Directivei CE 2006/95/CE)

Producător: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Produsul descris aici respectă prevederile următoarelor Directive Europene:

2006/95/CE Directiva Parlamentului și Consiliului European din 12 decembrie 2006 pentru armonizarea legislației statelor membre cu privire la mijloacele de producție electrice destinate utilizării între anumite limite de tensiune.

Confirmăm prin prezenta conformitatea produsului mai sus menționat cu următoarele norme: 1

Aplicarea marcajului CE: 1996

Această declarație confirmă conformitatea cu directivele menționate, însă nu reprezintă o garanție a calității sau fiabilității.

Trebuie respectate indicațiile de siguranță din documentația livrată cu produsul.

Bulgarisch:

ЕО-декларация за съответствие (съгласно директива ЕО- 2006/95/ЕО)

Производител: **Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15, D-90441 Nürnberg**

Обозначеният продукт съответства на предписанията на следните Европейски директиви:

2006/95/ЕО Директива на Европейския парламент и на Съвета от 12 декември 2006 за уеднаквяване на правните предписания на страните членки относно електрически работни средства за използване в определени граници на напрежение.

Потвърждаваме съответствието на горепосочения продукт със стандартите: 1

Поставяне на CE-обозначение: 1996

Тази декларация удостоверява съответствието с посочените директиви, но не е гаранция за свойствата или трайността.

Да се спазват указанията за безопасност от доставената заедно с продукта, продуктова документация.

C.2 EC declaration of conformity (Ex nA)

SIEMENS

EG-Konformitätserklärung

(nach Anhang VIII der EG-Richtlinie 94/9/EG)

Nr. A5E00840812A

Hersteller:	Siemens Aktiengesellschaft	DT LD
	Sector Industry Drive Technologies Large Drives	
Anschrift:	Postfach 4743	Vogelweiherstr. 1-15
	D-90025 Nürnberg	D-90441 Nürnberg
Produktbezeichnung:	Drehstrom-Asynchronmaschine mit Käfigläufer	
	Zündschutzart "nA"	
	Typ: 1LA8, 1PQ8	
	Gerätegruppe II, Gerätekategorie 3G	

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinie überein:

94/9/EG Richtlinie des Europäischen Parlaments und des Rates zur Rechtsangleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.

Wir bestätigen die Konformität des oben genannten Produktes mit den Normen:

Referenznummer	Ausgabedatum	Referenznummer	Ausgabedatum
EN 60079-0	2009	EN 60079-15	2010
EN 60034	2011		

Erstmalige Anbringung der CE-Kennzeichnung: 2003

Das bezeichnete Produkt ist bestimmt zum Einbau in eine andere Maschine für den Einsatz in explosionsgefährdeten Bereichen der Zone 2 nach EN 60079-10-1 und Richtlinie 1999/92/EG. Die Inbetriebnahme ist solange untersagt, bis die Konformität dieser Maschine mit der Richtlinie 94/9/EG festgestellt ist. Der Betrieb am Frequenzumrichter wird eingeschlossen, wenn die Angaben über Drehzahlstellbereich sowie Drehmomentcharakteristik eingehalten werden, und wenn eine Wicklungstemperaturüberwachung über die eingebauten Temperaturfühler in Verbindung mit einem Auslösegerät gewährleistet ist.

Nürnberg, den 30.03.2012

Siemens Aktiengesellschaft



Klaus Körber,

Bevollmächtigter für den Produktbereich



Martin ExB,

Produktsicherheitsbeauftragter

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.

Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme, Managing Board: Peter Loescher, Chairman, President and Chief Executive Officer; Roland Busch, Brigitte Ederer, Klaus Helmrich, Joe Kaeser, Barbara Kux, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen, Michael Süß, Registered offices: Berlin and Munich; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684, WEEE-Reg.-No. DE 23691322

SIEMENS

Englisch

EC Declaration of Conformity (according to Annex VIII of EC Directive 94/9/EG)

Manufacturer: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

The designated product is in conformity with the specifications of the following European Directive:

94/9/EC Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.

We confirm conformity of the product indicated above with the standards:

First display of the CE marking: 2003

The product indicated is intended to be installed in another machine for use in hazardous areas of zone 2 in accordance with EN 60079-10-1 and Directive 1999/92/EC.

