



i500

Inverter i550-Cabinet 3 ... 22 kW

i500

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About this document

WARNING!

Read this documentation thoroughly before carrying out the installation and commissioning.

- ▶ Please observe the safety instructions!



Information and tools with regard to the Lenze products can be found on the Internet:
<http://www.lenze.com> → Download

Notations and conventions

This document uses the following conventions to distinguish different types of information:

Numbers			
	Decimal separator	Point	In general, the decimal point is used. Example: 1 234.56
Warning			
	UL warning	UL	Are used in English and French.
	UR warning	UR	
Text			
	Programs	» «	Software Example: »Engineer«, »EASY Starter«
Icons			
	Page reference		Reference to another page with additional information Example:  16 = see page 16
	Documentation reference		Reference to another documentation with additional information Example:  EDKxxx = see documentation EDKxxx

Layout of the safety instructions

DANGER!

This note refers to an imminent danger which, if not avoided, may result in death or serious injury.

WARNING!

This note refers to a danger which, if not avoided, may result in death or serious injury.

CAUTION!

This note refers to a danger which, if not avoided, may result in minor or moderate injury.

NOTICE

This note refers to a danger which, if not avoided, may result in damage to material assets.

Safety instructions

Disregarding the following basic safety measures and safety information may lead to severe personal injury and damage to property!

Please observe the specific safety information in the other sections!

Basic safety measures

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- The product must never be technically modified.
- Never commission the product before assembly has been completed.
- The product must never be operated without required covers.

The product must only be used by qualified personnel. IEC 60364 or CENELEC HD 384 define the skills 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.

The procedural notes and circuit details described in this document are only proposals. It is up to the user to check whether they can be adapted to the particular applications. Lenze does not take any responsibility for the suitability of the procedures and circuit proposals described.

Device protection

- Connect/disconnect all pluggable terminals only in deenergised condition.
- Only change wiring on connections in deenergised condition.
- Only remove the product from the installation, e.g. from the rear panel of the control cabinet, in deenergised condition.
- The maximum test voltage for insulation tests between 24 V control potential and PE must not exceed 110 V DC (EN 61800-5-1).

Observe all specifications of the corresponding documentation supplied. This is the precondition for safe and trouble-free operation and for obtaining the product features specified.

Residual hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system.

If the above is disregarded, this can lead to severe injuries to persons and damage to property!

Product

Observe the warning labels on the product!

Icon	Description
	Electrostatic sensitive devices: Before working on the product, the staff must ensure to be free of electrostatic charge!
	Dangerous electrical voltage Before working on the product, check if no voltage is applied to the power terminals! After mains disconnection, the power terminals carry the hazardous electrical voltage given on the product!
	High leakage current: Carry out fixed installation and PE connection in compliance with EN 61800-5-1 or EN 60204-1!
	Hot surface: Use personal protective equipment or wait until devices have cooled down!

Motor protection

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

- E. g. by longer operation of self-ventilated motors at low speed.
- E. g. by longer operation of the DC-injection brake.

Protection of the machine/system

Drives can reach dangerous overspeeds.

- E. g. by setting high output frequencies in connection with motors and machines not suitable for this purpose.
- The inverters do not provide protection against such operating conditions. For this purpose, use additional components.

Switch contactors in the motor cable only if the controller is inhibited.

- Switching while the inverter is enabled is only permissible if no monitoring functions are activated.

Motor

If there is a short circuit of two power transistors, a residual movement of up to $180^\circ/\text{number of pole pairs}$ can occur at the motor! (For 4-pole motor: residual movement max. $180^\circ/2 = 90^\circ$).

Application as directed

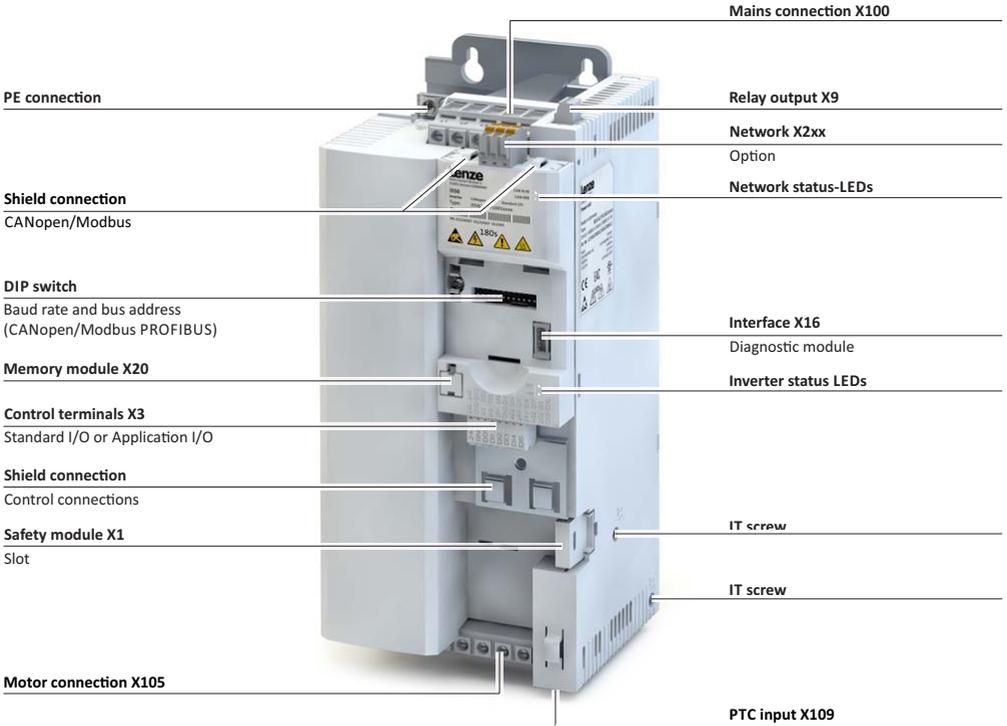
- The product must only be operated under the operating conditions prescribed in this documentation.
- The product meets the protection requirements of 2014/35/EU: Low-Voltage Directive.
- The product is not a machine in terms of 2006/42/EC: Machinery Directive.
- Commissioning or starting the operation as directed of a machine with the product is not permitted until it has been ensured that the machine meets the regulations of the EC Directive 2006/42/EC: Machinery Directive; observe EN 60204-1.
- Commissioning or starting the operation as directed is only allowed when there is compliance with the EMC Directive 2014/30/EU.
- The harmonised standard EN 61800-5-1 is used for the inverters.
- The product is not a household appliance, but is only designed as component for commercial or professional use in terms of EN 61000-3-2.
- The product can be used according to the technical data if drive systems have to comply with categories according to EN 61800-3.

In residential areas, the product may cause EMC interferences. The operator is responsible for taking interference suppression measures.

- The product must only be actuated with motors that are suitable for the operation with inverters.
 - Lenze L-force motors meet the requirements
 - Exception: m240 motors are designed for mains operation only.

