Induction motor SIMOTICS M-1PH8

Type 1PH818., 1PH822. forced ventilated € € II 3D Ex tc IIIB T150°C Dc

Operating Instructions / Installation Instructions 11/2012



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For employment in zone 22 (IEC/EN 60079-10-2) **C€** [®] II 3D Ex tc IIIB T150°C Dc

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.

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 Content

These operating instructions are valid for 1PH8 induction motors in shaft heights 180 ... 225 in the force-ventilated version.

- 1PH818.1 and 1PH818.3
- 1PH822.1 and 1PH822.3

The serial number of the motor can be found on the rating plate.

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 our Service Center (Page 125).

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.

1.1 Content

Safety information 2

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 125) for planning, installation, commissioning, and servicing work.

In the individual chapters of this document, you will find safety instructions that must be obeyed absolutely, 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.

2.2 The five safety rules:

For your personal safety and to prevent material damage when working on the machine, always observe the safety instructions and the following five safety rules, according to EN 50110-1 "Working in a voltage-free state". Apply the five safety rules in the order stated before starting work at the machine.

Five safety rules

- Disconnect the system.
 Disconnect the auxiliary circuits, for example anti-condensation heating
- 2. Prevent reconnection.
- 3. Make sure that the equipment is at zero voltage

2.4 Safe handling

- 4. Ground and short-circuit
- 5. Cover or isolate nearby components that are still live.

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



/I\ 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 13)" 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.





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.



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.

- 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 work place. 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 areas in Zone 22

Electrical systems in hazardous areas must be assembled, installed, and operated by the 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 the 94/9/EG and 1999/92/EG directives as well as in the IEC / EN 60079-14 standard.

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, coordinated with the responsible supervisory authority. It is mandatory that the necessary measures are complied with. The machine manufacturer cannot offer any generally applicable recommendations in this case. Please observe the information in these operating instructions.

Note

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

2.6 Electrostatic sensitive devices

ESD protective measures



NOTICE

Electrostatic discharge

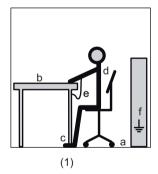
Electronic modules contain components that can be destroyed by electrostatic discharge.

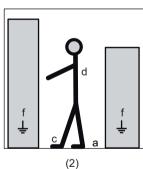
These modules can be easily destroyed by improper handling.

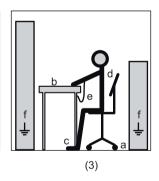
To protect your equipment against damage, follow the instructions given below.

- 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 Interference voltages when operating the converter

/!\ 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/EG on electromagnetic compatibility.

2.8 Interference immunity

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

When using machines with integrated sensors (e.g. PT100, PTC thermistors), the manufacturers of the complete systems must ensure sufficient interference immunity by selecting suitable sensor signal leads and evaluation units.

2.9 Interference voltages when operating the converter

/ WARNING

Interference voltages when operating the converter

When a converter is in operation, the emitted interference varies in strength depending on the converter (manufacturer, type, interference suppression measures undertaken). On motors 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.

In order to avoid exceeding the limit values set for the drive system (motor 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.

2.10 Electromagnetic fields when operating electrical power engineering installations

/ WARNING

Interference on electronic devices through electromagnetic fields

Electromagnetic fields are generated during operation of electrical power engineering installations. Electromagnetic fields can interfere with electronic devices, resulting in malfunctioning of those devices. The operation of heart pacemakers can be impaired, potentially leading to damage to a person's health or even death. It is therefore forbidden for persons with heart pacemakers to come into the vicinity of the machine. Data may be lost from magnetic or electronic data media.

As the operator of the installation, you must take the following measures:

- Ensure that the personnel working on the plant are adequately protected from any harm by making appropriate arrangements, 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 with you.

2.10 Electromagnetic fields when operating electrical power engineering installations

Description 3

Application range

The motors of the 1PH818., 1PH822., series are used as industrial drives. They have been designed to address a wide range of drive applications exclusively fed from converters.

They are characterized by their high power density, ruggedness, long lifetime, and overall reliability.

Type of protection Ex to

This machine has been designed in accordance with the "constructional safety" (Ex tc) type of protection in line with IEC / EN-60079-0 and IEC / EN 60079-31 . It may, therefore, be operated in hazardous areas in the presence of non-conductive, combustible dust in **Zone 22** in accordance with IEC / EN 60079-10-2 .



Risk of explosion

This machine is not designed for use in the following areas:

- Explosive gas atmospheres.
- Areas in which an explosion hazard exists due to hybrid mixtures.
- Areas with dust of explosive materials.
- Dust explosion protection areas with conducting dusts
- Areas with pyrophoric materials.

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 above mentioned areas.

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.

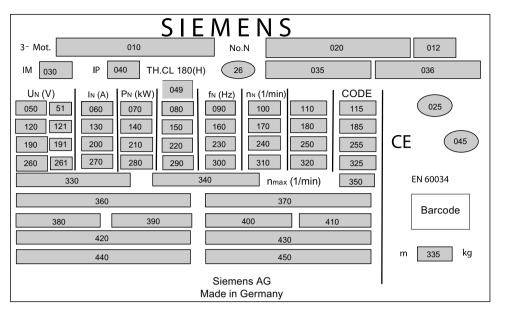


Figure 3-1 Schematic layout of rating plate

Table 3-1 Elements on the rating plate

No.	Description	No.	Description
010	MLFB	200	Rated current I _N (3)
012	Consecutive number, part of serial number	210	Rated power P _N (3)
020	Serial number	220	cos φ (3)
025	UL approval	230	Rated frequency f _N (3)
026	(empty)	240	Rated speed n _N (3)
030	Type of construction	250	Operating mode (3)
035	(empty)	255	Code for operating point 3
036	(empty)	260	Rated voltage V _N (4)
040	Degree of protection	261	Switching mode 4
045	Type of balancing	270	Rated current I _N (4)
049	Power factor (asynchronous)	280	Rated power P _N (4)
050	Rated voltage V _N (1)	290	cos φ (4)
051	Switching mode 1	300	Rated frequency f _N (4)
060	Rated current I _N (1)	310	Rated speed n _N (4)
070	Rated power P _N (1)	320	Operating mode (4)
080	cos φ (1)	325	Code for operating point 4
090	Rated frequency f _N (1)	335	Weight
100	Rated speed n _N (1)	330	Maximum current I _{MAX}
110	Operating mode (1)	340	Maximum torque M _{MAX}
115	Code for operating point 1	350	Maximum speed n _{MAX}
120	Rated voltage V _N (2)	360	Temperature sensor
121	Switching mode 2	370	Tachometer/resolver
130	Rated current I _N (2)	380	Cooling method
140	Rated power P _N (2)	390	Throughput I/min (m³/s)

No.	Description	No.	Description
150	cos φ (2)	400	System pressure
160	Rated frequency f _N (2)	410	Maximum coolant temperature
170	Rated speed n _N (2)	420	Options (I)
180	Operating mode (2)	430	Options (II)
185	Code for operating point 2	440	Optional customer information
190	Rated voltage V _N (3)	450	Anti-condensation heater / place holder
191	Switching mode 3		

Rotor

This machine is an induction motor for low voltage with squirrel-cage induction motor and integrated cooling circuit.

Machine design

The regulations and standards used as basis for designing and testing 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 3-2 Machine design

Feature	Standard
Dimensions and operation characteristics	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
Mechanical vibrations	IEC / EN 60034-14
IEC-standard voltages	IEC/DIN IEC 60038
Vibration limit values	DIN ISO 10816-3

The following standards additionally apply for explosion-proof motors:

Table 3-3 Motor version with type of explosion protection Ex t

Feature	Standard
Type of protection Ex t ^①	IEC / EN 60079-0
	IEC / EN 60079-31

^① Optional (depending on order)



Figure 3-2 Ex plate on the machine (schematic representation)

Drive

The motor speed is controlled using a converter.

NOTICE

Destruction of the machine when operated directly from the line supply

The machine will be destroyed if it is directly connected to the line supply. Only operate the machine using a converter.

Types of construction

The motor is supplied with two attached lifting eyes. The type construction can be found on the rating plate.

Vertical type of construction

For IM V5 and IM V15 types of construction with "shaft extension pointing downward", the motor is equipped with two additional Vario eye bolts. The Vario eyebolts are in the terminal box.

NOTICE

Protection against falling parts

For vertical types of construction, protect the air intake or discharge against falling parts, e.g. by attaching a canopy. Otherwise the machine could be damaged.

Cooling with external fan

The machine has cooling method IC 416 in accordance with IEC / EN 60034-6. The separately driven fan unit and the terminal box can be mounted in a different position depending on the order.



Operating instructions, external fan

Improper use of the external fan can result in death, serious injury, and material damage.

Observe and follow the operating instructions of the external fan.

NOTICE

Minimum clearance for mounted accessories

If the required cooling air flow cannot be maintained, then the machine can overheat. Material damage can result.

Maintain a **minimum clearance of 300 mm** for customer-supplied mounted accessories at the air intake opening and at the air discharge openings to ensure the required cooling air flow.

EC external fan from the Ziehl-Abegg company

For air-cooled 1PH8. motors, the EC external fans from the Ziehl-Abegg company are installed. This are especially designed fan units for this motor series, with a permanently set operating speed. The external fan is suitable for use in hazardous areas of Zone 22.

Terminals GND; 10V; D1; I1; A1 and A2 must not be connected and are therefore equipped with insulators.

NOTICE

The use in IT systems is not permitted.

NOTICE

The external fan may not be cleaned with a water jet. This results in material damage.

Degree of protection

The machine is available with degree of protection IP55.

Supplementary devices

A KTY 84 temperature sensor is installed (Page 71) in the stator winding for winding control.

Depending on the order options, various supplementary devices such as encoder systems can be installed or mounted, which are suitable for use in Zone 22.

Ambient conditions

The standard machines are not suitable for use in corrosive atmospheres, atmospheres with a high salt content, or outdoor applications.

Roller bearings

The machines are equipped with different types of roller bearings depending on the version and the operating conditions described in the order. If the machine is equipped with a regreasing system, you will find the relevant data on the machine's lubricant plate.

The following standard roller bearing versions are available:

Table 3-4 Roller bearing versions

Design	Bearings	
Standard design	Drive end deep-groove ball bearing as spring-loaded floating bearing	
	Non-drive end deep-groove ball bearing as fixed bearing	
Version for increased radial forces	Drive end cylindrical-roller bearing as floating bearing	
	Non-drive end deep-groove ball bearing as fixed bearing	

NOTICE

Maintain the minimum radial forces

Operating cylindrical roller bearings without a load can damage them. Maintain the minimum radial forces specified when using cylindrical-roller bearings.

Table 3-5 Minimum radial forces

Туре	Minimum radial force		
1PH818.	4 kN		
1PH822.	5 kN		
1PH828.	9 kN		

Paint finish

The machine is painted according to the instructions in your order.

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" 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

Note

Note also the technical data on the rating plates on the motor enclosure.

Preconditions for adequate cooling

- In the case of motors that are cooled by the ambient air, the cooling air must be able to flow unimpeded to and from the motors. Hot discharged air should not be drawn in again.
- The requirements of the IP degree of protection must be maintained.

 Higher requirements regarding the IP degree of protection may necessitate the installation of suitable filters and special arrangement of the intake and outlet openings.
- Equipment and cables must be connected without strain.

NOTICE

Minimum clearance for mounted accessories

If the required cooling air flow cannot be maintained, then the machine can overheat. Material damage can result.

Maintain a **minimum clearance of 300 mm** for customer-supplied mounted accessories at the air intake opening and at the air discharge openings to ensure the required cooling air flow.

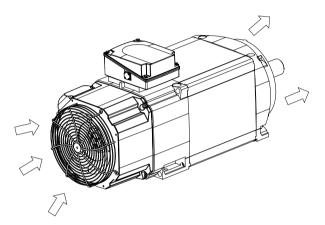


Figure 4-1 Air guidance from NDE to DE (schematic representation)

External fan

The code for the external fan is the eleventh position of the order number, e.g. 1PH8...-...0. For details of the order number, which also tells you which type of external fan is installed (pressure or extraction), please refer to the motor rating plate.

Machines with pipe connection

You must mount and connect pipes and a fan of suitable type and dimensioning to machines that are intended for the connection of pipes and/or for operation with an external fan. An adapter is not included in the scope of supply.

Please observe the following when connecting pipes:

- Additional pressure drop in the system.
- Shipping covers on the ventilation openings must have been removed.

For machines with a pipe connection, the potential pressure drop inside the machine is given in the following table:

Table 4-1 Pressure drop in motors with pipe connection

Туре	Volume flow	Pressure drop	Flow resistance
1PH818.	0,17 m ³ /s	550 Pa	19030 Ns ² /m ⁸
1PH822.	0,31 m ³ /s	650 Pa	6760 Ns²/m ⁸

4.3 Cooling air quality

The cooling air is only permitted to have weak chemically aggressive properties and must only have low levels of oil or dust.

4.4 Interlock circuit for the external fan

For machines with external fans, install an interlock circuit that prevents the main machine being switched on if the external fan is not operational.

See also

Operating instructions, external fan (Page 146)

Force-ventilated 1PH818. and 1PH822. motors are equipped as standard with an external fan with electronically commutated motor (EC motor); this is optional for 1PH828. motors.

NOTICE

Voltage fluctuations

The electronics of the external fan equipped with EC motor can be damaged as a result of voltage fluctuations. Supply the external fan with power from the line supply and not via a frequency converter.

4.5 Thermal motor protection

The machine is equipped as standard with a KTY 84 temperature sensor, optionally with PTC thermistors to directly monitor the motor temperature to protect the machine against overload in operation. Plan a corresponding circuit for monitoring.

See also

Connecting the temperature sensor (Page 71)

4.6 Overheating during periodic duty

NOTICE

Periodic duty

For all operating modes, operate the external fan according to DIN EN 60034-1. Also for non-periodic operation, the machine can be thermally overloaded. This can result in damage to the machine.

In the case of extended non-operational periods, the fan should be in operation until the machine has approximately reached the temperature of the coolant, see S2-operation in DIN EN 60034-1.

Use a suitable circuit to ensure that the external fan is appropriately operated.

4.7 Noise emissions



WARNING

Noise emissions

During operation, the machine's noise emission levels can exceed those permitted at the work place. 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.

4.8 Rotational speed limit values



WARNING

Permissible speed

Excessive rotational speed can lead to serious damage to the machine. This can result in death, serious injury or material damage.

The controller must ensure that operation at impermissible speeds is prevented. Observe the information about the speeds on the rating plate.

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.

DIN 4024 must be taken into account when constructing the machine foundation. The limit values in accordance with DIN ISO 10816-3 must not be exceeded.

4.10 Torsional loading of the shaft assembly 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.



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 in the catalog.

Note

The system planner is responsible for the entire shaft assembly.

4.11 Transport and storage

When carrying out any work on the machine, observe the general safety instructions and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

4.11 Transport and storage

4.11.1 Checking the delivery

Checking the delivery for completeness

The drive systems are put together on an individual basis. When you take receipt of the delivery, please check immediately whether the items delivered are in accordance with the accompanying documents. Siemens will not accept any claims relating to items missing from the delivery and which are submitted at a later date.

- Report any apparent transport damage to the delivery agent immediately. Never commission a damaged motor.
- Report any apparent defects/missing components to the appropriate Siemens office immediately.

These safety instructions are part of the scope of supply; keep them in a location where they can be easily accessed.

4.11.2 Requirements for safe lifting and transporting

- 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 ≤ 0.4 g
 Speed v ≤ 20 m/_{min}
- Use only the load carrying device on the stator frame for lifting.

/ WARNING

The machine can tip, move or fall down

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.

∕ NARNING

The machine can tip, move or fall down

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 Lifting and transporting

There are two lifting eyebolts for horizontal transport of the motor. Always transport and lift the motor by the lifting eyebolts.

- Only lift the motor at the lifting eyebolts on the bearing end shields. To hoist the motor, in particular if there are built-on assemblies, use suitable cable-guidance or spreading equipment.
- Pay attention to the lifting capacity of the hoisting gear. The weight of the motor is specified on the rating plate.

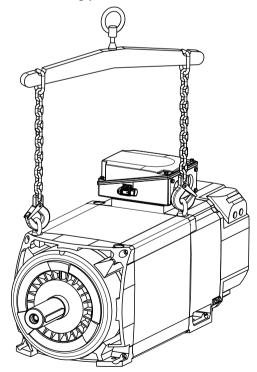


Figure 4-2 Lifting the machine (schematic representation)

4.11 Transport and storage

Lifting force-ventilated motor in type of construction IM V5 with side-mounted terminal box

Proceed as follows if you wish to lift a machine with type of construction IM V5 and with sidemounted terminal box:

- 1. Screw off the external fan.
- 2. Screw in the eyebolts supplied and use these to lift the machine.
- 3. Screw on the external fan again after the work has been completed.

Rotor shipping brace

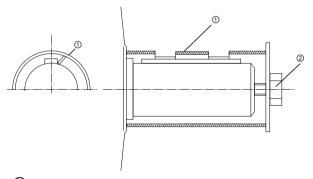
Machines ordered with the "Increased radial force" option are equipped with cylindrical-roller bearings and a rotor shipping brace.

NOTICE

Transport damage if the rotor shipping brace device is not used.

The motor can be damaged if it is jolted during transport. Material damage can result.

- Always transport the motor with the rotor shipping brace supplied. It must be securely attached during transportation.
- Only remove it before pushing on the drive element.
- When the motor has to be transported after the drive element is pushed on you must take other appropriate measures to fix the axial position of the rotor.



- Sleeve
- 2 Shaft screw

Figure 4-3 Rotor shipping brace

Table 4-2 Tightening torque for rotor shipping brace

Туре	Thread in the shaft end	Tightening torque	Preload
1PH818.	M20	50 Nm	12 kN
1PH822.	M20	50 Nm	12 kN
1PH828.	M24	100 Nm	20 kN

4.11.4 Transporting a force-ventilated motor that has already been in operation

If you have already operated the motor and now want to transport it, proceed as follows:

- 1. Allow the motor to cool down.
- 2. Remove the connections provided by the customer.
- 3. Fit the rotor shipping brace.
- 4. Only use the eyebolts on the bearing shields to transport and lift the motor.