Commissioning is prohibited until conformity of this machine with Directive 94/9/EC has been confirmed. This declaration confirms conformity with the guidelines mentioned. Operation on frequency converters is included if the specifications relating to speed setting ranges and torque characteristic are adhered to and if winding temperature monitoring is ensured by means of integrated temperature sensors in conjunction with a tripping device.

However, this is neither a quality nor a durability warranty.

Please take notice of the safety notes supplied with the product documentation.

Tschechisch

Prohlášení o shodě s předpisy EU (podle dodatku VIII směrnice EU 94/9/EG)

Výrobce: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Uvedený výrobek se shoduje s předpisy následujících evropských směrnic:

94/9/EG směrnice Evropského parlamentu a Rady o sjednocení legislativy členských států EU týkající se přístrojů a ochranných systémů za účelem jejich správného používání v oblastech ohrožených explozí.

Potvrzujeme tímto, že se výše uvedený výrobek shoduje s následujícími normami:

První umístění označení CE: 2003

Uvedený výrobek je určen pro montáž do jiných strojů pro použití v oblastech ohrožených explozí zóny 2 podle EN 60079-10-1 a směrnice 1999/92/EG.

Stroj není dovoleno zprovozňovat, dokud není potvrzena shoda tohoto stroje se směrnicí 94/9/EG. Provoz s měničem frekvence je možný tehdy, když jsou dodrženy údaje týkající se nastavení rozsahu otáček a charakteristiky točivého momentu a je zajištěno monitorování teploty vinutí pomocí integrovaného snímače teploty ve spojení s vypínacím zařízením.

Toto prohlášení osvědčuje shodu s uvedenými směrnicemi, neznamená však záruku vlastností nebo trvanlivosti.

Dodržujte bezpečnostní pokyny podle dodané dokumentace k výrobku.

SIEMENS

Dänisch

EF-overensstemmelseserklæring (i henhold til EF-direktivet 94/9/EF)

Producent: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Det angivne produkt opfylder forskrifterne fra følgende europæiske direktiver:

94/9/EF Direktiv fra Europa Parlamentet og rådet for tilpasning af medlemslandenes redskaber og beskyttelsessystemer til anvendelse inden for bestemte eksplosive områder.

Vi bekræfter det ovennævnte produkts overensstemmelse med standarderne:

1. anbringelse af CE-mærkningen: 2003

Det beskrevne produkt er bestemt til indbygning i en anden maskine til indsats i eksplosive områder i zone 2 i henhold til EN 60079-10-1 og direktiv 1999/92/EF.

Idrifttagning er forbudt, indtil denne maskine er konstateret overensstemmende med direktiv 94/9/EF. Drift på frekvensomformerer inddrages, hvis specifikationer for indstillingsområde for omdrejningstal samt drejningsmomentkarakteristik overholdes, og hvis viklingstemperaturovervågning er sikret ved hjælp af de indbyggede temperaturfølere i kombination med en udløserenhed.

Denne erklæring gælder som dokumentation for overensstemmelse med de nævnte direktiver men er dog ingen beskaftenheds- eller holdbarhedsgaranti.

Sikkerhedshenvisningerne i den medleverede produktinformation skal overholdes.

Estnisch

EÜ vastavustunnistus (vastavalt EÜ-direktiivi 94/9/EÜ lisale VIII)

Tootja: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Nimetatud toode vastab järgmise euroopa direktiivide nõuetele:

94/9/EÜ Euroopa Parlamendi ja Nõukogu direktiiv plahvatusohtlikus keskkonnas kasutatavaid seadmeid ja kaitsesüsteeme käsitlevate liikmesriikide õigusaktide ühtlustamise kohta.

Kinnitame eelnimetatud toote vastavust järgmistele standarditele:

Esmakordne CE märgistuse kandmine tootele: 2003

Antud toode on mõeldud paigaldamiseks teise masina sisse kasutamiseks vastavalt EN 60079-10-1 ja direktiivi 1999/92/EÜ 2 tsooni plahvatusohtlikes piirkondades.

Kasutuselevõtt on nii kaua keelatud, kuni on fikseeritud antud masina vastavus direktiivile 94/9/EÜ. Kehtib ka sagedusmuunduriga käitamisest pidada kinni pörete seadevahemikust ja pöördemomendikarakteristikast, samuti tagades vallandusseadmega ühenduses paigaldatud temperatuurianduriga mähise temperatuurijärelevalve.

Käesolev deklaratsioon tõendab vastavust nimetatud direktiividele, ei kujuta endast aga tootemadus- ega vastupidavusgarantiid.