Product information

Equipment



Mounting/ installation

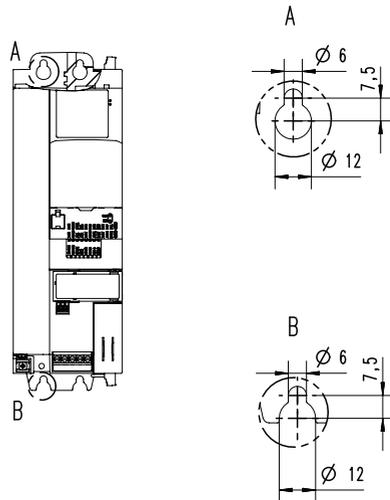
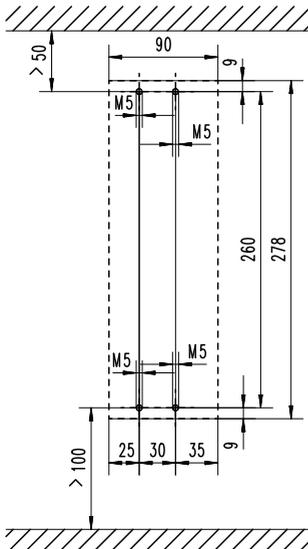
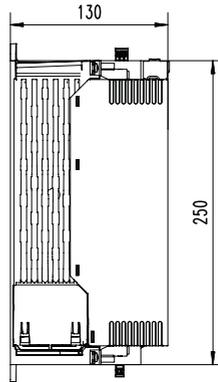
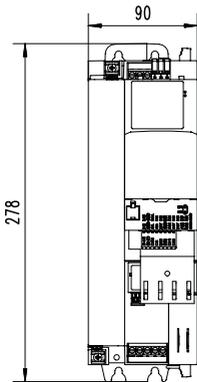
Mechanical installation

Dimensions

3 kW ... 5.5 kW

The dimensions in mm apply to:

3 kW	4 kW	5.5 kW
I55AE230F	I55AE240D I55AE240F	I55AE255D I55AE255F



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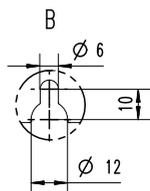
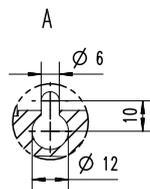
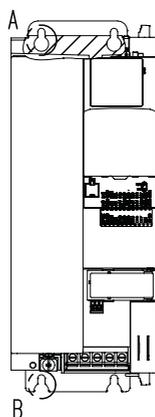
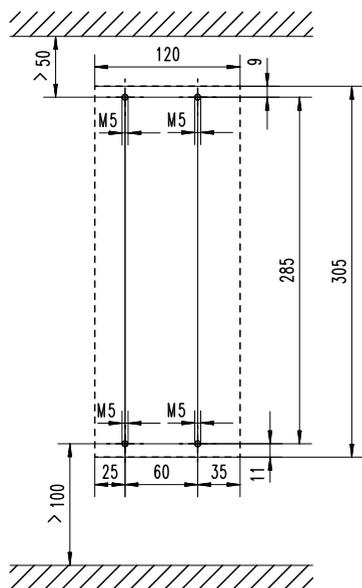
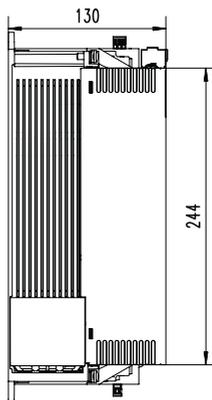
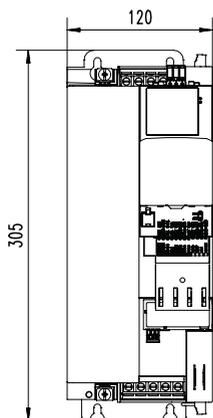
Mounting/ installation
 Mechanical installation
 Dimensions

7.5 kW ... 11 kW

The dimensions in mm apply to:

7.5 kW
 I55AE275F

11 kW
 I55AE311F



8800296

Mounting/ installation

Electrical installation

Important notes

Electrical installation

Important notes

DANGER!

Dangerous electrical voltage

Possible consequence: death or severe injuries

- ▶ All work on the inverter must only be carried out in the deenergised state.
 - ▶ After switching off the mains voltage, wait for at least 3 minutes before you start working.
-

DANGER!

Dangerous electrical voltage

The leakage current against earth (PE) is $> 3.5 \text{ mA AC}$ or $> 10 \text{ mA DC}$.

Possible consequences: Death or severe injuries when touching the device in the event of an error.

- ▶ Implement the measures required in EN 61800-5-1, especially:
 - ▶ Fixed installation
 - ▶ The PE connection must comply with the standards (PE conductor diameter $\geq 10 \text{ mm}^2$ or use a double PE conductor)
-

3-phase mains connection 230/240 V



I5xAExxxD inverters do not have an integrated EMC filter in the AC mains supply.

In order to comply with the EMC requirements according to EN 61800-3, an external EMC filter according to IEC EN 60939 has to be used.

The user must prove that the EN 61800-3 requirements for conformity are fulfilled.

Connection plan

The connection plan is valid for the I5xAExxxC inverters.

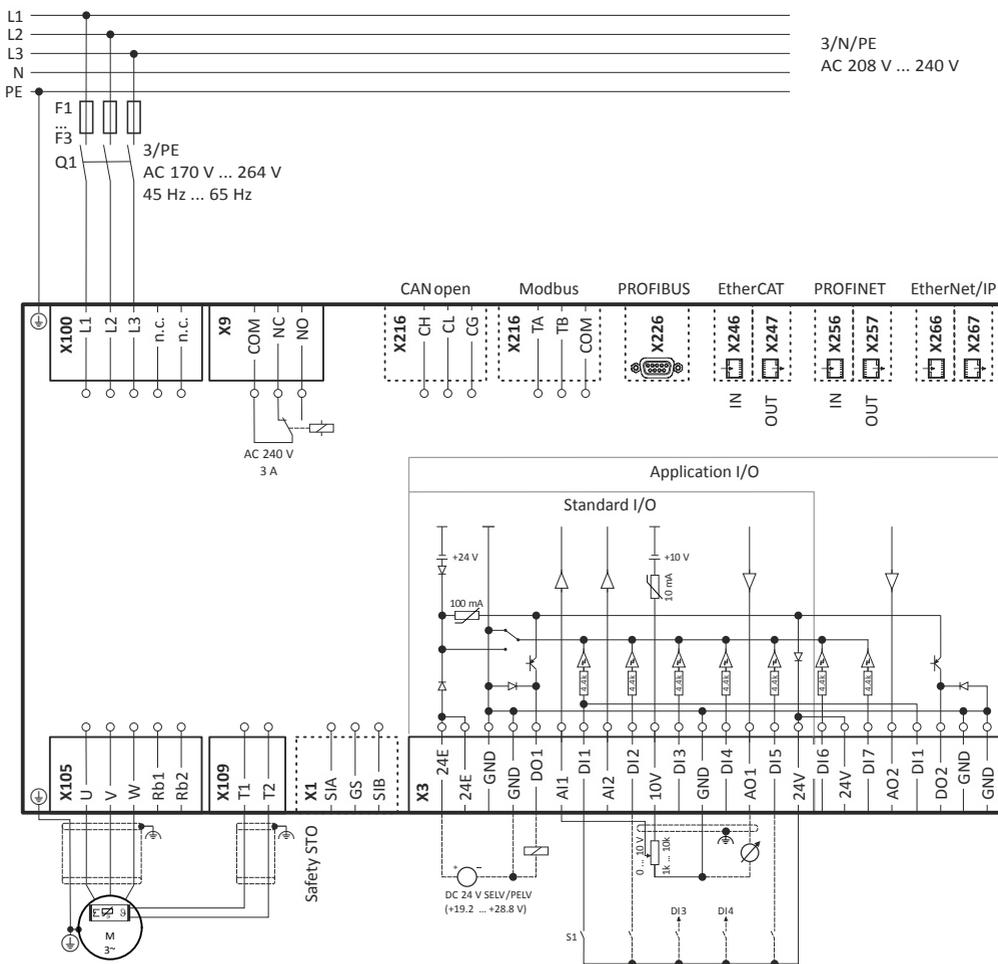


Fig. 3: Wiring example

S1 Start/Stop
 Fx Fuses

Q1 Mains contactor
 -- Dashed line = options

Mounting/ installation

Electrical installation

3-phase mains connection 230/240 V

Fusing and terminal data

Fuse data			
Inverter		I55AE240C	I55AE255C
Cable installation in compliance with		EN 60204-1	
Laying system		C	
operation		without mains choke	
Fuse		gG/gL or gRL	
Max. rated current	A	32	32
Circuit breaker		B	
Max. rated current	A	32	32
operation		with mains choke	
Fuse		gG/gL or gRL	
Max. rated current	A	32	32
Circuit breaker		B	
Max. rated current	A	32	32
Earth-leakage circuit breaker		≥ 300 mA, type B	
3-phase mains connection			

