

Project planning EN



i550 protec frequency inverter
0.37 kW ... 22 kW,
0.5 hp ... 30 hp

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About this document

Document description

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

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

Further documents

For certain tasks, information is available in additional documents.

Document	Contents/topics
Configuration document	Basic information on configuring and ordering the product
Commissioning document	Basic information on installing and commissioning the product
"Functional safety" configuration document	Basic information on configuring "functional safety" of the product

More information

For certain tasks, more information is available in additional documents.

Document	Contents/topics
Commissioning document	Setting and parameterising the inverters
Mounting Instructions	Basic information for the mechanical and electrical installation <ul style="list-style-type: none">• Is supplied with each component.
"Functional safety" configuration document	Information on this (optional) function

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





About this document

Notations and conventions



Notations and conventions

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

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

Layout of the safety instructions

DANGER!

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

WARNING!

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

CAUTION!

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

NOTICE

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



Product information

Product description

The frequency inverters from the i500 protec series use the same tried-and-tested technology used in control cabinet inverters and only differ functionally in terms of a higher degree of housing protection with an adapted design. If your machine requires a lot of space, has a modular design, or the space in the control cabinet is limited, we recommend a decentralized installation close to the motor. The latest connection systems are available as accessories and offer a great deal of flexibility during installation, while maintaining compliance with the degree of protection. The inverters comply with the future EN 50598-2 standard.

Highlights

- 0.37 ... 22 kW with IP31 and IP66 protection classes
- IP66 protection class (NEMA 4X with indoor and outdoor approval)
- Integrated diagnostic interface (micro USB) for service purposes
- Versions with or without repair switch, with keypad or WLAN module for easy commissioning
- Optionally available with "Safe Torque Off (STO)" with SIL 3 (EN ISO 13849-1) and Performance Level e (EN 62061/EN 61508-2)
- Industry-standard fieldbus network options: ▶ [Topologies / network](#) 16
- The "Light Duty" load characteristic allows for a higher output current for inverters with protection class IP31: ▶ [Load characteristics](#) 14
- High internal functional range: ▶ [Overview](#) 21

Application ranges

- Pumps and fans
- Conveying and travelling drives
- Forming, tool and hoist drives

Product information

Product description
Product variants



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 repair 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](#) [197](#)

The i550 protec with extension box and repair switch is ideal for a looping-through connection. ▶ [Mains installation with several devices](#) [197](#)

For easy operation and diagnostics, the inverters can be equipped with a keypad or WLAN module. ▶ [Operation and diagnostics](#) [29](#)

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/NEMA 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/NEMA 4X, indoor or outdoor installation) allows for use in rough environments, i.e. it is hoseproof and dust-tight.



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	Without extension box	With empty extension box	With extension box and repair switch
Product illustration				
Protection class EN	IP31	IP66	IP66	IP66
Protection class UL/NEMA	1	4X	4X	4X
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



Load characteristics

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

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

	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



Features

Connections and interfaces

The i550 protec frequency inverters are outfitted with these interfaces:

- Standard I/O:
 - 5x digital input
 - 1x digital output
 - 2x analog input
 - 1x analog output
 - PNP/NPN logic
 - Cycle time: 1 ms
- Frequency input: 0 ... 100 kHz
- 1x 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.

Product information

Features
Topologies / network



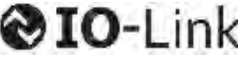





Topologies / network

The inverters can be equipped with different fieldbus networks.

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

Currently available networks:

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



Product information

Features
Inverters without Extension box

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.

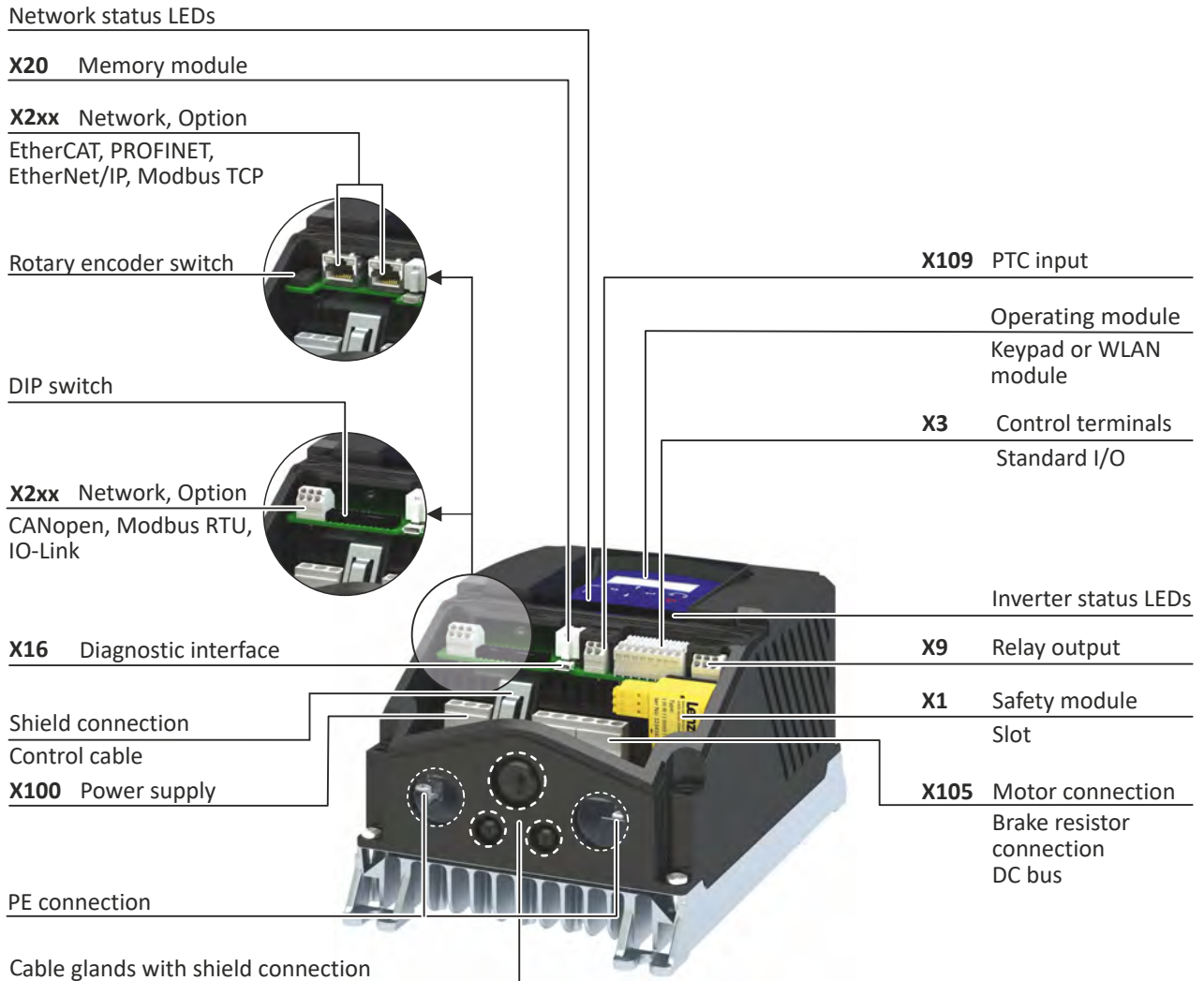


Fig. 1: Example for i550 protec without extension box

Product information

Features
Inverters with Extension box empty



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.

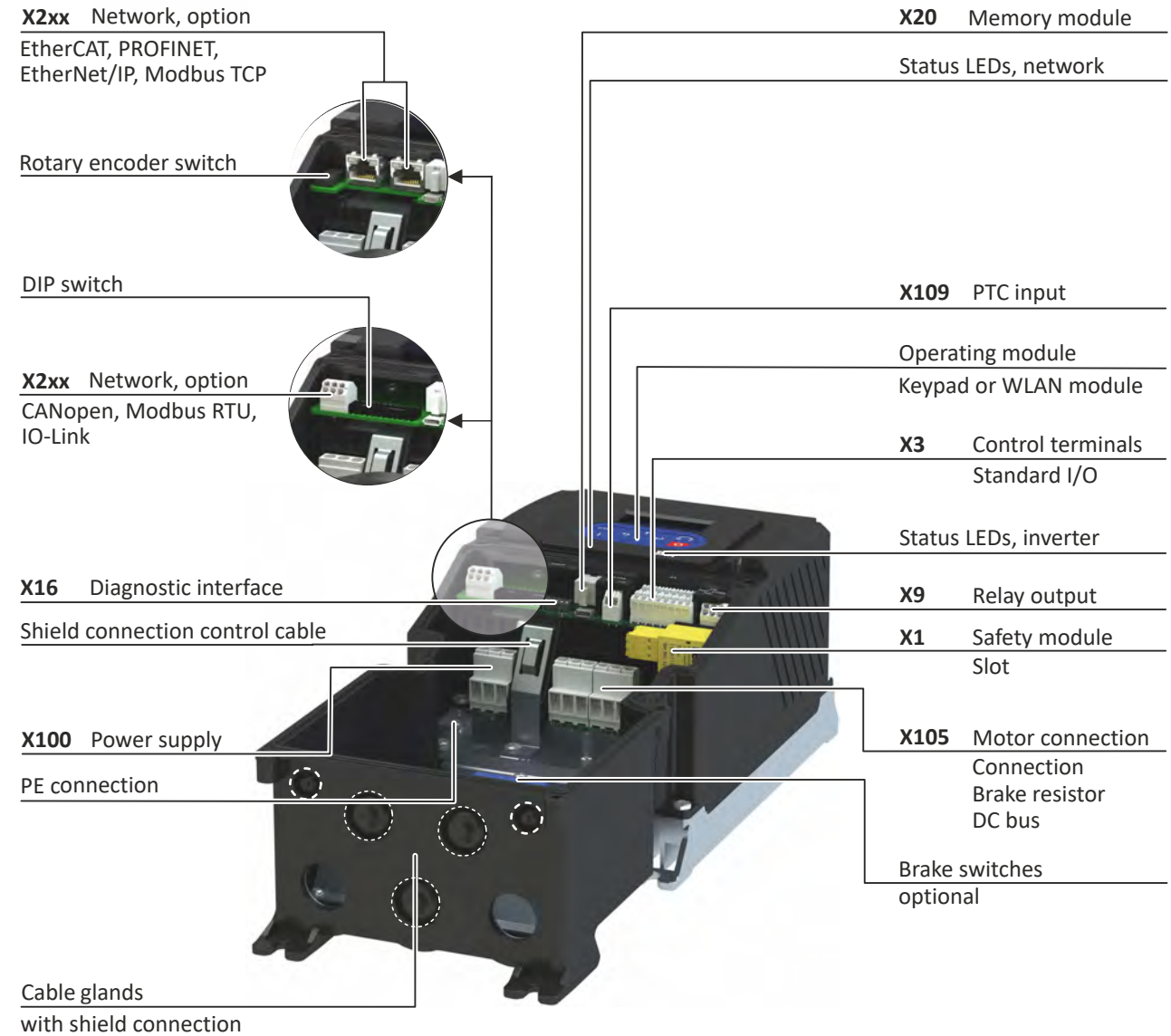


Fig. 2: Example for i550 protec with extension box



Product information

Features
Inverters with Extension box and repair switch

Inverters with Extension box and repair 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.

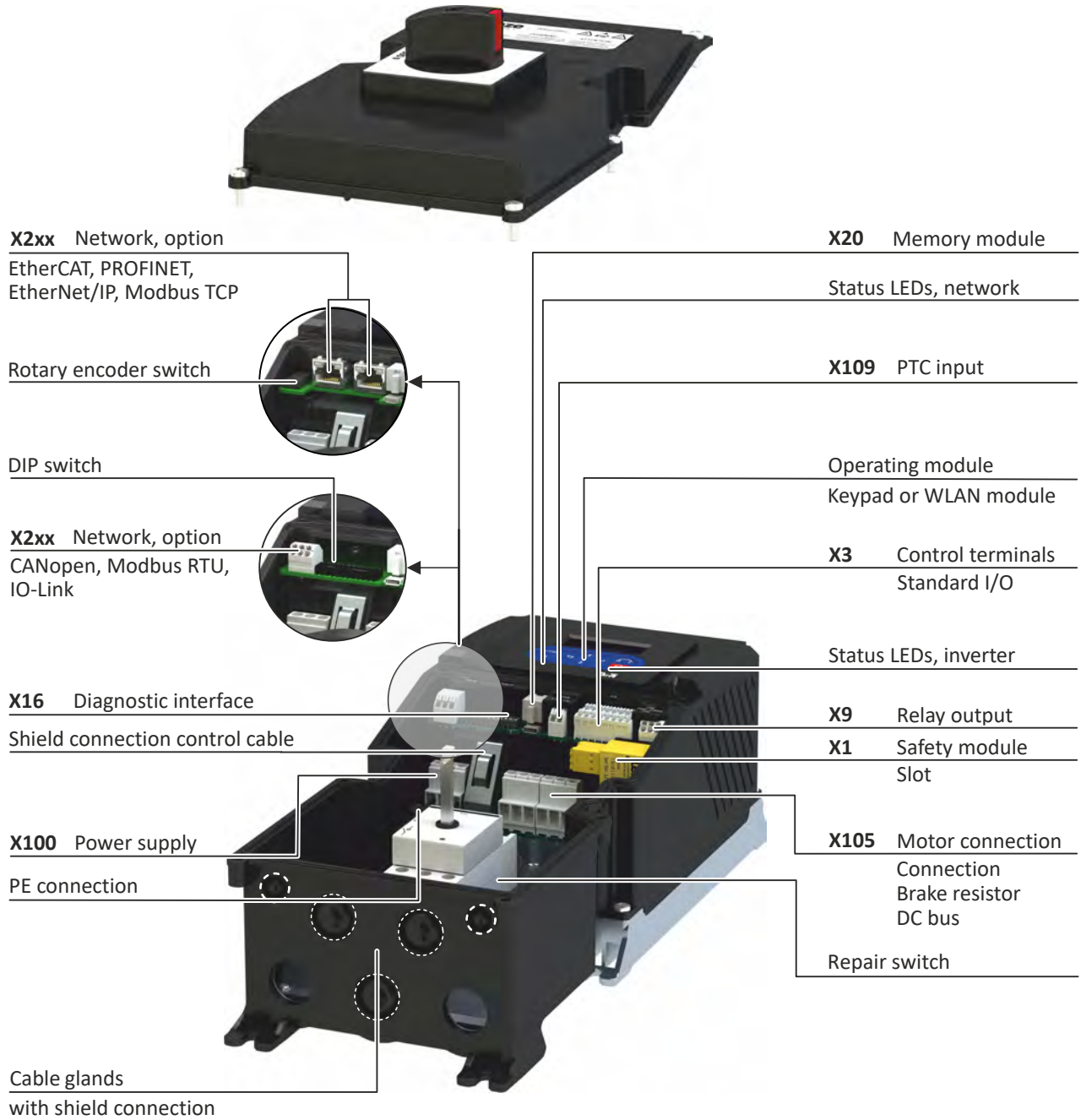


Fig. 3: Example for i550 protec with extension box and repair switch

Product information

Features

Accessories for installation in inverters with Extension box



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 repair switch
		
▶ Brake switches □ 201	•	-
▶ Switch/Potentiometer set □ 199 • 1 x potentiometer • 1 x rotary switch	•	•
▶ Terminal block set □ 201 • 1 x 6-way terminal • 1 x PE terminal • 1 x DIN rail • 2 x fixing screw	•	-
▶ DIN rail set □ 202 • 5 x DIN rail • 10 x fixing screw	•	-
• Installation possible - Installation impossible		



Functions

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.	

Product information

Functions
Motor control types



Motor control types

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

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

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

Motor functions

Motor setting range

Rated point 120 Hz



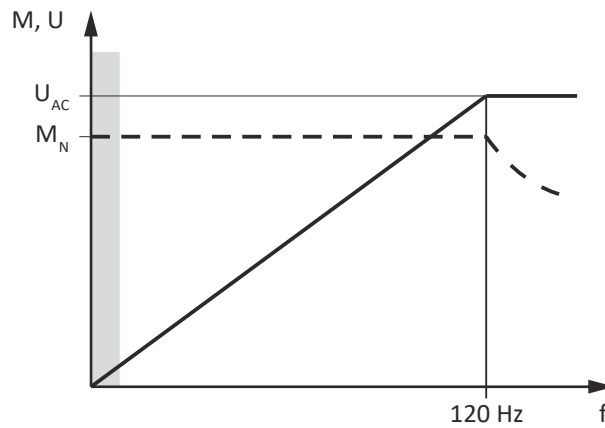
Only possible with Lenze MF motors.

The rated motor torque is available up to 120 Hz.

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

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

V/f at 120 Hz



V Voltage
M Torque
f Frequency

U_{AC} Mains voltage
 M_N Rated torque



Rated point 87 Hz

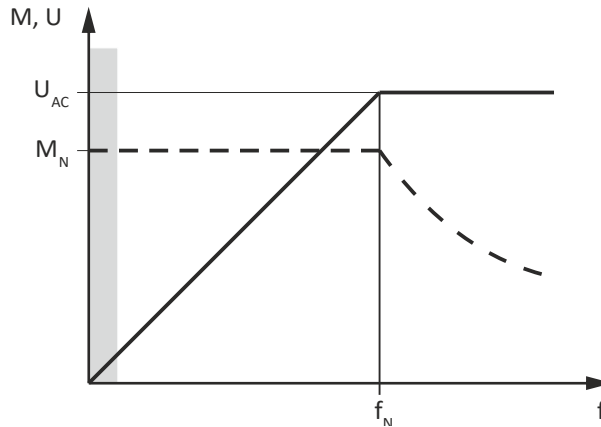
The rated motor torque is available up to 87 Hz.

Compared to the 50-Hz operation, the setting range increases by 1.74 times.

For this purpose, a motor with 230/400 V in a triangle is driven by a 400 V inverter.

The inverter must be dimensioned for a rated motor current of 230 V.

V/f at 87 Hz



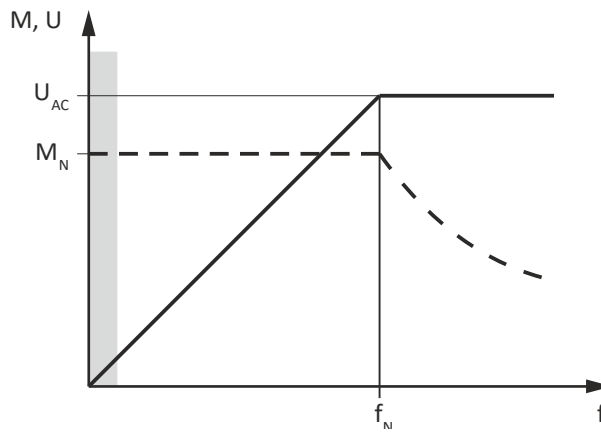
V Voltage
M Torque
f Frequency

U_{AC} Mains voltage
 M_{rated} Rated torque
 f_{rated} Rated frequency

Rated point 50 Hz

The rated motor torque is available up to 50 Hz.

V/f at 50 Hz



V Voltage
M Torque
f Frequency

U_{AC} Mains voltage
 M_{rated} Rated torque
 f_{rated} Rated frequency

Product information

Identification of the products



Identification of the products

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 order codes in chapter [Purchase order](#) 207.

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	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty	Heavy Duty				
		kW	kW	V			
i550	P	-	0.37	120	1	i550-P0.37/120-1	IP31
			IP66				
			i550-P0.75/120-1			IP31	
		IP66					
		i550-P1.1/120-1	IP31				
		IP66					

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty	Heavy Duty				
		kW	kW	V			
i550	P	-	0.37	230	1	i550-P0.37/230-1	IP66
		0.55			1/3	i550-P0.37/230-2	IP31
		-	0.55		1	i550-P0.55/230-1	IP66
		0.75			1/3	i550-P0.55/230-2	IP31
		-	0.75		1	i550-P0.75/230-1	IP66
		1.1			1/3	i550-P0.75/230-2	IP31
		-	1.1		1	i550-P1.1/230-1	IP66
		1.5			1/3	i550-P1.1/230-2	IP31
		-	1.5		1	i550-P1.5/230-1	IP66
		2.2			1/3	i550-P1.5/230-2	IP31
		-	2.2		1	i550-P2.2/230-1	IP66
		3			1/3	i550-P2.2/230-2	IP31
		-			IP66		
		-			IP66		



Product information

Identification of the products

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty kW	Heavy Duty kW				
i550	P	0.55	0.37	240	1/3	i550-P0.37/230-2	IP31
		-					IP66
		0.75	0.55			i550-P0.55/230-2	IP31
		-					IP66
		1.1	0.75			i550-P0.75/230-2	IP31
		-					IP66
		1.5	1.1			i550-P1.1/230-2	IP31
		-					IP66
		2.2	1.5			i550-P1.5/230-2	IP31
		-					IP66
		3	2.2			i550-P2.2/230-2	IP31
		-					IP66
		4	3		i550-P3.0/230-3	IP31	
		-				IP66	
		5.5	4		i550-P4.0/230-3	IP31	
		-				IP66	
		7.5	5.5		i550-P5.5/230-3	IP31	
		-				IP66	
		11	7.5		i550-P7.5/230-3	IP31	
		-				IP66	
		-	11		i550-P11/230-3	IP31	
		18.5				IP66	
-	15	i550-P15/230-3	IP31				
22			IP66				
-	18.5	i550-P18/230-3	IP66				
-			IP31				
				3			

Product information

Identification of the products



Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty kW	Heavy Duty kW				
i550	P	0.55	0.37	400	3	i550-P0.37/400-3	IP31
		-					IP66
		0.75	0.55			i550-P0.55/400-3	IP31
		-					IP66
		1.1	0.75			i550-P0.75/400-3	IP31
		-					IP66
		1.5	1.1			i550-P1.1/400-3	IP31
		-					IP66
		2.2	1.5			i550-P1.5/400-3	IP31
		-					IP66
		3	2.2			i550-P2.2/400-3	IP31
		-					IP66
		4	3			i550-P3.0/400-3	IP31
		-					IP66
		5.5	4			i550-P4.0/400-3	IP31
		-					IP66
		7.5	5.5			i550-P5.5/400-3	IP31
		-					IP66
		11	7.5			i550-P7.5/400-3	IP31
		-					IP66
15	11	i550-P11/400-3	IP31				
-			IP66				
18.5	15	i550-P15/400-3	IP31				
-			IP66				
22	18.5	i550-P18/400-3	IP31				
-			IP66				
30	22	i550-P22/400-3	IP31				
-			IP66				



Product information

Identification of the products

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty	Heavy Duty				
		kW	kW	V			
i550	P	0.55	0.37	480	3	i550-P0.37/400-3	IP31
		-					IP66
		0.75	0.55			i550-P0.55/400-3	IP31
		-					IP66
		1.1	0.75			i550-P0.75/400-3	IP31
		-					IP66
		1.5	1.1			i550-P1.1/400-3	IP31
		-					IP66
		2.2	1.5			i550-P1.5/400-3	IP31
		-					IP66
		3	2.2			i550-P2.2/400-3	IP31
		-					IP66
		4	3			i550-P3.0/400-3	IP31
		-					IP66
		5.5	4			i550-P4.0/400-3	IP31
		-					IP66
		7.5	5.5			i550-P5.5/400-3	IP31
		-					IP66
		11	7.5			i550-P7.5/400-3	IP31
		-					IP66
		15	11			i550-P11/400-3	IP31
		-					IP66
		18.5	15			i550-P15/400-3	IP31
		-					IP66
		22	18.5			i550-P18/400-3	IP31
		-					IP66
		30	22			i550-P22/400-3	IP31
		-					IP66
1.1	0.75	i550-P0.75/600-3	IP31				
-			IP66				
2.2	1.5	i550-P1.5/600-3	IP31				
-			IP66				
3	2.2	i550-P2.2/600-3	IP31				
-			IP66				

Device series	Type	Rated power		Rated mains voltage	No. of phases	Inverter	Degree of protection
		Light Duty	Heavy Duty				
		kW	kW	V			
i550	P	1.1	0.75	600	3	i550-P0.75/600-3	IP31
		-					IP66
		2.2	1.5			i550-P1.5/600-3	IP31
		-					IP66
		3	2.2			i550-P2.2/600-3	IP31
		-					IP66

Product information

Identification of the products



Product code

		I	5	5	A	P	□□□	□	□	□	□	□	□	□□□
Product type	Inverter	I												
Product family	i500		5											
Product	i550			5										
Product generation	Generation 1				A									
Mounting type	Wall mounting					P								
Rated power (Examples)	0.37 kW						137							
	1.5 kW						215							
	4.0 kW						240							
	11 kW						311							
Mains voltage and connection type	1/N/PE AC 120 V							A						
	1/N/PE AC 230/240 V							B						
	3/PE AC 230/240 V							C						
	1/N/PE AC 230/240 V							D						
	3/PE AC 230/240 V							E						
	3/PE AC 400 V							F						
	3/PE AC 480 V							G						
Product variant	Without extension box								0					
	With empty extension box								1					
	With extension box and repair switch								2					
Integrated functional safety	Without safety function									0				
	Basic Safety - STO									A				
Degree of protection	IP31, uncoated										3			
	IP54, uncoated										5			
	IP66, uncoated										7			
Interference suppression	Without											0		
	Integrated RFI filter											1		
Application	Default parameter setting: Region EU (50-Hz networks)												0	
	Default parameter setting: Region US (60-Hz networks)												1	
Product extension	Standard I/O: ...													0
	Keypad with standard I/O ...													K
	WLAN module with standard I/O ...													W
	... without network													00S
	... with CANopen													02S
	... with Modbus RTU													03S
	... with IO-Link													06S
	... with EtherCAT													0KS
	... with EtherNet/IP													0MS
	... with Modbus TCP													0WS
	... with PROFINET													0LS



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



Information on project planning

Project planning process

Dimensioning

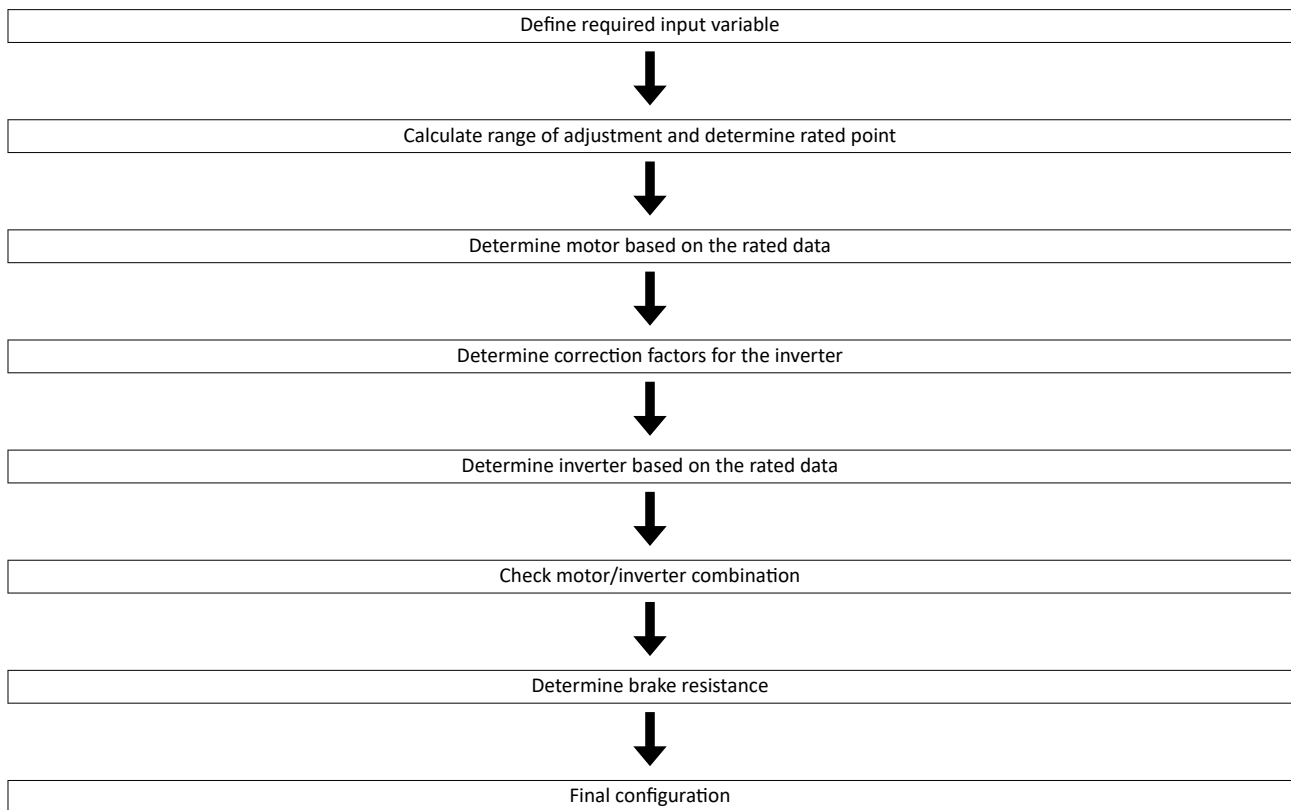
3 methods for dimensioning

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

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

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

Workflow of a configuration process



Define required input variables

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



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) ≤ 4.35 (20 - 87Hz) ≤ 6 (20 - 120Hz)	50 Hz 87 Hz 120 Hz
Motor with blower	≤ 10.0 (5 - 50 Hz)	50 Hz
Motor with integral fan (reduced torque)	≤ 17.4 (5 - 87Hz) ≤ 24 (5 - 120Hz)	87 Hz 120 Hz

Determine motor based on the rated data

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

			Note
Rated torque	M_{rated}	Nm	→ Rated motor data
Rated speed	n_{rated}	rpm	
Rated point at		Hz	→ setting range
Power factor	$\cos \varphi$		→ 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	$I_{out} \geq I_{N,Mot} \times 1.5 / (k_{H,INV} \times k_{TU,INV})$

Information on project planning

Project planning process
Dimensioning



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

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

Check motor/inverter combination

			Calculation
Motor torque	M	Nm	$M = \sqrt{\left(\frac{I_{out,INV}}{I_{N,MOT}}\right)^2 - (1 - \cos\varphi^2)} \times \frac{M_N}{\cos\varphi}$

			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	$P_N \geq P_{max} \times \eta_e \times \eta_m \times \frac{t_1}{t_2}$	$P_N \geq \frac{P_{max} \times \eta_e \times \eta_m \times t_1}{2} \times \frac{t_1}{t_2}$
Thermal capacity	C_{th}	kWs	$C_{th} \geq P_{max} \times \eta_e \times \eta_m \times t_1$	$C_{th} \geq \frac{P_{max} \times \eta_e \times \eta_m \times t_1}{2} \times t_1$
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_2 [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](#)  173

▶ [Accessories](#)  195

Operation in motor and generator mode

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

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

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

The drive brakes the load in a controlled manner.

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

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

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

Information on project planning

Project planning process
Overcurrent operation



Overcurrent operation

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

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

Cycle 15 s

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

Cycle 180 s

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

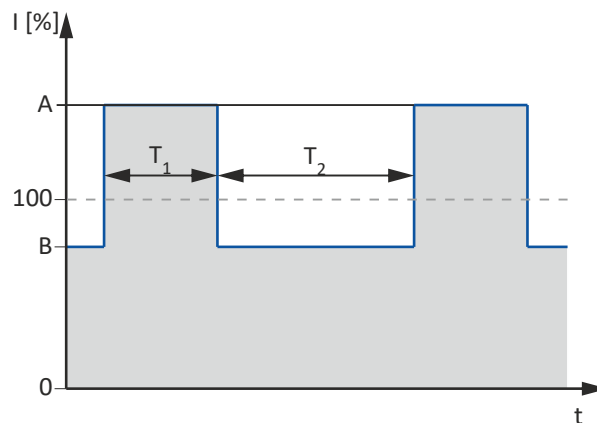
The monitoring of the device utilization (I_{xt}) triggers an error if the utilization value exceeds a threshold of 100 %.



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

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

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



Cycle	Max. output current	Max. overload time	Max. output current during the Recovery time	Min. recovery time
	A	T_1	B	T_2
s	%	s	%	s
15	200	3	75	12
180	150	60	75	120



Safety instructions

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

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

Please observe the specific safety information in the other sections!

Basic safety instructions

DANGER!

Dangerous electrical voltage

Possible consequences: Death or severe injuries from electric shock

- ▶ Any work on the device must only be carried out in a deenergized state.
- ▶ After switching off the mains voltage, observe the signs on the product.

Product

- The product must only be used as directed.
- Never commission the product in the event of visible damage.
- The product must never be technically modified.
- Never commission the product before assembly has been completed.
- The product must never be operated without required covers.
- Connect/disconnect all pluggable terminals only in de-energized condition.
- Only remove the product from the installation in the de-energized state.

Personnel

Only qualified and skilled personnel are allowed to work with the product. IEC 60364 and/or CENELEC HD 384 define the qualifications of these persons as follows:

- They are familiar with the installation, mounting, commissioning, and operation of the product.
- They possess the appropriate qualifications for their tasks.
- They are familiar with all regulations for the prevention of accidents, directives, and laws applicable at the location and are able to apply them.

Process engineering

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

Device protection

- 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).

Information on project planning

Safety instructions
Application as directed



Application as directed

- The product serves to control three-phase AC motors and three-phase permanent magnet AC motors (PMAC motors).
- The product must only be actuated with motors that are suitable for the operation with inverters.
- The product is not a household appliance, but is only designed as a component for commercial or professional use in terms of EN 61000-3-2.
- Depending on the degree of protection, the product can be mounted inside and outside control cabinets.
- The product must only be actuated under the operating conditions and power limits specified in this documentation.
- The product meets the protection requirements of 2014/35/EU: Low-Voltage Directive.
- The product is not a machine in terms of 2006/42/EU: Machinery Directive, with the exception of all functions of the functional safety.
- Commissioning or starting the operation as directed of a machine with the product is not permitted until it has been ensured that the machine meets the regulations of the EC Directive 2006/42/EU: Machinery Directive observe; EN 60204-1 .
- Commissioning or starting operation as directed is only permissible if the EMC Directive 2014/30/EU is complied with.
- In residential areas, the product may cause EMC interferences. The operator is responsible for taking interference suppression measures.

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.

The user is not allowed to change inverters that come with integrated safety technology.

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

Use of explosion-protected motors

Explosion-protected motors which are not designed for use with an inverter lose their approval when they are used for variable speed applications. Due to the many areas of liability that can arise when dealing with these applications, the following basic declaration applies:



Lenze inverters are sold without any warranty of suitability for a specific purpose or of suitability for use in explosion-protected motors. Lenze shall accept no responsibility for direct, incidental or consequential damages, costs or losses that may arise through the use of AC inverters in these applications. The buyer expressly agrees to accept any risk of losses, costs or damages that may arise from such applications.

Foreseeable misuse

Inverters are not to be operated with DC motors.



Handling

Transport, storage

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

Installation

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

The inverters must be installed and cooled according to the instructions given in the corresponding documentation. Observe the climatic conditions according to the technical data. The ambient air must not exceed the degree of pollution 2 according to EN 61800-5-1.

Electrical connection

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

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

The documentation contains information about installation according to EMC regulations (shielding, grounding, filters and cable routing). Please also observe this information for CE-marked inverters. The manufacturer of the system or machine is responsible for adherence to the limit values required in connection with EMC legislation. The inverters must be installed in housings (e. g. control cabinets) to meet the limit values for radio interferences valid at the site of installation. The housings must enable an EMC-compliant installation. Observe in particular that e. the control cabinet doors should have a circumferential metal connection to the housing. Reduce housing openings and cutouts to a minimum.

Protection in the event of short circuit or earth fault

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

- Use fuses according to the technical data.
- The installation must comply with the requirements of the IEC/HD 60364 (DIN VDE 0100; VDE 0100).
- 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 60364-4-41 is exceeded with a high system impedance (especially with TT mains) or a high loop impedance with the prescribed fuses, a residual current device (RCD) can be used. Alternatively, other protective measures can be used, e. g. isolation from the environment by means of double or reinforced insulation, or isolation from the supply system by using a transformer.
- If a residual current device (RCD) is connected upstream of the inverter for protection in the event of an earth fault, only type B/B+ is permitted for 3-phase devices.

Operation

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

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

All protection covers and doors must be shut during operation.

Information on project planning

Safety instructions
Handling



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/EU. The notes on the integrated safety provided in this documentation must be observed.

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.



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 3 ... 20 minutes.
- The power terminals X100 and X105 remain live even when the motor is stopped.

Motor protection

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

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

Protection of the machine/system

Drives can reach dangerous overspeeds.

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

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

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

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. $180^\circ/2 = 90^\circ$).



