

## Operating instructions



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# i550 cabinet frequency inverter



0.25 ... 132 kW

## General information

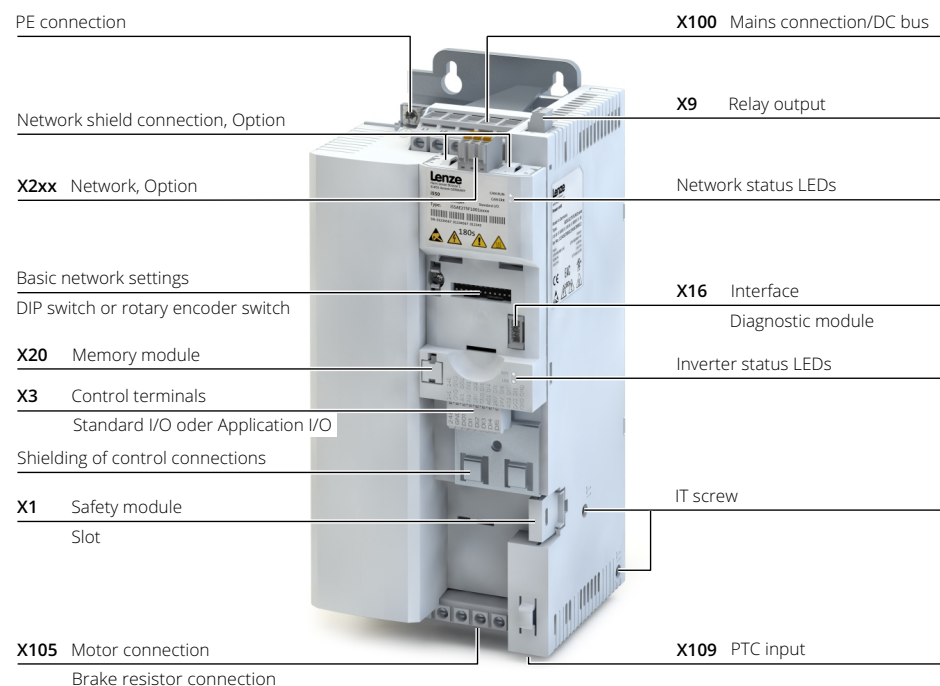
Overview

Information

Identification

Conventions

### Hardware overview of the inverter



## General information

Overview

Information

Identification

Conventions

Please read this documentation carefully before installing the inverter and observe the safety instructions!

This document only includes the most frequently asked questions and presents them in a simplified form for a better overview. Detailed technical and functional explanations can be found in the comprehensive product documentation. The complete documentation, further information and tools regarding Lenze products can be found on the Internet:

[www.lenze.com](http://www.lenze.com)

### Application as directed

- The product is a piece of professional equipment intended for use by trades, specific professions or industry, and not for sale to the general public. IEC 60050 [IEV161-05-05]
- 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.

### Device-specific standards and directives

- The product meets the protection requirements of the Low-Voltage Directive 2014/35/EU.
- The harmonized standard EN IEC 61800-5-1 is used for the inverters. (Europe).
- UL 61800-5-1 and CAN/CSA C22.2 No.274 are the North American electrical safety standards.

### Relevant standards and directives for the operator

- If the product is used in accordance with the technical data, the drive systems comply with the EN IEC 61800-3 categories (Category C2 is similar to FCC Class A).
- The test voltage for insulation resistance tests between a control potential of 24 V and PE must be measured in accordance with EN IEC 61800-5-1.
- The cables must be installed in accordance with EN IEC 60204-1 or US National Electrical Code NFPA 70/Canadian Electrical Code C22.1.

### Commissioning

- Commissioning or starting the operation as directed of a machine with the product is prohibited until it has been ensured that the machine meets the regulations of the Machinery Directive 2006/42/EG and the standard EN IEC 60204-1.
- Commissioning or starting the operation as directed is only permissible if the EMC Directive 2014/30/EU is complied with.
- In residential areas, the product may cause EMC interference. The operator is responsible for executing the interference suppression measures.

### License information PROFINET

The PROFINET firmware is optional. The PROFINET firmware uses the following open source software packages under a modified GPL license: eCos Operating System. These components are used at the operating system level of the firmware. The protocol stack does not use source code under a GPL license.

View license: <http://ecos.sourceforge.org/license-overview.html>

General information

- Overview
- Information
- Identification
- Conventions

Identification of the products

I

5

5

A<sup>1</sup>

E

137<sup>2</sup>

F<sup>3</sup>

1

A<sup>4</sup>

V

0<sup>5</sup>

0<sup>6</sup>

000S<sup>7</sup>

1

| Product generation |              |
|--------------------|--------------|
| A                  | Generation 1 |
| B                  | Generation 2 |

2

| Rated power |         |
|-------------|---------|
| 125         | 0.25 kW |
| 137         | 0.37 kW |
| 155         | 0.55 kW |
| 175         | 0.75 kW |
| 211         | 1.1 kW  |
| 215         | 1.5 kW  |
| 222         | 2.2 kW  |
| 230         | 3 kW    |
| 240         | 4 kW    |
| 255         | 5.5 kW  |
| 275         | 7.5 kW  |
| 311         | 11 kW   |
| 315         | 15 kW   |
| 318         | 18.5 kW |
| 322         | 22 kW   |
| 330         | 30 kW   |
| 337         | 37 kW   |
| 345         | 45 kW   |
| 355         | 55 kW   |
| 375         | 75 kW   |
| 390         | 90 kW   |
| 411         | 110 kW  |

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| Mains voltage and connection type |                                          |
|-----------------------------------|------------------------------------------|
| A                                 | 1/N/PE AC 120 V                          |
| B                                 | 1/N/PE AC 230/240 V                      |
| C                                 | 3/PE AC 230/240 V                        |
| D                                 | 1/N/PE AC 230/240 V<br>3/PE AC 230/240 V |
| F                                 | 3/PE AC 400 V<br>3/PE AC 480 V           |

4

| Integrated functional safety |                           |
|------------------------------|---------------------------|
| 0                            | Without functional safety |
| A                            | Basic Safety - STO        |

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| Interference suppression |                                  |
|--------------------------|----------------------------------|
| 0                        | Without interference suppression |
| 1                        | Integrated RFI filter            |

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| Application area |                                                          |
|------------------|----------------------------------------------------------|
| 0                | Default parameter setting:<br>Region EU (50-Hz networks) |
| 1                | Default parameter setting:<br>Region US (60-Hz networks) |

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| Design types |                                 |
|--------------|---------------------------------|
| 000S         | Standard I/O without network    |
| 001S         | Application I/O without network |
| 002S         | Standard I/O with CANopen       |
| 003S         | Standard I/O with Modbus RTU    |
| 004S         | Standard I/O with PROFIBUS      |
| 012S         | Standard I/O with POWERLINK     |
| 0xKS         | Standard I/O with EtherCAT      |
| 0xLS         | Standard I/O with PROFINET      |
| 0xMS         | Standard I/O with EtherNet/IP   |
| 0xWS         | Standard I/O with Modbus TCP    |
| 016S         | Standard I/O with IO-Link       |

## General information

Overview

Information

Identification

Conventions

### Safety instructions

By safety instructions, we mean information for the use of products that serves to warn the user of hazards and to instruct behavior that will not result in harm to people. In this document, these are distinguished as follows according to ANSI Z535.6:

#### **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.

### Numeric notation

As a rule, a period is used as a decimal separator in this documentation.

Example: 1234.56

## Safety instructions

Basic  
safety instructions

Residual hazards

### Basic safety instructions

#### **DANGER!**

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 state!
- Only remove the product from the installation in a 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. 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 must 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.

#### **WARNING!**

#### **Functional safety**

Certain variants of the product support safety functions (e.g. "Safe Torque Off (STO)") in accordance with the requirements of 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008]. Be sure to observe the instructions in the documentation regarding the integrated safety technology.

#### **NOTICE**

#### **Device protection**

Carry out insulation resistance tests between 24-V control potential terminals and PE. The maximum test voltage must not exceed 110 V DC.

#### **NOTICE**

#### **Foreseeable misuse**

Inverters are not to be operated with DC motors.

## Safety instructions

Basic  
safety instructions

Residual hazards

### Residual hazards

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 may result in injuries to persons and material damage!



### 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 to earth (PE) is > 3.5 mA AC or > 10 mA DC.

Possible consequences

- Death or serious injuries 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 is at a standstill.
- Implement the measures required by EN IEC 61800-5-1 or EN IEC 60204-1, i.e. fixed installation and standards-compliant PE connection.

### Degree of protection - Protection of persons and device protection

Information applies to the mounted and ready-for-use state.

### Motor protection

With some settings of the inverter, the connected motor can be overheated.

- E.g. via the operation of self-ventilated motors at low speeds over a long period.
- E.g. by operating DC-injection braking over a long period.

### Product

Observe the warning signs on the product!

### Dangerous electrical voltage



Before working on the product, check whether all power connections are deenergized!

After mains disconnection, the power terminals carry the hazardous electrical voltage for the time specified 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 the following standard:

EN IEC 61800-5-1/EN IEC 60204-1



### Hot surface

Use personal protective equipment or wait until the device has cooled down!

### Protection of the machine/system

- Drives can reach dangerous overspeeds, e.g. from setting high output frequencies for motors and machines which are not suitable. The inverters do not provide any protection against such operating conditions. Use additional external components for this purpose.
- Only switch the contactor in the motor cable when the inverter is inhibited. Switching them when the inverter is enabled is only permissible when no monitoring components respond.

### Motor

In the event of a short circuit of two power transistors, a residual movement of up to 180°/number of pole pairs on the motor may occur (e.g. 4-pole motor): Residual movement max.  $180^\circ/2 = 90^\circ$ ).

# Technical data

## Standards and operating conditions

### Standards and operating conditions

|                         |                 |                             |                                                                                     |                                                                                                                                                                                                                                                                          |
|-------------------------|-----------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Market approvals        |                 | CE (European Union)         |                                                                                     | Further information and certificates of approval:<br><a href="https://www.lenze.com/en-de/products/inverters/frequency-inverters/i550-cabinet-frequency-inverter">https://www.lenze.com/en-de/products/inverters/frequency-inverters/i550-cabinet-frequency-inverter</a> |
|                         |                 | UKCA (Great Britain)        |                                                                                     |                                                                                                                                                                                                                                                                          |
|                         |                 | cULus (USA, Canada)         |                                                                                     |                                                                                                                                                                                                                                                                          |
| Environment             |                 | RoHS                        |                                                                                     |                                                                                                                                                                                                                                                                          |
| Energy efficiency       | High Efficiency | EN IEC 61800-9-2            | Class IE2                                                                           |                                                                                                                                                                                                                                                                          |
| Degree of protection    |                 |                             |                                                                                     | Information applies to the mounted and ready-for-use state                                                                                                                                                                                                               |
|                         | EN              | EN IEC 60529                | IP20                                                                                | In the area of the power connections, size-dependent IP10                                                                                                                                                                                                                |
|                         | UL              | UL 50E                      | Type 1                                                                              | Protection against accidental contact                                                                                                                                                                                                                                    |
|                         |                 | UL 61800-5-1                | Open type                                                                           | UL 50E type 1 comparable to NEMA 1                                                                                                                                                                                                                                       |
| Ambient conditions      | Operation       | EN 60721-3-3:1995 + A2:1997 | 3K3 (-10 ... +60 °C)                                                                | Operation at a switching frequency of 2 or 4 kHz:<br>Above +45°C: reduce rated output current by 2.5 %/°C                                                                                                                                                                |
|                         |                 |                             |                                                                                     | Operation at a switching frequency of 8 or 16 kHz:<br>Above +40°C: reduce rated output current by 2.5 %/°C                                                                                                                                                               |
|                         |                 |                             |                                                                                     | Relative humidity < 95 %, condensation not permissible                                                                                                                                                                                                                   |
|                         |                 |                             | 3C3                                                                                 | For chemically active substances                                                                                                                                                                                                                                         |
|                         |                 |                             | 3S2                                                                                 | For mechanically active substances                                                                                                                                                                                                                                       |
| Power systems           |                 |                             | TT, TN                                                                              | Voltage to earth: max. 300 V                                                                                                                                                                                                                                             |
|                         |                 |                             | IT                                                                                  | Apply the measures described for IT systems!                                                                                                                                                                                                                             |
| Mains switching         |                 |                             | 3 x within one minute possible                                                      |                                                                                                                                                                                                                                                                          |
| Max. motor cable length |                 |                             | device-specific; see technical data in project planning document                    |                                                                                                                                                                                                                                                                          |
| Max. output frequency   |                 |                             | 0 Hz ... 599 Hz                                                                     |                                                                                                                                                                                                                                                                          |
| Overload capacity       |                 |                             | Heavy Duty: 200 % for 3s, 150 % for 60s<br>Light Duty 167 % for 3 s, 125 % for 60 s |                                                                                                                                                                                                                                                                          |

Further standards and operating conditions can be found in the project planning documents.

## Mechanical installation

Important notes

Preparation

Dimensions and assembly

### Important notes

#### NOTICE

#### UL marking

Modular construction - A complete drive consists of a power unit series no. I5D in combination with a control unit series no. I5C only.

#### Marquage UL

Conception modulaire – Le système d'entraînement complet comprend un module d'alimentation de série I5D, impérativement associé à une unité de commande de série I5C.

## Mechanical installation

Important notes

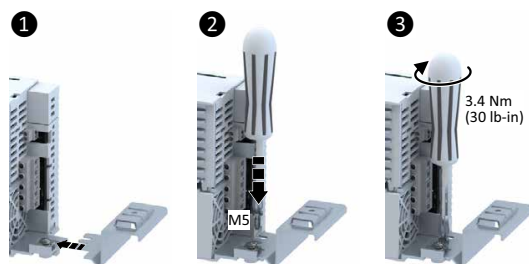
Preparation

Dimensions and assembly

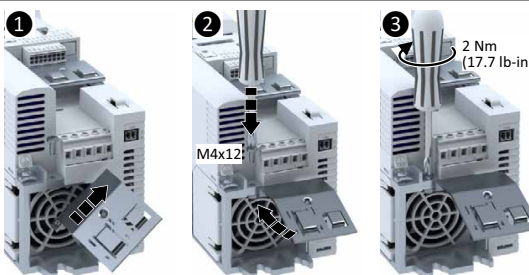
### Mounting of shield connection sheet

#### I55xE125 ... I55xE240 (optional accessories)

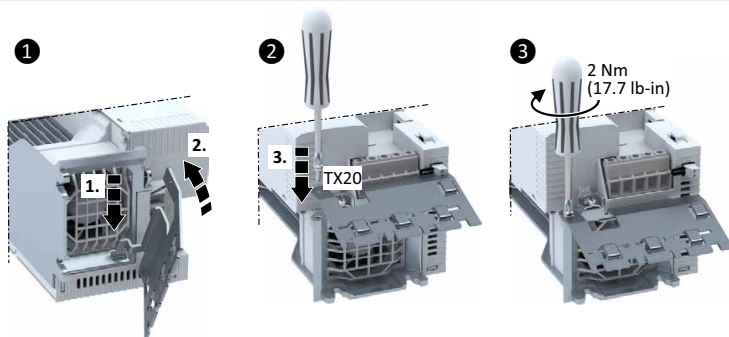
Together with the inverter, the shield connection sheet is screwed onto the mounting plate.



