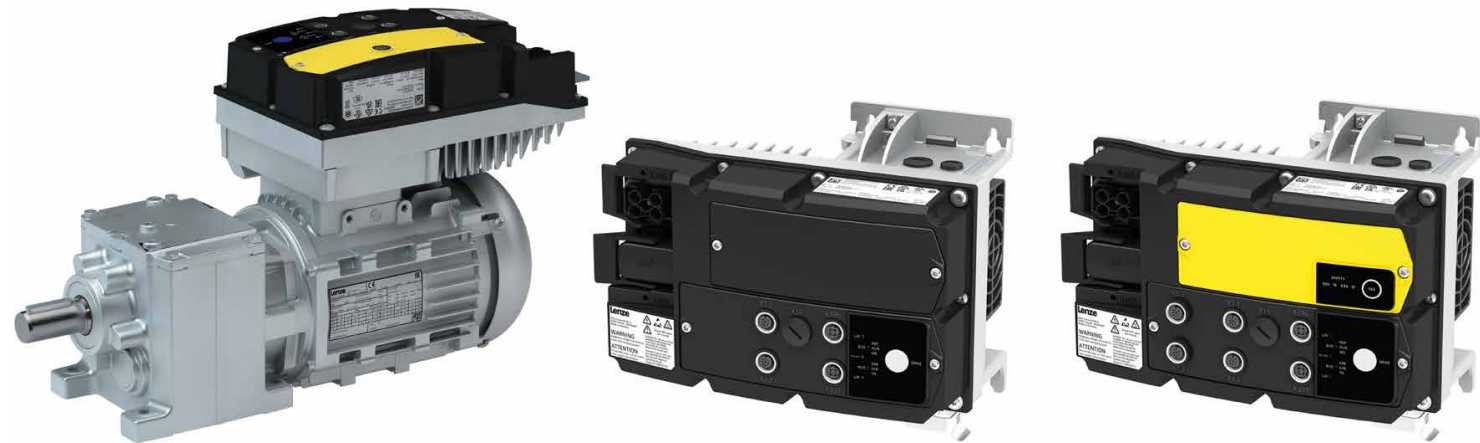


Operating instructions

i550/i650 motec frequency inverters



0.37 ... 45 kW

Home

General information

Safety instructions

Technical data

Mechanical installation

Electrical installation

Commissioning

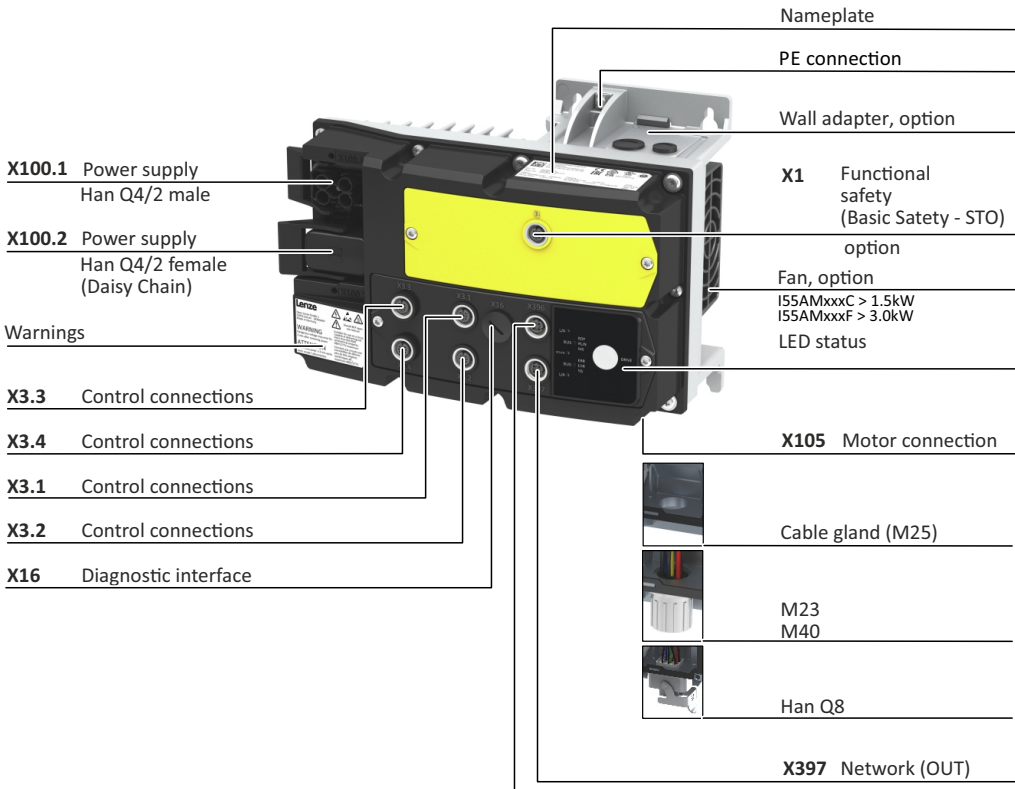
Troubleshooting

Environmental notes and recycling

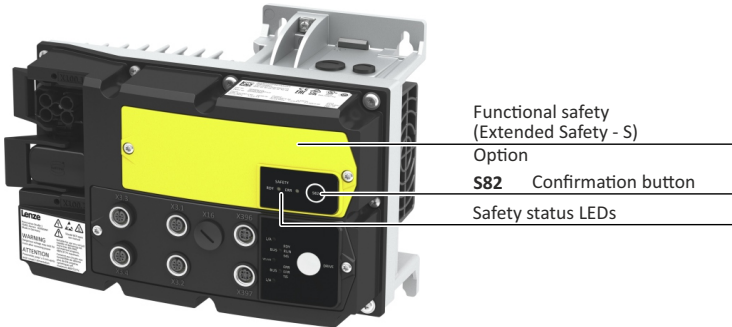
General information

- Overview
- Information
- Identification
- Conventions

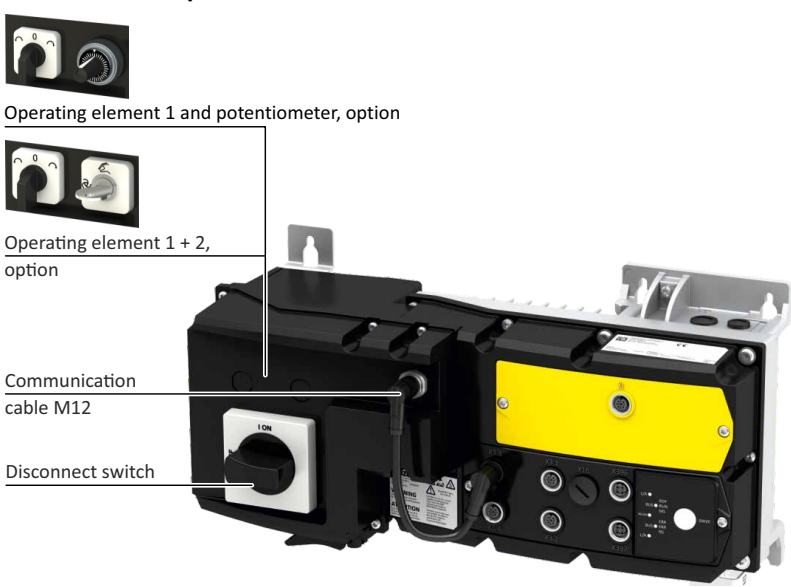
Hardware overview of the inverter



Example of i650 motec with integrated functional safety "Extended Safety - S":



Extension box (option)



Operating element	Function
Disconnect switch	Mains voltage on/off
Operating element 1	Forward/Reverse/Stop
Operating element 2, lockable	Local control/network control
Potentiometer	Setpoint frequency