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

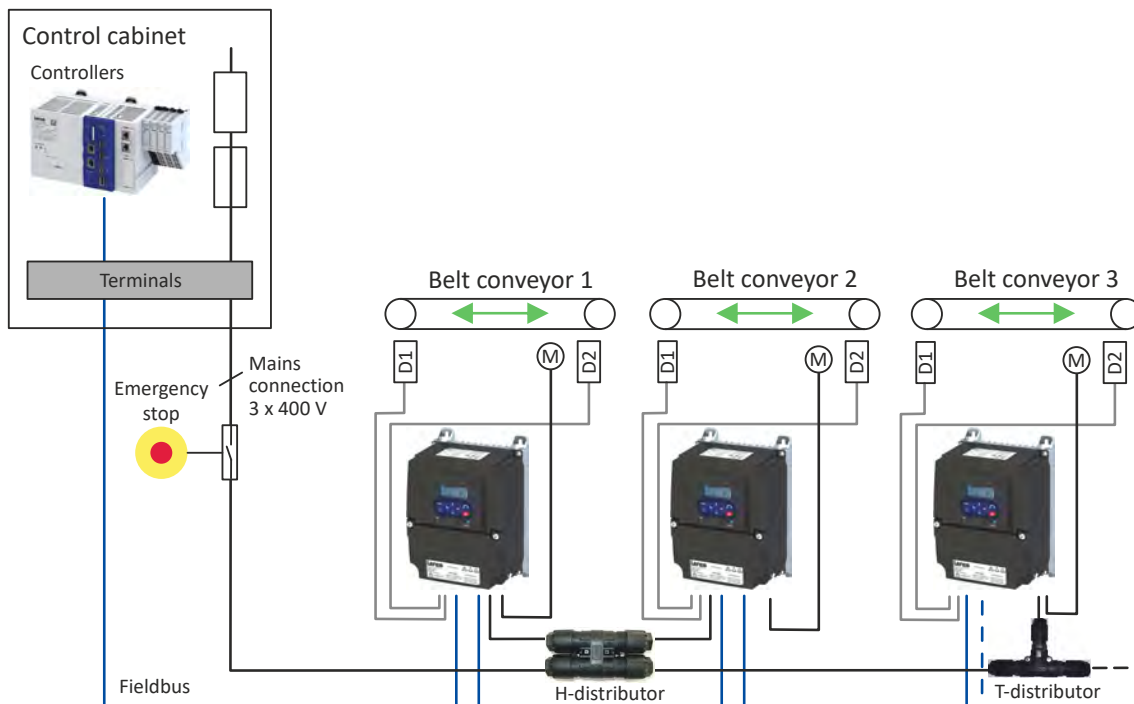


Fig. 4: Sample configuration



Safety engineering extensions

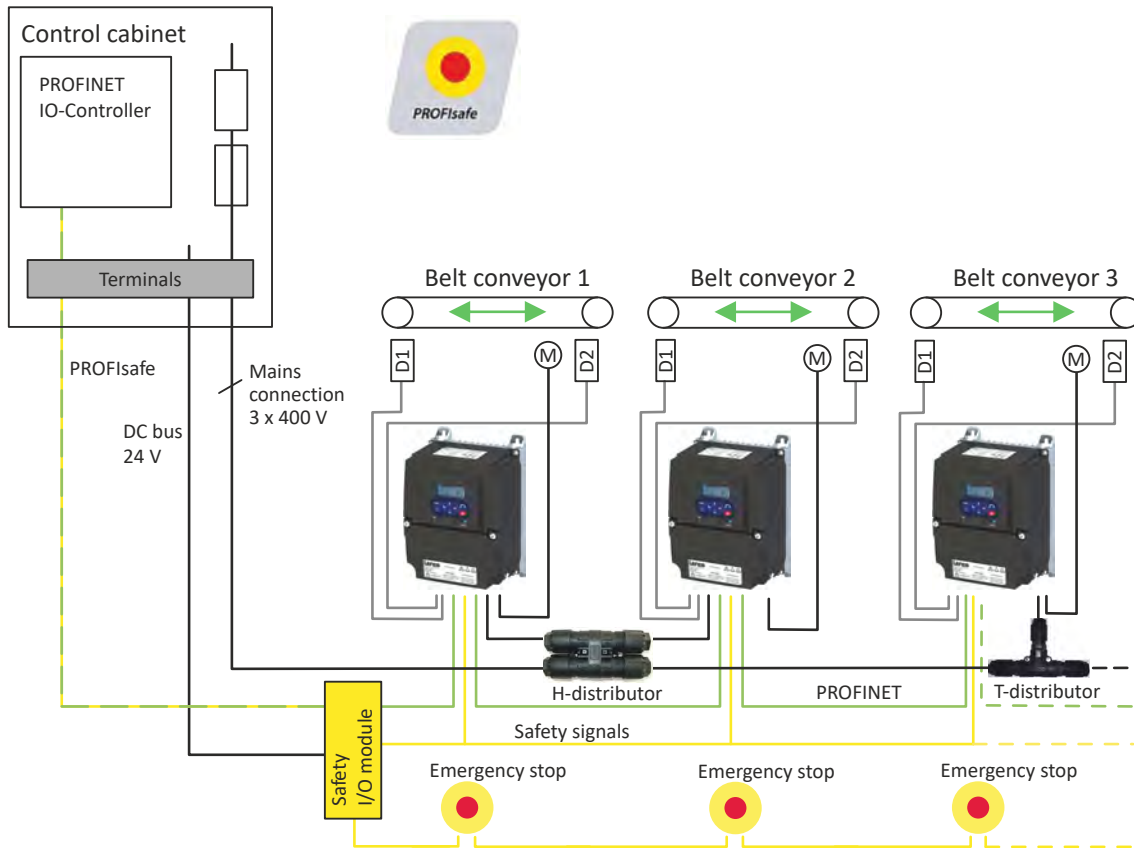


Fig. 5: Sample configuration with PROFIsafe solution

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.



Information on mechanical installation

Important notes

Measures for cooling during operation

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

Preparation



Mounting instructions are included in the scope of supply of the inverter. They describe technical data and information on mechanical and electrical installation.

Mounting position

- Vertical alignment – free air flow from bottom to top on heatsink fins is not hindered.
Other mounting positions require a reduction of rated output values by approx. 1/3. Your Lenze contact person will be glad to assist with a detailed assessment.

Free spaces

- Maintain the specified free spaces above and below to the other installations.

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 the 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 additional devices if necessary.
 - a) Align the units to each other.
 - b) Screw the devices in place on 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](#)  40

▶ [Dimensions](#)  142



Information on electrical installation

Important notes

DANGER!

Electrical voltage

Possible consequences: Death or severe injuries

- ▶ Any work on the inverter must only be carried out in the de-energized state.
- ▶ Inverter up to 11 kW: After switching off the mains voltage, wait for at least 3 min before you start working.
- ▶ Inverter from 15 kW onwards: After switching off the mains voltage, wait for at least 10 min before you start working.

DANGER!

Dangerous electrical voltage

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

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

- ▶ Implement the measures requested in EN 61800-5-1 or EN 60204-1. Especially:
- ▶ Fixed installation
- ▶ The PE connection must comply with the standards (PE conductor diameter $\geq 10 \text{ mm}^2$ or use a double PE conductor)

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

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

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.

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.



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".



Preparation



Mounting instructions are included in the scope of supply of the inverter. They describe technical data and information on mechanical and electrical installation.

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 connection area

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

Additional positions with centring aid for cable glands for control cables have been prepared.

Where necessary, they will need to be drilled out using a step drill.

The cable gland of the motor cable must satisfy EMC requirements. The housing wall for the cable gland is reinforced and highly conductive in order to avoid EMC interference.

Bore holes and positions for cable glands

Power range	i550 protec ohne Extension Box	i550 protecwith extension box
0.75 ... 2.2 kW	2 x M20 (bore hole) 1 x M20 (position) 2 x M12 (position)	2 x M20 (bore hole) 3 x M20 (position) 2 x M12 (position)
3 ... 11 kW	2 x M32 (bore hole) 1 x M20 (position) 2 x M12 (position)	2 x M32 (bore hole) 3 x M20 (position) 2 x M12 (position)
15 ... 22 kW	2 x M40 (bore hole) 1 x M32 (position) 2 x M12 (position)	2 x M40 (bore hole) 1 x M32 (position) 2 x M20 (position) 2 x M12 (position)



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

▶ [Cable glands](#) 203

Further data and information

▶ [EMC-compliant installation](#) 46

▶ [Standards and operating conditions](#) 73



EMC-compliant installation

The drive system (inverter and drive) only complies with the EMC Directive 2014/30/EU 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 following example shows the effective wiring:



- A Shield connection for control connections
- B Control line
- C EMC cable gland
- D Motor cable with low capacity
- E Power line

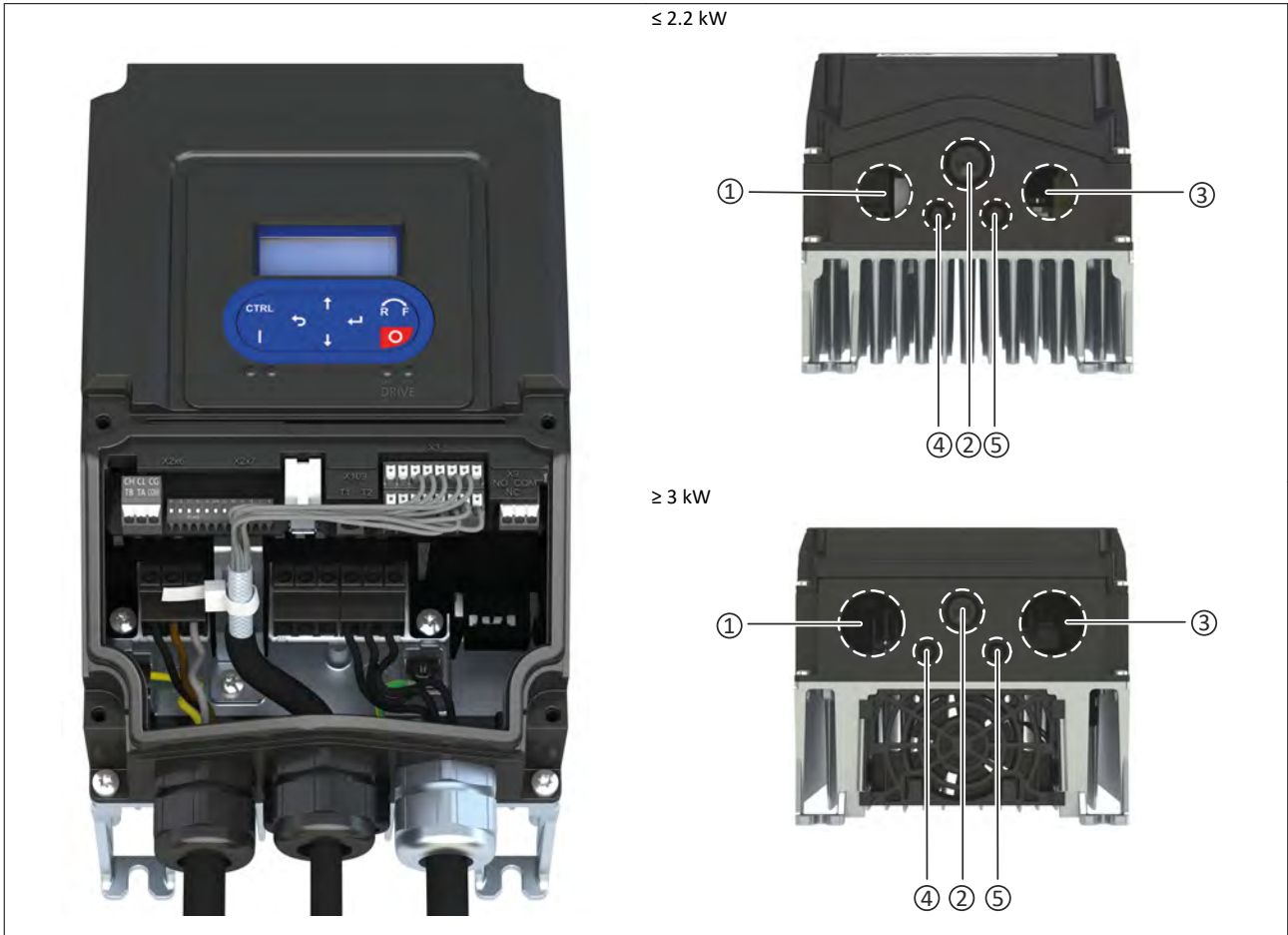
EMC-compliant installation must be implemented with shielded motor cables of low capacitance.

Capacitance per unit length:

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



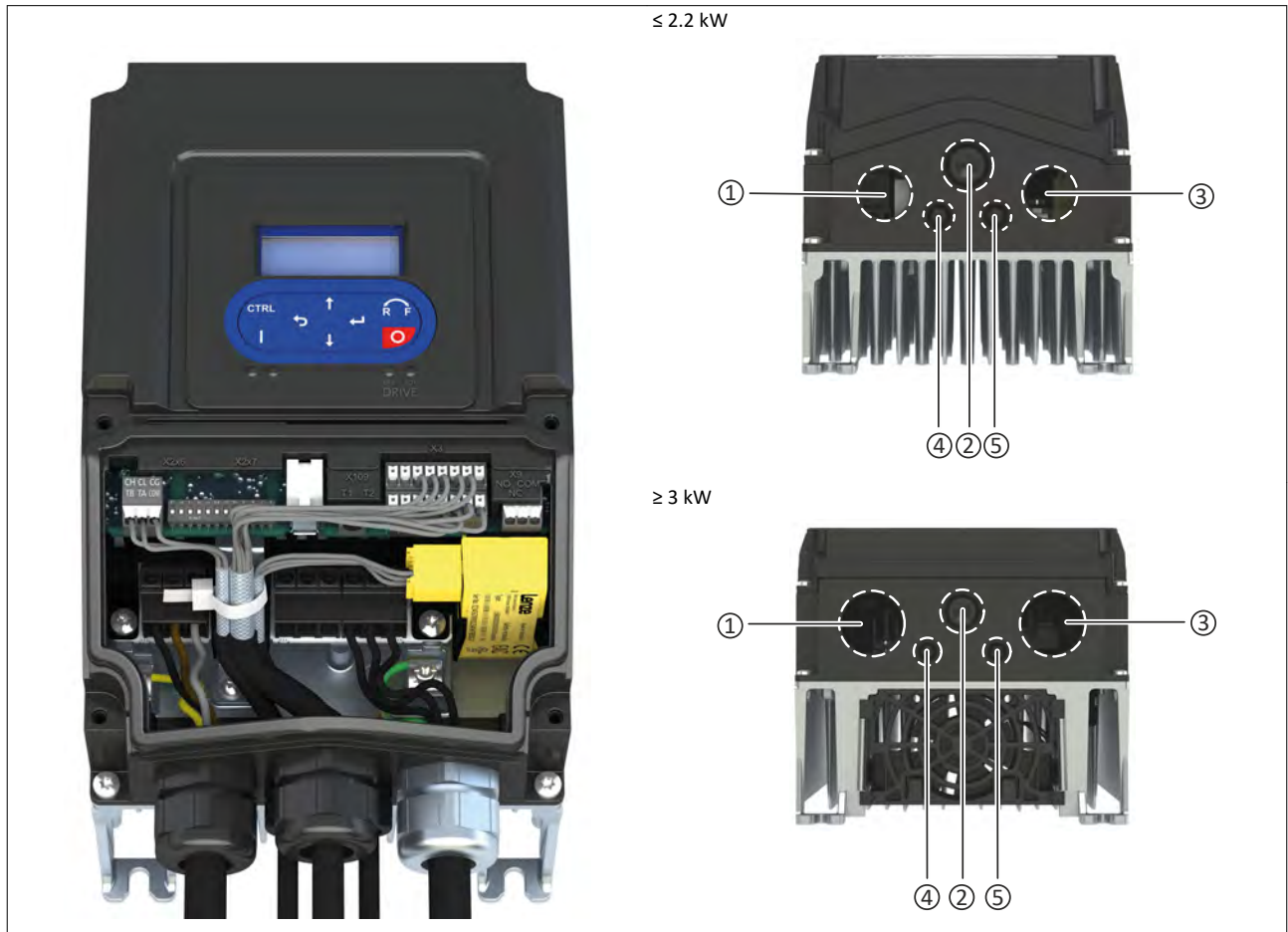
Example 1: Application without network and without functional safety



<p>① M20 (M32 ≥ 3 kW) Mains cable to X100</p>	<p>② M20 Shielded control cable on X3 and X9</p>	<p>③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable on X105 and motor PTC on X109</p>
<p>④ M12 Not in use</p>		<p>⑤ M12 Not in use</p>



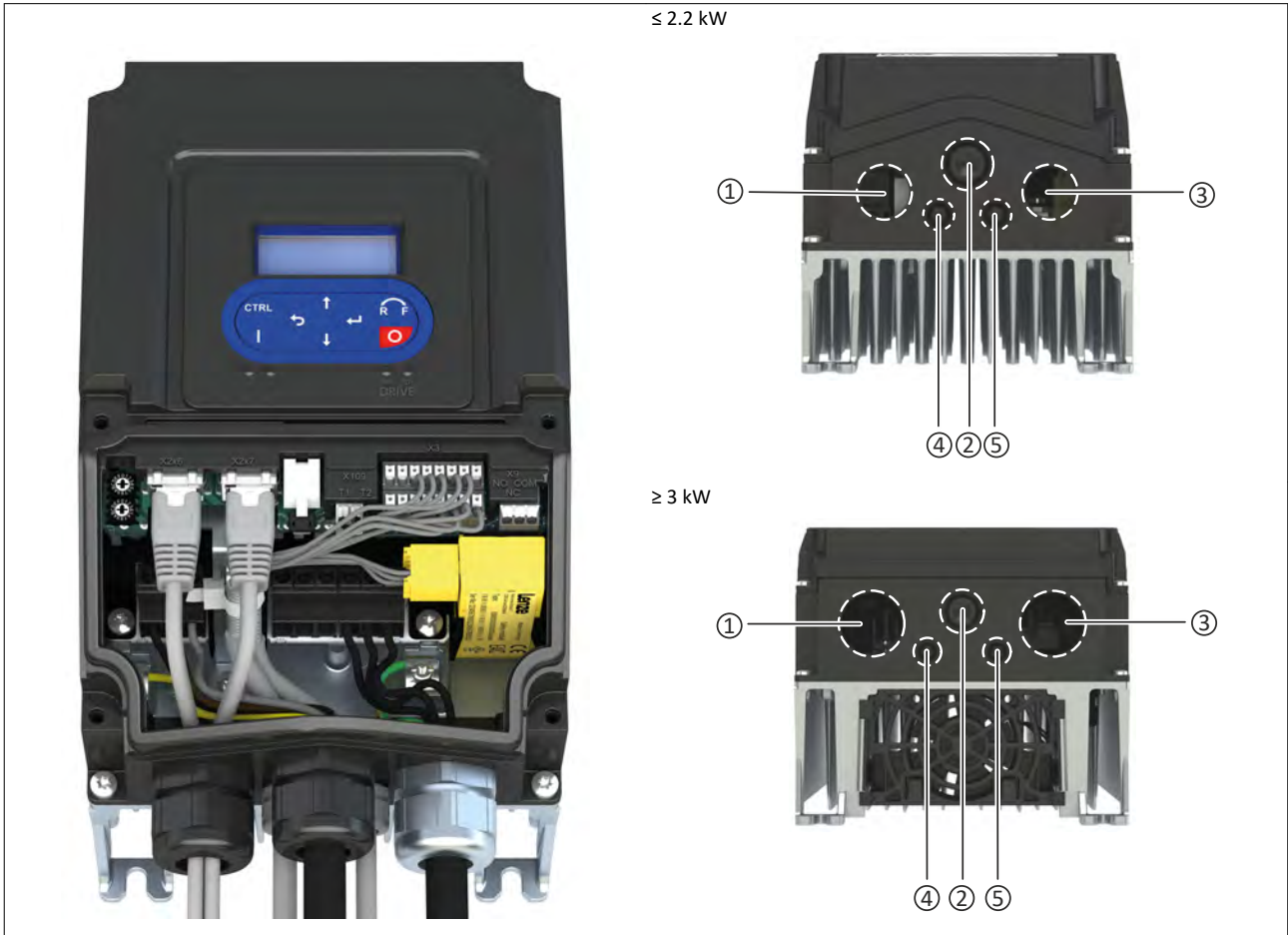
Example 2: Application with three-wire network and functional safety (STO)



<p>① M20 (M32 ≥ 3 kW) Mains cable to X100</p>	<p>② M20 Shielded control cable on X3 and X9</p>	<p>③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable on X105 and motor PTC on X109</p>
<p>④ M12 Fieldbus cable to X2xx</p>		<p>⑤ M12 Shielded control cable for functional safety (STO) on X1</p>



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



<p>① M20 (M32 ≥ 3 kW) Separable double cable gland with network cables to X2xx</p>	<p>② M20 Mains cable to X100</p>	<p>③ M20 (M32 ≥ 3 kW) EMC cable gland with shielded motor cable on X105 and motor PTC on X109</p>
<p>④ M12 Shielded control cable on X3 and X9</p>		<p>⑤ M12 Shielded control cable for functional safety (STO) on X1</p>

Information on electrical installation

Connection according to UL
Important notes



Connection according to UL

Important notes

⚠ WARNING!

- ▶ **UL marking**
- ▶ The integral solid state short circuit protection included in the inverter does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code / Canadian Electrical Code and any additional local codes.
- ▶ **Marquage UL**
- ▶ La protection statique intégrée contre les courts-circuits n'offre pas la même protection que le dispositif de protection du circuit de dérivation. Un tel dispositif doit être fourni, conformément au National Electrical Code / Canadian Electrical Code et aux autres dispositions applicables au niveau local.

⚠ WARNING!

- ▶ **UL marking**
- ▶ Use 75 °C copper wire only, except for control circuits.
- ▶ **Marquage UL**
- ▶ Utiliser exclusivement des conducteurs en cuivre 75 °C, sauf pour la partie commande.

⚠ WARNING!

- ▶ **UL marking**
- ▶ Suitable for motor group installation or use on a circuit capable of delivering not more than the RMS symmetrical amperes (SCCR) of the drive at its rated voltage.
- ▶ Approved fusing is specified in SCCR tables below.
- ▶ **Marquage UL**
- ▶ Convient pour l'utilisation sur une installation avec un groupe de moteurs ou sur un circuit capable de fournir au maximum une valeur de courant efficace symétrique en ampères à la tension assignée de l'appareil.
- ▶ Les dispositifs de protection adaptés sont spécifiés dans les SCCR tableaux suivants.

NOTICE

- ▶ **UL marking**
- ▶ The opening of the Branch Circuit Protective Device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.
- ▶ **Marquage UL**
- ▶ Le déclenchement du dispositif de protection du circuit de dérivation peut être dû à une coupure qui résulte d'un courant de défaut. Pour limiter le risque d'incendie ou de choc électrique, examiner les pièces porteuses de courant et les autres éléments du contrôleur et les remplacer s'ils sont endommagés. En cas de grillage de l'élément traversé par le courant dans un relais de surcharge, le relais tout entier doit être remplacé.



Information on electrical installation

Connection according to UL
Important notes

NOTICE

- ▶ **UL marking**
 - ▶ Internal overload protection rated for 125 % of the rated FLA.
 - ▶ **Marquage UL**
 - ▶ Protection contre les surcharges conçue pour se déclencher à 125 % de l'intensité assignée à pleine charge.
-

Information on electrical installation

Connection according to UL
Fusing data



Fusing data

Branch Circuit Protection (BCP)

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

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

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

Inverter			Standard Fuses (UL248)			Circuit Breaker (UL489)	
Mains	Rated power		SCCR	Max. rated current	Class	SCCR	Max. rated current
	kW	HP	kA	A		kA	A
120 V, 1-ph	0.37	0.5	5	30	CC, CF, J, T	5	30
120 V, 1-ph	0.75	1	5	30	CC, CF, J, T	5	30
120 V, 1-ph	1.1	1.5	5	30	CC, CF, J, T	5	30
230 V, 1-ph	0.37	0.5	65	60	CF, J, T	5	30
230 V, 1-ph	0.55	0.75	65	60	CF, J, T	5	30
230 V, 1-ph	0.75	1	65	60	CF, J, T	5	30
230 V, 1-ph	1.1	1.5	65	60	CF, J, T	5	30
230 V, 1-ph	1.5	2	65	60	CF, J, T	5	30
230 V, 1-ph	2.2	3	65	60	CF, J, T	5	30
230 V, 1/3-ph	0.37	0.5	65	60	CF, J, T	5	30
230 V, 1/3-ph	0.37	0.5	65	60	CF, J, T	5	30
230 V, 1/3-ph	0.55	0.75	65	60	CF, J, T	5	30
230 V, 1/3-ph	0.75	1	65	60	CF, J, T	5	30
230 V, 1/3-ph	1.1	1.5	65	60	CF, J, T	5	30
230 V, 1/3-ph	1.5	2	65	60	CF, J, T	5	30
230 V, 1/3-ph	2.2	3	65	60	CF, J, T	5	30
230 V, 3-ph	3	4	5	80	CF, J, T		
230 V, 3-ph	4	5	5	80	CF, J, T		
230 V, 3-ph	5.5	7.5	5	80	CF, J, T		
230 V, 3-ph	7.5	10	5	80	CF, J, T		
230 V, 3-ph	11	15	5	80	CF, J, T		
230 V, 3-ph	15	20	5	125	CF, J, T		
230 V, 3-ph	18.5	25	5	125	CF, J, T		
480 V, 3-ph	0.37	0.5	65	60	CF, J, T	5	30
480 V, 3-ph	0.37	0.5	65	60	CF, J, T	5	30
480 V, 3-ph	0.55	0.75	65	60	CF, J, T	5	30
480 V, 3-ph	0.75	1	65	60	CF, J, T	5	30
480 V, 3-ph	1.1	1.5	65	60	CF, J, T	5	30
480 V, 3-ph	1.5	2	65	60	CF, J, T	5	30
480 V, 3-ph	2.2	3	65	60	CF, J, T	5	30
480 V, 3-ph	3	4	5	50	CF, J, T		
480 V, 3-ph	4	5	5	50	CF, J, T		
480 V, 3-ph	5.5	7.5	5	50	CF, J, T		
480 V, 3-ph	7.5	10	5	50	CF, J, T		
480 V, 3-ph	11	15	5	50	CF, J, T		
480 V, 3-ph	15	20	5	80	CF, J, T		
480 V, 3-ph	18.5	25	5	80	CF, J, T		
480 V, 3-ph	22	30	5	80	CF, J, T		
600 V, 3-ph	0.75	1	5	20	CC, CF, J, T		
600 V, 3-ph	1.5	2	5	20	CC, CF, J, T		
600 V, 3-ph	2.2	3	5	20	CC, CF, J, T		



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.

▶ [DC-bus connection](#)  63

Information on electrical installation

Mains connection
1-phase mains connection 120 V



1-phase mains connection 120 V

The connection plan is valid for the inverters i550-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 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN 61800-3 is fulfilled.

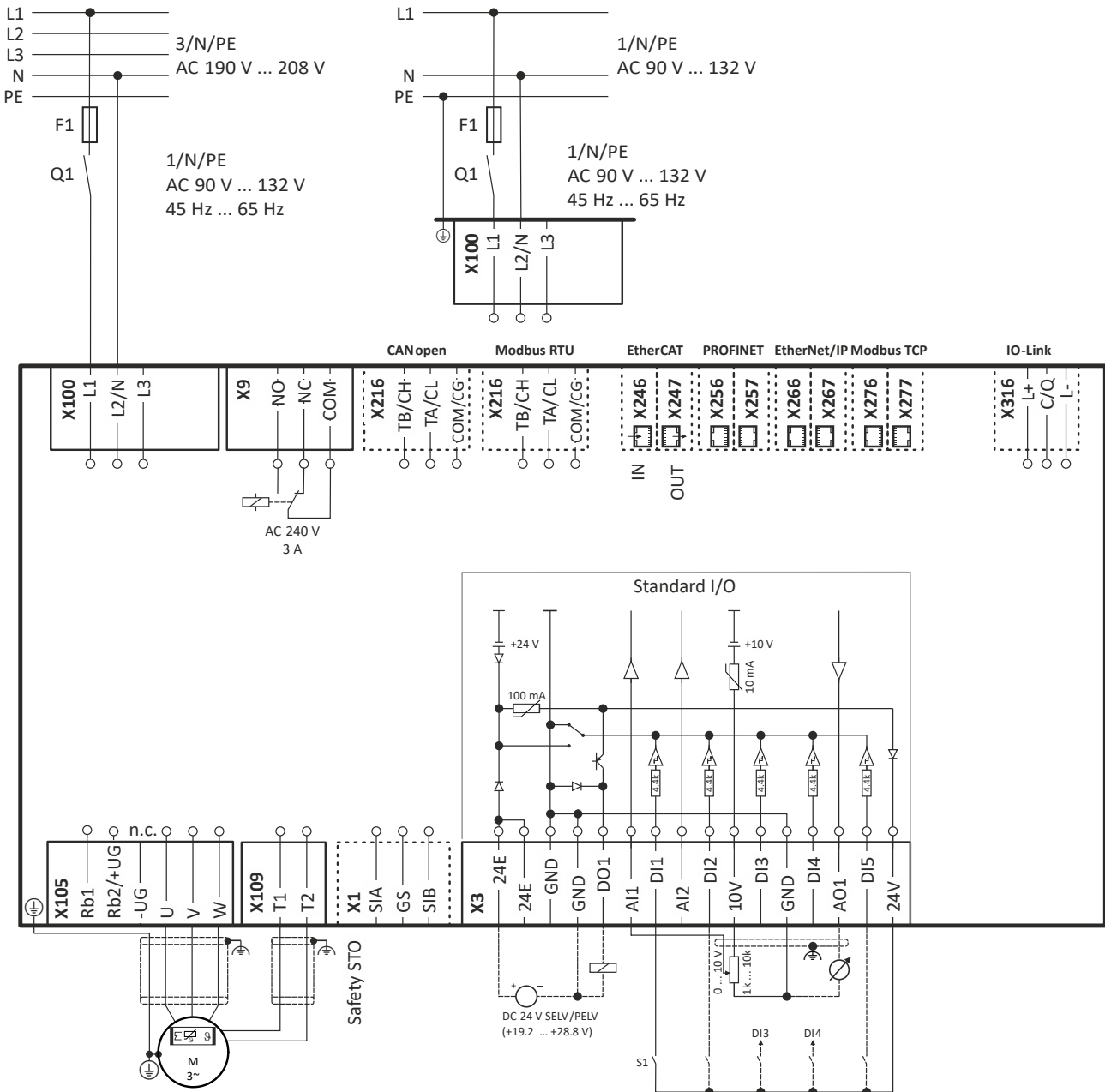


Fig. 6: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



Information on electrical installation

Mains connection
1-phase mains connection 230/240 V

1-phase mains connection 230/240 V

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

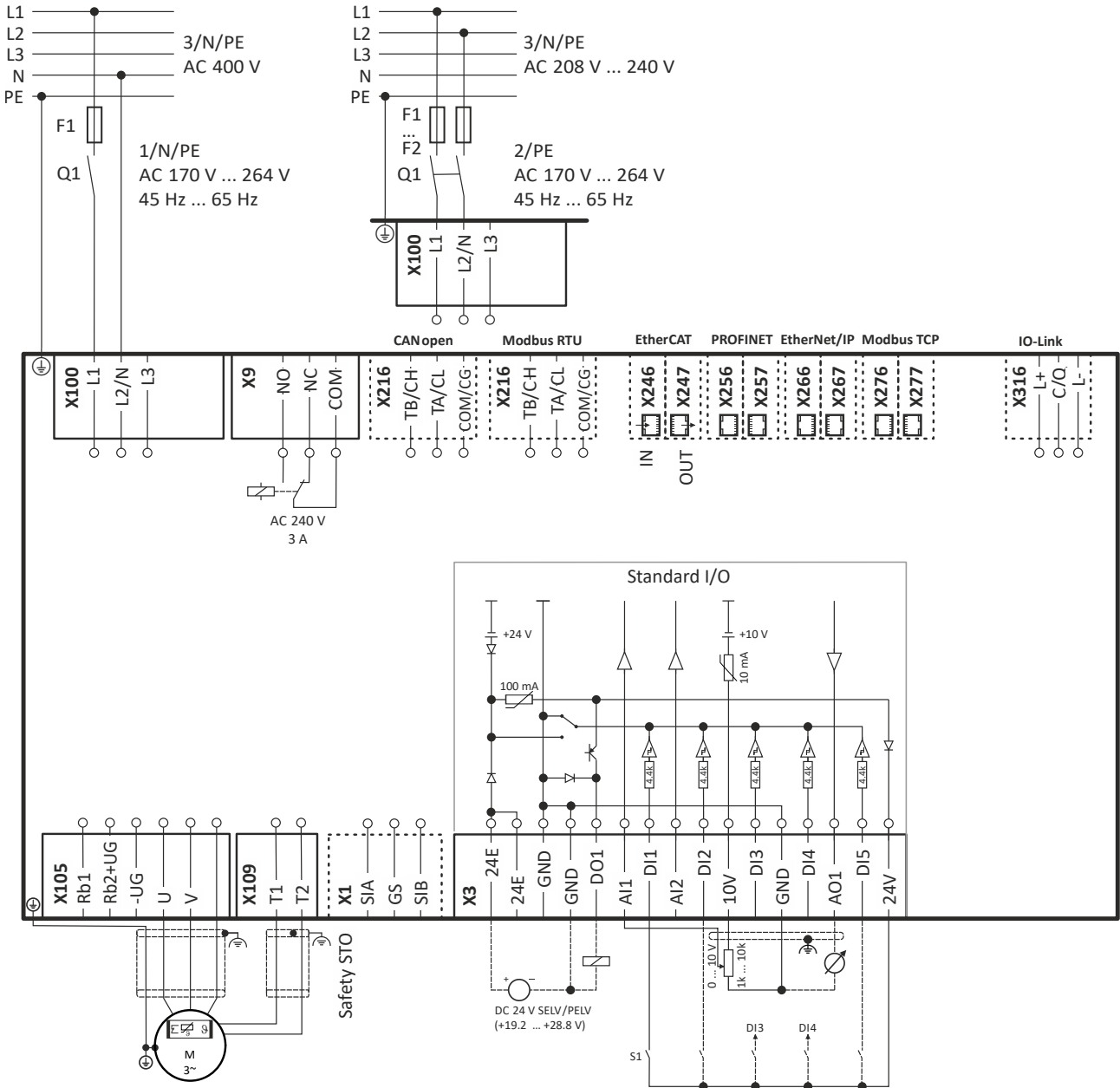


Fig. 7: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
-- Dashed line = options

Information on electrical installation

Mains connection
3-phase mains connection 230/240 V



3-phase mains connection 230/240 V

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



The inverters i550-Pxxx/**230-3** and 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 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN 61800-3 is fulfilled.