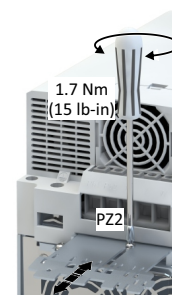
#### I55AE255 ... I55AE311 (optional accessories)



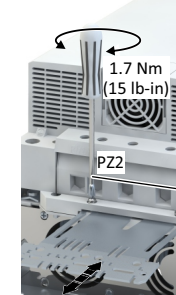
#### I55BE275 ... I55BE311 (optional accessories)



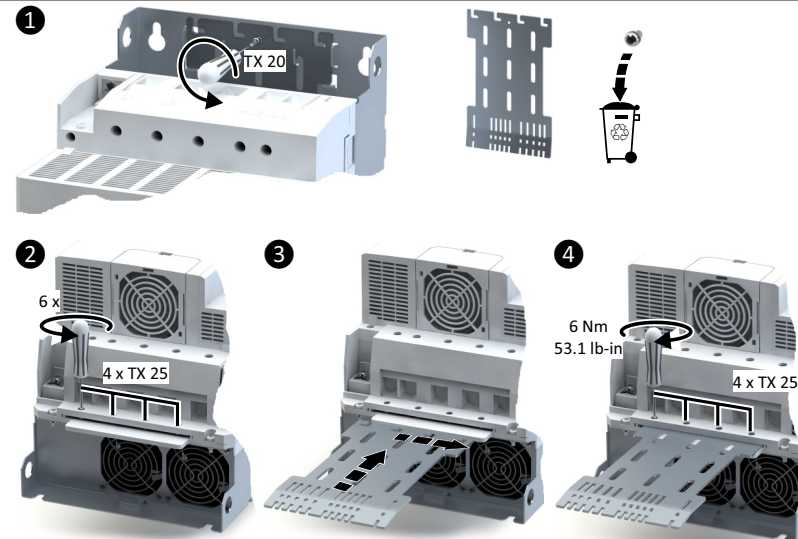
#### I55AE315 ... I55AE322, I55BE315 ... I55BE330



#### I55AE330 ... I55AE345



#### I55AE355 ... I55AE411



## Mechanical installation

Important notes

Preparation

Dimensions and assembly

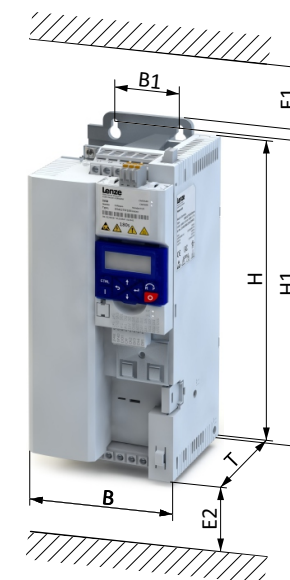
### Dimensions and assembly

#### NOTICE

The specified installation clearances are minimum dimensions to ensure a sufficient air circulation for cooling purposes. They do not take into account the bending radii of the connecting cables.

Several i5xx cabinet inverters can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

| Inverter                                             | Rated power<br>[kW] | Weight<br>[kg] | H<br>[mm] | B<br>[mm] | T<br>[mm] | H1<br>[mm] | B1<br>[mm] | Screws | E1<br>[mm] | E2<br>[mm] |
|------------------------------------------------------|---------------------|----------------|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| <b>1-phase mains connection 120 V devices</b>        |                     |                |           |           |           |            |            |        |            |            |
| I55AExxxA                                            | 0.25 ... 0.37       | 1              | 180       | 60        | 130       | 190        | -          | 2x M5  | >50        | >50        |
| I55AExxxA                                            | 0.75 ... 1.1        | 1.35           | 250       | 60        | 130       | 260        | -          | 2x M5  | >50        | >50        |
| <b>1-phase mains connection 230/240 V devices</b>    |                     |                |           |           |           |            |            |        |            |            |
| I55AExxxB                                            | 0.25 ... 0.37       | 0.8            | 155       | 60        | 130       | 165        | -          | 2x M5  | >50        | >50        |
| I55AExxxB                                            | 0.55 ... 0.75       | 1              | 180       | 60        | 130       | 190        | -          | 2x M5  | >50        | >50        |
| I55AExxxB                                            | 1.1 ... 2.2         | 1.35           | 250       | 60        | 130       | 260        | -          | 2x M5  | >50        | >50        |
| <b>1-/3-phase mains connection 230/240 V devices</b> |                     |                |           |           |           |            |            |        |            |            |
| I55AExxxD                                            | 0.25 ... 0.37       | 0.8            | 155       | 60        | 130       | 165        | -          | 2x M5  | >50        | >50        |
| I55AExxxD                                            | 0.55 ... 0.75       | 1              | 180       | 60        | 130       | 190        | -          | 2x M5  | >50        | >50        |
| I55AExxxD                                            | 1.1 ... 2.2         | 1.35           | 250       | 60        | 130       | 260        | -          | 2x M5  | >50        | >50        |
| I55AExxxC                                            | 4 ... 5.5           | 2.1            | 250       | 90        | 130       | 260        | 30         | 4x M5  | >50        | >100       |
| <b>3-phase mains connection 400/480 V devices</b>    |                     |                |           |           |           |            |            |        |            |            |
| I55AExxxF                                            | 0.37                | 0.8            | 155       | 60        | 130       | 165        | -          | 2x M5  | >50        | >50        |
| I55AExxxF                                            | 0.55 ... 0.75       | 1              | 180       | 60        | 130       | 190        | -          | 2x M5  | >50        | >50        |
| I55AExxxF                                            | 1.1 ... 2.2         | 1.35           | 250       | 60        | 130       | 260        | -          | 2x M5  | >50        | >50        |
| I55AExxxF                                            | 3 ... 4             | 2.3            | 250       | 90        | 130       | 260        | 30         | 4x M5  | >50        | >100       |
| I55BExxxF                                            | 3 ... 4             | 1.35           | 250       | 60        | 130       | 260        | -          | 2x M5  | >50        | >50        |
| I55AExxxF                                            | 5.5                 | 2.3            | 250       | 90        | 130       | 260        | 30         | 4x M5  | >50        | >50        |
| I55AExxxF                                            | 7.5 ... 11          | 3.7            | 276       | 120       | 130       | 285        | 60         | 4x M5  | >50        | >100       |
| I55BExxxF                                            | 7.5 ... 11          | 3.7            | 276       | 120       | 130       | 285        | 60         | 4x M5  | >50        | >100       |
| I55AExxxF                                            | 15 ... 22           | 10.3           | 347       | 204.5     | 222       | 343        | 180        | 4x M6  | >50        | >100       |
| I55BExxxF                                            | 15 ... 30           | 8              | 342       | 180       | 165       | 365        | 154        | 4x M6  | >50        | >100       |
| I55AExxxF                                            | 30 ... 45           | 17.2           | 450       | 250       | 230       | 496        | 210        | 4x M8  | >95        | >130       |
| I55AExxxF                                            | 55 ... 75           | 24             | 536       | 250       | 265       | 596        | 210        | 4x M8  | >95        | >260       |
| I55AExxxF                                            | 90 ... 110          | 35.6           | 685       | 258       | 304       | 748        | 210        | 4x M8  | >95        | >260       |



## Electrical installation

Preparation

Connection diagram

1-phase | 120 V

1-phase | 230/240 V

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Brake resistor

Control terminals

Relay output

PTC input

Networks

Functional safety

Safe torque off (STO)

### Preparation for connection to an IT system

#### NOTICE

#### Internal components have ground potential

Possible consequence: The monitoring devices of the IT system will be triggered.

- Connect an isolating transformer upstream.
- Before connection to an IT system be absolutely sure to remove the screws marked on the product with "IT".

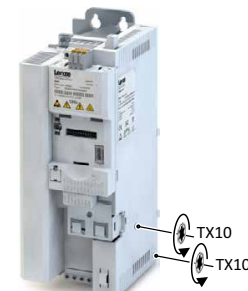
I55AE125 ... I55AE137



I55AE155 ... I55AE222, I55BE230 ... I55BE240



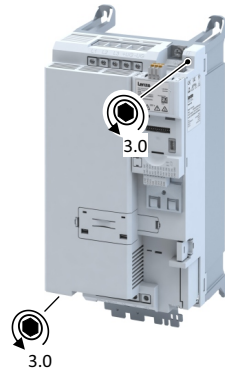
I55AE230 ... I55AE311, I55BE275 ... I55BE311



I55AE315 ... I55AE322



I55BE315 ... I55BE330



I55AE330 ... I55AE345



I55AE355 ... I55AE411



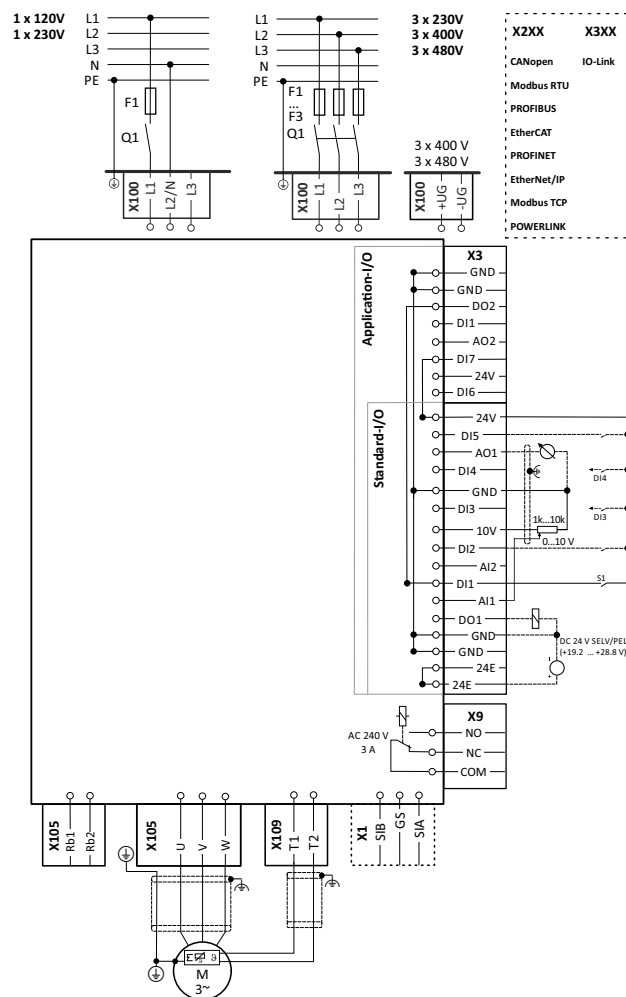
## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V 3-phase | 480 V Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

### Connection diagram

The connection diagram is considered exemplary for all voltage and power classes.

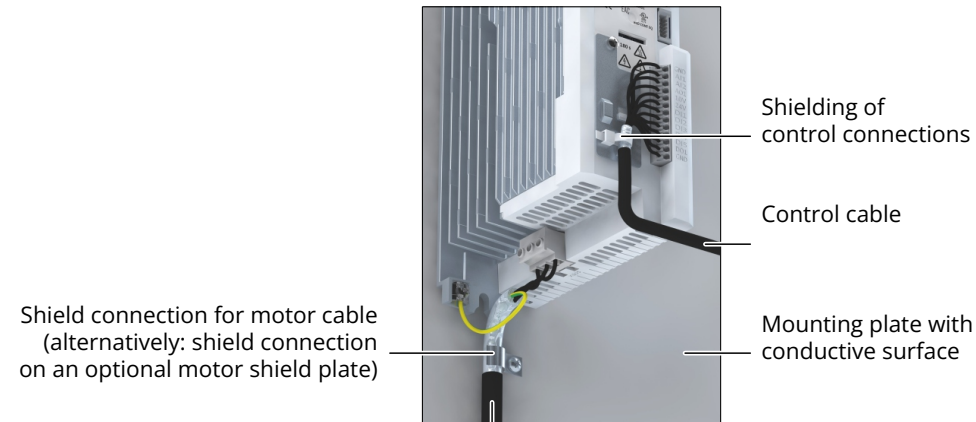


### EMC-compliant installation

The drive system of inverter and drive comply with the EMC Directive 2014/30/EU if they are installed according to the specifications of CE-typical drive systems. These guidelines should also be followed in installations requiring FCC Part 15 or ICES 001 compliance. The structure at the installation location 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 earthing points.

The following example shows the effective wiring.



