

Automation systems Drive solutions

Controls

Inverter

Motors

Gearboxes

Engineering Tools

Contents of the L-force catalogue

About Lenze		Lenze makes many things easy for you.	
		A matter of principle: the right products for every application.	
		L-force product portfolio	
Automation systems		Controller-based Automation	1.1
		Drive-based automation	1.2
Drive solutions		HighLine tasks	2.1
		StateLine tasks	2.2
		BaseLine tasks	2.3
Controls	Visualisation	Panel PC v800	3.1
		Monitor v200	3.2
	Cabinet Controllers	Controller 3200 C	3.3
		Controller c300	3.4
	Panel Controllers	Controller p500	3.5
		Controller p300	3.6
		I/O System 1000	3.7
Inverter	Decentralised	Inverter Drives 8400 protec	4.1
		Inverter Drives 8400 motec	4.2
	Cabinet	Servo Drives 9400 HighLine	4.3
		Inverter Drives 8400 TopLine	4.4
		Servo-Inverter i700	4.5
		Inverter Drives 8400 HighLine	4.6
		Inverter Drives 8400 StateLine	4.7
Motors	Servo motors	MCS synchronous servo motors	5.1
		MCM synchronous servo motors	5.2
		MD□KS synchronous servo motors	5.3
		MQA asynchronous servo motors	5.4
		MCA asynchronous servo motors	5.5
	Three-phase AC motors	IE3 three-phase AC motors m540/m550-P	5.6
		Inverter opt. three-phase AC motors MF	5.7
		IE2 MH three-phase AC motors	5.8
		IE1 MD three-phase AC motors	5.9
		Lenze Smart Motor m300	5.10
		IE3 three-phase AC motors m240-P	5.11
		IE1/2 three-phase AC motors Basic MD/MH	5.12
Gearboxes	Axial gearboxes	g700-P planetary gearbox	6.1
		MPR/MPG planetary gearboxes	6.2
		g500-H helical gearboxes	6.3
		g500-S shaft-mounted helical gearbox	6.4
	Right-angle gearboxes	g500-B bevel gearbox	6.5
	Motor data	Assignment see above	6.6
Engineering Tools		Navigator	7.1
		Drive Solution Designer	7.2
		Drive Solution Catalogue	7.3
		Engineer	7.4
		PLC Designer	7.5
		VisiWinNET®	7.6
		EASY Starter	7.7

Lenze makes many things easy for you.

With our motivated and committed approach, we work together with you to create the best possible solution and set your ideas in motion - whether you are looking to optimise an existing machine or develop a new one. We always strive to make things easy and seek perfection therein. This is anchored in our thinking, in our services and in every detail of our products.

1

Developing ideas

Are you looking to build the best machine possible and already have some initial ideas? Then get these down on paper together with us, starting with small innovative details and stretching all the way to completely new machines. Working together, we will develop an intelligent and sustainable concept that is perfectly aligned with your specific requirements.

2

Drafting concepts

We see welcome challenges in your machine tasks, supporting you with our comprehensive expertise and providing valuable impetus for your innovations. We take a holistic view of the individual motion and control functions here and draw up consistent, end-to-end drive and automation solutions for you - keeping everything as easy as possible and as extensive as necessary.

3

Implementing solutions

Our easy formula for satisfied customers is to establish an active partnership with fast decision making processes and an individually tailored offer. We have been using this principle to meet the ever more specialised customer requirements in the field of machine engineering for many years.

4

Manufacturing machines

Functional diversity in perfect harmony: as one of the few full-range providers in the market, we can provide you with precisely those products that you actually need for any machine task – no more and no less. Our L-force product portfolio, a consistent platform for implementing drive and automation tasks, is invaluable in this regard.

5

Ensuring productivity

Productivity, reliability and new performance peaks on a daily basis – these are our key success factors for your machine. After delivery, we offer you cleverly devised service concepts to ensure continued safe operation. The primary focus here is on technical support, based on the excellent application expertise of our highly-skilled and knowledgeable after-sales team.

A matter of principle: the right products for every application.

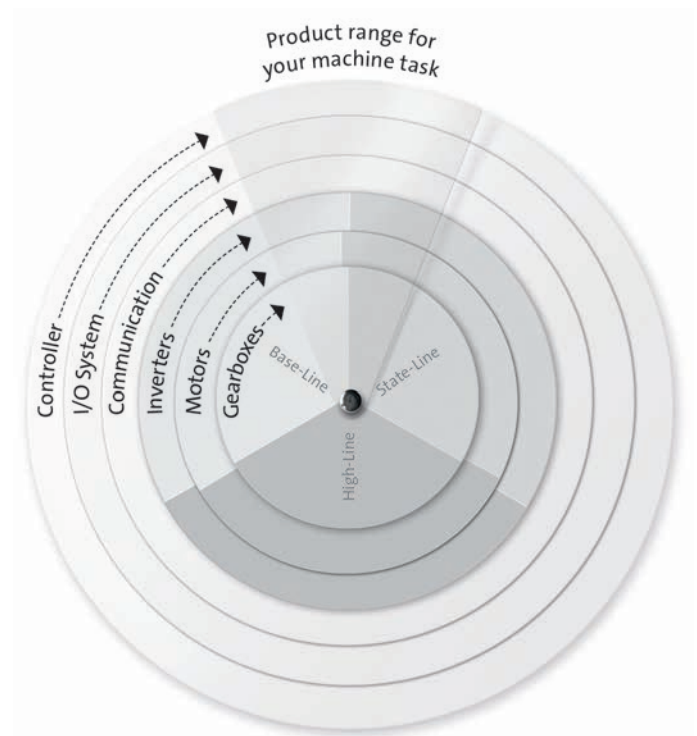
Lenze's extensive L-force product portfolio follows a very simple principle. The functions of our finely scaled products are assigned to the three lines Base-Line, State-Line or High-Line.

But what does this mean for you? It allows you to quickly recognise which products represent the best solution for your own specific requirements.

Powerful products with a major impact:

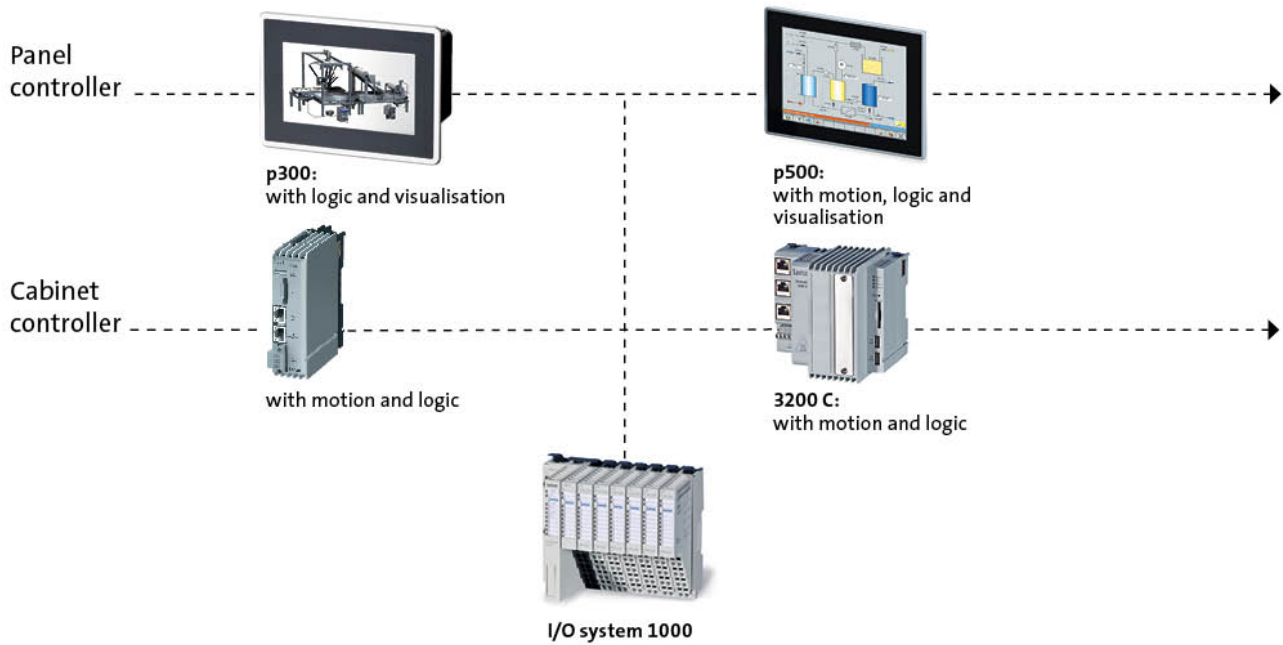
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

Lenze products undergo the most stringent testing in our own laboratory. This allows us to ensure that you will receive consistently high quality and a long service life. In addition to this, five logistics centres ensure that the Lenze products you select are available for quick delivery anywhere across the globe.

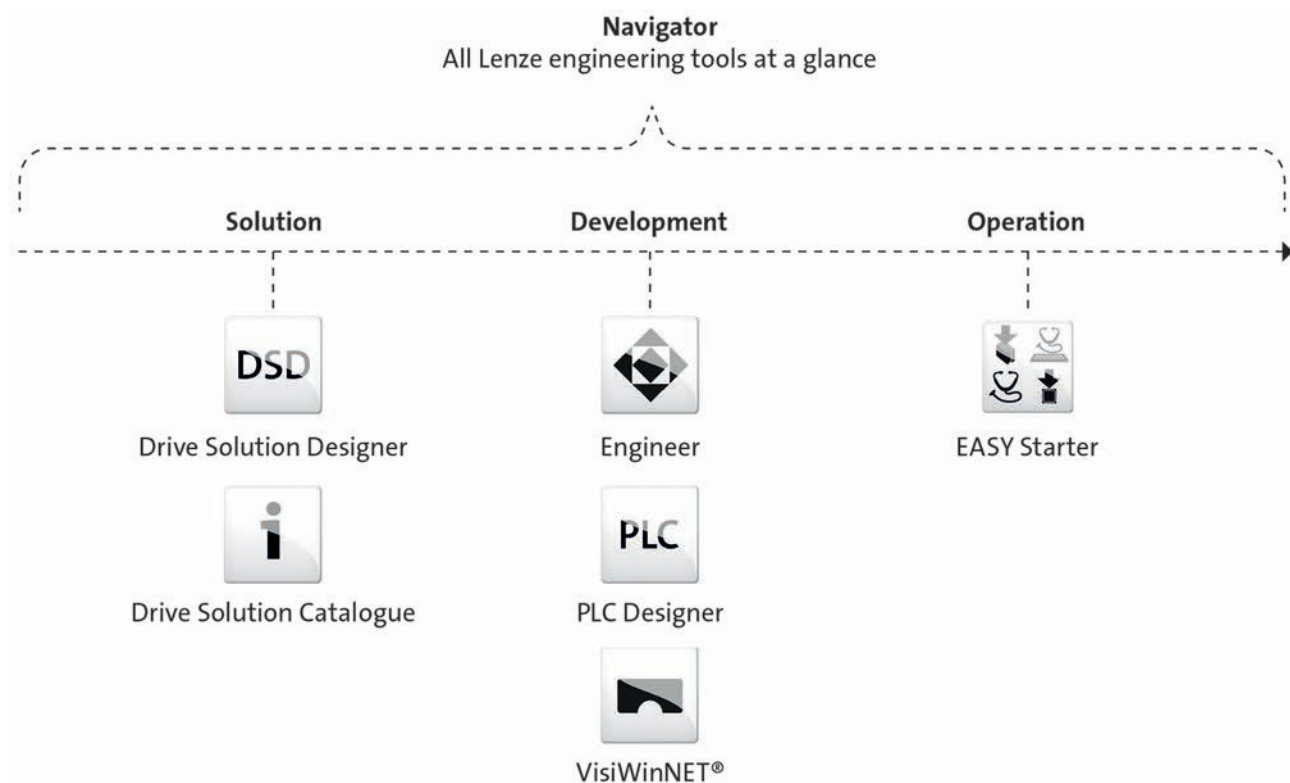


L-force product portfolio

Controls

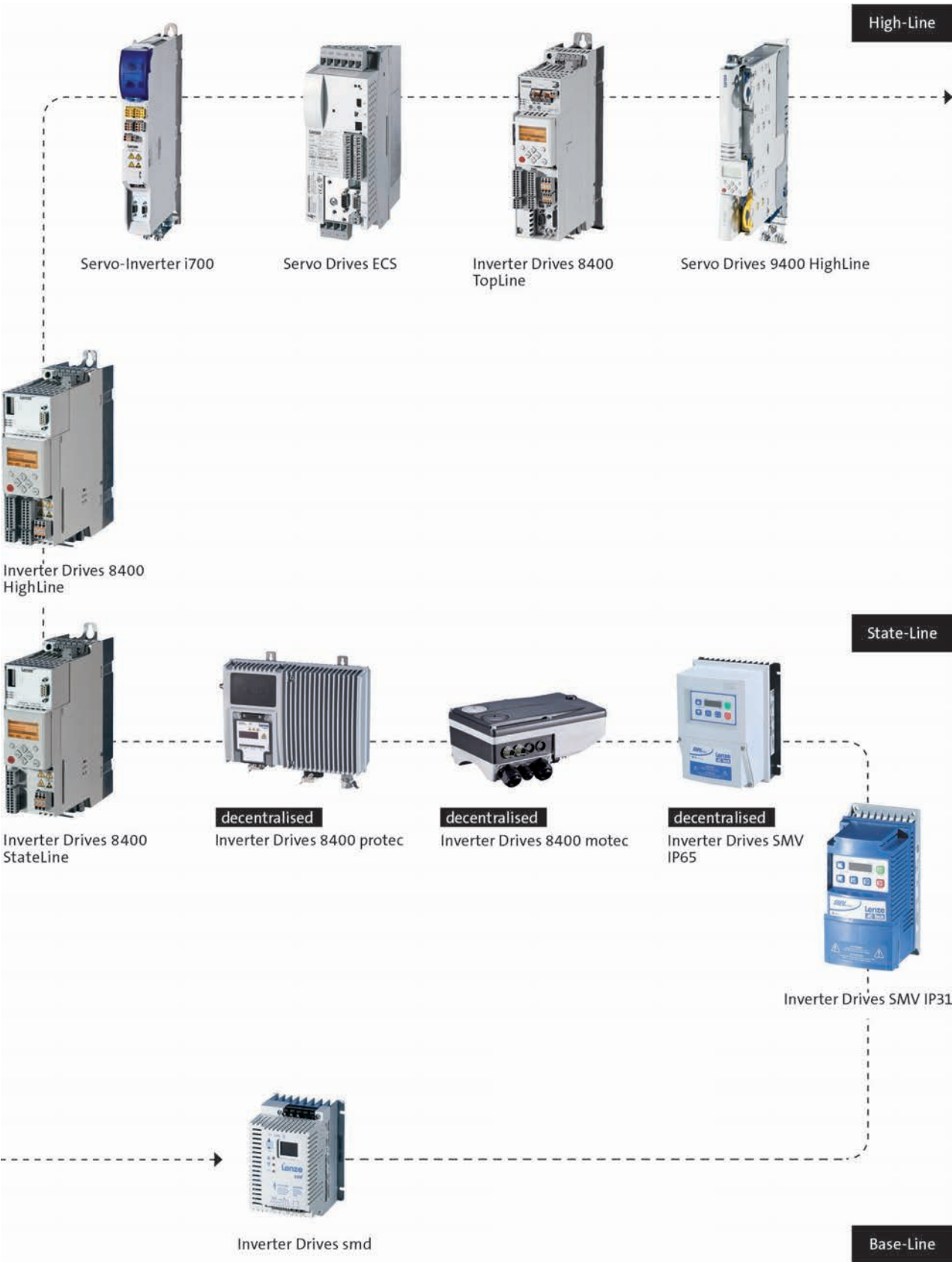


Engineering Tools



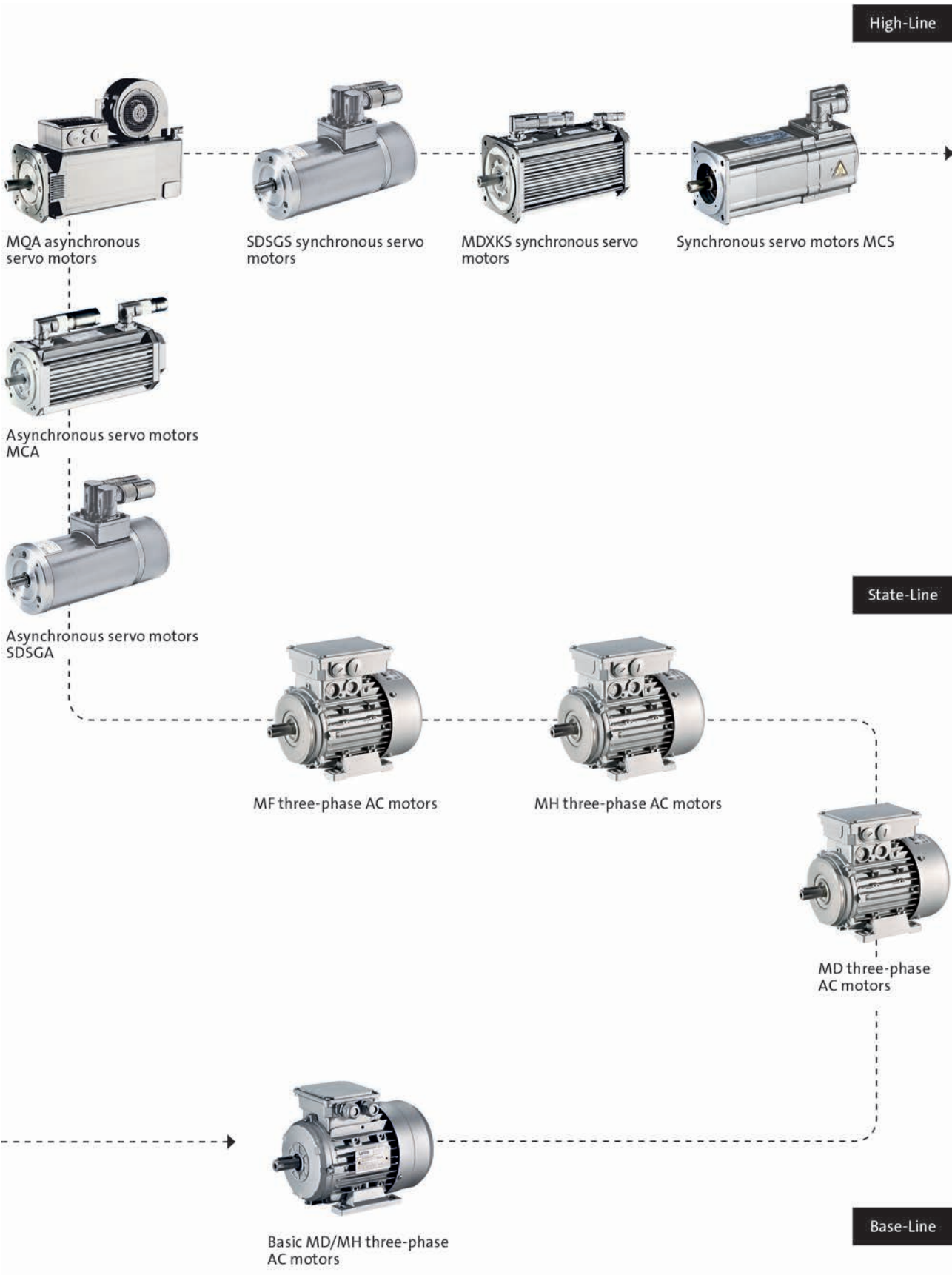
L-force product portfolio

Inverter



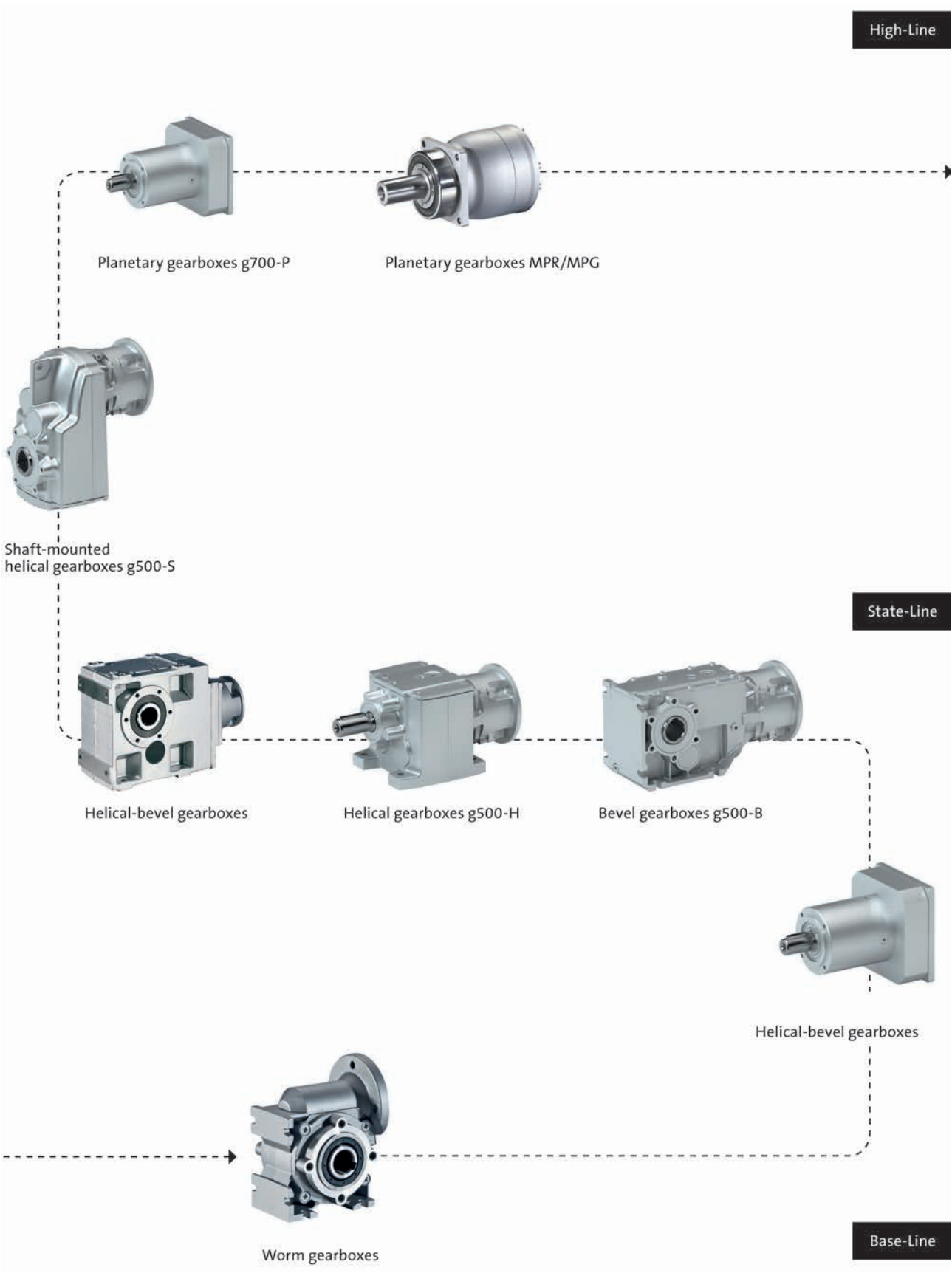
L-force product portfolio

Motors



L-force product portfolio

Gearboxes



Inverter

Inverter Drives 8400 TopLine

0.25 to 45 kW



Inverter Drives 8400 TopLine

Contents



General information	Product key	4.4 - 4	
	Equipment	4.4 - 5	
	List of abbreviations	4.4 - 6	
	Inverter Drives 8400	4.4 - 7	
	Functions and features	4.4 - 8	
	Operating modes	4.4 - 9	
Technical data	Standards and operating conditions	4.4 - 11	
	Rated data 230 V	4.4 - 12	
	Rated data 400 V	4.4 - 18	
	"Cold plate" design	4.4 - 30	
	Push-through technique design	4.4 - 32	
Interfaces	Mains connection	4.4 - 35	
	Motor connection	4.4 - 37	
	Connection diagrams	4.4 - 41	
	Control connections	4.4 - 43	
	Memory module	4.4 - 45	
	Safety system (STO)	4.4 - 45	
	EtherCAT® communication module	4.4 - 46	
	EtherNet/IP communication module	4.4 - 48	
	POWERLINK communication module	4.4 - 50	
	PROFIBUS communication module	4.4 - 52	
	PROFINET communication module	4.4 - 54	
Accessories	Brake resistors	4.4 - 57	
	Mains chokes	Operation at rated power	4.4 - 59
		Operation with increased power output	4.4 - 60
	Interference suppression	Available RFI and mains filters	4.4 - 61
		Operation at rated power	4.4 - 62
		Operation with increased power output	4.4 - 64
	Sinusoidal filters	Operation at rated power	4.4 - 66
		Operation with increased power output	4.4 - 67
	Regenerative power supply modules	Rated data for power supply modules	4.4 - 68
		Rated data for regenerative power supply modules	4.4 - 70
		Control connections	4.4 - 72
		Brake resistors of the regenerative power supply modules	4.4 - 73
		Mains chokes of the power supply modules	4.4 - 74
		Interference suppression of the regenerative power supply modules	4.4 - 75
		DC input module	4.4 - 78
		DC-bus connection	4.4 - 79
		24 V power supply unit	4.4 - 81
		Brake switch	4.4 - 81
		USB diagnostic adapter	4.4 - 82
		X400 keypad	4.4 - 83
		X400 diagnosis terminal	4.4 - 83
		PC system bus adapter	4.4 - 84
		Shield mounting	4.4 - 84
		Terminal strips	4.4 - 85
	Setpoint potentiometer	4.4 - 86	

Inverter Drives 8400 TopLine

General information



Product key

	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 5.5 kW)												
Power												
251 - 0.25 kW												
371 - 0.37 kW												
551 - 0.55 kW												
751 - 0.75 kW												
112 - 1.1 kW												
152 - 1.5 kW												
222 - 2.2 kW												
302 - 3.0 kW												
402 - 4.0 kW												
552 - 5.5 kW												
752 - 7.5 kW												
113 - 11.0 kW												
153 - 15.0 kW												
183 - 18.5 kW												
223 - 22.0 kW												
303 - 30.0 kW												
373 - 37.0 kW												
453 - 45.0 kW												
Voltage class												
2 - 230/240 V, 1/N/PE AC (0.25 ... 2.2 kW)												
4 - 400/500 V, 3/PE AC (0.37 ... 45.0 kW)												
Ambient conditions												
S - standard (0.25 ... 15.0 kW)												
V - rough environment (coated printed circuit boards, 0.25 ... 45.0 kW)												
Safety engineering												
X - without safety engineering												
B - with safety engineering (STO)												
Version identifier												
0 - 599 Hz												
S - 599 Hz												
7 - 1000 Hz												
Communication module plugged in												
XX - without communication module												
ET - EtherCAT												
EO - EtherNET/IP												
EC - POWERLINK												
PM - PROFIBUS												
ER - PROFINET												
Operating module plugged in												
X - without keypad												
K - with keypad												

Inverter Drives 8400 TopLine

General information



Equipment

X100 Mains connection	X100 DC-bus connection (400 V types)
IT screw	X101 Relay connection
Communication module Option	Safety engineering (STO) Option
Memory module • pluggable • contains all drive data	X6 Diagnostic interface USB adapter for PC connection or keypad, option
X3 Control terminal Spring terminal	X1 CANopen on board • DS301-compliant • T-plug
X5 Control terminal Spring terminal	X10 Axis bus Cross communication, synchronisation
X107 Control terminal Spring terminal	X8 Multiple encoder input TTL500 kHz, SinCos, Hiperface, SSI
X4 Control terminal Spring terminal	Integrated shield connection Motor cable X105 Motor connection
X7 Resolver input	Integrated shield connection Control cables
X80 Connection of safety engineering (STO) Option	

4.4

Inverter Drives 8400 TopLine

General information



List of abbreviations

b	[mm]	Dimensions
C _{th}	[KW _s]	Thermal capacity
f _{ch}	[kHz]	Switching frequency
h	[mm]	Dimensions
H _{max}	[m]	Site altitude
I _{max}	[A]	Max. DC-bus current
I _{max, out}	[A]	Max. output current
I _{N, AC}	[A]	Rated mains current
I _{N, DC}	[A]	Rated DC-bus current
I _{N, out}	[A]	Rated output current
l _{max}	[m]	Max. cable length
m	[kg]	Mass
P	[kW]	Typical motor power
P _{max, 1}	[kW]	Max. output power
P _V	[kW]	Power loss
P _N	[kW]	Rated power
R _{min}	[Ω]	Min. brake resistance
R _N	[Ω]	Rated resistance
t	[mm]	Dimensions
U _{AC}	[V]	Mains voltage
U _{DC}	[V]	DC supply
U _{N, AC}	[V]	Rated voltage
U _{out}	[V]	Max. output voltage

ASM	Asynchronous motor
DIAG	Slot for diagnostic adapter
DIN	Deutsches Institut für Normung e.V.
EN	European standard
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60721-3	Classification of environmental conditions; Part 3: Classes of environmental parameters and their limit values
EN 61800-3	Electrical variable speed drives Part 3: EMC requirements including special test methods
IEC	International Electrotechnical Commission
IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
IM	International Mounting Code
IP	International Protection Code
MCI	Slot for communication module (module communication interface)
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

Inverter Drives 8400 TopLine

General information



Inverter Drives 8400

Cost-efficiency, time savings and quality enhancement are the challenges of the future. Lenze is facing these challenges with its L-force product portfolio – the holistic solution portfolio with precisely matched interfaces and components. For faster configuration and commissioning, better performance and more flexibility in production.

As such, the four versions of Inverter Drives 8400 - BaseLine, StateLine, HighLine and TopLine - have been designed for consistent process optimisation – throughout your entire value-added chain. They reduce your costs, from component selection, through project planning, manufacturing and commissioning, all the way up to servicing. We call this "rightsizing".

Rightsized for versatile applications

Are you looking to control a three-phase AC motor or perform positioning with or without feedback? Then select exactly the inverter you need from the scaled solution space of the Inverter Drives 8400 with units in the power range from 0.25 kW to 45 kW. You are sure to find exactly what you are looking for here, as the modular 8400 range of inverters offers the right solution for a broad spectrum of applications.

While the BaseLine is excellent for basic applications, the TopLine offers servo qualities and thereby fulfils with the strict requirements in terms of dynamics and accuracy.

8400 TopLine - for servo applications

8400 TopLine – the inverter with servo qualities within the 8400 range. Equipped with everything needed for high dynamic performance and accuracy in complex applications. Alongside a resolver input, a multiple encoder input (which can be used at the same time) is also provided which optimally supplements the range of feedback systems that can be used. Cross communication between multiple TopLine units requires minimum wiring (3-core), as it runs via the separate axis bus. Alongside asynchronous motors, TopLine also supports dynamic synchronous motors via feedback.

Benefit from precisely tailored, cost-optimised Lenze drive units, consisting of prepared system cables, motors and gearboxes, feedback, brakes, fans and of course the 8400 TopLine.

The 8400 TopLine is, for example, recommended for storage and retrieval units, synchronised line drives and pick-and-place applications.

Inverter Drives 8400 TopLine

General information



Functions and features

Mode	8400 TopLine
Control types, motor control	
Field-oriented servo control (SC)	For synchronous servo motors, asynchronous servo motors and three-phase asynchronous motors
Sensorless control (SLPSM)	For synchronous servo motors
Sensorless vector control (SLVC)	For three-phase asynchronous motors
V/f control (VFCplus)	For three-phase AC motors and asynchronous servo motor (linear or square-law)
Energy saving function (VFC eco)	For three-phase asynchronous motors
Basic functions	Freely assignable user menu Free function block interconnection with extensive function library Parameter change-over DC brake function Braking operation without brake resistor Brake management for brake control with low rate of wear Flying restart circuit S-shaped ramps for smooth acceleration PID controller 15 fixed frequencies Masking frequencies Inversion of motor phase sequence
Technology applications	Speed actuating drive Switch-off positioning without feedback Table positioning without feedback (with sequential positioning)
Advanced functions	Function blocks for positioning sequence control Function blocks for electrical shaft (speed and angular synchronism) Function blocks for dancer control Function blocks for mains failure control
Monitoring and protective measures	Short circuit Earth fault Overvoltage Motor phase failure Overcurrent I ² x t-Motor monitoring Motor overtemperature Mains phase failure Protection against restart for cyclic mains switching Motor stalling
Diagnostics	Data logger, logbook, oscilloscope functions
Status display	6 LEDs
Diagnostic interface	Integrated For USB diagnostic adapter or keypad (diagnosis terminal)
Braking operation	
Brake chopper	Integrated
Brake resistor	External

Inverter Drives 8400 TopLine

General information

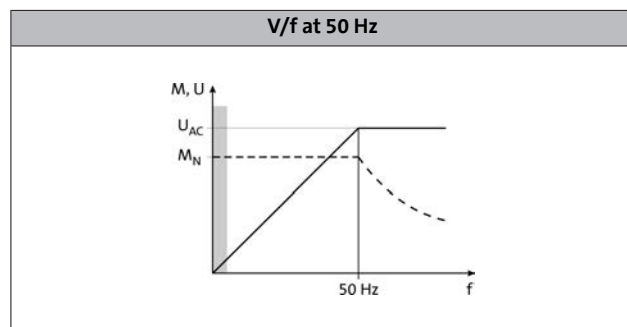


Operating modes

An inverter enables energy-efficient operation of a system in virtually all application cases. The various operating modes, which can be created by making just a few simple settings, facilitate this. The following characteristics and corresponding specifications listed on the following pages can be used to calculate the optimum operating mode during the project planning phase.

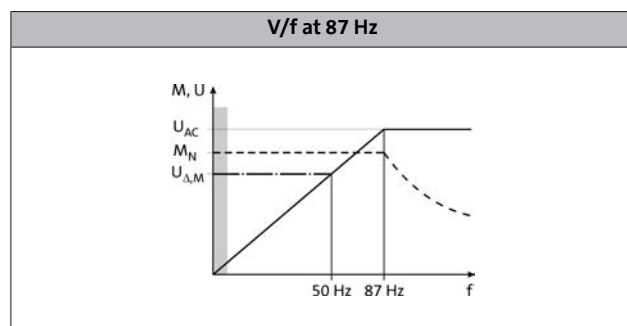
Standard setting

In its initial state when delivered, the inverter is set up for basic operation with a three-phase AC motor with V/f control. When operated in this mode, the rated torque of the motor is available in a setting range up to 50 Hz.



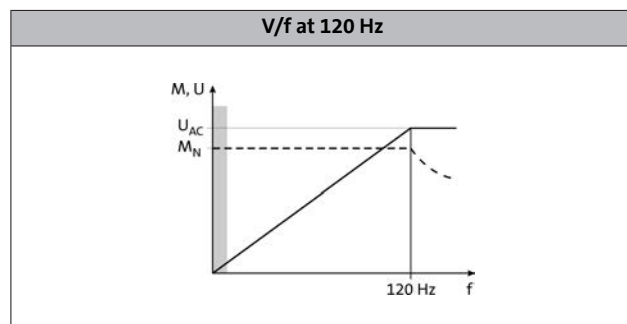
Extended setting range up to 87 Hz

If the V/f reference point on the inverter is set to 87 Hz, the rated torque can be used across an extended setting range. Here, a 230/400V motor is for example used and operated in a delta layout with a 400V inverter. The setting range is then increased by 40 %. The inverter must be dimensioned for a rated motor current of 230 V.



Operation with inverter-optimised MF motors

Large setting ranges and optimum operation at the rated torque: these are the strengths of the MF motor when used in combination with an inverter. The motors are optimised for a setting range up to 120 Hz. Compared to conventional 50Hz operation, the setting range increases by 250 %. It is quite simply not possible for a drive to be operated any more efficiently in a machine.



Inverter Drives 8400 TopLine

General information



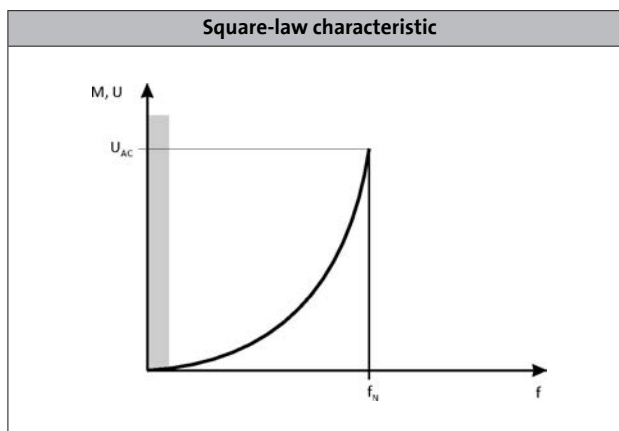
Operating modes

Square-law V/f characteristic control

The output voltage is increased quadratically 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 quadratically to the frequency increase, the maximum output power of the motor being constant.

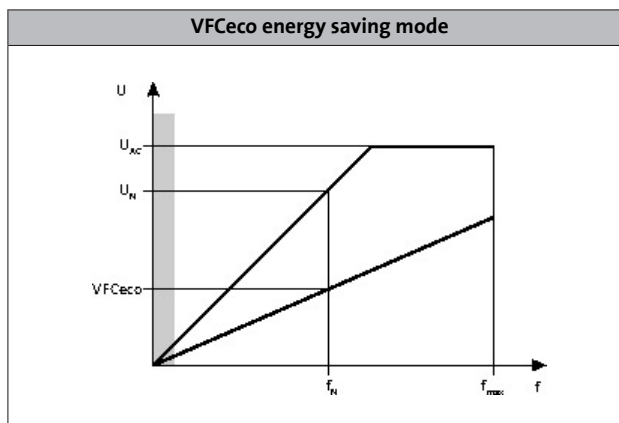
Application areas are for instance:

- Pumps
- Blowers
- Fans



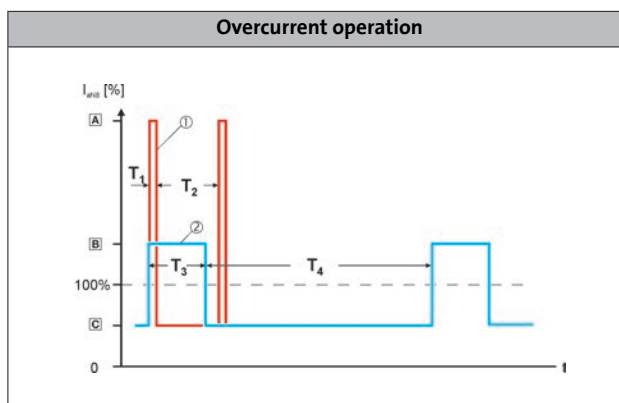
VFCeco energy saving mode

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.



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 with a duration 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. For both utilisation cycles, a moving average is determined separately. The adjacent diagram shows both cycles: 15 s in red and 180 s in blue. The overload times t_{o1} are 3 s (T_1) and 60 s (T_3) respectively, the corresponding recovery times t_{re} are 12 s (T_2) and 120 s (T_4) respectively. The following tables show the resulting maximum output currents. Monitoring of the device utilisation ($I \times t$) activates the set error response (trip or warning if one of the two utilisation values exceeds the limit of 100 %).



Inverter Drives 8400 TopLine

Technical data



Standards and operating conditions

Mode			
Product			8400 TopLine
Conformity			
CE			Low-Voltage Directive
			2014/35/EU [UKCA: S.I. 2016/1101]
Approval			
UL 508C			for USA and Canada (requirements of the CSA 22.2 No. 14) ²⁾ Power Conversion Equipment (file no. E132659)
Degree of protection			
EN 60529 ³⁾			IP20
NEMA 250			Type 1
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10 °C ... +55 °C)
Current derating at over 45 °C			2.5% / K
Site altitude			
Amsl	H _{max}	[m]	4000
Current derating at over 1000 m		[%/1000 m]	5
Vibration resistance			
Transport (EN 60721-3-2)			2M2
Operation (EN 61800-5-1)			10 Hz ≤ f ≤ 57 Hz: ±0.075 mm amplitude, 57 Hz ≤ f ≤ 150 Hz: 1.0 g
Operation (Germanischer Lloyd)			5 Hz ≤ f ≤ 13.2 Hz: ± 1 mm amplitude 13.2 Hz ≤ f ≤ 100 Hz: 0.7 g

4.4

Mode			
Product			8400 TopLine
Supply form			
			Systems with earthed star point (TN and TT systems) Systems with high-resistance or isolated star point (IT systems)
Noise emission			
EN 61800-3			Integrated RFI suppression: category C2 up to 25 m shielded motor cable ¹⁾
Insulation resistance			
EN 61800-5-1			Overvoltage category III Above 2000 m amsl overvoltage category II
Degree of pollution			
EN 61800-5-1			2
Protective insulation of control circuits			
EN 61800-5-1			Safe mains isolation: double/reinforced insulation

¹⁾  37 - Please also refer to the Motor connection section

²⁾ CSA when using an external mains choke or a module for reducing transients.

³⁾ Mounted and ready-to-use

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55 ¹⁾
Product key						
			E84AVTC□2512□□0 E84AVTC□2512□□S		E84AVTC□3712□□0 E84AVTC□3712□□S	
Mains voltage range						
	U _{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	I _{N, AC}	[A]	3.0	3.6	4.2	5.0
Without mains choke	I _{N, AC}	[A]	3.4	4.1	5.0	
Rated output current						
	I _{N, out}	[A]	1.7	2.1	2.4	2.9
Output current						
2 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
4 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
8 kHz	I _{out}	[A]	1.7		2.4	
16 kHz	I _{out}	[A]	1.1		1.6	

Data for 60 s overload

Max. output current				
	I _{max, out}	[A]	2.6	3.6
Overload time				
	t _{ol}	[s]	60.0	
Recovery time				
	t _{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	3.4	4.8
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55
Product key						
			E84AVTC□2512□□0 E84AVTC□2512□□S		E84AVTC□3712□□0 E84AVTC□3712□□S	
Power loss						
	P _V	[kW]	0.045		0.050	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	0.6	0.6
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	0.8	0.8
Min. brake resistance				
	R _{min}	[Ω]	180.0	180.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	215	215
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	214	214
Mass				
	m	[kg]	2.0	2.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).

Output currents I_{out} apply to:

Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.

Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.

Output currents apply to:

Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10 ¹⁾
Product key			E84AVTC□5512□□0 E84AVTC□5512□□S		E84AVTC□7512□□0 E84AVTC□7512□□S	
Mains voltage range			1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U _{AC}	[V]				
Rated mains current						
With mains choke	I _{N, AC}	[A]	5.0	6.0	7.0	8.4
Without mains choke	I _{N, AC}	[A]	5.3	6.4	8.0	
Rated output current						
	I _{N, out}	[A]	3.0	3.6	4.0	4.8
Output current						
2 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
4 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
8 kHz	I _{out}	[A]	3.0		4.0	
16 kHz	I _{out}	[A]	2.0		2.7	

Data for 60 s overload

Max. output current				
	I _{max, out}	[A]	4.5	6.0
Overload time				
	t _{ol}	[s]	60.0	
Recovery time				
	t _{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	6.0	8.0
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10
Product key						
			E84AVTC□5512□□0 E84AVTC□5512□□S		E84AVTC□7512□□0 E84AVTC□7512□□S	
Power loss						
	P _V	[kW]	0.060		0.075	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	1.1	1.1
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	1.4	1.4
Min. brake resistance				
	R _{min}	[Ω]	100.0	100.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	215	215
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	214	214
Mass				
	m	[kg]	2.0	2.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

							
Typical motor power							
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20 ¹⁾	2.20
Product key							
			E84AVTC□1122□□0 E84AVTC□1122□□S	E84AVTC□1522□□0 E84AVTC□1522□□S	E84AVTC□2222□□0 E84AVTC□2222□□S		
Mains voltage range							
	U_{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %				
Rated mains current							
With mains choke	$I_{N, AC}$	[A]	9.9	11.9	11.4	13.7	16.4
Without mains choke	$I_{N, AC}$	[A]	12.0	14.4	13.7		21.8
Rated output current							
	$I_{N, out}$	[A]	5.5	6.8	7.0	8.4	9.5
Output current							
2 kHz	I_{out}	[A]	5.5	6.8	7.0	8.4	9.5
4 kHz	I_{out}	[A]	5.5	6.8	7.0	8.4	9.5
8 kHz	I_{out}	[A]	5.5		7.0		9.5
16 kHz	I_{out}	[A]	3.7		4.7		6.3

Data for 60 s overload

Max. output current							
	$I_{max, out}$	[A]	8.3 10.5 14.3				
Overload time							
	t_{ol}	[s]	60.0				
Recovery time							
	t_{re}	[s]	120.0				

Data for 3 s overload

Max. short-time output current							
	$I_{max, out}$	[A]	11.0 14.0 19.0				
Overload time							
	t_{ol}	[s]	3.0				
Recovery time							
	t_{re}	[s]	12.0				

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	
Product key								
			E84AVTC□1122□□0 E84AVTC□1122□□S		E84AVTC□1522□□0 E84AVTC□1522□□S		E84AVTC□2222□□0 E84AVTC□2222□□S	
Power loss								
	P _V	[kW]	0.095		0.110		0.140	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	3.3	3.3	3.3
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	4.4	4.4	4.4
Min. brake resistance					
	R _{min}	[Ω]	33.0	33.0	33.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	270	270	270
Width	b	[mm]	70	70	70
Depth ²⁾	t	[mm]	214	214	214
Mass					
	m	[kg]	2.3	2.3	2.3

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10 ¹⁾
Product key			E84AVTC□3714□□0 E84AVTC□3714□□S		E84AVTC□5514□□0 E84AVTC□5514□□S		E84AVTC□7514□□0 E84AVTC□7514□□S	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	1.4	1.7	2.0	2.6		3.0
Without mains choke	I _{N, AC}	[A]	1.8	2.2	2.5	3.2	3.6	
Rated output current								
	I _{N, out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
Output current								
2 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
4 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
8 kHz	I _{out}	[A]	1.3		1.8		2.4	
16 kHz	I _{out}	[A]	0.9		1.2		1.6	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	2.0	2.7	3.6
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	2.6	3.6	4.8
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10
Product key								
			E84AVTC□3714□□0 E84AVTC□3714□□S		E84AVTC□5514□□0 E84AVTC□5514□□S		E84AVTC□7514□□0 E84AVTC□7514□□S	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	2.2		3.3		4.4	
Power loss								
	P _V	[kW]	0.050		0.065		0.080	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

4.4

Brake chopper rated data

Rated power, Brake chopper								
	P _N	[kW]	1.3		1.3		1.3	
Max. output power, Brake chopper								
	P _{max, 1}	[kW]	1.3		1.3		1.3	
Min. brake resistance								
	R _{min}	[Ω]	390.0		390.0		390.0	

Dimensions and weights

Standard installation design

Dimensions								
Height	h	[mm]	215		215		215	
Width	b	[mm]	70		70		70	
Depth ²⁾	t	[mm]	214		214		214	
Mass								
	m	[kg]	2.0		2.0		2.0	

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00 ¹⁾	3.00	4.00 ¹⁾
Product key										
			E84AVTC□1124□□0 E84AVTC□1124□□S		E84AVTC□1524□□0 E84AVTC□1524□□S		E84AVTC□2224□□0 E84AVTC□2224□□S		E84AVTC□3024□□S	
Mains voltage range										
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %							
Rated mains current										
With mains choke	I _{N, AC}	[A]	3.2	3.8	3.9	4.7	5.1	6.1	7.0	8.4
Without mains choke	I _{N, AC}	[A]	4.4	5.3	5.5	6.6	7.3		9.8	11.8
Rated output current										
	I _{N, out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
Output current										
2 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
4 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
8 kHz	I _{out}	[A]	3.2		3.9		5.6		7.3	
16 kHz	I _{out}	[A]	2.1		2.6		3.7		4.9	

Data for 60 s overload

Max. output current						
	I _{max, out}	[A]	4.8	5.9	8.4	11.0
Overload time						
	t _{ol}	[s]	60.0			
Recovery time						
	t _{re}	[s]	120.0			

Data for 3 s overload

Max. short-time output current						
	I _{max, out}	[A]	6.4	7.8	11.2	14.6
Overload time						
	t _{ol}	[s]	3.0			
Recovery time						
	t _{re}	[s]	12.0			

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00	3.00	4.00
Product key										
			E84AVTC□1124□□0 E84AVTC□1124□□S	E84AVTC□1524□□0 E84AVTC□1524□□S		E84AVTC□2224□□0 E84AVTC□2224□□S		E84AVTC□3024□□S		
DC supply										
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %							
Rated DC-bus current										
	I _{N, DC}	[A]	5.4		6.7		8.9		12.0	
Power loss										
	P _V	[kW]	0.095		0.105		0.135		0.165	
Max. cable length ¹⁾										
Shielded motor cable	I _{max}	[m]	50							

4.4

Brake chopper rated data

Rated power, Brake chopper						
	P _N	[kW]	2.9	2.9	3.5	6.4
Max. output power, Brake chopper						
	P _{max, 1}	[kW]	2.9	2.9	3.5	6.4
Min. brake resistance						
	R _{min}	[Ω]	180.0	180.0	150.0	82.0

Dimensions and weights

Standard installation design

Dimensions						
Height	h	[mm]	270	270	270	270
Width	b	[mm]	70	70	70	70
Depth ²⁾	t	[mm]	214	214	214	214
Mass						
	m	[kg]	2.3	2.3	2.3	2.3

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50 ¹⁾
Product key								
			E84AVTC□3024□□0		E84AVTC□4024□□0		E84AVTC□5524□□0	
Mains voltage range								
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
Rated mains current								
With mains choke	I _{N, AC}	[A]	7.0	8.4	8.8	10.6	12.0	18.0
Without mains choke	I _{N, AC}	[A]	9.8	11.8	13.1	15.7	18.0	
Rated output current								
	I _{N, out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
Output current								
2 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
4 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
8 kHz	I _{out}	[A]	7.3		9.5		13.0	
16 kHz	I _{out}	[A]	4.9		6.3		8.7	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	11.0	14.3	19.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	14.6	19.0	26.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50
Product key								
			E84AVTC□3024□□0		E84AVTC□4024□□0		E84AVTC□5524□□0	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	12.0		16.0		22.0	
Power loss								
	P _V	[kW]	0.165		0.205		0.275	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

4.4

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	6.4	9.4	9.4
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	6.4	11.2	11.2
Min. brake resistance					
	R _{min}	[Ω]	82.0	47.0	47.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	270	270	270
Width	b	[mm]	140	140	140
Depth ²⁾	t	[mm]	214	214	214
Mass					
	m	[kg]	4.6	4.6	4.6

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0 ¹⁾	15.0 ¹⁾	
Product key								
			E84AVTC□7524□□0		E84AVTC□1134□□0		E84AVTC□1534□□0	
Mains voltage range								
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
Rated mains current								
With mains choke	I _{N, AC}	[A]	15.0	21.0		29.0		
Without mains choke	I _{N, AC}	[A]	20.0	28.0	29.0			
Rated output current								
	I _{N, out}	[A]	16.5	21.0	23.5	28.2	32.0	
Output current								
2 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0	
4 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0	
8 kHz	I _{out}	[A]	16.5		23.5		32.0	
16 kHz	I _{out}	[A]	11.0		15.7		21.3	

Data for 60 s overload

Max. output current					
	$I_{\text{max, out}}$	[A]	26.4	35.3	48.0
Overload time					
	t_{ol}	[s]	60.0		
Recovery time					
	t_{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	33.0	47.0	64.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0	15.0	
Product key			E84AVTC□7524□□0		E84AVTC□1134□□0		E84AVTC□1534□□0	
DC supply								
	U _{DC}	[V]						
Rated DC-bus current			DC 455 V -0 % ... 775 V +0 %					
	I _{N, DC}	[A]	24.5		35.5			
Power loss								
	P _V	[kW]	0.320		0.435		0.470	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

4.4

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	19.5	19.5	29.2
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	19.5	19.5	29.2
Min. brake resistance					
	R _{min}	[Ω]	27.0	27.0	18.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	325	325	325
Width	b	[mm]	140	140	140
Depth ²⁾	t	[mm]	214	214	214
Mass					
	m	[kg]	6.0	6.0	6.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0 ¹⁾	22.0 ¹⁾	30.0 ¹⁾
Product key						
			E84AVTC□1834□□0		E84AVTC□2234□□0	
Mains voltage range						
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	I _{N, AC}	[A]	36.0	42.2	42.0	50.8
Without mains choke	I _{N, AC}	[A]	50.4			
Rated output current						
	I _{N, out}	[A]	40.0	46.8	47.0	56.4
Output current						
2 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
4 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
8 kHz	I _{out}	[A]	40.0	47.0		
16 kHz	I _{out}	[A]	27.0	31.3		

Data for 60 s overload

Max. output current				
	$I_{\text{max, out}}$	[A]	60.0	70.5
Overload time				
	t_{ol}	[s]	60.0	
Recovery time				
	t_{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	78.0	89.3
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke or mains filter

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0	22.0	30.0
Product key			E84AVTC□1834□□0			E84AVTC□2234□□0
DC supply			DC 455 V -0 % ... 775 V +0 %			
	U _{DC}	[V]				
Rated DC-bus current						
	I _{N, DC}	[A]	44.1		51.4	
Power loss						
	P _V	[kW]	0.540		0.640	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	100			

4.4

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	35.0	35.0
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	35.0	35.0
Min. brake resistance				
	R _{min}	[Ω]	15.0	15.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	350	350
Width	b	[mm]	205	205
Depth ²⁾	t	[mm]	265	265
Mass				
	m	[kg]	12.2	12.2

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0 ¹⁾	37.0 ¹⁾	37.0 ¹⁾	45.0 ¹⁾	45.0 ¹⁾	55.0 ¹⁾
Product key			E84AVTC□3034□□0		E84AVTC□3734□□0		E84AVTC□4534□□0	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	55.0	66.0	68.0	81.6	80.0	96.0
Without mains choke	I _{N, AC}	[A]						
Rated output current								
	I _{N, out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
Output current								
2 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
4 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
8 kHz	I _{out}	[A]	61.0		76.0		89.0	
16 kHz	I _{out}	[A]	41.0		51.0		60.0	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	91.5	114.0	133.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	112.1	136.8	169.1
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke or mains filter

Inverter Drives 8400 TopLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0	37.0	37.0	45.0	45.0	55.0
Product key								
			E84AVTC□3034□□0		E84AVTC□3734□□0		E84AVTC□4534□□0	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	67.4		83.3		98.0	
Power loss								
	P _V	[kW]	0.840		0.980		1.300	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	100					

4.4

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	70.1	70.1	70.1
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	70.1	70.1	70.1
Min. brake resistance					
	R _{min}	[Ω]	7.5	7.5	7.5

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	450	450	450
Width	b	[mm]	250	250	250
Depth ²⁾	t	[mm]	265	265	265
Mass					
	m	[kg]	17.4	17.4	17.4

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



"Cold plate" design

Inverters in cold-plate design dissipate some of their waste heat (heat loss) via a cooler adapted to the application. For this purpose, the inverters are provided with a planed cooling plate which is connected to a separate cooler in a thermally conductive way. Using the cold plate technology, the main part of the heat energy can be transferred directly to the external cooling units.

The use of cold-plate technology is advantageous for the following application cases:

- Minimising the expense of cooling the control cabinet. Here, the main part of the power loss is directly transferred to a cooling unit outside of the control cabinet, e.g. convection cooler or water cooler.
- Heavily polluted ambient air or control cabinets with a high degree of protection which do not allow for a use of a forced air cooling of the control cabinets.
- Low mounting depth in the control cabinet.

Product key	Power to be dissipated	Thermal resistance
	P_V	R_{th}
	[W]	[K/W]
E84AVTCC2512□□S	15.0	≤ 1.5
E84AVTCC3712□□S	20.0	≤ 1.5
E84AVTCC5512□□S	30.0	≤ 1.0
E84AVTCC7512□□S	40.0	≤ 1.0
E84AVTCC1122□□S	60.0	≤ 0.6
E84AVTCC1522□□S	75.0	≤ 0.5
E84AVTCC2222□□S	100	≤ 0.4
E84AVTCC3714□□S	25.0	≤ 1.0
E84AVTCC5514□□S	35.0	≤ 1.0
E84AVTCC7514□□S	50.0	≤ 1.0
E84AVTCC1124□□S	60.0	≤ 0.6
E84AVTCC1524□□S	70.0	≤ 0.5
E84AVTCC2224□□S	100	≤ 0.4
E84AVTCC3024□□S	100	≤ 0.4
E84AVTCC4024□□0	155	≤ 0.25
E84AVTCC5524□□0	215	≤ 0.18

Dimensions and weights

Product key			
			E84AVTCC2512□□S E84AVTCC3712□□S E84AVTCC5512□□S E84AVTCC7512□□S
Dimensions			
Height, including fastening	h	[mm]	236
Width, including fastening	b	[mm]	70
Depth	t	[mm]	178
Mass			
	m	[kg]	1.7

Product key			
			E84AVTCC1122□□S E84AVTCC1522□□S E84AVTCC2222□□S
Dimensions			
Height, including fastening	h	[mm]	295
Width, including fastening	b	[mm]	70
Depth	t	[mm]	178
Mass			
	m	[kg]	2.2

Inverter Drives 8400 TopLine

Technical data



"Cold plate" design

Dimensions and weights

Product key			E84AVTCC3714□□S	E84AVTCC5514□□S	E84AVTCC7514□□S
Dimensions					
Height, including fastening	h	[mm]	236		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	178		
Mass					
	m	[kg]	1.7		

Product key			E84AVTCC1124□□S	E84AVTCC1524□□S	E84AVTCC2224□□S
Dimensions					
Height, including fastening	h	[mm]	295		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	178		
Mass					
	m	[kg]	2.2		

Product key			E84AVTCC3024□□S		E84AVTCC4024□□0	E84AVTCC5524□□0
Dimensions						
Height, including fastening	h	[mm]	295		318	
Width, including fastening	b	[mm]	70		174	
Depth ¹⁾	t	[mm]	178		156	
Mass						
	m	[kg]	2.2		2.9	

¹⁾ With safety engineering plus 20 mm

4.4



Push-through technique design

The inverters in push-through design reduce the waste heat in the control cabinet.

The inverter is mounted in the control cabinet such that the heatsink of the inverter is outside the control cabinet. Thus, the entire waste heat can be dissipated outside the control cabinet via convection or forced air cooling for almost all device performances. For inverters with a power below 2.2 kW, restrictions may occur.

Using the push-through technology is advantageous in the following application cases:

- Minimising the expense for control cabinet cooling. For this purpose, the main part of the power loss is directly transferred to the ambience outside the control cabinet (e.g. convection cooling).
- In case of control cabinets with a high degree of protection > IP54 by using separate mounting and cooling areas.
- Low mounting depth in the control cabinet.

Inverter Drives 8400 TopLine

Technical data



Push-through technique design

Dimensions and weights

Product key						
			E84AVTCD2512□□□0	E84AVTCD3712□□□0	E84AVTCD5512□□□0	E84AVTCD7512□□□0
Dimensions						
Height, including fastening	h	[mm]	236			
Width, including fastening	b	[mm]	102			
Depth (in control cabinet) ¹⁾	t	[mm]	178			
Mass						
	m	[kg]	2.1			

Product key						
			E84AVTCD1122□□□0	E84AVTCD1522□□□0	E84AVTCD2222□□□0	E84AVTCD3714□□□0
Dimensions						
Height, including fastening	h	[mm]	295			236
Width, including fastening	b	[mm]	137			102
Depth (in control cabinet) ¹⁾	t	[mm]	178			
Mass						
	m	[kg]	3.7			2.1

Product key			E84AVTCD5514□□0	E84AVTCD7514□□0	E84AVTCD1124□□0	E84AVTCD1524□□0
Dimensions						
Height, including fastening	h	[mm]	236		295	
Width, including fastening	b	[mm]	102		137	
Depth (in control cabinet) ¹⁾	t	[mm]	178			
Mass						
	m	[kg]	2.1		3.7	

Product key						
			E84AVTCD2224□□0	E84AVTCD3024□□0	E84AVTCD4024□□0	E84AVTCD5524□□0
Dimensions						
Height, including fastening	h	[mm]	295	318		
Width, including fastening	b	[mm]	137	174		
Depth (in control cabinet) ¹⁾	t	[mm]	178	156		
Mass						
	m	[kg]	3.7	5.1		

Product key					
			E84AVTCD7524□□□0	E84AVTCD1134□□□0	E84AVTCD1534□□□0
Dimensions					
Height, including fastening	h	[mm]	378		
Width, including fastening	b	[mm]	174		
Depth (in control cabinet) ¹⁾	t	[mm]	156		
Mass					
	m	[kg]	6.4		

¹⁾ With safety engineering plus 20 mm

Inverter Drives 8400 TopLine

Technical data



Inverter Drives 8400 TopLine

Interfaces



Mains connection

- The mains fuse and cable cross-section specifications are for a mains connection of 1 x 230V or 3 x 400V.
- Class gG/gI fuses or class gRL semiconductor fuses.
- The cable cross-sections apply to PVC-insulated copper cables.
- Use for installation with UL-approved cables, fuses and brackets.

Operation with mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection	
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (with mains choke)	
P	U _{AC}		I	I	I	q	
[kW]	[V]		[A]	[A]	[A]	[mm ²]	
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	C6	6	6	1.0	
0.37		E84AV□□□3712□□□			10		
0.55		E84AV□□□5512□□□	C10	10	15	1.5	
0.75		E84AV□□□7512□□□			20		
1.10		E84AV□□□1122□□□	C16	16	25	2.5	
1.50		E84AV□□□1522□□□			30		
2.20		E84AV□□□2222□□□	C20	20	30	4.0	
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	C6	6	6	1.0	
0.55		E84AV□□□5514□□□			10		
0.75		E84AV□□□7514□□□					
1.10		E84AV□□□1124□□□			15		
1.50		E84AV□□□1524□□□					
2.20		E84AV□□□2224□□□	C10	10	15	1.5	
3.00		E84AV□□□3024□□□			20		
4.00		E84AV□□□4024□□□	C16	16	2.5		
5.50		E84AV□□□5524□□□	C20	20		4.0	
7.50		E84AV□□□7524□□□		30			
11.0		E84AV□□□1134□□□	C32	32		10.0	
15.0		E84AV□□□1534□□□		40			
18.5		E84AV□□□1834□□□	C50	50	16.0		
22.0		E84AV□□□2234□□□	C63	63	50	25.0	
30.0		E84AV□□□3034□□□	C80	80	70		
37.0		E84AV□□□3734□□□	C100	100	80	50.0	
45.0		E84AV□□□4534□□□	C125	125	100		

Inverter Drives 8400 TopLine

Interfaces



Mains connection

Operation without mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (without mains choke)
P	U _{AC}		I	I	I	q
[kW]	[V]		[A]	[A]	[A]	[mm ²]
0.25	1 AC 180... 264	E84AV□□□2512□□□	C6	6	6	1.0
0.37		E84AV□□□3712□□□			10	
0.55		E84AV□□□5512□□□	C10	10	15	1.5
0.75		E84AV□□□7512□□□			20	
1.10		E84AV□□□1122□□□	C16	16	25	2.5
1.50		E84AV□□□1522□□□	C20	20	30	4.0
2.20		E84AV□□□2222□□□	C25	25	30	6.0
0.37	3 AC 320... 550	E84AV□□□3714□□□	C6	6	6	1.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	C10	10	10	1.5
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	C16	16	15	2.5
4.00		E84AV□□□4024□□□			20	
5.50		E84AV□□□5524□□□	C25	25	25	4.0
7.50		E84AV□□□7524□□□	C32	32	40	10.0
11.0		E84AV□□□1134□□□				
18.5		E84AV□□□1834□□□	C80	80	60	25.0

Inverter Drives 8400 TopLine

Interfaces



Motor connection

- Keep motor cables as short as possible, as this has a positive effect on the drive behaviour.
- With group drives (multiple motors on one inverter), the resulting cable length is the key factor. This can be calculated using the hardware manual.
- Electric strength of the motor cable: 1 kV as per VDE 250-1.
- Capacitance per unit length
 $\leq 1.5 \text{ mm}^2 / \text{AWG 16: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 75 / \leq 150 \text{ pF/m}$
 $\geq 2.5 \text{ mm}^2 / \text{AWG 12: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 100 / \leq 150 \text{ pF/m.}$

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)
			45 °C	40 °C	40 °C	40 °C
U_{in}	P	Inverter	I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]
230	0.25	E84AV□□□2512□□□	50	100	50	50
	0.37	E84AV□□□3712□□□				
	0.55	E84AV□□□5512□□□				
	0.75	E84AV□□□7512□□□				
	1.10	E84AV□□□1122□□□				
	1.50	E84AV□□□1522□□□				
	2.20	E84AV□□□2222□□□				
400	0.37	E84AV□□□3714□□□	50	100	50	25
	0.55	E84AV□□□5514□□□				
	0.75	E84AV□□□7514□□□				
	1.10	E84AV□□□1124□□□				
	1.50	E84AV□□□1524□□□				
	2.20	E84AV□□□2224□□□				
	3.00	E84AV□□□3024□□□				
	4.00	E84AV□□□4024□□□				
	5.50	E84AV□□□5524□□□	100	150	100	100
	7.50	E84AV□□□7524□□□				
	11.0	E84AV□□□1134□□□				
	15.0	E84AV□□□1534□□□				
	18.5	E84AV□□□1834□□□				
	22.0	E84AV□□□2234□□□				
	30.0	E84AV□□□3034□□□				
	37.0	E84AV□□□3734□□□				
	45.0	E84AV□□□4534□□□				
500	0.37	E84AV□□□3714□□□	50	100	25	15
	0.55	E84AV□□□5514□□□				
	0.75	E84AV□□□7514□□□				
	1.10	E84AV□□□1124□□□				
	1.50	E84AV□□□1524□□□				
	2.20	E84AV□□□2224□□□				
	3.00	E84AV□□□3024□□□				



Motor connection

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)
	4-pole asynchronous motor	Inverter	45 °C	40 °C	40 °C	40 °C
U_{in}	P		I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]
500	4.00	E84AV□□□4024□□□	50	100	50	50
	5.50	E84AV□□□5524□□□				
	7.50	E84AV□□□7524□□□				
	11.0	E84AV□□□1134□□□				
	15.0	E84AV□□□1534□□□				
	18.5	E84AV□□□1834□□□	100	150	100	100
	22.0	E84AV□□□2234□□□				
	30.0	E84AV□□□3034□□□				
	37.0	E84AV□□□3734□□□				
	45.0	E84AV□□□4534□□□				

Maximum shielded motor cable length acc. to category C2 (industry), conducted

- The values for I_{max} are valid for an ambient temperature of up to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD	
	4-pole asynchronous motor	Inverter	4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz
U_{in}	P		I_{max}	I_{max}	I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]	[m]	[m]
230	0.25	E84AV□□□2512□□□	25	25	50	50	100	50
	0.37	E84AV□□□3712□□□						
	0.55	E84AV□□□5512□□□						
	0.75	E84AV□□□7512□□□						
	1.10	E84AV□□□1122□□□						
	1.50	E84AV□□□1522□□□						
	2.20	E84AV□□□2222□□□						
400	0.37	E84AV□□□3714□□□						
	0.55	E84AV□□□5514□□□						
	0.75	E84AV□□□7514□□□						
	1.10	E84AV□□□1124□□□						
	1.50	E84AV□□□1524□□□						
	2.20	E84AV□□□2224□□□						
	3.00	E84AV□□□3024□□□						
	4.00	E84AV□□□4024□□□						
	5.50	E84AV□□□5524□□□						
	7.50	E84AV□□□7524□□□						
	11.0	E84AV□□□1134□□□						
	15.0	E84AV□□□1534□□□						



Motor connection

Maximum shielded motor cable length acc. to category C2 (industry),
conducted

- The values for $I_{\max}$ are valid for an ambient temperature of up
to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD			
	4-pole asynchronous motor	Inverter	4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz		
U _{in}	P		I _{max}	I _{max}	I _{max}	I _{max}	I _{max}	I _{max}		
[V]	[kW]		[m]	[m]	[m]	[m]	[m]	[m]		
400	18.5	E84AV□□□1834□□□	25	25			100			
	22.0	E84AV□□□2234□□□								
	30.0	E84AV□□□3034□□□								
	37.0	E84AV□□□3734□□□								
	45.0	E84AV□□□4534□□□								
500	0.37	E84AV□□□3714□□□			50	25		100	25	
	0.55	E84AV□□□5514□□□								
	0.75	E84AV□□□7514□□□								
	1.10	E84AV□□□1124□□□								
	1.50	E84AV□□□1524□□□								
	2.20	E84AV□□□2224□□□								
	3.00	E84AV□□□3024□□□								
	4.00	E84AV□□□4024□□□								
	5.50	E84AV□□□5524□□□				50			50	
	7.50	E84AV□□□7524□□□								
	11.0	E84AV□□□1134□□□								
	15.0	E84AV□□□1534□□□								
	18.5	E84AV□□□1834□□□							100	
	22.0	E84AV□□□2234□□□								
	30.0	E84AV□□□3034□□□								
	37.0	E84AV□□□3734□□□								
	45.0	E84AV□□□4534□□□								



Motor connection

Operation with earth-leakage circuit breaker

If the inverter is connected via an earth-leakage circuit breaker, the following cable lengths are permissible, although the table must also be taken into account:

Earth-leakage circuit breaker 30 mA:

- 0.25 ... 2.2 kW to 25 m shielded motor cable with integrated RFI measures
- 0.25 ... 15 kW to 25 m shielded motor cable with RFI filter SD.

Earth-leakage circuit breaker 300 mA:

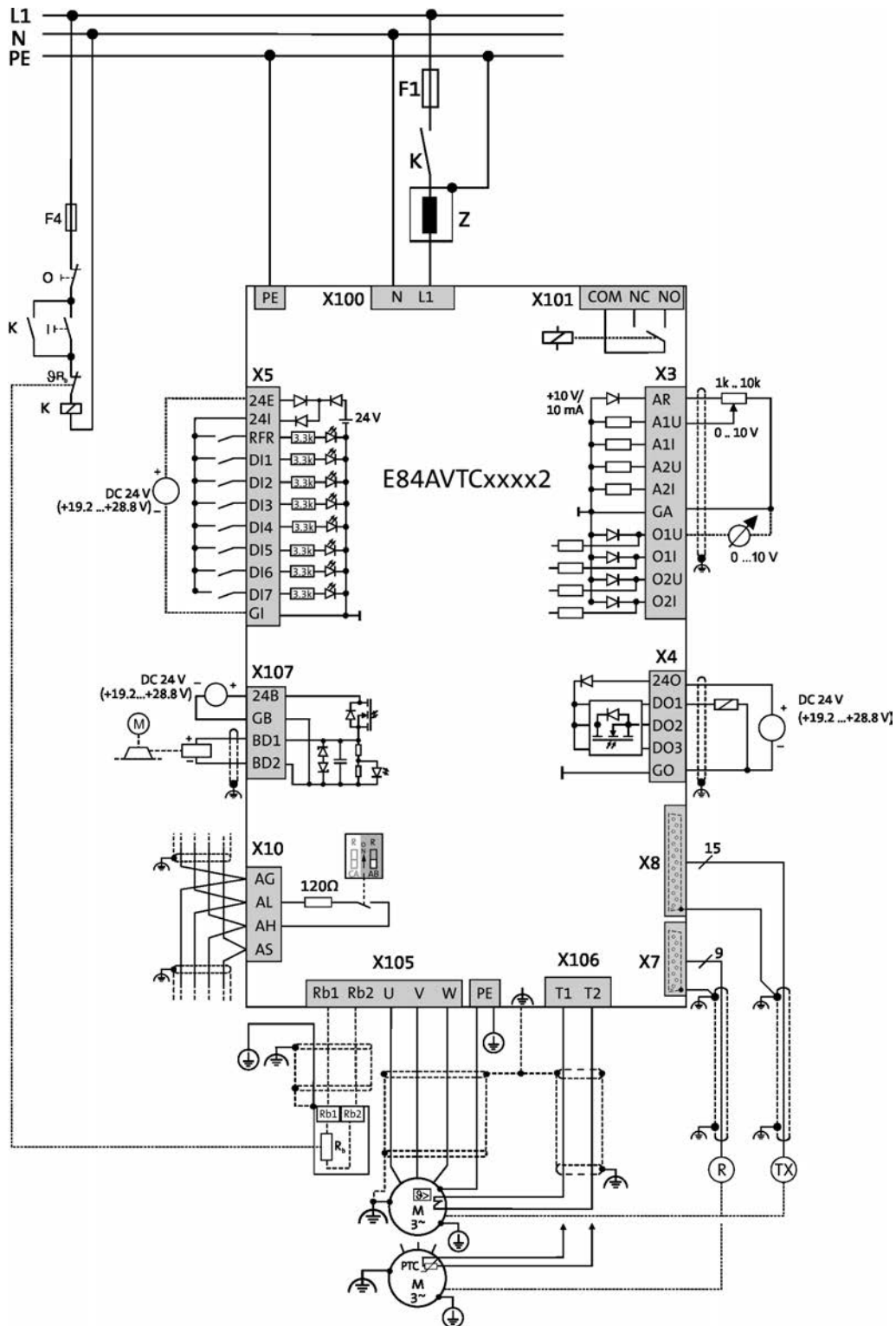
- 0.25 to 45 kW up to 25 m shielded motor cable with integrated RFI measures
- 0.25 to 45 kW up to 50 m shielded motor cable with RFI filter LD.

- ▶ When RFI filters SD are used, C1 can be complied with in a conducted manner (a shielded motor cable up to 25 m).
- ▶ In case of 0.25 ... 2.2 kW (230 V) with RFI filter LL, C1 and a fault current <3.5 mA can be realised (a shielded motor cable of up to 5 m).



Connection diagrams

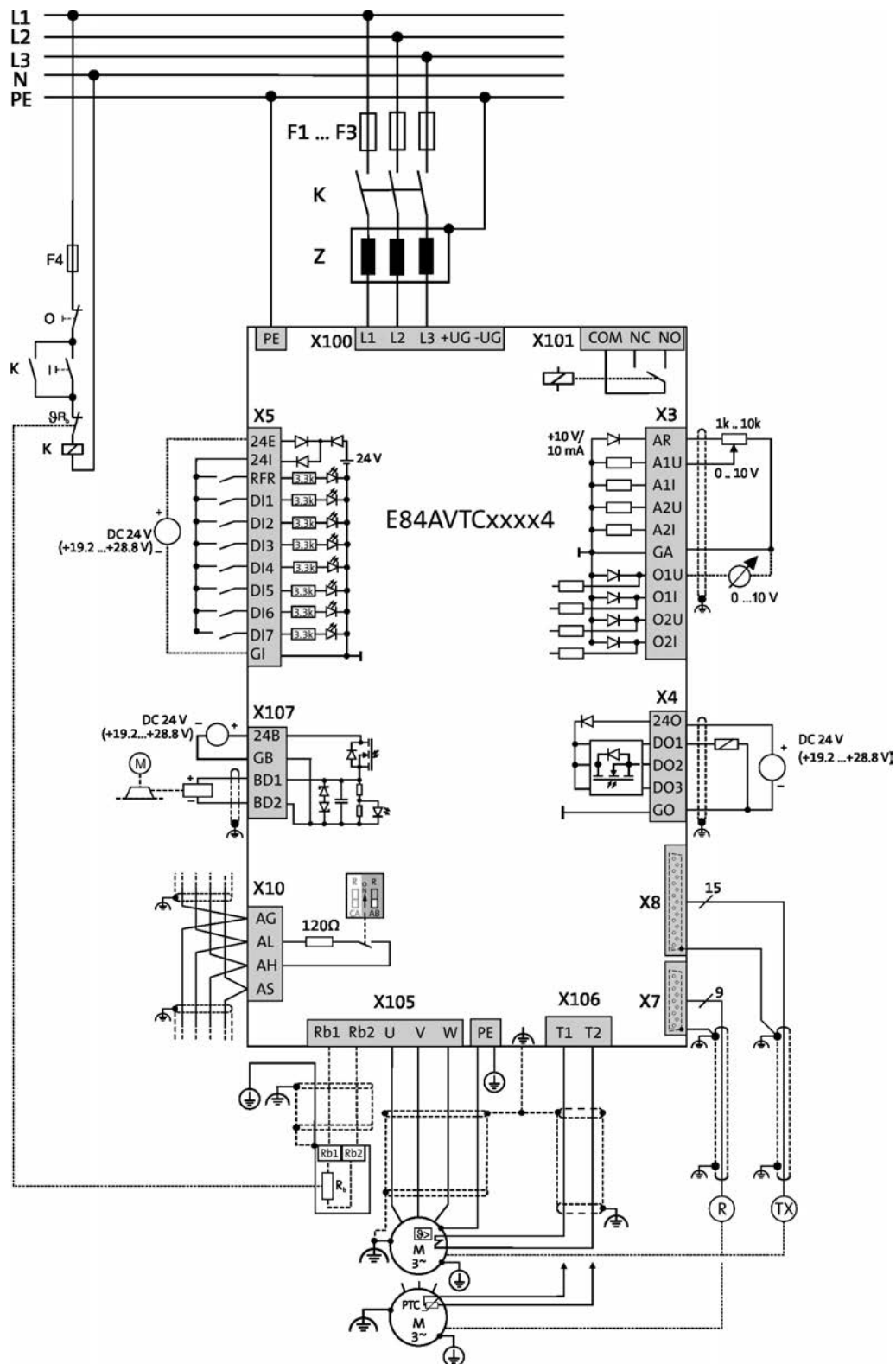
Wiring example for connecting Inverter Drives 8400 TopLine to 1 x 230V





Connection diagrams

Verdrahtungsbeispiel Inverter Drives 8400 TopLine an 3 x 400 V





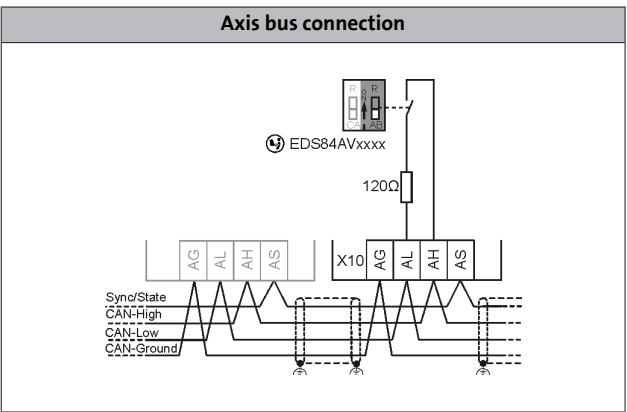
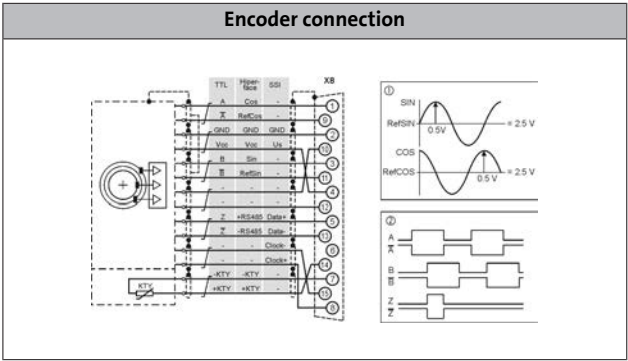
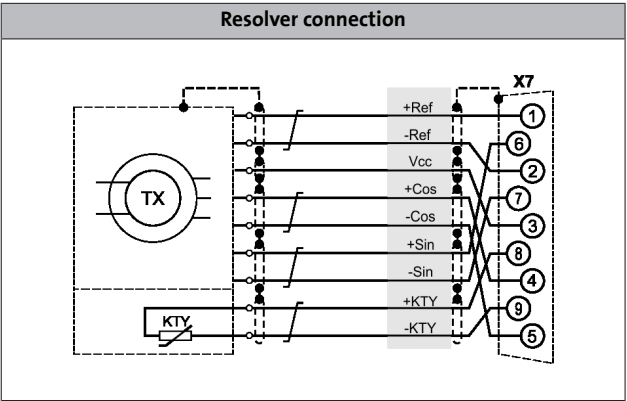
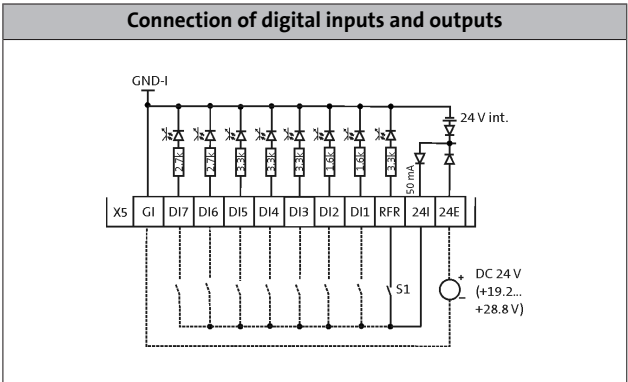
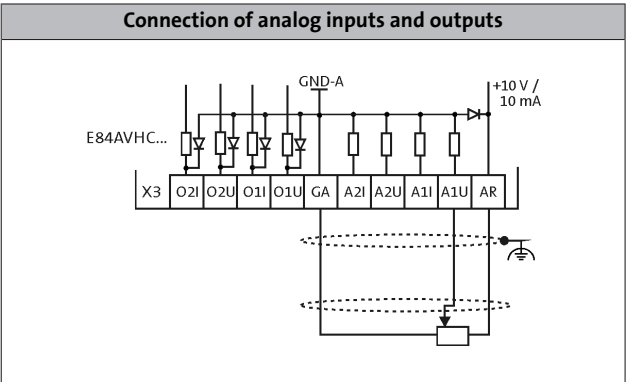
Control connections

Mode	8400 TopLine
Analog inputs	
Number	2 Optional: voltage or current input
Resolution	10 bits + sign
Value range	0 ... +/- 10V, 0/4 ... 20 mA
Analog outputs	
Number	2 Optional: voltage or current output
Resolution	10 bits
Value range	0 ... 10V, 0/4 ... 20mA
Digital inputs	
Number	8
Switching level	PLC (IEC 61131-2)
Max. input current	11 mA
Function	4 inputs can optionally be used as frequency input (200 kHz, 2-track)
Digital outputs	
Number	4
Switching level	PLC (IEC 61131-2)
Max. output current	1 x 2.5 A, (basic insulation, with spark suppressor, e.g. for 24 V service brake) 3 x 50 mA
Relay	
Number	1
Contact	Changeover contact
AC connection	250V, 3A
DC connection	24V, 2A ... 240V, 0.16A
External DC supply	
Rated voltage ¹⁾	24 V
Interfaces	
CANopen	Integrated functional insulated Max. baud rate 1000 kbps DIP switch for address, baud rate, bus termination
Extensions	optional communication module
Safety engineering	Optional Safe torque off (STO)
Drive interface	
Axis bus	for cross communication and synchronisation of several 8400 TopLine devices
Encoder input	Sub-D, 15-pin Multiple encoder input for: TTL incremental encoder, SinCos incremental or absolute value encoder, SSI absolute value encoder KTY temperature sensor evaluation Via 4 digital inputs: HTL, 2/4-track, 200 kHz
Resolver input	Sub-D, 9-pin

¹⁾ For mains-independent control electronics supply



Control connections



Inverter Drives 8400 TopLine

Interfaces



Memory module

All drive settings for the 8400 are stored on the memory module, which is a pluggable memory chip. The memory module ensures that drives can be replaced quickly and without errors being made.

Mode	Features	Product key
Memory module	- For 8400 StateLine, HighLine, Topline and protec - Packaging unit: 5 items	E84AYM10S/M

- Each inverter is equipped with a memory module in the factory

Safety system (STO)

The 8400 StateLine, HighLine and TopLine models are optionally available with "STO safe torque off" safety engineering. This helps reduce control system costs, save space in the control cabinet and keep wiring to a minimum. The safety engineering is certified to EN ISO 13849-1 (Cat. 4, PL e), EN 61508/EN 62061 (SIL 3).

The inverters can optionally be ordered with integrated safety engineering (STO). In this case, the product key of the inverter has a "B" as the 14th character.

For example, a StateLine 230 V, 0.55 kW built-in unit with safety engineering would be: E84AVSCE5512SB0



4.4

8400 StateLine with safety engineering

Inverter Drives 8400 TopLine

Interfaces



EtherCAT® communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherCAT® communication module

Mode		Features	Slot	Product key
Communication module				
EtherCAT		• Distributed clock • 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Connection option for separate 24 V supply	MCI	E84AYCETV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-in EtherCAT® communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ETXXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCETV/S
Mode			EtherCAT
Communication module			
Degree of protection			IP20
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherCAT® communication module

Rated data

Product key			E84AYCETV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			CoE (CANopen over EtherCAT)
Baud rate			
	b	[MBit/s]	100
Node			
			Slave
Network topology			
			Line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			Max. 65535
Max. cable length			
between two nodes	$l_{\max}$	[m]	100



EtherNet/IP communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherNet/IP communication module

Mode		Features	Slot	Product key
Communication module				
EtherNet/IP		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Address can be set via 2 rotary DIP switches • TCP/IP channel • ODVA certification (Open Device Vendor Association) • Supported assembly object instances as per ODVA: 20, 21, 22, 23 and 70, 71, 72, 73 • Manufacturer-specific supported assembly object instances (custom): 110 and 111 • Connection option for separate 24 V supply	MCI	E84AYCEOV/S

- The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-EOXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCEOV/S
Mode			
Communication module			EtherNet/IP
Degree of protection			
EN 60529			IP20
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherNet/IP communication module

Rated data

Product key			E84AYCEO/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 / EN50173
Communication profile			EtherNET/IP, AC Drive
Baud rate			
	b	[MBit/s]	10/100 (full duplex/half duplex)
Node			
			Slave (Adapter)
Network topology			
			Tree, star and line
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 254 im Subnetz
Max. cable length			
between two nodes	$l_{\max}$	[m]	100



Ethernet POWERLINK communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



POWERLINK communication module

Mode		Features	Slot	Product key
Communication module				
Ethernet POWERLINK CN		• Sync mode, Multiplex mode • 5 LEDs for status display • 2 x RJ45 connections with LEDs for link and collision • Address can be set via 2 rotary DIP switches • Connection option for separate 24 V supply	MCI	E84AYCECV/S

- The Inverter Drives 8400 can be ordered with a plug-in POWERLINK communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ECXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCECV/S
Mode			Ethernet POWERLINK CN
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



Ethernet POWERLINK communication module

Rated data

Product key			E84AYCECV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			EPL2.0
Baud rate			
	b	[MBit/s]	100
Node			
			Controlled node (CN)
Network topology			
			Tree, star and line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 239
Max. cable length			
between two nodes	l_{max}	[m]	100



PROFIBUS communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFIBUS communication module

Mode		Features	Slot	Product key
Communication module				
PROFIBUS		• 5 LEDs for status display • Sub-D connection • Address can be set via DIP switch	MCI	E84AYCPMV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-in PROFIBUS communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-PMXXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCPMV/S
Mode			PROFIBUS
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFIBUS communication module

Rated data

Product key			E84AYCPMV/S
Communication			
Medium			RS 485
Communication profile			PROFIBUS-DP-V1 PROFIBUS-DP-V0
Device profile			PROFIDrive, version 3
Baud rate			
	b	[kBit/s]	9.6 ... 12 000 (automatic detection)
Node			
			Slave
Network topology			
			Line with repeater: Line or tree without repeater:
Process data words (PCD)			
16 Bit			1 ... 16
DP user data length			
			Optional parameter channel (4 words) + process data words
Number of bus nodes			
			31 slaves + 1 master per bus segment With repeaters: 125
Max. cable length			
per bus segment	$I_{\max}$	[m]	1200 (depending on the baud rate and the cable type used)

4.4

Inverter Drives 8400 TopLine

Interfaces



PROFINET communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFINET communication module

Mode		Features	Slot	Product key
Communication module				
PROFINET		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • TCP/IP channel • Connection option for separate 24 V supply	MCI	E84AYCERV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ER-XXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCERV/S
Mode			PROFINET
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFINET communication module

Rated data

Product key			E84AYCERV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			PROFINET RT Conf. Class B
Baud rate			
	b	[MBit/s]	100
Node			
			Slave (Device)
Network topology			
			Line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Max. cable length			
between two nodes	$l_{\max}$	[m]	100



Inverter Drives 8400 TopLine

Accessories



Brake resistors

An external brake resistor is required to brake high moments of inertia or in the event of prolonged operation in generator mode; this resistor converts braking energy into heat.

The brake resistors recommended in the table below have been dimensioned for approx. 1.5 times the regenerative power, with a cycle time of 15/135 s (brake/rest ratio). These brake resistors generally meet the usual requirements of standard applications.

The brake resistors are fitted with a thermostat (potential-free NC contact).



ERBM...(IP50) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	ERBM180R050W	180.0	0.050	7.50	175 x 20.6 x 40	0.3
0.37		E84AV□□□3712□□□						
0.55		E84AV□□□5512□□□	ERBM100R100W	100.0	0.10	15.0	240 x 80 x 95	0.5
0.75		E84AV□□□7512□□□						
1.10		E84AV□□□1122□□□	ERBP033R200W	33.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1522□□□						
2.20		E84AV□□□2222□□□	ERBP033R300W		0.30	45.0	320 x 41 x 122	1.4
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	ERBM390R100W	390.0	0.10	15.0	235 x 20.6 x 40	0.4
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□	ERBP180R200W	180.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□						

Inverter Drives 8400 TopLine

Accessories



Brake resistors

For standard applications, we recommend the following combinations:

E84AV□□□3024□□□ and ERBP082R200W

E84AV□□□4024□□□ and ERBS047R400W

E84AV□□□5524□□□ and ERBS047R800W

E84AV□□□7524□□□ and ERBS027R01K2

E84AV□□□1134□□□ and ERBS027R01K2

E84AV□□□1534□□□ and ERBS018R01K4

E84AV□□□1834□□□ and ERBS015R02K4

E84AV□□□2234□□□ and ERBS015R02K4.



Other possible combinations:

ERBP...(IP21) and ERBS...(IP65) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KWs]	[mm]	[kg]
3.00	3 AC 320...550	E84AV□□□3024□□□	ERBP082R200W	82.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS082R780W		0.78	117	666 x 124 x 122	4.0
4.00		E84AV□□□4024□□□	ERBS047R400W	47.0	0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
5.50		E84AV□□□5524□□□	ERBS047R400W		0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
7.50		E84AV□□□7524□□□	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
11.0		E84AV□□□1134□□□	ERBP027R200W		0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
15.0		E84AV□□□1534□□□	ERBS018R800W	18.0	0.80	120	710 x 110 x 105	3.9
			ERBS018R01K4		1.40	210	1110 x 110 x 105	6.2
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0
18.5		E84AV□□□1834□□□	ERBS015R800W	15.0	0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
22.0		E84AV□□□2234□□□	ERBS015R800W		0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
30.0		E84AV□□□3034□□□	ERBG075D01K9	7.5	1.90	285	486 x 236 x 302	9.5
37.0		E84AV□□□3734□□□						
45.0		E84AV□□□4534□□□						

4.4

Inverter Drives 8400 TopLine

Accessories



Mains chokes

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains choke			
P	U_{AC}			I_N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□				
0.75		E84AV□□□7512□□□	ELN1-0500H009	9.00	75 x 66 x 82	1.1
1.10		E84AV□□□1122□□□				
1.50		E84AV□□□1522□□□	ELN1-0250H018	18.0	96 x 96 x 90	2.1
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	56 x 77 x 100	0.5
0.55		E84AV□□□5514□□□	EZAELN3004B742	4.00	60 x 95 x 115	1.3
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	EZAELN3008B372	8.00	85 x 120 x 140	1.9
4.00		E84AV□□□4024□□□	EZAELN3010B292	10.0		2.0
5.50		E84AV□□□5524□□□	EZAELN3016B182	16.0	95 x 120 x 140	2.7
7.50		E84AV□□□7524□□□	EZAELN3020B152	20.0	95 x 155 x 165	3.8
11.0		E84AV□□□1134□□□	EZAELN3025B122	25.0	110 x 155 x 170	5.8
15.0		E84AV□□□1534□□□ ¹⁾	EZAELN3035B841	35.0		6.0
18.5		E84AV□□□1834□□□	EZAELN3045B651	45.0	112 x 185 x 200	8.3
22.0		E84AV□□□2234□□□ ¹⁾	EZAELN3050B591	50.0	112 x 185 x 210	8.4
30.0		E84AV□□□3034□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7
37.0		E84AV□□□3734□□□ ¹⁾	EZAELN3080B371	80.0	125 x 210 x 240	12.5
45.0		E84AV□□□4534□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5

¹⁾ Operation only permitted with mains choke

- On some inverters, a mains filter (combination of RFI filter and mains choke) can be used in place of a mains choke. Information on this can be found in the "Interference suppression" section.

