

# Operating and Assembly Instruction Progressive Cavity Pump

Commission No.  
782927

Type  
BNM 70-24

Please read manual  
before starting work.

Always keep the manual  
near the plant.

Original manual



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**Subsidiaries**



## **1.1 Notes on these instructions**

### 1.1.1 General notes

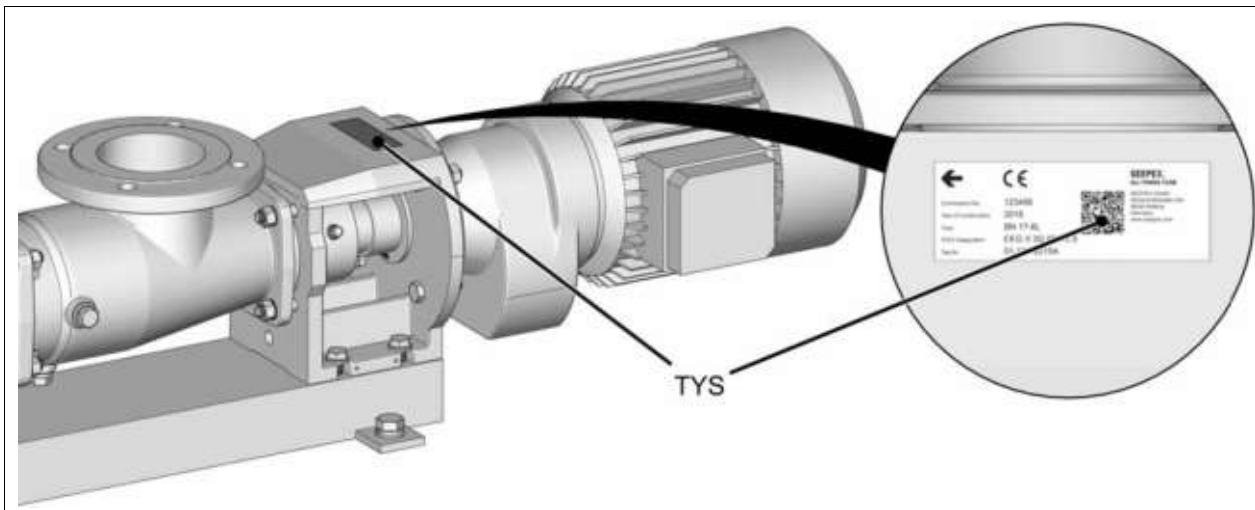
- Always keep the operating and maintenance instructions close by the machine.
  - If problems cannot be solved with reference to the operating and maintenance instructions, please contact SEEPEX.

Observe the following points in addition to these operating and maintenance instructions:

- Prohibition, warning and mandatory signs, warning notes on the machine
  - Relevant laws and ordinances
  - Statutory provisions on accident prevention
  - Corresponding harmonised standards and regulations

### **1.1.2 Validity of these instructions**

- These operating and assembly instructions are valid exclusively for machines with the commission no. specified on the cover sheet.
  - The operating and assembly instructions are correlated with the SEEPEX machine by means of the commission no. on the type plate (**TYS**).



*Figure similar*

# 1. Safety

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## 1.1.3 Symbols, notes and abbreviations

### 1.1.3.1 Information symbols

Symbol	Application
➤	Instruction/measure
-	supplementary instruction/measure
•	List item
<b>i</b>	Information
→	Cross-reference

### 1.1.3.2 Abbreviations

Abbreviations facilitate readability in drawings.

Abbreviations are explained below:

Abbreviation	Designation	Abbreviation	Designation
ANT	Drive	K	Terminal
AP	Lashing points	KF	Kinetic ring grease
ATG	Drive casing	KUL	Crank
CBH	Feed hopper screw fitting	P	Dimension for stator replacement
CFL	Flanged connection	RTE	Rotating unit
CTH	Threaded connection	S	Support
DFL	Flange seal	SCH	Screw fitting
ELT	Feed hopper	SCL	Holding band loop
ERD	Earth connection	SEA	Shaft sealing
FCO	Flange cover	SH	Protective cover
FLS	Flange bearing surface	SHL	Cutting lever
GC	Anti-seize graphite petroleum	SSU	Flush connection
GF	Joint grease	TSE	Dry-running protection device
GM	Lubricant	TYS	Type plate
GS	Soft soap	ZA	Sealing -/ centering surface
HBD	Holding band	ZD	Centering surface
HS	Label		

## 1.2 Safety-related Information

SEEPTEX machines are built in accordance with the state of the art. Nevertheless, there is a residual risk, because the machine works with:

- Mechanical movements that pose a danger
- Electrical voltages and currents

## 1.3 Designated use

SEEPTEX machines are individually configured. The machine is allocated to the operating and assembly instructions based on the commission no. The commission no. is indicated on the type plate of the machine and on the cover sheet of the operating and assembly instructions.

Observe the following points to ensure compliance with the intended use:

- Use the machine only for conveying media in accordance with the technical data (→ chapter 3)
- Use the machine only within the performance data as specified in the technical data (→ chapter 3)
- Make alterations and modifications to the machine only after obtaining the approval of SEEPTEX
- Use the machine only in commercial and industrial areas
- Do not use the machine in explosive areas

## 1.4 Foreseeable misuse

Any use other than the intended use or any different use of the machine will be considered as improper use and can cause serious physical injury and damage to property.

In particular, the following is not admissible:

- Conveyance of conveying products other than those specified in the technical data (→ chapter 3)
- Operating the machine outside of the performance data specified in the technical data (→ chapter 3)
- Operating the machine without safety and protection devices
- Mechanical or electrical bypassing of machines or machine parts
- Use of parts other than the original parts
- Alterations, modification and manipulation
- Non-compliance with instructions and prescribed operating, maintenance and servicing conditions
- Non-compliance with the rules and regulations in the country of use and the statutory provisions and accident prevention regulations when handling the machine
- Operating the machine in explosive areas

## 1.5 Structure of warning notes

- For the protection of personnel and for the safe and efficient use of the machine, observe warning notes.

### Preceding warning notes

Preceding warning notes are placed at the beginning of each chapter or sequence of actions, and relate to the instructions following directly after.

# 1. Safety

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## DANGER

### Type and source of danger.

Possible consequences.

- Measures to avert the danger.
- 

### Preceding warning notes with warning or mandatory signs

Specific dangers are identified with additional warning or mandatory signs.

*Example:*



## DANGER

### Type and source of danger.

Possible consequences.

- Measures to avert the danger.



---

### Embedded warning notes

Embedded warning notes describe immediately relevant dangers, and are shown within a sequence of actions. They are placed immediately before the danger.

*Examples:*

- **WARNING** Type and source of danger. Possible consequences. Measures to avert the danger.

**WARNING** Type and source of danger. Possible consequences.

- Measures to avert the danger.

### 1.5.1 Warning levels

Warning notes are identified by coloured warning symbols and signal word fields.

The different warning levels are identified by additional signal words, and describe the extent of the danger.

#### *Personal injury*



## DANGER

DANGER indicates a dangerous situation which, if not avoided, will result in death or serious injury.

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## WARNING

WARNING indicates a dangerous situation which, if not avoided, may result in death or serious injury.

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## CAUTION

CAUTION indicates a dangerous situation which, if not avoided, may result in minor or moderate injury.

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## Property damage

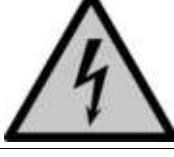
### NOTICE

NOTICE is used when the situation is not associated with personal injury.

## 1.5.2 Warning symbols

In these operating and assembly instructions and on the machine, there are warning symbols.

- Ensure that these warning symbols are complied with.
- Warning symbols on the machine must be fully present and easily legible at all times.

Warning symbols	Hazard
	Suspended load warning
	Electric voltage warning
	Hot surface warning
	Warning for automatic start

# 1. Safety

## 1.6 Qualification of the personnel



Detailed technical knowledge is essential for performing any work on the machine, in order to be able to independently recognise and avoid potential dangers.

Activity	Person	proven knowledge
➤ Instruction of personnel ➤ Definition of responsibilities ➤ Definition of responsibilities ➤ Monitoring of adequate qualification of personnel	Owner	➤ Knowledge of safety regulations ➤ Knowledge of these operating and assembly instructions
➤ Operation ➤ Operational monitoring ➤ Easy maintenance work and troubleshooting	Operator	➤ Instruction for the machine ➤ Before starting any activity, the operating and assembly instructions must be read and understood ➤ Knowledge of safety devices and regulations
➤ Electrical installation ➤ Commissioning ➤ Maintenance ➤ Repair ➤ Decommissioning ➤ Assembly and dismantling	Electrical technician	➤ Technical training, knowledge and experience with the machine in relation to electrical components ➤ Knowledge of the relevant standards and regulations ➤ Safe handling of tools ➤ Knowledge of these operating and assembly instructions
➤ Commissioning ➤ Maintenance ➤ Repair ➤ Decommissioning ➤ Assembly and dismantling	Mechanical technician	➤ Technical training, knowledge and experience with the machine in relation to mechanical components ➤ Knowledge of the relevant standards and regulations ➤ Safe handling of tools ➤ Knowledge of these operating and assembly instructions

## 1.7 Tasks, notes for the owners, operators and technicians

- Do not work on the machine or plant unless it is at a standstill and de-pressurised.
- Switch off the main switch and pull out the power plug before starting work on live components.
- Observe the procedure for shutting down the machine (→ chapter 6).
  - Follow decommissioning procedure.
  - Secure the machine against recommissioning.
- On completion of all work, attach all safety and protective devices and make sure they are functioning.
- Refer to chapter Commissioning before recommissioning the machine (→ chapter 6).

## 1.8 Personal protective equipment

- Wear personal protective equipment and/or additional equipment for your own safety.

Sign	Meaning	Scope of application
	Wear safety shoes	Work in the area of the machine
	Wear eye protection	Work on the machine during which parts may be ejected at speed and parts may be pressurised
	Wear protective gloves	Possible contact with aggressive media, hot surfaces or sharp edges
	Wear ear protection	Sustained sound pressure level > C 75 dB (A)

# 1. Safety

Sign	Meaning	Scope of application
	Wear safety helmet	Work with suspended loads and overhead work
	Wear protective clothing	Possible contact with aggressive media

## 1.9 Safety and protective devices

- Before commissioning, bolt SEEPEX machines to a suitable foundation to ensure stability.
- Start-stop equipment must be clearly recognisable. In order to avoid errors, the operator must arrange corresponding measures.



Protective devices protect those persons who are attempting to reach danger areas without additional help and under the conditions defined for various situations of reaching up, reaching under or reaching through.

- Equip pump with a protective device
  - In order to prevent contact with hot surfaces
  - In order to prevent contact with moving parts
  - Use finger probe to check protective device.

## 2.1 General description

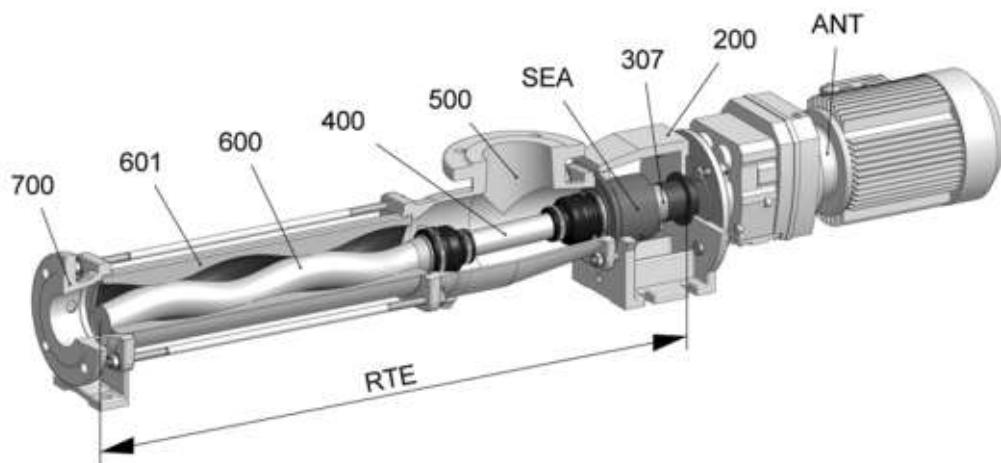
seepex pumps are members of the group of rotating displacement pumps.

- Characteristic features
  - Special configuration/arrangement of the rotor and stator pumping elements.
  - Motion sequence

## 2.2 Mode of action and pumping principle of the seepex pump

- Sealing bands are produced through geometric design/contact of both conveying elements.
- Sealing bands ensure a perfect fit between the suction and pressure side.  
Result:
  - Increased pump suction.
  - Higher pressure build-up independent of speed possible.

## 2.3 Constructive design



No.	Designation
ANT	Drive
200	Lantern
307	Plug-in shaft
400	Coupling rod
SEA	Shaft seal
500	Suction casing
600	Rotor
RTE	Rotating unit
601	Stator
700	Pressure branch



### 3.1 Data sheet

## 3.2 Characteristic Curves

### **3.3 Declaration of conformity / declaration of incorporation**



## Progressive cavity pump

### BNM 70-24

#### **Application data**

Conveyed product	Grout
Flowability	flowable
Viscosity	
Solids content	not specified
Size of solids	not specified
Concentration	not specified
Density	1 kg/dm <sup>3</sup>
Product temperature	5°C - 30°C
pH value	unknown
Kind of operation	continuous
Operating hours	8 h/day
Location	outdoor, dry atmosphere
Altitude of installation	up to 1000 m assumed
Surrounding temperature	normal (5-40 °C)

B 153 XXX001

#### **Performance data**

	<b>Capacity</b>	<b>Pressure</b>	<b>Speed</b>	
	16.8 m <sup>3</sup> /h	20 bar	119 min <sup>-1</sup>	min
	42 m <sup>3</sup> /h	20 bar	237 min <sup>-1</sup>	max
Starting torque	1800 Nm			
Req. power at pump shaft	41 kW			
Inlet pressure	flooded suction (up to 0,5bar)			
NPSH <sub>r</sub> (Standard test)	2.46 m			

Tolerances according to SEEPEX standards.

#### **Materials and executions**

Installation	horizontal
Direction of rotation	counter clockwise (left)
Lantern - Design	with cover plates
Lantern - Material	EN-JL 1040 (gci-25)
Lantern - Flange diameter	450mm
Suction casing - Design	Easy Maintenance-design
Suction casing - Material	EN-JL 1040 (gci-25)
Pressure branch - Design	standard
Pressure branch - Material	EN-GJS 500-7 (GGG50)
Position of branch	position 2
Suction connection	DN 200 PN 16, DIN EN 1092-2, Form B
Pressure connection	DN 150 PN 25, DIN EN 1092-2, Form B
Joint - Design	pin joint with joint sleeve, grease filled
Joint - Material	standard, holding bands 1.4401
Joint - Universal joint sleeve: material	NBR - Perbunan
Joint - Joint Grease	joint grease SEEPEX 10325
Coupling rod - Design	with grease filling device
Coupling rod - Material	1.4462 / Duplex stainless steel
Rotor - Design	Easy Maintenance-design
Rotor - Material	1.4404 / AISI 316L
Stator - Design	standard, with TSE, sensor sleeve 1.4404
Stator - Material	NBR - Perbunan
Shaft sealing	mechanical seal
Code	GA - single acting mechanical seal
Shaft diameter	100 mm
Make	SEEPEX
Type	GA Q1Q1 VGG
Casing - material	1.4404 / AISI 316L
Casing - connection standard	ISO 228
Plug-in Shaft - Design	standard
Plug-in Shaft - Material	1.4404 / AISI 316L
Plug-in Shaft - Drilling diameter	70
Plug-in Shaft - Drilling depth	120
Bolting - Design	completely stainless steel
Painting - Color	RAL 5013 - Cobalt blue (2K)
Painting - Surface protection	std. surface protection C2 (NDFT 95 µm)

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## Drive

<b>Drive Type</b>	Gear & Motor at freq. inv.		
<b>Type</b>	Gear		
<b>Make</b>	SEW		
<b>Model</b>	RF107 AMS225		
<b>Mounting position</b>	M1		
<b>Ratio (i)</b>	10.13		
<b>Flange diameter</b>	450 mm		
<b>Shaft diameter</b>	70 mm		
<b>Shaft length</b>	140 mm		
<b>Shaft drawing</b>	716/1300-004B4		
<b>Speed</b>	<b>Norm</b>	<b>Min</b>	<b>Max</b>
<b>Motor speed</b>	146 min <sup>-1</sup>	119 min <sup>-1</sup>	240 min <sup>-1</sup>
<b>Frequency</b>	1480 min <sup>-1</sup>	1308 min <sup>-1</sup>	2440 min <sup>-1</sup>
	50 Hz	44 Hz	82 Hz
<b>Type</b>	Motor		
<b>Make</b>	WEG		
<b>Model</b>	W22-225S/M L42		
<b>Rated output</b>	45 kW		
<b>Rated speed</b>	1480 min <sup>-1</sup>		
<b>Mounting position</b>	B3+B5		
<b>Flange diameter</b>	450 mm		
<b>Shaft diameter</b>	60 mm		
<b>Starting</b>	direct on frequency inverter		
<b>Efficiency class</b>	IE3		
<b>Terminal box position acc. to supplier</b>	right		
<b>Cable entry position acc. to supplier</b>	not specified		
<b>Voltage</b>	400/690 V		
<b>Frequency</b>	50Hz		
<b>Thermal class</b>	H		
<b>Enclosure</b>	IP66		

The frequency inverter has to follow a linear U/f characteristic curve (constant torque).  
It's essential to have a minimum overload capability of 150% for at least 60 seconds. (see technical data sheet)

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## TSE

### Design

<b>Design</b>	basic design
	- sensor sleeve fitted to the stator of the pump with integrated temperature sensor and evaluation unit (IP67)
	- fixed switch off temperature 60°C
	- connection with M12 sensor plug
<b>Voltage</b>	24 V DC
<b>Material sensor sleeve</b>	1.4404 / AISI 316L
<b>Material connection head</b>	1.4404 / AISI 316L

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## Packing

<b>Type of packing</b>	crate
<b>Type of transport</b>	truck / railway
<b>Quantity of pumps per position</b>	1 pump

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## Accessories

## **Design**

Control cabinet as per requirements, each including the following:

- Rittal XAU 1054.500 600 x 600 x 250mm, IP66, powder coated mild steel enclosure.
- Following door-mounted controls on enclosure:
  - Kraus & Naimer forward/reverse selector switch
  - Start push button
  - Stop push button
  - Reset push button
  - Emergency stop push button
  - VSD and TSE fault indicator lights
  - Potentiometer for speed control
- All control hardware to be Schneider except for Kraus & Naimer selector switch
- VSD programming
- Safety wired to highest achievable category rating, utilising STO of the VSD
- Ventilation on enclosure with electronic timer for control
- Electrical drawings
- Terminals at bottom of panel for wiring of mains, motor and TSE

Excluded from Scope

- Wiring motor or mains cable/plug
- Supplying motor, TSE or VSD
- Mounting of the enclosure or any metalwork external to the enclosure

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## **Accessories**

### **Design**

External VSD

I5DAE345F10010000S i550 Power Unit 45kW 415V three phase IP20

45kw heavy duty/55kw light duty

I5CA50020000A0000S i550 Standard I/O

I5MASAV000000S i550 STO Safety module

I5MADK0000000S i500 Keypad

EZAEELN3080B371 Mains choke 80A 0.37mH (37kW - 45kW)

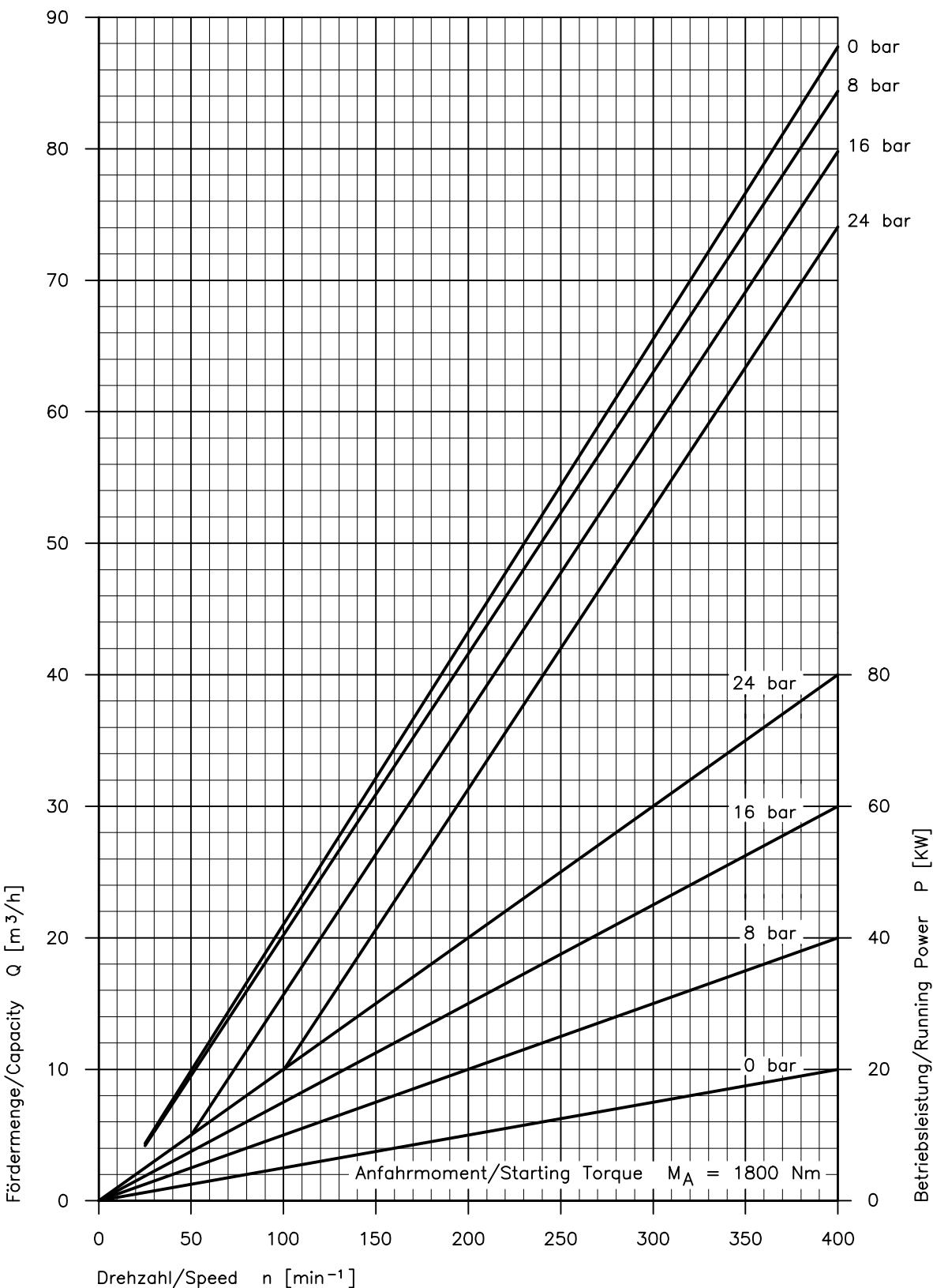
I5MADR0000001S i500 External Keypad Mounting Kit c/w 3m cable

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## **Documentation**



Kennlinien/Characteristic Curves  
Baugröße/Size  
70–24



Werte bezogen auf Wasser 20°C ; Hinweise zur Antriebsauslegung siehe PER  
Values based upon water 20°C ; For notes on drive selection refer to PER



## **Declaration of conformity**

for complete machines  
according to Machinery directive 2006/42/EC, Annex II A

**SEEPEX.**

Location: Bottrop  
Date: 29.11.2023  
Manufacturer: SEEPEX GmbH  
Address: Scharnhölzstraße 344, 46240 Bottrop, Germany

We hereby declare that the following product

### **Progressive cavity pump unit**

Type: BNM 70-24  
Commission no.: 782927

meets the provisions of the directive indicated above.

### **The product also meets all the provisions of the following directives:**

2014/35/EU Electrical equipment  
2014/30/EU Electromagnetic compatibility

### **The following harmonised standards are applied:**

DIN EN ISO 12100	Safety of machines	Issue 03/2011
DIN EN ISO 13857	Safety distances, upper and lower limbs	Issue 04/2020
DIN EN 809	Pumps and pump units for liquids	Issue 10/2012

### **Responsible for documentation:**

SEEPEX GmbH  
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Manager Quality Assurance  
SEEPEX GmbH



## 4.1 Safety

<b>!</b>	<b>CAUTION</b>
<b>Damage to property/injuries due to incorrect transport</b>	
Slight injury or damage to property can occur	
<ul style="list-style-type: none"> <li>➤ Comply with the safety notes and transport notes on the packaging.</li> <li>➤ Use suitable means of transport, lifting devices and tools.</li> <li>➤ Use protective equipment.</li> </ul>	

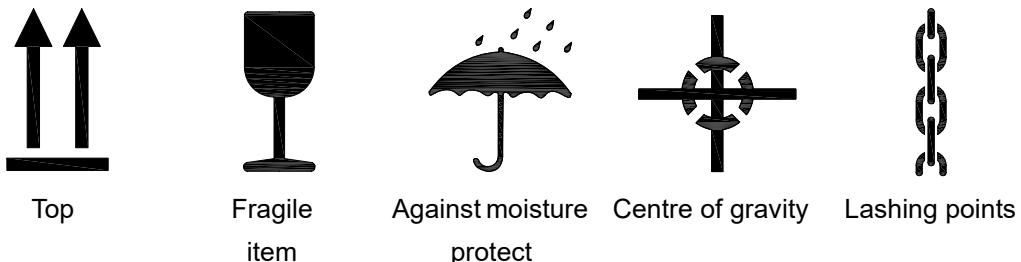
## 4.2 Transport

### 4.2.1 Dimensions, weights and center of gravity

- Note the dimensional drawing (→ chapter 5.6).

### 4.2.2 Symbols

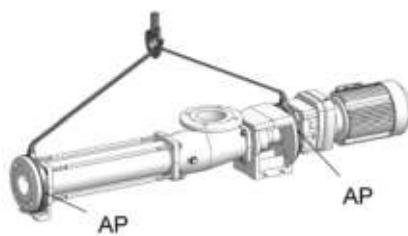
- Meaning of symbol



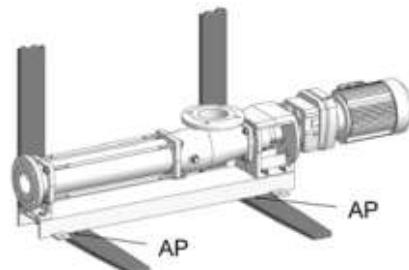
### 4.2.3 Sling points (AP) for lifting devices

<b>!</b>	<b>WARNING</b>
<b>Warning of suspended load.</b> Death of serious injury can occur.	
<ul style="list-style-type: none"> <li>➤ Use the lashing points (<b>AP</b>) for lifting devices.</li> <li>➤ Note the centre of gravity (→ dimensional drawing, chapter 5.6).</li> </ul>	

Lifting machine



Industrial trucks



### 4.2.4 Unpacking the machine

- Comply with the symbols and notices on the packaging.
- Remove the screwed connection between the machine and packaging.
- Remove the machine with a lifting machine/industrial truck.

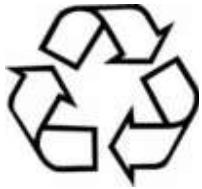
## 4.3 Temporary storage/Corrosion protection

- All seepex machines have corrosion protection applied as standard prior to transport.

**NOTICE****Damage to property if corrosion protection is missing**

Property damage can occur due to corrosion.

- Temporary storage must be in a dry, enclosed, frost-free room in order to provide protection against ambient influences.
- Contact seepex regarding the necessary corrosion protection for temporary storage.

**4.4 Disposal****NOTICE****Environmental protection**

Material damage can occur.

- Drain the pumping medium and dispose of it in accordance with the regulations.
- Dispose of the machine with regard to its composition and existing regulations.

## 5.1 Mounting tools / lifting gear

 <b>CAUTION</b>
<p><b>Pump falling over.</b> Slight injury or damage to property can occur.</p> <ul style="list-style-type: none"> <li>➤ Adhere to the lifting tool's starting point.</li> <li>➤ Pay attention to the dimensions, weight and centre of gravity of the pump.</li> <li>➤ Use suitable mounting tools/lifting gear.</li> </ul>

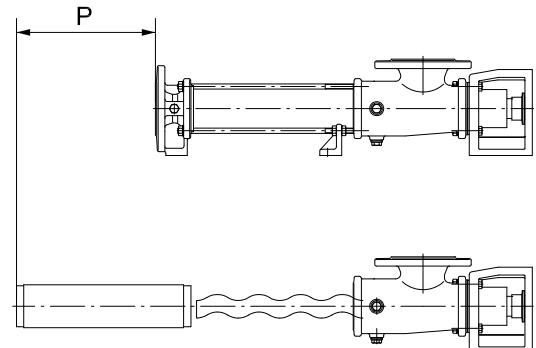
## 5.2 Space requirement

The required space should be determined by considering the following factors:

- Dimensions and weight.
- Requisite transport and lifting equipment.
- Pipe routing – dismantling (dimension for stator replacement).

### 5.2.1 Dimension for stator replacement (P)

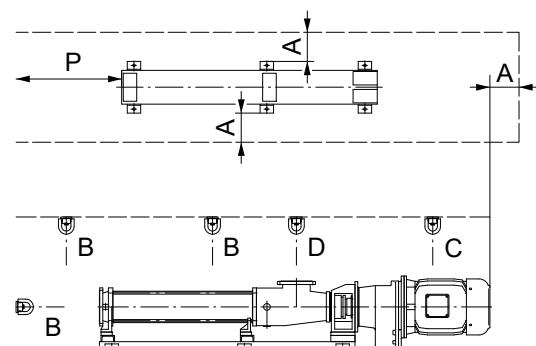
- Refer to the dimensional drawing.



### 5.2.2 Space requirement for service work

Note the following measure:

- A Provide a working area of approx. 1 m/ 40 inch width alongside the pump.
- B When changing the stator, provide suspension points above the stator and in front of the pressure branch.
- C For dismantling/assembly the drive, provide suspension points above the drive unit.
- D For dismantling/assembly of the suction casing/hopper, provide suspension points above the housing.
- P Dimension for stator replacement.



### 5.3 Assembly of the complete mounted pump

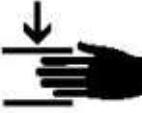
- Assemble according to technical data (chapter 3.).
- Note the dimensional drawing.

#### Tension-free mounting of the pump

- Balance unevenness with suitable supports..
- Applies to mounting on foundations/load-bearing elements.
- Total areas of all pump bearing areas are resting on the surface.

#### Correct position of the drives

- All drives are set up ready for operation and mounted.
- Correct displacements of the drive during transport/installation of the pump by adjusting/fixing the drive.

	<b>CAUTION</b>
	<b>Safety protective devices.</b> Slight injury or damage to property can occur. ➤ Connect safety protection devices and activate.

### 5.4 Power supply of the seepex pump

	<b>DANGER</b>
	<b>Line voltage and line frequency</b> Death or serious injury can occur. ➤ Note the type plate on the pump. ➤ Pay attention to manufacturer's directions (chapter 13.). ➤ Pay attention to safety regulations.

### 5.5 Pipelines

#### 5.5.1 Suction and pressure connection

- Refer to the dimensional drawing for position, nominal width and standard.
- Note the direction of rotation/flow direction.

#### 5.5.2 Pipeline dimensions

- Adhere to specifications regarding pressure in the pressure respectively suction connection.
- Note technical data (chapter 3.).
- Nominal width of suction pipe = nominal width of pump suction connection.

#### 5.5.3 Residue-free pipelines

<b>NOTICE</b>
<b>Damage to property through assembly residue.</b> No claims under guarantee if violated. ➤ Keep all pipelines free from foreign objects. ➤ Remove weld spatter, screws, steel chips, etc.

#### 5.5.4 Tension-free assembly

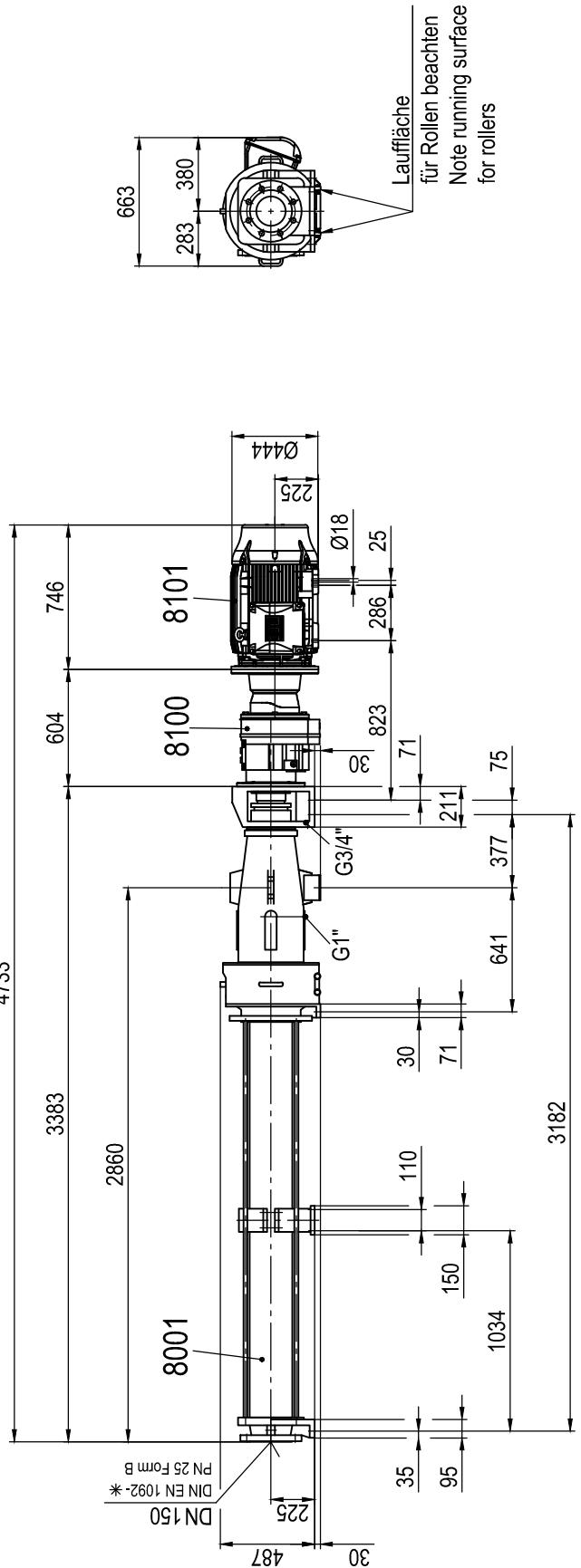
- Assemble pipelines and other components in a tension-free manner on the pump.

A

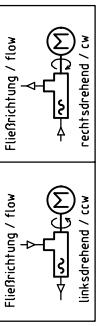
2

6

1



Ausführung siehe Pumpdatenblatt  
\* design see pump data sheet



1	8101	Motormotor WEG W2Z-225M/L42			380	
1	8100	Getriebegehä. SEW RF/07 AN1525			216	
1	8001	Pumpe / Pump. BMW E64			709	
						Gewicht (kg) Weight (kg)
						Bemerkung Remarks

**SEEPEX.**

ISO 5456-2		Gewicht Weight	1305kg	Maßstab Scale	1:25
Dokumentennummer Document number		Index Revision	Größe Size	Dateinummer File number	Blatt Page
<b>165-B34/0700-D-001</b>		<b>A</b>	<b>DIN A 3</b>	<b>228696</b>	<b>1/1</b>
Erstellt Created	Name Name	Datum Date	Bezeichnung Denomination		
		<u>bli</u>	<u>Maßzeichnung</u>		
Geprüft Checked'	Name Name	Datum Date	<u>Dimensional drawing</u>		
		<u>gao</u>	<u>27.11.2023</u>		
Schutzzurkennung nach / Notice of protected rights acc. to DIN ISO 16016 © SEEPEX GmbH					

Allgemeintoleranzen  
General tolerances  
DIN ISO 2768-v



**Master Copy****6.1 Commissioning report**

Send commissioning report online to  
[www.seepex.com\](http://www.seepex.com)

**Must be specified with every order!**

**Commission:**

**Model:**

**From:**

Contact person: .....  
 Tel.: .....  
 Fax: .....  
 E-mail: .....

<b>Customer Service:</b> seepex GmbH Postfach 10 15 64 D-46215 Bottrop service@seepex.com	<b>Germany</b>	Phone: +49 2041.996-231 Fax: +49 2041.996-431	<b>Address of plant:</b> .... .... .... ....
	<b>Rest of Europe</b>	Phone: +49 2041.996-224 Fax: +49 2041.996-424	
	<b>Outside Europe</b>	Phone: +49 2041.996-120 Fax: +49 2041.996-432	

Delivery date:	
Date of installation:	
Assembly check carried out on:	

Please enter operational data:

Conveying liquid:		
Temperature:		
Fuse level/motor protection or power consumption		
Frequency control	<input type="checkbox"/> no <input type="checkbox"/> yes	
		If yes:
		<input type="checkbox"/> Supplied by seepex <input type="checkbox"/> Supplied by customer
		<input type="checkbox"/> Frequency: <input type="checkbox"/> Speed: <input type="checkbox"/> Power consumption:

Place, date

Signature / company stamp

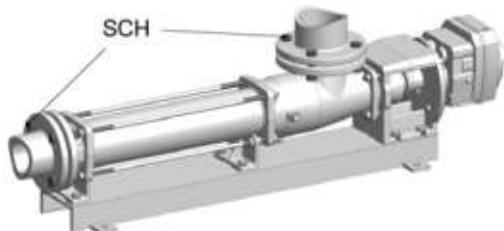


## 6.2 Measures before commissioning

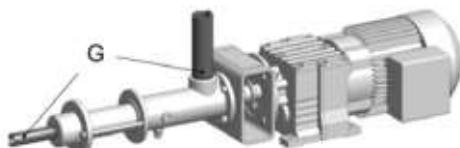
- Note the technical data (→ chapter 3.).

### 6.2.1 Checking pipelines

- Check flange screwed connections (**SCH**).



- Check threaded connections (**G**).



#### NOTICE

**Ensure the liquid can flow through without obstruction.**

Malfunction and/or irreparable damage to the pump.

- Open all shut-off elements before switching on the pump.

### 6.2.2 Protective devices on the pump



#### DANGER

**Missing protective device.**

Danger of pulling in and crushing.

- Equip the pump with a protective device. Protective devices provided for preventing contact with surfaces or moving parts must be regarded as suitable if contact is not possible in a test involving a test finger, with regard to the penetration possibility, strength and shock resistance.
  - Comply with national protection regulations.
  - In pumps with an open suction flange/feed hopper, attach touch protection. These safety clearances protect those persons who are attempting to reach danger areas without additional help and under the conditions defined for various situations of reaching up, reaching under or reaching through
- In shaft seals, touch protection is only necessary if there are components on the rotating shaft.

### 6.2.3 Electrical/hydraulic connections



#### DANGER

**Dangerous voltage.**

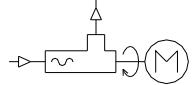
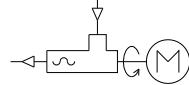
Death or serious injury can occur.

- Note safety regulations.
- Disconnect motor from all sources of energy.
- Secure electrical connections against restarting.

#### 6.2.4 Direction of rotation check

flow direction

- The pump direction of rotation determines the flow direction of the pumping medium.
- Note the direction of rotation arrow on the type plate.



counter clockwise

clockwise

#### 6.2.5 Additional devices - optional

- Refer to additional devices (→ chapter 12.1).

#### 6.3 Initial commissioning/repeated commissioning

- Start up the pump.

##### NOTICE

###### **Dry running of the pump.**

Malfunction and/or irreparable damage to the pump.

- Fill the suction casing with liquid in order to lubricate the pumping elements.

#### 6.3.1 Avoid dry running of the pump

##### NOTICE

###### **High temperature between rotor and stator.**

Stator material burned.

Complete failure of the pump.

- Make sure that the suction-side conveying capacity does not cavitate.
- If this cannot be guaranteed on the machine side, assemble a seepex dry running protection (TSE).

#### 6.3.2 Pressure in the suction and pressure connection



##### CAUTION

###### **High pressure.**

Malfunction and/or irreparable damage to the shaft seal or pump.

- Maintain pressure in the suction connection in accordance with the technical data (→ chapter 3.).

##### **Recommendation:**

- Assemble an oil-filled contact pressure gauge to monitor and deactivate the pump.

## 6.4 De-commissioning

Protect the pump and additional devices against the following:

- Frost
- Deposit of solids
- Sedimentation from the liquid
- Corrosion of parts that come into contact with the medium

### 6.4.1 Switching off the pump

	<b>DANGER</b> <b>Dangerous voltage.</b> Death or serious injury can occur. <ul style="list-style-type: none"> <li>➤ Note safety regulations.</li> <li>➤ Disconnect motor from all sources of energy.</li> <li>➤ Secure electrical connections against restarting.</li> </ul>
---	---

### 6.4.2 Emptying the pump

	<b>CAUTION</b> <b>Liquid draining out.</b> Minor injury or damage to property can occur. <ul style="list-style-type: none"> <li>➤ Wear suitable protective clothing.</li> <li>➤ Refer to the technical data (→ chapter 3.) for the corresponding configuration of the pump housing.</li> </ul>
---	---

To drain the pump:

- If the pump housing has screwed plugs, remove the screwed plugs.
- Drain using a connection branch (suction casing, pressure branch) if the pump housing is coated or the housing does not have screwed plugs.
- Drain the residual liquid from the pump housing.
- Drain the pipelines on the suction and pressure sides, or shut off behind the pump connections.

### 6.4.3 Removing the pump



#### WARNING

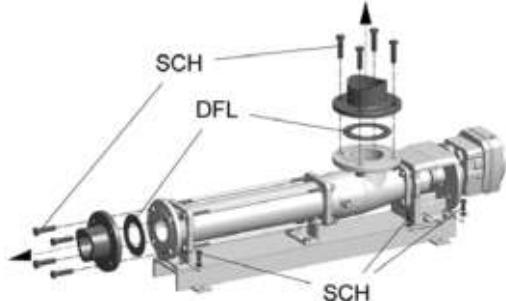
**Risk of pump tipping or falling.**

Death or serious injury can occur.

- Support the drive unit to guarantee stability.

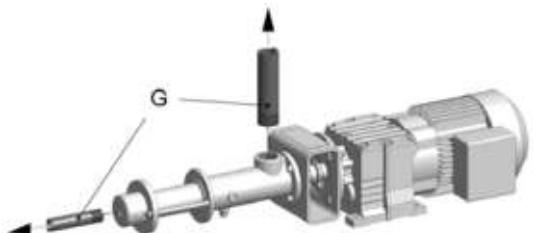
#### Pipeline dismantling

- Remove flange bolts (**SCH**) and flange seals (**DFL**).  
with/without base plate
- Remove bolts (**SCH**) from the pump feet.



#### Pipeline dismantling

- Remove threaded connections (**G**).  
with/without base plate
- Remove bolts (**SCH**) from the pump feet.



### 6.4.4 Preservation/storage of the pump

#### NOTICE

**Damage to property due to lack of corrosion protection.**

Property damage can occur due to corrosion.

- Contact seepex to discuss suitable preservation measures.
  - State the commission number of the pump.

## 7.1 Preventive measures



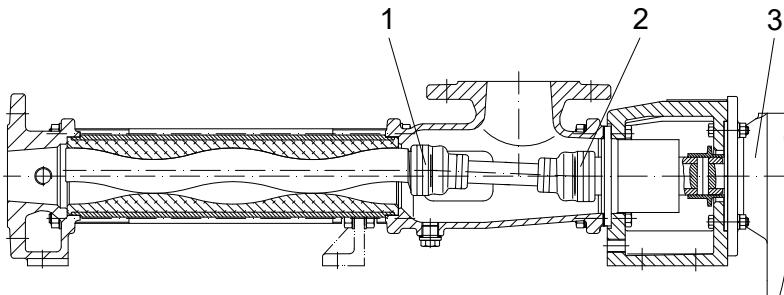
The maintenance personnel must have these operating instructions, follow them and also require corresponding qualifications.

<b>DANGER</b> 	
	<p><b>Dangerous voltage.</b> Death or serious injury can occur.</p> <ul style="list-style-type: none"> <li>➤ Observe safety regulations.</li> <li>➤ Disconnect the pump from all sources of energy.</li> <li>➤ Prevent electrical connections from being switched on again.</li> </ul> 

### 7.1.1 Pump down-time

<b>NOTICE</b>	
<p><b>Pump down-time.</b> Production failure due to wear.</p> <ul style="list-style-type: none"> <li>➤ Acquisition of a set of wearing parts and a set of gaskets.</li> </ul>	

## 7.2 Lubrication



No.	Denomination	Lubricant	Lubricant change in operating hours	Fill volume
1	Pin joint	seepex special grease (10325)	10000 h	335 cm <sup>3</sup>
2	Pin joint	seepex special grease (10325)	10000 h	335 cm <sup>3</sup>
3	Drive	Refer to manufacturer's documentation (chapter 13._)		
Rotor/stator		Conveying medium	---	---
Shaft seal		Conveying medium	---	---

### 7.2.1 Joint grease

<b>NOTICE</b>	
<p><b>Other grease types.</b> Malfunction and/or irreparable damage to the joints or the pump.</p> <ul style="list-style-type: none"> <li>➤ Exclusively use seepex special grease.</li> </ul>	

**7.3 Inspection**

Component	Interval	Action
Joints	Every 10,000 operating hours	Renew joint grease
Stator	Every week	Visual check for leaks
Shaft seal	Every week	Visual check for leaks
Drive unit	Every 3000 operating hours, at least every 6 months	Comply with manufacturer's documentation

Refer to technical data (chapter 3.) for application range of the pump.

Malfunction									Causes	Rectification
Pump is not sucking	Pump pumping unevenly	Conveying capacity is not achieved	Pressure head is not reached	Pump does not start up	Pump seized / pump does not pump	Pump is loud when running	Motor gets too hot	Premature stator wear		
			X				X		X	Static friction between stator/rotor too great.
X										Incorrect direction of rotation.
X	X	X		X	X					Suction pipe or shaft seal leaking.
X	X	X			X					Suction head too great.
X	X	X								Viscosity of conveying product too great.
		X	X			X				Pump rotation speed incorrect.
	X	X								Avoid air bubbles in the conveying product.
		X	X	X	X	X	X	X		Pressure head too great.
X	X	X			X			X		Pump running partially/completely dry.
						X	X			Check coupling.
X		X								Rotation speed too low.

Malfunction							Causes	Rectification	
Pump is not sucking	Pump pumping unevenly	Conveying capacity is not achieved	Pressure head is not reached	Pump does not start up	Pump seized / pump does not pump	Pump is loud when running			
X	X			X			Rotation speed too high.	Reduce rotation speed for high-viscosity media, risk of cavitation.	
				X			Joint play too large.	Check mounting of coupling rod bushing.	
X	X	X	X		X		Foreign objects in pump.	Dismantle pump, remove foreign bodies, replace defective parts.	
X	X	X	X				Stator/rotor worn.	Dismantle pump and renew defective parts.	
X	X		X	X			Joint parts worn.	Renew joint parts, use seepex pin joint grease.	
X	X		X		X		Suction pipe blocked.	Clean the suction pipe.	
X			X	X	X	X	Temperature of pumping liquid too high.	Check temperature, use an undersize rotor.	
X	X	X			X	X	Gland packing too firm/worn.	Loosen packing gland or tighten. Renew unusable packing rings.	
X			X	X		X	Solid content and/or grain size too great.	Reduce pump speed, install screen with permitted mesh width. Increase liquid proportion.	
X			X			X	X	Sedimentation/gumming of solids when pump stationary.	Rinse through and clean the pump immediately.
X			X	X		X	X	Conveying product hardens when the temperature drops below a certain limit.	Heat the pump.
			X	X	X	X	X	Stator swollen and unable to withstand conveying product.	Select a suitable stator material, use an undersize rotor.
				X			X	Bearings in pump drive housing or drive unit defective.	Renew bearings.
							X	Mechanical seal defective.	Check slippings and O-rings for wear/resistance, renew if necessary.

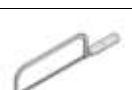
## 9. Dismantle/Reassembly

### 9.1 Dismantling

#### 9.1.1 Keep tools ready for the dismantling

##### **Recommended tools**

Keep the listed tools ready (not part of the delivery scope):

Illustration	Denomination
	Hammer
	Set allen keys
	Set ring spanners size 10 - size 30
	Set fork spanners size 10 - size 30
	Metal saw ( <b>WH</b> )
	Screwdriver ( <b>WS</b> )
	Chisel ( <b>WM</b> )
	Hoisting/pulling device ( <b>HZV</b> )

##### **Recommended special tools**



Special tools are not part of the delivery scope.

➤ Order special tools using the order form (→ chapter 11).

Illustration	Denomination
	Chain wrench ( <b>W2</b> )
	Drift ( <b>W5</b> )
	Mounting lever ( <b>W9</b> )

## 9. Dismantle/Reassembly

### **Recommended auxiliary materials**

Keep the listed auxiliary materials available (not included in the scope of delivery):

- Lubricant (**GM**)

### **NOTICE**

#### **Damage to property due to inadequate lubricants (**GM**).**

Damage to components. Contamination of the conveying medium.

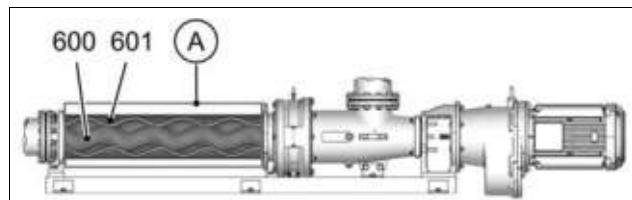
- Observe resistance to the materials used and the conveying medium.
- Use suitable lubricants (**GM**) only.

### 9.1.2 Prepare pump for dismantling

- Follow the instructions in the chapter Shut-down (→ chapter 6).

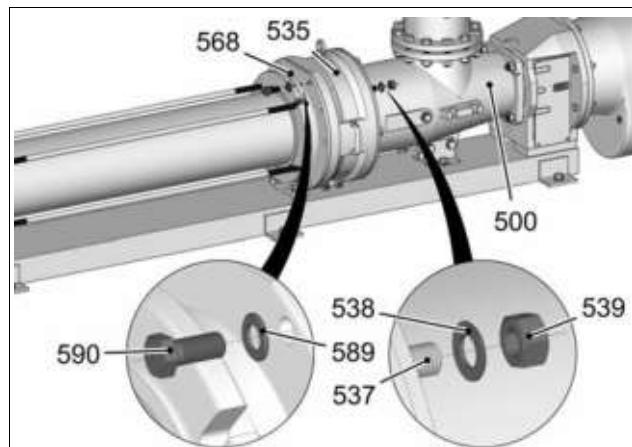
### 9.1.3 Dismantle unit (A)

- Unit (**A**) consisting of:
  - Rotor (**600**)
  - Stator (**601**)



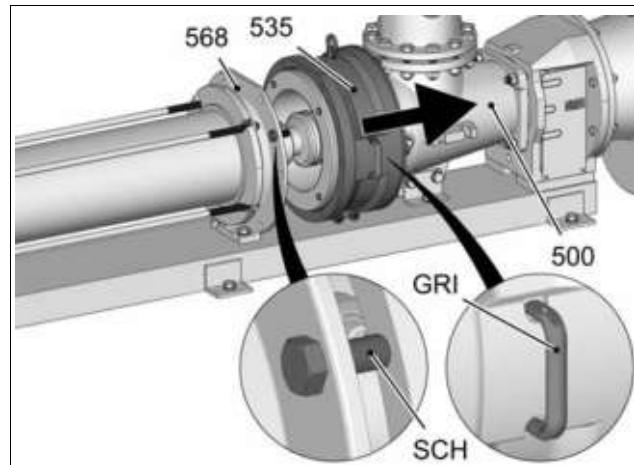
#### 9.1.3.1 Shift casing element (535)

- Dismantle screw fitting (**589, 590**) between stator capture (**568**) and casing element (**535**).
- Dismantle screw fitting (**538, 539**) between casing element (**535**) and suction casing (**500**).



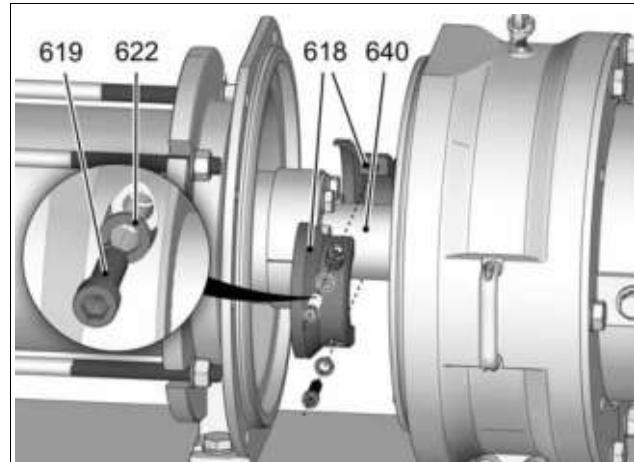
## 9. Dismantle/Reassembly

- Press casing element (535) using a hex screw (SCH) from stator capture (568).
- **CAUTION** Risk of injury through incorrect dismantling. Risk of fingers being crushed when shifting casing element (535). Use grips (GRI) on casing element (535) for shifting.
- Slide casing element (535) towards suction casing (500).



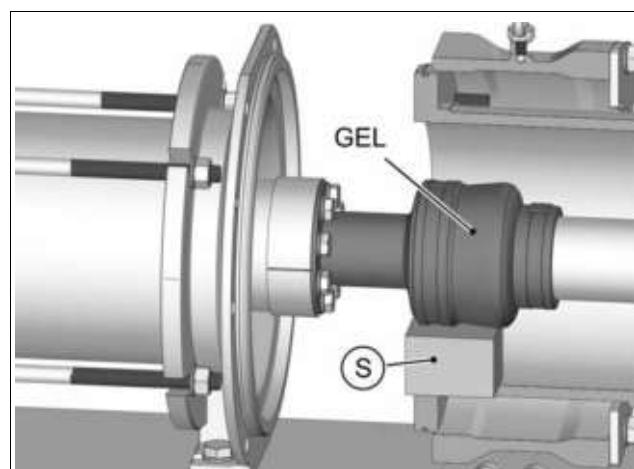
### Dismantle screw fitting guard (618) - optional

- Dismantle screw fitting (619, 622).
- Remove screw fitting guard (618) from rotor head (640).



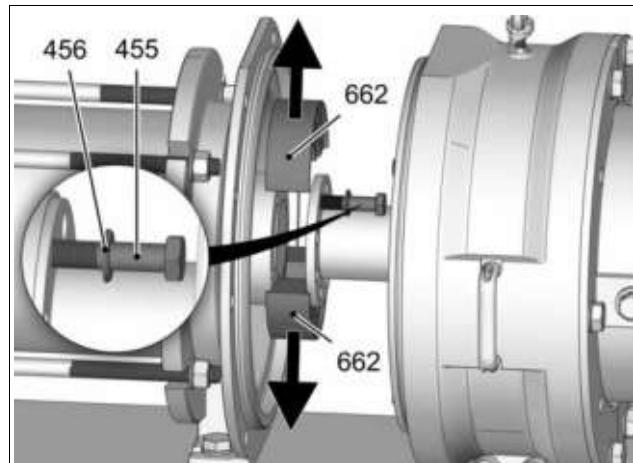
### 9.1.3.2 Dismantle spacer ring (662)

- Prop up rotor-sided joint (GEL) with support (S).



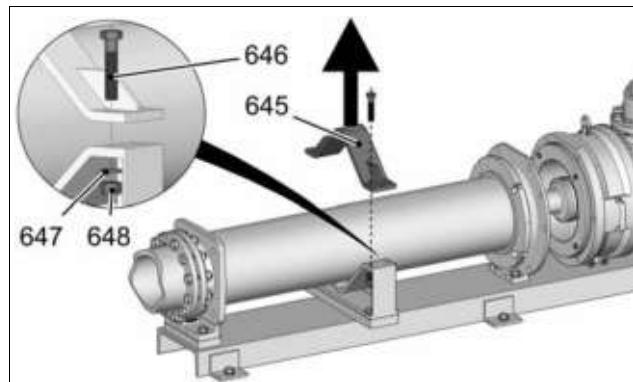
## 9. Dismantle/Reassembly

- Dismantle screw fitting (455, 456).
- Remove spacer ring (662).



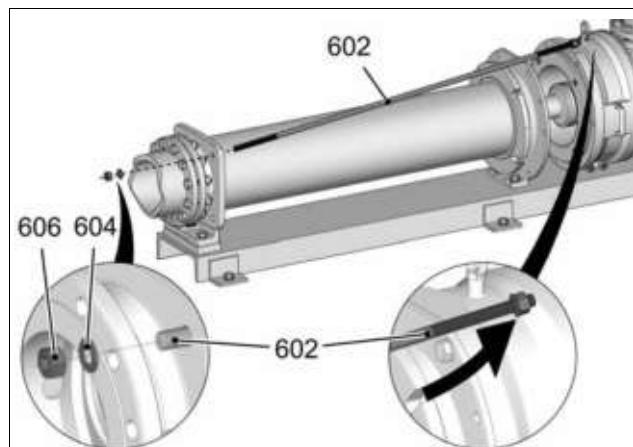
### 9.1.3.3 Dismantle stator support (645) - optional

- Dismantle the screw fitting (646, 647, 648).
- Remove upper part of the stator support (645).



### 9.1.3.4 Dismantle tie bolts (602)

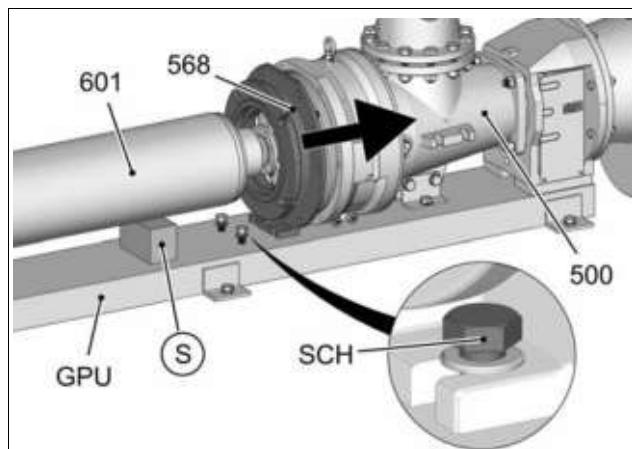
- Dismantle screw fitting (604, 606).
- Remove tie bolts (602).



## 9. Dismantle/Reassembly

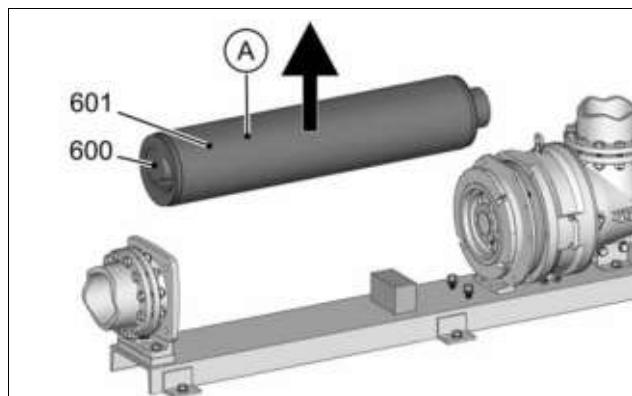
### 9.1.3.5 Shift stator capture (568)

- Prop up stator (601) with support (S).
- Loosen screw fitting (SCH) between base plate (GPU) and stator capture (568).
- Shift stator capture (568) towards suction casing (500).



### 9.1.3.6 Remove unit (A)

- Remove unit (A), consisting of rotor (600) and stator (601).

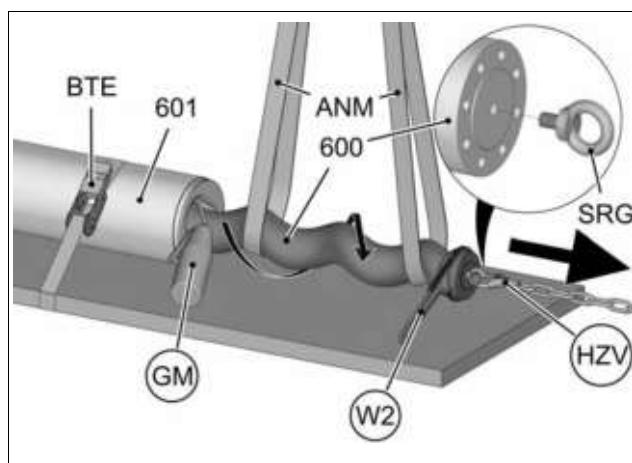


### 9.1.4 Dismantle components parts - Unit (A)

#### 9.1.4.1 Remove rotor (600) from stator (601)

**CAUTION** Falling or rolling of rotor (600) and stator (601). Impact and crushing of body parts possible.

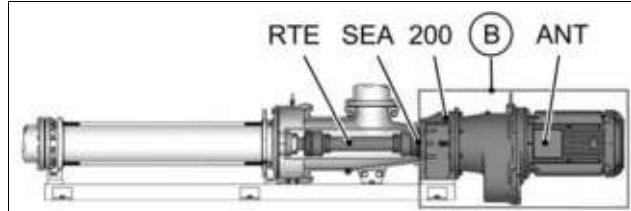
- Secure rotor (600) and stator (601) against rolling and falling.
  - Use appropriate securing means (BTE) and slings (ANM).
- Mount eye bolt (SRG) on rotor (600).
- Pull rotor (600) out of stator (601) by turning it.
  - For easier dismantling, add lubricant (GM) in the gap between rotor (600) and stator (601).
  - Use tool (W2).
  - Use tool (HZV).



## 9. Dismantle/Reassembly

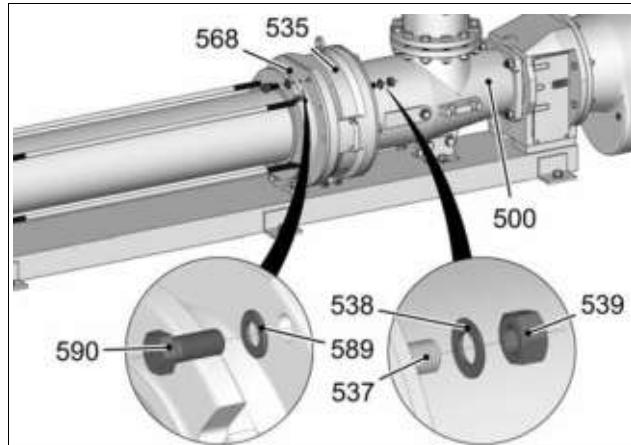
### 9.1.5 Dismantle unit (B)

- Unit (**B**) consisting of:
  - Rotating unit (**RTE**)
  - Lantern (**200**)
  - Shaft seal (**SEA**)
  - Drive (**ANT**)



#### 9.1.5.1 Shift casing element (535)

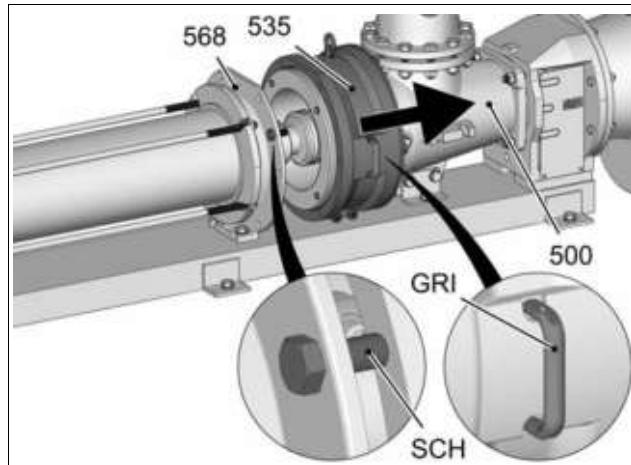
- Dismantle screw fitting (**589, 590**) between stator capture (**568**) and casing element (**535**).
- Dismantle screw fitting (**538, 539**) between casing element (**535**) and suction casing (**500**).



- Press casing element (**535**) using a hex screw (**SCH**) from stator capture (**568**).

**CAUTION** Risk of injury through incorrect dismantling. Risk of fingers being crushed when shifting casing element (**535**). Use grips (**GRI**) on casing element (**535**) for shifting.

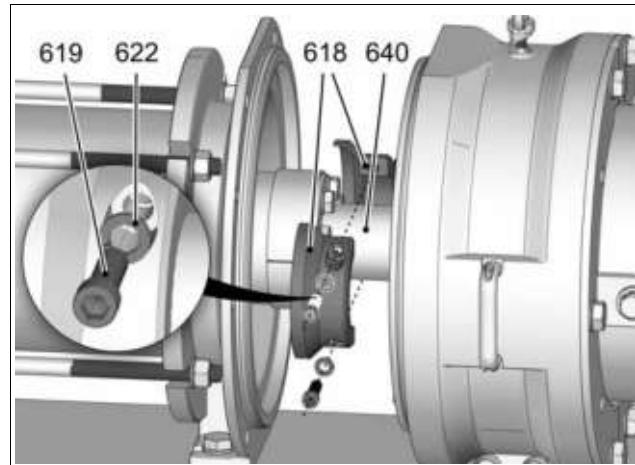
- Slide casing element (**535**) towards suction casing (**500**).



## 9. Dismantle/Reassembly

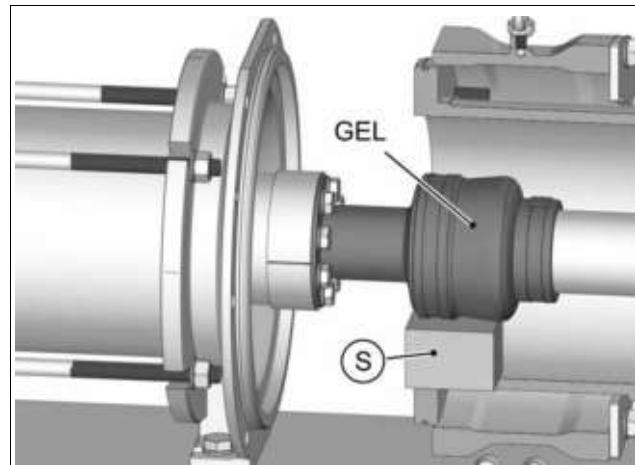
### Dismantle screw fitting guard (618) - optional

- Dismantle screw fitting (619, 622).
- Remove screw fitting guard (618) from rotor head (640).

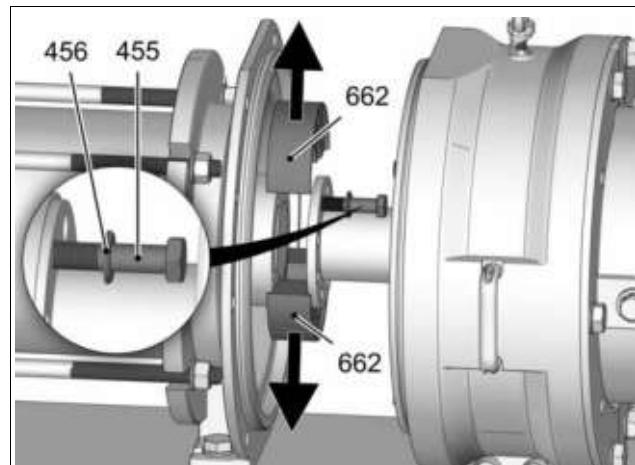


### 9.1.5.2 Dismantle spacer ring (662)

- Prop up rotor-sided joint (GEL) with support (S).



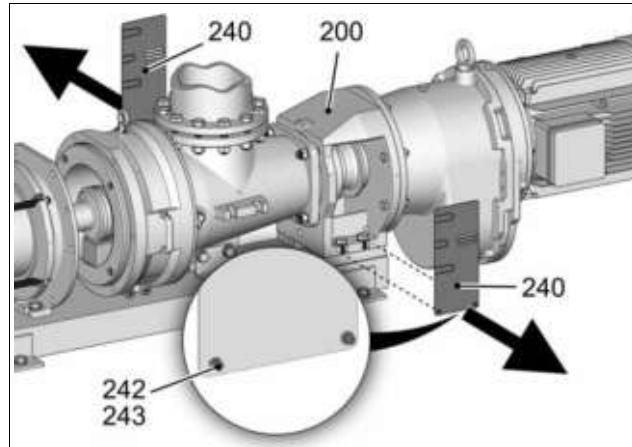
- Dismantle screw fitting (455, 456).
- Remove spacer ring (662).



## 9. Dismantle/Reassembly

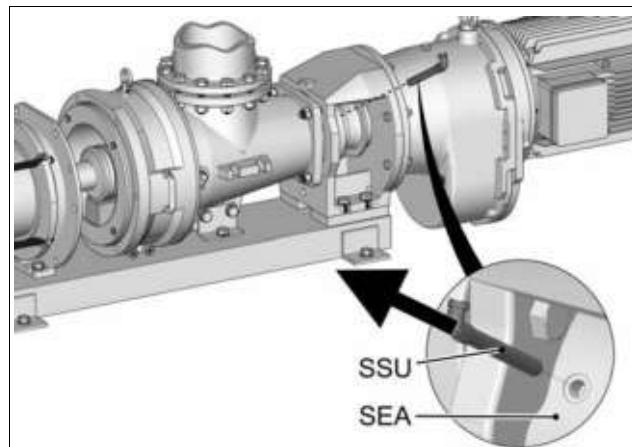
### 9.1.5.3 Dismantle cover plates (240)

- Remove cover plates (240) along with screw fitting (242, 243) from the lantern (200).



### Dismantle flush connection (SSU) (optional)

- Remove flush connection (SSU) from the casing of the shaft sealing (SEA).

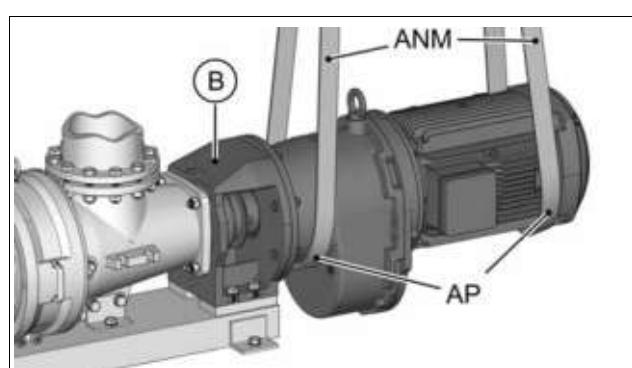


### 9.1.5.4 Remove unit (B)

**⚠ WARNING** Risk of injury caused by tipping or falling unit (B). Risk of body parts being crushed.

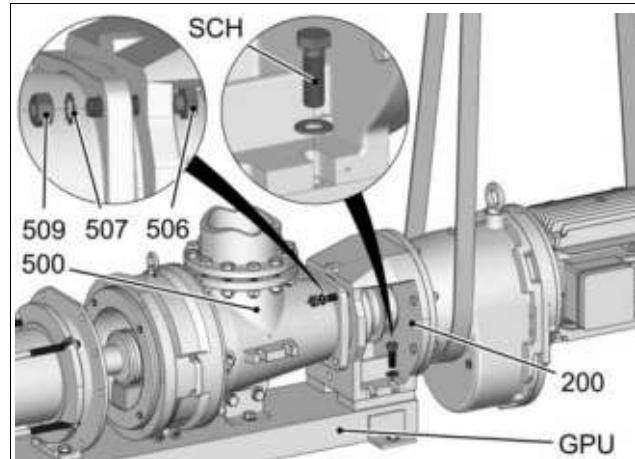
- Secure unit (B) against tipping and falling.

- Note lashing points (AP).
- Use suitable slings (ANM).



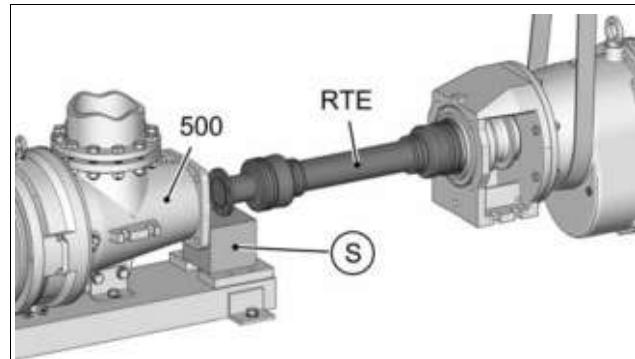
## 9. Dismantle/Reassembly

- Dismantle screw fitting (**506**, **507**, **509**) between suction casing (**500**) and lantern (**200**).
- Dismantle screw fitting (**SCH**) between lantern (**200**) and base plate (**GPU**).

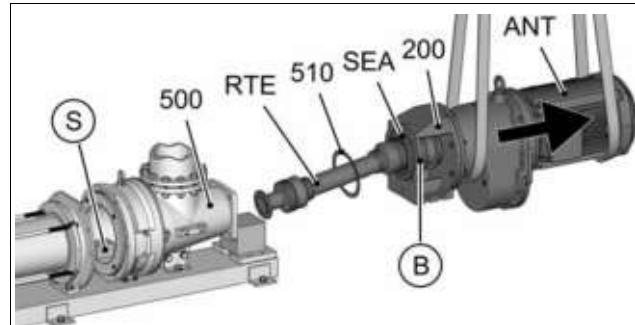


**CAUTION** Risk of injury and material damage caused by buckling rotating unit (**RTE**). Crushing of fingers and damage to components possible.

- When pulling out rotating unit (**RTE**) out of suction casing (**500**) do not reach into opening of suction casing (**500**).
- Secure rotating unit (**RTE**) with support (**S**) against falling.



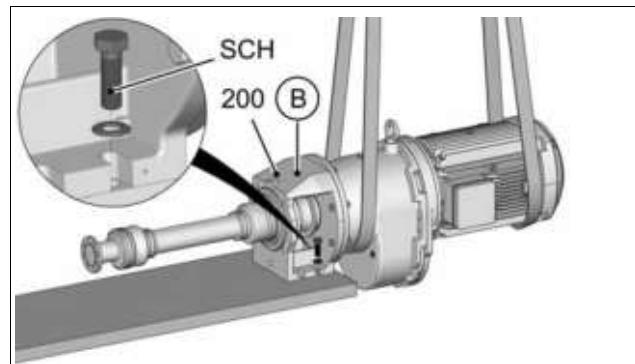
- Remove unit (**B**), consisting of rotating unit (**RTE**), shaft seal (**SEA**), lantern (**200**) and drive (**ANT**), from suction casing (**500**).
- Remove suction casing gasket (**510**) from shaft seal (**SEA**).
- Remove support (**S**) from suction casing (**500**).



**WARNING** Risk of injury due to lack of stability of unit (**B**). Crushing of body parts caused by tipping or falling components.

### Screw unit (**B**)

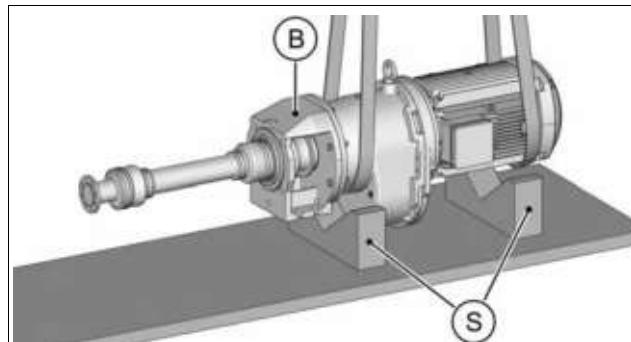
- Fasten lantern (**200**) to secure unit (**B**).
  - Recommendation: Fasten on a suitable base using screw fitting (**SCH**).



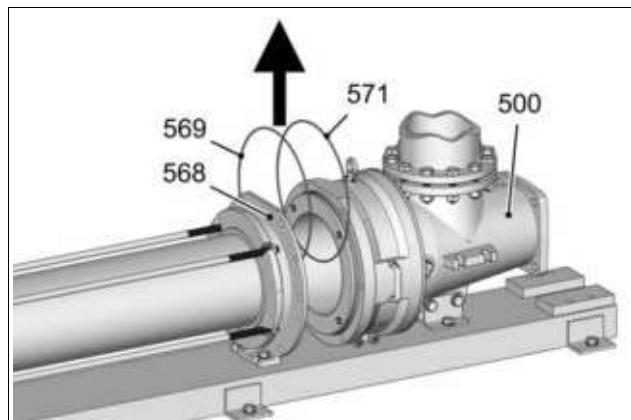
## 9. Dismantle/Reassembly

### **Place unit (B) securely**

- Secure unit (B) from rolling away.
  - Recommendation: Place it on appropriate support (S).



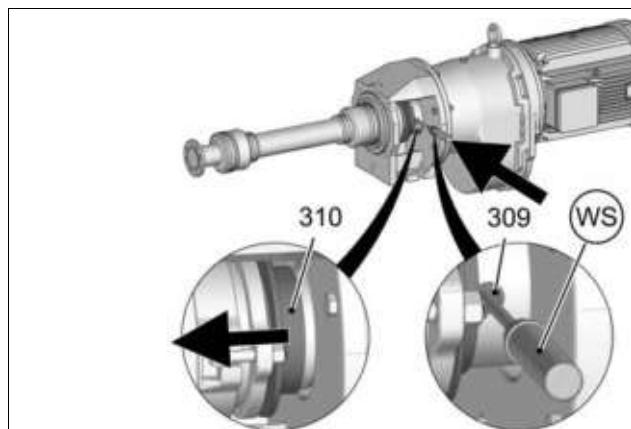
- Remove O-rings (569, 571) from stator capture (568) and suction casing (500).



#### 9.1.6 Unit (B) - dismantle individual parts

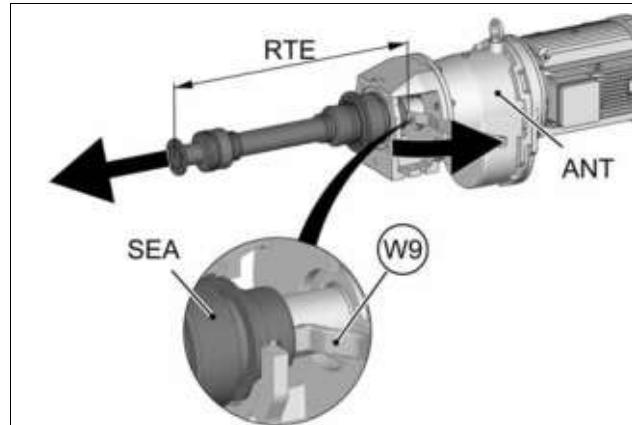
##### 9.1.6.1 Dismantle rotating unit (RTE)

- Lift/push splash ring (310) to remove plug-in shaft pin (309).
- Push out plug-in shaft pin (309).
  - Use a suitable tool (WS).

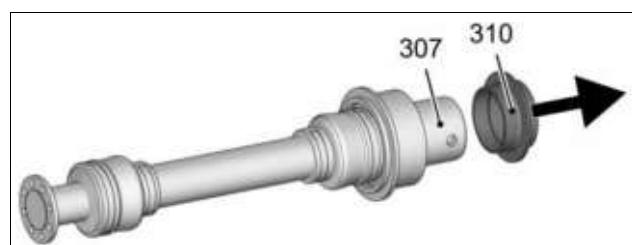


## 9. Dismantle/Reassembly

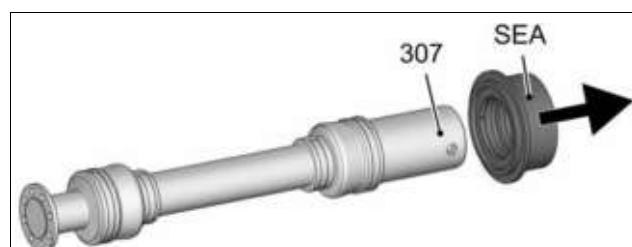
- Pull off rotating unit (**RTE**) with shaft seal (**SEA**) from output shaft of drive (**ANT**).
  - Use tool (**W9**).



- Remove splash ring (**310**) from plug-in shaft (**307**).



- Remove shaft seal casing (**SEA**) from plug-in shaft (**307**).
  - See dismantling of shaft seal (**SEA**) (→ chapter 9.4/9.5).



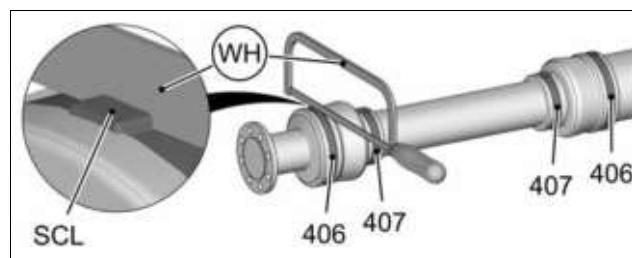
### 9.1.6.2 Dismantle rotor (600), coupling rod (400) and plug-in shaft (307)

#### *Dismantle universal joint sleeve protection (408) (optional)*

- Dismantle the universal joint sleeve protection (**MAS**) on rotor side.
  - See chapter on additional devices (→ chapter 12.1).

#### Dismantle holding band (406, 407)

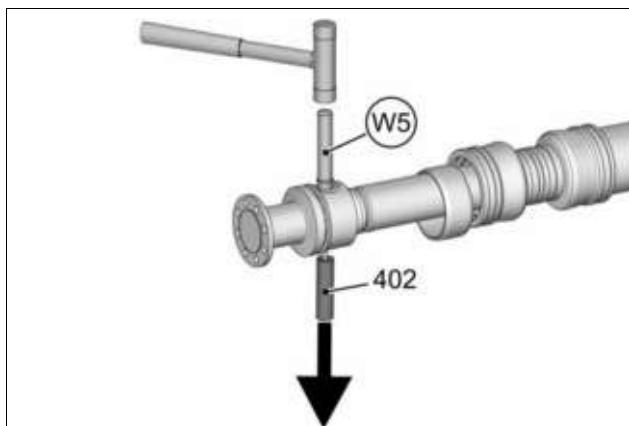
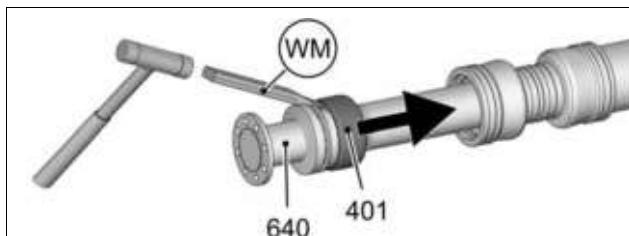
- **CAUTION** Holding band parts can be ejected at speed. Risk of injury to eyes.
  - Wear safety goggles.
- Disconnect holding band loop (**SCL**).
  - Use suitable tools (**WH**).
- Press out parts of the holding band loop (**SCL**).
- Remove holding band (**406, 407**).



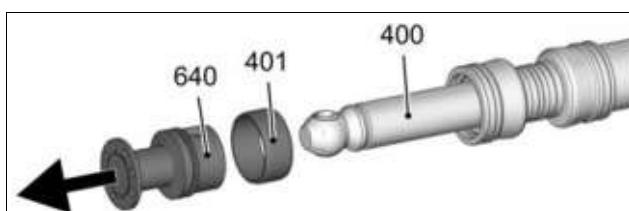
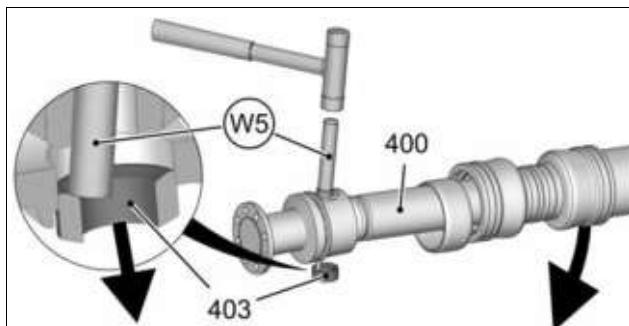
## 9. Dismantle/Reassembly

### Separate joint - rotor side

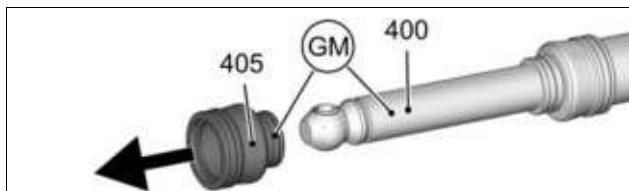
- Pull back universal joint sleeve (405).
- Slide retaining sleeve (401) of rotor head (640).
  - Use a suitable tool (WM).
- Eject coupling rod pins (402).
  - Use tool (W5).



- Bend the coupling rod (400).
- Knock guide bushing (403).
  - Use tool (W5).
- Remove rotor head (640) and retaining sleeve (401) from coupling rod (400).



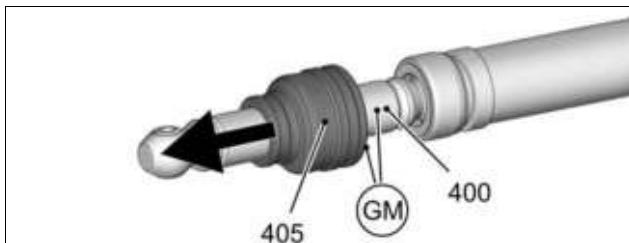
- For easier dismantling, apply lubricant (GM) to the interior of the universal joint sleeve (405) and the outer surface of the coupling rod (400).
- Remove universal joint sleeve (405) from coupling rod (400).



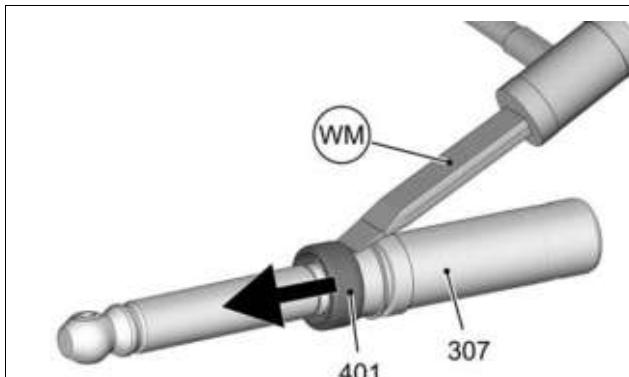
## 9. Dismantle/Reassembly

### Separate joint - drive side

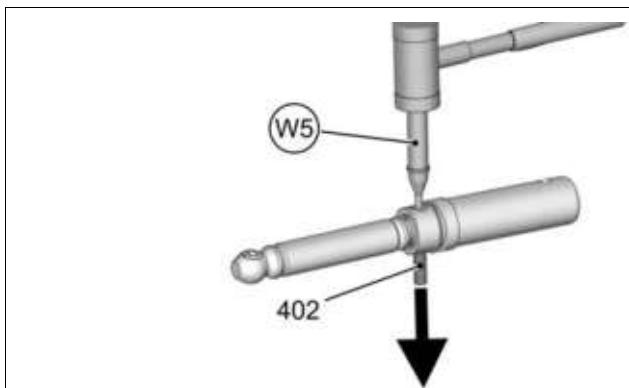
- For easier dismantling, apply lubricant (**GM**) to the interior of the universal joint sleeve (**405**) and the outer surface of the coupling rod (**400**).
- Remove universal joint sleeve (**405**) from coupling rod (**400**).



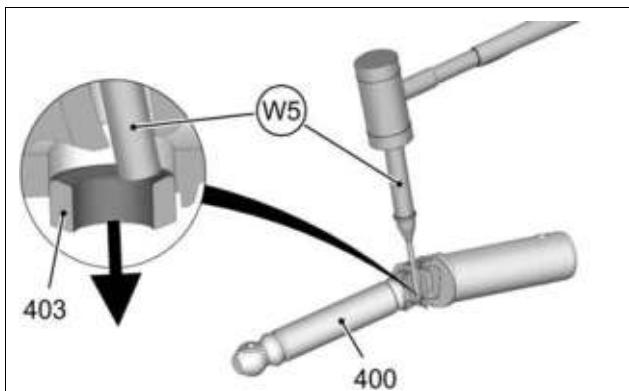
- Push retaining sleeve (**401**) off the plug-in shaft (**307**).
  - Use a suitable tool (**WM**).
- Remove retaining sleeve (**401**).



- Eject coupling rod pins (**402**).
  - Use tool (**W5**).



- Bend the coupling rod (**400**).
- Knock guide bushing (**403**).
  - Use tool (**W5**).



- Remove coupling rod (**400**) from plug-in shaft (**307**).



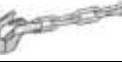
## 9. Dismantle/Reassembly

### 9.2 Reassembly

#### 9.2.1 Keep tools ready for assembly

##### *Recommended tools*

Keep the listed tools ready (not part of the delivery scope):

Illustration	Denomination
	Hammer
	Set allen keys
	Set ring spanners size 10 - size 30
	Set fork spanners size 10 - size 30
	Screwdriver ( <b>WS</b> )
	Pliers ( <b>WFZ</b> )
	Centre punch ( <b>WK</b> )
	Cartridge gun ( <b>WF</b> )
	Belt shears ( <b>WBS</b> )
	Hoisting/pulling device ( <b>HZV</b> )
	Torque wrench ( <b>WT</b> )

## 9. Dismantle/Reassembly

### Recommended special tools



Special tools are not part of the delivery scope.

- Order special tools using the order form (→ chapter 11).

Illustration	Denomination
	Chain wrench ( <b>W2</b> )
	Mounting tool ( <b>W3</b> )
	Assembly mandrel ( <b>W4</b> )
	Drift ( <b>W5</b> )

### Recommended auxiliary materials

Keep the listed auxiliary materials available (not included in the scope of delivery):

- Lubricant (**GM**)
- Anti-seize graphite petroleum (**GC**)
- SEEPEX Joint grease (**GF**)
- WEICON Anti-seize assembly paste (**PAS**)

### NOTICE

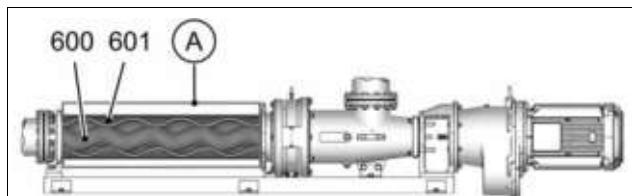
#### Damage to property due to inadequate lubricants (**GM**).

Damage to components. Contamination of the conveying medium.

- Observe resistance to the materials used and the conveying medium.
- Use suitable lubricants (**GM**) only.

### 9.2.2 Unit (**A**) - Preparing components parts for assembly

- Unit (**A**) consisting of:
  - Rotor (**600**)
  - Stator (**601**)



- Check o-rings and seals for wear.
  - In case of wear replace o-rings and seal.

#### 9.2.2.1 Prepare rotor (**600**) for assembly

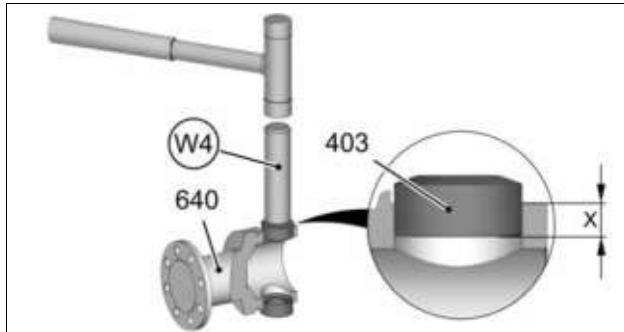
- Remove any damage.
- Clean rotor (**600**).

## 9. Dismantle/Reassembly

### 9.2.2.2 Prepare rotor head (640) for assembly

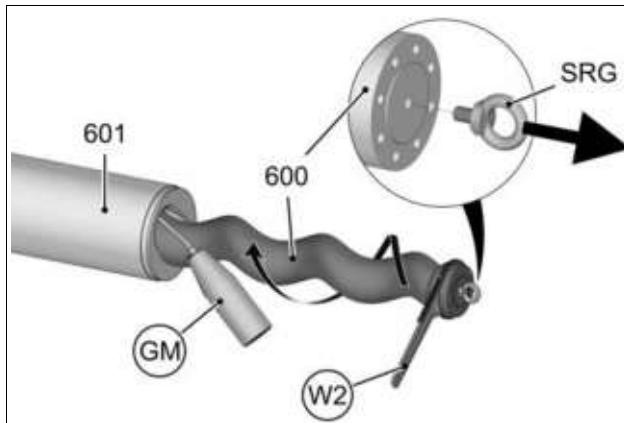
**NOTICE** Malfunction of the joints. Malfunction and/or destruction of the joints.

- Renew coupling rod pin (402) and guide bushings (403) together.
- Drive in guide bushings (403) (Depth X = 2/3).
  -  Use tool (W4).



### 9.2.3 Assemble components parts - Unit (A)

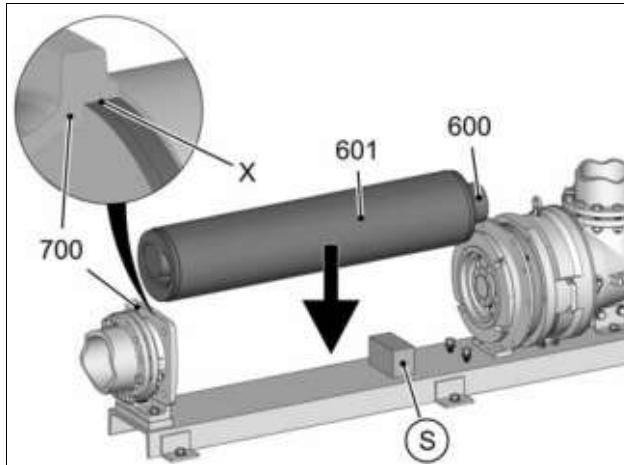
- For easy assembly of rotor (600) apply lubricant (GM) to outer surface of rotor (600) and inner surface of stator (601).
- Secure stator (601) against twisting.
- Push rotor (600) by turning into stator (601)
  -  Use tool (W2).
- Dismantle eye bolt (SRG) from rotor (600).



### 9.2.4 Assemble unit (A)

#### 9.2.4.1 Attaching unit (A) to pump

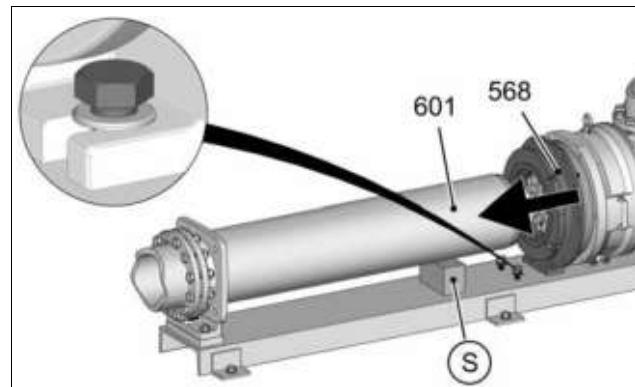
- Attach unit (A), consisting of rotor (600) and stator (601), to pump.
- Insert stator collar (X) into pressure branch (700).
- Prop up stator (601) with support (S).



## 9. Dismantle/Reassembly

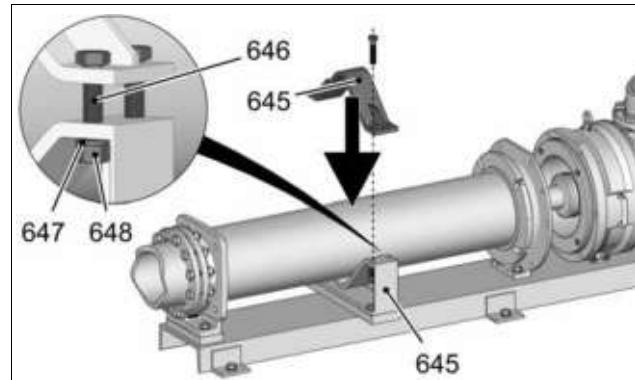
### 9.2.4.2 Slide stator capture (568) onto stator (601)

- Slide stator capture (568) onto stator (601).
- Remove support (S).



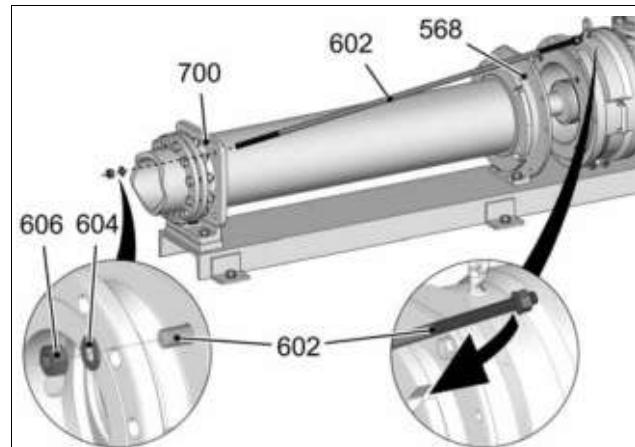
### 9.2.4.3 Assemble stator support (645) - optional

- Pre-assemble upper part of the stator support (645) using screw fitting (646, 647, 648) onto lower part of the stator support (645).



### 9.2.4.4 Assemble tie bolts (602)

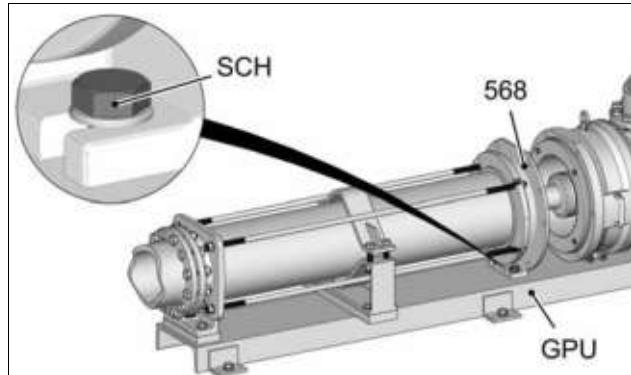
- Insert tie bolts (602) in pressure branch (700) and stator capture (568).
- Assemble screw fitting (604, 606).
- Tighten tie bolts (602) evenly.



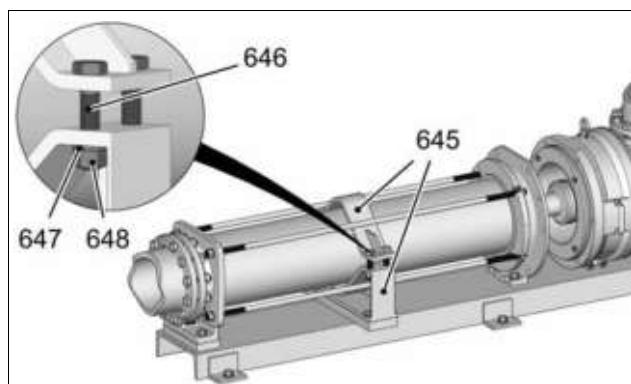
## 9. Dismantle/Reassembly

### 9.2.4.5 Tighten screw fitting on stator capture (568) and stator support (645)

- Tighten screw fitting (**SCH**) between stator capture (**568**) and base plate (**GPU**) evenly.

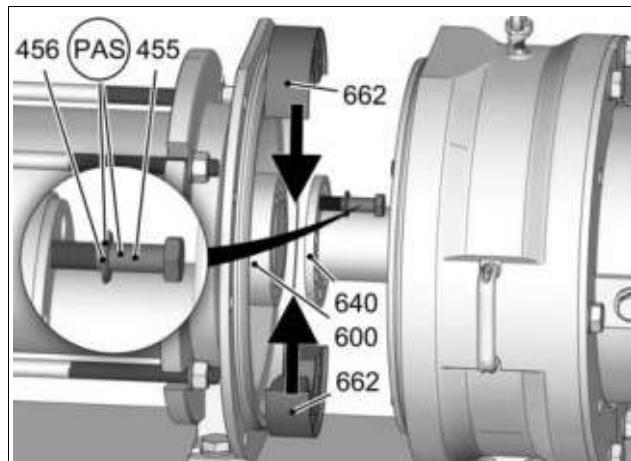


- Tighten screw fitting (**646**, **647**, **648**) on stator support (**645**) evenly.



### 9.2.4.6 Assemble spacer ring (662)

- Insert upper and lower spacer ring half (**662**) between rotor (**600**) and rotor head (**640**) and align them.
- Apply assembly paste (**PAS**) to screw fitting (**455**, **456**).
  - Use WEICON Anti-Seize assembly paste.
- Connect rotor (**600**), spacer ring (**662**) and rotor head (**640**) together using screw fitting (**455**, **456**).

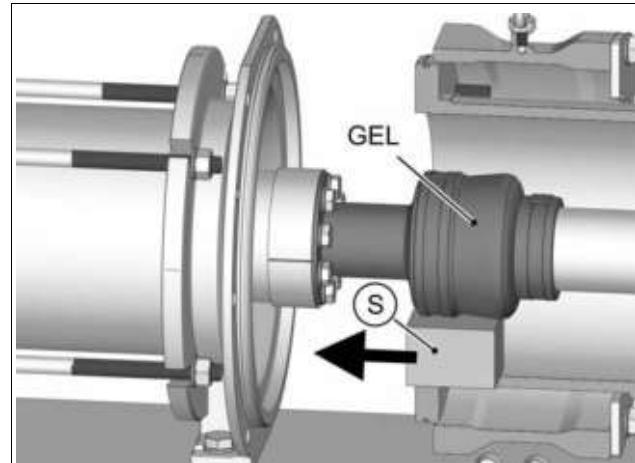


- Note tightening torques:
  - Use tool (**WT**).

Size	Thread size	Tightening torque
35	M10	40 Nm
70	M12	70 Nm
130	M16	160 Nm

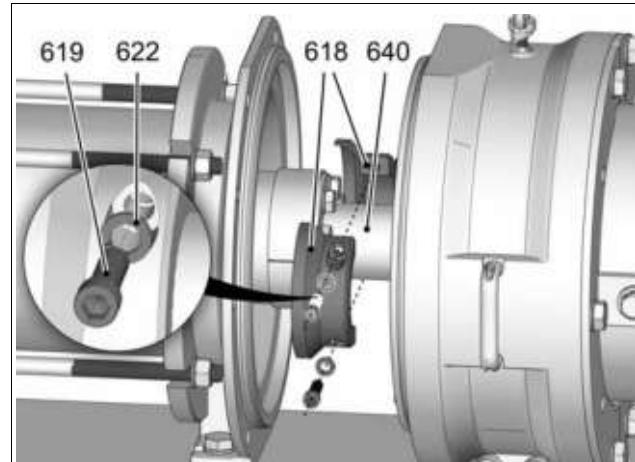
## 9. Dismantle/Reassembly

- Remove support (S) from rotor-sided joint (GEL).



### Assemble screw fitting guard (618) - optional

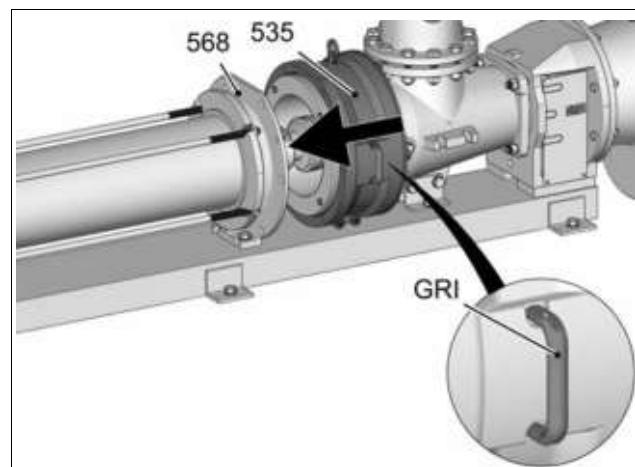
- Assemble screw fitting guard (618) using screw fitting (619, 622) onto rotor head (640).



#### 9.2.4.7 Shift casing element (535)

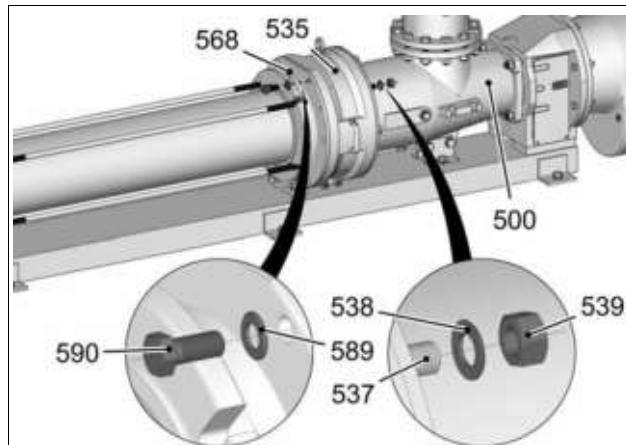
**CAUTION** Risk of injury through incorrect reassembly. Risk of fingers being crushed when shifting casing element (535). Use grips (GRI) on casing element (535) for shifting.

- Slide casing element (535) onto stator capture (568).



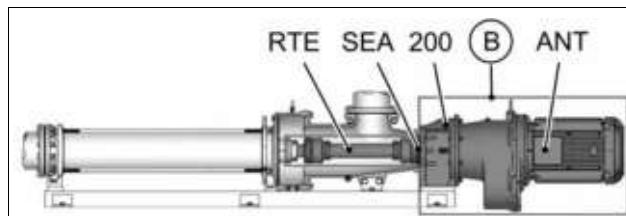
## 9. Dismantle/Reassembly

- Assemble screw fitting (589, 590) between stator capture (568) and casing element (535).
- Stud bolts (537) are glued and can leak during dismantling. If stud bolts (537) are detached or damaged during dismantling, replace them with new stud bolts (537) in suction casing (500).
- Use "medium-strength" screw retention (Loctite 243).
- Assemble screw fitting (538, 539) between casing element (535) and suction casing (500).



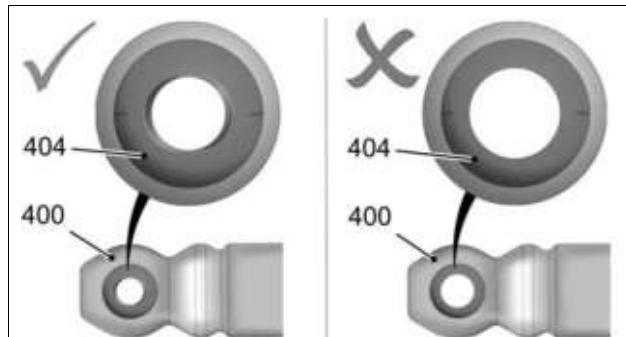
### 9.2.5 Unit (B) - Preparing components parts for assembly

- Unit (B) consisting of:
  - Rotating unit (RTE)
  - Lantern (200)
  - Shaft seal (SEA)
  - Drive (ANT)
- Check o-rings and seals for wear.
  - In case of wear replace o-rings and seal.

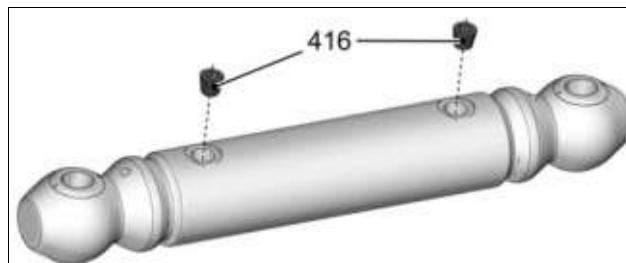


#### 9.2.5.1 Prepare coupling rod (400) for assembly

- Clean coupling rod (400).
- NOTICE** Malfunction of the joints. Malfunction and/or destruction of the joints
- Check coupling rod bushings (404) for wear.
  - In the event of wear, replace coupling rod (400), including the coupling rod bushings (404).



- Dismantle screwed plugs (416).



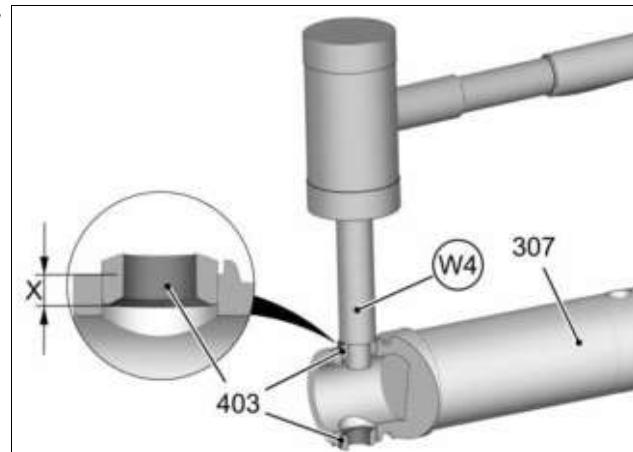
#### 9.2.5.2 Prepare plug-in shaft (307) for assembly

- Remove any damage.
- Clean plug-in shaft (307).

## 9. Dismantle/Reassembly

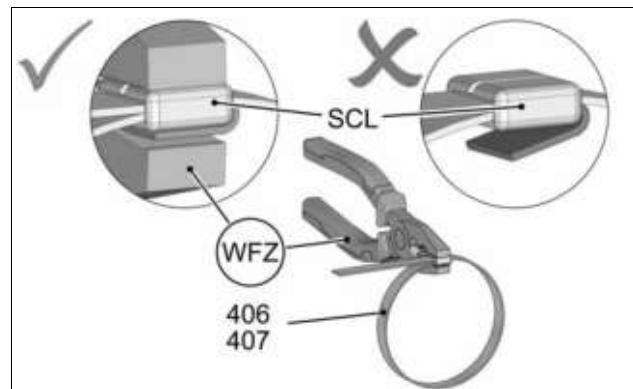
**NOTICE** Malfunction of the joints. Malfunction and/or destruction of the joints.

- Renew coupling rod pin (402) and guide bushings (403) together.
- Drive in guide bushings (403) (depth X = 2/3).
  -  Use tool (W4).



### 9.2.5.3 Prepare holding band (406, 407)

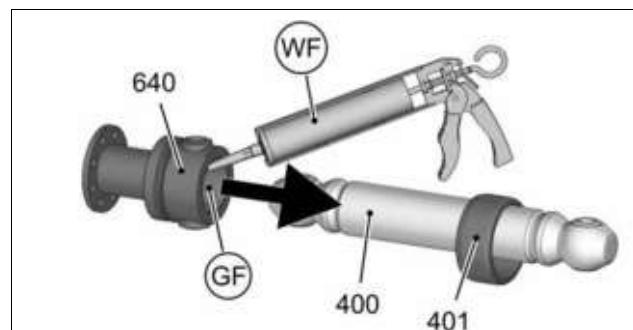
- Use prefabricated double-band holding bands only.
- Check the holding band (406, 407)
  - Bent-over holding band (406, 407) is in contact with holding band loop (SCL) to avoid damaging universal joint sleeve (405).
  - Press on holding band (406, 407) using tool (WFZ) if necessary.



### 9.2.6 Unit (B) - Assemble components parts

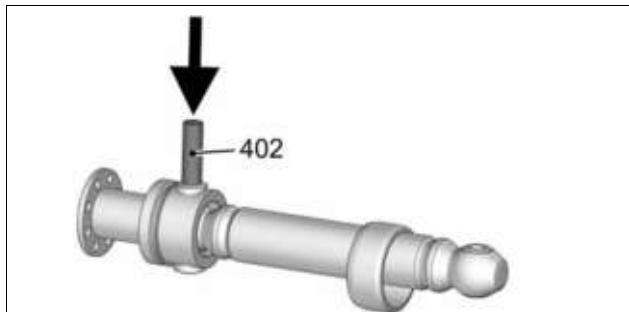
#### 9.2.6.1 Connect rotor head (640) with coupling rod (400)

- Fill inner area of joint head with SEEPTEX joint grease (GF).
  - Use tool (WF).
- Slide retaining sleeve (401) onto coupling rod (400).
- Slide rotor head (640) onto coupling rod (400).

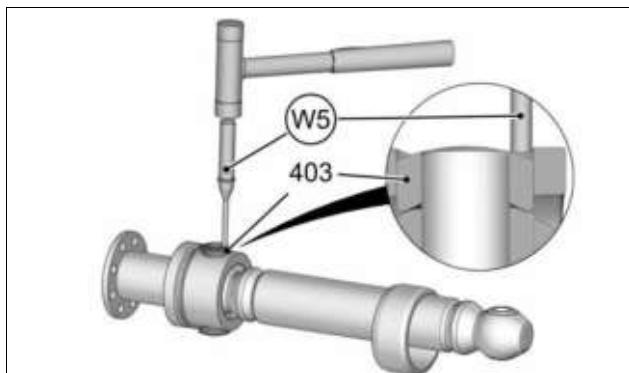


## 9. Dismantle/Reassembly

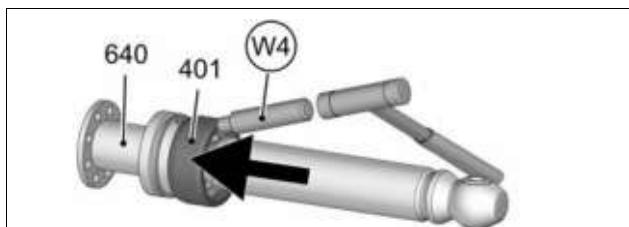
- Insert coupling rod pin (402).



- Knock the guide bushings (403) in.
  - Use tool (W5).

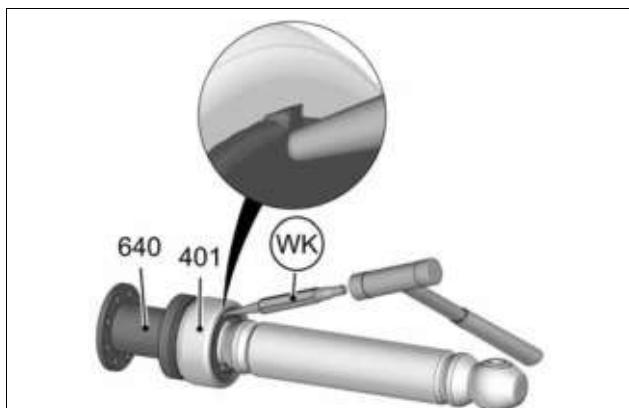


- Slide retaining sleeve (401) onto rotor head (640).
  - Use tool (W4).



### 9.2.6.2 Secure retaining sleeve (401) - rotor-side

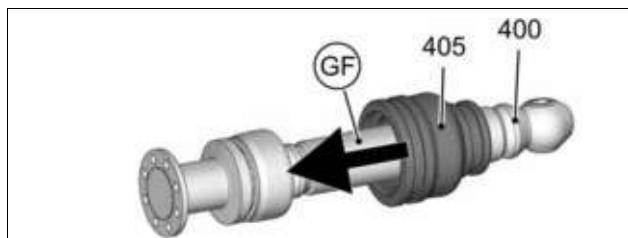
- Secure retaining sleeve (401) at a distance of 180° by means of material deformation at the rotor head (640).
  - Use a suitable tool (WK).



## 9. Dismantle/Reassembly

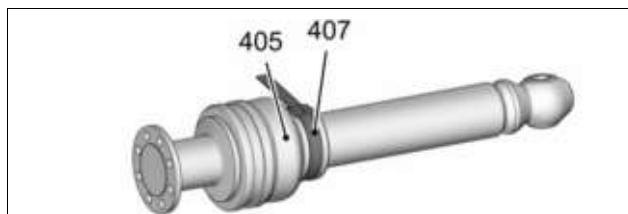
### 9.2.6.3 Assemble universal joint sleeve (405) - rotor-side

- For easier assembly of the universal joint sleeve (405), lubricate outer surface of coupling rod (400) with SEEPEX joint grease (GF).
- Slide universal joint sleeve (405) onto joint.

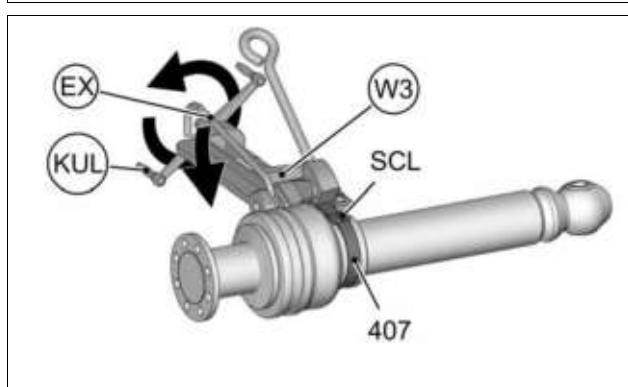


### 9.2.6.4 Assemble holding band (407) - rotor sided

- Slide holding band (407) loosely onto universal joint sleeve (405)

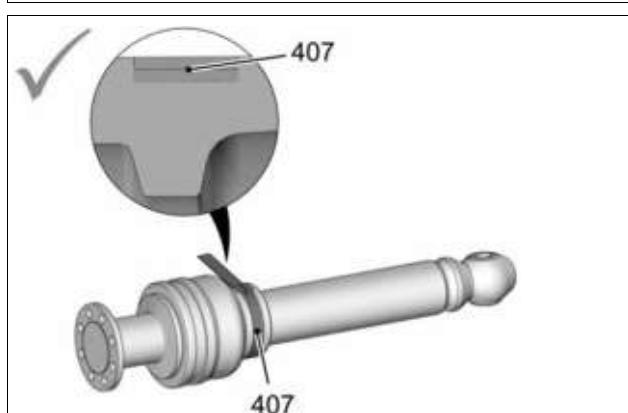


- Clamp holding band (407) - rotor-sided.
  - Insert holding band (407) into tool (W3).
  - Hold holding band firmly using eccentric lever (EX).
  - Turn crank (KUL), until holding band (407) is clamped and in contact with holding band loop (SCL).
  - Pull holding band (407) carefully together, until it is in contact with the circumferential universal joint sleeve groove.



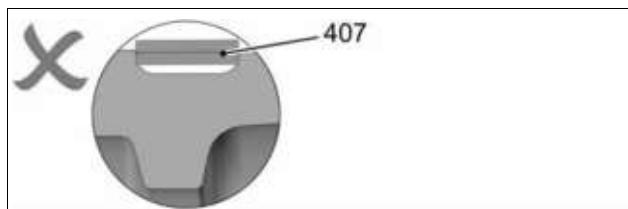
#### Correct

Holding band (407) has been pulled into the outer shape of the universal joint sleeve and is firmly seated.



#### Incorrect

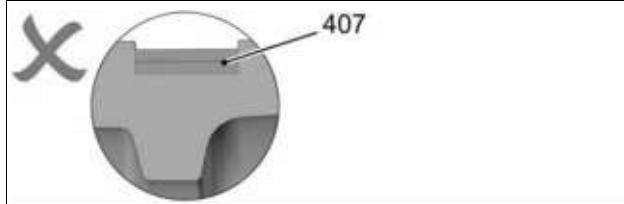
Holding band (407) too loose, could slip.



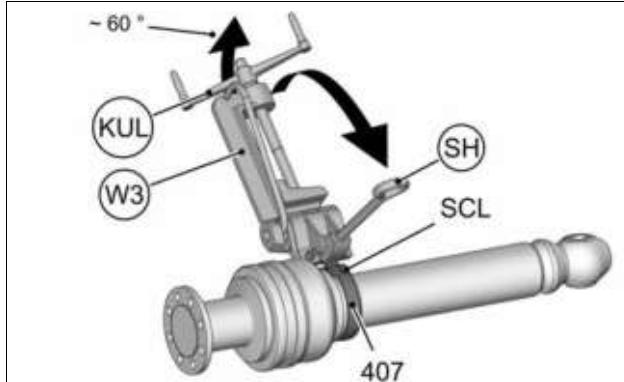
## 9. Dismantle/Reassembly

### *Incorrect*

Holding band (**407**) too tight, universal joint sleeve will be damaged/ sheared off.

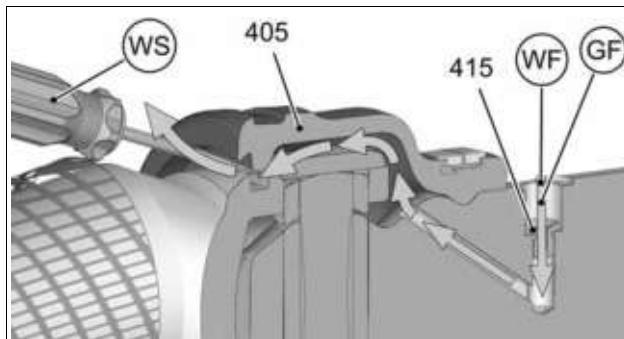


- Overturn holding band (**407**).
- Swivel tool (**W3**) approx. 60° upwards.
- Loosen crank (**KUL**) by half a turn.
- Swivel trimming lever (**SH**) upwards until edge is behind holding band loop (**SCL**).



- Fill universal joint sleeve (**405**) via lubrication nipple (**415**) with SEEPEX joint grease (**GF**), until joint grease (**GF**) flows out.
  - For minimum fill level of SEEPEX joint grease (**GF**), refer to the maintenance document (→ chapter 7).
  - Use tool (**WF**).

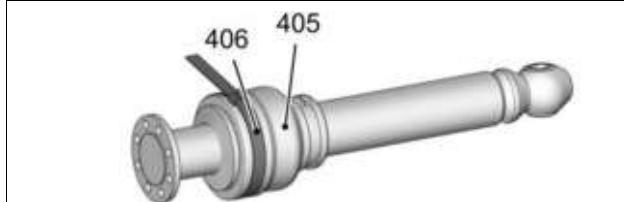
**NOTICE** Damage of universal joint sleeve due to sharp tools. Leak in universal joint sleeve.



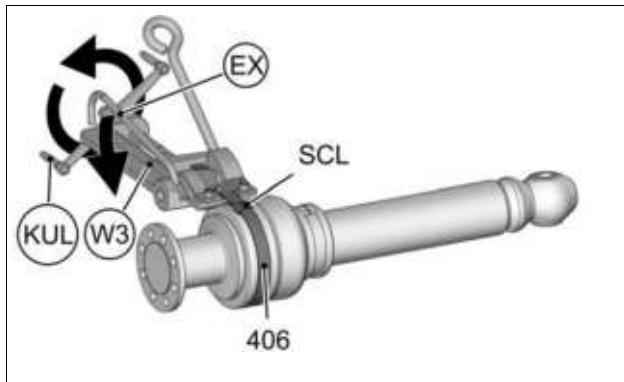
- Ventilate interior of the joint by lifting universal joint sleeve (**405**).
  - Use a suitable tool (**WS**).

### 9.2.6.5 Assemble holding band (**406**) - rotor sided

- Slide holding band (**406**) loosely onto universal joint sleeve (**405**)



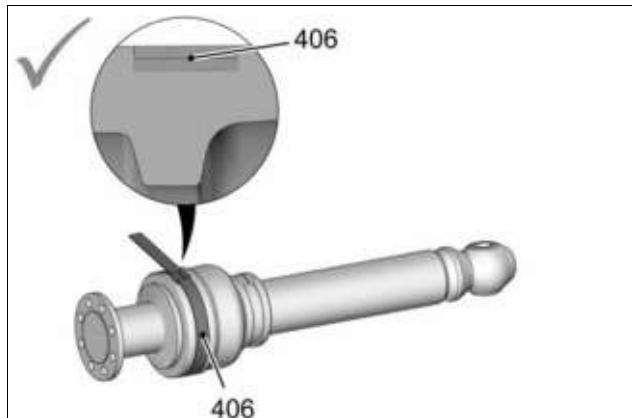
- Clamp holding band (**406**) - rotor-sided.
  - Insert holding band (**406**) into tool (**W3**).
  - Hold holding band firmly using eccentric lever (**EX**).
  - Turn crank (**KUL**), until holding band (**406**) is clamped and in contact with holding band loop (**SCL**).
  - Pull holding band (**406**) carefully together, until it is in contact with the circumferential universal joint sleeve groove.



## 9. Dismantle/Reassembly

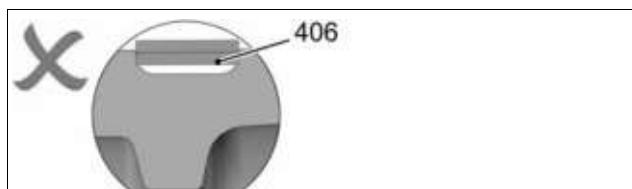
### Correct

Holding band (**406**) has been pulled into outer shape of universal joint sleeve and is firmly seated.



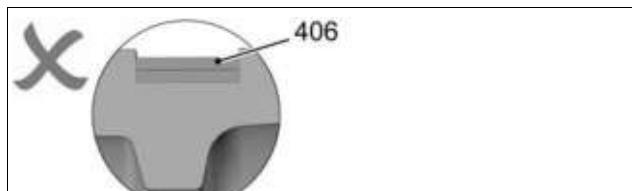
### Incorrect

Holding band (**406**) too loose, could slip.

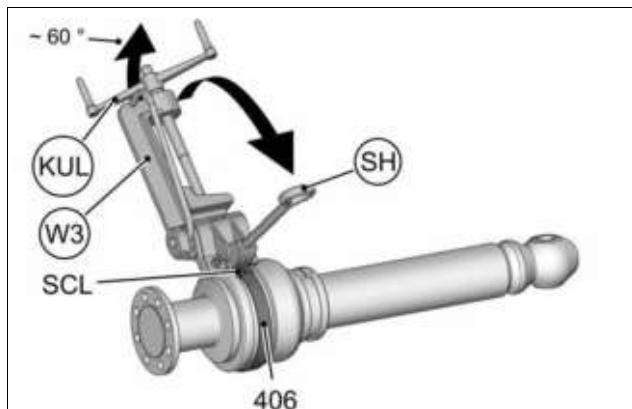


### Incorrect

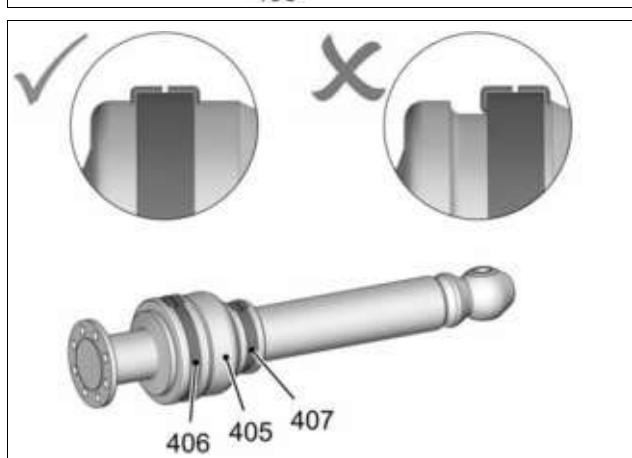
Holding band (**406**) too tight, universal joint sleeve will be damaged/ sheared off.



- Overturn holding band (**406**).
- Swivel tool (**W3**) approx. 60° upwards.
- Loosen crank (**KUL**) by half a turn.
- Swivel trimming lever (**SH**) upwards until edge is behind holding band loop (**SCL**).



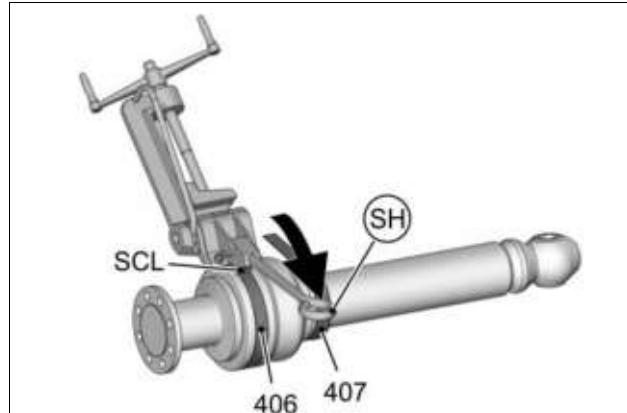
- The holding band (**406, 407**) must lie in the groove of the universal joint sleeve (**405**).
- Replace the holding band (**406, 407**) if the holding band (**406, 407**) slips back through the loop.



## 9. Dismantle/Reassembly

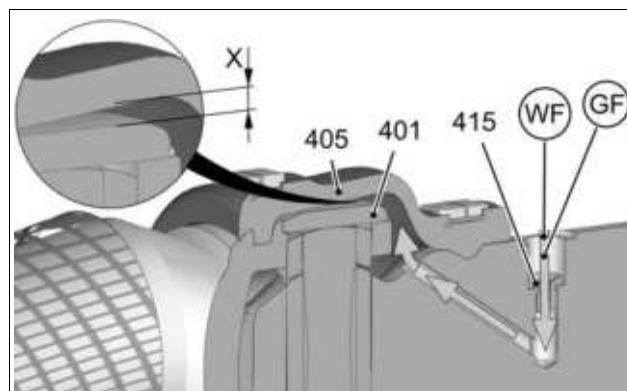
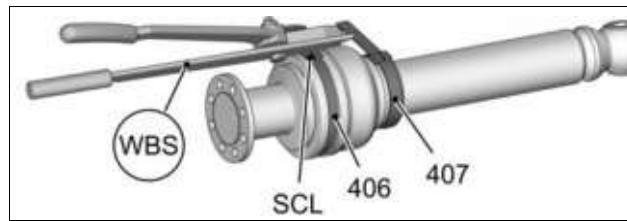
### ***Shear off holding band (406, 407) in stainless steel material design, non-corrosive steels***

- **NOTICE** Damage to the universal joint sleeve by hammering and hitting.
  - Joint grease (**GF**) may leak. Avoid hammering or hitting the universal joint sleeve.
- For material design, refer to the technical data (→ chapter 3).
- Shear off holding band (**406, 407**) behind the holding band loop (**SCL**).
  - Strike cutting lever (**SH**) with the palm of your hand.
- Straighten the holding band (**406, 407**) carefully if it lifts up at the sheared-off end.



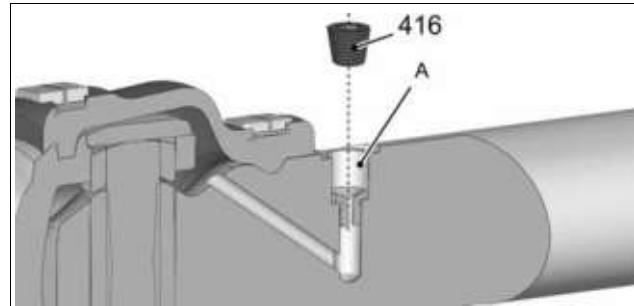
### ***Cut off holding band (406, 407) in stainless steel material design, heat-resistant steels***

- **NOTICE** Damage to the universal joint sleeve by hammering and hitting. Joint grease (**GF**) may leak.
  - Avoid hammering or hitting the universal joint sleeve.
- For material design, refer to the technical data (→ chapter 3).
- Cut off holding band (**406, 407**) behind the holding band loop (**SCL**).
  - Use tool (**WBS**).
- File down and deburr any projecting edges.
- Fill universal joint sleeve (**405**) via lubrication nipple (**415**) with SEEPEX joint grease (**GF**), until a noticeable gap (**X**) is created between universal joint sleeve (**405**) and retaining sleeve (**401**).
  - Use tool (**WF**).



## 9. Dismantle/Reassembly

- Clean threaded area (**A**) of the screwed plug (**416**).
  - Surfaces must be clean, dry and free of dust.
- Flush-fit screwed plug (**416**) into coupling rod (**400**).
  - Use “medium-strength” screw retention (Loctite 243).

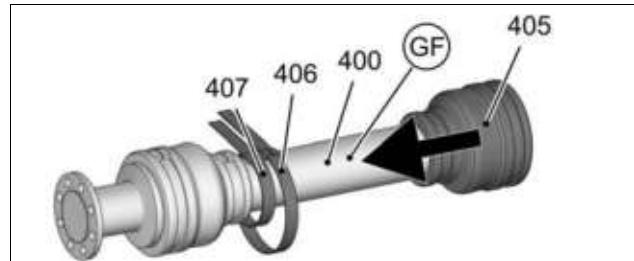


### **Assemble universal joint sleeve protection (408) (optional)**

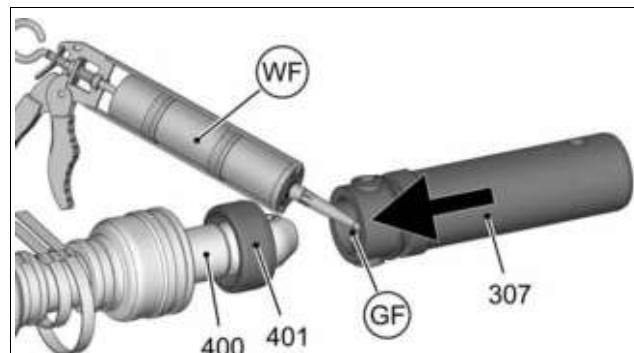
- Assemble the universal joint sleeve protection (**MAS**) on rotor side.
  - See chapter on additional devices (→ chapter 12.1).

#### 9.2.6.6 Connect coupling rod (400) and plug-in shaft (307)

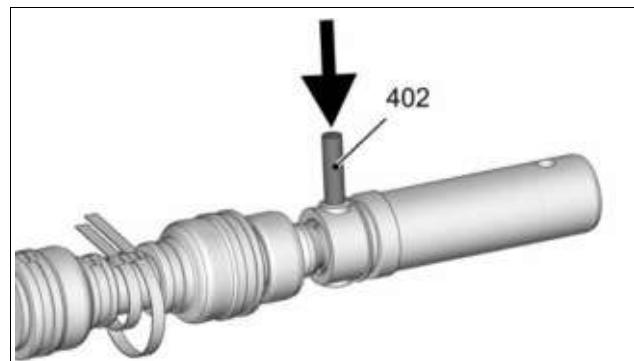
- For easier assembly of the universal joint sleeve (**405**), lubricate the outer surface of coupling rod (**400**) with SEEPEX joint grease (**GF**).
- Slide holding bands (**406, 407**) and universal joint sleeve (**405**) onto coupling rod (**400**).



- Fill interior of joint head with SEEPEX joint grease (**GF**).
  - Use tool (**WF**).
- Slide the retaining sleeve (**401**) and plug-in shaft (**307**) onto the coupling rod (**400**).

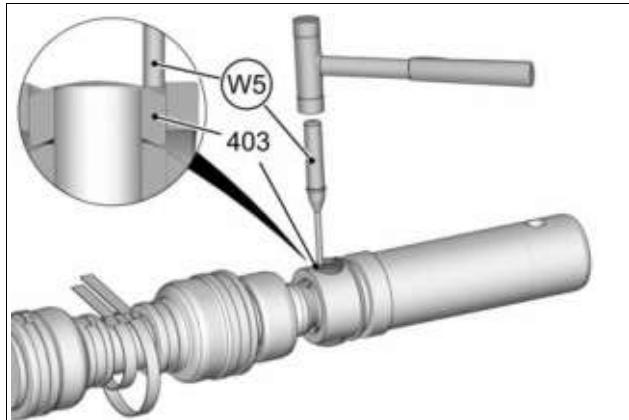


- Insert coupling rod pin (**402**).

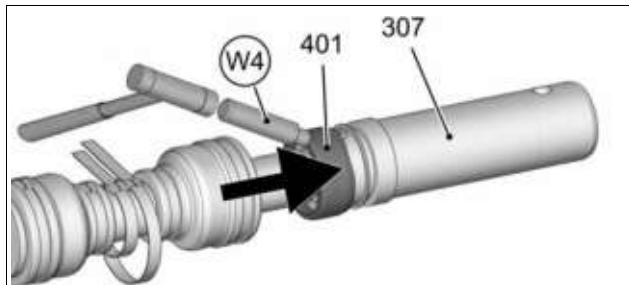


## 9. Dismantle/Reassembly

- Knock the guide bushings (403) in.  
–  Use tool (W5).

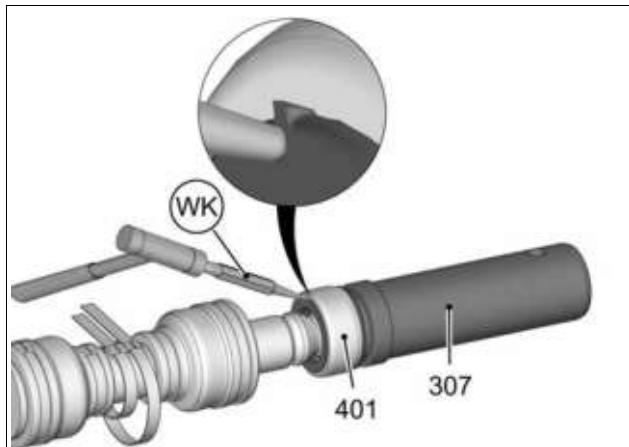


- Slide retaining sleeve (401) onto plug-in shaft (307).  
–  Use tool (W4).



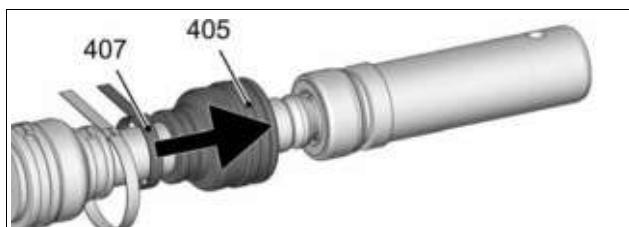
### 9.2.6.7 Secure retaining sleeve (401) - drive side

- Secure retaining sleeve (401) at a distance of 180° by means of material deformation at plug-in shaft (307).  
– Use a suitable tool (WK).



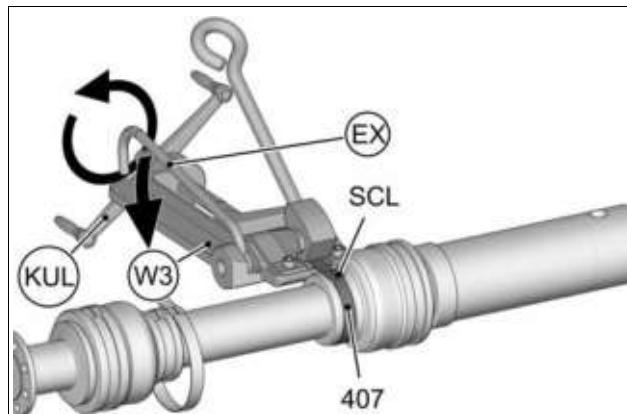
### 9.2.6.8 Assemble universal joint sleeve (405) - drive side

- Slide universal joint sleeve (405) and holding band (407) onto joint.



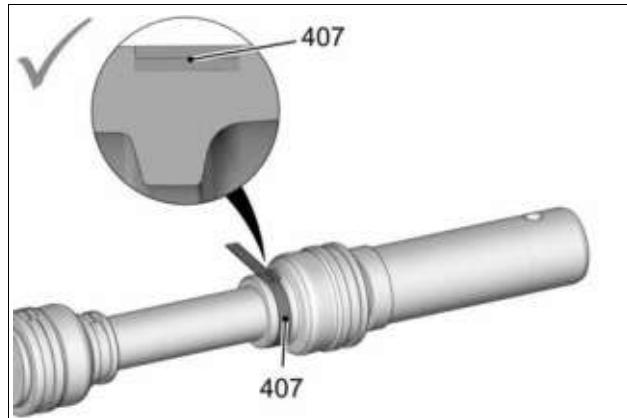
### 9.2.6.9 Assemble holding band (407) - drive-sided

- Clamp holding band (407) - rotor-sided.
  -  Insert holding band (407) into tool (W3).
  - Hold holding band firmly using eccentric lever (EX).
  - Turn crank (KUL), until holding band (407) is clamped and in contact with holding band loop (SCL).
  - Pull holding band (407) carefully together, until it is in contact with the circumferential universal joint sleeve groove.



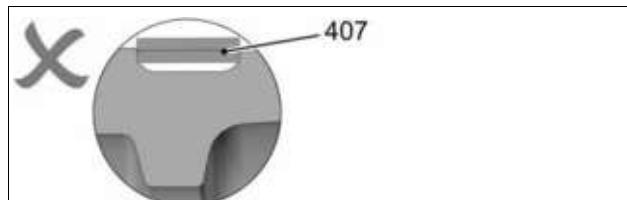
*Correct*

Holding band (407) has been pulled into the outer shape of the universal joint sleeve and is firmly seated.



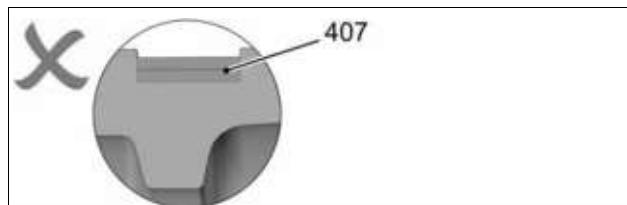
*Incorrect*

Holding band (407) too loose, could slip.



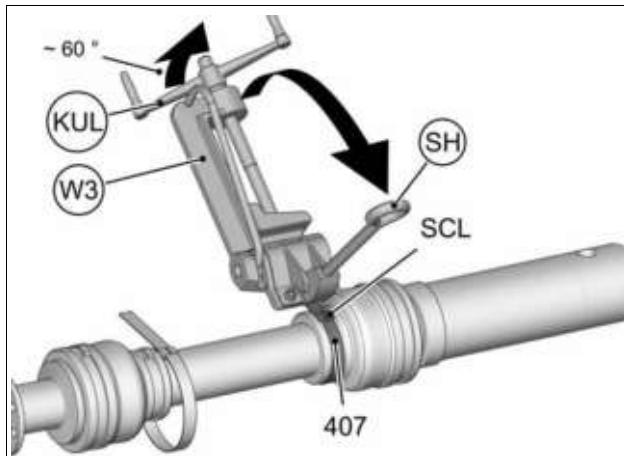
*Incorrect*

Holding band (407) too tight, universal joint sleeve will be damaged/ sheared off.



## 9. Dismantle/Reassembly

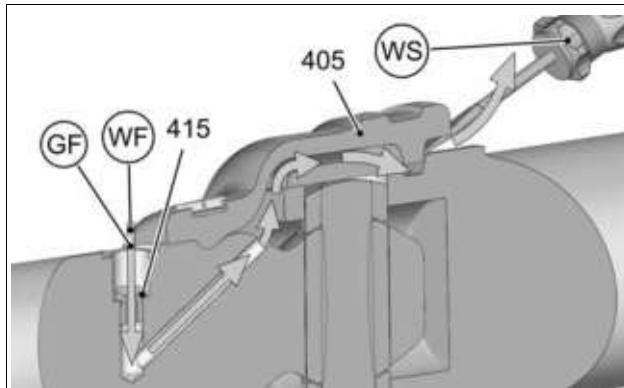
- Overturn holding band (407).
- Swivel tool (W3) approx. 60° upwards.
- Loosen crank (KUL) by half a turn.
- Swivel trimming lever (SH) upwards until edge is behind holding band loop (SCL).



- Fill universal joint sleeve (405) via lubrication nipple (415) with SEEPEX joint grease (GF), until joint grease (GF) flows out.
  - For minimum fill level of SEEPEX joint grease (GF), refer to the maintenance document (→ chapter 7).
  - Use tool (WF).

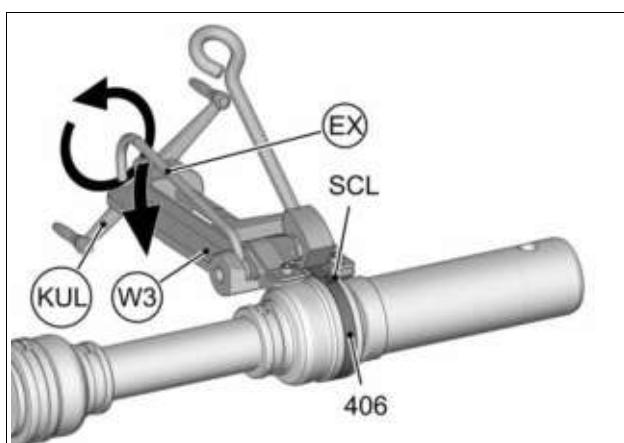
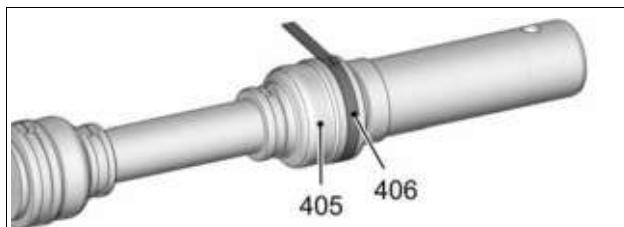
**NOTICE** Damage of universal joint sleeve due to sharp tools. Leak in universal joint sleeve.

- Ventilate interior of the joint by lifting universal joint sleeve (405).
  - Use a suitable tool (WS).



### 9.2.6.10 Assemble holding band (406) - drive-sided

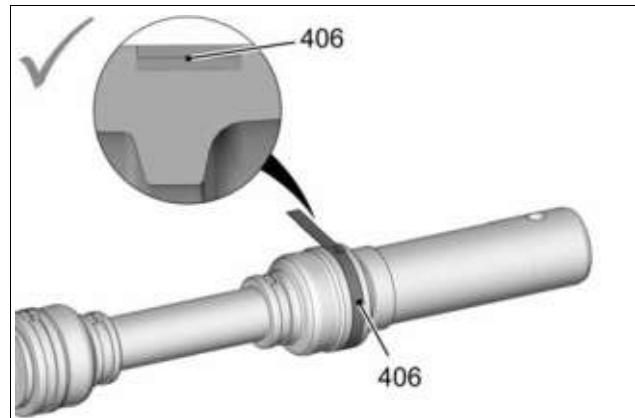
- Slide holding band (406) loosely onto universal joint sleeve (405)
- Clamp holding band (406) - drive-sided.
  - Insert holding band (406) into tool (W3).
  - Hold holding band firmly using eccentric lever (EX).
  - Turn crank (KUL), until holding band (406) is clamped and in contact with holding band loop (SCL).
  - Pull holding band (406) carefully together, until it is in contact with the circumferential universal joint sleeve groove.



## 9. Dismantle/Reassembly

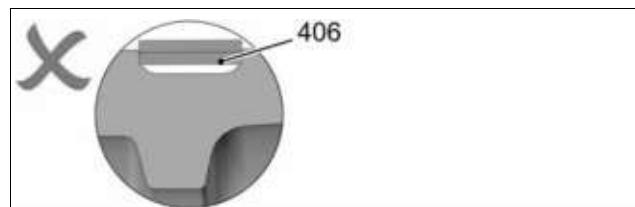
### Correct

Holding band (**406**) has been pulled into outer shape of universal joint sleeve and is firmly seated.



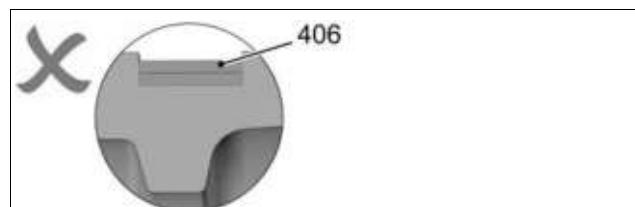
### Incorrect

Holding band (**406**) too loose, could slip.

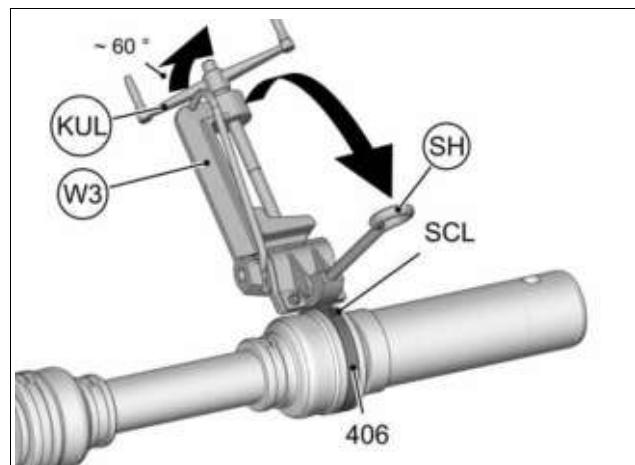


### Incorrect

Holding band (**406**) too tight, universal joint sleeve will be damaged/ sheared off.



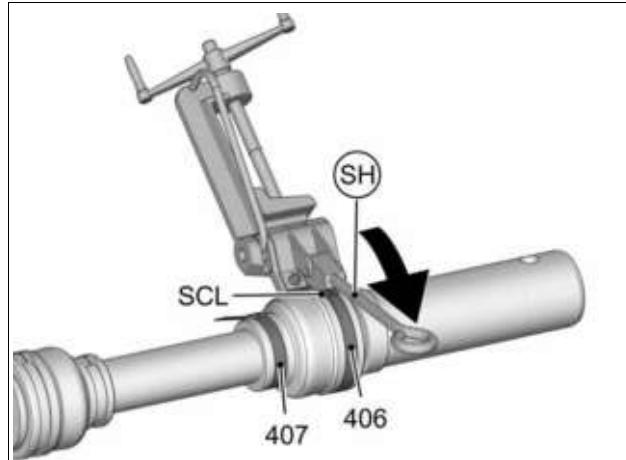
- Overturn holding band (**406**).
- Swivel tool (**W3**) approx. 60° upwards.
- Loosen crank (**KUL**) by half a turn.
- Swivel trimming lever (**SH**) upwards until edge is behind holding band loop (**SCL**).



## 9. Dismantle/Reassembly

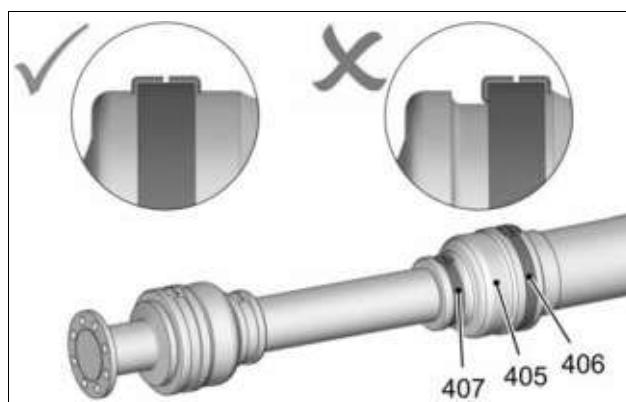
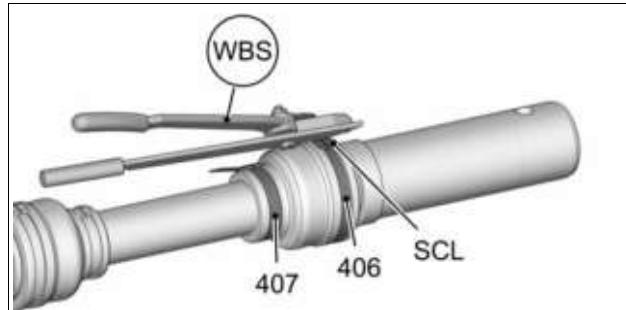
### **Shear off holding band (406, 407) for material design stainless steel, corrosion-resistant steel**

- **NOTICE** Universal joint sleeve can be damaged by hammering and striking. Joint grease (GF) can leak out.
  - Avoid hammering or striking the universal joint sleeve.
- Refer to the technical data (→ chapter 3) for the material design.
- Shear off holding band (**406, 407**) below holding band loop (**SCL**).
  - Strike cutting lever (**SH**) with the palm of your hand.
- Straighten the holding band (**406, 407**) carefully if it lifts up at the sheared-off end.



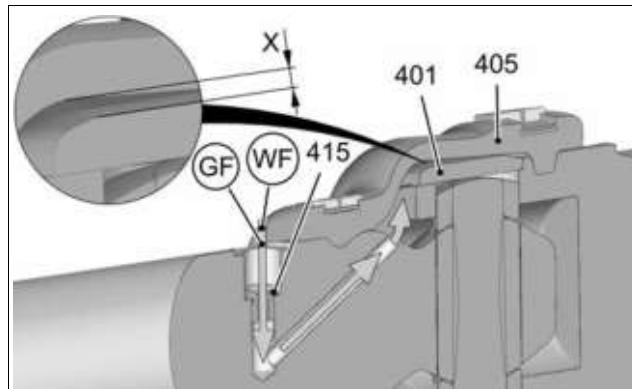
### **Cut off holding band (406, 407) for material design stainless steel, heat-resistant steel**

- **NOTICE** Universal joint sleeve can be damaged by hammering and striking. Joint grease (GF) can leak out.
  - Avoid hammering or striking the universal joint sleeve.
- Refer to the technical data (→ chapter 3) for the material design.
- Cut off holding band (**406, 407**) below holding band loop (**SCL**).
  - Use tool (**WBS**).
- File down and deburr any projecting edges.
- The holding band (**406, 407**) must lie in the groove of the universal joint sleeve (**405**).
- Replace the holding band (**406, 407**) if the holding band (**406, 407**) slips back through the loop.

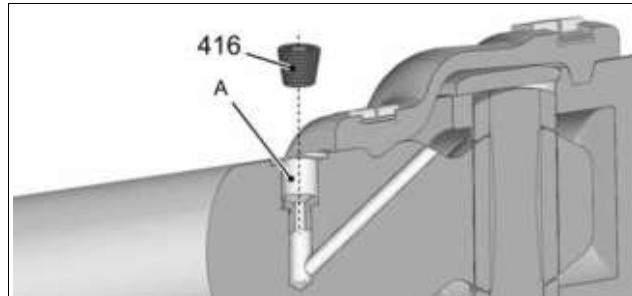


## 9. Dismantle/Reassembly

- Fill universal joint sleeve (405) via lubrication nipple (415) with SEEPEX joint grease (GF), until a noticeable gap (X) is created between universal joint sleeve (405) and retaining sleeve (401).
  - Use tool (WF).

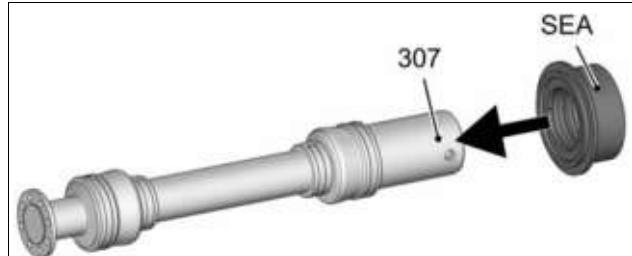


- Clean threaded area (A) of the screwed plug (416).
  - Surfaces must be clean, dry and free of dust.
- Flush-fit screwed plug (416) into coupling rod (400).
  - Use "medium-strength" screw retention (Loctite 243).