Low-capacitance motor cable  
 $C\text{-core/core/C-core/shield} < 75/150 \text{ pF/m} \leq 2.5 \text{ mm}^2 (\geq \text{AWG } 14)$   
 $C\text{-core/core/C-core/shield} < 150/300 \text{ pF/m} \geq 4 \text{ mm}^2 (\leq \text{AWG } 12)$

# Electrical installation

Preparation Connection diagram **1-phase | 120 V** 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V 3-phase | 480 V Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 1-phase mains connection 120 V (90 V ... 132 V, 45 Hz ... 65 Hz)

### Terminal data

| Inverter                 |                 | I55AExxxA             |  |               |                       |
|--------------------------|-----------------|-----------------------|--|---------------|-----------------------|
| Rated power              | kW              | 0.25 ... 0.37         |  | 0.75 ... 1.1  | 0.25 ... 1.1          |
| Connection               |                 | Mains connection X100 |  | PE connection | Motor connection X105 |
| Connection type          |                 | Screw terminal        |  | Screw         | Screw terminal        |
| Max. cable cross-section | mm <sup>2</sup> | 2.5                   |  | 6             | 2.5                   |
| Stripping length         | mm              | 8                     |  | 10            | 8                     |
| Tightening torque        | Nm              | 0.5                   |  | 2             | 0.5                   |
| Required tool            |                 | ⊖<br>0.5 x 3.0        |  | ⊕<br>TX20     | ⊖<br>0.5 x 3.0        |

### Rated data and fusing data

| Inverter                          |    | I55AE           |      |      |      |
|-----------------------------------|----|-----------------|------|------|------|
|                                   |    | 125A            | 137A | 175A | 211A |
| Rated power                       | kW | 0.25            | 0.37 | 0.75 | 1.1  |
| Rated output current (8 kHz)      | A  | 1.7             | 2.4  | 4.2  | 6    |
| Max output current (≤ 8 kHz) *    | A  | 3.4             | 4.8  | 8.4  | 12   |
| Operation without mains choke     |    |                 |      |      |      |
| Rated mains current               | A  | 6.8             | 9.6  | 16.8 | 22.9 |
| Fuse (EN 60204-1)                 |    |                 |      |      |      |
| Characteristic                    |    | gG/gL or gRL    |      |      |      |
| Max. rated current                | A  | 16              | 16   | 32   | 32   |
| Max. short-circuit current (SCCR) | kA | 5               | 5    | 5    | 5    |
| Circuit breaker (EN 60204-1)      |    |                 |      |      |      |
| Characteristic                    |    | B, C            |      |      |      |
| Max. rated current                | A  | 16              | 16   | 32   | 32   |
| Max. short-circuit current (SCCR) | kA | 5               | 5    | 5    | 5    |
| Residual current device (RCD)     |    | ≥ 30 mA, type B |      |      |      |

\* Overload time = 3 s, recovery time = 12 s

Electrical installation

- Preparation
- Connection diagram
- 1-phase | 120 V
- 1-phase | 230/240 V
- 3-phase | 230/240 V
- 3-phase | 400 V
- 3-phase | 480 V
- Brake resistor
- Control terminals
- Relay output
- PTC input
- Networks
- Functional safety
- Safe torque off (STO)

1-phase mains connection 230/240 V (170 V ... 264 V, 45 Hz ... 65 Hz)

Terminal data

| Inverter                 |     | I55AExxxB (1-phase), I55AExxD (1/3-phase) |  |               |                       |
|--------------------------|-----|-------------------------------------------|--|---------------|-----------------------|
| Rated power              | kW  | 0.25 ... 0.75                             |  | 1.1 ... 2.2   | 0.25 ... 2.2          |
| Connection               |     | Mains connection X100                     |  | PE connection | Motor connection X105 |
| Connection type          |     | Screw terminal                            |  | Screw         | Screw terminal        |
| Max. cable cross-section | mm² | 2.5                                       |  | 6             | 2.5                   |
| Stripping length         | mm  | 8                                         |  | 10            | 8                     |
| Tightening torque        | Nm  | 0.5                                       |  | 2             | 0.5                   |
| Required tool            |     | ⊖<br>0.5 x 3.0                            |  | ⊕<br>TX20     | ⊖<br>0.5 x 3.0        |

Rated data and fusing data

| Inverter                          |    | I55AE                 |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------|----|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                                   |    | 125B                  | 125D | 137B | 137D | 155B | 155D | 175B | 175D | 211B | 211D | 215B | 215D | 222B | 222D |
| Rated power                       | kW | 0.25                  |      | 0.37 |      | 0.55 |      | 0.75 |      | 1.1  |      | 1.5  |      | 2.2  |      |
| Rated output current (8 kHz)      | A  | 1.7                   |      | 2.4  |      | 3.2  |      | 4.2  |      | 6    |      | 7    |      | 9.6  |      |
| Max output current (≤ 8 kHz) *    | A  | 3.4                   |      | 4.8  |      | 6.4  |      | 8.4  |      | 12   |      | 14   |      | 19.2 |      |
| Operation without mains choke     |    |                       |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated mains current               | A  | 4                     |      | 5.7  |      | 7.6  |      | 10   |      | 14.3 |      | 16.7 |      | 22.5 |      |
| Fuse (EN 60204-1)                 |    |                       |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Characteristic                    |    | gG/gL or gRL          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Max. rated current                | A  | 16                    |      | 16   |      | 16   |      | 16   |      | 32   |      | 32   |      | 32   |      |
| Max. short-circuit current (SCCR) | kA | 65                    |      | 65   |      | 65   |      | 65   |      | 65   |      | 65   |      | 65   |      |
| Circuit breaker (EN 60204-1)      |    |                       |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Characteristic                    |    | B, C                  |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Max. rated current                | A  | 16                    |      | 16   |      | 16   |      | 16   |      | 32   |      | 32   |      | 32   |      |
| Max. short-circuit current (SCCR) | kA | 65                    |      | 65   |      | 65   |      | 65   |      | 65   |      | 65   |      | 65   |      |
| Residual current device (RCD)     |    | ≥ 30 mA, type B, F ** |      |      |      |      |      |      |      |      |      |      |      |      |      |

\* Overload time = 3 s, recovery time = 12 s      \*\* RCD type "F" is only permitted in 1-phase operation (L/N)!

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V **3-phase | 230/240 V** 3-phase | 400 V 3-phase | 480 V Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 230/240 V (195 V ... 264 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |                 | I55AExxxD (1/3-phase), I55AExxxC (3-phase) |                |                |               |                       |                |
|--------------------------|-----------------|--------------------------------------------|----------------|----------------|---------------|-----------------------|----------------|
| Rated power              | kW              | 0.25 ... 0.75                              | 1.1 ... 2.2    | 4 ... 5.5      | 0.25 ... 5.5  | 0.25 ... 2.2          | 4 ... 5.5      |
| Connection               |                 | Mains connection X100                      |                |                | PE connection | Motor connection X105 |                |
| Connection type          |                 | Screw terminal                             |                |                | Screw         | Screw terminal        |                |
| Max. cable cross-section | mm <sup>2</sup> | 2.5                                        | 6              | 6              | 6             | 2.5                   | 6              |
| Stripping length         | mm              | 8                                          | 8              | 9              | 10            | 8                     | 9              |
| Tightening torque        | Nm              | 0.5                                        | 0.7            | 0.5            | 2             | 0.5                   | 0.5            |
| Required tool            |                 | ⊖<br>0.5 x 3.0                             | ⊖<br>0.6 x 3.5 | ⊖<br>0.6 x 3.5 | ⊕<br>TX20     | ⊖<br>0.5 x 3.0        | ⊖<br>0.6 x 3.5 |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE                 |      |      |      |      |      |      |                  |      |
|-----------------------------------|----|-----------------------|------|------|------|------|------|------|------------------|------|
|                                   |    | 125D                  | 137D | 155D | 175D | 211D | 215D | 222D | 240C             | 255C |
| Rated power                       | kW | 0.25                  | 0.37 | 0.55 | 0.75 | 1.1  | 1.5  | 2.2  | 4                | 5.5  |
| Rated output current (8 kHz)      | A  | 1.7                   | 2.4  | 3.2  | 4.2  | 6    | 7    | 9.6  | 16.5             | 23   |
| Max output current (≤ 8 kHz) *    | A  | 3.4                   | 4.8  | 6.4  | 8.4  | 12   | 14   | 19.2 | 33               | 46   |
| Operation without mains choke     |    |                       |      |      |      |      |      |      |                  |      |
| Rated mains current               | A  | 2.6                   | 3.9  | 4.8  | 6.4  | 7.8  | 9.5  | 13.6 | 20.6             | 28.8 |
| Fuse (EN 60204-1)                 |    |                       |      |      |      |      |      |      |                  |      |
| Characteristic                    |    | gG/gL or gRL          |      |      |      |      |      |      |                  |      |
| Max. rated current                | A  | 16                    | 16   | 16   | 16   | 32   | 32   | 32   | 40               | 40   |
| Max. short circuit current (SCCR) | kA | 65                    | 65   | 65   | 65   | 65   | 65   | 65   | 65               | 65   |
| Circuit breaker (EN 60204-1)      |    |                       |      |      |      |      |      |      |                  |      |
| Characteristic                    |    | B, C                  |      |      |      |      |      |      |                  |      |
| Max. rated current                | A  | 16                    | 16   | 16   | 16   | 32   | 32   | 32   | 40               | 40   |
| Max. short circuit current (SCCR) | kA | 65                    | 65   | 65   | 65   | 65   | 65   | 65   | 65               | 65   |
| Residual current device (RCD)     |    | ≥ 30 mA, type B, F ** |      |      |      |      |      |      | ≥ 300 mA, type B |      |

## Rated data (light duty)

| Inverter                     |    | I55AE |      |      |      |      |      |      |      |      |
|------------------------------|----|-------|------|------|------|------|------|------|------|------|
|                              |    | 125D  | 137D | 155D | 175D | 211D | 215D | 222D | 240C | 255C |
| Rated power                  | kW | -     | -    | -    | -    | -    | -    | -    | 5.5  | 7.5  |
| Rated output current (4 kHz) | A  | -     | -    | -    | -    | -    | -    | -    | 20.6 | 27.6 |
| Max. output current *        | A  | -     | -    | -    | -    | -    | -    | -    | 33   | 46   |

\* Overload time = 3 s, recovery time = 12 s

\*\* RCD type "F" is only permitted in 1-phase operation (L/N)!

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V **3-phase | 400 V** 3-phase | 480 V Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |                 | I55AExxxF             |                | I55BExxxF      | I55ExxxF      | I55AExxxF             |                | I55BExxxF      |
|--------------------------|-----------------|-----------------------|----------------|----------------|---------------|-----------------------|----------------|----------------|
| Rated power              | kW              | 0.37 ... 2.2          | 3 ... 5.5      | 3 ... 4        | 0.37 ... 5.5  | 0.37 ... 2.2          | 3 ... 5.5      | 3 ... 4        |
| Connection               |                 | Mains connection X100 |                |                | PE connection | Motor connection X105 |                |                |
| Connection type          |                 | Screw terminal        |                |                | Screw         | Screw terminal        |                |                |
| Max. cable cross-section | mm <sup>2</sup> | 2.5                   | 6              | 4              | 6             | 2.5                   | 6              | 2.5            |
| Stripping length         | mm              | 8                     | 9              | 8              | 10            | 8                     | 9              | 8              |
| Tightening torque        | Nm              | 0.5                   | 0.5            | 0.6            | 2             | 0.5                   | 0.5            | 0.5            |
| Required tool            |                 | ⊖<br>0.5 x 3.0        | ⊖<br>0.6 x 3.5 | ⊖<br>0.5 x 3.0 | ⊕<br>TX20     | ⊖<br>0.5 x 3.0        | ⊖<br>0.6 x 3.5 | ⊖<br>0.5 x 3.0 |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE           |      |      |      |      |      | I55AE | I55BE | I55AE | I55BE | I55AE            |
|-----------------------------------|----|-----------------|------|------|------|------|------|-------|-------|-------|-------|------------------|
|                                   |    | 137F            | 155F | 175F | 211F | 215F | 222F | 230F  |       | 240F  |       | 255F             |
| Rated power                       | kW | 0.37            | 0.55 | 0.75 | 1.1  | 1.5  | 2.2  | 3     |       | 4     |       | 5.5              |
| Rated output current (8 kHz)      | A  | 1.3             | 1.8  | 2.4  | 3.2  | 3.9  | 5.6  | 7.3   |       | 9.5   |       | 13               |
| Max output current (≤ 8 kHz) *    | A  | 2.6             | 3.6  | 4.8  | 6.4  | 7.8  | 11.2 | 14.6  |       | 19    |       | 26               |
| Operation without mains choke     |    |                 |      |      |      |      |      |       |       |       |       |                  |
| Rated mains current               | A  | 1.8             | 2.5  | 3.3  | 4.4  | 5.4  | 7.8  | 9.6   |       | 12.5  |       | 17.2             |
| Fuse (EN 60204-1)                 |    |                 |      |      |      |      |      |       |       |       |       |                  |
| Characteristic                    |    | gG/gL, gRL      |      |      |      |      |      |       |       |       |       |                  |
| Max. rated current                | A  | 16              | 16   | 16   | 16   | 16   | 16   | 25    | 35    | 25    | 35    | 25               |
| Max. short circuit current (SCCR) | kA | 65              | 65   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 65    | 65               |
| Circuit breaker (EN 60204-1)      |    |                 |      |      |      |      |      |       |       |       |       |                  |
| Characteristic                    |    | B, C            |      |      |      |      |      |       |       |       |       |                  |
| Max. rated current                | A  | 16              | 16   | 16   | 16   | 16   | 16   | 25    | 25    | 25    | 25    | 25               |
| Max. short circuit current (SCCR) | kA | 65              | 65   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 65    | 65               |
| Residual current device (RCD)     |    | ≥ 30 mA, type B |      |      |      |      |      |       |       |       |       | ≥ 300 mA, type B |

## Rated data (light duty)

| Inverter                     |    | I55AE |      |      |      |      |      | I55AE | I55BE | I55AE | I55BE | I55AE |
|------------------------------|----|-------|------|------|------|------|------|-------|-------|-------|-------|-------|
|                              |    | 137F  | 155F | 175F | 211F | 215F | 222F | 230F  |       | 240F  |       | 255F  |
| Rated power                  | kW | -     | -    | -    | -    | -    | -    | 4     |       | 5.5   |       | 7.5   |
| Rated output current (4 kHz) | A  | -     | -    | -    | -    | -    | -    | 8.8   |       | 11.9  |       | 15.6  |
| Max. output current *        | A  | -     | -    | -    | -    | -    | -    | 14.6  |       | 19    |       | 26    |