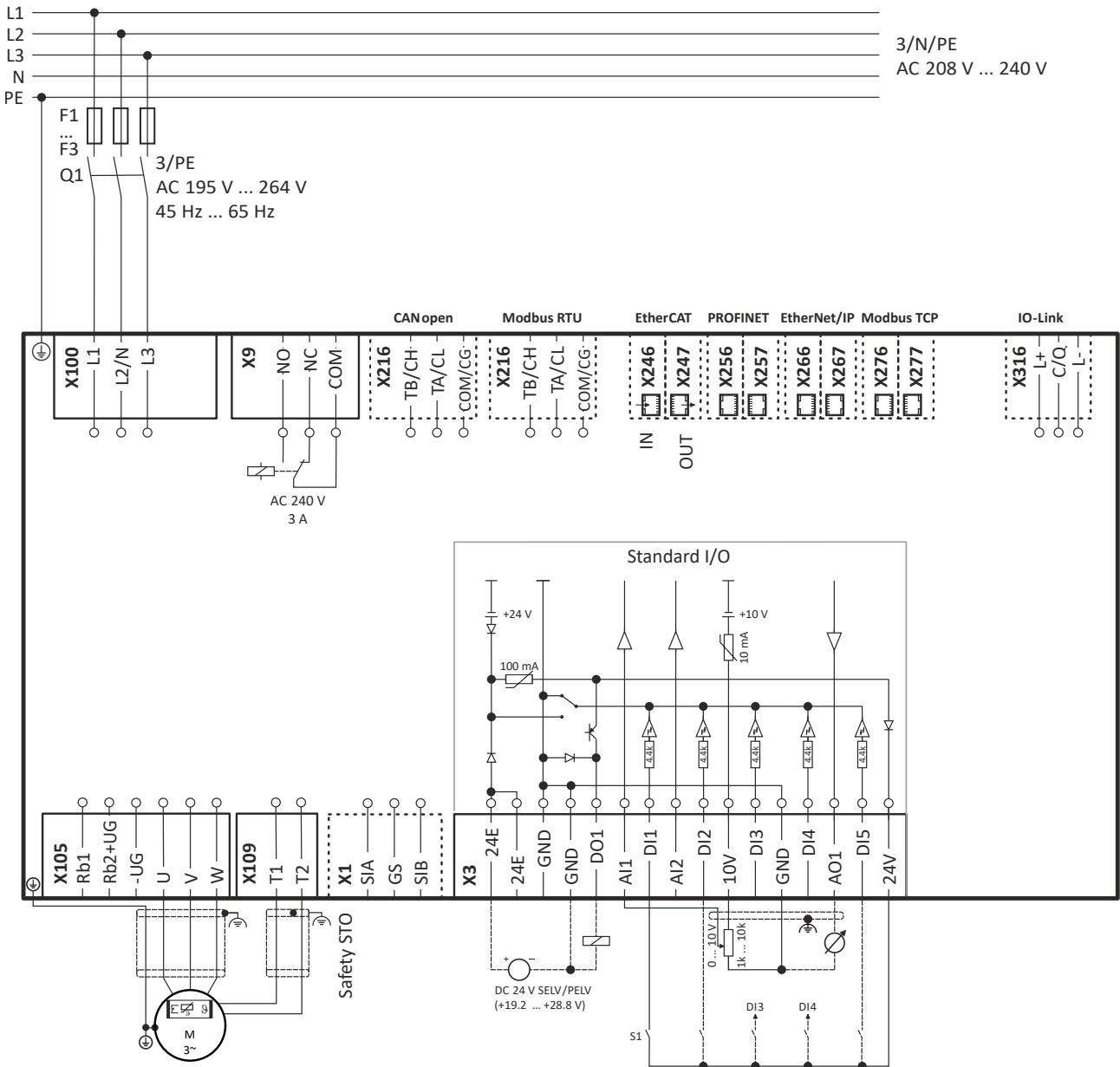


Fig. 8: Wiring example

- S1 Start/Stop
- Fx Fuses

- Q1 Mains contactor
- Dashed line = options



Information on electrical installation

Mains connection
3-phase mains connection 400 V

3-phase mains connection 400 V

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

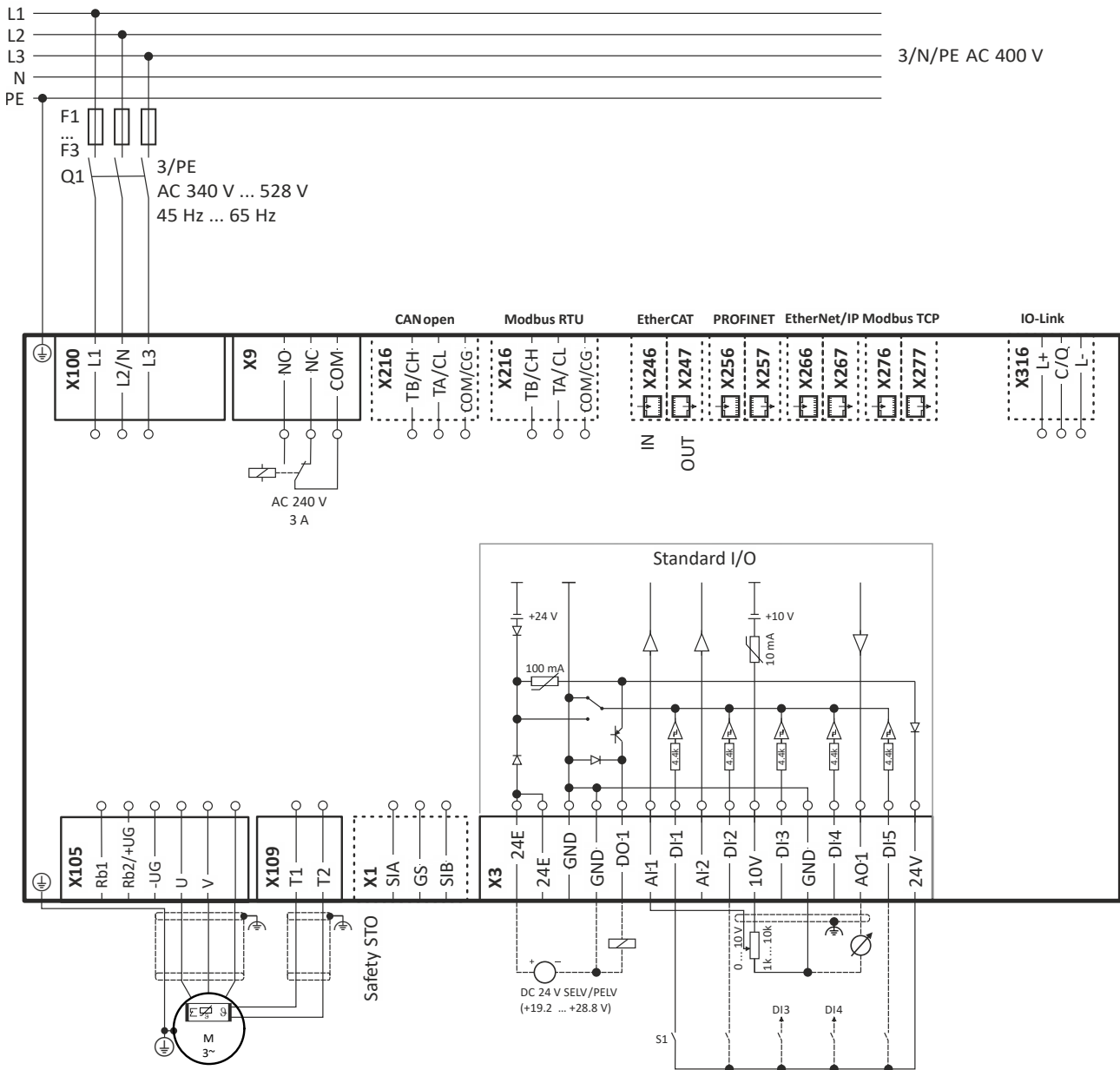


Fig. 9: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options

Information on electrical installation

Mains connection
3-phase mains connection 480 V



3-phase mains connection 480 V

The connection plan is valid for the inverters i550-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 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN 61800-3 is fulfilled.

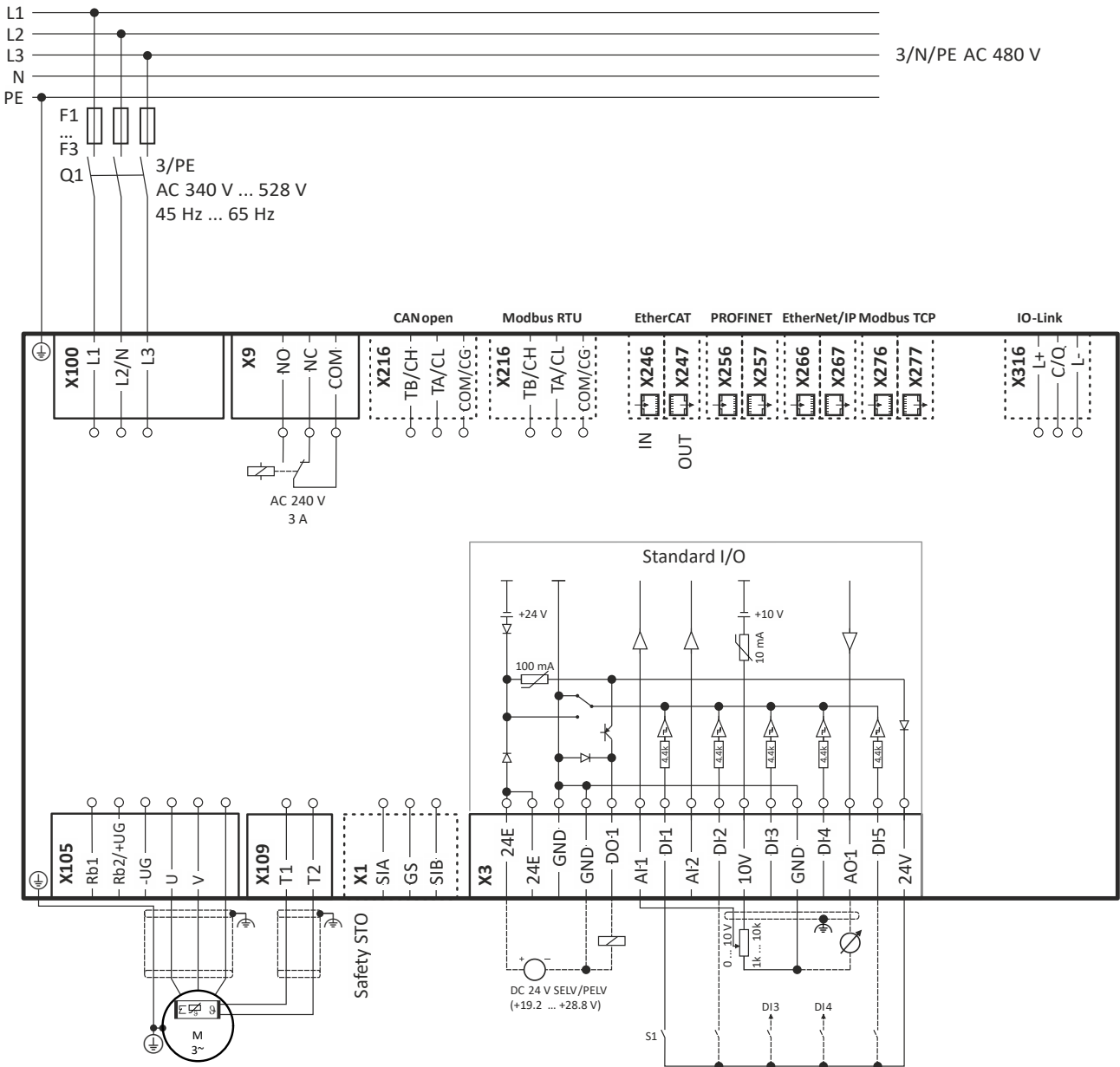


Fig. 10: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options



Information on electrical installation

Mains connection
3-phase mains connection 600 V

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 61800-3, an external EMC filter according to IEC EN 60939 must be used.

The user must verify that the conformity with EN 61800-3 is fulfilled.

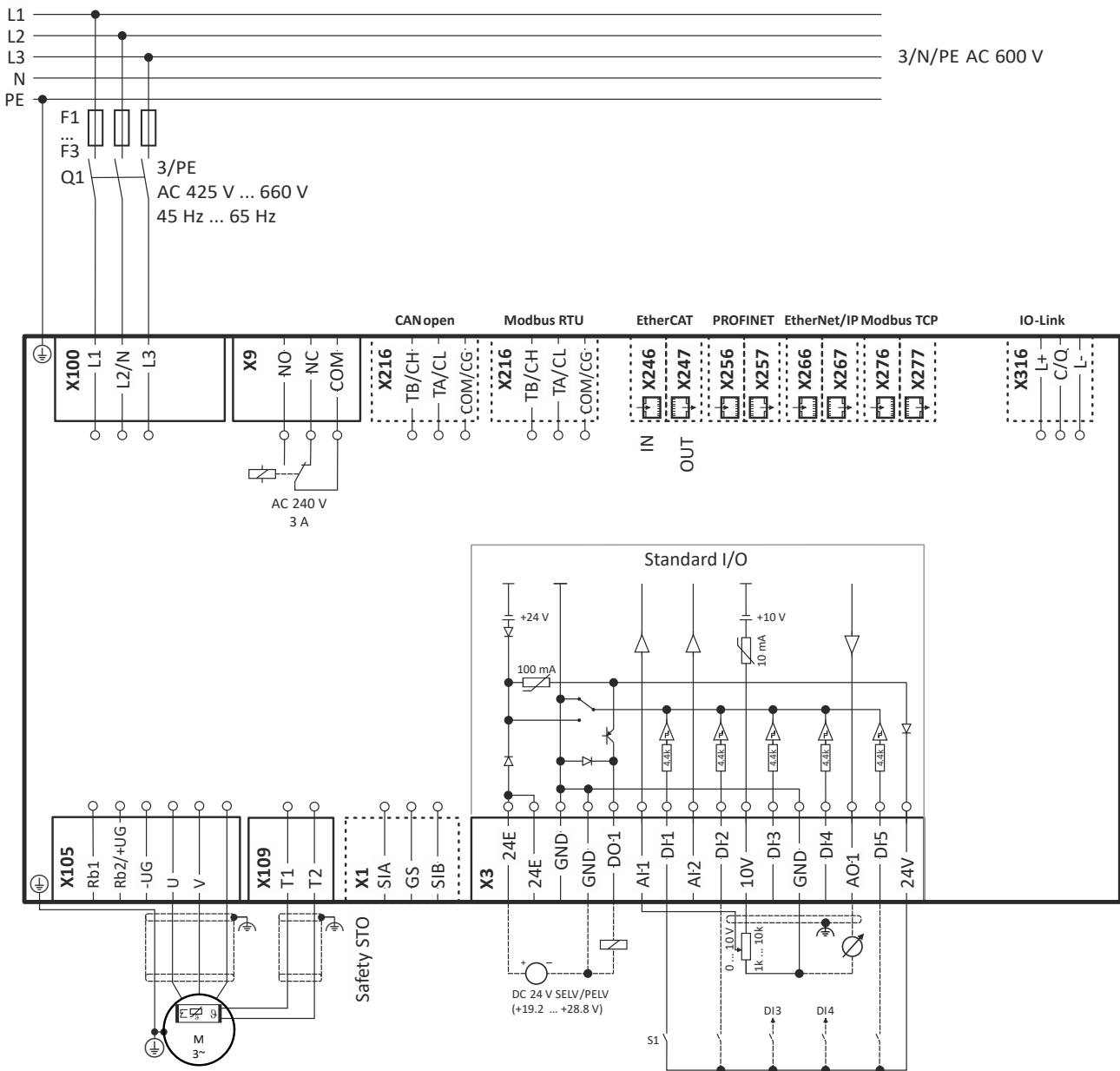


Fig. 11: Wiring example

S1 Start/Stop
Fx Fuses

Q1 Mains contactor
--- Dashed line = options

Information on electrical installation

Mains connection
Mains installation with several devices



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](#) [□ 204](#)



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 repair switch
<p>Connection at terminal block (Lenze accessories) in the extension box</p>  <p>2.5 ... 10 mm²</p>	<p>Repair switch connection, ideal for looping-through connection</p>  <p>2.5 ... 4.0 mm²</p>



Motor connection

Switching in the motor cable



Switching on the motor side of the inverter is permissible:

For safety shutdown (emergency stop).

In case several motors are driven by one inverter (only in V/f operating mode).

Please note the following:

The switching elements on the motor side must be dimensioned for with the maximum occurring load.

Connection of motor temperature monitoring



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



Brake resistor connection



Use intrinsically safe brake resistors to be able to dispense with a separate switch-off device (e.g. a contactor).

Short connecting cables up to 0.5 m

Up to a cable length of 0.5 m, the cable for the brake resistor and that of the temperature monitoring can be twisted. Doing so reduces problems due to EMC interference.

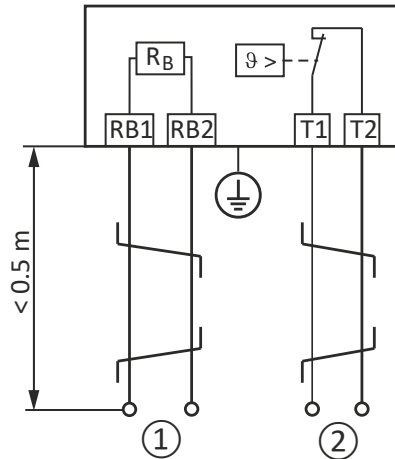


Fig. 12: Connection plan - brake resistor with a cable length of up to 0.5 m

- ① Wiring to the "brake resistor" connection on the inverter or another component with brake chopper.
- ② Optional: Wiring to a control contact, e. g. a digital input that is set to monitor the thermal contact. If the thermal contact responds, the voltage supply of the inverter must be disconnected (e. g. switch off the control of the mains contactor).

Long connecting cables up to max. 5 m

The brake resistor cable must be shielded. The maximum length is 5 m.

For the temperature monitoring cable, twisting is sufficient.

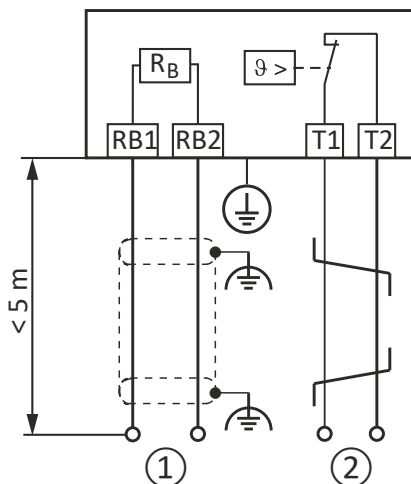


Fig. 13: Connection plan - brake resistor with a cable length of up to 5 m

- ① Wiring to the "brake resistor" connection on the inverter or another component with brake chopper.
- ② Optional: Wiring to a control contact, e. g. a digital input that is set to monitor the thermal contact. If the thermal contact responds, the voltage supply of the inverter must be disconnected (e. g. switch off the control of the mains contactor).



DC-bus connection

If multiple inverters are operated in a DC-bus connection, energy exchange between individual drives working as motors and generators is possible. Groups of inverters are connected to the DC bus.

Preconditions:

- The inverters must have an appropriate connection facility, e. g. terminal +UG/-UG.
- The inverters connected to the DC bus must be designed for the same DC-bus voltage and have the same number of phases on the mains side.

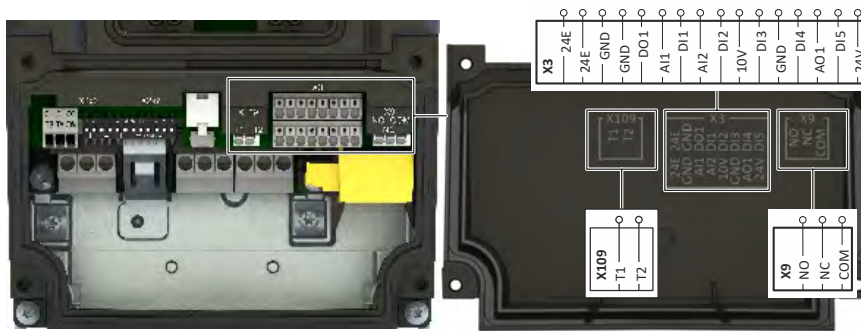
The DC system can be provided by power supply modules (AC/DC converters) or inverters with a power reserve. The technical data provide information on possible applications.

Error-free operation of the inverters in a DC-bus connection is only possible with meticulous design.

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 description			Control terminals	Relay output	PTC input
Connection			X3	X9	X109
Connection type			Non-pluggable	Non-pluggable	Non-pluggable
Max. cable cross-section		mm ²	1.5	1.5	1.5
Max. cable cross-section		AWG	16	16	16
Stripping length		mm	9	9	9
Stripping length		in	0.35	0.35	0.35
Required tool			Screwdriver 0.4 x 2.5		

Information on electrical installation

Networks
CANopen



Networks



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

- Lay communication cables separately from power cables. Maintain as large a distance as possible to the motor cables which are subject to interference.
- To avoid compensating currents via the shielding of the communication cable, install an independent, low-impedance equipotential bonding over the shortest possible distance parallel to the communication cable. This applies in particular to long cables.
- CAT5 cables according to specification establish the shield connection via the RJ45 plug connection. Additional shield connections are not required.
- Cables must comply with CAT5 and be suitable for ≥ 10 Mbps.
- Only certified, tested and fully assembled patch cables from well-known manufacturers are recommended.
- Observe bending radii according to manufacturer information. Minimum bending radii of 10 x cable diameter or 20 x diameter for frequent manipulation of the cables are standard.
- RJ45 plug connections only function properly if they are not subjected to mechanical stress or lateral forces.
- Patch cables of 25 cm length are suitable for the network connection of inverters ≤ 4 kW installed side by side. When wiring from right to left, a sufficient bending radius can be maintained.
- Fix longer cables 30 cm after the connection point.

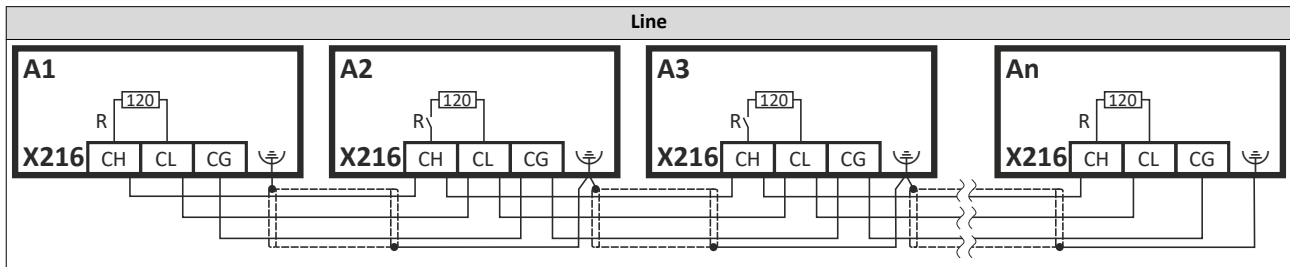
CANopen



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 description		CANopen	
Connection		X216	
Connection type		Non-pluggable	
Max. cable cross-section	mm ²	1.5	
Max. cable cross-section	AWG	16	
Stripping length	mm	9	
Stripping length	in	0.35	
Required tool		Screwdriver 0.4 x 2.5	



Information on electrical installation

Networks
Modbus RTU

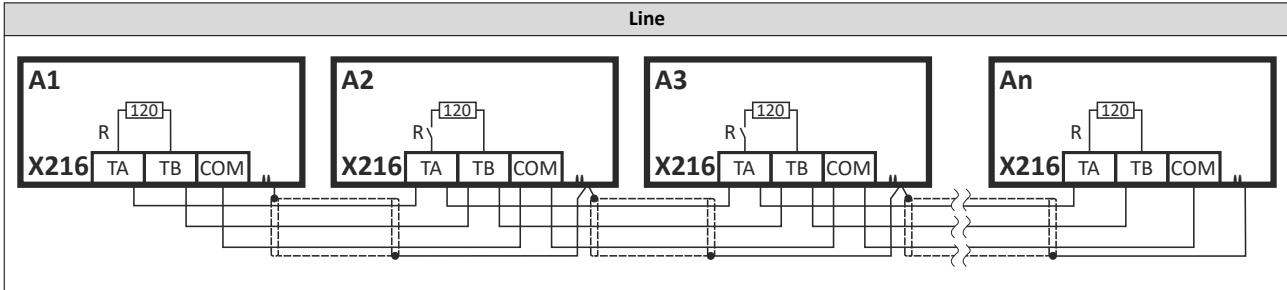
Modbus RTU



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 description		Modbus RTU	
Connection		X216	
Connection type		Non-pluggable	
Max. cable cross-section	mm ²	1.5	
Max. cable cross-section	AWG	16	
Stripping length	mm	9	
Stripping length	in	0.35	
Required tool		Screwdriver 0.4 x 2.5	

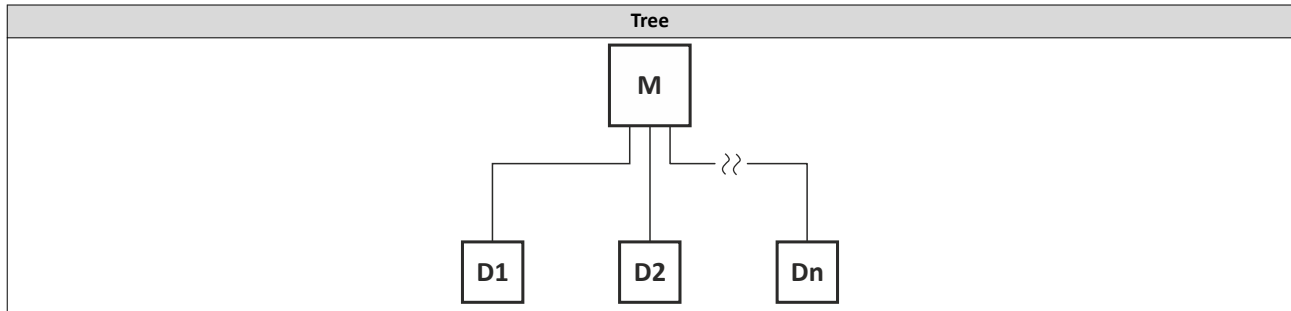
Information on electrical installation

Networks
IO-Link



IO-Link

Typical topologies



M Master

D Device

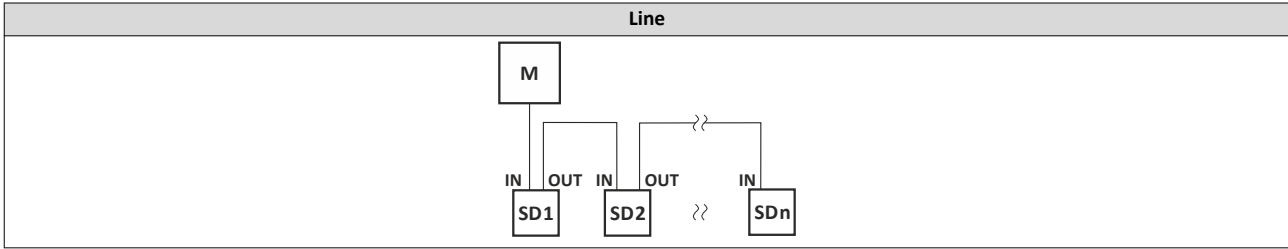
Connection description		IO-Link	
Connection		X316	
Connection type		Non-pluggable	
Max. cable cross-section	mm ²	1.5	
Max. cable cross-section	AWG	16	
Stripping length	mm	9	
Stripping length	in	0.35	
Required tool		Screwdriver 0.4 x 2.5	

Information			
Name		IO-Link	
Specification		1.1	
Transmission rate		230.4 kbaud (COM 3)	
Cycle time		2 ms	
Port Class A (type A)		I max. 200 mA	
Connection designation		L+	24 V
		C/Q	Switching and communication line
		L-	0 V
<div style="text-align: center;"> <p>IO-Link</p> <p>X316</p> <p>L+</p> <p>C/Q</p> <p>L-</p> </div>			
	Cable		Spring-loaded terminal, 3-pole



EtherCAT

Typical topologies



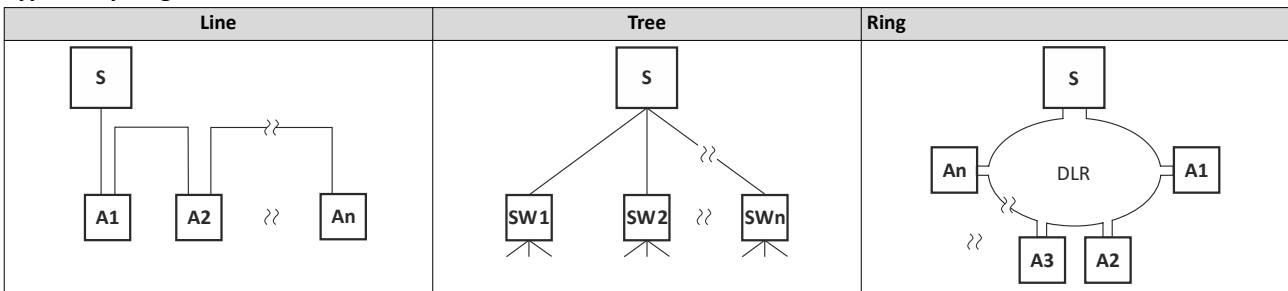
M Master
SD Slave Device

Connection description		EtherCAT	
Connection		X246	X247
Connection type		RJ45	

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

EtherNet/IP

Typical topologies



S Scanner
A Adapter
SW Switch

Connection description		EtherNet/IP	
Connection		X266	X267
Connection type		RJ45	

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	

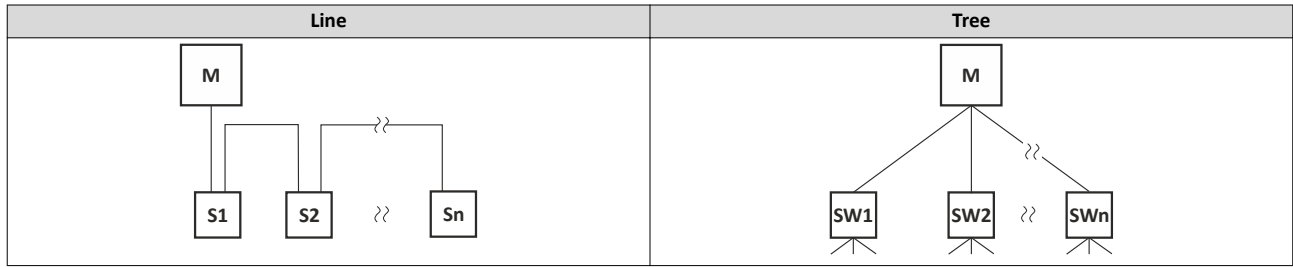
Information on electrical installation

Networks
Modbus TCP



Modbus TCP

Typical topologies



M Master
S Slave

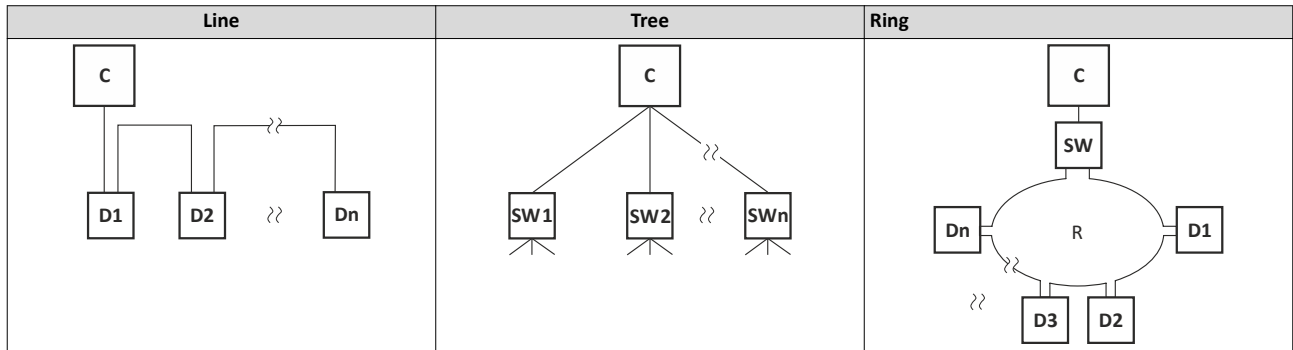
SW Switch

Connection description	Modbus TCP		
Connection	X276	X277	
Connection type	RJ45		

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

PROFINET

Typical topologies



C IO controller
D IO device

SW Switch SCALANCE (MRP capable)
R Redundant domain

Connection description	PROFINET		
Connection	X256	X257	
Connection type	RJ45		

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	



Functional safety

⚠ DANGER!

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

Possible consequence: Death or severe injuries

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

⚠ DANGER!

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

Possible consequences: Death or severe injuries

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

NOTICE

Overvoltage

Destruction of the safety component

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

NOTICE

Excessively high humidity or condensation

Malfunction or destruction of the safety component

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

Information on electrical installation

Functional safety
Basic Safety - STO



Basic Safety - STO

DANGER!

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

Possible consequences: Death or severe injuries

► "Emergency stop" requires electrical isolation, e. g. via a central mains contactor.

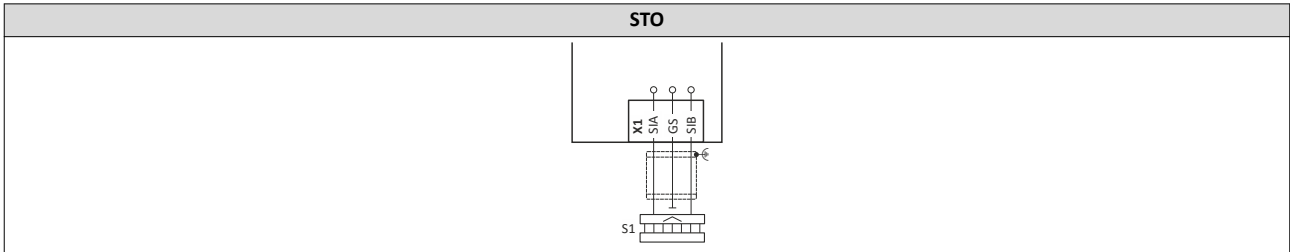


Connection diagram



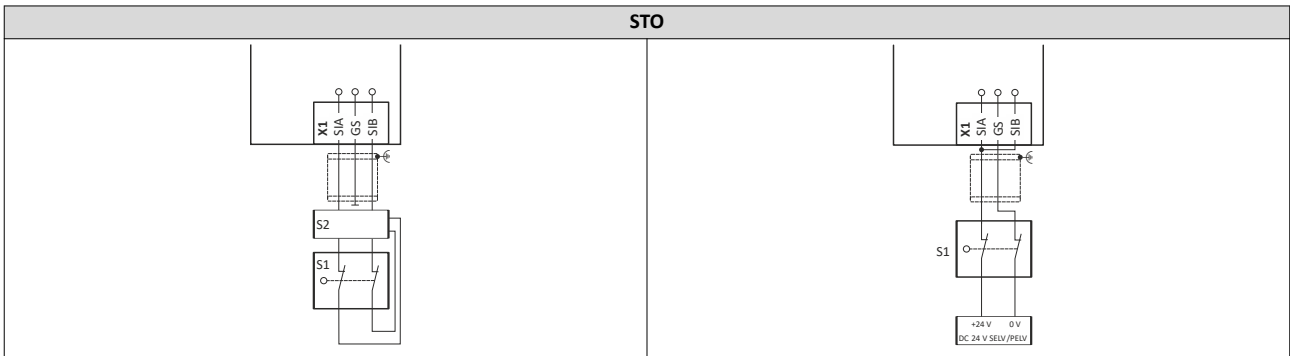
The connection diagrams shown are only example circuits. The user is responsible for the correct safety-related design and selection of the components!

Active sensors



S1 Active sensor - example of light grid

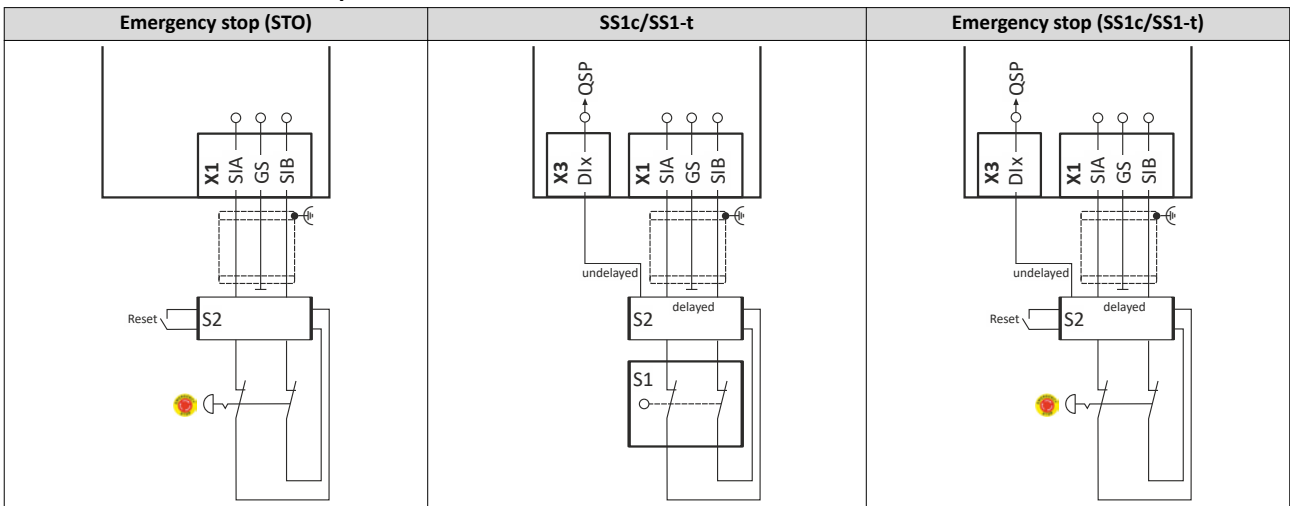
Passive sensors



S1 Passive sensor
S2 Safety switching device

S1 Passive sensor

Passive sensors - further examples



S2 Safety switching device

S1 Passive sensor
S2 Safety switching device with delayed contacts

S2 Safety switching device with delayed contacts

Information on electrical installation

Functional safety
Basic Safety - STO



Terminal data

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

Connection description		Basic Safety - STO	
Connection		X1	
Connection type		Pluggable	
Max. cable cross-section	mm ²	1.5	
Max. cable cross-section	AWG	16	
Stripping length	mm	9	
Stripping length	in	0.35	
Required tool		Screwdriver 0.4 x 2.5	



Technical data

Standards and operating conditions

Conformities and approvals

Conformities			
CE	2014/30/EU		EMC Directive (reference: CE-typical drive system)
	2014/35/EU		Low-Voltage Directive
EAC	TP TC 020/2011		Eurasian conformity: Electromagnetic compatibility of technical means
	TP TR 004/2011		Eurasian conformity: Safety of low voltage equipment
RoHS	2011/65/EU		Restrictions on the use of certain hazardous substances in electrical and electronic devices
Approvals			
UL	UL 61800-5-1		File No. E132659
			for USA and Canada (requirements of the CSA 22.2 No. 274)

Protection of persons and device protection

Degree of protection			Information applies to the mounted and ready-for-use state
EN	EN 60529	IP31	
		IP66	
NEMA	NEMA 250	Type 1	
		Type 4X outdoor	
UL	UL 50	Type 1	
		UL 50E	
Insulation resistance			
Overvoltage category	EN 61800-5-1	II	>2000 m amsl
		III	0 ... 2000 m amsl
Insulation of control circuits			
	EN 61800-5-1	Safe mains isolation	double/reinforced insulation
Leakage current			
AC	EN 61800-5-1	> 3.5 mA	Please observe regulations and safety instructions!
DC		> 10 mA	
Starting current			
		≤ 3 x rated mains current	
Protective measures			
Earth fault resistance			Earth-fault protected depending on operating status
Motor stall protection			
Short-circuit strength			
Overvoltage resistance			
Overtemperature of motor			PTC or thermal contact, I ² t monitoring

EMC data

Operation on public supply systems			The machine or system manufacturer is responsible for compliance with the requirements for the machine/system!
> 1 kW, mains current ≤ 16 A	EN 61000-3-2	no additional measures	
< 1kW		with mains choke	
Mains current > 16 A	EN 61000-3-12	With mains choke or mains filter	When designed for rated power.
Noise emission			
Category C1	EN 61800-3		See rated data
Category C2			
Category C3			
Noise immunity			
	EN 61800-3	Requirements fulfilled	

Technical data

Standards and operating conditions
Motor connection



Motor connection

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

Environmental conditions

Energy efficiency			
High Efficiency	EN 50598-2	Class IE2	
Climate			
Storage	EN 60721-3-1	1K3 (-30 ... +60°C)	
Transport	EN 60721-3-2	2K3 (-30 ... +70 °C)	
Operation	EN 60721-3-3	3K3 (-30 ... +55°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
		3C2 (for IP66)	For chemical, active substances
		3S3 (for IP66)	For mechanical, active substances
Site altitude			
0 ... 1000 m amsl			
1000 ... 4000 m amsl			Reduce rated output current by 5 %/1000 m
Pollution			
	EN 61800-5-1 UL 61800-5-1	Degree of pollution 2	
Vibration resistance			
Transport	EN 60721-3-2	2M2 (sine, shock)	in original packaging
Operation	EN 61800-5-1	Amplitude 0.075 mm	10 ... 57 Hz
		acceleration resistant up to 1 g	57 ... 150 Hz
	German Lloyd	Amplitude 1 mm	5 ... 13.2 Hz up to 11kW
		acceleration resistant up to 0.7 g	13.2 ... 100 Hz up to 11kW

Electrical supply conditions

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

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

The following is supported:

- [1-phase mains connection 120 V](#) 76
- [1-phase mains connection 230/240 V](#) 81
- [1-phase mains connection 230/240 V "Light Duty"](#) 89
- [3-phase mains connection 230/240 V](#) 93
- [3-phase mains connection 230/240 V "Light Duty"](#) 103
- [3-phase mains connection 400 V](#) 108
- [3-phase mains connection 400 V "Light Duty"](#) 116
- [3-phase mains connection 480 V](#) 121
- [3-phase mains connection 480 V "Light Duty"](#) 130
- [3-phase mains connection 600 V](#) 136
- [3-phase mains connection 600 V "Light Duty"](#) 139



Certification of the integrated safety

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

- EN ISO 13849-1: Safety of machinery – safety-related parts of control systems – Part 1
- EN ISO 13849-2: Safety of machinery – safety-related parts of control systems – Part 2
- EN 60204-1: Safety of machinery – electrical equipment of machines – Part 1
- EN 61508, Part 1-7: Safety of machinery Functional safety of electrical/electronic/programmable electronic safety-related systems
- EN 61800-3: Electric variable-speed drives – Part 3: EMC requirements including specific test procedures
- EN 61800-5-1: Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – electrical, thermal and energy requirements
- EN 61800-5-2: Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – functional safety
- EN 62061: Safety of machinery – functional safety of safety-related electrical/electronic/programmable electronic systems



Declarations of Conformity and certificates can be found on the internet:

www.Lenze.com

Technical data

1-phase mains connection 120 V



1-phase mains connection 120 V



EMC filters are **not integrated** in inverters for this mains connection.