Inverter Drives 8400 TopLine

Accessories



Mains chokes

Operation with increased power output



Mains choke

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains choke			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1
0.55		E84AV□□□3712□□□ ¹⁾				
0.75		E84AV□□□5512□□□	ELN1-0500H009	9.00	96 x 96 x 90	2.1
1.10		E84AV□□□7512□□□ ¹⁾				
1.50		E84AV□□□1122□□□	ELN1-0250H018	18.0	56 x 77 x 100	0.5
2.20		E84AV□□□1522□□□ ¹⁾				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	60 x 95 x 115	1.3
0.75		E84AV□□□5514□□□	EZAELN3004B742	4.00	69 x 95 x 120	1.5
1.10		E84AV□□□7514□□□ ¹⁾				
1.50		E84AV□□□1124□□□	EZAELN3006B492	6.00	85 x 120 x 140	2.0
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□ ¹⁾	EZAELN3008B372	8.00	95 x 120 x 140	2.7
4.00		E84AV□□□3024□□□ ¹⁾	EZAELN3010B292	10.0		
5.50		E84AV□□□3024□□□0			95 x 155 x 165	3.8
7.50		E84AV□□□4024□□□	EZAELN3016B182	16.0		
11.0		E84AV□□□5524□□□ ¹⁾	EZAELN3020B152	20.0	110 x 155 x 170	5.8
15.0		E84AV□□□7524□□□	EZAELN3025B122	25.0		
22.0		E84AV□□□1134□□□ ¹⁾	EZAELN3030B982	30.0	112 x 185 x 200	8.3
30.0		E84AV□□□1834□□□ ¹⁾	EZAELN3045B651	45.0		
37.0		E84AV□□□2234□□□ ¹⁾	EZAELN3063B471	63.0	125 x 210 x 240	12.5
45.0		E84AV□□□3034□□□ ¹⁾	EZAELN3080B371	80.0		
55.0		E84AV□□□3734□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5
		E84AV□□□4534□□□ ¹⁾	EZAELN3100B301	100		

¹⁾ Operation only permitted with mains choke



Interference suppression

RFI and mains filters are used to ensure compliance with the EMC requirements of European Standard EN 61800-3. This standard defines the EMC requirements for electrical drive system in various categories. **Category C1** applies to public networks (residential areas). Category C1 corresponds to Class B with regard to the limit values of Class B in line with EN 55011. **Category C2** is applicable in industrial premises; use in residential areas is left to the user's discretion. With regard to limit values, Category C2 corresponds to Class A according to EN 55011.



RFI filters

When working with stricter line-bound noise emission requirements, which cannot be met using the radio interference suppression measures integrated in the inverter (C2 up to 25 m shielded motor cable), external filters can be used. The filters can be installed below or next to the inverters.

Available RFI and mains filters

Mode				
Filter	RFI filter LL (Low Leakage) E84AZESR□□□□LL	RFI filter SD (Short Distance) E84AZESR□□□□SD	RFI filter LD (Long Distance) E84AZESR□□□□LD	Mains filter LD (Long Distance) I0FAE□□□F100D000□S
Category C1	Up to 5 m shielded motor cable ¹⁾	Up to 25 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾
Category C2		Up to 50 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾
Power range	0.25 to 2.2 kW, 230 V	0.25 to 15 kW	0.25 to 18.5 kW	22 to 45 kW
Features	• For installation in mobile systems, leakage current < 3.5 mA (up to 5 m shielded motor cable)	• Optimised for low leakage current.	• 0,25 up to 15 kW: 50 - 100 m at max. 40 °C ambient temperature and max. 4 kHz switching frequency.	• Combination of mains choke and RFI filter.

¹⁾   37 - Details on maximum motor cable lengths.

Inverter Drives 8400 TopLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				

4.4

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	E84AZESR3024SD	9.80	306 x 140 x 60	1.5
		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
11.0		E84AV□□□1134□□□				
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 TopLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass	
4-pole asynchronous motor		Inverter	RFI filter				
P	U _{AC}			I _N	h x b x t	m	
[kW]	[V]			[A]	[mm]	[kg]	
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8	
0.37		E84AV□□□3712□□□					
0.55		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0	
0.75		E84AV□□□7512□□□					
1.10		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6	
1.50		E84AV□□□1522□□□					
2.20		E84AV□□□2222□□□					
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514LD	3.30	262 x 70 x 60	1.1	
0.55		E84AV□□□5514□□□					
0.75		E84AV□□□7514□□□					
1.10		E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2	
1.50		E84AV□□□1524□□□					
2.20		E84AV□□□2224□□□					
3.00		E84AV□□□3024□□S	E84AZESR3024LD	9.80	306 x 140 x 60	1.3	
		E84AV□□□3024□□0	E84AZESR5524LD	18.0		2.4	
4.00		E84AV□□□4024□□□					
5.50		E84AV□□□5524□□□					
7.50		E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3	
11.0		E84AV□□□1134□□□					
15.0		E84AV□□□1534□□□					
18.5		E84AV□□□1834□□□	IOFAE318F100D0000S	50.4	436 x 205 x 90	7.1	

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□2234□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□3034□□□	I0FAE330F100D0000S	55.0	590 x 250 x 105	23.0
37.0		E84AV□□□3734□□□	I0FAE337F100D0000S	69.0		25.0
45.0		E84AV□□□4534□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0

Inverter Drives 8400 TopLine

Accessories



Interference suppression

Operation with increased power output

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024SD	9.80	317 x 70 x 60	1.5
		E84AV□□□3024□□0				
5.50		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
15.0		E84AV□□□1134□□□				

Inverter Drives 8400 TopLine

Accessories



Interference suppression

Operation with increased power output

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514LD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024LD	9.80		1.3
		E84AV□□□3024□□0	E84AZESR5524LD	18.0	306 x 140 x 60	2.4
5.50		E84AV□□□4024□□□				
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3
15.0		E84AV□□□1134□□□				

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□1834□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□2234□□□	I0FAE322F100D0001S	55.0	365 x 205 x 90	18.5
37.0		E84AV□□□3034□□□	I0FAE337F100D0000S	69.0	590 x 250 x 105	25.0
45.0		E84AV□□□3734□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0
55.0		E84AV□□□4534□□□				

Inverter Drives 8400 TopLine

Accessories



Sinusoidal filters

A sinusoidal filter in the motor cable limits the rate of voltage rise and the capacitive charge/discharge currents that occur during inverter operation.

Application range:

- Only use a sinusoidal filter with standard asynchronous motors of 0 ... 550 V
- Operation only with V/f or V/f² characteristic control
- Set the switching frequency permanently to the specified value
- Limit the output frequency of the Inverter Drives 8400 to the specified value



Sinusoidal filters

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass
4-pole asynchronous motor		Inverter	Sinusoidal filter			
P	U _{AC}			L _N	f _{ch}	m
[kW]	[V]			[mH]	[kHz]	[kg]
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-004A200	11.0	4 8	4.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□	EZS3-010A200	5.10		5.5
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EZS3-017A200	3.07		8.5
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	EZS3-024A200	2.50		14.5
11.0		E84AV□□□1134□□□	EZS3-032A200	2.00		19.0
15.0		E84AV□□□1534□□□	EZS3-037A200	1.70		21.0
18.5		E84AV□□□1834□□□	EZS3-048A200	1.20		25.5
22.0		E84AV□□□2234□□□	EZS3-061A200	1.00		33.5
30.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0
37.0		E84AV□□□3734□□□	EZS3-090A200	0.80		53.0
45.0		E84AV□□□4534□□□	EZS3-115A200	0.70	2 4	66.0

Inverter Drives 8400 TopLine

Accessories



Sinusoidal filters

Operation with increased power output

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass	
4-pole asynchronous motor		Inverter	Sinusoidal filter				
P	U _{AC}			L _N	f _{ch}	m	
[kW]	[V]			[mH]	[kHz]	[kg]	
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-010A200	5.10	4 8	5.5	
0.75		E84AV□□□5514□□□					
1.10		E84AV□□□7514□□□					
1.50		E84AV□□□1124□□□					
2.20		E84AV□□□1524□□□					
3.00		E84AV□□□2224□□□	EZS3-017A200	3.07		8.5	
4.00		E84AV□□□3024□□□					
5.50		E84AV□□□4024□□□					
7.50		E84AV□□□5524□□□	EZS3-024A200	2.50		14.5	
11.0		E84AV□□□7524□□□					
15.0		E84AV□□□1134□□□	EZS3-037A200	1.70		21.0	
22.0		E84AV□□□1834□□□	EZS3-061A200				1.00
30.0		E84AV□□□2234□□□					
37.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0	
45.0		E84AV□□□3734□□□	EZS3-090A200				0.80
55.0		E84AV□□□4534□□□	EZS3-115A200	0.70		2 4	

4.4

Inverter Drives 8400 TopLine

Accessories



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0%, 45 Hz-0% ... 65 Hz+0%			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	8.0	29.0	82.0	200.0
Rated DC-bus current						
	$I_{N, DC}$	[A]	10.0	36.0	100.0	245.0

4.4

Data for 60 s overload

Max. DC-bus current						
	I_{max}	[A]	15.0	54.0	150.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			120.0			
	t_{ol}	[s]				
Recovery time			60.0			
	t_{re}	[s]				
Max. output power¹⁾						
	$P_{max, 1}$	[kW]	7.4	26.3	72.9	179.0

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	40.0	108.0	200.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			0.5			
	t_{ol}	[s]				
Recovery time			4.5			
	t_{re}	[s]				
Max. short-term output power¹⁾						
	$P_{max, 2}$	[kW]	19.6	52.5	146.0	357.0

¹⁾ Mains filter required; if no mains filter is installed, the stated values for P_{max} decrease

Inverter Drives 8400 TopLine

Accessories



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Rated DC-bus current						
	$I_{N,DC}$	[A]	10.0	36.0	100.0	245.0
Power loss						
	P_V	[kW]	0.055	0.110	0.230	0.550
Dimensions						
Height	h	[mm]	350		383	
Height, including fastening	h	[mm]	481		510	
Width	b	[mm]	60	120	210	390
Depth	t	[mm]	288			
Mass						
	m	[kg]	2.6	5.3	13.5	28.5

4.4

Brake chopper rated data

Rated power, Brake chopper						
	P_N	[kW]	2.6	8.7	17.0	30.3
Max. output power, Brake chopper						
	$P_{max,1}$	[kW]	19.5	43.8	105.1	187.7
Running time						
	t_{on}	[s]	1.0			
Recovery time						
	t_{re}	[s]	3.8	2.5	3.1	
Min. brake resistance						
	R_{min}	[Ω]	27.0	12.0	5.0	2.8

Inverter Drives 8400 TopLine

Accessories



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key			E94ARNE0134		E94ARNE0244	
Supply- / regenerative module			E94ARNE0134		E94ARNE0244	
Operating mode			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	26.0	13.0	47.0	23.5
Rated DC-bus current						
	$I_{N, DC}$	[A]	32.0	16.0	57.0	29.0

Data for 60 s overload

Max. DC-bus current						
	I_{max}	[A]	48.0	24.0	86.0	44.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Overload time			60.0			
	t_{ol}	[s]				
Recovery time			120.0			
	t_{re}	[s]				
Max. output power						
	$P_{max, 1}$	[kW]	22.4	11.2	40.5	20.2

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	96.0	48.0	171.0	87.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Max. short-term output power						
	$P_{max, 2}$	[kW]	44.9	22.4	81.1	40.5
with brake chopper support	$P_{max, 2}$	[kW]		35.1		59.6

Inverter Drives 8400 TopLine

Accessories



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key						
Supply- / regenerative module			E94ARNE0134		E94ARNE0244	
Operating mode						
			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Rated DC-bus current						
	$I_{N,DC}$	[A]	32.0	16.0	57.0	29.0
Power loss						
	P_V	[kW]	0.150	0.110	0.230	0.190
Dimensions						
Height	h	[mm]	350			
Height, including fastening	h	[mm]	481			
Width	b	[mm]	120			
Depth	t	[mm]	288			
Mass						
	m	[kg]	6.0			

4.4

Brake chopper rated data

Rated power, Brake chopper				
	P_N	[kW]	4.7	9.3
Max. output power, Brake chopper				
	$P_{max,1}$	[kW]	19.5	29.2
Running time				
	t_{on}	[s]	1.0	
Recovery time				
	t_{re}	[s]	4.2	3.9
Min. brake resistance				
	R_{min}	[Ω]	27.0	18.0



Control connections

Mode	Power supply modules	Regenerative power supply modules
Analog inputs		
Number		2
Resolution		11 bits + sign
Value range		+/- 10V 1 x switchable 20 mA
Analog outputs		
Number		2
Resolution		10 bits + sign
Value range		+/- 10V max. 2 mA
Digital inputs		
Number	1 Permanently configured	8
Switching level	PLC (IEC 61131-2)	
Max. input current	8 mA	
Digital outputs		
Number	4 fest konfiguriert	4
Switching level	PLC (IEC 61131-2)	
Max. output current	50 mA per output	
Load capacity	>480 Ω at 24 V	
External DC supply		
Rated voltage	24 V in accordance with IEC 61131-2	
Voltage range	19.2 ... 28.8 V, max. residual ripple ± 5%	
Current	Approx. 1.4 A during operation, max. 4 A starting current for 100 ms	Approx. 1.2 A during operation, max. 3 A starting current for 100 ms ¹⁾
Interfaces		
CANopen		Integrated
Extensions		Via slot MXI 2: extension 2 Via slot MXI 1: extension 1
State bus		Integrated
Memory		Slot MMI
Safety engineering		Slot MSI
Drive interface		
Resolver input		Integrated (no function)
Mains synchronisation input		Integrated Sub-D, 15-pin

¹⁾ The supply to the control electronics comes from the mains voltage. Alternatively, it can be provided by a 24 V supply that is independent of the mains (available as an option).

Inverter Drives 8400 TopLine

Accessories



Brake resistors of the regenerative power supply modules

Assignment of brake resistors to the supply and regenerative power supply modules is shown in the tables below.



Brake resistor 27 ohms

Brake resistors for power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
Without mains filter/mains choke		Power supply module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
3.60	3 AC 340 ... 528 ¹⁾	E94APNE0104	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
13.0		E94APNE0364	ERBG012R01K9	12.0	1.90	285	486 x 236 x 302	13.0
			ERBG012R05K2		5.20	750	486 x 426 x 302	28.0
36.2		E94APNE1004	ERBG005R02K6	5.0	2.60	390	486 x 326 x 302	12.6
88.6		E94APNE2454	ERBG028D04K1	2.8	4.10	615	486 x 426 x 302	12.8

¹⁾ For 230 V mains voltage a different brake resistor assignment applies.

Brake resistors for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
15.0	3 AC 340 ... 528 ¹⁾	E94ARNE0134	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
27.0		E94ARNE0244	ERBP018R300W	18.0	0.30	30.0	240 x 41 x 122	1.4
			ERBS018R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0

²⁾ For 230 V mains voltage a different brake resistor assignment applies.



Mains chokes of the power supply modules

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Rated power	Mains voltage	Product key		Rated current	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains choke			
P_N	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	EZAELN3008B372	8.00	85 x 120 x 140	1.9
17.5		E94APNE0364	EZAELN3030B982	30.0	110 x 155 x 167	5.9
48.6		E94APNE1004	EZAELN3080B371	80.0	125 x 210 x 240	12.5
119		E94APNE2454	EZAELN3200B151	200	352 x 144 x 264	32.0

Inverter Drives 8400 TopLine

Accessories



Interference suppression of the regenerative power supply modules

RFI filters and mains filters enable compliance with the interference voltage categories of the European standard EN 61800-3. There a distinction is drawn between category C1 and category C2.

Category C1 describes the use on public supply networks.

Category C2 describes the use of drives which are intended to be used for industrial purposes in areas also comprising residential areas.

For Multi Drives external filters must be used to comply with the EMC Directive.



RFI filter, can be mounted beside the power supply module

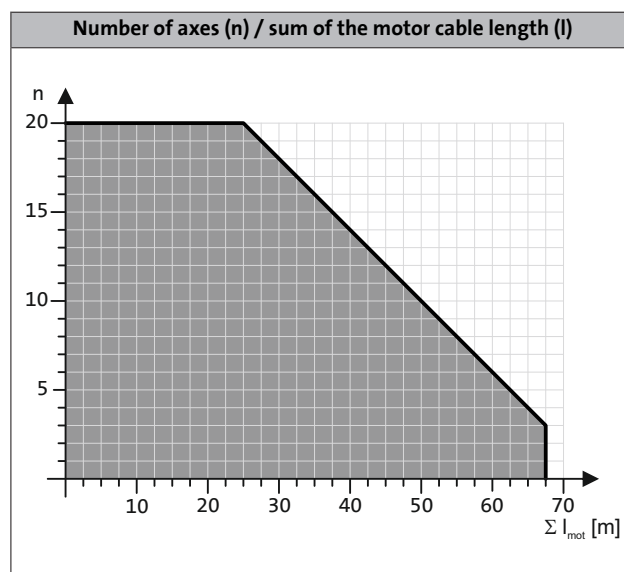
RFI filters

RFI filters are primarily capacitive accessory components which can be connected directly upstream from the power supply modules. This measure enables compliance with the corresponding conducted noise emission requirements according to EN 61800-3.

4.4

Rated power	Mains voltage	Product key		Rated current	Power loss	Max. cable length	Dimensions	Mass
Without mains filter/mains choke		Power supply module	RFI filter			Reference group C2		
P_N	U_{AC}			I_N	P_V	l_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[kW]	[m]	[mm]	[kg]
3.60	3 AC 340 ... 528	E94APNE0104	E94AZRP0084	8.00	0.020	6 axes of 10 m each	485 x 60 x 261	4.2
13.0		E94APNE0364	E94AZRP0294	29.0	0.050			4.5
36.2		E94APNE1004	E94AZRP0824	82.0	0.080		490 x 209 x 272	18.5
88.6		E94APNE2454	E94AZRP2004	200	0.150			20.5

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.





Interference suppression of the regenerative power supply modules

Mains filters

A mains filter is a combination of mains choke and RFI filter in a single housing. It reduces line-bound noise emission into the mains, thus ensuring that the line-bound interference voltage is reduced to a permissible level according to EN61800-3.



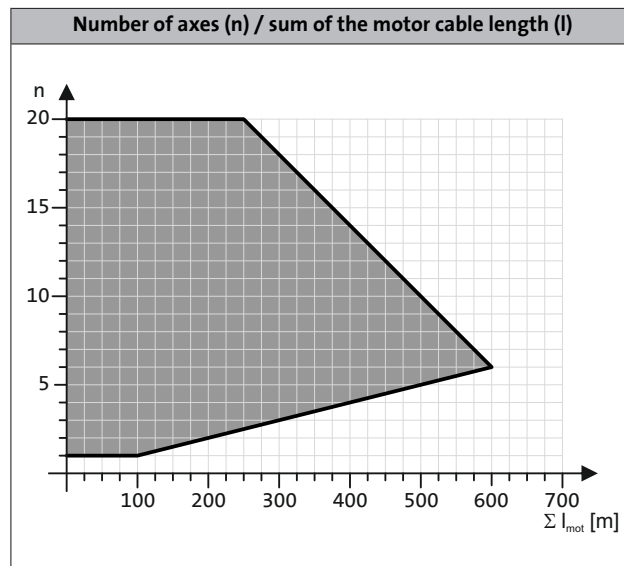
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

RFI filters

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	E94AZMP0084	8.00	10.0	10 axes of 50 m each	485 x 90 x 261	8.6
17.5		E94APNE0364	E94AZMP0294	29.0	7.3		485 x 120 x 261	16.5
48.6		E94APNE1004	E94AZMP0824 ¹⁾	82.0	6.4		490 x 270 x 272	29.0
119		E94APNE2454	E94AZMP2004 ¹⁾	200	6.3		490 x 330 x 272	52.0

¹⁾ External 24 V supply from a safely separated power supply unit (SELV/PELV) required for integrated fan.

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.



Inverter Drives 8400 TopLine

Accessories



Interference suppression of the regenerative power supply modules

Mains filters for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
15.0	3 AC 340 ... 528	E94ARNE0134	E94AZMR0264SDB ¹⁾	26.0	6.3	6 axes of 10 m each	485 x 149 x 272	25.0
			E94AZMR0264LDB ¹⁾			10 axes of 50 m each		26.0
27.0		E94ARNE0244	E94AZMR0474SDB ¹⁾	47.0	6.2	6 axes of 10 m each	485 x 209 x 272	36.0
			E94AZMR0474LDB ¹⁾			10 axes of 50 m each		37.0

¹⁾ External 24 V supply through safely separated power supply unit (SELV/PELV) required for integrated mains voltage recording.



DC input module

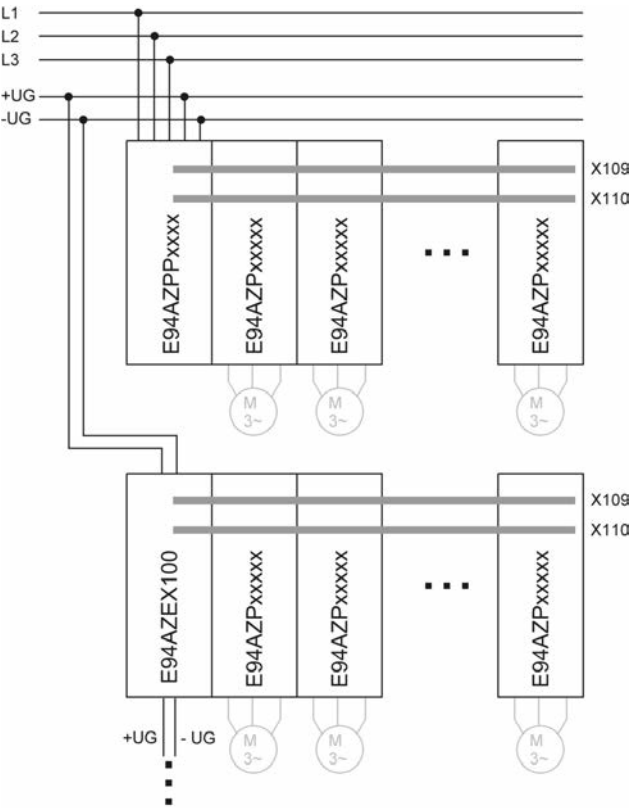
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied via a central DC power supply unit. The rated current of the DC input module is defined to be 100 A (DC). The DC input module can be connected at the top or bottom, offering great flexibility with regard to integration into the system wiring. This provides an ideal way of connecting multi-row axis modules in particular.



DC input module
100 A

Mode	Product key	Dimensions	Mass
	Input module		
		h x b x t	m
		[mm]	[kg]
DC input module 100 A	E94AZEX100	422 x 60 x 95	0.9

4.4



Wiring example for multi-row mounting of axis modules

Inverter Drives 8400 TopLine

Accessories



DC-bus connection

The Inverter Drives 8400 can be operated in a DC-bus connection. The 400 V devices have a direct connection for this.

The components listed here are used to interconnect the individual devices for operation with or without a regenerative power supply module. With a DC-bus connection, energy can be exchanged between the individual devices. This makes particular sense with cyclic operation of multiple devices.

The design of a DC-bus connection requires extremely precise dimensioning of the devices' energy requirements among one another.

Lenze Sales is happy to advise you here to ensure the most energy-efficient drive dimensioning. The components listed here form the basis for this.

- ▶ Two DC fuses are always required.
- ▶ The fuse holders EFH10005 and EFH10004 are single-pole, while the holders EFH20005 and EFH20007 are 2-pole.
- ▶ The fuses are not UL-approved for the DC operation.
- ▶ Please consult Lenze Sales to ensure the right dimensioning.

Components for DC-bus connection

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0060AYHN	6.00	14x51 without indicator
EFSGR0100AYHN	10.0	
EFSGR0160AYHN	16.0	
EFSGR0200AYHN	20.0	
EFSGR0250AYHN	25.0	
EFSGR0320AYHN	32.0	
EFSGR0400AYHN	40.0	
EFSGR0060AYHK	6.00	14x51 with indicator
EFSGR0100AYHK	10.0	
EFSGR0160AYHK	16.0	
EFSGR0200AYHK	20.0	
EFSGR0250AYHK	25.0	
EFSGR0320AYHK	32.0	
EFSGR0400AYHK	40.0	

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0120AYIN	12.0	22x58 without indicator
EFSGR0160AYIN	16.0	
EFSGR0200AYIN	20.0	
EFSGR0250AYIN	25.0	
EFSGR0320AYIN	32.0	
EFSGR0400AYIN	40.0	
EFSGR0500AYIN	50.0	
EFSGR0800AYIN	80.0	
EFSGR0120AYIK	12.0	22x58 with indicator
EFSGR0160AYIK	16.0	
EFSGR0200AYIK	20.0	
EFSGR0250AYIK	25.0	
EFSGR0320AYIK	32.0	
EFSGR0400AYIK	40.0	
EFSGR0500AYIK	50.0	
EFSGR0800AYIK	80.0	

4.4

Mode	Features	Product key
DC busbar	- Busbar system 14 x 51 - DC busbar length 1m, cross-section 25 mm²	EWZ0036
End cap	- Busbar system 22 x 58 - DC busbar length 1m, cross-section 25 mm²	EWZ0037
Terminal	End caps for DC busbar (packaging unit 10 pcs)	EWZ0038
	Single-pole terminal for internal supply	EWZ0039

Inverter Drives 8400 TopLine

Accessories



DC-bus connection

DC fuses size 14 x 51 mm

Typical motor power	Mains voltage	Product key						
4-pole asynchron- ous motor		Inverter	DC fuses					
P	U _{AC}							
[kW]	[V]							
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0160AYHN	EFH20005	EFSGR0160AYHK	EFH10005		
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□						
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□	EFSGR0200AYHN		EFSGR0200AYHK			
3.00		E84AV□□□3024□□□						
4.00		E84AV□□□4024□□□					EFSGR0320AYHN	EFSGR0320AYHK
5.50		E84AV□□□5524□□□					EFSGR0400AYHN	EFSGR0400AYHK
7.50		E84AV□□□7524□□□						
11.0		E84AV□□□1134□□□						
15.0		E84AV□□□1534□□□						

4.4

DC fuses size 22 x 58 mm

Typical motor power	Mains voltage	Product key				
4-pole asynchron- ous motor		Inverter	DC fuses			
P	U _{AC}					
[kW]	[V]					
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0120AYIN	EFH20007	EFSGR0120AYIK	EFH10004
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□	EFSGR0200AYIN		EFSGR0200AYIK	
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EFSGR0320AYIN		EFSGR0320AYIK	
5.50		E84AV□□□5524□□□	EFSGR0400AYIN		EFSGR0400AYIK	
7.50		E84AV□□□7524□□□	EFSGR0500AYIN		EFSGR0500AYIK	
11.0		E84AV□□□1134□□□	EFSGR0800AYIN		EFSGR0800AYIK	
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 TopLine

Accessories



24 V power supply unit

External power supply units are available for supplying the control electronics of the 8400 StateLine, HighLine or TopLine. With an external supply, the inverters can be parameterised and diagnosed while the mains input is deenergised.



24 V power supply unit

Rated data

Product key			EZV1200-000	EZV2400-000	EZV4800-000	EZV1200-001	EZV2400-001	EZV4800-001
Rated voltage			230			400		
AC	$U_{N, AC}$	[V]						
Input voltage			AC 85 ... 264 DC 90 ... 350			AC 320 ... 575 DC 450 ... 800		
Rated mains current								
	$I_{N, AC}$	[A]	0.8	1.2	2.3	0.3	0.6	1.0
Output voltage			DC 22.5 ... 28.5					
Rated output current								
	$I_{N, out}$	[A]	5.0	10.0	20.0	5.0	10.0	20.0
Dimensions								
Height	h	[mm]	130					
Width	b	[mm]	55	85	157	73	85	160
Depth	t	[mm]	125					
Mass								
	m	[kg]	0.8	1.2	2.5	1.0	1.1	1.9

Brake switch

The brake switch consists of a rectifier and an electronic circuit breaker for the switching of an electromechanical brake switch. The brake switch is mounted on the control cabinet plate by means of two screws. Control is performed using a digital output on the inverter.



Brake switch

Mode	Features	Product key
Half-wave rectification	- Input voltage: AC 320 ... 550 V - Output voltage: DC 180 V (at AC 400 V), DC 225 V (at AC 500 V) - Max. brake current: DC 0.61 A - IP00 degree of protection	E82ZWBRE
Bridge rectification	- Input voltage: AC 180 ... 317 V - Output voltage: DC 205 V (at AC 230 V) - Max. brake current: DC 0.54 A - IP00 degree of protection	E82ZWBRB

Inverter Drives 8400 TopLine

Accessories



USB diagnostic adapter

The operation, parameter setting and diagnostics of the Inverter Drives 8400 and the Servo Drives 9400 via the L-force diagnostics is made with the keypad X400 or a PC. The connection of a PC can be made via a USB interface and the USB diagnostic adapter.

For connecting the USB diagnostic adapter with the L-force diagnostics interface (DIAG) at the inverter, three different connecting cables are separately available in the lengths 2.5 m, 5 m and 10 m. The connection can be established during operation. The engineering tools EASY Starter or Engineer can be used to carry out the operation, parameter setting or diagnostics of the inverters. Both tools have simple intuitive surfaces. This enables a quick and easy commissioning.

Optionally to the USB diagnostic adapter, the PC system bus adapter can be used. For this purpose, a CANopen interface must be available at the inverter.



USB diagnostic adapter incl. connecting cable to the PC

- The engineering tools EASY Starter or Engineer are used for operation, parameter setting and diagnostics of the inverters.

4.4

Mode		Features	Product key
USB diagnostic adapter		• Input-side voltage supply via USB connection on PC • Output-side voltage supply via inverter's diagnostic interface • Diagnostic LEDs • Electrical isolation of PC and inverter • Hot-pluggable	E94AZCUS

Connecting cables for USB diagnostic adapter

Mode	Features	Product key
Connecting cable for USB diagnostic adapter	• Length: 2.5 m	EWL0070
	• Length: 5 m	EWL0071
	• Length: 10 m	EWL0072



X400 keypad

As an alternative to the PC, the X400 keypad can be used for local operation, parameter setting or diagnostics.
The X400 keypad plugs into the L-force diagnostics interface (DIAG) on the front of the inverter.



X400 keypad

Mode		Features	Slot	Product key
X400 keypad		• Menu navigation • Graphics display with background lightning for clear presentation of information • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function	DIAG	EZAEBK1001

- The Inverter Drives 8400 can be ordered with a plug-in keypad already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-XXXXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

4.4

X400 diagnosis terminal

Mode		Features	Slot	Product key
X400 diagnosis terminal		• X400 keypad in a robust housing • Also suitable for installation in the control cabinet door • incl. 2.5 m cable • IP20 degree of protection, IP65 for control cabinet installation on front face	DIAG	EZAEBK2001



PC system bus adapter

The operation, parameterisation and diagnostics of the Inverter Drives 8400 using a PC can also be carried out via the CANopen interface using a PC system bus adapter. This requires a PC system bus adapter instead of a USB diagnostic adapter. This adapter is plugged into the parallel interface or USB connection of the PC. The corresponding drivers will be installed automatically. The voltage for the adapter is supplied via the USB connection of the PC. The CANopen interface is integrated or available with a variant (BaseLine C).

Advantage:

- Operation, parameterisation and diagnostics in parallel with the keypad
- In interconnected systems, multiple inverters can be addressed simultaneously from one point (remote parameterisation via CANopen)



EMF2177IB adapter

Mode	Features	Product key
PC system bus adapter	• Voltage supply via USB port on PC • Electrical isolation from the bus	EMF2177IB

Shield mounting

A shield mounting is used to connect the motor cable shield on the inverter's shield connection.

Mode	Features	Product key
Metal cable tie	• Cable diameter: 8...30 mm • Packaging unit: 50 items	EZAMBKBM
Fixing clip	• Cable diameter: 4...10 mm • Packaging unit: 20 items	EZAMBHXM007/M
Wire clamp	• Cable diameter: 4...15 mm • Packaging unit: 10 items	EZAMBHXM006/M
	• Cable diameter: 10...20 mm • Packaging unit: 10 items	EZAMBHXM003/M
	• Cable diameter: 15...28 mm • Packaging unit: 10 items	EZAMBHXM004/M
	• Cable diameter: 20...37 mm • Packaging unit: 10 items	EZAMBHXM005/M

Inverter Drives 8400 TopLine

Accessories



Terminal strips

All connections are equipped with pluggable connectors, with power connections up to 15 kW. These pluggable connectors are available separately for service purposes or if cable harnesses need to be physically separated.

► Power connections

Product key	Terminal strip	Features	Product key	Terminal strip	Features	Product key							
Inverter													
E84AV□□□2512□□□	X100	• Connection: mains • Packaging unit: 10 items	E84AZEVS001X100/M	X105	• Connection: motor • Packaging unit: 5 items	E84AZEVS010X105/M							
E84AV□□□3712□□□													
E84AV□□□5512□□□			E84AZEVS002X100/M										
E84AV□□□7512□□□													
E84AV□□□1122□□□			E84AZEVS003X100/M										
E84AV□□□1522□□□													
E84AV□□□2222□□□		• Connection: mains • Packaging unit: 5 items											
E84AV□□□3714□□□													
E84AV□□□5514□□□													
E84AV□□□7514□□□													
E84AV□□□1124□□□													
E84AV□□□1524□□□													
E84AV□□□2224□□□													
E84AV□□□3024□□□													
E84AV□□□4024□□□		E84AZEVS004X100/M	E84AZEVS011X105/M										
E84AV□□□5524□□□		E84AZEVS005X100/M				E84AZEVS012X105/M							
E84AV□□□7524□□□													
E84AV□□□1134□□□													
E84AV□□□1534□□□													

► Control connections

Terminal strip	Features	Product key
X1	- Connection: CANopen - Packaging unit: 10 items	E84AZEVS040X001/M
X3	- Connection: analog inputs and outputs - Packaging unit: 5 items	E84AZEVS060X003/M
X4	- Connection: digital outputs - Packaging unit: 10 items	E84AZEVS060X004/M
X5	- Connection: digital inputs - Packaging unit: 5 items	E84AZEVS060X005/M
X10	- Connection: axis bus - Packaging unit: 10 items	E84AZEVS060X010/M
X80	- Connection: safety engineering - Packaging unit: 10 items	E84AZEVS070X080/M
X101	- Connection: relay - Packaging unit: 10 items	E84AZEVS020X101/M
X106	- Connection: PTC - Packaging unit: 10 items	E84AZEVS030X106/M
X107	- Connection: 2.5 A digital output - Packaging unit: 10 items	E84AZEVS060X107/M



Setpoint potentiometer

The setpoint selection (e.g. speed) can be made via an external potentiometer.
The setpoint potentiometer is connected to the inverter's analog input terminals. A scale and a rotary knob are also available.



Setpoint potentiometer with scale and rotary knob

Mode	Product key
10 kOhm / 1 Watt potentiometer	ERPD0010K0001W
Rotary knob, 36 mm diameter	ERZ0001
Scale 0 ... 100%, 62 mm diameter	ERZ0002

Inverter Drives 8400 TopLine

Accessories



Inverter Drives 8400 TopLine

Accessories



Inverter

Inverter Drives 8400 HighLine

0.25 to 45 kW



Inverter Drives 8400 HighLine

Contents



General information	Product key	4.6 - 4	
	Equipment	4.6 - 5	
	List of abbreviations	4.6 - 6	
	Inverter Drives 8400	4.6 - 7	
	Functions and features	4.6 - 8	
	Operating modes	4.6 - 9	
	Technical data	Standards and operating conditions	4.6 - 11
Rated data 230 V		4.6 - 12	
Rated data 400 V		4.6 - 18	
"Cold plate" design		4.6 - 30	
Push-through technique design		4.6 - 32	
Interfaces	Mains connection	4.6 - 35	
	Motor connection	4.6 - 37	
	Connection diagrams	4.6 - 41	
	Control connections	4.6 - 43	
	Memory module	4.6 - 45	
	Safety system (STO)	4.6 - 45	
	EtherCAT® communication module	4.6 - 46	
	EtherNet/IP communication module	4.6 - 48	
	POWERLINK communication module	4.6 - 50	
	PROFIBUS communication module	4.6 - 52	
	PROFINET communication module	4.6 - 54	
	Accessories	Brake resistors	4.6 - 57
Mains chokes		Operation at rated power	4.6 - 59
		Operation with increased power output	4.6 - 60
Interference suppression		Available RFI and mains filters	4.6 - 61
		Operation at rated power	4.6 - 62
		Operation with increased power output	4.6 - 64
Sinusoidal filters		Operation at rated power	4.6 - 66
		Operation with increased power output	4.6 - 67
Regenerative power supply modules		Rated data for power supply modules	4.6 - 68
		Rated data for regenerative power supply modules	4.6 - 70
		Control connections	4.6 - 72
		Brake resistors of the regenerative power supply modules	4.6 - 73
		Mains chokes of the power supply modules	4.6 - 74
		Interference suppression of the regenerative power supply modules	4.6 - 75
		DC input module	4.6 - 78
		DC-bus connection	4.6 - 79
		24 V power supply unit	4.6 - 81
		Brake switch	4.6 - 81
		USB diagnostic adapter	4.6 - 82
		X400 keypad	4.6 - 83
		X400 diagnosis terminal	4.6 - 83
		PC system bus adapter	4.6 - 84
		Shield mounting	4.6 - 84
		Terminal strips	4.6 - 85
Setpoint potentiometer		4.6 - 86	

Inverter Drives 8400 HighLine

General information



Product key

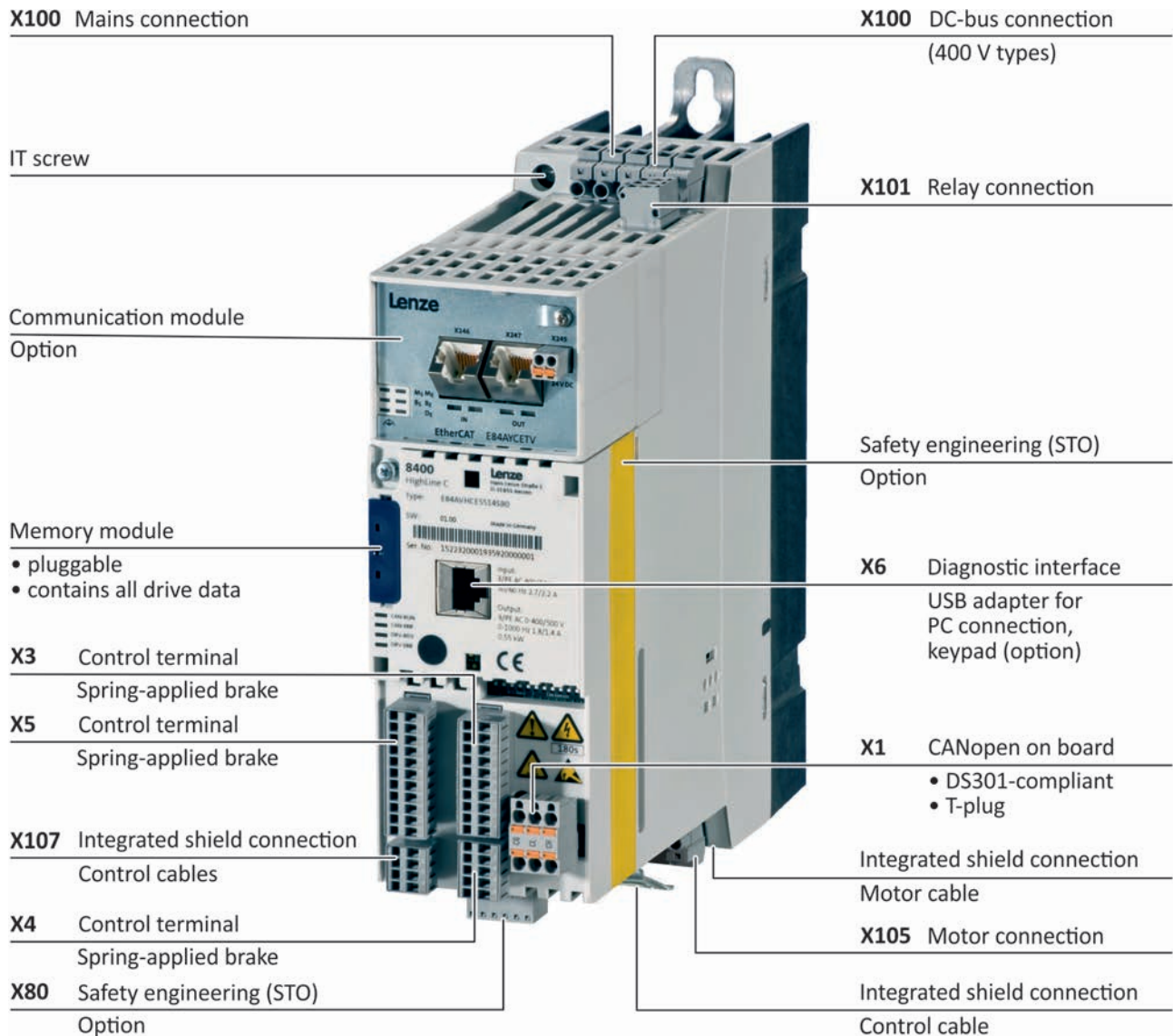
	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 5.5 kW)												
Power												
251 - 0.25 kW												
371 - 0.37 kW												
551 - 0.55 kW												
751 - 0.75 kW												
112 - 1.1 kW												
152 - 1.5 kW												
222 - 2.2 kW												
302 - 3.0 kW												
402 - 4.0 kW												
Voltage class												
2 - 230/240 V, 1/N/PE AC (0.25 ... 2.2 kW)												
4 - 400/500 V, 3/PE AC (0.37 ... 45.0 kW)												
Ambient conditions												
S - standard (0.25 ... 15.0 kW)												
V - rough environment (coated printed circuit boards, 0.25 ... 45.0 kW)												
Safety engineering												
X - without safety engineering												
B - with safety engineering (STO)												
Version identifier												
0 - 599 Hz												
S - 599 Hz												
7 - 1000 Hz												
Communication module plugged in												
XX - without communication module												
ET - EtherCAT												
EO - EtherNET/IP												
EC - POWERLINK												
PM - PROFIBUS												
ER - PROFINET												
Operating module plugged in												
X - without keypad												
K - with keypad												

Inverter Drives 8400 HighLine

General information



Equipment



4.6

Inverter Drives 8400 HighLine

General information



List of abbreviations

b	[mm]	Dimensions
C _{th}	[KW _s]	Thermal capacity
f _{ch}	[kHz]	Switching frequency
h	[mm]	Dimensions
H _{max}	[m]	Site altitude
I _{max}	[A]	Max. DC-bus current
I _{max, out}	[A]	Max. output current
I _{N, AC}	[A]	Rated mains current
I _{N, DC}	[A]	Rated DC-bus current
I _{N, out}	[A]	Rated output current
l _{max}	[m]	Max. cable length
m	[kg]	Mass
P	[kW]	Typical motor power
P _{max, 1}	[kW]	Max. output power
P _V	[kW]	Power loss
P _N	[kW]	Rated power
R _{min}	[Ω]	Min. brake resistance
R _N	[Ω]	Rated resistance
t	[mm]	Dimensions
U _{AC}	[V]	Mains voltage
U _{DC}	[V]	DC supply
U _{N, AC}	[V]	Rated voltage
U _{out}	[V]	Max. output voltage

ASM	Asynchronous motor
DIAG	Slot for diagnostic adapter
DIN	Deutsches Institut für Normung e.V.
EN	European standard
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60721-3	Classification of environmental conditions; Part 3: Classes of environmental parameters and their limit values
EN 61800-3	Electrical variable speed drives Part 3: EMC requirements including special test methods
IEC	International Electrotechnical Commission
IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
IM	International Mounting Code
IP	International Protection Code
MCI	Slot for communication module (module communication interface)
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

Inverter Drives 8400 HighLine

General information



Inverter Drives 8400

Cost-efficiency, time savings and quality enhancement are the challenges of the future. Lenze is facing these challenges with its L-force product portfolio – the holistic solution portfolio with precisely matched interfaces and components. For faster configuration and commissioning, better performance and more flexibility in production.

As such, the four versions of Inverter Drives 8400 - BaseLine, StateLine, HighLine and TopLine - have been designed for consistent process optimisation – throughout your entire value-added chain. They reduce your costs, from component selection, through project planning, manufacturing and commissioning, all the way up to servicing. We call this "rightsizing".

Rightsized for versatile applications

Are you looking to control a three-phase AC motor or perform positioning with or without feedback? Then select exactly the inverter you need from the scaled solution space of the Inverter Drives 8400 with units in the power range from 0.25 kW to 45 kW. You are sure to find exactly what you are looking for here, as the modular 8400 range of inverters offers the right solution for a broad spectrum of applications.

While the BaseLine is excellent for basic applications, the TopLine offers servo qualities and thereby fulfils with the strict requirements in terms of dynamics and accuracy.

Rightsized for optimised operation

The energy-saving function "VFC eco" supported by the 8400 reduces the energy required by the motor in partial load operation. Combine this with an MF L-force three-phase AC motor (inverter-optimised, 120 Hz) and what you get is a highly efficient, compact and cost-effective drive with high dynamic performance and a wide setting range. "VFC eco" can reduce your energy costs by up to 30%.

8400 HighLine - for positioning tasks

Alongside the options offered by the 8400 StateLine, the additional features of the 8400 HighLine include integrated point-to-point positioning. As such, up to 15 selectable target positions, including the corresponding travel profile (e.g. acceleration), can be stored in the inverter. These positions are selected and corresponding procedures specified by the master control. The returned incremental encoder signal is evaluated via two digital inputs, whereby many applications do not require feedback.

The 8400 HighLine is recommended for applications such as rotary indexing tables, rolling and sliding doors or positioning tasks in storage systems.

Inverter Drives 8400 HighLine

General information



Functions and features

Mode	8400 HighLine
Control types, motor control	
Field-oriented servo control (SC)	For asynchronous servo motors and three-phase asynchronous motors
Sensorless control (SLPSM)	For synchronous servo motors
Sensorless vector control (SLVC)	For three-phase asynchronous motors
V/f control (VFCplus)	For three-phase AC motors and asynchronous servo motor (linear or square-law)
Energy saving function (VFC eco)	For three-phase asynchronous motors
Basic functions	Freely assignable user menu Free function block interconnection with extensive function library Parameter change-over DC brake function Braking operation without brake resistor Brake management for brake control with low rate of wear Flying restart circuit S-shaped ramps for smooth acceleration PID controller 15 fixed frequencies Masking frequencies Inversion of motor phase sequence
Technology applications	Speed actuating drive Switch-off positioning without feedback Table positioning without feedback
Monitoring and protective measures	Short circuit Earth fault Overvoltage Motor phase failure Overcurrent $I^2 \times t$ -Motor monitoring Motor overtemperature Mains phase failure Protection against restart for cyclic mains switching Motor stalling
Diagnostics	Data logger, logbook, oscilloscope functions
Status display	4 LEDs
Diagnostic interface	Integrated For USB diagnostic adapter or keypad (diagnosis terminal)
Braking operation	
Brake chopper	Integrated
Brake resistor	External

4.6

Inverter Drives 8400 HighLine

General information

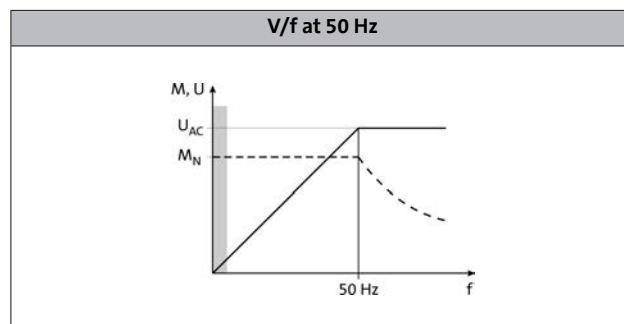


Operating modes

An inverter enables energy-efficient operation of a system in virtually all application cases. The various operating modes, which can be created by making just a few simple settings, facilitate this. The following characteristics and corresponding specifications listed on the following pages can be used to calculate the optimum operating mode during the project planning phase.

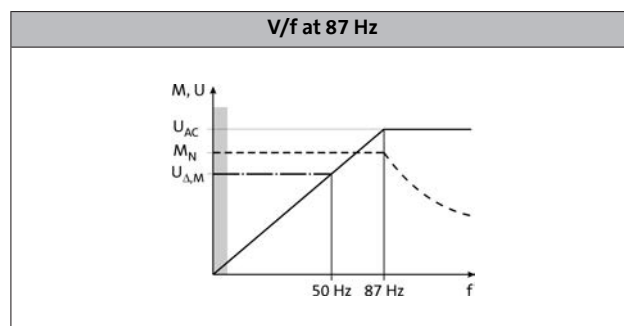
Standard setting

In its initial state when delivered, the inverter is set up for basic operation with a three-phase AC motor with V/f control. When operated in this mode, the rated torque of the motor is available in a setting range up to 50 Hz.



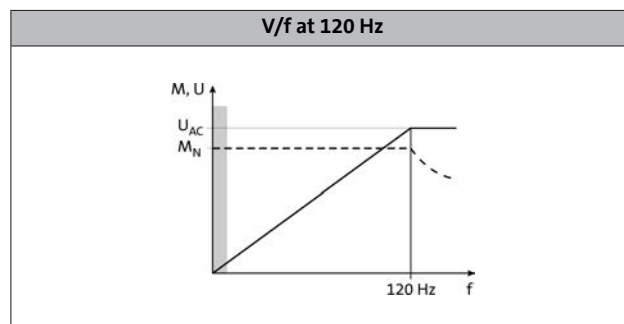
Extended setting range up to 87 Hz

If the V/f reference point on the inverter is set to 87 Hz, the rated torque can be used across an extended setting range. Here, a 230/400V motor is for example used and operated in a delta layout with a 400V inverter. The setting range is then increased by 40 %. The inverter must be dimensioned for a rated motor current of 230 V.



Operation with inverter-optimised MF motors

Large setting ranges and optimum operation at the rated torque: these are the strengths of the MF motor when used in combination with an inverter. The motors are optimised for a setting range up to 120 Hz. Compared to conventional 50Hz operation, the setting range increases by 250 %. It is quite simply not possible for a drive to be operated any more efficiently in a machine.



Inverter Drives 8400 HighLine

General information



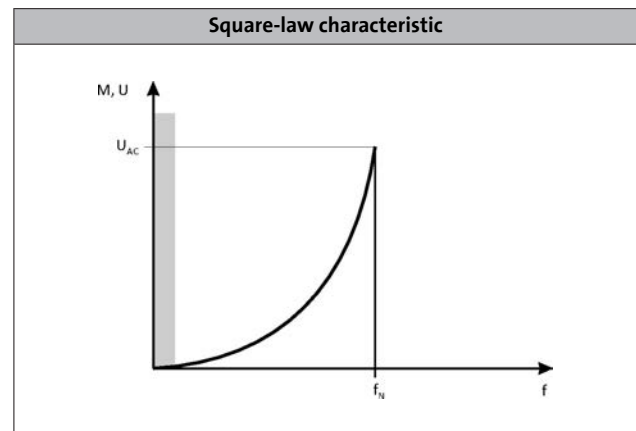
Operating modes

Square-law V/f characteristic control

The output voltage is increased quadratically 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 quadratically to the frequency increase, the maximum output power of the motor being constant.

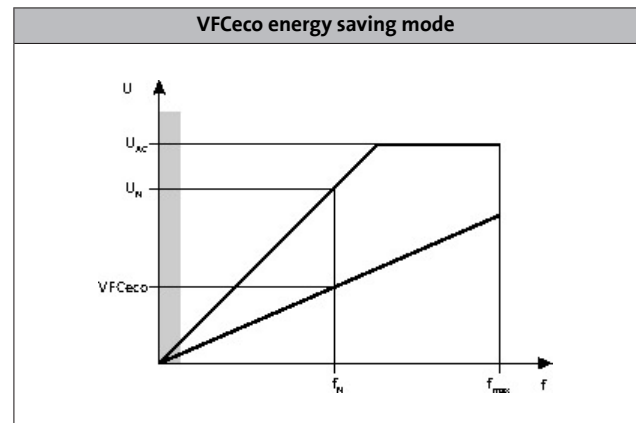
Application areas are for instance:

- Pumps
- Blowers
- Fans



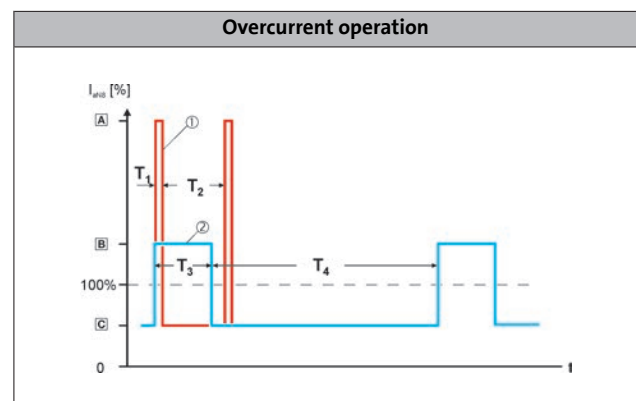
VFCeco energy saving mode

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.



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 with a duration 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. For both utilisation cycles, a moving average is determined separately. The adjacent diagram shows both cycles: 15 s in red and 180 s in blue. The overload times t_{o1} are 3 s (T_1) and 60 s (T_3) respectively, the corresponding recovery times t_{re} are 12 s (T_2) and 120 s (T_4) respectively. The following tables show the resulting maximum output currents. Monitoring of the device utilisation ($I \times t$) activates the set error response (trip or warning if one of the two utilisation values exceeds the limit of 100 %).



Inverter Drives 8400 HighLine

Technical data



Standards and operating conditions

Mode			
Product			8400 HighLine
Conformity			
CE			Low-Voltage Directive
			2014/35/EU [UKCA: S.I. 2016/1101]
Approval			
UL 508C			for USA and Canada (requirements of the CSA 22.2 No. 14) ²⁾ Power Conversion Equipment (file no. E132659)
Degree of protection			
EN 60529 ³⁾			IP20
NEMA 250			Type 1
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10 °C ... +55 °C)
Current derating at over 45 °C			2.5% / K
Site altitude			
Amsl	H _{max}	[m]	4000
Current derating at over 1000 m		[%/1000 m]	5
Vibration resistance			
Transport (EN 60721-3-2)			2M2
Operation (EN 61800-5-1)			10 Hz ≤ f ≤ 57 Hz: ±0.075 mm amplitude, 57 Hz ≤ f ≤ 150 Hz: 1.0 g
Operation (Germanischer Lloyd)			5 Hz ≤ f ≤ 13.2 Hz: ± 1 mm amplitude 13.2 Hz ≤ f ≤ 100 Hz: 0.7 g

Mode			
Product			8400 HighLine
Supply form			
			Systems with earthed star point (TN and TT systems) Systems with high-resistance or isolated star point (IT systems)
Noise emission			
EN 61800-3			Integrated RFI suppression: category C2 up to 25 m shielded motor cable ¹⁾
Insulation resistance			
EN 61800-5-1			Overvoltage category III Above 2000 m amsl overvoltage category II
Degree of pollution			
EN 61800-5-1			2
Protective insulation of control circuits			
EN 61800-5-1			Safe mains isolation: double/reinforced insulation

¹⁾  37 - Please also refer to the Motor connection section

²⁾ CSA when using an external mains choke or a module for reducing transients.

³⁾ Mounted and ready-to-use

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).

Output currents I_{out} apply to:

Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.

Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.

Output currents apply to:

Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55 ¹⁾
Product key						
			E84AVHC□2512□□0		E84AVHC□3712□□0	
Mains voltage range						
	U _{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	I _{N, AC}	[A]	3.0	3.6	4.2	5.0
Without mains choke	I _{N, AC}	[A]	3.4	4.1	5.0	
Rated output current						
	I _{N, out}	[A]	1.7	2.1	2.4	2.9
Output current						
2 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
4 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
8 kHz	I _{out}	[A]	1.7		2.4	
16 kHz	I _{out}	[A]	1.1		1.6	

Data for 60 s overload

Max. output current						
	$I_{max,out}$	[A]	2.6		3.6	
Overload time						
	t_{ol}	[s]	60.0			
Recovery time						
	t_{re}	[s]	120.0			

Data for 3 s overload

Max. short-time output current						
	$I_{max,out}$	[A]	3.4		4.8	
Overload time						
	t_{ol}	[s]	3.0			
Recovery time						
	t_{re}	[s]	12.0			

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55
Product key						
			E84AVHC□2512□□0			E84AVHC□3712□□0
Power loss						
	P _V	[kW]	0.045		0.050	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	0.6	0.6
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	0.8	0.8
Min. brake resistance				
	R _{min}	[Ω]	180.0	180.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	165	165
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	1.3	1.3

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).

Output currents I_{out} apply to:

Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.

Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.

Output currents apply to:

Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

frequency 5 kHz to 16 kHz						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10 ¹⁾
Product key						
			E84AVHC□5512□□0 E84AVHC□5512□□S		E84AVHC□7512□□0 E84AVHC□7512□□S	
Mains voltage range						
	U _{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	I _{N, AC}	[A]	5.0	6.0	7.0	8.4
Without mains choke	I _{N, AC}	[A]	5.3	6.4	8.0	
Rated output current						
	I _{N, out}	[A]	3.0	3.6	4.0	4.8
Output current						
2 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
4 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
8 kHz	I _{out}	[A]	3.0		4.0	
16 kHz	I _{out}	[A]	2.0		2.7	

Data for 60 s overload

Max. output current				
	I _{max, out}	[A]	4.5	6.0
Overload time				
	t _{ol}	[s]	60.0	
Recovery time				
	t _{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	6.0	8.0
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10
Product key						
			E84AVHC□5512□□0 E84AVHC□5512□□S		E84AVHC□7512□□0 E84AVHC□7512□□S	E84AVHC□7512□□0 E84AVHCC7512□□S
Power loss						
	P _V	[kW]	0.060		0.075	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	1.1	1.1
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	1.4	1.4
Min. brake resistance				
	R _{min}	[Ω]	100.0	100.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	215	215
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	1.8	1.8

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

							
Typical motor power							
4-pole asynchronous motor	P	[kW]	1.10	1.10	1.50	2.20 ¹⁾	2.20
Product key							
			E84AVHC□1122□□0 E84AVHC□1122□□S	E84AVHC□1522□□0 E84AVHC□1522□□S	E84AVHC□2222□□0 E84AVHC□2222□□S		
Mains voltage range							
	U_{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %				
Rated mains current							
With mains choke	$I_{N, AC}$	[A]	9.9	11.9	11.4	13.7	16.4
Without mains choke	$I_{N, AC}$	[A]	12.0	14.4	13.7		21.8
Rated output current							
	$I_{N, out}$	[A]	5.5	6.8	7.0	8.4	9.5
Output current							
2 kHz	I_{out}	[A]	5.5	6.8	7.0	8.4	9.5
4 kHz	I_{out}	[A]	5.5	6.8	7.0	8.4	9.5
8 kHz	I_{out}	[A]	5.5		7.0		9.5
16 kHz	I_{out}	[A]	3.7		4.7		6.3

Data for 60 s overload

Max. output current							
	$I_{max, out}$	[A]	8.3	10.5	14.3		
Overload time							
	t_{ol}	[s]	60.0				
Recovery time							
	t_{re}	[s]	120.0				

Data for 3 s overload

Max. short-time output current							
	$I_{max, out}$	[A]	11.0	14.0	19.0		
Overload time							
	t_{ol}	[s]	3.0				
Recovery time							
	t_{re}	[s]	12.0				

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	
Product key								
			E84AVHC□1122□□0 E84AVHC□1122□□S		E84AVHC□1522□□0 E84AVHC□1522□□S		E84AVHC□2222□□0 E84AVHC□2222□□S	
Power loss								
	P _V	[kW]	0.095		0.110		0.140	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	3.3	3.3	3.3
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	4.4	4.4	4.4
Min. brake resistance					
	R _{min}	[Ω]	33.0	33.0	33.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	270	270	270
Width	b	[mm]	70	70	70
Depth ²⁾	t	[mm]	199	199	199
Mass					
	m	[kg]	2.1	2.1	2.1

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10 ¹⁾
Product key			E84AVHC□3714□□0 E84AVHC□3714□□S		E84AVHC□5514□□0 E84AVHC□5514□□S		E84AVHC□7514□□0 E84AVHC□7514□□S	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	1.4	1.7	2.0	2.6		3.0
Without mains choke	I _{N, AC}	[A]	1.8	2.2	2.5	3.2	3.6	
Rated output current								
	I _{N, out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
Output current								
2 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
4 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
8 kHz	I _{out}	[A]	1.3		1.8		2.4	
16 kHz	I _{out}	[A]	0.9		1.2		1.6	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	2.0	2.7	3.6
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	2.6	3.6	4.8
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10
Product key								
			E84AVHC□3714□□0 E84AVHC□3714□□S		E84AVHC□5514□□0 E84AVHC□5514□□S		E84AVHC□7514□□0 E84AVHC□7514□□S	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	2.2		3.3		4.4	
Power loss								
	P _V	[kW]	0.050		0.065		0.080	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

Rated power, Brake chopper								
	P _N	[kW]	1.3		1.3		1.3	
Max. output power, Brake chopper								
	P _{max, 1}	[kW]	1.3		1.3		1.3	
Min. brake resistance								
	R _{min}	[Ω]	390.0		390.0		390.0	

Dimensions and weights

Standard installation design

Dimensions								
Height	h	[mm]	215		215		215	
Width	b	[mm]	70		70		70	
Depth ²⁾	t	[mm]	199		199		199	
Mass								
	m	[kg]	1.8		1.8		1.8	

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00 ¹⁾	3.00	4.00 ¹⁾
Product key										
			E84AVHC□1124□□□ E84AVHCC1124□□S		E84AVHC□1524□□□ E84AVHCC1524□□S		E84AVHC□2224□□□ E84AVHCC2224□□S		E84AVHC□3024□□□S	
Mains voltage range										
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %							
Rated mains current										
With mains choke	I _{N, AC}	[A]	3.2	3.8	3.9	4.7	5.1	6.1	7.0	8.4
Without mains choke	I _{N, AC}	[A]	4.4	5.3	5.5	6.6	7.3		9.8	11.8
Rated output current										
	I _{N, out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
Output current										
2 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
4 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
8 kHz	I _{out}	[A]	3.2		3.9		5.6		7.3	
16 kHz	I _{out}	[A]	2.1		2.6		3.7		4.9	

Data for 60 s overload

Max. output current						
	I _{max, out}	[A]	4.8	5.9	8.4	11.0
Overload time						
	t _{ol}	[s]	60.0			
Recovery time						
	t _{re}	[s]	120.0			

Data for 3 s overload

Max. short-time output current						
	I _{max, out}	[A]	6.4	7.8	11.2	14.6
Overload time						
	t _{ol}	[s]	3.0			
Recovery time						
	t _{re}	[s]	12.0			

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00	3.00	4.00
Product key										
			E84AVHC□1124□□0 E84AVHCC1124□□S	E84AVHC□1524□□0 E84AVHCC1524□□S	E84AVHC□2224□□0 E84AVHCC2224□□S	E84AVHC□3024□□S				
DC supply										
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %							
Rated DC-bus current										
	I _{N, DC}	[A]	5.4	6.7	8.9	12.0				
Power loss										
	P _V	[kW]	0.095	0.105	0.135	0.165				
Max. cable length ¹⁾										
Shielded motor cable	l _{max}	[m]	50							

Brake chopper rated data

Rated power, Brake chopper						
	P _N	[kW]	2.9	2.9	3.5	6.4
Max. output power, Brake chopper						
	P _{max, 1}	[kW]	2.9	2.9	3.5	6.4
Min. brake resistance						
	R _{min}	[Ω]	180.0	180.0	150.0	82.0

Dimensions and weights

Standard installation design

Dimensions						
Height	h	[mm]	270	270	270	270
Width	b	[mm]	70	70	70	70
Depth ²⁾	t	[mm]	199	199	199	199
Mass						
	m	[kg]	2.1	2.1	2.1	2.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50 ¹⁾
Product key								
			E84AVHC□3024□□0		E84AVHC□4024□□0		E84AVHC□5524□□0	
Mains voltage range								
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
Rated mains current								
With mains choke	I _{N, AC}	[A]	7.0	8.4	8.8	10.6	12.0	18.0
Without mains choke	I _{N, AC}	[A]	9.8	11.8	13.1	15.7	18.0	
Rated output current								
	I _{N, out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
Output current								
2 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
4 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
8 kHz	I _{out}	[A]	7.3		9.5		13.0	
16 kHz	I _{out}	[A]	4.9		6.3		8.7	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	11.0	14.3	19.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	14.6	19.0	26.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50
Product key								
			E84AVHC□3024□□0		E84AVHC□4024□□0		E84AVHC□5524□□0	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N,DC}	[A]	12.0		16.0		22.0	
Power loss								
	P _V	[kW]	0.165		0.205		0.275	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

4.6

Rated power, Brake chopper					
	P _N	[kW]	6.4	9.4	9.4
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	6.4	11.2	11.2
Min. brake resistance					
	R _{min}	[Ω]	82.0	47.0	47.0

Dimensions and weights

Standard installation design

Product key				
			E84AVHC□4024□□0	E84AVHC□5524□□0
Dimensions				
Height	h	[mm]	270	270
Width	b	[mm]	140	140
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	4.4	4.4

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

							
Typical motor power							
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0 ¹⁾	15.0 ¹⁾
Product key							
			E84AVHC□7524□□0		E84AVHC□1134□□0		E84AVHC□1534□□0
Mains voltage range							
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %				
Rated mains current							
With mains choke	I _{N, AC}	[A]	15.0	21.0		29.0	
Without mains choke	I _{N, AC}	[A]	20.0	28.0	29.0		
Rated output current							
	I _{N, out}	[A]	16.5	21.0	23.5	28.2	32.0
Output current							
2 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0
4 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0
8 kHz	I _{out}	[A]	16.5		23.5		32.0
16 kHz	I _{out}	[A]	11.0		15.7		21.3

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	26.4	35.3	48.0
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	33.0	47.0	64.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0	15.0	
Product key			E84AVHC□7524□□0		E84AVHC□1134□□0		E84AVHC□1534□□0	
DC supply								
	U _{DC}	[V]						
Rated DC-bus current								
	I _{N, DC}	[A]	24.5		35.5			
Power loss								
	P _V	[kW]	0.320		0.435		0.470	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

4.6

Rated power, Brake chopper					
	P _N	[kW]	19.5	19.5	29.2
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	19.5	19.5	29.2
Min. brake resistance					
	R _{min}	[Ω]	27.0	27.0	18.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	325	325	325
Width	b	[mm]	140	140	140
Depth ²⁾	t	[mm]	199	199	199
Mass					
	m	[kg]	5.8	5.8	5.8

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0 ¹⁾	22.0 ¹⁾	30.0 ¹⁾
Product key			E84AVHC□1834□□0		E84AVHC□2234□□0	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U _{AC}	[V]				
Rated mains current						
With mains choke	I _{N, AC}	[A]	36.0	42.2	42.0	50.8
Without mains choke	I _{N, AC}	[A]	50.4			
Rated output current						
	I _{N, out}	[A]	40.0	46.8	47.0	56.4
Output current						
2 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
4 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
8 kHz	I _{out}	[A]	40.0		47.0	
16 kHz	I _{out}	[A]	27.0		31.3	

Data for 60 s overload

Max. output current				
	$I_{\text{max, out}}$	[A]	60.0	70.5
Overload time				
	t_{ol}	[s]	60.0	
Recovery time				
	t_{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	78.0	89.3
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke or mains filter

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0	22.0	30.0
Product key						
			E84AVHC□1834□□0			E84AVHC□2234□□0
DC supply						
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %			
Rated DC-bus current						
	I _{N, DC}	[A]	44.1		51.4	
Power loss						
	P _V	[kW]	0.540		0.640	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	100			

Brake chopper rated data

4.6

Rated power, Brake chopper				
	P _N	[kW]	35.0	35.0
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	35.0	35.0
Min. brake resistance				
	R _{min}	[Ω]	15.0	15.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	350	350
Width	b	[mm]	205	205
Depth ²⁾	t	[mm]	250	250
Mass				
	m	[kg]	12.0	12.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0 ¹⁾	37.0 ¹⁾	37.0 ¹⁾	45.0 ¹⁾	45.0 ¹⁾	55.0 ¹⁾
Product key			E84AVHC□3034□□0		E84AVHC□3734□□0		E84AVHC□4534□□0	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	55.0	66.0	68.0	81.6	80.0	96.0
Without mains choke	I _{N, AC}	[A]						
Rated output current								
	I _{N, out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
Output current								
2 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
4 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
8 kHz	I _{out}	[A]	61.0		76.0		89.0	
16 kHz	I _{out}	[A]	41.0		51.0		60.0	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	91.5	114.0	133.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	112.1	136.8	169.1
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke or mains filter

Inverter Drives 8400 HighLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0	37.0	37.0	45.0	45.0	55.0
Product key								
			E84AVHC□3034□□0		E84AVHC□3734□□0		E84AVHC□4534□□0	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	67.4		83.3		98.0	
Power loss								
	P _V	[kW]	0.840		0.980		1.300	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	100					

Brake chopper rated data

4.6

Rated power, Brake chopper					
	P _N	[kW]	70.1	70.1	70.1
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	70.1	70.1	70.1
Min. brake resistance					
	R _{min}	[Ω]	7.5	7.5	7.5

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	450	450	450
Width	b	[mm]	250	250	250
Depth ²⁾	t	[mm]	250	250	250
Mass					
	m	[kg]	17.2	17.2	17.2

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



"Cold plate" design

Inverters in cold-plate design dissipate some of their waste heat (heat loss) via a cooler adapted to the application. For this purpose, the inverters are provided with a planed cooling plate which is connected to a separate cooler in a thermally conductive way. Using the cold plate technology, the main part of the heat energy can be transferred directly to the external cooling units.

The use of cold-plate technology is advantageous for the following application cases:

- Minimising the expense of cooling the control cabinet. Here, the main part of the power loss is directly transferred to a cooling unit outside of the control cabinet, e.g. convection cooler or water cooler.
- Heavily polluted ambient air or control cabinets with a high degree of protection which do not allow for a use of a forced air cooling of the control cabinets.
- Low mounting depth in the control cabinet.

Product key	Power to be dissipated	Thermal resistance
	P_V	R_{th}
	[W]	[K/W]
E84AVHCC2512□□0	15.0	≤ 1.5
E84AVHCC3712□□0	20.0	≤ 1.5
E84AVHCC5512□□S	30.0	≤ 1.0
E84AVHCC7512□□S	40.0	≤ 1.0
E84AVHCC1122□□S	60.0	≤ 0.6
E84AVHCC1522□□S	75.0	≤ 0.5
E84AVHCC2222□□S	100	≤ 0.4
E84AVHCC3714□□S	25.0	≤ 1.0
E84AVHCC5514□□S	35.0	≤ 1.0
E84AVHCC7514□□S	50.0	≤ 1.0
E84AVHCC1124□□S	60.0	≤ 0.6
E84AVHCC1524□□S	70.0	≤ 0.5
E84AVHCC2224□□S	100	≤ 0.4
E84AVHCC3024□□S	100	≤ 0.4
E84AVHCC4024□□0	155	≤ 0.25
E84AVHCC5524□□0	215	≤ 0.18

4.6

Dimensions and weights

Product key			E84AVHCC2512□□0	E84AVHCC3712□□0	E84AVHCC5512□□S	E84AVHCC7512□□S
Dimensions						
Height, including fastening	h	[mm]	186		236	
Width, including fastening	b	[mm]	102		70	
Depth	t	[mm]	185		163	
Mass						
	m	[kg]	1.3		1.5	

Product key			E84AVHCC1122□□S	E84AVHCC1522□□S	E84AVHCC2222□□S
Dimensions					
Height, including fastening	h	[mm]		295	
Width, including fastening	b	[mm]		70	
Depth	t	[mm]		163	
Mass					
	m	[kg]		2.0	

Inverter Drives 8400 HighLine

Technical data



"Cold plate" design

Dimensions and weights

Product key			E84AVHCC3714□□S	E84AVHCC5514□□S	E84AVHCC7514□□S
Dimensions					
Height, including fastening	h	[mm]	236		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	163		
Mass					
	m	[kg]	1.5		

Product key			E84AVHCC1124□□S	E84AVHCC1524□□S	E84AVHCC2224□□S
Dimensions					
Height, including fastening	h	[mm]	295		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	163		
Mass					
	m	[kg]	2.0		

Product key			E84AVHCC3024□□S		E84AVHCC4024□□0	E84AVHCC5524□□0
Dimensions						
Height, including fastening	h	[mm]	295		318	
Width, including fastening	b	[mm]	70		174	
Depth ¹⁾	t	[mm]	163		141	
Mass						
	m	[kg]	2.0		2.7	

¹⁾ With safety engineering plus 20 mm

4.6



Push-through technique design

The inverters in push-through design reduce the waste heat in the control cabinet.

The inverter is mounted in the control cabinet such that the heatsink of the inverter is outside the control cabinet. Thus, the entire waste heat can be dissipated outside the control cabinet via convection or forced air cooling for almost all device performances. For inverters with a power below 2.2 kW, restrictions may occur.

Using the push-through technology is advantageous in the following application cases:

- Minimising the expense for control cabinet cooling. For this purpose, the main part of the power loss is directly transferred to the ambience outside the control cabinet (e.g. convection cooling).
- In case of control cabinets with a high degree of protection > IP54 by using separate mounting and cooling areas.
- Low mounting depth in the control cabinet.

Inverter Drives 8400 HighLine

Technical data



Push-through technique design

Dimensions and weights

Product key				
			E84AVHCD2512□□0	E84AVHCD3712□□0
			E84AVHCD5512□□0	E84AVHCD7512□□0
Dimensions				
Height, including fastening	h	[mm]	186	236
Width, including fastening	b	[mm]	102	
Depth (in control cabinet) ¹⁾	t	[mm]	185	163
Mass				
	m	[kg]	1.4	1.9

Product key				
			E84AVHCD1122□□0	E84AVHCD1522□□0
			E84AVHCD2222□□0	E84AVHCD3714□□0
Dimensions				
Height, including fastening	h	[mm]	295	236
Width, including fastening	b	[mm]	137	102
Depth (in control cabinet) ¹⁾	t	[mm]	163	
Mass				
	m	[kg]	3.5	1.9

Product key				
			E84AVHCD5514□□0	E84AVHCD7514□□0
			E84AVHCD1124□□0	E84AVHCD1524□□0
Dimensions				
Height, including fastening	h	[mm]	236	295
Width, including fastening	b	[mm]	102	137
Depth (in control cabinet) ¹⁾	t	[mm]	163	
Mass				
	m	[kg]	1.9	3.5

Product key				
			E84AVHCD2224□□0	E84AVHCD3024□□0
			E84AVHCD4024□□0	E84AVHCD5524□□0
Dimensions				
Height, including fastening	h	[mm]	295	318
Width, including fastening	b	[mm]	137	174
Depth (in control cabinet) ¹⁾	t	[mm]	163	141
Mass				
	m	[kg]	3.5	4.9

Product key				
			E84AVHCD7524□□0	E84AVHCD1134□□0
			E84AVHCD1534□□0	
Dimensions				
Height, including fastening	h	[mm]	378	
Width, including fastening	b	[mm]	174	
Depth (in control cabinet) ¹⁾	t	[mm]	141	
Mass				
	m	[kg]	6.2	

¹⁾ With safety engineering plus 20 mm

Inverter Drives 8400 HighLine

Technical data



Inverter Drives 8400 HighLine

Interfaces



Mains connection

- The mains fuse and cable cross-section specifications are for a mains connection of 1 x 230V or 3 x 400V.
- Class gG/gI fuses or class gRL semiconductor fuses.
- The cable cross-sections apply to PVC-insulated copper cables.
- Use for installation with UL-approved cables, fuses and brackets.

Operation with mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection	
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (with mains choke)	
P	U _{AC}		I	I	I	q	
[kW]	[V]		[A]	[A]	[A]	[mm ²]	
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	C6	6	6	1.0	
0.37		E84AV□□□3712□□□			10		
0.55		E84AV□□□5512□□□	C10	10	15	1.5	
0.75		E84AV□□□7512□□□			20		
1.10		E84AV□□□1122□□□	C16	16	25	2.5	
1.50		E84AV□□□1522□□□			30		
2.20		E84AV□□□2222□□□	C20	20	30	4.0	
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	C6	6	6	1.0	
0.55		E84AV□□□5514□□□			10		
0.75		E84AV□□□7514□□□					
1.10		E84AV□□□1124□□□			15		
1.50		E84AV□□□1524□□□					
2.20		E84AV□□□2224□□□	C10	10	15	1.5	
3.00		E84AV□□□3024□□□			20		
4.00		E84AV□□□4024□□□	C16	16	2.5		
5.50		E84AV□□□5524□□□	C20	20		4.0	
7.50		E84AV□□□7524□□□		30			
11.0		E84AV□□□1134□□□	C32	32		10.0	
15.0		E84AV□□□1534□□□		40			
18.5		E84AV□□□1834□□□	C50	50	16.0		
22.0		E84AV□□□2234□□□	C63	63	50	25.0	
30.0		E84AV□□□3034□□□	C80	80	70		
37.0		E84AV□□□3734□□□	C100	100	80	50.0	
45.0		E84AV□□□4534□□□	C125	125	100		

Inverter Drives 8400 HighLine

Interfaces



Mains connection

Operation without mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (without mains choke)
P	U _{AC}		I	I	I	q
[kW]	[V]		[A]	[A]	[A]	[mm ²]
0.25	1 AC 180... 264	E84AV□□□2512□□□	C6	6	6	1.0
0.37		E84AV□□□3712□□□			10	
0.55		E84AV□□□5512□□□	C10	10	15	1.5
0.75		E84AV□□□7512□□□			20	
1.10		E84AV□□□1122□□□	C16	16	25	2.5
1.50		E84AV□□□1522□□□	C20	20	30	4.0
2.20		E84AV□□□2222□□□	C25	25	30	6.0
0.37	3 AC 320... 550	E84AV□□□3714□□□	C6	6	6	1.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	C10	10	10	1.5
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	C16	16	15	2.5
4.00		E84AV□□□4024□□□			20	
5.50		E84AV□□□5524□□□	C25	25	25	4.0
7.50		E84AV□□□7524□□□	C32	32	40	10.0
11.0		E84AV□□□1134□□□				
18.5		E84AV□□□1834□□□	C80	80	60	25.0

Inverter Drives 8400 HighLine

Interfaces



Motor connection

- Keep motor cables as short as possible, as this has a positive effect on the drive behaviour.
- With group drives (multiple motors on one inverter), the resulting cable length is the key factor. This can be calculated using the hardware manual.
- Electric strength of the motor cable: 1 kV as per VDE 250-1.
- Capacitance per unit length
 $\leq 1.5 \text{ mm}^2 / \text{AWG 16: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 75 / \leq 150 \text{ pF/m}$
 $\geq 2.5 \text{ mm}^2 / \text{AWG 12: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 100 / \leq 150 \text{ pF/m.}$

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)
			45 °C	40 °C		
	4-pole asynchronous motor	Inverter			40 °C	40 °C
U_{in}	P		I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]
230	0.25	E84AV□□□2512□□□	50	100	50	50
	0.37	E84AV□□□3712□□□				
	0.55	E84AV□□□5512□□□				
	0.75	E84AV□□□7512□□□				
	1.10	E84AV□□□1122□□□				
	1.50	E84AV□□□1522□□□				
	2.20	E84AV□□□2222□□□				
400	0.37	E84AV□□□3714□□□	50	100	50	25
	0.55	E84AV□□□5514□□□				
	0.75	E84AV□□□7514□□□				
	1.10	E84AV□□□1124□□□				
	1.50	E84AV□□□1524□□□				
	2.20	E84AV□□□2224□□□				
	3.00	E84AV□□□3024□□□				
	4.00	E84AV□□□4024□□□				
	5.50	E84AV□□□5524□□□	100	150	100	100
	7.50	E84AV□□□7524□□□				
	11.0	E84AV□□□1134□□□				
	15.0	E84AV□□□1534□□□				
	18.5	E84AV□□□1834□□□				
	22.0	E84AV□□□2234□□□				
	30.0	E84AV□□□3034□□□				
	37.0	E84AV□□□3734□□□				
	45.0	E84AV□□□4534□□□				
500	0.37	E84AV□□□3714□□□	50	100	25	15
	0.55	E84AV□□□5514□□□				
	0.75	E84AV□□□7514□□□				
	1.10	E84AV□□□1124□□□				
	1.50	E84AV□□□1524□□□				
	2.20	E84AV□□□2224□□□				
	3.00	E84AV□□□3024□□□				

Inverter Drives 8400 HighLine

Interfaces



Motor connection

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)
			45 °C	40 °C	40 °C	40 °C
U_{in}	4-pole asynchronous motor	Inverter				
[V]	P		I_{max}	I_{max}	I_{max}	I_{max}
	[kW]		[m]	[m]	[m]	[m]
500	4.00	E84AV□□□4024□□□	50	100	50	50
	5.50	E84AV□□□5524□□□				
	7.50	E84AV□□□7524□□□				
	11.0	E84AV□□□1134□□□				
	15.0	E84AV□□□1534□□□				
	18.5	E84AV□□□1834□□□	100	150	100	100
	22.0	E84AV□□□2234□□□				
	30.0	E84AV□□□3034□□□				
	37.0	E84AV□□□3734□□□				
	45.0	E84AV□□□4534□□□				

4.6

Maximum shielded motor cable length acc. to category C2 (industry), conducted

- The values for I_{max} are valid for an ambient temperature of up to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD	
			4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz
U_{in}	4-pole asynchronous motor	Inverter						
[V]	P		I_{max}	I_{max}	I_{max}	I_{max}	I_{max}	I_{max}
	[kW]		[m]	[m]	[m]	[m]	[m]	[m]
230	0.25	E84AV□□□2512□□□	25	25	50	50	100	50
	0.37	E84AV□□□3712□□□						
	0.55	E84AV□□□5512□□□						
	0.75	E84AV□□□7512□□□						
	1.10	E84AV□□□1122□□□						
	1.50	E84AV□□□1522□□□						
	2.20	E84AV□□□2222□□□						
400	0.37	E84AV□□□3714□□□						
	0.55	E84AV□□□5514□□□						
	0.75	E84AV□□□7514□□□						
	1.10	E84AV□□□1124□□□						
	1.50	E84AV□□□1524□□□						
	2.20	E84AV□□□2224□□□						
	3.00	E84AV□□□3024□□□						
	4.00	E84AV□□□4024□□□						
	5.50	E84AV□□□5524□□□						
	7.50	E84AV□□□7524□□□						
	11.0	E84AV□□□1134□□□						
	15.0	E84AV□□□1534□□□						

Inverter Drives 8400 HighLine

Interfaces



Motor connection

Maximum shielded motor cable length acc. to category C2 (industry),
conducted

- The values for $I_{\max}$ are valid for an ambient temperature of up to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD				
	4-pole asynchronous motor	Inverter	4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz			
U _{in}	P		I _{max}	I _{max}	I _{max}	I _{max}	I _{max}	I _{max}			
[V]	[kW]		[m]	[m]	[m]	[m]	[m]	[m]			
400	18.5	E84AV□□□1834□□□	25	25			100	100			
	22.0	E84AV□□□2234□□□									
	30.0	E84AV□□□3034□□□									
	37.0	E84AV□□□3734□□□									
	45.0	E84AV□□□4534□□□									
500	0.37	E84AV□□□3714□□□								100	25
	0.55	E84AV□□□5514□□□									
	0.75	E84AV□□□7514□□□									
	1.10	E84AV□□□1124□□□						25			
	1.50	E84AV□□□1524□□□									
	2.20	E84AV□□□2224□□□									
	3.00	E84AV□□□3024□□□									
	4.00	E84AV□□□4024□□□									
	5.50	E84AV□□□5524□□□									
	7.50	E84AV□□□7524□□□					50		50		
	11.0	E84AV□□□1134□□□									
	15.0	E84AV□□□1534□□□									
	18.5	E84AV□□□1834□□□									
	22.0	E84AV□□□2234□□□									
	30.0	E84AV□□□3034□□□							100		
	37.0	E84AV□□□3734□□□									
	45.0	E84AV□□□4534□□□									



Motor connection

Operation with earth-leakage circuit breaker

If the inverter is connected via an earth-leakage circuit breaker, the following cable lengths are permissible, although the table must also be taken into account:

Earth-leakage circuit breaker 30 mA:

- 0.25 ... 2.2 kW to 25 m shielded motor cable with integrated RFI measures
- 0.25 ... 15 kW to 25 m shielded motor cable with RFI filter SD.

Earth-leakage circuit breaker 300 mA:

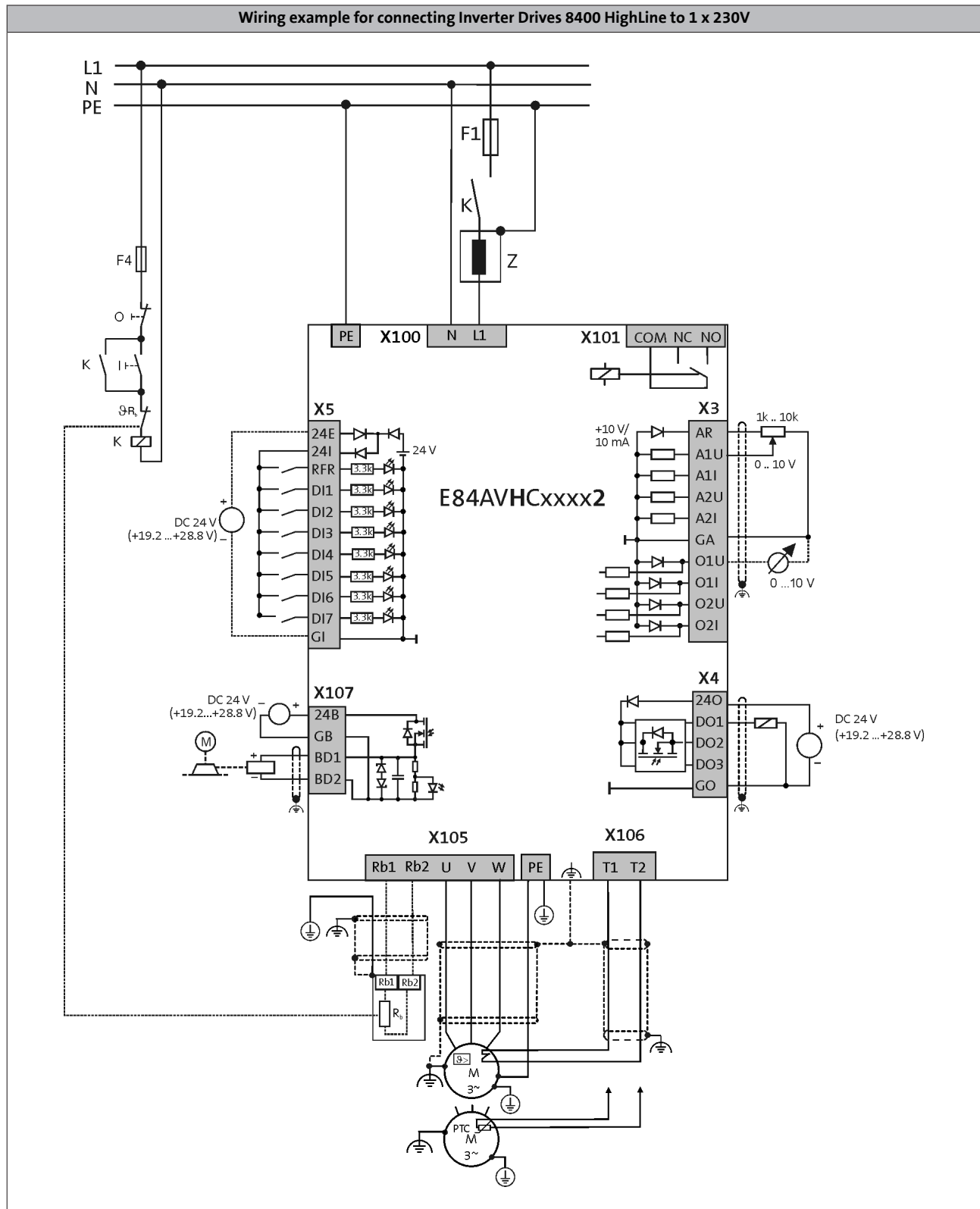
- 0.25 to 45 kW up to 25 m shielded motor cable with integrated RFI measures
- 0.25 to 45 kW up to 50 m shielded motor cable with RFI filter LD.

- ▶ When RFI filters SD are used, C1 can be complied with in a conducted manner (a shielded motor cable up to 25 m).
- ▶ In case of 0.25 ... 2.2 kW (230 V) with RFI filter LL, C1 and a fault current <3.5 mA can be realised (a shielded motor cable of up to 5 m).