\* Overload time = 3 s, recovery time = 12 s

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V **3-phase | 400 V** 3-phase | 480 V Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |     | I55xExxxF             |                |               |           |                       |                |
|--------------------------|-----|-----------------------|----------------|---------------|-----------|-----------------------|----------------|
| Rated power              | kW  | 7.5 ... 11            | 15 ... 30      | 7.5 ... 11    | 15 ... 30 | 7.5 ... 11            | 15 ... 30      |
| Connection               |     | Mains connection X100 |                | PE connection |           | Motor connection X105 |                |
| Connection type          |     | Screw terminal        |                | Screw         |           | Screw terminal        |                |
| Max. cable cross-section | mm² | 16                    | 35             | 16            | 25        | 16                    | 35             |
| Stripping length         | mm  | 11                    | 18             | 11            | 16        | 11                    | 18             |
| Tightening torque        | Nm  | 1.2                   | 3.8            | 3.4           | 4         | 1.2                   | 3.8            |
| Required tool            |     | ⊖<br>0.8 x 4.0        | ⊖<br>0.8 x 5.5 | ⊕<br>PZ2      | ⊕<br>PZ2  | ⊖<br>0.8 x 4.0        | ⊖<br>0.8 x 5.5 |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE            | I55BE           | I55AE            | I55BE           | I55AE            | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE |
|-----------------------------------|----|------------------|-----------------|------------------|-----------------|------------------|-------|-------|-------|-------|-------|-------|-------|
|                                   |    | 275F             |                 | 311F             |                 | 315F             |       | 318F  |       | 322F  |       | 330F  |       |
| Rated power                       | kW | 7.5              |                 | 11               |                 | 15               |       | 18.5  |       | 22    |       | 30    |       |
| Rated output current (8 kHz)      | A  | 16.5             |                 | 23.5             |                 | 32               |       | 40    |       | 47    |       | 61    |       |
| Max output current (≤ 8 kHz) *    | A  | 33               |                 | 47               |                 | 64               |       | 80    |       | 94    |       | 122   |       |
| Operation without mains choke     |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Rated mains current               | A  | 20               |                 | 28.4             |                 | 38.7             |       | 48.4  |       | -     | 53    |       | -     |
| Fuse (EN 60204-1)                 |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Characteristic                    |    | gG/gL, gRL       |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Max. rated current                | A  | 40               | 40              | 40               | 40              | 63               | 90    | 63    | 90    | 63    | 90    | 125   | 90    |
| Max. short circuit current (SCCR) | kA | 65               | 65              | 65               | 65              | 65               | 65    | 65    | 65    | 65    | 65    | 22    | 65    |
| Circuit breaker (EN 60204-1)      |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Characteristic                    |    | B, C             |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Max. rated current                | A  | 40               | 40              | 40               | 40              | 63               | 90    | 63    | 90    | 63    | 90    | 125   | 90    |
| Max. short circuit current (SCCR) | kA | 65               | 65              | 65               | 65              | 65               | 65    | 65    | 65    | 65    | 65    | 35    | 65    |
| Residual current device (RCD)     |    | ≥ 300 mA, type B | ≥ 30 mA, type B | ≥ 300 mA, type B | ≥ 30 mA, type B | ≥ 300 mA, type B |       |       |       |       |       |       |       |

## Rated data (light duty)

| Inverter                     |    | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE |
|------------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                              |    | 275F  | 311F  | 315F  | 318F  | 322F  | 330F  |       |       |       |       |       |       |
| Rated power                  | kW | 11    | 15    | 18.5  | 22    | 30    | 37    |       |       |       |       |       |       |
| Rated output current (4 kHz) | A  | 23    | 28.2  | 38.4  | 48    | 56.4  | 73.2  |       |       |       |       |       |       |
| Max. output current *        | A  | 33    | 47    | 64    | 80    | 94    | 122   |       |       |       |       |       |       |

\* Overload time = 3 s, recovery time = 12 s

# Electrical installation

|             |                    |                   |                       |                     |                 |                 |                |                   |              |
|-------------|--------------------|-------------------|-----------------------|---------------------|-----------------|-----------------|----------------|-------------------|--------------|
| Preparation | Connection diagram | 1-phase   120 V   | 1-phase   230/240 V   | 3-phase   230/240 V | 3-phase   400 V | 3-phase   480 V | Brake resistor | Control terminals | Relay output |
| PTC input   | Networks           | Functional safety | Safe torque off (STO) |                     |                 |                 |                |                   |              |

## 3-phase mains connection 400 V (340 V ... 528 V, 45 Hz ... 65 Hz)

### Terminal data

| Inverter                 |                 | I55xExxxF             |           |            |               |             |                       |           |            |
|--------------------------|-----------------|-----------------------|-----------|------------|---------------|-------------|-----------------------|-----------|------------|
| Rated power              | kW              | 37 ... 45             | 55 ... 75 | 90 ... 110 | 37 ... 75     | 90 ... 110  | 37 ... 45             | 55 ... 75 | 90 ... 110 |
| Connection               |                 | Mains connection X100 |           |            | PE connection |             | Motor connection X105 |           |            |
| Connection type          |                 | Screw terminal        |           |            | Screw         | Bolt        | Screw terminal        |           |            |
| Max. cable cross-section | mm <sup>2</sup> | 50                    | 95        | 150        | 35            | 150         | 50                    | 95        | 150        |
| Stripping length         | mm              | 22                    | 32        | 41         | 16            | -           | 22                    | 32        | 41         |
| Tightening torque        | Nm              | 4                     | 10        | 18         | 4             | 10          | 4                     | 10        | 18         |
| Required tool            |                 | ⦿<br>5.0              | ⦿<br>6.0  | ⦿<br>8.0   | ⊕<br>PZ2      | Size 13 key | ⦿<br>5.0              | ⦿<br>6.0  | ⦿<br>8.0   |

### Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE            |      |      |      |      |      |
|-----------------------------------|----|------------------|------|------|------|------|------|
|                                   |    | 337F             | 345F | 355F | 375F | 390F | 411F |
| Rated power                       | kW | 37               | 45   | 55   | 75   | 90   | 110  |
| Rated output current (8 kHz)      | A  | 76               | 89   | 110  | 150  | 180  | 212  |
| Max output current (≤ 8 kHz) *    | A  | 152              | 178  | 220  | 300  | 360  | 424  |
| Operation without mains choke     |    |                  |      |      |      |      |      |
| Rated mains current               | A  | -                | -    | -    | -    | -    | -    |
| Fuse (EN 60204-1)                 |    |                  |      |      |      |      |      |
| Characteristic                    |    | gG/gL, gRL       |      |      | gR   |      |      |
| Max. rated current                | A  | 125              | 125  | 200  | 200  | 300  | 300  |
| Max. short circuit current (SCCR) | kA | 22               | 22   | 22   | 22   | 22   | 22   |
| Circuit breaker (EN 60204-1)      |    |                  |      |      |      |      |      |
| Characteristic                    |    | B, C             |      |      |      |      |      |
| Max. rated current                | A  | 125              | 125  | 200  | 200  | 300  | 300  |
| Max. short circuit current (SCCR) | kA | 35               | 35   | 35   | 35   | 10   | 10   |
| Residual current device (RCD)     |    | ≥ 300 mA, type B |      |      |      |      |      |

### Rated data (light duty)

| Inverter                     |    | I55AE |      |      |      |      |      |
|------------------------------|----|-------|------|------|------|------|------|
|                              |    | 337F  | 345F | 355F | 375F | 390F | 411F |
| Rated power                  | kW | 45    | 55   | 75   | 90   | 110  | 132  |
| Rated output current (4 kHz) | A  | 91.2  | 107  | 132  | 180  | 216  | 254  |
| Max. output current *        | A  | 152   | 178  | 220  | 300  | 360  | 424  |

\* Overload time = 3 s, recovery time = 12 s

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V **3-phase | 480 V** Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |                 | I55AExxxF             |                | I55BExxxF      | I55xExxxF     | I55AExxxF             |                | I55BExxxF      |
|--------------------------|-----------------|-----------------------|----------------|----------------|---------------|-----------------------|----------------|----------------|
| Rated power              | kW              | 0.37 ... 2.2          | 3 ... 5.5      | 3 ... 4        | 0.37 ... 5.5  | 0.37 ... 2.2          | 3 ... 5.5      | 3 ... 4        |
| Connection               |                 | Mains connection X100 |                |                | PE connection | Motor connection X105 |                |                |
| Connection type          |                 | Screw terminal        |                |                | Screw         | Screw terminal        |                |                |
| Max. cable cross-section | mm <sup>2</sup> | 2.5                   | 6              | 4              | 6             | 2.5                   | 6              | 2.5            |
| Stripping length         | mm              | 8                     | 9              | 8              | 10            | 8                     | 9              | 8              |
| Tightening torque        | Nm              | 0.5                   | 0.5            | 0.6            | 2             | 0.5                   | 0.5            | 0.5            |
| Required tool            |                 | ⊖<br>0.5 x 3.0        | ⊖<br>0.6 x 3.5 | ⊖<br>0.5 x 3.0 | ⊕<br>TX20     | ⊖<br>0.5 x 3.0        | ⊖<br>0.6 x 3.5 | ⊖<br>0.5 x 3.0 |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE           |      |      |      |      |      | I55AE | I55BE | I55AE | I55BE | I55AE |                  |
|-----------------------------------|----|-----------------|------|------|------|------|------|-------|-------|-------|-------|-------|------------------|
|                                   |    | 137F            | 155F | 175F | 211F | 215F | 222F | 230F  |       | 240F  |       | 255F  |                  |
| Rated power                       | kW | 0.37            | 0.55 | 0.75 | 1.1  | 1.5  | 2.2  | 3     |       | 4     |       | 5.5   |                  |
| Rated output current (8 kHz)      | A  | 1.1             | 1.6  | 2.1  | 3    | 3.5  | 4.8  | 6.3   |       | 8.2   |       | 11    |                  |
| Max output current (≤ 8 kHz) *    | A  | 2.2             | 3.2  | 4.2  | 6    | 7    | 9.6  | 12.6  |       | 16.4  |       | 22    |                  |
| Operation without mains choke     |    |                 |      |      |      |      |      |       |       |       |       |       |                  |
| Rated mains current               | A  | 1.5             | 2.1  | 2.8  | 3.7  | 4.5  | 6.5  | 8     |       | 10.5  |       | 14.3  |                  |
| Fuse (EN 60204-1)                 |    |                 |      |      |      |      |      |       |       |       |       |       |                  |
| Characteristic                    |    | gG/gL, gRL      |      |      |      |      |      |       |       |       |       |       |                  |
| Max. rated current                | A  | 16              | 16   | 16   | 16   | 16   | 16   | 25    | 35    | 25    | 35    | 25    |                  |
| Max. short circuit current (SCCR) | kA | 65              | 65   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 65    | 65    |                  |
| Circuit breaker (EN 60204-1)      |    |                 |      |      |      |      |      |       |       |       |       |       |                  |
| Characteristic                    |    | B, C            |      |      |      |      |      |       |       |       |       |       |                  |
| Max. rated current                | A  | 16              | 16   | 16   | 16   | 16   | 16   | 25    | 25    | 25    | 25    | 25    |                  |
| Max. short circuit current (SCCR) | kA | 65              | 65   | 65   | 65   | 65   | 65   | 65    | 65    | 65    | 65    | 65    |                  |
| Residual current device (RCD)     |    | ≥ 30 mA, type B |      |      |      |      |      |       |       |       |       |       | ≥ 300 mA, type B |

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V **3-phase | 480 V** Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |     | I55xExxxF             |                |               |           |                       |                |
|--------------------------|-----|-----------------------|----------------|---------------|-----------|-----------------------|----------------|
| Rated power              | kW  | 7.5 ... 11            | 15 ... 30      | 7.5 ... 11    | 15 ... 30 | 7.5 ... 11            | 15 ... 30      |
| Connection               |     | Mains connection X100 |                | PE connection |           | Motor connection X105 |                |
| Connection type          |     | Screw terminal        |                | Screw         |           | Screw terminal        |                |
| Max. cable cross-section | mm² | 16                    | 35             | 16            | 25        | 16                    | 35             |
| Stripping length         | mm  | 11                    | 18             | 11            | 16        | 11                    | 18             |
| Tightening torque        | Nm  | 1.2                   | 3.8            | 3.4           | 4         | 1.2                   | 3.8            |
| Required tool            |     | ⊖<br>0.8 x 4.0        | ⊖<br>0.8 x 5.5 | ⊕<br>PZ2      | ⊕<br>PZ2  | ⊖<br>0.8 x 4.0        | ⊖<br>0.8 x 5.5 |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE            | I55BE           | I55AE            | I55BE           | I55AE            | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE |
|-----------------------------------|----|------------------|-----------------|------------------|-----------------|------------------|-------|-------|-------|-------|-------|-------|-------|
|                                   |    | 275F             |                 | 311F             |                 | 315F             |       | 318F  |       | 322F  |       | 330F  |       |
| Rated power                       | kW | 7.5              |                 | 11               |                 | 15               |       | 18.5  |       | 22    |       | 30    |       |
| Rated output current (8 kHz)      | A  | 14               |                 | 21               |                 | 27               |       | 34    |       | 40.4  |       | 52    |       |
| Max output current (≤ 8 kHz) *    | A  | 28               |                 | 42               |                 | 54               |       | 68    |       | 81    |       | 104   |       |
| Operation without mains choke     |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Rated mains current               | A  | 16.6             |                 | 23.7             |                 | 32.3             |       | 40.3  |       | 44.2  |       | -     | 61.5  |
| Fuse (EN 60204-1)                 |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Characteristic                    |    | gG/gL, gRL       |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Max. rated current                | A  | 40               | 40              | 40               | 40              | 63               | 90    | 63    | 90    | 63    | 90    | 125   | 90    |
| Max. short circuit current (SCCR) | kA | 65               | 65              | 65               | 65              | 65               | 65    | 65    | 65    | 65    | 65    | 22    | 65    |
| Circuit breaker (EN 60204-1)      |    |                  |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Characteristic                    |    | B, C             |                 |                  |                 |                  |       |       |       |       |       |       |       |
| Max. rated current                | A  | 40               | 40              | 40               | 40              | 63               | 90    | 63    | 90    | 63    | 90    | 125   | 90    |
| Max. short circuit current (SCCR) | kA | 65               | 65              | 65               | 65              | 65               | 65    | 65    | 65    | 65    | 65    | 35    | 65    |
| Residual current device (RCD)     |    | ≥ 300 mA, type B | ≥ 30 mA, type B | ≥ 300 mA, type B | ≥ 30 mA, type B | ≥ 300 mA, type B |       |       |       |       |       |       |       |

## Rated data (light duty)

| Inverter                     |    | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE | I55AE | I55BE |
|------------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                              |    | 275F  | 311F  | 315F  | 318F  | 322F  | 330F  |       |       |       |       |       |       |
| Rated power                  | kW | 11    | 15    | 18.5  | 22    | 30    | 37    |       |       |       |       |       |       |
| Rated output current (4 kHz) | A  | 18.3  | 25.2  | 32.4  | 40.8  | 48.5  | 62.4  |       |       |       |       |       |       |
| Max. output current *        | A  | 28    | 42    | 54    | 68    | 81    | 104   |       |       |       |       |       |       |

\* Overload time = 3 s, recovery time = 12 s

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V **3-phase | 480 V** Brake resistor Control terminals Relay output

PTC input Networks Functional safety Safe torque off (STO)