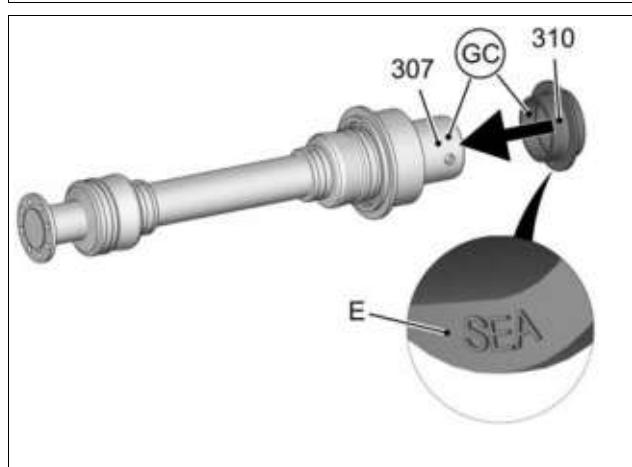


### 9.2.6.11 Assemble rotating unit (RTE)

- Slide shaft seal casing (SEA) onto plug-in shaft (307).
  - See shaft seal reassembly (→ chapter 9.4/9.5).

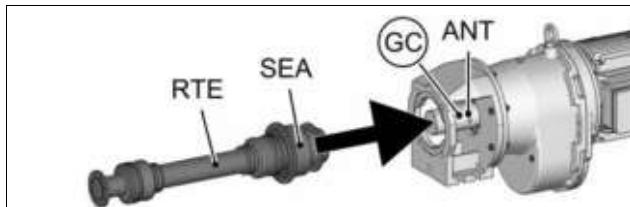


- Moisten inner surface of splash ring (310) and outer surface of plug-in shaft (307) with anti-seize graphite petroleum (GC) for easier assembly of the splash ring (310).
- Slide splash ring (310) onto plug-in shaft (307).
  - Observe fitting position of splash ring (E) (lettering „SEA“).

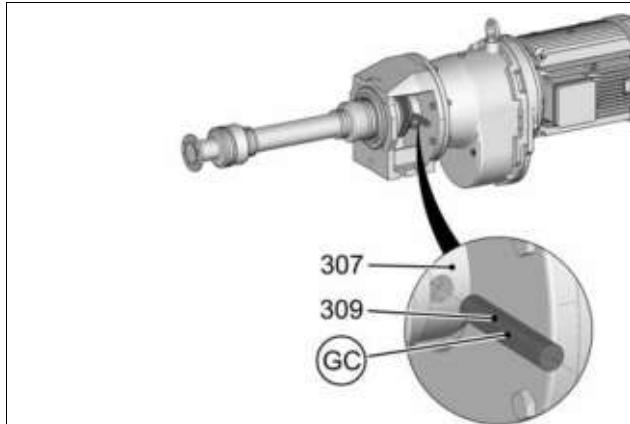


## 9. Dismantle/Reassembly

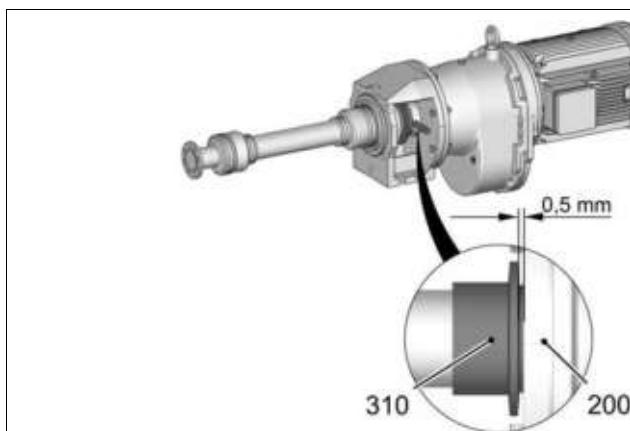
- Moisten output shaft of drive (**ANT**) with anti-seize graphite petroleum (**GC**) for easier assembly of the rotating unit (**RTE**).
- Push rotating unit (**RTE**) onto output shaft of the drive (**ANT**).



- Moisten plug-in shaft pin (**309**) with anti-seize graphite petroleum (**GC**) and insert into the plug-in shaft (**307**).



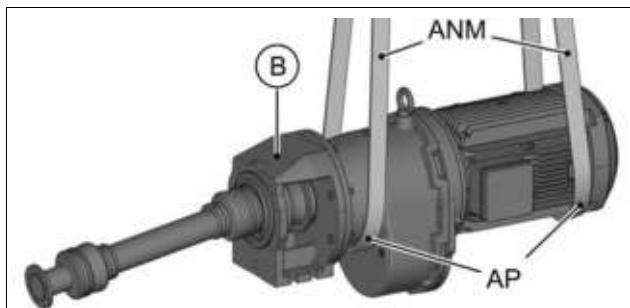
- Note position of splash ring (**310**).
- Insert splash ring collar at a distance of 0.5 mm from the lantern (**200**).



### 9.2.7 Assemble unit (**B**)

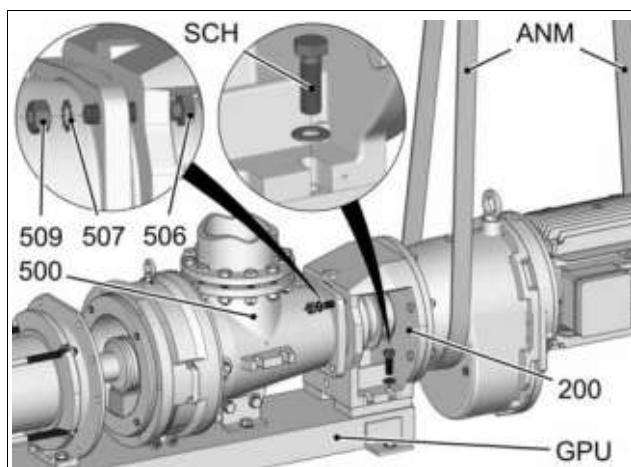
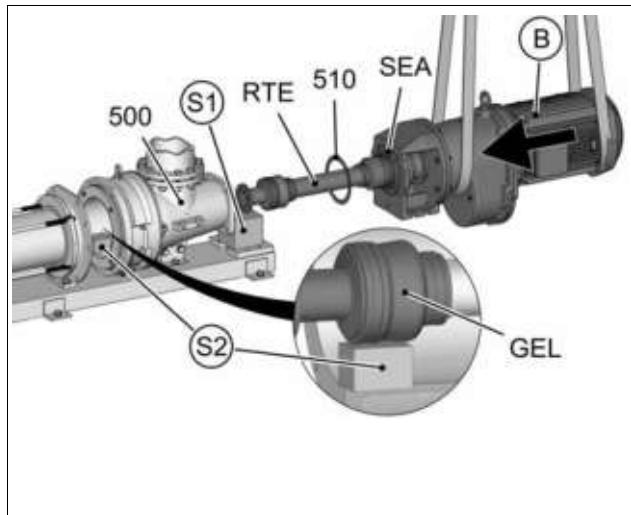
**⚠ WARNING** Risk of injury caused by tipping or falling unit (**B**). Risk of body parts being crushed.

- Secure unit (**B**) against tipping and falling.
  - Note lashing points (**AP**).
  - Use suitable slings (**ANM**).



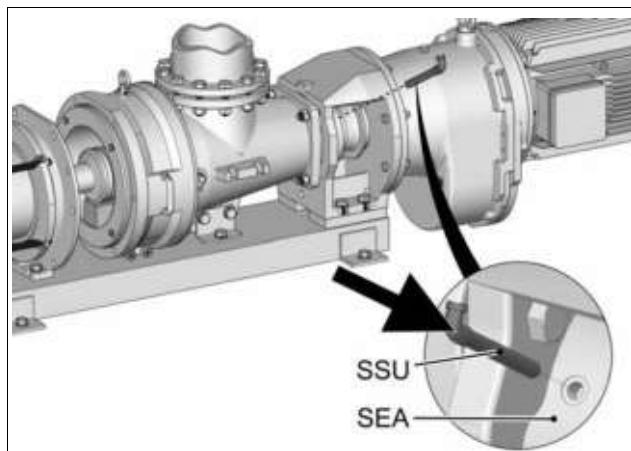
## 9. Dismantle/Reassembly

- Push suction casing seal (510) onto shaft seal casing (SEA).
- CAUTION** Risk of injury and material damage caused by buckling rotating unit (RTE). Crushing of fingers and damage to components possible.
- When inserting rotating unit (RTE) into suction casing (500) do not reach into opening of suction casing (500).
    - Use support (S1) as a guide.
  - Insert rotating unit (RTE) into suction casing (500).
  - Shift unit (B) until shaft seal casing (SEA) butts against suction casing (500).
  - Prop up rotor-sided joint (GEL) with support (S2).
  - Assemble screw fitting (506, 507, 509) between suction casing (500) and lantern (200).
  - Assemble screw fitting (SCH) between lantern (200) and base plate (GPU).
  - Remove slings (ANM).



### Assemble the flush connection (SSU) (optional)

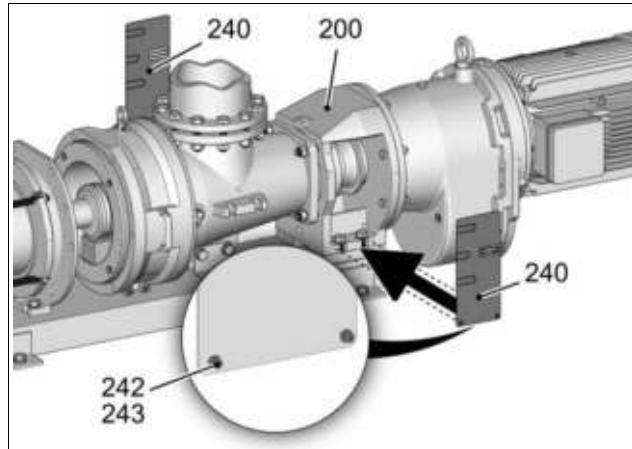
- Assemble flush connection (SSU).



## 9. Dismantle/Reassembly

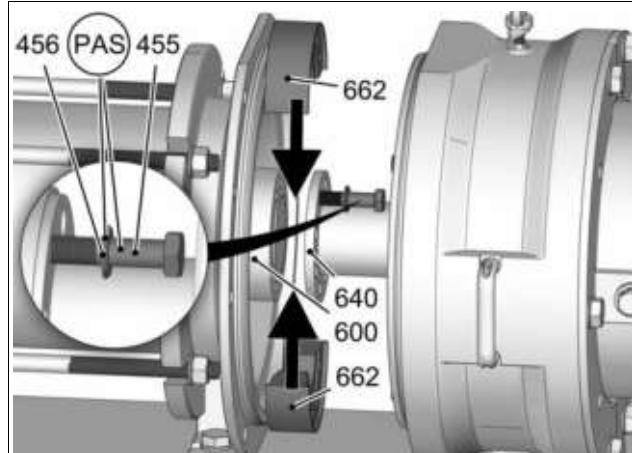
### 9.2.7.1 Assemble cover plates (240)

- Assemble cover plates (240) on lantern (200) using screw fitting (242, 243).



### 9.2.7.2 Assemble spacer ring (662)

- Insert upper and lower spacer ring half (662) between rotor (600) and rotor head (640) and align them.
- Apply assembly paste (PAS) to screw fitting (455, 456).
  - Use WEICON Anti-Seize assembly paste.
- Connect rotor (600), spacer ring (662) and rotor head (640) together using screw fitting (455, 456).

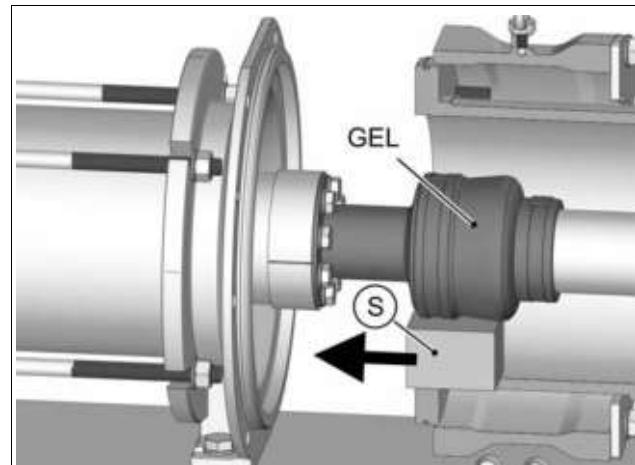


- Note tightening torques:
  - Use tool (WT).

Size	Thread size	Tightening torque
35	M10	40 Nm
70	M12	70 Nm
130	M16	160 Nm

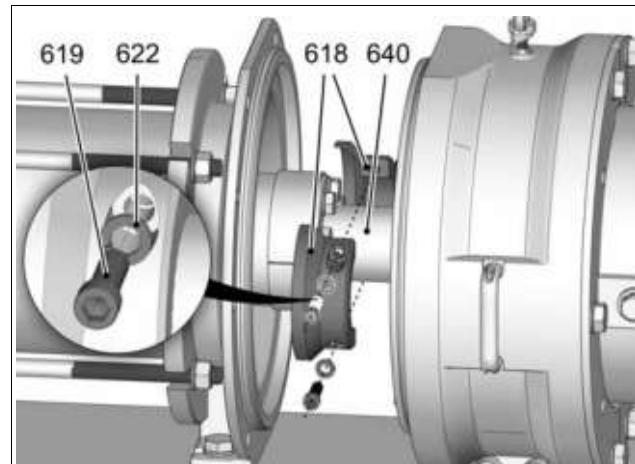
## 9. Dismantle/Reassembly

- Remove support (S) from rotor-sided joint (GEL).



### Assemble screw fitting guard (618) - optional

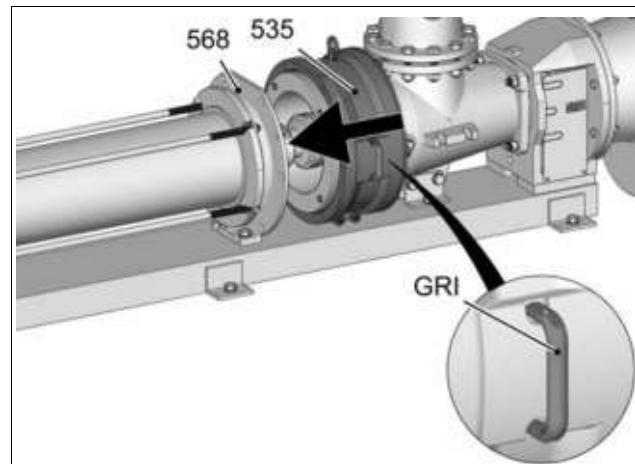
- Assemble screw fitting guard (618) using screw fitting (619, 622) onto rotor head (640).



### 9.2.7.3 Shift casing element (535)

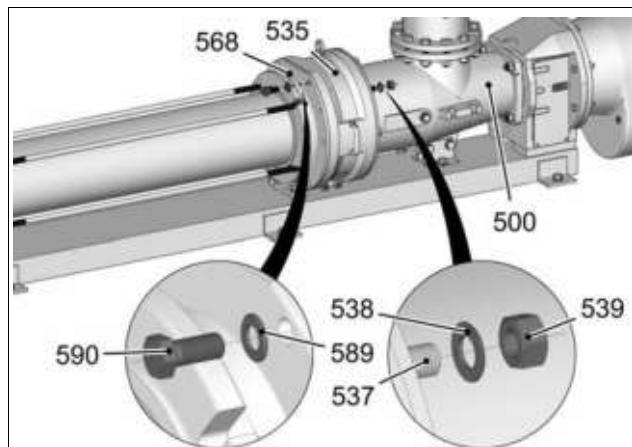
**CAUTION** Risk of injury through incorrect reassembly. Risk of fingers being crushed when shifting casing element (535). Use grips (GRI) on casing element (535) for shifting.

- Slide casing element (535) onto stator capture (568).



## 9. Dismantle/Reassembly

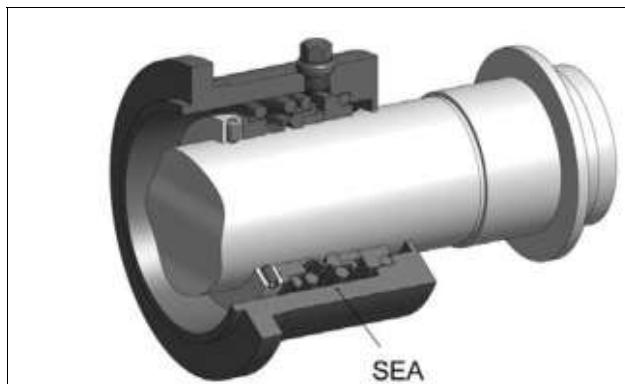
- Assemble screw fitting (**589, 590**) between stator capture (**568**) and casing element (**535**).
- Stud bolts (**537**) are glued and can leak during dismantling. If stud bolts (**537**) are detached or damaged during dismantling, replace them with new stud bolts (**537**) in suction casing (**500**).
- Use “medium-strength” screw retention (Loctite 243).
- Assemble screw fitting (**538, 539**) between casing element (**535**) and suction casing (**500**).



## 9. Dismantle/reassembly of shaft seal

### 9.4 Dismantle/reassembly of shaft seal

- Single acting mechanical seal (**SEA**)



#### **Recommended auxiliary materials**

Keep the auxiliary materials listed available (not included in the scope of delivery):

- Lubricant (**GM**)
  - Diluted liquid soap

#### **NOTICE**

##### **Damage due to unauthorised lubricant (GM).**

Damage to components. Contamination of the conveying product.

- Note resistance to the materials used and to the conveying product.
- Use only suitable lubricant (**GM**) ones.



- Shaft seals are high-quality precision parts. Therefore, be careful during installation.
- The sliding surfaces of the shaft seal must be clean, dry and free of dust.

### 9.4.1 Dismantle mechanical seal (330)

For the execution of shaft sealing, see the technical data (→ chapter 3) and the shaft sealing sectional drawing (→ chapter 9.6).

- Remove any damage.
- Clean plug-in shaft (307).

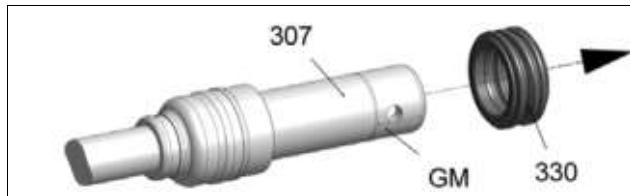
#### 9.4.1.1 Design without set ring (372)

- Moisten plug-in shaft (307) with lubricant (**GM**) for easier dismantling of mechanical seal casing (333) and mechanical seal (330).
- Remove mechanical seal casing (333) together with counter ring (330G) from plug-in shaft (307).

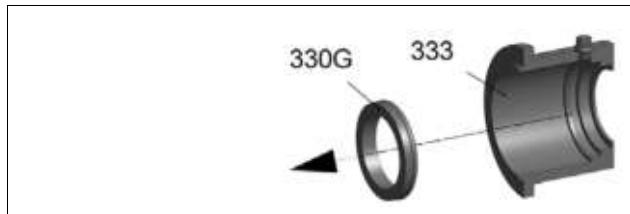


## 9. Dismantle/reassembly of shaft seal

- Remove mechanical seal (330) from plug-in shaft (307).



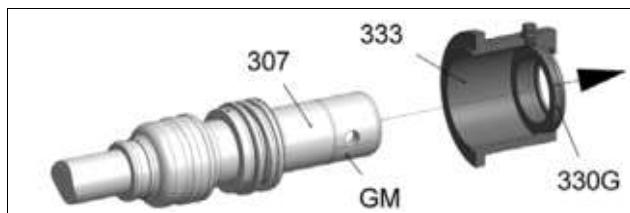
- Remove counter ring (330G) together with O-ring from mechanical seal casing (333).



### 9.4.1.2 Design with set ring (372) for axial securing

- Moisten plug-in shaft (307) with lubricant (GM) for easier dismantling of mechanical seal casing (333) and mechanical seal (330).

- Remove mechanical seal casing (333) together with counter ring (330G) from plug-in shaft (307).



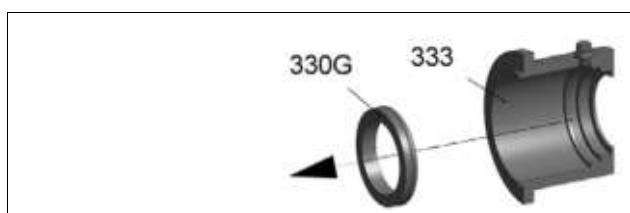
- Remove mechanical seal (330) from plug-in shaft (307).



- Loosen set screw (378) on the set collar (372).
- Remove set collar (372) from plug-in shaft (307).



- Remove counter ring (330G) together with O-ring from mechanical seal casing (333).



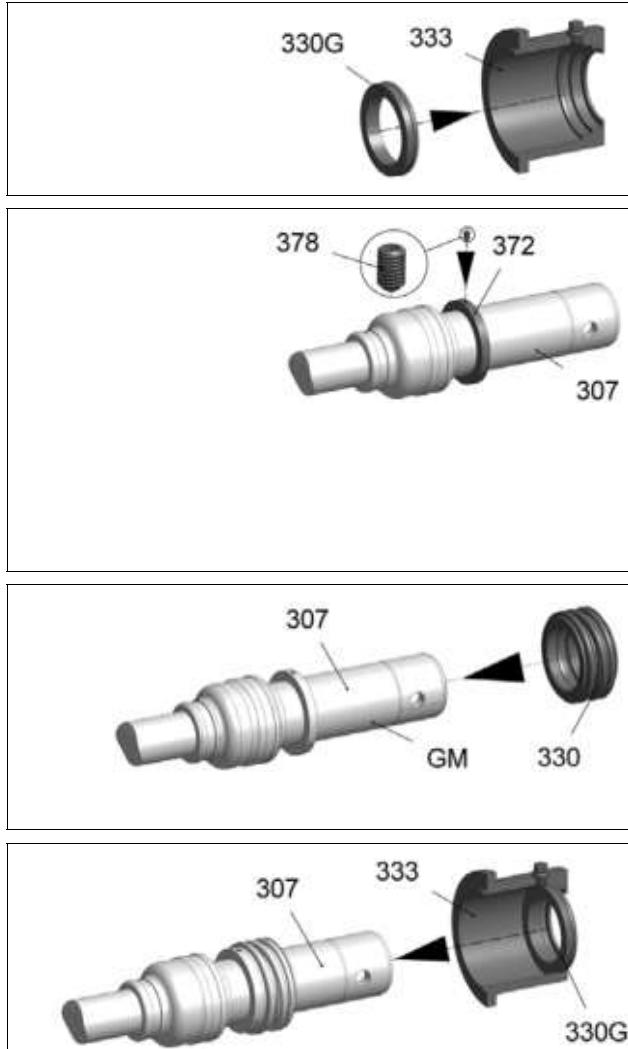
## 9. Dismantle/reassembly of shaft seal

### 9.4.2 Assemble mechanical seal (330)

- Remove any damage.
- Clean plug-in shaft (307).

#### 9.4.2.1 Design with set ring (372) for axial securing

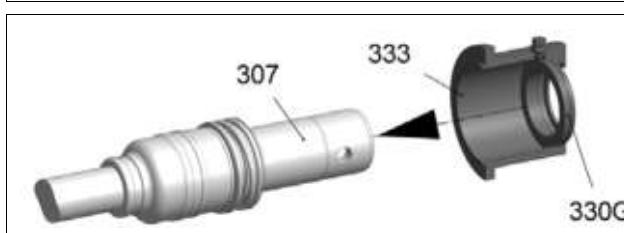
- Clean mechanical seal casing (333).
- Moisten O-ring of the counter ring (330G) with lubricant (GM).
- Insert counter ring (330G) together with O-ring evenly into the mechanical seal casing (333).
- Remove set screw (378) from set ring (372).
- Lubricate set screw (378) with screw retention and install into set ring (372).
  - Use screw retention (Loctite 243).
- Push set ring (372) on to plug-in shaft (307) and fix with set screw (378).
- Adjust the set ring (372) to prescribed size.
  - Observe sectional drawing of shaft seal (→ chapter 9.6).
- Fasten and secure set screw (378).
- Moisten plug-in shaft (307) and elastomer parts of the mechanical seal (330) with lubricant (GM) for easier assembly.
- Push the mechanical seal (330) onto plug-in shaft (307).
  - Observe sectional drawing of shaft seal (→ chapter 9.6).
- Slide mechanical seal casing (333) together with counter ring (330G) onto plug-in shaft (307).

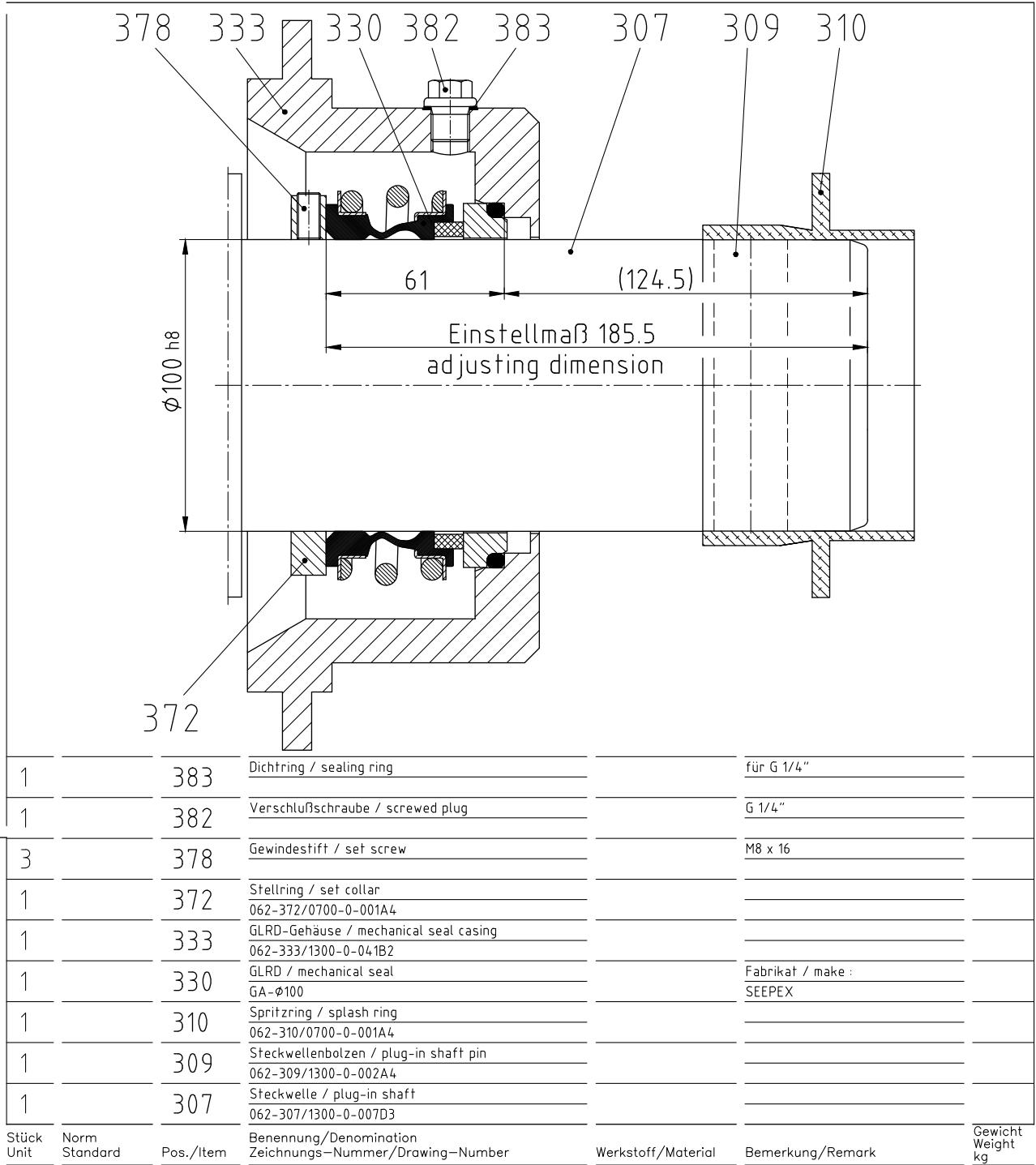


## 9. Dismantle/reassembly of shaft seal

### 9.4.2.2 Design without set ring (372)

- Clean mechanical seal casing (333).
- Moisten O-ring of the counter ring (330G) with lubricant (GM).
- Insert counter ring (330G) together with O-ring evenly into the mechanical seal casing (333).
- For easier assembly, lubricate plug-in shaft (307) and elastomer parts of the mechanical seal (330) with lubricant (GM).
- Push the mechanical seal (330) onto plug-in shaft (307).
- Slide mechanical seal casing (333) together with counter ring (330G) onto plug-in shaft (307).





**SEEPEX.**  
**ALL THINGS FLOW**

Allgemeintoleranzen für Maße ohne einzelne Toleranzeneintragung DIN ISO 2768-mittel	Aus- gabe Issue	Änderung Modification	Name Name	Datum Date	Maßstab/Scale 1:2	Werkstoff/Material ◎	Gewicht/Weight
Bezeichnung/Denomination							
General tolerances for mass without individual tolerance entry DIN ISO 2768-average							
Rauheit für Oberflächenzeichen DIN ISO 1302 Reihe 2			Name Name	Datum Date	Zeichnungs-Nummer/Drawing-Number		
Roughness for surface finish indication DIN ISO 1302 Reihe 2		Bearbeitet/Drawn hgg		13.09.2000	062-0GA/1300-0-001A4		
Geprüft/Checked kno				13.09.2000	EDV-Nr./EDP-No. 40494.dwg		
Normiert/Standard Gedruckt/Printed					Ersatz für/Replacement for:	Ersetzt durch/Replacement by:	

Urheberrechtsschutz: Diese Zeichnung ist unser Eigentum und uns nach dem Gesetz über Urheberrecht und verwandte Schutzrechte geschützt.  
Protection of Copyright: This drawing is our property and is protected acc. to the law referring to copyright and related protective laws.



10.1 Spare parts list

10.2 Sectional drawing and parts list



### Ordering spare parts

**Commission number** .....

The commission number and type are printed on the type plate of your SEEPEX machine.

**Type** .....

**Request**

After placing the order, you will receive an order confirmation and deadline before the parts are shipped.

**Order**

#### Your data

First Name .....

Surname .....

Company .....

Department .....

Street .....

Postcode, City .....

Telephone .....

Fax .....

E-mail .....

#### Our contact data

Customer Service

Fax +49.2041.996-5350

[service@seepex.com](mailto:service@seepex.com)

## 10. Spare parts

---

Order spare parts or complete packages tailored to your pump type.

### **Spare parts**

#### **Plug-in shaft and shaft seal**

Item	Component	Quantity
301	Packing ring (Rate) *	<input type="text"/>
307	Plug-in shaft	<input type="text"/>
309	Plug-in shaft pin	<input type="text"/>
310	Splash ring	<input type="text"/>
311	Flushing ring	<input type="text"/>
330	Mechanical seal *	<input type="text"/>

#### **Coupling rod and joint parts**

Item	Component	Quantity
400	Coupling rod	<input type="text"/>
401	Retaining sleeve	<input type="text"/>
402	Coupling rod pin	<input type="text"/>
403	Guide bushing	<input type="text"/>
405	Universal joint sleeve	<input type="text"/>
406	Holding band	<input type="text"/>
407	Holding band	<input type="text"/>

## 10. Spare parts

### Conveying elements

Item	Component	Quantity
600	Rotor	<input type="text"/>
455	Hexagon bolt	<input type="text"/>
456	Lock washer	<input type="text"/>
601	Stator	<input type="text"/>

### Miscellaneous parts

Item	Component	Quantity
501	Casing gasket	<input type="text"/>
569	O-ring	<input type="text"/>
571	O-ring	<input type="text"/>
098	Joint grease (GF) = 300 g (~ 315 cm <sup>3</sup> ) for required quantity see chapter 10	<input type="text"/>
457	Assembly paste (PAS) = WEICON Anti-Seize Assembly paste	<input type="text"/>

### Complete packages

#### Minor set of wearing parts

consisting of:	Quantity
1 x Retaining sleeve (401)	<input type="text"/>
1 x Coupling rod pin (402)	
2 x Guide bushing (403)	
1 x Universal joint sleeve (405)	
1 x Holding band (406)	
1 x Holding band (407)	
1 x Casing gasket (501)	
1 x Rotor (600)	
6 (8) x Hexagon bolt (455) *	
6 (8) x Lock washer (456) *	
1 x O-ring (569)	
1 x O-ring (571)	
1 x Stator (601)	
Joint grease (098)	
Assembly paste (457)	

## 10. Spare parts

### Large set of wearing parts

consisting of:	Quantity
1 x Packing ring (Rate) (301) *	<input type="text"/>
1 x Plug-in shaft (307)	
1 x Splash ring (310)	
1 x Flushing ring (311)	
1 x Mechanical seal (330) *	
1 x Coupling rod (400)	
2 x Retaining sleeve (401)	
2 x Coupling rod pin (402)	
4 x Guide bushing (403)	
2 x Universal joint sleeve (405)	
2 x Holding band (406)	
2 x Holding band (407)	
1 x Casing gasket (501)	
1 x O-ring (569)	
1 x O-ring (571)	
1 x Rotor (600)	
6 (8) x Hexagon bolt (455) *	
6 (8) x Lock washer (456) *	
1 x Stator (601)	
Joint grease (098)	
Assembly paste (457)	

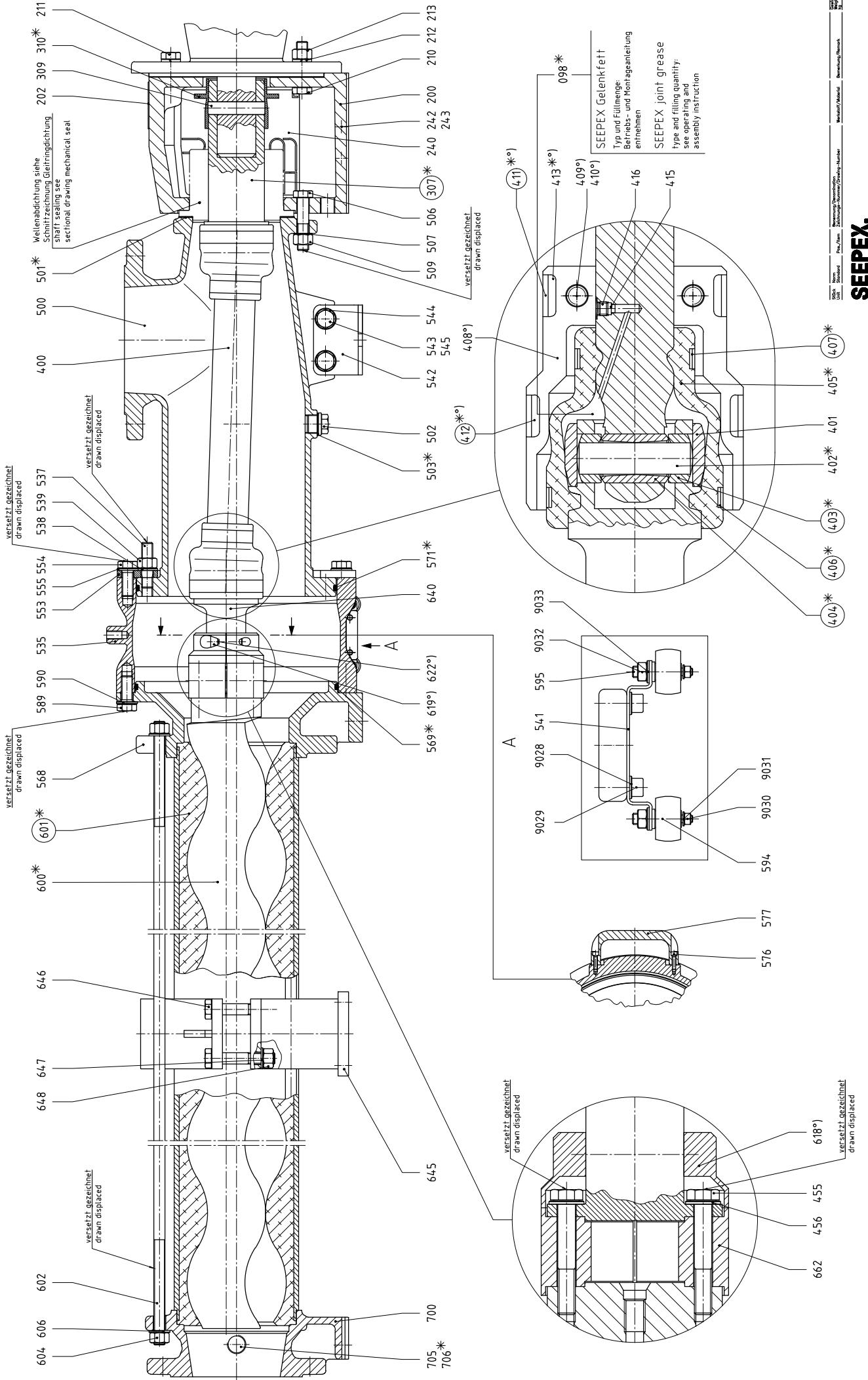
\* see sectional drawing and parts list (→ chapter 10.2)

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Place, date

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Signature, company stamp



**SEEPEX.**  
Allgemeintitelzeichen  
Aufzeichnung  
Zulassung

\* Verschleißteile und Dichtungen  
Betriebs- und Montageanleitung

Wearing parts and sealings  
ee operating and  
ntnehmen

entrepreneur	Wearing parts see operating and
entrepreneur	Tools see operating and

Zulieferer-/Lieferant-/Hersteller-	
Name / Betrieb	Hf. 10.02.2021
Adresse	165 - 005C1
PLZ / Ort	1020 Wien
Land	AT
Symbol / Logo	EPA-IV EDP-IV
Symbol für nachweisbare Gütekennzeichnung	2022/02/09
Hersteller-/Zulieferer-Nr.	
Erstellt am / Revidiert am	
Autoren / Revidierer	



**Stückliste**  
**Parts List**  
**Liste des pièces**

**SEEPEX.**

Stck.	Pos.	DE	EN	FR
		Baureihe BNM	range BNM	série BNM
		Schnittzeichnung Nr. 165-005C1	sectional drawing no. 165-005C1	plan no. 165-005C1
		Benennung Stck. / Pos.	denomination Qty. / Item	désignation Qté. / Poste
1	200	Laterne	lantern	lanterne
1	202	Typenschild	type plate	plaque signalétique
4/8	210	6kt-Schraube	hexagon bolt	vis
	211	6kt-Schraube	hexagon bolt	vis
4/8	212	Federring	spring washer	rondelle frein
	213	6kt-Mutter	hexagon nut	écrou
2	240	Abdeckblech	cover plate	tôle de protection
4	242	Zylinderschraube	socket screw	vis à tête cylindrique
4	243	Sicherungsscheibe	lock washer	rondelle protégée
1	307	Steckwelle	plug-in shaft	arbre à broche
1	309	Steckwellenbolzen	plug-in shaft pin	cheville pour arbre à broche
1	310	Spritzring	splash ring	bague de projection
1	400	Kuppelstange	coupling rod	barre d'accouplement
2	401	Gelenkhülse	retaining sleeve	douille d' articulation
2	402	Kuppelstangenbolzen	coupling rod pin	axe d' articulation
4	403	Führungsbuchse	guide bushing	douille de guidage
2	404	Kuppelstangenbuchse	coupling rod bushing	chemise d' axe
2	405	Manschette	universal joint sleeve	manchette
2	406	Halteband	holding band	collier de serrage
2	407	Halteband	holding band	collier de serrage
1	°) 408	Manschettenschutz	universal joint sleeve protection	protection métallique des manchettes
2	°) 409	Zylinderschraube	socket screw	vis à tête cylindrique
2	°) 410	Federring	spring washer	rondelle frein
1	°) 411	Halteband	holding band	collier de serrage
1	°) 412	Halteband	holding band	collier de serrage
1	°) 413	Gummistreifen	rubber strip	bandelette de gomme
2	415	Schmiernippel	lubrication nipple	raccord fileté de graissage
2	416	Verschlusschraube	screwed plug	bouchon de vidange
8	455	6kt-Schraube	hexagon bolt	vis
8	456	Scheibe	washer	rondelle
1	500	Sauggehäuse	suction casing	carter d' aspiration
1	501	Sauggehäusedichtung	casing gasket	étanchéité du carter d' aspiration
3	502	Verschlusschraube	screwed plug	bouchon de vidange
3	503	Dichtring	sealing ring	joint d' étanchéité
4	506	6kt-Schraube	hexagon bolt	vis
4	507	Fächerscheibe	fan type lock washer	rondelle à dents chevauchantes extérieures
4	509	6kt-Mutter	hexagon nut	écrou
1	535	Gehäuseelement	casing element	
4	537	Stiftschraube	stud bolt	boulon fileté
4	538	Scheibe	washer	rondelle
4	539	6kt-Mutter	hexagon nut	écrou
2	541	Halter	holder	support
2	542	Stütze	support	pied
2	543	6kt-Schraube	hexagon bolt	vis
4	544	Scheibe	washer	rondelle
2	545	6kt-Mutter	hexagon nut	écrou
2	553	Axiale Sicherung	axial securing	
6	554	6kt-Schraube	hexagon bolt	vis
6	555	Scheibe	washer	rondelle

Stck.	Pos.	DE	EN	FR
		<b>Baureihe BNM</b>	<b>range BNM</b>	<b>série BNM</b>
		<b>Schnittzeichnung Nr.</b> <b>165-005C1</b>	<b>sectional drawing no.</b> <b>165-005C1</b>	<b>plan no.</b> <b>165-005C1</b>
		<b>Benennung</b> <b>Stck. / Pos.</b>	<b>denomination</b> <b>Qty. / Item</b>	<b>désignation</b> <b>Qté. / Poste</b>
1	568	Statoraufnahme	stator capture	logement de stator
1	569	O-Ring	o-ring	joint torique
1	571	O-Ring	o-ring	joint torique
4	576	Zylinderschraube	socket screw	vis à tête cylindrique
2	577	Griff	handle	
6	589	6kt-Schraube	hexagon bolt	vis
6	590	Scheibe	washer	rondelle
4	594	Laufrolle	roller	roulette
4	595	Achse	axle	axe
1	600	Rotor	rotor	rotor
1	601	Stator	stator	stator
4	602	Spannschraube	tie bolt	tirant
8	604	6kt-Mutter	hexagon nut	écrou
8	606	Scheibe	washer	rondelle
1	618°)	Verschlusskappe	end cap	
2	619°)	Zylinderschraube	socket screw	vis à tête cylindrique
2	622°)	Federring	spring washer	rondelle frein
1	640	Rotorkopf	rotor head	tête de rotor
1	645	Statorstütze	stator support	support pour stator
4	646	6kt-Schraube	hexagon bolt	vis à tête hexagonale
4	647	Federring	spring washer	rondelle frein
4	648	6kt-Mutter	hexagon nut	écrou hexagonal
1	662	Distanzring	spacer ring	anneau d'écartement
1	700	Druckstutzen	pressure branch	bride de refoulement
1	705	Verschlusschraube	screwed plug	bouchon de vidange
1	706	Dichtring	sealing ring	joint d'étanchéité
4	9028	Scheibe	washer	rondelle
4	9029	Zylinderschraube	socket screw	vis à tête cylindrique
4	9030	6kt-Mutter	hexagon nut	écrou
4	9031	Scheibe	washer	rondelle
4	9032	6kt-Mutter	hexagon nut	écrou
4	9033	Scheibe	washer	rondelle
	098	SEEPEX Gelenkfett Typ und Füllmenge: Betriebs- und Montageanleitung entnehmen	SEEPEX joint grease type and filling quantity: see operating and assembly instruction	SEEPEX graisse d'articulations sommaire pour type et quantité: voir instructions de montage et de fonctionnement
		Verschleißteile und Dichtungen: Betriebs- und Montageanleitung entnehmen	Wearing parts and sealings: see operating and assembly instruction	pièces d'usure et étanchéités: voir instructions de montage et de fonctionnement
		Werkzeuge: Betriebs- und Montageanleitung entnehmen	Tools: see operating and assembly instruction	Outils: voir instructions de montage et de fonctionnement
		versetzt gezeichnet	drawn displaced	plan séparé
	°)	Option	option	option

### Ordering special tools

**Commission number** .....

The commission number and type are printed on the type plate of your SEEPEX machine.

**Type** .....

**Request**

After placing the order, you will receive an order confirmation and deadline before the parts are shipped.

**Order**

#### Your data

First Name .....

Surname .....

Company .....

Department .....

Street .....

Postcode, City .....

Telephone .....

Fax .....

E-mail .....

#### Our contact data

Customer Service

Fax +49.2041.996-5350

[service@seepex.com](mailto:service@seepex.com)

## 11. Special tools

### Your order

Order special tools tailored to your pump type.

Tool no.	Denomination	For assembly of	Order no.	
W1	 Packing puller	Packing*	PKZ	<input type="checkbox"/>
W2	 Chain pipe wrench plus spare chain	Stator	KRZ	<input type="checkbox"/>
W3	 Mounting tool	Holding band	MHB	<input type="checkbox"/>
W4	 Assembly mandrel	Joint	MTD	<input type="checkbox"/>
W5	 Drift	Joint	DHS	<input type="checkbox"/>
W9	 Mounting lever	General	MHL	<input type="checkbox"/>
W10	 Dismantling tool	Plug-in shaft	AZV	<input type="checkbox"/>

\*see sectional drawing and parts list (→ chapter 10.2)

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Place, date

---

Signature, company stamp

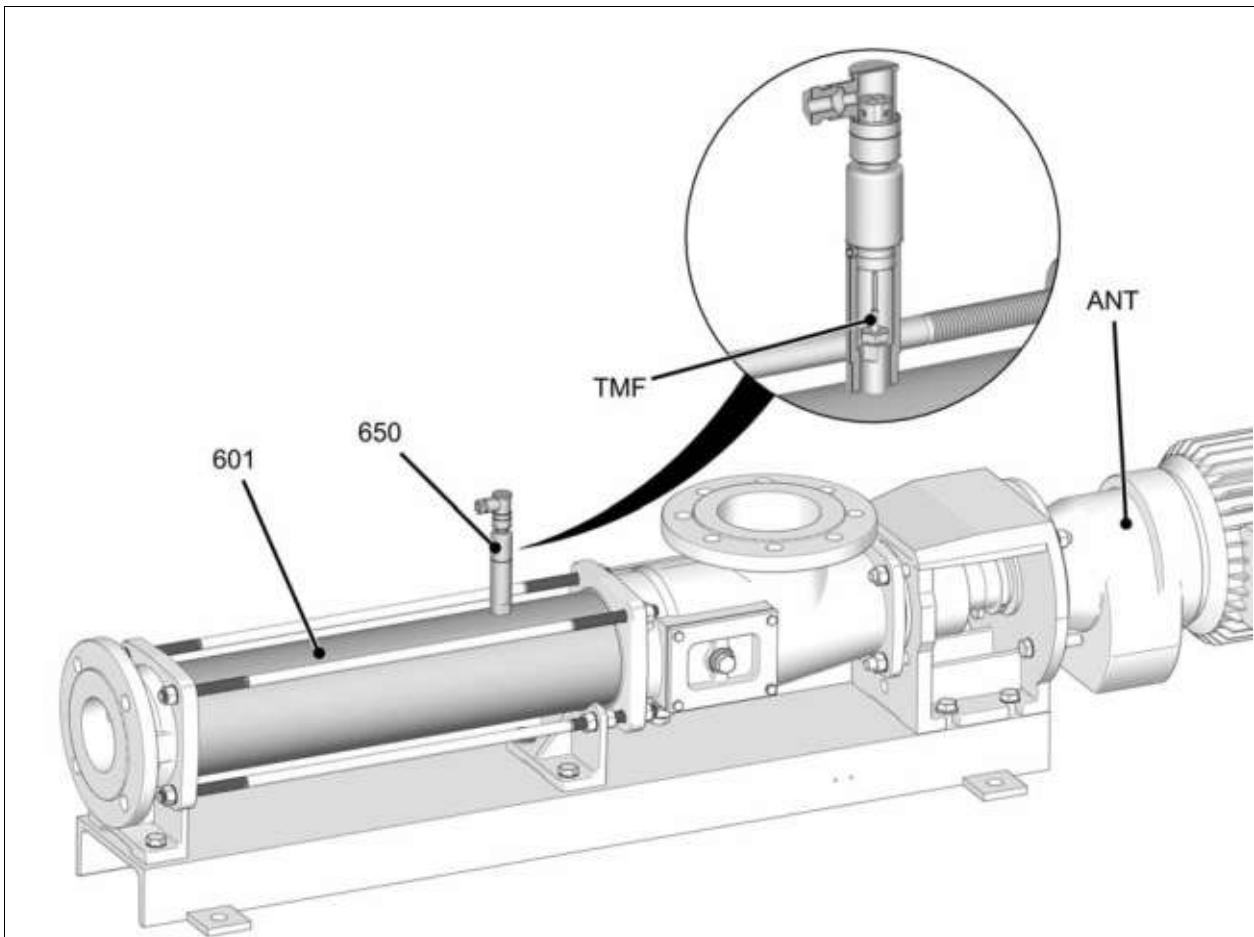
12.1 Accessories

12.2 Technical information

12.3 Manufacturer's documents shaft seal



## 1. Functioning of the dry-running protection device (TSE)



*Figure similar*

Item	Designation	Item	Designation
601	Stator	TMF	Thermistor sensor
650	Basic TSE unit	ANT	Drive

- The temperature in the stator (**601**) is monitored continuously using the basic TSE unit (**650**).
- The temperature in the stator (**601**) is measured using a thermistor sensor (**TMF**) in the basic TSE unit (**650**).
- When the set shut off temperature is reached, a signal is sent to the controller on the customer side to switch off the pump drive.
- When the switch-on temperature is reached, the pump can be started once again.

## 2. Technical data of the dry-running protection device Basic TSE

### 2.1. Assembly Construction Basic TSE Unit

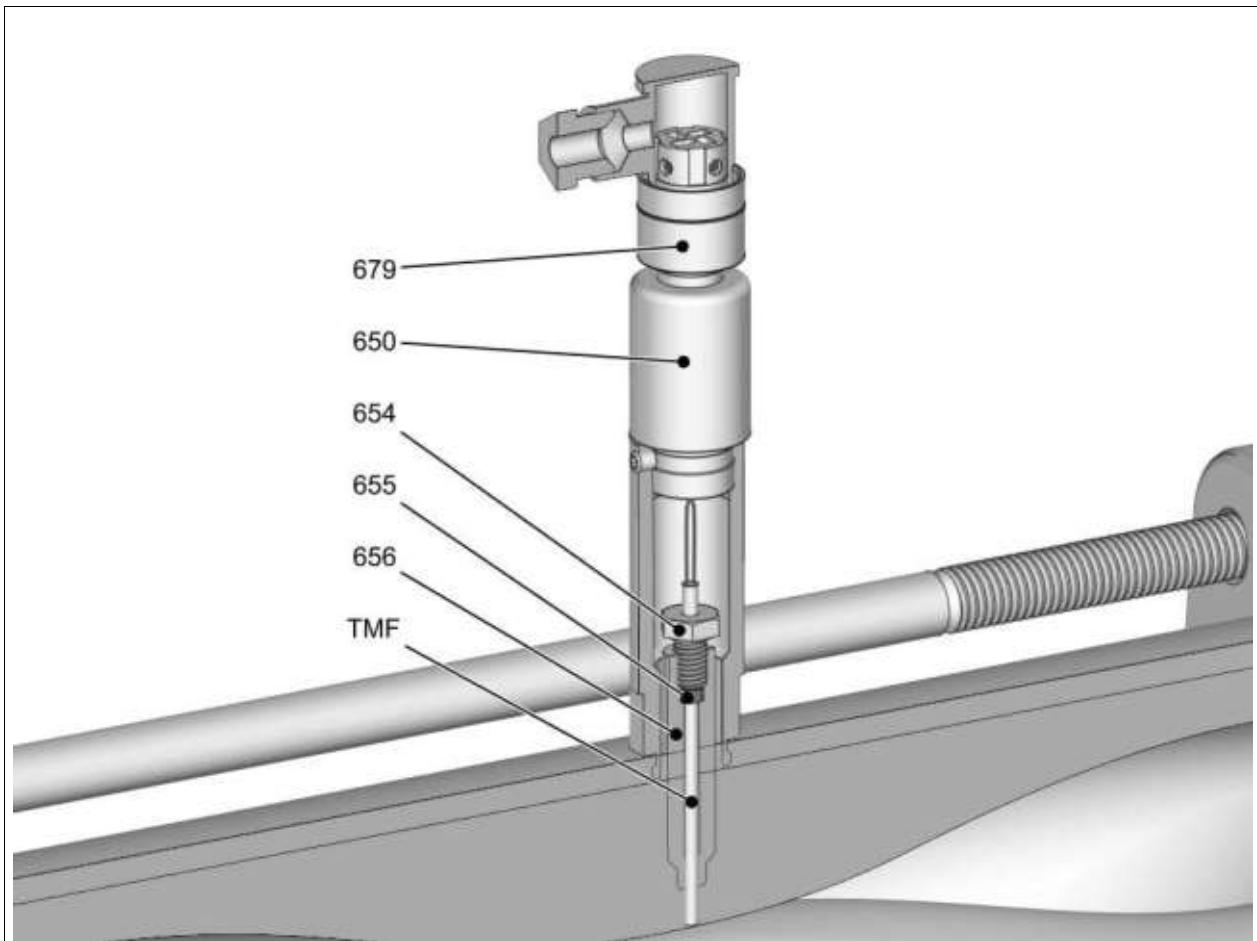


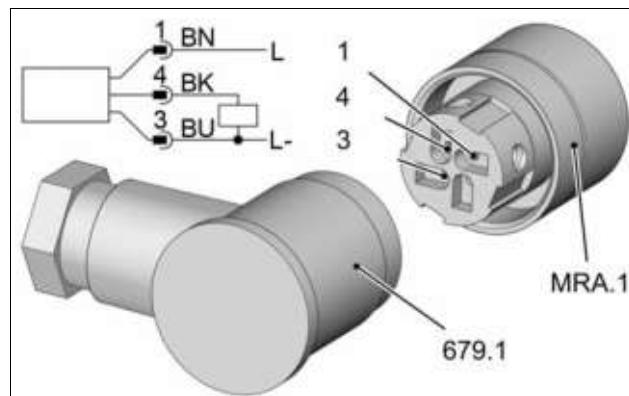
Figure similar

Item	Designation	Item	Designation
650	Basic TSE unit	656	Sensor sleeve
654	Clamping screw	679	Plug
655	Rubber ring	TMF	Thermistor sensor

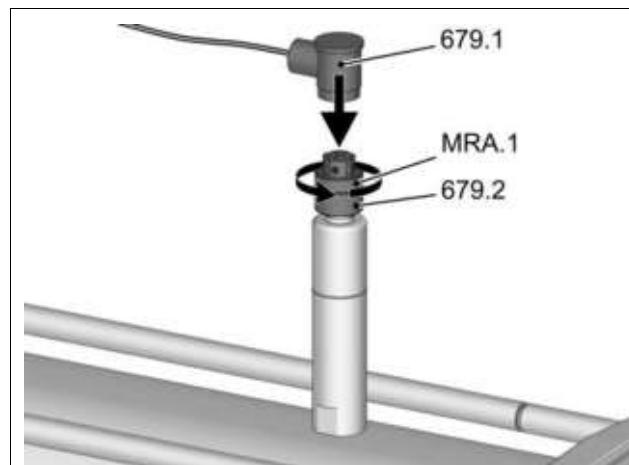
Operating voltage:	14 to 32 V DC
Current carrying capacity:	700 mA
Measuring accuracy:	+/-0.5 K
Repeat accuracy:	+/-0.1 K
Effect of temperature:	0.1 per 10 K
Response dynamics:	<ul style="list-style-type: none"> <li>- T05 = 3 s</li> <li>- T09 = 7 s</li> </ul>
Material:	<ul style="list-style-type: none"> <li>- Evaluation unit: V4A (1.4404); PA</li> <li>- Thermistor sensor: V4A (1.4404)</li> <li>- Cable insulation: Silicone</li> </ul>
Ambient temperature:	-25 to 80 °C
Storage temperature:	-40 to 100 °C
Protection:	IP 67
Protection class:	III
Insulation resistance:	> 100 MΩ (500 V DC)

### 3. Electrical connection

- Loosen the knurled nut (**MRA.1**) and remove the upper part of the plug (**679.1**).
  - Make the electrical connections according to the adjacent diagram.



- Assemble the upper part of the plug (**679.1**) using the knurled nut (**MRA.1**) to the lower part of the plug (**679.2**).



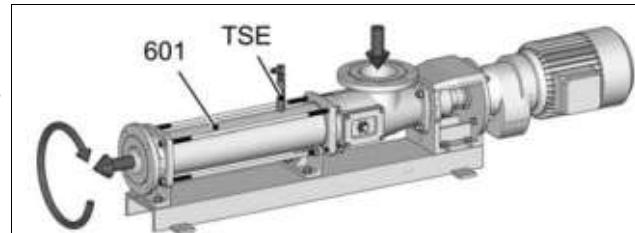
## 4. Commissioning the dry-running protection device (TSE)

### 4.1. Note the fitting position of the dry-running protection device (TSE)

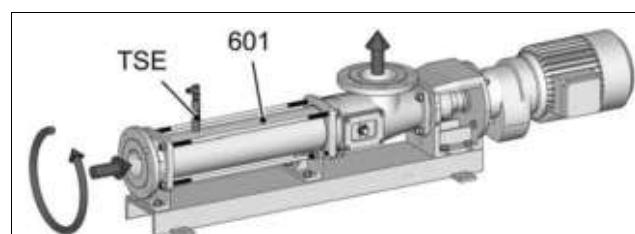
- The dry-running protection device (TSE) is always installed on the suction side during delivery.

**DANGER** Installation of the dry-running protection device (TSE) on the pressure side.

- Note the fitting position of the dry-running protection device (TSE).
  - The drilling for the dry-running protection device (TSE) in the stator (**601**) should always be on the suction side.



*counter clockwise rotating pump*



*clockwise rotating pump*

*Figures similar*

## 5. Operation of the dry-running protection device (TSE)

- Switch off temperature = 60 ° C (fixed).
- Switch on temperature = 55 ° C.

Temperature < 60 ° C	<ul style="list-style-type: none"> <li>• Output closed.           <ul style="list-style-type: none"> <li>– Pump in operation.</li> </ul> </li> </ul>
Temperature ≥ 60 ° C	<ul style="list-style-type: none"> <li>• Output opens.           <ul style="list-style-type: none"> <li>– Signal to customer side controller to switch off of the pump drive.</li> </ul> </li> </ul>
Temperature = 55 ° C	<ul style="list-style-type: none"> <li>• Output closes.           <ul style="list-style-type: none"> <li>– Start the pump drive again.</li> </ul> </li> </ul>

## 6. Functional failure

- Damage or short circuit of the thermistor sensor.
  - Output opens, signal to switch off the pump drive.

## 7. Dismantle the basic TSE

- Follow the instructions in the chapter Shut-down (→ chapter 6).

### **NOTICE**

**Adjusting the sensor sleeve (656) assembled at the factory.**

Damage caused by incorrect readings of the dry-running protection device (**TSE**).

- Retain the location and position of the sensor sleeve (**656**).
- The pump-side parts of the dry-running protection device (**TSE**) should be assembled / dismantled only by SEEPLEX trained personnel.

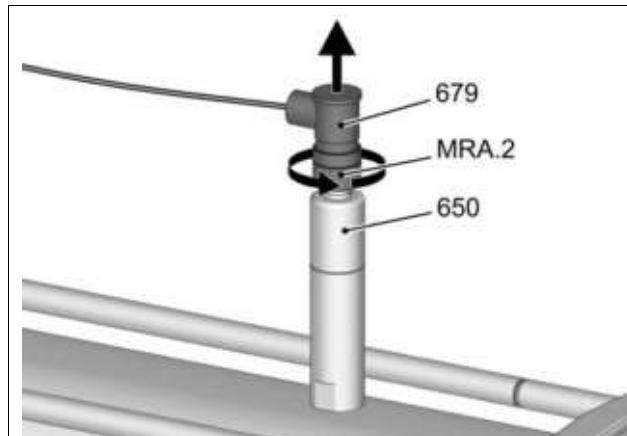
### **NOTICE**

**Improper dismantling of the screw socket (652) and basic TSE unit (650).**

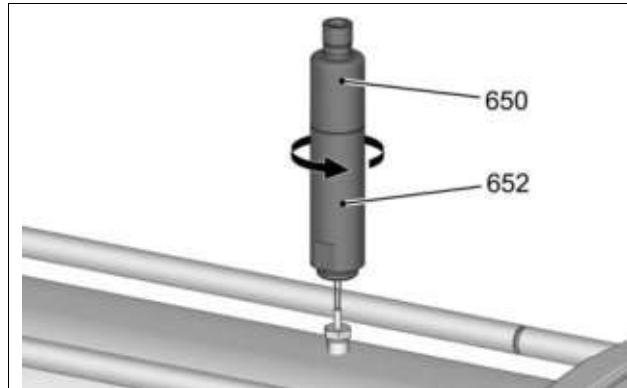
Cable (**KAB**) of the basic TSE unit (**650**) may be torn off.

- Dismantle the basic TSE unit (**650**) only together with the thermistor sensor (**TMF**) and screw socket (**652**) from the stator (**601**).

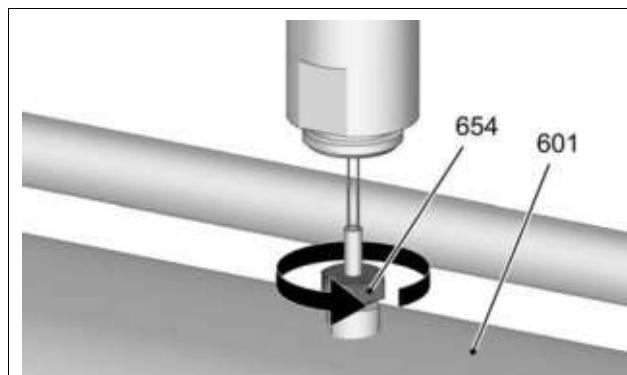
- Loosen the knurled nut (**MRA.2**) and remove the plug (**679**) from the basic TSE unit (**650**).



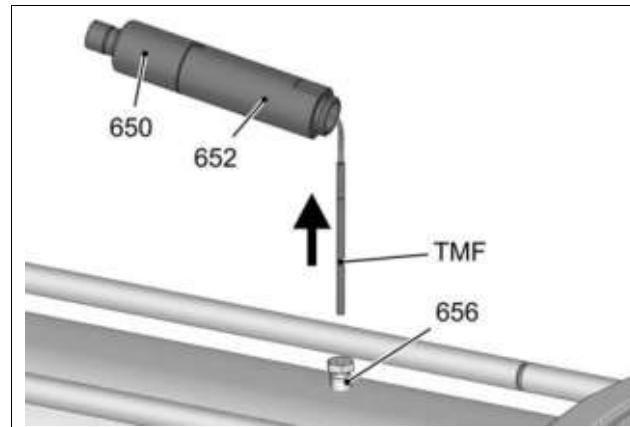
- Loosen the basic TSE unit (**650**) together with the screw socket (**652**).



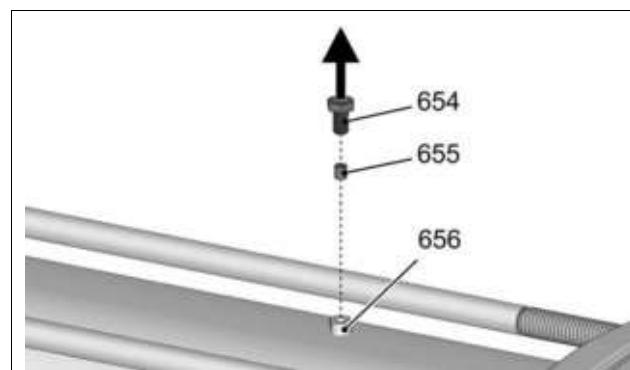
- Loosen the clamping screw (**654**).



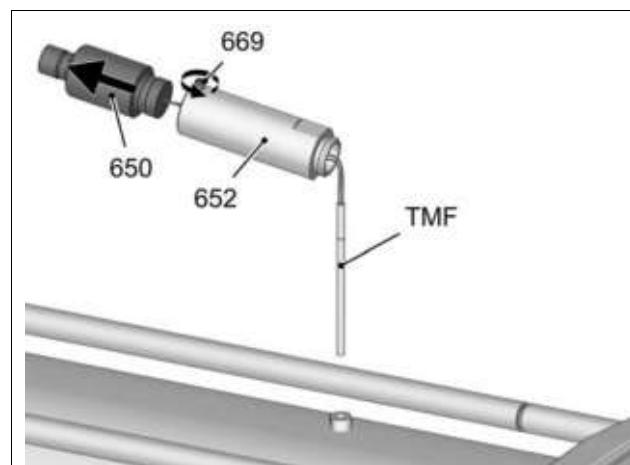
- Remove the screw socket (652) and basic TSE unit (650) together with the thermistor sensor (TMF) from the sensor sleeve (656).



- Dismantle the clamping screw (654) and rubber ring (655) from the sensor sleeve (656).



- Loosen the set screw (669).
- Remove the basic TSE unit (650) together with the thermistor sensor (TMF) from the screw socket (652).



## 8. Assemble the basic TSE

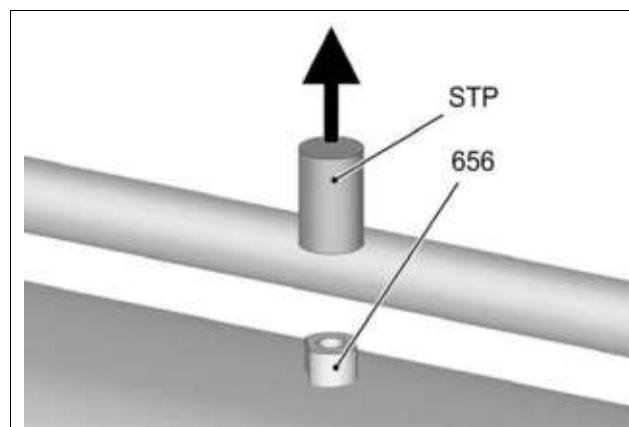
### **NOTICE**

#### **Adjusting the sensor sleeve (656) assembled at the factory.**

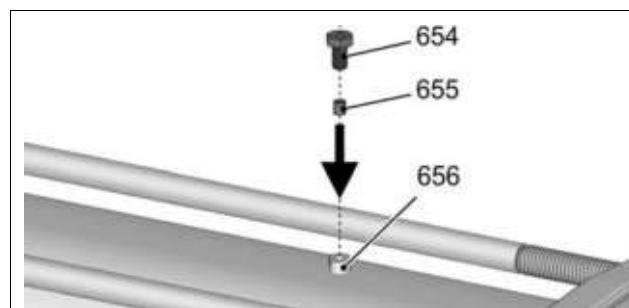
Damage caused by incorrect readings of the dry-running protection device (**TSE**).

- Retain the location and position of the sensor sleeve (**656**).
- The pump-side parts of the dry-running protection device (**TSE**) should be assembled / dismantled only by SEEPLEX trained personnel.

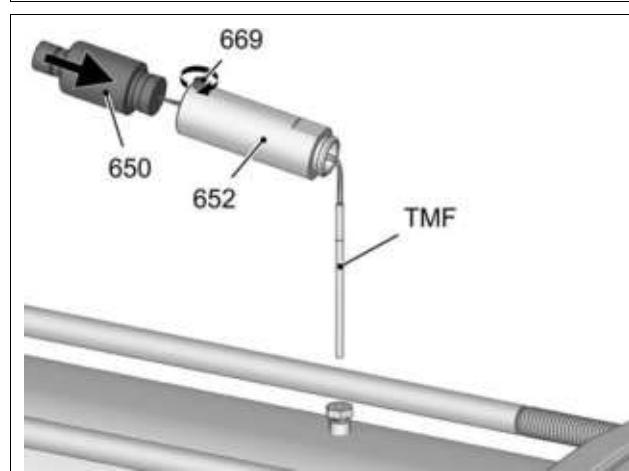
- Remove the transport locks (**STP**) (if available) from sensor sleeve (**656**).



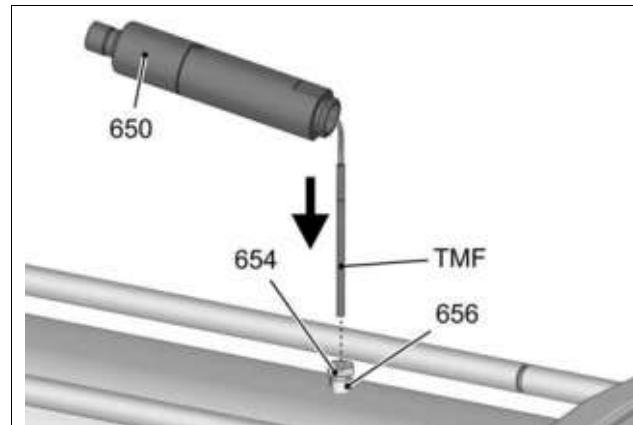
- Mount the clamping screw (**654**) and rubber ring (**655**) onto the sensor sleeve (**656**) and tighten slightly.



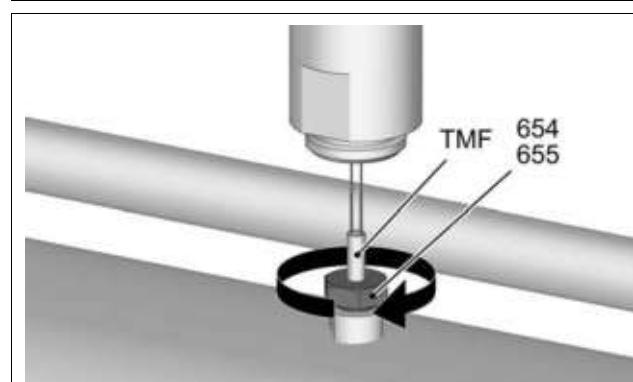
- To simplify assembly of the thermistor sensor (**TMF**), mount the basic TSE unit (**650**) onto the screw socket (**652**).
  - To secure, tighten the set screw (**669**) slightly.



- Insert the thermistor sensor (**TMF**) through the opening of the clamping screw (**654**) down to the bottom of the sensor sleeve (**656**).

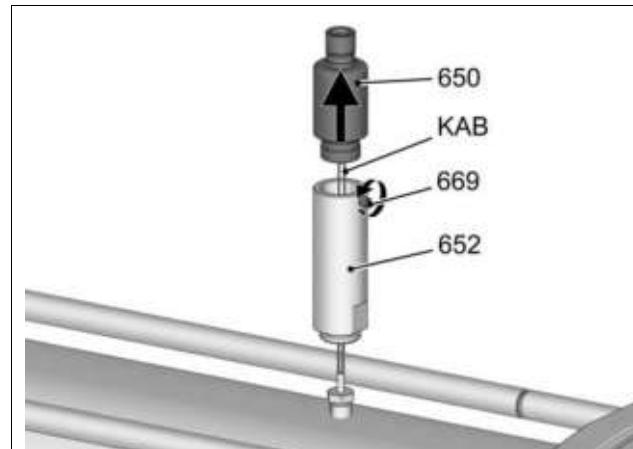


- Tighten the thermistor sensor "finger tight" (**TMF**) using clamping screw (**654**) and rubber ring (**655**).

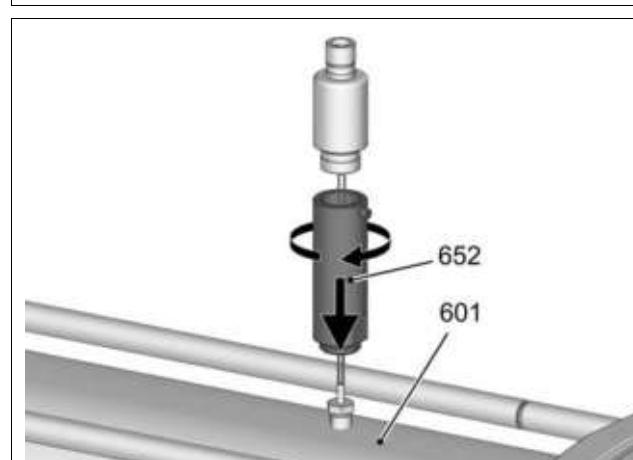


**NOTICE** Improper Assembly of the screw socket (**652**) and basic TSE unit (**650**). Cable (**KAB**) of the basic TSE unit (**650**) may be torn off.

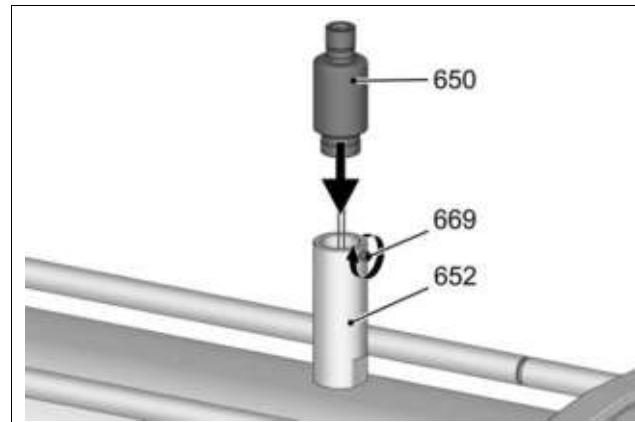
- Loosen the set screw (**669**).
- Remove the basic TSE unit (**650**) from the screw socket (**652**).



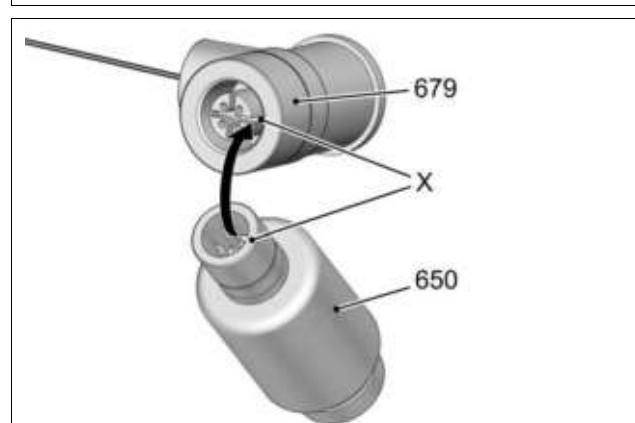
- Mount the screw socket (**652**) onto the stator (**601**).



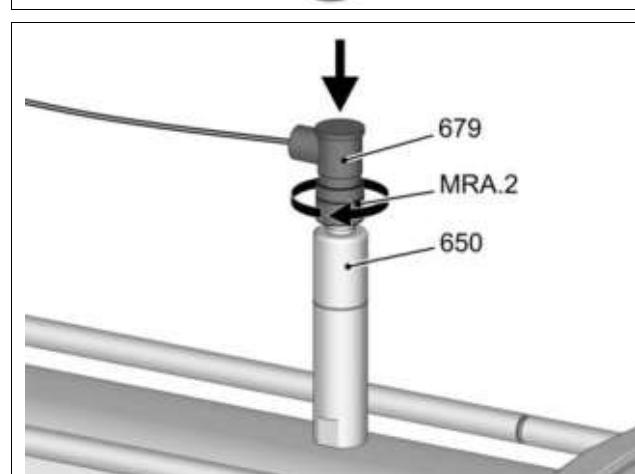
- Mount the basic TSE unit (**650**) onto the screw socket (**652**).
  - Tighten the set screw (**669**).



- Align the plug (**679**) with the basic TSE unit (**650**).
  - Note the position of the notch (**X**) on the plug (**679**).



- Mount the plug (**679**) using the knurled nut (**MRA.2**) onto the basic TSE unit (**650**).



- Re-establish the electrical connection to the basic TSE unit (**650**).
  - See chapter on Electrical connection (→ chapter 3.).



## 1.0 Connection of the drive motor to a frequency inverter

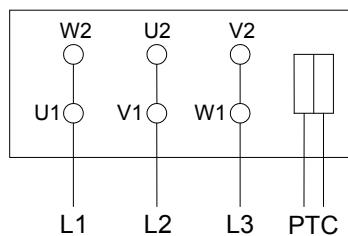
	<b>NOTICE</b>
<ul style="list-style-type: none"> <li>➤ Heed the technical information and information in the manufacturer's operating instructions when installing and commissioning the frequency inverter.</li> </ul>	

- Perform the connection of the frequency inverter and motor in accordance with the table.
- An incorrect motor connection causes considerable reduction in motor performance.  
The pump may possibly not start, or it might cause the drive to overheat.

Details motor type place (nominal motor voltage / circuit arrangement)	Line voltage of the frequency inverter	Output voltage of the frequency inverter	Motor connection
230 V ▲ / 400 V Y	1 x 230 V AC	3 x 0 to 230 V	Delta ▲
230 V ▲ / 400 V Y	3 x 400 V AC	3 x 0 to 400 V	Star Y
400 V ▲ / 690 V Y	3 x 400 V AC	3 x 0 to 400 V	Delta ▲

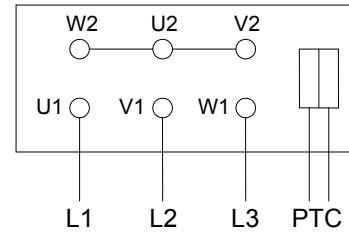
### 1.1 Standard three phase current squirrel cage motors with PTC thermistors

Delta connection (▲)



Motor terminal board

Star connection (Y)



Motor terminal board

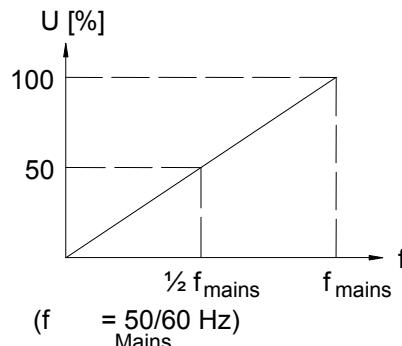
### 1.2 Self ventilated and force ventilated motors

- Self ventilated motors must be equipped with a PTC temperature monitoring device for speed control by means of a frequency inverter.
- Force ventilated motors may be loaded with nominal torque for the complete speed range.
- Connect force ventilators to a separate terminal board on the fan cover.
- Heed type plate details of the force ventilator or see separate terminal connection diagram.

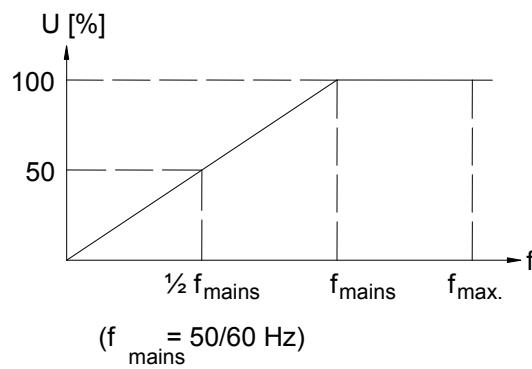
### 1.3 Setting up the frequency inverter

- The power output of the frequency inverter must correspond to the motor power.
  - Where applicable the power of the inverter can be customised to the motor rating by adjusting the parameters.
- The pump requires a higher torque to start (breakaway torque).
  - This required torque can only be achieved by frequency inverters, which make 1.5 times the rated current for the motor available for at least 30s.
  - The operating torque is approximately constant throughout the whole speed range where the conveying pressure remains constant.
- Heed the following frequency inverter characteristic curves (Item 1.3.1, 1.3.2).
  - The quadratic characteristic curve, which is frequently designated the pump and ventilator characteristic curve, is **not** suitable for progressive cavity pumps

### 1.3.1 Linear voltage / frequency characteristic curve up to mains frequency



### 1.3.2 Linear voltage / frequency characteristic curve up to levels above the mains frequency



### 1.3.3 Linear voltage / frequency characteristic curve with the installation of a magnetic bias (StartBoost)

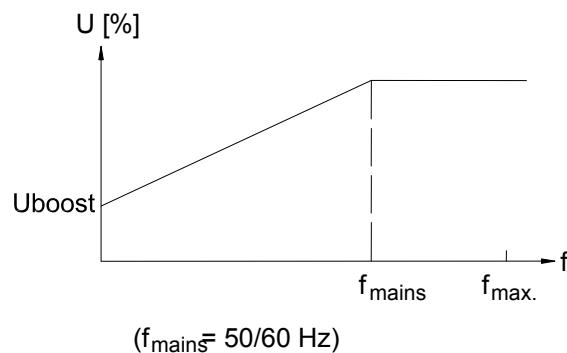
- If problems arise when starting the pump which make a higher breakaway torque necessary, these should be resolved by the adjustment of a magnetic bias. In the case of the magnetic bias the drive is supplied with current by the frequency inverter at just 0Hz.

#### **NOTICE**

##### **Magnetisation current set too high**

Damage to the motor due to overheating.

- Heed the frequency inverter manufacturer's instructions when setting the magnetic bias.



### **13.1 Manufacturer's documents / suppliers**

- available





**SEW  
EURODRIVE**

## **Assembly and Operating Instructions**



**Gear Unit Model Series R.., F.., K.., S.., SPIROPLAN® W..**



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# 1 General information

## 1.1 About this documentation

### The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or if you require further information, contact SEW-EURODRIVE.

## 1.2 Structure of the safety notes

### 1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
<b>DANGER</b>	Imminent hazard	Severe or fatal injuries
<b>WARNING</b>	Possible dangerous situation	Severe or fatal injuries
<b>CAUTION</b>	Possible dangerous situation	Minor injuries
<b>NOTICE</b>	Possible damage to property	Damage to the product or its environment
<b>INFORMATION</b>	Useful information or tip: Simplifies handling of the product.	

### 1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



#### SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

**Meaning of the hazard symbols**

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of automatic restart

**1.2.3 Structure of embedded safety notes**

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

**⚠ SIGNAL WORD!** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

**1.3 Rights to claim under limited warranty**

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

## 1.4 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

## 1.5 Copyright notice

© 2021 SEW-EURODRIVE. All rights reserved. Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

## 2 Safety notes

### 2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

### 2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following may be carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- National and regional safety and accident prevention regulations
- Warning and safety signs on the product
- All other relevant project planning documents, installation and startup instructions, and wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and conditions

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

### 2.3 Target group

Specialist for mechanical work

Any mechanical work may be performed only by adequately qualified specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product who possess the following qualifications:

- Qualifications in the field of mechanics in accordance with the national regulations
- Familiarity with this documentation

Specialist for electrotechnical work	Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product who possess the following qualifications: <ul style="list-style-type: none"> <li>• Qualifications in the field of electrical engineering in accordance with the national regulations</li> <li>• Familiarity with this documentation</li> </ul>
Additional qualifications	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.
Instructed persons	The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

## 2.4 Designated use

The product is intended for use in industrial and commercial systems.

In case of installation in electrical systems or machines, startup of the product is prohibited until it is determined that the machine meets the requirements stipulated in the local laws and directives. For Europe, Machinery Directive 2006/42/EC as well as the EMC Directive 2014/30/EU apply.

Use in potentially explosive atmospheres is prohibited, unless specifically designated otherwise.

## 2.5 Transportation/storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

Observe the storage information concerning climatic conditions in accordance with chapter "Extended storage" (→ 187).

The permissible storage temperature is -30 °C to +50 °C.

If the product is not immediately installed, it must be stored in a dry and dust-free location. The product can be stored for up to 9 months without requiring any special measures before startup. Do not store the product outdoors.

The installed lifting eyebolts are in accordance with DIN 580. Observe the loads and regulations specified there. The tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

The lifting eyes are designed to carry only the weight of the product. Do not mount any additional loads. If the product has several lifting eyes or lifting eyebolts, then you should use all lifting eyes and lifting eyebolts for attaching transport ropes. Tighten the screwed-in lifting eyes.

The gear units K..167 and K..187 have no lifting eyes and are supplied without lifting eyebolts. Use alternative, suitable slings.

Use suitable, sufficiently rated handling equipment, that can be used for further transport.

## 2.6 Installation/assembly

Ensure that the product is installed and cooled according to the regulations in the documentation.

Protect the product from strong mechanical strain. The product and its mounting parts must never protrude into the path of persons or vehicles. Ensure that components are not deformed, particularly during transportation and handling. Electrical components must not be mechanically damaged or destroyed.

The following applications are prohibited unless the device is explicitly designed for such use:

- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1
- Use in environments with harmful oils, acids, gases, vapors, dust, radiation, etc.

Before using a stainless steel shrink disk or stainless steel output shaft, check if the ambient conditions are compatible with the stainless steel material. For information on the material, refer to the order confirmation.

Observe the danger due to static overdetermination. Gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) must not be fastened via the torque arm and the foot plate at the same time. Gearmotors must also not be fastened to the foot plate of the gear unit (e.g. KA19/29B, KA127/157B or FA127/157B, R gear unit with foot-mounted motor) and the foot plate of the motor at the same time.

## 2.7 Startup/operation

Check the oil level before startup as described in chapter "Inspection/maintenance" (→ 123).

Check that the direction of rotation is correct in the **decoupled** state. Listen out for unusual grinding noises as the shaft rotates.

Secure the keys for the test run without output elements.

Do not deactivate monitoring and protection devices even for a test run.

Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperatures, unusual noises, vibrations). Determine the cause. It may be necessary to contact SEW-EURODRIVE.

## 2.8 Cleaning

When using a stainless steel shrink disk or stainless steel output shaft, check if the cleaning agents and chemicals are compatible with the stainless steel material. For information on the material, refer to the order confirmation.

## 2.9 Inspection/maintenance

Observe the information in chapter "Inspection/maintenance" (→ 123).

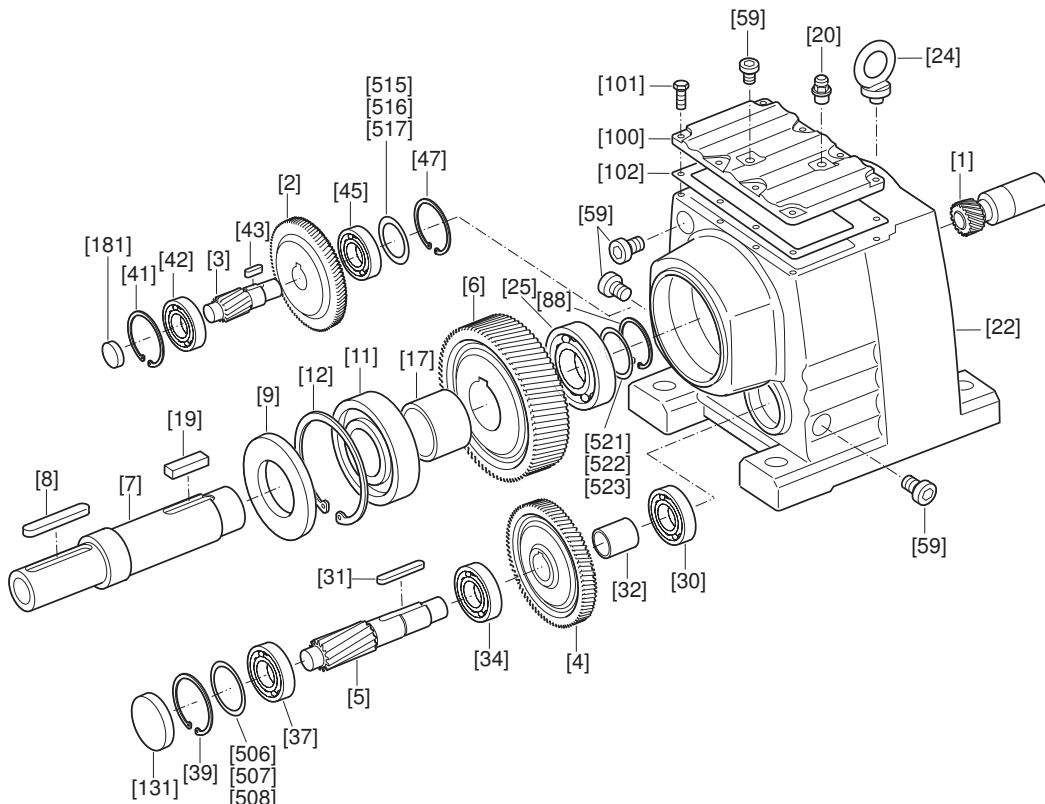
## 3 Gear unit structure

### INFORMATION



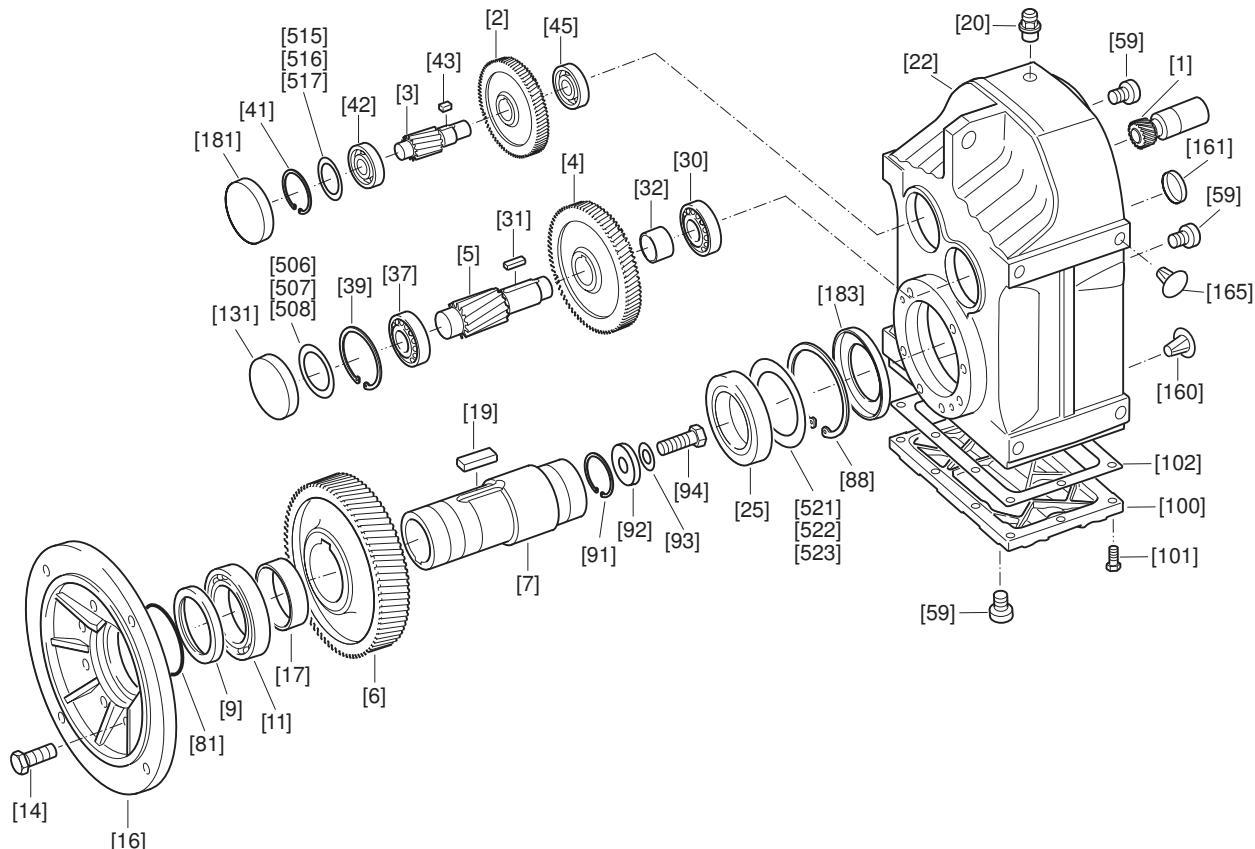
The following figures are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Discrepancies may occur depending on the gear unit size and version.

#### 3.1 Basic structure of helical gear units R..07 – R..167



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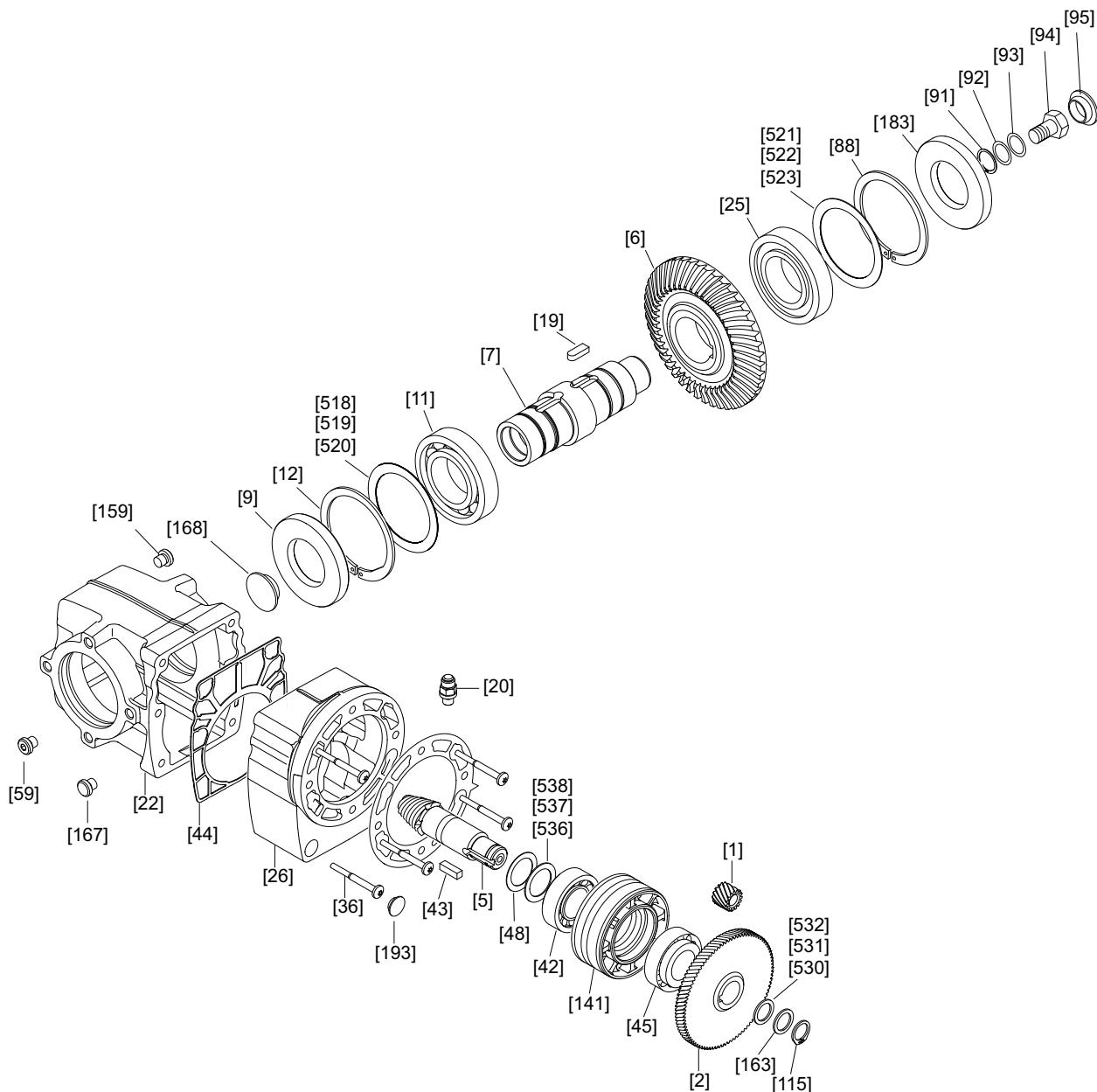
[1]	Pinion	[19]	Key	[42]	Rolling bearing	[507]	Shim
[2]	Gear	[20]	Breather valve	[43]	Key	[508]	Shim
[3]	Pinion shaft	[22]	Gear unit housing	[45]	Rolling bearing	[515]	Shim
[4]	Gear	[24]	Eyebolt	[47]	Retaining ring	[516]	Shim
[5]	Pinion shaft	[25]	Rolling bearing	[59]	Screw plug	[517]	Shim
[6]	Gear	[30]	Rolling bearing	[88]	Retaining ring	[521]	Shim
[7]	Output shaft	[31]	Key	[100]	Inspection cover	[522]	Shim
[8]	Key	[32]	Spacer tube	[101]	Hex head screw	[523]	Shim
[9]	Oil seal	[34]	Rolling bearing	[102]	Gasket		
[11]	Rolling bearing	[37]	Rolling bearing	[131]	Closing cap		
[12]	Retaining ring	[39]	Retaining ring	[181]	Closing cap		
[17]	Spacer tube	[41]	Retaining ring	[506]	Shim		

**3.2 Basic structure of parallel-shaft helical gear units F..27 – F..157**

9007199274039051

[1]	Pinion	[22]	Gear unit housing	[91]	Retaining ring	[506]	Shim
[2]	Gear	[25]	Rolling bearing	[92]	Washer	[507]	Shim
[3]	Pinion shaft	[30]	Rolling bearing	[93]	Lock washer	[508]	Shim
[4]	Gear	[31]	Key	[94]	Hex head screw	[515]	Shim
[5]	Pinion shaft	[32]	Spacer tube	[100]	Inspection cover	[516]	Shim
[6]	Gear	[37]	Rolling bearing	[101]	Hex head screw	[517]	Shim
[7]	Hollow shaft	[39]	Retaining ring	[102]	Gasket	[521]	Shim
[9]	Oil seal	[41]	Retaining ring	[131]	Closing cap	[522]	Shim
[11]	Rolling bearing	[42]	Rolling bearing	[160]	Closing plug	[523]	Shim
[14]	Hex head screw	[43]	Key	[161]	Closing cap		
[16]	Output flange	[45]	Rolling bearing	[165]	Closing plug		
[17]	Spacer tube	[59]	Screw plug	[181]	Closing cap		
[19]	Key	[81]	Shield ring	[183]	Oil seal		
[20]	Breather valve	[88]	Retaining ring				

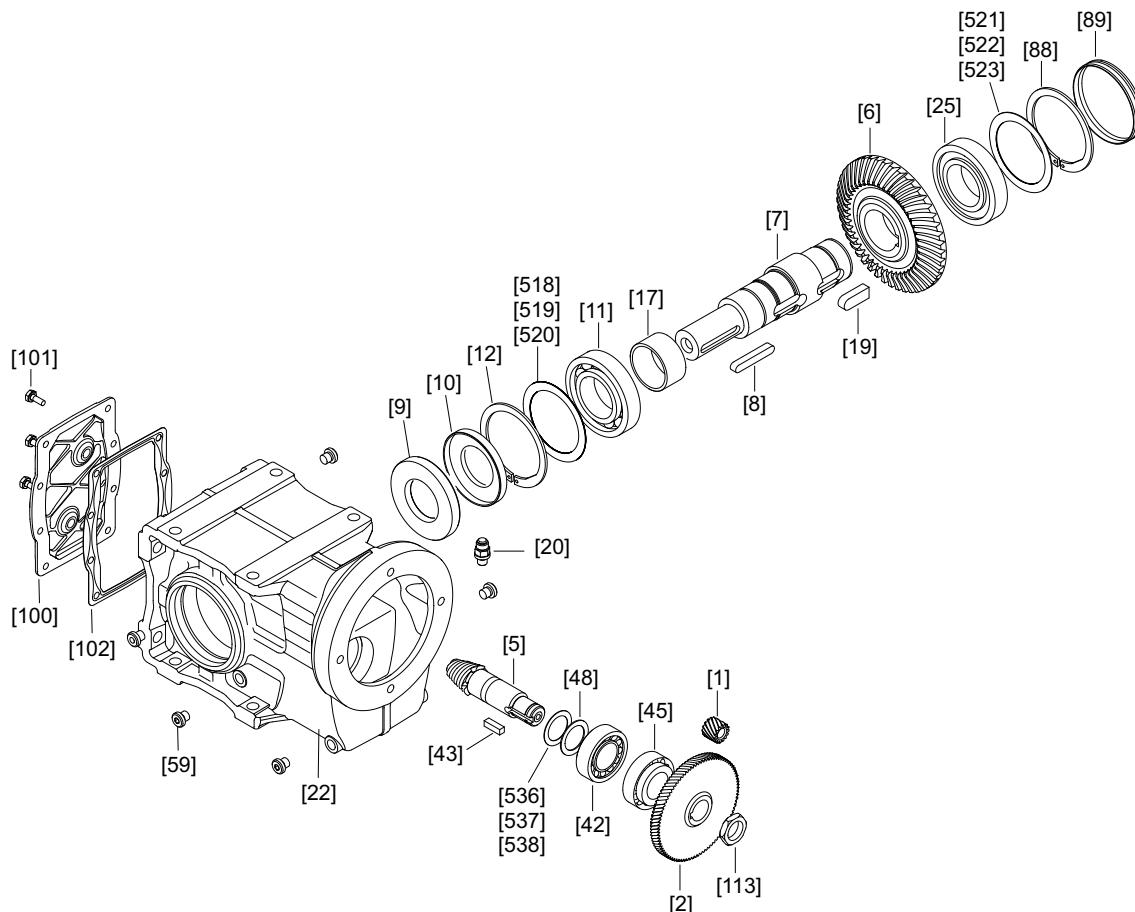
### 3.3 Basic structure of helical-bevel gear units K..19/K..29



9007206676351499

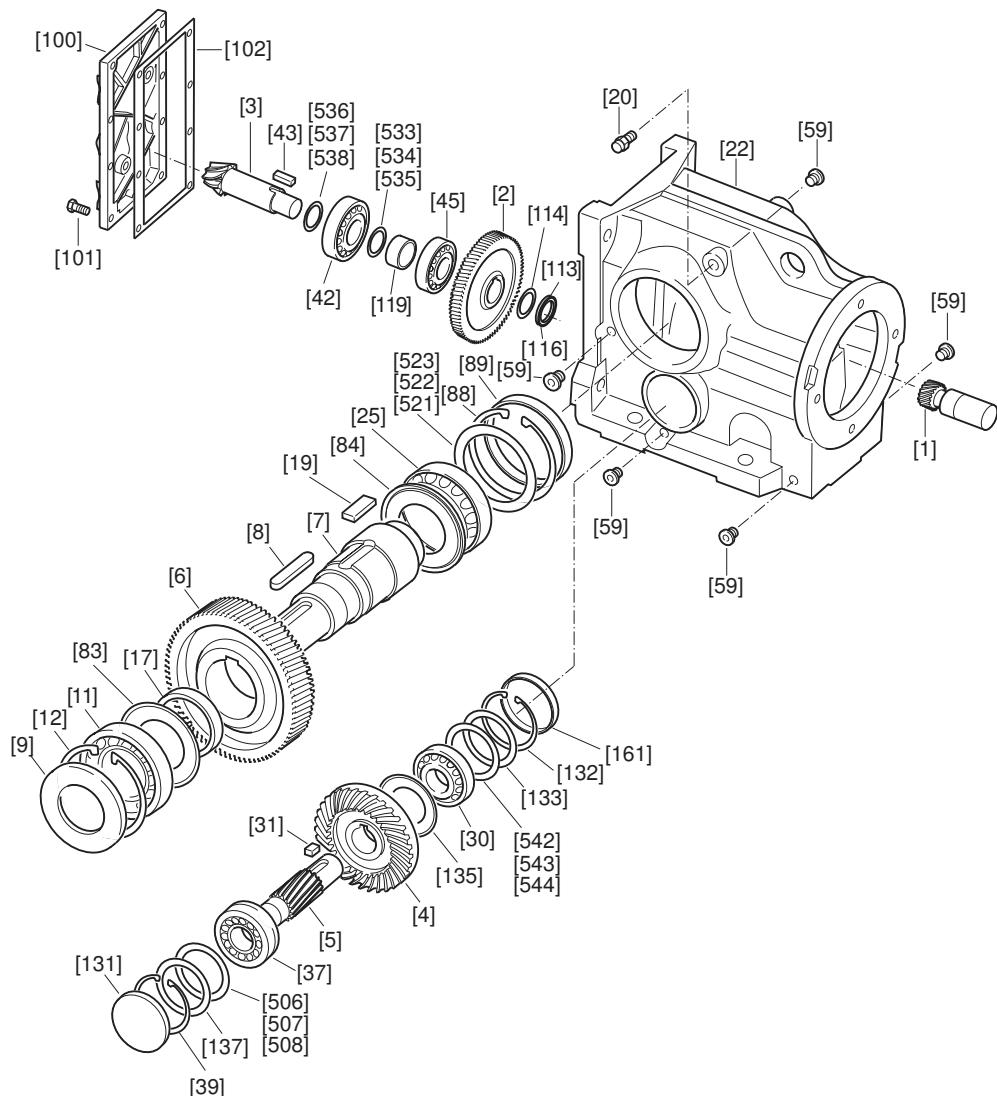
[1] Pinion	[26] Housing of 1st stage	[94] Hex head screw	[520] Shim
[2] Gear	[36] Stud	[95] Protection cap	[521] Shim
[5] Pinion shaft	[42] Tapered roller bearing	[115] Retaining ring	[522] Shim
[6] Gear	[43] Key	[141] Bushing	[523] Shim
[7] Hollow shaft	[44] Seal	[159] Closing plug	[530] Shim
[9] Oil seal	[45] Tapered roller bearing	[163] Supporting ring	[531] Shim
[11] Rolling bearing	[50] Bevel gear set	[167] Closing plug	[532] Shim
[12] Retaining ring	[59] Screw plug	[168] Protection cap	[536] Shim
[19] Key	[88] Retaining ring	[183] Oil seal	[537] Shim
[20] Breather valve	[91] Retaining ring	[193] Closing plug	[538] Shim
[22] Gear unit housing	[92] Washer	[518] Shim	
[25] Deep groove ball bearing	[93] Lock washer	[519] Shim	

### 3.4 Basic structure of helical-bevel gear units K..39/K..49



14457456395

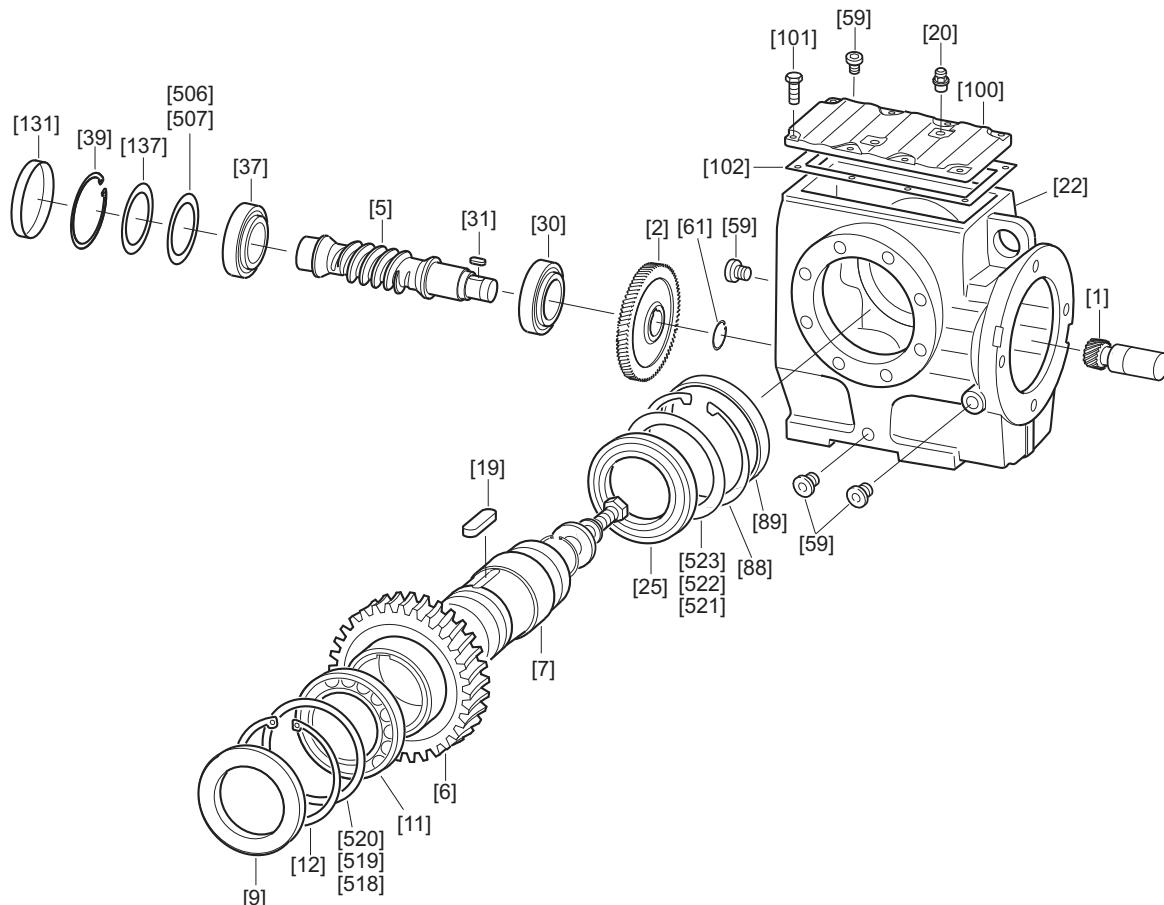
[1] Pinion	[12] Retaining ring	[48] Supporting ring	[518] Shim
[2] Gear	[17] Spacer tube	[50] Bevel gear set	[519] Shim
[5] Pinion shaft	[19] Key	[59] Screw plug	[520] Shim
[6] Gear	[20] Breather valve	[88] Retaining ring	[521] Shim
[7] Hollow shaft	[22] Gear unit housing	[89] Closing cap	[522] Shim
[8] Key	[25] Deep groove ball bearing	[100] Inspection cover	[523] Shim
[9] Oil seal	[42] Tapered roller bearing	[101] Hex head screw	[536] Shim
[10] Oil seal	[43] Key	[102] Gasket	[537] Shim
[11] Deep groove ball bearing	[45] Tapered roller bearing	[113] Slotted nut	[538] Shim

**3.5 Basic structure of helical-bevel gear units K..37 – K..187**

9007199274042123

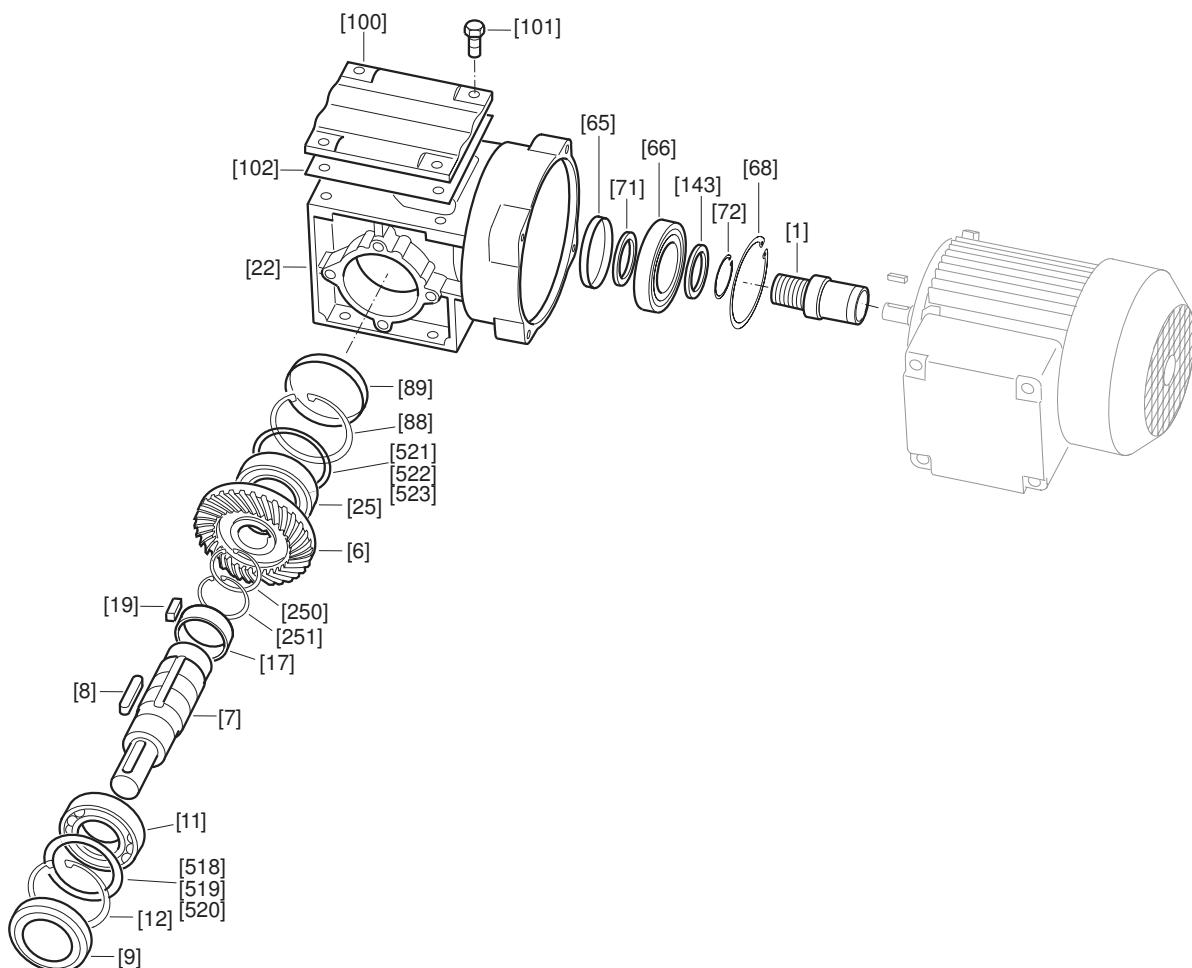
[1]	Pinion	[25]	Rolling bearing	[102]	Gasket	[522]	Shim
[2]	Gear	[30]	Rolling bearing	[113]	Slotted nut	[523]	Shim
[3]	Pinion shaft	[31]	Key	[114]	Multi-tang washer	[533]	Shim
[4]	Gear	[37]	Rolling bearing	[116]	Thread lock	[534]	Shim
[5]	Pinion shaft	[39]	Retaining ring	[119]	Spacer tube	[535]	Shim
[6]	Gear	[42]	Rolling bearing	[131]	Closing cap	[536]	Shim
[7]	Output shaft	[43]	Key	[132]	Retaining ring	[537]	Shim
[8]	Key	[45]	Rolling bearing	[133]	Supporting ring	[538]	Shim
[9]	Oil seal	[59]	Screw plug	[135]	Shield ring	[542]	Shim
[11]	Rolling bearing	[83]	Shield ring	[137]	Supporting ring	[543]	Shim
[12]	Retaining ring	[84]	Shield ring	[161]	Closing cap	[544]	Shim
[17]	Spacer tube	[88]	Retaining ring				
[19]	Key	[89]	Closing cap				
[20]	Breather valve	[100]	Inspection cover				
[22]	Gear unit housing	[101]	Hex head screw				
				[521]	Shim		

### 3.6 Basic structure of helical-worm gear units S..37 – S..97, S..37p – S..97p



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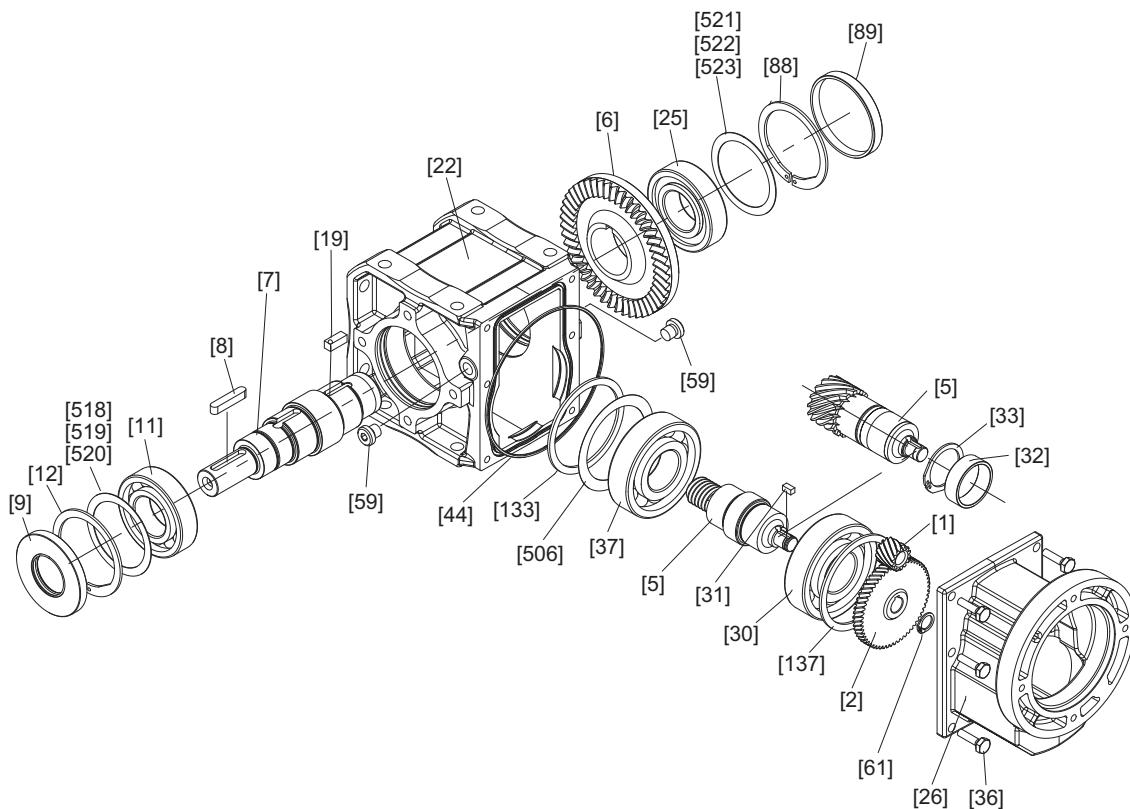
[1]	Pinion	[20]	Breather valve	[88]	Retaining ring	[518]	Shim
[2]	Gear	[22]	Gear unit housing	[89]	Closing cap	[519]	Shim
[5]	Worm	[25]	Rolling bearings	[100]	Gear unit cover	[520]	Shim
[6]	Worm gear	[30]	Rolling bearings	[101]	Hex head screw	[521]	Shim
[7]	Output shaft	[31]	Key	[102]	Gasket	[522]	Shim
[9]	Oil seal	[37]	Rolling bearings	[131]	Closing cap	[523]	Shim
[11]	Rolling bearings	[39]	Retaining ring	[137]	Supporting ring		
[12]	Retaining ring	[59]	Screw plug	[506]	Shim		
[19]	Key	[61]	Retaining ring	[507]	Shim		

**3.7 Basic structure of SPIROPLAN® gear units W..10 – W..30**

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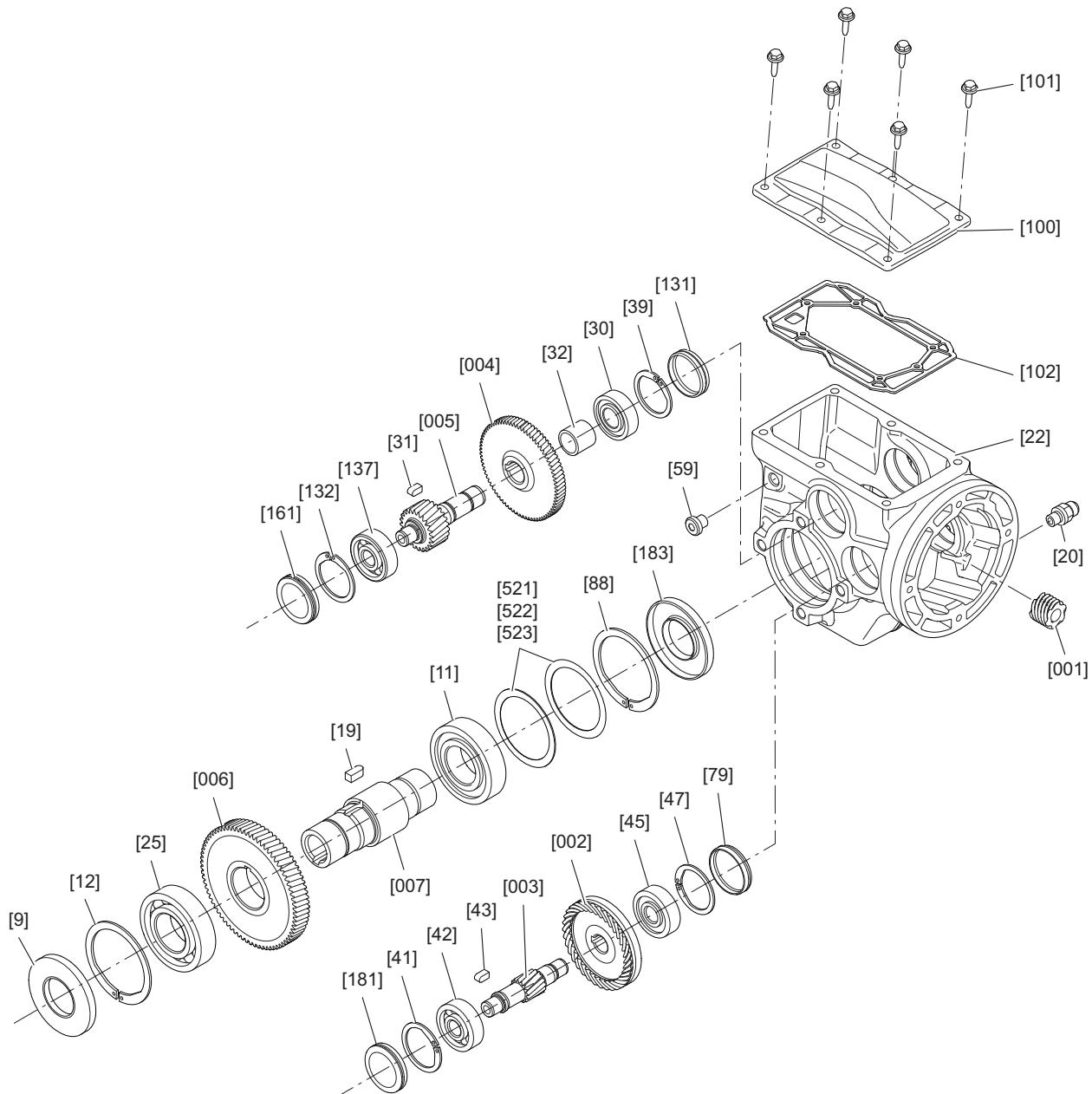
[1]	Pinion	[19]	Key	[88]	Retaining ring	[518]	Shim
[6]	Gear	[22]	Gear unit housing	[89]	Closing cap	[519]	Shim
[7]	Output shaft	[25]	Rolling bearing	[100]	Inspection cover	[520]	Shim
[8]	Key	[65]	Oil seal	[101]	Hex head screw	[521]	Shim
[9]	Oil seal	[66]	Rolling bearing	[102]	Gasket	[522]	Shim
[11]	Rolling bearing	[68]	Retaining ring	[143]	Supporting ring	[523]	Shim
[12]	Retaining ring	[71]	Supporting ring	[250]	Retaining ring		
[17]	Spacer tube	[72]	Retaining ring	[251]	Retaining ring		

### 3.8 Basic structure of SPIROPLAN® gear units W..37 – W..47



18014399115354379

[1]	Pinion	[22]	Gear unit housing	[59]	Screw plug	[521]	Shim
[2]	Gear	[25]	Deep groove ball bearing	[61]	Retaining ring	[522]	Shim
[5]	Pinion shaft	[26]	Housing stage 1	[88]	Retaining ring	[523]	Shim
[6]	Gear	[30]	Deep groove ball bearing	[89]	Closing cap		
[7]	Output shaft	[31]	Key	[133]	Shim		
[8]	Key	[32]	Spacer tube	[137]	Shim		
[9]	Oil seal	[33]	Retaining ring	[506]	Shim		
[11]	Deep groove ball bearing	[36]	Hex head screw	[518]	Shim		
[12]	Retaining ring	[37]	Deep groove ball bearing	[519]	Shim		
[19]	Key	[44]	O-ring	[520]	Shim		

**3.9 Basic structure of SPIROPLAN® gear units W..29/W..39**

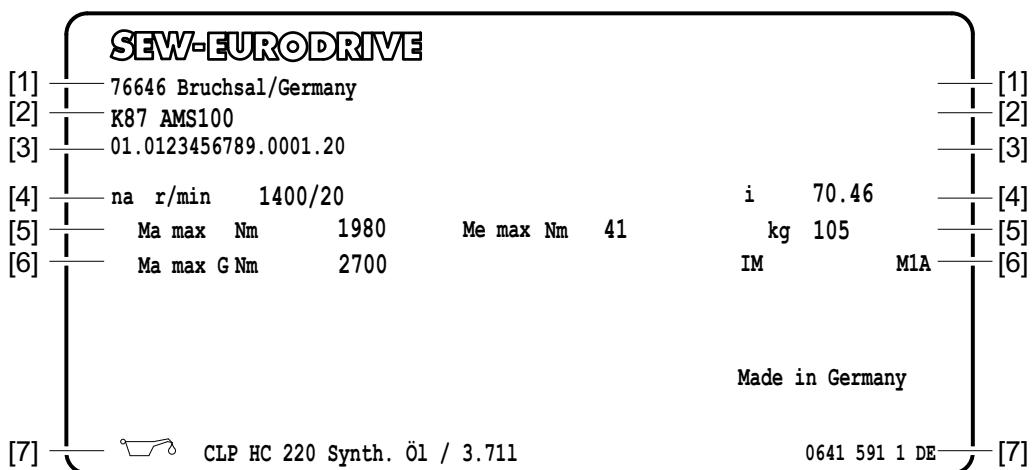
[1]	Pinion	[22]	Gear unit housing	[79]	Closing cap	[522]	Shim
[2]	Gear	[25]	Deep groove ball bearing	[88]	Retaining ring	[523]	Shim
[3]	Pinion shaft	[30]	Deep groove ball bearing	[100]	Gear unit cover		
[4]	Gear	[31]	Key	[101]	Hex head screw		
[5]	Pinion shaft	[32]	Spacer tube	[102]	Gasket		
[6]	Gear	[39]	Retaining ring	[131]	Closing cap		
[7]	Input shaft	[41]	Retaining ring	[132]	Retaining ring		
[9]	Oil seal	[42]	Deep groove ball bearing	[137]	Deep groove ball bearing		
[11]	Deep groove ball bearing	[43]	Key	[161]	Closing cap		
[12]	Retaining ring	[45]	Deep groove ball bearing	[181]	Closing cap		
[19]	Key	[47]	Retaining ring	[183]	Oil seal		
[20]	Breather valve	[59]	Screw plug	[521]	Shim		

## 3.10 Nameplate/type designation

### 3.10.1 Gear unit nameplates

The following figures show examples of nameplates for a helical-bevel gear unit with input adapter:

Nameplate 1



- [1] • Manufacturer, address
- [2] • Type designation
- [3] • Serial number
- [4] • Input speed / output speed  
• Gear ratio
- [5] • Maximum permitted output torque of the gear unit / adapter combination  
• Maximum permitted input torque  
• Weight
- [6] • Maximum permitted output torque of the open gear unit without additional component  
• Mounting position
- [7] • Oil type and oil fill volume

**Explanation of the production number:**

<b>01.</b>	<b>0123456789.</b>	<b>0001.</b>	<b>20</b>
Sales Organization	Order number	Item number	Year of manufacture

**Nameplate 2**

Digital Services

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

**3.10.2 Type designation of the gear unit**

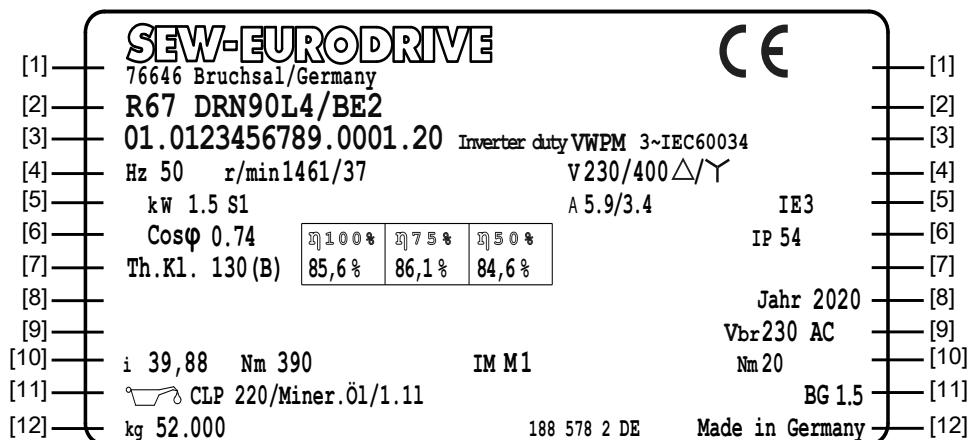
A helical-bevel gear unit with AQA adapter, for example, has the following type designation:

<b>Example: K37/R AQSA 80 /1</b>		
Gear unit type	<b>K</b>	Helical-bevel gear units
Gear unit size	<b>37</b>	19 – 49; 37 – 187
Option	<b>/R</b>	E.g. option /R: reduced rotational clearance
Adapter	<b>AQSA</b>	E.g. adapter for mounting servomotors: AQSA: Adapter with keyway AQSH: Adapter with clamping ring hub
Adapter size	<b>80</b>	
Variants	<b>/1</b>	

**3.10.3 DRN.. gearmotor nameplates**

The following figures show examples of the nameplates of a DRN.. gearmotor.

## Nameplate 1



Line	Information
[1]	<ul style="list-style-type: none"> <li>• Manufacturer, address, CE mark</li> </ul>
[2]	<ul style="list-style-type: none"> <li>• Type designation</li> </ul>
[3]	<ul style="list-style-type: none"> <li>• Serial number</li> <li>• Suitability for inverter operation</li> <li>• Number of phases and underlying rating and performance standard</li> </ul>
[4]	<ul style="list-style-type: none"> <li>• Rated frequency</li> <li>• Rated speed of the motor / speed of the gear unit output shaft</li> <li>• Nominal voltage</li> </ul>
[5]	<ul style="list-style-type: none"> <li>• Rated power and operating mode</li> <li>• Rated current</li> <li>• Energy efficiency class according to IEC/EN 60034-30-1</li> </ul>
[6]	<ul style="list-style-type: none"> <li>• Power factor</li> <li>• Efficiency after capacity utilization of 100%, 75%, and 50%</li> <li>• Degree of protection according to IEC 60034-5</li> </ul>
[7]	<ul style="list-style-type: none"> <li>• Thermal class</li> </ul>
[8]	<ul style="list-style-type: none"> <li>• Year of manufacture</li> </ul>
[9]	<ul style="list-style-type: none"> <li>• Brake voltage</li> </ul>
[10]	<ul style="list-style-type: none"> <li>• Gear unit ratio</li> <li>• Output torque</li> <li>• Mounting position</li> <li>• Nominal braking torque</li> </ul>
[11]	<ul style="list-style-type: none"> <li>• Oil type and oil fill volume</li> <li>• Brake control</li> </ul>
[12]	<ul style="list-style-type: none"> <li>• Gearmotor weight</li> <li>• Nameplate number</li> <li>• Country of manufacture</li> </ul>

**Nameplate 2**

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Digital Services

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

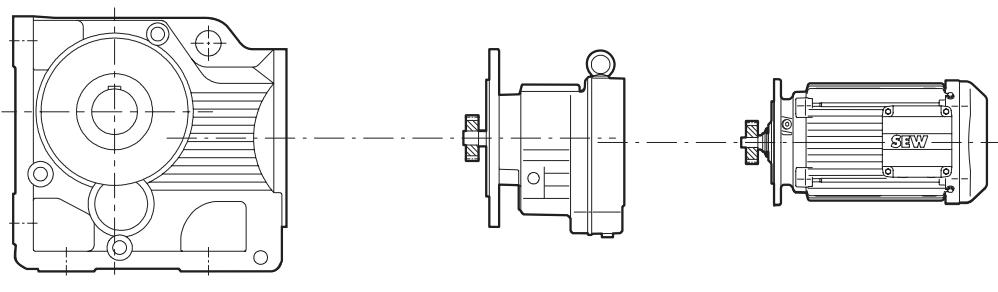
### 3.10.4 Type designation of a DRN.. gearmotor

The type designation of the gearmotor starts from the component on the output end.

For instance, a multi-stage helical-bevel gearmotor with temperature sensor in the motor winding has the following type designation:

<b>Example: K107R77 DRN100LS4 /TF</b>		
Gear unit type	K	1st gear unit
Size	107	
Gear unit type	R	2nd gear unit
Size	77	
Motor series	DR	Motor
Product line	N	
Size	100LS	
Number of poles	4	
Motor option temperature sensor	/TF	Option

Example: DRN.. gearmotor



### 3.11 Designs and options – R, F, K, S, W gear units

Below is an overview of type designations for R, F, K, S, and W gear units and their options.

#### 3.11.1 Helical gear units

Designation	Description
RX..	Single-stage foot-mounted design, output shaft with key
RXF..	Single-stage B5 flange-mounted design, output shaft with key
R..	Foot-mounted design, output shaft with key
R..F	Foot- and B5 flange-mounted design, output shaft with key
RF..	B5 flange-mounted design, output shaft with key
RZ..	B14 flange-mounted design, output shaft with key
RM..	B5 flange-mounted design with extended bearing hub, output shaft with key

#### 3.11.2 Parallel-shaft helical gear units

Designation	Description
F..	Foot-mounted design, output shaft with key
FA..B	Foot-mounted design, hollow shaft with keyway
FH..B	Foot-mounted design, hollow shaft with shrink disk
FV..B	Foot-mounted design, splined hollow shaft to DIN 5480
FF..	B5 flange-mounted design, output shaft with key
FAF..	B5 flange-mounted design, hollow shaft with keyway
FHF..	B5 flange-mounted design, hollow shaft with shrink disk
FVF..	B5 flange-mounted design, splined hollow shaft to DIN 5480
FA..	Hollow shaft with keyway
FH..	Hollow shaft with shrink disk
FT..	Hollow shaft with TorqLOC® hollow shaft mounting system
FV..	Splined hollow shaft to DIN 5480
FZ..	B14 flange-mounted design, output shaft with key
FAZ..	B14 flange-mounted design, hollow shaft with keyway
FHZ..	B14 flange-mounted design, hollow shaft with shrink disk
FVZ..	B14 flange-mounted design, splined hollow shaft to DIN 5480
FM..	B5 flange-mounted design with extended bearing hub, output shaft with key
FAM..	B5 flange-mounted design with extended bearing hub, hollow shaft with keyway

### 3.11.3 Helical-bevel gear units

Designation	
K..	Foot-mounted design, output shaft with key
KA..B	Foot-mounted design, hollow shaft with keyway
KAF..B	B5 flange-mounted design, foot-mounted design, hollow shaft with keyway
KF..B	B5 flange-mounted design, foot-mounted design, output shaft with key
KH..B	Foot-mounted design, hollow shaft with shrink disk
KHF..B	B5 flange-mounted design, foot-mounted design, hollow shaft with shrink disk
KV..B	Foot-mounted design, splined hollow shaft to DIN 5480
KF..	B5 flange-mounted design, output shaft with key
KAF..	B5 flange-mounted design, hollow shaft with keyway
KHF..	B5 flange-mounted design, hollow shaft with shrink disk
KVF..	B5 flange-mounted design, splined hollow shaft to DIN 5480
KA..	Hollow shaft with keyway
KH..	Hollow shaft with shrink disk
KT..	Hollow shaft with TorqLOC® hollow shaft mounting system
KV..	Splined hollow shaft to DIN 5480
KZ..	B14 flange-mounted design, output shaft with key
KAZ..	B14 flange-mounted design, hollow shaft with keyway
KHZ..	B14 flange-mounted design, hollow shaft with shrink disk
KVZ..	B14 flange-mounted design, splined hollow shaft to DIN 5480
KM..	B5 flange-mounted design with extended bearing hub, output shaft with key
KAM..	B5 flange-mounted design with extended bearing hub, hollow shaft with keyway

### 3.11.4 Helical-worm gear units

Designation	Description
S..	Foot-mounted design, output shaft with key
SF..	B5 flange-mounted design, output shaft with key
SAF..	B5 flange-mounted design and hollow shaft with keyway
SHF..	B5 flange-mounted design and hollow shaft with shrink disk
SA..	Hollow shaft with keyway
SH..	Hollow shaft with shrink disk
ST..	Hollow shaft with TorqLOC® hollow shaft mounting system
SAZ..	B14 flange-mounted design and hollow shaft with keyway

Designation	Description
SHZ..	B14 flange-mounted design and hollow shaft with shrink disk

### 3.11.5 SPIROPLAN® gear units

Designation	Description
W..	Foot-mounted design, output shaft with key
WF..	B5 flange-mounted design, output shaft with key
WAF..	B5 flange-mounted design and hollow shaft with keyway
WA..	Hollow shaft with keyway
WHF..	B5 flange-mounted design and hollow shaft with shrink disk
WH..	Hollow shaft with shrink disk
WT..	Hollow shaft with TorqLOC® hollow shaft mounting system

### 3.11.6 Options

R, F and K gear units:

Designation	Description
/R	Reduced backlash

K, S and W gear units:

Designation	Description
/T	With torque arm

F gear units:

Designation	Description
/G	With rubber buffer

### 3.11.7 Condition monitoring

Designation	Description
/DUO	Diagnostic Unit Oil = Oil aging sensor
/DUV40A	Diagnostic Unit Vibration = Vibration sensor

## 4 Mechanical installation

### 4.1 Installation requirements

#### NOTICE

Damage to the gear unit/gearmotor due to improper installation can occur.

Damage to property can occur.

- Observe the following information.

Make sure that the following requirements are met before you start installing the unit:

- The drive has not been damaged during transportation or storage.
- The entries on the nameplate of the gearmotor match the voltage supply system.
- In the case of abrasive ambient conditions, the output-end oil seals must be protected against wear.
- Output shafts and flange surfaces must be completely free from anti-corrosion agent and any kind of pollution. Use a commercially available solvent to clean the flange surfaces. Note that solvent damages the oil seal ring. Do not let the solvent come into contact with the sealing lips of the oil seal!
- **For standard drives:**
  - Check if the gear unit/gearmotor is designed for the ambient temperature. For the application limits, refer to the technical documentation, the nameplate, or the lubricant table (see chapter "Lubrication table (017512104)" (→ 190)).
  - Make sure the environment contains no hazardous substances (oils, acids, gases, vapors, dusts, etc.) or radiation.
- **For special designs:**
  - Check if the gear unit/gearmotor is designed for the ambient temperature. You can find the application limits on the nameplate.
- **With helical-worm gear units / SPIROPLAN® W..0 gear units:**
  - Note that no large external mass moments of inertia which could exert a retrodriving load on the gear unit must be present.
  - Note the self-locking at  $\eta' < 0.5$ .  
Calculation of  $\eta':\eta' = 2 - 1/\eta$
- **Servomotor mounting:**
  - The drive may only be mounted if it is ensured that after the mounting the drive will be sufficiently ventilated. Ventilation prevents heat build-up.

#### 4.1.1 Required tools/resources

The following tools and resources are required for the mechanical installation:

- Wrench
- Torque wrench for:
  - Gear unit mounting
  - Shrink disks
  - AQSH or EWH motor adapter
  - Input shaft assembly with centering shoulder

- Mounting device
- Compensation elements (shims and spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® fluid)
- Thread locking compound for input shaft assembly with centering shoulder (e.g. Loctite 243®)

## INFORMATION



Standard parts are not included in the delivery.

#### 4.1.2 Installation tolerances

Shaft end	Flanges
Diameter tolerance according to DIN 748 <ul style="list-style-type: none"><li>• ISO k6 for solid shafts with <math>\varnothing \leq 50</math> mm</li><li>• ISO m6 for solid shafts with <math>\varnothing &gt; 50</math> mm</li><li>• ISO H7 for hollow shafts</li><li>• Centering bore according to DIN 332, shape DR</li></ul>	Centering shoulder tolerance to DIN EN 50347 <ul style="list-style-type: none"><li>• ISO j6 with <math>N \leq 250</math> mm</li><li>• ISO h6 with <math>N &gt; 250</math> mm</li></ul>

## 4.2 Direction of rotation

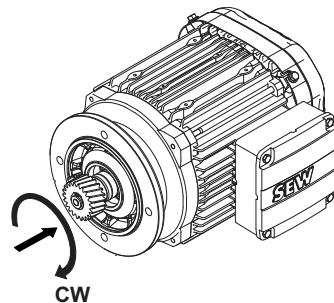
### 4.2.1 Definitions

#### Standard direction of rotation for motor shaft

In accordance with the standard DIN EN 60034-8 defined as standard:

Clockwise direction of rotation (CW) as viewed on the pinion shaft end of the motor.

Prerequisite: Connection U1-V1-W1

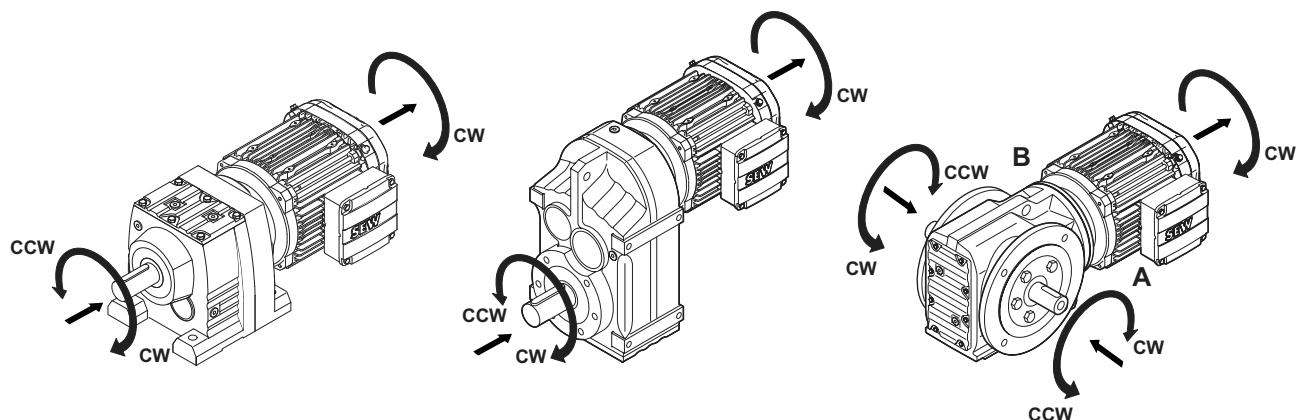


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#### Standard direction of rotation for output shaft

Standard direction of rotation as viewed on the output shaft of the gear unit:

- CW (clockwise)  
Clockwise direction of rotation
- CCW (counterclockwise)  
Counterclockwise direction of rotation



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#### 4.2.2 Direction of rotation of the gear unit

### INFORMATION



With helical-bevel gear units K.., helical-worm gear units S.. and SPIROPLAN®-W gear units, shaft position A, B or AB is possible.

The direction of rotation is specified in accordance with the shaft position as viewed on the output end A or B, or A and B.

Series	Size	Gear unit stages	Shaft position	Standard direction of rotation as viewed on the output shaft <sup>1)</sup>
RX	57 – 107	1		CCW
R	07 – 167	2		CW
		3		CCW
F	27 – 157	2		CW
		3		CCW

1) CW = clockwise; CCW = counterclockwise.

Series	Size	Gear unit stages	Shaft position	Standard direction of rotation as viewed on the output shaft <sup>1)</sup>	
				View of output end A	View of output end B
K	19 – 49	2	A	CW	
			AB	CW	CCW
			B		CCW
K	37 – 187	3	A	CCW	
			AB	CCW	CW
			B		CCW
S	37 – 97	2	A	CW	
			AB	CW	CCW
			B		CCW
W	10 – 30	1	A	CCW	
			AB	CCW	CW
			B		CW
W	29 – 39	2	A	CW	
			AB	CW	CCW
			B		CCW
		3	A	CCW	
			AB	CCW	CW
			B		CW

1) CW = clockwise; CCW = counterclockwise.

## 4.3 Installing the gear unit

### **⚠ CAUTION**



Risk of injury due to improper installation/disassembly.

Severe personal injury and damage to property can occur.

- Work on the gear unit only when the machine is in an idle state.
- Secure the drive unit against unintentional power-up.
- Prevent heavy component parts (e.g. shrink disks) against falling during installation/disassembly.

### **⚠ CAUTION**



Risk of injury due to protruding gear unit parts.

Severe injuries can occur.

- Keep a sufficient safety distance from the gear unit/gearmotor.

### **⚠ CAUTION**



Danger due to static overdetermination if gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) are mounted both via the torque arm and via the foot plate.

Risk of injuries and damage to property

- Especially with the KA.9B/T variant, it is not permitted to use the foot plates and the torque arm at the same time.
- Attach the KA.9B/T design only via the torque arm.
- Attach the K.9 or KA.9B design only via the foot plate.
- If you want to use foot plates and torque arms for mounting, contact SEW-EURODRIVE.

### **⚠ CAUTION**



Danger due to static overdetermination in the case of gearmotors when the gear unit is attached to the foot plate (e.g. KA19/29B, KA127/157B or FA127/157B, R gear unit with foot-mounted motor) and the motor is attached to the foot plate as well.

Risk of injuries and damage to property

- Attach only the gear unit or only the motor to the foot plate.

### **NOTICE**

Damage to gear unit/gearmotor due to cold air currents can occur. Condensed water in the gear unit can cause damage.

Damage to property can occur.

- Protect the gear unit from direct cold air currents.

### **INFORMATION**



When installing the gear unit, make sure that the oil level and oil drain plugs as well as the breather valves are easily accessible!

**Mounting position** It is only permitted to install the gear unit or gearmotor in the specified mounting position. Observe the information on the nameplate. SPIROPLAN® gear units of sizes W10 – W30 are mounting position-independent.

**Oil level** Check the mounting position-dependent oil level, refer to chapter "Inspection/maintenance of the gear unit" (→ 130). The gear units are filled with the required oil quantity at the factory. There may be slight deviations at the oil level plug as a result of the mounting position, which are permitted within the manufacturing tolerances.

**Adjust the lubricant fill quantities and the position of the breather valve accordingly in the event of a change of mounting position.** Observe chapter "Lubricant fill quantities" (→ 204) and chapter "Mounting positions" (→ 146).

Contact SEW-EURODRIVE in case of the following mounting position changes:

- Mounting position change to M4: Depending on the operating mode of the drive, an oil expansion tank can be necessary (see chapter "Oil expansion tank" (→ 108)).
- Changing the mounting position of K gear units to M5 or M6 or within these mounting positions
- Changing the mounting position of size S47 – S97 S gear units to mounting positions M2 and M3
- Changing the mounting positions of R gear units to mounting position M2.

**Submounting** The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

The following table shows the maximally permitted flatness defect for foot and flange-mounting (guide values based on DIN ISO 1101):

Gear unit size	Flatness defect
≤ 67	Max. 0.4 mm
77 – 107	Max. 0.5 mm
127 to 147	Max. 0.7 mm
157 – 187	Max. 0.8 mm

Do not twist housing legs and mounting flanges against each other. Observe the permitted overhung and axial loads! Observe the chapter "Project Planning" in the gear unit/gearmotor catalog for calculating the permitted overhung and axial loads.

Strength class of the screws

Always mount gearmotors using screws of strength class 8.8. The gearmotors in flange-mounted design and in foot/flange-mounted design listed in the following table are an exception. Always use screws of strength class 10.9 for these gearmotors. Use suitable washers.

Gear unit	Flange Ø mm	Strength class of the screws
RF37/R37F SF37p	120	
RF47/R47F	140	
RF57/R57F SF67p	160 200	
FF/FAF77 KF/KAF77 SF77p	250	
FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	300	
FM/FAM87 KM/KAM87 SF87p	350	10.9
FM/FAM97 KM/KAM97	400	
RF147 FM/FAM107 KM/KAM107	450	
RF167 FM/FAM127 KM/KAM127	550	
FM/FAM157 KM/KAM157	660	
RZ37 – RZ87	60ZR – 130ZR	

Corrosion protection for screw connections

Use plastic inserts (2 – 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine. The material used must have an electrical leakage resistance  $< 10^9 \Omega$ . Electrochemical corrosion can occur between various metals, for example, cast iron and stainless steel. Also install the screws with plastic washers! Additionally ground the housing. Use grounding screws on the motor.

#### 4.3.1 Notes concerning tightening torques

The tightening torques specified in the following chapters are based on the following friction coefficients:

Friction coefficient $\mu_{G,K}$ for thread and head contact surface	Strength class of screw
0.14	8.8 / 70 <sup>1)</sup> , 80 <sup>1)</sup>

Friction coefficient $\mu_{G,K}$ for thread and head contact surface	Strength class of screw
0.09	10.9, 12.9

1) Stainless steel screws.

If screws with a different friction coefficient are used, the tightening torques must be adapted accordingly.

Only use one of the following tools to tighten the screws:

- Torque wrench
- Torque-controlled torque wrench
- Impulse driver, switched off and controlled mechanically
- Torque wrench with light and sound signal
- Motorized torque wrench with dynamic torque measuring
- Torque-controlled, gradual hydraulic tools

**4.3.2 Tightening torques for retaining screws**

Screw on the gearmotors with the following tightening torques, and observe the details in chapter "Notes concerning tightening torques" (→ 36):

Screw/nut	Tightening torque $\pm 15\%$ Strength class 8.8 Nm
M6	12
M8	28
M10	56
M12	96
M16	235
M20	460
M24	795
M30	1590
M36	2760
M42	4410
M48	6650
M56	10 600

Screw on the specified gearmotors with flange-mounted design with the following tightening torques, and observe the details in chapter "Notes concerning tightening torques" (→ 36):

Flange Ø mm	Gear unit	Screw/nut	Tightening torque $\pm 15\%$ Strength class 10.9 Nm
120	RF37 SF37p	M6	12
140	RF37/RF47	M8	29
160	RF57	M8	29
200	SF67p	M10	57
250	SF77p	M12	98
300	FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	M12	98
350	FM/FAM87 KM/KAM87 SF87p	M16	235
400	FM/FAM97 KM/KAM97	M16	235

Flange Ø mm	Gear unit	Screw/nut	Tightening torque ±15% Strength class 10.9 Nm
450	FM/FAM107 KM/KAM107	M16	235
450	RF147	M20	465
550	FM/FAM127 KM/KAM127	M16	235
550	RF167	M20	465
660	FM/FAM157 KM/KAM157	M20	465
60ZR	RZ37	M8	29
70ZR	RZ47	M8	29
80ZR	RZ57	M10	57
95ZR	RZ67	M10	57
110ZR	RZ77	M10	57
130ZR	RZ87	M12	98
250	FF77/KF77/ FAF77/ KAF77	M12	98

#### 4.3.3 Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses

Observe the tightening torques in the following table when screwing in:

Thread	Tightening torque Nm
M10 × 1	12
M12 × 1.5	15
M22 × 1.5	60
M33 × 2	100
M42 × 2	150

#### 4.3.4 Installing the gear unit

### INFORMATION



If you use the gear unit in flange-mounted design or foot/flange-mounted design in connection with VARIBLOC® variable-speed gear units, use screws of 10.9 quality and suitable washers for flange mounting on the customer side.

To improve the friction contact between flange and mounting surface, SEW-EURODRIVE recommends anaerobic gaskets or an anaerobic glue.

### INFORMATION



With the gear units KAZ/KZ/FAZ/FZ 107 – 157, remove the 4 transport protection screws from the B14 flange. The 2 recessed screws **must** remain in the B14 flange.

#### Foot-mounted gear unit

The following table shows the thread sizes of the foot-mounted gear units depending on the gear unit type and size:

Screw	Gear unit type					
	R/R..F	RX	F/FH..B/ FA..B	K/KH..B/KV..B/ KA..B	S	W
M6	07	–	–	19	–	10/20
M8	17/27/37	–	27/37	29	37	30/37/47
M10	–	57	47	37/39/47/49	47/57	–
M12	47/57/67	67	57/67	57/67	67	–
M16	77/87	77/87	77/87	77	77	–
M20	97	97/107	97	87	87	–
M24	107	–	107	97	97	–
M30	127/137	–	127	107/167	–	–
M36	147/167	–	157	127/157/187	–	–

#### Gear unit with B14 flange-mounted design and/or hollow shaft

The following table shows the thread sizes of the gear units with B14 flange and/or hollow shaft depending on the gear unit type and size:

Screw	Gear unit type				
	RZ	FZ/FAZ/FHZ/ FVZ	KZ/KAZ/KHZ/ KVZ	SA/SAZ/SHZ	WA
M6	07/17/27	–	–	37	10/20/30 <sup>1)</sup>
M8	37/47	27/37/47	37/47	47/57	29/37/39
M10	57/67	–	–	–	47
M12	77/87	57/67/77	57/67/77	67/77	–
M16	–	87/97	87/97	87/97	–
M20	–	107/127	107/127	–	–

Screw	Gear unit type				
	RZ	FZ/FAZ/FHZ/ FVZ	KZ/KAZ/KHZ/ KVZ	SA/SAZ/SHZ	WA
M24	—	157	157	—	—

1) For the W30 design mounted directly on a CMP.. motor or mounted via an EWH.. adapter, the thread size is M8.