Connection diagrams

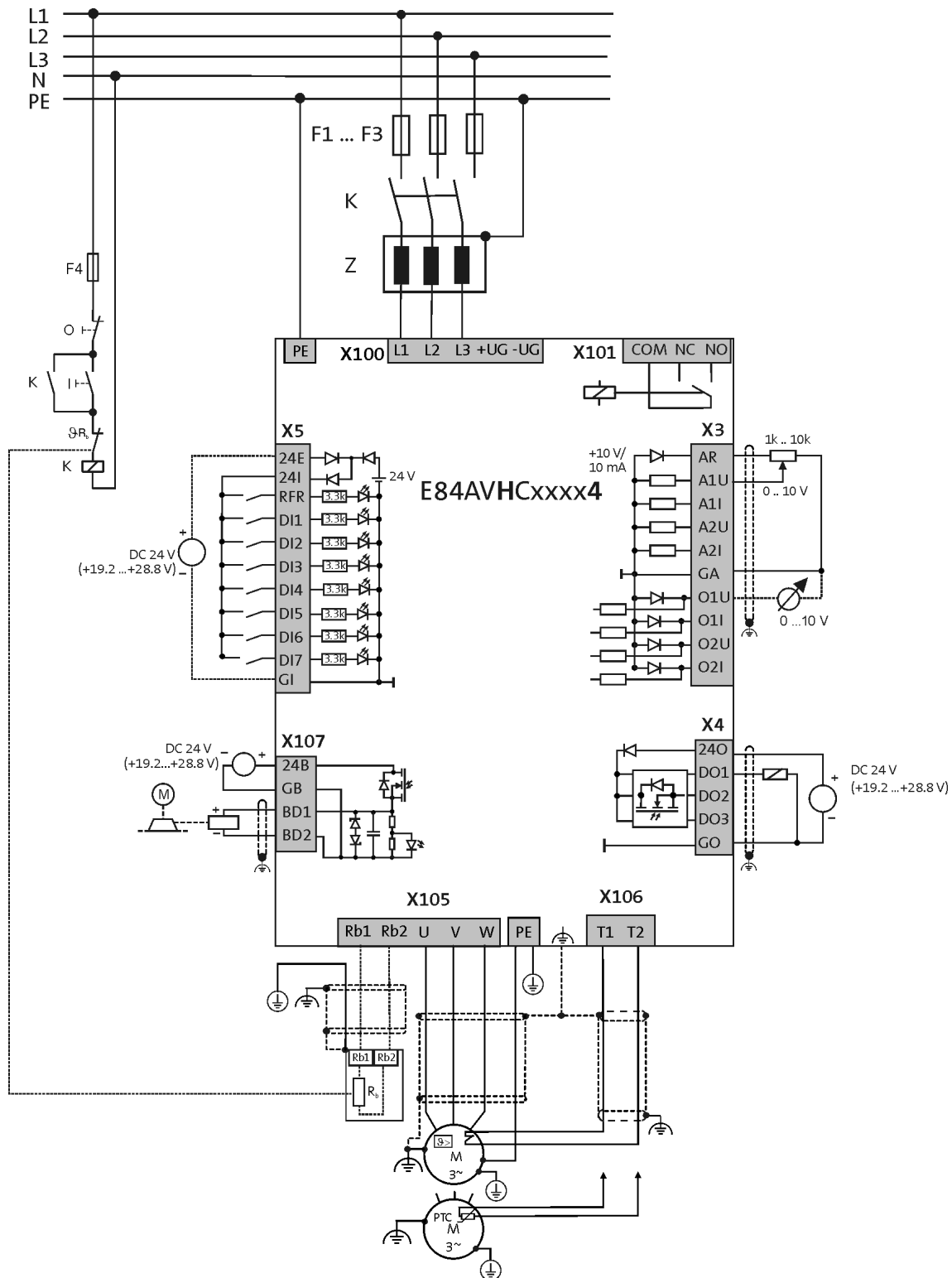
Wiring example for connecting Inverter Drives 8400 HighLine to 1 x 230V





Connection diagrams

Wiring example for connecting Inverter Drives 8400 HighLine to 3 x 400V



Inverter Drives 8400 HighLine

Interfaces



Control connections

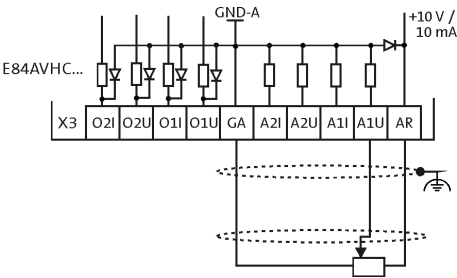
Mode	8400 HighLine
Analog inputs	
Number	2 Optional: voltage or current input
Resolution	10 bits + sign
Value range	0 ... +/- 10V, 0/4 ... 20 mA
Analog outputs	
Number	2 Optional: voltage or current output
Resolution	10 bits
Value range	0 ... 10V, 0/4 ... 20mA
Digital inputs	
Number	8
Switching level	PLC (IEC 61131-2)
Max. input current	11 mA
Function	2 inputs, can optionally be used as a frequency input (200 kHz, 2-track) 2 inputs, can optionally be used as a frequency input (10 kHz, 2-track)
Digital outputs	
Number	4
Switching level	PLC (IEC 61131-2)
Max. output current	1 x 2.5A, (basic insulation, with spark suppressor, e.g. for 24 V service brake) 3 x 50mA
Relay	
Number	1
Contact	Changeover contact
AC connection	250V, 3A
DC connection	24V, 2A ... 240V, 0.16A
External DC supply	
Rated voltage	24 V
Interfaces	
CANopen	Integrated functional insulated Max. baud rate 1000 kbps DIP switch for address, baud rate, bus termination
Extensions	optional communication module
Safety engineering	Optional Safe torque off (STO)
Drive interface	
Encoder input	Via 2 digital inputs: HTL, 2-track, 200 kHz Via 2/4 digital inputs: HTL, 2/4-track, 5 kHz

¹⁾ For mains-independent control electronics supply

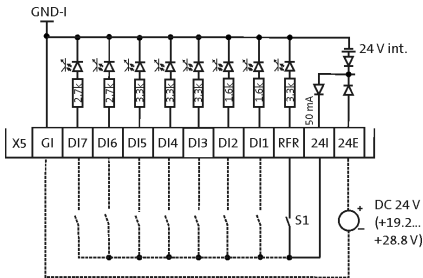


Control connections

Connection of analog inputs and outputs



Connection of digital inputs and outputs



Inverter Drives 8400 HighLine

Interfaces



Memory module

All drive settings for the 8400 are stored on the memory module, which is a pluggable memory chip. The memory module ensures that drives can be replaced quickly and without errors being made.

Mode	Features	Product key
Memory module	- For 8400 StateLine, HighLine, Topline and protec - Packaging unit: 5 items	E84AYM10S/M

- Each inverter is equipped with a memory module in the factory

Safety system (STO)

The 8400 StateLine, HighLine and TopLine models are optionally available with "STO safe torque off" safety engineering. This helps reduce control system costs, save space in the control cabinet and keep wiring to a minimum. The safety engineering is certified to EN ISO 13849-1 (Cat. 4, PL e), EN 61508/EN 62061 (SIL 3).

The inverters can optionally be ordered with integrated safety engineering (STO). In this case, the product key of the inverter has a "B" as the 14th character.

For example, a StateLine 230 V, 0.55 kW built-in unit with safety engineering would be: E84AVSCE5512SB0



4.6

8400 StateLine with safety engineering

Inverter Drives 8400 HighLine

Interfaces



EtherCAT® communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherCAT® communication module

Mode		Features	Slot	Product key
Communication module				
EtherCAT		• Distributed clock • 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Connection option for separate 24 V supply	MCI	E84AYCETV/S

4.6

- ▶ The Inverter Drives 8400 can be ordered with a plug-in EtherCAT® communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ETXXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCETV/S
Mode			EtherCAT
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherCAT® communication module

Rated data

Product key			E84AYCETV/S
Communication			CAT5e S/FTP according to ISO/ICE11801 (2002)
Medium			
Communication profile			CoE (CANopen over EtherCAT)
Baud rate			100
	b	[MBit/s]	
Node			Slave
Network topology			Line
Number of logical process data channels			1
Process data words (PCD)			1 ... 16
16 Bit			
Number of bus nodes			Max. 65535
Max. cable length			100
between two nodes	$l_{\max}$	[m]	



EtherNet/IP communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherNet/IP communication module

Mode		Features	Slot	Product key
Communication module				
EtherNet/IP		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Address can be set via 2 rotary DIP switches • TCP/IP channel • ODVA certification (Open Device Vendor Association) • Supported assembly object instances as per ODVA: 20, 21, 22, 23 and 70, 71, 72, 73 • Manufacturer-specific supported assembly object instances (custom): 110 and 111 • Connection option for separate 24 V supply	MCI	E84AYCEOV/S

- The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-EOXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCEOV/S
Mode			EtherNet/IP
Degree of protection			IP20
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherNet/IP communication module

Rated data

Product key			E84AYCEO/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 / EN50173
Communication profile			EtherNET/IP, AC Drive
Baud rate			
	b	[MBit/s]	10/100 (full duplex/half duplex)
Node			
			Slave (Adapter)
Network topology			
			Tree, star and line
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 254 im Subnetz
Max. cable length			
between two nodes	$l_{\max}$	[m]	100

Inverter Drives 8400 HighLine

Interfaces



Ethernet POWERLINK communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



POWERLINK communication module

Mode		Features	Slot	Product key
Communication module				
Ethernet POWERLINK CN		• Sync mode, Multiplex mode • 5 LEDs for status display • 2 x RJ45 connections with LEDs for link and collision • Address can be set via 2 rotary DIP switches • Connection option for separate 24 V supply	MCI	E84AYCECV/S

4.6

- The Inverter Drives 8400 can be ordered with a plug-in POWERLINK communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ECXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCECV/S
Mode			Ethernet POWERLINK CN
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



Ethernet POWERLINK communication module

Rated data

Product key			E84AYCECV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			EPL2.0
Baud rate			
	b	[MBit/s]	100
Node			
			Controlled node (CN)
Network topology			
			Tree, star and line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 239
Max. cable length			
between two nodes	$l_{\max}$	[m]	100

Inverter Drives 8400 HighLine

Interfaces



PROFIBUS communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFIBUS communication module

Mode		Features	Slot	Product key
Communication module				
PROFIBUS		• 5 LEDs for status display • Sub-D connection • Address can be set via DIP switch	MCI	E84AYCPMV/S

4.6

- The Inverter Drives 8400 can be ordered with a plug-in PROFIBUS communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-PMXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCPMV/S
Mode			PROFIBUS
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFIBUS communication module

Rated data

Product key			E84AYCPMV/S
Communication			
Medium			RS 485
Communication profile			PROFIBUS-DP-V1 PROFIBUS-DP-V0
Device profile			PROFIDrive, version 3
Baud rate			
	b	[kBit/s]	9.6 ... 12 000 (automatic detection)
Node			
			Slave
Network topology			
			Line with repeater: Line or tree without repeater:
Process data words (PCD)			
16 Bit			1 ... 16
DP user data length			
			Optional parameter channel (4 words) + process data words
Number of bus nodes			
			31 slaves + 1 master per bus segment With repeaters: 125
Max. cable length			
per bus segment	$I_{\max}$	[m]	1200 (depending on the baud rate and the cable type used)

Inverter Drives 8400 HighLine

Interfaces



PROFINET communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFINET communication module

Mode		Features	Slot	Product key
Communication module				
PROFINET		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • TCP/IP channel • Connection option for separate 24 V supply	MCI	E84AYCERV/S

4.6

- ▶ The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ER-XXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCERV/S
Mode			PROFINET
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFINET communication module

Rated data

Product key			E84AYCERV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			PROFINET RT Conf. Class B
Baud rate			
	b	[MBit/s]	100
Node			
			Slave (Device)
Network topology			
			Line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Max. cable length			
between two nodes	$l_{\max}$	[m]	100



Inverter Drives 8400 HighLine

Accessories



Brake resistors

An external brake resistor is required to brake high moments of inertia or in the event of prolonged operation in generator mode; this resistor converts braking energy into heat.

The brake resistors recommended in the table below have been dimensioned for approx. 1.5 times the regenerative power, with a cycle time of 15/135 s (brake/rest ratio). These brake resistors generally meet the usual requirements of standard applications.

The brake resistors are fitted with a thermostat (potential-free NC contact).



ERBM...(IP50) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KWs]	[mm]	[kg]
0.25	1 AC 180... 264	E84AV□□□2512□□□	ERBM180R050W	180.0	0.050	7.50	175 x 20.6 x 40	0.3
0.37		E84AV□□□3712□□□						
0.55		E84AV□□□5512□□□	ERBM100R100W	100.0	0.10	15.0	240 x 80 x 95	0.5
0.75		E84AV□□□7512□□□						
1.10		E84AV□□□1122□□□	ERBP033R200W	33.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1522□□□						
2.20		E84AV□□□2222□□□	ERBP033R300W		0.30	45.0	320 x 41 x 122	1.4
0.37	3 AC 320... 550	E84AV□□□3714□□□	ERBM390R100W	390.0	0.10	15.0	235 x 20.6 x 40	0.4
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□	ERBP180R200W	180.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□	ERBP180R300W		0.30	45.0	320 x 41 x 122	1.4

Inverter Drives 8400 HighLine

Accessories



Brake resistors

For standard applications, we recommend the following combinations:

E84AV□□□3024□□□ and ERBP082R200W
 E84AV□□□4024□□□ and ERBS047R400W
 E84AV□□□5524□□□ and ERBS047R800W
 E84AV□□□7524□□□ and ERBS027R01K2
 E84AV□□□1134□□□ and ERBS027R01K2
 E84AV□□□1534□□□ and ERBS018R01K4
 E84AV□□□1834□□□ and ERBS015R02K4
 E84AV□□□2234□□□ and ERBS015R02K4.



Other possible combinations:

ERBP...(IP21) and ERBS...(IP65) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KWs]	[mm]	[kg]
3.00	3 AC 320...550	E84AV□□□3024□□□	ERBP082R200W	82.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS082R780W		0.78	117	666 x 124 x 122	4.0
4.00		E84AV□□□4024□□□	ERBS047R400W	47.0	0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
5.50		E84AV□□□5524□□□	ERBS047R400W		0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
7.50		E84AV□□□7524□□□	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
11.0		E84AV□□□1134□□□	ERBP027R200W		0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
15.0		E84AV□□□1534□□□	ERBS018R800W	18.0	0.80	120	710 x 110 x 105	3.9
			ERBS018R01K4		1.40	210	1110 x 110 x 105	6.2
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0
18.5		E84AV□□□1834□□□	ERBS015R800W	15.0	0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
22.0		E84AV□□□2234□□□	ERBS015R800W		0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
30.0		E84AV□□□3034□□□	ERBG075D01K9	7.5	1.90	285	486 x 236 x 302	9.5
37.0		E84AV□□□3734□□□						
45.0		E84AV□□□4534□□□						

Inverter Drives 8400 HighLine

Accessories



Mains chokes

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains choke			
P	U_{AC}			I_N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	ELN1-0500H009	9.00	75 x 66 x 82	1.1
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	ELN1-0250H018	18.0	96 x 96 x 90	2.1
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	56 x 77 x 100	0.5
0.55		E84AV□□□5514□□□	EZAELN3004B742	4.00	60 x 95 x 115	1.3
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	EZAELN3008B372	8.00	85 x 120 x 140	1.9
4.00		E84AV□□□4024□□□	EZAELN3010B292	10.0		2.0
5.50		E84AV□□□5524□□□	EZAELN3016B182	16.0	95 x 120 x 140	2.7
7.50		E84AV□□□7524□□□	EZAELN3020B152	20.0	95 x 155 x 165	3.8
11.0		E84AV□□□1134□□□	EZAELN3025B122	25.0	110 x 155 x 170	5.8
15.0		E84AV□□□1534□□□ ¹⁾	EZAELN3035B841	35.0		6.0
18.5		E84AV□□□1834□□□	EZAELN3045B651	45.0	112 x 185 x 200	8.3
22.0		E84AV□□□2234□□□ ¹⁾	EZAELN3050B591	50.0	112 x 185 x 210	8.4
30.0		E84AV□□□3034□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7
37.0		E84AV□□□3734□□□ ¹⁾	EZAELN3080B371	80.0	125 x 210 x 240	12.5
45.0		E84AV□□□4534□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5

¹⁾ Operation only permitted with mains choke

- On some inverters, a mains filter (combination of RFI filter and mains choke) can be used in place of a mains choke. Information on this can be found in the "Interference suppression" section.

Inverter Drives 8400 HighLine

Accessories



Mains chokes

Operation with increased power output



Mains choke

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass	
4-pole asynchronous motor		Inverter	Mains choke				
P	U _{AC}			I _N	h x b x t	m	
[kW]	[V]			[A]	[mm]	[kg]	
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1	
0.55		E84AV□□□3712□□□ ¹⁾					
0.75		E84AV□□□5512□□□	ELN1-0500H009	9.00	75 x 66 x 82	1.1	
1.10		E84AV□□□7512□□□ ¹⁾					
1.50		E84AV□□□1122□□□	ELN1-0250H018	18.0	96 x 96 x 90	2.1	
2.20		E84AV□□□1522□□□ ¹⁾					
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	56 x 77 x 100	0.5	
0.75		E84AV□□□5514□□□	EZAELN3004B742	4.00	60 x 95 x 115	1.3	
1.10		E84AV□□□7514□□□ ¹⁾					
1.50		E84AV□□□1124□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5	
2.20		E84AV□□□1524□□□					
3.00		E84AV□□□2224□□□ ¹⁾	EZAELN3008B372	8.00	85 x 120 x 140	1.9	
4.00		E84AV□□□3024□□□ ¹⁾	EZAELN3010B292	10.0		2.0	
		E84AV□□□3024□□□0					
5.50		E84AV□□□4024□□□	EZAELN3016B182	16.0	95 x 120 x 140	2.7	
7.50		E84AV□□□5524□□□ ¹⁾	EZAELN3020B152	20.0	95 x 155 x 165	3.8	
11.0		E84AV□□□7524□□□	EZAELN3025B122	25.0	110 x 155 x 170	5.8	
15.0		E84AV□□□1134□□□ ¹⁾	EZAELN3030B982	30.0	110 x 155 x 167	5.9	
22.0		E84AV□□□1834□□□ ¹⁾	EZAELN3045B651	45.0	112 x 185 x 200	8.3	
30.0		E84AV□□□2234□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7	
37.0		E84AV□□□3034□□□ ¹⁾	EZAELN3080B371	80.0	125 x 210 x 240	12.5	
45.0		E84AV□□□3734□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5	
55.0		E84AV□□□4534□□□ ¹⁾	EZAELN3100B301	100	139 x 267 x 205	16.5	

¹⁾ Operation only permitted with mains choke



Interference suppression

RFI and mains filters are used to ensure compliance with the EMC requirements of European Standard EN 61800-3. This standard defines the EMC requirements for electrical drive system in various categories. **Category C1** applies to public networks (residential areas). Category C1 corresponds to Class B with regard to the limit values of Class B in line with EN 55011. **Category C2** is applicable in industrial premises; use in residential areas is left to the user's discretion. With regard to limit values, Category C2 corresponds to Class A according to EN 55011.



RFI filters

When working with stricter line-bound noise emission requirements, which cannot be met using the radio interference suppression measures integrated in the inverter (C2 up to 25 m shielded motor cable), external filters can be used. The filters can be installed below or next to the inverters.

Available RFI and mains filters

Mode				
Filter	RFI filter LL (Low Leakage) E84AZESR□□□□LL	RFI filter SD (Short Distance) E84AZESR□□□□SD	RFI filter LD (Long Distance) E84AZESR□□□□LD	Mains filter LD (Long Distance) I0FAE□□□F100D000□S
Category C1	Up to 5 m shielded motor cable ¹⁾	Up to 25 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾
Category C2		Up to 50 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾
Power range	0.25 to 2.2 kW, 230 V	0.25 to 15 kW	0.25 to 18.5 kW	22 to 45 kW
Features	For installation in mobile systems, leakage current < 3.5 mA (up to 5 m shielded motor cable)	Optimised for low leakage current.	0,25 up to 15 kW: 50 - 100 m at max. 40 °C ambient temperature and max. 4 kHz switching frequency.	Combination of mains choke and RFI filter.

¹⁾   37 - Details on maximum motor cable lengths.

Inverter Drives 8400 HighLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□S	E84AZESR3024SD	9.80	306 x 140 x 60	1.5
		E84AV□□□3024□□□0				
4.00		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
11.0		E84AV□□□1134□□□				
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 HighLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass	
4-pole asynchronous motor		Inverter	RFI filter				
P	U _{AC}			I _N	h x b x t	m	
[kW]	[V]			[A]	[mm]	[kg]	
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8	
0.37		E84AV□□□3712□□□					
0.55		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0	
0.75		E84AV□□□7512□□□					
1.10		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6	
1.50		E84AV□□□1522□□□					
2.20		E84AV□□□2222□□□					
0.37		E84AV□□□3714□□□					E84AZESR7514LD
0.55	E84AV□□□5514□□□						
0.75	E84AV□□□7514□□□						
1.10	3 AC 320 ... 550	E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2	
1.50		E84AV□□□1524□□□					
2.20		E84AV□□□2224□□□	E84AZESR3024LD	9.80		1.3	
3.00		E84AV□□□3024□□S	E84AZESR5524LD	18.0	306 x 140 x 60	2.4	
4.00		E84AV□□□3024□□0					
5.50		E84AV□□□4024□□□					
5.50		E84AV□□□5524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3	
7.50		E84AV□□□7524□□□					
11.0		E84AV□□□1134□□□					
15.0		E84AV□□□1534□□□					
18.5			E84AV□□□1834□□□	IOFAE318F100D0000S	50.4	436 x 205 x 90	7.1

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□2234□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□3034□□□	I0FAE330F100D0000S	55.0	590 x 250 x 105	23.0
37.0		E84AV□□□3734□□□	I0FAE337F100D0000S	69.0		25.0
45.0		E84AV□□□4534□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0

Inverter Drives 8400 HighLine

Accessories



Interference suppression

Operation with increased power output

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024SD	9.80	317 x 70 x 60	1.5
		E84AV□□□3024□□0				
5.50		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
15.0		E84AV□□□1134□□□				

4.6

Inverter Drives 8400 HighLine

Accessories



Interference suppression

Operation with increased power output

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514LD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024LD	9.80		1.3
		E84AV□□□3024□□0	E84AZESR5524LD	18.0	306 x 140 x 60	2.4
5.50		E84AV□□□4024□□□				
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3
15.0		E84AV□□□1134□□□				

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□1834□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□2234□□□	I0FAE322F100D0001S	55.0	365 x 205 x 90	18.5
37.0		E84AV□□□3034□□□	I0FAE337F100D0000S	69.0	590 x 250 x 105	25.0
45.0		E84AV□□□3734□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0
55.0		E84AV□□□4534□□□				

Inverter Drives 8400 HighLine

Accessories



Sinusoidal filters

A sinusoidal filter in the motor cable limits the rate of voltage rise and the capacitive charge/discharge currents that occur during inverter operation.

Application range:

- Only use a sinusoidal filter with standard asynchronous motors of 0 ... 550 V
- Operation only with V/f or V/f² characteristic control
- Set the switching frequency permanently to the specified value
- Limit the output frequency of the Inverter Drives 8400 to the specified value



Sinusoidal filters

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass
4-pole asynchronous motor		Inverter	Sinusoidal filter			
P	U _{AC}			L _N	f _{ch}	m
[kW]	[V]			[mH]	[kHz]	[kg]
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-004A200	11.0	4 8	4.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□	EZS3-010A200	5.10		
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EZS3-017A200	3.07		
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	EZS3-024A200	2.50		14.5
11.0		E84AV□□□1134□□□	EZS3-032A200	2.00		19.0
15.0		E84AV□□□1534□□□	EZS3-037A200	1.70		21.0
18.5		E84AV□□□1834□□□	EZS3-048A200	1.20		25.5
22.0		E84AV□□□2234□□□	EZS3-061A200	1.00		33.5
30.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0
37.0		E84AV□□□3734□□□	EZS3-090A200	0.80		53.0
45.0		E84AV□□□4534□□□	EZS3-115A200	0.70	2 4	66.0

Inverter Drives 8400 HighLine

Accessories



Sinusoidal filters

Operation with increased power output

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass	
4-pole asynchronous motor		Inverter	Sinusoidal filter				
P	U _{AC}			L _N	f _{ch}	m	
[kW]	[V]			[mH]	[kHz]	[kg]	
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-010A200	5.10	4 8	5.5	
0.75		E84AV□□□5514□□□					
1.10		E84AV□□□7514□□□					
1.50		E84AV□□□1124□□□					
2.20		E84AV□□□1524□□□					
3.00		E84AV□□□2224□□□	EZS3-017A200	3.07		8.5	
4.00		E84AV□□□3024□□□					
5.50		E84AV□□□4024□□□					
7.50		E84AV□□□5524□□□	EZS3-024A200	2.50		14.5	
11.0		E84AV□□□7524□□□					
15.0		E84AV□□□1134□□□	EZS3-037A200	1.70		21.0	
22.0		E84AV□□□1834□□□	EZS3-061A200				1.00
30.0		E84AV□□□2234□□□					
37.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0	
45.0		E84AV□□□3734□□□	EZS3-090A200				0.80
55.0		E84AV□□□4534□□□	EZS3-115A200	0.70		2 4	

4.6

Inverter Drives 8400 HighLine

Accessories



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0%, 45 Hz-0% ... 65 Hz+0%			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	8.0	29.0	82.0	200.0
Rated DC-bus current						
	$I_{N, DC}$	[A]	10.0	36.0	100.0	245.0

Data for 60 s overload

Max. DC-bus current						
	I_{max}	[A]	15.0	54.0	150.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			120.0			
	t_{ol}	[s]				
Recovery time			60.0			
	t_{re}	[s]				
Max. output power¹⁾						
	$P_{max, 1}$	[kW]	7.4	26.3	72.9	179.0

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	40.0	108.0	200.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			0.5			
	t_{ol}	[s]				
Recovery time			4.5			
	t_{re}	[s]				
Max. short-term output power¹⁾						
	$P_{max, 2}$	[kW]	19.6	52.5	146.0	357.0

¹⁾ Mains filter required; if no mains filter is installed, the stated values for P_{max} decrease



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Rated DC-bus current						
	$I_{N,DC}$	[A]	10.0	36.0	100.0	245.0
Power loss						
	P_V	[kW]	0.055	0.110	0.230	0.550
Dimensions						
Height	h	[mm]	350		383	
Height, including fastening	h	[mm]	481		510	
Width	b	[mm]	60	120	210	390
Depth	t	[mm]	288			
Mass						
	m	[kg]	2.6	5.3	13.5	28.5

4.6

Brake chopper rated data

Rated power, Brake chopper						
	P_N	[kW]	2.6	8.7	17.0	30.3
Max. output power, Brake chopper						
	$P_{max,1}$	[kW]	19.5	43.8	105.1	187.7
Running time						
	t_{on}	[s]	1.0			
Recovery time						
	t_{re}	[s]	3.8	2.5	3.1	
Min. brake resistance						
	R_{min}	[Ω]	27.0	12.0	5.0	2.8



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key			E94ARNE0134		E94ARNE0244	
Supply- / regenerative module			E94ARNE0134		E94ARNE0244	
Operating mode			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	26.0	13.0	47.0	23.5
Rated DC-bus current						
	$I_{N, DC}$	[A]	32.0	16.0	57.0	29.0

4.6

Data for 60 s overload

Max. DC-bus current						
	I_{max}	[A]	48.0	24.0	86.0	44.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Overload time			60.0			
	t_{ol}	[s]				
Recovery time			120.0			
	t_{re}	[s]				
Max. output power						
	$P_{max, 1}$	[kW]	22.4	11.2	40.5	20.2

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	96.0	48.0	171.0	87.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Max. short-term output power						
	$P_{max, 2}$	[kW]	44.9	22.4	81.1	40.5
with brake chopper support	$P_{max, 2}$	[kW]		35.1		59.6

Inverter Drives 8400 HighLine

Accessories



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key			E94ARNE0134		E94ARNE0244	
Supply- / regenerative module						
Operating mode			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Rated DC-bus current						
	$I_{N,DC}$	[A]	32.0	16.0	57.0	29.0
Power loss						
	P_V	[kW]	0.150	0.110	0.230	0.190
Dimensions						
Height	h	[mm]	350			
Height, including fastening	h	[mm]	481			
Width	b	[mm]	120			
Depth	t	[mm]	288			
Mass						
	m	[kg]	6.0			

4.6

Brake chopper rated data

Rated power, Brake chopper				
	P_N	[kW]	4.7	9.3
Max. output power, Brake chopper				
	$P_{max,1}$	[kW]	19.5	29.2
Running time				
	t_{on}	[s]	1.0	
Recovery time				
	t_{re}	[s]	4.2	3.9
Min. brake resistance				
	R_{min}	[Ω]	27.0	18.0



Control connections

Mode	Power supply modules	Regenerative power supply modules
Analog inputs		
Number		2
Resolution		11 bits + sign
Value range		+/- 10V 1 x switchable 20 mA
Analog outputs		
Number		2
Resolution		10 bits + sign
Value range		+/- 10V max. 2 mA
Digital inputs		
Number	1 Permanently configured	8
Switching level	PLC (IEC 61131-2)	
Max. input current	8 mA	
Digital outputs		
Number	4 fest konfiguriert	4
Switching level	PLC (IEC 61131-2)	
Max. output current	50 mA per output	
Load capacity	>480 Ω at 24 V	
External DC supply		
Rated voltage	24 V in accordance with IEC 61131-2	
Voltage range	19.2 ... 28.8 V, max. residual ripple ± 5%	
Current	Approx. 1.4 A during operation, max. 4 A starting current for 100 ms	Approx. 1.2 A during operation, max. 3 A starting current for 100 ms ¹⁾
Interfaces		
CANopen		Integrated
Extensions		Via slot MXI 2: extension 2 Via slot MXI 1: extension 1
State bus		Integrated
Memory		Slot MMI
Safety engineering		Slot MSI
Drive interface		
Resolver input		Integrated (no function)
Mains synchronisation input		Integrated Sub-D, 15-pin

¹⁾ The supply to the control electronics comes from the mains voltage. Alternatively, it can be provided by a 24 V supply that is independent of the mains (available as an option).

Inverter Drives 8400 HighLine

Accessories



Brake resistors of the regenerative power supply modules

Assignment of brake resistors to the supply and regenerative power supply modules is shown in the tables below.



Brake resistor 27 ohms

Brake resistors for power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
Without mains filter/mains choke		Power supply module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
3.60	3 AC 340 ... 528 ¹⁾	E94APNE0104	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
13.0		E94APNE0364	ERBG012R01K9	12.0	1.90	285	486 x 236 x 302	13.0
			ERBG012R05K2		5.20	750	486 x 426 x 302	28.0
36.2		E94APNE1004	ERBG005R02K6	5.0	2.60	390	486 x 326 x 302	12.6
88.6		E94APNE2454	ERBG028D04K1	2.8	4.10	615	486 x 426 x 302	12.8

¹⁾ For 230 V mains voltage a different brake resistor assignment applies.

Brake resistors for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
15.0	3 AC 340 ... 528 ¹⁾	E94ARNE0134	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
27.0		E94ARNE0244	ERBP018R300W	18.0	0.30	30.0	240 x 41 x 122	1.4
			ERBS018R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0

²⁾ For 230 V mains voltage a different brake resistor assignment applies.



Mains chokes of the power supply modules

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Rated power	Mains voltage	Product key		Rated current	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains choke			
P_N	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	EZAELN3008B372	8.00	85 x 120 x 140	1.9
17.5		E94APNE0364	EZAELN3030B982	30.0	110 x 155 x 167	5.9
48.6		E94APNE1004	EZAELN3080B371	80.0	125 x 210 x 240	12.5
119		E94APNE2454	EZAELN3200B151	200	352 x 144 x 264	32.0



Interference suppression of the regenerative power supply modules

RFI filters and mains filters enable compliance with the interference voltage categories of the European standard EN 61800-3. There a distinction is drawn between category C1 and category C2.

Category C1 describes the use on public supply networks.

Category C2 describes the use of drives which are intended to be used for industrial purposes in areas also comprising residential areas.

For Multi Drives external filters must be used to comply with the EMC Directive.



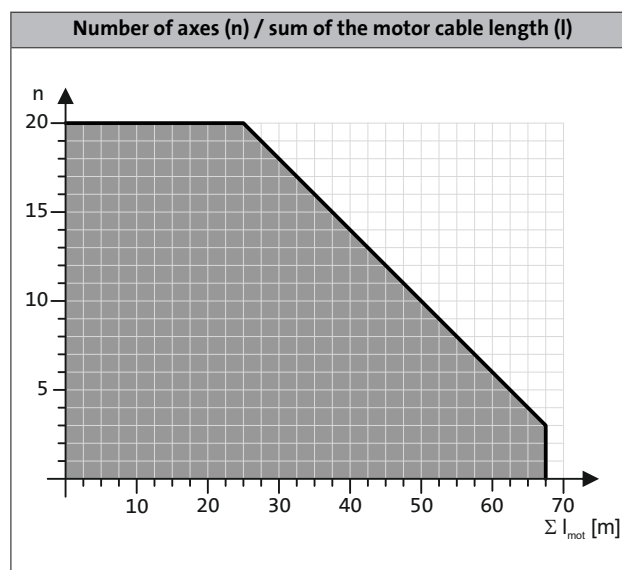
RFI filter, can be mounted beside the power supply module

RFI filters

RFI filters are primarily capacitive accessory components which can be connected directly upstream from the power supply modules. This measure enables compliance with the corresponding conducted noise emission requirements according to EN 61800-3.

Rated power	Mains voltage	Product key		Rated current	Power loss	Max. cable length	Dimensions	Mass
Without mains filter/mains choke		Power supply module	RFI filter			Reference group C2		
P_N	U_{AC}			I_N	P_V	l_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[kW]	[m]	[mm]	[kg]
3.60	3 AC 340 ... 528	E94APNE0104	E94AZRP0084	8.00	0.020	6 axes of 10 m each	485 x 60 x 261	4.2
13.0		E94APNE0364	E94AZRP0294	29.0	0.050			4.5
36.2		E94APNE1004	E94AZRP0824	82.0	0.080		490 x 209 x 272	18.5
88.6		E94APNE2454	E94AZRP2004	200	0.150			20.5

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.





Interference suppression of the regenerative power supply modules

Mains filters

A mains filter is a combination of mains choke and RFI filter in a single housing. It reduces line-bound noise emission into the mains, thus ensuring that the line-bound interference voltage is reduced to a permissible level according to EN61800-3.



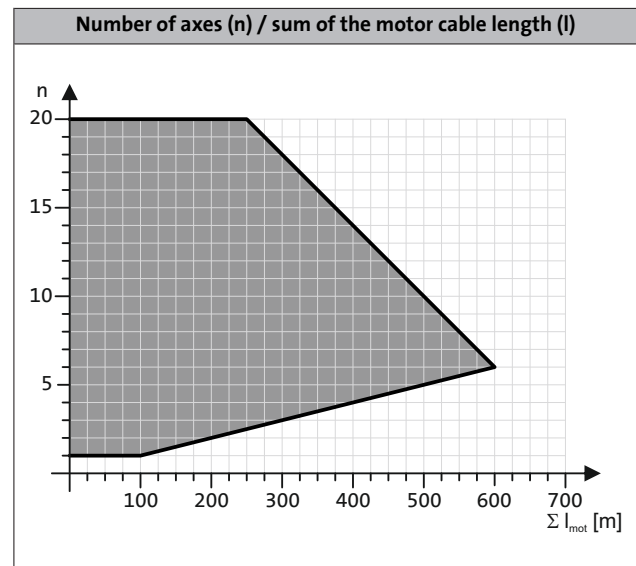
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

RFI filters

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	E94AZMP0084	8.00	10.0	10 axes of 50 m each	485 x 90 x 261	8.6
17.5		E94APNE0364	E94AZMP0294	29.0	7.3		485 x 120 x 261	16.5
48.6		E94APNE1004	E94AZMP0824 ¹⁾	82.0	6.4		490 x 270 x 272	29.0
119		E94APNE2454	E94AZMP2004 ¹⁾	200	6.3		490 x 330 x 272	52.0

¹⁾ External 24 V supply from a safely separated power supply unit (SELV/PELV) required for integrated fan.

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.





Interference suppression of the regenerative power supply modules

Mains filters for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
15.0	3 AC 340 ... 528	E94ARNE0134	E94AZMR0264SDB ¹⁾	26.0	6.3	6 axes of 10 m each	485 x 149 x 272	25.0
			E94AZMR0264LDB ¹⁾			10 axes of 50 m each		26.0
27.0		E94ARNE0244	E94AZMR0474SDB ¹⁾	47.0	6.2	6 axes of 10 m each	485 x 209 x 272	36.0
			E94AZMR0474LDB ¹⁾			10 axes of 50 m each		37.0

¹⁾ External 24 V supply through safely separated power supply unit (SELV/PELV) required for integrated mains voltage recording.



DC input module

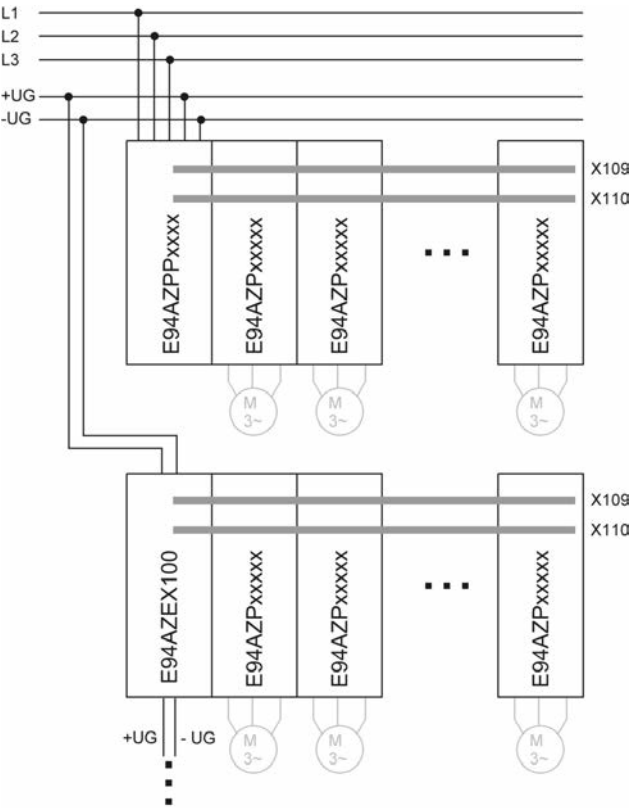
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied via a central DC power supply unit. The rated current of the DC input module is defined to be 100 A (DC). The DC input module can be connected at the top or bottom, offering great flexibility with regard to integration into the system wiring. This provides an ideal way of connecting multi-row axis modules in particular.



DC input module
100 A

Mode	Product key	Dimensions	Mass
	Input module		
		h x b x t	m
		[mm]	[kg]
DC input module 100 A	E94AZEX100	422 x 60 x 95	0.9

4.6



Wiring example for multi-row mounting of axis modules

Inverter Drives 8400 HighLine

Accessories



DC-bus connection

The Inverter Drives 8400 can be operated in a DC-bus connection. The 400 V devices have a direct connection for this.

The components listed here are used to interconnect the individual devices for operation with or without a regenerative power supply module. With a DC-bus connection, energy can be exchanged between the individual devices. This makes particular sense with cyclic operation of multiple devices.

The design of a DC-bus connection requires extremely precise dimensioning of the devices' energy requirements among one another.

Lenze Sales is happy to advise you here to ensure the most energy-efficient drive dimensioning. The components listed here form the basis for this.

- ▶ Two DC fuses are always required.
- ▶ The fuse holders EFH10005 and EFH10004 are single-pole, while the holders EFH20005 and EFH20007 are 2-pole.
- ▶ The fuses are not UL-approved for the DC operation.
- ▶ Please consult Lenze Sales to ensure the right dimensioning.

Components for DC-bus connection

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0060AYHN	6.00	14x51 without indicator
EFSGR0100AYHN	10.0	
EFSGR0160AYHN	16.0	
EFSGR0200AYHN	20.0	
EFSGR0250AYHN	25.0	
EFSGR0320AYHN	32.0	
EFSGR0400AYHN	40.0	
EFSGR0060AYHK	6.00	14x51 with indicator
EFSGR0100AYHK	10.0	
EFSGR0160AYHK	16.0	
EFSGR0200AYHK	20.0	
EFSGR0250AYHK	25.0	
EFSGR0320AYHK	32.0	
EFSGR0400AYHK	40.0	

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0120AYIN	12.0	22x58 without indicator
EFSGR0160AYIN	16.0	
EFSGR0200AYIN	20.0	
EFSGR0250AYIN	25.0	
EFSGR0320AYIN	32.0	
EFSGR0400AYIN	40.0	
EFSGR0500AYIN	50.0	
EFSGR0800AYIN	80.0	
EFSGR0120AYIK	12.0	22x58 with indicator
EFSGR0160AYIK	16.0	
EFSGR0200AYIK	20.0	
EFSGR0250AYIK	25.0	
EFSGR0320AYIK	32.0	
EFSGR0400AYIK	40.0	
EFSGR0500AYIK	50.0	
EFSGR0800AYIK	80.0	

4.6

Mode	Features	Product key
DC busbar	• Busbar system 14 x 51 • DC busbar length 1m, cross-section 25 mm²	EWZ0036
End cap	• Busbar system 22 x 58 • DC busbar length 1m, cross-section 25 mm²	EWZ0037
Terminal	• End caps for DC busbar (packaging unit 10 pcs)	EWZ0038
	• Single-pole terminal for internal supply	EWZ0039

Inverter Drives 8400 HighLine

Accessories



DC-bus connection

DC fuses size 14 x 51 mm

Typical motor power	Mains voltage	Product key						
4-pole asynchron- ous motor		Inverter	DC fuses					
P	U _{AC}							
[kW]	[V]							
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0160AYHN	EFH20005	EFSGR0160AYHK	EFH10005		
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□						
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□	EFSGR0200AYHN		EFSGR0200AYHK			
3.00		E84AV□□□3024□□□						
4.00		E84AV□□□4024□□□					EFSGR0320AYHN	EFSGR0320AYHK
5.50		E84AV□□□5524□□□					EFSGR0400AYHN	EFSGR0400AYHK
7.50		E84AV□□□7524□□□						
11.0		E84AV□□□1134□□□						
15.0		E84AV□□□1534□□□						

4.6

DC fuses size 22 x 58 mm

Typical motor power	Mains voltage	Product key				
4-pole asynchron- ous motor		Inverter	DC fuses			
P	U _{AC}					
[kW]	[V]					
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0120AYIN	EFH20007	EFSGR0120AYIK	EFH10004
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□	EFSGR0200AYIN		EFSGR0200AYIK	
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EFSGR0320AYIN		EFSGR0320AYIK	
5.50		E84AV□□□5524□□□	EFSGR0400AYIN		EFSGR0400AYIK	
7.50		E84AV□□□7524□□□	EFSGR0500AYIN		EFSGR0500AYIK	
11.0		E84AV□□□1134□□□	EFSGR0800AYIN		EFSGR0800AYIK	
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 HighLine

Accessories



24 V power supply unit

External power supply units are available for supplying the control electronics of the 8400 StateLine, HighLine or TopLine. With an external supply, the inverters can be parameterised and diagnosed while the mains input is deenergised.



24 V power supply unit

Rated data

Product key								
			EZV1200-000	EZV2400-000	EZV4800-000	EZV1200-001	EZV2400-001	EZV4800-001
Rated voltage								
AC	U _{N, AC}	[V]						
Input voltage			230			400		
	U _{in}	[V]	AC 85 ... 264 DC 90 ...350			AC 320 ... 575 DC 450 ...800		
Rated mains current								
	I _{N, AC}	[A]						
Output voltage								
	U _{out}	[V]						
Rated output current								
	I _{N, out}	[A]						
Dimensions								
Height	h	[mm]						
Width	b	[mm]	55	85	157	73	85	160
Depth	t	[mm]	125					
Mass								
	m	[kg]						
			0.8	1.2	2.5	1.0	1.1	1.9

Brake switch

The brake switch consists of a rectifier and an electronic circuit breaker for the switching of an electromechanical brake switch. The brake switch is mounted on the control cabinet plate by means of two screws. Control is performed using a digital output on the inverter.



Brake switch

Mode	Features	Product key
Half-wave rectification	- Input voltage: AC 320 ... 550 V - Output voltage: DC 180 V (at AC 400 V), DC 225 V (at AC 500 V) - Max. brake current: DC 0.61 A - IP00 degree of protection	E82ZWBRE
Bridge rectification	- Input voltage: AC 180 ... 317 V - Output voltage: DC 205 V (at AC 230 V) - Max. brake current: DC 0.54 A - IP00 degree of protection	E82ZWBRB

Inverter Drives 8400 HighLine

Accessories



USB diagnostic adapter

The operation, parameter setting and diagnostics of the Inverter Drives 8400 and the Servo Drives 9400 via the L-force diagnostics is made with the keypad X400 or a PC. The connection of a PC can be made via a USB interface and the USB diagnostic adapter.

For connecting the USB diagnostic adapter with the L-force diagnostics interface (DIAG) at the inverter, three different connecting cables are separately available in the lengths 2.5 m, 5 m and 10 m. The connection can be established during operation. The engineering tools EASY Starter or Engineer can be used to carry out the operation, parameter setting or diagnostics of the inverters. Both tools have simple intuitive surfaces. This enables a quick and easy commissioning.

Optionally to the USB diagnostic adapter, the PC system bus adapter can be used. For this purpose, a CANopen interface must be available at the inverter.



USB diagnostic adapter incl. connecting cable to the PC

- The engineering tools EASY Starter or Engineer are used for operation, parameter setting and diagnostics of the inverters.

Mode		Features	Product key
USB diagnostic adapter		• Input-side voltage supply via USB connection on PC • Output-side voltage supply via inverter's diagnostic interface • Diagnostic LEDs • Electrical isolation of PC and inverter • Hot-pluggable	E94AZCUS

Connecting cables for USB diagnostic adapter

Mode	Features	Product key
Connecting cable for USB diagnostic adapter	• Length: 2.5 m	EWL0070
	• Length: 5 m	EWL0071
	• Length: 10 m	EWL0072



X400 keypad

As an alternative to the PC, the X400 keypad can be used for local operation, parameter setting or diagnostics.
The X400 keypad plugs into the L-force diagnostics interface (DIAG) on the front of the inverter.



X400 keypad

Mode		Features	Slot	Product key
X400 keypad		• Menu navigation • Graphics display with background lightning for clear presentation of information • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function	DIAG	EZAEBK1001

- The Inverter Drives 8400 can be ordered with a plug-in keypad already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-XXXXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

X400 diagnosis terminal

Mode		Features	Slot	Product key
X400 diagnosis terminal		• X400 keypad in a robust housing • Also suitable for installation in the control cabinet door • incl. 2.5 m cable • IP20 degree of protection, IP65 for control cabinet installation on front face	DIAG	EZAEBK2001



PC system bus adapter

The operation, parameterisation and diagnostics of the Inverter Drives 8400 using a PC can also be carried out via the CANopen interface using a PC system bus adapter. This requires a PC system bus adapter instead of a USB diagnostic adapter. This adapter is plugged into the parallel interface or USB connection of the PC. The corresponding drivers will be installed automatically. The voltage for the adapter is supplied via the USB connection of the PC. The CANopen interface is integrated or available with a variant (BaseLine C).

Advantage:

- Operation, parameterisation and diagnostics in parallel with the keypad
- In interconnected systems, multiple inverters can be addressed simultaneously from one point (remote parameterisation via CANopen)



EMF2177IB adapter

Mode	Features	Product key
PC system bus adapter	• Voltage supply via USB port on PC • Electrical isolation from the bus	EMF2177IB

Shield mounting

A shield mounting is used to connect the motor cable shield on the inverter's shield connection.

Mode	Features	Product key
Metal cable tie	• Cable diameter: 8...30 mm • Packaging unit: 50 items	EZAMBKBM
Fixing clip	• Cable diameter: 4...10 mm • Packaging unit: 20 items	EZAMBHXM007/M
Wire clamp	• Cable diameter: 4...15 mm • Packaging unit: 10 items	EZAMBHXM006/M
	• Cable diameter: 10...20 mm • Packaging unit: 10 items	EZAMBHXM003/M
	• Cable diameter: 15...28 mm • Packaging unit: 10 items	EZAMBHXM004/M
	• Cable diameter: 20...37 mm • Packaging unit: 10 items	EZAMBHXM005/M

Inverter Drives 8400 HighLine

Accessories



Terminal strips

All connections are equipped with pluggable connectors, with power connections up to 15 kW. These pluggable connectors are available separately for service purposes or if cable harnesses need to be physically separated.

► Power connections

Product key	Terminal strip	Features	Product key	Terminal strip	Features	Product key
Inverter						
E84AV□□□2512□□□	X100	• Connection: mains • Packaging unit: 10 items	E84AZEVS001X100/M	X105	• Connection: motor • Packaging unit: 5 items	E84AZEVS010X105/M
E84AV□□□3712□□□			E84AZEVS002X100/M			
E84AV□□□5512□□□						
E84AV□□□7512□□□						
E84AV□□□1122□□□						
E84AV□□□1522□□□						
E84AV□□□2222□□□		E84AZEVS003X100/M				
E84AV□□□3714□□□						
E84AV□□□5514□□□						
E84AV□□□7514□□□						
E84AV□□□1124□□□						
E84AV□□□1524□□□						
E84AV□□□2224□□□						
E84AV□□□3024□□□						
E84AV□□□4024□□□			E84AZEVS004X100/M			
E84AV□□□5524□□□			E84AZEVS005X100/M			
E84AV□□□7524□□□						
E84AV□□□1134□□□						
E84AV□□□1534□□□						

► Control connections

Terminal strip	Features	Product key
X1	- Connection: CANopen - Packaging unit: 10 items	E84AZEVS040X001/M
X3	- Connection: analog inputs and outputs - Packaging unit: 5 items	E84AZEVS060X003/M
X4	- Connection: digital outputs - Packaging unit: 10 items	E84AZEVS060X004/M
X5	- Connection: digital inputs - Packaging unit: 5 items	E84AZEVS060X005/M
X80	- Connection: safety engineering - Packaging unit: 10 items	E84AZEVS070X080/M
X101	- Connection: relay - Packaging unit: 10 items	E84AZEVS020X101/M
X106	- Connection: PTC - Packaging unit: 10 items	E84AZEVS030X106/M
X107	- Connection: 2.5 A digital output - Packaging unit: 10 items	E84AZEVS060X107/M



Setpoint potentiometer

The setpoint selection (e.g. speed) can be made via an external potentiometer.
The setpoint potentiometer is connected to the inverter's analog input terminals. A scale and a rotary knob are also available.



Setpoint potentiometer with scale and rotary knob

Mode	Product key
10 kOhm / 1 Watt potentiometer	ERPD0010K0001W
Rotary knob, 36 mm diameter	ERZ0001
Scale 0 ... 100%, 62 mm diameter	ERZ0002

Inverter Drives 8400 HighLine

Accessories



Inverter Drives 8400 HighLine

Accessories



Inverter

Inverter Drives 8400 StateLine

0.25 to 45 kW



Inverter Drives 8400 StateLine

Contents



General information	Product key	4.7 - 4	
	Equipment	4.7 - 5	
	List of abbreviations	4.7 - 6	
	Inverter Drives 8400	4.7 - 7	
	Functions and features	4.7 - 8	
	Operating modes	4.7 - 9	
Technical data	Standards and operating conditions	4.7 - 11	
	Rated data 230 V	4.7 - 12	
	Rated data 400 V	4.7 - 18	
	"Cold plate" design	4.7 - 30	
	Push-through technique design	4.7 - 32	
Interfaces	Mains connection	4.7 - 35	
	Motor connection	4.7 - 37	
	Connection diagrams	4.7 - 41	
	Control connections	4.7 - 43	
	Memory module	4.7 - 45	
	Safety system (STO)	4.7 - 45	
	EtherCAT® communication module	4.7 - 46	
	EtherNet/IP communication module	4.7 - 48	
	POWERLINK communication module	4.7 - 50	
	PROFIBUS communication module	4.7 - 52	
	PROFINET communication module	4.7 - 54	
Accessories	Brake resistors	4.7 - 57	
	Mains chokes	Operation at rated power	4.7 - 59
		Operation with increased power output	4.7 - 60
	Interference suppression	Available RFI and mains filters	4.7 - 61
		Operation at rated power	4.7 - 62
		Operation with increased power output	4.7 - 64
	Sinusoidal filters	Operation at rated power	4.7 - 66
		Operation with increased power output	4.7 - 67
	Regenerative power supply modules	Rated data for power supply modules	4.7 - 68
		Rated data for regenerative power supply modules	4.7 - 70
		Control connections	4.7 - 72
		Brake resistors of the regenerative power supply modules	4.7 - 73
		Mains chokes of the power supply modules	4.7 - 74
		Interference suppression of the regenerative power supply modules	4.7 - 75
		DC input module	4.7 - 78
		DC-bus connection	4.7 - 79
		24 V power supply unit	4.7 - 81
		Brake switch	4.7 - 81
		USB diagnostic adapter	4.7 - 82
		X400 keypad	4.7 - 83
		X400 diagnosis terminal	4.7 - 83
		PC system bus adapter	4.7 - 84
		Shield mounting	4.7 - 84
		Terminal strips	4.7 - 85
	Setpoint potentiometer	4.7 - 86	

Inverter Drives 8400 StateLine

General information



Product key

	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 5.5 kW)												
Power												
251 - 0.25 kW												
371 - 0.37 kW												
551 - 0.55 kW												
751 - 0.75 kW												
112 - 1.1 kW												
152 - 1.5 kW												
222 - 2.2 kW												
302 - 3.0 kW												
402 - 4.0 kW												
552 - 5.5 kW												
752 - 7.5 kW												
113 - 11.0 kW												
153 - 15.0 kW												
183 - 18.5 kW												
223 - 22.0 kW												
303 - 30.0 kW												
373 - 37.0 kW												
453 - 45.0 kW												
Voltage class												
2 - 230/240 V, 1/N/PE AC (0.25 ... 2.2 kW)												
4 - 400/500 V, 3/PE AC (0.37 ... 45.0 kW)												
Ambient conditions												
S - standard (0.25 ... 15.0 kW)												
V - rough environment (coated printed circuit boards, 0.25 ... 45.0 kW)												
Safety engineering												
X - without safety engineering												
B - with safety engineering (STO)												
Version identifier												
0 - 599 Hz												
S - 599 Hz												
7 - 1000 Hz												
Communication module plugged in												
XX - without communication module												
ET - EtherCAT												
EO - EtherNET/IP												
EC - POWERLINK												
PM - PROFIBUS												
ER - PROFINET												
Operating module plugged in												
X - without keypad												
K - with keypad												

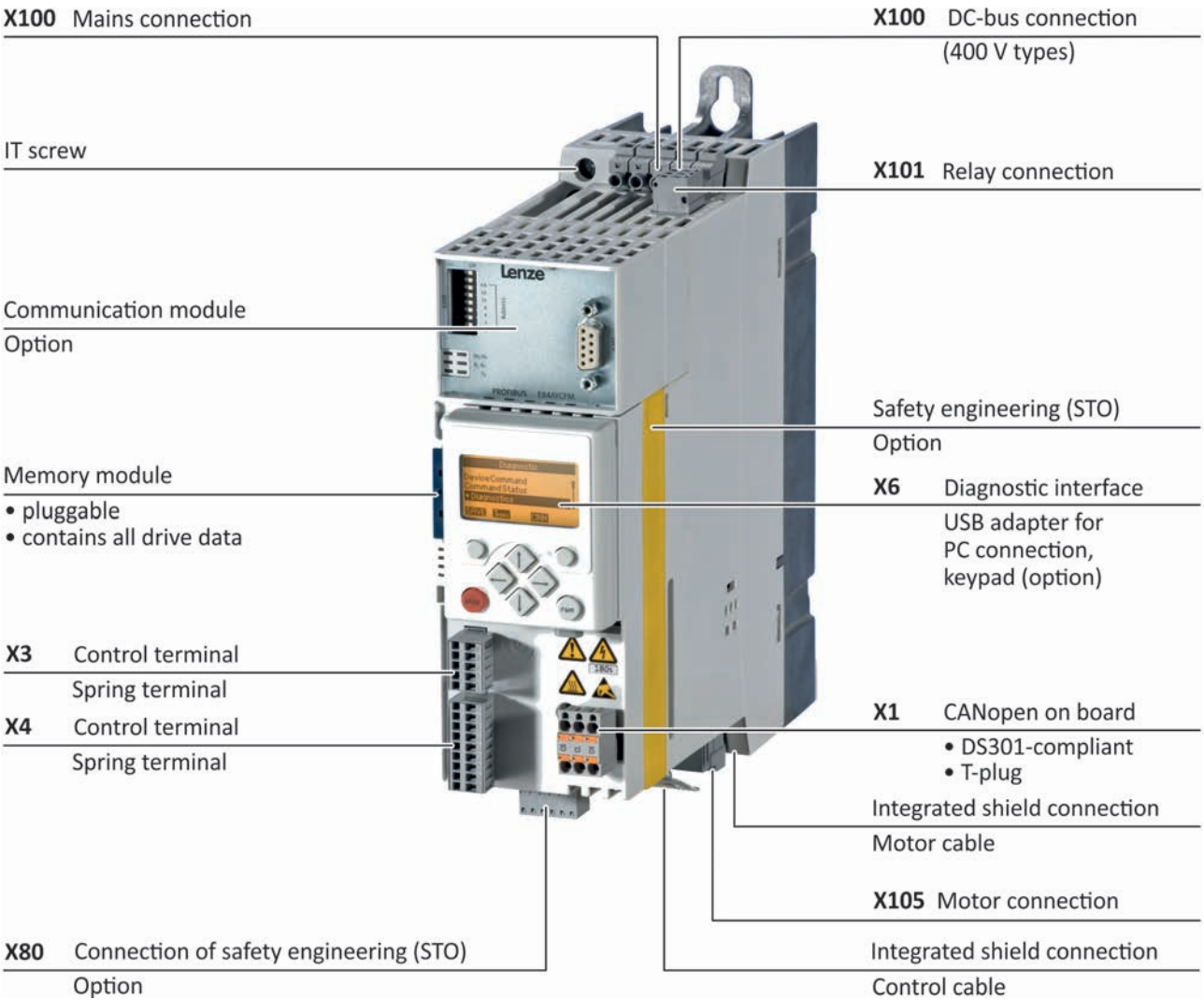
4.7

Inverter Drives 8400 StateLine

General information



Equipment





List of abbreviations

b	[mm]	Dimensions
C _{th}	[KW _s]	Thermal capacity
f _{ch}	[kHz]	Switching frequency
h	[mm]	Dimensions
H _{max}	[m]	Site altitude
I _{max}	[A]	Max. DC-bus current
I _{max, out}	[A]	Max. output current
I _{N, AC}	[A]	Rated mains current
I _{N, DC}	[A]	Rated DC-bus current
I _{N, out}	[A]	Rated output current
l _{max}	[m]	Max. cable length
m	[kg]	Mass
P	[kW]	Typical motor power
P _{max, 1}	[kW]	Max. output power
P _V	[kW]	Power loss
P _N	[kW]	Rated power
R _{min}	[Ω]	Min. brake resistance
R _N	[Ω]	Rated resistance
t	[mm]	Dimensions
U _{AC}	[V]	Mains voltage
U _{DC}	[V]	DC supply
U _{N, AC}	[V]	Rated voltage
U _{out}	[V]	Max. output voltage

ASM	Asynchronous motor
DIAG	Slot for diagnostic adapter
DIN	Deutsches Institut für Normung e.V.
EN	European standard
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60721-3	Classification of environmental conditions; Part 3: Classes of environmental parameters and their limit values
EN 61800-3	Electrical variable speed drives Part 3: EMC requirements including special test methods
IEC	International Electrotechnical Commission
IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
IM	International Mounting Code
IP	International Protection Code
MCI	Slot for communication module (module communication interface)
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product
VDE	Verband deutscher Elektrotechniker (Association of German Electrical Engineers)

Inverter Drives 8400 StateLine

General information



Inverter Drives 8400

Cost-efficiency, time savings and quality enhancement are the challenges of the future. Lenze is facing these challenges with its L-force product portfolio – the holistic solution portfolio with precisely matched interfaces and components. For faster configuration and commissioning, better performance and more flexibility in production.

As such, the four versions of Inverter Drives 8400 - BaseLine, StateLine, HighLine and TopLine - have been designed for consistent process optimisation – throughout your entire value-added chain. They reduce your costs, from component selection, through project planning, manufacturing and commissioning, all the way up to servicing. We call this "rightsizing".

Rightsized for versatile applications

Are you looking to control a three-phase AC motor or perform positioning with or without feedback? Then select exactly the inverter you need from the scaled solution space of the Inverter Drives 8400 with units in the power range from 0.25 kW to 45 kW. You are sure to find exactly what you are looking for here, as the modular 8400 range of inverters offers the right solution for a broad spectrum of applications.

While the BaseLine is excellent for basic applications, the TopLine offers servo qualities and thereby fulfils with the strict requirements in terms of dynamics and accuracy.

Rightsized for optimised operation

The energy-saving function "VFC eco" supported by the 8400 reduces the energy required by the motor in partial load operation. Combine this with an MF L-force three-phase AC motor (inverter-optimised, 120 Hz) and what you get is a highly efficient, compact and cost-effective drive with high dynamic performance and a wide setting range. "VFC eco" can reduce your energy costs by up to 30%.

8400 StateLine - for controlled motion

The 8400 StateLine is intended for drive control with or without speed feedback and is also used when networking via bus systems is needed. The integrated brake management system also delivers greatly reduced wear on the service brakes. Mains switching at too high a rate is also no problem for the StateLine, as the input circuit is protected from overload.

The 8400 StateLine is a step up from the BaseLine models for applications that must satisfy more stringent requirements. The StateLine is also ideally suited to applications such as palletizers, extruders, filling systems or travelling/variable speed drives.

Inverter Drives 8400 StateLine

General information



Functions and features

Mode	8400 StateLine
Control types, motor control	
Sensorless vector control (SLVC)	For three-phase asynchronous motors
V/f control (VFCplus)	For three-phase AC motors and asynchronous servo motor (linear or square-law)
Energy saving function (VFC eco)	For three-phase asynchronous motors
Basic functions	Freely assignable user menu Free function block interconnection with extensive function library Parameter change-over DC brake function Braking operation without brake resistor Brake management for brake control with low rate of wear Flying restart circuit S-shaped ramps for smooth acceleration PID controller 15 fixed frequencies Masking frequencies Inversion of motor phase sequence
Technology applications	Speed actuating drive Switch-off positioning without feedback
Monitoring and protective measures	Short circuit Earth fault Overvoltage Motor phase failure Overcurrent I ² x t-Motor monitoring Motor overtemperature Mains phase failure Protection against restart for cyclic mains switching Motor stalling
Diagnostics	Data logger, logbook, oscilloscope functions
Status display	4 LEDs
Diagnostic interface	Integrated For USB diagnostic adapter or keypad (diagnosis terminal)
Braking operation	
Brake chopper	Integrated
Brake resistor	External

Inverter Drives 8400 StateLine

General information

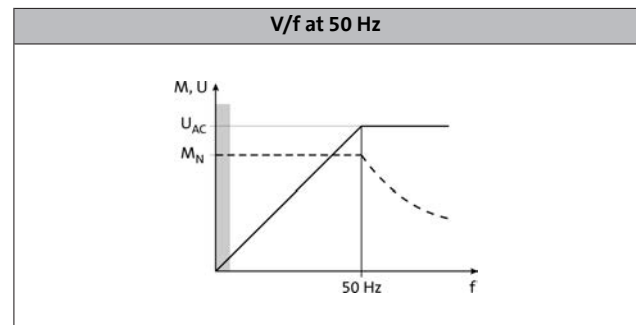


Operating modes

An inverter enables energy-efficient operation of a system in virtually all application cases. The various operating modes, which can be created by making just a few simple settings, facilitate this. The following characteristics and corresponding specifications listed on the following pages can be used to calculate the optimum operating mode during the project planning phase.

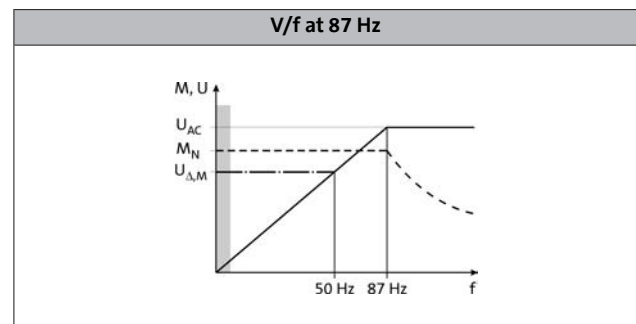
Standard setting

In its initial state when delivered, the inverter is set up for basic operation with a three-phase AC motor with V/f control. When operated in this mode, the rated torque of the motor is available in a setting range up to 50 Hz.



Extended setting range up to 87 Hz

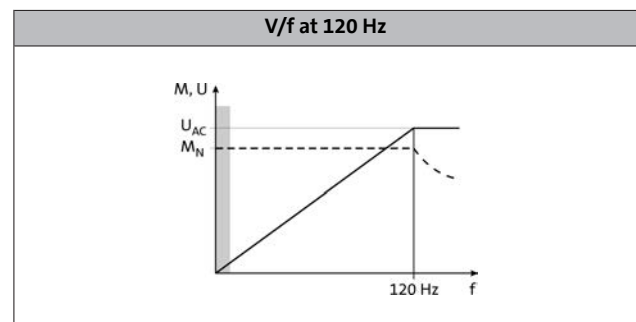
If the V/f reference point on the inverter is set to 87 Hz, the rated torque can be used across an extended setting range. Here, a 230/400V motor is for example used and operated in a delta layout with a 400V inverter. The setting range is then increased by 40 %. The inverter must be dimensioned for a rated motor current of 230 V.



4.7

Operation with inverter-optimised MF motors

Large setting ranges and optimum operation at the rated torque: these are the strengths of the MF motor when used in combination with an inverter. The motors are optimised for a setting range up to 120 Hz. Compared to conventional 50Hz operation, the setting range increases by 250 %. It is quite simply not possible for a drive to be operated any more efficiently in a machine.



Inverter Drives 8400 StateLine

General information



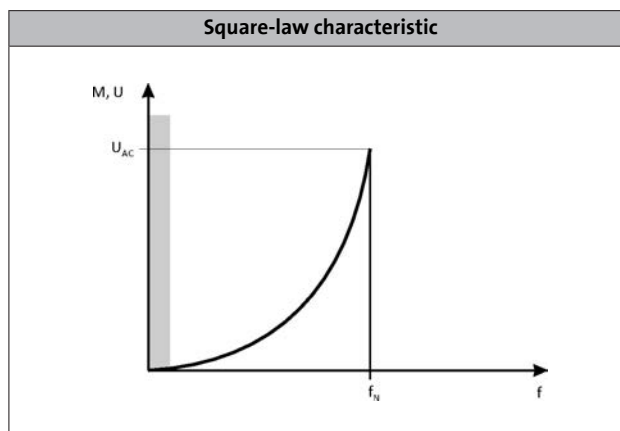
Operating modes

Square-law V/f characteristic control

The output voltage is increased quadratically 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 quadratically to the frequency increase, the maximum output power of the motor being constant.

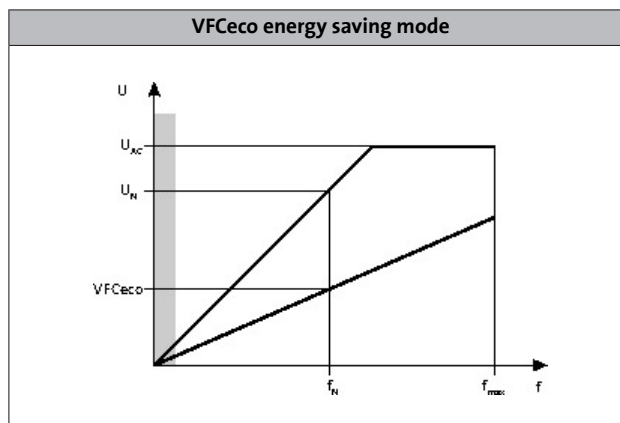
Application areas are for instance:

- Pumps
- Blowers
- Fans



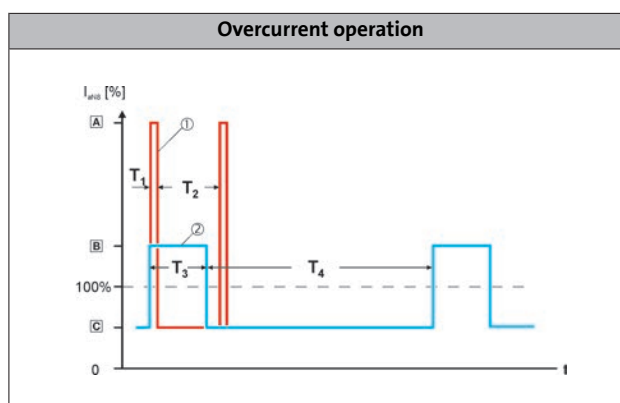
VFCeco energy saving mode

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.



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 with a duration 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. For both utilisation cycles, a moving average is determined separately. The adjacent diagram shows both cycles: 15 s in red and 180 s in blue. The overload times t_{o1} are 3 s (T_1) and 60 s (T_3) respectively, the corresponding recovery times t_{re} are 12 s (T_2) and 120 s (T_4) respectively. The following tables show the resulting maximum output currents. Monitoring of the device utilisation ($I \times t$) activates the set error response (trip or warning if one of the two utilisation values exceeds the limit of 100 %).



Inverter Drives 8400 StateLine

Technical data



Standards and operating conditions

Mode			
Product			8400 StateLine
Conformity			
CE			Low-Voltage Directive
			2014/35/EU [UKCA: S.I. 2016/1101]
Approval			
UL 508C			for USA and Canada (requirements of the CSA 22.2 No. 14) ²⁾ Power Conversion Equipment (file no. E132659)
Degree of protection			
EN 60529 ³⁾			IP20
NEMA 250			Type 1
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10 °C ... +55 °C)
Current derating at over 45 °C			2.5% / K
Site altitude			
Amsl	H _{max}	[m]	4000
Current derating at over 1000 m		[%/1000 m]	5
Vibration resistance			
Transport (EN 60721-3-2)			2M2
Operation (EN 61800-5-1)			10 Hz ≤ f ≤ 57 Hz: ±0.075 mm amplitude, 57 Hz ≤ f ≤ 150 Hz: 1.0 g
Operation (Germanischer Lloyd)			5 Hz ≤ f ≤ 13.2 Hz: ± 1 mm amplitude 13.2 Hz ≤ f ≤ 100 Hz: 0.7 g

4.7

Mode			
Product			8400 StateLine
Supply form			
			Systems with earthed star point (TN and TT systems) Systems with high-resistance or isolated star point (IT systems)
Noise emission			
EN 61800-3			Integrated RFI suppression: category C2 up to 25 m shielded motor cable ¹⁾
Insulation resistance			
EN 61800-5-1			Overvoltage category III Above 2000 m amsl overvoltage category II
Degree of pollution			
EN 61800-5-1			2
Protective insulation of control circuits			
EN 61800-5-1			Safe mains isolation: double/reinforced insulation

¹⁾   37 - Please also refer to the Motor connection section

²⁾ CSA when using an external mains choke or a module for reducing transients.

³⁾ Mounted and ready-to-use

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55 ¹⁾
Product key			E84AVSC□2512□□0		E84AVSC□3712□□0	
Mains voltage range			1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U _{AC}	[V]				
Rated mains current						
With mains choke	I _{N, AC}	[A]	3.0	3.6	4.2	5.0
Without mains choke	I _{N, AC}	[A]	3.4	4.1	5.0	
Rated output current						
	I _{N, out}	[A]	1.7	2.1	2.4	2.9
Output current						
2 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
4 kHz	I _{out}	[A]	1.7	2.1	2.4	2.9
8 kHz	I _{out}	[A]	1.7		2.4	
16 kHz	I _{out}	[A]	1.1		1.6	

Data for 60 s overload

Max. output current				
	$I_{\text{max, out}}$	[A]	2.6	3.6
Overload time				
	t_{ol}	[s]	60.0	
Recovery time				
	t_{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	3.4	4.8
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.37	0.55
Product key			E84AVSC□2512□□0			E84AVSC□3712□□0
Power loss						
	P _V	[kW]	0.045			0.050
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	0.6	0.6
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	0.8	0.8
Min. brake resistance				
	R _{min}	[Ω]	180.0	180.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	165	165
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	1.3	1.3

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10 ¹⁾
Product key			E84AVSC□5512□□0 E84AVSC□5512□□S		E84AVSC□7512□□0 E84AVSC□7512□□S	
Mains voltage range			1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U _{AC}	[V]				
Rated mains current						
With mains choke	I _{N, AC}	[A]	5.0	6.0	7.0	8.4
Without mains choke	I _{N, AC}	[A]	5.3	6.4	8.0	
Rated output current						
	I _{N, out}	[A]	3.0	3.6	4.0	4.8
Output current						
2 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
4 kHz	I _{out}	[A]	3.0	3.6	4.0	4.8
8 kHz	I _{out}	[A]	3.0		4.0	
16 kHz	I _{out}	[A]	2.0		2.7	

Data for 60 s overload

Max. output current				
	I _{max, out}	[A]	4.5	6.0
Overload time				
	t _{ol}	[s]	60.0	
Recovery time				
	t _{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	6.0	8.0
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.55	0.75	0.75	1.10
Product key						
			E84AVSC□5512□□0 E84AVSC□5512□□S		E84AVSC□7512□□0 E84AVSC□7512□□S	
Power loss						
	P _V	[kW]	0.060		0.075	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	1.1	1.1
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	1.4	1.4
Min. brake resistance				
	R _{min}	[Ω]	100.0	100.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	215	215
Width	b	[mm]	70	70
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	1.8	1.8

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at a mains voltage 230 V, switching frequency 8 kHz variable and an ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 230 V, switching frequency 4 kHz and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with switching frequency 2 kHz or 4 kHz.

							
Typical motor power							
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20 ¹⁾	2.20
Product key							
			E84AVSC□1122□□0 E84AVSC□1122□□S	E84AVSC□1522□□0 E84AVSC□1522□□S	E84AVSC□2222□□0 E84AVSC□2222□□S		
Mains voltage range							
	U _{AC}	[V]	1/N/PE AC 180 V-0 % ... 264 V+0 %, 45 Hz-0 % ... 65 Hz+0 %				
Rated mains current							
With mains choke	I _{N, AC}	[A]	9.9	11.9	11.4	13.7	16.4
Without mains choke	I _{N, AC}	[A]	12.0	14.4	13.7		21.8
Rated output current							
	I _{N, out}	[A]	5.5	6.8	7.0	8.4	9.5
Output current							
2 kHz	I _{out}	[A]	5.5	6.8	7.0	8.4	9.5
4 kHz	I _{out}	[A]	5.5	6.8	7.0	8.4	9.5
8 kHz	I _{out}	[A]	5.5		7.0		9.5
16 kHz	I _{out}	[A]	3.7		4.7		6.3

Data for 60 s overload

Max. output current							
	I _{max, out}	[A]	8.3 10.5 14.3				
Overload time							
	t _{ol}	[s]	60.0				
Recovery time							
	t _{re}	[s]	120.0				

Data for 3 s overload

Max. short-time output current							
	I _{max, out}	[A]	11.0 14.0 19.0				
Overload time							
	t _{ol}	[s]	3.0				
Recovery time							
	t _{re}	[s]	12.0				

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 230 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	
Product key								
			E84AVSC□1122□□0 E84AVSC□1122□□S		E84AVSC□1522□□0 E84AVSC□1522□□S		E84AVSC□2222□□0 E84AVSC□2222□□S	
Power loss								
	P _V	[kW]	0.095		0.110		0.140	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	3.3	3.3	3.3
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	4.4	4.4	4.4
Min. brake resistance					
	R _{min}	[Ω]	33.0	33.0	33.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	270	270	270
Width	b	[mm]	70	70	70
Depth ²⁾	t	[mm]	199	199	199
Mass					
	m	[kg]	2.1	2.1	2.1

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10 ¹⁾
Product key			E84AVSC□3714□□0 E84AVSC□3714□□S		E84AVSC□5514□□0 E84AVSC□5514□□S		E84AVSC□7514□□0 E84AVSC□7514□□S	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	1.4	1.7	2.0	2.6		3.0
Without mains choke	I _{N, AC}	[A]	1.8	2.2	2.5	3.2	3.6	
Rated output current								
	I _{N, out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
Output current								
2 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
4 kHz	I _{out}	[A]	1.3	1.6	1.8	2.2	2.4	2.9
8 kHz	I _{out}	[A]	1.3		1.8		2.4	
16 kHz	I _{out}	[A]	0.9		1.2		1.6	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	2.0	2.7	3.6
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	2.6	3.6	4.8
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.55	0.75	0.75	1.10
Product key								
			E84AVSC□3714□□0 E84AVSC□3714□□S		E84AVSC□5514□□0 E84AVSC□5514□□S		E84AVSC□7514□□0 E84AVSC□7514□□S	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	2.2		3.3		4.4	
Power loss								
	P _V	[kW]	0.050		0.065		0.080	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

4.7

Rated power, Brake chopper					
	P _N	[kW]	1.3	1.3	1.3
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	1.3	1.3	1.3
Min. brake resistance					
	R _{min}	[Ω]	390.0	390.0	390.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	215	215	215
Width	b	[mm]	70	70	70
Depth ²⁾	t	[mm]	199	199	199
Mass					
	m	[kg]	1.8	1.8	1.8

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00 ¹⁾	3.00	4.00 ¹⁾
Product key										
			E84AVSC□1124□□0 E84AVSC□1124□□S		E84AVSC□1524□□0 E84AVSC□1524□□S		E84AVSC□2224□□0 E84AVSC□2224□□S		E84AVSC□3024□□S	
Mains voltage range										
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %							
Rated mains current										
With mains choke	I _{N, AC}	[A]	3.2	3.8	3.9	4.7	5.1	6.1	7.0	8.4
Without mains choke	I _{N, AC}	[A]	4.4	5.3	5.5	6.6	7.3		9.8	11.8
Rated output current										
	I _{N, out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
Output current										
2 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
4 kHz	I _{out}	[A]	3.2	3.8	3.9	4.8	5.6	6.7	7.3	8.8
8 kHz	I _{out}	[A]	3.2		3.9		5.6		7.3	
16 kHz	I _{out}	[A]	2.1		2.6		3.7		4.9	

Data for 60 s overload

Max. output current						
	I _{max, out}	[A]	4.8	5.9	8.4	11.0
Overload time						
	t _{ol}	[s]	60.0			
Recovery time						
	t _{re}	[s]	120.0			

Data for 3 s overload

Max. short-time output current						
	I _{max, out}	[A]	6.4	7.8	11.2	14.6
Overload time						
	t _{ol}	[s]	3.0			
Recovery time						
	t _{re}	[s]	12.0			

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

										
Typical motor power										
4-pole asynchronous motor	P	[kW]	1.10	1.50	1.50	2.20	2.20	3.00	3.00	4.00
Product key										
			E84AVSC□1124□□0 E84AVSC□1124□□S	E84AVSC□1524□□0 E84AVSC□1524□□S	E84AVSC□2224□□0 E84AVSC□2224□□S	E84AVSC□3024□□S				
DC supply										
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %							
Rated DC-bus current										
	I _{N, DC}	[A]	5.4		6.7		8.9		12.0	
Power loss										
	P _V	[kW]	0.095		0.105		0.135		0.165	
Max. cable length ¹⁾										
Shielded motor cable	I _{max}	[m]	50							

Brake chopper rated data

Rated power, Brake chopper						
	P _N	[kW]	2.9	2.9	3.5	6.4
Max. output power, Brake chopper						
	P _{max, 1}	[kW]	2.9	2.9	3.5	6.4
Min. brake resistance						
	R _{min}	[Ω]	180.0	180.0	150.0	82.0

Dimensions and weights

Standard installation design

Dimensions						
Height	h	[mm]	270	270	270	270
Width	b	[mm]	70	70	70	70
Depth ²⁾	t	[mm]	199	199	199	199
Mass						
	m	[kg]	2.1	2.1	2.1	2.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50 ¹⁾
Product key								
			E84AVSC□3024□□0		E84AVSC□4024□□0		E84AVSC□5524□□0	
Mains voltage range								
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
Rated mains current								
With mains choke	I _{N, AC}	[A]	7.0	8.4	8.8	10.6	12.0	18.0
Without mains choke	I _{N, AC}	[A]	9.8	11.8	13.1	15.7	18.0	
Rated output current								
	I _{N, out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
Output current								
2 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
4 kHz	I _{out}	[A]	7.3	8.8	9.5	11.5	13.0	15.6
8 kHz	I _{out}	[A]	7.3		9.5		13.0	
16 kHz	I _{out}	[A]	4.9		6.3		8.7	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	11.0	14.3	19.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	14.6	19.0	26.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	3.00	4.00	4.00	5.50	5.50	7.50
Product key			E84AVSC□3024□□0		E84AVSC□4024□□0		E84AVSC□5524□□0	
DC supply			DC 455 V -0 % ... 775 V +0 %					
	U _{DC}	[V]						
Rated DC-bus current			12.0					
	I _{N, DC}	[A]						
Power loss			0.165		0.205		0.275	
	P _V	[kW]						
Max. cable length ¹⁾			50					
Shielded motor cable	I _{max}	[m]						

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	6.4	9.4	9.4
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	6.4	11.2	11.2
Min. brake resistance					
	R _{min}	[Ω]	82.0	47.0	47.0

Dimensions and weights

Standard installation design

Product key				
			E84AVSC□4024□□0	E84AVSC□5524□□0
Dimensions				
Height	h	[mm]	270	270
Width	b	[mm]	140	140
Depth ²⁾	t	[mm]	199	199
Mass				
	m	[kg]	4.4	4.4

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0 ¹⁾	15.0 ¹⁾	
Product key								
			E84AVSC□7524□□0		E84AVSC□1134□□0		E84AVHC□1534□□0	
Mains voltage range								
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
Rated mains current								
With mains choke	I _{N, AC}	[A]	15.0	21.0		29.0		
Without mains choke	I _{N, AC}	[A]	20.0	28.0	29.0			
Rated output current								
	I _{N, out}	[A]	16.5	21.0	23.5	28.2	32.0	
Output current								
2 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0	
4 kHz	I _{out}	[A]	16.5	21.0	23.5	28.2	32.0	
8 kHz	I _{out}	[A]	16.5		23.5		32.0	
16 kHz	I _{out}	[A]	11.0		15.7		21.3	

Data for 60 s overload

Max. output current					
	$I_{\text{max, out}}$	[A]	26.4	35.3	48.0
Overload time					
	t_{ol}	[s]	60.0		
Recovery time					
	t_{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	33.0	47.0	64.0
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	7.50	11.0	11.0	15.0	15.0	
Product key			E84AVSC□7524□□0		E84AVSC□1134□□0		E84AVSC□1534□□0	
DC supply								
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %					
Rated DC-bus current								
	I _{N, DC}	[A]	24.5		35.5			
Power loss								
	P _V	[kW]	0.320		0.435		0.470	
Max. cable length ¹⁾								
Shielded motor cable	I _{max}	[m]	50					

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	19.5	19.5	29.2
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	19.5	19.5	29.2
Min. brake resistance					
	R _{min}	[Ω]	27.0	27.0	18.0

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	325	325	325
Width	b	[mm]	140	140	140
Depth ²⁾	t	[mm]	199	199	199
Mass					
	m	[kg]	5.8	5.8	5.8

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0 ¹⁾	22.0 ¹⁾	30.0 ¹⁾
Product key						
			E84AVSC□1834□□0		E84AVSC□2234□□0	
Mains voltage range						
	U _{AC}	[V]	3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	I _{N, AC}	[A]	36.0	42.2	42.0	50.8
Without mains choke	I _{N, AC}	[A]	50.4			
Rated output current						
	I _{N, out}	[A]	40.0	46.8	47.0	56.4
Output current						
2 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
4 kHz	I _{out}	[A]	40.0	46.8	47.0	56.4
8 kHz	I _{out}	[A]	40.0		47.0	
16 kHz	I _{out}	[A]	27.0		31.3	

Data for 60 s overload

Max. output current				
	$I_{\text{max, out}}$	[A]	60.0	70.5
Overload time				
	t_{ol}	[s]	60.0	
Recovery time				
	t_{re}	[s]	120.0	

Data for 3 s overload

Max. short-time output current				
	I _{max, out}	[A]	78.0	89.3
Overload time				
	t _{ol}	[s]	3.0	
Recovery time				
	t _{re}	[s]	12.0	

¹⁾ Operation only permitted with mains choke or mains filter

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	18.5	22.0	22.0	30.0
Product key						
			E84AVSC□1834□□0		E84AVSC□2234□□0	
DC supply						
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %			
Rated DC-bus current						
	I _{N, DC}	[A]	44.1		51.4	
Power loss						
	P _V	[kW]	0.540		0.640	
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	100			

Brake chopper rated data

Rated power, Brake chopper				
	P _N	[kW]	35.0	35.0
Max. output power, Brake chopper				
	P _{max, 1}	[kW]	35.0	35.0
Min. brake resistance				
	R _{min}	[Ω]	15.0	15.0

Dimensions and weights

Standard installation design

Dimensions				
Height	h	[mm]	350	350
Width	b	[mm]	205	205
Depth ²⁾	t	[mm]	250	250
Mass				
	m	[kg]	12.0	12.0

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

Data in left column per device

Operation with rated data: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 8 kHz variable and max. ambient temperature 45 °C (default setting).
Output currents I_{out} apply to:
Ambient temperature 45 °C operating with constant switching frequency 2 kHz or 4 kHz.
Ambient temperature 40 °C operating with constant switching frequency 8 kHz or 16 kHz.

Data in right column per device

Operation with increased power: rated output current $I_{N,out}$ at mains voltage 400 V, switching frequency 4 kHz constant and max. ambient temperature 40 °C.
Output currents apply to:
Ambient temperature 40 °C operating with constant switching frequency 2 kHz or 4 kHz.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0 ⁻¹⁾	37.0 ⁻¹⁾	37.0 ⁻¹⁾	45.0 ⁻¹⁾	45.0 ⁻¹⁾	55.0 ⁻¹⁾
Product key			E84AVSC□3034□□0		E84AVSC□3734□□0		E84AVSC□4534□□0	
Mains voltage range			3/PE AC 320 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %					
	U _{AC}	[V]						
Rated mains current								
With mains choke	I _{N, AC}	[A]	55.0	66.0	68.0	81.6	80.0	96.0
Without mains choke	I _{N, AC}	[A]						
Rated output current								
	I _{N, out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
Output current								
2 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
4 kHz	I _{out}	[A]	61.0	73.2	76.0	91.2	89.0	106.8
8 kHz	I _{out}	[A]	61.0		76.0		89.0	
16 kHz	I _{out}	[A]	41.0		51.0		60.0	

Data for 60 s overload

Max. output current					
	I _{max, out}	[A]	91.5	114.0	133.5
Overload time					
	t _{ol}	[s]	60.0		
Recovery time					
	t _{re}	[s]	120.0		

Data for 3 s overload

Max. short-time output current					
	I _{max, out}	[A]	112.1	136.8	169.1
Overload time					
	t _{ol}	[s]	3.0		
Recovery time					
	t _{re}	[s]	12.0		

¹⁾ Operation only permitted with mains choke

Inverter Drives 8400 StateLine

Technical data



Rated data 400 V

► Unless otherwise specified, the data refers to the default setting.

								
Typical motor power								
4-pole asynchronous motor	P	[kW]	30.0	37.0	37.0	45.0	45.0	55.0
Product key			E84AVSC□3034□□0		E84AVSC□3734□□0		E84AVSC□4534□□0	
DC supply			DC 455 V -0 % ... 775 V +0 %					
	U _{DC}	[V]						
Rated DC-bus current			67.4					
	I _{N, DC}	[A]						
Power loss			0.840		0.980		1.300	
	P _V	[kW]						
Max. cable length ¹⁾			100					
Shielded motor cable	I _{max}	[m]						

Brake chopper rated data

Rated power, Brake chopper					
	P _N	[kW]	70.1	70.1	70.1
Max. output power, Brake chopper					
	P _{max, 1}	[kW]	70.1	70.1	70.1
Min. brake resistance					
	R _{min}	[Ω]	7.5	7.5	7.5

Dimensions and weights

Standard installation design

Dimensions					
Height	h	[mm]	450	450	450
Width	b	[mm]	250	250	250
Depth ²⁾	t	[mm]	250	250	250
Mass					
	m	[kg]	17.2	17.2	17.2

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

²⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data



"Cold plate" design

Inverters in cold-plate design dissipate some of their waste heat (heat loss) via a cooler adapted to the application. For this purpose, the inverters are provided with a planed cooling plate which is connected to a separate cooler in a thermally conductive way. Using the cold plate technology, the main part of the heat energy can be transferred directly to the external cooling units.

The use of cold-plate technology is advantageous for the following application cases:

- Minimising the expense of cooling the control cabinet. Here, the main part of the power loss is directly transferred to a cooling unit outside of the control cabinet, e.g. convection cooler or water cooler.
- Heavily polluted ambient air or control cabinets with a high degree of protection which do not allow for a use of a forced air cooling of the control cabinets.
- Low mounting depth in the control cabinet.

Product key	Power to be dissipated	Thermal resistance
	P_V	R_{th}
	[W]	[K/W]
E84AVSCC2512□□0	15.0	≤ 1.5
E84AVSCC3712□□0	20.0	≤ 1.5
E84AVSCC5512□□S	30.0	≤ 1.0
E84AVSCC7512□□S	40.0	≤ 1.0
E84AVSCC1122□□S	60.0	≤ 0.6
E84AVSCC1522□□S	75.0	≤ 0.5
E84AVSCC2222□□S	100	≤ 0.4
E84AVSCC3714□□S	25.0	≤ 1.0
E84AVSCC5514□□S	35.0	≤ 1.0
E84AVSCC7514□□S	50.0	≤ 1.0
E84AVSCC1124□□S	60.0	≤ 0.6
E84AVSCC1524□□S	70.0	≤ 0.5
E84AVSCC2224□□S	100	≤ 0.4
E84AVSCC3024□□S	100	≤ 0.4
E84AVSCC4024□□0	155	≤ 0.25
E84AVSCC5524□□0	215	≤ 0.18

4.7

Dimensions and weights

Product key			E84AVSCC2512□□0	E84AVSCC3712□□0	E84AVSCC5512□□S	E84AVSCC7512□□S
Dimensions						
Height, including fastening	h	[mm]	186		236	
Width, including fastening	b	[mm]	102		70	
Depth	t	[mm]	185		163	
Mass						
	m	[kg]	1.3		1.5	

Product key			E84AVSCC1122□□S	E84AVSCC1522□□S	E84AVSCC2222□□S
Dimensions					
Height, including fastening	h	[mm]		295	
Width, including fastening	b	[mm]		70	
Depth	t	[mm]		163	
Mass					
	m	[kg]		2.0	

Inverter Drives 8400 StateLine

Technical data



"Cold plate" design

Dimensions and weights

Product key			E84AVSCC3714□□S	E84AVSCC5514□□S	E84AVSCC7514□□S
Dimensions					
Height, including fastening	h	[mm]	236		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	163		
Mass					
	m	[kg]	1.5		

Product key			E84AVSCC1124□□S	E84AVSCC1524□□S	E84AVSCC2224□□S
Dimensions					
Height, including fastening	h	[mm]	295		
Width, including fastening	b	[mm]	70		
Depth ¹⁾	t	[mm]	163		
Mass					
	m	[kg]	2.0		

Product key			E84AVSCC3024□□S		E84AVSCC4024□□0	E84AVSCC5524□□0
Dimensions						
Height, including fastening	h	[mm]	295		318	
Width, including fastening	b	[mm]	70		174	
Depth ¹⁾	t	[mm]	163		141	
Mass						
	m	[kg]	2.0		2.7	

¹⁾ With safety engineering plus 20 mm

4.7



Push-through technique design

The inverters in push-through design reduce the waste heat in the control cabinet.

The inverter is mounted in the control cabinet such that the heatsink of the inverter is outside the control cabinet. Thus, the entire waste heat can be dissipated outside the control cabinet via convection or forced air cooling for almost all device performances. For inverters with a power below 2.2 kW, restrictions may occur.

Using the push-through technology is advantageous in the following application cases:

- Minimising the expense for control cabinet cooling. For this purpose, the main part of the power loss is directly transferred to the ambience outside the control cabinet (e.g. convection cooling).
- In case of control cabinets with a high degree of protection > IP54 by using separate mounting and cooling areas.
- Low mounting depth in the control cabinet.