## 3-phase mains connection 480 V (340 V ... 528 V, 45 Hz ... 65 Hz)

## Terminal data

| Inverter                 |                 | I55xExxxF             |           |            |               |             |                       |           |            |
|--------------------------|-----------------|-----------------------|-----------|------------|---------------|-------------|-----------------------|-----------|------------|
| Rated power              | kW              | 37 ... 45             | 55 ... 75 | 90 ... 110 | 37 ... 75     | 90 ... 110  | 37 ... 45             | 55 ... 75 | 90 ... 110 |
| Connection               |                 | Mains connection X100 |           |            | PE connection |             | Motor connection X105 |           |            |
| Connection type          |                 | Screw terminal        |           |            | Screw         | Bolt        | Screw terminal        |           |            |
| Max. cable cross-section | mm <sup>2</sup> | 50                    | 95        | 150        | 35            | 150         | 50                    | 95        | 150        |
| Stripping length         | mm              | 22                    | 32        | 41         | 16            | -           | 22                    | 32        | 41         |
| Tightening torque        | Nm              | 4                     | 10        | 18         | 4             | 10          | 4                     | 10        | 18         |
| Required tool            |                 | ⦿<br>5.0              | ⦿<br>6.0  | ⦿<br>8.0   | ⊕<br>PZ2      | Size 13 key | ⦿<br>5.0              | ⦿<br>6.0  | ⦿<br>8.0   |

## Rated data (Heavy Duty) und fusing data

| Inverter                          |    | I55AE            |      |      |      |      |      |
|-----------------------------------|----|------------------|------|------|------|------|------|
|                                   |    | 337F             | 345F | 355F | 375F | 390F | 411F |
| Rated power                       | kW | 37               | 45   | 55   | 75   | 90   | 110  |
| Rated output current (8 kHz)      | A  | 65               | 77   | 96   | 124  | 156  | 180  |
| Max output current (≤ 8 kHz) *    | A  | 130              | 154  | 192  | 248  | 312  | 360  |
| Operation without mains choke     |    |                  |      |      |      |      |      |
| Rated mains current               | A  | -                | -    | -    | -    | -    | -    |
| Fuse (EN 60204-1)                 |    |                  |      |      |      |      |      |
| Characteristic                    |    | gG/gL, gRL       |      |      | gR   |      |      |
| Max. rated current                | A  | 125              | 125  | 200  | 200  | 300  | 300  |
| Max. short circuit current (SCCR) | kA | 22               | 22   | 22   | 22   | 22   | 22   |
| Circuit breaker (EN 60204-1)      |    |                  |      |      |      |      |      |
| Characteristic                    |    | B, C             |      |      |      |      |      |
| Max. rated current                | A  | 125              | 125  | 200  | 200  | 300  | 300  |
| Max. short circuit current (SCCR) | kA | 35               | 35   | 35   | 35   | 10   | 10   |
| Residual current device (RCD)     |    | ≥ 300 mA, type B |      |      |      |      |      |

## Rated data (light duty)

| Inverter                     |    | I55AE |      |      |      |      |      |
|------------------------------|----|-------|------|------|------|------|------|
|                              |    | 337F  | 345F | 355F | 375F | 390F | 411F |
| Rated power                  | kW | 45    | 55   | 75   | 90   | 110  | 132  |
| Rated output current (4 kHz) | A  | 78    | 92.4 | 115  | 149  | 187  | 216  |
| Max. output current *        | A  | 130   | 154  | 192  | 248  | 312  | 360  |

\* Overload time = 3 s, recovery time = 12 s

Electrical installation

- Preparation
- Connection diagram
- 1-phase | 120 V
- 1-phase | 230/240 V
- 3-phase | 230/240 V
- 3-phase | 400 V
- 3-phase | 480 V
- Brake resistor
- Control terminals
- Relay output
- PTC input
- Networks
- Functional safety
- Safe torque off (STO)

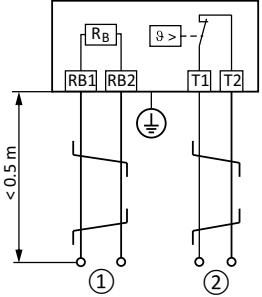
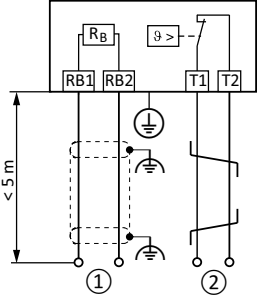
Brake resistor connection

NOTICE

Overload

- Possible consequences: Irreversible damage to 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 inverter from the mains.

Recommendation: 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                                                                                                      |                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Up to a cable length of 0.5 m, the cable for the brake resistor and that of the temperature monitoring can be twisted. This procedure reduces problems caused by EMC interference. |                                                                                                                                                                                                                                  | The cable of the brake resistor must be shielded. The maximum length is 5 m. For the temperature monitoring cable, twisting is sufficient. |                                                                                                                                                                                                                                  |
|                                                                                                  |                                                                                                                                                                                                                                  |                                                          |                                                                                                                                                                                                                                  |
| 1                                                                                                                                                                                  | Wiring to the "brake resistor" connection on the inverter or another component with brake chopper.                                                                                                                               | 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). | 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). |

## Electrical installation

Preparation Connection diagram 1-phase | 120 V 1-phase | 230/240 V 3-phase | 230/240 V 3-phase | 400 V 3-phase | 480 V Brake resistor **Control terminals** Relay output

PTC input Networks Functional safety Safe torque off (STO)

### Control terminals X3

| Connection type          |                                 | Spring terminal, pluggable                                                                                                                                               |
|--------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. cable cross-section | mm <sup>2</sup>                 | 1.5                                                                                                                                                                      |
| Stripping length         | mm                              | 9                                                                                                                                                                        |
| Required tool            |                                 | ⊖<br>0.4 x 2.5                                                                                                                                                           |
| Application              | DI1<br>DI2<br>DI3<br>DI4<br>DI5 | Digital inputs<br>DI3/DI4 can optionally be used as frequency input or encoder input.<br>HIGH active/LOW active switchable<br>LOW = 0 ... +3 V<br>HIGH = +12 V ... +30 V |
|                          | DO1                             | Digital output<br>Max. 100 mA for DO1 and 24 V output                                                                                                                    |
|                          | AI1<br>AI2                      | Analog inputs<br>Can optionally be used as voltage input or current input.                                                                                               |
|                          | AO1                             | Analog output<br>Can be optionally used as voltage output or current output.                                                                                             |
|                          | 24E                             | 24-V input<br>For mains-independent power DC supply of control electronics (including communication).<br>Max. 1 A                                                        |
|                          | 10V                             | 10 V output<br>Primarily for the supply of a potentiometer (1 ... 10 kΩ). Max. 10 mA                                                                                     |
|                          | 24V                             | 24 V output<br>Primarily for the supply of digital inputs.<br>Max. 100 mA for DO1 and 24 V output                                                                        |

### NOTICE

For voltage supply with DC 24 V (± 20 %), use only a safely separated power supply unit in accordance with prevailing SELV/PELV requirements.

Electrical installation

- Preparation
- Connection diagram
- 1-phase | 120 V
- 1-phase | 230/240 V
- 3-phase | 230/240 V
- 3-phase | 400 V
- 3-phase | 480 V
- Brake resistor
- Control terminals
- Relay output
- PTC input
- Networks
- Functional safety
- Safe torque off (STO)



Relay output X9

The relay is not suitable for direct switching of an electromechanical holding brake. Use a corresponding suppressor circuit in case of an inductive or capacitive load.

|                                          |                 |                           |
|------------------------------------------|-----------------|---------------------------|
| Connection type                          |                 | Screw terminal, pluggable |
| Max. cable cross-section                 | mm <sup>2</sup> | 1.5                       |
| Stripping length                         | mm              | 6                         |
| Required tool                            |                 | ⌀<br>0.4 x 2.5            |
| Application                              | NO              | Normally-open contact     |
|                                          | NC              | Normally-closed contact   |
|                                          | COM             | Center contact            |
| Max. switching voltage/switching current |                 | AC 240 V/3 A              |
|                                          |                 | DC 24 V/2 A               |
|                                          |                 | DC 240 V/0.16 A           |

Electrical installation

- Preparation
- Connection diagram
- 1-phase | 120 V
- 1-phase | 230/240 V
- 3-phase | 230/240 V
- 3-phase | 400 V
- 3-phase | 480 V
- Brake resistor
- Control terminals
- Relay output
- PTC input
- Networks
- Functional safety
- Safe torque off (STO)



PTC input X109

In the default setting, the motor temperature monitoring is active! By default, a wire jumper is installed between the terminals T1 and T2. Before connecting a thermal sensor, remove the wire jumper.

|                          |     |                                      |
|--------------------------|-----|--------------------------------------|
| Connection type          |     | Screw terminal, pluggable            |
| Max. cable cross-section | mm² | 1.5                                  |
| Stripping length         | mm  | 6                                    |
| Required tool            |     | ⊖<br>0.4 x 2.5                       |
| Application              | T1  | Connection of PTC or thermal contact |
|                          | T2  |                                      |
| Sensor types             |     | PTC single sensor (DIN 44081)        |
|                          |     | PTC triplet sensor (DIN 44082)       |
|                          |     | Thermal contact                      |

Electrical installation

- Preparation
- Connection diagram
- 1-phase | 120 V
- 1-phase | 230/240 V
- 3-phase | 230/240 V
- 3-phase | 400 V
- 3-phase | 480 V
- Brake resistor
- Control terminals
- Relay output
- PTC input
- Networks
- Functional safety
- Safe torque off (STO)



Networks

| Network                  |     | CANopen                    | Modbus RTU | IO-Link | PROFIBUS                | EtherCAT     | EtherNet/IP  | Modbus TCP   | POWERLINK    | PROFINET     |
|--------------------------|-----|----------------------------|------------|---------|-------------------------|--------------|--------------|--------------|--------------|--------------|
| Connection               |     | X216                       |            | X316    | X226                    | X246<br>X247 | X266<br>X267 | X276<br>X277 | X286<br>X287 | X256<br>X257 |
| Connection type          |     | Spring terminal, pluggable |            |         | Sub-D socket,<br>9-pole | RJ45         | RJ45         | RJ45         | RJ45         | RJ45         |
| Max. cable cross-section | mm² | 2.5                        |            |         | -                       | -            | -            | -            | -            | -            |
| Stripping length         | mm  | 10                         |            |         | -                       | -            | -            | -            | -            | -            |
| Required tool            |     | ⊖<br>0.4 x 2.5             |            |         | -                       | -            | -            | -            | -            | -            |

CANopen / Modbus RTU

The network must be terminated with a resistor at the first and last physical node. At these nodes, set the DIP switch "R" to ON.

You can use the other DIP switches to set the node address and baud rate. When these DIP switches are all in the OFF position: Node address = setting in P510.01, baud rate = setting in P510.02. For Modbus RTU, the baud rate and parity are detected automatically in OFF position.

EtherCAT

You can set the EtherCAT identifier for "Explicit Device Identification" using the rotary encoder switches. When both are in position 0: Identifier = setting in P510.04.

Ethernet/IP / Modbus TCP

You can set the last byte of the IP address using the rotary encoder switches: 192.168.124.<switch position>. When both are in position 0: IP address = setting in P510.01.

POWERLINK

The rotary encoder switches allow you to set the node address (last byte of the IP address). Resulting IP address: 192.168.100.<switch position> When both are in position 0: Node address = setting in 0x23C1:004.

PROFIBUS

The network must be terminated with a resistor at the first and last physical node. Activate the bus terminating resistor in the bus connector at these nodes.

Use the DIP switches to set the station address. When all DIP switches are in OFF position: Station address = setting in P510.01, the baud rate is detected automatically.

| X226 | Pin | Assignment | Description                                                              |
|------|-----|------------|--------------------------------------------------------------------------|
|      | 1   | Shield     | Additional shielding                                                     |
|      | 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.      |                                                                          |

PROFINET

The rotary encoder switches have no function.

## Electrical installation

|             |                    |                   |                       |                     |                 |                 |                |                   |              |
|-------------|--------------------|-------------------|-----------------------|---------------------|-----------------|-----------------|----------------|-------------------|--------------|
| Preparation | Connection diagram | 1-phase   120 V   | 1-phase   230/240 V   | 3-phase   230/240 V | 3-phase   400 V | 3-phase   480 V | Brake resistor | Control terminals | Relay output |
| PTC input   | Networks           | Functional safety | Safe torque off (STO) |                     |                 |                 |                |                   |              |

### Functional safety

#### DANGER!

#### Uncontrolled start-up

Improper installation of the safety technology can cause an uncontrolled starting action of the drives.

Possible consequences: Death or severe injuries

- Safety technology may only be installed and commissioned by qualified personnel.
- All wiring must be EMC-compliant.
- All control components (switches, relays, PLC, ...) must comply with the requirements of EN ISO 13849-1 and EN ISO 13849-2.
- Switches, relays with at least IP54 enclosure.
- Devices with a degree of protection less than IP54 must always be installed in a control cabinet with a minimum protection class 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.
- Securely eliminate short-circuits and crossed wires according to the specifications of EN ISO 13849-2.
- Please refer to EN ISO 13849-1 and EN ISO 13849-2 for all further requirements and measures.
- In the case of an external force effect on the drive axes, additional brakes are necessary. In particular, please observe the effect of gravitational force on hanging loads!
- For safety-related braking functions, use safety-rated brakes only.
- The user must ensure that the inverter is only operated within the specified environmental conditions in its intended application. Only by doing so can the specified safety-related characteristics be adhered to.

#### DANGER!

**Automatic restart** when the requirement of the safety function is disabled.

Possible consequences: Death or severe injuries

- You must implement external measures in accordance with EN ISO 13849-1 to ensure that the drive only starts up again after an acknowledgement.

#### NOTICE

#### Overvoltage

Possible consequences: Destruction of the safety component

- Make sure that the maximum voltage (maximum rated) at the safe inputs does not exceed 32 V DC.

#### NOTICE

#### Excessive humidity or condensation

Possible consequences: Malfunction or irreparable damage to safety component

- Only commission the safety component when it has acclimatized.

# Electrical installation

Preparation

Connection diagram

1-phase | 120 V

1-phase | 230/240 V

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Brake resistor

Control terminals

Relay output

PTC input

Networks

Functional safety

Safe torque off (STO)

## Safe torque off (STO)



### No "Emergency switching off" in accordance with EN 60204-1

When using the "Safe torque off (STO)" function, additional measures are required for an "Emergency switching off" in accordance with EN 60204-1. There is no electrical isolation between the motor and inverter, no service switch or repair switch!

Possible consequences: Death or severe injuries

– An "Emergency off" requires an electrical isolation, e.g. by a central mains contactor.