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

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 exclusively suitable for installation in control cabinets and, depending on the protection class and version, for wall and motor mounting.
- The product may only be operated with motors that are suitable for 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 measurement for insulation resistance tests between control potential and PE must be performed 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: <https://ecos.sourceforge.org/license-overview.html>

General information

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Identification of the products

I	55 ¹	A	M	137 ²	F ³	0 ⁴	A ⁵	D ⁶	0 ⁷	0 ⁸	0 ⁹	0 ¹⁰	K ¹¹	S
---	-----------------	---	---	------------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	-----------------	-----------------	---

1

Product series	
55	i550
65	i650

2

Rated power	
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

3

Mains voltage and connection type	
C	3/PE AC 230/240 V
F	3/PE AC 400 V 3/PE AC 480 V

4

Extension box	
0	Without extension box
Extension box for inverters up to – 5.5 kW (230/240 V) – 11 kW (400/480 V)	
1	with mains terminals
A	with disconnect switch
B	with disconnect switch with status feedback
C	with Type E combination motor controller
D	with Type E combination motor controller and status feedback
E	with disconnect switch with status feedback and operating elements
F	with disconnect switch with status feedback, operating element and potentiometer

5

Integrated functional safety	
0	Without functional safety
A	Basic Safety - STO
E	Extended Safety - S

6

Degree of protection	
B	IP54, coated (UL Type 12 / 12K)
D	IP66, coated (UL Type 4X indoor)

7

Motor connection	
0	Without adapter
Wall adapter	
A	with Han Q8
D	with heatsink fan and Han Q8
C	with M23
F	with heatsink fan and M23
H	with M40
B	with cable gland (M25)
E	with heatsink fan and cable gland (M25)
G	with cable gland (M40)
Motor adapter	
I	for BG063 - BG071
J	for BG080 - BG112
K	for BG132
L	for BG160 - BG180

8

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

9

Additional functions	
0	Without additional functions
P	Logic PLC & Table positioning

10

Control connections	
0	Standard-I/O
1	Application-I/O

11

Network	
K	EtherCAT
L	PROFINET
M	EtherNet/IP
W	Modbus TCP

General information

Overview

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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 notice will result in severe irreparable injury and even death.

WARNING!

Indicates an extremely hazardous situation. Failure to comply with this notice may result in severe irreparable injury and even death.

CAUTION!

Indicates a hazardous situation. Failure to comply with this notice may result in slight to medium injury.

NOTICE

Indicates a material hazard. Failure to comply with this notice may result in material damage.

Numeric notation

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

Example: 1234.56

Wildcard

□□ Wildcard for product series (55 for i550, 65 for i650)

x Wildcard for product variants

Example: l□□AMxxxC

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 notices 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 notices in the documentation regarding the integrated safety technology.

NOTICE

Device protection

Perform insulation resistance tests between control potential 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: https://www.lenze.com/en-de/products/inverters/frequency-inverters/i550-motec-frequency-inverter/	
		UKCA (Great Britain)			
		cULus (USA, Canada)			
Environment		RoHS			
Energy efficiency	High Efficiency	EN IEC 61800-9-2	Class IE2		
Degree of protection	EN	EN IEC 60529	IP54	Information applies to the mounted and ready-for-use state.	
			IP66	Extension box with Type E combination motor controller	
	UL	UL 50E	Type 12 / 12K	Extension box with disconnect switch and operating elements	
				Inverter without extension box	
				Extension box with disconnect switch	
			Type 4X indoor	Extension box with Type E combination motor controller	
				Extension box with disconnect switch and operating elements	
				UL 50E Type 12 / 12K comparable to NEMA 12 / 12K	
	Ambient conditions	Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-30 ... +60 °C)	Inverter without extension box
				3C3	Extension box with disconnect switch
3S3				Housing parts UV-resistant (f1 rating)	
				UL 50E Type 4X comparable to NEMA 4X	
Power systems		TT, TN		Above +40°C: reduce rated output current by 2.5 %/°C	
Max. motor cable length		Device-specific; see technical data in project planning document			
Max. output frequency		0 Hz ... 599 Hz			
Overload capacity		200 % for 3s, 150 % for 60s 3 x 230 V, 18.5 kW and 22 kW: 166 % for 3 s, 125 % for 60 s 3 x 400 V, 37 kW and 45 kW: 166 % for 3 s, 125 % for 60 s			

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

Mechanical installation

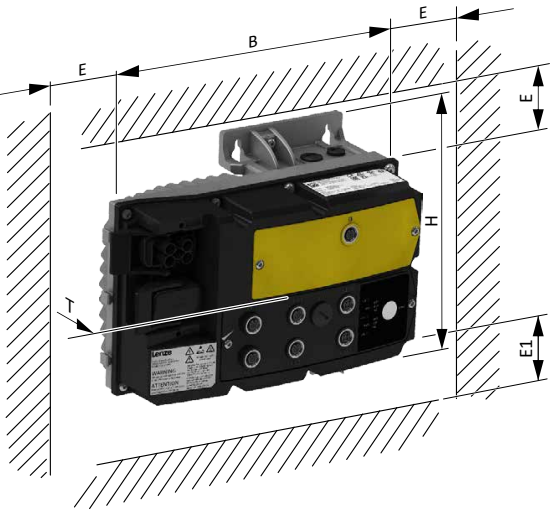
- Design/mounting Wall
- ... Extension box
- Design/mounting Motor

Dimensions and mounting – inverter for wall mounting (without extension box)

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.

Inverter	Rated power	Weight	H	B	T	E	E1
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 230/240 V devices							
I□□AMxxxC	0.37 ... 1.1 kW	3.2	202	265	128	>50	>100
I□□AMxxxC	1.5 ... 3 kW	3.8	202	265	152	>50	>100
I□□AMxxxC	4 ... 5.5 kW	6.0	257	358	168	>50	>100
I□□AMxxxC	7.5 ... 22 kW	13.3	340	443	209	>50	>100
3-phase mains connection 400/480 V devices							
I□□AMxxxF	0.37 ... 2.2 kW	3.2	202	265	128	>50	>100
I□□AMxxxF	3 ... 5.5 kW	3.8	202	265	152	>50	>100
I□□AMxxxF	7.5 ... 11 kW	6.0	257	358	168	>50	>100
I□□AMxxxF	15 ... 45 kW	13.3	340	443	209	>50	>100



Mechanical installation

Design/mounting Wall

... Extension box

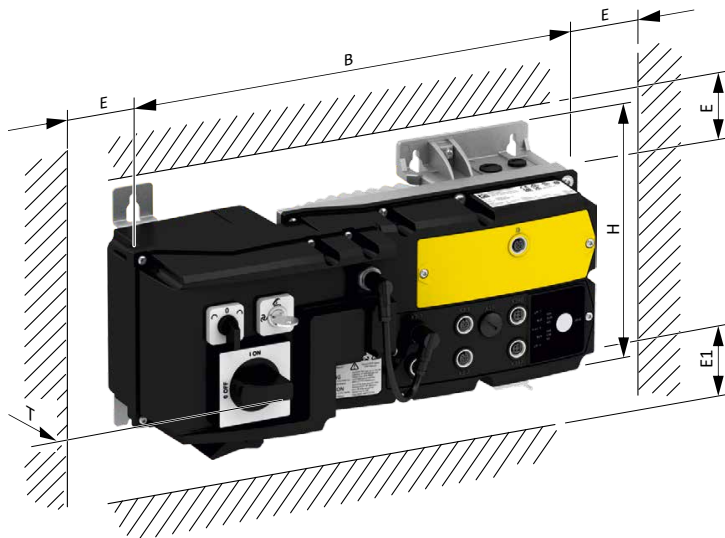
Design/mounting Motor

Dimensions and mounting – inverter for wall mounting (with extension box)

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.