Mains connection			
Inverter		I55AE240C	I55AE255C
Connection		X100	
Connection type		Screw terminal	
Min. cable cross-section	mm ²	1.5	
Max. cable cross-section	mm ²	6	
Stripping length	mm	9	
Tightening torque	Nm	0.5	
Required tool		0.6 x 3.5	
Connection		PE	
Connection type		PE screw	
Min. cable cross-section	mm ²	1.5	
Max. cable cross-section	mm ²	6	
Stripping length	mm	10	
Tightening torque	Nm	1.2	
Required tool		0.8 x 5.5	

Motor connection			
Inverter		I55AE240C	I55AE255C
Connection		X105	
Connection type		Screw terminal	
Min. cable cross-section	mm ²	1.5	
Max. cable cross-section	mm ²	6	
Stripping length	mm	9	
Tightening torque	Nm	0.5	
Required tool		0.6 x 3.5	
Connection		PE	
Connection type		PE screw	
Min. cable cross-section	mm ²	1.5	
Max. cable cross-section	mm ²	6	
Stripping length	mm	10	
Tightening torque	Nm	1.2	
Required tool		0.8 x 5.5	

3-phase mains connection 400 V

Connection plan

The wiring diagram is valid for I5xAExxxF inverters.

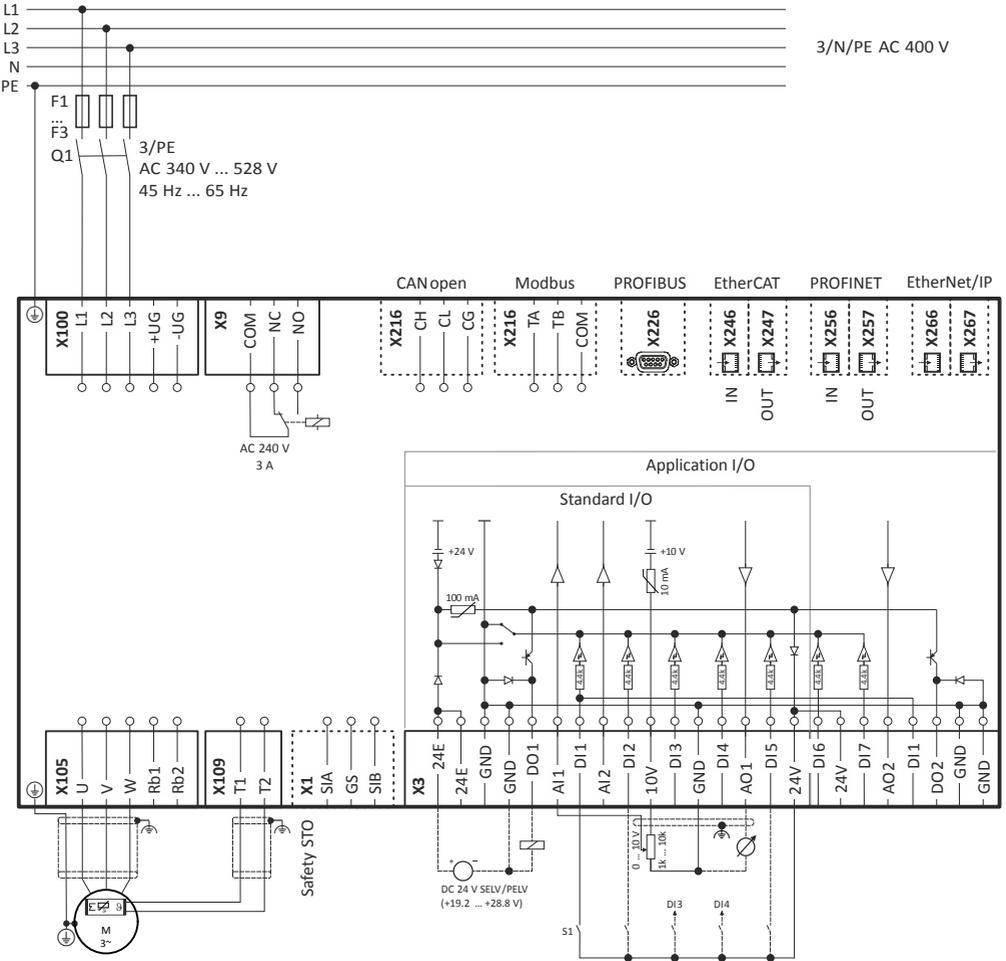


Fig. 4: Wiring example

S1 Start/Stop
 Fx Fuses

Q1 Mains contactor
 --- Dashed line = options

Mounting/ installation
 Electrical installation
 3-phase mains connection 400 V

Fusing and terminal data

Fuse data								
Inverter		I55AE230F	I55AE240F	I55AE255F	I55AE275F	I55AE311F	I55AE315F	I55AE318F
Cable installation in compliance with		EN 60204-1						
Laying system		B2						
operation		without mains choke						
Fuse								
Characteristics		gG/gL or gRL					gR	
Max. rated current	A	25	25	25	32	32	63	63
Circuit breaker								
Characteristics		B						
Max. rated current	A	25	25	25	32	32	63	63
operation		with mains choke						
Fuse								
Characteristics		gG/gL or gRL					gR	
Max. rated current	A	25	25	25	32	32	63	63
Circuit breaker								
Characteristics		B						
Max. rated current	A	25	25	25	32	32	63	63
Earth-leakage circuit breaker								
3-phase mains connection		≥ 300 mA, type B						

Fuse data								
Inverter		I55AE322F						
Cable installation in compliance with		EN 60204-1						
Laying system		B2						
operation								
Fuse								
Characteristics		-						
Max. rated current	A	-						
Circuit breaker								
Characteristics		-						
Max. rated current	A	-						
operation		with mains choke						
Fuse								
Characteristics		gR						
Max. rated current	A	63						
Circuit breaker								
Characteristics		B						
Max. rated current	A	63						
Earth-leakage circuit breaker								
3-phase mains connection		≥ 300 mA, type B						

Mains connection								
Inverter		I55AE230F	I55AE240F	I55AE255F	I55AE275F	I55AE311F	I55AE315F	I55AE318F
Connection		X100						
Connection type		Screw terminal						
Min. cable cross-section	mm ²	1.5						
Max. cable cross-section	mm ²	6		16		35		
Stripping length	mm	9		11		18		
Tightening torque	Nm	0.5		1.2		3.8		
Required tool		0.6 x 3.5		0.8 x 4.0		0.8 x 5.5		
Connection		PE						
Connection type		PE screw						
Min. cable cross-section	mm ²	1.5						4
Max. cable cross-section	mm ²	6		16		25		
Stripping length	mm	10		11		16		
Tightening torque	Nm	1.2		3.4		4		
Required tool		0.8 x 5.5		PZZ				