Technical data

1-phase mains connection 120 V
Rated data

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



Inverter			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/PE AC 90 V ... 132 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 230/240 V		
Rated mains current					
without mains choke		A	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-		
Max. Unshielded motor cable length					
without EMC category		m	60	80	



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [▶ Fusing data](#) 52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current	Characteristic	Max. rated current	mA	Type
		A		A		
i550-P0.37/120-1	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P0.75/120-1	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P1.1/120-1	gG/gL, gRL	32	B	32	≥30	Typ B

Terminal data

Rated power	P _{rated}	kW	0.37 ... 0.37		0.75 ... 1.1	
Connection description			Mains connection			
Connection			X100			
Connection type			Non-pluggable			
Max. cable cross-section		mm ²	4		4	
Max. cable cross-section		AWG	10		10	
Stripping length		mm	10		10	
Stripping length		in	0.4		0.4	
Tightening torque		Nm	0.5		0.5	
Tightening torque		lb-in	4.4		4.4	
Required tool			Screwdriver 1.2 x 8.0		Screwdriver 0.6 x 3.5	

Rated power	P _{rated}	kW	0.37 ... 1.1			
Connection description			PE connection			
Connection			PE			
Max. cable cross-section		mm ²	6			
Max. cable cross-section		AWG	10			
Stripping length		mm	10			
Stripping length		in	0.4			
Tightening torque		Nm	2			
Tightening torque		lb-in	18			
Required tool			Torx key 20			

Rated power	P _{rated}	kW	0.37 ... 0.37		0.75 ... 1.1	
Connection description			Motor connection			
Connection			X105			
Connection type			Non-pluggable			
Max. cable cross-section		mm ²	4		4	
Max. cable cross-section		AWG	10		10	
Stripping length		mm	10		10	
Stripping length		in	0.4		0.4	
Tightening torque		Nm	0.5		0.5	
Tightening torque		lb-in	4.4		4.4	
Required tool			Screwdriver 1.2 x 8.0		Screwdriver 0.6 x 3.5	

Technical data

1-phase mains connection 120 V
Brake resistors



Brake resistors

Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Order code	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	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	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	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

Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Order code	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	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P0.75/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/120-1	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66



1-phase mains connection 230/240 V



EMC filters are **not integrated** in inverters of the type "i550-Px.xx/230-2".

Technical data

1-phase mains connection 230/240 V
Rated data



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

Inverter			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/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	5.7		7.6	
with mains choke		A	-			
Apparent output power		kVA	0.9		1.2	
Rated output current						
2 kHz		A	2.4		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		A	3.6		4.8	
Overload time	T_1	s	60			
Recovery time	T_2	s	120			
Max. output current during the recovery time		A	1.8		2.4	
Overcurrent cycle 15 s						
Max. output current		A	4.8		6.4	
Overload time	T_1	s	3			
Recovery time	T_2	s	12			
Max. output current during the recovery time		A	1.8		2.4	
Cyclic mains switching			3 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	10	-	10	-
Category C3 (2 kHz, 4 kHz, 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



Inverter			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/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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		A	6.3		9	
Overload time	T_1	s	60			
Recovery time	T_2	s	120			
Max. output current during the recovery time		A	3.2		4.5	
Overcurrent cycle 15 s						
Max. output current		A	8.4		12	
Overload time	T_1	s	3			
Recovery time	T_2	s	12			
Max. output current during the recovery time		A	3.2		4.5	
Cyclic mains switching			3 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	10	-	10	-
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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		A	10.5		14.4	
Overload time	T_1	s	60			
Recovery time	T_2	s	120			
Max. output current during the recovery time		A	5.3		7.2	
Overcurrent cycle 15 s						
Max. output current		A	14		19.2	
Overload time	T_1	s	3			
Recovery time	T_2	s	12			
Max. output current during the recovery time		A	5.3		7.2	
Cyclic mains switching			3 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	10	-	10	-
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35	-	35	-
Max. Unshielded motor cable length						
without EMC category		m	80			

Technical data

1-phase mains connection 230/240 V
Fusing data



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#) 52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current	Characteristic	Max. rated current	mA	Type
		A		A		
i550-P0.37/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.37/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.55/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.55/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.75/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.75/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.1/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.1/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.5/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.5/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P2.2/230-1	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P2.2/230-2	gG/gL, gRL	40	B	32	≥30	Typ B



Technical data

1-phase mains connection 230/240 V
Terminal data

Terminal data

Rated power	P _{rated}	kW	0.37 ... 2.2
Connection description			Mains connection
Connection			X100
Connection type			Non-pluggable
Max. cable cross-section		mm ²	4
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tool			Screwdriver 1.2 x 8.0

Rated power	P _{rated}	kW	0.37 ... 2.2
Connection description			PE connection
Connection			PE
Max. cable cross-section		mm ²	6
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	2
Tightening torque		lb-in	18
Required tool			Torx key 20

Rated power	P _{rated}	kW	0.37 ... 2.2
Connection description			Motor connection
Connection			X105
Connection type			Non-pluggable
Max. cable cross-section		mm ²	4
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tool			Screwdriver 1.2 x 8.0

Technical data

1-phase mains connection 230/240 V
Brake resistors



Brake resistors

Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Order code	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	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	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	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	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.5/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P2.2/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66

Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Order code	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	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	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	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	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.5/230-1	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P2.2/230-1	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66



Technical data

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

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



EMC filters are **not integrated** in inverters of the type "i550-Px.xx/230-2".

Technical data

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

Rated data



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).

Inverter			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/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	6.9	9.1	12	17.1
with mains choke		A	-			
Apparent output power		kVA	1.2	1.6	2.2	2.6
Rated output current						
2 kHz		A	2.9	3.8	5	7.2
4 kHz		A	2.9	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 170 V ... 264 V, 45 Hz ... 65 Hz	
Output voltage			3 AC 0 - 230/240 V	
Rated mains current				
without mains choke		A	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-	
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-	
Max. Unshielded motor cable length				
without EMC category		m	80	

Technical data

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



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [▶ Fusing data](#) 52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current	Characteristic	Max. rated current	mA	Type
		A		A		
i550-P0.37/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.55/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.75/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.1/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.5/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P2.2/230-2	gG/gL, gRL	40	B	32	≥30	Typ B

Terminal data

[▶ Terminal data](#) 87

Brake resistors

[▶ Assignment to inverters with protection class IP31](#) 88



3-phase mains connection 230/240 V



EMC filters are **not integrated** in inverters for this mains connection.

Technical data

3-phase mains connection 230/240 V
Rated data



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 230/240 V
Rated data

Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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	2.4	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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



Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	28.8	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		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		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 times per minute			
Brake chopper						
Max. output current		A	26	30	31	48.8
Min. Brake resistor		Ω	15	13		8
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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




Inverter			i550-P18/230-3
Rated power	P_{rated}	kW	18.5
Rated power	P_{rated}	HP	25
Mains voltage range			3/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz
Output voltage			3 AC 0 - 230/240 V
Rated mains current			
without mains choke		A	78
with mains choke		A	-
Apparent output power		kVA	26.2
Rated output current			
2 kHz		A	68
4 kHz		A	68
8 kHz		A	68
12 kHz		A	61.2
16 kHz		A	45.3
Power loss			
2 kHz		W	408
4 kHz		W	435
8 kHz		W	569
12 kHz		W	543
16 kHz		W	542
Overcurrent cycle 180 s			
Max. output current		A	102
Overload time	T_1	s	60
Recovery time	T_2	s	120
Max. output current during the recovery time		A	51
Overcurrent cycle 15 s			
Max. output current		A	136
Overload time	T_1	s	3
Recovery time	T_2	s	12
Max. output current during the recovery time		A	51
Cyclic mains switching			3 times per minute
Brake chopper			
Max. output current		A	48.8
Min. Brake resistor		Ω	8
Max. shielded motor cable length			
without EMC category		m	50
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-
Max. Unshielded motor cable length			
without EMC category		m	200



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#)  52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current A	Characteristic	Max. rated current A	mA	Type
i550-P0.37/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.55/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P0.75/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.1/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P1.5/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P2.2/230-2	gG/gL, gRL	40	B	32	≥30	Typ B
i550-P3.0/230-3	gG/gL, gRL	80	B	80	≥30	Typ B
i550-P4.0/230-3	gG/gL, gRL	80	B	80	≥30	Typ B
i550-P5.5/230-3	gG/gL, gRL	80	B	80	≥30	Typ B
i550-P7.5/230-3	gG/gL, gRL	80	B	80	≥30	Typ B
i550-P11/230-3	gG/gL, gRL	80	B	80	≥30	Typ B
i550-P15/230-3	gG/gL, gRL	125	B	125	≥30	Typ B
i550-P18/230-3	gG/gL, gRL	125	B	125	≥30	Typ B

Technical data

3-phase mains connection 230/240 V
Terminal data



Terminal data

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 5.5	7.5 ... 11	15 ... 18.5
Connection description			Mains connection			
Connection			X100			
Connection type			Non-pluggable			
Max. cable cross-section		mm ²	4	6	16	35
Max. cable cross-section		AWG	10	8	6	2
Stripping length		mm	10	9	11	18
Stripping length		in	0.4	0.35	0.43	0.7
Tightening torque		Nm	0.5	0.5	1.2	3.8
Tightening torque		lb-in	4.4	4.4	11	34
Required tool			Screwdriver 1.2 x 8.0	Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 18.5
Connection description			PE connection		
Connection			PE		
Max. cable cross-section		mm ²	6	16	25
Max. cable cross-section		AWG	10	6	2
Stripping length		mm	10	11	16
Stripping length		in	0.4	0.4	0.6
Tightening torque		Nm	2	3.4	4
Tightening torque		lb-in	18	30	35
Required tool			Torx key 20	Crosstip screwdriver PZ2	

Rated power	P _{rated}	kW	0.37 ... 0.75	1.1 ... 5.5	7.5 ... 11	15 ... 18.5
Connection description			Motor connection			
Connection			X105			
Connection type			Non-pluggable			
Max. cable cross-section		mm ²	4	6	16	35
Max. cable cross-section		AWG	10	8	6	2
Stripping length		mm	10	9	11	18
Stripping length		in	0.4	0.35	0.43	0.7
Tightening torque		Nm	0.5	0.5	1.2	3.8
Tightening torque		lb-in	4.4	4.4	11	34
Required tool			Screwdriver 1.2 x 8.0	Screwdriver 0.6 x 3.5	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5



Brake resistors

Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Order code	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	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	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	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	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.5/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P2.2/230-2	ERBM039R120W	39	120	18	265 x 31 x 60	1.0	IP54
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P3.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	IP66
i550-P3.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	IP66
i550-P4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	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	4.0	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	4.0	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 200 x 105	9.8	IP66
i550-P15/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 300 x 280	35.5	IP66
i550-P18/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 200 x 105	9.8	IP66
i550-P18/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 300 x 280	35.5	IP66

Technical data

3-phase mains connection 230/240 V
Brake resistors



Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Order code	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	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-P0.75/230-2	ERBS100R625WNQN000	100	625	94	566 x 124 x 122	3.1	IP66
i550-P1.1/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P1.5/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P2.2/230-2	ERBS039R01K6NQN000	39	1600	246	748 x 200 x 122	7.8	IP66
i550-P3.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	IP66
i550-P3.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P4.0/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	IP66
i550-P4.0/230-3	ERBS015R01K2	15	1200	180	1020 x 114 x 105	5.6	IP66
i550-P5.5/230-3	ERBS015R800W	15	800	120	710 x 114 x 105	4.0	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	4.0	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	4.0	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 200 x 105	9.8	IP66
i550-P15/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 300 x 280	35.5	IP66
i550-P18/230-3	ERBS012R02K0WQN000	12	2000	300	865 x 200 x 105	9.8	IP66
i550-P18/230-3	ERBS012R05K0WQN000	12	5000	750	995 x 300 x 280	35.5	IP66



Technical data

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

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



EMC filters are **not integrated** in inverters for this mains connection.

Technical data

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



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).

Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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	2.9	3.8	5	7.2
4 kHz		A	2.9	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 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



Inverter			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/PE AC 195 V ... 264 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 230/240 V			
Rated mains current						
without mains choke		A	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
Power loss						
2 kHz		W	172	242	404	489
4 kHz		W	183	258	430	521
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-			
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-			
Max. Unshielded motor cable length						
without EMC category		m	100	200		



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#) 52

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

Terminal data

[► Terminal data](#) 100

Brake resistors

[► Assignment to inverters with protection class IP31](#) 101

Technical data

3-phase mains connection 400 V
Rated data



3-phase mains connection 400 V

Rated data

The output currents apply to these operating conditions:

- At 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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	1.8	2.5	3.3	4.4
with mains choke		A	-			
Apparent output power		kVA	0.9	1.2	1.6	2.1
Rated output current						
2 kHz		A	1.3	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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



Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	5.4	7.8	9.6	12.5
with mains choke		A	-			
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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3		-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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

Inverter			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3
Rated power	P_{rated}	kW	5.5	7.5	11
Rated power	P_{rated}	HP	7.5	10	15
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	17.2	20	28.4
with mains choke		A	-		
Apparent output power		kVA	8.7	11	15.8
Rated output current					
2 kHz		A	13	16.5	23.5
4 kHz		A	13	16.5	23.5
8 kHz		A	13	16.5	23.5
12 kHz		A	10.4	14.9	21.2
16 kHz		A	8.7	11	15.7
Power loss					
2 kHz		W	137	172	242
4 kHz		W	145	183	258
8 kHz		W	189	238	337
12 kHz		W	180	255	361
16 kHz		W	180	227	321
Overcurrent cycle 180 s					
Max. output current		A	19.5	24.8	35
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	9.8	12.4	17.6
Overcurrent cycle 15 s					
Max. output current		A	26	33	47
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	9.8	12.4	17.6
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	16.6	29	
Min. Brake resistor		Ω	47	27	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20		
Category C3 (2 kHz, 4 kHz, 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



Inverter			i550-P15/400-3	i550-P18/400-3	i550-P22/400-3
Rated power	P_{rated}	kW	15	18.5	22
Rated power	P_{rated}	HP	20	25	30
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	37	46	53
with mains choke		A	-		
Apparent output power		kVA	21.5	26.8	31.5
Rated output current					
2 kHz		A	32	40	47
4 kHz		A	32	40	47
8 kHz		A	32	40	47
12 kHz		A	25.6	32	37.6
16 kHz		A	21.3	26.6	31.3
Power loss					
2 kHz		W	328	408	479
4 kHz		W	349	435	510
8 kHz		W	457	569	668
12 kHz		W	435	543	636
16 kHz		W	435	542	636
Overcurrent cycle 180 s					
Max. output current		A	48	60	70.5
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	24	30	35.3
Overcurrent cycle 15 s					
Max. output current		A	64	80	94
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	24	30	35.3
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	40.3	48.3	
Min. Brake resistor		Ω	18	15	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz)		m	15		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35		
Max. Unshielded motor cable length					
without EMC category		m	200		



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#) 52

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

Technical data

3-phase mains connection 400 V
Terminal data



Terminal data

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22
Connection description			Mains connection		
Connection			X100		
Connection type			Non-pluggable		
Max. cable cross-section		mm ²	4	16	35
Max. cable cross-section		AWG	10	6	2
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 tool			Screwdriver 1.2 x 8.0	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22
Connection description			PE connection		
Connection			PE		
Max. cable cross-section		mm ²	6	16	25
Max. cable cross-section		AWG	10	6	2
Stripping length		mm	10	11	16
Stripping length		in	0.4	0.4	0.6
Tightening torque		Nm	2	3.4	4
Tightening torque		lb-in	18	30	35
Required tool			Torx key 20	Crosstip screwdriver PZ2	

Rated power	P _{rated}	kW	0.37 ... 5.5	7.5 ... 11	15 ... 22
Connection description			Motor connection		
Connection			X105		
Connection type			Non-pluggable		
Max. cable cross-section		mm ²	4	16	35
Max. cable cross-section		AWG	10	6	2
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 tool			Screwdriver 1.2 x 8.0	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5



Technical data

3-phase mains connection 400 V
Brake resistors

Brake resistors

Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Order code	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	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
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	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	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	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	4.0	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	4.0	IP66
i550-P7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200.00	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	600.00	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200.00	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

Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Order code	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	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	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	4.0	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	4.0	IP66
i550-P7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200.00	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	600.00	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200.00	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

Technical data

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



3-phase mains connection 400 V "Light Duty"

Rated data

The output currents apply to these operating conditions:

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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	1.8	2.5	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	1.6	2.2	2.9	3.8
4 kHz		A	1.6	2.2	2.9	3.8
Power loss						
2 kHz		W	24	30	38	45
4 kHz		W	25	32	40	48
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	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
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3		-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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



Inverter			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3
Rated power	P_{rated}	kW	7.5	11	15
Rated power	P_{rated}	HP	10	15	20
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	18.3	28	34.2
with mains choke		A	-		
Apparent output power		kVA	11	15.8	21.5
Rated output current					
2 kHz		A	15.6	23	28.2
4 kHz		A	15.6	23	28.2
Power loss					
2 kHz		W	172	242	340
4 kHz		W	183	258	361
Overcurrent cycle 180 s					
Max. output current		A	19.5	24.8	35
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	9.8	12.4	17.6
Overcurrent cycle 15 s					
Max. output current		A	26	33	47
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	9.8	12.4	17.6
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	16.6	29	
Min. Brake resistor		Ω	47	27	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20		
Category C3 (2 kHz, 4 kHz, 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

Inverter			i550-P15/400-3	i550-P18/400-3	i550-P22/400-3
Rated power	P_{rated}	kW	18.5	22	30
Rated power	P_{rated}	HP	25	30	40
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	43.6	54.5	64
with mains choke		A	-		
Apparent output power		kVA	25.8	32.2	37.8
Rated output current					
2 kHz		A	38.4	48	56.4
4 kHz		A	38.4	48	56.4
Power loss					
2 kHz		W	392	489	573
4 kHz		W	418	521	611
Overcurrent cycle 180 s					
Max. output current		A	48	60	70.5
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	24	30	35.3
Overcurrent cycle 15 s					
Max. output current		A	64	80	94
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	24	30	35.3
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	40.3	48.3	
Min. Brake resistor		Ω	18	15	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz)		m	15		
Category C3 (2 kHz, 4 kHz, 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



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#) 52

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

Terminal data

[► Terminal data](#) 114

Brake resistors

[► Assignment to inverters with protection class IP31](#) 115



Technical data

3-phase mains connection 480 V
Rated data

3-phase mains connection 480 V

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 480 V

Rated data



Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	1.5	2.1	2.8	3.7
with mains choke		A	-			
Apparent output power		kVA	0.9	1.3	1.7	2.4
Rated output current						
2 kHz		A	1.1	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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	4.5	6.5	8	10.5
with mains choke		A	-			
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		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3		-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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



Inverter			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P0.75/600-3
Rated power	P_{rated}	kW	5.5	7.5	11	0.75
Rated power	P_{rated}	HP	7.5	10	15	1
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			3 AC 0 - 480/600 V
Rated mains current						
without mains choke		A	14.3	16.6	23.7	2.0
with mains choke		A	-			
Apparent output power		kVA	8.9	11.3	16.9	1.4
Rated output current						
2 kHz		A	11	14	21	1.7
4 kHz		A	11	14	21	1.7
8 kHz		A	11	14	21	1.7
12 kHz		A	8.8	12.6	18.9	1.3
16 kHz		A	7.3	9.3	14	
Power loss						
2 kHz		W	137	172	242	30
4 kHz		W	145	183	258	32
8 kHz		W	189	238	337	40
12 kHz		W	180	255	361	38
16 kHz		W	180	227	321	
Overcurrent cycle 180 s						
Max. output current		A	16.5	21	31.5	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	8.3	10.5	15.8	1.3
Overcurrent cycle 15 s						
Max. output current		A	22	28	42	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	8.3	10.5	15.8	1.3
Cyclic mains switching			3 times per minute			
Brake chopper						
Max. output current		A	16.6	29		2.1
Min. Brake resistor		Ω	47	27		470
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			-
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35			-
Max. Unshielded motor cable length						
without EMC category		m	100	200		60



Technical data

3-phase mains connection 480 V
Rated data

Inverter			i550-P1.5/600-3	i550-P2.2/600-3
Rated power	P_{rated}	kW	1.5	2.2
Rated power	P_{rated}	HP	2	3
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz	
Output voltage			3 AC 0 - 480/600 V	
Rated mains current				
without mains choke		A	3.2	4.4
with mains choke		A	-	
Apparent output power		kVA	2.2	3.1
Rated output current				
2 kHz		A	2.7	3.9
4 kHz		A	2.7	3.9
8 kHz		A	2.7	3.9
12 kHz		A	2.1	3.0
Power loss				
2 kHz		W	45	62
4 kHz		W	48	66
8 kHz		W	61	85
12 kHz		W	65	91
Overcurrent cycle 180 s				
Max. output current		A	4.1	5.9
Overload time	T_1	s	60	60
Recovery time	T_2	s	120	120
Max. output current during the recovery time		A	2	2.9
Overcurrent cycle 15 s				
Max. output current		A	5.4	7.8
Overload time	T_1	s	3	3
Recovery time	T_2	s	12	12
Max. output current during the recovery time		A	2	2.9
Cyclic mains switching			3 times per minute	
Brake chopper				
Max. output current		A	5.4	
Min. Brake resistor		Ω	180	
Max. shielded motor cable length				
without EMC category		m	50	
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-	
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-	
Max. Unshielded motor cable length				
without EMC category		m	80	

Technical data

3-phase mains connection 480 V

Rated data




Inverter			i550-P15/400-3	i550-P18/400-3	i550-P22/400-3
Rated power	P_{rated}	kW	15	18.5	22
Rated power	P_{rated}	HP	20	25	30
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	30.7	38	44.2
with mains choke		A	-		
Apparent output power		kVA	21.7	27.4	32.5
Rated output current					
2 kHz		A	27	34	40.4
4 kHz		A	27	34	40.4
8 kHz		A	27	34	40.4
12 kHz		A	21.6	27.2	32.3
16 kHz		A	18	22.6	26.9
Power loss					
2 kHz		W	328	408	479
4 kHz		W	349	435	510
8 kHz		W	457	569	668
12 kHz		W	435	543	636
16 kHz		W	435	542	636
Overcurrent cycle 180 s					
Max. output current		A	40.5	51	60.6
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	20.3	25.5	30.3
Overcurrent cycle 15 s					
Max. output current		A	54	68	80.8
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	20.3	25.5	30.3
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	40.3	48.3	
Min. Brake resistor		Ω	18	15	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz)		m	15		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35		
Max. Unshielded motor cable length					
without EMC category		m	200		



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#)  52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current A	Characteristic	Max. rated current A	mA	Type
i550-P0.37/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P0.55/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P0.75/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P1.1/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P1.5/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P2.2/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P3.0/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P4.0/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P5.5/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P7.5/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P11/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P15/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P18/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P22/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P0.75/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P1.5/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P2.2/600-3	gG/gL, gRL	20	-	-	≥30	Typ B

Technical data

3-phase mains connection 480 V
Terminal data



Terminal data

Rated power	P _{rated}	kW	0.37 ... 2.2	7.5 ... 11	15 ... 22
Connection description			Mains connection		
Connection			X100		
Connection type			Non-pluggable		
Max. cable cross-section		mm ²	4	16	35
Max. cable cross-section		AWG	10	6	2
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 tool			Screwdriver 1.2 x 8.0	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5

Rated power	P _{rated}	kW	0.37 ... 2.2	7.5 ... 11	15 ... 22
Connection description			PE connection		
Connection			PE		
Max. cable cross-section		mm ²	6	16	25
Max. cable cross-section		AWG	10	6	2
Stripping length		mm	10	11	16
Stripping length		in	0.4	0.4	0.6
Tightening torque		Nm	2	3.4	4
Tightening torque		lb-in	18	30	35
Required tool			Torx key 20	Crosstip screwdriver PZ2	

Rated power	P _{rated}	kW	0.37 ... 2.2	7.5 ... 11	15 ... 22
Connection description			Motor connection		
Connection			X105		
Connection type			Non-pluggable		
Max. cable cross-section		mm ²	4	16	35
Max. cable cross-section		AWG	10	6	2
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 tool			Screwdriver 1.2 x 8.0	Screwdriver 0.8 x 4.0	Screwdriver 0.8 x 4.5



Brake resistors

Assignment to inverters with protection class IP31

Inverter	Brake resistor						
	Order code	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	ERBM390R100W	390	100	15	235 x 20.6 x 40	0.37	IP54
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	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	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	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	4.0	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	4.0	IP66
i550-P7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200.00	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	600.00	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200.00	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

Assignment to inverters with protection class IP66

Inverter	Brake resistor						
	Order code	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	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.55/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P0.75/400-3	ERBS470R150WNQN000	470	150	22.5	222 x 124 x 122	1.3	IP66
i550-P1.1/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P1.5/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P2.2/400-3	ERBS180R350WNQN000	180	350	53	382 x 124 x 122	2.1	IP66
i550-P3.0/400-3	ERBS082R780WNQN000	82	780	117	666 x 124 x 122	3.6	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	4.0	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	4.0	IP66
i550-P7.5/400-3	ERBS027R600W	27	600.00	90	550 x 114 x 105	3.1	IP66
i550-P7.5/400-3	ERBS027R01K2	27	1200.00	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	600.00	90	550 x 114 x 105	3.1	IP66
i550-P11/400-3	ERBS027R01K2	27	1200.00	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

Technical data

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



3-phase mains connection 480 V "Light Duty"

Rated data

The output currents apply to these operating conditions:

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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	1.5	2.1	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	1.3	1.9	2.5	3.6
4 kHz		A	1.3	1.9	2.5	3.6
Power loss						
2 kHz		W	24	30	38	45
4 kHz		W	25	32	40	48
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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

Inverter			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/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			
Rated mains current						
without mains choke		A	5.1	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
Power loss						
2 kHz		W	62	79	102	137
4 kHz		W	66	84	108	145
Overcurrent cycle 180 s						
Max. output current		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		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 times per 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 (2 kHz, 4 kHz, 8kHz)		m	3		-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			
Category C3 (2 kHz, 4 kHz, 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



Inverter			i550-P5.5/400-3	i550-P7.5/400-3	i550-P11/400-3	i550-P0.75/600-3
Rated power	P _{rated}	kW	7.5	11	15	1.1
Rated power	P _{rated}	HP	10	15	20	1.5
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz			
Output voltage			3 AC 0 - 400/480 V			3 AC 0 - 480/600 V
Rated mains current						
without mains choke		A	15.3	22	30.5	2.7
with mains choke		A	-			
Apparent output power		kVA	11.3	16.9	21.7	2.2
Rated output current						
2 kHz		A	13.2	18.3	25.2	2
4 kHz		A	13.2	18.3	25.2	2
Power loss						
2 kHz		W	172	242	340	38
4 kHz		W	183	258	361	40
Overcurrent cycle 180 s						
Max. output current		A	16.5	21	31.5	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	8.3	10.5	15.8	1.3
Overcurrent cycle 15 s						
Max. output current		A	22	28	42	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	8.3	10.5	15.8	1.3
Cyclic mains switching			3 times per minute			
Brake chopper						
Max. output current		A	16.6	29		2.1
Min. Brake resistor		Ω	47	27		470
Max. shielded motor cable length						
without EMC category		m	50			
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-			
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	20			-
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35			-
Max. Unshielded motor cable length						
without EMC category		m	100	200		60



Technical data

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

Inverter			i550-P1.5/600-3	i550-P2.2/600-3
Rated power	P_{rated}	kW	2.2	3
Rated power	P_{rated}	HP	3	4
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz	
Output voltage			3 AC 0 - 480/600 V	
Rated mains current				
without mains choke		A	4.2	6.1
with mains choke		A	-	
Apparent output power		kVA	3.1	4.9
Rated output current				
2 kHz		A	3.2	4.7
4 kHz		A	3.2	4.7
Power loss				
2 kHz		W	62	79
4 kHz		W	66	84
Overcurrent cycle 180 s				
Max. output current		A	4.1	5.9
Overload time	T_1	s	60	60
Recovery time	T_2	s	120	120
Max. output current during the recovery time		A	2	2.9
Overcurrent cycle 15 s				
Max. output current		A	5.4	7.8
Overload time	T_1	s	3	3
Recovery time	T_2	s	12	12
Max. output current during the recovery time		A	2	2.9
Cyclic mains switching			3 times per minute	
Brake chopper				
Max. output current		A	5.4	
Min. Brake resistor		Ω	180	
Max. shielded motor cable length				
without EMC category		m	50	
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-	
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-	
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-	
Max. Unshielded motor cable length				
without EMC category		m	80	

Technical data

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



Inverter			i550-P15/400-3	i550-P18/400-3	i550-P22/400-3
Rated power	P_{rated}	kW	18.5	22	30
Rated power	P_{rated}	HP	25	30	40
Mains voltage range			3/PE AC 340 V ... 528 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 400/480 V		
Rated mains current					
without mains choke		A	36.8	46.3	55
with mains choke		A	-		
Apparent output power		kVA	26.1	32.8	39.0
Rated output current					
2 kHz		A	32.4	40.8	48.5
4 kHz		A	32.4	40.8	48.5
Power loss					
2 kHz		W	392	489	573
4 kHz		W	418	521	611
Overcurrent cycle 180 s					
Max. output current		A	40.5	51	60.6
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	20.3	25.5	30.3
Overcurrent cycle 15 s					
Max. output current		A	54	68	80.8
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	20.3	25.5	30.3
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	40.3	48.3	
Min. Brake resistor		Ω	18	15	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz)		m	15		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	35		
Max. Unshielded motor cable length					
without EMC category		m	200		



Fusing data



A residual current device (RCD) is optional.

Fusing data for UL/NEC compliant installations: [► Fusing data](#) 52

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current A	Characteristic	Max. rated current A	mA	Type
i550-P0.37/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P0.55/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P0.75/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P1.1/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P1.5/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P2.2/400-3	gG/gL, gRL	32	B	32	≥30	Typ B
i550-P3.0/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P4.0/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P5.5/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P7.5/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P11/400-3	gG/gL, gRL	50	B	50	≥30	Typ B
i550-P15/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P18/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P22/400-3	gG/gL, gRL	80	B	80	≥300	Typ B
i550-P0.75/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P1.5/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P2.2/600-3	gG/gL, gRL	20	-	-	≥30	Typ B

Terminal data

[► Terminal data](#) 128

Brake resistors

[► Assignment to inverters with protection class IP31](#) 129

Technical data

3-phase mains connection 600 V



3-phase mains connection 600 V



EMC filters are **not integrated** in inverters for this mains connection.



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 or 12 kHz: Ambient temperature max. 40 °C (104 °F).

Inverter			i550-P0.75/600-3	i550-P1.5/600-3	i550-P2.2/600-3
Rated power	P_{rated}	kW	0.75	1.5	2.2
Rated power	P_{rated}	HP	1	2	3
Mains voltage range			3/PE AC 425 V ... 660 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 480/600 V		
Rated mains current					
without mains choke		A	2.0	3.2	4.4
with mains choke		A	-		
Apparent output power		kVA	1.7	2.7	3.9
Rated output current					
2 kHz		A	1.7	2.7	3.9
4 kHz		A	1.7	2.7	3.9
8 kHz		A	1.7	2.7	3.9
12 kHz		A	1.3	2.1	3.0
Power loss					
2 kHz		W	30	45	62
4 kHz		W	32	48	66
8 kHz		W	40	61	85
12 kHz		W	38	65	91
Overcurrent cycle 180 s					
Max. output current		A	2.6	4.1	5.9
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	1.3	2	2.9
Overcurrent cycle 15 s					
Max. output current		A	3.4	5.4	7.8
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	1.3	2	2.9
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	2.1	5.4	
Min. Brake resistor		Ω	470	180	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-		
Max. Unshielded motor cable length					
without EMC category		m	60	80	

Technical data

3-phase mains connection 600 V

Fusing data



Fusing data

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current	Characteristic	Max. rated current		Type
		A			mA	
i550-P0.75/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P1.5/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P2.2/600-3	gG/gL, gRL	20	-	-	≥30	Typ B

Terminal data

Rated power	P _{rated}	kW	0.75 ... 2.2
Connection description			Mains connection
Connection			X100
Connection type			Non-pluggable
Max. cable cross-section		mm ²	4
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tool			Screwdriver 1.2 x 8.0

Rated power	P _{rated}	kW	0.75 ... 2.2
Connection description			PE connection
Connection			PE
Max. cable cross-section		mm ²	6
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	2
Tightening torque		lb-in	18
Required tool			Torx key 20

Rated power	P _{rated}	kW	0.75 ... 2.2
Connection description			Motor connection
Connection			X105
Connection type			Non-pluggable
Max. cable cross-section		mm ²	4
Max. cable cross-section		AWG	10
Stripping length		mm	10
Stripping length		in	0.4
Tightening torque		Nm	0.5
Tightening torque		lb-in	4.4
Required tool			Screwdriver 1.2 x 8.0



Technical data

3-phase mains connection 600 V "Light Duty"

3-phase mains connection 600 V "Light Duty"



EMC filters are **not integrated** in inverters for this mains connection.

Technical data

3-phase mains connection 600 V "Light Duty"

Rated data



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).

Inverter			i550-P0.75/600-3	i550-P1.5/600-3	i550-P2.2/600-3
Rated power	P_{rated}	kW	1.1	2.2	3
Rated power	P_{rated}	HP	1.5	3	4
Mains voltage range			3/PE AC 425 V ... 660 V, 45 Hz ... 65 Hz		
Output voltage			3 AC 0 - 480/600 V		
Rated mains current					
without mains choke		A	2.7	4.2	6.1
with mains choke		A	-		
Apparent output power		kVA	2.7	3.9	6.1
Rated output current					
2 kHz		A	2	3.2	4.7
4 kHz		A	2	3.2	4.7
Power loss					
2 kHz		W	38	62	79
4 kHz		W	40	66	84
Overcurrent cycle 180 s					
Max. output current		A	2.6	4.1	5.9
Overload time	T_1	s	60	60	60
Recovery time	T_2	s	120	120	120
Max. output current during the recovery time		A	1.3	2	2.9
Overcurrent cycle 15 s					
Max. output current		A	3.4	5.4	7.8
Overload time	T_1	s	3	3	3
Recovery time	T_2	s	12	12	12
Max. output current during the recovery time		A	1.3	2	2.9
Cyclic mains switching			3 times per minute		
Brake chopper					
Max. output current		A	2.1	5.4	
Min. Brake resistor		Ω	470	180	
Max. shielded motor cable length					
without EMC category		m	50		
Category C1 (2 kHz, 4 kHz, 8kHz)		m	-		
Category C2 (2 kHz, 4 kHz, 8 kHz)		m	-		
Category C3 (2 kHz, 4 kHz, 8 kHz)		m	-		
Max. Unshielded motor cable length					
without EMC category		m	60	80	



Technical data

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

Fusing data

Inverter	Fuse		Circuit breaker		RCD	
	Characteristic	Max. rated current	Characteristic	Max. rated current	mA	Type
		A				
i550-P0.75/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P1.5/600-3	gG/gL, gRL	20	-	-	≥30	Typ B
i550-P2.2/600-3	gG/gL, gRL	20	-	-	≥30	Typ B

Terminal data

▶ [Terminal data](#) 138

Technical data

Dimensions



Dimensions



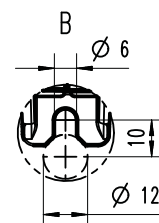
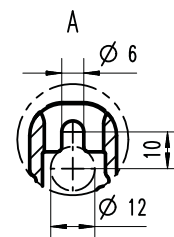
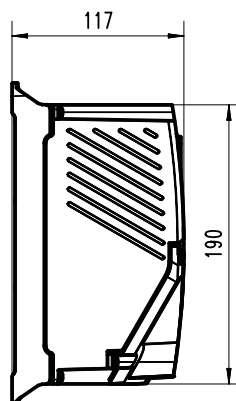
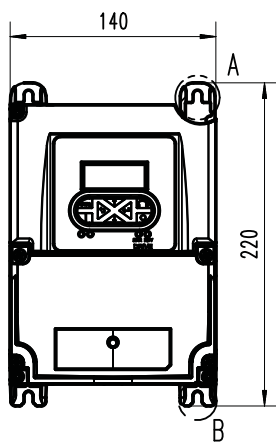
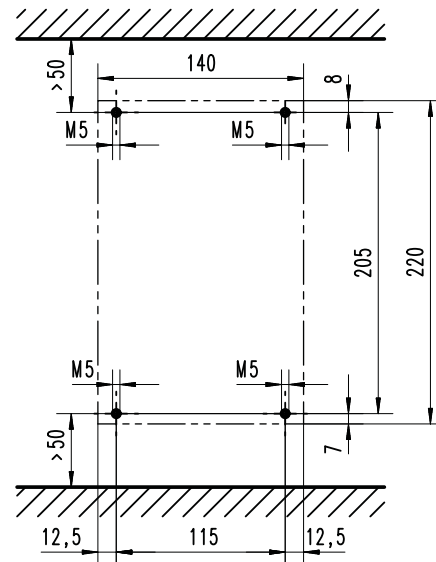
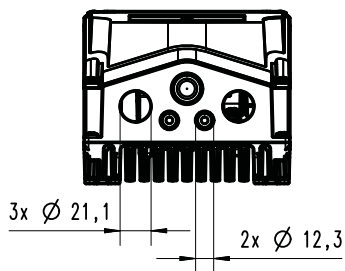
The specified installation clearances are minimum dimensions to ensure a sufficient air circulation for cooling purposes. They do not consider the bend radiuses of the connecting cables.