Tarnimisel kaasaantud tootedokumentatsioonis äratoodud ohutusjuhistest tuleb kinni pidada.

SIEMENS

Griechisch

Δήλωση συμμόρφωσης ΕΚ (σύμφωνα με το Παράρτημα VIII της Οδηγίας 94/9/ΕΚ)

Κατασκευαστής: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Το αναφερόμενο προϊόν συμφωνεί με τις διατάξεις της ακόλουθης Ευρωπαϊκής Οδηγίας:

94/9/ΕΚ Οδηγία του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου για την προσέγγιση των νομικών διατάξεων των χωρών μελών που αφορούν εξοπλισμό και συστήματα προστασίας που προορίζονται για χρήση σε περιοχές με κίνδυνο έκρηξης.

Με το παρόν πιστοποιούμε τη συμμόρφωση του ανωτέρω αναφερόμενου προϊόντος με τα πρότυπα:

Πρώτη τοποθέτηση της σήμανσης CE: 2003

Το αναφερόμενο προϊόν προορίζεται για εγκατάσταση σε άλλη μηχανή για χρήση σε περιοχές με κίνδυνο έκρηξης της Ζώνης 2 σύμφωνα με EN 60079-10-1 και την Οδηγία 1999/92/ΕΚ.

Η θέση σε λειτουργία απαγορεύεται μέχρι να εξακριβωθεί η συμμόρφωση αυτής της μηχανής με την Οδηγία 94/9/ΕΚ. Δυνατή είναι η λειτουργία με τον μετατροπέα συχνότητας, αν τηρηθούν τα στοιχεία σχετικά με τη ζώνη ρύθμισης του αριθμού στροφών και τα χαρακτηριστικά ροπής και αν εξασφαλιστεί η επιτήρηση της θερμοκρασίας περιέλιξης στους ενσωματωμένους αισθητήρες θερμοκρασίας με μία συσκευή ενεργοποίησης.

Αυτή η δήλωση πιστοποιεί την συμμόρφωση με τις αναφερόμενες Οδηγίες, ωστόσο δεν αποτελεί εγγύηση καλής κατάστασης ή διάρκειας ζωής. Πρέπει να τηρούνται οι υποδείξεις ασφαλείας της συνοδευτικής τεκμηρίωσης προϊόντος.

Spanisch

Declaración de conformidad CE (según el Anexo VIII de la Directiva 94/9/CE)

Fabricante: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

El producto arriba mencionado cumple con lo especificado en la Directiva Europea siguiente:

94/9/CE Directiva del Parlamento Europeo y del Consejo para la armonización de las leyes de los estados miembros relativa a aparatos y sistemas de protección para uso conforme en atmósferas potencialmente explosivas.

Confirmamos que el producto arriba mencionado cumple las siguientes normas:

Primera colocación de la marca "CE": 2003

El producto mencionado está previsto para su montaje en otra máquina prevista para su instalación en atmósferas potencialmente explosivas de la zona 2 conforme a EN 60079-10-1 y la directiva 1999/92/CE.

La puesta en marcha está prohibida hasta que no se haya confirmado que dicha máquina cumple la directiva 94/9/CE. La operación con convertidores de frecuencia puede ser considerada mientras se respeten las especificaciones referentes al rango de velocidades y a la característica de par, y siempre y cuando el control de la temperatura del bobinado este garantizada a través de los sensores de temperatura integrados en combinación con un dispositivo de desconexión.

Esta declaración certifica el cumplimiento de las directivas mencionadas pero no garantiza las características ni la durabilidad. Deben observarse las consignas de seguridad de la documentación de producto suministrada.

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SIEMENS

Französisch

Déclaration CE de conformité (selon annexe VIII de la directive 94/9/CE)

Constructeur : Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Le produit désigné est conforme aux prescriptions de la directive européenne suivante :

94/9/EG Directive du parlement européen et du conseil concernant le rapprochement des législations des États membres pour les appareils et les systèmes de protection destinés à être utilisés en atmosphères explosibles.

Nous certifions la conformité du produit mentionné ci-dessus avec les normes :

Première apposition du marquage CE : 2003

Le produit désigné est destiné à l'implantation dans une autre machine pour l'utilisation en atmosphère explosible, zone 2 selon la norme EN 60079-10-1 et la directive 1999/92/EG.

