

i550 protec frequency inverter



0.37 ... 75 kW
0.5 ... 100 hp

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1 About this document

1.1 Document description

This document is intended for all persons who want to configure inverters with the products described.

This document assists you with the configuration and selection of your product. It contains information on mechanical and electrical installation, on product expansions, and on accessories.



1.2 Further documents

For certain tasks, information is available in further documents.

Document	Contents/topics
Mounting sheet	General safety instructions and important UL/CSA instructions, connection diagram and technical data. • The mounting sheet is included in the delivery of the product.
Operating instructions	Basic information on installing and commissioning the product.
Commissioning manual	Detailed information on setting and parameterizing the product.

More information

For certain tasks, information is available in other media.

Medium	Contents/topics
Engineering Tools	For commissioning
AKB articles	Additional technical information for users in the Application Knowledge Base
CAD data	Download in different formats from the EASY Product Finder
EPLAN macros	Project planning, documentation and management of projects for EPLAN P8.
Device descriptions	Standardized files for network configuration



Information and tools with regard to the Lenze products can be found on the Internet:
www.lenze.com → Downloads



1.3 Notations and conventions

Conventions are used in this document to distinguish between different types of information.

Numeric notation		
Decimal separator	Point	Generally shown as a decimal point. Example: 1 234.56
Warnings		
UL Warnings	UL	Are used in English and French.
UR warnings	UR	
Text		
Engineering Tools	" "	Software Example: "EASY Starter", "PLC Designer"
Icons		
Page reference		Reference to another page with additional information. Example:  16 = see page 16
Documentation reference		Reference to other documentation with additional information. Example:  EDKxxx = see documentation EDKxxx

Layout of the safety instructions

DANGER!

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

WARNING!

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

CAUTION!

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

NOTICE

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



2 Product information

2.1 Product description

The i550 protec frequency inverter uses the same tried-and-tested technology used in control cabinet inverters and only differs in terms of a higher degree of housing protection and an adapted design. If there is not enough space in the control cabinet or the inverter has to be mounted close to the motor in various machine modules, then this versatile and reliable device is the right solution. Thanks to the extension box, a disconnect switch and operating elements can be used.

The requirements of the Ecodesign Directive, standard EN IEC 61800-9-2, are met.

Application areas: Conveyor drives, traveling drives, winding drives, hoist drives, extruders, packaging machines, pumps, fans, ...

Overview						
Mains connection	1 x 120 V	1 x 230 V	3 x 230 V	3 x 400 V	3 x 480 V	3 x 600 V
Power range	0.37 ... 1.1 kW	0.37 ... 2.2 kW	0.37 ... 45 kW	0.37 ... 75 kW	0.37 ... 75 kW	0.75 ... 45 kW
Protection class	IP31, IP66		IP31, IP66 (IP55 from 30 kW)			IP31, IP66
Communication	CANopen, EtherCAT, EtherNet/IP, Modbus RTU, Modbus TCP, PROFINET					

Highlights

- The IP66 (UL Type 4X outdoor) protection against high pressure water jets from any direction and dust tightness allows for use in harsh environment applications
- Decentralized drive with IO-Link interface V1.1
- Integrated diagnostic interface (micro USB) for service purposes
- Versions with or without disconnect switch, with keypad or WLAN module for easy commissioning
- Optionally available with "Safe Torque Off (STO)" with SIL 3 (EN IEC 62061/EN IEC 61508) and Performance Level e (EN ISO 13849-1)
- Industry standard fieldbus network options: ▶ [Topologies / network](#)  17
- The "Light Duty" load characteristic enables a higher output current for inverters with IP31 (UL Type 1) protection: ▶ [Load characteristics](#)  14
- High internal functional range: ▶ [Overview](#)  22

Product information

Product description
Product variants



2.1.1 Product variants

The i550 protec frequency inverters are available in these product variants:

- i550 protec without extension box
- i550 protec with empty extension box
- i550 protec with extension box and disconnect switch

The variants with an extension box offer additional installation space for optional accessories, e.g. brake switches, rotary switches/potentiometers, or an additional terminal block.

► [Accessories for installation in inverters with Extension box](#) 21

The i550 protec with extension box and disconnect switch is ideal for a looping-through connection. ► [Mains installation with several devices](#) 242

For easy operation and diagnostics, the inverters can be equipped with a keypad or WLAN module. ► [Operation and diagnostics](#) 32

For fieldbus communication, the following network options are configurable:

- CANopen
- Modbus RTU
- I/O-Link
- EtherCAT
- EtherNet/IP
- Modbus TCP
- PROFINET

Degrees of protection

The version with protection class IP31 (UL Type 1) allows for use in less rough environments, i.e. protection against foreign particles ≥ 2.5 mm and dripping water.

The version with protection class IP66 (UL Type 4X outdoor) allows for use in rough environments, i.e. it is hoseproof and dust-tight.

In the IP31 version, the keypad or WLAN module can be replaced:



For reasons of space, this document uses the comparable NEMA ratings in some tables to differentiate between UL protection classes.

- UL Type 1 is comparable to NEMA 1
- UL Type 12/12K is comparable to NEMA 12/12K
- UL Type 4X outdoor is comparable to NEMA 4X



Product information

Product description
Product variants

Overview

Overview of mains connections with load characteristics and additional connection options for power supply:

Feature	i550 protec			
	Without extension box		With empty extension box	With extension box and disconnect switch
Product illustration				
Protection class EN	IP31	IP66 (IP55 from 30 kW)	IP66	IP66
Protection class UL/NEMA	Type 1	Type 4X outdoor (Type 12 from 40 hp)	Type 4X outdoor	Type 4X outdoor
Mains connection 1-phase, 120 V	●	●	●	●
"Heavy Duty" load characteristic	●	●	●	●
"Light Duty" load characteristic	-	-	-	-
DC bus connection	-	-	-	-
Brake resistor connection	●	●	●	●
Integrated RFI filter	-	-	-	-
Mains connection 1-phase, 230/240 V	-	●	●	●
"Heavy Duty" load characteristic	-	●	●	●
"Light Duty" load characteristic	-	-	-	-
DC bus connection	-	●	●	●
Brake resistor connection	-	●	●	●
Integrated RFI filter	-	●	●	●
Mains connection 1/3-phase 230/240 V	●	●	●	●
"Heavy Duty" load characteristic	●	●	●	●
"Light Duty" load characteristic	●	-	-	-
DC bus connection	●	●	●	●
Brake resistor connection	●	●	●	●
Integrated RFI filter	-	-	-	-
Mains connection 3-phase 230/240 V	●	●	●	●
"Heavy Duty" load characteristic	●	●	●	●
"Light Duty" load characteristic	●	-	-	-
DC bus connection	●	●	●	●
Brake resistor connection	●	●	●	●
Integrated RFI filter	-	-	-	-
Mains connection 3-phase 400/480 V	●	●	●	●
"Heavy Duty" load characteristic	●	●	●	●
"Light Duty" load characteristic	●	-	-	-
DC bus connection	●	●	●	●
Brake resistor connection	●	●	●	●
Integrated RFI filter	●	●	●	●
Mains connection 3-phase 600/480 V	●	●	●	●
"Heavy Duty" load characteristic	●	●	●	●
"Light Duty" load characteristic	●	-	-	-
DC bus connection	●	●	●	●
Brake resistor connection	●	●	●	●
Integrated RFI filter	-	-	-	-
● Available - Not available				

Product information

Product description
Load characteristics



2.1.2 Load characteristics

The i550 protec frequency inverters with protection class IP31 have two different load characteristics: "Heavy Duty" and "Light Duty".

The "Light Duty" load characteristic allows for a higher output current with restrictions regarding overload capacity, ambient temperature and switching frequency. This allows the motor required for the application to be driven by a less powerful inverter. Select the load characteristic according to the application.

	Heavy Duty	Light Duty
Characteristic	High dynamic requirements	Low dynamic requirements
Typical applications	Main tool drives, travelling drives, hoist drives, winders, forming drives and conveyors	Pumps, fans, general horizontal materials handling technology and line drives
Overload capacity	3 s/200 %, 60 s/150 % See technical data	Restricted See technical data



2.2 Features

2.2.1 Connections and interfaces

The i550 protec frequency inverters are outfitted with these interfaces:

- Standard I/O:
 - 5 x digital input
 - 1 x digital output
 - 2 x analog input
 - 1 x analog output
 - PNP/NPN logic
 - Cycle time: 1 ms
- Frequency input: 0 ... 100 kHz
- 1 x NO/NC relay (DC 24 V max. 2 A; AC 240 V max. 3 A)
- External 24 V supply and internal 24 V power supply unit
- Spring terminals
- Motor PTC input
- Diagnostic interface (micro USB)

Functional safety (optional)

- Safe Torque Off (STO)



Exceptions for 600 V devices:

- No PTC input X109
 - No safety module
-



2.2.2 Status LEDs

The "RDY" and "ERR" LED status displays on the front of the inverter provide some quick information about certain operating states.

"RDY" LED (blue)	"ERR" LED (red)	Status/meaning
off	off	No supply voltage
 on	 on	Initialisation (inverter is started)
 blinking (1 Hz)	off	Safe torque off (STO) active. The inverter has been disabled by the integrated functional safety. ▶ Safe torque off (STO)  236
	 blinking fast (4 Hz)	Safe torque off (STO) active, warning present. The inverter has been disabled by the integrated functional safety. ▶ Safe torque off (STO)  236
 blinking (2 Hz)	off	Inverter disabled
	 blinking fast (4 Hz)	Inverter disabled, warning present.
	 on	Inverter disabled, error active.
	 on briefly every 1.5 s	Inverter disabled, no DC-bus voltage.
 on	off	Inverter enabled. The motor rotates according to the specified setpoint or quick stop active.
	 blinking fast (4 Hz)	Inverter enabled, warning present. The motor rotates according to the specified setpoint or quick stop active.
	 blinking (1 Hz)	Inverter enabled, quick stop as response to fault active.
 Both LEDs are blinking in a rapidly alternating mode		Firmware update is active
 Both LEDs are blinking in a very rapidly synchronous mode		"Visual tracking" function is active

For the meaning of the status LEDs for the network, see the commissioning document.



2.2.3 Topologies / network

The inverters can be equipped with different fieldbus networks.

The topologies and protocols typical for the prevailing networks are supported.

Currently available networks:

	CANopen® is a communication protocol based on CAN. CANopen® is a registered community trademark of the CAN user organisation CiA® (CAN in Automation e. V.). Device descriptions for the download: EDS files for Lenze devices
	The Modbus protocol is an open communication protocol based on a client/server architecture and developed for the communication with programmable logic controllers. Further development is carried out by the international user organisation Modbus Organization, USA.
	IO-Link is the standardized IO technology (IEC 61131-9) for communication with sensors and actuators. Point-to-point communication is based on the 3-wire sensor and actuator connection without additional requirements concerning the cable material. IO-Link is a registered trademark. It may only be used by members of the IO-Link community and non-members that have purchased the corresponding license. Detailed information on the usage can be found in the IO-Link Community Rules at www.io-link.com.
	EtherCAT® (Ethernet for Controller and Automation Technology) is an Ethernet-based fieldbus system meeting the application profile for industrial real-time systems. EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany. Device descriptions for the download: XML/ESI files for Lenze devices
	EtherNet/IP™ (EtherNet Industrial Protocol) is an Ethernet-based fieldbus system that uses Common Industrial Protocol™ (CIP™) to exchange data. EtherNet/IP™ and Common Industrial Protocol™ (CIP™) are trademarks and patented technologies, licensed by the user organization ODVA (Open DeviceNet Vendor Association), Inc., USA. Device descriptions for the download: EDS files for Lenze devices
	PROFINET® (Process Field Network) is a real-time capable fieldbus system based on Ethernet. PROFINET® is a registered trademark and patented technology licensed by the PROFIBUS & PROFINET International (PI) user organisation. Device descriptions for the download: GSDML files for Lenze devices



2.2.4 Inverters without Extension box

The following figure gives an overview of the elements and connections on the devices.
Position, size and appearance of elements and connections may vary depending on the power and size of the devices.

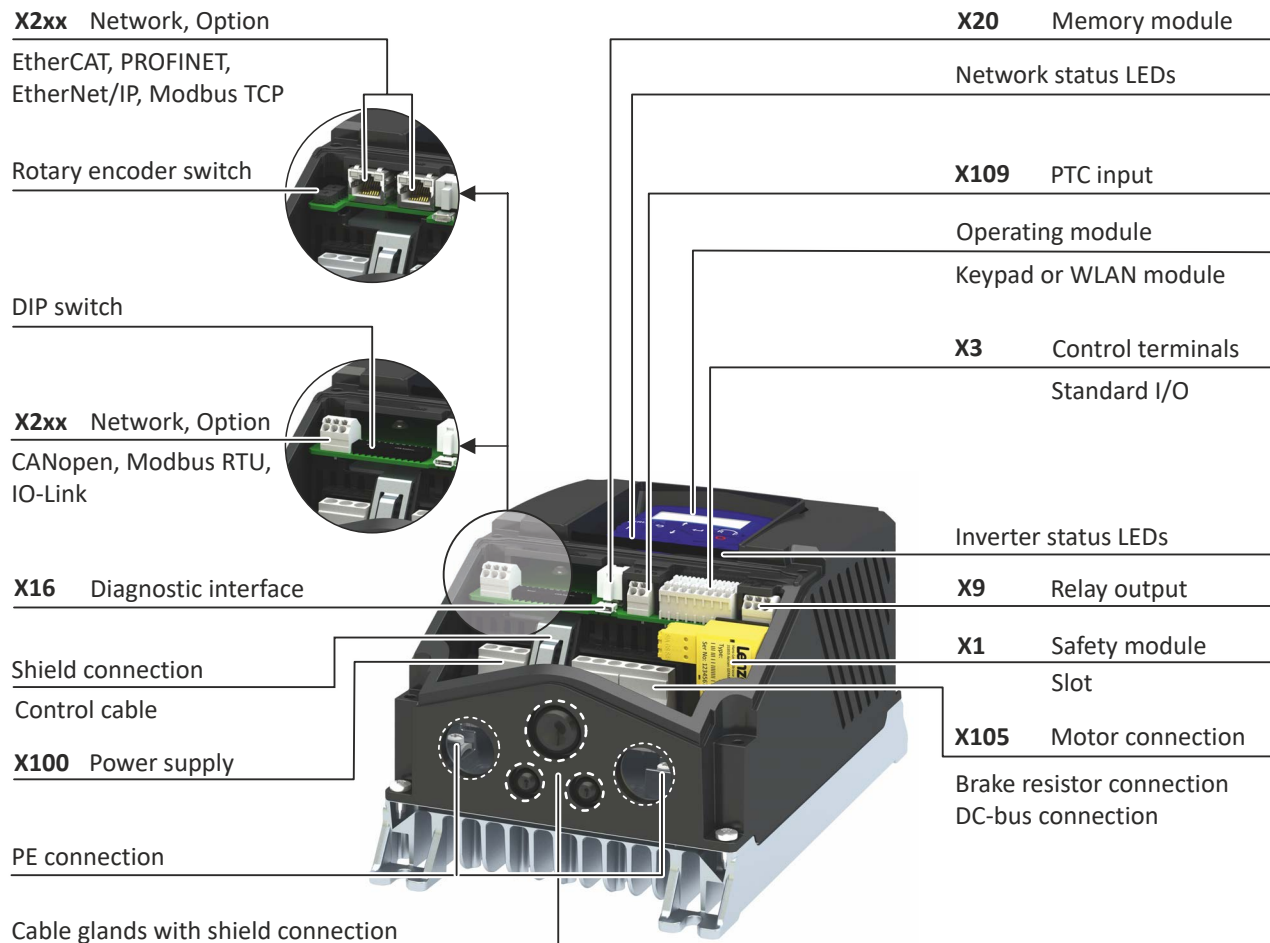


Fig. 1: Example for i550 protec without extension box



2.2.5 Inverters with Extension box empty

The following figure gives an overview of the elements and connections on the devices.
Position, size and appearance of elements and connections may vary depending on the power and size of the devices.

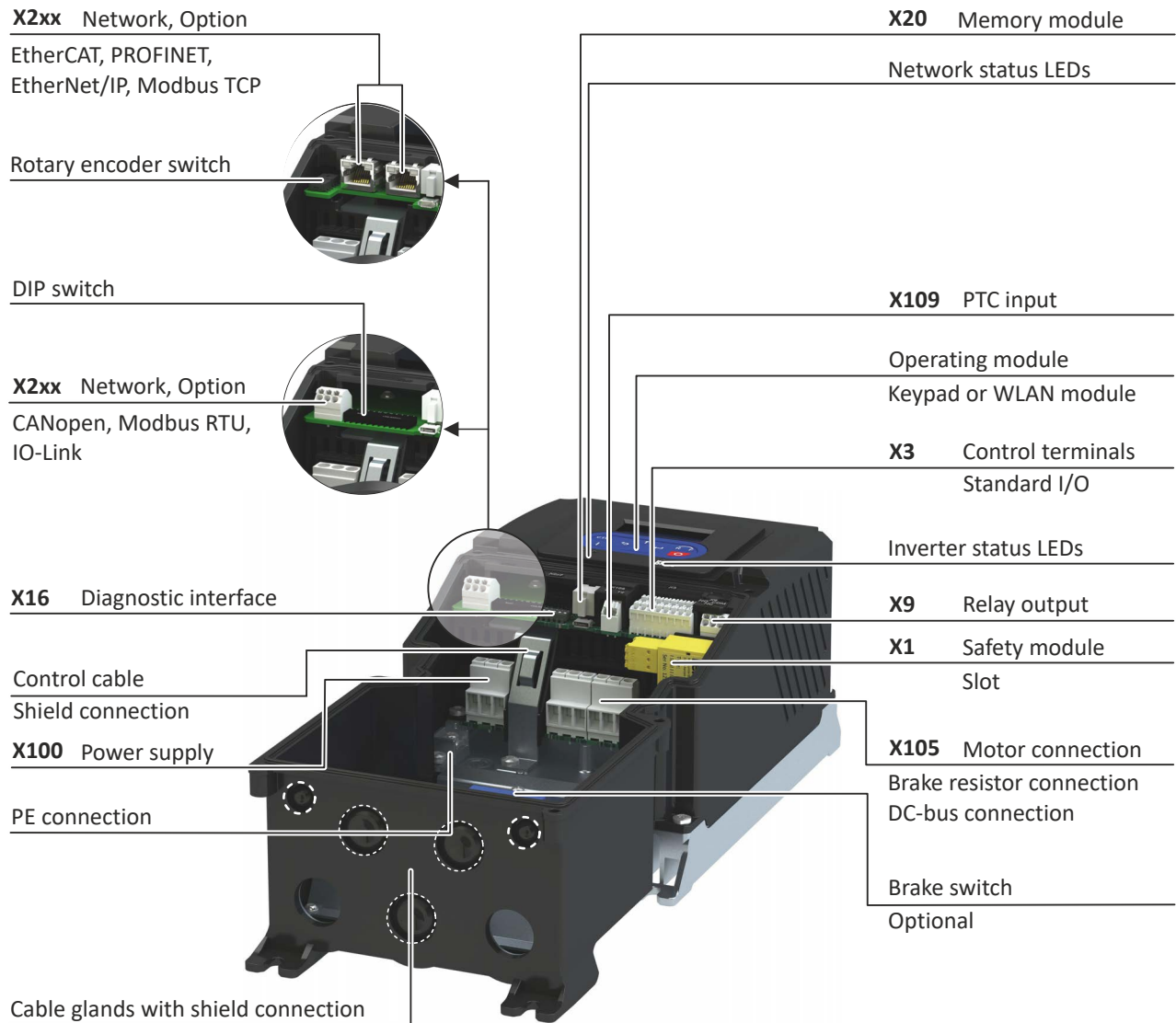


Fig. 2: Example for i550 protec with extension box



2.2.6 Inverters with Extension box and disconnect switch

The following figure gives an overview of the elements and connections on the devices.
Position, size and appearance of elements and connections may vary depending on the power and size of the devices.

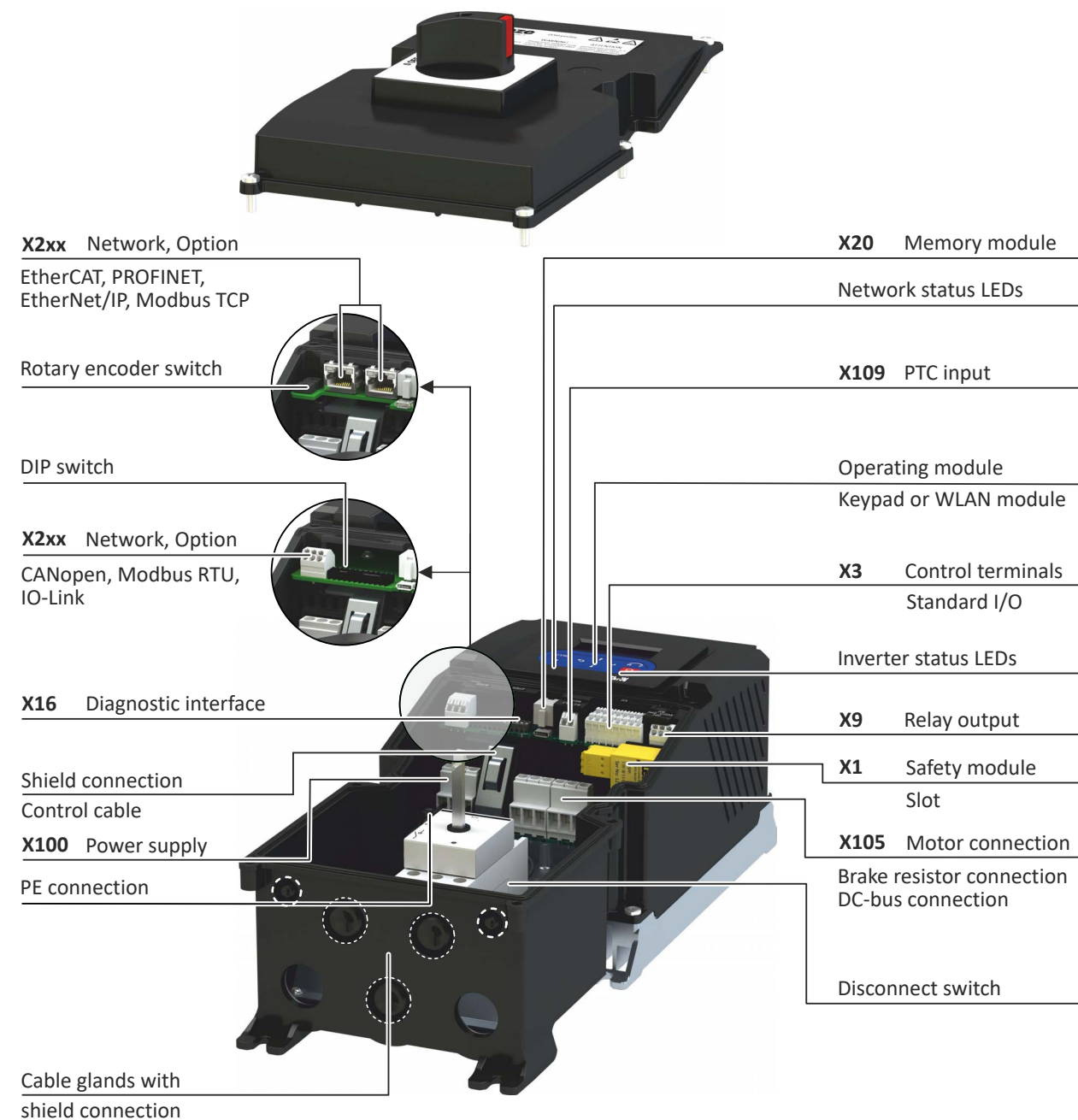


Fig. 3: Example for i550 protec with extension box and disconnect switch



2.2.7 Accessories for installation in inverters with Extension box

Overview of accessories which can be integrated into the i550 protec frequency inverter with extension box:

Accessories	i550 protec	
	With empty extension box	With extension box and disconnect switch
		
▶ Brake switches □ 252	•	-
▶ Switch/Potentiometer set □ 245 • 1 x potentiometer • 1 x rotary switch	•	•
▶ Terminal block set □ 253 • 1 x 6-way terminal • 1 x PE terminal • 1 x DIN rail • 2 x fixing screw	•	-
▶ DIN rail set □ 254 • 5 x DIN rail • 10 x fixing screw	•	-
• Installation possible - Installation impossible		



2.3 Functions

2.3.1 Overview

The functions of the frequency inverters i550 protec are tailored for an extensive range of applications.

Functions	
Motor control	Monitoring
V/f characteristic control linear/square-law (VFC plus)	Short circuit
V/f characteristic control (VFC closed loop)	Earth fault
Energy saving function (VFC-Eco)	Device overload (ixt)
Sensorless vector control (SLVC)	Motor overload (i ² xt)
Sensorless control for synchronous motors (SL-PSM/SLSM-PSM)	Mains phase failure
Servo control for asynchronous motors (SC-ASM)	Stall protection
Motor functions	Motor current limit
Flying restart circuit	Maximum torque
Slip compensation	Ultimate motor current
DC braking	Motor speed
Oscillation damping	Load loss detection
Skip frequencies	Motor temperature
Automatic identification of the motor data	Diagnostics
Braking energy management	Error history buffer
Holding brake control	Logbook
"Voltage add" function	LED status displays
Rational Energy Ride Through (RERT)	Keypad language selection German, English
Speed feedback (HTL encoder)	Network
Brake resistor control (brake chopper integrated)	CANopen
Frequency setpoint	Modbus RTU
DC-bus connection (400V devices)	IO-Link
Application functions	EtherCAT
Process controller	EtherNet/IP
Access protection	Modbus TCP
Process controller sleep mode and rinse function	PROFINET
Freely assignable favorite menu	Safety functions
Parameter change-over	Basic Safety - STO
S-shaped ramps for smooth acceleration	
Motor potentiometer	
Flexible I/O configuration	
Automatic restart	
OEM parameter set	
Complete control with 8-key keypad	
UPS operation	
Frequency output via digital output DO1	
Cascade function for pumps and fans	
The "Light Duty" load characteristic can be adjusted for selected inverters.	



2.3.2 Motor control types

The following table contains the possible control types with Lenze motors.

Motors	V/f characteristic control VFCplus	Sensorless vector control SLVC	ASM servo control SC ASM
Three-phase AC motors			
MD	•	•	•
MF	•	•	•
mH	•	•	•
m500	•	•	•

Lenze synchronous servo motors are not suitable for use with inverters, e.g. the types MCS, MCM or m850.

2.3.3 Motor functions

2.3.3.1 Motor setting range

Rated point 120 Hz



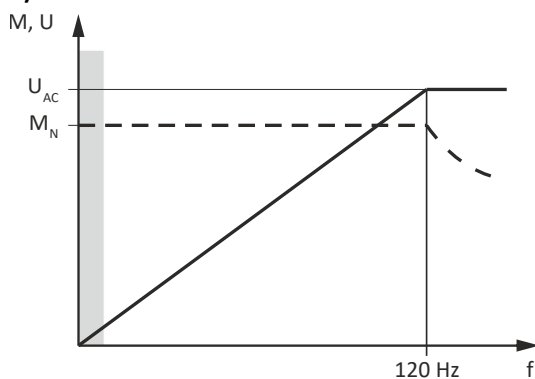
Only possible with Lenze MF motors.

The rated motor torque is available up to 120 Hz.

Compared to the 50-Hz operation, the setting range increases by 2.5 times.

Thus, a smaller motor can be selected at the same rated power.

V/f at 120 Hz



V Voltage
M Torque
f Frequency

V_{AC} Mains voltage
 M_N Rated torque

Product information

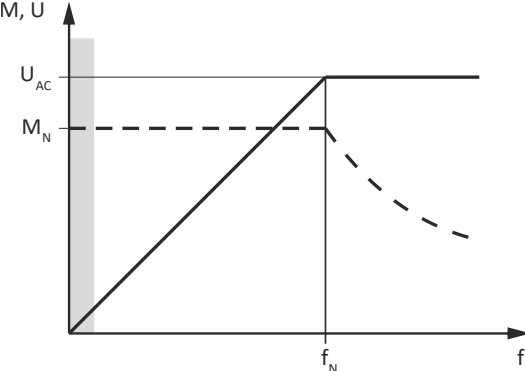
Functions
Motor functions
Motor setting range



Rated point 87 Hz

The rated motor torque is available up to 87 Hz.
Compared to the 50-Hz operation, the setting range increases by 1.74 times.
For this purpose, a motor with 230/400 V in a triangle is driven by a 400 V inverter.
The inverter must be dimensioned for a rated motor current of 230 V.

V/f at 87 Hz

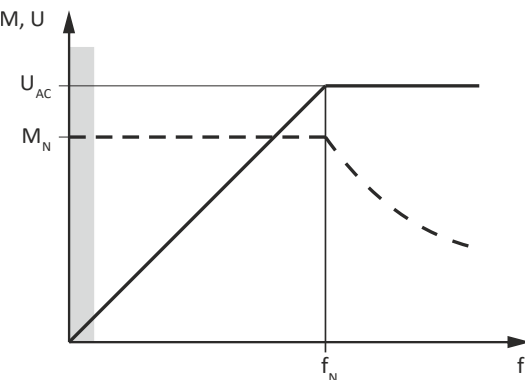


V	Voltage	U_{AC}	Mains voltage
M	Torque	M_{rated}	Rated torque
f	Frequency	f_{rated}	Rated frequency

Rated point 50 Hz

The rated motor torque is available up to 50 Hz.

V/f at 50 Hz



V	Voltage	U_{AC}	Mains voltage
M	Torque	M_{rated}	Rated torque
f	Frequency	f_{rated}	Rated frequency



2.4 Identification of the products

Product name

The product name is used when listing the technical data of the various product variants and for the assignment of accessories. You can find the assignment of product names to type codes in chapter "[Purchase order](#)". [260](#)

The product name contains:

- the designation of the product range – e.g. i5xx
- the type – "P" for "protec" = inverter for decentralized mounting locations
- its power rating – in kW for the load characteristic "Heavy Duty"
- the mains voltage class – e.g. 120 V, 230 V or 400 V
- the number of mains phases – the 1/3-phase inverters are labelled with "-2".

Device series	Design	Rated power		Rated mains voltage	Product name	Degree of protection	
		Light Duty	Heavy Duty				
		kW	kW				
i550	P	-	0.37	1 AC 120 V	i550-P0.37/120-1	IP31, NEMA 1	
			0.75			i550-P0.75/120-1	IP66, NEMA 4X
					1.1		i550-P1.1/120-1
						IP66, NEMA 4X	
						IP31, NEMA 1	
			IP66, NEMA 4X				

Device series	Design	Rated power		Rated mains voltage	Product name	Degree of protection
		Light Duty	Heavy Duty			
		kW	kW			
i550	P	-	0.37	1 AC 230/240 V	i550-P0.37/230-1	IP66, NEMA 4X
		0.55		1/3 AC 230/240 V	i550-P0.37/230-2	IP31, NEMA 1
		-	0.55	1 AC 230/240 V	i550-P0.55/230-1	IP66, NEMA 4X
		0.75		1/3 AC 230/240 V	i550-P0.55/230-2	IP31, NEMA 1
		-	0.75	1 AC 230/240 V	i550-P0.75/230-1	IP66, NEMA 4X
		1.1		1/3 AC 230/240 V	i550-P0.75/230-2	IP31, NEMA 1
		-	1.1	1 AC 230/240 V	i550-P1.1/230-1	IP66, NEMA 4X
		1.5		1/3 AC 230/240 V	i550-P1.1/230-2	IP31, NEMA 1
		-	1.5	1 AC 230/240 V	i550-P1.5/230-1	IP66, NEMA 4X
		2.2		1/3 AC 230/240 V	i550-P1.5/230-2	IP31, NEMA 1
		-	2.2	1 AC 230/240 V	i550-P2.2/230-1	IP66, NEMA 4X
		3		1/3 AC 230/240 V	i550-P2.2/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X

Product information

Identification of the products



Device series	Design	Rated power		Rated mains voltage	Product name	Degree of protection
		Light Duty	Heavy Duty			
		kW	kW			
i550	P	0.55	0.37	1/3 AC 230/240 V	i550-P0.37/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		0.75	0.55		i550-P0.55/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		1.1	0.75		i550-P0.75/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		1.5	1.1		i550-P1.1/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		2.2	1.5		i550-P1.5/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		3	2.2		i550-P2.2/230-2	IP31, NEMA 1
		-				IP66, NEMA 4X
		4	3	3 AC 230/240 V	i550-P3.0/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		5.5	4		i550-P4.0/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		7.5	5.5		i550-P5.5/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		11	7.5		i550-P7.5/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		-	11		i550-P11/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		18.5	15		i550-P15/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		22	18.5		i550-P18/230-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		-	30		i550-P30/230-3	IP55, NEMA 12
		-				



Product information

Identification of the products

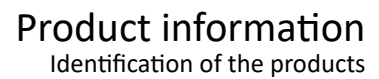
Device series	Design	Rated power		Rated mains voltage	Product name	Degree of protection
		Light Duty	Heavy Duty			
		kW	kW			
i550	P	0.55	0.37	3 AC 400/480 V	i550-P0.37/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		0.75	0.55		i550-P0.55/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		1.1	0.75		i550-P0.75/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		1.5	1.1		i550-P1.1/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		2.2	1.5		i550-P1.5/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		3	2.2		i550-P2.2/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		4	3		i550-P3.0/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		5.5	4		i550-P4.0/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		7.5	5.5		i550-P5.5/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		11	7.5		i550-P7.5/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		15	11		i550-P11/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		18.5	15		i550-P15/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		22	18.5		i550-P18/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		30	22		i550-P22/400-3	IP31, NEMA 1
		-				IP66, NEMA 4X
			30		IP55, NEMA 12	
			37			
			45			
			55			
			75			

Product information

Identification of the products



Device series	Design	Rated power		Rated mains voltage	Product name	Degree of protection
		Light Duty	Heavy Duty			
		kW	kW			
i550	P	1.1	0.75	3 AC 480/600 V	i550-P0.75/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		2.2	1.5		i550-P1.5/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		3	2.2		i550-P2.2/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		5.5	4		i550-P4.0/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		7.5	5.5		i550-P5.5/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		11	7.5		i550-P7.5/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		15	11		i550-P11/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		18.5	15		i550-P15/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		22	18.5		i550-P18/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		30	22		i550-P22/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
		37	30		i550-P30/600-3	IP31, NEMA 1
		-				IP66, NEMA 4X
			37		i550-P37/600-3	IP31, NEMA 1
						IP66, NEMA 4X
		45	i550-P45/600-3		IP31, NEMA 1	
					IP66, NEMA 4X	

[illegible]



2.5 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.sourceware.org/license-overview.html>



2.6 Information on EC-Dual-Use Regulation



By limiting the maximum output frequency to ± 599 Hz, the devices are not subject to the export restrictions of the EU Dual-Use Regulation 2021/821.



2.7 Ways of commissioning

There are three ways to commission the inverter quickly and easily.

Thanks to Lenze's engineering philosophy, the high functionality is still easy to grasp. Parameterization and commissioning are a breeze thanks to clear structure and simple dialogs, leading to the desired outcome quickly and reliably.

Keypad

If it's only a matter of setting a few key parameters such as acceleration and deceleration time, this can be done quickly on the keypad.



»EASY Starter«

If functions such as the holding brake control or sequencer need to be set, it's best to use the »EASY Starter« engineering tool.



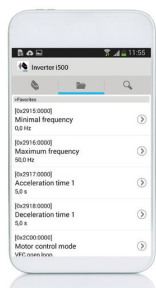
Connect your Engineering PC on which the software is installed to the diagnostic interface. For this purpose, a cable with micro B plug is required.

SMART Keypad App

The Lenze SMART Keypad App for Android or iOS allows you to diagnose and parameterize an inverter. A WLAN module on the inverter is required for communication.

- Ideal for the parameterization of simple applications such as a conveyor belt.
- Ideal for the diagnostics of the inverter.

The app can be found in the Google Play Store or in the Apple App Store.



Android



iOS



3 Safety instructions

3.1 Basic safety instructions

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

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never modify the product technically.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- The product can – depending on their degree of protection – have live, movable or rotating parts during or after operation. Surfaces can be hot.
- Observe the specifications of the corresponding documentation. This is the condition for safe and trouble-free operation and the achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of these persons:
 - They are familiar with installing, mounting, commissioning, and operating the product.
 - They have the corresponding qualifications for their work.
 - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

Please observe the specific safety information in the other sections!



3.2 Application as directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product is exclusively suitable for installation in control cabinets and, depending on the protection class and design, for wall and motor mounting.
- The product must only be actuated with motors that are suitable for the operation with inverters.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.

Additional information for the intended use in North America:

The cables must be installed in accordance with US National Electrical Code NFPA 70 or Canadian Electrical Code C22.1.

Use of explosion-protected motors

Explosion-protected motors that are not designed for use with an inverter lose their approval if they are used for variable speed applications. Due to the many areas of liability that may arise when handling these applications, the following policy statement applies:



Lenze inverters are sold without warranty of suitability for use with explosion-protected motors. Lenze assumes no responsibility for direct, incidental or consequential damages, costs or losses that may result from the use of AC inverters with explosion-protected motors. Buyer expressly agrees to assume any risk of loss, expense or damage that may result from such application.



3.3 Foreseeable misuse

Inverters are not to be operated with DC motors.



3.4 Handling

Transport, storage

Observe the notes regarding transport, storage and correct handling. Ensure proper handling and avoid mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts. Inverters contain electrostatically sensitive components which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since thereby your health could be endangered!

Installation

The technical data and supply conditions can be obtained from the nameplate and the documentation. They must be strictly observed.

The inverters must be installed and cooled according to the instructions given in the corresponding documentation. Observe the climatic conditions according to the technical data.

Recommendation: Protect the inverter from direct sunlight and other weather influences.

Electrical connection

When working on energized inverters, comply with the applicable national accident prevention regulations.

The electrical installation must be carried out according to the appropriate regulations (e. g. cable cross-sections, fuses, PE connection). Additional information can be obtained from the documentation.

The documentation contains information about installation according to EMC regulations (shielding, grounding, filters and cable routing). Please also observe this information for CE-marked inverters. The manufacturer of the system or machine is responsible for adherence to the limit values required in connection with EMC legislation.

Protection in the event of short circuit or earth fault

To ensure protection according to EN 61800-5-1 in the event of an electrical short circuit or earth fault (protection against electric shock, thermal hazards and fire), the following must be taken into account in the installation:

- Use fuses according to the technical data.
- The installation must meet the requirements of the IEC 60364.
- The continuity of all associated protective conductors and equipotential bonding conductors including all connection points must be ensured.
- If the maximum permissible switch-off time according to IEC 60364 is exceeded with a high system impedance (especially with TT mains) or a high loop impedance with the prescribed fuses, a residual current device (RCD) can be used. Alternatively, other protective measures can be used, e. g. isolation from the environment by means of double or reinforced insulation, or isolation from the supply system by using a transformer.
- If a residual current device (RCD) is connected upstream of the inverter for protection in the event of an earth fault, only type B is permitted for three-phase devices.

Operation

If necessary, systems including inverters must be equipped with additional monitoring and protection devices. Also comply with the safety regulations and provisions valid at the installation site.

After the inverter has been disconnected from the supply voltage, all live components and power terminals must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the inverter.

All protection covers and doors must be shut during operation.



You may adapt the inverters to your application by parameter setting within the limits available. For this, observe the notes in the documentation.

Safety functions

Certain inverter versions support safety functions (e. g. "safe torque off", formerly "safe standstill") according to the requirements of the EC Machinery Directive 2006/42/EC [UKCA: S.I. 2008/1597] . The notes on the integrated functional safety provided in this documentation must be observed.

The user must not modify inverters equipped with integrated functional safety.

- The safety module must not be removed.
- The user must not carry out any repairs on the safety module.
- The safety module is not a spare part.
- If the safety module is defective, the inverter must be replaced.

Maintenance and servicing

The inverters do not require any maintenance if the prescribed operating conditions are observed.

Disposal

In accordance with the current provisions, Lenze products and accessories have to be disposed of by means of professional recycling. Lenze products contain recyclable raw material such as metal, plastics and electronic components.



3.5 Residual hazards

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

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

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

Product

Observe the warning labels on the product!



Dangerous electrical voltage:

Before working on the product, make sure there is no voltage applied to the power terminals! After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!



Electrostatic sensitive devices:

Before working on the product, the staff must ensure to be free of electrostatic charge!



High leakage current:

Carry out fixed installation and PE connection in compliance with:
EN 61800-5-1 / EN 60204-1



Hot surface:

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

Degree of protection - protection of persons and device protection

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

Protection of persons

Before working on the inverter, check if no voltage is applied to the power terminals.

- Depending on the device, the power terminals X105 remain live for up to 20 minutes.
- The power terminals X100 and X105 remain live even when the motor is stopped.

Device protection

- The maximum test voltage for insulation tests between a control potential of 24 V and PE must not exceed 110 V DC (EN 61800-5-1).

Motor protection

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

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

Protection of the machine/system

Drives can reach dangerous overspeeds.

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

Motor

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



4 Information on project planning

4.1 Project planning process

4.1.1 Dimensioning

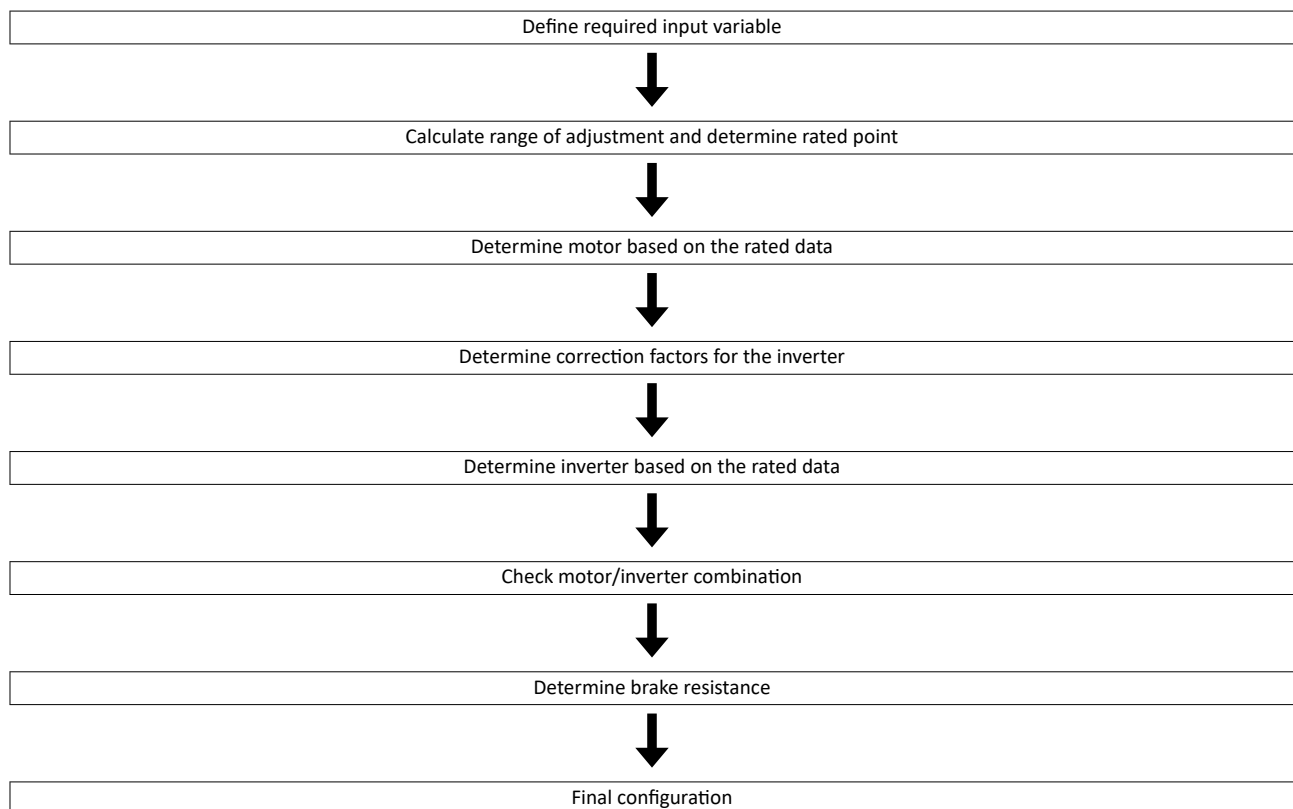
3 methods for dimensioning

Fast: Selection of the inverter based on the motor data of a 4-pole asynchronous motor.

Detailed: In order to optimize the selection of the inverter and all drive components, it is worthwhile to execute the detailed system dimensioning based on the physical requirements of the application. For this purpose, Lenze provides the Drive Solution Designer (DSD) design program.

Manual: The following chapter guides you step by step through the selection of a drive system.

Workflow of a configuration process



Define required input variables

Operating mode			S1 or S6
Max. load torque	$M_{L,max}$	Nm	
Max. load speed	$n_{L,max}$	rpm	
Min. load speed	$n_{L,min}$	rpm	
Site altitude	H	m	
Ambient temperature (inverter)	T_U	°C	



Calculate range of adjustment and determine rated point

	Calculation	
Setting range	$V = \frac{n_{L,max}}{n_{L,min}}$	
	Setting range	Rated point
Motor with integral fan	≤ 2.50 (20 - 50 Hz)	50 Hz
	≤ 4.35 (20 - 87Hz)	87 Hz
	≤ 6 (20 - 120Hz)	120 Hz
Motor with blower	≤ 10.0 (5 - 50 Hz)	50 Hz
Motor with integral fan (reduced torque)	≤ 17.4 (5 - 87Hz)	87 Hz
	≤ 24 (5 - 120Hz)	120 Hz

Determine motor based on the rated data

			Check
Rated torque			
Operating mode S1	M_{rated}	Nm	$M_N \geq \frac{M_{L,max}}{T_{H,Mot} \times T_{U,Mot}}$
Operating mode S6	M_{rated}	Nm	$M_N \geq \frac{M_{L,max}}{2 \times T_{H,Mot} \times T_{U,Mot}}$
Rated speed	n_{rated}	rpm	$n_{rated} \geq n_{L,max}$ $\frac{n_n}{V} \leq n_{L,min}$

			Note
Rated torque	M_{rated}	Nm	→ Rated motor data
Rated speed	n_{rated}	rpm	
Rated point at		Hz	→ setting range
Power factor	$\cos \phi$		→ Rated motor data
Rated current	$I_{N,MOT}$	A	
Rated power	P_{rated}	kW	
Correction factor - site altitude	$T_{H,MOT}$		→ Technical motor data
Correction factor - ambient temperature	$T_{U,MOT}$		
Select motor			

Correction factors for the inverter

Site altitude Amsl		H				
		[m]	≤ 1000	≤ 2000	≤ 3000	≤ 4000
k _{H,INV}			1.00	0.95	0.90	0.85
Temperature in the control cabinet		T _U				
		[°C]	≤ 40	≤ 45	≤ 50	≤ 55
Switching frequency						
2 or 4 kHz	k _{TU,INV}		1.00	1.00	0.875	0.750
8 or 16 kHz			1.00	0.875	0.750	0.625
Switching frequency with the "Light Duty" load characteristic						
2 or 4 kHz	k _{TU,INV}		1.00	0.875	0.750	-
8 or 16 kHz			-	-	-	-



Determine the inverter based on the rated data

			Check
Output current			
Continuous operation	I_{out}	A	$I_{out} \geq I_{N,Mot} / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 15 s	I_{out}	A	$I_{out} \geq I_{N,Mot} \times 2 / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 180 s	I_{out}	A	$I_{out} \geq I_{N,Mot} \times 1.5 / (k_{H,INV} \times k_{TU,INV})$

Determine the inverter based on the rated data for the "Light Duty" load characteristic

			Check
Output current			
Continuous operation	I_{out}	A	$I_{out} \geq I_{N,Mot} / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 15 s	I_{out}	A	$I_{out} \geq I_{N,Mot} \times 1.65 / (k_{H,INV} \times k_{TU,INV})$
Overcurrent operation cycle 180 s	I_{out}	A	$I_{out} \geq I_{N,Mot} \times 1.25 / (k_{H,INV} \times k_{TU,INV})$

Check motor/inverter combination

			Calculation
Motor torque	M	Nm	$M = \sqrt{\left(\frac{I_{out,INV}}{I_{N,MOT}}\right)^2 - (1 - \cos \varphi^2)} \times \frac{M_N}{\cos \varphi}$
			Check
Inverter overload capacity			$\frac{M_{L,max}}{M} \leq 1.5$

Braking operation without additional measures

To decelerate small masses, the "DC injection brake DCB" function can be parameterised. DC-injection braking enables a quick deceleration of the drive to standstill without the need for an external brake resistor.

- A code can be used to select the braking current.
- The maximum braking torque to be realised by the DC braking current amounts to approx. 20 ... 30 % of the rated motor torque. It is lower compared to braking action in generator mode with external brake resistor.
- Automatic DC-injection braking (Auto-DCB) improves the starting performance of the motor when the operation mode without speed feedback is used.

Braking operation with external brake resistor

To decelerate greater moments of inertia or with a longer operation in generator mode an external brake resistor is required. It converts braking energy into heat.

The brake resistor is connected if the DC-bus voltage exceeds the switching threshold. This prevents the controller from setting pulse inhibit through the "Overvoltage" fault and the drive from coasting down. The external brake resistor serves to control the braking process at any time.

The brake chopper integrated in the controller connects the external brake resistor.



Determine brake resistance

			Application	
			With active load	With passive load
Rated power	P_{rated}	kW	$P_N \geq P_{max} \times \eta_e \times \eta_m \times \frac{t_1}{t_z}$	$P_N \geq \frac{P_{max} \times \eta_e \times \eta_m}{2} \times \frac{t_1}{t_z}$
Thermal capacity	C_{th}	kWs	$C_{th} \geq P_{max} \times \eta_e \times \eta_m \times t_1$	$C_{th} \geq \frac{P_{max} \times \eta_e \times \eta_m}{2} \times t_1$
Rated resistance	R_{rated}	Ω	$R_N \geq \frac{U_{DC}^2}{P_{max} \times \eta_e \times \eta_m}$	

Active load	Can start to move independent of the drive (e.g. unwinder)
Passive load	Can stop independent of the drive (e.g. horizontal travelling drives, centrifuges, fans)
U_{DC} [V]	Switching threshold - brake chopper
P_{max} [W]	Maximum occurring braking power
η_e	Electrical efficiency
η_m	Mechanical efficiency
t_1 [s]	Braking time
t_z [s]	Cycle time = time between two successive braking processes (t_1 + dead time)

Final configuration

Product extensions and accessories can be found here:

► [Product extensions](#) 217

► [Accessories](#) 240

4.1.2 Operation in motor and generator mode

The energy analysis differs between operation in motor mode and generator mode.

During operation in motor mode, the energy flows from the supplying mains via the inverter to the motor which converts electrical energy into mechanical energy (e. g. for lifting a load).

During operation in generator mode, the energy flows back from the motor to the inverter. The motor converts the mechanical energy into electrical energy - it acts as a generator (e. g. when lowering a load).

The drive brakes the load in a controlled manner.

The energy recovery causes a rise in the DC-bus voltage. If this voltage exceeds an upper limit, the output stage of the inverter will be blocked to prevent the device from being destroyed.

The drive coasts until the DC-bus voltage reaches the permissible value range again.

In order that the excessive energy can be dissipated, a brake resistor or a regenerative module is required.



4.1.3 Overcurrent operation

The inverters can be driven at higher amperages beyond the rated current if the duration of this overcurrent operation is time limited.

Two utilisation cycles of 15 s and 180 s are defined. Within these utilisation cycles, an overcurrent is possible for a certain time if afterwards an accordingly long recovery phase takes place.

Cycle 15 s

During this operation, the inverter may be loaded for 3 s with up to 200 % of the rated current if afterwards a recovery time of 12 s with max. 75 % of the rated current is observed. A cycle corresponds to 15 s.

Cycle 180 s

During this operation, the inverter may be loaded for 60 s with up to 150 % of the rated current if afterwards a recovery time of 120 s with max. 75 % of the rated current is observed. A cycle corresponds to 180 s.

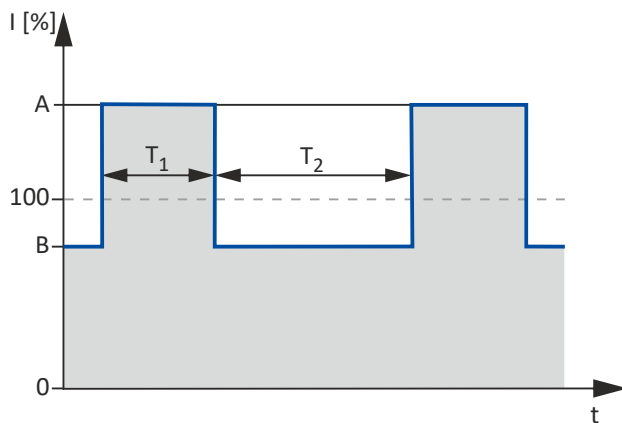
The monitoring of the device utilization (Ixt) triggers an error if the utilization value exceeds a threshold of 100 %.



The maximum output currents correspond to the switching frequencies and the overload behaviour of the inverters are given in the rated data.

In case of rotating frequencies < 10 Hz, the time-related overload behaviour may be reduced.

The graphics shows a cycle. The basic conditions given in the table (graphics field highlighted in grey) have to be complied with in order that the inverter will not be overloaded. Both cycles can be combined with each other.



Load characteristic	Cycle	Max. output current	Max. overload time	Max. output current during the recovery time	Min. recovery time
		A	T ₁	B	T ₂
	s	%	s	%	s
Heavy Duty	15	200	3	75	12
	180	150	60	75	120
Light Duty	15	166	3	62.5	12
	180	125	60	62.5	120



4.2 Decentralized topologies

In particular, the frequency inverters i550 protec support decentralized concepts for machines and electrical installations.