Note

Store the rotor locking device

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

4.11.5 Transporting the machine set



Falling down of the machine

The lifting lugs on the machine are designed only for the weight of the machine. If a machine set is lifted and transported by 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.

- 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.



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 the machine when it is raised.

4.11 Transport and storage

4.11.6 Storage

The motors can be stored for up to two years in dry, dust-free and vibration-free rooms without reducing the specified storage time.

NOTICE

Seizure damage to bearings

If the motors are stored incorrectly there is a risk of bearing seizure damage such as brinelling, for example as a result of vibrations.

Read the following storage instructions.

Preparation

- Fit the rotor shipping brace.
- Apply a preserving agent such as Tectyl to bare external components such as shaft ends, if this has not already been applied in the factory.

Storing indoors

NOTICE

Damage caused as a result of outdoor storage

Storing the machine outdoors can result in it being damaged. Ensure that the machine is only stored in areas that comply with the following conditions.

- Store the motor in an area that meets the following criteria:
 - Dry, dust-free, frost-free and vibration-free The relative air humidity should be lower than 60% and the temperature should not drop below -15 °C in accordance with EN 60034-1.
 - It must be well ventilated.
 - Offers protection against extreme weather conditions
 - The air in the storage area must not contain any harmful gases.
- Protect the motor from shocks and humidity.
- Cover the motor properly.
- Avoid contact corrosion:
 - Every three months, remove the shipping brace and rotate the shaft end by hand.
 - Then reattach the rotor shipping brace.

Protection against humidity

- If a dry storage area is not available, then take the following precautions:
 - Wrap the motor in humidity-absorbent material and then wrap it in film to create an airtight unit.
 - Include several bags of desiccant in the seal-tight packaging. Check the desiccant and replace as required.
 - Place a humidity meter in the seal-tight packaging to indicate the level of air humidity inside it.
 - Inspect the motor regularly.



Explosion hazard during commissioning

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. There is also a risk that potentially explosive gaseous atmosphere may enter the machine and ignite 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.

4.11.7 Attaching the rotor shipping brace prior to storage

The machine is delivered with mounted rotor shipping brace. If the machine has already been operational, mount the rotor shipping brace prior to packing and/or storing. This prevents damage to the bearings.

If the rotor shipping brace is not attached on a motor in storage, make sure that you turn the rotor through 360° regularly to prevent the occurrence of damage as a result of standstill.

NOTICE

Bearing damage caused by vibrations

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. Protect the machine against strong radial vibrations, since the rotor shipping brace might not absorb these completely.

4.11 Transport and storage

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.

4.11.8 Long-term storage

If you are storing a machine for more than six months, you must check its condition every six months.

- Check the machine for damage.
- Carry out any necessary maintenance work.
- Document all preservation measures taken so that they can be reversed before the machines are put back into service.
- Provide air-conditioning for the storage room.

Condensation

Condensation can collect in the machine as a result of sharp fluctuations in ambient temperature, exposure to direct sunlight, high levels of humidity in the storage location or intermittent operation/variations in load during operation.

NOTICE

Damage caused by condensation

If the stator winding is damp, its insulation resistance is reduced. This results in voltage flashovers that can destroy the winding. Condensation can also cause rusting inside the machine.

4.11.9 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

4.12.1 Connection to a converter

Selecting and connecting the cable

- Use Motion Connect cables or symmetrically constructed, shielded cables to connect the
 motor to a converter. The cable shielding, made up of as many strands as possible, must
 have good electrical conductivity. Braided shields made of copper or aluminum are well
 suited.
- 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 effective discharge of high-frequency currents, make the shield contact over the largest possible area, i.e. as a 360° contact on the converter and motor, e.g. using EMC glands at the cable entry points.

4.12 Converter operation

Measures to 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 prevent bearing currents:

- Setting up a properly meshed grounding system in the system as a whole, with low impedance for high-frequency currents
- No potential difference between the motor, converter, and working machine.
 - Use symmetrical, shielded connecting cables.
 - Connect the cable shield at both ends over the greatest possible surface area (360° contact).
 - Use equipotential bonding conductors between the motor and the driven machine as well as between the motor and the converter
- Use iron cores mounted above the motor connecting cable at the converter output. These
 help to reduce common-mode components. The Siemens sales representative is
 responsible for selection and dimensioning.
- Limit the voltage rate of rise by using an output filter to dampen harmonic components in the output voltage

4.12.2 Insulated bearings for converter operation

If the machine is operated at a low-voltage converter such as SINAMICS G150 / S150 / S120, then an insulated bearing and a speed encoder with insulated storage (option) is mounted on the non-drive end.

For 1PH818, the insulated bearings are optional; for 1PH822 and 1PH828, insulated bearings are standard.

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

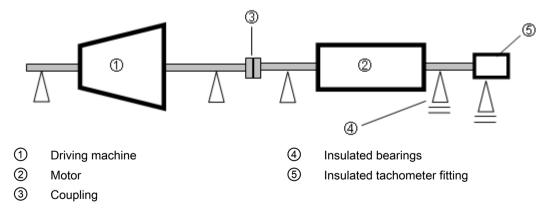


Figure 4-4 Schematic representation of a single drive

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 your Service Center, if necessary.

See also

Service and Support (Page 125)

4.12.3 Operation with insulated coupling

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..

4.12 Converter operation

Mounting 5

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

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 motor lead to the loss of conformity with the 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.

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 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:

5.2 Testing the insulation resistance and polarization index

- · 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"

5.2 Testing the insulation resistance and polarization index



∕ WARNING

Hazardous voltage at the terminals

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.

- 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:
 - 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. Disconnect any connected main-circuit cables from the terminals before measuring the insulation resistance.

- 3. Measure the insulation resistance of the winding in relation to the machine housing 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.

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_{insul 10 min} / R_{insul 1 min}

Modern measuring devices display these values automatically following the measurement.

Limit values for insulation resistance and polarization index of the stator winding

The following table indicates the measuring voltage and limit values for the insulation resistance and PI. These values correspond to recommendations in IEEE 43-2000. In addition, a critical insulation resistance is specified for the stator winding, which is the minimum requirement for further operation, e.g. following a long-term machine downtime.

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

U _{rated} [V]	U _{meas} [V]	R _c [MΩ]	R _{C, operation}	R _τ [MΩ]	PI
U ≤ 1000	500	<u>[</u>] ≥ 5	0.2 MΩ/kV	R _o	
0 3 1000	300			$R_T = \frac{C}{\sqrt{40.7540}}$	
			(≈0.5 MΩ/kV at 25° C)	0,5 ^{(40-T)/10}	2.0
1000 ≤ U ≤ 2500	500 (max. 1000)	100	1.8 MΩ/kV		
2500 < U ≤ 5000	1000 (max. 2500)		(≈5 MΩ/kV at 25° C)		
5000 < U ≤ 12000	2500 (max. 5000)				
U > 12000	5000 (max. 10000)				

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

 U_{meas} = DC measuring voltage

 $R_{\rm C}$ = critical or minimum insulation resistance at reference temperature of 40° C

R_c = minimum insulation resistance after cleaning/repair at 40° C

 $R_{C, operation}$ = critical insulation resistance during operation at 40° C

 R_T = insulation resistance converted to current measuring/winding temperature

PI = polarization index R_{insul 10 min} / R_{insul 1 min} (T < 40° C)

T = current measuring/winding temperature

Note the following:

- When measuring at winding temperatures other than 40 °C, the measured value must be
 converted to the reference temperature of 40 °C. The value is calculated using the formula
 specified in the table from IEEE 43-2000. 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 ... 2000 MΩ, or even higher values, if required. Insulation resistance close to the minimum value could be due to humidity 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.

Example calculation

Critical resistance for a rated voltage (V_N) of 3.3 kV:

3,3 kV x 1,8 M Ω / kV = 6 M Ω at 40 °C.

A winding temperature of T = 25° C during the measurement, results in a critical insulation resistance of $16.5 \text{ M}\Omega$.

NOTICE

Damage to insulation

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

- Contact your Siemens Service Center.
- If the measured value is close to the critical value, you must subsequently check the insulation resistance at shorter intervals.

5.3 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 125).

5.4 Vibration severity

Due to the influencing variables listed below, the vibration response of the system at the site of operation can lead to increased vibration severity at the motor:

- Transmission elements
- · Assembly conditions
- · Alignment and installation
- · Effects of external vibrations

Under certain circumstances, the rotor may have to be balanced completely with the output element.

Please take care to ensure that the vibration severity specified to ISO 10816 is not exceeded at the defined measuring points on the motor. By doing this, you can ensure problem-free operation and a long service life.

Maximum permitted vibration severity

The values for the maximum permitted radial and axial vibration severity must both be maintained.

Table 5-2 Maximum permitted radial vibration severity

Vibration frequency	Vibration values ¹⁾
< 6.3 Hz	Vibration displacement s ≤ 0.25 mm
6.3 to 63 Hz	Vibration velocity v _{rms} ≤ 7.1 mm/s
> 63 Hz	Vibration acceleration a ≤ 4.0 m/s²

Table 5-3 Maximum permitted axial vibration severity

Vibration velocity	Vibration acceleration
v _{rms} = 7.1 mm/s	$a_{peak} = 3.55 \text{ m/s}^2$

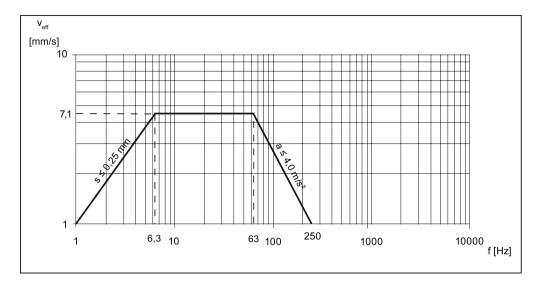


Figure 5-1 Max. permissible vibration velocity, taking into account the vibration displacement and vibration acceleration

To evaluate the vibration velocity, the measuring equipment must fulfill the requirements of ISO 2954.

The vibration acceleration must be measured as a peak value in the time range in a frequency band of 10 to 2000 Hz.

If excitation in excess of 2000 Hz (e.g. meshing frequencies) is to be expected, the measurement range must be adapted accordingly. This does not alter the maximum permissible values.

5.5 Aligning the machine

Vertical and horizontal alignment

The following measures are required in order to compensate any radial offset at the coupling and to horizontally adjust the electric motor with respect to the driven load:

- Place shims under the motor feet to position it vertically and to prevent stress/distortion.
 The number of shims should be kept as low as possible, so use as few thicker shims as possible, instead of several thinner shims.
- For horizontal positioning, push the motor sideways on the foundation Pay attention to maintaining the axial position.
- When positioning the motor, ensure that a uniform axial gap is maintained around the coupling.

Note

Alignment accuracy

Remember to take account of data concerning the alignment accuracy of the driven load and the coupling.

Alignment accuracy

- 1. Align the motors with coupling output in such a manner that the center lines of the shafts are parallel with no offset. This ensures that no additional forces affect their bearings during operation.
- 2. Perform the fine adjustments with plates under the entire motor foot.

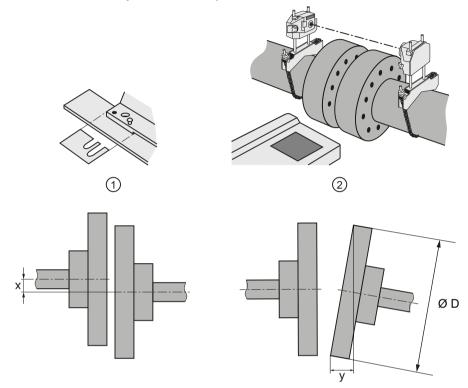


Figure 5-2 Aligning the machine

Table 5-4 Permissible deviations when aligning the motor

Permissible deviations	Radial shaft offset [x]	Axial shaft offset [y]	
Flexible coupling	0.05 mm	0.05 mm	

5.6 Securing the machine

Fixing by means of motor feet

- The contact surfaces of the motor feet must lie on one plane. If the motor needs to be aligned, position metal shims underneath the feet in order to prevent machine deformation. The number of shims should be kept as low as possible i.e. stack as few as possible.
- Select foot screws as per ISO 898-1 in compliance with the loading conditions and machine type:

- Use foot screws with a minimum property class of 8.8.
- Pin the mounting feet to the customer foundation for motors with types of construction B6, B7, B8, V5 and V6.

Туре	Foot screw size
1PH818.	M12
1PH822.	M16
1PH828.	M20

Flange mounting

The flange is only used to transfer the torque. Due to the empty weight or as a result of vibrations that arise if the flange is too soft, the motor can be damaged if it is only fastened via the flange.

- 1. Fasten the flange-mounted motors via a stable motor suspension and support them via the end shield feet (foot flange type of construction).
- 2. During commissioning, ensure that the permitted vibration values are maintained in accordance with ISO 10816-3.

If the motor is to be only flange mounted, then the maximum speed n_{max} is reduced for rigid foundations according to the following table:

Туре	Maximum speed n _{max}
1PH818.	3000 ¹/ _{min}
1PH822.	2500 ¹/ _{min}
1PH828.	2000 ¹/ _{min}

Maximum speed for a rigid foundation and flange mounting

5.7 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 5-5 Tightening torques for bolted connections with a tolerance of ±10%.

Case	M4	M5	М6	М8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	
Α	1,2	2,5	4	8	13	20	40	52	80	150	-	-	-	-	Nm
В	1,3	2,6	4,5	11	22	38	92	180	310	620	1080	1700	2600	4200	Nm
С	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:

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 lower-strength materials (e. g. aluminum) and to bolts of strength class 8.8 to ISO 898-1.

Case C

Applies to bolts of strength class 8.8 or A4-70 to ISO 898-1, but only to bolts screwed into components made from higher-strength materials (e. g. gray 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.

5.8 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 5-3 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.
 - 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 output element is mounted up to the shaft shoulder for motors with full-key balancing "F", or if the output element is longer than the motor shaft extension, then when balancing the coupling or belt pulley, take into account that the feather key does not completely fill the slot in the hub.

/ WARNING

The feather key can fall out

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.

Death or serious injury can result.

- 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".

5.8 Mounting the output elements

Note

Type of balancing

In the case of shaft extensions with feather keys, the type of balancing is also included on the rating plate next to the CE mark.

5.8 Mounting the output elements

Electrical connection 6

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

Note

Service Center

If you require support when electrically connecting up the motor, please contact the (Page 125) Service Center.

6.1 Safety instructions relating to the electrical connection

/ WARNING

Connected parts can loosen

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.

- 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.

See also

Tightening torques for screw and bolt connections (Page 52)

6.2 Preparation

6.2.1 Selecting cables

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

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

6.2.2 Connecting the grounding conductor

The grounding conductor of the motor must be in full conformance with the installation regulations, e.g. in accordance with IEC/EN 60204-1.

- Connect the ground conductor to the end shield of the motor. There is a fixing lug ① for the ground conductor at the designated connection point.
 - The fixing lug ① is suitable for grounding high-frequency currents using HF ribbon cable with appropriately formed conductor ends.

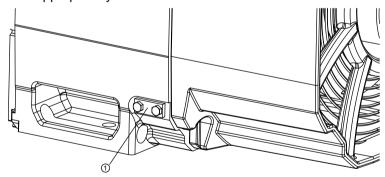


Figure 6-1 Detailed view: Connection point ① for ground conductor

- When making connections, ensure the following:
 - the connecting surface is bare and protected against corrosion using a suitable substance, e.g. acid-free Vaseline
 - the flat and spring washers are located under the bolt head.

6.3 Connecting

Depending on the version, different terminal boxes may be installed on the machine. Dependent on the terminal box, different cable entries and options for the cable connection are possible. You can identify the terminal box installed on the machine via the illustrations in the following chapters.

6.3.1 Circuit diagram

Data on the connection and connecting the motor winding can be found in the circuit diagram in the cover of the terminal box.

6.3.2 Terminal designation

With the terminal designations according to IEC / EN 60034-8, the following definitions apply to three-phase machines:

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

1	U	1	-	1	Designation
х					Index for pole assignment on pole-changing motors where applicable. A lower index signifies a lower speed. Special case for split winding.
	х				Phase designation U, V, W
		х			Index for winding start (1) or end (2) or if there is more than one connection per winding
				х	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 Laying cables

- For explosion-proof machines use certified versions of cable glands and cable or lead inlets. The cable glands are not included in the scope of supply. For loose cables, use twist-protection cable glands with strain relief.
- For fixed cables use EMC screwed cable glands. Screw the EMC cable glands into the threaded holes of the screw-off entry plate.
- Arrange the exposed connecting cables in the terminal box such that the PE conductor has excess length and the insulation of the cable strands cannot be damaged.

6.3 Connecting

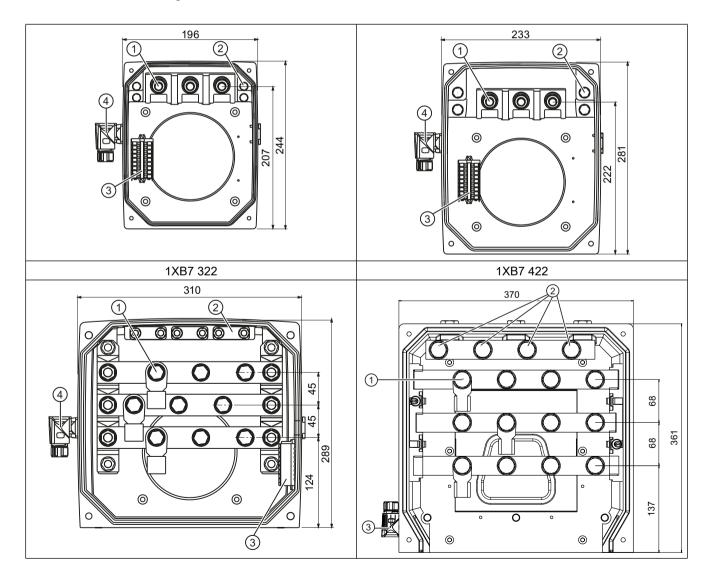
- Use shielded cables.
- In the case of aluminum connecting bars, insert a steel washer between the cable lug and connecting bar. This prevents contact corrosion.