Inverter	Rated power	Weight	H	B	T	E	E1
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 230/240 V devices							
I□□AMxxxC	0.37 ... 1.1 kW	4.3	202	400	172	>50	>100
I□□AMxxxC	1.5 ... 3 kW	5.0	202	400	196	>50	>100
I□□AMxxxC	4 ... 5.5 kW	7.4	257	493	193	>50	>100
3-phase mains connection 400/480 V devices							
I□□AMxxxF	0.37 ... 2.2 kW	4.3	202	400	172	>50	>100
I□□AMxxxF	3 ... 5.5 kW	5.0	202	400	196	>50	>100
I□□AMxxxF	7.5 ... 11 kW	7.4	257	493	193	>50	>100



Mechanical installation

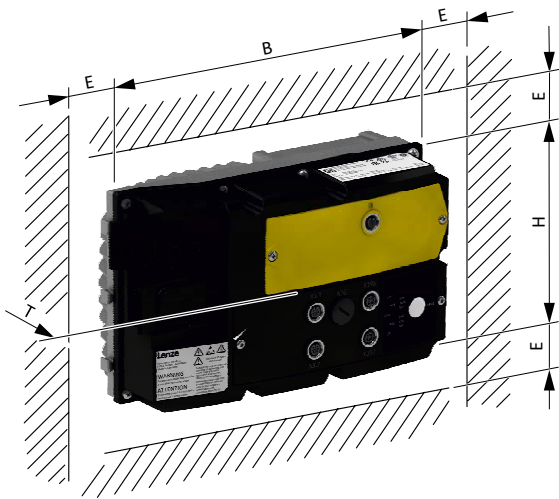
- Design/mounting Wall
- ... Extension box
- Design/mounting Motor

Dimensions and mounting – inverter for motor mounting

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.

Inverter	Rated power	Weight	H	B	T	E
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 230/240 V devices						
I□□AMxxxC	0.37 ... 1.1 kW	2.9	160	265	126	>50
I□□AMxxxC	1.5 ... 3 kW	3.4	160	265	140	>50
I□□AMxxxC	4 ... 5.5 kW	5.4	211	358	164	>50
I□□AMxxxC	7.5 ... 22 kW	12.5	280	443	216	>50
3-phase mains connection 400/480 V devices						
I□□AMxxxF	0.37 ... 2.2 kW	2.9	160	265	126	>50
I□□AMxxxF	3 ... 5.5 kW	3.4	160	265	140	>50
I□□AMxxxF	7.5 ... 11 kW	5.4	211	358	164	>50
I□□AMxxxF	15 ... 45 kW	12.5	280	443	216	>50



Electrical installation

Preparation

Connection diagram

Motor connection

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Control connections

PTC input

Networks

Functional safety

Basic Safety - STO

Extended Safety

NOTICE

Assembly does not satisfy protection class requirements

Possible consequences: Damage to property due to ingress of humidity and foreign bodies.

- All cable glands and mounting parts must at least correspond to the protection class of the inverter.
- All openings in the housing must be closed according to the protection class.
- Device screws must be tightened to the specified tightening torque.

NOTICE

For voltage supply with DC 20.5 ... 49.9 V, only use a safely separated power supply unit in accordance with the prevailing SELV/PELV requirements.

Electrical installation

Preparation

Connection diagram

Motor connection

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Control connections

PTC input

Networks

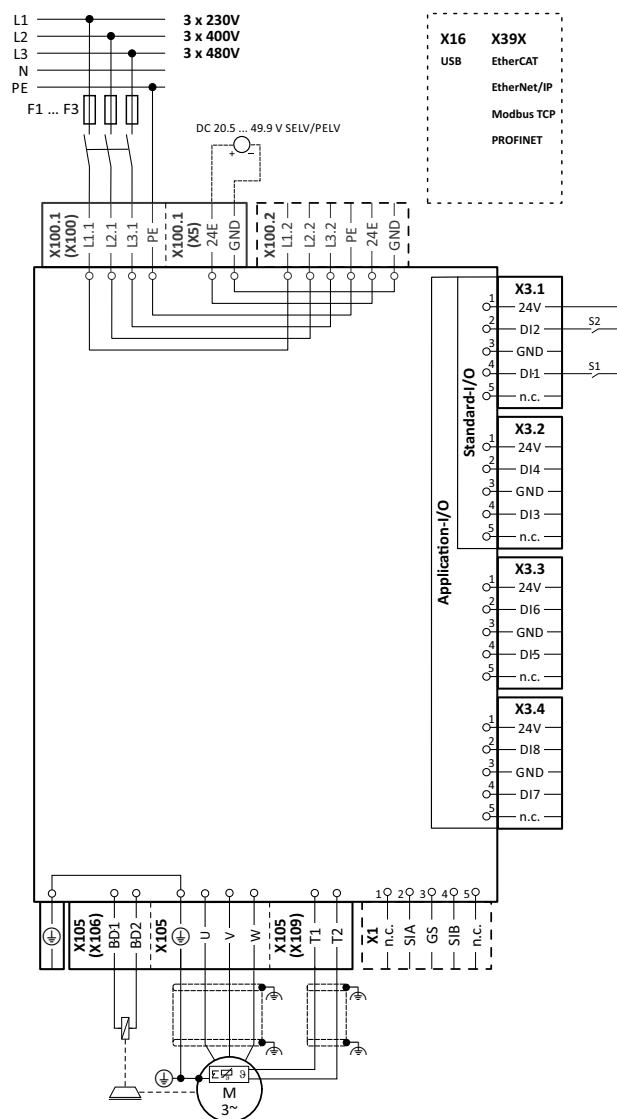
Functional safety

Basic Safety - STO

Extended Safety

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.

Pin assignment for mains connection

□□AMxxxC up to 5.5 kW and □□AMxxxF up to 11 kW:

X100.1			X100.2 (daisy chain)		
Han Q4/2 male	Pin	Assignment	Han Q4/2 female	Pin	Assignment
	1	L1.1		1	L1.2
	2	L2.1		2	L2.2
	3	L3.1		3	L3.2
	4	Not assigned		4	Not assigned
	⌚	PE		⌚	PE
	11	24E		11	24E
	12	GND		12	GND

□□AMxxxC from 7.5 kW and □□AMxxxF from 15 kW: The mains connection is made via terminals.

Mains connection with multiple devices

Several inverters in close proximity can be connected to the mains using the integrated Han Q4/2 connectors. The mains cables are looped through from one inverter to the next via the Han Q4/2 connector.

System cables

Lenze offers ready-made system cables for connecting and interconnecting Lenze products. For more information, refer to the "Accessories for frequency and servo inverters" brochure.

Electrical installation

Preparation

Connection diagram

Motor connection

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Control connections

PTC input

Networks

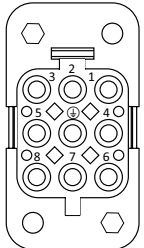
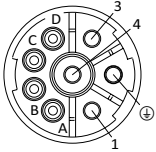
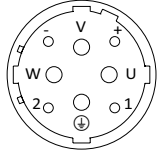
Functional safety

Basic Safety - STO

Extended Safety

Motor connection

For the motor connection, the inverter is equipped with a Han Q8 connector, an M23/M40 connector, or terminals for a cable gland, depending on the version.