Mains connection							
Inverter		I55AE322F					
Connection		X100					
Connection type		Screw terminal					
Min. cable cross-section	mm ²	1.5					
Max. cable cross-section	mm ²	35					
Stripping length	mm	18					
Tightening torque	Nm	3.8					
Required tool		0.8 x 5.5					
Connection		PE					
Connection type		PE screw					
Min. cable cross-section	mm ²	4					
Max. cable cross-section	mm ²	25					
Stripping length	mm	16					
Tightening torque	Nm	4					
Required tool		PZZ					

Motor connection								
Inverter		I55AE230F	I55AE240F	I55AE255F	I55AE275F	I55AE311F	I55AE315F	I55AE318F
Connection		X105						
Connection type		Screw terminal						
Min. cable cross-section	mm ²	1.5						
Max. cable cross-section	mm ²	6		16		35		
Stripping length	mm	9		11		18		
Tightening torque	Nm	0.5		1.2		3.8		
Required tool		0.6 x 3.5		0.8 x 4.0		0.8 x 5.5		
Connection		PE						
Connection type		PE screw						
Min. cable cross-section	mm ²	1.5						
Max. cable cross-section	mm ²	6		16		25		
Stripping length	mm	10		11		16		
Tightening torque	Nm	1.2		3.4		4		
Required tool		0.8 x 5.5		PZZ				

Mounting/ installation

Electrical installation

Connection to the IT system

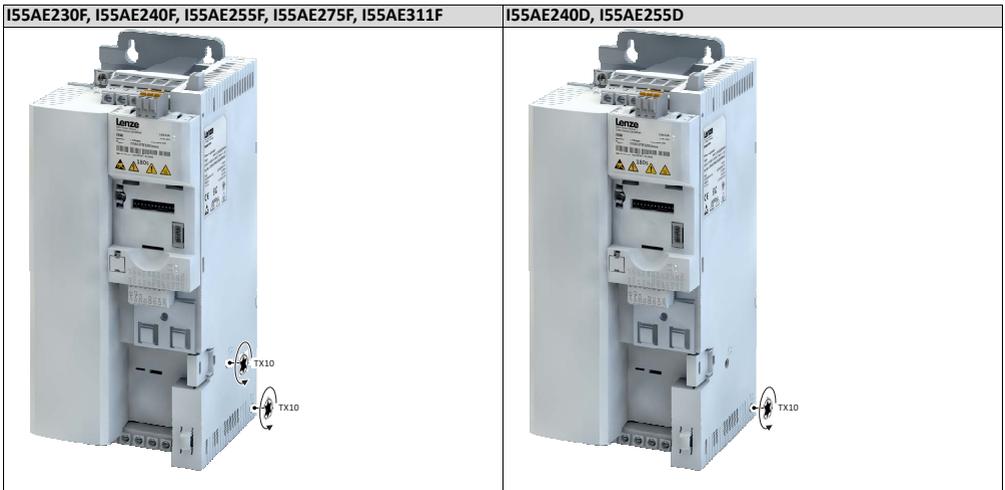
Motor connection	
Inverter	I55AE322F
Connection	X105
Connection type	Screw terminal
Min. cable cross-section	mm ² 1.5
Max. cable cross-section	mm ² 35
Stripping length	mm 18
Tightening torque	Nm 3.8
Required tool	0.8 x 5.5
Connection	PE
Connection type	PE screw
Min. cable cross-section	mm ² 4
Max. cable cross-section	mm ² 25
Stripping length	mm 16
Tightening torque	Nm 4
Required tool	PZ2

Connection to the IT system

NOTICE

Internal components have earth/ground potential if the IT screws are not removed.
 Consequence: the monitoring functions of the IT system respond.

- ▶ Before connection to an IT system be absolutely sure to remove the IT screws.

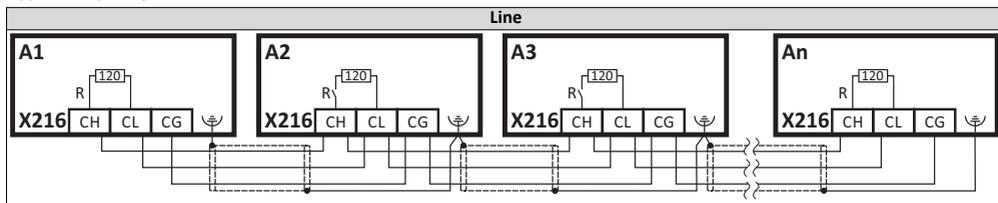


Control connections

Terminal description		Relay output	PTC input	Control terminals
Connection		X9	X109	X3
Connection type		pluggable screw terminal	pluggable screw terminal	pluggable spring terminal
Min. cable cross-section	mm ²	0.5	0.5	0.5
Max. cable cross-section	mm ²	1.5	1.5	1.5
Stripping length	mm	6	6	9
Tightening torque	Nm	0.2	0.2	-
Required tool		0.4 x 2.5	0.4 x 2.5	0.4 x 2.5

CANopen

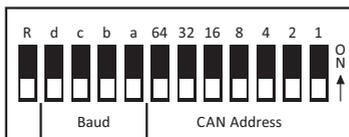
Typical topologies



Terminal description		CANopen
Connection		X216
Connection type		pluggable spring terminal
Min. cable cross-section	mm ²	0.5
Max. cable cross-section	mm ²	2.5
Stripping length	mm	10
Tightening torque	Nm	-
Required tool		0.4 x 2.5

Basic network settings

Use the DIP switch to set the node address and baud rate and to activate the integrated bus terminating resistor.



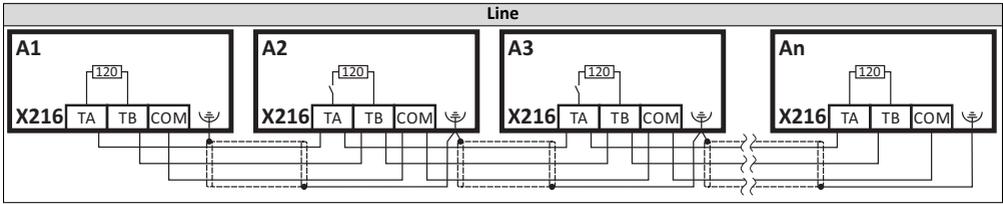
Bus termination	Baud rate					CAN node address						
	R	d	c	b	a	64	32	16	8	4	2	1
OFF	OFF	ON	OFF	ON	20 kbps	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Inactive	OFF	OFF	ON	ON	50 kbps	Value from parameter						
ON	OFF	OFF	ON	OFF	125 kbps	Node address - example:						
Active	OFF	OFF	OFF	ON	250 kbps	OFF	OFF	ON	OFF	ON	ON	ON
	OFF	OFF	OFF	OFF	Value from parameter (500 kbps)	Node address = 16 + 4 + 2 + 1 = 23						
	OFF	ON	OFF	OFF	1 Mbps							
	All other combinations				Value from parameter (500 kbps)							

Bold print = default setting



The network must be terminated with a 120 Ω resistor at the physically first and last node.
Set the "R" switch to ON at these nodes.

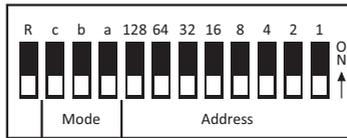
Modbus RTU
Typical topologies



Terminal description		Modbus
Connection		X216
Connection type		pluggable spring terminal
Min. cable cross-section	mm ²	0.5
Max. cable cross-section	mm ²	2.5
Stripping length	mm	10
Tightening torque	Nm	-
Required tool		0.4 x 2.5

Basic network settings

Use the DIP switch to set the node address and baud rate and to activate the integrated bus terminating resistor.