NOTICE

Close unused screw threads with a metallic locking screw certified for use in Zone 2 or Zone 22 or which is bonded in position and cannot be removed. This achieves the required IP degree of protection and high-frequency shielding.

6.3.4 Electrical connection data

Cable entry and technical connection data depend on the mounted terminal box. You can find more information on the terminal box that is mounted in the ordering documentation or in the catalog.



1XB7 700	1XB7 712 (*)		
① main terminal	③ signal connection terminal		
② ground terminal	signal connection		

Table 6-2 Data for electrical connection

Terminal box type	1XB7 322	1XB7 422	1XB7 700	1XB7 712 (*)
Cable entry	2 x M50 x 1,5	2 x M63 x 1,5	3 x M75 x 1,5	4 x M75 x 1,5
Max. poss. cable outer diameter	38 mm	53 mm	68 mm	68 mm
Number of main terminals	3 x M12	3 x M12	3 x 3 x M12	3 x 4 x M16
Max. cross-section per terminal	2 x 50 mm ²	2 x 70 mm ²	3 x 150 mm ²	4 x 185 mm ²
Max. current per terminal ①	210 A	270 A	700 A	1150 A
Number of ground terminals	4 x M6	4 x M8	Terminal strip	4 x M16

[©] Current carrying capacity based on IEC / EN 60204-1or IEC / EN 60364-5-32

6.3.5 Connection with cable lugs

- 1. To connect the cables to the main terminals, select cable lugs that match the necessary cable cross-section and appropriate screw size.
 - The connectable cable cross section is determined by the cable lug size for example.
 - Cable lug in accordance with DIN 46234 from 35 mm² to 185 mm²,
 - Cable lug in accordance with DIN 46235 from 35 mm² to 185 mm².
 Observe the possible outer diameter of the connecting cable in the chapter entitled "Electrical connection data".
 - Connect only one conductor per cable lug.
- 2. Remove the insulation from the conductor ends so that the remaining insulation is almost long enough to reach the cable lug.
- 3. Fasten the cable lug to the end of the conductor correctly, e.g. by crimping.
- 4. If necessary, insulate the cable lugs in order to maintain the minimum clearances of 10 mm and the 20 mm creepage distance, which are normally available.

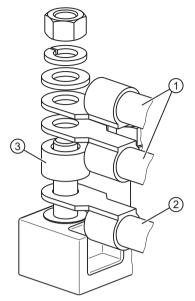
 The tightening torque for contact nuts and fixing screws depends on the size of the screw, see Case A in the table in ChapterTightening torques for screw and bolt connections

(Page 52).

^(*) Terminal box 1XB7 712 is not used in hazardous areas of Zone 22.

6.3 Connecting

Connection with cable lug at the terminal box 1XB7 322 / 1XB7 422

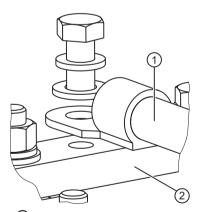


- ① Customer connecting cable
- 2 Internal motor connecting cable
- 3 Copper spacer ring

Connection with cable lug at the terminal box 1XB7 700 / 1XB7 712

Note

Terminal box 1XB7 712 is **not** used in hazardous areas of Zone 22.



- ① Customer connecting cable
- 2 Connection bar

See also

Electrical connection data (Page 60)

/ 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 are observed.

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

- 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.

6.3.6 Connecting 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 reoxidation.

NOTICE

The aluminum flow is determined by contact

The aluminum flow is determined by contact following installation. The connection with the clamping nuts can loosen as a result. The contact resistance would increase and the current-carrying be 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.

6.3 Connecting

6.3.7 Completing connection work

- 1. Before closing the terminal box, please check that:
 - the electrical connections in the terminal box are tight and are in full compliance with the specifications above.
 - The required clearances in air of 10 mm are maintained.
 - Wire ends do not protrude.
 - the inside of the terminal box is clean and free of any cable debris.
 - all seals and sealing surfaces are undamaged.
 - The connecting cables are arranged so that they do not come into contact with the machine, and the cable insulation cannot be damaged.
 - Unused threads are closed with metal screw plugs certified for use in Zone 22 or bonded in position so they cannot be removed. The sealing elements can only be removed with a tool.
 - The cable/conductor glands are fitted compliant with the specifications regarding degree of protection, cable routing type, permissible cable diameter etc.
- 2. Then close the terminal box with the terminal box cover fixing screws.

6.3.8 Internal equipotential bonding

The internal equipotential bonding between the grounding terminal in the box enclosure and the motor frame is established through the terminal box retaining bolts. The contact locations underneath the bolt heads are bare metal and protected against corrosion.

The standard cover fixing screws are sufficient for equipotential bonding between the terminal box cover and terminal box housing.

Note

Connecting points are provided on the enclosure or end shield to allow an outer PE conductor or equipotential bonding conductor to be connected; see "Connecting the grounding conductor".

See also

Connecting the grounding conductor (Page 58)

6.4 Auxiliary circuits

6.4.1 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 crosssection as defined by required length of cable, etc.
- Requirements to IEC / EN 60204-1
- Requirements to IEC / EN 60079-14

6.4.2 Connecting the auxiliary circuits

Cable entry and routing

The cable entries and sealing plugs must be certified for use in **Zone 22**.

A plate is bolted to the terminal box housing via a rectangular cut-out through which the connecting cables are introduced. Refer to the machine documentation for the dimensions.

- Normally this plate is supplied without threaded holes for the cable glands. Adjust the number and size of the cable glands to the operational conditions.
- Seal the screwed sockets on the cable glands in accordance with the degree of protection for the machine (see rating plate).

6.4.3 Intrinsically safe circuits for sensors or probes

Observe the IEC / EN 60079-14 standard when selecting and routing connecting cables.

NOTICE

Intrinsically safe circuits for sensors or probes

If blue connection terminals are installed for sensors/probes, these sensors/probes must be connected to certified intrinsically safe circuits. This can otherwise result in damage. Ensure that you also observe the additional requirements in IEC / EN 60079-14 for intrinsically safe equipment and the associated connecting cables.

6.4 Auxiliary circuits

NOTICE

Connection of temperature sensors to intrinsically safe circuits with certified evaluation devices

The temperature sensors may only be connected to intrinsically safe circuits with certified evaluation devices. The maximum permissible input currents and powers according to the EC type-examination certificate shall not be exceeded. This can otherwise result in damage.

If shielded, intrinsically safe temperature sensors are fitted in the stator winding, these must be connected using the blue connecting terminals. The shield is grounded at the laminated core; multiple grounding is not permitted.

6.4.4 Connecting an external fan

Preconditions

- Only use cables that comply with the relevant installation regulations regarding voltage, current, insulation material, and load-carrying capacity.
- Before connecting the device, make sure that the line voltage matches the device voltage.
- Check whether the data on the fan rating plate matches the connection data.
- Cable glands are not included in the scope of delivery. Close unused cable entries, otherwise, the degree of protection is not maintained.

Туре	Supply voltage	Current consumption
1PH818.	1 AC 200 V 277 V / 50Hz, 60 Hz (± 10 %)	1,45 1,05 A
1PH822.	1 AC 200 V 277 V / 50Hz, 60 Hz (± 10 %)	2,3 1,6 A
1PH828.	3 AC 400 V / 50 Hz (± 10 %)	2,55 A
	3 AC 400 V / 60 Hz (± 10 %)	2,50 A
	3 AC 480 V / 60 Hz (± 10 %)	2,50 A

Connection values for external fans

 The line voltage must fulfill the quality criteria stipulated by DIN EN 50160 and the defined standard voltages specified in DIN IEC 60038.

Procedure

- 1. Open the terminal box of the external fan and route the cables into it. The cables are not included in the scope of delivery.
- 2. Connect the protective conductor (PE).
- 3. Connect the other cables to the relevant terminals, refer to the connection diagram. Connection cables must not be subject to excessive tensile stress.

Note

For fans equipped with EC motor, the fan motor starts with a delay after the line voltage is connected.

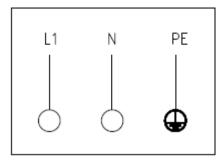


Figure 6-2 Connection in the external fan terminal box

External ground connection

Motors with a power rating of more than 100 kW must be grounded via the additional grounding screw M12 at the mounting flange. Use a cable lug in accordance with DIN 46234.

Protection against humidity

Protect the device against humidity. Water must not be allowed to run along the cables and into the terminal box.

- Use suitable cables at the connection cable gland on the terminal box.
- Ensure the terminal box cover is properly mounted and completely closed.



$\dot{\mathbb{N}}$ warning

Voltages at the internal motor connections

The motor may continue running, e.g. due to airflow, or may run on after being shut down. This means that dangerous voltages of over 50 V can occur at the internal motor connections. Death, serious injury or material damage can result.

- For safety reasons, it is not permissible to make any unauthorized modifications or changes to the fan.
- Due to the way it functions, the fan switches on and off automatically.
- After a power failure or when the power has been disconnected, the fan starts up automatically again when the voltage is restored.
- Wait until the fan has come to a standstill before approaching it.
- Provide a protective circuit that prevents the main motor from being switched on when the external fan is not in operation.

See also

Operating instructions, external fan (Page 146)

Connecting an external fan (type 1PH818., 1PH822.)

The external fan is connected in the external fan terminal box. If necessary, you can rotate the external fan through 90°.

6.4 Auxiliary circuits

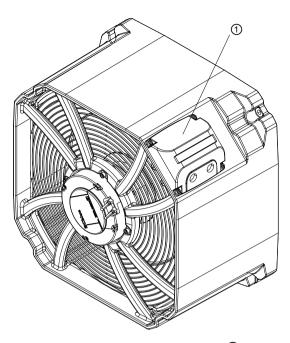


Figure 6-3 External fan terminal box ① (schematic representation)

NOTICE

Rotating the external fan

If you rotate the external fan through 90°, then it is not permissible that the cable outlet faces upwards. Water that accumulates at the cable glands can result in a short circuit.

Rotate the terminal box cover of the external fan through 180°.

See also

Interlock circuit for the external fan (Page 31)

6.4.5 Connecting the speed encoder

The speed encoder is connected at the terminal box using a plug connection ①. This is located on the terminal box enclosure. A protective tube for disassembly ② is supplied as special fastener when removing the signal connector.

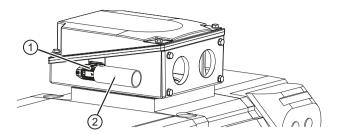


Figure 6-4 Detailed view: Plug-in connection

Note

The plug-in connection may differ from the standard layout in the case of special orders. For versions without speed encoder, connection thread M16x1.5 is located here.

Cable outlet directions

The sensor module is mounted on the motor terminal box. The sensor module can be rotated through approximately 235°. You can change the cable outlet directions by rotating the sensor module, as shown in the diagram below.

NOTICE

Damage to the sensor module

You can damage the sensor module if you turn it with a pipe wrench, a hammer, or similar tools.

Turn the sensor module by hand. The typical torque is approx. 4 ... 8 Nm.

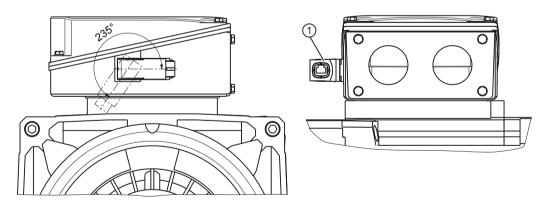


Figure 6-5 Sensor Module ① mounted on the terminal box

NOTICE

Modifying the cable outlet direction

Changing the cable outlet direction by any improper means will damage the connecting cables.

The permissible rotation range must not be exceeded. A maximum of ten changes to the rotation angle of the Sensor Module are permissible within the rotation range.

6.4.6 Attach a protective tube for the signal connector

A protective tube is supplied as special fastener when removing the signal connector. Slide the protective tube to remove the signal connector over it and screw it down firmly.

Operation without special fastener is not permissible.



Figure 6-6 Slide the protective tube to remove the signal connector over the signal connector



Figure 6-7 Screw the protective tube to remove the connector to the end position

/ WARNING

Risk of explosion

The disassembly protective tube and the signal plug must not be removed in an explosionendangered environment or when under power. An explosion can result. This can result in death, serious injury or material damage.

- Ensure that the ambient atmosphere is not combustible before you remove the disassembly protective tube and the signal plug.
- The disassembly protective tube and the signal plug must be connected from the power supply before being removed.

6.4.7 Connecting the temperature sensor

- The temperature sensor is connected to the signal connector together with the speed encoder signal.
- For the version without speed encoder, the temperature sensor is connected at the terminal strip.
- The motor has a reserve temperature sensor, which is also connected at the auxiliary terminal strip. Reconnect the temperature sensor as needed, e.g. if the previous temperature sensor fails.

6.4.8 Connection to a converter

Selecting and connecting the cable

- Use Motion Connect cables or symmetrically constructed, shielded cables to connect the
 motor to a converter. The cable shielding, made up of as many strands as possible, must
 have good electrical conductivity. Braided shields made of copper or aluminum are well
 suited.
- 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 effective discharge of high-frequency currents, make the shield contact over the largest possible area, i.e. as a 360° contact on the converter and motor, e.g. using EMC glands at the cable entry points.

6.4 Auxiliary circuits

Measures to 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 prevent bearing currents:

- Setting up a properly meshed grounding system in the system as a whole, with low impedance for high-frequency currents
- No potential difference between the motor, converter, and working machine.
 - Use symmetrical, shielded connecting cables.
 - Connect the cable shield at both ends over the greatest possible surface area (360° contact).
 - Use equipotential bonding conductors between the motor and the driven machine as well as between the motor and the converter
- Use iron cores mounted above the motor connecting cable at the converter output. These
 help to reduce common-mode components. The Siemens sales representative is
 responsible for selection and dimensioning.
- Limit the voltage rate of rise by using an output filter to dampen harmonic components in the output voltage

6.4.9 Converter operation on a grounded network

NOTICE

Damage resulting from protective conductor currents

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.

- Use an appropriately sized PE conductor.
- Connect the PE conductor to the grounding terminal on the motor enclosure.

See also

Connect metal shield in the terminal box (Page 73)

6.4.10 Connect metal shield in the terminal box

When you insert metal-armored cables into the terminal box or auxiliary terminal box, ground the metal shield in the terminal and in the operator control post.

NOTICE

Faults

If the metal shield is grounded just once, cable- or field-related interferences can occur. Ground the metal shield at least twice.

6.4 Auxiliary circuits

Commissioning

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

7.1 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 46)

7.2 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.

7.2 Checks to be carried out prior to commissioning

- 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.
- The rotor can spin without coming into contact with the stator.
- The bearing insulation is not bridged.
- 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.
- While being operated on the converter, the motor cannot exceed the specified upper speed limit n_{max} or undershoot the lower speed limit n_{min}.
 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.

- If the motor has been stored for more than two years in a dry, dust-free and vibration-free room, prepare for commissioning as follows:
 - Replace the rolling-contact bearings on motors with lifetime lubrication.
 - Replace the grease in motors with re-greasing system.
- If stored under less favorable conditions, replacement of bearings or re-greasing must be carried out after a storage period of approx. 18 months.
- Appropriately configured control and speed monitoring functions ensure that the the permissible speeds specified on the rating plate cannot be exceeded.
- Any supplementary motor monitoring devices and equipment have been correctly connected and are fully functional.

Force-ventilated motors

- All external fans fitted are ready for operation and have been connected so that they rotate
 in the direction specified.
- The flow of cooling air is not impeded.

7.3 Switching on

- See the operating instructions of the frequency converter for switching on.
- Before you switch on the motor, ensure that the parameters of the frequency converter have been assigned correctly.
- Use appropriate commissioning tools, such as "Drive ES" or "STARTER".

NOTICE

Operation noise or abnormal noises

The motor can be damaged by improper handling during transport, storage or set up. If a damaged motor is operated damage to the winding, bearings or, complete destruction of the motor can be the result.

If the motor is not running smoothly or is emitting abnormal noises, de-energize it, and determine the cause of the fault as the motor runs down.

Maximum speed

The maximum rotational speed n_{max} is the highest permissible operating speed. The maximum rotational speed is specified on the rating plate.

7.4 Test run

Commission the machine after assembly or inspection as follows:

- Start up the machine without a load. To do this, close the circuit breaker and do not, if at all possible, switch off prematurely.
- 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 the required dimensions. Allow the machine to run down before switching it on again.
- Check the machine for noises or vibrations on the bearings or bearing shields as it runs.
- If the machine is not running smoothly or is emitting abnormal noises, de-energize it, and determine the cause of the fault as the motor runs down.
 - If the mechanical operation improves immediately after the machine is switched off, then
 the cause is magnetic or electrical.
 - If the mechanical operation is not improved after switching off, then the cause is mechanical. This can be an imbalance in the electrical machines or in the driven machine, poor alignment of the machine unit, operation of the machine with the system resonating (system = motor, base frame, foundation etc.).
- Continue to observe the motor for a while in no-load operation.
- If it runs perfectly, connect a load. Check whether it is running smoothly. Read off the values for voltage, current, and output and log them. If possible, read and log the corresponding values for the working machine.

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.

• Monitor and log the temperatures of the bearings, windings, etc., until the system reaches the steady state, in as much as this is possible with the available measuring equipment.

Operation 8

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

8.1 Safety guidelines in operation



∕I∖ 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.



∕Ñ 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 the parts before touching them and take appropriate protective measures if necessary.
- Allow the machine to cool before starting work on the machine.