I□□AMxxx C 0.37 ... 22 kW I□□AMxxx F 0.37 ... 45 kW			I□□AMxxx C 0.37 ... 5.5 kW I□□AMxxx F 0.37 ... 22 kW			I□□AMxxx C 7.5 ... 22 kW I□□AMxxx F 30 ... 45 kW		
X105			X105			X105		
Han Q8 connector			M23 connector			M40 connector		
	Pin	Assignment		Pin	Assignment		Pin	Assignment
	⊕	PE		⊕	PE		⊕	PE
	1	U		1	U		U	U
	2	Not assigned		3	V		V	V
	3	W		4	W		W	W
	4	BD1		A	T1		-	BD2
	5	T1		B	T2		+	BD1
	6	BD2		C	BD1		1	T1
	7	V		D	BD2		2	T2
	8	T2						

Assignment of the terminals for version with cable gland:

Signal	I□□AMxxx C 0.37 ... 3 kW I□□AMxxx F 0.37 ... 5.5 kW		I□□AMxxx C 4 ... 5.5 kW I□□AMxxx F 7.5 ... 11 kW		I□□AMxxx C 7.5 ... 22 kW I□□AMxxx F 15 ... 45 kW		I□□AMxxx C 4 ... 22 kW I□□AMxxx F 7.5 ... 45 kW	
	X105		X105		X105		X106	X109
	Spring terminal		Spring terminal		Screw terminal		Spring terminal	
	Pin		Pin		Pin		Pin	Pin
PE	PE		PE		PE			
BD1	BD1						BD1	
BD2	BD2						BD2	
U	U		U		U			
V	V		V		V			
W	W		W		W			
T1	T1							T1
T2	T2							T2

Electrical installation

Preparation

Connection diagram

Motor connection

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Control connections

PTC input

Networks

Functional safety

Basic Safety - STO

Extended Safety

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

Connection data for version with cable gland

Inverter		I□□AMxxxC							
Connection		Mains connection X100		PE connection			Motor connection X105		
Rated power	kW	0.37 ... 5.5	7.5 ... 22	0.37 ... 3	4 ... 5.5	7.5 ... 22	0.37 ... 3	4 ... 5.5	7.5 ... 22
Connection type		Han Q4/2 male	Screw terminal	Screw			Spring terminal		Screw terminal
Max. cable cross-section	mm ²	-	35	6	16	25	2.5	16	35
Stripping length	mm	-	18	10	12	18	8	18	18
Tightening torque	Nm	-	3.8	2	3.4	4	-	-	3.8
Required tools		-	⊕ TX20	⊕ TX20	⊕ TX25	⊕ TX30	⊖ 0.6 x 3.5	⊖ 0.8 x 4.0	⊕ TX20

Rated data and fusing data

Inverter		I□□AM													
		137C	155C	175C	211C	215C	222C	230C	240C	255C	275C	311C	315C	318C	322C
Rated power	kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22
Rated output current ¹	A	2.4	3.2	4.2	6	7	9.6	12	16.5	23	29	42	54	68	80
Overcurrent cycle 15 s ²															
Max. output current	A	4.8	6.4	8.4	12	14	19.2	24	33	46	58	84	108	113	133
Operation without mains choke															
Rated mains current	A	2.2	2.9	3.8	5.4	6.3	8.6	10.8	14	19.6	24.7	35.7	45.9	57.8	68
Fuse (EN 60204-1)															
Characteristic		gG/gL or gRL										gR			
Max. rated current	A	32	32	32	32	32	32	32	32	32	125	125	125	125	125
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	10	10	10	10	10
Circuit breaker (EN 60204-1)															
Characteristic		B													
Max. rated current	A	32	32	32	32	32	32	32	32	32	100	100	100	100	100
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	10	10	10	10	10
Residual current device (RCD)		≥ 30 mA, type B													

¹ Rated output current at 8 kHz; at I□□AM318C and I□□AM322C at 4 kHz

² Overload time = 3 s, recovery time = 12 s

Electrical installation

Preparation

Connection diagram

Motor connection

3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

Control connections

PTC input

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

Connection data for version with cable gland

Inverter		I□□AMxxxF							
Connection		Mains connection X100		PE connection			Motor connection X105		
Rated power	kW	0.37 ... 11	15 ... 45	0.37 ... 5.5	7.5 ... 11	15 ... 45	0.37 ... 5.5	7.5 ... 11	15 ... 45
Connection type		Han Q4/2 male	Screw terminal	Screw			Spring terminal		Screw terminal
Max. cable cross-section	mm²	-	35	6	16	25	2.5	16	35
Stripping length	mm	-	18	10	12	18	8	18	18
Tightening torque	Nm	-	3.8	2	3.4	4	-	-	3.8
Required tools		-	⊕ TX20	⊕ TX20	⊕ TX25	⊕ TX30	⊖ 0.6 x 3.5	⊖ 0.8 x 4.0	⊕ TX20

Rated data and fusing data

Inverter		I□□AM																
		137F	155F	175F	211F	215F	222F	230F	240F	255F	275F	311F	315F	318F	322F	330F	337F	345F
Rated power	kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45
Rated output current ¹	A	1.3	1.8	2.4	3.2	3.9	5.6	7.3	9.5	13	16.5	23.5	32	40	47	61	76	84
Overcurrent cycle 15 s ²																		
Max. output current	A	2.6	3.6	4.8	6.4	7.8	11.2	14.6	19	26	33	47	64	80	94	122	127	140
Operation without mains choke																		
Rated mains current	A	1.2	1.6	2.2	2.9	3.5	5	6.6	8.6	11.7	14	20	27.2	34	40	51.9	64.6	71.4
Fuse (EN 60204-1)																		
Characteristic		gG/gL or gRL											gR					
Max. rated current	A	32	32	32	32	32	32	32	32	32	32	32	125	125	125	125	125	125
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10
Circuit breaker (EN 60204-1)																		
Characteristic		B																
Max. rated current	A	32	32	32	32	32	32	32	32	32	32	32	100	100	100	100	100	100
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10
Residual current device (RCD)		≥ 30 mA, type B																

¹ Rated output current at 8 kHz; at I□□AM337F and I□□AM345F at 4 kHz

² Overload time = 3 s, recovery time = 12 s

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3-phase | 400 V

3-phase | 480 V

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

Connection data for version with cable gland

Inverter		I□□AMxxxF							
Connection		Mains connection X100		PE connection			Motor connection X105		
Rated power	kW	0.37 ... 11	15 ... 45	0.37 ... 5.5	7.5 ... 11	15 ... 45	0.37 ... 5.5	7.5 ... 11	15 ... 45
Connection type		Han Q4/2 male	Screw terminal	Screw			Spring terminal		Screw terminal
Max. cable cross-section	mm ²	-	35	6	16	25	2.5	16	35
Stripping length	mm	-	18	10	12	18	8	18	18
Tightening torque	Nm	-	3.8	2	3.4	4	-	-	3.8
Required tools		-	⊕ TX20	⊕ TX20	⊕ TX25	⊕ TX30	⊖ 0.6 x 3.5	⊖ 0.8 x 4.0	⊕ TX20

Rated data and fusing data

Inverter		I□□AM																
		137F	155F	175F	211F	215F	222F	230F	240F	255F	275F	311F	315F	318F	322F	330F	337F	345F
Rated power	kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45
Rated output current ¹	A	1.1	1.6	2.1	3	3.5	4.8	6.3	8.2	11	14	21	27	34	40.4	52	65	77
Overcurrent cycle 15 s ²																		
Max. output current	A	2.2	3.2	4.2	6	7	9.6	12.6	16.4	22	28	42	54	68	80.8	104	108	128
Operation without mains choke																		
Rated mains current	A	1	1.4	1.9	2.7	3.2	4.3	5.7	7.4	9.9	11.9	17.9	23	28.9	34.3	44.2	55.3	65.5
Fuse (EN 60204-1)																		
Characteristic		gG/gL or gRL											gR					
Max. rated current	A	32	32	32	32	32	32	32	32	32	32	32	125	125	125	125	125	125
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10
Circuit breaker (EN 60204-1)																		
Characteristic		B																
Max. rated current	A	32	32	32	32	32	32	32	32	32	32	32	100	100	100	100	100	100
Max. short-circuit current (SCCR)	kA	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10
Residual current device (RCD)		≥ 30 mA, type B																

¹ Rated output current at 8 kHz; at I□□AM337F and I□□AM345F at 4 kHz

² Overload time = 3 s, recovery time = 12 s

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3-phase | 480 V

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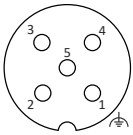
Extended Safety

Control connections

The functional assignment of the X3.x connectors is configurable.