La mise en service est proscrite tant que la conformité de cette machine avec la directive 94/9/EG n'est pas constatée. L'opération sur convertisseur de fréquence est incluse, si les données indiquant la marge de rotation du rotor ainsi que les caractéristiques du moment d'accouplement sont respectés, et si la supervision thermique du stator à travers les sondes de température intégrés et d'un dispositif de déclenchement un est assurée.

Ce certificat atteste la conformité aux directives mentionnées, mais ne tient pas lieu de garantie de qualité ni de longévité. Respecter les consignes de sécurité figurant dans la documentation produit fournie.

Italianisch

Dichiarazione di conformità CE (in conformità all'Annesso VIII della Direttiva Europea 94/9/CE)

Costruttore: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Il prodotto designato è conforme alle prescrizioni della seguente Direttiva Europea:

94/9/CE Direttiva del Parlamento Europeo e del Consiglio concernente il ravvicinamento delle legislazioni degli Stati membri relativa agli apparecchi e sistemi di protezione destinati ad essere utilizzati in atmosfera potenzialmente esplosiva.

Si certifica la conformità del prodotto sopra menzionato alle norme seguenti:

Prima apposizione del marchio CE: 2003

Il prodotto designato è destinato ad essere installato in un'altra macchina per l'impiego in aree a rischio di esplosione della Zona 2 secondo la norma EN 60079-10-1 e la Direttiva 1999/92/CE.

La messa in servizio è vietata fintantoché non è stata accertata la conformità di questa macchina con la Direttiva 94/9/CE. È incluso il funzionamento con il convertitore di frequenza, se vengono rispettate le prescrizioni sul campo di regolazione della velocità e sulla caratteristica di coppia e se è garantita la sorveglianza di temperatura dell'avvolgimento mediante le sonde termiche incorporate in combinazione con un dispositivo di sgancio.

Questa dichiarazione certifica la conformità con le direttive citate, non costituisce però alcuna garanzia di caratteristiche di prodotto oppure di durata. Le avvertenze di sicurezza riportate nella documentazione di prodotto allegata devono essere rispettate.

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SIEMENS

Lettisch

EK atbilstības deklarācija (Saskaņā ar pielikumu VIII no EK direktīvas 94/9/EG)

Ražotājs: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Ražojums atbilst turpmāk minēto Eiropas direktīvu specifikācijām:

94/9/EK Eiropas parlamenta un padomes direktīva, saskaņā ar dalībvalstu likumiem, attiecībā uz ieceri
izmantojot ierīces un aizsardzības sistēmas iespējami sprādzienbīstamā vidē.

Ar šo dokumentu apliecinām, ka iepriekš aprakstītais izstrādājums atbilst šādām prasībām:

CE zīmes pirmā uzlikšana: 2003

Saskaņā ar EN 60079-10-1 un direktīvu 1999/92/ EK šis izstrādājums paredzēts iebūvēšanai citos mehānismos, kas izmantojami 2. zonas sprādzienbīstamā vidē. Nodrošana ekspluatācijā aizliegta kamēr nebūs apstiprināta šīs mašīnas atbilstība direktīvai 94/9/EK. Ekspluatācija ar frekvenču pārveidotāju ir pieļaujama, ja tiek ievēroti apgriezienu skaita diapazons un griezes momenta raksturlielumi, un ja ar iebūvētajiem temperatūras sensoriem kombinācijā ar atslēgšanas ierīci ir nodrošināta tinuma temperatūras kontrole.

Šī deklarācija apliecina atbilstību norādītajām direktīvām, bet tā negarantē atbilstību norādītajām izstrādājuma īpašībām vai kalpošanas ilgumam.

Jāievēro drošības norādījumi, kas ietverti piegādes komplektā iekļautajā izstrādājuma dokumentācijā.

Litauisch

EB atitiktības deklarācija (pagal EB direktīvas 94/9/EB VIII pielikuma)

Gamintojas: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Nurodytas produktas atitinka šios Europos direktyvos reikalavimus:

94/9/EB Europos Parlamento ir Tarybos direktyva dėl valstybių narių įstatymų, susijusių su potencialiai sprogioje aplinkoje naudojama įranga ir apsaugos sistemomis, suderinimo

Tvirtiname, kad aukščiau minėtas produktas atitinka normas:

Pirmasis CE ženklas pritvirtintas: 2003

Nurodytas produktas skirtas montuoti į kitą mašiną, naudojamą potencialiai sprogioje 2 zonos aplinkoje pagal EN 60079-10-1 ir direktyvą 1999/92/EB.