Advantages

- Saves installation costs
 - Less expensive shielded motor cables, no EMC collective filters
 - Fewer circuit breakers, protection devices and mains cables
 - Fewer I/O gateways and cabling thanks to decentralized I/Os
 - Smaller control cabinet
- New solutions when less space is available
- Combination of functionally independent machine modules
- Less cooling units, higher efficiency

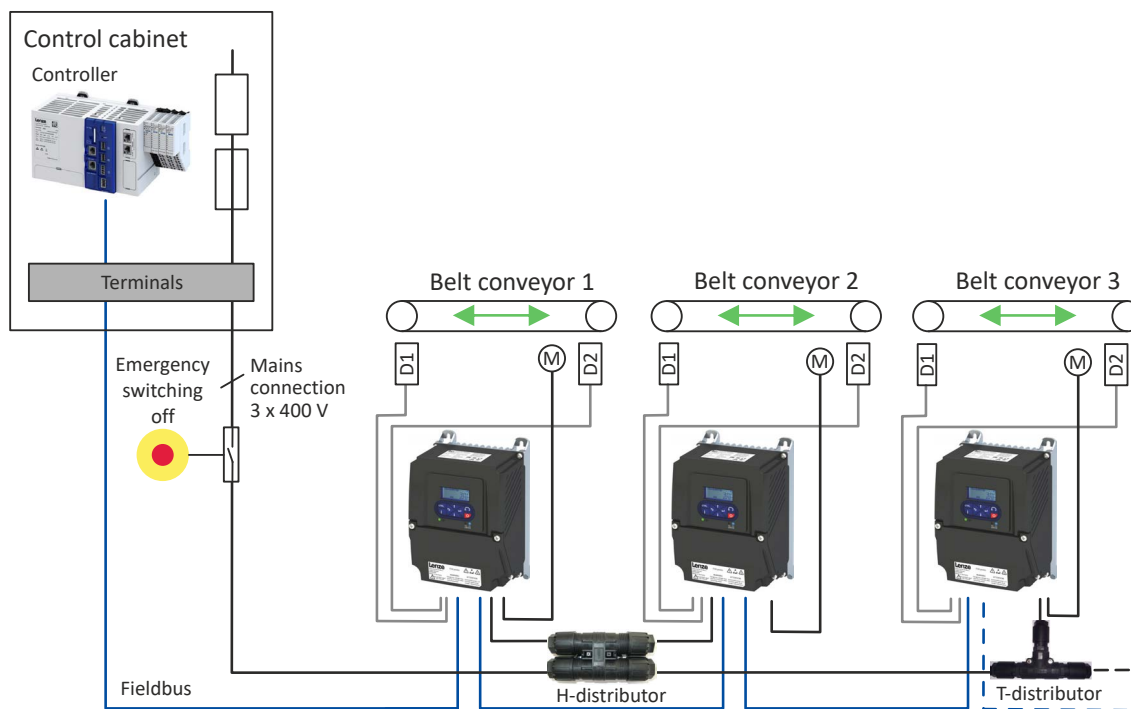


Fig. 4: Sample configuration



Extended by functional safety

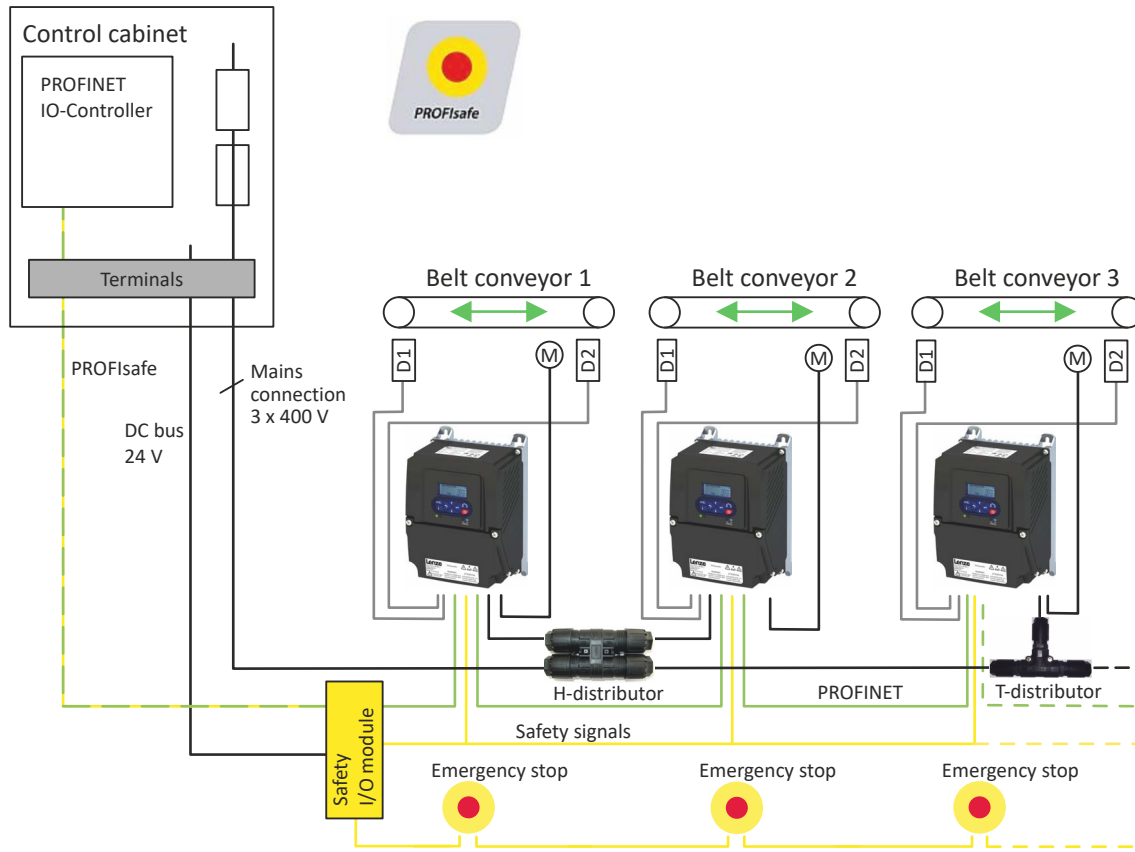


Fig. 5: Example setup with PROFIsafe solution

4.2.1 Cables

Requirements

- The cables used must correspond to the requirements at the location (e. g. EN 60204-1, UL).
- The cable cross-section must be dimensioned for the assigned fusing. Observe national and regional regulations.
- You must observe the regulations for minimum cross-sections of PE conductors. The cross-section of the PE conductor must be at least as large as the cross-section of the power connections.



5 Mechanical installation

5.1 Important notes

CAUTION!

Sharp edges or residual burrs

Possible consequences: Cut injuries

- Wear suitable protective gloves against mechanical risks during mounting (PPE category II in accordance with EN 388).
-

Measures for cooling during operation

- Ensure unimpeded ventilation of cooling air and outlet of exhaust air.



5.2 Preparation

Mounting position

- Vertical alignment - do not interfere with free air flow from bottom to top of heatsink fins.
Other mounting positions require a reduction of the rated output values by approx. 1/3.
Your Lenze contact will help you with a precise assessment.

Free spaces

- Maintain the specified free spaces above and below to the other installations.
- Several i5xx protec frequency inverters can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

Mechanical fastening

- The mounting location and material must ensure a durable mechanical connection.
- Do not mount onto DIN rails!
- In case of continuous vibrations or shocks use vibration dampers.

How to mount the inverters at a mounting location.

Required:

- Tool for drilling and thread cutting
 - Screwdriver
 - Screw and washer assemblies or hexagon socket screws with washers.
1. Prepare mounting area with corresponding threaded holes.
 2. Fit screws and washers (if applicable).
 3. Do not yet tighten the screws.
 4. Mount the inverter on the prepared mounting area via keyhole suspension.
 5. Only tighten the screws hand-tight.
 6. Pre-assemble other devices if necessary.
 - a) Adjust the devices.
 - b) Screw the devices onto the mounting area.

The inverters are mounted on the mounting area. You can begin with the wiring.

Screw and washer assemblies or hexagon socket screws with washers are recommended..

M5 x ≥ 10 mm for devices up to and including 2.2 kW

M5 x ≥ 12 mm for devices up to and including 11 kW

M6 x ≥ 16 mm for devices up to and including 22 kW

M8 x ≥ 16 mm for devices up to and including 110 kW

Further data and information

► [Decentralized topologies](#) 44

► [Dimensions](#) 181



6 Electrical installation

6.1 Important notes

DANGER!

Dangerous electrical voltage

During operation and up to 20 minutes after power-off, hazardous electrical voltages may be present at the connections of the product.

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

Possible consequences: Death or serious injury from electric shock

Protective measures

- Any work on the product must only be carried out in a deenergized state.
- Check that no voltage is present!
- After switching off the mains voltage, observe the signs on the product.
- After switching off, wait until the drive comes to a standstill.
- Implement the measures required by EN 61800-5-1 or EN 60204-1, i.e. fixed installation and standard-compliant PE connection.

WARNING!

Dangerous electrical voltage

Device error causes an overvoltage in the system.

- For a voltage supply with DC 24 V ($\pm 20 \%$), use only a safely separated power supply unit according to the valid SELV/PELV requirements.

NOTICE

No protection against excessively high mains voltage

The mains input is not fused internally.

Possible consequences: Destruction of the product in the event of excessively high mains voltage.

- Take note of the maximum permissible mains voltage.
- On the mains supply side, use fuses to adequately protect the product against mains fluctuations and voltage peaks.

NOTICE

Overvoltage at devices with 230-V mains connection and no. of phases = 1 or 1/3

An impermissible overvoltage may occur if the central supply of the N conductor is interrupted if the devices are connected to a TN three-phase system.

Possible consequences: Destruction of the device

- Provide for the use of isolating transformers.

NOTICE

The product contains electrostatic sensitive devices.

Possible consequences: Destruction of the device

- Before working in the connection area, the personnel must be free of electrostatic charge.



NOTICE

Mounting not according to protection class

Possible consequences: Material damage due to penetrating 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.
- ▶ The cover must be screwed on with the specified tightening torque.



Always use cable glands with long thread.



When implementing machines and systems for the use in the UL/CSA scope, you have to observe the relevant special notes.

These notes are marked with "UL marking".

6.1.1 Automatic disconnection of the supply according to IEC/HD 60364-4-41

IEC/HD 60364-4-41 (DIN VDE 0100-410; VDE 0100-410) requires fault protection for the output circuits.

Preconditions

Installation in TN network and TT network

- The inverters are installed according to the specifications in the documentation.
- The system complies with the requirements of the applicable standards of the series IEC/HD 60364 (DIN VDE 0100; VDE 0100).
- The continuity of all associated PE conductors and equipotential bonding conductors is ensured including the bonding and connection points.
- Additional measures in the TT network:
 - Use of earth-leakage circuit breakers or the additional protective grounding according to IEC 60361-4-41, section 415.

Under these conditions, the inverters meet the protective measure "automatic disconnection of the supply" according to IEC/HD 60364-4-41 (DIN VDE 0100-410; VDE 0100-410):2007-06, section 411.3.2.5.

This means that in the event of a short circuit with negligible impedance to a protective conductor or to earth, the inverters reduce the output voltage within the time required in table 41.1 of IEC/HD 60364-4-41 (DIN VDE 0100-410; VDE 0100-410):2007-06.



6.2 Preparation

Open and close screw connection of the cover



For wiring purposes, loosen the 4 screws in the cover using a Phillips head screwdriver. After completing the wiring, close the cover again using the 4 screws to ensure that the degree of protection is maintained.



Cable glands and wire range

Bore holes are provided for mounting the cable glands for the mains cable and motor cable.

Further positions with centering aid for cable glands for control cables are prepared. If necessary, these must be drilled out with a step drill.

The cable gland of the motor cable must be EMC-compatible. The housing wall for the cable gland is reinforced and well conductive to avoid EMC interference.

Bore holes and positions for cable glands

Power range	i550 protec without extension box		i550 protec with extension box	
	Cable glands	Conduit hubs	Cable glands	Conduit hubs
0.75 ... 2.2 kW	2 x M20 (bore hole) 1 x M20 (position) 2 x M12 (position)	2 x ½" conduit hub (bore hole) 1 x ½" conduit hub (position) 2 x M12 (position)	2 x M20 (bore hole) 3 x M20 (position) 2 x M12 (position)	2 x ½" conduit hub (bore hole) 3 x ½" conduit hub (position) 2 x M12 (position)
3 ... 11 kW	2 x M32 (bore hole) 1 x M20 (position) 2 x M12 (position)	2 x 1" conduit hub (bore hole) 1 x ½" conduit hub (position) 2 x M12 (position)	2 x M32 (bore hole) 3 x M20 (position) 2 x M12 (position)	2 x 1" conduit hub (bore hole) 3 x ½" conduit hub (position) 2 x M12 (position)
15 ... 22 kW	2 x M40 (bore hole) 1 x M32 (position) 2 x M12 (position)	2 x 1¼" conduit hub (bore hole) 1 x 1" conduit hub (position) 2 x M12 (position)	2 x M40 (bore hole) 1 x M32 (position) 2 x M20 (position) 2 x M12 (position)	2 x 1¼" conduit hub (bore hole) 1 x 1" conduit hub (position) 2 x ½" conduit hub (position) 2 x M12 (position)
30 ... 75 kW	2 x M63 (bore hole) 2 x M32 (position) 2 x M16 (position)	2 x 2" conduit hub (bore hole) 2 x 1" conduit hub (position) 2 x M16 (position)	-	-



Sets with specially matched cable glands make it easier to lay the cables in the wire range.

► [Cable glands](#) 255

Further data and information

► [EMC-compliant installation](#) 51

► [Standards and operating conditions](#) 84



6.3 EMC-compliant installation

The drive system (inverter and drive) only complies with the directive 2014/30/EU: EMC Directive [UKCA: S.I. 2016/1091 - The Electromagnetic Compatibility Regulations 2016] if it is installed according to the guidelines for CE-typical drive systems.

These guidelines should also be followed in installations requiring FCC Part 15 or ICES 001 compliance.

NOTICE

Electromagnetic interferences

Product and peripheral devices may be affected during operation.

- Use integrated conductive shield connections for control lines and motor lines.
- Use central earthing points.

The example below shows the effective wiring:



- A Shield connection for control connections
- B Control cable
- C EMC cable gland/conduit hub
- D Low-capacitance motor cable
- E Mains cable

6.3.1 Mains connection

- Inverters, mains chokes, or mains filters may be connected to the mains via unshielded single cores or unshielded cables.
- Cable between line filter and inverter:

	Cable length	
	≤ 300 mm	> 300 mm
Type	unshielded twisted option	always shielded

- In DC-bus operation or DC supply, use shielded cables.



6.3.2 Motor cable

EMC-compliant installation must be carried out with shielded low-capacitance motor cables.

Suitable motor cables can be obtained directly from Lenze.

Capacitance per unit length

- Cable cross-section $\leq 2.5 \text{ mm}^2$ ($\geq$ AWG 14): C-core-core/C-core-shield $<75/150 \text{ pF/m}$
- Cable cross-section $\leq 4 \text{ mm}^2$ ($\geq$ AWG 12): C-core-core/C-core-shield $<150/300 \text{ pF/m}$

Conduits

When using electrically conductive conduits:

- Single unshielded conductors or multi-core unshielded cables installed in a metallic conduit are equivalent to a shielded motor cable for EMC compliance purposes.
- Permissible is a rigid or flexible metallic conduit.
- The conduit must be properly connected at both ends with metal glands to the inverter and motor to connect all devices.
- Non-metallic branches or glands that interrupt the electrical conductivity of the metallic conduit are not permitted.

Braid

- Only use motor cables with braids made of tinned or nickel-plated copper.
- Shields made of steel braids are not suitable.
- The overlap rate of the braid must be at least 70 % with an overlap angle of 90° .

Measures on the motor

- Connect the shield with PE over a large area at the terminal box of the motor, e.g. via a metallic EMC cable gland.
- For motors with plug connectors, the large-area shield connection is ensured via the plug connection.

Further supporting measures

- Route the motor cable separately from the mains cables and control cables.
- Lay the motor cable so that it only crosses mains cables and control cables at right angles.
- Do not disconnect the motor cable.
- If the motor cable must be disconnected (e.g. by chokes, contactors, or terminals):
 - Install the shield of the motor cable directly before and behind the point of separation to the mounting plate with a large surface.
 - The unshielded cable ends must not be longer than 100 mm.
 - Mount the separating component at least 100 mm away from other components.



6.3.3 Fieldbus cables, networks

Please observe the following recommendations for trouble-free operation, especially in the event of Ethernet-based networks.

- Cables and wiring must meet the specifications and requirements of the network being used to allow reliable operation of the network in typical installations. In this context, also observe the recommendations for action of the respective user organization.
- Lay network cables separately from power cables. Maintain as large a distance as possible to the motor cables which are subject to interference.
- To avoid compensating currents via the shielding of the network cable, install an independent, low-resistance equipotential bonding over the shortest possible distance parallel to the network cable. This applies in particular to long cables.
- Observe bending radii according to manufacturer information. Guide values for minimum bending radii:
 - 10 x cable diameter
 - 20 x cable diameter with frequent movement of the cable
- Fix longer cables 30 cm after the connection point.

Patch cable/CAT5 cables:

- Cables must comply with CAT5 and be suitable for ≥ 10 Mbps.
- CAT5 cables according to specification establish the shield connection via the RJ45 plug connection. Additional shield connections are not required.
- Patch cables of 25 cm length are suitable for the network connection of inverters ≤ 4 kW installed side by side. When wiring from right to left, a sufficient bending radius can be maintained.
- Only certified, tested and fully assembled patch cables from well-known manufacturers are recommended.

RJ45 plug connections:

- RJ45 plug connections only function properly if they are not subjected to mechanical stress or lateral forces.
- For all communication modules of the i-series, the connection of the cable shielding at the RJ45 sockets is carried out as follows:
 - At the first RJ45 socket, the shielding is directly connected to functional earth (FE).
 - At the second RJ45 socket, the shielding is connected to functional earth (FE) via an RC element.

This measure prevents potential equalization currents and the resulting interference effects (see also IEC 61158-2, section 11.8.7).

Note: High-frequency interference is dissipated via the low-impedance capacitor to functional earth (FE), but for low-frequency signals this system has a high loop impedance. Measuring systems that use low impedance test signals therefore indicate too high impedance values for the shielding at the second RJ45 socket



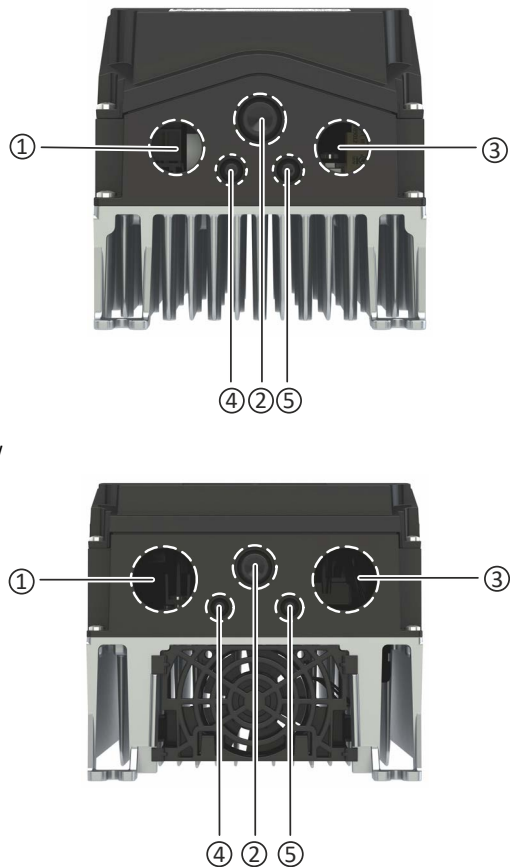
6.3.4 Examples

Example 1: Application without network and without functional safety

≤ 2.2 kW



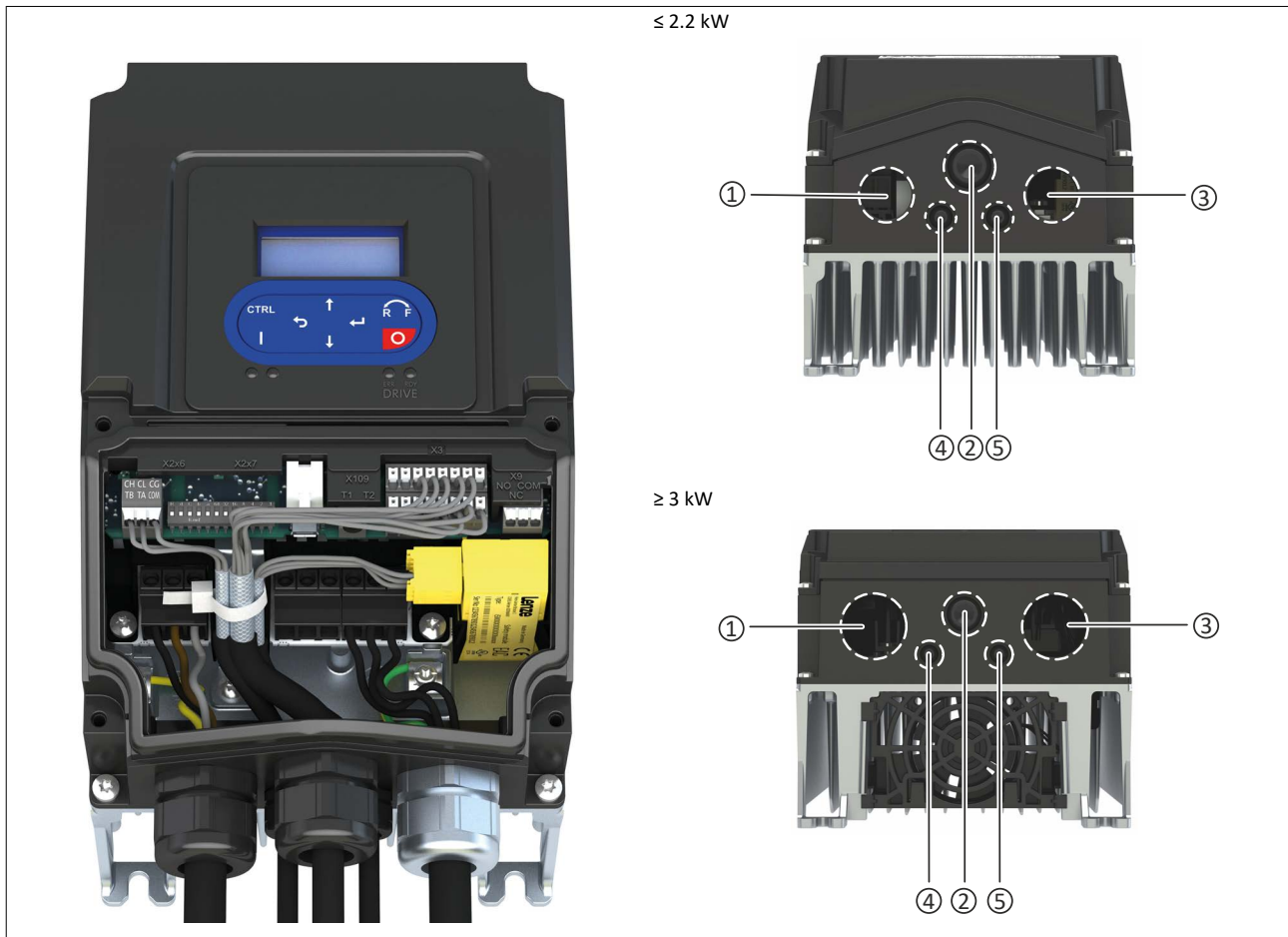
≥ 3 kW



① M20 (M32 ≥ 3 kW) Mains cable at X100	② M20 Shielded control cable at X3 and X9	③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable at X105 and motor PTC at X109 Alternative: unshielded motor cable in electrically conductive conduit.
④ M12 Not used		⑤ M12 Not used



Example 2: Application with three-wire network and functional safety (STO)



① M20 (M32 ≥ 3 kW) Mains cable at X100	② M20 Shielded control cable at X3 and X9	③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable at X105 and motor PTC at X109 Alternative: unshielded motor cable in electrically conductive conduit.
④ M12 Fieldbus cable at X2xx	⑤ M12 Shielded control cable of functional safety (STO) at X1	



Example 3: Application with Ethernet-based network and functional safety (STO)

≤ 2.2 kW

≥ 3 kW

① M20 (M32 ≥ 3 kW) Separable double cable gland with network cables on X2xx	② M20 Mains cable at X100	③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable at X105 and motor PTC at X109 Alternative: unshielded motor cable in electrically conductive conduit.
④ M12 Shielded control cable at X3 and X9	⑤ M12 Shielded control cable of functional safety (STO) at X1	



6.4 Connection according to UL

6.4.1 Important notes

WARNING!

► **UL marking**

- The integral solid state short circuit protection included in the inverter does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code / Canadian Electrical Code and any additional local codes.

► **Marquage UL**

- La protection statique intégrée contre les courts-circuits n'offre pas la même protection que le dispositif de protection du circuit de dérivation. Un tel dispositif doit être fourni, conformément au National Electrical Code / Canadian Electrical Code et aux autres dispositions applicables au niveau local.
-

WARNING!

► **UL marking**

- Use 75 °C copper wire only, except for control circuits.

► **Marquage UL**

- Utiliser exclusivement des conducteurs en cuivre 75 °C, sauf pour la partie commande.
-

WARNING!

► **UL marking**

- Suitable for motor group installation or use on a circuit capable of delivering not more than the RMS symmetrical amperes (SCCR) of the drive at its rated voltage.
- Approved fusing is specified in SCCR tables below.

► **Marquage UL**

- Convient pour l'utilisation sur une installation avec un groupe de moteurs ou sur un circuit capable de fournir au maximum une valeur de courant efficace symétrique en ampères à la tension assignée de l'appareil.
 - Les dispositifs de protection adaptés sont spécifiés dans les SCCR tableaux suivants.
-

WARNING!

► **UL marking**

- The opening of the Branch Circuit Protective Device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

► **Marquage UL**

- Le déclenchement du dispositif de protection du circuit de dérivation peut être dû à une coupure qui résulte d'un courant de défaut. Pour limiter le risque d'incendie ou de choc électrique, examiner les pièces porteuses de courant et les autres éléments du contrôleur et les remplacer s'ils sont endommagés. En cas de grillage de l'élément traversé par le courant dans un relais de surcharge, le relais tout entier doit être remplacé.
-

Electrical installation

Connection according to UL
Important notes



NOTICE

► **UL marking**

► Internal overload protection rated for 125 % of the rated FLA.

► **Marquage UL**

► Protection contre les surcharges conçue pour se déclencher à 125 % de l'intensité assignée à pleine charge.



6.4.2 Fusing data

6.4.2.1 Branch Circuit Protection (BCP) with Standard Fuses or Circuit Breaker

Short Circuit Current Ratings (SCCR) with Standard Fuses or Circuit Breaker

(Tested per UL61800-5-1, reference UL file E132659)

These devices are suitable for motor group installation when used with Standard Fuses or Circuit Breaker. For single motor installation, if the fuse value indicated is higher than 400 % of the motor current (FLA), the fuse value has to be calculated. If the value of the fuse is below two standard ratings, the nearest standard ratings less than the calculated value shall apply.

Electrical installation

Connection according to UL

Fusing data

Branch Circuit Protection (BCP) with Standard Fuses or Circuit Breaker



Inverter	Standard fuses (UL248)			Circuit breaker (UL489)	
	SCCR	Max. rated current	Class	SCCR	Max. rated current
	kA	A		kA	A
I55AP137Axxx	5	15	CC, CF, J, T	5	30
I55AP175Axxx	5	30	CC, CF, J, T	5	30
I55AP211Axxx	5	30	CC, CF, J, T	5	30
I55AP137Bxxx	65	60	CF, J, T	5	30
I55AP155Bxxx	65	60	CF, J, T	5	30
I55AP175Bxxx	65	60	CF, J, T	5	30
I55AP211Bxxx	65	60	CF, J, T	5	30
I55AP215Bxxx	65	60	CF, J, T	5	30
I55AP222Bxxx	65	60	CF, J, T	5	30
I55AP230Cxxx	65	80	CF, J, T	-	-
I55AP240Cxxx	65	80	CF, J, T	-	-
I55AP255Cxx3	5	80	CF, J, T	-	-
I55AP255Cxx7	65	80	CF, J, T	-	-
I55AP275Cxx3	5	80	CF, J, T	-	-
I55AP275Cxx7	65	80	CF, J, T	-	-
I55AP311Cxx3	5	80	CF, J, T	-	-
I55AP311Cxx7	65	80	CF, J, T	-	-
I55AP315Cxx3	5	125	CF, J, T	-	-
I55AP315Cxx7	65	125	CF, J, T	-	-
I55AP318Cxx3	5	125	CF, J, T	-	-
I55AP318Cxx7	65	125	CF, J, T	-	-
I55AP330Cxxx	10	125	CF, J, T	-	-
I55AP345Cxxx	10	200	CF, J, T	-	-
I55AP137Dxxx	65	60	CF, J, T	5	30
I55AP155Dxxx	65	60	CF, J, T	5	30
I55AP175Dxxx	65	60	CF, J, T	5	30
I55AP211Dxxx	65	60	CF, J, T	5	30
I55AP215Dxxx	65	60	CF, J, T	5	30
I55AP222Dxxx	65	60	CF, J, T	5	30
I55AP137Fxx3	5	30	CC, CF, J, T	5	30
I55AP137Fxx7	65	30	CF, J, T	5	30
I55AP155Fxx3	5	30	CC, CF, J, T	5	30
I55AP155Fxx7	65	30	CF, J, T	5	30
I55AP175Fxx3	5	30	CC, CF, J, T	5	30
I55AP175Fxx7	65	30	CF, J, T	5	30
I55AP211Fxx3	5	30	CC, CF, J, T	5	30
I55AP211Fxx7	65	30	CF, J, T	5	30
I55AP215Fxx3	5	30	CC, CF, J, T	5	30
I55AP215Fxx7	65	30	CF, J, T	5	30
I55AP222Fxx3	5	30	CC, CF, J, T	5	30
I55AP222Fxx7	65	30	CF, J, T	5	30
I55AP230Fxxx	65	50	CF, J, T	-	-
I55AP240Fxxx	65	50	CF, J, T	-	-
I55AP255Fxx3	5	50	CF, J, T	-	-
I55AP255Fxx7	65	50	CF, J, T	-	-
I55AP275Fxx3	5	50	CF, J, T	-	-
I55AP275Fxx7	65	50	CF, J, T	-	-
I55AP311Fxx3	5	50	CF, J, T	-	-
I55AP311Fxx7	65	50	CF, J, T	-	-
I55AP315Fxx3	5	80	CF, J, T	-	-
I55AP315Fxx7	65	80	CF, J, T	-	-
I55AP318Fxx3	5	80	CF, J, T	-	-
I55AP318Fxx7	65	80	CF, J, T	-	-



Electrical installation

Connection according to UL

Fusing data

Branch Circuit Protection (BCP) with Standard Fuses or Circuit Breaker

Inverter	Standard fuses (UL248)			Circuit breaker (UL489)	
	SCCR	Max. rated current	Class	SCCR	Max. rated current
	kA	A		kA	A
I55AP322Fxx3	5	80	CF, J, T	-	-
I55AP322Fxx7	65	80	CF, J, T	-	-
I55AP330Fxxx	10	125	CF, J, T	-	-
I55AP337Fxxx	10	125	CF, J, T	-	-
I55AP345Fxxx	10	125	CF, J, T	-	-
I55AP355Fxxx	10	200	CF, J, T	-	-
I55AP375Fxxx	10	200	CF, J, T	-	-
I55AP175Gxxx	65	20	CC, CF, J, T	-	-
I55AP215Gxxx	65	20	CC, CF, J, T	-	-
I55AP222Gxxx	65	20	CC, CF, J, T	-	-
I55AP240Gxxx	65	40	CF, J, T	-	-
I55AP255Gxxx	65	40	CF, J, T	-	-
I55AP275Gxxx	5	40	CF, J, T	-	-
I55AP311Gxxx	5	40	CF, J, T	-	-
I55BP315Gxx3	10	100	CF, J, T	-	-
I55BP315Gxx7	65	100	CF, J, T	-	-
I55BP318Gxx3	10	100	CF, J, T	-	-
I55BP318Gxx7	65	100	CF, J, T	-	-
I55BP322Gxx3	10	100	CF, J, T	-	-
I55BP322Gxx7	65	100	CF, J, T	-	-
I55BP330Gxx3	10	100	CF, J, T	-	-
I55BP330Gxx7	65	100	CF, J, T	-	-
I55BP337Gxx3	10	100	CF, J, T	-	-
I55BP337Gxx7	65	100	CF, J, T	-	-
I55BP345Gxx3	10	100	CF, J, T	-	-
I55BP345Gxx7	10	110	CF, J, T	-	-



6.5 Mains connection

Single inverters are connected directly to the **AC system** or via upstream filters. RFI filters are already integrated in many inverters. Depending on the requirements, mains chokes or mains filters can be used.

In a **DC-system**, several inverters are operated in a network. This enables an energy exchange between motor and generator driven single drives.

6.5.1 1-phase mains connection 120 V

The connection plan is valid for the inverters i550-Pxxx/**120-1**.



The inverters i550-Pxxx/**120-1** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

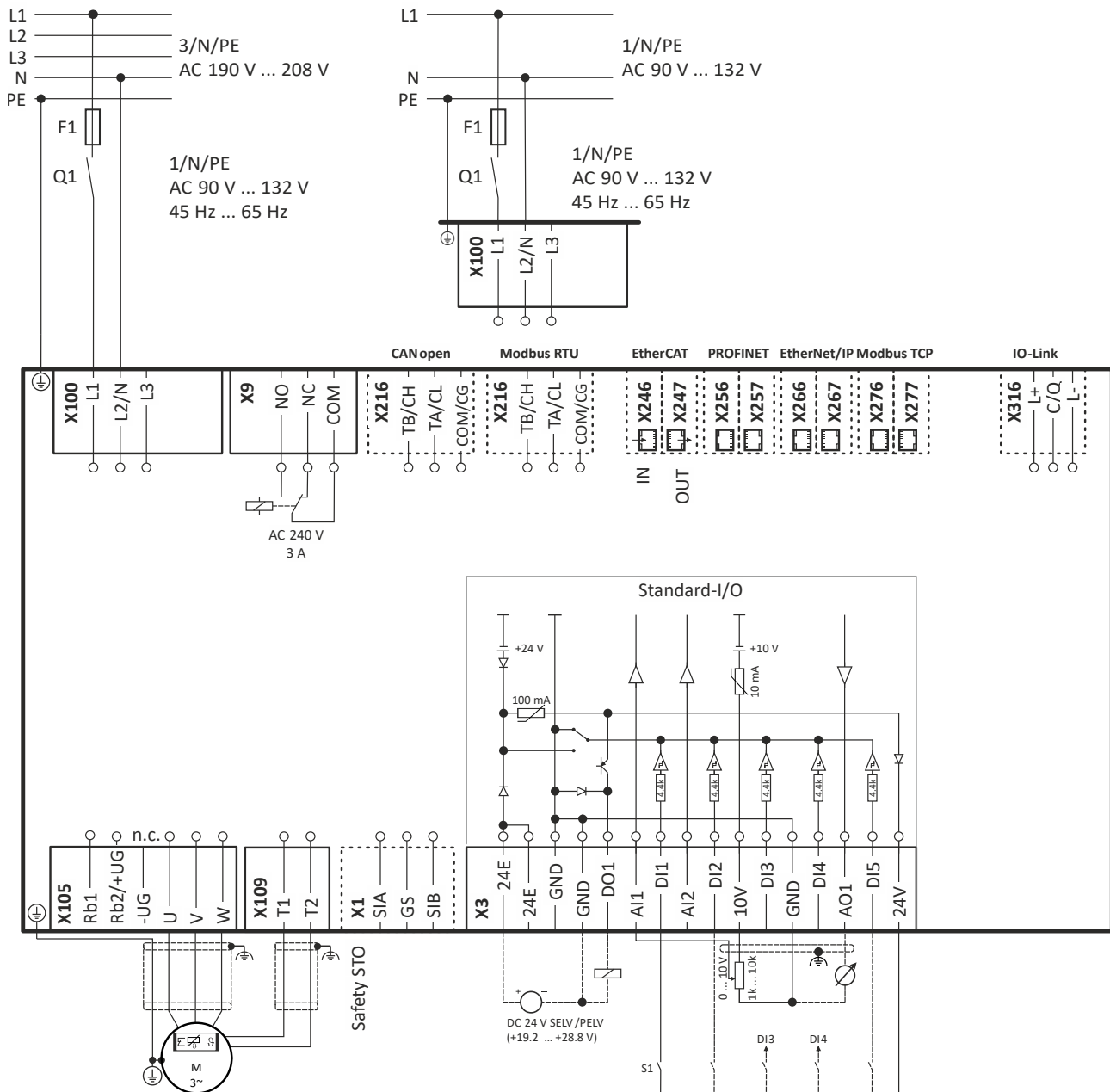


Fig. 6: Wiring example

S1 Start/Stop

Fx Fuses

Q1 Mains contactor

--- Dashed line = options



6.5.2 1-phase mains connection 230/240 V

The connection plan is valid for the inverters i550-Pxxx/**230-1** and i550-Pxxx/**230-2**.



Take into account when selecting the inverter:

The inverters i550-Pxxx/**230-1** have an integrated RFI filter in the AC mains supply.

The inverters i550-Pxxx/**230-2** do **not** have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

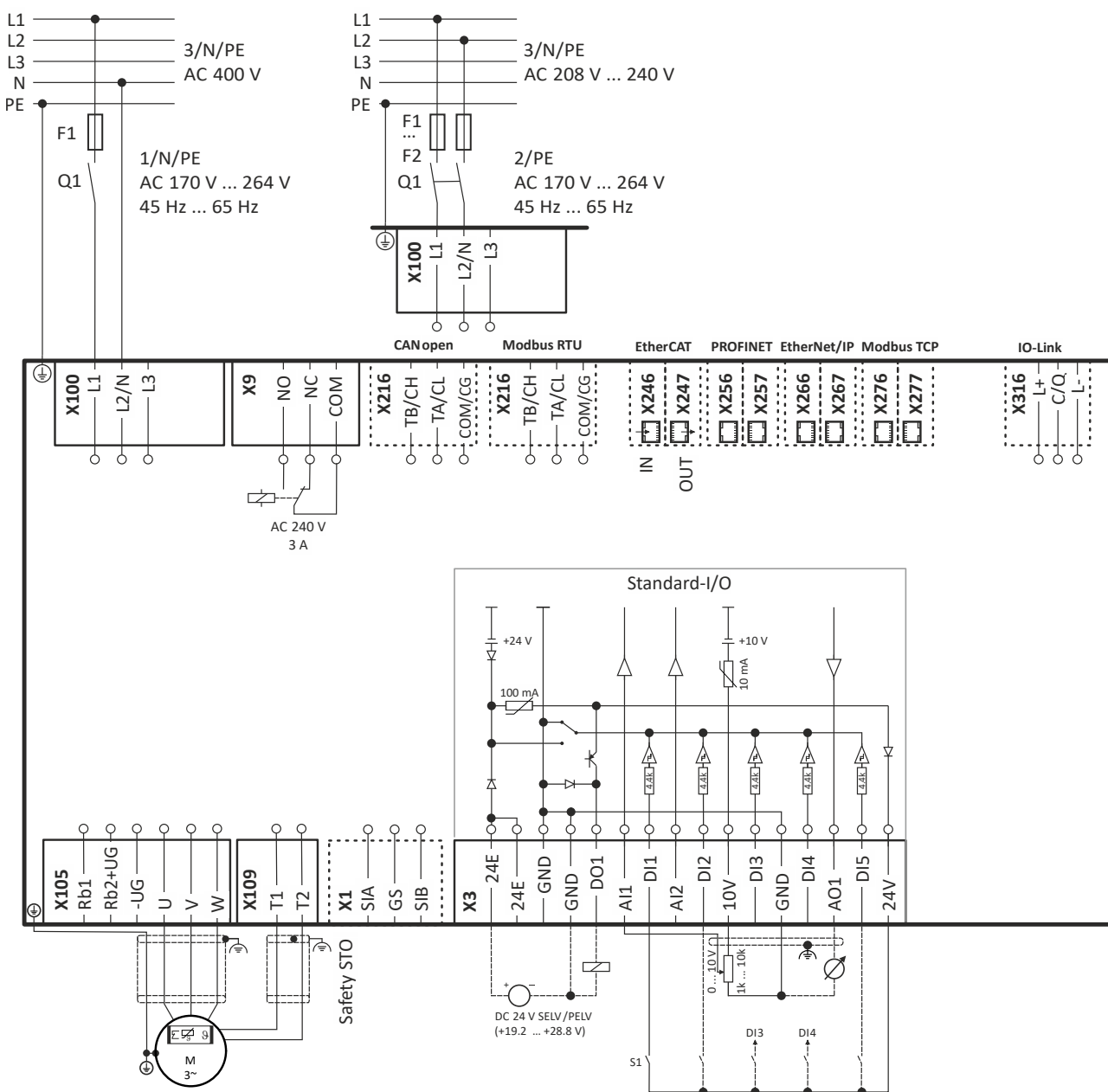


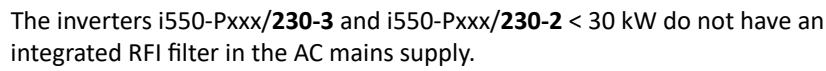
Fig. 7: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



The connection plan is valid for the inverters i550-Pxxx/**230-3** and i550-Pxxx/**230-2**.



-
- The diagram illustrates the wiring for the ET 200S-2 power supply unit. It is divided into several functional sections:
- Power Input (Top):**
 - 3/N/PE:** AC 208 V ... 240 V, 50/60 Hz.
 - 3/PE:** AC 195 V ... 264 V, 45 Hz ... 65 Hz.
 - Terminals: L1, L2/N, L3, and PE.
 - Power Output (Bottom Left):**
 - X105:** Output terminals for Rb1, Rb2+UG, UG, U, V, and W.
 - X109:** Safety STO terminals T1 and T2.
 - X1:** Safety terminals SIA, GS, and SIB.
 - Communication (Top Middle):**
 - CANopen:** X216 (TB/CH, TA/CL, COM/CG).
 - Modbus RTU:** X216 (TB/CH, TA/CL, COM/CG).
 - EtherCAT:** X246 (IN), X247 (OUT).
 - PROFINET:** X256, X257.
 - EtherNet/IP:** X266, X267.
 - Modbus TCP:** X276, X277.
 - IO-Link:** X316 (L+, C/Q, L-).
 - Standard I/O (Bottom Right):**
 - X3:** Analog input (AI1-AI5), digital input (DI1-DI5), and analog output (AO1) terminals.
 - 24V:** Terminal for 24V supply.
 - 10V:** Terminal for 10V supply.
 - GND:** Grounding terminals.
 - DO1:** Digital output terminal.
 - Internal Circuitry:** Shows a 24V supply with a 100 mA current limit, a +10V supply with a 10 mA current limit, and various resistors (4.7k, 1k) and diodes.

S1	Start/Stop
Fx	Fuses

Q1 Mains contactor
--- Dashed line = options



6.5.4 3-phase mains connection 400 V

The connection plan is valid for the inverters i550-Pxxx/400-3.

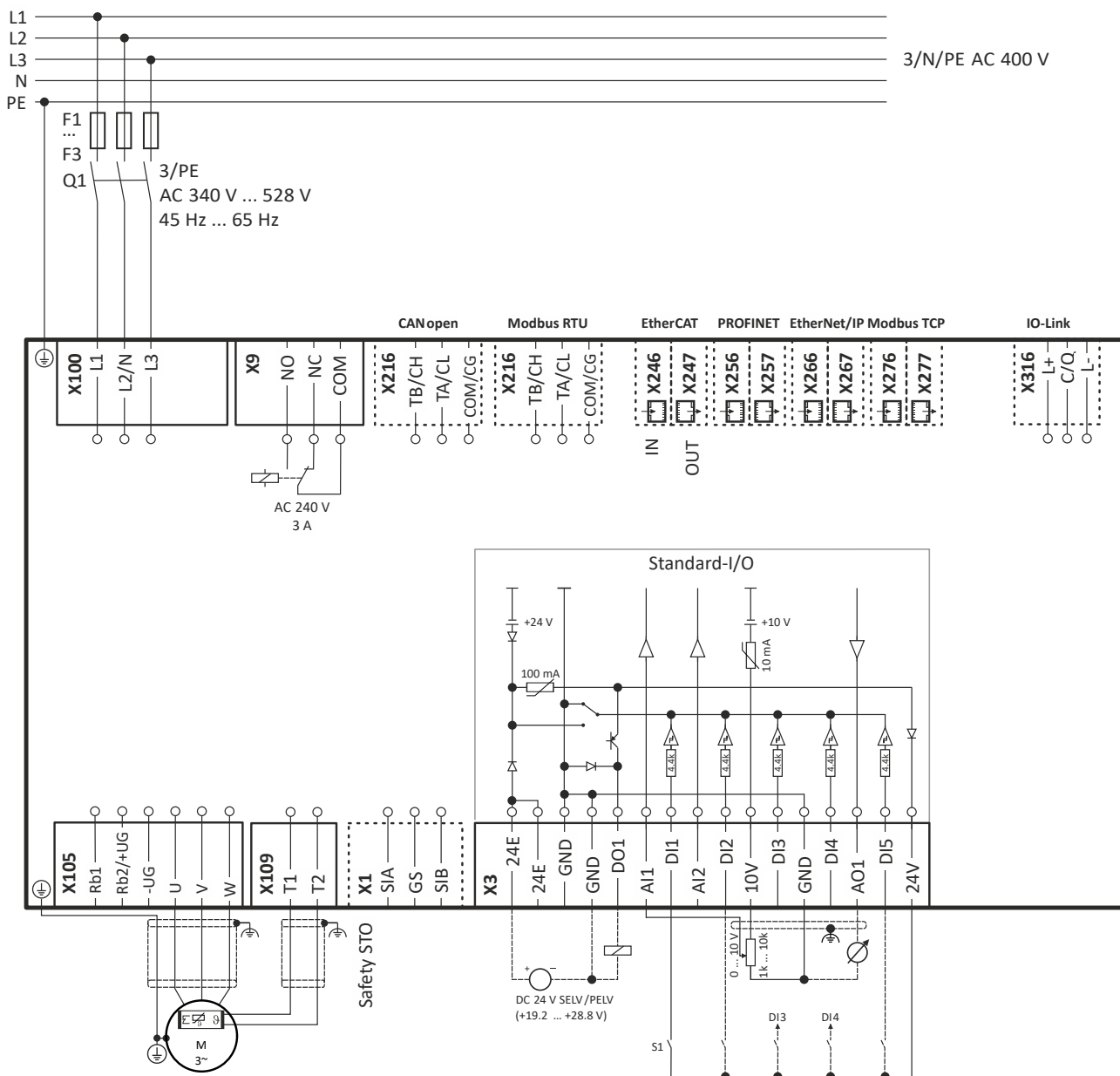


Fig. 9: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



6.5.5 3-phase mains connection 480 V

The connection plan is valid for the inverters i550-Pxxx/**400-3** and i550-Pxxx/**600-3**.



The inverters i550-Pxxx/**600-3** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

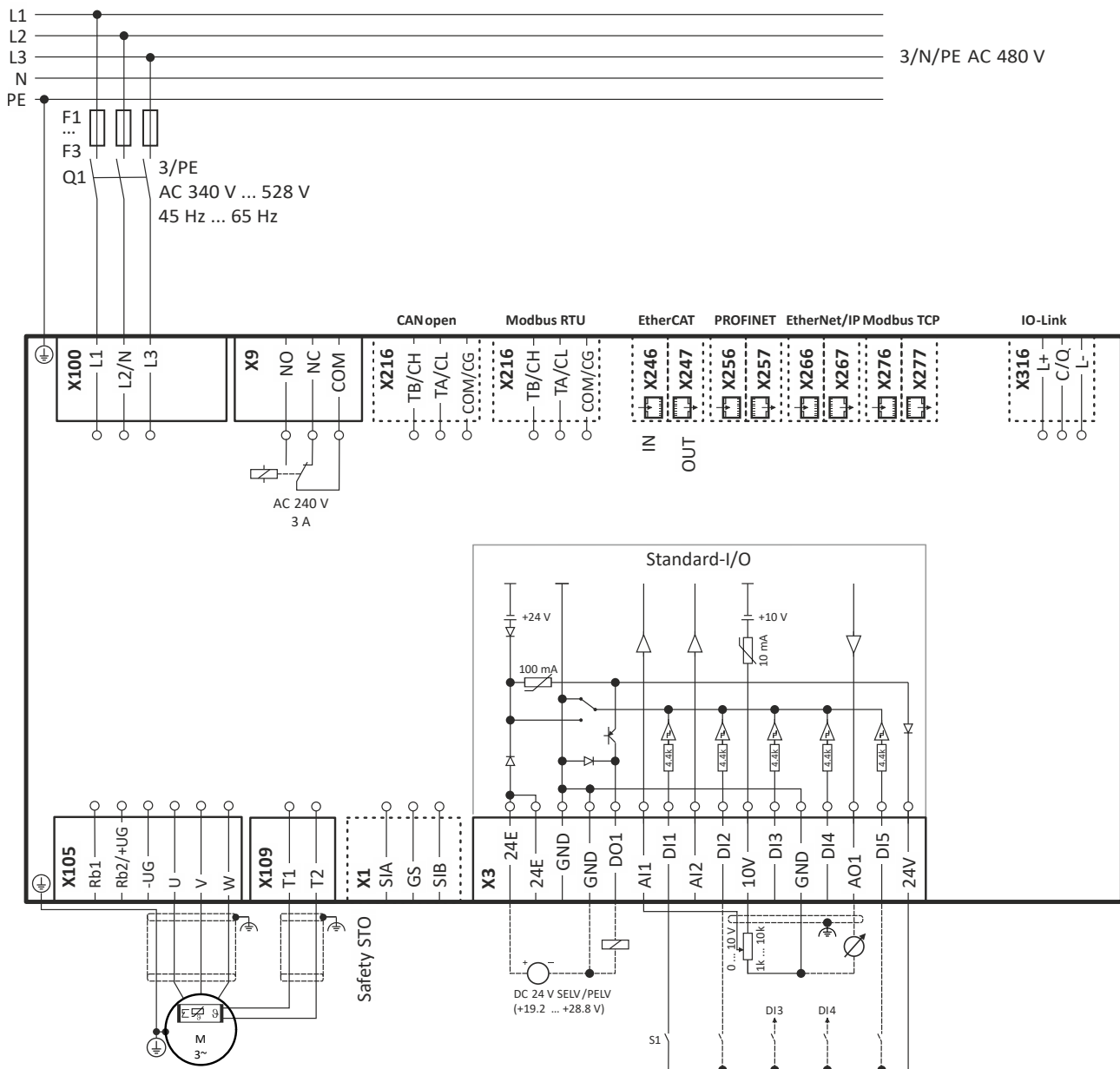


Fig. 10: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



6.5.6 3-phase mains connection 600 V

The connection plan is valid for the inverters i550-Pxxx/600-3.



The inverters i550-Pxxx/600-3 do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

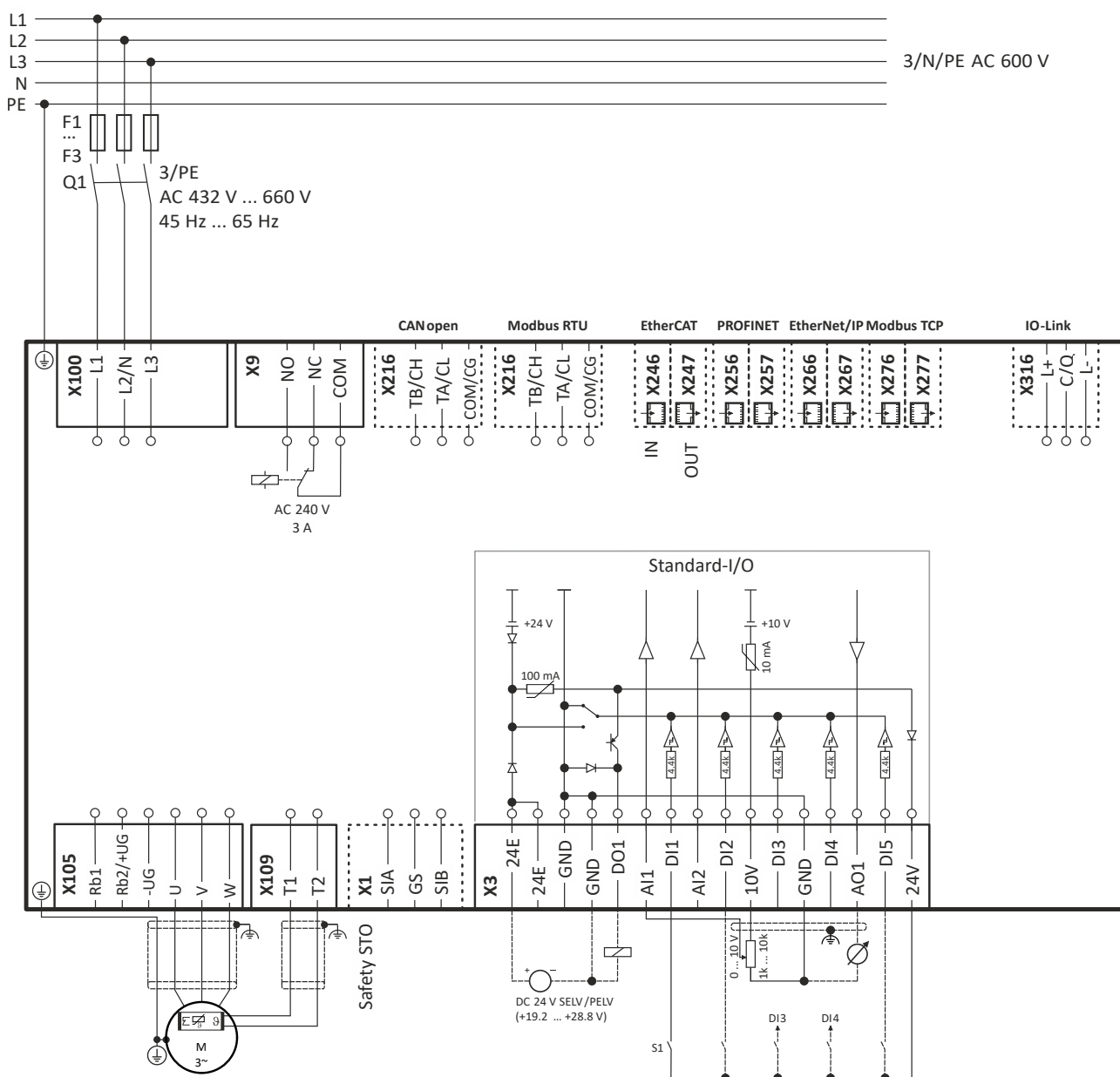


Fig. 11: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



6.5.7 Mains installation with several devices

With affordable and compact QUICKON H-distributors and T-distributors, multiple inverters that are located physically close to each other can be connected to the power supply system. With a T-distributor, a stub can easily be installed for the inverters. In this case, the cable branches off from the continuous main cable at a right angle. With its four parallel interconnected connections, an H-distributor can be used as a star hub.

► [QUICKON connector](#) 256



One easy to install alternative is e.g. the Weidmüller FieldPower® distributor.



Looping-through connection

i550 protec with empty extension box	i550 protec with extension box and disconnect switch
Connection at terminal block (Lenze accessories) in the extension box	Disconnect switch connection, ideal for looping-through connection
2.5 ... 10 mm²	2.5 ... 4.0 mm²



6.6 Motor connection

Only use motors suitable for the inverter operation.