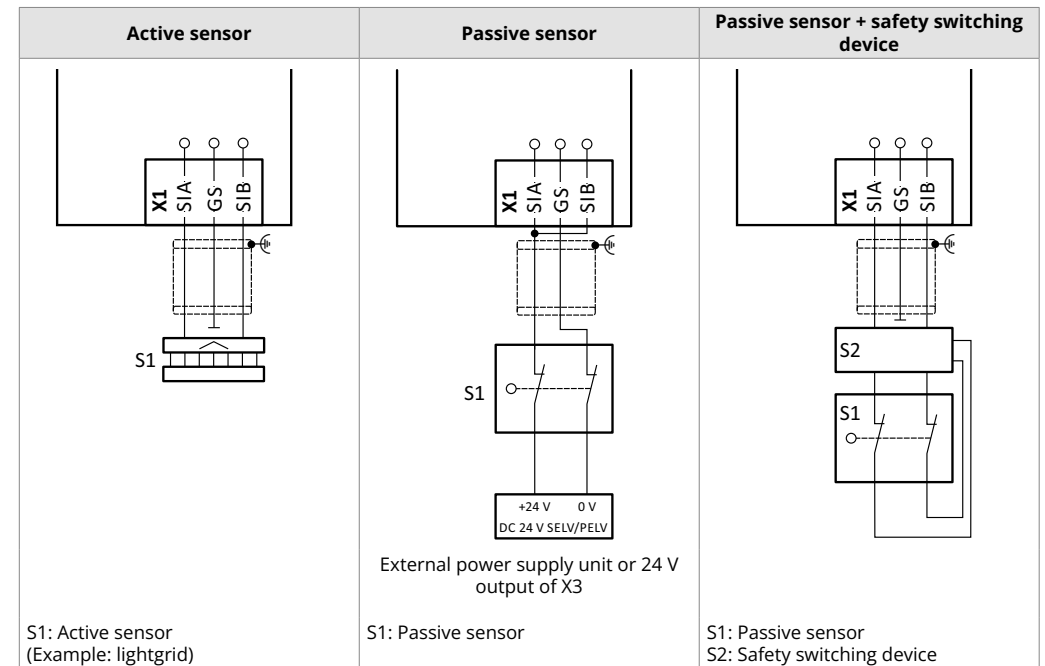
### Control terminals X1

| Connection type          | Spring terminal, pluggable |                                                 |  |
|--------------------------|----------------------------|-------------------------------------------------|--|
| Max. cable cross-section | mm <sup>2</sup>            | 1.5                                             |  |
| Stripping length         | mm                         | 9                                               |  |
| Required tool            |                            | ⌀<br>0.4 x 2.5                                  |  |
| Application              | SIA                        | Inputs for connecting active or passive sensors |  |
|                          | SIB                        |                                                 |  |
|                          | GS                         | Reference potential for SIA and SIB             |  |

| Specifications for SIA, SIB |    | minimum | typical | maximum |
|-----------------------------|----|---------|---------|---------|
| LOW signal                  | V  | -3      | 0       | +5      |
| HIGH signal                 | V  | +15     | +24     | +30     |
| Runtime                     | ms |         | 3       |         |
| Switch-off 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      |         |         |

## Connection of active and passive sensors

The connection diagrams shown are only example circuits. The user is responsible for the correct safety-related design and selection of the components!



Safety-related characteristic values and further example circuits can be found in the project planning document.

## Commissioning

Initial switch-on

Important notes

Keypad-module

Keypad control

Terminal control

Extended terminal control

Parameter overview

Favorites

Basic setting

Motor control

Additional functions

### Initial switch-on



**DANGER!**

#### Unexpected states during commissioning

Incorrect wiring can cause unexpected states during the commissioning phase.

Possible consequences: Death, severe injuries, or damage to property

- Wiring must be complete and correct.
- Wiring must be free of short circuits and earth faults.
- The motor circuit configuration (star/delta) must be adapted to the inverter.
- The motor must be connected in-phase (rotating direction).
- Check the "emergency switching off" function of the overall system.
- Clear hazardous area.
- Observe safety instructions and safety clearances.

Preconditions:

- The power connections must be wired.
- The digital inputs X3/DI1 (start/stop), X3/DI3 (reversal) and X3/DI4 (frequency preset 20 Hz) must be wired.
- The analog input X3/AI1 must not be wired or connected to GND.

1. Switch on mains voltage.
2. Check readiness for operation.
3. Observe LED status displays "RDY" and "ERR" on the inverter front panel.

## Commissioning

Initial switch-on

**Important notes**

Keypad-module

Keypad control

Terminal control

Extended  
terminal control

Parameter overview

Favorites

Basic setting

Motor control

Additional functions

### Important notes



**DANGER!**

#### Unexpected and dangerous motor movements and system movements

Incorrect settings during commissioning may cause unexpected and dangerous motor and system movements.

Possible consequences: Death, severe injuries, or damage to property

- Clear hazardous area.
- Observe safety instructions and safety clearances.

The following plug-on modules are available as accessories for the inverter:

- Keypad module
- WLAN module
- USB module

#### Keypad module

Commissioning with the keypad module is described on the following pages.

#### WLAN module

A connection to the WLAN module is established upon entering the connection data.

Default setting:

- IP address: 192.168.178.1
- SSID: "Product type"\_"10-digit identification"
- WLAN password: password

### Engineering Tool »EASY Starter«

Commissioning and diagnostics can be carried out with the »EASY Starter« engineering tool. For communication, a USB module on the inverter and a standard USB cable (A plug to micro B plug) is required.

#### 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

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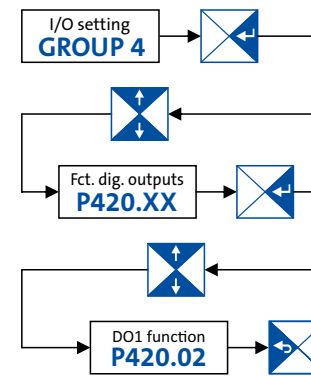
### Keypad module – Functions of the keys

| Key                                                                                                                                                                                                | Actuation             | Action                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------|
|  Up arrow key<br> Down arrow key | press briefly         | · Navigation in the menu<br>· Parameter alteration                    |
|                                                                                                                   | press briefly         | Go to Menu/Parameter<br>· Confirm parameter                           |
|                                                                                                                                                                                                    | press and hold for 3s | Save parameter ("P.SAVED" appears on screen when parameter is saved.) |
|                                                                                                                   | press briefly         | Quit Menu/Parameters                                                  |
|                                                                                                                   | press briefly         | Activate keypad control                                               |
|                                                                                                                   | press briefly         | Start motor                                                           |
|                                                                                                                   | press briefly         | Reverse rotating direction                                            |
|                                                                                                                   | press briefly         | Stop motor                                                            |

- The motor must be at standstill before parameters can be changed or confirmed.
- The settings are saved temporarily until the motor is switched off again. Press and hold the enter key for 3 s to save the settings permanently.

### Example of the keypad handling

Function assignment for digital output DO1 with parameter P420.02:



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### Keypad control

Activate temporary keypad control:

1. Press the CTRL key to activate the keypad control.
2. Press the enter key to confirm the change.

Deactivate temporary keypad control:

1. Press the CTRL key to deactivate the keypad control.
2. Press the enter key to confirm the change.

Activate permanent keypad control:

If the keypad does not have a CTRL key, the motor control is activated via the following parameters:

- Set P200.00 to 1.
- Set P201.01 to 1.
- Set P400.01 to 1.
- Set P400.02 to 1.

Start/control/stop motor with keypad:

1. Press the start key to start the motor.
  - The keypad shows the motor speed.
2. Change the frequency setpoint using the up arrow key or the down arrow key.
3. Press the stop key to stop the motor.

Reverse rotating direction:

1. Press the R/F key.
2. Press the enter key to confirm the reversal of rotating direction.

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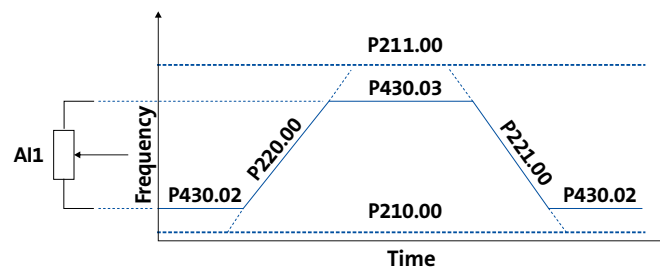
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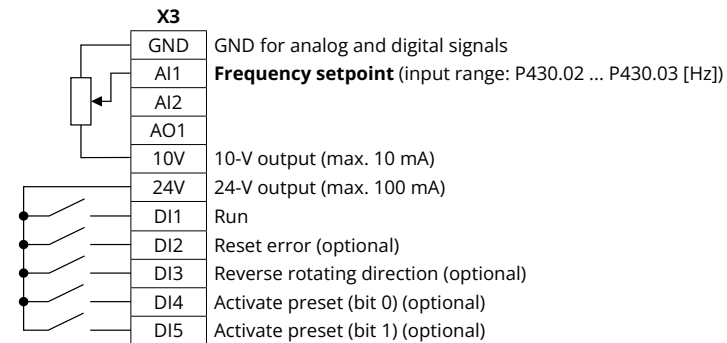
### Quick commissioning – terminal control

The following quick overview with graphical parameter representation is sufficient for commissioning many applications with terminal control. Further setting options are described in this document or in the commissioning document.

1. Load default setting: Set P700.01 to 1.
2. Set the following parameters for V/f characteristic control:
  - P208.01: Mains voltage
  - P303.01: V/f characteristic data: Base voltage
  - P303.02: V/f characteristic data: Base frequency
  - P210.00: Minimum frequency
  - P211.00: Maximum frequency
  - P220.00: Acceleration time 1
  - P221.00: Deceleration time 1
  - P430.02: Analog input 1: Min frequency value
  - P430.03: Analog input 1: Max. frequency value



3. Save settings: Press and hold the enter key for 3 s.
4. With the wiring shown on the right, the inverter can be operated using the control terminals.



Preset 1 is activated if DI4 is connected.

Preset 2 is activated if DI5 is connected.

Preset 3 is activated if DI4 and DI5 are connected at the same time.

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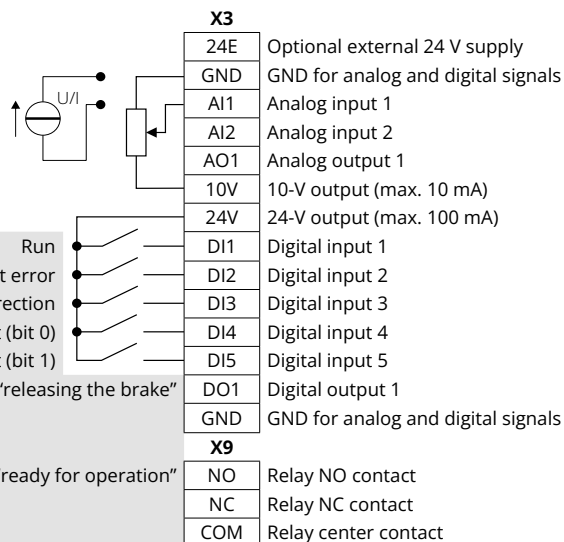
## Extended terminal control

The following illustration shows a more extensive wiring of the control terminals linked with the respective parameters.

### Default setting

P201.01  
(configured AI1 as standard setpoint)

P400.02 Run  
P400.04 Reset error  
P400.13 Reverse rotating direction  
P400.18 Activate preset (bit 0)  
P400.19 Activate preset (bit 1)  
P420.02 DO1 triggered at "releasing the brake"  
  
P420.01 Relay triggered at "ready for operation"



Setpoint selection and configuration:

| DI5 | DI4 | Setpoint       | Configuration | Default setting |
|-----|-----|----------------|---------------|-----------------|
| 0   | 0   | Analog input 1 | P430.01       | AI1 input area  |
|     |     |                | P430.02       | AI1 freq @ min  |
|     |     |                | P430.03       | AI1 freq @ max  |
| 0   | 1   | Preset value 1 | P450.01       | Freq. preset 1  |
| 1   | 0   | Preset value 2 | P450.02       | Freq. preset 2  |
| 1   | 1   | Preset value 3 | P450.03       | Freq. preset 3  |

\* Depending on whether device is for 50-Hz mains or 60-Hz mains

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### The most important parameters at a glance

This chapter contains the most important parameters and selections.

You can find a detailed description in the commissioning document:

[www.lenze.com/product-information](http://www.lenze.com/product-information)

The parameters are divided into the following function groups:

- Pxxx.xx group 0: Favorites
- P1xx.xx group 1: Diagnostics
- P2xx.xx group 2: Basic setting
- P3xx.xx group 3: Motor control
- P4xx.xx group 4: I/O setting
- P5xx.xx group 5: Network setting
- P6xx.xx group 6: Process controller
- P7xx.xx group 7: Additional functions
- P8xx.xx group 8: Sequencer

### Favorites (group 0)

Group 0 contains the configurable favorites that are also contained in the groups 1 to 4. In the default setting these are the most common parameters for the solution of typical applications.