Bus termination	c	Baud rate	Parity	Modbus node address								
		b	a	128	64	32	16	8	4	2	1	
OFF	n.c.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Inactive		Automatic detection	Automatic detection	Value from parameter								
ON		ON	ON	Node address - example:								
Active		Value from parameter	Value from parameter	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON
				Node address = 16 + 4 + 2 + 1 = 23								
				Node address > 247: value from parameter								

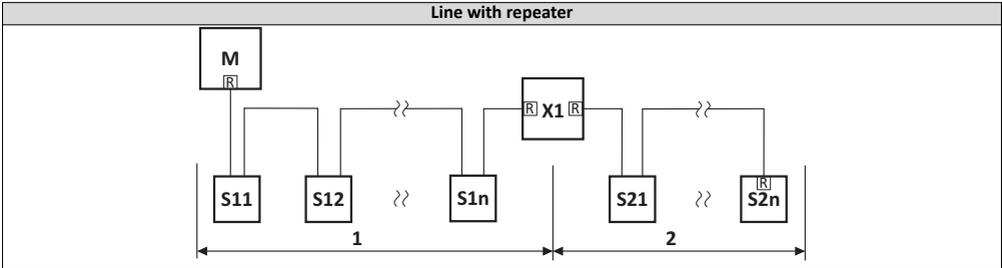
Bold print = default setting



The network must be terminated with a 120 Ω resistor at the physically first and last node.
 Set the "R" switch to ON at these nodes.

PROFIBUS

Typical topologies



M Master
Sxx Slaves
X1 Repeater
R Activated bus terminating resistor

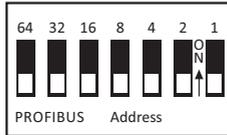
Sub D socket 9-pin - X226

View	Pin	Assignment	Description
	1	Shield	Additional shield connection
	2	n.c.	
	3	RxD/TxD-P	Data line-B (received data/transmitted data +)
	4	RTS	Request To Send (received data/transmitted data, no differential signal)
	5	M5V2	Reference potential (bus terminating resistor -)
	6	P5V2	5 V DC / 30 mA (bus terminating resistor +, OLM, OLP)
	7	n.c.	
	8	RxD/TxD-N	Data line-A (received data/transmitted data -)
	9	n.c.	

Basic network settings

Use the DIP switch to set the station address.

The baud rate is detected automatically.



PROFIBUS station address						
64	32	16	8	4	2	1
OFF	OFF	OFF	OFF	OFF	OFF	OFF
Value from parameter						
Station address - example:						
OFF	OFF	ON	OFF	ON	ON	ON
Station address = 16 + 4 + 2 + 1 = 23						
Do not set station address = 126 and station address = 127. These station addresses are invalid.						

Bold print = default setting



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

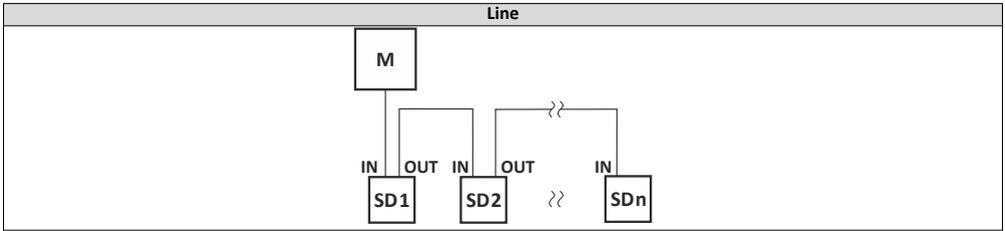
Mounting/ installation

Electrical installation

EtherCAT

EtherCAT

Typical topologies

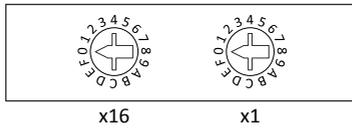


M Master
SD Slave Device

Bus-related information			
Name		EtherCAT	
Communication medium		Ethernet 100 Mbps, full duplex	
Use		Connection of the inverter to an EtherCAT network	
Connection system		RJ45	
Status display		2 LEDs	
Connection designation		In: X246 Out: X247	

Basic network settings

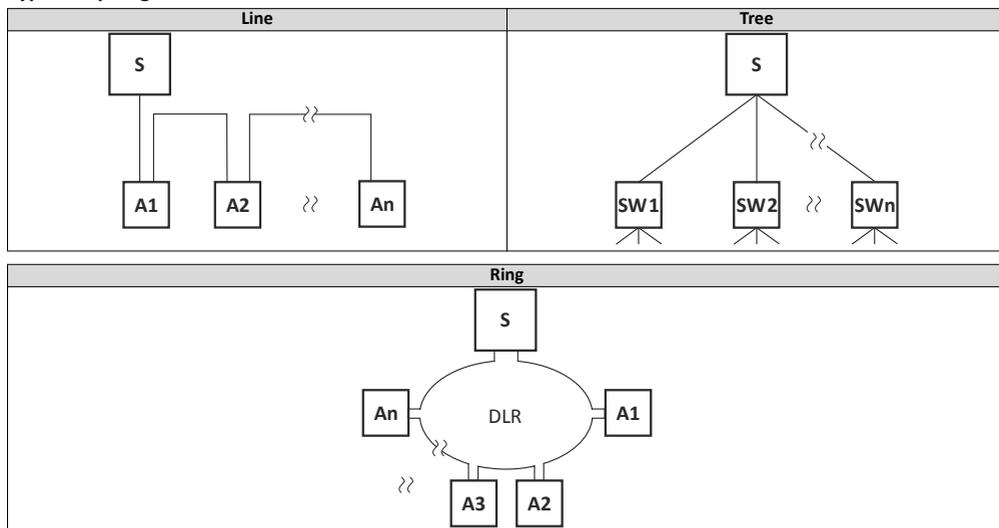
The rotary encoder switch allows you to set an EtherCAT identifier.



Setting	Identifier
0x00	Value from parameter
0x01 ... 0xFF	Switch position

EtherNet/IP

Typical topologies

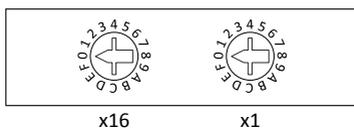


S Scanner
A Adapter

Bus-related information			
Name		EtherNet/IP	
Communication medium		Ethernet 10 Mbps, 100 Mbps, half duplex, full duplex	
Use		Connection of the inverter to an EtherNet/IP network	
Connection system		RJ45	
Status display		2 LEDs	
Connection designation		X266, X267	

Basic network settings

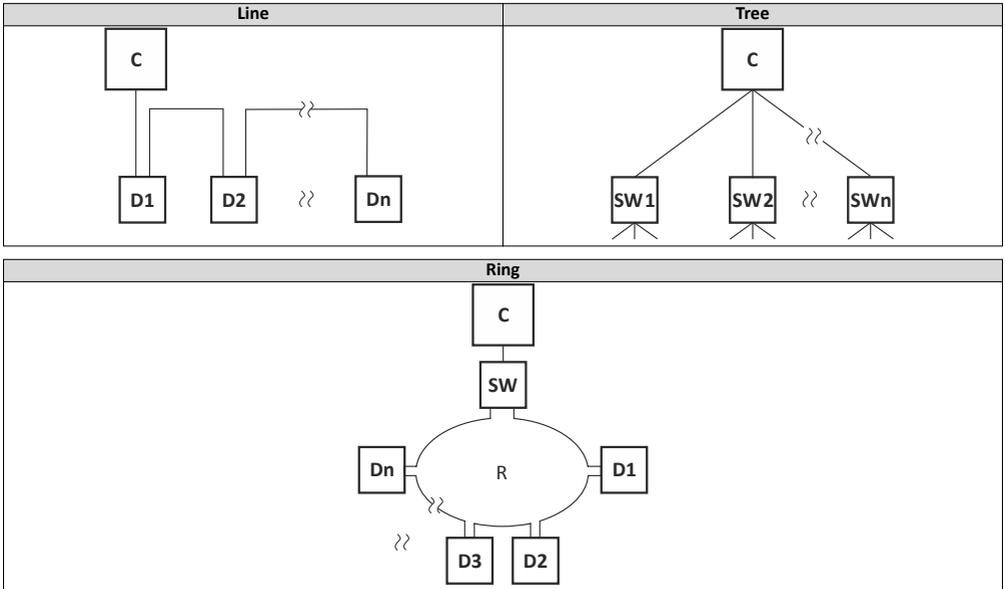
The rotary encoder switch allows you to set the last byte of the IP address.