Insulation resistance (EN 60034): max. $\hat{u} \geq 1.5 \text{ kV}$, max. $du/dt \geq 5 \text{ kV}/\mu\text{s}$



When using electrically conductive conduits, the conduit is considered a cable shield, so unshielded cables or single cores together with the conduit are also considered shielded cables.

Switching in the motor cable

Some applications require switching on the motor side of the inverter. Switching on the motor side of the inverter is permitted if you observe the following basic conditions.

Preconditions:

- The switching elements on the motor side must be dimensioned for with the maximum occurring loads.
- Connect the shield of the motor cable to the mounting plate immediately before and after the switching element in an EMC-compliant manner.

Possible applications:

- Galvanic isolation of the motor from the inverter
 - A controller must ensure that the switching element in the motor cable does not switch until the inverter is inhibited.
- Operation of several motors on one inverter in V/f characteristic control mode
 - Monitoring functions of the inverter for motor protection (e.g. i^2xt) cannot be used.
 - Ensure temperature monitoring of all motors by external measures.
 - Disable the inverter when overload protection and cable protection in the individual motor cables respond. Do not disconnect the motor circuit.

Please note the following:

- If switching is performed on the motor side when the inverter is enabled, error messages can be triggered.
- It is not possible to predict whether an error message will be triggered or not. This can only be determined by testing under real operating conditions.
- Error messages to be expected:
 - Overcurrent
 - Motor phase failure



6.7 Connection of motor temperature monitoring

The inverter offers extensive protection against overload through the use of an overcurrent relay or temperature monitoring. We recommend using a PTC thermistor or thermal contact to monitor the temperature of the motor. We also recommend using the "Motor overload monitoring (i^2xt)" function to monitor the motor.



If the terminal X109 is used, e. g. to connect an external PTC thermistor (PTC) or a thermal contact, ensure at least one basic insulation to the potentials of motor, mains and control terminals to not restrict the safe separation of the control terminals.



6.8 Brake resistor connection

NOTICE

Overload

Overload can destroy the brake resistor.

- Protect the brake resistor of the inverter against overload with suitable parameterization.
- The thermal contact of the brake resistor can be used to establish a safety shutdown to disconnect the controller from the mains.

NOTICE

Use of intrinsically safe brake resistors

In the case of brake resistors that are not unsafe in the event of thermal overload, i.e. whose behavior is “intrinsically safe”, no separate temperature monitoring (thermal contact) and no control of the mains contactor is required.

The intrinsically safe brake resistor can be destroyed in the event of thermal overload (e.g. short circuit of the brake transistor). This interrupts the energy flow. If it is permanently energized (due to a fault), there is no danger, provided it has been installed in accordance with the mounting instructions.

Preconditions

- The cables for connecting the brake resistor (Rb1/Rb2) must be selected so that upstream fuses interrupt the supply voltage in the event of an error (short circuit or earth fault). Or there must be short-circuit-proof wiring in accordance with DIN VDE 0100-520:2013-06, which excludes a short circuit or earth fault.

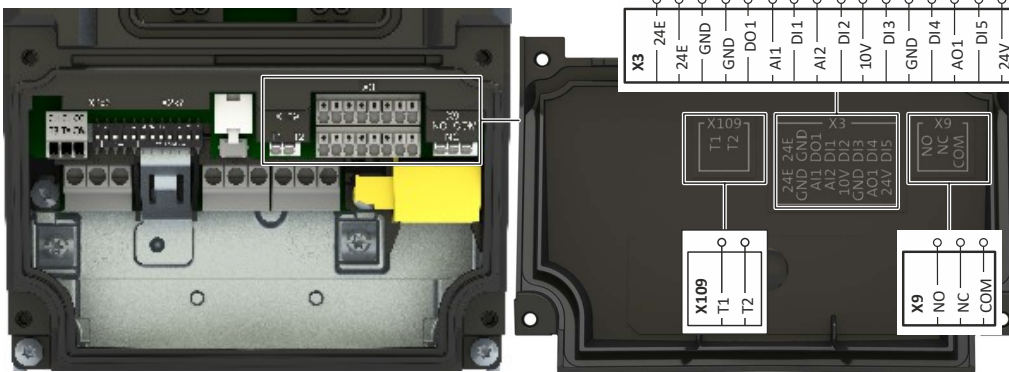
Short connection cables up to 0.5 m	Long connection cables up to max. 10 m
Up to a cable length of 0.5 m, the cable for the brake resistor and that of the temperature monitoring can be twisted. Doing so reduces problems due to EMC interference.	The cable of the brake resistor must be shielded. The maximum length is 10 m. Twisting is sufficient for the temperature monitoring cable.
① Wiring to the "brake resistor" connection on the component with brake chopper. ② Wiring to a control contact that is set to monitor the thermal contact. If the thermal contact responds, the voltage supply to the component with brake chopper must be disconnected (e.g. switch off the control of the mains contactor).	



6.9 Control connections



In case of long cables and/or high interference the effect of the shielding can be improved. To do this, connect the shield of cables for the analog inputs and outputs at one end of the cable via a capacitor with PE potential (e. g. 10 nF/250 V).



The designations for the X109, X3 and X9 terminals can be found on the inside of the cover.

Connection			Control signals (I/O)	Control signals (relay)	PTC, thermal contact
Connection designation			X3	X9	X109
Connection system			Spring terminal	Spring terminal	Spring terminal
Connection type			Non-pluggable	Non-pluggable	Non-pluggable
Double (Daisy Chain)			No		
Max. Cable cross-section		mm ²	1.5	1.5	1.5
Max. Cable cross-section		AWG	16	16	16
Min. Cable cross-section		mm ²	0.25	0.25	0.25
Min. Cable cross-section		AWG	22	22	22
Stripping length		mm	9	9	9
Stripping length		in	0.35	0.35	0.35
Required tools			Screwdriver 0.4 x 2.5		



6.10 Networks



When planning networks, consider the recommendations listed in the chapter "EMC-compliant installation" for low-interference operation, especially of Ethernet-based networks.

EMC-compliant installation → [Fieldbus cables, networks](#)  53



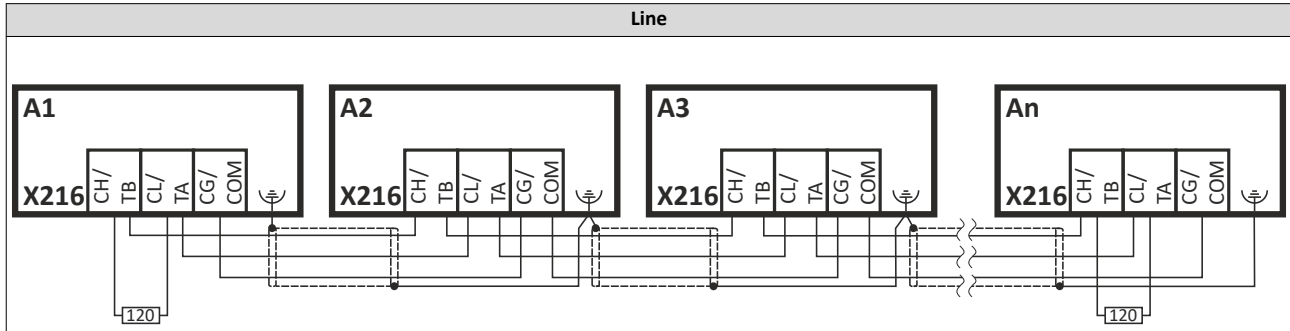
6.10.1 CANopen



The network must be terminated with a 120 Ω resistor at the first and last physical node.

Set the "R" DIP switch to ON at these network nodes.

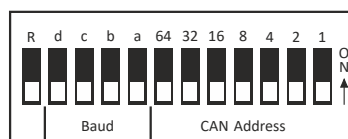
Typical topologies



Connection	CANopen		
Connection designation			X216
Connection system			Spring terminal
Connection type			Non-pluggable
Double (Daisy Chain)			No
Max. Cable cross-section		mm ²	1.5
Max. Cable cross-section		AWG	16
Min. Cable cross-section		mm ²	0.25
Min. Cable cross-section		AWG	22
Stripping length		mm	9
Stripping length		in	0.35
Required tools			Screwdriver 0.4 x 2.5

Basic network settings

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



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

Bold print = default setting



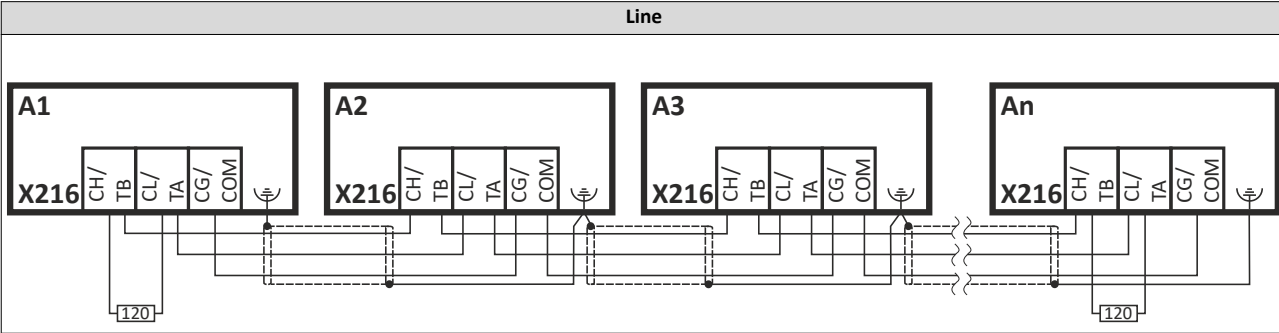
6.10.2 Modbus RTU



The network must be terminated with a 120 Ω resistor at the first and last physical node.

Set the "R" DIP switch to ON at these network nodes.

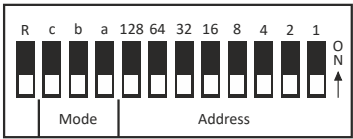
Typical topologies



Connection	Modbus RTU		
Connection designation			X216
Connection system			Spring terminal
Connection type			Non-pluggable
Double (Daisy Chain)			No
Max. Cable cross-section		mm ²	1.5
Max. Cable cross-section		AWG	16
Min. Cable cross-section		mm ²	0.25
Min. Cable cross-section		AWG	22
Stripping length		mm	9
Stripping length		in	0.35
Required tools			Screwdriver 0.4 x 2.5

Basic network settings

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

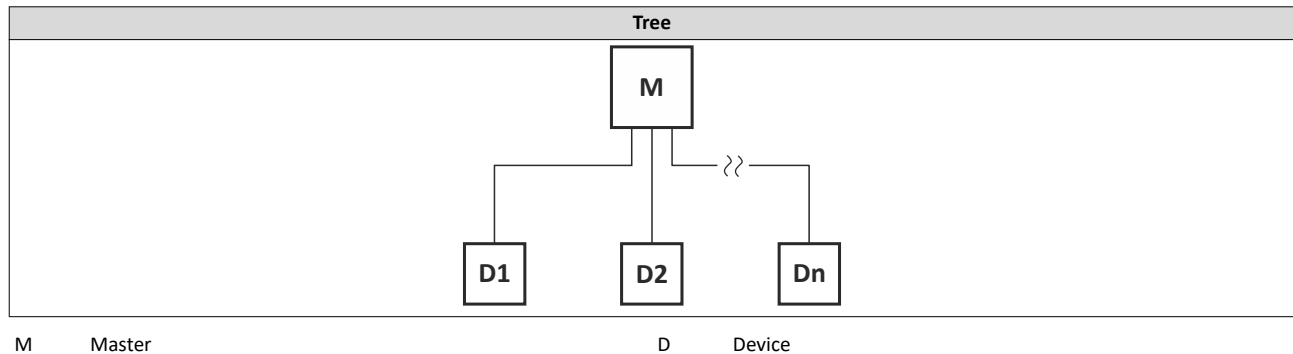


Bus termination		Baud rate	Parity	Modbus node address							
R	c	b	a	128	64	32	16	8	4	2	1
OFF	n. c.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Inactive		Automatic detection	Automatic detection	Value from parameter							
ON		ON	ON	Node address - example:							
Active		Value from parameter	Value from parameter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

Bold print = default setting

6.10.3 IO-Link

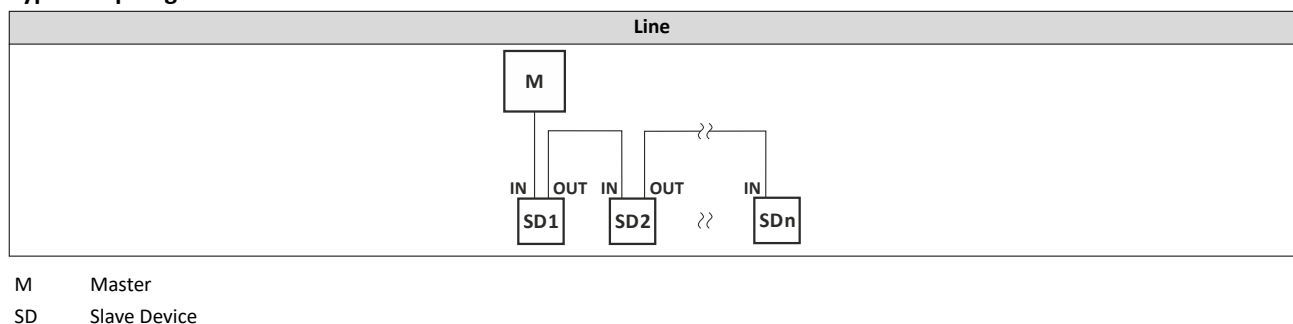
Typical topologies



Connection			IO-Link
Connection designation			X316
Connection type			Non-pluggable
Max. Cable cross-section		mm²	1.5
Max. Cable cross-section		AWG	16
Stripping length		mm	9
Stripping length		in	0.35
Required tools			Screwdriver 0.4 x 2.5

6.10.4 EtherCAT

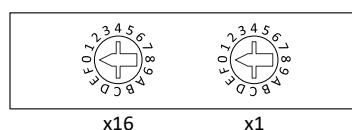
Typical topologies



Connection			EtherCAT	
Connection designation			X246	X247
Connection type			RJ45	
Max. Cable cross-section		mm ²	-	-

Basic network settings

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

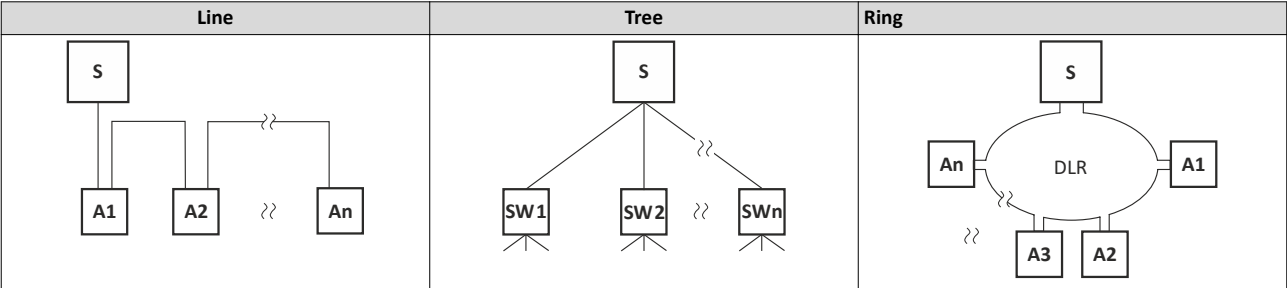


Setting	Identifier
0x00	Value from parameter
0x01 ... 0xFF	Switch position



6.10.5 EtherNet/IP

Typical topologies



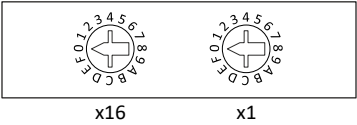
S Scanner
A Adapter

SW Switch

Connection			EtherNet/IP	
Connection designation			X266	X267
Connection type			RJ45	
Max. Cable cross-section		mm ²	-	-

Basic network settings

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

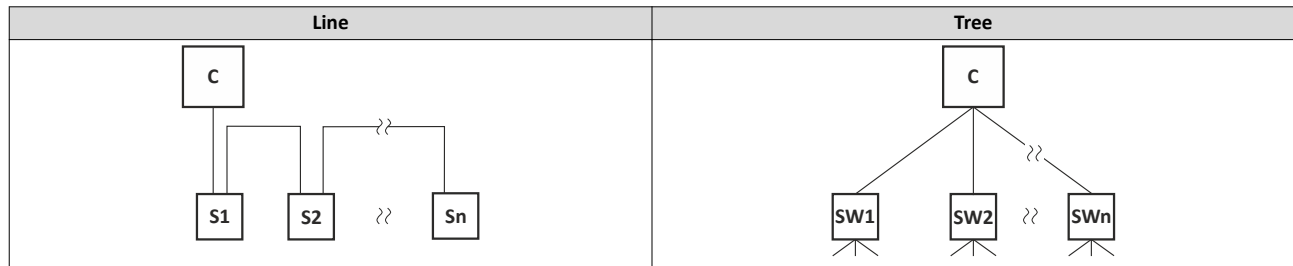


Setting	Value of last byte	Resulting IP address
0x00	Value from parameter	Value from parameter
0x01 ... 0xFE	Switch position	192.168.124.<switch position>
0xFF	Default setting	192.168.124.16



6.10.6 Modbus TCP

Typical topologies



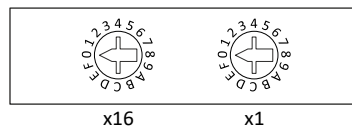
C Client
S Server

SW Switch

Connection			Modbus TCP	
Connection designation			X276	X277
Connection type			RJ45	
Max. Cable cross-section		mm ²	-	-

Basic network settings

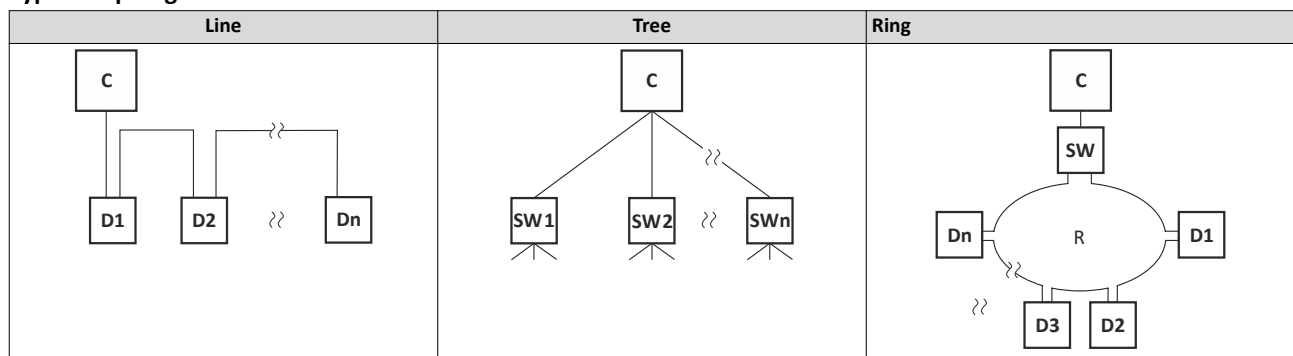
The rotary encoder switch allows you to set the last byte of the IP address.



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

6.10.7 PROFINET

Typical topologies



C IO controller
D IO device

SW Switch SCALANCE (MRP capable)
R Redundant domain

Connection			PROFINET	
Connection designation			X256	X257
Connection type			RJ45	
Max. Cable cross-section		mm ²	-	-



The rotary encoder switch has no function.



6.11 Functional safety

DANGER!

If the safety components are not installed correctly, drives may start up in an uncontrolled manner.

Possible consequences: Death or severe injuries

- ▶ Only qualified personnel may install and commission safety components.
- ▶ All wiring must be EMC-compliant.
- ▶ All control components (switch, relay, PLC, ...) must comply with the requirements of EN ISO 13849-1 and the EN ISO 13849-2.
- ▶ Switches and relays must have a protection class of at least IP54.
- ▶ Always install inverters, controllers, and other safety components with a protection class of less than IP54 in a control cabinet with a protection class of at least IP54.
- ▶ The wiring must be shielded from a cable length of 3 m.
- ▶ 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.
- ▶ 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 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

Excessively high humidity or condensation

Malfunction or destruction of the safety component

- ▶ Only commission the safety component when it has acclimated.



6.11.1 Basic Safety - STO

NOTICE

Overvoltage

Destruction of the safety component

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

DANGER!

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

Possible consequences: Death or severe injuries

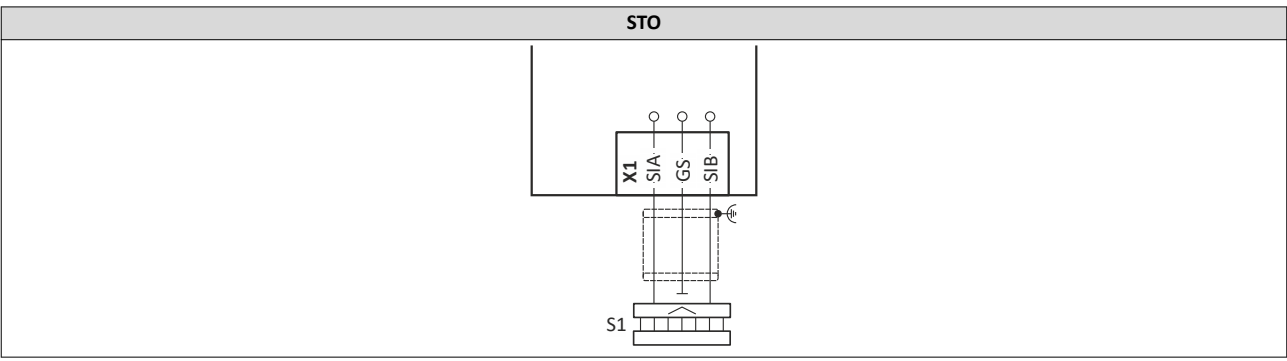
- "Emergency switching off" requires electrical isolation, e. g. by a central mains contactor.



6.11.1.1 Connection diagram

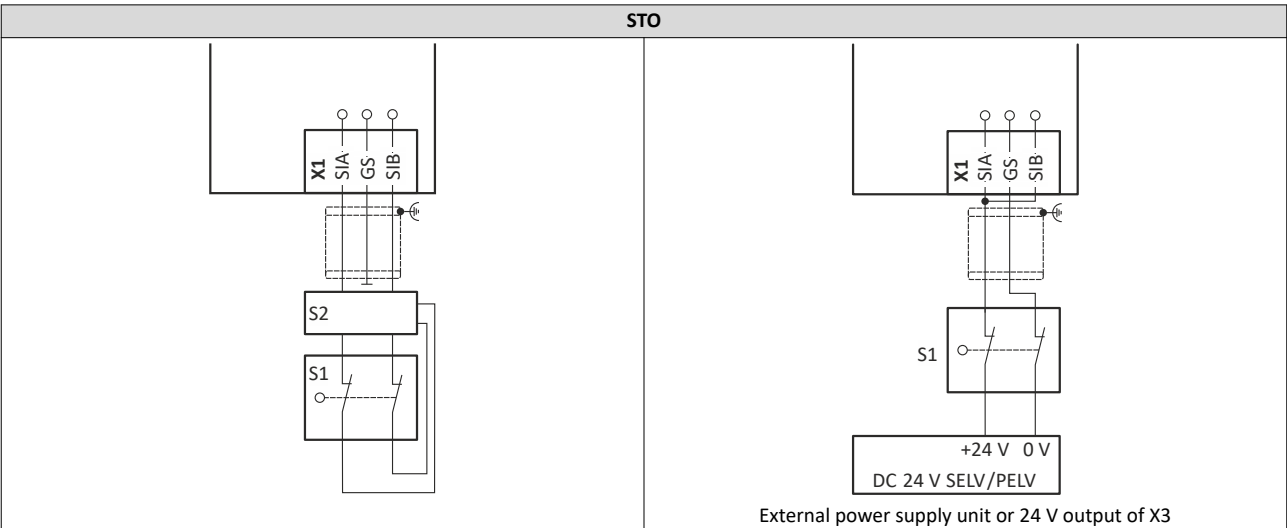
 The connection diagrams shown are only example circuits. The user is responsible for the correct safety-related design and selection of the components!

Active sensors



S1 Active sensor - example of lightgrid

Passive sensors



S1 Passive sensor
S2 Safety switching device

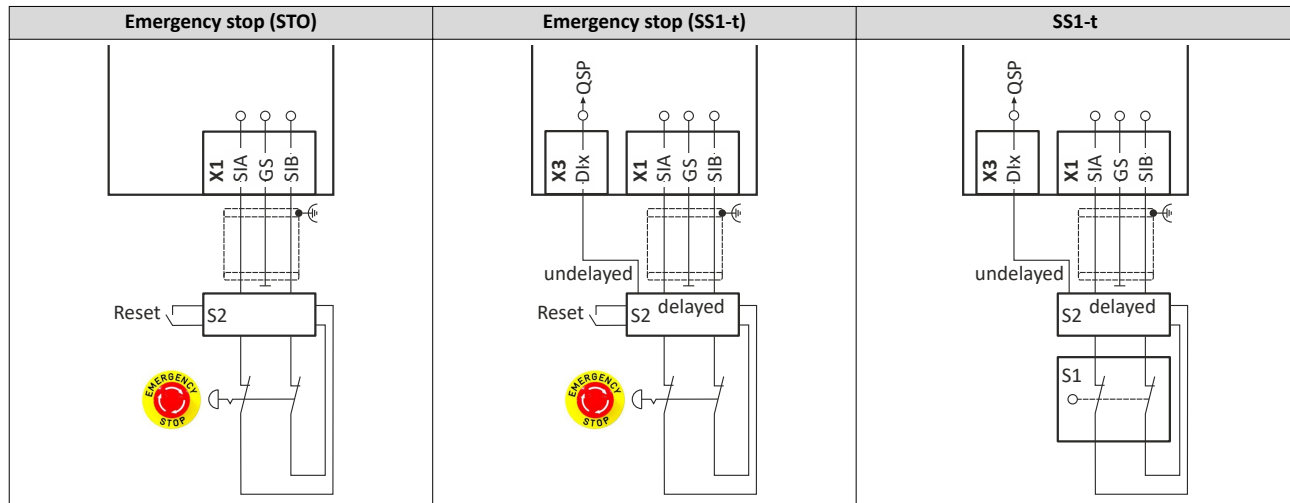
S1 Passive sensor



Electrical installation

Functional safety
Basic Safety - STO
Connection data

Passive sensors - further examples



S2 Safety switching device

S2 Safety switching device with delayed contacts
QSP "Quick stop" function

S1 Passive sensor
S2 Safety switching device with delayed contacts
QSP "Quick stop" function

6.11.1.2 Connection data

Connection			STO
Connection designation			X1
Connection system			Spring terminal
Connection type			Pluggable
Double (Daisy Chain)			Yes
Max. Cable cross-section		mm ²	1.5
Max. Cable cross-section		AWG	16
Min. Cable cross-section		mm ²	0.25
Min. Cable cross-section		AWG	22
Stripping length			9
Stripping length			0.35
Required tools			Screwdriver 0.4 x 2.5

X1	Specification	Unit	min.	typ.	max.
SIA, SIB	LOW signal	V	-3	0	+5
	HIGH signal	V	+15	+24	+30
	Switch-on time	ms		3	
	Clear time	ms		50	60
	Input current SIA	mA		10	14
	Input current SIB	mA		7	12
	Input peak current	mA		100	
	Test pulse duration	ms			1
	Test pulse interval	ms	10		
GS	Reference potential for SIA and SIB				

- Maximum cable length: 100 m
- From 30 m cable length, a shielded version is required!



7 Technical data

7.1 Standards and operating conditions

7.1.1 Conformities and approvals

Conformities			
CE	2006/42/EC		Machinery Directive only relevant for safety components
	2009/125/EC		Ecodesign Directive
	2011/65/EU		RoHS Directive
	2014/30/EU		EMC Directive
	2014/35/EU		Low-Voltage Directive
UKCA	S.I. 2008/1597		The Supply of Machinery (Safety) Regulations 2008
	S.I. 2012/3032		The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
	S.I. 2016/1091		The Electromagnetic Compatibility Regulations 2016
	S.I. 2016/1101		The Electrical Equipment (Safety) Regulations 2016
	S.I. 2021/745		The Ecodesign for Energy-Related Products and Energy Information Regulations 2021
Approvals			
cULus	UL 61800-5-1		File No. E132659
			For USA and Canada



Declarations of conformity, certificates and approvals can be found on the Internet:

www.Lenze.com → Products → Inverters → Frequency inverters

→ [i550 protec frequency inverter](#)

(Section "Product support")

7.1.2 Protection of persons and device protection

Protection class			Information applies to the mounted and ready-for-use state.
EN	EN IEC 60529	IP31	Type code I55□P □□□ □ □ 3
		IP55	Type code I55□P □□□ □ □ 8
		IP66	Type code I55□P □□□ □ □ 7
UL	UL 50E	Type 1	Type code I55□P □□□ □ □ 3 UL 50E Type 1 comparable to NEMA 1
		Type 12/12K	Type code I55□P □□□ □ □ 8 UL 50E Type 12/12K comparable to NEMA 12/12K
		Type 4X outdoor	Type code I55□P □□□ □ □ 7 UL 50E Type 4X comparable to NEMA 4X
	UL 61800-5-1	Open type	Attention! Installation only in the control cabinet.
	Protection against electric shock		
Isolation of control circuits	EN IEC 61800-5-1	Safe mains isolation	Double/reinforced insulation
Overvoltage category		II	>2000 m amsl
Degree of pollution		III	0 ... 2000 m amsl
Leakage current			
AC	EN IEC 61800-5-1	> 3.5 mA	Observe regulations and safety instructions!
DC		> 10 mA	
Starting current			
		≤ 3 x rated mains current	
Protective measures			
Earth fault strength			Earth-fault protected depending on operating status
Motor stalling protection			
Short-circuit strength			
Overvoltage resistance			
Motor overtemperature			PTC or thermal contact, I²xt monitoring



7.1.3 EMC data

Operation on public networks			The machine or system manufacturer is responsible for compliance with the requirements for the machine/system!
< 1 kW	EN IEC 61000-3-2	With mains choke	The use of an active filter is recommended for single-phase inverters in order to comply with the limit values!
> 1 kW, mains current ≤ 16 A		No additional measures	
Mains current > 16 A ... ≤ 75 A	EN IEC 61000-3-12	With mains choke	The use of an active filter is recommended for single-phase inverters in order to comply with the limit values!
		No additional measures	≥ 30 kW
Noise emission			
Category C1	EN IEC 61800-3		see rated data
Category C2			
Category C3			
Interference immunity			
	EN IEC 61800-3	Requirements fulfilled	

7.1.4 Motor connection

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

7.1.5 Environmental conditions

Energy efficiency			
Efficiency level	EN IEC 61800-9-2	Energy efficiency class IE2	according to REGULATION (EU) 2019/1781
Climate			
Storage	EN 60721-3-1:1997	1K3 (-30 ... +60°C)	
Transport	EN 60721-3-2:1997	2K3 (-30 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3C3 (at IP66)	For chemically active substances
		3S3 (for IP66)	For mechanically active substances
		3K3 (-30 ... +60 °C)	Operation at a switching frequency of 2 or 4 kHz: Above +45°C: reduce rated output current by 2.5 %/°C
			Operation at a switching frequency of 8, 12 or 16 kHz: Above +40°C: reduce rated output current by 2.5 %/°C
			Devices with IP31: Relative humidity < 95 %, condensation not permissible
		3C2	For chemically active substances
3S2	For mechanically active substances		
Site altitude			
0 ... 1000 m amsl			Without current derating
1000 ... 4000 m amsl			Reduce rated output current by 5 %/1000 m
Vibration resistance			
Transport	EN 60721-3-2:1998	2M2 (sine, shock)	In original packaging up to 11 kW
Operation	DNV-CG-0339	Amplitude 1 mm	5 ... 13.2 Hz to 11 kW
		Acceleration resistant up to 0.7 g	13.2 ... 100 Hz up to 11 kW
	EN IEC 61800-5-1	Amplitude 0.075 mm	10 ... 57 Hz
			10 ... 57 Hz (30 ... 75 kW in preparation)
		Acceleration resistant up to 1 g	57 ... 150 Hz
		57 ... 150 Hz (30 ... 75 kW in preparation)	



7.1.6 Electrical supply conditions

Power systems			
TN			Voltage against earth: max. 300 V
TT			

The connection to different supply forms enables a worldwide application of the inverters.

The following is supported:

- [1-phase mains connection 120 V](#) 87
- [1-phase mains connection 230/240 V](#) 92
- [1-phase mains connection 230/240 V "Light Duty"](#) 100
- [3-phase mains connection 230/240 V](#) 104
- [3-phase mains connection 230/240 V "Light Duty"](#) 113
- [3-phase mains connection 400 V](#) 118
- [3-phase mains connection 400 V "Light Duty"](#) 129
- [3-phase mains connection 480 V](#) 135
- [3-phase mains connection 480 V "Light Duty"](#) 151
- [3-phase mains connection 600 V](#) 160
- [3-phase mains connection 600 V "Light Duty"](#) 169

7.1.7 Certification of the integrated functional safety

The certification of the integrated safety is based on these test fundamentals:

EN ISO 13849-1:2023	Safety of machinery – Safety-related parts of control systems – Part 1
EN 61508, Part 1-7:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61800-5-1:2023	Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy requirements
EN 61800-5-2:2007 EN 61800-5-2:2017	Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional safety



Declarations of conformity, certificates and approvals can be found on the Internet:

www.Lenze.com → Products → Inverters → Frequency inverters
→ [i550 protec frequency inverter](#)

(Section "Product support")



7.2 1-phase mains connection 120 V



The inverters i550-Pxxx/**120-1** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

7.2.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

1-phase mains connection 120 V
Rated data



Product name			i550-P0.37/120-1	i550-P0.75/120-1	i550-P1.1/120-1
Rated power	P _{rated}	kW	0.37	0.75	1.1
Rated power	P _{rated}	hp	0.5	1	1.5
Mains voltage range			1 AC 90 V ... 132 V, 45 Hz ... 65 Hz		
Output voltage		V	3 AC 0 ... 230/240		
Rated mains current					
without mains choke		A	9.6	16.8	22.9
with mains choke		A	-		
Apparent output power		kVA	0.9	1.6	2.3
Rated output current					
2 kHz		A	2.4	4.2	6
4 kHz		A	2.4	4.2	6
8 kHz		A	2.4	4.2	6
12 kHz		A	2.2	3.8	5.4
16 kHz		A	1.6	2.8	4
Power loss					
2 kHz		W	19	30	38
4 kHz		W	20	32	40
8 kHz		W	24	40	51
12 kHz		W	23	38	54
16 kHz		W	22	35	49
Overcurrent cycle 180 s					
Max. output current (≤ 8 kHz)		A	3.6	6.3	9
Overload time	T ₁	s	60	60	60
Recovery time	T ₂	s	120	120	120
Max. Output current during the recovery time		A	1.8	3.2	4.5
Overcurrent cycle 15 s					
Max. output current (≤ 8 kHz)		A	4.8	8.4	12
Overload time	T ₁	s	3	3	3
Recovery time	T ₂	s	12	12	12
Max. Output current during the recovery time		A	1.8	3.2	4.5
Cyclic mains switching			3-mal pro Minute		
Brake chopper					
Max. output current		A	2.2	3.9	
Min. Brake resistor		Ω	180	100	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (≤ 8 kHz)		m	-		
Category C2 (≤ 8 kHz)		m	-		
Category C3 (≤ 8 kHz)		m	-		
Max. unshielded motor cable length					
without EMC category		m	60	80	



7.2.2 Fusing data (EN 60204-1)



- A residual current device (**RCD**) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data](#) 59

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/120-1 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.37/120-1 (IP66)								
i550-P0.75/120-1 (IP31)								
i550-P0.75/120-1 (IP66)								
i550-P1.1/120-1 (IP31)								
i550-P1.1/120-1 (IP66)								



7.2.3 Connection data

Rated power	P _{rated}	kW	0.37 ... 1.1
Connection			Netz
Connection designation			X100
Connection system			Screw terminal
Connection type			Non-pluggable
Max. Cable cross-section		mm ²	4
Max. Cable cross-section		AWG	10
Min. Cable cross-section		mm ²	1.0
Min. Cable cross-section		AWG	18
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tools			Screwdriver 0.6 x 3.5

Rated power	P _{rated}	kW	0.37 ... 1.1
Connection			Schutzerde (PE)
Connection designation			Symbol for protective earth (PE)
Connection system			Schraube
Max. Cable cross-section		mm ²	6
Max. Cable cross-section		AWG	10
Min. Cable cross-section		mm ²	1.5
Min. Cable cross-section		AWG	16
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	2
Tightening torque		lb-in	18
Required tools			Torx key 20

Rated power	P _{rated}	kW	0.37 ... 1.1
Connection			Motor
Connection designation			X105
Connection system			Screw terminal
Connection type			Non-pluggable
Max. Cable cross-section		mm ²	4
Max. Cable cross-section		AWG	10
Min. Cable cross-section		mm ²	1.0
Min. Cable cross-section		AWG	18
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tools			Screwdriver 0.6 x 3.5



7.2.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.2.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/120-1	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/120-1	ERBM180R050W	180	50	7.5	175 x 20.6 x 40	0.28	IP54
i550-P0.37/120-1	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P0.75/120-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/120-1	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.75/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/120-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/120-1	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P1.1/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66

7.2.4.2 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/120-1	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/120-1	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P0.75/120-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/120-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66



7.3 1-phase mains connection 230/240 V



Take into account when selecting the inverter:

The inverters i550-Pxxx/**230-1** have an integrated RFI filter in the AC mains supply.

The inverters i550-Pxxx/**230-2** do **not** have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.



Inverters with an power of up to 2.2 kW are available for the 230/240 V single-phase mains connection.

For advanced 1-phase operation (> 2.2 kW), larger 3-phase 230 V devices can be used (with a current reduction of 50 %).

Example:

A 230 V motor with a rated current of 20 A can be operated with an i550-P11/230-3 inverter.

- Rated power at 3 AC 230/240 V = 11 kW (Heavy Duty)
- Rated output current at 3 AC 230/240 V = 42 A
- Rated output current at 1 AC 230/240 V = 21 A (current reduction by 50 %)

If an overload capacity is also required, a correspondingly larger device must be selected.

7.3.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).



Technical data

1-phase mains connection 230/240 V
Rated data

Product name			i550-P0.37/230-1	i550-P0.37/230-2	i550-P0.55/230-1	i550-P0.55/230-2
Rated power	P _{rated}	kW	0.37		0.55	
Rated power	P _{rated}	hp	0.5		0.75	
Mains voltage range			1 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	5.7		7.6	
with mains choke		A	-			
Apparent output power		kVA	0.9		1.2	
Rated output current						
2 kHz		A	-		3.2	
4 kHz		A	2.4		3.2	
8 kHz		A	2.4		3.2	
12 kHz		A	2.2		2.9	
16 kHz		A	1.6		2.1	
Power loss						
2 kHz		W	19		24	
4 kHz		W	20		25	
8 kHz		W	24		31	
12 kHz		W	23		30	
16 kHz		W	22		28	
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	3.6	3.6	4.8	4.8
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.8	1.8	2.4	2.4
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	4.8	4.8	6.4	6.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.8	1.8	2.4	2.4
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	3.9			
Min. Brake resistor		Ω	100			
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	10	-	10	-
Category C3 (≤ 8 kHz)		m	35	-	35	-
Max. unshielded motor cable length						
without EMC category		m	60			

Technical data

1-phase mains connection 230/240 V
Rated data



Product name			i550-P0.75/230-1	i550-P0.75/230-2	i550-P1.1/230-1	i550-P1.1/230-2
Rated power	P _{rated}	kW	0.75		1.1	
Rated power	P _{rated}	hp	1		1.5	
Mains voltage range			1 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	10		14.3	
with mains choke		A	-			
Apparent output power		kVA	1.6		2.3	
Rated output current						
2 kHz		A	4.2		6	
4 kHz		A	4.2		6	
8 kHz		A	4.2		6	
12 kHz		A	3.8		5.4	
16 kHz		A	2.8		4	
Power loss						
2 kHz		W	30		38	
4 kHz		W	32		40	
8 kHz		W	40		51	
12 kHz		W	38		54	
16 kHz		W	35		49	
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	6.3	6.3	9	9
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	3.2	3.2	4.5	4.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	8.4	8.4	12	12
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	3.2	3.2	4.5	4.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	3.9		12	
Min. Brake resistor		Ω	100		33	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	10	-	10	-
Category C3 (≤ 8 kHz)		m	35	-	35	-
Max. unshielded motor cable length						
without EMC category		m	60		80	



Technical data

1-phase mains connection 230/240 V
Rated data

Product name			i550-P1.5/230-1	i550-P1.5/230-2	i550-P2.2/230-1	i550-P2.2/230-2
Rated power	P _{rated}	kW	1.5		2.2	
Rated power	P _{rated}	hp	2		3	
Mains voltage range			1 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	16.7		22.5	
with mains choke		A	-			
Apparent output power		kVA	2.6		3.6	
Rated output current						
2 kHz		A	7		9.6	
4 kHz		A	7		9.6	
8 kHz		A	7		9.6	
12 kHz		A	6.3		8.6	
16 kHz		A	4.7		6.4	
Power loss						
2 kHz		W	45		62	
4 kHz		W	48		66	
8 kHz		W	61		85	
12 kHz		W	65		91	
16 kHz		W	58		81	
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	10.5	10.5	14.4	14.4
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	5.3	5.3	7.2	7.2
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	14	14	19.2	19.2
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	5.3	5.3	7.2	7.2
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	12			
Min. Brake resistor		Ω	33			
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	10	-	10	-
Category C3 (≤ 8 kHz)		m	35	-	35	-
Max. unshielded motor cable length						
without EMC category		m	80			



7.3.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
▶ [Connection according to UL, Fusing data](#) 59



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

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.37/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.37/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.37/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.55/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.55/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.75/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.75/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.1/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.1/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.5/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.5/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P2.2/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-1 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P2.2/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F



7.3.3 Connection data

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 2.2
Connection			Netz	
Connection designation			X100	
Connection system			Screw terminal	
Connection type			Non-pluggable	
Max. Cable cross-section		mm ²	4	6
Max. Cable cross-section		AWG	10	10
Min. Cable cross-section		mm ²	1.0	1.0
Min. Cable cross-section		AWG	18	18
Stripping length		mm	10	9
Stripping length		in	0.4	0.35
Tightening torque		Nm	0.5	0.5
Tightening torque		lb-in	4.4	4.4
Required tools			Screwdriver 0.6 x 3.5	

Rated power	P _{rated}	kW	0.37 ... 2.2	
Connection			Schutzerde (PE)	
Connection designation			Symbol for protective earth (PE)	
Connection system			Schraube	
Max. Cable cross-section		mm ²	6	
Max. Cable cross-section		AWG	10	
Min. Cable cross-section		mm ²	1.5	
Min. Cable cross-section		AWG	16	
Stripping length		mm	10	
Stripping length		in	0.4	
Tightening torque		Nm	2	
Tightening torque		lb-in	18	
Required tools			Torx key 20	

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 2.2
Connection			Motor	
Connection designation			X105	
Connection system			Screw terminal	
Connection type			Non-pluggable	
Max. Cable cross-section		mm ²	4	6
Max. Cable cross-section		AWG	10	10
Min. Cable cross-section		mm ²	1.0	1.0
Min. Cable cross-section		AWG	18	18
Stripping length		mm	10	9
Stripping length		in	0.4	0.35
Tightening torque		Nm	0.5	0.5
Tightening torque		lb-in	4.4	4.4
Required tools			Screwdriver 0.6 x 3.5	

Technical data

1-phase mains connection 230/240 V

Brake resistors

Assignment to inverters with protection class IP31



7.3.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.3.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.37/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.55/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.75/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.75/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.5/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P2.2/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66



Technical data

1-phase mains connection 230/240 V

Brake resistors

Assignment to inverters with protection class IP66

7.3.4.2 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/230-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.37/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.55/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/230-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.55/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.75/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/230-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.75/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/230-1	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.5/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/230-1	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P2.2/230-1	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/230-1	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66



7.4 1-phase mains connection 230/240 V "Light Duty"

(Only inverters with protection class IP31 / UL Type 1)



The inverters i550-Pxxx/**230-2** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

7.4.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 40 °C (104 °F).



Technical data

1-phase mains connection 230/240 V "Light Duty"
Rated data

Product name			i550-P0.37/230-2	i550-P0.55/230-2	i550-P0.75/230-2	i550-P1.1/230-2
Rated power	P _{rated}	kW	0.55	0.75	1.1	1.5
Rated power	P _{rated}	hp	0.75	1	1.5	2
Mains voltage range			1 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	6.9	9.1	12	17.1
with mains choke		A	-			
Apparent output power		kVA	1.2	1.6	2.2	2.6
4 kHz		A	2.9	3.8	5	7.2
				3.8	5	7.2
Power loss						
2 kHz		W	30		38	45
4 kHz		W	32		40	48
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	3.6	4.8	6.3	9
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	4.8	6.4	8.4	12
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	3.9			12
Min. Brake resistor		Ω	100			33
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	60			80

Technical data

1-phase mains connection 230/240 V "Light Duty"

Rated data



Product name			i550-P1.5/230-2	i550-P2.2/230-2
Rated power	P _{rated}	kW	2.2	3
Rated power	P _{rated}	hp	3	4
Mains voltage range			1 AC 170 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage		V	3 AC 0 ... 230/240	
Rated mains current				
without mains choke		A	20	27.4
with mains choke		A	-	
Apparent output power		kVA	3.6	4.9
Rated output current				
2 kHz		A	8.4	11.5
4 kHz		A	8.4	11.5
Power loss				
2 kHz		W	62	79
4 kHz		W	66	84
Overcurrent cycle 180 s				
Max. output current (≤ 8 kHz)		A	10.5	14.4
Overload time	T ₁	s	60	60
Recovery time	T ₂	s	120	120
Max. Output current during the recovery time		A	5.3	7.2
Overcurrent cycle 15 s				
Max. output current (≤ 8 kHz)		A	14	19.2
Overload time	T ₁	s	3	3
Recovery time	T ₂	s	12	12
Max. Output current during the recovery time		A	5.3	7.2
Cyclic mains switching			3-mal pro Minute	
Brake chopper				
Max. output current		A	12	
Min. Brake resistor		Ω	33	
Max. shielded motor cable length				
without EMC category		m	50	
Category C1 (≤ 8 kHz)		m	-	
Category C2 (≤ 8 kHz)		m	-	
Category C3 (≤ 8 kHz)		m	-	
Max. unshielded motor cable length				
without EMC category		m	80	



7.4.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data 59](#)



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

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ F

7.4.3 Connection data

[▶ Connection data 97](#)

7.4.4 Brake resistors

[▶ Assignment to inverters with protection class IP31 98](#)



7.5 3-phase mains connection 230/240 V



The inverters i550-Pxxx/**230-2** and i550-Pxxx/**230-3** < 30 kW do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.



Inverters ≥ 30 kW have an integrated mains choke in addition to the RFI filter.

7.5.1 Rated data



For inverters ≥ 30 kW, EMC category C2 is only valid for the switching frequencies 2 kHz and 4 kHz.

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).



Technical data

3-phase mains connection 230/240 V
Rated data

Product name			i550-P0.37/230-2	i550-P0.55/230-2	i550-P0.75/230-2	i550-P1.1/230-2
Rated power	P _{rated}	kW	0.37	0.55	0.75	1.1
Rated power	P _{rated}	hp	0.5	0.75	1	1.5
Mains voltage range			3 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	3.9	4.8	6.4	7.8
with mains choke		A	-			
Apparent output power		kVA	0.9	1.2	1.6	2.3
Rated output current						
2 kHz		A	-	3.2	4.2	6
4 kHz		A	2.4	3.2	4.2	6
8 kHz		A	2.4	3.2	4.2	6
12 kHz		A	2.2	2.9	3.8	5.4
16 kHz		A	1.6	2.1	2.8	4
Power loss						
2 kHz		W	19	24	30	38
4 kHz		W	20	25	32	40
8 kHz		W	24	31	40	51
12 kHz		W	23	30	38	54
16 kHz		W	22	28	35	49
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	3.6	4.8	6.3	9
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	4.8	6.4	8.4	12
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	3.9			12
Min. Brake resistor		Ω	100			33
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	60			80

Technical data

3-phase mains connection 230/240 V
Rated data



Product name			i550-P1.5/230-2	i550-P2.2/230-2	i550-P3.0/230-3	i550-P4.0/230-3
Rated power	P _{rated}	kW	1.5	2.2	3	4
Rated power	P _{rated}	hp	2	3	4	5
Mains voltage range			3 AC 170 V ... 264 V, 45 Hz ... 65 Hz		3 AC 180 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	9.5	13.6	15	20.6
with mains choke		A	-			
Apparent output power		kVA	2.6	3.6	4.5	6.2
Rated output current						
2 kHz		A	7	9.6	12	16.5
4 kHz		A	7	9.6	12	16.5
8 kHz		A	7	9.6	12	16.5
12 kHz		A	6.3	8.6	10.8	14.9
16 kHz		A	4.7	6.4	8	11
Power loss						
2 kHz		W	45	62	79	102
4 kHz		W	48	66	84	108
8 kHz		W	61	85	109	140
12 kHz		W	65	91	104	133
16 kHz		W	58	81	104	133
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	10.5	14.4	18	24.8
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	5.3	7.2	9	12.4
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	14	19.2	24	33
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	5.3	7.2	9	12.4
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	12		26	
Min. Brake resistor		Ω	33		15	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	80		100	



Technical data

3-phase mains connection 230/240 V
Rated data

Product name			i550-P5.5/230-3	i550-P7.5/230-3	i550-P11/230-3	i550-P15/230-3
Rated power	P _{rated}	kW	5.5	7.5	11	15
Rated power	P _{rated}	hp	7.5	10	15	20
Mains voltage range			3 AC 180 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	28.8	36.3	52.2	62
with mains choke		A	-			
Apparent output power		kVA	8.7	10.9	15.8	20.8
Rated output current						
2 kHz		A	23	29	42	54
4 kHz		A	23	29	42	54
8 kHz		A	23	29	42	54
12 kHz		A	20.7	26.1	37.8	48.6
16 kHz		A	15.3	19.3	28	36
Power loss						
2 kHz		W	137	172	242	340
4 kHz		W	145	183	258	361
8 kHz		W	189	238	337	469
12 kHz		W	180	255	361	447
16 kHz		W	180	227	321	447
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	34.5	43.5	63	81
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	17.3	21.8	31.5	40.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	46	58	84	108
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	17.3	21.8	31.5	40.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	26	30		48.8
Min. Brake resistor		Ω	15	13		8
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100	200		

Technical data

3-phase mains connection 230/240 V

Rated data



Product name			i550-P18/230-3	i550-P30/230-3	i550-P45/230-3
Rated power	P _{rated}	kW	18.5	30	45
Rated power	P _{rated}	hp	25	40	60
Mains voltage range			3 AC 180 V ... 264 V, 45 Hz ... 65 Hz		
Output voltage		V	3 AC 0 ... 230/240		
Rated mains current					
without mains choke		A	78	80	135
with mains choke		A	-		
Apparent output power		kVA	26.2	34.4	57.9
Rated output current					
2 kHz		A	68	89	150
4 kHz		A	68	89	150
8 kHz		A	68	89	150
12 kHz		A	61.2	71.2	120
16 kHz		A	45.3	59.3	100.5
Power loss					
2 kHz		W	408	746	1319
4 kHz		W	435	780	1377
8 kHz		W	569	952	1666
12 kHz		W	543	877	1524
16 kHz		W	542	848	1474
Overcurrent cycle 180 s					
Max. output current (≤ 8 kHz)		A	102	133.5	225
Overload time	T ₁	s	60	60	60
Recovery time	T ₂	s	120	120	120
Max. Output current during the recovery time		A	51	66.75	112.5
Overcurrent cycle 15 s					
Max. output current (≤ 8 kHz)		A	136	178	300
Overload time	T ₁	s	3	3	3
Recovery time	T ₂	s	12	12	12
Max. Output current during the recovery time		A	51	66.75	112.5
Cyclic mains switching			3-mal pro Minute		1-mal pro Minute
Brake chopper					
Max. output current		A	48.8	52	83
Min. Brake resistor		Ω	8	7.5	4.7
Max. shielded motor cable length					
without EMC category		m	50	100	200
Category C1 (≤ 8 kHz)		m	-		
Category C2 (≤ 8 kHz)		m	-	15	
Category C3 (≤ 8 kHz)		m	-	15	100
Max. unshielded motor cable length					
without EMC category		m	200	100	200



7.5.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
▶ [Connection according to UL, Fusing data](#) 59

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.37/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP66)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P3.0/230-3 (IP31)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P3.0/230-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P4.0/230-3 (IP31)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P4.0/230-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P5.5/230-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P5.5/230-3 (IP66)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P7.5/230-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P7.5/230-3 (IP66)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P11/230-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P11/230-3 (IP66)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P15/230-3 (IP31)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B
i550-P15/230-3 (IP66)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B
i550-P18/230-3 (IP31)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B
i550-P18/230-3 (IP66)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B
i550-P30/230-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P45/230-3 (IP55)	10	gG/gL, gR	200	10	B	200	≥ 300	Typ B



7.5.3 Connection data

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 5.5	7.5 ... 11	15 ... 18.5	30	45
Connection			Mains connection					
Connection designation			X100					
Connection system			Screw terminal					
Connection type			Non-pluggable					
Max. Cable cross-section		mm ²	4	6	16	35	50	95
Max. Cable cross-section		AWG	10	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	18	16	16	6	2
Stripping length		mm	10	9	11	18	22	32
Stripping length		in	0.4	0.35	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5		Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 18.5	30 ... 45
Connection			Schutzerde (PE)			
Connection designation			Symbol for protective earth (PE)			
Connection system			Schraube			Bolzen
Max. Cable cross-section		mm ²	6	16	25	95
Max. Cable cross-section		AWG	10	6	4	4/0
Min. Cable cross-section		mm ²	1.5	2.5	4	35
Min. Cable cross-section		AWG	16	14	12	2
Stripping length		mm	10	12	16	-
Stripping length		in	0.4	0.47	0.63	-
Tightening torque		Nm	2	3.4	4	10
Tightening torque		lb-in	18	30	35	90
Required tools			Torx key 20	Crosstip screwdriver PZ2		Wrench size 13

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 5.5	7.5 ... 11	15 ... 18.5	30	45
Connection			Motor					
Connection designation			X105					
Connection system			Screw terminal					
Connection type			Non-pluggable					
Max. Cable cross-section		mm ²	4	6	16	35	50	95
Max. Cable cross-section		AWG	10	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	18	16	16	6	2
Stripping length		mm	10	9	11	18	22	32
Stripping length		in	0.4	0.35	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5		Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0



7.5.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.5.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.37/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.55/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.75/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/230-2	ERBM100R100W	100	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.75/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.5/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P2.2/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1	IP54
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P3.0/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P3.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P4.0/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P5.5/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P5.5/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P7.5/230-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P11/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P11/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/230-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P15/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 204 x 105	9.8	IP66
i550-P15/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 301 x 280	36	IP66
i550-P18/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 204 x 105	9.8	IP66
i550-P18/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 301 x 280	36	IP66

Technical data

3-phase mains connection 230/240 V

Brake resistors

Assignment to inverters with protection class IP55



7.5.4.2 Assignment to inverters with protection class IP55

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kJ	mm	kg	
i550-P30/230-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P30/230-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P30/230-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P45/230-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P45/230-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P45/230-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54

7.5.4.3 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.55/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P0.75/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P1.5/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P2.2/230-2	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	751 x 208 x 122	7.8	IP66
i550-P3.0/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P3.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P4.0/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P5.5/230-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P5.5/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P7.5/230-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P11/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P11/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/230-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P15/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 204 x 105	9.8	IP66
i550-P15/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 301 x 280	36	IP66
i550-P18/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 204 x 105	9.8	IP66
i550-P18/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 301 x 280	36	IP66



7.6 3-phase mains connection 230/240 V "Light Duty"

(Only inverters with protection class IP31 / UL Type 1)



The inverters i550-Pxxx/**230-2** and i550-Pxxx/**230-3** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

7.6.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

3-phase mains connection 230/240 V "Light Duty"

Rated data



Product name			i550-P0.37/230-2	i550-P0.55/230-2	i550-P0.75/230-2	i550-P1.1/230-2
Rated power	P _{rated}	kW	0.55	0.75	1.1	1.5
Rated power	P _{rated}	hp	0.75	1	1.5	2
Mains voltage range			3 AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	4.7	5.8	7.7	9.4
with mains choke		A	-			
Apparent output power		kVA	1.2	1.6	2.2	2.6
Rated output current						
2 kHz		A	-	3.8	5	7.2
4 kHz		A	2.9	3.8	5	7.2
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	30		38	45
4 kHz		W	32		40	48
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	3.6	4.8	6.3	9
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	4.8	6.4	8.4	12
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.8	2.4	3.2	4.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	3.9			12
Min. Brake resistor		Ω	100			33
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	60			80



Technical data

3-phase mains connection 230/240 V "Light Duty"
Rated data

Product name			i550-P1.5/230-2	i550-P2.2/230-2	i550-P3.0/230-3	i550-P4.0/230-3
Rated power	P _{rated}	kW	2.2	3	4	5.5
Rated power	P _{rated}	hp	3	4	5	7.5
Mains voltage range			3 AC 170 V ... 264 V, 45 Hz ... 65 Hz		3 AC 180 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	11.4	16.4	17.3	23.8
with mains choke		A	-			
Apparent output power		kVA	3.6	4.9	6.2	8.7
Rated output current						
2 kHz		A	8.4	11.5	14.4	19.8
4 kHz		A	8.4	11.5	14.4	19.8
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	10.5	14.4	18	24.8
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	5.3	7.2	9	12.4
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	14	19.2	24	33
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	5.3	7.2	9	12.4
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	12		26	
Min. Brake resistor		Ω	33		15	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	80		100	

Technical data

3-phase mains connection 230/240 V "Light Duty"

Rated data



Product name			i550-P5.5/230-3	i550-P7.5/230-3	i550-P15/230-3	i550-P18/230-3
Rated power	P _{rated}	kW	7.5	11	18.5	22
Rated power	P _{rated}	hp	10	15	25	30
Mains voltage range			3 AC 180 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 230/240			
Rated mains current						
without mains choke		A	33.1	40	71	90
with mains choke		A	-			
Apparent output power		kVA	11	15.8	24.4	30.7
Rated output current						
2 kHz		A	27.6	34.8	64.8	81.6
4 kHz		A	27.6	34.8	64.8	81.6
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	172	242	404	489
4 kHz		W	183	258	430	521
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	34.5	43.5	81	102
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	17.3	21.8	40.5	51
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	46	58	108	136
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	17.3	21.8	40.5	51
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	26	30	48.8	
Min. Brake resistor		Ω	15	13	8	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100	200		



7.6.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data 59](#)

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.55/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P0.75/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.1/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P1.5/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P2.2/230-2 (IP31)	65	gG/gL, gRL	40	5	B	32	≥ 30	Typ B
i550-P3.0/230-3 (IP31)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P4.0/230-3 (IP31)	65	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P5.5/230-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P7.5/230-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 30	Typ B
i550-P15/230-3 (IP31)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B
i550-P18/230-3 (IP31)	5	gG/gL, gRL	125	5	B	125	≥ 30	Typ B

7.6.3 Connection data

▶ [Connection data 110](#)

7.6.4 Brake resistors

▶ [Assignment to inverters with protection class IP31 111](#)



7.7 3-phase mains connection 400 V



A mains choke is integrated in the following inverters:

- i550-P30/400-3
- i550-P37/400-3
- i550-P45/400-3
- i550-P55/400-3
- i550-P75/400-3

7.7.1 Rated data



For inverters ≥ 15 kW, EMC category C2 is only valid for the switching frequencies 2 kHz and 4 kHz.