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



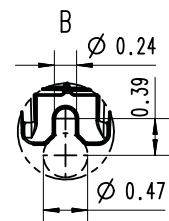
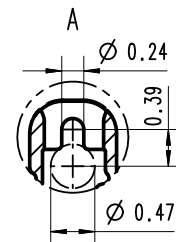
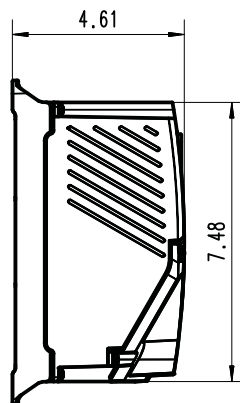
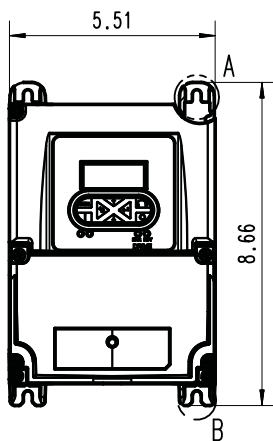
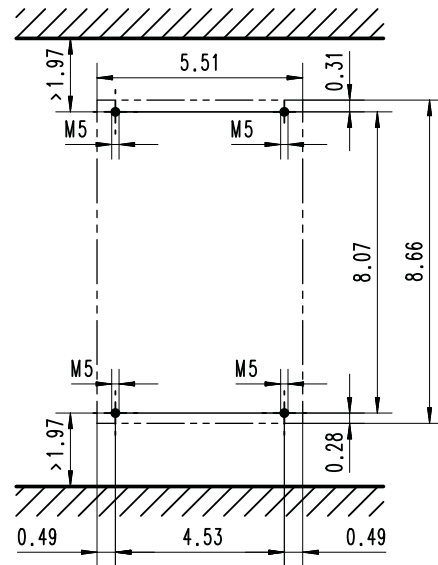
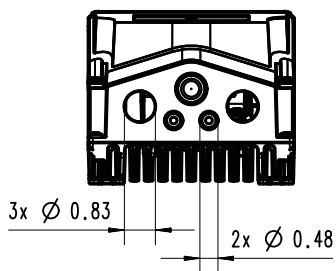
8800640



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

Technical data

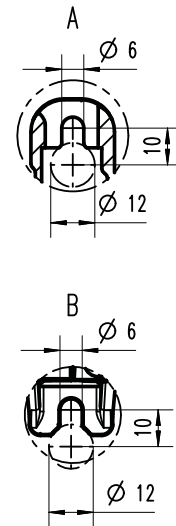
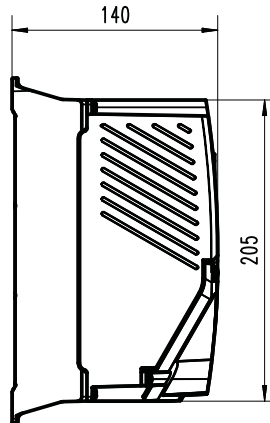
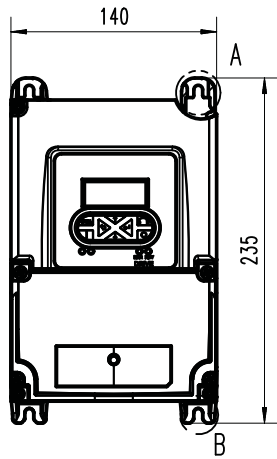
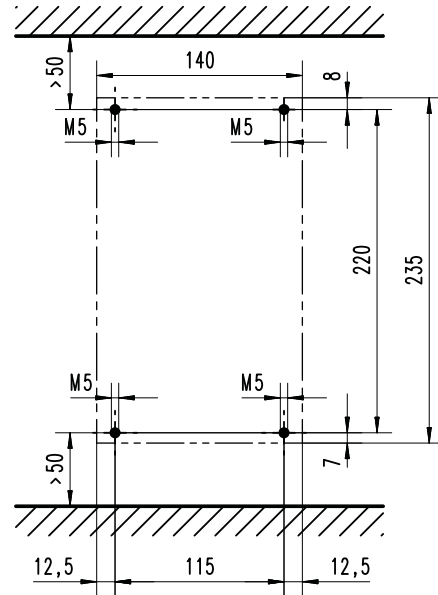
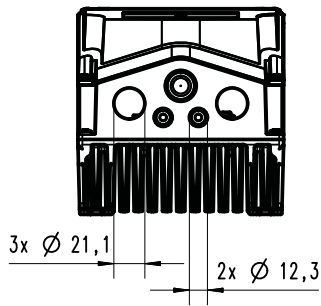
Dimensions



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



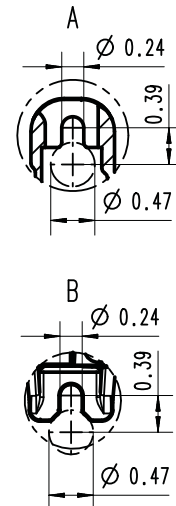
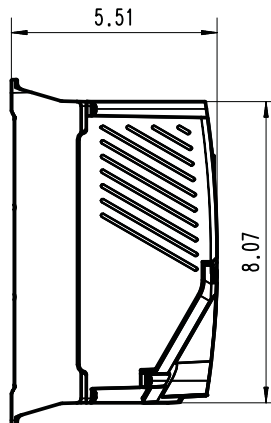
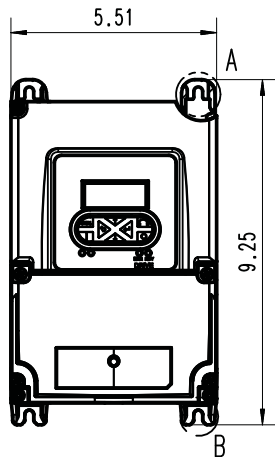
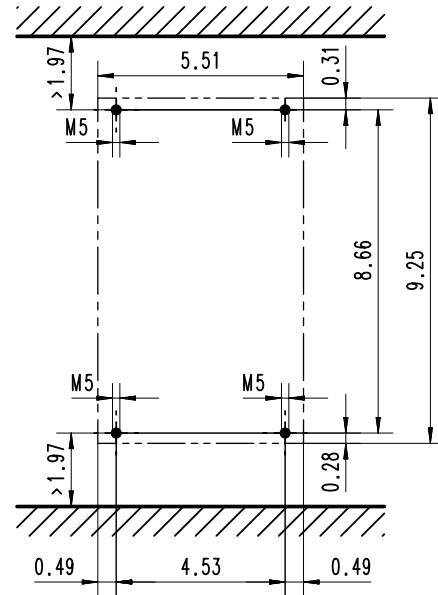
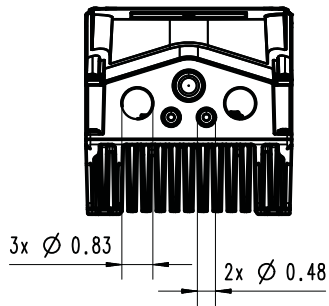
8800642



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

Technical data

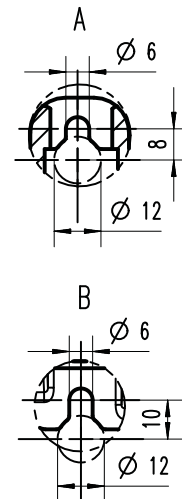
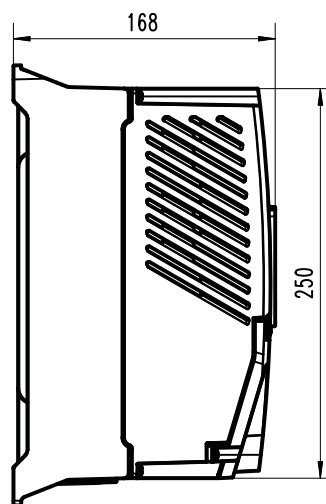
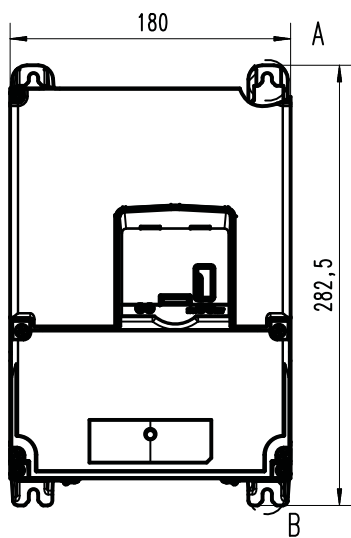
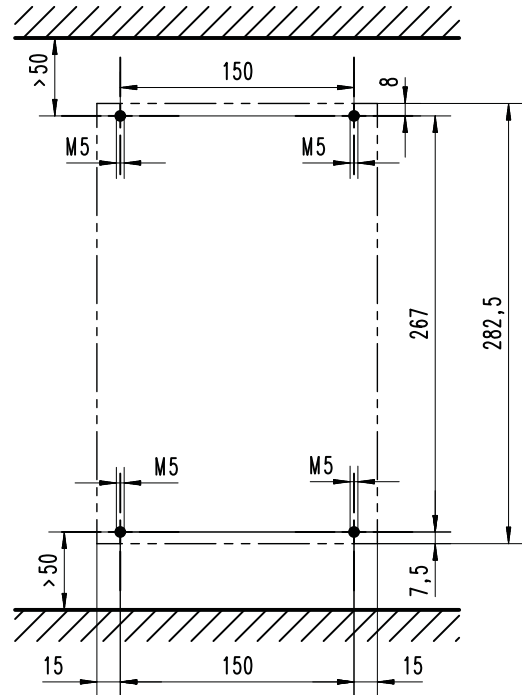
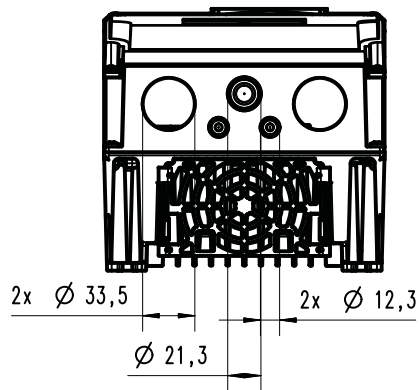
Dimensions



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
5.5 kW	i550-P5.5/230-3	i550-P5.5/400-3
Weight	IP31: 4.7 kg	IP31: 4.8 kg
	IP66: 4.8 kg	IP66: 4.9 kg



8800779



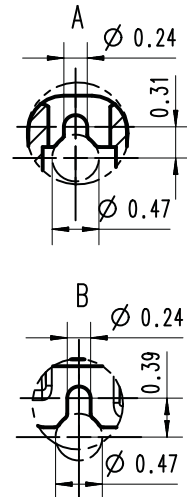
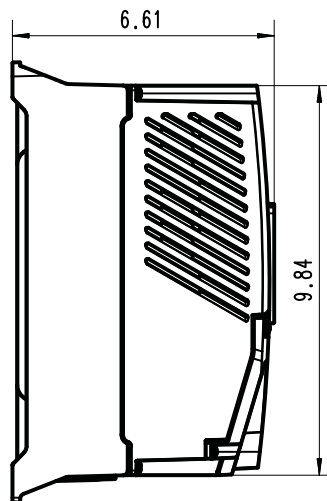
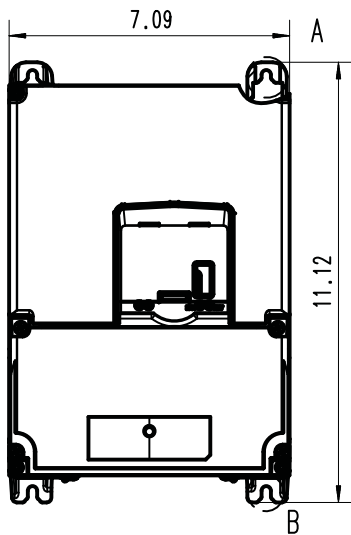
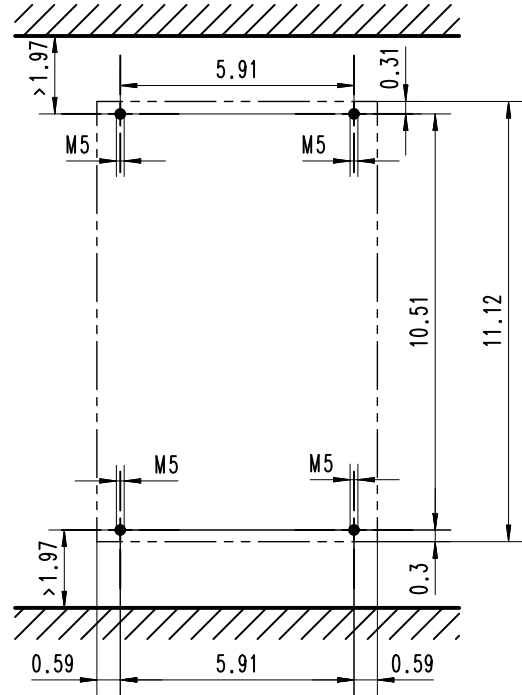
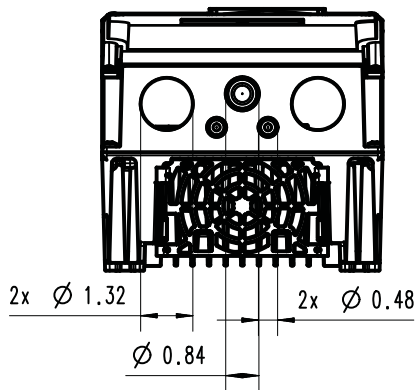
Technical data

Dimensions

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
7.5 HP	i550-P5.5/230-3	i550-P5.5/400-3
Weight	NEMA 1: 10.4 lb	NEMA 1: 10.6 lb
	NEMA 4X: 10.6 lb	NEMA 4X: 10.8 lb



8800780

Technical data

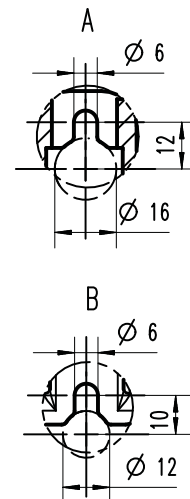
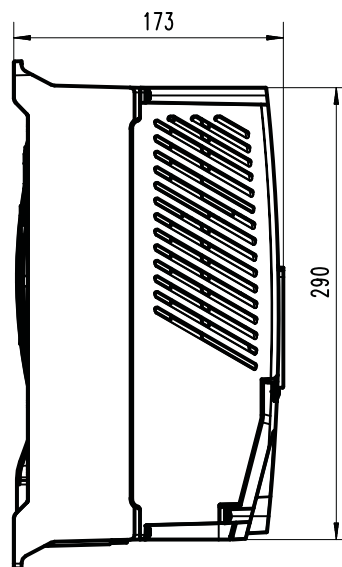
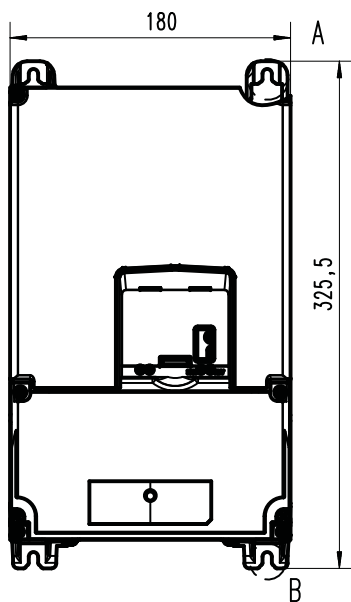
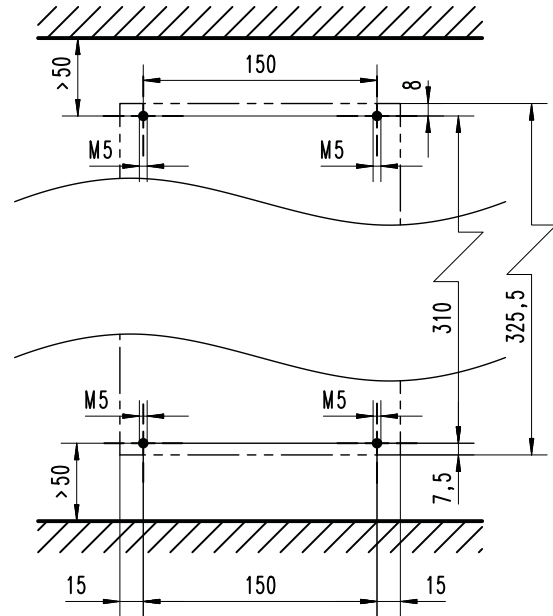
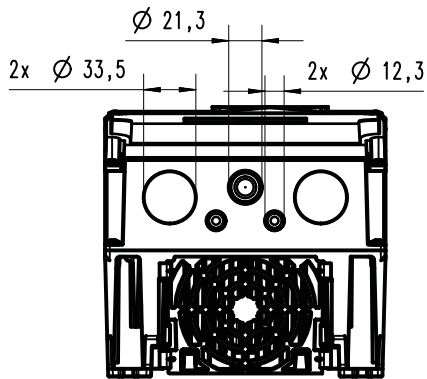
Dimensions



7.5 kW ... 11 kW

The dimensions in mm apply to:

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



8800788



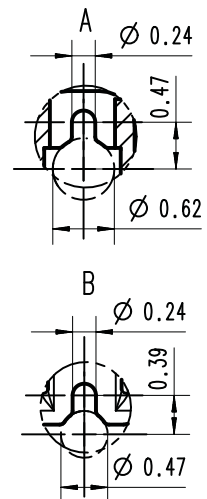
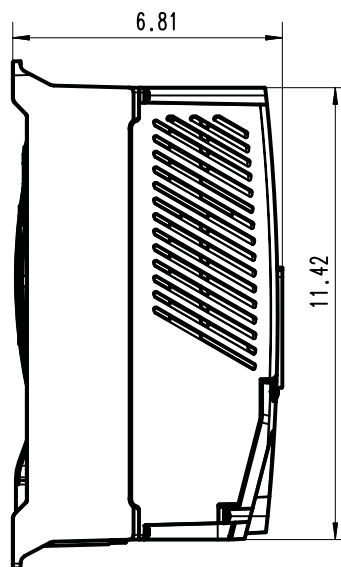
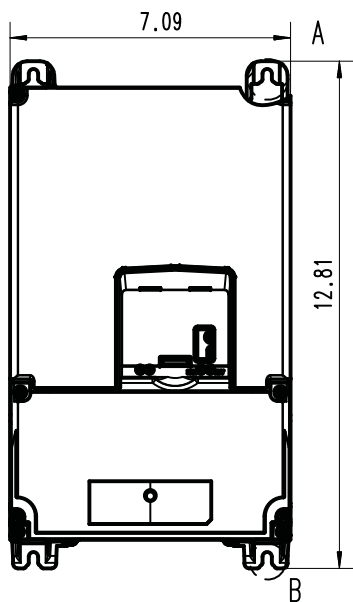
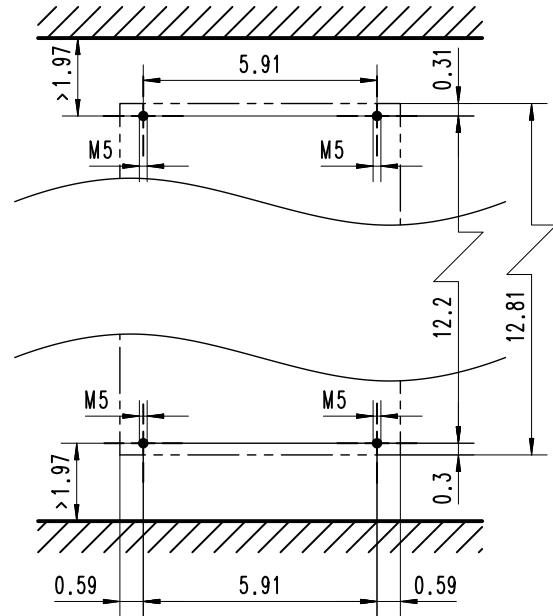
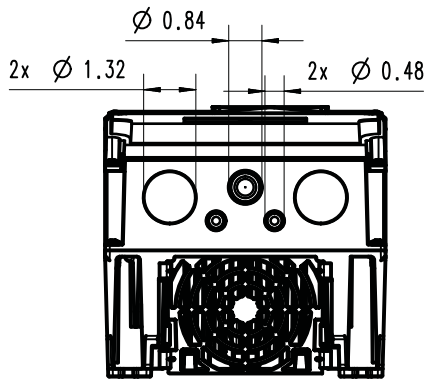
Technical data

Dimensions

10 HP ... 15 HP

The dimensions in inch apply to:

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



8800789

Technical data

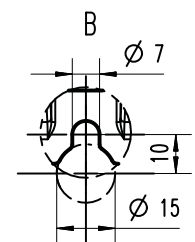
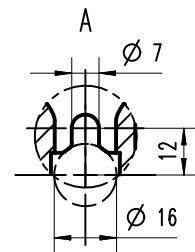
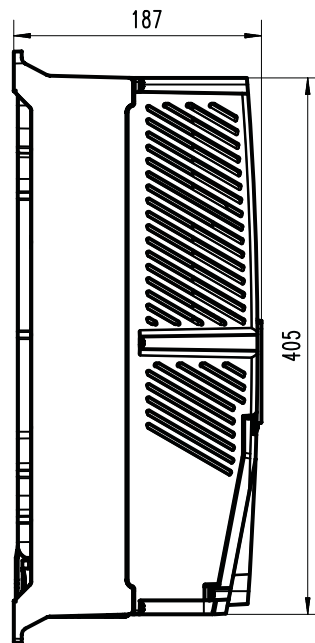
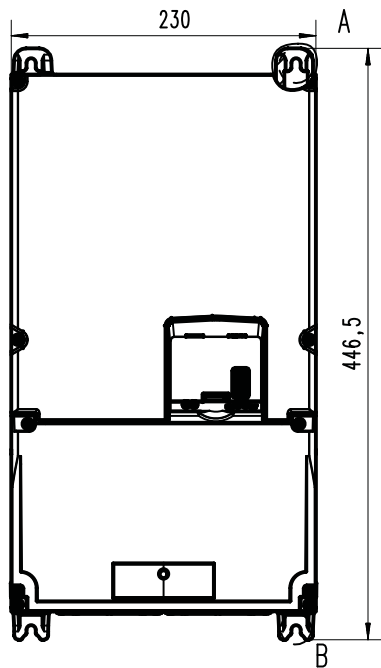
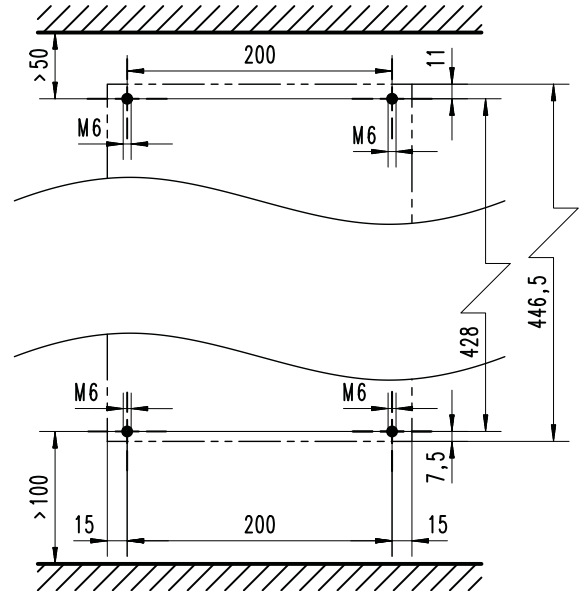
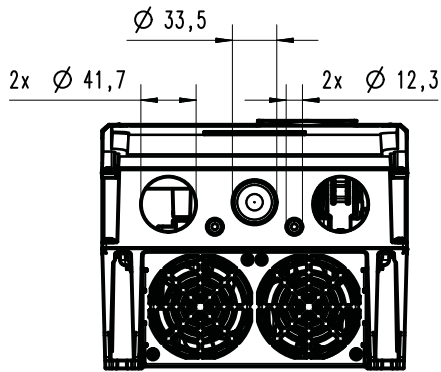
Dimensions



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	IP31: 9.3 kg	IP31: 10.1 kg
	IP66: 9.4 kg	IP66: 10.2 kg



8801290



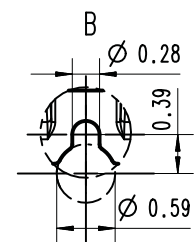
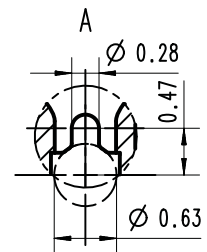
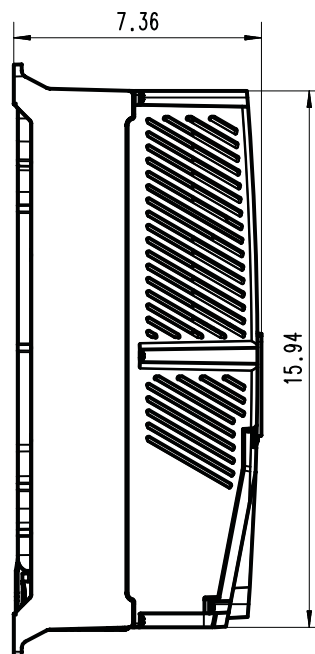
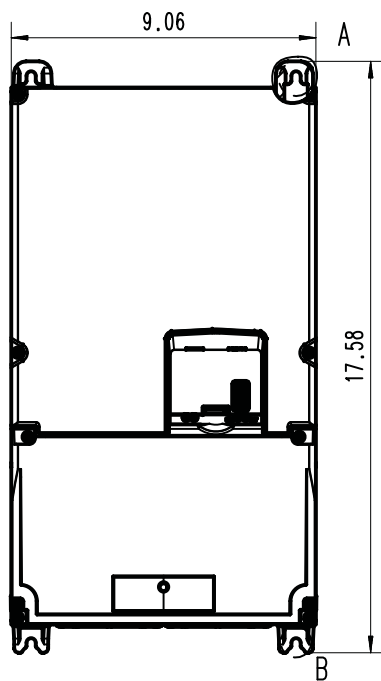
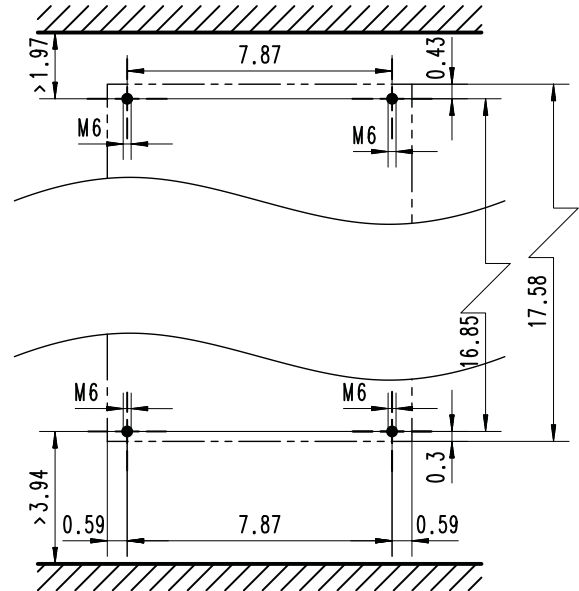
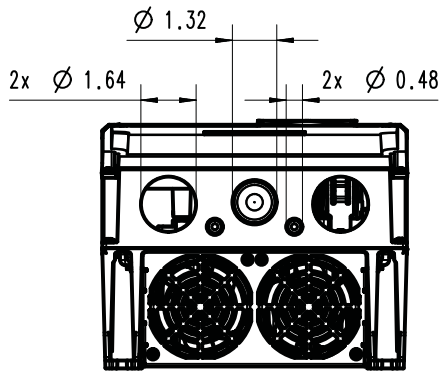
Technical data

Dimensions

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 1: 20.5 lb NEMA 4X: 20.7 lb	NEMA 1: 22.3 lb NEMA 4X: 22.5 lb



8801291

Technical data

Dimensions



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 repair switch.

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

0.37 kW ... 0.75 kW

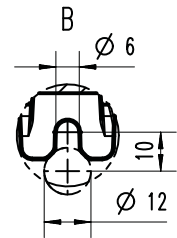
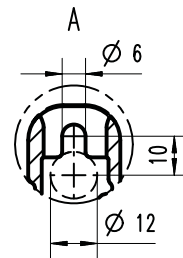
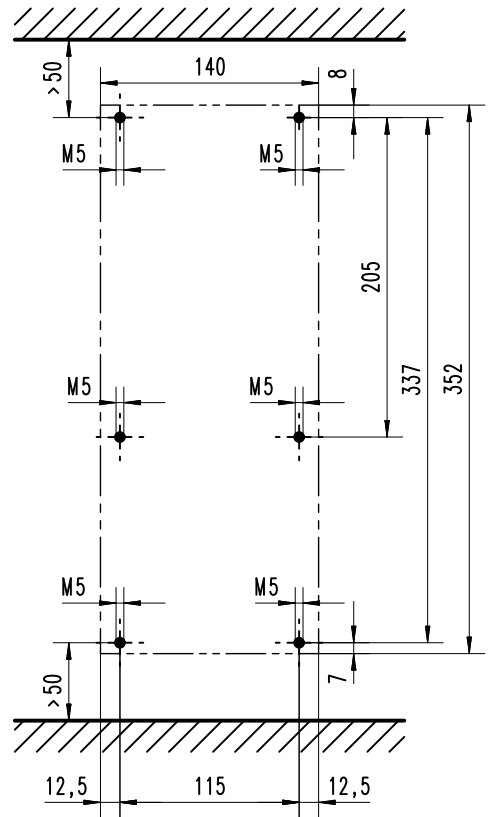
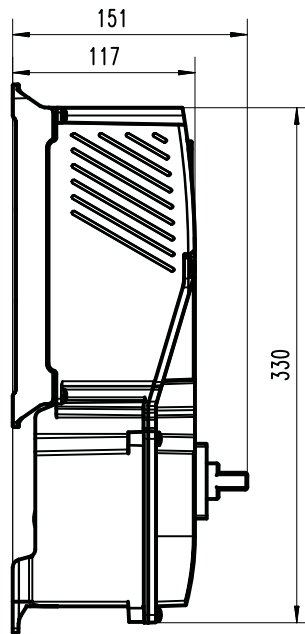
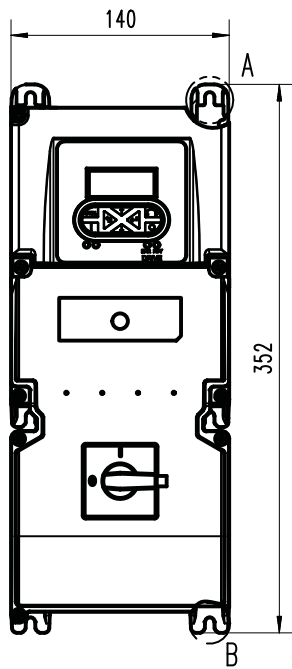
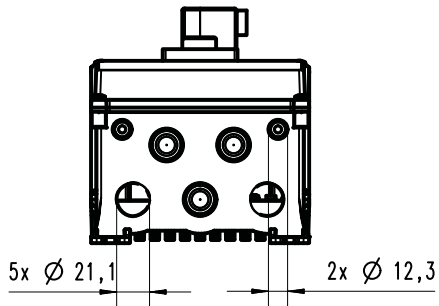
The dimensions in mm apply to:

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: 2.3 kg IP66: 2.5 kg	IP66: 2.3 kg IP66: 2.5 kg	IP66: 2.2 kg IP66: 2.4 kg	IP66: 2.3 kg IP66: 2.5 kg	IP66: 2.3 kg IP66: 2.5 kg



Technical data

Dimensions



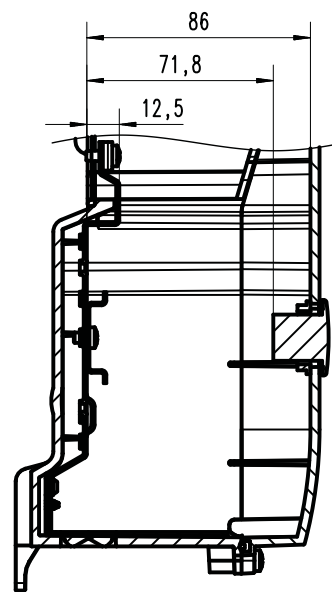
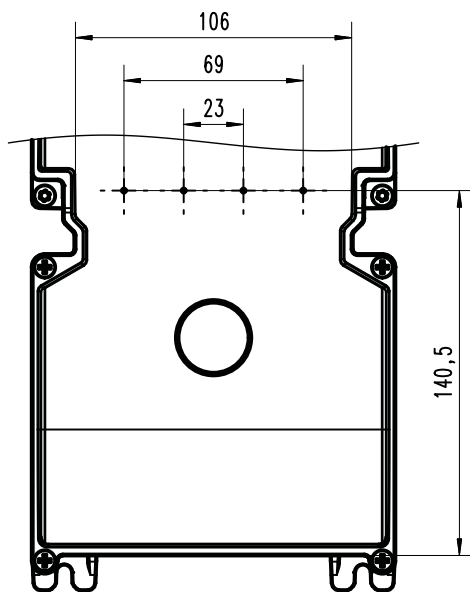
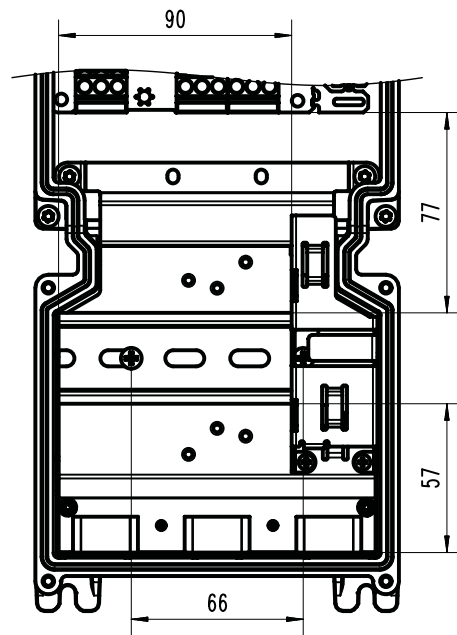
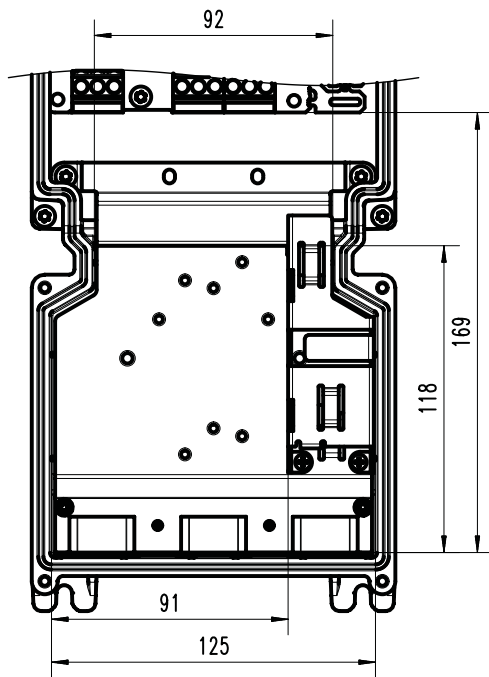
8800956