### Gear unit with B5 flange-mounted design

The following table shows the thread sizes of the gear units with B5 flange depending on the gear unit type, size and flange diameter:

Flange Ø mm	Screw	Gear unit type						
		RF/R..F/RM	RXF	FF/FAF/ FHF/ FVF	FM/FAM KM/ KAM	KF/KAF/ KHF/ KVF	SF/SAF/ SHF	WF/WAF/ WHF
80	M6	—	—	—	—	—	—	10
110	M8	—	—	—	—	—	—	20
120	M6	07/17/27	—	—	—	—	37	10/20/30/37
120	M8	—	—	—	—	19	—	29
140	M8	07/17/27/37/47	57	—	—	—	—	—
160	M8	07/17/27/37/47	57/67	27/37	—	19/37	37/47	30/37/47/29
160	M10	—	—	—	—	29/39	—	39
200	M10	37/47/57/67	57/67/77	47	—	29/47	57/67	39
200	M12	—	—	—	—	49	—	—
250	M12	57/67/77/87	67/77/87	57/67	—	57/67	77	—
300	M12	67/77/87	87/97	77	67/77	77	—	—
350	M16	77/87/97/107	97/107	87	87	87	87	—
400	M16	—	—	—	97	—	—	—
450	M16	97/107/127/137/ 147	107	97/107	107	97/107	97	—
550	M16	107/127/137/ 147/167	—	127	127	127	—	—
660	M20	147/167	—	157	157	157	—	—

#### 4.3.5 Installation in damp locations or outdoors

##### NOTICE

Paint can block the breather valve and damage the sealing lips of the oil seals.

Damage to property can occur.

- Thoroughly cover the breather valve and sealing lip of the oil seals with strips prior to painting/re-painting.
- Remove the adhesive strips after painting.

Drives are supplied in corrosion-resistant designs with a suitable surface protection coating for use in damp areas or outdoors.

- Repair any damage to the paint work (e.g. on the breather valve or the lifting eyes).
- When motors are being mounted onto AMA.., AQA.. adapters and to AR.., AT.. start-up couplings and slip clutches, seal the flange areas with a suitable sealant (e.g. Loctite® 574).
- During outdoor setup, the drives must not be exposed to direct sunlight. Install appropriate protection devices, e.g. a cover or a canopy. The protection device must not cause heat build-up.
- The system operator must ensure that no foreign objects (e.g. falling objects or coverings) affect the operation of the gear unit.

#### **4.3.6 Gear unit venting**

##### **NOTICE**

Dirt and dust in the environment impair the function of the breather valve.

Potential damage to property can occur.

- Check the breather valve function regularly and replace it if necessary.
- In the event of high dirt and dust load, use a breather filter instead of a breather valve.

#### **Gear units with installed breather valve**

Depending on gear unit size and mounting position, the gear units are delivered with the activated breather valve installed according to the mounting position. If the breather valve has not been activated, yet, remove the transport protection as described in chapter "Activating the breather valve" (→ 43). This activates the breather valve.

#### **Gear units with separately included breather valve**

The following gear units are delivered with a screw plug on the provided breather hole:

- For gear units in the pivoted mounting position (stationary), see chapter "Gear unit in pivoted mounting position (stationary)" (→ 148).
- For gear units in mounting position MX, see chapter "Mounting position MX" (→ 149).
- For gear units in the variable mounting position, see chapter "Variable mounting position" (→ 149).
- Gear head units vented on the input side.

Replace the screw plug with the provided breather valve before startup. The tightening torque can be found in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

#### **Gear units that do not require venting**

The following table lists gear units that do not require venting.

<b>Gear unit</b>	<b>Mounting position</b>
R..07	M1/M2/M3/M5/M6

Gear unit	Mounting position
R..17/R..27/F..27	M1/M3/M5/M6
W..10/W..20/W..30	M1 – M6
W..37/W..47	M1/M2/M3/M5/M6
K..19/K..29	M1/M2/M3/M5/M6
W..29/W..39	M1/M2/M3/M5/M6

### Gear units that can be operated without venting after verification by SEW-EURODRIVE

Certain gear units require individual verification. Contact SEW-EURODRIVE in case of the following gear units:

- Gear units in closed design.
- For gear units in the pivoted mounting position (dynamic), see chapter "Gear unit in pivoted mounting position (dynamic)" (→ 148).

### Gear units with gear unit venting on fixed piping

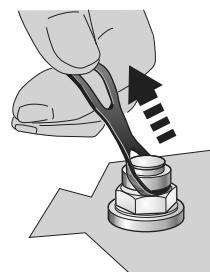
Gear units with gear unit venting on fixed piping, with expansion tanks and ventilation filters are delivered without a breather valve. Observe the installation notes provided with the respective venting system.

#### Activating the breather valve

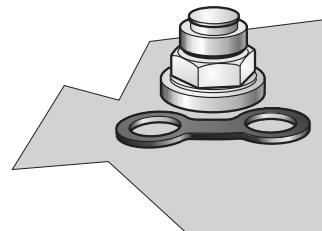
1. Before startup, check whether the transport protection on the breather valve has been removed and the valve is therefore activated. The following figure shows a breather valve with transport protection:



2. Remove the transport protection.



⇒ The following figure shows an activated breather valve:



**4.3.7 Painting the gear unit****NOTICE**

Paint can block the breather valve and damage the sealing lips of the oil seals.

Damage to property.

- Thoroughly cover the breather valve and sealing lip of the oil seals with strips prior to painting/re-painting.
- Remove the strips after painting.

## 4.4 Gear unit with solid shaft

### 4.4.1 Assembling input and output elements

#### NOTICE

Damage to bearing, housing or shafts due to incorrect mounting

Possible damage to property.

- Only use a mounting device for installing input and output elements (see chapter "Using the mounting device" (→ 45)). Use the threaded centering bore at the shaft end.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- During the installation of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- Make sure the transmission elements are balanced after fitting and do not give rise to any impermissible radial or axial forces. For the approved values, refer to the catalog "Gearmotors" or "Explosion-Proof Drives".

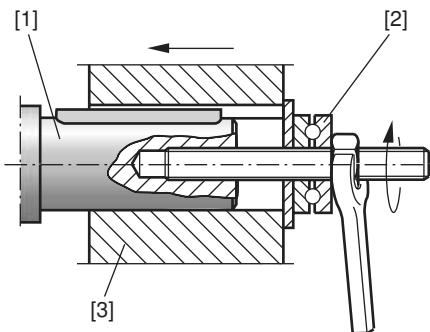
#### INFORMATION



Mounting is easier if you first apply lubricant to the output element or heat it up briefly to 80 – 100 °C.

### Using a mounting device

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



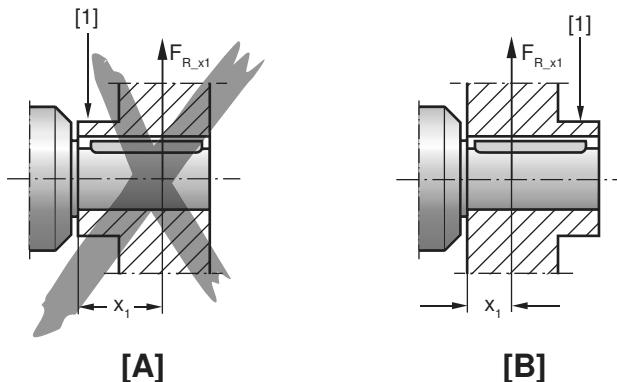
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[1] Gear shaft end  
[2] Thrust bearing

[3] Coupling hub

**Avoiding high radial loads**

To avoid high radial loads, mount gears and sprockets according to figure **B**.



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[1] Hub  
[A] Incorrect assembly

$F_{R,x1}$  Radial load at position  $x_1$   
[B] Correct assembly

**4.4.2 Mounting of couplings**
**⚠ CAUTION**

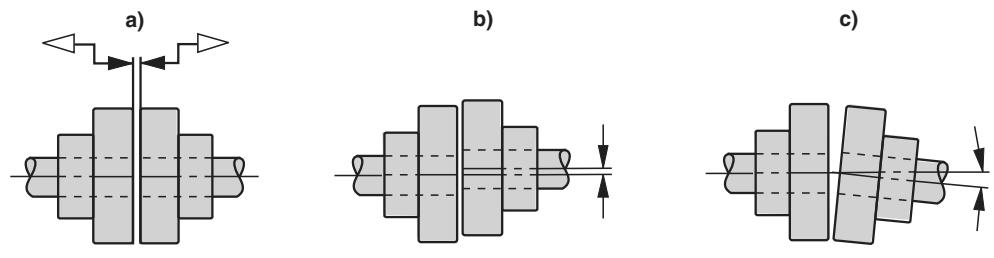
Risk of injury due to moving drive components and output elements, such as belt pulleys or couplings, during operation.

Risk of jamming and crushing.

- Equip the input and output elements with a touch guard.

Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings:

- Maximum and minimum clearance
- Axial misalignment
- Angular offset



## 4.5 Torque arms for shaft-mounted gear units

### 4.5.1 Mounting the bushing

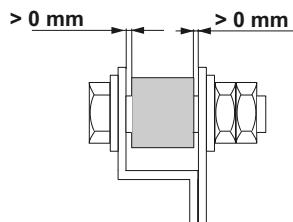
#### NOTICE

Damage to gear unit due to improper installation of the torque arm.

Damage to the gear unit.

- Do not deform the torque arm during installation.

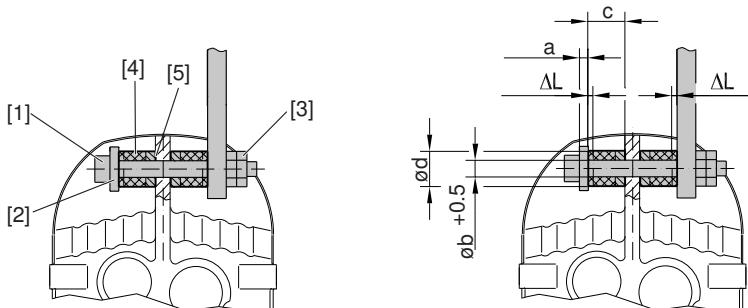
The following illustration shows a bushing attached at both sides without tightening:



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### 4.5.2 Mounting torque arms for parallel-shaft helical gear units

The following figure shows the torque support for parallel-shaft helical gear units in a loose condition.



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- [1] Screw
- [2] Washer
- [3] Nuts
- [4] Rubber buffer
- [5] Metal side of the rubber buffer
- a Washer width
- b Rubber buffer inner diameter
- c Rubber buffer length in loose state
- d Rubber buffer diameter
- $\Delta L$  Preload per rubber buffer in tightened state

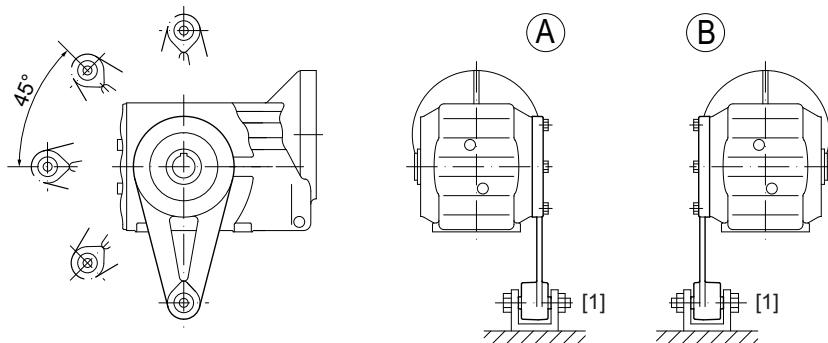
Proceed as follows:

1. Make sure that the metal sides of the rubber buffers lay against the gear unit.
2. Use screws [1] and washers [2] according to the following table.
3. Secure the screw connection with a nut [3].
4. Tighten the screw [1] until the preload " $\Delta L$ " of the rubber buffers is reached in accordance with the following table:

Gear unit	Washer a mm	d mm	Rubber buffer		
			b mm	c mm	Δ L mm
F..27 /G	5	40	12.5	20	1
F..37 /G	5	40	12.5	20	1
F..47 /G	5	40	12.5	20	1.5
F..57 /G	5	40	12.5	20	1.5
F..67 /G	5	40	12.5	20	1.5
F..77 /G	10	60	21.0	30	1.5
F..87 /G	10	60	21.0	30	1.5
F..97 /G	12	80	25.0	40	2
F..107 /G	12	80	25.0	40	2
F..127 /G	15	100	32.0	60	3
F..157 /G	15	120	32.0	60	3

#### 4.5.3 Mounting torque arms for helical-bevel gear unit K..19 – K..49

The following figure shows the torque support for the helical-bevel gear units K..19 – K..49:



[1] Bushing  
A Connection side  
B Connection side

Observe the following points during assembly:

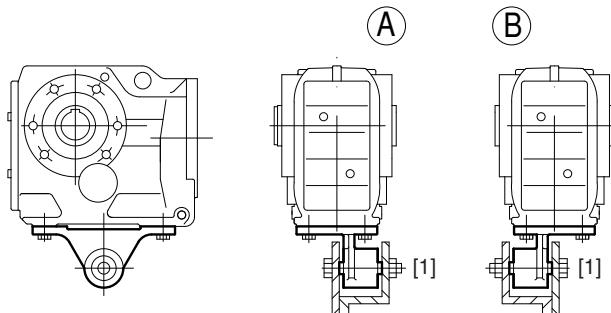
- Fasten the bushing [1] on both sides without mechanical stress, as described in chapter "Mounting the bushing" (→ 47).
- When tightening the screws, please observe chapter "Notes concerning tightening torques" (→ 36).
- Refer to the following table for the screw sizes and tightening torques:

Gear unit	Screws	Tightening torque in Nm ±15 %		
		Strength class		
		8.8	70	80
K..19 /T	4 × M8 × 20	28	–	28
K..29 /T	4 × M8 × 20	28	–	28

Gear unit	Screws	Tightening torque in Nm $\pm 15\%$		
		Strength class		
		8.8	70	80
K..39 /T	4 × M10 × 30	56	36	—
K..49 /T	4 × M12 × 35	96	62	—

#### 4.5.4 Mounting torque arms for helical-bevel gear unit K..37 – K..157

The following figure shows the torque support for the helical-bevel gear units K..37 – K..157.



36028797230326027

[1] Bushing

A Connection side

B Connection side

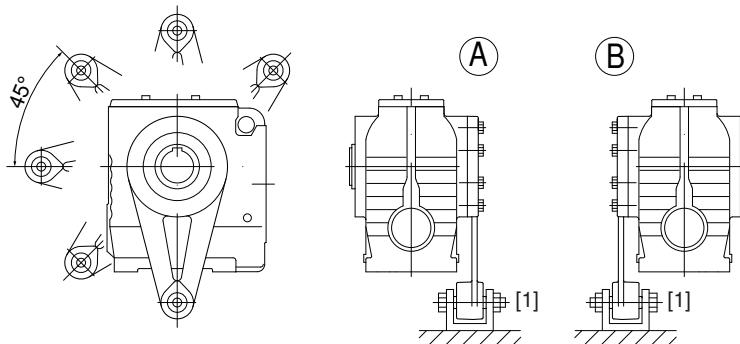
Observe the following points during assembly:

- Fasten the bushing [1] on both sides without mechanical stress, as described in chapter "Mounting the bushing" (→ 47).
- When tightening the screws, please observe chapter "Notes concerning tightening torques" (→ 36).
- Refer to the following table for the screw sizes and tightening torques:

Gear unit	Screws	Tightening torque in Nm $\pm 15\%$		
		Strength class		
		8.8	70	80
K..37 /T	4 × M10 × 25	56	36	—
K..47 /T	4 × M10 × 30	56	36	—
K..57 /T	4 × M12 × 35	96	62	—
K..67 /T	4 × M12 × 35	96	62	—
K..77 /T	4 × M16 × 40	235	151	—
K..87 /T	4 × M16 × 40	235	151	—
K..97 /T	4 × M20 × 50	460	295	—
K..107 /T	4 × M24 × 60	795	510	—
K..127 /T	4 × M36 × 130	2760	1770	—
K..157 /T	4 × M36 × 130	2760	1770	—

#### 4.5.5 Mounting torque arms for helical-worm gear units

The following figure shows the torque support for helical-worm gear units.



[1] Bushing

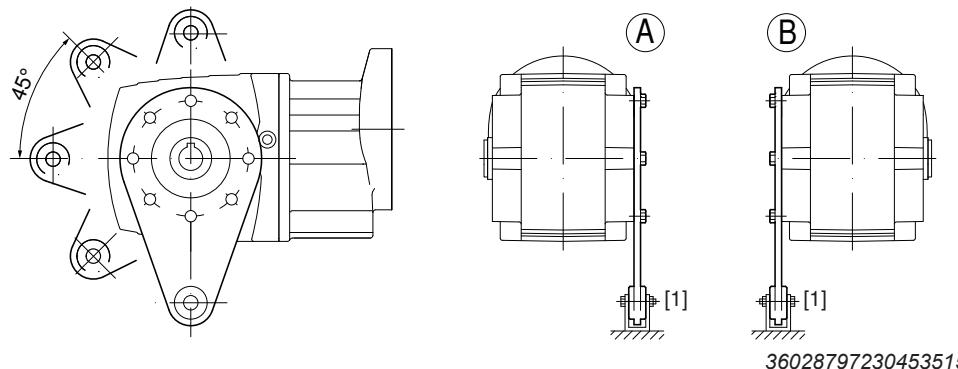
Observe the following points during assembly:

- Fasten the bushing [1] on both sides without mechanical stress, as described in chapter "Mounting the bushing" (→ 47).
- When tightening the screws, please observe chapter "Notes concerning tightening torques" (→ 36).
- Refer to the following table for the screw sizes and tightening torques:

Gear unit	Screws	Tightening torque in Nm ±15 %		
		8.8	70	80
S..37 /T	4 × M6 × 16	12	–	12
S..47 /T	4 × M8 × 25	28	–	28
S..57 /T	6 × M8 × 25	28	–	28
S..67 /T	4 × M12 × 35	96	–	96
S..77 /T	4 × M12 × 35	96	–	96
S..87 /T	4 × M16 × 45	235	–	235
S..97 /T	4 × M16 × 50	235	–	235

#### 4.5.6 Mounting torque brackets for SPIROPLAN® W gear units

The following figure shows the torque support for SPIROPLAN® W gear units.



36028797230453515

[1] Bushing

- Fasten the bushing [1] on both sides without mechanical stress, as described in chapter "Mounting the bushing" (→ 47).
- When tightening the screws, please observe chapter "Notes concerning tightening torques" (→ 36).
- Refer to the following table for the screw sizes and tightening torques:

Gear unit	Screws	Tightening torque in Nm ±15 %			
		Strength class	8.8	70	80
W..10 /T	4 × M6 × 16		12	—	12
W..20 /T	4 × M6 × 16		12	—	12
W..30 /T	4 × M6 × 16		12	—	12
W..29 /T	4 × M8 × 20		28	—	28
W..37 /T	4 × M8 × 20		28	—	28
W..39 /T	4 × M8 × 20		28	—	28
W..47 /T	4 × M10 × 20		56	—	56

## 4.6 Mounting shaft-mounted gear units with splined hollow shaft

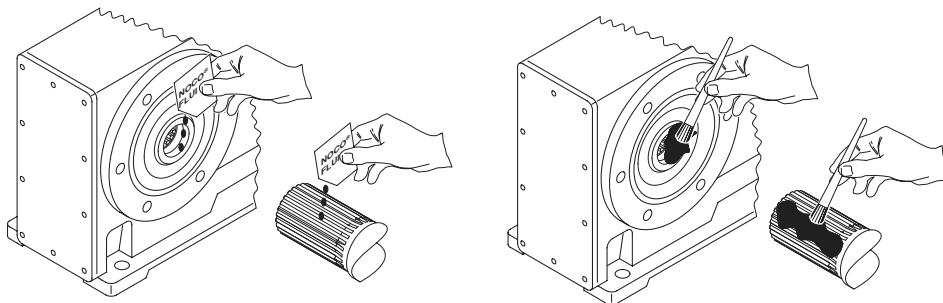
### INFORMATION



Concerning the configuration of the customer shaft, please also refer to the design notes in the "Garmotors" catalog.

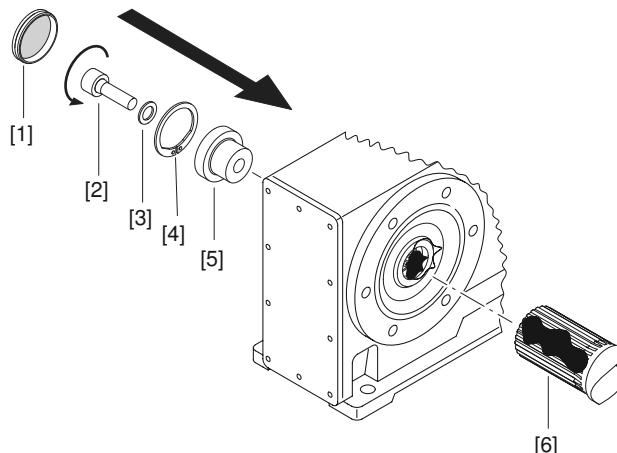
Proceed as follows:

1. Apply NOCO® fluid. Spread carefully.



20685469067

2. Install the shaft and secure it axially. For easier installation, use a mounting device.



20685473931

[1] Closing plug  
[2] Cap screw  
[3] Supporting ring

[4] Retaining ring  
[5] Washer

## 4.7 Shaft-mounted gear unit with keyway

### INFORMATION

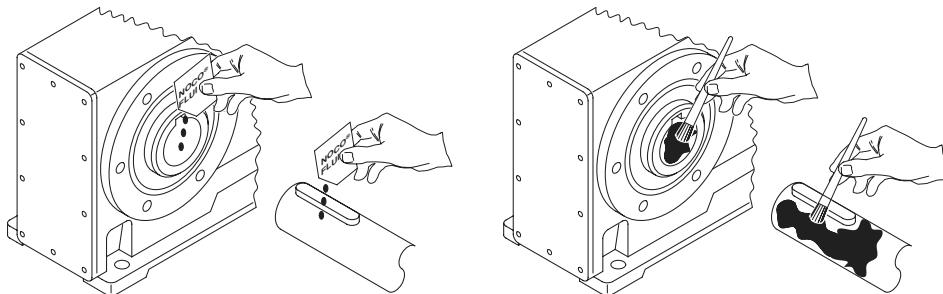


Concerning the design of the customer shaft, please also refer to the design notes in the "Garmotors" catalog.

#### 4.7.1 Mounting shaft-mounted gear units with keyway

Proceed as follows:

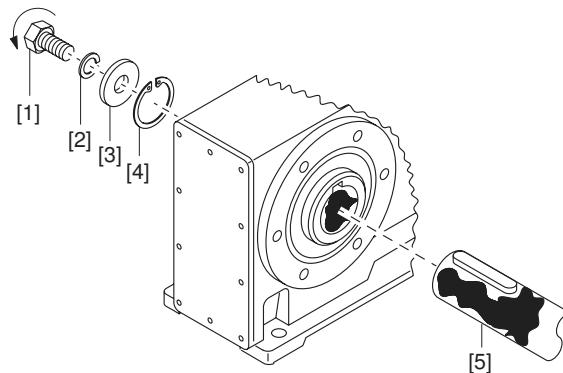
1. Apply NOCO® fluid. Spread carefully.



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2. Install the shaft and secure it axially. For easier installation, use a mounting device. Proceed according to one of the **3 mounting types**, depending on the scope of delivery.

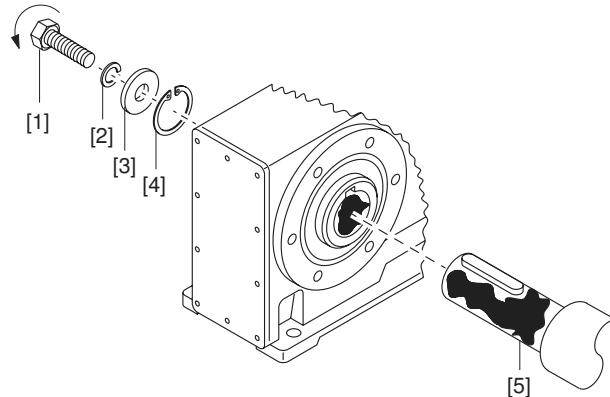
#### A) Fit customer shaft (standard scope of delivery, except with shaft position AB):



18014398721000331

- [1] Short retaining screw (standard scope of delivery)
- [2] Lock washer
- [3] Washer
- [4] Retaining ring
- [5] Customer shaft

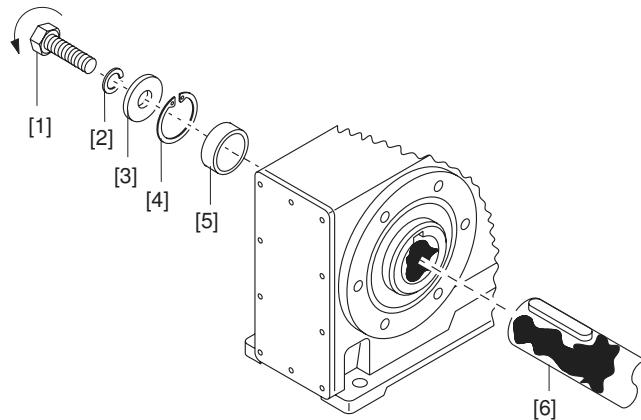
**B) Mounting customer shaft with contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:**



18014398721002507

- [1] Retaining screw
- [2] Lock washer
- [3] Washer
- [4] Retaining ring
- [5] Customer shaft with contact shoulder

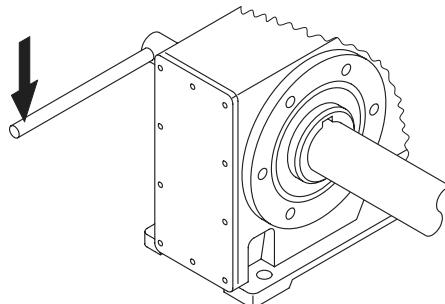
**C) Mounting customer shaft without contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:**



18014398721004683

- [1] Retaining screw
- [2] Lock washer
- [3] Washer
- [4] Retaining ring
- [5] Spacer tube
- [6] Customer shaft without contact shoulder

3. Tighten the retaining screw to the appropriate torque. Observe the tightening torques specified in the following table.

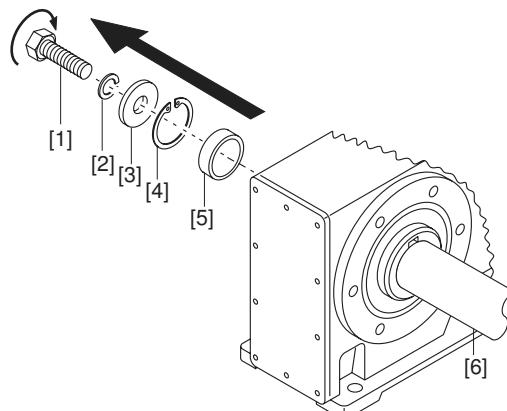


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Screw	Tightening torque Nm
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

#### 4.7.2 Removing the shaft-mounted gear unit

This description is only applicable if the gear unit was assembled using the SEW-EURODRIVE assembly/disassembly kit (see step 2 of Mounting the shaft-mounted gear unit).



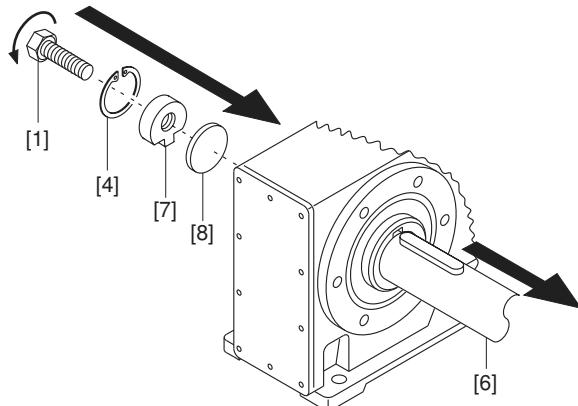
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- |     |                 |     |                |
|-----|-----------------|-----|----------------|
| [1] | Retaining screw | [4] | Retaining ring |
| [2] | Lock washer     | [5] | Spacer tube    |
| [3] | Washer          | [6] | Customer shaft |

Proceed as follows:

1. Loosen the retaining screw [1].
2. Remove parts [2] to [4] and, if applicable, the spacer tube [5].

3. Insert the forcing washer [8] and the fixed nut [7] from the SEW-EURODRIVE assembly/disassembly kit between the customer shaft [6] and the retaining ring [4] (see SEW-EURODRIVE assembly/disassembly kit).
4. Re-install the retaining ring [4].
5. Re-install the retaining screw [1]. Press the gear unit off the shaft by tightening the screw.



9007199466270219

[1] Retaining screw  
 [4] Retaining ring  
 [6] Customer shaft

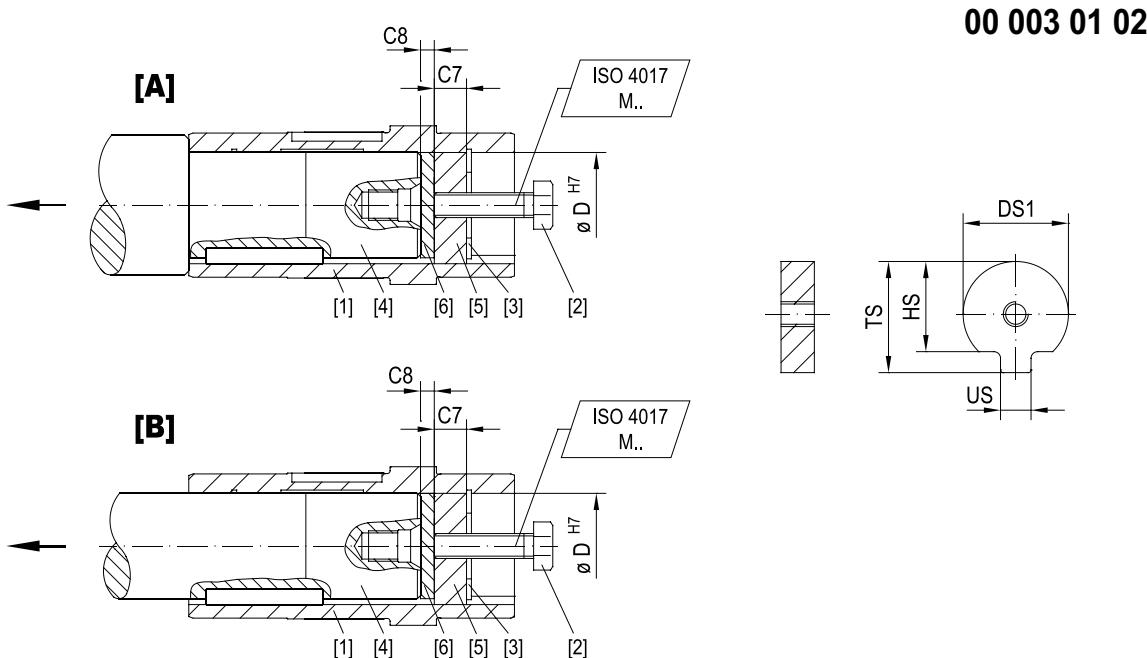
[7] Fixed nut  
 [8] Forcing washer

#### 4.7.3 Assembly/disassembly kit by SEW-EURODRIVE

Applies only if the installation/removal kit was previously used for installation.

1. Loosen the retaining screw [2].
2. Remove the retaining ring [3] and, if used, the spacer tube.
3. Insert the forcing washer [6] and the fixed nut [5] between the customer shaft [4] and retaining ring [3] as shown in the following figure.
4. Re-install the retaining ring [3].
5. Re-install the retaining screw [2]. Now you can force the gear unit off the shaft.

The following figure shows the SEW-EURODRIVE assembly/disassembly kit.



C7	Width of fixed nut
C8	Width of forcing washer
D	Hollow shaft diameter
DS1	Diameter of fixed nut
HS	Height 1 of fixed nut
TS	Height 2 of fixed nut
US	Base width of fixed nut
[1]	Hollow shaft
[2]	Retaining screw
[3]	Retaining ring
[4]	Customer shaft
[5]	Fixed nut for disassembly
[6]	Forcing washer

Dimensions and part numbers of the assembly/disassembly kit:

Gear unit	D <sup>H7</sup> mm	C8 mm	C7 mm	HS mm	US mm	TS mm	DS1 mm	ISO 4017 M..	Part number of the as- sembly/disassembly kit
WA..10	16	5	5	12	4.5	18	15.7	M5 × 50	06437125
WA..20	18	5	6	13.5	5.5	20.5	17.7	M6 × 25	0643682X

## Mechanical installation

Shaft-mounted gear unit with keyway

Gear unit	D <sup>H7</sup> mm	C8 mm	C7 mm	HS mm	US mm	TS mm	DS1 mm	ISO 4017 M..	Part number of the as- sembly/disassembly kit
WA..20, WA..30, SA..37, KA..19, W..29	20	5	6	15.5	5.5	22.5	19.7	M6 × 25	06436838
FA..27, SA..47, KA..29, W..29, W..39	25	5	10	20	7.5	28	24.7	M10 × 35	06436846
FA..37, KA..29, KA..37, KA..39, SA..47, SA..57, W..29, W..39	30	5	10	25	7.5	33	29.7	M10 × 35	06436854
FA..47, KA..39, KA..47, KA..49, SA..57	35	5	12	29	9.5	38	34.7	M12 × 45	06436862
FA..57, KA..57, FA..67, KA..49, KA..67, SA..67	40	5	12	34	11.5	41.9	39.7	M16 × 50	06436870
SA..67	45	5	12	38.5	13.5	48.5	44.7	M16 × 50	06436889
FA..77, KA..77, SA..77	50	5	12	43.5	13.5	53.5	49.7	M16 × 50	06436897
FA..87, KA..87, SA..77, SA..87	60	5	16	56	17.5	64	59.7	M20 × 60	06436900
FA..97, KA..97, SA..87, SA..97	70	5	16	65.5	19.5	74.5	69.7	M20 × 60	06436919
FA..107, KA..107, SA..97	90	5	20	80	24.5	95	89.7	M24 × 70	06436927
FA..127, KA..127	100	5	20	89	27.5	106	99.7	M24 × 70	06436935
FA..157, KA..157	120	5	20	107	31	127	119.7	M24 × 70	06436943

## 4.8 Shaft-mounted gear unit with shrink disk

### 4.8.1 Mounting shaft mounted gear units with shrink disk

#### NOTICE



Deformation of the hollow shaft due to tightening the locking screws without first installing the shaft.

Gear unit damage can occur.

- Never tighten the locking screws without the shaft installed.

#### INFORMATION



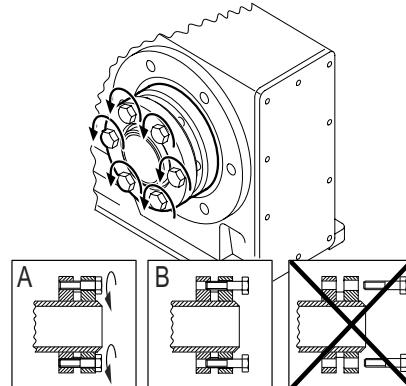
The exact values for the tightening torques are shown on the shrink disk.

#### INFORMATION



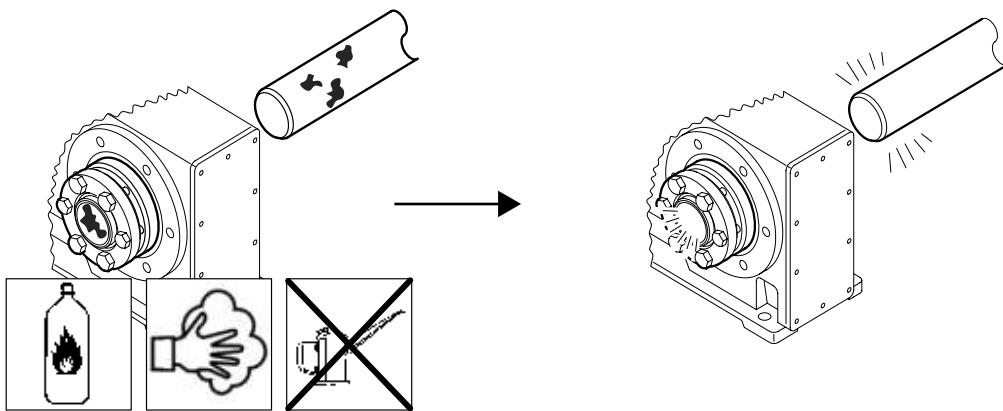
Standard shrink disks and stainless steel shrink disks have the same tightening torques.

- Slightly loosen the locking screws. Do not remove the locking screws completely.



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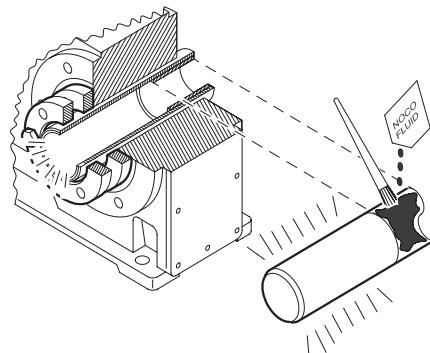
- Carefully **degrease** the hollow shaft bore and the input shaft using a commercial solvent.



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3. **⚠ CAUTION!** Never apply NOCO® fluid directly onto the bushing, since the compound can get into the clamping area of the shrink disk when the machine shaft is fitted.

Apply NOCO® fluid to the machine shaft in the vicinity of the bushing. It is essential to make sure that the clamping area of the shrink disk is free from grease!



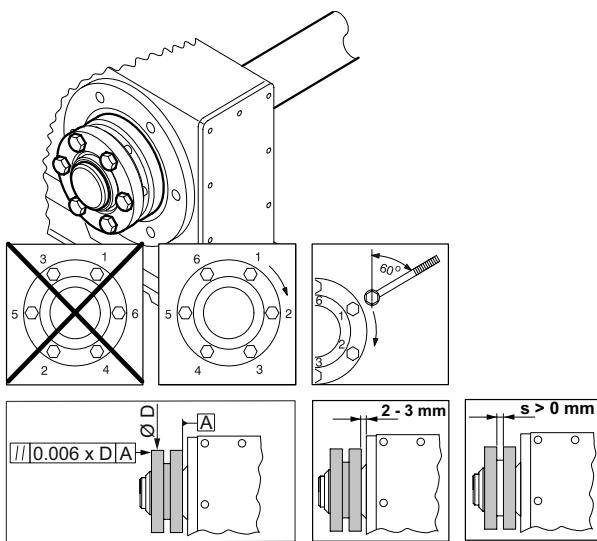
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4. **⚠ CAUTION!** Risk of injury due to falling shrink disk. Secure the shrink disk immediately after fitting the shaft.

Install the shaft. Make sure that the outer rings of the shrink disc are installed plane-parallel to each other when doing this.

5. Install the input shaft. Proceed as follows to do so:

6. If you have a gear unit with a shaft shoulder, then fit the shrink disk to the shaft shoulder as far as it will go, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm.
7. In the case of a gear unit without a shaft shoulder, mount the shrink disk at a distance of 2 – 3 mm from the gear unit housing.
8. Tighten the locking screws by working round several times from one screw to the next (not in diametrically opposite sequence). The tightening torques can be found in the following table. After installation, grease the outer surface of the hollow shaft in the vicinity of the shrink disk to prevent corrosion.



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9. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is  $s > 0$  mm.

10. To prevent corrosion, grease the outer surface of the hollow shaft around the shrink disk.

11. **⚠ CAUTION!** Install the provided rotating safety cover or another, suitable protective cover at the shrink disk to prevent injuries. Never start up the drive if the protective covers are not installed.

KH..	Gear unit type			Locking screw ISO 4014/ISO 4017/ ISO 4762	Tightening torque $\pm 4\%$ Nm
	FH..	SH..	WH..		
19/29	27	37	37/29/39	M5	5
37/39/47/49/57/67/77	37/47/57/67/77	47/57/67/77	47	M6	12
87/97	87/97	87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100
167	–	–	–	M16	250
187	–	–	–	M20	470

#### 4.8.2 Removing shaft mounted gear units with shrink disk

### INFORMATION



There is no need to dismantle clean, removed shrink disks before they are reinstalled.

1. **⚠ CAUTION!** Risk of injury due to falling shrink disk. Secure the shrink disk before disassembly.
2. To prevent the outer rings from jamming, loosen the locking screws for a quarter turn, one after the other.
3. Steadily loosen the locking screws one after the other, but do not remove the locking screws completely.
4. If rust has formed on the shaft in front of the hub, remove the rust.
5. Remove the shaft or pull the hub off the shaft.
6. Remove the shrink disk from the hub.

**4.8.3 Cleaning and lubricating the shrink disk**

If a removed shrink disk is clean, it does not have to be disassembled or re-greased before re-tightening.

The shrink disk only needs to be cleaned and greased if it is contaminated.

Use one of the following solid lubricants for the tapered surfaces:

Lubricant ( $\text{Mo S}_2$ )	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or compound
Aemasol MO 19P	Spray or compound
AemasolDIO-sétral 57 N (lube coat)	Spray

Grease the locking screws with a multipurpose grease such as Molykote BR 2 or similar.

## 4.9 Shaft-mounted gear units with TorqLOC®

### NOTICE

With a fixed flange or foot mounting, stress can build up in the drive train because of the possible tolerance adjustment of the TorqLOC® shaft.

#### Damage to property

- A flange or foot mounting is only allowed for TorqLOC® mounting if it is ensured that no static overdetermination can occur. Tolerance adjustment of the shaft must be possible.

### INFORMATION

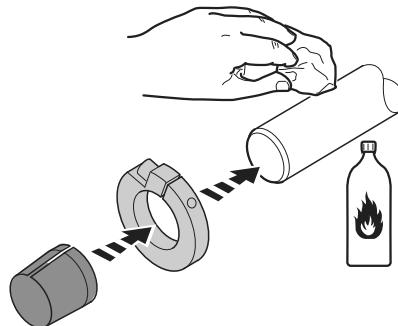


In case of flange mounting, installing the clamping ring may not be possible depending on the size.

#### 4.9.1 Mounting a customer shaft without contact shoulder

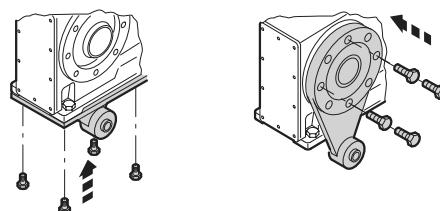
Proceed as follows:

1. Clean the customer shaft and the inside of the hollow shaft. Ensure that all traces of grease or oil are removed.
2. Install the stop ring and the bushing on the customer shaft.



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3. Attach the torque bracket to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 47).

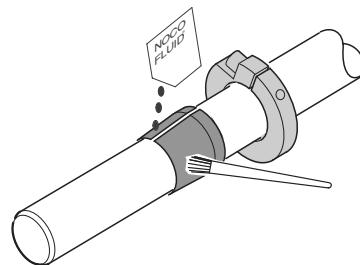


K..7

S../W../K..9

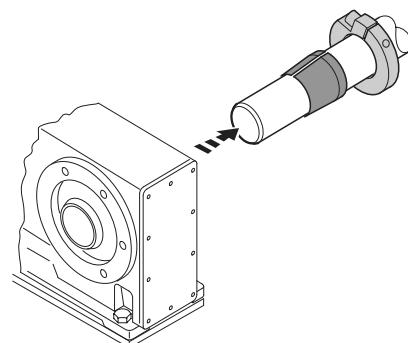
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4. Apply NOCO® fluid to the bushing. Spread carefully.



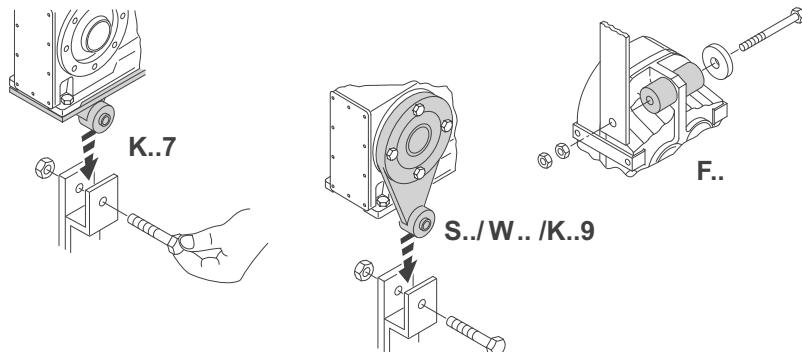
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5. Push the gear unit onto the customer shaft.



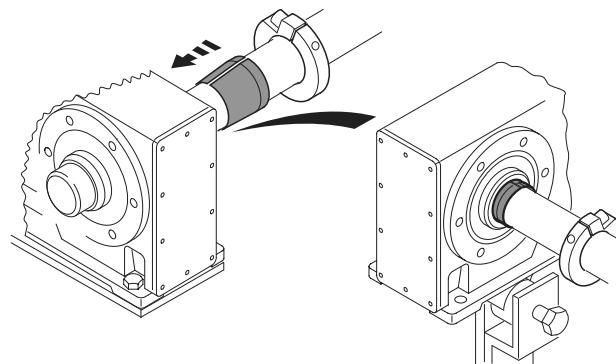
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6. Preassemble the torque bracket. Do not firmly tighten the screws.



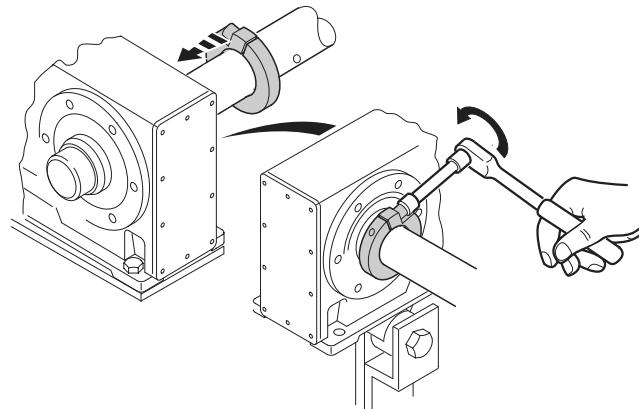
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7. Push the bushing into the gear unit up to the stop.



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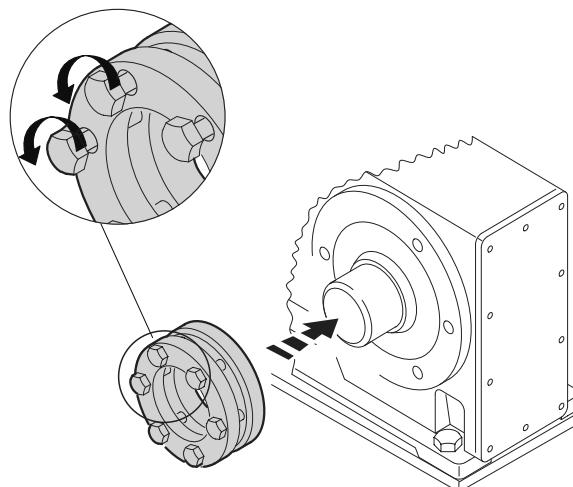
8. Secure the bushing with the stop ring. Attach the stop ring to the bushing with the respective tightening torque. Refer to the following table for the suitable tightening torque.



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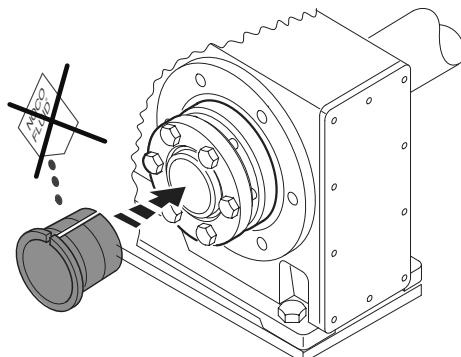
Gear unit type				Tightening torque Nm	
FT..	KT..	ST..	WT..	Standard	Stainless steel
–	19	37	37/29	10	10
37	29/37	47	47/39	10	10
47	39/47	57	–	10	10
57/67	49/57/67	67	–	25	25
77	77	77	–	25	25
87	87	87	–	25	25
97	97	97	–	25	25
107	107	–	–	38	38
127	127	–	–	65	65
157	157	–	–	150	150

9. Make sure that all screws are loosened and slide the shrink disk onto the hollow shaft.

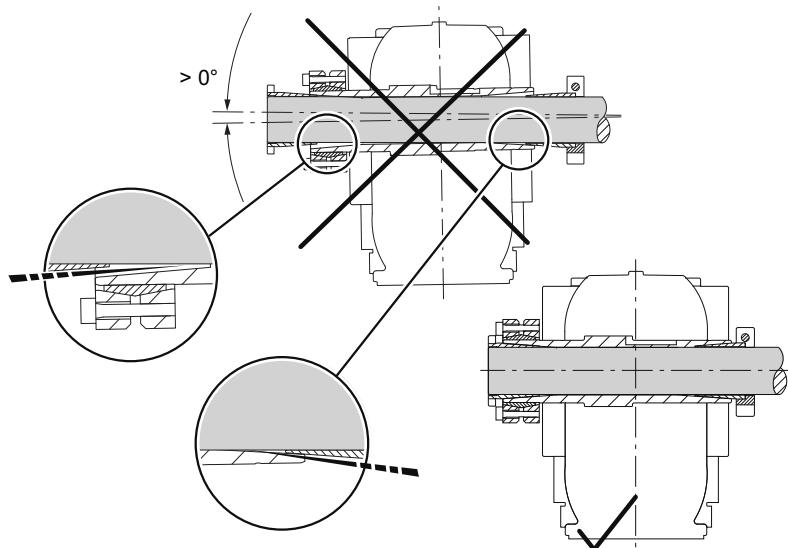


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10. Slide the counter bushing onto the customer shaft and into the hollow shaft. Make sure that the gear unit is mounted flush with the customer shaft.

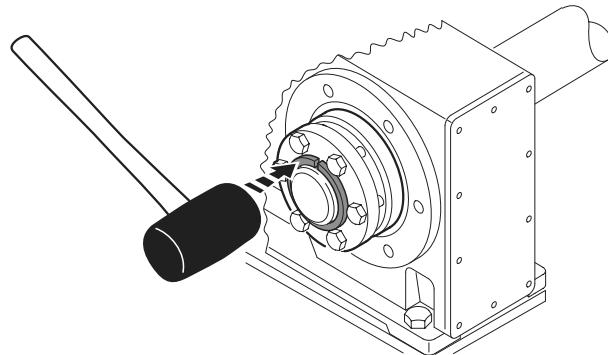


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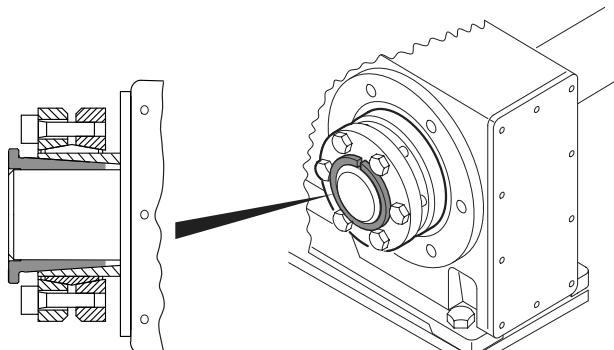
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11. If you have a gear unit **with a shaft shoulder**, then fit the shrink disk to the shaft shoulder as far as it will go, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm. In the case of a gear unit **without a shaft shoulder**, mount the shrink disk at a distance of 2 – 3 mm from the gear unit housing.
12. Tap lightly on the flange of the counter bushing to ensure that the bushing is fitted securely in the hollow shaft.



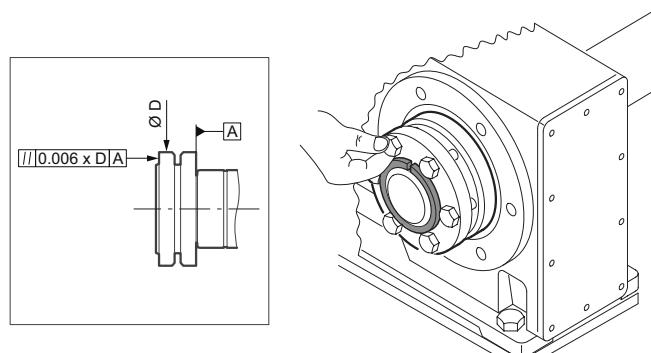
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13. Make sure that the customer shaft is seated in the counter bushing.



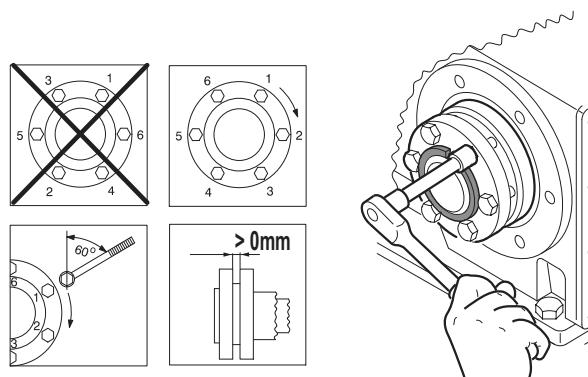
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14. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



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15. Tighten the locking screws with the specified tightening torque in accordance with the following table. Tighten the screws by working round several times from one bolt to the next (not in diametrically opposite sequence).



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## INFORMATION



The exact values for the tightening torques are shown on the shrink disk.

## INFORMATION

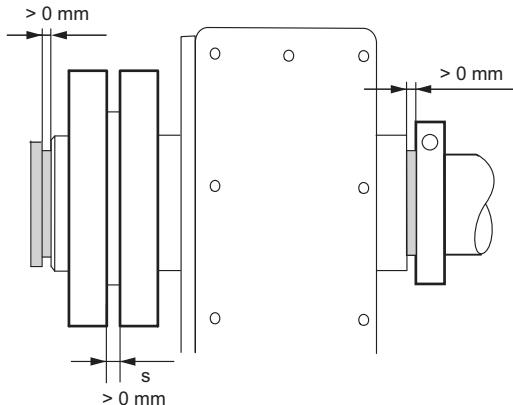


Standard shrink disks and stainless steel shrink disks have the same tightening torques.

Gear unit type				Locking screw	Tightening torque ±4 %
FT..	KT..	ST..	WT..	ISO 4762	Nm
-	19	37	37/29	M5	4
-	29		39	M5	5
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	-	M6	12
77/87/97	77/87/97	77/87/97	-	M8	30
107	107	-	-	M10	59
127/157	127/157	-	-	M12	100

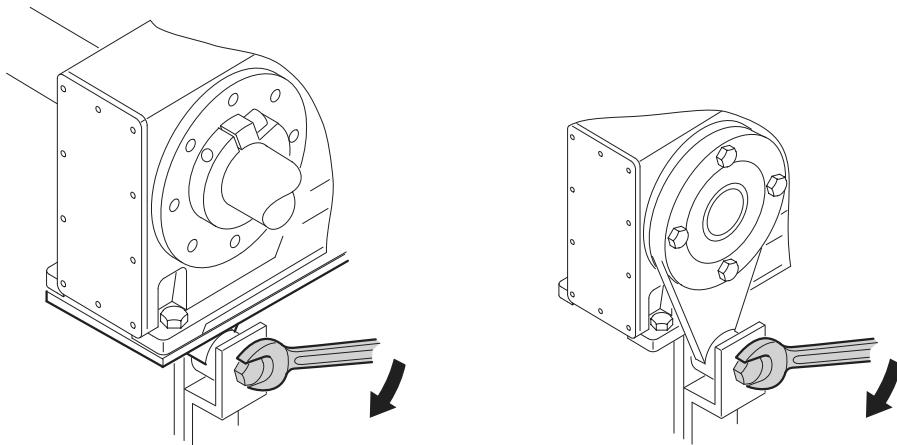
16. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is > 0 mm.

17. Make sure that the remaining gap between counter bushing and hollow shaft end, as well as between hollow shaft end and the stop ring is > 0 mm.



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18. Tighten the torque bracket. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 47).



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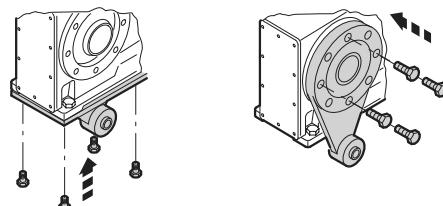
#### 4.9.2 Mounting a customer shaft with contact shoulder

1. Clean the customer shaft and the inside of the hollow shaft. Ensure that all traces of grease or oil are removed.



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2. Attach the torque bracket to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 47).

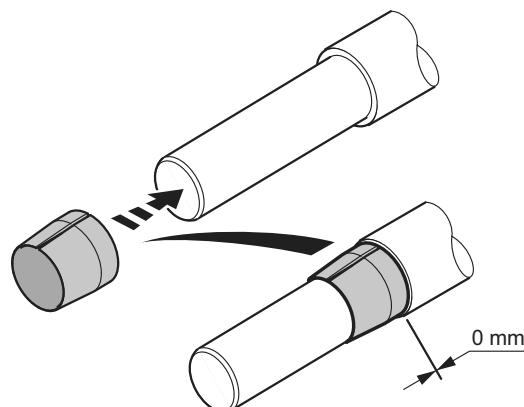


K..7

S../W../K..9

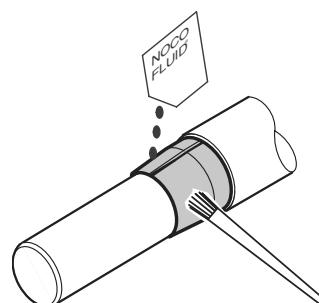
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3. Slide the bushing onto the customer shaft.



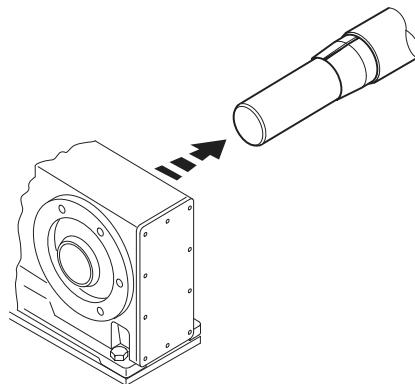
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4. Apply NOCO® fluid to the bushing. Spread carefully.



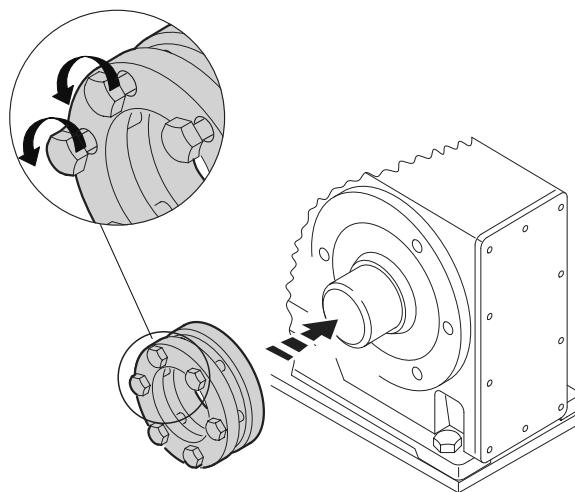
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5. Push the gear unit onto the customer shaft.



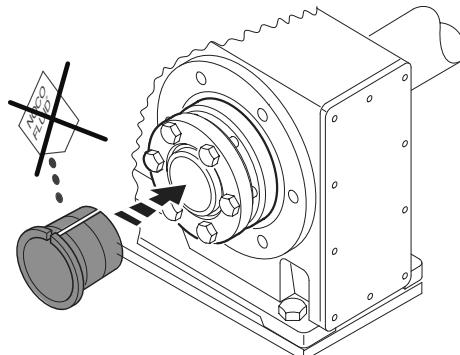
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6. Ensure that all screws are loosened. Slide the shrink disk onto the hollow shaft.

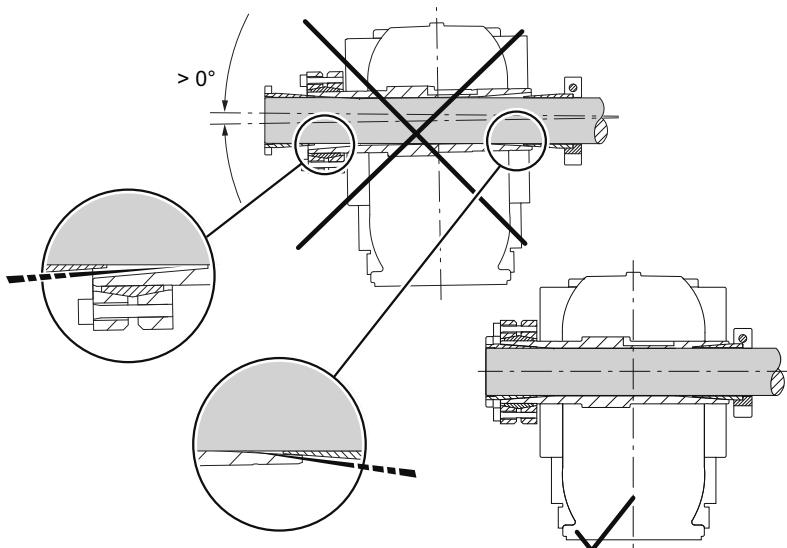


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7. Slide the counter bushing onto the customer shaft and into the hollow shaft. Make sure that the gear unit is mounted flush with the customer shaft.

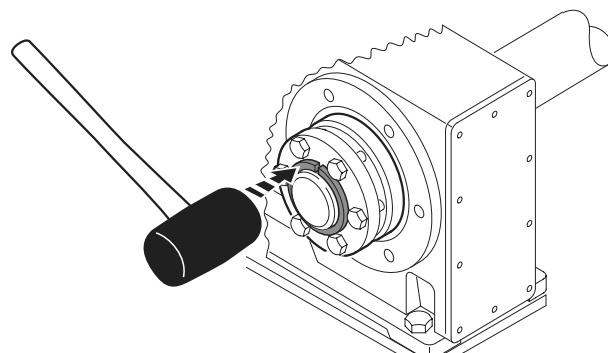


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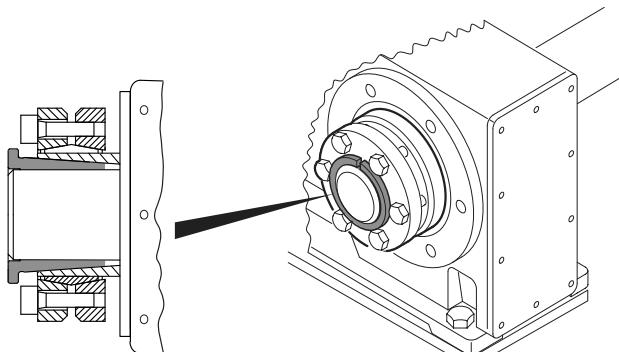
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8. In the case of a gear unit **with a shaft shoulder**, fit the shrink disk to the shaft shoulder as far as it will go. If the case of a gear unit **without a shaft shoulder**, then fit the shrink disk at a distance of 2 – 3 mm from the gear unit housing, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm.
9. Tap lightly on the flange of the counter bushing to ensure that the bushing is fitted securely in the hollow shaft.



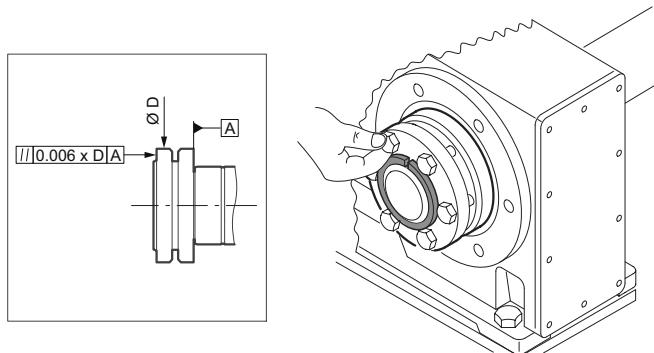
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10. Make sure that the customer shaft is seated in the counter bushing.



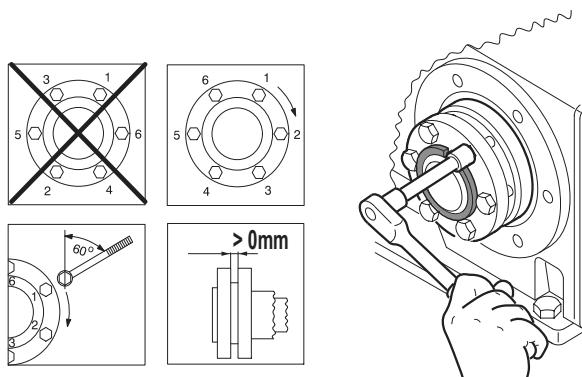
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11. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



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12. Tighten the locking screws with the specified tightening torque in accordance with the following table. Tighten the screws by working round several times from one bolt to the next (not in diametrically opposite sequence).



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## INFORMATION



The exact values for the tightening torques are shown on the shrink disk.

## INFORMATION

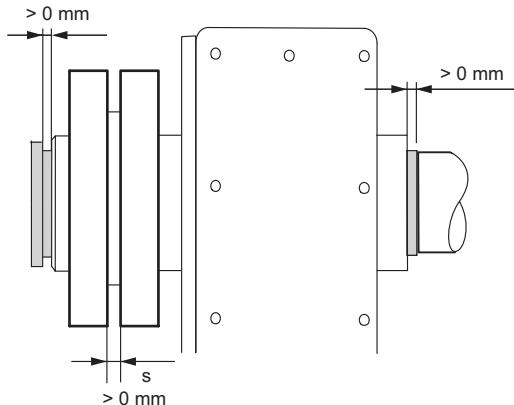


Standard shrink disks and stainless steel shrink disks have the same tightening torques.

Gear unit type				Locking screw	Tightening torque ±4 %
FT..	KT..	ST..	WT..	ISO 4762	Nm
-	19	37	37/29	M5	4
-	29		39	M5	5
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	-	M6	12
77/87/97	77/87/97	77/87/97	-	M8	30
107	107	-	-	M10	59
127/157	127/157	-	-	M12	100

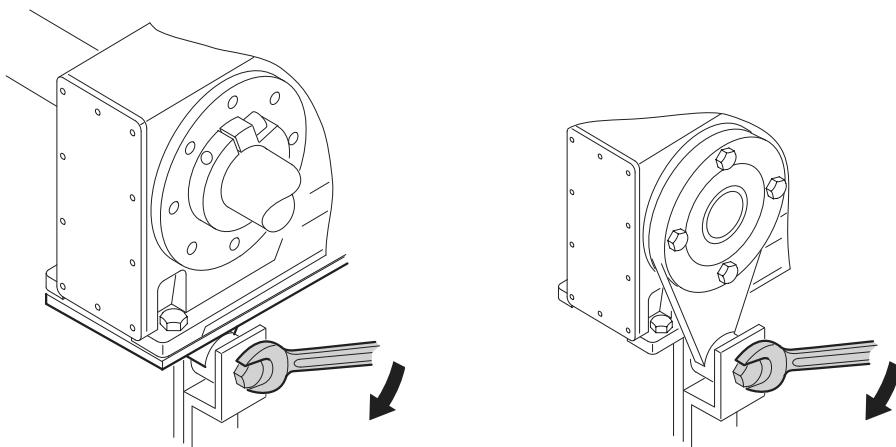
13. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is > 0 mm.

14. Make sure that the remaining gap between counter bushing and hollow shaft end, as well as between the hollow shaft end and customer shaft shoulder is > 0 mm.



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15. Mount the torque bracket and firmly tighten it. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 47).



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#### 4.9.3 Removing the shaft-mounted gear unit

##### **⚠ CAUTION**



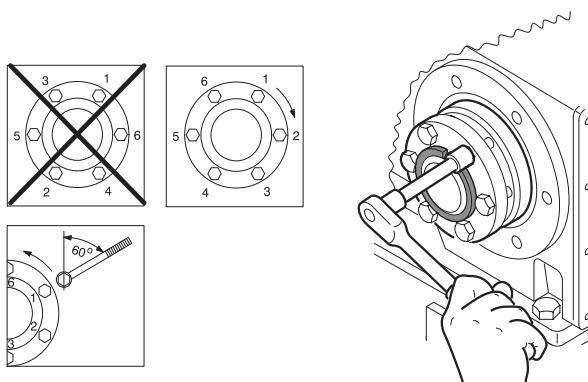
Risk of burns caused by hot surfaces

Severe injuries

- Let the units cool down before working on them.

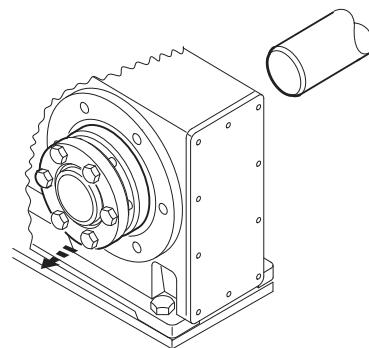
Proceed as follows:

- To prevent the outer rings from jamming, loosen the locking screws for a quarter turn, one after the other.



2903644171

- Unscrew the locking screws evenly one after the other. Do not remove the locking screws completely.
- Remove the conical steel bushing. If required, use the outer rings as pullers. Proceed as follows to do so:
  - Remove all the locking screws.
  - Screw the respective number of screws in the tapped holes of the shrink disk.
  - Support the inner ring against the gear unit housing.
  - Pull off the conical steel bushing by tightening the screws.
- Remove the gear unit from the shaft.



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- Remove the shrink disk from the hub.

##### **INFORMATION**



There is no need to dismantle removed shrink disks before they are reinstalled.

#### 4.9.4 Cleaning and lubricating shaft-mounted gear units

- If the shrink disk is dirty, clean and lubricate the shrink disk.
- Lubricate the tapered surfaces with one of the following solid lubricants:

Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétrial 57 N (lube coat)	Spray

- Grease the locking screws with a multipurpose grease such as Molykote BR 2.

## 4.10 Mounting the cover

### ⚠ CAUTION

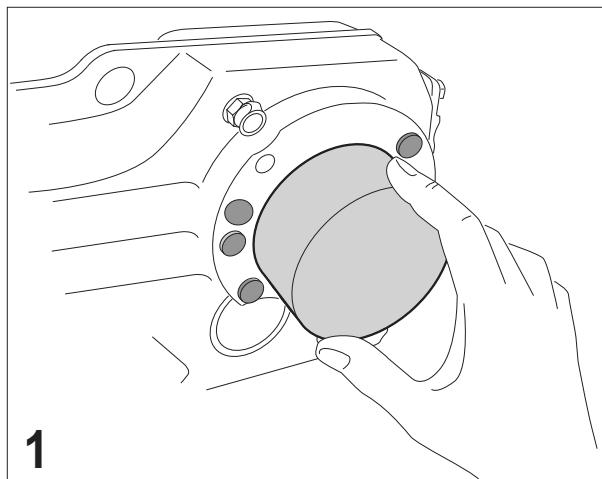


Injury due to assembly work during operation.

#### Injury

- Before you begin working on the unit, disconnect the motor from the power supply. Safeguard the drive against unintentional restart.

### 4.10.1 Installing the rotating safety cover



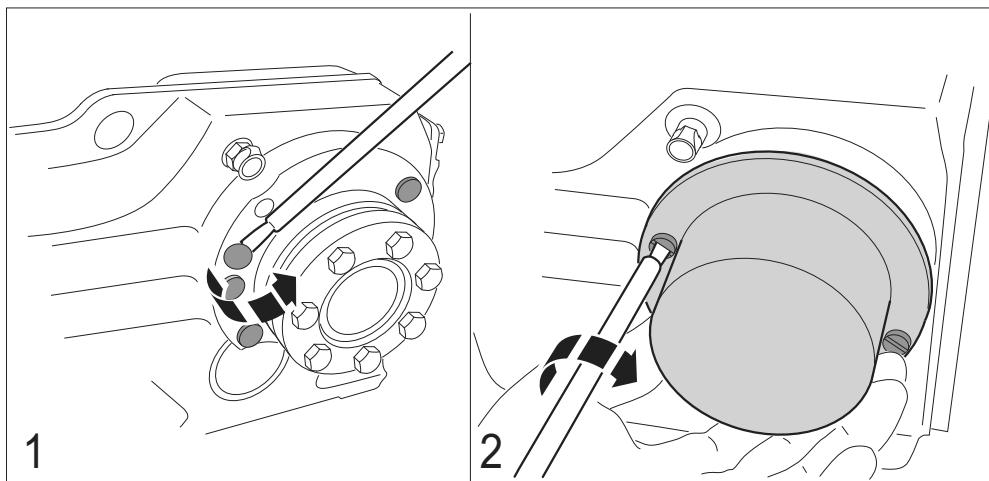
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1. Slide the rotating safety cover onto the shrink disc until it snaps in.

### 4.10.2 Mounting the fixed cover

Proceed as follows:

1. Remove the plastic plug on the gear unit housing (see figure 1).



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2. Use the delivered screws to mount the cover to the gear unit housing (see figure 2).

#### 4.10.3 Operation without cover

In certain application cases, e.g. with a through-shaft, a cover cannot be installed. The cover is not necessary if the system or unit manufacturer provides corresponding components to guarantee for compliance with the required degree of protection. If this results in additional maintenance, the manufacturer has to describe this in the operating instructions for the system or component.

## 4.11 AMS.. adapter

### 4.11.1 Figure and note concerning the installation of the AMS.. adapter

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

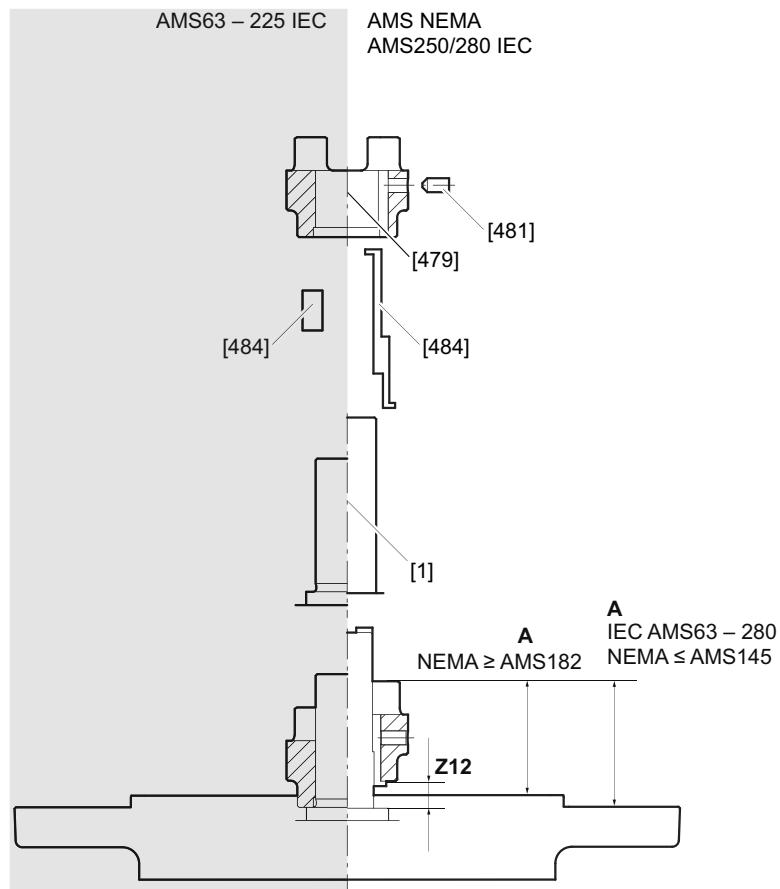
Damage to the adapter

- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.

#### INFORMATION



To avoid contact corrosion, SEW-EURODRIVE recommends applying NOCO® fluid to the motor shaft before mounting the coupling half.



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- [1] Motor shaft
- [479] Coupling half
- [481] Set screw
- [484] Key
- A Distance A
- Z12 Distance between shaft shoulder and coupling

#### 4.11.2 Fitting the motor to IEC adapter AMS63 – 225

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft. Replace this key with the supplied key [484]. **Notice!** The key must not protrude beyond the base of the coupling claw in the installed condition!
3. Heat the coupling half [479] to approx. 80 °C – 100 °C. Slide the coupling half onto the shoulder of the motor shaft as far as it will go.
4. Check the position of the coupling half. The values for distance "A" are listed in the following table.
5. Secure the key and the coupling half to the motor shaft using the set screw [481]. Refer to the following table for the required tightening torque " $T_A$ ".
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Fit the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85).

**IEC adapter AM63 – 225: Distance A and tightening torque  $T_A$**

	63/71	80	90	100/112	132	160/180	200/225
<b>A /mm</b>	27.3	30	39	48.5	56.5	80.5	78
<b><math>T_A</math> /Nm</b>	1.5	2	2	4.8	10	17	17
<b>Thread</b>	M4	M5	M5	M6	M8	M10	M10

#### 4.11.3 Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft. Replace this key with the provided key [484]. The position of the key is dependent upon the adapter: **AMS250-280**: The key must lie against the shoulder of the motor shaft. **NEMA**: The shoulder of the key must lie against the front of the motor shaft.
3. Heat the coupling half [479] to approx. 80 °C – 100 °C and slide the coupling half onto the motor shaft. Slide the coupling half onto the shoulder of the key as far as it will go.
4. Check the position of the coupling half. The values for distance "A" are listed in the following table.
5. Secure the key and the coupling half to the motor shaft using the set screw [481]. Refer to the following table for the required tightening torque " $T_A$ ".
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Fit the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85).

**IEC adapter AMS250/280: Distance A and tightening torque  $T_A$**

	250/280
<b>A /mm</b>	139

	<b>250/280</b>
<b>T<sub>A</sub> /Nm</b>	17
<b>Thread</b>	M10

**NEMA adapter AMS56 – 365: Distance A and tightening torque T<sub>A</sub>**

	56	143/145	182/184	213/215	254/256	324/326
					284/286	364/365
<b>A /mm</b>	37.7	46.3	54.2	61.2	81.6	90.4
<b>T<sub>A</sub> /Nm</b>	2	2	4.8	10	17	17
<b>Thread</b>	M5	M5	M6	M8	M10	M10

**4.11.4 Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with standard key**

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft. Replace this with a standard key. The required standard key size can be found in the following table. **Notice!** The key must not protrude beyond the base of the coupling claw in the installed condition!
3. Heat the coupling half [479] to approx. 80 °C – 100 °C and slide the coupling half onto the motor shaft. Slide the coupling half onto the motor shaft up to distance Z12. The values for distance "Z12" are listed in the following table.
4. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key" (→ 79).
5. Secure the key and the coupling half to the motor shaft using the set screw [481]. The required tightening torque "T<sub>A</sub>" can be found in the table in chapter "Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key" (→ 79).
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Fit the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85).

Adapter	Z12 mm	Standard key <sup>1)</sup> inch	Standard key <sup>2)</sup> mm
<b>AMS56</b>	3.1	B3/16 × 3/16 × 7/16	–
<b>AMS143/145</b>	10.6	B3/16 × 3/16 × 9/16	–
<b>AMS182/184</b>	9	B1/4 × 1/4 × 1/2	–
<b>AMS213/215</b>	11.3	B5/16 × 5/16 × 13/16	–
<b>AMS254/256</b>	7.4	B3/8 × 3/8 × 1-1/4	–
<b>AMS284/286</b>	13.8	B1/2 × 1/2 × 1-1/4	–
<b>AMS324/326</b>	18.7	B1/2 × 1/2 × 1-1/2	–
<b>AMS364/365</b>	19	B5/8 × 5/8 × 1-1/4	–
<b>AMS250</b>	19	–	B18 × 11 × 70

Adapter	Z12 mm	Standard key <sup>1)</sup> inch	Standard key <sup>2)</sup> mm
AMS280	19	—	B20 × 12 × 70

1) The key size relates to material type 1045 or type 1018 in accordance with ASTM A 29/A29M.

2) The key size relates to material C45+C in accordance with DIN EN 10277-2.

#### 4.11.5 Permitted loads

##### NOTICE

Overloading of the gear unit can occur due to excessive weight or excessive power rating of an attached motor.

Gear unit damage can occur.

- Note that the load data specified in the following table must not be exceeded.
- Ensure that the approved power rating (torque and speed) on the adapter is observed in accordance with the nameplate.

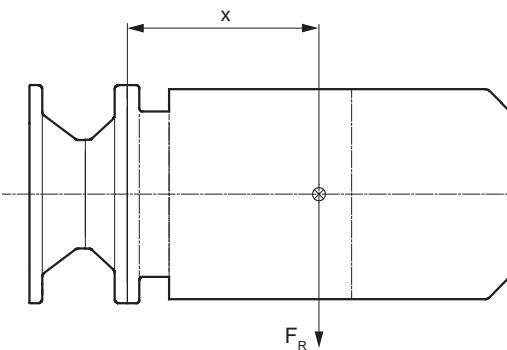
##### NOTICE

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the load caused by the mass of the motor:



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⊗ Motor center of gravity

x Distance between adapter flange and motor center of gravity

F<sub>R</sub> Overhung load

## Permitted loads for gear unit model series R..7, F..7, K..7, K..9, S..7, S..7p and W..9:

IEC adapter	x <sup>1)</sup>	Gear unit input end flange diameter	Standard	/DH option	/RS option
	mm	mm	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N
AMS63/71	77	105	260	220	-
		≥ 120	530	455	-
AMS80	113	105	300	265	-
		120	420	370	350
		≥ 160	1000	880	820
AMS90	113	120	420	375	350
		≥ 160	1000	895	840
AMS100/112	144	≥ 160	2000	1685	1685
AMS132	186	160	1600	1375	1370
		≥ 200	4700	4060	4055
AMS160/180	251	≥ 250	4600	4200	4600
AMS200/225	297	≥ 300	5600	5600	5600
AMS250/280	390	≥ 450	11200	11200	11200

NEMA adapter	x <sup>1)</sup>	Gear unit input end flange diameter	Standard	/DH option	/RS option
	mm	mm	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N
AMS56	77	105	215	185	-
		≥ 120	445	385	-
AMS143/145	113	120	410	370	345
		≥ 160	965	865	820
		≥ 160	1960	1660	1660
AMS182/184	144	≥ 160	1585	1360	1360
AMS213/215	186	160	4640	4010	4010
AMS213/215		≥ 200	4525	4135	4525
AMS254 – 286	251	≥ 250	5600	5600	5600
AMS324 – 365	297	≥ 300	5600	5600	5600

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance x increases, the maximum permitted weight F<sub>R</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R</sub> must not be increased.

## Permitted loads for gear unit model series SPIROPLAN® W37 – W47

IEC adapter	x <sup>1)</sup>	Standard	/DH option	/RS option
	mm	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N	F <sub>R</sub> <sup>1)</sup> in N
AMS63/71	115	140	125	-
AMS80/90	151	270	245	230

NEMA adapt- er	$x^{1)}$	Standard	/DH option	/RS option
	mm	$F_R^{1)}$ in N	$F_R^{1)}$ in N	$F_R^{1)}$ in N
AMS56	115	120	105	-
AMS143/145	151	265	240	230

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_R$  of the attached motor must be reduced linearly. If the center of gravity distance  $x$  decreases, the maximum permitted weight  $F_R$  must not be increased.

### Permissible power ratings and mass moments of inertia

The following table shows the permitted power ratings and mass moments of inertia:

Adapter		$P_m^{1)}$	$J_{Adapter}$
IEC	NEMA	kW	kg × m <sup>2</sup>
AMS63	–	0.25	$0.44 \times 10^{-4}$
AMS71	–	0.37	$0.44 \times 10^{-4}$
AMS80	AMS56	0.75	$1.3 \times 10^{-4}$
AMS90	AMS143/145	1.5	$2.5 \times 10^{-4}$
AMS100	AMS182	3	$7.8 \times 10^{-4}$
AMS112	AMS184	4	$7.8 \times 10^{-4}$
AMS132S/M	AMS213/215	7.5	$22 \times 10^{-4}$
AMS132ML	–	9.2	$22 \times 10^{-4}$
AMS160	AMS254/256	15	$72 \times 10^{-4}$
AMS180	AMS284/286	22	$72 \times 10^{-4}$
AMS200	AMS324/326	30	$201 \times 10^{-4}$
AMS225	AMS364/365	45	$204 \times 10^{-4}$
AMS250	–	55	$442 \times 10^{-4}$
AMS280	–	90	$547 \times 10^{-4}$

1) Maximum rated power of the attached standard electric motor at 1400 1/min.

The specified mass moments of inertia apply for the standard adapter and the adapter with reinforced bearings. The mass moments of inertia of the adapters with backstop AMS..//RS and drain hole AMS..//DH can be found in the tables in chapters "Adapter with backstop AMS..//RS" (→ 83) and "Adapter with drain hole AMS..//DH" (→ 84).

#### 4.11.6 Adapter with backstop AMS..//RS

Check the direction of rotation of the drive prior to mounting or startup. If the direction of rotation is wrong, please consult SEW-EURODRIVE.

The backstop is maintenance-free in operation. Backstops have a minimum lift-off speed depending on the size (see following table).

**NOTICE**

If the speed is below the minimum lift-off speed of the drive, the backstop is subject to wear and heats up.

Possible damage to property can occur.

- In nominal operation the lift-off speed of the drive must not drop below the specified minimum.
- During startup or braking, the lift-off speed of the drive may drop below the minimum levels.

Adapter		max. Locking torque backstop Nm	Minimum lift-off speed min <sup>-1</sup>	J <sub>Adapter</sub> kg × m <sup>2</sup>
IEC	NEMA			
AMS80/RS	–	130	720	4.5 × 10 <sup>-4</sup>
AMS90/RS	AMS143/145/RS			
AMS100/RS	AMS182/RS	190	625	15 × 10 <sup>-4</sup>
AMS112/RS	AMS184/RS			
AMS132/RS	AMS213/215/RS	500	550	44 × 10 <sup>-4</sup>
AMS160/RS	AMS254/256/RS	900	515	108 × 10 <sup>-4</sup>
AMS180/RS	AMS284/286/RS			
AMS200/RS	AMS324/326/RS	1900	490	257 × 10 <sup>-4</sup>
AMS225/RS	AMS364/365/RS			
AMS250/RS	–			496 × 10 <sup>-4</sup>
AMS280/RS	–			601 × 10 <sup>-4</sup>

**4.11.7 Adapter with drain hole AMS../DH**

The following table shows the maximum permissible rotational speeds and mass moments of inertia for the adapters with the drain hole option (condensation drain hole):

Adapter		Max. permitted speed min <sup>-1</sup>	J <sub>Adapter</sub> kg × m <sup>2</sup>
IEC	NEMA		
AMS63/71/DH	–	3600	0.6 × 10 <sup>-4</sup>
AMS80/DH	AMS56/DH	3600	1.8 × 10 <sup>-4</sup>
AMS90/DH	AMS143/145/DH	3600	3.1 × 10 <sup>-4</sup>
AMS100/DH	AMS182/DH	3600	11 × 10 <sup>-4</sup>
AMS112/DH	AMS184/DH	3600	11 × 10 <sup>-4</sup>
AMS132/DH	AMS213/215/DH	3200	31 × 10 <sup>-4</sup>
AMS160/DH	AMS254/256/DH	2600	87 × 10 <sup>-4</sup>
AMS180/DH	AMS284/286/DH	2600	86 × 10 <sup>-4</sup>
AMS200/DH	AMS324/326/DH	1900	201 × 10 <sup>-4</sup>
AMS225/DH	AMS364/365/DH	1900	204 × 10 <sup>-4</sup>

Adapter		Max. permitted speed min <sup>-1</sup>	J <sub>Adapter</sub> kg × m <sup>2</sup>
IEC	NEMA		
AMS250/DH	–	1900	442 × 10 <sup>-4</sup>
AMS280/DH	–	1900	547 × 10 <sup>-4</sup>

#### 4.11.8 Mounting of third-party motors(s) to AR../AL.. adapters

If a third-party motor is mounted, the customer must ensure that the permitted weight and the power at the adapter are adhered to according to the operating instructions. For information on the permitted loads, refer to chapter "Permitted loads" (→ 81).

Adapter	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
AR/AL71	77	375
AR/AL80/90	113	320
AR/AL100/112	144	1560
AR/AL132 <sup>2)</sup>	186	1230
AR/AL132	186	3630
AR/AL160/180	251	3540

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance x increases, the maximum permitted weight F<sub>R</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R</sub> must not be increased.
- 2) Gear unit input end flange diameter: 160 mm.

#### 4.11.9 Tightening torques for motor to adapter

Screw the motors to the adapters with the following tightening torques: When doing this, observe the tightening torques in chapter "Notes concerning tightening torques" (→ 36).

Screw size	Strength class	Tightening torque ±15 % Nm
M5	8.8	7
M6		12
M8		28
M10		56
M12		96
M16		235

#### 4.11.10 AMS.. adapter with attached foot-mounted motor

A foot-mounted motor reduces the loads at the adapter interface. The foot-mounted motor at the adapter must be installed without tensions at the customer construction.

## 4.12 AQS.. adapter

### 4.12.1 Figure and note concerning the installation of the AQS.. adapter

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

Damage to the adapter

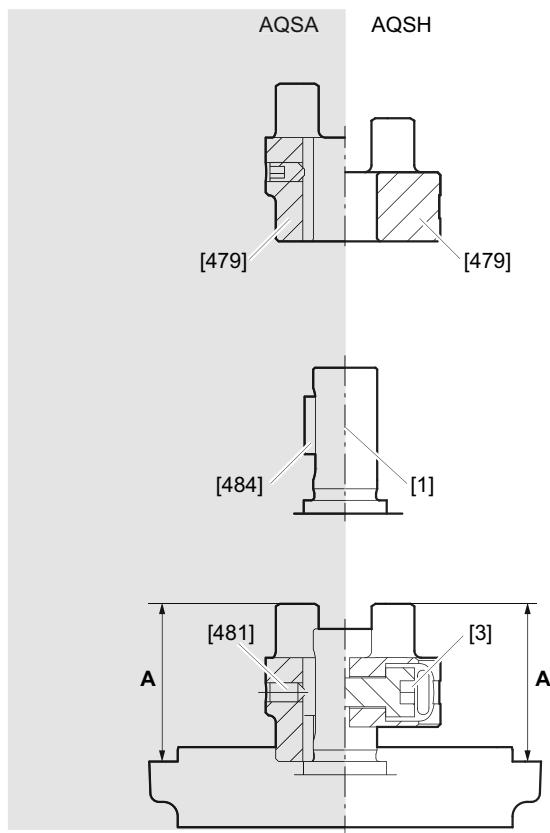
- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.

#### INFORMATION



**With AQSA..:** To avoid contact corrosion, SEW-EURODRIVE recommends applying NOCO® fluid to the motor shaft before mounting the coupling half.

**With AQSH..:** The use of NOCO® fluid is not permitted.



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- [1] Motor shaft
- [3] Clamping screw
- [479] Coupling half
- [481] Set screw
- [484] Key
- A Distance A

#### 4.12.2 Mounting of motor to adapter AQSH.. with coupling half pre-mounted in adapter

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Ensure that the clamping screw [3] of the coupling is accessible through the lateral hole in the housing. **Information!** The coupling half [479] is spread apart in the delivery state.
3. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
4. Fit the motor to the adapter. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85).
5. Tighten the clamping screw of the coupling half. The values for tightening torque " $T_A$ " are listed in the table in chapter "Distances and tightening torques" (→ 88).
6. Close the lateral holes using the closing plugs.

#### 4.12.3 Mounting of motor to adapter AQSH.. with coupling half pre-mounted to motor shaft

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
  2. Unscrew the clamping screw [3] of the coupling until the screw head is lying against the lateral pin. Then continue turning for half a revolution so that the coupling half [479] is spread apart.
  3. Slide the coupling half onto the motor shaft up to distance "A". The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 88).
  4. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 88).
  5. Secure the coupling half to the motor shaft. Tighten the clamping screw of the coupling half. The values for tightening torque " $T_A$ " are listed in the table in chapter "Distances and tightening torques" (→ 88).
  6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
  7. Mount the motor onto the adapter, making sure that the claws of the two coupling halves engage in each other. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85). **Information!** The amount of mounting force can be reduced by lightly greasing or oiling the coupling ring or the coupling half. To do this, only use mineral oil-based oil or grease without additives.
  8. Close the lateral holes using the closing plugs.
- ⇒ The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

#### 4.12.4 Mounting of motor to adapter AQSA..

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key [484] of the motor shaft. Replace this key with the provided key. **NOTICE!** With AQSA80 – AQSA190, the key must not protrude beyond the base of the coupling claw in the installed condition.
3. Heat the coupling half [479] to approx. 80 °C – 100 °C.

4. Slide the coupling half onto the motor shaft up to distance "A". The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 88). With the usual motor shaft dimensions, the coupling half lies flush against the motor shaft.
5. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 88).
6. Secure the coupling half and the key to the motor shaft using the set screw [481]. The values for tightening torque " $T_A$ " are listed in the table in chapter "Distances and tightening torques" (→ 88).
7. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
8. Mount the motor onto the adapter, making sure that the claws of the two coupling halves engage in each other. Please adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 85). **Information!** The amount of mounting force can be reduced by lightly greasing or oiling the coupling ring or the coupling half. To do this, only use mineral oil-based oil or grease without additives.
9. Close the lateral holes using the closing plugs.  
⇒ The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

#### 4.12.5 Distances and tightening torques

Adapter	$\varnothing$ of coupling bore mm	Distance A mm	Screws		Tightening torque $T_A$ Nm	
			AQSA..	AQSH..	AQSA..	AQSH..
AQSA/AQSH50	8	23.3	—	M4	—	4.1
	9		M3		0.6	
AQSA/AQSH80	11	27.3	M4	M5	1	8.1
	14					
AQSA/AQSH100	14	30	M5	M6	2	14
	16					
	19					
AQSA/AQSH115	19	39	M5	M6	2	14
	22		—		—	
	24		M5		2	
AQSA/AQSH140	24	48.5	M6	M8	4.8	34
	28					
	32					
AQSA/AQSH160/190	28	56.5	M8	M10	10	67
	32			M10	—	
	35		—	M10	—	
	38		M8	M10	10	

#### 4.12.6 Permitted loads

##### NOTICE

Overloading of the gear unit can occur due to excessive weight or excessive power rating of an attached motor.

Gear unit damage can occur.

- Note that the load data specified in the following table must not be exceeded.
- Ensure that the approved power rating (torque and speed) on the adapter is observed in accordance with the nameplate.

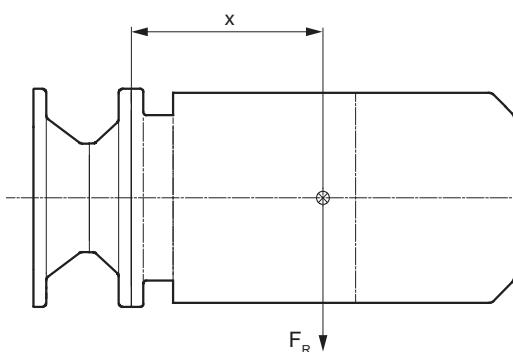
##### NOTICE

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property can occur.

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the load caused by the mass of the motor:



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⊗ Motor center of gravity

x Distance between adapter flange and motor center of gravity

F<sub>R</sub> Overhung load

**Permitted loads for gear unit model series R..7, F..7, K..7, K..9, S..7, S..7p and W..9:**

Adapter	x <sup>1)</sup> mm	Gear unit input end flange diameter mm	F <sub>R</sub> <sup>1)</sup> N
<b>AQS50</b>	45	≥ 105	200
<b>AQS80</b>	77	105	200
		≥ 120	370
<b>AQS100</b>	113	105	200
		≥ 120	350
<b>AQS115</b>	113	≥ 120	300

Adapter	x <sup>1)</sup> mm	Gear unit input end flange diameter mm	F <sub>R</sub> <sup>1)</sup> N
<b>AQS140</b>	144	120	300
		≥ 160	1550
<b>AQS160</b>	144	≥ 160	1450
<b>AQS190</b>	186	160	1250
		≥ 200	3750

**Permitted loads for gear unit model series SPIROPLAN® W37/W47:**

Adapter	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
<b>AQS50/80</b>	115	140
<b>AQS100/115</b>	151	265
<b>AQS140</b>	151	265

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance x increases, the maximum permitted weight F<sub>R</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R</sub> must not be increased.

## 4.13 EWH adapters

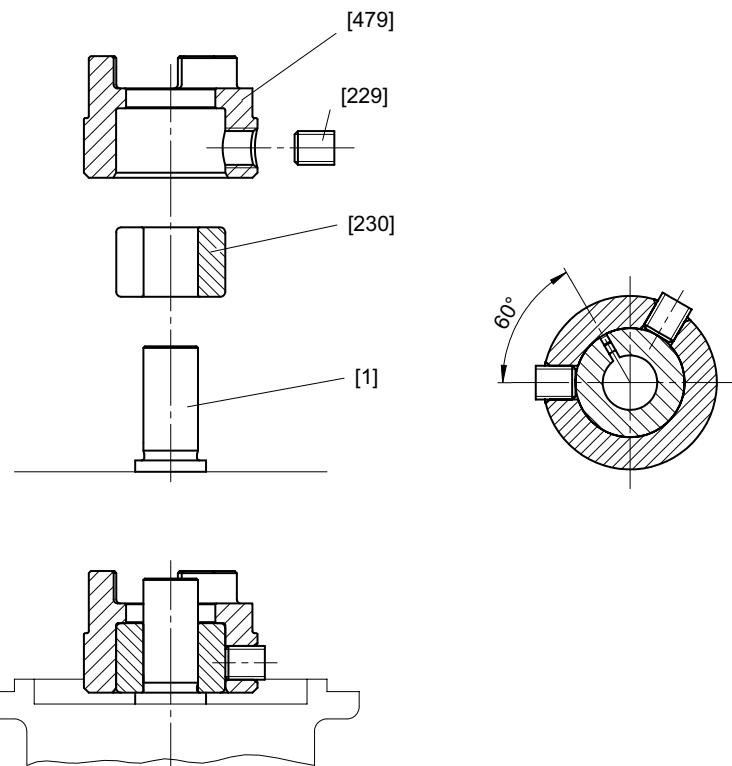
### 4.13.1 Adapter EWH01 – 03

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

Damage to the adapter

- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.



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[1] Motor shaft  
[229] Clamping screws

[230] Motor shaft sleeve  
[479] Coupling half

1. Clean and de-grease the hollow shaft hole of the coupling half [479], the motor shaft sleeve [230], and the motor shaft [1].
2. Insert the motor shaft sleeve [230] into the coupling half [479] so that the slot of the motor shaft sleeve [230] is at a 60° angle to the two clamping screws [229].
3. Push the coupling half [479] until it reaches the shoulder of the motor shaft.
4. Tighten the clamping screws [229] one after the other with a suitable torque wrench, initially to 25% of the tightening torque prescribed in the following table.
5. Tighten the two clamping screws [229] to the full prescribed tightening torque.

Adapter	Motor shaft diameter mm	Number of clamping screws	Clamping screw tightening torque Nm	Wrench size mm
EWH01	9	2	6	3
EWH01	11	2	10	4
EWH02	11, 14, 16	2	10	4
EWH03	11, 14, 16	2	10	4

#### 4.13.2 Permitted loads

##### NOTICE

Overloading of the gear unit due to excessive weight or excessive power rating of an attached motor.

Gear unit failure

- Note that the load data specified in the following table must not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

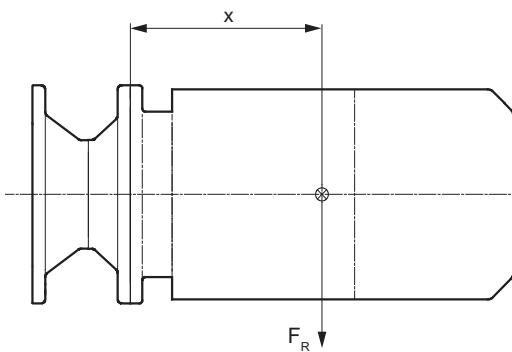
##### NOTICE

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the load caused by the mass of the motor:



18014398527995403

⊗ Motor center of gravity

x Distance between adapter flange and motor center of gravity

F<sub>R</sub> Overhung load

Adapter	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
EWH01	113	40

Adapter	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
EWH02	120	56
EWH03	120	56

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance x increases, the maximum permitted weight F<sub>R</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R</sub> must not be increased.

#### 4.13.3 Tightening torques for motor to adapter

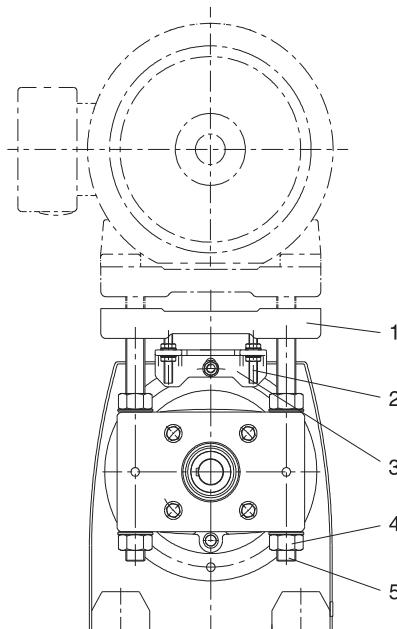
Screw the motors to the adapters with the following tightening torques: When doing this, observe the tightening torques in chapter "Notes concerning tightening torques" (→ 36).

Screw size	Strength class	Tightening torque ±15 % Nm
M5	8.8	7
M6		12
M8		28
M10		56
M12		96
M16		235

## 4.14 AD Input shaft assembly

Observe chapter "Mounting the drive components and output elements" (→ 45) when installing drive components.

### 4.14.1 Mounting the cover with motor platform AD..P



212119307

- [1] Motor platform
- [2] Stud bolt (only AD6/P / AD7/P)
- [3] Support (only AD6/P / AD7/P)
- [4] Nut
- [5] Threaded column

To mount the motor and to adjust the motor platform proceed as follows:

1. Set the motor platform [1] to the required mounting position by evenly tightening the adjusting nuts [4].
2. If necessary, remove the lifting eyebolt/lifting eye of the helical gear unit to reach the lowest adjustment position. Touch up any damage to the paint work.
3. Align the motor on the motor platform [1] so that the shaft ends are in line. Attach the motor.
4. Mount the drive components onto the input side shaft end and the motor shaft.
5. Align the drive components, shaft end and motor shaft. If necessary, correct the motor position again.
6. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor platform [1]. Do not stress the motor platform and the columns against each other when doing this.
7. To fasten the threaded columns [5], tighten the nuts [4] that are not used for adjustment.

#### 4.14.2 Special aspects of AD6/P and AD7/P

Proceed as follows:

1. Unscrew the nuts on the threaded bolts [2] before adjustment to allow the threaded bolts [2] to move axially in the support [3] without restriction.
2. Only tighten the nuts when the final adjustment position is reached.

### INFORMATION

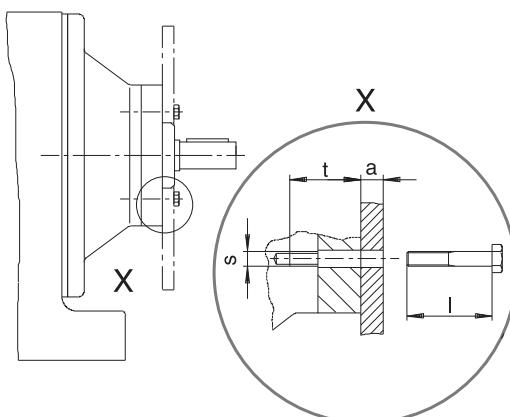


Do not adjust the motor platform [1] via the support [3].

#### 4.14.3 AD../ZR input shaft assembly with centering shoulder

Mounting applications on the input shaft assembly with centering shoulder

1. Prepare screws of a suitable length for attaching the application. The following figure shows the screw length  $l = t + a$ . **Round off the result to the next smaller standard length.**



18014398721603467

a Strength of the additional element      s Retaining thread (see table)  
t Screw-in depth (see table)

2. Remove the retaining screw from the centering shoulder
3. Clean the contact surface and the centering shoulder.
4. Clean the threads of the new screws and apply a thread locking compound (e.g. Loctite® 243) to the first few threads.
5. Place the application on the centering shoulder. Tighten the retaining screws with the specified tightening torque " $T_A$ " (see following table).

Cover	Screw-in depth t m	Retaining thread	Tightening torque $T_A$ for connection screws in strength class 8.8 Nm
<b>AD2/ZR</b>	25.5	M8	27
<b>AD3/ZR</b>	31.5	M10	54
<b>AD4/ZR</b>	36	M12	93
<b>AD5/ZR</b>	44	M12	93
<b>AD6/ZR</b>	48.5	M16	230

Cover	Screw-in depth t m	Retaining thread	Tightening torque $T_A$ for connection screws in strength class 8.8 Nm
AD7/ZR	49	M20	464
AD8/ZR	42	M12	93

**Permitted loads****NOTICE**

Overloading of the gear unit can occur due to excessive weight or excessive power rating of an attached motor.

Gear unit damage can occur.

- Note that the load data specified in the following table must not be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

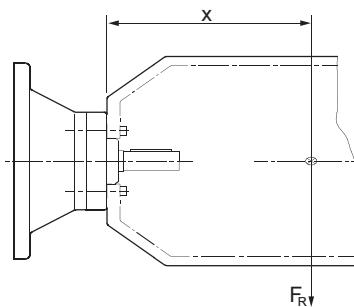
**NOTICE**

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the load caused by the mass of the motor:



⊗ Motor center of gravity

x Distance between adapter flange and motor center of gravity

$F_R$  Overhung load

Cover	x <sup>1)</sup> mm	$F_R$ <sup>1)</sup> N
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR <sup>2)</sup>	361	1120
AD4/ZR		3300

Cover	$x^1)$ mm	$F_R^1)$ N
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_R$  of the attached motor must be reduced linearly. If the center of gravity distance  $x$  decreases, the maximum permitted weight  $F_R$  must not be increased.
- 2) Diameter of the adapter output flange: 160 mm

#### 4.14.4 Cover with backstop AD../RS

##### NOTICE

If the speed is below the minimum lift-off speed of the drive, the backstop is subject to wear and heats up.

Possible damage to property can occur.

- In nominal operation the lift-off speed of the drive must not drop below the specified minimum.
- During startup or braking, the lift-off speed of the drive may drop below the minimum levels.

Check the direction of rotation of the drive prior to mounting or startup. If the direction of rotation is wrong, please consult SEW-EURODRIVE.

The backstop is maintenance-free in operation. Backstops have a minimum lift-off speed depending on the size (see following table).

Cover	Maximum locking torque of the backstop	Minimum lift-off speed
	Nm	min <sup>-1</sup>
AD2/RS	65	820
AD3/RS	425	620
AD4/RS	850	530
AD5/RS	1450	480
AD6/RS	1950	450
AD7/RS	1950	450
AD8/RS	1950	450

## 4.15 Direct mounting of a motor on a gear unit

### INFORMATION

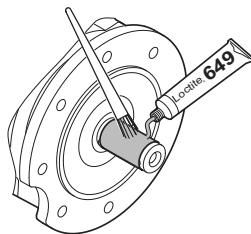


Secure all pinions on the motor or input shaft with Loctite® 649, even if a retaining ring is additionally present.

If the pinion is already fastened to the shaft, start cleaning the sealing surface (step 6).

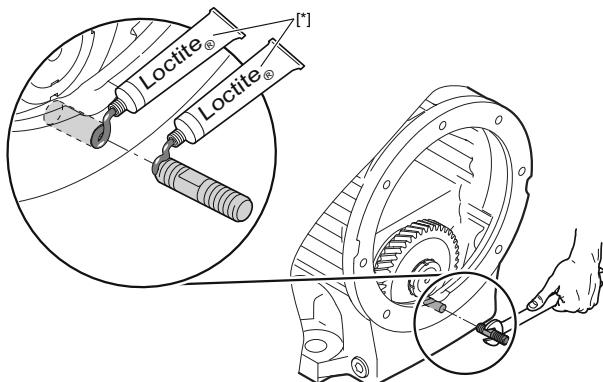
Joining the pinion  
to the motor or in-  
put shaft

1. Clean and degrease the shaft and the bore of the pinion.
2. Apply Loctite® 649 to the shaft behind the groove over the entire area of the circumference.



22763067787

3. Warm the pinion up to **at least** 100 °C to a **maximum of** 130 °C.
4. Push the pinion onto the shaft.
5. Secure the pinion on the shaft with the retaining ring.
6. Remove oils, grease, irregularities of the surface, rust, and old Loctite® residue from the flange surfaces.
- To prevent oil from escaping after installation, flange threads that lead into the housing interior must be sealed!
7. Clean and degrease the thread through bores that lead into the housing interior and their studs.
8. Apply Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) in a continuous ring on the upper threads of the flange thread and the stud.



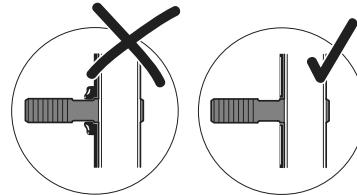
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[\*] Loctite® according to the table at the end of the chapter

Screwing in the  
studs

9. Screw the studs into the thread up to the shoulder.

10. Remove any excess Loctite® (see following diagram) from the sealing surface 60 minutes after screwing in at the latest.



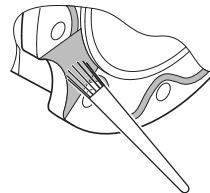
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Sealing the flange  
surface

## INFORMATION



Always apply the sealant over a large area in narrow places and on the gear units R97, R107, R127, F97 or F107.



11. Only distribute Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) to one of the sealing surfaces. Apply the sealant in beads or over a large area without gaps. Use a suitable application tool that does not contaminate the sealing surface, for example, a non-shedding brush or a short-hair lamb's wool roller.

Joining flange surfaces

12. Join the flange surfaces together. Next, **immediately** tighten the nuts with the specified torque (see the table below). If you tighten the nuts too late, the sealing film can tear.
13. The sealant must harden for 30 minutes and must not come into contact with the gear oil during this time.

### 4.15.1 Tightening torques

When tightening, observe the tightening torques in chapter "Notes concerning tightening torques" (→ 36).

Screw/nut	Tightening torque $\pm 15\%$ Nm
M6	12
M8	28
M10	56
M12	96
M16	235

**4.15.2 Selecting and using Loctite®**

Sealant	Use	Suitability	Batch size	Part number
Loctite® 649	Locking agent for pinions	All gear units	50 ml	09120998
Loctite® 574	Surface sealant	All gear units except for R97 – R127, F97, F107	7 ml	09102558
Loctite® 5188		R97 – R127, F97, F107	50 ml	03207013

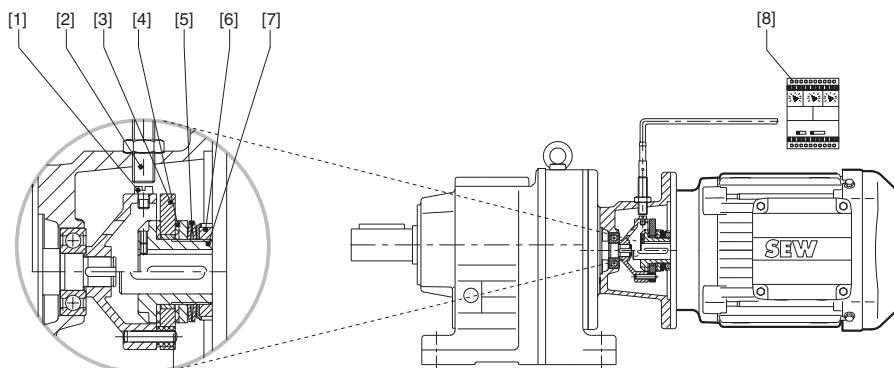
## 4.16 Accessory equipment

### 4.16.1 AR.. and AT.. centrifugal and friction couplings

#### AR.. friction coupling

Drives with a slip clutch consist of a standard toothed gear drive and motor/variable speed gearmotor with an adapter installed between them. This adapter accommodates the slip clutch. In gearmotors with a compound gear unit, the slip clutch may be located between the first and second gear units. On delivery, the slip torque is set individually according to the particular drive design.

The following figure shows a drive with slip clutch and W: speed monitor



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- [1] Trip cam
- [2] Incremental encoder
- [3] Driving disk
- [4] Friction lining
- [5] Cup spring
- [6] Slotted nut
- [7] Friction hub
- [8] Speed monitor

#### W speed monitor:

The speed monitor is used with constant-speed gearmotors and is connected to the incremental encoder in the adapter.

#### WS slip monitor:

The slip monitor is used with the following components:

- Speed-controlled motors with speed sensor
- VARIBLOC® variable-speed gear unit

## INFORMATION



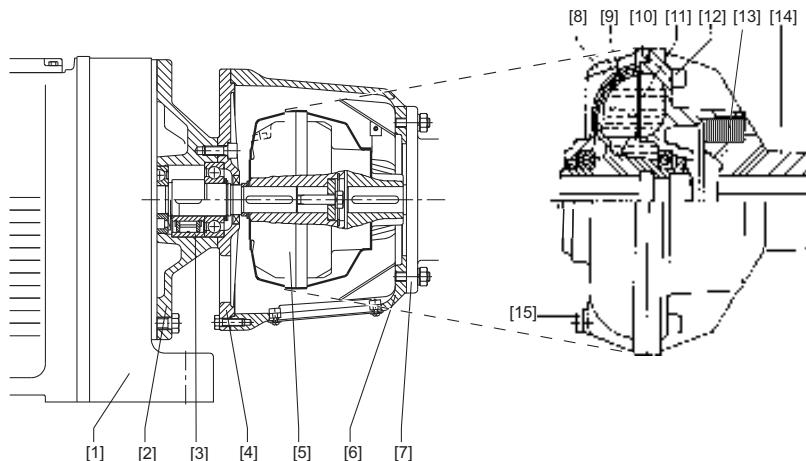
For further information about the AR.. coupling, refer to the "Start-up coupling and slip clutch AR.. and AT.." operating instructions.

#### AT.. hydraulic centrifugal coupling

Hydraulic start-up couplings are fluid couplings based on the Föttinger principle. They consist of 2 hinged hemispheres with blades separated by a tight gap.

The applied torque is transmitted by the inertial force of the streaming fluid. This fluid circulates within a closed circuit, between the pump wheel (primary side) [12] on the driving shaft (motor shaft) and the turbine wheel (secondary side) [9] on the driven shaft (gear unit input shaft).

The following figure shows the structure of a drive with hydraulic start-up coupling:



18014400410625675

- |                           |                               |                                      |
|---------------------------|-------------------------------|--------------------------------------|
| [1] Gear unit             | [6] Extended housing complete | [11] Operating fluid (hydraulic oil) |
| [2] Basic flange complete | [7] Motor                     | [12] Pump wheel                      |
| [3] Backstop (optional)   | [8] Filling plugs             | [13] Elastic components              |
| [4] Intermediate flange   | [9] Turbine wheel             | [14] Flexible connection coupling    |

## INFORMATION



For detailed information about the AT.. coupling, refer to the "Start-up coupling and slip clutch AR.. and AT.." operating instructions.

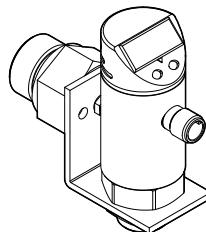
### 4.16.2 Diagnostic units /DUV and /DUO

#### /DUO diagnostic unit

DUO10A comprises a diagnostic unit and a temperature sensor. The temperature sensor (PT100 or PT1000 resistance sensor) is positioned in the gear unit oil to record the oil's temperature. The diagnostic units uses the oil temperature values to calculate the remaining service life of the oil.

The diagnostic unit continuously records the gear unit temperature and calculates the remaining service life for the selected oil type immediately. For this purpose, the diagnostic unit must be supplied with a 24 V voltage supply. Times when the diagnostic unit is switched off are not included in the forecast.

The following figure shows the DUO10A diagnostic unit:



## INFORMATION

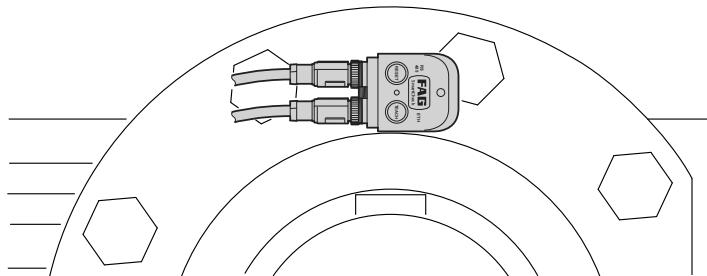


For further information on the evaluation unit, refer to the manual "DUV30A Diagnostic Unit".

### DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-based measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

DUV40A is configured using the SmartWeb software. If you use several Vibration SmartCheck systems, you can control them centrally from one PC using the SmartUtility Light software.



## INFORMATION



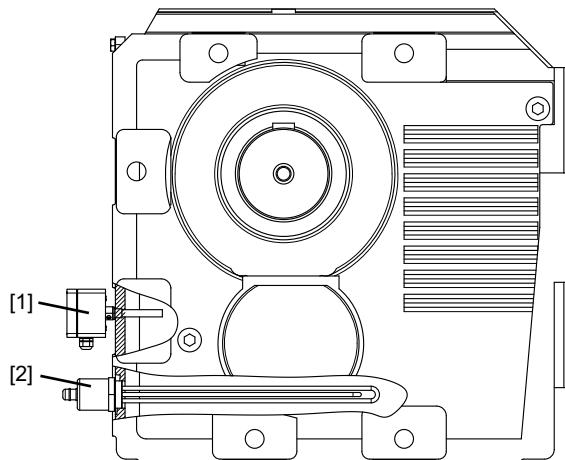
For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part No.: 29190258/DE.

#### 4.16.3 Gear unit heater for gear unit series R..7, F..7, and K..7

An oil heating can be required in order to allow for a smooth startup in the event of a cold start at low ambient temperatures. An oil heating is available with an external or an integrated thermostat depending on the gear unit design.

The heater is screwed into the gear unit housing and is controlled via a thermostat. The limit temperature of the thermostat below which the oil must be heated, is set depending on the respective lubricant.

The following figure shows a gear unit with heater and external thermostat:



2060553483

[1] Thermostat

[2] Heater

#### INFORMATION



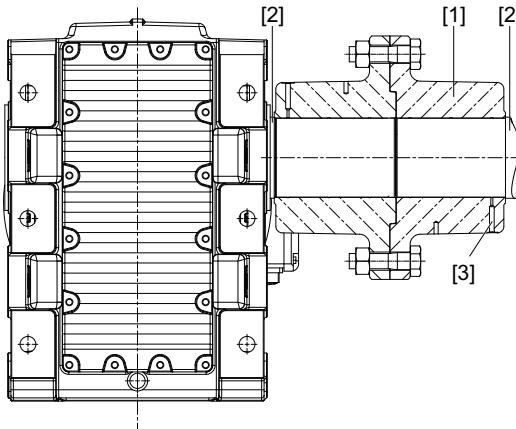
For further information regarding gear unit heaters, refer to the addendum "Gear unit heaters for gear unit series R..7, F..7 and K..7" to the operating instructions "Gear unit series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W".

#### 4.16.4 Flange coupling

Flange couplings [1] are rigid couplings for connecting 2 shafts [2].

Flange couplings are suitable for operation in both directions of rotation, but cannot compensate any shaft misalignments.

Torque between shaft and coupling is transmitted via a cylindrical interference fit. The two coupling halves are mounted together at the flanges. The couplings are equipped with several disassembly bores [3] for removing the interference fit hydraulically.



27021601961007627

[1] Rigid flange coupling

[2] Customer and gear shaft

[3] Disassembly bores

## INFORMATION



For detailed information about the flange coupling, refer to the "Gear Unit Model Series R..7, F..7, K..7, S..7, and SPIROPLAN® W flange coupling" addendum to the operating instructions.

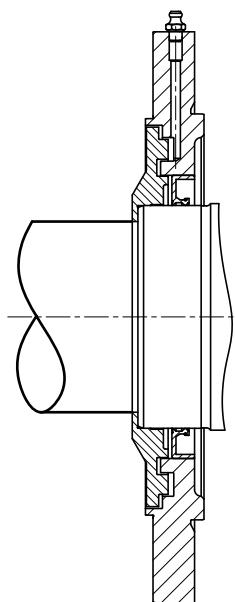
#### 4.16.5 Regreasing the labyrinth seal

Labyrinth seals are used to protect the oil seal in case of very high dust load or other abrasive substances.

##### Output shaft

The following figure shows an example of a regreasable radial labyrinth seal (taconite).

- Single oil seal with radial labyrinth seal
- Used in **very dusty** environments with abrasive particles



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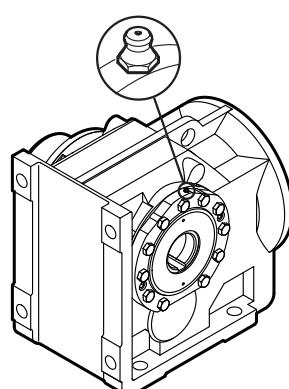
#### INFORMATION



The gear shaft must rotate during relubrication.

#### Position of greasing points

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A. Regreasing must be carried out at regular intervals. The greasing points are located near the output shaft, see following figure:



4986644747

## Refilling grease

Regreasable sealing systems can be refilled with lubricating grease. Use moderate pressure to force grease into each lubrication point until new grease leaks out of the sealing gap.

Used grease, including contaminants and sand, is in this way pressed out of the sealing gap.

## INFORMATION



Immediately remove the old grease that leaked out.

## Inspection and maintenance intervals

Observe the following inspection and maintenance intervals for the regreasing of labyrinth seals:

Time interval	What to do?
Every 3000 operating hours, at least every 6 months	Fill regreasable sealing systems with grease.

## Technical data

### Sealing and rolling bearing grease

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	SEW-EURODRIVE	SEW Grease HL 2 E1 <sup>1)</sup>
		Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
		Klüber	Petamo GHY 133 N
	-40 °C to +40 °C	SEW-EURODRIVE	SEW Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil.

2) Lubricant for the food processing industry.

3) Easily biodegradable lubricant for environmentally sensitive areas.

## INFORMATION



The following grease quantities are required:

- **For fast-running bearings (gear unit input side):** Fill the cavities between the rolling elements one-third full with grease.
- **For slow-running bearings (gear unit output side):** Fill the cavities between the rolling elements two-thirds full with grease.

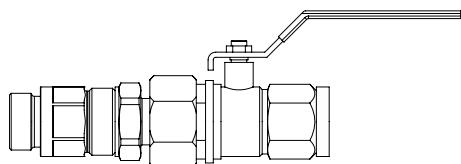
## INFORMATION



If a customer wants to use a grease that is not listed in the above table, the customer has to make sure that it is suitable for the intended application.

#### 4.16.6 Oil drain valve

The gear unit is equipped with an oil drain plug as standard. An oil drain valve that enables attaching a drain pipe for changing the gear unit oil can optionally be installed.



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#### 4.16.7 Oil expansion tank

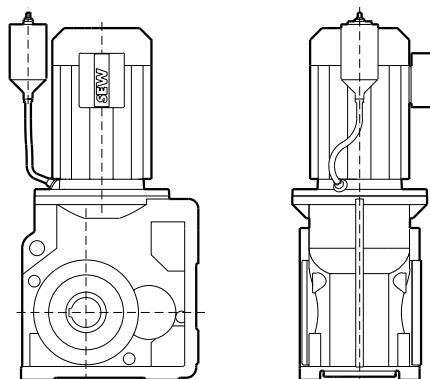
The oil fill level for gear units in mounting position M4 has technical reasons. In case of unfavorable circumstances, oil may leak from the breather valve of these gear units. Use an oil expansion tank to reliably prevent oil from leaking. The oil expansion tank provides additional space for the lubricant to expand.

In case of gear units and gearmotors of size 107 and larger, an oil expansion tank is always required for operation in mounting position M4.

SEW-EURODRIVE recommends using an oil expansion tank for gear units and gearmotors in mounting position M4, in the following cases:

- For input speeds > 2000 min<sup>-1</sup>
- For sizes 77 – 97 and input speeds > 1800 min<sup>-1</sup>

The following figure shows the oil expansion tank of a gearmotor.



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The oil expansion tank is delivered as an assembly kit for mounting onto the gearmotor. In case of limited space or of gear units without motor, the oil expansion tank can also be mounted to nearby machine parts.

### INFORMATION



Transverse acceleration is not permitted for gear units with expansion tank with fixed piping for third party motors and servomotors.

For further information, contact your SEW-EURODRIVE sales representative.

#### 4.16.8 Oil-air cooler for splash lubrication /OAC

If the thermal rating of the naturally cooled gear unit is not sufficient, an oil-air cooling system can be used.

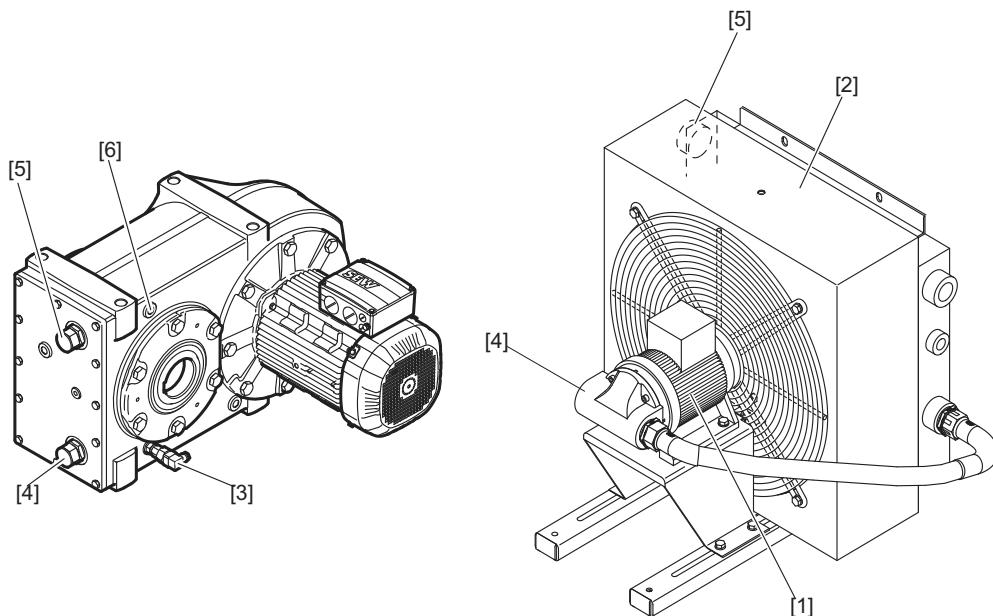
The cooling system is delivered without electrical wiring and piping as a complete unit on a base frame for separate installation.

The standard scope of delivery of the cooling system includes:

- Pump with directly mounted asynchronous motor
- Oil-air heat exchanger
- Temperature switch with 2 switching points

SEW-EURODRIVE uses oil-air cooling systems for standard gear units in sizes OAC 005 and OAC 010.

The following figure shows an example of a standard parallel-shaft helical gear unit next to an oil-air cooler.



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- |     |  |     |                                       |
|-----|--|-----|---------------------------------------|
| [1] | Motor for pump and fan                     | [4] | Suction pipe connections              |
| [2] | Oil-air heat exchanger                     | [5] | Pressure pipe connections             |
| [3] | Temperature switch with 2 switching points | [6] | Option: Oil expansion tank connection |

## INFORMATION



For more information on the cooling system, refer to the addendum to the operating instructions "Gear unit series R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W: Oil-air cooler for splash lubrication /OAC".

**4.16.9 Agitator design****Relubrication of the agitator design**

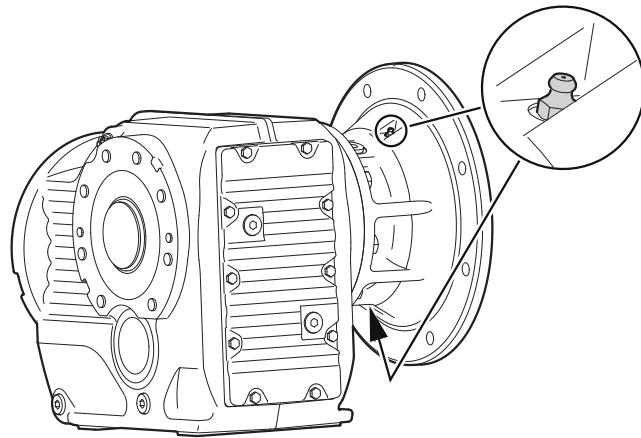
A relubrication of the output shaft bearing is offered as an option for the agitator drives FM.., FAM.., KM.. and KAM...

*Position of greasing points*

**INFORMATION**

The gear shaft must turn during the relubrication procedure.

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A. The following figure shows the position of the greasing points:



23563258507

**Maintenance interval and grease quantities**

Regrease the agitator after 10 000 operating hours. The number of regreasing procedures is limited to 5x. Observe the information on the required grease quantities in the following table:

Size	Grease quantity for regreasing g
67	5
77	11
87	11
97	16
107	35
127	34
157	46

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	SEW-EURODRIVE	SEW Grease HL 2 E1 <sup>1)</sup>
		Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
		Klüber	Petamo GHY 133 N
 <sup>2)</sup>	-40 °C to +40 °C	SEW-EURODRIVE	SEW Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
 <sup>3)</sup>	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil.

2) Lubricant for the food processing industry.

3) Easily biodegradable lubricant for environmentally sensitive areas.

## INFORMATION



If a customer wants to use a grease that is not listed in the above table, the customer has to make sure that it is suitable for the intended application.

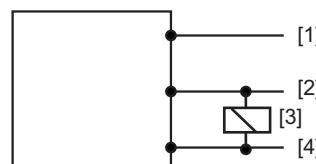
### Leak sensor (Drywell design) with the agitator design

A Drywell design with level sensor is optionally available for agitator drives FM.., FAM.., KM.. and KAM...

One of the two following sensors is used, depending on the gear unit size:

*Level sensor for sizes 67 – 97*

#### Electrical connection



23527583115

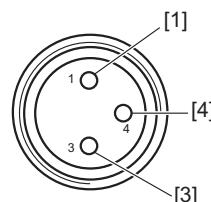
[1] DC 12 V – 32 V

[2] Output

[3] Load

[4] 0 V

#### Pin assignment



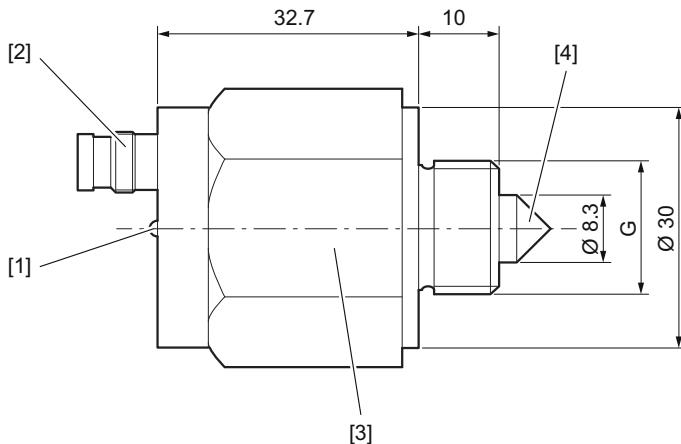
23527590411

[1] DC 12 V – 32 V

[4] Output

[3] Load

## Dimensions



23563256075

- [1] LED function indicator
- [2] M8×1 circular connector; 3-pin (alternatively cable connection)
- [3] Wrench size: 30
- [4] Glass prism

## Technical Data

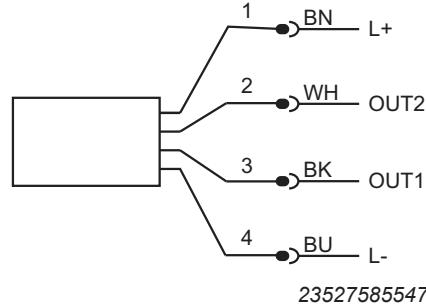
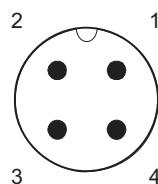
Measuring accuracy	$\pm 0.5$ mm
Minimum distance of the glass tip to an opposite surface	$\geq 10$ mm
Mounting position	Any
Optical display of the switching status	1 LED
Process connection	Male thread G 3/8", G 1/2" or M12 × 1

For more information, please contact SEW-EURODRIVE.

Level sensor for sizes 107 – 157

### Electrical connection

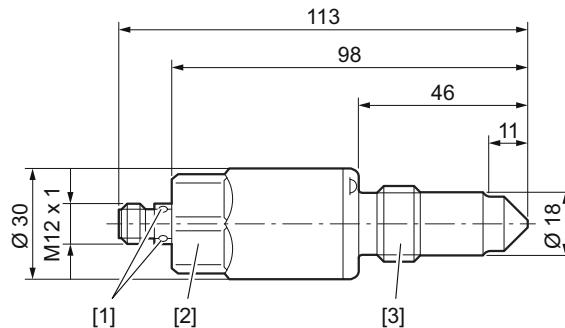
M12 plug-in connector:



OUT1: Switching output/IO link/teach

OUT2: Switching output

### Dimensions



23563253643

[1] LED

[2] Tightening torque 20 – 25 Nm

[3] G 1/2

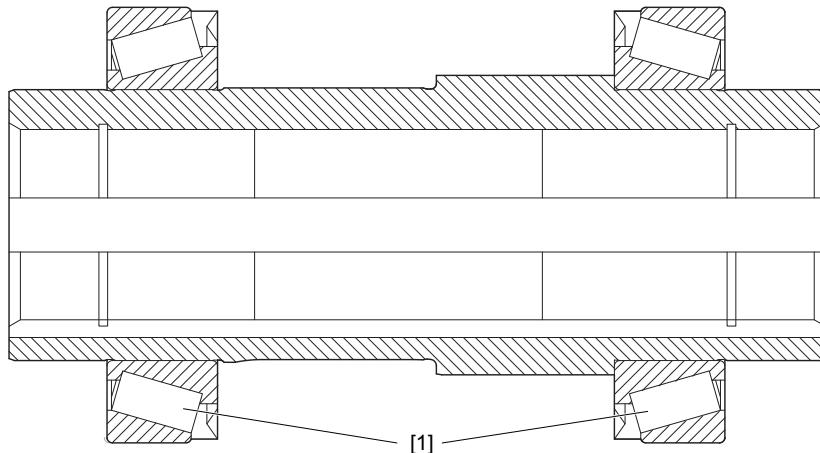
Tightening torque 20 – 25 Nm

### Technical Data

- Plug-in connection
- Process connection G 1/2 A
- Gold-plated contacts
- 2 switching outputs

**4.16.10 Reinforced hollow shaft bearing**

With the reinforced hollow shaft bearing, the standard deep groove ball bearings are replaced with tapered roller bearings. This measure enables considerably higher overhung and axial loads and at the same time an increased service life of the bearings. Contact SEW-EURODRIVE for additional information.

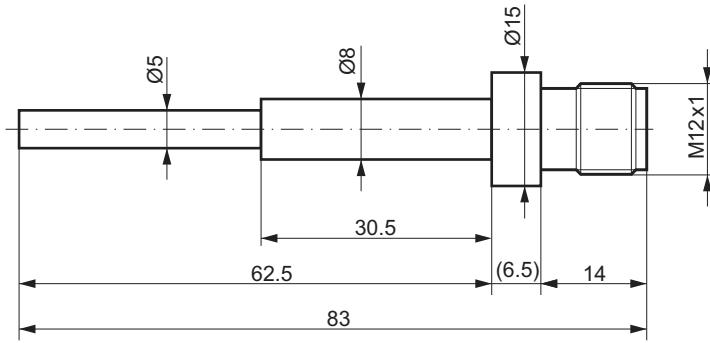


34258018699

[1] Tapered roller bearing

#### 4.16.11 PT1000 temperature sensor

##### PT1000 dimension drawing

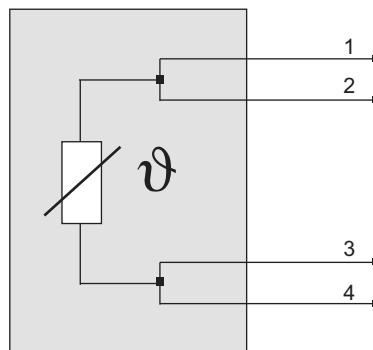


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##### PT1000 technical data

Technical Data	Value
Rod length	62.5 mm
Measuring range	-40 – 130 °C
Permitted oil temperature	-40 – 130 °C
Accuracy	± (PT1000 + 0.2 K)
Measuring element	1 × PT1000 to DIN EN 60751, class B, 4-wire connection
Dynamic response T05/T09 (s)	3/8 to DIN EN 60751
Ambient temperature	-25 – 80 °C
Degree of protection, protection class	IP67, III
Housing materials	V4A (1.4404)
Materials in contact with the medium	V4A (1.4404)
Port	M12 plug-in connection; gold-plated contacts

##### PT1000 connection diagram



15115128971

## 5      Startup

### ⚠ CAUTION



Damage to the gear unit can occur due to improper startup.

Possible damage to property can occur.

- Observe the following information.

- Check that the oil level is correct before startup, see chapter "Inspection/maintenance of the gear unit" (→ 130).
- The oil level plugs and oil drain plugs, as well as the breather plugs and breather valves, must be freely accessible.
- Observe the maximum and rms values of project planning during startup of gear units with servomotor. The buyer is obliged to make the data available to the end user.
- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings and the order confirmation.
- After gear unit setup, ensure that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- Prior to startup, ensure that rotating shafts and couplings are equipped with suitable protection covers.
- If the gear unit has an oil sight glass to monitor the oil level, the oil sight glass must be protected against damage.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Protect the gear unit from falling objects.
- Remove any available transport protection prior to startup.
- Strictly observe the safety notes in the individual chapters.

### 5.1    Inverter-operated gearmotors

For gear units with servomotor, the maximum and r.m.s. values of project planning must be observed during startup. The buyer is obliged to make the data available to the user.

### 5.2    Checking the oil level

Before startup, make sure that the oil level corresponds to the mounting position. Observe chapter "Checking the oil level and changing the oil" (→ 130).

If the gear unit is equipped with an oil sight glass, you can also determine the oil level at the oil sight glass.

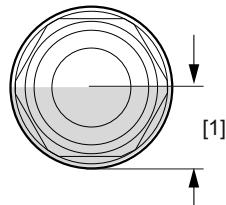
**NOTICE**

Damage to the gear unit can occur due to oil leaking from the damaged oil sight glass.

Possible damage to the unit can occur.

- Attach a protective device to prevent the oil sight glass from being damaged by mechanical impacts.

1. Check the oil level at the oil sight glass according to the following figure:



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[1] The oil level must be within this range.

2. Proceed as follows if the oil level is too low:

- Open the respective oil fill plug; see chapter "Inspection/maintenance of the gear unit" (→ 130).
- Fill in new oil of the same type up to the mark via the oil fill plug.
- Screw in the oil fill plug.

### 5.3 Pseudo-leakage at shaft seals

Due to their operating principle, seals between moving surfaces at shaft passages cannot be completely tight, as a lubricant film must form during operation. The lubricant film between shaft and sealing lip keeps the built-up of heat and wear on the sealing system to a minimum and ensures the intended service life. The optimum sealing properties are only achieved after the run-in phase.

## 5.4 Helical-worm gear units and SPIROPLAN® W gear units

### 5.4.1 Run-in period

SPIROPLAN® W..0-, SPIROPLAN® W..7 and helical-worm gear units require a run-in period of at least 48 hours before reaching their maximum efficiency. A separate run-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the run-in period.

#### Helical-worm gear units

	Worm	
	i range	$\eta$ reduction
<b>1-start</b>	approx. 50 – 280	approx. 12 %
<b>2-start</b>	approx. 20 – 75	approx. 6 %
<b>3-start</b>	approx. 20 – 90	approx. 3 %
<b>4-start</b>	–	–
<b>5-start</b>	approx. 6 – 25	approx. 3 %
<b>6-start</b>	approx. 7 – 25	approx. 2 %

#### SPIROPLAN® gear units

Gear units in model series SPIROPLAN® W..9 are not subject to the run-in behavior, since the gear ratios in the SPIROPLAN® stage are smaller and therefore have a very small amount of sliding.

W10/W20/W30		W37/W47	
i range	$\eta$ reduction	i range	$\eta$ reduction
approx. 35 – 75	approx. 15 %		
approx. 20 – 35	approx. 10 %		
approx. 10 – 20	approx. 8 %	approx. 30 – 70	approx. 8 %
approx. 8	approx. 5 %	approx. 10 – 30	approx. 5 %
approx. 6	approx. 3 %	approx. 3 – 10	approx. 3 %

### 5.4.2 Helical-worm gear unit with projecting worm shaft

#### **⚠ CAUTION**

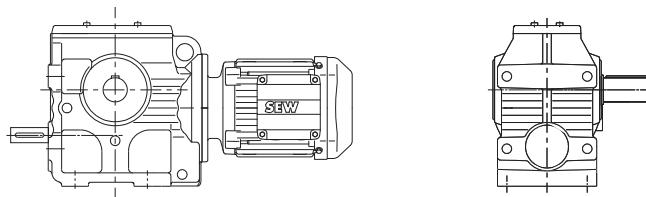


Risk of injury due to rotating parts

##### Injury

- Before you operate the helical-worm gear unit using the inserted handwheel or the hand crank, de-energize the drive.
- If the handwheel or the hand crank remains attached to the shaft during operation, take appropriate measures to prevent injuries.

The following figure shows a helical-worm gearmotor with projecting worm shaft:



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## 5.5 Helical/parallel-shaft helical/helical-bevel gear units

If the gear units were installed according to chapter "Mechanical installation" (→ 29), no special startup notes must be observed for helical, parallel-shaft helical and helical-bevel gear units.

## 5.6 Gear units with backstop

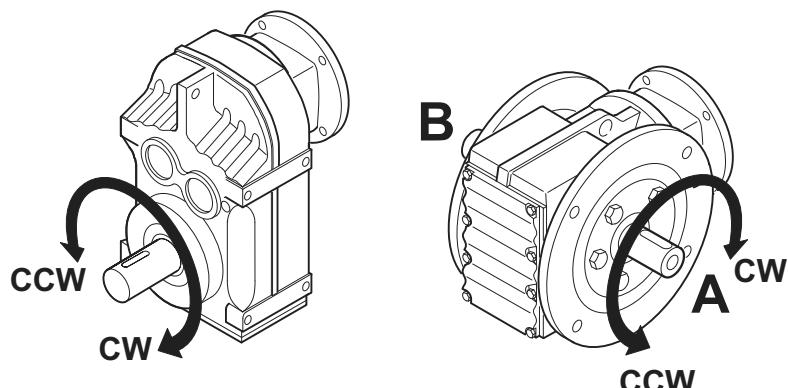
### NOTICE

Operating the motor in the blocking direction could destroy the backstop.

Possible damage to property

- Do not start up the motor in the blocking direction. Before motor startup, make sure the current supply of the motor for the direction of rotation is connected accordingly.
- For control purposes, operation in blocking direction with half the output torque is permitted once.

The purpose of a backstop is to prevent unwanted directions of rotation. During operation, the backstop permits rotation only in the specified direction.



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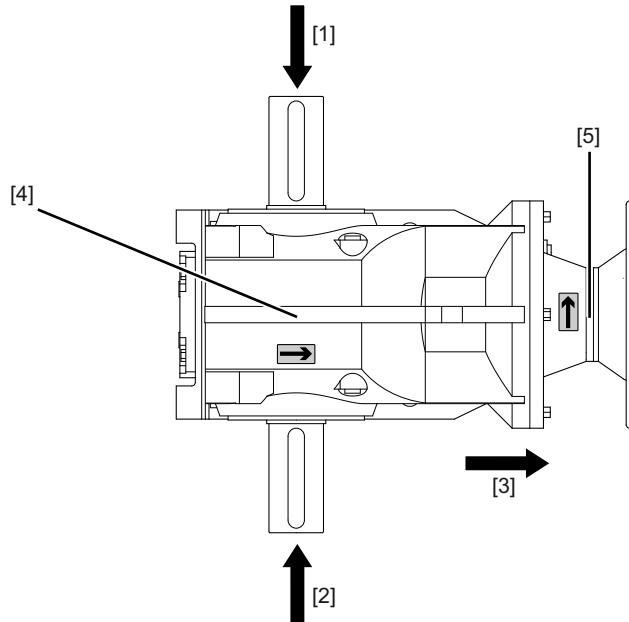
The permitted direction of rotation is indicated by a direction arrow on the housing:



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A replacement label is enclosed for the customer.

In right-angle gear units, you also have to indicate whether the direction of rotation is given looking onto the A or B-side.



16117549579

- |  |   |
|--|---|
| [1] Viewing direction, Direction of rotation Output B  | [2] Viewing direction, Direction of rotation Output A and A+B |
| [3] Viewing direction, Direction of rotation Input end | [4] Gear unit   |
| [5] Adapter/cover with RS option                       |   |

## 5.7 Components made of elastomers with fluorocarbon rubber



### CAUTION

Health risk due to dangerous gases, vapors, and residue created by heating fluorocarbon rubber to > 200 °C.

Damage to health.

- Make sure that components made of fluorocarbon rubber are not exposed to temperatures > 200 °C. Remove the components, if necessary.
- Avoid inhaling fluorocarbon rubber gases and vapors as well as skin and eye contact.
- Avoid contact with the cooled-down fluorocarbon rubber, as dangerous residue has formed while it was heated.

Under normal operating conditions and at temperatures up to 200 °C, fluorocarbon rubber is very stable and safe. However, when heated to more than 300 °C, e.g. by fire or the flame of a cutting torch, fluorocarbon rubber forms harmful gases and vapors as well as residue.

The following components of R..7, F..7, K..7, K..9, S..7, and SPIROPLAN® W gear units can contain elastomers made of fluorocarbon rubber:

- Oil seals

- Breather valve
- Screw plugs

The user is responsible for safe handling during the service life including eco-friendly disposal.

SEW-EURODRIVE is not responsible for damage caused by improper handling.

## 6 Inspection/maintenance

### **⚠ WARNING**



Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the drive from the power supply before you start working on the unit.
- Prevent the drive from starting up unintentionally for example, by locking the key switch or removing the fuses from the current supply, and attach a warning sign that prohibits switching on the drive.

### **⚠ WARNING**



Risk of injury if preloaded shaft connections are loosened.

Severe or fatal injuries.

- Before releasing any shaft connections, make sure there is no active torsional torque present that could lead to tension within the system.

### **⚠ WARNING**



Risk of burns due to hot gear unit and hot gear unit lubricant.

Severe injuries.

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.

### **NOTICE**

Loss of lubricant qualities due to filling of wrong lubricant.

Damage to the gear unit.

- Do not mix synthetic lubricants and mineral lubricants.
- Do not mix different synthetic lubricants.

### **NOTICE**

Damage to oil seal caused by cleaning the gear unit with a high pressure device.

Gear unit damage.

- Do not clean the gear unit with a high-pressure cleaning device.

### **NOTICE**

Damage to gear unit due to ingress of foreign objects during maintenance and inspection work.

Gear unit failure.

- Prevent foreign particles from entering into the gear unit during maintenance and inspection work.

## INFORMATION



Maintain the inspection and maintenance intervals. This is necessary to ensure operational safety.

## INFORMATION



Perform a safety check and functional check following maintenance and repair work.

## 6.1 Wearing parts

### Gearing

If you observe the SEW-EURODRIVE design criteria and the inspection and maintenance intervals, then the gearing components of the gear units will be wear-free after the run-in period. The worm gearing is an exception for design reasons. Depending on the operating conditions, material on the tooth flanks of the worm gear is removed to different extents. The main influencing factors are:

- Rotational speed
- Load
- Operating temperature
- Lubricant (type, viscosity, additives, pollution)
- Switching frequency

For information on the worm gearing service life under certain operating conditions, contact SEW-EURODRIVE.

### Rolling bearings

Rolling bearings in the gear unit, adapter, and input shaft assembly have a limited service life, even under ideal operating conditions. This nominal bearing service life is a solely statistical value. The actual service life of an individual bearing may deviate greatly from this value. The main influencing factors are:

- Rotational speed
- Equivalent bearing load
- Operating temperature
- Lubricant (type, viscosity, additives, pollution)
- Lubricant supply of the bearing
- Misalignment under operating load

Therefore the rolling bearings must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 127), "Lubricant change intervals" (→ 128), "Maintaining adapter AL./AMS./AQS./EWH.." (→ 128) and "AD input shaft assembly maintenance" (→ 129).

For information on the nominal bearing service life under certain operating conditions, contact SEW-EURODRIVE.

### Lubricants

Lubricants are subject to aging. Their service life is limited depending on the load conditions.

The service life depends significantly on the oil operating temperature. The dependency of lubricant change intervals on the operating temperature is depicted in the figure in chapter "Lubricant change intervals" (→ 128).

### Oil seals

Oil seals are contact seals that seal unit housings at emerging elements, such as shafts, from the environment. Oil seals are wear parts with a service life that is influenced by the following factors, among others:

- Shaft speed and circumferential speed at the sealing lip
- Ambient conditions (temperature, dust, humidity, pressure, chemicals, radiation)
- Lubricant (type, viscosity, additives, pollution)
- Surface quality of the sealing
- Lubricant supply of the sealing
- Oil seal material

Due to the various influencing factors, it is not possible to predict the service life. Therefore the oil seals must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 127), "Lubricant change intervals" (→ 128), "Maintaining adapter AL../AMS../AQS../EWH.." (→ 128) and "AD input shaft assembly maintenance" (→ 129).

**Coupling ring**

The couplings installed in the AMS.., AL.., AQS... and EWH.. adapters are designed to be positive, puncture-proof and low-maintenance claw couplings with an impact and vibration-absorbing cam ring (AMS.., EWH..) or coupling ring (AQS..., AL..). The service life is determined by the following factors, among others:

- Ambient conditions (temperature, chemicals, radiation)
- Operational conditions (switching frequency, impact characteristics)

Adhere to the corresponding inspection and maintenance intervals in chapter "Maintaining adapter AL../AMS../AQS../EWH.." (→ 128).

**Rubber buffer**

The rubber buffer is required for shaft-mounted gear units of the F and W gear unit types for torque support. Rubber buffers are wear parts with a service life that is influenced by the following factors:

- Load
- Ambient conditions
  - Temperature
  - Humidity
  - Aggressive chemicals, e.g. ozone
- Switching frequency
- Impact characteristics

**Flexible bushing**

A so-called flexible bushing is required for the torque bracket of the S and K gear unit types. Flexible bushings are wear parts with a service life that is influenced by the following factors:

- Load
- Ambient conditions
  - Temperature
  - Humidity
  - Aggressive chemicals, e.g. ozone
- Switching frequency
- Impact characteristics

## 6.2 Inspection/maintenance intervals

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
• Every 3000 operating hours; at least every 6 months	<ul style="list-style-type: none"> <li>• Check oil and oil level</li> <li>• Check running noise for possible bearing damage</li> <li>• Visual inspection of the seals for leakage</li> <li>• Check that all screw plugs, any oil sight glass, the breather valve, and the gear unit cover screws are tight.</li> <li>• For gear units with a torque bracket: Check and replace the rubber buffers, if necessary</li> </ul>
With mineral oil:	<ul style="list-style-type: none"> <li>• Change the oil</li> <li>• Replace rolling bearing grease (recommendation)</li> <li>• Replace oil seal (do not install it in the same track again)</li> </ul>
With synthetic oil:	<ul style="list-style-type: none"> <li>• Change the oil</li> <li>• Replace rolling bearing grease (recommendation)</li> <li>• Replace oil seal (do not install it in the same track again)</li> </ul>
• Varying (depending on external factors)	<ul style="list-style-type: none"> <li>• Touch up or renew the surface/anti-corrosion coating</li> <li>• Check operation of breather valve (if present)</li> </ul>
• From 5th year of operation	<ul style="list-style-type: none"> <li>• Check the blocking effect of the backstop annually. Ensure that the maximum blocking torque is not exceeded.</li> </ul>

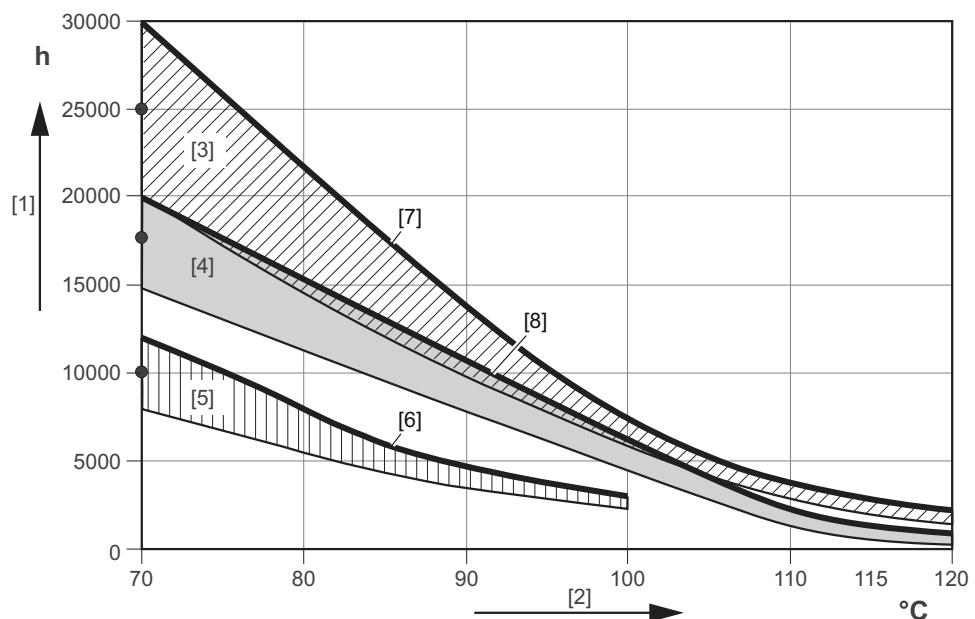
### Exceptions

The following gear units are lubricated for life. A scheduled oil change is not necessary:

- Helical gear units R07, R17, R27
- Parallel-shaft helical gear unit F27
- SPIROPLAN® gear units

### 6.3 Lubricant change intervals

Use the following figure to determine the number of operating hours between 2 oil changes based on the sustained oil bath temperature at normal ambient conditions. In case of special designs under severe/aggressive ambient conditions, change the lubricant more frequently.