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).



Technical data

3-phase mains connection 400 V
Rated data

Product name			i550-P0.37/400-3	i550-P0.55/400-3	i550-P0.75/400-3	i550-P1.1/400-3
Rated power	P _{rated}	kW	0.37	0.55	0.75	1.1
Rated power	P _{rated}	hp	0.5	0.75	1	1.5
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	1.8	2.5	3.3	4.4
with mains choke		A	-			
Apparent output power		kVA	0.9	1.2	1.6	2.1
Rated output current						
2 kHz		A	-	1.8	2.4	3.2
4 kHz		A	1.3	1.8	2.4	3.2
8 kHz		A	1.3	1.8	2.4	3.2
12 kHz		A	1	1.4	1.9	2.9
16 kHz		A	0.9	1.2	1.4	2.1
Power loss						
2 kHz		W	19	24	30	38
4 kHz		W	20	25	32	40
8 kHz		W	24	31	40	51
12 kHz		W	23	30	38	54
16 kHz		W	22	28	35	49
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	2	2.7	3.6	4.8
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1	1.4	1.8	2.4
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	2.6	3.6	4.8	6.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1	1.4	1.8	2.4
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	1.9			4.8
Min. Brake resistor		Ω	390			150
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3			
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	60			80

Technical data

3-phase mains connection 400 V
Rated data



Product name			i550-P1.5/400-3	i550-P2.2/400-3	i550-P3.0/400-3	i550-P4.0/400-3
Rated power	P _{rated}	kW	1.5	2.2	3	4
Rated power	P _{rated}	hp	2	3	4	5
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	5.4	7.8	9.6	12.5
with mains choke		A	-			
Apparent output power		kVA	2.6	3.8	4.9	6.4
Rated output current						
2 kHz		A	3.9	5.6	7.3	9.5
4 kHz		A	3.9	5.6	7.3	9.5
8 kHz		A	3.9	5.6	7.3	9.5
12 kHz		A	3.5	5	5.8	7.6
16 kHz		A	2.6	3.7	4.9	6.3
Power loss						
2 kHz		W	45	62	79	102
4 kHz		W	48	66	84	108
8 kHz		W	61	85	109	140
12 kHz		W	65	91	104	133
16 kHz		W	58	81	104	133
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	5.9	8.4	11	14.3
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2.9	4.2	5.5	7.1
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	7.8	11.2	14.6	19
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2.9	4.2	5.5	7.1
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	4.8		8.8	15.4
Min. Brake resistor		Ω	150		82	47
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3		-	
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	80		100	



Technical data

3-phase mains connection 400 V
Rated data

Product name			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P15/400-3
Rated power	P _{rated}	kW	5.5	7.5	11	15
Rated power	P _{rated}	hp	7.5	10	15	20
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	17.2	20	28.4	37
with mains choke		A	-			
Apparent output power		kVA	8.7	11	15.8	21.5
Rated output current						
2 kHz		A	13	16.5	23.5	32
4 kHz		A	13	16.5	23.5	32
8 kHz		A	13	16.5	23.5	32
12 kHz		A	10.4	14.9	21.2	25.6
16 kHz		A	8.7	11	15.7	21.3
Power loss						
2 kHz		W	137	172	242	328
4 kHz		W	145	183	258	349
8 kHz		W	189	238	337	457
12 kHz		W	180	255	361	435
16 kHz		W	180	227	321	435
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	19.5	24.8	35	48
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	9.8	12.4	17.6	24
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	26	33	47	64
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	9.8	12.4	17.6	24
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	15.4	27	40	
Min. Brake resistor		Ω	47	27	18	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	20			15
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	100	200		

Technical data

3-phase mains connection 400 V
Rated data



Product name			i550-P18/400-3	i550-P22/400-3	i550-P30/400-3	i550-P37/400-3
Rated power	P _{rated}	kW	18.5	22	30	37
Rated power	P _{rated}	hp	25	30	40	50
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	46	53	54.9	68
with mains choke		A	-			
Apparent output power		kVA	26.8	31.5	39.3	48.9
Rated output current						
2 kHz		A	40	47	61	76
4 kHz		A	40	47	61	76
8 kHz		A	40	47	61	76
12 kHz		A	32	37.6	48.8	60.8
16 kHz		A	26.6	31.3	40.6	50.6
Power loss						
2 kHz		W	408	479	755	933
4 kHz		W	435	510	794	982
8 kHz		W	569	668	990	1227
12 kHz		W	543	636	923	1143
16 kHz		W	542	636	903	1119
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	60	70.5	91.5	114
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	30	35.3	45.75	57
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	80	94	122	152
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	30	35.3	45.75	57
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	48		97	
Min. Brake resistor		Ω	15		7.5	
Max. shielded motor cable length						
without EMC category		m	50		100	
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	15			
Category C3 (≤ 8 kHz)		m	35		15	
Max. unshielded motor cable length						
without EMC category		m	200		100	



Technical data

3-phase mains connection 400 V
Rated data

Product name			i550-P45/400-3	i550-P55/400-3	i550-P75/400-3
Rated power	P _{rated}	kW	45	55	75
Rated power	P _{rated}	hp	60	75	100
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz		
Output voltage		V	3 AC 0 ... 400		
Rated mains current					
without mains choke		A	80	99	135
with mains choke		A	-		
Apparent output power		kVA	57.3	70.8	96.6
Rated output current					
2 kHz		A	89	110	150
4 kHz		A	89	110	150
8 kHz		A	89	110	150
12 kHz		A	71.2	88	120
16 kHz		A	59.3	73.3	100.5
Power loss					
2 kHz		W	1089	1400	1898
4 kHz		W	1147	1471	1995
8 kHz		W	1433	1825	2478
12 kHz		W	1335	1692	2297
16 kHz		W	1306	1650	2239
Overcurrent cycle 180 s					
Max. output current (≤ 8 kHz)		A	133.5	165	225
Overload time	T ₁	s	60	60	60
Recovery time	T ₂	s	120	120	120
Max. Output current during the recovery time		A	66.75	82.5	112.5
Overcurrent cycle 15 s					
Max. output current (≤ 8 kHz)		A	178	220	300
Overload time	T ₁	s	3	3	3
Recovery time	T ₂	s	12	12	12
Max. Output current during the recovery time		A	66.75	82.5	112.5
Cyclic mains switching			3-mal pro Minute	1-mal pro Minute	
Brake chopper					
Max. output current		A	97	154	
Min. Brake resistor		Ω	7.5	4.7	
Max. shielded motor cable length					
without EMC category		m	100	200	
Category C1 (≤ 8 kHz)		m	-		
Category C2 (≤ 8 kHz)		m	15		
Category C3 (≤ 8 kHz)		m	15	100	
Max. unshielded motor cable length					
without EMC category		m	100	200	



7.7.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data](#) 59

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.37/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P3.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P3.0/400-3 (IP66)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP66)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P15/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P15/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P30/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P37/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P45/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P55/400-3 (IP55)	10	gR	200	10	B	200	≥ 300	Typ B
i550-P75/400-3 (IP55)	10	gR	200	10	B	200	≥ 300	Typ B



7.7.3 Connection data

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75
Connection			Mains connection				
Connection designation			X100				
Connection system			Screw terminal				
Connection type			Non-pluggable				
Max. Cable cross-section		mm ²	4	16	35	50	95
Max. Cable cross-section		AWG	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	16	16	6	2
Stripping length		mm	10	11	18	22	32
Stripping length		in	0.4	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 75
Connection			Schutzerde (PE)			
Connection designation			Symbol for protective earth (PE)			
Connection system			Schraube			Bolzen
Max. Cable cross-section		mm ²	6	16	25	95
Max. Cable cross-section		AWG	10	6	4	4/0
Min. Cable cross-section		mm ²	1.5	2.5	4	35
Min. Cable cross-section		AWG	16	14	12	2
Stripping length		mm	10	12	16	-
Stripping length		in	0.4	0.47	0.63	-
Tightening torque		Nm	2	3.4	4	10
Tightening torque		lb-in	18	30	35	90
Required tools			Torx key 20	Crosstip screwdriver PZ2		Wrench size 13

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75
Connection			Motor				
Connection designation			X105				
Connection system			Screw terminal				
Connection type			Non-pluggable				
Max. Cable cross-section		mm ²	4	16	35	50	95
Max. Cable cross-section		AWG	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	16	16	6	2
Stripping length		mm	10	11	18	22	32
Stripping length		in	0.4	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0

Technical data

3-phase mains connection 400 V

Brake resistors

Assignment to inverters with protection class IP31



7.7.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.7.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	IP66
i550-P4.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66



Technical data

3-phase mains connection 400 V
Brake resistors
Assignment to inverters with protection class IP55

7.7.4.2 Assignment to inverters with protection class IP55

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kJ	mm	kg	
i550-P30/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P30/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P30/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P37/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P37/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P37/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P45/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P45/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P45/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P55/400-3	ERBS005R02K0WQN000	5	2000	300	125 x 200 x 897	9	IP66
i550-P55/400-3	ERBB005R07K5GKN000	5	7500	1125	260 x 270 x 467	8.1	IP54
i550-P55/400-3	ERBB005R23K0GKN000	5	23000	3450	392 x 270 x 717	19.2	IP54
i550-P75/400-3	ERBB005R07K5GKN000	5	7500	1125	260 x 270 x 467	8.1	IP54
i550-P75/400-3	ERBB005R23K0GKN000	5	23000	3450	392 x 270 x 717	19.2	IP54
i550-P75/400-3	ERBS005R02K0WQN000	5	2000	300	125 x 200 x 897	9	IP66

Technical data

3-phase mains connection 400 V

Brake resistors

Assignment to inverters with protection class IP66



7.7.4.3 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.55/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	IP66
i550-P4.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66



7.8 3-phase mains connection 400 V "Light Duty"

(Only inverters with protection class IP31 / UL Type 1)

7.8.1 Rated data



For inverters ≥ 15 kW, EMC category C2 is only valid for the switching frequencies 2 kHz and 4 kHz.

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

3-phase mains connection 400 V "Light Duty"

Rated data



Product name			i550-P0.37/400-3	i550-P0.55/400-3	i550-P0.75/400-3	i550-P1.1/400-3
Rated power	P _{rated}	kW	0.55	0.75	1.1	1.5
Rated power	P _{rated}	hp	0.75	1	1.5	2
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	1.8	2.5	4.5	5
with mains choke		A	-			
Apparent output power		kVA	0.9	1.6	2.1	2.6
Rated output current						
2 kHz		A	-	2.2	2.9	3.8
4 kHz		A	1.6	2.2	2.9	3.8
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	24	30	38	45
4 kHz		W	25	32	40	48
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	2	2.7	3.6	4.8
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1	1.4	1.8	2.4
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	2.6	3.6	4.8	6.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1	1.4	1.8	2.4
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	1.9			4.8
Min. Brake resistor		Ω	390			150
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3			
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	60			80



Technical data

3-phase mains connection 400 V "Light Duty"
Rated data

Product name			i550-P1.5/400-3	i550-P2.2/400-3	i550-P3.0/400-3	i550-P4.0/400-3
Rated power	P _{rated}	kW	2.2	3	4	5.5
Rated power	P _{rated}	hp	3	4	5	7.5
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	6.1	8.7	10.3	14
with mains choke		A	-			
Apparent output power		kVA	3.6	4.9	6.4	8.7
Rated output current						
2 kHz		A	4.7	6.7	8.8	11.9
4 kHz		A	4.7	6.7	8.8	11.9
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	5.9	8.4	11	14.3
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2.9	4.2	5.5	7.1
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	7.8	11.2	14.6	19
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2.9	4.2	5.5	7.1
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	4.8		8.8	15.4
Min. Brake resistor		Ω	150		82	47
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3		-	
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	80		100	

Technical data

3-phase mains connection 400 V "Light Duty"

Rated data



Product name			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P15/400-3
Rated power	P _{rated}	kW	7.5	11	15	18.5
Rated power	P _{rated}	hp	10	15	20	25
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 400			
Rated mains current						
without mains choke		A	18.3	28	34.2	43.6
with mains choke		A	-			
Apparent output power		kVA	11	15.8	21.5	25.8
Rated output current						
2 kHz		A	15.6	23	28.2	38.4
4 kHz		A	15.6	23	28.2	38.4
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	172	242	340	392
4 kHz		W	183	258	361	418
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	19.5	24.8	35	48
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	9.8	12.4	17.6	24
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	26	33	47	64
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	9.8	12.4	17.6	24
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	15.4	27		40
Min. Brake resistor		Ω	47	27		18
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	20			15
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	100	200		



Technical data

3-phase mains connection 400 V "Light Duty"
Rated data

Product name			i550-P18/400-3	i550-P22/400-3
Rated power	P _{rated}	kW	22	30
Rated power	P _{rated}	hp	30	40
Mains voltage range			3 AC 340 V ... 440 V, 45 Hz ... 65 Hz	
Output voltage		V	3 AC 0 ... 400	
Rated mains current				
without mains choke		A	54.5	64
with mains choke		A	-	
Apparent output power		kVA	32.2	37.8
Rated output current				
2 kHz		A	48	56.4
4 kHz		A	48	56.4
8 kHz		A	-	
12 kHz		A	-	
16 kHz		A	-	
Power loss				
2 kHz		W	489	573
4 kHz		W	521	611
8 kHz		W	-	
12 kHz		W	-	
16 kHz		W	-	
Overcurrent cycle 180 s				
Max. output current (≤ 8 kHz)		A	60	70.5
Overload time	T ₁	s	60	60
Recovery time	T ₂	s	120	120
Max. Output current during the recovery time		A	30	35.3
Overcurrent cycle 15 s				
Max. output current (≤ 8 kHz)		A	80	94
Overload time	T ₁	s	3	3
Recovery time	T ₂	s	12	12
Max. Output current during the recovery time		A	30	35.3
Cyclic mains switching			3-mal pro Minute	
Brake chopper				
Max. output current		A	48	
Min. Brake resistor		Ω	15	
Max. shielded motor cable length				
without EMC category		m	50	
Category C1 (≤ 8 kHz)		m	-	
Category C2 (≤ 8 kHz)		m	15	
Category C3 (≤ 8 kHz)		m	35	
Max. unshielded motor cable length				
without EMC category		m	200	

Technical data

3-phase mains connection 400 V "Light Duty"

Fusing data (EN 60204-1)



7.8.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data 59](#)

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P3.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P15/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B

7.8.3 Connection data

[▶ Connection data 125](#)

7.8.4 Brake resistors

[▶ Assignment to inverters with protection class IP31 126](#)



7.9 3-phase mains connection 480 V



A mains choke is integrated in the following inverters:

- i550-P30/400-3
 - i550-P37/400-3
 - i550-P45/400-3
 - i550-P55/400-3
 - i550-P75/400-3
-

7.9.1 Rated data



For inverters ≥ 15 kW, EMC category C2 is only valid for the switching frequencies 2 kHz and 4 kHz.

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

3-phase mains connection 480 V

Rated data



Product name			i550-P0.37/400-3	i550-P0.55/400-3	i550-P0.75/400-3	i550-P1.1/400-3
Rated power	P _{rated}	kW	0.37	0.55	0.75	1.1
Rated power	P _{rated}	hp	0.5	0.75	1	1.5
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	1.5	2.1	2.8	3.7
with mains choke		A	-			
Apparent output power		kVA	0.9	1.3	1.7	2.4
Rated output current						
2 kHz		A	-	1.6	2.1	3
4 kHz		A	1.1	1.6	2.1	3
8 kHz		A	1.1	1.6	2.1	3
12 kHz		A	0.9	1.3	1.7	2.7
16 kHz		A	0.7	1.1	1.3	2
Power loss						
2 kHz		W	19	24	30	38
4 kHz		W	20	25	32	40
8 kHz		W	24	31	40	51
12 kHz		W	23	30	38	54
16 kHz		W	22	28	35	49
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	1.7	2.4	3.2	4.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	0.8	1.2	1.6	2.3
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	2.2	3.2	4.2	6
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	0.8	1.2	1.6	2.3
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	2			5.2
Min. Brake resistor		Ω	390			150
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3			
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	60			80



Technical data

3-phase mains connection 480 V
Rated data

Product name			i550-P1.5/400-3	i550-P2.2/400-3	i550-P3.0/400-3	i550-P4.0/400-3
Rated power	P _{rated}	kW	1.5	2.2	3	4
Rated power	P _{rated}	hp	2	3	4	5
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	4.5	6.5	8	10.5
with mains choke		A	-			
Apparent output power		kVA	2.8	3.9	5.1	6.6
Rated output current						
2 kHz		A	3.5	4.8	6.3	8.2
4 kHz		A	3.5	4.8	6.3	8.2
8 kHz		A	3.5	4.8	6.3	8.2
12 kHz		A	3.2	4.3	5	6.6
16 kHz		A	2.3	3.2	4.2	5.5
Power loss						
2 kHz		W	45	62	79	102
4 kHz		W	48	66	84	108
8 kHz		W	61	85	109	140
12 kHz		W	65	91	104	133
16 kHz		W	58	81	104	133
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	5.3	7.2	9.5	12.3
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2.6	3.6	4.7	6.2
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	7	9.6	12.6	16.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2.6	3.6	4.7	6.2
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	5.2		9.5	16.6
Min. Brake resistor		Ω	150		82	47
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3		-	
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	80		100	

Technical data

3-phase mains connection 480 V

Rated data



Product name			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P15/400-3
Rated power	P _{rated}	kW	5.5	7.5	11	15
Rated power	P _{rated}	hp	7.5	10	15	20
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	14.3	16.6	23.7	30.7
with mains choke		A	-			
Apparent output power		kVA	8.9	11.3	16.9	21.7
Rated output current						
2 kHz		A	11	14	21	27
4 kHz		A	11	14	21	27
8 kHz		A	11	14	21	27
12 kHz		A	8.8	12.6	18.9	21.6
16 kHz		A	7.3	9.3	14	18
Power loss						
2 kHz		W	137	172	242	328
4 kHz		W	145	183	258	349
8 kHz		W	189	238	337	457
12 kHz		W	180	255	361	435
16 kHz		W	180	227	321	435
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	16.5	21	31.5	40.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	8.3	10.5	15.8	20.3
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	22	28	42	54
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	8.3	10.5	15.8	20.3
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	16.6	29	43	
Min. Brake resistor		Ω	47	27	18	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	20			15
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	100	200		



Technical data

3-phase mains connection 480 V
Rated data

Product name			i550-P18/400-3	i550-P22/400-3	i550-P30/400-3	i550-P37/400-3
Rated power	P _{rated}	kW	18.5	22	30	37
Rated power	P _{rated}	hp	25	30	40	50
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	38	44.2	45.7	57
with mains choke		A	-			
Apparent output power		kVA	27.4	32.5	40.2	50.2
Rated output current						
2 kHz		A	34	40.4	52	65
4 kHz		A	34	40.4	52	65
8 kHz		A	34	40.4	52	65
12 kHz		A	27.2	32.3	41.6	52
16 kHz		A	22.6	26.9	34.6	43.3
Power loss						
2 kHz		W	408	479	755	933
4 kHz		W	435	510	794	982
8 kHz		W	569	668	990	1227
12 kHz		W	543	636	923	1143
16 kHz		W	542	636	903	1119
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	51	60.6	78	97.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	25.5	30.3	39	48.75
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	68	80.8	104	130
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	25.5	30.3	39	48.75
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	52		104	
Min. Brake resistor		Ω	15		7.5	
Max. shielded motor cable length						
without EMC category		m	50		100	
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	15			
Category C3 (≤ 8 kHz)		m	35		15	
Max. unshielded motor cable length						
without EMC category		m	200		100	

Technical data

3-phase mains connection 480 V

Rated data



Product name			i550-P45/400-3	i550-P55/400-3	i550-P75/400-3	i550-P0.75/600-3
Rated power	P _{rated}	kW	45	55	75	0.75
Rated power	P _{rated}	hp	60	75	100	1
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	66.7	83	113	2.0
with mains choke		A	-			
Apparent output power		kVA	59.5	74.2	95.8	1.4
Rated output current						
2 kHz		A	77	96	124	1.7
4 kHz		A	77	96	124	1.7
8 kHz		A	77	96	124	1.7
12 kHz		A	61.6	76.8	99.2	1.3
16 kHz		A	51.3	63.9	83.1	-
Power loss						
2 kHz		W	1089	1400	1898	27
4 kHz		W	1147	1471	1995	28
8 kHz		W	1433	1825	2478	35
12 kHz		W	1335	1692	2297	32
16 kHz		W	1306	1650	2239	-
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	115.5	144	186	2.6
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	57.75	72	93	1.3
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	154	192	248	3.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	57.75	72	93	1.3
Cyclic mains switching			3-mal pro Minute	1-mal pro Minute		3-mal pro Minute
Brake chopper						
Max. output current		A	104	166		1.7
Min. Brake resistor		Ω	7.5	4.7		470
Max. shielded motor cable length						
without EMC category		m	100	200		50
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	15			-
Category C3 (≤ 8 kHz)		m	15	100		-
Max. unshielded motor cable length						
without EMC category		m	100	200		60



Technical data

3-phase mains connection 480 V
Rated data

Product name			i550-P1.5/600-3	i550-P2.2/600-3	i550-P4.0/600-3	i550-P5.5/600-3
Rated power	P _{rated}	kW	1.5	2.2	4	5.5
Rated power	P _{rated}	hp	2	3	5	7.5
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	3.2	4.4	6.8	10.2
with mains choke		A	-			
Apparent output power		kVA	2.2	3.1	4.9	7.2
Rated output current						
2 kHz		A	2.7	3.9	6.1	9
4 kHz		A	2.7	3.9	6.1	9
8 kHz		A	2.7	3.9	6.1	9
12 kHz		A	2.1	3.0	4.6	6.8
16 kHz		A	-			
Power loss						
2 kHz		W	39	53	80	115
4 kHz		W	41	56	85	122
8 kHz		W	52	72	109	158
12 kHz		W	47	66	99	144
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	4.1	5.9	9.15	13.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2	2.9	4.575	6.75
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	5.4	7.8	12.2	18
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2	2.9	4.575	6.75
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	4.3		9.5	
Min. Brake resistor		Ω	180		82	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	80		100	

Technical data

3-phase mains connection 480 V
Rated data



Product name			i550-P7.5/600-3	i550-P11/600-3	i550-P15/600-3	i550-P18/600-3
Rated power	P _{rated}	kW	7.5	11	15	18.5
Rated power	P _{rated}	hp	10	15	20	25
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	12.4	19.7	27	34
with mains choke		A	-			
Apparent output power		kVA	8.9	13.7	17.7	21.7
Rated output current						
2 kHz		A	11	17	22	27
4 kHz		A	11	17	22	27
8 kHz		A	11	17	22	27
12 kHz		A	8.4	12.9	16.7	20.5
16 kHz		A	-		14.7	18
Power loss						
2 kHz		W	139	211	272	332
4 kHz		W	148	225	289	354
8 kHz		W	192	293	378	462
12 kHz		W	174	266	342	419
16 kHz		W	-		360	440
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	16.5	25.5	33	40.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	8.25	12.75	16.5	20.25
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	22	34	44	54
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	8.25	12.75	16.5	20.25
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	20		54	
Min. Brake resistor		Ω	39		18	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			



Technical data

3-phase mains connection 480 V
Rated data

Product name			i550-P22/600-3	i550-P30/600-3	i550-P37/600-3	i550-P45/600-3
Rated power	P _{rated}	kW	22	30	37	45
Rated power	P _{rated}	hp	30	40	50	60
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	40	51	65	77
with mains choke		A	-			
Apparent output power		kVA	25.8	33	41.8	49.9
Rated output current						
2 kHz		A	32	41	52	62
4 kHz		A	32	41	52	62
8 kHz		A	32	41	-	
12 kHz		A	24.3	-		
16 kHz		A	21.3	-		
Power loss						
2 kHz		W	392	501	634	754
4 kHz		W	418	534	676	804
8 kHz		W	547	699	-	
12 kHz		W	495	-		
16 kHz		W	521	-		
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	48	61.5	65	77.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	24	30.75	39	46.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	64	82	82	82
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	24	30.75	39	46.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	54			
Min. Brake resistor		Ω	18			
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			

Technical data

3-phase mains connection 480 V

Fusing data (EN 60204-1)



7.9.2 Fusing data (EN 60204-1)



-
- A residual current device (**RCD**) is optional.
 - **I_{cc}** = Rated conditional short-circuit current
 - Fusing data for UL/NEC compliant installations:
 - ▶ [Connection according to UL, Fusing data](#) 59
-



Technical data

3-phase mains connection 480 V
Fusing data (EN 60204-1)

Inverter	Fuse			Circuit breaker			RCD	
	Icc	Characteristic	Max. rated current	Icc	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.37/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP66)	65	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P3.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P3.0/400-3 (IP66)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP66)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP66)	65	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P15/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P15/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP66)	65	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P30/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P37/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P45/400-3 (IP55)	10	gG/gL, gRL	125	10	B	125	≥ 300	Typ B
i550-P55/400-3 (IP55)	10	gR	200	10	B	200	≥ 300	Typ B
i550-P75/400-3 (IP55)	10	gR	200	10	B	200	≥ 300	Typ B
i550-P0.75/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P0.75/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP66)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP66)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP66)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP66)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P15/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P15/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P22/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B

Technical data

3-phase mains connection 480 V

Fusing data (EN 60204-1)



Inverter	Fuse			Circuit breaker			RCD	
	Icc	Characteristic	Max. rated current	Icc	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P22/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P37/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P37/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P45/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P45/600-3 (IP66)	10	gG/gL, gRL	110	-	-		≥ 300	Typ B



7.9.3 Connection data

Connection data for i550-Pxxx/400-3 inverters

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75
Connection			Mains connection				
Connection designation			X100				
Connection system			Screw terminal				
Connection type			Non-pluggable				
Max. Cable cross-section		mm ²	4	16	35	50	95
Max. Cable cross-section		AWG	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	16	16	6	2
Stripping length		mm	10	11	18	22	32
Stripping length		in	0.4	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 75
Connection			Schutzerde (PE)			
Connection designation			Symbol for protective earth (PE)			
Connection system			Schraube			Bolzen
Max. Cable cross-section		mm ²	6	16	25	95
Max. Cable cross-section		AWG	10	6	4	4/0
Min. Cable cross-section		mm ²	1.5	2.5	4	35
Min. Cable cross-section		AWG	16	14	12	2
Stripping length		mm	10	12	16	-
Stripping length		in	0.4	0.47	0.63	-
Tightening torque		Nm	2	3.4	4	10
Tightening torque		lb-in	18	30	35	90
Required tools			Torx key 20	Crosstip screwdriver PZ2		Wrench size 13

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22	30 ... 45	55 ... 75
Connection			Motor				
Connection designation			X105				
Connection system			Screw terminal				
Connection type			Non-pluggable				
Max. Cable cross-section		mm ²	4	16	35	50	95
Max. Cable cross-section		AWG	10	6	2	1/0	4/0
Min. Cable cross-section		mm ²	1.0	1.5	1.5	10	25
Min. Cable cross-section		AWG	18	16	16	6	2
Stripping length		mm	10	11	18	22	32
Stripping length		in	0.4	0.43	0.7	0.87	1.25
Tightening torque		Nm	0.5	1.2	3.8	4	10
Tightening torque		lb-in	4.4	11	34	35	90
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5	Hex key 5.0	Hex key 6.0

Connection data for i550-Pxxx/600-3 inverters: [▶ Connection data](#) 166

Technical data

3-phase mains connection 480 V

Brake resistors

Assignment to inverters with protection class IP31



7.9.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.9.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/400-3	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	IP66
i550-P4.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66

Brake resistors for i550-Pxxx/**600-3** inverters: ▶ [Assignment to inverters with protection class IP31](#) 167



Technical data

3-phase mains connection 480 V

Brake resistors

Assignment to inverters with protection class IP55

7.9.4.2 Assignment to inverters with protection class IP55

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kJ	mm	kg	
i550-P30/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P30/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P30/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P37/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P37/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P37/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P45/400-3	ERBS075D01K2WQN000	7.5	1200	180	105 x 114 x 1020	5.6	IP66
i550-P45/400-3	ERBS075D04K0WQN000	7.5	4000	600	105 x 279 x 1100	18.2	IP66
i550-P45/400-3	ERBB075D14K0GKN000	7.5	14000	2100	310 x 270 x 597	12.3	IP54
i550-P55/400-3	ERBS005R02K0WQN000	5	2000	300	125 x 200 x 897	9	IP66
i550-P55/400-3	ERBB005R07K5GKN000	5	7500	1125	260 x 270 x 467	8.1	IP54
i550-P55/400-3	ERBB005R23K0GKN000	5	23000	3450	392 x 270 x 717	19.2	IP54
i550-P75/400-3	ERBS005R02K0WQN000	5	2000	300	125 x 200 x 897	9	IP66
i550-P75/400-3	ERBB005R07K5GKN000	5	7500	1125	260 x 270 x 467	8.1	IP54
i550-P75/400-3	ERBB005R23K0GKN000	5	23000	3450	392 x 270 x 717	19.2	IP54

Technical data

3-phase mains connection 480 V

Brake resistors

Assignment to inverters with protection class IP66



7.9.4.3 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.37/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.37/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.55/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBU390R015WAQN000	390	15	2.25	83 x 24 x 24	0.2	IP66
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	IP66
i550-P4.0/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P4.0/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/400-3	ERBU150R015WAQN000	150	15	2.25	83 x 24 x 24	0.2	IP66
i550-P5.5/400-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/400-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/400-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/400-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/400-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/400-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/400-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/400-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/400-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66

Brake resistors for i550-Pxxx/600-3 inverters: [► Assignment to inverters with protection class IP66](#) 168



7.10 3-phase mains connection 480 V "Light Duty"

(Only inverters with protection class IP31 / UL Type 1)

7.10.1 Rated data



For inverters ≥ 15 kW, EMC category C2 is only valid for the switching frequencies 2 kHz and 4 kHz.

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

3-phase mains connection 480 V "Light Duty"

Rated data



Product name			i550-P0.37/400-3	i550-P0.55/400-3	i550-P0.75/400-3	i550-P1.1/400-3
Rated power	P _{rated}	kW	0.55	0.75	1.1	1.5
Rated power	P _{rated}	hp	0.75	1	1.5	2
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	1.5	2.1	3.9	4.2
with mains choke		A	-			
Apparent output power		kVA	1.3	1.7	2.4	2.8
Rated output current						
2 kHz		A	-	1.9	2.5	3.6
4 kHz		A	1.3	1.9	2.5	3.6
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	24	30	38	45
4 kHz		W	25	32	40	48
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	1.7	2.4	3.2	4.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	0.8	1.2	1.6	2.3
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	2.2	3.2	4.2	6
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	0.8	1.2	1.6	2.3
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	2			5.2
Min. Brake resistor		Ω	390			150
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3			
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	60			80



Technical data

3-phase mains connection 480 V "Light Duty"
Rated data

Product name			i550-P1.5/400-3	i550-P2.2/400-3	i550-P3.0/400-3	i550-P4.0/400-3
Rated power	P _{rated}	kW	2.2	3	4	5.5
Rated power	P _{rated}	hp	3	4	5	7.5
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	5.1	7.3	8.6	11.2
with mains choke		A	-			
Apparent output power		kVA	3.9	5.1	6.6	8.9
Rated output current						
2 kHz		A	4.2	5.8	7.6	9.8
4 kHz		A	4.2	5.8	7.6	9.8
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	5.3	7.2	9.5	12.3
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2.6	3.6	4.7	6.2
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	7	9.6	12.6	16.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2.6	3.6	4.7	6.2
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	5.2		9.5	16.6
Min. Brake resistor		Ω	150		82	47
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	3		-	
Category C2 (≤ 8 kHz)		m	20			
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	80		100	

Technical data

3-phase mains connection 480 V "Light Duty"

Rated data



Product name			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P15/400-3
Rated power	P _{rated}	kW	7.5	11	15	18.5
Rated power	P _{rated}	hp	10	15	20	25
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	15.3	22	30.5	36.8
with mains choke		A	-			
Apparent output power		kVA	11.3	16.9	21.7	26.1
Rated output current						
2 kHz		A	13.2	18.3	25.2	32.4
4 kHz		A	13.2	18.3	25.2	32.4
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	172	242	340	392
4 kHz		W	183	258	361	418
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	16.5	21	31.5	40.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	8.3	10.5	15.8	20.3
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	22	28	42	54
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	8.3	10.5	15.8	20.3
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	16.6	29	43	
Min. Brake resistor		Ω	47	27	18	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	20			15
Category C3 (≤ 8 kHz)		m	35			
Max. unshielded motor cable length						
without EMC category		m	100	200		



Technical data

3-phase mains connection 480 V "Light Duty"
Rated data

Product name			i550-P18/400-3	i550-P22/400-3	i550-P0.75/600-3	i550-P1.5/600-3
Rated power	P _{rated}	kW	22	30	1.1	2.2
Rated power	P _{rated}	hp	30	40	1.5	3
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	46.3	55	2.7	4.2
with mains choke		A	-			
Apparent output power		kVA	32.8	39.0	1.6	2.6
Rated output current						
2 kHz		A	40.8	48.5	2	3.2
4 kHz		A	40.8	48.5	2	3.2
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	489	573	31	45
4 kHz		W	521	611	32	48
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	51	60.6	2.6	4.1
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	25.5	30.3	1.3	2
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	68	80.8	3.4	5.4
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	25.5	30.3	1.3	2
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	52		1.7	4.3
Min. Brake resistor		Ω	15		470	180
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	15		-	
Category C3 (≤ 8 kHz)		m	35		-	
Max. unshielded motor cable length						
without EMC category		m	200		60	80

Technical data

3-phase mains connection 480 V "Light Duty"

Rated data



Product name			i550-P2.2/600-3	i550-P4.0/600-3	i550-P5.5/600-3	i550-P7.5/600-3
Rated power	P _{rated}	kW	3	5.5	7.5	11
Rated power	P _{rated}	hp	4	7.5	10	15
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	6.1	9.1	12.4	15.2
with mains choke		A	-			
Apparent output power		kVA	3.8	6.4	8.7	12.2
Rated output current						
2 kHz		A	4.7	7.9	10.8	13.2
4 kHz		A	4.7	7.9	10.8	13.2
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	62	102	136	165
4 kHz		W	66	108	145	176
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	5.9	9.2	13.5	16.5
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	2.9	4.575	6.75	8.25
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	7.8	12.2	18	22
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	2.9	4.575	6.75	8.25
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	4.3	9.5	20	
Min. Brake resistor		Ω	180	82	39	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	80	100		



Technical data

3-phase mains connection 480 V "Light Duty"
Rated data

Product name			i550-P11/600-3	i550-P15/600-3	i550-P18/600-3	i550-P22/600-3
Rated power	P _{rated}	kW	15	18.5	22	30
Rated power	P _{rated}	hp	20	25	30	40
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 480			
Rated mains current						
without mains choke		A	25.3	34	40	51
with mains choke		A	-			
Apparent output power		kVA	16.4	21.7	25.8	33
Rated output current						
2 kHz		A	22.0	27	32	41
4 kHz		A	22.0	27	32	41
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	272	332	392	501
4 kHz		W	289	354	418	534
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	25.5	33	40.5	48
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	12.75	16.5	20.25	24
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	34	44	54	64
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	12.75	16.5	20.25	24
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	20	54		
Min. Brake resistor		Ω	39	18		
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			

Technical data

3-phase mains connection 480 V "Light Duty"
Rated data



Product name			i550-P30/600-3
Rated power	P _{rated}	kW	37
Rated power	P _{rated}	hp	50
Mains voltage range			3 AC 432 V ... 528 V, 45 Hz ... 65 Hz
Output voltage		V	3 AC 0 ... 480
Rated mains current			
without mains choke		A	65
with mains choke		A	-
Apparent output power		kVA	41.8
Rated output current			
2 kHz		A	52
4 kHz		A	52
8 kHz		A	-
12 kHz		A	-
16 kHz		A	-
Power loss			
2 kHz		W	634
4 kHz		W	676
8 kHz		W	-
12 kHz		W	-
16 kHz		W	-
Overcurrent cycle 180 s			
Max. output current (≤ 8 kHz)		A	61.5
Overload time	T ₁	s	60
Recovery time	T ₂	s	120
Max. Output current during the recovery time		A	30.75
Overcurrent cycle 15 s			
Max. output current (≤ 8 kHz)		A	82
Overload time	T ₁	s	3
Recovery time	T ₂	s	12
Max. Output current during the recovery time		A	30.75
Cyclic mains switching			3-mal pro Minute
Brake chopper			
Max. output current		A	54
Min. Brake resistor		Ω	18
Max. shielded motor cable length			
without EMC category		m	50
Category C1 (≤ 8 kHz)		m	-
Category C2 (≤ 8 kHz)		m	-
Category C3 (≤ 8 kHz)		m	-
Max. unshielded motor cable length			
without EMC category		m	100



7.10.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
▶ [Connection according to UL, Fusing data](#) 59

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A	kA		A	mA	
i550-P0.37/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.55/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P0.75/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.1/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P1.5/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P2.2/400-3 (IP31)	5	gG/gL, gRL	32	5	B	32	≥ 30	Typ B
i550-P3.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P4.0/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P5.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P7.5/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P11/400-3 (IP31)	5	gG/gL, gRL	50	5	B	50	≥ 30	Typ B
i550-P15/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P18/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P22/400-3 (IP31)	5	gG/gL, gRL	80	5	B	80	≥ 300	Typ B
i550-P0.75/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P15/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P15/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 30	Typ B
i550-P18/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 30	Typ B
i550-P22/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P22/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 30	Typ B
i550-P30/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 30	Typ B

7.10.3 Connection data

▶ [Connection data](#) 147

7.10.4 Brake resistors

▶ [Assignment to inverters with protection class IP31](#) 148



7.11 3-phase mains connection 600 V



The inverters i550-Pxxx/**600-3** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

7.11.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 45 °C (113 °F).
- At switching frequency 8 kHz, 12 kHz or 16 kHz: Ambient temperature max. 40 °C (104 °F).



Technical data

3-phase mains connection 600 V
Rated data

Product name			i550-P0.75/600-3	i550-P1.5/600-3	i550-P2.2/600-3	i550-P4.0/600-3
Rated power	P _{rated}	kW	0.75	1.5	2.2	4
Rated power	P _{rated}	hp	1	2	3	5
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 600			
Rated mains current						
without mains choke		A	2.0	3.2	4.4	6.8
with mains choke		A	-			
Apparent output power		kVA	1.7	2.7	3.9	6.1
Rated output current						
2 kHz		A	1.7	2.7	3.9	6.1
4 kHz		A	1.7	2.7	3.9	6.1
8 kHz		A	1.7	2.7	3.9	6.1
12 kHz		A	1.3	2.1	3.0	4.6
16 kHz		A	-			
Power loss						
2 kHz		W	32	47	65	98
4 kHz		W	33	49	69	104
8 kHz		W	42	63	88	135
12 kHz		W	38	58	81	123
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	2.6	4.1	5.9	9.15
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.3	2	2.9	4.575
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	3.4	5.4	7.8	12.2
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.3	2	2.9	4.575
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	2.1	5.4	11.9	
Min. Brake resistor		Ω	470	180	82	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	60	80	100	

Technical data

3-phase mains connection 600 V

Rated data



Product name			i550-P5.5/600-3	i550-P7.5/600-3	i550-P11/600-3	i550-P15/600-3
Rated power	P _{rated}	kW	5.5	7.5	11	15
Rated power	P _{rated}	hp	7.5	10	15	20
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 600			
Rated mains current						
without mains choke		A	10.2	12.4	19.7	27
with mains choke		A	-			
Apparent output power		kVA	9.1	11.1	17.1	22.1
Rated output current						
2 kHz		A	9	11	17	22
4 kHz		A	9	11	17	22
8 kHz		A	9	11	17	22
12 kHz		A	6.8	8.4	12.9	16.7
16 kHz		A	-			14.7
Power loss						
2 kHz		W	142	172	263	338
4 kHz		W	151	183	280	360
8 kHz		W	196	238	365	471
12 kHz		W	178	216	331	426
16 kHz		W	-			448
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	13.5	16.5	25.5	33
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	6.75	8.25	12.75	16.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	18	22	34	44
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	6.75	8.25	12.75	16.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	11.9	25		54
Min. Brake resistor		Ω	82	39		18
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			



Technical data

3-phase mains connection 600 V
Rated data

Product name			i550-P18/600-3	i550-P22/600-3	i550-P30/600-3	i550-P37/600-3
Rated power	P _{rated}	kW	18.5	22	30	37
Rated power	P _{rated}	hp	25	30	40	50
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 600			
Rated mains current						
without mains choke		A	34	40	51	65
with mains choke		A	-			
Apparent output power		kVA	27.2	32.2	41.2	52.3
Rated output current						
2 kHz		A	27	32	41	52
4 kHz		A	27	32	41	52
8 kHz		A	27	32	41	-
12 kHz		A	20.5	24.3	-	
16 kHz		A	18	21.3	-	
Power loss						
2 kHz		W	413	489	625	791
4 kHz		W	441	521	666	843
8 kHz		W	576	682	872	-
12 kHz		W	522	618	-	
16 kHz		W	549	649	-	
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	40.5	48	61.5	65
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	20.25	24	30.75	39
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	54	64	82	82
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	20.25	24	30.75	39
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	54			
Min. Brake resistor		Ω	18			
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			

Technical data

3-phase mains connection 600 V
Rated data



Product name			i550-P45/600-3
Rated power	P _{rated}	kW	45
Rated power	P _{rated}	hp	60
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz
Output voltage		V	3 AC 0 ... 600
Rated mains current			
without mains choke		A	77
with mains choke		A	-
Apparent output power		kVA	62.4
Rated output current			
2 kHz		A	62
4 kHz		A	62
8 kHz		A	-
12 kHz		A	-
16 kHz		A	-
Power loss			
2 kHz		W	942
4 kHz		W	1004
8 kHz		W	-
12 kHz		W	-
16 kHz		W	-
Overcurrent cycle 180 s			
Max. output current (≤ 8 kHz)		A	77.5
Overload time	T ₁	s	60
Recovery time	T ₂	s	120
Max. Output current during the recovery time		A	46.5
Overcurrent cycle 15 s			
Max. output current (≤ 8 kHz)		A	82
Overload time	T ₁	s	3
Recovery time	T ₂	s	12
Max. Output current during the recovery time		A	46.5
Cyclic mains switching			3-mal pro Minute
Brake chopper			
Max. output current		A	54
Min. Brake resistor		Ω	18
Max. shielded motor cable length			
without EMC category		m	50
Category C1 (≤ 8 kHz)		m	-
Category C2 (≤ 8 kHz)		m	-
Category C3 (≤ 8 kHz)		m	-
Max. unshielded motor cable length			
without EMC category		m	100



7.11.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
[▶ Connection according to UL, Fusing data 59](#)

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A			A	mA	
i550-P0.75/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P0.75/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP66)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP66)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP66)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP66)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP66)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P15/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P15/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P22/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P22/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P37/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P37/600-3 (IP66)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P45/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P45/600-3 (IP66)	10	gG/gL, gRL	110	-	-		≥ 300	Typ B



7.11.3 Connection data

Rated power	P _{rated}	kW	0.75 ... 5.5	7.5 ... 11	15 ... 45
Connection			Netz		
Connection designation			X100		
Connection system			Screw terminal		
Connection type			Non-pluggable		
Max. Cable cross-section		mm ²	4	16	35
Max. Cable cross-section		AWG	10	6	2
Min. Cable cross-section		mm ²	1.0	1.5	1.5
Min. Cable cross-section		AWG	18	16	16
Stripping length		mm	10	11	18
Stripping length		in	0.4	0.43	0.7
Tightening torque		Nm	0.5	1.2	3.8
Tightening torque		lb-in	4.4	11	34
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5

Rated power	P _{rated}	kW	0.75 ... 5.5	7.5 ... 11	15 ... 45
Connection			Schutzerde (PE)		
Connection system			Schraube		
Max. Cable cross-section		mm ²	6	16	25
Max. Cable cross-section		AWG	10	6	4
Min. Cable cross-section		mm ²	1.5	2.5	4
Min. Cable cross-section		AWG	16	14	12
Stripping length		mm	10	12	16
Stripping length		in	0.4	0.47	0.63
Tightening torque		Nm	2	3.4	4
Tightening torque		lb-in	18	30	35
Required tools			Torx key 20	Crosstip screwdriver PZ2	

Rated power	P _{rated}	kW	0.75 ... 5.5	7.5 ... 11	15 ... 45
Connection			Motor		
Connection designation			X105		
Connection system			Screw terminal		
Connection type			Non-pluggable		
Max. Cable cross-section		mm ²	4	16	35
Max. Cable cross-section		AWG	10	6	2
Min. Cable cross-section		mm ²	1.0	1.5	1.5
Min. Cable cross-section		AWG	18	16	16
Stripping length		mm	10	11	18
Stripping length		in	0.4	0.43	0.7
Tightening torque		Nm	0.5	1.2	3.8
Tightening torque		lb-in	4.4	11	34
Required tools			Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 1.0 x 5.5



7.11.4 Brake resistors



Further information on brake resistors and their design can be found in the brochure "[Accessories for frequency inverters and servo inverters](#)".

7.11.4.1 Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.75/600-3	ERBS470R150WNQN600	470	150	22.5	120 x 124 x 255	1.6	IP66
i550-P1.5/600-3	ERBS180R350WNQN600	180	350	52.5	120 x 124 x 355	2.7	IP66
i550-P2.2/600-3	ERBS180R350WNQN600	180	350	52.5	120 x 124 x 355	2.7	IP66
i550-P4.0/600-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/600-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/600-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/600-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/600-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/600-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/600-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/600-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/600-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/600-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/600-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/600-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/600-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/600-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/600-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/600-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/600-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/600-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/600-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66

Technical data

3-phase mains connection 600 V

Brake resistors

Assignment to inverters with protection class IP66



7.11.4.2 Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Type designation	Rated resistance	Rated power	Thermal capacity	Dimensions (H x W x D)	Weight	Degree of protection
		Ω	W	kWs	mm	kg	
i550-P0.75/600-3	ERBS470R150WNQN600	470	150	22.5	120 x 124 x 255	1.6	IP66
i550-P1.5/600-3	ERBS180R350WNQN600	180	350	52.5	120 x 124 x 355	2.7	IP66
i550-P2.2/600-3	ERBS180R350WNQN600	180	350	52.5	120 x 124 x 355	2.7	IP66
i550-P4.0/600-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P4.0/600-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P5.5/600-3	ERBS047R400W	47	400	60	400 x 114 x 105	2.3	IP66
i550-P5.5/600-3	ERBS047R800W	47	800	120	710 x 114 x 105	4	IP66
i550-P7.5/600-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P7.5/600-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P7.5/600-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P11/600-3	ERBS027R600W	27	600	90	550 x 114 x 105	3.1	IP66
i550-P11/600-3	ERBS027R01K2	27	1200	180	1020 x 114 x 105	5.6	IP66
i550-P11/600-3	ERBS027R01K4	27	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/600-3	ERBS018R800W	18	800	120	710 x 114 x 105	4	IP66
i550-P15/600-3	ERBS018R01K4	18	1400	210	1110 x 114 x 105	6.3	IP66
i550-P15/600-3	ERBS018R04K5WQN000	18	4500	675	895 x 301 x 280	31	IP66
i550-P18/600-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P18/600-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P18/600-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66
i550-P22/600-3	ERBS015R800W	15	800	120	710 x 114 x 105	4	IP66
i550-P22/600-3	ERBS015R02K4	15	2400	360	1020 x 204 x 105	10	IP66
i550-P22/600-3	ERBS015R06K3WQN000	15	6300	945	1095 x 301 x 280	39	IP66



7.12 3-phase mains connection 600 V "Light Duty"

(Only inverters with protection class IP31 / UL Type 1)



The inverters i550-Pxxx/**600-3** do not have an integrated RFI filter in the AC mains supply.

- In order to meet the EMC requirements according to EN IEC 61800-3, an external EMC filter according to IEC EN 60939 must be used.
- Suitable EMC filters can be obtained directly from Lenze as accessories.
- The user must verify that the conformity with EN IEC 61800-3 is fulfilled.

7.12.1 Rated data

The output currents apply to these operating conditions:

- At switching frequency 2 kHz or 4 kHz: Ambient temperature max. 40 °C (104 °F).