8.2 Machine overheating caused by dust



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 systemspecific 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.

8.2 Machine overheating caused by dust



WARNING

Explosion hazard due to overheating of the machine caused by a layer of dust

Layers of dust thicker than 5mm can insulate the machine, resulting in overheating. The maximum surface temperature of the machine cannot be adhered to. The dust can ignite, resulting in an explosion. This can result in death, serious injury or material damage.

Dust the machine regularly. Do not allow dust layers thicker than 5 mm to build up on the machine surface. Do not switch the machine on until the dust has been removed.



WARNING

Risk of explosion due to excessive bearing temperature

The surface temperature cannot be maintained within maximum permissible limits if the bearing becomes too hot. The dust can ignite, resulting in an explosion. This can result in death, serious injury or material damage.

- Always check the bearing temperature.
- In addition to the current-dependent overload protection device located in the three phases
 of the connecting cable, we recommend that you also monitor the temperature rise in the
 motor with the aid of the temperature sensors built into the stator winding.

/!ackslash 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.

NOTICE

Periodic duty

For all operating modes, operate the external fan according to DIN EN 60034-1. Also for non-periodic operation, the machine can be thermally overloaded. This can result in damage to the machine.

In the case of extended non-operational periods, the fan should be in operation until the machine has approximately reached the temperature of the coolant, see S2-operation in DIN EN 60034-1.

Use a suitable circuit to ensure that the external fan is appropriately operated.

8.3 Operation

- After starting the motor, observe it for a while to see if it is running smoothly and check the monitoring devices.
- Monitor operation and the monitoring devices regularly and record the values you read off.

NOTICE

Speed monitoring

The motor is designed for a certain speed range.

If a motor is operated at impermissible speeds damage to the winding, bearings, or complete destruction of the motor can be the result.

Ensure that the speeds specified on the rating plate are not exceeded by appropriately configuring controller and speed monitoring components.

8.4 Switching-off force-ventilated motors

- When switching-off, also observe the converter operating instructions.
- Switch off the external fan during longer standstill periods. Leave the fan on for approximately 30 minutes after switching off the motor to avoid overheating of the motor.
- If a standstill heating unit is available, switch it on.

8.5 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

8.6 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 when motors are at standstill and ready for operation

- For longer periods when the motor is not being used, either energize the motor at regular intervals (roughly once a month), or at least spin the rotor.
- Please refer to the section"Switching on" (Page 77) before switching on to recommission the motor.

NOTICE

Damage due to improper storage

The motor can be damaged if it is not stored properly. If the motor is out of service for extended periods of time, implement suitable anti-corrosion, preservation, and drying measures.

When recommissioning the motor after a long period out of service, carry out the measures recommended in the chapter entitled "Commissioning (Page 75)".

8.6.1 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.

8.6.2 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"

8.7 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 perform the necessary measures for anti-corrosion protection, preservation, packaging and drying. Otherwise damage to the machine will result.

8.9 Faults

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

8.8 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.

8.9 Faults

8.9.1 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.

8.9.2 Electrical faults at force-ventilated motors

Note

When operating the machine with a converter, also refer to the operating instructions of the frequency converter if electrical faults occur.

Table 8-1 Electrical faults

↓ M		otor fails to start						
	* IV	Motor accelerates sluggishly ↓ Humming noise when starting						
		Humming noise with starting Humming noise in operation						
		↓ High temperature rise during no-load operation						on
					↓ H	ligh t	emperature rise under load	
						↓ F	ligh temperature rise of individual	winding sections
							Possible causes of faults	Remedial measures
X	Χ		Х		Х		Overload	Reduce the load.
X							Interruption of a phase in the supply cable	Check frequency converters and supply cables.
	Х	Х	Х		Х		Interruption of a phase in the supply after switching on	Check frequency converters and supply cables.
	Х	Х	Х			Х	Winding short circuit or phase short circuit in stator winding	Determine the winding and insulation resistances. Contact the Service Center.
				Х			Converter output voltage too high, frequency too low	Check the settings at the frequency converter and perform the automatic motor identification.
					Х		External fan is not running	Check the external fan and its connections.
					Х		Reduced air intake	Check the air ducts; clean the machine.

8.9.3 Mechanical faults

Table 8-2 Mechanical faults

↓ G	Grinding noise							
	↓ Ove	↓ Overheating ↓ Radial vibrations						
	1							
	↓ Axial vibrations							
			Possible causes of faults	Remedial measures				
Х			Rotating parts are grinding	Establish the cause and realign the parts.				
	X		Rotor not balanced	Decouple the rotor and then rebalance it.				
	X		Rotor out of true, shaft bent	Contact the Service Center.				
	X	X	Poor alignment	Align the machine set and check the coupling. 1)				
	X		Coupled machine not balanced	Rebalance the coupled machine.				
		Х	Shocks from coupled machine	Examine the coupled machine.				
	Х	X	Resonance with the foundation	Stabilize the foundation following consultation.				
	X	X	Changes in foundation	Determine the cause of the changes and, if necessary, rectify. Realign the machine.				

¹⁾ Take into account possible changes which may occur during overheating.

8.9.4 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

↓ B	Bearing overheats						
	↓ B	↓ Bearing "whistles"					
	↓ Bearing "knocks"						
			Possible causes of faults	Remedial measures			
Х			High coupling pressure	Align the machine more accurately.			
Χ			Belt tension too high	Reduce the drive belt tension.			
Χ			Bearing contaminated	Clean the bearing or replace it. Check the seals.			
Х			High ambient temperature	Use a suitable high-temperature grease.			
Х	Х		Insufficient lubrication	Grease the bearings as instructed.			
Χ	Х		Bearing canted	Properly install the bearing.			
Χ	X		Insufficient bearing play	Only after consultation with the manufacturer: Fit a bearing with greater play.			
		Х	Excessive bearing play	Only after consultation with the manufacturer: Fit a bearing with lower play.			
Х	Х		Bearing corroded	Replace the bearing. Check the seals.			
Х			Too much grease in bearing	Remove surplus grease.			
Х			Wrong grease in the bearing	Use the correct grease.			
		Х	Friction marks on raceway	Replace the bearing.			
		Х	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 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.

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, if you require support with servicing, maintenance or repair.

9.1 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.

9.2 Observe the operating instructions of the components

When carrying out any maintenance and repair work, always carefully observe the manufacturer's operating instructions for additional components.

See also

Operating instructions, external fan (Page 146)

9.3 Inspection and maintenance



∕I∖ WARNING

Rotating and live parts

Electric machines have live parts 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.

- 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.



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.



Explosion hazard due to overheating of the machine caused by a layer of dust

Layers of dust thicker than 5mm can insulate the machine, resulting in overheating. The maximum surface temperature of the machine cannot be adhered to. The dust can ignite, resulting in an explosion. This can result in death, serious injury or material damage.

Dust the machine regularly. Do not allow dust layers thicker than 5 mm to build up on the machine surface. Do not switch the machine on until the dust has been removed.



Risk of explosion due to excessive bearing temperature

The surface temperature cannot be maintained within maximum permissible limits if the bearing becomes too hot. The dust can ignite, resulting in an explosion. This can result in death, serious injury or material damage.

- Always check the bearing temperature.
- In addition to the current-dependent overload protection device located in the three phases
 of the connecting cable, we recommend that you also monitor the temperature rise in the
 motor with the aid of the temperature sensors built into the stator winding.

/İ\ 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.

9.3.1 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.

9.3.2 Initial inspection

Perform the following checks after approximately 500 operating hours or at the latest after six months:

Table 9-1 Checks after installation or repair

Check	When the motor is running	At standstill
The electrical parameters are maintained.	Х	
The smooth running characteristics and machine running noise have not deteriorated.	X	
The motor foundation has no cracks and indentations. (*)	Х	Х

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

Additional checks 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 damage the motor.

9.3.3 General inspection

Inspection interval

Perform the following checks after approx. 16,000 operating hours or two years, whichever comes first.

Implementation

- While the motor is running, check that:
 - The stated electrical characteristics are being observed
 - The smooth running characteristics and machine running noise have not deteriorated
- Once the machine has been shut down, check that:
 - The motor foundation has no indentations or cracks
 - The machine is aligned within the permissible tolerance ranges
 - All the fixing bolts/screws for the mechanical and electrical connections have been securely tightened
 - The winding insulation resistances are sufficiently high
 - Any bearing insulation has been fitted as shown on plates and labeling.
 - Cables and insulating parts and components are in good condition and there is no evidence of discoloring

NOTICE

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

9.3.4 Rolling-contact bearing inspection

Inspections in the event of faults

Perform an inspection immediately in the event of faults or exceptional operating conditions indicating an electrical or mechanical overload, e.g., overload, short circuit.

9.3 Inspection and maintenance

Regreasing intervals

NOTICE

Observe the regreasing intervals for the rolling-contact bearings

The regreasing intervals for roller bearings are different from the servicing intervals for the machine. Failure to regrease the rolling-contact bearings at the specified intervals can result in them sustaining damage. Comply with the regreasing intervals for roller bearings, the regreasing intervals are specified on the lubricant plate.

9.3.5 Changing bearings when using permanently lubricated rolling-contact bearings

The replacement of the permanently lubricated roller bearing is determined by the number of operating hours and is required around every three years.

9.3.6 Maintenance

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.



/I \setminus Warning

Rotating and live parts

Electric machines have live parts 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.

- 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 13).



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.



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.

9.3.6.1 Measuring the insulation resistance during the course 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 46)

9.3.6.2 Maintenance intervals

Perform the following maintenance measures after the operating time or the intervals specified in the following table elapse.

Table 9-2 Maintenance measures

Maintenance measures	Maintenance intervals
Initial inspection	After 500 operating hours, at the latest after six months
Regreasing	See the lubricant plate
Permanent lubrication (with coupling output)	Replace bearings after approximately 20,000 operating hours, at the latest after three years
Cleaning	Depending on the degree of pollution
Main inspection	After approximately 16,000 operating hours, at the latest after two years

9.3.6.3 Rolling-contact bearings

The motors have rolling-contact bearing bushes for grease lubrication. Depending on the version, the motors are permanently lubricated or are equipped with a regreasing device.

Depending on the type of load, a deep-groove ball bearing or a cylindrical-roller bearing is fitted as a floating bearing on the drive end.

The DE bearing contains built-in compression springs that help to rebalance the axial play of the external bearing rings.

See also

Description (Page 21)

9.3.6.4 Lubrication

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

Initial lubrication

For initial lubrication of the bearings (when delivered), the lubricating grease ESSO / Unirex N (standard version) or Lubcon / Sintono GPE702 (Performance version) is used.

Grease selection criteria

High qualityISO-L-X BDEA3 grease according to ISO 6743-9 and K3N-20 grease according to DIN 51825 with lithium soap as a thickener and an upper service temperature of at least +140 °C / +284 °F are permissible for standard applications without special requirements.

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 according to NLGI class	DIN 51818	3 for vertical and horizontal types of construction	-
		2 alternatively for horizontal type of construction with reduced lubrication interval	
Worked penetration	DIN ISO 2137	220–295	0.1 mm
Operating temperature range	-	At least -20 °C +140 °C	°C
Dropping point	DIN ISO 2176	At least +200 °C	°C
Basic oil viscosity	DIN 51562-1	Approx. 100 mm²/s at 40 °C	mm²/s
		Approx. 10 mm²/s at 100 °C	
Additive	-	Antioxidation (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 +140 °C	h
		F50 ≥ 100 h at +140 °C	
Behavior with respect to 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 +140 °C	Corr.°

9.3 Inspection and maintenance

Criteria	Standard	Property, characteristic value	Unit
Resistance to corrosion (EMCOR)	DIN 51802 /	0 - 0 (0 - 1, permissible for special greases)	Corr.°
	ISO 11007		
Solid matter content, particle sizes > 25 µm	DIN 51813	< 10 mg/kg	mg/kg
Suitability of bearings	-	Suitable for the built-in motor bearings, seals and	-
Speed characteristic nxdm		these speeds	mm/min

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

NOTICE

Other ambient temperatures and operating conditions

For other ambient temperatures and operating conditions, an alternative grease to the one stated on the lubricant plate may only be used after prior consultation with the manufacturer. Otherwise the roller bearing could be damaged.

NOTICE

Use of other greases

If other greases are used, there can be no guarantee of compatibility with the overall system. Otherwise the roller bearing could be damaged.

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 accordingly. 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 types of construction due to their technical properties:

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

Manufacturer	Grease type
ExxonMobil	Unirex N3
Esso	
Fuchs	Renolit H443 HD88
Lubcon	Turmoplex 3
FAG	Arcanol Multi 3

For motors with a horizontal type of 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 with a horizontal type of construction

Manufacturer	Grease type
ExxonMobil	Unirex N2
Esso	

Manufacturer	Grease type
Castrol	Longtime PD2
Lubcon	Turmogrease L 802 EP plus
Shell	Retinax LX2
FAG	Arcanol Multi 2

Table 9-6 Lubricating grease for the Performance version (Option L37)

Manufacturer	Grease type
Lubcon	Sintono GPE702

For the Performance version, only this special lubricating grease may be used.

NOTICE

Damage caused by mixing lubrication types

Mixing different greases adversely affects the lubricating properties and must therefore be avoided. Only the manufacturer can provide a guarantee as to whether certain greases can be mixed.

Regreasing

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

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

Irrespective of the actual number of operating hours, the machine must be regreased every 12 months at the latest.

NOTICE

Relubrication intervals

The relubrication intervals for roller bearings are different from the servicing intervals for the machine. Failure to observe the relubrication intervals can result in damage to roller bearings.

Pay attention to the instructions on the lubricant plate.

Grease replacement intervals

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

- Normal load
- Operation at speeds in accordance with the rating plate
- Low-vibration operation

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- Neutral ambient air
- High-quality roller bearing greases

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

Regreasing

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



/!\ WARNING

Rotating parts

When regreasing, pay attention to all rotating components. This can result in death, serious injury or material damage.

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 being expelled from the bearing.

The used grease collects outside each bearing in a spent grease chamber. If the specifications on the lubricant plate are observed, the spent grease chamber will provide capacity for a calculated service life of at least 20 000 operating hours (approx. 2.5 years).

Lubricating using the regreasing system

A flat grease nipple in accordance with DIN 3404, size M10x1, is provided at both the DE ① and the NDE ② for regreasing.

- 1. Clean the grease nipples at the DE and NDE.
- 2. Press in the type and quantity of grease specified (see lubrication instruction plate). The shaft should rotate so that the new grease can be distributed throughout the bearing. The bearing temperature rises sharply at first, then drops to the normal value again after the excess grease has been displaced out of the bearing.

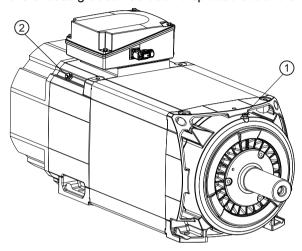


Figure 9-1 Flat grease nipples ① and ② (schematic representation for types 1PH818. and 1PH822.)

/ 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.

9.3.6.5 Cleaning the spent grease chamber

The rolling-contact bearing's spent grease chamber only has room for a limited amount of spent grease. When the spent grease chamber is full, the spent grease must be removed, otherwise it will penetrate into the interior of the machine. The information on the amount of grease to be used when regreasing can be found on the lubricant plate. When changing the

9.3 Inspection and maintenance

bearings remove the spent grease that has collected in the spent grease chamber and in the outer bearing cover.

To remove the spent grease, proceed as follows:

- 1. Remove the transmission element.
- 2. Remove the spent grease:
 - At the DE, unscrew the outer bearing cover and empty the spent grease from the outer bearing cover.
 - At the NDE, remove the cover of the speed sensor and the cover of the spent grease chamber. Empty the spent grease chamber.

Note

For types 1PH818. and 1PH822., you must remove the fan before removing the speed encoder cover. At the NDE, remove the fan and then the speed encoder cover.

9.3.6.6 Cleaning the cooling air passages

Cleaning the cooling air passages

 Regularly clean the cooling air passages through which the ambient air flows, e.g. using dry compressed air.

NOTICE

Cleaning intervals depend on the degree of fouling

The frequency of the cleaning intervals depends on the local degree of fouling. The machine can overheat if the cooling air passages are fouled and the cooling air cannot flow without obstruction.

Check for fouling regularly and clean the cooling air passages through which the ambient air flows.

Servicing the external fan

- Check the external fan in accordance with DIN ISO 10816 every 12 months for mechanical vibrations. The maximum permissible vibrational severity is 2.8 mm/s measured on the end shield of the impeller-side motor bearing.
- Regularly clean and inspect the fan. Impeller and frame are subject to natural wear depending on the area of application and displacement medium.



Impeller can crack

Due to deposits and the resulting imbalance there is a hazard of fatigue fracture of the impeller. The impeller can crack in operation. Death, serious injury, or material damage can result.

Regularly clean and inspect the fan.

9.3 Inspection and maintenance





Voltages at the internal motor connections

The motor may continue running, e.g. due to airflow, or may run on after being shut down. This means that dangerous voltages of over 50 V can occur at the internal motor connections. Death, serious injury, or material damage can result.

- For safety reasons, it is not permissible to make any unauthorized modifications or changes to the fan.
- Due to the way it functions, the fan switches on and off automatically.
- After a power failure or when the power has been disconnected, the fan starts up automatically again when the voltage is restored.
- Wait until the fan has come to a standstill before approaching it.
- Provide a protective circuit that prevents the main motor from being switched on when the external fan is not in operation.

Cleaning the fan

If the fan blades need to be cleaned, the following points must be observed:



DANGER

Danger of shearing

During maintenance work on the forced ventilation unit (e.g. when cleaning the fan blades), the fan must be at a standstill. The circuit for the forced ventilation unit must be open and a safeguard must be provided to prevent unintentional reclosing.



CAUTION

Avoid the effects of excessive force

If excessive forces are present, this can damage the fan blades.