- [1] Operating hours
- [2] Sustained oil bath temperature
- [3] CLP PG/CLP PG NSF H1
- [4] CLP HC/ CLP HC NSF H1
- [5] CLP (CC)/E
- [6] SEW GearOil Base
- [7] SEW GearOil Poly (H1)
- [8] SEW GearOil Synth (H1)
- Average value per oil type at 70 °C

### 6.4 Maintaining adapter AL../AMS../AQS../EWH..

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
<ul style="list-style-type: none"> <li>• Every 3000 operating hours; at least every 6 months</li> </ul>	<ul style="list-style-type: none"> <li>• Check the running noises to detect possible bearing damage.</li> <li>• Visually check the adapter for leakage.</li> <li>• With the drain hole design, check whether the condensation drain holes are clear.</li> </ul>
<ul style="list-style-type: none"> <li>• After 10 000 operating hours</li> </ul>	<ul style="list-style-type: none"> <li>• Check the rotational clearance.</li> <li>• Visually check the coupling ring (AMS.., EWH.., or AQS.., AL..).</li> </ul>

Time interval	What to do?
<ul style="list-style-type: none"> <li>After 10 000 operating hours with NBR/FKM oil seals</li> <li>After 20 000 operating hours with Premium Sine Seal adapter oil seals:</li> </ul>	<ul style="list-style-type: none"> <li>Change the oil seal. With standard NBR or FKM oil seals, the new oil seal must not be fitted on the previous track. This is allowed with Premium Sine Seal adapter oil seals.</li> </ul>

## 6.5 AD input shaft assembly maintenance

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
<ul style="list-style-type: none"> <li>Every 3000 operating hours; at least every 6 months</li> <li>After 10 000 operating hours</li> </ul>	<ul style="list-style-type: none"> <li>Check the running noises to detect possible bearing damage.</li> <li>Visually check the adapter for leakage.</li> <li>Change the oil seal. Do not mount it in the same track.</li> </ul>

# 6

## Inspection/maintenance

Inspection/maintenance of the gear unit

### 6.6 Inspection/maintenance of the gear unit

#### 6.6.1 Checking the oil level and changing the oil

The procedure when checking the oil level and changing the oil depends on gear unit type, size and mounting position. Determine the code letter (A, B, C, D or E) in the following table in regard of gear unit type and size. Use the code letter to find the reference for the procedure for the corresponding gear unit in the 2nd table.

Gear unit type	Size	Code letter for chapter "Checking the oil level and changing the oil"					
		M1	M2	M3	M4	M5	M6
R	R..07 – 27			B			
	R..37/R..67			A			
	R..47/R..57		A		B		A
	R..77 – 167			A			
	RX..57 – 107			A			
F	F..27			B			
	F..37 – 157			A			
K	K..19/K..29			C			
	K..39/K..49			A			
	K..37 – 187			A			
S	S..37			C			
	S..47 – 97			A			
W	W..10 – 30			B			
	W..29 – W..39			B			
	W..37 – 47	D		E		D	

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
A:	<ul style="list-style-type: none"> <li>• Helical gear units...</li> <li>• Parallel-shaft helical gear units...</li> <li>• K..39/K..49, K..37 – 187 helical-bevel gear units</li> <li>• Helical-worm gear units... S..47 – 97</li> </ul> <p><b>With oil level plug</b></p>	(→ 131)
B:	<ul style="list-style-type: none"> <li>• Helical gear units...</li> <li>• Parallel-shaft helical gear units...</li> <li>• SPIROPLAN® gear units...</li> </ul> <p><b>Without oil level plug, with cover plate</b></p>	(→ 134)
C:	<ul style="list-style-type: none"> <li>• S..37 helical-worm gear unit</li> <li>• K..19/K..29 helical-bevel gear unit</li> </ul> <p><b>Without oil level plug, without cover plate</b></p>	(→ 138)

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
D:	<ul style="list-style-type: none"> <li>SPIROPLAN® W..37/W..47</li> </ul> <b>In mounting positions M1, M2, M3, M5, M6 with oil level plug</b>	(→ 141)
E:	<ul style="list-style-type: none"> <li>SPIROPLAN® W..37/W..47...</li> </ul> <b>In mounting position M4 without oil level plug and cover plate</b>	(→ 143)

Refer to chapter "Mounting positions" (→ 146) for notes on the mounting positions.

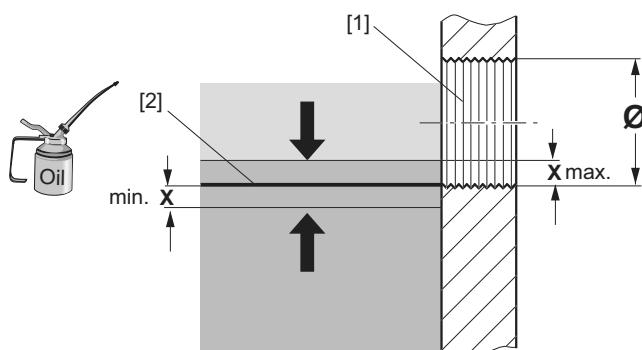
You cannot check the oil level of gear units in pivoted mounting position. The gear units are delivered with the correct oil level. Observe the specifications and fill quantities on the nameplate if you have to change the oil.

## 6.6.2 A: Helical, parallel-shaft helical, helical-bevel and helical-worm gear units with oil level plug

### Checking the oil level at the oil level plug

Proceed as follows to check the oil level of the gear unit:

- Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
- Determine the positions of the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 146).
- Place a container underneath the oil level plug.
- Slowly unscrew the oil level plug. Small amounts of oil may leak out as the permitted maximum oil level is higher than the lower edge of the oil level bore.
- Check the oil level according to the following figure and the corresponding table.



634361867

- [1] Oil level bore  
[2] Oil level setpoint

X Min./max. oil level

Ø oil level bore	Approved fluctuation "x" of the oil level mm
M10 × 1	1.5
M12 × 1.5	2
M22 × 1.5	3
M33 × 2	4
M42 × 2	5

6. Proceed as follows if the oil level is too low:

- Remove the breather valve from the breather bore.
  - Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore, up to the lower edge of the oil level bore.
  - Screw in the breather valve again. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).
7. Screw in the oil level plug again. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

### **Checking the oil via the oil drain plug**

Proceed as follows to check the gear unit oil:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting positions" (→ 146).
3. Remove a little oil from the oil drain plug.
4. Check the oil consistency:
  - Viscosity (have this carried out by a suitable laboratory if necessary)
  - If you can see that the oil is heavily contaminated, it is advisable to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 127).
5. Check the oil level. See chapter "Checking the oil level via the oil level plug".

### **Changing the oil via the oil drain plug and the breather valve**

#### **⚠ WARNING**



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 146).
3. Place a container underneath the oil drain plug.
4. Remove the oil level plug, the breather valve and the oil drain plug.
5. Drain all the oil.
6. Re-insert the oil drain plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore. Do not mix different synthetic lubricants.

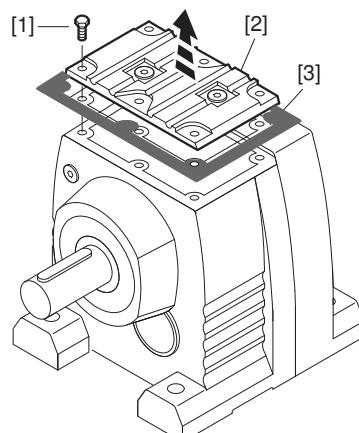
- Observe the oil quantities according to the specifications on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities" (→ 204).
  - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

### 6.6.3 B: Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

#### Checking the oil level via the cover plate

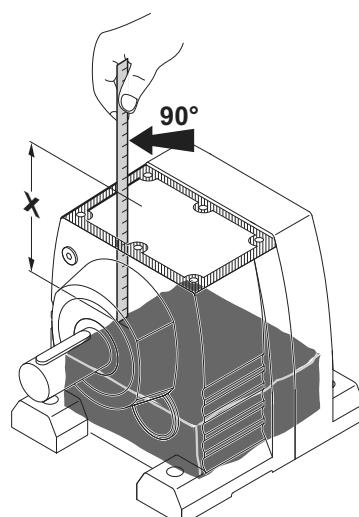
For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. To position the cover plate on the top, place the gear unit in the following mounting position:
  - R07 – R57 in mounting position M1
  - F27 in M3 mounting position
  - W10 – W30 and W..29 – W..39 in mounting position M1
3. Loosen the screws [1] of the cover plate [2] and remove the cover plate [2] and the corresponding gasket [3] (see following figure).



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4. Determine the vertical distance "x" between oil level and sealing surface of the gear unit housing (see following figure).



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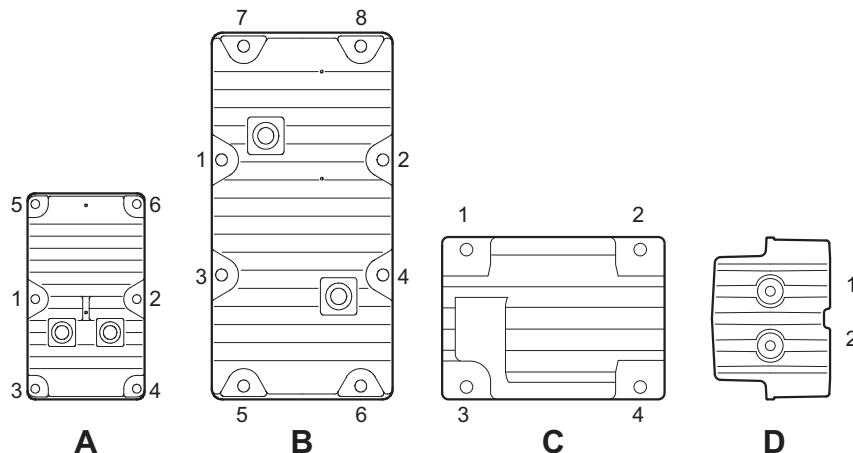
5. Compare the determined value "x" to the max. distance between oil level and sealing surface of the gear unit housing specified in the following table. Adjust the fill level if required.

<b>Gear unit type</b>		<b>Maximum distance x between oil level and sealing surface of gear unit housing for mounting position</b>							
		<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>M4</b>	<b>M5</b>	<b>M6</b>		
R07	2-stage	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1		
	3-stage	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1		
R17	2-stage	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1		
	3-stage	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2		
R27	2-stage	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1		
	3-stage	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1		
R47	2-stage	—	—	—	—	39 ± 1	—		
	3-stage	—	—	—	—	32 ± 1	—		
R57	2-stage	—	—	—	—	32 ± 1	—		
	3-stage	—	—	—	—	28 ± 1	—		
F27	2-stage	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1		
	3-stage	71 ± 1	24 ± 1	70 ± 1	45 ± 1	71 ± 1	71 ± 1		
W..29		45 ± 1			5 ± 1	15 ± 1			
W..39		56 ± 1			4 ± 1	25 ± 1			
Irrespective of mounting position									
W10		12 ± 1							
W20		19 ± 1							
W30		31 ± 1							

6. Close the gear unit after the oil level check:

- Re-attach the seal of the cover plate. Make sure that the sealing surfaces are clean and dry.
- Screw on the cover plate. Tighten the cover plate screw connections working from the inside to the outside. Tighten the cover plate screw connections in the sequence depicted in the following figure. Tighten the cover plate screw connections with the specified tightening torque according to the following table.

Repeat the tightening procedure until the screws are properly tightened. To avoid damaging the cover plate, use only impulse wrenches or torque wrenches. Do not use impact screwdrivers.



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Gear unit type	Image	Retaining thread	Tightening torque $T_N$ Nm	Minimum tightening torque $T_{min}$ Nm
R/RF07/17/27	D	M6	11	7
R/RF47/57				
F27	B	M5	6	4
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			
W..29/W..39	A	M5	6	4

#### Checking the oil via cover plate

Proceed as follows to check the gear unit oil:

- Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
- Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 134).
- Take an oil sample via the cover plate opening.
  - Viscosity (have this carried out by a suitable laboratory if necessary)
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 130).
- Check the oil level. See chapter "Checking the oil level via the cover plate" (→ 134).
- Screw on the cover plate. Observe the order and the tightening torques in accordance with chapter "Checking the oil level via the cover plate" (→ 134).

**Changing the oil via the cover plate****⚠ WARNING**

Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 134).
3. Completely drain the oil into a container via the cover plate opening.
4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the cover plate. You must not mix different synthetic lubricants.
  - Fill in the oil quantity as specified on the nameplate or the order confirmation.
5. Check the oil level.
6. Screw on the cover plate. Observe the order and the tightening torques in accordance with chapter "Checking the oil level via the cover plate" (→ 134).

# 6

## Inspection/maintenance

Inspection/maintenance of the gear unit

### 6.6.4 C: Helical-worm gear units S..37 and helical-bevel gear units K..19/K..29 without oil level plug and cover plate

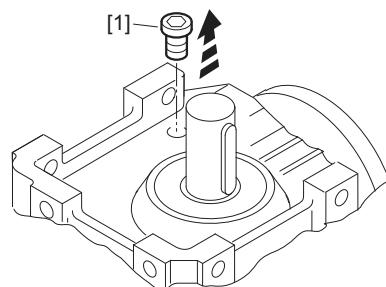
#### Checking the oil level via screw plug

The gear units S..37, K..19, and K..29 are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Place the gear unit in the mounting position stated in the following table. Thus the control bore always points upwards.

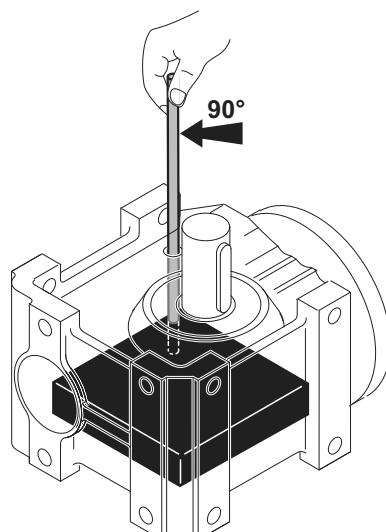
Gear unit	Mounting position
S..37	M5/M6
K..19/K..29	M6

3. Remove the screw plug [1] as shown in the following figure.



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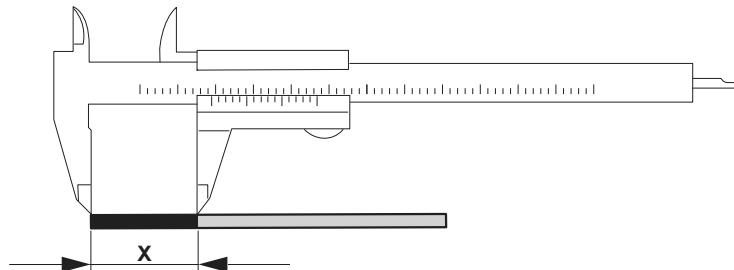
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Pull the dipstick vertically out of the control bore again, as shown in the following figure.



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5. Determine the size of the section "x" of the dipstick covered with lubricant using a slide-gauge as depicted in the following figure.



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section "x" in mm of the dipstick					
	Mounting position					
	M1	M2	M3	M4	M5	M6
K..19	33 ± 1	33 ± 1	33 ± 1	35 ± 1	33 ± 1	33 ± 1
K..29	50 ± 1	50 ± 1	50 ± 1	63 ± 1	50 ± 1	50 ± 1
S..37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

7. Re-insert and tighten the screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

#### Checking the oil via the screw plug

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Open the screw plug of the gear unit according to chapter "Checking the oil level via screw plug" (→ 138).
3. Take an oil sample via the screw plug bore.
4. Check the oil consistency.
  - Viscosity (have this carried out by a suitable laboratory if necessary)
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 127).
5. Check the oil level. See chapter "Checking the oil level via screw plug" (→ 138).
6. Screw the screw plug back into place. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

**Changing the oil via the screw plug****⚠ WARNING**

Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

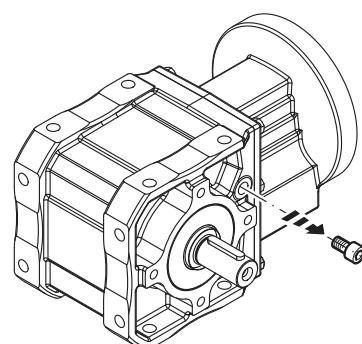
1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Open the screw plug of the gear unit according to chapter "Checking the oil level via screw plug" (→ 138).
3. Completely drain the oil via the screw plug bore.
4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the control bore. You must not mix different synthetic lubricants.
  - Observe the oil quantity specified on the nameplate or according to the mounting position. Observe chapter "Lubricant fill quantities" (→ 204).
5. Check the oil level.
6. Screw the screw plug back into place. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

## 6.6.5 D: SPIROPLAN® W..37/W..47 in mounting position M1, M2, M3, M5, M6 with oil level plug

### Checking the oil level at the oil level plug

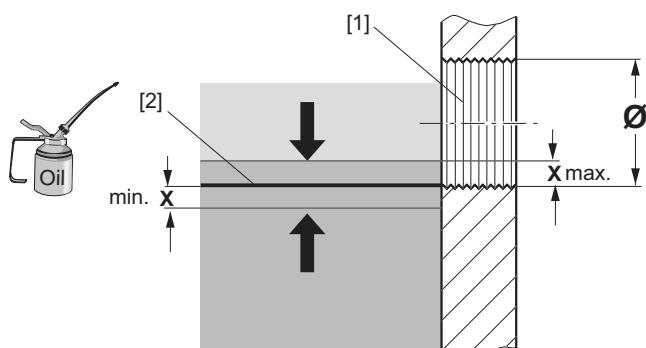
Proceed as follows to check the oil level of the gear unit:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Set up the gear unit in M1 mounting position.
3. Slowly remove the oil level plug (see following figure). Small amounts of oil may leak out.



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4. Check the oil level according to the following figure.



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[1] Oil level bore

[2] Target oil level

Ø oil level bore	Fluctuation "x" for minimum and maximum fill level in mm
M10 × 1	1.5

5. If the oil level is too low, add fresh oil of the same type (consult SEW-EURODRIVE if necessary) via the oil level bore, up to the lower edge of the bore.
6. Screw in the oil level plug again. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

**Checking the oil level at the oil level plug**

Proceed as follows to check the oil of the gear unit:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Remove some oil at the oil level plug.
3. Check the oil consistency.
  - Viscosity (have this carried out by a suitable laboratory if necessary)
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 127).
4. Check the oil level. See previous chapter.

**Changing the oil at the oil level plug****⚠ WARNING**

Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

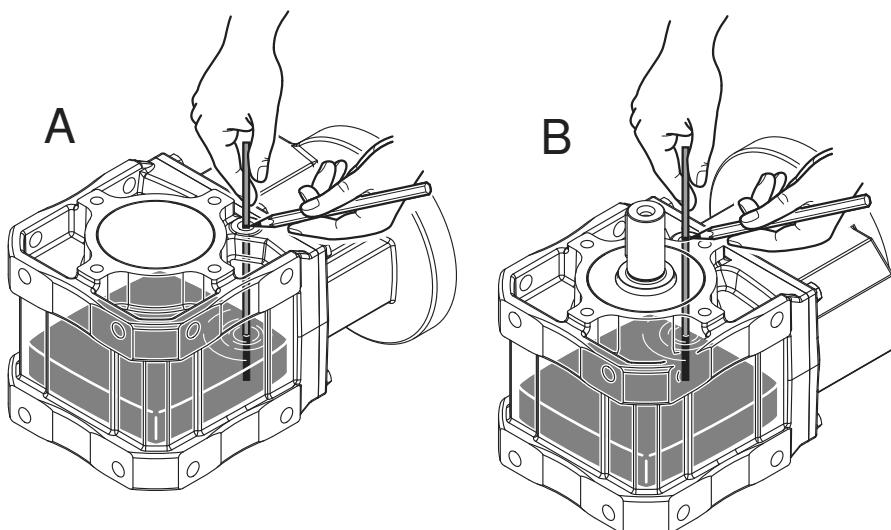
- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
- 
1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
  2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 146).
  3. Place a container underneath the oil level plug.
  4. Remove the oil level plugs on the A- and B-side of the gear unit.
  5. Drain all the oil.
  6. Re-insert the lower oil level plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).
  7. Fill in new oil of the same type (contact SEW-EURODRIVE if necessary) via the upper oil level plug. You must not mix different synthetic lubricants.
    - Observe the oil quantity specified on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities" (→ 204).
    - Check the oil level in accordance with in chapter "Checking the oil level at the oil level plug" (→ 141).
  8. Re-insert the upper oil level plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

## 6.6.6 E: SPIROPLAN® W..37 / W..47 in mounting position M4 without oil level plug and cover plate

### Checking the oil level via screw plug

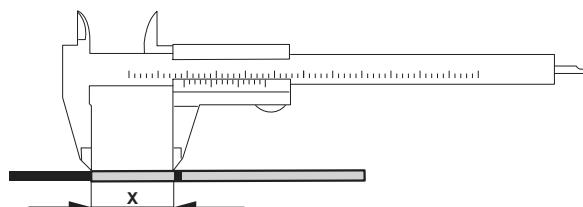
The W37 / W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 146).
3. Remove the screw plug.
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Mark the point on the dipstick where it exits the gear unit. Pull out the dipstick vertically (see following figure).



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5. Determine the section "x" between the wetted part and the marking using a caliper (see following figure).



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = section "x" in mm of the dipstick	
	Mounting position during check	
	M5	M6
Lying on the A-side	Lying on the B-side	
W37 in M4 mounting position	37 ± 1	29 ± 1
W47 in M4 mounting position	41 ± 1	30 ± 1

7. Re-insert and tighten the screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

### **Checking the oil via the screw plug**

Proceed as follows to check the oil of the gear unit:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency:
  - Viscosity (have this carried out by a suitable laboratory if necessary)
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 127).
4. Check the oil level. See previous chapter.

### **Changing the oil via the screw plug**

#### **⚠ WARNING**



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 123).
  2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 146).
  3. Place a container underneath the screw plug.
  4. Remove the screw plugs at the A and B-side of the gear unit.
  5. Drain all the oil.
  6. Re-insert the lower screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).
  7. Add fresh oil of the same type (consult SEW-EURODRIVE if necessary) via the upper screw plug. You must not mix different synthetic lubricants.
    - Add the oil quantity specified on the nameplate or in accordance with the information in chapter "Lubricant fill quantities" (→ 204).
    - Check the oil level in accordance with in chapter "Checking the oil level via screw plug" (→ 143).
  8. Re-insert the upper screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

### 6.6.7 Replacing the oil seal

#### NOTICE

Damage to oil seal when mounted below 0 °C.

Damage to oil seal.

- Store oil seals at ambient temperatures over 0 °C.
- If necessary, heat the oil seal before mounting it.

Proceed as follows:

1. Ensure that there is a sufficient grease reservoir between the dust lip and sealing lip, depending on the gear unit design.
2. If you use double oil seals, the space has to be filled with grease for one third.

### 6.6.8 Painting the gear unit

#### NOTICE

Paint can block the breather valve and damage the sealing lips of the oil seals.

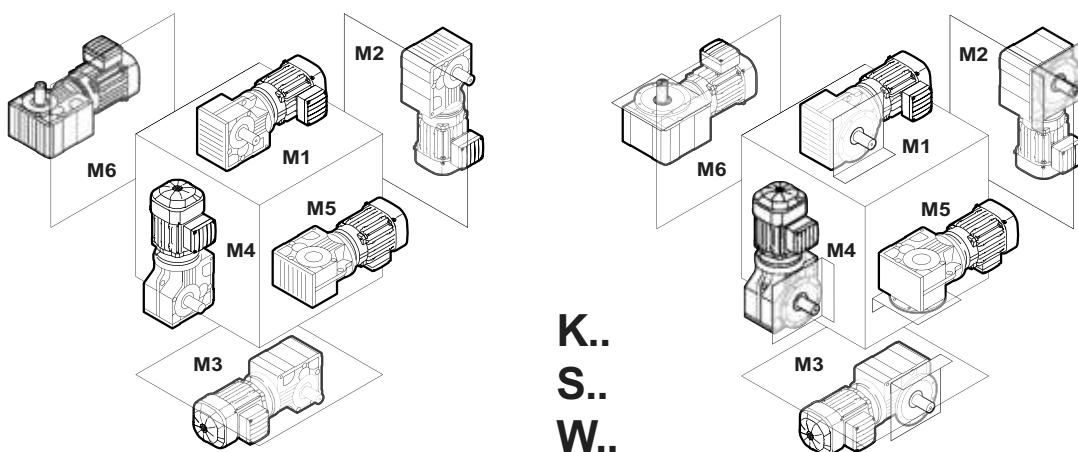
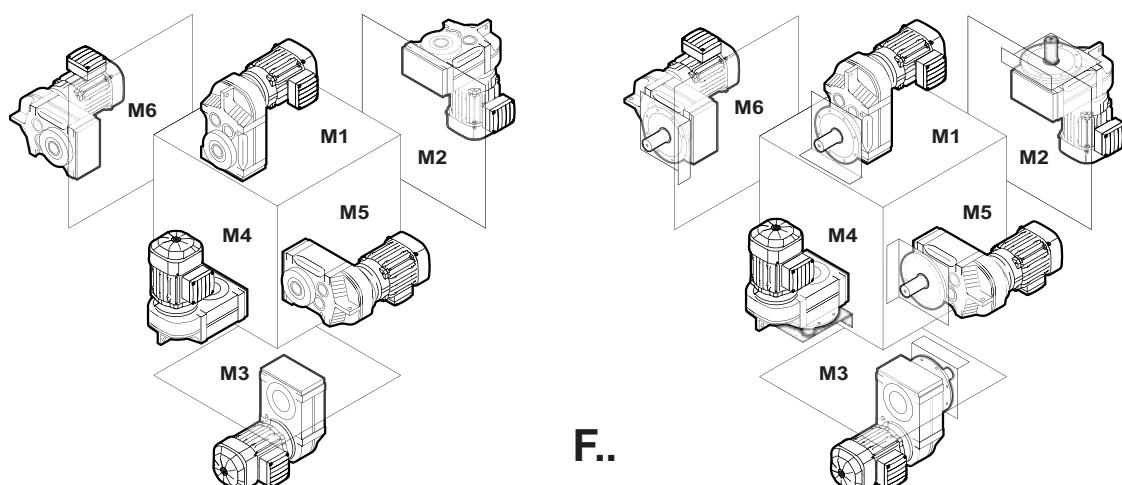
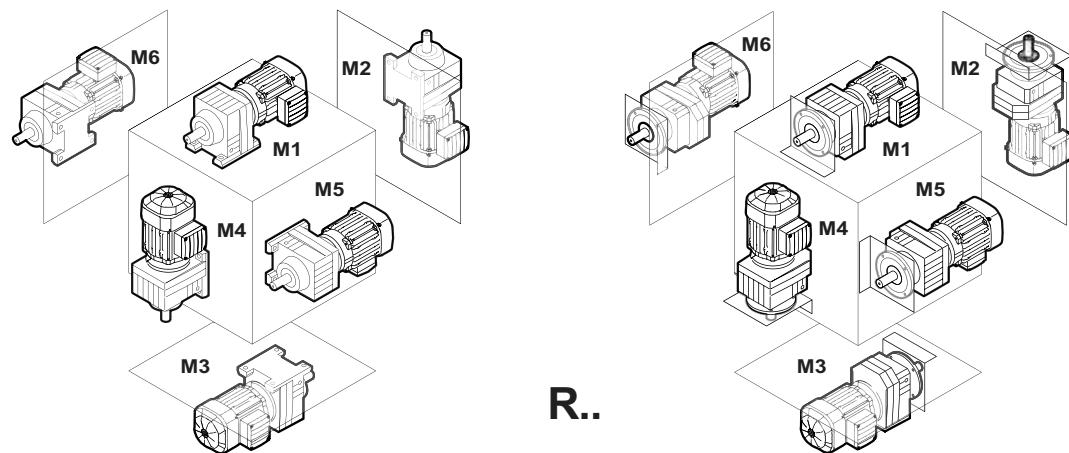
Damage to property.

- Thoroughly cover the breather valve and sealing lip of the oil seals with strips prior to painting/re-painting.
- Remove the strips after painting.

## 7 Mounting positions

### 7.1 Designation of the mounting positions

The following illustration shows the SEW-EURODRIVE mounting positions M1 – M6:



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## 7.2 Churning losses and thermal rating



Churning losses may occur with the following conditions. They must be considered during thermal check:

- A mounting position where the first gear unit stage is fully immersed in the lubricant. The respective mounting positions of the gear units are marked with \* in chapter "Mounting position sheets" (→ 150).
- A high mean input speed and consequently a high circumferential speed of the gear wheels of the input gear stage.

If one or both conditions are present, determine the requirements of the application and the corresponding operating conditions (see chapter "Data for calculating the thermal rating" (→ 147)) and contact SEW-EURODRIVE. SEW-EURODRIVE can calculate the thermal rating based on the actual operating conditions. The thermal rating of the gear unit can be increased by appropriate measures, such as by using a synthetic lubricant with higher thermal endurance properties.

### INFORMATION



To reduce churning losses to a minimum, use gear units preferably in M1 mounting position.

#### 7.2.1 Data for calculating the thermal rating

The following information is required for calculating the thermal rating:

##### Gear unit type and design:

- Gear unit ratio  $i$
- Mean input speed  $n_{em}$  or mean output speed  $n_{am}$  each in  $\text{min}^{-1}$
- Effective motor torque  $M_{eff}$  in Nm
- Input motor power  $P_{Mot}$  in kW
- Mounting position M1 – M6 or pivoting angle

##### Installation site:

- Ambient temperature  $T_{amb}$  in °C
- Installation altitude
- In small, closed rooms or in large rooms (halls) or outdoors

##### Installation situation:

- Space-critical or well ventilated
- Steel base or concrete base

## 7.3 Change of mounting position

Observe the following information when you operate the gearmotor in a mounting position other than the one indicated in the order:

- Adjust the lubricant fill quantity to the changed mounting position.
- Adjust the position of the breather valve.
- When changing the mounting position to M4: Contact SEW-EURODRIVE. Depending on the drive's operating mode, an oil expansion tank might be necessary (see chapter "Oil expansion tank" (→ 108)).

## Mounting positions

Gear unit in pivoted mounting position (dynamic)

- For helical-bevel gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M5 or M6.
- For helical-worm gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M2 or M3.
- For helical gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M2.
- If you change the mounting position to a mounting position that requires more oil, SEW-EURODRIVE recommends to perform a thermal check/project planning again.

### 7.4 Gear unit in pivoted mounting position (dynamic)

The dynamic pivoted mounting position is available on request for gear units of the types R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..9.

In the pivoted mounting position, the gear units are delivered with the maximum required oil fill quantity and sealed with oil screw plugs. The gear unit can be pivoted during operation to the mounting positions required by the customer.

### 7.5 Gear unit in pivoted mounting position (stationary)

The stationary pivoted mounting position is available for all gear units of the type R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..7.

In the stationary pivoted mounting position, the gear units are delivered with the oil fill quantity required for this pivoted mounting position and sealed with oil screw plugs. For gear units with stationary pivoted mounting position, replace the highest screw plug with the supplied breather valve before startup. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

### 7.6 Universal mounting position M0

SPIROPLAN® gear units W10.. – W30.. are available in universal mounting position M0. Because of their compact size, they are fully enclosed and do not have a breather valve. You can use them in any M1 – M6 mounting position without having to adapt the gear unit.

All W10..to W30.. gear units of a certain size have the same oil fill quantity.

## 7.7 Mounting position MX

Mounting position MX is available for all gear units of sizes R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..7 and W..9.

Before startup, make adjustments dependent on the mounting position for gear units in mounting position MX.

In the mounting position MX, the gear units are delivered with the maximum required oil fill quantity and sealed with oil screw plugs. A breather valve is included with each drive. The oil fill volume must be adapted according to the mounting position of the gear unit (see chapter "Lubricant fill quantities" (→ 204)). Customers will also have to mount the enclosed breather valve at the proper location depending on the mounting position, see chapter "Mounting position sheets" (→ 150). When screwing in the breather valve, observe the corresponding tightening torque in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

Check for the correct oil level before startup, as described in chapter "Checking the oil level and changing the oil" (→ 130).

### 7.7.1 Compound gear units in MX mounting position

In MX mounting position, both gear units (primary and subsequent gear unit) are in the same mounting position.

## 7.8 Variable mounting position

The variable mounting position is available by request for gear units types R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..7/W..9.

Before startup, make adjustments dependent on the mounting position for gear units in the variable mounting position.

In the variable mounting position, the gear units are delivered with the maximum required oil fill quantity of the mentioned mounting positions and sealed with oil screw plugs. A breather valve is included with each drive. The enclosed breather valve must be mounted in the proper location depending on the mounting position, see chapter "Mounting position sheets" (→ 150). When screwing in the breather valve, observe the corresponding tightening torque in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 39).

## 7.9 Mounting position sheets

### 7.9.1 Key to the mounting position sheets

#### INFORMATION



The positions of the breather valve, oil level plug, and oil drain plug specified in the mounting position sheets are binding and comply with the assembly specifications.

The motors are only depicted symbolically on the mounting position sheets.

#### INFORMATION



**For gear units with solid shaft:** The displayed shaft is always on the A-side.

**For shaft-mounted gear units:** The shaft with dashed lines represents the customer shaft. The output end (= output shaft position) is always shown on the A-side.

#### INFORMATION



SPIROPLAN® gearmotors do not depend on the mounting position. An exception are W..37, W..47, W..29 and W..39 gearmotors in M4 mounting position. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

#### INFORMATION



SPIROPLAN® gearmotors W..10 to W..30 cannot be equipped with breather valves, oil level plugs or oil drain plugs.

SPIROPLAN® gearmotors W..37, W..47, W..29 and W..39 are equipped with breather valves in mounting position M4 and with oil drain plugs in mounting position M2.

#### INFORMATION



Some gear units can be supplied in mounting position M0. In this case, the gear unit is delivered in a universal mounting position and can be adjusted to various mounting positions by the customer. It may be necessary to contact SEW-EURODRIVE.

### Symbols used

The following table shows the symbols used in the mounting position sheets.

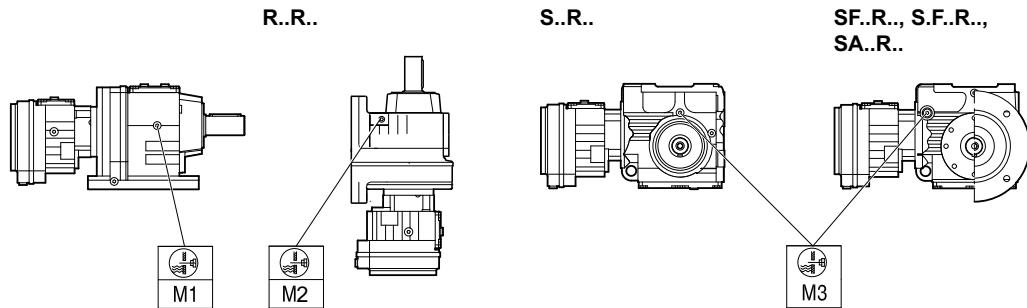
Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug

### 7.9.2 Position of the oil level plug of compound gear units

To ensure sufficient lubrication of the first gear unit (larger gear unit) in case of compound gear units, the following gear units have a higher oil level in the specified mounting positions:

- Helical gear unit type R..R in mounting position M1 and M2
- Helical-worm gear unit type S..R in mounting position M3

The oil level plugs are located at the following positions, deviating from the specifications on the mounting position sheets:



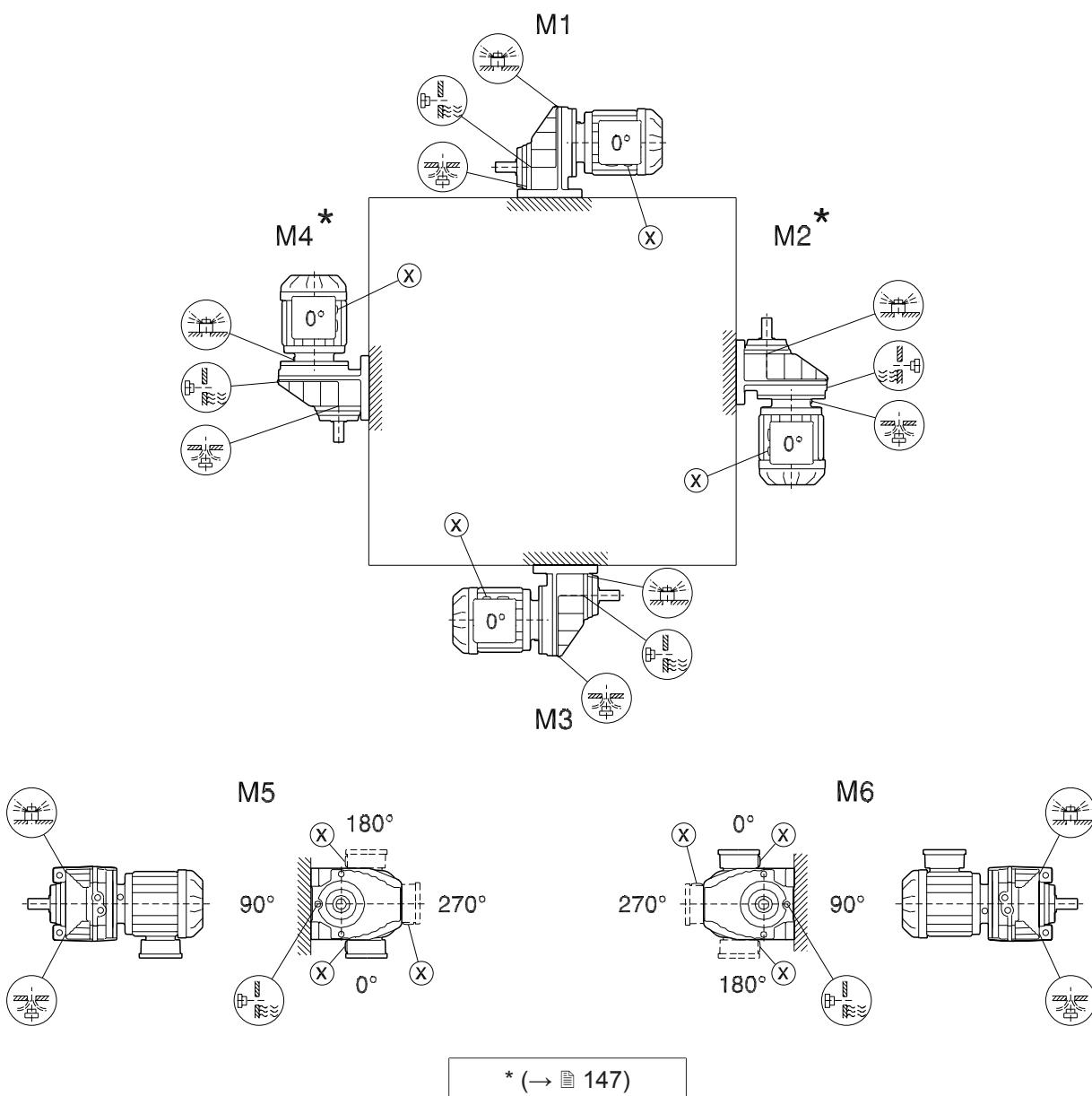
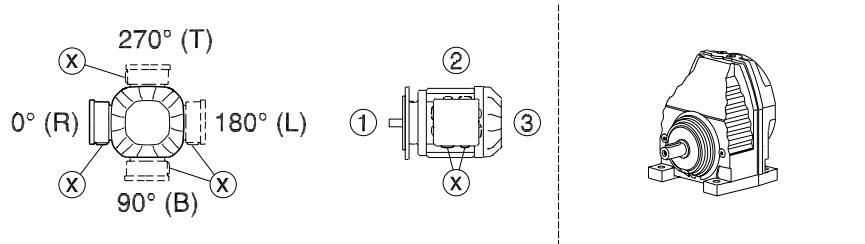
15987248395

Icon	Meaning
A circular icon containing a stylized oil droplet and a plug symbol.	Oil level plug

## 7.9.3 Mounting positions of helical gearmotors

RX57-RX107

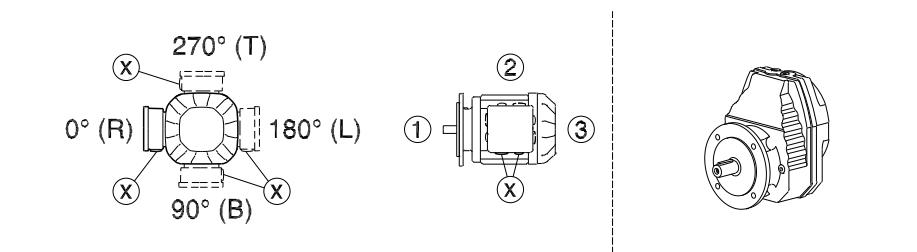
04 043 03 00



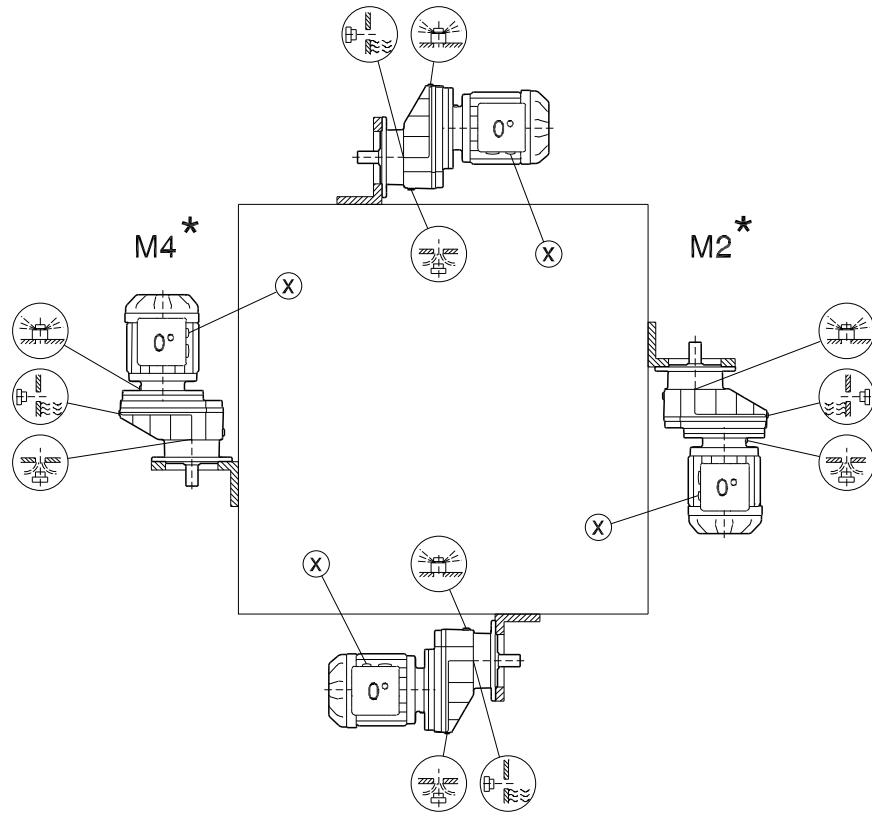
\* (→ 147)

## RXF57-RXF107

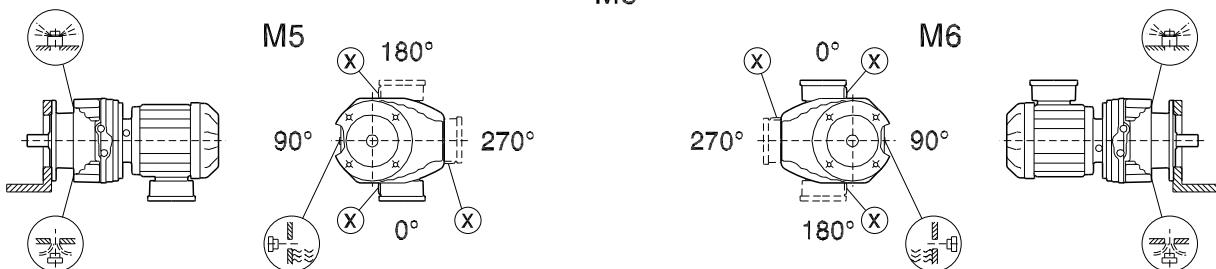
04 044 03 00



M1

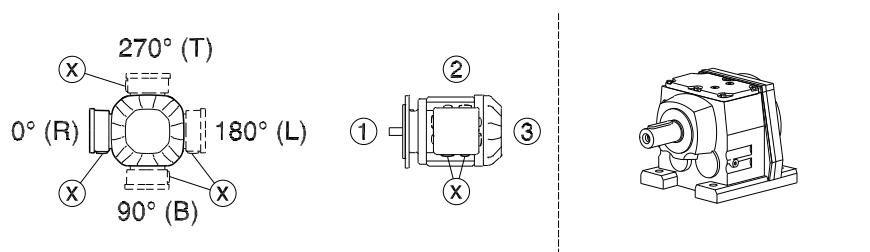


M3

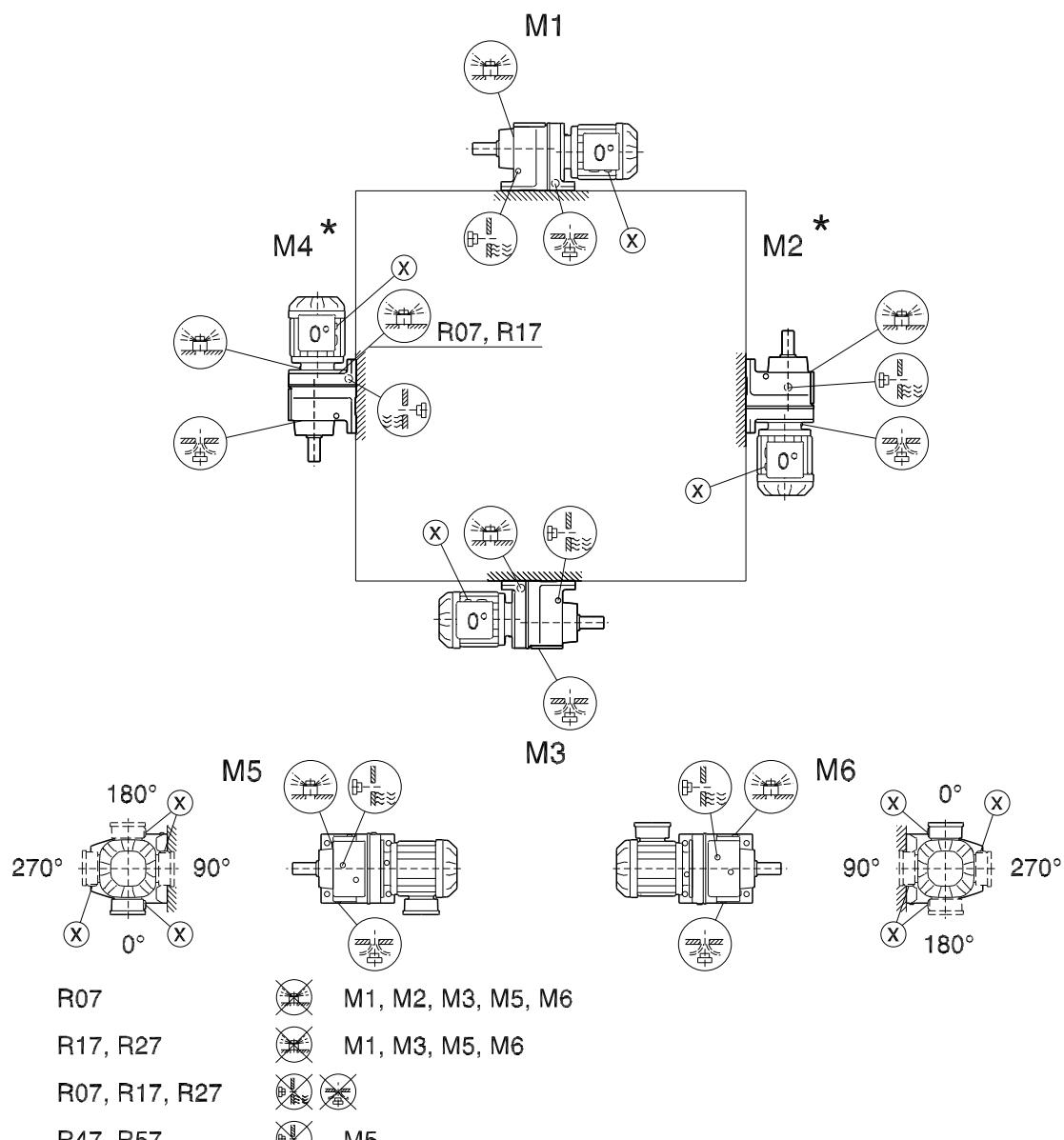


\* (→ 147)

R07-R167



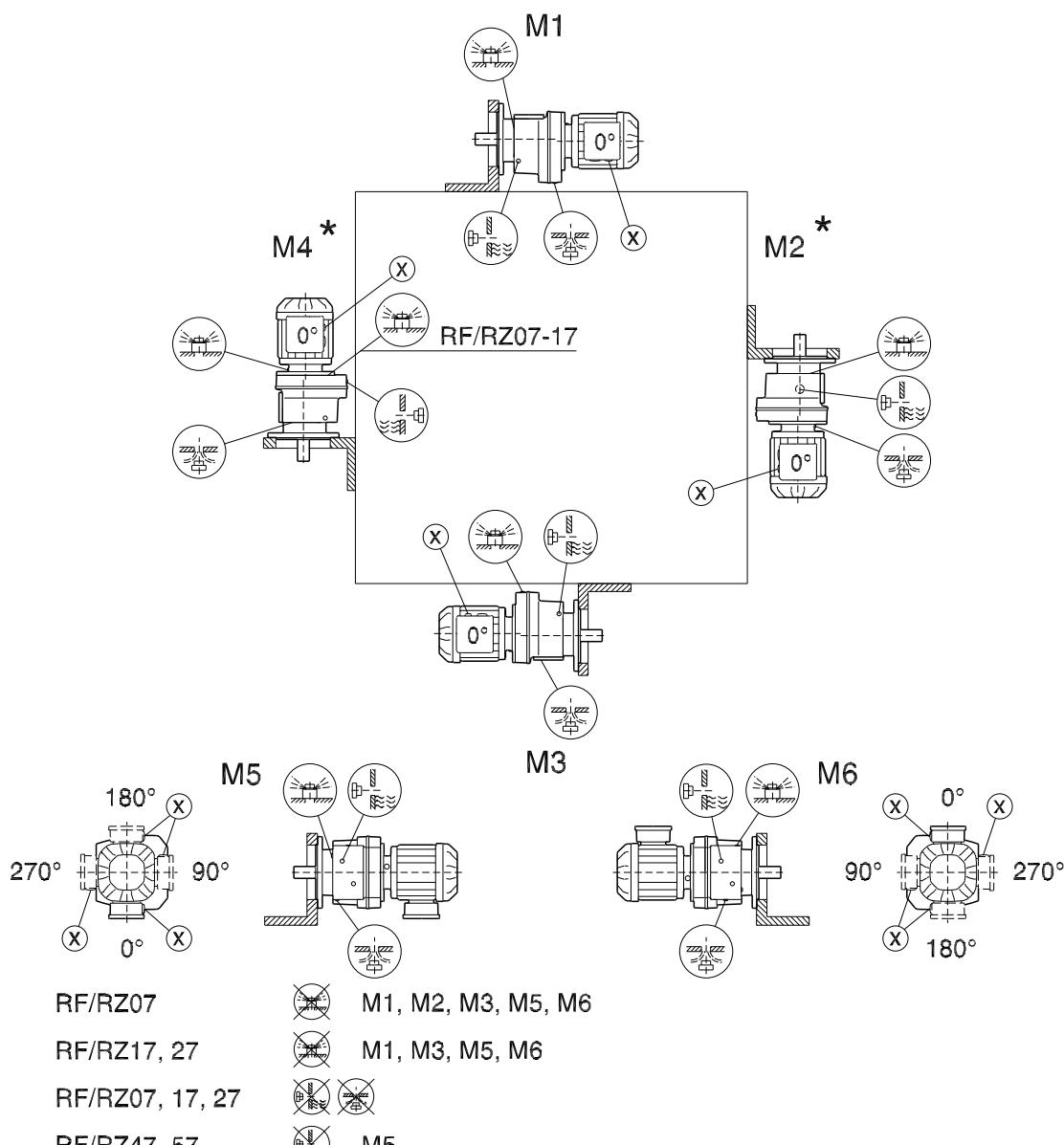
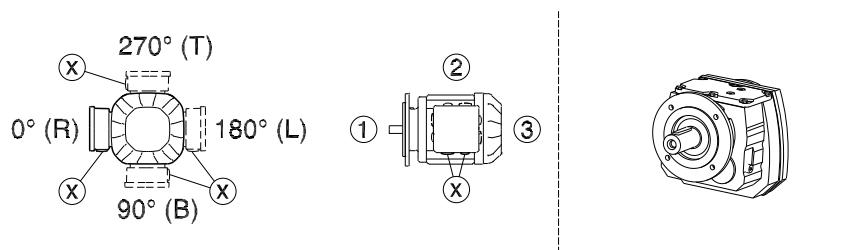
04 040 04 00



\* (→ 147)

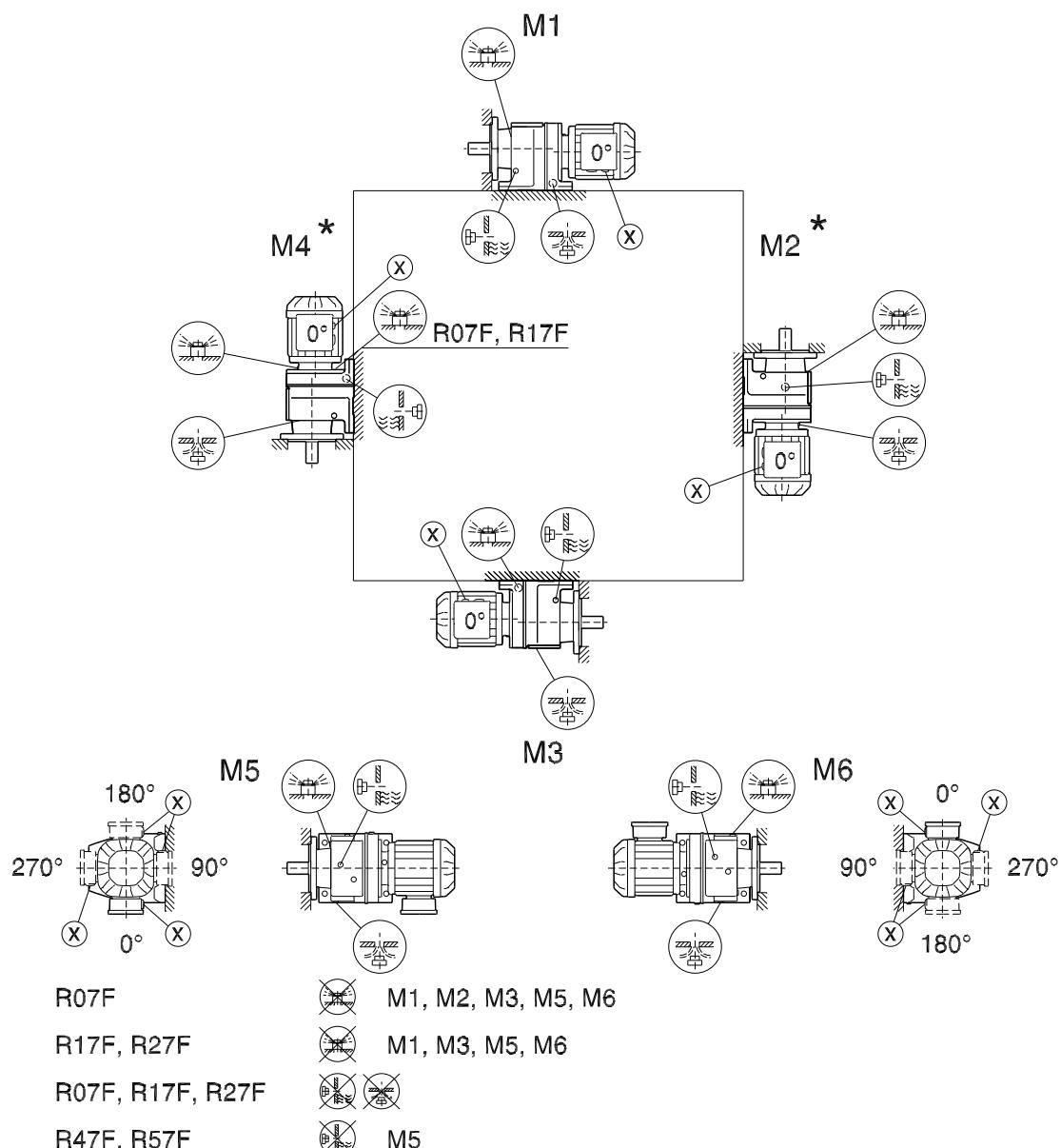
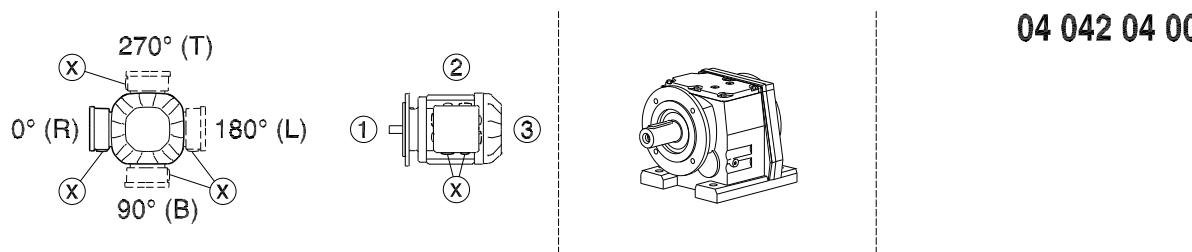
## RF07-RF167, RZ07-RZ87, RM57-RM167

04 041 04 00



\* (→ 147)

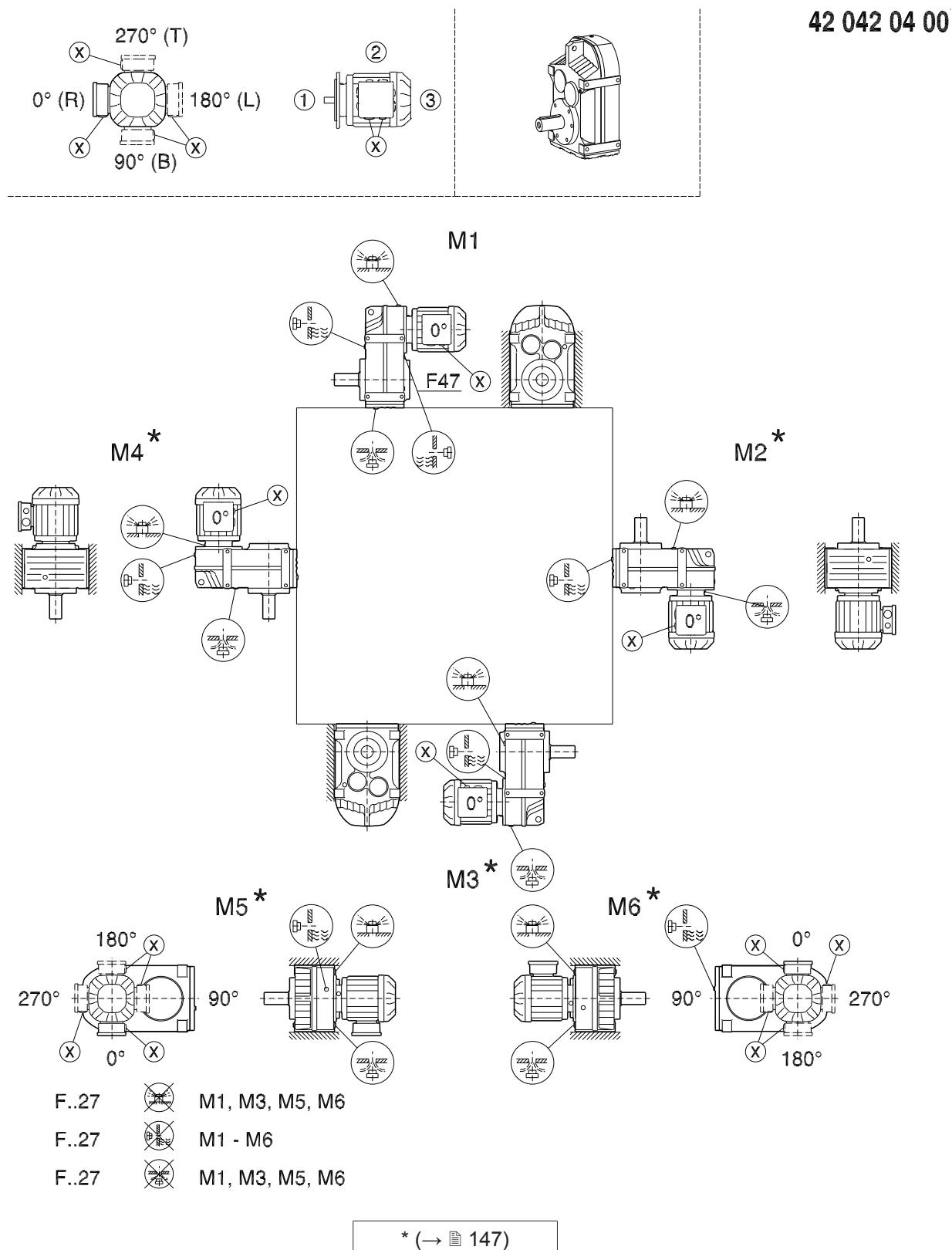
## R07F-R87F



\* (→ 147)

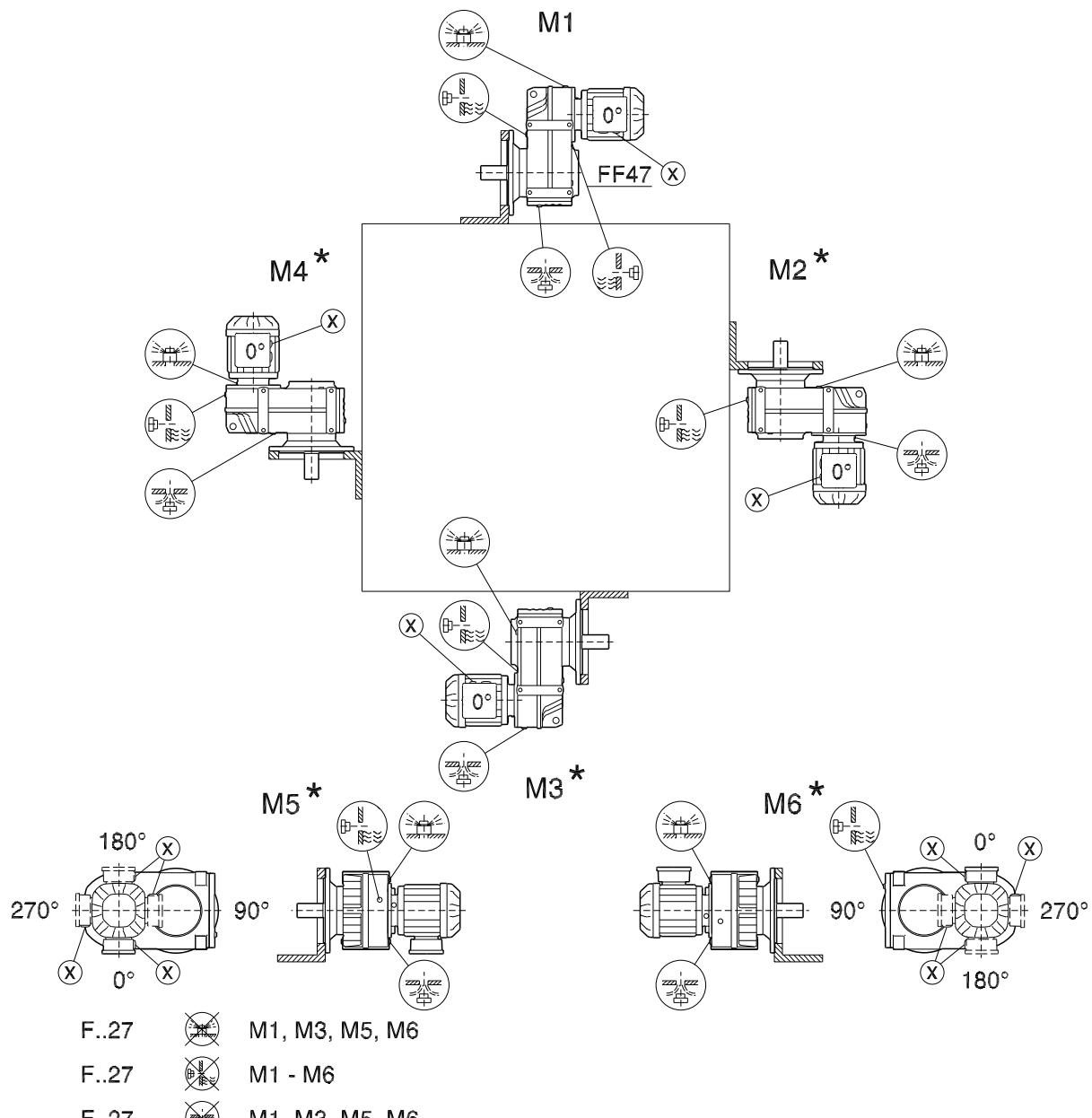
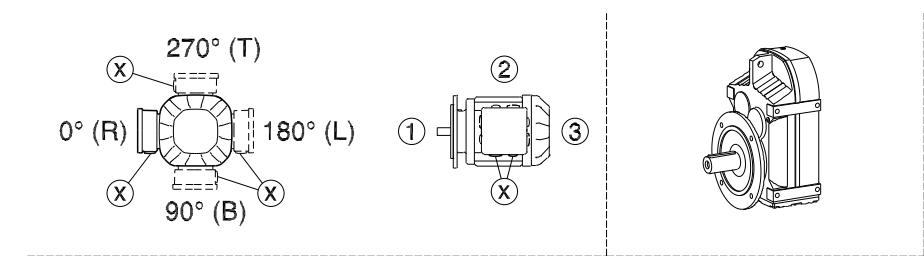
## 7.9.4 Mounting positions of parallel-shaft helical gearmotors

F/FA..B/FH27B-157B, FV27B-107B



FF/FAF/FHF/FZ/FAZ/FHZ27-157, FVF/FVZ27-107, FM/FAM67-157

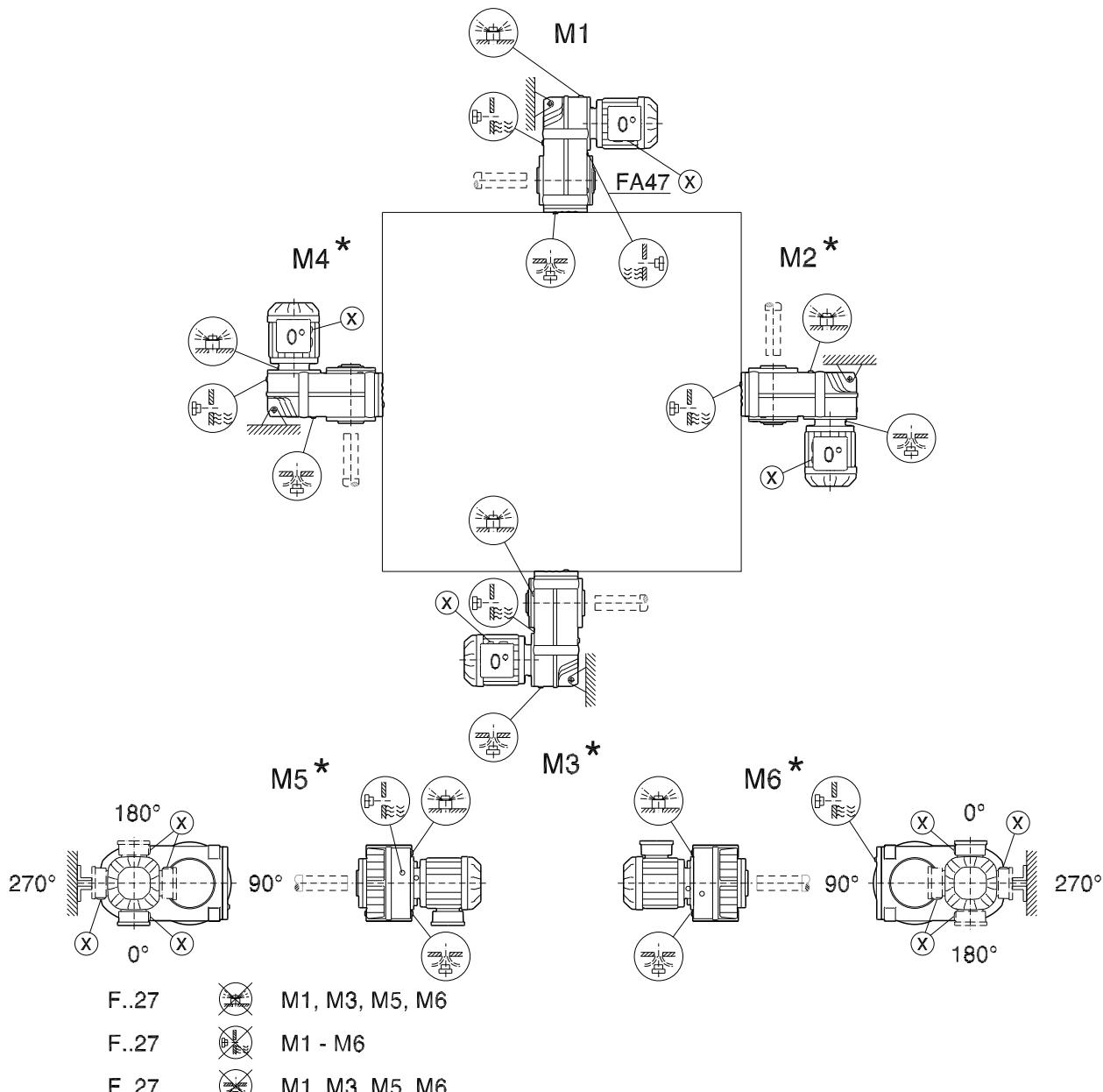
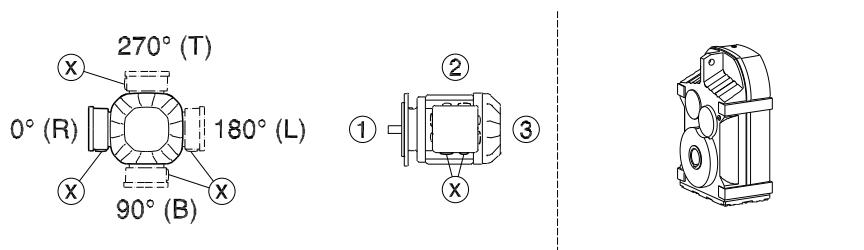
42 043 04 00



\* (→ 147)

## FA/FH27-157, FV27-107, FT37-97

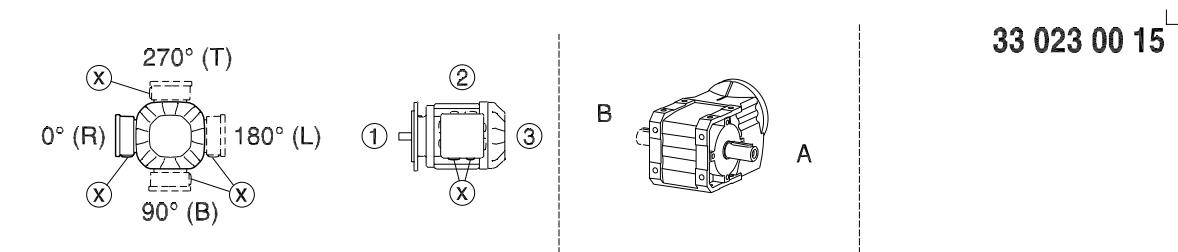
42 044 04 00



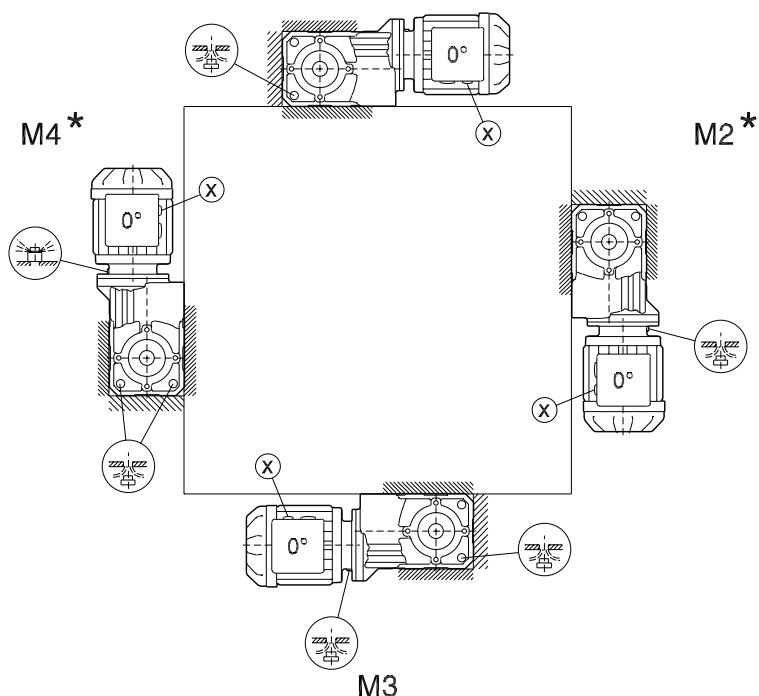
\* (→ 147)

## 7.9.5 Mounting positions of helical-bevel gearmotors

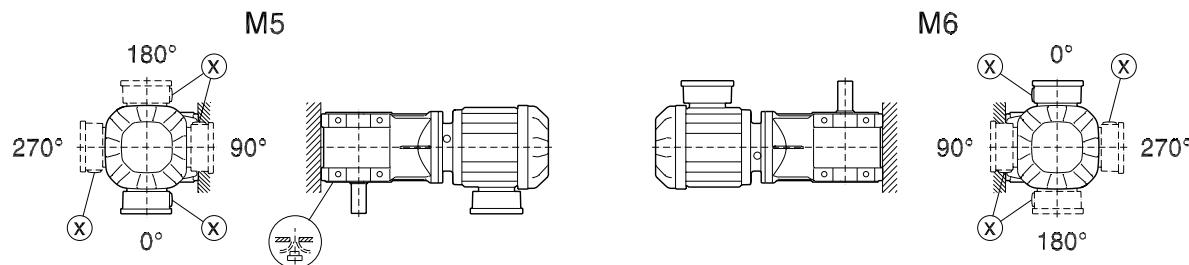
K/KA..B/KH19B-29B



M1



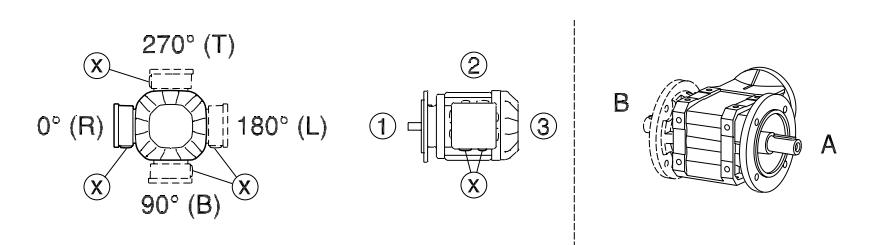
M3



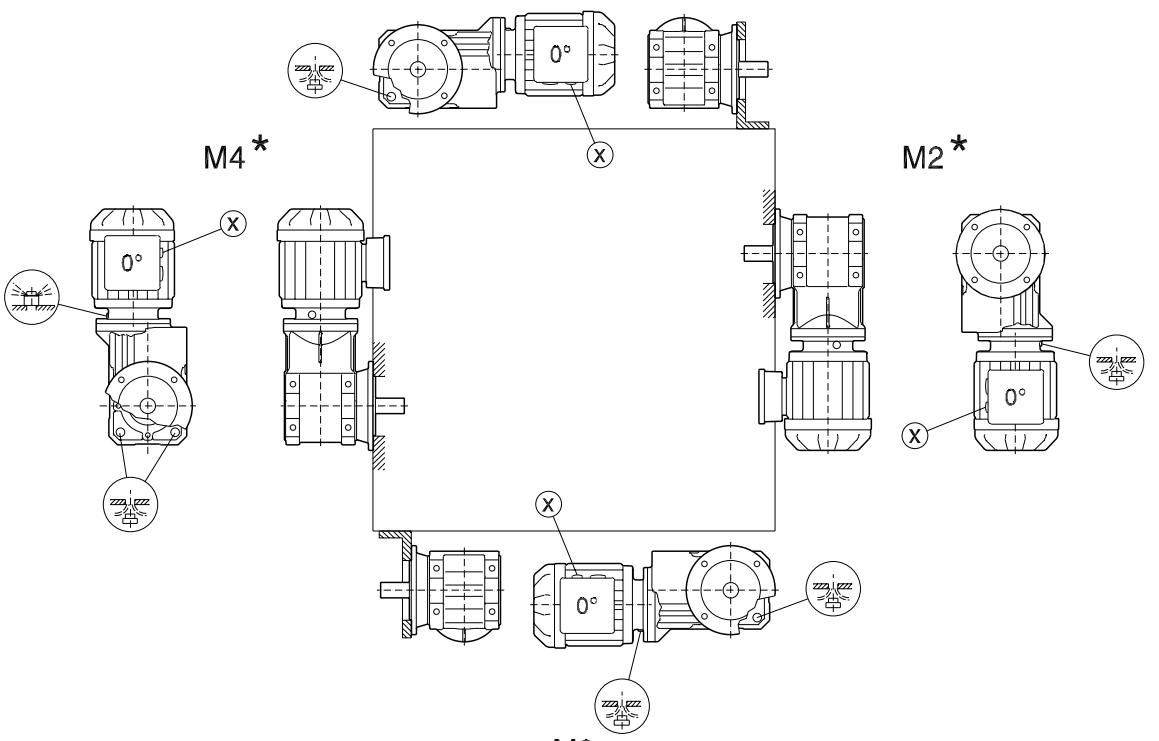
\* (→ 147)

## KF..B/KAF..B/KHF19B-29B

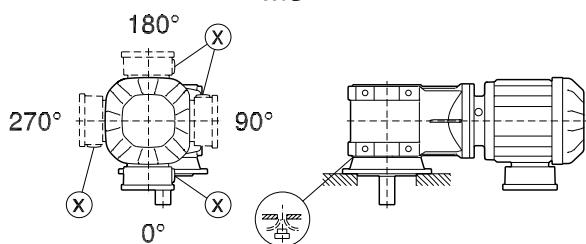
33 024 00 15



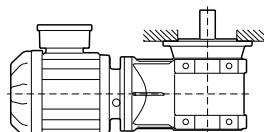
M1



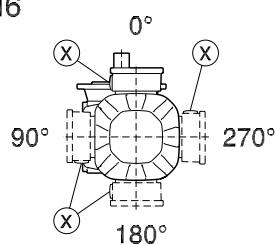
M5



M3



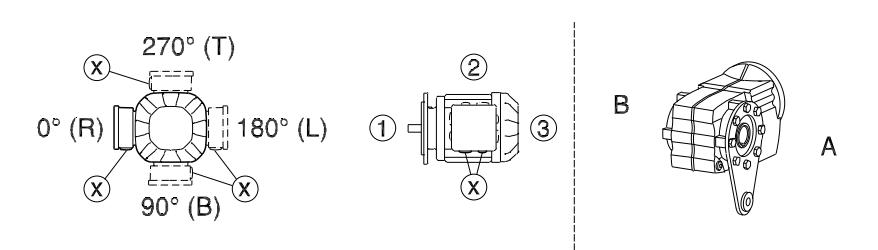
M6



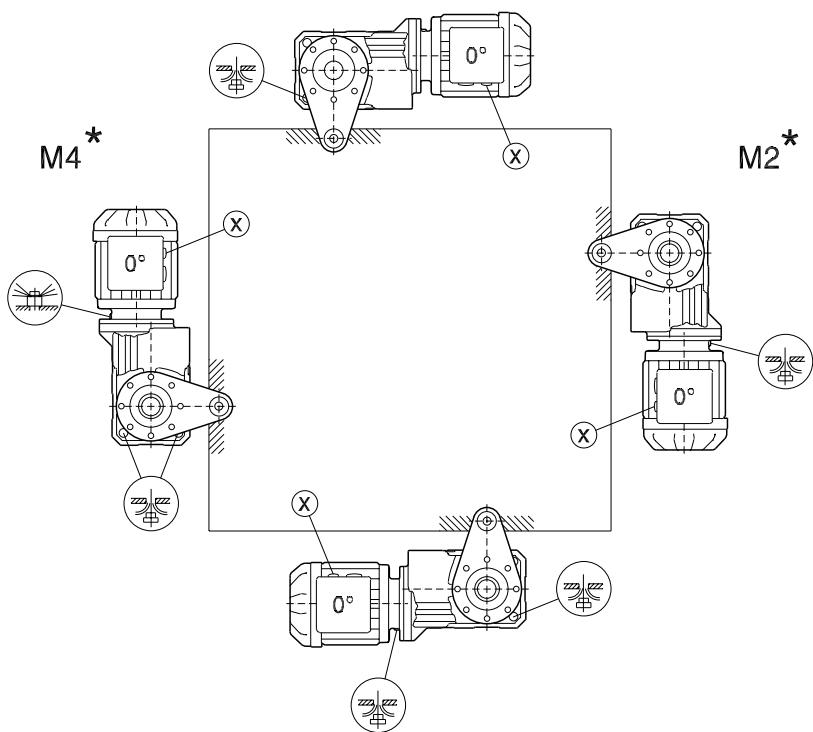
\* (→ 147)

## KA..B/KH19B-29B

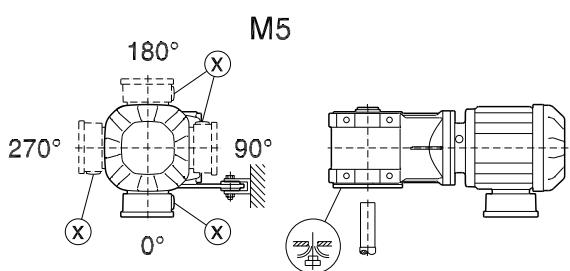
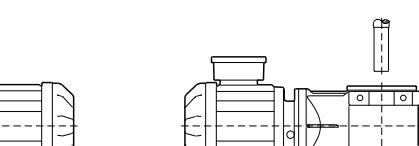
33 025 00 15



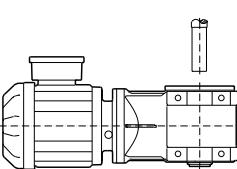
M1



M3



M5

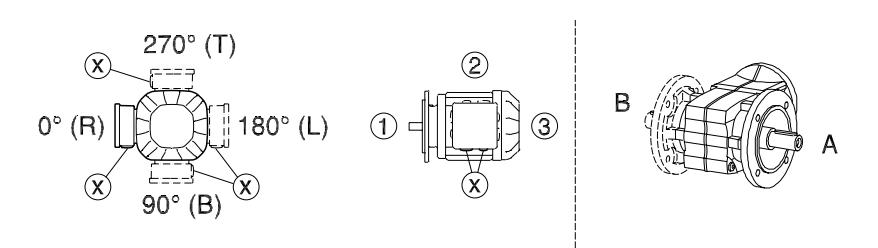


M6

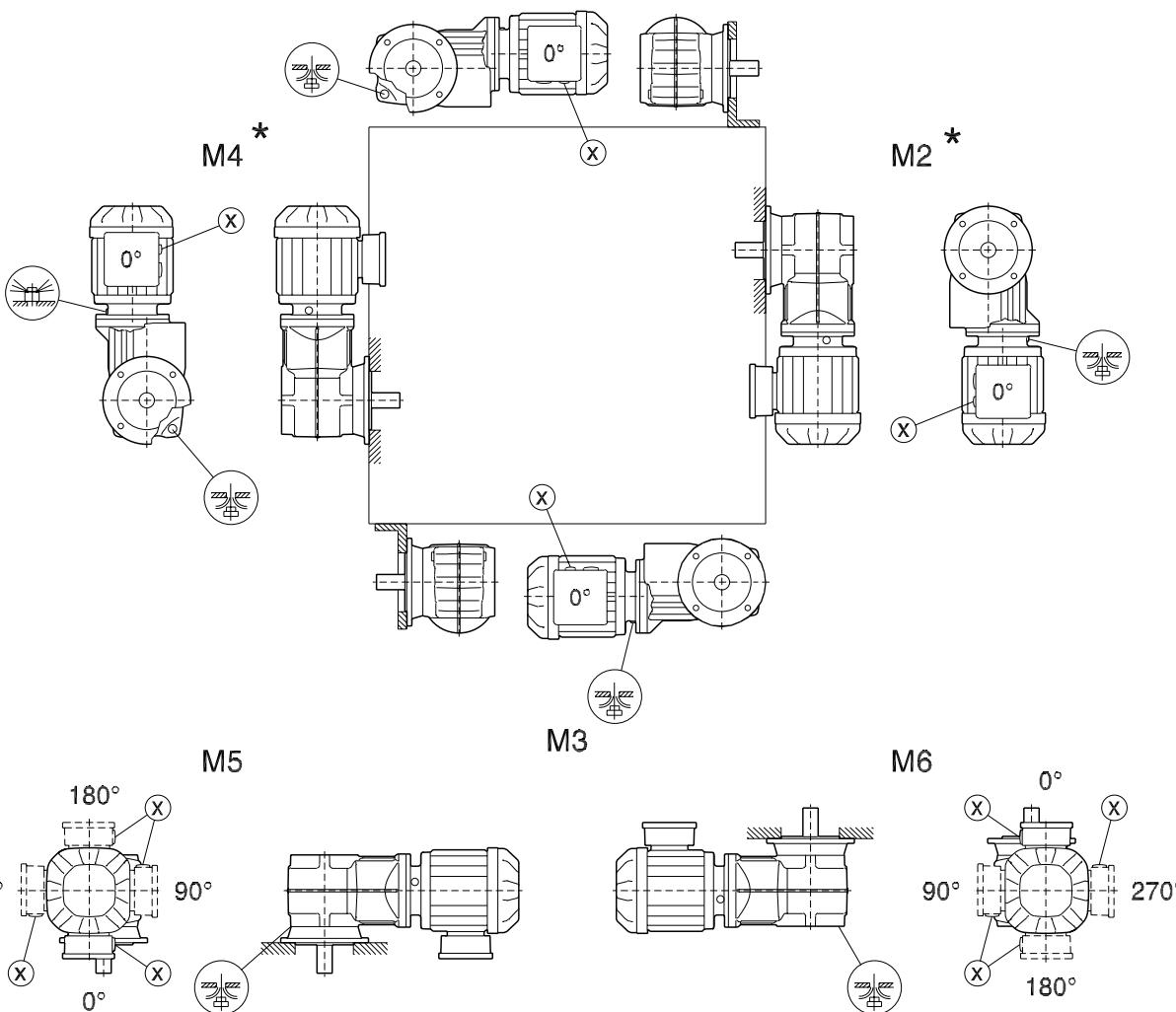
\* (→ 147)

## KF/KAF/KHF19-29

33 026 00 15



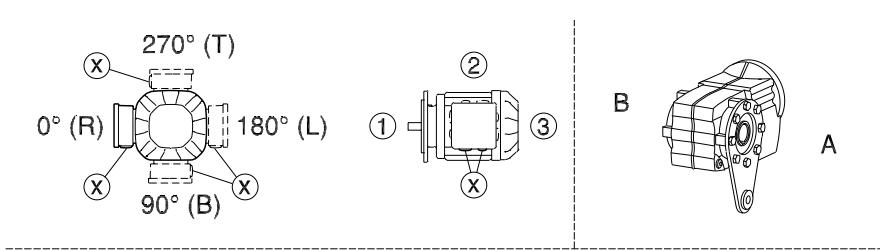
M1



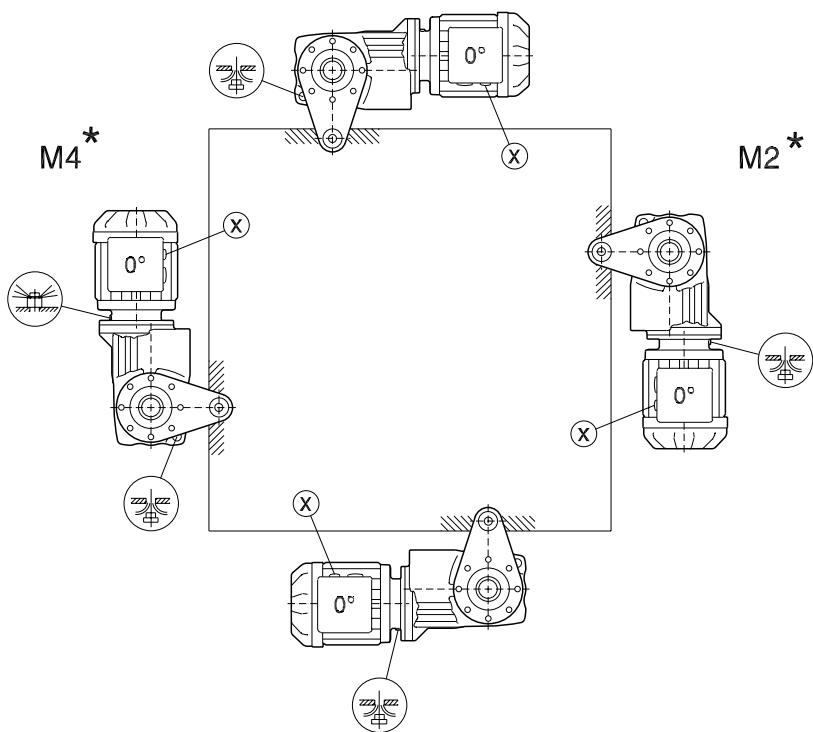
\* (→ 147)

## KA/KH/KT19-29

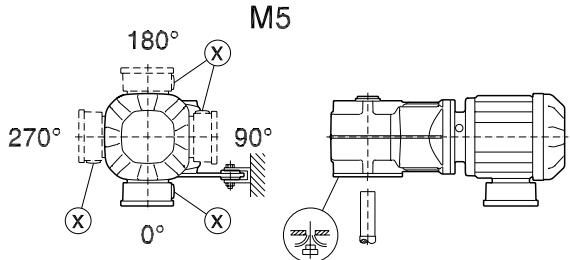
33 027 00 15



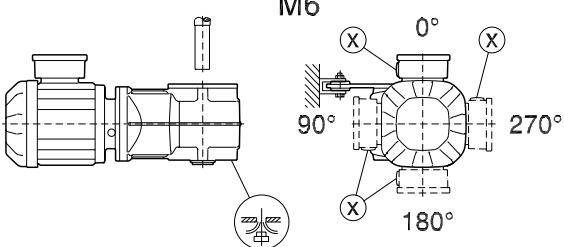
M1



M3

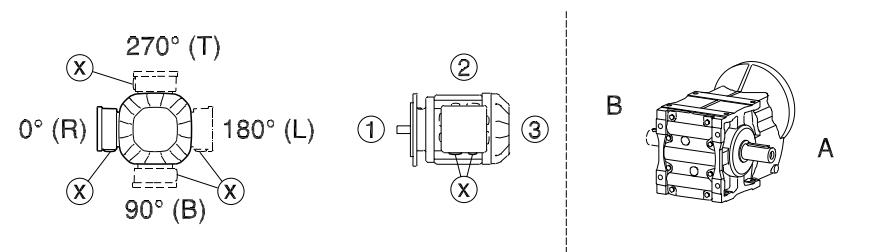


M6

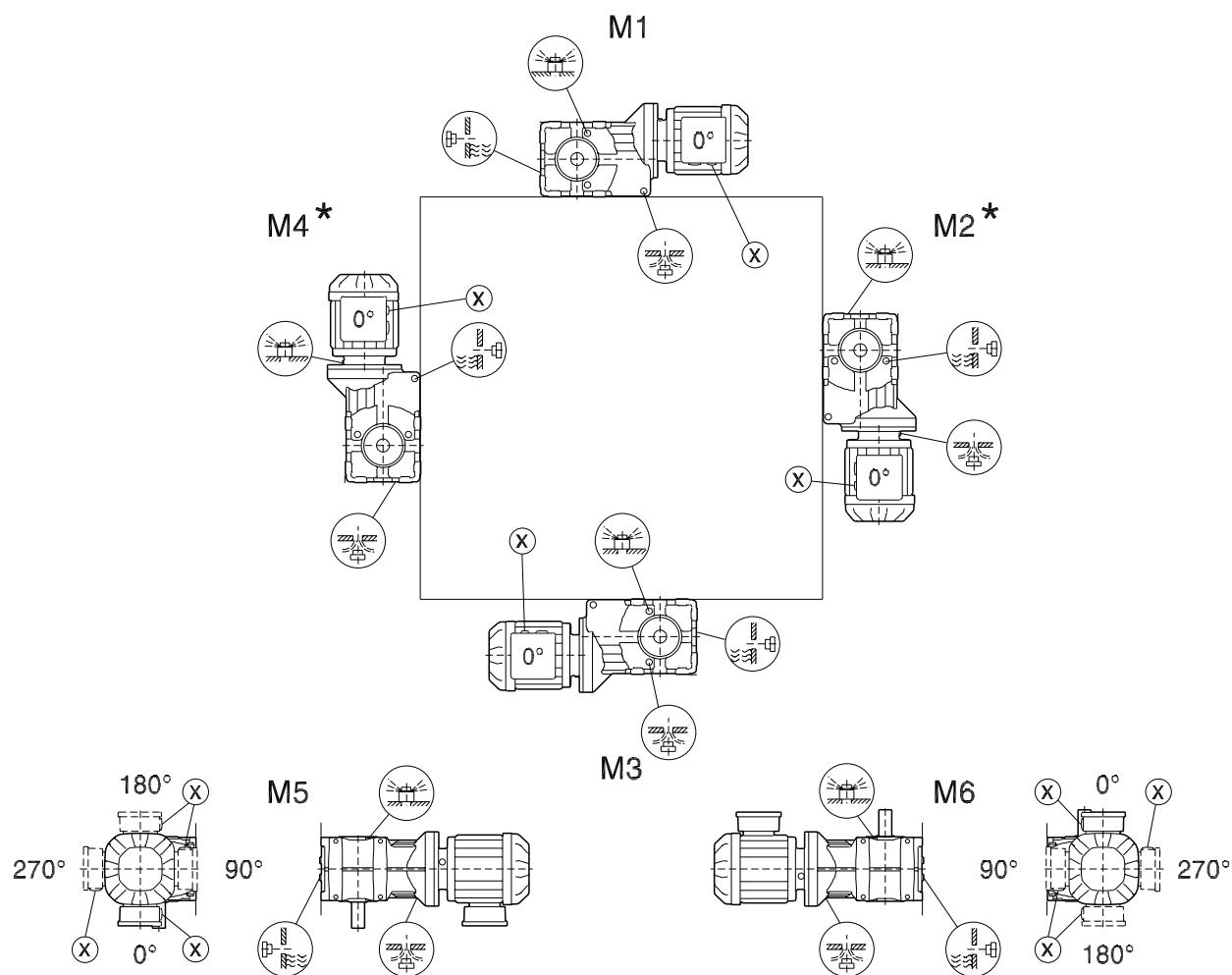


\* (→ 147)

## K/KA..B39-49

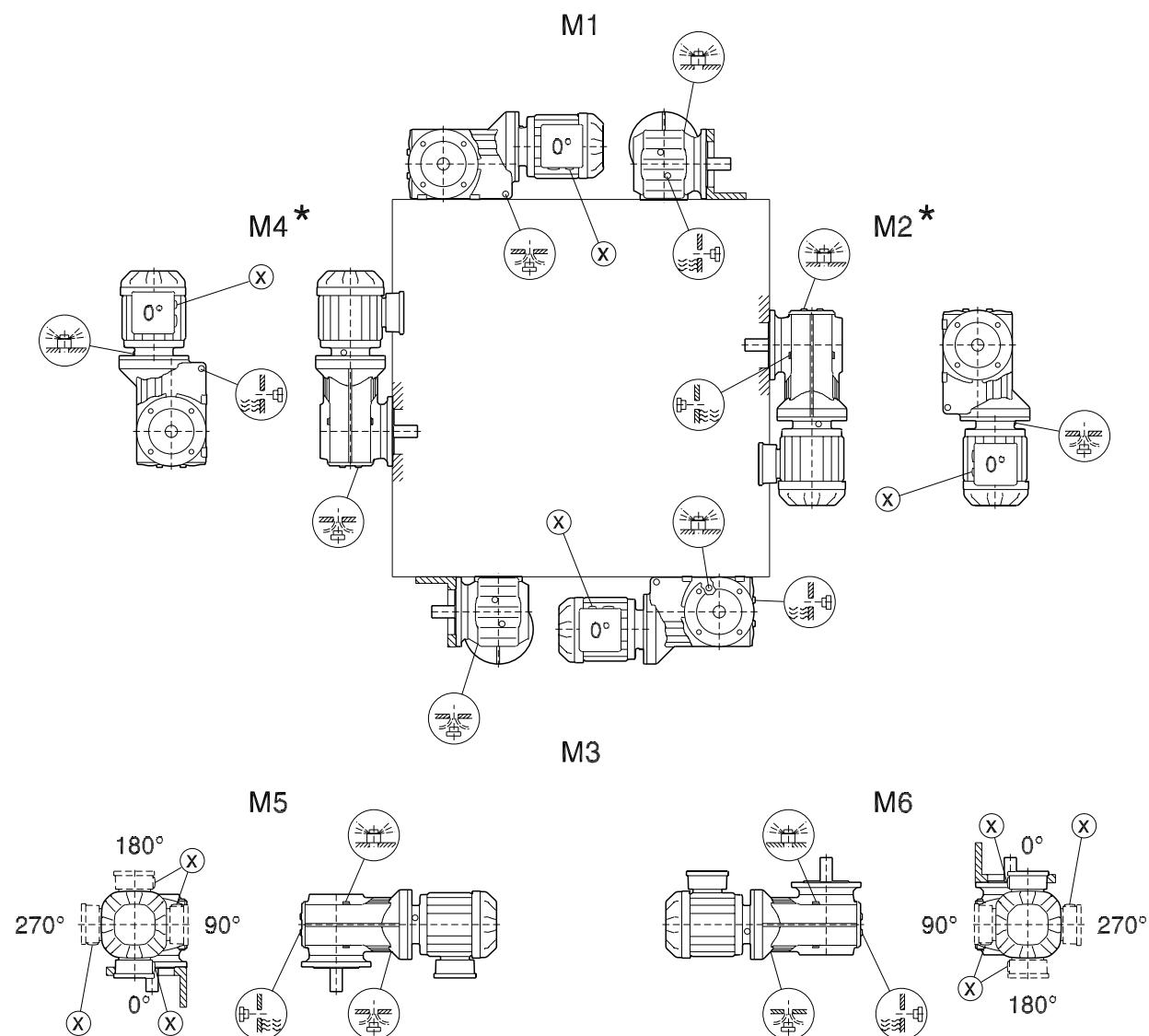
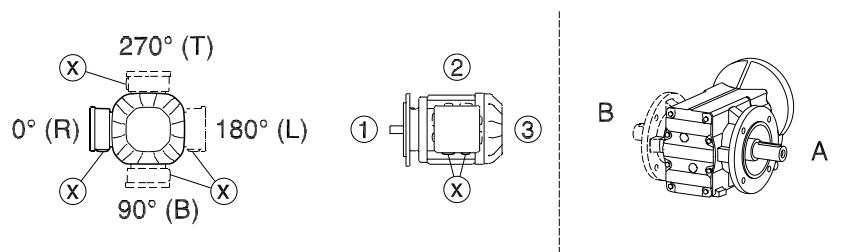


33 092 03 14



\* (→ 147)

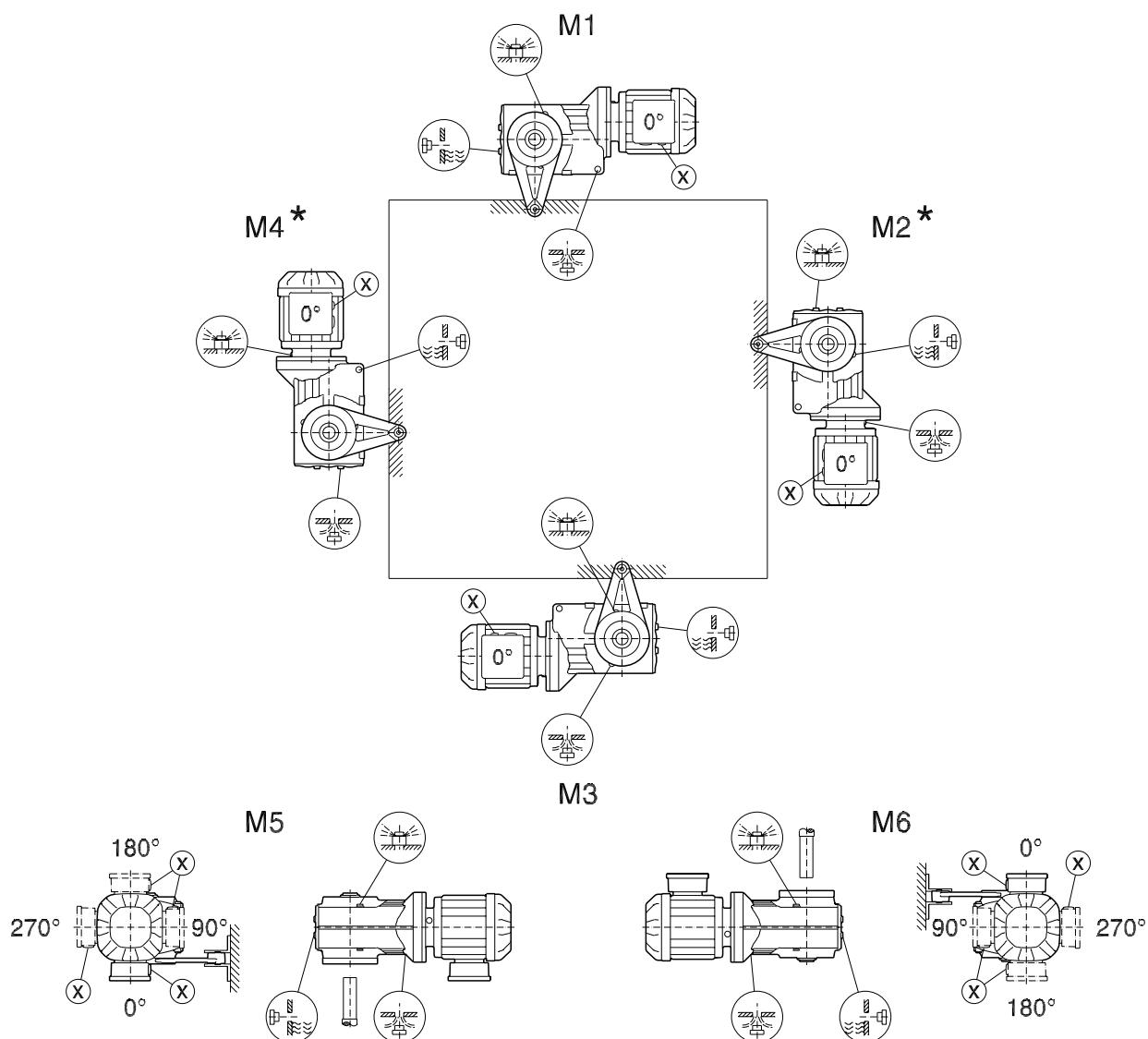
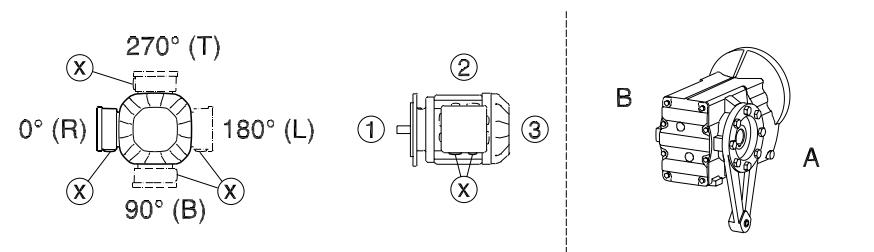
## KF/KAF/KHF39-49



\* (→ 147)

## KA/KH/KT39-49

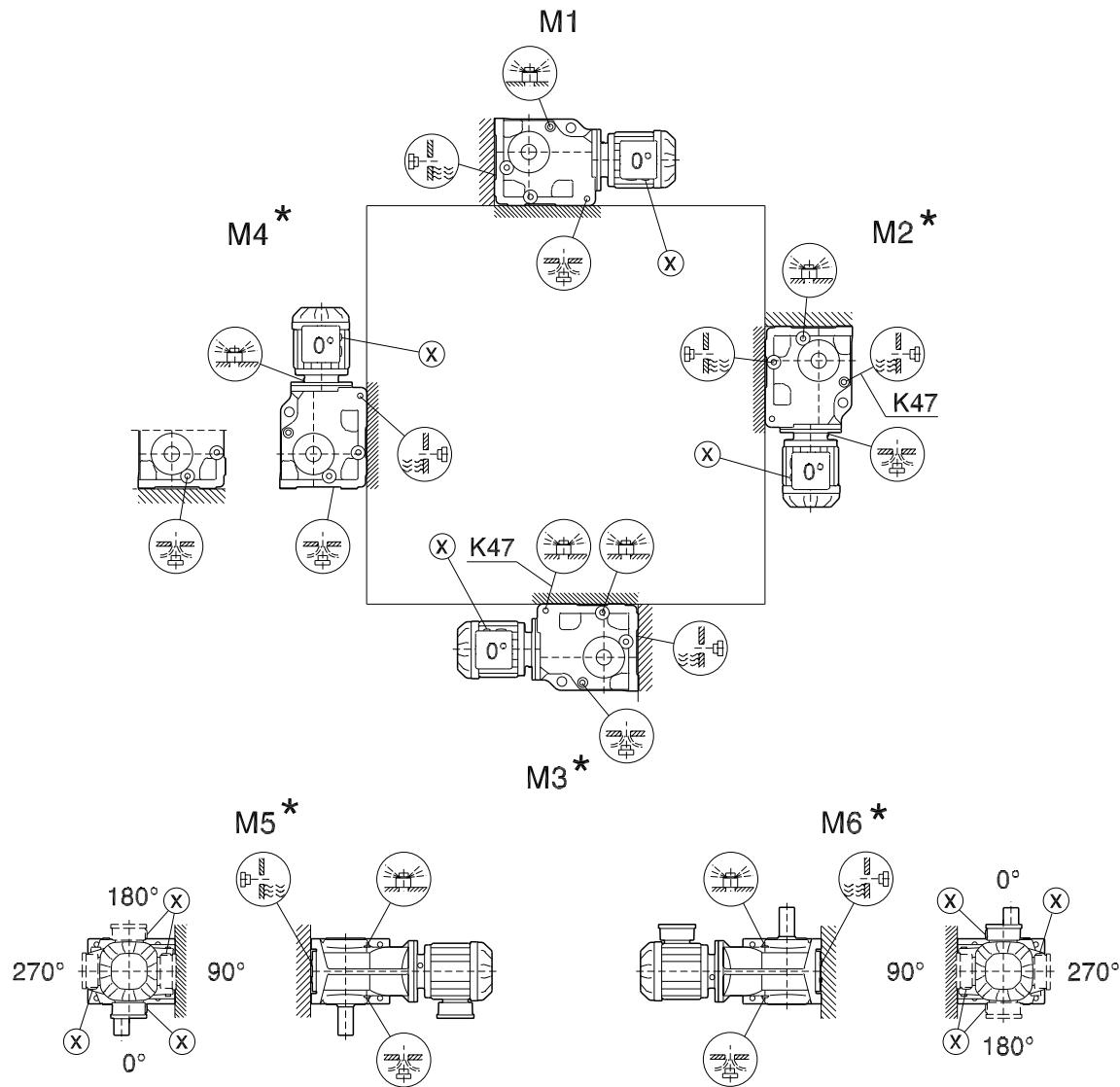
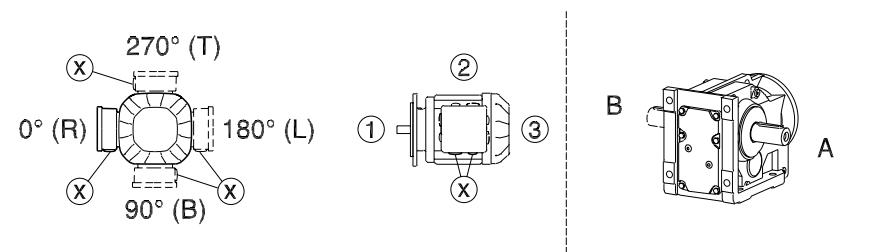
33 094 01 14



\* (→ 147)

K37-157/KA..B/KH47B-157B, KV47B-107B

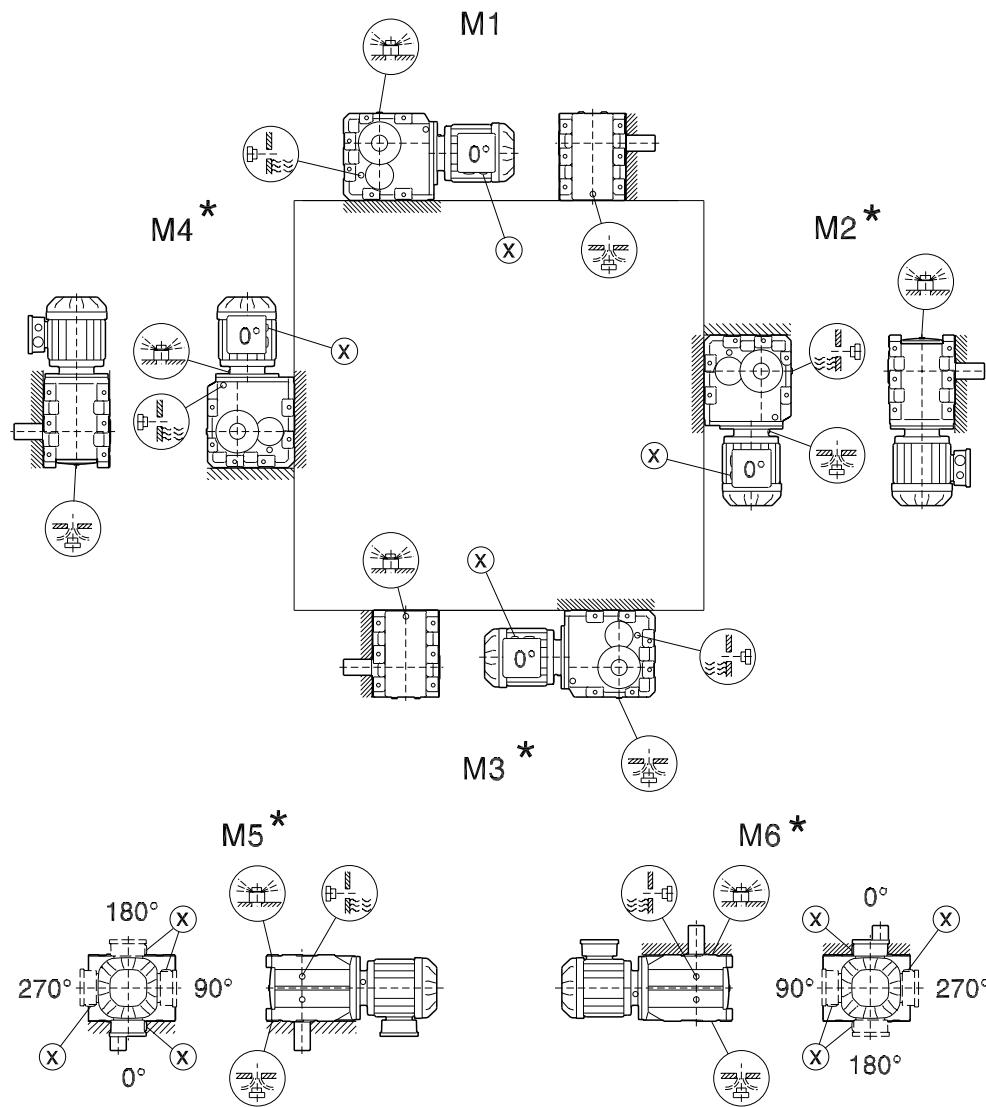
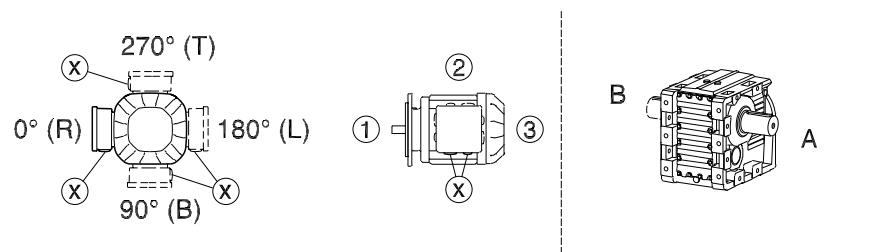
34 025 05 00



\* (→ 147)

## K167-187, KH167B-187B

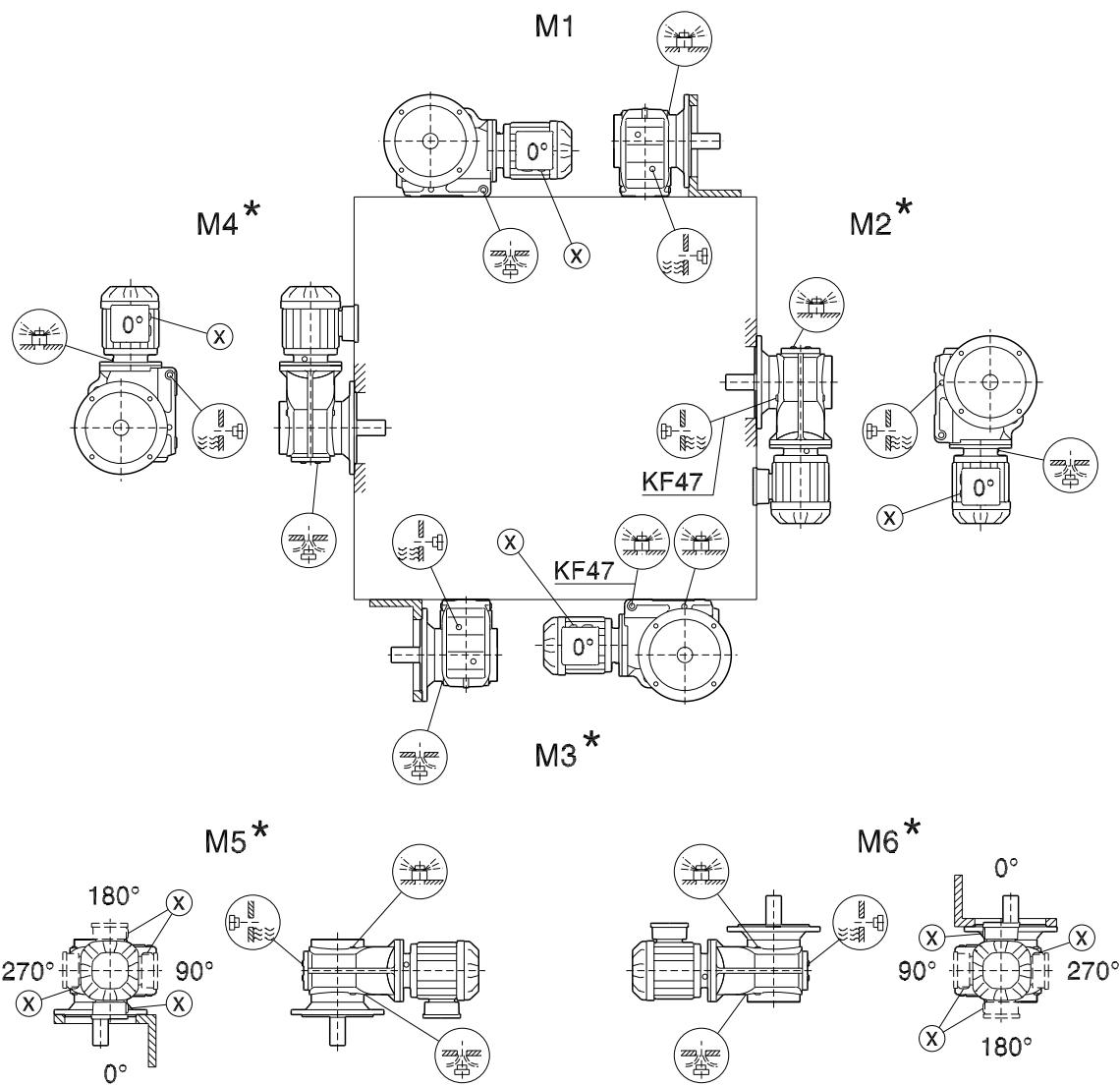
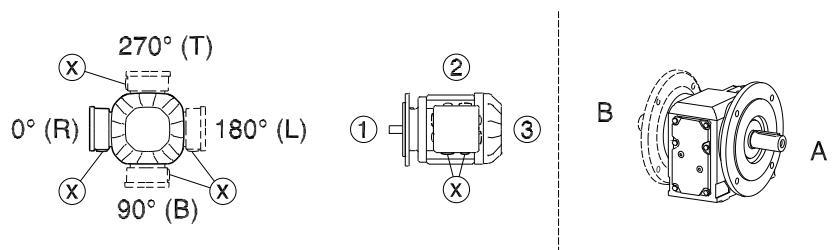
34 026 05 00



\* (→ 147)

## KF/KAF/KHF/KZ/KAZ/KHZ37-157, KVF/KVZ37-107, KM/KAM67-157

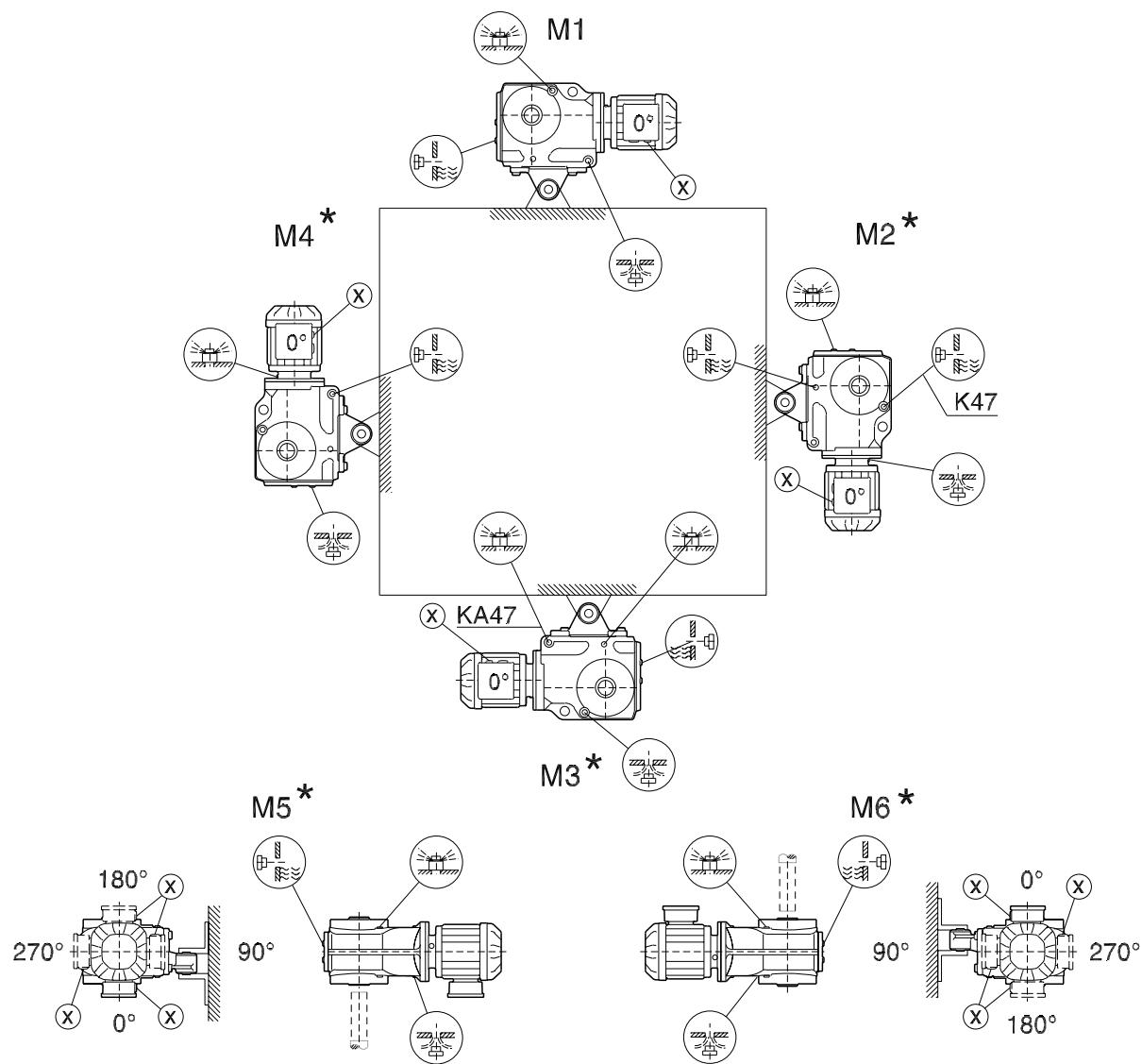
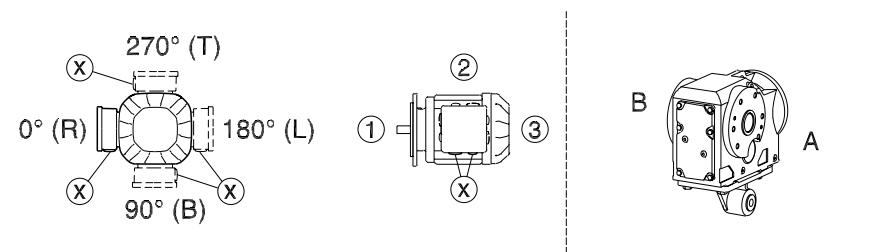
34 027 04 00



\* (→ 147)

## KA/KH37-157, KV37-107, KT37-97

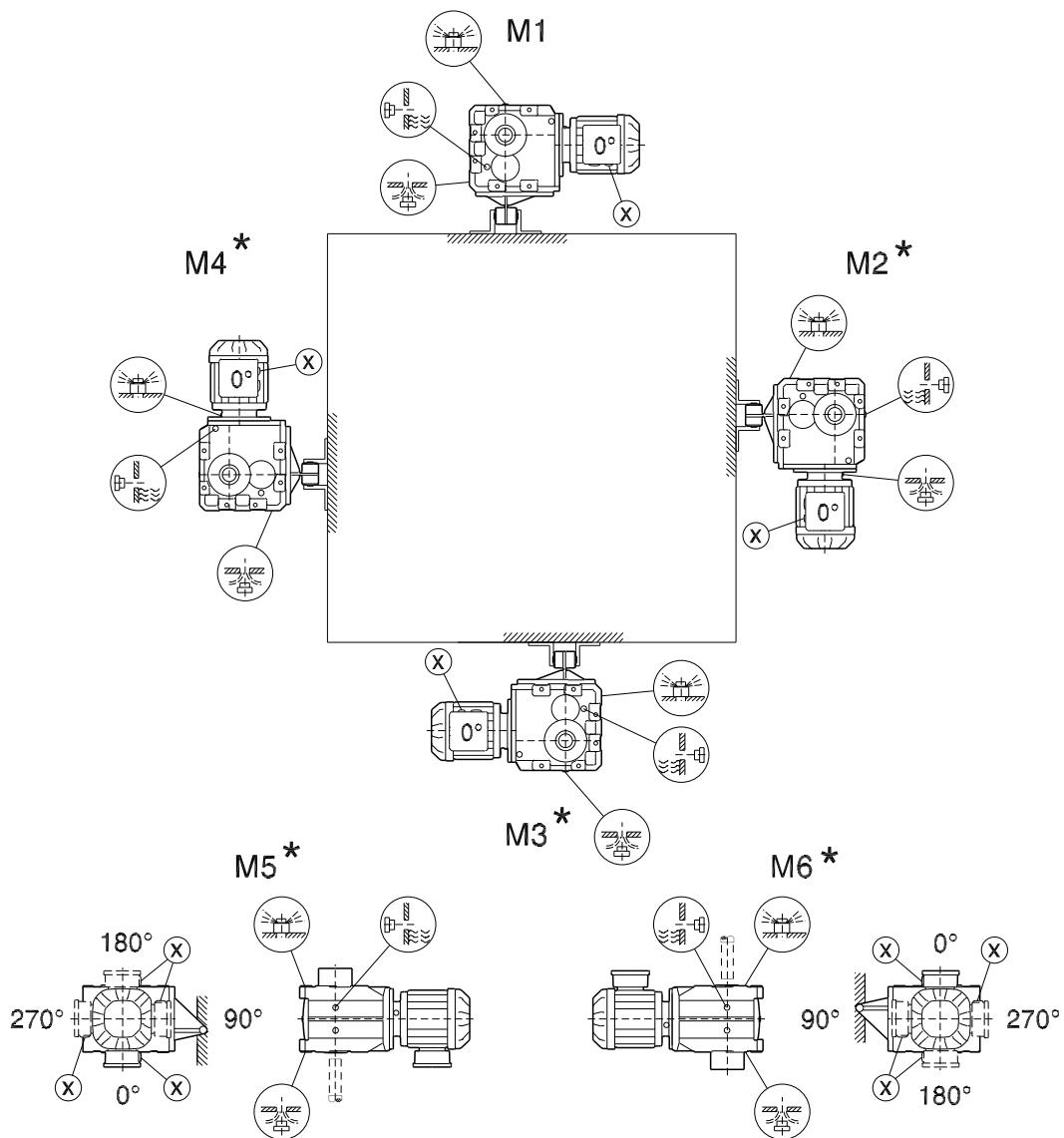
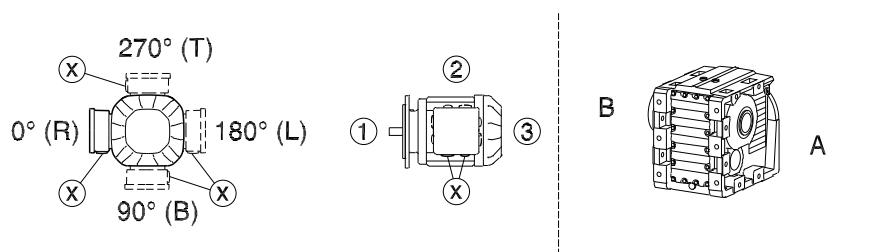
39 025 05 00



\* (→ 147)

KH167-187

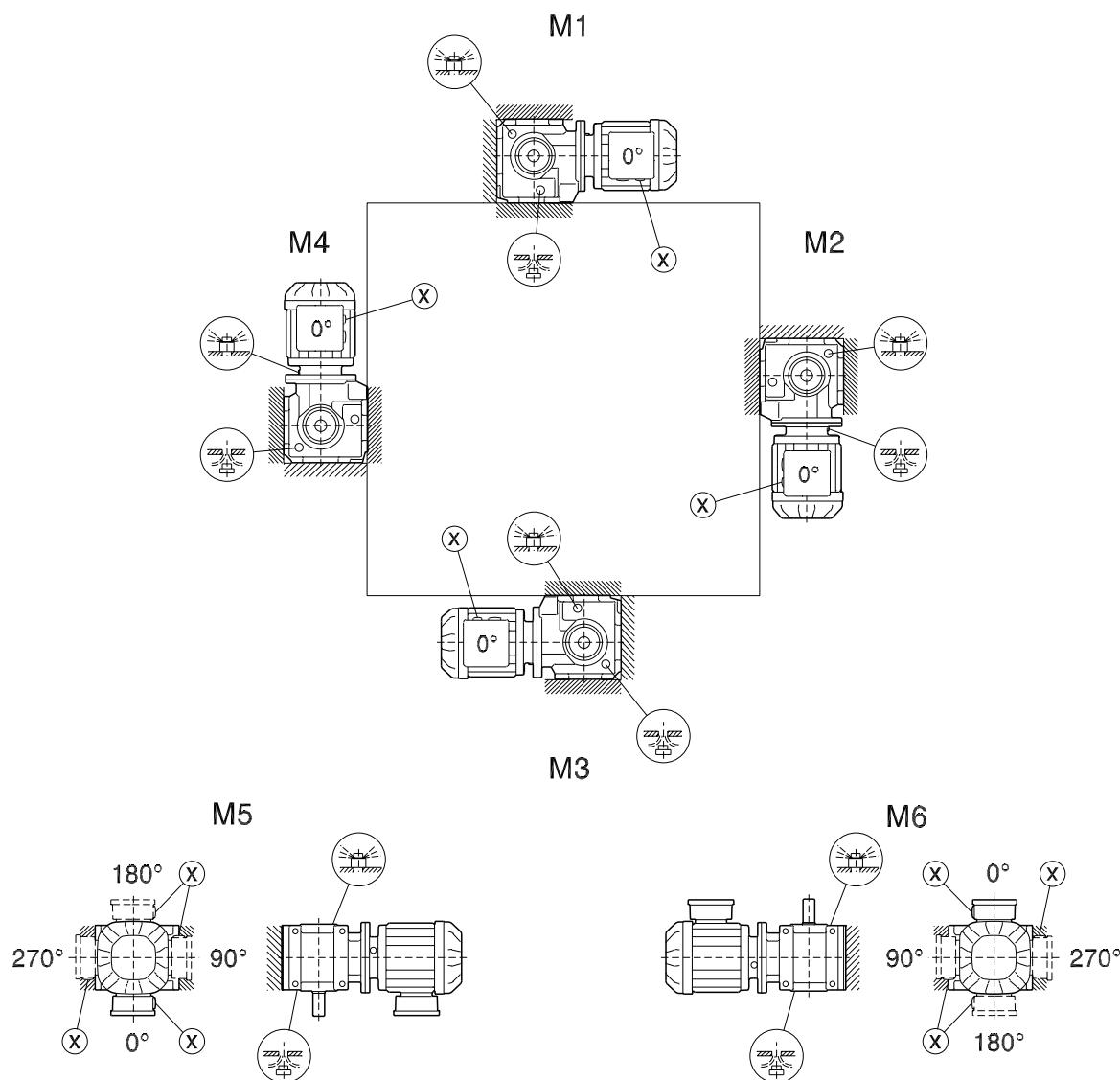
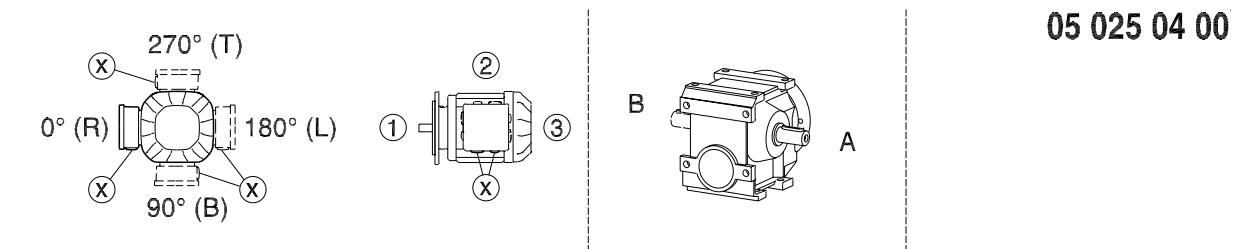
39 026 05 00



\* (→ 147)

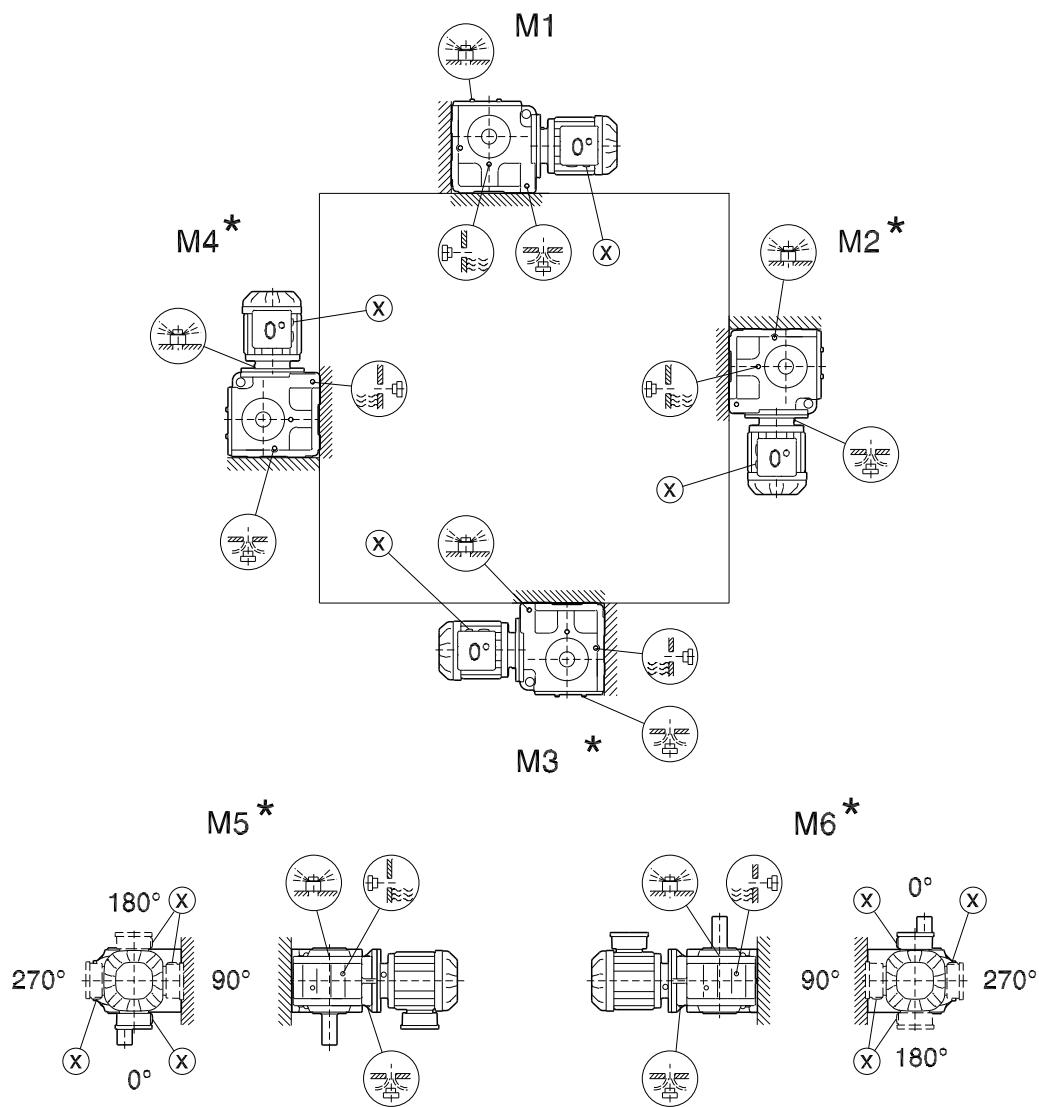
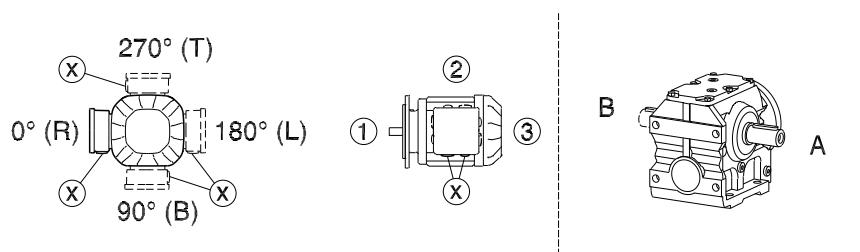
## 7.9.6 Mounting positions of helical-worm gearmotors

S37



S47-S97

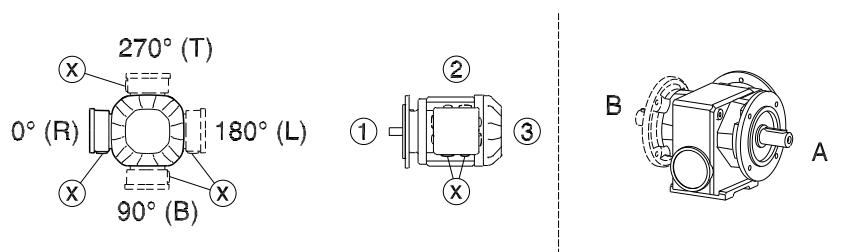
05 026 04 00



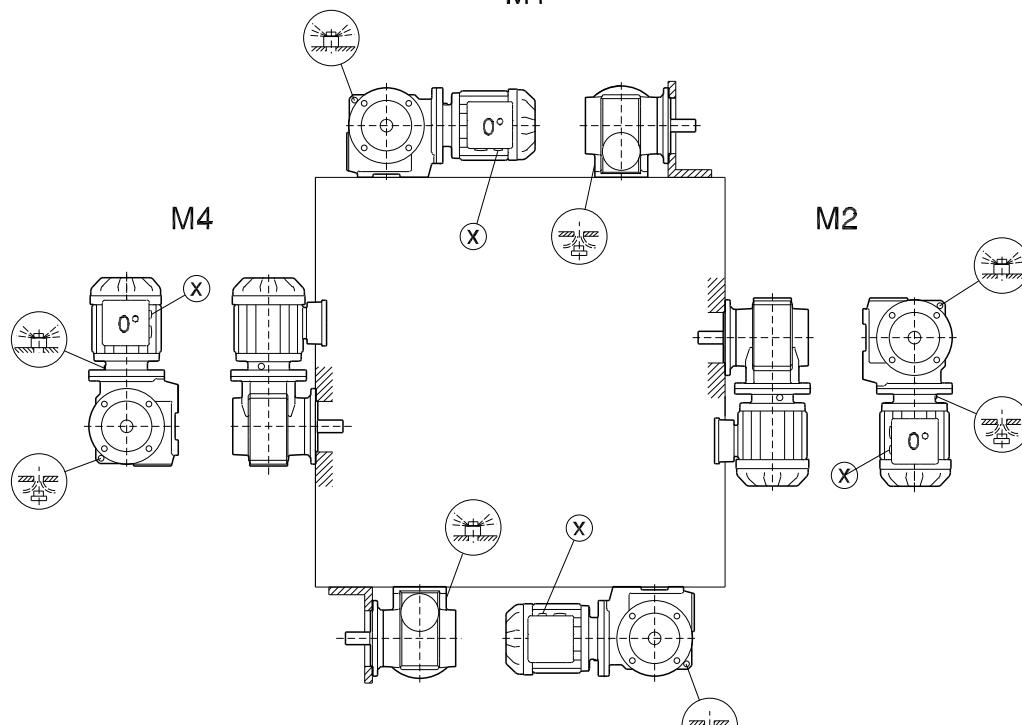
\* (→ 147)

## SF/SAF/SHF37

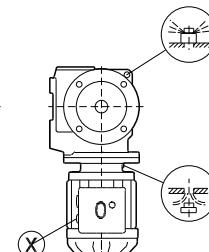
05 027 04 00



M1

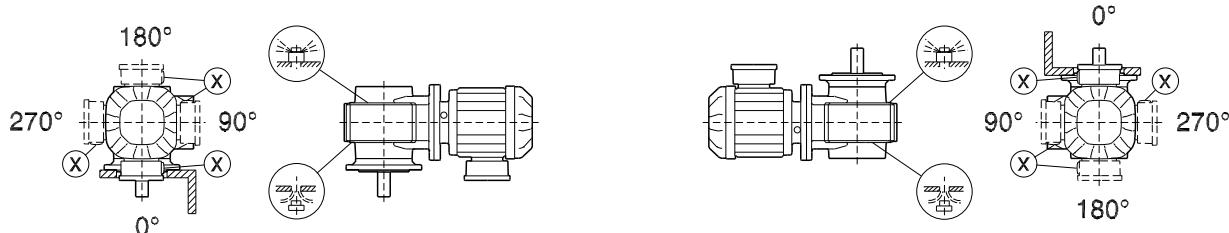


M2



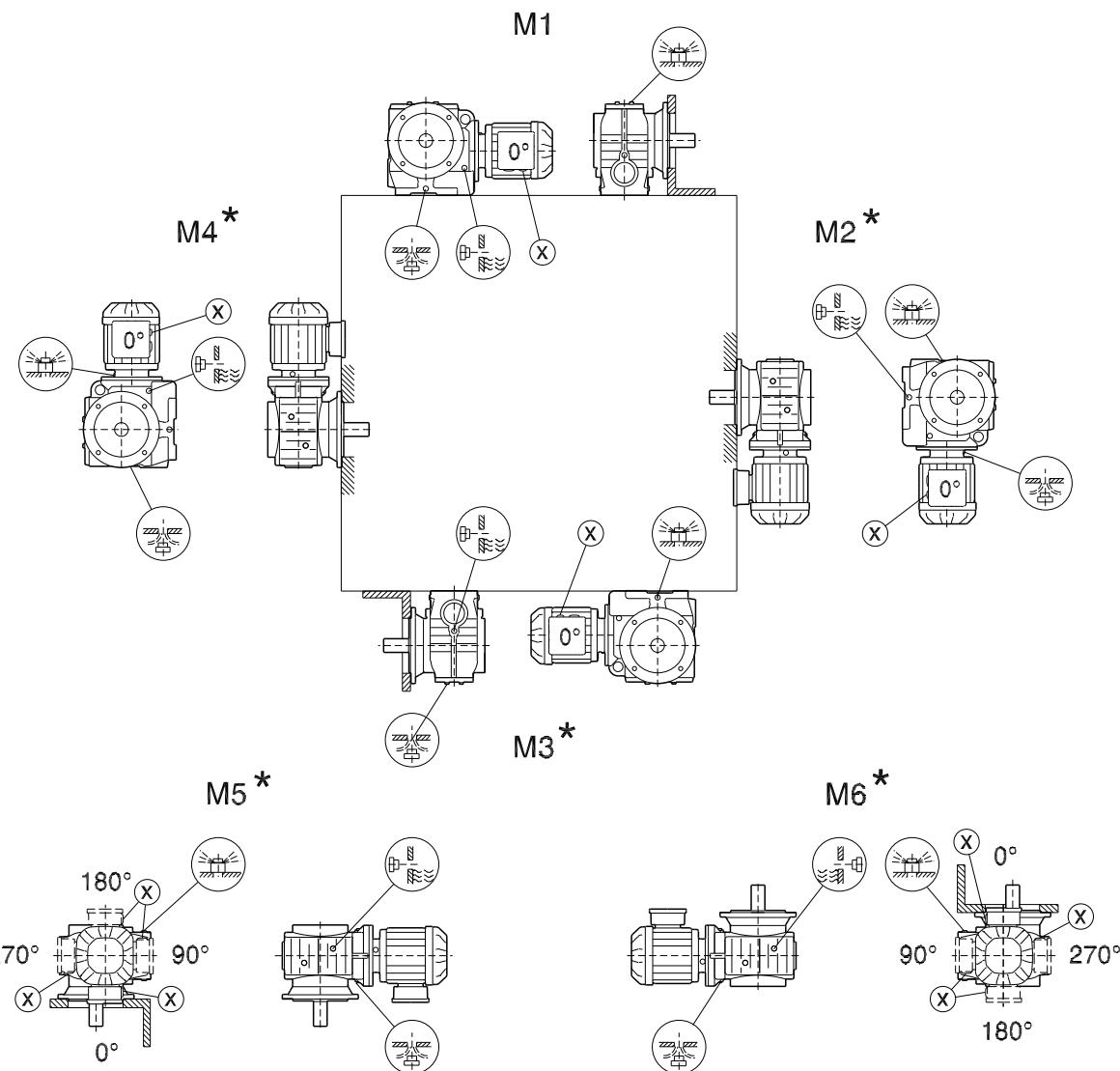
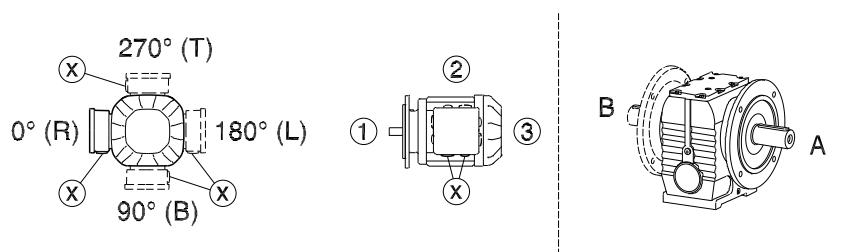
M3

M6



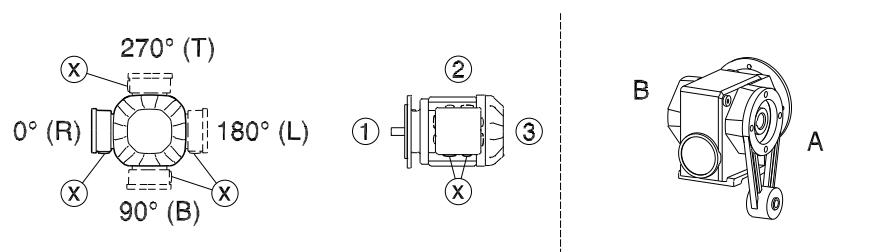
SF/SAF/SHF/SAZ/SHZ47-97

05 028 04 00

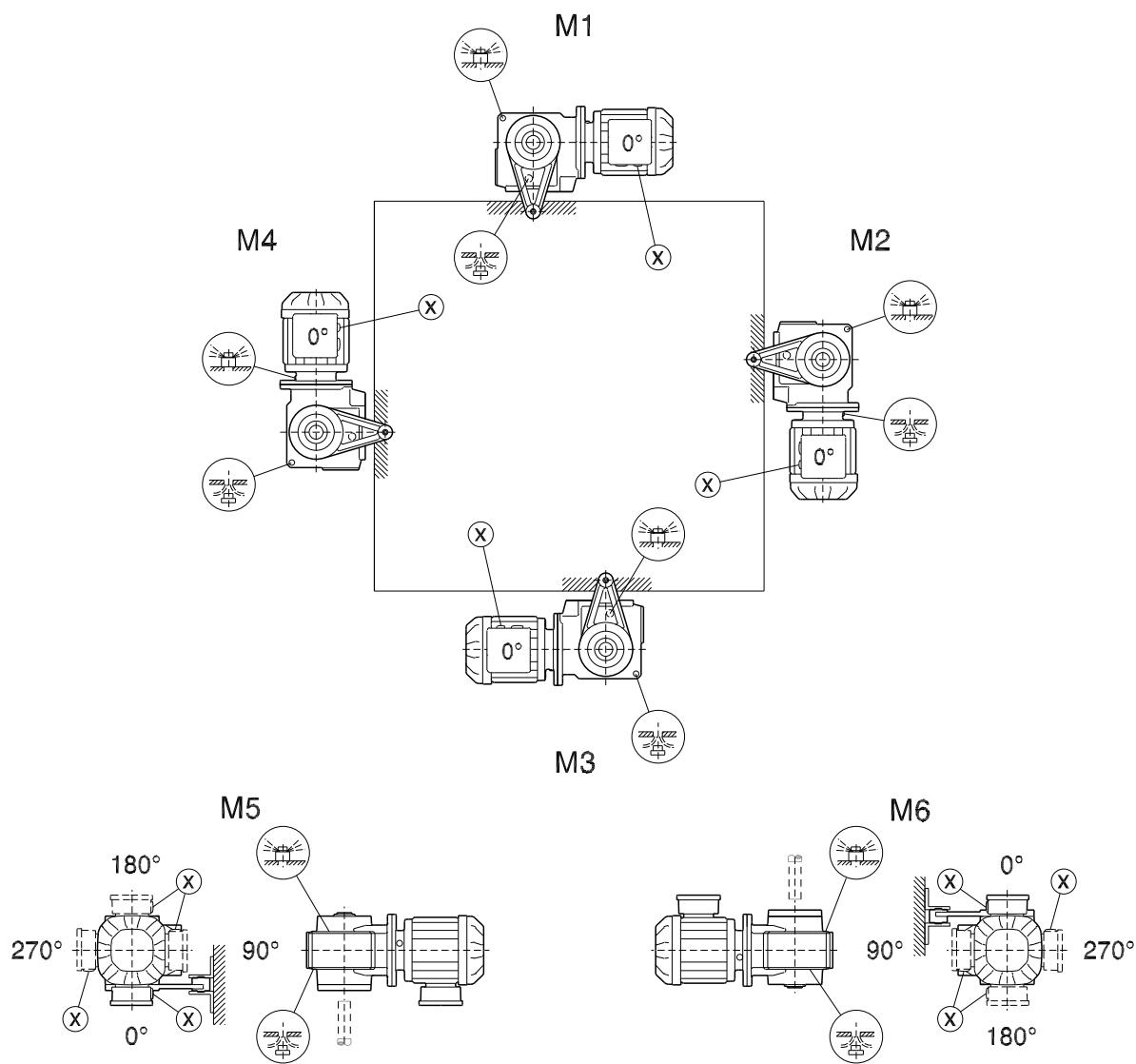


\* (→ 147)

## SA/SH/ST37

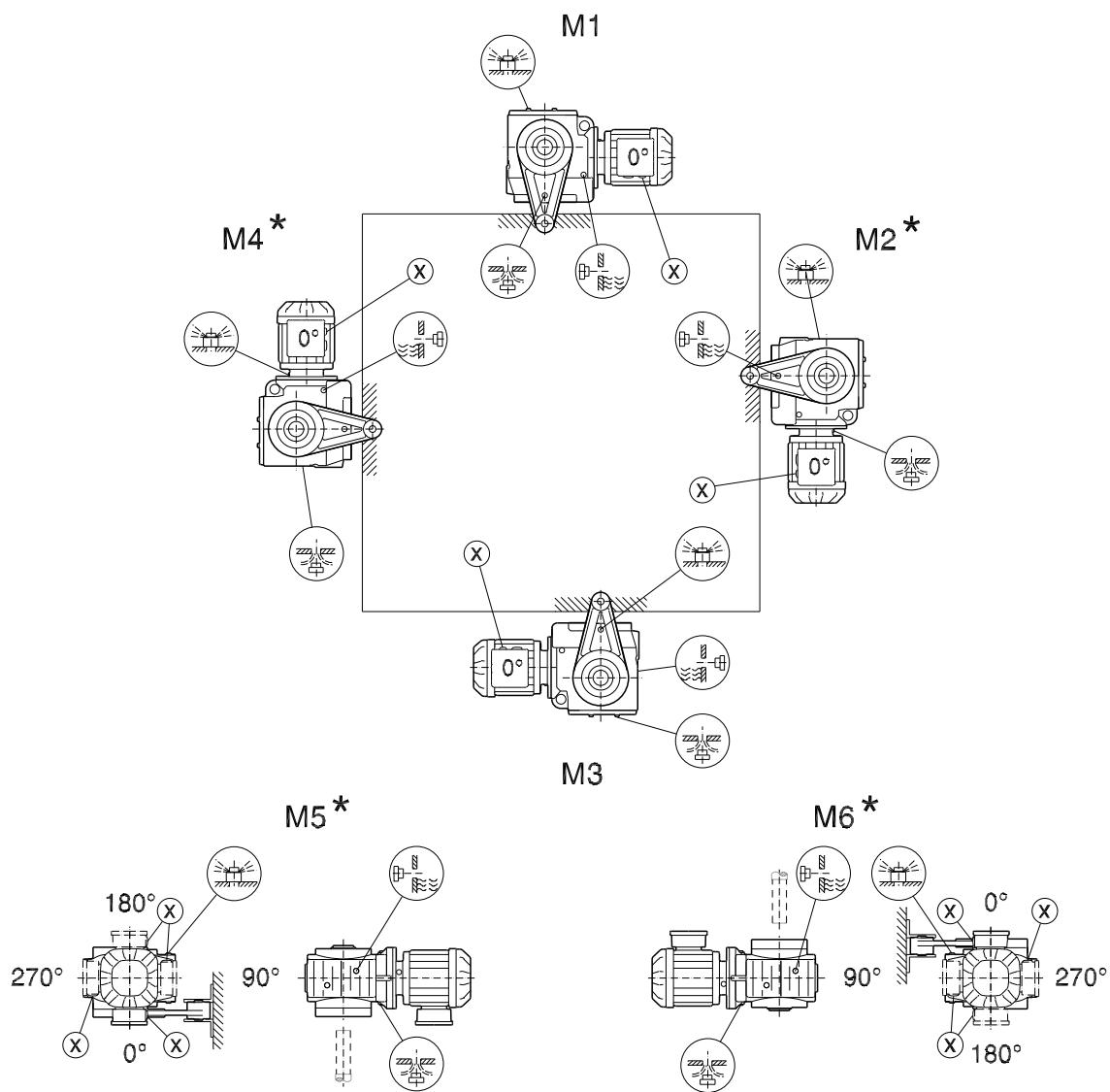
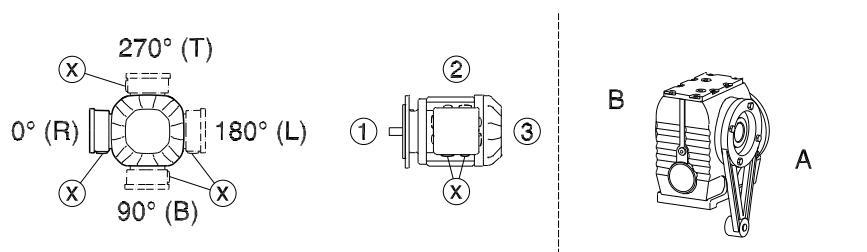