Technical data

3-phase mains connection 600 V "Light Duty"

Rated data



Product name			i550-P0.75/600-3	i550-P1.5/600-3	i550-P2.2/600-3	i550-P4.0/600-3
Rated power	P _{rated}	kW	1.1	2.2	3	5.5
Rated power	P _{rated}	hp	1.5	3	4	7.5
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 600			
Rated mains current						
without mains choke		A	2.7	4.2	6.1	9.1
with mains choke		A	-			
Apparent output power		kVA	2.1	3.3	4.7	7.9
Rated output current						
2 kHz		A	2	3.2	4.7	7.9
4 kHz		A	2	3.2	4.7	7.9
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	37	55	77	126
4 kHz		W	39	58	81	134
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	2.6	4.1	5.9	9.2
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	1.3	2	2.9	4.575
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	3.4	5.4	7.8	12.2
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	1.3	2	2.9	4.575
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	2.1	5.4	11.9	
Min. Brake resistor		Ω	470	180	82	
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	60	80	100	



Technical data

3-phase mains connection 600 V "Light Duty"
Rated data

Product name			i550-P5.5/600-3	i550-P7.5/600-3	i550-P11/600-3	i550-P15/600-3
Rated power	P _{rated}	kW	7.5	11	15	18.5
Rated power	P _{rated}	hp	10	15	20	25
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz			
Output voltage		V	3 AC 0 ... 600			
Rated mains current						
without mains choke		A	12.4	15.2	25.3	34
with mains choke		A	-			
Apparent output power		kVA	10.9	15.2	20.5	27.2
Rated output current						
2 kHz		A	10.8	13.2	22.0	27
4 kHz		A	10.8	13.2	22.0	27
8 kHz		A	-			
12 kHz		A	-			
16 kHz		A	-			
Power loss						
2 kHz		W	169	205	338	413
4 kHz		W	180	218	360	441
8 kHz		W	-			
12 kHz		W	-			
16 kHz		W	-			
Overcurrent cycle 180 s						
Max. output current (≤ 8 kHz)		A	13.5	16.5	25.5	33
Overload time	T ₁	s	60	60	60	60
Recovery time	T ₂	s	120	120	120	120
Max. Output current during the recovery time		A	6.75	8.25	12.75	16.5
Overcurrent cycle 15 s						
Max. output current (≤ 8 kHz)		A	18	22	34	44
Overload time	T ₁	s	3	3	3	3
Recovery time	T ₂	s	12	12	12	12
Max. Output current during the recovery time		A	6.75	8.25	12.75	16.5
Cyclic mains switching			3-mal pro Minute			
Brake chopper						
Max. output current		A	11.9	25		54
Min. Brake resistor		Ω	82	39		18
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (≤ 8 kHz)		m	-			
Category C2 (≤ 8 kHz)		m	-			
Category C3 (≤ 8 kHz)		m	-			
Max. unshielded motor cable length						
without EMC category		m	100			

Technical data

3-phase mains connection 600 V "Light Duty"
Rated data



Product name			i550-P18/600-3	i550-P22/600-3	i550-P30/600-3
Rated power	P _{rated}	kW	22	30	37
Rated power	P _{rated}	hp	30	40	50
Mains voltage range			3 AC 540 V ... 660 V, 45 Hz ... 65 Hz		
Output voltage		V	3 AC 0 ... 600		
Rated mains current					
without mains choke		A	40	51	65
with mains choke		A	-		
Apparent output power		kVA	32.2	41.2	52.3
Rated output current					
2 kHz		A	32	41	52
4 kHz		A	32	41	52
8 kHz		A	-		
12 kHz		A	-		
16 kHz		A	-		
Power loss					
2 kHz		W	489	625	791
4 kHz		W	521	666	843
8 kHz		W	-		
12 kHz		W	-		
16 kHz		W	-		
Overcurrent cycle 180 s					
Max. output current (≤ 8 kHz)		A	40.5	48	61.5
Overload time	T ₁	s	60	60	60
Recovery time	T ₂	s	120	120	120
Max. Output current during the recovery time		A	20.25	24	30.75
Overcurrent cycle 15 s					
Max. output current (≤ 8 kHz)		A	54	64	82
Overload time	T ₁	s	3	3	3
Recovery time	T ₂	s	12	12	12
Max. Output current during the recovery time		A	20.25	24	30.75
Cyclic mains switching			3-mal pro Minute		
Brake chopper					
Max. output current		A	54		
Min. Brake resistor		Ω	18		
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (≤ 8 kHz)		m	-		
Category C2 (≤ 8 kHz)		m	-		
Category C3 (≤ 8 kHz)		m	-		
Max. unshielded motor cable length					
without EMC category		m	100		



7.12.2 Fusing data (EN 60204-1)



- A residual current device (RCD) is optional.
- **I_{cc}** = Rated conditional short-circuit current
- Fusing data for UL/NEC compliant installations:
▶ [Connection according to UL, Fusing data](#) 59

Inverter	Fuse			Circuit breaker			RCD	
	I _{cc}	Characteristic	Max. rated current	I _{cc}	Characteristic	Max. rated current		Type
	kA		A			A	mA	
i550-P0.75/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P1.5/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P2.2/600-3 (IP31)	65	gG/gL, gRL	20	-	-		≥ 30	Typ B
i550-P4.0/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P5.5/600-3 (IP31)	65	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P7.5/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P11/600-3 (IP31)	5	gG/gL, gRL	40	-	-		≥ 30	Typ B
i550-P15/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P18/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P22/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B
i550-P30/600-3 (IP31)	10	gG/gL, gRL	100	-	-		≥ 300	Typ B

7.12.3 Connection data

▶ [Connection data](#) 166

7.12.4 Brake resistors

▶ [Assignment to inverters with protection class IP31](#) 167



7.13 Ecodesign Directive

Product information acc. to REGULATION (EU) 2019/1781 (ANNEX I, Section 4)

Legend

Operating point (f; I) f = relative motor stator frequency; I = relative torque-producing current

Power losses The power losses at the operating points (f; I) and in the standby state refer to the rated apparent output power.
The power losses for options (e.g. for diagnostics) and for accessories can be found in the additional product documentation on the Internet.

Performance losses										
0; 25	f; I	%	1.9	1.0	0.9	1.9	2.1	1.8	1.8	1.1
0; 50	f; I	%	1.9	1.1	1.1	1.9	2.1	1.9	1.9	1.3
0; 100	f; I	%	2.1	1.5	1.4	2.1	2.3	2.1	2.1	1.6
50; 25	f; I	%	2.0	1.1	1.0	2.0	2.1	1.9	1.9	1.2
50; 50	f; I	%	2.0	1.3	1.2	2.0	2.2	2.0	2.0	1.4
50; 100	f; I	%	2.3	1.8	1.8	2.3	2.5	2.3	2.3	1.9
90; 50	f; I	%	2.1	1.4	1.4	2.1	2.3	2.2	2.1	1.5
90; 100	f; I	%	2.6	2.3	2.5	2.5	2.5	2.6	2.4	2.3
In standby mode		%	0.6	0.4	0.3	0.6	0.6	0.5	0.5	0.4
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA							
Commercial register number			-							
Model identifier of the product			I55AP137A	I55AP175A	I55AP211A	I55AP137B	I55AP137D	I55AP155B	I55AP155D	I55AP175B
Apparent output power		kVA	0.9	1.6	2.3	0.9	0.9	1.2	1.2	1.6
Indicative rated output power of the motor		kW	0.37	0.75	1.1	0.37	0.37	0.55	0.55	0.75
Rated output current		A	2.4	4.2	6	2.4	2.4	3.2	3.2	4.2
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	120			230				
Switching frequency		kHz	4							
Rated apparent output power		kVA	0.977	1.71	2.29	0.977	0.977	1.19	1.19	1.71



Performance losses										
0; 25	f; l	%	1.2	1.0	1.1	0.8	0.9	0.8	0.8	1.0
0; 50	f; l	%	1.3	1.2	1.2	1.0	1.0	0.9	1.0	1.1
0; 100	f; l	%	1.7	1.6	1.6	1.3	1.3	1.3	1.4	1.5
50; 25	f; l	%	1.2	1.1	1.1	0.9	0.9	0.8	0.9	1.0
50; 50	f; l	%	1.4	1.3	1.3	1.1	1.1	1.0	1.1	1.2
50; 100	f; l	%	1.9	1.8	1.8	1.6	1.6	1.6	1.6	1.7
90; 50	f; l	%	1.5	1.4	1.4	1.2	1.2	1.2	1.2	1.3
90; 100	f; l	%	2.0	2.3	2.0	2.1	1.8	2.2	1.9	1.8
In standby mode		%	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA							
Commercial register number			-							
Model identifier of the product			I55AP175D	I55AP211B	I55AP211D	I55AP215B	I55AP215D	I55AP222B	I55AP222D	I55AP230C
Apparent output power		kVA	1.6	2.3	2.3	2.6	2.6	3.6	3.6	4.5
Indicative rated output power of the motor		kW	0.75	1.1	1.1	1.5	1.5	2.2	2.2	3
Rated output current		A	4.2	6	6	7	7	9.6	9.6	12
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	230							
Switching frequency		kHz	4							
Rated apparent output power		kVA	1.71	2.29	2.29	3.3	3.3	4.44	4.44	5.85



Performance losses										
0; 25	f; I	%	0.9	0.7	0.6	0.5	1.3	1.3	1.0	0.9
0; 50	f; I	%	1.0	0.9	0.7	0.7	1.7	1.6	1.3	1.3
0; 100	f; I	%	1.4	1.4	1.2	1.2	2.8	2.7	2.3	2.4
50; 25	f; I	%	0.9	0.7	0.6	0.6	1.4	1.3	1.1	1.0
50; 50	f; I	%	1.2	1.0	0.8	0.8	1.8	1.8	1.5	1.4
50; 100	f; I	%	1.7	1.7	1.4	1.5	3.1	3.1	2.8	2.8
90; 50	f; I	%	1.3	1.1	0.9	0.9	2.0	1.9	1.7	1.7
90; 100	f; I	%	1.8	1.9	1.6	1.8	3.2	3.2	3.3	3.3
In standby mode		%	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA						Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY	
Commercial register number			-						Hannover HRB 204803	
Model identifier of the product			I55AP240C	I55AP255C	I55AP275C	I55AP311C	I55AP315C	I55AP318C	I55AP330C	I55AP345C
Apparent output power		kVA	6.2	8.7	10.9	15.8	20.8	26.2	34.4	57.9
Indicative rated output power of the motor		kW	4	5.5	7.5	11	15	18.5	30	45
Rated output current		A	16.5	23	29	42	54	68	89	150
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	230							
Switching frequency		kHz	4							
Rated apparent output power		kVA	7.38	9.95	14.4	19.5	19.5	23.9	38.2	68.4



Performance losses										
0; 25	f; l	%	4.1	3.2	2.1	1.9	1.3	1.2	1.3	1.2
0; 50	f; l	%	4.1	3.2	2.2	2.1	1.4	1.3	1.4	1.4
0; 100	f; l	%	4.3	3.5	2.5	2.4	1.7	1.6	1.7	1.7
50; 25	f; l	%	4.1	3.2	2.1	1.9	1.3	1.2	1.3	1.3
50; 50	f; l	%	4.1	3.3	2.3	2.1	1.5	1.3	1.5	1.4
50; 100	f; l	%	4.4	3.6	2.7	2.5	1.9	1.7	1.9	1.8
90; 50	f; l	%	4.2	3.4	2.3	2.2	1.5	1.4	1.5	1.5
90; 100	f; l	%	4.0	3.4	2.5	2.4	1.8	1.8	1.8	1.8
In standby mode		%	0.6	0.5	0.4	0.3	0.2	0.1	0.1	0.1
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA							
Commercial register number			-							
Model identifier of the product			I55AP137F	I55AP155F	I55AP175F	I55AP211F	I55AP215F	I55AP222F	I55AP230F	I55AP240F
Apparent output power		kVA	0.9	1.2	1.6	2.1	2.6	3.8	4.9	6.4
Indicative rated output power of the motor		kW	0.37	0.55	0.75	1.1	1.5	2.2	3	4
Rated output current		A	1.3	1.8	2.4	3.2	3.9	5.6	7.3	9.5
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	400							
Switching frequency		kHz	4							
Rated apparent output power		kVA	0.977	1.19	1.71	2.29	3.3	4.44	5.85	7.38



Performance losses										
0; 25	f; I	%	1.0	0.8	0.7	0.8	0.8	0.6	0.6	0.5
0; 50	f; I	%	1.2	0.9	0.8	1.0	1.0	0.8	0.7	0.7
0; 100	f; I	%	1.6	1.3	1.2	1.5	1.5	1.2	1.3	1.3
50; 25	f; I	%	1.1	0.8	0.7	0.8	0.8	0.7	0.6	0.6
50; 50	f; I	%	1.2	1.0	0.9	1.0	1.0	0.8	0.8	0.8
50; 100	f; I	%	1.8	1.5	1.4	1.6	1.7	1.4	1.4	1.4
90; 50	f; I	%	1.3	1.1	1.0	1.1	1.1	0.9	0.9	0.9
90; 100	f; I	%	1.8	1.5	1.5	1.6	1.7	1.5	1.5	1.6
In standby mode		%	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA						Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY	
Commercial register number			-						Hannover HRB 204803	
Model identifier of the product			I55AP255F	I55AP275F	I55AP311F	I55AP315F	I55AP318F	I55AP322F	I55AP330F	I55AP337F
Apparent output power		kVA	8.7	11	15.8	21.5	26.8	31.5	39.3	48.9
Indicative rated output power of the motor		kW	5.5	7.5	11	15	18.5	22	30	37
Rated output current		A	13	16.5	23.5	32	40	47	61	76
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50							
Rated input voltage		V	400							
Switching frequency		kHz	4							
Rated apparent output power		kVA	9.95	14.4	19.5	23.9	28.3	38.2	47	56.2



Performance losses										
0; 25	f; l	%	0.5	0.5	0.6	3.1	1.3	1.0	0.8	0.7
0; 50	f; l	%	0.7	0.7	0.8	3.3	1.3	1.1	0.9	0.8
0; 100	f; l	%	1.2	1.2	1.4	3.5	1.5	1.3	1.1	1.1
50; 25	f; l	%	0.5	0.5	0.6	3.2	1.3	1.0	0.8	0.7
50; 50	f; l	%	0.8	0.7	0.9	3.3	1.4	1.1	0.9	0.8
50; 100	f; l	%	1.4	1.4	1.7	3.6	1.6	1.3	1.1	1.1
90; 50	f; l	%	0.8	0.9	1.0	3.3	1.4	1.1	1.0	0.9
90; 100	f; l	%	1.6	1.6	1.9	3.7	1.6	1.4	1.2	1.2
In standby mode		%	0.0	0.0	0.0	0.9	0.3	0.2	0.1	0.1
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aersen · GERMANY			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA				
Commercial register number			Hannover HRB 204803			-				
Model identifier of the product			I55AP345F	I55AP355F	I55AP375F	I55AP175G	I55AP215G	I55AP222G	I55AP240G	I55AP255G
Apparent output power		kVA	57.3	70.8	96.6	1.7	2.7	3.9	6.1	9.1
Indicative rated output power of the motor		kW	45	55	75	0.75	1.5	2.2	4	5.5
Rated output current		A	89	110	150	1.7	2.7	3.9	6.1	9
Maximum operating temperature		°C	45							
Rated input frequency		Hz	50			60				
Rated input voltage		V	400			600				
Switching frequency		kHz	4							
Rated apparent output power		kVA	68.4	92.8	111	1.19	3.3	4.44	7.38	9.95



Performance losses										
0; 25	f; I	%	0.8	0.6	0.1	0.1	0.1	0.1	0.1	0.1
0; 50	f; I	%	0.9	0.7	0.2	0.2	0.2	0.2	0.2	0.1
0; 100	f; I	%	1.1	1.0	0.3	0.3	0.3	0.3	0.3	0.3
50; 25	f; I	%	0.8	0.6	0.2	0.2	0.1	0.1	0.1	0.1
50; 50	f; I	%	0.9	0.7	0.2	0.2	0.2	0.2	0.2	0.2
50; 100	f; I	%	1.2	1.0	0.4	0.4	0.4	0.4	0.4	0.4
90; 50	f; I	%	0.9	0.8	0.3	0.3	0.2	0.2	0.3	0.2
90; 100	f; I	%	1.3	1.2	1.3	1.3	1.2	1.2	1.2	1.2
In standby mode		%	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze Americas · 630 Douglas Street · Uxbridge, MA 01569 · USA							
Commercial register number			-							
Model identifier of the product			I55AP275G	I55AP311G	I55BP315G	I55BP318G	I55BP322G	I55BP330G	I55BP337G	I55BP345G
Apparent output power		kVA	11.1	17.1	22.1	27.2	32.2	41.2	52.3	62.4
Indicative rated output power of the motor		kW	7.5	11	15	18.5	22	30	37	45
Rated output current		A	11	17	22	27	32	41	52	62
Maximum operating temperature		°C	45							
Rated input frequency		Hz	60							
Rated input voltage		V	600							
Switching frequency		kHz	4							
Rated apparent output power		kVA	14.4	19.5	23.9	28.3	38.2	47	56.2	68.4



7.14 Dimensions



The specified installation clearances are minimum dimensions to ensure a sufficient air circulation for cooling purposes. They do not consider the bend radiuses of the connecting cables.



Several i5xx protec frequency inverters with IP55 (UL Type 12/12K) or IP66 (UL Type 4X outdoor) protection can be mounted directly next to each other, regardless of the device size. No installation clearance is required between the devices.

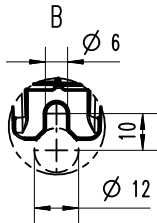
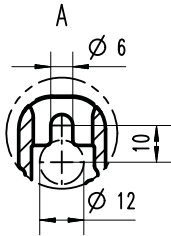
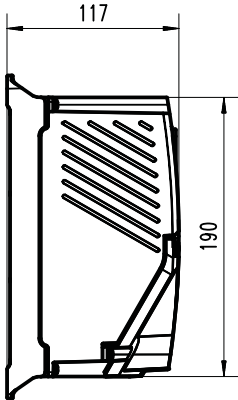
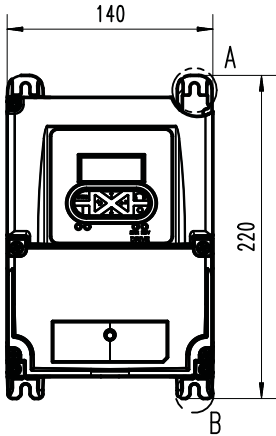
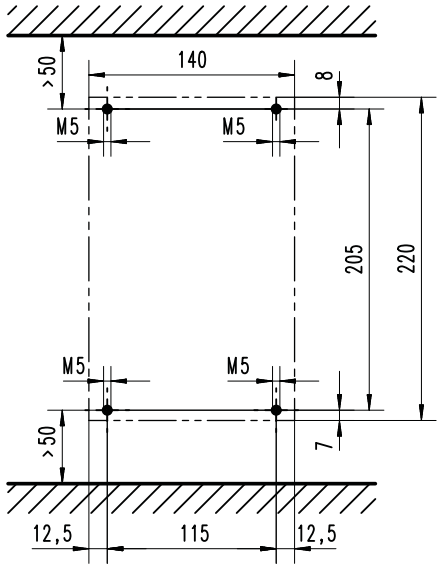
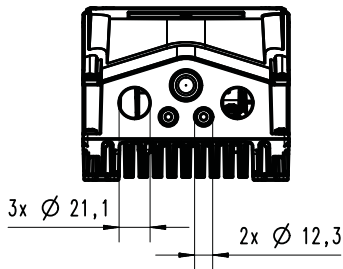
Dimensions for inverter without extension box



0.37 kW ... 0.75 kW

The dimensions in mm apply to:

0.37 kW	i550-P0.37/120-1	i550-P0.37/230-1	i550-P0.37/230-2	i550-P0.37/400-3	
0.55 kW		i550-P0.55/230-1	i550-P0.55/230-2	i550-P0.55/400-3	
0.75 kW		i550-P0.75/230-1	i550-P0.75/230-2	i550-P0.75/400-3	i550-P0.75/600-3
Weight	IP31: 1.7 kg IP66: 1.8 kg	IP66: 1.8 kg	IP31: 1.6 kg IP66: 1.7 kg	IP31: 1.7 kg IP66: 1.8 kg	IP31: 1.7 kg IP66: 1.8 kg



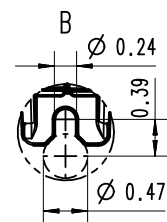
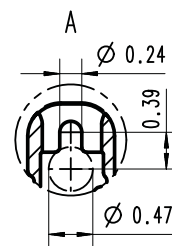
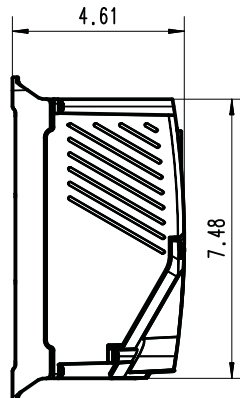
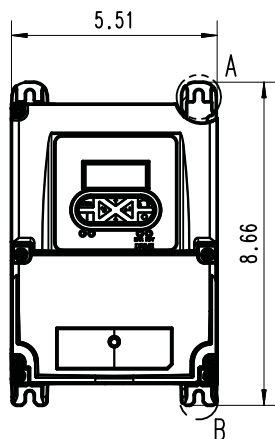
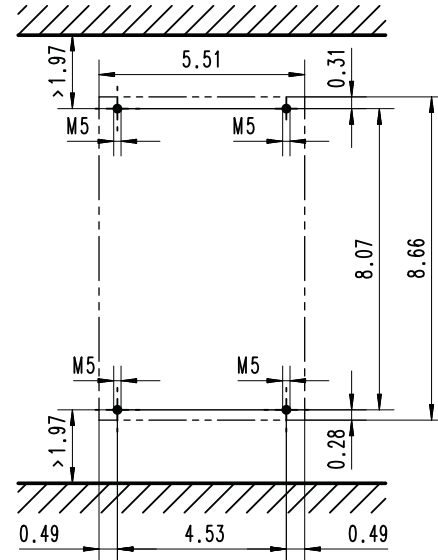
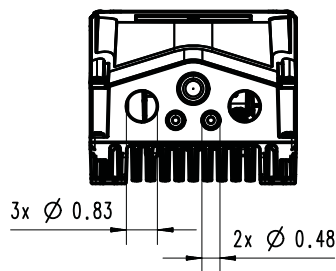
8800640



0.5 hp ... 1 hp

The dimensions in inch apply to:

0.5 hp	i550-P0.37/120-1	i550-P0.37/230-1	i550-P0.37/230-2	i550-P0.37/400-3	
0.75 hp		i550-P0.55/230-1	i550-P0.55/230-2	i550-P0.55/400-3	
1 hp		i550-P0.75/230-1	i550-P0.75/230-2	i550-P0.75/400-3	i550-P0.75/600-3
Weight	NEMA 1: 3.7 lb NEMA 4X: 4 lb	NEMA 4X: 4 lb	NEMA 1: 3.5 lb NEMA 4X: 3.7 lb	NEMA 1: 3.7 lb NEMA 4X: 4 lb	NEMA 1: 3.7 lb NEMA 4X: 4 lb



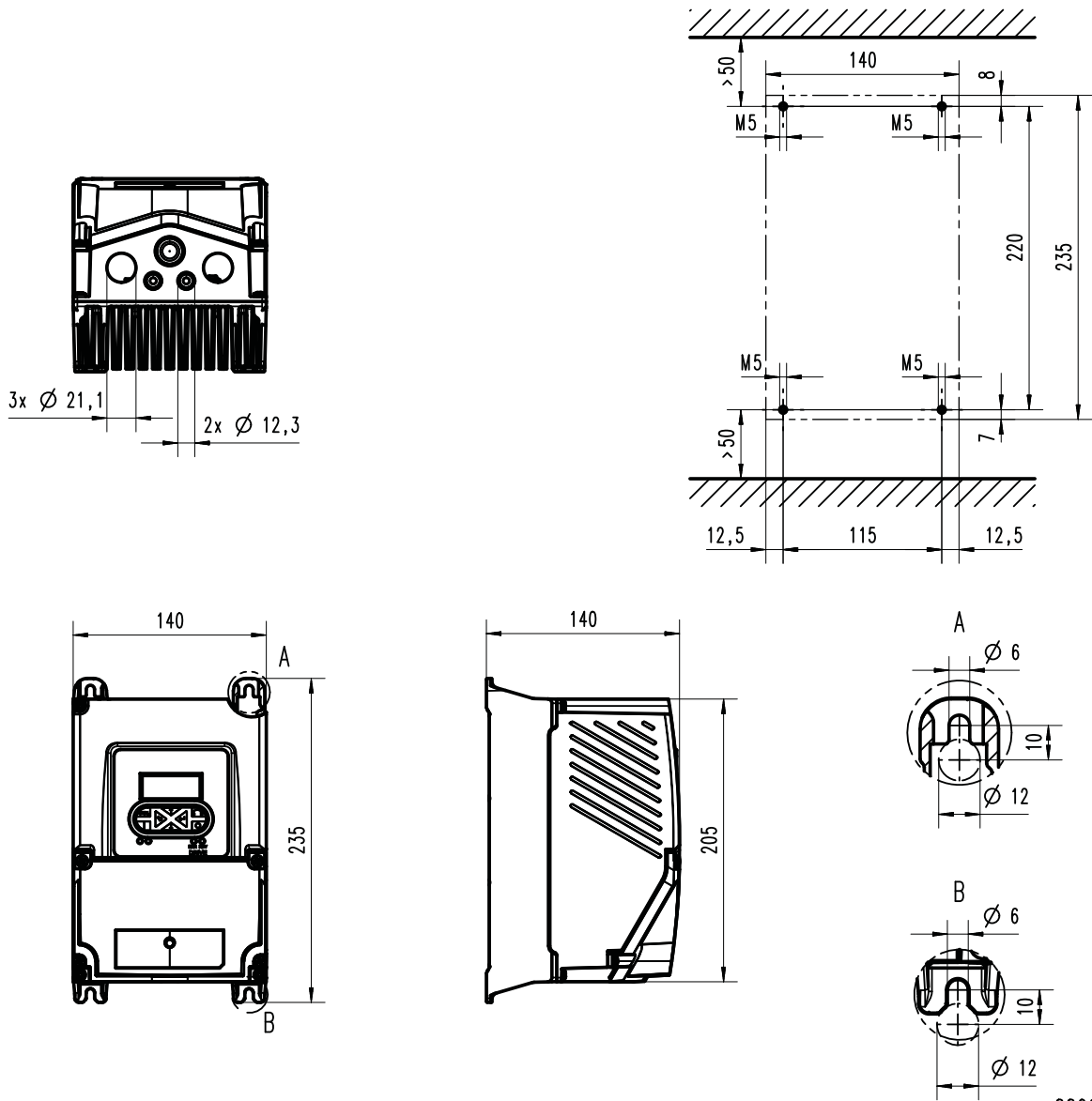
8800641



0.75 kW ... 2.2 kW

The dimensions in mm apply to:

0.75 kW	i550-P0.75/120-1				
1.1 kW	i550-P1.1/120-1	i550-P1.1/230-1	i550-P1.1/230-2	i550-P1.1/400-3	
1.5 kW		i550-P1.5/230-1	i550-P1.5/230-2	i550-P1.5/400-3	i550-P1.5/600-3
2.2 kW		i550-P2.2/230-1	i550-P2.2/230-2	i550-P2.2/400-3	i550-P2.2/600-3
Weight	IP31: 2.6 kg IP66: 2.7 kg	IP66: 2.7 kg	IP31: 2.5 kg IP66: 2.6 kg	IP31: 2.6 kg IP66: 2.7 kg	IP31: 2.6 kg IP66: 2.7 kg



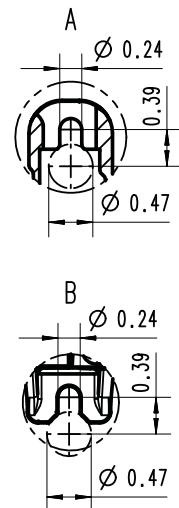
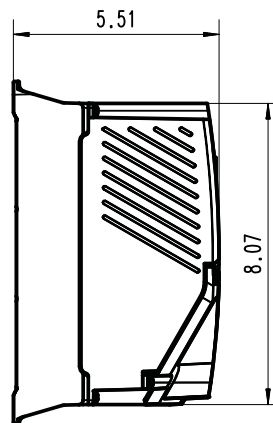
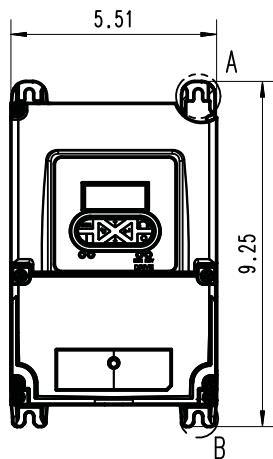
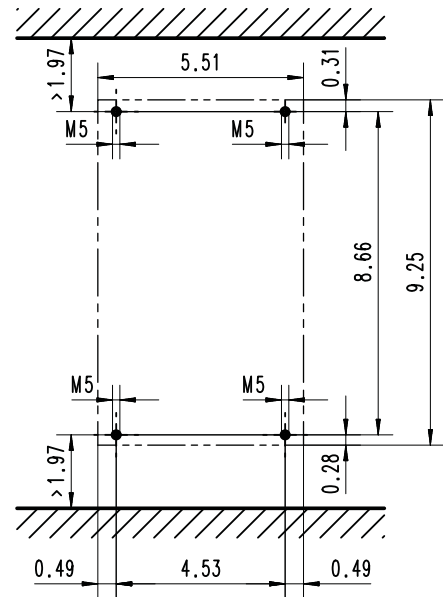
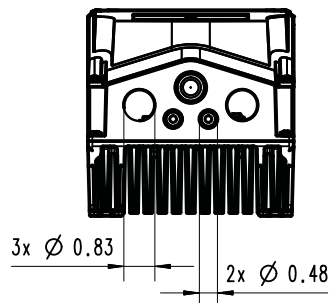
8800642



1 hp ... 3 hp

The dimensions in inch apply to:

1 hp	i550-P0.75/120-1				
1.5 hp	i550-P1.1/120-1	i550-P1.1/230-1	i550-P1.1/230-2	i550-P1.1/400-3	
2 hp		i550-P1.5/230-1	i550-P1.5/230-2	i550-P1.5/400-3	i550-P1.5/600-3
3 hp		i550-P2.2/230-1	i550-P2.2/230-2	i550-P2.2/400-3	i550-P2.2/600-3
Weight	NEMA 1: 5.7 lb NEMA 4X: 6 lb	NEMA 4X: 6 lb	NEMA 1: 5.5 lb NEMA 4X: 5.7 lb	NEMA 1: 5.7 lb NEMA 4X: 6 lb	NEMA 1: 5.7 lb NEMA 4X: 6 lb



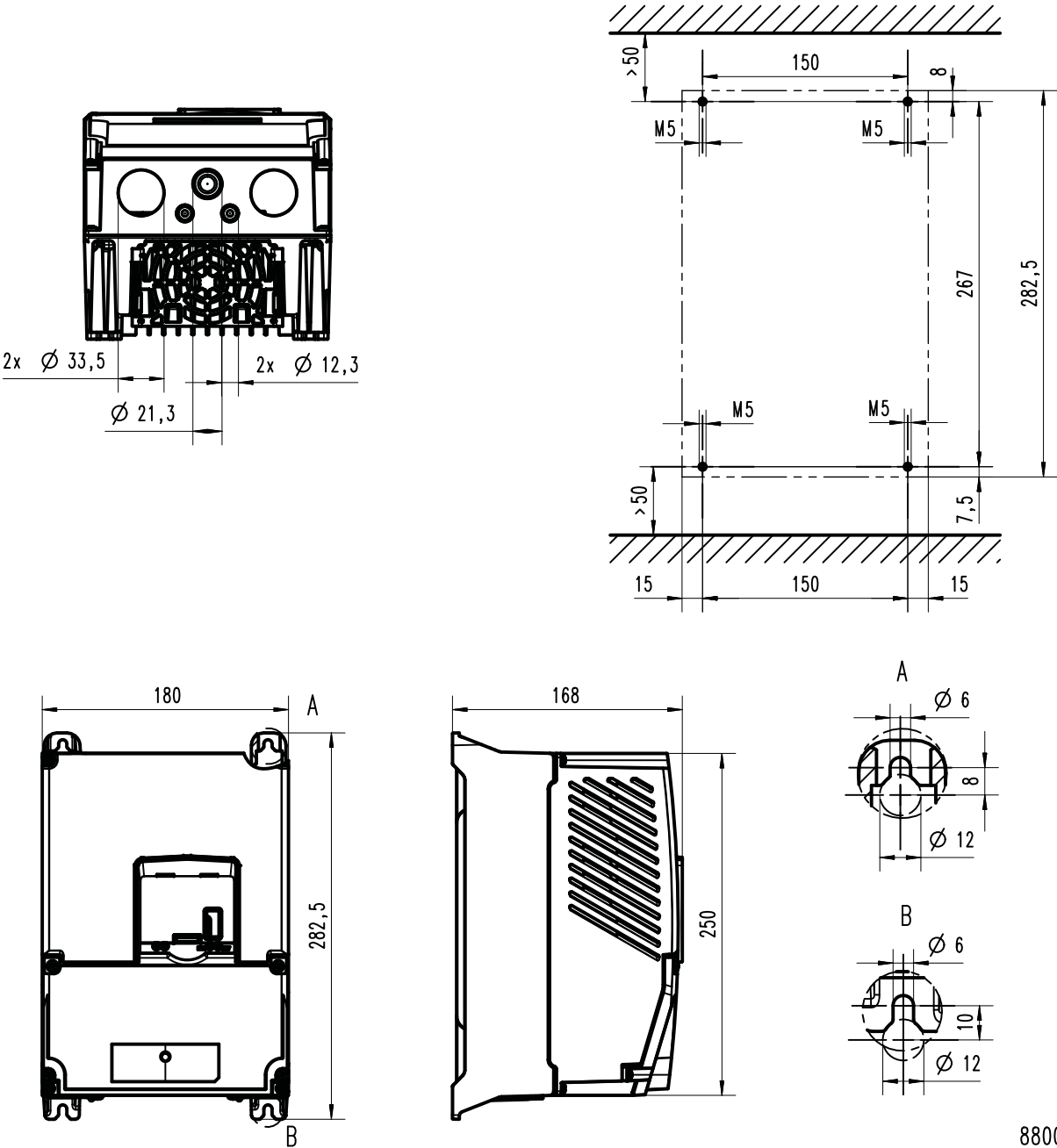
8800643



3 kW ... 5.5 kW

The dimensions in mm apply to:

3 kW	i550-P3.0/230-3	i550-P3.0/400-3	
4 kW	i550-P4.0/230-3	i550-P4.0/400-3	i550-P4.0/600-3
5.5 kW	i550-P5.5/230-3	i550-P5.5/400-3	i550-P5.5/600-3
Weight	IP31: 4.7 kg IP66: 4.8 kg	IP31: 4.8 kg IP66: 4.9 kg	IP31: 4.8 kg IP66: 4.9 kg



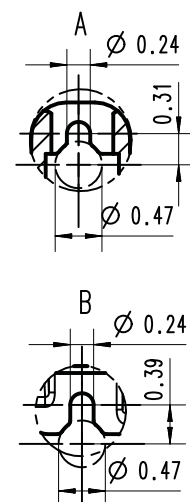
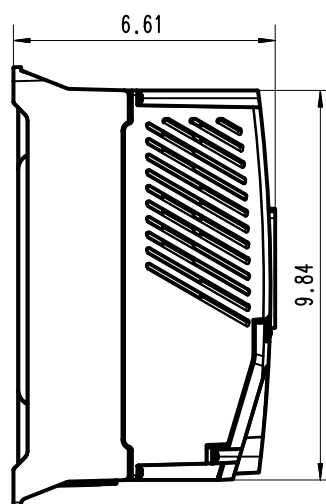
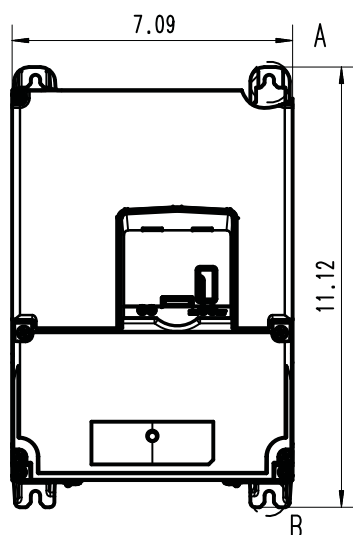
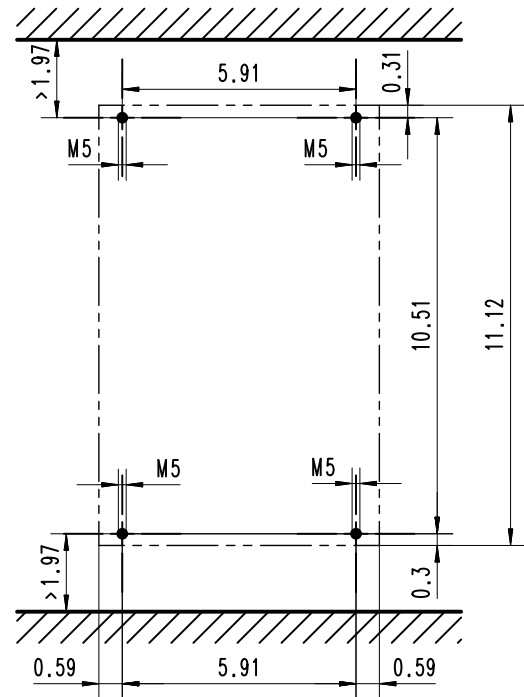
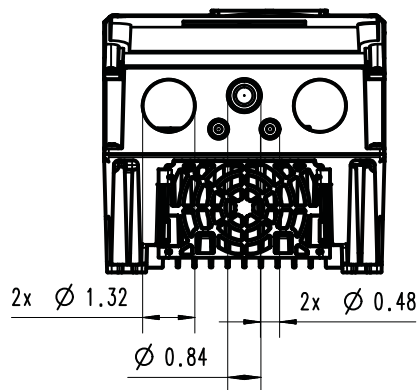
8800779



4 hp ... 7.5 hp

The dimensions in inch apply to:

4 hp	i550-P3.0/230-3	i550-P3.0/400-3	
5 hp	i550-P4.0/230-3	i550-P4.0/400-3	i550-P4.0/600-3
7.5 hp	i550-P5.5/230-3	i550-P5.5/400-3	i550-P5.5/600-3
Weight	NEMA 1: 10.4 lb NEMA 4X: 10.6 lb	NEMA 1: 10.6 lb NEMA 4X: 10.8 lb	NEMA 1: 10.6 lb NEMA 4X: 10.8 lb



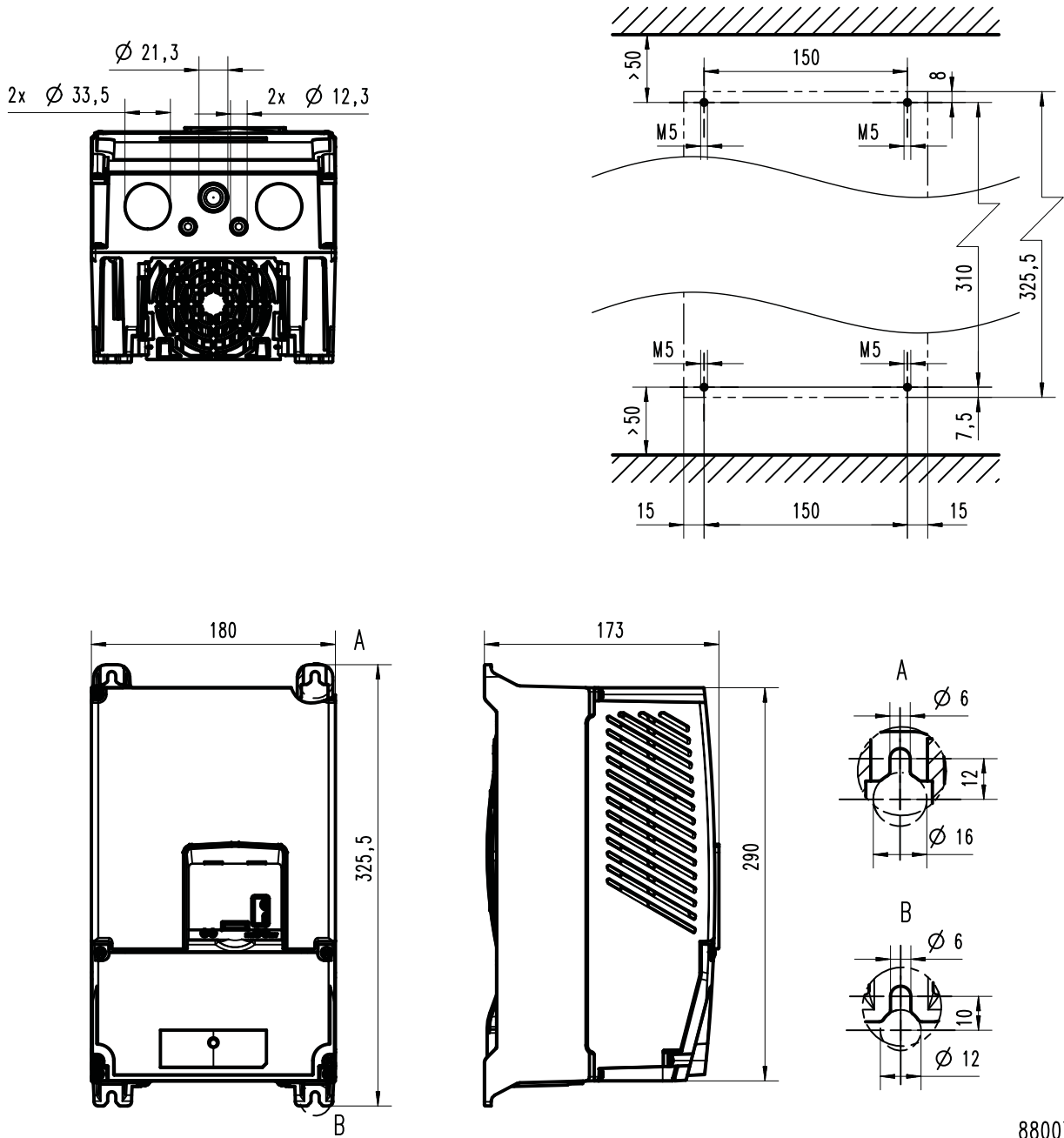
8800780



7.5 kW ... 11 kW

The dimensions in mm apply to:

7.5 kW	i550-P7.5/230-3	i550-P7.5/400-3	i550-P7.5/600-3
11 kW	i550-P11/230-3	i550-P11/400-3	i550-P11/600-3
Weight	IP31: 4.9 kg IP66: 5 kg	IP31: 5 kg IP66: 5.1 kg	IP31: 5 kg IP66: 5.1 kg



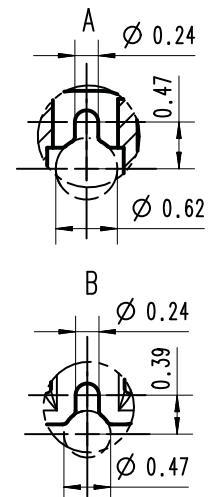
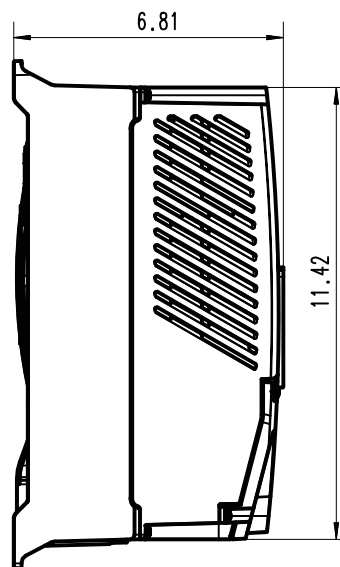
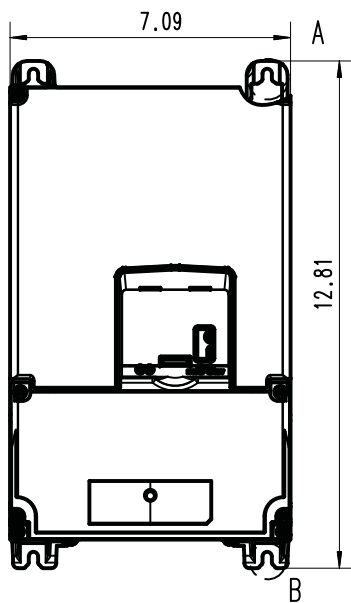
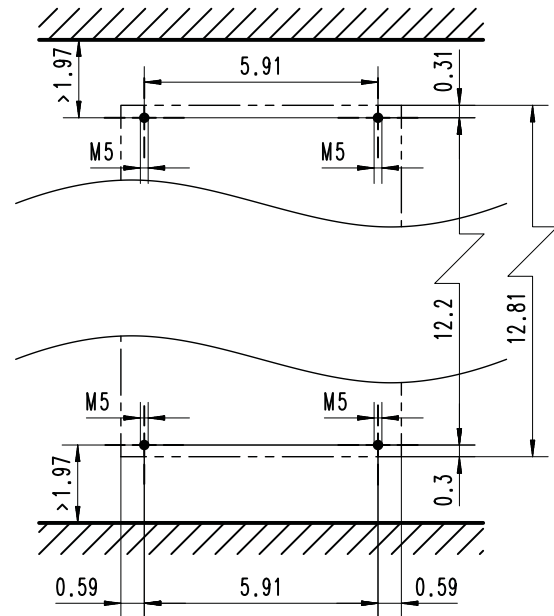
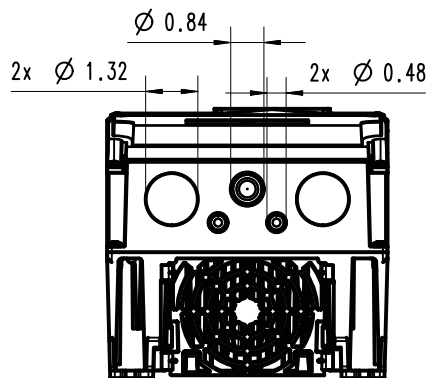
8800788



10 hp ... 15 hp

The dimensions in inch apply to:

10 hp	i550-P7.5/230-3	i550-P7.5/400-3	i550-P7.5/600-3
15 hp	i550-P11/230-3	i550-P11/400-3	i550-P11/600-3
Weight	NEMA 1: 10.8 lb NEMA 4X: 11 lb	NEMA 1: 11 lb NEMA 4X: 11.2 lb	NEMA 1: 11 lb NEMA 4X: 11.2 lb



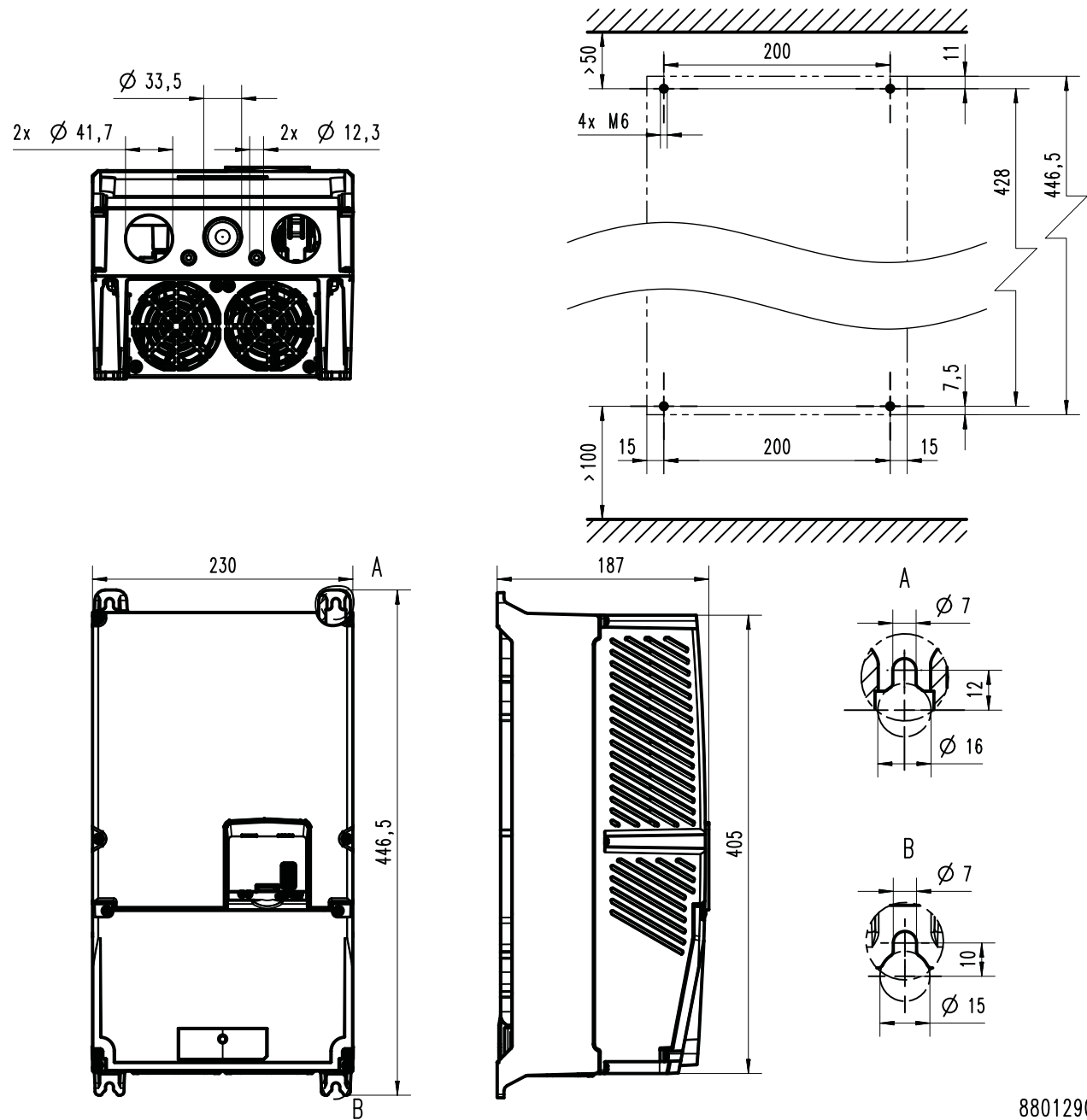
8800789



15 kW ... 45 kW

The dimensions in mm apply to:

15 kW	i550-P15/230-3	i550-P15/400-3	i550-P15/600-3
18.5 kW	i550-P18/230-3	i550-P18/400-3	i550-P18/600-3
22 kW		i550-P22/400-3	i550-P22/600-3
30 kW			i550-P30/600-3
37 kW			i550-P37/600-3
45 kW			i550-P45/600-3
Weight	IP31: 9.3 kg IP66: 9.4 kg	IP31: 10.1 kg IP66: 10.2 kg	IP31: 10.2 kg IP66: 10.2 kg



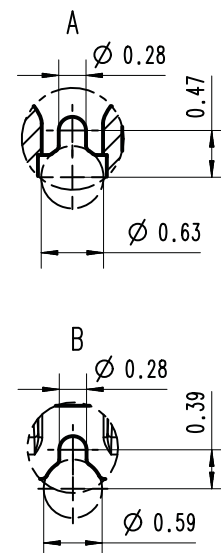
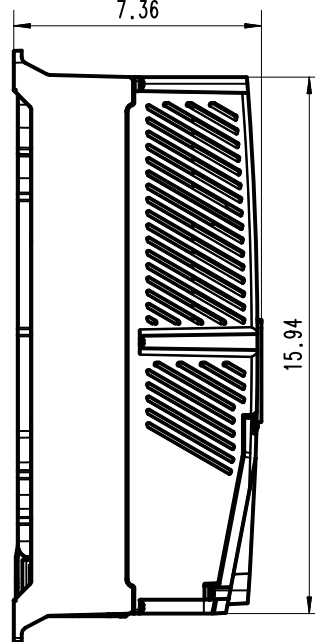
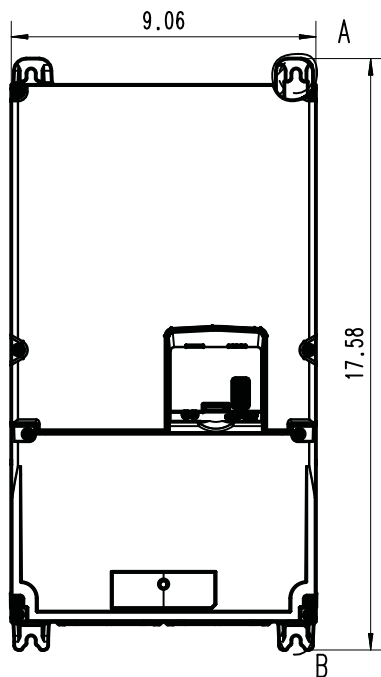
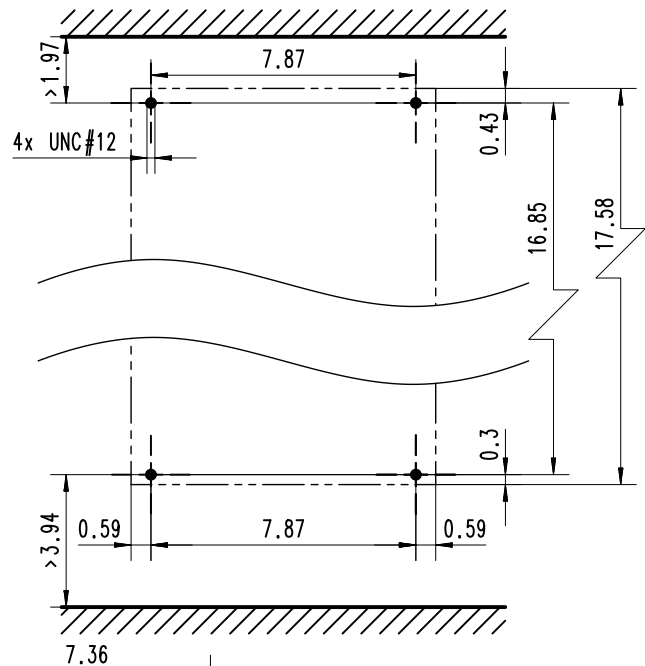
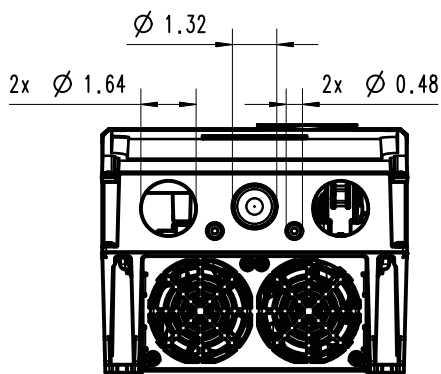
8801290



20 hp ... 60 hp

The dimensions in inch apply to:

20 hp	i550-P15/230-3	i550-P15/400-3	i550-P15/600-3
25 hp	i550-P18/230-3	i550-P18/400-3	i550-P18/600-3
30 hp		i550-P22/400-3	i550-P22/600-3
40 hp			i550-P30/600-3
50 hp			i550-P37/600-3
60 hp			i550-P45/600-3
Weight	NEMA 1: 20.5 lb NEMA 4X: 20.7 lb	NEMA 1: 22.3 lb NEMA 4X: 22.5 lb	NEMA 1: 22.5 lb NEMA 4X: 22.5 lb