Inverter Drives 8400 StateLine

Technical data



Push-through technique design

Dimensions and weights

Product key				
			E84AVSCD2512□□0	E84AVSCD3712□□0
Dimensions			E84AVSCD5512□□0	E84AVSCD7512□□0
Height, including fastening	h	[mm]	186	236
Width, including fastening	b	[mm]	102	
Depth (in control cabinet) ¹⁾	t	[mm]	185	163
Mass				
	m	[kg]	1.4	1.9

Product key				
			E84AVSCD1122□□0	E84AVSCD1522□□0
Dimensions			E84AVSCD2222□□0	E84AVSCD3714□□0
Height, including fastening	h	[mm]	295	236
Width, including fastening	b	[mm]	137	102
Depth (in control cabinet) ¹⁾	t	[mm]	163	
Mass				
	m	[kg]	3.5	1.9

Product key				
			E84AVSCD5514□□0	E84AVSCD7514□□0
Dimensions			E84AVSCD1124□□0	E84AVSCD1524□□0
Height, including fastening	h	[mm]	236	295
Width, including fastening	b	[mm]	102	137
Depth (in control cabinet) ¹⁾	t	[mm]	163	
Mass				
	m	[kg]	1.9	3.5

Product key				
			E84AVSCD2224□□0	E84AVSCD3024□□0
Dimensions			E84AVSCD4024□□0	E84AVSCD5524□□0
Height, including fastening	h	[mm]	295	318
Width, including fastening	b	[mm]	137	174
Depth (in control cabinet) ¹⁾	t	[mm]	163	141
Mass				
	m	[kg]	3.5	4.9

Product key				
			E84AVSCD7524□□0	E84AVSCD1134□□0
Dimensions			E84AVSCD1534□□0	
Height, including fastening	h	[mm]	378	
Width, including fastening	b	[mm]	174	
Depth (in control cabinet) ¹⁾	t	[mm]	141	
Mass				
	m	[kg]	6.2	

¹⁾ With safety engineering plus 20 mm

Inverter Drives 8400 StateLine

Technical data





Mains connection

- The mains fuse and cable cross-section specifications are for a mains connection of 1 x 230V or 3 x 400V.
- Class gG/gI fuses or class gRL semiconductor fuses.
- The cable cross-sections apply to PVC-insulated copper cables.
- Use for installation with UL-approved cables, fuses and brackets.

Operation with mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection	
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (with mains choke)	
P	U _{AC}		I	I	I	q	
[kW]	[V]		[A]	[A]	[A]	[mm ²]	
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	C6	6	6	1.0	
0.37		E84AV□□□3712□□□			10		
0.55		E84AV□□□5512□□□	C10	10	15	1.5	
0.75		E84AV□□□7512□□□			20		
1.10		E84AV□□□1122□□□	C16	16	25	2.5	
1.50		E84AV□□□1522□□□			30		
2.20		E84AV□□□2222□□□	C20	20	30	4.0	
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	C6	6	6	1.0	
0.55		E84AV□□□5514□□□			10		
0.75		E84AV□□□7514□□□					
1.10		E84AV□□□1124□□□			15		
1.50		E84AV□□□1524□□□					
2.20		E84AV□□□2224□□□	C10	10	15	1.5	
3.00		E84AV□□□3024□□□			20		
4.00		E84AV□□□4024□□□	C16	16	2.5		
5.50		E84AV□□□5524□□□	C20	20		4.0	
7.50		E84AV□□□7524□□□		30			
11.0		E84AV□□□1134□□□	C32	32		10.0	
15.0		E84AV□□□1534□□□		40			
18.5		E84AV□□□1834□□□	C50	50	16.0		
22.0		E84AV□□□2234□□□	C63	63	50	25.0	
30.0		E84AV□□□3034□□□	C80	80	70		
37.0		E84AV□□□3734□□□	C100	100	80	50.0	
45.0		E84AV□□□4534□□□	C125	125	100		



Mains connection

Operation without mains choke

Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (without mains choke)
P	U _{AC}		I	I	I	q
[kW]	[V]		[A]	[A]	[A]	[mm ²]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	C6	6	6	1.0
0.37		E84AV□□□3712□□□			10	
0.55		E84AV□□□5512□□□	C10	10	15	1.5
0.75		E84AV□□□7512□□□			20	
1.10		E84AV□□□1122□□□	C16	16	25	2.5
1.50		E84AV□□□1522□□□	C20	20	30	4.0
2.20		E84AV□□□2222□□□	C25	25	30	6.0
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	C6	6	6	1.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	C10	10	10	1.5
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	C16	16	15	2.5
4.00		E84AV□□□4024□□□			20	
5.50		E84AV□□□5524□□□	C25	25	25	4.0
7.50		E84AV□□□7524□□□	C32	32	40	10.0
11.0		E84AV□□□1134□□□				
18.5		E84AV□□□1834□□□	C80	80	60	25.0



Motor connection

- Keep motor cables as short as possible, as this has a positive effect on the drive behaviour.
- With group drives (multiple motors on one inverter), the resulting cable length is the key factor. This can be calculated using the hardware manual.
- Electric strength of the motor cable: 1 kV as per VDE 250-1.
- Capacitance per unit length
 $\leq 1.5 \text{ mm}^2 / \text{AWG 16: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 75 / \leq 150 \text{ pF/m}$
 $\geq 2.5 \text{ mm}^2 / \text{AWG 12: } C_{\text{core-core}} / C_{\text{core-shield}} \leq 100 / \leq 150 \text{ pF/m.}$

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)	
	4-pole asynchronous motor	Inverter	45 °C	40 °C	40 °C	40 °C	
U _{in}	P		I _{max}	I _{max}	I _{max}	I _{max}	
[V]	[kW]		[m]	[m]	[m]	[m]	
230	0.25	E84AV□□□2512□□□				50	
	0.37	E84AV□□□3712□□□					
	0.55	E84AV□□□5512□□□					
	0.75	E84AV□□□7512□□□					
	1.10	E84AV□□□1122□□□					
	1.50	E84AV□□□1522□□□					
	2.20	E84AV□□□2222□□□					
400	0.37	E84AV□□□3714□□□	50	100	50	25	
	0.55	E84AV□□□5514□□□					
	0.75	E84AV□□□7514□□□					
	1.10	E84AV□□□1124□□□					
	1.50	E84AV□□□1524□□□					
	2.20	E84AV□□□2224□□□					
	3.00	E84AV□□□3024□□□					
	4.00	E84AV□□□4024□□□	50				
	5.50	E84AV□□□5524□□□		100	150	100	
	7.50	E84AV□□□7524□□□					
	11.0	E84AV□□□1134□□□					
	15.0	E84AV□□□1534□□□					
	18.5	E84AV□□□1834□□□					
	22.0	E84AV□□□2234□□□					
	30.0	E84AV□□□3034□□□					
	37.0	E84AV□□□3734□□□					
	45.0	E84AV□□□4534□□□					
500	0.37	E84AV□□□3714□□□	50				
	0.55	E84AV□□□5514□□□					
	0.75	E84AV□□□7514□□□					
	1.10	E84AV□□□1124□□□					
	1.50	E84AV□□□1524□□□					
	2.20	E84AV□□□2224□□□					
	3.00	E84AV□□□3024□□□					



Motor connection

Maximum shielded motor cable length without EMC limit values at switching frequency

Rated mains voltage	Typical motor power	Product key	4 kHz (without limit value)		8 kHz (without limit value)	16 kHz (without limit value)
			45 °C	40 °C	40 °C	40 °C
U_{in}	P	Inverter	I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]
500	4.00	E84AV□□□4024□□□	50	100	50	50
	5.50	E84AV□□□5524□□□				
	7.50	E84AV□□□7524□□□				
	11.0	E84AV□□□1134□□□				
	15.0	E84AV□□□1534□□□				
	18.5	E84AV□□□1834□□□	100	150	100	100
	22.0	E84AV□□□2234□□□				
	30.0	E84AV□□□3034□□□				
	37.0	E84AV□□□3734□□□				
	45.0	E84AV□□□4534□□□				

Maximum shielded motor cable length acc. to category C2 (industry), conducted

- The values for I_{max} are valid for an ambient temperature of up to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD	
			4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz
U_{in}	P	Inverter	I_{max}	I_{max}	I_{max}	I_{max}	I_{max}	I_{max}
[V]	[kW]		[m]	[m]	[m]	[m]	[m]	[m]
230	0.25	E84AV□□□2512□□□	25	25	50	50	100	50
	0.37	E84AV□□□3712□□□						
	0.55	E84AV□□□5512□□□						
	0.75	E84AV□□□7512□□□						
	1.10	E84AV□□□1122□□□						
	1.50	E84AV□□□1522□□□						
	2.20	E84AV□□□2222□□□						
400	0.37	E84AV□□□3714□□□						
	0.55	E84AV□□□5514□□□						
	0.75	E84AV□□□7514□□□						
	1.10	E84AV□□□1124□□□						
	1.50	E84AV□□□1524□□□						
	2.20	E84AV□□□2224□□□						
	3.00	E84AV□□□3024□□□						
	4.00	E84AV□□□4024□□□						
	5.50	E84AV□□□5524□□□						
	7.50	E84AV□□□7524□□□						
	11.0	E84AV□□□1134□□□						
	15.0	E84AV□□□1534□□□						

Inverter Drives 8400 StateLine

Interfaces



Motor connection

Maximum shielded motor cable length acc. to category C2 (industry), conducted

- The values for $I_{\max}$ are valid for an ambient temperature of up to 40°C.

Rated mains voltage	Typical motor power	Product key	Integrated filter		RFI filter SD		RFI filter LD		
	4-pole asynchronous motor	Inverter	4 kHz	8 kHz	4 kHz	8 kHz	4 kHz	8 kHz	
U _{in}	P		I _{max}	I _{max}	I _{max}	I _{max}	I _{max}	I _{max}	
[V]	[kW]		[m]	[m]	[m]	[m]	[m]	[m]	
400	18.5	E84AV□□□1834□□□	25	25	50		100	100	
	22.0	E84AV□□□2234□□□							
	30.0	E84AV□□□3034□□□							
	37.0	E84AV□□□3734□□□							
	45.0	E84AV□□□4534□□□							
500	0.37	E84AV□□□3714□□□			50	25		100	25
	0.55	E84AV□□□5514□□□							
	0.75	E84AV□□□7514□□□							
	1.10	E84AV□□□1124□□□							
	1.50	E84AV□□□1524□□□							
	2.20	E84AV□□□2224□□□							
	3.00	E84AV□□□3024□□□							
	4.00	E84AV□□□4024□□□							
	5.50	E84AV□□□5524□□□				50			50
	7.50	E84AV□□□7524□□□							
	11.0	E84AV□□□1134□□□							
	15.0	E84AV□□□1534□□□							
	18.5	E84AV□□□1834□□□							100
	22.0	E84AV□□□2234□□□							
	30.0	E84AV□□□3034□□□							
	37.0	E84AV□□□3734□□□							
	45.0	E84AV□□□4534□□□							



Motor connection

Operation with earth-leakage circuit breaker

If the inverter is connected via an earth-leakage circuit breaker, the following cable lengths are permissible, although the table must also be taken into account:

Earth-leakage circuit breaker 30 mA:

- 0.25 ... 2.2 kW to 25 m shielded motor cable with integrated RFI measures
- 0.25 ... 15 kW to 25 m shielded motor cable with RFI filter SD.

Earth-leakage circuit breaker 300 mA:

- 0.25 to 45 kW up to 25 m shielded motor cable with integrated RFI measures
- 0.25 to 45 kW up to 50 m shielded motor cable with RFI filter LD.

- ▶ When RFI filters SD are used, C1 can be complied with in a conducted manner (a shielded motor cable up to 25 m).
- ▶ In case of 0.25 ... 2.2 kW (230 V) with RFI filter LL, C1 and a fault current <3.5 mA can be realised (a shielded motor cable of up to 5 m).

Connection diagrams

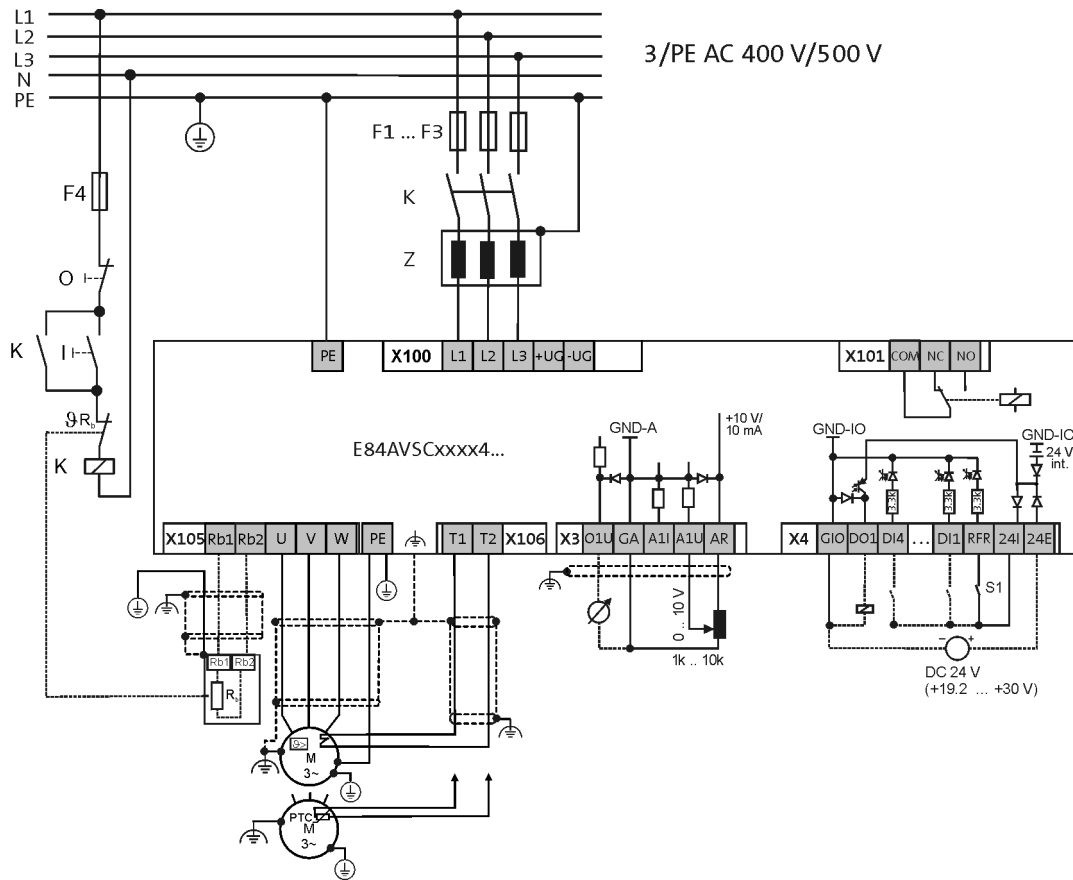
Wiring example for connecting Inverter Drives 8400 StateLine to 1 x 230V

Lenze | V10-en_GB-10/2021



Connection diagrams

Wiring example for connecting Inverter Drives 8400 StateLine to 3 x 400V





Control connections

Mode	8400 StateLine
Analog inputs	
Number	1 Optional: voltage or current input
Resolution	10 bits
Value range	0 ... +/- 10V, 0/4 ... 20 mA
Analog outputs	
Number	1
Resolution	10 bits
Value range	0 ... 10V
Digital inputs	
Number	5
Switching level	PLC (IEC 61131-2)
Max. input current	11mA
Function	2 inputs, can optionally be used as a frequency input (10 kHz, 2-track)
Digital outputs	
Number	1
Switching level	PLC (IEC 61131-2)
Max. output current	50mA
Relay	
Number	1
Contact	Changeover contact
AC connection	250V, 3A
DC connection	24V, 2A ... 240V, 0.16A
External DC supply	
Rated voltage ¹⁾	24 V
Interfaces	
CANopen	Integrated functional insulated Max. baud rate 1000 kbps DIP switch for address, baud rate, bus termination
Extensions	optional communication module
Safety engineering	Optional Safe torque off (STO)
Drive interface	
Encoder input	Via 2 digital inputs: HTL, 2-track, 10 kHz

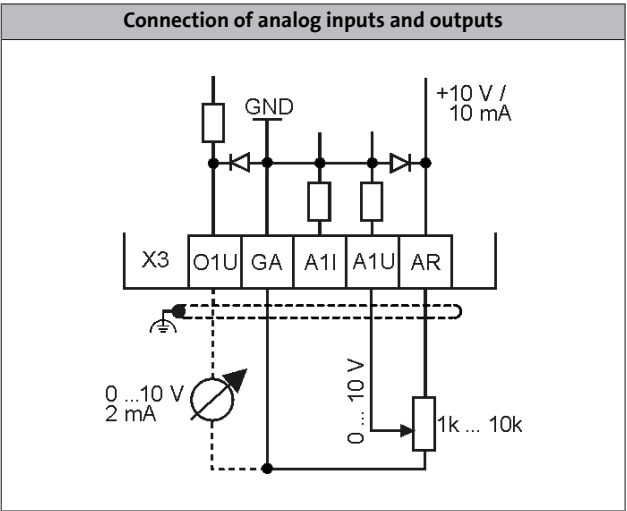
¹⁾ For mains-independent control electronics supply

Inverter Drives 8400 StateLine

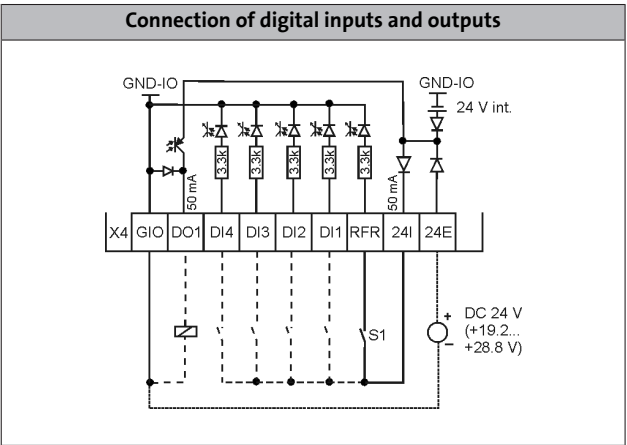
Interfaces



Control connections



4.7



Inverter Drives 8400 StateLine

Interfaces



Memory module

All drive settings for the 8400 are stored on the memory module, which is a pluggable memory chip. The memory module ensures that drives can be replaced quickly and without errors being made.

Mode	Features	Product key
Memory module	- For 8400 StateLine, HighLine, Topline and protec - Packaging unit: 5 items	E84AYM10S/M

- Each inverter is equipped with a memory module in the factory

Safety system (STO)

The 8400 StateLine, HighLine and TopLine models are optionally available with "STO safe torque off" safety engineering. This helps reduce control system costs, save space in the control cabinet and keep wiring to a minimum. The safety engineering is certified to EN ISO 13849-1 (Cat. 4, PL e), EN 61508/EN 62061 (SIL 3).

The inverters can optionally be ordered with integrated safety engineering (STO). In this case, the product key of the inverter has a "B" as the 14th character.

For example, a StateLine 230 V, 0.55 kW built-in unit with safety engineering would be: E84AVSCE5512SB0



4.7

8400 StateLine with safety engineering

Inverter Drives 8400 StateLine

Interfaces



EtherCAT® communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherCAT® communication module

Mode		Features	Slot	Product key
Communication module				
EtherCAT		• Distributed clock • 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Connection option for separate 24 V supply	MCI	E84AYCETV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-in EtherCAT® communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ETXXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCETV/S
Mode			EtherCAT
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherCAT® communication module

Rated data

Product key			E84AYCETV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			CoE (CANopen over EtherCAT)
Baud rate			
	b	[MBit/s]	100
Node			
			Slave
Network topology			
			Line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			Max. 65535
Max. cable length			
between two nodes	$l_{\max}$	[m]	100



EtherNet/IP communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



EtherNet/IP communication module

Mode		Features	Slot	Product key
Communication module				
EtherNet/IP		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • Address can be set via 2 rotary DIP switches • TCP/IP channel • ODVA certification (Open Device Vendor Association) • Supported assembly object instances as per ODVA: 20, 21, 22, 23 and 70, 71, 72, 73 • Manufacturer-specific supported assembly object instances (custom): 110 and 111 • Connection option for separate 24 V supply	MCI	E84AYCEOV/S

4.7

- The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-EOXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCEOV/S
Mode			
Communication module			EtherNet/IP
Degree of protection			
EN 60529			IP20
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



EtherNet/IP communication module

Rated data

Product key			E84AYCEOV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 / EN50173
Communication profile			EtherNET/IP, AC Drive
Baud rate			
	b	[MBit/s]	10/100 (full duplex/half duplex)
Node			
			Slave (Adapter)
Network topology			
			Tree, star and line
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 254 im Subnetz
Max. cable length			
between two nodes	$l_{\max}$	[m]	100

Inverter Drives 8400 StateLine

Interfaces



Ethernet POWERLINK communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



POWERLINK communication module

Mode		Features	Slot	Product key
Communication module				
Ethernet POWERLINK CN		• Sync mode, Multiplex mode • 5 LEDs for status display • 2 x RJ45 connections with LEDs for link and collision • Address can be set via 2 rotary DIP switches • Connection option for separate 24 V supply	MCI	E84AYCECV/S

- The Inverter Drives 8400 can be ordered with a plug-in POWERLINK communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ECXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCECV/S
Mode			Ethernet POWERLINK CN
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



Ethernet POWERLINK communication module

Rated data

Product key			E84AYCECV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			EPL2.0
Baud rate			
	b	[MBit/s]	100
Node			
			Controlled node (CN)
Network topology			
			Tree, star and line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Number of bus nodes			
			max. 239
Max. cable length			
between two nodes	l_{max}	[m]	100



PROFIBUS communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFIBUS communication module

Mode		Features	Slot	Product key
Communication module				
PROFIBUS		• 5 LEDs for status display • Sub-D connection • Address can be set via DIP switch	MCI	E84AYCPMV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-in PROFIBUS communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-PMXXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			
			E84AYCPMV/S
Mode			PROFIBUS
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFIBUS communication module

Rated data

Product key			E84AYCPMV/S
Communication			
Medium			RS 485
Communication profile			PROFIBUS-DP-V1 PROFIBUS-DP-V0
Device profile			PROFIDrive, version 3
Baud rate			
	b	[kBit/s]	9.6 ... 12 000 (automatic detection)
Node			
			Slave
Network topology			
			Line with repeater: Line or tree without repeater:
Process data words (PCD)			
16 Bit			1 ... 16
DP user data length			
			Optional parameter channel (4 words) + process data words
Number of bus nodes			
			31 slaves + 1 master per bus segment With repeaters: 125
Max. cable length			
per bus segment	$I_{\max}$	[m]	1200 (depending on the baud rate and the cable type used)

Inverter Drives 8400 StateLine

Interfaces



PROFINET communication module

A communication module is used to connect the 8400 StateLine, HighLine or TopLine to a bus system.



PROFINET communication module

Mode		Features	Slot	Product key
Communication module				
PROFINET		• 5 LEDs for status display • 2 RJ45 connections with LEDs for link and activity • TCP/IP channel • Connection option for separate 24 V supply	MCI	E84AYCERV/S

- ▶ The Inverter Drives 8400 can be ordered with a plug-on PROFINET communication module already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-ER-XXX
- ▶ The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

Standards and operating conditions

Product key			E84AYCERV/S
Mode			PROFINET
Communication module			
Degree of protection			IP20
EN 60529			
Climatic conditions			
Storage (EN 60721-3-1)			1K3 (temperature: -25 °C ... +60 °C)
Transport (EN 60721-3-2)			2K3 (temperature: -25 °C ... +70 °C)
Operation (EN 60721-3-3)			3K3 (temperature: -10°C ... +55 °C)
Insulation voltage to reference earth/PE			
EN 61800-5-1	U _{AC}	[V]	50.0



PROFINET communication module

Rated data

Product key			E84AYCERV/S
Communication			
Medium			CAT5e S/FTP according to ISO/ICE11801 (2002)
Communication profile			PROFINET RT Conf. Class B
Baud rate			
	b	[MBit/s]	100
Node			
			Slave (Device)
Network topology			
			Line
Number of logical process data channels			
			1
Process data words (PCD)			
16 Bit			1 ... 16
Max. cable length			
between two nodes	$l_{\max}$	[m]	100





Brake resistors

An external brake resistor is required to brake high moments of inertia or in the event of prolonged operation in generator mode; this resistor converts braking energy into heat.

The brake resistors recommended in the table below have been dimensioned for approx. 1.5 times the regenerative power, with a cycle time of 15/135 s (brake/rest ratio). These brake resistors generally meet the usual requirements of standard applications.

The brake resistors are fitted with a thermostat (potential-free NC contact).



ERBM... (IP50) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KWs]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	ERBM180R050W	180.0	0.050	7.50	175 x 20.6 x 40	0.3
0.37		E84AV□□□3712□□□						
0.55		E84AV□□□5512□□□	ERBM100R100W	100.0	0.10	15.0	240 x 80 x 95	0.5
0.75		E84AV□□□7512□□□						
1.10		E84AV□□□1122□□□	ERBP033R200W	33.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1522□□□						
2.20		E84AV□□□2222□□□	ERBP033R300W		0.30	45.0	320 x 41 x 122	1.4
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	ERBM390R100W	390.0	0.10	15.0	235 x 20.6 x 40	0.4
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□	ERBP180R200W	180.0	0.20	30.0	240 x 41 x 122	1.0
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□	ERBP180R300W		0.30	45.0	320 x 41 x 122	1.4



Brake resistors

For standard applications, we recommend the following combinations:

E84AV□□□3024□□□ and ERBP082R200W
 E84AV□□□4024□□□ and ERBS047R400W
 E84AV□□□5524□□□ and ERBS047R800W
 E84AV□□□7524□□□ and ERBS027R01K2
 E84AV□□□1134□□□ and ERBS027R01K2
 E84AV□□□1534□□□ and ERBS018R01K4
 E84AV□□□1834□□□ and ERBS015R02K4
 E84AV□□□2234□□□ and ERBS015R02K4.



Other possible combinations:

ERBP...(IP21) and ERBS...(IP65) brake resistor

Typical motor power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
4-pole asynchronous motor		Inverter	Brake resistor					
P	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KWs]	[mm]	[kg]
3.00	3 AC 320...550	E84AV□□□3024□□□	ERBP082R200W	82.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS082R780W		0.78	117	666 x 124 x 122	4.0
4.00		E84AV□□□4024□□□	ERBS047R400W	47.0	0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
5.50		E84AV□□□5524□□□	ERBS047R400W		0.40	60.0	400 x 110 x 105	2.3
			ERBS047R800W		0.80	120	710 x 110 x 105	3.9
7.50		E84AV□□□7524□□□	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
11.0		E84AV□□□1134□□□	ERBP027R200W		0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
15.0		E84AV□□□1534□□□	ERBS018R800W	18.0	0.80	120	710 x 110 x 105	3.9
			ERBS018R01K4		1.40	210	1110 x 110 x 105	6.2
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0
18.5		E84AV□□□1834□□□	ERBS015R800W	15.0	0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
22.0		E84AV□□□2234□□□	ERBS015R800W		0.80	120	710 x 110 x 105	3.9
			ERBS015R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS015R02K4		2.40	420	1020 x 200 x 105	10.0
30.0		E84AV□□□3034□□□	ERBG075D01K9	7.5	1.90	285	486 x 236 x 302	9.5
37.0		E84AV□□□3734□□□						
45.0		E84AV□□□4534□□□						

Inverter Drives 8400 StateLine

Accessories



Mains chokes

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains choke			
P	U_{AC}			I_N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	ELN1-0500H009	9.00	75 x 66 x 82	1.1
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	ELN1-0250H018	18.0	96 x 96 x 90	2.1
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	56 x 77 x 100	0.5
0.55		E84AV□□□5514□□□	EZAELN3004B742	4.00	60 x 95 x 115	1.3
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	EZAELN3008B372	8.00	85 x 120 x 140	1.9
4.00		E84AV□□□4024□□□	EZAELN3010B292	10.0		2.0
5.50		E84AV□□□5524□□□	EZAELN3016B182	16.0	95 x 120 x 140	2.7
7.50		E84AV□□□7524□□□	EZAELN3020B152	20.0	95 x 155 x 165	3.8
11.0		E84AV□□□1134□□□	EZAELN3025B122	25.0	110 x 155 x 170	5.8
15.0		E84AV□□□1534□□□ ¹⁾	EZAELN3035B841	35.0		6.0
18.5		E84AV□□□1834□□□	EZAELN3045B651	45.0	112 x 185 x 200	8.3
22.0		E84AV□□□2234□□□ ¹⁾	EZAELN3050B591	50.0	112 x 185 x 210	8.4
30.0		E84AV□□□3034□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7
37.0		E84AV□□□3734□□□ ¹⁾	EZAELN3080B371	80.0	125 x 210 x 240	12.5
45.0		E84AV□□□4534□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5

¹⁾ Operation only permitted with mains choke

- On some inverters, a mains filter (combination of RFI filter and mains choke) can be used in place of a mains choke. Information on this can be found in the "Interference suppression" section.

Inverter Drives 8400 StateLine

Accessories



Mains chokes

Operation with increased power output



Mains choke

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains choke			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	ELN1-0900H005	5.00	75 x 66 x 82	1.1
0.55		E84AV□□□3712□□□ ¹⁾				
0.75		E84AV□□□5512□□□	ELN1-0500H009	9.00		
1.10		E84AV□□□7512□□□ ¹⁾				
1.50		E84AV□□□1122□□□	ELN1-0250H018	18.0	96 x 96 x 90	2.1
2.20		E84AV□□□1522□□□ ¹⁾				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZAELN3002B153	2.00	56 x 77 x 100	0.5
0.75		E84AV□□□5514□□□	EZAELN3004B742	4.00	60 x 95 x 115	1.3
1.10		E84AV□□□7514□□□ ¹⁾				
1.50		E84AV□□□1124□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□ ¹⁾	EZAELN3008B372	8.00	85 x 120 x 140	1.9
4.00		E84AV□□□3024□□□ ¹⁾	EZAELN3010B292	10.0		
		E84AV□□□3024□□□0				
5.50		E84AV□□□4024□□□	EZAELN3016B182	16.0	95 x 120 x 140	2.7
7.50		E84AV□□□5524□□□ ¹⁾	EZAELN3020B152	20.0	95 x 155 x 165	3.8
11.0		E84AV□□□7524□□□	EZAELN3025B122	25.0	110 x 155 x 170	5.8
15.0		E84AV□□□1134□□□ ¹⁾	EZAELN3030B982	30.0	110 x 155 x 167	5.9
22.0		E84AV□□□1834□□□ ¹⁾	EZAELN3045B651	45.0	112 x 185 x 200	8.3
30.0		E84AV□□□2234□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7
37.0		E84AV□□□3034□□□ ¹⁾	EZAELN3080B371	80.0	125 x 210 x 240	12.5
45.0		E84AV□□□3734□□□ ¹⁾	EZAELN3090B331	90.0	115 x 267 x 205	11.5
55.0		E84AV□□□4534□□□ ¹⁾	EZAELN3100B301	100	139 x 267 x 205	16.5

¹⁾ Operation only permitted with mains choke



Interference suppression

RFI and mains filters are used to ensure compliance with the EMC requirements of European Standard EN 61800-3. This standard defines the EMC requirements for electrical drive system in various categories. **Category C1** applies to public networks (residential areas). Category C1 corresponds to Class B with regard to the limit values of Class B in line with EN 55011. **Category C2** is applicable in industrial premises; use in residential areas is left to the user's discretion. With regard to limit values, Category C2 corresponds to Class A according to EN 55011.



RFI filters

When working with stricter line-bound noise emission requirements, which cannot be met using the radio interference suppression measures integrated in the inverter (C2 up to 25 m shielded motor cable), external filters can be used. The filters can be installed below or next to the inverters.

Available RFI and mains filters

Mode				
Filter	RFI filter LL (Low Leakage) E84AZESR□□□□LL	RFI filter SD (Short Distance) E84AZESR□□□□SD	RFI filter LD (Long Distance) E84AZESR□□□□LD	Mains filter LD (Long Distance) I0FAE□□□F100D000□S
Category C1	Up to 5 m shielded motor cable ¹⁾	Up to 25 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾	Up to 50 m shielded motor cable ¹⁾
Category C2		Up to 50 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾	Up to 100 m shielded motor cable ¹⁾
Power range	0.25 to 2.2 kW, 230 V	0.25 to 15 kW	0.25 to 18.5 kW	22 to 45 kW
Features	For installation in mobile systems, leakage current < 3.5 mA (up to 5 m shielded motor cable)	Optimised for low leakage current.	0,25 up to 15 kW: 50 - 100 m at max. 40 °C ambient temperature and max. 4 kHz switching frequency.	Combination of mains choke and RFI filter.

¹⁾   37 - Details on maximum motor cable lengths.

Inverter Drives 8400 StateLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□	E84AZESR3024SD	9.80	306 x 140 x 60	1.5
		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
11.0		E84AV□□□1134□□□				
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 StateLine

Accessories



Interference suppression

Operation at rated power

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8
0.37		E84AV□□□3712□□□				
0.55		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0
0.75		E84AV□□□7512□□□				
1.10		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6
1.50		E84AV□□□1522□□□				
2.20		E84AV□□□2222□□□				
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514LD	3.30	262 x 70 x 60	1.1
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□S	E84AZESR3024LD	9.80	306 x 140 x 60	1.3
		E84AV□□□3024□□0				
4.00		E84AV□□□4024□□□	E84AZESR5524LD	18.0	306 x 140 x 60	2.4
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3
11.0		E84AV□□□1134□□□				
15.0		E84AV□□□1534□□□				
18.5		E84AV□□□1834□□□	I0FAE318F100D0000S	50.4	436 x 205 x 90	7.1

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□2234□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□3034□□□	I0FAE330F100D0000S	55.0	590 x 250 x 105	23.0
37.0		E84AV□□□3734□□□	I0FAE337F100D0000S	69.0		25.0
45.0		E84AV□□□4534□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0

Inverter Drives 8400 StateLine

Accessories



Interference suppression

Operation with increased power output

► RFI filter LL (Low Leakage)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LL	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LL	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LL	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				

► RFI filter SD (Short Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712SD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512SD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222SD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514SD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024SD	9.80	317 x 70 x 60	1.5
		E84AV□□□3024□□0				
5.50		E84AV□□□4024□□□	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
15.0		E84AV□□□1134□□□				



Interference suppression

Operation with increased power output

► RFI filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	RFI filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
0.37	1 AC 180 ... 264	E84AV□□□2512□□□	E84AZESR3712LD	5.00	212 x 70 x 60	0.8
0.55		E84AV□□□3712□□□				
0.75		E84AV□□□5512□□□	E84AZESR7512LD	9.00	262 x 70 x 60	1.0
1.10		E84AV□□□7512□□□				
1.50		E84AV□□□1122□□□	E84AZESR2222LD	22.0	317 x 70 x 60	1.6
2.20		E84AV□□□1522□□□				
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	E84AZESR7514LD	3.30	262 x 70 x 60	1.1
0.75		E84AV□□□5514□□□				
1.10		E84AV□□□7514□□□				
1.50		E84AV□□□1124□□□	E84AZESR2224LD	7.30	317 x 70 x 60	1.2
2.20		E84AV□□□1524□□□				
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR3024LD	9.80		1.3
5.50		E84AV□□□3024□□0	E84AZESR5524LD	18.0	306 x 140 x 60	2.4
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3
15.0		E84AV□□□1134□□□				

► Mains filter LD (Long Distance)

Typical motor power	Mains voltage	Product key		Rated current	Dimensions	Mass
4-pole asynchronous motor		Inverter	Mains filter			
P	U _{AC}			I _N	h x b x t	m
[kW]	[V]			[A]	[mm]	[kg]
22.0	3 AC 320 ... 550	E84AV□□□1834□□□	I0FAE322F100D0000S	43.0	436 x 205 x 90	14.0
30.0		E84AV□□□2234□□□	I0FAE322F100D0001S	55.0	365 x 205 x 90	18.5
37.0		E84AV□□□3034□□□	I0FAE337F100D0000S	69.0	590 x 250 x 105	25.0
45.0		E84AV□□□3734□□□	I0FAE345F100D0001S	100	519 x 250 x 105	32.0
55.0		E84AV□□□4534□□□				

Inverter Drives 8400 StateLine

Accessories



Sinusoidal filters

A sinusoidal filter in the motor cable limits the rate of voltage rise and the capacitive charge/discharge currents that occur during inverter operation.

Application range:

- Only use a sinusoidal filter with standard asynchronous motors of 0 ... 550 V
- Operation only with V/f or V/f² characteristic control
- Set the switching frequency permanently to the specified value
- Limit the output frequency of the Inverter Drives 8400 to the specified value



Sinusoidal filters

Operation at rated power

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass
4-pole asynchronous motor		Inverter	Sinusoidal filter			
P	U _{AC}			L _N	f _{ch}	m
[kW]	[V]			[mH]	[kHz]	[kg]
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-004A200	11.0	4 8	4.0
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□	EZS3-010A200	5.10		5.5
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EZS3-017A200	3.07		8.5
5.50		E84AV□□□5524□□□				
7.50		E84AV□□□7524□□□	EZS3-024A200	2.50		14.5
11.0		E84AV□□□1134□□□	EZS3-032A200	2.00		19.0
15.0		E84AV□□□1534□□□	EZS3-037A200	1.70		21.0
18.5		E84AV□□□1834□□□	EZS3-048A200	1.20		25.5
22.0		E84AV□□□2234□□□	EZS3-061A200	1.00		33.5
30.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0
37.0		E84AV□□□3734□□□	EZS3-090A200	0.80		53.0
45.0		E84AV□□□4534□□□	EZS3-115A200	0.70	2 4	66.0

Inverter Drives 8400 StateLine

Accessories



Sinusoidal filters

Operation with increased power output

Typical motor power	Mains voltage	Product key		Rated inductance	Switching frequency	Mass	
4-pole asynchronous motor		Inverter	Sinusoidal filter				
P	U _{AC}			L _N	f _{ch}	m	
[kW]	[V]			[mH]	[kHz]	[kg]	
0.55	3 AC 320 ... 550	E84AV□□□3714□□□	EZS3-010A200	5.10	4 8	5.5	
0.75		E84AV□□□5514□□□					
1.10		E84AV□□□7514□□□					
1.50		E84AV□□□1124□□□					
2.20		E84AV□□□1524□□□					
3.00		E84AV□□□2224□□□	EZS3-017A200	3.07		8.5	
4.00		E84AV□□□3024□□□					
5.50		E84AV□□□4024□□□					
7.50		E84AV□□□5524□□□	EZS3-024A200	2.50		14.5	
11.0		E84AV□□□7524□□□					
15.0		E84AV□□□1134□□□	EZS3-037A200	1.70		21.0	
22.0		E84AV□□□1834□□□	EZS3-061A200	1.00		33.5	
30.0		E84AV□□□2234□□□					
37.0		E84AV□□□3034□□□	EZS3-072A200	0.95		37.0	
45.0		E84AV□□□3734□□□	EZS3-090A200	0.80		53.0	
55.0		E84AV□□□4534□□□	EZS3-115A200	0.70		2 4	66.0

Inverter Drives 8400 StateLine

Accessories



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0%, 45 Hz-0% ... 65 Hz+0%			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	8.0	29.0	82.0	200.0
Rated DC-bus current						
	$I_{N, DC}$	[A]	10.0	36.0	100.0	245.0

Data for 60 s overload

4.7

Max. DC-bus current						
	I_{max}	[A]	15.0	54.0	150.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			120.0			
	t_{ol}	[s]				
Recovery time			60.0			
	t_{re}	[s]				
Max. output power¹⁾						
	$P_{max, 1}$	[kW]	7.4	26.3	72.9	179.0

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	40.0	108.0	200.0	368.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	7.5	27.0	75.0	183.5
Overload time			0.5			
	t_{ol}	[s]				
Recovery time			4.5			
	t_{re}	[s]				
Max. short-term output power¹⁾						
	$P_{max, 2}$	[kW]	19.6	52.5	146.0	357.0

¹⁾ Mains filter required; if no mains filter is installed, the stated values for P_{max} decrease



Rated data for power supply modules

► The data is valid for operation at 3/PE AC 400 V.

						
Product key						
Power supply module			E94APNE0104	E94APNE0364	E94APNE1004	E94APNE2454
Rated power						
With mains filter/mains choke	P_N	[kW]	4.90	17.5	48.6	119
Without mains filter/mains choke	P_N	[kW]	3.60	13.0	36.2	88.6
Rated DC-bus current						
	$I_{N,DC}$	[A]	10.0	36.0	100.0	245.0
Power loss						
	P_V	[kW]	0.055	0.110	0.230	0.550
Dimensions						
Height	h	[mm]	350		383	
Height, including fastening	h	[mm]	481		510	
Width	b	[mm]	60	120	210	390
Depth	t	[mm]	288			
Mass						
	m	[kg]	2.6	5.3	13.5	28.5

4.7

Brake chopper rated data

Rated power, Brake chopper						
	P_N	[kW]	2.6	8.7	17.0	30.3
Max. output power, Brake chopper						
	$P_{max,1}$	[kW]	19.5	43.8	105.1	187.7
Running time						
	t_{on}	[s]	1.0			
Recovery time						
	t_{re}	[s]	3.8	2.5	3.1	
Min. brake resistance						
	R_{min}	[Ω]	27.0	12.0	5.0	2.8



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key			E94ARNE0134		E94ARNE0244	
Supply- / regenerative module						
Operating mode			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Mains voltage range			3/PE AC 340 V-0% ... 528 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
	U_{AC}	[V]				
Rated mains current						
	$I_{N, AC}$	[A]	26.0	13.0	47.0	23.5
Rated DC-bus current						
	$I_{N, DC}$	[A]	32.0	16.0	57.0	29.0

4.7

Data for 60 s overload

Max. DC-bus current						
	I_{max}	[A]	48.0	24.0	86.0	44.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Overload time			60.0			
	t_{ol}	[s]				
Recovery time			120.0			
	t_{re}	[s]				
Max. output power						
	$P_{max, 1}$	[kW]	22.4	11.2	40.5	20.2

Data for 0.5 s overload

Max. short-time DC-bus current						
	I_{max}	[A]	96.0	48.0	171.0	87.0
Reduced DC-bus current						
	$I_{red, DC}$	[A]	20.0	9.8	35.0	18.0
Max. short-term output power						
	$P_{max, 2}$	[kW]	44.9	22.4	81.1	40.5
with brake chopper support	$P_{max, 2}$	[kW]		35.1		59.6



Rated data for regenerative power supply modules

- The data is valid for operation at 3/PE AC 400 V.
- Mains filter required, please refer to the following pages

						
Product key						
Supply- / regenerative module			E94ARNE0134		E94ARNE0244	
Operating mode						
			Feed	Feedback	Feed	Feedback
Rated power						
With mains filter/mains choke	P_N	[kW]	15.0	7.50	27.0	13.5
Rated DC-bus current						
	$I_{N,DC}$	[A]	32.0	16.0	57.0	29.0
Power loss						
	P_V	[kW]	0.150	0.110	0.230	0.190
Dimensions						
Height	h	[mm]			350	
Height, including fastening	h	[mm]			481	
Width	b	[mm]			120	
Depth	t	[mm]			288	
Mass						
	m	[kg]			6.0	

4.7

Brake chopper rated data

Rated power, Brake chopper				
	P_N	[kW]	4.7	9.3
Max. output power, Brake chopper				
	$P_{max,1}$	[kW]	19.5	29.2
Running time				
	t_{on}	[s]	1.0	
Recovery time				
	t_{re}	[s]	4.2	3.9
Min. brake resistance				
	R_{min}	[Ω]	27.0	18.0



Control connections

Mode	Power supply modules	Regenerative power supply modules
Analog inputs		
Number		2
Resolution		11 bits + sign
Value range		+/- 10V 1 x switchable 20 mA
Analog outputs		
Number		2
Resolution		10 bits + sign
Value range		+/- 10V max. 2 mA
Digital inputs		
Number	1 Permanently configured	8
Switching level	PLC (IEC 61131-2)	
Max. input current	8 mA	
Digital outputs		
Number	4 fest konfiguriert	4
Switching level	PLC (IEC 61131-2)	
Max. output current	50 mA per output	
Load capacity	>480 Ω at 24 V	
External DC supply		
Rated voltage	24 V in accordance with IEC 61131-2	
Voltage range	19.2 ... 28.8 V, max. residual ripple ± 5%	
Current	Approx. 1.4 A during operation, max. 4 A starting current for 100 ms	Approx. 1.2 A during operation, max. 3 A starting current for 100 ms ¹⁾
Interfaces		
CANopen		Integrated
Extensions		Via slot MXI 2: extension 2 Via slot MXI 1: extension 1
State bus		Integrated
Memory		Slot MMI
Safety engineering		Slot MSI
Drive interface		
Resolver input		Integrated (no function)
Mains synchronisation input		Integrated Sub-D, 15-pin

¹⁾ The supply to the control electronics comes from the mains voltage. Alternatively, it can be provided by a 24 V supply that is independent of the mains (available as an option).



Brake resistors of the regenerative power supply modules

Assignment of brake resistors to the supply and regenerative power supply modules is shown in the tables below.



Brake resistor 27 ohms

Brake resistors for power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
Without mains filter/mains choke		Power supply module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
3.60	3 AC 340 ... 528 ¹⁾	E94APNE0104	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
13.0		E94APNE0364	ERBG012R01K9	12.0	1.90	285	486 x 236 x 302	13.0
			ERBG012R05K2		5.20	750	486 x 426 x 302	28.0
36.2		E94APNE1004	ERBG005R02K6	5.0	2.60	390	486 x 326 x 302	12.6
88.6		E94APNE2454	ERBG028D04K1	2.8	4.10	615	486 x 426 x 302	12.8

¹⁾ For 230 V mains voltage a different brake resistor assignment applies.

Brake resistors for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated resistance	Rated power	Thermal capacity	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Brake resistor					
P _N	U _{AC}			R _N	P _N	C _{th}	h x b x t	m
[kW]	[V]			[Ω]	[kW]	[KW _s]	[mm]	[kg]
15.0	3 AC 340 ... 528 ¹⁾	E94ARNE0134	ERBP027R200W	27.0	0.20	30.0	320 x 41 x 122	1.0
			ERBS027R600W		0.60	90.0	550 x 110 x 105	3.1
			ERBS027R01K2		1.20	180	1020 x 110 x 105	5.6
27.0		E94ARNE0244	ERBP018R300W	18.0	0.30	30.0	240 x 41 x 122	1.4
			ERBS018R01K2		1.20	180	1020 x 110 x 105	5.6
			ERBS018R02K8		2.80	420	1110 x 200 x 105	12.0

²⁾ For 230 V mains voltage a different brake resistor assignment applies.



Mains chokes of the power supply modules

A mains choke is an inductive resistor which is connected in the mains cable of the power supply module. The use of a mains choke provides the following advantages:

- **Fewer effects on the mains:**
The wave form of the mains current is a close approximation to a sine wave.
- **Reduction in the effective mains current:**
Reduction of mains, cable and fuse loads

Mains chokes can be used without restrictions in conjunction with RFI filters and/or sinusoidal filters.

Please note:

: The use of a mains choke slightly reduces the mains voltage at the input of the inverter - the typical voltage drop across the mains choke at the rated values is around 4%.



Mains choke

Rated power	Mains voltage	Product key		Rated current	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains choke			
P_N	U_{AC}			I_N	$h \times b \times t$	m
[kW]	[V]			[A]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	EZAELN3008B372	8.00	85 x 120 x 140	1.9
17.5		E94APNE0364	EZAELN3030B982	30.0	110 x 155 x 167	5.9
48.6		E94APNE1004	EZAELN3080B371	80.0	125 x 210 x 240	12.5
119		E94APNE2454	EZAELN3200B151	200	352 x 144 x 264	32.0



Interference suppression of the regenerative power supply modules

RFI filters and mains filters enable compliance with the interference voltage categories of the European standard EN 61800-3. There a distinction is drawn between category C1 and category C2.

Category C1 describes the use on public supply networks.

Category C2 describes the use of drives which are intended to be used for industrial purposes in areas also comprising residential areas.

For Multi Drives external filters must be used to comply with the EMC Directive.



RFI filter, can be mounted beside the power supply module

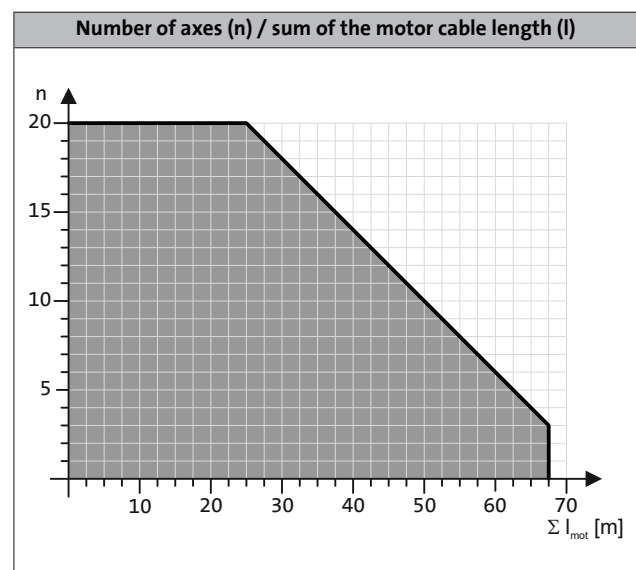
RFI filters

RFI filters are primarily capacitive accessory components which can be connected directly upstream from the power supply modules. This measure enables compliance with the corresponding conducted noise emission requirements according to EN 61800-3.

Rated power	Mains voltage	Product key		Rated current	Power loss	Max. cable length	Dimensions	Mass
Without mains filter/mains choke		Power supply module	RFI filter			Reference group C2		
P_N	U_{AC}			I_N	P_V	l_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[kW]	[m]	[mm]	[kg]
3.60	3 AC 340 ... 528	E94APNE0104	E94AZRP0084	8.00	0.020	6 axes of 10 m each	485 x 60 x 261	4.2
13.0		E94APNE0364	E94AZRP0294	29.0	0.050			4.5
36.2		E94APNE1004	E94AZRP0824	82.0	0.080		490 x 209 x 272	18.5
88.6		E94APNE2454	E94AZRP2004	200	0.150			20.5

4.7

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.





Interference suppression of the regenerative power supply modules

Mains filters

A mains filter is a combination of mains choke and RFI filter in a single housing. It reduces line-bound noise emission into the mains, thus ensuring that the line-bound interference voltage is reduced to a permissible level according to EN61800-3.



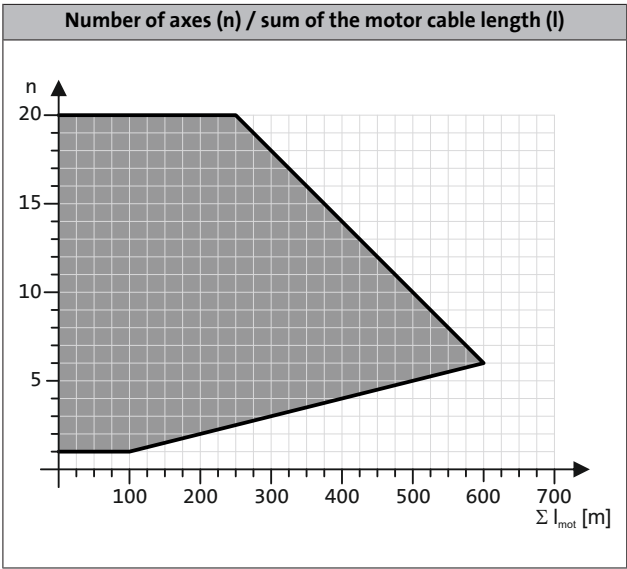
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

RFI filters

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Power supply module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
4.90	3 AC 340 ... 528	E94APNE0104	E94AZMP0084	8.00	10.0	10 axes of 50 m each	485 x 90 x 261	8.6
17.5		E94APNE0364	E94AZMP0294	29.0	7.3		485 x 120 x 261	16.5
48.6		E94APNE1004	E94AZMP0824 ¹⁾	82.0	6.4		490 x 270 x 272	29.0
119		E94APNE2454	E94AZMP2004 ¹⁾	200	6.3		490 x 330 x 272	52.0

¹⁾ External 24 V supply from a safely separated power supply unit (SELV/PELV) required for integrated fan.

The following diagram shows the possible number of axes and the possible sum of motor cable lengths to ensure compliance with interference suppression according to category C2.





Interference suppression of the regenerative power supply modules

Mains filters for regenerative power supply modules

Rated power	Mains voltage	Product key		Rated current	Voltage drop	Max. cable length	Dimensions	Mass
With mains filter/mains choke		Supply- / regenerative module	Mains filter			Reference group C2		
P_N	U_{AC}			I_N	U	I_{max}	$h \times b \times t$	m
[kW]	[V]			[A]	[V]	[m]	[mm]	[kg]
15.0	3 AC 340 ... 528	E94ARNE0134	E94AZMR0264SDB ¹⁾	26.0	6.3	6 axes of 10 m each	485 x 149 x 272	25.0
			E94AZMR0264LDB ¹⁾			10 axes of 50 m each		26.0
27.0		E94ARNE0244	E94AZMR0474SDB ¹⁾	47.0	6.2	6 axes of 10 m each	485 x 209 x 272	36.0
			E94AZMR0474LDB ¹⁾			10 axes of 50 m each		37.0

¹⁾ External 24 V supply through safely separated power supply unit (SELV/PELV) required for integrated mains voltage recording.



DC input module

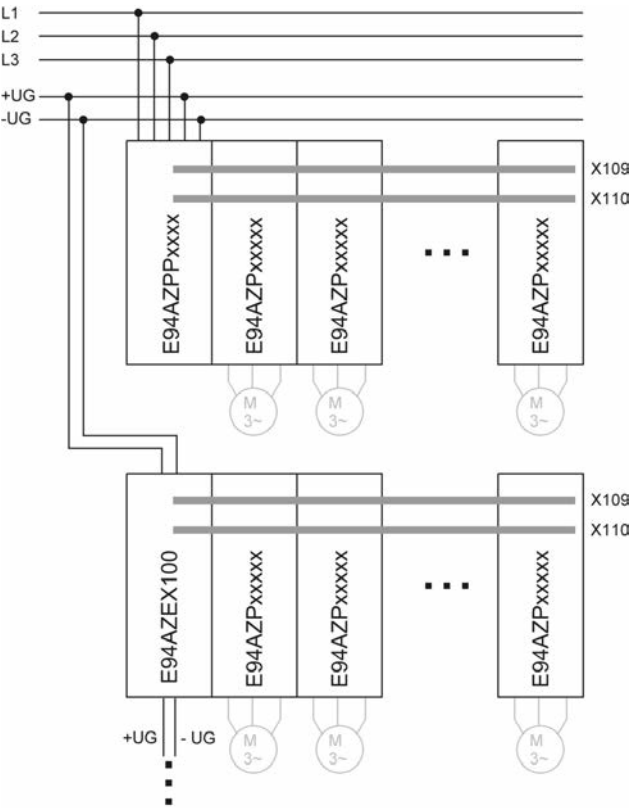
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied via a central DC power supply unit. The rated current of the DC input module is defined to be 100 A (DC). The DC input module can be connected at the top or bottom, offering great flexibility with regard to integration into the system wiring. This provides an ideal way of connecting multi-row axis modules in particular.



DC input module
100 A

Mode	Product key	Dimensions	Mass
	Input module		
		h x b x t	m
		[mm]	[kg]
DC input module 100 A	E94AZEX100	422 x 60 x 95	0.9

4.7



Wiring example for multi-row mounting of axis modules



DC-bus connection

The Inverter Drives 8400 can be operated in a DC-bus connection. The 400 V devices have a direct connection for this.

The components listed here are used to interconnect the individual devices for operation with or without a regenerative power supply module. With a DC-bus connection, energy can be exchanged between the individual devices. This makes particular sense with cyclic operation of multiple devices.

The design of a DC-bus connection requires extremely precise dimensioning of the devices' energy requirements among one another.

Lenze Sales is happy to advise you here to ensure the most energy-efficient drive dimensioning. The components listed here form the basis for this.

- ▶ Two DC fuses are always required.
- ▶ The fuse holders EFH10005 and EFH10004 are single-pole, while the holders EFH20005 and EFH20007 are 2-pole.
- ▶ The fuses are not UL-approved for the DC operation.
- ▶ Please consult Lenze Sales to ensure the right dimensioning.

Components for DC-bus connection

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0060AYHN	6.00	14x51 without indicator
EFSGR0100AYHN	10.0	
EFSGR0160AYHN	16.0	
EFSGR0200AYHN	20.0	
EFSGR0250AYHN	25.0	
EFSGR0320AYHN	32.0	
EFSGR0400AYHN	40.0	
EFSGR0060AYHK	6.00	14x51 with indicator
EFSGR0100AYHK	10.0	
EFSGR0160AYHK	16.0	
EFSGR0200AYHK	20.0	
EFSGR0250AYHK	25.0	
EFSGR0320AYHK	32.0	
EFSGR0400AYHK	40.0	

Product key	Rated current	Design
DC fuses		
	I_N	
	[A]	
EFSGR0120AYIN	12.0	22x58 without indicator
EFSGR0160AYIN	16.0	
EFSGR0200AYIN	20.0	
EFSGR0250AYIN	25.0	
EFSGR0320AYIN	32.0	
EFSGR0400AYIN	40.0	
EFSGR0500AYIN	50.0	
EFSGR0800AYIN	80.0	
EFSGR0120AYIK	12.0	22x58 with indicator
EFSGR0160AYIK	16.0	
EFSGR0200AYIK	20.0	
EFSGR0250AYIK	25.0	
EFSGR0320AYIK	32.0	
EFSGR0400AYIK	40.0	
EFSGR0500AYIK	50.0	
EFSGR0800AYIK	80.0	

4.7

Mode	Features	Product key
DC busbar	- Busbar system 14 x 51 - DC busbar length 1m, cross-section 25 mm²	EWZ0036
End cap	- Busbar system 22 x 58 - DC busbar length 1m, cross-section 25 mm²	EWZ0037
Terminal	End caps for DC busbar (packaging unit 10 pcs)	EWZ0038
	Single-pole terminal for internal supply	EWZ0039

Inverter Drives 8400 StateLine

Accessories



DC-bus connection

DC fuses size 14 x 51 mm

Typical motor power	Mains voltage	Product key						
4-pole asynchronous motor		Inverter	DC fuses					
P	U _{AC}							
[kW]	[V]							
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0160AYHN	EFH20005	EFSGR0160AYHK	EFH10005		
0.55		E84AV□□□5514□□□						
0.75		E84AV□□□7514□□□						
1.10		E84AV□□□1124□□□						
1.50		E84AV□□□1524□□□						
2.20		E84AV□□□2224□□□	EFSGR0200AYHN		EFSGR0200AYHK			
3.00		E84AV□□□3024□□□						
4.00		E84AV□□□4024□□□					EFSGR0320AYHN	EFSGR0320AYHK
5.50		E84AV□□□5524□□□					EFSGR0400AYHN	EFSGR0400AYHK
7.50		E84AV□□□7524□□□						
11.0		E84AV□□□1134□□□						
15.0		E84AV□□□1534□□□						

4.7

DC fuses size 22 x 58 mm

Typical motor power	Mains voltage	Product key				
4-pole asynchron- ous motor		Inverter	DC fuses			
P	U _{AC}					
[kW]	[V]					
0.37	3 AC 320 ... 550	E84AV□□□3714□□□	EFSGR0120AYIN	EFH20007	EFSGR0120AYIK	EFH10004
0.55		E84AV□□□5514□□□				
0.75		E84AV□□□7514□□□				
1.10		E84AV□□□1124□□□				
1.50		E84AV□□□1524□□□				
2.20		E84AV□□□2224□□□	EFSGR0200AYIN		EFSGR0200AYIK	
3.00		E84AV□□□3024□□□				
4.00		E84AV□□□4024□□□	EFSGR0320AYIN		EFSGR0320AYIK	
5.50		E84AV□□□5524□□□	EFSGR0400AYIN		EFSGR0400AYIK	
7.50		E84AV□□□7524□□□	EFSGR0500AYIN		EFSGR0500AYIK	
11.0		E84AV□□□1134□□□	EFSGR0800AYIN		EFSGR0800AYIK	
15.0		E84AV□□□1534□□□				

Inverter Drives 8400 StateLine

Accessories



24 V power supply unit

External power supply units are available for supplying the control electronics of the 8400 StateLine, HighLine or TopLine. With an external supply, the inverters can be parameterised and diagnosed while the mains input is deenergised.



24 V power supply unit

Rated data

Product key								
			EZV1200-000	EZV2400-000	EZV4800-000	EZV1200-001	EZV2400-001	EZV4800-001
Rated voltage								
AC	U _{N, AC}	[V]						
Input voltage			230			400		
	U _{in}	[V]	AC 85 ... 264 DC 90 ...350			AC 320 ... 575 DC 450 ...800		
Rated mains current								
	I _{N, AC}	[A]						
Output voltage								
	U _{out}	[V]						
Rated output current								
	I _{N, out}	[A]						
Dimensions								
Height	h	[mm]						
Width	b	[mm]	55	85	157	73	85	160
Depth	t	[mm]	125					
Mass								
	m	[kg]						
			0.8	1.2	2.5	1.0	1.1	1.9

Brake switch

The brake switch consists of a rectifier and an electronic circuit breaker for the switching of an electromechanical brake switch. The brake switch is mounted on the control cabinet plate by means of two screws. Control is performed using a digital output on the inverter.



Brake switch

Mode	Features	Product key
Half-wave rectification	- Input voltage: AC 320 ... 550 V - Output voltage: DC 180 V (at AC 400 V), DC 225 V (at AC 500 V) - Max. brake current: DC 0.61 A - IP00 degree of protection	E82ZWBRE
Bridge rectification	- Input voltage: AC 180 ... 317 V - Output voltage: DC 205 V (at AC 230 V) - Max. brake current: DC 0.54 A - IP00 degree of protection	E82ZWBRB



USB diagnostic adapter

The operation, parameter setting and diagnostics of the Inverter Drives 8400 and the Servo Drives 9400 via the L-force diagnostics is made with the keypad X400 or a PC. The connection of a PC can be made via a USB interface and the USB diagnostic adapter.

For connecting the USB diagnostic adapter with the L-force diagnostics interface (DIAG) at the inverter, three different connecting cables are separately available in the lengths 2.5 m, 5 m and 10 m. The connection can be established during operation. The engineering tools EASY Starter or Engineer can be used to carry out the operation, parameter setting or diagnostics of the inverters. Both tools have simple intuitive surfaces. This enables a quick and easy commissioning.

Optionally to the USB diagnostic adapter, the PC system bus adapter can be used. For this purpose, a CANopen interface must be available at the inverter.



USB diagnostic adapter incl. connecting cable to the PC

- The engineering tools EASY Starter or Engineer are used for operation, parameter setting and diagnostics of the inverters.

Mode		Features	Product key
USB diagnostic adapter		• Input-side voltage supply via USB connection on PC • Output-side voltage supply via inverter's diagnostic interface • Diagnostic LEDs • Electrical isolation of PC and inverter • Hot-pluggable	E94AZCUS

Connecting cables for USB diagnostic adapter

Mode	Features	Product key
Connecting cable for USB diagnostic adapter	• Length: 2.5 m	EWL0070
	• Length: 5 m	EWL0071
	• Length: 10 m	EWL0072



X400 keypad

As an alternative to the PC, the X400 keypad can be used for local operation, parameter setting or diagnostics.
The X400 keypad plugs into the L-force diagnostics interface (DIAG) on the front of the inverter.



X400 keypad

Mode		Features	Slot	Product key
X400 keypad		• Menu navigation • Graphics display with background lightning for clear presentation of information • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function	DIAG	EZAEBK1001

- The Inverter Drives 8400 can be ordered with a plug-in keypad already installed. If you would like to order the products in this complete form, please add the inverter product key as follows when placing your order: E84AV to X-XXXXXX
- The product key with the supplement for the applied module is provided in our sales documents. This information is not part of the nameplate of the device.

X400 diagnosis terminal

Mode		Features	Slot	Product key
X400 diagnosis terminal		• X400 keypad in a robust housing • Also suitable for installation in the control cabinet door • incl. 2.5 m cable • IP20 degree of protection, IP65 for control cabinet installation on front face	DIAG	EZAEBK2001



PC system bus adapter

The operation, parameterisation and diagnostics of the Inverter Drives 8400 using a PC can also be carried out via the CANopen interface using a PC system bus adapter. This requires a PC system bus adapter instead of a USB diagnostic adapter. This adapter is plugged into the parallel interface or USB connection of the PC. The corresponding drivers will be installed automatically. The voltage for the adapter is supplied via the USB connection of the PC. The CANopen interface is integrated or available with a variant (BaseLine C).

Advantage:

- Operation, parameterisation and diagnostics in parallel with the keypad
- In interconnected systems, multiple inverters can be addressed simultaneously from one point (remote parameterisation via CANopen)



EMF2177IB adapter

Mode	Features	Product key
PC system bus adapter	• Voltage supply via USB port on PC • Electrical isolation from the bus	EMF2177IB

Shield mounting

A shield mounting is used to connect the motor cable shield on the inverter's shield connection.

Mode	Features	Product key
Metal cable tie	• Cable diameter: 8...30 mm • Packaging unit: 50 items	EZAMBKBM
Fixing clip	• Cable diameter: 4...10 mm • Packaging unit: 20 items	EZAMBHXM007/M
Wire clamp	• Cable diameter: 4...15 mm • Packaging unit: 10 items	EZAMBHXM006/M
	• Cable diameter: 10...20 mm • Packaging unit: 10 items	EZAMBHXM003/M
	• Cable diameter: 15...28 mm • Packaging unit: 10 items	EZAMBHXM004/M
	• Cable diameter: 20...37 mm • Packaging unit: 10 items	EZAMBHXM005/M



Terminal strips

All connections are equipped with pluggable connectors, with power connections up to 15 kW. These pluggable connectors are available separately for service purposes or if cable harnesses need to be physically separated.

► Power connections

Product key	Terminal strip	Features	Product key	Terminal strip	Features	Product key					
Inverter											
E84AV□□□2512□□□	X100	• Connection: mains • Packaging unit: 10 items	E84AZEVS001X100/M	X105	• Connection: motor • Packaging unit: 5 items	E84AZEVS010X105/M					
E84AV□□□3712□□□			E84AZEVS002X100/M								
E84AV□□□5512□□□											
E84AV□□□7512□□□											
E84AV□□□1122□□□											
E84AV□□□1522□□□											
E84AV□□□2222□□□		• Connection: mains • Packaging unit: 5 items	E84AZEVS003X100/M								
E84AV□□□3714□□□											
E84AV□□□5514□□□											
E84AV□□□7514□□□											
E84AV□□□1124□□□											
E84AV□□□1524□□□											
E84AV□□□2224□□□											
E84AV□□□3024□□□											
E84AV□□□4024□□□							E84AZEVS004X100/M	E84AZEVS011X105/M			
E84AV□□□5524□□□							E84AZEVS005X100/M	E84AZEVS012X105/M			
E84AV□□□7524□□□											
E84AV□□□1134□□□											
E84AV□□□1534□□□											

► Control connections

Terminal strip	Features	Product key
X1	• Connection: CANopen • Packaging unit: 10 items	E84AZEVS040X001/M
X3	• Connection: analog inputs and outputs • Packaging unit: 10 items	E84AZEVS050X003/M
X4	• Connection: digital inputs and outputs • Packaging unit: 5 items	E84AZEVS050X004/M
X80	• Connection: safety engineering • Packaging unit: 10 items	E84AZEVS070X080/M
X101	• Connection: relay • Packaging unit: 10 items	E84AZEVS020X101/M
X106	• Connection: PTC • Packaging unit: 10 items	E84AZEVS030X106/M



Setpoint potentiometer

The setpoint selection (e.g. speed) can be made via an external potentiometer.
The setpoint potentiometer is connected to the inverter's analog input terminals. A scale and a rotary knob are also available.



Setpoint potentiometer with scale and rotary knob

Mode	Product key
10 kOhm / 1 Watt potentiometer	ERPD0010K0001W
Rotary knob, 36 mm diameter	ERZ0001
Scale 0 ... 100%, 62 mm diameter	ERZ0002

Inverter Drives 8400 StateLine

Accessories



Inverter Drives 8400 StateLine

Accessories



Internet version

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Lenze

L-force *Drives*

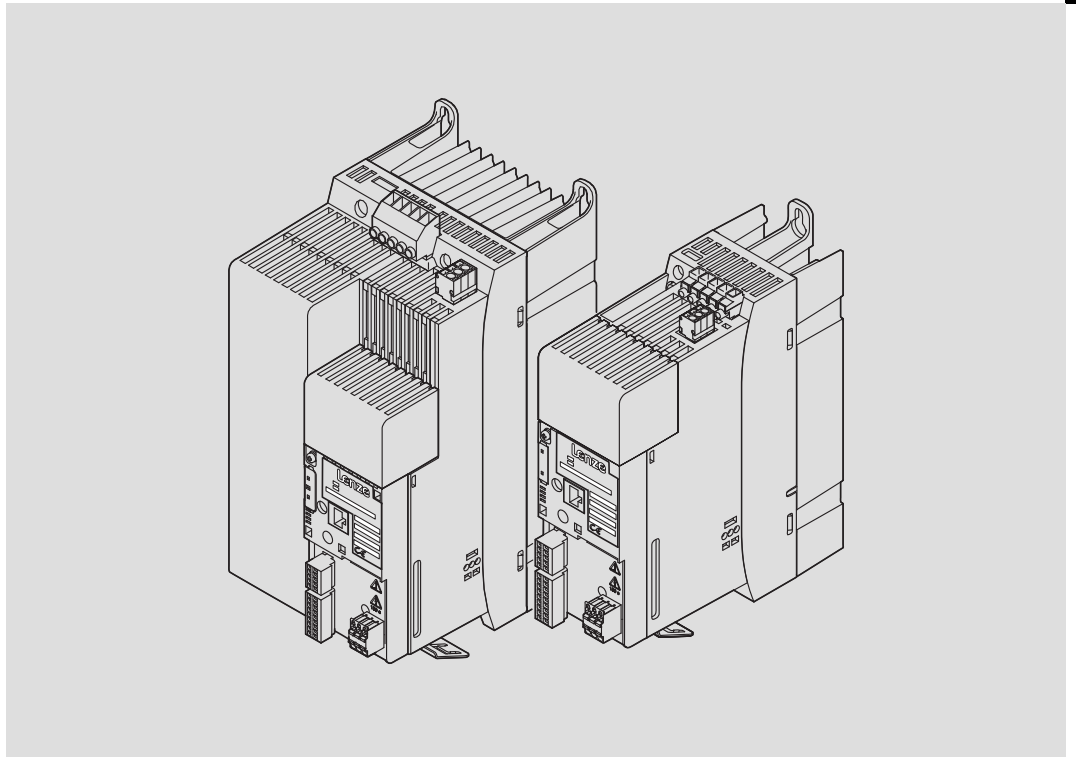


Translation

Hardware Manual

8400

0.25 ... 45 kW



E84Axxxx StateLine C/HighLine C/TopLine C

Frequency inverter 8400

1	About this documentation	8
1.1	Document history	9
1.2	Conventions used	10
1.3	Terms and abbreviations used	11
1.4	Notes used	12
2	Safety instructions	13
2.1	General safety and application notes for Lenze controllers	13
2.2	General safety and application instructions for Lenze motors	17
2.3	Residual hazards	20
3	Product description	21
3.1	Device features	21
3.2	Overview of standard devices	23
3.3	Overview of control terminals	26
3.4	Identification	28
3.5	Product key	29
4	Technical data	30
4.1	General data and operating conditions	30
4.2	Rated data	37
4.2.1	Overview	37
4.2.2	Operation at rated mains voltage 230 V	40
4.2.3	Operation at rated mains voltage 400 V	44
4.2.4	Operation at a rated mains voltage of 500 V	51
4.2.5	Operation with increased power at a 230 V mains	58
4.2.6	Operation with increased power at a 400 V mains	61
4.2.7	Operation with increased power at a 500 V mains	66
4.3	Current characteristics	71
4.4	Overcurrent operation	75
4.5	Terminal description	77
4.5.1	Overview	77
4.6	StateLine C control terminals	81
4.6.1	External supply voltage 24 V	81
4.6.2	Analog inputs	82
4.6.3	Analog outputs	82
4.6.4	Digital inputs	83
4.6.5	Digital outputs	83
4.6.6	Connection of relay output	83

4.7	HighLine C control terminals	84
4.7.1	External supply voltage 24 V	84
4.7.2	Analog inputs	85
4.7.3	Analog outputs	85
4.7.4	Digital inputs	86
4.7.5	Digital outputs	86
4.7.6	Connection of relay output	87
4.7.7	Motor holding brake connection	87
4.8	TopLine C control terminals	88
4.8.1	Axis bus	88
4.8.2	Multi-encoder connection	89
4.8.3	Resolver connection	91
5	Mechanical installation	92
5.1	Important notes	92
5.2	Standard devices in a power range of 0.25 ... 3 kW	93
5.2.1	Assembly in built-in technique (standard)	93
5.2.2	Assembly in push-through technique (thermal separation)	102
5.2.3	Mounting in "cold plate" technique	107
5.3	Standard devices in the power range 3 ... 22 kW	114
5.3.1	Assembly in built-in technique (standard)	114
5.3.2	Assembly in push-through technique (thermal separation)	123
5.3.3	Mounting in "cold plate" technique	131
5.4	Standard devices in a power range of 30 ... 45 kW	140
5.4.1	Assembly in built-in technique (standard)	140
5.4.2	Mounting in "cold plate" technique	150
6	Electrical installation	155
6.1	Important notes	155
6.1.1	Electrical isolation	159
6.1.2	Device protection	160
6.1.3	Maximum motor cable length	161
6.1.4	Motor protection	161
6.1.5	Interaction with compensation equipment	161
6.1.6	Safety instructions for the installation according to UL/CSA	162
6.1.7	Safety instructions for the installation according to UL/CSA	166

6.2	Installation according to EMC (installation of a CE-typical drive system)	170
6.2.1	Shielding	170
6.2.2	Mains connection, DC supply	172
6.2.3	Motor cable	173
6.2.4	Control cables	174
6.2.5	Installation in the control cabinet	175
6.2.6	Wiring outside of the control cabinet	177
6.2.7	Detecting and eliminating EMC interferences	179
6.3	Devices in the power range 0.25 ... 2.2 kW (1/N/PE AC 230 V)	180
6.3.1	Example circuits	180
6.3.2	Terminal assignment of the power connections	184
6.4	Devices in the power range 0.37 ... 22 kW (3/PE AC 400 V)	191
6.4.1	Example circuits	191
6.4.2	Terminal assignment of the power connections	194
6.5	Devices in a power range of 30 ... 45 kW (3/PE AC 400 V)	203
6.5.1	Example circuits	203
6.5.2	Terminal assignment of the power connections	204
6.6	Common control terminals	213
6.6.1	Important notes	213
6.6.2	System bus connection (CANopen)	217
6.6.3	Connection of relay output	223
6.6.4	Diagnostics	225
6.7	StateLine C control terminals	226
6.7.1	External supply voltage 24 V	226
6.7.2	Analog inputs and outputs	227
6.7.3	Digital inputs and outputs	230
6.8	HighLine C control terminals	232
6.8.1	External supply voltage 24 V	232
6.8.2	Analog inputs and outputs	234
6.8.3	Digital inputs and outputs	237
6.8.4	Motor holding brake connection	240
6.9	TopLine C control terminals	241
6.9.1	Resolver connection	241
6.9.2	Encoder connection	242
6.9.3	Axis bus	243
7	Commissioning	245
7.1	Before switching on	245
7.2	Quick commissioning	248
7.2.1	Keypad control	249
7.2.2	Terminal control	251

8	Braking operation	253
8.1	Braking operation without additional measures	253
8.2	Braking operation with external brake resistor	254
8.2.1	Operation at rated mains voltage 230 V	254
8.2.2	Operation at rated mains voltage 400 V	255
8.2.3	Operation at a rated mains voltage of 500 V	256
8.2.4	Selection of the brake resistors	257
8.2.5	Rating for Lenze brake resistors	258
8.2.6	Wiring of brake resistor	260
8.3	Operation with spring-applied brake	262
8.3.1	Introduction	262
8.3.2	Rated data	264
8.3.3	Wiring	266
9	DC-bus operation	269
9.1	Advantages of DC-bus operation	269
9.2	Conditions for trouble-free DC-bus operation	269
10	Diagnostics	270
10.1	Display of operating data, diagnostics	270
10.1.1	Status display via controller LEDs	270
10.1.2	Drive diagnostics via keypad	273
11	Safety engineering	275
11.1	Introduction	275
11.2	Important notes	276
11.2.1	Hazard and risk analysis	277
11.2.2	Standards	277
11.2.3	Mission time	278
11.3	Acceptance	279
11.3.1	Description	279
11.3.2	Periodic inspections	279
11.4	Basics for safety sensors	280
11.5	Operating mode	281
11.6	Hardware revision	283
11.7	Technical data	284
11.8	Electrical installation	288
11.9	Certification	290
12	Accessories (overview)	291
12.1	Overview	291
12.2	Mains chokes	292

12.3	RFI filter/mains filter	294
12.4	Sinusoidal filters	296
12.5	External brake resistors	297
12.6	Memory module	298
12.6.1	E84AYM10S	298
12.7	Communication modules	299
12.8	Keypad	300
12.9	Power supply units	301
12.10	Terminals (replacement)	302
12.11	EMC accessories	304
12.12	Accessories for applications with digital frequency	307
13	Appendix	308
13.1	Declarations of conformity	308
13.2	Ecodesign Directive	311
13.3	Index	317

1 About this documentation

Contents

The hardware manual provides the complete information on the application as directed of the 8400 controllers of the StateLine C, HighLine C, and TopLine C versions.

Validity

Type	Type designation	from hardware version	from software version
8400 StateLine C	E84AVSCxxxxx	VA	01.00
8400 HighLine C	E84AVHCxxxxx	VA	01.00
8400 TopLine C	E84AVTCxxxxx	VA	01.00

Target group

This Hardware Manual is intended for all persons who design, install, commission, and adjust controllers of the 8400 Inverter Drives product range.



Tip!

Information and tools concerning the Lenze products can be found in the download area at www.lenze.com

1.1 Document history

Material number	Version			Description
13564879	11.3	09/2022	TD00	Complemented: Conformity UKCA
13564879	11.2	05/2020	TD15	Error corrections
13564879	11.1	03/2020	TD15	RCD
13564879	11.0	05/2019	TD15	Error corrections Change: Output frequency adapted to the dual-use regulation, 1000 Hz -> 599 Hz Supplement: DC-bus operation
13481094	10.0	01/2015	TD14	Complemented: Conformity EAC Corrected: Error, data according to UL
13457188	9.1	03/2014	TD14	Information on safety engineering: HW revision 2A
13418876	9.0	12/2012	TD15	Error corrections
13394172	8.1	11/2011	TD14	Changed dimension sheets Error corrections
13385308	7.1	08/2011	TD14	Error corrections
13353079	7.0	11/2010	TD03	Added: • Devices of size 7 (30 ... 45 kW) • Devices of the TopLine version Error corrections
13321942	6.0	12/2009	TD03	Supplemented by devices of device size 6 (18.5 ... 22kW) Error corrections
13296844	5.0	04/2009	TD03	Supplemented by push-through and cold plate technique for devices of device size 5
13277975	4.0	11/2008	TD03	Supplemented by devices of device size 5 (7 ... 15kW)
13261567	3.0	07/2008	TD03	Supplemented by devices in the HighLine version
13255657	2.1	06/2008	TD03	Supplements to the chapter "Electrical installation"
13252301	2.0	04/2008	TD03	Complete revision
13234980	1.0	10/2007	TD15	First edition

1 About this documentation

Conventions used

1.2 Conventions used

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

Spelling of numbers

Decimal separator	Point	In general, the decimal point is used. For instance: 1234.56
-------------------	-------	---

Warnings

UL warnings		Given in English and French
UR warnings		

Text

Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)
--------------	-----	--

Icons

Page reference		Reference to another page with additional information For instance:  16 = see page 16
Documentation reference		Reference to another documentation with additional information For example:  EDKxxx = see documentation EDKxxx

1.3 Terms and abbreviations used

Term	Meaning
Device size	Used as generic term for a group of devices which have the same dimensions (depth, height and width) but different power ratings.
Standard device	Used as generic term when actions and features are described which are very similar or the same for different versions or device sizes, e.g. • mechanical installation or • power terminals
Abbreviation	Meaning
Cat.	Category according to EN ISO 13849-1
OSSD	Output Signal Switching Device, tested signal output
PWM	Pulse width modulation
SIL	Safety Integrity Level according to IEC 61508
SU	Safety Unit
OFF state	Signal status of the safety sensors when safety sensors are activated or respond
ON state	Signal status of the safety sensors during normal operation
STO	Safe Torque Off Former designation: safe standstill

1.4 Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

Safety instructions

Structure of safety instructions:



Danger!

(characterises the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph and signal word	Meaning
 Danger!	Danger of personal injury through dangerous electrical voltage. Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 Danger!	Danger of personal injury through a general source of danger. Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 Stop!	Danger of property damage. Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph and signal word	Meaning
 Note!	Important note to ensure troublefree operation
 Tip!	Useful tip for simple handling
	Reference to another documentation

Special safety instructions and application notes

Pictograph and signal word	Meaning
 Warnings!	Safety note or application note for the operation according to UL or CSA requirements.
 Warnings!	The measures are required to meet the requirements according to UL or CSA.

2 Safety instructions

2.1 General safety and application notes for Lenze controllers

For your personal safety

Disregarding the following basic safety measures may lead to severe personal injury and damage to material assets:

- ▶ Only use the product as directed.
- ▶ Never commission the product in the event of visible damage.
- ▶ Never commission the product before assembly has been completed.
- ▶ Do not carry out any technical changes on the product.
- ▶ Only use the accessories approved for the product.
- ▶ Only use original spare parts from Lenze.
- ▶ Observe all regulations for the prevention of accidents, directives and laws applicable on site.
- ▶ Transport, installation, commissioning and maintenance work must only be carried out by qualified personnel.
 - IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC-Report 664 or DIN VDE 0110 and national regulations for the prevention of accidents must be observed.
 - According to the basic safety information, qualified, skilled personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.
- ▶ Observe all specifications in this documentation.
 - This is the condition for safe and trouble-free operation and the achievement of the specified product features.
 - The procedural notes and circuit details described in this documentation are only proposals. It's up to the user to check whether they can be transferred to the particular applications. Lenze SE does not accept any liability for the suitability of the procedures and circuit proposals described.
- ▶ According to their enclosure, Lenze controllers (frequency inverters, servo inverters, DC speed controllers) and their components can carry a voltage, or parts of the controllers can move or rotate during operation. Surfaces can be hot.
 - Non-authorised removal of the required cover, inappropriate use, incorrect installation or operation create the risk of severe injury to persons or damage to material assets.
 - For more information, please see the documentation.
- ▶ There is a high amount of energy within the controller. Therefore always wear personal protective equipment (body protection, headgear, eye protection, ear protection, hand guard) when working on the controller when it is live.

Application as directed

Drive controllers are components designed for the installation in electrical systems or machinery. They must not be used as household appliances. They are intended exclusively for professional and commercial purposes according to EN 61000-3-2.

When controllers are installed into machines, commissioning (i.e. starting of the operation as directed) is prohibited until it is proven that the machine complies with the regulations of the EC Directive 2006/42/EC (Machinery Directive) [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008]; EN 60204 must be observed.

Commissioning (i.e. starting of the operation as directed) is only allowed when there is compliance with the EMC Directive (2014/30/EU) [UKCA: S.I. 2016/1091 - The Electromagnetic Compatibility Regulations 2016].

The inverters meet the requirements of the Low-Voltage Directive 2014/35/EU [UKCA: S.I. 2016/1101 - The Electrical Equipment (Safety) Regulations 2016]. The harmonised standard EN 61800-5-1 applies to the inverters.

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

The actuation of the inverters in specific areas in compliance with EN61800-3 (EMC categories) possibly requires the use of filters.

Warning: in residential environments, this product may cause high-frequency interferences which may make the implementation of interference suppression measures necessary.

Transport, storage

Please observe the notes on transport, storage, and appropriate handling.

Observe the climatic conditions according to the technical data.

For storage periods < 5 years, no measures are required.

For storage periods > 5 years, no measures are required. However, during the initial commissioning, a one-hour load-free operation on the mains is recommended.

Installation

The controllers must be installed and cooled according to the instructions given in the corresponding documentation.

The ambient air must not exceed degree of pollution 2 according to EN 61800-5-1.

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 or contacts.

Controllers contain electrostatically sensitive components which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical component since doing so might endanger your health!

Electrical connection

When working on live inverters, observe the applicable national regulations for the prevention of accidents.

Carry out the electrical installation according to the relevant regulations (e. g. cable cross-sections, fusing, connection to the PE conductor). Additional notes are included in the documentation.

This documentation contains information on installation in compliance with EMC (shielding, earthing, filter, and cables). These notes must also be observed for CE-marked controllers. The manufacturer of the system is responsible for compliance with the limit values demanded by EMC legislation. The controllers 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.g. the control cabinet doors have a circumferential metal connection to the housing. Reduce housing openings and cutouts to a minimum.

Protection in case of short circuit or earth fault

To ensure the protection according to IEC 61800-5-1 in case of electrical short circuit or earth fault (protection against electric shock, thermal hazards and fire), the following must be considered in the installation:

- ▶ Use fuses according to the technical data.
- ▶ The installation must fulfill the requirements of IEC 60364.
- ▶ The continuity of all associated PE and equipotential bonding conductors, including all connection points, must be ensured.
- ▶ If in case of a high mains impedance (especially with TT mains) or a high loop impedance the maximum permissible switch-off time according to IEC 60364-4-41 with the prescribed fuses is exceeded, a residual current circuit breaker (RCD) can be used. Alternatively, other protective measures can be used, such as separation from the environment by double or reinforced insulation or separation from the mains power supply by means of a transformer.
- ▶ If a residual current circuit breaker (RCD) is used for earth fault protection in combination with a frequency inverter, only type B/B+ is permitted.

Operation

If necessary, systems including controllers must be equipped with additional monitoring and protection devices according to the valid safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents). You are allowed to adapt the controllers to your application. Please observe the corresponding information given in the documentation.

After the controller 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 controller.

Keep all protective covers and doors closed during operation.

Safety functions

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

Maintenance and servicing

The controllers do not require any maintenance if the prescribed conditions of operation are observed.

Waste disposal

Recycle metal and plastic materials. Assembled PCBs must be disposed of professionally.

The product-specific safety and application notes given in these instructions must be observed!

2.2 General safety and application instructions for Lenze motors

General

Low-voltage machines have dangerous, live and rotating parts as well as possibly hot surfaces.

Synchronous machines induce voltages at open terminals during operation.

All operations serving transport, connection, commissioning and maintenance are to be carried out by skilled, responsible technical personnel (observe EN 50110-1 (VDE 0105-1) and IEC 60364). Improper handling can cause severe injuries or damages.

Lowvoltage machines may only be operated under the conditions that are indicated in the section "Application as directed".

The conditions at the place of installation must comply with the data given on the nameplate and in the documentation.

Application as directed

Lowvoltage machines are intended for commercial installations. They comply with the harmonised standards of the series IEC/EN 60034 (VDE 0530). Their use in potentially explosive atmospheres is prohibited unless they are expressly intended for such use (follow additional instructions).

Low voltage machines are components for installation into machines as defined in the Machinery Directive 2006/42/EC [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008]. Commissioning is prohibited until the conformity of the end product with this directive has been established (follow i. a. EN 60204-1).

Low voltage machines with IP23 protection or less are only intended for outdoor use when applying special protective features.

The integrated brakes must not be used as safety brakes. It cannot be ruled out that factors which cannot be influenced, such as oil ingress due to a defective Aside shaft seal, cause a brake torque reduction.

Transport, storage

Damages must be reported immediately upon receipt to the forwarder; if required, commissioning must be excluded. Tighten screwedin ring bolts before transport. They are designed for the weight of the lowvoltage machines, do not apply extra loads. If necessary, use suitable and adequately dimensioned means of transport (e. g. rope guides).

Remove transport locking devices before commissioning. Reuse them for further transport. When storing low-voltage machines, ensure a dry, dustfree and low-vibration ($v_{\text{eff}} \leq 0.2 \text{ mm/s}$) environment (bearing damage while being stored).

Installation

Ensure an even surface, solid foot/flange mounting and exact alignment if a direct clutch is connected. Avoid resonances with the rotational frequency and double mains frequency which may be caused by the assembly. Turn rotor by hand, listen for unusual slipping noises. Check the direction of rotation when the clutch is not active (observe section "Electrical connection").

Use appropriate means to mount or remove belt pulleys and clutches (heating) and cover them with a touch guard. Avoid impermissible belt tensions.

The machines are halfkey balanced. The clutch must be halfkey balanced, too. The visible jutting out part of the key must be removed.

If required, provide pipe connections. Designs with shaft end at bottom must be protected with a cover which prevents the ingress of foreign particles into the fan. Free circulation of the cooling air must be ensured. The exhaust air also the exhaust air of other machines next to the drive system must not be taken in immediately.

Electrical connection

All operations must only be carried out by qualified and skilled personnel on the lowvoltage machine at standstill and deenergised and provided with a safe guard to prevent an unintentional restart. This also applies to auxiliary circuits (e. g. brake, encoder, blower).

Check safe isolation from supply!

If the tolerances specified in EN 600341; IEC 34 (VDE 05301) voltage $\pm 5\%$, frequency $\pm 2\%$, waveform, symmetry are exceeded, more heat will be generated and the electromagnetic compatibility will be affected.

Observe the data on the nameplate, operating notes, and the connection diagram in the terminal box.

The connection must ensure a continuous and safe electrical supply (no loose wire ends); use appropriate cable terminals. The connection to the PE conductor must be safe. The plug-in connectors must be bolt tightly (tostop).

The clearances between blank, live parts and to earth must not fall below 8 mm at $V_{\text{rated}} \leq 550 \text{ V}$, 10 mm at $V_{\text{rated}} \leq 725 \text{ V}$, 14 mm at $V_{\text{rated}} \leq 1000 \text{ V}$.

The terminal box must be free of foreign particles, dirt and moisture. All unused cable entries and the box itself must be sealed against dust and water.

Commissioning and operation

Before commissioning after longer storage periods, measure insulation resistance. In case of values $\leq 1 \text{ k}\Omega$ per volt of rated voltage, dry winding.

For trial run without output elements, lock the featherkey. Do not deactivate the protective devices, not even in a trial run.

Check the correct operation of the brake before commissioning lowvoltage machines with brakes.

Integrated thermal detectors do not provide full protection for the machine. If necessary, limit the maximum current. Parameterise the controller so that the motor will be switched off with $I > I_{\text{rated}}$ after a few seconds of operation, especially at the risk of blocking.

Vibrational severities $v_{\text{eff}} \leq 3.5 \text{ mm/s}$ ($P_{\text{rated}} \leq 15 \text{ kW}$) or 4.5 mm/s ($P_{\text{rated}} > 15 \text{ kW}$) are acceptable if the clutch is activated.

If deviations from normal operation occur, e.g. increased temperatures, noises, vibrations, find the cause and, if required, contact the manufacturer. In case of doubt, switch off the lowvoltage machine.

If the machine is exposed to dirt, clean the air paths regularly.

Shaft sealing rings and roller bearings have a limited service life.

Regrease bearings with relubricating devices while the lowvoltage machine is running. Only use the grease recommended by the manufacturer. If the grease drain holes are sealed with a plug, (IP54 drive end; IP23 drive and nondrive end), remove plug before commissioning. Seal bore holes with grease. Replace prelubricated bearings (2Z bearing) after approx. 10,000 h 20,000 h, at the latest however after 3 4 years.

The product-specific safety and application notes given in these instructions must be observed!!

2.3**Residual hazards****Protection of persons**

- ▶ Before working on the controller, check that no voltage is applied to the power terminals, because
 - depending on the controller - the power terminals U, V, W, +UG, -UG, Rb1 and Rb2 carry hazardous voltages for up to 3 to 20 minutes after mains disconnection.
 - the power terminals L1, L2, L3; U, V, W, +UG, -UG, Rb1 and Rb2 carry hazardous voltages when the motor is stopped.

Device protection

- ▶ Connect/disconnect all pluggable terminals only in deenergised condition!
- ▶ Detach the controllers from the installation, e.g. from the rear panel of the control cabinet, only in deenergised condition!

Motor protection

- ▶ Depending on the controller settings, the connected motor can be overheated by:
 - For instance, longer DC-braking operations.
 - Longer operation of self-ventilated motors at low speed.