28 020 05 00



SA/SH/ST47-97

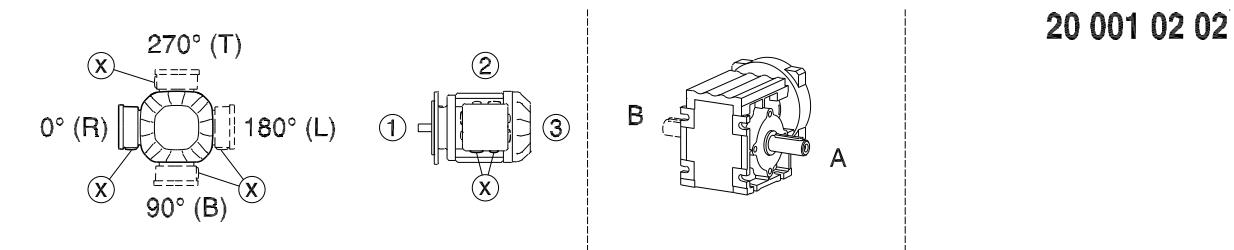
28 021 04 00



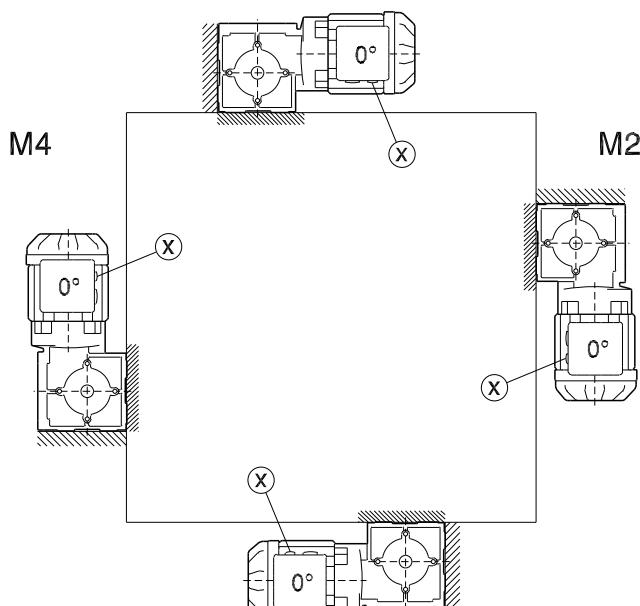
\* (→ 147)

## 7.9.7 Mounting positions of SPIROPLAN® gearmotors

W10-30



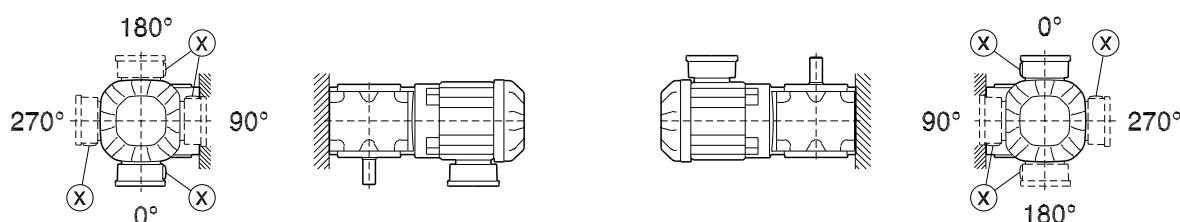
M1



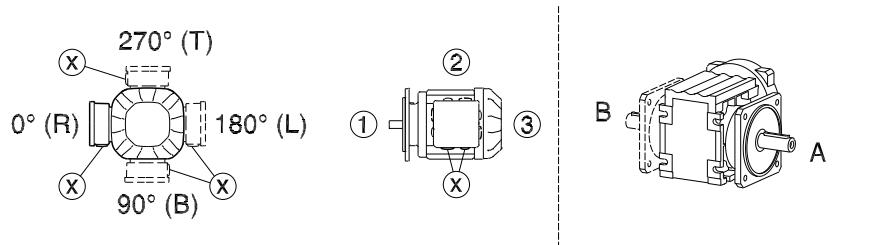
M3

M5

M6

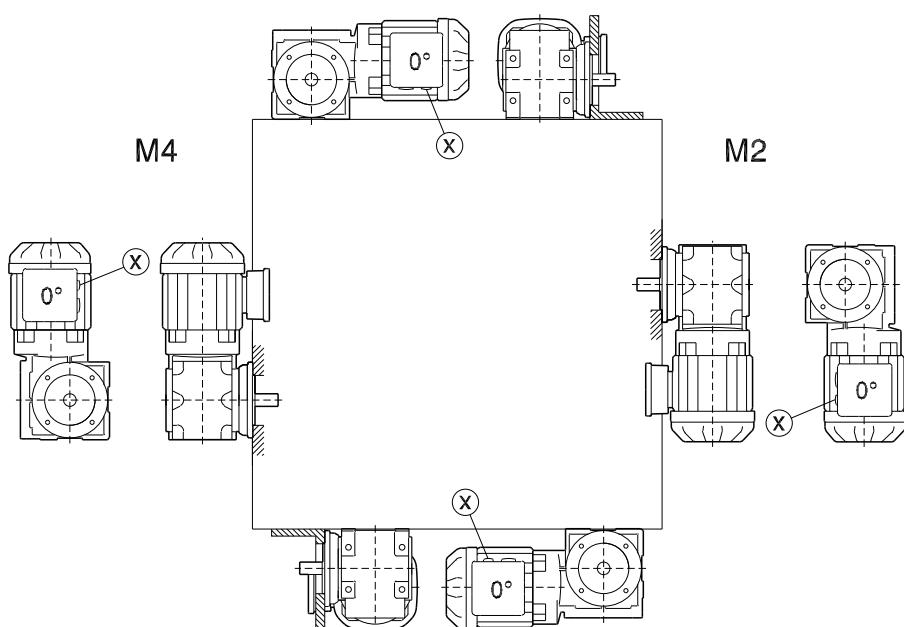


WF10-30



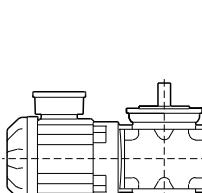
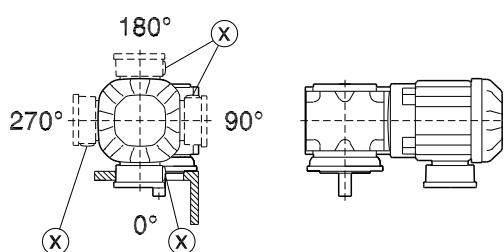
20 002 02 02

M1



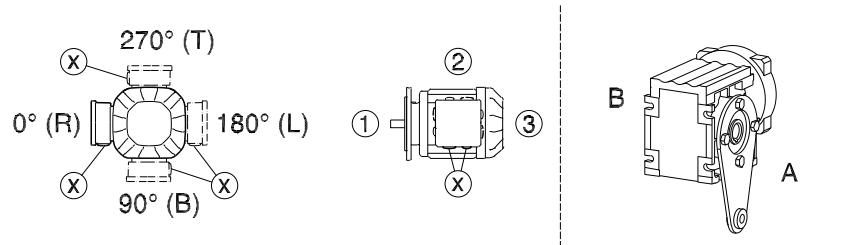
M3

M5



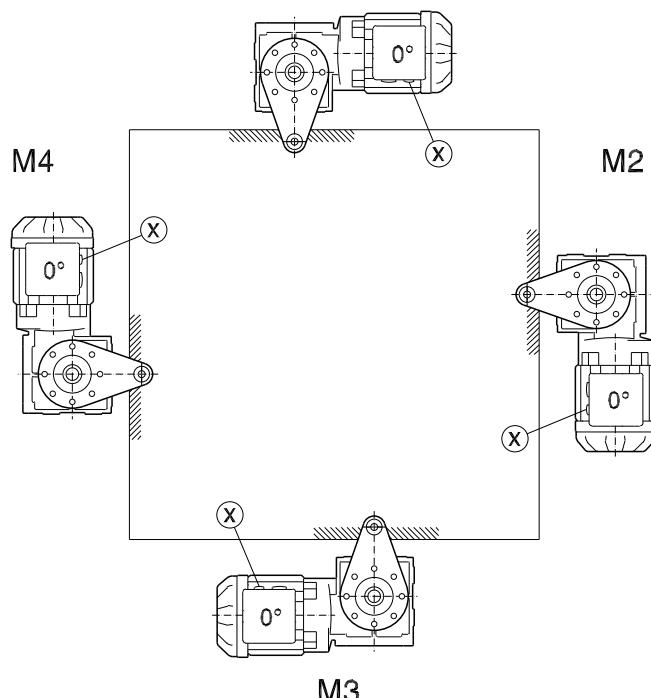
M6

## WA10-30

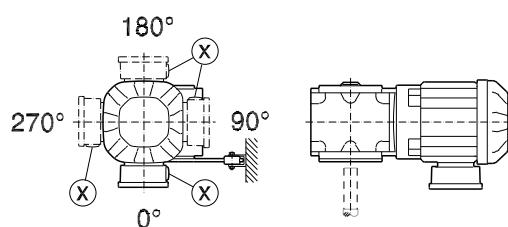


20 003 03 02

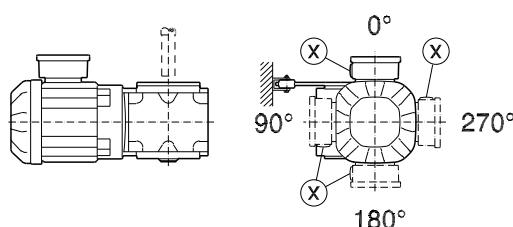
M1



M5

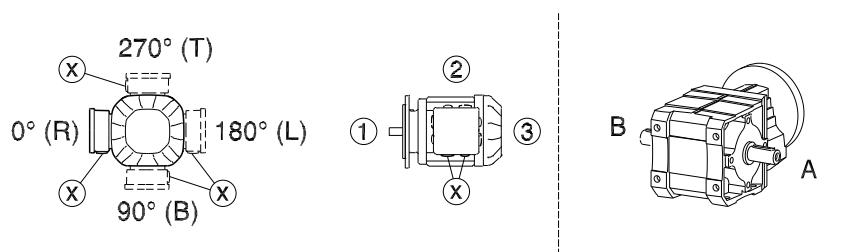


M6

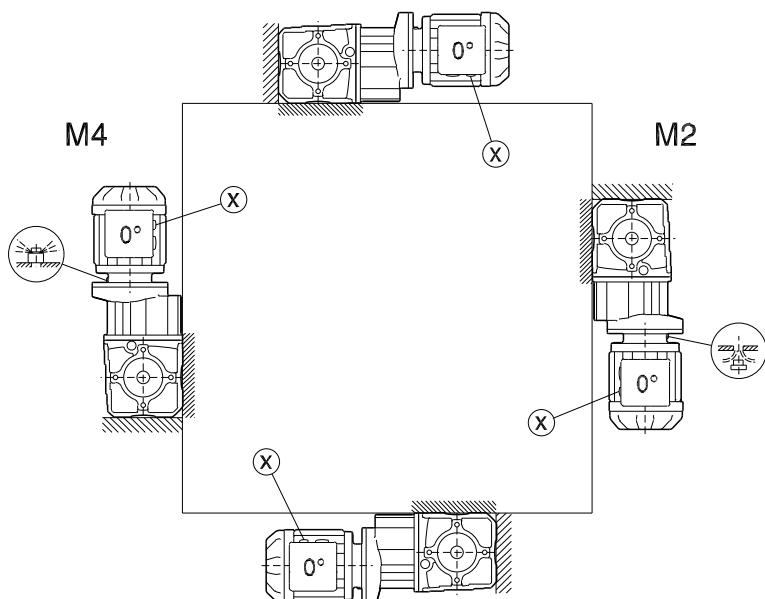


## W/WA..B/WH37B-47B

20 012 02 07

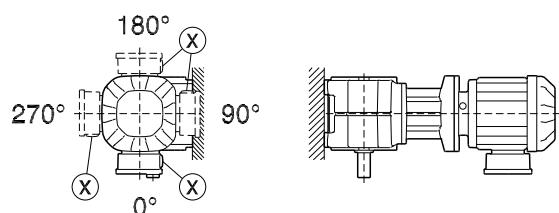


M1

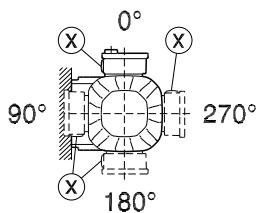
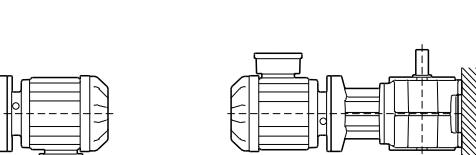


M3

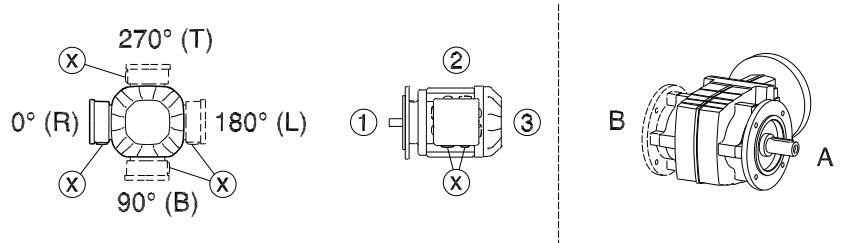
M5



M6

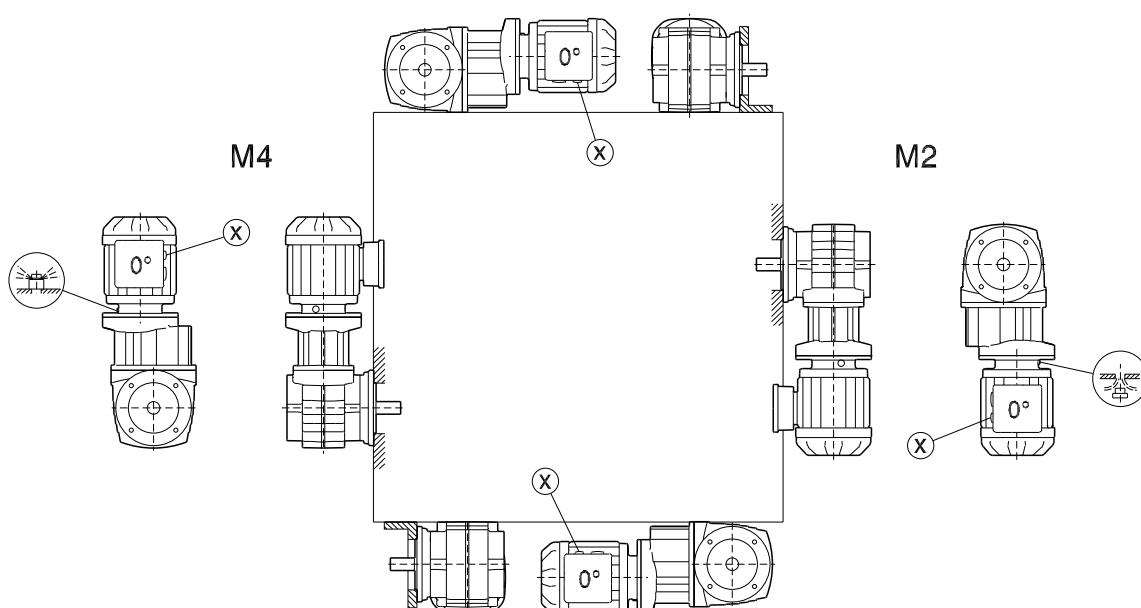


## WF/WAF/WHF37-47

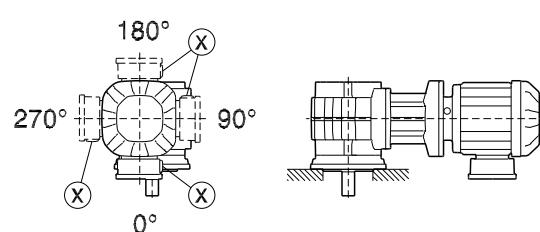


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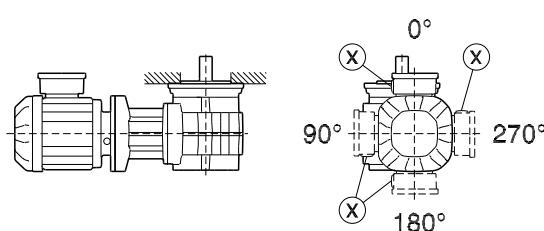


M5



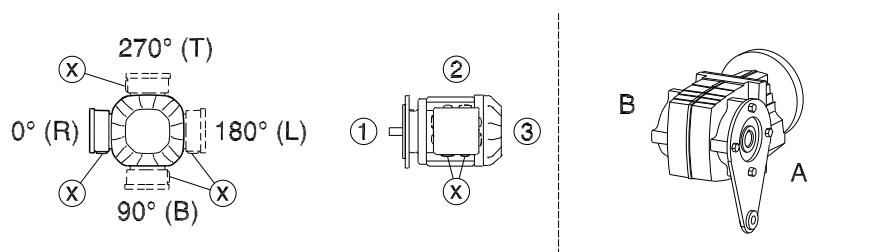
M3

M6

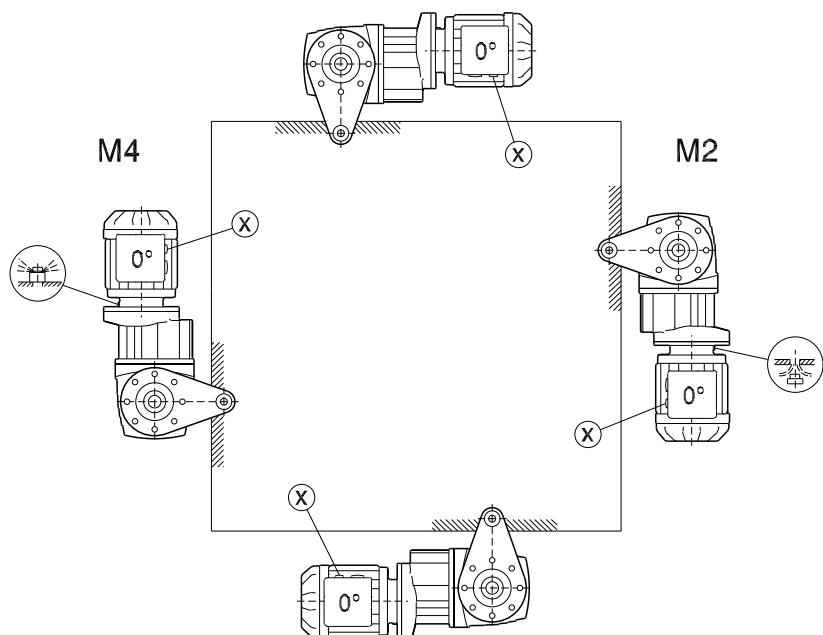


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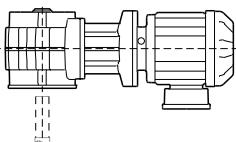
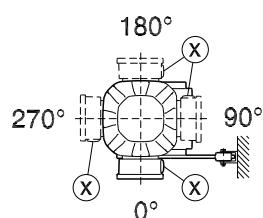


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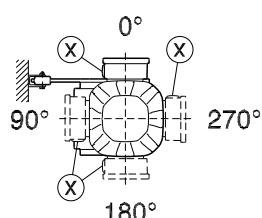
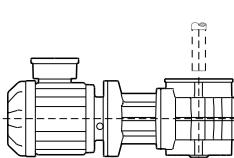


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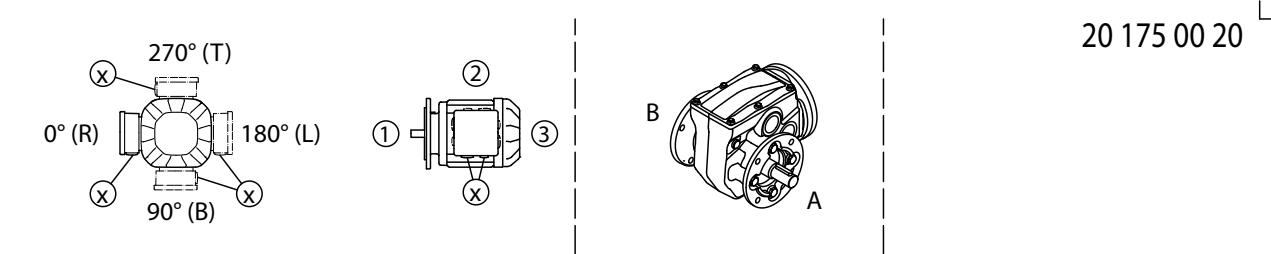
M5



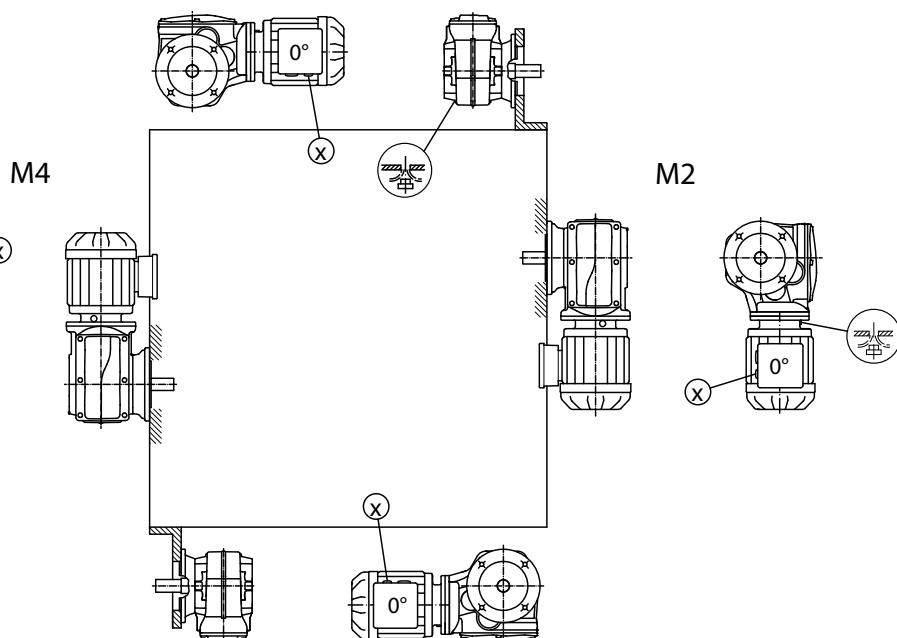
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## WF/WAF/WHF29-39

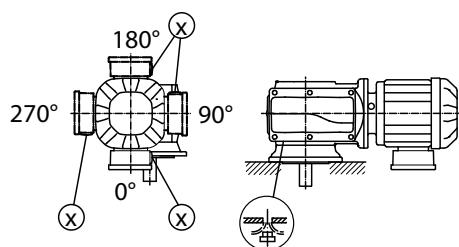


M1

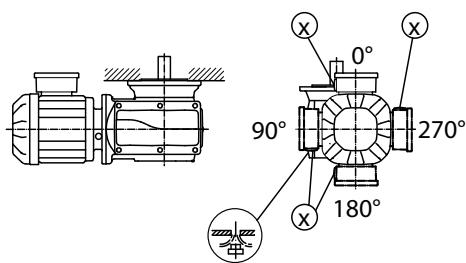


M3

M5

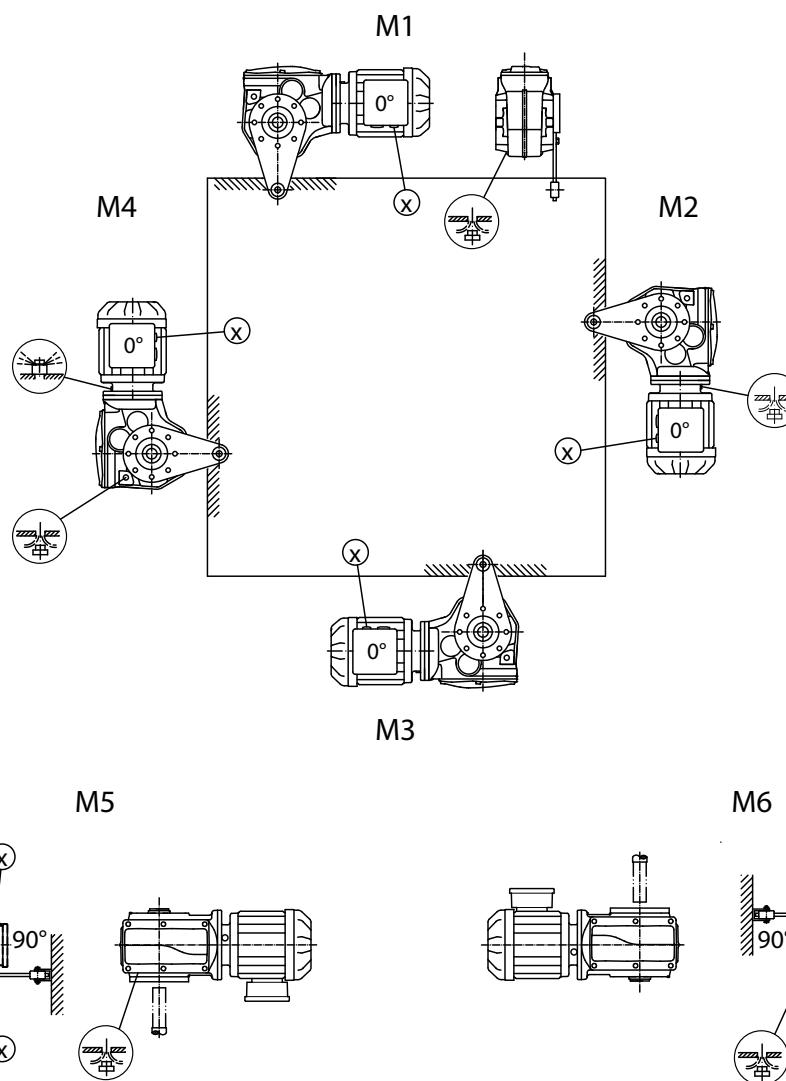
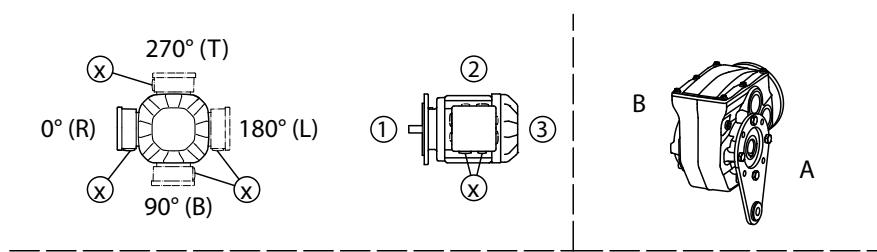


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## 8 Technical data

### 8.1 Extended storage

#### INFORMATION



For storage periods longer than 9 months, SEW-EURODRIVE recommends the "extended storage" gear unit type. Gear units in this design are designated with a corresponding label.

#### INFORMATION



The gear units must remain tightly sealed until taken into operation to prevent the VCI anti-corrosion agent from evaporating.

For gear units of the "extended storage" design, the following measures are taken:

- A VCI anti-corrosion agent (**volatile corrosion inhibitors**) is added to the lubricant.  
Please note that this VCI anti-corrosion agent is only effective in a temperature range of -25 °C to +50 °C.
- The flange contact surfaces and shaft ends are also treated with an anti-corrosion agent.

Observe the storage conditions specified in the following table for extended storage.

#### 8.1.1 Storage conditions

Climate zone	Packaging <sup>1)</sup>	Storage <sup>2)</sup>	Storage duration
Temperate (Europe, USA, Canada, China and Russia, ex- cluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks on the packaging and moisture in- dicator (relative atmospheric hu- midity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < θ < 50 °C, < 50% relative humidity).  No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No ag- gressive vapors, no shocks.	2 years or more with regular in- spections. Check for cleanliness and mechanical damage during the inspection. Check corrosion protection.

Climate zone	Packaging <sup>1)</sup>	Storage <sup>2)</sup>	Storage duration
Tropical (Asia, Africa, Central and South America, Australia, New Zealand and excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	Under roof, protected against rain and shocks.	Up to 3 years with regular checks on the packaging and moisture indicator (relative atmospheric humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < θ < 50 °C, relative humidity < 50%). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during the inspection. Check corrosion protection.

1) The packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends to store the gear units according to the mounting position.

## 8.2 Lubricants

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The mounting position (see chapter "Mounting positions" (→ 146)) must therefore be specified in the drive order. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (see chapter "Lubricant fill quantities" (→ 204)).

### 8.2.1 Bearing greases

The gear unit rolling bearings are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends re-greasing the rolling bearings with a grease filling at the same time as changing the oil.

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	SEW-EURODRIVE	SEW Grease HL 2 E1 <sup>1)</sup>
		Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
		Klüber	Petamo GHY 133 N
 <sup>2)</sup>	-40 °C to +40 °C	SEW-EURODRIVE	SEW Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
 <sup>3)</sup>	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil.

2) Lubricant for the food processing industry.

3) Easily biodegradable lubricant for environmentally sensitive areas.

## INFORMATION



The following grease quantities are required:

- **For fast-running bearings (gear unit input side):** Fill the cavities between the rolling elements one-third full with grease.
- **For slow-running bearings (gear unit output side):** Fill the cavities between the rolling elements two-thirds full with grease.

## 8.2.2 Lubrication table (017512104)

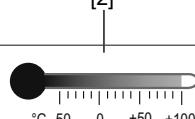
**NOTICE**

Damage to the gear unit due to improper lubricants.

Possible damage to property.

- The oil viscosity and type (mineral/synthetic) to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate. If you use other lubricants for the gear units and/or use the lubricants at temperatures outside the recommended temperature range, SEW-EURODRIVE does not assume liability.
- The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of their product.
- Do not mix synthetic lubricants.
- Do not mix synthetic lubricants and mineral lubricants.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimally and maximally permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants is subject to dynamic change on the part of the lubricant manufacturers. For the latest information about the lubricants, visit: [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants).

**Information on table structure**

[1]	[2]		[3]	
R..	 °C -50    0    +50    +100		ISO, SAE NLGI	
	-15         +40		VG 460	
	-25         +30		CLP HC - NSF H1 - PSS	VG 220

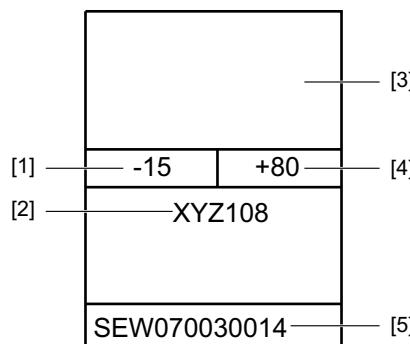
[4] [5]

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- [1] Gear unit type
- [2] Ambient temperature range
- [3] Viscosity class
- [4] Note on special approvals
- [5] Lubricant type

The specified ambient temperatures are guide values for selecting a suitable lubricant. The exact upper and lower temperature limits for project planning are specified in the table with the respective trade name. Bear in mind during project planning that the viscosity increases at low temperatures and that this might influence the starting behavior.

### Information on the various lubricants



- [1] Lowest oil sump temperature in °C; **going below this value during operation is not permitted**
- [2] Trade name
- [3] Manufacturer
- [4] Highest oil sump temperature in °C. The service life will be considerably reduced when this temperature is exceeded. Observe the lubricant change intervals according to chapter "Lubricant change intervals" (→ 128).
- [5] Approvals regarding compatibility of the lubricant with approved oil seals

### Lubricant compatibility with oil seals

Approval	Explanation
SEW07004_ _13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

### Approved application temperature range of the oil seals

In the low temperature range, oil seals can withstand shaft deflections (e. g. through overhung load) only to a limited extent. Especially avoid or limit pulsating or changing radial displacements of the shaft. Contact SEW-EURODRIVE, if required.

Oil seal Material class	Permitted
	Oil sump temperature
NBR	-40 °C to +80 °C
FKM	-25 °C to +115 °C
FKM-PSS	-25 °C to +115 °C

**Limitations of use** of oil seals with the specific lubricant are described in the following table:

Material class			Manufacturer		Material	
S	1	NBR	1	Freudenberg		72 NBR 902
			2	Trelleborg		4NV11
	2	FKM	1	Freudenberg	1	75 FKM 585
			2		2	75 FKM 170055
			2	Trelleborg	1	VCBVR

**Examples:**

**S11:** Only the elastomer 72NBR902 of the Freudenberg company meets the requirements of the approval in conjunction with the specific lubricant.

**S2:** Only the elastomer FKM meets the requirements of the approval in conjunction with the specific lubricant.

**Key**

The following table shows the abbreviations and symbols used in the lubricant table and explains what they mean:

Abbreviation/symbol	Meaning
	Synthetic lubricant (marked gray)
	Mineral lubricant
CLP	Mineral oil
CLP PG	Polyglycol (PG)
CLP HC	Synthetic hydrocarbons – polyalphaolefins (PAO)
E	Ester-based oil
	Lubricant for the food processing industry and feed industry. Oils are NSF-H1 registered and compliant in accordance with FDA 21 CFR § 178.3570
	Easily biodegradable oil for environmentally sensitive areas
	Lubricant suitable for ATEX environment
1)	Helical-worm gear units with CLP-PG: Contact SEW-EURODRIVE
2)	Low-viscosity grease
3)	With appropriate measures, the gear units can be operated at ambient temperatures as low as -40 °C. Contact SEW-EURODRIVE.
Oil seal	Oil seal
PSS	Oil seal of the Premium Sine Seal type. The addendum "PSS" for the lubricant type indicates compatibility with the sealing system.

**Lubricant table for R.., F.., and K..7 gear units**

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

R.. RES	[3] C -50 0 +50 +100	[1]	[2] ISO SAE NLGI	<b>SEW EURODRIVE</b>	<b>Castrol</b>	<b>FUCHS</b>	<b>Mobil</b>	<b>KÜBLER LUBRICATION</b>	<b>Shell</b>	<b>TOTAL</b>
K..7 KES	-15 +40			-15 +80	-15 +80	-15 +80	-15 +80	-15 +80	-15 +80	-15 +80
HK..		VG 220		SEW Gear Oil Base 220 E1 / US1	Optigear BM 220	Renolin CLP 220 Plus	Mobilgear 600 XP 220	Kübleroil GEM 1-220 N	Shell Omala SG 220	Cater EP 220
F..	-20 +30			SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313
		CLP		-20 +80	-20 +80	-20 +80	-20 +80	-20 +80	-20 +80	-20 +80
		VG 150		SEW Gear Oil Base 150 E1 / US1	Optigear BM 150	Renolin CLP 150 Plus	Mobilgear 600 XP 150	Kübleroil GEM 1-150 N	Shell Omala SG 150	Cater EP 150
				SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313	SEW07040313
		CLP PSS		-15 +80		-15 +80	-15 +80			
		VG 220		SEW Gear Oil Base 220 E1 / US1		Renolin CLP 220 Plus	Mobilgear 600 XP 220			
				SEW07040313		SEW07040313	SEW07040313			
		CLP 150		-20 +80		-20 +80	-20 +80			
				SEW Gear Oil Base 150 E1 / US1		Renolin CLP 150 Plus	Mobilgear 600 XP 150			
				SEW07040313		SEW07040313	SEW07040313			

[1] Note on special approvals

[2] Oil type

[3] Ambient temperature range

[4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

## [1] Note on special approvals

### [2] Oil type

### [3] Ambient temperature range

## [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

	[3]	[1]	[2]	ISO SAE NLGI	SEW EURODRIVE	Castrol	FUCHS	Mobil®	KLÜBERSYNT	Shell	TOTAL
R.. RES	-50 +50	0 +100									
K.. KES	-25	+60									
K.. HK..	-30	+50									
F..	-35	+20									
CLP HC											
CLP HC - PS3											
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## [1] Note on special approvals

[2] Oil type

### [3] Ambient temperature range

## [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

## [1] Note on special approvals

[2] Oil type

### [3] Ambient temperature range

[4] Standard

**Lubricant table for K..9 gear units**

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

[3]	[1]	[2]	ISO SAE NLGI	SEW EURODRIVE	brenner & leguil	Castrol	Mobil®	FUCHS	KOBER LUBRICATION	TOTAL
-50	+50	+100				-20	+95		-20 +95	
[4] -20	+60		VG 460	SEW GearOil Poly 460 E1 SEW 070040313					Klubersynth GH 6-460	
-15	+80		VG 680						-15 +115	
-25	+40		VG 220	SEW GearOil Poly 220 E1 SEW 070040313		-25 +70			Klubersynth GH 6-680	
-30	+30		VG 150	SEW GearOil Poly 150 E1 SEW 070040313		-30 +60			Klubersynth GH 6-150	
[4] -20	+60		VG 460	SEW GearOil Poly 460 H1 E1 SEW 070040313		-20 +95			Klubersynth UH 6-460	
-15	+80		VG 680			-20 +95			Klubersynth UH 6-680	
-25	+40		VG 220	SEW GearOil Poly 220 H1 E1 SEW 070040313		-15 +115			Klubersynth UH 6-220	
-30	+30		VG 150	SEW GearOil Poly 150 H1 E1 SEW 070040313		-30 +60			Klubersynth UH 6-150	

- [1] Note on special approvals  
 [2] Oil type

- [3] Ambient temperature range  
 [4] Standard

## Lubricant table for S.. gear units

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

	[3] C -30 0 +50 +100	[1] [2] ISO SAE NLGI	SEW EURODRIVE	brenner & legum Castrol	FUCHS	Mobil	KOBER LUBRICATION	Shell	TOTAL
[4] 0	+40		0 -80	0 +40	0 -80	0 +80	0 +80	0 +80	0 +80
			SEW GearOil Base 880 S E1	Optigear BM 680	Renolin CLP 680 Plus	Mobilgear 600 XP 680	Klüberoil G EM 1-680 N	Shell Omala SG 680	Carter EP 680
S.. HS..	-20	+25	SEW GearOil Base 150 E1 / US1	Optigear BM 150	Renolin CLP 150 Plus	Mobilgear 600 XP 150	Klüberoil G EM 1-150 N	Shell Omala SG 150	Carter EP 150
[4] 0	+40		0 -80	0 +80	0 +80	0 +80	0 +80	0 +80	0 +80
			SEW GearOil Base 880 S E1	Optigear BM 680	Renolin CLP 680 Plus	Mobilgear 600 XP 680	Klüberoil G EM 1-680 N	Shell Omala SG 680	Carter EP 680
	-20	+25	SEW GearOil Base 150 E1 / US1	Optigear BM 150	Renolin CLP 150 Plus	Mobilgear 600 XP 150	Klüberoil G EM 1-150 N	Shell Omala SG 150	Carter EP 150
	-20	+25	CLP - PSS						
	-20	+25	VG 150						
	-20	+25	CLP - PSS						

- [1] Note on special approvals  
 [2] Oil type

- [3] Ambient temperature range  
 [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

## [1] Note on special approvals

[2] Oil type

### [3] Ambient temperature range

## [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

[3] °C -50 0 +50 +100		[1] ISO, SAE NLGI	[2] <b>SEW</b> <b>EURODRIVE</b>	[1] bremer & egli	[2] <b>Castrol</b>	<b>FUCHS</b>	<b>Mobil®</b>	<b>KOBER</b> <i>LUBRICATION</i>	<b>Shell</b>	<b>TOTAL</b>
[4] -15 +60		VG 460	CLP HC	Renolin Unisyn CLP 460	Mobil SHC 634	Kübersynth GEM 4-460 N	+105	-15	+105	-15 +105
S.. HS.. -30 +30		VG 150 <sup>3)</sup>	Ex	Renolin Unisyn CLP 150	Mobil SHC 629	Kübersynth GEM 4-150 N	+70	-30	+70	+70
-35 +20		VG 68		Renolin Unisyn CLP 68	Mobil SHC 626	Kübersynth S4 GX 150	+55	-40	+55	+50
-40 0		VG 32	Ex	Renolin Unisyn OL 32	Mobil SHC 624	Shell Omala S4 GX 68	+30	-40	+30	+30
[4] -15 +60		VG 460	CLP HC - PSS				+105	-20	+105	
-30 +30		VG 150 <sup>3)</sup>	Ex					-30	+75	

- [1] Note on special approvals
- [2] Oil type

- [3] Ambient temperature range
- [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

[3]		[1]	[2]	ISO SAE NLGI	SEW EURODRIVE	bremmer & egli	Castrol	FUCHS	Mobil	KLUBER LUBRICATION	Shell	TOTAL
°C -50	0	+50	+100									
[4]	-15	+40			VG 460		-15 +85 Cassida Fluid GL 460	-15 +90 Optileb GT 460	-15 +85 Cassida Fluid GL 460	-15 +90 Kluber oil 4UH1-460 N		
S.. HS..	-25	+30			VG 220		-25 +75 Cassida Fluid GL 220	-25 +70 Optileb GT 220	-25 +75 Cassida Fluid GL 220	-25 +70 Kluber oil 4UH1-220 N		
[4]	-35	0			VG 68		-35 +40 Cassida Fluid HF 68	-40 +40 Optileb HY 68	-35 +40 Cassida Fluid HF 68	-35 +40 Kluber oil 4UH1-68 N		
	-40	-10			VG 32		-40 +25 Cassida Fluid HF 32	-40 +20 Optileb HY 32	-40 +25 Cassida Fluid HF 32	-40 +25 KluberSummit HySyn FG 32		
[4]	-15	+40			VG 460				-15 +90 Optileb GT 460	-15 +85 Cassida Fluid GL 460		
	-25	+30			VG 220				-15 +90 Optileb GT 220	-15 +75 Cassida Fluid GL 220		
	-20	+40			M					-20 +80 Plantogear 460 S	-20 +80 Kluberbio Cx 2-460 S2	

## [1] Note on special approvals

[2] Oil type

### [3] Ambient temperature range

#### [4] Standard

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

## [1] Note on special approvals

[2] Oil type

### [3] Ambient temperature range

## [4] Standard

**Lubricant table for W.. gear units**

The lubricant table is valid on the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seals" (→ 191).

[3] °C -50 0 +50 +100	[1] [2]	ISO SAE NLGI	SEW EURODRIVE	D bremer & leguil	Castrol	FUCHS	Mobil	KOEBER LUBRICATION	Shell	TOTAL
[4] -20	+60		VG 460	-20 +115 SEW GearOil Poly 460 W E1 SEW070040313						-20 +115
			VG 460	-20 +115 SEW GearOil Poly 460 H1 E1 SEW070040313						Kubersynth UH 6-460
			VG 460	-30 +65 SEW GearOil Poly 460 H1 E1 SEW070040313						-30 +65
			VG 150	-30 +65 SEW GearOil Poly 150 H1 E1 SEW070040313						Kubersynth UH 16-150
			SAE 75W90 (VG 100)							-40 +65
			VG 220							Mobil Synthetic Gear Oil 75 W90
			VG 460							
			VG 150							

- [1] Note on special approvals  
 [2] Oil type

- [3] Ambient temperature range  
 [4] Standard

### 8.2.3 Lubricant fill quantities

#### INFORMATION



The specified fill quantities are **guide values**. The exact values vary depending on the number of gear stages and gear ratio. Check the oil level plug for the exact oil quantity.

#### INFORMATION



Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific mounting position. The mounting position (see chapter "Designation of the mounting positions" (→ 146)) must therefore be specified in the drive order.

When the mounting position is changed, the lubricant fill quantity must be adapted accordingly (see the following chapters). Consequently, a mounting position may only be **changed** after consultation with SEW-EURODRIVE, **otherwise your rights to claim under limited warranty no longer apply**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 – M6.

**Helical (R) gear units**

R.., R..F

Gear unit	Fill quantity in liters					
	M1 <sup>1)</sup>	M2	M3	M4	M5	M6
R07	0.12			0.20		
R17	0.25	0.55	0.35	0.55	0.35	0.40
R27	0.25/0.40	0.70	0.50	0.70		0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65		1.50
R57	0.80/1.70	1.90	1.70	2.10		1.70
R67	1.10/2.30	2.40	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30	3.60	3.80	2.50	3.40
R87	2.30/6.0	6.2	7.4	7.05	6.4	6.6
R97	4.60/9.8	11.7		13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R127	6.4/17	18.3	18.2	22.0	16.8	17.9
R137	10.0/25.0	28.0	29.5	31.5		25.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

1) The larger gear unit of compound gear units must be filled with the larger oil quantity.

RF.., RM.., RZ..

Gear unit	Fill quantity in liters					
	M1 <sup>1)</sup>	M2	M3	M4	M5	M6
RF07	0.12			0.20		
RF17	0.25	0.55	0.35	0.55	0.35	0.40
RF27	0.25/0.40	0.70	0.50	0.70		0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65		1.50
RF57	0.80/1.70	1.80	1.70	2.00		1.70
RF67	1.20/2.50	2.50	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.4	7.1	7.2	6.3	6.4
RF97	5.1/10.2	11.9	11.2	14.0	11.2	11.8
RF107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF127	6.6/16.0	18.3	18.2	21.4	15.9	17.0
RF137	9.5/25.0	27.0	29.0	32.5		25.0
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The larger gear unit of compound gear units must be filled with the larger oil quantity.

RX..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80		1.30		0.90
RX67		0.80	1.70	1.90		1.10
RX77	1.10	1.50	2.60	2.70		1.60
RX87	1.70	2.50		4.80		2.90
RX97	2.10	3.40	7.4	7.0		4.80
RX107	3.90	5.6	11.6	11.9		7.7

RXF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80		1.10		0.70
RXF67	0.70	0.80	1.50	1.40		1.00

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF77	0.90	1.30	2.40	2.00		1.60
RXF87	1.60	1.95	4.90	3.95		2.90
RXF97	2.10	3.70	7.1	6.3		4.80
RXF107	3.10	5.7	11.2	9.3		7.2

**Parallel shaft helical (F) gear units**

F.., FA..B, FH..B, FV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.25	3.15	1.65	3.15	2.40	2.50
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.0	27.0	27.0
F..127	39.5	51.7	31.5	60.1	45.6	44.2
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.30	3.10	1.70	3.10	2.30	2.40
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.90	7.30	4.30	8.10	6.00	6.30
FF87	11.0	13.3	7.80	14.1	11.1	11.3
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	40.6	51.6	31.5	61.2	46.3	44.9
FF157	72.0	105.0	64.0	106.0	87.0	79.0

FA.., FH.., FV.., FAF.., FAZ.., FHF.., FZ.., FHZ.., FVF.., FVZ.., FT.., FM.., FAM..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.40	3.10	1.70	3.15	2.40	2.50
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.90	7.30	4.30	8.00	6.00	6.30
F..87	11.0	13.1	7.70	13.8	10.9	11.1
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	38.3	50.9	31.5	59.7	44.7	43.3
F..157	68.0	103.0	62.0	104.0	85.0	77.0

**Helical-bevel (K) gear units****INFORMATION**

All K..19 and K..29 gear units have a universal mounting position, which means that K..19 and K..29 gear units of the same design are filled with the same oil quantity independent of the mounting position. An exception to this is the M4 mounting position.

K., KA..B, KH..B, KV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19		0.40		0.45		0.40
K..29		0.70		0.85		0.70
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50		1.00		1.25	
K..47	0.80	1.30	1.50	2.00		1.60
K..57	1.10		2.20		2.80	2.30
K..67	1.10	2.40	2.60	3.45		2.60
K..77	2.20	4.10	4.40	5.80	4.20	4.40
K..87	3.70	8.20	8.90	10.75		8.20
K..97	7.0	14.0	15.70	20.0	15.70	15.50
K..107	10.0	21.0	25.50	33.50		24.0
K..127	21.0	41.50	44.0	54.0	40.0	41.0
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

KF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF19		0.40		0.45		0.40
KF29		0.70		0.85		0.70
KF39	0.90	1.70	1.55	1.9	1.55	1.30
KF49	1.70	3.40	2.80	4.20	3.15	2.80
KF37	0.50		1.10		1.50	
KF47	0.80	1.30	1.70	2.20		1.60
KF57	1.20	2.20	2.40	3.15	2.50	2.30
KF67	1.10	2.40	2.80	3.70		2.70
KF77	2.10	4.10	4.40	5.90		4.50
KF87	3.70	8.20	9.0	11.90		8.40
KF97	7.0	14.70	17.30	21.50	15.70	16.50
KF107	10.0	21.80	25.80	35.10		25.20
KF127	21.0	41.50	46.0	55.0		41.0
KF157	31.0	66.0	69.0	92.0	62.0	63.0

KA.., KH.., KV.., KAF.., KHF.., KVF.., KZ.., KAZ.., KHZ.., KVZ.., KT.., KM.., KAM..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19		0.40		0.45		0.40
K..29		0.70		0.85		0.70
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50		1.00		1.40	
K..47	0.80	1.30	1.60	2.15		1.60
K..57	1.20	2.20	2.40	3.15	2.70	2.40

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..67	1.10	2.40	2.70	3.70		2.60
K..77	2.10	4.10	4.60	5.90		4.40
K..87	3.70	8.20	8.80	11.10		8.0
K..97	7.0	14.70	15.70	20.0		15.70
K..107	10.0	20.80	24.5	31.95	24.5	24.3
K..127	21.0	41.50	43.0	52.0		40.0
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

**Helical-worm (S) gear units**

S..

Gear unit	Fill quantity in liters					
	M1	M2	M3 <sup>1)</sup>	M4	M5	M6
S37	0.25	0.40	0.50	0.55		0.40
S47	0.35	0.80	0.70/0.90	1.03		0.80
S57	0.50	1.20	1.00/1.20	1.43		1.30
S67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S77	1.90	4.20	3.70/5.4	5.9		4.40
S87	3.30	8.1	6.9/10.4	11.3		8.4
S97	6.8	15.0	13.4/18.0	21.8		17.0

1) The larger gear unit of compound gear units must be filled with the larger oil quantity.

SF..

Gear unit	Fill quantity in liters					
	M1	M2	M3 <sup>1)</sup>	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.6	0.40
SF47	0.40	0.90	0.90/1.05	1.08	1.13	1.00
SF57	0.50	1.20	1.00/1.50	1.48	1.53	1.40
SF67	1.00	2.20	2.30/3.00	3.20	3.5	2.70
SF77	1.90	4.10	3.90/5.8	6.5	7.2	4.90
SF87	3.80	8.0	7.1/10.1	12.0	13.2	9.1
SF97	7.4	15.0	13.8/18.8	23.1	25.2	18.0

1) The larger gear unit of compound gear units must be filled with the larger oil quantity.

SA.., SH.., SAF.., SHZ.., SAZ.., SHF.., ST..

Gear unit	Fill quantity in liters					
	M1	M2	M3 <sup>1)</sup>	M4	M5	M6
S..37	0.25	0.40	0.50		0.40	
S..47	0.40	0.80	0.70/0.90	1.03		0.80
S..57	0.50	1.10	1.00/1.50	1.43		1.20
S..67	1.00	2.00	1.80/2.60	2.90		2.50
S..77	1.80	3.90	3.60/5.0	5.8		4.50
S..87	3.80	7.4	6.0/8.7	10.8		8.0
S..97	7.0	14.0	11.4/16.0	21.0		15.7

1) The larger gear unit of compound gear units must be filled with the larger oil quantity.

**SPIROPLAN® (W) gear units****INFORMATION**

SPIROPLAN® gear units W..10 to W..30 have a universal mounting position, which means that gear units of the same design are filled with the same oil quantity independent of the mounting position.

The oil fill quantity of SPIROPLAN® gear units W..37 and W..47 in mounting position M4 is different from that of the other mounting positions.

W., WA..B, WH..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4 2 3	M5	M6
W10	0.16					
W20	0.24					
W30	0.40					
W37	0.50	0.70		0.50		
W47	0.90	1.40		0.90		

WF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4 2 3	M5	M6
WF10	0.16					
WF20	0.24					
WF30	0.40					
WF37	0.50	0.70		0.50		
WF47	0.90	1.55		0.90		
WF29	0.54	0.93		0.78	0.84	
WF39	0.85	1.5		1.35	1.25	

WA.., WAF.., WH.., WT.., WHF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4 2 3	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37	0.50	0.70		0.50		
W..47	0.80	1.40		0.80		
W..29	0.54	0.93		0.78	0.84	
W..39	0.85	1.5		1.35	1.25	

## 9 Malfunctions and remedies

### ⚠ WARNING



Risk of death or injury if the drive starts up unintentionally.

Severe or fatal injuries can occur.

- De-energize the motor before you start working on the unit.
- Secure the motor against unintended power-up.

### ⚠ CAUTION



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries can occur.

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.

### NOTICE

Damage to gear unit/gearmotor due to improper operation can occur.

Damage to the gear unit/gearmotor can occur.

- Repair works at SEW-EURODRIVE gear units may only be performed by qualified specialists. In the context of this documentation, qualified specialists are persons who are familiar with the "Technical regulations on operating safety" (TRBS).
- Drive and motor may only be disconnected by qualified specialists.
- Contact SEW-EURODRIVE.

## 9.1 Gear units

Fault	Possible cause	Measure
Unusual, regular running noise	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage</li> <li>Knocking noise: Irregularity in the gearing</li> <li>Deformation of the housing upon tightening</li> <li>Noise generation caused by insufficient rigidity of the gear unit foundation</li> </ul>	<ul style="list-style-type: none"> <li>Check the oil consistency; change bearings</li> <li>Contact SEW-EURODRIVE. For a better assessment of the failure, send an audio recording of the noise</li> <li>Check the gear unit mounting for possible deformation and correct if necessary</li> <li>Reinforce the gear unit foundation</li> </ul>
Unusual, irregular running noises	<ul style="list-style-type: none"> <li>Foreign objects in the oil</li> </ul>	<ul style="list-style-type: none"> <li>Check the oil consistency</li> <li>Stop the drive, contact SEW-EURODRIVE</li> </ul>
Oil leaking from gear unit cover	<ul style="list-style-type: none"> <li>Seal of the gear unit cover leaking</li> <li>Seal defective</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the screws of the gear unit cover and observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking</li> <li>Contact SEW-EURODRIVE</li> </ul>
Small amounts of oil leak from the oil seal during run-in phase.	<ul style="list-style-type: none"> <li>Function-related pseudo-leakage</li> </ul>	<ul style="list-style-type: none"> <li>There is no failure. Remove with a soft, lint-free cloth and keep monitoring it.</li> </ul>
Film of moisture around the dust lip of the oil seal	<ul style="list-style-type: none"> <li>Function-related pseudo-leakage</li> </ul>	<ul style="list-style-type: none"> <li>There is no failure. Remove with a soft, lint-free cloth and keep monitoring it.</li> </ul>
Oil leaking from oil seal	<ul style="list-style-type: none"> <li>Oil seal leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to consult SEW-EURODRIVE</li> </ul>
Oil leaking from motor (e.g. terminal box or fan)	<ul style="list-style-type: none"> <li>Too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Gear unit not ventilated</li> </ul>	<ul style="list-style-type: none"> <li>Vent gear unit</li> </ul>
	<ul style="list-style-type: none"> <li>Oil seal leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to consult SEW-EURODRIVE</li> </ul>
Oil leaking from flange	<ul style="list-style-type: none"> <li>Flange gasket leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to consult SEW-EURODRIVE</li> </ul>
	<ul style="list-style-type: none"> <li>Too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Gear unit not ventilated</li> </ul>	<ul style="list-style-type: none"> <li>Vent gear unit</li> </ul>
Oil emerging from breather valve	<ul style="list-style-type: none"> <li>Too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Check oil quantity, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Function-related oil mist</li> </ul>	<ul style="list-style-type: none"> <li>There is no failure.</li> </ul>
	<ul style="list-style-type: none"> <li>Drive not installed in proper mounting position</li> </ul>	<ul style="list-style-type: none"> <li>Install breather valve correctly and adjust the oil level.</li> </ul>
	<ul style="list-style-type: none"> <li>Frequent cold starts (oil foams) and/or high oil level</li> </ul>	<ul style="list-style-type: none"> <li>Install oil expansion tank</li> </ul>

Fault	Possible cause	Measure
Output shaft does not turn although the motor is running or the input shaft is rotated	<ul style="list-style-type: none"> <li>Shaft-hub connection in the gear unit interrupted</li> </ul>	<ul style="list-style-type: none"> <li>Send in the gear unit/gearmotor for repair</li> </ul>

## 9.2 AMS..../AQS..../AL..../EWH.. adapter

Fault	Possible cause	Measure
Unusual, regular running noise	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE</li> </ul>
Oil leaking.	<ul style="list-style-type: none"> <li>Seal defective</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE</li> </ul>
Output shaft does not turn although the motor is running or the input shaft is rotated	<ul style="list-style-type: none"> <li>Shaft-hub connection in the gear unit interrupted</li> </ul>	<ul style="list-style-type: none"> <li>Send in the gear unit/gearmotor for repair</li> </ul>
Change in running noise and/or vibrations	<ul style="list-style-type: none"> <li>Coupling ring wear, short-term torque transmission due to metal contact</li> <li>Screws to secure hub axially are loose</li> </ul>	<ul style="list-style-type: none"> <li>Replace coupling ring.</li> <li>Tighten the screws</li> </ul>
Premature coupling ring wear	<ul style="list-style-type: none"> <li>Contact with aggressive fluids/oils; ozone influence; excessive ambient temperatures, etc. that can change the physical properties of the coupling ring.</li> <li>Non-permissibly high coupling ring ambient/contact temperatures; max. permissible: -20 °C to +80 °C.</li> <li>Overload</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE</li> <li>Contact SEW-EURODRIVE</li> <li>Contact SEW-EURODRIVE</li> </ul>

## 9.3 AD input shaft assembly

Fault	Possible cause	Measure
Unusual, regular running noise	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE</li> </ul>
Oil leaking	<ul style="list-style-type: none"> <li>Seal defective</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE</li> </ul>
Output shaft does not turn although the input shaft is rotated	<ul style="list-style-type: none"> <li>Connection between shaft and hub in gear unit or cover interrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Send the gear unit to SEW-EURODRIVE for repair.</li> </ul>

## 9.4 Service

If you require customer service, include the following information:

- Nameplate data (complete)
- Type and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Assumed cause
- A digital picture of the failure, if possible

## 9.5 Waste disposal

Dispose of gear units in accordance with the material structure and the regulations in force:

- As scrap steel/stainless steel
  - Housing parts
  - Gear wheels
  - Shafts
  - Rolling bearings
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gear accordingly.
- Collect used oil and dispose of it according to the regulations in force.

## 10 Address list

### Argentina

Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 <a href="http://www.sew-eurodrive.com.ar">http://www.sew-eurodrive.com.ar</a> <a href="mailto:sewar@sew-eurodrive.com.ar">sewar@sew-eurodrive.com.ar</a>
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### Australia

Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 <a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a> <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>

### Austria

Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Straße 24 1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 <a href="http://www.sew-eurodrive.at">http://www.sew-eurodrive.at</a> <a href="mailto:sew@sew-eurodrive.at">sew@sew-eurodrive.at</a>
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### Bangladesh

Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 <a href="mailto:salesdhaka@seweurodrivebangladesh.com">salesdhaka@seweurodrivebangladesh.com</a>
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### Belarus

Sales	Minsk	Foreign unitary production enterprise SEW-EURODRIVE RybalkoStr. 26 220033 Minsk	Tel. +375 17 319 47 56 / +375 17 378 47 58 Fax +375 17 378 47 54 <a href="http://www.sew-eurodrive.by">http://www.sew-eurodrive.by</a> <a href="mailto:sew@sew-eurodrive.by">sew@sew-eurodrive.by</a>
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### Belgium

Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:info@sew-eurodrive.be">info@sew-eurodrive.be</a>
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue du Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:info@sew.be">info@sew.be</a>

### Brazil

Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 <a href="mailto:sew@sew.com.br">sew@sew.com.br</a>
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Compark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 <a href="mailto:montadora.rc@sew.com.br">montadora.rc@sew.com.br</a>
	Joinville	SEW-EURODRIVE Brasil Ltda. Jvl / Ind Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 <a href="mailto:fili.al.sc@sew.com.br">fili.al.sc@sew.com.br</a>

### Bulgaria

Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 <a href="mailto:bever@bever.bg">bever@bever.bg</a>
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**Cameroon**

Sales	Douala	SEW-EURODRIVE SARLU Ancienne Route Bonabéri P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 12 35 Fax +237 233 39 02 10 <a href="http://www.sew-eurodrive.ci/">www.sew-eurodrive.ci/</a> <a href="mailto:info@sew-eurodrive.cm">info@sew-eurodrive.cm</a>
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**Canada**

Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 <a href="http://www.sew-eurodrive.ca">http://www.sew-eurodrive.ca</a> <a href="mailto:l.watson@sew-eurodrive.ca">l.watson@sew-eurodrive.ca</a>
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 <a href="mailto:b.wake@sew-eurodrive.ca">b.wake@sew-eurodrive.ca</a>
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2001 Ch. de l'Aviation Dorval Quebec H9P 2X6	Tel. +1 514 367-1124 Fax +1 514 367-3677 <a href="mailto:n.paradis@sew-eurodrive.ca">n.paradis@sew-eurodrive.ca</a>

**Chile**

Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 <a href="http://www.sew-eurodrive.cl">http://www.sew-eurodrive.cl</a> <a href="mailto:ventas@sew-eurodrive.cl">ventas@sew-eurodrive.cl</a>
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**China**

Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 <a href="http://www.sew-eurodrive.cn">http://www.sew-eurodrive.cn</a> <a href="mailto:info@sew-eurodrive.cn">info@sew-eurodrive.cn</a>
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 <a href="mailto:suzhou@sew-eurodrive.cn">suzhou@sew-eurodrive.cn</a>
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 <a href="mailto:guangzhou@sew-eurodrive.cn">guangzhou@sew-eurodrive.cn</a>
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 <a href="mailto:shenyang@sew-eurodrive.cn">shenyang@sew-eurodrive.cn</a>
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co., Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 <a href="mailto:taiyuan@sew-eurodrive.cn">taiyuan@sew-eurodrive.cn</a>
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 <a href="mailto:wuhan@sew-eurodrive.cn">wuhan@sew-eurodrive.cn</a>
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 <a href="mailto:xian@sew-eurodrive.cn">xian@sew-eurodrive.cn</a>
Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 <a href="mailto:contact@sew-eurodrive.hk">contact@sew-eurodrive.hk</a>

**Colombia**

Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 <a href="http://www.sew-eurodrive.com.co">http://www.sew-eurodrive.com.co</a> <a href="mailto:sew@sew-eurodrive.com.co">sew@sew-eurodrive.com.co</a>
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**Croatia**

Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 <a href="mailto:kompeks@inet.hr">kompeks@inet.hr</a>
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**Czech Republic**

Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 <a href="http://www.sew-eurodrive.cz">http://www.sew-eurodrive.cz</a> <a href="mailto:sew@sew-eurodrive.cz">sew@sew-eurodrive.cz</a>
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**Denmark**

Assembly Sales Service	Copenhagen	SEW-EURODRIVE A/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 <a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a> <a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>
Service	Vejle	SEW-EURODRIVE A/S Bødkervej 2 7100 Vejle	Tel. +45 43 9585 00 <a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a> <a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>

**Egypt**

Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 <a href="http://www.copam-egypt.com">http://www.copam-egypt.com</a> <a href="mailto:copam@copam-egypt.com">copam@copam-egypt.com</a>
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**Estonia**

Sales	Tallin	ALAS-KUUL AS Loomäe tee 1, Lehmja küla 75306 Rae vald Harjumaa	Tel. +372 6593230 Fax +372 6593231 <a href="http://www.alas-kuul.ee">http://www.alas-kuul.ee</a> <a href="mailto:info@alas-kuul.ee">info@alas-kuul.ee</a>
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**Finland**

Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
	Tornio	SEW-EURODRIVE Oy Lossirannankatu 5 95420 Tornio	Tel. +358 201 589 300 Fax +358 3 780 6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>

**France**

Production Sales	Hagenau	SEW USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 <a href="http://www.usocome.com">http://www.usocome.com</a> <a href="mailto:sew@usocome.com">sew@usocome.com</a>
Production	Forbach	SEW USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00

**France**

Assembly Sales Service	Bordeaux	SEW USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 dtcbordeaux@usocome.com
	Haguenau	SEW USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 dtchaguenau@usocome.com
	Lyon	SEW USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 dtclyon@usocome.com
	Nantes	SEW USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 dtcnantes@usocome.com
	Paris	SEW USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 dtcparis@usocome.com

**Gabon**

Representation: Cameroon

**Germany**

Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 <a href="http://www.sew-eurodrive.de">http://www.sew-eurodrive.de</a> sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production / Precision Gear Units	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Straße 12 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
	MAXOLU- TION® Factory Automation	SEW-EURODRIVE GmbH & Co KG Eisenbahnstraße 11 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 43 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909551-21 Fax +49 89 909551-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Allerkai 4 28309 Bremen	Tel. +49 421 33918-10 Fax +49 421 33918-22 tb-bremen@sew-eurodrive.de

**Germany**

Hamburg	SEW-EURODRIVE GmbH & Co KG Hasselbinnen 11 22869 Schenefeld	Tel. +49 40298109-60 Fax +49 40298109-70 dc-hamburg@sew-eurodrive.de
Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service		0 800 SEWHELP 0 800 7394357

**Great Britain**

Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 <a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a> <a href="mailto:info@sew-eurodrive.co.uk">info@sew-eurodrive.co.uk</a>
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**Greece**

Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 <a href="http://www.boznos.gr">http://www.boznos.gr</a> <a href="mailto:info@boznos.gr">info@boznos.gr</a>
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**Hungary**

Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyi út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 <a href="http://www.sew-eurodrive.hu">http://www.sew-eurodrive.hu</a> <a href="mailto:office@sew-eurodrive.hu">office@sew-eurodrive.hu</a>
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**Iceland**

Sales	Reykjavik	Varma & Vélaverk ehf. Knarravogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 <a href="https://vov.is/">https://vov.is/</a> <a href="mailto:vov@vov.is">vov@vov.is</a>
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**India**

Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited 302, NOTUS IT PARK, Sarabhai Campus, Beside Notus Pride, Genda Circle, Vadodara 390023 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 <a href="http://www.seweurodriveindia.com">http://www.seweurodriveindia.com</a> <a href="mailto:salesvadodara@seweurodriveindia.com">salesvadodara@seweurodriveindia.com</a>
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 <a href="mailto:saleschennai@seweurodriveindia.com">saleschennai@seweurodriveindia.com</a>
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 <a href="mailto:salespune@seweurodriveindia.com">salespune@seweurodriveindia.com</a>
Sales Service	Gurgaon	SEW-EURODRIVE India Private Limited Drive Center Gurugram Plot no 395, Phase-IV, UdyogVihar Gurugram , 122016 Haryana	Tel. +91 99588 78855 <a href="mailto:salesgurgaon@seweurodriveindia.com">salesgurgaon@seweurodriveindia.com</a>

**Indonesia**

Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com <a href="http://www.serumpunindah.com">http://www.serumpunindah.com</a>
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 <a href="mailto:cjakt@cbn.net.id">cjakt@cbn.net.id</a>
	Jakarta	PT. Agrindo Putra Lestari JL.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 <a href="mailto:aplindo@indosat.net.id">aplindo@indosat.net.id</a> <a href="http://www.aplindo.com">http://www.aplindo.com</a>
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 <a href="mailto:sales@triagri.co.id">sales@triagri.co.id</a> <a href="http://www.triagri.co.id">http://www.triagri.co.id</a>
	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 <a href="mailto:sianhwa@sby.centrin.net.id">sianhwa@sby.centrin.net.id</a> <a href="http://www.cvmultimas.com">http://www.cvmultimas.com</a>

**Ireland**

Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 <a href="http://www.alperton.ie">http://www.alperton.ie</a> <a href="mailto:info@alperton.ie">info@alperton.ie</a>
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**Israel**

Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 <a href="http://www.liraz-handasa.co.il">http://www.liraz-handasa.co.il</a> <a href="mailto:office@liraz-handasa.co.il">office@liraz-handasa.co.il</a>
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**Italy**

Assembly Sales Service	Milan	SEW-EURODRIVE S.a.s. di SEW S.r.l. & Co. Via Bernini,12 20033 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 <a href="http://www.sew-eurodrive.it">http://www.sew-eurodrive.it</a> <a href="mailto:milano@sew-eurodrive.it">milano@sew-eurodrive.it</a>
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**Ivory Coast**

Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 27 21 21 81 05 Fax +225 27 21 25 30 47 <a href="mailto:info@sew-eurodrive.ci">info@sew-eurodrive.ci</a> <a href="http://www.sew-eurodrive.ci">http://www.sew-eurodrive.ci</a>
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**Japan**

Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 <a href="http://www.sew-eurodrive.co.jp">http://www.sew-eurodrive.co.jp</a> <a href="mailto:sewjapan@sew-eurodrive.co.jp">sewjapan@sew-eurodrive.co.jp</a>
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**Kazakhstan**

Sales Service	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 <a href="http://www.sew-eurodrive.kz">http://www.sew-eurodrive.kz</a> <a href="mailto:sew@sew-eurodrive.kz">sew@sew-eurodrive.kz</a>
	Tashkent	Representative Office SEW-EURODRIVE Representative office in Uzbekistan 95A Amir Temur ave, office 401/3 100084 Tashkent	Tel. +998 97 134 01 99 <a href="http://www.sew-eurodrive.uz">http://www.sew-eurodrive.uz</a> <a href="mailto:sew@sew-eurodrive.uz">sew@sew-eurodrive.uz</a>
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Fax +976-77109997 <a href="mailto:imt@imt.mn">imt@imt.mn</a>

**Latvia**

Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 <a href="http://www.alas-kuul.lv">http://www.alas-kuul.lv</a> <a href="mailto:info@alas-kuul.com">info@alas-kuul.com</a>
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**Lebanon**

Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 <a href="mailto:ssacar@inco.com.lb">ssacar@inco.com.lb</a>
Sales (Jordan, Kuwait , Beirut Saudi Arabia, Syria)		Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 <a href="http://www.medrives.com">http://www.medrives.com</a> <a href="mailto:info@medrives.com">info@medrives.com</a>

**Lithuania**

Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 <a href="http://www.irseva.lt">http://www.irseva.lt</a> <a href="mailto:irmantas@irseva.lt">irmantas@irseva.lt</a>
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**Luxembourg**

Representation: Belgium

**Macedonia**

Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 <a href="http://www.boznos.mk">http://www.boznos.mk</a>
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**Malaysia**

Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 <a href="mailto:sales@sew-eurodrive.com.my">sales@sew-eurodrive.com.my</a>
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**Mexico**

Assembly Sales Service	Querétaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Querétaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> <a href="mailto:scmexico@seweurodrive.com.mx">scmexico@seweurodrive.com.mx</a>
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> <a href="mailto:scmexico@seweurodrive.com.mx">scmexico@seweurodrive.com.mx</a>

**Mongolia**

Technical Office	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 <a href="http://imt.mn/">http://imt.mn/</a> <a href="mailto:imt@imt.mn">imt@imt.mn</a>
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**Morocco**

Sales Service Assembly	Bouskoura	SEW-EURODRIVE Morocco SARL Parc Industriel CFCIM, Lot. 55/59 27182 Bouskoura Grand Casablanca	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 <a href="http://www.sew-eurodrive.ma">http://www.sew-eurodrive.ma</a> <a href="mailto:sew@sew-eurodrive.ma">sew@sew-eurodrive.ma</a>
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**Namibia**

Sales	Swakopmund	DB MINING & INDUSTRIAL SUPPLIES CC Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 <a href="mailto:anton@dbminingnam.com">anton@dbminingnam.com</a>
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**Netherlands**

Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP <a href="http://www.sew-eurodrive.nl">http://www.sew-eurodrive.nl</a> <a href="mailto:info@sew-eurodrive.nl">info@sew-eurodrive.nl</a>
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**New Zealand**

Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 <a href="http://www.sew-eurodrive.co.nz">http://www.sew-eurodrive.co.nz</a> <a href="mailto:sales@sew-eurodrive.co.nz">sales@sew-eurodrive.co.nz</a>
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 <a href="mailto:sales@sew-eurodrive.co.nz">sales@sew-eurodrive.co.nz</a>

**Nigeria**

Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 <a href="http://www.greenpegltd.com">http://www.greenpegltd.com</a> <a href="mailto:sales@greenpegltd.com">sales@greenpegltd.com</a>
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**Norway**

Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 <a href="http://www.sew-eurodrive.no">http://www.sew-eurodrive.no</a> <a href="mailto:sew@sew-eurodrive.no">sew@sew-eurodrive.no</a>
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**Pakistan**

Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 <a href="mailto:seweurodrive@cyber.net.pk">seweurodrive@cyber.net.pk</a>
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**Paraguay**

Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L Nu Guazu No. 642 casi Campo Esperanza Santisima Trinidad Asuncion	Tel. +595 991 519695 Fax +595 21 3285539 <a href="mailto:sewpy@sew-eurodrive.com.py">sewpy@sew-eurodrive.com.py</a>
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**Peru**

Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 <a href="http://www.sew-eurodrive.com.pe">http://www.sew-eurodrive.com.pe</a> <a href="mailto:sewperu@sew-eurodrive.com.pe">sewperu@sew-eurodrive.com.pe</a>
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**Philippines**

Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 <a href="mailto:mech_drive_sys@ptcerna.com">mech_drive_sys@ptcerna.com</a> <a href="http://www.ptcerna.com">http://www.ptcerna.com</a>
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**Poland**

Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 <a href="http://www.sew-eurodrive.pl">http://www.sew-eurodrive.pl</a> <a href="mailto:sew@sew-eurodrive.pl">sew@sew-eurodrive.pl</a>
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) <a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>

**Portugal**

Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 <a href="http://www.sew-eurodrive.pt">http://www.sew-eurodrive.pt</a> <a href="mailto:infosew@sew-eurodrive.pt">infosew@sew-eurodrive.pt</a>
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**Romania**

Sales Service Bucharest Sialco Trading SRL  
str. Brazilia nr. 36  
011783 Bucuresti Tel. +40 21 230-1328  
Fax +40 21 230-7170  
<http://www.sialco.ro>  
[sialco@sialco.ro](mailto:sialco@sialco.ro)

**Russia**

Assembly Sales Service St. Petersburg 3AO «СЕВ-ЕВРОДРАЙФ»  
188660, Russia, Leningrad Region, Vsevolozhsky District, Korabselki, Aleksandra Nevskogo str.  
building 4, block 1  
P.O. Box 36  
195220 St. Petersburg Tel. +7 812 3332522 / +7 812 5357142  
Fax +7 812 3332523  
<http://www.sew-eurodrive.ru>  
[sew@sew-eurodrive.ru](mailto:sew@sew-eurodrive.ru)

**Senegal**

Sales Dakar SENEMECA  
Mécanique Générale  
Km 8, Route de Rufisque  
B.P. 3251, Dakar Tel. +221 338 494 770  
Fax +221 338 494 771  
<http://www.senemeca.com>  
[senemeca@senemeca.sn](mailto:senemeca@senemeca.sn)

**Serbia**

Sales Belgrade DIPAR d.o.o.  
Ustanicka 128a  
PC Košum, IV floor  
11000 Beograd Tel. +381 11 347 3244 / +381 11 288 0393  
Fax +381 11 347 1337  
[office@dipar.rs](mailto:office@dipar.rs)

**Singapore**

Assembly Sales Service Singapore SEW-EURODRIVE PTE. LTD.  
No 9, Tuas Drive 2  
Jurong Industrial Estate  
Singapore 638644 Tel. +65 68621701  
Fax +65 68612827  
<http://www.sew-eurodrive.com.sg>  
[sewsingapore@sew-eurodrive.com](mailto:sewsingapore@sew-eurodrive.com)

**Slovakia**

Sales Bernolákovo SEW-Eurodrive SK s.r.o.  
Priemyselná ulica 6267/7  
900 27 Bernolákovo Tel. +421 2 48 212 800  
<http://www.sew-eurodrive.sk>  
[sew@sew-eurodrive.sk](mailto:sew@sew-eurodrive.sk)

**Slovenia**

Sales Service Celje Pakman - Pogonska Tehnika d.o.o.  
UI. XIV. divizije 14  
3000 Celje Tel. +386 3 490 83-20  
Fax +386 3 490 83-21  
[pakman@siol.net](mailto:pakman@siol.net)

**South Africa**

Assembly Sales Service Johannesburg SEW-EURODRIVE (PROPRIETARY) LIMITED Tel. +27 11 248-7000  
Eurodrive House  
Cnr. Adcock Ingram and Aerodrome Roads  
Aeroton Ext. 2  
Johannesburg 2013  
P.O.Box 90004  
Bertsham 2013 Fax +27 11 248-7289  
<http://www.sew.co.za>  
[info@sew.co.za](mailto:info@sew.co.za)

Cape Town SEW-EURODRIVE (PROPRIETARY) LIMITED Tel. +27 21 552-9820  
Rainbow Park  
Cnr. Racecourse & Omuramba Road  
Montague Gardens  
Cape Town  
P.O.Box 36556  
Chempet 7442 Fax +27 21 552-9830  
Telex 576 062  
[bgriffiths@sew.co.za](mailto:bgriffiths@sew.co.za)

Durban SEW-EURODRIVE (PROPRIETARY) LIMITED Tel. +27 31 902 3815  
48 Prospecton Road  
Isipingo  
Durban  
P.O. Box 10433, Ashwood 3605 Fax +27 31 902 3826  
[cdejager@sew.co.za](mailto:cdejager@sew.co.za)

Nelspruit SEW-EURODRIVE (PROPRIETARY) LIMITED Tel. +27 13 752-8007  
7 Christie Crescent  
Vintonia  
P.O.Box 1942  
Nelspruit 1200 Fax +27 13 752-8008  
[robermeyer@sew.co.za](mailto:robermeyer@sew.co.za)

**South Korea**

Assembly Sales Service	Ansan	SEW-EURODRIVE Korea Co., Ltd. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 <a href="http://www.sew-eurodrive.kr">http://www.sew-eurodrive.kr</a> <a href="mailto:master.korea@sew-eurodrive.com">master.korea@sew-eurodrive.com</a>
	Busan	SEW-EURODRIVE Korea Co., Ltd. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Assembly Service	Siheung	SEW-EURODRIVE Korea Co., Ltd. 35, Emtibeu 26-ro 58beon-gil, Siheung-si, Gyeonggi-do	<a href="http://www.sew-eurodrive.kr">http://www.sew-eurodrive.kr</a>

**Spain**

Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 <a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a> <a href="mailto:sew.spain@sew-eurodrive.es">sew.spain@sew-eurodrive.es</a>
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**Sri Lanka**

Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
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**Swaziland**

Sales	Manzini	C G Trading Co. (Pty) Ltd Simunye street Matsapha, Manzini	Tel. +268 7602 0790 Fax +268 2 518 5033 <a href="mailto:charles@cgtading.co.sz">charles@cgtading.co.sz</a> <a href="http://www.cgtadingswaziland.com">www.cgtadingswaziland.com</a>
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**Sweden**

Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 <a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a> <a href="mailto:jonkoping@sew.se">jonkoping@sew.se</a>
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**Switzerland**

Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 <a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a> <a href="mailto:info@imhof-sew.ch">info@imhof-sew.ch</a>
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**Taiwan**

Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>

**Tanzania**

Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 <a href="http://www.sew-eurodrive.co.tz">http://www.sew-eurodrive.co.tz</a> <a href="mailto:info@sew.co.tz">info@sew.co.tz</a>
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**Thailand**

Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaro Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 <a href="mailto:sewtailand@sew-eurodrive.com">sewtailand@sew-eurodrive.com</a>
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**Tunisia**

Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 <a href="http://www.tms.com.tn">http://www.tms.com.tn</a> <a href="mailto:tms@tms.com.tn">tms@tms.com.tn</a>
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**Turkey**

Assembly	Kocaeli-Gebze	SEW-EURODRIVE Ana Merkez Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 <a href="http://www.sew-eurodrive.com.tr">http://www.sew-eurodrive.com.tr</a> <a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a>
Sales			
Service			

**Ukraine**

Assembly	Dnipropetrovsk	SEW-EURODRIVE, LLC Robochya str., bld. 23-B, office 409 49008 Dnipro	Tel. +380 56 370 3211 Fax +380 56 372 2078 <a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a> <a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a>
Sales			
Service			

**United Arab Emirates**

Drive Technology Center	Dubai	SEW-EURODRIVE FZE PO Box 263835 Jebel Ali Free Zone – South, P.O. Box Dubai, United Arab Emirates	Tel. +971 (0)4 8806461 Fax +971 (0)4 8806464 <a href="mailto:info@sew-eurodrive.ae">info@sew-eurodrive.ae</a>
Sales			
Service			

**Uruguay**

Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esquina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 <a href="mailto:sewuy@sew-eurodrive.com.uy">sewuy@sew-eurodrive.com.uy</a>
Sales			
Service			

**USA**

Production	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 <a href="http://www.seweurodrive.com">http://www.seweurodrive.com</a> <a href="mailto:csllyman@seweurodrive.com">csllyman@seweurodrive.com</a>
Assembly	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 <a href="mailto:csbridgeport@seweurodrive.com">csbridgeport@seweurodrive.com</a>
Sales			
Service			
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 <a href="mailto:cstroy@seweurodrive.com">cstroy@seweurodrive.com</a>
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 <a href="mailto:csdallas@seweurodrive.com">csdallas@seweurodrive.com</a>
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 <a href="mailto:cshayward@seweurodrive.com">cshayward@seweurodrive.com</a>
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 <a href="mailto:IGOOrders@seweurodrive.com">IGOOrders@seweurodrive.com</a>

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**Zambia**

Representation: South Africa

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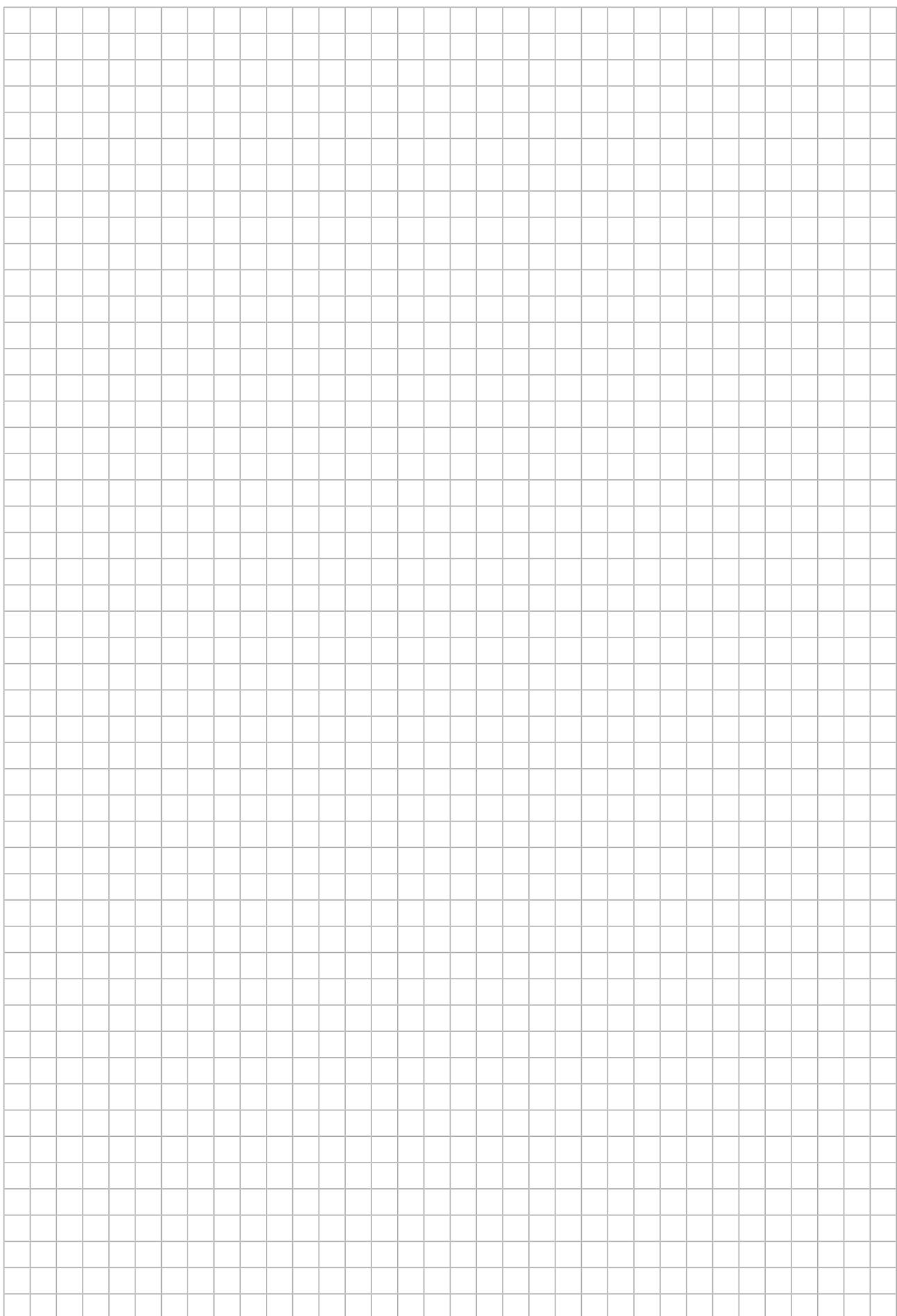
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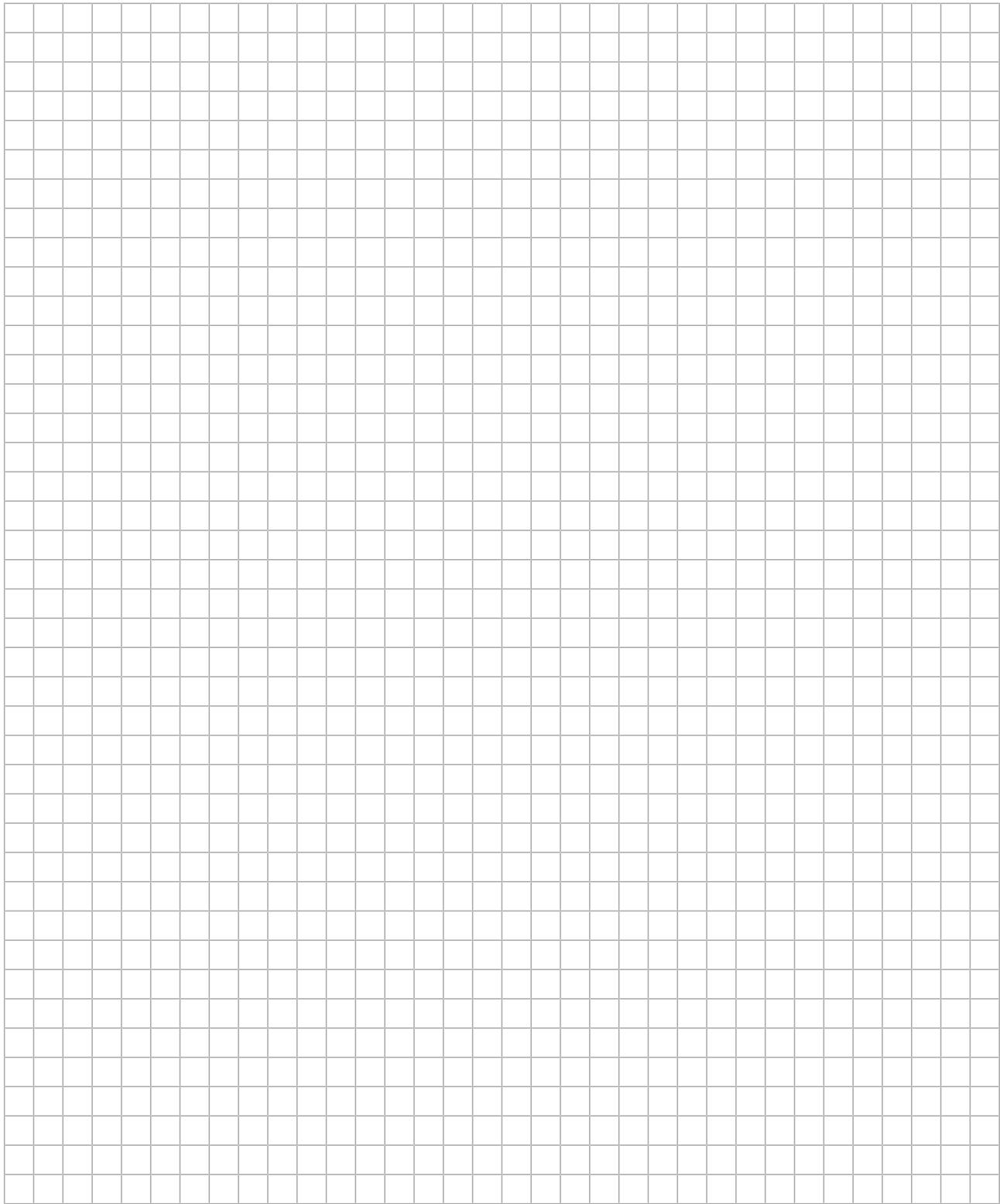
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# Manual geral de instalação, operação e manutenção de motores elétricos

# Installation, operation and maintenance manual of electric motors

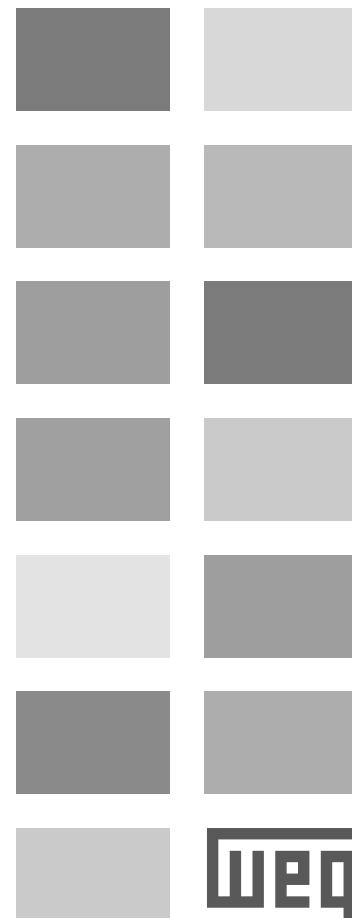
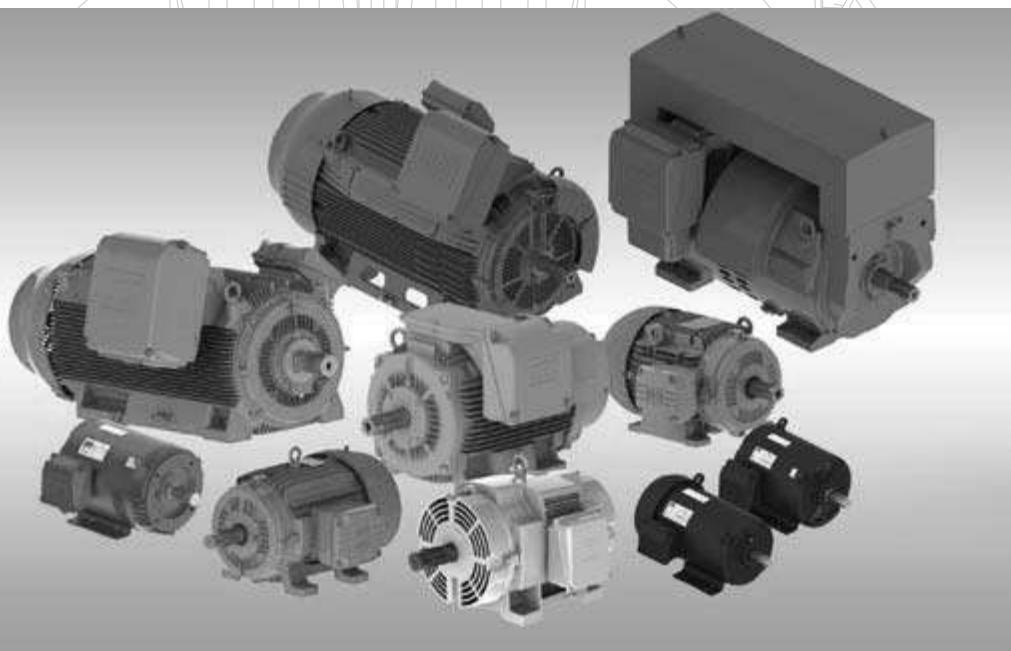
# Manual general de instalación, operación y mantenimiento de motores eléctricos

# Installations-, betriebs- und wartungsanleitung für elektrische motoren

# Manual de instalare, exploatare și întreținere a motoarelor electrice

# Ръководство за монтаж, експлоатация и поддръжка на електродвигатели

# Руководство по установке, эксплуатации и техническому обслуживанию электрических двигателей



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## INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF ELECTRIC MOTORS

This manual provides information about WEG induction motors fitted with squirrel cage, permanent magnet or hybrid rotors, low, medium and high voltage, in frame sizes IEC 56 to 630 and NEMA 42 to 9606/10.

The motor lines indicated below have additional information that can be checked in their respective manuals:

- Smoke Extraction Motors;
- Electromagnetic Brake Motors;
- Hazardous Area Motors.

These motors meet the following standards, if applicable:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

If you have any questions regarding this manual please contact your local WEG branch, contact details can be found at [www.weg.net](http://www.weg.net).



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## 1. TERMINOLOGY

**Balancing:** the procedure by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibration of the journals and/or forces on the bearings at a frequency corresponding to service speed are within specified limits in International Standards.  
[ISO 1925:2001, definition 4.1]

**Balance quality grade:** indicates the peak velocity amplitude of vibration, given in mm/s, of a rotor running free-in-space and it is the product of a specific unbalance and the angular velocity of the rotor at maximum operating speed.

**Grounded Part:** metallic part connected to the grounding system.

**Live Part:** conductor or conductive part intended to be energized in normal operation, including a neutral conductor.

**Authorized personnel:** employee who has formal approval of the company.

**Qualified personnel:** employee who meets the following conditions simultaneously:

- Receives training under the guidance and responsibility of a qualified and authorized professional;
- Works under the responsibility of a qualified and approved professional.

**Note:** The qualification is only valid for the company that trained the employee in the conditions set out by the authorized and qualified professional responsible for training.



## 2. INITIAL RECOMMENDATIONS



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. Therefore, it is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Also the applicable procedures and relevant standards of the country where the machine will be installed must be considered.

Noncompliance with the recommended procedures in this manual and other references on the WEG website may cause severe personal injuries and/or substantial property damage and may void the product warranty.

For practical reasons, it is not possible to include in this Manual detailed information that covers all construction variables nor covering all possible assembly, operation or maintenance alternatives.

This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.

For *Smoke Extraction Motors*, please refer to the additional instruction manual 50026367 available on the website [www.weg.net](http://www.weg.net).

For brake motors, please refer to the information contained in WEG 50021973 brake motor manual available on the website [www.weg.net](http://www.weg.net).

For information about permissible radial and axial shaft loads, please check the product technical catalogue.



The user is responsible for the correct definition of the installation environment and application characteristics.



During the warranty period, all repair, overhaul and reclamation services must be carried out by WEG authorized Service Centers to maintain validity of the warranty.

### 2.1. WARNING SYMBOL



Warning about safety and warranty.

### 2.2. RECEIVING INSPECTION

All motors are tested during the manufacturing process.

The motor must be checked when received for any damage that may have occurred during the transportation.

All damages must be reported in writing to the transportation company, to the insurance company and to WEG. Failure to comply with such procedures will void the product warranty.

You must inspect the product:

- Check if nameplate data complies with the purchase order;
  - Remove the shaft locking device (if any) and rotate the shaft by hand to ensure that it rotates freely;
  - Check that the motor has not been exposed to excessive dust and moisture during the transportation.
- Do not remove the protective grease from the shaft, or the plugs from the cable entries. These protections must remain in place until the installation has been completed.

### 2.3. NAMEPLATES

The nameplate contains information that describes the construction characteristics and the performance of the motor. Figure 2.1 and Figure 2.2 show nameplate layout examples.

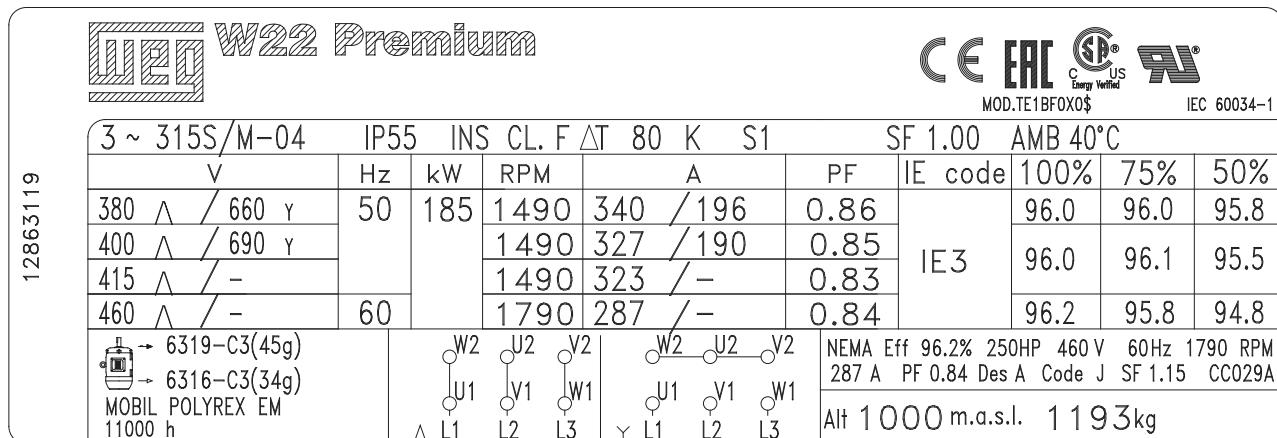
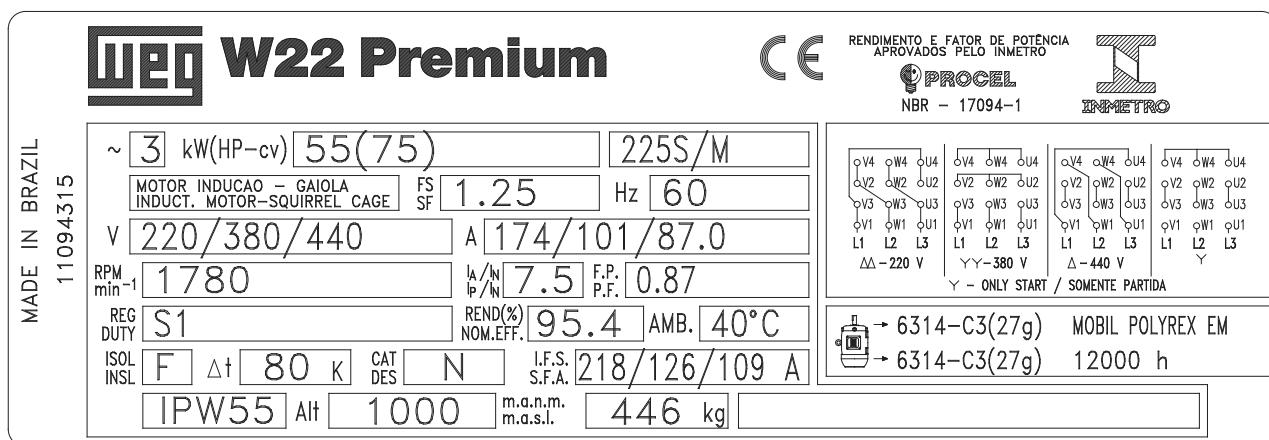
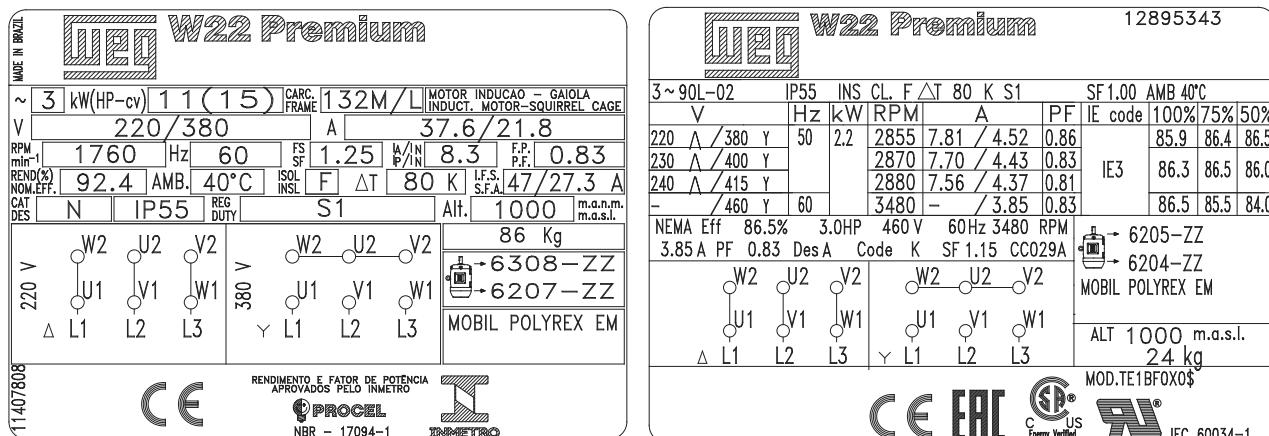
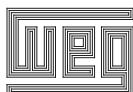


Figure 2.1 - IEC motor nameplate

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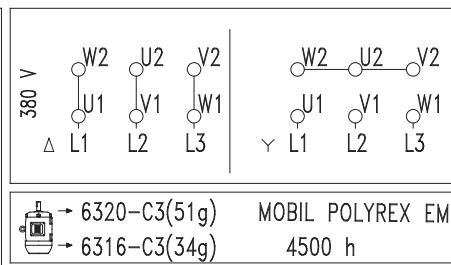


HGF

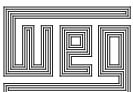


NBR-17094-1

~	3	kW(HP-cv)	370(500)		CARC.	315C/D/E
MOTOR INDUCAO - GAIOLA INDUCT. MOTOR-SQUIRREL CAGE	FS SF	1.00	Hz	60		
V	380	A	680			
RPM min-1	1784	I <sub>A</sub> /N I <sub>P</sub> /N	6.8	F.P. P.F.	0.86	
REG DUTY	S1	REND(%) NOM.EFF.	96.1	AMB.	40°C	
ISOL INSL	F	Δt	80 K	CAT DES	N	I.F.S. S.F.A.
	IP55	Alt	1000	m.a.n.m. m.a.s.l.	2161	kg



12309946

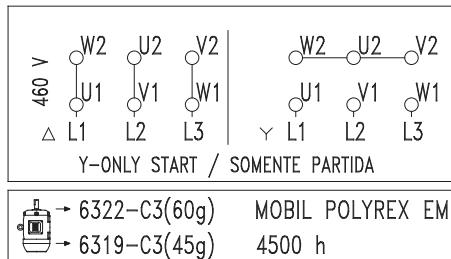


HGF

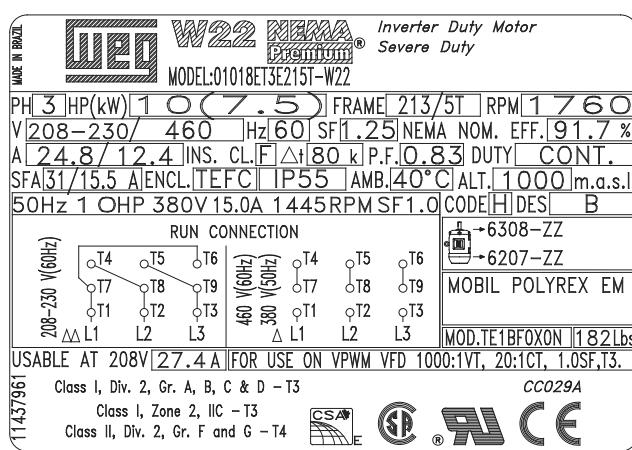


VDE 0530  
IEC 60034

~	3	kW	560	FRAME	355C/D/E
V	460			Hz	60
A	841			SF	1.00
min <sup>-1</sup>	1783			P.F.	0.87
DUTY	S1			AMB.	40°C
INS. CL.	F		Δt 80	K	IP55
Alt	1000	m.a.s.l.	WEIGHT	3114 kg	



ENGLISH



**Figure 2.1 - IEC motor nameplate**

**Figure 2.2 - NEMA motor nameplate**

### 3. SAFETY INSTRUCTIONS



The motor must be disconnected from the power supply and be completely stopped before conducting any installation or maintenance procedures. Additional measures should be taken to avoid accidental motor starting.



Professionals working with electrical installations, either in the assembly, operation or maintenance, should use proper tools and be instructed on the application of standards and safety requirements, including the use of Personal Protective Equipment (PPE) that must be carefully observed in order to reduce risk of personal injury during these services.



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. It is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Always follow the safety, installation, maintenance and inspection instructions in accordance with the applicable standards in each country.

## 4. HANDLING AND TRANSPORT

Individually packaged motors should never be lifted by the shaft or by the packaging. They must be lifted only by means of the eyebolts, when supplied. Use always suitable lifting devices to lift the motor. Eyebolts on the frame are designed for lifting the machine weight only as indicated on the motor nameplate. Motors supplied on pallets must be lifted by the pallet base with lifting devices fully supporting the motor weight.

The package should never be dropped. Handle it carefully to avoid bearing damage.



Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc..

Never use damaged, bent or cracked eyebolts. Always check the eyebolt condition before lifting the motor.

Eyebolts mounted on components, such as on end shields, forced ventilation kits, etc. must be used for lifting these components only. Do not use them for lifting the complete machine set.

Handle the motor carefully without sudden impacts to avoid bearing damage and prevent excessive mechanical stresses on the eyebolts resulting in its rupture.



To move or transport motors with cylindrical roller bearings or angular contact ball bearings, use always the shaft locking device provided with the motor.

All HGF motors, regardless of bearing type, must be transported with shaft locking device fitted.

Vertical mounted motors with oil-lubricated bearings must be transported in the vertical position. If necessary to move or transport the motor in the horizontal position, install the shaft locking device on both sides (drive end and non-drive end) of the motor.

### 4.1. LIFTING



Before lifting the motor ensure that all eyebolts are tightened properly and the eyebolt shoulders are in contact with the base to be lifted, as shown in Figure 4.1. Figure 4.2 shows an incorrect tightening of the eyebolt.

Ensure that lifting machine has the required lifting capacity for the weight indicated on the motor nameplate.



*Figure 4.1 - Correct tightening of the eyebolt*



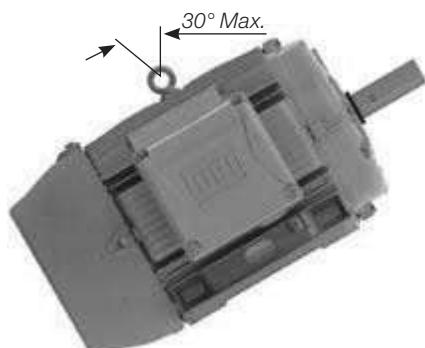
*Figure 4.2 - Incorrect tightening of the eyebolt*



The center-of-gravity may change depending on motor design and accessories. During the lifting procedures the maximum allowed angle of inclination should never be exceeded as specified below.

#### 4.1.1. Horizontal motors with one eyebolt

For horizontal motors fitted with only one eyebolt, the maximum allowed angle-of-inclination during the lifting process should not exceed 30° in relation to the vertical axis, as shown in Figure 4.3.



*Figure 4.3 - Maximum allowed angle-of-inclination for motor with one eyebolt*

#### 4.1.2. Horizontal motor with two eyebolts

When motors are fitted with two or more eyebolts, all supplied eyebolts must be used simultaneously for the lifting procedure.

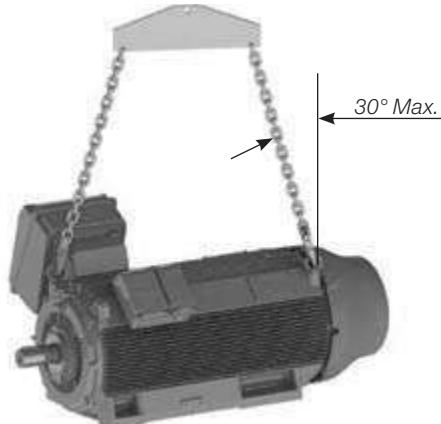
There are two possible eyebolt arrangements (vertical and inclined), as shown below:

- For motors with vertical lifting eyebolts, as shown in Figure 4.4, the maximum allowed lifting angle should not exceed  $45^\circ$  in relation to the vertical axis. We recommend to use a spreader beam for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface;



**Figure 4.4 - Maximum resulting angle for motors with two or more lifting eyebolts**

- For HGF, W40 and W50 motors, as shown in Figure 4.5, the maximum resulting angle should not exceed  $30^\circ$  in relation to the vertical axis;



**Figure 4.5 - Maximum resulting angle for horizontal HGF, W40 and W50 motors**

- For motors fitted with inclined eyebolts, as shown in Figure 4.6, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



**Figure 4.6 - Use of a spreader beam for lifting**

#### 4.1.3. Vertical motors

For vertical mounted motors, as shown in Figure 4.7, the use of a spreader beam is required for maintaining the lifting element (chain or rope) in vertical position and thus preventing damage to the motor surface.



*Figure 4.7 - Lifting of vertical mounted motors*



Always use the eyebolts mounted on the top side of the motor, diametrically opposite, considering the mounting position. See Figure 4.8.



*Figure 4.8 - Lifting of HGF and W50 motors.*

##### 4.1.3.1. Procedures to place W22 motors in the vertical position

For safety reasons during the transport, vertical mounted Motors are usually packed and supplied in horizontal position.

To place W22 motors fitted with eyebolts (see Figure 4.6), to the vertical position, proceed as follows:

1. Ensure that the eyebolts are tightened properly, as shown in Figure 4.1;
2. Remove the motor from the packaging, using the top mounted eyebolts, as shown in Figure 4.9;



*Figure 4.9 - Removing the motor from the packaging*

3. Install a second pair of eyebolts, as shown in Figure 4.10;



*Figure 4.10 - Installation of the second pair of eyebolts*

4. Reduce the load on the first pair of eyebolts to start the motor rotation, as shown in Figure 4.11. This procedure must be carried out slowly and carefully.



*Figure 4.11 - End result: motor placed in vertical position*

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

#### 4.1.3.2. Procedures to place HGF and W50 motors in the vertical position

HGF motors are fitted with eight lifting points: four at drive end and four at non-drive end. W50 motors are fitted with nine lifting points: four at drive end, one in the central part and four at non-drive end. The motors are usually transported in horizontal position, however for the installation they must be placed in the vertical position.

To place an these motors in the vertical position, proceed as follows:

1. Lift the motor by using the four lateral eyebolts and two hoists, see Figure 4.12;



*Figure 4.12 - Lifting of HGF and W50 motors with two hoists*

2. Lower the hoist fixed to motor drive end while lifting the hoist fixed to motor non-drive end until the motor reaches its equilibrium, see Figure 4.13;



**Figure 4.13 - Placing HGF and W50 motors in vertical position**

3. Remove the hoist hooks from the drive end eyebolts and rotate the motor 180° to fix the removed hooks into the two eyebolts at the motor non-drive end, see Figure 4.14;



**Figure 4.14 - Lifting HGF and W50 motors by the eyebolts at the non-drive end**

4. Fix the removed hoist hooks in the other two eyebolts at the non-drive end and lift the motor until the vertical position is reached, see Figure 4.15.



**Figure 4.15 - HGF and W50 motors in the vertical position**

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

#### **4.2 Procedures to place W22 vertical mount motors in horizontal position**

To place W22 vertical mount motor in horizontal position, proceed as follows:

1. Ensure that all eyebolts are tightened properly, as shown in Figure 4.1;
2. Install the first pair of eyebolts and lift the motor as shown in Figure 4.16;



**Figure 4.16 - Install the first pair of eyebolts**

3. Install the second pair of eyebolts, as shown in Figure 4.17;



**Figure 4.17 - Install the second pair of eyebolts**

4. Reduce the load on the first pair of eyebolts for rotating the motor, as shown in Figure 4.18. This procedure must be carried out slowly and carefully;



**Figure 4.18 - Motor is being rotated to horizontal position**

5. Remove the first pair of eyebolts, as shown in Figure 4.19.



**Figure 4.19 - Final result: motor placed in horizontal position**

## 5. STORAGE

If the motor is not installed immediately, it must be stored in a dry and clean environment, with relative humidity not exceeding 60%, with an ambient temperature between 5 °C and 40 °C, without sudden temperature changes, free of dust, vibrations, gases or corrosive agents. The motor must be stored in horizontal position, unless specifically designed for vertical operation, without placing objects on it. Do not remove the protection grease from shaft end to prevent rust.

If the motor are fitted with space heaters, they must always be turned on during the storage period or when the installed motor is out of operation. Space heaters will prevent water condensation inside the motor and keep the winding insulation resistance within acceptable levels. Store the motor in such position that the condensed water can be easily drained. If fitted, remove pulleys or couplings from the shaft end (more information are given on item 6).



The space heaters should never be energized when the motor is in operation.

### 5.1. EXPOSED MACHINED SURFACES

All exposed machined surfaces (like shaft end and flange) are factory-protected with temporary rust inhibitor. A protective film must be reapplied periodically (at least every six months), or when it has been removed and/or damaged.

### 5.2. STORAGE

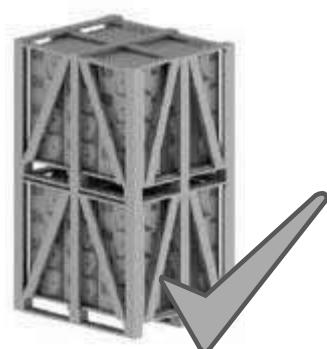
The stacking height of the motor packaging during the storage period should not exceed 5 m, always considering the criteria indicated in Table 5.1:

*Table 5.1 - Max. recommended stacking height*

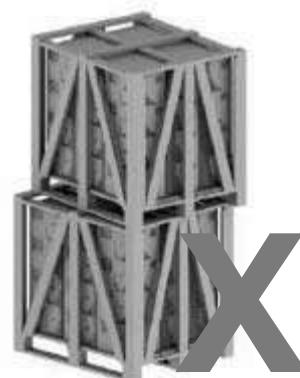
Packaging type	Frame sizes	Maximum stacking quantity
<b>Cardboard box</b>	IEC 63 to 132 NEMA 143 to 215	Indicated on the top side of the cardboard box
<b>Wood crate</b>	IEC 63 to 315 NEMA 48 to 504/5	06
	IEC 355 NEMA 586/7 and 588/9	03
	W40 / W50 / HGF IEC 315 to 630 W40 / W50 / HGF NEMA 5000 to 9600	Indicated on the packaging

**Notes:**

- 1) Never stack larger packaging onto smaller packaging;
- 2) Align the packaging correctly (see Figure 5.1 and Figure 5.2);



*Figure 5.1 - Correct stacking*



*Figure 5.2 - Incorrect stacking*

3) The feet of the crates above should always be supported by suitable wood battens (Figure 5.3) and never stand on the steel tape or without support (Figure 5.4);



Figure 5.3 - Correct stacking

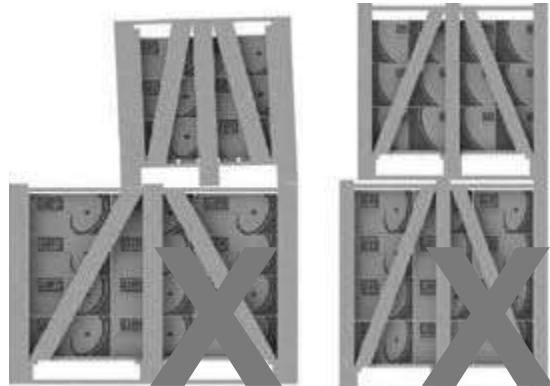


Figure 5.4 - Incorrect stacking

4) When stacking smaller crates onto longer crates, always ensure that suitable wooden supports are provided to withstand the weight (see Figure 5.5). This condition usually occurs with motor packaging above IEC 225S/M (NEMA 364/5T) frame sizes.



Figure 5.5 - Use of additional battens for stacking

## 5.3 BEARINGS

### 5.3.1 Grease lubricated bearings

We recommend rotating the motor shaft at least once a month (by hand, at least five revolutions, stopping the shaft at a different position from the original one). If the motor is fitted with shaft locking device, remove it before rotating the shaft and install it again before performing any handling procedure. Vertical motors may be stored in the vertical or in horizontal position. If motors with open bearings are stored longer than six months, the bearings must be relubricated according to item 8.2 before commissioning of the motor.

If the motor is stored for longer than 2 years, the bearings must be replaced or removed, washed, inspected and relubricated according to item 8.2.

### 5.3.2 Oil lubricated bearings

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the center of the sight glass.

During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced according to Item 8.2, before starting the operation. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to Item 8.2. The oil of vertical mounted motors is removed to prevent oils leaks during the transport. After receiving the motor the bearings must be lubricated.

### 5.3.3 Oil Mist lubricated bearings

The motor must be stored in horizontal position. Lubricate the bearings with ISO VG 68 mineral oil in the amount indicated in the Table 5.2 (this is also valid for bearings with equivalent dimensions). After filling with oil, rotate the shaft by hand, at least five revolutions)

During the storage period, remove the shaft locking device (if any) and rotate the shaft by hand every week, at least five revolutions, stopping it at a different position from the original one. Reinstall the shaft locking device every time the motor has to be moved. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to item 8.2.

**Table 5.2 - Amount of oil per bearing**

Bearing size	Amount of oil (ml)	Bearing size	Amount of oil (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

The oil must always be removed when the motor has to be handled. If the oil mist system is not operating after installation, fill the bearings with oil to prevent bearing rusting. During the storage period, rotate the shaft by hand, at least five revolutions, stopping it at a different position from the original one. Before starting the motor, all bearing protection oil must be drained from the bearing and the oil mist system must be switched ON.

### 5.3.4 Sleeve bearing

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the middle of the sight glass. During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, and at 30 rpm, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced, according to Item 8.2, before starting the operation.

If the motor is stored for a period longer than the oil change interval, or if it is not possible to rotate the motor shaft by hand, the oil must be drained and a corrosion protection and dehumidifiers must be applied.

## 5.4. INSULATION RESISTANCE

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

### 5.4.1. Insulation resistance measurement

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.



The insulation resistance must be measured in a safe environment.

The insulation resistance must be measured with a megohmmeter. The machine must be in cold state and disconnected from the power supply.



To prevent the risk of an electrical shock, ground the terminals before and after each measurement.  
Ground the capacitor (if any) to ensure that it is fully discharged before the measurement is taken.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded. The test of all phases simultaneously evaluates the insulation resistance to ground only but does not evaluate the insulation resistance between the phases.

The power supply cables, switches, capacitors and other external devices connected to the motor may considerably influence the insulation resistance measurement. Thus all external devices must be disconnected and grounded during the insulation resistance measurement.

Measure the insulation resistance one minute after the voltage has been applied to the winding. The applied voltage should be as shown in Table 5.3.

**Table 5.3 - Voltage for the insulation resistance**

<b>Winding rated voltage (V)</b>	<b>Testing voltage for measuring the insulation resistance (V)</b>
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

The reading of the insulation resistance must be corrected to 40 °C as shown in the Table 5.4.

**Table 5.4 - Correction factor for the insulation resistance corrected to 40 °C**

<b>Measuring temperature of the insulation resistance (°C)</b>	<b>Correction factor of the insulation resistance corrected to 40 °C</b>	<b>Measuring temperature of the insulation resistance (°C)</b>	<b>Correction factor of the insulation resistance corrected to 40 °C</b>
10	0.125	30	0.500
11	0.134	31	0.536
12	0.144	32	0.574
13	0.154	33	0.616
14	0.165	34	0.660
15	0.177	35	0.707
16	0.189	36	0.758
17	0.203	37	0.812
18	0.218	38	0.871
19	0.233	39	0.933
20	0.250	40	1.000
21	0.268	41	1.072
22	0.287	42	1.149
23	0.308	43	1.231
24	0.330	44	1.320
25	0.354	45	1.414
26	0.379	46	1.516
27	0.406	47	1.625
28	0.435	48	1.741
29	0.467	49	1.866
30	0.500	50	2.000

The motor insulation condition must be evaluated by comparing the measured value with the values indicated in Table 5.5 (corrected to 40 °C):

*Table 5.5 - Evaluation of the insulation system*

Limit value for rated voltage up to 1.1 kV (MΩ)	Limit value for rated voltage above 1.1 kV (MΩ)	Situation
Up to 5	Up to 100	Dangerous. The motor can not be operated in this condition
5 to 100	100 to 500	Regular
100 to 500	Higher than 500	Good
Higher than 500	Higher than 1000	Excellent

The values indicated in the table should be considered only as reference values. It is advisable to log all measured values to provide a quick and easy overview on the machine insulation resistance.

If the insulation resistance is low, moisture may be present in the stator windings. In this case the motor should be removed and transported to a WEG authorized Service Center for proper evaluation and repair (This service is not covered by the warranty). To improve the insulation resistance through the drying process, see section 8.4.



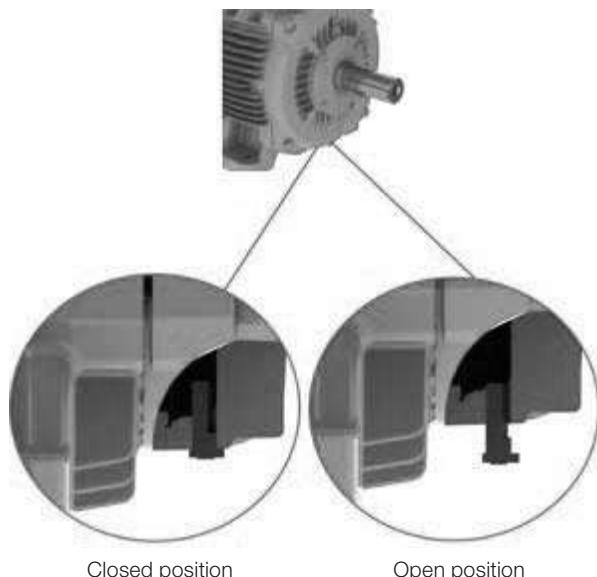
## 6. INSTALLATION



The insulation resistance must be measured in a safe environment.

Check some aspects before proceeding with the installation:

1. Insulation resistance: must be within the acceptable limits. See item 5.4.
2. Bearings:  
If the motor is installed without running immediately, proceed as described in item 5.3.
3. Operating conditions of the start capacitors: If single-phase motors are stored for a period of over two years, it is recommended to change the start capacitors before motor starting since they lose their operating characteristics.
4. Terminal box:
  - a. the inside of the terminal box must be clean and dry;
  - b. the contacts must be correctly connected and corrosion free. See 6.9 and 6.10;
  - c. the cable entries must be correctly sealed and the terminal box cover properly mounted in order to ensure the degree of protection indicated on the motor nameplate.
5. Cooling: the cooling fins, air inlet and outlet openings must be clean and unobstructed. The distance between the air inlet openings and the wall should not be shorter than  $\frac{1}{4}$  (one quarter) of the diameter of the air inlet. Ensure sufficient space to perform the cleaning services. See item 7.
6. Coupling: remove the shaft locking device (where fitted) and the corrosion protection grease from the shaft end and flange just before installing the motor. See item 6.4.
7. Drain hole: the motor must always be positioned so the drain hole is at the lowest position (If there is any indication arrow on the drain, the drain must be so installed that the arrow points downwards).  
Motors supplied with rubber drain plugs leave the factory in the closed position and must be opened periodically to allow the exit of condensed water. For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position (see Figure 6.1).  
For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position (see Figure 6.1), being opened only during the motor maintenance procedures.  
The drain system of motors with Oil Mist lubrication system must be connected to a specific collection system (see Figure 6.12).



*Figure 6.1 - Detail of the rubber drain plug mounted in closed and open position*

## 8.Additional recommendations:

- a. Check the direction of motor rotation, starting the motor at no-load before coupling it to the load;
- b. Vertical mounted motors with shaft end down must be fitted with drip cover to protect them from liquids or solids that may drop onto the motors;
- c. Vertical mounted motors with shaft end up should be fitted with water slinger ring to prevent water ingress inside the motor.
- d. The fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.



Remove or fix the shaft key before starting the motor.



Changes on the motor construction (features), such as installation of extended grease fittings or modification of the lubrication system, installation of accessories at alternative locations, etc., can be carried out only after prior written consent from WEG.

## 6.1. FOUNDATIONS

The foundation is the structure, structural element, natural or prepared base, designed to withstand the stresses produced by the installed equipment, ensuring safe and stable performance during operation. The foundation design should consider the adjacent structures to avoid the influences of other installed equipment and no vibration is transferred through the structure

The foundation must be flat and its selection and design must consider the following characteristics:

- a) The features of the machine to be installed on the foundation, the driven loads, application, maximum allowed deformations and vibration levels (for instance, motors with reduced vibration levels, foot flatness, flange concentricity, axial and radial loads, etc. lower than the values specified for standard motors).
- b) Adjacent buildings, conservation status, maximum applied load estimation, type of foundation and fixation and vibrations transmitted by these constructions.

If the motor is supplied with leveling/alignment bolts, this must be considered in the base design.



Please consider for the foundation dimensioning all stresses that are generated during the operation of the driven load.

The user is responsible for the foundation designing and construction.

The foundation stresses can be calculated by using the following equations (see Figure 6.2):

$$\begin{aligned} F_1 &= 0,5 * g * m - (4 * T_b / A) \\ F_2 &= 0,5 * g * m + (4 * T_b / A) \end{aligned}$$

Where:

$F_1$  and  $F_2$  = lateral stresses (N);

$g$  = gravitational acceleration ( $9,8 \text{ m/s}^2$ );

$m$  = motor weight (kg);

$T_b$  = breakdown torque (Nm);

$A$  = distance between centerlines of mounting holes in feet or base of the machine (end view) (m).



The motors may be mounted on:

- Concrete bases: are most used for large-size motors (see Figure 6.2);
- Metallic bases: are generally used for small-size motors (see Figure 6.3).

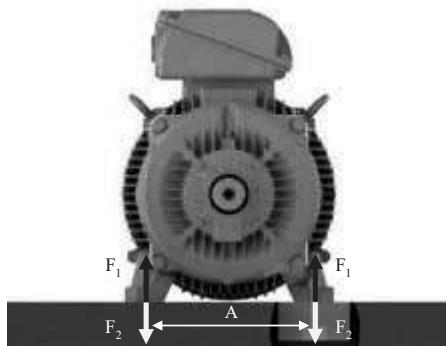


Figure 6.2 - Motor installed on concrete base

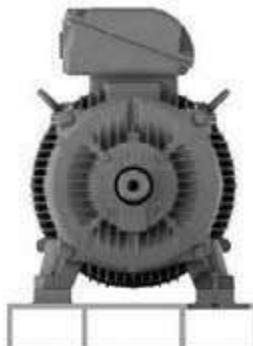


Figure 6.3 - Motor installed on metallic base

The metallic and concrete bases may be fitted with sliding system. These types of foundations are generally used where the power transmission is achieved by belts and pulleys. This power transmission system is easier to assemble/disassemble and allows the belt tension adjustment. Other important aspect of this foundation type is the location of the base locking screws that must be diagonally opposite. The rail nearest the drive pulley is placed in such a way that the positioning bolt is between the motor and the driven machine. The other rail must be placed with the bolt on the opposite side (diagonally opposite), as shown in Figure 6.4 .

To facilitate assembly, the bases may have the following features:

- Shoulders and/or recesses;
- Anchor bolts with loose plates;
- Bolts cast in the concrete;
- Leveling screws;
- Positioning screws;
- Steel & cast iron blocks, plates with flat surfaces.

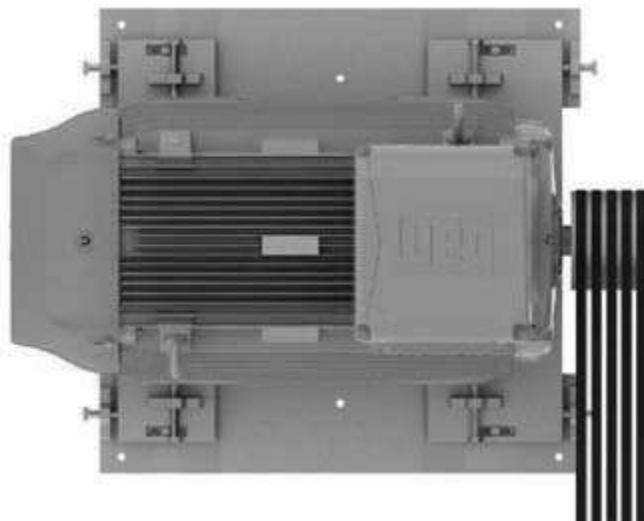


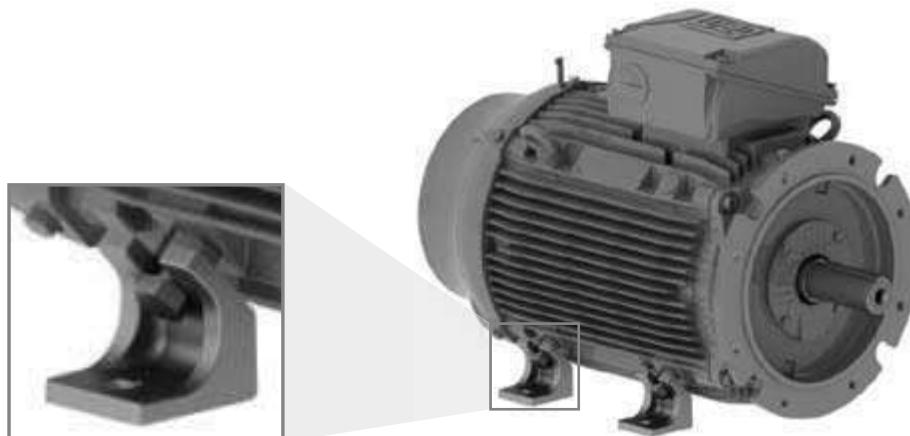
Figure 6.4 - Motor installed on sliding base

After completing the installation, it is recommended that all exposed machined surfaces are coated with suitable rust inhibitor.

## 6.2. MOTOR MOUNTING



Footless motors supplied with transportation devices, according to Figure 6.5, must have their devices removed before starting the motor installation.



*Figure 6.5 - Detail of the transportation devices for footless motors*

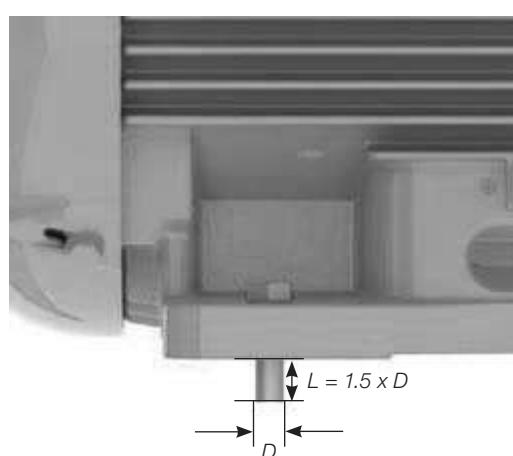
### 6.2.1. Foot mounted motors

The drawings of the mounting hole dimensions for NEMA or IEC motors can be checked in the respective technical catalogue.

The motor must be correctly aligned and leveled with the driven machine. Incorrect alignment and leveling may result in bearing damage, generate excessive vibration and even shaft distortion/breakage.

For more details, see section 6.3 and 6.6. The thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. This thread engagement length should be evaluated in more severe applications and increased accordingly.

Figure 6.6 shows the mounting system of a foot mounted motor indicating the minimum required thread engagement length.



*Figure 6.6 - Mounting system of a foot mounted motor*

### 6.2.2. Flange mounted motors

The drawings of the flange mounting dimensions, IEC and NEMA flanges, can be checked in the technical catalogue.

The coupling of the driven equipment to the motor flange must be properly dimensioned to ensure the required concentricity of the assembly.

Depending on the flange type, the mounting can be performed from the motor to the driven equipment flange (flange FF (IEC) or D (NEMA)) or from the driven equipment flange to the motor (flange C (DIN or NEMA)).

For the mounting process from the driven equipment flange to the motor, you must consider the bolt length, flange thickness and the thread depth of the motor flange.



If the motor flange has tapped through-holes, the length of the mounting bolts must not exceed the tapped through-hole length of the motor flange, thus preventing damage to the winding head.

For flange mounting the thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. In severe applications, longer thread engagement length may be required. In severe applications or if large motors are flange mounted, a foot or pad mounting may be required in addition to the flange mounting (Figure 6.7). The motor must never be supported on its cooling fins.



**Figure 6.7 - Mounting method of flange mounted motors with frame base support**

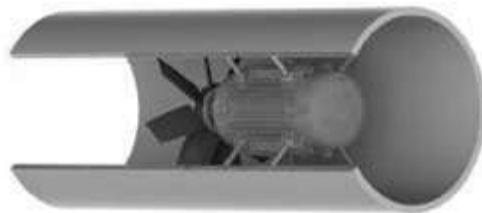
**Note:**

When liquid (for example oil) is likely to come into contact with the shaft seal, please contact your local WEG representative.

### 6.2.3. Pad mounted motors

Typically, this method of mounting is used in axial fans. The motor is fixed by tapped holes in the frame. The dimensions of these tapped holes can be checked in the respective product catalogue. The selection of the motor mounting rods/bolts must consider the dimensions of the fan case, the installation base and the thread depth in the motor frame.

The mounting rods and the fan case wall must be sufficiently stiff to prevent the transmission of excessive vibration to the machine set (motor & fan). Figure 6.8 shows the pad mounting system.



**Figure 6.8 - Mounting of the motor inside the cooling duct**

## 6.3. BALANCING

Unbalanced machines generate vibration which can result in damage to the motor. WEG motors are dynamically balanced with "half key" and without load (uncoupled). Special balancing quality level must be stated in the Purchase Order.



The transmission elements, such as pulleys, couplings, etc., must be balanced with "half key" before they are mounted on the motor shaft.

The balance quality grade meets the applicable standards for each product line.

The maximum balancing deviation must be recorded in the installation report.

## 6.4. COUPLINGS

Couplings are used to transmit the torque from the motor shaft to the shaft of the driven machine. The following aspects must be considered when couplings are installed:

- Use proper tools for coupling assembly & disassembly to avoid damages to the motor and bearings;
- Whenever possible, use flexible couplings, since they can absorb eventual residual misalignments during the machine operation;
- The maximum loads and speed limits informed in the coupling and motor manufacturer catalogues cannot be exceeded;
- Level and align the motor as specified in sections 6.5 and 6.6, respectively.



Remove or fix the shaft key firmly when the motor is operated without coupling in order to prevent accidents.

#### 6.4.1. Direct coupling

Direct coupling is characterized when the Motor shaft is directly coupled to the shaft of the driven machine without transmission elements. Whenever possible, use direct coupling due to lower cost, less space required for installation and more safety against accidents.



Do not use roller bearings for direct coupling, unless sufficient radial load is expected.

#### 6.4.2. Gearbox coupling

Gearbox coupling is typically used where speed reduction is required.

Make sure that shafts are perfectly aligned and strictly parallel (in case of straight spur gears) and in the right meshing angle (in case of bevel and helical gears).

#### 6.4.3. Pulley and belt coupling

Pulleys and belts are used when speed increase or reduction between motor shaft and driven load is required.



Excessive belt tension will damage the bearings and cause unexpected accidents such as breakage of the motor shaft.

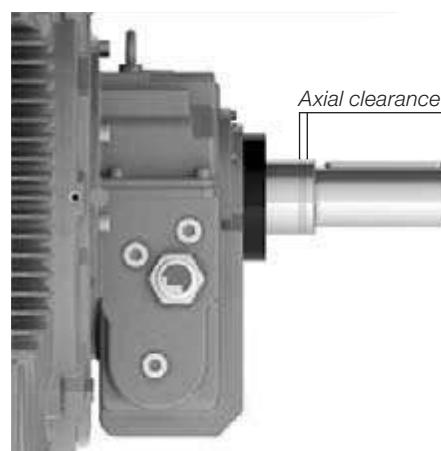
#### 6.4.4. Coupling of sleeve bearing motors



Motors designed with sleeve bearings must be operated with direct coupling to the driven machine or a gearbox. Pulley and belts can not be applied for sleeve bearing motors.

Motors designed with sleeve bearings have 3 (three) marks on the shaft end. The center mark is the indication of the magnetic center and the 2 (two) outside marks indicate the allowed limits of the rotor axial movement, as shown in Figure 6.9.

The motor must be so coupled that during operation the arrow on the frame is placed over the central mark indicating the rotor magnetic center. During start-up, or even during operation, the rotor may freely move between the two outside marks when the driven machine exerts an axial load on the motor shaft. However, under no circumstance, the motor can operate continuously with axial forces on the bearing.



*Figure 6.9 - Axial clearance of motor designed with sleeve bearing*





For coupling evaluation consider the maximum axial bearing clearance as shown in Table 6.1.  
The axial clearance of the driven machine and coupling influence the maximum bearing clearance.

**Table 6.1 - Clearance used for sleeve bearings**

Bearing size	Total axial clearance (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 = 10
18	7,5 + 7,5 = 15

\* For Motors in accordance with API 541, the total axial clearance is 12.7 mm

The sleeve bearings used by WEG were not designed to support axial load continuously.  
Under no circumstance must the motor be operated continuously at its axial clearance limits.

## 6.5. LEVELING

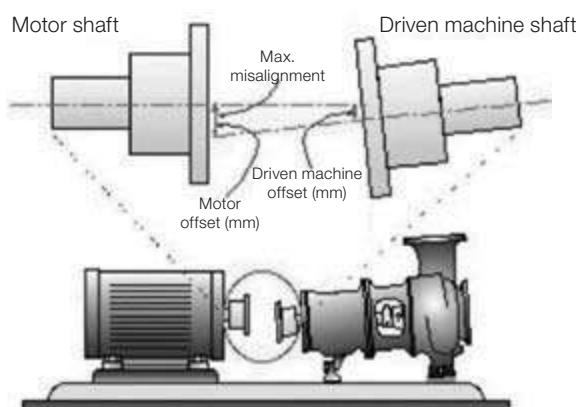
The motor must be leveled to correct any deviations in flatness arising from the manufacturing process and the material structure rearrangement. The leveling can be carried out by a leveling screw fixed on the motor foot or on the flange or by means of thin compensation shims. After the leveling process, the leveling height between the motor mounting base and the motor cannot exceed 0.1 mm.

If a metallic base is used to level the height of the motor shaft end and the shaft end of the driven machine, level only the metallic base relating to the concrete base.

Record the maximum leveling deviations in the installation report.

## 6.6. ALIGNMENT

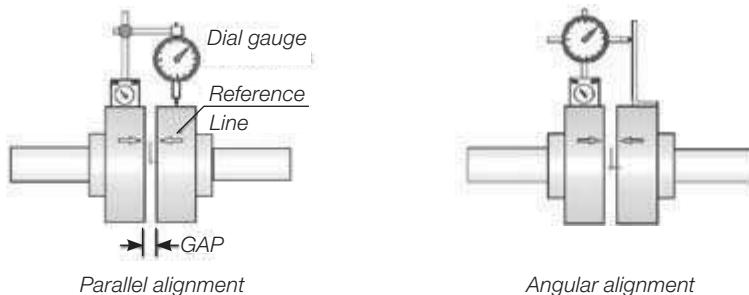
The correct alignment between the motor and the driven machine is one of the most important variables that extends the useful service life of the motor. Incorrect coupling alignment generates high loads and vibrations reducing the useful life of the bearings and even resulting in shaft breakages. Figure 6.10 illustrates the misalignment between the motor and the driven machine.



**Figure 6.10 - Typical misalignment condition**

Alignment procedures must be carried out using suitable tools and devices, such as dial gauge, laser alignment instruments, etc.. The motor shaft must be aligned axially and radially with the driven machine shaft.

The maximum allowed eccentricity for a complete shaft turn should not exceed 0.03 mm, when alignment is made with dial gauges, as shown in Figure 6.11. Ensure a gap between couplings to compensate the thermal expansion between the shafts as specified by the coupling manufacturer.



**Figure 6.11 - Alignment with dial gauge**

If alignment is made by a laser instrument, please consider the instructions and recommendations provided by the laser instrument manufacturer.

The alignment should be checked at ambient temperature with machine at operating temperature.



The coupling alignment must be checked periodically.

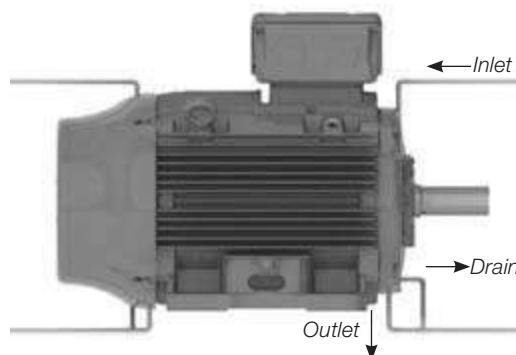
Pulley and belt couplings must be so aligned that the driver pulley center lies in the same plane of the driven pulley center and the motor shaft and the shaft of the driven machine are perfectly parallel.

After completing the alignment procedures, ensure that mounting devices do not change the motor and machine alignment and leveling resulting into machine damage during operation.

It is recommended to record the maximum alignment deviation in the Installation Report.

## 6.7. CONNECTION OF OIL LUBRICATED OR OIL MIST LUBRICATED MOTORS

When oil lubricated or oil mist lubricated motors are installed, connect the existing lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12. The lubrication system must ensure continuous oil flow through the bearings as specified by the manufacturer of the installed lubrication system.



**Figure 6.12 - Oil supply and drain system of oil lubricated or oil mist lubricated motors**

## 6.8. CONNECTION OF THE COOLING WATER SYSTEM

When water cooled motors are installed, connect the water inlet and outlet tubes to ensure proper motor cooling. According to item 7.2, ensure correct cooling water flow rate and water temperature in the motor cooling system.

## 6.9. ELECTRICAL CONNECTION

Consider the rated motor current, service factor, starting current, environmental and installation conditions, maximum voltage drop, etc. to select appropriate power supply cables and switching and protection devices. All motors must be installed with overload protection systems. Three-phase motors should be fitted with phase fault protection systems.



Before connecting the motor, check if the power supply voltage and the frequency comply with the motor nameplate data. All wiring must be made according to the connection diagram on the motor nameplate. Please consider the connection diagrams in the Table 6.2 as reference value.

To prevent accidents, check if motor has been solidly grounded in accordance with the applicable standards.



Table 6.2 - Typical connection diagram for three-phase motors.

Configuration	Quantity of leads	Type of connection	Connection diagram	
Single speed	3	-		
	6	Δ - Y		
	9	YY - Y		
	9	ΔΔ - Δ		
	12	ΔΔ - YY - Δ - Y		
	12	Δ - PWS Part-winding start	PART-WINDING	WYE-DELTA
Double speed Dahlander	6	YY - Y Variable Torque	 	 
	6	Δ - YY Constant Torque	 	 
	9	YY - Δ Constant Output	 	 
	9	Δ - Y - YY	  	  
Double speed Double winding	6	-	 	 

Equivalent table for lead identification													
Lead identification on the wiring diagram		1	2	3	4	5	6	7	8	9	10	11	12
Single speed	NEMA MG 1 Part 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
	JIS (JEC 2137) - up to 6 terminals	U	V	W	X	Y	Z						
	JIS (JEC 2137) - above 6 terminals	U1	V1	W1	U2	V2	W2	U5	V5	W5	U6	V6	W6
Double speed (Dahlander / Double winding)	NEMA MG 1 Part 2 <sup>1)</sup>	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	JIS (JEC 2137)	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

1) NEMA MG 1 Part 2 defines T1 to T12 for two or more winding, however WEG adopts 1U to 4W.

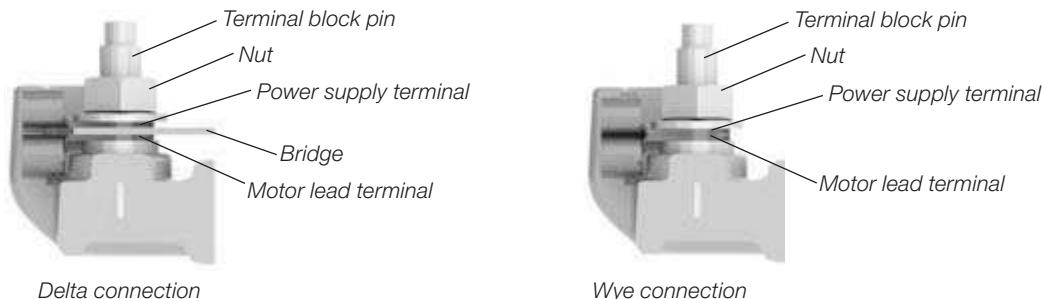


**WARNING - Local Standards have priority on the definition of the connection standards.**

The connections presented below are a reference for the connection of the customer's power cables on low voltage motors with terminal block. The terminal blocks presented below are the standard for each product line, however variations may occur.

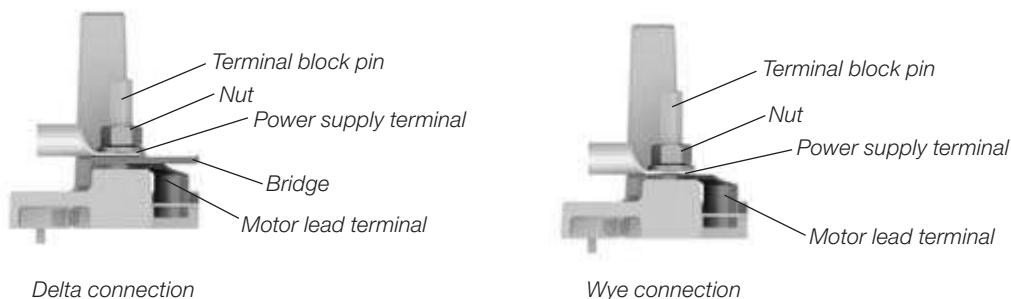
It is recommended the use of terminals made of electrolytic copper or brass, similar to the terminals used on the motors cables.

### **W21 and W22**



**Figure 6.13 - Connnection for W21 and W22 motors with terminal block**

### **W50 and HGF**

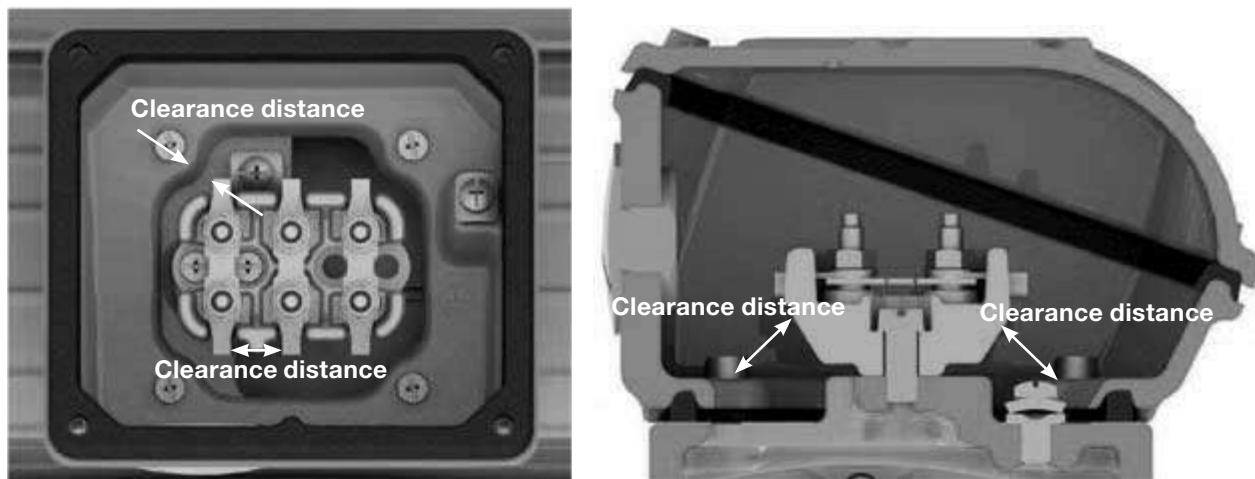


**Figure 6.14 - Connnection for W50 and HGF motors with terminal block**

If motors are supplied without terminal blocks, insulate the cable terminals with suitable insulation material that meets the power supply voltage and the insulation class indicated on the motor nameplate.

Ensure correct tightening torque for the power cable and grounding connections as specified in Table 8.11

The clearance distance (see Figure 6.15) between non-insulated live parts with each other and between grounded parts must be as indicated in Table 6.3.



**Figure 6.15 - Clearance distance representation**

**Table 6.3 - Minimum clearance distance (mm) x supply voltage**

Voltage	Minimum clearance distance (mm)
$U \leq 440 \text{ V}$	4
$440 < U \leq 690 \text{ V}$	5.5
$690 < U \leq 1000 \text{ V}$	8
$1000 < U \leq 6900 \text{ V}$	45
$6900 < U \leq 11000 \text{ V}$	70
$11000 < U \leq 16500 \text{ V}$	105

**!** Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element. Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely.

**!** After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

**!** Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:

- unused cable inlet holes in the terminal boxes must be properly closed with blanking plugs;
- components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

**!** If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

All protection devices, including overcurrent protection, must be set according to the rated machine conditions. These protection devices must protect the machine against short circuit, phase fault or locked rotor condition. The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

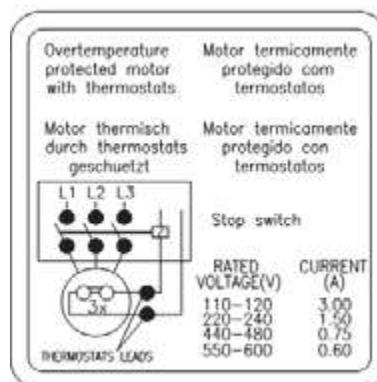
## 6.10. CONNECTION OF THE THERMAL PROTECTION DEVICES

If the motor is supplied with temperature monitoring devices, such as, thermostat, thermistors, automatic thermal protectors, Pt-100 (RTD), etc., they must be connected to the corresponding control devices as specified on the accessory nameplates. The non-compliance with this procedure may void the product warranty and cause serious material damages.

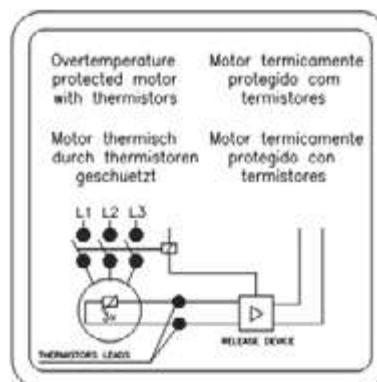


Do not apply test voltage above 2.5 V on thermistors and current above 1 mA on RTDs (Pt-100) according to IEC 60751 standard.

Figure 6.16 and Figure 6.17 show the connection diagram of the bimetal thermal protector (thermostats) and thermistors, respectively.



*Figure 6.16 - Connection of the bimetal thermal protectors (thermostats)*



*Figure 6.17 - Thermistor connection*

The alarm temperature limits and thermal protection shutdowns can be defined according to the application; however these temperature limits can not exceed the values in Table 6.4.

*Table 6.4 - Maximum activation temperature of the thermal protections*

Component	Insulation class	Maximum temperature of the protection setting (°C)	
		Alarm	Tripping
Winding	B	-	130
	F	130	155
	H	155	180
Bearing	All	110	120

**Notes:**

- 1) The number and type of the installed protection devices are stated on the accessory nameplate of the motor.
- 2) If the motor is supplied with calibrated resistance, (for example, Pt-100), the motor protection system must be set according to the operating temperatures indicated in Table 6.4.

## 6.11. RESISTANCE TEMPERATURE DETECTORS (PT-100)

The thermocouples Pt-100 are made of materials, whose resistance depends on the temperature variation, intrinsic property of some materials (usually platinum, nickel or copper), calibrated resistance. Its operation is based on the principle that the electric resistance of a metallic conductor varies linearly with the temperature, thus allowing a continuous monitoring of the motor warm-up through the controller display ensuring a high level of precision and answer stability. These devices are widely used for measuring temperatures in various industry sectors.

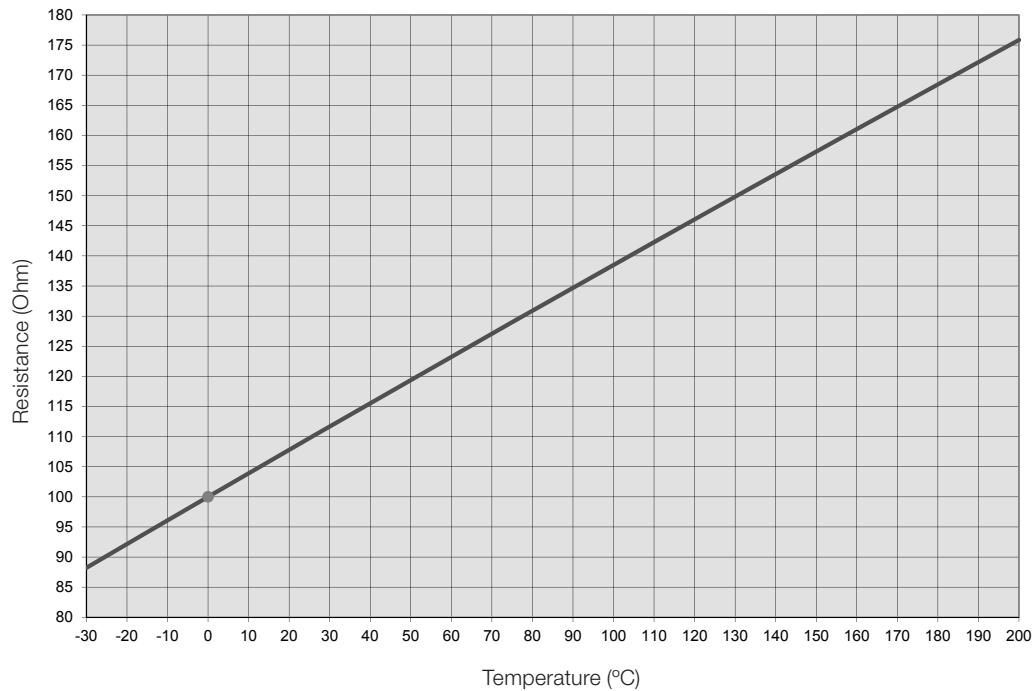
In general these devices are used in installations where precise temperature control is required, for example, in installation for irregular or intermittent duty.

The same detector may be used for alarm and tripping purposes.

Table 6.5 and Figure 6.18 show the equivalence between the Pt-100 resistance and the temperature.