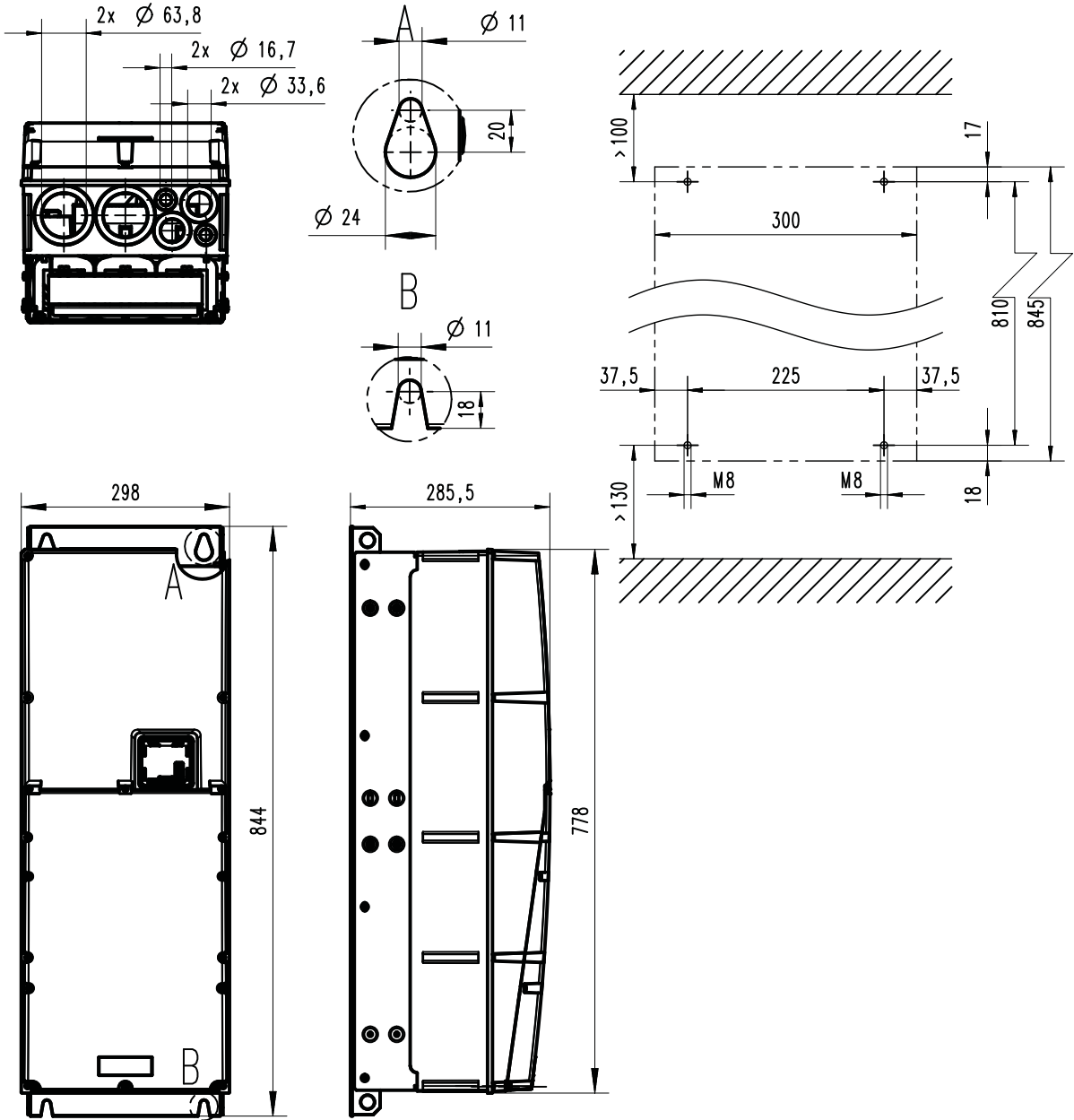
8801291



30 kW ... 45 kW

The dimensions in mm apply to:

30 kW	i550-P30/230-3	i550-P30/400-3
37 kW		i550-P37/400-3
45 kW		i550-P45/400-3
Weight	IP55: 46 kg	IP55: 46 kg



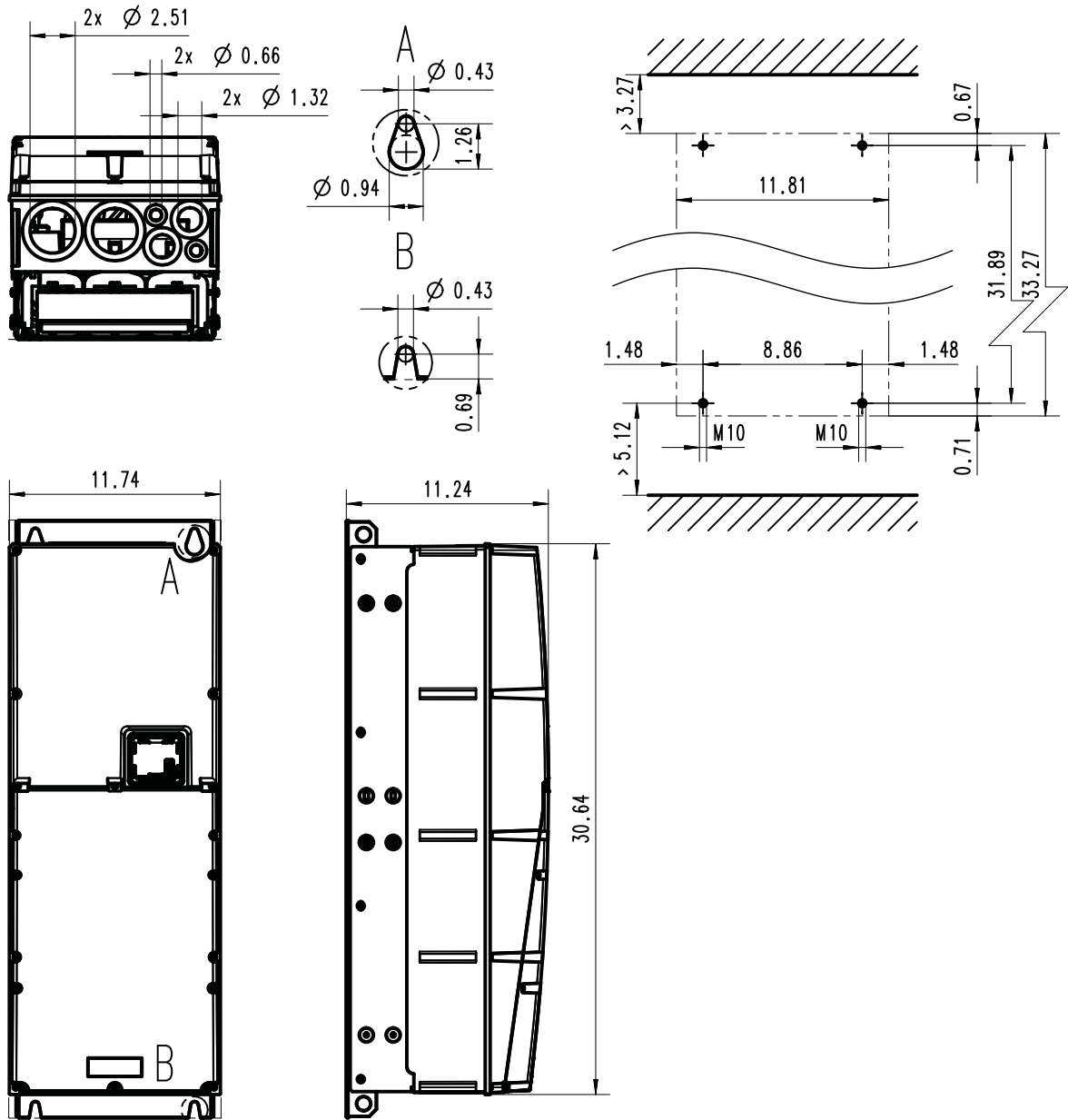
8801370



40 hp ... 60 hp

The dimensions in inch apply to:

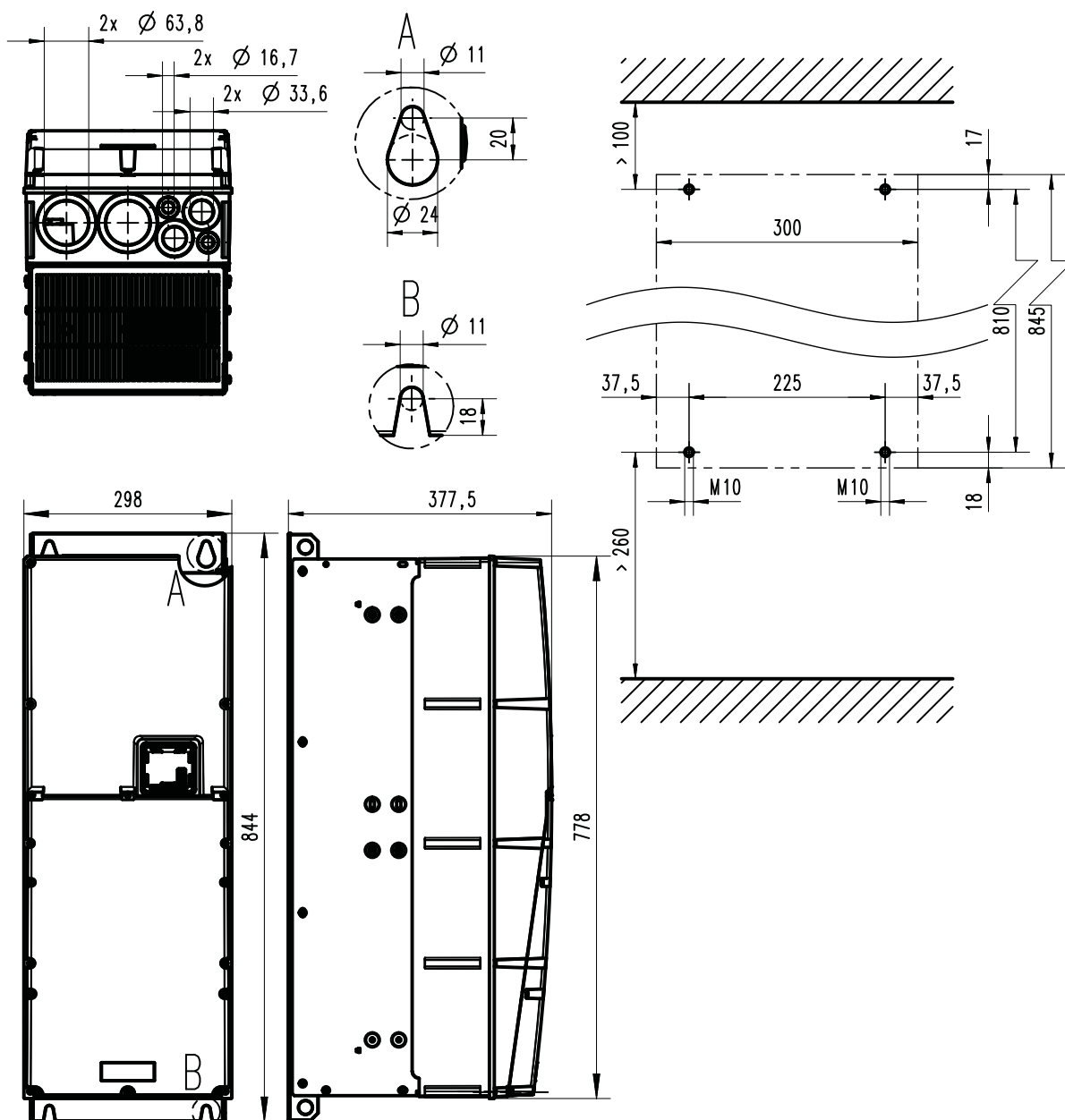
40 hp	i550-P30/230-3	i550-P30/400-3
50 hp		i550-P37/400-3
60 hp		i550-P45/400-3
Weight	NEMA 12: 102 lb	NEMA 12: 102 lb



8801371

The dimensions in mm apply to:

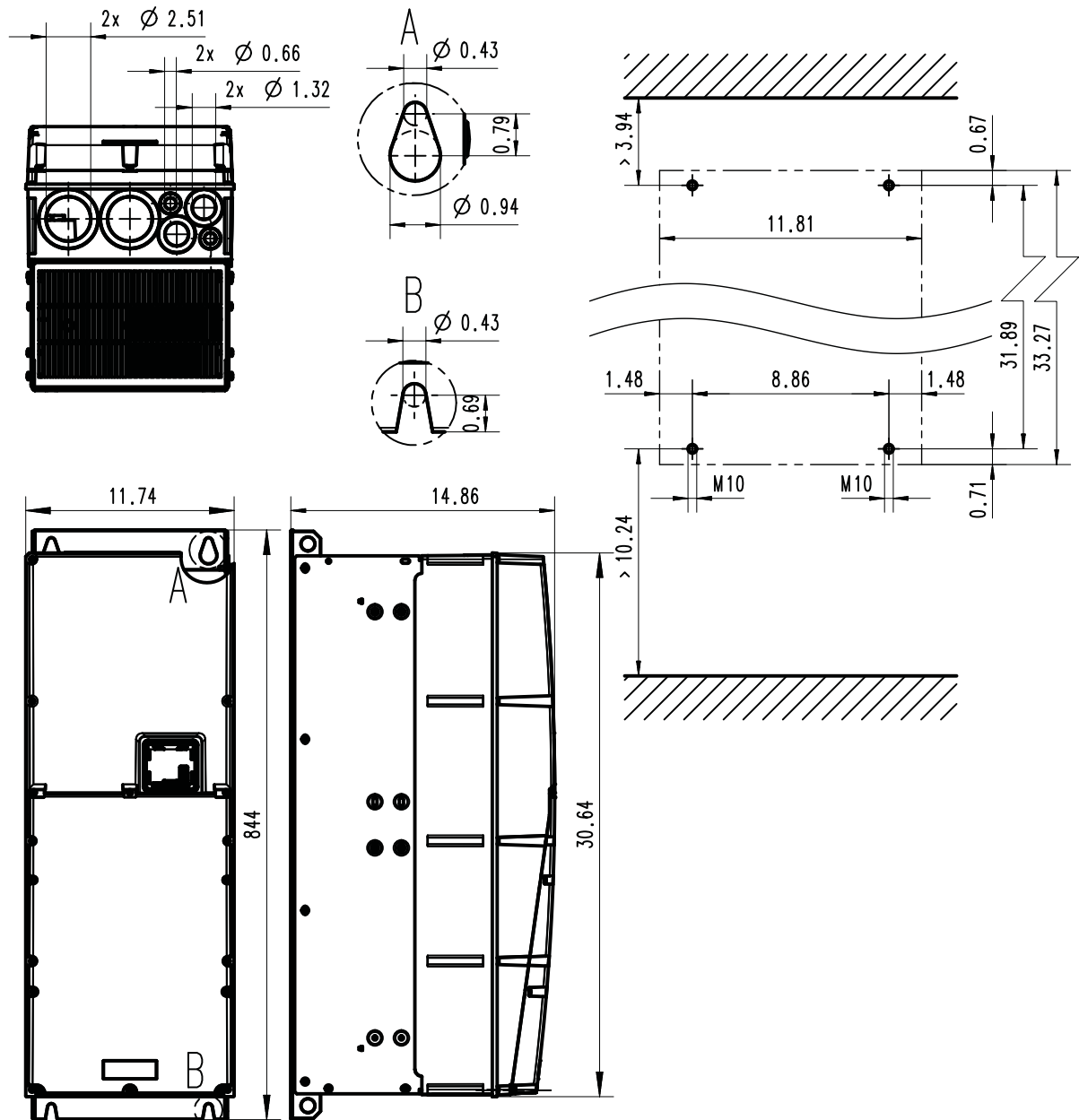
45 kW	i550-P45/230-3	
55 kW		i550-P55/400-3
75 kW		i550-P75/400-3
Weight	IP55: 53 kg	IP55: 53 kg



8801372



The dimensions in inch apply to:





Dimensions for inverter with extension box



The lower weight applies for the i550 protec with empty extension box.

The higher weight applies for the i550 protec with extension box and disconnect switch.

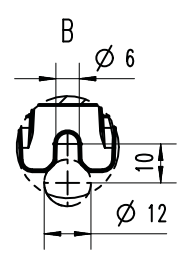
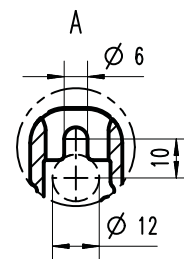
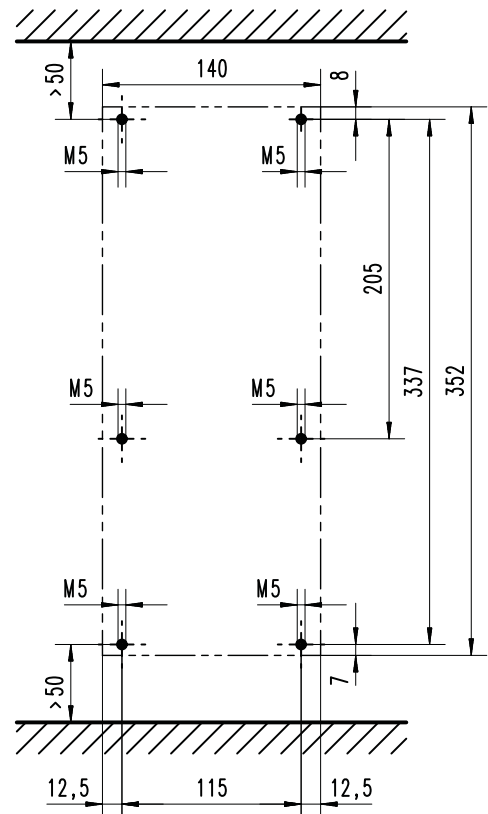
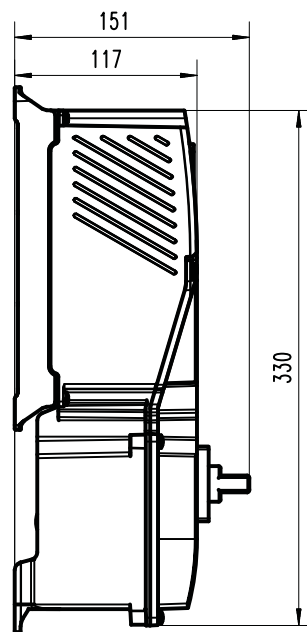
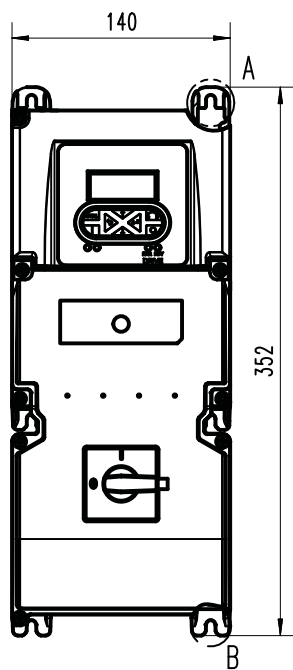
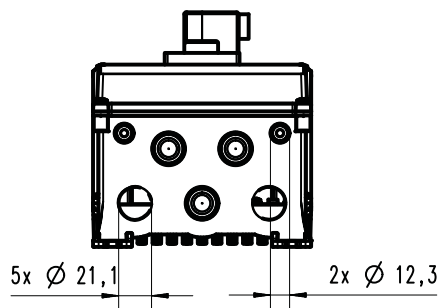
For the i550 protec with empty extension box, the dimension with the disconnect switch is **not relevant**.



0.37 kW ... 0.75 kW

The dimensions in mm apply to:

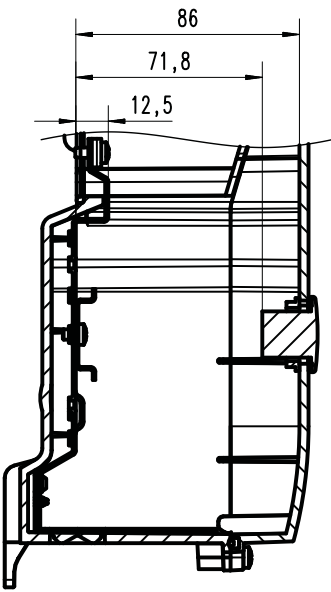
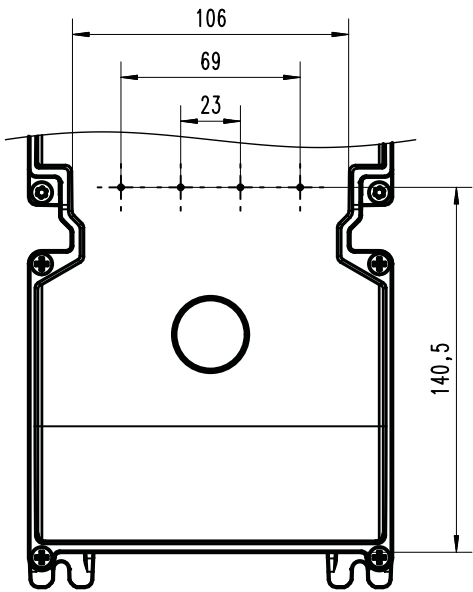
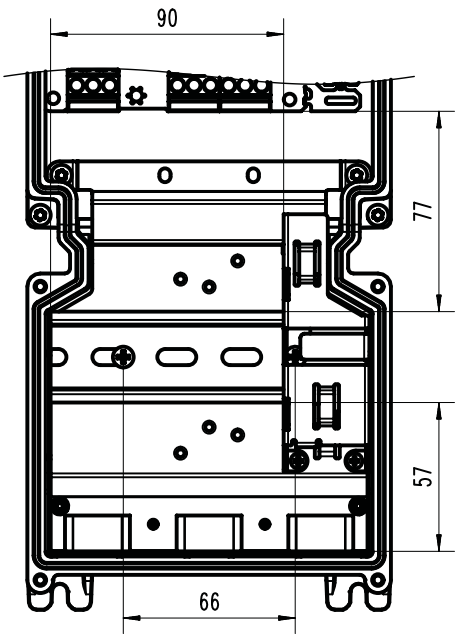
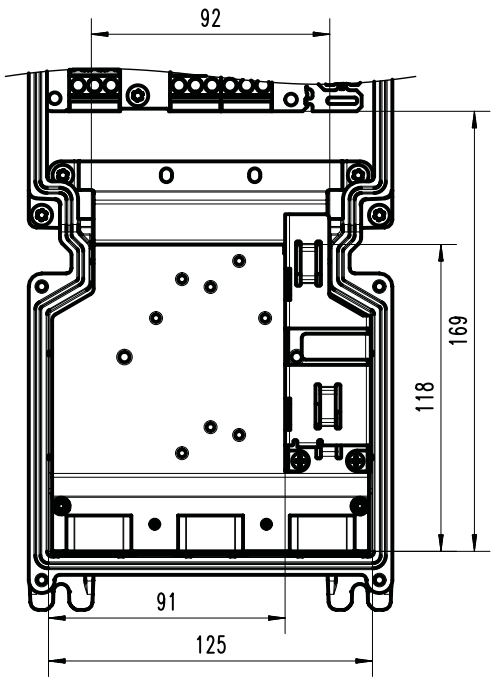
0.37 kW	i550-P0.37/120-1	i550-P0.37/230-1	i550-P0.37/230-2	i550-P0.37/400-3	
0.55 kW		i550-P0.55/230-1	i550-P0.55/230-2	i550-P0.55/400-3	
0.75 kW		i550-P0.75/230-1	i550-P0.75/230-2	i550-P0.75/400-3	i550-P0.75/600-3
Weight	IP66: 2.5 kg IP66: 2.3 kg	IP66: 2.5 kg IP66: 2.3 kg	IP66: 2.2 kg IP66: 2.4 kg	IP66: 2.3 kg IP66: 2.5 kg	IP66: 2.5 kg IP66: 2.3 kg



8800956



Free mounting space of product variant i550 protec with empty extension box



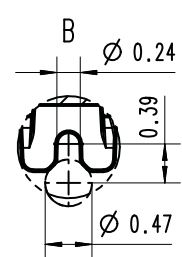
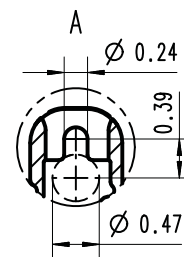
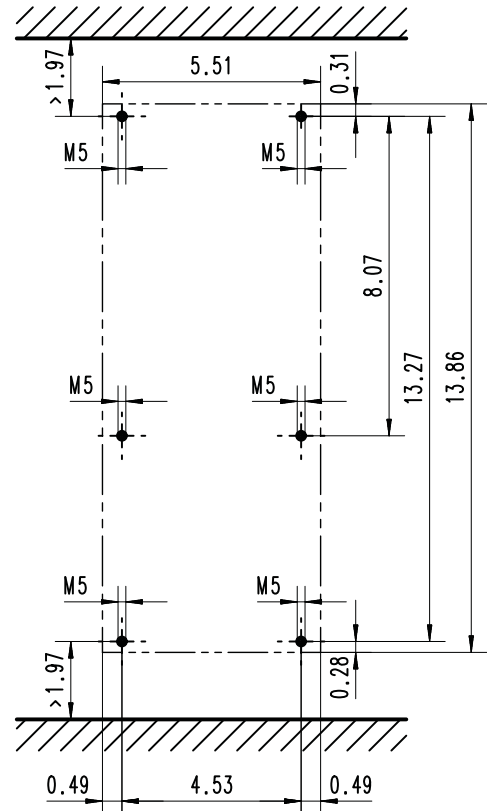
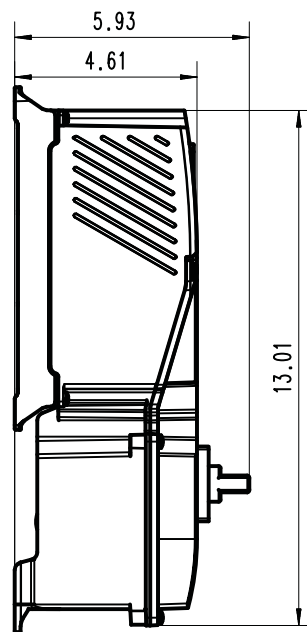
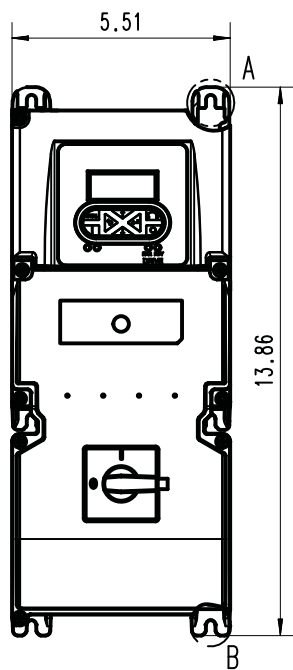
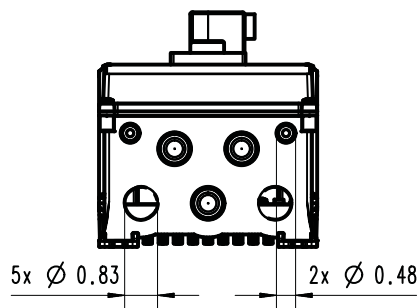
8801281



0.5 hp ... 1 hp

The dimensions in inch apply to:

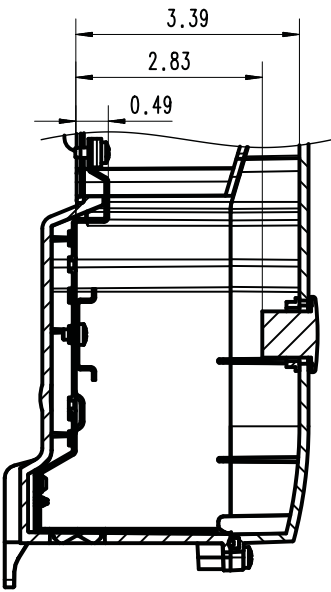
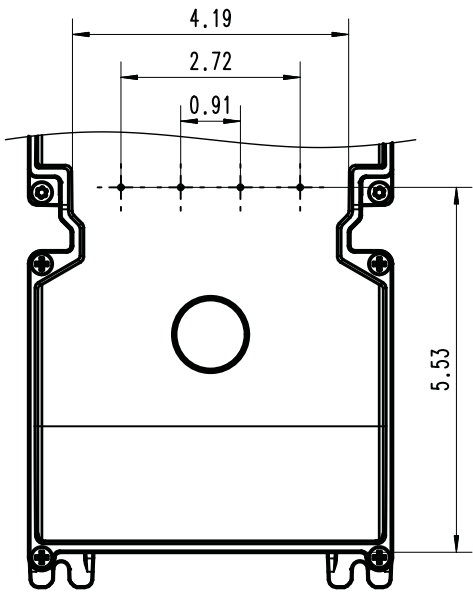
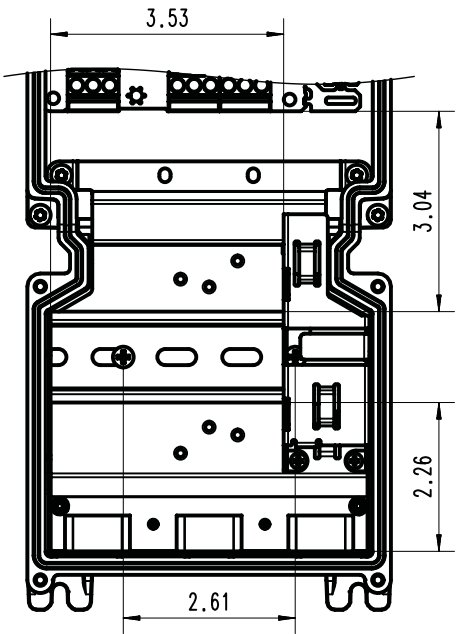
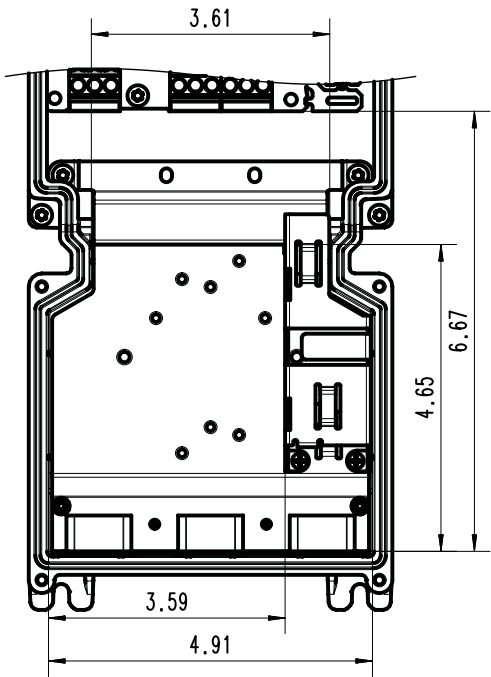
0.5 hp	i550-P0.37/120-1	i550-P0.37/230-1	i550-P0.37/230-2	i550-P0.37/400-3	
0.75 hp		i550-P0.55/230-1	i550-P0.55/230-2	i550-P0.55/400-3	
1 hp		i550-P0.75/230-1	i550-P0.75/230-2	i550-P0.75/400-3	i550-P0.75/600-3
Weight	NEMA 4X: 5.5 lb	NEMA 4X: 5.5 lb	NEMA 4X: 4.8 lb	NEMA 4X: 5.1 lb	NEMA 4X: 5.5 lb
	NEMA 4X: 5.1 lb	NEMA 4X: 5.1 lb	NEMA 4X: 5.3 lb	NEMA 4X: 5.5 lb	NEMA 4X: 5.1 lb



8800957



Free mounting space of product variant i550 protec with empty extension box



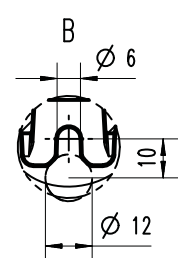
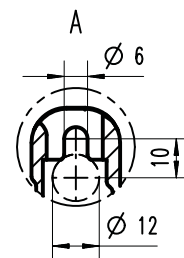
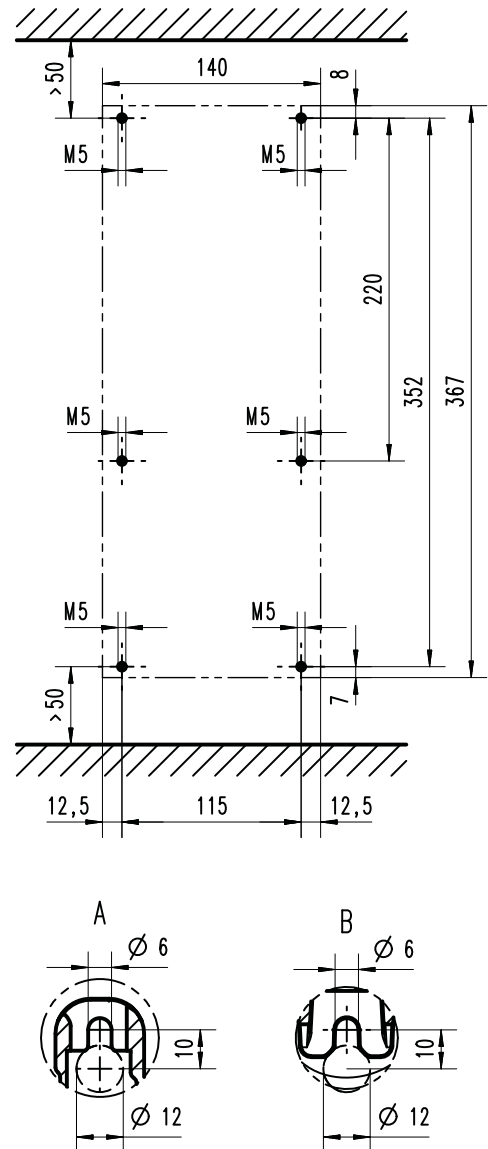
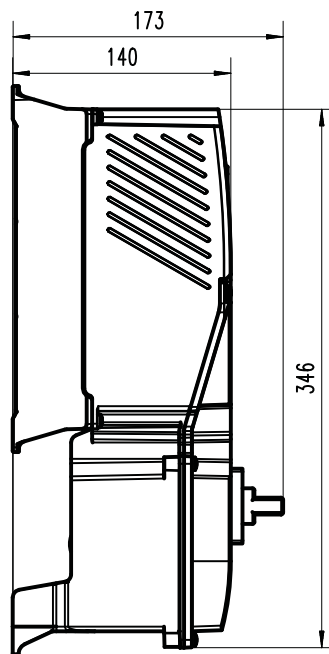
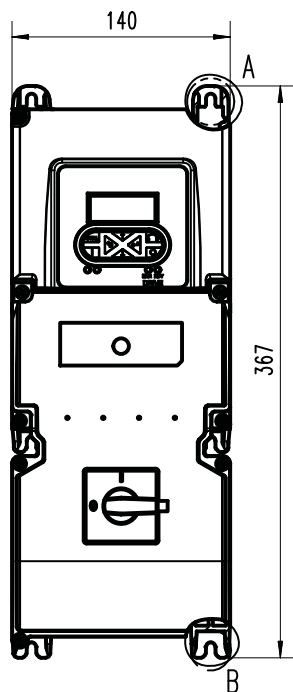
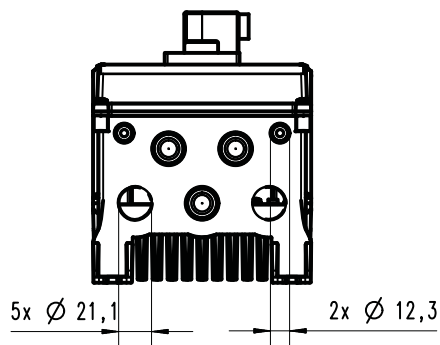
8801282



0.75 kW ... 2.2 kW

The dimensions in mm apply to:

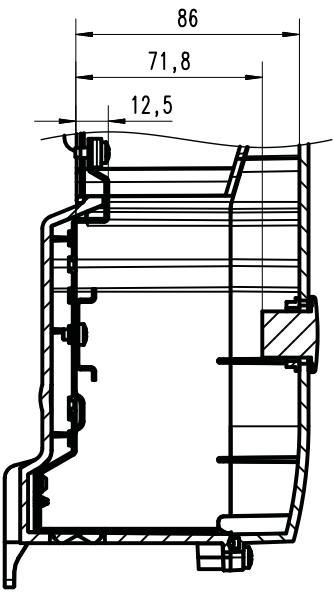
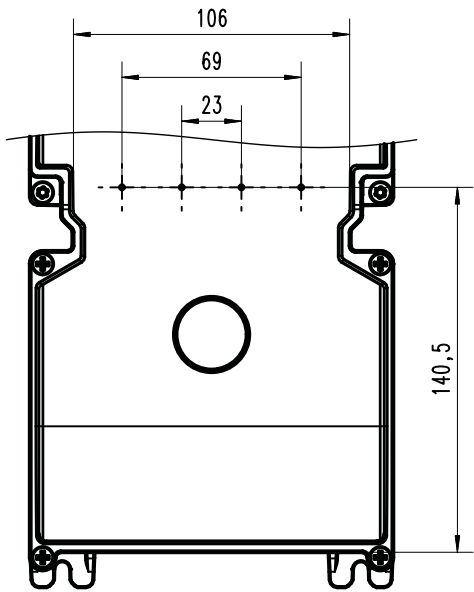
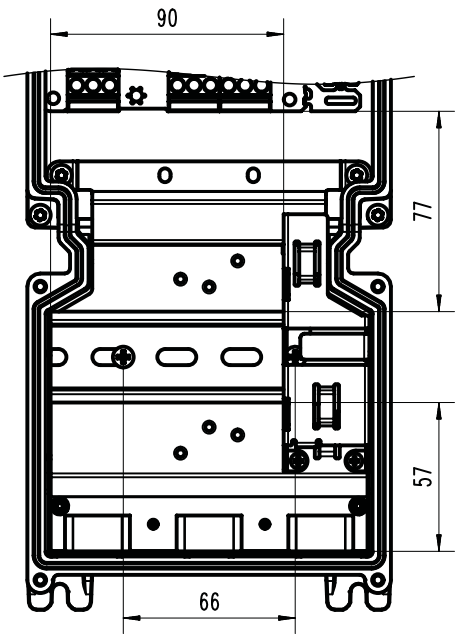
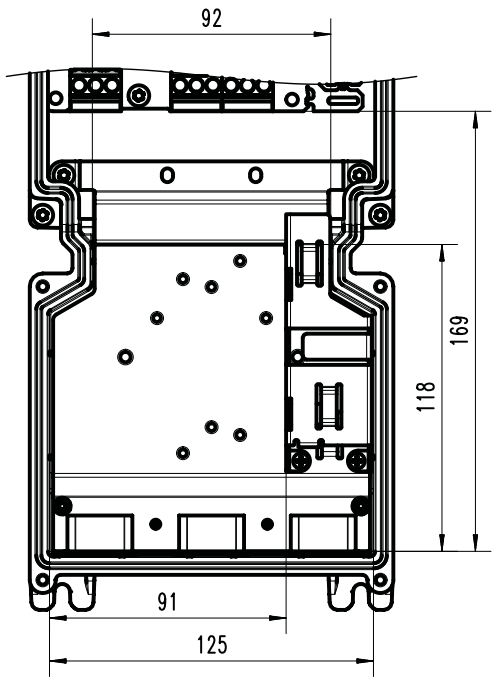
0.75 kW	i550-P0.75/120-1				
1.1 kW	i550-P1.1/120-1	i550-P1.1/230-1	i550-P1.1/230-2	i550-P1.1/400-3	
1.5 kW		i550-P1.5/230-1	i550-P1.5/230-2	i550-P1.5/400-3	i550-P1.5/600-3
2.2 kW		i550-P2.2/230-1	i550-P2.2/230-2	i550-P2.2/400-3	i550-P2.2/600-3
Weight	IP66: 3.3 kg	IP66: 3.3 kg	IP66: 3.2 kg	IP66: 3.5 kg	IP66: 3.3 kg
	IP66: 3.5 kg	IP66: 3.5 kg	IP66: 3.4 kg	IP66: 3.3 kg	IP66: 3.5 kg



8800958



Free mounting space of product variant i550 protec with empty extension box



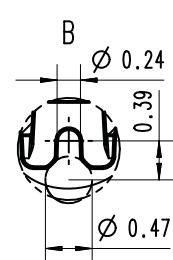
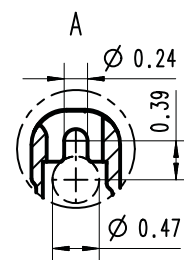
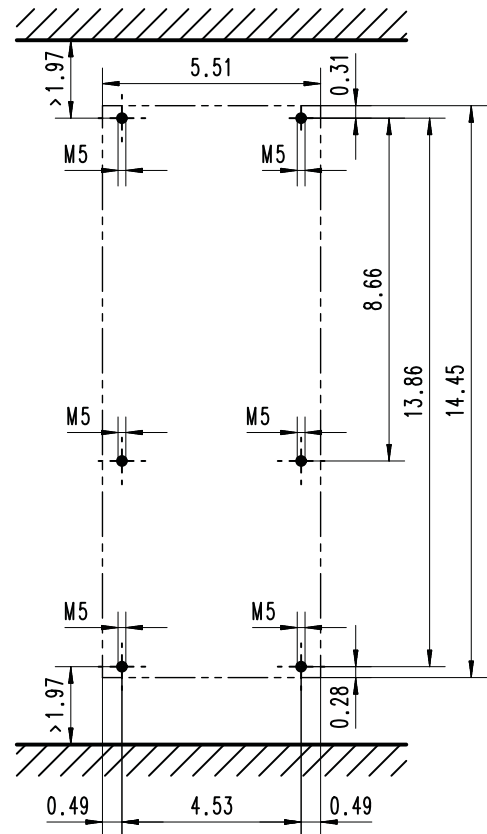
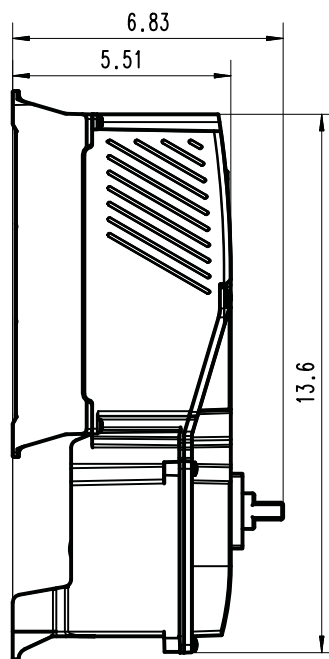
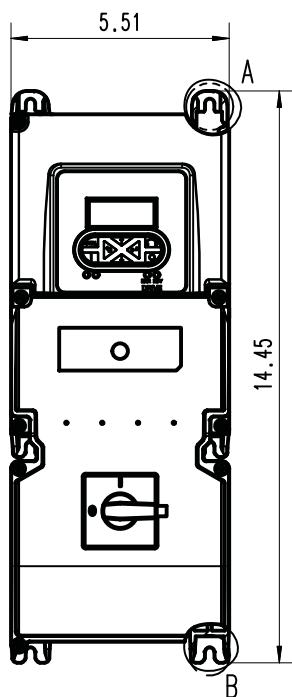
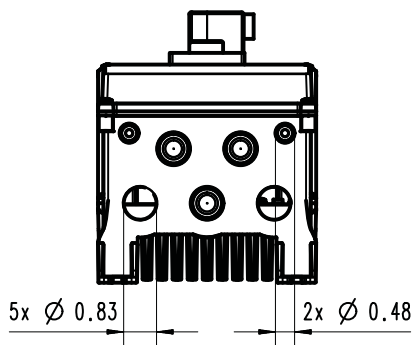
8801281



1 hp ... 3 hp

The dimensions in inch apply to:

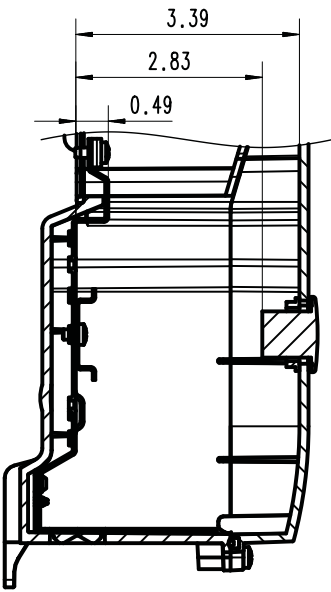
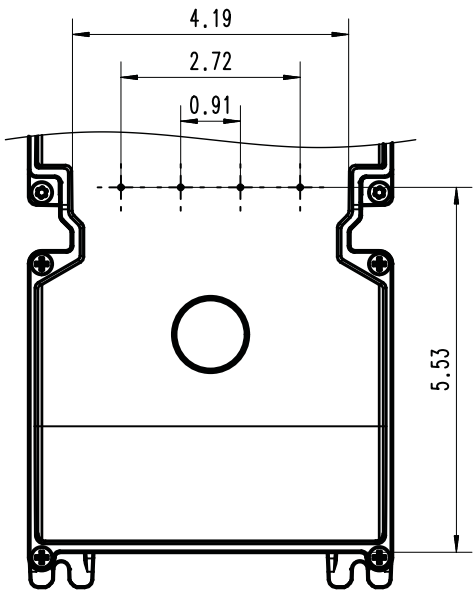
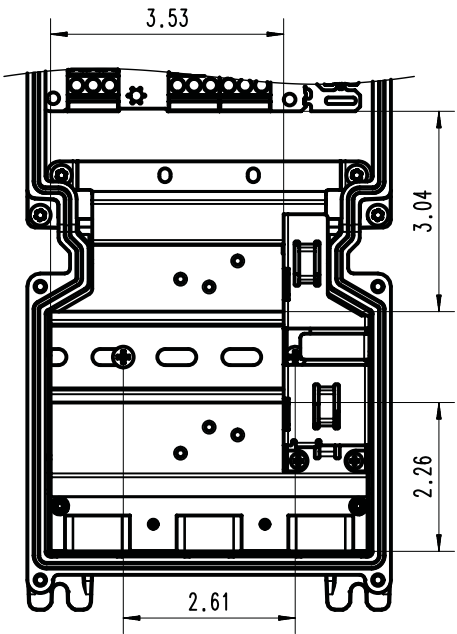
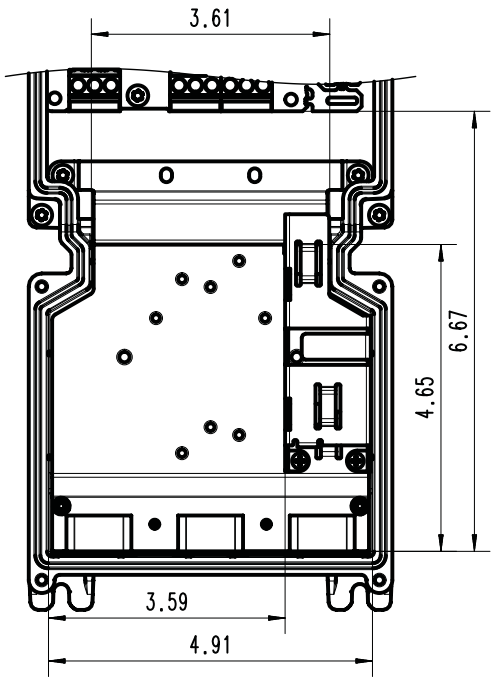
1 hp	i550-P0.75/120-1				
1.5 hp	i550-P1.1/120-1	i550-P1.1/230-1	i550-P1.1/230-2	i550-P1.1/400-3	
2 hp		i550-P1.5/230-1	i550-P1.5/230-2	i550-P1.5/400-3	i550-P1.5/600-3
3 hp		i550-P2.2/230-1	i550-P2.2/230-2	i550-P2.2/400-3	i550-P2.2/600-3
Weight	NEMA 4X: 7.3 lb	NEMA 4X: 7.3 lb	NEMA 4X: 7 lb	NEMA 4X: 7.7 lb	NEMA 4X: 7.3 lb
	NEMA 4X: 7.7 lb	NEMA 4X: 7.7 lb	NEMA 4X: 7.5 lb	NEMA 4X: 7.3 lb	NEMA 4X: 7.7 lb



8800959



Free mounting space of product variant i550 protec with empty extension box



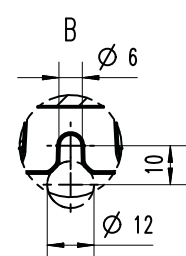
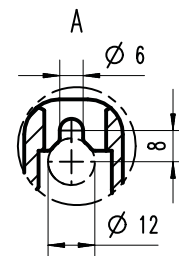
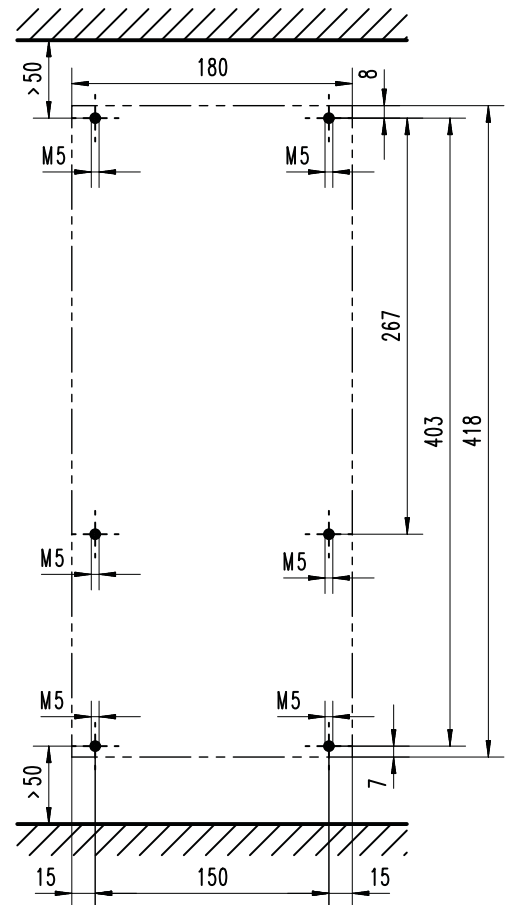
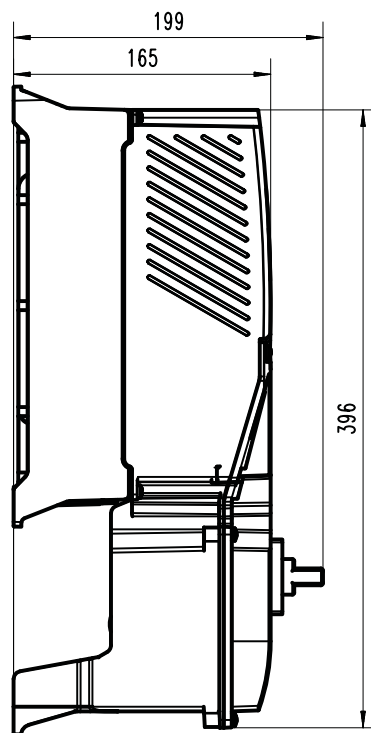
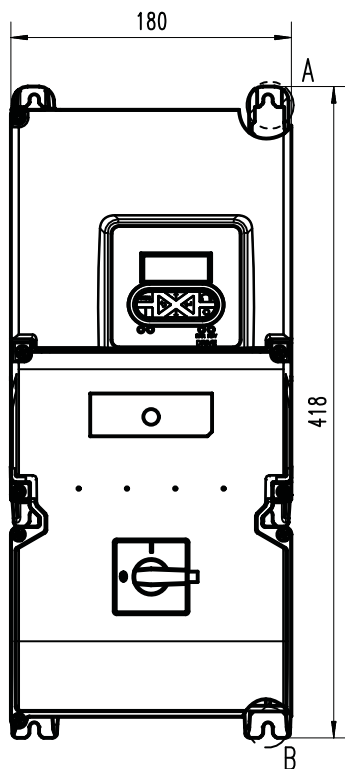
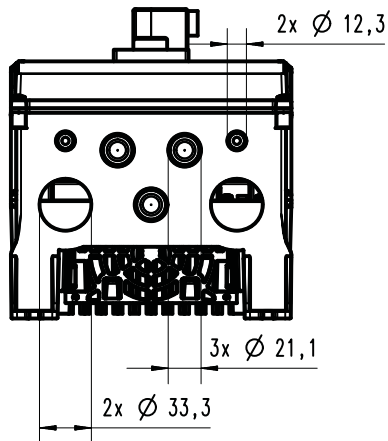
8801282



3 kW ... 5.5 kW

The dimensions in mm apply to:

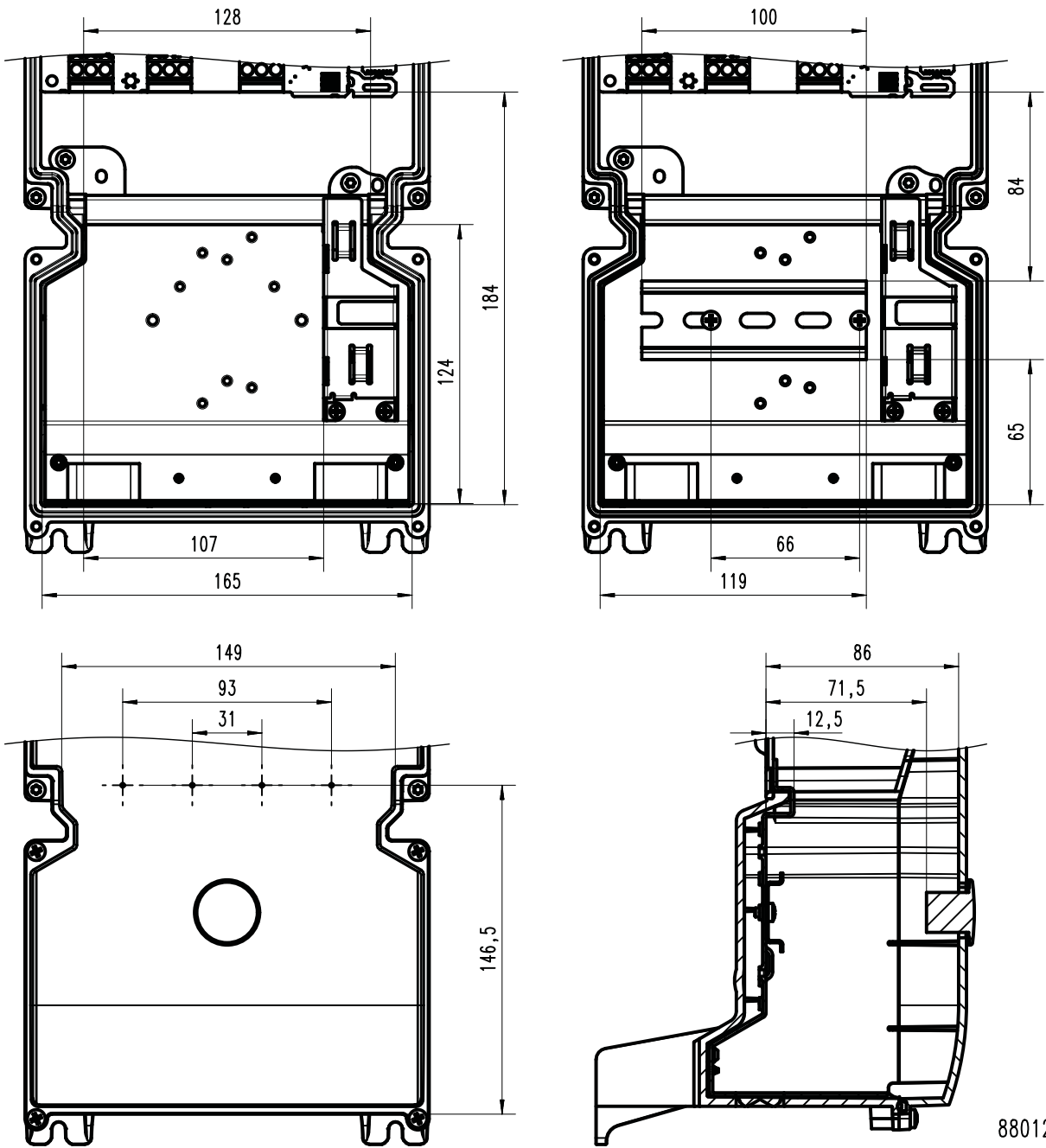
3 kW	i550-P3.0/230-3	i550-P3.0/400-3	
4 kW	i550-P4.0/230-3	i550-P4.0/400-3	i550-P4.0/600-3
5.5 kW	i550-P5.5/230-3	i550-P5.5/400-3	i550-P5.5/600-3
Weight	IP66: 5.7 kg IP66: 5.9 kg	IP66: 6 kg IP66: 5.8 kg	IP66: 5.8 kg IP66: 6 kg