Setting	Value of last byte	Resulting IP address
0x00	Value from parameter	Value from parameter
0x01 ... 0xFE	Switch position	192.168.124.<switch position>
0xFF	Default setting	192.168.124.16

PROFINET

Typical topologies



C I/O controller
 D I/O device
 SW Switch SCALANCE (MRP capable)
 R Redundant domain

Bus-related information	
Name	PROFINET RT
Communication medium	Ethernet 100 Mbps, full duplex
Use	Connection of the inverter to a PROFINET network
Connection system	RJ45
Status display	2 LEDs
Connection designation	X256, X257



The rotary encoder switch has no function.

Connection of the safety module

DANGER!

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

Possible consequences: Death or severe injuries

- ▶ Safety engineering systems may only be installed and commissioned by qualified and skilled personnel.
 - ▶ All control components (switches, relays, PLC, ...) and the control cabinet must comply with the requirements of the EN ISO 13849-1 and the EN ISO 13849-2.
 - ▶ Switches, relays with at least IP54 enclosure.
 - ▶ Control cabinet with at least IP54 enclosure.
 - ▶ It is essential to use insulated wire end ferrules for wiring.
 - ▶ All safety relevant cables outside the control cabinet must be protected, e.g. by means of a cable duct
 - ▶ Ensure that no short circuits can occur according to the specifications of the EN ISO 13849-2.
 - ▶ All further requirements and measures can be obtained from the EN ISO 13849-1 and the EN ISO 13849-2.
 - ▶ If an external force acts upon the drive axes, additional brakes are required. Please observe that hanging loads are subject to the force of gravity!
 - ▶ The user has to ensure that the inverter will only be used in its intended application within the specified environmental conditions. This is the only way to comply with the declared safety-related characteristics.
-

DANGER!

With the "Safe torque off" (STO) function, no "emergency stop" in terms -EN 60204-1 can be executed without additional measures. There is no isolation between the motor and inverter, no service switch or maintenance switch!

Possible consequence: death or severe injuries

- ▶ "Emergency stop" requires electrical isolation, e.g. by a central mains contactor.
-

DANGER!

Automatic restart if the request of the safety function is deactivated.

Possible consequences: Death or severe injuries

- ▶ You must provide external measures according to EN ISO 13849-1 which ensure that the drive only restarts after a confirmation.
-

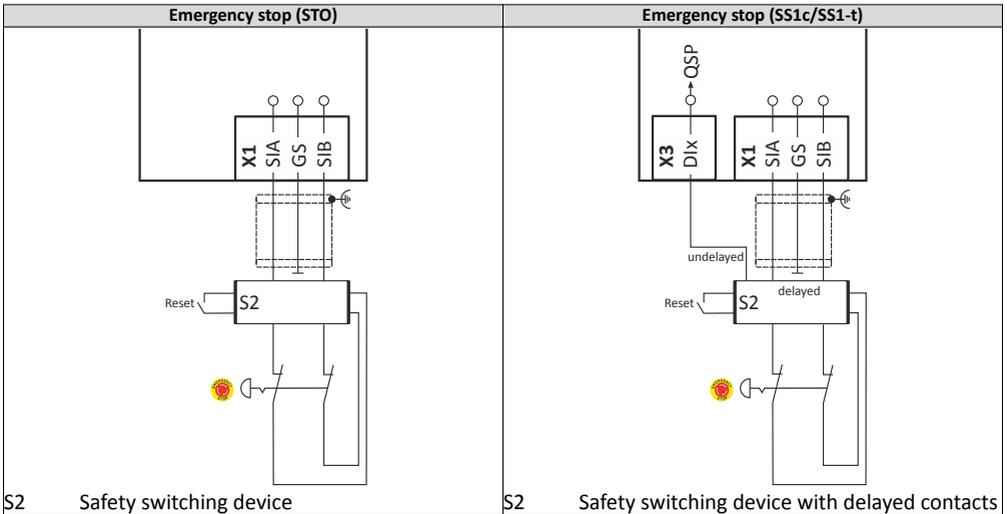
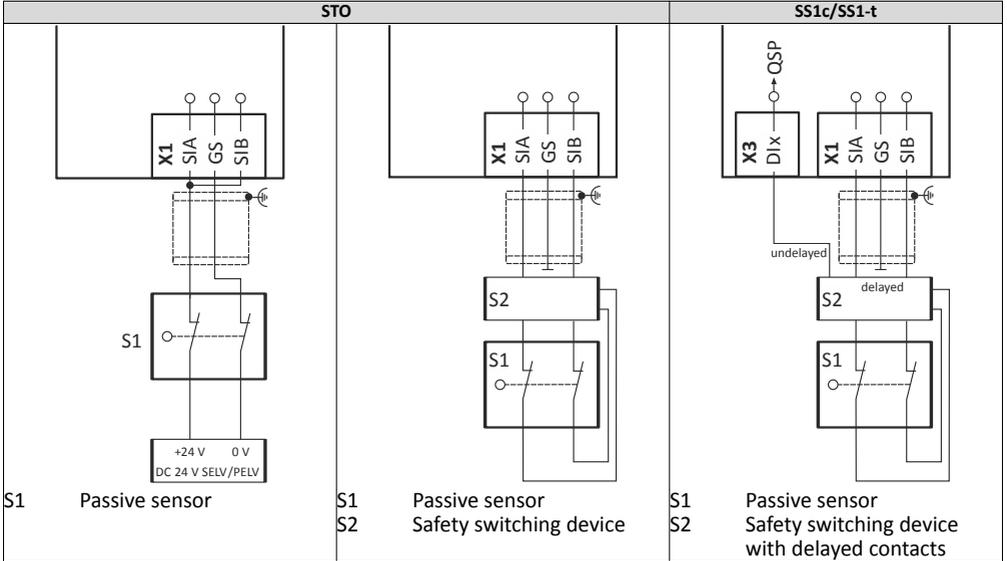
NOTICE