Technical data

Dimensions



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



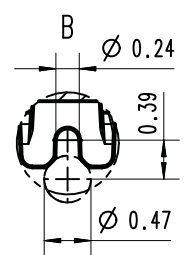
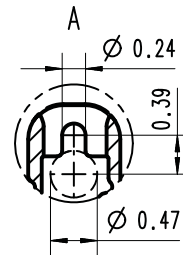
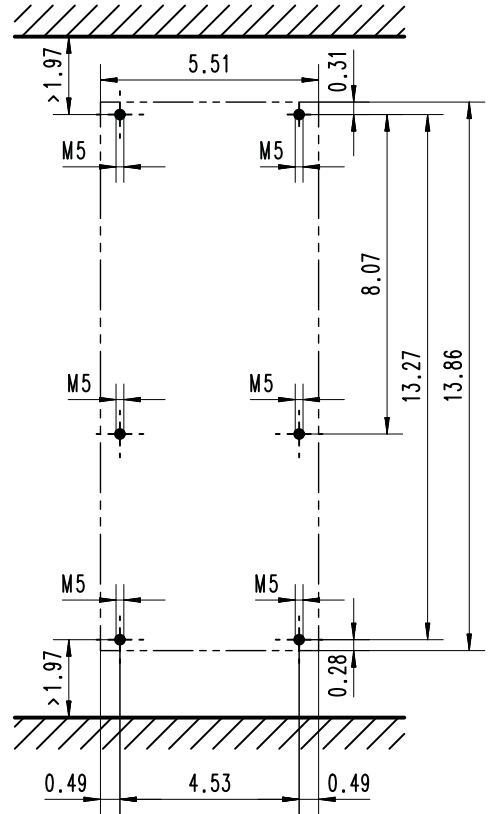
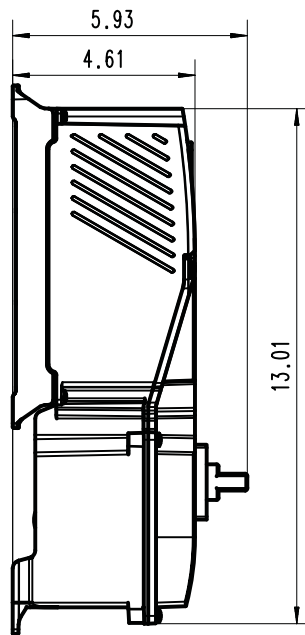
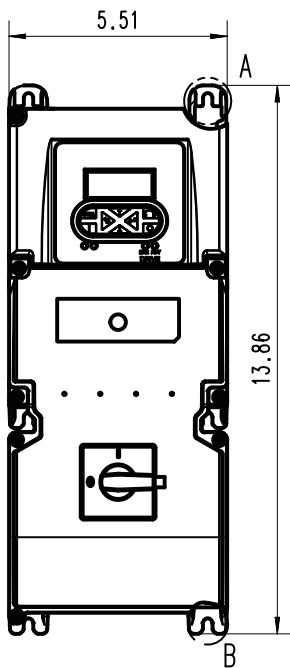
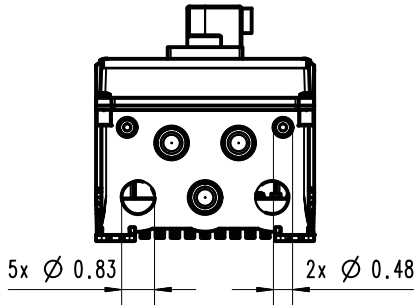
8801281



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: 5.1 lb	NEMA 4X: 5.1 lb	NEMA 4X: 4.8 lb	NEMA 4X: 5.1 lb	NEMA 4X: 5.1 lb
	NEMA 4X: 5.5 lb	NEMA 4X: 5.5 lb	NEMA 4X: 5.3 lb	NEMA 4X: 5.5 lb	NEMA 4X: 5.5 lb



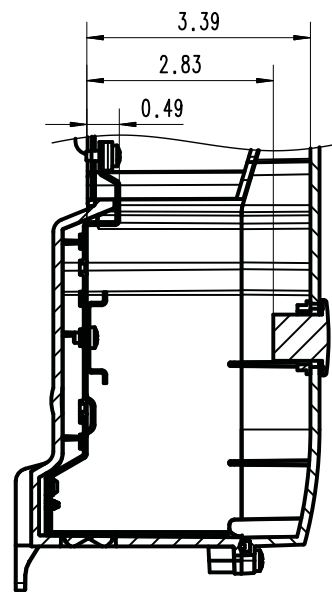
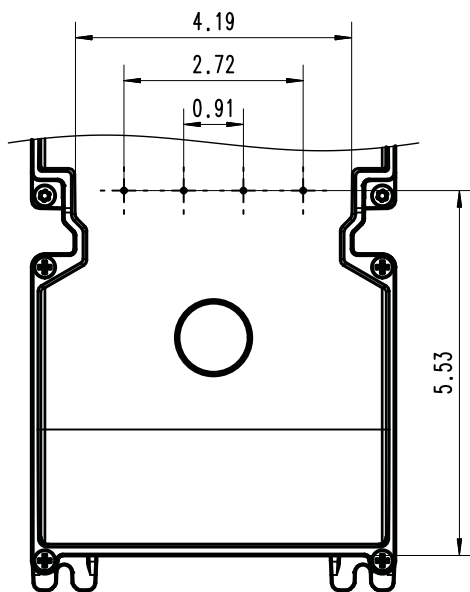
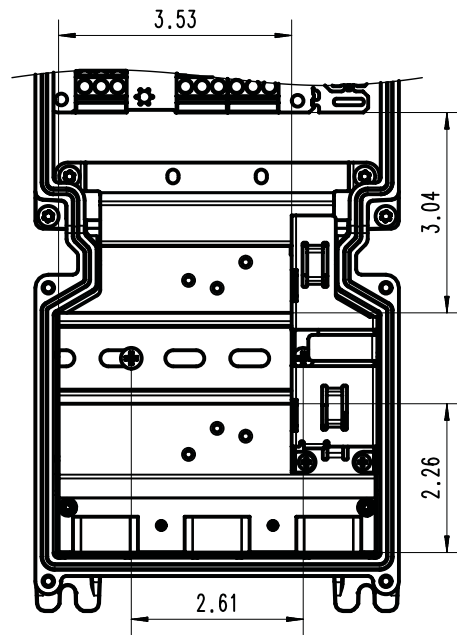
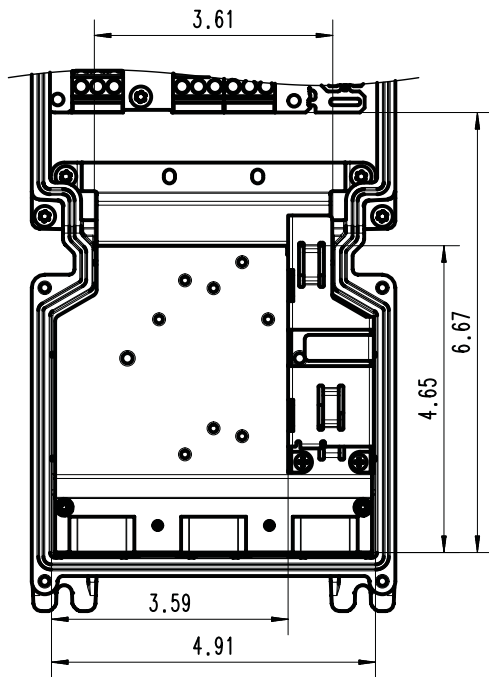
8800957

Technical data

Dimensions



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



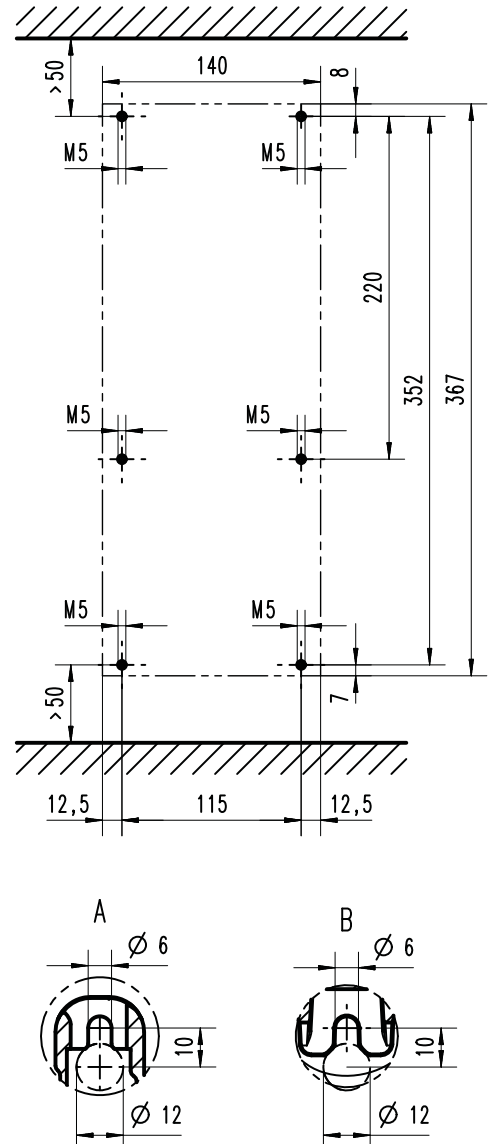
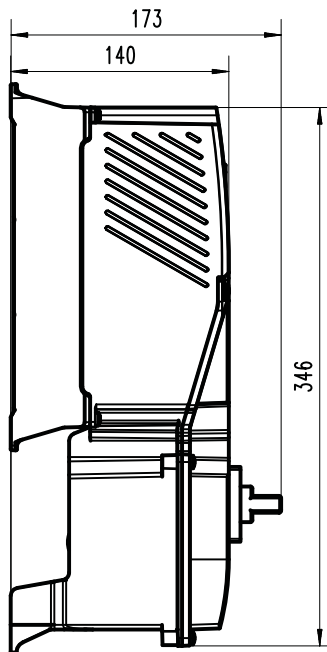
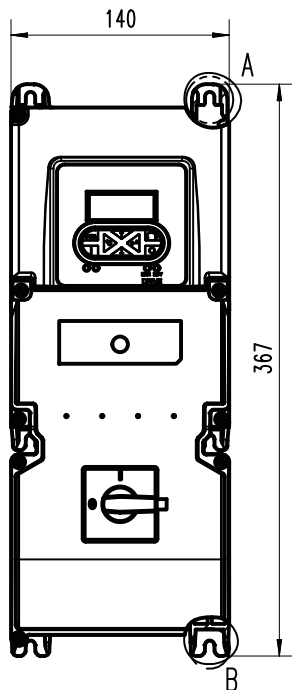
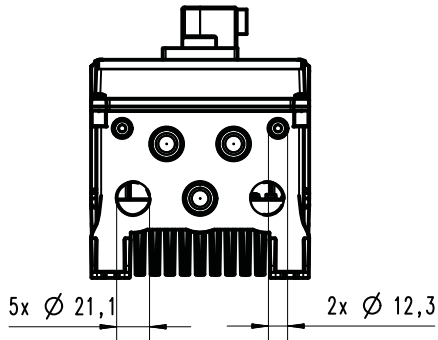
8801282



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: 3.3 kg	IP66: 3.3 kg
	IP66: 3.5 kg	IP66: 3.5 kg	IP66: 3.4 kg	IP66: 3.5 kg	IP66: 3.5 kg



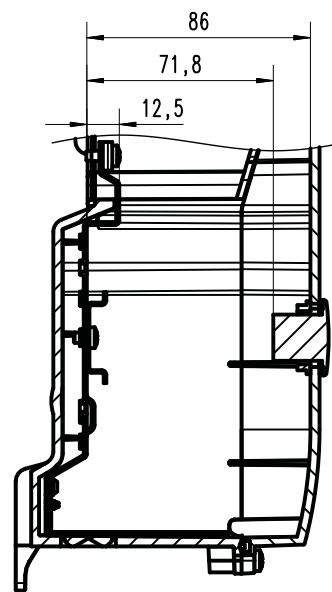
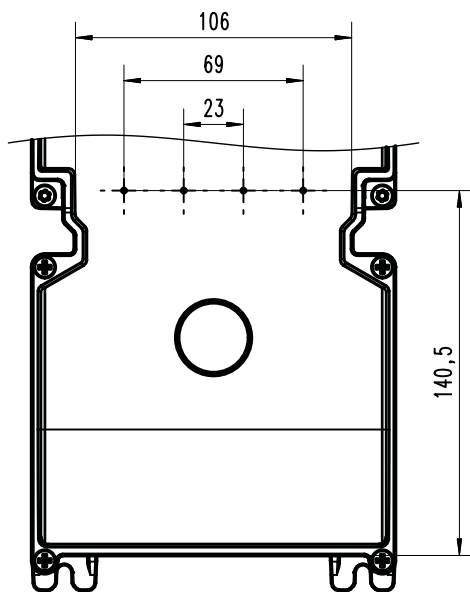
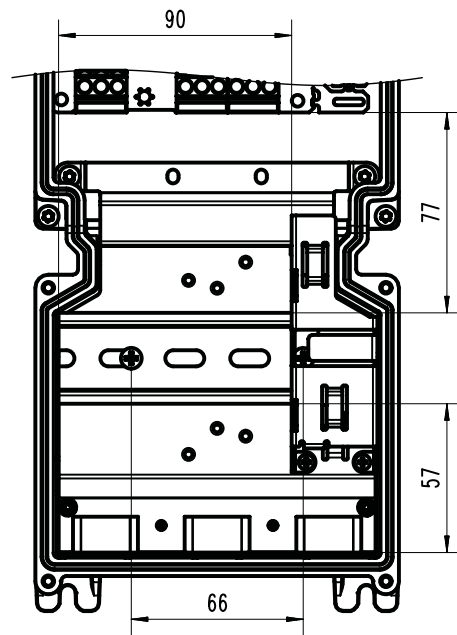
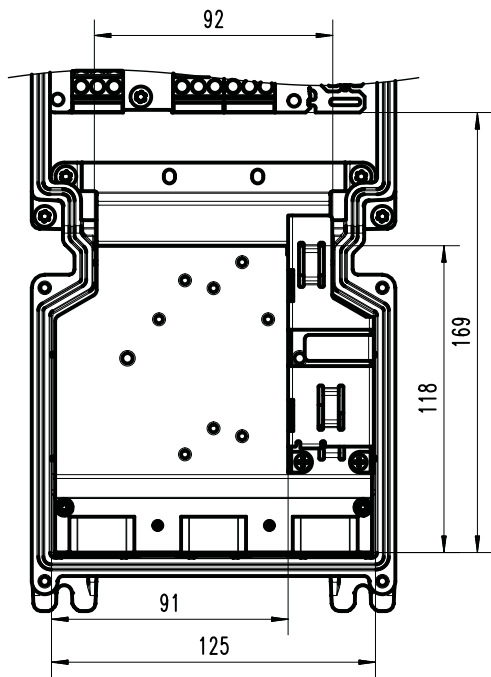
8800958

Technical data

Dimensions



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



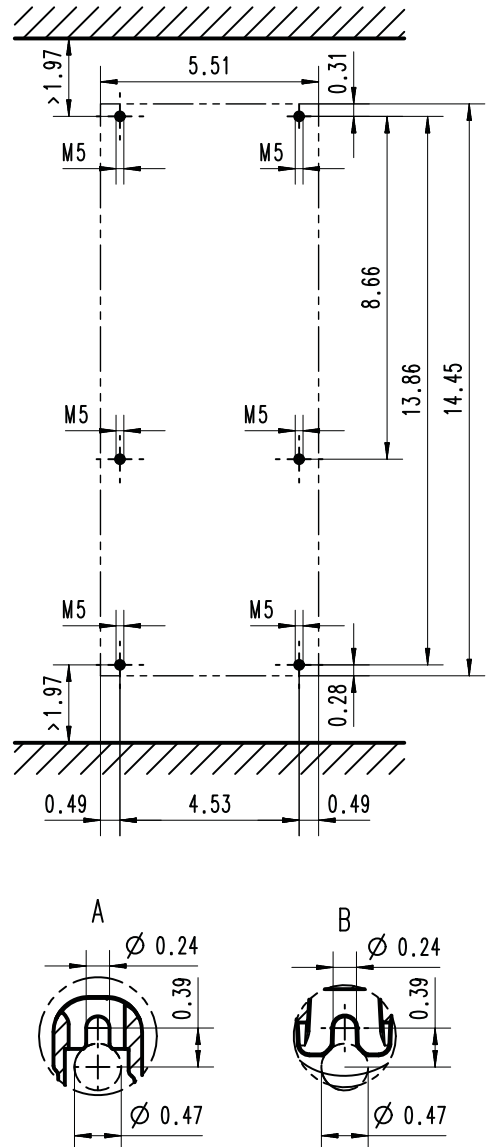
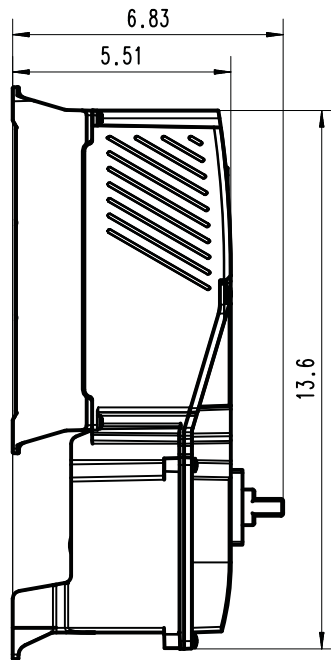
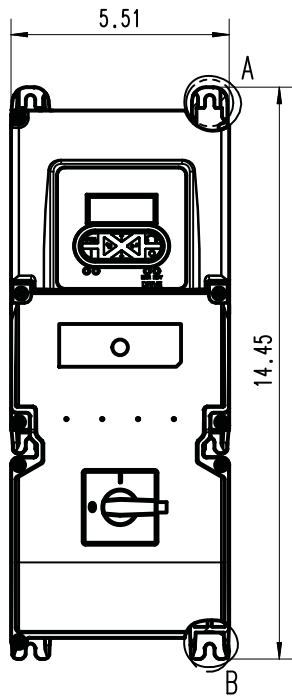
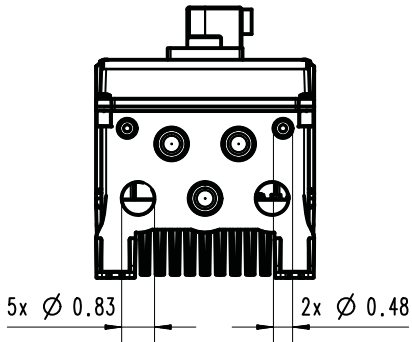
8801281



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: 7.3 lb	NEMA 4X: 7.3 lb
	NEMA 4X: 7.7 lb	NEMA 4X: 7.7 lb	NEMA 4X: 7.5 lb	NEMA 4X: 7.7 lb	NEMA 4X: 7.7 lb



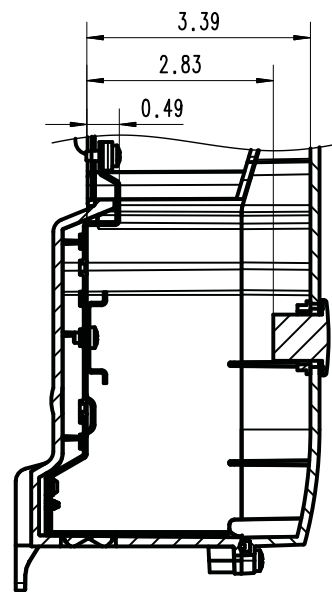
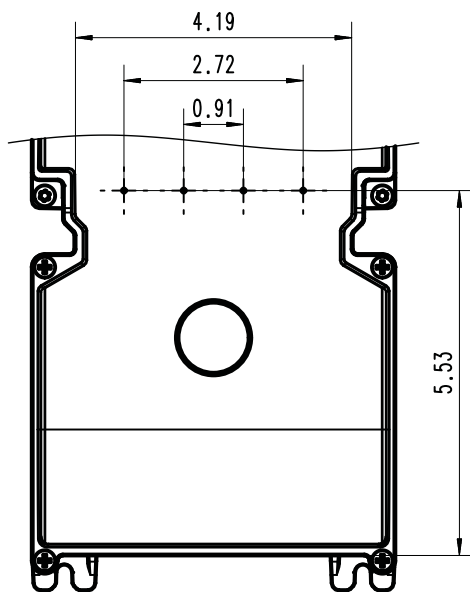
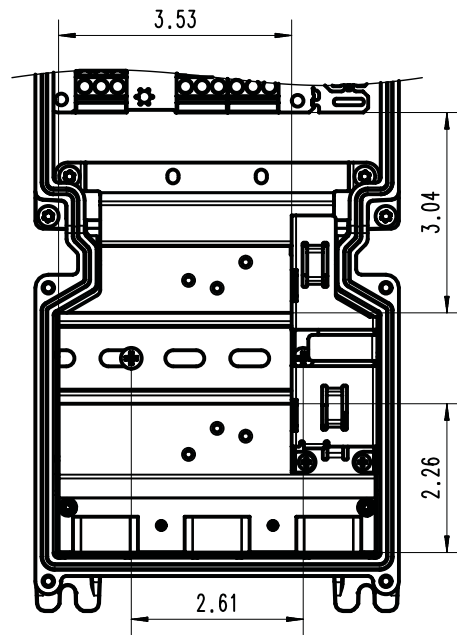
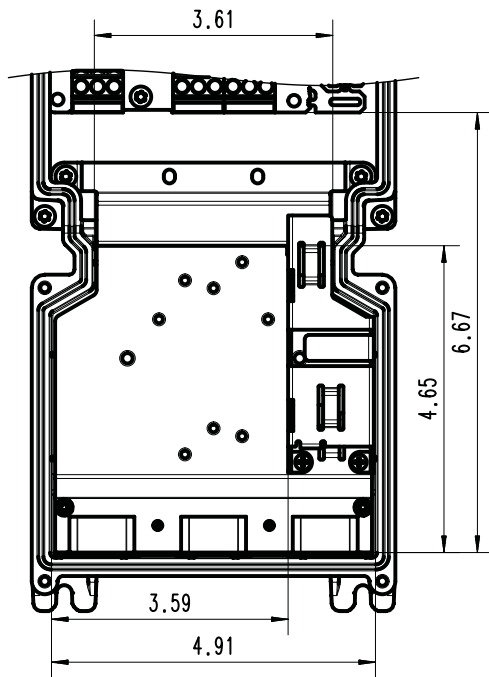
8800959

Technical data

Dimensions



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



8801282



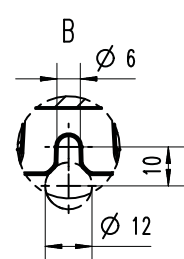
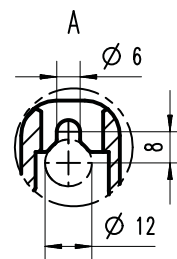
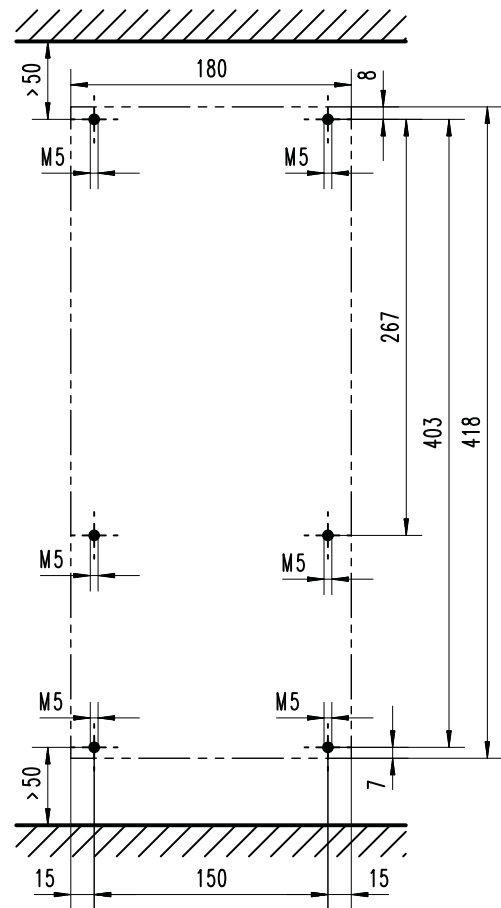
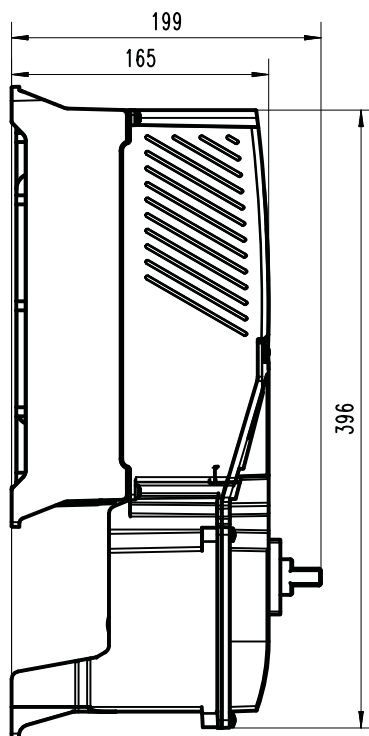
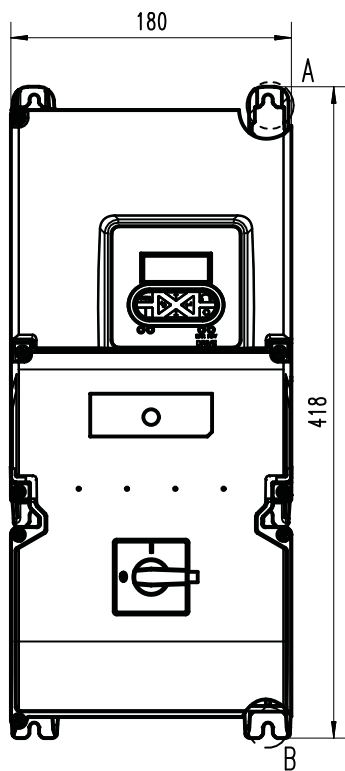
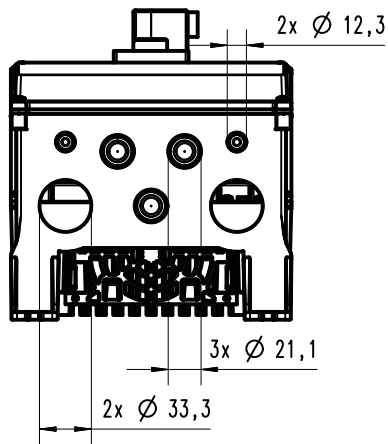
Technical data

Dimensions

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
5.5 kW	i550-P5.5/230-3	i550-P5.5/400-3
Weight	IP66: 5.7 kg	IP66: 5.8 kg
	IP66: 5.9 kg	IP66: 6 kg



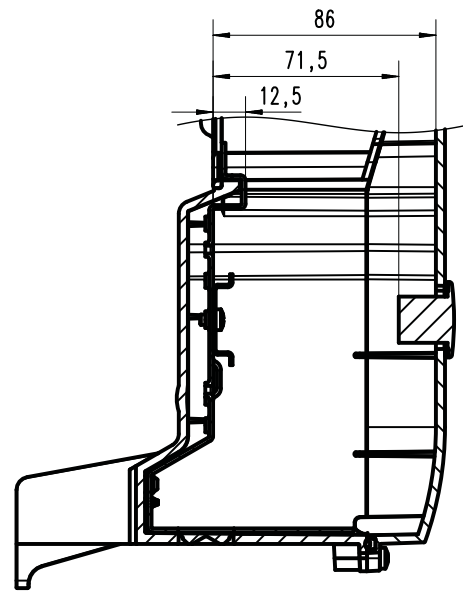
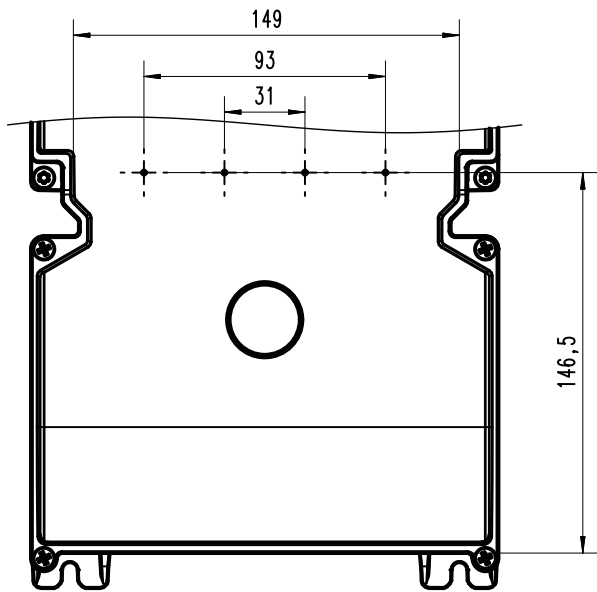
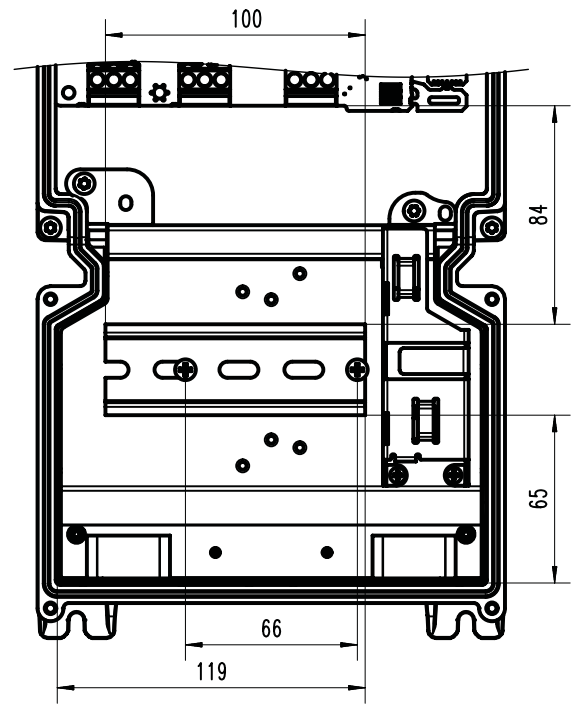
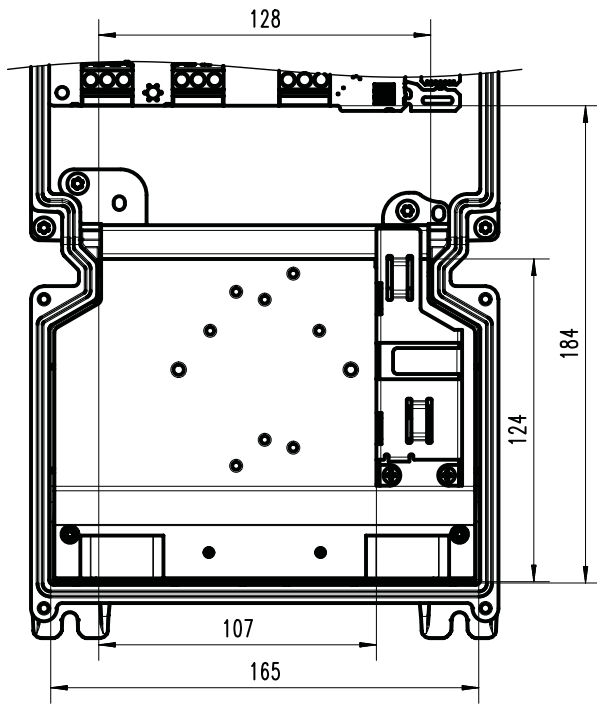
8800960

Technical data

Dimensions



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



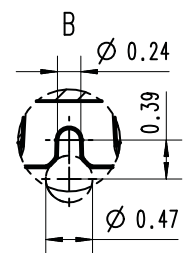
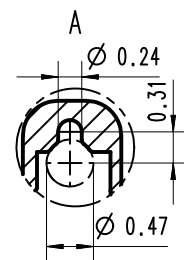
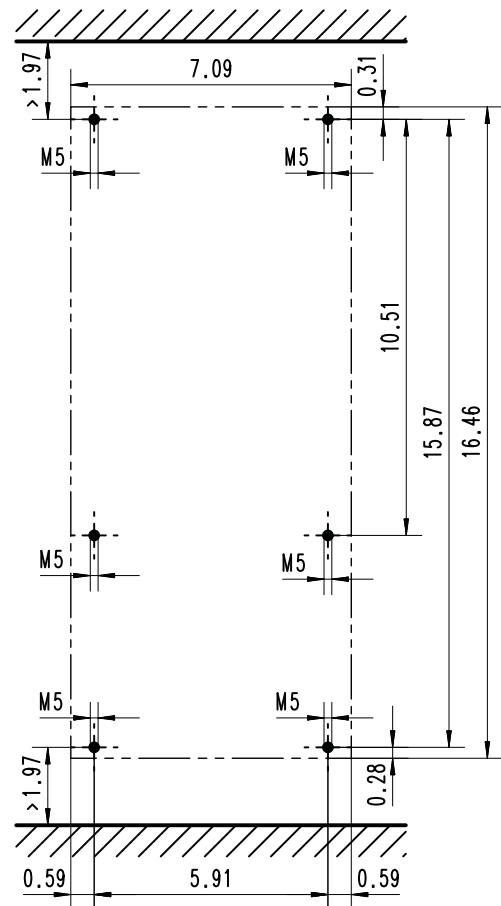
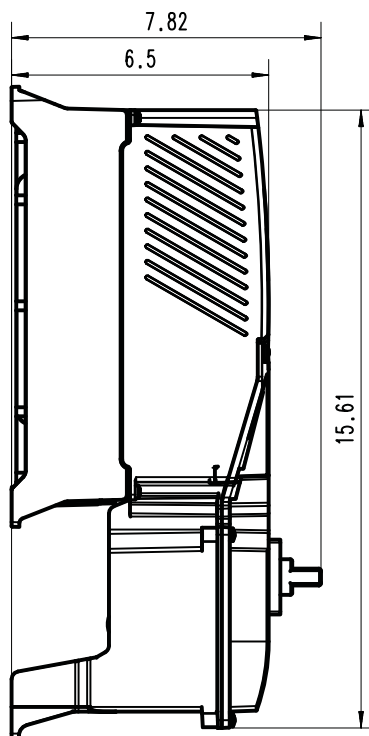
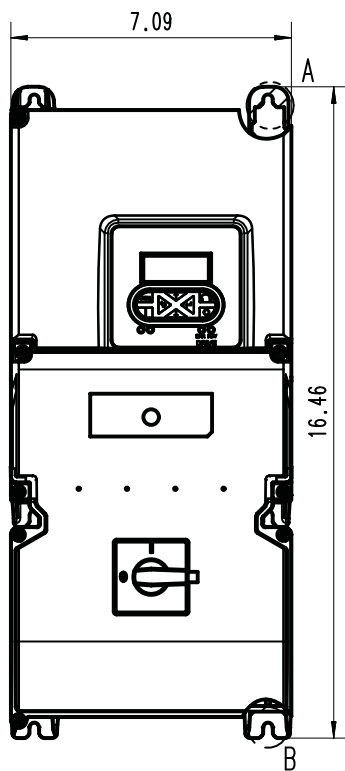
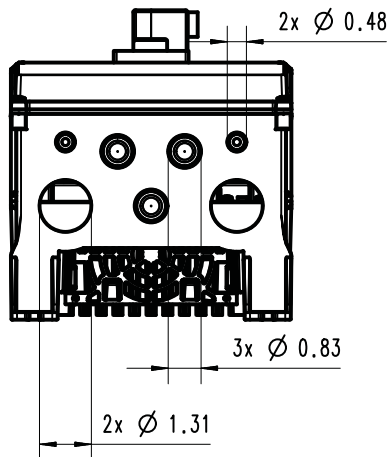
8801285



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
7.5 HP	i550-P5.5/230-3	i550-P5.5/400-3
Weight	NEMA 4X: 12.5 lb	NEMA 4X: 12.8 lb
	NEMA 4X: 13 lb	NEMA 4X: 13.2 lb