8800960



Free mounting space of product variant i550 protec with empty extension box



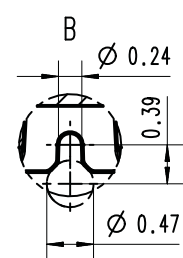
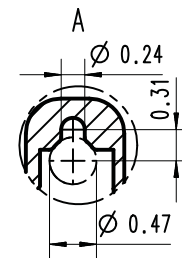
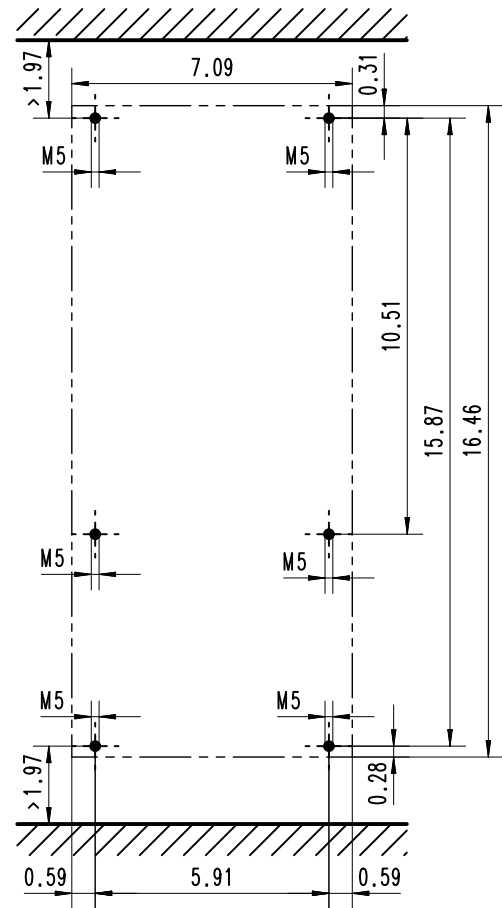
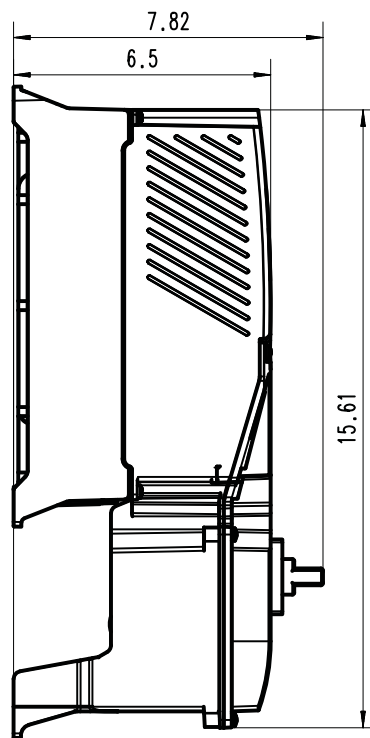
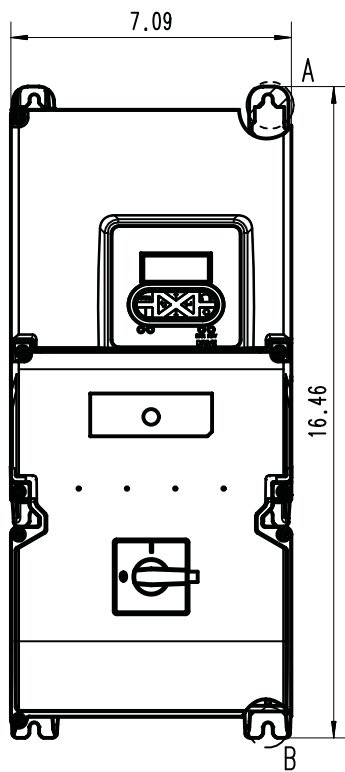
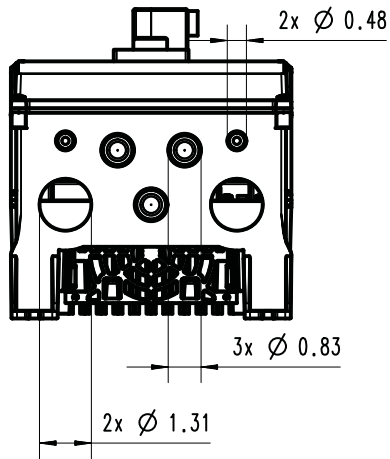
8801285



4 hp ... 7.5 hp

The dimensions in inch apply to:

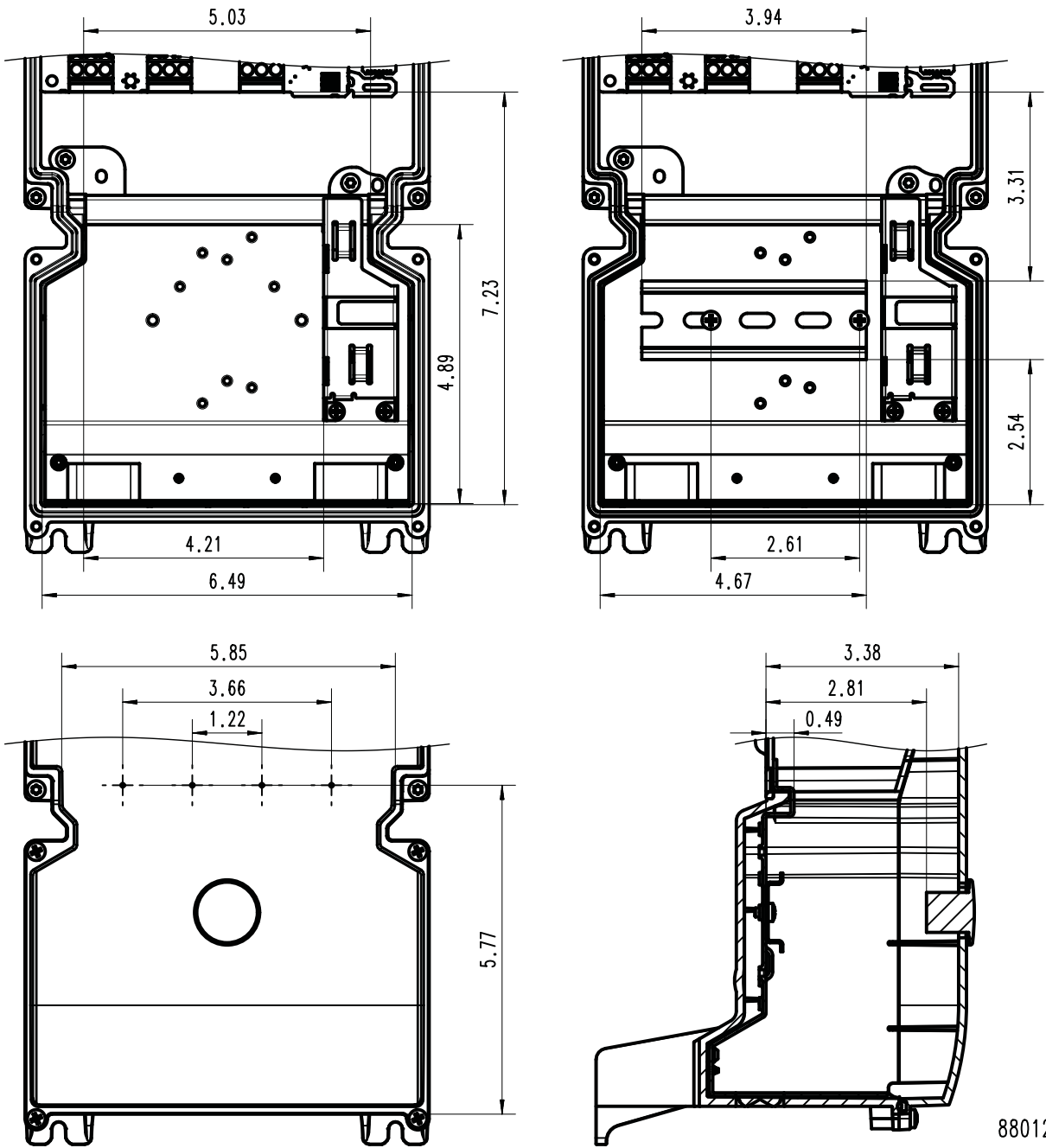
4 hp	i550-P3.0/230-3	i550-P3.0/400-3	
5 hp	i550-P4.0/230-3	i550-P4.0/400-3	i550-P4.0/600-3
7.5 hp	i550-P5.5/230-3	i550-P5.5/400-3	i550-P5.5/600-3
Weight	NEMA 4X: 12.5 lb NEMA 4X: 13 lb	NEMA 4X: 13.2 lb NEMA 4X: 12.8 lb	NEMA 4X: 12.8 lb NEMA 4X: 13.2 lb



8800961



Free mounting space of product variant i550 protec with empty extension box



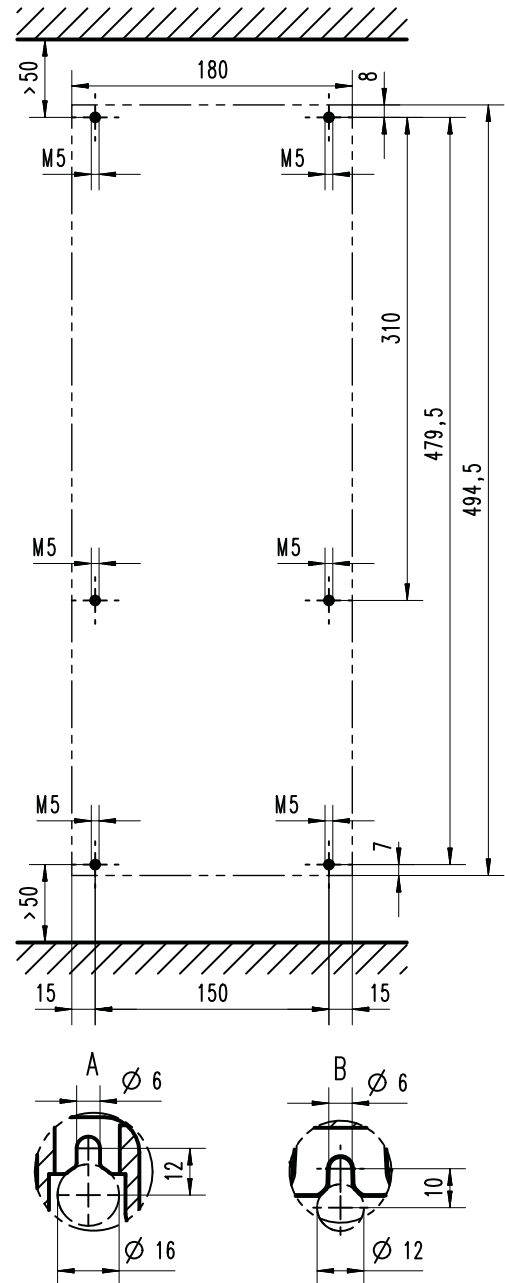
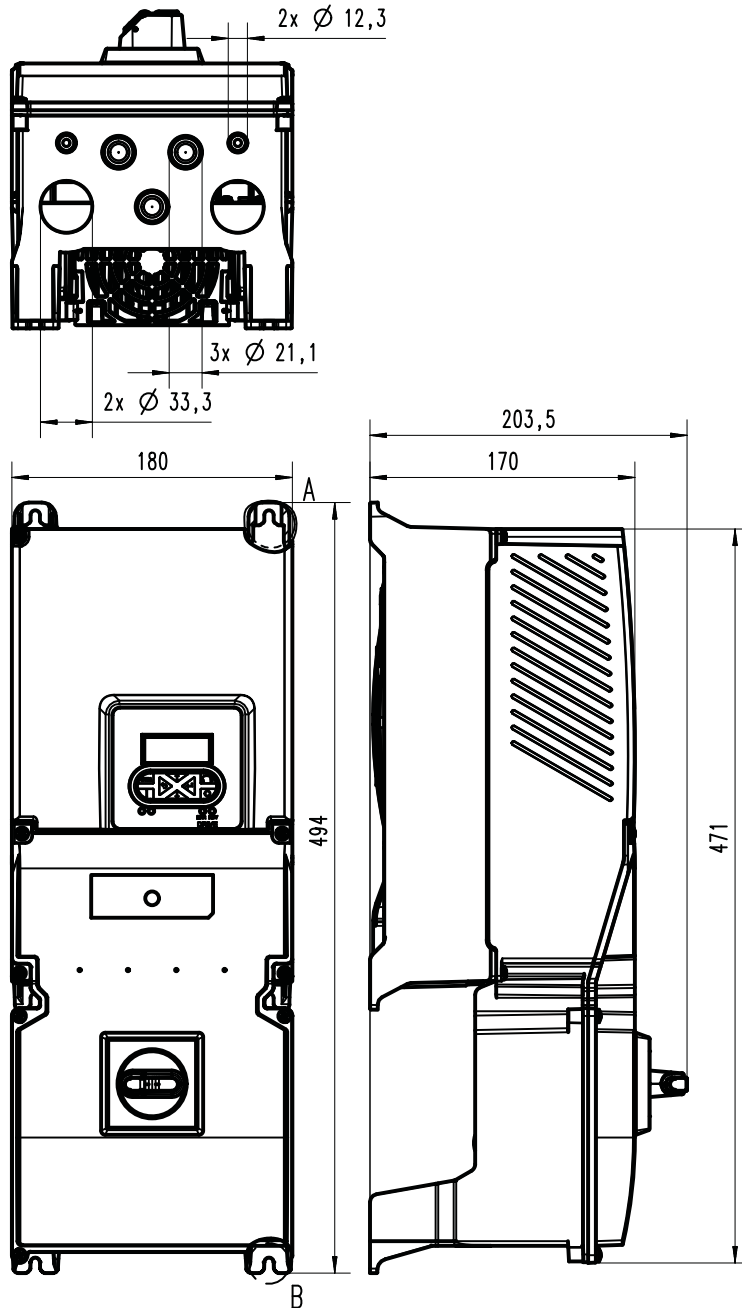
8801286



7.5 kW ... 11 kW

The dimensions in mm apply to:

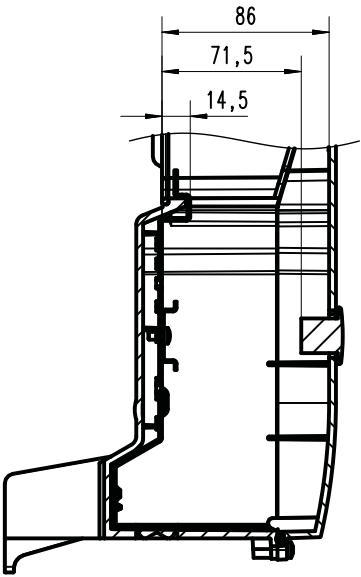
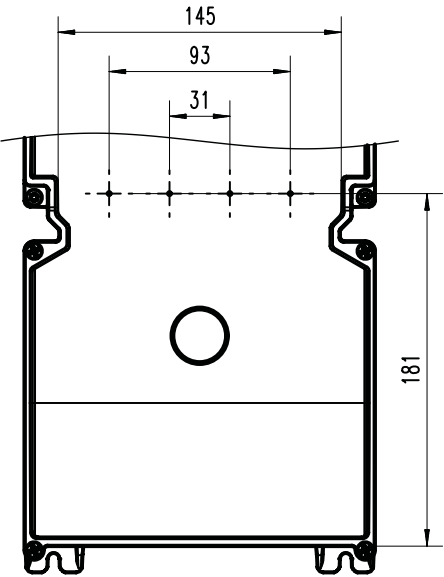
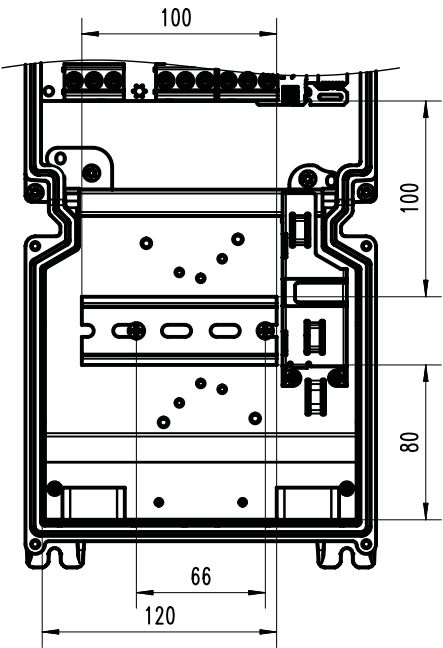
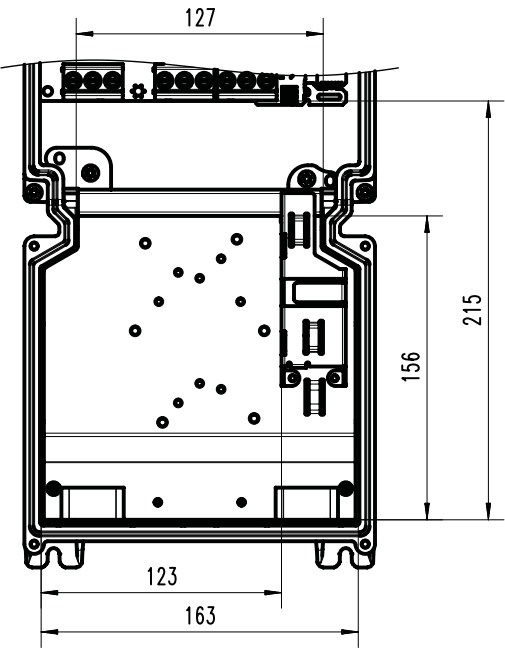
7.5 kW	i550-P7.5/230-3	i550-P7.5/400-3	i550-P7.5/600-3
11 kW	i550-P11/230-3	i550-P11/400-3	i550-P11/600-3
Weight	IP66: 6.2 kg IP66: 6 kg	IP66: 6.3 kg IP66: 6.1 kg	IP66: 6.3 kg IP66: 6.1 kg



8800962



Free mounting space of product variant i550 protec with empty extension box



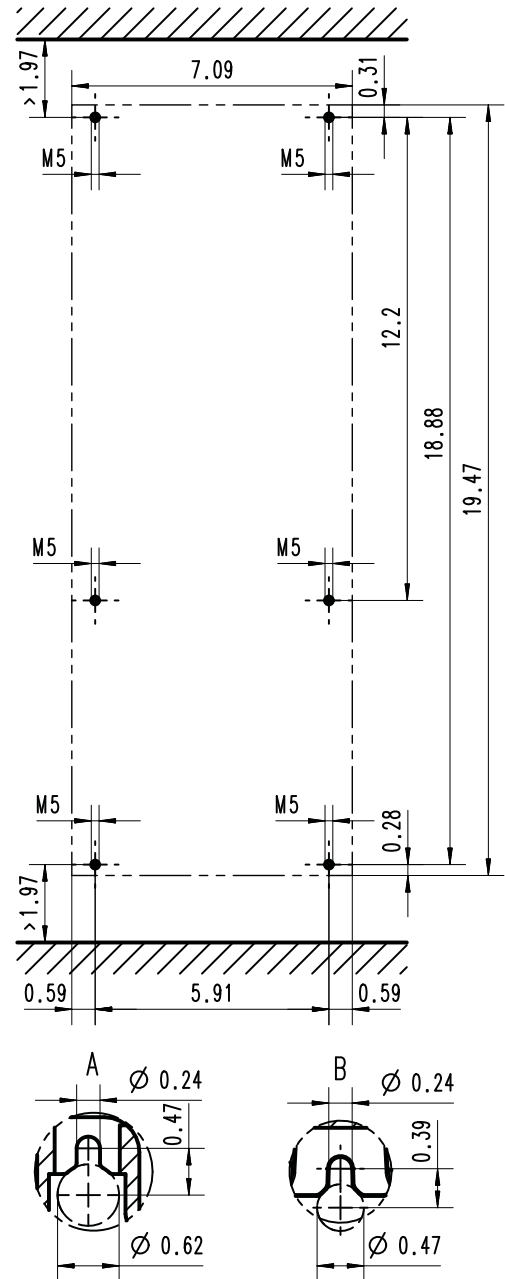
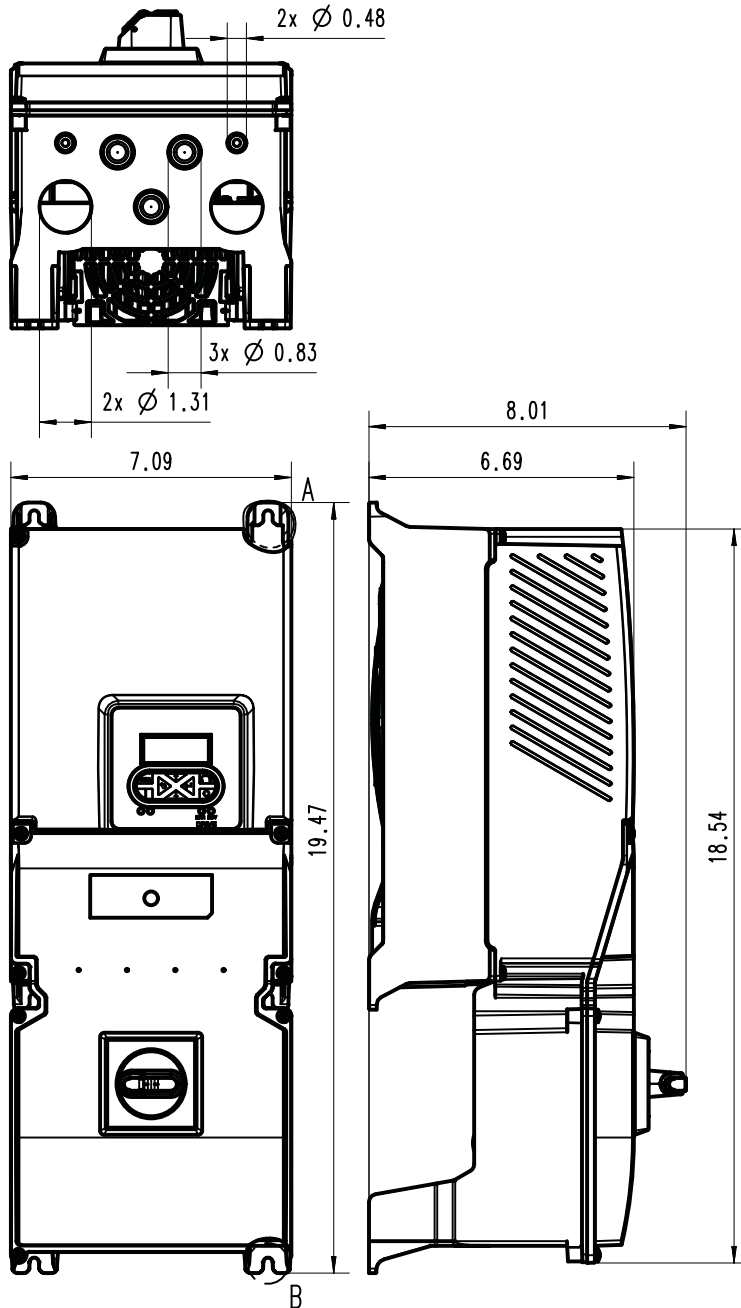
8801287



10 hp ... 15 hp

The dimensions in inch apply to:

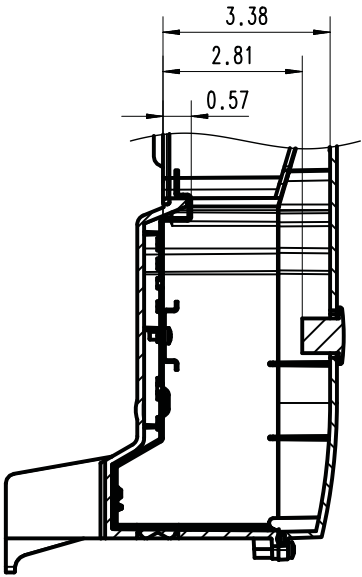
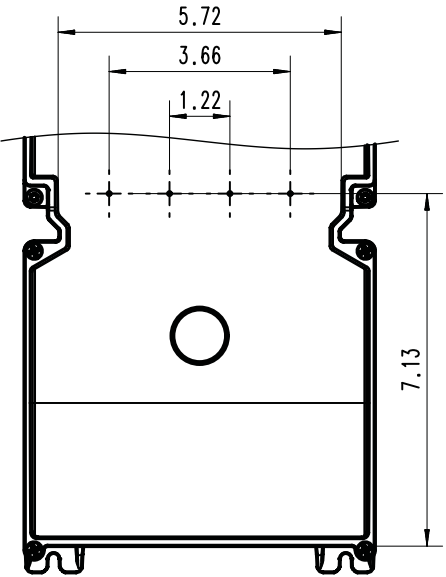
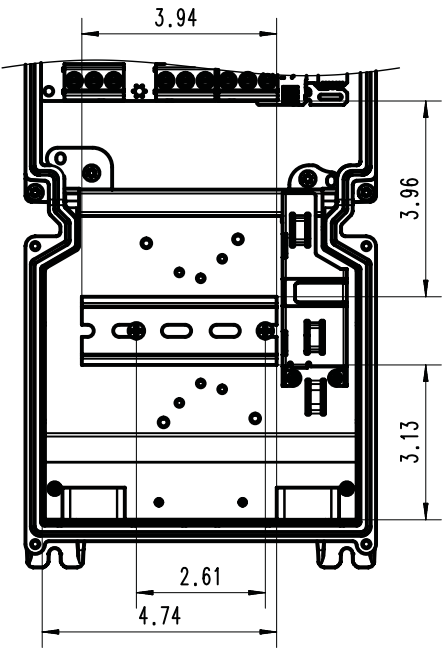
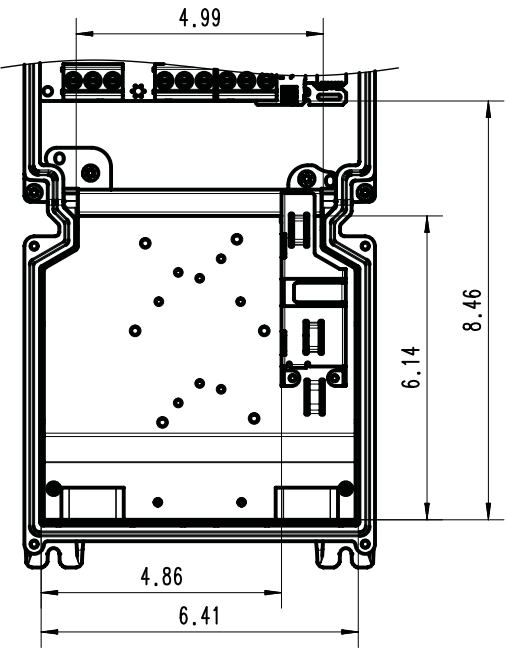
10 hp	i550-P7.5/230-3	i550-P7.5/400-3	i550-P7.5/600-3
15 hp	i550-P11/230-3	i550-P11/400-3	i550-P11/600-3
Weight	NEMA 4X: 13.6 lb NEMA 4X: 13.2 lb	NEMA 4X: 13.9 lb NEMA 4X: 13.4 lb	NEMA 4X: 13.9 lb NEMA 4X: 13.4 lb



8800963



Free mounting space of product variant i550 protec with empty extension box



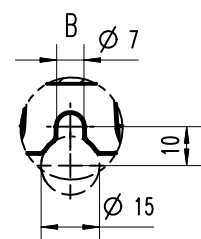
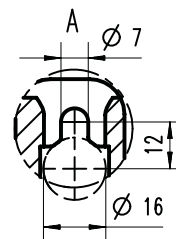
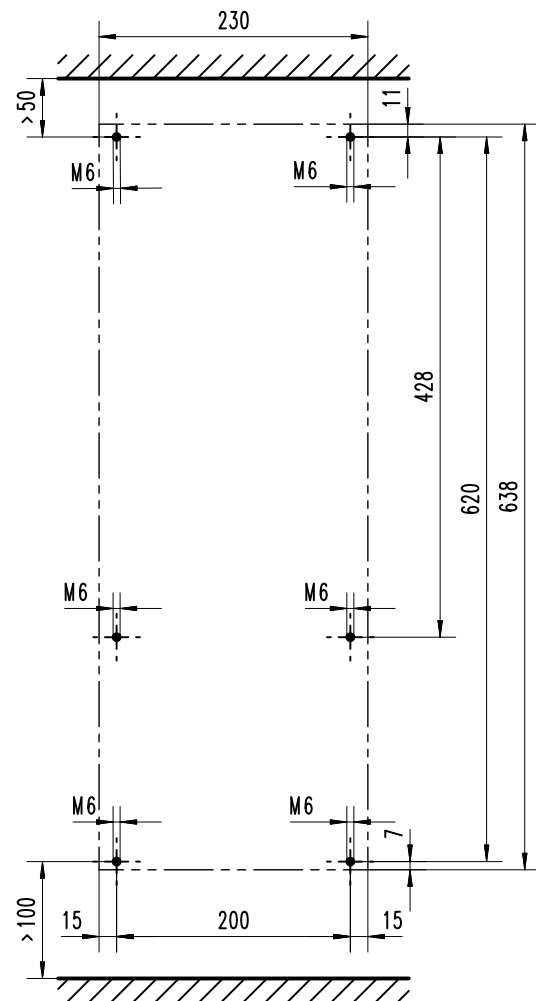
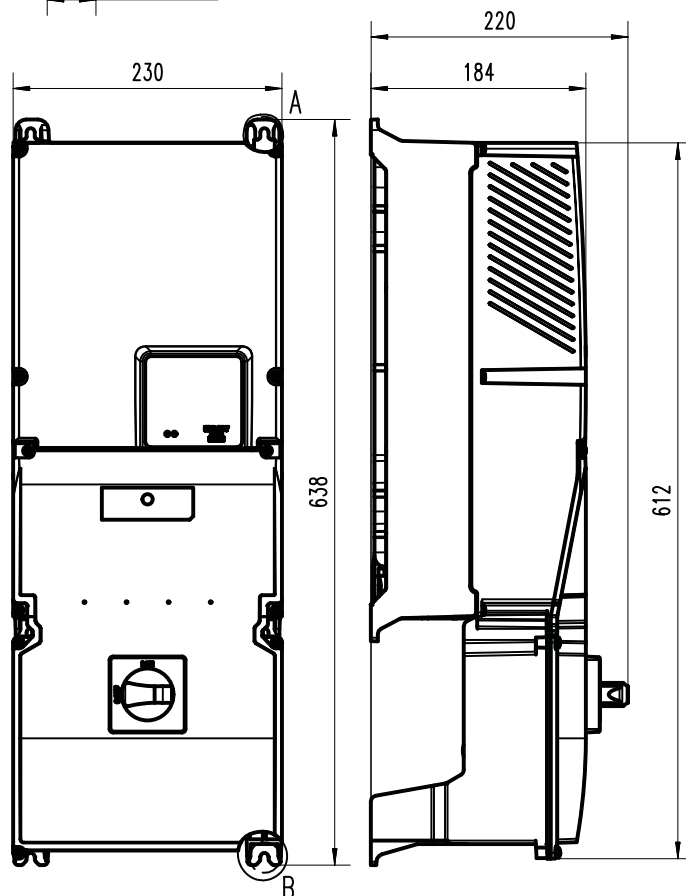
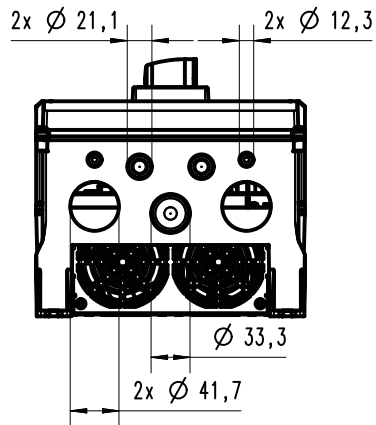
8801288



15 kW ... 22 kW

The dimensions in mm apply to:

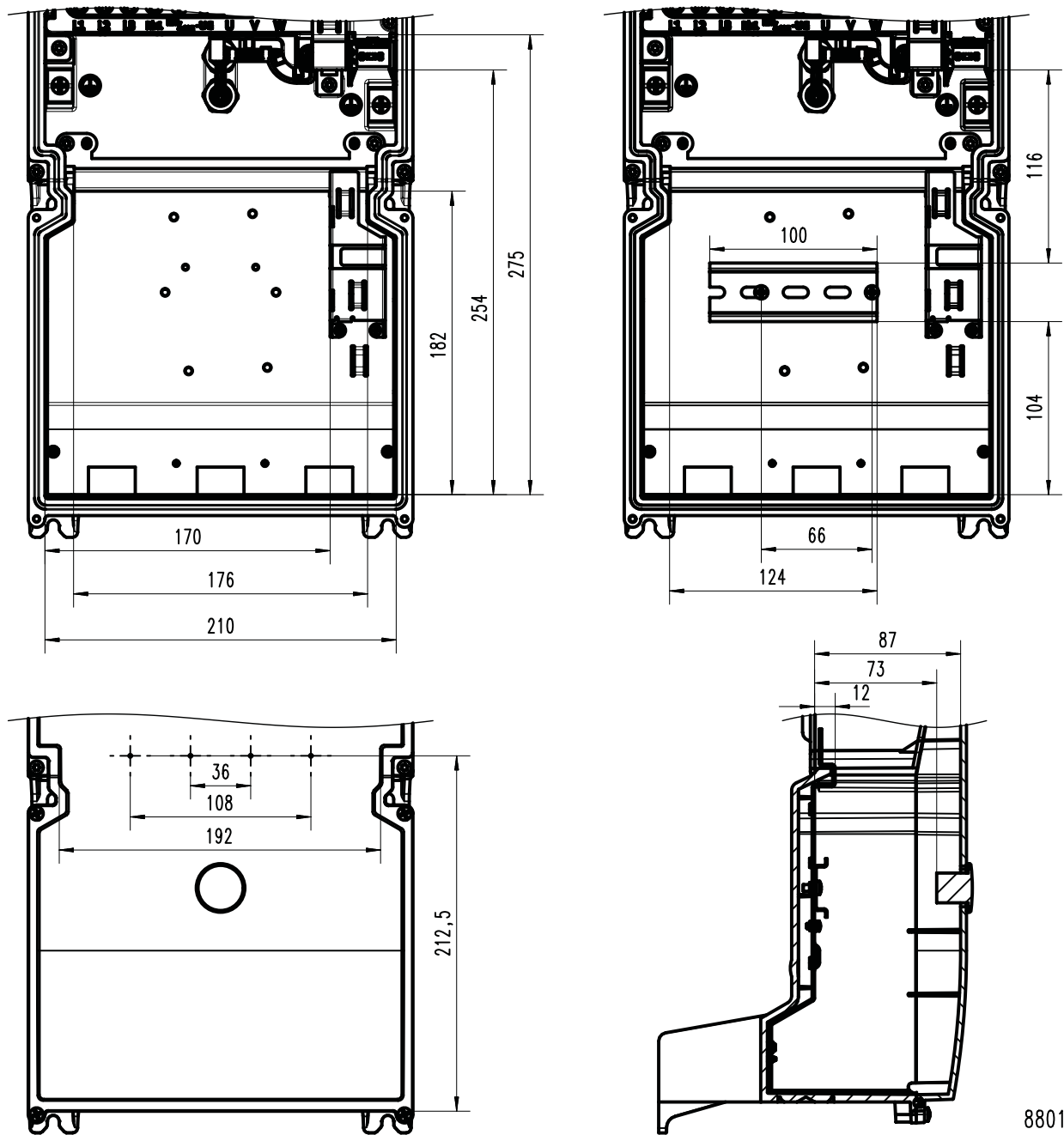
15 kW	i550-P15/230-3	i550-P15/400-3
18.5 kW	i550-P18/230-3	i550-P18/400-3
22 kW		i550-P22/400-3
Weight	IP66: 11.9 kg IP66: 11.4 kg	IP66: 11.5 kg IP66: 12 kg



8801292



Free mounting space of product variant i550 protec with empty extension box



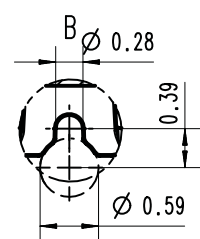
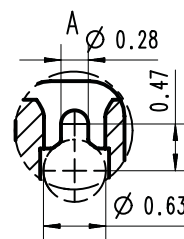
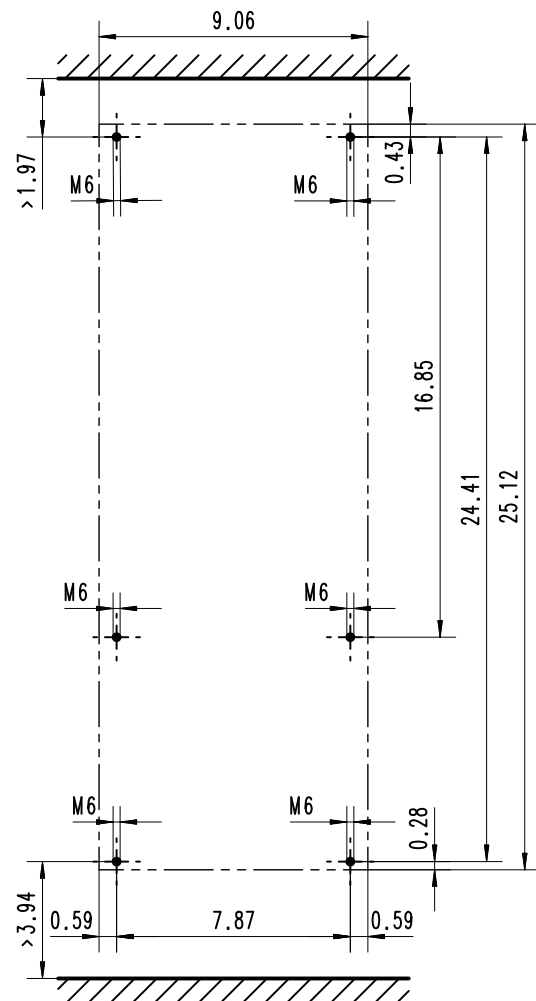
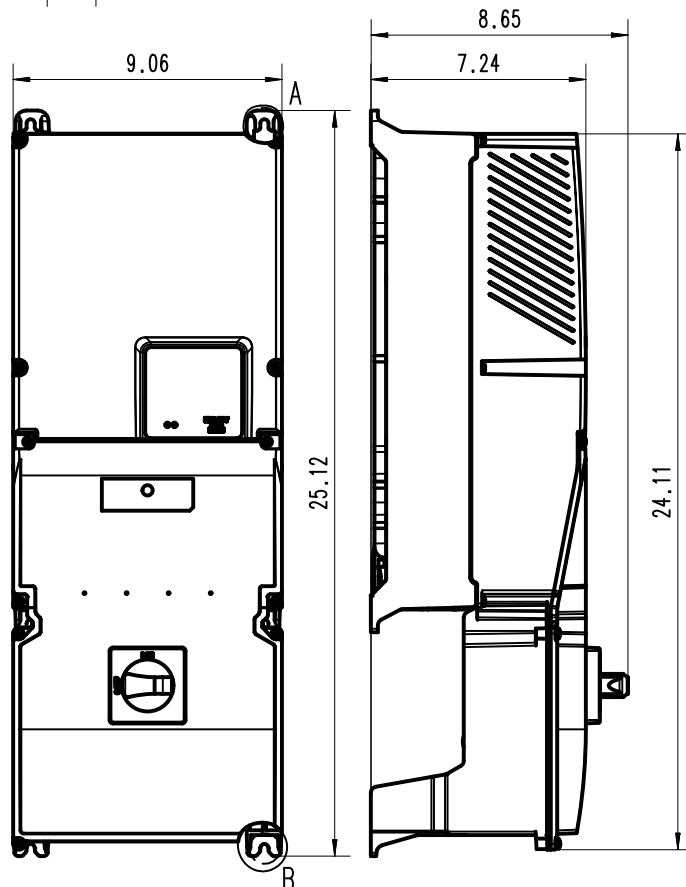
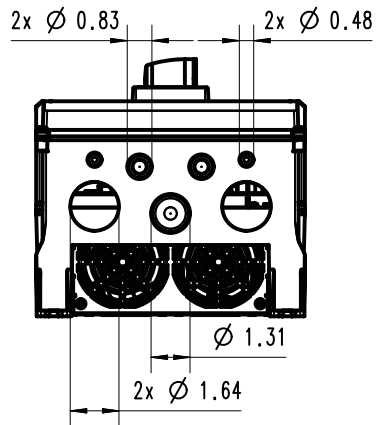
8801294



20 hp ... 30 hp

The dimensions in inch apply to:

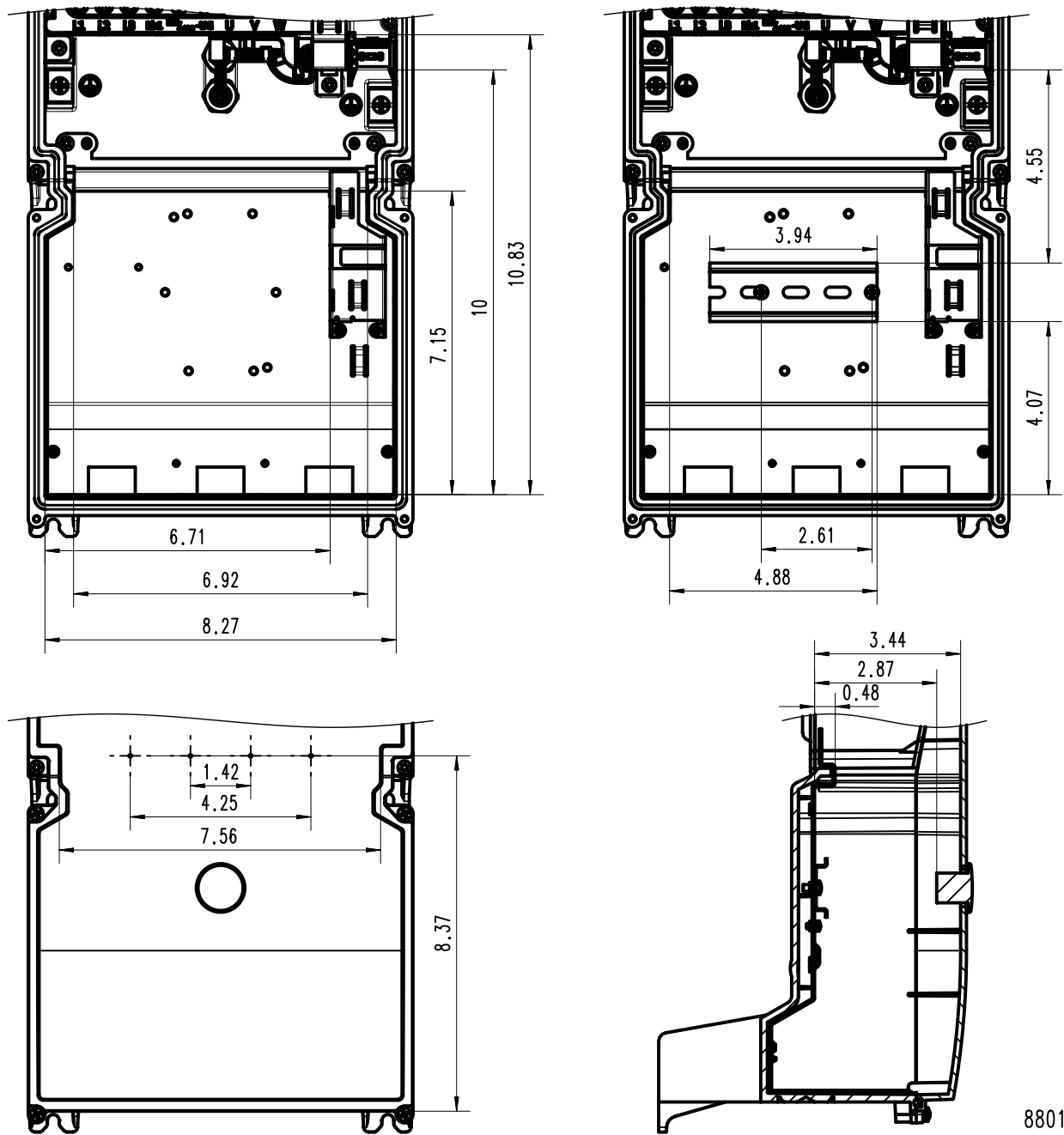
20 hp	i550-P15/230-3	i550-P15/400-3
25 hp	i550-P18/230-3	i550-P18/400-3
30 hp		i550-P22/400-3
Weight	NEMA 4X: 26.2 lb NEMA 4X: 25.1 lb	NEMA 4X: 25.4 lb NEMA 4X: 26.5 lb



8801293



Free mounting space of product variant i550 protec with empty extension box



8801295



8 Product extensions

8.1 Overview

Integrated standard interfaces:

- Standard I/O (analog and digital inputs and outputs)
- Relay output
- PTC input

These **optional** product extensions provide additional interfaces for the required functions of your application:

- Networks:
 - CANopen
 - Modbus RTU
 - IO-Link
 - EtherCAT
 - EtherNet/IP
 - Modbus TCP
 - PROFINET
- Functional safety (STO)



Exceptions for 600 V devices:

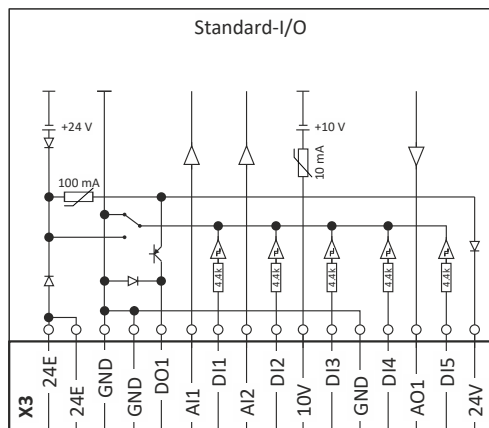
- No PTC input X109
 - No safety module
-



8.2 I/O extensions

8.2.1 Standard I/O

The Standard-I/O provides the inverter with analog and digital inputs and outputs and is designed for standard applications. The Standard-I/O is available with different network options. ▶ [Networks](#) 223



Control terminal X3		
Inputs/outputs	Terminal	Description
Digital inputs	DI1, DI2, DI3, DI4, DI5	DI3/DI4 can be optionally used as frequency or encoder input. HIGH active/LOW active switchable.
Digital outputs	DO1	
Analog inputs	AI1, AI2	Can be optionally used as voltage or current input.
Analog outputs	AO1	Can be optionally used as voltage or current output.
24-V input	24E	Mains-independent DC supply of the control electronics (incl. communication)
10-V output	10 V	Reference voltage or setpoint potentiometer
24-V output	24V	Primarily for supplying digital inputs or Basic Safety - STO; SELV/PELV
Reference potential	GND	
Connection system		Spring terminals, not pluggable



8.2.2 Data of control connections

Digital inputs

Switching type		PNP, NPN	Parameterisable
PNP switching level			
LOW	V	< +5	IEC 61131-2, type 1
HIGH	V	> +15	
NPN switching level			
LOW	V	> +15	
HIGH	V	< +5	
Input resistance	kΩ	4.6	
Cycle time	ms	1	
Electric strength of external voltage	V	± 30	

Frequency input			
Connection		X3/DI3, X3/DI4	
Frequency range	kHz	0 ... 100	

Encoder input			
Type		Incremental HTL encoder	
Two-track connection		X3/DI3 X3/DI4	Track A Track B
Frequency range	kHz	0 ... 100	

Digital outputs

Switching level			
LOW	V	< +5	IEC 61131-2, type 1
HIGH	V	> +15	
max. output current	mA	100	Total current for DO1 and 24V
Cycle time	ms	1	
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	± 30	
Polarity reversal protection		Integrated freewheeling diode for switching the inductive load	
Overload behaviour		Reduced voltage or periodic switch-off/on	
Reset or switch-on behaviour		Output is switched off	LOW

Product extensions

I/O extensions
Data of control connections



Analog inputs

Cycle time	ms	1	
Resolution of A/D converter	Bit	12	
Operation as voltage input			
Connection designation		X3/AI1, X3/AI2	
Input voltage DC	V	-10 ... 10	
Input resistance	kΩ	70	
Accuracy	mV	± 50	Typical
Input voltage in case of open circuit	V	- 0.2 ... 0.2	Display "0"
Electric strength of external voltage	V	± 30	
Operation as current input			
Connection designation		X3/AI1, X3/AI2	
Input current	mA	0 ... 20	
		4 ... 20	open-circuit monitored
Accuracy	mA	± 0.1	Typical
Input current in case of open circuit	mA	< 0.1	Display "0"
Input resistance	Ω	< 250	
Electric strength of external voltage	V	± 30	

Analog outputs

Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 30	
Operation as voltage output			
Resolution of D/A converter	Bit	12	
Output voltage DC	V	0 ... 10	
max. output current	mA	5	
min. load resistance	kΩ	≥ 2.2	
max. capacitive load	μF	1	
Accuracy	mV	± 100	Typical
Operation as current output			
Output current	mA	0 ... 20	
		4 ... 20	open-circuit monitored
Accuracy	mA	± 0.3	Typical

10-V output

Use		Primarily for the supply of a potentiometer (1 ... 10 kΩ)	
Output voltage DC			
Typical	V	10	
Accuracy	mV	± 100	
Max. output current	mA	10	
Max. capacitive load	μF	1	
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 30	



24-V input

Use		Input for mains-independent DC supply of the control electronics (incl. communication)	
Input voltage DC			
Typical	V	24	IEC 61131-2
Area	V	19.2 ... 28.8	
Input power			
Typical	W	3.6	
Max.	W	6	Depending on the use and state of inputs and outputs.
Input current			
Typical	A	0.150	
Max.	A	1.0	When switching on for 50 ms
Capacity to be charged	μF	440	
Polarity reversal protection		When polarity is reversed: No function and no destruction	
Suppression of voltage pulses		Suppressor diode 30 V, bidirectional	
Power supply unit		SELV/PELV	Externally to create a mains-independent DC supply
Max. current	A	8.0	While looping-through

24-V output

Use		Primarily for the supply of digital inputs	SELV/PELV
Output voltage DC			
Typical	V	24	
Area	V	16 ... 28	
max. output current	mA	100	Total current for DO... and 24V
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 30	
Excess current release		Automatically resettable	



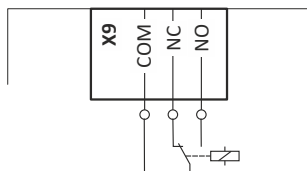
8.3 Further control connections

8.3.1 Relay output



Use a corresponding suppressor circuit in case of an inductive or capacitive load!

Connection			Terminal X9: COM	Common contact (Common)
			Terminal X9: NC	Normally closed contact
			Terminal X9: NO	Normally open contact
Minimum DC contact load				
	Voltage	V	10	A correct switching of the relay contacts needs both values to be exceeded simultaneously.
	Current	mA	10	
Switching voltage/switching current				
Maximum	AC 240 V	A	3	According to UL: General Purpose
	24 V DC	A	2	According to UL: Resistive
	240 V DC	A	0.16	



8.3.2 PTC input



Devices for rated mains voltage of 600 V (i550-Pxxx/600-3) do not have a PTC input.



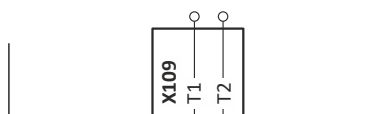
The external PTC sensor incl. cabling must possess the following **electrical insulation**:

At least one basic insulation to the power potential and at least one basic insulation to the control potential **or** a double insulation to the power section and at least one functional insulation to the control unit.



In the Lenze setting, motor temperature monitoring is activated! In the delivery status, there is a wire jumper between the terminals T1 and T2. Before connecting a thermal sensor, remove the wire jumper.

Use	Connection of PTC or thermal contact
Connection	Terminal X109: T1
	Terminal X109: T2
Sensor types	PTC single sensor (DIN 44081)
	PTC triple sensor (DIN 44082)
	Thermal contact





8.4 Networks

8.4.1 CANopen

CANopen is an internationally approved communication protocol which is designed for commercial and industrial automation applications.

Bus-related information			
Name		CANopen CiA 301 V4.2.0	
Communication medium		CAN cable in accordance with ISO 11898-2	
Use		Connection of inverter to a CANopen network	
Connection system		Pluggable double spring terminal	
Status display		2 LEDs	
Connection designation		X216: CH, CL, CG	

Technical data			
Bus terminating resistor	Ω	120	Terminated on both sides
Integrated bus terminating resistor		Yes	Activation via DIP switch
Network topology			
without repeater		Line	
with repeater		Line or tree	
Station			
Type		Responder	
Max. number without repeater		127	Per bus segment, incl. host system
Address		1 ... 127	Adjustable via code or DIP switch
Baud rate	kbps	20, 50, 125, 250, 500, 800 or 1000	Adjustable via code or DIP switch
Max. bus length	m	2500, 1000, 500, 250, 100, 50 or 25	Total cable length depends on the baud rate
Max. cable length between two nodes		Not limited	The max. bus length is decisive
Process data			
Transmit PDOs		3 TPDOs with 1 ... 8 bytes (adjustable)	
Receive PDOs		3 RPDOs with 1 ... 8 bytes (adjustable)	
Transmission mode for TPDOs			
With change of data		Yes	
Time-controlled, multiple of	ms	10	
After reception		1 ... 240 sync telegrams	
Parameter data			
SDO channels		Max. 2 servers	

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

Processing time of process data			
Update cycle	ms	10	In inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

Other data			
Note: There are no interdependencies between parameter data and process data.			



8.4.2 Modbus RTU

Modbus is an internationally approved, asynchronous, serial communication protocol, designed for commercial and industrial automation applications.

Bus-related information			
Name		Modbus RTU	
Communication medium		RS485 (EIA)	
Use		Connection as Modbus server	
Connection system		Pluggable double spring terminal	
Status display		2 LEDs	
Connection designation		X216: TA, TB, COM	

Technical data			
Communication profile		Modbus RTU	
Bus terminating resistor	Ω	120	Terminated on both sides
Integrated bus terminating resistor		Yes	Activation via DIP switch
Network topology			
Without repeater		Line	
Station			
Type		Server	
Max. number without repeater		32	Per bus segment, incl. host system
Max. number with repeater		90	
Address		1 ... 247	Adjustable via code or DIP switch
Transfer rate	kbps	4.8 ... 115	Adjustable via code or DIP switch, alternatively automatic detection via DIP switch can be activated
Max. cable length	m	12 ... 600	Per bus segment, depending on the transfer rate and the cable type used
Max. cable length between two nodes		Not limited	The max. bus length is decisive
Data channel			
SDO channels		Max. 2 servers, with 1 ... 8 bytes	Supported functions: • Read Holding Registers • Preset Single Register • Preset Multiple Registers • Read/Write 4 x registers

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

Processing time of process data			
Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

Other data	
Note: There are no interdependencies between parameter data and process data.	