The fan should be cleaned with a suitable cloth or brush, and steps should be taken to prevent moisture from entering the motor.

- Once the voltage has been disconnected on all poles, wait for five minutes before touching the device.
- Never open the device during operation.
- Never loosen any fixing screws for the ventilation unit during operation.

Changing the filter mat of the external fan (option)

Check the state of the filter mat regularly depending on the prevailing conditions. Change it if it is dirty.

/ CAUTION

Changing the filter only when the fan is stationary

When the mesh is removed, the degree of protection is no longer guaranteed. There is a risk of injury. Only change the filter when the fan is stationary.

- 1. Unscrew the fan guard and remove the old filter mat.
- 2. Insert the new filter mats and screw the fan guard back into position.

You can order the filter mat as a spare part.

- Spare parts, external fan (Page 114)
- Spare parts kits (Page 111)
- Ordering spare parts via the Internet (Page 112)

9.3.6.7 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.



Short-circuit hazard

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

Replace damaged components.

9.4 Repair

When carrying out any work on the machine, observe the general safety instructions (Page 13) and the specifications contained in EN 50110-1 regarding working safely with and on electrical machines.



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.

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

Note

If the motor has to be transported, please observe the information and instructions in the "Transport" (Page 35) section.

9.4.1 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.



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, if necessary.

9.4.2 Explosion hazard during installation and disassembling of the external fan



WARNING

Explosion hazard

Sparks can occur if the external fan rotor grazes the external fan housing and ignite ambient air dust. An explosion can result. This can result in death, serious injury or material damage.

The external fan may only by removed and installed by appropriately qualified technical personnel or a Siemens Service workshop. Only then can it be ensured that the distance between the external fan rotor and the external fan housing is greater than 2 mm.

9.4 Repair

9.4.3 Disassembling the machine

The drawings and parts lists do not contain any detailed information about the type and dimensions of fixing elements, etc.

NOTICE

Installing and removing the impeller

For some motor versions the stator link has an interior diameter that is smaller than the impeller diameter. When removing the rotor the stator coil connection can be damaged.

Only install the impeller in the direction on which a stator link is not attached. Contact the Siemens Service Center (Page 125), if necessary.

NOTICE

Dismantling centered parts

Centered parts can be damaged if dismantled improperly with unsuitable tools.

Use pullers or suitable devices to disassemble parts and components attached to the motor shaft.

Removing

- 1. Ensure you do not damage insulation when dismantling the device. Check the insulation for possible damage prior to re-installing.
- To disassemble the motor, disconnect the connecting cables from the terminals and the entry plate from the terminal box housing.
 In this way, the respective positioning of the cables in relation to one another and the sealing of the cables in the cable entries are to a large extent maintained.
- 3. Remove the connecting cables in the terminal box of the fan motor, and if necessary the cable on the ground terminal and the cables laid out on the motor.
- 4. Pull out the connector of the speed sensor.

Links

The circuit diagram (Page 59) shows the relationships required when connecting to the line supply.

Component assignment

When dismantling or assembling the bearing pay attention to the proper arrangement of the components particularly if the bearing is the same size on the DE side and NDE side, for example:

- Bearing shield
- Bearings
- Compression springs

- · Spacer washers,
- Covers with different centering length, etc.

Insulated roller 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.

9.4.4 Removing and installing the protecting ring

The protecting ring acts as an outer bearing seal. It sits on the shaft outside the bearing end shield.

9.4 Repair

Disassembly

• Once the coupling is detached, you can remove the protective ring from the shaft. After it has been removed, the protective ring will be deformed and must be replaced.

Assembly

• Push the protecting ring over the end of the shaft. Make sure that the outer collar is placed at a spacing of 1 mm from the bearing end shield.

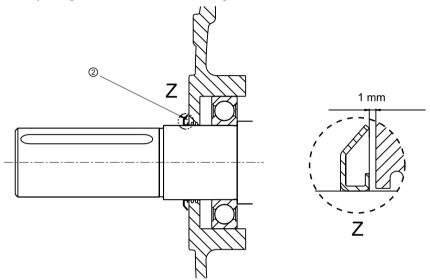


Figure 9-2 Fitting the protecting ring

9.4.5 Removing and mounting the bearing shields

- 1. Unscrew the belt pulleys. The belt pulleys may be jammed or distorted, in which case you should lever them off carefully.
- Remove the bearing shield.When removing the bearing shields, take care that the windings are not damaged.

For assembly, proceed in reverse order.

9.4.6 Installing the machine

Strictly ensure the greatest possible care and cleanliness when repairing the machine.

Mount the machine on an alignment plate. This ensures that the contact surfaces of the motor feet are all on the same level.

NOTICE

Do not damage windings

Windings protrude from the stator housing and can be damaged when attaching the end shield. This can damage the motor.

When mounting the end shield, ensure that the windings that project from the stator housing are not damaged.

Sealing the motor

- Clean bare joints between parts before re-assembling (e.g. between enclosures, end shields and the active parts of bearings).
- Brush the bare joints with the non-hardening sealing agent " Hylomar M".
- Note that these joints between parts (e.g. the sealing gap on the active part of the bearing) must also be resealed with a suitable, silicone-free sealant during assembly.
- Check the sealing elements fitted (e.g. at the terminal boxes) and replace them if they do not provide an adequate seal.
- Follow the manufacturer's application and safety instructions when using the sealant.
- Replace parts that are subject to wear such as the adjusting springs.

Installing the active parts of the bearings

- 1. First position the parts that must be arranged on the shaft within the bearing.
- 2. To fit the bearings on the shaft, heat them up to about 80 °C in oil or air.
- 3. Then push the bearings onto the shaft up to its shoulder. Avoid any heavy blows that might damage the bearings.
- 4. Fill the bearing to the top with the specified lubricating grease.

9.4.7 Removing the external fan

The external fan may only be replaced, removed and mounted by qualified technical personnel or a Siemens Service Center.

9.4.8 Removing and mounting the speed encoder

The speed encoder may only be replaced, removed and mounted by qualified technical personnel or a Siemens Service Center.

9.4 Repair

9.4.9 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 before you repair any paint damage. They will provide you with more information about the correct paint system and methods of repairing paint damage.



Repainting explosion-proof motors

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 surface resistance of the paint used:
 Surface resistance ≤ 1 GΩ for motors of explosion group III
- Breakdown voltage ≤ 4 kV for explosion group III

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.

Spare parts 10

10.1 Ordering data

When ordering spare parts, in addition to the precise designation of the spare part, specify the motor type and the serial number of the motor. Ensure that the spare part designation matches the designation in the spare part lists and add the associated part number.

Example:

Spare part Spare parts kit, drive-end bearing (Part 3.00)

Machine type 1PH81841JD202FA1
Serial number N-W91246206010001

The machine type and the serial number are indicated on the rating plate and in the technical data, and are also embossed on the drive end of the shaft.

Note

Bar code on rating plate

You can also read the machine type and serial number from the bar code on the rating plate.

Note

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

10.2 Spare parts kits

The spare parts are bundled with the necessary wearing parts in a logical way so as to create spare parts kits. The spare parts kits for the bearings also contain the bearing grease.

The following spare parts kits are available for you to order:

3.00	Spare parts kit, non-drive-end bearing (complete)
4.00	Spare parts kit, drive-end bearing (complete)
32.00	Spare parts kit, separately driven fan (only force-ventilated motors)
55.00	Spare parts kit, relevant version of speed encoder

Additional spare parts are available on request.

For an overview of the services available from Technical Support, please visit:

Technical Support (http://support.automation.siemens.com/WW/view/en/16605654)

10.4 Using commercially available spare parts

If you wish to submit a service request directly, you can do so via the following page:

http://www.siemens.com/automation/support-request (http://www.siemens.com/automation/support-request (<a href="http://www.siemens.com/automati

Insulated roller 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.

10.3 Ordering spare parts via the Internet

Spare parts can be ordered online from the spare parts service "Spares on Web":

Spares on Web (https://b2b-extern.automation.siemens.com/spares_on_web).

You can use "Spares on Web" to determine the order numbers for motor spare parts quickly and easily.

A short description of how to use "Spares on Web" is available on the Internet.

Guide for Spares on Web (http://support.automation.siemens.com/WW/news/en/25248626).

10.4 Using commercially available spare parts



Risk of explosion

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.

- 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.
- Commercially available equivalent standard parts such as screws may be used.

10.5 Spare parts force-ventilated motor

10.5.1 Force-ventilated motor, complete

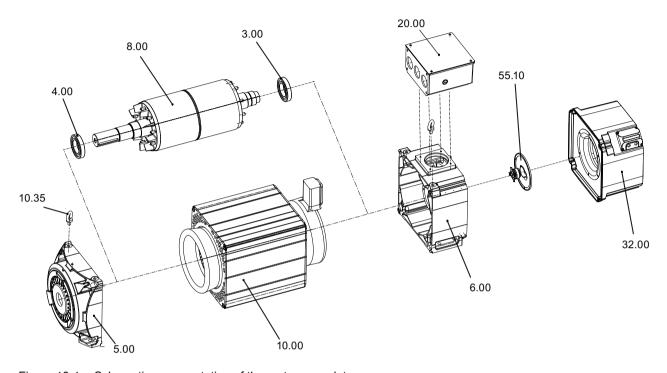


Figure 10-1 Schematic representation of the motor, complete

Table 10-1 Motor, complete

Number	Designation	Number	Designation
3.00	Spare parts kit, NDE bearing	10.00*	Stator housing (with laminated core and winding)
4.00	Spare parts kit, DE bearing	10.35*	Eyebolt
5.00*	Bearing shield, DE	20.00*	Terminal box
6.00*	Bearing shield, NDE	32.00	External fan
8.00*	Rotor, complete	55.10	Spare parts kit, speed encoder

^{*} On request

10.5.2 External fan

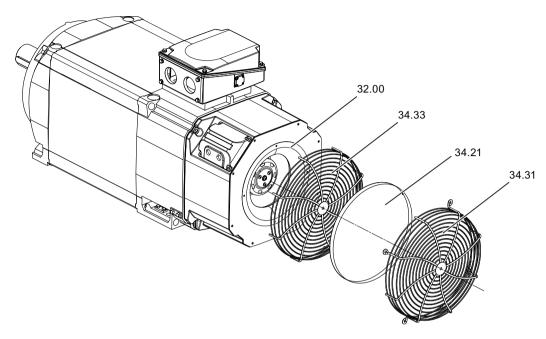


Figure 10-2 Spare parts for external fan (type 1PH818., 1PH822.)

Table 10-2 Spare parts for external fan

Part	Description	Part	Description
32.00	Fan	34.31	External grill cover
34.21	Filter element *	34.33	Inside basket

^{*} Option for type 1PH828.

10.5.3 Roller bearing cartridge DE with radial shaft sealing ring with regreasing

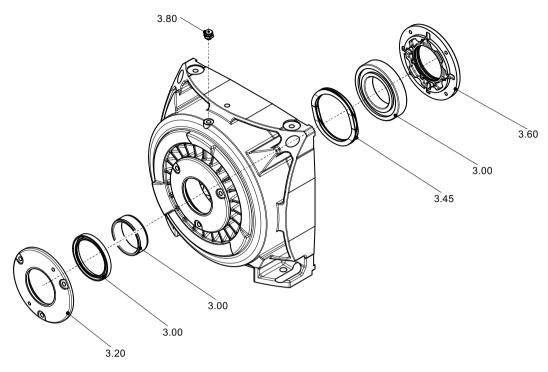


Figure 10-3 Rolling-contact bearing bush drive end with mounted gearing, with regreasing

Table 10-3 Spare parts for rolling-contact bearing bush drive end with mounted gearing, with regreasing

Number	Designation	Number	Designation
3.00	Spare parts kit, drive-end bearing	3.60*	Inner bearing cover
	 Deep-groove ball bearing (floating bearing) 		
	 Radial shaft sealing ring 		
	Inner ring		
3.20*	Outer bearing cover	3.80*	Grease nipple
3.45*	Corrugated spring/compression springs		

^{*} On request

10.5.4 Roller bearing cartridge DE, belt coupling

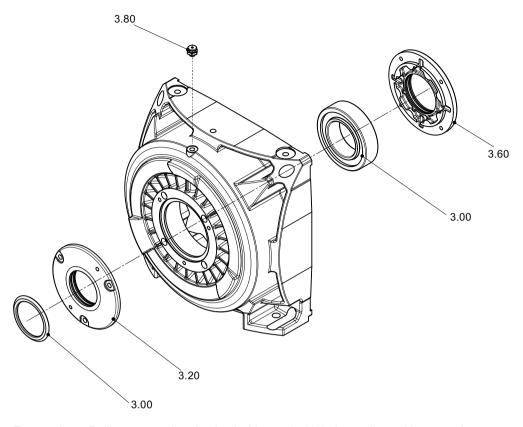


Figure 10-4 Rolling-contact bearing bush drive end with belt coupling, with regreasing

Table 10-4 Spare parts for rolling-contact bearing bush drive end with belt coupling, with regreasing

Number	Designation	Number	Designation
3.00	Spare parts kit, drive-end bearing	3.60*	Inner bearing cover
	 Cylindrical-roller bearing (floating bearing) 		
	 Protecting ring (rotating) 		
3.20*	Outer bearing cover	3.80*	Grease nipple

^{*} On request

10.5.5 Roller bearing cartridge DE, coupling output, with regreasing

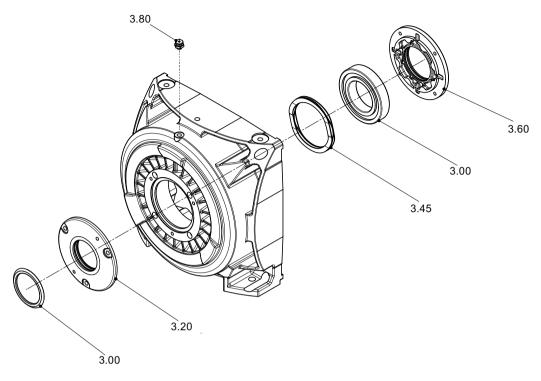


Figure 10-5 Rolling-contact bearing bush drive end, with coupling output, with regreasing

Table 10-5 Spare parts for rolling-contact bearing bush drive end, with coupling output, with regreasing

Number	Designation	Number	Designation
3.00	Spare parts kit, drive-end bearing	3.60*	Inner bearing cover
	 Deep-groove ball bearing (floating bearing) 		
	 Protecting ring (rotating) 		
3.20*	Outer bearing cover	3.80*	Grease nipple
3.45*	Corrugated spring		

^{*} On request

10.5.6 Roller bearing cartridge DE, coupling output, with permanent lubrication

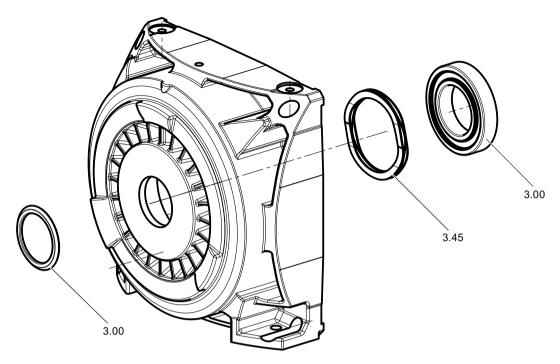


Figure 10-6 Rolling-contact bearing bush drive end, with coupling output, with permanent lubrication

Table 10-6 Spare parts for rolling-contact bearing bush drive end, with coupling output, with permanent lubrication

Number	Designation	
3.00	Spare parts kit, drive-end bearing	
	 Deep-groove ball bearing (floating bearing) 	
	Protecting ring (rotating)	
3.45*	Corrugated spring/compression springs	

^{*} On request

10.5.7 Roller bearing cartridge NDE, with permanent lubrication

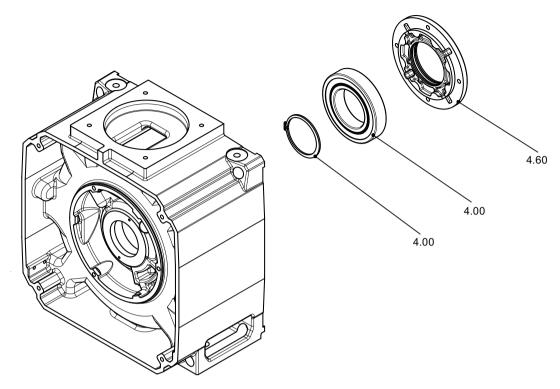


Figure 10-7 Roller bearing cartridge, non-drive end, permanent lubrication

Table 10-7 Spare parts for roller bearing cartridge, non-drive end, permanent lubrication

Number	Designation	
4.00	Spare parts kit, NDE bearing	
	 Deep-groove ball bearing (locating bearing) 	
	Retaining ring	
4.60*	Inner bearing cover	

^{*} On request

10.5.8 Roller bearing cartridge NDE, with regreasing (type 1PH818., 1PH822.)

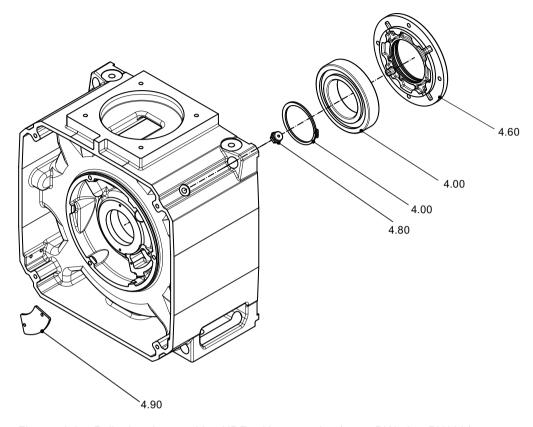


Figure 10-8 Roller bearing cartridge NDE, with regreasing (type 1PH818., 1PH822.)

Table 10-8 Spare part, roller bearing cartridge NDE, with regreasing (type 1PH818., 1PH822.)