Draudžiama atiduoti eksploatacijai tol, kol nenustatyta, kad ši mašina atitinka direktyvą 94/9/EB. Darbas su dažnio konvertoriumi yra galimas, jei laikomasi apsukų skaičiaus diapazono ir apsukų momento charakteristikos duomenų, ir jei yra užtikrintas apvijos temperatūros stebėjimas, vykstantis per įmontuotą temperatūros jutiklį su paleidimo prietaisu.

Ši deklaracija patvirtina atitikimą nurodytoms direktyvoms, tačiau negarantuoja jokių ypatybių ar tinkamumo naudoti termino.

Būtina laikytis pridedamoje gaminio dokumentacijoje pateiktų įspėjimų nurodymų.

SIEMENS

Ungarisch

EU egyezőségi nyilatkozat (a 94/9/EG számú EU-irányelv VIII függeléke szerint)

Gyártó: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

A jelzett termék megfelel a következő európai irányelvek előírásainak:

94/9/EG Az Európai Parlament és az Európa Tanács irányelve a tagállamok készülékekre és védelmi rendszerekre vonatkozó jogi előírásainak harmonizálásáról a robbanásveszélyes területeken való rendeltetésszerű használatához.

A fent említett termék szabványokkal való egyezőségét a következőkkel igazoljuk:

A CE-jelzés első elhelyezése: 2003

A jelzett termék más gépbe történő elhelyezésre készült a 2 zónába területein történő alkalmazáshoz az EN 60079-10-1 szabvány és az 1999/92/EG irányelv szerint.

Az üzembe helyezés mindaddig tilos, amíg a gép egyezőségét a 94/9/EG irányelvvel nem rögzítették.

Frekvenciaváltón történő üzemelés akkor történik, ha a fordulatszám-beállítási területre és a forgatónyomaték-tulajdonságokra vonatkozó adatokat betartják, és ha a tekercselési hőmérséklet ellenőrzését egy kioldó-készülékkel ellátott integrált hőmérséklet-érzékelő biztosítja.

Ez a nyilatkozat tanúsítja a nevezett irányelveknek való megfelelést, de semmilyen minőségi- vagy tartóssági garanciát nem jelent.

A csatolt termékdokumentációban szereplő biztonsági utasításokat figyelembe kell venni.

Maltesisch

UE-Dikjarazzjoni ta' Konformità (skond l-appendiċi VIII tad-Direttiva tal-Kunsill ta'-l-Unjoni Ewropea 94/9/KE)

Manifattur: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Il-prodott imsemmi jikkorrispondi ma' l-Instruzzjonijiet tad-direttivi ewropej.

94/9/KE Direttiva tal-parlament Ewropew u tal-Kunsill dwar l-approssimazzjoni tal-liġijiet ta'-l-Istati Membri li jirrigwardaw tagħmir u sistemi ta' sigurtà għal użu skond ir-regolamenti f' zoni fejn hemm periklu ta' splużżjonijiet.

Nikkonfermaw il-konformità tal-prodott imsemmi ma' l-Istandards:

Applikazzjoni tal-marka CE: 2003

Il-prodott imsemmi huwa maħsub biex jiġi immuntat f'magna oħra għall-użu f' zona ta' periklu 2 skond EN 60079-10-1 u d-Direttiva 1999/92/KE.

Il-prodott ma jistax jibda' jiġi mħaddem sakemm tigi determinata il-konformità ta' din il-magna mad-direttiva 94/9/KE.

It-tħaddim ta' konverturi tal-frekwenza hija inkluża jekk l-ispeċifikazzjonijiet marbuta mal-kontroll fil-medda ta' veloċità u l-karatteristika tat-tork jiġu segwiti u jekk il-monitoraġġ tat-temperatura tal-liwi jiġi żgurat b'sensuri tat-temperaturi integrati flimkien ma' tagħmir li jitrrippja.

Din id-dikjarazzjoni mhix garanzija ta' responsabbiltà dwar il-prodott.

Ir-regoli tad-dokumentazzjoni tal-prodott għandhom jiġu obduti.