By default, the connectors are configured as digital inputs (DIx).

- Logic level "HIGH-active" or "LOW-active", debounce time, and inversion can be parameterized.
- LOW = 0 ... +3 V, HIGH = +12 V ... +30 V

M12 (A coded)	Pin	X3.1	X3.2	X3.3 *	X3.4 *
	1	24 V	24 V	24 V	24 V
	2	DI2	DI4	DI6	DI8
	3	GND	GND	GND	GND
	4	DI1	DI3	DI5	DI7
	5	Not assigned			
 Housing is connected to functional earth					

* Only available for devices with "Application-I/O".

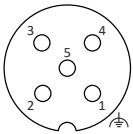
Further configuration options for the connectors can be found in the commissioning document.

IO-Link

Only available for devices with "Application-I/O".

The inverter (IO-Link master) supports IO-Link version 1.1.

For communication with sensors and actuators (IO-Link devices) with port class A, the respective pin 4 of connector X3.x can be configured separately as an IO-Link port:

M12 (A coded)	Pin	X3.1	X3.2	X3.3	X3.4
	1	24 V / L+	24 V / L+	24 V / L+	24 V / L+
	2	DI2	DI4	DI6	DI8
	3	GND / L-	GND / L-	GND / L-	GND / L-
	4	IO-Link Port 1	IO-Link Port 2	IO-Link Port 3	IO-Link Port 4
	5	Not assigned			
 Housing is connected to functional earth					

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PTC input

By default, the motor temperature monitoring is active!

		I□□AMxxx C 0.37 ... 3 kW I□□AMxxx F 0.37 ... 5.5 kW	I□□AMxxx C 4 ... 22 kW I□□AMxxx F 7.5 ... 45 kW
Connection		X105	
Connection type		Han Q8 / M23	Spring terminal
Max. cable cross-section	mm²	-	2.5
Stripping length	mm	-	8
Required tools		-	0.6 x 3.5
Application	T1	Connection of PTC or thermal contact	
	T2		
Sensor types		PTC single sensor (DIN 44081)	
		PTC triplet sensor (DIN 44082)	
		Thermal contact	
		Notice: The PT1000 temperature sensor is not supported	

NOTICE

If the terminals T1 and T2 are used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the potentials of motor, mains and M12 connectors as well as to the auxiliary supply to not restrict the safe isolation of the M12 connectors.

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3-phase | 400 V

3-phase | 480 V

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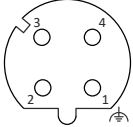
Networks

The Multi-Ethernet interface of the i550/i650 motec inverter supports the typical topologies and protocols of the following networks:

- EtherCAT
- EtherNet/IP
- Modbus TCP
- PROFINET

It is possible to switch between the different protocols via parameterization.

The multi-Ethernet interface is designed as an M12 plug connector:

X396 (IN) / X397 (OUT)		
M12 (D coded)	Pin	Assignment
	1	TX+
	2	RX+
	3	TX-
	4	RX-
		Housing is connected to functional earth

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3-phase | 480 V

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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

Excessive humidity or condensation

Possible consequences: Malfunction or irreparable damage to safety component

- Only commission the safety component when it has acclimatized.

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3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

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Basic Safety - STO

"Basic Safety - STO" is part of the product variants I55AMxxxxxA and I65AMxxxxxA.

NOTICE

Overvoltage

Possible consequences: Destruction of the safety component

- Make sure that the maximum voltage (maximum rated) at the safe inputs does not exceed 30 V DC.

⚠ DANGER!

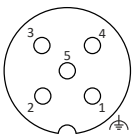
No "Emergency switching off" in accordance with EN 60204-1

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 disconnect switch!

Possible consequences: Death or severe injuries

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

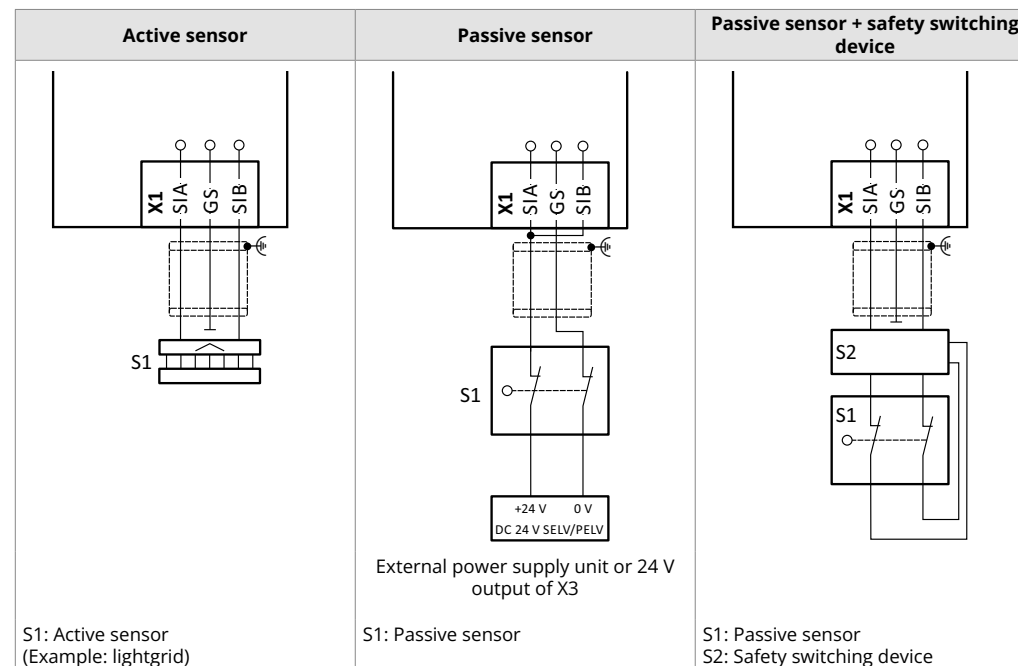
X1

M12 (A coded)	Pin	Assignment
	1	Not assigned
	2	SIA
	3	GS
	4	SIB
	5	Not assigned
	⏏	Housing is connected to functional earth

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.

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3-phase | 230/240 V

3-phase | 400 V

3-phase | 480 V

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Extended Safety

"Extended Safety - S" is part of the product variant I65AMxxxxxE.



DANGER!

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 disconnect switch!

Possible consequences: Death or severe injuries

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

The "Extended Safety - S" version has no safe inputs for controlling the safety functions. The safety functions are controlled exclusively via the safety bus.

Detailed information on the safety bus and the individual safety functions as well as safety-related characteristic values can be found in the project planning document and in the commissioning document.

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DANGER!

Unexpected states during commissioning

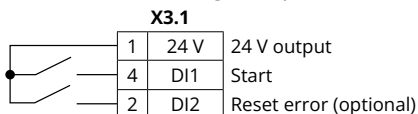
Incorrect wiring can cause unexpected states during the commissioning phase.

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.
- Connector X3.1 (digital input 1) must be wired.



- The control connections of the safety technology must be wired.