Number	Designation	Number	Designation
4.00	Spare parts kit, NDE bearing	4.80*	Grease nipple
	 Deep-groove ball bearing (locating bearing) 		
	 Retaining ring 		
4.60*	Inner bearing cover	4.90*	Cover of spent grease chamber

^{*} On request

10.6 Terminal box

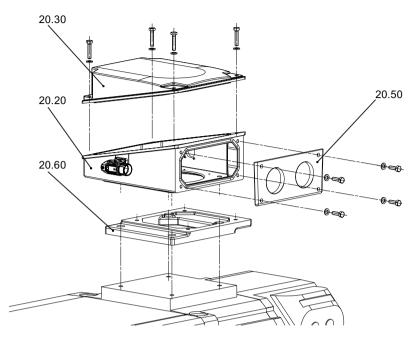


Figure 10-9 Terminal box

Table 10-9 Spare parts for terminal box

Number	Designation	Number	Designation
20.20*	Enclosure	20.50*	Entry plate
20.30*	Cover	20.60*	Adapter plate (optional)

^{*} On request

10.7 Speed encoder (type 1PH818., 1PH822.)

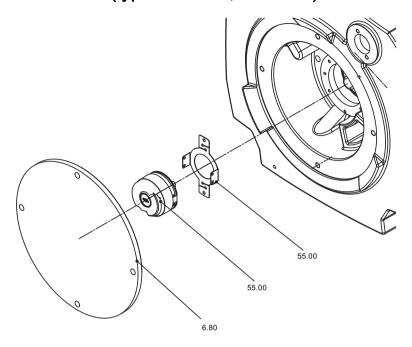


Figure 10-10 Speed encoder

Table 10-10 Spare part, speed encoder (type 1PH818., 1PH822.)

Part	Description
55.00	Spare parts kit, speed encoder
	Speed encoder
	Torque arm
6.80*	Cover

^{*} On request

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 Preparing for disassembly

Disassembly of the machine must be carried out and/or supervised by qualified personnel with appropriate expert knowledge.

- 1. Contact a certified waste disposal organization in your vicinity. Clarify what is expected in terms of the quality of dismantling the machine and provision of the components.
- 2. Follow the five safety rules (Page 13).
- 3. Disconnect all electrical connections and remove all cables.
- 4. Remove all liquids such as oil, cooling liquids, ...
- 5. Detach the machine fixings.
- 6. Transport the machine to a suitable location for disassembly.

See also

Maintenance (Page 87)

11.3 Dismantling the machine

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



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.

Secure the machine parts being dismantled to prevent them falling.

11.4 Disposal of components

Components

The machines consist for the most part of steel and various proportions of copper and aluminum. Metals are generally considered to be unlimitedly recyclable.

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

Dispose of the separated components according to local regulations or via a specialist disposal company. The same goes 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 thermically. Dirty foil must be disposed of via waste incineration.

Service and Support



A.1 Siemens Service Center

Contact for further information

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

Service numbers

If you wish to request local field service or order spare parts, or if you require answers to technical queries or any additional information, please contact the relevant service number below.

Please have the following machine data ready:

- Machine type
- Machine number

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

Table A-1 Service numbers

Local field service	Phone	+49 (0)911 895 7444
	Fax	+49 (0)911 895 7445
Technical queries or additional	Phone	+49 (0)911 895 7448
information	Fax	+49 (0)911 895 7449
Spare parts and repairs	Phone	+49 (0)911 895 7222
	Fax	+49 (0)911 895 7223

Contact:

- http://www.siemens.com/automation/support-request (http://www.siemens.com/automation/support-request (<a href="http://www.siemens.com/automa
- Id-service.i-cs@siemens.com (mailto:ld-service.i-cs@siemens.com)

A.1 Siemens Service Center

Quality documents

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

SIEMENS

EG-Konformitätserklärung

(nach der EG-Richtlinie 2006/95/EG, NSR) Nr. A5E02034600A - AG / 05.2010

Hersteller:

Siemens Aktiengesellschaft

Bereich Automation and Drives

Geschäftsgebiet

Large Drives

A&D LD

Anschrift:

Postfach 4743

Vogelweiherstr. 1-15

D-90025 Nürnberg

D-90441 Nürnberg

Produktbezeichnung:

Drehstrom Asynchronmotor mit Käfigläufer, wasser- bzw. luftgekühlt Permanentmagneterregter Synchronmotor, wasser- bzw. luftgekühlt

Typ:

1PH8

Achshöhe:

180, 225 und 280 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

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

Referenznummer Ausgabedatum Ausgabedatum Referenznummer EN 60034 - 1 04.2005 EN 60034 - 5 09.2007 01.2008 EN 60034 - 6 08.1996 EN 60034 - 9 EN 60204 - 1 06.2007

Anbringung der CE-Kennzeichnung:

Nürnberg, den 27.05.2010

Siemens Aktiengesellschaft

Jürgen Amedick

Unterschrift

Dr. Martin Kaufhold

Leiter Geschäftszweig Products

Produktsicherheitsbeauftragter Geschäftsgebiet

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.

Die EG-Konformitätsbewertung ist archiviert unter der Nummer A5E02034532A.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme; Managing Board: Peter Löscher, Chairman, President and Chief Executive Officer; Johannes Feldmayer, Heinrich Hiesinger, Joe Kaeser, Rudi Lamprecht, Eduardo Montes, Juergen Radomski, Erich R. Reinhardt, Hermann Requardt, Uriel J. Sharef, Klaus Wucherer;

Registered offices: Berlin and Munich; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684 WEEE-Reg.-No. DE

A&D LD

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Unterschrift

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

B.2 EC Declaration of Conformity (Ex t)

SIEMENS

EG-Konformitätserklärung

(nach Anhang VIII der EG-Richtlinie 94/9/EG) Nr. A5E01617933A

Hersteller:

Siemens Aktiengesellschaft

Sector Industry Drive Technologies Large Drives

DT LD

Anschrift:

Postfach 4743

Vogelweiherstr. 1-15

D-90025 Nürnberg

D-90441 Nürnberg

Produktbezeichnung:

Drehstrom-Asynchronmaschine mit Käfigläufer

Zündschutzart "tc"

Typ: 1PH8

Gerätegruppe II, Gerätekategorie 3D

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 60079-31

2009

EN 60034

2011

Erstmalige Anbringung der CE-Kennzeichnung: 2008

Das bezeichnete Produkt ist bestimmt zum Einbau in eine andere Maschine für den Einsatz in explosionsgefährdeten Bereichen der Zone 22 mit nichtleitenden Stäuben nach EN 60079-10-2 und Richtlinie 1999/92/EG.

Die Inbetriebnahme ist solange untersagt, bis die Konformität dieser Maschine mit der Richtlinie 94/9/EG festgestellt ist.

Nürnberg, den 30.03.2012

Siemens Aktiengesellschaft

Klaus Körber.

Bevollmächtigter für den Produktbereich

Martin Exß,

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

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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: 2008

The product indicated is intended to be installed in another machine for use in hazardous areas of zone 22 (non-conductive dust) in accordance with EN 60079-10-2 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. 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: 2008

Uvedený výrobek je určen pro montáž do jiných strojů pro použití v oblastech ohrožených explozí zóny 22 s nevodivým prachem podle EN 60079-10-2 a směrnice 1999/92/EG.

Stroj není dovoleno zprovozňovat, dokud není potvrzena shoda tohoto stroje se směrnicí 94/9/EG.

Toto prohlášení osvědčuje shodu s uvedenými směrnicemi, neznamená však záruku vlastností nebo trvanlivosti. Dodržujte bezpečnostní pokyny podle dodané dokumentace k výrobku.

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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

Nürnbera

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: 2008

Det beskrevne produkt er bestemt til indbygning i en anden maskine til indsats i eksplosive områder i zone 22 med ikke-ledende støv i henhold til EN 60079-10-2 og direktiv 1999/92/EF.

Idrifttagning er forbudt, indtil denne maskine er konstateret overensstemmende med direktiv 94/9/EF.

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.

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 järgmiste 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: 2008

Antud toode on mõeldud paigaldamiseks teise masina sisse kasutamiseks vastavalt EN 60079-10-2 ja direktiivi 1999/92/EÜ 22 tsooni plahvatusohtlikes piirkondades mittejuhtivate tolmudega.

Kasutuselevõtt on nii kaua keelatud, kuni on fikseeritud antud masina vastavus direktiivile 94/9/EÜ.

Käesolev deklaratsioon tõendab vastavust nimetatud direktiividele, ei kujuta endast aga tooteomadus- ega vastupidavusgarantiid.

Tarnimisel kaasaantud tootedokumentatsioonis äratoodud ohutusjuhistest tuleb kinni pidada.

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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: 2008

Το αναφερόμενο προϊόν προορίζεται για εγκατάσταση σε άλλη μηχανή για χρήση σε περιοχές με κίνδυνο έκρηξης της Ζώνης 22 για μη αγώγιμη σκόνη σύμφωνα με ΕΝ 60079-10-2 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.

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": 2008

El producto mencionado está previsto para su montaje en otra máquina prevista para su instalación en atmósferas potencialmente explosivas de la zona 22 con polvo no conductor conforme a EN 60079-10-2 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.

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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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: 2008

Le produit désigné est destiné à l'implantation dans une autre machine pour l'utilisation en atmosphère explosible, zone 22 avec poussière non-conductrice selon la norme EN 60079-10-2 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.

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.

Italienisch

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: 2008

Il prodotto designato è destinato ad essere installato in un'altra macchina per l'impiego in aree a rischio di esplosione della Zona 22 con polveri non conduttrici secondo la norma EN 60079-10-2 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.

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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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

izmantot ierīces un aizsardzības sistēmas iespējami sprādzienbīstamā vidē.

Ar šo dokumentu apliecinām, ka iepriekš aprakstītais izstrādājums atbilst šādām prasībām:

CE zīmes pirmā uzlikšana: 2008

Saskaņā ar EN 60079-10-2 un direktīvu 1999/92/ EK šis izstrādājums paredzēts iebūvēšanai citos mehānismos, kas izmantojami 22. zonas strāvu nevadošu putekļu sprādzienbīstamā vidē. Nodošana ekspluatācijā aizliegta kamēr nebūs apstiprināta šīs mašīnas atbilstība direktīvai 94/9/EK.

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 atitikties deklaracija (pagal EB direktyvos 94/9/EB VIII priedą)

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: 2008

Nurodytas produktas skirtas montuoti į kitą mašiną, naudojamą potencialiai sprogioje 22 zonos aplinkoje su nelaidžiomis dulkėmis pagal EN 60079-10-2 ir direktyvą 1999/92/EB.

Draudžiama atiduoti ekspoatacijai tol, kol nenustatyta, kad ši mašina atitinka direktyvą 94/9/EB.

Ši deklaracija patvirtina atitikimą nurodytoms direktyvoms, tačiau negarantuoja jokių ypatybių ar tinkamumo naudoti termino.

Būtina laikytis pridedamoje gaminio dokumentacijoje pateiktų įspėjamųjų nurodymų.

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 használathoz.

A fent említett termék szabványokkal való egyezőségét a következőkkel igazoljuk:

A CE-jelzés első elhelyezése: 2008

A jelzett termék más gépbe történő elhelyezésre készült a 22-es zónába sorolt nemvezető porok környezetében területein történő alkalmazáshoz az EN 60079-10-2 szabvány és az 1999/92/EG irányelv szerint.

Az üzembe helyezés mindaddig tilos, amíg a gép egyezőségét a 94/9/EG irányelvvel nem rögzítették.

Ez a nyilatkozat tanúsítja a nevezett irányelveknek való megfelelőséget, de semmilyen minőségi- vagy tartóssági garanciát nem jelent.

A csatolt termékdokumentációban szereplő biztonsági utasításokat figyelembe kell venni.

Maltesisch

UE-Dİkjarazzjoni ta' Konformità (skond I-appendići VIII tad-Direttiva tal-Kunsill ta'I-Unjoni Ewropea 94/9/KE)

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

II-prodott imsemmi jikkorrispondi ma' I-instruzzjonijiet tad-direttivi ewropej.

94/9/KE

Direttiva tal-parlament Ewropew u tal-Kunsill dwar l-approssimazzjoni tal-liģijiet ta'l-Istati Membri li jirrigwardaw tagħmir u sistemi ta' sigurtà għal użu skond ir-regolamenti f' żoni fejn hemm periklu ta' splużżjonijiet.

Nikkonfermaw il-konformità tal-prodott imsemmi ma' l-istandards:

Applikazzjoni tal-marka CE: 2008

II-prodott imsemmi huwa maħsub biex jiġi immuntat f'magna oħra għall-użu f' żona ta' periklu 22 (trab mhux konduttiv) skond EN 60079-10-2 u d-Direttiva 1999/92/KE.

II-prodott ma jistax jibda' jiği mħaddem sakemm tigi determinata il-konformità ta' din il-magna mad-direttiva 94/9/KE.

Din id-dikjarazzjoni mhix garanzija ta' responsabbiltà dwar il-prodott. Ir-regoli tad-dokumentazzjoni tal-prodott għandhom jigu obduti.

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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: 2008

Het omschreven product is bedoeld voor inbouw in een andere machine voor gebruik op explosiegevaarlijke plaatsen van zone 22 met niet-geleidende stoffen volgens EN 60079-10-2 en richtlijn 1999/92/EG.

De inbedrijfneming is verboden tot de conformiteit van de machine met de Richtlijn 94/9/EG is vastgesteld.

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: 2008

Det omtalte produktet er ment for innbygging i en annen maskin for bruk i eksplosjonsfarlige områder i sone 22 med ikke-ledende støv i henhold til EN 60079-10-2 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.

Denne erklæringen er ingen garanti om egenskaper.

Henvisningene i den medfølgende produktdokumentasjonen må overholdes

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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: 2008

Wymieniony produkt przeznaczony jest do wbudowania w inne maszyny do zastosowania w strefach zagrożonych wybuchem 22 z nieprowadzącymi pyłami według normy EN 60079-10-2 i dyrektywy 1999/92/WE.

Nie zaleca się uruchomienia bez stwierdzenia zgodności niniejszej maszyny z dyrektywą 94/9/EG.

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: 2008

O produto supracitado destina-se à instalação noutra máquina para a utilização em atmosferas potencialmente explosivas da zona 22 com poeiras não condutoras em conformidade com a Norma EN 60079-10-2 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 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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Russisch

Заявление о соответствии стандартам ЕС (согласно приложению VIII Директивы ЕС 94/9/ЕG)

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 странучастниц на устройства и системы защиты, применяемые во взрывоопасных помещениях.

Подтверждаем соответствие вышеназванного изделия следующим стандартам:

Первое нанесение знака СЕ: 2008

Названное изделие предназначено для встраивания в другой механизм для применения во взрывоопасных помещениях зоны 22 при наличии неэлектропроводящей пыли согласно EN 60079-10-2 и Директиве 1999/92/EG.

Ввод в эксплуатацию запрещен, пока не будет признано соответствие такого механизма директиве 94/9/EG.

Настоящее заявление не является гарантией эксплуатационных характеристик.

Соблюдайте рекомендации документации на изделие, входящей в состав поставки.

Slowakisch

Prehlásenie o zhode s normami EÚ

(v súlade s prílohou VIII Smernice EÚ č. 94/9 /EEC, vrátane všetkých neskorších doplnkov)

Výrobca: Siemens

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 zosúladení 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: 2008

Uvedený výrobok je určený pre zabudovanie do iného stroja pre nasadenie v priestoroch s nebezpečím výbuchu v zóne 22 s nevodivými prachovými časticami podľa normy EN 60079-10-2 a smernice EÚ č. 1999/92/EEC Uvedenie do prevádky nie je dovolené dovtedy, pokiaľ nebude stanovená zhoda tohoto stroja so smernicou EÚ č. 94/9/EEC.

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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Slowenisch

EG- izjava o skladnosti (po dodatku VIII EG smernici 94/9/EG)

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

Označeni izdelek ustreza predpisom sledečih evropskih smernic:

94/9/EG Smernice Evropskega parlametna in sveta za zakonsko prilagajanje predpisov držav članic za

naprave in varovalne sisteme. V eksplozijsko ogroženih področjih velja uporaba ustreznih določil.

Potrjujemo skladnost zgoraj navedenega izdelka po normah:

Prva navedba CE - oznake: 2008

Označeni izdelek je namenjen za vgradnjo v drug stroj za uporabo v eksplozijsko ogroženih področji in to v conah 22 z neprevodnimi vrstami prahu po EN 60079-10-2 ter smernici 1999/92/EG.

Uporaba je prepovedana, dokler ni zagotovljena skladnost stroja s predpisi 94/9/EG.

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.

Finnisch

EU-vaatimustemukaisuusvakuutus (EU-direktiivin 94/9/EY liitteen VIII mukaan)

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

Kuvattu tuote vastaa seuraavien eurooppalaisten direktiivien vaatimuksia:

94/9/EY Euroopan Parlamentin ja Neuvoston direktiivi räjähdysvaarallisissa tiloissa käytettäväksi

tarkoitettuja laitteita ja suojajärjestelmiä koskevan jäsenvaltioiden lainsäädännön lähentämisestä..

Vakuutamme, että yllä mainittu tuote on seuraavien standardien mukainen:

CE-merkintä annettu ensimmäisen kerran: 2008

Kuvattu tuote on tarkoitettu asennettavaksi toiseen koneeseen, jota käytetään räjähdysvaarallisissa, sähköä johtamatonta pölyä sisältävissä tilaluokan 22 tiloissa standardin EN 60079-10-2 ja direktiivin 1999/92/EY mukaisesti.

Käyttöönotto on kielletty, kunnes koneen on todettu vastaavan direktiivin 94/9/EY määräyksiä.

Tämä selostus todistaa, että tuote vastaa mainittuja direktiivejä, mutta se ei ole ominaisuus- tai kestävyystakuu. Tuotteen mukana toimitettavan dokumentaation turvallisuusohjeita on noudatettava.