**Table 6.5 - Equivalence between the Pt-100 resistance and the temperature**

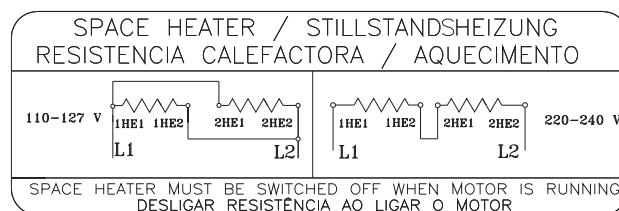
°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840



**Figure 6.18** - Ohmic resistance of the Pt-100 x temperature

## 6.12. CONNECTION OF THE SPACE HEATERS

Before switching ON the space heaters, check if the space heaters connection have been made according to the connection diagram shown on the space heater nameplate. For motors supplied with dual voltage space heaters (110-127/220-240 V), see Figure 6.19.



**Figure 6.19** - Dual voltage space heater connection



The space heaters should never be energized when the motor is in operation.

## 6.13. STARTING METHODS

Whenever possible, the motor starting must be Direct On Line (DOL) at rated voltage. This is the most simple and feasible starting method. However, it must only be applied when the starting current does not affect the power supply. Please consider the local electric utility regulations when installing a motor.

High inrush current may result in:

- a) high voltage drop in the power supply line creating unacceptable line disturbance on the distribution system;
- b) requiring oversized protection system (cables and contactor) increasing the installation costs.

If DOL starting is not allowed due to the reasons mentioned above, an indirect starting method compatible with the load and motor voltage to reduce the starting current may be used.

If reduced voltage starters are used for starting, the motor starting torque will also be reduced.

Table 6.6 shows the possible indirect starting methods that can be used depending on the number of the motor leads.

*Table 6.6 - Starting method x number of motor leads*

Number of leads	Possible starting methods
3 leads	Autotransformer Soft-starter
6 leads	Star-Delta Autotransformer Soft-starter
9 leads	Series/Parallel Part winding Autotransformer Soft-starter
12 leads	Star-Delta Series/Parallel Part winding Autotransformer Soft-starter

Table 6.7 shows examples of possible indirect starting methods to be used according to the voltage indicated on the motor nameplate and the power supply voltage.

*Table 6.7 - Starting methods x voltage*

Nameplate voltage	Operating voltage	Star-delta	Autotransformer starting	Starting by series/parallel switch	Part-winding starting	Starting by Soft-starter
220/380 V	220 V 380 V	YES NO	YES YES	NO NO	NO NO	YES YES
220/440 V	220 V 440 V	NO NO	YES YES	YES NO	YES NO	YES YES
230/460 V	230 V 460 V	NO NO	YES YES	YES NO	YES NO	YES YES
380/660 V	380 V	YES	YES	NO	NO	YES
220/380/440 V	220 V 380 V 440 V	YES NO YES	YES YES YES	YES YES NO	YES YES NO	YES YES YES



The WQuattro line motors must be started direct on-line (DOL) or driven by a frequency inverter in scalar mode.

## 6.14. MOTORS DRIVEN BY FREQUENCY INVERTER



The operation with frequency inverter must be stated in the Purchase Order since this drive type may require some changes of the motor design.



Wmagnet Motors must only be driven by WEG frequency inverter.

The frequency inverter used to drive motors up to 690 V must be fitted with Pulse With Modulation (PWM) with vector control.

When a motor is driven by a frequency inverter at lower frequencies than the rated frequency, you must reduce the motor torque to prevent motor overheating. The torque reduction (derating torque) can be found in the item 6.4 of the "Technical Guidelines for Induction Motors driven by PWM Frequency inverters" available on the site [www.weg.net](http://www.weg.net).

If the motor is operated above the rated frequency, please note:

- That the motor must be operated at constant output;
- That the motor can supply max. 95% of its rated output;
- Do not exceed the maximum speed and please consider:
  - max. operating frequency stated on the additional nameplate;
  - mechanical speed limitation of the motor.

Information on the selection of the power cables between the frequency inverter and the motor can be found in the item 6.4 of the "Technical Guidelines for Induction Motors driven by PWM Frequency inverters" available at [www.weg.net](http://www.weg.net).

### 6.14.1. Use of dV/dt filter

#### 6.14.1.1. Motor with enameled round wire

Motors designed for rated voltages up to 690 V, when driven by frequency inverter, do not require the use of dV/dT filters, provided that following criteria are considered.

Criteria for the selection of motors with round enameled wire when driven by frequency inverter				
Motor rated votage <sup>1</sup>	Peak voltage at the motor terminals (max)	dV/dt inverter output (max)	Inverter Rise Time <sup>2</sup> (min.)	MTBP <sup>2</sup> Time between pulses (min)
V <sub>nom</sub> < 460 V	≤ 1600 V	≤ 5200 V/μs	≥ 0,1 μs	≥ 6 μs
460 ≤ V <sub>nom</sub> < 575 V	≤ 2000 V	≤ 6500 V/μs		
575 ≤ V <sub>nom</sub> ≤ 1000 V	≤ 2400 V	≤ 7800 V/μs		

**Notes:**

1. For the application of dual voltage motors, example 380/660 V, consider the lower voltage (380 V).
2. Information supplied by the inverter manufacturer.

#### 6.14.1.2. Motor with prewound coils

Motors with prewound coils (medium and high voltage motors regardless of frame sizes, and low voltage motors from IEC 500 / NEMA 800 frame on), designed for the use with frequency inverters, do not require the use of filters, provided they comply with the criteria in Table 6.8.

**Table 6.8 - Criteria to be considered when using motor with prewound coils to be drive by frequency inverters**

Motor rated voltage	Type of modulation	Turn to turn insulation (phase-phase)		Phase-ground insulation	
		Peak voltage at the motor terminals	dV/dt at the motor terminals	Peak voltage at the motor terminals	dV/dt at the motor terminals
690 < V <sub>nom</sub> ≤ 4160 V	Sinusoidal	≤ 5900 V	≤ 500 V/μs	≤ 3400 V	≤ 500 V/μs
	PWM	≤ 9300 V	≤ 2700 V/μs	≤ 5400 V	≤ 2700 V/μs
4160 < V <sub>nom</sub> ≤ 6600 V	Sinusoidal	≤ 9300 V	≤ 500 V/μs	≤ 5400 V	≤ 500 V/μs
	PWM	≤ 14000 V	≤ 1500 V/μs	≤ 8000 V	≤ 1500 V/μs

## 6.14.2. Bearing insulation

Only the motors in IEC frame size 400 (NEMA 680) and larger are supplied, as standard, with insulated bearing. If motor must be driven by frequency inverter, insulate the bearing according to Table 6.9.

**Table 6.9 - Recommendation on the bearing insulation for inverter driven motors**

Frame size	Recommendation
IEC 315 and 355 NEMA 445/7 to L5810/11	<ul style="list-style-type: none"> <li>■ Insulated bearing/end shield</li> <li>■ Grounding between shaft and frame by grounding brush</li> </ul>
IEC 400 and larger NEMA 680 and larger	<ul style="list-style-type: none"> <li>■ Insulated NDE bearing</li> <li>■ Grounding between shaft and frame by grounding brush</li> </ul>



When motors are supplied with shaft grounding system, monitor the grounding brush constantly during its operation and, when it reaches the end of its useful life, it must be replaced by another brush with the same specification.

## 6.14.3. Switching frequency

The minimum inverter switching frequency must not be lower than 2.5 kHz and should not exceed 5 kHz.



The non-compliance with the criteria and recommendations indicated in this manual may void the product warranty.

## 6.14.4. Mechanical speed limitation

Table 6.10 shows the maximum speeds allowed for motors driven by frequency inverter.

**Table 6.10 - Maximum motor speed (in rpm)**

Frame size		DE-bearing	Maximum speed for standard motors
IEC	NEMA		
63-90	143/5	6201 6202 6203 6204 6205	10400
100	-	6206	8800
112	182/4	6207 6307	7600 6800
132	213/5	6308	6000
160	254/6	6309	5300
180	284/6	6311	4400
200	324/6	6312	4200
225-630	364/5-9610	6314	3600
		6315	3600
		6316	3200
		6319	3000
		6218	3600
		6220	3600
		6320	2200
		6322	1900
		6324	1800
		6328	1800
		6330	1800
		6224	1800
		6228	1800

**Note:**

To select the maximum allowed motor speed, consider the motor torque derating curve.

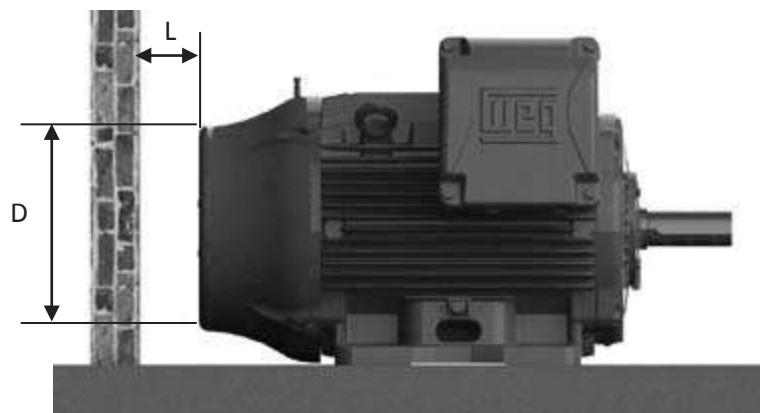
For more information on the application of frequency inverters, contact WEG or check the "Technical Guidelines for Induction Motors driven by PWM Frequency inverters" available at [www.weg.net](http://www.weg.net).

## 7. COMMISSIONING

### 7.1. INITIAL START-UP

After finishing the installation procedures and before starting the motor for the first time or after a long period without operation, the following items must be checked:

- If the nameplate data (voltage, current, connection diagram, degree of protection, cooling system, service factor, etc.) meet the application requirements;
- If the machine set (motor + driven machine) has been mounted and aligned correctly;
- If the motor driving system ensures that the motor speed does not exceed the max. allowed speed indicated in Table 6.10;
- Measure the winding insulation resistance, making sure it complies with the specified values in item 5.4;
- Check the motor rotation direction;
- Inspect the motor terminal box for damage and ensure that it is clean and dry and all contacts are rust-free, the seals are in perfect operating conditions and all unused threaded holes are properly closed thus ensuring the degree of protection indicated on the motor nameplate;
- Check if the motor wiring connections, including grounding and auxiliary equipment connection, have been carried out properly and are in accordance with the recommendations in item 6.9;
- Check the operating conditions of the installed auxiliary devices (brake, encoder, thermal protection device, forced cooling system, etc.);
- Check bearing operating conditions. If the motors are stored and/or installed for more than two years without running, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started. If the motor is stored and/or installed according to the recommendations described in item 5.3, lubricate the bearings as described in item 8.2. For the bearing condition evaluation, it is recommended to use of the vibration analysis techniques: Envelope Analysis or Demodulation Analysis.
- For roller bearing motors with oil lubrication, ensure:
  - The oil level should be in the center of the sight glass (see Figure 8.1 and 8.2);
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- When motors are fitted with sleeve bearings, ensure:
  - Correct oil level for the sleeve bearing. The oil level should be in the center of the sight glass (see Figure 8.3);
  - That the motor is not started or operated with axial or radial loads;
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- Inspect the capacitor operating condition, if any. If motors are installed for more than two years, but were never commissioned, it is recommended to change the start capacitors since they lose their operating characteristics;
- Ensure that the air inlet and outlet opening are not blocked. The minimum clearance to the nearest wall ( $L$ ) should be at least  $\frac{1}{4}$  of the fan cover diameter ( $D$ ), see Figure 7.1. The intake air temperature must be at ambient temperature.



*Figure 7.1- Minimum clearance to the wall*

Please consider the minimum distances shown in the Table 7.1 as reference value;

**Table 7.1 - Minimum distance between the fan cover and wall**

<b>Frame size</b>		<b>Distance between the fan cover and the wall (L)</b>	
<b>IEC</b>	<b>NEMA</b>	<b>mm</b>	<b>inches</b>
63	-	25	0.96
71	-	26	1.02
80	-	30	1.18
90	143/5	33	1.30
100	-	36	1.43
112	182/4	41	1.61
132	213/5	50	1.98
160	254/6	65	2.56
180	284/6	68	2.66
200	324/6	78	3.08
225	364/5	85	3.35
250	404/5		
	444/5		
280	445/7 447/9	108	4.23
315	L447/9 504/5 5006/7/8 5009/10/11	122	4.80
355	586/7 588/9 5807/8/9 5810/11/12	136	5.35
400	6806/7/8 6809/10/11	147	5.79
450	7006/10	159	6.26
500	8006/10	171	6.73
560	8806/10	185	7.28
630	9606/10	200	7.87

- Ensure correct water flow rate and water temperature when water cooled motors are used. See item 7.2;
- Ensure that all rotating parts, such as pulleys, couplings, external fans, shaft, etc. are protected against accidental contact.

Other tests and inspections not included in the manual may be required, depending on the specific installation, application and/or motor characteristics.

After all previous inspections have been carried out, proceed as follows to start the motor:

- Start the motor on no-load (if possible) and check the motor direction of rotation. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions;
- Ensure the motor starts smoothly. If any abnormal operating condition is noticed, switch off the motor, check the assembly system and connections before the motor is started again;
- If excessive vibrations are noticed, check if the motor mounting bolts are well tightened or if the vibrations are not generated and transmitted from adjacent installed equipment. Check the motor vibration periodically and ensure that the vibration limits are as specified in item 7.2.1;
- Start the motor at rated load during a short time and compare the operating current with the rated current indicated on the nameplate;
- Continue to measure the following motor variables until thermal equilibrium is reached: current, voltage, bearing and motor frame temperature, vibration and noise levels;
- Record the measured current and voltage values on the Installation Report for future comparisons.

As induction motors have high inrush currents during start-up, the acceleration of high inertia load requires an extended starting time to reach full speed resulting in fast motor temperature rise. Successive starts within short intervals will result in winding temperature increases and can lead to physical insulation damage reducing the useful life of the insulation system. If the duty cycle S1 / CONT. is specified on the motor nameplate, this means that the motor has been designed for:

- Two successive starts: first start from cold condition, i. e., the motor windings are at room temperature and the second start immediately after the motor stops;
- One start from hot condition, i. e., the motor windings are at rated temperature.

The Troubleshooting Chart in section 10 provides a basic list of unusual cases that may occur during motor operation with the respective corrective actions.

## 7.2. OPERATING CONDITIONS

Unless otherwise stated in the Purchase Order, electric motors are designed and built to be operated at altitudes up to 1000 meters above sea level and in a temperature range from -20 °C to +40 °C. Any deviation from the normal condition of motor operation must be stated on the motor nameplate. Some components must be changed if the ambient temperature is different from the specified one. Please contact WEG to check the required special features.

For operating temperatures and altitudes differing from those above, the factors indicated in Table 7.2 must be applied to the nominal motor power rating in order to determine the derated available output ( $P_{max} = P_{nom} \times$  correction factor).

**Table 7.2 - Correction factors for altitude and ambient temperature**

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0.97	0.92	0.88
15						0.98	0.94	0.90	0.86
20					1.00	0.95	0.91	0.87	0.83
25				1.00	0.95	0.93	0.89	0.85	0.81
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44

Motors installed inside enclosures (cubicles) must be ensured an air renewal rate in the order of one cubic meter per second for each 100 kW installed power or fraction of installed power. Totally Enclosed Air Over motors - TEAO (fan and exhaust / smoke extraction) are supplied without cooling fan and the manufacturer of the driven machine is responsible for sufficient motor cooling. If no minimum required air speed between motor fins is indicated on the motor nameplate, ensure the air speed indicated in the table 7.3 is provided. The values shown in Table 7.3 are valid for 60 Hz motors. To obtain the minimum air speed for 50 Hz motors, multiply the values in the table by 0.83.

**Table 7.3 - Minimum required air speed between motor fins (metres/second)**

Frame		Poles			
IEC	NEMA	2	4	6	8
63 to 90	143/5	13	7	5	4
100 to 132	182/4 to 213/5	18	12	8	6
160 to 200	254/6 to 324/6	20	15	10	7
225 to 280	364/5 to 444/5	22	20	15	12
315 to 450	445/7 to 7008/9	25	25	20	15

The voltage and frequency variations may affect the performance characteristics and the electromagnetic compatibility of the motor. The power supply variations should not exceed the values specified in the applicable standards. Examples:

- ABNT NBR 17094 - Parts 1 and 2. The motor has been designed to supply the rated torque for a combined variation in voltage and frequency:

- Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
- Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods.

- IEC 60034-1. The motor has been designed to supply the rated torque for combined variation in voltage and frequency:

- Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
- Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods. For multivoltage motors (example 380-415/660 V), a ±5% voltage variation from the rated voltage is allowed.

- NEMA MG 1 Part 12. The motor has been designed to be operated in one of the following variations:
  - $\pm 10\%$  of the rated voltage, with rated frequency;
  - $\pm 5\%$  of the rated frequency, with rated voltage;
  - A combined variation in voltage and frequency of  $\pm 10\%$ , provided the frequency variation does not exceed  $\pm 5\%$ .

If the motor is cooled by ambient air, clean the air inlet and outlet openings and cooling fins at regular intervals to ensure a free airflow over the frame surface. The hot air should never be returned to the motor. The cooling air must be at room temperature limited to the temperature range indicated on the motor nameplate (if no room temperature is specified, please consider a temperature range between -20 °C and +40 °C).

Table 7.4 shows the minimum required water flow for water cooled motors considering the different frame sizes and the maximum allowed temperature rise of the cooling water after circulating through the motor. The inlet water temperature should not exceed 40 °C.

**Table 7.4** - Minimum required water flow and the maximum allowed temperature rise of the cooling water after circulating through the motor

Frame size		Flow rate (litres/minute)	Maximum allowed water temperature rise (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5	15	6
	445/7		
	447/9		
315	504/5	16	6
355	586/7 588/9	25	6

Motors fitted with oil mist lubrication systems can be operated continuously for a maximum of one hour after the failure of the oil pumping system.

Considering the sun's heat increases the operating temperature, externally mounted motors should always be protected from direct sunlight exposure.

Each and every deviation from the normal operating condition (tripping of the thermal protection, noise and vibration level increase, temperature and current rise) should be investigated and corrected by WEG Authorized Service Centers.



Motors fitted with cylindrical roller bearings require a minimum radial load to ensure a normal operation.  
For information regarding the radial preload, please contact WEG.

### 7.2.1.Limits of vibration

The vibration severity is the maximum vibration value measured at all positions and in all directions as recommended in the standard IEC 60034-14. Table 7.5 specifies the limits of the maximum vibrations magnitudes according to standard IEC 60034-14 for shaft heights IEC 56 to 400, for vibrations grades A and B. The vibration severity limits in Table 7.5 are given as RMS values (Root Mean Square values or effective values) of the vibration speed in mm/s measured in free suspension condition.

**Table 7.5** - Recommended limits for the vibration severity according to standard IEC 60034-14

Shaft height [mm]	56 ≤ H ≤ 132	132 ≤ H ≤ 280	H > 280
Vibration grade	Vibration severity on elastic base [mm/s RMS]		
A	1.6	2.2	2.8
B	0.7	1.1	1.8

**Notes:**

- 1 - The values in Table 7.5 are valid for measurements carried out with decoupled machines (without load) operated at rated voltage and frequency.
- 2 - The values in Table 7.5 are valid regardless of the direction of rotation of the machine.
- 3 - The values in Table 7.5 are not applicable to single-phase motors, three-phase motors powered by a single-phase system or to machines mounted in situ or coupled with inertia flywheels or to loads.

According to NEMA MG 1, the allowed vibration limit for standard motors is 0.15 in/s (peak vibration in in/s).

**Note:**

For the load operation condition, the use of the standard ISO 10816-3 is recommended for evaluating the motor vibration limits. In the load condition the motor vibration will be influenced by several factors, such as, type of the coupled load, condition of the motor fixation, alignment condition under load, structure or base vibration due to other equipments, etc..

## 8. MAINTENANCE

The purpose of the maintenance is to extend the useful life of the equipment. The non-compliance with one of these previous items can cause unexpected machine failures.

If motors with cylindrical roller or angular contact bearings are to be transported during the maintenance procedures, the shaft locking device must always be fitted. All HGF motors, regardless of the bearing type, must always be transported with the shaft locking device fitted.

All repairs, disassembly and assembly related services must be carried out only by qualified and well-trained personnel by using proper tools and techniques. Make sure that the machine has stopped and it is disconnected from the power supply, including the accessory devices (space heater, brake, etc.), before any servicing is undertaken.

The company does not assume any responsibility or liability for repair services or maintenance operations executed by non-authorized Service Centers or by non qualified service personnel. The company shall have no obligation or liability whatsoever to the buyer for any indirect, special, consequential or incidental loss or damage caused or arising from the company's proven negligence

### 8.1. GENERAL INSPECTION

The inspection intervals depend on the motor type, application and installation conditions. Proceed as follows during inspection:

- Visually inspect the motor and coupling. Check if abnormal noises, vibrations, excessive heating, wear signs, misalignment or damaged parts are noticed. Replace the damaged parts as required;
- Measure the insulation resistance according to the item 5.4;
- Clean the motor enclosure. Remove oil spills and dust accumulation from the motor frame surface to ensure a better heat transfer to the surrounding ambient;
- Check cooling fan condition and clean the air inlet & outlet openings to ensure a free air flow over the motor;
- Investigate the actual condition of the seals and replace them, if required;
- Drain the condensed water from inside the motor. After draining, reinstall the drain plugs to ensure the degree of protection as indicated on the motor nameplate. The motor must always be positioned so the drain hole is at the lowest position (see item 6);
- Check the connections of the power supply cables, ensuring the correct clearance distance between live and grounded parts, as specified in Table 6.3;
- Check if the tightening torque of the bolted connections and mounting bolts meets the tightening torque specified in Table 8.11;
- Check the status of the cable passages, the cable gland seals and the seals inside the terminal box and replace them, if required;
- Check the bearing operating conditions. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions, like motor temperature rise. Check the oil level, the lube oil condition and compare the workings hours with the informed life time;
- Record and file all changes performed on the motor.



Do not reuse damaged or worn parts. Damaged or worn parts must be replaced by parts supplied by the manufacturer and must be installed as if they were the original parts.

### 8.2. LUBRICATION

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).

When the motor is fitted with thermal protection devices for bearing temperature control, consider the operating temperature limits shown in Table 6.4.

The maximum operating temperature of motors used in special applications may differ from those shown in Table 6.4. The grease and oil disposal should be made in compliance with applicable laws in each country.



Please contact WEG when motors are to be installed in special environments or used for special applications.

### 8.2.1. Grease lubricated rolling bearings



Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in Table 8.1, Table 8.2, Table 8.3, Table 8.4, Table 8.5, Table 8.6, Table 8.7 and Table 8.8 consider an absolute temperature on the bearing of 70 °C (up to frame size IEC 200 / NEMA 324/6) and 85 °C (for frame size IEC 225 / NEMA 364/5 and above), the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

**Table 8.1 - Lubrication intervals for ball bearings**

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)					
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
90	143/5	2 4 6 8	6205	4	-	-	20000	20000	25000	25000
100	-				-	-	20000	20000	25000	25000
112	182/4				-	-	20000	20000	25000	25000
132	213/5				-	-	20000	18400	25000	23200
160	254/6	2 4 6 8	6308	11	-	-	20000	20000	25000	25000
180	284/6				-	-	18100	15700	22000	20000
200	324/6				-	-	20000	20000	25000	25000
225	364/5				-	-	13700	11500	17000	14000
250	404/5	2 4 6 8	6311	18	20000	20000	20000	20000	25000	25000
280	444/5				-	-	11900	9800	15000	12000
315	445/7				-	-	20000	20000	25000	25000
355	447/9				-	-	14000	*Upon request	3500	*Upon request
	L447/9	2 4 6 8	6316	34	-	-	10400	8500	13000	10000
	504/5				-	-	14900	12800	18000	16000
	5008				-	-	18700	15900	20000	20000
	5010/11				-	-	7200	5100	9000	6000
	586/7	2 4 6 8	6319	45	-	-	10800	9200	13000	11000
	588/9				-	-	15100	11800	19000	14000
	4				-	-	9000	7000	11000	8000
	6				-	-	13000	11000	16000	13000
	8				-	-	17400	14000	20000	17000
	4	6322	60	20000	20000	20000	7200	5100	9000	6000
	6						10800	9200	13000	11000
	8						15100	11800	19000	14000

**Table 8.2 - Lubrication intervals for cylindrical roller bearings**

Frame		Poles	Bearing designation	Amount of grease (g)	LUBRICATION INTERVALS (hours)						
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)		
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000	
		4				20000	20000	20000	25000	25000	
		6			18	18400	12800	9200	6400	11000	8000
		8				20000	20000	20000	20000	25000	25000
180	284/6	2	NU311	18	15200	10200	7600	5100	9000	6000	
		4			20000	20000	20000	17200	25000	21000	
		6				19100	19100	15100		25000	25000
		8				20000	20000	20000	20000	25000	25000
200	324/6	2	NU312	21	17800	14200	8900	7100	11000	9000	
		4			20000	20000	13100	11000	16000	13000	
		6				16900	16900	15100	20000	20000	19000
		8				15200	12000	7600	6000	9000	7000
225	364/5	4	NU314	27	15200	12000	7600	6000	9000	7000	
		6			20000	20000	19000	11600	14000	12000	
		8				20000	15500	13800	19000	19000	17000
		4				12000	9400	6000	4700	7000	5000
250	404/5	6	NU316	34	19600	15200	9800	7600	12000	9000	
		8			20000	20000	13700	12200	17000	15000	
		4				8800	6600	4400	3300	5000	4000
		6				15600	11800	7800	5900	9000	7000
280	L447/9	8	NU319	45	20000	20000	11500	10700	14000	13000	
		4			60	12000	9400	6000	4700	7000	5000
		6				19600	15200	9800	7600	12000	9000
		8				20000	20000	13700	12200	17000	15000
315	504/5	4	NU322	60	8800	6600	4400	3300	5000	4000	
		6			15600	11800	7800	5900	9000	7000	
		8			20000	20000	11500	10700	14000	13000	
		4			15600	11800	7800	5900	9000	7000	
355	5008	6			20000	20000	11500	10700	14000	13000	
		8			12000	9400	6000	4700	7000	5000	
		4			19600	15200	9800	7600	12000	9000	
		6			20000	20000	13700	12200	17000	15000	
225	444/5	8	NU322	60	8800	6600	4400	3300	5000	4000	
		4			15600	11800	7800	5900	9000	7000	
		6			20000	20000	11500	10700	14000	13000	
		8			12000	9400	6000	4700	7000	5000	
250	445/7	4	NU322	60	19600	15200	9800	7600	12000	9000	
		6			20000	20000	13700	12200	17000	15000	
		8			12000	9400	6000	4700	7000	5000	
		4			19600	15200	9800	7600	12000	9000	
280	447/9	6	NU322	60	20000	20000	13700	12200	17000	15000	
		8			12000	9400	6000	4700	7000	5000	
		4			19600	15200	9800	7600	12000	9000	
		6			20000	20000	13700	12200	17000	15000	
315	5010/11	8	NU322	60	8800	6600	4400	3300	5000	4000	
		4			15600	11800	7800	5900	9000	7000	
		6			20000	20000	11500	10700	14000	13000	
		8			12000	9400	6000	4700	7000	5000	
355	586/7	4	NU322	60	19600	15200	9800	7600	12000	9000	
		6			20000	20000	13700	12200	17000	15000	
		8			12000	9400	6000	4700	7000	5000	
		4			19600	15200	9800	7600	12000	9000	
225	588/9	6	NU322	60	20000	20000	11500	10700	14000	13000	
		8			12000	9400	6000	4700	7000	5000	
		4			19600	15200	9800	7600	12000	9000	
		6			20000	20000	13700	12200	17000	15000	

**Table 8.3 - Lubrication intervals for ball bearings - HGF line**

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
					50 Hz	60 Hz
IEC	NEMA					
315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34	4500	4500
355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45	4500	4500
400L/A/B and 400 C/D/E	6806/7/8T and 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45	4500	4500
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60	4500	4500
		6 - 8	6328	93	4500	4500
			6322	60	4500	4500
500	8006/10	4	6330	104	4200	2800
		6 - 8	6324	72	4500	4500
			6330	104	4500	4500
		6324	72	4500	4500	4500
560	8806/10	4 - 8	*Upon request			
630	9606/10	4 - 8				

**Table 8.4 - Lubrication intervals for cylindrical roller bearings - HGF line**

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8 and 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B and 355C/D/E	5807/8/9 and 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B and 400C/D/E	6806/7/8 and 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

**Table 8.5 - Lubrication intervals for ball bearings - W50 line**

Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz	60 Hz	NDE Bearing	Amount of grease (g)	50 Hz	60 Hz
IEC	NEMA				(h)	(h)			(h)	(h)
Horizontal mounting Ball bearings	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500
			4 - 8	6320	50		4500	6316	34	
	355 J/H	5809/10	2	6314	27		3500	6314	27	
			4 - 8	6322	60		4500	6319	45	
	400 L/K and 400 J/H	6806/07 and 6808/09	2	6218	24	3800	2500	6218	24	3800
			4 - 8	6324	72	4500	4500	6319	45	4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	6220	31	3000	2000	6220	31	3000
			4	6328	93	4500	3300	6322	60	4500
			6 - 8				4500			
Vertical mounting Ball bearings	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500
			4	6320	50	4200	3200	6316	34	4500
			6 - 8			4500	4500			
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500
			4	6322	60	3600	2700	6319	45	4500
			6 - 8			4500	4500			
	400 L/K and 400 J/H	6806/07 and 6808/09	2	7218	24	2000	1300	6218	24	2000
			4	7324	72	3200	2300	6319	45	4500
			6			4300	4500			
			8			4500	4500			
450 L/K and 450 J/H	7006/07 and 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
		4	7328	93	2400	1700	6322	60	3500	2700
		6			4100	3500			4500	4500
		8			4500	4500				

**Table 8.6 - Lubrication intervals for cylindrical roller bearings - W50 line**

Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz	60 Hz	NDE Bearing	Amount of grease (g)	50 Hz	60 Hz
IEC	NEMA				(h)	(h)			(h)	(h)
Horizontal mounting Roller bearings	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500
			6 - 8			4500	4500			
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45	4500
			6 - 8			4500	4500			
	400 L/K and 400 J/H	6806/07 and 6808/09	4	NU324	72	2900	1800			
			6 - 8			4500	4500			
	450 L/K and 450 J/H	7006/07 and 7008/09	4	NU328	93	2000	1400	6322	60	4500
			6			4500	3200			
			8			4500	4500			

**Table 8.7 - Lubrication intervals for ball bearings - W40 line**

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
<b>Horizontal mounting Ball bearings</b>	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
			2 - 8	6311	18	20000	20000	6209	9	20000	20000
<b>180M/L</b>	284/6		2 - 8	6311	18	20000	20000	6211	11	20000	20000
			2 - 8	6312	21	20000	20000	6211	11	20000	20000
<b>200M/L</b>	324/6		2 - 8	6312	21	20000	20000	6211	11	20000	20000
			2 - 8	6314	27	18000	14400	6211	11	20000	20000
<b>225S/M</b>	364/5		2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6314	27	18000	14400	6212	13	20000	20000
<b>250S/M</b>	404/5		2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6316	34	20000	20000	6212	13	20000	20000
<b>280S/M</b>	444/5		2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
<b>280L</b>	447/9		2	6314	27	18000	14400	6314	27	18000	14400
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
<b>315G/F</b>	5010/11		2	6314	27	4500	4500	6314	27	4500	4500
			4 - 8	6319	45	4500	4500	6314	27	4500	4500
<b>355J/H</b>	L5010/11		2	6218	24	4500	4500	6218	24	4500	4500
			4 - 8	6224	43	4500	4500	6218	24	4500	4500
<b>400J/H</b>	L5810/11		2	6220	31	4500	3800	6220	31	4500	3800
			4 - 8	6228	52	4500	4500	6220	31	4500	4500
<b>450K/J</b>	L6808/09		2	6220	31	4500	3800	6220	31	4500	3800
			4 - 8	6228	52	4500	4500	6220	31	4500	4500

**Table 8.8 - Lubrication intervals for cylindrical roller bearings - W40 line**

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
<b>Horizontal mounting Roller bearings</b>	225S/M	364/5	4 - 8	NU314	27	20000	20000	6314	27	20000	20000
			4 - 8	NU316	34	20000	20000	6314	27	20000	20000
<b>250S/M</b>	404/5		4 - 8	NU319	45	20000	18800	6314	27	20000	20000
			4 - 8	NU319	45	20000	18800	6314	27	20000	20000
<b>280S/M</b>	444/5		4 - 8	NU319	45	20000	18800	6314	27	20000	20000
			4 - 8	NU319	45	20000	18800	6314	27	20000	20000
<b>280L</b>	447/9		4 - 8	NU319	45	20000	18800	6314	27	20000	20000
			4 - 8	NU319	45	20000	18800	6314	27	20000	20000
<b>315G/F</b>	5010/11		4 - 8	NU319	45	4500	4500	6314	27	4500	4500
			4 - 8	NU224	43	4500	4500	6218	24	4500	4500
<b>355J/H</b>	L5010/11		4 - 8	NU228	52	4500	3300	6220	31	4500	4500
			4 - 8	NU228	52	4500	3300	6220	31	4500	4500
<b>400J/H</b>	L5810/11		4 - 8	NU228	52	4500	3300	6220	31	4500	4500
			4 - 8	NU228	52	4500	3300	6220	31	4500	4500

For each increment of 15 °C above the bearing temperature, the relubrication intervals given in the Table must be halved. The relubrication interval of motors designed by the manufacturer for mounting in horizontal position, but installed in vertical position (with WEG authorization), must be halved.

For special applications, such as: high and low temperatures, aggressive environments, driven by frequency inverter (VFD - frequency inverter), etc., please contact WEG about the required amount of grease and the relubrication intervals.

### 8.2.1.1. Motor without grease fitting

Motors without grease fittings must be lubricated in accordance with the existing Maintenance Plan. Motor disassembly must be carried out as specified in Item 8.3. If motors are fitted with shielded bearings (for example, ZZ, DDU, 2RS, VV), these bearings must be replaced at the end of the grease service life.

### 8.2.1.2. Motor with grease fitting

To lubricate the bearings with the motor stopped, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug;
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet protection.

To grease the motor while running, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Pump the total grease indicated on the motor nameplate;
- Lower again the grease inlet protection.



For lubrication, use only manual grease gun.

If Motors are provided with a spring device for grease removal, the grease excess must be removed by pulling the rod and cleaning the spring until the spring does not remove more grease.

### 8.2.1.3. Compatibility of the Mobil Polyrex EM grease with other greases

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil and it is not compatible with other greases.

If you need another type of grease, contact WEG.

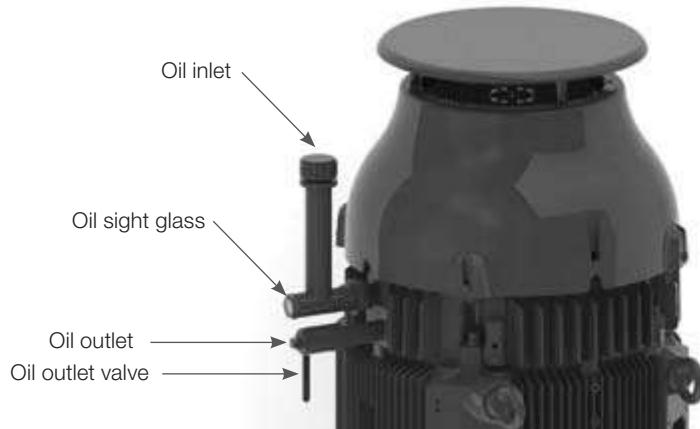
It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.

The used grease must have in its formulation corrosion and oxidation inhibitors.

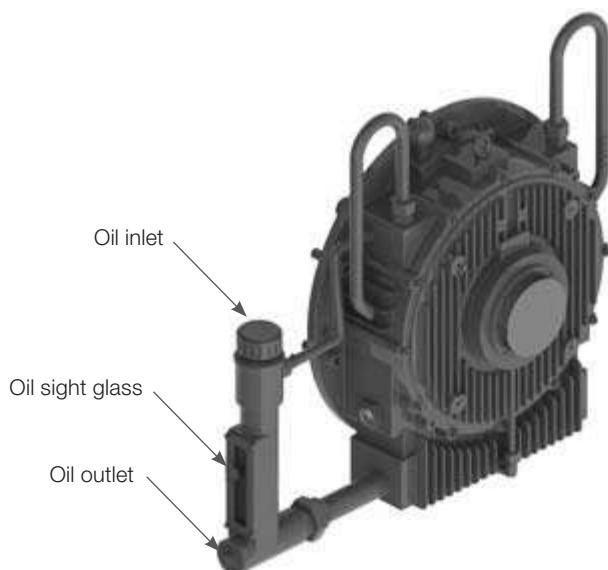
### 8.2.2. Oil lubricated bearings

To change the oil of oil lubricated motor proceed as follows:

- Switch-off the motor;
- Remove threaded oil drain plug;
- Open the valve and drain the oil;
- Close the drain valve again;
- Reinstall the threaded oil drain plug;
- Fill-up with the type and amount of oil as specified on the nameplate;
- Check oil level. The oil level is OK when the lubricant can be viewed approximately in the center of the sight glass;
- Reinstall oil inlet plug;
- Check for oil leaks and ensure that all not used threaded plugs are closed with plugs.



*Figure 8.1 - Oil lubricated bearing - vertical mounting*



*Figure 8.2 - Oil lubricated bearing - horizontal mounting*

The bearing lubricating oil must be replaced as specified on the nameplate or whenever changes in the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and must be kept in the center of the sight glass. Please contact WEG, when oils with different viscosities should be used.

**Note:**

The HGF vertical mounted motors with high axial thrust are supplied with grease lubricated DE-bearings and with oil lubricated NDE-bearings. The DE-bearings must be lubricated according to recommendations in item 8.2.1. Table 8.9 specifies the oil type and the amount of oil required for this motor lubrication.

**Table 8.9 - Oil properties for HGF vertical mounted motors with high axial thrust**

Mounting - high axial thrust	Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
	IEC	NEMA						
315L/A/B e 315C/D/E	5006/7/8T e 5009/10/11T		4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	ISO VG150 mineral oil with antifoam and antioxidant additives
	5807/8/9T e 5810/11/12T		4 - 8	29320	26			
	6806/7/8T e 6809/10/11T		4 - 8	29320	37			
	450	7006/10	4 - 8	29320	45			

### 8.2.3. Oil mist lubricated bearings

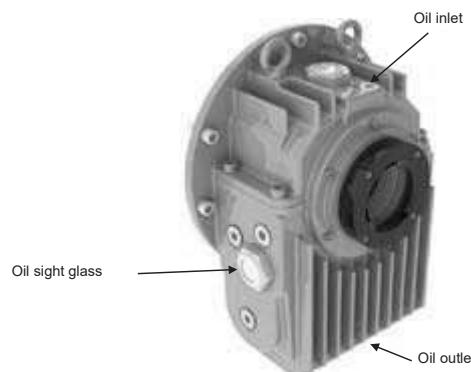
Check the service conditions of the seals and if replacement is required use only original components. Clean the seal components before assembly (bearing caps, end shields, etc.).

Apply joint sealant between the bearing caps and end shields. The joint sealant must be compatible with the used lubricating oil. Connect the oil lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12.

### 8.2.4. Sleeve bearings

The lubricating oil of sleeve bearings must be changed at the intervals specified in Table 8.10. To replace the oil, proceed as follows:

- NDE-bearing: remove the protection plate from the fan cover;
- Drain the oil through the drain hole located at the bottom of the bearing (see Figure 8.3);
- Close the oil drain hole;
- Remove the oil inlet plug;
- Fill the sleeve bearing with the specified oil and with the amount of oil specified in;
- Check the oil level and ensure it is kept close to the center of the sight glass;
- Install the oil inlet plug;
- Check for oil leaks.



**Figure 8.3 - Sleeve bearing**

**Table 8.10 - Oil properties for sleeve bearings**

Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification			
IEC	NEMA									
315	5000	2	9-80	2.8	8000	FUCHS Renolin DTA 10	ISO VG32 mineral oil with antifoam and antioxidant additives			
355	5800									
400	6800									
450	7000									
315	5000	4 - 8	9-90	2.8	8000	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoam and antioxidant additives			
355	5800		9-100							
400	6800		11-110	4.7						
450	7000		11-125							
500	8000									

The lubricating oil must be replaced as specified on the nameplate or whenever changes on the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and kept in the center of the sight glass.

Please contact WEG, when oils with different viscosities are to be used.

### 8.3. MOTOR ASSEMBLY AND DISASSEMBLY

 All repair services on motors should be always performed by qualified personnel and in accordance with the applicable laws and regulations in each country. Always use proper tools and devices for motor disassembly and assembly.

 Disassembly and assembly services can be carried out only after the motor has been disconnected from the power supply and is completely stopped.

Dangerous voltages may be present at the motor terminals inside the terminal box since capacitors can retain electrical charge for long periods of time even when they are not connected directly to a power source or when space heaters are connected to the motor or when the motor windings are used as space heaters.

Dangerous voltages may be present at the motor terminals when they are driven by frequency inverter even when they are completely stopped.

Record the installation conditions such as terminal connection diagram, alignment / leveling conditions before starting the disassembly procedures. These records should be considered for later assembly.

Disassemble the motor carefully without causing scratches on machined surfaces or damaging the threads.

Assemble the motor on a flat surface ensuring a good support base. Footless motors must be fixed/locked on the base to prevent accidents.

Handle the motor carefully to not damage the insulated components such as windings, insulated rolling bearings, power cables etc..

Seal elements, such as joint seals and bearing seals should always be replaced when wear or damage is noticed.

Motors with degree of protection higher than IP55 are supplied with joint and screw seal Loctite 5923 (Henkel). Clean the components and apply a new coat of Loctite 5923 on the surfaces before assembly.

For the W50 and HGF motor lines provided with axial fans, the motor and the axial fan have different markings for indicating the direction of rotation to prevent incorrect assembly.

The axial fan must be assembled so that the indicative arrow for direction of rotation is always visible, viewing the non-drive end side. The marking indicated on the axial fan blade, CW for clockwise direction of rotation or CCW for counterclockwise direction of rotation, indicates the direction of rotation of the motor viewing the drive end side.

### 8.3.1. Terminal box

Proceed as follows to remove the terminal box cover and to disconnect/connect the power supply cables and the cables of the accessory devices:

- Ensure that during the screw removal the terminal box cover does not damage the components installed inside the terminal box;
- If the terminal box cover is fitted with lifting eyebolt, lift the terminal box cover always by its lift eyebolt;
- If motors are supplied with terminal blocks, ensure the correct tightening torque on the motor terminals as specified in Table 8.11;
- Ensure that the cables do not contact sharp edges;
- Ensure that the original IP degree of protection is not changed and is maintained as indicated on the motor nameplate. The power supply cables and the control cables must always be fitted with components (cable glands, conduits) that meet the applicable standards and regulations of each country;
- Ensure that the pressure relief device is in perfect operating condition, if provided. The seals in the terminal box must be in perfect condition for reuse and must be reinstalled correctly to ensure the specified degree of protection;
- Ensure the correct tightening torque for the securing bolts of the terminal box cover as specified in Table 8.11.

**Table 8.11 - Tightening torque for the securing bolts [Nm]**

Screw type and seal	M4	M5	M6	M8	M10	M12	M14	M16	M20
Hex bolt/hex socket bolt (rigid joint)	-	3,5 to 5	6 to 9	14 to 20	28 to 40	45 to 70	75 to 110	115 to 170	230 to 330
Combined slotted screw (rigid joint)	1,5 to 3	3 to 5	5 to 10	10 to 18	-	-	-	-	-
Hex bolt/hex socket bolt (flexible joint)	-	3 to 5	4 to 8	8 to 15	18 to 30	25 to 40	30 to 45	35 to 50	-
Combined slotted screw (flexible joint)	-	3 to 5	4 to 8	8 to 15	-	-	-	-	-
Terminal blocks	1 to 1,5	2 to 4 1)	4 to 6,5	6,5 to 9	10 to 18	15,5 to 30	-	30 to 50	50 to 75
Grounding terminals	1,5 to 3	3 to 5	5 to 10	10 to 18	28 to 40	45 to 70	-	115 to 170	-

Note: 1) For 12-pin terminal block, apply the minimum torque of 1.5 Nm and maximum torque of 2.5 Nm.

### 8.4. DRYING THE STATOR WINDING INSULATION

Dismantle the motor completely. Remove the end shields, the rotor with the shaft, the fan cover, the fan and the terminal box before the wound stator with the frame is transferred to the oven for the drying process. Place the wound stator in the oven heated to max. 120 °C for two hours. For larger motors a longer drying time may be required. After the drying process has been concluded, allow the stator to cool to room temperature. Measure the insulation resistance again as described in item 5.4. Repeat the stator drying process if the required insulation resistance does not meet the values specified in Table 5.3. If the insulation resistance does not improve despite several drying processes, evaluate the causes of the insulation resistance drop carefully and an eventual replacement of the motor winding may be required. If in doubt contact WEG.



To prevent electrical shock, discharge the motor terminals immediately before, and after each measurement. If the motor is equipped with capacitors, these must be discharged before beginning any repair.

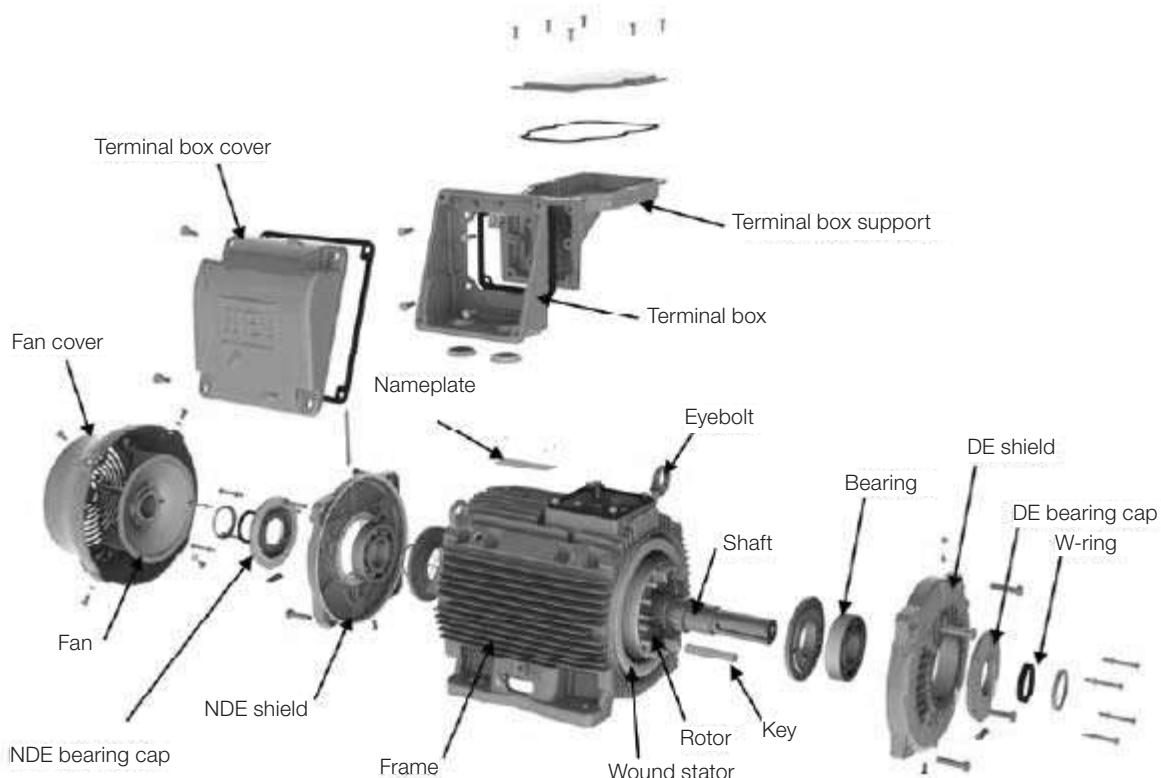


## 8.5. SPARE PARTS

When ordering spare parts, always provide complete motor designation, indicating the motor type, the code number and the serial number, which are stated on the motor nameplate.

Spare parts must always be purchased from WEG authorized Service Centers. The use of non-original spare parts can cause motor failure, performance drop and void the product warranty.

The spare parts must be stored in a clean, dry and properly ventilated room, with relative air humidity not exceeding 60%, with ambient temperature between 5 °C and 40 °C, free of dust, vibrations, gases, corrosive smokes and at constant temperature. The spare parts must be stored in their normal mounting position without placing other components onto them.



*Figure 8.4 - Exploded view of the components of a W22 motor*

## 9. ENVIRONMENTAL INFORMATION

### 9.1. PACKAGING

WEG electric motors are supplied in cardboard, plastic or wooden packaging. These materials can be recycled and must be disposed according to the applicable laws and regulations in each country. All wood used in the packaging of WEG motors come from the company reforestation program and is not submitted to any chemical conservation treatment.

### 9.2. PRODUCT

Electric motors consist mainly of ferrous metals (steel plates and cast iron), non ferrous metals (copper and aluminum) and plastic materials.

In general, electric motors have relatively long service live. However when they must be discarded, WEG recommends to dismantle the motor, sort the different materials and send them for recycling.

No-recyclable materials should be disposed of at industrial landfills according to the applicable environmental laws and regulations in each country, or co-processed in cement kilns or incinerated.

The recycling service providers, the disposal in industrial landfills, the waste co-processing or the incineration process must be properly authorized by the state environment agency to carry out these activities.



## 10. TROUBLESHOOTING CHART X SOLUTIONS

This troubleshooting chart provides a basic list of problems that may occur during motor operation, possible causes and recommended corrective actions. In case of doubts, please contact WEG Service Center.

Problem	Possible cause	Corrective action
Motor does not start, neither coupled nor decoupled	Power cables are interrupted	Check the control panel and the motor power supply cables
	Blown fuses	Replace blown fuses
	Wrong motor connection	Correct the motor connection according to connection diagram
	Locked rotor	Check motor shaft to ensure that it rotates freely
The motor starts at no-load, but fails when load is applied. It starts very slowly and does not reach the rated speed	Load torque is too high during start-up	Do not start the motor on load
	Too high voltage drop in the power cables	Check the installation dimensioning (transformer, cable cross section, relays, circuit breakers, etc.)
Abnormal/excessive noise	Defective transmission component or defective driven machine	Check the transmission force, the coupling and the alignment
	Misaligned / unleveled base	Align / level the motor with the driven machine
	Unbalanced components or unbalanced driven machine	Balance the machine set again
	Different balancing methods used for motor and coupling balancing (halve key, full key)	Balance the motor again
	Wrong motor direction of rotation	Reverse the direction of rotation
	Loose bolts	Retighten the bolts
	Foundation resonance	Check the foundation design
	Damaged bearings	Replace the bearings
Motor overheating	Insufficient cooling	Clean air inlet and outlet and cooling fins
		Check the minimum required distance between the fan cover and nearest walls. See item 7
		Check air temperature at inlet
	Overload	Measure motor current, evaluate motor application and if required, reduce the load
	Number of starts per hour is too high or the load inertia moment is too high	Reduce the number of starts per hour
	Power supply voltage too high	Check the motor power supply voltage. Power supply voltage must not exceed the tolerance specified in item 7.2
	Power supply voltage too low	Check the motor power supply voltage and the voltage drop. Power supply voltage must not exceed the tolerance specified in item 7.2
	Interrupted power supply	Check the connection of the power cables
	Voltage unbalance at the motor terminals	Check for blown fuses, wrong commands, voltage unbalance in the power line, phase fault or interrupted power cables
	Direction of rotation is not compatible with the unidirectional fan	Check if the direction of rotation matches the rotation arrow indicated on end shield
Bearing overheating	Excessive grease/oil	Clean the bearing and lubricate it according to the provided recommendations
	Grease/oil aging	
	The used grease/oil does not matches the specified one	
	Lack of grease/oil	Lubricate the bearing according to the provided recommendations
	Excessive axial or radial forces due to the belt tension	Reduce the belt tension Reduce the load applied to the motor

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\* European Union Importers



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# Inverter

i550 frequency inverter

0.25 kW ... 132 kW

0.33 hp ... 180 hp



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## About this document

Document description

## About this document

### Document description

This document is intended for all persons who want to configure inverters with the products described.

This document assists you with the configuration and selection of your product. It contains information on mechanical and electrical installation, on product expansions, and on accessories.

### Further documents

For certain tasks, information is available in further documents.

Document	Contents/topics
Mounting sheet	General safety instructions and important UL/CSA instructions, connection diagram and technical data. <ul style="list-style-type: none"><li>The mounting sheet is included in the delivery of the product.</li></ul>
Operating instructions	Basic information on installing and commissioning the product.
Commissioning manual	Detailed information on setting and parameterizing the product.

### More information

For certain tasks, information is available in other media.

Medium	Contents/topics
Engineering Tools	For commissioning
AKB articles	Additional technical information for users in the Application Knowledge Base
CAD data	Download in different formats from the EASY Product Finder
EPLAN macros	Project planning, documentation and management of projects for EPLAN P8.
Device descriptions	Standardized files for network configuration



Information and tools with regard to the Lenze products can be found on the Internet:  
[www.Lenze.com](http://www.Lenze.com) → Downloads

# About this document

Notations and conventions



## Notations and conventions

Conventions are used in this document to distinguish between different types of information.

Numeric notation		
Decimal separator	Point	Generally shown as a decimal point. Example: 1 234.56
Warnings		
UL Warnings	UL	Are used in English and French.
UR warnings	UR	
Text		
Engineering Tools	" "	Software Example: "Engineer", "EASY Starter"
Icons		
Page reference		Reference to another page with additional information. Example:  16 = see page 16
Documentation reference		Reference to other documentation with additional information. Example:  EDKxxx = see documentation EDKxxx

## Layout of the safety instructions

### DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

### WARNING!

Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

### CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

### NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.



## Product information

### Product description

The i550 cabinet frequency inverter is a compact control cabinet device with scalable functionality. The support of all common fieldbuses makes it universally applicable. It is versatile, reliable and easy to use.

The requirements of the Ecodesign Directive are met.

Application areas: Conveyor drives, traveling drives, winding drives, hoist drives, extruders, packaging machines, pumps, fans, ...

#### Highlights

- Space saving design: 60 mm wide (up to 4 kW), 130 mm deep (up to 11 kW), with zero-clearance mounting
- Innovative interaction (e.g. over WLAN) makes new record-breaking commissioning times and convenient diagnostics a reality
- The modular design allows different product configurations – just as the machine requires
- Optionally available with "Safe Torque Off (STO)" with SIL 3 (EN IEC 62061/EN IEC 61508) and Performance Level e (EN ISO 13849-1)
- For the greatest possible flexibility available as a complete device or in individual parts (Power Unit, Control Unit and Safety Unit)
- Can be directly connected without external cooling
- All typical motor control types of modern inverters
- Cyclic and continuous operation of the motor according to common operating modes
- Industry-standard networking opportunities
- High internal functional range



# Product information

## Product description

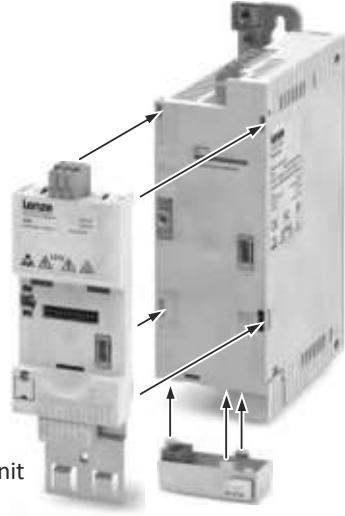
### The concept



### The concept

Thanks to its flexible concept and modular structure consisting of power unit, control unit and safety module, the inverter can be optimally adapted to the application.

This provides the user with a flexible logistics concept - ordered as a complete inverter or single components.

Complete inverter	Inverter consisting of components
	 <p>Control unit</p> <p>Power unit</p> <p>Safety module</p>

#### Power unit

The Power Unit is the power section of the inverter.

It is available in the power range from 0.25 kW to 110 kW.

#### Control unit

The control unit is the open and closed-loop control unit.

It contains I/O connections, an optional network, the interface for diagnostic modules, LED status displays and the memory module.

#### Safety module

The optional safety module is available with the functional safety STO (Safe Torque Off).



## Product information

Product description

Load characteristics

### Load characteristics

The inverters have two different load characteristics: "Light Duty" and "Heavy Duty".

The "Light Duty" load characteristic allows for a higher output current with restrictions regarding overload capacity, ambient temperature and switching frequency. This allows the motor required for the application to be driven by a less powerful inverter. Select the load characteristic according to the application.

	<b>Heavy Duty</b>	<b>Light Duty</b>
Characteristic	High dynamic requirements	Low dynamic requirements
Typical applications	Main tool drives, travelling drives, hoist drives, winders, forming drives and conveyors	Pumps, fans, general horizontal materials handling technology and line drives
Overload capacity	3 s/200 %, 60 s/150 % See technical data	Restricted See technical data

# Product information

## Features

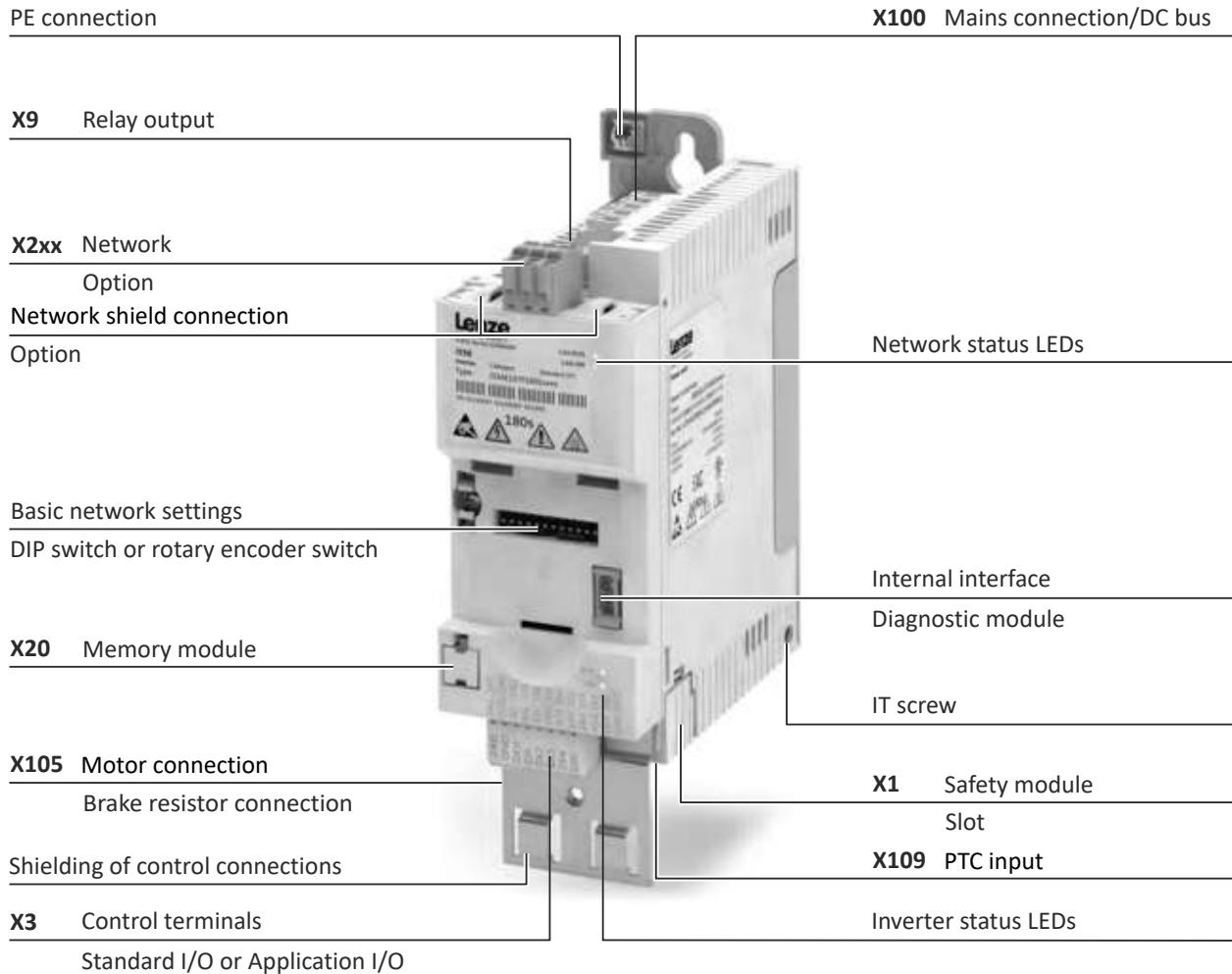


## Features

The following figures give an overview of the elements and connections on the devices. Position, size and appearance of elements and connections may vary depending on the capacity and size of the equipment.

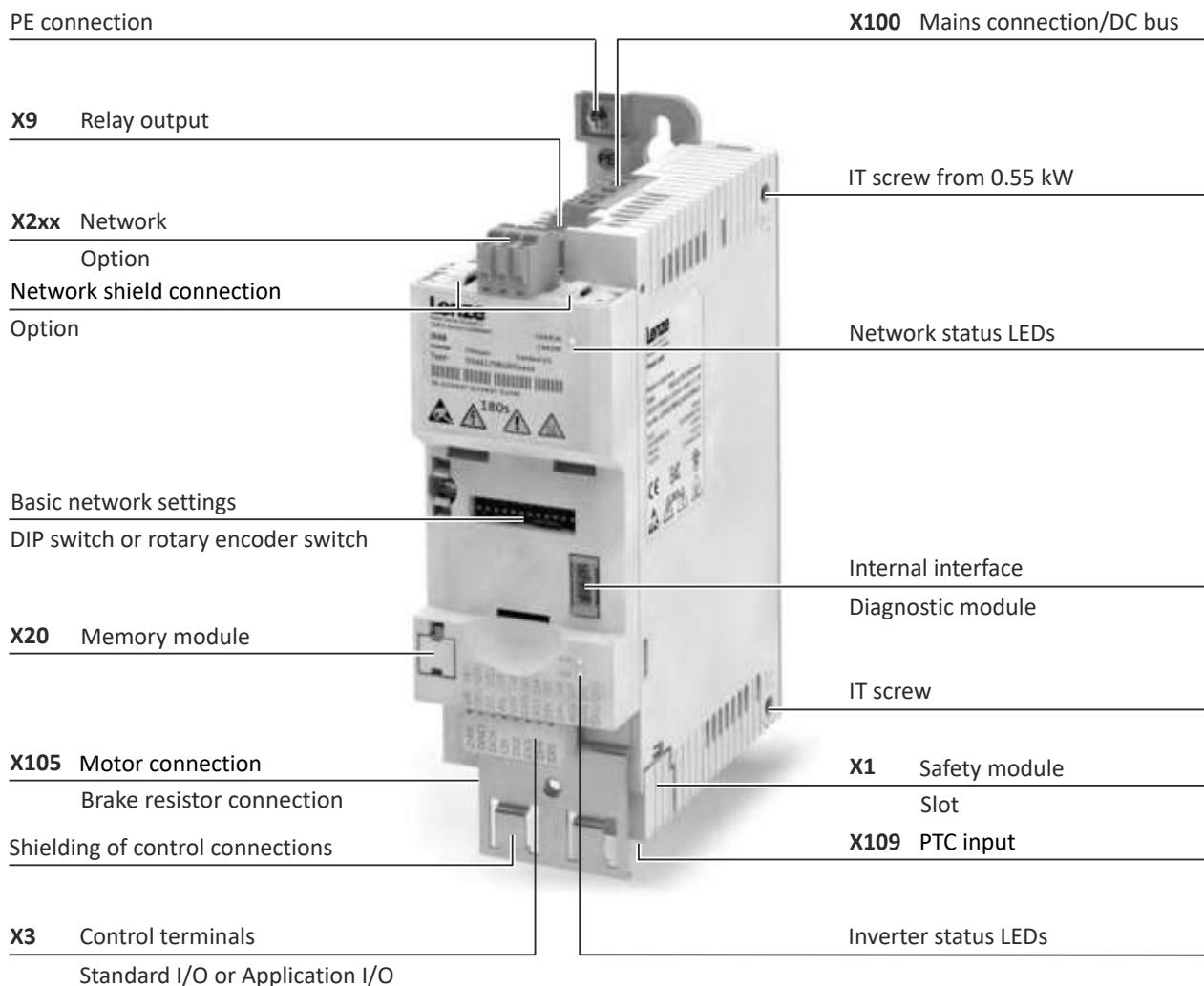
Some equipment may be optional.

### Example of 0.25 kW ... 0.37 kW





Example of 0.55 kW ... 4 kW

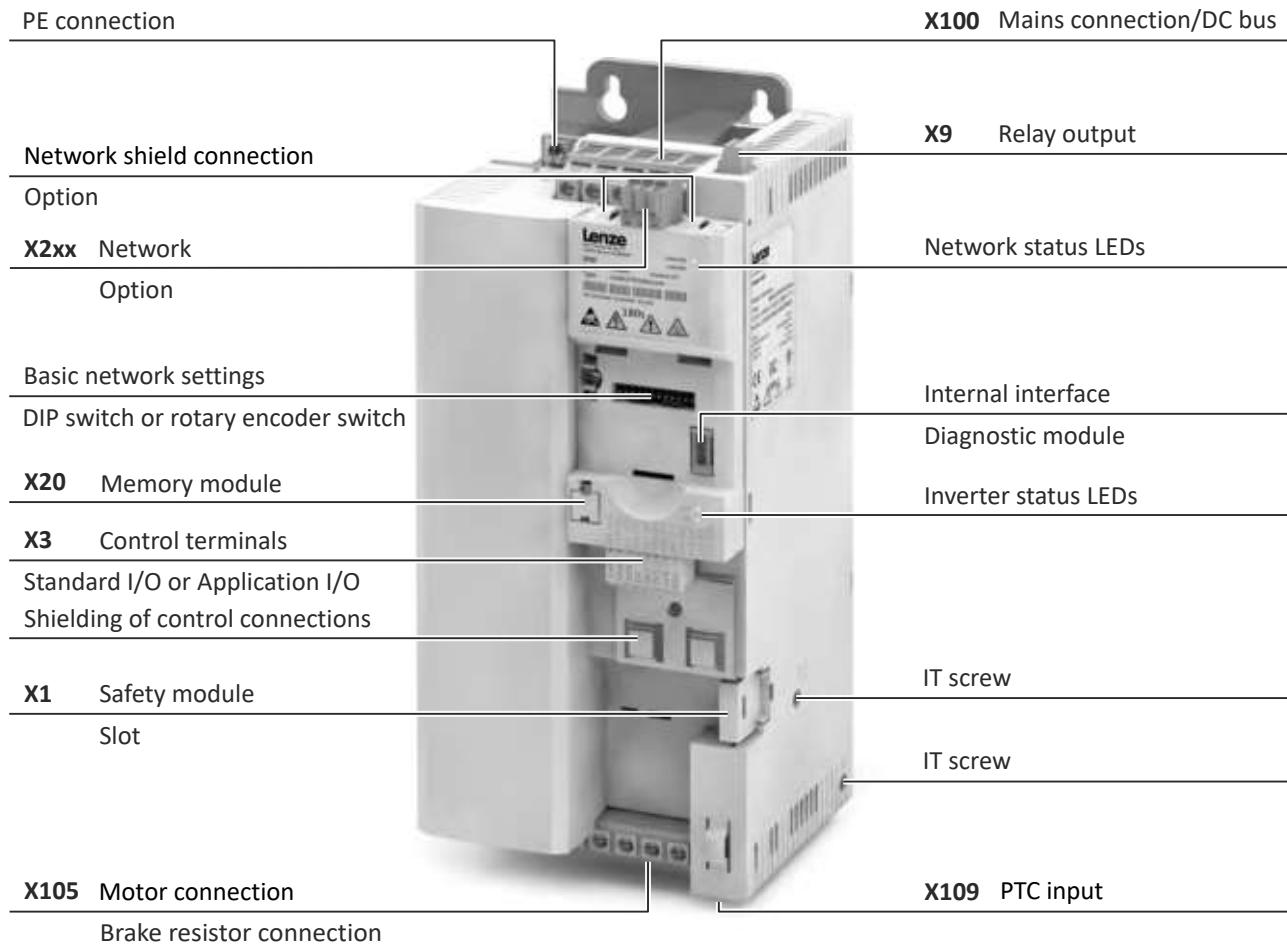


# Product information

## Features



### Example of 5.5 kW ... 11 kW



**Example of 15 kW ... 22 kW****X100** Mains connection/DC bus

Network shield connection

Option

Basic network settings

DIP switch or rotary encoder switch

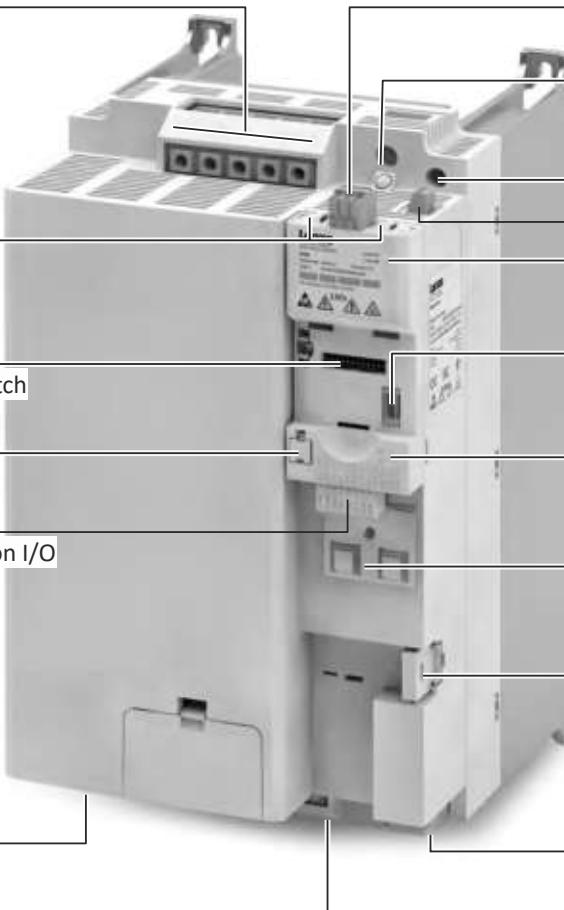
**X20** Memory module**X3** Control terminals

Standard I/O or Application I/O

IT screw

**X105** Motor connection

Brake resistor connection

**X2xx** NetworkOption  
PE connection

IT screw

**X9** Relay output

Network status LEDs

Internal interface

Diagnostic module

Inverter status LEDs

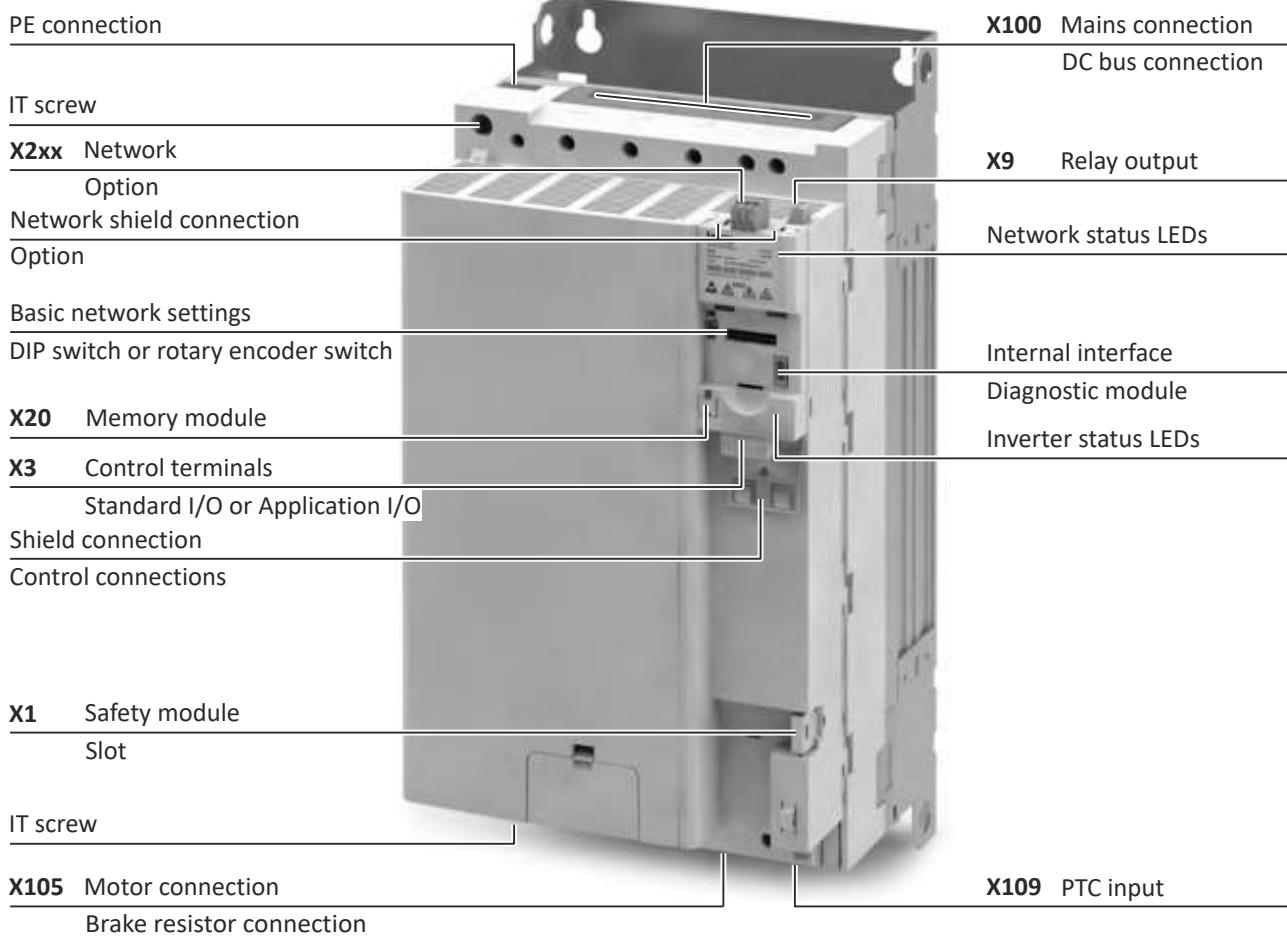
Shielding of  
control connections**X1** Safety module  
Slot**X109** PTC input

# Product information

## Features

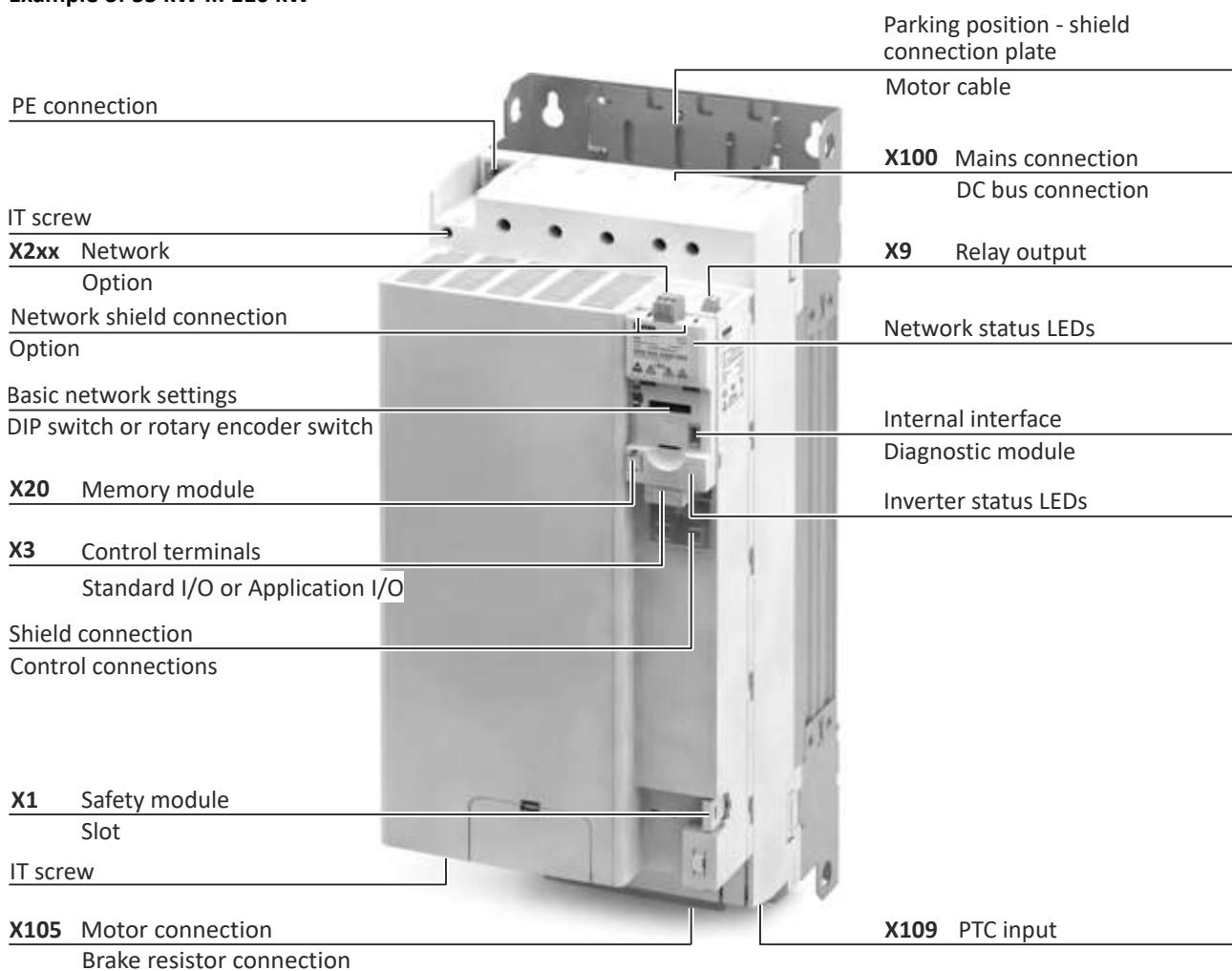


### Example of 30 kW ... 45 kW

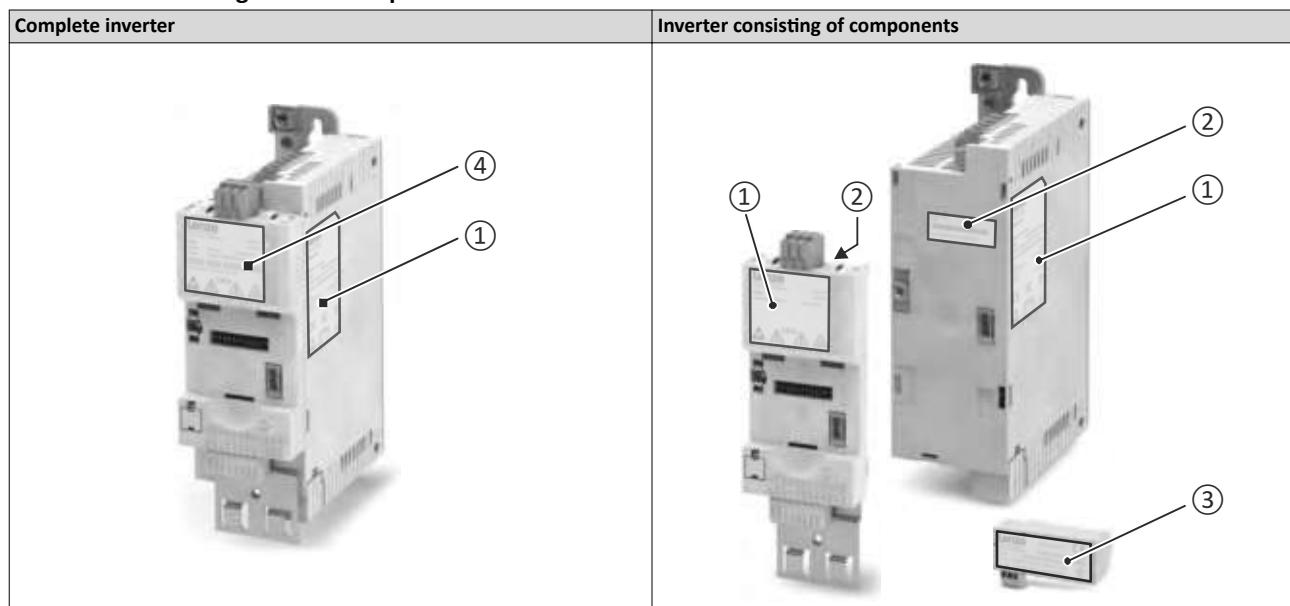




### Example of 55 kW ... 110 kW



### Position and meaning of the nameplates



①	Technical data of the inverter	①	Technical data of the component
<input type="checkbox"/>	Technical data of the control unit Type and serial number of the inverter	②	Type and serial number of the component
		③	Technical data, type, and serial number of the safety module

# Product information

Features

Topologies / network



## Topologies / network

The inverters can be equipped with different fieldbus networks.

The topologies and protocols typical for the prevailing networks are supported.

Currently available networks:

	<p>CANopen® is a communication protocol based on CAN. CANopen® is a registered community trademark of the CAN user organisation CiA® (CAN in Automation e. V.). Device descriptions for the download: EDS files for Lenze devices</p>
	<p>The Modbus protocol is an open communication protocol based on a client/server architecture and developed for the communication with programmable logic controllers. Further development is carried out by the international user organisation Modbus Organization, USA.</p>
	<p>IO-Link is the standardized IO technology (IEC 61131-9) for communication with sensors and actuators. Point-to-point communication is based on the 3-wire sensor and actuator connection without additional requirements concerning the cable material. IO-Link is a registered trademark. It may only be used by members of the IO-Link community and non-members that have purchased the corresponding license. Detailed information on the usage can be found in the IO-Link Community Rules at <a href="http://www.io-link.com">www.io-link.com</a>.</p>
	<p>PROFIBUS® (Process Field Bus) is a widely-used fieldbus system for the automation of machines and production plants. PROFIBUS® is a registered trademark and patented technology licensed by the PROFIBUS &amp; PROFINET International (PI) user organisation. Device descriptions for the download: GSD files for Lenze devices</p>
	<p>EtherCAT® (Ethernet for Controller and Automation Technology) is an Ethernet-based fieldbus system which fulfils the application profile for industrial realtime systems EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany. Device descriptions for the download: XML/ESI files for Lenze devices</p>
	<p>EtherNet/IP™ (EtherNet Industrial Protocol) is an Ethernet-based fieldbus system that uses Common Industrial Protocol™ (CIP™) to exchange data. EtherNet/IP™ and Common Industrial Protocol™ (CIP™) are trademarks and patented technologies, licensed by the user organization ODVA (Open DeviceNet Vendor Association), Inc., USA. Device descriptions for the download: EDS files for Lenze devices</p>
	<p>Ethernet POWERLINK is an Ethernet-based fieldbus system which fulfils the application profile for industrial real-time systems. POWERLINK is an open technology. Detailed information on POWERLINK can be found on the web page of the Ethernet POWERLINK Standardization Group (EPSG): <a href="http://www.ethernet-powerlink.org">http://www.ethernet-powerlink.org</a></p>
	<p>PROFINET® (Process Field Network) is a real-time capable fieldbus system based on Ethernet. PROFINET® is a registered trademark and patented technology licensed by the PROFIBUS &amp; PROFINET International (PI) user organisation. Device descriptions for the download: GSDML files for Lenze devices</p>

More information on the supported networks can be found at:

[www.Lenze.com](http://www.Lenze.com)



## Functions

### Overview

With regard to their functionality, the inverters i550 are adapted to extensive applications. This is also reflected in the overall scope of the products.

Functions	
Motor control	Monitoring
V/f characteristic control linear/square-law (VFC plus)	Short circuit
V/f characteristic control (VFC closed loop)	Earth fault
Energy saving function (VFC-Eco)	Device overload ( $i^*t$ )
Sensorless vector control (SLVC)	Motor overload ( $i^{**}t$ )
Sensorless control for synchronous motors (SL-PSM/SLSM-PSM)	Mains phase failure
Servo control for asynchronous motors (SC-ASM)	Stall protection
Motor functions	Motor current limit
Flying restart circuit	Maximum torque
Slip compensation	Ultimate motor current
DC braking	Motor speed
Oscillation damping	Load loss detection
Skip frequencies	Motor temperature
Automatic identification of the motor data	Diagnostics
Braking energy management	Error history buffer
Holding brake control	Logbook
Voltage add – function	LED status displays
Rational Energy Ride Through (RERT)	Keypad language selection German, English
Speed feedback (HTL encoder)	Network
Brake resistor control (brake chopper integrated)	CANopen
Frequency setpoint	Modbus RTU
DC-bus connection (400V devices)	Modbus TCP
Application functions	PROFIBUS
Process controller	EtherCAT
Access protection	EtherNet/IP
Process controller sleep mode and rinse function	PROFINET
Freely assignable favorite menu	POWERLINK
Parameter change-over	IO-Link
S-shaped ramps for smooth acceleration	Safety functions
Motor potentiometer	STO (Safe Torque Off)
Flexible I/O configuration	
Automatic restart	
OEM parameter set	
Complete control with 8-key keypad	
UPS operation	
Frequency output via digital output DO1	
"Light Duty" load characteristic can be adjusted for selected inverters	

# Product information

Functions

Motor control types



## Motor control types

The following table contains the possible control types with Lenze motors.

Motors	V/f characteristic control VFCplus	Sensorless vector control SLVC	ASM servo control SC ASM
Three-phase AC motors			
MD	•	•	•
MF	•	•	•
mH	•	•	•
m500	•	•	•

Lenze synchronous servo motors are not suitable for use with inverters, e.g. the types MCS, MCM or m850.

## Motor functions

### Motor setting range

#### Rated point 120 Hz



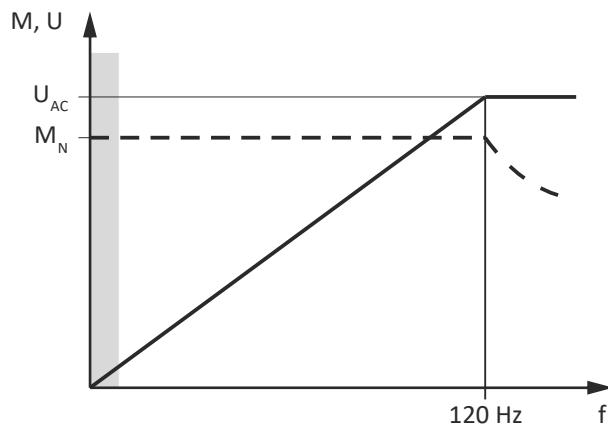
Only possible with Lenze MF motors.

The rated motor torque is available up to 120 Hz.

Compared to the 50-Hz operation, the setting range increases by 2.5 times.

Thus, a smaller motor can be selected at the same rated power.

#### V/f at 120 Hz



V Voltage

M Torque

f Frequency

$U_{AC}$  Mains voltage

$M_N$  Rated torque

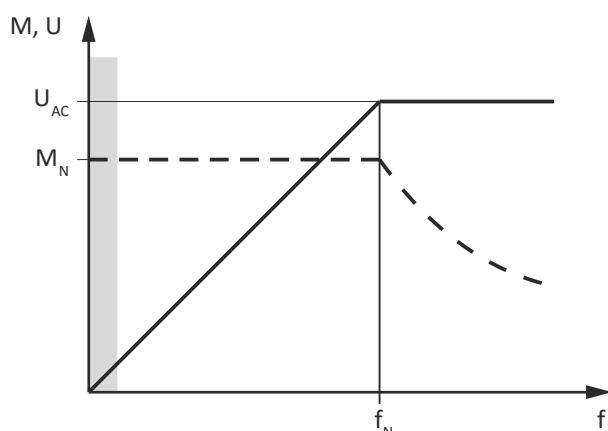
**Rated point 87 Hz**

The rated motor torque is available up to 87 Hz.

Compared to the 50-Hz operation, the setting range increases by 1.74 times.

For this purpose, a motor with 230/400 V in a triangle is driven by a 400 V inverter.

The inverter must be dimensioned for a rated motor current of 230 V.

**V/f at 87 Hz**

V Voltage

M Torque

f Frequency

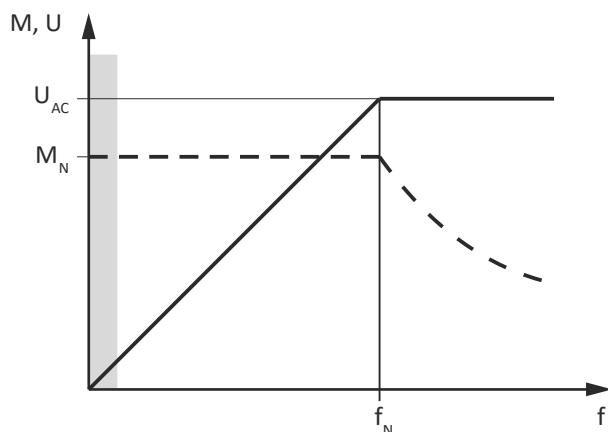
$U_{AC}$  Mains voltage

$M_{rated}$  Rated torque

$f_{rated}$  Rated frequency

**Rated point 50 Hz**

The rated motor torque is available up to 50 Hz.

**V/f at 50 Hz**

V Voltage

M Torque

f Frequency

$U_{AC}$  Mains voltage

$M_{rated}$  Rated torque

$f_{rated}$  Rated frequency

# Product information

Identification of the products



## Identification of the products

When the technical data of the different versions was listed, the product name was entered because it is easier to read than the individual product code of the product. The product name is also used for categorising the accessories. The assignment of product name and order code can be found in the "Order" chapter. [219](#)

The product name contains the power in kW, the mains voltage class 120 V, 230 V or 400 V and the number of phases.

In the product name, the power information always refers to the "Heavy Duty" load characteristic.

The 1/3-phase inverters are marked at the end with "-2".

"C" marks the "Cabinet" version = inverter for the installation into the control cabinet.

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter
		Light Duty	Heavy Duty			
		kW	kW	V		
i550	C	-	0.25	120	1	i550-C0.25/120-1
			0.37			i550-C0.37/120-1
			0.75			i550-C0.75/120-1
			1.1			i550-C1.1/120-1

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter
		Light Duty	Heavy Duty			
		kW	kW	V		
i550	C	-	0.25	230	1	i550-C0.25/230-1
			0.37		1/3	i550-C0.25/230-2
			0.55		1	i550-C0.37/230-1
			0.75		1/3	i550-C0.37/230-2
			1.1		1	i550-C0.55/230-1
			1.5		1/3	i550-C0.55/230-2
			2.2		1	i550-C0.75/230-1
					1/3	i550-C0.75/230-2
					1	i550-C1.1/230-1
					1/3	i550-C1.1/230-2
					1	i550-C1.5/230-1
					1/3	i550-C1.5/230-2
					1	i550-C2.2/230-1
					1/3	i550-C2.2/230-2

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter
		Light Duty	Heavy Duty			
		kW	kW	V		
i550	C	-	0.25	240	1/3	i550-C0.25/230-2
			0.37			i550-C0.37/230-2
			0.55			i550-C0.55/230-2
			0.75			i550-C0.75/230-2
			1.1			i550-C1.1/230-2
			1.5		3	i550-C1.5/230-2
			2.2			i550-C2.2/230-2
			5.5			i550-C4.0/230-3
			7.5			i550-C5.5/230-3



## Product information

Identification of the products

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter
		Light Duty	Heavy Duty			
		kW	kW	V		
i550	C	-	0.37	400	3	i550-C0.37/400-3
			0.55			i550-C0.55/400-3
			0.75			i550-C0.75/400-3
			1.1			i550-C1.1/400-3
			1.5			i550-C1.5/400-3
			2.2			i550-C2.2/400-3
		4	3			i550-C3.0/400-3
		5.5	4			i550-C4.0/400-3
		7.5	5.5			i550-C5.5/400-3
		11	7.5			i550-C7.5/400-3
		15	11			i550-C11/400-3
		18.5	15			i550-C15/400-3
		22	18.5			i550-C18/400-3
		30	22			i550-C22/400-3
		37	30			i550-C30/400-3
		45	37			i550-C37/400-3
		55	45			i550-C45/400-3
		75	55			i550-C55/400-3
		90	75			i550-C75/400-3
		110	90			i550-C90/400-3
		132	110			i550-C110/400-3

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter
		Light Duty	Heavy Duty			
		kW	kW	V		
i550	C	-	0.37	480	3	i550-C0.37/400-3
			0.55			i550-C0.55/400-3
			0.75			i550-C0.75/400-3
			1.1			i550-C1.1/400-3
			1.5			i550-C1.5/400-3
			2.2			i550-C2.2/400-3
		4	3			i550-C3.0/400-3
		5.5	4			i550-C4.0/400-3
		7.5	5.5			i550-C5.5/400-3
		11	7.5			i550-C7.5/400-3
		15	11			i550-C11/400-3
		18.5	15			i550-C15/400-3
		22	18.5			i550-C18/400-3
		30	22			i550-C22/400-3
		37	30			i550-C30/400-3
		45	37			i550-C37/400-3
		55	45			i550-C45/400-3
		75	55			i550-C55/400-3
		90	75			i550-C75/400-3
		110	90			i550-C90/400-3
		132	110			i550-C110/400-3

# Product information

Identification of the products



## Product code

		I	5	5	A	E	000	0	1	0	0	0	0000
Product type	Inverter	I											
Product family	i500		5										
Product	i550			5									
Product generation	Generation 1				A								
	Generation 2				B								
Mounting type	Control cabinet mounting					E							
Rated power (Examples)	0.25 kW						125						
	0.55 kW						155						
	2.2 kW						222						
	3.0 kW						230						
	15 kW						315						
	30 kW						330						
Mains voltage and connection type	1/N/PE AC 120 V							A					
	1/N/PE AC 230/240 V							B					
	3/PE AC 230/240 V							C					
	1/N/PE AC 230/240 V							D					
	3/PE AC 230/240 V							F					
	3/PE AC 400 V								1				
	3/PE AC 480 V									0			
Motor connections	Single axis									A			
Integrated functional safety	Without safety function									V			
	Basic Safety STO										0		
Degree of protection	IP20, coated										1		
Interference suppression	Without										0		
	Integrated RFI filter										1		
Application	Default parameter setting: Region EU (50-Hz networks)										0		
	Default parameter setting: Region US (60-Hz networks)										1		
Design types	Standard I/O without network											000S	
	Application I/O without network											001S	
	Standard I/O with CANopen											002S	
	Standard I/O with Modbus RTU											003S	
	Standard I/O with PROFIBUS											004S	
	Standard I/O with POWERLINK											012S	
	Standard I/O with EtherCAT											00KS	
	Standard I/O with PROFINET											00LS	
	Standard I/O with EtherNet/IP											00MS	
	Standard I/O with Modbus TCP											00WS	
	Standard I/O with IO-Link											016S	

## Example:

Product code	Meaning
I55AE311F1AV1000KS	Inverter i550 cabinet, 11 kW, 3-phase, 400 V/480 V STO safety function, IP20, varnished, integrated RFI filter; 50 Hz variant Standard I/O with EtherCAT network



## Ways of commissioning

There are three ways to commission the inverter quickly and easily.

Thanks to Lenze's engineering philosophy, the high functionality is still easy to grasp. Parameterization and commissioning are a breeze thanks to clear structure and simple dialogs, leading to the desired outcome quickly and reliably.

### Keypad

If it's only a matter of setting a few key parameters such as acceleration and deceleration time, this can be done quickly on the keypad.



### »EASY Starter«

If functions such as the holding brake control or sequencer need to be set, it's best to use the »EASY Starter« engineering tool.



### SMART Keypad App

The Lenze SMART Keypad App for Android or iOS allows you to diagnose and parameterize an inverter. A WLAN module on the inverter is required for communication.

- Ideal for the parameterization of simple applications such as a conveyor belt.
- Ideal for the diagnostics of the inverter.

The app can be found in the Google Play Store or in the Apple App Store.



Android



iOS

# Information on project planning

Project planning process  
Dimensioning



## Information on project planning

### Project planning process

#### Dimensioning

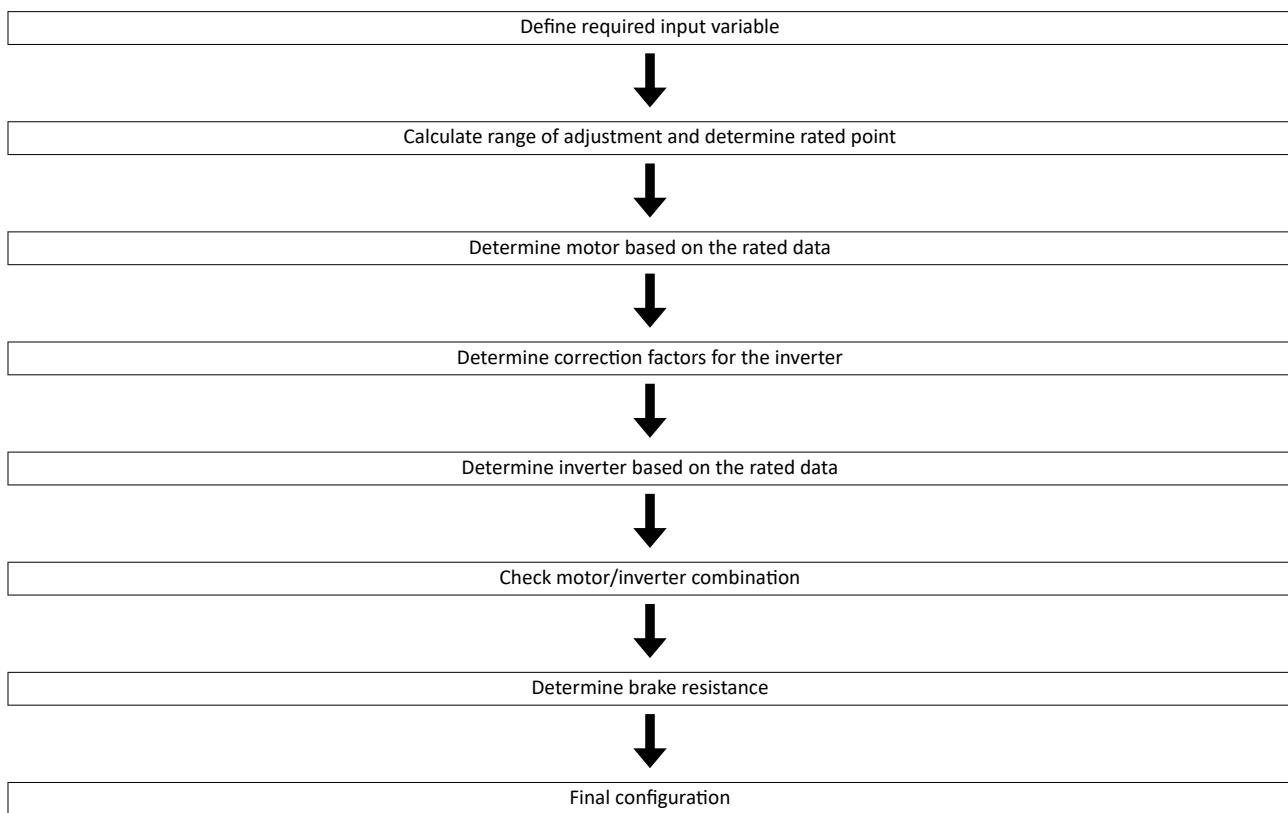
##### 3 methods for dimensioning

**Fast:** Selection of the inverter based on the motor data of a 4-pole asynchronous motor.

**Detailed:** In order to optimize the selection of the inverter and all drive components, it is worthwhile to execute the detailed system dimensioning based on the physical requirements of the application. For this purpose, Lenze provides the Drive Solution Designer (DSD) design program.

**Manual:** The following chapter guides you step by step through the selection of a drive system.

#### Workflow of a configuration process



#### Define required input variables

Operating mode			S1 or S6
Max. load torque	$M_{L,max}$	Nm	
Max. load speed	$n_{L,max}$	rpm	
Min. load speed	$n_{L,min}$	rpm	
Site altitude	H	m	
Ambient temperature (inverter)	$T_u$	°C	



# Information on project planning

Project planning process

Dimensioning

## Calculate range of adjustment and determine rated point

	Calculation	
Setting range	$V = \frac{n_{L,max}}{n_{L,min}}$	
Motor with integral fan	≤ 2.50 (20 - 50 Hz) ≤ 4.35 (20 - 87Hz) ≤ 6 (20 - 120Hz)	50 Hz 87 Hz 120 Hz
Motor with blower	≤ 10.0 (5 - 50 Hz)	50 Hz
Motor with integral fan (reduced torque)	≤ 17.4 (5 - 87Hz) ≤ 24 (5 - 120Hz)	87 Hz 120 Hz

## Determine motor based on the rated data

			Check
Rated torque			
Operating mode S1	$M_{rated}$	Nm	$M_N \geq \frac{M_{L,max}}{T_{H,Mot} \times T_{U,Mot}}$
Operating mode S6	$M_{rated}$	Nm	$M_N \geq \frac{M_{L,max}}{2 \times T_{H,Mot} \times T_{U,Mot}}$
Rated speed	$n_{rated}$	rpm	$n_{rated} \geq n_{L,max}$ $\frac{n_h}{V} \leq n_{L,min}$

			Note
Rated torque	$M_{rated}$	Nm	→ Rated motor data
Rated speed	$n_{rated}$	rpm	
Rated point at		Hz	→ setting range
Power factor	$\cos \varphi$		
Rated current	$I_{N,MOT}$	A	→ Rated motor data
Rated power	$P_{rated}$	kW	
Correction factor - site altitude	$T_{H,MOT}$		→ Technical motor data
Correction factor - ambient temperature	$T_{U,MOT}$		
Select motor			

## Correction factors for the inverter

Site altitude Amsl		H				
	[m]	≤ 1000	≤ 2000	≤ 3000	≤ 4000	
$k_{H,INV}$		1.00	0.95	0.90	0.85	
Temperature in the control cabinet		T <sub>U</sub>				
	[°C]	≤ 40	≤ 45	≤ 50	≤ 55	
Switching frequency						
2 or 4 kHz	$k_{TU,INV}$		1.00	1.00	0.875	0.750
8 or 16 kHz			1.00	0.875	0.750	0.625
Switching frequency with the "Light Duty" load characteristic						
2 or 4 kHz	$k_{TU,INV}$		1.00	0.875	0.750	-
8 or 16 kHz			-	-	-	-

## Determine the inverter based on the rated data

			Check
Output current			
Continuous operation	$I_{out}$	A	$I_{out} \geq I_{N,Mot} / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 15 s	$I_{out}$	A	$I_{out} \geq I_{N,Mot} \times 2 / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 180 s	$I_{out}$	A	$I_{out} \geq I_{N,Mot} \times 1.5 / (k_{H,INV} \times k_{TU,INV})$

# Information on project planning

Project planning process  
Dimensioning



## Determine the inverter based on the rated data for the "Light Duty" load characteristic

			Check
Output current			
Continuous operation	$I_{out}$	A	$I_{out} \geq I_{N,Mot} / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 15 s	$I_{out}$	A	$I_{out} \geq I_{N,Mot} \times 1.65 / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 180 s	$I_{out}$	A	$I_{out} \geq I_{N,Mot} \times 1.25 / (k_{H,INV} \times k_{TU,INV})$

## Check motor/inverter combination

			Calculation
Motor torque	M	Nm	$M = \sqrt{\left(\frac{I_{out,INV}}{I_{N,MOT}}\right)^2 - (1 - \cos \varphi^2)} \times \frac{M_N}{\cos \varphi}$
Inverter overload capacity			$\frac{M_{L,max}}{M} \leq 1.5$

## Braking operation without additional measures

To decelerate small masses, the "DC injection brake DCB" function can be parameterised. DC-injection braking enables a quick deceleration of the drive to standstill without the need for an external brake resistor.

- A code can be used to select the braking current.
- The maximum braking torque to be realised by the DC braking current amounts to approx. 20 ... 30 % of the rated motor torque. It is lower compared to braking action in generator mode with external brake resistor.
- Automatic DC-injection braking (Auto-DCB) improves the starting performance of the motor when the operation mode without speed feedback is used.

## Braking operation with external brake resistor

To decelerate greater moments of inertia or with a longer operation in generator mode an external brake resistor is required. It converts braking energy into heat.

The brake resistor is connected if the DC-bus voltage exceeds the switching threshold. This prevents the controller from setting pulse inhibit through the "Overvoltage" fault and the drive from coasting down. The external brake resistor serves to control the braking process at any time.

The brake chopper integrated in the controller connects the external brake resistor.

## Determine brake resistance

			Application	
			With active load	With passive load
Rated power	$P_{rated}$	kW	$P_N \geq P_{max} \times \eta_e \times \eta_m \times \frac{t_1}{t_z}$	$P_N \geq \frac{P_{max} \times \eta_e \times \eta_m}{2} \times \frac{t_1}{t_z}$
Thermal capacity	$C_{th}$	kWs	$C_{th} \geq P_{max} \times \eta_e \times \eta_m \times t_1$	$C_{th} \geq \frac{P_{max} \times \eta_e \times \eta_m}{2} \times t_1$
Rated resistance	$R_{rated}$	$\Omega$		$R_N \geq \frac{U_{DC}^2}{P_{max} \times \eta_e \times \eta_m}$

Active load Can start to move independent of the drive (e.g. unwinder)

Passive load Can stop independent of the drive (e.g. horizontal travelling drives, centrifuges, fans)

$U_{DC}$  [V] Switching threshold - brake chopper

$P_{max}$  [W] Maximum occurring braking power

$\eta_e$  Electrical efficiency

$\eta_m$  Mechanical efficiency

$t_1$  [s] Braking time

$t_z$  [s] Cycle time = time between two successive braking processes ( $t_1 +$  dead time)



## Final configuration

Product extensions and accessories can be found here:

- ▶ Product extensions □ 179
- ▶ Accessories □ 205

## Operation in motor and generator mode

The energy analysis differs between operation in motor mode and generator mode.

During operation in motor mode, the energy flows from the supplying mains via the inverter to the motor which converts electrical energy into mechanical energy (e. g. for lifting a load).

During operation in generator mode, the energy flows back from the motor to the inverter. The motor converts the mechanical energy into electrical energy - it acts as a generator (e. g. when lowering a load).

The drive brakes the load in a controlled manner.

The energy recovery causes a rise in the DC-bus voltage. If this voltage exceeds an upper limit, the output stage of the inverter will be blocked to prevent the device from being destroyed.

The drive coasts until the DC-bus voltage reaches the permissible value range again.

In order that the excessive energy can be dissipated, a brake resistor or a regenerative module is required.

# Information on project planning

Project planning process  
Overcurrent operation



## Overcurrent operation

The inverters can be driven at higher amperages beyond the rated current if the duration of this overcurrent operation is time limited.

Two utilisation cycles of 15 s and 180 s are defined. Within these utilisation cycles, an overcurrent is possible for a certain time if afterwards an accordingly long recovery phase takes place.

### Cycle 15 s

During this operation, the inverter may be loaded for 3 s with up to 200 % of the rated current if afterwards a recovery time of 12 s with max. 75 % of the rated current is observed. A cycle corresponds to 15 s.

### Cycle 180 s

During this operation, the inverter may be loaded for 60 s with up to 150 % of the rated current if afterwards a recovery time of 120 s with max. 75 % of the rated current is observed. A cycle corresponds to 180 s.

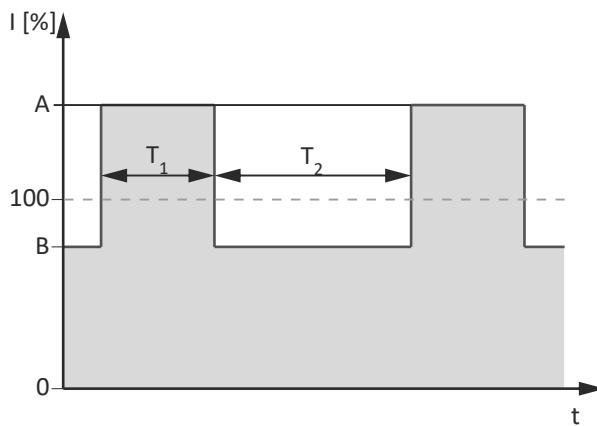
The monitoring of the device utilization ( $I_{xt}$ ) triggers an error if the utilization value exceeds a threshold of 100 %.



The maximum output currents correspond to the switching frequencies and the overload behaviour of the inverters are given in the rated data.

In case of rotating frequencies < 10 Hz, the time-related overload behaviour may be reduced.

The graphics shows a cycle. The basic conditions given in the table (graphics field highlighted in grey) have to be complied with in order that the inverter will not be overloaded. Both cycles can be combined with each other.



Cycle	Max. output current	Max. overload time	Max. output current during the Recovery time	Min. recovery time
s	A %	T <sub>1</sub> s	B %	T <sub>2</sub> s
15	200	3	75	12
180	150	60	75	120



## Safety instructions

Disregarding the following basic safety measures and safety information may lead to severe personal injury and damage to property!

Observe all specifications of the corresponding documentation supplied. This is the precondition for safe and trouble-free operation and for obtaining the product features specified.

Please observe the specific safety information in the other sections!

## Basic safety instructions

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never modify the product technically.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- The product can – depending on their degree of protection – have live, movable or rotating parts during or after operation. Surfaces can be hot.
- Observe all specifications of the corresponding documentation supplied. This is the condition for safe and trouble-free operation and the achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of these persons:
  - They are familiar with installing, mounting, commissioning, and operating the product.
  - They have the corresponding qualifications for their work.
  - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

# Information on project planning

Safety instructions  
Application as directed



## Application as directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product is only suitable for installation in control cabinets and, depending on the protection class, for wall mounting.
- The product must only be actuated with motors that are suitable for the operation with inverters.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.

## Additional information for the intended use in North America:

The cables must be installed in accordance with US National Electrical Code NFPA 70 or Canadian Electrical Code C22.1.

## Use of explosion-protected motors

Explosion-protected motors that are not designed for use with an inverter lose their approval if they are used for variable speed applications. Due to the many areas of liability that may arise when handling these applications, the following policy statement applies:



Lenze inverters are sold without warranty of suitability for use with explosion-protected motors. Lenze assumes no responsibility for direct, incidental or consequential damages, costs or losses that may result from the use of AC inverters with explosion-protected motors. Buyer expressly agrees to assume any risk of loss, expense or damage that may result from such application.

## Foreseeable misuse

Inverters are not to be operated with DC motors.



## Handling

### Transport, storage

Observe the notes regarding transport, storage and correct handling. Ensure proper handling and avoid mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts. Inverters contain electrostatically sensitive components which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since thereby your health could be endangered!

### Installation

The technical data and supply conditions can be obtained from the nameplate and the documentation. They must be strictly observed.

The inverters must be installed and cooled according to the instructions given in the corresponding documentation. Observe the climatic conditions according to the technical data. The ambient air must not exceed the degree of pollution 2 according to EN IEC 61800-5-1.

### Electrical connection

When working on energized inverters, comply with the applicable national accident prevention regulations.

The electrical installation must be carried out according to the appropriate regulations (e. g. cable cross-sections, fuses, PE connection). Additional information can be obtained from the documentation.

The documentation contains information about installation according to EMC regulations (shielding, grounding, filters and cable routing). Please also observe this information for CE-marked inverters. The manufacturer of the system or machine is responsible for adherence to the limit values required in connection with EMC legislation. The inverters must be installed in housings (e. g. control cabinets) to meet the limit values for radio interferences valid at the site of installation. The housings must enable an EMC-compliant installation. Observe in particular that e. the control cabinet doors should have a circumferential metal connection to the housing. Reduce housing openings and cutouts to a minimum.

### Protection in the event of short circuit or earth fault

To ensure protection according to EN IEC 61800-5-1 in the event of an electrical short circuit or earth fault (protection against electric shock, thermal hazards and fire), the following must be taken into account in the installation:

- Use fuses according to the technical data.
- The installation must meet the requirements of the IEC 60364.
- The continuity of all associated protective conductors and equipotential bonding conductors including all connection points must be ensured.
- If the maximum permissible switch-off time according to IEC 60364 is exceeded with a high system impedance (especially with TT mains) or a high loop impedance with the prescribed fuses, a residual current device (RCD) can be used. Alternatively, other protective measures can be used, e. g. isolation from the environment by means of double or reinforced insulation, or isolation from the supply system by using a transformer.
- If a residual current device (RCD) is connected upstream of the inverter for protection in the event of an earth fault, only type B/B+ is permitted for three-phase devices.

### Operation

If necessary, systems including inverters must be equipped with additional monitoring and protection devices. Also comply with the safety regulations and provisions valid at the installation site.

After the inverter has been disconnected from the supply voltage, all live components and power terminals must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the inverter.

All protection covers and doors must be shut during operation.

# Information on project planning

Safety instructions  
Handling



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You may adapt the inverters to your application by parameter setting within the limits available. For this, observe the notes in the documentation.

## Safety functions

Certain inverter versions support safety functions (e.g. "safe torque off", formerly "safe standstill") according to the requirements of the EC Machinery Directive 2006/42/EC [UKCA: S.I. 2008/1597]. The notes on the integrated safety provided in this documentation must be observed.

The user is not allowed to change inverters that come with integrated safety technology.

- The safety module must not be removed.
- The user must not carry out any repairs on the safety module.
- The safety module is not a spare part.
- If the safety module is defective, the inverter has to be replaced.

## Maintenance and servicing

The inverters do not require any maintenance if the prescribed operating conditions are observed.

## Disposal

In accordance with the current provisions, Lenze products and accessories have to be disposed of by means of professional recycling. Lenze products contain recyclable raw material such as metal, plastics and electronic components.



# Information on project planning

Safety instructions  
Residual hazards

## Residual hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system.

If the above is disregarded, this can lead to severe injuries to persons and damage to property!

## Product

Observe the warning labels on the product!



### Dangerous electrical voltage:

Before working on the product, make sure there is no voltage applied to the power terminals!

After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!



### Electrostatic sensitive devices:

Before working on the product, the staff must ensure to be free of electrostatic charge!



### High leakage current:

Carry out fixed installation and PE connection in compliance with:

EN IEC 61800-5-1 / EN IEC 60204-1



### Hot surface:

Use personal protective equipment or wait until the device has cooled down!

## Degree of protection - protection of persons and device protection

- Information applies to the mounted and ready-for-use state.
- Information does not apply to the wire range of the terminals.
  - Terminals that are not wired have low protection against physical contact.
  - Terminals for large cable cross-sections have lower classes of protection, e. g. from 15 kW IP10 only.

## Protection of persons

Before working on the inverter, check if no voltage is applied to the power terminals.

- Depending on the device, the power terminals X105 remain live for up to 20 minutes.
- The power terminals X100 and X105 remain live even when the motor is stopped.

## Device protection

- The maximum test voltage for insulation tests between a control potential of 24 V and PE must not exceed 110 V DC (EN IEC 61800-5-1).

## Motor protection

With some settings of the inverter, the connected motor can be overheated.

- E. g. by longer operation of self-ventilated motors at low speed.
- E. g. by longer operation of DC-injection braking.

## Protection of the machine/system

Drives can reach dangerous overspeeds.

- E. g. by setting high output frequencies in connection with motors and machines not suitable for this purpose.
- The inverters do not provide protection against such operating conditions. For this purpose, use additional components.

Switch contactors in the motor cable only if the controller is inhibited.

- Switching while the inverter is enabled is only permissible if no monitoring functions are activated.

# Information on project planning

Safety instructions

Residual hazards



## Motor

If there is a short circuit of two power transistors, a residual movement of up to  $180^\circ/\text{number of pole pairs}$  can occur at the motor! (e. g. 4-pole motor: residual movement max.  $180^\circ/2 = 90^\circ$ ).



## Control cabinet structure

### Control cabinet requirements

- Protection against electromagnetic interferences
- Compliance with the ambient conditions of the installed components

### Mounting plate requirements

- The mounting plate must be electrically conductive.
  - Use zinc-coated mounting plates or mounting plates made of V2A.
  - Varnished mounting plates are unsuitable, even if the varnish is removed from the contact surfaces.
- When using several mounting plates, make a conductive connection over a large surface (e. g. using grounding strips).

### Arrangement of components

- Division into power and control areas

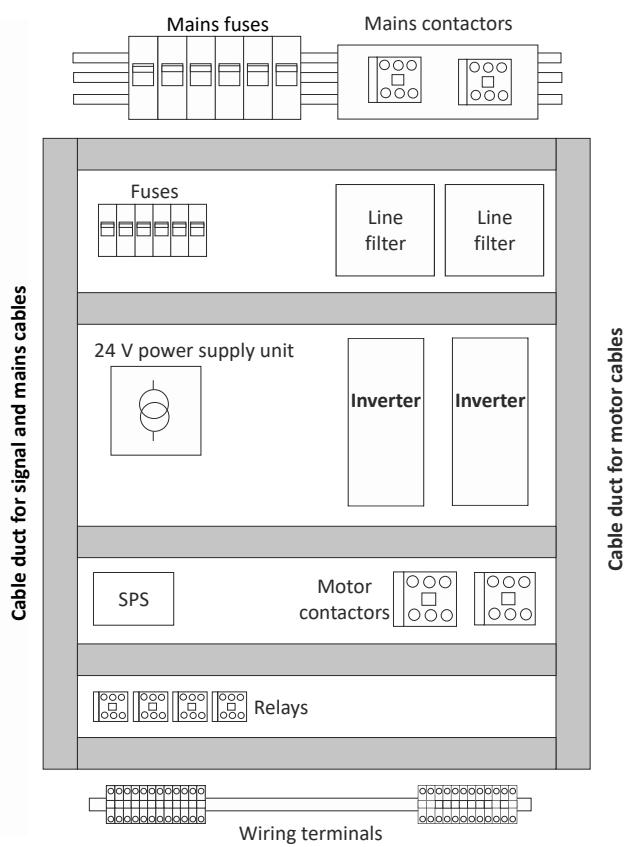


Fig. 1: Example for the ideal arrangement of components in the control cabinet

# Information on project planning

Control cabinet structure

Cables



## Cables

Requirements

- The cables used must correspond to the requirements at the location (e. g. EN IEC 60204-1, UL).
- The cable cross-section must be dimensioned for the assigned fusing. Observe national and regional regulations.
- You must observe the regulations for minimum cross-sections of PE conductors. The cross-section of the PE conductor must be at least as large as the cross-section of the power connections.

Installation inside the control cabinet

- Always install cables close to the mounting plate (reference potential), as freely suspended cables act like antennas.
- Use separated cable ducts for motor cables and control cables. Do not mix up different cable types in one cable duct.
- Route cables so that they are straight-lined to the terminals (do not form cable bundles).
- Minimize coupling capacities and coupling inductances by avoiding unnecessary cable lengths and reserve loops.
- Short-circuit unused cores to the reference potential.
- Install the cables of a 24 V DC supply (positive and negative cable) close to each other or twisted over the entire length to avoid loops.
- Before leaving the control cabinet, connect the shield of the fieldbus cable to the mounting plate in accordance with EMC requirements.

Installation outside the control cabinet

- In the case of greater cable lengths, a greater cable distance between the cables is required.
- In the case of parallel routing (cable trays) of cables with different types of signals, the degree of interference can be minimized by using a metallic cable separator or isolated cable ducts.

## Earthing concept

- Set up the earthing system with a star topology.
- Connect all components (inverters, filters, chokes) to a central earthing point (PE rail).
- Comply with the corresponding minimum cross-sections of the cables.
- When using several mounting plates, make a conductive connection over a large surface (e. g. using grounding strips).



## Information on mechanical installation

### Important notes

#### Measures for cooling during operation

- Ensure unimpeded ventilation of cooling air and outlet of exhaust air.
- If the cooling air is polluted (fluff, (conductive) dust, soot, grease, aggressive gases), take adequate countermeasures.
  - Install filters.
  - Arrange for regular cleaning of the filters.
  - Use air conditioners with hermetic separation of the inside and outside air of the control cabinet.
- If required, implement a separate air guide.

# Information on mechanical installation

## Preparation



### Preparation

Further data and information for mechanical mounting:

- ▶ Control cabinet structure □ 39
- ▶ Dimensions □ 160

#### Mounting position

- Vertical alignment - all mains connections are at the top and the motor connections at the bottom.

#### Free spaces

- Maintain the specified free spaces above and below to the other installations.
- Several i5xx frequency inverters can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

#### Mechanical installation

- The mounting location and material must ensure a durable mechanical connection.
- Do not mount onto DIN rails!
- In case of continuous vibrations or shocks use vibration dampers. If non-conductive vibration dampers are used, an EMC-compliant design must be ensured.

How to mount the inverters onto the mounting plate.

Preconditions:

- Mounting plate with conductive surface

Required:

- Tool for drilling and thread cutting
- Screwdriver
- Screw and washer assemblies or hexagon socket screws with washers.

1. Prepare mounting plate with corresponding threaded holes.
2. Fit screws and washers (if applicable).
3. Do not yet tighten the screws.
4. Mount the inverter on the prepared mounting plate via keyhole suspension.
5. Only tighten the screws hand-tight.
6. Pre-assemble further units if necessary.
7. Adjust the units.
8. Screw the units onto the mounting plate.

The inverter and any other units are mounted on the mounting plate. You can begin with the wiring.

Screw and washer assemblies or hexagon socket screws with washers are recommended..

M5 x ≥ 10 mm for devices up to and including 2.2 kW

M5 x ≥ 12 mm for devices up to and including 11 kW

M6 x ≥ 16 mm for devices up to and including 22 kW

M8 x ≥ 16 mm for devices up to and including 110 kW



## Information on electrical installation

### Important notes

#### **⚠ DANGER!**

Dangerous electrical voltage

During operation and up to 20 minutes after power-off, hazardous electrical voltages may be present at the connections of the product.

The leakage current against earth (PE) is > 3.5 mA AC or > 10 mA DC.

Possible consequences: Death or serious injury from electric shock

Protective measures

- ▶ Any work on the product must only be carried out in a deenergized state.
- ▶ Check that no voltage is present!
- ▶ After switching off the mains voltage, observe the signs on the product.
- ▶ After switching off, wait until the drive comes to a standstill.
- ▶ Implement the measures required by EN IEC 61800-5-1 or EN IEC 60204-1, i.e. fixed installation and standard-compliant PE connection.

#### **⚠ DANGER!**

Use of the inverter on a phase earthed mains with a rated mains voltage  $\geq 400\text{ V}$

The protection against accidental contact is not ensured without external measures.

- ▶ If protection against accidental contact according to EN IEC 61800-5-1 is required for the control terminals of the inverters and the connections of the plugged device modules, ...
- ▶ an additional basic insulation has to be provided.
- ▶ the components to be connected have to come with a second basic insulation.

#### **⚠ WARNING!**

Dangerous electrical voltage

Device error causes an overvoltage in the system.

- ▶ For a voltage supply with DC 24 V ( $\pm 20\%$ ), use only a safely separated power supply unit according to the valid SELV/PELV requirements.

#### **NOTICE**

No protection against excessively high mains voltage

The mains input is not fused internally.

Possible consequences: Destruction of the product in the event of excessively high mains voltage.

- ▶ Take note of the maximum permissible mains voltage.
- ▶ On the mains supply side, use fuses to adequately protect the product against mains fluctuations and voltage peaks.

# Information on electrical installation

Important notes  
Electrical isolation



## NOTICE

Overvoltage at devices with 230-V mains connection

An impermissible overvoltage may occur if the central supply of the N conductor is interrupted if the devices are connected to a TN three-phase system.

Possible consequences: Destruction of the device

- ▶ Provide for the use of isolating transformers.

## NOTICE

The product contains electrostatic sensitive devices.

Possible consequences: Destruction of the device

- ▶ Before working in the connection area, the personnel must be free of electrostatic charge.

## NOTICE

Use of mains filters and RFI filters in IT systems

Mains filters and RFI filters from Lenze contain components that are interconnected against PE.

Possible consequences: The filters may be destroyed when an earth fault occurs.

Possible consequences: Monitoring of the IT system may be triggered.

- ▶ Do not use mains filters and RFI filters from Lenze in IT systems.
- ▶ Before using the inverter in the IT system, remove the IT screws.

## NOTICE

Overvoltage at components

In case of an earth fault in IT systems, intolerable overvoltages may occur in the plant.

Possible consequences: Destruction of the device.

- ▶ Before using the inverter in the IT system, the contact screws must be removed.
- ▶ Positions and number of the contact screws depend on the device.



When implementing machines and systems for the use in the UL/CSA scope, you have to observe the relevant special notes.

These notes are marked with "UL marking".



You have to install the devices into housings (e. g. control cabinets) to comply with valid regulations.

Stickers with warning notes must be displayed prominently and close to the device.

## Electrical isolation



Ensure a trouble-free operation:

Carry out the total wiring so that the separation of the separate potential areas is preserved.



## Preparation

### Further data and information

- ▶ EMC-compliant installation □ 46
- ▶ Standards and operating conditions □ 78

# Information on electrical installation

EMC-compliant installation



## EMC-compliant installation

The drive system (inverter and drive) only complies with the directive 2014/30/EU: EMC Directive [UKCA: S.I. 2016/1091 - The Electromagnetic Compatibility Regulations 2016] if it is installed according to the guidelines for CE-typical drive systems.

These guidelines should also be followed in installations requiring FCC Part 15 or ICES 001 compliance.

### NOTICE

#### Electromagnetic interference

Product and peripheral devices may be affected during operation.

- ▶ Please use sufficiently conductive shield connections.
- ▶ Connect the housing with shielding effect to the grounded mounting plate with a surface as large as possible, e. g., inverters and RFI filters.
- ▶ Use central earthing points.

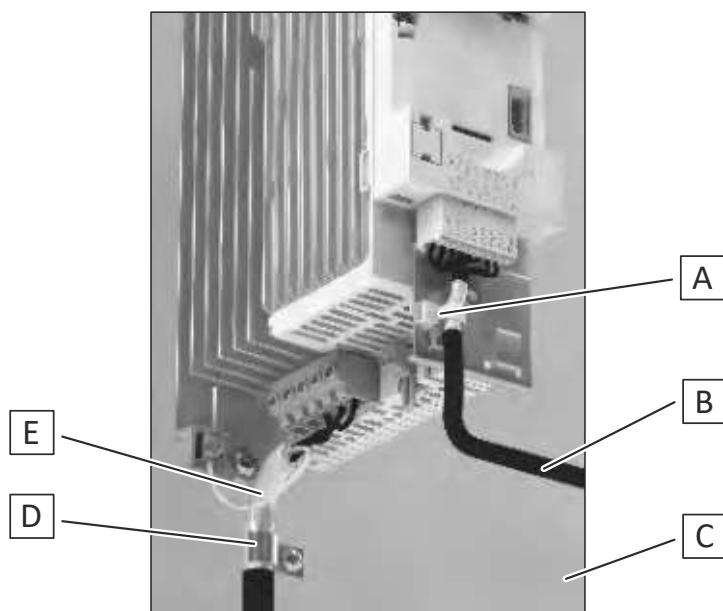
The structure in the control cabinet must support the EMC-compliant installation with shielded motor cables.

- Please use sufficiently conductive shield connections.
- Connect the housing with shielding effect to the grounded mounting plate with a surface as large as possible, e. g. of inverters and RFI filters.
- Use central grounding points.

Matching accessories makes effective shielding easier.

- Motor shield plates as alternative shield connections for the motor cable
- Shield clips/shield clamps
- Metallic cable ties

The example below shows the effective wiring:



- A      Shield connection of control cable  
B      Control cable  
C      Mounting plate with conductive surface

- D      Shield connection of motor cable  
(alternative: shield connection on optional motor shield plate)  
E      Motor cable with low capacitance



# Information on electrical installation

## EMC-compliant installation

EMC-compliant installation must be implemented with shielded motor cables with low capacitance.

Capacitance per unit length:

- C-core-core/C-core-shielding:  $< 75/150 \text{ pF/m} \leq 2.5 \text{ mm}^2 (\geq \text{AWG } 14)$
- C-core-core/C-core-shielding:  $< 150/300 \text{ pF/m} \geq 4 \text{ mm}^2 (\leq \text{AWG } 12)$

### Mains connection, DC supply

- Inverters, mains chokes, or mains filters may only be connected to the mains via unshielded single cores or unshielded cables.
- When a line filter is used, shield the cable between mains filter or RFI filter and inverter if its length exceeds 300 mm. Unshielded cores must be twisted.
- In DC-bus operation or DC supply, use shielded cables.

### Motor cable

- Only use low-capacitance and shielded motor cables with braid made of tinned or nickel-plated copper.
  - The overlap rate of the braid must be at least 70 % with an overlap angle of 90 °.
  - Shields made of steel braids are not suitable.
- Shield the cable for motor temperature monitoring (PTC or thermal contact) and install it separately from the motor cable.
  - In Lenz system cables, the cable for the brake control is integrated into the motor cable. If this cable is not required for brake control, it can also be used to connect the motor temperature monitoring up to a length of 50 m.
  - Only certain inverters are provided with this connection facility.
- Connect the shield with a large surface and fix it with metal cable binders or conductive clamp. The following is suitable for the connection of the shield:
  - The mounting plate
  - A central grounding rail
  - A shield plate, if necessary, optional
- This is optimal:
  - The motor cable is separated from the mains cables and control cables.
  - The motor cable only crosses mains cables and control cables at right angles.
  - The motor cable is not interrupted.
- If the motor cable must be opened all the same (e. g. by chokes, contactors, or terminals):
  - The unshielded cable ends must not be longer than 100 mm (depending on the cable cross-section).
  - Install chokes, contactors, terminals etc. spatially separated from other components (with a minimum distance of 100 mm).
  - Install the shield of the motor cable directly before and behind the point of separation to the mounting plate with a large surface.
- Connect the shield with a large surface to PE in the terminal box of the motor at the motor housing.
  - Metal EMC cable glands at the motor terminal box ensure a large surface connection of the shield with the motor housing.

### Control cables

- Install the cables so that no induction-sensitive loops arise.
- Distance of shield connections of control cables to shield connections of motor cables and DC cables:
  - At least 50 mm
- Control cables for analog signals:
  - Must always be shielded
  - Connect the shield on one side of the inverter
- Control cables for digital signals:

	Cable length		
	< ca. 5 m	ca. 5 m ... ca. 30 m	> ca. 30 m
Type	unshielded option	unshielded twisted option	always shielded connected on both sides

# Information on electrical installation

EMC-compliant installation



## Fieldbus cables

- Before leaving the control cabinet, connect the shield of the fieldbus cable with the equipotential bonding system (e. g. mounting plate) on a large surface.
- See also the recommendations for action of the respective user organization.

## Network cables

- Cables and wiring must comply with the specifications and requirements of the used network.
  - Ensures the reliable operation of the network in typical systems.

## Detecting and eliminating EMC interferences

Trouble	Cause	Remedy
Interferences of analog setpoints of your own or other devices and measuring systems	Unshielded motor cable has been used	Use shielded motor cable
	Shield contact is not extensive enough	Carry out optimal shielding as specified
	Shield of the motor cable is interrupted, e. g. by terminal strips, switches etc.	<ul style="list-style-type: none"><li>• Separate components from other component parts with a minimum distance of 100 mm</li><li>• Use motor chokes or motor filters</li></ul>
	Additional unshielded cables inside the motor cable have been installed, e. g. for motor temperature monitoring	Install and shield additional cables separately
	Too long and unshielded cable ends of the motor cable	Shorten unshielded cable ends to max. 40 mm
Conducted interference level is exceeded on the supply side	Terminal strips for the motor cable are directly located next to the supply terminals	Spatially separate the terminal strips for the motor cable from mains terminals and other control terminals with a minimum distance of 100 mm
	Mounting plate varnished	Optimize PE connection: <ul style="list-style-type: none"><li>• Remove varnish</li><li>• Use zinc-coated mounting plate</li></ul>
	HF short circuit	Check cable routing
Malfunctions of the fieldbus communication or exceedance of the permissible interference levels	Shield contact is not extensive enough	Before leaving the control cabinet, connect the shield of the fieldbus cable with the equipotential bonding system (e. g. mounting plate) on a large surface.
	Shield connection on the inverter only	
	Shield of fieldbus cable connected on one side only	Shield connection on both sides



# Information on electrical installation

Connection according to UL  
Important notes

## Connection according to UL

### Important notes

#### ⚠ WARNING!

- ▶ **UL marking**
- ▶ The integral solid state short circuit protection included in the inverter does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code / Canadian Electrical Code and any additional local codes.
- ▶ **Marquage UL**
- ▶ La protection statique intégrée contre les courts-circuits n'offre pas la même protection que le dispositif de protection du circuit de dérivation. Un tel dispositif doit être fourni, conformément au National Electrical Code / Canadian Electrical Code et aux autres dispositions applicables au niveau local.

#### ⚠ WARNING!

- ▶ **UL marking**
- ▶ Use 75 °C copper wire only, except for control circuits.
- ▶ **Marquage UL**
- ▶ Utiliser exclusivement des conducteurs en cuivre 75 °C, sauf pour la partie commande.

#### ⚠ WARNING!

- ▶ **UL marking**
- ▶ Suitable for motor group installation or use on a circuit capable of delivering not more than the RMS symmetrical amperes (SCCR) of the drive at its rated voltage.
- ▶ Approved fusing is specified in SCCR tables below.
- ▶ **Marquage UL**
- ▶ Convient pour l'utilisation sur une installation avec un groupe de moteurs ou sur un circuit capable de fournir au maximum une valeur de courant efficace symétrique en ampères à la tension assignée de l'appareil.
- ▶ Les dispositifs de protection adaptés sont spécifiés dans les SCCR tableaux suivants.

### NOTICE

#### ▶ **UL marking**

- ▶ The opening of the Branch Circuit Protective Device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

#### ▶ **Marquage UL**

- ▶ Le déclenchement du dispositif de protection du circuit de dérivation peut être dû à une coupure qui résulte d'un courant de défaut. Pour limiter le risque d'incendie ou de choc électrique, examiner les pièces porteuses de courant et les autres éléments du contrôleur et les remplacer s'ils sont endommagés. En cas de grillage de l'élément traversé par le courant dans un relais de surcharge, le relais tout entier doit être remplacé.

# Information on electrical installation

Connection according to UL

Important notes



## NOTICE

### ► UL marking

- Internal overload protection rated for 125 % of the rated FLA.
- **Marquage UL**
- Protection contre les surcharges conçue pour se déclencher à 125 % de l'intensité assignée à pleine charge.



# Information on electrical installation

Connection according to UL  
Fusing data

## Fusing data

### Branch Circuit Protection (BCP)

#### Short Circuit Current Ratings (SCCR) with Standard Fuses or Circuit Breaker

(Tested per UL61800-5-1, reference UL file E132659)

These devices are suitable for motor group installation when used with Standard Fuses or Circuit Breaker. For single motor installation, if the fuse value indicated is higher than 400 % of the motor current (FLA), the fuse value has to be calculated. If the value of the fuse is below two standard ratings, the nearest standard ratings less than the calculated value shall apply.

Inverter			Standard Fuses (UL248)			Circuit Breaker (UL489)			
Mains	Rated power		Max. SCCR	Max. rated current	Class	Max. SCCR	Max. rated current	Min. cabinet dimensions	
	kW	hp	kA	A		kA	A	m³	ft³
120 V, 1-ph	0.25	0.33	5	15	CC	5	15		
120 V, 1-ph	0.37	0.5	5	15	CC	5	15		
120 V, 1-ph	0.75	1	5	30	CC, J, T	5	30		
120 V, 1-ph	1.1	1.5	5	30	CC, J, T	5	30		
230 V, 1-ph	0.25	0.33	65	15	CC	65	15	0.042	1.48
230 V, 1-ph	0.37	0.5	65	15	CC	65	15	0.042	1.48
230 V, 1-ph	0.55	0.75	65	15	CC	65	15	0.042	1.48
230 V, 1-ph	0.75	1	65	15	CC	65	15	0.042	1.48
230 V, 1-ph	1.1	1.5	65	30	CC, J, T	65	30	0.042	1.48
230 V, 1-ph	1.5	2	65	30	CC, J, T	65	30	0.042	1.48
230 V, 1-ph	2.2	3	65	30	CC, J, T	65	30	0.042	1.48
230 V, 1/3-ph	0.25	0.33	65	15	CC	65	15	0.042	1.48
230 V, 1/3-ph	0.37	0.5	65	15	CC	65	15	0.042	1.48
230 V, 1/3-ph	0.55	0.75	65	15	CC	65	15	0.042	1.48
230 V, 1/3-ph	0.75	1	65	15	CC	65	15	0.042	1.48
230 V, 1/3-ph	1.1	1.5	65	30	CC, J, T	65	30	0.042	1.48
230 V, 1/3-ph	1.5	2	65	30	CC, J, T	65	30	0.042	1.48
230 V, 1/3-ph	2.2	3	65	30	CC, J, T	65	30	0.042	1.48
230 V, 3-ph	4	5	65	40	J, T	65	40	0.042	1.48
230 V, 3-ph	5.5	7.5	65	40	J, T	65	40	0.042	1.48
480 V, 3-ph	0.37	0.5	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	0.55	0.75	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	0.75	1	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	1.1	1.5	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	1.5	2	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	2.2	3	65	15	CC	65	15	0.042	1.48
480 V, 3-ph	3	4	65	25	CC, J, T	65	25	0.042	1.48
480 V, 3-ph	4	5	65	25	CC, J, T	65	25	0.042	1.48
480 V, 3-ph	5.5	7.5	65	25	CC, J, T	65	25	0.042	1.48
480 V, 3-ph	7.5	10	65	40	J, T	65	40	0.042	1.48
480 V, 3-ph	11	15	65	40	J, T	65	40	0.042	1.48
480 V, 3-ph	15	20	65	70	J, T	65	60	0.17	6
480 V, 3-ph	18.5	25	65	70	J, T	65	60	0.17	6
480 V, 3-ph	22	30	65	70	J, T	65	60	0.17	6
480 V, 3-ph	30	40	22	125	J, T	35	125	0.57	20
480 V, 3-ph	37	50	22	125	J, T	35	125	0.57	20
480 V, 3-ph	45	60	22	125	J, T	35	125	0.57	20
480 V, 3-ph	55	75	22	200	J, T	35	200	0.57	20
480 V, 3-ph	75	100	22	200	J, T	35	200	0.57	20
480 V, 3-ph	90	125	22	300	J, T	10	300	0.57	20
480 V, 3-ph	110	150	22	300	J, T	10	300	0.57	20

# Information on electrical installation

Connection according to UL  
Fusing data



## Short Circuit Current Ratings (SCCR) with Semiconductor Fuses

(Tested per UL61800-5-1, reference UL file E132659)

These devices are suitable for standard installation when used with Semiconductor Fuses. For single motor installation, if the fuse value indicated is higher than 400 % of the motor current (FLA), the fuse value has to be calculated. If the value of the fuse is below two standard ratings, the nearest standard ratings less than the calculated value shall apply.

Mains	Inverter		Alternate Fuse (Semiconductor Fuse)	
	kW	hp	Max. SCCR	Max. rated current
120 V, 1-ph	0.25	0.33		
120 V, 1-ph	0.37	0.5		
120 V, 1-ph	0.75	1		
120 V, 1-ph	1.1	1.5		
230 V, 1-ph	0.25	0.33	100	15
230 V, 1-ph	0.37	0.5	100	15
230 V, 1-ph	0.55	0.75	100	40
230 V, 1-ph	0.75	1	100	40
230 V, 1-ph	1.1	1.5	100	40
230 V, 1-ph	1.5	2	100	40
230 V, 1-ph	2.2	3	100	40
230 V, 1/3-ph	0.25	0.33	100	15
230 V, 1/3-ph	0.37	0.5	100	15
230 V, 1/3-ph	0.55	0.75	100	40
230 V, 1/3-ph	0.75	1	100	40
230 V, 1/3-ph	1.1	1.5	100	40
230 V, 1/3-ph	1.5	2	100	40
230 V, 1/3-ph	2.2	3	100	40
230 V, 3-ph	4	5	100	50
230 V, 3-ph	5.5	7.5	100	50
480 V, 3-ph	0.37	0.5	100	6
480 V, 3-ph	0.55	0.75	100	15
480 V, 3-ph	0.75	1	100	15
480 V, 3-ph	1.1	1.5	100	15
480 V, 3-ph	1.5	2	100	15
480 V, 3-ph	2.2	3	100	15
480 V, 3-ph	3	4	100	40
480 V, 3-ph	4	5	100	40
480 V, 3-ph	5.5	7.5	100	40
480 V, 3-ph	7.5	10	100	50
480 V, 3-ph	11	15	100	50
480 V, 3-ph	15	20	100	80
480 V, 3-ph	18.5	25	100	80
480 V, 3-ph	22	30	100	80
480 V, 3-ph	30	40	100	80
480 V, 3-ph	37	50	100	100
480 V, 3-ph	45	60	100	125
480 V, 3-ph	55	75	100	200
480 V, 3-ph	75	100	100	200
480 V, 3-ph	90	125	100	350
480 V, 3-ph	110	150	100	350



# Information on electrical installation

Connection according to UL

Fusing data

## Approved manufacturers for BCP fusing

Manufacturer	Max. rated current	Designation
	A	
Eaton/Bussmann	350	FWP-350A
Mersen	6	A70QS6-14F
	15	A60Q15-2
	40	A70QS40-14F
	50	A70QS50-22F
	80	A70QS80-22F, A70QS80-4
	100	A70QS100-4
	125	A70QS125-4
	200	A70QS200-4
	350	A70QS350-4

# Information on electrical installation

## Mains connection



### Mains connection

Single inverters are connected directly to the **AC system** or via upstream filters. RFI filters are already integrated in many inverters. Depending on the requirements, mains chokes or mains filters can be used.

In a **DC-system**, several inverters are operated in a network. This enables an energy exchange between motor and generator driven single drives.



## Information on electrical installation

Mains connection  
1-phase mains connection 120 V

### 1-phase mains connection 120 V

The connection plan is valid for the inverters i550-Cxxx/120-1.



The inverters i550-Cxxx/120-1 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

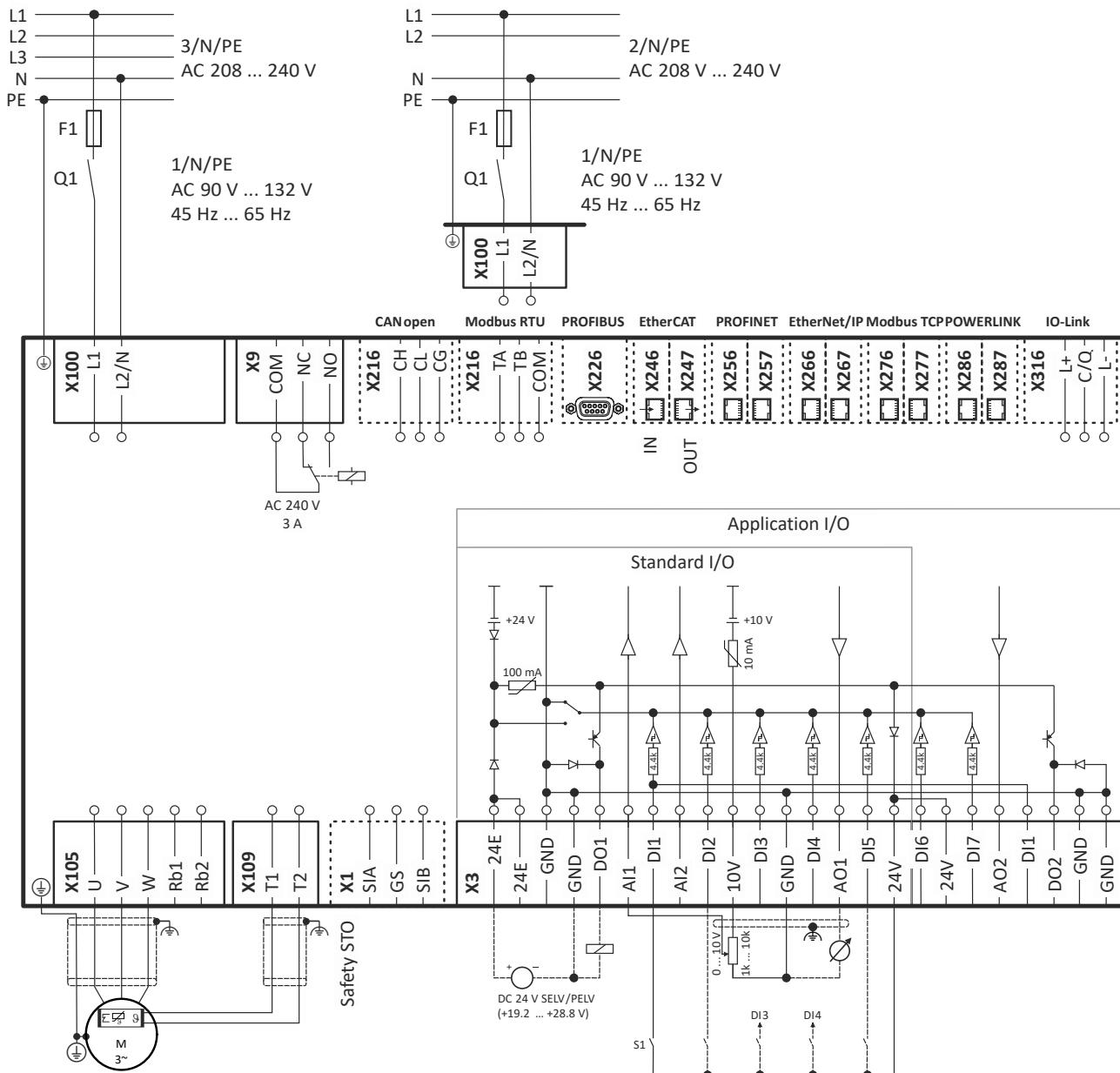


Fig. 2: Wiring example

S1 Start/Stop  
Fx Fuses

Q1 Mains contactor  
--- Dashed line = options

## Information on electrical installation

## Mains connection

1-phase mains connection 230/240 V



**1-phase mains connection 230/240 V**

The connection plan is valid for the inverters i550-Cxxx/230-1.

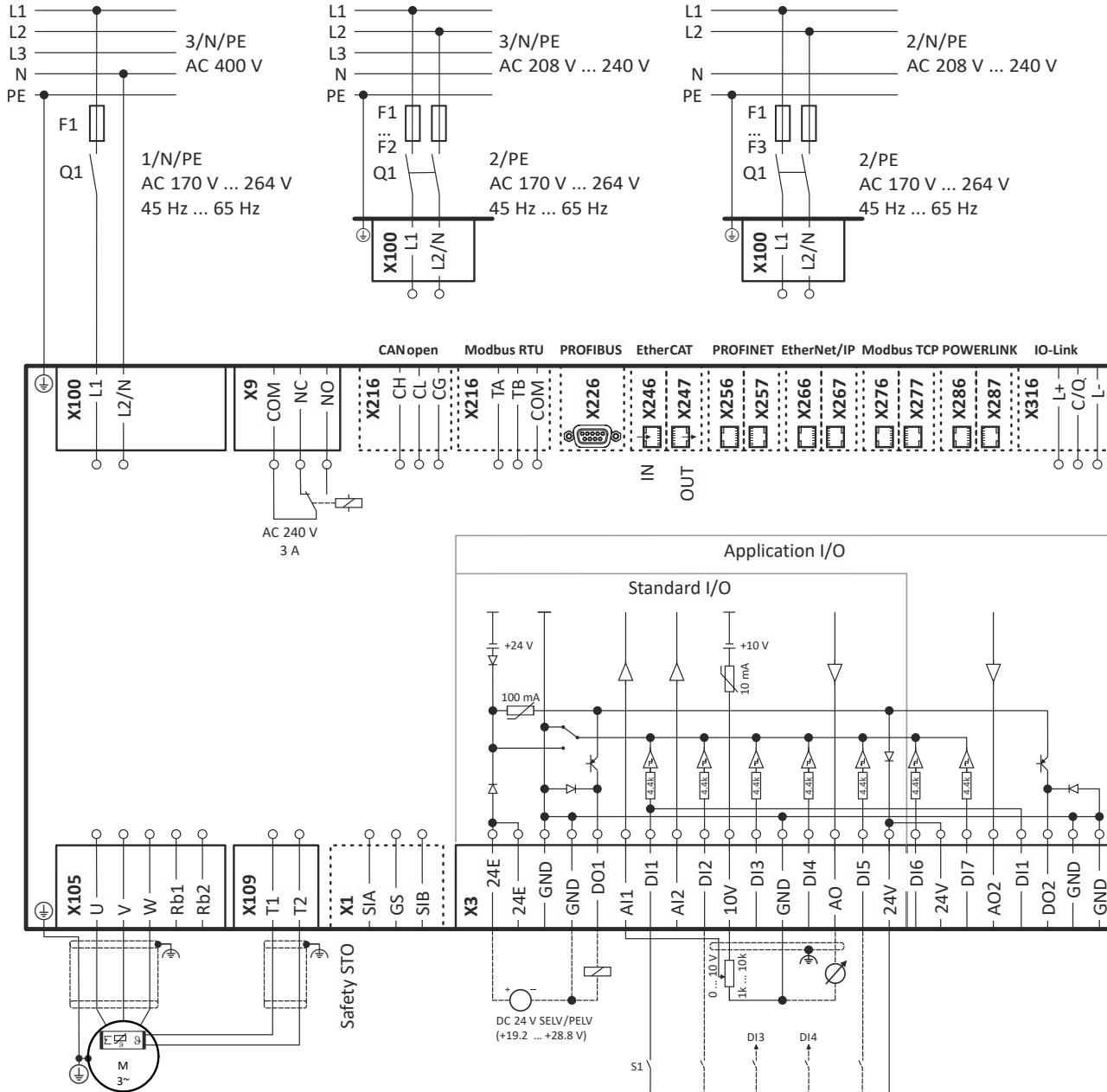


Fig. 3: Wiring example

S1 Start/Stop

## Fx Fuses

## Q1 Mains contactor

--- Dashed line = options



# Information on electrical installation

Mains connection  
1-phase mains connection 230/240 V

The connection plan is valid for the inverters i550-Cxxx/230-2.



The inverters i550-Cxxx/230-2 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

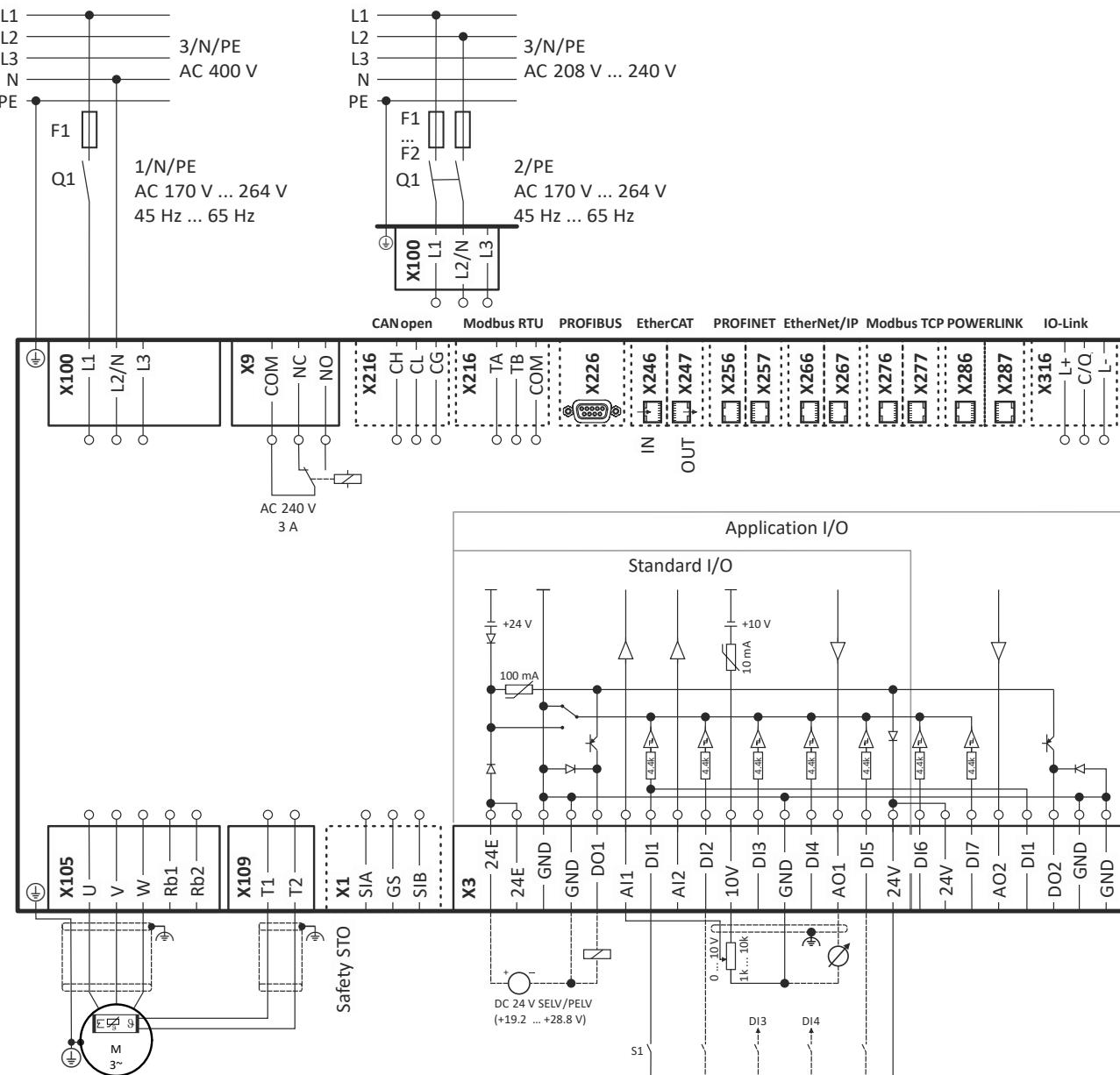


Fig. 4: Wiring example

# Information on electrical installation

Mains connection

3-phase mains connection 230/240 V



## 3-phase mains connection 230/240 V

The connection plan is valid for the inverters i550-Cxxx/230-3.