1. Switch on mains voltage.
2. Check readiness for operation.
3. Observe the "DRIVE" LED status display on the front of the inverter.

Carry out functional test

Objective: The motor connected to the inverter should rotate within the shortest possible time.

Preconditions:

- The connected motor matches the inverter in terms of power.
- The parameter settings correspond to the state upon delivery.
- The inverter is ready for operation. The mains voltage is switched on.

Start the drive and stop it again:

1. Drive enabled: X1/SIA = HIGH and X1/SIB = HIGH
2. Start drive: X3.1/DI1 = HIGH (switch closed)
 - The drive rotates with 20 Hz.
3. Stop drive again: X3.1/DI1 = LOW (switch open)

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DANGER!

Unexpected and dangerous motor 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.

Diagnostic interface X16 (USB interface)

The inverter has a built-in USB port (USB-C).

- The USB port may only be used temporarily for the diagnostics and parameterization of the inverter. We recommend keeping the inverter and diagnostics device on the same ground potential or disconnecting the diagnostics device from the mains.
- Parameter setting without motor operation does not require a mains voltage. If you connect the inverter directly to the PC without a hub, the USB interface of the PC is sufficient for the voltage supply.

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Engineering Tool »EASY Starter«

Commissioning and diagnostics are performed via the "EASY Starter" Engineering Tool.

Download »EASY Starter«: [EASY Engineering Tools Downloads](#)

Establish connection between inverter and »EASY Starter«

Preconditions for commissioning:

- The functional test has been completed successfully (without any errors or faults).
- The inverter is ready for operation. The mains voltage is switched on.

Accessories required for commissioning:

- USB cable with USB-C connector
- PC with installed »EASY Starter« software

1. Insert the USB-C plug of the USB cable into the USB socket of the inverter.

2. Plug the other end into a free USB socket on the PC.

3. Start »EASY Starter«. The "Add devices" dialog is shown.

4. Select the "USB on Board" connection.

5. Click the "Insert" button.

»EASY Starter« searches for connected devices via the communication path selected. When the connection has been established successfully, the inverter is displayed in the device list of »EASY Starter«. The inverter parameters can now be accessed via the tabs of »EASY Starter«.

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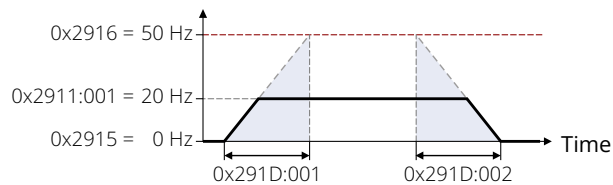
Basic setting

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1. Load default setting: 0x2022:001 = "on / start [1]"
2. Set the following parameters for V/f characteristic control:
 - 0x2540:001: Mains voltage
 - 0x2B01:001: V/f characteristic data: Base voltage
 - 0x2B01:002: V/f characteristic data: Base frequency
 - 0x2915: Minimum frequency
 - 0x2916: Maximum frequency
 - 0x291D:001: Acceleration time 1
 - 0x291D:002: Deceleration time 1
 - 0x2911:001: Setpoint frequency preset 1



3. Save settings: 0x2022:003 = "on / start [1]"

Start drive:

- Drive enabled: X1/SIA = HIGH and X1/SIB = HIGH
- Start drive: X3.1/DI1 = HIGH
 - The drive rotates with setpoint frequency preset 1 (0x2911:001)

Stop drive again: X3.1/DI1 = LOW

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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

Parameter list

In the "EASY Starter" you have access to all available parameters of the inverter via the "Parameter list" tab.

The parameters are divided into the following function groups in the parameter list:

- Group 0 - favorites
- Group 1 - diagnostics
- Group 2 - basic setting
- Group 3 - motor control
- Group 4 - I/O setting
- Group 5 - network setting
- Group 6 - process controller
- Group 7 - additional functions

Group 0 - favorites

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

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Group 0 - favorites

Index	Name	Possible settings/value ranges	Selection no.	Information
0x2DDD	Output frequency	x.x Hz (read only)		Display of the actual output frequency.
0x6078	Actual current	x.x % (read only)		Display of the actual motor current.
0x2D89	Motor voltage	x VAC (read only)		Display of the current motor voltage.
0x603 F	Error code	- (read only)		Error message.
0x2860:001	Frequency control: Standard setpoint source	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.
		...	...	For further setting options, see the commissioning document.
0x2838:001	Start method	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 0x2B84:002.
0x2838:003	Stop method	Coasting	[0]	The motor has no torque (coasts down to standstill).
		Standard ramp	[1]	The motor is brought to a standstill with deceleration time 1 (0x291D:002) or - if activated - with deceleration time 2 (0x291D:004).
		Quick stop ramp	[2]	The motor is brought to a standstill with the deceleration time (0x291C) set for the "Quick stop" function.
0x2540:001	Rated mains voltage	230 Veff	[0]	Selection of the mains voltage for actuating the inverter.
		400 Veff	[1]	
		480 Veff	[2]	
0x2915	Minimum frequency	0.0 ... 599.0 Hz		Lower limit value for all frequency setpoints.
0x2916	Maximum frequency	0.0 ... 50.0 ... 599.0 Hz		Upper limit value for all frequency setpoints.
0x291D:001	Acceleration 1	0.0 ... 5.0 ... 3600.0 s		Acceleration time 1.
0x291D:002	Deceleration 1	0.0 ... 5.0 ... 3600.0 s		Deceleration time 1
0x2C00	Motor control type	Servo control (SC ASM)	[2]	This control mode is used for servo control of an asynchronous motor.
		Sensorless vector control (SLVC)	[4]	This control mode is used for sensorless vector control of an asynchronous motor.
		V/f characteristic control 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 (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 the sensorless control of a synchronous motor.
0x2B00	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.
0x2B01:001	Base voltage	0 ... 400 ... 5000 V *		Base voltage and base frequency define the V/f ratio and thus the gradient of the V/f characteristic. – The V/f base voltage is usually set to the rated motor voltage. – The V/f base frequency is usually set to the rated motor frequency.
0x2B01:002	Base frequency	0 ... 50 ... 1500 Hz		

* Default setting dependent on the size

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Group 0 - favorites

Index	Name	Possible settings/value ranges	Selection no.	Information
0x283A	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.
0x2939	Switching frequency	*	[*]	Selection of the inverter switching frequency.
0x2D4B:001	Maximum utilization [60 s]	30 ... 150 ... 200 %		Maximum permissible thermal motor utilization (max. permissible motor current for 60 seconds). With regard to rated motor current (0x6075).
0x2B12:001	Fixed boost	0.0 ... 2.5 ... 20.0 % *		Constant voltage boost for the V/f characteristic control without feedback.
0x6075	Rated motor current	0.001 ... 1,420 ... 500.000 A *		Setting of the rated motor current according to motor nameplate.
0x6073	Max. current	0.0 ... 200.0 ... 3000.0 %		Maximum overload current of the inverter. With regard to rated motor current (0x6075).
0x2631:001	Inverter enable	Constant TRUE	[1]	Assignment of a trigger to the "inverter enable" function. Trigger = TRUE: The inverter is enabled (unless there is another cause for inverter disable). Trigger = FALSE: The inverter is disabled. The motor has no torque and coasts.
		...	...	For further setting options, see the commissioning document.
0x2631:002	Start	Digital input 1	[11]	Assignment of a trigger to the "Run" function. Function 1: Start/stop motor (default setting) Function 1 is active when no network control is active. Trigger = TRUE: Let motor rotate forward (CW). Trigger = FALSE: Stop motor according to stop method (0x2838:003).
				Function 2: Start enable/stop motor Function 2 is active when network control is active. Trigger = TRUE: Start commands of the active control source are enabled. Trigger = FALSE: Stop motor.
				For further setting options, see the commissioning document.
0x2631:003	Activate quick stop	Not connected	[0]	Assignment of a trigger to the "Activate quick stop" function. Trigger = TRUE: Activate quick stop. Quick stop ramp adjustable in 0x291C. Trigger = FALSE: Deactivate quick stop
		...	...	For further setting options, see the commissioning document.
0x2631:004	Reset error	Digital input 2	[12]	Assignment of a trigger to the "Reset error" function. Trigger = FALSE > TRUE (edge): Active error is reset (acknowledged) if the error condition is not active anymore and the error is resettable. Trigger = FALSE: No action.
		...	...	For further setting options, see the commissioning document.
0x2631:005	Activate DC braking	Not connected	[0]	Assignment of a trigger to the "Activate DC braking" function. Trigger = TRUE: Activate DC braking. Trigger = FALSE: Deactivate DC braking.
		...	...	For further setting options, see the commissioning document.