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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: 2008

Den märkta produkten är avsedd att byggas in i en annan maskin för insats i områden med explosionsrisk i zonen 22 med ej ledande damm enligt EN 60079-10-2 och direktiv 1999/92/EG.

Idrifttagande är förbjudet fram till dess att denna maskins överensstämmelse med direktiv 94/9/EG har fastställts.

Denna förklaring garanterar överensstämmelse med nämnda standarder, men gäller inte som garanti av något slag. Beakta säkerhetsanvisningarna i den medföljande produktdokumentationen.

Rumänisch

Declaratie 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: 2008

Produsul mai sus menționat este conceput pentru montarea într-o altă mașină pentru utilizarea în zone cu pericol de explozie zonei 22 cu pulberi neconductibile cu EN 60079-10-2 și directiva 1999/92/CE.

Punerea în funcțiune este interzisă până când se stabilește conformitatea acestei mașini cu directiva 94/9/CE.

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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Bulgarisch

EC- декларация за съгласуваност, (съгласно приложение VIII на директива на ЕС 94/9/ЕG)

Производител: Siemens AG Sector Industry Drive Technologies Large Drives

Aдрес: Postfach 4743 Vogelweiherstr. 1-15

D-90025 Nürnberg D-90441 Nürnberg

Обозначеният продукт отговаря на предписанията на следната европейска директива:

94/9/ЕС 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 СЕ-обозначение: 2008

Обозначеният продукт е предназначен за вграждане в друга машина за употреба във взривоопасни области на зона 22 с непроводими прахове, съгласно EN 60079-10-2 и директива 1999/92/EG.

Пускането в експлоатация е забранено до тогава, докато се потвърди съгласуваността на тази машина с директива 94/9/EG.

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.

B.2 EC Declaration of Conformity (Ex t)

Additional documents

If you have any questions or problems, contact your Siemens service center (Page 125).

C.1 Operating instructions, external fan

Montageanleitung

⟨€x⟩ Radialventilatoren

Radialventilatoren GR31M / GR25V der Gruppe II, Geräte-kategorie 3D mit Zündschutzart "c" für die Förderung von explosionsfähiger Staubatmosphäre der Gruppe IIIB für Zone 22, mit EC-Innenläufermotor MK096 für staubexplosionsgefährdete Bereiche, Zündschutzart "tc".

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VENTILATOR-Typenschild einkleben!



Anwendung

Saugende Ausführung





- Ziehl-Abegg-Radialventilatoren der Baureihe GR31M / GR25V (Typenbezeichnung siehe Typenschild) in explosionsgeschützter Ausführung Ex c IIIB mit integriertem EC-Innenläufermotor der Bauart MK096 in Zündschutzart Schutz durch Gehäuse "tc" 🗟 II 3D Ex tc IIIB T150°C nach IEC 60079-0; 60079-31 sind keine gebrauchsfertigen Produkte, sondern als Komponenten für lufttechnische
- Geräte, Maschinen und Anlagen konzipiert. Sie dürfen erst betrieben werden, wenn sie ihrer Bestimmung entsprechend eingebaut sind und die Sicherheit durch Schutzeinrichtungen nach DIN EN ISO 13857 (DIN EN ISO 12100) und den nach EN14986 erforderlichen baulichen Explosionsschutzmaßnahmen sichergestellt ist.
- Ziehl-Abegg-Radialventilatoren erfüllen hinsichtlich der Werkstoffwahl durch besondere Schutzmaßnahmen im Bereich möglicher Berührungsflächen zwischen rotierenden und stehenden Bauteilen (Lüfterraddeckscheibe Einströmdüse) die Anforderungen der Norm EN14986. Für das rotierende Teil (Lüfterraddeckscheibe) des Motorlüfterrades wird als Werkstoff Stahl beschichtet (RH31M) bzw. PA66 (RH25V) eingesetzt. Es dürfen nur Werkstoff-
- paarungen nach EN14986 eingesetzt werden. Alle Ventilator-Motor-Einheiten werden in zwei Ebenen nach DIN ISO 1940-1 ausgewuchtet.

Assembly instructions



Centrifugal Fans

Group III, 3D Device Category GR31M / GR25V centrifugal fans with type of protection "c" for the conveyance of potentially explosive, group IIIB dust atmospheres for zone 22, with an EC internal rotor motor MK096. for explosion-hazardous areas, type of protection "tc"

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Application

Drückende Ausführung





- Ziehl-Abegg series GR31M / GR25V centrifugal fans (type designation see rating plate) explosion-protected versionEx c IIIB with integrated EC internal rotor motor, MK design in protection type protection through house "tc" II 3D Ex tc IIIB T150°C according to IEC 60079-0; 60079-31 are not ready-to-use products, but designed as components for ventilation devices, machines, and systems.
- They may only be operated when they are installed as intended, and when safety is ensured by safety equipment according to DIN EN ISO 13857 (DIN EN ISO 12100) and the required structural explosion-protective measure's according to EN14986.
- In regard to the material selection, Ziehl-Abegg centrifugal fans meet the requirements in the EN14986 standard through special protective measures in the area of possible contact surfaces between rotating and stationary components (fan impeller cover disk) / inlet rings. For the rotating part (fan impeller cover disk) coated steel (RH31M) or PA66 (RH25V) is used. Mate only with material acc.
- All fan-motor-units are balanced in two levels in accordance with DIN ISO 1940-1.

deutsch

english

ZIEHL-ABEGG

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Sicherheitshinweise

- Die Normen EN 60079-0 Elektrische Betriebsmittel für explosionsgefährdete Bereiche (Allgemeine Bestimmungen), EN 60079-31 (Schutz durch Gehäuse "tc") und alle für Ventilatoren in explosionsgeschützter Ausführung relevanten Normen müssen eingehalten werden. Damit wird der Betrieb von Motoren in potentiell explosionsfähigen Staub-Luft-Gemischen in explosionsgefährdeten Bereichen der Kategorie 3D (Zone 22) zulässig.
- Die Ventilatoren sind nur zur Förderung von Luft oder explosionsfähiger Staub-Luft-Gemische der Zone 22 hestimmt
- Fördermedien, die die Werkstoffe des Radialventilators angreifen, sind nicht zulässig. Verwendete Materialien:

 RH25V: PA66+6 (GF + CF)40; Stahl DIN EN 10346-

 - RH31M: Lackbasis Polyacrylat, Polyisozyanat; Beschichtungspulverbasis Polyester-Epoxid-Harz; Stahl DIN EN 10042-DX53D+Z275-N-A
 - Einströmdüse (RH25V): Blech DIN EN 10088-2
 - Einströmdüse (RH31M): Blech DIN EN 1652-Cu-DHP-R220
- Die Angabe der maximalen Oberflächentemperatur auf dem Motor-Leistungsschild muss die unterste Zündtemperatur des möglicherweise auftretenden, brennbaren Staubes unterschreiten.
- Betreiben Sie den Ventilator nur nach seiner bestimmungsgemäßen Verwendung und nur bis zur max. zulässigen Betriebsdrehzahl gemäß Angaben auf dem Venti-lator-/ Motorlüfterrad-Typenschild. Ein Überschreiten der max. Betriebsdrehzahl ist nicht zulässig. Das Laufrad kann bersten - Lebensgefahr! → siehe Betriebsbedingungen.
- Die max. zulässigen Betriebsdaten auf dem Ventilator-Leistungsschild gelten für eine Luftdichte ρ = 1,2 kg/m 3
- Montage und elektrische Installation darf nur durch geeignetes Fachpersonal, das die einschlägigen Vorschriften beachtet, vorgenommen werden!
 - Zur Vermeidung von Störfällen und zum Schutz des Motors muss der Motor durch die eingebauten Kaltleiter bei einer Betriebsstörung (z.B. unzulässig hohe Mediumstemperatur) in Vertindung mit einem Auslösegerät (Kennzeichnung II (2) G siehe Richtlinie 94/9/EG) und einem externen Schütz vom Netz getrennt werden.
 - max. Prüfspannung der Kaltleiter: 2,5V
 - Ein stromabhängiger Schutz ist nicht zulässig und auch als Sekundärschutz nicht möglich.
 - Die Motoren enthalten Drillingskaltleiter. Mehr als zwei Kaltleiterketten dürfen nicht in Serie geschaltet werden, da dies zu undefiniertem Abschalten führen kann.
- Alle Ventilator-Motor-Einheiten werden mit herausge-Alle Vertilator-Motor-Einneiten werden mit nerausgeführtem Kabel geliefert. Die zulässige Mediumstemperatur beträgt -20°C...+40°C. Abweichende Mediumstemperaturen sind dem Typenschild oder dem Datenblatt zu entnehmen. Die Einhaltung der EN ISO 13857 bzw. EN 60529 IP20 bezieht sich nur auf den montierten Berührschutz sofern dieser zum Lieferumfang gehört. Für die vollständige Erfüllung der EN ISO 13857 bzw. EN 60529 ist der Anlagenbauer verantwortlich.
- Sicherheitsbauteile, z.B. Schutzgitter, dürfen weder demontiert noch umgangen oder außer Funktion gesetzt werden!
- Wenn durch die Geräte- oder Anlagenkonstruktion das Ansaugen oder Hereinfallen von Fremdkörpern nicht verhindert werden kann, es besteht die **Gefahr der Explo**sion einer zündfähigen Staub-Luftatmosphäre, sind vom Betreiber zusätzliche Maßnahmen zu treffen, um dies zu verhindern, z.B. durch das Anbringen eines zusätzli-chen Schutzgitters mit einer engen Maschenweite. Bei den Einbaubeispielen die im nebenstehenden Bild mit einem Blitz gekennzeichnet sind, muss mit einer erhöhten Gefahr bezüglich dem Hereinfallen von Fremdkörpern gerechnet werden



Safety instructions

- The standards Explosive atmospheres Part 0: Equipment (General Requirements), EN 60079-15 (Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t") and all standards relevant to fans in explosion protected versions must be complied with. That makes operation of motors in potentially explosive dust-air mixtures in Category 3D (Zone 22) explosive atmosphere areas permissible.
- The fans are intended to convey air or potentially explosive
- Zone 22 dust-air mixtures.

 Pumping media that corrode the centrifugal fans are not permitted. Materials used:
 - RH25V: PA66+6 (GF + CF)40; Steel DIN EN 10346-DX54D
 - DX34D
 RH31M: Varnish base polyacrylate, polyisocyanate; coated powder basis polyester epoxy resin; Steel DIN EN 10042-DX53D+Z275-N-A
 Air inlets (RH25V): Plate DIN EN 10088-2 (1.4571)
- Inlet ring (RH31M): Sheet DIN EN 1652-Cu-DHP-R220
- The specification of the maximum surface temperature on the motor rating plate must be less than the lowest ignition temperature of any possibly occurring, flammable dust.

 Operate the fan only in accordance with its intended use
- and only up to the max. permissible operating speed in compliance with the specifications on the fan/motor impel-ler/rating plate. Exceeding the max. operating speed is prohibited. The impeller can burst - danger of death!see operating instructions.
- The maximum permissible operating data given on the fan-rating-plate are valid from air density ρ =1,2 kg/m³.
- Mounting and electrical installation may only be carried out by trained specialized personnel who observe the relevant regulations!
 - In order to prevent malfunctions and in order to protect the motor the motor must be disconnected from the mains by the integrated PTC in connection with a triggering device (identification

 Il (2)G; see directive 94/9/EU) and an external contactor during an operations failure (e.g., inadmissibly high medium temperature)
- max. test voltage of the PTC: 2.5V
- A current dependent protection is not admissible and also not possible as secondary protection.
 The motors have triplet PTC's. More than two PTC's
- may not be connected in series, as this can lead to undefined shut-downs.
- All fan-motor-units are supplied with the cable led out. The permissible media temperature is -20°C...+40°C. Refer to the rating plate or data sheet for non-complying media temperatures. Compliance with EN ISO 13857 or EN 60529 IP20 relates solely to the mounted contact protec-tion insofar as it is included in the scope of delivery. The tion insolar as it is included in the scope of delivery. The system constructor is responsible for compliance with EN ISO 13857 or EN 60529.

 Safety features, e.g. guard grilles, are not to be dismantled, circumvented or made inoperative!
- If sucking or falling in of foreign objects cannot be prevented due to the device design or plant construction, there is a hazard of explosion of an ignitable dust-air mixture; the operator must take additional measures to prevent this from occurring, for instance by attaching an additional narrow meshed guard grill. In the installation examples marked with a lightning symbol in the picture opposite, one must reckon with an increased hazard regarding foreign objects being able to fall in.

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- · Ein Restrisiko durch Fehlverhalten, Fehlfunktion, oder Einwirken höherer Gewalt beim Betreiben des Radialventilators kann nicht völlig ausgeschlossen werden. Der Planer, Betreiber oder Erbauer des Gerätes, der Maschine oder Anlage muss durch geeignete Sicherheitsmaß-nahmen nach **DIN EN ISO 12100** und insbesondere nach EN14986 verhindern, dass eine Gefährdungssituation
- entstehen kann. Die Einhaltung der EMV-Richtlinie 2004/108/EG wird nur dann gewährleistet, wenn das Produkt direkt an das übliche Stromversorgungsnetz angeschlossen ist. Wird dieses Produkt in eine Anlage integriert oder mit anderen Komponenten (z.B. Regel- und Steuergeräte) komplettiert und betrieben, so ist der Hersteller oder Betreiber der Gesamtanlage für die Einhaltung der EMV-Richtlinie 2004/108/EG verantwortlich. Beachten Sie die Hinweise zur Instandhaltung und
- Diese Montageanleitung ist Teil des Produktes und als solche zugänglich aufzubewahren



Transport, Lagerung

- Ziehl-Abegg- Ventilatoren sind ab Werk für die jeweils
- vereinbarte Transportart entsprechend verpackt.
 Transportieren Sie den/die Ventilator/-en entweder originalverpackt oder größere Ventilatoren an den dafür vorgesehenen Transportvorrichtungen (Gehäuseflansch, Befestigungswinkel, Bohrungen am Motorgehäuse zum Einschrauben von Ringschrauben) mit geeigneten Trans-
- Beachten Sie die Gewichtsangaben auf dem Typenschild.
- Nicht am Anschlusskabel transportieren! Vermeiden Sie Schläge und Stöße, besonders bei Geräten mit aufgebauten Ventilatoren.
- Achten Sie auf evtl. Beschädigung der Verpackung oder des Ventilators.
- Lagern Sie den Ventilator trocken und wettergeschützt in der Originalverpackung oder schützen Sie ihn bis zur endgültigen Montage vor Schmutz und Wettereinwirkung. Vermeiden Sie extreme Hitze- oder Kälteeinwirkung.
- Vermeiden Sie zu lange Lagerzeiträume (wir empfehlen max. ein Jahr) und überprüfen Sie vor dem Einbau die ordnungsgemäße Funktion der Motorlagerung



- A residual risk through inappropriate behavior, malfunction, or affects through acts of God or force majeure during operation of the centrifugal fan cannot be completely operation of the centificial ran carinot be completely excluded. The planner, operator, or constructor of the system, machine, or plant must prevent a hazardous situation from arising by taking appropriate safety precautions in accordance with **DINENTISO 12100** and especially in
- accordance with the EN14986.

 Compliance with EMC guideline 2004/108/EG is only guaranteed if the product is connected to the standard electricity supply grid. If this product is integrated into a system or complemented and operated with other components (e.g. controller units and control devices), the manufacturer or operator of the entire system is responsible for the compliance with the EMC directive 2004/108/FG.
- Pay attention to the notes which concerning maintenance
- These assembly instructions are part of the product and, as such, are to be kept accessible at all times.



Transport, storage

- Ziehl-Abegg Fans are packaged at the factory to comply
- with requirements for the agreed mode of transport.
 Transport the fan(s) either in the original packaging or, in
 the case of larger fans, on the dedicated transportation interease of larger rans, of the declared a language rans, of interesting tracket, holes on the motor housing to attach lifting eye bolts), using a suitable means of transportation.
- Observe the weight data on the type code
- Do not transport the fan by the connecting cable!
- Avoid impacts and collisions, especially on fans set-up on devices.
- Be on the alert for any damage to the packaging or the fan.
- Store the fan in the original packaging in a dry area protected from the weather or protect it from dirt and weather until final installation.
- Avoid exposure to extreme heat and cold.
- Avoid excessive storage periods (we recommend a one year max.) and inspect the motor bearings for proper operation prior to installation.



Montage

- Es obliegt der Verantwortung des System- oder Anlagenbauers, dass anlagenbezogene Einbau- und Sicherheits hinweise sich im Einklang mit den geltenden Normen (DIN EN ISO 12100, 13857, DIN EN 60529, EN14986) befinden.
- Für alle Ventilatorbauformen gilt:

 Nicht verspannt einbauen. Anbauflächen müssen eben sein. Verformungen und Verlagerungen dürfen nicht zum Anschlagen oder Schleifen rotierender Teile führen.

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Mounting

- The system manufacturer or the machine builder is responsible that the inherent installation and security informations are harmonised with the valid standard and guide-lines (DIN EN ISO 12100,13857, DIN EN 60529,EN14986).
- The following applies to all fan designs:

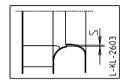
 Do not install distorted. The installation area must be level. Deformations and misalignments must not result in rotating parts striking or grinding



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 Bei Einhaltung der Werkstoffpaarung müssen folgende Mindestspalte eingehalten werden: zwischen rotierwill destspale eingerlaten werden. Zewischen Totel-enden und stehenden Teilen darf der Mindestspalt nicht kleiner als 1 % des maßgeblichen Kontaktdurchmes-sers, aber nicht weniger als 2 mm in axialer oder radialer Richtung sein und muss nicht mehr als 20 mm betragen. Das Spaltmaß "S" nach Abb. wurde bereits im Auslieferungszustand eingestellt. Vor Einbau ist der Ventilator vom Anlagenbauer auf gleichmäßiges Spaltmaß zu überprüfen. Bei Abweichung ist der Hersteller zu informieren.