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## Favorites (group 0)

| Display code   | Name              | Possible settings/<br>Value ranges                                 | Keypad code   | Information                                                                                                                                                                                                                                                                                 |
|----------------|-------------------|--------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>P100.00</b> | Output frequency  | x.x Hz (read only)                                                 |               | Display of the actual output frequency.                                                                                                                                                                                                                                                     |
| <b>P103.00</b> | Actual current    | x.x % (read only)                                                  |               | Display of the actual motor current.                                                                                                                                                                                                                                                        |
| <b>P106.00</b> | Motor voltage     | x VAC (read only)                                                  |               | Display of the actual motor voltage.                                                                                                                                                                                                                                                        |
| <b>P150.00</b> | Error code        | - (Read only)                                                      |               | Error message.                                                                                                                                                                                                                                                                              |
| <b>P200.00</b> | Control selection | Flexible I/O                                                       | [0]           | This selection enables a flexible assignment of the start, stop, and rotating direction commands with digital signal sources.                                                                                                                                                               |
|                |                   | Keypad                                                             | [1]           | This selection enables the motor to start exclusively via the start key of the keypad. Other signal sources for starting the motor are ignored.                                                                                                                                             |
| <b>P201.01</b> | F-setp.source     | Keypad                                                             | [1]           | The setpoint is specified locally by the keypad.                                                                                                                                                                                                                                            |
|                |                   | Analog input 1                                                     | [2]           | The setpoint is defined as analog signal via the analog input 1.                                                                                                                                                                                                                            |
|                |                   | Analog input 2                                                     | [3]           | The setpoint is defined as analog signal via the analog input 2.                                                                                                                                                                                                                            |
|                |                   | HTL input                                                          | [4]           | The digital inputs DI3 and DI4 can be configured as HTL input to use an HTL encoder as setpoint encoder or define the setpoint as a reference frequency ("pulse train").                                                                                                                    |
|                |                   | Network                                                            | [5]           | The setpoint is defined as process data object via the network.                                                                                                                                                                                                                             |
|                |                   | Frequency preset 1 ... 15                                          | [11] ... [25] | For the setpoint selection, "preset" values can be parameterized and selected. All frequency presets are described in detail in the commissioning manual.                                                                                                                                   |
| <b>P203.01</b> | Start method      | ...                                                                | ...           | For further setting options, see the commissioning document.                                                                                                                                                                                                                                |
|                |                   | Standard                                                           | [0]           | After start command, the standard ramps are active.                                                                                                                                                                                                                                         |
|                |                   | DC braking                                                         | [1]           | After start command, the "DC braking" function is active for the time set in P704.02.                                                                                                                                                                                                       |
|                |                   | Flying restart circuit                                             | [2]           | After the start command, the flying restart circuit is active.                                                                                                                                                                                                                              |
| <b>P203.03</b> | Stop method       | Premagnetization                                                   | [3]           | After start command, the standard ramps are active and the premagnetization of the motor is activated. This reduces the motor current and smoothes the acceleration curve during the starting process (only relevant in the V/f motor control mode).                                        |
|                |                   | Coasting                                                           | [0]           | The motor has no torque (coasts down to standstill).                                                                                                                                                                                                                                        |
|                |                   | Standard ramp                                                      | [1]           | The motor is brought to a standstill with the deceleration time 1 P221.00 (or deceleration time 2 P223.00 if activated).                                                                                                                                                                    |
|                |                   | Quick stop ramp                                                    | [2]           | The motor is brought to a standstill with the deceleration time (P225.00) set for the "quick stop" function.                                                                                                                                                                                |
| <b>P208.01</b> | Mains voltage     | Switch-off positioning                                             | [3]           | Is similar to the stop method "standard ramp [1]". Depending on the actual output frequency, however, the inverter delays the beginning of the down-ramping so that the number of motor revolutions until a standstill is reached and thus the stop position is always relatively constant. |
|                |                   | 230 Veff                                                           | [0]           | Selection of the mains voltage for actuating the inverter.                                                                                                                                                                                                                                  |
|                |                   | 400 Veff                                                           | [1]           |                                                                                                                                                                                                                                                                                             |
|                |                   | 480 Veff                                                           | [2]           |                                                                                                                                                                                                                                                                                             |
| <b>P210.00</b> | Min. frequency    | 120 Veff                                                           | [3]           |                                                                                                                                                                                                                                                                                             |
| <b>P211.00</b> | Max. frequency    | 0.0 ... 599.0 Hz                                                   |               | Lower limit value for all frequency setpoints.                                                                                                                                                                                                                                              |
| <b>P211.00</b> | Max. frequency    | Device for 50-Hz mains: 50 Hz *<br>Device for 60-Hz mains: 60 Hz * |               | Upper limit value for all frequency setpoints.                                                                                                                                                                                                                                              |

\* Default setting dependent on the size

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| Display code | Name                     | Possible settings/<br>Value ranges                                 | Keypad code | Information                                                                                                                                                                                                                                   |
|--------------|--------------------------|--------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P220.00      | Acceleration 1           | 0.0 ... 5.0 ... 3600.0 s                                           |             | Acceleration time 1.                                                                                                                                                                                                                          |
| P221.00      | Deceleration 1           | 0.0 ... 5.0 ... 3600.0 s                                           |             | Deceleration time 1                                                                                                                                                                                                                           |
| P300.00      | Motor ctrl mode          | Servo control (SC ASM)                                             | [2]         | This control mode is used for servo control of an asynchronous motor.                                                                                                                                                                         |
|              |                          | Sensorless control (SL PSM)                                        | [3]         | This control mode is used for sensorless control of a synchronous motor.                                                                                                                                                                      |
|              |                          | Sensorless vector control (SLVC)                                   | [4]         | This control mode is used for sensorless vector control of an asynchronous motor.                                                                                                                                                             |
|              |                          | V/f characteristic control<br>VFC open loop                        | [6]         | This control mode is used for the speed control of an asynchronous motor via a V/f characteristic and is the simplest control mode.                                                                                                           |
|              |                          | V/f characteristic control<br>(VFC closed loop)                    | [7]         | The control mode is used for speed control of an asynchronous motor via a V/f characteristic with speed feedback.                                                                                                                             |
|              |                          | Sensorless control (SLSM-PSM)                                      | [8]         | This control mode is used for sensorless control of a synchronous motor.                                                                                                                                                                      |
| P302.00      | V/f characteristic shape | Linear                                                             | [0]         | Linear characteristic for drives with constant load torque over the speed.                                                                                                                                                                    |
|              |                          | Square-law                                                         | [1]         | Square-law characteristic for drives with a square-law load torque over the speed.                                                                                                                                                            |
|              |                          | Eco                                                                | [3]         | Linear characteristic with energy optimization in the partial load operational range.                                                                                                                                                         |
| P303.01      | Base voltage             | 0 ... 230 ... 5000 V *                                             |             | Base voltage and base frequency define the V/f ratio and thus the gradient of the V/f characteristic.                                                                                                                                         |
| P303.02      | Base frequency           | Device for 50-Hz mains: 50 Hz *<br>Device for 60-Hz mains: 60 Hz * |             | – The V/f base voltage is usually set to the rated motor voltage.<br>– The V/f base frequency is usually set to the rated motor frequency.                                                                                                    |
| P304.00      | Limitation of rotation   | Only clockwise (CW)                                                | [0]         | The motor can only rotate clockwise (CW). The transfer of negative frequency and PID setpoints to the motor control is prevented.                                                                                                             |
|              |                          | Both rotating directions                                           | [1]         | Both directions of motor rotation are enabled.                                                                                                                                                                                                |
| P305.00      | Switching frequency      | 8 kHz var/opt/4 *                                                  |             | Selection of the inverter switching frequency.                                                                                                                                                                                                |
| P306.01      | Overload selection       | Heavy duty                                                         | [0]         | Load characteristic for high dynamic requirements.                                                                                                                                                                                            |
|              |                          | Light Duty                                                         | [1]         | Load characteristic for low dynamic requirements.                                                                                                                                                                                             |
| P308.01      | Max. load for 60s        | 30 ... 150 ... 200 %                                               |             | Maximum permissible thermal motor utilization (max. permissible motor current for 60 seconds). With regard to rated motor current (P323.00).                                                                                                  |
| P316.01      | Fixed V/f boost          | 0.0 ... 2.5 ... 20.0 % *                                           |             | Constant voltage boost for the V/f characteristic control without feedback.                                                                                                                                                                   |
| P323.00      | Rated. mot curr.         | 0.001 ... 1.700 ... 500.000 A *                                    |             | Setting of the rated motor current according to motor nameplate.                                                                                                                                                                              |
| P324.00      | Max. current             | 0.0 ... 200.0 ... 3000.0 %                                         |             | Maximum overload current of the inverter. With regard to rated motor current (P323.00).                                                                                                                                                       |
| P400.01      | Inverter enable          | TRUE                                                               | [1]         | Assignment of a trigger to the "inverter enable" function.<br>Trigger = TRUE: The inverter is enabled (unless there is another cause for inverter disable).<br>Trigger = FALSE: The inverter is disabled. The motor has no torque and coasts. |
|              |                          | ...                                                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                  |

\* Default setting dependent on the size

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| Display code | Name          | Possible settings/<br>Value ranges | Keypad code | Information                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|---------------|------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P400.02      | Run           | Digital input 1                    | [11]        | Assignment of a trigger to the "Run" function.<br>Function 1: Start / stop motor (default setting)<br>Function 1 is active if no further start commands (start forward/start reverse) have been connected to triggers, no keypad control is active and no network control is active.<br>Trigger = TRUE: Let motor rotate forward (CW).<br>Trigger = FALSE: Stop motor according to stop function (P203.03). |
|              |               | ...                                | ...         | Function 2: Start enable/stop motor<br>Function 2 is active if further start commands have been connected to triggers, the keypad control is active or the network control is active.<br>Trigger = TRUE: Start commands of the active control source are enabled.<br>Trigger = FALSE: Stop motor.                                                                                                           |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |
| P400.03      | Quick stop    | Not connected                      | [0]         | Assignment of a trigger to the "Activate quick stop" function.<br>Trigger = TRUE: Activate quick stop. Quick stop ramp adjustable in P225.00.<br>Trigger = FALSE: Deactivate quick stop                                                                                                                                                                                                                     |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |
| P400.04      | Error reset   | Digital input 2                    | [12]        | Assignment of a trigger to the "Reset error" function.<br>Trigger = FALSE > TRUE (edge): Active error is reset (acknowledged) if the error condition is not active anymore and the error is resettable.<br>Trigger = FALSE: No action.                                                                                                                                                                      |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |
| P400.05      | DC braking    | Not connected                      | [0]         | Assignment of a trigger to the "Activate DC braking" function.<br>Trigger = TRUE: Activate DC braking.<br>Trigger = FALSE: Deactivate DC braking.                                                                                                                                                                                                                                                           |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |
| P400.06      | Start forward | Not connected                      | [0]         | Assignment of a trigger to the "Start forward (CW)" function.<br>Trigger = FALSE > TRUE (edge): Let motor rotate forward.<br>Trigger = TRUE > FALSE (edge): No action.<br>Stop motor via P400.02 (default digital input 1).                                                                                                                                                                                 |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |
| P400.07      | Start reverse | Not connected                      | [0]         | Assignment of a trigger to the "Start reverse (CCW)" function.<br>Trigger = FALSE > TRUE (edge): Let motor rotate backward.<br>Trigger = TRUE > FALSE (edge): No action.<br>Stop motor via P400.02 (default digital input 1).                                                                                                                                                                               |
|              |               | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                                                                                                                                                                |

\* Default setting dependent on the size

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| Display code | Name              | Possible settings/<br>Value ranges | Keypad code | Information                                                                                                                                                                                                                                                   |
|--------------|-------------------|------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P400.08      | Run forward       | Not connected                      | [0]         | Assignment of a trigger to the "Run forward (CW)" function.<br>Trigger = TRUE: Let motor rotate forward.<br>Trigger = FALSE: Stop motor.                                                                                                                      |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P400.09      | Run reverse       | Not connected                      | [0]         | Assignment of a trigger to the "Run reverse (CCW)" function.<br>Trigger = TRUE: Let motor rotate backward.<br>Trigger = FALSE: Stop motor.                                                                                                                    |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P400.13      | Reverse rot. dir. | Digital input 3                    | [13]        | Assignment of a trigger to the "Reverse rotating direction" function.<br>Trigger = TRUE: The setpoint specified is inverted (i.e. the sign is inverted).<br>Trigger = FALSE: No action/deactivate function again.                                             |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P400.18      | Setp: Preset B0   | Digital input 4                    | [14]        | Assignment of a trigger to the "Activate preset (bit 0)" function.<br>Bit with the valency 2 <sup>0</sup> for the bit-coded selection and activation of a parameterized setpoint (preset value).<br>Trigger = FALSE: Bit = "0".<br>Trigger = TRUE: Bit = "1". |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P400.19      | Setp: Preset B1   | Digital input 5                    | [15]        | Assignment of a trigger to the "Activate preset (bit 1)" function.<br>Bit with the valency 2 <sup>1</sup> for the bit-coded selection and activation of a parameterized setpoint (preset value).<br>Trigger = FALSE: Bit = "0".<br>Trigger = TRUE: Bit = "1". |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P400.20      | Setp: Preset B2   | Not connected                      | [0]         | Assignment of a trigger to the "Activate preset (bit 2)" function.<br>Bit with the valency 2 <sup>2</sup> for the bit-coded selection and activation of a parameterized setpoint (preset value).<br>Trigger = FALSE: Bit = "0".<br>Trigger = TRUE: Bit = "1". |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P420.01      | Relay function    | Running                            | [50]        | TRUE if inverter and start are enabled and output frequency > 0.2 Hz. Otherwise FALSE.                                                                                                                                                                        |
|              |                   | Ready for operation                | [51]        | TRUE if inverter is ready for operation (no error active, no STO active and DC-bus voltage ok). Otherwise FALSE.                                                                                                                                              |
|              |                   | Operation enabled                  | [52]        | TRUE if inverter and start are enabled. Otherwise FALSE.                                                                                                                                                                                                      |
|              |                   | Stop active                        | [53]        | TRUE if inverter is enabled and motor is not started and output frequency = 0.                                                                                                                                                                                |
|              |                   | Error active                       | [56]        | TRUE if error is active. Otherwise FALSE.                                                                                                                                                                                                                     |
|              |                   | Device warning active              | [58]        | TRUE if warning is active. Otherwise FALSE.                                                                                                                                                                                                                   |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |
| P420.02      | DO1 function      | Release brake                      | [115]       | Assignment of a trigger to digital output 1.<br>Trigger = FALSE: X3/DO1 set to LOW level.<br>Trigger = TRUE: X3/DO1 set to HIGH level.                                                                                                                        |
|              |                   | ...                                | ...         | For further setting options, see the commissioning document.                                                                                                                                                                                                  |

\* Default setting dependent on the size

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| Display code | Name            | Possible settings/<br>Value ranges      | Keypad code | Information                                                                                                                                 |
|--------------|-----------------|-----------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| P430.01      | AI1 input area  | 0 ... 10 VDC                            | [0]         | Definition of the input range for analog input AI1.                                                                                         |
|              |                 | 0 ... 5 VDC                             | [1]         |                                                                                                                                             |
|              |                 | 2 ... 10 VDC                            | [2]         |                                                                                                                                             |
|              |                 | -10 ... +10 VDC                         | [3]         |                                                                                                                                             |
|              |                 | 4 ... 20 mA                             | [4]         |                                                                                                                                             |
|              |                 | 0 ... 20 mA                             | [5]         |                                                                                                                                             |
| P430.02      | AI1 freq @ min  | -1000.0 ... 0.0 ... 1000.0 Hz           |             | Scaling of the input signal AI1 to the frequency value.                                                                                     |
| P430.03      | AI1 freq @ max  | -1000.0 ... 50.0   60.0 ... 1000.0 Hz * |             | – Direction of rotation according to sign.<br>– The standard setpoint source for operating mode “MS: Velocity mode” is selected in P201.01. |
| P440.01      | AO1 output area | Disabled                                | [0]         | Definition of the output range for analog output AO1.                                                                                       |
|              |                 | 0 ... 10 VDC                            | [1]         |                                                                                                                                             |
|              |                 | 0 ... 5 VDC                             | [2]         |                                                                                                                                             |
|              |                 | 2 ... 10 VDC                            | [3]         |                                                                                                                                             |
|              |                 | 4 ... 20 mA                             | [4]         |                                                                                                                                             |
|              |                 | 0 ... 20 mA                             | [5]         |                                                                                                                                             |
| P440.02      | AO1 function    | Output frequency                        | [1]         | Current output frequency (resolution: 0.1 Hz).                                                                                              |
|              |                 | Frequency setpoint                      | [2]         | Current frequency setpoint (resolution: 0.1 Hz).                                                                                            |
|              |                 | Analog input 1                          | [3]         | Input signal of analog input 1 (resolution: 0.1 %).                                                                                         |
|              |                 | ...                                     | ...         | For further setting options, see the commissioning document.                                                                                |
| P440.03      | AO1 min. signal | -2147483648 ... 0 ... 2147483647        |             | Definition of the signal value that corresponds to the minimum value at analog output 1.                                                    |
| P440.04      | AO1 max. signal | -2147483648 ... 1000 ... 2147483647     |             | Definition of the signal value that corresponds to the maximum value at analog output 1.                                                    |
| P450.01      | Freq. preset 1  | 0.0 ... 20.0 ... 599.0 Hz               |             | Parameterizable frequency setpoints (preset 1).                                                                                             |
| P450.02      | Freq. preset 2  | 0.0 ... 40.0 ... 599.0 Hz               |             | Parameterizable frequency setpoints (preset 2).                                                                                             |
| P450.03      | Freq. preset 3  | 0.0 ... 50.0   60.0 ... 599.0 Hz *      |             | Parameterizable frequency setpoints (preset 3).                                                                                             |
| P450.04      | Freq. preset 4  | 0.0 ... 0.0 ... 599.0 Hz                |             | Parameterizable frequency setpoints (preset 4).                                                                                             |