* Default setting dependent on the size

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Group 0 - favorites

Index	Name	Possible settings/value ranges	Selection no.	Information
0x2631:006	Start forward	Not connected	[0]	Assignment of a trigger to the "Start forward (CW)" function. Trigger = FALSE > TRUE (edge): Let motor rotate forward. Trigger = TRUE > FALSE (edge): No action. To stop the motor, set function "Start" to FALSE (0x2631:002, default digital input 1).
		...	...	For further setting options, see the commissioning document.
0x2631:007	Start reverse	Not connected	[0]	Assignment of a trigger to the "Start reverse (CCW)" function. Trigger = FALSE > TRUE (edge): Let motor rotate backward. Trigger = TRUE > FALSE (edge): No action. To stop the motor, set function "Start" to FALSE (0x2631:002, default digital input 1).
		...	...	For further setting options, see the commissioning document.
0x2631:008	Run forward	Not connected	[0]	Assignment of a trigger to the "Run forward (CW)" function. Trigger = TRUE: Let motor rotate forward. Trigger = FALSE: Stop motor.
		...	...	For further setting options, see the commissioning document.
0x2631:009	Run reverse	Not connected	[0]	Assignment of a trigger to the "Run reverse (CCW)" function. Trigger = TRUE: Let motor rotate backward. Trigger = FALSE: Stop motor.
		...	...	For further setting options, see the commissioning document.
0x2631:013	Reverse rotating direction	Not connected	[0]	Assignment of a trigger to the "Reverse rotating direction" function. Trigger = TRUE: The setpoint specified is inverted (i.e. the sign is inverted). Trigger = FALSE: No action/deactivate function again.
		...	...	For further setting options, see the commissioning document.
0x2631:018	Activate preset (bit 0)	Not connected	[0]	Assignment of a trigger to the "Activate preset (bit 0)" function. Bit with the valency 2 ⁰ for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = "0". Trigger = TRUE: Bit = "1".
		...	...	For further setting options, see the commissioning document.
0x2631:019	Activate preset (bit 1)	Not connected	[0]	Assignment of a trigger to the "Activate preset (bit 1)" function. Bit with the valency 2 ¹ for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = "0". Trigger = TRUE: Bit = "1".
		...	...	For further setting options, see the commissioning document.
0x2631:020	Activate preset (bit 2)	Not connected	[0]	Assignment of a trigger to the "Activate preset (bit 2)" function. Bit with the valency 2 ² for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = "0". Trigger = TRUE: Bit = "1".
		...	...	For further setting options, see the commissioning document.

* Default setting dependent on the size

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Group 0 - favorites

Index	Name	Possible settings/value ranges	Selection no.	Information
0x2634:002	Digital output 1	Operation enabled	[52]	Assignment of a trigger to digital output 1. Trigger = FALSE: X3.1/DO1 set to LOW level. Trigger = TRUE: X3.1/DO1 set to HIGH level.
		...	...	For further setting options, see the commissioning document.
0x2911:001	Setpoint frequency presets: Preset value 1	0.0 ... 20.0 ... 599.0 Hz		Parameterizable frequency setpoints
0x2911:002	Setpoint frequency presets: Preset value 2	0.0 ... 40.0 ... 599.0 Hz		
0x2911:003	Setpoint frequency presets: Preset value 3	0.0 ... 50.0 ... 599.0 Hz		
0x2911:004	Setpoint frequency presets: Preset value 4	0.0 ... 0.0 ... 599.0 Hz		

* Default setting dependent on the size

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Group 2 - basic setting

Index	Name	Possible settings	Selection no.	Information
0x291C	Quick stop ramp	0.0 ... 1.0 ... 3600.0 s		Quick stop ramp for "MS: Velocity mode" – If the "Quick stop" function is activated, the motor is brought to a standstill within the deceleration time set here. – The set braking deceleration time refers to the braking deceleration starting from the set maximum frequency (0x2916) to standstill. In the case of a lower actual frequency, the actual deceleration time is reduced accordingly. – Setting is not effective in the operating mode 0x6060 = "CiA: Velocity mode [2]".

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Group 3 - motor control

Index	Name	Possible settings	Selection no.	Information
0x2C01:004	Motor parameter: Rated speed	50 ... 1450 ... 50000 rpm		General motor data. Carry out settings as specified by motor nameplate data. Notice! When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the connection type selected.
0x2C01:005	Motor parameter: Rated frequency	1.0 ... 50.0 ... 10000.0 Hz		
0x2C01:006	Motor parameter: Rated power	0.00 ... 0.25 ... 655.35 kW 0.00 ... 0.33 ... 878.84 hp		
0x2C01:007	Motor parameter: Rated voltage	0 ... 230 ... 65535 V		
0x2C01:008	Motor parameter: Cosine phi	0.00 ... 0.80 ... 1.00		

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Group 7 - additional functions

Index	Name	Possible settings	Selection no.	Information
0x2022:001	Device commands: 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. – All parameter changes made by the user are lost during this process! – This process may take some seconds. When the device command has been executed successfully, the value 0 is shown. – 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
0x2022:002	Device commands: Save user data	On / start	[1]	1 = save current parameter settings in the inverter with mains failure protection. – This process may take some seconds. When the device command has been executed successfully, the value 0 is shown. – Do not switch off the supply voltage during the saving process!
		Off / ready	[0]	Only status feedback

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Diagnostics

The inverter provides many diagnostic parameters which are helpful for operation, maintenance, error diagnosis, error correction, etc.

In the "EASY Starter" you have access to the diagnostic parameters of the inverter via the "Diagnostics" tab.

Reset error via »EASY Starter«

Errors can be reset with the "Reset" button ("Diagnostics" tab).

- Condition: Cause of error has been eliminated and no blocking time is active.

Reset error via control connections

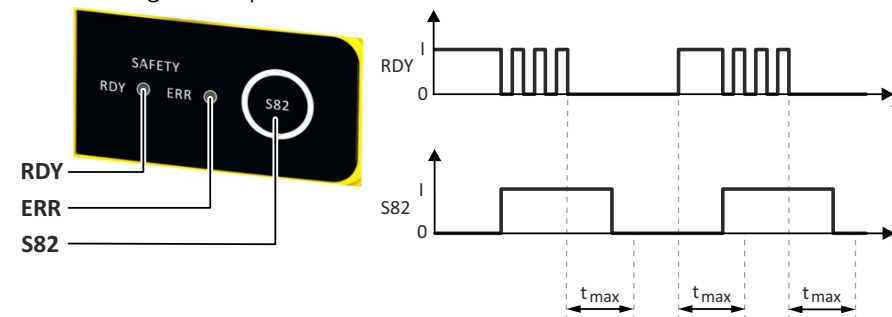
Errors can be reset in two ways via the control connections:

1. Via start signal (0x2631:002, default digital input 1).
 - Condition: 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 (0x2631:004, default digital input 2).
 - Condition: 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.