Overvoltage

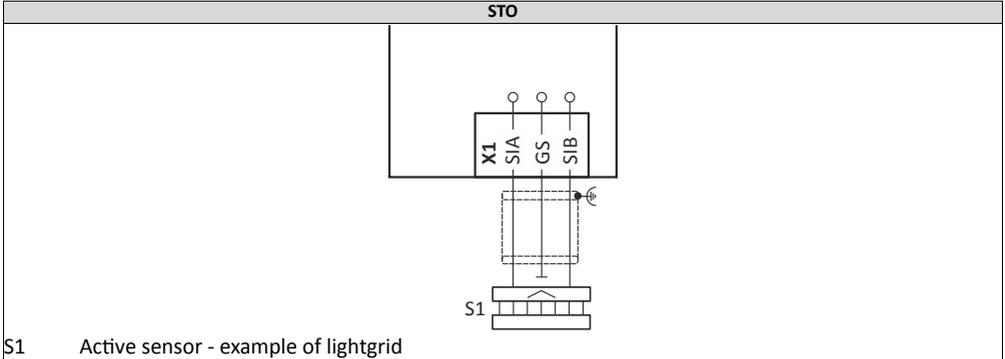
Destruction of the safety component

- ▶ The maximum voltage (maximum rated) at the safety inputs is 32 V DC. The user must make provisions to avoid that this voltage is exceeded.
-

Passive sensors



Active sensors



S1 Active sensor - example of lightgrid

X1	Specification	Unit	min.	typ.	max.
SIA, SIB	LOW signal	V	-3	0	+5
	HIGH signal	V	+15	+24	+30
	Running time	ms		3	
	Input current SIA	mA		10	14
	Input current SIB	mA		7	12
	Input peak current	mA		100	
	Tolerated test pulse	ms			1
	Switch-off time	ms		50	
	Permissible distance of the test pulses	ms	10		
GS	Reference potential for SIA and SIB				

Commissioning

Important notes

WARNING!

Incorrect wiring can cause unexpected states during the commissioning phase.

Possible consequence: death, severe injuries or damage to property

Check the following before switching on the mains voltage:

- ▶ Is the wiring complete and correct?
 - ▶ Are there no short circuits and earth faults?
 - ▶ Is the motor circuit configuration (star/delta) adapted to the output voltage of the inverter?
 - ▶ Is the motor connected in-phase (direction of rotation)?
 - ▶ Does the "emergency stop" function of the entire plant operate correctly?
-

WARNING!

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

Possible consequence: death, severe injuries or damage to property

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

Initial switch-on

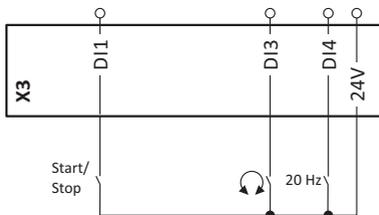
Target: achieve rotation of the motor connected to the inverter as quickly as possible.

Requirements:

- The connected motor matches the inverter in terms of power.
- The parameter settings comply with the delivery status (Lenze setting).

1. Preparation

1. Wiring of power terminals. (Chapter)
2. Wire digital inputs X3/DI1 (start/stop), X3/DI3 (reversal of rotation direction), and X3/DI4 (preset frequency setpoint 20 Hz).
3. Do not connect terminal X3/AI1 (analog setpoint selection) or connect it to GND.



2. Switch on mains and check readiness for operation

1. Switch on mains voltage.
2. Observe LED status displays "RDY" and "ERR" on the front of the inverter:
 - a) If the blue "RDY" LED is blinking and the red "ERR" LED is off, the inverter is ready for operation. The controller is inhibited.
You can now start the drive.
 - b) If the red "ERR" LED is lit permanently, a fault is pending.
Eliminate the fault before you carry on with the functional test.

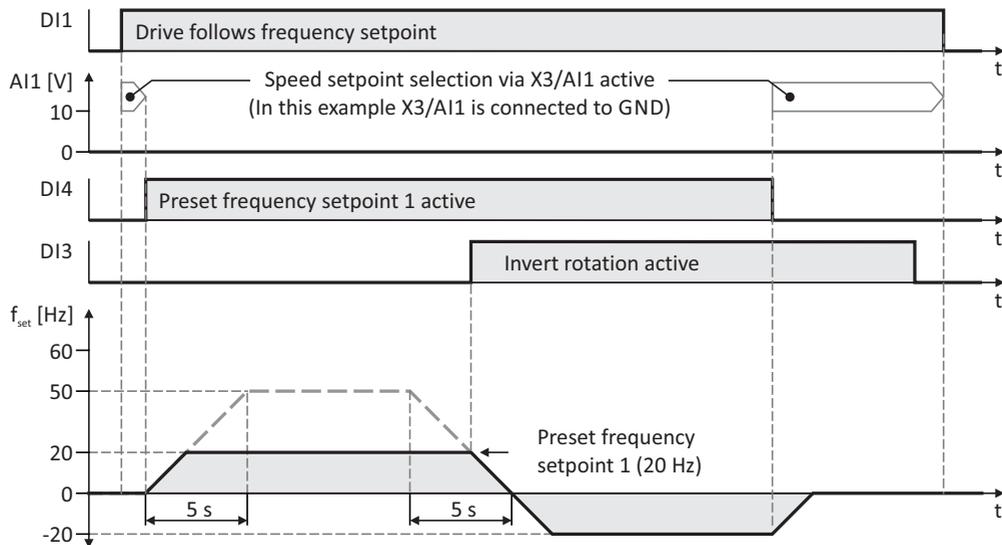
LED status displays

"RDY" LED (blue)	"ERR" LED (red)	Status/meaning
off	off	No supply voltage.
blinking (1 Hz)	off	Safe torque off (STO) active.
	blinking fast (4 Hz)	Safe torque off (STO) active. Warning active.
blinking (2 Hz)	off	Inverter inhibited.
	lit every 1.5 s for a short time	Inverter inhibited, no DC-bus voltage.
	blinking fast (4 Hz)	Inverter inhibited, warning active.
	on	Inverter inhibited, fault active.
on	off	Inverter enabled.
	blinking fast (4 Hz)	Inverter enabled, warning active.
	blinking (1 Hz)	Inverter enabled, quick stop as response to a fault active.

Carrying out the functional test

1. Start drive

1. Start inverter: X3/DI1 = HIGH.
 - a) If the inverter is equipped with an integrated safety system: X1/SIA = HIGH and X1/SIB = HIGH.
2. Activate preset frequency setpoint 1 (20 Hz) as speed setpoint: X3/DI4 = HIGH.
The drive rotates with 20 Hz.
3. Optional: activate the function for the reversal of rotation direction.
 - a) X3/DI3 = HIGH.
The drive rotates with 20 Hz in the opposite direction.
 - b) Deactivate the function for the reversal of rotation direction again: X3/DI3 = LOW.
Speed characteristic (example)



2. Stop drive

1. Deactivate preset frequency setpoint 1 again: X3/DI4 = LOW.
2. Stop inverter again: X3/DI1 = LOW.

The functional test is completed.