SIEMENS

Niederländisch

EG-conformiteitsverklaring (volgens bijlage VIII van de EG-richtlijn 94/9/EG)

Fabrikant: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Het omschreven product stemt overeen met de voorschriften van de volgende Europese richtlijn:

94/9/EG Richtlijn van het Europees Parlement en de Raad inzake de onderlinge aanpassing van de wetgevingen van de lidstaten betreffende apparaten en beveiligingssystemen bedoeld voor gebruik op plaatsen waar ontploffingsgevaar kan heersen.

Wij bevestigen de conformiteit van bovengenoemd product met de normen:

Eerste aanbrengen van het CE-keurmerk: 2003

Het omschreven product is bedoeld voor inbouw in een andere machine voor gebruik op explosiegevaarlijke plaatsen van zone 2 volgens EN 60079-10-1 en richtlijn 1999/92/EG.

De inbedrijfneming is verboden tot de conformiteit van de machine met de Richtlijn 94/9/EG is vastgesteld. Het gebruik aan de frequentieomvormer is toegestaan als de gegevens over het toerentalinstelbereik en de draaimomentkarakteristiek in acht genomen worden en als een wikkelingstemperatuurbewaking over de ingebouwde temperatuursensor in combinatie met het activeringstoestel gegarandeerd is.

Deze verklaring bevestigt de conformiteit met de genoemde richtlijnen, maar geeft geen garantie betreffende de gesteldheid of de houdbaarheid.

De veiligheidsaanwijzingen in de meegeleverde productdocumentatie dienen te worden nageleefd.

Norwegisch

EU konformitetserklæring (i henhold til EUs direktiv 94/9/EU)

Produsent: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Det angitte produktet er i overensstemmelse med forskriftene i følgende europeiske direktiv:

94/9/EU Direktiv fra EU-parlamentet og rådet for tilpasning av medlemsstatenes rettslige forskrifter for utstyr og beskyttelsessystemer for forskriftemessig bruk i eksplosjonsfarlige områder.

Vi bekrefter det overnevnte produkts konformitet med standardene:

Første gangs plassering av Ce-MERKING: 2003

Det omtalte produktet er ment for innbygging i en annen maskin for bruk i eksplosjonsfarlige områder i sone 2 i henhold til EN 60079-10-1 og Direktiv 1999/92/EU.

Det er forbudt å ta i bruk inntil konformiteten i denne maskinen er fastsatt ut fra Direktiv 94/9/EU. Drift på frekvensomformere er inkludert dersom spesifikasjonene knyttet til hastighetsområder og dreiemomentkarakteristikk er overholdt, og dersom svingningstemperaturovervåking sikres ved hjelp av integrerte temperatursensorer i forbindelse med en utløserenhet.

Denne erklæringen er ingen garanti om egenskaper.

Henvisningene i den medfølgende produktokumentasjonen må overholdes.

SIEMENS

Polnisch

Deklaracja zgodności UE (według załącznika VIII dyrektywy EG 94/9/EG)

Producent: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Wymieniony produkt jest zgodny z przepisami następującej Dyrektywy Europejskiej:

94/9/EG Dyrektywa Parlamentu Europejskiego i Rady ds. Harmonizacji Przepisów Prawnych Państw Członkowskich dla Urządzeń i Systemów Ochronnych w celu ich użytkowania zgodnego z przeznaczeniem w obszarach zagrożonych wybuchami.

Niniejszym potwierdzamy, że opisany powyżej produkt spełnia następujące standardy:

Pierwsze użycie znaku CE: 2003

Wymieniony produkt przeznaczony jest do wbudowania w inne maszyny do zastosowania w strefach zagrożonych wybuchem 2 według normy EN 60079-10-1 i dyrektywy 1999/92/WE.

Nie zaleca się uruchomienia bez stwierdzenia zgodności niniejszej maszyny z dyrektywą 94/9/EG. Eksploatacja z przetwornicą częstotliwości jest możliwa, jeśli przestrzegane są dane dotyczące zakresu ustawienia prędkości obrotowej oraz charakterystyka momentu obrotowego, a także gdy zagwarantowana jest kontrola temperatury uzwojenia poprzez wbudowane czujniki temperatury w połączeniu z urządzeniem wyzwalającym.

Niniejsza deklaracja zaświadcza zgodność z wymienionymi dyrektywami, jednak nie stanowi gwarancji o właściwościach lub trwałości produktu.

Należy zapoznać się ze wskazówkami bezpieczeństwa zawartych w dołączonej dokumentacji produktu.