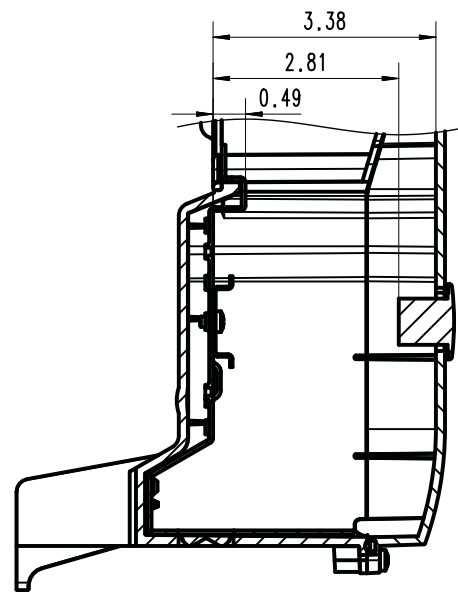
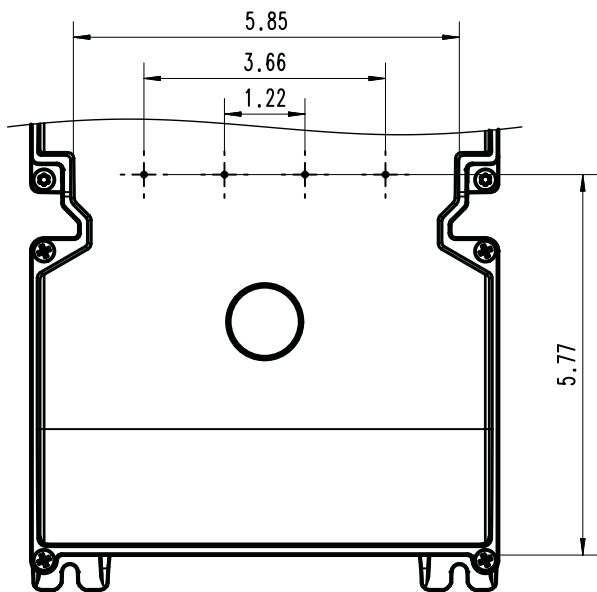
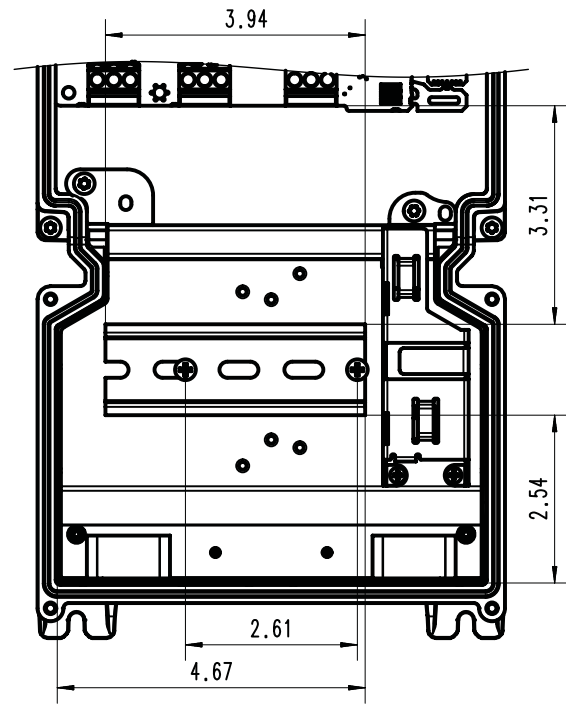
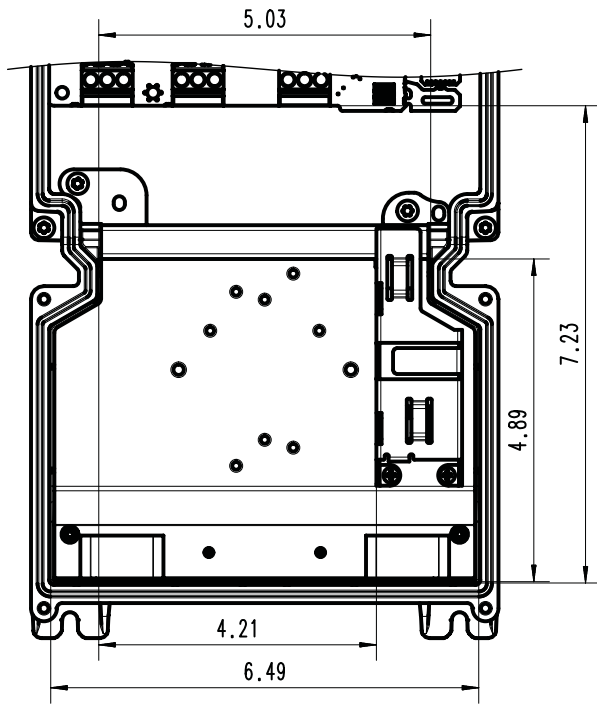
8800961

Technical data

Dimensions



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



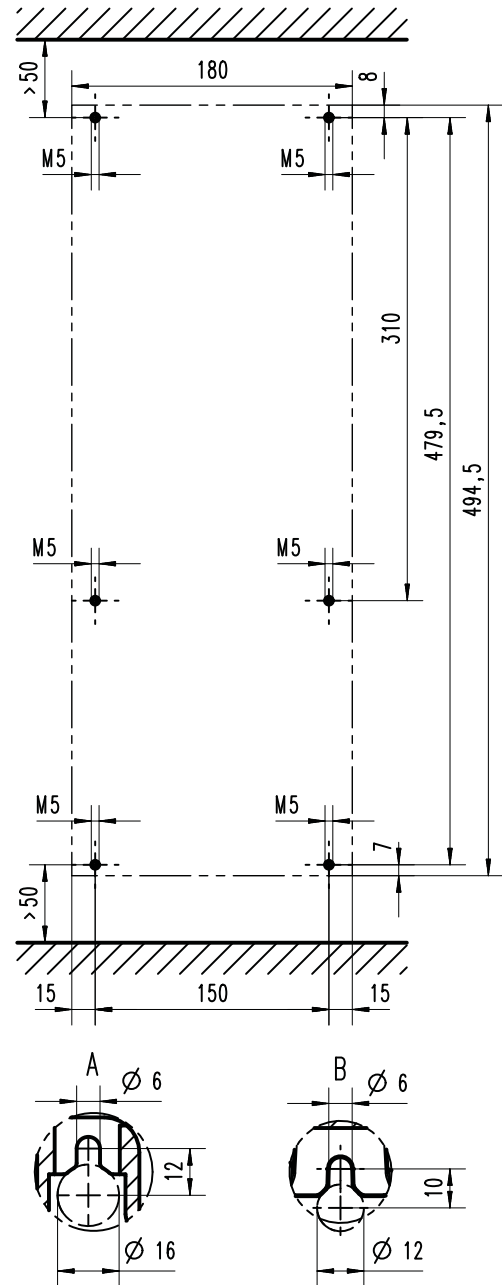
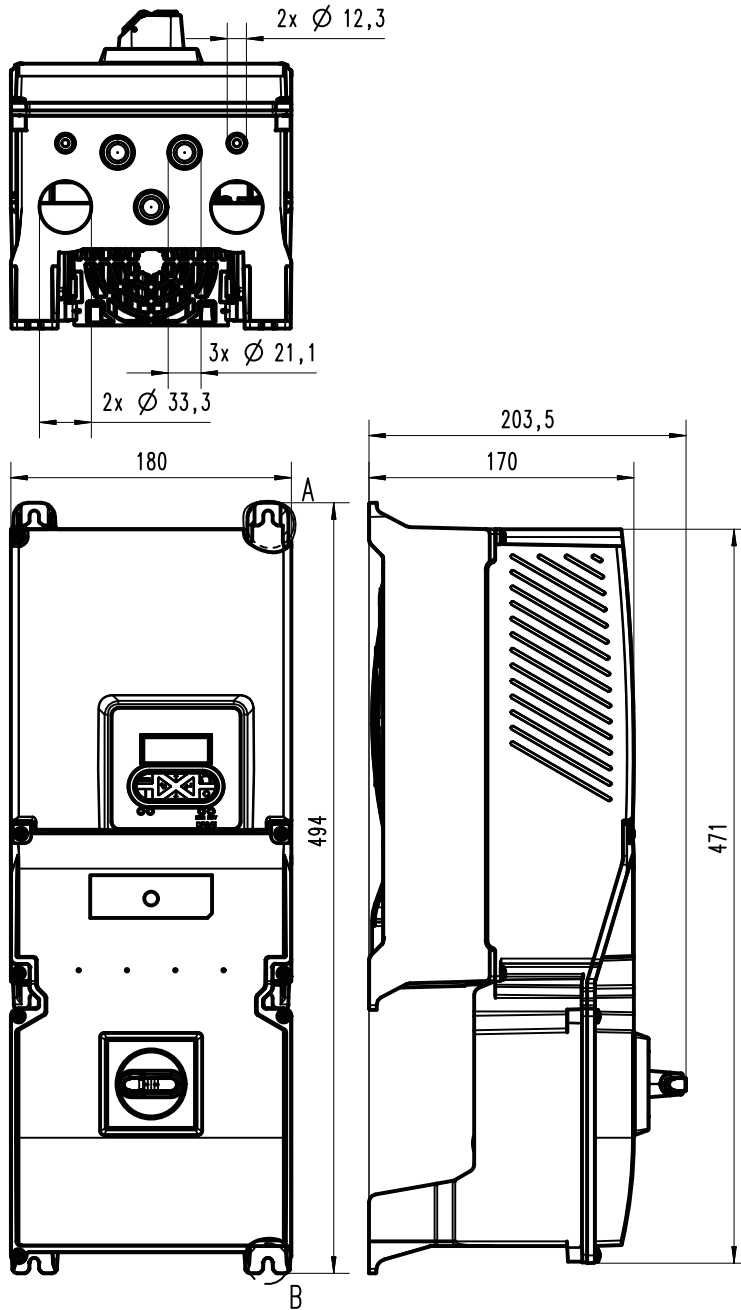
8801286



7.5 kW ... 11 kW

The dimensions in mm apply to:

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



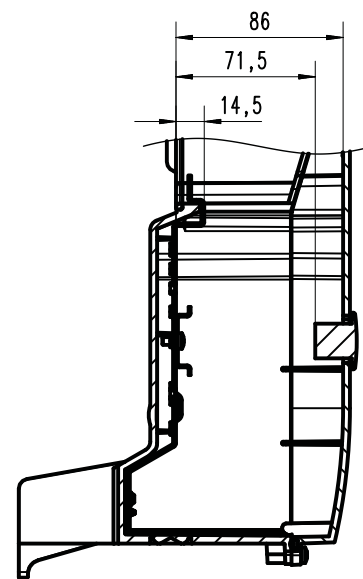
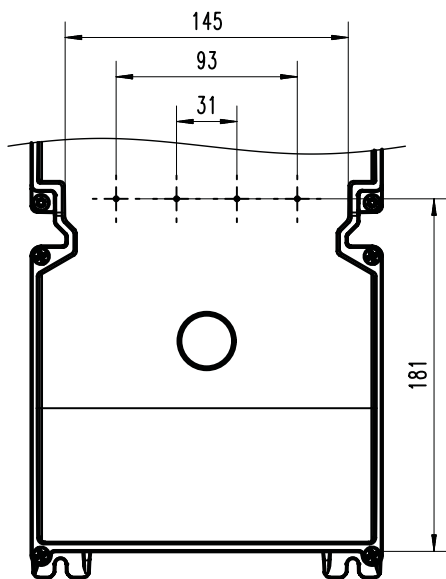
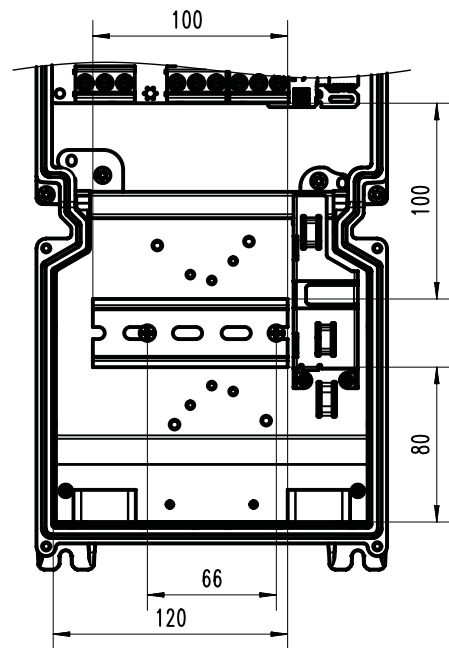
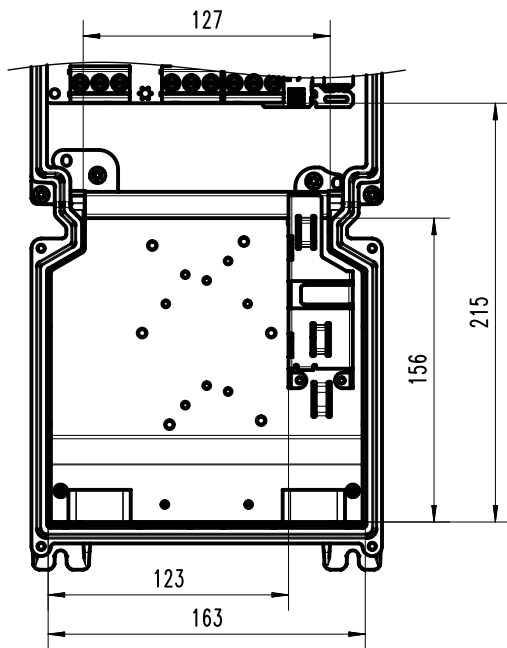
8800962

Technical data

Dimensions



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



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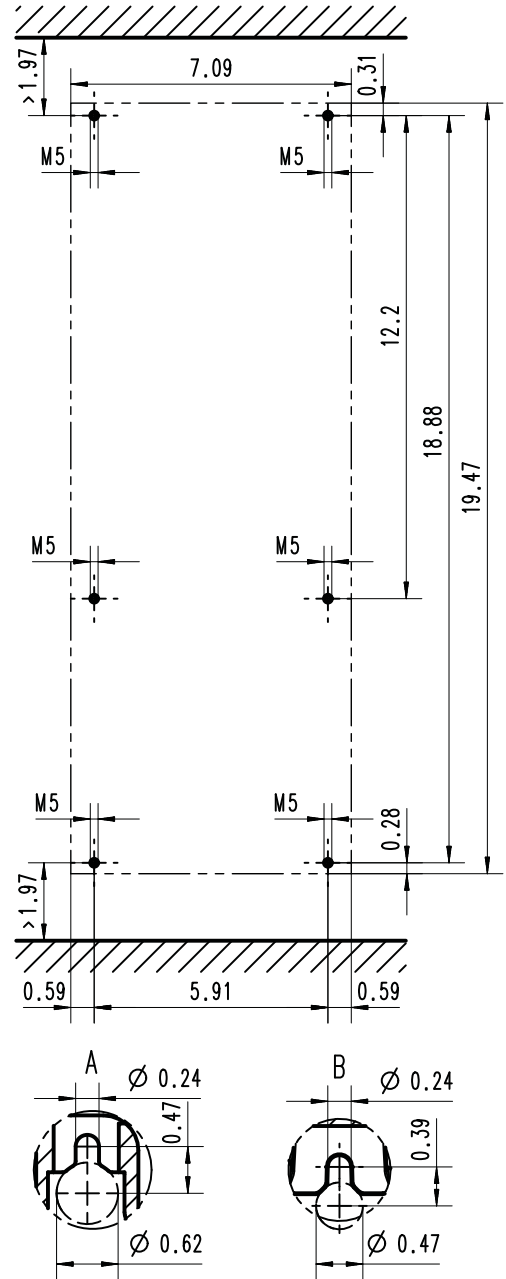
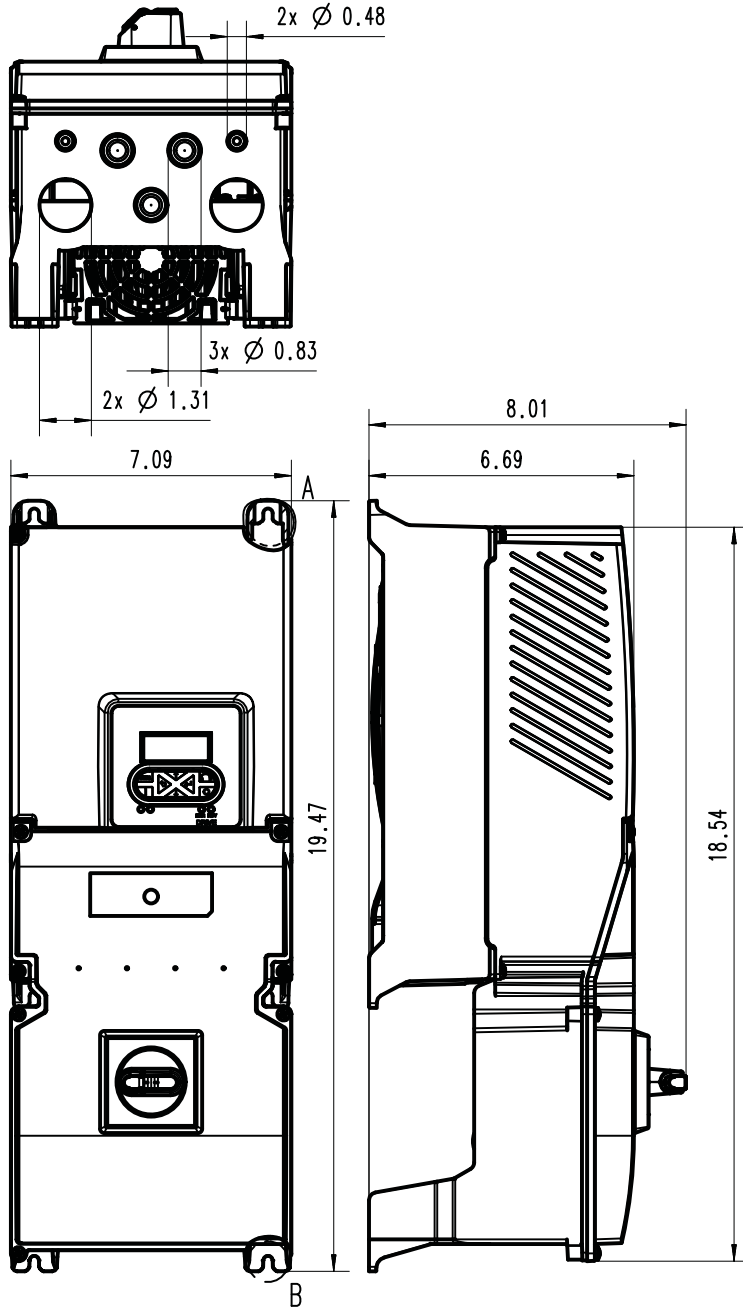
Technical data

Dimensions

10 HP ... 15 HP

The dimensions in inch apply to:

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



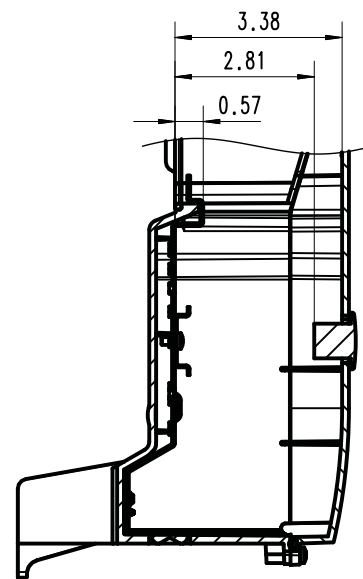
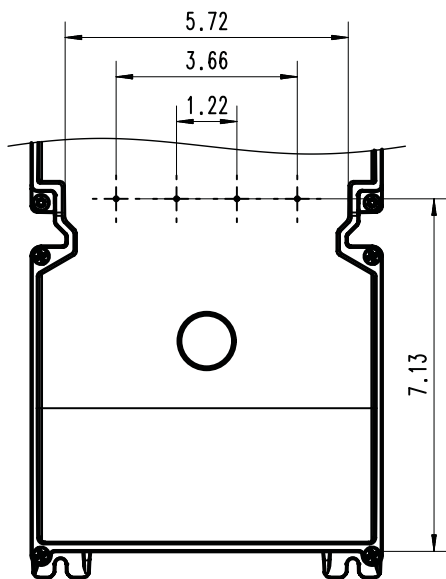
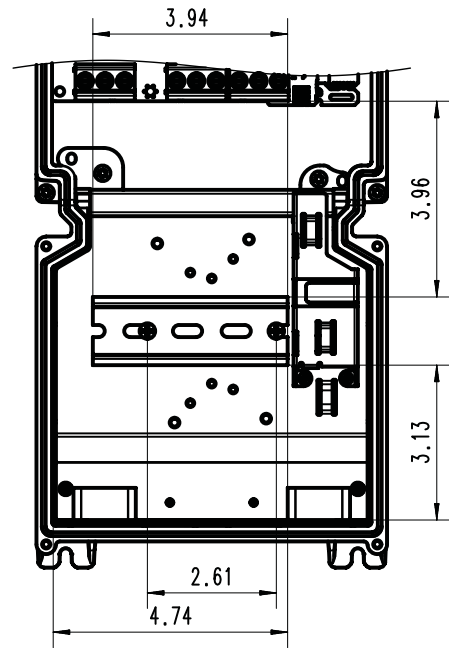
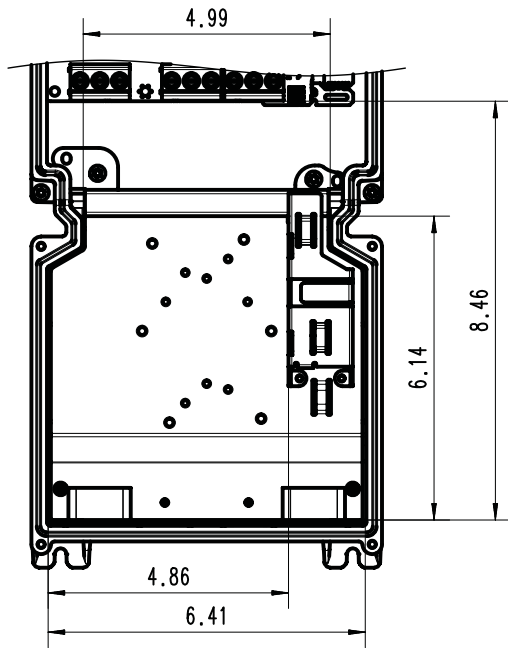
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Technical data

Dimensions



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



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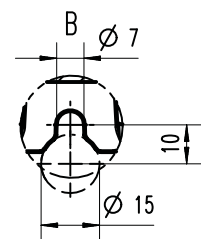
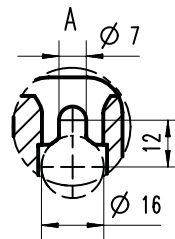
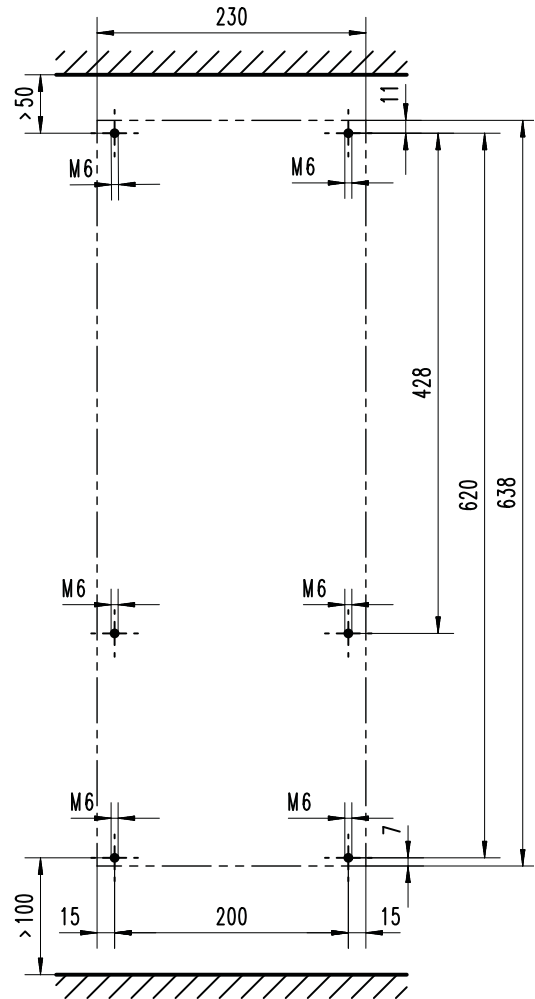
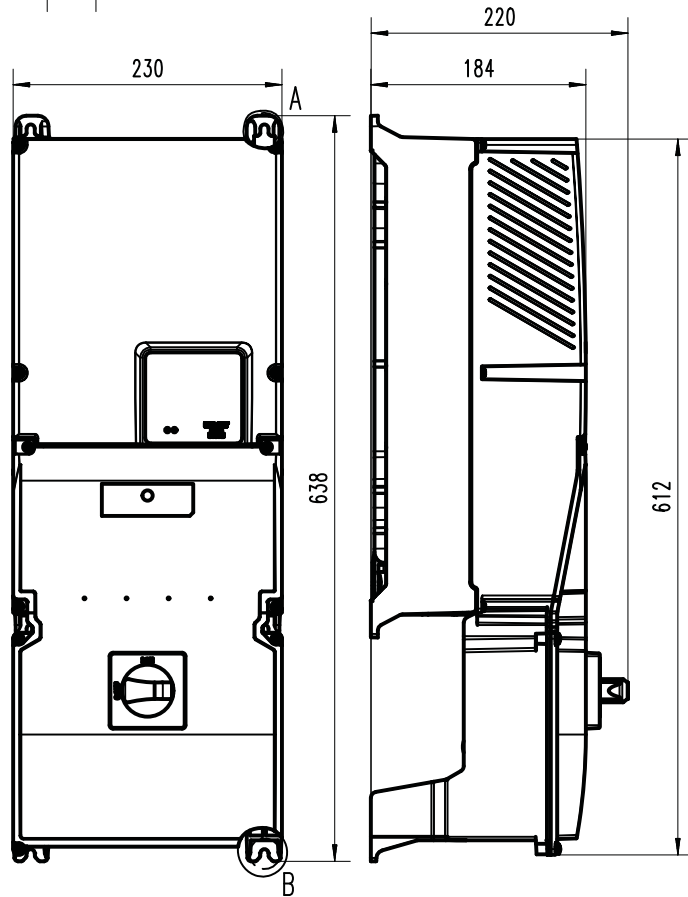
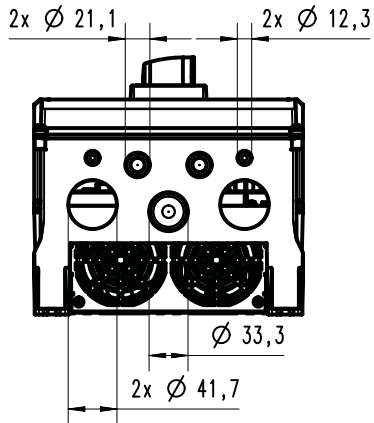
Technical data

Dimensions

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: 11.4 kg IP66: 11.9 kg	IP66: 11.5 kg IP66: 12 kg



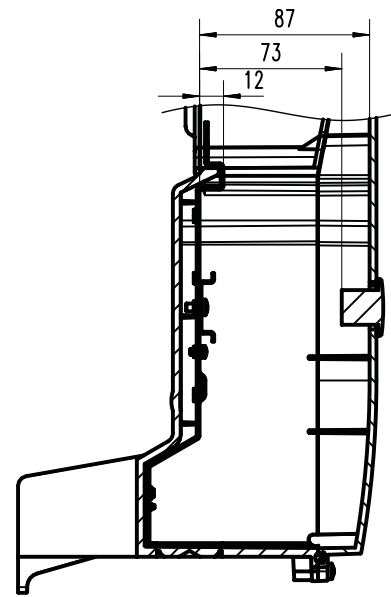
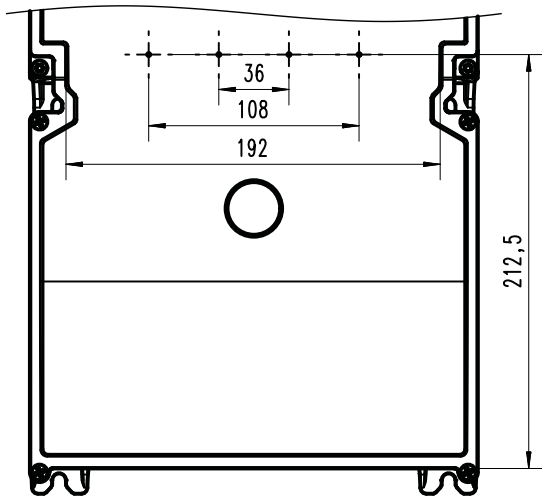
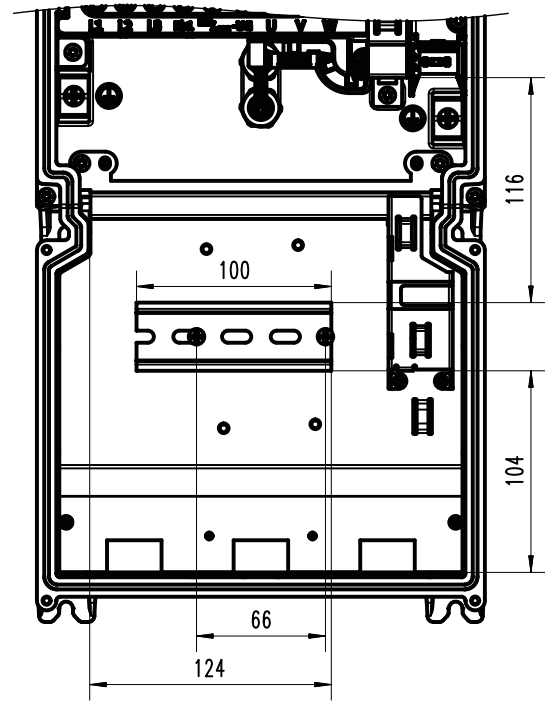
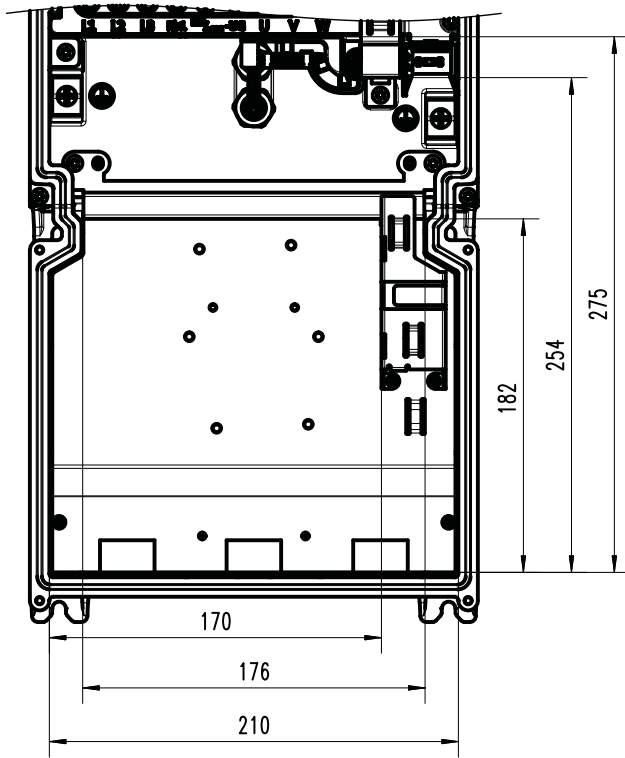
8801292

Technical data

Dimensions



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



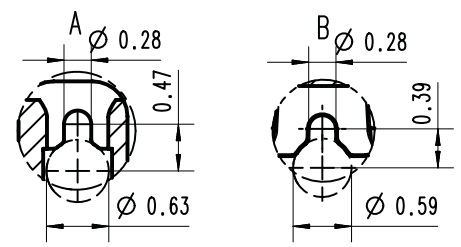
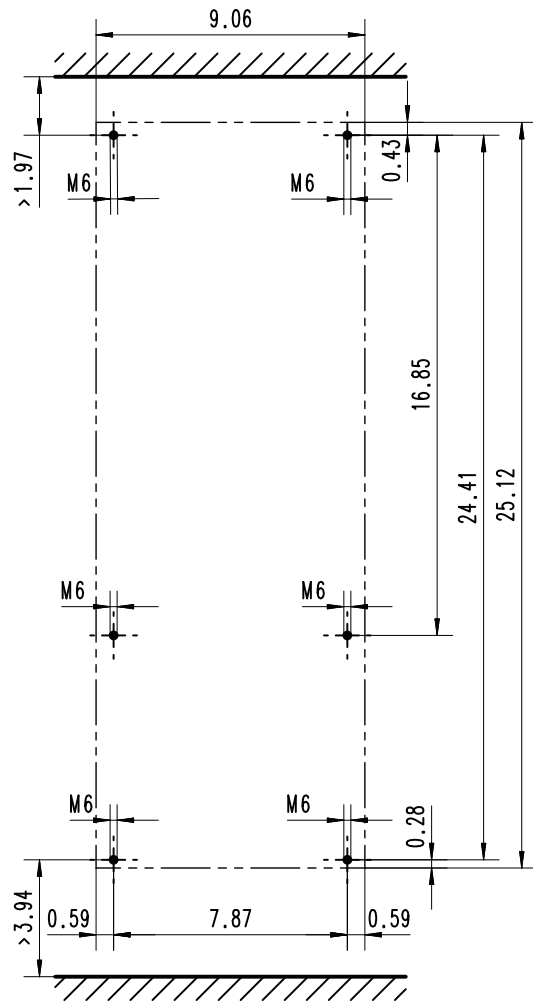
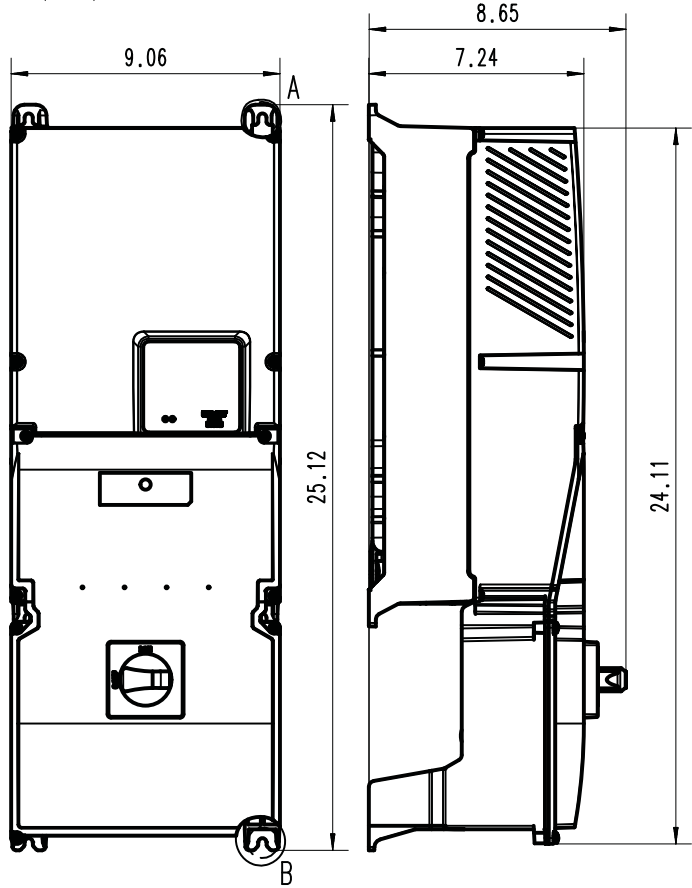
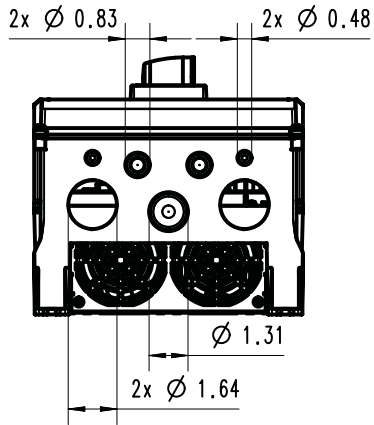
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20 HP ... 30 HP

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: 25.1 lb NEMA 4X: 26.2 lb	NEMA 4X: 25.4 lb NEMA 4X: 26.5 lb



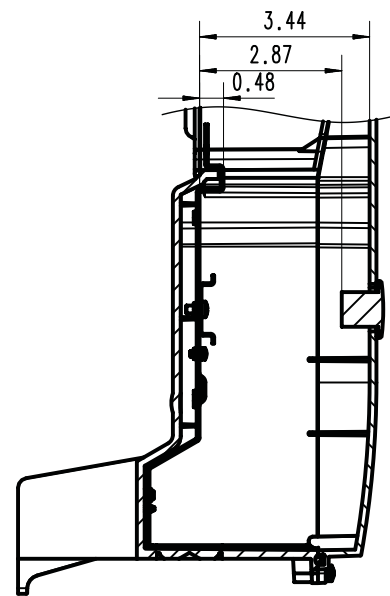
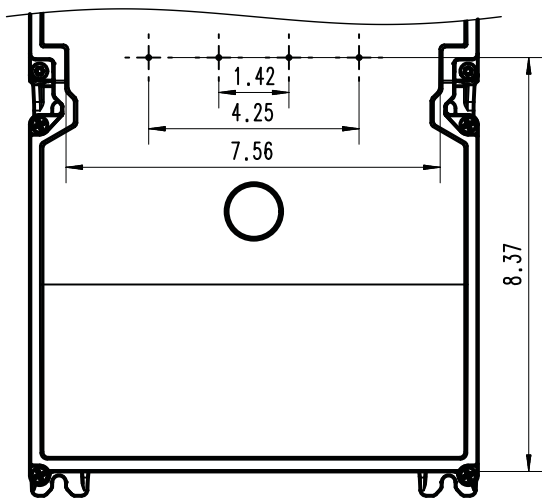
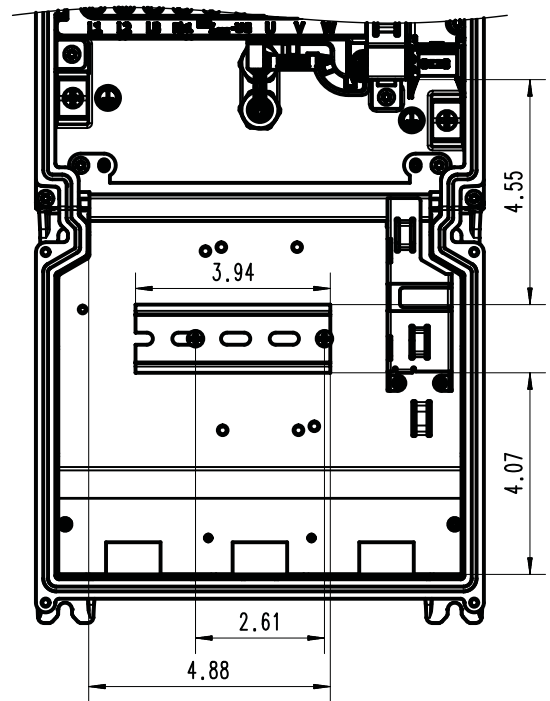
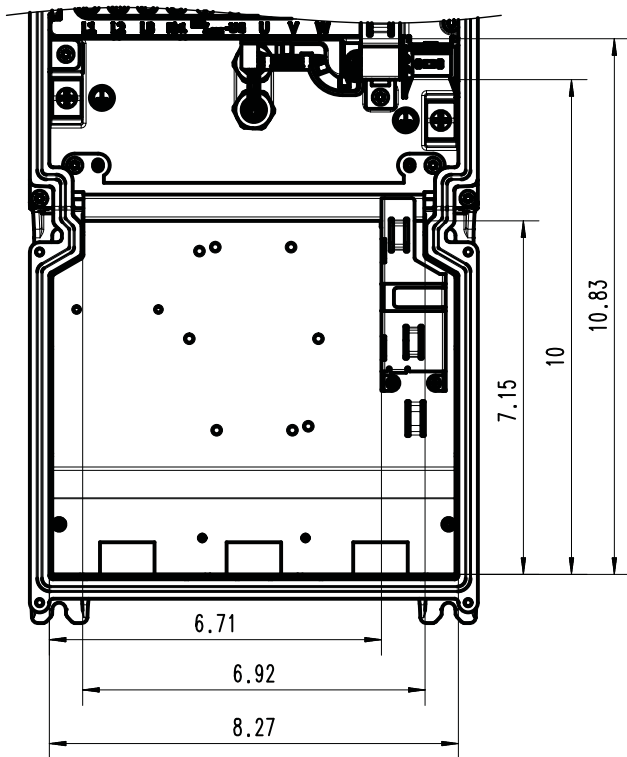
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Technical data

Dimensions



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



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Product extensions

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.