The commissioning process of the drive solution is described in a separate commissioning instruction which can be found on the Internet in our download area:
<http://www.lenze.com> → Download

Technical data

Standards and operating conditions

Conformities/approvals

Conformities		
CE	2014/35/EU	Low-Voltage Directive
	2014/30/EU	EMC Directive (reference: CE-typical drive system)
EAC	TR TC 004/2011	Eurasian conformity: safety of low voltage equipment
	TP TC 020/2011	Eurasian conformity: electromagnetic compatibility of technical means
RoHS 2	2011/65/EU	Restrictions for the use of specific hazardous materials in electric and electronic devices
Approvals		
UL	UL 61800-5-1	for USA and Canada (requirements of the CSA 22.2 No. 274)
		0.25 kW ... 45 kW (55 kW ... 75 kW in preparation)

Protection of persons and device protection

Degree of protection		
IP20	EN 60529	
Type 1	NEMA 250	Protection against contact
Open type		only in UL-approved systems
Insulation resistance		
Overvoltage category III	EN 61800-5-1	0 ... 2000 m a.m.s.l.
Overvoltage category II		above 2000 m a.m.s.l.
Control circuit isolation		
Safe mains isolation by double/reinforced insulation	EN 61800-5-1	
Protective measures against		
Short circuit		Earth fault strength depends on the operating status
earth fault		
overvoltage		
Motor stalling		
Motor overtemperature		
Leakage current		
> 3.5 mA AC, > 10 mA DC	EN 61800-5-1	Observe regulations and safety instructions!
Cyclic mains switching		
3 times per minute		Without restrictions
Starting current		
≤ 3 x rated mains current		

EMC data

Actuation on public supply systems		
Implement measures to limit the radio interference to be expected:	EN 61000-3-2	The machine or plant manufacturer is responsible for compliance with the requirements for the machine/plant!
< 1 kW: with mains choke		
> 1 kW at mains current ≤ 16 A: without additional measures		
Mains current > 16 A: with mains choke or mains filter, with dimensioning for rated power. R _{sce} ≥ 120 is to be met.	EN 61000-3-12	RSCE: short-circuit power ratio at the connection point of the machine/plant to the public network.
Noise emission		
Category C1	EN 61800-3	Type-dependent, for motor cable lengths see rated data
Category C2		
Noise immunity		
Meets requirement in compliance with	EN 61800-3	

Technical data

Standards and operating conditions

Motor connection

Motor connection

Requirements to the shielded motor cable		
Capacitance per unit length		
C-core-core/C-core-shield < 75/150 pF/m		≤ 2.5 mm ² / AWG 14
C-core-core/C-core-shield < 150/300 pF/m		≥ 4 mm ² / AWG 12
Electric strength		
U ₀ /U = 0.6/1.0 kV		U ₀ = r.m.s. value external conductor to PE
U ≥ 600 V	UL	U = r.m.s. value external conductor/external conductor

Environmental conditions

Energy efficiency		
Class IE2	EN 50598-2	Reference: Lenze setting (switching frequency 8 kHz variable)
Climate		
1K3 (-25 ... +60 °C)	EN 60721-3-1	Storage
2K3 (-25 ... +70 °C)	EN 60721-3-2	Transport
3K3 (-10 ... +55 °C)	EN 60721-3-3	operation
		Operation at a switching frequency of 2 or 4 kHz: above +45°C, reduce rated output current by 2.5 %/°C
		Operation at a switching frequency of 8 or 16 kHz: above +40°C, reduce rated output current by 2.5 %/°C
Site altitude		
0 ... 1000 m a.m.s.l.		
1000 ... 4000 m a.m.s.l.		Reduce rated output current by 5 %/1000 m
Pollution		
Degree of pollution 2	EN 61800-5-1	
Vibration resistance		
Transport		
2M2 (sine, shock)	EN 60721-3-2	
operation		
Amplitude 1 mm	Germanischer Lloyd	5 ... 13.2 Hz
Amplitude 0.075 mm	EN 61800-5-1	10 ... 57 Hz

Electrical supply conditions

Permissible mains systems		
TT		Voltage to earth/ground: max. 300 V
TN		
IT		Apply the measures described for IT systems!
		IT systems are not relevant for UL-approved systems

3-phase mains connection 230/240 V



I5xAExxD inverters do not have an integrated EMC filter in the AC mains supply.

In order to comply with the EMC requirements according to EN 61800–3, an external EMC filter according to IEC EN 60939 has to be used.

The user must prove that the EN 61800–3 requirements for conformity are fulfilled.

Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40 °C.

Inverter		I55AE240C	I55AE255C
Rated power	kW	4	5.5
Mains voltage range		3/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz	
Rated mains current			
without mains choke	A	20.6	28.8
with mains choke	A	15.7	21.9
Apparent output power	kVA	6.4	8.7
Output current			
2 kHz	A	16.5	23
4 kHz	A	16.5	23
8 kHz	A	16.5	23
16 kHz	A	11	15.3
Power loss			
4 kHz	W	115	175
8 kHz	W	130	195
at controller inhibit	W	6	6
Overcurrent cycle 180 s			
Max. output current	A	24.8	34.5
Overload time	s	60	60
Recovery time	s	120	120
Max. output current during the recovery time	A	12.4	17.3
Overcurrent cycle 15 s			
Max. output current	A	33	46
Overload time	s	3	3
Recovery time	s	12	12
Max. output current during the recovery time	A	12.4	17.3
Brake chopper			
Max. output current	A	26	26
Min. brake resistance	Ω	15	15
Max. motor cable length shielded			
without EMC category	m	50	
Weight	kg	2.1	

Technical data

3-phase mains connection 400 V

Rated data

3-phase mains connection 400 V

Rated data

The output currents apply to these operating conditions:

- At a switching frequency of 2 kHz or 4 kHz: Max. ambient temperature 45°C.
- At a switching frequency of 8 kHz or 16 kHz: Max. ambient temperature 40°C.

Inverter		I55AE230F	I55AE240F	I55AE255F	I55AE275F	I55AE311F	I55AE315F	I55AE318F
Rated power	kW	3	4	5.5	7.5	11	15	18.5
Mains voltage range		3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz						
Rated mains current								
without mains choke	A	9.6	12.5	17.2	20	28.4	38.7	48.4
with mains choke	A	6.9	9	12.4	15.7	22.3	28.8	36
Apparent output power	kVA	4.9	6.4	8.7	11	16	22	27
Output current								
2 kHz	A	7.3	9.5	13	16.5	23.5	32	40
4 kHz	A	7.3	9.5	13	16.5	23.5	32	40
8 kHz	A	7.3	9.5	13	16.5	23.5	32	40
16 kHz	A	4.9	6.3	8.7	11	15.7	21.3	26.6
Power loss								
4 kHz	W	85	110	145	185	260	360	450
8 kHz	W	110	140	190	240	340	460	570
at controller inhibit	W	6	6	6	6	6	18	18
Overcurrent cycle 180 s								
Max. output current	A	11	14.3	19.5	24.8	35	48	60
Overload time	s	60	60	60	60	60	60	60
Recovery time	s	120	120	120	120	120	120	120
Max. output current during the recovery time	A	5.5	7.1	9.8	12.4	17.6	24	30
Overcurrent cycle 15 s								
Max. output current	A	14.6	19	26	33	47	64	80
Overload time	s	3	3	3	3	3	3	3
Recovery time	s	12	12	12	12	12	12	12
Max. output current during the recovery time	A	5.5	7.1	9.8	12.4	17.6	24	30
Brake chopper								
Max. output current	A	9.5	16.6	16.6	29	29	43	52
Min. brake resistance	Ω	82	47	47	27	27	18	15
Max. motor cable length shielded								
without EMC category	m	50			100			
Category C2	m	20						
Weight	kg	2.3			3.7		10.3	

Inverter		I55AE322F
Rated power	kW	22
Mains voltage range		3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz
Rated mains current		
without mains choke	A	-
with mains choke	A	42
Apparent output power	kVA	32
Output current		
2 kHz	A	47
4 kHz	A	47
8 kHz	A	47
16 kHz	A	31.3
Power loss		
4 kHz	W	520
8 kHz	W	670
at controller inhibit	W	18
Overcurrent cycle 180 s		
Max. output current	A	71
Overload time	s	60
Recovery time	s	120
Max. output current during the recovery time	A	35
Overcurrent cycle 15 s		
Max. output current	A	94
Overload time	s	3
Recovery time	s	12
Max. output current during the recovery time	A	35
Brake chopper		
Max. output current	A	52
Min. brake resistance	Ω	15
Max. motor cable length shielded		
without EMC category	m	100
Category C2	m	20
Weight	kg	10.3

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