Portugiesisch

Declaração de conformidade CE (segundo o anexo VIII da Directiva CE 94/9)

Fabricante: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

O produto especificado está em conformidade com o disposto nas seguintes Directivas Europeias:

94/9/CE Directiva do Parlamento Europeu e do Conselho relativa à aproximação das legislações dos Estados-Membros sobre aparelhos e sistemas de protecção destinados a serem utilizados em conformidade com as especificações em atmosferas potencialmente explosivas

Certificamos a conformidade do produto supracitado com as seguintes normas:

Primeira aposição da classificação CE: 2003

O produto supracitado destina-se à instalação noutra máquina para a utilização em atmosferas potencialmente explosivas da zona 2 em conformidade com a Norma EN 60079-10-1 e a Directiva 1999/92/CE.

Não é autorizada a sua colocação em funcionamento enquanto não for verificada a conformidade da máquina com a Directiva 94/9/CE. A operação no conversor de frequências está implícita, se forem respeitadas as especificações relativas à faixa de ajuste das rotações, assim como a característica do binário, e se estiver garantida a supervisão da temperatura de enrolamento, através de sensores de temperatura integrados em conjunto com um dispositivo de disparo

A presente declaração atesta a conformidade com as directivas mencionadas, no entanto, não constitui uma garantia de qualidade ou durabilidade. Respeitar as indicações de segurança da documentação do produto juntamente fornecida.

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SIEMENS

Russisch

Заявление о соответствии стандартам ЕС (согласно приложению VIII Директивы ЕС 94/9/EG)

Производитель: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Названное изделие соответствует предписаниям следующей директивы ЕС:

94/9/EG Директива Европейского Парламента и Совета по адаптации правовых предписаний стран-участниц на устройства и системы защиты, применяемые во взрывоопасных помещениях.

Подтверждаем соответствие вышеназванного изделия следующим стандартам:

Первое нанесение знака CE: 2003

Названное изделие предназначено для встраивания в другой механизм для применения во взрывоопасных помещениях зоны 2 согласно EN 60079-10-1 и Директиве 1999/92/EG.

Ввод в эксплуатацию запрещен, пока не будет признано соответствие такого механизма директиве 94/9/EG. Эксплуатация с преобразователем частоты допустима, если соблюдены требования по диапазонам частоты вращения и характеристикам вращающего момента, а также обеспечен контроль температуры обмотки при помощи встроенных датчиков температуры в сочетании с устройством защиты.

Настоящее заявление не является гарантией эксплуатационных характеристик.

Соблюдайте рекомендации документации на изделие, входящей в состав поставки.

Slowakisch

Prehľadanie o zhode s normami EÚ

(v súlade s prílohou VIII Smernice EÚ č. 94/9 /EEC, vrátane všetkých neskorších doplnkov)

Výrobca: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Uvedený výrobok zodpovedá predpisom nasledovných európskych smerníc:

94/9/EEC Smernica Európskeho parlamentu a Rady o zosúladiení zákonných požiadaviek členských štátov týkajúcich sa prístrojov a ochranných systémov, ktoré sú určené na použitie v rámci stanovených predpisov v prostrediach s nebezpečím výbuchu.

Potvrdzujeme zhodu horeuvedeného výrobku s normami:

Označenie CE bolo prvýkrát uvedené: 2003

Uvedený výrobok je určený pre zabudovanie do iného stroja pre nasadenie v priestoroch s nebezpečím výbuchu v zóne 2 podľa normy EN 60079-10-1 a smernice EÚ č. 1999/92/EEC

Uvedenie do prevádzky nie je dovolené dovtedy, pokiaľ nebude stanovená zhoda tohoto stroja so smernicou EÚ č. 94/9/EEC. Prevádzka na meníči frekvencie sa zahŕňa, ak sú dodržané údaje o nastaviteľnom rozsahu otáčok ako aj charakteristika točivého momentu, a keď je zaručené sledovanie teploty vinutia prostredníctvom zabudovaného snímača teploty v spojení s vypínacím relé.

Toto prehlásenie osvedčuje zhodu s uvedenými smernicami, neznamená však záruku vlastností alebo trvanlivosti.

Dodržiavajte bezpečnostné pokyny podľa dodanej dokumentácie k výrobku.