Protection of the machine/system

- ▶ Drives can reach dangerous overspeeds (e.g. setting of high output frequencies in connection with motors and machines unsuitable for such conditions):
 - The controllers do not offer any protection against such operating conditions. Use additional components for this purpose.
- ▶ Switch **contactors in the motor cable** only if the controller is inhibited.
When switching contactors in the motor cable while the controller is enabled, you can activate monitoring functions of the controller. If no monitoring function is activated, switching is permissible.

Parameter set transfer

- ▶ During the parameter set transfer, control terminals of the controllers can adopt undefined states!
 - Therefore, it is absolutely necessary to remove control terminal X4 (digital input signals for devices of the StateLine C version) or control terminal X5 (digital input signals for devices of the HighLine C/TopLine C version). This ensures that the controller is inhibited and all control terminals have the firmly defined "LOW" status.

3 Product description

3.1 Device features

Features	Version		
	StateLine C	HighLine C	TopLine C
Power range from 250 W to 45 kW	✓	✓	✓
Communication and diagnostic interfaces	✓	✓	✓
Integrated interference suppression acc. to EN 61800-3	✓	✓	✓
Integrated DC-bus connection for devices with 400 V mains connection	✓	✓	✓
Flying restart circuit	✓	✓	✓
Integrated brake management	✓	✓	✓
Integrated brake chopper	✓	✓	✓
Optionally: Integrated safety system "Safe torque off (STO)"	✓	✓	✓
Operating modes:			
VFCplus: V/f open loop control, linear and quadratic	✓	✓	✓
VFCplus: Freely definable characteristic	✓	✓	✓
VFCplus eco: Energy-efficient V/f characteristic	✓	✓	✓
SLVC: Sensorless vector control (torque / speed)	✓	✓	✓
VFCplus: V/f closed loop control for speed-controlled applications	✓	✓	✓
SC: Servo control ASM (torque / speed)	-	✓	✓
SC: Servo control PSM (torque / speed)	-	-	✓
SL PSM: Sensorless synchronous control (torque / speed)	-	✓	✓
S-shaped ramps for almost jerk-free acceleration and deceleration	✓	✓	✓
200 % overload current (3 s)	✓	✓	✓
IT system usability	✓	✓	✓
Protection against restart for cyclic mains switching	✓	✓	✓
CANopen baud rate	Up to 1000 kbps	Up to 1000 kbps	Up to 1000 kbps
Speed feedback			
Frequency input	10 kHz	10 kHz and 200 kHz	10 kHz and 200 kHz
Incremental HTL encoder Evaluation: Single-track / two-track	10 kHz	10 kHz and 200 kHz	10 kHz and 200 kHz
Incremental HTL encoder Evaluation: Four-track	-	5 kHz	200 kHz
Incremental TTL encoder	-	-	✓
SSI	-	-	✓
1 V _{SS} sin/cos encoder	-	-	✓
1 V _{SS} sin/cos absolute value encoder (Hiperface)	-	-	✓
Applications			
Actuating drive	✓	✓	✓
Table positioning	-	✓	✓
Switch-off positioning	✓	✓	✓
Touch probe	-	✓	✓

Features	Version		
	StateLine C	HighLine C	TopLine C
Axis bus	-	-	✓
Digital frequency coupling	-	-	✓
Digital 2.5 A output with integrated spark suppressor, e.g. for the direct control of a 24 V motor holding brake	-	✓	✓

Supplementary information with regard to export control

By limiting the maximum output frequency to ± 599 Hz, the devices are not subject to the export restrictions of the "EC-Dual-Use Regulation" - EC 428/2009. This applies to devices supplied from the middle of the year 2015.

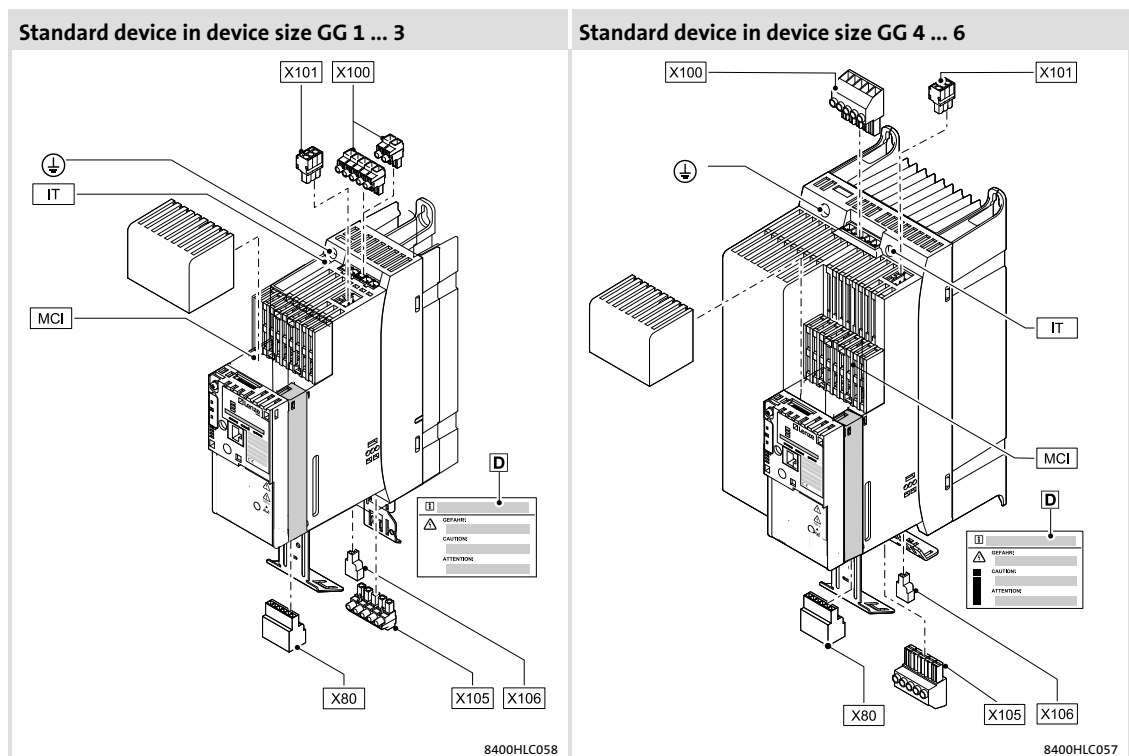
The maximum possible output frequency is specified on the nameplate. The technical data have been adapted with the hardware manual V11.0 release.

For certain applications, devices with the previous maximum output frequency of ± 1000 Hz may be supplied. If necessary, get in touch with your Lenze contact person.

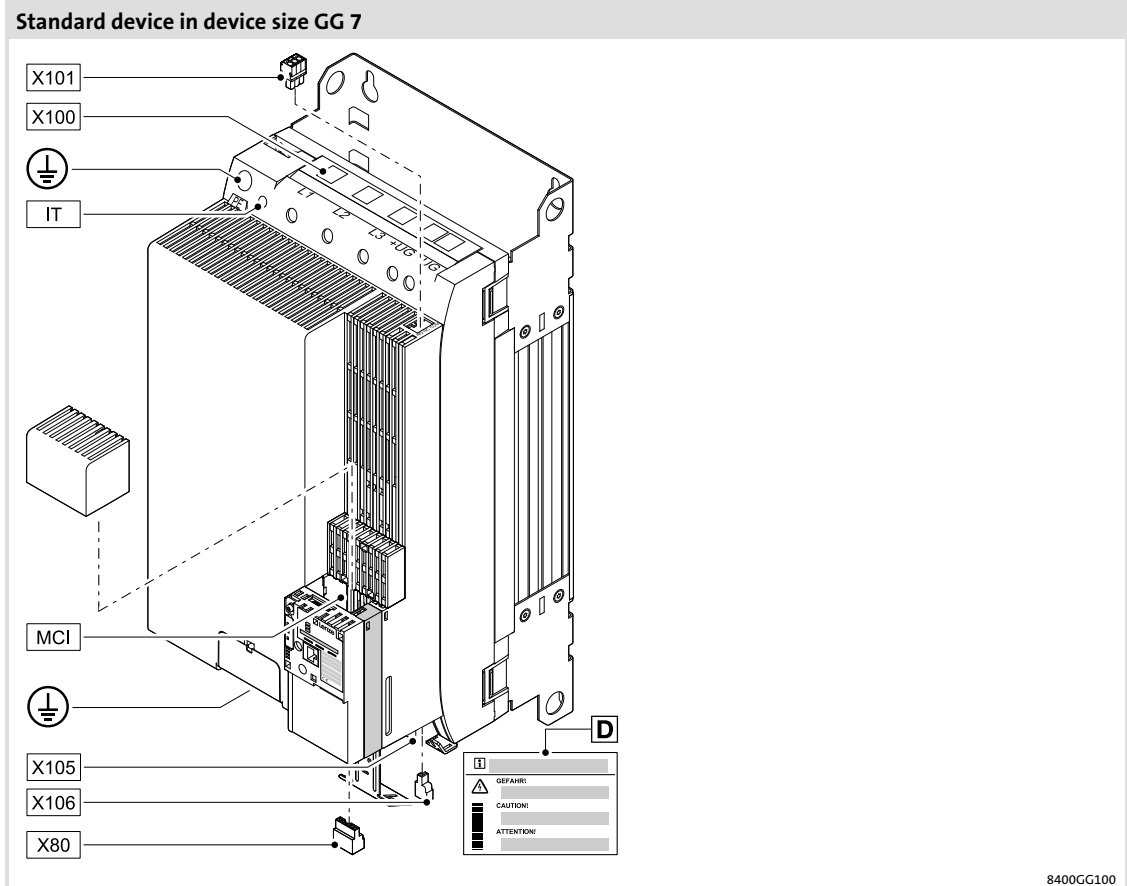
3.2 Overview of standard devices

Allocation of the device sizes

Device size	Power range [kW]		
GG 1	0.25	...	0.37
GG 2	0.55	...	0.75
GG 3	1.1	...	3.0
GG 4	3.0	...	5.5
GG 5	7.5	...	15.0
GG 6	18.5	...	22.0
GG 7	30.0	...	45.0



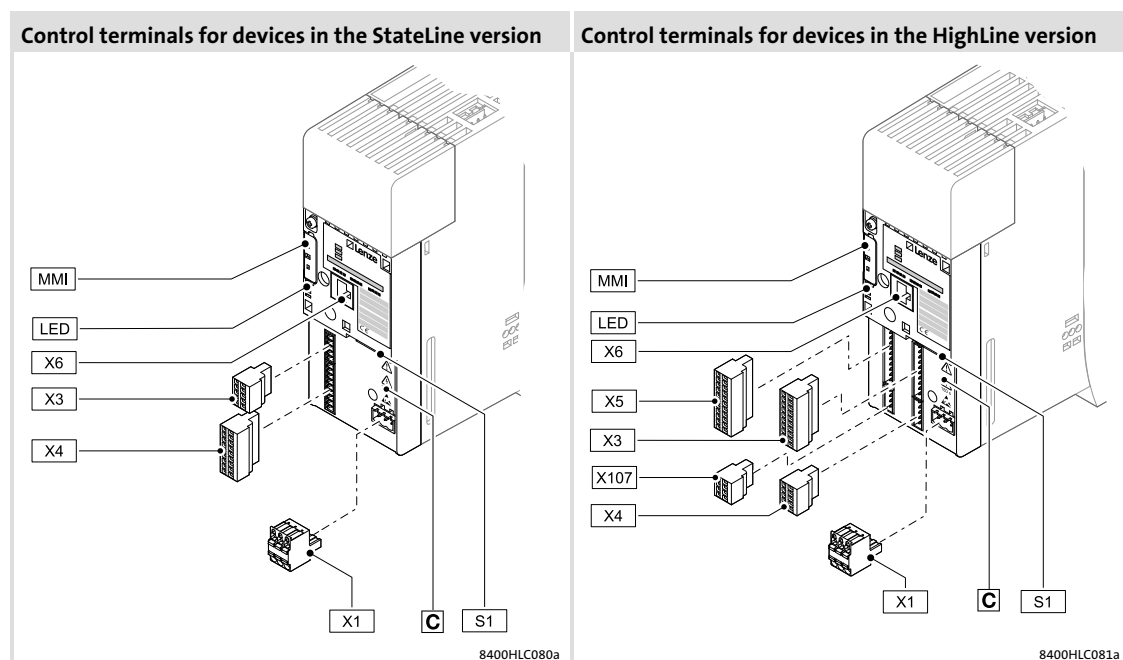
Connection		Information	
Pos.	Description	230 V	400 V
X80	Terminal strip for the integrated safety unit	📖 275	
X100	Mains/DC-bus voltage (for 400 V devices) – For devices in device size 6 (18.5 ... 22 kW) the terminal strip is not pluggable.	📖 186	📖 196
X101	Relay output	📖 223	
X105	Motor/external brake resistor – For devices in device size 6 (18.5 ... 22 kW) the terminal strip is not pluggable.	📖 190	📖 200
X106	Motor temperature monitoring	📖 189	📖 201
IT	Contact screw for interference suppression (on the supply side/on the motor side)	📖 188	📖 198
MCI	Slot for communication module (Module Communication Interface)	📖 299	
Ⓜ	Sticker with warning	-	



Connection		Information	
Pos.	Description	230 V	400 V
X80	Terminal strip for the integrated safety unit	-	275
X100	Mains/DC-bus voltage (for 400 V devices) – For devices of device size 7 (30 ... 45 kW) this terminal strip is not pluggable.	-	206
X101	Relay output	-	223
X105	Motor/external brake resistor – For devices of device size 7 (30 ... 45 kW) this terminal strip is not pluggable.	-	210
X106	Motor temperature monitoring	-	211
IT	Contact screw for interference suppression (on the supply side/on the motor side)	-	208
MCI	Slot for communication module (Module Communication Interface)	-	299
D	Sticker with warning	-	

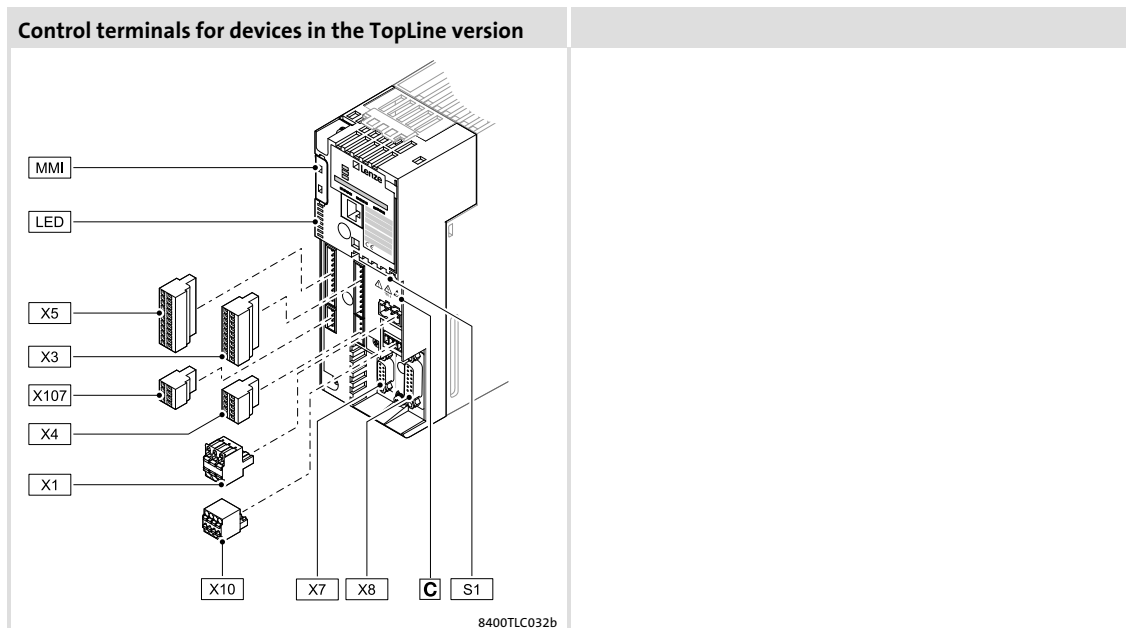
3.3

Overview of control terminals



Connection			Information	
Pos.	Description		StateLine C	HighLine C
X1	CANopen connection		 217	
S1	CANopen settings			
X3	Analog inputs/outputs; 10V reference voltage		 227	 234
X4	Digital inputs; controller enable		 238	-
	24 V supply of the control electronics			
	Digital outputs			 238
	24 V voltage output			
X5	Digital inputs; controller enable		-	 237
	External 24V supply of the control electronics; internal 24V supply fused via PTC			
X6 (DIAG)	Diagnostic interface		 225	
X107	24 V brake supply;		-	 240
	+ BD1	Connection for DC brake coil		
	- BD2			
MMI	Slot for memory module (Memory Module Interface)		 298	

Icon	Description
	Long discharge time: All power terminals remain live for a few minutes after mains disconnection! The duration is given under the warning symbol on the device.
	High leakage current: Carry out fixed installation and PE connection according to EN 61800-5-1!
	Electrostatic sensitive devices: Before working on the device, the personnel must be free of electrostatic charge!
	Hot surface: Risk of burns! Hot surfaces should not be touched without wearing protective gloves.



Connection		Information
Pos.	Description	TopLine C
X1	CANopen connection	217
S1	CANopen settings	
	Settings for CANopen terminating resistor and axis bus	
X3	Analog inputs / outputs; 10 V reference voltage	234
X4	Digital inputs; controller enable	-
	24 V supply of the control electronics	
	Digital outputs	
	24 V voltage output	238
X5	Digital inputs; controller enable	237
	External 24 V supply of the control electronics; internal 24 V supply, fused via PTC	
X6 (DIAG)	Diagnostic interface	225
X7	Resolver	241
X8	Encoder	242
X10	Axis bus	243
X107	24 V brake supply	240
	+ BD1	
	- BD2	
MMI	Slot for memory module (Memory Module Interface)	298

Icon	Description
	Long discharge time: All power terminals remain live for a few minutes after mains disconnection! The duration is given under the warning symbol on the device.
	High leakage current: Carry out fixed installation and PE connection according to EN 61800-5-1!
	Electrostatic sensitive devices: Before working on the device, the personnel must be free of electrostatic charge!
	Hot surface: Risk of burns! Hot surfaces should not be touched without wearing protective gloves.

3.4

Identification

The type data used in this manual refer to the nameplate which is placed at the front of the controller (Fig. 3-1).

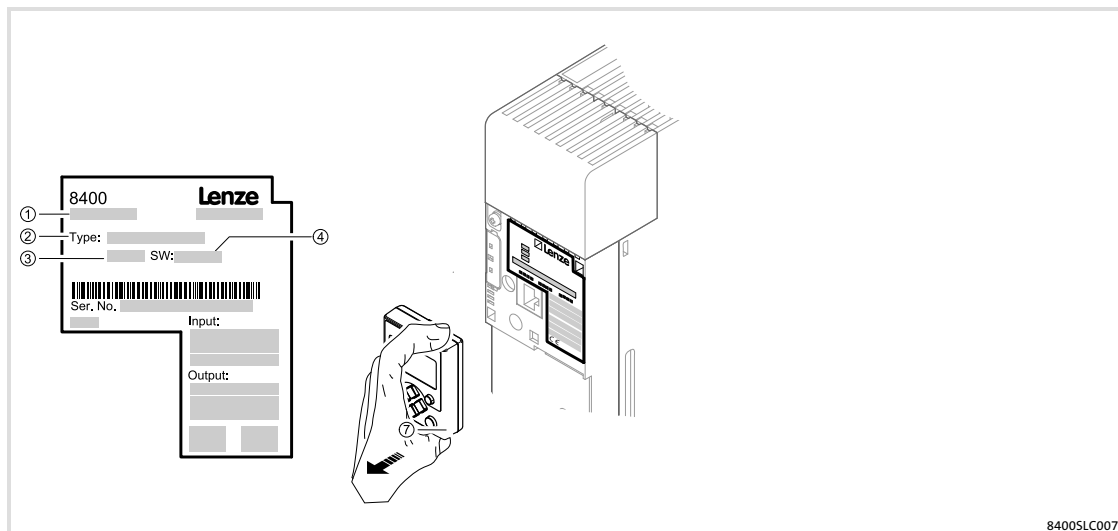


Fig. 3-1 Contents and position of the nameplate

- | | |
|---|------------------|
| ① | Device version |
| ② | Product key |
| ③ | Rated power |
| ④ | Software version |

3.5

Product key

	E84	A	V	xx	x	xxx	x	x	x	x
Product range Inverter Drives 8400										
Version A = 1. version										
Inverter type V = vector-controlled inverter										
Version SC = StateLine C HC = HighLine C TC = TopLine C										
Mounting type E = installation D = push-through technique C = cold plate technology										
Power e.g. 251 = 25 x 10 ¹ W = 0.25 kW 222 = 22 x 10 ² W = 2.2 kW										
Voltage class 2 = 230/240 V, 1/N/PE AC (0.25 ... 2.2 kW) 4 = 400/500 V, 3/PE AC (0.37 ... 45 kW)										
Ambient conditions S = standard industrial environment IE33 according to IEC 60721-3-3 standard V = rough environment (coated printed circuit boards)										
Safety system X = without safety system B = with integrated safety system "Safe torque off (STO)"										
Special design 0 = 599 Hz S = 599 Hz 7 = 1000 Hz										

The nameplate serves to identify delivered products by nameplate data. The product catalogue provides information on the possible configuration to order the products.

Conformity and approval

Conformity

CE	2006/42/EC	Machinery Directive (only relevant for safety components)
	2014/35/EU	Low-Voltage Directive
	2014/30/EU	EMC Directive
	2011/65/EU	RoHS Directive
	2009/125/EC	Ecodesign Directive
UKCA	S.I. 2008/1597	The Supply of Machinery (Safety) Regulations 2008 (only relevant for safety components)
	S.I. 2016/1101	The Electrical Equipment (Safety) Regulations 2016
	S.I. 2016/1091	The Electromagnetic Compatibility Regulations 2016
	S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
	S.I. 2021/745	The Ecodesign for Energy-Related Products and Energy Information Regulations 2021
China RoHS	SJ/T 11364-2014	Marking for the restriction of the use of hazardous substances in electrical and electronic product

Approval

UL	UL 508C	- Device size 1 ... 7 (0.25 ... 45 kW) - Certification of the integrated safety system: see chapter 11.9
CSA	CSA C22.2 No. 274	- Device size 1 ... 7 (0.25 ... 45 kW) - only when using an external mains choke or a module for reducing transients, compare chapter 6.1.6

Protection of persons and device protection

Type of protection	EN 60529	IP 20  187	Specification • applies to the fully assembled state ready for use • does not apply to the wire range of the terminals
	NEMA 250	Protection against accidental contact acc. to type 1	
Insulation resistance	EN 61800-5-1	Overvoltage category III Above 2000 m amsl: Overvoltage category II	
Control circuit isolation	EN 61800-5-1	Safe mains isolation via double / reinforced insulation for star-point earthed mains with a rated voltage for external conductors / star point of up to 300 V.	
Short-circuit strength Earth-fault strength	EN 61800-5-1	Motor connection: Limited, i.e. an internal protective device responds, the controller is inhibited (Error acknowledgement is required) Control terminals: Without limitation	
SCCR		CE • 0.25 ... 22 kW: 65 kA • 30 ... 45 kW: 35 kA	
Protective measures against		• Short circuit • Earth fault (Earth fault strength depends on the operating status) • Overvoltage • Motor stalling • Motor overtemperature (PTC or thermal contact, I²t-monitoring)	
Leakage current	EN 61800-5-1	> 3.5 mA AC, > 10 mA DC	Observe regulations and safety instructions!
Mains switching		• Mains switching 3 times in 9 minutes (without restrictions) • More frequent mains switching, e.g. during setting-up operation, does not harm the controller. – Devices of up to 22 kW are protected against overload. A monitoring issues the "Su03" message. The message must be acknowledged via mains switching. Before you switch on again: Let the device cool down! – Devices from 30 kW are protected by the dimensioning of the load circuit. Monitoring is not carried out.	
Starting current		≤ 2 x I _{rated}	

Supply conditions

AC mains operation		Direct connection
Power systems		
TT		Operation permitted without restrictions
TN		
With earthed phase	EN 61800-5-1	Operation permitted if additional measures are taken: • Overvoltage reduction to overvoltage category II required. If protection against accidental contact is required for the control terminals, external measures must be taken. • The measures described for IT systems must be taken. Operation is not permissible: • With integrated safety system, e.g. E84AVxxxxxxxBx
IT		Observe instructions regarding special measures.
DC-bus operation		Direct connection possible for devices with 400 V mains connection.
Motors		Only use motors suitable for inverter operation. Lenze L-force motors comply with the requirements.

Environmental conditions

Climate

Storage	IEC/EN 60721-3-1	1K3 (-25 ... +60 °C)
Transport	IEC/EN 60721-3-2	2K3 (-25 ... +70 °C)
Operation	IEC/EN 60721-3-3	3K3 (-10 ... +55 °C) Operation at 2/4 kHz, +45 ... +55 °C: Reduce rated output current by 2.5 %/°C Operation at 8/16 kHz, +40 ... +55 °C: Reduce rated output current by 2.5 %/°C
Site altitude		0 ... 4000 m amsl 1000 ... 4000 m amsl: Reduce rated output current by 5 %/1000 m 2000 ... 4000 m amsl: overvoltage category II
Pollution	EN 61800-5-1	Degree of pollution 2

Vibration resistance ($9.81 \text{ m/s}^2 = 1 \text{ g}$)

Transport	IEC/EN 60721-3-2	2M2
	EN 61800-2	2 ... 9 Hz: Amplitude 3.5 mm 10 ... 200 Hz: acceleration resistant up to 10 m/s^2 200 ... 500 Hz: acceleration resistant up to 15 m/s^2
	Germanischer Lloyd	5 ... 13.2 Hz: Amplitude $\pm 1 \text{ mm}$ 13.2 ... 100 Hz: acceleration resistant up to 0.7 g
Operation	EN 61800-5-1	10 ... 57 Hz: amplitude 0.075 mm 57 ... 150 Hz: acceleration resistant up to 10 m/s^2

Requirements on the motor cable

Capacitance per unit length

$\leq 2.5 \text{ mm}^2/\text{AWG 14}$	$C_{\text{Core/core}}/C_{\text{Core/shield}} < 75/150 \text{ pF/m}$
$\geq 4 \text{ mm}^2/\text{AWG 12}$	$C_{\text{Core/core}}/C_{\text{Core/shield}} < 150/300 \text{ pF/m}$

Electric strength

VDE 0250-1	$U_0/U \geq 0.6/1.0 \text{ kV}$ (U_0 = r.m.s. value external - conductor/PE, U = r.m.s. value - external conductor/external conductor)
UL	$U \geq 600 \text{ V}$ (U = r.m.s. value external conductor/external conductor)

Motor cable lengths without considering EMC limit values

U _{rated} [V]	P _{rated} [kW]	Maximum length of the shielded motor cable [m] ¹⁾			
		after switching frequencies			
		4 kHz / 40 °C	4 kHz / 45 °C	8 kHz / 40 °C	16 kHz / 40 °C
230	0.25 ... 2.2	100	50	50	50
400	0.37 ... 2.2	100	50	50	25
500	0.37 ... 2.2	100	50	25	15
400/500	3 ... 15	100	50	50	50
400/500	18.5 ... 45	150	100	100	100

Motor cable lengths with interference suppression

- Device-dependent assignments of the filter are described in the chapter "Accessories", 12.3 and 12.4.

Compliance with category C2 (industry), cable-guided

U _{rated} [V]	P _{rated} [kW]	Maximum length of the shielded motor cable [m] After interference suppression and possible earth-leakage circuit breaker, type B								
		with integrated filter, RCD			with SD filter, RCD			with LD filter, RCD		
		30 mA	300 mA	without	30 mA	300 mA	without	30 mA	300 mA	without
230	0.25 ... 2.2	25	25	25	25	50	50	-	50	100 ³⁾
400/500	0.37 ... 2.2	25	25	25	25 ³⁾	50 ³⁾	50 ³⁾	-	50 ³⁾	100 ³⁾
400/500	3.0 ... 15	-	25	25	25	50	50	-	50	100 ³⁾
400/500	18.5 ... 45	-	25	25	-	-	-	-	50	100

³⁾ Comply with switching frequency-dependent restrictions according to "motor cable lengths without considering EMC limit values" table

Compliance with category C1 (residential areas, public systems), cable-guided

U _{rated} [V]	P _{rated} [kW]	Maximum length of the shielded motor cable [m] After interference suppression and possible earth-leakage circuit breaker, type B								
		with LL filter ⁴⁾ , RCD			with SD filter, RCD			with LD filter, RCD		
		30 mA	300 mA	without	30 mA	300 mA	without	30 mA	300 mA	without
230	0.25 ... 2.2	5	5	5	25	25	25	-	50	50
400/500	0.37 ... 2.2	-	-	-	25 ³⁾	25 ³⁾	25 ³⁾	-	50 ³⁾	50 ³⁾
400/500	3.0 ... 15	-	-	-	25	25	25	-	50	50
400/500	18.5 ... 45	-	-	-	-	-	-	-	50	50

³⁾ Comply with switching frequency-dependent restrictions according to "motor cable lengths without considering EMC limit values" table

⁴⁾ If LL filters are used, the ≤ fault current is 3.5 mA and no fixed installation is required.

EMC		
Interference emission		
cable-guided	EN 61800-3	Up to a shielded motor cable length of 25 m: Category C2 With interference suppression: Category C1
Radiation		Category C2
Immunity to interference (acc. to EN 61800-3 requirements)		
Electrostatic discharge (ESD)	EN 61000-4-2	Air discharge: 8 kV, Contact discharge to housing: 4 kV
High frequency		
cable-guided	EN 61000-4-6	150 kHz ... 80 MHz, 10 V/m 80 % AM (1kHz)
Interference (housing)	EN 61000-4-3	80 MHz ... 1000 MHz, 10 V/m 80 % AM (1kHz)
Burst		
Power connections and interfaces	EN 61000-4-4	2 kV/5 kHz
Signal interfaces	EN 61000-4-4	1 kV/5 kHz
Control terminals	EN 61000-4-4	2 kV/5 kHz
Surge (surge voltage)		
Power connections	EN 61000-4-5	1.2/50 µs, 1 kV phase-phase, 2 kV phase-PE
Control terminals	EN 61000-4-5	1.2/50 µs, 1 kV
Operation on public supply systems	EN 61000-3-2 EN 61000-3-12	The devices are intended for the use in industrial environments. If they are used on public systems, measures must be taken to limit the radio interference to be expected. The machine / system manufacturer is responsible for compliance with the machine / system requirements!
	EN 61000-3-2	< 0.5 kW: With mains choke 0.5 ... 1 kW: With active filter > 1 kW at a mains current of ≤ 16 A: No limit values for harmonic currents
	EN 61000-3-12	Mains current > 16 A: in combination with an assigned mains choke or mains filter, in case of dimensioning for operation with rated power. The requirement for the short-circuit power ratio $RSCE \geq 120$ has to be met. RSCE is the short-circuit power ratio at the connection point of the machine/plant to the public network.

Open and closed loop control**Open and closed loop control processes**

V/f characteristic control (VFCplus)
- Operation of asynchronous machines with a linear load torque characteristic - Operation of asynchronous machines with a quadratic load torque characteristic
V/f control (VFCplus + encoder)
V/f characteristic control VFCplus with additional speed feedback
Energy-saving V/f characteristic control (VFCplusEco)
Reduction of the power loss in the partial load operational range
Sensorless vector control (SLVC)
Encoderless control of asynchronous machines
Sensorless vector control (SLPSM)
Encoderless control of synchronous machines
Servo control (SC)
- Dynamic control of asynchronous machines in all quadrants - Dynamic control of synchronous machines in all quadrants

Switching frequency

2 kHz, 4 kHz, 8 kHz, 16 kHz, Optionally noise optimised or power-loss optimised
--

Torque behaviour

Setting range SC ASM	1 : 20 ... 50	Valid for power- / current-adapted motor and correct parameterisation.
Setting range SC PMSM	1 : 20 ... 40	Valid for power- / current-adapted motor and correct parameterisation.
Setting range SLVC	1 : 10 ... 20	Valid for power- / current-adapted motor and correct parameterisation.
Setting range SLPSM	1 : 10 ... 20	Valid for power- / current-adapted motor and correct parameterisation. Information exclusively refers to controlled operational range.

Note: The setting range depends on the accuracy of the nameplate data and the equivalent circuit diagram data of the motor. Depending on the data quality, the above-stated setting ranges may differ. In the case of special motors or strong differences in the dimensioning of motor and controller, the values may also differ.

Sensorless vector control (speed)

Minimum output frequency	0.5 Hz (0 ... M_{rated})	
Setting range	1 : 10	Based on 50 Hz and M_{rated}
Accuracy	±0.5 %	In a setting range of 3 ... 50 Hz
Smooth running	±0.1 Hz	

Output frequency

Range	-599 Hz ... +599 Hz (Version -1000 Hz ... +1000 Hz available on request)	
Absolute resolution	0.02 Hz	
Standardised resolution	Parameter data: 0.01 %, process data: 0.006 % (= 2^{14})	

Digital setpoint selection

Accuracy	±0.01 %
----------	---------

Analog setpoint selection

Accuracy	±0.5 %	Based on the final value
----------	--------	--------------------------

4.2 Rated data

4.2.1 Overview

Input data

Mains	Voltage U_{Rated} [V]	Voltage range U_{Rated} [V]	Frequency range f [Hz]
1/N/PE AC	230	180 - 0 % ... 264 + 0 %	45 - 0 % ... 65 + 0 %
3/PE AC	400	320 - 0 % ... 440 + 0 %	45 - 0 % ... 65 + 0 %
3/PE AC	500	400 - 0 % ... 550 + 0 %	45 - 0 % ... 65 + 0 %

	Voltage [V]	Frequency [Hz]	Rated current [A]		Number of phases
			up to +45 °C ①	up to +55 °C ①	
E84AVxxx2512	230	50/60	3.4	2.6	1
E84AVxxx3712	230	50/60	5.0	3.8	1
E84AVxxx5512	230	50/60	5.3	4.0	1
E84AVxxx7512	230	50/60	8.0	6.0	1
E84AVxxx1122	230	50/60	12.0	9.0	1
E84AVxxx1522	230	50/60	13.7	10.3	1
E84AVxxx2222	230	50/60	21.8	16.4	1
E84AVxxx3714	400/500	50/60	1.8/1.4	1.4/1.1	3
E84AVxxx5514	400/500	50/60	2.5/2.0	2.0/1.7	3
E84AVxxx7514	400/500	50/60	3.6/2.6	2.7/2.2	3
E84AVxxx1124	400/500	50/60	4.4/3.6	3.3/2.7	3
E84AVxxx1524	400/500	50/60	5.5/4.4	4.1/3.3	3
E84AVxxx2224	400/500	50/60	7.3/5.8	5.5/4.4	3
E84AVxxx3024xxS	400/500	50/60	9.8/7.8	7.4/5.9	3
E84AVxxx3024xx0	400/500	50/60	9.8/7.8	7.4/5.9	3
E84AVxxx4024	400/500	50/60	13.1/10.5	9.8/7.8	3
E84AVxxx5524	400/500	50/60	18/14.4	13.5/10.8	3
E84AVxxx7524	400/500	50/60	20.0/16.0	15.0/12.0	3
E84AVxxx1134	400/500	50/60	29.0/23.2	21.7/17.4	3
E84AVxxx1534	400/500	50/60	29.0 ¹⁾ /23.2 ¹⁾	21.4 ¹⁾ /17.4 ¹⁾	3
E84AVxxx1834	400/500	50/60	50.4/43.4	37.8/32.6	3
E84AVxxx2234	400/500	50/60	42.0 ¹⁾ /36.1 ¹⁾	31.5 ¹⁾ /27.1 ¹⁾	3
E84AVxxx3034	400/500	50/60	55.0 ¹⁾ /46.9 ¹⁾	41.3 ¹⁾ /35.2 ¹⁾	3
E84AVxxx3734	400/500	50/60	68.0 ¹⁾ /58.2 ¹⁾	51.0 ¹⁾ /43.7 ¹⁾	3
E84AVxxx4534	400/500	50/60	80.0 ¹⁾ /69.2 ¹⁾	60.0 ¹⁾ /51.9 ¹⁾	3

① Ambient temperature in the control cabinet, switching frequency 2 and 4 kHz, operation without mains choke

¹⁾ only with external mains choke

Output data

	Voltage [V]	Frequency [Hz]	Rated current [A]		Number of phases
			up to +45 °C ①	up to +55 °C ①	
E84AVxxx2512	0 - 230	0 - 599	1.7	1.3	3
E84AVxxx3712	0 - 230	0 - 599	2.4	1.8	3
E84AVxxx5512	0 - 230	0 - 599	3.0	2.3	3
E84AVxxx7512	0 - 230	0 - 599	4.0	3.0	3
E84AVxxx1122	0 - 230	0 - 599	5.5	4.1	3
E84AVxxx1522	0 - 230	0 - 599	7.0	5.3	3
E84AVxxx2222	0 - 230	0 - 599	9.5	7.1	3
E84AVxxx3714	0 - 400/500	0 - 599	1.3/1.0	1.0/0.8	3
E84AVxxx5514	0 - 400/500	0 - 599	1.8/1.4	1.4/1.0	3
E84AVxxx7514	0 - 400/500	0 - 599	2.4/1.9	1.8/1.4	3
E84AVxxx1124	0 - 400/500	0 - 599	3.2/2.6	2.4/2.0	3
E84AVxxx1524	0 - 400/500	0 - 599	3.9/3.1	2.9/2.3	3
E84AVxxx2224	0 - 400/500	0 - 599	5.6/4.5	4.2/3.4	3
E84AVxxx3024xx5	0 - 400/500	0 - 599	7.3/5.8	5.5/4.4	3
E84AVxxx3024xx0	0 - 400/500	0 - 599	7.3/5.8	5.5/4.4	3
E84AVxxx4024	0 - 400/500	0 - 599	9.5/7.6	7.1/5.7	3
E84AVxxx5524	0 - 400/500	0 - 599	13/10.4	9.8/7.8	3
E84AVxxx7524	0 - 400/500	0 - 599	16.5/13.2	12.4/9.9	3
E84AVxxx1134	0 - 400/500	0 - 599	23.5/18.8	17.6/14.1	3
E84AVxxx1534	0 - 400/500	0 - 599	32.0/25.6	24.0/19.2	3
E84AVxxx1834	0 - 400/500	0 - 599	40.0/34.0	29.3/25.1	3
E84AVxxx2234	0 - 400/500	0 - 599	47.0/40.4	35.3/30.3	3
E84AVxxx3034	0 - 400/500	0 - 599	61.0/52.0	45.8/39.0	3
E84AVxxx3734	0 - 400/500	0 - 599	76.0/65.0	57.0/48.8	3
E84AVxxx4534	0 - 400/500	0 - 599	89.0/77.0	66.8/57.8	3

① Ambient temperature in the control cabinet, switching frequency 2 and 4 kHz, operation without mains choke

**Note!**

The indicated output voltage will not be reached under certain operating conditions.

- Output power in the maximum range
- High switching frequencies
- Use of mains filters or mains chokes
- Mains supply with high impedance ($U_k > 5\%$)

Power losses

Type	Power loss P_V [W]	
	when operating with rated output current I_{rated}	when controller is inhibited
E84AVxxx2512	45	20
E84AVxxx3712	50	
E84AVxxx5512	60	
E84AVxxx7512	75	
E84AVxxx1122	95	
E84AVxxx1522	110	
E84AVxxx2222	140	
E84AVxxx3714	50	
E84AVxxx5514	65	
E84AVxxx7514	80	
E84AVxxx1124	95	
E84AVxxx1524	105	
E84AVxxx2224	135	
E84AVxxx3024xx5	165	
E84AVxxx3024xx0	165	25
E84AVxxx4024	205	
E84AVxxx5524	275	
E84AVxxx7524	320	30
E84AVxxx1134	435	35
E84AVxxx1534	470	
E84AVxxx1834	540	40
E84AVxxx2234	640	
E84AVxxx3034	840	30
E84AVxxx3734	980	
E84AVxxx4534	1300	

4.2.2 Operation at rated mains voltage 230 V

Mains	Voltage U_{Rated} [V]	Voltage range U_{Rated} [V]	Frequency range f [Hz]
1/N/PE AC	230	180 - 0 % ... 264 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power	Motor power
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]	U, V, W S_{aR} [kVA]	4 pol. ASM P_{aR} [kW]
E84AVxxx2512	3.0	3.4	0.6	0.25
E84AVxxx3712	4.2	5.0	0.9	0.37
E84AVxxx5512	5.0	5.3	1.1	0.55
E84AVxxx7512	7.0	8.0	1.4	0.75
E84AVxxx1122	9.9	12.0	2.0	1.1
E84AVxxx1522	11.4	13.7	2.5	1.5
E84AVxxx2222	16.4	21.8	3.4	2.2

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx2512	No	ELN1-0900H005
E84AVxxx3712	No	
E84AVxxx5512	No	
E84AVxxx7512	No	ELN1-0500H009
E84AVxxx1122	No	
E84AVxxx1522	No	
E84AVxxx2222	No	ELN1-0250H018

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{arated2}	I_{aM2}	I_{arated4}	I_{aM4}	I_{arated8}	I_{aM8}	I_{arated16}	I_{aM16}
E84AVxxx2512	1.7	3.4	1.7	3.4	1.7	3.4	1.1	2.8
E84AVxxx3712	2.4	4.8	2.4	4.8	2.4	4.8	1.6	4.0
E84AVxxx5512	3.0	6.0	3.0	6.0	3.0	6.0	2.0	5.0
E84AVxxx7512	4.0	8.0	4.0	8.0	4.0	8.0	2.7	6.6
E84AVxxx1122	5.5	11.0	5.5	11.0	5.5	11.0	3.7	9.1
E84AVxxx1522	7.0	14.0	7.0	14.0	7.0	14.0	4.7	11.6
E84AVxxx2222	9.5	19.0	9.5	19.0	9.5	19.0	6.3	15.7

I_{aNx}

I_{aMx}

Switching
frequency

Rated value of continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s according to the tables under chapter 4.4
- Can be obtained in the setting "x kHz fixed/..." in C00018

If the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

In the setting "x kHz var./..." in C00018 the switching frequency is reduced depending on the output current.

Depending on the switching frequency and e.g. the ambient temperature, it may be required to reduce the output current (chapter 4.1, operating conditions).

Rated data for internal brake chopper

Switching threshold V_{BRmax} : 380 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx2512	180	2.1	0.8	1.6	0.6	-	∞	-
E84AVxxx3712	180	2.1	0.8	1.6	0.6	-	∞	-
E84AVxxx5512	100	3.8	1.4	2.8	1.1	-	∞	-
E84AVxxx7512	100	3.8	1.4	2.8	1.1	-	∞	-
E84AVxxx1122	33	11.5	4.4	8.6	3.3	-	∞	-
E84AVxxx1522	33	11.5	4.4	8.6	3.3	-	∞	-
E84AVxxx2222	33	11.5	4.4	8.6	3.3	-	∞	-

R_{Bmin}

I_{BRmax}

P_{BRmax}

I_{BRd}

P_{Bd}

t_z

t_{on}

$t_z - t_{\text{on}}$

t_{fp}

Minimum brake resistance, nominal value $\pm 10\%$

Peak current

Peak braking power

Continuous current RMS - important for the dimensioning of the cables

Continuous braking power

Cycle time, periodic load change with running time and recovery time

Running time

Recovery time

Maximum running time without initial load and compliance with the recovery time

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾
	①	②	L1, N - laying system			③	L1, N	
			B2	C	F			
			[A]	[A]	[mm ²]			
E84AVxxx2512	C 6	6	1	-	-	6	18	≥ 30 ³⁾
E84AVxxx3712	C 6	6	1	-	-	10	16	
E84AVxxx5512	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx7512	C 10	10	1.5	-	-	15	14	
E84AVxxx1122	C16	16	2.5	-	-	20	12	≥ 30 ³⁾
E84AVxxx1522	C 20	20	4.0	-	-	25	10	
E84AVxxx2222	C 25	25	6.0	-	-	30	10	

¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4).

The cable-cross sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45 °C, no bundling of cables or cores, two loaded cores. Smaller cable cross-sections are not permissible for technical reasons.

²⁾ Use UL-approved cable, fuses, and fuse holders only.

UL fuse: voltage ≥ 240 V, tripping characteristic for example "H", "K5" or "CC".

The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C. Smaller cable cross-sections are not permissible for technical reasons.

³⁾ RCD, optional, type B

If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

Operation with external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾
	①	②	L1, N - laying system			③	L1, N	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx2512	C 6	6	1	-	-	6	18	≥ 30 ³⁾
E84AVxxx3712	C 6	6	1	-	-	10	16	
E84AVxxx5512	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx7512	C 10	10	1.5	-	-	15	14	
E84AVxxx1122	C 16	16	2.5	-	-	20	12	≥ 30 ³⁾
E84AVxxx1522	C 16	16	2.5	-	-	25	10	
E84AVxxx2222	C 20	20	4.0	-	-	30	10	

- ¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4).
The cable-cross sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45 °C, no bundling of cables or cores, two loaded cores. Smaller cable cross-sections are not permissible for technical reasons.
- ²⁾ Use UL-approved cable, fuses, and fuse holders only.
UL fuse: voltage ≥ 240 V, tripping characteristic for example "H", "K5" or "CC".
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C. Smaller cable cross-sections are not permissible for technical reasons.
- ³⁾ RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.
- ① Circuit breaker
② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category
③ Fuse
- Observe national and regional regulations

4.2.3 Operation at rated mains voltage 400 V

Mains	Voltage U_{Rated} [V]	Voltage range U_{Rated} [V]	Frequency range f [Hz]
3/PE AC	400	320 - 0 % ... 440 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power	Motor power
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]	U, V, W S_{aR} [kVA]	4 pol. ASM P_{aR} [kW]
E84AVxxx3714	1.4	1.8	0.8	0.37
E84AVxxx5514	2.0	2.5	1.1	0.55
E84AVxxx7514	2.5	3.6	1.5	0.75
E84AVxxx1124	3.2	4.4	2.0	1.1
E84AVxxx1524	3.9	5.5	2.4	1.5
E84AVxxx2224	5.1	7.3	3.5	2.2
E84AVxxx3024xx5	7.0	9.8	4.6	3.0
E84AVxxx3024xx0	7.0	9.8	4.6	3.0
E84AVxxx4024	8.8	13.1	5.9	4.0
E84AVxxx5524	12.0	18	8.1	5.5
E84AVxxx7524	15.0	20.0	10.3	7.5
E84AVxxx1134	21.0	29.0	14.7	11.0
E84AVxxx1534 ¹⁾	29.0	-	20.0	15.0
E84AVxxx1834	36.0	50.4	24.9	18.5
E84AVxxx2234 ¹⁾	42.0	-	29.3	22.0
E84AVxxx3034 ¹⁾	55.0	-	38.0	30.0
E84AVxxx3734 ¹⁾	68.0	-	47.4	37.0
E84AVxxx4534 ¹⁾	80.0	-	55.5	45.0

¹⁾ only with external mains choke

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx3714	No	EZAELN3002B153
E84AVxxx5514	No	EZAELN3004B742
E84AVxxx7514	No	
E84AVxxx1124	No	
E84AVxxx1524	No	EZAELN3006B492
E84AVxxx2224	No	
E84AVxxx3024xx5	No	EZAELN3008B372
E84AVxxx3024xx0	No	EZAELN3008B372
E84AVxxx4024	No	EZAELN3010B292
E84AVxxx5524	No	EZAELN3016B182
E84AVxxx7524	No	EZAELN3020B152
E84AVxxx1134	No	EZAELN3025B122
E84AVxxx1534	Yes	EZAELN3035B841
E84AVxxx1834	No	EZAELN3045B651
E84AVxxx2234	Yes	EZAELN3050B591
E84AVxxx3034	Yes	EZAELN3063B471
E84AVxxx3734	Yes	EZAELN3080B371
E84AVxxx4534	Yes	EZAELN3090B331

Alternative DC supply

Basis of the data			
Mains	Voltage U_{DC} [V]	Voltage range U_{DC} [V]	Frequency range f [Hz]
2/PE DC	565	455 - 0 % ... 620 + 0 %	-

Type	Input current at I_{aN} I_{DC} [A]	Output power U, V, W S_{ar} [kVA]	Motor power 4.pol. ASM P_{ar} [kW]
E84AVxxx3714	2.2	0.8	0.37
E84AVxxx5514	3.1	1.1	0.55
E84AVxxx7514	4.4	1.5	0.75
E84AVxxx1124	5.4	2.0	1.1
E84AVxxx1524	6.7	2.4	1.5
E84AVxxx2224	8.9	3.5	2.2
E84AVxxx3024xx5	12.0	4.6	3.0
E84AVxxx3024xx0	12.0	4.6	3.0
E84AVxxx4024	16.0	5.9	4.0
E84AVxxx5524	22.0	8.1	5.5
E84AVxxx7524	24.5	10.3	7.5
E84AVxxx1134	35.5	14.7	11.0
E84AVxxx1534	35.5	20.0	15.0
E84AVxxx1834	44.1	24.9	18.5
E84AVxxx2234	51.4	29.3	22.0
E84AVxxx3034	67.4	38.0	30.0
E84AVxxx3734	83.3	47.4	37.0
E84AVxxx4534	98.0	55.5	45.0

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	$I_{arated2}$	I_{aM2}	$I_{arated4}$	I_{aM4}	$I_{arated8}$	I_{aM8}	$I_{arated16}$	I_{aM16}
E84AVxxx3714	1.3	2.6	1.3	2.6	1.3	2.6	0.9	2.1
E84AVxxx5514	1.8	3.6	1.8	3.6	1.8	3.6	1.2	3.0
E84AVxxx7514	2.4	4.8	2.4	4.8	2.4	4.8	1.6	4.0
E84AVxxx1124	3.2	6.4	3.2	6.4	3.2	6.4	2.1	5.3
E84AVxxx1524	3.9	7.8	3.9	7.8	3.9	7.8	2.6	6.4
E84AVxxx2224	5.6	11.2	5.6	11.2	5.6	11.2	3.7	9.2
E84AVxxx3024xxS	7.3	14.6	7.3	14.6	7.3	14.6	4.9	9.5
E84AVxxx3024xx0	7.3	14.6	7.3	14.6	7.3	14.6	4.9	9.5
E84AVxxx4024	9.5	19.0	9.5	19.0	9.5	17.1	6.3	9.5
E84AVxxx5524	13.0	26.0	13.0	26.0	13.0	19.5	8.7	11.7
E84AVxxx7524	16.5	33.0	16.5	33.0	16.5	26.4	11.0	16.5
E84AVxxx1134	23.5	47.0	23.5	47.0	23.5	32.9	15.7	21.2
E84AVxxx1534	32.0	64.0	32.0	57.1	32.0	43.2	21.3	27.2
E84AVxxx1834	40.0	78.0	40.0	78.0	40.0	72.2	27.0	48.8
E84AVxxx2234	47.0	89.3	47.0	89.3	47.0	75.2	31.3	49.4
E84AVxxx3034	61.0	112.1	61.0	89.3	61.0	75.2	41.0	53.1
E84AVxxx3734	76.0	136.8	76.0	115.2	76.0	97.2	51.0	72.0
E84AVxxx4534	89.0	169.1	89.0	146.9	89.0	120.2	60.0	84.6

I_{aNx}
 I_{aMx}

Rated value of continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s according to the tables under chapter 4.4
- Can be obtained in the setting "x kHz fixed/..." in C00018

Switching
frequency

If the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

In the setting "x kHz var./..." in C00018 the switching frequency is reduced depending on the output current.

Depending on the switching frequency and e.g. the ambient temperature, it may be required to reduce the output current (chapter 4.1, operating conditions).

Rated data for internal brake chopper

Switching threshold V_{BRmax} : 725 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx3714	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx5514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx7514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx1124	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVxxx1524	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVxxx2224	150	4.8	3.5	4.8	3.5	-	∞	-
E84AVxxx3024xx5	82	8.8	6.4	8.8	6.4	-	∞	-
E84AVxxx3024xx0	82	8.8	6.4	8.8	6.4	-	∞	-
E84AVxxx4024	47	15.4	11.2	13.0	9.4	-	∞	-
E84AVxxx5524	47	15.4	11.2	13.0	9.4	-	∞	-
E84AVxxx7524	27	26.9	19.5	26.9	19.5	-	∞	-
E84AVxxx1134	27	26.9	19.5	26.9	19.5	-	∞	-
E84AVxxx1534	18	40.3	29.2	40.3	29.2	-	∞	-
E84AVxxx1834	15	48.3	35.0	48.3	35.0	-	∞	-
E84AVxxx2234	15	48.3	35.0	48.3	35.0	-	∞	-
E84AVxxx3034	7.5	96.7	70.1	96.7	70.1	-	∞	-
E84AVxxx3734	7.5	96.7	70.1	96.7	70.1	-	∞	-
E84AVxxx4534	7.5	96.7	70.1	96.7	70.1	-	∞	-

R_{Bmin}	Minimum brake resistance, nominal value $\pm 10\%$
I_{BRmax}	Peak current
P_{BRmax}	Peak braking power
I_{BRd}	Continuous current RMS - important for the dimensioning of the cables
P_{Bd}	Continuous braking power
t_z	Cycle time, periodic load change with running time and recovery time
t_{on}	Running time
$t_z - t_{on}$	Recovery time
t_{fp}	Maximum running time without initial load and compliance with the recovery time

Note on brake chopper operation according to cUL/CSA

Brake chopper operation according to cUL/CSA is ensured if the running time t_{on} is not higher than 30% compared to the cycle time t_z .

The condition is fulfilled if the continuous braking power P_d is not higher than 30% compared to the peak braking power P_{BRmax}^* made possible through the resistor R_B used:

$$\frac{t_{on}}{t_z} \leq 0.3 ; \quad \frac{P_d}{P_{BRmax}^*} \leq 0.3 ; \quad P_{BRmax}^* \leq \frac{U_{BRmax}^2}{R_B}$$

R_B	Brake resistor used (nameplate data)
V_{BRmax}	Switching threshold of the inverter (725 V at $V_{LN} = 400$ V, 790 V at $V_{Lr} = 500$ V)
V_{Lr}	Rated mains voltage
P_{BRmax}^*	Peak braking power of the resistor used
P_d	Continuous braking power of the load to be braked (dependent on the application)
t_{on}	Running time
t_z	Cycle time ("duty cycle")

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾ [mA]
	①	②	L1, L2, L3 - Laying system			③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18	≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18	
E84AVxxx7514	C 6	6	1.0	-	-	6	18	
E84AVxxx1124	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx1524	C 10	10	1.5	-	-	10	16	
E84AVxxx2224	C 10	10	1.5	-	-	10	16	
E84AVxxx3024xx5	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx3024xx0	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12	
E84AVxxx5524	C 25	25	4	-	-	20	12	
E84AVxxx7524	C 32	32	10	-	-	25	10	≥ 300 ³⁾
E84AVxxx1134	C 32	32	10	-	-	40	8	
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	C80	80	25	16	-	60	6	≥ 300 ³⁾
E84AVxxx2234	-	-	-	-	-	-	-	-
E84AVxxx3034	-	-	-	-	-	-	-	-
E84AVxxx3734	-	-	-	-	-	-	-	-
E84AVxxx4534	-	-	-	-	-	-	-	-

- ¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.
- ²⁾ Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.
- ³⁾ RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.
- ① Circuit breaker
② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category
③ Fuse
- Observe national and regional regulations

Operation with external mains choke/mains filter									
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾			RCD ³⁾
	①	②	L1, L2, L3 - Laying system			①	③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18		≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18		
E84AVxxx7514	C 6	6	1.0	-	-	6	18		
E84AVxxx1124	C 6	6	1.0	-	-	10	16		≥ 30 ³⁾
E84AVxxx1524	C 6	6	1.0	-	-	10	16		
E84AVxxx2224	C 10	10	1.5	-	-	10	16		
E84AVxxx3024xx S	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx3024xx 0	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12		
E84AVxxx5524	C 20	20	4	-	-	20	12		
E84AVxxx7524	C 20	20	4	2.5	-	20	12		≥ 300 ³⁾
E84AVxxx1134	C 32	32	10	10	-	30	10		
E84AVxxx1534	C 32	32	10	10	-	40	8		
E84AVxxx1834	C 50	50	16	10	-	40	8		≥ 300 ³⁾
E84AVxxx2234	C 63	63	25	16	-	50	6		
E84AVxxx3034	C 80	80	-	16	-	70	4		
E84AVxxx3734	C100	100	-	25	-	80	4		≥ 300 ³⁾
E84AVxxx4534	C125	125	-	50	-	100	3		

1) These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.

2) Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.

The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

3) RCD, optional, type B

If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

4.2.4 Operation at a rated mains voltage of 500 V

Mains	Voltage U_{Rated} [V]	Voltage range U_{Rated} [V]	Frequency range f [Hz]
3/PE AC	500	400 - 0 % ... 550 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power	Motor power
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]	U, V, W S_{aR} [kVA]	4 pol. ASM P_{aR} [kW]
E84AVxxx3714	1.1	1.4	0.8	0.37
E84AVxxx5514	1.4	2.0	1.1	0.55
E84AVxxx7514	2.0	2.6	1.5	0.75
E84AVxxx1124	2.6	3.6	2.0	1.1
E84AVxxx1524	3.1	4.4	2.4	1.5
E84AVxxx2224	4.1	5.8	3.5	2.2
E84AVxxx3024xx5	5.6	7.8	4.5	3.0
E84AVxxx3024xx0	5.6	7.8	4.5	3.0
E84AVxxx4024	7.0	10.5	5.9	4.0
E84AVxxx5524	9.6	14.4	8.1	5.5
E84AVxxx7524	12.0	16.0	10.3	7.5
E84AVxxx1134	16.8	23.2	14.7	11.0
E84AVxxx1534 ¹⁾	23.2	-	20.0	15.0
E84AVxxx1834	31.0	43.4	26.1	18.5
E84AVxxx2234 ¹⁾	36.1	-	31.5	22.0
E84AVxxx3034 ¹⁾	46.9	-	40.5	30.0
E84AVxxx3734 ¹⁾	58.2	-	50.7	37.0
E84AVxxx4534 ¹⁾	69.2	-	60.0	45.0

¹⁾ only with external mains choke

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx3714	No	EZAELN3002B153
E84AVxxx5514	No	EZAELN3004B742
E84AVxxx7514	No	
E84AVxxx1124	No	
E84AVxxx1524	No	EZAELN3006B492
E84AVxxx2224	No	
E84AVxxx3024xx5	No	EZAELN3008B372
E84AVxxx3024xx0	No	EZAELN3008B372
E84AVxxx4024	No	EZAELN3010B292
E84AVxxx5524	No	EZAELN3016B182
E84AVxxx7524	No	EZAELN3020B152
E84AVxxx1134	No	EZAELN3025B122
E84AVxxx1534	Yes	EZAELN3035B841
E84AVxxx1834	No	EZAELN3045B651
E84AVxxx2234	Yes	EZAELN3050B591
E84AVxxx3034	Yes	EZAELN3063B471
E84AVxxx3734	Yes	EZAELN3080B371
E84AVxxx4534	Yes	EZAELN3090B331

Alternative DC supply

Basis of the data			
Mains	Voltage U_{DC} [V]	Voltage range U_{DC} [V]	Frequency range f [Hz]
2/PE DC	705	565 - 0 % ... 775 + 0 %	-

Type	Input current at I_{aN} I_{DC} [A]	Output power U, V, W S_{ar} [kVA]	Motor power 4.pol. ASM P_{ar} [kW]
E84AVxxx3714	1.7	0.8	0.37
E84AVxxx5514	2.4	1.1	0.55
E84AVxxx7514	3.2	1.5	0.75
E84AVxxx1124	4.4	2.0	1.1
E84AVxxx1524	5.4	2.4	1.5
E84AVxxx2224	7.1	3.5	2.2
E84AVxxx3024xxS	9.6	4.5	3.0
E84AVxxx3024xx0	9.6	4.5	3.0
E84AVxxx4024	12.9	5.9	4.0
E84AVxxx5524	17.6	8.1	5.5
E84AVxxx7524	19.6	10.3	7.5
E84AVxxx1134	28.4	14.7	11.0
E84AVxxx1534	28.4	20.0	15.0
E84AVxxx1834	38.0	26.1	18.5
E84AVxxx2234	44.2	31.5	22.0
E84AVxxx3034	57.4	40.5	30.0
E84AVxxx3734	71.3	50.7	37.0
E84AVxxx4534	84.8	60.0	45.0

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{arated2}	I_{aM2}	I_{arated4}	I_{aM4}	I_{arated8}	I_{aM8}	I_{arated16}	I_{aM16}
E84AVxxx3714	1.0	2.6	1.0	2.6	1.0	2.4	0.7	1.7
E84AVxxx5514	1.4	3.6	1.4	3.6	1.4	3.3	0.9	2.3
E84AVxxx7514	1.9	4.8	1.9	4.8	1.9	4.4	1.3	3.1
E84AVxxx1124	2.6	6.4	2.6	6.4	2.6	5.9	1.7	4.1
E84AVxxx1524	3.1	7.8	3.1	7.2	3.1	7.2	2.1	5.0
E84AVxxx2224	4.5	11.2	4.5	11.2	4.5	10.4	3.0	7.2
E84AVxxx3024xxS	5.8	14.6	5.8	13.5	5.8	13.5	3.9	7.4
E84AVxxx3024xx0	5.8	14.6	5.8	13.5	5.8	13.5	3.9	7.4
E84AVxxx4024	7.6	19.0	7.6	17.6	7.6	13.4	5.1	7.3
E84AVxxx5524	10.4	26.0	10.4	24.1	10.4	15.2	6.9	9.0
E84AVxxx7524	13.2	33.0	13.2	30.5	13.2	20.6	8.8	12.7
E84AVxxx1134	18.8	47.0	18.8	43.5	18.8	25.6	12.5	16.2
E84AVxxx1534	25.6	64.0	25.6	49.0	25.6	33.6	17.1	20.8
E84AVxxx1834	34.0	78.0	34.0	78.0	34.0	61.2	23.0	41.1
E84AVxxx2234	40.0	89.3	40.0	89.3	40.0	63.7	27.0	41.5
E84AVxxx3034	52.0	112.1	52.0	89.3	52.0	63.7	35.0	44.4
E84AVxxx3734	65.0	136.8	65.0	97.6	65.0	82.1	43.0	60.4
E84AVxxx4534	77.0	169.1	77.0	124.4	77.0	101.5	51.0	70.8

 I_{aNx} I_{aMx} Switching
frequency

Rated value of continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s according to the tables under chapter 4.4
- Can be obtained in the setting "x kHz fixed/..." in C00018

If the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

In the setting "x kHz var./..." in C00018 the switching frequency is reduced depending on the output current.

Depending on the switching frequency and e.g. the ambient temperature, it may be required to reduce the output current (chapter 4.1, operating conditions).

Rated data for internal brake chopper

Switching threshold V_{BRmax} : 790 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx3714	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx5514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx7514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx1124	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVxxx1524	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVxxx2224	150	5.3	4.2	5.3	4.2	-	∞	-
E84AVxxx3024xx5	82	9.6	7.6	9.6	7.6	-	∞	-
E84AVxxx3024xx0	82	9.6	7.6	9.6	7.6	-	∞	-
E84AVxxx4024	47	16.8	13.3	13.0	10.3	-	∞	-
E84AVxxx5524	47	16.8	13.3	13.0	10.3	-	∞	-
E84AVxxx7524	27	29.3	23.1	29.3	23.1	-	∞	-
E84AVxxx1134	27	29.3	23.1	29.3	23.1	-	∞	-
E84AVxxx1534	18	43.9	34.7	43.9	34.7	-	∞	-
E84AVxxx1834	15	52.7	41.6	52.7	41.6	-	∞	-
E84AVxxx2234	15	52.7	41.6	52.7	41.6	-	∞	-
E84AVxxx3034	7.5	105.3	83.2	105.3	83.2	-	∞	-
E84AVxxx3734	7.5	105.3	83.2	105.3	83.2	-	∞	-
E84AVxxx4534	7.5	105.3	83.2	105.3	83.2	-	∞	-

R_{Bmin}	Minimum brake resistance, nominal value $\pm 10\%$
I_{BRmax}	Peak current
P_{BRmax}	Peak braking power
I_{BRd}	Continuous current RMS - important for the dimensioning of the cables
P_{Bd}	Continuous braking power
t_z	Cycle time, periodic load change with running time and recovery time
t_{on}	Running time
$t_z - t_{on}$	Recovery time
t_{fp}	Maximum running time without initial load and compliance with the recovery time

Note on brake chopper operation according to cUL/CSA

Brake chopper operation according to cUL/CSA is ensured if the running time t_{on} is not higher than 30% compared to the cycle time t_z .

The condition is fulfilled if the continuous braking power P_d is not higher than 30% compared to the peak braking power P_{BRmax}^* made possible through the resistor R_B used:

$$\frac{t_{on}}{t_z} \leq 0.3 ; \quad \frac{P_d}{P_{BRmax}^*} \leq 0.3 ; \quad P_{BRmax}^* \leq \frac{U_{BRmax}^2}{R_B}$$

R_B	Brake resistor used (nameplate data)
V_{BRmax}	Switching threshold of the inverter (725 V at $V_{LN} = 400$ V, 790 V at $V_{Lr} = 500$ V)
V_{Lr}	Rated mains voltage
P_{BRmax}^*	Peak braking power of the resistor used
P_d	Continuous braking power of the load to be braked (dependent on the application)
t_{on}	Running time
t_z	Cycle time ("duty cycle")

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾ [mA]
	①	②	L1, L2, L3 - Laying system			③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18	≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18	
E84AVxxx7514	C 6	6	1.0	-	-	6	18	
E84AVxxx1124	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx1524	C 10	10	1.5	-	-	10	16	
E84AVxxx2224	C 10	10	1.5	-	-	10	16	
E84AVxxx3024xx5	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx3024xx0	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12	
E84AVxxx5524	C 25	25	4	-	-	20	12	
E84AVxxx7524	C 32	32	10	-	-	25	10	≥ 300 ³⁾
E84AVxxx1134	C 32	32	10	-	-	40	8	
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	C80	80	25	16	-	60	6	≥ 300 ³⁾
E84AVxxx2234	-	-	-	-	-	-	-	-
E84AVxxx3034	-	-	-	-	-	-	-	-
E84AVxxx3734	-	-	-	-	-	-	-	-
E84AVxxx4534	-	-	-	-	-	-	-	-

¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.

²⁾ Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

³⁾ RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

Operation with external mains choke/mains filter									
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾			RCD ³⁾
	①	②	L1, L2, L3 - Laying system			①	③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18		≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18		
E84AVxxx7514	C 6	6	1.0	-	-	6	18		
E84AVxxx1124	C 6	6	1.0	-	-	10	16		≥ 30 ³⁾
E84AVxxx1524	C 6	6	1.0	-	-	10	16		
E84AVxxx2224	C 10	10	1.5	-	-	10	16		
E84AVxxx3024xx S	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx3024xx 0	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12		
E84AVxxx5524	C 20	20	4	-	-	20	12		
E84AVxxx7524	C 20	20	4	2.5	-	20	12		≥ 300 ³⁾
E84AVxxx1134	C 32	32	10	10	-	30	10		
E84AVxxx1534	C 32	32	10	10	-	40	8		
E84AVxxx1834	C 50	50	16	-	-	40	8		≥ 300 ³⁾
E84AVxxx2234	C 63	63	25	-	-	50	6		
E84AVxxx3034	C80	80	-	16	-	70	4		
E84AVxxx3734	C100	100		25	-	80	4		≥ 300 ³⁾
E84AVxxx4534	C125	125		50	-	100	3		≥ 300 ³⁾

- ¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.
- ²⁾ Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.
- ³⁾ RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.
- ① Circuit breaker
② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category
③ Fuse
- Observe national and regional regulations

4.2.5 Operation with increased power at a 230 V mains

With an increased continuous power, the inverter can be connected to a next higher and more powerful motor. The overload capacity according to operation with rated data continues to exist. The drive of units with quadratic load characteristic as provided by pumps or fans are typical applications.



Note!

Operation with increased power is only permitted ...

- ▶ With the rated data provided for the controller.
- ▶ In the stated mains voltage range.
- ▶ At switching frequencies of 2 kHz and 4 kHz.
- ▶ At a max. ambient temperature of 40 °C.
- ▶ With the stated installation types.
- ▶ With the fuses, cable cross-sections, mains chokes and filters required for this type of operation.
- ▶ After parameterisation acc. to specification (cp. software manual EDS84AV...)

Mains	Voltage U_{Rated} [V]	Voltage range U_{Rated} [V]	Frequency range f [Hz]
1/N/PE AC	230	180 - 0 % ... 264 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power U, V, W S_{aR} [kVA]	Motor power 4 pol. ASM P_{aR} [kW]
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]		
E84AVxxx2512	3.6	4.1	0.8	0.37
E84AVxxx3712	5.0	-	1.0	0.55
E84AVxxx5512	6.0	6.4	1.3	0.75
E84AVxxx7512	8.4	-	1.7	1.1
E84AVxxx1122	11.9	14.4	2.4	1.5
E84AVxxx1522	13.7	-	3.0	2.2
E84AVxxx2222	-	-	-	-

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx2512	no	ELN1-0900H005
E84AVxxx3712	yes	ELN1-0900H005
E84AVxxx5512	no	ELN1-0500H009
E84AVxxx7512	yes	ELN1-0500H009
E84AVxxx1122	no	ELN1-0250H018
E84AVxxx1522	yes	ELN1-0250H018
E84AVxxx2222	-	-

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I _{rated2}	I _{aM2}	I _{rated4}	I _{aM4}	I _{rated8}	I _{aM8}	I _{rated16}	I _{aM16}
E84AVxxx2512	2.1	3.4	2.1	3.4	-	-	-	-
E84AVxxx3712	2.9	4.8	2.9	4.8	-	-	-	-
E84AVxxx5512	3.6	6.0	3.6	6.0	-	-	-	-
E84AVxxx7512	4.8	8.0	4.8	8.0	-	-	-	-
E84AVxxx1122	6.8	11.0	6.8	11.0	-	-	-	-
E84AVxxx1522	8.4	14.0	8.4	14.0	-	-	-	-
E84AVxxx2222	-	-	-	-	-	-	-	-

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾
	①	②	L1, L2, L3 - Laying system			③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx2512	C 6	6	1	-	-	6	18	≥ 30 ³⁾
E84AVxxx3712	-	-	-	-	-	10	16	-
E84AVxxx5512	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx7512	-	-	-	-	-	15	14	-
E84AVxxx1122	C 16	16	2.5	-	-	20	12	≥ 30 ³⁾
E84AVxxx1522	-	-	-	-	-	25	10	-
E84AVxxx2222	-	-	-	-	-	30	10	-

Operation with external mains choke/mains filter									
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾			RCD ³⁾
	①	②	L1, L2, L3 - Laying system			①	③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[A]	[AWG]	
E84AVxxx2512	C 6	6	1	-	-	6	18	≥ 30 ³⁾	
E84AVxxx3712	C 6	6	1	-	-	10	16		
E84AVxxx5512	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾	
E84AVxxx7512	C 10	10	1.5	-	-	15	14		
E84AVxxx1122	C 16	16	2.5	-	-	20	12	≥ 30 ³⁾	
E84AVxxx1522	C 16	16	2.5	-	-	25	10		
E84AVxxx2222	-	-	-	-	-	30	10		

1) These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.

2) Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

3) RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

4.2.6 Operation with increased power at a 400 V mains

With an increased continuous power, the inverter can be connected to a next higher and more powerful motor. The overload capacity according to operation with rated data continues to exist. The drive of units with quadratic load characteristic as provided by pumps or fans are typical applications.



Note!

Operation with increased power is only permitted ...

- ▶ With the rated data provided for the controller.
- ▶ In the stated mains voltage range.
- ▶ At switching frequencies of 2 kHz and 4 kHz.
- ▶ At a max. ambient temperature of 40 °C.
- ▶ With the stated installation types.
- ▶ With the fuses, cable cross-sections, mains chokes and filters required for this type of operation.
- ▶ After parameterisation acc. to specification (cp. software manual EDS84AV...)

Mains	Voltage U_{Lrated} [V]	Voltage range U_{Lrated} [V]	Frequency range f [Hz]
3/PE AC	400	320 - 0 % ... 440 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power U, V, W S_{aR} [kVA]	Motor power 4 pol. ASM P_{aR} [kW]
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]		
E84AVxxx3714	1.7	2.2	1.0	0.55
E84AVxxx5514	2.4	2.9	1.4	0.75
E84AVxxx7514	2.9	-	1.8	1.1
E84AVxxx1124	3.8	5.3	2.4	1.5
E84AVxxx1524	4.7	6.6	3.0	2.2
E84AVxxx2224	6.1	-	4.2	3.0
E84AVxxx3024xxS	8.4	-	5.5	4.0
E84AVxxx3024xx0	8.4	11.8	5.5	4.0
E84AVxxx4024	10.6	15.7	7.2	5.5
E84AVxxx5524	18.0	-	9.7	7.5
E84AVxxx7524	21.0	28	13.1	11
E84AVxxx1134	29.0	-	17.6	15
E84AVxxx1534	-	-	-	-
E84AVxxx1834	42.2	-	29.2	22
E84AVxxx2234 ¹⁾	50.8	-	35.2	30
E84AVxxx3034 ¹⁾	66.0	-	45.6	37
E84AVxxx3734 ¹⁾	81.6	-	56.9	45
E84AVxxx4534 ¹⁾	96.0	-	66.6	55

¹⁾ only with external mains choke

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx3714	No	EZAELN3002B153
E84AVxxx5514	No	EZAELN3004B742
E84AVxxx7514	Yes	
E84AVxxx1124	No	
E84AVxxx1524	No	EZAELN3006B492
E84AVxxx2224	Yes	EZAELN3008B372
E84AVxxx3024xx5	Yes	EZAELN3010B292
E84AVxxx3024xx0	No	EZAELN3010B292
E84AVxxx4024	No	EZAELN3016B182
E84AVxxx5524	Yes	EZAELN3020B152
E84AVxxx7524	No	EZAELN3025B122
E84AVxxx1134	Yes	EZAELN3030B982
E84AVxxx1534	-	-
E84AVxxx1834	Yes	EZAELN3045B651
E84AVxxx2234	Yes	EZAELN3063B471
E84AVxxx3034	Yes	EZAELN3080B371
E84AVxxx3734	Yes	EZAELN3090B331
E84AVxxx4534	Yes	EZAELN3100B301

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{arated2}	I_{aM2}	I_{arated4}	I_{aM4}	I_{arated8}	I_{aM8}	I_{arated16}	I_{aM16}
E84AVxxx3714	1.6	2.6	1.6	2.6	-	-	-	-
E84AVxxx5514	2.2	3.6	2.2	3.6	-	-	-	-
E84AVxxx7514	2.9	4.8	2.9	4.8	-	-	-	-
E84AVxxx1124	3.8	6.4	3.8	6.4	-	-	-	-
E84AVxxx1524	4.8	7.8	4.8	7.8	-	-	-	-
E84AVxxx2224	6.7	11.2	6.7	11.2	-	-	-	-
E84AVxxx3024xxS	8.8	14.6	8.8	14.6	-	-	-	-
E84AVxxx3024xx0	8.8	14.6	8.8	14.6	-	-	-	-
E84AVxxx4024	11.5	19.0	11.5	19.0	-	-	-	-
E84AVxxx5524	15.6	26.0	15.6	26.0	-	-	-	-
E84AVxxx7524	21.0	33.0	21.0	33.0	-	-	-	-
E84AVxxx1134	28.2	47.0	28.2	47.0	-	-	-	-
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	46.8	78.0	46.8	78.0	-	-	-	-
E84AVxxx2234	56.4	89.3	56.4	89.3	-	-	-	-
E84AVxxx3034	73.2	112.1	73.2	89.3	-	-	-	-
E84AVxxx3734	91.2	136.8	91.2	115.2	-	-	-	-
E84AVxxx4534	107.0	169.1	107.0	146.9	-	-	-	-

I_{aNx}
 I_{aMx}

Rated value of continuous output current
Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s according to the tables under chapter 4.4
- Can be obtained in the setting "x kHz fixed/..." in C00018

If the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

In the setting "x kHz var./..." in C00018 the switching frequency is reduced depending on the output current.

Depending on the switching frequency and e.g. the ambient temperature, it may be required to reduce the output current (chapter 4.1, operating conditions).

Switching
frequency

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾ [mA]
	①	②	L1, L2, L3 - Laying system			③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18	≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18	
E84AVxxx7514	-	-	-	-	-	-	-	-
E84AVxxx1124	C10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx1524	C 10	10	1.5	-	-	10	16	
E84AVxxx2224	-	-	-	-	-	-	-	-
E84AVxxx3024xx5	-	-	-	-	-	-	-	-
E84AVxxx3024xx0	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12	≥ 300 ³⁾
E84AVxxx5524	-	-	-	-	-	-	-	-
E84AVxxx7524	C 32	32	10	-	-	25	10	≥ 300 ³⁾
E84AVxxx1134	-	-	-	-	-	-	-	-
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	-	-	-	-	-	-	-	-
E84AVxxx2234	-	-	-	-	-	-	-	-
E84AVxxx3034	-	-	-	-	-	-	-	-
E84AVxxx3734	-	-	-	-	-	-	-	-
E84AVxxx4534	-	-	-	-	-	-	-	-

1) These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45 °C, no bundling of cables or cores, three loaded cores.

2) Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C.

3) RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

Operation with external mains choke/mains filter									
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾			RCD ³⁾
	①	②	L1, L2, L3 - Laying system			①	③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18		≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18		
E84AVxxx7514	C 6	6	1.0	-	-	6	18		
E84AVxxx1124	C 6	6	1.0	-	-	10	16		≥ 30 ³⁾
E84AVxxx1524	C 6	6	1.0	-	-	10	16		
E84AVxxx2224	C 10	10	1.5	-	-	10	16		
E84AVxxx3024xx S	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx3024xx O	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12		≥ 300 ³⁾
E84AVxxx5524	C 20	20	4	-	-	20	12		
E84AVxxx7524	C 20	20	4	2.5	-	20	12		
E84AVxxx1134	C 32	32	10	10	-	30	10		≥ 300 ³⁾
E84AVxxx1534	-	-	-	-	-	-	-		-
E84AVxxx1834	C 50	50	16	-	-	60	6		≥ 300 ³⁾
E84AVxxx2234	C 63	63	25	-	-	60	6		
E84AVxxx3034	C100	100	-	25	-	80	4		
E84AVxxx3734	C125	125	-	50	-	100	3		≥ 300 ³⁾
E84AVxxx4534	C125	125	-	50	-	125	1		

- 1) These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.
- 2) Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.
- 3) RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.
- ① Circuit breaker
② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category
③ Fuse
- Observe national and regional regulations

4.2.7

Operation with increased power at a 500 V mains

With an increased continuous power, the inverter can be connected to a next higher and more powerful motor. The overload capacity according to operation with rated data continues to exist. The drive of units with quadratic load characteristic as provided by pumps or fans are typical applications.

**Note!**

Operation with increased power is only permitted ...

- ▶ With the rated data provided for the controller.
- ▶ In the stated mains voltage range.
- ▶ At switching frequencies of 2 kHz and 4 kHz.
- ▶ At a max. ambient temperature of 40 °C.
- ▶ With the stated installation types.
- ▶ With the fuses, cable cross-sections, mains chokes and filters required for this type of operation.
- ▶ After parameterisation acc. to specification (cp. software manual EDS84AV...)

Mains	Voltage U_{Lrated} [V]	Voltage range U_{Lrated} [V]	Frequency range f [Hz]
3/PE AC	500	400 - 0 % ... 550 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Apparent output power U, V, W S_{aR} [kVA]	Motor power 4 pol. ASM P_{aR} [kW]
	with external mains choke I_{LR} [A]	without external mains choke I_{LR} [A]		
E84AVxxx3714	1.3	1.7	1.0	0.55
E84AVxxx5514	1.7	2.4	1.4	0.75
E84AVxxx7514	2.4	-	1.8	1.1
E84AVxxx1124	3.1	4.3	2.4	1.5
E84AVxxx1524	3.7	5.3	3.0	2.2
E84AVxxx2224	4.9	-	4.2	3.0
E84AVxxx3024xxS	6.7	-	5.5	4.0
E84AVxxx3024xx0	6.7	9.4	5.5	4.0
E84AVxxx4024	8.4	12.6	7.2	5.5
E84AVxxx5524	14.4	-	9.7	7.5
E84AVxxx7524	16.8	22.4	13.3	11
E84AVxxx1134	20.1	-	17.6	15
E84AVxxx1534	-	-	-	-
E84AVxxx1834	33.7	-	31.3	22
E84AVxxx2234 ¹⁾	40.6	-	37.8	30
E84AVxxx3034 ¹⁾	56.3	-	45.7	37
E84AVxxx3734 ¹⁾	69.8	-	56.9	45
E84AVxxx4534 ¹⁾	83.0	-	66.6	55

¹⁾ only with external mains choke

Assignment of external mains chokes

Assignment		
Type	Mains choke required	Mains choke
E84AVxxx3714	No	EZAELN3002B153
E84AVxxx5514	No	EZAELN3004B742
E84AVxxx7514	Yes	
E84AVxxx1124	No	
E84AVxxx1524	No	EZAELN3006B492
E84AVxxx2224	Yes	EZAELN3008B372
E84AVxxx3024xx5	Yes	EZAELN3010B292
E84AVxxx3024xx0	No	EZAELN3010B292
E84AVxxx4024	No	EZAELN3016B182
E84AVxxx5524	Yes	EZAELN3020B152
E84AVxxx7524	No	EZAELN3025B122
E84AVxxx1134	Yes	EZAELN3030B982
E84AVxxx1534	-	-
E84AVxxx1834	Yes	EZAELN3045B651
E84AVxxx2234	Yes	EZAELN3063B471
E84AVxxx3034	Yes	EZAELN3080B371
E84AVxxx3734	Yes	EZAELN3090B331
E84AVxxx4534	Yes	EZAELN3100B301

Switching frequency-dependent output currents

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{arated2}	I_{aM2}	I_{arated4}	I_{aM4}	I_{arated8}	I_{aM8}	I_{arated16}	I_{aM16}
E84AVxxx3714	1.2	2.6	1.2	2.6	-	-	-	-
E84AVxxx5514	1.7	3.6	1.7	3.6	-	-	-	-
E84AVxxx7514	2.3	4.8	2.3	4.8	-	-	-	-
E84AVxxx1124	3.1	6.4	3.1	6.4	-	-	-	-
E84AVxxx1524	3.8	7.8	3.8	7.2	-	-	-	-
E84AVxxx2224	5.4	11.2	5.4	11.2	-	-	-	-
E84AVxxx3024xxS	7.0	14.6	7.0	13.5	-	-	-	-
E84AVxxx3024xx0	7.0	14.6	7.0	13.5	-	-	-	-
E84AVxxx4024	9.1	19.0	9.1	17.6	-	-	-	-
E84AVxxx5524	12.5	26.0	12.5	24.1	-	-	-	-
E84AVxxx7524	17.0	33.0	17.0	30.5	-	-	-	-
E84AVxxx1134	22.6	47.0	22.6	43.5	-	-	-	-
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	40.2	78.0	40.2	78.0	-	-	-	-
E84AVxxx2234	48.5	89.3	48.5	89.3	-	-	-	-
E84AVxxx3034	58.6	112.1	58.6	89.3	-	-	-	-
E84AVxxx3734	73.0	136.8	73.0	97.6	-	-	-	-
E84AVxxx4534	85.4	169.1	85.4	124.4	-	-	-	-

I_{aNx}
 I_{aMx}

Rated value of continuous output current
Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s according to the tables under chapter 4.4
- Can be obtained in the setting "x kHz fixed/..." in C00018

If the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

In the setting "x kHz var./..." in C00018 the switching frequency is reduced depending on the output current.

Depending on the switching frequency and e.g. the ambient temperature, it may be required to reduce the output current (chapter 4.1, operating conditions).

Switching
frequency

Fuses and cable cross-sections

Operation without external mains choke/mains filter								
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾		RCD ³⁾ [mA]
	①	②	L1, L2, L3 - Laying system			③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18	≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18	
E84AVxxx7514	-	-	-	-	-	-	-	-
E84AVxxx1124	C 10	10	1.5	-	-	10	16	≥ 30 ³⁾
E84AVxxx1524	C10	10	1.5	-	-	10	16	
E84AVxxx2224	-	-	-	-	-	-	-	-
E84AVxxx3024xx5	-	-	-	-	-	-	-	-
E84AVxxx3024xx0	C 16	16	2.5	-	-	15	14	≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12	
E84AVxxx5524	-	-	-	-	-	-	-	-
E84AVxxx7524	C 32	32	10	-	-	25	10	≥ 300 ³⁾
E84AVxxx1134	-	-	-	-	-	-	-	-
E84AVxxx1534	-	-	-	-	-	-	-	-
E84AVxxx1834	-	-	-	-	-	-	-	-
E84AVxxx2234	-	-	-	-	-	-	-	-
E84AVxxx3034	-	-	-	-	-	-	-	-
E84AVxxx3734	-	-	-	-	-	-	-	-
E84AVxxx4534	-	-	-	-	-	-	-	-

- 1) These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45 °C, no bundling of cables or cores, three loaded cores.
- 2) Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C.
- 3) RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.
- ① Circuit breaker
② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category
③ Fuse
- Observe national and regional regulations

Operation with external mains choke/mains filter									
Type	Installation according to EN 60204-1 ¹⁾					Installation according to UL ²⁾			RCD ³⁾
	①	②	L1, L2, L3 - Laying system			①	③	L1, L2, L3	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[A]	[AWG]	
E84AVxxx3714	C 6	6	1.0	-	-	6	18		≥ 30 ³⁾
E84AVxxx5514	C 6	6	1.0	-	-	6	18		
E84AVxxx7514	C 6	6	1.0	-	-	6	18		
E84AVxxx1124	C 6	6	1.0	-	-	10	16		≥ 30 ³⁾
E84AVxxx1524	C 6	6	1.0	-	-	10	16		
E84AVxxx2224	C 10	10	1.5	-	-	10	16		
E84AVxxx3024xx S	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx3024xx 0	C 10	10	1.5	-	-	15	14		≥ 300 ³⁾
E84AVxxx4024	C 16	16	2.5	-	-	20	12		
E84AVxxx5524	C 20	20	4	-	-	20	12		
E84AVxxx7524	C 20	20	4	2.5	-	20	12		≥ 300 ³⁾
E84AVxxx1134	C 32	32	10	10	-	30	10		
E84AVxxx1534	-	-	-	-	-	-	-		
E84AVxxx1834	C 50	50	16	-	-	60	6		≥ 300 ³⁾
E84AVxxx2234	C 63	63	25	-	-	60	6		
E84AVxxx3034	C100	100	-	25	-	80	4		
E84AVxxx3734	C125	125	-	50	-	100	3		≥ 300 ³⁾
E84AVxxx4534	C125	125	-	50	-	125	1		

¹⁾ These values are recommendations only. Other dimensioning values/laying systems are possible (e.g. according to VDE 0298-4). The cable cross-sections apply under the following conditions: Use of PVC-insulated copper cables, conductor temperature < 70 °C, ambient temperature < 45°C, no bundling of cables or cores, three loaded cores.

²⁾ Use UL-approved cables, fuses and fuse holders only. UL fuse:  6.1.6.
The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

³⁾ RCD, optional, type B
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

① Circuit breaker

② Fuse of gG/gL utilisation category or semiconductor fuses of gRL utilisation category

③ Fuse

Observe national and regional regulations

4.3 Current characteristics

The controller limits its maximally possible motor current under the following operating conditions ("current derating"):

- ▶ If the maximum heatsink temperature is exceeded
 - In this case, the controller switches independently from switching frequency mode of 16 kHz to 8 kHz and from 8 kHz to 4 kHz (but not from 4 kHz to 2 kHz). This function can be deactivated via C00144.
When the heatsink temperature continues to rise, the inverter output will be inhibited and the error message "Trip" occurs. This also occurs when the switching frequency reduction is deactivated.
- ▶ In case of output frequencies $f_{out} < |5 \text{ Hz}|$
- ▶ As a function of the switching frequency modes "fixed" or "variable"

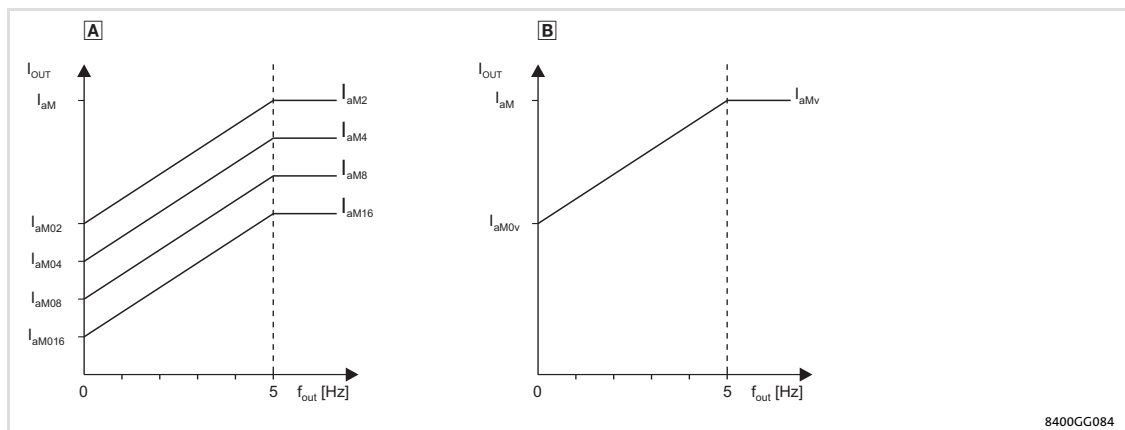


Fig. 4-1 Current derating characteristics

- A** Derating curve depending on the fixed switching frequency
- B** Derating curve depending on the variable switching frequency

I_{out}	Output current
I_{aM}	Maximum output current (overload current)
I_{aMx}	Maximum output current (overload current) at different switching frequencies: 2kHz, 4kHz, 8kHz and 16kHz
I_{aM0x}	Maximum output current (overload current) at $f_{out} = 0\text{Hz}$ and different switching frequencies: 2kHz, 4kHz, 8kHz, 16kHz
I_{aMv}	Maximum output current (overload current) at a variable switching frequency
I_{aM0v}	Maximum output current (overload current) at $f_{out} = 0\text{Hz}$ and a variable switching frequency
f_{out}	Field frequency at the output U, V, W

The maximum output currents depending on the mains voltage and the switching frequency modes are shown in the following tables.