The inverters i550-Cxxx/230-3 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

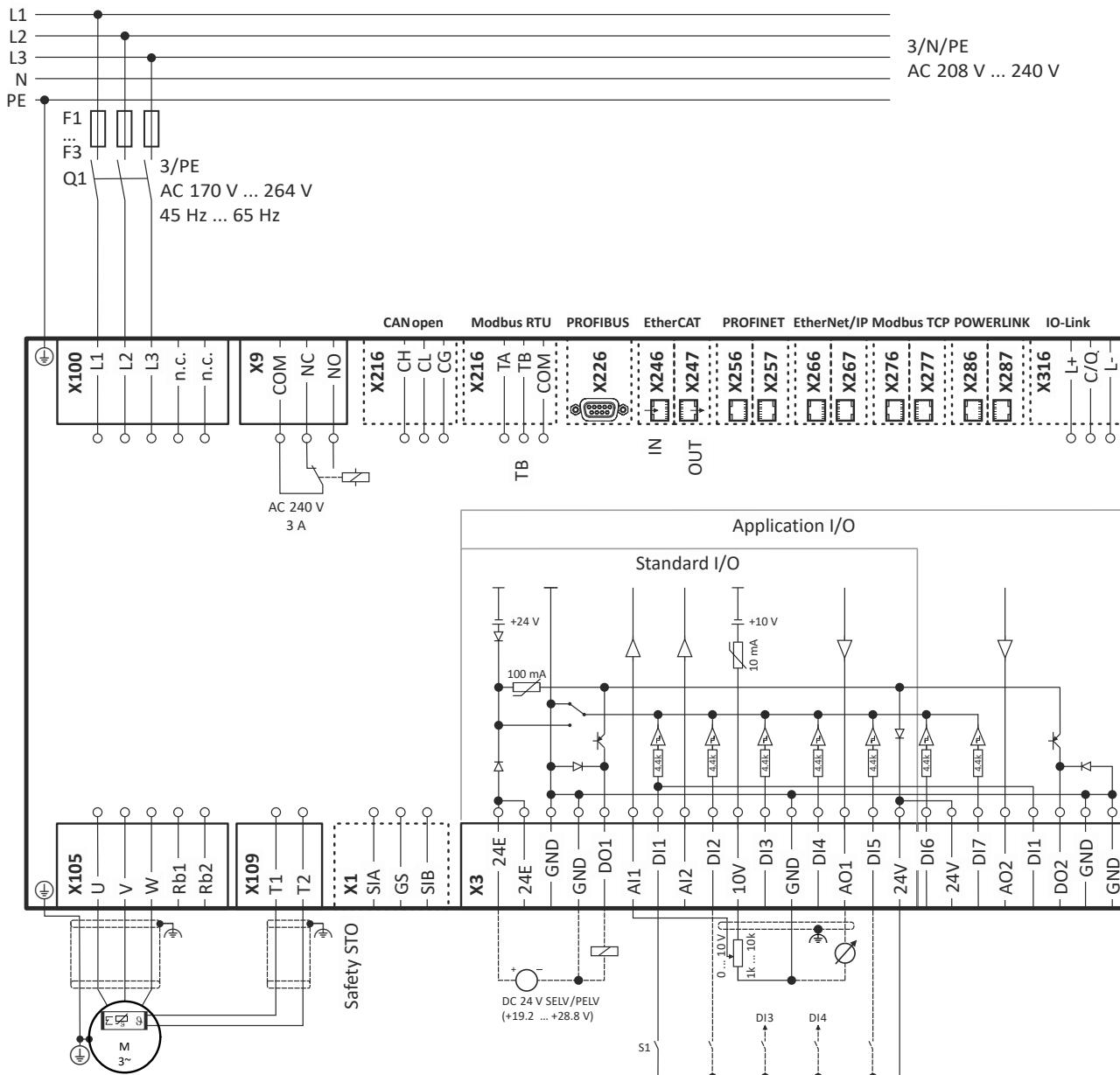


Fig. 5: Wiring example

S1 Start/Stop

Fx Fuses

Q1 Mains contactor

--- Dashed line = options



# Information on electrical installation

Mains connection  
3-phase mains connection 230/240 V "Light Duty"

The connection plan is valid for the inverters i550-Cxxx/230-2.



The inverters i550-Cxxx/230-2 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

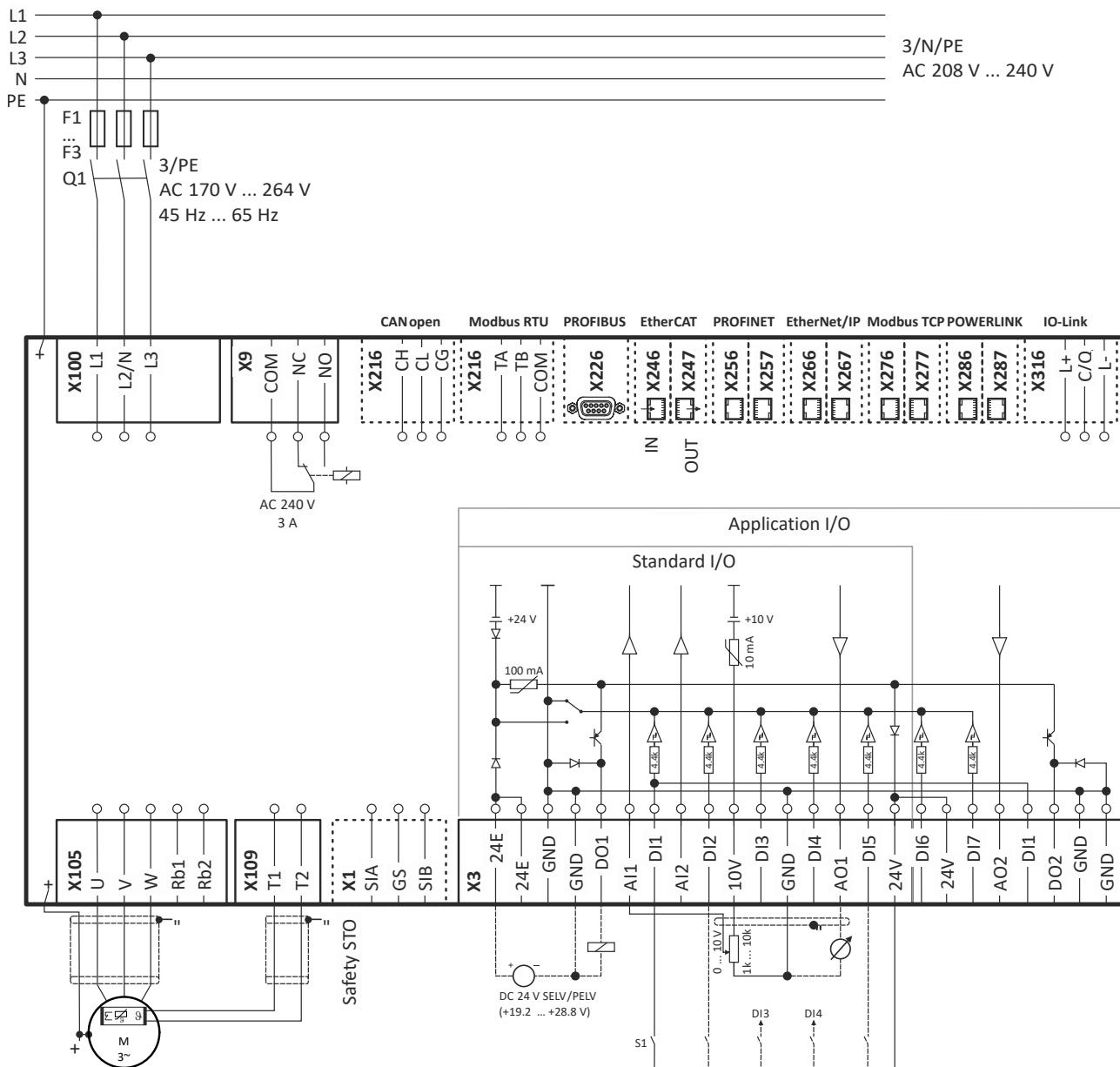


Fig. 6: Wiring example

S1 Start/Stop  
Fx Fuses  
Q1 Mains contactor  
--- Dashed line = options

## 3-phase mains connection 230/240 V "Light Duty"

See "3-phase mains connection 230/240 V". □ 58

## Information on electrical installation

## Mains connection

### 3-phase mains connection 400 V



### **3-phase mains connection 400 V**

The connection plan is valid for the inverters i550-Cxxx/400-3.

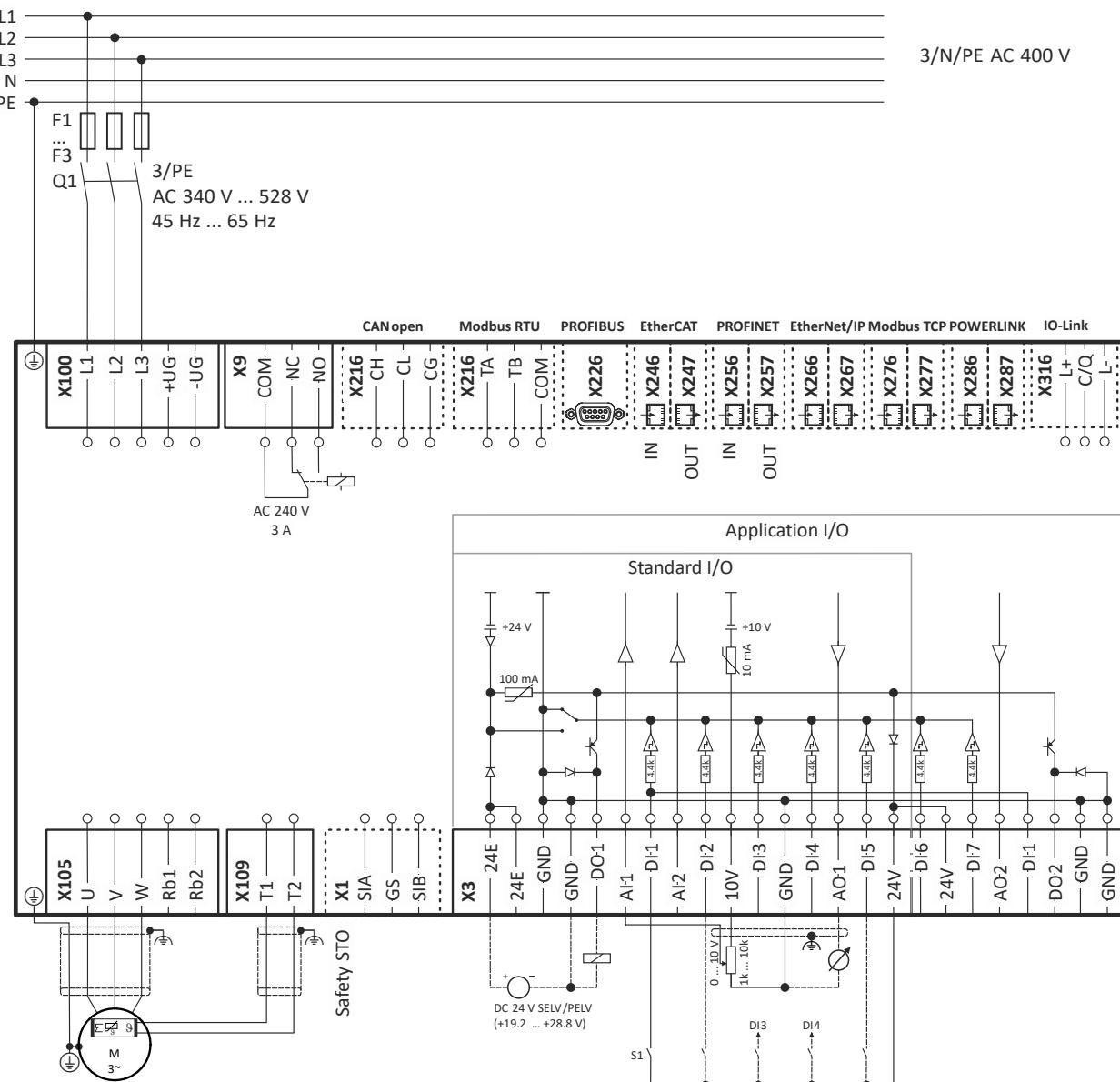


Fig. 7: Wiring example

S1 Start/Stop

## Fx Fuses

## Q1 Mains contactor

--- Dashed line = options

**3-phase mains connection 400 V "Light Duty"**

See "3-phase mains connection 400 V".  60



# Information on electrical installation

Mains connection  
3-phase mains connection 480 V

## 3-phase mains connection 480 V

The connection plan is valid for the inverters i550-Cxxx/400-3.

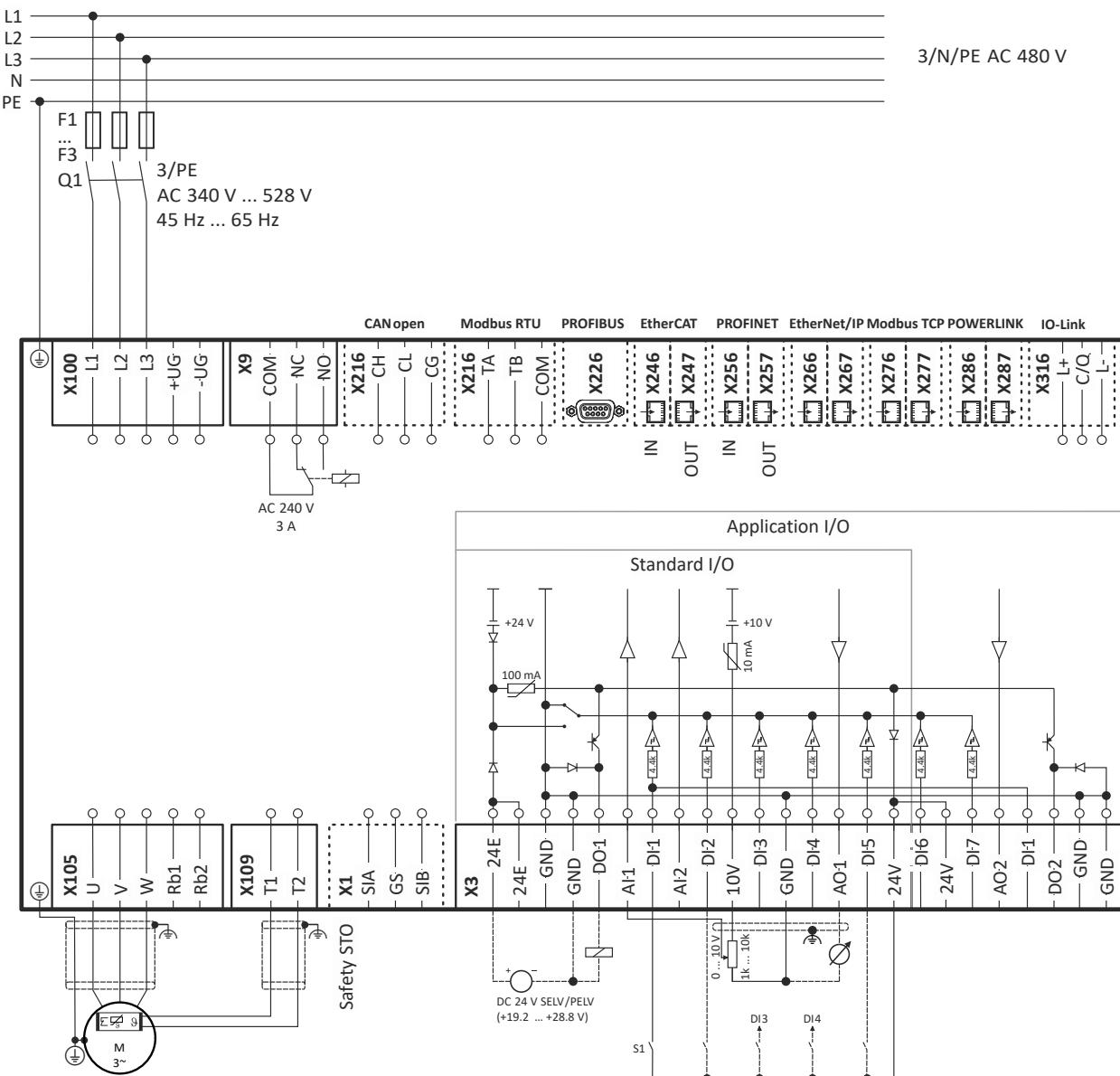


Fig. 8: Wiring example

S1 Start/Stop  
Fx Fuses

Q1 Mains contactor  
--- Dashed line = options

## 3-phase mains connection 480 V "Light Duty"

See "3-phase mains connection 480 V". □ 61

# Information on electrical installation

## Motor connection



### Motor connection

#### Motor cable lengths

- The rated data for the motor cable length must be observed.
- Keep the motor cable as short as possible as this has a positive effect on the drive behaviour and the EMC.
- Several motors connected to an inverter form a group drive.

In case of group drives, the resulting motor cable length  $l_{\text{res}}$  is relevant:

$$l_{\text{res}} [\text{m}] = (l_1 + l_2 + l_3 \dots l_i) \cdot v_i$$

$l_{\text{res}}$  Resulting length of the motor cables

$l_x$  Length of the single motor cable

$i$  Number of the single motor cables

#### Switching in the motor cable



Switching on the motor side of the inverter is permissible:

For safety shutdown (emergency stop).

In case several motors are driven by one inverter (only in V/f operating mode).

Please note the following:

The switching elements on the motor side must be dimensioned for with the maximum occurring load.



# Information on electrical installation

Connection to the IT system

## Connection to the IT system

### NOTICE

Internal components have earth/ground potential

Possible consequence: The monitoring devices of the IT system will be triggered.

- ▶ Upstream an isolation transformer.
- ▶ Before connection to an IT system be absolutely sure to remove the screws labeled with "IT" on the product.

I55AE125x, I55AE137x	I55AE155x, I55AE175x, I55AE211x, I55AE215x, I55AE222x, I55BE230x, I55BE240x
	
I55AE230F, I55AE240C, I55AE240F, I55AE255C, I55AE255F, I55AE275F, I55BE275F, I55AE311F, I55BE311F	
	

# Information on electrical installation

## Connection of motor temperature monitoring



I55AE315F, I55AE318F, I55AE322F	I55AE330F, I55AE337F, I55AE345F
<b>I55AE355F, I55AE375F, I55AE390F, I55AE411F</b>	

## Connection of motor temperature monitoring



If the terminal X109 is used, e. g. to connect an external PTC thermistor (PTC) or a thermal contact, ensure at least one basic insulation to the potentials of motor, mains and control terminals to not restrict the safe separation of the control terminals.



# Information on electrical installation

Brake resistor connection

## Brake resistor connection

### NOTICE

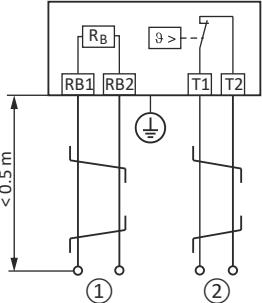
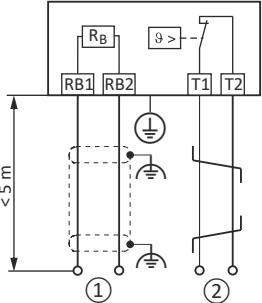
#### Overload

Overload can destroy the brake resistor.

- ▶ Protect the brake resistor of the inverter against overload with suitable parameterization.
- ▶ The thermostat of the brake resistor can be used to establish a safety shutdown to disconnect the controller from the mains.



Use intrinsically safe brake resistors to be able to dispense with a separate switch-off device (e.g. a contactor).

Short connection cables up to 0.5 m	Long connection cables up to max. 5 m
<p>Up to a cable length of 0.5 m, the cable for the brake resistor and that of the temperature monitoring can be twisted. Doing so reduces problems due to EMC interference.</p> 	<p>The cable of the brake resistor must be shielded. The maximum length is 5 m. Twisting is sufficient for the temperature monitoring cable.</p> 

① Wiring to the "brake resistor" connection on the inverter or another component with brake chopper.  
 ② Optional: Wiring to a control contact that is set to monitor the thermal contact.  
 If the thermal contact responds, the voltage supply to the inverter must be disconnected (e.g. switch off the control of the mains contactor).

## Control connections



In case of long cables and/or high interference the effect of the shielding can be improved. To do this, connect the shield of cables for the analog inputs and outputs at one end of the cable via a capacitor with PE potential (e. g. 10 nF/250 V).

Connection description		Control terminals	Relay output	PTC input
Connection		X3	X9	X109
Connection type		Pluggable	Pluggable	Pluggable
Max. cable cross-section	mm <sup>2</sup>	1.5	1.5	1.5
Max. cable cross-section	AWG	16	14	14
Stripping length	mm	9	6	6
Stripping length	in	0.35	0.2	0.2
Required tool		Screwdriver 0.4 x 2.5		

# Information on electrical installation

## Networks



When planning networks, please observe the following recommendations for trouble-free operation, especially in the event of Ethernet-based networks.

- Lay communication cables separately from power cables. Maintain as large a distance as possible to the motor cables which are subject to interference.
- To avoid compensating currents via the shielding of the communication cable, install an independent, low-impedance equipotential bonding over the shortest possible distance parallel to the communication cable. This applies in particular to long cables.
- CAT5 cables according to specification establish the shield connection via the RJ45 plug connection. Additional shield connections are not required.
- Cables must comply with CAT5 and be suitable for  $\geq 10$  Mbps.
- Only certified, tested and fully assembled patch cables from well-known manufacturers are recommended.
- Observe bending radii according to manufacturer information. Minimum bending radii of  $10 \times$  cable diameter or  $20 \times$  diameter for frequent manipulation of the cables are standard.
- RJ45 plug connections only function properly if they are not subjected to mechanical stress or lateral forces.
- Patch cables of 25 cm length are suitable for the network connection of inverters  $\leq 4$  kW installed side by side. When wiring from right to left, a sufficient bending radius can be maintained.
- Fix longer cables 30 cm after the connection point.



# Information on electrical installation

Networks  
CANopen

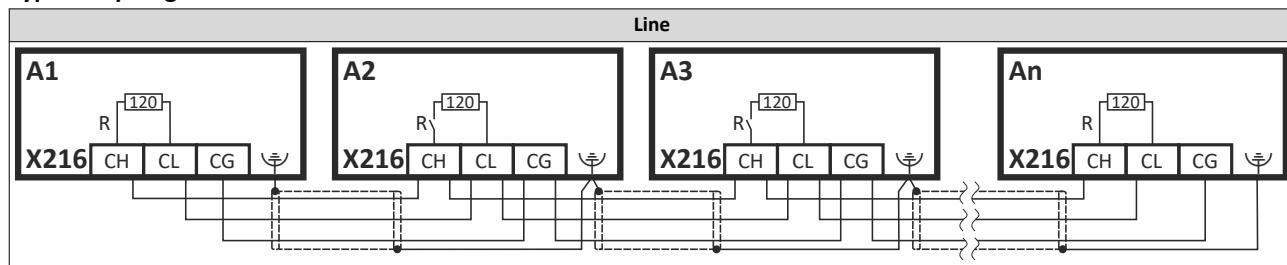
## CANopen



The network must be terminated with a  $120\ \Omega$  resistor at the first and last physical node.

Set the "R" DIP switch to ON at these network nodes.

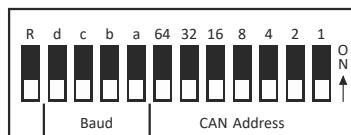
## Typical topologies



Connection description		CANopen
Connection	X216	X216
Connection type		Pluggable
Max. cable cross-section	mm <sup>2</sup>	2.5
Max. cable cross-section	AWG	12
Stripping length	mm	10
Stripping length	in	0.39
Required tool		Screwdriver 0.4 x 2.5

## Basic network settings

Use the DIP switch to set the node address and baud rate and to activate the integrated bus terminating resistor.



Bus termination	Baud rate					CAN node address								
	R	d	c	b	a	64	32	16	8	4	2	1		
<b>OFF</b>	OFF	ON	OFF	ON		20 kbit/s					<b>OFF</b>	<b>OFF</b>		
Inactive	OFF	OFF	ON	ON		50 kbit/s					Value from parameter			
<b>ON</b>	OFF	OFF	ON	OFF		125 kbit/s					Node address - example:			
Active	OFF	OFF	OFF	ON		250 kbit/s					<b>OFF</b>	<b>OFF</b>		
	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>		Value from parameter (500 kbit/s)					Node address = 16 + 4 + 2 + 1 = 23			
	OFF	ON	OFF	OFF		1 Mbit/s								
	All other combinations					Value from parameter (500 kbit/s)								

**Bold print** = default setting

# Information on electrical installation



Networks  
Modbus RTU

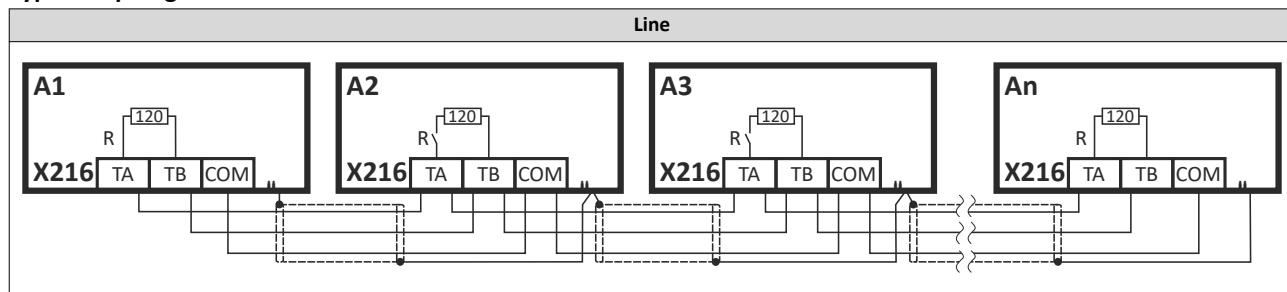
## Modbus RTU



The network must be terminated with a  $120\ \Omega$  resistor at the first and last physical node.

Set the "R" DIP switch to ON at these network nodes.

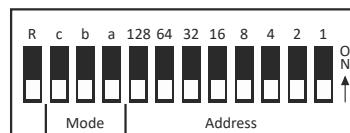
### Typical topologies



Connection description			Modbus RTU	
Connection			X216	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	
Max. cable cross-section	AWG		12	
Stripping length	mm		10	
Stripping length	in		0.39	
Required tool			Screwdriver 0.4 x 2.5	

### Basic network settings

Use the DIP switch to set the node address and baud rate and to activate the integrated bus terminating resistor.



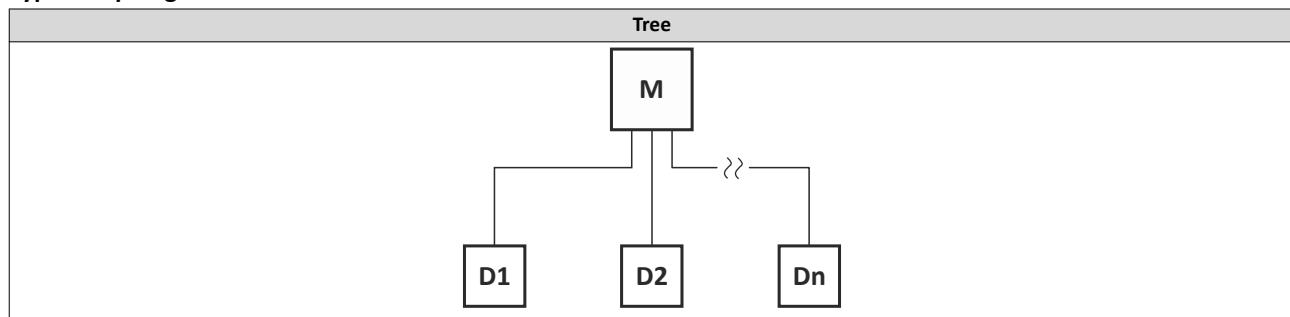
Bus termination		Baud rate			Parity			Modbus node address																		
R	c	b	OFF	a	OFF	OFF	128	64	32	16	8	4	2	1												
<b>OFF</b>	n. c	<b>OFF</b>		<b>OFF</b>		<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>												
Inactive	.	Automatic detection			Automatic detection			Value from parameter																		
ON		ON			ON			Node address - example:																		
Active		Value from parameter			Value from parameter			OFF OFF OFF ON OFF ON ON ON																		
		Node address = 16 + 4 + 2 + 1 = 23																								
		Node address > 247: Value from parameter																								

**Bold print** = default setting



IO-Link

Typical topologies



M Master

D Device

Connection description			IO-Link
Connection			X316
Connection type			Pluggable
Max. cable cross-section	mm <sup>2</sup>		2.5
Max. cable cross-section	AWG		12
Stripping length	mm		10
Stripping length	in		0.39
Required tool			Screwdriver 0.4 x 2.5

# Information on electrical installation

Networks  
PROFIBUS



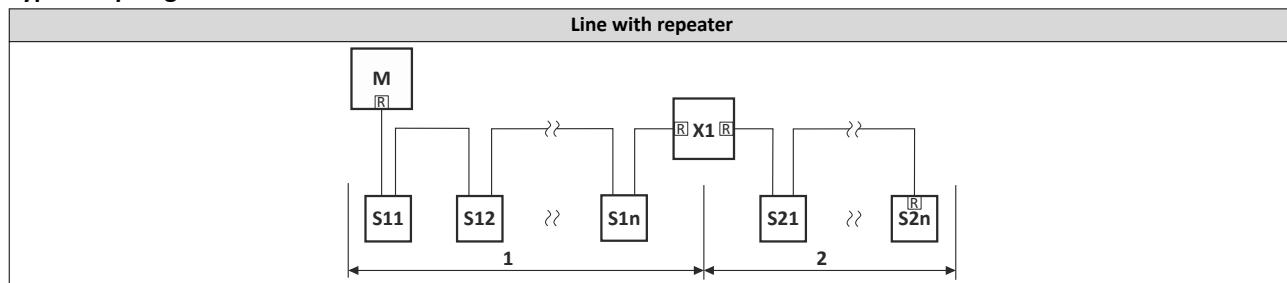
## PROFIBUS



The network must be terminated with a resistor at the physically first and last node.

Activate the bus terminating resistor at these nodes in the bus connection plug.

### Typical topologies



M Master

S Slave

X Repeater

R Activated bus terminating resistor

### Sub D socket 9-pin - X226

View	Pin	Assignment	Description
	1	Shield	Additional shield connection
	2	n.c.	
	3	RxD/TxD-P	Data line-B (received data/transmitted data +)
	4	RTS	Request To Send (received data/transmitted data, no differential signal)
	5	M5V2	Reference potential (bus terminating resistor -)
	6	P5V2	5 V DC / 30 mA (bus terminating resistor +, OLM, OLP)
	7	n.c.	
	8	RxD/TxD-N	Data line-A (received data/transmitted data -)
	9	n.c.	

### Basic network settings

Use the DIP switch to set the station address.

The baud rate is detected automatically.



PROFIBUS station address							
<b>64</b>	<b>32</b>	<b>16</b>	<b>8</b>	<b>4</b>	<b>2</b>	<b>1</b>	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Value from parameter							
Station address - example:							
OFF	OFF	ON	OFF	ON	ON	ON	ON
Station address = 16 + 4 + 2 + 1 = 23							
Do not set station address = 126 and station address = 127. These station addresses are invalid.							

**Bold print** = default setting

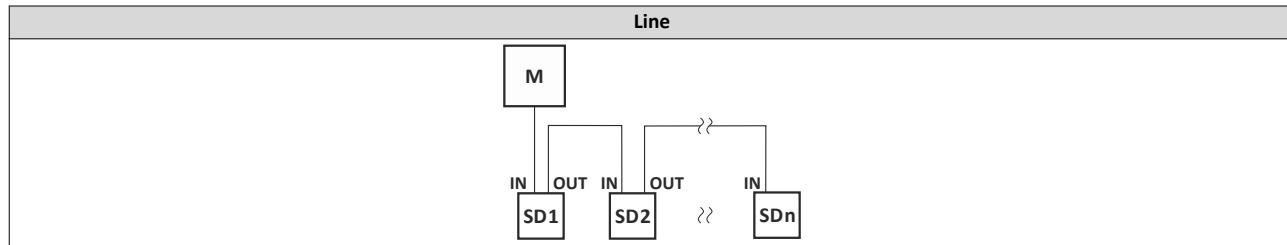


# Information on electrical installation

Networks  
EtherCAT

## EtherCAT

### Typical topologies



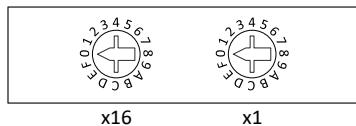
M Master

SD Slave Device

Connection description			EtherCAT	
Connection			X246	X247
Connection type			RJ45	

### Basic network settings

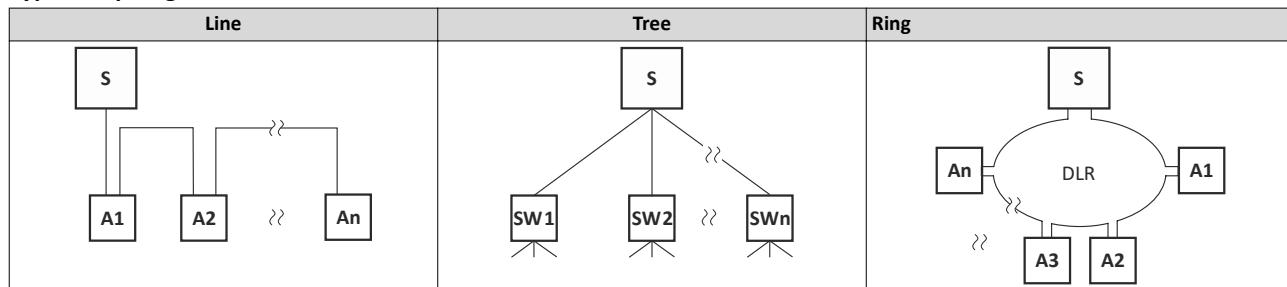
The rotary encoder switch allows you to set an EtherCAT identifier.



Setting	Identifier
0x00	Value from parameter
0x01 ... 0xFF	Switch position

## EtherNet/IP

### Typical topologies



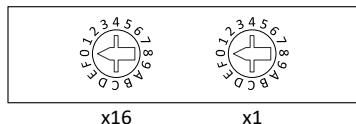
S Scanner

A Adapter

Connection description			EtherNet/IP	
Connection			X266	X267
Connection type			RJ45	

### Basic network settings

The rotary encoder switch allows you to set the last byte of the IP address.



Setting	Value of last byte	Resulting IP address
0x00	Value from parameter	Value from parameter
0x01 ... 0xFE	Switch position	192.168.124.<switch position>
0xFF	Default setting	192.168.124.16

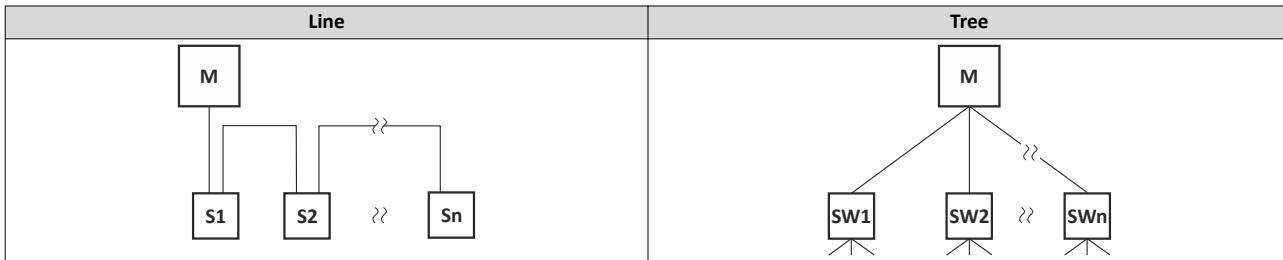
# Information on electrical installation

Networks  
Modbus TCP



## Modbus TCP

### Typical topologies



M Master

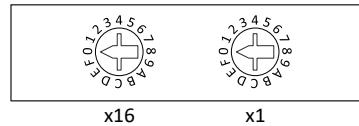
S Slave

SW Switch

Connection description			Modbus TCP	
Connection	X276	X277		
Connection type		RJ45		

### Basic network settings

The rotary encoder switch allows you to set the last byte of the IP address.



Setting	Value of last byte	Resulting IP address
0x00	Value from parameter	Value from parameter
0x01 ... 0xFE	Switch position	192.168.124.<switch position>
0xFF	Default setting	192.168.124.16

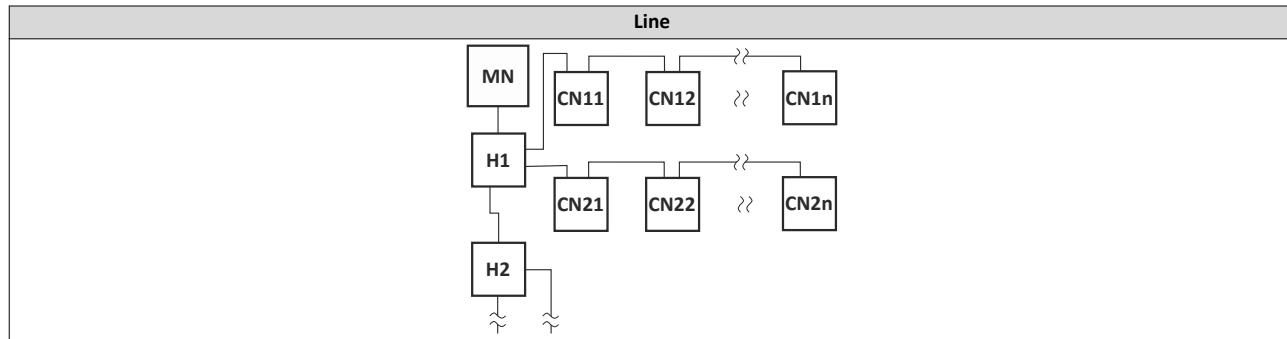


# Information on electrical installation

Networks  
POWERLINK

## POWERLINK

### Typical topologies



MN Managing Node

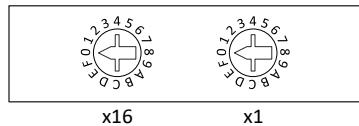
H Hub

CN Controlled Node

Connection description			POWERLINK
Connection		X286	X287
Connection type		RJ45	

### Basic network settings

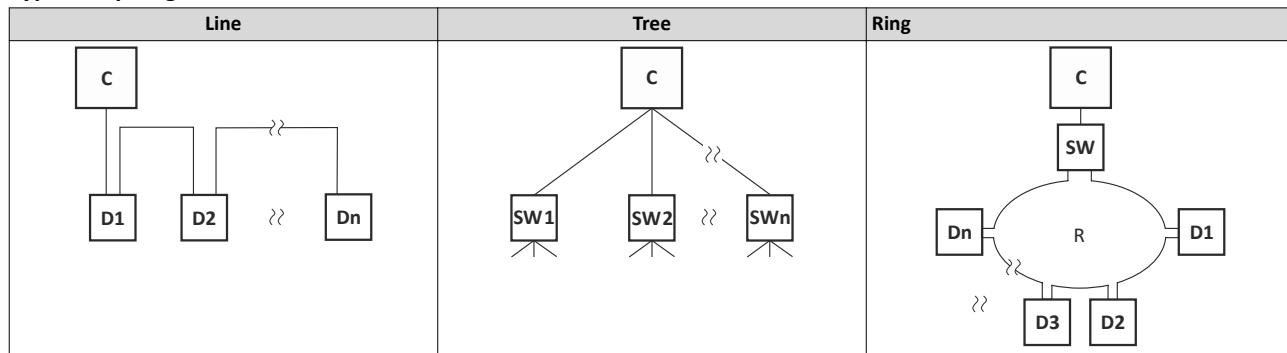
The rotary encoder switch allows you to set the node address (last byte of the IP address).



Setting	Node address	Resulting IP address
0x00	Value from parameter	192.168.100.<parameter value>
0x01 ... 0xEF	Switch position	192.168.100.<switch position>

## PROFINET

### Typical topologies



C IO controller

D IO device

SW Switch SCALANCE (MRP capable)

R Redundant domain

Connection description			PROFINET
Connection		X256	X257
Connection type		RJ45	



The rotary encoder switch has no function.

# Information on electrical installation

## Functional safety



### Functional safety

#### **DANGER!**

Improper installation of the safety engineering system can cause an uncontrolled starting action of the drives.

Possible consequence: Death or severe injuries

- ▶ Safety engineering systems may only be installed and commissioned by qualified personnel.
- ▶ The complete wiring must be designed in accordance with EMC requirements.
- ▶ All control components (switch, relay, PLC, ...) must comply with the requirements of EN ISO 13849–1 and the EN ISO 13849–2.
- ▶ Switches, relays with at least IP54 degree of protection.
- ▶ Always mount devices with a degree of protection lower than IP54 in control cabinets with a minimum degree of protection of IP54.
- ▶ The wiring must be shielded.
- ▶ It is essential to use insulated wire end ferrules for wiring.
- ▶ All safety-relevant cables outside the control cabinet must be protected, e.g. by means of a cable duct.
- ▶ Ensure that no short circuits can occur according to the specifications of the EN ISO 13849–2.
- ▶ All further requirements and measures can be obtained from the EN ISO 13849–1 and the EN ISO 13849–2.
- ▶ If an external force acts upon the drive axes, additional brakes are required. Please observe that hanging loads are subject to the force of gravity!
- ▶ For safety-related braking functions, use safety-rated brakes only.
- ▶ The user has to ensure that the inverter will only be used in its intended application within the specified environmental conditions. This is the only way to comply with the declared safety-related characteristics.

#### **DANGER!**

Automatic restart if the request of the safety function is deactivated.

Possible consequences: Death or severe injuries

- ▶ You must provide external measures according to EN ISO 13849–1 which ensure that the drive only restarts after a confirmation.

#### **NOTICE**

Overvoltage

Destruction of the safety component

- ▶ Make sure that the maximum voltage (maximum rated) at the safe inputs does not exceed 30 V DC.

#### **NOTICE**

Excessively high humidity or condensation

Malfunction or destruction of the safety component

- ▶ Only commission the safety component when it has acclimated.



## Information on electrical installation

Functional safety  
Basic Safety - STO

### Basic Safety - STO

#### **DANGER!**

With the "Safe torque off" (STO) function, no "emergency stop" can be executed according to EN IEC 60204-1 without additional measures. There is no electrical isolation between the motor and inverter and no service switch or maintenance switch!

Possible consequences: Death or severe injuries

- "Emergency stop" requires safe isolation,

## Information on electrical installation

## Functional safety Basic Safety - STO

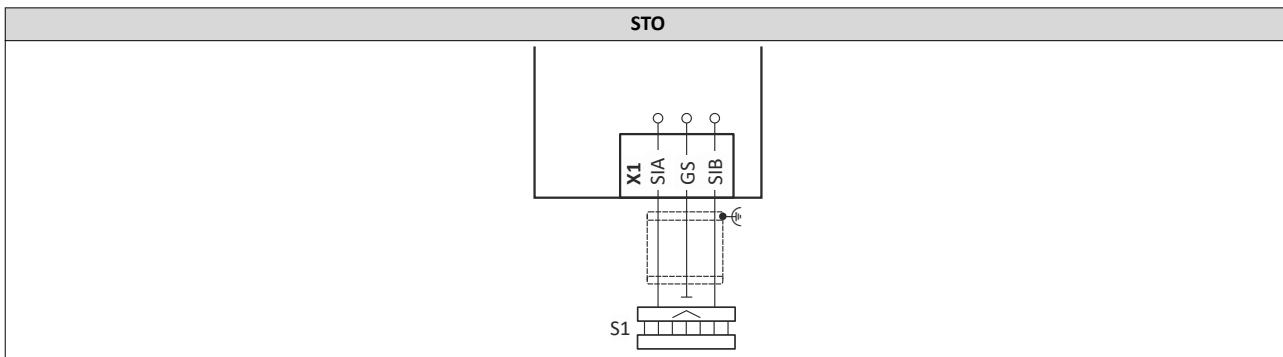


## Connection diagram



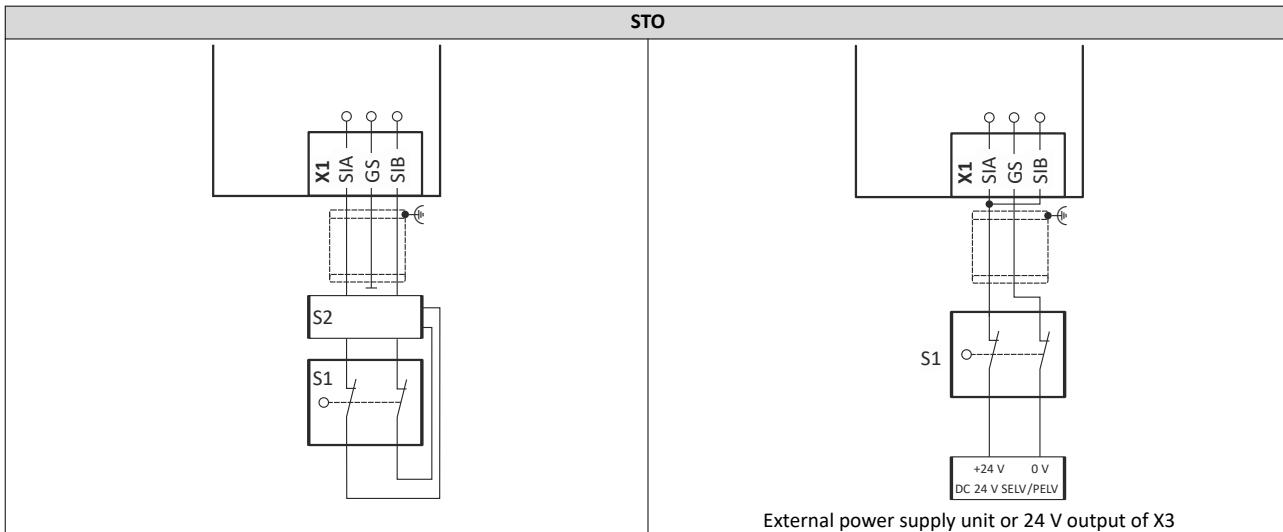
The connection diagrams shown are only example circuits. The user is responsible for the correct safety-related design and selection of the components!

## Active sensors



## S1 Active sensor - example of lightgrid

## Passive sensors



- S1 Passive sensor
- S2 Safety switching device

## S1 Passive sensor

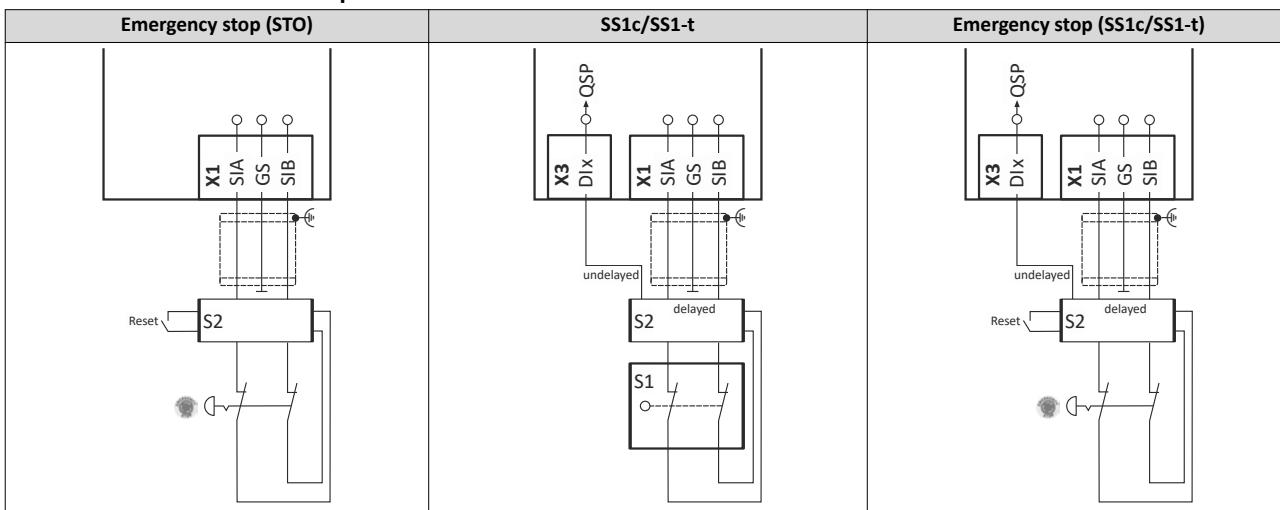


## Information on electrical installation

Functional safety

Basic Safety - STO

## Passive sensors - further examples



## S2 Safety switching device

- S1 Passive sensor
- S2 Safety switching device with delayed contacts

S2 Safety switching device with delayed contacts

## Terminal data

X1	Specification	Unit	min.	typ.	max.
SIA, SIB	LOW signal	V	-3	0	+5
	HIGH signal	V	+15	+24	+30
	Switch-on time	ms		3	
	Clear time	ms		50	60
	Input current SIA	mA		10	14
	Input current SIB	mA		7	12
	Input peak current	mA		100	
	Test pulse duration	ms			1
	Test pulse interval	ms	10		
GS	Reference potential for SIA and SIB				

Connection description		Basic Safety - STO
Connection		X1
Connection type		Pluggable
Max. cable cross-section	mm <sup>2</sup>	1.5
Max. cable cross-section	AWG	16
Stripping length	mm	9
Stripping length	in	0.35
Required tool		Screwdriver 0.4 x 2.5

# Technical data

Standards and operating conditions  
Conformities and approvals



## Technical data

### Standards and operating conditions

#### Conformities and approvals

Conformities			
CE	2009/125/EC		Ecodesign Directive
	2011/65/EU		RoHS Directive
	2014/30/EU		EMC Directive (reference: CE-typical drive system)
	2014/35/EU		Low-Voltage Directive
EAC	TP TC 020/2011		Eurasian conformity: Electromagnetic compatibility of technical means
	TR TC 004/2011		Eurasian conformity: Safety of low voltage equipment
UKCA	S.I. 2008/1597		The Supply of Machinery (Safety) Regulations 2008
	S.I. 2012/3032		The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
	S.I. 2016/1091		The Electromagnetic Compatibility Regulations 2016
	S.I. 2021/745		The Ecodesign for Energy-Related Products and Energy Information Regulations 2021
Approvals			
UL	UL 61800-5-1		File No. E132659 for USA and Canada (requirements of the CSA 22.2 No. 274)

#### Protection of persons and device protection

Degree of protection			Data applies to operationally ready mounted state and not in wire range of terminals
EN	EN IEC 60529	IP20	
NEMA	NEMA 250	Type 1	protection against accidental contact only
Insulation resistance			
Overvoltage category	EN IEC 61800-5-1	II	>2000 m amsl
		III	0 ... 2000 m amsl
Isolation of control circuits			
	EN IEC 61800-5-1	Safe mains isolation	double/reinforced insulation
Leakage current			
AC	EN IEC 61800-5-1	> 3.5 mA	Observe regulations and safety instructions!
DC		> 10 mA	
Starting current			
		≤ 3 x rated mains current	
Protective measures			
Earth fault strength			Earth-fault protected depending on operating status
Motor stalling protection			
Short-circuit strength			
Overvoltage resistance			
Motor overtemperature			PTC or thermal contact, $I^2xt$ monitoring



### EMC data

Operation on public supply systems			The machine or system manufacturer is responsible for compliance with the requirements for the machine/system!
> 1 kW, mains current ≤ 16 A	EN IEC 61000-3-2	no additional measures	
< 1 kW		with mains choke	
Mains current > 16 A	EN IEC 61000-3-12	With mains choke or mains filter	When designed for rated power.
Noise emission			
Category C1	EN IEC 61800-3		see rated data
Category C2			
Category C3			
Noise immunity			
	EN IEC 61800-3	Requirements fulfilled	

### Motor connection

Requirements for the shielded motor cable			
Capacitance per unit length		< 150/300 pF/m	≥ 4 mm <sup>2</sup> / AWG 12
		< 75/150 pF/m	≤ 2.5 mm <sup>2</sup> / AWG 14
Electric strength	UL	Uo/U = 0.6/1.0 kV	U = r.m.s. value from external conductor to external conductor
			Uo = r.m.s. value external conductor to PE
	UL	U ≥ 600 V	U = r.m.s. value from external conductor to external conductor

### Environmental conditions

Energy efficiency			
High Efficiency	EN IEC 61800-9-2	Class IE2	
Climate			
Storage	EN 60721-3-1:1997	1K3 (-25 ... +60 °C)	
Transport	EN 60721-3-2:1997	2K3 (-25 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-10 ... +60 °C)	Operation at a switching frequency of 2 or 4 kHz: Above +45°C: reduce rated output current by 2.5 %/°C
			Operation at a switching frequency of 8 or 16 kHz: Above +40°C: reduce rated output current by 2.5 %/°C
		3C3	For chemically active substances
		3S2	For mechanically active substances
Site altitude			
0 ... 1000 m amsl			without current derating
1000 ... 4000 m amsl			Reduce rated output current by 5 %/1000 m
Pollution			
	EN IEC 61800-5-1	Degree of pollution 2	
Vibration resistance			
Transport	EN 60721-3-2:1997	2M2 (sine, shock)	in original packaging up to 45 kW
Operation	DNVGL-CG-0339		up to 11 kW
		Amplitude 1 mm	5 ... 13.2 Hz up to 11 kW
		acceleration resistant up to 0.7 g	13.2 ... 100 Hz up to 11 kW
	EN IEC 61800-5-1	Amplitude 0.075 mm	10 ... 57 Hz
		acceleration resistant up to 1 g	57 ... 150 Hz

# Technical data

Standards and operating conditions  
Electrical supply conditions



## Electrical supply conditions

Power systems		
IT		Apply the measures described for IT systems!
TN		IT systems not relevant for UL-approved systems
TT		Voltage to earth: max. 300 V

The connection to different supply forms enables a worldwide application of the inverters.

The following is supported:

- 1-phase mains connection 120 V [82](#)
- 1-phase mains connection 230/240 V [87](#)
- 3-phase mains connection 230/240 V [97](#)
- 3-phase mains connection 230/240 V "Light Duty" [104](#)
- 3-phase mains connection 400 V [107](#)
- 3-phase mains connection 400 V "Light Duty" [121](#)
- 3-phase mains connection 480 V [131](#)
- 3-phase mains connection 480 V "Light Duty" [145](#)



## Technical data

Standards and operating conditions  
Certification of the integrated safety

### Certification of the integrated safety

The certification of the integrated safety is based on these test fundamentals:

- EN ISO 13849-1: Safety of machinery – Safety-related parts of control systems – Part 1
- EN IEC 60204-1: Safety of machinery – Electrical equipment of machines – Part 1
- EN IEC 61508, Part 1-7: Functional safety of electrical/electronic/programmable electronic safety-related systems
- EN IEC 61800-3: Electric variable-speed drives – Part 3: EMC requirements including specific test procedures
- EN IEC 61800-5-1: Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy requirements
- EN IEC 61800-5-2: Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional safety
- EN IEC 62061: Safety of machinery – Functional safety of safety-related electrical/electronic/programmable electronic systems



Declarations of Conformity and certificates can be found on the Internet.

[www.Lenze.com](http://www.Lenze.com)

## Technical data

1-phase mains connection 120 V

Rated data



### 1-phase mains connection 120 V



The inverters i550-Cxxx/120-1 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.



**Technical data**  
1-phase mains connection 120 V  
Rated data

Inverter			i550-C0.25/120-1	i550-C0.37/120-1	i550-C0.75/120-1	i550-C1.1/120-1	
<b>Rated power</b>	P <sub>rated</sub>	kW	0.25	0.37	0.75	1.1	
<b>Rated power</b>	P <sub>rated</sub>	hp	0.33	0.5	1	1.5	
Mains voltage range			1/PE AC 90 V ... 132 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 230/240 V				
Rated mains current							
without mains choke	A		6.8	9.6	16.8	22.9	
with mains choke	A		6	8.5	14.7	17.1	
Apparent output power	kVA		0.6	0.9	1.6	2.2	
Rated output current							
2 kHz	A		1.7	2.4	4.2	6	
4 kHz	A		1.7	2.4	4.2	6	
8 kHz	A		1.7	2.4	4.2	6	
16 kHz	A		1.1	1.6	2.8	4	
Power loss							
2 kHz	W		15	19	29	39	
4 kHz	W		16	21	29	40	
8 kHz	W		18	23	35	47	
16 kHz	W		20	24	36	45	
Overcurrent cycle 180 s							
Max. output current	A		2.6	3.6	6.3	9	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		1.3	1.8	3.2	4.5	
Overcurrent cycle 15 s							
Max. output current	A		3.4	4.8	8.4	12	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		1.3	1.8	3.2	4.5	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		2.2		8.3		
Min. brake resistance	Ω		180		47		
Max. motor cable length shielded							
without EMC category	m			50			
Category C1 (2 kHz, 4 kHz, 8 kHz)	m			-			
Category C2 (2 kHz, 4 kHz, 8 kHz)	m			-			
Category C3 (2 kHz, 4 kHz, 8 kHz)	m			-			
Max. motor cable length unshielded							
without EMC category	m			100			

## Technical data

1-phase mains connection 120 V

Fusing data



### Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current	mA	Type
			kA			kA		
i550-C0.25/120-1	5	gG/gL, gRL	16	5	B, C	16	≥30	Typ B
i550-C0.37/120-1	5	gG/gL, gRL	16	5	B, C	16	≥30	Typ B
i550-C0.75/120-1	5	gG/gL, gRL	32	5	B, C	32	≥30	Typ B
i550-C1.1/120-1	5	gG/gL, gRL	32	5	B, C	32	≥30	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49



## Technical data

1-phase mains connection 120 V  
Terminal data

### Terminal data

Rated power	P <sub>rated</sub>	kW	0.25 ... 0.37	0.75 ... 1.1
<b>Connection description</b>			<b>Mains connection</b>	
<b>Connection</b>			<b>X100</b>	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	6
Max. cable cross-section	AWG		12	10
Stripping length	mm		8	8
Stripping length	in		0.3	0.3
Tightening torque	Nm		0.5	0.7
Tightening torque	lb-in		4.4	6.2
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5
Rated power	P <sub>rated</sub>	kW	<b>0.25 ... 1.1</b>	
<b>Connection description</b>			<b>PE connection</b>	
<b>Terminal type</b>			<b>Schraube</b>	
Max. cable cross-section	mm <sup>2</sup>		6	
Max. cable cross-section	AWG		10	
Stripping length	mm		10	
Stripping length	in		0.4	
Tightening torque	Nm		2	
Tightening torque	lb-in		18	
Required tool			Torx key 20	
Rated power	P <sub>rated</sub>	kW	<b>0.25 ... 1.1</b>	
<b>Connection description</b>			<b>Motor connection</b>	
<b>Connection</b>			<b>X105</b>	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	
Max. cable cross-section	AWG		12	
Stripping length	mm		8	
Stripping length	in		0.3	
Tightening torque	Nm		0.5	
Tightening torque	lb-in		4.4	
Required tool			Screwdriver 0.5 x 3.0	

The terminal data for the terminal X1 can be found under: ▶ Terminal data 77

### Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
					mm	kg
i550-C0.25/120-1	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.25/120-1	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.37/120-1	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.37/120-1	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.75/120-1	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C0.75/120-1	ERBP047R200W	47	200	30	240 x 42 x 122	1.0
i550-C1.1/120-1	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C1.1/120-1	ERBS047R400W	47	400	60	400 x 114 x 105	2.3

## Technical data

1-phase mains connection 120 V  
Mains chokes



### Mains chokes

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
		A	mH	mm	kg	
i550-C0.25/120-1			9	5	82 x 66 x 75	1.1
i550-C0.37/120-1	ELN1-0500H009	1				
i550-C0.75/120-1			18	2.5	90 x 96 x 96	2.1
i550-C1.1/120-1	ELN1-0250H018					



## 1-phase mains connection 230/240 V



When selecting the inverters, please note:

The inverters i550-Cxxx/230-1 have an integrated RFI filter in the AC mains supply.

The inverters i550-Cxxx/230-2 **do not have** an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.

# Technical data

1-phase mains connection 230/240 V

Rated data



Inverter			i550-C0.25/230-1	i550-C0.25/230-2	i550-C0.37/230-1	i550-C0.37/230-2				
Rated power	P <sub>rated</sub>	kW	0.25		0.37					
Rated power	P <sub>rated</sub>	hp	0.33		0.5					
Mains voltage range			1/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz							
Output voltage			3 AC 0 - 230/240 V							
Rated mains current										
without mains choke	A		4		5.7					
with mains choke	A		3.6		4.8					
Apparent output power	kVA		0.6		0.9					
Rated output current										
2 kHz	A		-							
4 kHz	A		1.7		2.4					
8 kHz	A		1.7		2.4					
16 kHz	A		1.1		1.6					
Power loss										
2 kHz	W		-							
4 kHz	W		15		18					
8 kHz	W		15		20					
16 kHz	W		19		24					
Overcurrent cycle 180 s										
Max. output current	A	2.6	2.6	3.6	3.6	3.6				
Overload time	T <sub>1</sub>	s	60	60	60	60				
Recovery time	T <sub>2</sub>	s	120	120	120	120				
Max. output current during the recovery time	A	1.3	1.3	1.8	1.8	1.8				
Overcurrent cycle 15 s										
Max. output current	A	3.4	3.4	4.8	4.8	4.8				
Overload time	T <sub>1</sub>	s	3	3	3	3				
Recovery time	T <sub>2</sub>	s	12	12	12	12				
Max. output current during the recovery time	A	1.3	1.3	1.8	1.8	1.8				
Cyclic mains switching			3 times per minute							
Brake chopper										
Max. output current	A		2.2							
Min. brake resistance	Ω		180							
Max. motor cable length shielded										
without EMC category	m		50							
Category C1 (2 kHz, 4 kHz, 8 kHz)	m	3	-	3	3	-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m	15	-	15	15	-				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m	15	-	15	15	-				
Max. motor cable length unshielded										
without EMC category	m	80	100	80	80	100				



**Technical data**  
1-phase mains connection 230/240 V  
Rated data

Inverter			i550-C0.55/230-1	i550-C0.55/230-2	i550-C0.75/230-1	i550-C0.75/230-2
<b>Rated power</b>	P <sub>rated</sub>	kW		<b>0.55</b>		<b>0.75</b>
<b>Rated power</b>	P <sub>rated</sub>	hp		<b>0.75</b>		<b>1</b>
Mains voltage range				1/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz		
Output voltage				3 AC 0 - 230/240 V		
Rated mains current						
without mains choke	A		7.6		10	
with mains choke	A		7.1		8.8	
Apparent output power	kVA		1.2		1.6	
Rated output current						
2 kHz	A		3.2		4.2	
4 kHz	A		3.2		4.2	
8 kHz	A		3.2		4.2	
16 kHz	A		2.1		2.8	
Power loss						
2 kHz	W		22		27	
4 kHz	W		23		29	
8 kHz	W		25		33	
16 kHz	W		30		38	
Overcurrent cycle 180 s						
Max. output current	A	4.8	4.8	6.3	6.3	
Overload time	T <sub>1</sub>	s	60	60	60	60
Recovery time	T <sub>2</sub>	s	120	120	120	120
Max. output current during the recovery time	A	2.4	2.4	3.2	3.2	
Overcurrent cycle 15 s						
Max. output current	A	6.4	6.4	8.4	8.4	
Overload time	T <sub>1</sub>	s	3	3	3	3
Recovery time	T <sub>2</sub>	s	12	12	12	12
Max. output current during the recovery time	A	2.4	2.4	3.2	3.2	
Cyclic mains switching			3 times per minute			
Brake chopper						
Max. output current	A		3.9			
Min. brake resistance	Ω		100			
Max. motor cable length shielded						
without EMC category	m		50			
Category C1 (2 kHz, 4 kHz, 8 kHz)	m	3	-	3	-	
Category C2 (2 kHz, 4 kHz, 8 kHz)	m	20	-	20	-	
Category C3 (2 kHz, 4 kHz, 8 kHz)	m	50	-	50	-	
Max. motor cable length unshielded						
without EMC category	m		100			

# Technical data

1-phase mains connection 230/240 V

Rated data



Inverter			i550-C1.1/230-1	i550-C1.1/230-2	i550-C1.5/230-1	i550-C1.5/230-2			
Rated power	P <sub>rated</sub>	kW	1.1		1.5				
Rated power	P <sub>rated</sub>	hp	1.5		2				
Mains voltage range			1/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz						
Output voltage			3 AC 0 - 230/240 V						
Rated mains current									
without mains choke	A		14.3		16.7				
with mains choke	A		11.9		13.9				
Apparent output power	kVA		2.2		2.6				
Rated output current									
2 kHz	A		6		7				
4 kHz	A		6		7				
8 kHz	A		6		7				
16 kHz	A		4		4.7				
Power loss									
2 kHz	W		36		41				
4 kHz	W		37		43				
8 kHz	W		42		50				
16 kHz	W		51		59				
Overcurrent cycle 180 s									
Max. output current	A		9	9	10.5	10.5			
Overload time	T <sub>1</sub>	s	60	60	60	60			
Recovery time	T <sub>2</sub>	s	120	120	120	120			
Max. output current during the recovery time	A		4.5	4.5	5.3	5.3			
Overcurrent cycle 15 s									
Max. output current	A		12	12	14	14			
Overload time	T <sub>1</sub>	s	3	3	3	3			
Recovery time	T <sub>2</sub>	s	12	12	12	12			
Max. output current during the recovery time	A		4.5	4.5	5.3	5.3			
Cyclic mains switching			3 times per minute						
Brake chopper									
Max. output current	A		12						
Min. brake resistance	Ω		33						
Max. motor cable length shielded									
without EMC category	m		50						
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3	-	3	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20	-	20	-			
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	-	35	-			
Max. motor cable length unshielded									
without EMC category	m		100						



**Technical data**  
1-phase mains connection 230/240 V  
Rated data

Inverter			i550-C2.2/230-1	i550-C2.2/230-2
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>kW</b>	2.2	
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>hp</b>		3
Mains voltage range			1/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage			3 AC 0 - 230/240 V	
Rated mains current				
without mains choke	A		22.5	
with mains choke	A		16.9	
Apparent output power		kVA		3.6
Rated output current				
2 kHz	A		9.6	
4 kHz	A		9.6	
8 kHz	A		9.6	
16 kHz	A		6.4	
Power loss				
2 kHz	W		54	
4 kHz	W		60	
8 kHz	W		70	
16 kHz	W		78	
Overcurrent cycle 180 s				
Max. output current	A		14.4	14.4
Overload time	T <sub>1</sub>	s	60	60
Recovery time	T <sub>2</sub>	s	120	120
Max. output current during the recovery time	A		7.2	7.2
Overcurrent cycle 15 s				
Max. output current	A		19.2	19.2
Overload time	T <sub>1</sub>	s	3	3
Recovery time	T <sub>2</sub>	s	12	12
Max. output current during the recovery time	A		7.2	7.2
Cyclic mains switching			3 times per minute	
Brake chopper				
Max. output current	A		12	
Min. brake resistance	Ω		33	
Max. motor cable length shielded				
without EMC category	m		50	
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3	-
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20	-
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	-
Max. motor cable length unshielded				
without EMC category	m		100	

# Technical data

1-phase mains connection 230/240 V

Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current	mA	Type
			kA			kA		
i550-C0.25/230-1	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.25/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.37/230-1	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.37/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.55/230-1	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.55/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.75/230-1	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.75/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.1/230-1	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C1.1/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C1.5/230-1	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C1.5/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C2.2/230-1	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C2.2/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49



**Technical data**  
1-phase mains connection 230/240 V  
Terminal data

**Terminal data**

Rated power	P <sub>rated</sub>	kW	0.25 ... 0.75	1.1 ... 2.2
<b>Connection description</b>			<b>Mains connection</b>	
<b>Connection</b>			<b>X100</b>	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	6
Max. cable cross-section	AWG		12	10
Stripping length	mm		8	8
Stripping length	in		0.3	0.3
Tightening torque	Nm		0.5	0.7
Tightening torque	lb-in		4.4	6.2
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5

Rated power	P <sub>rated</sub>	kW	0.25 ... 2.2	
<b>Connection description</b>			<b>PE connection</b>	
<b>Terminal type</b>			<b>Schraube</b>	
Max. cable cross-section	mm <sup>2</sup>		6	
Max. cable cross-section	AWG		10	
Stripping length	mm		10	
Stripping length	in		0.4	
Tightening torque	Nm		2	
Tightening torque	lb-in		18	
Required tool			Torx key 20	

Rated power	P <sub>rated</sub>	kW	0.25 ... 2.2	
<b>Connection description</b>			<b>Motor connection</b>	
<b>Connection</b>			<b>X105</b>	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	
Max. cable cross-section	AWG		12	
Stripping length	mm		8	
Stripping length	in		0.3	
Tightening torque	Nm		0.5	
Tightening torque	lb-in		4.4	
Required tool			Screwdriver 0.5 x 3.0	

The terminal data for the terminal X1 can be found under: ▶ Terminal data □ 77

# Technical data

1-phase mains connection 230/240 V

Brake resistors



## Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C0.25/230-1	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.25/230-1	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.37/230-1	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.37/230-1	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.55/230-1	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.55/230-1	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C0.75/230-1	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.75/230-1	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C1.1/230-1	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.1/230-1	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C1.5/230-1	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.5/230-1	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C2.2/230-1	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C2.2/230-1	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C0.25/230-2	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.25/230-2	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.37/230-2	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.37/230-2	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.55/230-2	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.55/230-2	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C0.75/230-2	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.75/230-2	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C1.1/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.1/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C1.5/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.5/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C2.2/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C2.2/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4

## Mains chokes

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
i550-C0.25/230-1	ELN1-0900H005	1	5	9	82 x 66 x 75	1.1
			9	5		
			18	2.5	90 x 96 x 96	
i550-C1.1/230-1	ELN1-0250H018	1				2.1
i550-C0.25/230-2	ELN1-0900H005	1				
i550-C0.37/230-1						
i550-C0.37/230-2						
i550-C0.55/230-1						
i550-C0.55/230-2	ELN1-0500H009	1				
i550-C0.75/230-1						
i550-C0.75/230-2						
i550-C1.1/230-1						
i550-C1.1/230-2	ELN1-0250H018	1				
i550-C1.5/230-1						
i550-C1.5/230-2						
i550-C2.2/230-1						
i550-C2.2/230-2	ELN1-0250H018	1				
i550-C2.2/230-2						



## Technical data

1-phase mains connection 230/240 V  
RFI filters / Mains filters

### RFI filters / Mains filters

Basic information on RFI filters, mains filters and EMC: from [211](#)



EMC filters can be used both in the side structure and in the substructure.

### Maximum motor cable lengths with residual current device (RCD)

Mains connection			1-phase, 230 V		
Inverter		i550-C0.25/230-1 i550-C0.37/230-1	i550-C0.55/230-1 i550-C0.75/230-1	i550-C1.1/230-1 i550-C1.5/230-1 i550-C2.2/230-1	
Without RFI filter					
without EMC category Thermal limitation	Max. motor cable length shielded	m	50	50	50
	Max. motor cable length unshielded	m	100	100	200
With integrated RFI filter					
Category C1	Max. motor cable length shielded	m	3	3	3
Category C2		m	15	20	20
	Earth-leakage circuit breaker (optional)	mA	30	30	30
RFI filter Low Leakage					
Category C1	Max. motor cable length shielded	m	5	5	5
	Earth-leakage circuit breaker (optional)	mA	10	10	10
RFI filter Short Distance					
Category C1	Max. motor cable length shielded	m	25	25	25
Category C2		m	50	50	50
	Earth-leakage circuit breaker (optional)	mA	30	30	30
RFI filter Long Distance					
Category C1	Max. motor cable length shielded	m	50	50	50
Category C2		m	50	50	50
	Earth-leakage circuit breaker (optional)	mA	300	300	300

### Short distance filter

Inverter	Filter					Max. motor cable length shielded		
	Order code	Rated current A	Dimensions (H x W x D)		Weight kg	C1	C2	C3
			mm	mm		m	m	m
i550-C0.25/230-1	IOFAE175B100S0000S	10	276 x 60 x 50	276 x 60 x 50	0.77	25	50	-
i550-C0.37/230-1	IOFAE175B100S0000S	10	276 x 60 x 50	276 x 60 x 50	0.77	25	50	-
i550-C0.55/230-1	IOFAE175B100S0000S	10	276 x 60 x 50	276 x 60 x 50	0.77	25	50	-
i550-C0.75/230-1	IOFAE175B100S0000S	10	276 x 60 x 50	276 x 60 x 50	0.77	25	50	-
i550-C1.1/230-1	IOFAE222B100S0000S	22.5	346 x 60 x 50	346 x 60 x 50	1.02	25	50	-
i550-C1.5/230-1	IOFAE222B100S0000S	22.5	346 x 60 x 50	346 x 60 x 50	1.02	25	50	-
i550-C2.2/230-1	IOFAE222B100S0000S	22.5	346 x 60 x 50	346 x 60 x 50	1.02	25	50	-

## Technical data

1-phase mains connection 230/240 V

RFI filters / Mains filters



### Long distance filter

Inverter	Filter				Max. motor cable length shielded		
	Order code	Rated current	Dimensions (H x W x D)	Weight	C1	C2	C3
			mm		kg	m	m
i550-C0.25/230-1	IOFAE175B100D0000S	10	276 x 60 x 50	0.82	50	50	-
i550-C0.37/230-1	IOFAE175B100D0000S	10	276 x 60 x 50	0.82	50	50	-
i550-C0.55/230-1	IOFAE175B100D0000S	10	276 x 60 x 50	0.82	50	50	-
i550-C0.75/230-1	IOFAE175B100D0000S	10	276 x 60 x 50	0.82	50	50	-
i550-C1.1/230-1	IOFAE222B100D0000S	22.5	346 x 60 x 50	1.09	50	50	-
i550-C1.5/230-1	IOFAE222B100D0000S	22.5	346 x 60 x 50	1.09	50	50	-
i550-C2.2/230-1	IOFAE222B100D0000S	22.5	346 x 60 x 50	1.09	50	50	-



### 3-phase mains connection 230/240 V



The inverters i550-Cxxx/230-3 and i550-Cxxx/230-2 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.

# Technical data

3-phase mains connection 230/240 V

Rated data



Inverter			i550-C0.25/230-2	i550-C0.37/230-2	i550-C0.55/230-2	i550-C0.75/230-2	
Rated power	P <sub>rated</sub>	kW	0.25	0.37	0.55	0.75	
Rated power	P <sub>rated</sub>	hp	0.33	0.5	0.75	1	
Mains voltage range			3/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 230/240 V				
Rated mains current							
without mains choke	A		2.6	3.9	4.8	6.4	
with mains choke	A		2	3	3.8	5.1	
Apparent output power	kVA		0.6	0.9	1.2	1.6	
Rated output current							
2 kHz	A		-		3.2	4.2	
4 kHz	A		1.7	2.4	3.2	4.2	
8 kHz	A		1.7	2.4	3.2	4.2	
16 kHz	A		1.1	1.6	2.1	2.8	
Power loss							
2 kHz	W		-		22	27	
4 kHz	W		15	18	23	29	
8 kHz	W		15	20	25	33	
16 kHz	W		19	24	30	38	
Overcurrent cycle 180 s							
Max. output current	A		2.6	3.6	4.8	6.3	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		1.3	1.8	2.4	3.2	
Overcurrent cycle 15 s							
Max. output current	A		3.4	4.8	6.4	8.4	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		1.3	1.8	2.4	3.2	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		2.2		3.9		
Min. brake resistance	Ω		180		100		
Max. motor cable length shielded							
without EMC category	m		50				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		-				
Max. motor cable length unshielded							
without EMC category	m		100				



**Technical data**  
3-phase mains connection 230/240 V  
Rated data

Inverter			i550-C1.1/230-2	i550-C1.5/230-2	i550-C2.2/230-2	i550-C4.0/230-3	
<b>Rated power</b>	P <sub>rated</sub>	kW	1.1	1.5	2.2	4	
<b>Rated power</b>	P <sub>rated</sub>	hp	1.5	2	3	5	
Mains voltage range			3/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 230/240 V				
Rated mains current							
without mains choke	A		7.8	9.5	13.6	20.6	
with mains choke	A		5.6	6.8	9.8	15.7	
Apparent output power	kVA		2.2	2.6	3.6	6.4	
Rated output current							
2 kHz	A		6	7	9.6	16.5	
4 kHz	A		6	7	9.6	16.5	
8 kHz	A		6	7	9.6	16.5	
16 kHz	A		4	4.7	6.4	11	
Power loss							
2 kHz	W		36	41	54	113	
4 kHz	W		37	43	60	115	
8 kHz	W		42	50	70	130	
16 kHz	W		51	59	78	116	
Overcurrent cycle 180 s							
Max. output current	A		9	10.5	14.4	24.8	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		4.5	5.3	7.2	12.4	
Overcurrent cycle 15 s							
Max. output current	A		12	14	19.2	33	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		4.5	5.3	7.2	12.4	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		12			26	
Min. brake resistance	Ω		33			15	
Max. motor cable length shielded							
without EMC category	m		50				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		-				
Max. motor cable length unshielded							
without EMC category	m		100				

# Technical data

3-phase mains connection 230/240 V

Rated data



Inverter			i550-C5.5/230-3
Rated power	P <sub>rated</sub>	kW	5.5
Rated power	P <sub>rated</sub>	hp	7.5
Mains voltage range			3/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz
Output voltage			3 AC 0 - 230/240 V
Rated mains current			
without mains choke	A		28.8
with mains choke	A		21.9
Apparent output power		kVA	8.7
Rated output current			
2 kHz	A		23
4 kHz	A		23
8 kHz	A		23
16 kHz	A		15.3
Power loss			
2 kHz	W		166
4 kHz	W		175
8 kHz	W		195
16 kHz	W		159
Overcurrent cycle 180 s			
Max. output current	A		34.5
Overload time	T <sub>1</sub>	s	60
Recovery time	T <sub>2</sub>	s	120
Max. output current during the recovery time		A	17.3
Overcurrent cycle 15 s			
Max. output current	A		46
Overload time	T <sub>1</sub>	s	3
Recovery time	T <sub>2</sub>	s	12
Max. output current during the recovery time		A	17.3
Cyclic mains switching			3 times per minute
Brake chopper			
Max. output current	A		26
Min. brake resistance	Ω		15
Max. motor cable length shielded			
without EMC category	m		50
Category C1 (2 kHz, 4 kHz, 8 kHz)		m	-
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-
Max. motor cable length unshielded			
without EMC category	m		100



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
			kA					mA
i550-C0.25/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.37/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.55/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.75/230-2	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.1/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C1.5/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C2.2/230-2	65	gG/gL, gRL	32	65	B, C	32	≥30	Typ B
i550-C4.0/230-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C5.5/230-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49

# Technical data

3-phase mains connection 230/240 V  
Terminal data



## Terminal data

Rated power	P <sub>rated</sub>	kW	0.25 ... 0.75	1.1 ... 2.2	4 ... 5.5
<b>Connection description</b>			<b>Mains connection</b>		
<b>Connection</b>			<b>X100</b>		
Connection type			Pluggable		Non-pluggable
Max. cable cross-section	mm <sup>2</sup>		2.5	6	6
Max. cable cross-section	AWG		12	10	10
Stripping length	mm		8	8	9
Stripping length	in		0.3	0.3	0.35
Tightening torque	Nm		0.5	0.7	0.5
Tightening torque	lb-in		4.4	6.2	4.4
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5	

Rated power	P <sub>rated</sub>	kW	0.25 ... 5.5	
<b>Connection description</b>			<b>PE connection</b>	
<b>Terminal type</b>			<b>Schraube</b>	
Max. cable cross-section	mm <sup>2</sup>		6	
Max. cable cross-section	AWG		10	
Stripping length	mm		10	
Stripping length	in		0.4	
Tightening torque	Nm		2	
Tightening torque	lb-in		18	
Required tool			Torx key 20	

Rated power	P <sub>rated</sub>	kW	0.25 ... 2.2	4 ... 5.5
<b>Connection description</b>			<b>Motor connection</b>	
<b>Connection</b>			<b>X105</b>	
Connection type			Pluggable	
Max. cable cross-section	mm <sup>2</sup>		2.5	6
Max. cable cross-section	AWG		12	10
Stripping length	mm		8	9
Stripping length	in		0.3	0.35
Tightening torque	Nm		0.5	0.5
Tightening torque	lb-in		4.4	4.4
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5

The terminal data for the terminal X1 can be found under: ▶ Terminal data 77



**Technical data**  
3-phase mains connection 230/240 V  
Brake resistors

**Brake resistors**

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C0.25/230-2	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.25/230-2	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.37/230-2	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28
i550-C0.37/230-2	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C0.55/230-2	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.55/230-2	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C0.75/230-2	ERBM100R086W	100	86	3.4	110 x 80 x 28	0.49
i550-C0.75/230-2	ERBM100R150W	100	150	22.5	238 x 80 x 59	0.54
i550-C1.1/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.1/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C1.5/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C1.5/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C2.2/230-2	ERBP033R200W	33	200	30	240 x 42 x 122	1.0
i550-C2.2/230-2	ERBP033R300W	33	300	45	320 x 42 x 122	1.4
i550-C4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6
i550-C5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C5.5/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6

**Mains chokes**

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
			A	mH	mm	kg
i550-C0.25/230-2	EZAELN3002B153	3	2	14.7	56 x 77 x 100	0.53
i550-C0.37/230-2	EZAELN3004B742		4	7.35	60 x 95 x 117	1.31
i550-C0.55/230-2	EZAELN3006B492		6	4.9	69 x 95 x 117	1.45
i550-C1.1/230-2	EZAELN3008B372		8	3.68	85 x 120 x 140	1.9
i550-C1.5/230-2	EZAELN3010B292		10	2.94		2
i550-C2.2/230-2	EZAELN3016B182		16	1.84	95 x 120 x 140	2.7
i550-C4.0/230-3	EZAELN3025B122		25	1.18	110 x 155 x 170	5.8

## Technical data

3-phase mains connection 230/240 V "Light Duty"

Rated data



### 3-phase mains connection 230/240 V "Light Duty"



The inverters i550-Cxxx/230-3 do not have an integrated RFI filter in the AC mains supply.

In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Ambient temperature above 40 °C with a rated output current reduced by 2.5 %/°C.
- If the load characteristic "Light Duty" and the switching frequencies 8 kHz or 16 kHz are selected, only the values of the load characteristic "Heavy Duty" are reached.



## Technical data

3-phase mains connection 230/240 V "Light Duty"  
Rated data

Inverter			i550-C4.0/230-3	i550-C5.5/230-3
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>kW</b>	<b>5.5</b>	<b>7.5</b>
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>hp</b>	<b>7.5</b>	<b>10</b>
Mains voltage range			3/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage			3 AC 0 - 230/240 V	
Rated mains current				
without mains choke	A		25.8	-
with mains choke	A		18.9	24.2
Apparent output power	kVA		8	10.5
Rated output current				
2 kHz	A		20.6	27.6
4 kHz	A		20.6	27.6
8 kHz	A		-	
16 kHz	A		-	
Power loss				
2 kHz	W		124	190
4 kHz	W		131	200
8 kHz	W		-	
16 kHz	W		-	
Overcurrent cycle 180 s				
Max. output current	A		24.8	34.5
Overload time	T <sub>1</sub>	s	60	60
Recovery time	T <sub>2</sub>	s	120	120
Max. output current during the recovery time	A		12.4	17.3
Overcurrent cycle 15 s				
Max. output current	A		33	46
Overload time	T <sub>1</sub>	s	3	3
Recovery time	T <sub>2</sub>	s	12	12
Max. output current during the recovery time	A		12.4	17.3
Cyclic mains switching			3 times per minute	
Brake chopper				
Max. output current	A		26	
Min. brake resistance	Ω		15	
Max. motor cable length shielded				
without EMC category	m		50	
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-	
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		-	
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		-	
Max. motor cable length unshielded				
without EMC category	m		100	

# Technical data

3-phase mains connection 230/240 V "Light Duty"  
Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
							kA	A
i550-C4.0/230-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C5.5/230-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49

## Terminal data

See "3-phase mains connection 230/240 V" ▶ Terminal data 102

The terminal data for the terminal X1 can be found under: ▶ Terminal data 77

## Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
		Ω	W	kWs	mm	kg
i550-C4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6
i550-C5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C5.5/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6

## Mains chokes

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
i550-C4.0/230-3	EZAELN3016B182		A	mH	mm	kg
i550-C5.5/230-3	EZAELN3025B122	3	16	1.84	95 x 120 x 140	2.7
			25	1.18	110 x 155 x 170	5.8



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### 3-phase mains connection 400 V

#### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.

# Technical data

3-phase mains connection 400 V

Rated data



Inverter			i550-C0.37/400-3	i550-C0.55/400-3	i550-C0.75/400-3	i550-C1.1/400-3	
Rated power	P <sub>rated</sub>	kW	0.37	0.55	0.75	1.1	
Rated power	P <sub>rated</sub>	hp	0.5	0.75	1	1.5	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A		1.8	2.5	3.3	4.4	
with mains choke	A		1.4	2	2.6	3	
Apparent output power	kVA		0.9	1.2	1.6	2.2	
Rated output current							
2 kHz	A		-	1.8	2.4	3.2	
4 kHz	A		1.3	1.8	2.4	3.2	
8 kHz	A		1.3	1.8	2.4	3.2	
16 kHz	A		0.9	1.2	1.6	2.1	
Power loss							
2 kHz	W		-	24	30	38	
4 kHz	W		20	25	32	40	
8 kHz	W		24	31	40	51	
16 kHz	W		24	31	40	51	
Overcurrent cycle 180 s							
Max. output current	A		2	2.7	3.6	4.8	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		1	1.4	1.8	2.4	
Overcurrent cycle 15 s							
Max. output current	A		2.6	3.6	4.8	6.4	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		1	1.4	1.8	2.4	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		2			5.2	
Min. brake resistance	Ω		390			150	
Max. motor cable length shielded							
without EMC category	m		15	50			
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		15	20			
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		15	20			35
Max. motor cable length unshielded							
without EMC category	m		40	80			100



**Technical data**  
3-phase mains connection 400 V  
Rated data

Inverter			i550-C1.5/400-3	i550-C2.2/400-3	i550-C3.0/400-3	i550-C4.0/400-3			
<b>Rated power</b>	P <sub>rated</sub>	kW	1.5	2.2	3	4			
<b>Rated power</b>	P <sub>rated</sub>	hp	2	3	4	5			
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz						
Output voltage			3 AC 0 - 400/480 V						
Rated mains current									
without mains choke	A		5.4	7.8	9.6	12.5			
with mains choke	A		3.7	5.3	6.9	9			
Apparent output power	kVA		2.6	3.8	4.9	6.4			
Rated output current									
2 kHz	A		3.9	5.6	7.3	9.5			
4 kHz	A		3.9	5.6	7.3	9.5			
8 kHz	A		3.9	5.6	7.3	9.5			
16 kHz	A		2.6	3.7	4.9	6.3			
Power loss									
2 kHz	W		45	62	79	102			
4 kHz	W		48	66	85	110			
8 kHz	W		61	85	110	140			
16 kHz	W		61	85	109	140			
Overcurrent cycle 180 s									
Max. output current	A		5.9	8.4	11	14.3			
Overload time	T <sub>1</sub>	s	60	60	60	60			
Recovery time	T <sub>2</sub>	s	120	120	120	120			
Max. output current during the recovery time	A		2.9	4.2	5.5	7.1			
Overcurrent cycle 15 s									
Max. output current	A		7.8	11.2	14.6	19			
Overload time	T <sub>1</sub>	s	3	3	3	3			
Recovery time	T <sub>2</sub>	s	12	12	12	12			
Max. output current during the recovery time	A		2.9	4.2	5.5	7.1			
Cyclic mains switching			3 times per minute						
Brake chopper									
Max. output current	A		5.2		9.5	16.6			
Min. brake resistance	Ω		150		82	47			
Max. motor cable length shielded									
without EMC category	m		50						
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20						
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35						
Max. motor cable length unshielded									
without EMC category	m		100						

# Technical data

3-phase mains connection 400 V

Rated data



Inverter			i550-C5.5/400-3	i550-C7.5/400-3	i550-C11/400-3	i550-C15/400-3	
Rated power	P <sub>rated</sub>	kW	5.5	7.5	11	15	
Rated power	P <sub>rated</sub>	hp	7.5	10	15	20	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A		17.2	20	28.4	38.7	
with mains choke	A		12.4	15.7	22.3	28.8	
Apparent output power	kVA		8.7	11	16	22	
Rated output current							
2 kHz	A		13	16.5	23.5	32	
4 kHz	A		13	16.5	23.5	32	
8 kHz	A		13	16.5	23.5	32	
16 kHz	A		8.7	11	15.7	21.3	
Power loss							
2 kHz	W		137	172	242	340	
4 kHz	W		145	185	260	360	
8 kHz	W		190	240	340	460	
16 kHz	W		189	238	337	469	
Overcurrent cycle 180 s							
Max. output current	A		19.5	25	35	48	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		9.8	12.4	17.6	24	
Overcurrent cycle 15 s							
Max. output current	A		26	33	47	64	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		9.8	12.4	17.6	24	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		16.6	29	43		
Min. brake resistance	Ω		47	27	18		
Max. motor cable length shielded							
without EMC category	m		100				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	50	35		
Max. motor cable length unshielded							
without EMC category	m		200				



**Technical data**  
3-phase mains connection 400 V  
Rated data

Inverter			i550-C18/400-3	i550-C22/400-3	i550-C30/400-3	i550-C37/400-3	
<b>Rated power</b>	P <sub>rated</sub>	kW	18.5	22	30	37	
<b>Rated power</b>	P <sub>rated</sub>	hp	25	30	40	50	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A		48.4	-			
with mains choke	A		36	42	54.9	68	
Apparent output power	kVA		27	32	41	51	
Rated output current							
2 kHz	A		40	47	61	76	
4 kHz	A		40	47	61	76	
8 kHz	A		40	47	61	76	
16 kHz	A		26.6	31.3	40.6	50.6	
Power loss							
2 kHz	W		420	491	639	790	
4 kHz	W		450	520	680	840	
8 kHz	W		570	670	880	1100	
16 kHz	W		581	680	884	1095	
Overcurrent cycle 180 s							
Max. output current	A		60	71	92	114	
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A		30	35	46	57	
Overcurrent cycle 15 s							
Max. output current	A		80	94	122	152	
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A		30	35	46	57	
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		52	-	104		
Min. brake resistance	Ω		15	-	7.5		
Max. motor cable length shielded							
without EMC category	m		100				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				
Max. motor cable length unshielded							
without EMC category	m		200				

# Technical data

3-phase mains connection 400 V

Rated data



Inverter			i550-C45/400-3	i550-C55/400-3	i550-C75/400-3	i550-C90/400-3				
Rated power	P <sub>rated</sub>	kW	45	55	75	90				
Rated power	P <sub>rated</sub>	hp	60	75	100	125				
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz							
Output voltage			3 AC 0 - 400/480 V							
Rated mains current										
without mains choke	A		-							
with mains choke	A		80	99	135	168				
Apparent output power	kVA		60	75	100	121				
Rated output current										
2 kHz	A		89	110	150	180				
4 kHz	A		89	110	150	180				
8 kHz	A		89	110	150	162				
16 kHz	A		59.3	73.3	100	108				
Power loss										
2 kHz	W		920	1137	1539	1841				
4 kHz	W		980	1210	1640	1961				
8 kHz	W		1280	1580	2140	2312				
16 kHz	W		1278	1579	2143	2312				
Overcurrent cycle 180 s										
Max. output current	A		134	165	225	270				
Overload time	T <sub>1</sub>	s	60	60	60	60				
Recovery time	T <sub>2</sub>	s	120	120	120	120				
Max. output current during the recovery time	A		67	83	113	135				
Overcurrent cycle 15 s										
Max. output current	A		178	220	300	360				
Overload time	T <sub>1</sub>	s	3	3	3	3				
Recovery time	T <sub>2</sub>	s	12	12	12	12				
Max. output current during the recovery time	A		67	83	113	135				
Cyclic mains switching			3 times per minute	Once per minute						
Brake chopper										
Max. output current	A		104	166	275					
Min. brake resistance	Ω		7.5	4.7	2.4					
Max. motor cable length shielded										
without EMC category	m		100	200						
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-							
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20							
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	100						
Max. motor cable length unshielded										
without EMC category	m		200	300						



**Technical data**  
3-phase mains connection 400 V  
Rated data

Inverter			i550-C110/400-3
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>kW</b>	<b>110</b>
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>hp</b>	<b>150</b>
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz
Output voltage			3 AC 0 - 400/480 V
Rated mains current			
without mains choke	A		-
with mains choke	A		198
Apparent output power		kVA	142
Rated output current			
2 kHz	A		212
4 kHz	A		212
8 kHz	A		191
16 kHz	A		127
Power loss			
2 kHz	W		2163
4 kHz	W		2305
8 kHz	W		2717
16 kHz	W		2717
Overcurrent cycle 180 s			
Max. output current	A		318
Overload time	T <sub>1</sub>	s	60
Recovery time	T <sub>2</sub>	s	120
Max. output current during the recovery time		A	159
Overcurrent cycle 15 s			
Max. output current	A		424
Overload time	T <sub>1</sub>	s	3
Recovery time	T <sub>2</sub>	s	12
Max. output current during the recovery time		A	159
Cyclic mains switching			Once per minute
Brake chopper			
Max. output current	A		275
Min. brake resistance	Ω		2.4
Max. motor cable length shielded			
without EMC category	m		200
Category C1 (2 kHz, 4 kHz, 8 kHz)		m	-
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	100
Max. motor cable length unshielded			
without EMC category	m		300

# Technical data

3-phase mains connection 400 V

Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-C0.37/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.55/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.75/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.1/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.5/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C2.2/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C3.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C4.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C5.5/400-3	65	gG/gL, gRL	25	65	B, C	25	≥300	Typ B
i550-C7.5/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C11/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C15/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C18/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C22/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C30/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C37/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C45/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C55/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C75/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C90/400-3	22	gR	300	10	B, C	300	≥300	Typ B
i550-C110/400-3	22	gR	300	10	B, C	300	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49



Please note that from 22 kW onwards a mains choke must always be used.



## Technical data

3-phase mains connection 400 V  
Terminal data

### Terminal data

Rated power	P <sub>rated</sub>	kW	0.37 ... 2.2	3 ... 4	5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75	90 ... 110
<b>Connection description</b>										
<b>Connection</b>										
Connection type			Pluggable		Non-pluggable					
Max. cable cross-section		mm <sup>2</sup>	2.5	4	6	16	35	50	95	150
Max. cable cross-section		AWG	12	10	10	6	2	1/0	4/0	-
Stripping length		mm	8	8	9	11	18	19	22	28
Stripping length		in	0.3	0.3	0.35	0.43	0.7	0.75	0.87	1.1
Tightening torque		Nm	0.5	0.6	0.5	1.2	3.8	4	10	18
Tightening torque		lb-in	4.4	5.3	4.4	11	34	35	89	160
Required tool			Screwdriver 0.5 x 3.0		Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 5.5	Hex key 5.0	Hex key 6.0	Hex key 8.0

Rated power	P <sub>rated</sub>	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 75	90 ... 110		
<b>Connection description</b>									
<b>Terminal type</b>									
Max. cable cross-section		mm <sup>2</sup>	6	16	35	25	150		
Max. cable cross-section		AWG	10	6	2	2	300 kcmil		
Stripping length		mm	10	11	16	16	-		
Stripping length		in	0.4	0.4	0.6	0.6	-		
Tightening torque		Nm	2	3.4	4	4	10		
Tightening torque		lb-in	18	30	35	35	89		
Required tool			Torx key 20				Crosstip screwdriver PZ2		Wrench size 13

Rated power	P <sub>rated</sub>	kW	0.37 ... 4	5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75	90 ... 110
<b>Connection description</b>									
<b>Connection</b>									
Connection type			Pluggable	Non-pluggable					
Max. cable cross-section		mm <sup>2</sup>	2.5	6	16	35	50	95	150
Max. cable cross-section		AWG	12	10	6	2	1/0	4/0	-
Stripping length		mm	8	9	11	18	19	22	28
Stripping length		in	0.3	0.35	0.43	0.7	0.75	0.87	1.1
Tightening torque		Nm	0.5	0.5	1.2	3.8	4	10	18
Tightening torque		lb-in	4.4	4.4	11	34	35	89	160
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 5.5	Hex key 5.0	Hex key 6.0	Hex key 8.0

The terminal data for the terminal X1 can be found under: ▶ Terminal data 77

# Technical data

3-phase mains connection 400 V

Brake resistors



## Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C0.37/400-3	ERBM470R020W	470	20	3	160 x 40 x 36	0.34
i550-C0.37/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C0.55/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C0.75/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C1.1/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C1.1/400-3	ERBP180R300W	180	300	45	320 x 42 x 122	1.4
i550-C1.5/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1
i550-C2.2/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C2.2/400-3	ERBP180R300W	180	300	45	320 x 42 x 122	1.4
i550-C2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1
i550-C5.5/400-3	ERBP047R200W	47	200	30	240 x 42 x 122	1.0
i550-C5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C15/400-3	ERBP018R300W	18	300	45	320 x 42 x 122	1.4
i550-C15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3
i550-C15/400-3	ERBG018R04K3	18	4300	645	302 x 486 x 426	13.5
i550-C18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C18/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C22/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C30/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C37/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C45/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C55/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C75/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C90/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C110/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C3.0/400-3	ERBM082R150W	82	150	22.5	238 x 80 x 59	0.70
i550-C3.0/400-3	ERBP082R200W	82	200	30	240 x 42 x 122	1.0
i550-C3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6
i550-C4.0/400-3	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C7.5/400-3	ERBP027R200W	27	200	30	240 x 42 x 122	1.0
i550-C7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3
i550-C11/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C11/400-3	ERBS027R01K2	27	1200.00	180	1020 x 114 x 105	5.6
i550-C11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3



**Technical data**  
3-phase mains connection 400 V  
Mains chokes

**Mains chokes**

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
			A	mH	mm	kg
i550-C0.37/400-3	EZAELN3002B203	3	1.5	19.6	56 x 77 x 100	0.52
i550-C0.55/400-3	EZAELN3002B153		2	14.7		0.53
i550-C0.75/400-3			4	7.35	60 x 95 x 117	1.31
i550-C1.1/400-3	EZAELN3004B742		6	4.9	69 x 95 x 117	1.45
i550-C1.5/400-3			8	3.68	85 x 120 x 140	1.9
i550-C2.2/400-3	EZAELN3006B492		10	2.94		2
i550-C3.0/400-3	EZAELN3008B372		16	1.84	95 x 120 x 140	2.7
i550-C4.0/400-3	EZAELN3010B292		25	1.18	110 x 155 x 170	5.8
i550-C5.5/400-3	EZAELN3016B182		30	0.98	111 x 155 x 170	5.85
i550-C7.5/400-3			40	0.74	102 x 185 x 195	6.8
i550-C11/400-3	EZAELN3025B122		45	0.65	112 x 185 x 200	8.25
i550-C15/400-3	EZAELN3030B981		63	0.47	122 x 185 x 210	9.65
i550-C18/400-3	EZAELN3040B741		80	0.37	125 x 210 x 240	12.5
i550-C22/400-3	EZAELN3045B651		100	0.3	154 x 267 x 205	16.3
i550-C30/400-3	EZAELN3063B471		160	0.19	189 x 291 x 215	22.1
i550-C37/400-3	EZAELN3080B371		180	0.17	184 x 316 x 235	25
i550-C45/400-3			200	0.15	160 x 352 x 265	

# Technical data

3-phase mains connection 400 V  
RFI filters / Mains filters



## RFI filters / Mains filters

Basic information on RFI filters, mains filters and EMC: from [211](#)



EMC filters can be used both in the side structure and in the substructure.

### Maximum motor cable lengths with residual current device (RCD)

Mains connection			3-phase, 400 V/480 V			
Inverter			i550-C0.37/400-3	i550-C0.55/400-3 i550-C0.75/400-3	i550-C1.1/400-3 i550-C1.5/400-3 i550-C2.2/400-3 i550-C3.0/400-3 i550-C4.0/400-3	i550-C5.5/400-3
Without RFI filter						
Without EMC category Thermal limitation	Max. Shielded motor cable length	m	15	50	50	100
	Max. Unshielded motor cable length	m	30	100	200	200
With integrated RFI filter						
Category C1	Max. Shielded motor cable length	m	3	3	-	-
Category C2	Max. Unshielded motor cable length	m	15	20	20	20
	RCD (optional)	mA	30	30	30	300
RFI filter Low Leakage						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
	RCD (optional)	mA	-	-	-	-
RFI filter Short Distance						
Category C1	Max. Shielded motor cable length	m	15	25	25	25
Category C2		m	15	50	50	50
	RCD (optional)	mA	30	30	30	30
RFI filter Long Distance						
Category C1	Max. Shielded motor cable length	m	15	50	50	50
Category C2		m	15	50	50	100
	RCD (optional)	mA	300	300	300	300



## Technical data

3-phase mains connection 400 V  
RFI filters / Mains filters

Mains connection			3-phase, 400 V/480 V			
Inverter			i550-C7.5/400-3 i550-C11/400-3	i550-C15/400-3 i550-C18/400-3 i550-C22/400-3	i550-C30/400-3 i550-C37/400-3 i550-C45/400-3	i550-C55/400-3 i550-C75/400-3 i550-C90/400-3 i550-C110/400-3
Without RFI filter						
Without EMC category	Max. Shielded motor cable length	m	100	100	100	100
	Thermal limitation	m	200	200	200	200
With integrated RFI filter						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
Category C2		m	20	20	20	20
	RCD (optional)	mA	300	300	300	300
RFI filter Low Leakage						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
	RCD (optional)	mA	-	-	-	-
RFI filter Short Distance						
Category C1	Max. Shielded motor cable length	m	25	-	-	-
Category C2		m	50	-	-	-
	RCD (optional)	mA	30	-	-	-
RFI filter Long Distance						
Category C1	Max. Shielded motor cable length	m	50	50	50	50
Category C2		m	100	100	100	100
	RCD (optional)	mA	300	300	300	300

From i550-C22/400-3, long distance mains filters are used. Mains filters are a combination of mains choke and RFI filter.

### Short distance filter

Inverter	Filter					Max. motor cable length shielded		
	Order code	Rated current	Dimensions (H x W x D)		Weight	C1	C2	C3
			A	mm		m	m	
i550-C0.37/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	15	15	-
i550-C0.55/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	25	50	-
i550-C0.75/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	25	50	-
i550-C1.1/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C1.5/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C2.2/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C5.5/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C15/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90	436 x 202 x 90	7.1	-	50	-
i550-C3.0/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C4.0/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C7.5/400-3	IOFAE311F100S0000S	29	371 x 120 x 60	371 x 120 x 60	2.35	25	50	-
i550-C11/400-3	IOFAE311F100S0000S	29	371 x 120 x 60	371 x 120 x 60	2.35	25	50	-

# Technical data

3-phase mains connection 400 V

Sine filter



## Long distance filter

Inverter	Filter					Max. motor cable length shielded		
	Order code	Rated current	Dimensions (H x W x D)		Weight	C1	C2	C3
			A	mm		m	m	m
i550-C0.37/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50	86	0.86	15	15	-
i550-C0.55/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50	86	0.86	50	50	-
i550-C0.75/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50	86	0.86	50	50	-
i550-C1.1/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50	103	1.03	50	50	-
i550-C1.5/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50	103	1.03	50	50	-
i550-C2.2/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50	103	1.03	50	50	-
i550-C5.5/400-3	IOFAE255F100D0001S	18.3	346 x 90 x 60	165	1.65	50	50	-
i550-C15/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90	71	7.1	50	100	-
i550-C18/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90	71	7.1	50	100	-
i550-C22/400-3	IOFAE322F100D0000S	43	436 x 202 x 90	14	14	50	100	-
i550-C30/400-3	IOFAE330F100D0000S	55	590 x 250 x 105	23	23	50	100	-
i550-C37/400-3	IOFAE337F100D0000S	69	590 x 250 x 105	25	25	50	100	-
i550-C45/400-3	IOFAE345F100D0001S	100	590 x 250 x 105	32	32	50	100	-
i550-C55/400-3	IOFAE355F100D0001S	120	700 x 250 x 105	36	36	50	50	-
i550-C75/400-3	IOFAE375F100D0001S	162	700 x 250 x 105	41.5	41.5	50	50	-
i550-C3.0/400-3	IOFAE240F100D0000S	12.5	346 x 60 x 50	12.5	1.25	50	50	-
i550-C4.0/400-3	IOFAE240F100D0000S	12.5	346 x 60 x 50	12.5	1.25	50	50	-
i550-C7.5/400-3	IOFAE311F100D0000S	29	371 x 120 x 60	20.5	2.05	50	100	-
i550-C11/400-3	IOFAE311F100D0000S	29	371 x 120 x 60	20.5	2.05	50	100	-

## Sine filter

Inverter	Sine filters				
	Switching frequency	Order code	Rated inductance	Max. output frequency	
	kHz		mH	Hz	
i550-C0.37/400-3	4	EZS3-004A200	11.0	150	
i550-C0.55/400-3					
i550-C0.75/400-3		EZS3-010A200	5.10		
i550-C1.1/400-3					
i550-C1.5/400-3		EZS3-017A200	3.07		
i550-C2.2/400-3					
i550-C3.0/400-3		EZS3-024A200	2.50		
i550-C4.0/400-3					
i550-C5.5/400-3		EZS3-032A200	2.00		
i550-C7.5/400-3					
i550-C11/400-3		EZS3-037A200	1.70		
i550-C15/400-3					
i550-C18/400-3		EZS3-048A200	1.20		
i550-C22/400-3					
i550-C30/400-3		EZS3-048A200	1.20		
i550-C37/400-3					
i550-C45/400-3		EZS3-061A200	1.00		
i550-C55/400-3	2				
i550-C75/400-3	4	EZS3-090A200	0.8		
		EZS3-090A200	0.8		



## Technical data

3-phase mains connection 400 V "Light Duty"

Rated data

### 3-phase mains connection 400 V "Light Duty"

#### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Ambient temperature above 40 °C with a rated output current reduced by 2.5 %/°C.
- If the load characteristic "Light Duty" and the switching frequencies 8 kHz or 16 kHz are selected, only the values of the load characteristic "Heavy Duty" are reached.

# Technical data

3-phase mains connection 400 V "Light Duty"

Rated data



Inverter			i550-C3.0/400-3	i550-C4.0/400-3	i550-C5.5/400-3	i550-C7.5/400-3	
Rated power	P <sub>rated</sub>	kW	4	5.5	7.5	11	
Rated power	P <sub>rated</sub>	hp	5	7.5	10	15	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A	10.3	14	18.3	28		
with mains choke	A	8.2	11	14.5	22		
Apparent output power	kVA	5.9	8	10.5	15		
Rated output current							
2 kHz	A	8.8	11.9	15.6	23		
4 kHz	A	8.8	11.9	15.6	23		
8 kHz	A		-				
16 kHz	A		-				
Power loss							
2 kHz	W	94	125	163	238		
4 kHz	W	100	133	173	253		
8 kHz	W		-				
16 kHz	W		-				
Overcurrent cycle 180 s							
Max. output current	A	11	14.3	19.5	23.6		
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A	5.5	7.1	9.8	12.4		
Overcurrent cycle 15 s							
Max. output current	A	14.6	19	26	33		
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A	5.5	7.1	9.8	12.4		
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A	9.5	16.6	29			
Min. brake resistance	Ω	82	47	27			
Max. motor cable length shielded							
without EMC category	m	50		100			
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				
Max. motor cable length unshielded							
without EMC category	m	100		200			



## Technical data

3-phase mains connection 400 V "Light Duty"  
Rated data

Inverter			i550-C11/400-3	i550-C15/400-3	i550-C18/400-3	i550-C22/400-3		
Rated power	P <sub>rated</sub>	kW	15	18.5	22	30		
Rated power	P <sub>rated</sub>	hp	20	25	30	40		
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz					
Output voltage			3 AC 0 - 400/480 V					
Rated mains current								
without mains choke	A	-	48		-			
with mains choke	A	27.1	36	43	55			
Apparent output power	kVA	19	26	32	38			
Rated output current								
2 kHz	A	28.2	38.4	48	56.4			
4 kHz	A	28.2	38.4	48	56.4			
8 kHz	A		-					
16 kHz	A		-					
Power loss								
2 kHz	W	290	404	501	585			
4 kHz	W	309	430	533	623			
8 kHz	W		-					
16 kHz	W		-					
Overcurrent cycle 180 s								
Max. output current	A	35	48	60	71			
Overload time	T <sub>1</sub>	s	60	60	60	60		
Recovery time	T <sub>2</sub>	s	120	120	120	120		
Max. output current during the recovery time	A	17.6	24	30	35			
Overcurrent cycle 15 s								
Max. output current	A	47	64	80	94			
Overload time	T <sub>1</sub>	s	3	3	3	3		
Recovery time	T <sub>2</sub>	s	12	12	12	12		
Max. output current during the recovery time	A	17.6	24	30	35			
Cyclic mains switching			3 times per minute					
Brake chopper								
Max. output current	A	29	43	52				
Min. brake resistance	Ω	27	18	15				
Max. motor cable length shielded								
without EMC category	m		100					
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-					
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20					
Category C3 (2 kHz, 4 kHz, 8 kHz)	m	50		35				
Max. motor cable length unshielded								
without EMC category	m		200					

# Technical data

3-phase mains connection 400 V "Light Duty"

Rated data



Inverter			i550-C30/400-3	i550-C37/400-3	i550-C45/400-3	i550-C55/400-3		
Rated power	P <sub>rated</sub>	kW	37	45	55	75		
Rated power	P <sub>rated</sub>	hp	50	60	75	100		
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz					
Output voltage			3 AC 0 - 400/480 V					
Rated mains current								
without mains choke	A		-					
with mains choke	A		69	86	100	119		
Apparent output power	kVA		49	61	72	89		
Rated output current								
2 kHz	A		73.2	91.2	107	132		
4 kHz	A		73.2	91.2	107	132		
8 kHz	A		-					
16 kHz	A		-					
Power loss								
2 kHz	W		761	942	1101	1358		
4 kHz	W		810	1004	1171	1446		
8 kHz	W		-					
16 kHz	W		-					
Overcurrent cycle 180 s								
Max. output current	A		92	114	134	165		
Overload time	T <sub>1</sub>	s	60	60	60	60		
Recovery time	T <sub>2</sub>	s	120	120	120	120		
Max. output current during the recovery time	A		46	57	67	83		
Overcurrent cycle 15 s								
Max. output current	A		122	152	178	220		
Overload time	T <sub>1</sub>	s	3	3	3	3		
Recovery time	T <sub>2</sub>	s	12	12	12	12		
Max. output current during the recovery time	A		46	57	67	83		
Cyclic mains switching			3 times per minute				Once per minute	
Brake chopper								
Max. output current	A		104				166	
Min. brake resistance	Ω		7.5				4.7	
Max. motor cable length shielded								
without EMC category	m		100				200	
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-					
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20					
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				100	
Max. motor cable length unshielded								
without EMC category	m		200				300	



## Technical data

3-phase mains connection 400 V "Light Duty"  
Rated data

Inverter			i550-C75/400-3	i550-C90/400-3	i550-C110/400-3					
Rated power	P <sub>rated</sub>	kW	90	110	132					
Rated power	P <sub>rated</sub>	hp	125	150	180					
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz							
Output voltage			3 AC 0 - 400/480 V							
Rated mains current										
without mains choke		A	-							
with mains choke		A	160	200	234					
Apparent output power		kVA	121	145	171					
Rated output current										
2 kHz		A	180	216	254					
4 kHz		A	180	216	254					
8 kHz		A	-							
16 kHz		A	-							
Power loss										
2 kHz		W	1841	2203	2589					
4 kHz		W	1961	2348	2760					
8 kHz		W	-							
16 kHz		W	-							
Overcurrent cycle 180 s										
Max. output current		A	225	270	318					
Overload time	T <sub>1</sub>	s	60	60	60					
Recovery time	T <sub>2</sub>	s	120	120	120					
Max. output current during the recovery time		A	113	135	159					
Overcurrent cycle 15 s										
Max. output current		A	300	360	424					
Overload time	T <sub>1</sub>	s	3	3	3					
Recovery time	T <sub>2</sub>	s	12	12	12					
Max. output current during the recovery time		A	113	135	159					
Cyclic mains switching			Once per minute							
Brake chopper										
Max. output current		A	166	275						
Min. brake resistance		Ω	4.7	2.4						
Max. motor cable length shielded										
without EMC category		m	200							
Category C1 (2 kHz, 4 kHz, 8 kHz)		m	-							
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20							
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	100							
Max. motor cable length unshielded										
without EMC category		m	300							

# Technical data

3-phase mains connection 400 V "Light Duty"

Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data [51](#)

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
	kA	A	kA		A	mA		
i550-C3.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C4.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C5.5/400-3	65	gG/gL, gRL	25	65	B, C	25	≥300	Typ B
i550-C7.5/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C11/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C15/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C18/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C22/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C30/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C37/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C45/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C55/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C75/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C90/400-3	22	gR	300	10	B, C	300	≥300	Typ B
i550-C110/400-3	22	gR	300	10	B, C	300	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL [49](#)



Please note that from 15 kW onwards a mains choke must always be used.

## Terminal data

See "3-phase mains connection 400 V" ▶ Terminal data [115](#)

The terminal data for the terminal X1 can be found under: ▶ Terminal data [77](#)



## Technical data

3-phase mains connection 400 V "Light Duty"  
Brake resistors

### Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C5.5/400-3	ERBP047R200W	47	200	30	240 x 42 x 122	1.0
i550-C5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C15/400-3	ERBP018R300W	18	300	45	320 x 42 x 122	1.4
i550-C15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3
i550-C15/400-3	ERBG018R04K3	18	4300	645	302 x 486 x 426	13.5
i550-C18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C18/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C22/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C30/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C37/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C45/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C55/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C75/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C90/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C110/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C3.0/400-3	ERBM082R150W	82	150	22.5	238 x 80 x 59	0.70
i550-C3.0/400-3	ERBP082R200W	82	200	30	240 x 42 x 122	1.0
i550-C3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6
i550-C4.0/400-3	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C7.5/400-3	ERBP027R200W	27	200	30	240 x 42 x 122	1.0
i550-C7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3
i550-C11/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C11/400-3	ERBS027R01K2	27	1200.00	180	1020 x 114 x 105	5.6
i550-C11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3

# Technical data

3-phase mains connection 400 V "Light Duty"  
Mains chokes



## Mains chokes

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
			A	mH	mm	kg
i550-C3.0/400-3	EZAELN3010B292	3	10	2.94	85 x 120 x 140	2
i550-C4.0/400-3	EZAELN3016B182		16	1.84	95 x 120 x 140	2.7
i550-C5.5/400-3			25	1.18	110 x 155 x 170	5.8
i550-C7.5/400-3	EZAELN3025B122		30	0.98	111 x 155 x 170	5.85
i550-C11/400-3	EZAELN3030B981		40	0.74	102 x 185 x 195	6.8
i550-C15/400-3	EZAELN3040B741		45	0.65	112 x 185 x 200	8.25
i550-C18/400-3	EZAELN3045B651		63	0.47	122 x 185 x 210	9.65
i550-C22/400-3	EZAELN3063B471		80	0.37	125 x 210 x 240	12.5
i550-C30/400-3	EZAELN3080B371		90	0.33	130 x 267 x 205	10.95
i550-C37/400-3	EZAELN3090B331		100	0.3	154 x 267 x 205	16.3
i550-C45/400-3	EZAELN3100B301		125	0.24	160 x 291 x 215	17.1
i550-C55/400-3	EZAELN3125B241		160	0.19	189 x 291 x 215	22.1
i550-C75/400-3	EZAELN3160B191		200	0.15	160 x 352 x 265	25
i550-C90/400-3	EZAELN3200B151		250	0.12	176 x 352 x 265	31
i550-C110/400-3	EZAELN3250B121					



## Technical data

3-phase mains connection 400 V "Light Duty"  
RFI filters / Mains filters

### RFI filters / Mains filters

Basic information on RFI filters, mains filters and EMC: from [211](#)



EMC filters can be used both in the side structure and in the substructure.

### Maximum motor cable lengths with residual current device (RCD)

Mains connection			3-phase, 400 V/480 V, Light Duty				
<b>Inverter</b>			i550-C3.0/400-3	i550-C5.5/400-3	i550-C7.5/400-3	i550-C15/400-3	i550-C30/400-3
Without RFI filter							
Without EMC category	Max. motor cable length shielded	m	50	100	100	100	100
Thermal limitation	Max. motor cable length unshielded	m	200	200	200	200	200
With integrated RFI filter							
Category C1	Max. motor cable length shielded	m	-	-	-	-	-
Category C2	Max. motor cable length unshielded	m	20	20	20	20	20
	RCD (optional)	mA	30	300	300	300	300
RFI filter Low Leakage							
Category C1	Max. motor cable length shielded	m	-	-	-	-	-
	RCD (optional)	mA	-	-	-	-	-
RFI filter Short Distance							
Category C1	Max. motor cable length shielded	m	25	25	25	-	-
Category C2	Max. motor cable length unshielded	m	50	50	50	-	-
	RCD (optional)	mA	30	30	30	-	-
RFI filter Long Distance							
Category C1	Max. motor cable length shielded	m	50	50	50	-	-
Category C2	Max. motor cable length unshielded	m	100	100	100	-	-
	RCD (optional)	mA	300	300	300	-	-

From i550-C18/400-3, long distance mains filters are used. Mains filters are a combination of mains choke and RFI filter.

### Short distance filter

Inverter	Filter					Max. motor cable length shielded			
	Order code	Rated current		Dimensions (H x W x D)		Weight	C1	C2	C3
		A	mm	kg	m				
i550-C5.5/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C15/400-3	I0FAE318F100D0000S	50.4	436 x 202 x 90	7.1	-	50	-		
i550-C3.0/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C4.0/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C7.5/400-3	I0FAE311F100S0000S	29	371 x 120 x 60	2.35	25	50	-		
i550-C11/400-3	I0FAE311F100S0000S	29	371 x 120 x 60	2.35	25	50	-		

# Technical data

3-phase mains connection 400 V "Light Duty"  
Sine filter



## Long distance filter

Inverter	Filter				Max. motor cable length shielded		
	Order code	Rated current	Dimensions (H x W x D)		Weight	C1	C2
			A	mm		m	C3
i550-C5.5/400-3	IOFAE255F100D0001S	18.3		346 x 90 x 60	1.65	50	50
i550-C15/400-3	IOFAE318F100D0000S	50.4		436 x 202 x 90	7.1	50	100
i550-C18/400-3	IOFAE322F100D0000S	43		436 x 202 x 90	14	50	100
i550-C22/400-3	IOFAE322F100D0001S	55		436 x 202 x 90	18.5	50	100
i550-C30/400-3	IOFAE337F100D0000S	69		590 x 250 x 105	25	50	100
i550-C37/400-3	IOFAE345F100D0001S	100		590 x 250 x 105	32	50	100
i550-C45/400-3	IOFAE345F100D0001S	100		590 x 250 x 105	32	50	100
i550-C55/400-3	IOFAE355F100D0001S	120		700 x 250 x 105	36	50	50
i550-C75/400-3	IOFAE375F100D0001S	162		700 x 250 x 105	41.5	50	50
i550-C3.0/400-3	IOFAE240F100D0000S	12.5		346 x 60 x 50	1.25	50	50
i550-C4.0/400-3	IOFAE255F100D0001S	18.3		346 x 90 x 60	1.65	50	50
i550-C7.5/400-3	IOFAE311F100D0000S	29		371 x 120 x 60	2.05	50	100
i550-C11/400-3	IOFAE311F100D0000S	29		371 x 120 x 60	2.05	50	100

## Sine filter

Inverter	Sine filter			
	Switching frequency	Order code	Rated inductance	Max. output frequency
	kHz		mH	Hz
i550-C3.0/400-3	4	EZS3-010A200	5.10	150
i550-C4.0/400-3		EZS3-017A200	3.07	
i550-C5.5/400-3		EZS3-024A200	2.50	
i550-C7.5/400-3		EZS3-032A200	2.00	
i550-C11/400-3		EZS3-048A200	1.20	
i550-C15/400-3		EZS3-048A200	1.20	
i550-C18/400-3		EZS3-061A200	1.00	
i550-C22/400-3		EZS3-090A200	0.8	
i550-C30/400-3		EZS3-090A200	0.8	
i550-C37/400-3		EZS3-115A200	0.7	
i550-C45/400-3		EZS3-150A200	0.5	
i550-C55/400-3		EZS3-180A200	0.4	90
i550-C75/400-3				



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### 3-phase mains connection 480 V

#### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.

# Technical data

3-phase mains connection 480 V

Rated data



Inverter			i550-C0.37/400-3	i550-C0.55/400-3	i550-C0.75/400-3	i550-C1.1/400-3	
Rated power	P <sub>rated</sub>	kW	0.37	0.55	0.75	1.1	
Rated power	P <sub>rated</sub>	hp	0.5	0.75	1	1.5	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A	1.5	2.1	2.8	3.7		
with mains choke	A	1.2	1.7	2.2	2.5		
Apparent output power	kVA	0.9	1.2	1.6	2.2		
Rated output current							
2 kHz	A	-	1.6	2.1	3		
4 kHz	A	1.1	1.6	2.1	3		
8 kHz	A	1.1	1.6	2.1	3		
16 kHz	A	0.7	1.1	1.4	2		
Power loss							
2 kHz	W	-	24	30	38		
4 kHz	W	20	25	32	40		
8 kHz	W	24	31	40	51		
16 kHz	W	24	31	40	51		
Overcurrent cycle 180 s							
Max. output current	A	1.7	2.4	3.2	4.5		
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A	0.8	1.2	1.6	2.3		
Overcurrent cycle 15 s							
Max. output current	A	2.2	3.2	4.2	6		
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A	0.8	1.2	1.6	2.3		
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		2			5.2	
Min. brake resistance	Ω		390			150	
Max. motor cable length shielded							
without EMC category	m	15	50				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m	15	20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m	15	20			35	
Max. motor cable length unshielded							
without EMC category	m	40	80			100	



## Technical data

3-phase mains connection 480 V

Rated data

Inverter			i550-C1.5/400-3	i550-C2.2/400-3	i550-C3.0/400-3	i550-C4.0/400-3	
Rated power	P <sub>rated</sub>	kW	1.5	2.2	3	4	
Rated power	P <sub>rated</sub>	hp	2	3	4	5	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A	4.5	6.5	8	10.5		
with mains choke	A	3.1	4.4	5.8	7.5		
Apparent output power	kVA	2.6	3.8	4.9	6.4		
Rated output current							
2 kHz	A	3.5	4.8	6.3	8.2		
4 kHz	A	3.5	4.8	6.3	8.2		
8 kHz	A	3.5	4.8	6.3	8.2		
16 kHz	A	2.3	3.2	4.2	5.5		
Power loss							
2 kHz	W	45	62	79	102		
4 kHz	W	48	66	85	110		
8 kHz	W	61	85	110	140		
16 kHz	W	61	85	109	140		
Overcurrent cycle 180 s							
Max. output current	A	5.3	7.2	9.5	12.3		
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A	2.6	3.6	4.7	6.2		
Overcurrent cycle 15 s							
Max. output current	A	7	9.6	12.6	16.4		
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A	2.6	3.6	4.7	6.2		
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		5.2	9.5	16.6		
Min. brake resistance	Ω		150	82	47		
Max. motor cable length shielded							
without EMC category	m		50				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		3		-		
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				
Max. motor cable length unshielded							
without EMC category	m		100				

# Technical data

3-phase mains connection 480 V

Rated data



Inverter			i550-C5.5/400-3	i550-C7.5/400-3	i550-C11/400-3	i550-C15/400-3		
Rated power	P <sub>rated</sub>	kW	5.5	7.5	11	15		
Rated power	P <sub>rated</sub>	hp	7.5	10	15	20		
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz					
Output voltage			3 AC 0 - 400/480 V					
Rated mains current								
without mains choke	A		14.3	16.6	23.7	32.3		
with mains choke	A		10.3	13.1	18.6	24		
Apparent output power	kVA		8.7	11	16	22		
Rated output current								
2 kHz	A		11	14	21	27		
4 kHz	A		11	14	21	27		
8 kHz	A		11	14	21	27		
16 kHz	A		7.3	9.3	14	18		
Power loss								
2 kHz	W		137	172	242	340		
4 kHz	W		145	185	260	360		
8 kHz	W		190	240	340	460		
16 kHz	W		189	238	337	469		
Overcurrent cycle 180 s								
Max. output current	A		16.5	21	31.5	40.5		
Overload time	T <sub>1</sub>	s	60	60	60	60		
Recovery time	T <sub>2</sub>	s	120	120	120	120		
Max. output current during the recovery time	A		8.3	10.5	15.8	20.3		
Overcurrent cycle 15 s								
Max. output current	A		22	28	42	54		
Overload time	T <sub>1</sub>	s	3	3	3	3		
Recovery time	T <sub>2</sub>	s	12	12	12	12		
Max. output current during the recovery time	A		8.3	10.5	15.8	20.3		
Cyclic mains switching			3 times per minute					
Brake chopper								
Max. output current	A		16.6	29	43			
Min. brake resistance	Ω		47	27	18			
Max. motor cable length shielded								
without EMC category	m		100					
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-					
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20					
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	50	35			
Max. motor cable length unshielded								
without EMC category	m		200					



## Technical data

3-phase mains connection 480 V  
Rated data

Inverter			i550-C18/400-3	i550-C22/400-3	i550-C30/400-3	i550-C37/400-3	
Rated power	P <sub>rated</sub>	kW	18.5	22	30	37	
Rated power	P <sub>rated</sub>	hp	25	30	40	50	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A	40.3	47.4	-			
with mains choke	A	30	35.3	45.7	57		
Apparent output power	kVA	27	32	41	51		
Rated output current							
2 kHz	A	34	40.4	52	65		
4 kHz	A	34	40.4	52	65		
8 kHz	A	34	40.4	52	65		
16 kHz	A	22.6	26.9	34.6	43.3		
Power loss							
2 kHz	W	420	491	639	790		
4 kHz	W	450	520	680	840		
8 kHz	W	570	670	880	1100		
16 kHz	W	581	680	884	1095		
Overcurrent cycle 180 s							
Max. output current	A	51	61	78	98		
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A	25.5	30	39	49		
Overcurrent cycle 15 s							
Max. output current	A	68	81	104	130		
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A	25.5	30	39	49		
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A		52	104			
Min. brake resistance	Ω		15	7.5			
Max. motor cable length shielded							
without EMC category	m		100				
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				
Max. motor cable length unshielded							
without EMC category	m		200				

# Technical data

3-phase mains connection 480 V

Rated data



Inverter			i550-C45/400-3	i550-C55/400-3	i550-C75/400-3	i550-C90/400-3				
Rated power	P <sub>rated</sub>	kW	45	55	75	90				
Rated power	P <sub>rated</sub>	hp	60	75	100	125				
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz							
Output voltage			3 AC 0 - 400/480 V							
Rated mains current										
without mains choke	A		-							
with mains choke	A		66.7	83	113	146				
Apparent output power	kVA		60	75	100	121				
Rated output current										
2 kHz	A		77	96	124	156				
4 kHz	A		77	96	124	156				
8 kHz	A		77	96	124	140				
16 kHz	A		51.3	63.9	83.1	93.6				
Power loss										
2 kHz	W		920	1137	1539	1841				
4 kHz	W		980	1210	1640	1961				
8 kHz	W		1280	1580	2140	2312				
16 kHz	W		1278	1579	2143	2312				
Overcurrent cycle 180 s										
Max. output current	A		116	144	186	234				
Overload time	T <sub>1</sub>	s	60	60	60	60				
Recovery time	T <sub>2</sub>	s	120	120	120	120				
Max. output current during the recovery time	A		58	72	93	117				
Overcurrent cycle 15 s										
Max. output current	A		154	192	248	312				
Overload time	T <sub>1</sub>	s	3	3	3	3				
Recovery time	T <sub>2</sub>	s	12	12	12	12				
Max. output current during the recovery time	A		58	72	93	117				
Cyclic mains switching			3 times per minute	Once per minute						
Brake chopper										
Max. output current	A		104	166	275					
Min. brake resistance	Ω		7.5	4.7	2.4					
Max. motor cable length shielded										
without EMC category	m		100	200						
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-							
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20							
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35	100						
Max. motor cable length unshielded										
without EMC category	m		200	300						



## Technical data

3-phase mains connection 480 V

Rated data

Inverter			i550-C110/400-3
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>kW</b>	<b>110</b>
<b>Rated power</b>	<b>P<sub>rated</sub></b>	<b>hp</b>	<b>150</b>
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz
Output voltage			3 AC 0 - 400/480 V
Rated mains current			
without mains choke	A		-
with mains choke	A		168
Apparent output power		kVA	142
Rated output current			
2 kHz	A		180
4 kHz	A		180
8 kHz	A		162
16 kHz	A		108
Power loss			
2 kHz	W		2163
4 kHz	W		2305
8 kHz	W		2717
16 kHz	W		2717
Overcurrent cycle 180 s			
Max. output current	A		270
Overload time	T <sub>1</sub>	s	60
Recovery time	T <sub>2</sub>	s	120
Max. output current during the recovery time		A	135
Overcurrent cycle 15 s			
Max. output current	A		360
Overload time	T <sub>1</sub>	s	3
Recovery time	T <sub>2</sub>	s	12
Max. output current during the recovery time		A	135
Cyclic mains switching			Once per minute
Brake chopper			
Max. output current	A		275
Min. brake resistance	Ω		2.4
Max. motor cable length shielded			
without EMC category	m		200
Category C1 (2 kHz, 4 kHz, 8 kHz)		m	-
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	100
Max. motor cable length unshielded			
without EMC category	m		300

# Technical data

3-phase mains connection 480 V

Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data 51

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-C0.37/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.55/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C0.75/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.1/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C1.5/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C2.2/400-3	65	gG/gL, gRL	16	65	B, C	16	≥30	Typ B
i550-C3.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C4.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C5.5/400-3	65	gG/gL, gRL	25	65	B, C	25	≥300	Typ B
i550-C7.5/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C11/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C15/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C18/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C22/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C30/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C37/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C45/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C55/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C75/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C90/400-3	22	gR	300	10	B, C	300	≥300	Typ B
i550-C110/400-3	22	gR	300	10	B, C	300	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL 49



Please note that from 30 kW onwards a mains choke must always be used.



## Technical data

3-phase mains connection 480 V  
Terminal data

### Terminal data

Rated power	P <sub>rated</sub>	kW	0.37 ... 2.2	3 ... 4	5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75	90 ... 110
<b>Connection description</b>										
<b>Connection</b>										
Connection type			Pluggable		Non-pluggable					
Max. cable cross-section	mm <sup>2</sup>		2.5	4	6	16	35	50	95	150
Max. cable cross-section	AWG		12	10	10	6	2	1/0	4/0	-
Stripping length	mm		8	8	9	11	18	19	22	28
Stripping length	in		0.3	0.3	0.35	0.43	0.7	0.75	0.87	1.1
Tightening torque	Nm		0.5	0.6	0.5	1.2	3.8	4	10	18
Tightening torque	lb-in		4.4	5.3	4.4	11	34	35	89	160
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 5.5	Hex key 5.0	Hex key 6.0	Hex key 8.0	

Rated power	P <sub>rated</sub>	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 75	90 ... 110	
<b>Connection description</b>								
<b>Terminal type</b>								
Max. cable cross-section	mm <sup>2</sup>		6	16	35	25	150	
Max. cable cross-section	AWG		10	6	2	2	300 kcmil	
Stripping length	mm		10	11	16	16	-	
Stripping length	in		0.4	0.4	0.6	0.6	-	
Tightening torque	Nm		2	3.4	4	4	10	
Tightening torque	lb-in		18	30	35	35	89	
Required tool			Torx key 20	Crosstip screwdriver PZ2				Wrench size 13

Rated power	P <sub>rated</sub>	kW	0.37 ... 4	5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75	90 ... 110
<b>Connection description</b>									
<b>Connection</b>									
Connection type			Pluggable	Non-pluggable					
Max. cable cross-section	mm <sup>2</sup>		2.5	6	16	35	50	95	150
Max. cable cross-section	AWG		12	10	6	2	1/0	4/0	-
Stripping length	mm		8	9	11	18	19	22	28
Stripping length	in		0.3	0.35	0.43	0.7	0.75	0.87	1.1
Tightening torque	Nm		0.5	0.5	1.2	3.8	4	10	18
Tightening torque	lb-in		4.4	4.4	11	34	35	89	160
Required tool			Screwdriver 0.5 x 3.0	Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 5.5	Hex key 5.0	Hex key 6.0	Hex key 8.0

The terminal data for the terminal X1 can be found under: ▶ Terminal data □ 77

# Technical data

3-phase mains connection 480 V

Brake resistors



## Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C0.37/400-3	ERBM470R020W	470	20	3	160 x 40 x 36	0.34
i550-C0.37/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C0.55/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C0.75/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37
i550-C1.1/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C1.1/400-3	ERBP180R300W	180	300	45	320 x 42 x 122	1.4
i550-C1.5/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1
i550-C2.2/400-3	ERBP180R200W	180	200	30	240 x 42 x 122	1.0
i550-C2.2/400-3	ERBP180R300W	180	300	45	320 x 42 x 122	1.4
i550-C2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1
i550-C5.5/400-3	ERBP047R200W	47	200	30	240 x 42 x 122	1.0
i550-C5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C15/400-3	ERBP018R300W	18	300	45	320 x 42 x 122	1.4
i550-C15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3
i550-C15/400-3	ERBG018R04K3	18	4300	645	302 x 486 x 426	13.5
i550-C18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C18/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C22/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C30/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C37/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C45/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C55/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C75/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C90/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C110/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C3.0/400-3	ERBM082R150W	82	150	22.5	238 x 80 x 59	0.70
i550-C3.0/400-3	ERBP082R200W	82	200	30	240 x 42 x 122	1.0
i550-C3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6
i550-C4.0/400-3	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C7.5/400-3	ERBP027R200W	27	200	30	240 x 42 x 122	1.0
i550-C7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3
i550-C11/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C11/400-3	ERBS027R01K2	27	1200.00	180	1020 x 114 x 105	5.6
i550-C11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3



**Technical data**  
3-phase mains connection 480 V  
Mains chokes

**Mains chokes**

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
			A	mH	mm	kg
i550-C0.37/400-3	EZAELN3002B203	3	1.5	19.6	56 x 77 x 100	0.52
i550-C0.55/400-3	EZAELN3002B153		2	14.7		0.53
i550-C0.75/400-3			4	7.35	60 x 95 x 117	1.31
i550-C1.1/400-3	EZAELN3004B742		6	4.9	69 x 95 x 117	1.45
i550-C1.5/400-3			8	3.68	85 x 120 x 140	1.9
i550-C2.2/400-3	EZAELN3006B492		16	1.84	95 x 120 x 140	2.7
i550-C3.0/400-3			20	1.47	95 x 155 x 165	3.8
i550-C4.0/400-3	EZAELN3008B372		25	1.18	110 x 155 x 170	5.8
i550-C5.5/400-3	EZAELN3016B182		30	0.98	111 x 155 x 170	5.85
i550-C7.5/400-3			40	0.74	102 x 185 x 195	6.8
i550-C11/400-3	EZAELN3020B152		50	0.59	112 x 185 x 210	8.35
i550-C15/400-3	EZAELN3025B122		63	0.47	122 x 185 x 210	9.65
i550-C18/400-3	EZAELN3030B981		80	0.37	125 x 210 x 240	12.5
i550-C22/400-3	EZAELN3040B741		90	0.33	130 x 267 x 205	10.95
i550-C30/400-3	EZAELN3050B591		125	0.24	160 x 291 x 215	17.1
i550-C37/400-3	EZAELN3063B471		160	0.19	189 x 291 x 215	22.1
i550-C45/400-3	EZAELN3080B371		180	0.17	184 x 316 x 235	25
i550-C55/400-3	EZAELN3090B331					
i550-C75/400-3	EZAELN3125B241					
i550-C90/400-3	EZAELN3160B191					
i550-C110/400-3	EZAELN3180B171					

# Technical data

3-phase mains connection 480 V  
RFI filters / Mains filters



## RFI filters / Mains filters

Basic information on RFI filters, mains filters and EMC: from [211](#)



EMC filters can be used both in the side structure and in the substructure.

### Maximum motor cable lengths with residual current device (RCD)

Mains connection			3-phase, 400 V/480 V			
Inverter			i550-C0.37/400-3	i550-C0.55/400-3 i550-C0.75/400-3	i550-C1.1/400-3 i550-C1.5/400-3 i550-C2.2/400-3 i550-C3.0/400-3 i550-C4.0/400-3	i550-C5.5/400-3
Without RFI filter						
Without EMC category Thermal limitation	Max. Shielded motor cable length	m	15	50	50	100
	Max. Unshielded motor cable length	m	30	100	200	200
With integrated RFI filter						
Category C1	Max. Shielded motor cable length	m	3	3	-	-
Category C2	Max. Unshielded motor cable length	m	15	20	20	20
	RCD (optional)	mA	30	30	30	300
RFI filter Low Leakage						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
	RCD (optional)	mA	-	-	-	-
RFI filter Short Distance						
Category C1	Max. Shielded motor cable length	m	15	25	25	25
Category C2		m	15	50	50	50
	RCD (optional)	mA	30	30	30	30
RFI filter Long Distance						
Category C1	Max. Shielded motor cable length	m	15	50	50	50
Category C2		m	15	50	50	100
	RCD (optional)	mA	300	300	300	300



## Technical data

3-phase mains connection 480 V  
RFI filters / Mains filters

Mains connection			3-phase, 400 V/480 V			
Inverter			i550-C7.5/400-3 i550-C11/400-3	i550-C15/400-3 i550-C18/400-3 i550-C22/400-3	i550-C30/400-3 i550-C37/400-3 i550-C45/400-3	i550-C55/400-3 i550-C75/400-3 i550-C90/400-3 i550-C110/400-3
Without RFI filter						
Without EMC category	Max. Shielded motor cable length	m	100	100	100	100
	Thermal limitation	m	200	200	200	200
With integrated RFI filter						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
Category C2		m	20	20	20	20
	RCD (optional)	mA	300	300	300	300
RFI filter Low Leakage						
Category C1	Max. Shielded motor cable length	m	-	-	-	-
	RCD (optional)	mA	-	-	-	-
RFI filter Short Distance						
Category C1	Max. Shielded motor cable length	m	25	-	-	-
Category C2		m	50	-	-	-
	RCD (optional)	mA	30	-	-	-
RFI filter Long Distance						
Category C1	Max. Shielded motor cable length	m	50	50	50	50
Category C2		m	100	100	100	100
	RCD (optional)	mA	300	300	300	300

From i550-C22/400-3, long distance mains filters are used. Mains filters are a combination of mains choke and RFI filter.

### Short distance filter

Inverter	Filter					Max. motor cable length shielded		
	Order code	Rated current	Dimensions (H x W x D)		Weight	C1	C2	C3
			A	mm		m	m	
i550-C0.37/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	15	15	-
i550-C0.55/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	25	50	-
i550-C0.75/400-3	IOFAE175F100S0000S	3.3	276 x 60 x 50	276 x 60 x 50	0.82	25	50	-
i550-C1.1/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C1.5/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C2.2/400-3	IOFAE222F100S0000S	7.8	346 x 60 x 50	346 x 60 x 50	1.01	25	50	-
i550-C5.5/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C15/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90	436 x 202 x 90	7.1	-	50	-
i550-C3.0/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C4.0/400-3	IOFAE255F100S0001S	18.3	346 x 90 x 60	346 x 90 x 60	2.05	25	50	-
i550-C7.5/400-3	IOFAE311F100S0000S	29	371 x 120 x 60	371 x 120 x 60	2.35	25	50	-
i550-C11/400-3	IOFAE311F100S0000S	29	371 x 120 x 60	371 x 120 x 60	2.35	25	50	-

## Technical data

3-phase mains connection 480 V

RFI filters / Mains filters



### Long Distance filter

Inverter	Filter				Max. motor cable length shielded		
	Order code	Rated current A	Dimensions (H x W x D)		Weight kg	C1	C2
			mm			m	m
i550-C0.37/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50		0.86	15	15
i550-C0.55/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50		0.86	50	50
i550-C0.75/400-3	IOFAE175F100D0000S	3.3	276 x 60 x 50		0.86	50	50
i550-C1.1/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50		1.03	50	50
i550-C1.5/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50		1.03	50	50
i550-C2.2/400-3	IOFAE222F100D0000S	7.8	346 x 60 x 50		1.03	50	50
i550-C5.5/400-3	IOFAE255F100D0001S	18.3	346 x 90 x 60		1.65	50	50
i550-C15/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90		7.1	50	100
i550-C18/400-3	IOFAE318F100D0000S	50.4	436 x 202 x 90		7.1	50	100
i550-C22/400-3	IOFAE322F100D0000S	43	436 x 202 x 90		14	50	100
i550-C30/400-3	IOFAE330F100D0000S	55	590 x 250 x 105		23	50	100
i550-C37/400-3	IOFAE337F100D0000S	69	590 x 250 x 105		25	50	100
i550-C45/400-3	IOFAE345F100D0001S	100	590 x 250 x 105		32	50	100
i550-C55/400-3	IOFAE355F100D0001S	120	700 x 250 x 105		36	50	50
i550-C75/400-3	IOFAE375F100D0001S	162	700 x 250 x 105		41.5	50	50
i550-C3.0/400-3	IOFAE240F100D0000S	12.5	346 x 60 x 50		1.25	50	50
i550-C4.0/400-3	IOFAE240F100D0000S	12.5	346 x 60 x 50		1.25	50	50
i550-C7.5/400-3	IOFAE311F100D0000S	29	371 x 120 x 60		2.05	50	100
i550-C11/400-3	IOFAE311F100D0000S	29	371 x 120 x 60		2.05	50	100



## Technical data

3-phase mains connection 480 V "Light Duty"

Rated data

### 3-phase mains connection 480 V "Light Duty"

#### Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Ambient temperature above 40 °C with a rated output current reduced by 2.5 %/°C.
- If the load characteristic "Light Duty" and the switching frequencies 8 kHz or 16 kHz are selected, only the values of the load characteristic "Heavy Duty" are reached.

# Technical data

3-phase mains connection 480 V "Light Duty"

Rated data



Inverter			i550-C3.0/400-3	i550-C4.0/400-3	i550-C5.5/400-3	i550-C7.5/400-3	
Rated power	P <sub>rated</sub>	kW	4	5.5	7.5	11	
Rated power	P <sub>rated</sub>	hp	5	7.5	10	15	
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz				
Output voltage			3 AC 0 - 400/480 V				
Rated mains current							
without mains choke	A	8.6	11.2	15.3	22		
with mains choke	A	6.8	8.8	12.1	17.2		
Apparent output power	kVA	5.9	8	10.5	15		
Rated output current							
2 kHz	A	7.6	9.8	13.2	18.3		
4 kHz	A	7.6	9.8	13.2	18.3		
8 kHz	A		-				
16 kHz	A		-				
Power loss							
2 kHz	W	94	125	163	238		
4 kHz	W	100	133	173	253		
8 kHz	W		-				
16 kHz	W		-				
Overcurrent cycle 180 s							
Max. output current	A	9.5	12.3	16.5	21		
Overload time	T <sub>1</sub>	s	60	60	60	60	
Recovery time	T <sub>2</sub>	s	120	120	120	120	
Max. output current during the recovery time	A	4.7	6.2	8.3	10.5		
Overcurrent cycle 15 s							
Max. output current	A	12.6	16.4	22	28		
Overload time	T <sub>1</sub>	s	3	3	3	3	
Recovery time	T <sub>2</sub>	s	12	12	12	12	
Max. output current during the recovery time	A	4.7	6.2	8.3	10.5		
Cyclic mains switching			3 times per minute				
Brake chopper							
Max. output current	A	9.5	16.6	29			
Min. brake resistance	Ω	82	47	27			
Max. motor cable length shielded							
without EMC category	m	50		100			
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-				
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20				
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				
Max. motor cable length unshielded							
without EMC category	m	100		200			



## Technical data

3-phase mains connection 480 V "Light Duty"  
Rated data

Inverter			i550-C11/400-3	i550-C15/400-3	i550-C18/400-3	i550-C22/400-3		
Rated power	P <sub>rated</sub>	kW	15	18.5	22	30		
Rated power	P <sub>rated</sub>	hp	20	25	30	40		
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz					
Output voltage			3 AC 0 - 400/480 V					
Rated mains current								
without mains choke	A	-	40		-			
with mains choke	A	22.6	30	38	46			
Apparent output power	kVA	19	26	32	38			
Rated output current								
2 kHz	A	25.2	32.4	40.8	48.5			
4 kHz	A	25.2	32.4	40.8	48.5			
8 kHz	A		-					
16 kHz	A		-					
Power loss								
2 kHz	W	290	404	501	585			
4 kHz	W	309	430	533	623			
8 kHz	W		-					
16 kHz	W		-					
Overcurrent cycle 180 s								
Max. output current	A	31.5	40.5	51	61			
Overload time	T <sub>1</sub>	s	60	60	60	60		
Recovery time	T <sub>2</sub>	s	120	120	120	120		
Max. output current during the recovery time	A	15.8	20.3	25.5	30			
Overcurrent cycle 15 s								
Max. output current	A	42	54	68	81			
Overload time	T <sub>1</sub>	s	3	3	3	3		
Recovery time	T <sub>2</sub>	s	12	12	12	12		
Max. output current during the recovery time	A	15.8	20.3	25.5	30			
Cyclic mains switching			3 times per minute					
Brake chopper								
Max. output current	A	29	43	52				
Min. brake resistance	Ω	27	18	15				
Max. motor cable length shielded								
without EMC category	m		100					
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-					
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20					
Category C3 (2 kHz, 4 kHz, 8 kHz)	m	50		35				
Max. motor cable length unshielded								
without EMC category	m		200					

# Technical data

3-phase mains connection 480 V "Light Duty"

Rated data



Inverter			i550-C30/400-3	i550-C37/400-3	i550-C45/400-3	i550-C55/400-3		
Rated power	P <sub>rated</sub>	kW	37	45	55	75		
Rated power	P <sub>rated</sub>	hp	50	60	75	100		
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz					
Output voltage			3 AC 0 - 400/480 V					
Rated mains current								
without mains choke	A		-					
with mains choke	A		59	73	86	105		
Apparent output power	kVA		49	61	72	89		
Rated output current								
2 kHz	A		62.4	78	92.4	115		
4 kHz	A		62.4	78	92.4	115		
8 kHz	A		-					
16 kHz	A		-					
Power loss								
2 kHz	W		761	942	1101	1358		
4 kHz	W		810	1004	1171	1446		
8 kHz	W		-					
16 kHz	W		-					
Overcurrent cycle 180 s								
Max. output current	A		78	98	116	144		
Overload time	T <sub>1</sub>	s	60	60	60	60		
Recovery time	T <sub>2</sub>	s	120	120	120	120		
Max. output current during the recovery time	A		39	49	58	72		
Overcurrent cycle 15 s								
Max. output current	A		104	130	154	192		
Overload time	T <sub>1</sub>	s	3	3	3	3		
Recovery time	T <sub>2</sub>	s	12	12	12	12		
Max. output current during the recovery time	A		39	49	58	72		
Cyclic mains switching			3 times per minute				Once per minute	
Brake chopper								
Max. output current	A		104				166	
Min. brake resistance	Ω		7.5				4.7	
Max. motor cable length shielded								
without EMC category	m		100				200	
Category C1 (2 kHz, 4 kHz, 8 kHz)	m		-					
Category C2 (2 kHz, 4 kHz, 8 kHz)	m		20					
Category C3 (2 kHz, 4 kHz, 8 kHz)	m		35				100	
Max. motor cable length unshielded								
without EMC category	m		200				300	



## Technical data

3-phase mains connection 480 V "Light Duty"  
Rated data

Inverter			i550-C75/400-3	i550-C90/400-3	i550-C110/400-3					
Rated power	P <sub>rated</sub>	kW	90	110	132					
Rated power	P <sub>rated</sub>	hp	125	150	180					
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz							
Output voltage			3 AC 0 - 400/480 V							
Rated mains current										
without mains choke		A	-							
with mains choke		A	135	175	200					
Apparent output power		kVA	121	145	171					
Rated output current										
2 kHz		A	149	187	216					
4 kHz		A	149	187	216					
8 kHz		A	-							
16 kHz		A	-							
Power loss										
2 kHz		W	1841	2203	2589					
4 kHz		W	1961	2348	2760					
8 kHz		W	-							
16 kHz		W	-							
Overcurrent cycle 180 s										
Max. output current		A	186	234	270					
Overload time	T <sub>1</sub>	s	60	60	60					
Recovery time	T <sub>2</sub>	s	120	120	120					
Max. output current during the recovery time		A	93	117	135					
Overcurrent cycle 15 s										
Max. output current		A	248	312	360					
Overload time	T <sub>1</sub>	s	3	3	3					
Recovery time	T <sub>2</sub>	s	12	12	12					
Max. output current during the recovery time		A	93	117	135					
Cyclic mains switching			Once per minute							
Brake chopper										
Max. output current		A	166	275						
Min. brake resistance		Ω	4.7	2.4						
Max. motor cable length shielded										
without EMC category		m	200							
Category C1 (2 kHz, 4 kHz, 8 kHz)		m	-							
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20							
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	100							
Max. motor cable length unshielded										
without EMC category		m	300							

# Technical data

3-phase mains connection 480 V "Light Duty"

Fusing data



## Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: ▶ Fusing data [51](#)

Inverter	Fuse			Circuit breaker			RCD	
	Max. SCCR	Characteristic	Max. rated current	Max. SCCR	Characteristic	Max. rated current		Type
								kA
i550-C3.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C4.0/400-3	65	gG/gL, gRL	25	65	B, C	25	≥30	Typ B
i550-C5.5/400-3	65	gG/gL, gRL	25	65	B, C	25	≥300	Typ B
i550-C7.5/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C11/400-3	65	gG/gL, gRL	40	65	B, C	40	≥300	Typ B
i550-C15/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C18/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C22/400-3	65	gG/gL, gRL	63	65	B, C	63	≥300	Typ B
i550-C30/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C37/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C45/400-3	22	gG/gL, gRL	125	35	B, C	125	≥300	Typ B
i550-C55/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C75/400-3	22	gR	200	35	B, C	200	≥300	Typ B
i550-C90/400-3	22	gR	300	10	B, C	300	≥300	Typ B
i550-C110/400-3	22	gR	300	10	B, C	300	≥300	Typ B

The connection data according to UL can be found under: ▶ Connection according to UL [49](#)



Please note that from 15 kW onwards a mains choke must always be used.

## Terminal data

See "3-phase mains connection 480 V" ▶ Terminal data [139](#)

The terminal data for the terminal X1 can be found under: ▶ Terminal data [77](#)



## Technical data

3-phase mains connection 480 V "Light Duty"  
Brake resistors

### Brake resistors

Inverter	Brake resistor					
	Order code	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight
	Ω	W	kWs	mm	kg	
i550-C5.5/400-3	ERBP047R200W	47	200	30	240 x 42 x 122	1.0
i550-C5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C15/400-3	ERBP018R300W	18	300	45	320 x 42 x 122	1.4
i550-C15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3
i550-C15/400-3	ERBG018R04K3	18	4300	645	302 x 486 x 426	13.5
i550-C18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C18/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0
i550-C22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10
i550-C22/400-3	ERBG015R06K2	15	6200	930	302 x 486 x 526	17.0
i550-C30/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C37/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C45/400-3	ERBG075D01K9	7.5	1900	285	302 x 486 x 236	9.5
i550-C55/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C75/400-3	ERBG005R02K6	5	2600	390	302 x 486 x 326	11.0
i550-C90/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C110/400-3	ERBG028D04K1	2.8	4100	615	302 x 486 x 426	12.8
i550-C3.0/400-3	ERBM082R150W	82	150	22.5	238 x 80 x 59	0.70
i550-C3.0/400-3	ERBP082R200W	82	200	30	240 x 42 x 122	1.0
i550-C3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6
i550-C4.0/400-3	ERBM047R135W	47	135	6.3	216 x 80 x 28	0.67
i550-C4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3
i550-C4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4.0
i550-C7.5/400-3	ERBP027R200W	27	200	30	240 x 42 x 122	1.0
i550-C7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3
i550-C11/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1
i550-C11/400-3	ERBS027R01K2	27	1200.00	180	1020 x 114 x 105	5.6
i550-C11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3

# Technical data

3-phase mains connection 480 V "Light Duty"

Mains chokes



## Mains chokes

Inverter	Netzdrossel					
	Order code	No. of phases	Rated current	Inductance	Dimensions (H x W x D)	Weight
			A	mH	mm	kg
i550-C3.0/400-3	EZAELN3008B372	3	8	3.68	85 x 120 x 140	1.9
i550-C4.0/400-3	EZAELN3010B292		10	2.94		2
i550-C5.5/400-3	EZAELN3016B182		16	1.84	95 x 120 x 140	2.7
i550-C7.5/400-3	EZAELN3020B152		20	1.47	95 x 155 x 165	3.8
i550-C11/400-3	EZAELN3025B122		25	1.18	110 x 155 x 170	5.8
i550-C15/400-3	EZAELN3030B981		30	0.98	111 x 155 x 170	5.85
i550-C18/400-3	EZAELN3040B741		40	0.74	102 x 185 x 195	6.8
i550-C22/400-3	EZAELN3050B591		50	0.59	112 x 185 x 210	8.35
i550-C30/400-3	EZAELN3063B471		63	0.47	122 x 185 x 210	9.65
i550-C37/400-3	EZAELN3080B371		80	0.37	125 x 210 x 240	12.5
i550-C45/400-3	EZAELN3090B331		90	0.33	130 x 267 x 205	10.95
i550-C55/400-3	EZAELN3125B241		125	0.24	160 x 291 x 215	17.1
i550-C75/400-3	EZAELN3160B191		160	0.19	189 x 291 x 215	22.1
i550-C90/400-3	EZAELN3180B171		180	0.17	184 x 316 x 235	25
i550-C110/400-3	EZAELN3200B151		200	0.15	160 x 352 x 265	



## Technical data

3-phase mains connection 480 V "Light Duty"  
RFI filters / Mains filters

### RFI filters / Mains filters

Basic information on RFI filters, mains filters and EMC: from [211](#)



EMC filters can be used both in the side structure and in the substructure.