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SIEMENS

Schwedisch

EG-konformitetsförklaring (enligt artikel VIII i EG direktiv 94/9/EG)

Tillverkare: Siemens AG Sector Industry Drive Technologies Large Drives, Vogelweiherstr. 1-15,
D-90441 Nürnberg

Den märkta produkten stämmer överens med föreskrifterna i följande europeiska direktiv:

94/9/EG Direktiv från det europeiska parlamentet och rådet för anpassning av medlemsstaternas rättsliga föreskrifter angående apparater och skyddssystem för användning inom bestämda områden med explosionsrisk.

Vi bekräftar ovan angivna produkts överensstämmelse med standarderna:

Första placering av CE-märkning: 2003

Den märkta produkten är avsedd att byggas in i en annan maskin för insats i områden med explosionsrisk i zonen 2 enligt EN 60079-10-1 och direktiv 1999/92/EG.

Idrifttagande är förbjudet fram till dess att denna maskins överensstämmelse med direktiv 94/9/EG har fastställts. Drift med frekvensomriktare inkluderas under förutsättning att specifikationerna angående varvtalsområden och vridmomentegenskaper följs och lindningstemperaturen övervakas med hjälp av integrerade temperaturgivare i kombination med en fränkopplingsanordning.

Denna förklaring garanterar överensstämmelse med nämnda standarder, men gäller inte som garanti av något slag.

Beakta säkerhetsanvisningarna i den medföljande produktdokumentationen.

Rumänisch

Declarație de conformitate CE (în conformitate cu anexa VIII directivei CE 94/9/CE)

Producător: Siemens AG Sector Industry Drive Technologies Large Drives

Adresa: Căsuța poștală 4743 Vogelweiherstr. 1-15
D-90025 Nürnberg D-90441 Nürnberg

Produsul mai sus menționat corespunde prevederilor următoarelor Directive Europene:

94/9/CE Directiva Parlamentului European și a Consiliului cu privire la uniformizarea legislației statelor membre pentru aparate și sisteme de protecție cu privire la utilizarea conformă cu scopul de fabricație în zone cu pericol de explozie.

Confirmăm conformitatea produsului mai sus menționat cu următoarele norme:

Modul inițial de montare al simbolului CE: 2003

Produsul mai sus menționat este conceput pentru montarea într-o altă mașină pentru utilizarea în zone cu pericol de explozie zonei 2 cu EN 60079-10-1 și directiva 1999/92/CE.

Punerea în funcțiune este interzisă până când se stabilește conformitatea acestei mașini cu directiva 94/9/CE.

Alimentarea de la convertizoare de frecvență este inclusă dacă se respectă datele referitoare la intervalul de reglare a turației, cât și la caracteristica mecanică a sarcinii, și dacă se asigură monitorizarea temperaturii bobinajului cu ajutorul senzorilor de temperatură integrați în legătură cu un dispozitiv de declanșare.

Această declarație confirmă conformitatea cu directivele menționate, însă nu reprezintă o garanție a calității sau fiabilității.

Trebuie respectate indicațiile de siguranță din documentația livrată cu produsul.

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SIEMENS

Bulgarisch

ЕС- декларация за съгласуваност, (съгласно приложение VIII на директива на ЕС 94/9/EG)

Производител: Siemens AG Sector Industry Drive Technologies Large Drives
Адрес: Postfach 4743 Vogelweiherstr. 1-15
D-90025 Nürnberg D-90441 Nürnberg

Обозначеният продукт отговаря на предписанията на следната европейска директива:

94/9/EG Директива на Европейския парламент и съвет за правно уеднаквяване на нормативните актове на държавите членки за уреди и защитни системи за употреба съгласно предназначението във взривоопасни области.

Ние потвърждаваме съгласуваността на гореспоменатия продукт с нормите:

Първоначално поставяне на CE-обозначение: 2003

Обозначеният продукт е предназначен за вграждане в друга машина за употреба във взривоопасни области на зона 2, съгласно EN 60079-10-1 и директива 1999/92/EG.

Пускането в експлоатация е забранено до тогава, докато се потвърди съгласуваността на тази машина с директива 94/9/EG. Експлоатацията на честотен преобразувател се включва, когато бъдат спазени данните за диапазона на оборотите, както и характеристиката на въртящия момент, и когато е гарантиран контролът на температурата на намотката чрез монтираната температурна сонда в комбинация със задействащ уред.

Тази декларация удостоверява съответствието с посочените директиви, но не е гаранция за свойствата или трайността.

Да се спазват указанията за безопасност от доставената заедно с продукта, продуктова документация.

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AG Declaration of conformity 1LA8, area 2

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