- Zur Befestigung des Ventilators und der Schutzgitter, Schrauben der Festigkeitsklasse 8.8 verwenden und mit geeigneter Schraubensicherung versehen. Zul. Anzugsmomente: M5 = 5,5Nm; M8 =23 Nm. Bestimmte Betriebspunkte / Drehzahlen dürfen bei
- auftretenden Eigenresonanzen aufgrund von Anbauteilen nicht gefahren werden. Die Überprüfung auf Eigenresonanz ist vom Anlagenbauer bei Inbetriebnahme durchzuführen.
- Der Ventilator darf nur an Stromkreise angeschlossen werden, die mit einem allpolig trennenden Schalter abschaltbar sind
- Elektrischer Anschluss entsprechend dem im Klemmenkasten angebrachten Schaltbild! Das Anschlussschaltbild muss am Betriebsort verfügbar sein. Motoranschlusskabel mit Kabelbindern oder Kabel-
- schellen befestigen. Die Befestigung ist so vorzunehmen, dass das Kabel nach dem Befestigen noch verschiebbar ist, und somit die Kabelisolation nicht beschädigt wird
- Werden Gefährdungen durch Blitzschlag festgestellt, müssen die Anlagen durch geeignete Blitzschutzmaß-nahmen geschützt werden.
- Anlagen müssen in ausreichendem Sicherheitsabstand zu Sendeanlagen aufgestellt oder durch geeignete Abschirmung geschützt werden.

 For compliance with material mating, maintain the following minimum gaps: between rotating and stationary parts, the minimum gap must not be less than 1 % of the decisive contact diameter, but not less than 2 mm in axial or radial direction and must amount to no more than 20 mm. The gap dimension "S" in the figure was already set in the as-delivered condition. Before installing the fan, the plant constructor is to check for uniform gap dimension. Inform the manufacturer if there are any non-compliances.



- To attach the fan and the guard grill, use Strength Class 8.8 bolts and provide with suitable bolt locking. Perm. torque: M5 = 5,5Nm; M8 = 23 Nm.
- Certain operating points / speeds may not be run during self-resonance of the attached components. The verification of self-resonance is to be carried out by the system constructor during start-up operation.
- Connect fan only to electrical circuits that can be disconnected with an all-pole isolating switch. Electrical connection corresponding to the wiring
- diagram in the terminal box! The connection diagrams
- must be available at the operating location.
 Fasten the motor connection with cable ties or cable clamps. Attachment is to be carried out in such a way that the cable can still be moved after attachment and
- so that the cable insulation will not be damaged.

 If hazards from lightning strikes have been ascertained, the system must be protected through the use of suitable lightning protection measures.
- Systems must be sufficiently separated from transmit-ting installations or be protected through suitable



Betriebsbedingungen

- Das Ventilator-Leistungsschild enthält die Bemessungsspannung und Schaltung und bis zu welchen Daten der Ventilator belastet werden kann. Höhere Werte als die gestempelte Aufnahmeleistung / gestempelten Aufnahmeleistungen bedeuten, dass der Ventilator in einem nicht zulässigen Betrieb arbeitet. Motorschutz: siehe Sicherheitshinweise
- Schalthäufigkeit: Der Motor ist für Dauerbetrieb S1 bemessen. Die Steuerung darf keine extremen Schaltbetriebe zulassen!
- A-bewerteter Schallleistungspegel größer 80dB(A) möglich.



Operating conditions

- The fan rating plate includes the rated voltage and circuit and to which data the fan can be loaded. Values higher than the stamped power consumption / stamped power consumptions mean the fan is working in an impermissible range.
 Motor protection: see safety notifications
- witching frequency: The motor is dimensioned for contin-uous operation S1. The control must not allow any extreme switching modes!
- A-weighted sound power levels of over 80dB(A) possible.

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Inbetriebnahme

- Vor Erstinbetriebnahme prüfen:
- Einbau und elektrische Installation fachgerecht abgeschlossen?
- Sicherheitseinrichtungen montiert?
- Montagerückstände und Fremdkörper aus Ventilatorraum entfernt?
- Lüfterrad darf nicht an feststehendem Gehäuseteil schleifen (→ Zündfunke!).
- Schutzleiter angeschlossen?
- Kaltleiter und Auslösegerät fachgerecht angeschlossen und funktionsfähig?
 Kabeleinführung dicht?
- Stimmen Einbaulage und Anordnung der Kondenswasserlöcher überein?
- Stimmen Anschlussdaten mit den Daten auf dem Ventilator-Typenschild (Klebeschild) überein?
- Inbetriebnahme darf erst erfolgen, wenn alle Sicherheits-hinweise überprüft und eine Gefährdung ausgeschlossen ist
 - Drehrichtung kontrollieren (Drehrichtungspfeil auf Laufrad bzw. am Ventilatorgehäuse). Auf ruhigen Lauf achten.

 - Starke Schwingungen durch unruhigen Lauf (Unwucht), z. B. durch Transportschaden oder unsachgemäße Handhabung, können zum Ausfall führen, ggf. Unwucht überprüfen lassen. **Das Laufrad kann bersten** – Lebensgefahr!
- Alle leitfähigen Anbau- und Zubehörteile müssen geerdet werden, z. B. durch Kontaktscheiben. Dadurch kann das Entfernen der Lackschicht / Beschichtung
- Bei der Aufstellung / Inbetriebnahme müssen Umge-bungstemperatur, Luftfeuchtigkeit, Umgebungsver-schmutzung und Korrosion durch die Umgebungsatmosphäre berücksichtigt werden.



Start-up

- Before initial commissioning, check:
- Installation and electrical connection have been properly completed?
- Have the safety devices been installed?
 All leftover installation materials and other foreign materials have been removed from the fan cavity.
- The impeller must not rub against any stationary housing parts (→ sparks!).
 Is the protective earth connected?
- Thermistor and triggering device have been properly installed and are operational. Cable gland is sealed.
- Installation position and the arrangement of condensa-
- tion water drains correspond to each other? Connection data complies with the specifications on the type plate?
- Commissioning may only take place if all safety instruc-
- tions have been checked and danger can be excluded.

 Check the direction of rotation (direction of rotation) arrow on the impeller or on the fan housing).
- Watch out for smooth operation.
 Strong vibrations caused by uneven running (imbalance), for instance due to shipping damage or improper handling, can lead to failure. The impeller can burst -
- Danger of death!
 All conductive attachment and accessory parts must be grounded e.g., with contact disks: By doing so, removal of the paint coat / coating can be omitted.
- During erection / start-up operation, the ambient temperature, air humidity, environmental contamination, and corrosion through the surrounding atmosphere must be taken into consideration.



Instandhaltung und Wartung

- Der EC-Innenläufermotor ist durch Verwendung von Kugellagern mit "Lebensdauerschmierung" (Sonderbefettung) wartungsfrei.
- Bei Anzeichen von Verschleiß, oder spätestens nach 40.000 h, ist ein Lagerwechsel erforderlich. Da für den Lagerwechsel Spezialwerkzeug notwendig ist und spezielle Lager mit Ziehl-Abegg Sonderbefettung verwendet werden, kann der Lagerwechsel nur durch Ziehl-Abegg durchgeführt werden.
- Achten Sie auf untypische Laufgeräusche!
- Ablagerungen am Laufrad können zur Unwucht und damit zu Schäden führen. Regelmäßige Inspektion und Reinigung ist zwingend erforderlich, ggf. Unwucht überprüfen lassen. Das Laufrad kann bersten - Lebensgefahr!
- Außenaufstellung: Bei längeren Stillstandszeiten in feuchter Atmosphäre wird empfohlen die Ventilatoren wöchentlich für mindestens 2 Std. in Betrieb zu nehmen, damit eventuell eingedrungene Feuchtigkeit verdunstet.
- Bei allen Instandhaltungs- und Wartungsarbeiten:
 - Sicherheits- und Arbeitsvorschriften (DIN EN 50 110, IEC 364) beachten.

 Das Ventilatorlaufrad muss still stehen!

 - Stromkreis ist unterbrochen und gegen Wiedereinschalten gesichert.
 - Spannungsfreiheit feststellen.
- Keine Wartungsarbeiten am laufenden Ventilator!
- Eine Laufraddemontage und Wiedermontage ist nicht gestattet.
- Halten Sie die Luftwege des Ventilators frei Gefahr durch herausfliegende Gegenstände!
- Der Anlagenbauer muss eine leichte Zugänglichkeit für Reinigungs- und Inspektionsarbeiten ermöglichen.

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Repairs and maintenance

- Through the use of ball bearings with "lifetime lubrication" (special greasing), the EC internal rotor motor is maintenance-free
- Upon signs of wear or latest after 40,000 h, a bearing replacement is required. Since special tools are required to replace the bearing and since specific bearings with special Ziehl-Abegg lubrication are employed, only Ziehl-Abegg AG is allowed to replace the bearing. Take note of abnormal operating noise!
- Deposits on the impeller can lead to imbalance, causing damage. Periodic inspection and cleaning is mandatory; it applicable, have the imbalance checked. **The impeller** can burst – Danger of death!
- Outdoor fans: If a fan is stationary for long periods in a humid atmosphere, it should be switched ON for minimum of two hours every week to remove any moisture that may have condensed within the motor.
- For all repair and maintenance work:
- Observe the safety and labour regulations (DIN EN 50 110, IEC 364). The fan impeller must be at a standstill!
- Open the electrical circuit and secure against being switched back on.
- Verify the absence of voltage.
- No maintenance work at running fan! Disassembling and remounting the impeller is prohibited.
- Keep the airways of the fan free- danger because of objects dropping out!
- The system constructor must enable easy access for cleaning and inspection work.
- Before switching off the fan, make sure that no Ex atmosphere is present.





- Vor dem Abschalten des Ventilators ist sicher zu stellen, dass keine Ex-Atmosphäre anliegt.
- Bei allen anderen Schäden (z. B. Kabel- und Leitungs-einführungen, Wicklungen und Kabel) wenden Sie sich bitte an unsere Serviceabteilung.
- For all other defects (e.g. cable and wire lead-ins, windings and cables), please contact our service department.

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Reinigung

- Regelmäßige Inspektion, ggf. mit Reinigung erforderlich um Unwucht durch Verschmutzung zu vermeiden.

 – Durchströmungsbereich des Ventilators säubern.
 Achten Sie auf schwingungsarmen Lauf.
- Reinigungsintervalle je nach Verschmutzungsgrad des Laufrades.

 Der komplette Ventilator darf mit einem feuchten Putztuch
- gereinigt werden.
- Zur Reinigung dürfen keine aggressiven, lacklösenden
- Reinigungsmittel verwendet werden.
 Verwenden Sie keinesfalls einen Hochdruckreiniger oder Strahlwasser zur Reinigung.
- Nassreinigung unter Spannung kann zum Strom-schlag führen Lebensgefahr! Nach dem Reinigungsprozess muss der Motor zum
- Abtrocknen 30 Minuten bei 80-100% der max. Drehzahl betrieben werden, damit eventuell eingedrungenes Wasser verdunsten kann.



Cleaning

- Regular inspection, and cleaning is necessary to prevent imbalance due to ingress of dirt.
 - Clean the fans's flow area.
- Watch out for vibration free motion.
- The cleaning interval depends on the degree to which the impeller is soiled. You can clean the entire fan with a moist cloth.
- Do not use any aggressive, paint solvent cleaning agents when cleaning.
- Never use a high-pressure cleaner or spray let to clean.
- Wet cleaning under voltage may lead to an electric
- shock danger to life!

 After cleaning, the motor must be operated for 30 minutes at 80-100% of the max. rpm to let it dry out. This will allow any possibly penetrated water to evaporate.

(E Hersteller

Unsere Produkte sind nach den einschlägigen internationalen Vorschriften gefertigt (Auflistung und Ausgabestände siehe EG-Einbauerklärung und EG-Konformitätserklärung). Haben Sie Fragen zur Verwendung unserer Produkte oder planen Sie spezielle Anwendungen, wenden Sie sich bitte an:

Ziehl-Abegg AG Heinz-Ziehl-Straße D-74653 Künzelsau Tel. 07940/16-0 Fax 07940/16-300 info@ziehl-abegg.de

Serviceadresse

Länderspezifische Serviceadressen siehe Homepage unter www.ziehl-abegg.com

(Manufacturer

Our products are manufactured in compliance with applicable international standards and regulations (listing and relevant version see EC Declaration of Incorporation and EC Declaration of Conformity).

If you have any questions about how to use our products or if you are planning special applications, please contact:

Ziehl-Abegg AG Heinz-Ziehl-Strasse D-74653 Kuenzelsau Tel. 07940/16-0 Fax 07940/16-300 info@ziehl-abegg.de

Service address

Please refer to the homepage at www.ziehl-abegg.com for a list of our subsidiaries worldwide.

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EG-Einbauerklärung

im Sinne der EG-Richtlinie Maschinen 2006/42/EG, Anhang II B

Die Bauart der unvollständigen Maschine:

- Außenläufermotor für explosionsgefährdete Bereiche Zündschutzart "n" oder Zündschutzart "e" MK...
- Axialventilator für explosionsgefährdete Bereiche Zündschutzart "c" mit Außenläufermotor Zündschutzart "n" oder Zündschutzart e" FR
- Radialventilator für explosionsgefährdete Bereiche Zündschutzart "c" mit Außenläufermotor Zündschutzart "n" oder Zündschutzart "e" RE.., RH..
- Radialventilator für explosionsgefährdete Bereiche Zündschutzart "c" mit EC-Innenläufermotor Zündschutzart "tc" RH.., GR..
- Radialventilator für explosionsgefährdete Bereiche Zündschutzart "c" mit Innenläufermotor Zündschutzart "d"

Motorbauart:

- · Asynchron-Außen- oder Innenläufermotor
- Elektronisch kommutierter Innenläufermotor (mit integriertem EC-Controller)

entspricht den Anforderungen von Anhang I Artikel 1.1.2, 1.1.5, 1.4.1, 1.5.1, 1.5.7 der EG-Richtlinie Maschinen 2006/42/EG.

Hersteller ist die Ziehl-Abegg AG

Heinz-Ziehl-Straße D-74653 Künzelsau

Folgende harmonisierte Normen sind angewandt:

EN 1127-1:2007 Explosionsfähige Atmosphären - Explosionsschutz - Teil 1: Grundlagen und Methodik EN 60204-1:2006 Sicherheit von Maschinen; Elektrische Ausrüstung von Maschinen; Teil 1: Allgemeine

Anforderungen

EN ISO 12100:2010 Sicherheit von Maschinen; Grundbegriffe, allgemeine Gestaltungsleitsätze

EN ISO 13857:2008 Sicherheit von Maschinen; Sicherheitsabstände gegen das Erreichen von Gefahrstellen

mit den oberen Gliedmaßen

Hinweis: Die Einhaltung der EN ISO 13857:2008 bezieht sich nur dann auf den montierten

Berührschutz, sofern dieser zum Lieferumfang gehört.

Die speziellen Technischen Unterlagen gemäß Anhang VII B sind erstellt und vollständig vorhanden.

Bevollmächtigte Person für das Zusammenstellen der speziellen Technischen Unterlagen ist: Herr Dr. O. Sadi, Anschrift siehe oben.

Auf begründetes Verlangen werden die speziellen Unterlagen an die staatliche Stelle übermittelt. Die Übermittlung kann elektronisch, auf Datenträger oder auf Papier erfolgen. Alle Schutzrechte verbleiben bei o. g. Hersteller.

Die Inbetriebnahme dieser unvollständigen Maschine ist so lange untersagt, bis sichergestellt ist, dass die Maschine, in die sie eingebaut wurde, den Bestimmungen der EG-Richtlinie Maschinen entspricht.

Künzelsau, 15.02.2012

Dr. O. Sadi - Technischer Leiter Lufttechnik

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EC Declaration of Incorporation

as defined by the EC Machinery Directive 2006/42/EC, Annex II B

The design of the incomplete machine:

- External rotor motor for explosion-hazardous areas, type of protection "n" or "e" MK...
- Axial fan for explosion-hazardous areas, type of protection "c", with external rotor motor for explosion-hazardous
 areas, type of protection "n" or "e" FB..
- Centrifugal fan for explosion-hazardous areas, type of protection "c", with external rotor motor for explosion-hazardous areas, type of protection "n" or "e" RE..., RH...
- Centrifugal fan for explosion-hazardous areas, type of protection "c", with EC-internal rotor motor for explosion-hazardous areas, type of protection "tc" RH.., GR..
- Centrifugal fan for explosion-hazardous areas, type of protection "c", with internal rotor motor for explosion-hazardous areas, type of protection "d" ER..

Motor type:

- · Asynchronous external or internal rotor motor
- · Electronically commutated internal rotor motor (with integrated EC controller)

complies with the requirements in Appendix I, Articles 1.1.2, 1.1.5, 1.4.1, 1.5.1, 1.5.7 in EC Machinery Directive 2006/42/EC.

The manufacturer is the Ziehl-Abegg AG Heinz-Ziehl-Strasse D-74653 Kuenzelsau

The following standards are applied:

EN 1127-1:2007
EN 60204-1:2006
EN ISO 12100:2010
EN ISO 13857:2008
EN ISO 13857:2008
EN ISO 13857:2008
EN ISO 13857:2008
EXPLOYED TO THE METHOD contact protection, provided that it is part of the scope of delivery.

The specific technical documentation in accordance with Appendix VII B has been written and is available in its entirety.

The person authorised for compiling the specific technical documentation is: Dr. O. Sadi, address see above. The specific documentation will be transmitted to the official authorities on justified request. The transmission can be electronic, on data carriers or on paper. All industrial property rights remain with the above-mentioned manufacturer.

It is prohibited to commission this incomplete machine until it has been secured that the machine into which it was incorporated complies with the stipulations of the EC Machinery Directive.

Künzelsau, 15.02.2012 Dr. O. Sadi - Technical Director Ventilation Division

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ZIEHL-ABEGG

C.1 Operating instructions, external fan

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