### Maximum motor cable lengths with residual current device (RCD)

Mains connection			3-phase, 400 V/480 V, Light Duty				
<b>Inverter</b>			i550-C3.0/400-3	i550-C5.5/400-3	i550-C7.5/400-3	i550-C15/400-3	i550-C30/400-3
Without RFI filter							
Without EMC category	Max. motor cable length shielded	m	50	100	100	100	100
Thermal limitation	Max. motor cable length unshielded	m	200	200	200	200	200
With integrated RFI filter							
Category C1	Max. motor cable length shielded	m	-	-	-	-	-
Category C2	Max. motor cable length unshielded	m	20	20	20	20	20
	RCD (optional)	mA	30	300	300	300	300
RFI filter Low Leakage							
Category C1	Max. motor cable length shielded	m	-	-	-	-	-
	RCD (optional)	mA	-	-	-	-	-
RFI filter Short Distance							
Category C1	Max. motor cable length shielded	m	25	25	25	-	-
Category C2	Max. motor cable length unshielded	m	50	50	50	-	-
	RCD (optional)	mA	30	30	30	-	-
RFI filter Long Distance							
Category C1	Max. motor cable length shielded	m	50	50	50	-	-
Category C2	Max. motor cable length unshielded	m	100	100	100	-	-
	RCD (optional)	mA	300	300	300	-	-

From i550-C18/400-3, long distance mains filters are used. Mains filters are a combination of mains choke and RFI filter.

### Short distance filter

Inverter	Filter					Max. motor cable length shielded			
	Order code	Rated current		Dimensions (H x W x D)		Weight	C1	C2	C3
		A	mm	kg	m				
i550-C5.5/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C15/400-3	I0FAE318F100D0000S	50.4	436 x 202 x 90	7.1	-	50	-		
i550-C3.0/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C4.0/400-3	I0FAE255F100S0001S	18.3	346 x 90 x 60	2.05	25	50	-		
i550-C7.5/400-3	I0FAE311F100S0000S	29	371 x 120 x 60	2.35	25	50	-		
i550-C11/400-3	I0FAE311F100S0000S	29	371 x 120 x 60	2.35	25	50	-		

## Technical data

3-phase mains connection 480 V "Light Duty"

RFI filters / Mains filters



### Long distance filter

Inverter	Filter				Max. motor cable length shielded			
	Order code	Rated current			Weight	C1	C2	C3
			A	mm				
i550-C5.5/400-3	IOFAE255F100D0001S	18.3		346 x 90 x 60	1.65	50	50	-
i550-C15/400-3	IOFAE318F100D0000S	50.4		436 x 202 x 90	7.1	50	100	-
i550-C18/400-3	IOFAE322F100D0000S	43		436 x 202 x 90	14	50	100	-
i550-C22/400-3	IOFAE322F100D0001S	55		436 x 202 x 90	18.5	50	100	-
i550-C30/400-3	IOFAE337F100D0000S	69		590 x 250 x 105	25	50	100	-
i550-C37/400-3	IOFAE345F100D0001S	100		590 x 250 x 105	32	50	100	-
i550-C45/400-3	IOFAE345F100D0001S	100		590 x 250 x 105	32	50	100	-
i550-C55/400-3	IOFAE355F100D0001S	120		700 x 250 x 105	36	50	50	-
i550-C75/400-3	IOFAE375F100D0001S	162		700 x 250 x 105	41.5	50	50	-
i550-C3.0/400-3	IOFAE240F100D0000S	12.5		346 x 60 x 50	1.25	50	50	-
i550-C4.0/400-3	IOFAE255F100D0001S	18.3		346 x 90 x 60	1.65	50	50	-
i550-C7.5/400-3	IOFAE311F100D0000S	29		371 x 120 x 60	2.05	50	100	-
i550-C11/400-3	IOFAE311F100D0000S	29		371 x 120 x 60	2.05	50	100	-



## Ecodesign Directive

Product information acc. to REGULATION (EU) 2019/1781 (ANNEX I, Section 4)

### Legend

Validity	The specifications also apply to power units with model identifier I5D□E□□□□ in combination with a control unit I5C...								
Operating point (f; I)	f = relative motor stator frequency; I = relative torque-producing current								
Power losses	The power losses at the operating points (f; I) and in the standby state refer to the rated apparent output power. The power losses for options (e.g. for diagnostics) and for accessories (e.g. mains chokes) can be found in the additional product documentation on the Internet.								

Performance losses	f; I	%	2.7	1.9	1.1	1.0	2.2	2.2	1.8	1.8
0; 25	f; I	%	2.7	1.9	1.1	1.0	2.2	2.2	1.8	1.8
0; 50	f; I	%	2.7	1.9	1.3	1.1	2.2	2.2	1.8	1.8
0; 100	f; I	%	2.9	2.2	1.6	1.5	2.4	2.4	2.0	2.0
50; 25	f; I	%	2.7	2.0	1.2	1.0	2.2	2.3	1.8	1.8
50; 50	f; I	%	2.8	2.0	1.3	1.2	2.3	2.3	1.9	1.9
50; 100	f; I	%	3.1	2.3	1.8	1.7	2.6	2.6	2.2	2.2
90; 50	f; I	%	2.9	2.1	1.4	1.3	2.4	2.4	2.0	2.0
90; 100	f; I	%	3.3	2.6	2.0	1.9	2.9	2.8	2.5	2.4
In standby mode		%	0.9	0.6	0.4	0.3	0.9	0.9	0.6	0.6
Efficiency level			IE2	IE2						
Manufacturer	Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY									
Commercial register number	Hannover HRB 204803									
Model identifier of the product		I55AE125A	I55AE137A	I55AE175A	I55AE211A	I55AE125B	I55AE125D	I55AE137B	I55AE137D	
Apparent output power	kVA	0.6	0.9	1.6	2.2	0.6	0.6	0.9	0.9	
Indicative rated output power of the motor	kW	0.25	0.37	0.75	1.1	0.25	0.25	0.37	0.37	
Rated output current	A	1.7	2.4	4.2	6	1.7	1.7	2.4	2.4	
Maximum operating temperature	°C	45								
Rated input frequency	Hz	50								
Rated input voltage	V	120				230				
Switching frequency	kHz	4								
Rated apparent output power	kVA	0.697	0.977	1.71	2.29	0.697	0.697	0.977	0.977	

# Technical data

Ecodesign Directive



Performance losses		f; I	%	1.6	1.8	1.1	1.1	0.9	1.1	0.8	1.0
0; 25		f; I	%	1.6	1.8	1.1	1.1	0.9	1.1	0.8	1.0
0; 50		f; I	%	1.7	1.8	1.2	1.2	1.1	1.3	0.9	1.1
0; 100		f; I	%	1.9	2.1	1.5	1.6	1.4	1.6	1.2	1.4
50; 25		f; I	%	1.7	1.9	1.1	1.1	1.0	1.2	0.8	1.0
50; 50		f; I	%	1.7	1.9	1.3	1.3	1.1	1.4	1.0	1.2
50; 100		f; I	%	2.1	2.3	1.7	1.7	1.6	1.8	1.4	1.6
90; 50		f; I	%	1.8	2.0	1.3	1.4	1.2	1.4	1.1	1.3
90; 100		f; I	%	2.3	2.4	1.9	1.9	1.9	2.0	1.7	1.8
In standby mode			%	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.2
Efficiency level				IE2							
Manufacturer		Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY									
Commercial register number		Hannover HRB 204803									
Model identifier of the product				I55AE155B	I55AE155D	I55AE175B	I55AE175D	I55AE211B	I55AE211D	I55AE215B	I55AE215D
Apparent output power		kVA		1.2	1.2	1.6	1.6	2.2	2.2	2.6	2.6
Indicative rated output power of the motor		kW		0.55	0.55	0.75	0.75	1.1	1.1	1.5	1.5
Rated output current		A		3.2	3.2	4.2	4.2	6	6	7	7
Maximum operating temperature		°C		45							
Rated input frequency		Hz		50							
Rated input voltage		V		230							
Switching frequency		kHz		4							
Rated apparent output power		kVA		1.19	1.19	1.71	1.71	2.29	2.29	3.3	3.3



**Technical data**  
Ecodesign Directive

Performance losses		f; I	%	0.8	0.9	1.1	0.7	3.1	3.3	2.2	1.9
0; 25		f; I	%	0.8	0.9	1.1	0.7	3.1	3.3	2.2	1.9
0; 50		f; I	%	1.0	1.1	1.3	1.0	3.1	3.4	2.3	2.0
0; 100		f; I	%	1.3	1.4	1.8	1.7	3.3	3.6	2.6	2.3
50; 25		f; I	%	0.9	1.0	1.2	0.8	3.1	3.4	2.2	1.9
50; 50		f; I	%	1.1	1.2	1.5	1.1	3.2	3.4	2.4	2.1
50; 100		f; I	%	1.6	1.6	2.2	1.9	3.5	3.7	2.8	2.5
90; 50		f; I	%	1.2	1.3	1.6	1.2	3.3	3.5	2.5	2.2
90; 100		f; I	%	1.9	1.9	2.5	2.3	3.7	3.9	2.9	2.8
In standby mode			%	0.1	0.1	0.1	0.1	0.6	0.5	0.4	0.3
Efficiency level				IE2							
Manufacturer		Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY									
Commercial register number		Hannover HRB 204803									
Model identifier of the product				I55AE222B	I55AE222D	I55AE240C	I55AE255C	I55AE137F	I55AE155F	I55AE175F	I55AE211F
Apparent output power		kVA		3.6	3.6	6.4	8.7	0.9	1.2	1.6	2.2
Indicative rated output power of the motor		kW		2.2	2.2	4	5.5	0.37	0.55	0.75	1.1
Rated output current		A		9.6	9.6	16.5	23	1.3	1.8	2.4	3.2
Maximum operating temperature		°C					45				
Rated input frequency		Hz					50				
Rated input voltage		V			230				400		
Switching frequency		kHz					4				
Rated apparent output power		kVA		4.44	4.44	7.38	9.95	0.977	1.19	1.71	2.29

# Technical data

Ecodesign Directive



Performance losses		f; I	%	1.2	1.1	1.4	1.2	1.0	0.7	0.5	0.7
0; 25		f; I	%	1.2	1.1	1.4	1.2	1.0	0.7	0.5	0.7
0; 50		f; I	%	1.3	1.3	1.5	1.3	1.1	0.8	0.7	0.9
0; 100		f; I	%	1.6	1.6	1.9	1.7	1.6	1.2	1.0	1.4
50; 25		f; I	%	1.3	1.2	1.4	1.2	1.0	0.7	0.6	0.7
50; 50		f; I	%	1.4	1.3	1.6	1.4	1.2	0.9	0.7	0.9
50; 100		f; I	%	1.8	1.8	2.0	1.9	1.7	1.4	1.2	1.5
90; 50		f; I	%	1.5	1.5	1.6	1.5	1.2	0.9	0.8	1.0
90; 100		f; I	%	2.1	2.1	2.1	2.0	1.9	1.6	1.4	1.8
In standby mode			%	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Efficiency level				IE2							
Manufacturer		Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY									
Commercial register number		Hannover HRB 204803									
Model identifier of the product				I55AE215F	I55AE222F	I55BE230F	I55BE240F	I55AE255F	I55BE275F	I55BE311F	I55AE315F
Apparent output power		kVA		2.6	3.8	4.9	6.4	8.7	11	16	22
Indicative rated output power of the motor		kW		1.5	2.2	3	4	5.5	7.5	11	15
Rated output current		A		3.9	5.6	7.3	9.5	13	16.5	23.5	32
Maximum operating temperature		°C					45				
Rated input frequency		Hz					50				
Rated input voltage		V					400				
Switching frequency		kHz					4				
Rated apparent output power		kVA		3.3	4.44	5.85	7.38	9.95	14.4	19.5	23.9



Performance losses		f; I	%	0.7	0.6	0.5	0.5	0.4	0.5	0.5
0; 25		f; I	%	0.7	0.6	0.5	0.5	0.4	0.5	0.5
0; 50		f; I	%	0.8	0.7	0.7	0.7	0.6	0.6	0.7
0; 100		f; I	%	1.3	1.2	1.2	1.2	1.1	1.0	1.2
50; 25		f; I	%	0.7	0.6	0.6	0.5	0.5	0.5	0.5
50; 50		f; I	%	0.9	0.8	0.8	0.7	0.7	0.6	0.8
50; 100		f; I	%	1.5	1.3	1.4	1.3	1.3	1.2	1.5
90; 50		f; I	%	1.0	0.9	0.9	0.8	0.8	0.7	0.9
90; 100		f; I	%	1.9	1.6	1.6	1.6	1.6	1.5	1.9
In standby mode			%	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Efficiency level				IE2						
Manufacturer		Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY								
Commercial register number		Hannover HRB 204803								
Model identifier of the product			I55AE318F	I55AE322F	I55AE330F	I55AE337F	I55AE345F	I55AE355F	I55AE375F	I55AE390F
Apparent output power		kVA	27	32	41	51	60	75	100	121
Indicative rated output power of the motor		kW	18.5	22	30	37	45	55	75	90
Rated output current		A	40	47	61	76	89	110	150	180
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	400							
Switching frequency		kHz	4							
Rated apparent output power		kVA	28.3	38.2	47	56.2	68.4	92.8	111	135

# Technical data

## Dimensions



Performance losses	f; I	%	
0; 25	f; I	%	0.3
0; 50	f; I	%	0.5
0; 100	f; I	%	0.9
50; 25	f; I	%	0.4
50; 50	f; I	%	0.5
50; 100	f; I	%	1.1
90; 50	f; I	%	0.6
90; 100	f; I	%	1.5
In standby mode		%	0.0
Efficiency level			IE2
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY
Commercial register number			Hannover HRB 204803
Model identifier of the product			I55AE411F
Apparent output power	kVA		142
Indicative rated output power of the motor	kW		110
Rated output current	A		212
Maximum operating temperature	°C		45
Rated input frequency	Hz		50
Rated input voltage	V		400
Switching frequency	kHz		2
Rated apparent output power	kVA		162

## Dimensions



The specified installation clearances are minimum dimensions to ensure a sufficient air circulation for cooling purposes. They do not consider the bend radiiuses of the connecting cables.



Several i5xx frequency inverters can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

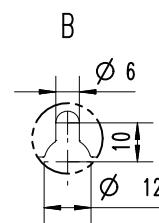
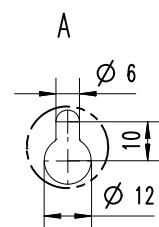
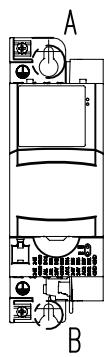
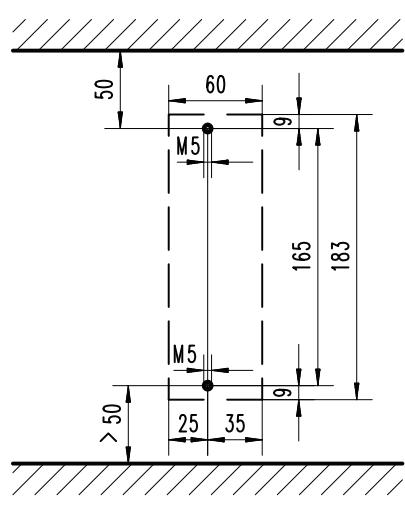
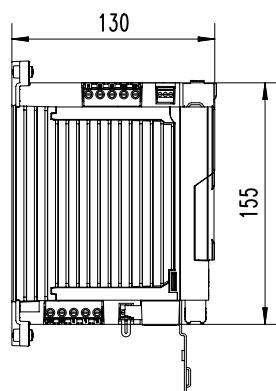
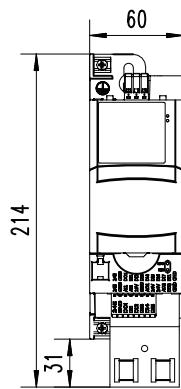


Technical data  
Dimensions

**0.25 kW ... 0.37 kW**

The dimensions in mm apply to:

0.25 kW	i550-C0.25/230-1	i550-C0.25/230-2	
0.37 kW	i550-C0.37/230-1	i550-C0.37/230-2	i550-C0.37/400-3
Weight	0.8 kg	0.8 kg	0.8 kg



8800263

# Technical data

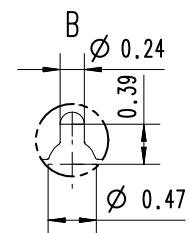
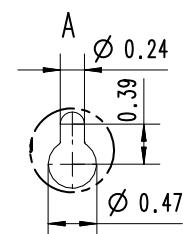
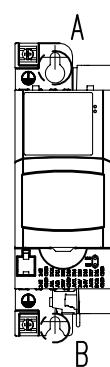
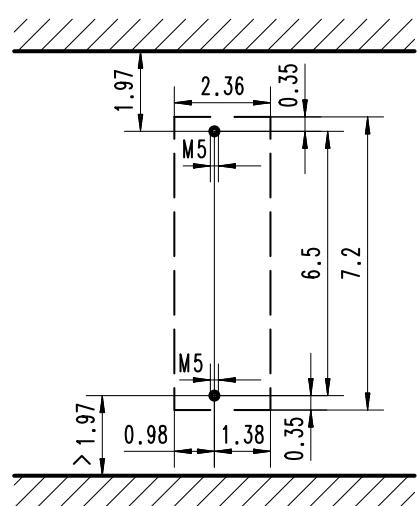
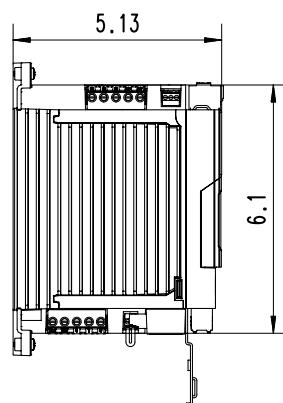
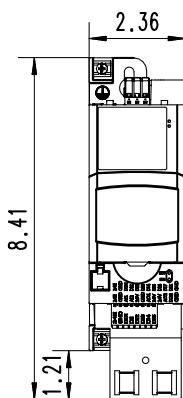
## Dimensions



### 0.33 hp ... 0.5 hp

The dimensions in inch apply to:

0.33 hp	i550-C0.25/230-1	i550-C0.25/230-2	
0.5 hp	i550-C0.37/230-1	i550-C0.37/230-2	i550-C0.37/400-3
Weight	1.8 lb	1.8 lb	1.8 lb



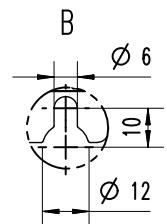
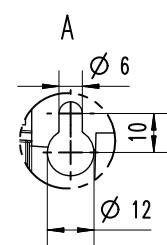
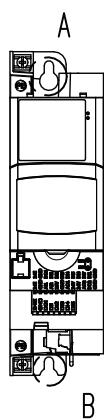
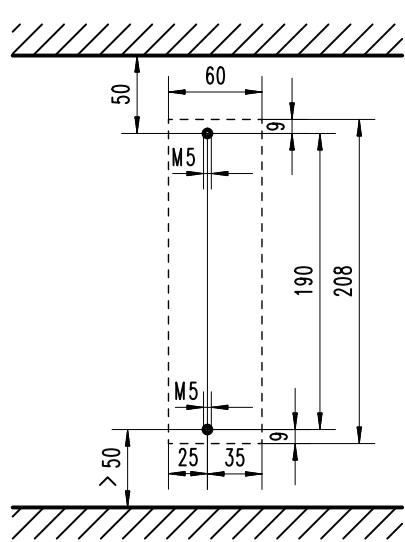
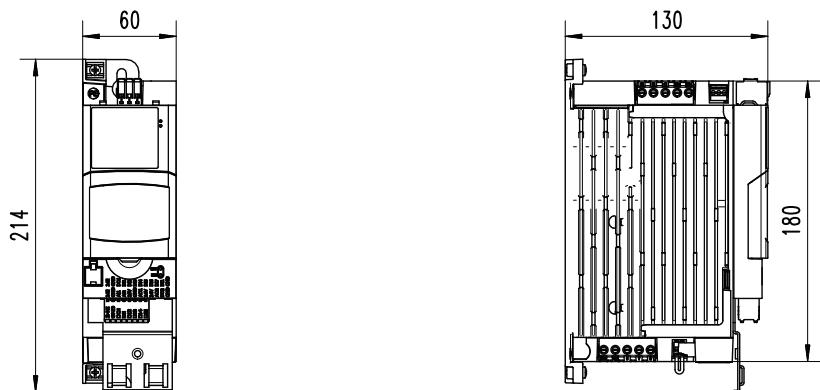
8800298



**0.25 kW ... 0.75 kW**

The dimensions in mm apply to:

0.25 kW	i550-C0.25/120-1			
0.37 kW	i550-C0.37/120-1			
0.55 kW		i550-C0.55/230-1	i550-C0.55/230-2	i550-C0.55/400-3
0.75 kW		i550-C0.75/230-1	i550-C0.75/230-2	i550-C0.75/400-3
Weight	1 kg	1 kg	1 kg	1 kg



# Technical data

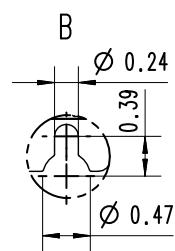
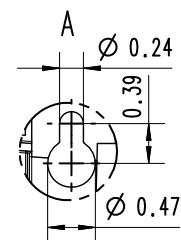
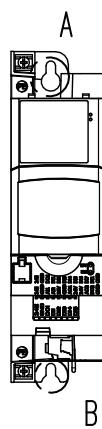
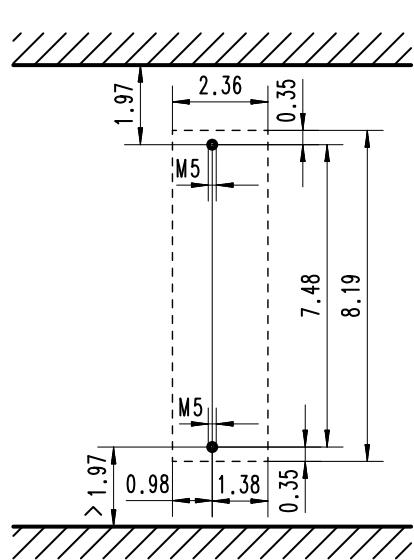
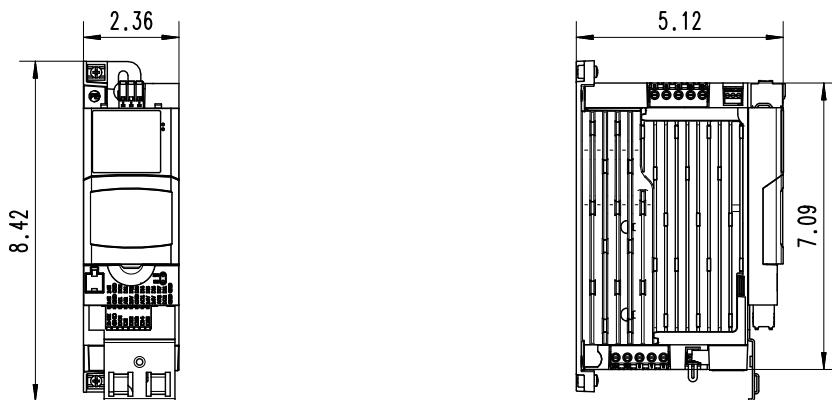
## Dimensions



### 0.33 hp ... 1 hp

The dimensions in inch apply to:

0.33 hp	i550-C0.25/120-1			
0.5 hp	i550-C0.37/120-1			
0.75 hp		i550-C0.55/230-1	i550-C0.55/230-2	i550-C0.55/400-3
1 hp		i550-C0.75/230-1	i550-C0.75/230-2	i550-C0.75/400-3
Weight	2.2 lb	2.2 lb	2.2 lb	2.2 lb



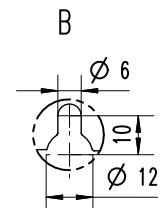
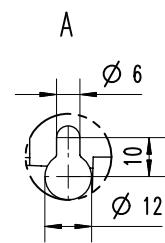
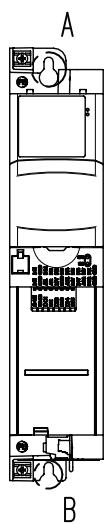
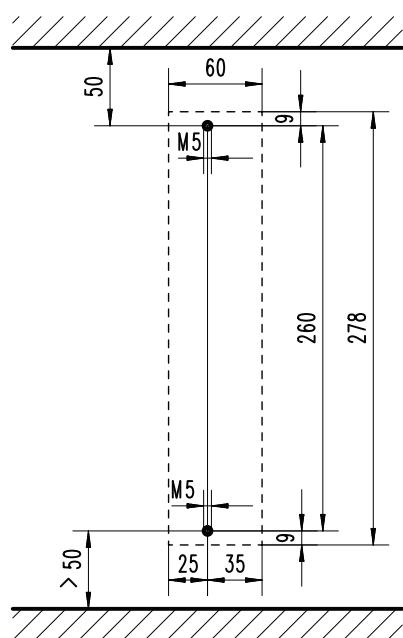
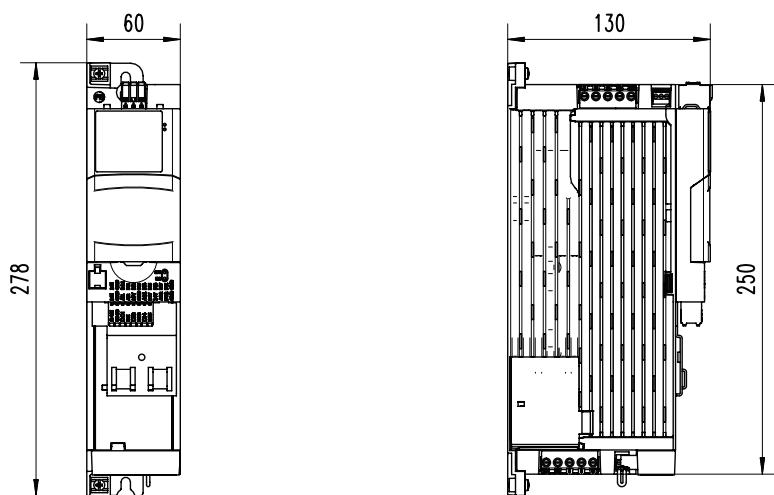
8800299



### 0.75 kW ... 4 kW

The dimensions in mm apply to:

0.75 kW	i550-C0.75/120-1				
1.1 kW	i550-C1.1/120-1	i550-C1.1/230-1	i550-C1.1/230-2	i550-C1.1/400-3	
1.5 kW		i550-C1.5/230-1	i550-C1.5/230-2	i550-C1.5/400-3	
2.2 kW		i550-C2.2/230-1	i550-C2.2/230-2	i550-C2.2/400-3	
3 kW					i550-C3.0/400-3
4 kW					i550-C4.0/400-3
Weight	1.35 kg	1.35 kg	1.35 kg	1.35 kg	1.35 kg



# Technical data

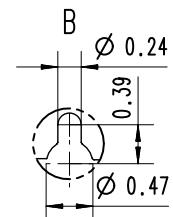
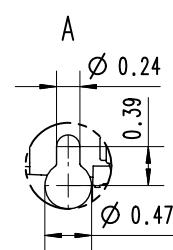
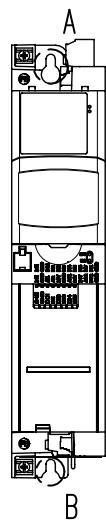
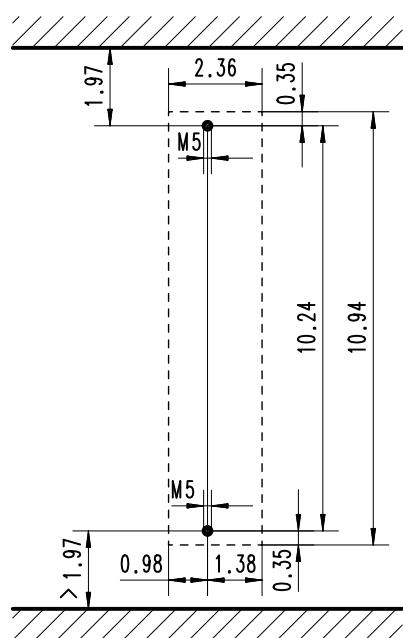
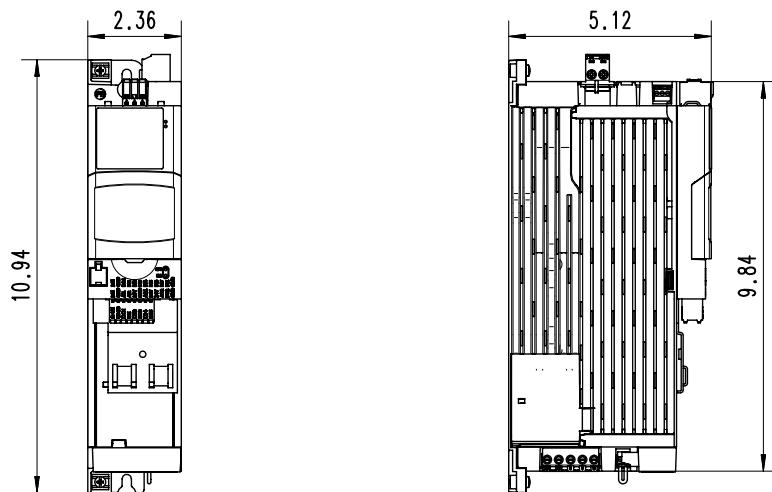
## Dimensions



### 1 hp ... 5 hp

The dimensions in inch apply to:

1 hp	i550-C0.75/120-1				
1.5 hp	i550-C1.1/120-1	i550-C1.1/230-1	i550-C1.1/230-2	i550-C1.1/400-3	
2 hp		i550-C1.5/230-1	i550-C1.5/230-2	i550-C1.5/400-3	
3 hp		i550-C2.2/230-1	i550-C2.2/230-2	i550-C2.2/400-3	
4 hp					i550-C3.0/400-3
5 hp					i550-C4.0/400-3
Weight	3 lb	3 lb	3 lb	3 lb	3 lb



8800300

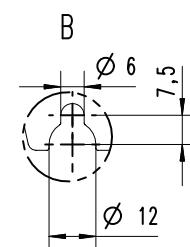
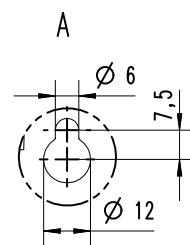
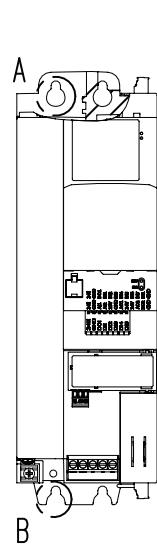
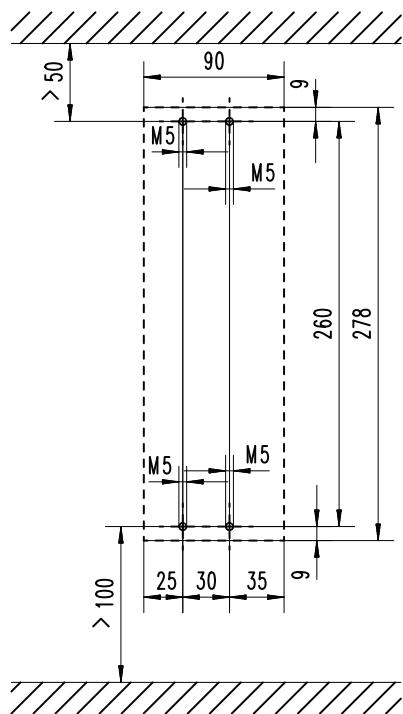
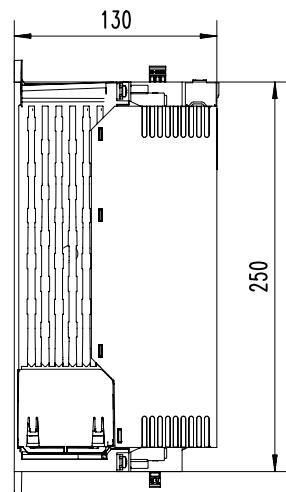
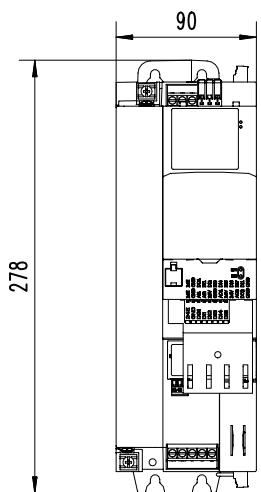


## Technical data Dimensions

**4 kW ... 5.5 kW**

The dimensions in mm apply to:

4 kW	i550-C4.0/230-3	
5.5 kW	i550-C5.5/230-3	i550-C5.5/400-3
Weight	2.1 kg	2.3 kg



8800288

# Technical data

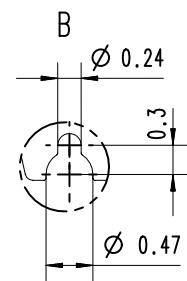
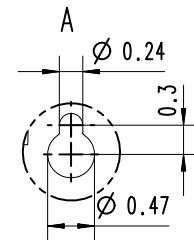
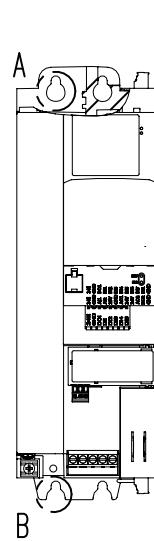
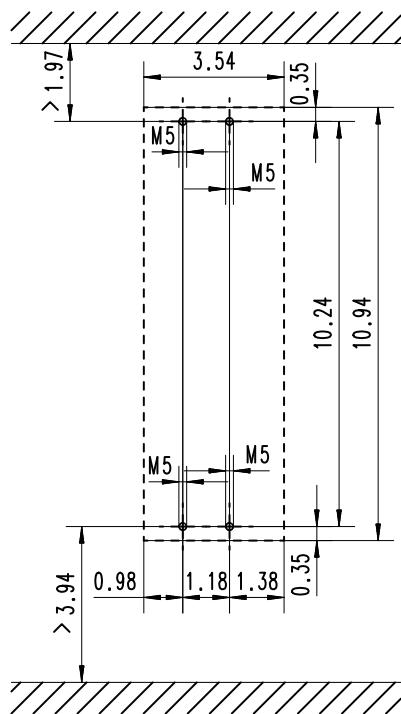
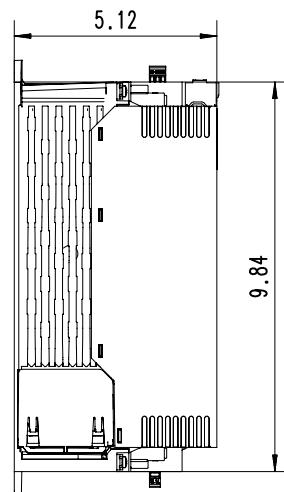
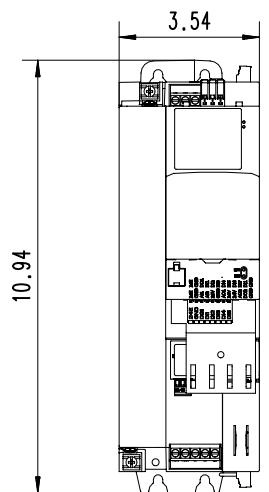
## Dimensions



### 5 hp ... 7.5 hp

The dimensions in inch apply to:

5 hp	i550-C4.0/230-3	
7.5 hp	i550-C5.5/230-3	i550-C5.5/400-3
Weight	4.6 lb	5 lb



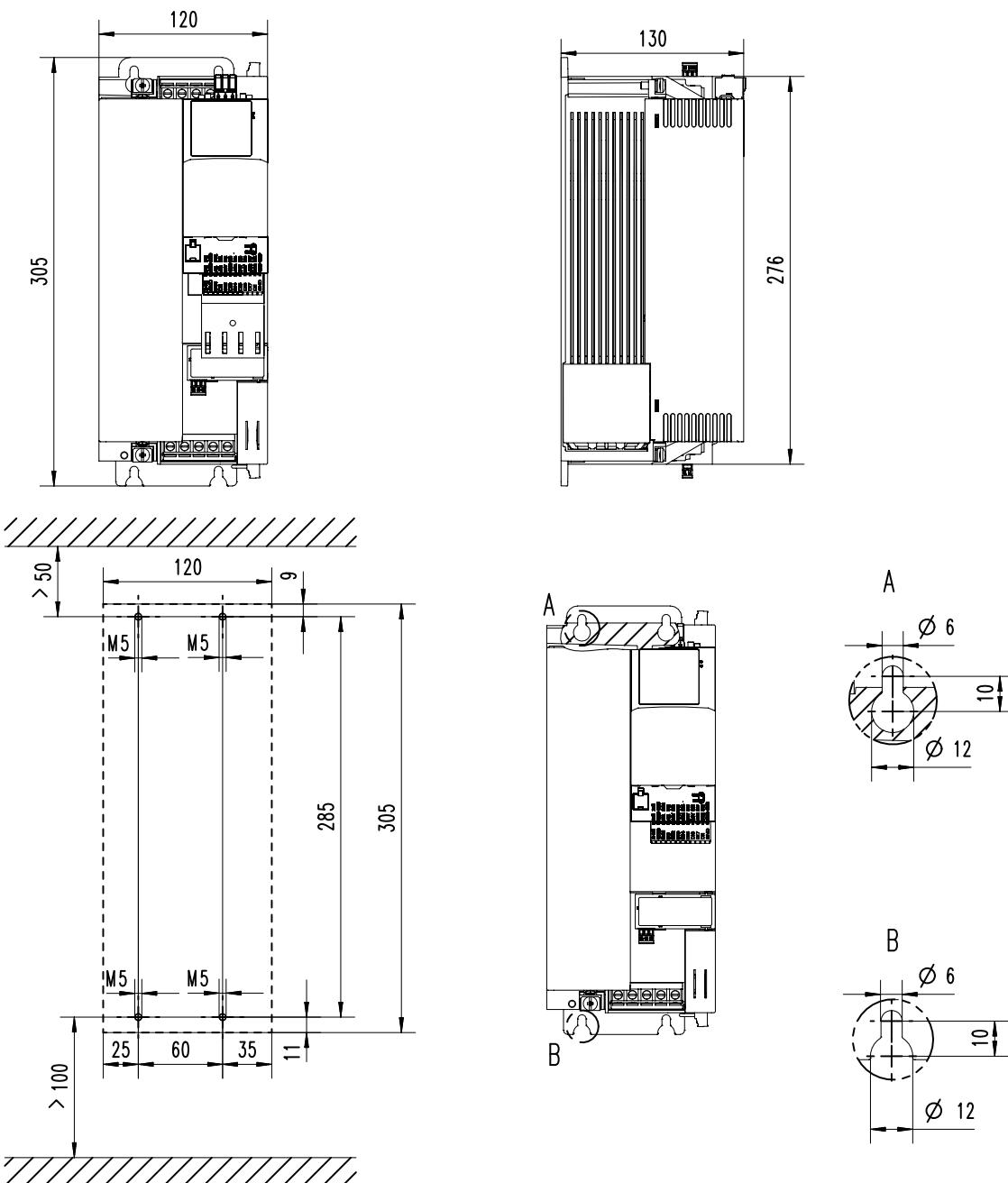
8800302



### 7.5 kW ... 11 kW

The dimensions in mm apply to:

7.5 kW	i550-C7.5/400-3
11 kW	i550-C11/400-3
Weight	3.7 kg



8800296

# Technical data

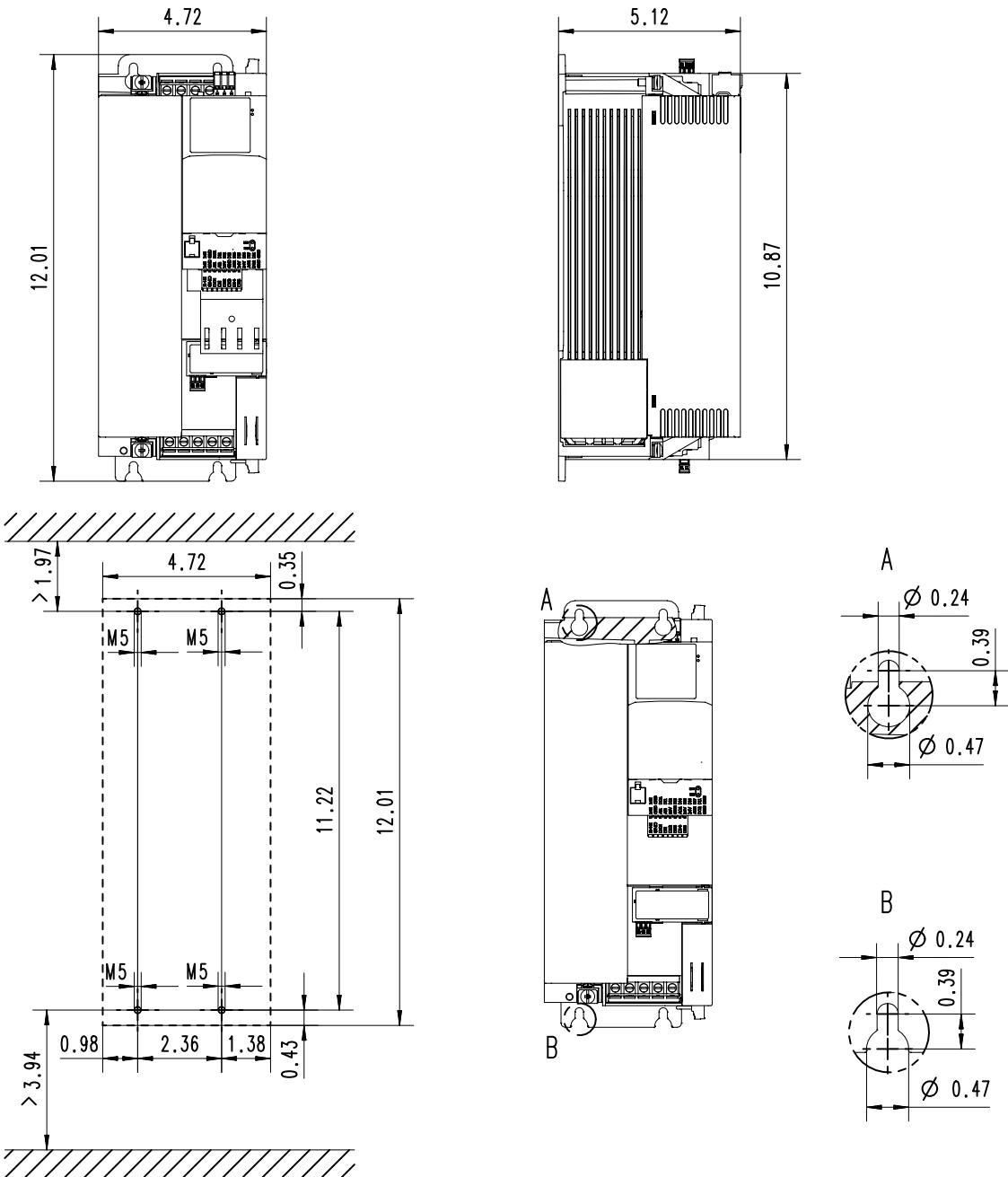
## Dimensions



### 10 hp ... 15 hp

The dimensions in inch apply to:

10 hp	i550-C7.5/400-3
15 hp	i550-C11/400-3
Weight	8 lb



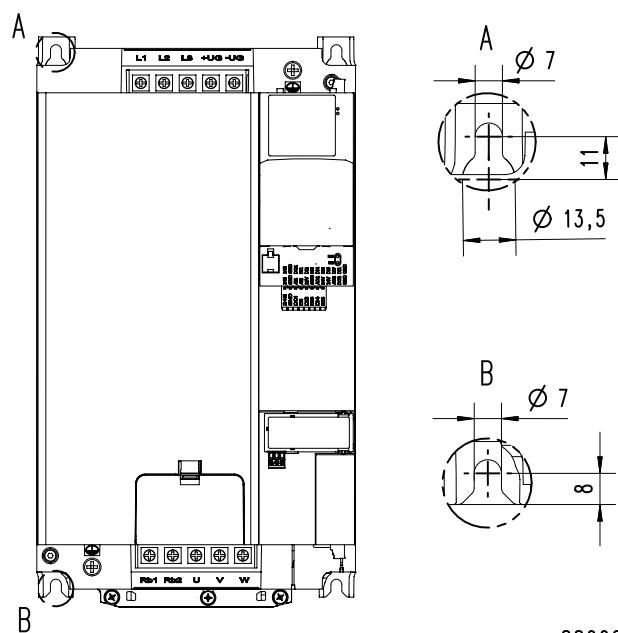
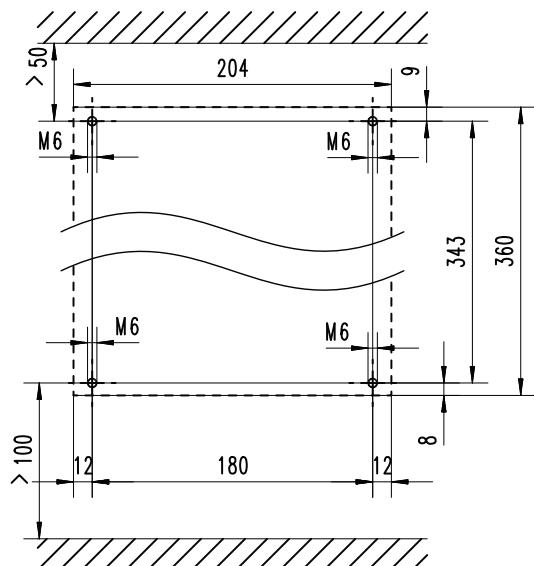
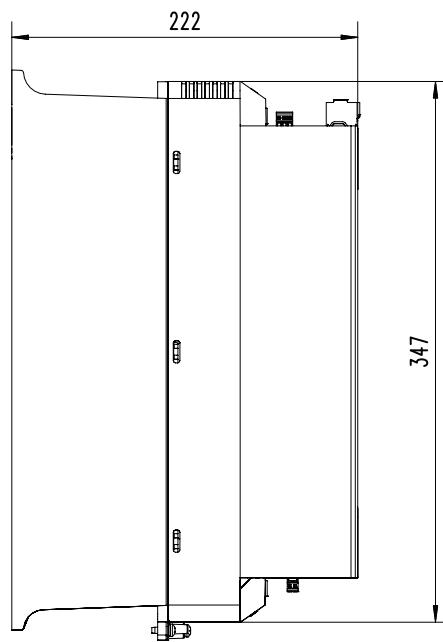
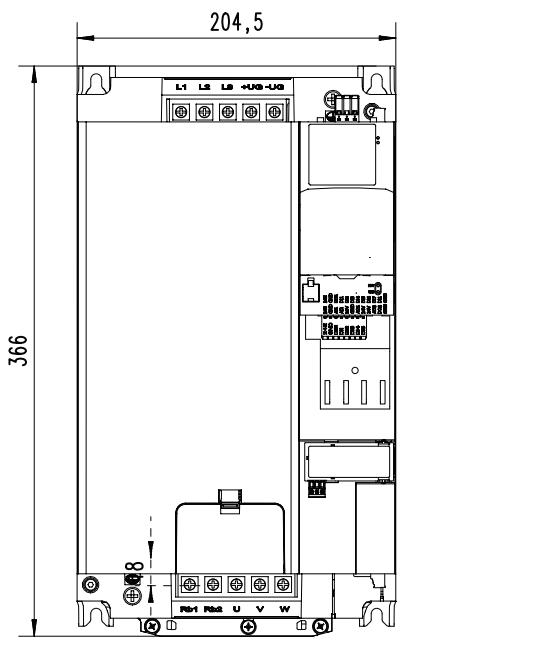
8800303



### 15 kW ... 22 kW

The dimensions in mm apply to:

15 kW	i550-C15/400-3
18.5 kW	i550-C18/400-3
22 kW	i550-C22/400-3
Weight	10.3 kg



8800297

# Technical data

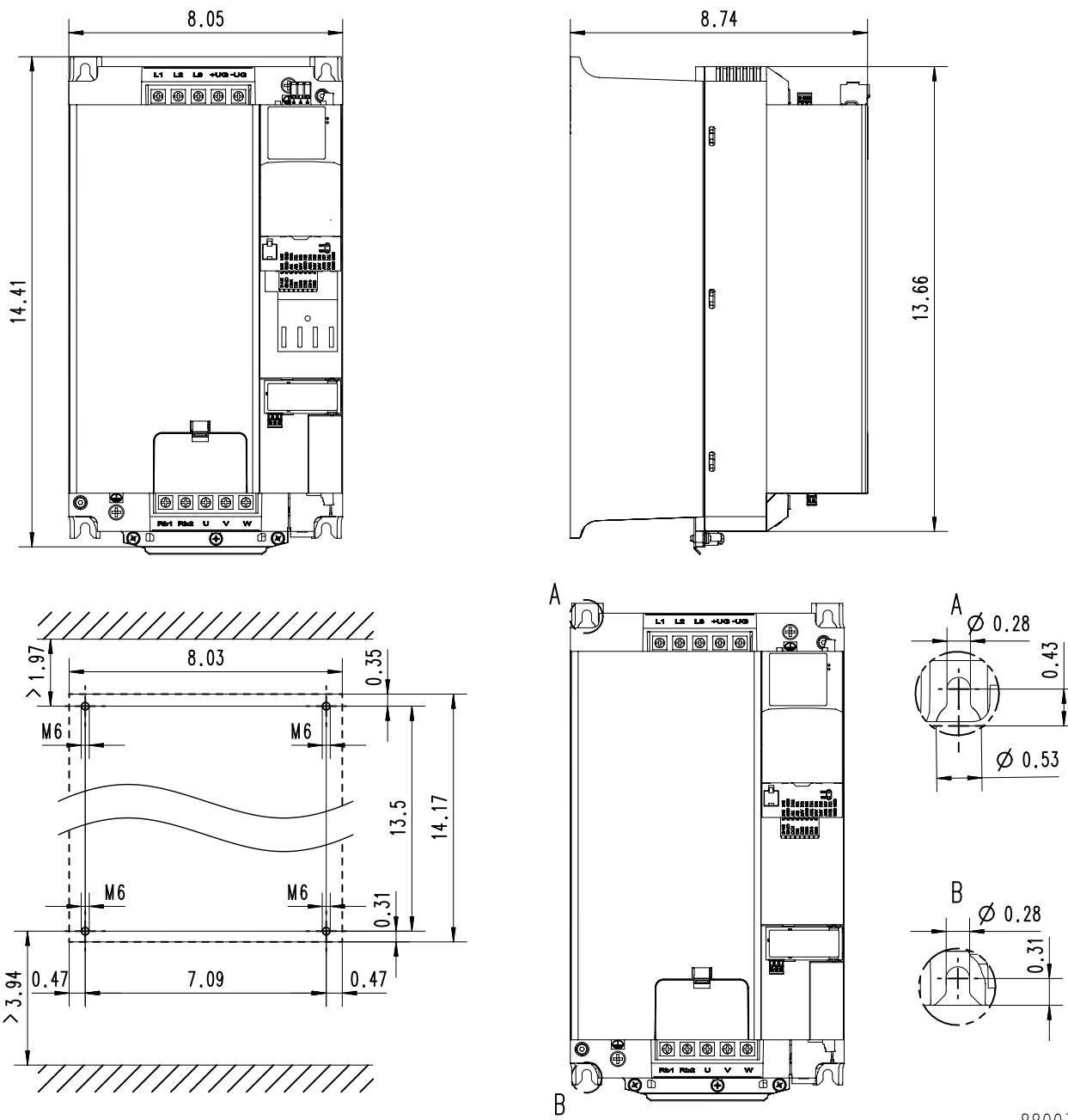
## Dimensions



**20 hp ... 30 hp**

The dimensions in inch apply to:

20 hp	i550-C15/400-3
25 hp	i550-C18/400-3
30 hp	i550-C22/400-3
Weight	23 lb



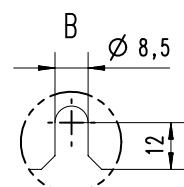
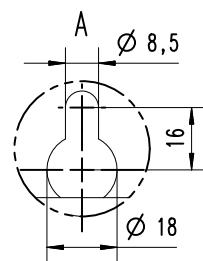
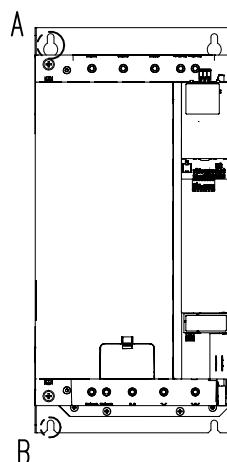
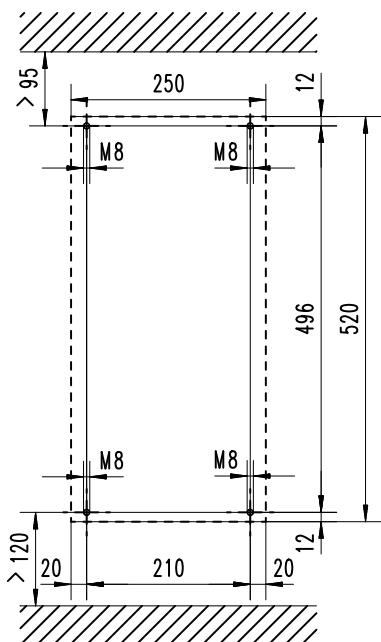
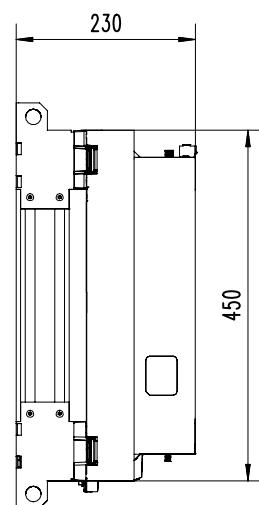
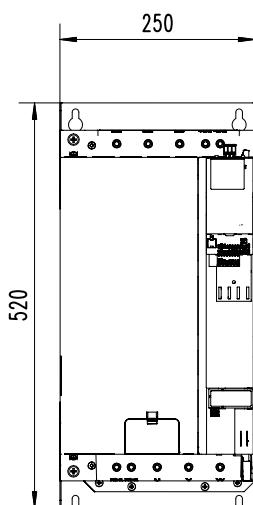
8800304



**30 kW ... 45 kW**

The dimensions in mm apply to:

30 kW	i550-C30/400-3
37 kW	i550-C37/400-3
45 kW	i550-C45/400-3
Weight	17.2 kg



8800313

# Technical data

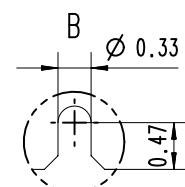
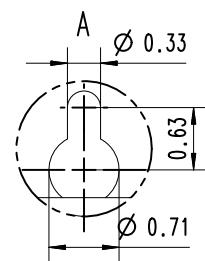
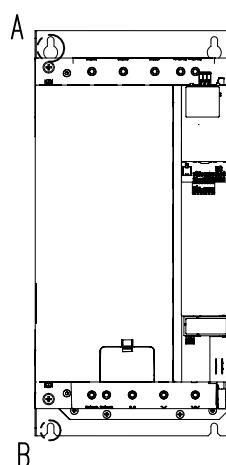
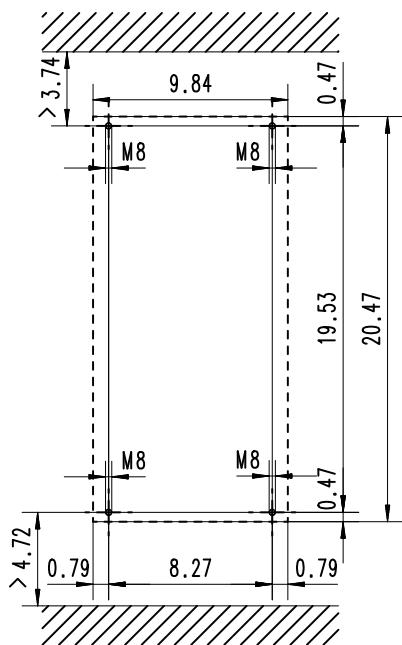
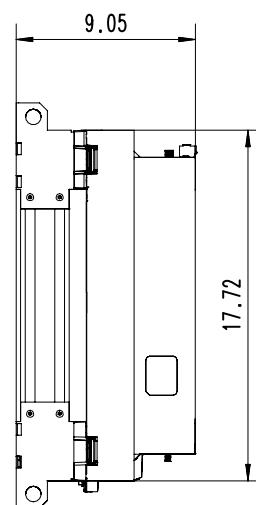
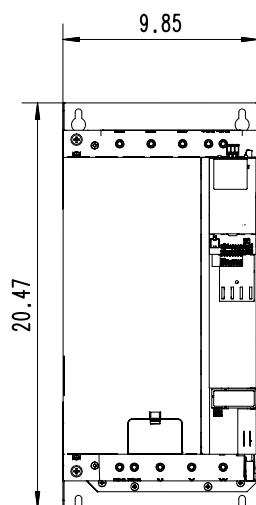
## Dimensions



### 40 hp ... 60 hp

The dimensions in inch apply to:

40 hp	i550-C30/400-3
50 hp	i550-C37/400-3
60 hp	i550-C45/400-3
Weight	38 lb



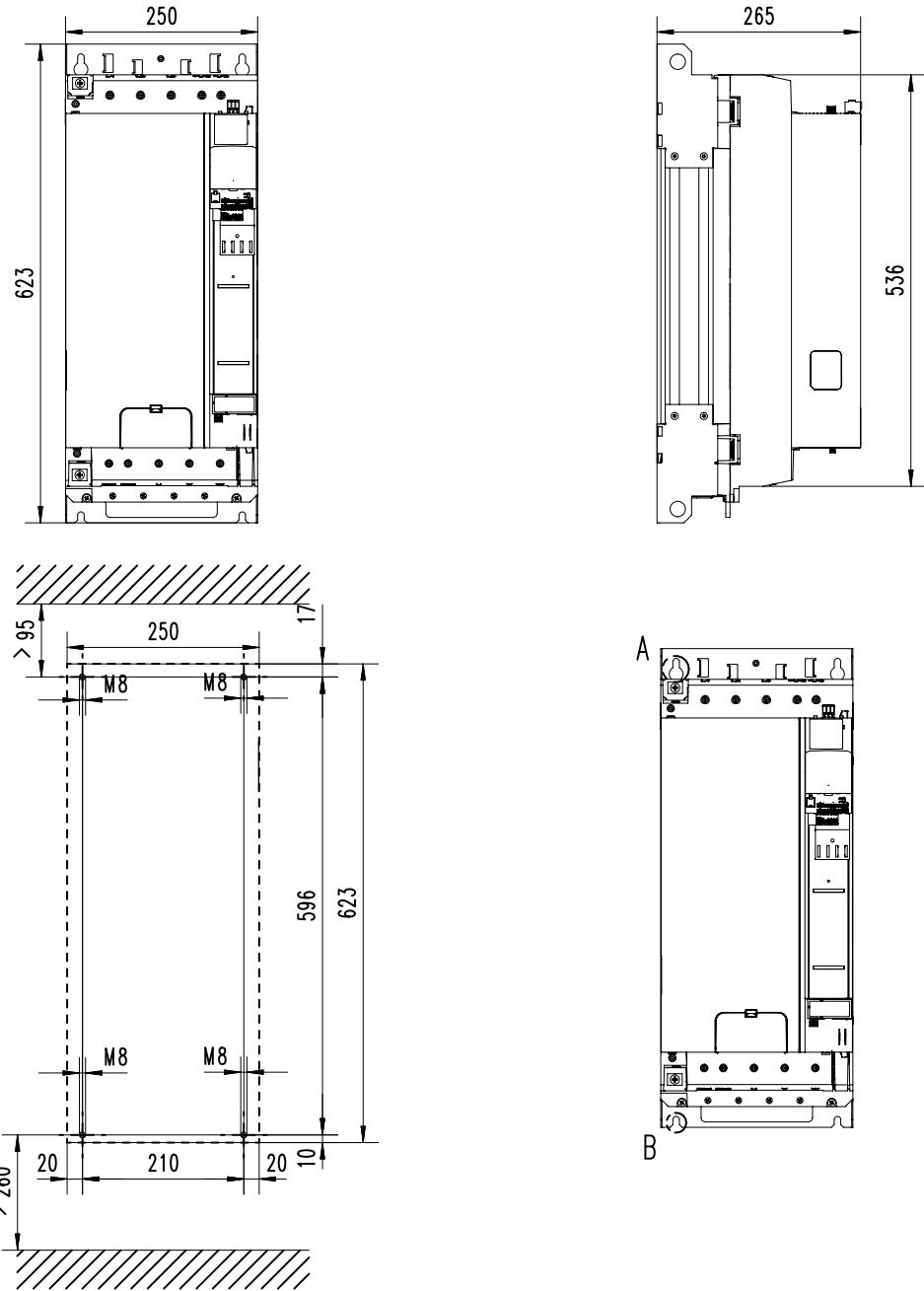
8800313



### 55 kW ... 75 kW

The dimensions in mm apply to:

55 kW	i550-C55/400-3
75 kW	i550-C75/400-3
Weight	24 kg



8800315

# Technical data

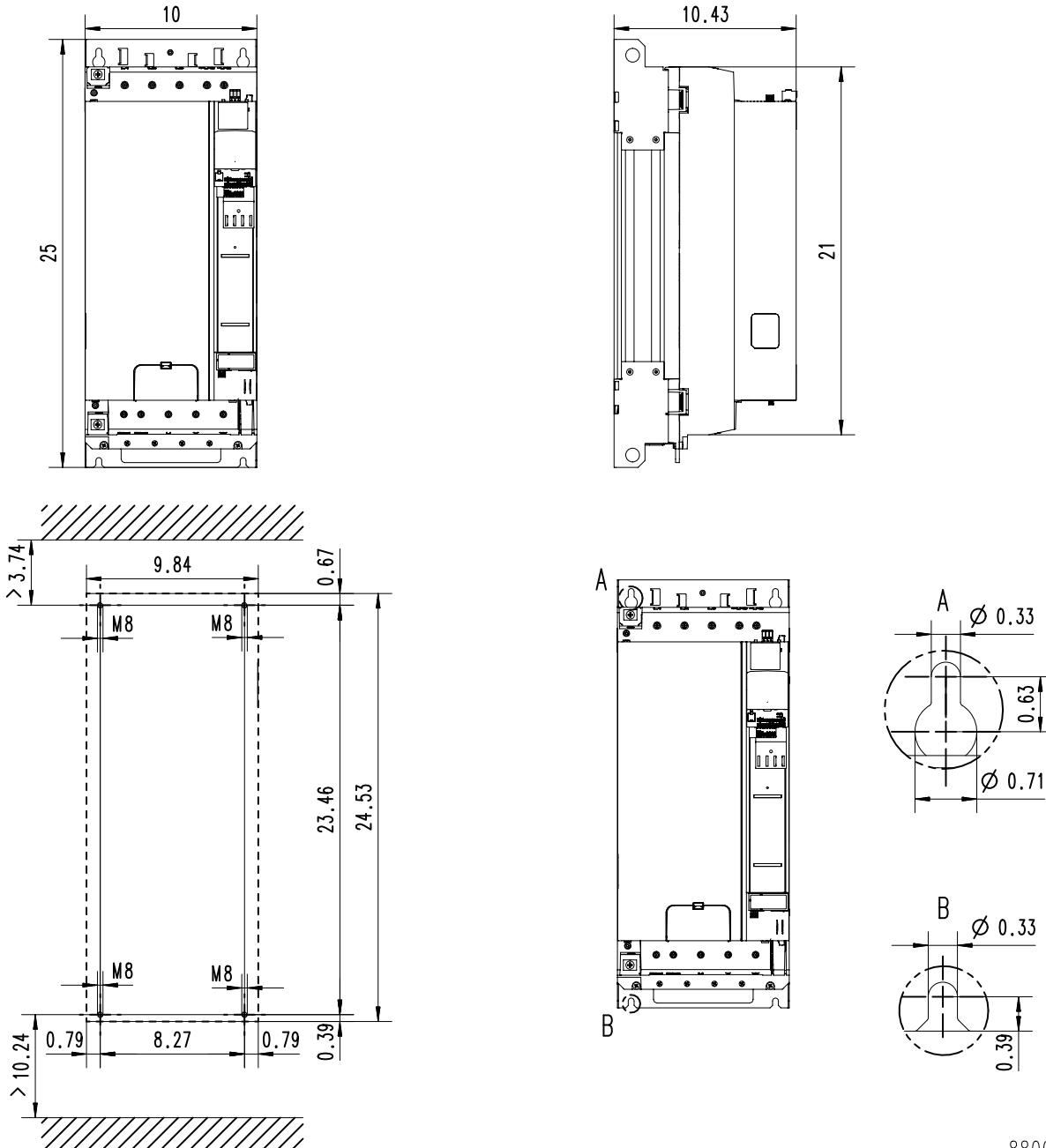
## Dimensions



### 75 hp ... 100 hp

The dimensions in inch apply to:

75 hp	i550-C55/400-3
100 hp	i550-C75/400-3
Weight	53 lb



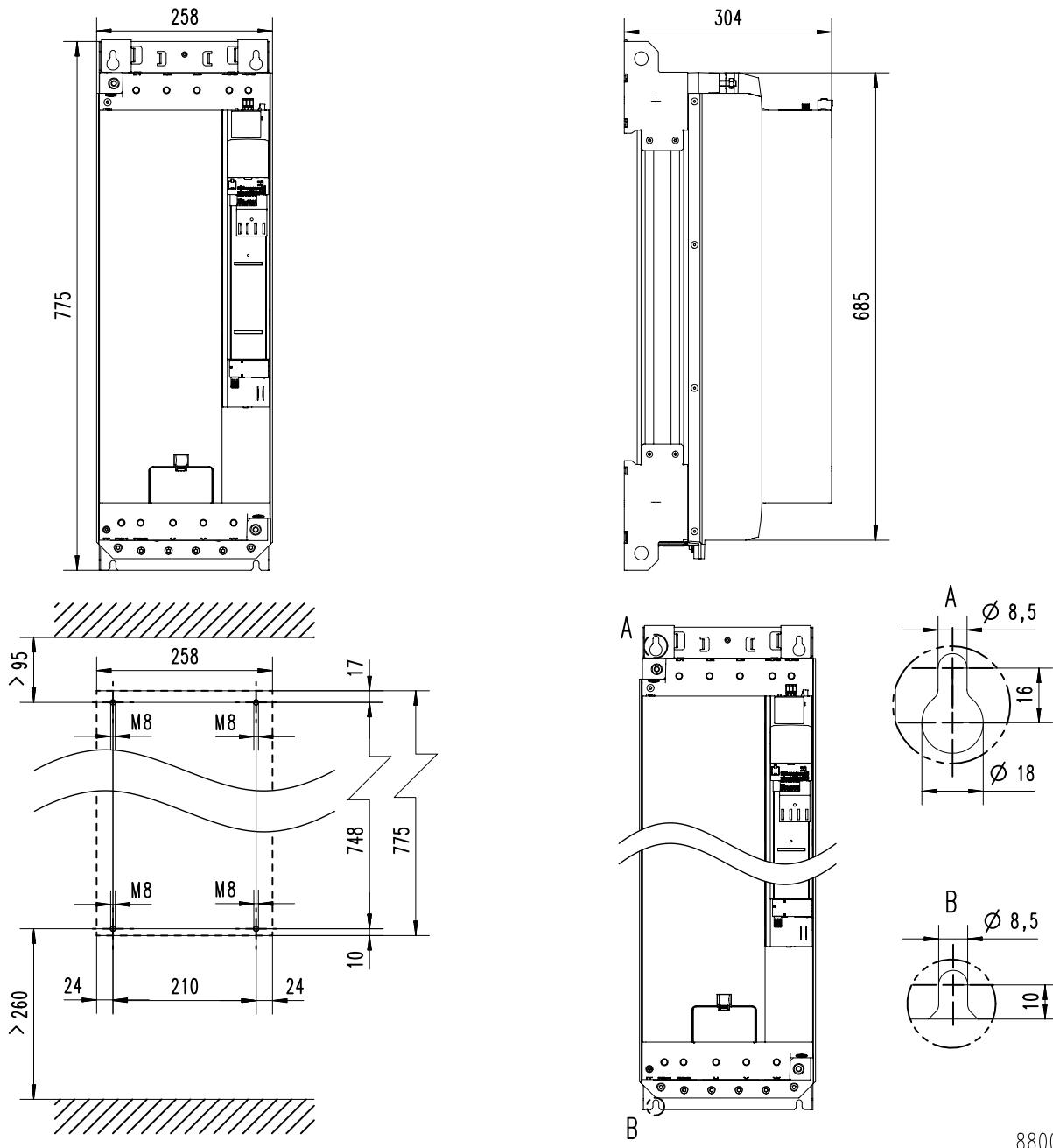
8800316



**90 kW ... 110 kW**

The dimensions in mm apply to:

90 kW	i550-C90/400-3
110 kW	i550-C110/400-3
Weight	35.6 kg



8800536

# Technical data

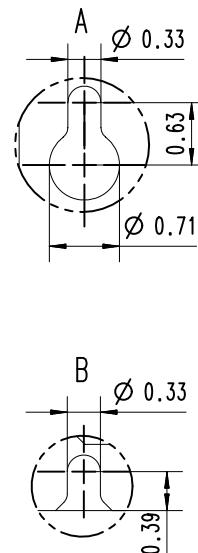
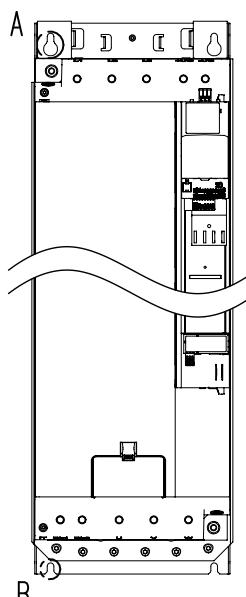
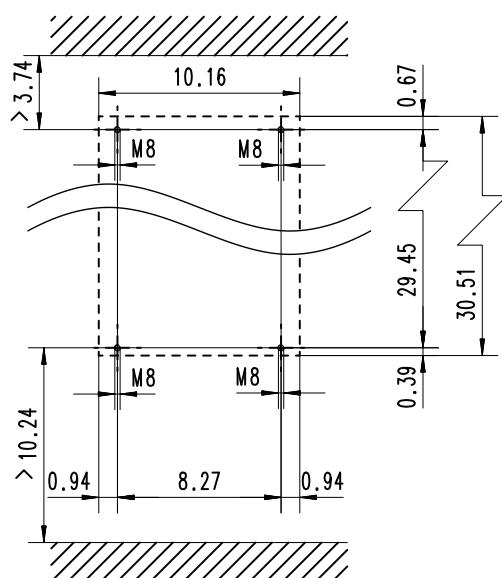
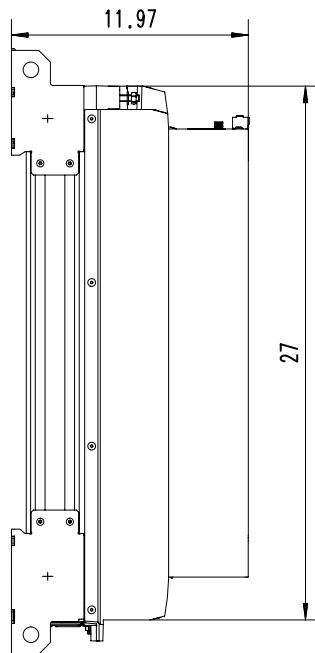
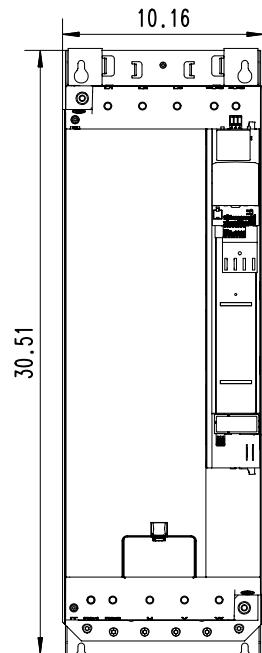
## Dimensions



### 125 hp ... 150 hp

The dimensions in inch apply to:

125 hp	i550-C90/400-3
150 hp	i550-C110/400-3
Weight	78.5 lb



8800537



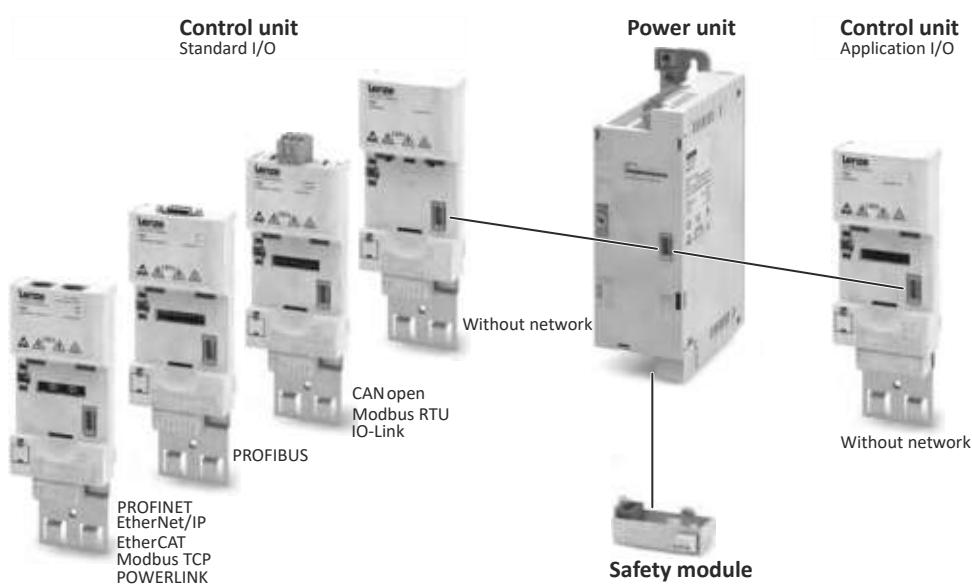
## Product extensions

### Overview

The inverters can easily be integrated into the machine. The scalable product extensions serve to flexibly match the required functions to your application.

The control unit with standard I/O can be extended with different networks.

The control unit with application I/O provides additional inputs and outputs (I/Os). A network component is not available.



# Product extensions

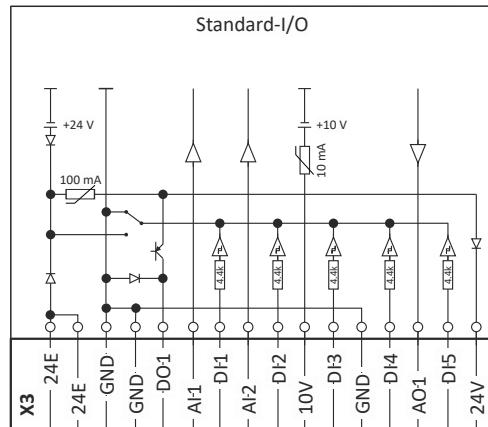
I/O extensions  
Standard I/O



## I/O extensions

### Standard I/O

The standard I/O provides the inverter with analog and digital inputs and outputs and is designed for standard applications. The standard I/O is available with different networks.



### Control terminal X3

Inputs/outputs	Terminal	Description
Digital inputs	DI1, DI2, DI3, DI4, DI5	DI3/DI4 can be optionally used as frequency or encoder input. HIGH active/LOW active switchable.
Digital outputs	DO1	
Analog inputs	AI1, AI2	Can be optionally used as voltage or current input.
Analog outputs	AO1	Can be optionally used as voltage or current output.
24-V input	24E	Mains-independent DC supply of the control electronics (incl. communication)
10-V output	10 V	Reference voltage or setpoint potentiometer
24-V output	24V	Primarily for supplying digital inputs or Basic Safety - STO; SELV/PELV
Reference potential	GND	
Connection system		Spring terminals, not pluggable



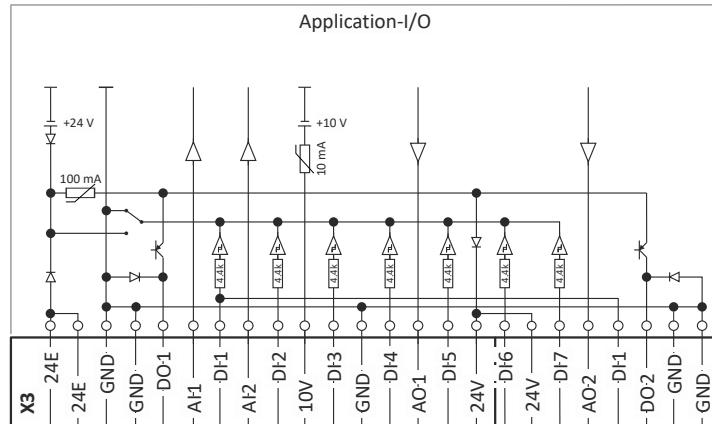
## Product extensions

I/O extensions

Application I/O

### Application I/O

In addition to the standard I/O, the application I/O provides the inverter with more digital and analog inputs and is intended for individual applications. The combination with network components is not available.



Digital inputs	Terminal X3: DI1, DI2, DI3, DI4, DI5, DI6, DI7	DI3/DI4 can be optionally used as frequency or encoder input. HIGH active/LOW active switchable
Digital outputs	Terminal X3: DO1, DO2	
Analog inputs	Terminal X3: AI1, AI2	can be optionally used as voltage or current input.
Analog outputs	Terminal X3: AO1, AO2	Can be optionally used as voltage or current output.
24-V input	Terminal X3: 24E	Mains-independent DC supply of the control electronics (incl. communication)
10-V output	Terminal X3: 10V	Reference voltage for setpoint potentiometer
24-V output	Terminal X3: 24V	
Reference potential	Terminal X3: GND	
Connection system	Pluggable spring terminal	

# Product extensions

I/O extensions

Data of control connections



## Data of control connections

### Digital inputs

Switching type		PNP, NPN	Parameterisable
PNP switching level			
LOW	V	< +5	IEC 61131-2, type 1
HIGH	V	> +15	
NPN switching level			
LOW	V	> +15	
HIGH	V	< +5	
Input resistance	kΩ	4.6	
Cycle time	ms	1	
Electric strength of external voltage	V	± 30	

Frequency input			
Connection		X3/DI3, X3/DI4	
Frequency range	kHz	0 ... 100	

Encoder input			
Type		Incremental HTL encoder	
Two-track connection		X3/DI3 X3/DI4	Track A Track B
Frequency range	kHz	0 ... 100	

### Digital outputs

Switching level			
LOW	V	< +5	IEC 61131-2, type 1
HIGH	V	> +15	
max. output current	mA	100	Total current for DO1 and 24V
Cycle time	ms	1	
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	± 30	
Polarity reversal protection		Integrated freewheeling diode for switching the inductive load	
Overload behaviour		Reduced voltage or periodic switch-off/on	
Reset or switch-on behaviour		Output is switched off	LOW



## Product extensions

I/O extensions

Data of control connections

### Analog inputs

Cycle time	ms	1	
Resolution of A/D converter	Bit	12	
Operation as voltage input			
Connection designation		X3/AI1, X3/AI2	
Input voltage DC	V	-10 ... 10	
Input resistance	kΩ	70	
Accuracy	mV	± 50	Typical
Input voltage in case of open circuit	V	-0.2 ... 0.2	Display "0"
Electric strength of external voltage	V	± 24	
Operation as current input			
Connection designation		X3/AI1, X3/AI2	
Input current	mA	0 ... 20	
		4 ... 20	open-circuit monitored
Accuracy	mA	± 0.1	Typical
Input current in case of open circuit	mA	< 0.1	Display "0"
Input resistance	Ω	< 250	
Electric strength of external voltage	V	± 24	

### Analog outputs

Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 24V	
Operation as voltage output			
Resolution of D/A converter	Bit	12	
Output voltage DC	V	0 ... 10	
max. output current	mA	5	
min. load resistance	kΩ	≥ 2.2	
max. capacitive load	µF	1	
Accuracy	mV	± 100	Typical
Operation as current output			
Output current	mA	0 ... 20	
		4 ... 20	open-circuit monitored
Accuracy	mA	± 0.3	Typical

### 10-V output

Use		Primarily for the supply of a potentiometer (1 ... 10 kΩ)	
Output voltage DC			
Typical	V	10	
Accuracy	mV	± 100	
Max. output current	mA	10	
Max. capacitive load	µF	1	
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 24	

# Product extensions

I/O extensions

Data of control connections



## 24-V input

Use		Input for mains-independent DC supply of the control electronics (incl. communication)	
Input voltage DC			
Typical	V	24	IEC 61131-2
Area	V	19.2 ... 28.8	
Input power			
Typical	W	3.6	
Max.	W	6	Depending on the use and state of inputs and outputs.
Input current			
Typical	A	0.150	
Max.	A	1.0	When switching on for 50 ms
Capacity to be charged	µF	440	
Polarity reversal protection		When polarity is reversed: No function and no destruction	
Suppression of voltage pulses		Suppressor diode 30 V, bidirectional	
Power supply unit		SELV/PELV	Externally to create a mains-independent DC supply
Max. current	A	8.0	While looping-through

## 24-V output

Use		Primarily for supplying digital inputs or passive sensors at X1	SELV/PELV
Output voltage DC			
Typical	V	24	
Range	V	16 ... 28	
max. output current	mA	100	Total current for DO... and 24V
Short-circuit strength		Unlimited period	
External-voltage protection	V	+ 30	
Overcurrent fusing		Automatically resettable	



## Product extensions

Further control connections  
Relay output

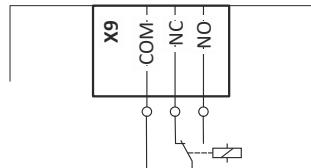
### Further control connections

#### Relay output



Use a corresponding suppressor circuit in case of an inductive or capacitive load!

Connection	Terminal X9: COM	Common contact (Common)
	Terminal X9: NC	Normally closed contact
	Terminal X9: NO	Normally open contact
Minimum DC contact load		
Voltage	V	10
Current	mA	10
Switching voltage/switching current		
AC 240 V	A	3
Maximum	24 V DC	According to UL: General Purpose
	240 V DC	According to UL: Resistive



#### PTC input



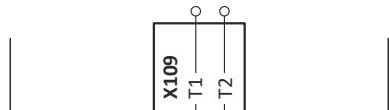
The external PTC sensor must have the following **electrical insulation** incl. wiring:

At least one basic insulation to the power potential and at least one basic insulation to the control potential.



In the Lenze setting, motor temperature monitoring is activated! In the delivery status, there is a wire jumper between the terminals T1 and T2. Before connecting a thermal sensor, remove the wire jumper.

Use	Connection of PTC or thermal contact
Connection	Terminal X109: T1 Terminal X109: T2
Sensor types	PTC single sensor (DIN 44081) PTC triple sensor (DIN 44082) Thermal contact



# Product extensions

Networks  
CANopen



## Networks

### CANopen

CANopen is an internationally approved communication protocol which is designed for commercial and industrial automation applications. High data transfer rates in connection with efficient data formatting provide for the coordination of motion control devices in multi-axis applications.

General information			
Version		Optionally Integrated in standard I/O	
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND
Bus-related information			
Name		CANopen CiA 301 V4.2.0	
Communication medium		CAN cable in accordance with ISO 11898-2	
Use		Connection of inverter to a CANopen network	
Connection system		Pluggable double spring terminal	
Status display		2 LEDs	
Connection designation		X216: CH, CL, CG	
Technical data			
Bus terminating resistor	Ω	120	Terminated on both sides
integrated bus terminating resistor		Yes	Activation via DIP switch
Network topology			
without repeater		Line	
with repeater		Line or tree	
Station			
Type		Slave	
Max. number without repeater		127	per bus segment, incl. host system
Address		1 ... 127	Adjustable via code or DIP switch
Baud rate	kbps	20, 50, 125, 250, 500, 800 or 1000	Adjustable via code or DIP switch
Max. bus length	m	2500, 1000, 500, 250, 100, 50 or 25	Total cable length depends on the baud rate
Max. cable length between two nodes		not limited, the max. bus length is decisive	
Process data			
Transmit PDOs		3 TPDOs with 1 ... 8 bytes (adjustable)	
Receive PDOs		3 RPDOs with 1 ... 8 bytes (adjustable)	
Transmission mode for TPDOs			
With change of data		Yes	
Time-controlled, multiple of	ms	10	
After reception		1 ... 240 sync telegrams	
Parameter data			
SDO channels		Max. 2 servers	
Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	



## Product extensions

Networks

CANopen

### Processing time of process data

Update cycle	ms	10	In inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

### Other data

Note: There are no interdependencies between parameter data and process data.

# Product extensions

Networks  
Modbus RTU



## Modbus RTU

Modbus is an internationally approved, asynchronous, serial communication protocol, designed for commercial and industrial automation applications.

General information				
Version		Optionally Integrated in standard I/O		
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent	
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND	
Bus-related information				
Name		Modbus RTU		
Communication medium		RS485 (EIA)		
Use		Connection of inverter to a Modbus network		
Connection system		Pluggable double spring terminal		
Status display		2 LEDs		
Connection designation		X216: TA, TB, COM		
Technical data				
Communication profile		Modbus RTU		
Bus terminating resistor	Ω	120	Terminated on both sides	
Integrated bus terminating resistor		Yes	Activation via DIP switch	
Network topology				
Without repeater		Line		
Station				
Type		Slave		
Max. number without repeater		32	Per bus segment, incl. host system	
Max. number with repeater		90		
Address		1 ... 247	Adjustable via code or DIP switch	
Transfer rate	kbit/s	4.8 ... 115	Adjustable via code or DIP switch, alternatively automatic detection via DIP switch can be activated	
Max. cable length	m	12 ... 600	Per bus segment, depending on the transfer rate and the cable type used	
Max. cable length between two nodes		not limited, the max. bus length is decisive		
Data channel				
SDO channels		Max. 2 servers, with 1 ... 8 bytes	Supported functions: Read Holding Registers Preset Single Register Preset Multiple Registers Read/Write 4 x registers	
Communication time				
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response	
		Telegram runtime (baud rate, telegram length)		
		Nesting depth of network		
		Bus load		
Processing time of process data				
Update cycle	ms	1	In the inverter	
Processing time	ms	0 ... 1		
Application task runtime of the technology application used (tolerance)	ms	1 ... x		
Other data				
Note: There are no interdependencies between parameter data and process data.				



## Product extensions

Networks

IO-Link

### IO-Link

IO-Link is the standardized IO technology (IEC 61131-9) for communication with sensors and actuators. Point-to-point communication is based on the 3-wire sensor and actuator connection without additional requirements concerning the cable material.

General information		
Version		Optionally Integrated in standard I/O
DC supply of the control electronics and optional fieldbus	Internally via the inverter	Network-dependent
	Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND

Bus-related information		
Name		IO-Link V 1.1
Communication medium		Unshielded 3-wire standard cable
Use		Connection of the inverter to an I/O-Link Master
Connection system		Pluggable double spring terminal
Status display		1 LED
Connection designation		X316: L+, C/Q, L-

Technical data		
Topology		
Master - slave		Tree (point to point)
Station		
Type		Slave
Master - slave		1:1
Baud rate	kbps	230.4
Max. length	m	20
Max. cable length between IO-Link master and IO-Link slave (i550)		20
Process data		
Input		12 Byte / 6 Byte
Output		12 Byte / 6 Byte Can be defined by selecting the IODD (12 bytes or 6 bytes).

Processing time of process data			
Cycle time	ms	2	

# Product extensions

Networks  
PROFIBUS



## PROFIBUS

PROFIBUS is a common fieldbus for the connection of inverters to different control systems in plants.

General information		
Version	Optionally Integrated in standard I/O	
DC supply of the control electronics and optional fieldbus	Internally via the inverter	Network-dependent
	Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND

Bus-related information		
Name	PROFIBUS-DP	
Communication medium	RS485	
Use	Connection of the inverter to a PROFIBUS-DP network	
Connection system	9-pole Sub-D socket	
Status display	2 LEDs	
Connection designation	X226: Pin 1 ... 9	

Technical data			
Communication profile	PROFIBUS-DP-V0	DRIVECOM parameter data channel	
	PROFIBUS-DP-V1	PROFIDrive parameter data channel	
Bus terminating resistor	Ω	120	Terminated on both sides
integrated bus terminating resistor		No	
Network topology		Line	
Without repeater		-	
With repeater			
Station			
Type		Slave	
Max. Number without repeater	32	per bus segment, incl. host system	
Max. Number with repeater	125		
Address		1 ... 127	Adjustable via code or DIP switch
Transfer rate	kbps	9.6 ... 12000	Automatic detection for cable type A (EN 50170)
Max. Bus length	m	1200	Per bus segment, depending on the transfer rate and the cable type used
Max. Cable length between two nodes		not limited, the max. bus length is decisive	
Process data			
PZD		1 ... 16 words (16 bits/word) per direction	Max. 32 bits (4 bytes) as a coherent PDO object
Transmission mode			
Data length, cyclic		1 ... 16 words, process data channel + 4 words of disconnectable parameter data channel	
Identification number		0x0E550	
User data			
Cyclic (DP-V0)		4 bytes	
Acyclic (DP-V1)		Max. 240 bytes	

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	



## Product extensions

Networks

PROFIBUS

### Processing time of process data

Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

### Other data

Note: There are no interdependencies between parameter data and process data.

# Product extensions

Networks  
EtherCAT



## EtherCAT

EtherCAT® (Ethernet for Controller and Automation Technology) is an Ethernet-based fieldbus system which fulfils the application profile for industrial plant systems.

General information				
Version		Optionally Integrated in standard I/O		
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent	
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND	
Bus-related information				
Name		EtherCAT		
Communication medium		Ethernet 100 Mbps, full duplex		
Use		Connection as EtherCAT slave		
Status display		2 LEDs (RUN, ERR)		
Connection designation		IN: X246 OUT: X247		
Technical data				
Communication profile		EtherCAT		
		CANopen over EtherCAT		
Safety over EtherCAT (FSoE)		Yes		
Vendor ID [hex]		0x3B		
Network topology		Line, tree ring		
Device				
Type		EtherCAT slave		
Max. number		65535	In the entire network	
Address		Automatically assigned by the master		
Max. cable length	m	Not limited	The length between the devices is decisive.	
Max. cable length between two devices	m	100		
Process data				
Transmit PDOs		0 ... 16 double words	Max. 64 bytes	
Receive PDOs		0 ... 16 double words		
Cycle time	ms	Integer multiple of 1 ms		
Communication time				
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response	
		Telegram runtime (baud rate, telegram length)		
		Nesting depth of network		
		Bus load		
Processing time of process data				
Update cycle	ms	1	In the inverter	
Processing time	ms	0 ... 1		
Application task runtime of the technology application used (tolerance)	ms	1 ... x		
Other data				
Note: There are no interdependencies between parameter data and process data.				



## Product extensions

Networks

EtherNet/IP

### EtherNet/IP

EtherNet/IP is a common fieldbus for the connection of inverters to different control systems in plants.

#### General information

Version		Optionally Integrated in standard I/O	
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND

#### Bus-related information

Name		EtherNet/IP	
Communication medium		Ethernet 10 Mbps, 100 Mbps, half duplex, full duplex	
Use		Connection as EtherNet/IP adapter	
Status display		2 LEDs (CIP Module Status, CIP Network Status)	
Connection designation		X266, X267	

#### Technical data

Communication profile		EtherNet/IP	
		AC Drive	
Bus terminating resistor		Not required	
integrated bus terminating resistor		No	
Network topology			
Without repeater		Line, tree, ring	
With repeater		-	
Device			
Type		Adapter (slave)	
Max. Number		254	Per subnetwork
Address		Station name	
Max. Cable length	m	-	Not limited The length between the TNs is decisive.
Max. cable length between two devices	m	100	
Process data			
Transmit PDOs		16 words	Max. 32 bits (4 bytes) as a coherent PDO object
Receive PDOs		16 words	
Cycle time	ms	> 4	
Switching method		Store-and-Forward Cut-Through	
Switch latency	µs	~ 125	At maximum telegram length
Other data		Additional TCP/IP channel	

#### Communication time

Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

#### Processing time of process data

Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

#### Other data

Note: There are no interdependencies between parameter data and process data.

# Product extensions

Networks  
Modbus TCP



## Modbus TCP

Modbus is an internationally approved Ethernet-based communication protocol, designed for commercial and industrial automation applications.

General information				
Version		Optionally Integrated in standard I/O		
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent	
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND	
Bus-related information				
Name		Modbus TCP		
Communication medium		Ethernet 10 Mbps, 100 Mbps, half duplex, full duplex		
Use		Connection as Modbus TCP slave		
Status display		2 LEDs		
Connection designation		Port 1: X276 Port 2 X277		
Technical data				
Communication profile		Modbus/TCP		
Bus terminating resistor		Not required		
integrated bus terminating resistor		No		
Network topology				
Without repeater		Line, tree, ring		
With repeater		-		
Device				
Type		Adapter (slave)		
Max. Number		254	Per subnetwork	
Address		Station name		
Max. Cable length	m	-	Not limited. The length between the devices is decisive.	
Max. cable length between two devices	m	100		
Process data				
Transmit PDOs		256 bytes		
Receive PDOs		256 bytes		
Cycle time	ms	> 4		
Switching method		-		
Switch latency	μs	~ 125	At maximum telegram length	
Other data		Additional TCP/IP channel		
Communication time				
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response	
		Telegram runtime (baud rate, telegram length)		
		Nesting depth of network		
		Bus load		
Processing time of process data				
Update cycle	ms	1	In the inverter	
Processing time	ms	0 ... 1		
Application task runtime of the technology application used (tolerance)	ms	1 ... x		
Other data				
Note: There are no interdependencies between parameter data and process data.				



## Product extensions

Networks

POWERLINK

### POWERLINK

Ethernet POWERLINK is a common fieldbus for the connection of inverters to different control systems in plants.

General information				
Version		Optionally Integrated in standard I/O		
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent	
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND	
Bus-related information				
Name		Ethernet POWERLINK		
Communication medium		Ethernet 100 Mbps, half duplex		
Use		Connection of the inverter to a POWERLINK network		
Connection system		RJ45		
Status display		2 LEDs		
Connection designation		IN: X286 OUT: X287		
Technical data				
Communication profile		POWERLINK		
		AC Drive		
Bus terminating resistor		Not required		
integrated bus terminating resistor		No		
Network topology				
Without repeater		Tree, star and line		
With repeater		-		
Station				
Type		Adapter (controlled node, CN)		
Max. Number		240		
Address		Station name		
Max. Cable length	m	-	Not limited The length between the nodes is decisive.	
Max. Cable length between two nodes	m	100		
Process data				
Transmit PDOs		4 words	Max. 16 bits (2 bytes) as a coherent PDO object	
Receive PDOs		2 words		
Cycle time	ms	Multiple of 0.4 ms and 0.5 ms		
Other data		Additional TCP/IP channel		
Communication time				
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response	
		Telegram runtime (baud rate, telegram length)		
		Nesting depth of network		
		Bus load		
Processing time of process data				
Update cycle	ms	1	In the inverter	
Processing time	ms	0 ... 1		
Application task runtime of the technology application used (tolerance)	ms	1 ... x		
Other data				
Note: There are no interdependencies between parameter data and process data.				

# Product extensions

Networks  
PROFINET



## PROFINET

PROFINET is a common fieldbus for the connection of inverters to different control systems in plants.

General information			
Version		Optionally Integrated in standard I/O	
DC supply of the control electronics and optional fieldbus		Internally via the inverter	Network-dependent
		Alternatively: External supply	Network-independent 24 V DC an X3/24E...GND
Bus-related information			
Name		PROFINET RT	
Communication medium		Ethernet 100 Mbps, full duplex	
Use		Integration as PROFINET IO-Device	
Status display		2 LEDs (Ready, Error)	
Connection designation		X256, X257	
Technical data			
Communication profile		PROFINET	
Bus terminating resistor		Not required	
Integrated bus terminating resistor		Yes	
Network topology			
Without repeater		Line, tree, ring	
With repeater		-	
Device			
Type		IO device with real time (RT) communication properties Conformance Class B	
Max. Number		255	Per subnetwork
Address		Station name	
Max. Cable length	m	Not limited	The length between the devices is decisive.
Max. cable length between two devices	m	100	
Process data	Byte	4, 8, 12, 16, 20, 24, 28, 32, ..., 64	
Cycle time	ms	1, 2, 4, 8, 16	
Switching method		Cut-through	
Other data		Additional TCP/IP channel	
Other data			
Note: There are no interdependencies between parameter data and process data.			



## Functional safety

### General information and basics

The functional safety describes the necessary measures that need to be taken by means of electrical or electronic equipment to prevent or eliminate dangers due to functional errors.

Protective devices prevent any human access to dangerous areas during normal operation. However, persons may have to be in the danger areas in certain operating modes. The machine operator is protected by internal drive and control measures in these operating modes.

### Integrated safety

Integrated safety provides the conditions in the controls and drives to implement protective functions. Planning and installation expenditure is reduced. Using integrated safety increases machine functionality and availability. Integrated safety can be used for the protection of persons working on machines in accordance with the Machinery Directive.

Integrated safety provides safe inputs. If the STO safety function is requested, the safety system immediately brings about the torque-free state according to EN IEC 61800-5-2.

### Standards

Safety regulations are confirmed by laws and other governmental guidelines and measures and the prevailing opinion among experts, e.g. by technical regulations.

The regulations and rules to be applied must be observed in accordance with the application.

### Risk assessment

This documentation can only accentuate the need for a risk assessment. The user of the integrated safety system must read up on standards and the legal situation.

Before a machine can be put into circulation, the manufacturer of the machine has to conduct a risk assessment according to the 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008] to determine the hazards associated with the use of the machine.

The Machinery Directive refers to three basic principles for the highest possible level of safety:

- Hazard elimination / minimisation by the construction itself.
- Taking the protective measures required against hazards that cannot be removed.
- Existing residual hazards must be documented and the user must be informed of them.

Detailed information on the risk assessment is provided in the DIN EN ISO 12100:2013-08: Safety of machinery – General principles for design – Risk assessment and risk reduction . The result of the risk assessment determines the category for safety-related control systems according to EN ISO 13849-1. Safety-oriented parts of the machine control must be compliant.

### Mission time

The mission time of the used components must be complied with.

In case of a defect or when the mission time of a component has expired, the complete component must be replaced. Continued operation is not permitted!



The mission time for the safety functions cannot be reset by a special proof test.

The specified mission time starts at the date of manufacture.

Mission time ▶ Technical data 204

# Product extensions

## Functional safety

### General information and basics



#### i550-Cabinet

- If you have mounted the safety module yourself, you must observe the manufacturing date of the safety module and the manufacturing date of the device.
- If you have a completely mounted device, you only have to observe the manufacturing date of the device.

The manufacturing date can be found on the nameplate of the respective component:

Manufacturing date of the device	Manufacturing date of the safety module

yyww = year of manufacture and week of manufacture (1841 = CW 41 2018)

#### Identification of the components

Safety components and the respective terminals are yellow.

#### Restart

#### DANGER!

The drive can automatically restart if the request of the safety function is deactivated.

Possible consequence: Death or severe injuries

- You must provide external measures according to EN ISO 13849-1 which ensure that the drive only restarts after a confirmation.



### Safe inputs

The components used must comply with the risk reduction required for the application.

#### Active sensors

Active sensors are units with 2-channel semiconductor outputs (OSSD outputs).

Test pulses for monitoring the outputs and lines are permissible.

P/M-switching sensors switch the positive and negative cable or the signal and ground cable of a sensor signal.

Please note the following:

- The maximum permissible connection capacity of the outputs.
- Active sensors are connected directly to the terminal strip, see section "Active sensor connection".
- Monitoring for short circuits must be carried out by the active sensor.

The outputs have to switch simultaneously (equivalently). Safety functions will be activated if only one channel is switched. Active triggering of only one channel points to faulty sensors or impermissible wiring.

Examples of active sensors:

- Lightgrid
- Laser scanner
- Control systems

#### Passive sensors

Passive sensors are 2-channel switching elements with contacts.

Please note the following:

- The switches must be wired according to the closed-circuit principle.
- Passive sensors are connected to the terminal strip via a safety switching device, see section "Passive sensor connection".
- An external safety component must monitor the connecting cables and the function of the sensors if complete exclusion of faults cannot be guaranteed.

The contacts must switch at the same time (equivalent). Safety functions will be activated if only one channel is switched. Switching of only one channel points to faulty sensors or impermissible wiring.

Examples of passive sensors:

- Door contact switch
- Emergency stop control units

# Product extensions

Functional safety

Safety functions



## Safety functions

### Supported safety functions for "Basic Safety-STO"

- ▶ Safe torque off (STO) □ 201

**Safe torque off (STO)**

This function corresponds to a "Stop 0" according to EN 60204.

The motor cannot generate torque and movements of the drive.

**⚠ DANGER!**

With the "Safe torque off" (STO) function, no "emergency-off" in terms with EN IEC 60204-1 can be executed without additional measures. There is no isolation between the motor and inverter and no service switch or maintenance switch!

Possible consequence: Death or severe injuries

- ▶ "Emergency-off" requires electrical isolation, e. g. by a central mains contactor.

**⚠ DANGER!**

Automatic restart if the request of the safety function is deactivated.

Possible consequences: Death or severe injuries

- ▶ You must provide external measures according to EN ISO 13849-1 which ensure that the drive only restarts after a confirmation.

**⚠ DANGER!**

The power supply is not safely disconnected.

Death or serious injury due to electrical voltage.

- ▶ Turn off the power supply.

**Functional description**

How to safely disconnect the drive:

1. A safety sensor requests the safety function.
  2. The transmission of the pulse width modulation is safely switched off by the safety unit.  
The power drivers do not generate a rotating field anymore.
  3. The inverter switches to the STO active device status (status word 0x6041, Bit15 = 0).
- The motor is safely switched to torqueless operation (STO).

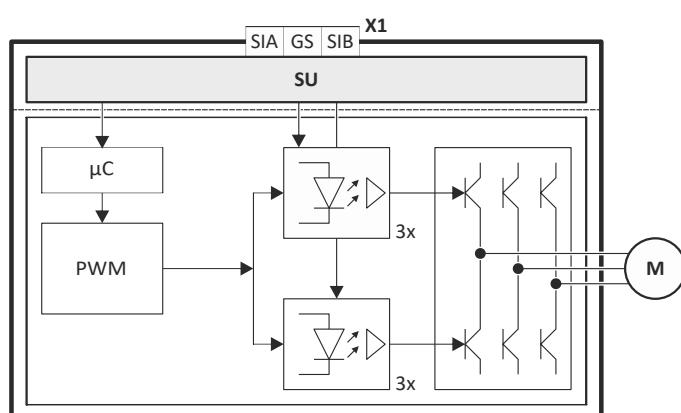


Fig. 9: Functional principle: Basic Safety - STO

X1 Control terminals of the safety unit

SU Hardware interface

μC Microcontroller

PWM Pulse width modulation

M Motor

# Product extensions

Functional safety  
Safety functions



## Function chart

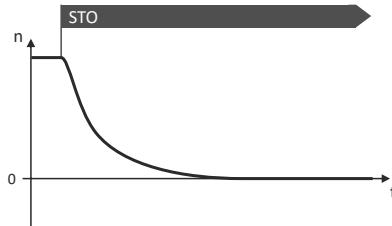


Fig. 10: Safety function STO



Functional sequence and error response have no adjustable parameters.

## Truth table

Safe input / channel		Inverter	Inverter status word 0x282A:004		CiA status word
SIA	SIB	Device state	Bit 10	Bit 11	Object 0x6041, bit 15
LOW	LOW	STO active	1	1	0
LOW	HIGH	Impermissible state, drive disabled	1	0	0
HIGH	LOW		1	0	0
HIGH	HIGH	Drive enabled	0	0	1



If the GS connection is interrupted, or in case of a short circuit/cross-circuit of GS to SIA/SIB, STO is active.



If SIA = LOW and SIB = LOW, the internal "Safe torque off (STO) active [55]" status signal in the inverter is set to TRUE. You can use this status signal to control a "non-safe output" (e.g. the relay).



### Acceptance

The machine manufacturer must check and prove the operability of the safety functions used.

- The machine manufacturer must authorise a person with expertise and knowledge of the safety functions to carry out the test.
- The test result of every safety function must be documented and signed by the inspector.

A complete test comprises the following:

- Documenting the plant including the safety functions:
  - Creating an overview screen of the plant.
  - Describing the plant.
  - Describing the safety equipment.
  - Documenting the safety functions used.
  - Checking the function of the safety functions used.
- Preparing the test report:
  - Documenting the functional test.
  - Checking the parameters.
  - Signing the test report.
- Preparing the appendix with test records:
  - Protocols for the plant
  - External recording



The tester must repeat the test after each change and record the results in the test report.

### Periodic inspections

After installation and after every modification, the user must check and validate the safety function.

The user must document these tests.

The correct sequence of the safety-oriented functions must be checked in periodic inspections. The risk analysis or applicable regulations determine the time distances between the tests.

The inspection interval should not exceed one year.

# Product extensions

Functional safety  
Technical data



## Technical data

### Safety-related characteristics Basic Safety - STO



The data applies to products delivered **after** 1st September 2016.

### Safety-related characteristics according to EN IEC 61508, Part 1–7 and EN IEC 62061

Specification	Value	Comment
Safety Integrity Level	SIL 3	
PFH [1/h]	1.71 E-09	1.71 % of SIL 3
PFD <sub>avg</sub> (T)	1.49 E-04	14.9 % of SIL 3 after T = 20 years
Proof test interval	20 years	Mission time

### Safety-related characteristics according to EN ISO 13849-1

Specification	Value	Comment
Performance Level	e	
Category	4	
MTTF <sub>d</sub>	High	3200 years
Mean diagnostic coverage DC <sub>av</sub>	High	99 %

### Basics of the safety-related characteristics

Basics	Value	Comment
Source of failure rates	SN 29500	When no values from the component manufacturers were available.
Average max. ambient temperature	40 °C	

X1	Specification	Unit	min.	typ.	max.
SIA, SIB	LOW signal	V	-3	0	+5
	HIGH signal	V	+15	+24	+30
	Switch-on time	ms		3	
	Clear time	ms		50	60
	Input current SIA	mA		10	14
	Input current SIB	mA		7	12
	Input peak current	mA		100	
	Test pulse duration	ms			1
	Test pulse interval	ms	10		
GS	Reference potential for SIA and SIB				

### Safety-related characteristics Extended Safety



The achievable risk reductions (PL/SIL) also depend on the motor/encoder combination used.

Match the values given here with the values for the motor/encoder combinations:

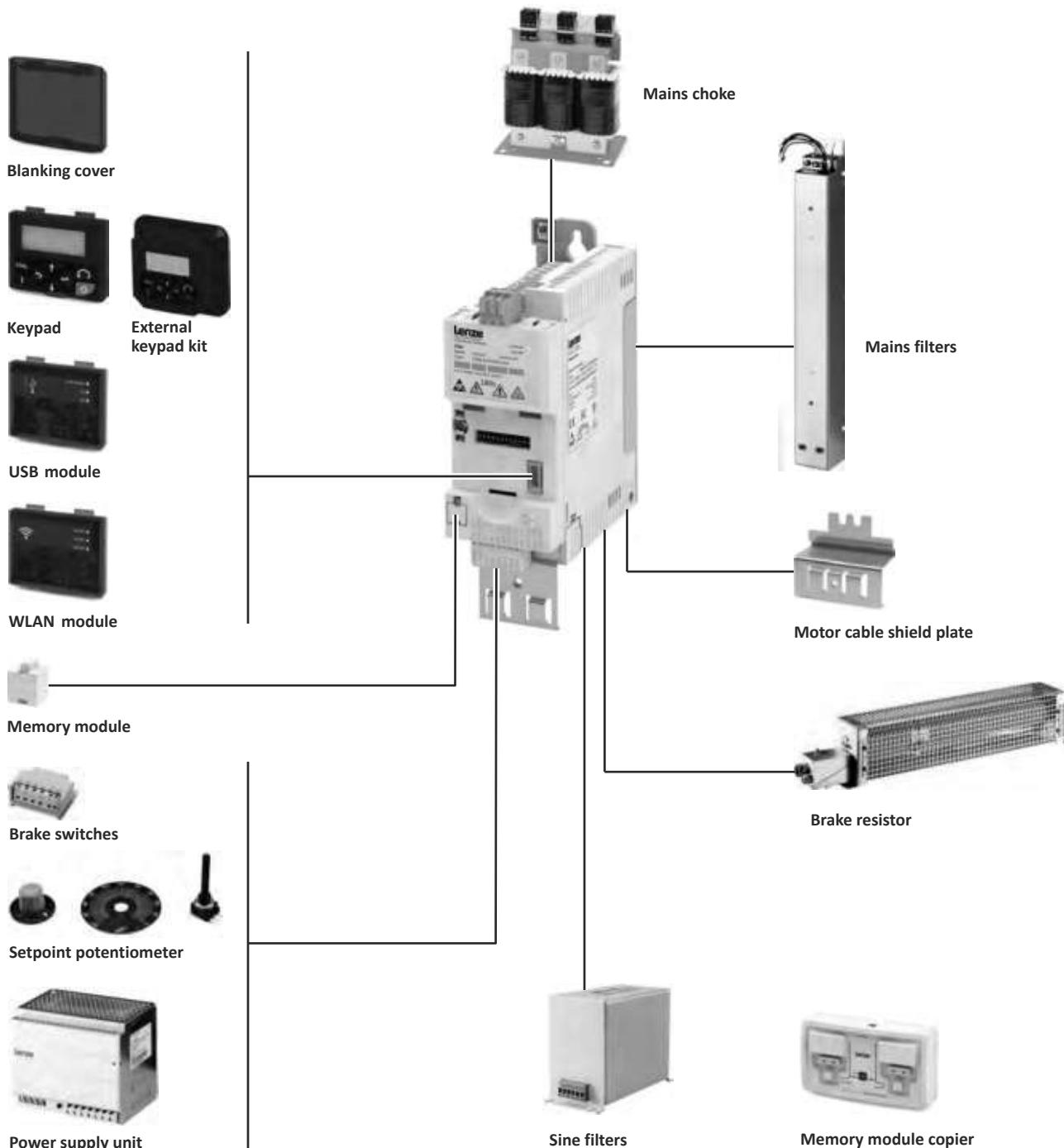


## Accessories

### Overview

A package of accessories optimally matched to the inverter is available for your applications.

Moreover, the pluggable modules make commissioning and diagnostics easier.



Further accessories: DIN rail, terminal strips and latching terminals for the shield sheet of the control unit.

## Accessories

Operation and diagnostics  
Keypad



### Operation and diagnostics

#### Keypad

Parameter setting and diagnostics

Thanks to the intuitive operating structure, the navigation keys allow a quick and easy access to the most important parameters, either to configure functions or to query current values. Parameters and actual values are indicated on the easy-to-read display.



#### Keypad

Order code	Type
I5MADK000000S	LCD display Display in German/English

#### External keypad

Installation in user interface

The external keypad kit facilitates installation of a I5MADK000000S keypad in an IP65 housing for mounting to the control cabinet wall.



#### External keypad kit

Order code	Type
I5MADR000000S	without connecting cable
I5MADR0000001S	with connecting cable 3 m
I5MADR0000002S	with connecting cable 5 m

The I5MADK000000S keypad is not part of the delivery.



## USB module

### Interface to the PC

Connect the inverter via a USB 2.0 connection cable to a PC on which the Lenze "EASY Starter" engineering tool is installed. Configure the inverter with the "EASY Starter" using graphical user interfaces. You can create diagnostics with trend functions or observe parameter values.

Parameterising without supplying the inverter with voltage: in many cases, the USB interface of the PC is sufficient for the voltage supply if you connect the inverter directly to the PC without a hub.



USB module	
Order code	Version
I5MADU0000000S	Parameterization without voltage supply of the inverter is possible. USB 2.0 connecting cable required

Connecting cable		
Order code	Length	Type
EWL0085/S	3 m	USB 2.0-connecting cable (A-plug to micro B-plug)
EWL0086/S	5 m	



Inverters with network option EtherCAT, PROFINET or EtherNET/IP must be supplied with an additional voltage for setting parameters if a connection cable longer than 3 m is used.

Please observe the following for USB modules labelled as "PRE-SERIES":  
Inverters with network option EtherCAT, PROFINET or EtherNET/IP must always be supplied with an additional voltage for setting parameters.

# Accessories

Operation and diagnostics  
WLAN module



## WLAN module

Communicate wirelessly with the inverter, via a PC using the Lenze Engineering Tool "EASY Starter" or the Lenze "SMART Keypad App" for Android and iOS smartphones.



### ⚠ WARNING!

- ▶ This product contains FCC ID: QOQWF121/IC: 5123A-BGTWF121
- ▶ To comply with FCC and Industry Canada RF radiation exposure limits for general population, the transmitter with its antenna must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times.
- ▶ This product must not be collocated or operated in conjunction with any other antenna or transmitter.
- ▶ -----
- ▶ Le produit contient un module transmetteur certifié FCC ID: QOQWF121/IC: 5123A-BGTWF121
- ▶ Afin de se conformer aux réglementations de la FCC et d'Industry Canada relatives aux limites d'exposition aux rayonnements RF pour le grand public, le transmetteur et son antenne doivent être installés de sorte qu'une distance minimale de 20 cm soit constamment maintenue entre le radiateur (antenne) et toute personne.
- ▶ Le produit ne doit pas être utilisé en combinaison avec d'autres antennes ou transmetteurs.

The module can be used if the certification is recognized in a country according to one of these standards.

Conformity and approvals			
CE	RED	EN 301489-1 V2.1.1:2016	
		EN 301489-17 V3.1.1:2016	
		EN 300328 V2.1.1:2016	
FCC	Part 15.107/15.109 ICES-003		

Additional conformities and approvals:

- IC
- CMIIT

LED status displays			
LED 1	LED 2	LED 3	Meaning
Power (green)	TX/RX (yellow)	WLAN (green)	
Supply voltage status	Communication status	WLAN status	
OFF	OFF	OFF	No voltage
ON	ON	ON	Self-test (approx. 1 s)
ON	OFF	OFF	Ready for operation No active WLAN connection
ON	Flashing	ON	Communication active
ON	OFF	Blinking	Client Mode Waiting for connection
Blinking	OFF	OFF	Trouble



## Accessories

Operation and diagnostics  
Blanking cover

Connection data (default setting)	
IP address	192.168.178.1
SSID	<Product type>_<10-digit identifier>
Password	password

WLAN module	
Order code	Type
I5MADW0000000S	Range in open space: 100 m, conditions on site may restrict the range.

### Blanking cover

#### Protection and optics

The blanking cover protects the terminals and provides for uniform optics if no other module is plugged on.



Blanking cover		
Order code	Type	VPE
I5ZAA0000M	Protection against dust Uniform optics	4

### Control and display elements

#### Potentiometer

For the external selection of an analog setpoint.

The setpoint selection (e.g. motor speed) can be manually set via the external potentiometer.

The potentiometer is connected to the analog input terminals of the inverter.

The position is displayed on the scale via the rotary knob.

The components have to be ordered separately.



Potentiometer		
Order code	Name	Type
ERPD0010K0001W	Potentiometer	10 kΩ/1 W
ERZ0001	Rotary knob	Diameter 36 mm
ERZ0002	Scale	Scale 0 ... 100 %, Diameter 62 mm

# Accessories

## Memory modules



### Memory modules

For standard set-up, Lenze offers its customers multipacked, unwritten memory modules (EPM). In combination with the EPM copier, the EPMs can be duplicated at any location.

A memory module is included in the scope of supply of the inverter.



Memory module		
Order code	Type	VPE
IOMAPA0000000M	Easily pluggable Duplicate data set with memory module copier	Piece 12

### Memory module copier

For duplicating data on memory modules for a faster standard set-up.

The memory module copier is a copying system for all memory modules from Lenze. With the help of simple optical user guidance, the data of a module is copied quickly and reliably to another memory module.



Memory module copiers	
Order code	Type
EZAED1001	Data set copier for memory modules

### Brake resistors

- To decelerate greater moments of inertia or with a longer operation in generator mode an external brake resistor is required.
- The brake resistor absorbs the produced brake energy and converts it into heat.



The matching assignment of these accessories is specified in the technical data of the devices.



## RFI filters / Mains filters

RFI and mains filters are used to ensure compliance with the EMC requirements of EN IEC 61800–3. This standard defines the EMC requirements for electrical drive system in various categories.

- RFI filters are capacitive accessory components. RFI filters reduce conducted noise emissions. RFI filters are also called EMC filters.
- Mains filters are a combination of mains choke and RFI filter. Mains filters reduce the conducted noise emission.

### Definition of the environments

(EN IEC 61800–3)

#### First environment

The first environment comprises residential buildings or locations that are directly connected to a low-voltage system for supplying residential areas.

#### Second environment

The second environment comprises facilities or locations that are not directly connected to a low-voltage system for supplying residential areas.

#### Category C1

Category C1 defines the requirements for drive systems that are intended for the use in the first environment at a rated voltage lower than 1000 V.

The limit values of the EN IEC 61800–3 comply with EN 55011 class B.

#### Category C2

Category C2 defines the requirements for permanently installed fixed drive systems that are intended for the use in the first environment at a rated voltage lower than 1000 V. Installation and commissioning may only be carried out by specialist personnel with EMC knowledge.

The limit values of the EN IEC 61800–3 comply with EN 55011 class A group 1.

#### Category C3

Category C3 defines the requirements for drive systems that are exclusively intended for the use in the second environment at a rated voltage lower than 1000 V.

The limit values of the EN IEC 61800–3 comply with EN 55011 class A group 2.



When working with stricter line-bound noise emission requirements which cannot be met using the radio interference suppression measures integrated in the inverter, external filters can be used. The filters can be installed below or next to the inverter.

If necessary, the internal filters have to be deactivated when external filters are used. For this purpose, remove the IT screws of the inverters.

# Accessories

## Sine filter



### Comparison of integrated and external RFI filters

RFI filter	Filter types			
	Integrated in the inverter	External		
		Low Leakage	Short Distance	Long Distance
Use	In standard applications	In mobile systems	With short cable length	At switching frequencies 4 kHz and 8 kHz.
Optimization	Easy use	For low leakage current	For low leakage current	For long motor cable
Reduces noise emissions	Cable-guided and radiated	Cable-guided	Cable-guided	Cable-guided



The matching assignment of these accessories is specified in the technical data of the devices.

## Sine filter

A sinusoidal filter in the motor cable limits the rate of voltage rise and the capacitive charge/discharge currents between the conductors that occur during inverter operation.



Only use a sinusoidal filter with standard asynchronous motors 0 to 550 V.

Operation only with V/f or square-law V/f characteristic control.

Set the switching frequency permanently to the specified value.

Limit the output frequency of the inverter to the given value.



The matching assignment of these accessories is specified in the technical data of the devices.

## Power supply units

For the external supply of the control electronics of the inverter.

The parameterization and diagnostics can be executed when the mains input at the inverter is deenergized.



Order code		EZV1200-000	EZV2400-000	EZV4800-000	EZV1200-001	EZV2400-001	EZV4800-001
Rated voltage	V		230			400	
Rated mains current	A	0.8	1.2	2.3	0.3	0.6	1.0
Input voltage	V		AC 85 - 264 DC 90 ...350			AC 320 ... 575 DC 450 ...800	
Output voltage	V			DC 22.5 - 28.5			
Rated output current	A	5.0	10.0	20.0	5.0	10.0	20.0



## Accessories

### Brake switches

#### Brake switches

For switching an electromechanical brake.

The brake switch consists of a rectifier and an electronic circuit breaker. It is mounted on the control cabinet plate. Control is performed using a digital output on the inverter.



Brake switches		Half-wave rectifiers	Bridge rectifiers
<b>Order code</b>		<b>E82ZWBR</b>	<b>E82ZWBRB</b>
Input voltage	V	AC 320 - 550	AC 180 - 317
Output voltage	V	DC 180 (with AC 400) DC 225 (with AC 500)	DC 205 (with AC 230)
Max. brake current	A	0.61	0.54

## Accessories

### Mounting

#### Shield mounting kit



## Mounting

### Shield mounting kit

#### Motor cable

If the shielding of the motor cable is centrally connected to an earthing busbar in the control cabinet, no shielding is required.

For a direct connection of the shielding of the motor cable to the inverter, the optionally available accessories can be used consisting of shield sheet and fixing clips or wire clamps.



From 15 kW, the shield sheet is integrated.





## Accessories

Mounting  
Shield mounting kit

Inverter	Shield mounting			
	Order code	Packaging unit	Order code	Packaging unit
		Piece		Piece
i550-C0.25/120-1				
i550-C0.37/120-1				
i550-C0.75/120-1				
i550-C1.1/120-1				
i550-C0.25/230-1	EZAMBHXM018/M	5x motor shield plate 5x fixing clip 5x terminal clamp (cable diameter 4 ... 15 mm)	EZAMBHXM018/S	1x motor shield plate 1x fixing clip 1x terminal clamp (cable diameter 4 ... 15 mm)
i550-C0.25/230-2				
i550-C0.37/230-1				
i550-C0.37/230-2				
i550-C0.55/230-1				
i550-C0.55/230-2				
i550-C0.75/230-1				
i550-C0.75/230-2				
i550-C1.1/230-1				
i550-C1.1/230-2				
i550-C1.5/230-1				
i550-C1.5/230-2				
i550-C2.2/230-1				
i550-C2.2/230-2				
i550-C4.0/230-3	EZAMBHXM015/M	5x motor shield plate 5x fixing clip 5x terminal clamp (cable diameter 4 ... 15 mm) 5x screw M4x12	EZAMBHXM015/S	1x motor shield plate 1x fixing clip 1x terminal clamp (cable diameter 4 ... 15 mm) 1x screw M4x12
i550-C5.5/230-3				
i550-C0.37/400-3	EZAMBHXM018/M	5x motor shield plate 5x fixing clip 5x terminal clamp (cable diameter 4 ... 15 mm)	EZAMBHXM018/S	1x motor shield plate 1x fixing clip 1x terminal clamp (cable diameter 4 ... 15 mm)
i550-C0.55/400-3				
i550-C0.75/400-3				
i550-C1.1/400-3				
i550-C1.5/400-3				
i550-C2.2/400-3				
i550-C3.0/400-3				
i550-C4.0/400-3				
i550-C5.5/400-3	EZAMBHXM015/M	5x motor shield plate 5x fixing clip 5x terminal clamp (cable diameter 4 ... 15 mm) 5x screw M4x12	EZAMBHXM015/S	1x motor shield plate 1x fixing clip 1x terminal clamp (cable diameter 4 ... 15 mm) 1x screw M4x12
i550-C7.5/400-3	For type I55AE...: EZAMBHXM016/M For type I55BE...: EZAMBHXM16/M	5x motor shield plate 5x fixing clip 5x terminal clamp (cable diameter 10 ... 20 mm) 5x screw M4x12	For type I55AE...: EZAMBHXM016/S For type I55BE...: EZAMBHXM16/S	1x motor shield plate 1x fixing clip 1x terminal clamp (cable diameter 10 ... 20 mm) 1x screw M4x12
i550-C11/400-3				
i550-C15/400-3	EZAMBHXM003/M	10x terminal clamp (cable diameter 10 ... 20 mm)	EZAMBHXM004/M	10x terminal clamp (cable diameter 15 ... 28 mm)
i550-C18.5/400-3				
i550-C22/400-3				
i550-C30/400-3	EZAMBHXM004/M	10x terminal clamp (cable diameter 15 ... 28 mm)	EZAMBHXM005/M	10x terminal clamp (cable diameter 20 ... 37 mm)
i550-C37/400-3				
i550-C45/400-3				
i550-C55/400-3	EZAMBHXM004/M	10x terminal clamp (cable diameter 15 ... 28 mm)	EZAMBHXM005/M	10x terminal clamp (cable diameter 20 ... 37 mm)
i550-C75/400-3				
i550-C90/400-3	-	-	-	-
i550-C110/400-3				

# Accessories

Mounting  
Terminal strips



## Shield mounting of the control cables

In case of the control unit, the shield sheet for control cables is integrated.

Usually, the shields can be fixed with standard plastic cable ties.

Optionally, fixing clips are suitable for the shield connections of the control cables of inverters 0.25 kW ... 0.75 kW.

Shield mounting kit	
Order code	VPE
	Piece
EZAMBHXM007/M	20x fixing clip

## Terminal strips

For connecting the inverter, the connections are equipped with pluggable terminal strips.

Pluggable terminal strips are available separately for service purposes or if cable harnesses need to be physically separated.

Inverter	Terminal strips Mains connection X100		Terminal strips Motor connection X105	
	Order code	VPE	Order code	VPE
	Piece		Piece	
i550-C0.25/230-1				
i550-C0.37/230-1	EZAEVE032/M			
i550-C0.55/230-1				
i550-C0.75/230-1				
i550-C1.1/230-1				
i550-C1.5/230-1	EZAEVE033/M			
i550-C2.2/230-1				
i550-C0.25/230-2				
i550-C0.37/230-2	EZAEVE034/M			
i550-C0.55/230-2				
i550-C0.75/230-2				
i550-C1.1/230-2				
i550-C1.5/230-2	EZAEVE035/M			
i550-C2.2/230-2				
i550-C0.37/400-3				
i550-C0.55/400-3				
i550-C0.75/400-3				
i550-C1.1/400-3	EZAEVE037/M			
i550-C1.5/400-3				
i550-C2.2/400-3				
i550-C3.0/400-3				
i550-C4.0/400-3				

Terminal strips	Order code	VPE	Terminal strips	Order code	VPE
		Piece			Piece
Safety (STO) X1	EZAEVE029/M	10	Standard I/O X3	EZAEVE040/M	5
Relay X9	EZAEVE030/M	10	Application-I/O X3	EZAEVE041/M	5
Motor PTC X109	EZAEVE031/M	10	CANopen / Modbus X216	EZAEVE042/M	10



## Accessories

Mounting  
DIN rail

### DIN rail

In accordance with EN 60175, the inverter can be mounted onto a DIN rail 35 mm x 7.5 mm. For this purpose, a mounting set is available.



Mounting set	Can be used for inverters
Order code	Order code
ISZAB0DR1S	I5xAE125x, I5xAE137x, I5xAE155x, I5xAE175x
ISZAB0DR2S	I55AE175Ax, I5xAE211x, I5xAE215x, I5xAE222x, I5xxE230x, I5xxE240x, I5xxE255x

# Purchase order

Notes on ordering

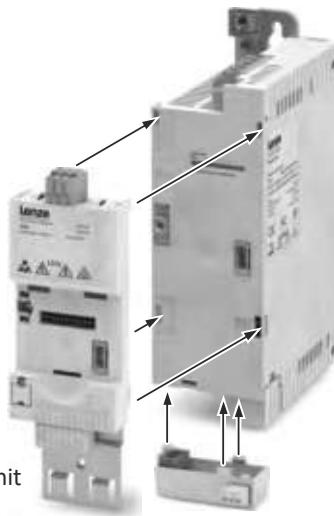


## Purchase order

### Notes on ordering

There are two ways to order an inverter.

As a complete inverter or as single components consisting of power unit, control unit and safety module.

Complete inverter	Inverter consisting of components
	 <p>The image shows a modular inverter setup. At the top is a 'Power unit' with a fan and heat sinks. Below it is a 'Control unit' with a digital display and several buttons. At the bottom is a 'Safety module'. Arrows point from the labels to their respective components.</p>

### »EASY Product Finder«

The »EASY Product Finder« helps you to configure your required product in next to no time. In addition, you can retrieve all important technical details such as data sheets, CAD data, and EPLAN data.

The link and the QR code lead directly to the "EASY Product Finder": EASY Product Finder





## Order code

### Delivery as complete inverter

If always the same inverter is used in the machine the inverter can be ordered "out of the box".

Order data: Order code of the complete device.

### Order example

Description of the component	Order code
Complete inverter	
3-phase mains connection 400 V	
Power 2.2 kW (i550-C2.2/400-3)	I55AE222F1AV10002S
Safety engineering: STO safety function	
Default setting of parameters: EU region (50-Hz systems)	
Standard I/O with CANopen	

# Purchase order

Order code



## i550 inverter

### Complete inverter

Power		Inverter	Order code				
kW	hp						
1-phase mains connection 120 V, EMC filter not integrated							
0.25	0.33	i550-C0.25/120-1	I55AE125A1				
0.37	0.5	i550-C0.37/120-1	I55AE137A1				
0.75	1	i550-C0.75/120-1	I55AE175A1				
1.1	1.5	i550-C1.1/120-1	I55AE211A1				
1-phase mains connection 230 V, EMC filter integrated							
0.25	0.33	i550-C0.25/230-1	I55AE125B1				
0.37	0.5	i550-C0.37/230-1	I55AE137B1				
0.55	0.75	i550-C0.55/230-1	I55AE155B1				
0.75	1	i550-C0.75/230-1	I55AE175B1				
1.1	1.5	i550-C1.1/230-1	I55AE211B1				
1.5	2	i550-C1.5/230-1	I55AE215B1				
2.2	3	i550-C2.2/230-1	I55AE222B1				
1/3-phase mains connection 230/240 V, EMC filter not integrated							
0.25	0.33	i550-C0.25/230-2	I55AE125D1				
0.37	0.5	i550-C0.37/230-2	I55AE137D1				
0.55	0.75	i550-C0.55/230-2	I55AE155D1				
0.75	1	i550-C0.75/230-2	I55AE175D1				
1.1	1.5	i550-C1.1/230-2	I55AE211D1				
1.5	2	i550-C1.5/230-2	I55AE215D1				
2.2	3	i550-C2.2/230-2	I55AE222D1				
3-phase mains connection 230/240 V, EMC filter not integrated							
4.0	5	i550-C4.0/230-3	I55AE240C1				
5.5	7.5	i550-C5.5/230-3	I55AE255C1				
3-phase mains connection 400/480 V, EMC filter integrated							
0.37	0.5	i550-C0.37/400-3	I55AE137F1				
0.55	0.75	i550-C0.55/400-3	I55AE155F1				
0.75	1	i550-C0.75/400-3	I55AE175F1				
1.1	1.5	i550-C1.1/400-3	I55AE211F1				
1.5	2	i550-C1.5/400-3	I55AE215F1				
2.2	3	i550-C2.2/400-3	I55AE222F1				
3	4	i550-C3.0/400-3	I55BE230F1				
4	5	i550-C4.0/400-3	I55BE240F1				
5.5	7.5	i550-C5.5/400-3	I55AE255F1				
7.5	10	i550-C7.5/400-3	I55BE275F1				
11	15	i550-C11/400-3	I55BE311F1				
15	20	i550-C15/400-3	I55AE315F1				
18.5	25	i550-C18/400-3	I55AE318F1				
22	30	i550-C22/400-3	I55AE322F1				
30	40	i550-C30/400-3	I55AE330F1				
37	50	i550-C37/400-3	I55AE337F1				
45	60	i550-C45/400-3	I55AE345F1				
55	74	i550-C55/400-3	I55AE355F1				
75	100	i550-C75/400-3	I55AE375F1				
90	120	i550-C90/400-3	I55AE390F1				
110	150	i550-C110/400-3	I55AE411F1				
Continuation ...							



Purchase order  
Order code

Complete inverter			
Power		Inverter	Order code
kW	hp		
<i>Continuation ...</i>			
Safety engineering			
Without safety engineering			0
Safety function STO			A
Not relevant			V
EMC filter			
not integrated	i550-Cxxx/ 120-1 i550-Cxxx/ 230-2 i550-Cxxx/ 230-3		0
Integrated	i550-Cxxx/ 230-1 i550-Cxxx/ 400-3		1
Delivery status			
Default parameter setting: Region EU (50-Hz networks)			0
Default parameter setting: Region US (60-Hz networks)			1
Control unit			
Standard I/O without network			000S
Application I/O without network			001S
Standard I/O with CANopen			002S
Standard I/O with Modbus RTU			003S
Standard I/O with Modbus TCP			00WS
Standard I/O with PROFIBUS			004S
Standard I/O with EtherCAT			00KS
Standard I/O with PROFINET			00LS
Standard I/O with EtherNet/IP			00MS
Standard I/O with POWERLINK			012S
Standard I/O with IO-Link			016S

#### Delivery of individual components

If different product versions are required in the machine, the various components can be ordered individually. Depending on the application, the components can be plugged together easily and without any further tools.

Order data: Order codes of the individual components.

#### Order example

Description of components	Order code
Power unit	
3-phase mains connection 400/480 V	I5DAE222F10V10000S
Power 2.2 kW (i550-C2.2/400-3)	
Safety module	I5MASAV000000S
Safety function STO	
Control unit	
Standard I/O with CANopen	I5CA5C02000VA0000S
Default setting of parameters: EU region (50-Hz systems)	

# Purchase order

Order code



Power unit			
Power		Inverter	Order code
kW	hp		
1-phase mains connection 120 V, EMC filter not integrated			
0.25	0.33	i550-C0.25/120-1	I5DAE125A10V00000S
0.37	0.5	i550-C0.37/120-1	I5DAE137A10V00000S
0.75	1	i550-C0.75/120-1	I5DAE175A10V00000S
1.1	1.5	i550-C1.1/120-1	I5DAE211A10V00000S
1-phase mains connection 230 V, EMC filter integrated			
0.25	0.33	i550-C0.25/230-1	I5DAE125B10V10000S
0.37	0.5	i550-C0.37/230-1	I5DAE137B10V10000S
0.55	0.75	i550-C0.55/230-1	I5DAE155B10V10000S
0.75	1	i550-C0.75/230-1	I5DAE175B10V10000S
1.1	1.5	i550-C1.1/230-1	I5DAE211B10V10000S
1.5	2	i550-C1.5/230-1	I5DAE215B10V10000S
2.2	3	i550-C2.2/230-1	I5DAE222B10V10000S
1/3-phase mains connection 230/240 V, EMC filter not integrated			
0.25	0.33	i550-C0.25/230-2	I5DAE125D10V00000S
0.37	0.5	i550-C0.37/230-2	I5DAE137D10V00000S
0.55	0.75	i550-C0.55/230-2	I5DAE155D10V00000S
0.75	1	i550-C0.75/230-2	I5DAE175D10V00000S
1.1	1.5	i550-C1.1/230-2	I5DAE211D10V00000S
1.5	2	i550-C1.5/230-2	I5DAE215D10V00000S
2.2	3	i550-C2.2/230-2	I5DAE222D10V00000S
3-phase mains connection 230/240 V, EMC filter not integrated			
4.0	5	i550-C4.0/230-3	I5DAE240C10V00000S
5.5	7.5	i550-C5.5/230-3	I5DAE255C10V00000S
3-phase mains connection 400/480 V, EMC filter integrated			
0.37	0.5	i550-C0.37/400-3	I5DAE137F10V10000S
0.55	0.75	i550-C0.55/400-3	I5DAE155F10V10000S
0.75	1	i550-C0.75/400-3	I5DAE175F10V10000S
1.1	1.5	i550-C1.1/400-3	I5DAE211F10V10000S
1.5	2	i550-C1.5/400-3	I5DAE215F10V10000S
2.2	3	i550-C2.2/400-3	I5DAE222F10V10000S
3	4	i550-C3.0/400-3	I5DBE230F10V10000S
4	5	i550-C4.0/400-3	I5DBE240F10V10000S
5.5	7.5	i550-C5.5/400-3	I5DAE255F10V10000S
7.5	10	i550-C7.5/400-3	I5DBE275F10V10000S
11	15	i550-C11/400-3	I5DBE311F10V10000S
15	20	i550-C15/400-3	I5DAE315F10V10000S
18.5	25	i550-C18/400-3	I5DAE318F10V10000S
22	30	i550-C22/400-3	I5DAE322F10V10000S
30	40	i550-C30/400-3	I5DAE330F10V10000S
37	50	i550-C37/400-3	I5DAE337F10V10000S
45	60	i550-C45/400-3	I5DAE345F10V10000S
55	74	i550-C55/400-3	I5DAE355F10V10000S
75	100	i550-C75/400-3	I5DAE375F10V10000S
90	120	i550-C90/400-3	I5DAE390F10V10000S
110	150	i550-C110/400-3	I5DAE411F10V10000S
Safety module			Order code
Safety function STO			I5MASAV000000S



Purchase order  
Order code

Control unit	Order code	
	Delivery status Default parameter setting: Region EU (50-Hz networks)	Delivery status Default parameter setting: Region US (60-Hz networks)
Standard I/O without network	I5CA5002000VA0000S	I5CA5002000VA1000S
Application I/O without network	I5CA5003000VA0000S	I5CA5003000VA1000S
Standard I/O with CANopen	I5CA5C02000VA0000S	I5CA5C02000VA1000S
Standard I/O with Modbus RTU	I5CA5W02000VA0000S	I5CA5W02000VA1000S
Standard I/O with Modbus TCP	I5CA5V02000VA0000S	I5CA5V02000VA1000S
Standard I/O with PROFIBUS	I5CA5P02000VA0000S	I5CA5P02000VA1000S
Standard I/O with EtherCAT	I5CA5T02000VA0000S	I5CA5T02000VA1000S
Standard I/O with PROFINET	I5CA5R02000VA0000S	I5CA5R02000VA1000S
Standard I/O with EtherNet/IP	I5CA5G02000VA0000S	I5CA5G02000VA1000S
Standard I/O with POWERLINK	I5CA5N02000VA0000S	I5CA5N02000VA1000S
Standard I/O with IO-Link	I5CA5K02000VA0000S	I5CA5K02000VA1000S



## Environmental notes and recycling

Lenze has been certified to the worldwide environmental management standard for many years (DIN EN ISO 14001). As part of our environmental policy and the associated climate responsibility, please note the following information on hazardous ingredients and the recycling of Lenze products and their packaging:



Lenze products are partly subject to the EU Directive on the restriction of certain hazardous substances in electrical and electronic equipment 2011/65/EU: RoHS Directive [UKCA: S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012]. This is documented accordingly in the EU declaration of conformity and with the CE mark.



Lenze products are not subject to EU Directive 2012/19/EU: Directive on waste electrical and electronic equipment (WEEE) [UKCA: S.I. 2013/3113 - The Waste Electrical and Electronic Equipment Regulations 2013], but some contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC: Battery Directive [UKCA: S.I. 2009/890 - The Waste Batteries and Accumulators Regulations 2009]. The disposal route, which is separate from household waste, is indicated by corresponding labels with the "crossed-out trash can".

Any batteries/rechargeable batteries included are designed to last the life of the product and do not need to be replaced or otherwise removed by the end user.



Lenze products are usually sold with cardboard or plastic packaging. This packaging complies with EU Directive 94/62/EC: Directive on packaging and packaging waste [UKCA: S.I. 1997/648 - The Producer Responsibility Obligations (Packaging Waste) Regulations 1997]. The required disposal route is indicated by material-specific labels with the "recycling triangle". Example: "21 - other cardboard"



Lenze products are subject to REGULATION (EC) No 1907/2006: REACH Regulation [UKCA: S.I. 2008/2852 - The REACH Enforcement Regulations 2008]. When used as intended, exposure of substances to humans, animals and the environment is excluded.

Lenze products are industrial electrical and electronic products and are disposed of professionally. Both the mechanical and electrical components such as electric motors, gearboxes or inverters contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the highest possible level of recyclability is therefore important and sensible from an economic and ecological point of view.

- Coordinate professional disposal with your waste disposal company.
- Separate mechanical and electrical components, packaging, hazardous waste (e.g. gear oils) and batteries/rechargeable batteries wherever possible.
- Dispose of the separated waste in an environmentally sound and proper manner (no household waste or municipal bulky waste).

What?	Material	Disposal instructions
Pallets	Wood	Return to manufacturers, freight forwarders or reusable materials collection system
Packaging material	Paper, cardboard, pasteboard, plastics	Collect and dispose of separately
Products		
Electronic devices	Metal, plastics, circuit boards, heatsinks	As electronic waste give to professional disposer for recycling
Gearbox	Oil	Drain oil and dispose of separately
	Casting, steel, aluminium	Dispose as metal scrap
Motors	Casting, copper, rotors, magnets, potting compound	As engine scrap give to professional disposer for recycling
Dry-cell batteries/rechargeable batteries		As used batteries give to professional disposer for recycling



Further information on Lenze's environmental and climate responsibility and on the topic of energy efficiency can be found on the Internet:

[www.Lenze.com](http://www.Lenze.com) → search word: "Sustainability"



**Appendix**  
Declarations of Conformity

**Appendix**

**Declarations of Conformity**



**Lenze**

2253891.07

**EU-Konformitätserklärung**

**EU Declaration of Conformity**

**LENZE SE, Hans-Lenze-Strasse 1, 31855 Aerzen GERMANY**

erklärt in alleiniger Verantwortung die Übereinstimmung der  
Produkte

declares under sole responsibility compliance of the products

IS55AExxxxx1xxxxxxxxx &

ISMASAxxxxxxx (Safety Module) (x=0-9/A-Z)

mit der

with the

**Maschinenrichtlinie**

**Machinery Directive**

2006/42/EG Anhang VIII und IX

2006/42/EC Annex VIII and IX

**Angewandte harmonisierte Normen:**

**Applied harmonized standards:**

Sichererhalt	Stop Category	EN 60204-1	:2018	Stop category	Safe torque off
	Kategorie 4			Category 4	
	Performance Level (PL):	EN ISO 13849-1	:2015	Performance Level (PL):	
	PL e			PL e	
		EN 61508 1-7	:2010		
Sicherheitsfunktionen siehe Betriebsanleitung.	SIL 3	EN 62061 +AC +A1 +A2	:2005 :2010 :2013 :2015	SIL 3	For safety functions see manual.
		EN 61800-5-2	:2017		
		EN 61800-5-1+A1	:2007 :2017		



**Konformitätsbewertung**



**Benannte Stelle**

**Conformity assessment**

TÜV Rheinland Industrie Service GmbH

notified body  
Am Grauen Stein  
51105 Köln / Germany

**Zertifikatnr.**

Certificates

**Gültigkeit**

Date of expiry

**EMV-Richtlinie**

**EMC Directive**

2014/30/EU

2014/30/EU

**Angewandte harmonisierte Normen:**

**Applied harmonized standards:**

EN 61800-3:2004 + A1:2012

EN 61800-3:2018

**RoHS-Richtlinie**

**RoHS Directive**

2011/65/EU

2011/65/EU

**Angewandte harmonisierte Normen:**

**Applied harmonized standards:**

EN IEC 63000:2018

Die Sicherheitshinweise der Betriebsanleitung sind zu beachten.

The safety instructions of the manual are to be considered.

Die Produkte sind bestimmt zum Einbau in Maschinen. Die  
Inbetriebnahme ist solange untersagt bis festgestellt wurde, dass  
die Maschine, in welche diese Produkte eingebaut werden sollen,  
den Bestimmungen der o.a. EU-Richtlinie entsprechen.

These products are intended for installation in machines. Operation is  
prohibited until it has been determined that the machine in which  
these products are to be installed, conforms to the above mentioned  
EU Directive.

**Dt. / Datum**  
**Place / date**

Aerzen 16.10.2020

**Geschäftsführer**  
Managing Director

Dipl.-Ing. Frank Maier

**Dokumentationsverantwortlicher**  
Responsible for documentation

J.V. T. Wedemeyer  
J.V. T. Wedemeyer



## Good to know

### Operating modes of the motor

Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature limit. This behaviour is referred to as overload capacity.

Depending on the duration of the load and the resulting temperature rise, the required motor can be selected reduced by the overload capacity.

### The most important operating modes

Continuous operation S1	Short-time operation S2
<p>Operation with a constant load until the motor reaches the thermal steady state. The motor may be actuated continuously with its rated power.</p>	<p>Operation with constant load; however, the motor does not reach the thermal steady state. During the following standstill, the motor winding cools down to the ambient temperature again. The increase in power depends on the load duration.</p>

Intermittent operation S3	Non-intermittent periodic operation S6
<p>Sequence of identical duty cycles comprising operation with a constant load and subsequent standstill. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/downtime ratio.</p>	<p>Sequence of identical duty cycles comprising operation with a constant load and subsequent no-load operation. The motor cools down during the no-load phase. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/idle time ratio.</p>

P	Power
t	Time
$t_L$	Idle time
$\theta$	Temperature

$P_V$	Power loss
$t_B$	Load period
$t_s$	Cycle duration

# Appendix

Good to know

Motor control types



## Motor control types

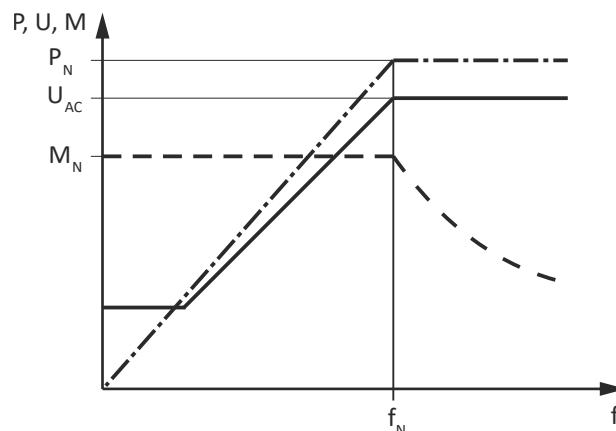
The inverter provides various motor control types.

### Linear V/f characteristic control

The output voltage is increased proportionately to the output frequency.

In case of low output frequencies, the motor voltage can be increased to ensure a minimum current for the breakaway torque. In the field weakening range, the output voltage of the inverter is constant (mains voltage) and the frequency can be further increased depending on the load. The maximum torque of the motor is reduced proportionately to the square of the frequency increase, the maximum output power of the motor being constant.

Application areas are for instance: Single drives with constant load.



P	Power
V	Voltage
M	Torque
f	Frequency

$P_N$	Rated power
$U_{AC}$	Mains voltage
$M_N$	Rated torque
$f_N$	Rated frequency



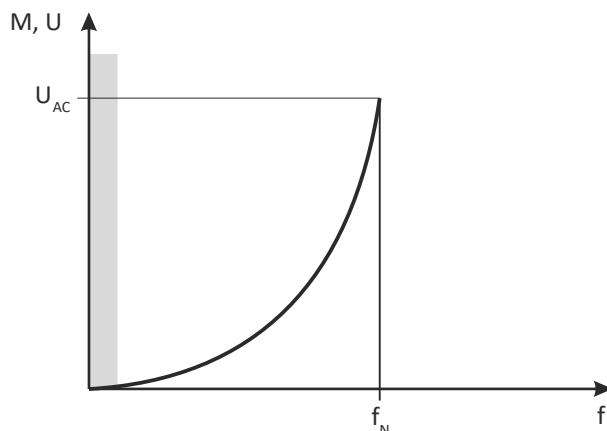
### Square-law V/f characteristic control

The output voltage is increased squarely to the output frequency.

In case of low output frequencies, the motor voltage can be increased to ensure a minimum current for the breakaway torque. In the field weakening range, the output voltage of the inverter is constant (mains voltage) and the frequency can be further increased depending on the load. The maximum torque of the motor is reduced squarely to the frequency increase, the maximum output power of the motor being constant.

Application areas are for instance:

- Pumps
- Fans
- Ventilators

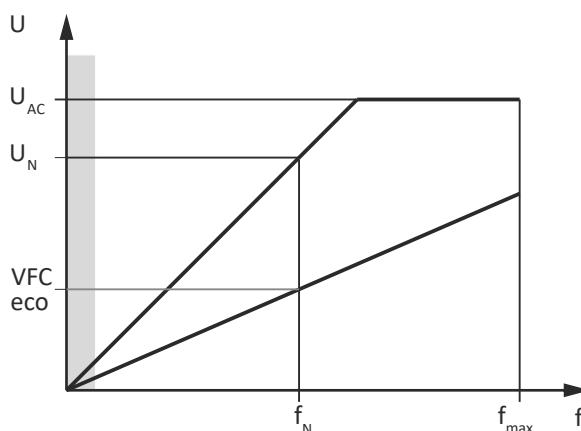


$V$  Voltage  
 $f$  Frequency  
 $M$  Torque

$U_{AC}$  Mains voltage  
 $f_N$  Rated frequency

### VFCeco

The VFCeco mode has a special effect in the partial load operational range. Usually, three-phase AC motors are supplied there with a higher magnetising current than required by the operating conditions. The VFCeco mode reduces the losses in the partial load operational range so that savings up to 30 % are possible.



$V$  Voltage  
 $U_{AC}$  Mains voltage  
 $U_N$  Rated voltage

$f$  Frequency  
 $f_N$  Rated frequency  
 $f_{max}$  Max. frequency

# Appendix

Good to know

Switching frequencies

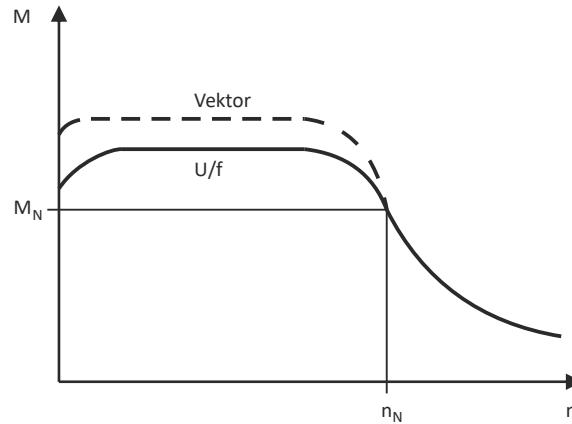


## Sensorless vector control (SLVC)

In vector control, an inverted voltage model is used for calculation. The parameters are detected via a parameter identification. The inverter determines the angle between current and voltage. This imposes a current on the motor".

Compared to the V/f characteristic control, the vector control serves to achieve improved drive characteristics thanks to:

- higher torque throughout the entire speed range
- higher speed accuracy and higher concentricity factor
- higher efficiency



M      Torque

n      Speed

$M_N$       Rated torque

$n_N$       Rated speed

Application areas are for instance:

- Single drives with changing loads
- Single drives with high starting duty
- Sensorless speed control of three-phase AC motors

## Switching frequencies

On an inverter, the term "switching frequency" is understood to mean the frequency with which the input and outputs of the output module (inverter) are switched. On an inverter, the switching frequency can generally be set to values between 2 and 16 kHz, whereby the selection is based on the respective power output.

As switching the modules cause heat losses, the inverter can provide higher output currents at low switching frequencies than at high frequencies. Additionally, it is distinguished between the operation at a permanently set switching frequency and a variably set switching frequency. Here, the switching frequency is automatically reduced as a function of the device utilization.

At a higher switching frequency, the noise generation is less.

Options for the switching frequency:

- 2 kHz
- 4 kHz
- 8 kHz
- 12 kHz
- 16 kHz
- variable (automatic adaptation)



## Enclosures

The protection class indicates the suitability of a product for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The protection classes are classified in the EN 60034-5/ EN IEC 60529.

The first code number after the code letters IP indicates the protection against the ingress of foreign particles and dust. The second code number refers to the protection against the ingress of humidity.

Code number 1	Degree of protection	Code number 2	Degree of protection
0	No protection	0	No protection
1	Protection against the ingress of foreign particles d > 50 mm. No protection in case of deliberate access.	1	Protection against vertically dripping water (dripping water).
2	Protection against medium-sized foreign particles, d > 12 mm, keeping away fingers or the like.	2	Protection against diagonally falling water (dripping water), 15 ° compared to normal service position.
3	Protection against small foreign particles d > 2.5 mm. Keeping away tools, wires or the like.	3	Protection against spraying water, up to 60 ° from vertical.
4	Protection against granular foreign particles, d > 1 mm, keeping away tools, wire or the like.	4	Protection against spraying water from all directions.
5	Protection against dust deposits (dust-protected), complete protection against contact.	5	Protection against water jets from all directions.
6	Protection against the ingress of dust (dust-proof), complete protection against contact.	6	Protection against choppy seas or heavy water jets (flood protection).

## Glossary

Abbreviation	Meaning
AIE	Acknowledge In Error, error acknowledgement
AIS	Acknowledge In Stop, restart acknowledgement
OFF state	Triggered signal status of the sensors
CCF	Common Cause Error (also $\beta$ -value)
EC_FS	Error Class Fail Safe
EC_SS1	Error Class Safe Stop 1
EC_SS2	Error Class Safe Stop 2
EC_STO	Error Class Safe Torque Off Stop 0
ON state	Signal status of the safety sensors in normal operation
FIT	Failure In Time, 1 FIT = 10 <sup>-9</sup> Error/h
FMEA	Failure Mode and Effect Analysis
FSoE	FailSafe over EtherCAT
GSDML	Device description file with PROFINET-specific data to integrate the configuring software of a PROFINET controller.
HFT	Hardware Failure Tolerance
Cat.	Category according to EN ISO 13849-1
OSSD	Output Signal Switching Device, tested signal output
PELV	Protective Extra Low Voltage
PL	Performance Level according to EN ISO 13849-1
PM	Plus-Minus – switched signal paths
PP	Plus-Plus – switched signal paths
PS	PROFIsafe
PWM	Pulse Width Modulation
SCS	Safe Creeping Speed
SD-In	Safe Digital Input
SD-Out	Safe Digital Output
SELV	Safety Extra Low Voltage
SFF	Safe Failure Fraction
SIL	Safety Integrity Level according to EN IEC 61508

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