Type	Maximum output currents [A] ¹⁾ at a fixed switching frequency and $U_{LN} = 230V$							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aM02}	I_{aM2}	I_{aM04}	I_{aM4}	I_{aM08}	I_{aM8}	I_{aM016}	I_{aM16}
E84AVxxx2512	3.4	3.4	3.4	3.4	3.0	3.4	2.3	2.8
E84AVxxx3712	4.8	4.8	4.8	4.8	4.2	4.8	3.2	4.0
E84AVxxx5512	6.0	6.0	6.0	6.0	4.1	6.0	2.9	5.0
E84AVxxx7512	8.0	8.0	8.0	8.0	5.4	8.0	3.8	6.6
E84AVxxx1122	8.3	11.0	8.3	11.0	7.4	11.0	4.1	9.1
E84AVxxx1522	10.5	14.0	10.5	14.0	9.5	14.0	5.3	11.6
E84AVxxx2222	14.3	19.0	14.3	19.0	12.8	19.0	7.1	15.7

Type	Maximum output currents [A] ¹⁾ at a fixed switching frequency and $U_{LN} = 400V$							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aM02}	I_{aM2}	I_{aM04}	I_{aM4}	I_{aM08}	I_{aM8}	I_{aM016}	I_{aM16}
E84AVxxx3714	2.6	2.6	2.6	2.6	1.5	2.6	1.0	2.1
E84AVxxx5514	3.6	3.6	3.6	3.6	2.1	3.6	1.4	3.0
E84AVxxx7514	4.8	4.8	4.8	4.8	2.8	4.8	1.8	4.0
E84AVxxx1124	4.8	6.4	4.8	6.4	3.4	6.4	2.1	5.3
E84AVxxx1524	5.9	7.8	5.9	7.8	4.1	7.8	2.5	6.4
E84AVxxx2224	8.4	11.2	8.4	11.2	5.9	11.2	3.6	9.2
E84AVxxx3024xx5	11.0	14.6	11.0	14.6	9.5	14.6	5.5	9.5
E84AVxxx3024xx0	11.0	14.6	11.0	14.6	9.5	14.6	5.5	9.5
E84AVxxx4024	14.3	19.0	13.8	19.0	9.5	17.1	5.7	9.5
E84AVxxx5524	19.5	26.0	16.9	26.0	11.7	19.5	6.5	11.7
E84AVxxx7524	24.8	33.0	24.8	33.0	16.5	26.4	9.9	16.5
E84AVxxx1134	35.3	47.0	31.7	47.0	21.2	32.9	12.9	21.2
E84AVxxx1534	48.0	64.0	44.8	62.4	30.4	43.2	17.6	27.2
E84AVxxx1834	58.5	78.0	58.5	78.0	48.8	72.2	29.3	48.8
E84AVxxx2234	70.5	89.3	68.2	89.3	49.4	75.2	30.6	49.4
E84AVxxx3034	82.6	112.1	67.9	88.5	53.1	73.8	38.4	53.1
E84AVxxx3734	108.0	136.8	93.6	115.2	79.2	97.2	54.0	72.0
E84AVxxx4534	133.5	169.1	124.6	146.9	97.9	120.2	66.8	84.6

Type	Maximum output currents [A] ¹⁾ at a fixed switching frequency and $U_{LN} = 500V$							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aM02}	I_{aM2}	I_{aM04}	I_{aM4}	I_{aM08}	I_{aM8}	I_{aM016}	I_{aM16}
E84AVxxx3714	2.6	2.6	2.4	2.6	1.2	2.4	0.7	1.7
E84AVxxx5514	3.6	3.6	3.3	3.6	1.6	3.3	1.0	2.3
E84AVxxx7514	4.8	4.8	4.4	4.8	2.1	4.4	1.4	3.1
E84AVxxx1124	4.8	6.4	4.8	6.4	2.6	5.9	1.6	4.1
E84AVxxx1524	5.9	7.8	5.9	7.2	3.2	7.2	1.9	5.0
E84AVxxx2224	8.4	11.2	8.4	11.2	4.5	10.4	2.7	7.2
E84AVxxx3024xx5	11.0	14.6	10.6	13.5	7.4	13.5	4.2	7.4
E84AVxxx3024xx0	11.0	14.6	10.6	13.5	7.4	13.5	4.2	7.4
E84AVxxx4024	14.3	19.0	10.7	17.6	7.3	13.4	4.3	7.3
E84AVxxx5524	19.5	26.0	13.1	24.1	9.0	15.2	4.8	9.0
E84AVxxx7524	24.8	33.0	19.3	30.5	12.7	20.6	7.4	12.7
E84AVxxx1134	35.3	47.0	24.7	43.5	16.2	25.6	9.6	16.2
E84AVxxx1534	48.0	64.0	34.9	49.0	23.4	33.6	13.1	20.8
E84AVxxx1834	58.5	78.0	56.2	78.0	41.1	61.2	24.3	41.1
E84AVxxx2234	70.5	89.3	57.6	89.3	41.5	63.7	25.3	41.5
E84AVxxx3034	82.6	112.1	57.1	74.9	44.4	62.2	31.7	44.4
E84AVxxx3734	108.0	136.8	79.0	97.6	66.6	82.1	44.9	60.4
E84AVxxx4534	133.5	169.1	105.3	124.4	82.3	101.5	55.5	70.8

¹⁾ The shown values apply to the operation with ambient temperatures of up to +45°C for 2/4kHz and up to +40°C for 8/16kHz. For ambient temperatures between +40/45°C and +55°C, a derating from 2.5 %/K to the given values must be observed.

Type	Maximum output currents [A] ¹⁾ at a variable switching frequency	
	$U_{Lr} = 230V$	
	I_{aM0v}	I_{aMv}
E84AVxxx2512	3.4	3.4
E84AVxxx3712	4.8	4.8
E84AVxxx5512	6.0	6.0
E84AVxxx7512	8.0	8.0
E84AVxxx1122	8.3	11.0
E84AVxxx1522	10.5	14.0
E84AVxxx2222	14.3	19.0

Type	Maximum output currents [A] ¹⁾ at a variable switching frequency	
	$U_{Lr} = 400V/U_{Lr} = 500V$	
	I_{aM0v}	I_{aMv}
E84AVxxx3714	2.6	2.6
E84AVxxx5514	3.6	3.6
E84AVxxx7514	4.8	4.8
E84AVxxx1124	4.8	6.4
E84AVxxx1524	5.9	7.8
E84AVxxx2224	8.4	11.2
E84AVxxx3024xx5	11.0	14.6
E84AVxxx3024xx0	11.0	14.6
E84AVxxx4024	14.3	19.0
E84AVxxx5524	19.5	26.0
E84AVxxx7524	24.8	33.0
E84AVxxx1134	35.3	47.0
E84AVxxx1534	48.0	64.0
E84AVxxx1834	58.5	78.0
E84AVxxx2234	70.5	89.3
E84AVxxx3034	88.5	112.1
E84AVxxx3734	108.0	136.8
E84AVxxx4534	133.5	169.1

¹⁾ The shown values apply to the operation with ambient temperatures of up to +45°C for 2/4kHz and up to +40°C for 8/16kHz. For ambient temperatures between +40/45°C and +55°C, a derating from 2.5 %/K to the given values must be observed.

4.4 Overcurrent operation

The controllers can be driven at higher amperages beyond the rated current if the duration of this overcurrent operation is time limited. Two utilisation cycles with a duration 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. For both utilisation cycles, a moving average is determined separately.

Monitoring of the device utilisation ($I \times t$) activates the set error response (trip or warning if one of the two utilisation values exceeds the limit of 100 %. The current device utilisation ($I \times t$) is displayed under parameter C00064/x:

- ▶ C00064/1: Total value of the device utilisation
- ▶ C00064/2: Pulse utilisation in 15-s cycle
- ▶ C00064/3: Permanent utilisation in 180-s cycle

Type of utilisation	Utilisation cycle	Monitoring function	
		Condition	Code
Pulse utilisation	15 s	$I_{aNx} > 160 \%$	• Display in C00064/2 • Display of the maximum value in C00064/1
Permanent utilisation	180 s	The monitoring function is permanently active.	• Display in C00064/3 • Display of the maximum value in C00064/1

The curves of typical load functions and the simulation of the "Ixt" function are shown in the following illustration:

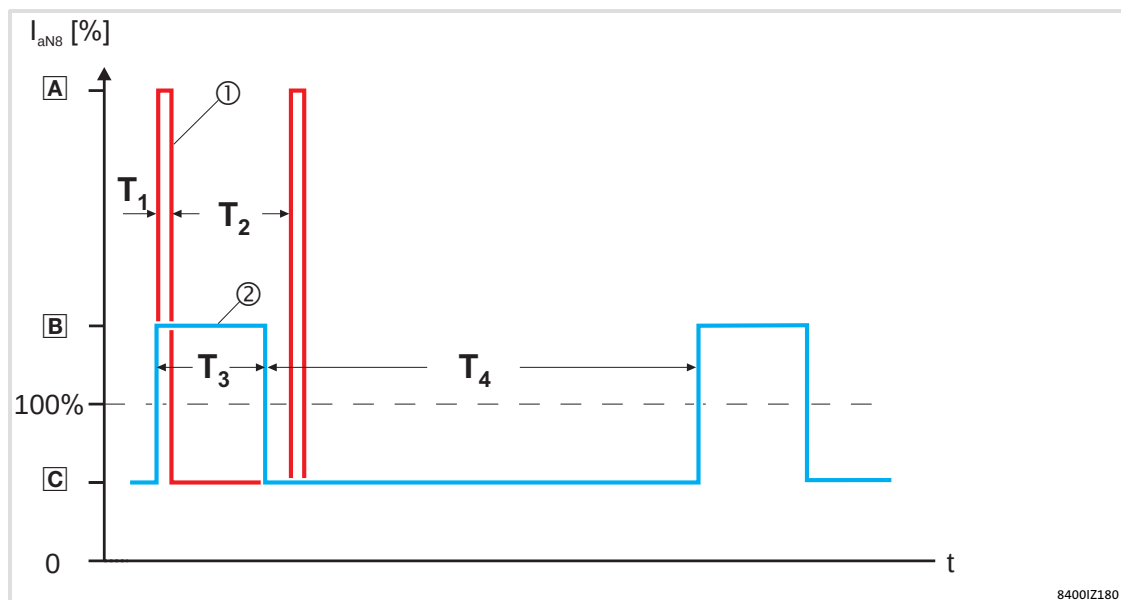


Fig. 4-2 Overcurrent capacity in 230/400 V operation at 45° C

- ① Pulse load (15 s cycle)
 A Peak current
 C Unloading current
 T₁ Peak current period
 T₂ Unloading current period

Calculation equation:

$$\frac{A \cdot T_1 \cdot C \cdot T_2}{T_1 \cdot T_2} \leq 100\%$$

- ② Permanent load (180 s cycle)
 B Peak current
 C Unloading current
 T₃ Peak current period
 T₄ Unloading current period
 I_{aNx} Rated value of continuous output current

Calculation equation:

$$\frac{B \cdot T_3 \cdot C \cdot T_4}{T_3 \cdot T_4} \leq 100\%$$

15-s cycle ①	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	A	C	A	C	A	C	A	C
I _{amax} /I _{aN8} [%]	200	75	200	75	200	75	133	50

180-s cycle ②	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	B	C	B	C	B	C	B	C
I _{amax} /I _{aN8} [%]	150	75	150	75	150	75	100	50



Tip!

For calculations of application-specific cycles please contact your Lenze contact person.

4.5

Terminal description

4.5.1

Overview

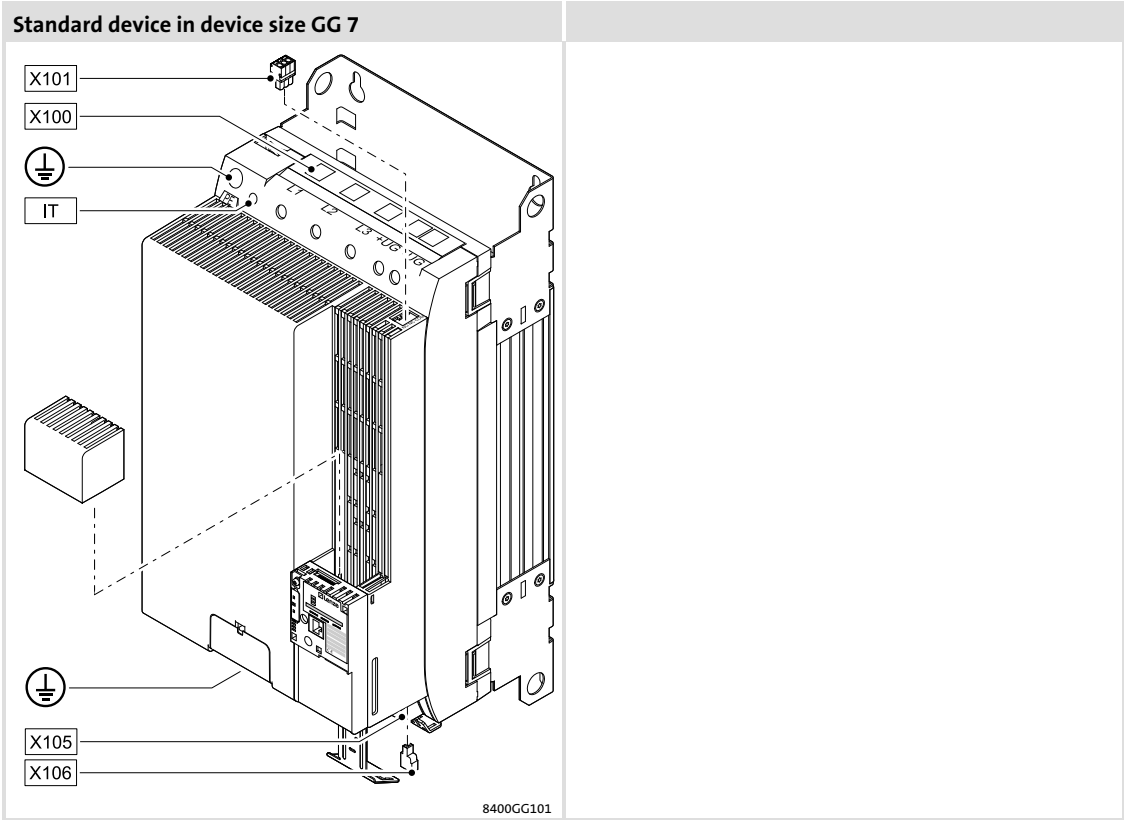
Standard device in device size GG 1 ... 3

8400HLC058

Standard device in device size GG 4 ... 6

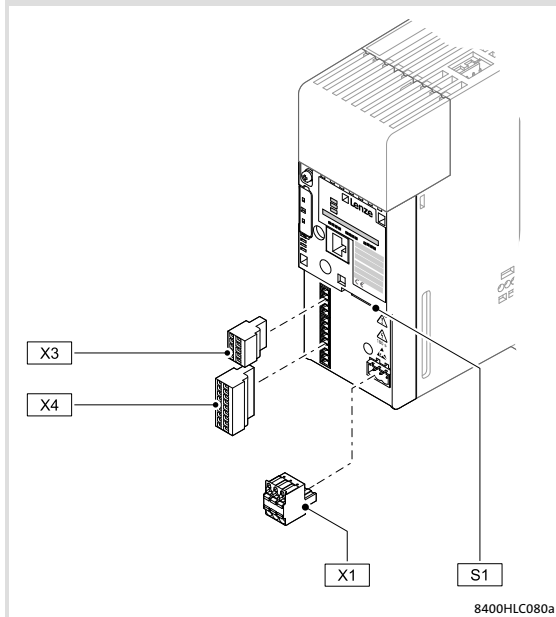
8400HLC057

Connection		
Pos.	Description	Number
X100	Mains/DC-bus voltage (for 400V devices) – For devices in device size 6 (18.5 ... 22 kW) the terminal strip is not pluggable.	1
X101	Relay output	1
X105	Motor/external brake resistor – For devices in device size 6 (18.5 ... 22 kW) the terminal strip is not pluggable.	1
X106	Motor temperature monitoring	1
⏏	PE conductor (on the supply side/on the motor side)	2
IT	Contact screw for interference suppression (on the supply side/on the motor side)	2

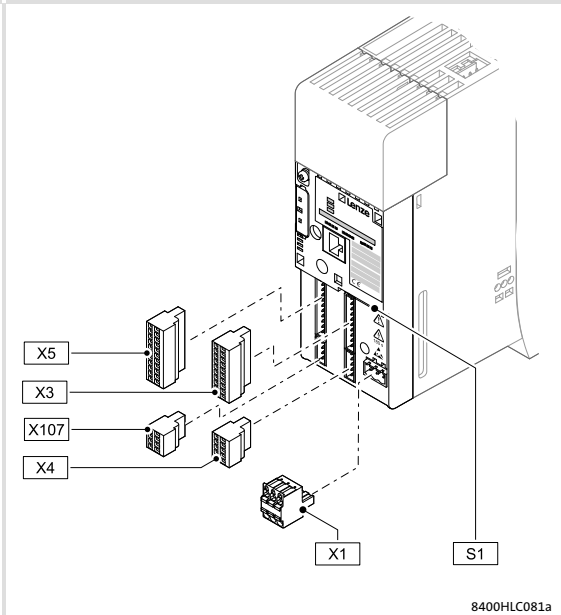


Connection		
Pos.	Description	Number
X100	Mains/DC-bus voltage – non-pluggable.	1
X101	Relay output	1
X105	Motor/external brake resistor – non-pluggable.	1
X106	Motor temperature monitoring	1
⏏	PE conductor (on the supply side/on the motor side)	2
IT	Contact screw for interference suppression (on the supply side/on the motor side)	2

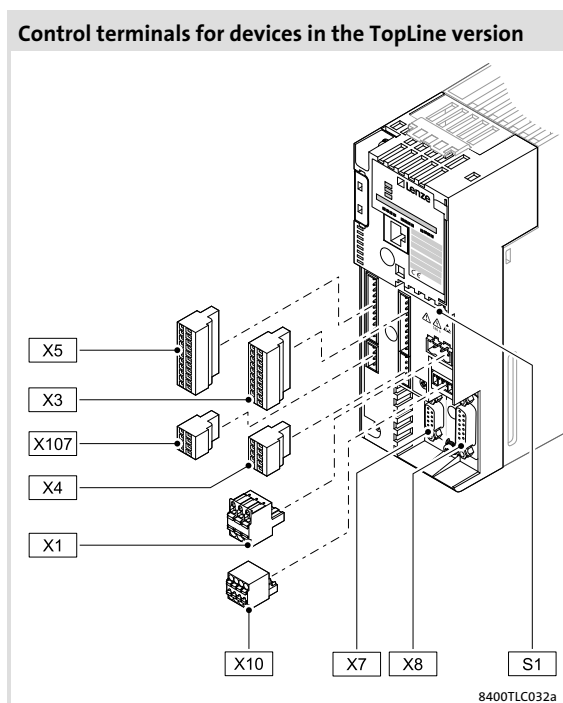
Control terminals for devices in the StateLine version



Control terminals for devices in the HighLine version



Connection		Number	
Pos.	Description	StateLine C	HighLine C
X1	System bus (CANopen)	1	1
S1	System bus settings (CANopen)	1	1
X3	Analog inputs (voltage/current)	1/1	2/2
	Analog outputs (voltage/current)	1/-	2/2
	10 V reference voltage	1	1
X4	Digital inputs	4	-
	Digital outputs	1	3
	Controller enable	1	-
	24 V supply of the control electronics	1	-
	24 V voltage output	1	1
X5	Digital inputs	-	7
	Controller enable	-	1
	24 V supply of the control electronics	-	1
	24 V internal supply	-	1
X107	Motor holding brake	-	1



Connection		Number
Pos.	Description	TopLine C
X1	System bus (CANopen)	1
S1	System bus settings (CANopen)	1
X3	Analog inputs (voltage/current)	2/2
	Analog outputs (voltage/current)	2/2
	10 V reference voltage	1
X4	Digital outputs	3
	24 V voltage output	1
X5	Digital inputs	7
	Controller enable	1
	24 V supply of the control electronics	1
	24 V internal supply	1
X6	Diagnostics	1
X7	Resolver (D-Sub 9-pole)	1
X8	Multi encoder (D-Sub 15-pole)	1
X10	Axis bus	1
	– Sync/State	
	– CAN	
X107	Motor holding brake	1

4.6 StateLine C control terminals

4.6.1 External supply voltage 24 V

Labelling	Feature	Rated value
X4/24E	Connection for external 24 V supply voltage by a safely separated power supply unit (required for mains-independent supply of the control electronics and the communication module)	24 V in accordance with IEC 61131-2 19.2 ... 28.8 V Residual ripple max. $\pm 5\%$ SELV/PELV
	Suppression of voltage pulses	Suppressor diode 36 V, bidirectional
	Polarity reversal protection	When polarity is reversed: no function and no destruction
	Current consumption	Approx. 0.6 A during operation Max. 1.5 A starting current for 100 ms
	Capacity to be charged	1000 μF
X4/GIO	GND, reference potential for digital signals	

Labelling	Feature	Rated value
X4/24I	24 V voltage output to connect digital inputs via potential-free contacts	External supply at 24E: voltage drop $< 2.5\text{ V}$ Internal supply: DC 18 ... 28 V
	Max. output current	50 mA
	Electric strength of external voltage	+30 V
	Excess current release	Automatically resettable
X4/GIO	GND, reference potential for digital signals	

4.6.2 Analog inputs

Labelling	Feature	Rated value
X3/A1U	Input	$\pm 10\text{ V}$
	Input resistance	$> 80\text{ k}\Omega$
	Input voltage in case of open circuit	Display "0" ($U < 0.2\text{ V}$, absolute)
	Sampling frequency	1 kHz (1 ms)
	Accuracy	$\pm 0.1\text{ V}$
	Electric strength of external voltage	$\pm 15\text{ V}$, permanent
	A/D converter	Resolution 10 bits + sign Error 1 digit $\approx 0.1\%$ relating to the final value
X3/A1I	Input	0 ... +20 mA 4 ... +20 mA, fail-safe
		Parameterisable
	Input resistance	215 Ω
	Input current in case of open circuit	Display "0" ($I < 0.1\text{ mA}$)
	Sampling frequency	1 kHz (1 ms)
	Accuracy	$\pm 0.1\text{ mA}$
	Electric strength of external voltage	$\pm 7\text{ V}$, permanent
X3/GA	A/D converter	10 bit resolution Error 1 digit $\approx 0.1\%$ relating to the final value
	GND, reference potential for analog signals	

4.6.3 Analog outputs

Labelling	Features	Rated value
X3/O1U	Output voltage	0 ... 10 V
	Output current	2 mA
	Capacitive load	max 1 μF
	Voltage - 0 V	Display "0" ($U < 0.1\text{ V}$, absolute)
	Output voltage at reset	$< 0.5\text{ V}$
	Accuracy	$\pm 2\%$ relating to the final value
	Short-circuit strength	Unlimited period
	Electric strength of external voltage	Not guaranteed
X3/AR	Reference 10 V	10.5 V
	Tolerance	$\pm 0.5\text{ V}$
	Capacitive load	max 1 μF
	Short-circuit strength	Unlimited period
	Electric strength of external voltage	Not guaranteed
X3/GA	Permissible current loading	10 mA
	GND, reference potential for analog signals	

4.6.4 Digital inputs

Labelling	Features	Rated value
X4/DI1, DI2	Digital input 1/2	In accordance with IEC61131-2, type 1 or two-track frequency input for HTL encoder 0 ... 10 kHz
X4/DI3, DI4	Digital input 3/4	In accordance with IEC61131-2, type 1
X4/RFR	Controller inhibit	In accordance with IEC61131-2, type 1
	Input resistance	3.3 k Ω (2.5 k Ω ... 6 k Ω)
	Electric strength of external voltage	Up to ± 30 V, permanent
	Isolation	 159
	Level	LOW < +5V HIGH > +15V
	Cycle time	1 ms, can be changed by software filtering
X4/GIO	GND, reference potential for digital signals	

4.6.5 Digital outputs

Labelling	Features	Rated value
X4/DO1	Digital output	In accordance with IEC61131-2, type 1, max. 50 mA
	External-voltage protected	Up to +30 V Integrated polarity reversal protection diode for switching inductive loads
	Isolation	 159
	Level	LOW < +5 V High > +15 V
	Time-dependent behaviour	LOW - HIGH / HIGH - LOW Max. 250 μ s
	Overload behaviour	Reduced voltage or periodical switch-off/on
	Reset and switch-on behaviour	Outputs are switched off (LOW)
	Cycle time	1 ms
X4/GIO	GND, reference potential for digital signals	

4.6.6 Connection of relay output

Labelling	Description/features	Rated value
X101	In the Lenze setting, the relay switches if the controller changes to the "Fault" device status. Observe the notes provided in the corresponding software manual if you would like to implement parameters other than envisaged in the Lenze setting. Use a corresponding suppressor circuit in case of an inductive or capacitive load!	
COM	Relay centre contact	AC 250 V, 3 A DC 24 V, 2 A
NC	NC contact (normally closed)	DC 240 V, 0.16 A
NO	NO contact (normally open)	- According to UL508C: – 3 A, 250 V AC (general purpose) – 2 A, 24 V DC (resistive)

4.7 HighLine C control terminals

4.7.1 External supply voltage 24 V

Labelling	Feature	Rated value
X5/24E	Connection for external 24 V supply voltage by a safely separated power supply unit (required for mains-independent supply of the control electronics and the communication module)	24 V in accordance with IEC 61131-2 19.2 ... 28.8 V Residual ripple max. $\pm 5\%$ SELV/PELV
	Suppression of voltage pulses	Suppressor diode 36 V, bidirectional
	Polarity reversal protection	When polarity is reversed: no function and no destruction
	Current consumption	Approx. 0.6 A during operation Max. 1.5 A starting current for 100 ms
	Capacity to be charged	1000 μF
X5/GI	GND, reference potential for digital signals	

Labelling	Feature	Rated value
X4/24O	Connection for external 24 V supply voltage by a safely separated Power supply unit (required for the supply of the digital outputs)	24 V in accordance with IEC 61131-2 19.2 ... 28.8 V Residual ripple max. $\pm 5\%$ SELV/PELV
	Suppression of voltage pulses	Suppressor diode 36 V, bidirectional
	Polarity reversal protection	When polarity is reversed: no function and no destruction
	Current consumption	Approx. 0.15 A if all digital outputs are loaded with rated current
X4/GO	GND, reference potential for digital signals	

Labelling	Feature	Rated value
X5/24I	24 V voltage output for connection of the digital inputs via potential-free contacts	External supply at 24E: voltage drop $< 2.5\text{ V}$ Internal supply: DC 18 ... 28 V
	Max. output current	50 mA
	Electric strength of external voltage	+30 V
	Excess current release	Automatically resettable
X5/GI	GND, reference potential for digital signals	

4.7.2 Analog inputs

Labelling	Feature	Rated value	
X3/A1U, A2U	Input	± 10 V	
	Input resistance	> 80 kΩ	
	Input voltage in case of open circuit	Display "0" (U < 0.2 V, absolute)	
	Sampling frequency	1 kHz (1 ms)	
	Accuracy	± 0.1 V	
	Electric strength of external voltage	± 15 V, permanent	
	A/D converter	Resolution 10 bits + sign Error 1 digit ≡ 0.1 % relating to the final value	
X3/A1I, A2I	Input	0 ... +20 mA	Parameterisable
		4 ... +20 mA, fail-safe	
	Input resistance	215 Ω	
	Input current in case of open circuit	Display "0" (I < 0.1 mA)	
	Sampling frequency	1 kHz (1 ms)	
	Accuracy	± 0.1 mA	
	Electric strength of external voltage	± 7 V, permanent	
	A/D converter	10 bit resolution Error 1 digit ≡ 0.1 % relating to the final value	
X3/GA	GND, reference potential for analog signals		

4.7.3 Analog outputs

Labelling	Features	Rated value	
X3/O1U, O2U	Output voltage	0 ... 10 V	
	Output current	2 mA	
	Capacitive load	max 1 μF	
	Voltage - 0 V	Display "0" (U < 0.1 V, absolute)	
	Output voltage at reset	< 0.5 V	
	Accuracy	± 2 % relating to the final value	
	Short-circuit strength	Unlimited period	
	Electric strength of external voltage	Not guaranteed	
X3/O1I, O2I	Output current	0 ... 20 mA	Parameterisable
		4 ... 20 mA, fail-safe can be implemented via function block interconnection	
	Output voltage	0 ... 10 V	
	Current for output 0 mA	I < 0.1 mA abs.	
	Output current in the case of reset	< 1 mA	
	Accuracy	± 2 % relating to the final value	
	Short-circuit strength	Unlimited period	
	External voltage protection	Not guaranteed	
X3/AR	Reference 10 V	10.5 V	
	Tolerance	±0.5 V	
	Capacitive load	max 1 μF	
	Short-circuit strength	Unlimited period	
	Electric strength of external voltage	Not guaranteed	
	Permissible current loading	10 mA	
X3/GA	GND, reference potential for analog signals		

4.7.4

Digital inputs

Labelling	Features	Rated value
X5/DI1, DI2	Digital input 1/2	according to IEC61131-2, type 1 or two-track frequency input for HTL encoder 0 ... 200 kHz
X5/DI3, DI4, DI5	Digital input 3/4/5	according to IEC61131-2, type 1
X5/DI6, DI7	Digital input 6/7	according to IEC61131-2, type 1 or frequency input 0 ... 10 kHz or HighLine: two-track frequency input for HTL-Encoder, 0 ... 5 kHz TopLine: two-track frequency input for HTL-Encoder, 0 ... 200 kHz
X5/RFR	Controller inhibit	according to IEC61131-2, type 1
	Input resistance	3.3 k Ω (2.5 k Ω ... 6 k Ω)
	Electric strength of external voltage	Up to ± 30 V, permanent
	Level	LOW < +5V HIGH > +15V
	Cycle time	1 ms, can be changed by software filtering
	Isolation	 159
X5/GI	GND, reference potential for digital signals	

► DI1, DI2, DI6, DI7 can be used for a four-track HTL encoder.

- HighLine up to 5 kHz
- TopLine up to 200 kHz

4.7.5

Digital outputs

Labelling	Features	Rated value
X4/DO1, DO2, DO3	Digital output 1/2/3 - for operation of the digital outputs an external voltage source is required ( 84)	In accordance with IEC61131-2, type 1, max. 50 mA
	External-voltage protected	Up to +30 V
	Isolation	 159
	Level	LOW < +5 V High > +15 V
	Time-dependent behaviour	LOW - HIGH / HIGH - LOW Max. 250 μ s
	Overload behaviour	Reduced voltage or periodical switch-off/on
	Reset and switch-on behaviour	Outputs are switched off (LOW)
	Cycle time	1 ms
X4/GO	GND, reference potential for digital signals	

4.7.6 Connection of relay output

Labelling	Description/features	Rated value
X101	In the Lenze setting, the relay switches if the controller changes to the "Fault" device status. Observe the notes provided in the corresponding software manual if you would like to implement parameters other than envisaged in the Lenze setting. Use a corresponding suppressor circuit in case of an inductive or capacitive load!	
COM	Relay centre contact	AC 250 V, 3 A DC 24 V, 2 A
NC	NC contact (normally closed)	DC 240 V, 0.16 A ● According to UL508C: – 3 A, 250 V AC (general purpose) – 2 A, 24 V DC (resistive)
NO	NO contact (normally open)	

4.7.7 Motor holding brake connection

Labelling	Feature	Rated value
X107/24B X107/GB	Connection for external 24 V supply voltage by a safely separated power supply unit (required for the supply of the brake output)	24 V in accordance with IEC 61131-2 19.2 ... 28.8 V Residual ripple max. $\pm 5\%$ SELV/PELV
	Suppression of voltage pulses	Suppressor diode 36 V, bidirectional
	Polarity reversal protection	No
	Rated current	2.5 A DC
	Capacity to be charged	1 μ F
X107/BD1 X107/BD2	24 V voltage output for connecting a motor holding brake via potential-free contacts - The brake output can also be used as a potential-free, digital output that can exceed a certain current value, e.g. for switching a relay or valve.	
	Max. output current	2.5 A
	Max. voltage drop in the high state	< 3 V for rated current
	Breaking energy	Max. 5 Ws
	Isolation	Basic insulation (159)
	Level	LOW < +5 V High > +15 V
	Time-dependent behaviour	LOW - HIGH / HIGH - LOW Max. 500 μ s
	Behaviour during overload	Reduced voltage or periodic switch-off/on
	Reset and switch-on behaviour	Outputs are switched off
	Cycle time	1 ms
	Operating frequency	Max. 6/min for max. breaking energy

4.8 TopLine C control terminals

Devices of the TopLine C version have identical connections as described under "HighLine C control terminals" (84). The additional control terminals of the TopLine C version are described in the following.

4.8.1 Axis bus

**Note!**

This connection is not supported in versions below 8400 TopLine, SW version 02.00. This connection must not be wired in these lower versions.

The axis bus connection serves to implement two functionalities:

- ▶ Synchronisation via state bus
- ▶ CAN synchronisation

I/O axis bus

The state bus is a bus system exclusively designed for Lenze controllers via which up to 20 controllers can be connected and which serves to simulate a "release cord" function. The state is controlled via the system module SFBDigitalOutput.

- ▶ The state bus knows the states "OK" and "fault".
- ▶ The state bus is multi-master-compliant, i.e. each node connected to the state bus can set the state bus to "fault" by changing to LOW level.
- ▶ In the "fault" status, all nodes activate their programmed response, e.g. synchronised braking of the drive system.

**Stop!**

Do not connect an external voltage to the state bus, otherwise the function will be disturbed.

Labelling	Feature	Rated value
X10/AS	I/O axis bus connection	TTL level: 5 V
X10/AG	GND, reference potential: I/O axis bus	

Data transfer axis bus

Labelling	Feature	Rated value
X10/AH, AL	Data transfer axis bus connection	Acc. to CAN specification Cable lengths: See CAN on board
	Baud rate	from version 12.00: 800 kbit/s, constant up to version 2.xx: 500 kbps, constant
	Terminating resistor	120 Ω, switching via DIP switch
X10/AG	GND, reference potential: Data transfer axis bus	

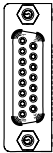
4.8.2 Multi-encoder connection

Encoders are connected at X8 (15-pole Sub-D socket).

In order to avoid interference injections, only use shielded motor and encoder cables when using an encoder.

- ▶ Absolute and incremental encoders are supported:
 - TTL encoders 5 V (incremental)
 - SinCos encoders 1 V_{SS} (incremental)
 - SinCos absolute value encoders 1 V_{SS} with Hiperface protocol
 - SSI absolute value encoders with Stegmann protocol
- ▶ Improved detection of low speeds with TTL encoders by additional time measuring technique.
- ▶ SinCos absolute value encoders are read out serially during initialisation (connection of the supply voltage). Then the SinCos signals are evaluated.
- ▶ Open-circuit monitoring:
 - In the case of SinCos encoders by comparison of the SinCos signals with the sine-wave form (radius monitoring)
 - In the case of TTL encoders by monitoring of the mean value and the amplitudes
 - Not with SSI encoders
- ▶ The following is not supported:
 - HTL encoders -
they are not connected via the multi-encoder input, but via the digital inputs of the controller.
 - Motors with an installed ENP and KTY -
for these motors, correct temperature evaluation and motor protection are not possible with 8400.

Labelling	Feature	Rated value
X8/ General	Cable length (system cable is recommended)	Max. 150 m
	Encoder types	TTL SinCos 1V _{SS}
	Protocols	Hiperface SSI
	Number of increments	1 ... 16384
	Input frequency	max. 500 kHz
	Scanning speed/position	TTL: 4 kHz (250 µs cycle) SSI: max. 4 kHz (250 µs cycle)
X8/4, 2	Supply voltage V _{CC} /GND for encoder	5 ... 12 V
	max. output/current	up to 45 °C: 3 W/600 mA 45 ... 55 °C: 1.6 W/320 mA
	max. capacitive switch-on load	100 µF
X8/12, 10	n. c.	-
X8/14, 7	+TEMP, -TEMP	Type K: TY 83-110, TY84, PT1000 Freely defined characteristic

X8	Pin	EYF001... cable			EYF002... cable SSI	EYDxxxxAxxxxS10S09 cable	
		TTL ¹⁾	1 V _{SS} ¹⁾	1 V _{SS} Hiperface ¹⁾		DfIn	DFOut
	1	A	A	COS	n. c.	A	-
	2	GND	GND	GND	GND	GND	-
	3	B	B	Sin	n. c.	B	-
	4	V _{CC}	V _{CC}	V _{CC}	U _S	V _{CC}	-
	5	Z	Z	+RS485	Data +	Z	-
	6	n. c.	n. c.	n. c.	n. c.	n. c.	-
	7	-TEMP	-TEMP	-TEMP	n. c.	-	$\bar{A}$
	8	n. c.	n. c.	n. c.	Clock +	-	Z
	9	/A	/A	Ref COS	n. c.	$\bar{A}$	-
	10	n. c.	n. c.	n. c.	n. c.	-	$\bar{B}$
	11	/B	/B	Ref SIN	n. c.	$\bar{B}$	-
	12	n. c.	n. c.	n. c.	n. c.	-	B
	13	/Z	/Z	-RS485	Data -	$\bar{Z}$	-
	14	+TEMP	+TEMP	+TEMP	n. c.	-	A
	15	n. c.	n. c.	n. c.	Clock -	-	$\bar{Z}$

9400SSP000X8

¹⁾ If DFOut is used in addition, no KTY temperature encoder can be connected to X8. However, a connection to X7 is possible. C01193 has to be set to ensure a correct evaluation.

Setting the supply voltage

The supply voltage of the encoder must be adjusted depending on the cable length.

This value is adjusted via the "Encoder voltage" parameter, C00421.

Encoder	U _r	Voltage setting [V] in C00421 for cable length [m]						
Product key	[V]	0 - 10	10 - 30	30 - 50	50 - 70	70 - 90	90 - 100	100 -150
TTL								
IG2048-5V-T	5 ±5%	5.0	5.0	5.1	5.1	5.2	5.2	5.3
IG4096-5V-T								
IK2048-5V-T								
IK4096-5V-T								
Sin/cos								
IG1024-5V-V	5 ±5%	5.0	5.0	5.1	5.1	5.2	5.2	5.3
IG2048-5V-S								
Sin/cos (Hiperface)								
AM1024-8V-H	8 (7 ... 12)	8.0						

Tab. 4-1

V_r Rated voltage of the encoder

The values provided in Tab. 4-1 apply if Lenze system cables are used at typical ambient temperatures.

Different cables, cable cross-sections, or extreme ambient temperatures may require adaptation after another metrological measurement process.

Encoders (e.g. laser-based length measuring systems) must be externally supplied if their supply must be increased.

4.8.3 Resolver connection

Resolvers are connected to X7 (9-pole Sub-D socket).

To avoid interference injection, only use shielded motor and encoder cables if an encoder is used.

You can connect and operate:

- ▶ Resolvers
 - Parameterisation of the number of pole pairs in C00925
 - Lenze setting: Number of pole pairs = 1.
- ▶ Multipole resolvers with a number of resolver pole pairs ≥ 2
- ▶ Resolvers of other manufacturers

Please ensure compliance with the technical limiting values of the resolver:

Description		Rated value
Cable length (system cable is recommended)		Max. 150 m
Number of resolver pole pairs		1 ... n
Carrier frequency of the excitation voltage		4 kHz
Impedance		$Z_{RO} = (R_{RO} + j X_{RO}) = 90.9 \text{ Ohms (max.)}$ When a resolver with a lower rotor impedance (Z_{RO}) is connected, the integrated overload protection limits the excitation current which impairs the signal quality and may distort the determined actual values.
X7 /		
Pin 1, 2	+REF, -REF	
	Excitation voltage	R.m.s. value: $V = 7.07 \text{ V}$ Peak value: $\hat{u} = 10 \text{ V}$
	Maximum excitation current	R.m.s. value: $I = 77.78 \text{ mA}$ Peak value: $\hat{I} = 110 \text{ mA}$
Pin 4, 5	+COS, -COS	
Pin 6, 7	+SIN, -SIN	
Pin 8, 9	+TEMP, -TEMP	Type: KTY 83-110, KTY 84, PT1000, adjustable

5 **Mechanical installation**

5.1 **Important notes**



Danger!

Sticker with warning note must be displayed prominently and close to the device!



Note!

The devices must be installed in housings (e.g. control cabinets) to meet applicable regulations.

- ▶ If the cooling air is polluted (lint, (conductive) dust, soot, aggressive gases), take adequate countermeasures, as e.g.:
 - Separate air guide
 - Installation of filters
 - Regular cleaning of the filters
- ▶ Possible mounting position:
 - Vertical on the mounting plate (mains connections at the top, motor connection at the bottom)
- ▶ Maintain the specified free spaces above and below the controller to other installations!
 - Ensure unimpeded ventilation of cooling air and outlet of exhaust air.
 - You can install several controllers of the 8400 L-force Inverter Drives product range next to each other without any clearance in the control cabinet.
- ▶ The mounting plate of the control cabinet must be electrically conductive.
- ▶ In case of continuous vibrations or shocks use vibration dampers.

5.2 Standard devices in a power range of 0.25 ... 3 kW**5.2.1 Assembly in built-in technique (standard)**

You can choose between three variants for mounting the "built-in unit" version of the controllers:

- ▶ Assembly without filter
 - in "standard" technique
- ▶ Assembly with filter:
 - in "standard" technique (footprint filter)
 - in mounting variant (side-mounted filter)

The following filters can be used for the controllers:

- ▶ on the supply side
 - RFI filters

Assembly without filter in "standard" technique

For mounting, use two screws M5 x >10 mm. The mounting location and material must ensure a durable mechanical connection.

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

How to proceed:

1. Prepare the fixing holes on the mounting surface.
2. Screw the controller directly to the mounting surface.

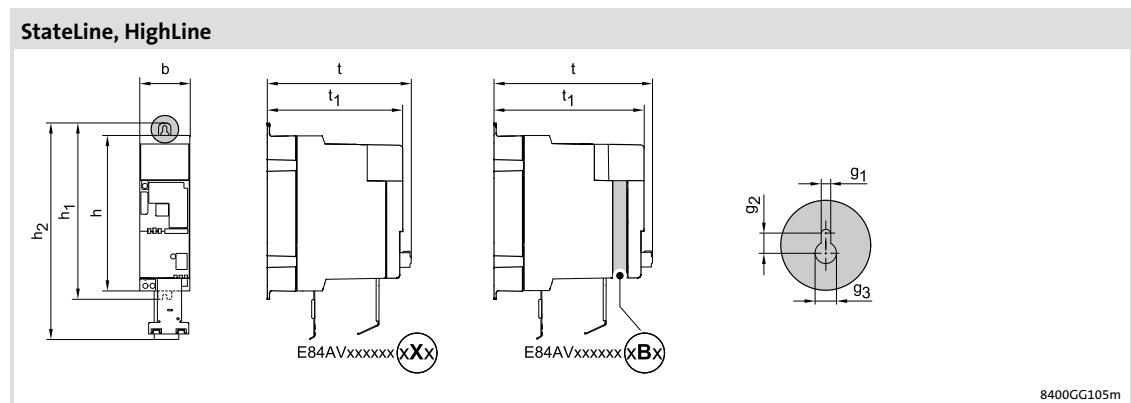


Fig. 5-1 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	t ₁	g ₁	g ₂	g ₃
		[mm]								
E84AVxxE2512xXx	0.25	165	70	199	194	235	186	6	11	12
E84AVxxE3712xXx	0.37									
E84AVxxE3714xXx	0.37									
E84AVxxE551xxXx	0.55	215	70	199	244	285	186	6	11	12
E84AVxxE751xxXx	0.75									
E84AVxxE112xxXx	1.1									
E84AVxxE152xxXx	1.5	270	70	199	304	340	186	6	11	12
E84AVxxE222xxXx	2.2									
E84AVxxE3024xXS	3.0									
E84AVxxE2512xBx	0.25									
E84AVxxE3712xBx	0.37	165	70	219	194	235	206	6	11	12
E84AVxxE3714xBx	0.37									
E84AVxxE551xxBx	0.55									
E84AVxxE751xxBx	0.75	215	70	219	244	285	206	6	11	12
E84AVxxE112xxBx	1.1									
E84AVxxE152xxBx	1.5									
E84AVxxE222xxBx	2.2	270	70	219	304	340	206	6	11	12
E84AVxxE3024xB5	3.0									

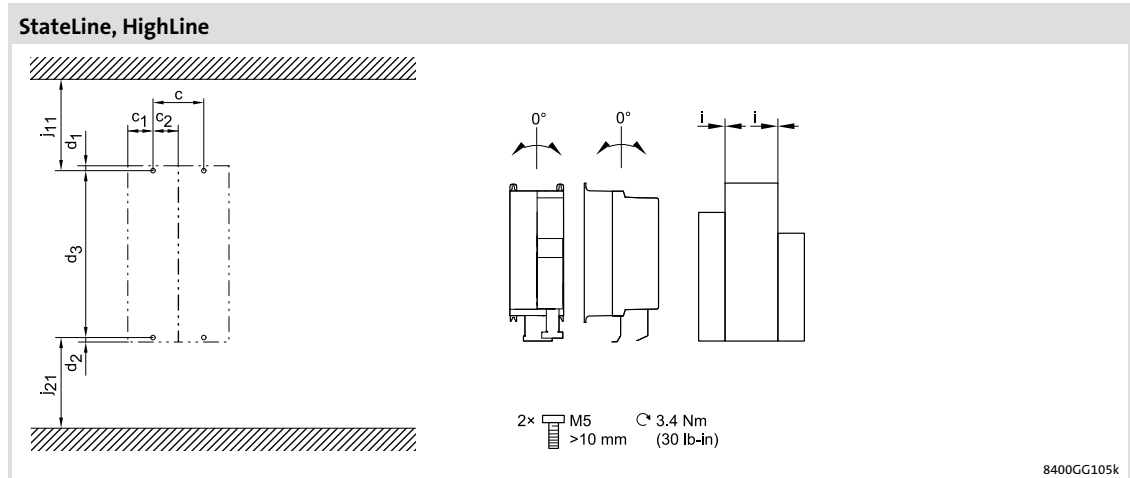


Fig. 5-2 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	i	j ₁₁	j ₂₁	
	[kW]	[mm]									[kg]
E84AVxxE2512xXx	0.25	9	5	180	70	35	35	0	> 95	> 95	1.3
E84AVxxE3712xXx	0.37										
E84AVxxE3714xXx	0.37										
E84AVxxE551xxXx	0.55	9	5	230	70	35	35	0	> 95	> 95	1.8
E84AVxxE751xxXx	0.75										
E84AVxxE112xxXx	1.1										
E84AVxxE152xxXx	1.5	8	10	285	70	35	35	0	> 95	> 95	2.1
E84AVxxE222xxXx	2.2										
E84AVxxE3024xXS	3.0										
E84AVxxE2512xBx	0.25	9	5	180	70	35	35	0	> 95	> 95	1.4
E84AVxxE3712xBx	0.37										
E84AVxxE3714xBx	0.37										
E84AVxxE551xxBx	0.55	9	5	230	70	35	35	0	> 95	> 95	1.9
E84AVxxE751xxBx	0.75										
E84AVxxE112xxBx	1.1										
E84AVxxE152xxBx	1.5	8	10	285	70	35	35	0	> 95	> 95	2.2
E84AVxxE222xxBx	2.2										
E84AVxxE3024xB5	3.0										

Mechanical installation

Standard devices in a power range of 0.25 ... 3 kW

Assembly without filter in "standard" technique

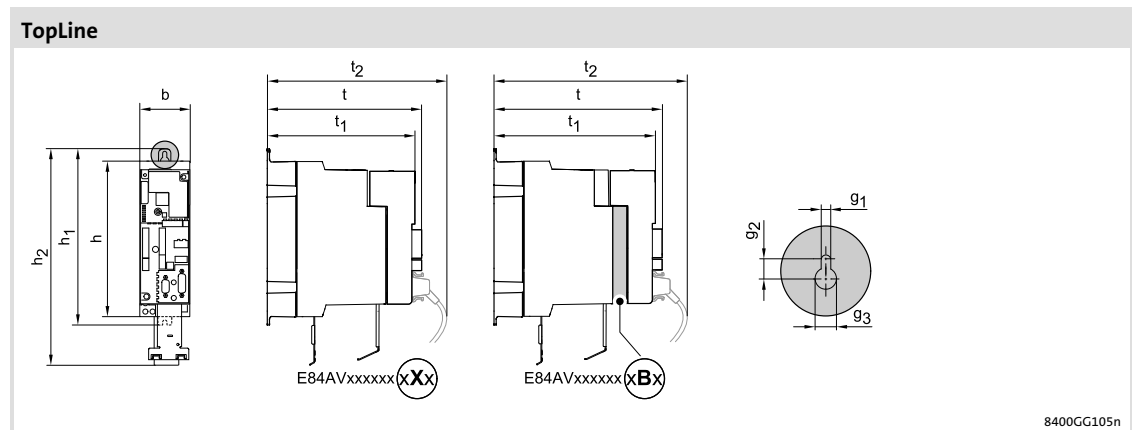


Fig. 5-3 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	t ₂	g ₁	g ₂	g ₃
	[kW]	[mm]									
E84AVTCE2512xXx	0.25	215	70	214	244	285	201	240	6	11	12
E84AVTCE371xxXx	0.37										
E84AVTCE551xxXx	0.55										
E84AVTCE751xxXx	0.75										
E84AVTCE112xxXx	1.1	270	70	214	304	340	201	240	6	11	12
E84AVTCE152xxXx	1.5										
E84AVTCE222xxXx	2.2										
E84AVTCE3024xXS	3.0										
E84AVTCE2512xBx	0.25	215	70	234	244	285	221	260	6	11	12
E84AVTCE371xxBx	0.37										
E84AVTCE551xxBx	0.55										
E84AVTCE751xxBx	0.75										
E84AVTCE112xxBx	1.1	270	70	234	304	340	221	260	6	11	12
E84AVTCE152xxBx	1.5										
E84AVTCE222xxBx	2.2										
E84AVTCE3024xB5	3.0										

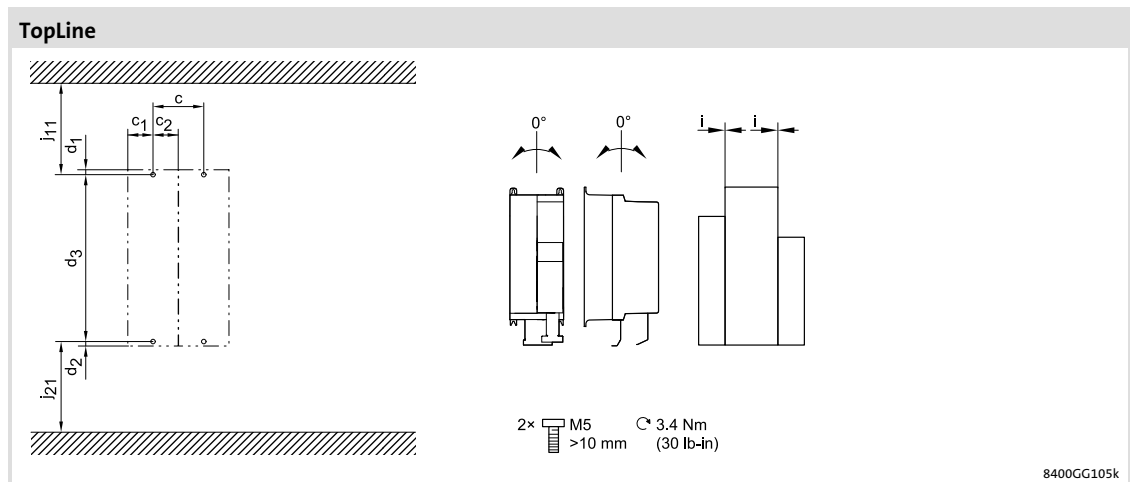


Fig. 5-4 Dimensions for mounting

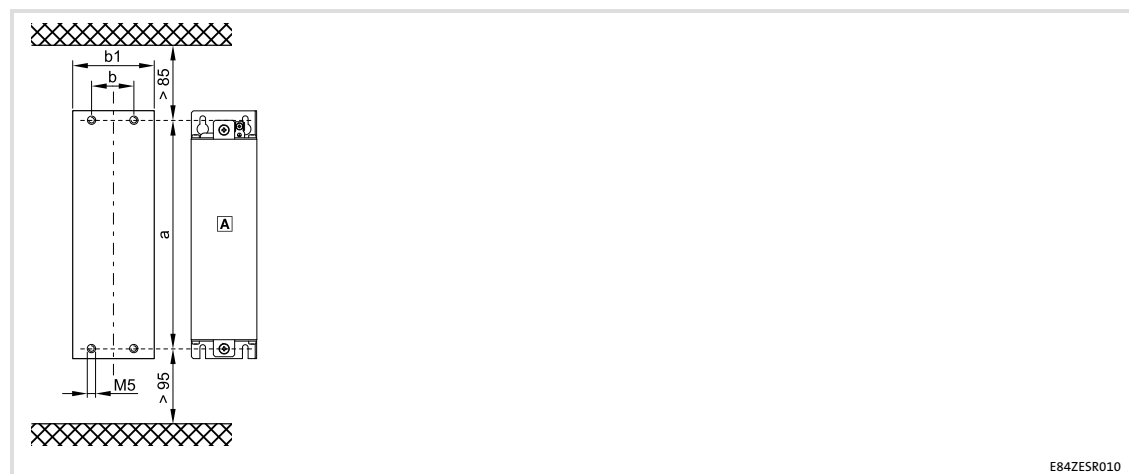
		d ₁	d ₂	d ₃	c	c ₁	c ₂	i	j ₁₁	j ₂₁	
	[kW]	[mm]									[kg]
E84AVTCE2512xXx	0.25	9	5	230	70	35	35	0	> 95	> 95	2.0
E84AVTCE371xxXx	0.37										
E84AVTCE551xxXx	0.55										
E84AVTCE751xxXx	0.75										
E84AVTCE112xxXx	1.1	8	10	285	70	35	35	0	> 95	> 95	2.3
E84AVTCE152xxXx	1.5										
E84AVTCE222xxXx	2.2										
E84AVTCE3024xXS	3.0										
E84AVTCE2512xBx	0.25	9	5	230	70	35	35	0	> 95	> 95	2.1
E84AVTCE371xxBx	0.37										
E84AVTCE551xxBx	0.55										
E84AVTCE751xxBx	0.75										
E84AVTCE112xxBx	1.1	8	10	285	70	35	35	0	> 95	> 95	2.4
E84AVTCE152xxBx	1.5										
E84AVTCE222xxBx	2.2										
E84AVTCE3024xB5	3.0										

Filter mounting in "standard" technique

For mounting, use two screws M5 x >10 mm. The mounting location and material must ensure a durable mechanical connection.

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

Assignment			
Type	SD	RFI filter LD	LL
E84AVxxx2512	E84AZESR3712SD	E84AZESR3712LD	E84AZESR3712LL
E84AVxxx3712			
E84AVxxx5512	E84AZESR7512SD	E84AZESR7512LD	E84AZESR7512LL
E84AVxxx7512			
E84AVxxx1122	E84AZESR2222SD	E84AZESR2222LD	E84AZESR2222LL
E84AVxxx1522			
E84AVxxx2222			
E84AVxxx3714	E84AZESR7514SD	E84AZESR7514LD	-
E84AVxxx5514			
E84AVxxx7514			
E84AVxxx1124	E84AZESR2224SD	E84AZESR2224LD	-
E84AVxxx1524			
E84AVxxx2224			
E84AVxxx3024xxS	E84AZESR3024SD	E84AZESR3024LD	-



E84ZESR010

A Footprint filter

	a	b	b1
	[mm]		
E84AZESR3712xx	190	45	70
E84AZESR7512xx	240		
E84AZESR7514xx	240		
E84AZESR2222xx	295	45	70
E84AZESR2224xx			
E84AZESR3024xx			

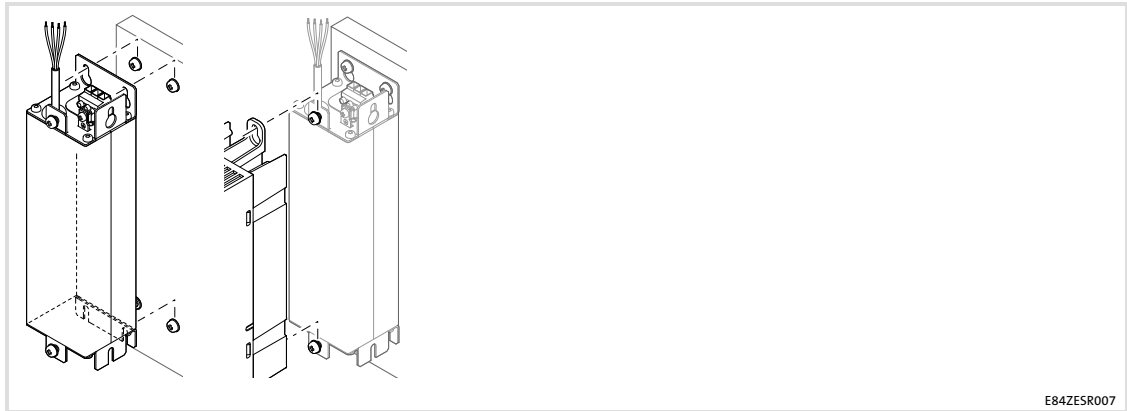


Fig. 5-5 Assembly with footprint filter

Proceed as follows for installation:

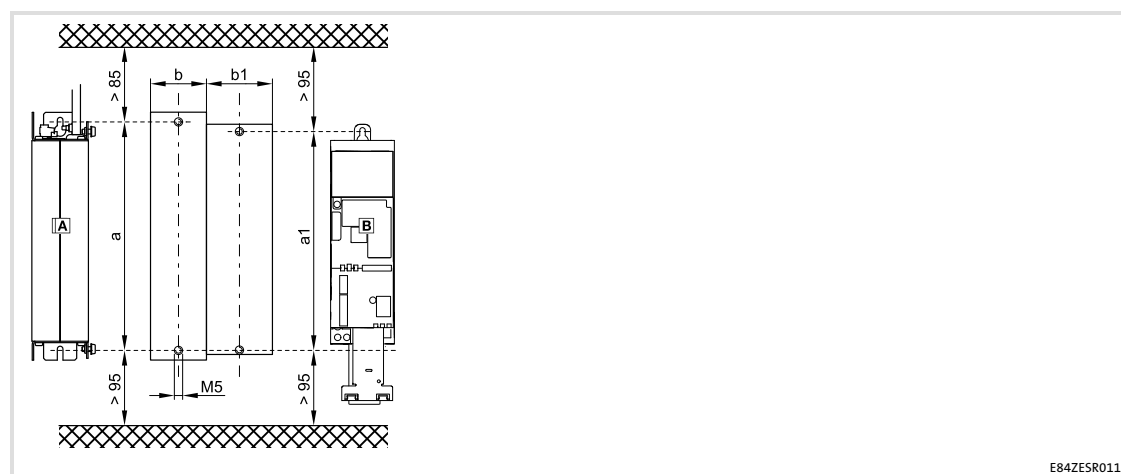
1. Prepare M5 threaded holes on the mounting plate and equip them with screws and washers.
 - Use four M5 screw and washer assemblies or M5 hexagon socket screws with washers.
 - Do not yet tighten the screws.
2. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
3. Loosen the two screw and washer assemblies to fix the standard device on the filter.
 - Two M5 × 14 mm screw and washer assemblies.
4. Mount the standard device onto the filter and tighten the screws.
 - Observe the instructions in the documentation for the standard device.
 - Tightening torque: 3.4 Nm (30 lb-in)
5. If necessary, preassemble additional units.
6. Align all units.
7. Screw all units onto the mounting plate.
 - Tightening torque: 3.4 Nm (30 lb-in)

Filter mounting variant

For mounting, use two screws M5 x >10 mm. The mounting location and material must ensure a durable mechanical connection.

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

Assignment			
Type	SD	RFI filter LD	LL
E84AVxxx2512	E84AZEsr3712SD	E84AZEsr3712LD	E84AZEsr3712LL
E84AVxxx3712			
E84AVxxx5512	E84AZEsr7512SD	E84AZEsr7512LD	E84AZEsr7512LL
E84AVxxx7512			
E84AVxxx1122	E84AZEsr2222SD	E84AZEsr2222LD	E84AZEsr2222LL
E84AVxxx1522			
E84AVxxx2222			
E84AVxxx3714	E84AZEsr7514SD	E84AZEsr7514LD	-
E84AVxxx5514			
E84AVxxx7514			
E84AVxxx1124	E84AZEsr2224SD	E84AZEsr2224LD	-
E84AVxxx1524			
E84AVxxx2224			
E84AVxxx3024xxS	E84AZEsr3024SD	E84AZEsr3024LD	-



- A Side-by-side filter
- B Standard device

	a	a1	b	b1
	[mm]			
E84AZEsr3712xx	190	180	60	70
E84AZEsr7512xx	240	230		
E84AZEsr7514xx	240	230		
E84AZEsr2222xx	295	285	60	70
E84AZEsr2224xx				
E84AZEsr3024xx				

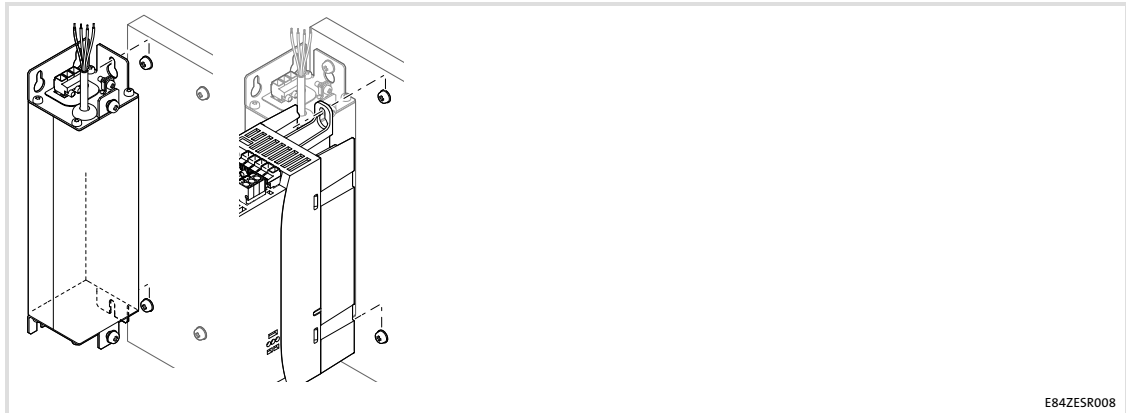


Fig. 5-6 Assembly with side-mounted filter

Proceed as follows for installation:

1. Prepare M5 threaded holes on the mounting plate and equip them with screws and washers.
 - Two M5 screw and washer assemblies or M5 hexagon socket screws with washers for the filter.
 - Two M5 screw and washer assemblies or M5 hexagon socket screws with washers for the standard device.
 - Do not yet tighten the screws.
2. Remove the screw and washer assemblies from the filter to fix the standard device.
3. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
4. Mount the standard device onto the prepared mounting plate.
 - Observe the instructions in the documentation for the standard device.
 - Only tighten the screws hand-tight.
5. If necessary, preassemble additional units.
6. Align all units.
7. Screw all units onto the mounting plate.
 - Tightening torque: 3.4 Nm (30 lb-in)

5.2.2 Assembly in push-through technique (thermal separation)

The E84AVxxD... controllers are designed for mounting in push-through design. The scope of supply includes all parts required for mounting.

Installation steps

How to proceed:

1. Prepare mounting cutout and mounting holes (threaded holes M5 recommended).
2. Insert the 8400 frequency inverter into the mounting cutout.
3. Tighten with 6 screw and washer assemblies M5 x 10 (cross screw connection recommended).
4. Seal the screws to ensure the IP54 enclosure or UL type 12.

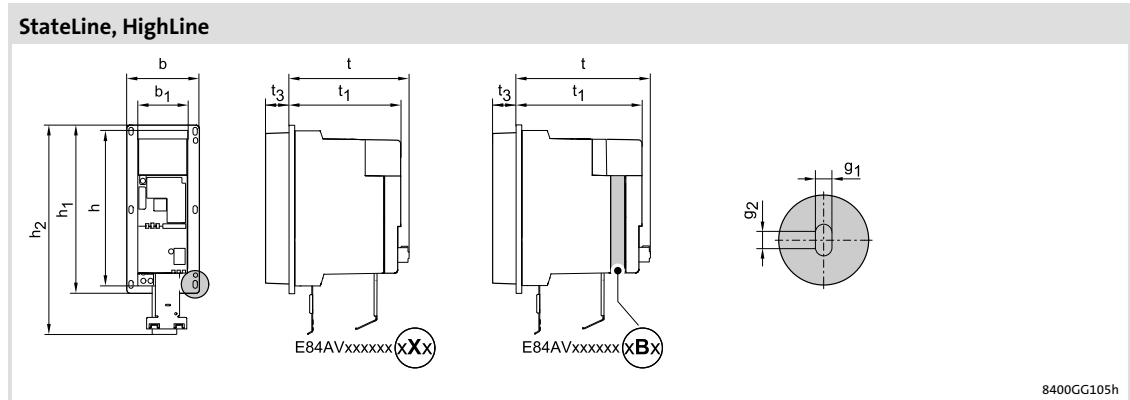


Fig. 5-7 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	t ₃	g ₁	g ₂
		[mm]									
E84AVxxD2512xXx	0.25	165	102	185	186	226	70	172	14	6	5
E84AVxxD3712xXx	0.37										
E84AVxxD3714xXx	0.37										
E84AVxxD551xxXx	0.55	215	102	163	236	276	70	150	36	6	5
E84AVxxD751xxXx	0.75										
E84AVxxD112xxXx	1.1										
E84AVxxD152xxXx	1.5	270	137	163	295	335	70	150	60	6	5
E84AVxxD222xxXx	2.2										
E84AVxxD2512xBx	0.25	165	102	205	186	226	70	192	14	6	5
E84AVxxD3712xBx	0.37										
E84AVxxD3714xBx	0.37										
E84AVxxD551xxBx	0.55	215	102	183	236	276	70	170	36	6	5
E84AVxxD751xxBx	0.75										
E84AVxxD112xxBx	1.1										
E84AVxxD152xxBx	1.5	270	137	183	295	335	70	170	60	6	5
E84AVxxD222xxBx	2.2										

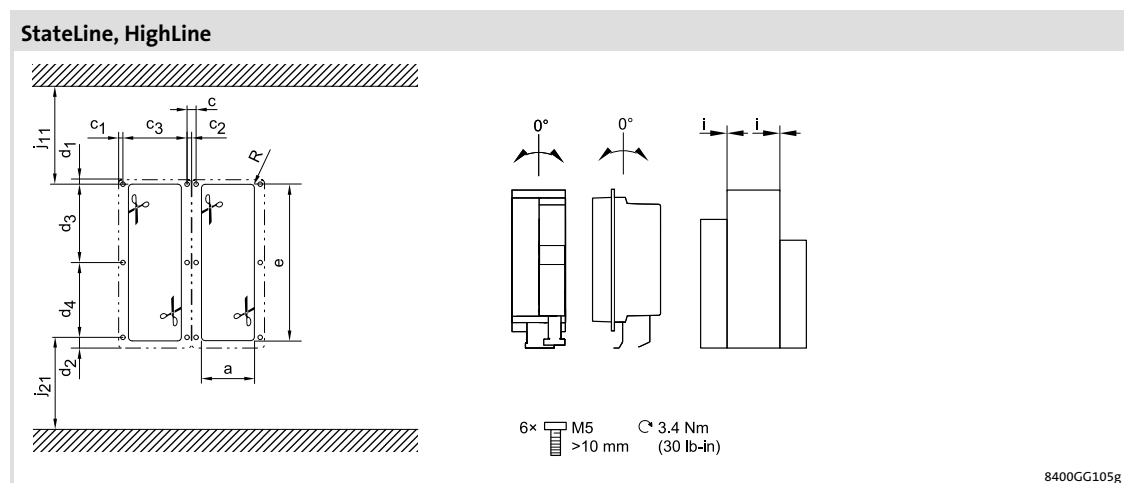


Fig. 5-8 Dimensions for mounting

		a	e	R	d ₁	d ₂	d ₃	d ₄	c	c ₁ , c ₂	c ₃	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVxxD2512xXx	0.25	75	170	5	10	10	85	80	12	6	90	0	> 95	1.4
E84AVxxD3712xXx	0.37	± 1	± 1											
E84AVxxD3714xXx	0.37													
E84AVxxD551xxXx	0.55	75	221	5	8.5	12.5	110	105	12	6	90	0	> 95	1.9
E84AVxxD751xxXx	0.75	± 1	± 1											
E84AVxxD112xxXx	1.1													
E84AVxxD152xxXx	1.5	109	274	5	12.5	12.5	135	135	12	6	125	0	> 95	3.5
E84AVxxD222xxXx	2.2	± 1	± 1											
E84AVxxD2512xBx	0.25	75	170	5	10	10	85	80	12	6	90	0	> 95	1.5
E84AVxxD3712xBx	0.37	± 1	± 1											
E84AVxxD3714xBx	0.37													
E84AVxxD551xxBx	0.55	75	221	5	8.5	12.5	110	105	12	6	90	0	> 95	2.0
E84AVxxD751xxBx	0.75	± 1	± 1											
E84AVxxD112xxBx	1.1													
E84AVxxD152xxBx	1.5	109	274	5	12.5	12.5	135	135	12	6	125	0	> 95	3.6
E84AVxxD222xxBx	2.2	± 1	± 1											

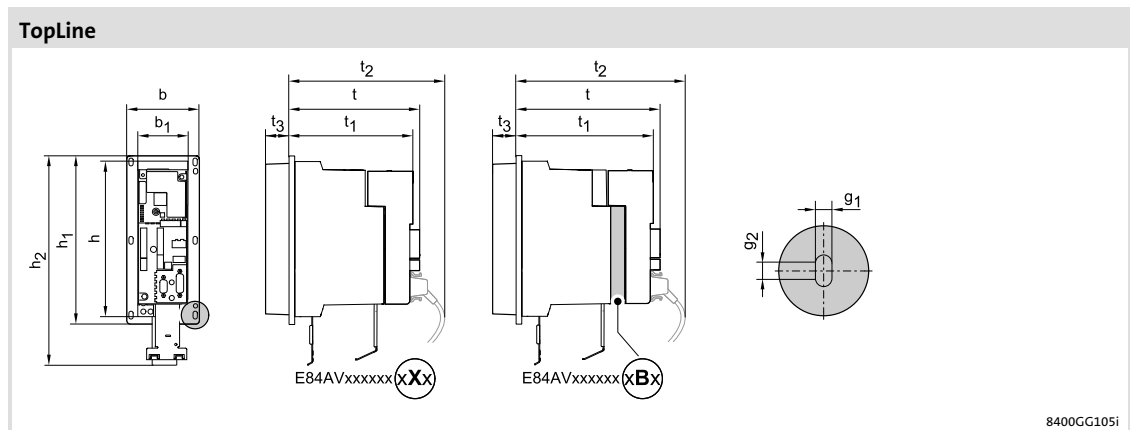


Fig. 5-9 Device dimensions

		h	b	t	h ₁	h ₂	b ₁	t ₁	t ₂	t ₃	g ₁	g ₂
	[kW]	[mm]										
E84AVTCD2512xxXx	0.25	215	102	179	236	276	70	166	206	36	6	5
E84AVTCD371xxXx	0.37											
E84AVTCD551xxXx	0.55											
E84AVTCD751xxXx	0.75											
E84AVTCD112xxXx	1.1	270	137	179	295	335	70	166	206	60	6	5
E84AVTCD152xxXx	1.5											
E84AVTCD222xxXx	2.2											
E84AVTCD2512xxBx	0.25	215	102	199	236	276	70	186	226	36	6	5
E84AVTCD371xxBx	0.37											
E84AVTCD551xxBx	0.55											
E84AVTCD751xxBx	0.75											
E84AVTCD112xxBx	1.1	270	137	199	295	335	70	186	226	60	6	5
E84AVTCD152xxBx	1.5											
E84AVTCD222xxBx	2.2											

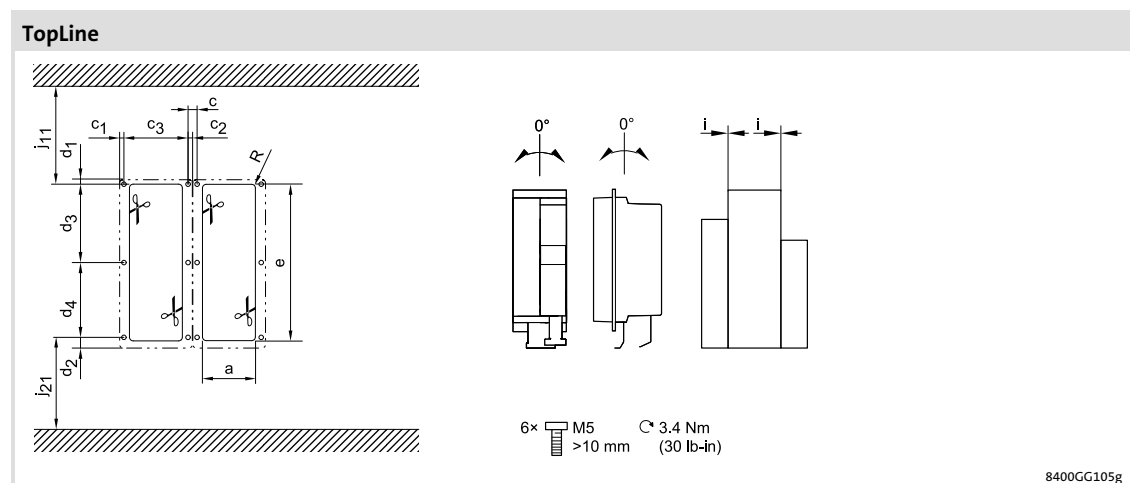


Fig. 5-10 Dimensions for mounting

		a	e	R	d ₁	d ₂	d ₃	d ₄	c	c ₁ , c ₂	c ₃	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVTCD2512xXx	0.25	75 ± 1	221 ± 1	5	8.5	12.5	110	105	12	6	90	0	> 95	2.1
E84AVTCD371xxXx	0.37													
E84AVTCD551xxXx	0.55													
E84AVTCD751xxXx	0.75	109 ± 1	274 ± 1	5	12.5	12.5	135	135	12	6	125	0	> 95	3.7
E84AVTCD112xxXx	1.1													
E84AVTCD152xxXx	1.5													
E84AVTCD222xxXx	2.2	75 ± 1	221 ± 1	5	8.5	12.5	110	105	12	6	90	0	> 95	2.2
E84AVTCD2512xBx	0.25													
E84AVTCD371xxBx	0.37													
E84AVTCD551xxBx	0.55	109 ± 1	274 ± 1	5	12.5	12.5	135	135	12	6	125	0	> 95	3.8
E84AVTCD751xxBx	0.75													
E84AVTCD112xxBx	1.1													
E84AVTCD152xxBx	1.5	75 ± 1	221 ± 1	5	8.5	12.5	110	105	12	6	90	0	> 95	2.2
E84AVTCD222xxBx	2.2													

5.2.3 Mounting in "cold plate" technique

The E84AVxxC... controllers are designed for assembly on coolers (e.g. collective coolers) in "cold-plate" technique.

Requirements for collective coolers

A good thermal connection to the cooler is important for the trouble-free operation of the controller:

- ▶ The contact area between the collective cooler and the controller
 - must be at least as big as the cooling plate of the controller.
 - must be smooth, the maximum deviation must not exceed 0.05 mm.
- ▶ The collective cooler must be connected to the controller with all required screwed joints.
- ▶ The thermal resistance R_{th} must be observed, see table.
 The values in the table apply to the operation of the controllers under rated conditions.
 The values include the heat transmission between the cooler and the device.
 With a standard heat conducting paste and a film thickness of 50 µm, the heat transmission is approx.
 - 0.03 K/W for controllers up to 5.5 kW
 - 0.02 K/W for controllers up to 15 kW
 - 0.01 K/W for controllers up to 22 kW.

	Power loss	Thermal resistance	T_{max}	Power loss (control cabinet)
Type	P_{V1} [W]	R_{th} [K/W]	[°C]	P_{V2} [W]
E84AVxxC2512		15		≤ 1.5
E84AVxxC3712		20		≤ 1.5
E84AVxxC5512		30		≤ 1.0
E84AVxxC7512		40		≤ 1.0
E84AVxxC1122		60		≤ 0.6
E84AVxxC1522		75		≤ 0.5
E84AVxxC2222		100		≤ 0.4
E84AVxxC3714		25		≤ 1.5
E84AVxxC5514		35		≤ 1.0
E84AVxxC7514		50		≤ 0.8
E84AVxxC1124		60		≤ 0.6
E84AVxxC1524		70		≤ 0.5
E84AVxxC2224		100		≤ 0.4
E84AVxxC3024xx5		100		≤ 0.4

Mechanical installation

Standard devices in a power range of 0.25 ... 3 kW

Mounting in "cold plate" technique

Ambient conditions

- The rated data and the derating factors at increased temperature also apply to the ambient temperature of the drive controllers.



Note!

Apply standard heat-conducting paste or heat-conducting foil onto cooler and cooling plate before you bolt the controller onto the cooler.

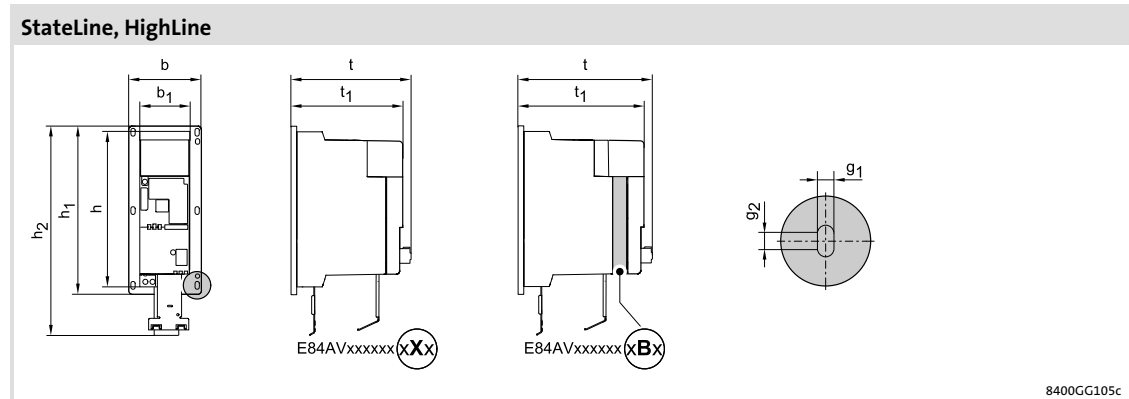


Fig. 5-11 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	g ₁	g ₂
		[mm]								
E84AVxxC2512xX0	0.25	165	102	185	186	226	70	172	6	5
E84AVxxC3712xX0	0.37									
E84AVxxC2512xB0	0.25	165	102	205	186	226	70	192	6	5
E84AVxxC3712xB0	0.37									

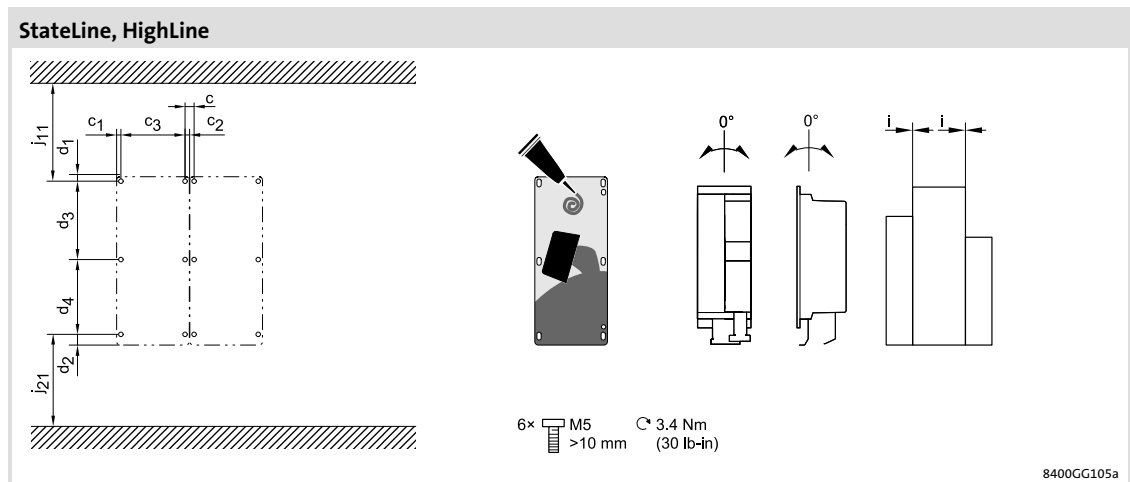


Fig. 5-12 Dimensions for mounting

		d_1	d_2	d_3	d_4	c	c_1	c_2	c_3	i	j_{11}	j_{21}	
	[kW]	[mm]											[kg]
E84AVxxC2512xX0	0.25	10	10	85	80	12	6	6	90	0	> 95	> 95	1.3
E84AVxxC3712xX0	0.37	10	10	85	80	12	6	6	90	0	> 95	> 95	1.4
E84AVxxC2512xB0	0.25	10	10	85	80	12	6	6	90	0	> 95	> 95	1.4
E84AVxxC3712xB0	0.37	10	10	85	80	12	6	6	90	0	> 95	> 95	1.4

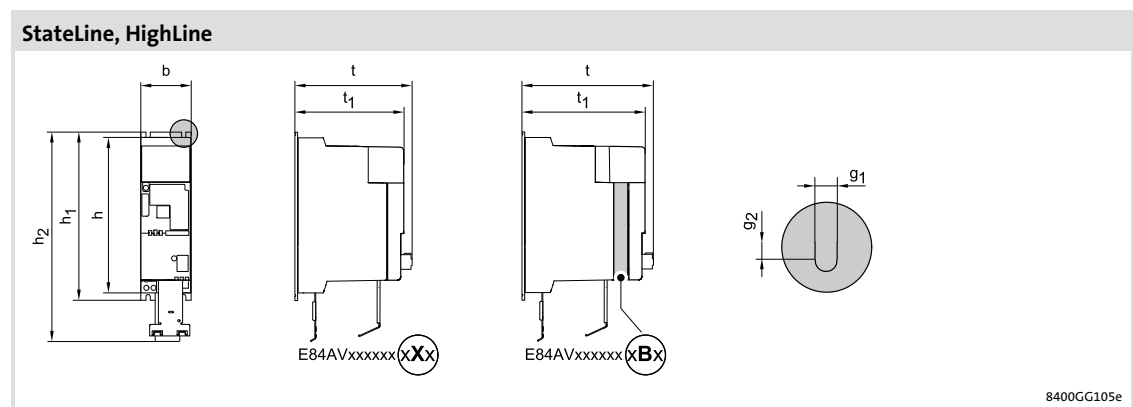


Fig. 5-13 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	g ₁	g ₂
	[kW]	[mm]							
E84AVxxC3714xXS	0.37	215	70	163	236	276	150	6	5
E84AVxxC551xxXS	0.55								
E84AVxxC751xxXS	0.75								
E84AVxxC112xxXS	1.1	270	70	163	295	335	150	6	5
E84AVxxC152xxXS	1.5								
E84AVxxC222xxXS	2.2								
E84AVxxC3024xXS	3.0								
E84AVxxC3714xB	0.37	215	70	183	236	276	170	6	5
E84AVxxC551xxB	0.55								
E84AVxxC751xxB	0.75								
E84AVxxC112xxB	1.1	270	70	183	295	335	170	6	5
E84AVxxC152xxB	1.5								
E84AVxxC222xxB	2.2								
E84AVxxC3024xB	3.0								

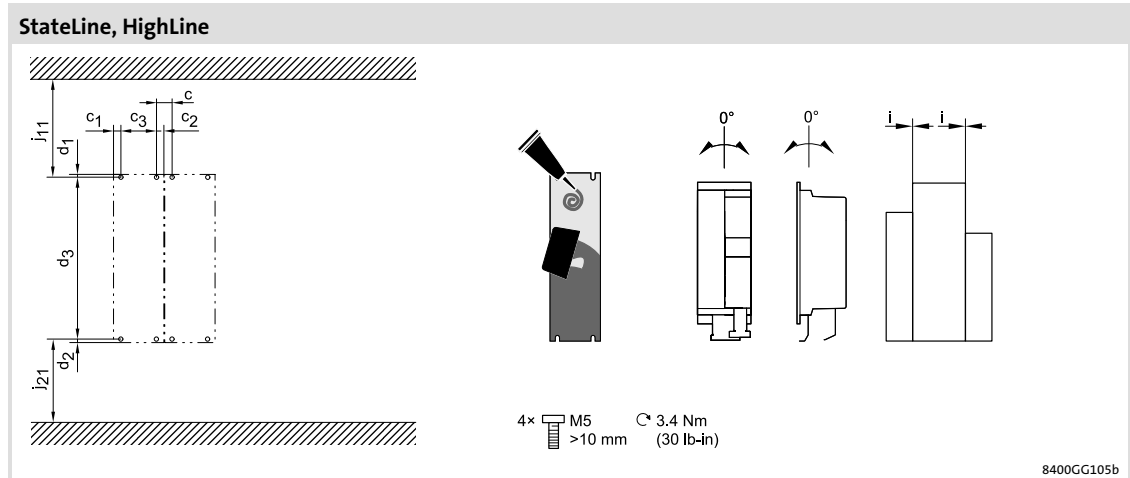


Fig. 5-14 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVxxC3714xXS	0.37	4	4	228	20	10	10	50	0	> 95	> 95	1.5
E84AVxxC551xxXS	0.55											
E84AVxxC751xxXS	0.75											
E84AVxxC112xxXS	1.1	5	5	285	20	10	10	50	0	> 95	> 95	2.0
E84AVxxC152xxXS	1.5											
E84AVxxC222xxXS	2.2											
E84AVxxC3024xxXS	3.0											
E84AVxxC3714xB5	0.37	4	4	228	20	10	10	50	0	> 95	> 95	1.6
E84AVxxC551xxB5	0.55											
E84AVxxC751xxB5	0.75											
E84AVxxC112xxB5	1.1	5	5	285	20	10	10	50	0	> 95	> 95	2.1
E84AVxxC152xxB5	1.5											
E84AVxxC222xxB5	2.2											
E84AVxxC3024xB5	3.0											

Mechanical installation

Standard devices in a power range of 0.25 ... 3 kW

Mounting in "cold plate" technique

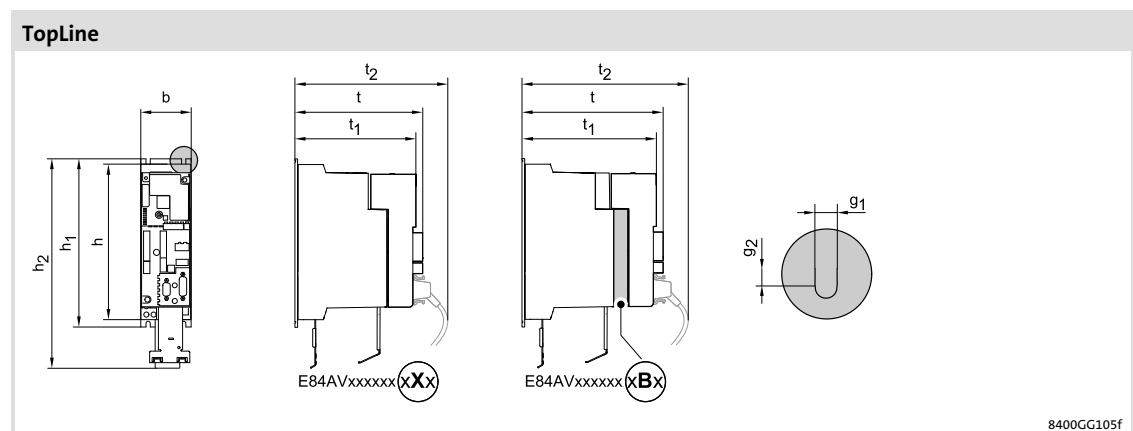


Fig. 5-15 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	t ₂	g ₁	g ₂
	[kW]	[mm]								
E84AVTCC2512xXS	0.25	215	70	178	236	276	165	205	6	5
E84AVTCC371xxXS	0.37									
E84AVTCC551xxXS	0.55									
E84AVTCC751xxXS	0.75									
E84AVTCC112xxXS	1.1	270	70	178	295	335	165	205	6	5
E84AVTCC152xxXS	1.5									
E84AVTCC222xxXS	2.2									
E84AVTCC3024xXS	3.0									
E84AVTCC2512xBs	0.25	215	70	198	236	276	185	225	6	5
E84AVTCC371xxBs	0.37									
E84AVTCC551xxBs	0.55									
E84AVTCC751xxBs	0.75									
E84AVTCC112xxBs	1.1	270	70	198	295	335	185	225	6	5
E84AVTCC152xxBs	1.5									
E84AVTCC222xxBs	2.2									
E84AVTCC3024xBs	3.0									

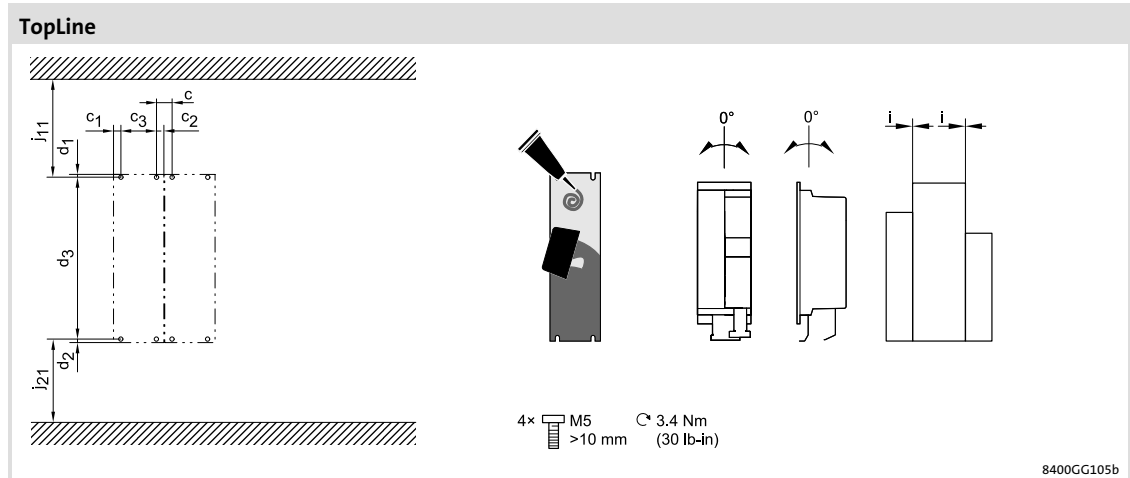


Fig. 5-16 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVTCC2512xXS	0.25	4	4	228	20	10	10	50	0	> 95	> 95	1.7
E84AVTCC371xxXS	0.37											
E84AVTCC551xxXS	0.55											
E84AVTCC751xxXS	0.75											
E84AVTCC112xxXS	1.1	5	5	285	20	10	10	50	0	> 95	> 95	2.2
E84AVTCC152xxXS	1.5											
E84AVTCC222xxXS	2.2											
E84AVTCC3024xXS	3.0											
E84AVTCC2512xBS	0.25	4	4	228	20	10	10	50	0	> 95	> 95	1.8
E84AVTCC371xxBS	0.37											
E84AVTCC551xxBS	0.55											
E84AVTCC751xxBS	0.75											
E84AVTCC112xxBS	1.1	5	5	285	20	10	10	50	0	> 95	> 95	2.3
E84AVTCC152xxBS	1.5											
E84AVTCC222xxBS	2.2											
E84AVTCC3024xBS	3.0											

5.3 Standard devices in the power range 3 ... 22 kW**5.3.1 Assembly in built-in technique (standard)**

You can choose between three variants for mounting the "built-in unit" version of the controllers:

- ▶ Assembly without filter
 - in "standard" technique
- ▶ Assembly with filter:
 - in "standard" technique (footprint filter)
 - in mounting variant (side-mounted filter)

The following filters can be used for the controllers:

- ▶ on the supply side
 - RFI filters

Assembly without filter in "standard" technique

Mounting requires four screws

- ▶ M5 x 12 mm (for devices in the power range 3 kW ... 15 kW) or
- ▶ M6 x 16 mm (for devices in the power range 18.5 kW 22 kW).

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

The mounting location and material must ensure a durable mechanical connection.