Extended Safety: Acknowledgement with confirmation button S82

If the device detects a modified parameter set or a changed safety address during initialization, for example, the device requests an acknowledgement with confirmation button S82: The safety LED "RDY" (yellow) is on and the safety LED "ERR" (red) flashes.

To acknowledge the request with the S82 confirmation button:



Notice: The acknowledgement procedure is aborted if the maximum permissible response time of 2.5 seconds is exceeded. The acknowledgement procedure must be repeated.

1. Press and hold the S82 button.
 - The "RDY" LED flashes.
2. The "RDY" LED goes off after 3 seconds.
3. Release the S82 button after a maximum of 2.5 seconds.
 - The "RDY" LED is lit.
4. Press and hold the S82 button after a maximum of 2.5 seconds.
 - The "RDY" LED flashes.
5. The "RDY" LED goes off after 3 seconds.
6. Release the S82 button after a maximum of 2.5 seconds.
 - The acknowledgement is successfully completed.
 - The action is recorded in the inverter logbook.
7. Use a function test to ensure that the acknowledgement has led to the correct result.

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Error code	Description	Classification	Remedy	Blocking time [s]
2250	CiA: Continuous overcurrent (inside the device)	Error	– Check motor and wiring for short circuits. – Check brake resistor and wiring. – Check motor circuit (delta connection, star connection). – Check setting of the motor data.	5
2320	Short circuit or earth leakage on motor side	Error	– Check motor cable. – Check the length of the motor cable. – Use shorter or lower-capacitance motor cable.	5
2340	CiA: Short circuit (inside the device)	Error	– Check motor cable for short circuit.	5
2350	CiA: $i^2 \cdot t$ overload (thermal state)	Error	– Check drive sizing. – Check machine/driven mechanics for excessive load. – Check setting of the motor data. – Reduce values for slip compensation (0x2B09:001, 0x2B09:002) and oscillation damping (0x2B0A:001, 0x2B0A:002).	5
2382	Error - device utilization (I _{xt}) too high	Error	– Check drive sizing. – Reduce maximum overload current of the inverter (0x6073). – In case of high mass inertias, reduce maximum overload current of the inverter (0x6073) to 150 %.	3
2383	Warning - device utilization (I _{xt}) too high	Warning	– Check drive sizing.	0
3120	Mains phase fault	Error	– Check mains connection wiring. – Check fuses.	0
3210	Error - DC bus overvoltage	Error	– Reduce dynamic performance of the load profile.	0
3211	Warning: DC-bus overvoltage	Warning	– Check mains voltage. – Check settings for the brake energy management.	0
3220	Error - DC-bus undervoltage	Trouble	– Check mains voltage. – Check fuses.	0
3221	Warning: DC bus undervoltage	Warning	– Check DC-bus voltage (0x2D87). – Check mains settings.	0
3222	DC-bus voltage too low for switch-on	Warning	– Check mains voltage. – Check fuses. – Check mains settings.	0
4210	Error - power section overtemperature	Error	– Check mains voltage. – Ensure sufficient cooling of the device (display of heatsink temperature in 0x2D84:001). – Clean fan and ventilation slots. If required, replace fan. – Reduce switching frequency (0x2939).	0
4281	Warning - heatsink fan	Warning	– Clean fan and ventilation slots. If required, replace fan. The fans can be unlocked via locking hooks and can then be removed.	0
4310	Motor overtemperature	Error	– Check drive sizing. – Check motor temperature sensor and wiring at X105/T1+T2 or X109/T1+T2.	5
5112	24 V supply critical	Warning	– Check optional external auxiliary supply on X100.1/24E.1, if connected. – Check mains voltage.	0
5180	24 V supply overload	Warning	– Check 24 V output and digital outputs for earth fault or overload.	0

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Error codes

Error code	Description	Classification	Remedy	Blocking time [s]
6280	Trigger/functions connected incorrectly	Trouble	– Check and correct the assignment of the triggers to the functions. – In network control, the two functions "Inverter enable" (0x2631:001) and "Start" (0x2631:002) can also be set to "Constant TRUE [1]" to start the motor.	0
7180	Motor overcurrent	Error	– Check motor load. – Check drive sizing. – Adapt set error threshold (0x2D46:001).	1
FF06	Motor overspeed	Error	– Adapt the maximum motor speed (0x6080) and the error threshold (0x2D44:001).	1
FF37	Automatic start disabled	Error	– Deactivate start command and reset error.	0



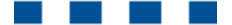
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Status LEDs

You can quickly obtain information on some operating states via the large "DRIVE" LED status display on the inverter. This status display is composed of a blue LED "RDY" and a red LED "ERR", which emit specific blinking patterns depending on the operating status:

LED "RDY" (blue))	LED "ERR" (red)	State/meaning
off	off	No supply voltage
		Initialization (inverter is started)
 flashes	off	Safe torque off (STO) active. The inverter has been disabled by the integrated functional safety.
	 flashes fast	Safe torque off (STO) active, warning active. The inverter has been disabled by the integrated functional safety.
 flashes	off	Inverter disabled
	 flashes fast	Inverter disabled, warning active.
		Inverter disabled, error active.
	 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.
	 flashes fast	Inverter enabled, warning active. The motor rotates according to the specified setpoint or quick stop active.
	 flashes	Inverter enabled, quick stop active as response to a fault.

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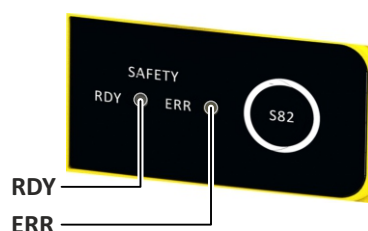
Status-LEDs Safety

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Status-LEDs Safety

Only available for product variant I65AMxxxxxE.

The LEDs "RDY" and "ERR" show the current safety status:



⚠ DANGER!

Unreliable status information possible due to LEDs.

LEDs are not reliable status displays. It is not guaranteed that the LEDs provide exact information.

Possible consequences: Death or severe injuries

- Only use LEDs for general diagnostics during commissioning or troubleshooting.
- Do not use LEDs as status displays.

LED "RDY" (yellow)	Status	Meaning
off	-	No status message active.
flashes yellow 1 Hz	Service status	Transfer of parameter set requested.

Display for requested acknowledgement

LED "RDY" (yellow)	LED "ERR" (red)	Status	Meaning
on	off	Restart acknowledgement requested	The device is working correctly.
	flashes red 1 Hz		During start-up, a modified parameter set was detected in the "Init" state.
	flashes red 2 Hz		During start-up, a changed safety address was detected in the "Init" state.

Display in the event of errors

LED "RDY" (yellow)	LED "ERR" (red)	Status	Meaning
	off	-	The device is working correctly.
	flashes red 1 Hz	Error	One of the following errors has been detected: – A monitoring device has been activated. – An acknowledgeable error is active. – Discrepancy of the inputs
flashes yellow 1 Hz	flashes red 1 Hz		One of the following errors has been detected: – Discrepancy of the configuration parameters – CRC checksum error
	flashes red 2 Hz	Safety bus error	Communication via the safety bus is not established: – There is no valid configuration. – The start-up has not been completed yet.

Display for critical device errors

LED "RDY" (yellow)	LED "ERR" (red)	Status	Meaning
flashes yellow	flashes red	Critical system error	– "Lock-out" (CPU stopped) – STO is active. – If the system error occurs again after switching the 24 V supply, the device is defective. It must be replaced.

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Support

Further information can be found on the online page

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>