Product extensions

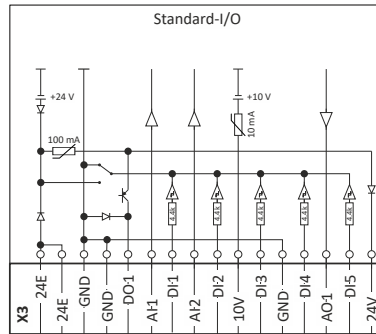
I/O extensions
Standard I/O



I/O extensions

Standard I/O

The Standard I/O provides the inverter with analog and digital inputs and outputs and is designed for standard applications. The Standard I/O is available with different network options. [▶ Networks](#) [179](#)



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 for setpoint potentiometer
24-V output	24 V	
Reference potential	GND	
Connection system		Spring terminal, not pluggable



Product extensions

I/O extensions
Data of control connections

Data of control connections

Digital inputs

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

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

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

Digital outputs

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

Product extensions

I/O extensions
Data of control connections



Analog inputs

Cycle time	ms	1	
Resolution of A/D converter	Bit	12	
Operation as voltage input			
Connection designation		X3/AI1, X3/AI2	
Input voltage DC	V	-10 ... 10	
Input resistance	kΩ	70	
Accuracy	mV	± 50	Typical
Input voltage in case of open circuit	V	- 0.2 ... 0.2	Display "0"
Electric strength of external voltage	V	± 24	
Operation as current input			
Connection designation		X3/AI1, X3/AI2	
Input current	mA	0 ... 20 4 ... 20	open-circuit monitored
Accuracy	mA	± 0.1	Typical
Input current in case of open circuit	mA	< 0.1	Display "0"
Input resistance	Ω	< 250	
Electric strength of external voltage	V	± 24	

Analog outputs

Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 24V	
Operation as voltage output			
Resolution of D/A converter	Bit	12	
Output voltage DC	V	0 ... 10	
max. output current	mA	5	
min. load resistance	kΩ	≥ 2.2	
max. capacitive load	μF	1	
Accuracy	mV	± 100	Typical
Operation as current output			
Output current	mA	0 ... 20 4 ... 20	open-circuit monitored
Accuracy	mA	± 0.3	Typical

10-V output

Use		Primarily for the supply of a potentiometer (1 ... 10 kΩ)	
Output voltage DC			
Typical	V	10	
Accuracy	mV	± 100	
Max. output current	mA	10	
Max. capacitive load	μF	1	
Short-circuit strength		Unlimited period	
Electric strength of external voltage	V	+ 24	



Product extensions

I/O extensions
Data of control connections

24-V input

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

24-V output

Use		Primarily for the supply of digital inputs	
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	

Product extensions

Further control connections
Relay output



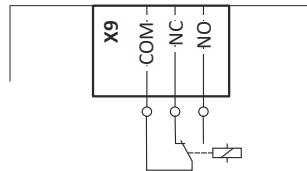
Further control connections

Relay output



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

Connection		Terminal X9: COM	Common contact (Common)	
		Terminal X9: NC	Normally closed contact	
		Terminal X9: NO	Normally open contact	
Minimum DC contact load				
	Voltage	V	10	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	



PTC input



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



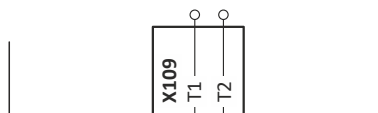
The external PTC sensor incl. cabling must possess the following **electrical insulation**:

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





Networks

CANopen

CANopen is an internationally approved communication protocol which is designed for commercial and industrial automation applications. High data transfer rates in connection with efficient data formatting provide for the coordination of motion control devices in multi-axis applications.

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

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

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	

Product extensions

Networks
Modbus RTU



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 of inverter to a Modbus network	
Connection system		Pluggable double spring terminal	
Status display		2 LEDs	
Connection designation		X216: TA, TB, COM	

Technical data			
Communication profile		Modbus RTU	
Bus terminating resistor	Ω	120	Terminated on both sides
Integrated bus terminating resistor		Yes	Activation via DIP switch
Network topology			
Without repeater		Line	
Station			
Type		Slave	
Max. number without repeater		32	Per bus segment, incl. host system
Max. number with repeater		90	
Address		1 ... 247	Adjustable via code or DIP switch
Transfer rate	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



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 cables	
Use		Connection of inverter to an I/O-Link master	
Connection system		Pluggable double spring terminal	
Status display		1 LED	
Connection designation		X316: L+, C/Q, L-	

Technical data			
Topology			
Master - slave		Tree (point to point)	
Station			
Type		Slave	
Master - slave		1:1	
Baud rate	kBit/s	230.4	COM3
Max. Length	m	20	
Max. Cable length between IO-Link master and IO-Link slave (i550)		20	
Process data			
Input		12 bytes (fix)	
Output		12 bytes (fix)	

Processing time of process data			
Cycle time	ms	2	

Product extensions

Networks
EtherCAT



EtherCAT

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

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

Technical data			
Communication profile		EtherCAT	
		CANopen over EtherCAT	
Safety over EtherCAT		Yes	
Vendor ID [hex]		0x3B	
Network topology		Line, tree ring	
Device			
Type		EtherCAT slave	
Max. number		65535	In the entire network
Address		Automatically assigned by the master	
Max. cable length	m	Not limited	The length between the devices is decisive.
Max. cable length between two devices	m	100	
Process data			
Transmit PDOs		0 ... 16 double words	Max. 64 bytes
Receive PDOs		0 ... 16 double words	
Cycle time	ms	Integer multiple of 1 ms	



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 (slave)	
Max. Number		254	Per subnetwork
Address		Station name	
Max. Cable length	m	-	Not limited The length between the TNs is decisive.
Max. cable length between two devices	m	100	
Process data			
Transmit PDOs		16 words	Max. 32 bits (4 bytes) as a coherent PDO object
Receive PDOs		16 words	
Cycle time	ms	> 4	
Switching method		Store-and-Forward Cut-Through	
Switch latency	μs	~ 125	At maximum telegram length
Other data		Additional TCP/IP channel	

Product extensions

Networks
Modbus TCP



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 slave	
Status display		2 LEDs	
Connection designation		Port 1: X276 Port 2 X277	

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



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 (RT) communication properties Conformance Class B	
Max. Number		255	Per subnetwork
Address		Station name	
Max. Cable length	m	Not limited	The length between the devices is decisive.
Max. cable length between two devices	m	100	
Process data	Byte	4, 8, 12, 16, 20, 24, 28, 32, ..., 64	
Cycle time	ms	1, 2, 4, 8, 16	
Switching method		Cut-through	
Other data		Additional TCP/IP channel	

Product extensions

Functional safety



Functional safety



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



General information and basics

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

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

Integrated safety

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

Integrated safety provides safe inputs. If the STO safety function is requested, the safety system immediately brings about the torque-free state according to EN 61800-5-2.

Standards

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

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

Risk assessment

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

Before a machine can be put into circulation, the manufacturer of the machine has to conduct a risk assessment according to the 2006/42/EU: Machinery Directive 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 characteristics](#) 194

Product extensions

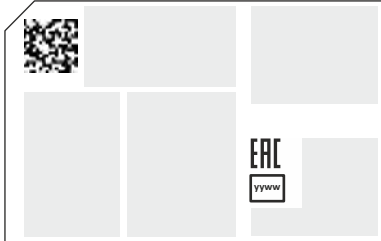
Functional safety
General information and basics



i550 protec

You will need to observe the manufacturing date of the device.

The manufacturing date can be found on the nameplate:

Manufacturing date of the device

yyww = year of manufacture and week of manufacture (1841 = CW 41 2018)

Identification of the components

Safety components and the respective terminals are yellow.

Restart

⚠ DANGER!

The drive can automatically restart if the request of the safety function is deactivated.

Possible consequence: Death or severe injuries

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



Safety sensors

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

Active sensors

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

Test pulses for monitoring the outputs and lines are permissible.

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

Please note the following:

- The maximum permissible connection capacity of the outputs.
- Active sensors are connected directly to the terminal strip, see section "Active sensor connection".
- Monitoring for short circuits must be carried out by the active sensor.

The outputs have to switch simultaneously (equivalently). Safety functions will be activated if only one channel is switched. Active triggering of only one channel points to faulty sensors or impermissible wiring.

Examples of active sensors:

- Lightgrid
- Laser scanner
- Control systems

Passive sensors

Passive sensors are 2-channel switching elements with contacts.

Please note the following:

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

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

Examples of passive sensors:

- Door contact switch
- Emergency stop control units

Product extensions

Functional safety
Safety functions



Safety functions

Supported safety functions for "Basic Safety-STO"

▶ [Safe torque off \(STO\)](#)  191



Safe torque off (STO)

This function corresponds to a "Stop 0" according to EN 60204.

The motor cannot generate torque and movements of the drive.

⚠ DANGER!

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

Possible consequence: Death or severe injuries

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

⚠ DANGER!

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

Possible consequences: Death or severe injuries

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

⚠ DANGER!

The power supply is not safely disconnected.

Death or serious injury due to electrical voltage.

- ▶ Turn off the power supply.

Functional description

How to safely disconnect the drive:

1. A safety sensor requests the safety function.
2. The transmission of the pulse width modulation is safely switched off by the safety unit.
The power drivers do not generate a rotating field anymore.
3. The inverter switches to the STO active device status (status word 0x6041, Bit15 = 0).
The motor is safely switched to torqueless operation (STO).

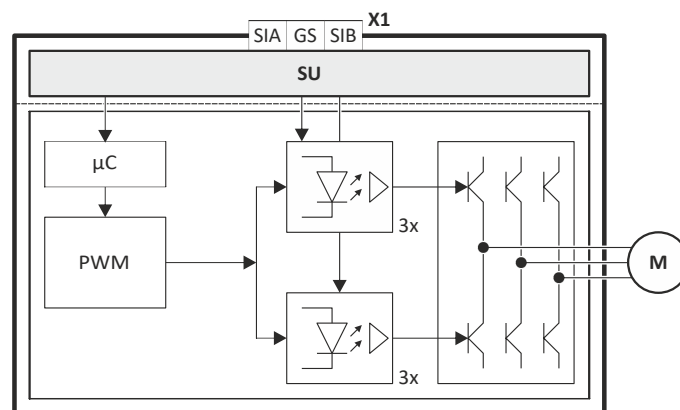


Fig. 14: Functional principle: Basic Safety - STO

X1	Control terminals of the safety unit	PWM	Pulse width modulation
SU	Hardware interface	M	Motor
µC	Microcontroller		

Product extensions

Functional safety
Safety functions



Functional diagram

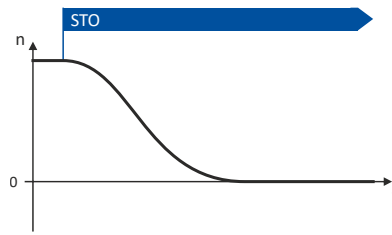


Fig. 15: Safety function STO



Functional sequence and error response have no adjustable parameters.

Truth table

Safe input / channel		Inverter	Inverter status word 0x282A:004		CiA status word
SIA	SIB	Device state	Bit 10	Bit 11	Object 0x6041, bit 15
LOW	LOW	STO active	1	1	0
LOW	HIGH	Impermissible state, drive disabled	1	0	0
HIGH	LOW		1	0	0
HIGH	HIGH	Drive enabled	0	0	1



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



If SIA = LOW and SIB = LOW, the internal "Safe torque off (STO) active [55]" status signal in the inverter is set to TRUE. You can use this status signal to control a "non-safe output" (e.g. the relay).



Acceptance

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

- The machine manufacturer must authorise a person with expertise and knowledge of the safety functions to carry out the test.
- The test result of every safety function must be documented and signed by the inspector.

A complete test comprises the following:

- Documenting the plant including the safety functions:
 - Creating an overview screen of the plant.
 - Describing the plant.
 - Describing the safety equipment.
 - Documenting the safety functions used.
 - Checking the function of the safety functions used.
- Preparing the test report:
 - Documenting the functional test.
 - Checking the parameters.
 - Signing the test report.
- Preparing the appendix with test records:
 - Protocols for the plant
 - External recording



The tester must repeat the test after each change and record the results in the test report.

Periodic inspections

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

The user must document these tests.

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

The inspection interval should not exceed one year.

Product extensions

Functional safety
Technical data



Technical data

Safety-related characteristics

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	

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				



Accessories

Overview

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

Accessories for i550 protec without extension box



RJ45 cable gland



Cable gland set



Screwed connection
membrane set (5 ea.)



Brake resistor



QUICKON connector



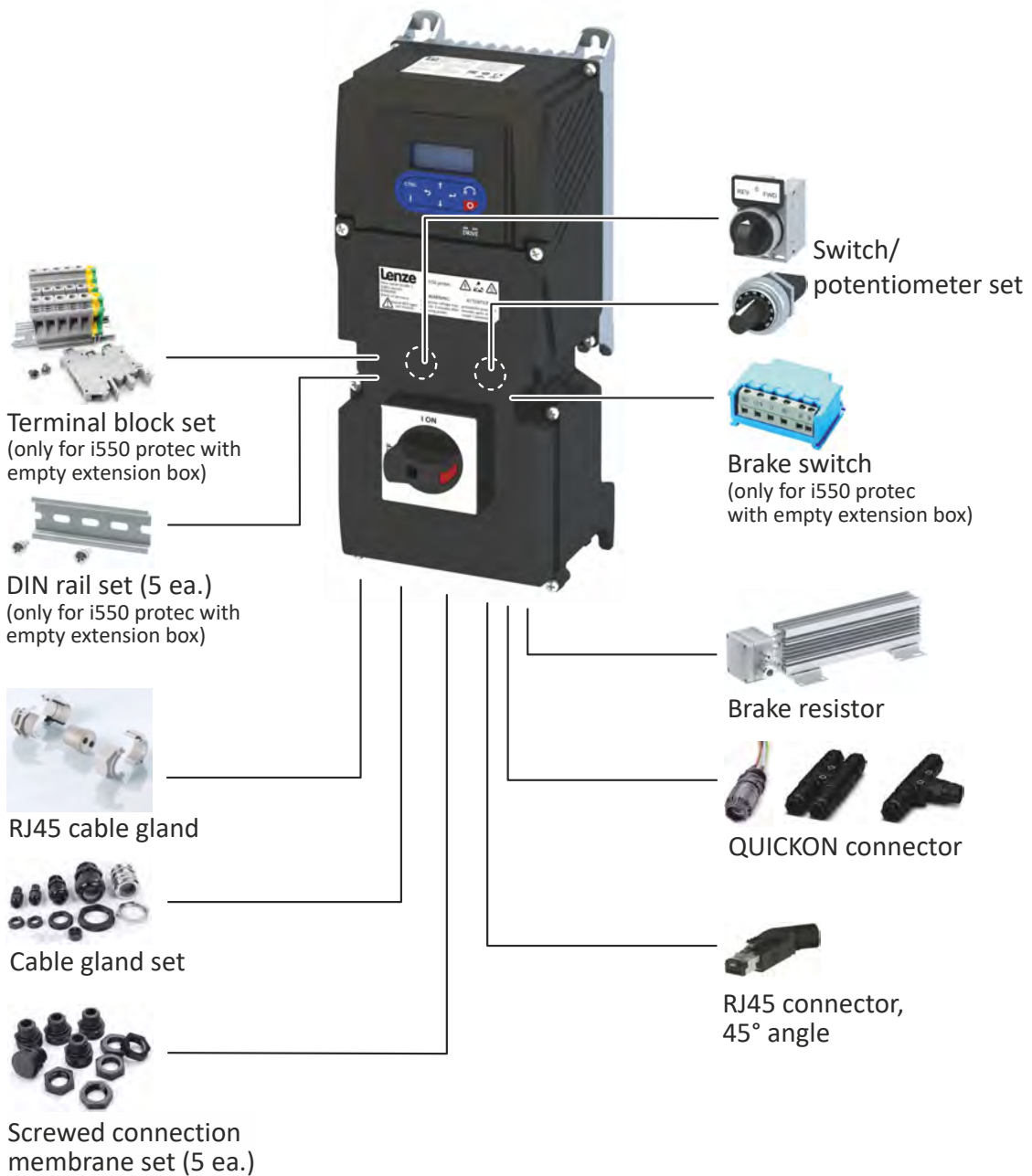
RJ45 connector,
45° angle

Accessories

Overview



Accessories for i550 protec with extension box



Further accessories

- Power supply units
- Memory modules
- Memory module copiers



Operation and diagnostics

Keypad

Parameter setting and diagnostics

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



The keypad is configured and ordered together with the device.

The device will subsequently be delivered with the keypad mounted. For devices with protection class IP66, the keypad cannot be replaced.

Accessories

Operation and diagnostics
WLAN module



WLAN module

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



⚠ WARNING!

- ▶ This product contains FCC ID: QQQWF121/IC: 5123A-BGTWF121
- ▶ To comply with FCC and Industry Canada RF radiation exposure limits for general population, the transmitter with its antenna must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times.
- ▶ This product must not be collocated or operated in conjunction with any other antenna or transmitter.
- ▶ -----
- ▶ Le produit contient un module transmetteur certifié FCC ID: QQQWF121/IC: 5123A-BGTWF121
- ▶ Afin de se conformer aux réglementations de la FCC et d'Industry Canada relatives aux limites d'exposition aux rayonnements RF pour le grand public, le transmetteur et son antenne doivent être installés de sorte qu'une distance minimale de 20 cm soit constamment maintenue entre le radiateur (antenne) et toute personne.
- ▶ Le produit ne doit pas être utilisé en combinaison avec d'autres antennes ou transmetteurs.

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

Conformity and approvals		
CE	RED	EN 301489-1 V2.1.1:2016
		EN 301489-17 V3.1.1:2016
		EN 300328 V2.1.1:2016
FCC	Part 15.107/15.109 ICES-003	

Additional conformities and approvals:

- IC
- CMIIT

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



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 device.

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

Switch/Potentiometer set

With the switch/potentiometer set, Standard I/O can be used to generate and feed in simple control signals.

The set can be installed in the product variants i550 protec with empty extension box and i550 protec with extension box and repair switch. In addition, parameterization is required.

Abbildung mit montiertem Schalter und Potentiometer



Potentiometer



Schalter



0: AUS
REV: Run-Rückwärts
FWD: Run-Vorwärts

Switch/potentiometer set		
Order code	Type	
EZAMBHXX028	1 x potentiometer	0 ... 10 kΩ
	1 x rotary switch	2 x NO contacts (normally-open contacts), positions 1 - 0 - 2
	1 x labelling field	"REV - 0 - FWD"
	Diameter of installation opening	22 mm

Accessories

Memory modules



Memory modules

For standard set-up, Lenze offers its customers multipacked, unwritten memory modules (EPM). In combination with the EPM copier, the EPMs can be duplicated at any location.

A memory module is included in the scope of supply of the inverter.



Memory module		
Order code	Type	VPE
		Piece
I0MAPA0000000M	Easily pluggable Duplicate data set with memory module copier	12

Memory module copier

For duplicating data on memory modules for a faster standard set-up.

The memory module copier is a copying system for all memory modules from Lenze. With the help of simple optical user guidance, the data of a module is copied quickly and reliably to another memory module.



Memory module copiers		
Order code	Type	
EZAEDE1001	Data set copier for memory modules	

Brake resistors

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



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](#) 73



Brake switches

Serves for switching an electromechanical brake.

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

The brake resistor 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
Order code		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

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		
Order code	Type	
EZAMBHXX029	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

Accessories

DIN rail set



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		
Order code	Type	
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



Cable glands

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

Cable gland sets			
Order code	Type		
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: 8 ... 13 mm
		1 x M20 Standard	For mains cables Diameter: 8 ... 13 mm
		1 x M20 EMC	For shielded motor cables Diameter: 11 ... 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: 8 ... 13 mm
		1 x M32 Standard	For mains cables Diameter: 15 ... 22 mm
		1 x M32 EMC	For shielded motor cables Diameter: 16 ... 22 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
		1 x M40 Standard	For mains cables Diameter: 19 ... 28 mm
		1 x M40 EMC	For shielded motor cables Diameter: 19 ... 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







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		
Order code	Type	
QUICKON V2 set for rated power values ≤ 4 kW (16 A)		
EZAMBHXX027		<ul style="list-style-type: none"> 1 x M25 QUICKON V2 plug (wall penetration), 3 + PE, 1 ... 2.5 mm² 1 x QUICKON V2 nut 1 x connecting cable 0.5 m 1 x adapter M20/M25 1 x adapter M25/M32
QUICKON V2 nut		
EWS0103/M		<ul style="list-style-type: none"> • Cable diameter: 6 ... 10 mm • Connection frequency: max. 10 • 5 pieces
EWS0104/M		<ul style="list-style-type: none"> • Cable diameter: 9 ... 14 mm • Connection frequency: max. 10 • 5 pieces
QUICKON V2 plug with nut		
EWS0105/M		<ul style="list-style-type: none"> • Cable diameter: 6 ... 10 mm • Connection frequency: ≥ 50 • 5 pieces
EWS0106/M		<ul style="list-style-type: none"> • Cable diameter: 9 ... 14 mm • Connection frequency: ≥ 50 • 5 pieces
QUICKON V2 H-distributor		
EWS0110		<ul style="list-style-type: none"> • Number of poles: 4 • Connection cross-section: 2.5 mm² • Cable diameter: 6 ... 14 mm • Connection frequency: ≥ 50 • No V2 nuts are included QUICKON in the scope of supply. These need to be ordered separately (EWS0103/M, EWS0104/M).
QUICKON V2 T-distributor		
EWS0111		<ul style="list-style-type: none"> • Number of poles: 4 • Connection cross-section: 2.5 mm² • Cable diameter: 9 ... 14 mm • Connection frequency: ≥ 50 • Two V2 nuts are included QUICKON in the scope of supply. Any additional nuts will need to be ordered separately (EWS0103/M, EWS0104/M).
QUICKON V2 box spanner		
EWS0112		<ul style="list-style-type: none"> • Fits QUICKON V2 nuts EWS0103/M ... EWS0106/M • Width across flats: 22 mm
QUICKON V2 protection cap		
EWS0113		<ul style="list-style-type: none"> • Fits QUICKON V2 distributor EWS0110, EWS0111 • Degree of protection: IP68 • Fastening eyelet



QUICKON V2 components for cable cross-section 2.5 ... 6 mm ²		
Order code	Type	
QUICKON V2 H-distributor		
EWS0114		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • Cable diameter: 12 ... 20 mm • Connection cross-section: 6 mm² • Connection frequency: max. 10 • 5 pieces
EWS0117		<ul style="list-style-type: none"> • Cable diameter: 9 ... 14 mm • Connection cross-section: 6 mm² • Connection frequency: max. 10 • 5 pieces
QUICKON V2 protection cap		
EWS0118		<p>Fits QUICKON V2 distributor EWS0114, EWS0115</p> <ul style="list-style-type: none"> • Degree of protection: IP68 • Fastening eyelet

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		
Order code	Type	
EZAMBHXX033		<p>For data lines, 4-pole, angled at 45°</p> <ul style="list-style-type: none"> • 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

Accessories


Screw connection membrane set



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		
Order code	Type	
EZAMBHXX026		5 x M12 screw connection with integrated membrane



Purchase order

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 repair 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](#)  195

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](#)



Purchase order

Order code



Order code

The following is a list of the necessary information when ordering an i550 protec frequency inverter.

Order example

Description of the component	Order code
Complete inverter	i55A P 222 F 1 A 3 1 0 002S
Rated power 2.2 kW (i550-P2.2/400-3)	
Three-phase mains connection 400 V	
Product variant: With empty extension box	
Safety engineering: Safety function STO	
Degree of protection: IP31 / NEMA1	
Interference suppression: Integrated RFI filter	
Default parameter setting: Region EU (50-Hz networks)	
Product extension: Standard I/O with CANopen	

Assignment of product name and order 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 order code:

Complete inverter			
Power		Inverter	Order code
kW	HP		
1-phase mains connection 120 V, EMC filter not integrated			
0.37	0.5	i550-P0.37/120-1	i55AP137A
0.75	1.0	i550-P0.75/120-1	i55AP175A
1.1	1.5	i550-P1.1/120-1	i55AP211A
1-phase mains connection 230 V, C2 EMC filter integrated			
0.37	0.5	i550-P0.37/230-1	i55AP137B
0.55	0.75	i550-P0.55/230-1	i55AP155B
0.75	1.0	i550-P0.75/230-1	i55AP175B
1.1	1.5	i550-P1.1/230-1	i55AP211B
1.5	2.0	i550-P1.5/230-1	i55AP215B
2.2	3.0	i550-P2.2/230-1	i55AP222B
1/3-phase mains connection 230/240 V, EMC 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	1.0	i550-P0.75/230-2	i55AP175D
1.1	1.5	i550-P1.1/230-2	i55AP211D
1.5	2.0	i550-P1.5/230-2	i55AP215D
2.2	3.0	i550-P2.2/230-2	i55AP222D
3-phase mains connection 230/240 V, EMC filter not integrated			
3.0	4.0	i550-P3.0/230-3	i55AP230C
4.0	5.0	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
Continuation ...			



Complete inverter			
Power		Inverter	Order code
kW	HP		
<i>Continuation ...</i>			
3-phase mains connection 400/480 V, C2 EMC filter integrated			
0.37	0.5	i550-P0.37/400-3	i55AP137F
0.55	0.75	i550-P0.55/400-3	i55AP155F
0.75	1.0	i550-P0.75/400-3	i55AP175F
1.1	1.5	i550-P1.1/400-3	i55AP211F
1.5	2.0	i550-P1.5/400-3	i55AP215F
2.2	3.0	i550-P2.2/400-3	i55AP222F
3.0	4.0	i550-P3.0/400-3	i55AP230F
4.0	5.0	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
3-phase mains connection 600 V, EMC filter not integrated			
0.75	1.0	i550-P0.75/600-3	i55AP175G
1.5	2.0	i550-P1.5/600-3	i55AP215G
2.2	3.0	i550-P2.2/600-3	i55AP222G

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

Purchase order

Order code



Format of order codes

		I	5	5	A	P	□□□	□	□	□	□	□	□	□	□	□	□
Product type	Inverter																
Product family	i500																
Product	i550																
Product generation	Generation 1																
Mounting type	Wall mounting																
Rated power (examples)																	
0.37 kW	0.5 hp						137										
1.5 kW	2.0 hp						215										
4.0 kW	5.0 hp						240										
11 kW	15 hp						311										
Mains voltage and connection type																	
1/N/PE AC 120 V																	A
1/N/PE AC 230/240 V																	B
3/PE AC 230/240 V																	C
1/N/PE AC 230/240 V																	D
3/PE AC 230/240 V																	D
3/PE AC 400 V																	F
3/PE AC 480 V																	F
3/PE AC 480 V																	G
3/PE AC 600 V																	G
Product variant																	
Without extension box																	0
With empty extension box																	1
With extension box and repair switch																	2
Safety engineering																	
Without safety engineering																	0
Basic Safety - STO																	A
Protection class																	
IP31, uncoated	NEMA 1																3
IP54, uncoated	NEMA 12																5
IP66, uncoated	NEMA 4X																7
Interference suppression																	
Without	i550-Pxxx/120-1 i550-Pxxx/230-2 i550-Pxxx/230-3 i550-Pxxx/600-3																0
Integrated RFI filter	i550-Pxxx/230-1 i550-Pxxx/400-3																1
Application																	
Default parameter setting: Region EU (50-Hz networks)																	0
Default parameter setting: Region US (60-Hz networks)																	1
Product extension																	
Standard I/O: ...																	0
Keypad with standard I/O ...																	K
WLAN module with standard I/O ...																	W
	... without network																00S
	... with CANopen																02S
	... with Modbus RTU																03S
	... with IO-Link																06S
	... with EtherCAT																0KS
	... with EtherNet/IP																0MS
	... with Modbus TCP																0WS
	... with PROFINET																0LS



Environmental notes and recycling

Lenze has been certified according to the global environmental management standard (DIN EN) ISO 14001 for many years. As part of our environmental policy and the associated climate responsibility, please observe the following information on hazardous substances and the recycling of Lenze products and their packaging:



Lenze products are subject in part to EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic devices (RoHS). This is documented accordingly in the EU Declaration of Conformity and with the CE mark.



Lenze products are not subject to EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), but do sometimes contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC (Battery Directive). The separate from domestic waste disposal route is shown by the corresponding labeling with the "crossed-out garbage can".

Any batteries/rechargeable batteries included are designed for the service life of the product and do not have to be replaced or otherwise removed by the end user.



Lenze products are usually sold with cardboard or plastic packaging. This packaging corresponds to EU Directive 94/62/EC on packaging and packaging waste (Packaging Directive). The required waste disposal route is shown by material-specific labeling with the "recycling triangle". Example: "21 - Miscellaneous cardboard"

REACH

Lenze products are subject to the European Regulation EC No. 1907/2006 (REACH chemical regulation). When used as intended, exposure of substances to humans, animals and the environment is excluded.

Lenze products are industrial electrical and electronic products and are to be disposed of professionally. Both the mechanical and electrical components, such as electric motors, gearboxes, or inverters, contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the highest possible reusable materials cycle is therefore important and sensible from an economic and ecological point of view.

- Always coordinate professional waste disposal with your local waste disposal company.
- Separate mechanical and electrical components, packaging, hazardous waste (e.g. gearbox oils), and batteries/rechargeable batteries wherever possible.
- Dispose of the separated waste in an environmentally friendly and proper way (not with household waste or municipal bulky waste).



More information on Lenze's environmental and climate responsibility, as well as on the topic of energy efficiency, can be found on the Internet:

www.Lenze.com → search word: "Sustainability"



Appendix

Good to know

Approvals and directives

CCC	China Compulsory Certification documents the compliance with the legal product safety requirements of the PR of China - in accordance with Guobiao standards.
c _{CSA} _{US}	CSA certificate, tested according to US and Canada standards
UE	Union Européenne documents the declaration of the manufacturer that EU Directives are complied with.
CEL	China Energy Label documents the compliance with the legal energy efficiency requirements for motors, tested according to the PR of China and Guobiao standards
CSA	CSA Group (Canadian Standards Association) CSA certificate, tested according to Canada standards
UL ^{Energy} _{US CA}	Energy Verified Certificate Determining the energy efficiency according to CSA C390 for products within the scope of energy efficiency requirements in the USA and Canada
c _{UL} _{US}	UL certificate for products, tested according to US and Canada standards
c _{UR} _{US}	UL certificate for components, tested according to US and Canada standards
EAC	Customs union Russia / Belarus / Kazakhstan certificate documents the declaration of the manufacturer that the specifications for the Eurasian conformity (EAC) required for placing electronic and electromechanical products on the market of the entire territory of the Customs Union (Russia, Belarus, Kazakhstan, Armenia and Kyrgyzstan) are complied with.
UL	Underwriters Laboratory Listed Product
UL _{LISTED}	UL Listing approval mark as proof that the product has been tested and the applicable safety requirements have been confirmed by UL (Underwriters Laboratory).
UR	UL Recognized Component approval mark as proof that the UL approved component can be used in a product or system bearing the UL Listing approval mark.



Operating modes of the motor

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

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

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

The most important operating modes

Continuous operation S1	Short-time operation S2
<p>Operation with a constant load until the motor reaches the thermal steady state. The motor may be actuated continuously with its rated power.</p>	<p>Operation with constant load; however, the motor does not reach the thermal steady state. During the following standstill, the motor winding cools down to the ambient temperature again. The increase in power depends on the load duration.</p>
Intermittent operation S3	Non-intermittent periodic operation S6
<p>Sequence of identical duty cycles comprising operation with a constant load and subsequent standstill. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/downtime ratio.</p>	<p>Sequence of identical duty cycles comprising operation with a constant load and subsequent no-load operation. The motor cools down during the no-load phase. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/idle time ratio.</p>

P Power
t Time
 t_L Idle time
 ϑ Temperature

P_V Power loss
 t_B Load period
 t_S Cycle duration



Motor control types

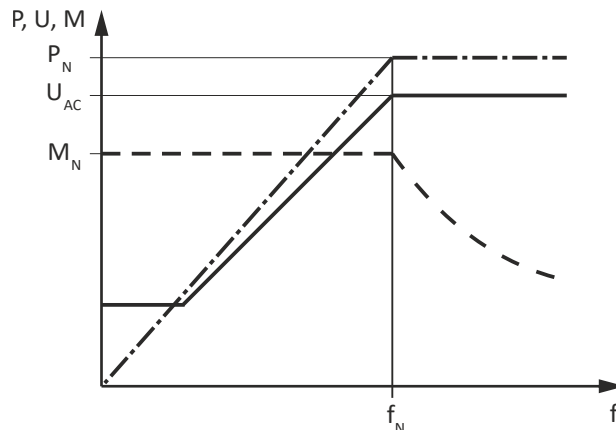
The inverter provides various motor control types.

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	M_{rated}	Rated torque
V	Voltage	f_{rated}	Rated frequency
M	Torque	M_{rated}	Rated torque
f	Frequency	f_{rated}	Rated frequency

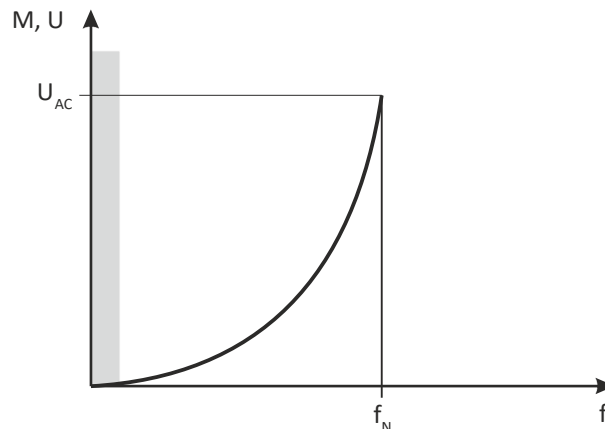
Square-law V/f characteristic control

The output voltage is increased squarely to the output frequency.

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

Application areas are for instance:

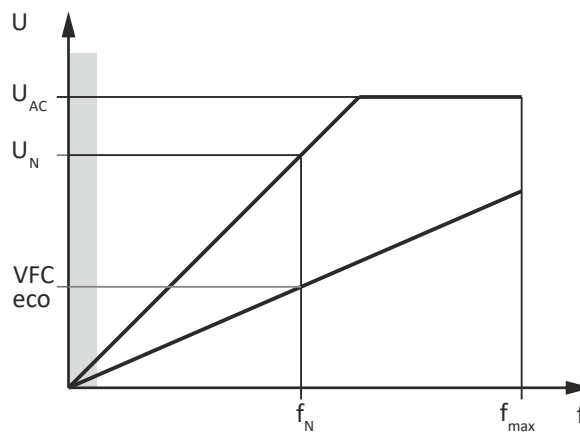
- Pumps
- Fans
- Ventilators



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

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.



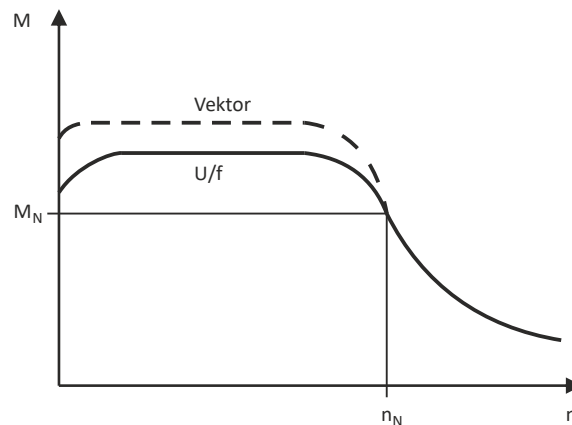
V	Voltage	f	Frequency
U_{AC}	Mains voltage	f_{rated}	Rated frequency
U_{rated}	Rated voltage	f_{max}	Max. frequency

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_{rated} Rated torque
 n_{rated} Rated speed

Application areas are for instance:

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

Switching frequencies

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

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

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

Options for the switching frequency:

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



Enclosures

The degree of protection indicates the suitability of a motor for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The degrees of protection are classified by EN 60529.

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

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

Glossary

Abbreviation	Meaning
AIE	Acknowledge In Error, error acknowledgement
AIS	Acknowledge In Stop, restart acknowledgement
OFF state	Triggered signal status of the sensors
CCF	Common Cause Error (also 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 sensor in normal operation
FIT	Failure In Time, $1 \text{ FIT} = 10^{-9} \text{ Error/h}$
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 in accordance with EN ISO 13849-1
OSSD	Output Signal Switching Device, tested signal output
PELV	Protective Extra Low Voltage, extra-low voltage with safe isolation
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 crawling speed
SD-In	Safe Digital Input
SD-Out	Safe Digital Output
SELV	Safety Extra Low Voltage
SFF	Safe Failure Fraction
SIL	Safety Integrity Level in accordance with IEC 61508