How to proceed:

1. Prepare the fixing holes on the mounting surface.
2. Screw the controller directly to the mounting surface.

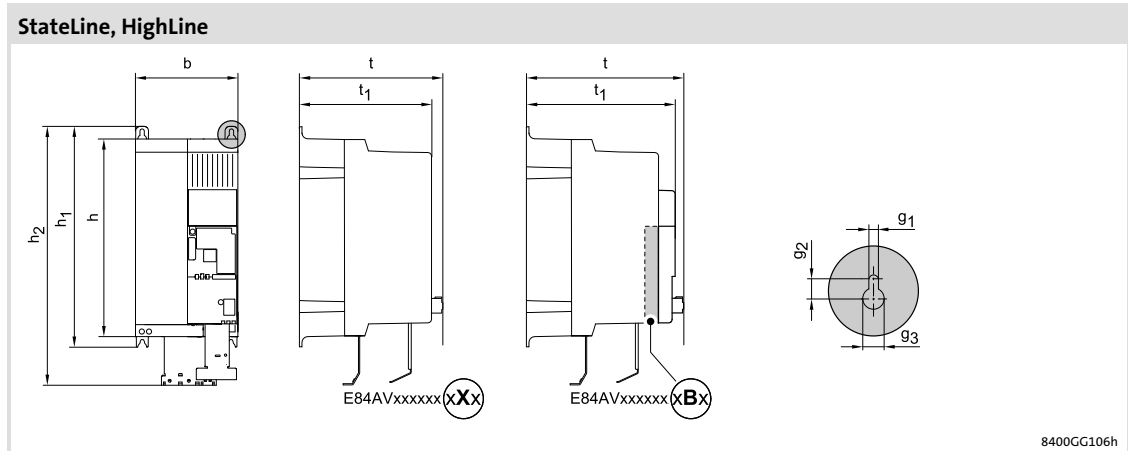


Fig. 5-17 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	t ₁	g ₁	g ₂	g ₃
		[mm]								
E84AVxxE4024xXx	4	270	140	199	303	360	186	6	11	12
E84AVxxE5524xXx	5.5									
E84AVxxE7524xXx	7.5									
E84AVxxE1134xXx	11	325	140	199	359	416	186	6	11	12
E84AVxxE1534xXx	15									
E84AVxxE1834xXx	18.5	350	205	250	359	430	237	7	10	13
E84AVxxE2234xXx	22									
E84AVxxE4024xBx	4	270	140	219	303	360	206	6	11	12
E84AVxxE5524xBx	5.5									
E84AVxxE7524xBx	7.5									
E84AVxxE1134xBx	11	325	140	219	359	416	206	6	11	12
E84AVxxE1534xBx	15									
E84AVxxE1834xBx	18.5	350	205	270	359	430	257	7	10	13
E84AVxxE2234xBx	22									

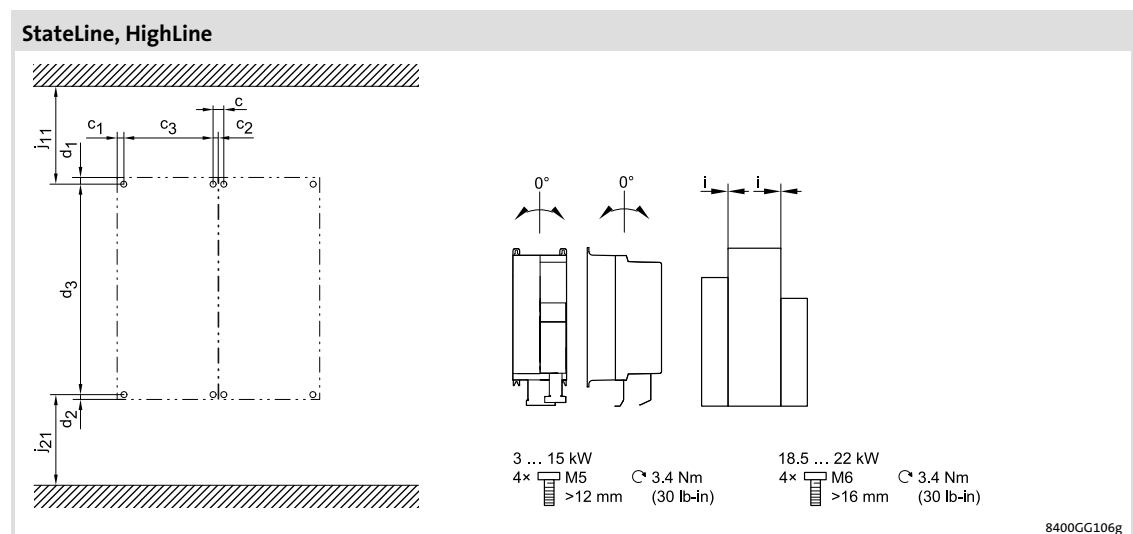


Fig. 5-18 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVxxE4024xXx	4	9	9	285	20	10	10	120	0	> 95	> 95	4.4
E84AVxxE5524xXx	5.5											
E84AVxxE7524xXx	7.5											
E84AVxxE1134xXx	11	10	9	343	20	10	10	120	0	> 95	> 95	5.8
E84AVxxE1534xXx	15											
E84AVxxE1834xXx	18.5											
E84AVxxE2234xXx	22	11	8	343	25	12.5	12.5	180	0	> 95	> 95	12.0
E84AVxxE4024xBx	4											
E84AVxxE5524xBx	5.5											
E84AVxxE7524xBx	7.5	10	9	343	20	10	10	120	0	> 95	> 95	5.9
E84AVxxE1134xBx	11											
E84AVxxE1534xBx	15											
E84AVxxE1834xBx	18.5	11	8	343	25	12.5	12.5	180	0	> 95	> 95	12.1
E84AVxxE2234xBx	22											

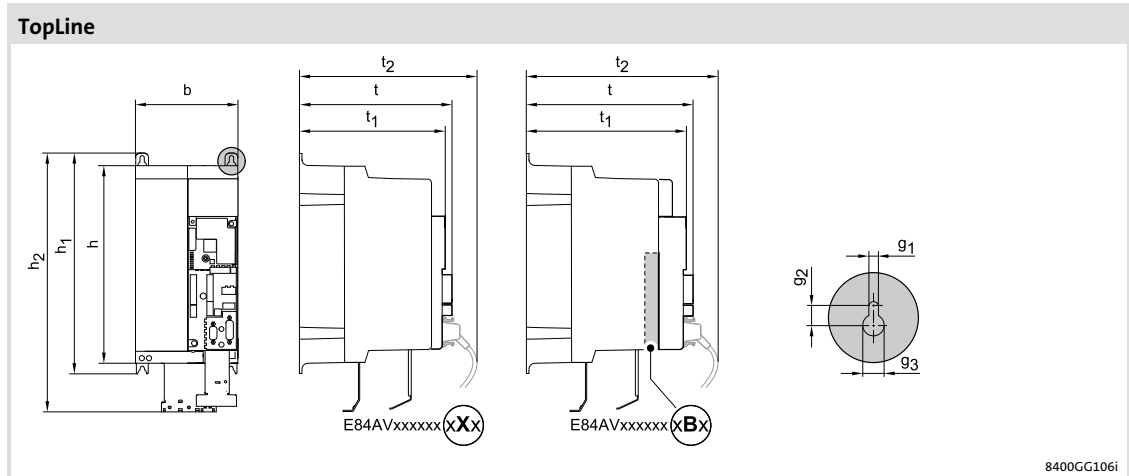


Fig. 5-19 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	t ₂	g ₁	g ₂	g ₃
	[kW]	[mm]									
E84AVTCE4024xXx	4	270	140	214	303	360	201	240	6	11	12
E84AVTCE5524xXx	5.5										
E84AVTCE7524xXx	7.5										
E84AVTCE1134xXx	11										
E84AVTCE1534xXx	15	325	140	214	359	416	201	240	6	11	12
E84AVTCE1834xXx	18.5										
E84AVTCE2234xXx	22										
E84AVTCE4024xBx	4										
E84AVTCE5524xBx	5.5	270	140	234	303	360	221	260	6	11	12
E84AVTCE7524xBx	7.5										
E84AVTCE1134xBx	11										
E84AVTCE1534xBx	15										
E84AVTCE1834xBx	18.5	350	205	285	359	430	272	311	7	10	13
E84AVTCE2234xBx	22										

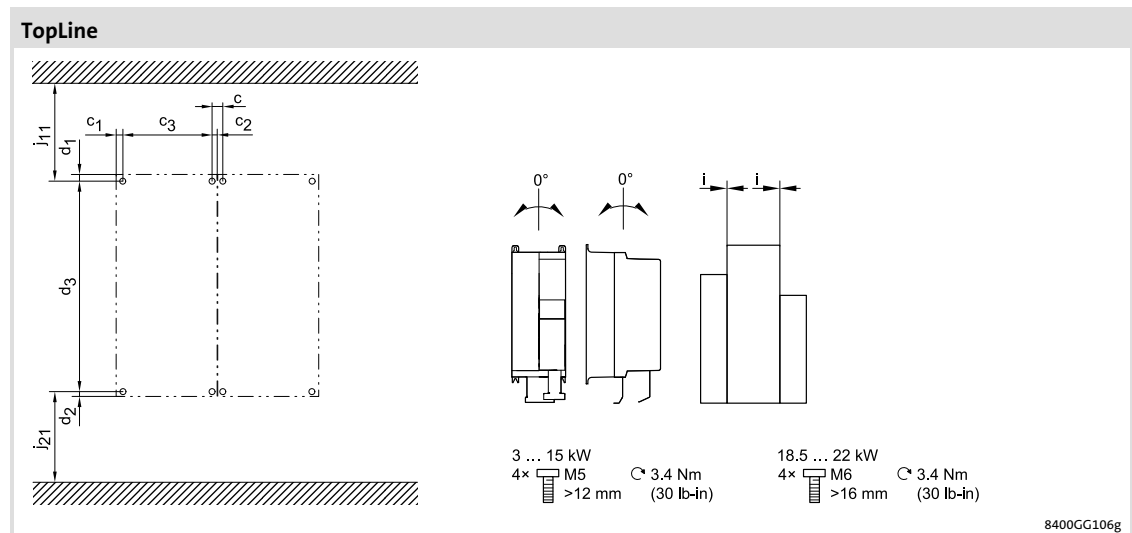


Fig. 5-20 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVTCE4024xXx	4	9	9	285	20	10	10	120	0	> 95	> 95	4.6
E84AVTCE5524xXx	5.5											
E84AVTCE7524xXx	7.5											
E84AVTCE1134xXx	11	10	9	343	20	10	10	120	0	> 95	> 95	6.0
E84AVTCE1534xXx	15											
E84AVTCE1834xXx	18.5											
E84AVTCE2234xXx	22	11	8	343	25	12.5	12.5	180	0	> 95	> 95	12.2
E84AVTCE4024xBx	4											
E84AVTCE5524xBx	5.5											
E84AVTCE7524xBx	7.5	10	9	343	20	10	10	120	0	> 95	> 95	6.1
E84AVTCE1134xBx	11											
E84AVTCE1534xBx	15											
E84AVTCE1834xBx	18.5	11	8	343	25	12.5	12.5	180	0	> 95	> 95	12.3
E84AVTCE2234xBx	22											

Filter mounting in "standard" technique

The mounting location and material must ensure a durable mechanical connection.

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



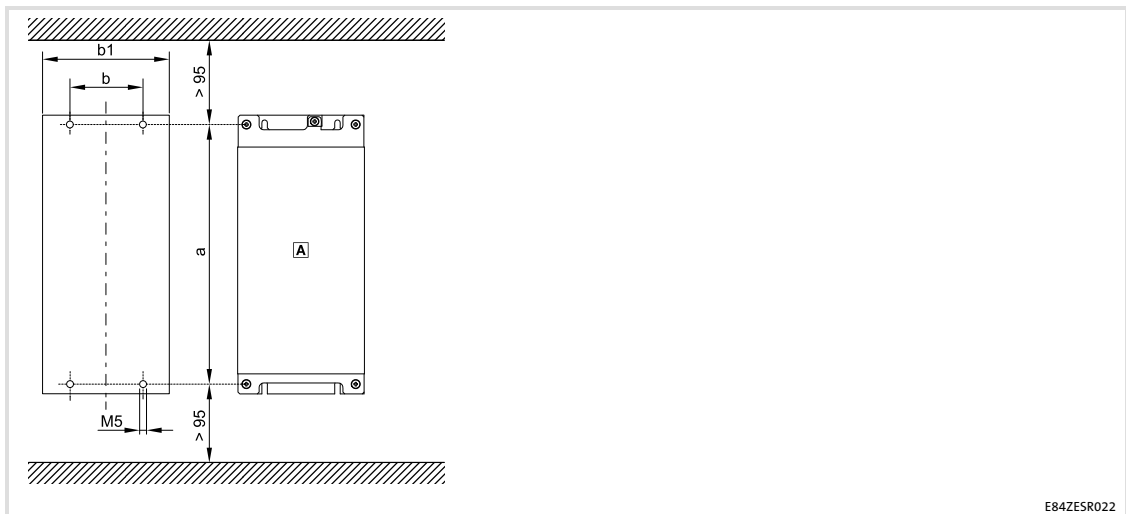
Tip!

The scope of supply of the filter comprises mounting instructions. They describe technical data and information on mechanical and electrical mounting of this accessory part.

Assignment

Type	SD	RFI filter	
		LD	LL
E84AVxxx4024	E84AZESR5524SD	E84AZESR5524LD	-
E84AVxxx5524			
E84AVxxx7524	E84AZESR1534SD	E84AZESR1534LD	-
E84AVxxx1134			
E84AVxxx1534			
E84AVxxx1834	-	I0FAE318F100D0000S	-
E84AVxxx2234	-	I0FAE322F100D0000S	-

1) Mains filter (mains choke with RFI filter)



A Footprint filter

Type	a	b	b1
	[mm]		
E84AZESR5524xx	285	80	140
E84AZESR1534xx	340	80	140
I0FAE318xxx	417	160	202
I0FAE322xxx	417	160	202

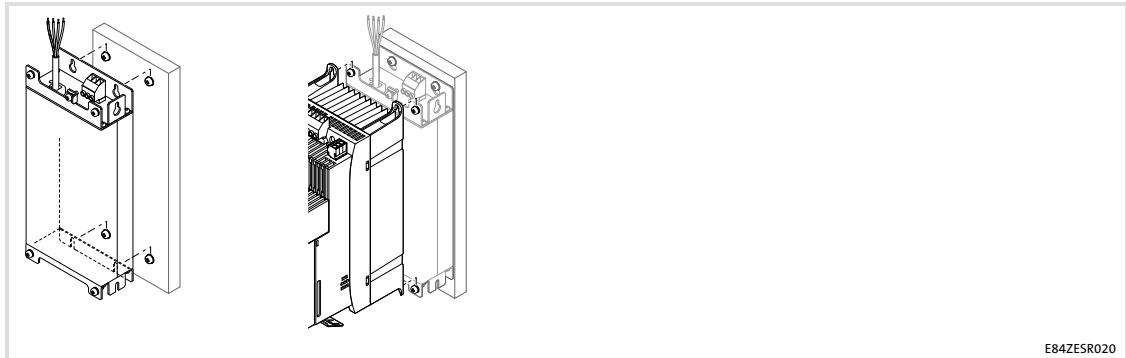


Fig. 5-21 Assembly with footprint filter

Proceed as follows for installation:

1. Prepare M5 threaded holes on the mounting plate and equip them with screws and washers.
 - Use four M5 screw and washer assemblies or M5 hexagon socket screws with washers.
 - Do not yet tighten the screws.
2. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
3. Loosen the two screw and washer assemblies to fix the standard device on the filter.
 - Two M5 × 14 mm screw and washer assemblies.
4. Mount the standard device onto the filter and tighten the screws.
 - Observe the instructions in the documentation for the standard device.
 - Tightening torque: 3.4 Nm (30 lb-in)
5. If necessary, preassemble additional units.
6. Align all units.
7. Screw all units onto the mounting plate.
 - Tightening torque: 3.4 Nm (30 lb-in)

Filter mounting variant

The mounting location and material must ensure a durable mechanical connection.

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



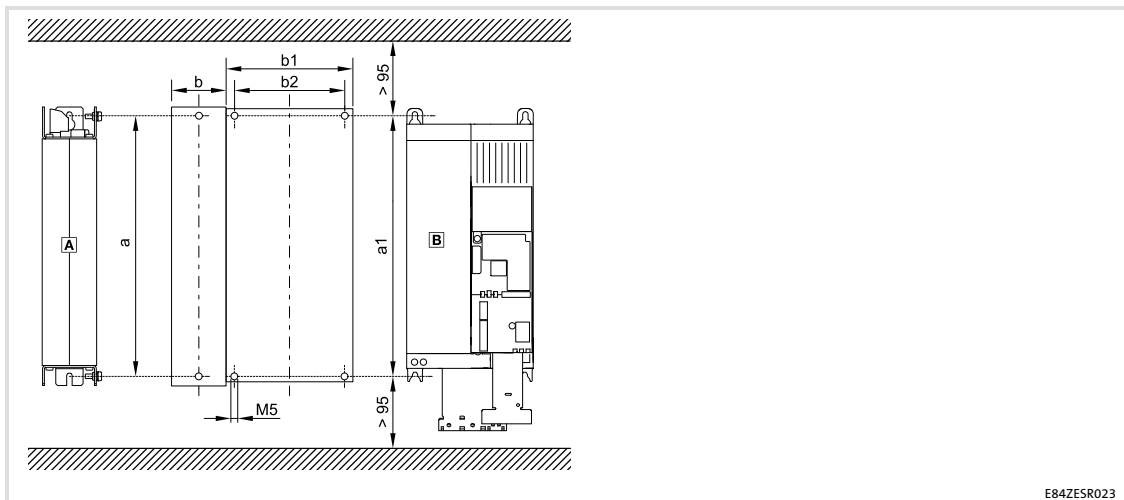
Tip!

The scope of supply of the filter comprises mounting instructions. They describe technical data and information on mechanical and electrical mounting of this accessory part.

Assignment

Type	RFI filter		
	SD	LD	LL
E84AVxxx4024	E84AZE5R5524SD	E84AZE5R5524LD	-
E84AVxxx5524			
E84AVxxx7524	E84AZE5R1534SD	E84AZE5R1534LD	-
E84AVxxx1134			
E84AVxxx1534	-	I0FAE318F100D0000S	-
E84AVxxx1834			
E84AVxxx2234	-	I0FAE322F100D0000S	-

1) Mains filter (mains choke with RFI filter)



E84ZE5R023

- A Side-by-side filter
- B Standard device

Type	a	a1	b	b1	b2
	[mm]	[mm]	[mm]	[mm]	[mm]
E84AZE5R5524xx	285	285	60	140	120
E84AZE5R1534xx	340	340	60	140	120
I0FAE318	415	340	90	205	180
I0FAE322	415	340	90	205	180

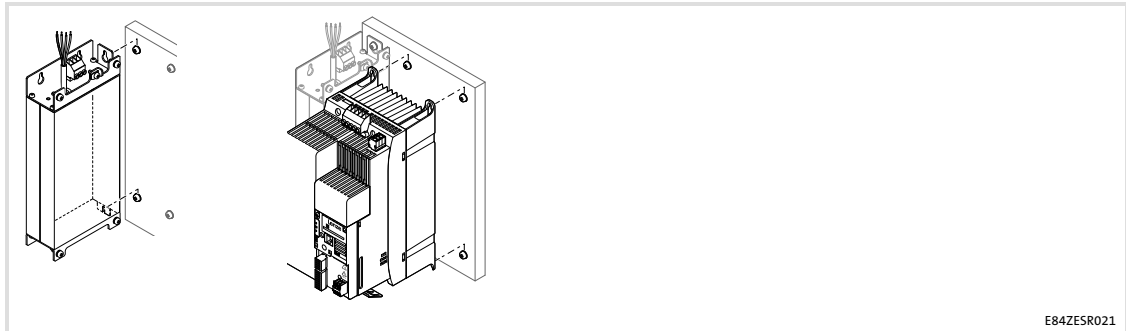


Fig. 5-22 Assembly with side-mounted filter

Proceed as follows for installation:

1. Prepare M5 threaded holes on the mounting plate and equip them with screws and washers.
 - Two M5 screw and washer assemblies or M5 hexagon socket screws with washers for the filter.
 - Two M5 screw and washer assemblies or M5 hexagon socket screws with washers for the standard device.
 - Do not yet tighten the screws.
2. Remove the screw and washer assemblies from the filter to fix the standard device.
3. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
4. Mount the standard device onto the prepared mounting plate.
 - Observe the instructions in the documentation for the standard device.
 - Only tighten the screws hand-tight.
5. If necessary, preassemble additional units.
6. Align all units.
7. Screw all units onto the mounting plate.
 - Tightening torque: 3.4 Nm (30 lb-in)

5.3.2 Assembly in push-through technique (thermal separation)

The E84AVxxD... controllers are designed for mounting in push-through design. The scope of supply includes all parts required for mounting.

Installation steps

How to proceed:

1. Prepare mounting cutout and mounting holes (threaded holes M5 recommended).
2. Insert the 8400 frequency inverter into the mounting cutout.
3. Tighten with 6 screw and washer assemblies M5 x 10 (cross screw connection recommended).
4. Seal the screws to ensure the IP54 enclosure or UL type 12.

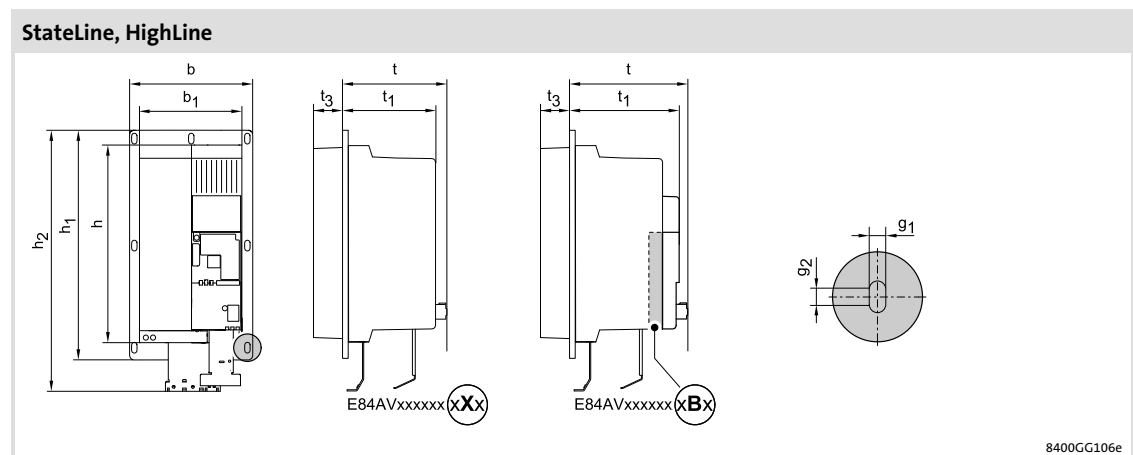


Fig. 5-23 Device dimensions

		h	b	t	h ₁	h ₂	b ₁	t ₁	t ₃	g ₁	g ₂
	[kW]	[mm]									
E84AVxxD3024xXX	3	270	174	141	318	366	140	128	64	6	5
E84AVxxD4024xXX	4										
E84AVxxD5524xXX	5.5										
E84AVxxD3024xBX	3	270	174	161	318	366	140	148	64	6	5
E84AVxxD4024xBX	4										
E84AVxxD5524xBX	5.5										

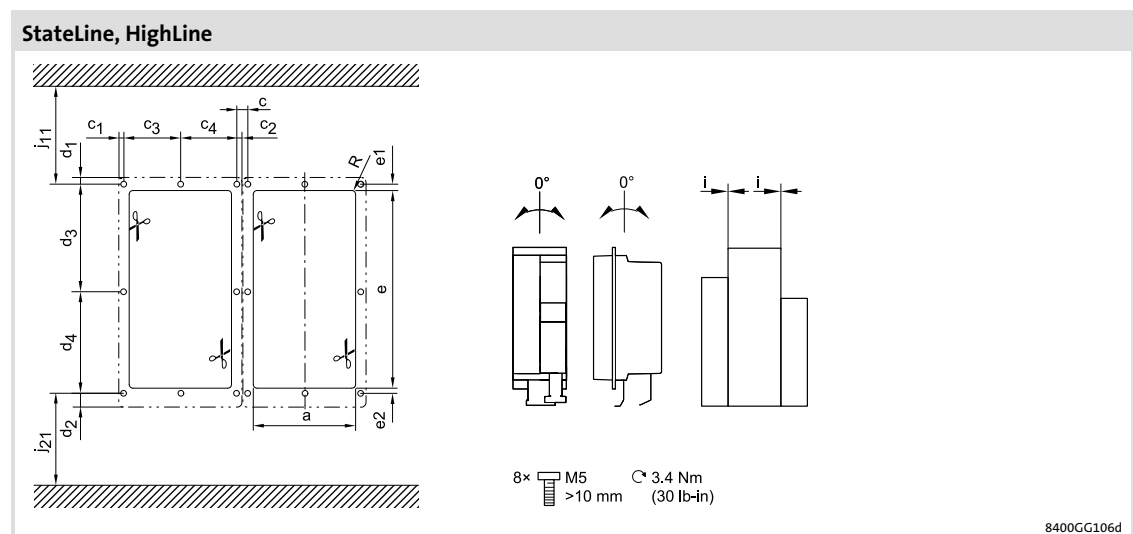


Fig. 5-24 Dimensions for mounting

		a	e	e ₁	e ₂	R	d ₁ , d ₂	d ₃ , d ₄	c	c ₁ , c ₂	c ₃ , c ₄	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVxxD3024xXx	3	146 ± 1	279 ± 1	12.5	8.5	5	9	150	15	7	80	0	> 95	4.9
E84AVxxD4024xXx	4													
E84AVxxD5524xXx	5.5													
E84AVxxD3024xBx	3	146 ± 1	279 ± 1	12.5	8.5	5	9	150	15	7	80	0	> 95	5.0
E84AVxxD4024xBx	4													
E84AVxxD5524xBx	5.5													

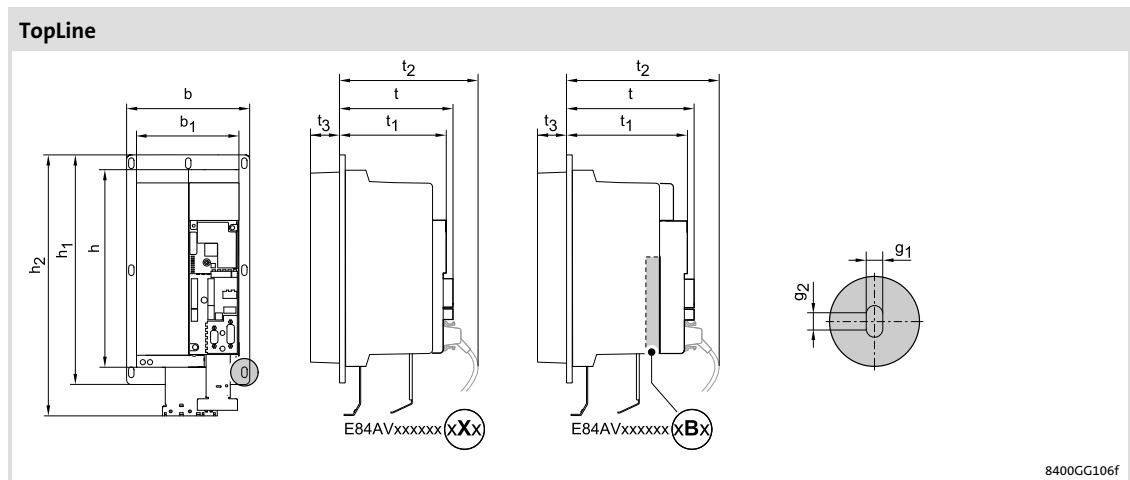


Fig. 5-25 Device dimensions

		h	b	t	h ₁	h ₂	b ₁	t ₁	t ₂	t ₃	g ₁	g ₂
	[kW]	[mm]										
E84AVTCD3024xXx	3	270	174	156	318	366	140	143	182	64	6	5
E84AVTCD4024xXx	4											
E84AVTCD5524xXx	5.5											
E84AVTCD3024xBx	3	270	174	176	318	366	140	163	202	64	6	5
E84AVTCD4024xBx	4											
E84AVTCD5524xBx	5.5											

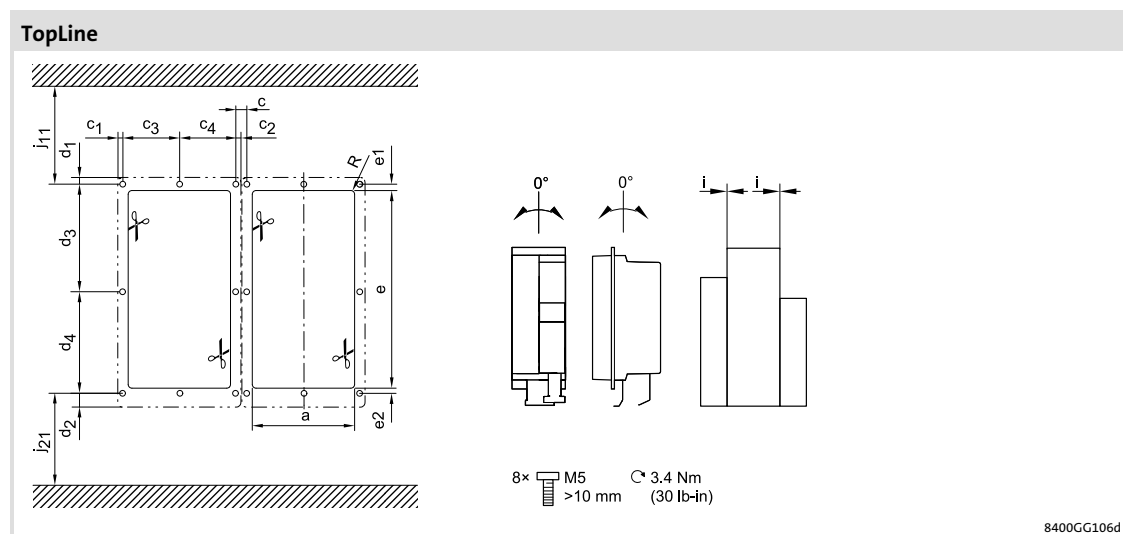


Fig. 5-26 Dimensions for mounting

		a	e	e ₁	e ₂	R	d ₁ , d ₂	d ₃ , d ₄	c	c ₁ , c ₂	c ₃ , c ₄	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVTCD3024xXx	3	146 ± 1	279 ± 1	12.5	8.5	5	9	150	15	7	80	0	> 95	5.1
E84AVTCD4024xXx	4													
E84AVTCD5524xXx	5.5													
E84AVTCD3024xBx	3	146 ± 1	279 ± 1	12.5	8.5	5	9	150	15	7	80	0	> 95	5.2
E84AVTCD4024xBx	4													
E84AVTCD5524xBx	5.5													

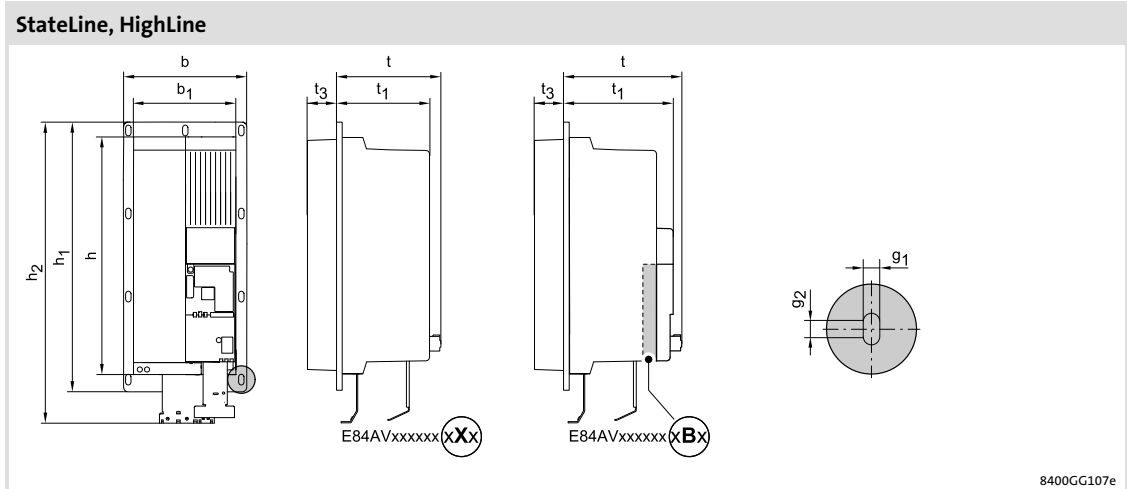


Fig. 5-27 Device dimensions

		h	b	t	h ₁	h ₂	b ₁	t ₁	t ₃	g ₁	g ₂
	[kW]	[mm]									
E84AVxxD7524xXx	7.5	325	174	141	378	426	140	128	64	6	5
E84AVxxD1134xXx	11										
E84AVxxD1534xXx	15										
E84AVxxD7524xBx	7.5	325	174	161	378	426	140	148	64	6	5
E84AVxxD1134xBx	11										
E84AVxxD1534xBx	15										

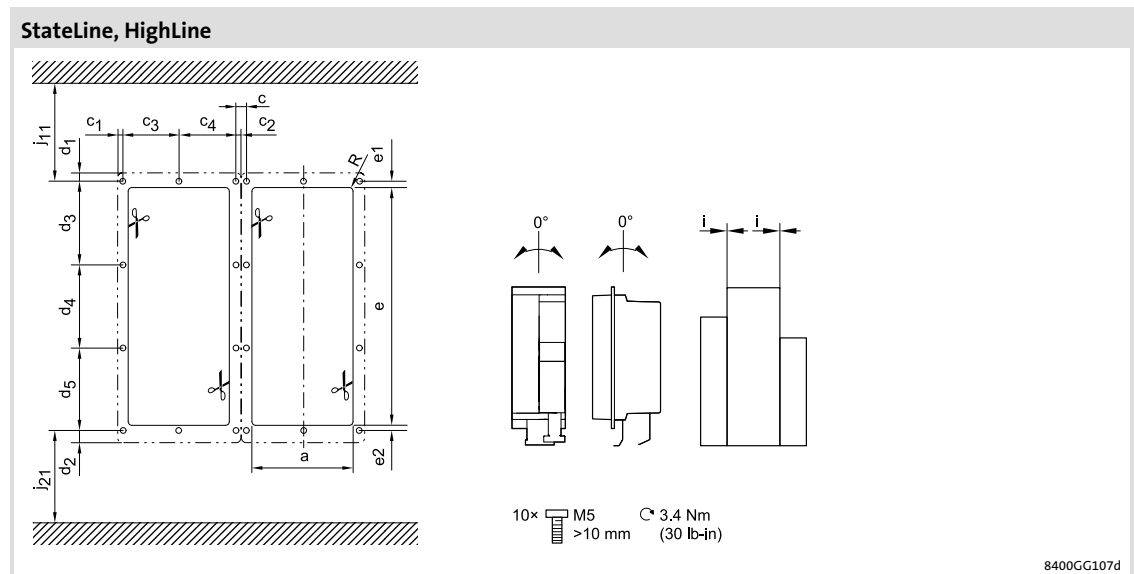


Fig. 5-28 Dimensions for mounting

		a	e	e ₁	e ₂	R	d ₁ , d ₂	d ₃ , d ₄ , d ₅	c	c ₁ , c ₂	c ₃ , c ₄	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVxxD7524xXx	7.5	145 ± 1	333 ± 1	17	10	5	9	120	15	7	80	0	> 95	6.2
E84AVxxD1134xXx	11													
E84AVxxD1534xXx	15													
E84AVxxD7524xBx	7.5	145 ± 1	333 ± 1	17	10	5	9	120	15	7	80	0	> 95	6.3
E84AVxxD1134xBx	11													
E84AVxxD1534xBx	15													

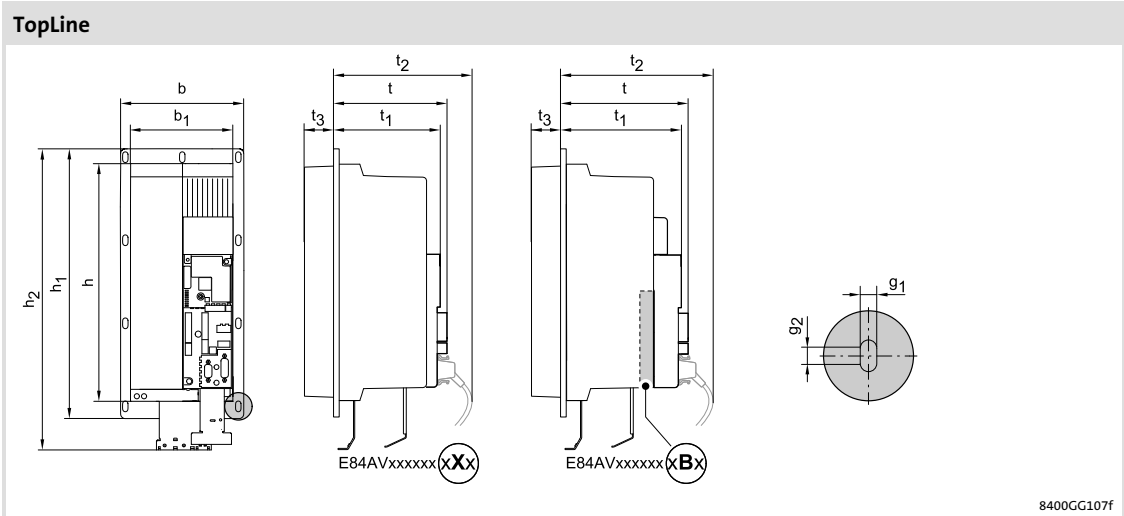


Fig. 5-29 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	t ₂	t ₃	g ₁	g ₂
		[mm]										
E84AVTCD7524xXx	7.5	325	174	156	378	426	140	143	182	64	6	5
E84AVTCD1134xXx	11			176	378	426	140	163	202	64	6	5
E84AVTCD1534xXx	15											
E84AVTCD7524xBx	7.5	325	174	176	378	426	140	163	202	64	6	5
E84AVTCD1134xBx	11											
E84AVTCD1534xBx	15											

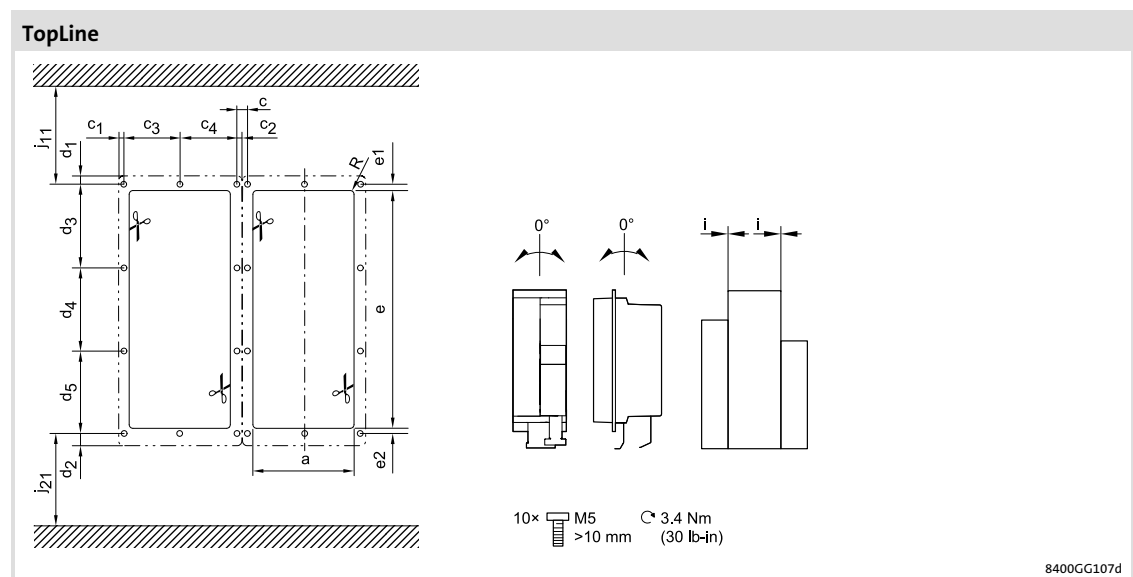


Fig. 5-30 Dimensions for mounting

		a	e	e ₁	e ₂	R	d ₁ , d ₂	d ₃ , d ₄ , d ₅	c	c ₁ , c ₂	c ₃ , c ₄	i	j ₁₁ , j ₂₁	
	[kW]	[mm]												[kg]
E84AVTCD7524xXx	7.5	145 ± 1	333 ± 1	17	10	5	9	120	15	7	80	0	> 95	6.4
E84AVTCD1134xXx	11													
E84AVTCD1534xXx	15													
E84AVTCD7524xBx	7.5	145 ± 1	333 ± 1	17	10	5	9	120	15	7	80	0	> 95	6.5
E84AVTCD1134xBx	11													
E84AVTCD1534xBx	15													

5.3.3 Mounting in "cold plate" technique

The E84AVxxC... controllers are designed for assembly on coolers (e.g. collective coolers) in "cold-plate" technique.

Requirements for collective coolers

A good thermal connection to the cooler is important for the trouble-free operation of the controller:

- ▶ The contact area between the collective cooler and the controller
 - must be at least as big as the cooling plate of the controller.
 - must be smooth, the maximum deviation must not exceed 0.05 mm.
- ▶ The collective cooler must be connected to the controller with all required screwed joints.
- ▶ The thermal resistance R_{th} must be observed, see table.
 The values in the table apply to the operation of the controllers under rated conditions.
 The values include the heat transmission between the cooler and the device.
 With a standard heat conducting paste and a film thickness of 50 µm, the heat transmission is approx.
 - 0.03 K/W for controllers up to 5.5 kW
 - 0.02 K/W for controllers up to 15 kW
 - 0.01 K/W for controllers up to 22 kW.

	Power to be dissipated	Thermal resistance
Type	P_v [W]	R_{th} [K/W]
E84AVxxC4024	155	≤ 0.25
E84AVxxC5524	215	≤ 0.18
E84AVxxC7524	250	≤ 0.15
E84AVxxC1134	355	≤ 0.11
E84AVxxC1534	390	≤ 0.10
E84AVxxC1834	460	≤ 0.057
E84AVxxC2234	540	≤ 0.057

Ambient conditions

- ▶ The rated data and the derating factors at increased temperature also apply to the ambient temperature of the drive controllers.



Note!

Apply standard heat-conducting paste or heat-conducting foil onto cooler and cooling plate before you bolt the controller onto the cooler.

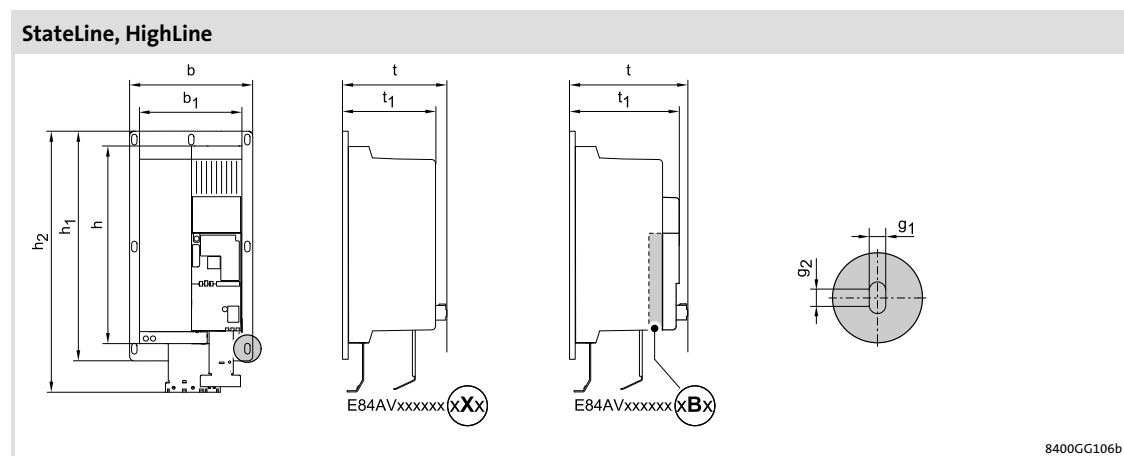


Fig. 5-31 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	g ₁	g ₂
		[mm]								
E84AVxxC4024xXx	4	270	174	141	318	366	140	128	6	5
E84AVxxC5524xXx	5.5									
E84AVxxC4024xBx	4	270	174	161	318	366	140	148	6	5
E84AVxxC5524xBx	5.5									

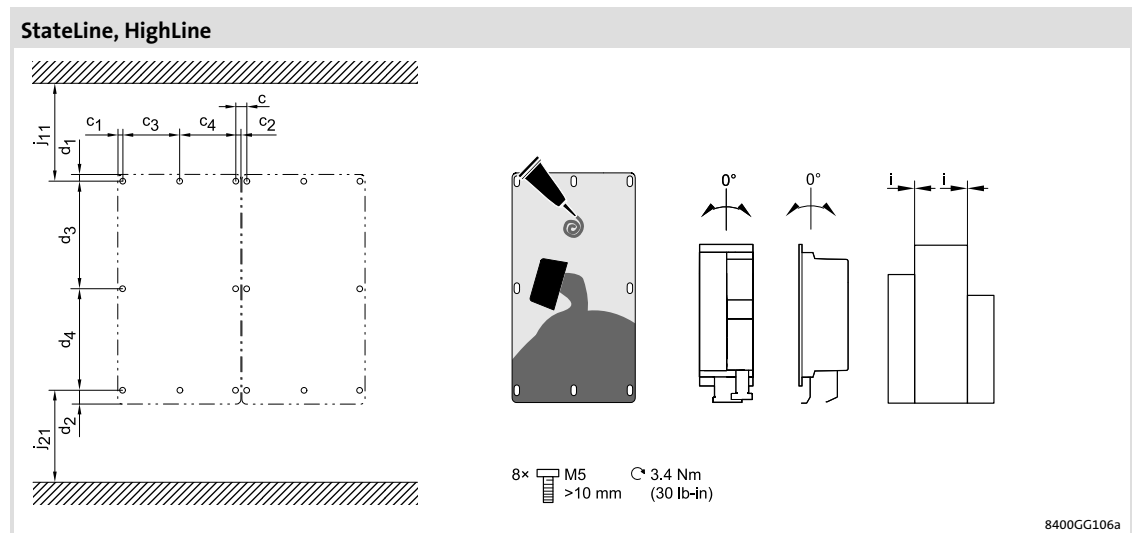


Fig. 5-32 Dimensions for mounting

		d ₁	d ₂	d ₃	d ₄	c	c ₁	c ₂	c ₃	c ₄	i	j ₁₁	j ₂₁	
	[kW]	[mm]												[kg]
E84AVxxC4024xXx	4	9	9	150	150	15	7	7	80	80	0	> 95	> 95	2.7
E84AVxxC5524xXx	5.5													
E84AVxxC4024xBx	4	9	9	150	150	15	7	7	80	80	0	> 95	> 95	2.8
E84AVxxC5524xBx	5.5													

Mechanical installation
Standard devices in the power range 3 ... 22 kW
Mounting in "cold plate" technique

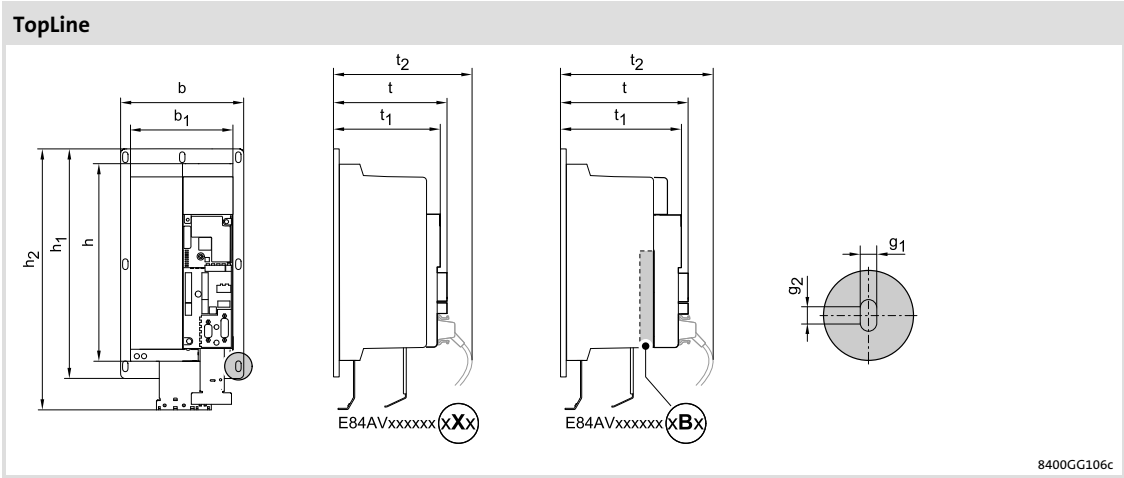


Fig. 5-33 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	t ₂	g ₁	g ₂
		[mm]									
E84AVTCC4024xXx	4	270	174	156	318	366	140	143	182	6	5
E84AVTCC5524xXx	5.5										
E84AVTCC4024xBx	4	270	174	176	318	366	140	163	202	6	5
E84AVTCC5524xBx	5.5										

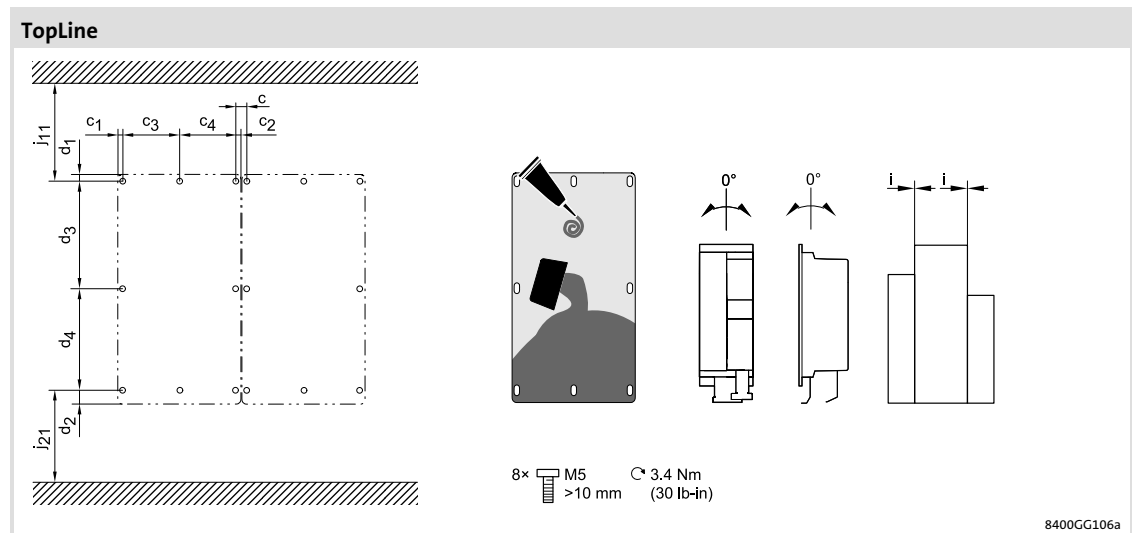


Fig. 5-34 Dimensions for mounting

		d ₁	d ₂	d ₃	d ₄	c	c ₁	c ₂	c ₃	c ₄	i	j ₁₁	j ₂₁	
	[kW]	[mm]												[kg]
E84AVTCC4024xXx	4	9	9	150	150	15	7	7	80	80	0	> 95	> 95	2.9
E84AVTCC5524xXx	5.5													
E84AVTCC4024xBx	4	9	9	150	150	15	7	7	80	80	0	> 95	> 95	3.0
E84AVTCC5524xBx	5.5													

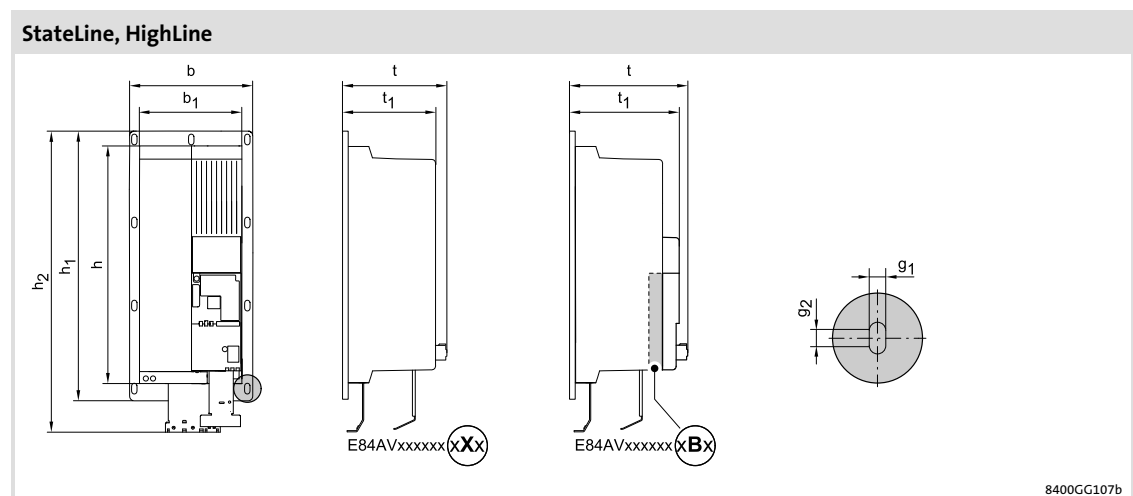


Fig. 5-35 Device dimensions

		h	b	t	h₁	h₂	b₁	t₁	g₁	g₂
	[kW]	[mm]								
E84AVxxC7524xXx	7.5	325	174	141	378	426	140	128	6	5
E84AVxxC1134xXx	11									
E84AVxxC1534xXx	15									
E84AVxxC1834xXx	18.5	350	231	164	407	458	205	151	6	7
E84AVxxC2234xXx	22									
E84AVxxC7524xBx	7.5									
E84AVxxC1134xBx	11	325	174	161	378	426	140	148	6	5
E84AVxxC1534xBx	15									
E84AVxxC1834xBx	18.5									
E84AVxxC2234xBx	22	350	231	184	407	458	205	171	6	7

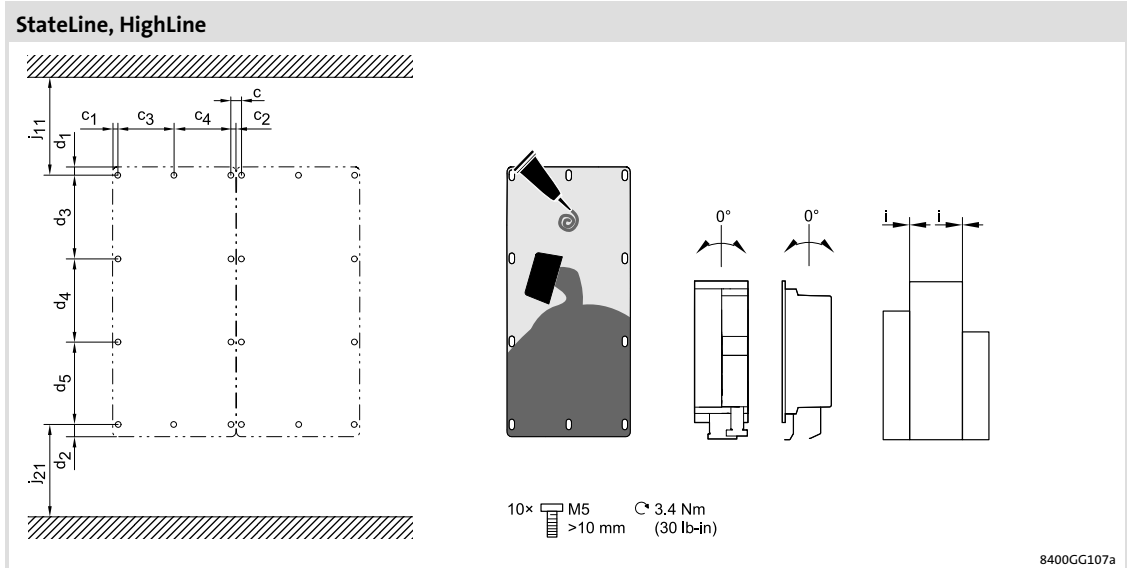


Fig. 5-36 Dimensions for mounting

		d ₁	d ₂	d ₃	d ₄	d ₅	c	c ₁	c ₂	c ₃	c ₄	i	j ₁₁	j ₂₁	
	[kW]	[mm]													[kg]
E84AVxxC7524xXx	7.5	9	9	120	120	120	15	7	7	80	80	0	> 95	> 95	3.6
E84AVxxC1134xXx	11														
E84AVxxC1534xXx	15														
E84AVxxC1834xXx	18.5	8.5	8.5	130	130	130	15	5.5	5.5	110	110	0	> 95	> 95	9.3
E84AVxxC2234xXx	22														
E84AVxxC7524xBx	7.5														
E84AVxxC1134xBx	11	9	9	120	120	120	15	7	7	80	80	0	> 95	> 95	3.7
E84AVxxC1534xBx	15														
E84AVxxC1834xBx	18.5														
E84AVxxC2234xBx	22	8.5	8.5	130	130	130	15	5.5	5.5	110	110	0	> 95	> 95	9.4

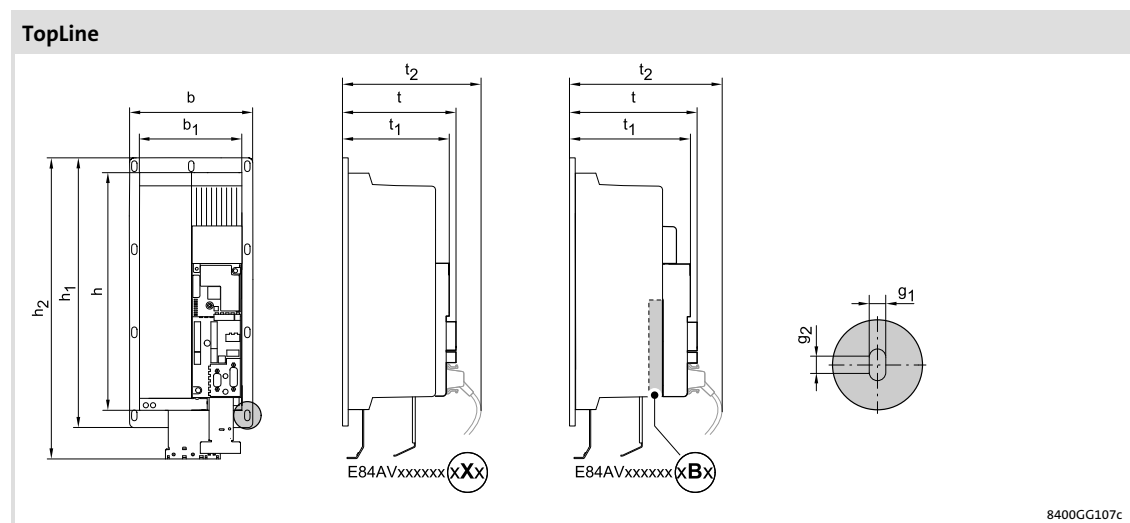


Fig. 5-37 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	b ₁	t ₁	t ₂	g ₁	g ₂
		[mm]									
E84AVTCC7524xXx	7.5	325	174	156	378	426	140	143	182	6	5
E84AVTCC1134xXx	11										
E84AVTCC1534xXx	15										
E84AVTCC1834xXx	18.5	350	231	179	407	458	205	166	205	6	7
E84AVTCC2234xXx	22										
E84AVTCC7524xBx	7.5										
E84AVTCC1134xBx	11	325	174	176	378	426	140	163	202	6	5
E84AVTCC1534xBx	15										
E84AVTCC1834xBx	18.5										
E84AVTCC2234xBx	22	350	231	199	407	458	205	186	225	6	7

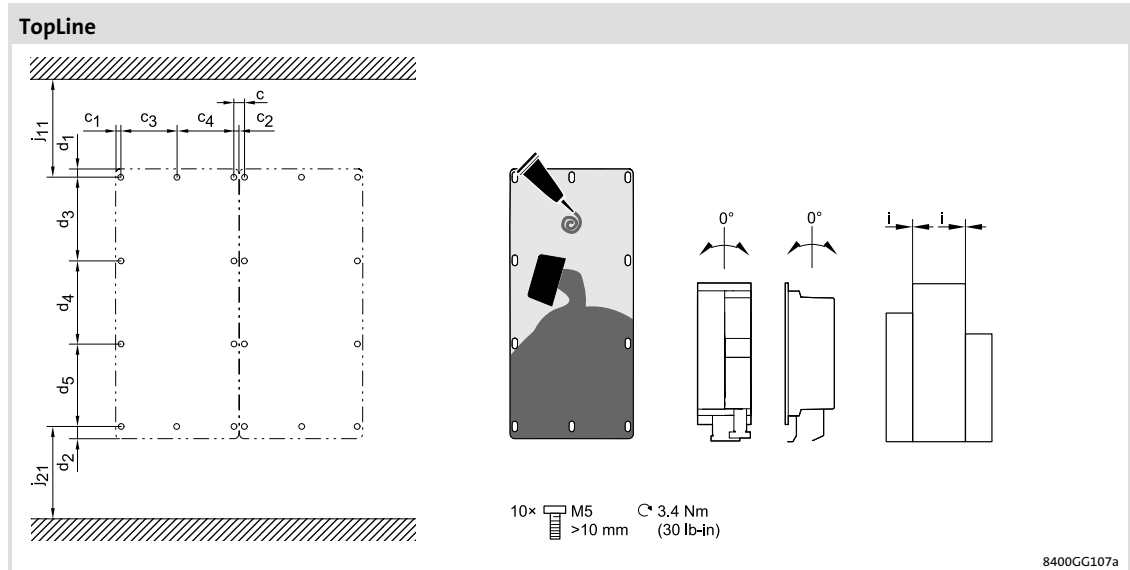


Fig. 5-38 Dimensions for mounting

		d ₁	d ₂	d ₃	d ₄	d ₅	c	c ₁	c ₂	c ₃	c ₄	i	j ₁₁	j ₂₁	
	[kW]	[mm]													[kg]
E84AVTCC7524xXx	7.5	9	9	120	120	120	15	7	7	80	80	0	> 95	> 95	3.8
E84AVTCC1134xXx	11														
E84AVTCC1534xXx	15														
E84AVTCC1834xXx	18.5	8.5	8.5	130	130	130	15	5.5	5.5	110	110	0	> 95	> 95	9.5
E84AVTCC2234xXx	22														
E84AVTCC7524xBx	7.5														
E84AVTCC1134xBx	11	9	9	120	120	120	15	7	7	80	80	0	> 95	> 95	3.9
E84AVTCC1534xBx	15														
E84AVTCC1834xBx	18.5														
E84AVTCC2234xBx	22	8.5	8.5	130	130	130	15	5.5	5.5	110	110	0	> 95	> 95	9.6

5.4 Standard devices in a power range of 30 ... 45 kW**5.4.1 Assembly in built-in technique (standard)**

You can choose between three variants for mounting the "built-in unit" version of the controllers:

- ▶ Assembly without filter
 - in "standard" technique
- ▶ Assembly with filter:
 - in "standard" technique (footprint filter)
 - in mounting variant (side-mounted filter)

The following filters can be used for the controllers:

- ▶ on the supply side
 - RFI filters

Assembly without filter in "standard" technique

For mounting, use four screws M8 x >16 mm. The mounting location and material must ensure a durable mechanical connection.

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

How to proceed:

1. Prepare the fixing holes on the mounting surface.
2. Screw the controller directly to the mounting surface.

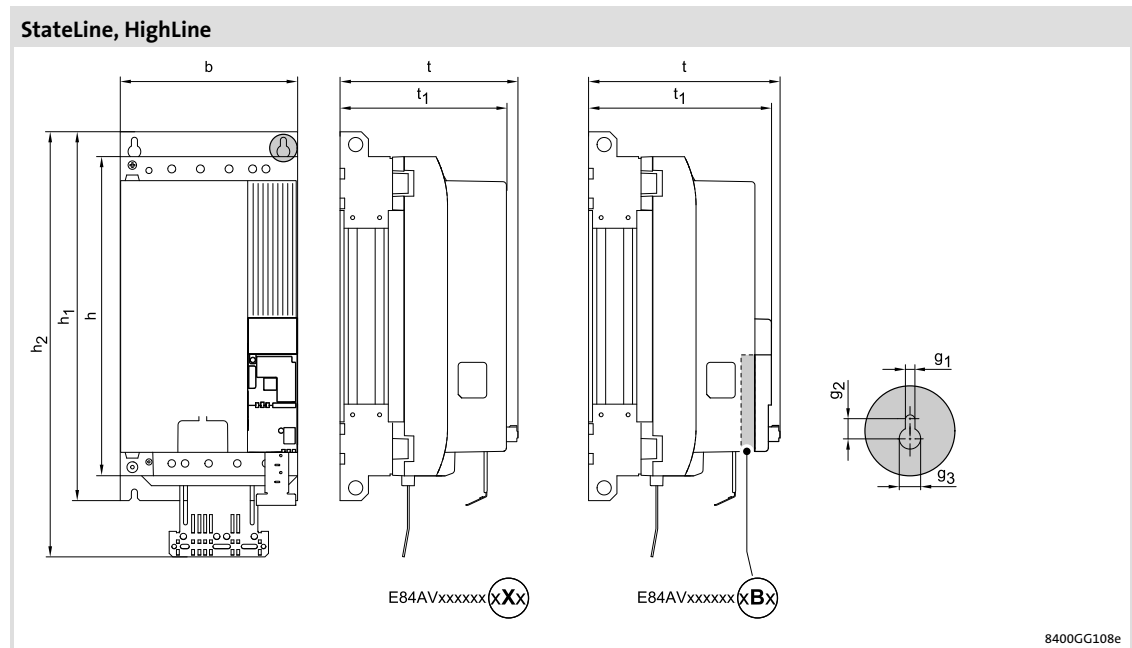


Fig. 5-39 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	g ₁	g ₂	g ₃
	[kW]	[mm]								
E84AVxxE3034xXx	30	450	250	250	520	636	237	8.5	16	18
E84AVxxE3734xXx	37									
E84AVxxE4534xXx	45									
E84AVxxE3034xBx	30	450	250	270	520	636	257	8.5	16	18
E84AVxxE3734xBx	37									
E84AVxxE4534xBx	45									

Mechanical installation
Standard devices in a power range of 30 ... 45 kW
Assembly without filter in "standard" technique

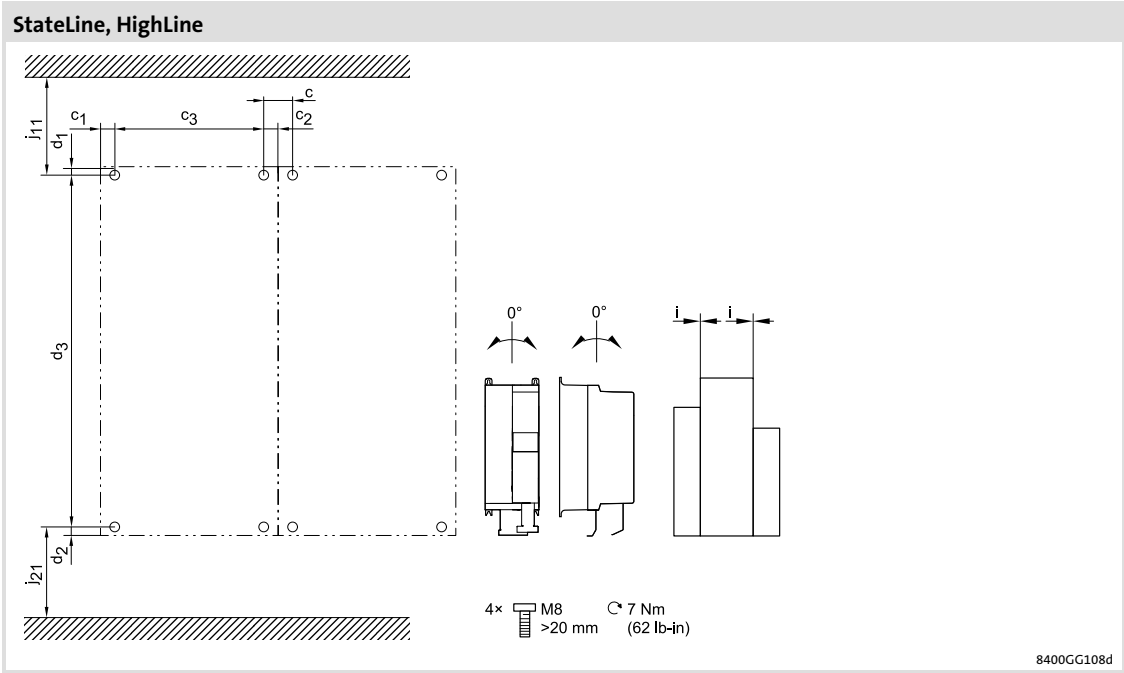


Fig. 5-40 Dimensions for mounting

	[kW]	d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
		[mm]										[kg]
E84AVxxE3034xXx	30	8	12	500	40	20	20	210	0	> 95	> 120	17.2
E84AVxxE3734xXx	37											
E84AVxxE4534xXx	45											
E84AVxxE3034xBx	30	8	12	500	40	20	20	210	0	> 95	> 120	17.3
E84AVxxE3734xBx	37											
E84AVxxE4534xBx	45											

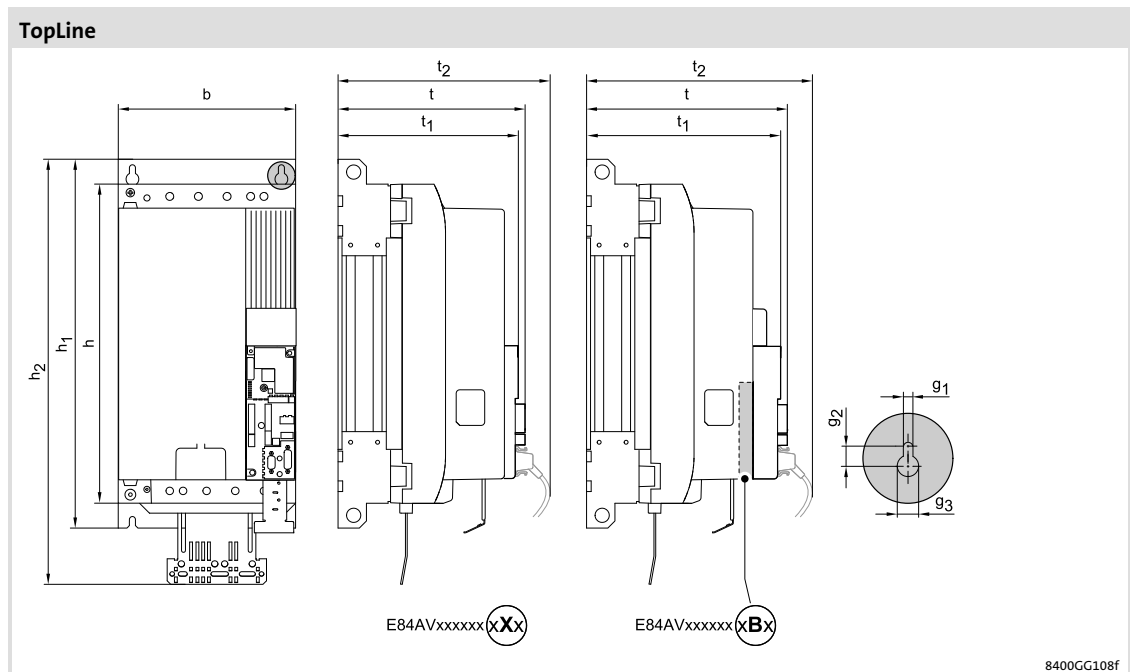


Fig. 5-41 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	t ₂	g ₁	g ₂	g ₃
	[kW]	[mm]									
E84AVTCE3034xXx	30	450	250	265	520	636	252	291	8.5	16	18
E84AVTCE3734xXx	37										
E84AVTCE4534xXx	45										
E84AVTCE3034xBx	30	450	250	285	520	636	272	311	8.5	16	18
E84AVTCE3734xBx	37										
E84AVTCE4534xBx	45										

Mechanical installation

Standard devices in a power range of 30 ... 45 kW

Assembly without filter in "standard" technique

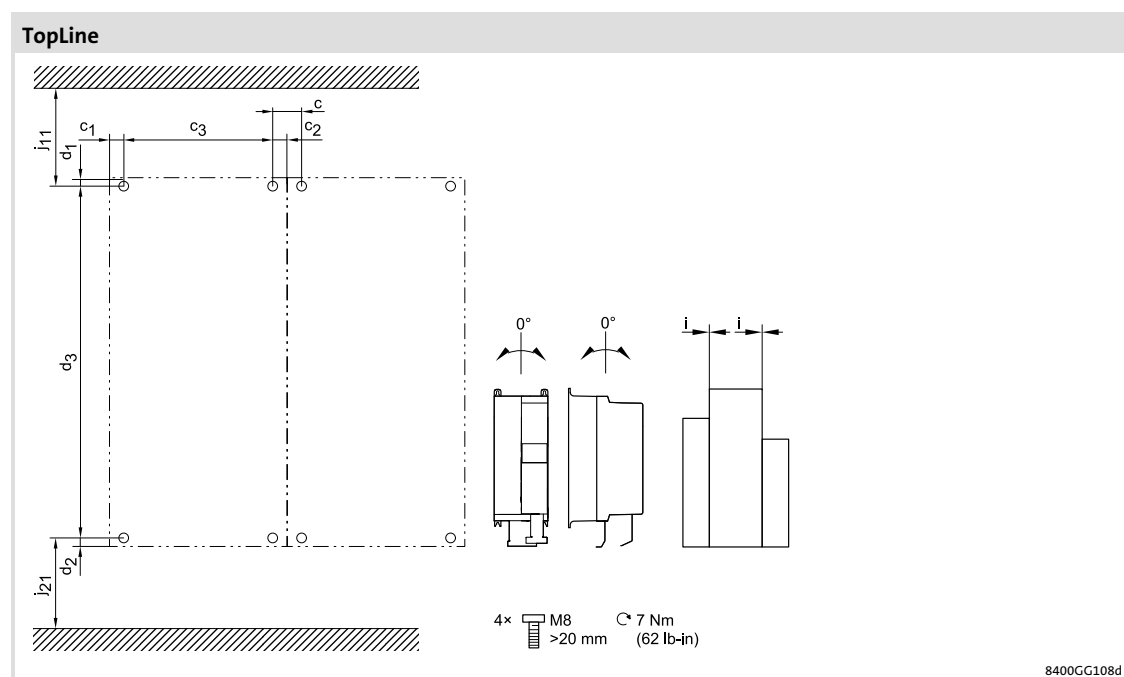


Fig. 5-42 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVTCE3034xXx	30	8	12	500	40	20	20	210	0	> 95	> 120	17.4
E84AVTCE3734xXx	37											
E84AVTCE4534xXx	45											
E84AVTCE3034xBx	30	8	12	500	40	20	20	210	0	> 95	> 120	17.5
E84AVTCE3734xBx	37											
E84AVTCE4534xBx	45											

Filter mounting in "standard" technique

The mounting location and material must ensure a durable mechanical connection.

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



Tip!

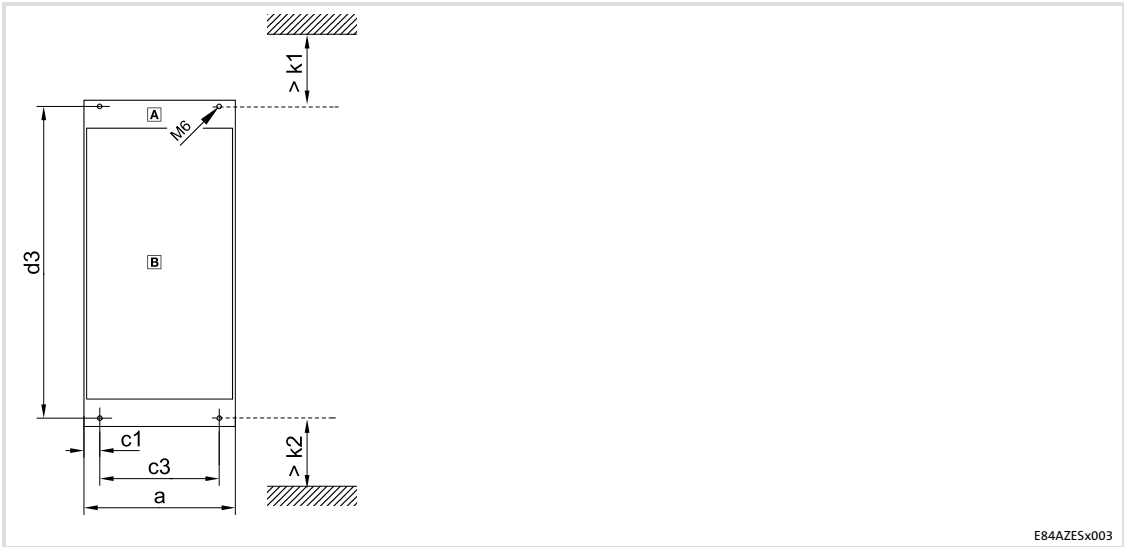
The scope of supply of the filter comprises mounting instructions. They describe technical data and information on mechanical and electrical mounting of this accessory part.

Assignment of filter – controller

Controller E84AVxxE...	RFI filter E84AZESM...			
	3034LD	3734LD	4534LD	4534LD001
3034	x	x ¹⁾		
3734		x	x ¹⁾	
4534			x	x ¹⁾

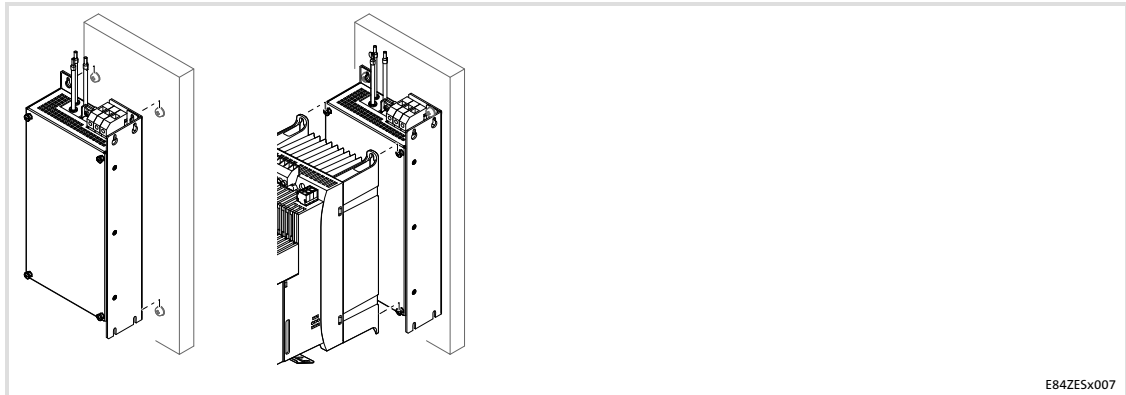
¹⁾ For operation with increased power

Mechanical installation
Standard devices in a power range of 30 ... 45 kW
Filter mounting in "standard" technique



- A Side-by-side filter
- B Standard device

	a	c1	c3	d3	k1	k2
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
I0FAE330F100D0000 S	250	20	210	572	55	60
I0FAE337F100D0000 S						
I0FAE345F100D0001 S						



Proceed as follows for installation:

1. Prepare threaded holes on the mounting plate.
2. Equip threaded holes with screws and washers.
 - Use 4 screw and washer assemblies or hexagon socket screws with washers.
 - Do not fully tighten the screws.
3. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
4. Mount the standard device onto the filter.
 - Use 4 screw and washer assemblies or hexagon socket screws with washers.
5. If required, pre-assemble further units.
6. Adjust all units.
7. Screw all units onto the mounting plate.
 - Starting torque: 7 Nm (62 lb-in)

Filter mounting variant

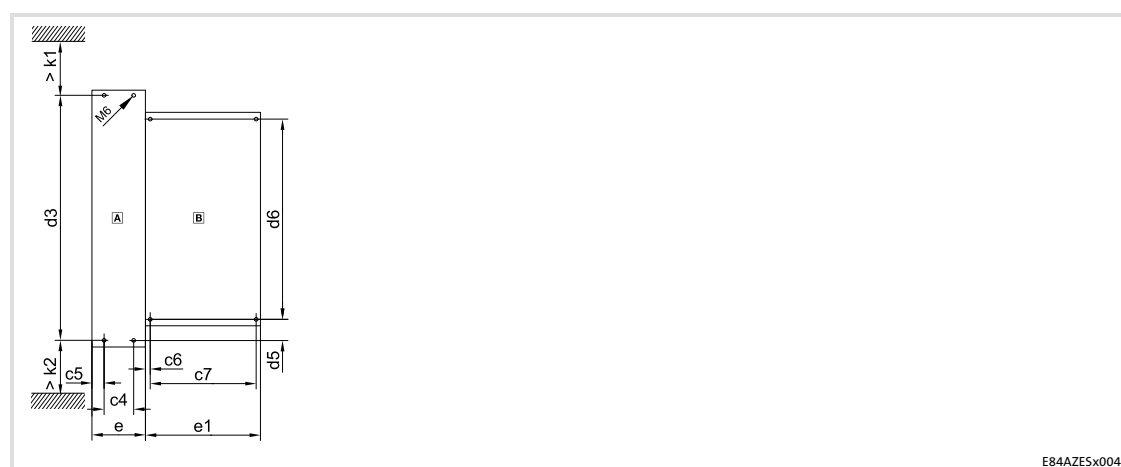
The mounting location and material must ensure a durable mechanical connection.

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



Tip!

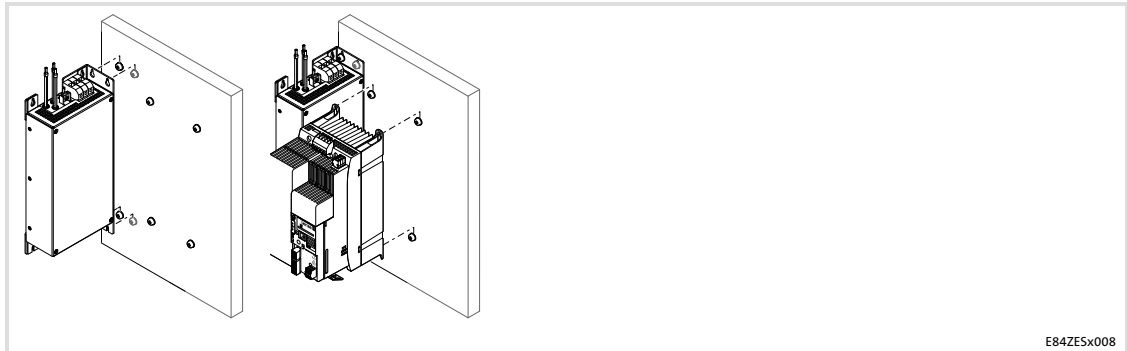
The scope of supply of the filter comprises mounting instructions. They describe technical data and information on mechanical and electrical mounting of this accessory part.



- A Side-by-side filter
- B Standard device

	c4	c5	c6	c7	d3	d5	d6
	[mm]						
I0FAE330F100D0000 S	65	20	20	210	572	37	495
I0FAE337F100D0000 S							
I0FAE345F100D0001 S							

	e	e1	k1	k2
	[mm]			
I0FAE330F100D0000 S	105	210	55	60
I0FAE337F100D0000 S				
I0FAE345F100D0001 S				



Proceed as follows for installation:

1. Prepare threaded holes on the mounting plate.
2. Equip threaded holes with screws and washers.
 - Use 8 screw and washer assemblies or hexagon socket screws with washers.
 - Do not fully tighten the screws.
3. Mount the filter onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
4. Mount the standard device onto the prepared mounting plate.
 - Only tighten the screws hand-tight.
5. If required, pre-assemble further units.
6. Adjust all units.
7. Screw all units onto the mounting plate.

5.4.2 Mounting in "cold plate" technique

The E84AVxxC... controllers are designed for assembly on coolers (e.g. collective coolers) in "cold-plate" technique.

Requirements for collective coolers

A good thermal connection to the cooler is important for the trouble-free operation of the controller:

- ▶ The contact area between the collective cooler and the controller
 - must be at least as big as the cooling plate of the controller.
 - must be smooth, the maximum deviation must not exceed 0.05 mm.
- ▶ The collective cooler must be connected to the controller with all required screwed joints.
- ▶ The thermal resistance R_{th} must be observed, see table.
 The values in the table apply to the operation of the controllers under rated conditions.
 The values include the heat transmission between the cooler and the device.
 With a standard heat conducting paste and a film thickness of 50 µm, the heat transmission is approx. 0.007 K/W.

	Power to be dissipated	Thermal resistance
Type	P_v [W]	R_{th} [K/W]
E84AVxxC3034	720	≤ 0.053
E84AVxxC3734	810	≤ 0.047
E84AVxxC4534	1080	≤ 0.035

Ambient conditions

- ▶ The rated data and the derating factors at increased temperature also apply to the ambient temperature of the drive controllers.

**Note!**

Apply standard heat-conducting paste or heat-conducting foil onto cooler and cooling plate before you bolt the controller onto the cooler.

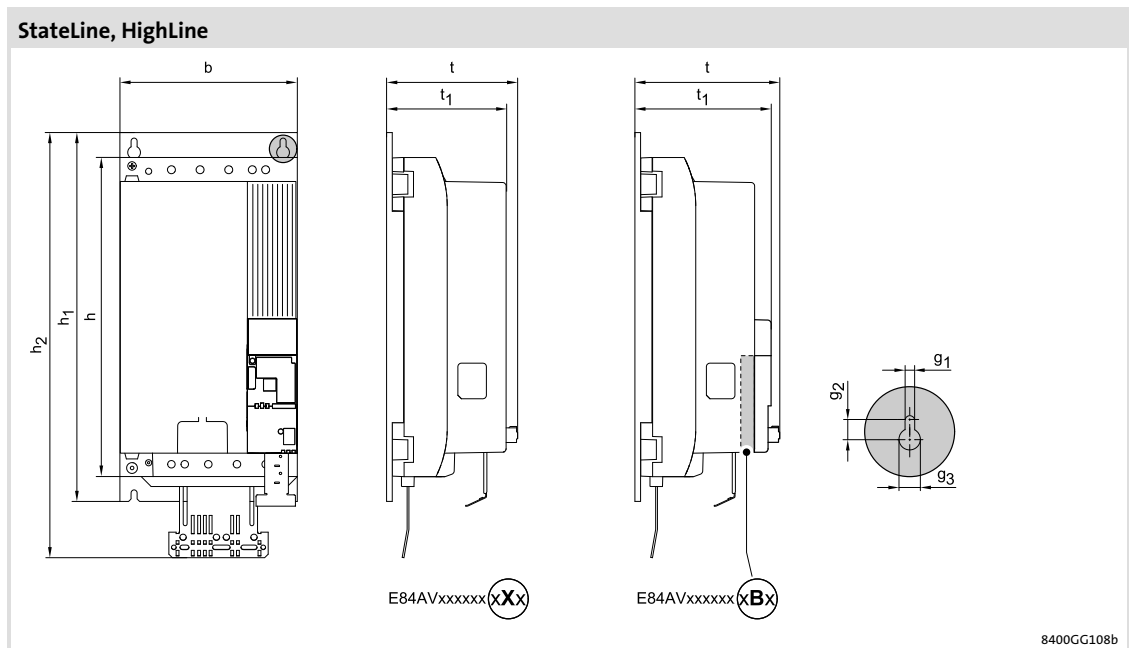


Fig. 5-43 Device dimensions

	[kW]	h	b	t	h ₁	h ₂	t ₁	g ₁	g ₂	g ₃
		[mm]								
E84AVxxC3034xXx	30	450	250	184	520	636	171	8.5	16	18
E84AVxxC3734xXx	37									
E84AVxxC4534xXx	45									
E84AVxxC3034xBx	30	450	250	204	520	636	191	8.5	16	18
E84AVxxC3734xBx	37									
E84AVxxC4534xBx	45									

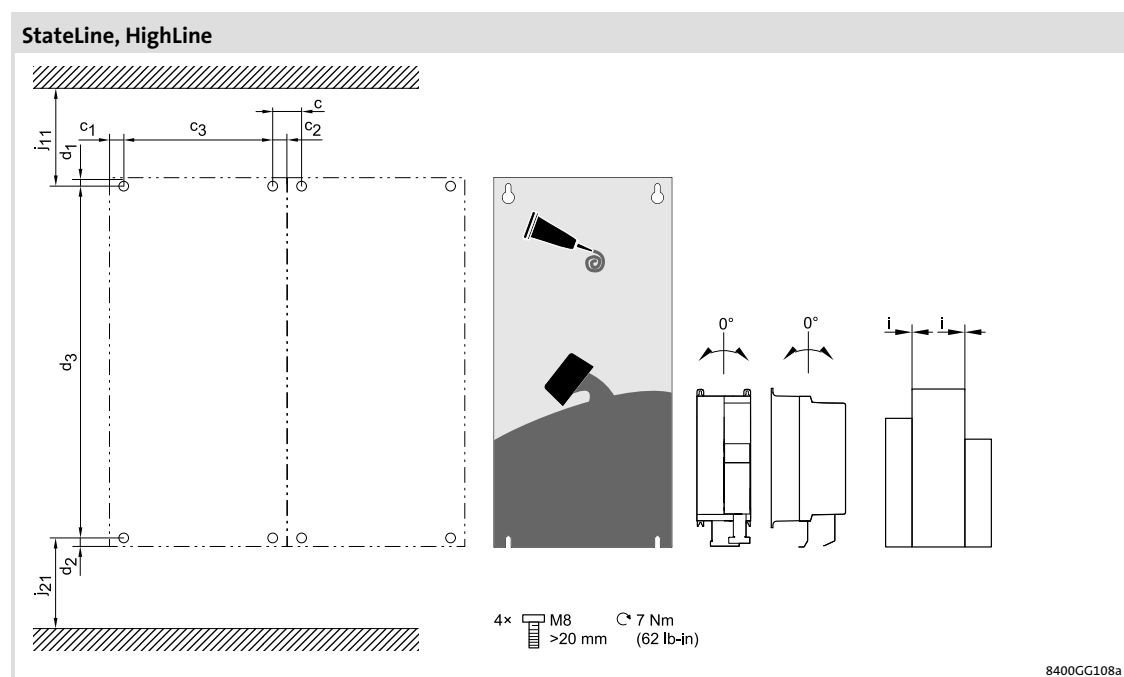


Fig. 5-44 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVxxC3034xXx	30	8	12	500	40	20	20	210	0	> 95	> 120	16.7
E84AVxxC3734xXx	37											
E84AVxxC4534xXx	45											
E84AVxxC3034xBx	30	8	12	500	40	20	20	210	0	> 95	> 120	16.8
E84AVxxC3734xBx	37											
E84AVxxC4534xBx	45											

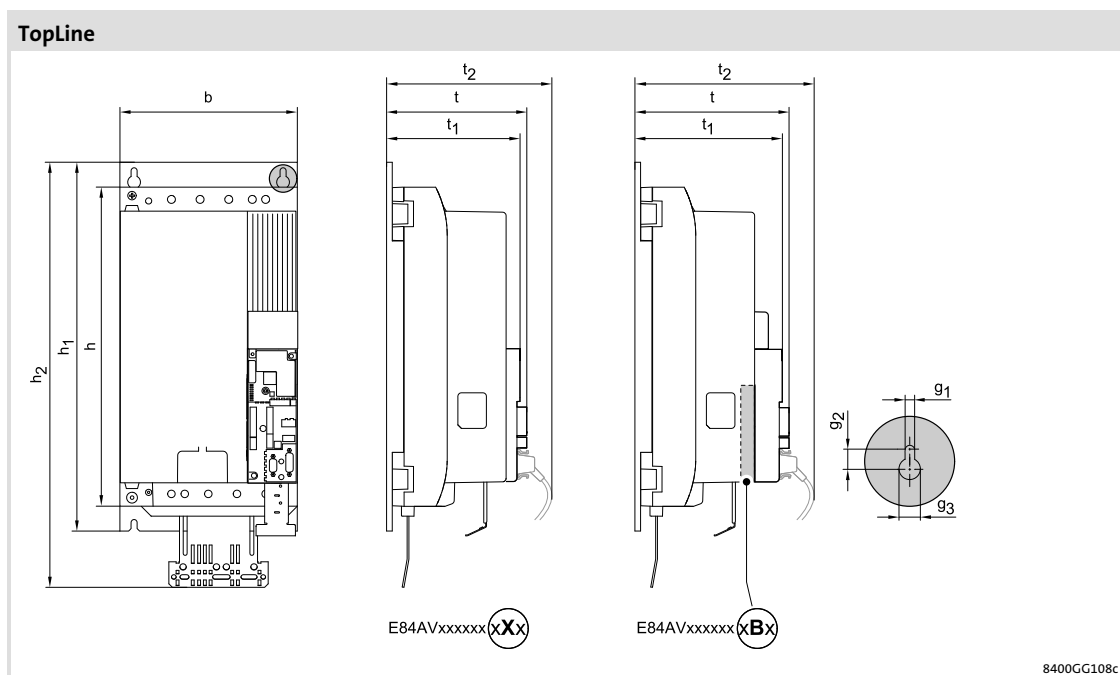


Fig. 5-45 Device dimensions

		h	b	t	h ₁	h ₂	t ₁	t ₂	g ₁	g ₂	g ₃
	[kW]	[mm]									
E84AVTCC3034xXx	30	450	250	199	520	636	186	225	8.5	16	18
E84AVTCC3734xXx	37										
E84AVTCC4534xXx	45										
E84AVTCC3034xBx	30	450	250	219	520	636	206	245	8.5	16	18
E84AVTCC3734xBx	37										
E84AVTCC4534xBx	45										

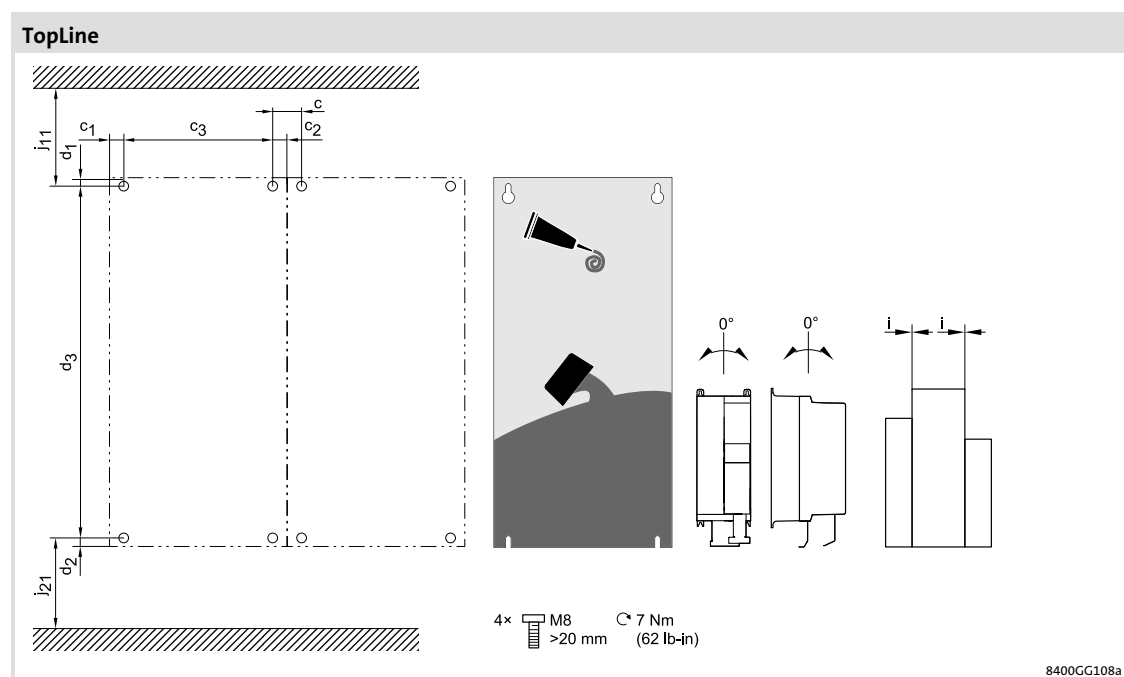


Fig. 5-46 Dimensions for mounting

		d ₁	d ₂	d ₃	c	c ₁	c ₂	c ₃	i	j ₁₁	j ₂₁	
	[kW]	[mm]										[kg]
E84AVTCC3034xXx	30	8	12	500	40	20	20	210	0	> 95	> 120	16.9
E84AVTCC3734xXx	37											
E84AVTCC4534xXx	45											
E84AVTCC3034xBx	30	8	12	500	40	20	20	210	0	> 95	> 120	17.0
E84AVTCC3734xBx	37											
E84AVTCC4534xBx	45											

6 Electrical installation

6.1 Important notes



Danger!