\* Default setting dependent on the size

## Commissioning

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### Keypad control

## Terminal control

### Extended terminal control

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### Basic setting (group 2)

| Display code | Name         | Possible settings | Keypad code | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------|--------------|-------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P225.00      | QSP del.time | 1.0 s             |             | <p>"Quick stop deceleration time for "MS: Velocity mode"</p> <ul style="list-style-type: none"> <li>- If the "Quick stop" function is activated, the motor is brought to a standstill within the deceleration time set here.</li> <li>- The braking deceleration time set refers to the deceleration from the maximum frequency set (P211.00) to standstill. In the case of a lower actual frequency, the actual deceleration time is reduced accordingly.</li> <li>- Setting is not effective in the operating mode P301.00 = "CiA: Velocity mode [2]".</li> </ul> |

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Motor control (group 3)

| Display code | Name            | Possible settings                        | Keypad code | Information                                                                                                                                                                                                                                                                                        |
|--------------|-----------------|------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P320.04      | Rated speed     | 50 ... 50000 rpm                         |             | General motor data.<br>Carry out settings as specified by motor nameplate data.<br>Note!<br>When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection).<br>Only enter the data applying to the connection type selected. |
| P320.05      | Rated frequency | 1.0 ... 10000.0 Hz                       |             |                                                                                                                                                                                                                                                                                                    |
| P320.06      | Rated power     | 0.00 ... 655.35 kW<br>0.00 ... 878.84 hp |             |                                                                                                                                                                                                                                                                                                    |
| P320.07      | Rated voltage   | 0 ... 65535 V                            |             |                                                                                                                                                                                                                                                                                                    |
| P320.08      | Cos phi         | 0.00 ... 1.00                            |             |                                                                                                                                                                                                                                                                                                    |
| P327.04      | Mot. identif.   | 0 ... 1                                  |             | 1 = start automatic identification of the motor data.<br>– Inverter characteristics, motor equivalent circuit diagram data and controller settings are identified and set automatically.<br>– During the procedure, the motor is energized!                                                        |
| P327.05      | Mot. calibrate  | 0 ... 1                                  |             | 1 = start automatic calibration of the motor data.<br>– A default inverter characteristic is loaded.<br>– The motor equivalent circuit diagram data and controller settings are calculated on the basis of the currently set rated motor data.<br>– The motor is not energized.                    |

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Additional functions (group 7)

| Display code | Name                  | Possible settings | Keypad code | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|-----------------------|-------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P700.01      | Load default settings | On / start        | [1]         | 1 = reset all parameters in the RAM memory of the inverter to the default setting stored in the inverter firmware.<br>– All parameter changes made by the user are lost during this process!<br>– This process may take some seconds. When the device command has been executed successfully, the value 0 is shown.<br>– Loading parameters has a direct effect on cyclic communication: The data exchange for control is interrupted and a communication error is generated.                                            |
|              |                       | Off/ready         | [0]         | Only status feedback                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| P700.03      | Save user data        | On / start        | [1]         | 1 = save current parameter settings in the user memory of the memory module with mains failure protection.<br>– This process may take some seconds. When the device command has been executed successfully, the value 0 is shown.<br>– Do not switch off the supply voltage during the saving process and do not unplug the memory module from the inverter!<br>– When the inverter is switched on, all parameters are automatically loaded from the user memory of the memory module to the RAM memory of the inverter. |
|              |                       | Off/ready         | [0]         | Only status feedback                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Troubleshooting

Error message

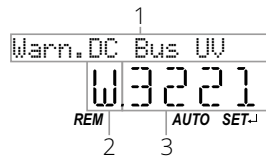
Error codes

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### Error message

If an error is pending, the keypad shows the following information.



1 = Error text

2 = Error type (F = fault, T = trouble, W = warning)

3 = Error code (hexadecimal)

- Faults (F) and trouble (T) are displayed continuously. The inverter is disabled.
- Warnings (W) are displayed every 2 seconds for a short time. The inverter is probably disabled.

### Reset error via keypad

Errors can be reset via the stop key.

- Prerequisite: Cause of error has been eliminated and no blocking time is active.
- Press the stop key to reset the error. The motor is stopped.
- Press the start key to cancel the stop.

### Reset error via terminal control

When terminal control is used, errors can be reset in two ways:

1. Via start signal P400.02 (default setting of digital input 1).
  - Prerequisite: Cause of error has been eliminated and no blocking time is active.
  - The signal at the digital input 1 must drop and then be applied again.
2. Via error reset signal (P400.04, default setting of digital input 2).
  - Prerequisite: Cause of error has been eliminated and no blocking time is active.
  - The error is reset if a signal is applied to digital input 2.

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### Error codes

| Error code | Description                                             | Classification | Remedy                                                                                                                                                                                                                                                                                                      | Blocking time [s] |
|------------|---------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 2250       | CiA: Continuous overcurrent (inside the device)         | Error          | <ul style="list-style-type: none"> <li>– Check motor and wiring for short circuits.</li> <li>– Check brake resistor and wiring.</li> <li>– Check motor circuit (delta connection, star connection).</li> <li>– Check setting of the motor data.</li> </ul>                                                  | 5                 |
| 2320       | Short circuit or earth leakage on motor side            | Error          | <ul style="list-style-type: none"> <li>– Check motor cable.</li> <li>– Check the length of the motor cable.</li> <li>– Use shorter or lower-capacitance motor cable.</li> </ul>                                                                                                                             | 5                 |
| 2340       | CiA: Short circuit (inside the device)                  | Error          | <ul style="list-style-type: none"> <li>– Check motor cable for short circuit.</li> </ul>                                                                                                                                                                                                                    | 5                 |
| 2350       | CiA: $i^2 \cdot t$ overload (thermal state)             | Error          | <ul style="list-style-type: none"> <li>– Check drive sizing.</li> <li>– Check machine/driven mechanics for excessive load.</li> <li>– Check setting of the motor data.</li> <li>– Reduce values for slip compensation (P315.01, P315.02) and oscillation damping (P318.01, P318.02).</li> </ul>             | 5                 |
| 2382       | Error: Device utilization (I <sub>xt</sub> ) too high   | Error          | <ul style="list-style-type: none"> <li>– Check drive sizing.</li> <li>– Reduce maximum overload current of the inverter (P324.00).</li> <li>– In case of high mass inertias, reduce maximum overload current of the inverter (P324.00) to 150 %.</li> </ul>                                                 | 3                 |
| 2383       | Warning: Device utilization (I <sub>xt</sub> ) too high | Warning        | <ul style="list-style-type: none"> <li>– Check drive sizing.</li> </ul>                                                                                                                                                                                                                                     | 0                 |
| 3120       | Mains phase fault                                       | Error          | <ul style="list-style-type: none"> <li>– Check mains connection wiring.</li> <li>– Check fuses.</li> </ul>                                                                                                                                                                                                  | 0                 |
| 3210       | DC-bus overvoltage                                      | Error          | <ul style="list-style-type: none"> <li>– Reduce dynamic performance of the load profile.</li> <li>– Check mains voltage.</li> <li>– Check settings for the brake energy management.</li> </ul>                                                                                                              | 0                 |
| 3211       | Warning: DC-bus overvoltage                             | Warning        | <ul style="list-style-type: none"> <li>– Connect brake resistor to the power unit and activate the integrated brake chopper. (P706.01 = 0: brake resistance)</li> </ul>                                                                                                                                     | 0                 |
| 3220       | DC bus undervoltage                                     | Trouble        | <ul style="list-style-type: none"> <li>– Check mains voltage.</li> <li>– Check fuses.</li> </ul>                                                                                                                                                                                                            | 0                 |
| 3221       | Warning: DC bus undervoltage                            | Warning        | <ul style="list-style-type: none"> <li>– Check DC-bus voltage (P105.00).</li> <li>– Check mains settings.</li> </ul>                                                                                                                                                                                        | 0                 |
| 3222       | DC-bus voltage too low for switch-on                    | Warning        | <ul style="list-style-type: none"> <li>– Check mains voltage.</li> <li>– Check fuses.</li> <li>– Check mains settings.</li> </ul>                                                                                                                                                                           | 0                 |
| 4210       | PU: Overtemperature fault                               | Error          | <ul style="list-style-type: none"> <li>– Check mains voltage.</li> <li>– Provide for a sufficient cooling of the device (display of the heatsink temperature in P117.01).</li> <li>– Clean fan and ventilation slots. If required, replace fan.</li> <li>– Reduce switching frequency (P305.00).</li> </ul> | 0                 |
| 4281       | Heatsink fan warning                                    | Warning        | <ul style="list-style-type: none"> <li>– Clean fan and ventilation slots. If required, replace fan. The fans can be unlocked via locking hooks and can then be removed.</li> </ul>                                                                                                                          | 0                 |
| 4310       | Error: Motor overtemperature                            | Error          | <ul style="list-style-type: none"> <li>– Check drive sizing.</li> <li>– Check motor temperature sensor and wiring (terminals X109/T1 and X109/T2).</li> </ul>                                                                                                                                               | 5                 |
| 5112       | 24 V supply critical                                    | Warning        | <ul style="list-style-type: none"> <li>– Check optional external 24 V voltage supply (terminal X3/24E), if connected.</li> <li>– Check mains voltage.</li> </ul>                                                                                                                                            | 0                 |

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Error codes

| Error code | Description                             | Classification | Remedy                                                                                                                                                                                                                                 | Blocking time [s] |
|------------|-----------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 5180       | 24 V supply overload                    | Warning        | – Check 24 V output and digital outputs for earth fault or overload.                                                                                                                                                                   | 0                 |
| 6280       | Trigger/functions connected incorrectly | Trouble        | – Check and correct the assignment of the triggers to the functions.<br>– With keypad or network control, the two functions “Inverter enable” (P400.01) and “Run” (P400.02) can also be set to “Constant TRUE [1]” to start the motor. | 0                 |
| 7180       | Motor overcurrent                       | Error          | – Check motor load.<br>– Check drive sizing.<br>– Adapt the set error threshold (P353.01).                                                                                                                                             | 1                 |
| 9080       | Keypad removed                          | Error          | – Connect the keypad again or activate another control source.                                                                                                                                                                         | 0                 |
| FF02       | Error: Brake resistor overload          | Error          | – Check drive sizing.<br>– Check settings for the brake energy management.<br>– Note! The error will be reset if the thermal load falls below the error threshold (P707.09) of - 20 %.                                                 | 5                 |
| FF06       | Motor overspeed                         | Error          | – Adapt the maximum motor speed (P322.00) and the error threshold (P350.01).                                                                                                                                                           | 1                 |
| FF36       | Warning: Brake resistor overload        | Warning        | – Check drive dimensions.<br>– Check settings for the brake energy management.<br>– Note! The warning will be reset if the thermal load falls below the warning threshold (P707.08) of - 20 %.                                         | 0                 |
| FF37       | Automatic start disabled                | Error          | – Deactivate start command and reset error.                                                                                                                                                                                            | 0                 |
| FF85       | Keypad full control active              | Warning        | – Press the CTRL key to exit control mode.                                                                                                                                                                                             | 0                 |

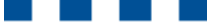
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Status LEDs

Meaning of the status LEDs for the inverter:

| LED "RDY" (blue)                                                                              | LED "ERR" (red)                                                                                             | State/meaning                                                                                                      |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| off                                                                                           | off                                                                                                         | No supply voltage                                                                                                  |
|              |                            | Initialisation (inverter is started)                                                                               |
| <br>blinking | off                                                                                                         | Safe torque off (STO) active. The inverter has been disabled by the integrated functional safety.                  |
|                                                                                               | <br>blinking fast          | Safe torque off (STO) active, warning present. The inverter has been disabled by the integrated functional safety. |
| <br>blinking | off                                                                                                         | Inverter disabled                                                                                                  |
|                                                                                               | <br>blinking fast          | Inverter disabled, warning present.                                                                                |
|                                                                                               |                            | Inverter disabled, error active.                                                                                   |
|                                                                                               | <br>on briefly every 1.5 s | Inverter disabled, no DC-bus voltage.                                                                              |
|              | off                                                                                                         | Inverter enabled. The motor rotates according to the specified setpoint or quick stop active.                      |
|                                                                                               | <br>blinking fast          | Inverter enabled, warning present. The motor rotates according to the specified setpoint or quick stop active.     |
|                                                                                               | <br>blinking             | Inverter enabled, quick stop active as response to a fault.                                                        |

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### Support

Further information can be found on the online page

[www.lenze.com/product-information](http://www.lenze.com/product-information)



The material number of the product can be found on the nameplate.

## Environmental notes and recycling



Lenze products are intended for use by companies in industrial environments. This means that they are also subject to requirements regarding recycling and disposal. Both mechanical and electrical components such as electric motors, gearboxes, and inverters contain valuable raw materials that can be recycled and reused. Proper recycling is important and sensible from both an economic and ecological perspective.

For information on the proper disposal and legal requirements of our products, please refer to the information on the respective product page on the Internet:

<https://www.lenze.com/en-de/products>

If you require support, please contact your local branch:

<https://www.lenze.com/en-de/company/global-presence>

Note: By disposing of devices and packaging properly, you are helping us to protect the environment and conserve resources.

Further information on Lenze's environmental and climate responsibility and on the topic of energy efficiency can be found on the Internet:

<https://www.lenze.com/en-de/company/sustainability>