8.4.3 IO-Link

IO-Link is the standardized IO technology (IEC 61131-9) for communication with sensors and actuators. Point-to-point communication is based on the 3-wire sensor and actuator connection without additional requirements concerning the cable material.

Bus-related information			
Name		IO-Link V 1.1	
Communication medium		Unshielded 3-wire standard cable	
Use		Connection as IO-Link device	
Connection system		Pluggable double spring terminal	
Status display		1 LED	
Connection designation		X316: L+ (24 V) C/Q (Switching and communication line) L- (0 V)	
Technical data			
Topology			
Master - device		Tree (point to point)	
Station			
Type		Device	
Master - device		1:1	
Baud rate	kbps	230.4	COM3
Max. input current	mA	200	Port Class A (type A)
Max. cable length between IO-Link master and IO-Link device (i550)	m	20	
Process data			
Input		12 Byte / 6 Byte	Can be defined by selecting the IODD (12 bytes or 6 bytes).
Output		12 Byte / 6 Byte	
Processing time of process data			
Cycle time	ms	2	



8.4.4 EtherCAT

EtherCAT® (Ethernet for Controller and Automation Technology) is an Ethernet-based fieldbus system which fulfils the application profile for industrial plant systems.

Bus-related information			
Name		EtherCAT	
Communication medium		Ethernet 100 Mbps, full duplex	
Use		Connection as EtherCAT slave	
Status display		2 LEDs (RUN, ERR)	
Connection designation		IN: X246 OUT: X247	

Technical data			
Communication profile		EtherCAT	
		CANopen over EtherCAT	
		File over Ethernet (FoE)	
		Ethernet over EtherCAT (EoE)	
Safety over EtherCAT (FSoE)		No	
Vendor ID [hex]		0x3B	
Network topology		Line, tree, ring	
Device			
Type		EtherCAT slave	
Max. number		65535	In the entire network
Max. cable length	m	Not limited	The length between the devices is decisive.
Max. cable length between two devices	m	100	
Process data			PDOs can be configured for 1-, 2- and 4-byte parameters of the device
Transmit PDOs	Bytes	max. 32	
Receive PDOs	Bytes	max. 32	
Cycle time	ms	Integer multiple of 1 ms	

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

Processing time of process data			
Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

Other data	
Note: There are no interdependencies between parameter data and process data.	



8.4.5 EtherNet/IP

EtherNet/IP is a common fieldbus for the connection of inverters to different control systems in plants.

Bus-related information			
Name		EtherNet/IP	
Communication medium		Ethernet 10 Mbps, 100 Mbps, half duplex, full duplex	
Use		Connection as EtherNet/IP adapter	
Status display		2 LEDs (CIP Module Status, CIP Network Status)	
Connection designation		X266, X267	

Technical data			
Communication profile		EtherNet/IP	
		AC Drive	
Bus terminating resistor		Not required	
Integrated bus terminating resistor		No	
Network topology			
Without repeater		Line, tree, ring	
With repeater		-	
Device			
Type		Adapter (Device)	
Max. number		254	Per subnetwork
Address		Station name	
Max. cable length	m	Not limited	The length between the devices is decisive
Max. cable length between two devices	m	100	
Process data			PDOs can be configured for 1-, 2- and 4-byte parameters of the device
Transmit PDOs	Bytes	max. 32	
Receive PDOs	Bytes	max. 32	
Cycle time	ms	> 4	
Switching method		Store and forward Cut-through	
Switch latency	µs	~ 125	With maximum telegram length
Other data		Additional TCP/IP channel	

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

Processing time of process data			
Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

Other data			
Note: There are no interdependencies between parameter data and process data.			



8.4.6 Modbus TCP

Modbus is an internationally approved Ethernet-based communication protocol, designed for commercial and industrial automation applications.

Bus-related information			
Name		Modbus TCP	
Communication medium		Ethernet 10 Mbps, 100 Mbps, half duplex, full duplex	
Use		Connection as Modbus TCP server	
Status display		2 LEDs	
Connection designation		Port 1: X276 Port 2: X277	

Technical data			
Communication profile		Modbus/TCP	
Bus terminating resistor		Not required	
Integrated bus terminating resistor		No	
Network topology			
Without repeater		Line, tree, ring	
With repeater		-	
Device			
Type		Server	
Max. Number		254	Per subnetwork
Address		Station name	
Max. Cable length	m	Not limited	The length between the devices is decisive
Max. cable length between two devices	m	100	
Process data			
Transmit PDOs	Bytes	256	
Receive PDOs	Bytes	256	
Cycle time	ms	> 4	
Switching method		-	
Switch latency	µs	~ 125	At maximum telegram length
Other data		Additional TCP/IP channel	

Communication time			
Communication time depends on		Processing time in the inverter	Time between start of a request and arrival of response
		Telegram runtime (baud rate, telegram length)	
		Nesting depth of network	
		Bus load	

Processing time of process data			
Update cycle	ms	1	In the inverter
Processing time	ms	0 ... 1	
Application task runtime of the technology application used (tolerance)	ms	1 ... x	

Other data	
Note: There are no interdependencies between parameter data and process data.	



8.4.7 PROFINET

PROFINET is a common fieldbus for the connection of inverters to different control systems in plants.

Bus-related information			
Name		PROFINET RT	
Communication medium		Ethernet 100 Mbps, full duplex	
Use		Integration as PROFINET IO-Device	
Status display		2 LEDs (Ready, Error)	
Connection designation		X256, X257	
Technical data			
Communication profile		PROFINET	
Bus terminating resistor		Not required	
Integrated bus terminating resistor		Yes	
Network topology			
Without repeater		Line, tree, ring	
With repeater		-	
Device			
Type		IO device with real-time communication properties (RT) Conformance class B	
Max. number		255	Per subnetwork
Address		Station name	
Max. cable length	m	Not limited	The length between the devices is decisive.
Max. cable length between two devices	m	100	
Process data			PDOs can be configured for 1-, 2- and 4-byte parameters of the device
Transmit PDOs	Bytes	max. 32	
Receive PDOs	Bytes	max. 32	
Cycle time	ms	1, 2, 4, 8, 16	
Switching method		Cut-through	
Other data		Additional TCP/IP channel	
Other data			
Note: There are no interdependencies between parameter data and process data.			



9 Functional safety



Functional safety is not possible with devices for a rated mains voltage of 600 V (i550-Pxxx/600-3).



9.1 General information and basics

Functional safety describes the necessary measures that need to be taken by means of electrical or electronic equipment to prevent or eliminate dangers due to functional errors.

Protective devices prevent any human access to dangerous areas during normal operation. However, persons may have to be in the danger areas in certain operating modes. The machine operator is protected by internal drive and control measures in these operating modes.

Integrated functional safety

Integrated functional safety provides the conditions in the controls and drives to implement protective functions. Planning and installation expenditure is reduced. Using integrated functional safety increases machine functionality and availability. Integrated functional safety can be used for the protection of persons working on machines in accordance with the Machinery Directive.

Safety component

The safety component in the inverter provides the safe interfaces (e.g. safe inputs or safe network interfaces). If the STO safety function is requested, the safety component immediately brings about the torque-free state according to EN 61800-5-2.

Safety components and the respective terminals are marked in yellow.

Standards

Safety regulations are confirmed by laws and other governmental guidelines and measures and the prevailing opinion among experts, e.g. by technical regulations.

The regulations and rules to be applied must be observed in accordance with the application.

Risk assessment

This documentation can only accentuate the need for a risk assessment. The user of the integrated functional safety must read up on standards and the legal situation.

Before a machine can be put into circulation, the manufacturer of the machine has to conduct a risk assessment according to the 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008] to determine the hazards associated with the use of the machine.

The Machinery Directive refers to three basic principles for the highest possible level of safety:

- Hazard elimination / minimisation by the construction itself.
- Taking the protective measures required against hazards that cannot be removed.
- Existing residual hazards must be documented and the user must be informed of them.

Detailed information on the risk assessment is provided in the DIN EN ISO 12100:2013-08: Safety of machinery – General principles for design – Risk assessment and risk reduction. The result of the risk assessment determines the category for safety-related control systems according to EN ISO 13849-1. Safety-oriented parts of the machine control must be compliant.

Mission time

The mission time of the used components must be complied with.

In case of a defect or when the mission time of a component has expired, the complete component must be replaced. Continued operation is not permitted!



The mission time for the safety functions cannot be reset by a special proof test.

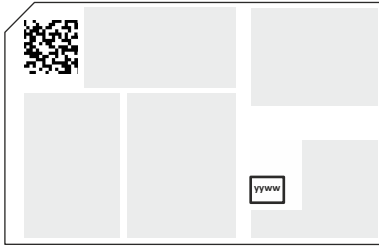
The specified mission time starts at the date of manufacture.

Mission time ► [Safety-related data](#) 239



Manufacturing date

The manufacturing date can be found on the nameplate:



yyww Year of manufacture and week of
manufacture (2144 = CW 44 2021)

9.1.1 Acceptance

The machine manufacturer must check and prove the operability of the safety functions used.

- The machine manufacturer must authorize a person as an inspector who can carry out the test on the basis of their technical training and knowledge of the safety functions.
- The inspector must document and sign the result of the test of each safety function in a test report.

A complete test includes:

- Document the installation including the safety functions:
 - Create an overview image of the installation.
 - Describe the installation.
 - Describe safety devices.
 - Document the safety functions used.
 - Complete validation of the safety functions used.
(The validation must also include tests under fault conditions.)
- Create test report:
 - Document the functional test.
 - Check parameters.
 - Sign test report.
- Create an annex with test records:
 - Protocols for the installation.
 - External recordings

9.1.2 Periodic inspections

After installation and after every modification, the user must check and validate the safety function.

The user must document these tests.

The correct sequence of the safety-oriented functions must be checked in periodic inspections. The risk analysis or applicable regulations determine the time distances between the tests.

The inspection interval should not exceed one year.

9.1.3 Device exchange

Exchange a maximum of one safe device before recommissioning.



9.2 Safe interfaces

Overview: Safe interfaces in Lenze inverters

Functional safety design	Products	Safe inputs	Safe output	Safe network interfaces		
				PROFIsafe	FSoE	CIP Safety™
Basic Safety - STO	i550, i750, i950	1 (STO)				
Advanced Safety - L	i750 cabinet				•	
Extended Safety - L	i750 cabinet				•	
Extended Safety - LT	i950 cabinet	4	•	•	•	

Abbreviations used:

CIP	Common Industrial Protocol	-
FSoE	FailSafe over EtherCAT	-
PROFIsafe	Process field safety	-
STO	Safe torque off (STO)	□ 236

The i550 protec frequency inverter is available in the following functional safety versions:

- Basic Safety - STO



9.2.1 Safe inputs

The components used must comply with the risk reduction required for the application.

Passive sensors

Passive sensors are 2-channel switching elements with contacts.

Please note the following:

- The switches must be wired according to the closed-circuit principle.
- Passive sensors are connected to the inverter via a safety switching device.
- An external safety component must monitor the connecting cables and the function of the sensors if complete exclusion of faults cannot be guaranteed.

The contacts must switch at the same time (equivalent). Safety functions will be activated if only one channel is switched. Switching of only one channel points to faulty sensors or impermissible wiring.

Examples of passive sensors:

- Door contact switch
- Emergency stop control units

Active sensors

Active sensors are units with 2-channel semiconductor outputs (OSSD outputs).

Test pulses for monitoring the outputs and cables are permissible.

P/M-switching sensors switch the positive and negative cable or the signal and ground cable of a sensor signal.

Please note the following:

- The maximum permissible connection capacity of the outputs.
- Active sensors are connected directly to the inverter.
- Monitoring for short circuits must be carried out by the active sensor.

The outputs must switch at the same time (equivalent). Safety functions will be activated if only one channel is switched. The active control of only one channel points to faulty sensors or impermissible wiring.

Examples of active sensors:

- Lightgrid
- Laser scanner
- Controllers

Further information on connecting passive and active sensors

Electrical installation ► [Functional safety](#) 80



9.3 Safety functions

Overview: Safety functions in Lenze inverters

Functional safety design	Products	Stop functions							Monitoring functions							Operation and diagnostics		
		Without feedback					With feedback		Without feedback			With feedback				MUT	Safety bus	I/Os
		STO	SS1	SSE	SBC	CAS	SS2	SOS	SMS	SLS	SSM	SDI	SLI	PDSS	SLP	SCA		
Basic Safety - STO	i550, i750, i950	•																•
Advanced Safety - L	i750 cabinet	•	•		•												•	
Extended Safety - L	i750 cabinet	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	
Extended Safety - LT	i950 cabinet	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Abbreviations used:

STO	Safe torque off (STO)	236
SS1	Safe stop 1 (SS1)	-
SSE	Safe stop emergency (SSE)	-
SBC	Safe brake control (SBC)	-
CAS	STO cascading (CAS)	-
SS2	Safe stop 2 (SS2)	-
SOS	Safe operating stop (SOS)	-
SMS	Safe maximum speed (SMS)	-
SLS	Safely-limited speed (SLS)	-
SSM	Safe speed monitor (SSM)	-
SDI	Safe direction (SDI)	-
SLI	Safely-limited increment (SLI)	-
PDSS	Position-dependent safe speed (PDSS)	-
SLP	Safely-limited position (SLP)	-
SCA	Safe cam (SCA)	-
MUT	Safe Muting (MUT)	-
I/Os	Safe inputs	234
	Safe output	-

The i550 protec frequency inverter is available in the following functional safety versions:

- Basic Safety - STO



9.3.1 Safe torque off (STO)

The "Safe Torque Off (STO)" safety function safely switches off the drive. The drive coasts down.

STO corresponds to an uncontrolled shutdown according to EN 60204-1, category 0.

With STO, additional measures are required for an "emergency switching off" according to EN 60204-1.



9.3.1.1 Basic Safety - STO

Function included in variant:	Umrichter mit Sicherheitsmodul ISMASA000
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Preconditions

- Additional measures are required to prevent movement caused by external forces.
- When assessing risk, also take into account overtravel distances.

Important notes

DANGER!

No "emergency switching off" in terms with EN 60204-1

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

Possible consequences: Death or severe injuries

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

DANGER!

The power supply is not safely disconnected.

Possible consequences: Death or severe injuries due to electrical voltage.

- Turn off the power supply.

DANGER!

Uncontrolled rotation of the motor possible.

Possible consequences: Death or severe injuries

- Set the motor to standstill mechanically.

DANGER!

Automatic restart can occur 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.

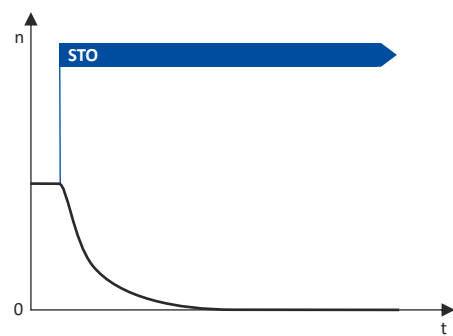
Functional safety

Safety functions
Safe torque off (STO)
Basic Safety - STO



Functional description

STO



- The transmission of the pulse width modulation is safely switched off by STO. The power drivers do not generate a rotating field anymore.
- The motor is safely switched to torqueless operation.

Activation

STO is activated via the safe input X1 with the channels SIA and SIB:

Safe input X1		Inverter device state
SIA	SIB	
LOW	LOW	STO active
LOW	HIGH	Inverter disabled (safety)
HIGH	LOW	
HIGH	HIGH	Drive enabled



If the GS connection is interrupted, or in case of a short circuit/cross-circuit of GS to SIA/SIB, STO is active.



9.4 Safety-related data

9.4.1 Safety-related characteristics Basic Safety - STO

Safety-related characteristics according to EN 61508, Part 1-7 and EN 62061

Specification	Value	Comment
Safety Integrity Level	SIL 3	
PFH [1/h]	1.71 E-09	1.71 % of SIL 3
PFD _{avg} (T)	1.49 E-04	14.9 % of SIL 3 after T = 20 years
Proof test interval	20 years	Mission time

Safety-related characteristics according to EN ISO 13849-1

Specification	Value	Comment
Performance Level	e	
Category	4	
MTTF _d	High	3200 years
Mean diagnostic coverage DC _{av}	High	99 %

Basics of the safety-related characteristics

Basics	Value	Comment
Source of failure rates	SN 29500	When no values from the component manufacturers were available.
Average max. ambient temperature	40 °C	

Further data and information

Electrical installation ► [Functional safety](#) 80



10 Accessories

10.1 Overview

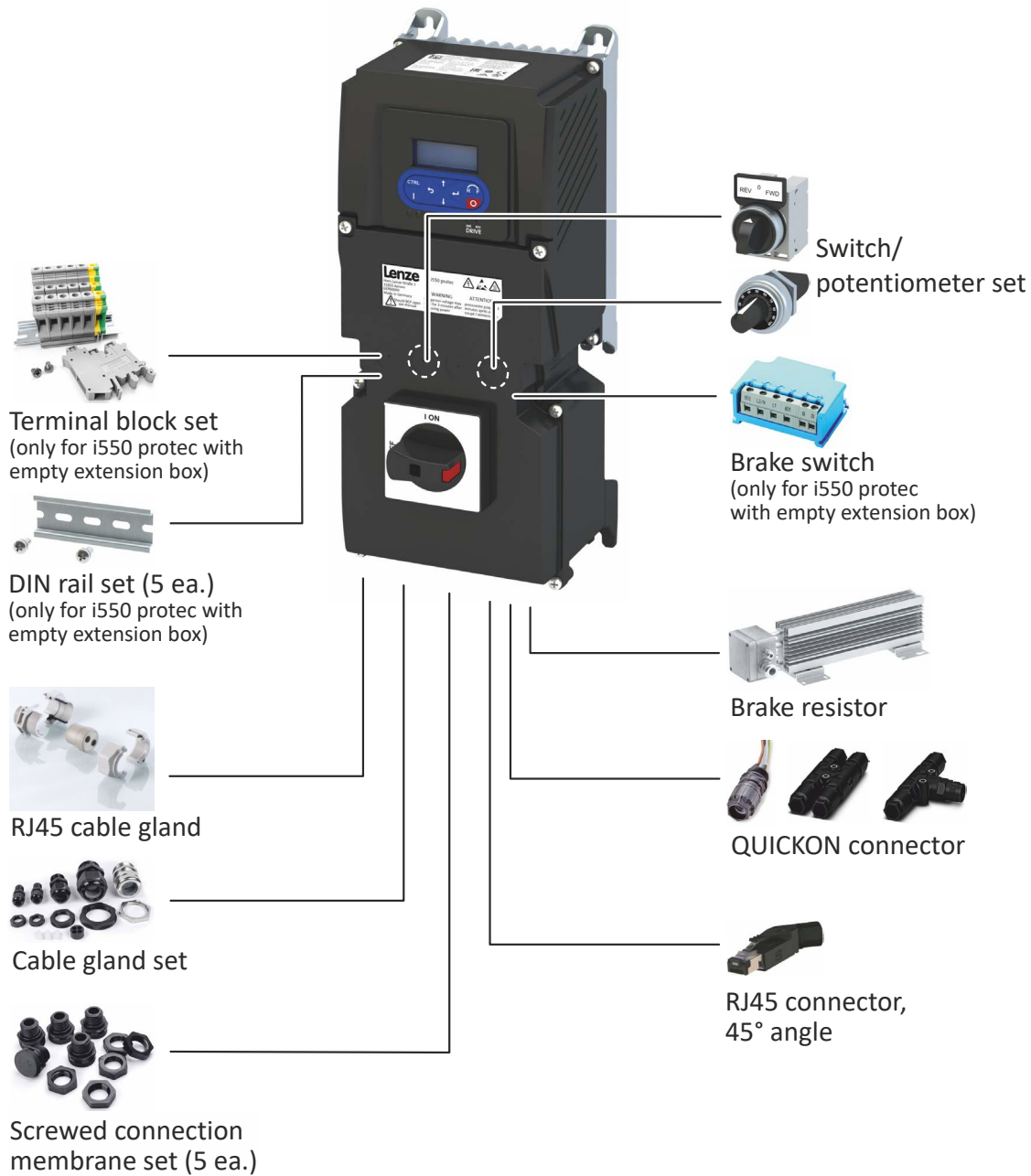
A package of accessories optimally matched to the inverter is available for your applications.

Accessories for i550 protec without extension box





Accessories for i550 protec with extension box



Further accessories

- Power supply units
- Memory modules
- Memory module copiers



10.2 Operation and diagnostics



The inverter can be configured and ordered with keypad module, USB module or WLAN module. The inverter is then delivered with the module mounted.

10.2.1 Keypad

Parameter setting and diagnostics

Thanks to the intuitive operating structure, the navigation keys allow a quick and easy access to the most important parameters, either to configure functions or to query current values. Parameters and actual values are indicated on the easy-to-read display.





10.2.2 WLAN module

Communicate wirelessly with the inverter, via a PC using the Lenze Engineering Tool "EASY Starter" or the Lenze "SMART Keypad App" for Android and iOS smartphones.



⚠ WARNING!

- ▶ This product contains FCC ID: Z64-CC3235MOD / IC: 451I-CC3235MOD
- ▶ To comply with FCC and Industry Canada RF radiation exposure limits for general population, the transmitter with its antenna must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times.
- ▶ This product must not be collocated or operated in conjunction with any other antenna or transmitter.
- ▶ -----
- ▶ Le produit contient un module transmetteur certifié FCC ID: Z64-CC3235MOD / IC: 451I-CC3235MOD
- ▶ Afin de se conformer aux réglementations de la FCC et d'Industry Canada relatives aux limites d'exposition aux rayonnements RF pour le grand public, le transmetteur et son antenne doivent être installés de sorte qu'une distance minimale de 20 cm soit constamment maintenue entre le radiateur (antenne) et toute personne.
- ▶ Le produit ne doit pas être utilisé en combinaison avec d'autres antennes ou transmetteurs.

NOTICE

Insecure WLAN network

Possible consequences: Unauthorized access to the device

- ▶ Assign a WLAN password that complies with the current password guidelines as recommended by international cyber security standards.
- ▶ Only operate the WLAN module in a secure network.
- ▶ Configure the WLAN encryption WPA2 for secure operation.

The module can be used if the certification is recognized in a country according to one of these standards.

Conformity and approvals		
CE	2014/53/EU	Radio equipment directive
FCC	Part 15.107/15.109 ICES-003	

Additional conformities and approvals:

- IC



LED status displays			
LED 1	LED 2	LED 3	Meaning
Power (green)	TX/RX (yellow)	WLAN (green)	
Supply voltage status	Communication status	WLAN status	
OFF	OFF	OFF	No voltage
ON	ON	ON	Self-test (approx. 1 s)
ON	OFF	OFF	Ready for operation No active WLAN connection
ON	Flashing	ON	Communication active
ON	OFF	Blinking	Client Mode Waiting for connection
Blinking	OFF	OFF	Trouble

Connection data (default setting)	
IP address	192.168.178.1
SSID	<Product type>_<10-digit identifier>
Password	password



The WLAN module is configured and ordered together with the inverter.

The inverter will subsequently be delivered with the WLAN module mounted. For inverters with protection class IP66, the WLAN module cannot be replaced.

WLAN module	
Type designation	Design
I5MBDW00000005	i500 WLAN module

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10.2.3 Control and display elements



The operating and display elements listed below can be installed in the following product variants:

- i550 protec with empty extension box
- i550 protec with extension box and disconnect switch

The degree of protection of the device is not reduced by the installation of the operating and display elements.

General information

- A maximum of three elements with 22 mm drill diameter can be mounted in the extension box. For three elements, use the center drilling position and the two outer drilling positions.
- A dielectric strength of 600 V and a conductor cross-section of 0.5 mm² / AWG 24 are recommended for the wiring of the control cables.
- In order for the operating and display elements to perform the desired function, the device must be parameterized. See commissioning manual.

10.2.3.1 Switch/Potentiometer set

The switch/potentiometer set can be used to generate and supply simple control signals via standard I/O.

- The switch is connected to the digital inputs.
- The potentiometer is connected to an analog input.
- In addition, parameterization is required.

Figure with mounted switch and potentiometer



Potentiometer



Switch



0: OFF
REV: Run reverse
FWD: Run forward

Switch/potentiometer set		
Type designation	Version	
EZAMBHXX028	1 x potentiometer	0 ... 10 kΩ
	1 x selector switch 3 positions	2 x NO contacts (normally open contact), positions 1 - 0 - 2
	1 x labeling field	"REV - 0 - FWD"
	Diameter of installation opening	22 mm

Accessories

Operation and diagnostics
Control and display elements
Potentiometer



10.2.3.2 Potentiometer

The potentiometer can be used to generate and supply analog setpoint signals (e.g. frequency setpoint) via standard I/O.

- The potentiometer is connected to an analog input.
- In addition, parameterization is required.



Potentiometer set		
Type designation	Design	
EZAMBHXX038	5 x potentiometer	0 ... 10 kΩ
	Diameter of installation opening	22 mm

10.2.3.3 Selector switch

The selector switch can be used to generate and supply simple control signals via standard I/O.

- The switch is connected to the digital inputs.
- In addition, parameterization is required.



Selector switch set		
Type designation	Design	
EZAMBHXX037	10 x selector switch 3 positions	2 x NO contacts (normally open contact), positions 1 - 0 - 2
	10 x labeling field	"REV - 0 - FWD"
	Diameter of installation opening	22 mm

10.2.3.4 Pushbuttons

The pushbutton can be used to generate and supply simple control signals via standard I/O.

- The pushbutton is connected to a digital input.
- In addition, parameterization is required.



Pushbutton set		
Type designation	Design	
EZAMBHXX035	10 x pushbutton, black	1 x contact NO (normally open contact)
	10 x labeling field	
	Diameter of installation opening	22 mm
EZAMBHXX036	10 x pushbutton, red	1 x contact NC (normally close contact)
	10 x labeling field	
	Diameter of installation opening	22 mm



10.2.3.5 Signal lamps

The signal lamp can be used to display simple status signals (e.g. "Ready for operation" or "Error") via standard I/O.

- The signal lamp is connected to the digital output.
- In addition, parameterization is required.



Signal lamps set		
Type designation	Design	
EZAMBHXX039	10 x signal lamp, blue	
	Diameter of installation opening	22 mm
EZAMBHXX040	10 x signal lamp, red	
	Diameter of installation opening	22 mm
EZAMBHXX041	10 x signal lamp, green	
	Diameter of installation opening	22 mm



10.3 Memory modules

For standard set-up, Lenze offers its customers multipacked, unwritten memory modules (EPM). In combination with the EPM copier, the EPMs can be duplicated at any location.
A memory module is included in the scope of supply of the inverter.



Memory module		
Type designation	Design	VPE
		Piece
IOMAPA0000000M	Easily pluggable Duplicate data set with memory module copier	12



10.4 Memory module copier

For duplicating data on memory modules for a faster standard set-up.
The memory module copier is a copying system for all memory modules from Lenze. With the help of simple optical user guidance, the data of a module is copied quickly and reliably to another memory module.



Memory module copiers	
Type designation	Type
EZAEDE1001	Data set copier for memory modules



10.5 Brake resistors

- To decelerate greater moments of inertia or with a longer operation in generator mode an external brake resistor is required.
- The brake resistor absorbs the produced brake energy and converts it into heat.



Compatible brake resistors are listed in the chapter "Technical data" under the mains connections. This is also where you will find the order codes for the brake resistors.

► [Technical data](#)  84



10.6 EMC filter for motor cable

EMC filters are used to ensure compliance with the EMC requirements of the EN IEC 61800-3 standard. This standard defines the EMC requirements for electrical drive systems in various categories.



For inverters ≥ 30 kW: If category C2 is to be complied with, an EMC filter is required for the motor cable and the motor cable length must not exceed 15 m. In addition, the parameter "Switching frequency" (0x2939) must be left at the default setting.

Definition of the environments

(EN IEC 61800-3)

First environment

The first environment comprises residential buildings or locations that are directly connected to a low-voltage system for supplying residential areas.

Second environment

The second environment comprises facilities or locations that are not directly connected to a low-voltage system for supplying residential areas.

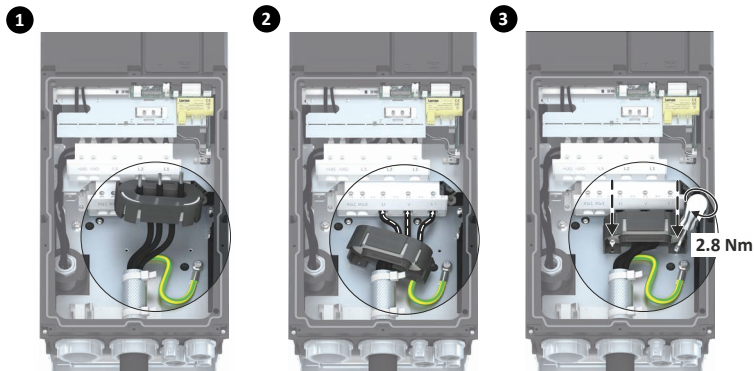
Category C2

Category C2 defines the requirements for permanently installed fixed drive systems that are intended for the use in the first environment at a rated voltage lower than 1000 V. Installation and commissioning may only be carried out by specialist personnel with EMC knowledge.

The limit values of the EN IEC 61800-3 comply with EN 55011 class A group 1.

Mounting information

The EMC filter for the motor cable (ferrite core) is mounted in the terminal box of the device:



EMC filter		
Type designation	Design	
EZAMBHXX042	1 x EMC filter	
	2 x fixing screw	Torx M5x16



10.7 Brake switches

Serves for switching an electromechanical brake.

The brake switch consists of a rectifier and an electronic circuit breaker.

The brake switch can be installed in the product variant i550 protec with empty extension box.

It must be controlled by a digital output of the inverter.

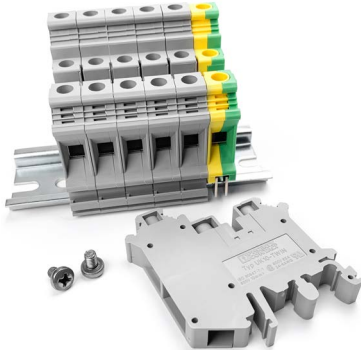


Brake switches		Half-wave rectifiers	Bridge rectifiers
Type designation		E82ZWBRE	E82ZWBRB
Input voltage	V	AC 320 - 550	AC 180 - 317
Output voltage	V	DC 180 (with AC 400) DC 225 (with AC 500)	DC 205 (with AC 230)
Max. brake current	A	0.61	0.54



10.8 Terminal block set

With the terminal block set, a connection and distribution point can be installed in the product variant i550 protec with empty extension box.



Terminal block set		
Type designation	Design	
EZAMBHXX043	1 x 6-way terminal	max. 10 mm ² [AWG 8] Colour: grey
	1 x PE terminal	max. 10 mm ² [AWG 8] Colour: yellow-green
	1 x DIN rail	DIN rail TS35, 100 x 35 x 7.5 mm
	2 x fixing screw	Oval head screw, cross recessed, M4 x 6



10.9 DIN rail set

A DIN rail can be installed in the product variant i550 protec with empty extension box. Additional components such as terminal blocks or fuses can be installed on the DIN rail.



DIN rail set		
Type designation	Design	
EZAMBHXX034	5 x DIN rail	DIN rail TS35, 100 x 35 x 7.5 mm
	10 x fixing screw	Oval head screw, cross recessed, M4 x 6



10.10 Cable glands

Sets with specially tailored cable glands make it easier to lay the cables in the connection area.

Cable gland sets			
Type designation	Design		
EZAMBHXX022	Set for inverters in power range 0.37 ... 2.2 kW		
		2 x M12	For signal cables Diameter: 3.5 ... 7 mm
		1 x M20 Universal	For signal cables Diameter: 7 ... 13 mm See also sealing set
		1 x M20 Standard	For mains cables Diameter: 7 ... 13 mm
		1 x M20 EMC	For shielded motor cables Diameter: 9 ... 13 mm
		1 x sealing set	1 x sealing ring for "M20 Universal" with openings, 4 x 5.3 mm 3 x sealing plugs
EZAMBHXX023	Set for inverters in power range 3 ... 11 kW		
		2 x M12	For signal cables Diameter: 3.5 ... 7 mm
		1 x M20 Universal	For signal cables Diameter: 7 ... 13 mm See also sealing set
		1 x M32 Standard + reducing seal insert	For mains cables Diameter: 7 ... 22 mm
		1 x M32 EMC + reducing seal insert	For shielded motor cables Diameter: 9 ... 20 mm
		1 x sealing set	1 x sealing ring for "M20 Universal" with openings, 4 x 5.3 mm 3 x sealing plugs
EZAMBHXX024	Set for inverters in power range 15 ... 22 kW		
		2 x M12	For signal cables Diameter: 3.5 ... 7 mm
		1 x M32 Universal	For signal cables Diameter: 15 ... 21 mm See also sealing set
		1 x M40 Standard + reducing seal insert	For mains cables Diameter: 12 ... 28 mm
		1 x M40 EMC + reducing seal insert	For shielded motor cables Diameter: 12 ... 27 mm
		1 x sealing set	1 x sealing ring for "M32 Universal" with openings, 4 x 7 mm 3 x sealing plugs
EZAMBHXX025	RJ45 cable gland		
		1 x M20	For network cables with RJ45 plug, separable Diameter: up to 6 mm



10.11 QUICKON connector

With the QUICKONconnectors, the mains connection is available in a pluggable version with a commonly used standard.

QUICKON V2 components for cable cross-section 1 ... 2.5 mm ²		
Type designation	Design	
QUICKON V2 set for rated power ≤ 4 kW (16 A)		
EZAMBHXX027		1 x M25 QUICKON V2 plug (wall bushing), 3 + PE, 1 ... 2.5 mm ² 1 x QUICKON V2 nut 1 x connecting cable 0.5 m with connection cross-section 2.5 mm ² 1 x adapter M20/M25 1 x adapter M25/M32
QUICKON V2 nut		
EWS0103/M		• Cable diameter: 6 ... 10 mm • Connection frequency: max. 10 • 5 pieces
EWS0104/M		• Cable diameter: 9 ... 14 mm • Connection frequency: max. 10 • 5 pieces
QUICKON V2 connector with nut		
EWS0105/M		• Cable diameter: 6 ... 10 mm • Connection frequency: ≥ 50 • 5 pieces
EWS0106/M		• Cable diameter: 9 ... 14 mm • Connection frequency: ≥ 50 • 5 pieces
QUICKON V2 H-distributor		
EWS0110		• Number of poles: 4 • Connection cross-section: 2.5 mm ² • Cable diameter: 6 ... 14 mm • Connection frequency: ≥ 50 • The scope of supply does not include QUICKON V2 nuts. These must be ordered additionally (EWS0103/M, EWS0104/M).
QUICKON V2 T distributor		
EWS0111		• Number of poles: 4 • Connection cross-section: 2.5 mm ² • Cable diameter: 9 ... 14 mm • Connection frequency: ≥ 50 • Two QUICKON V2 nuts are included in the scope of supply. Others must be ordered additionally (EWS0103/M, EWS0104/M).
QUICKON V2 socket wrench		
EWS0112		• Suitable for QUICKON V2 nuts EWS0103/M ... EWS0106/M • Wrench size: 22 mm
QUICKON V2 protection cover		
EWS0113		Suitable for QUICKON V2 distributor EWS0110, EWS0111 • Protection class: IP68 • Eyelet for fastening



QUICKON V2 components for cable cross-section 2.5 ... 6 mm ²		
Type designation	Design	
QUICKON V2 H-distributor		
EWS0114		• Number of poles: 5 • Connection cross-section: 6 mm² • Cable diameter: 9 ... 20 mm • Connection frequency: ≥ 50 • No V2 nuts are included QUICKON in the scope of supply. These need to be ordered separately (EWS0116, EWS0117).
QUICKON V2 T-distributor		
EWS0115		• Number of poles: 5 • Connection cross-section: 6 mm² • Cable diameter: 12 ... 20 mm • Connection frequency: ≥ 50 • Two V2 nuts are included QUICKON in the scope of supply. Any additional nuts will need to be ordered separately (EWS0116, EWS0117).
QUICKON V2 nut		
EWS0116		• Cable diameter: 12 ... 20 mm • Connection cross-section: 6 mm² • Connection frequency: max. 10 • 5 pieces
EWS0117		• Cable diameter: 9 ... 14 mm • Connection cross-section: 6 mm² • Connection frequency: max. 10 • 5 pieces
QUICKON V2 protection cap		
EWS0118		Fits QUICKON V2 distributor EWS0114, EWS0115 • Degree of protection: IP68 • Fastening eyelet



10.12 RJ45 connectors

The RJ45 connector is suitable for creating data lines for Ethernet-based fieldbus networks; can be mounted without special tools. A 45° angled piece allows for variable cable laying in 4 directions.

RJ45 connector		
Type designation	Design	
EZAMBHXX033		For data lines, 4-pole, angled at 45° • Connection type: IDC (insulation-displacement contact) connection • Shielding: fully shielded, 360° shield contact • Conductor diameter: 0.1 ... 0.32 mm (AWG 27 ... 22) • External core diameter: 1.6 mm • Cable diameter: 4.5 ... 8 mm • Transfer characteristics: Cat. 5 class D up to 100 MHz, 10 Mbit/s or 100 Mbit/s Ethernet • Degree of protection: IP20 • Temperature range: -40 ... +70 °C • Connection frequency: ≥ 750



10.13 Screw connection membrane set

A pressure compensation element with membrane technology prevents condensed water from forming in the device and ensures trouble-free operation. This ensures maintenance of the protection class.

Possible applications include scenarios with large differences in temperature and humidity between indoor and outdoor areas. The resulting negative pressure inside the device causes air flow from the outside to the inside and can lead to condensed water forming inside the unit.

Screwed connection, membrane set		
Type designation	Design	
EZAMBHXX026		5 x M12 screw connection with integrated membrane



11 Purchase order

11.1 Notes on ordering

The i550 protec frequency inverter can be ordered in the following product variants:

- i550 protec without extension box
- i550 protec with empty extension box
- i550 protec with extension box and disconnect switch

Additional feature options can be optionally configured during order placement.

- Rated power
- Mains voltage and connection type
- Safety engineering
- Protection class
- Application areas (default parameter setting)
- Product extension (Standard I/O, keypad, WLAN module, fieldbus network)

The inverters are supplied as complete devices in the desired configuration.

Later changes to the configured inverters are not possible. Only by doing so can the compact design and the protection class be achieved and guaranteed.

Accessory sets are not included in the scope of supply. They will need to be ordered and mounted separately. ▶ [Accessories](#)  240

The selection can be performed using the "EASY Product Finder" on the Lenze website.

»EASY Product Finder«

The »EASY Product Finder« helps you to configure your required product in next to no time. In addition, you can retrieve all important technical details such as data sheets, CAD data, and EPLAN data.

The link and the QR code lead directly to the "EASY Product Finder": [EASY Product Finder](#)





11.2 Order details

The information required to order an i550 protec frequency inverter is listed below.

Order example

Description of the component (Complete inverter)		Type code:												
		I	5	5	A	P	222	F	1	A	3	1	0	02S
Product type	Inverter	I												
Product family	i500		5											
Product	i550			5										
Product generation	Generation 1				A									
Mounting type	Wall mounting					P								
Rated power	2.2 kW 3 hp						222							
Mains voltage and connection type	3/PE AC 400 V 3/PE AC 480 V							F						
Extension box	With empty extension box								1					
Integrated functional safety	Basic Safety - STO									A				
Protection class	IP31, uncoated UL Type 1										3			
Interference suppression	Integrated RFI filter											1		
Application area	Default parameter setting: Region EU (50-Hz networks)												0	
Product extension	Standard-I/O ...													0
	... with CANopen													02S



Assignment of product name and type code

When listing the technical data of the various variants, the easily legible product name is used.

The product name contains the power in kW, mains voltage class and the number of phases.

This information results in the first 9 characters of the type code:

Complete inverter			
Power		Product name	Type code
kW	hp		
1-phase mains connection 120 V, RFI filter not integrated			
0.37	0.5	i550-P0.37/120-1	I55AP137A
0.75	1	i550-P0.75/120-1	I55AP175A
1.1	1.5	i550-P1.1/120-1	I55AP211A
1-phase mains connection 230 V, RFI filter integrated			
0.37	0.5	i550-P0.37/230-1	I55AP137B
0.55	0.75	i550-P0.55/230-1	I55AP155B
0.75	1	i550-P0.75/230-1	I55AP175B
1.1	1.5	i550-P1.1/230-1	I55AP211B
1.5	2	i550-P1.5/230-1	I55AP215B
2.2	3	i550-P2.2/230-1	I55AP222B
1/3-phase mains connection 230/240 V, RFI filter not integrated			
0.37	0.5	i550-P0.37/230-2	I55AP137D
0.55	0.75	i550-P0.55/230-2	I55AP155D
0.75	1	i550-P0.75/230-2	I55AP175D
1.1	1.5	i550-P1.1/230-2	I55AP211D
1.5	2	i550-P1.5/230-2	I55AP215D
2.2	3	i550-P2.2/230-2	I55AP222D
3-phase mains connection 230/240 V, RFI filter not integrated			
3	4	i550-P3.0/230-3	I55AP230C
4	5	i550-P4.0/230-3	I55AP240C
5.5	7.5	i550-P5.5/230-3	I55AP255C
7.5	10	i550-P7.5/230-3	I55AP275C
11	15	i550-P11/230-3	I55AP311C
15	20	i550-P15/230-3	I55AP315C
18.5	25	i550-P18/230-3	I55AP318C
3-phase mains connection 230/240 V, RFI filter integrated			
30	40	i550-P30/230-3	I55AP330C
45	60	i550-P45/230-3	I55AP345C
Continuation ...			



Complete inverter			
Power		Product name	Type code
kW	hp		
Continuation ...			
3-phase mains connection 400/480 V, RFI filter integrated			
0.37	0.5	i550-P0.37/400-3	I55AP137F
0.55	0.75	i550-P0.55/400-3	I55AP155F
0.75	1	i550-P0.75/400-3	I55AP175F
1.1	1.5	i550-P1.1/400-3	I55AP211F
1.5	2	i550-P1.5/400-3	I55AP215F
2.2	3	i550-P2.2/400-3	I55AP222F
3	4	i550-P3.0/400-3	I55AP230F
4	5	i550-P4.0/400-3	I55AP240F
5.5	7.5	i550-P5.5/400-3	I55AP255F
7.5	10	i550-P7.5/400-3	I55AP275F
11	15	i550-P11/400-3	I55AP311F
15	20	i550-P15/400-3	I55AP315F
18.5	25	i550-P18/400-3	I55AP318F
22	30	i550-P22/400-3	I55AP322F
30	40	i550-P30/400-3	I55AP330F
37	50	i550-P37/400-3	I55AP337F
45	60	i550-P45/400-3	I55AP345F
55	75	i550-P55/400-3	I55AP355F
75	100	i550-P75/400-3	I55AP375F
3-phase mains connection 600 V, RFI filter not integrated			
0.75	1	i550-P0.75/600-3	I55AP175G
1.5	2	i550-P1.5/600-3	I55AP215G
2.2	3	i550-P2.2/600-3	I55AP222G
4	5	i550-P4/600-3	I55AP240G
5.5	7.5	i550-P5.5/600-3	I55AP255G
7.5	10	i550-P7.5/600-3	I55AP275G
11	15	i550-P11/600-3	I55AP311G
15	20	i550-P15/600-3	I55BP315G
18.5	25	i550-P18/600-3	I55BP318G
22	30	i550-P22/600-3	I55BP322G
30	40	i550-P30/600-3	I55BP330G
37	50	i550-P37/600-3	I55BP337G
45	60	i550-P45/600-3	I55BP345G

The other positions of the type code indicate options and design variants. The following table shows the structure of the complete type code.

[illegible]



12 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>



13 Appendix

13.1 Good to know

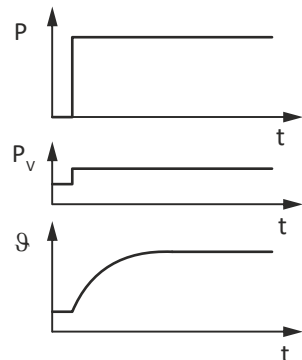
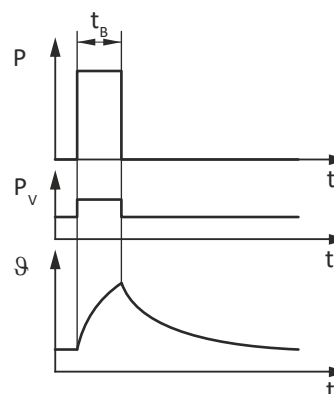
13.1.1 Operating modes of the motor

Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature limit. This behaviour is referred to as overload capacity.

Depending on the duration of the load and the resulting temperature rise, the required motor can be selected reduced by the overload capacity.

The most important operating modes

Continuous operation S1	Short-time operation S2
	
Operation with a constant load until the motor reaches the thermal steady state. The motor may be actuated continuously with its rated power.	Operation with constant load; however, the motor does not reach the thermal steady state. During the following standstill, the motor winding cools down to the ambient temperature again. The increase in power depends on the load duration.



Intermittent operation S3	Non-intermittent periodic operation S6
Sequence of identical duty cycles comprising operation with a constant load and subsequent standstill. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/downtime ratio.	Sequence of identical duty cycles comprising operation with a constant load and subsequent no-load operation. The motor cools down during the no-load phase. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/idle time ratio.
P Power t Time t_L Idle time θ Temperature	P_v Power loss t_B Load period t_S Cycle duration



13.1.2 Motor control types

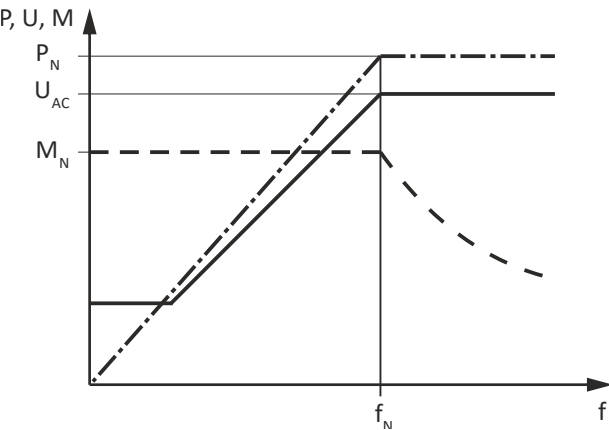
The inverter provides various motor control types.

Linear V/f characteristic control

The output voltage is increased proportionately to the output frequency.

In case of low output frequencies, the motor voltage can be increased to ensure a minimum current for the breakaway torque. In the field weakening range, the output voltage of the inverter is constant (mains voltage) and the frequency can be further increased depending on the load. The maximum torque of the motor is reduced proportionately to the square of the frequency increase, the maximum output power of the motor being constant.

Application areas are for instance: Single drives with constant load.



P Power
V Voltage
M Torque
f Frequency

P_N Rated power
 U_{AC} Mains voltage
 M_N Rated torque
 f_N Rated frequency



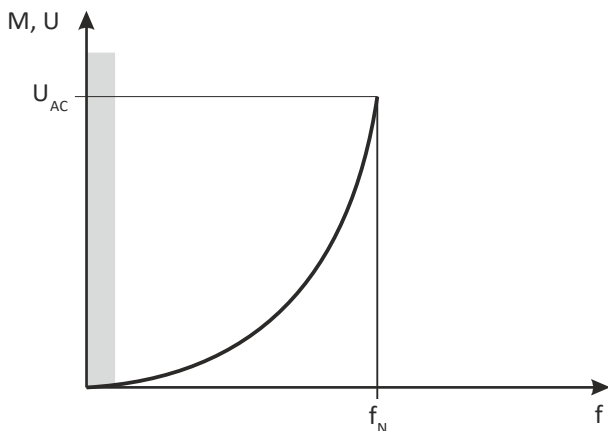
Square-law V/f characteristic control

The output voltage is increased squaredly to the output frequency.

In case of low output frequencies, the motor voltage can be increased to ensure a minimum current for the breakaway torque. In the field weakening range, the output voltage of the inverter is constant (mains voltage) and the frequency can be further increased depending on the load. The maximum torque of the motor is reduced squaredly to the frequency increase, the maximum output power of the motor being constant.

Application areas are for instance:

- Pumps
- Fans
- Ventilators

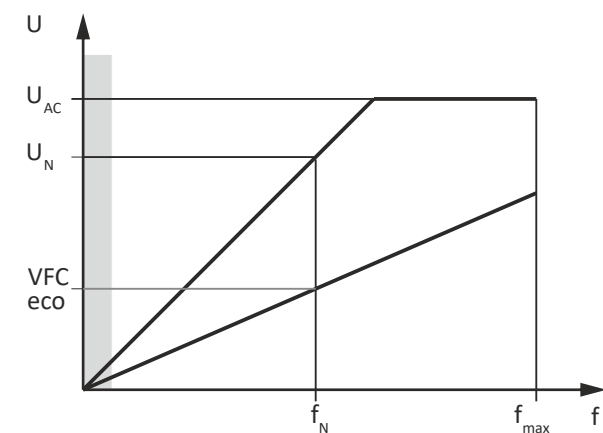


V Voltage
f Frequency
M Torque

U_{AC} Mains voltage
 f_N Rated frequency

VFCeco

The VFCeco mode has a special effect in the partial load operational range. Usually, three-phase AC motors are supplied there with a higher magnetising current than required by the operating conditions. The VFCeco mode reduces the losses in the partial load operational range so that savings up to 30 % are possible.



V Voltage
 U_{AC} Mains voltage
 U_N Rated voltage

f Frequency
 f_N Rated frequency
 f_{max} Max. frequency

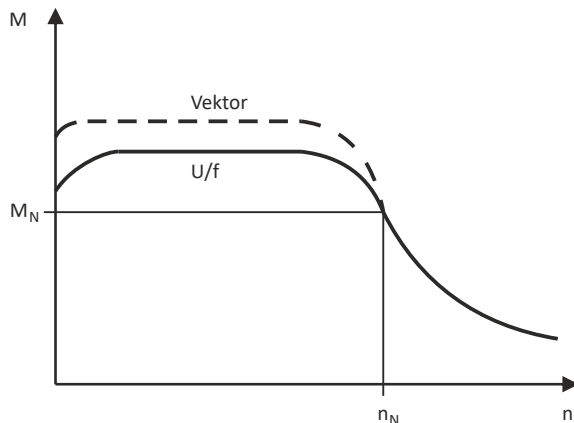


Sensorless vector control (SLVC)

In vector control, an inverted voltage model is used for calculation. The parameters are detected via a parameter identification. The inverter determines the angle between current and voltage. This imposes a current on the motor".

Compared to the V/f characteristic control, the vector control serves to achieve improved drive characteristics thanks to:

- higher torque throughout the entire speed range
- higher speed accuracy and higher concentricity factor
- higher efficiency



M Torque
n Speed

M_N Rated torque
 n_N Rated speed

Application areas are for instance:

- Single drives with changing loads
- Single drives with high starting duty
- Sensorless speed control of three-phase AC motors

13.1.3 Switching frequencies

On an inverter, the term "switching frequency" is understood to mean the frequency with which the input and outputs of the output module (inverter) are switched. On an inverter, the switching frequency can generally be set to values between 2 and 16 kHz, whereby the selection is based on the respective power output.

As switching the modules cause heat losses, the inverter can provide higher output currents at low switching frequencies than at high frequencies. Additionally, it is distinguished between the operation at a permanently set switching frequency and a variably set switching frequency. Here, the switching frequency is automatically reduced as a function of the device utilization.

At a higher switching frequency, the noise generation is less.

Options for the switching frequency:

- 2 kHz
- 4 kHz
- 8 kHz
- 12 kHz
- 16 kHz
- variable (automatic adaptation)



13.1.4 Enclosures

The protection class indicates the suitability of a product for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The protection classes are classified in the EN 60034-5/ EN IEC 60529.

The first code number after the code letters IP indicates the protection against the ingress of foreign particles and dust. The second code number refers to the protection against the ingress of humidity.

Code number 1	Degree of protection	Code number 2	Degree of protection
0	No protection	0	No protection
1	Protection against the ingress of foreign particles $d > 50$ mm. No protection in case of deliberate access.	1	Protection against vertically dripping water (dripping water).
2	Protection against medium-sized foreign particles, $d > 12$ mm, keeping away fingers or the like.	2	Protection against diagonally falling water (dripping water), 15° compared to normal service position.
3	Protection against small foreign particles $d > 2.5$ mm. Keeping away tools, wires or the like.	3	Protection against spraying water, up to 60° from vertical.
4	Protection against granular foreign particles, $d > 1$ mm, keeping away tools, wire or the like.	4	Protection against spraying water from all directions.
5	Protection against dust deposits (dust-protected), complete protection against contact.	5	Protection against water jets from all directions.
6	Protection against the ingress of dust (dust-proof), complete protection against contact.	6	Protection against choppy seas or heavy water jets (flood protection).



13.2 Glossary

Definitions in functional safety

Abbreviation	Meaning
AIE	Acknowledge In Error, error acknowledgement
AIS	Acknowledge In Stop, restart acknowledgement
OFF state	Triggered signal status of the safety sensors
CCF	Common Cause Error (also β -value)
EC_FS	Error Class Fail Safe
EC_SS1	Error Class Safe Stop 1
EC_SS2	Error Class Safe Stop 2
EC_STO	Error Class Safe Torque Off Stop 0
ON state	Signal status of the safety sensors in normal operation
FIT	Failure In Time, 1 FIT = 10^{-9} Error/h
FMEA	Failure Mode and Effect Analysis
FSoE	FailSafe over EtherCAT
GSDML	Device description file with PROFINET-specific data to integrate the configuring software of a PROFINET controller.
HFT	Hardware Failure Tolerance
Cat.	Category according to EN ISO 13849-1
nBD	Speed value Base-Drive, internally determined actual speed from standard application
nSD	Safe-Drive speed value, internally determined actual speed from the safety application
n_safe	Actual speed determined from validation of nBD and nSD. Enters the further processing of the speed-dependent safety functions.
OSSD	Output Signal Switching Device, tested signal output
pBD	Base-Drive position value, internally determined actual position from standard application
pSD	Safe-Drive position value, internally determined actual position from the safety application
p_safe	Actual position determined from validation of pBD and pSD. Enters the further processing of the position-dependent safety functions.
PELV	Protective Extra Low Voltage
PL	Performance Level according to EN ISO 13849-1
PM	Plus-Minus – switched signal paths
PP	Plus-Plus – switched signal paths
PS	PROFIsafe
PWM	Pulse Width Modulation
SCS	Safe Creeping Speed
SD-In	Safe Digital Input
SD-Out	Safe Digital Output
SELV	Safety Extra Low Voltage
SFF	Safe Failure Fraction
SIL	Safety Integrity Level according to EN IEC 61508

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