Hazardous electrical voltage

Depending on the device, all power connections remain live up to 3 minutes after the mains has been switched off.

Possible consequences:

- ▶ Death or severe injuries when touching the power terminals.

Protective measures:

- ▶ Wait for at least 3 minutes before working on the power terminals.
- ▶ Make sure that all power terminals are deenergised.



Danger!

Dangerous voltage

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

Possible consequences:

- ▶ Death or severe injuries when the device is touched in the event of a fault.

Protective measures:

- ▶ Implement the actions required in the EN 61800-5-1. Especially:
 - Fixed installation
 - PE connection must conform to standards (PE conductor diameter $\geq 10 \text{ mm}^2$ or PE conductor must be connected twice)

**Stop!****No device protection if the mains voltage is too high**

The mains input is not internally fused.

Possible consequences:

- Destruction of the device if the mains voltage is too high.

Protective measures:

- Observe the maximally permissible mains voltage.
- Fuse the device correctly on the supply side against mains fluctuations and voltage peaks.

**Stop!****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

Protective measures:

- Provide for the use of isolating transformers.

**Stop!**

The product contains electrostatic sensitive devices.

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

**Stop!****Pluggable terminal strips or plug connections**

Plugging or removing the terminal strips or plug connections during operation may cause high voltages and arcing.

Possible consequences:

- Damage of the devices

Protective measures:

- Switch off device.
- Only plug or remove the terminal strips or plug connections in deenergised status.



Stop!

Use of RFI filters in IT systems

The controllers must not be operated with mains filters and RFI filters from Lenze because these filters contain components connected to PE.

Possible consequences:

- ▶ The filters may be destroyed when an earth fault occurs.
- ▶ Monitoring of the IT system may be triggered.

Protective measures:

- ▶ Do not use RFI filters from Lenze in IT systems.
- ▶ Before using the controller in IT systems, remove the two contact screws for interference suppression (on the supply side and on the motor side).



Stop!

When using the STO safety function in IT power system, an isolating transformer must be connected on main side.



Stop!

Overvoltage at components:

In case of an earth fault in IT systems, intolerable overvoltages may occur in the plant.

Possible consequences:

Destruction of the device.

Protective measures:

Before using the controller in the IT system, remove the contact screws on the supply side and the motor side. (Fig. 6-14).



Note!

Switching on the controller motor side is permissible for safety shutdown (emergency stop) and for operation of several motor on the controller (only in V/f operating mode!).

Please observe the following:

- ▶ When switching with the controller enabled, you can activate monitoring functions of the controller. If no monitoring function is activated, switching is permissible.
- ▶ The switching elements on the motor side must be dimensioned in accordance with the maximum occurring load.

**Danger!**

Operation of the controller on a phase earthed mains with a rated mains voltage of ≥ 400 V:

- ▶ The protection against accidental contact is not ensured without external measures.
- ▶ If protection against accidental contact acc. to EN 61800-5-1 is required for the control terminals of the controller and the terminals for the plugged-in device modules,
 - an additional basic insulation must be available.
 - the components to be connected must have the second basic insulation.

6.1.1 Electrical isolation

The protective insulation of the "8400 Inverter Drives" controllers is implemented according to EN 61800-5-1. The following illustration shows the insulation concept.

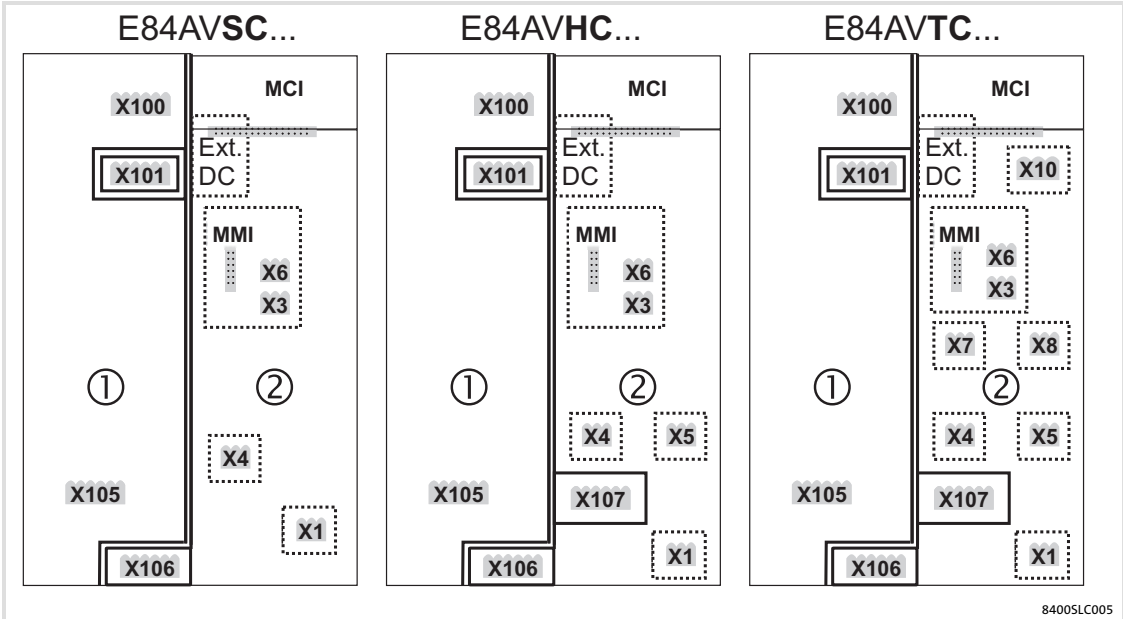


Fig. 6-1 Electrical isolation between power terminals, control terminals and housing



Note!
Ensure trouble-free operation
Execute the wiring in such a way that the potential islands remain separated.



Note!
If the terminal X106 is used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the motor or mains potential to not restrict the protective separation of the control terminals.



Note!
If terminal X107 is used for connecting a motor holding brake, at least one basic insulation to the motor or mains potential has to be provided, so that the protective separation of the control terminals is not limited.

Legend	
	Isolation by functional insulation
	Isolation by basic insulation
	Safe isolation by double or reinforced insulation Protection against accidental contact is guaranteed without any further measures.

Range	Connection	Name	Explanation
Power ①	X100	Mains	Protective separation towards X101, X106 and all control terminals
		DC bus	
	X105	Motor	Protective separation towards X100, X105 and all control terminals
		Brake resistor	
	X101	Relay contact	Protective separation towards X100, X105 and all control terminals
	X106	Motor temperature	Protective separation towards X100, X105 and X101 Isolation by basic insulation towards all control terminals Degree of insulation of thermal contact, PTC, or cable can influence the isolation.
Control ②	X1	System bus (CANopen)	Isolation by functional insulation towards other control terminals
	X3	Analog IO	
	X4	Digital IO	
		24 V external supply	The degree of insulation of the voltage source influences the degree of insulation of the controller.
	X5	Digital inputs	Isolation by functional insulation towards other control terminals
		24 V external supply	The degree of insulation of the voltage source influences the degree of insulation of the controller.
	X6	Diagnostics	Isolation by functional insulation towards other control terminals
	X107	24 V brake supply	Isolation by basic insulation towards other control terminals
	MCI	Communication	Isolation by functional insulation towards other control terminals
	MMI	Memory	
Control ②	additional connections TopLine:		Isolation by functional insulation towards other control terminals
	X7	Resolver	
	X8	Encoder	
	X10	Axis bus	

6.1.2

Device protection

- In case of condensation, do not connect the controller to the mains voltage before the moisture has evaporated completely.
- The controller must be protected by external fuses.
- Provide unused control inputs and outputs with terminal strips.

6.1.3 Maximum motor cable length

- ▶ Ensure that the motor cable is as short as possible to have a positive effect on the drive behaviour.
- ▶ In group drives (multiple motors on one controller), the resulting cable length l_{res} is the crucial factor:

$l_{res} [m] = (l_1 + l_2 + l_3 + \dots + l_i) \cdot \sqrt{i}$	l_x Length of the individual motor cable
	l_{res} Resulting length of the motor cable
	i Number of individual motor cables

- ▶ The "technical data" (chap. 4.1) provided for the motor cable length must be observed.

6.1.4 Motor protection

- ▶ Extensive protection against overload:
 - By overcurrent relays or temperature monitoring.
 - We recommend the use of PTC thermistors or thermostats to monitor the motor temperature.
 - PTC thermistors or thermostats can be connected to the controller.
 - For monitoring the motor, we recommend the use of the I^2xt monitoring.
- ▶ Only use motors with an insulation suitable for the inverter operation:
 - Insulation resistance: min. $\hat{u} = 1.5 \text{ kV}$, min. $du/dt = 5 \text{ kV}/\mu\text{s}$
 - When using motors with an unknown insulation resistance, please contact your motor supplier.

6.1.5 Interaction with compensation equipment

- ▶ Controllers only consume very little reactive power of the fundamental wave from the AC supply mains. Therefore, a compensation is not required.
- ▶ If the controllers are connected to a supply system with compensation equipment, this equipment must comprise chokes.
 - For this, contact the supplier of the compensation equipment.

6.1.6 Safety instructions for the installation according to UL/CSA

Original - English

**Warnings!**

- ▶ The integral solid state protection does not provide branch circuit protection and that branch circuit protection has to be provided externally in accordance with manufacturers instructions, the National Electrical Code and any additional codes.
- ▶ Branch circuit protection (240 V devices)
 - Suitable for use on a circuit capable of delivering not more than:
 - 5000 rms symmetrical amperes, 240 V maximum (240 V devices).
 - 200k rms symmetrical amperes, 240 V maximum when protected by CC, J, T or R class fuses.
 - 50k rms symmetrical amperes, 240 V maximum when protected by a circuit breaker having an interrupting rating not less than 50k rms symmetrical amperes, 240 V maximum.
- ▶ Branch circuit protection (400 V/500 V devices, 0.37 ... 22 kW)
 - Suitable for use on a circuit capable of delivering not more than:
 - 5000 rms symmetrical amperes, 400 V/500 V maximum.
 - 200k rms symmetrical amperes, 500 V maximum when protected by CC, J, T or R class fuses.
 - 50k rms symmetrical amperes, 500 V maximum when protected by a circuit breaker having an interrupting rating not less than 50k rms symmetrical amperes, 480 V/277 V ∇ maximum.
- ▶ Branch circuit protection (400 V/500 V devices, 30 ... 45 kW)
 - Suitable for use on a circuit capable of delivering not more than:
 - 10k rms symmetrical amperes, 500 V maximum, when protected by CC, J or T class fuses.
 - 200k rms symmetrical amperes, 500 V maximum when protected by CC, J or T class fuses.
- ▶ Branch circuit short circuit protection with fuses in accordance with UL248 or circuit breaker, 400 V/480 V ∇ maximum, in accordance with UL489.

Voltage of the fuses or circuit breakers must at least be suitable with the input voltage of the drive. The specific fuse/circuit breaker sizes and classes for each inverter are shown in the table below.

**Warnings!**

- ▶ Control card protection:
 - 24 V DC class 2 supply or external fuse for 24 V DC supply voltage of control terminal X107.
 - Rated 4 A DC fuse UL248-14.
 - Functional Safety is evaluated according to standards listed in section "Safety engineering".
- ▶ The device is provided with internal overload protection. For information on the protection level of the internal overload protection for a motor load, see the corresponding Software Manual or Online Help under the topic "Motor load monitoring (I²xt)". This function has to be activated; i. e. the reaction must be changed from "Warning" (factory setting) to "Fault".
- ▶ For information on rating and proper connection of the thermal protector (only for connection to motors having integral thermal protection), see the corresponding Manual or Online Help.

**Warnings!**

- ▶ The device shall be installed in a pollution degree 2 macro-environment.
- ▶ Maximum surrounding air temperature: 55 °C.
- ▶ Use 75 °C copper wire only, except for control circuits.

**Warnings!**

- ▶ Safety card protection:
 - 24 V DC class 2 supply or external fuse for 24 V DC supply voltage of control terminal X80.
 - Rated 4 A DC fuse UL248-14.
 - Functional Safety is not evaluated by UL.

The values of the fuses used may be equal to or fall below the values in the following table:

Type	Branch circuit protection		
	Fuse [A]		Circuit breaker [A]
	with mains choke	without mains choke	
E84AVxxx2512	6	6	15
E84AVxxx3712	10	10	15
E84AVxxx5512	10	10	15
E84AVxxx7512	15	15	15
E84AVxxx1122	20	20	20
E84AVxxx1522	25	25	25
E84AVxxx2222	30	30	30
E84AVxxx3714	6	6	15
E84AVxxx5514	6	6	15
E84AVxxx7514	6	6	15
E84AVxxx1124	10	10	15
E84AVxxx1524	10	10	15
E84AVxxx2224	10	10	15
E84AVxxx3024xx5	15	15	15
E84AVxxx3024xx0	15	15	15
E84AVxxx4024	20	20	20
E84AVxxx5524	20	20	20
E84AVxxx7524	20	25	25
E84AVxxx1134	30	40	40
E84AVxxx1534	50	-	50
E84AVxxx1834	60	60	-
E84AVxxx2234	60	-	-
E84AVxxx3034	80	-	-
E84AVxxx3734	100	-	-
E84AVxxx4534	125	-	-

**Warnings!**

For CSA Certification drives are intended to be used with Chokes - UL Recognized (XPTQ2/8, FOKY2/8) or CSA Certified (XPTQ2, FOKY2), File Number E103521 or E198787, mounted on the line side of the devices. The chokes are listed in chapter 4.2 Rated Data and chapter 12.2 Accessories. Alternatively - For Canadian Certification drives are intended to be used as follows:

Transient surge suppression for 240 V models

shall be installed on the line side of this equipment and shall have met the requirements of CSA C22.2 No. 8.

It shall be suitable for overvoltage category III.

It shall be rated

- phase to ground: 240 V,
- phase to phase: 240 V.

It shall provide protection for a rated impulse withstand voltage peak of

- line to line: 2.5 kV.

Transient surge suppression for 400/500 V models

shall be installed on the line side of this equipment and shall have met the requirements of CSA C22.2 No. 8.

It shall be suitable for overvoltage category III.

It shall be rated

- phase to ground: 500 V,
- phase to phase: 500 V.

It shall provide protection for a rated impulse withstand voltage peak of

- line to line: 2.5 kV.

6.1.7 Safety instructions for the installation according to UL/CSA

Original - French

**Avertissement !**

- ▶ La protection statique intégrée n'offre pas la même protection qu'un disjoncteur. Une protection par disjoncteur externe doit être fournie, conformément aux indications du fabricant, au National Electrical Code et aux autres dispositions applicables.
- ▶ Protection par disjoncteur (appareils 240 V)
Convient aux circuits non susceptibles de délivrer plus de :
 - 5000 ampères symétriques eff., maximum 240 V (appareils 240 V).
 - 200k ampères symétriques eff., maximum 240 V, avec protection par des fusibles CC de calibre J, T ou R.
 - 50k ampères symétriques eff., maximum 240 V, avec protection par disjoncteur à pouvoir de coupure nominal d'au moins 50k ampères symétriques eff., maximum 240 V.
- ▶ Protection par disjoncteur (appareils 400 V/500 V, 0,37 ... 22 kW)
Convient aux circuits non susceptibles de délivrer plus de :
 - 5000 ampères symétriques eff., maximum 400 V/500 V.
 - 200k ampères symétriques eff., maximum 500 V, avec protection par des fusibles CC de calibre J, T ou R.
 - 50k ampères symétriques eff., maximum 500 V, avec protection par disjoncteur à pouvoir de coupure nominal d'au moins 50k ampères symétriques eff., maximum 480 V/277 V √.
- ▶ Protection par disjoncteur (appareils 400 V/500 V, 30 ... 45 kW)
Convient aux circuits non susceptibles de délivrer plus de :
 - 10k ampères symétriques eff., maximum 500 V, avec protection par des fusibles CC de calibre J ou T.
 - 200k ampères symétriques eff., maximum 500 V, avec protection par des fusibles CC de calibre J ou T.
- ▶ Protéger le circuit de dérivation contre les court-circuits à l'aide de fusibles (norme UL248) ou d'un disjoncteur, maximum 400 V/480 V √ (norme UL489).
La tension des fusibles doit être adaptée à la tension d'entrée de l'entraînement (exigence minimale). Se reporter au tableau ci-après pour connaître le dimensionnement spécifique des fusibles/disjoncteurs et les classes agréés pour chaque variateur.

**Avertissement !**

- ▶ Protection de la carte de commande :
 - Fusible externe pour tension d'alimentation 24 V CC du bornier de commande X107.
 - Fusible CC 4 A UL248-14 (tension assignée).
 - La sécurité fonctionnelle n'est pas évaluée suivant les normes énumérées à la section "Système de sécurité".
- ▶ L'équipement est doté d'un dispositif de protection intégré contre les surcharges. Pour obtenir des informations sur le niveau de protection offert par la protection intégrée contre les surcharges du moteur, se reporter au manuel du logiciel ou à l'aide en ligne correspondante, rubrique "Surveillance de la charge du moteur (I²xt)". Cette fonction doit être activée. En d'autres termes, la réaction doit être modifiée de "Avertissement" (réglage usine) à "Défaut".
- ▶ Pour obtenir des informations sur les caractéristiques assignées et sur le raccordement correct du dispositif de protection thermique (uniquement pour raccordement à des moteurs dotés d'une protection thermique intégrée), se reporter au manuel correspondant ou à l'aide en ligne.

**Avertissement !**

- ▶ L'équipement est destiné à être installé dans un macro-environnement caractérisé par le degré de pollution 2.
- ▶ Température ambiante maximale : 55 °C.
- ▶ Utiliser exclusivement des conducteurs en cuivre 75 °C, sauf pour la partie commande.

**Avertissement !**

- ▶ Protection de la carte de sécurité :
 - Fusible externe pour tension d'alimentation 24 V CC du bornier de commande X80.
 - Fusible CC 4 A UL248-14 (tension assignée).
 - La sécurité fonctionnelle n'est pas évaluée dans le cadre de l'homologation UL.

The values of the fuses used may be equal to or fall below the values in the following table:

Type	Branch circuit protection		
	Fuse [A]		Circuit breaker [A]
	with mains choke	without mains choke	
E84AVxxx2512	6	6	15
E84AVxxx3712	10	10	15
E84AVxxx5512	10	10	15
E84AVxxx7512	15	15	15
E84AVxxx1122	20	20	20
E84AVxxx1522	25	25	25
E84AVxxx2222	30	30	30
E84AVxxx3714	6	6	15
E84AVxxx5514	6	6	15
E84AVxxx7514	6	6	15
E84AVxxx1124	10	10	15
E84AVxxx1524	10	10	15
E84AVxxx2224	10	10	15
E84AVxxx3024xx5	15	15	15
E84AVxxx3024xx0	15	15	15
E84AVxxx4024	20	20	20
E84AVxxx5524	20	20	20
E84AVxxx7524	20	25	25
E84AVxxx1134	30	40	40
E84AVxxx1534	50	-	50
E84AVxxx1834	60	60	-
E84AVxxx2234	60	-	-
E84AVxxx3034	80	-	-
E84AVxxx3734	100	-	-
E84AVxxx4534	125	-	-

**Avertissement !**

Pour obtenir la certification CSA, les entraînements doivent être destinés à une utilisation avec des selfs homologuées UL (XPTQ2/8, FOKY2/8) ou certifiées CSA (XPTQ2, FOKY2), n° de dossier E103521 ou E198787, montées côté alimentation des équipements.

Ces selfs sont répertoriées sous les 4.2 Caractéristiques assignées ainsi qu'au chapitre 12.2 Accessoires.

Sinon - Pour les lecteurs de certification canadiens sont destinés à être utilisés comme suit:

Les dispositif de suppression des tensions transitoires pour modèles à 240 V doit être installé côté alimentation de l'équipement et répondre aux exigences de la norme CSA C22.2 n° 8.

Il doit être compatible avec la catégorie de surtension III.

Il doit en outre offrir les caractéristiques assignées suivantes :

– de la phase à la terre : 240 V

– de phase à phase: 240 V

Le dispositif doit fournir une protection contre le pic de tension de choc assigné

– de ligne à ligne : 2,5 kV.

Les dispositif de suppression des tensions transitoires pour modèles à 400/500 V

doit être installé côté alimentation de l'équipement et répondre aux exigences de la norme CSA C22.2 n° 8.

Il doit être compatible avec la catégorie de surtension III.

Il doit en outre offrir les caractéristiques assignées suivantes :

– de la phase à la terre : 500 V

– de phase à phase: 500 V

Le dispositif doit fournir une protection contre le pic de tension de choc assigné

– de ligne à ligne : 2,5 kV.

6.2 Installation according to EMC (installation of a CE-typical drive system)**Design of the cables**

- ▶ It is imperative to comply with the regulations concerning 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.
- ▶ The cables used must comply with the approvals required for the location (e.g. UL).

6.2.1 Shielding**Requirements**

- ▶ The effectiveness of a shielded cable is reached by:
 - Providing a good shield connection through large-surface shield contact.
 - Using only braided shields with low shield resistance made of tin-plated or nickel-plated copper braid.
 - Using braided shields with an overlap rate > 70 % and an overlap angle of 90 °.
 - Keeping unshielded cable ends as short as possible.

Use system cables or shielded cables for these connections:

- ▶ Motor
- ▶ Feedback systems
- ▶ Motor holding brake (shielding is required when being integrated into the motor cable; connection to optional motor brake control)
- ▶ Motor temperature monitoring
- ▶ Analog signals (inputs and outputs; single-sided shield connection to the controller)
- ▶ System bus (CANopen)

The following connections need not be shielded:

- ▶ 24-V supply
- ▶ Digital signals (inputs and outputs).
 - We recommend to use shielded cables for a cable length from approximately 5 m on or in environments with strong interferences.

Connection system

- ▶ Connect the shield with a large surface and fix it with metal cable binders or a conductive clamp. (📖 12.11)
- ▶ Connect the shield directly to the corresponding device shield sheet.
 - If required, additionally connect the shield to the conductive and earthed mounting plate in the control cabinet.
 - If required, additionally connect the shield to the cable clamp rail.

Realisation

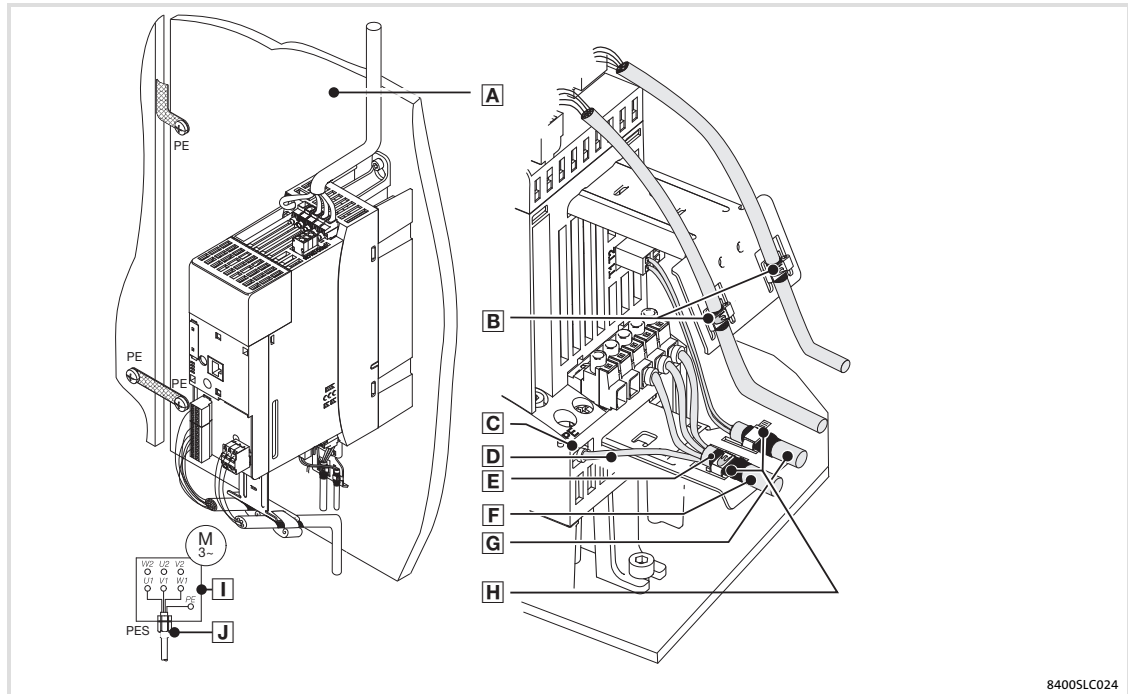


Fig. 6-2 Wiring in compliance with EMC standards

- A** Mounting plate with electrically conductive surface
- B** Control cables, connect shielding to the upper shield sheet (PES) with a surface as large as possible
- C** Terminal for motor PE
- D** PE of the motor cable
- E** Shield of the motor cable
- F** Shielded motor cable, low-capacitance
(Core/core $1.5 \text{ mm}^2 \leq 75 \text{ pF/m}$; from $2.5 \text{ mm}^2 \leq 100 \text{ pF/m}$; core/shield $\leq 150 \text{ pF/m}$)
- G** Shielded PTC cable or thermal contact cable (preferentially installed separately)
- H** Connect cable shields to the lower shield sheet (PES) with a large surface. Preferentially use metal cable binders from the accessories.
- I** Star or delta connection as indicated on the motor nameplate
- J** EMC cable gland (not included in the scope of supply)

6.2.2 Mains connection, DC supply

- ▶ Controllers, mains chokes, or mains filters may only be connected to the mains via unshielded single cores or unshielded cables.
- ▶ When a mains filter or RFI filter is used, shield the cable between mains filter or RFI filter and controller if its length exceeds 300 mm. Unshielded cores must be twisted.
- ▶ In DC-bus operation or DC supply, use shielded cables.
- ▶ The cable cross-section must be dimensioned for the assigned fusing (observe national and regional regulations).

6.2.3

Motor cable

- ▶ Only use shielded motor cables with braids made of tinned or nickel-plated copper. Shields made of steel braids are not suitable.
 - The overlap rate of the braid must be at least 70 % with an overlap angle of 90 °.
- ▶ The cables used must correspond to the requirements at the location (e.g. EN 60204-1).
- ▶ Shield the cable for motor temperature monitoring (PTC or thermal contact) and install it separately from the motor cable.
 - In Lenze system cables, the cable for brake control is integrated into the motor cable. If this cable is not required for brake control, it can also be used to connect the motor temperature monitoring up to a length of 50 m.
- ▶ Connect the shield with a large surface and fix it with metal cable binders or a conductive clamp.
- ▶ Connect the shield directly to the corresponding device shield sheet.
 - If required, additionally connect the shield to the conductive and earthed mounting plate in the control cabinet.
- ▶ The motor cable is optimally installed if
 - it is separated from mains cables and control cables,
 - it only crosses mains cables and control cables at right angles,
 - it is not interrupted.
- ▶ If the motor cable must be opened all the same (e.g. due to chokes, contactors, or terminals):
 - The unshielded cable ends may not be longer than 100 mm (depending on the cable cross-section).
 - Install chokes, contactors, terminals etc. spatially separated from other components (with a min. distance of 100 mm).
 - Install the shield of the motor cable directly before and behind the point of separation to the mounting plate with a large surface.
- ▶ Connect the shield with a large surface to PE in the terminal box of the motor at the motor housing.
 - Metal EMC cable glands at the motor terminal box ensure a large surface connection of the shield with the motor housing.

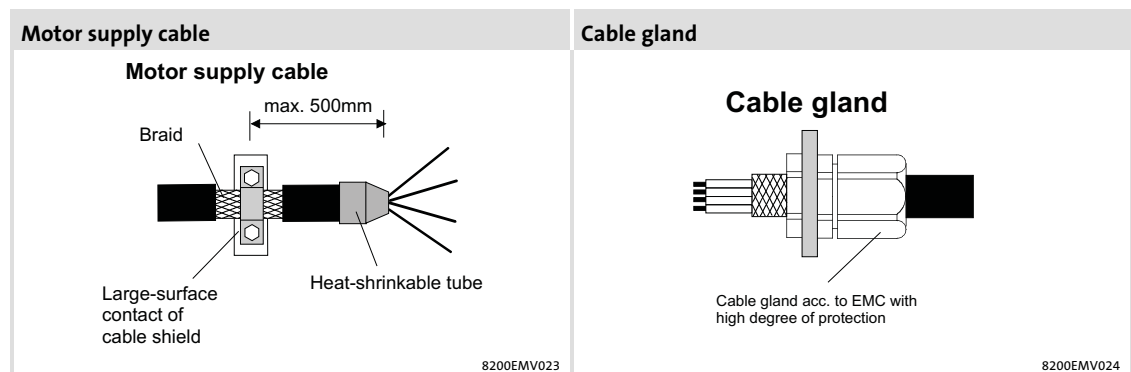


Fig. 6-3 Shielding of the motor cable

6.2.4**Control cables**

- ▶ Control cables must be shielded to minimise interference injections.
- ▶ For lengths of approx. 5 m and more, use only shielded cables for analog and digital inputs and outputs. Under 5 m, unshielded but twisted cables may be used.
- ▶ Connect the shield correctly:
 - The shield connections of the control cables must be at a distance of at least 50 mm from the shield connections of the motor cables and DC cables.
 - Connect the shield of digital input and output cables at both ends.
 - Connect the shield of analog input and output cables at one end (at the drive controller).
- ▶ To achieve an optimum shielding effect (in case of very long cables, with high interference) one shield end of analog input and output cables can be connected to PE potential via a capacitor (e.g. 10 nF/250 V) (see sketch).

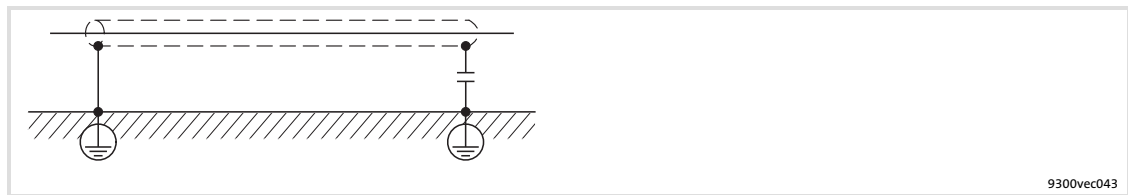


Fig. 6-4 Shielding of long, analog control cables

6.2.5 Installation in the control cabinet

Mounting plate requirements

- ▶ Only use mounting plates with conductive surfaces (zinc-coated or V2A-steel).
- ▶ Painted mounting plates are not suitable even if the paint is removed from the contact surfaces.
- ▶ If several mounting plates are used, ensure a large-surface connection between the mounting plates (e.g. by using earthing strips).

Mounting of the components

- ▶ Connect the controller and RFI filter to the grounded mounting plate with a surface as large as possible.
- ▶ No DIN rail mounting!

Optimum cable routing

- ▶ The motor cable is optimally installed if
 - it is separated from mains cables and control cables,
 - it crosses mains cables and control cables at right angles.
- ▶ Always install cables close to the mounting plate (reference potential), as freely suspended cables act like aerials.
- ▶ Lead the cables to the terminals in a straight line (avoid tangles of cables).
- ▶ Use separated cable channels for motor cables and control cables. Do not mix up different cable types in one cable channel.
- ▶ Minimise coupling capacities and coupling inductances by avoiding unnecessary cable lengths and reserve loops.
- ▶ Short-circuit unused cores to the reference potential.
- ▶ Install the positive and negative wires for DC 24 V close to each other over the entire length to avoid loops.

Earth connections

- ▶ Connect all components (drive controllers, chokes, filters) to a central earthing point (PE rail).
- ▶ Set up a star-shape earthing system.
- ▶ Comply with the corresponding minimum cable cross-sections.

Continuation of cable routing

Separation of the "hot" motor cable from the control, signal, and mains cables:

- ▶ Never install motor and signal cables in parallel and only cross at right angles
- ▶ The cables of a 24 V power supply unit (plus and minus cable) must be installed closely together over their entire length in order that no loops may occur.

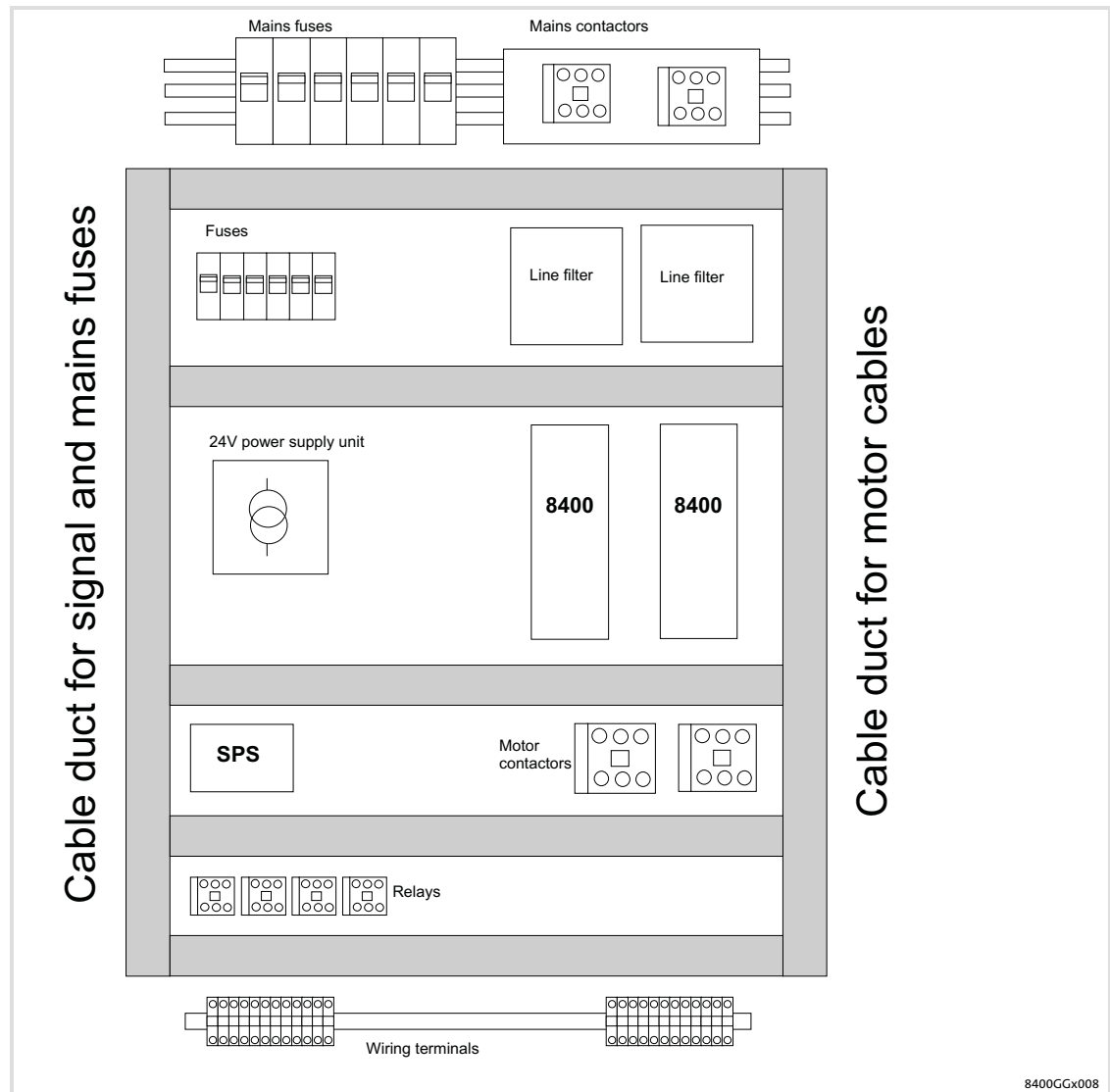


Fig. 6-5 Cable routing in the control cabinet

6.2.6 Wiring outside of the control cabinet

Notes for cable routing outside the control cabinet:

- The longer the cables the greater the space between the cables must be.
- If cables for different signal types are routed in parallel, the interferences can be minimized by means of a metal barrier or separated cable ducts.

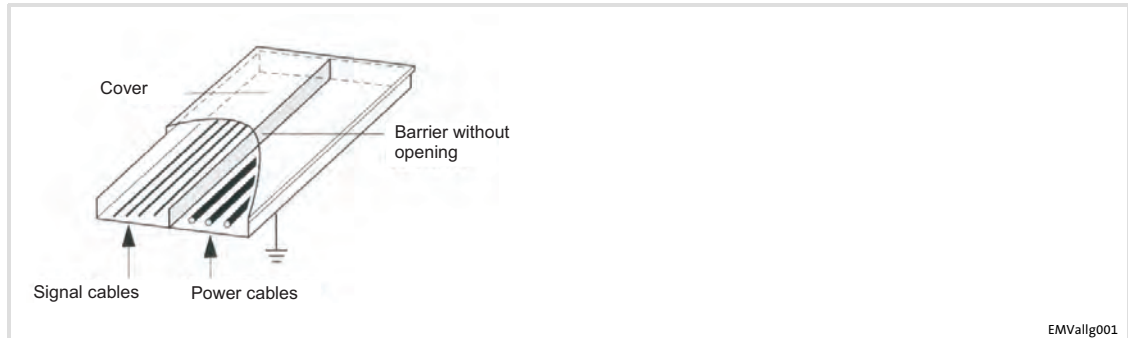


Fig. 6-6 Cable routing in the cable duct with barrier

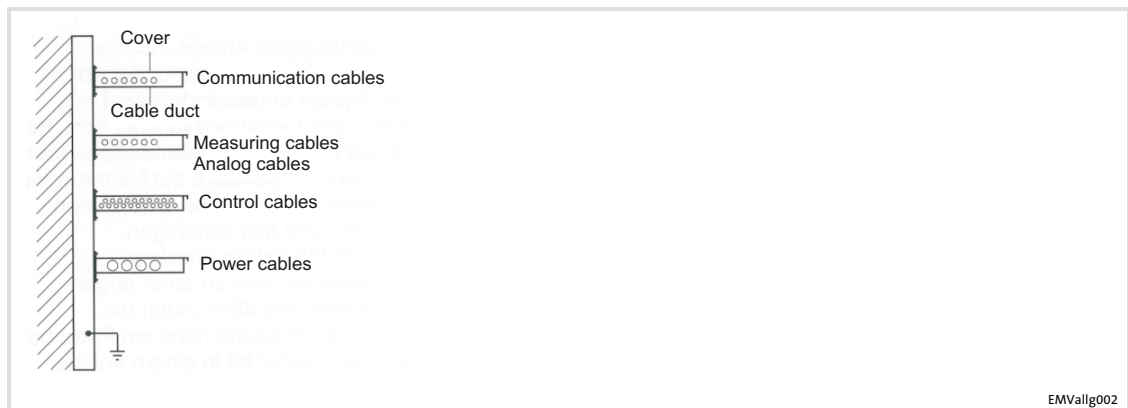


Fig. 6-7 Cable routing in separated cable ducts

Wiring on the mains side

- ▶ It is possible to connect the controller, mains choke or RFI filter to the mains via single cores or unshielded cables.
- ▶ The cable cross-section must be rated for the assigned fuse protection (VDE 0160).

Wiring on the motor side**Stop!**

The motor cable is highly susceptible to interference. Therefore you will achieve an optimum wiring on the motor side if you

- ▶ exclusively use shielded and low-capacitance motor cables.
- ▶ do **not** integrate any further cable into the motor cable (e.g. for blowers etc.).
- ▶ shield the supply cable for temperature monitoring of the motor (PTC or thermostat) and install it separately from the motor cable.

Special conditions allow you to integrate the supply cable for temperature monitoring of the motor into the motor cable: (📖 173)

6.2.7 Detecting and eliminating EMC interferences

Fault	Cause	Remedy
Interferences of analog setpoints of your own or other devices and measuring systems	Unshielded motor cable	Use shielded motor cable
	Shield contact is not extensive enough	Carry out optimal shielding as specified
	Shield of the motor cable is interrupted by terminal strips, switched, etc.	- Separate components from other component part with a minimum distance of 100 mm - Use motor choke/motor filter
	Install additional unshielded cables inside the motor cable (e.g. for motor temperature monitoring)	Install and shield additional cables separately
	Too long and unshielded cable ends of the motor cable	Shorten unshielded cable ends to maximally 40 mm
Conducted interference level is exceeded on the supply side	Terminal strips for the motor cable are directly located next to the mains terminals	Spatially separate the terminal strips for the motor cable from main terminals and other control terminals with a minimum distance of 100 mm
	Mounting plate varnished	Optimise PE connection: - Remove varnish - Use zinc-coated mounting plate
	HF short circuit	Check cable routing

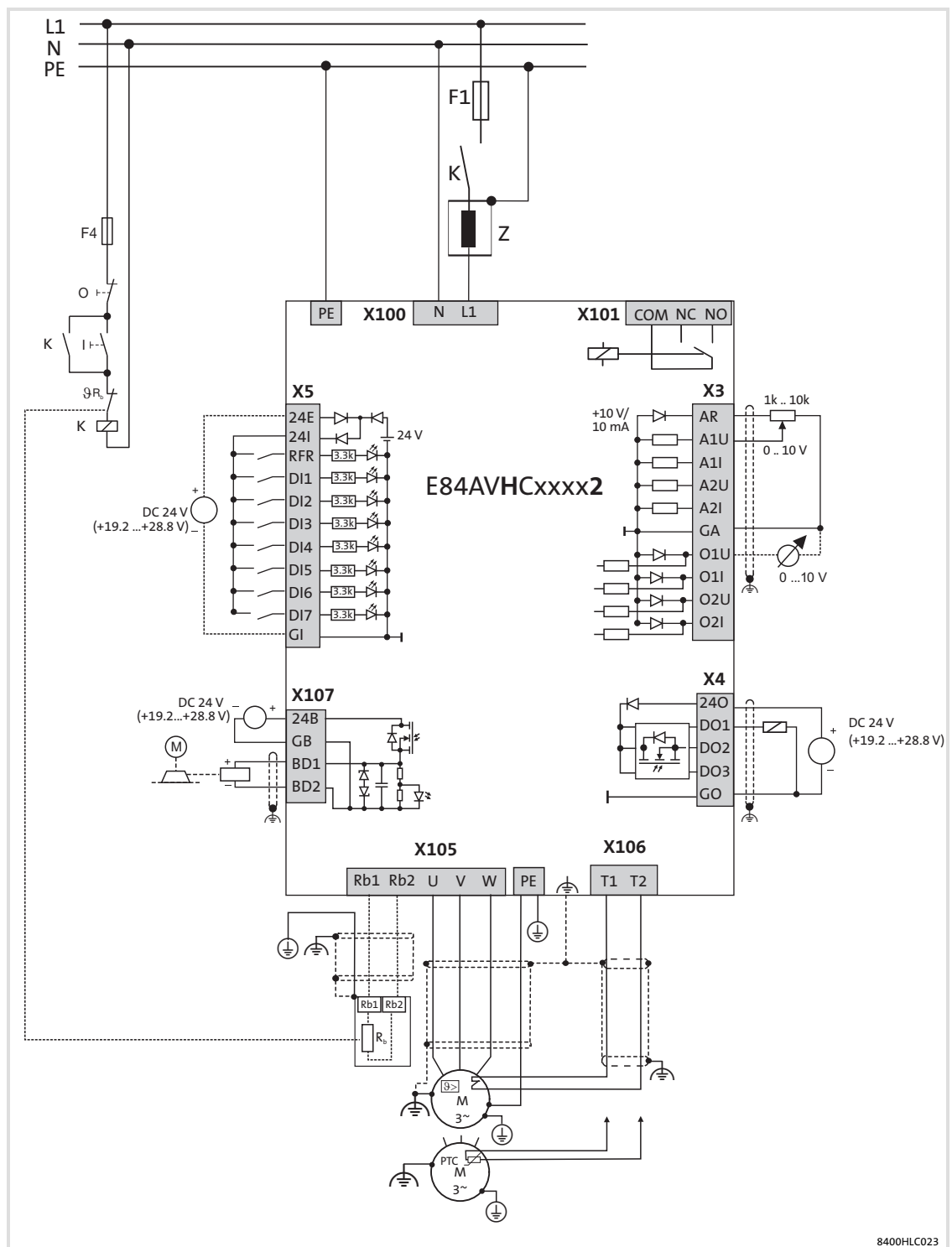


Fig. 6-9 Wiring for controllers in HighLine C design with 230-V mains connection

Electrical installation

Devices in the power range 0.25 ... 2.2 kW (1/N/PE AC 230 V)

Example circuits

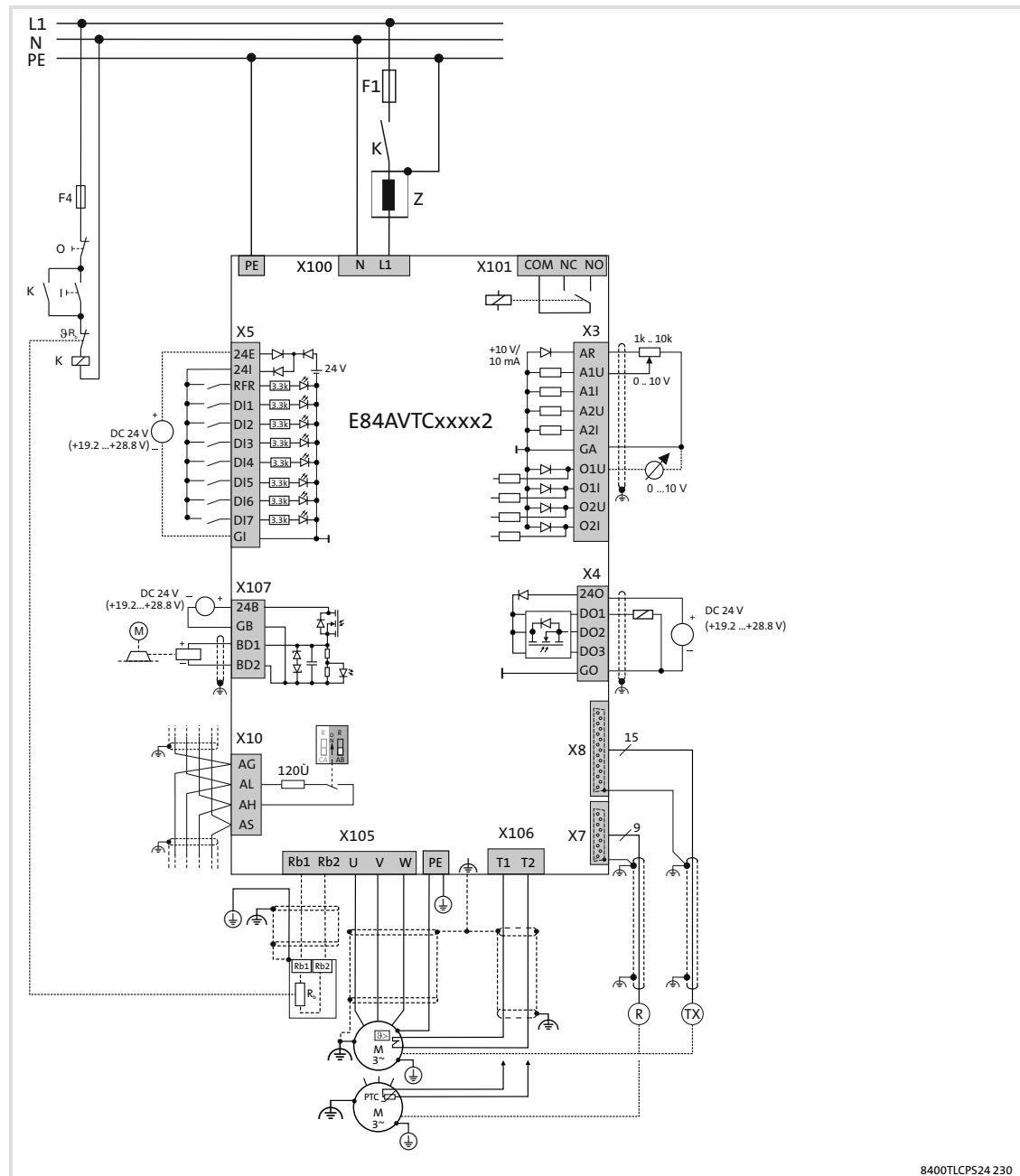


Fig. 6-10 Wiring for controllers in TopLine C design with 230-V mains connection

Operation with rated power at the 230V mains, 3/PE



Stop!

Destruction of the device

Devices with a 230V mains connection must not be connected to a three-phase 400V mains.

Possible consequences:

- The device will be destroyed

Protective measures:

- Check the voltage between the phase conductors L1 and L2. It must not exceed 230/240V.

The devices in the power range of 0.25kW to 2.2kW can also be connected to a three-phase 230V mains. In this case, the following conditions must be observed:

- Both mains phases L1 and L2 must be fused.
- If the drive controller is connected to the mains via a contactor or similar, both mains phases L1 and L2 must be switched via the contactor.

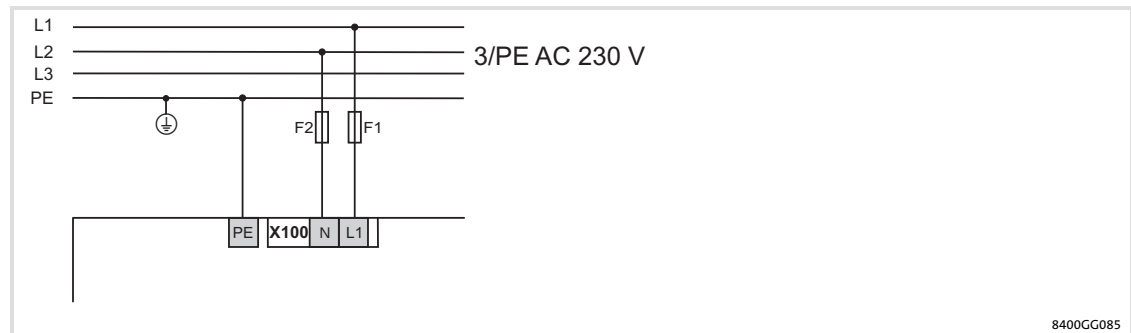


Fig. 6-11 Supplied by a three-phase 230V mains



Note!

The discharge current against ground is higher than when supplied via a one-phase 230V mains. If necessary, the application of a safety switch with a higher fault current must be observed.

6.3.2 Terminal assignment of the power connections**Preparing the cable installation**

To connect the shield of the motor cable, use the shield lug of the rear shield sheet. Position the shield sheet as follows:

1. Release the holding screw of the shield sheet.
2. Bring the shield sheet into the lock-in position.
3. Tighten the holding screw to lock the shield sheet.

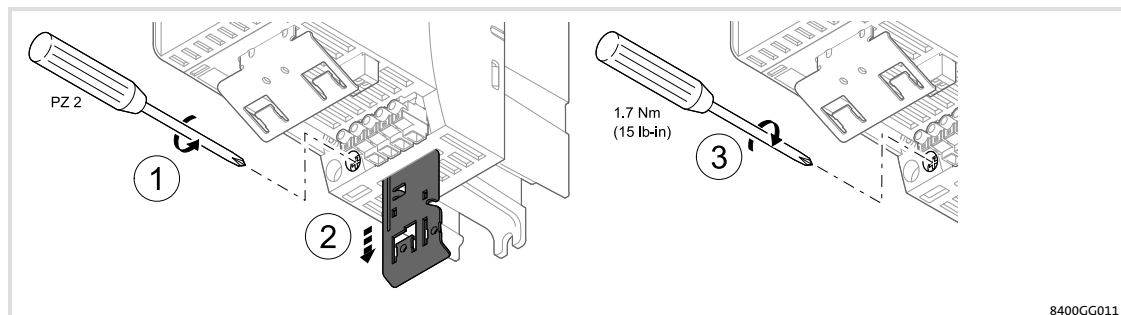
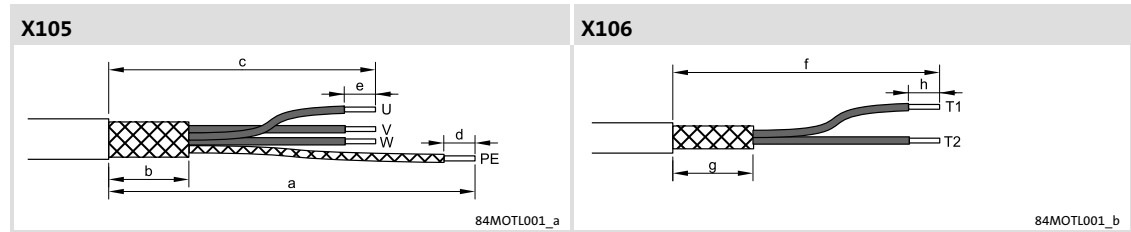


Fig. 6-12 Locate shield sheet in position

Strip cables



	U, V, W			PE		T1, T2		
	b	c	e	a	d	f	g	h
	[mm]			[mm]		[mm]		
E84AVxxx2512	25	65	7	90	9	95	25	10
E84AVxxx3712								
E84AVxxx5512	30	65	7	90	9	95	30	10
E84AVxxx7512								
E84AVxxx1122	30	65	7	90	9	95	30	10
E84AVxxx1522								
E84AVxxx2222								

How to proceed:

1. Strip motor cable and cable for motor temperature monitoring according to specified dimensions.
2. Fold back the shield of the motor cable and motor temperature cable over the cable sheath. Keep unshielded ends short.
3. Fix shield on the cable sheath (e.g. using a heat-shrinkable tube).
4. Fasten wire end ferrule to PE cable.
 - The other cables may be wired without using wire end ferrules.
5. Connect the shields separately to the shield sheet using (metal) cable ties or shield clamps.
 - left: motor cable
 - right: cable of motor temperature monitoring
 - For strain relief of the cables, measures are required.

Connecting the controller to protective earth

Using the PE connection on the motor side the controller and the motor cable can be connected to protective earth. Additional protective earthing of the controller can be carried out via this connection in order to comply with the requirements regarding the operation of devices with an increased discharge current to PE.

How to proceed:

1. Observe the above-mentioned steps regarding stripping and shielding.
2. Connect a second cable to the PE connection and earth it. (180).

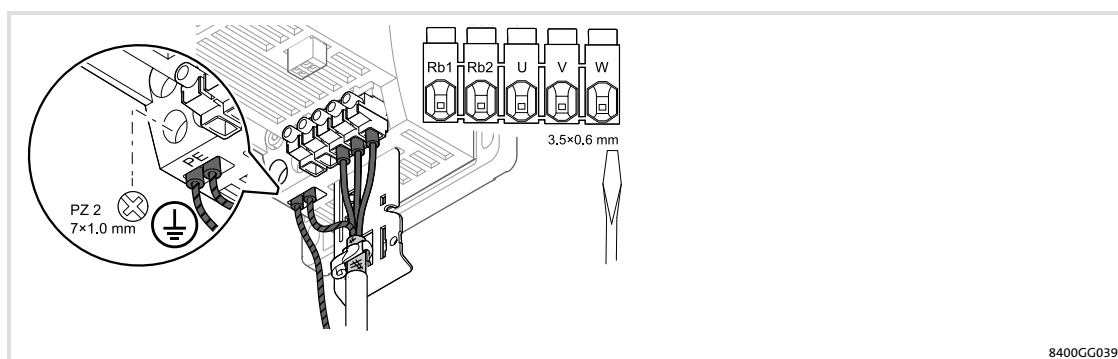
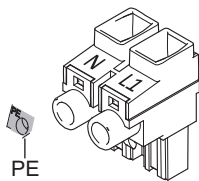


Fig. 6-13 Connection of controllers with device sizes 1 ... 3 to protective earth

Mains connection

Terminal X100	Labelling	Description
	L1	Mains phase L
	n	Neutral conductor
	PE	PE conductor on the supply side

8400GG1001b

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx2512 E84AVxxx3712 E84AVxxx5512 E84AVxxx7512	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1
E84AVxxx1122 E84AVxxx1522 E84AVxxx2222	1 ... 6 18 ... 10	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1

IT system

**Danger!**

- ▶ The contact screws have to be removed when controllers are used in IT operation or when external filters of E84AZESRxxxxLL or E84AZESRxxxxSD type are used.
- ▶ When both contact screws for interference suppression are removed, the enclosure for inverters E84AV ... will be reduced from IP 20 to IP 10.
- ▶ Please also observe further notes in the hardware manual and in mounting instructions of the inverters and filters.

**Stop!**

When using the STO safety function in IT power system, an isolating transformer must be connected on main side.

**Tip!**

You can increase the degree of protection to IP 20 again by screwing plastic bolts made of polyamide into the open threaded holes. The thickness of the bolt head including the washer must be greater than 3.2mm, as for example in case of cheese head screws with internal hexagon (similar to DIN EN ISO 4762)

According to the relevant EMC product standard EN 61800-3 there are no limit values for noise emission in the high-frequency range. Therefore, the technical data for EMC do not apply.

Before using the controller in the IT system, remove both contact screws for interference suppression:

- Two hexagon socket screws M4 x 16 mm with washers.
- Insert for Allen key: 3mm

The tightening torque of the contact screws for connecting the drive to other networks is 1 Nm (8 lb-in).

Electrical installation
Devices in the power range 0.25 ... 2.2 kW (1/N/PE AC 230 V)
Terminal assignment of the power connections

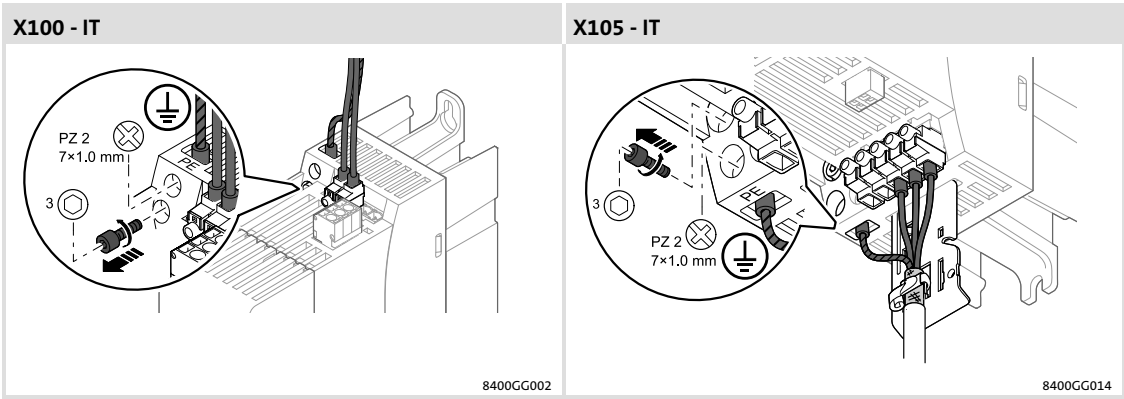
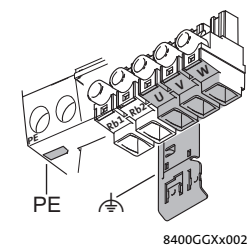


Fig. 6-14 Removal of the contact screws for device sizes 1 ... 3 (on the supply side and on the motor side)

Motor connection

Terminal X105	Labelling	Description
 8400GXx002b	U, V, W	Motor
	PE	PE conductor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx2512 E84AVxxx3712 E84AVxxx5512 E84AVxxx7512 E84AVxxx1122 E84AVxxx1522 E84AVxxx2222	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1

Motor temperature monitoring



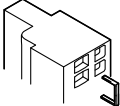
Note!

In the Lenze setting, motor temperature monitoring is activated! In the delivery status, there is a wire jumper between the terminals X106/T1 and X106/T2. Before connecting a thermal sensor, remove the wire jumper.



Note!

If the terminal X106 is used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the motor or mains potential to not restrict the protective separation of the control terminals.

Terminal X106	Labelling	Description
	T1 T2	Motor temperature monitoring with PTC element (type-A sensor, switching performance acc. to EN 60947-8 for type-A tripping units) or thermostat (NC contact). Lenze setting: activated, error message Setting in C00585
8400GG016b		

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
E84AVxxx2512 E84AVxxx3712 E84AVxxx5512 E84AVxxx7512 E84AVxxx1122 E84AVxxx1522 E84AVxxx2222	0.2 ... 1.5	24 ... 16	-	-	2.5 x 0.4

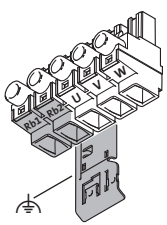


Tip!

For an easy removal of the wire jumper:

1. Cut the wire jumper with side-cutting pliers.
2. Overcome the spring pressure of the terminal with a screwdriver.
3. Remove both wire ends individually.

Connection of external brake resistor

Terminal X105	Labelling	Description
 8400GGx002b	Rb1, Rb2	Brake resistor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx2512 E84AVxxx3712 E84AVxxx5512 E84AVxxx7512 E84AVxxx1122 E84AVxxx1522 E84AVxxx2222	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1



Please read the information on how to install and connect the brake resistor in the corresponding mounting instructions.

6.4 Devices in the power range 0.37 ... 22 kW (3/PE AC 400 V)

6.4.1 Example circuits

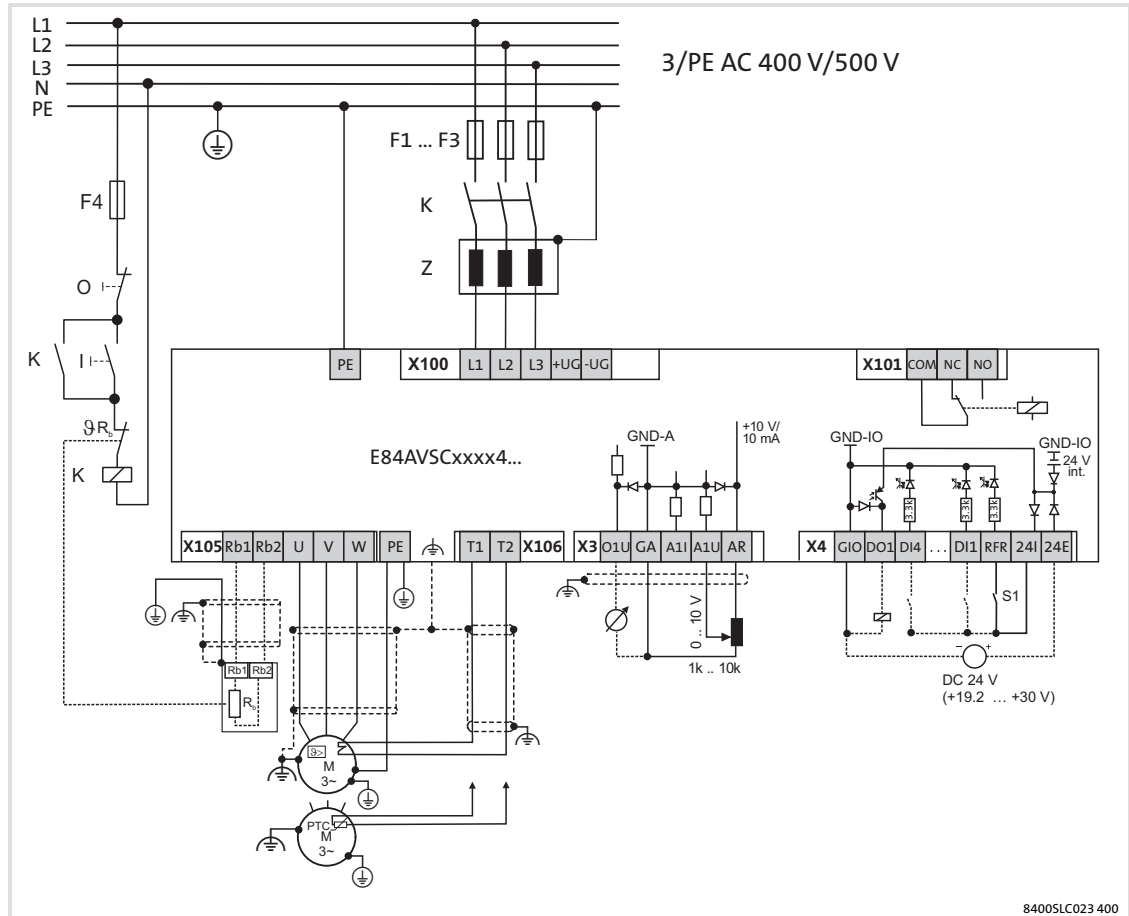


Fig. 6-15 Wiring for controllers in Stateline C design with 400-V/500-V mains connection

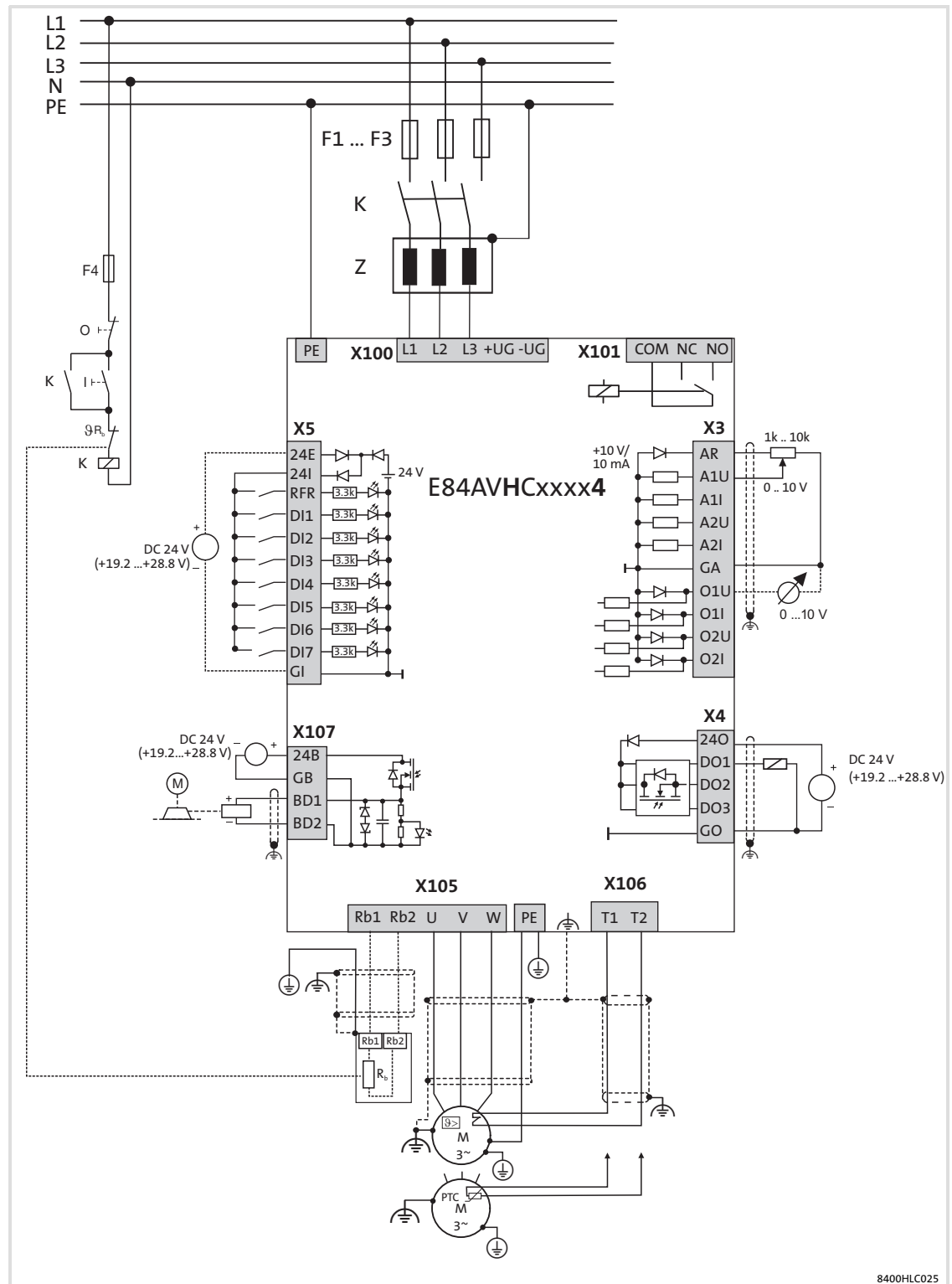


Fig. 6-16 Wiring for controllers in HighLine C design with 400-V/500-V mains connection

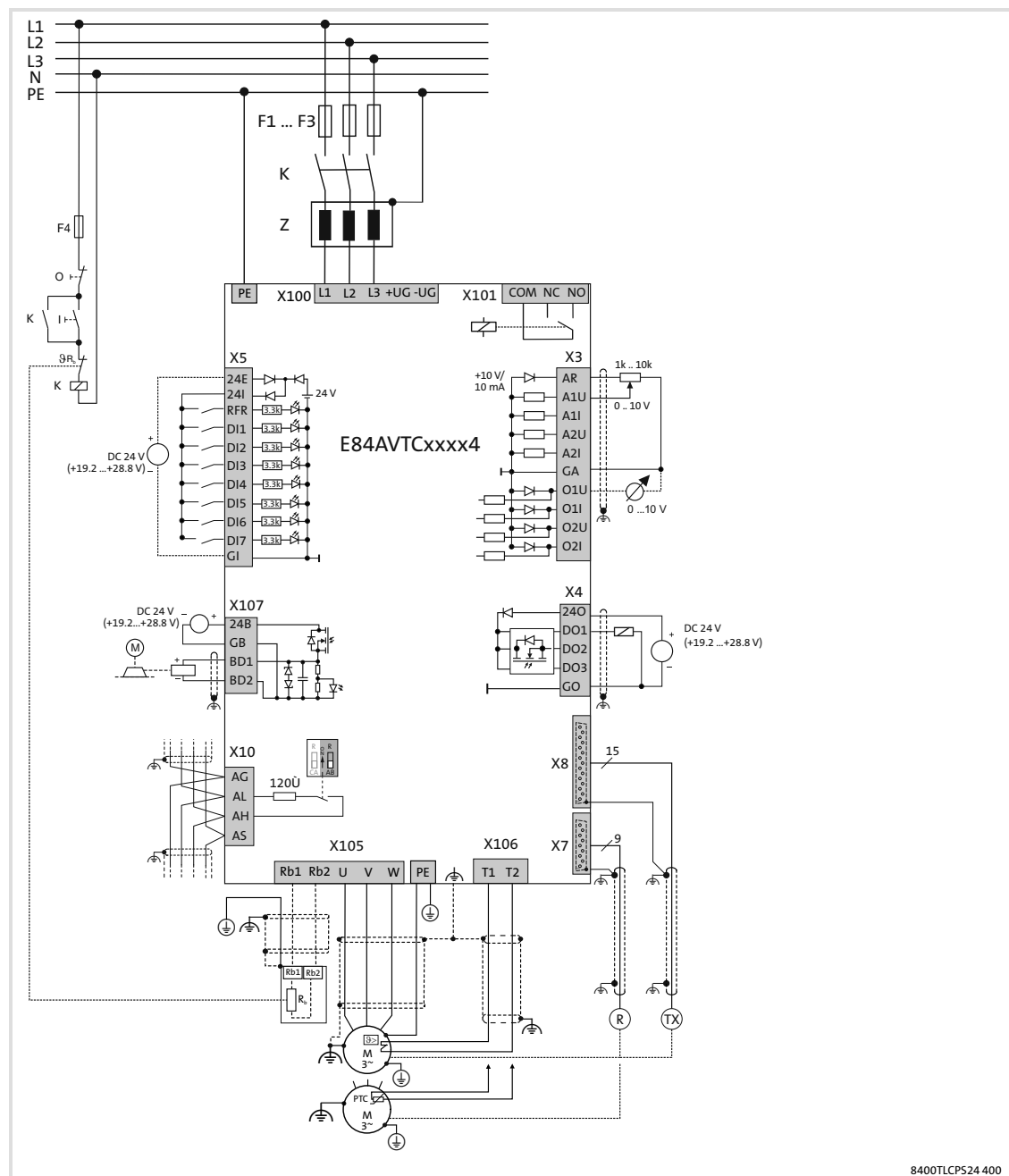


Fig. 6-17 Wiring for controllers in TopLine C design with 400-V/500-V mains connection

8400TLCPS24 400

6.4.2 Terminal assignment of the power connections**Preparing the cable installation**

To connect the shield of the motor cable, use the shield lug of the rear shield sheet. Position the shield sheet as follows:

1. Release the holding screw of the shield sheet.
2. Bring the shield sheet into the lock-in position.
3. Tighten the holding screw to lock the shield sheet.

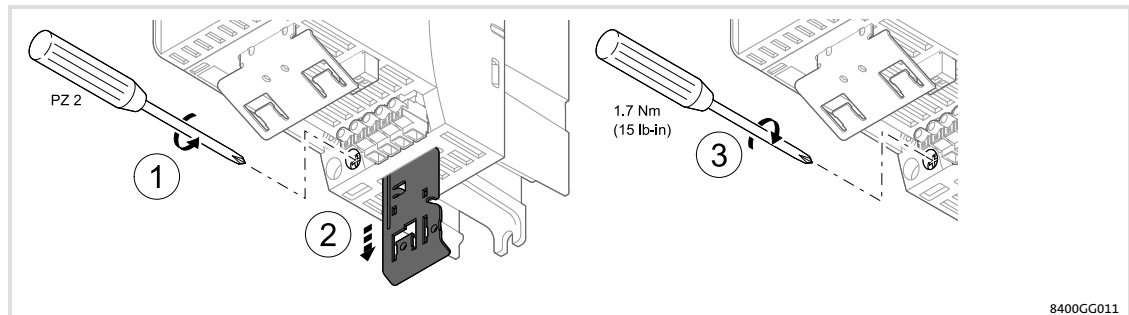
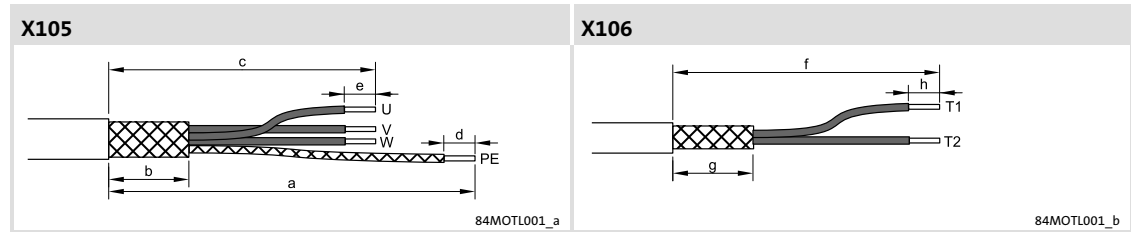


Fig. 6-18 Locate shield sheet in position

Strip cables



	U, V, W			PE		T1, T2		
	b	c	e	a	d	f	g	h
	[mm]			[mm]		[mm]		
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514 E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xxS	30	65	7	90	9	95	30	10
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	25	70	12 ... 14	125	12 ... 14	105	25	10
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	25	80	14	120	14	115	25	10
E84AVxxx1834 E84AVxxx2234	30	110	16	195	16	160	30	10

How to proceed:

- Strip motor cable and cable for motor temperature monitoring according to specified dimensions.
- Fold back the shield of the motor cable and motor temperature cable over the cable sheath. Keep unshielded ends short.
- Fix shield on the cable sheath (e.g. using a heat-shrinkable tube).
- Fasten wire end ferrule to PE cable.
 - The other cables may be wired without using wire end ferrules.
- Connect the shields separately to the shield sheet using (metal) cable ties or shield clamps.
 - left: motor cable
 - right: cable of motor temperature monitoring
 - For strain relief of the cables, measures are required.

Connecting the controller to protective earth

Using the PE connection on the motor side the controller and the motor cable can be connected to protective earth. Additional protective earthing of the controller can be carried out via this connection in order to comply with the requirements regarding the operation of devices with an increased discharge current to PE.

How to proceed:

1. Observe the above-mentioned steps regarding stripping and shielding.
2. Connect a second cable to the PE connection and earth it. (191).

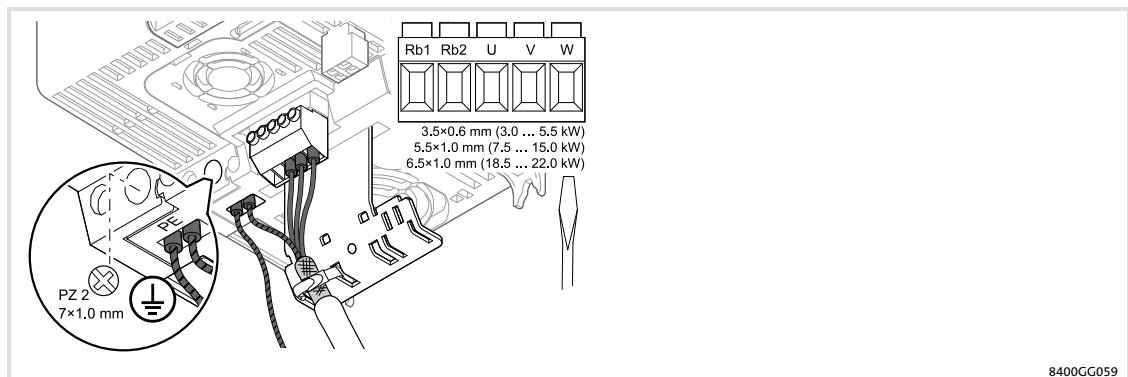
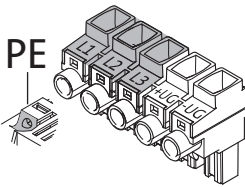


Fig. 6-19 Connecting controllers of device size 4 ... 6 to protective earth

Mains connection

Terminal X100	Labelling	Description
	L1	Connection of the mains phases L1, L2, L3
	L2	
	L3	
	PE	Connection for the PE conductor

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514 E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xx5	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	1 ... 6 18 ... 10	0.5 4.4	3.5 x 0.6	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	1 ... 16 18 ... 6	1.2 10.6	5.5 x 1	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx1834 E84AVxxx2234	1.5 ... 25 16 ... 2	3.5 31	6.5 x 1	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1

IT system

**Danger!**

- ▶ The contact screws have to be removed when controllers are used in IT operation or when external filters of E84AZESRxxxxLL or E84AZESRxxxxSD type are used.
- ▶ When both contact screws for interference suppression are removed, the enclosure for inverters E84AV ... will be reduced from IP 20 to IP 10.
- ▶ Please also observe further notes in the hardware manual and in mounting instructions of the inverters and filters.

**Stop!**

When using the STO safety function in IT power system, an isolating transformer must be connected on main side.

**Stop!****Overvoltage at components:**

In case of an earth fault in IT systems, intolerable overvoltages may occur in the plant.

Possible consequences:

Destruction of the device.

Protective measures:

Before using the controller in the IT system, remove the contact screws on the supply side and the motor side. (Fig. 6-20).

**Tip!**

You can increase the degree of protection to IP 20 again by screwing plastic bolts made of polyamide into the open threaded holes. The thickness of the bolt head including the washer must be greater than 3.2mm, as for example in case of cheese head screws with internal hexagon (similar to DIN EN ISO 4762)

According to the relevant EMC product standard EN 61800-3 there are no limit values for noise emission in the high-frequency range. Therefore, the technical data for EMC do not apply.

Before using the controller in the IT system, remove both contact screws for interference suppression:

- Two hexagon socket screws M4 x 16 mm with washers.
- Insert for Allen key: 3mm

The tightening torque of the contact screws for connecting the drive to other networks is 1 Nm (8 lb-in).

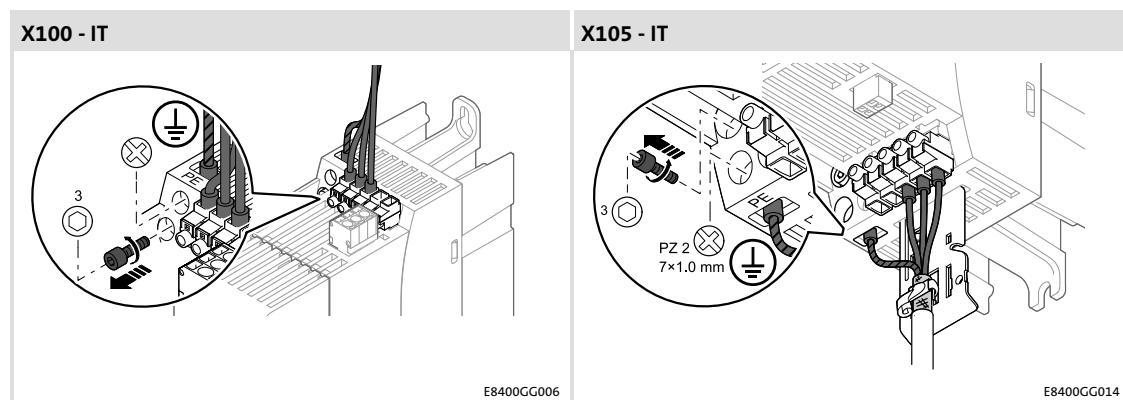


Fig. 6-20 Removal of the contact screws for device sizes 1 ... 3 (on the supply side and on the motor side)

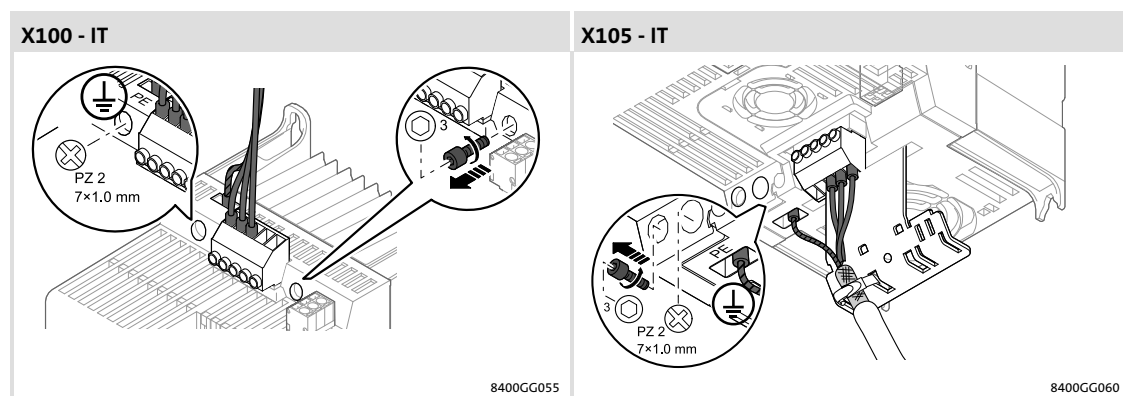
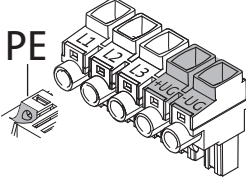


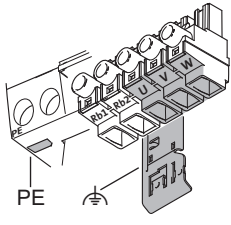
Fig. 6-21 Removal of the contact screws for device sizes 4 ... 6 (on the supply side and on the motor side)

Connection to the DC bus (+U_G, -U_G)

Terminal X100	Labelling	Description
 8400GGx001b	+UG -UG	Alternative connection of the DC-bus voltage
	PE	Connection for the PE conductor

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514 E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xxS	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	1 ... 6 18 ... 10	0.5 4.4	3.5 x 0.6	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	1 ... 16 18 ... 6	1.2 10.6	5.5 x 1	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx1834 E84AVxxx2234	1.5 ... 25 16 ... 2	3.5 31	6.5 x 1	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1

Motor connection

Terminal X105	Labelling	Description
 8400GGX002b	U, V, W	Motor
	PE	PE conductor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514 E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xxS	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	1 ... 6 18 ... 10	0.5 4.4	3.5 x 0.6	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	1 ... 16 18 ... 6	1.2 10.6	5.5 x 1	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx1834 E84AVxxx2234	1.5 ... 25 16 ... 2	3.5 31	6.5 x 1	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1

Motor temperature monitoring



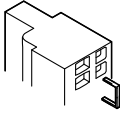
Note!

In the Lenze setting, motor temperature monitoring is activated! In the delivery status, there is a wire jumper between the terminals X106/T1 and X106/T2. Before connecting a thermal sensor, remove the wire jumper.



Note!

If the terminal X106 is used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the motor or mains potential to not restrict the protective separation of the control terminals.

Terminal X106	Labelling	Description
 8400GG016b	T1	Motor temperature monitoring with PTC element (type-A sensor, switching performance acc. to EN 60947-8 for type-A tripping units) or thermostat (NC contact). Lenze setting: activated, error message Setting in C00585
	T2	

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVxxxxxxx	0.2 ... 1.5	24 ... 16	-	-	2.5 x 0.4

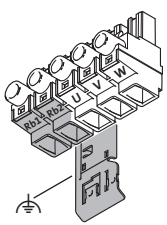


Tip!

For an easy removal of the wire jumper:

1. Cut the wire jumper with side-cutting pliers.
2. Overcome the spring pressure of the terminal with a screwdriver.
3. Remove both wire ends individually.

Connection of external brake resistor

Terminal X105	Labelling	Description
 8400GGx002b	Rb1, Rb2	Brake resistor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514 E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xxS	1 ... 2.5 18 ... 12	0.5 4.4	3.5 x 0.6	1 ... 6 18 ... 10	1.7 15	PZ 2 7 x 1
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	1 ... 6 18 ... 10	0.5 4.4	3.5 x 0.6	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	1 ... 16 18 ... 6	1.2 10.6	5.5 x 1	2.5 ... 16 12 ... 6	3.4 30	PZ 2 7 x 1
E84AVxxx1834 E84AVxxx2234	1.5 ... 25 16 ... 2	3.5 31	6.5 x 1	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1



Please read the information on how to install and connect the brake resistor in the corresponding mounting instructions.

6.5 Devices in a power range of 30 ... 45 kW (3/PE AC 400 V)**6.5.1 Example circuits**

Use the example circuits provided in the previous chapter ( 191).

6.5.2 Terminal assignment of the power connections**Preparing the cable installation**

To connect the shield of the motor cable, use the shield lug of the rear shield sheet. Position the shield sheet as follows:

1. Release the holding screw of the shield sheet.
2. Bring the shield sheet into the lock-in position.
3. Tighten the holding screw to lock the shield sheet.

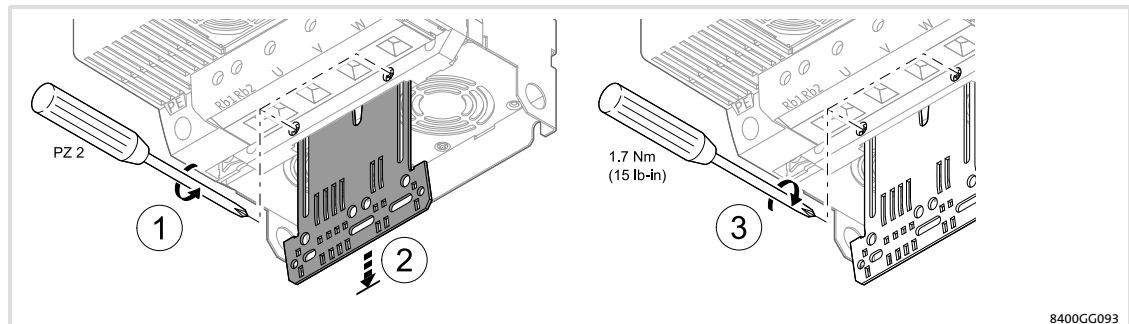
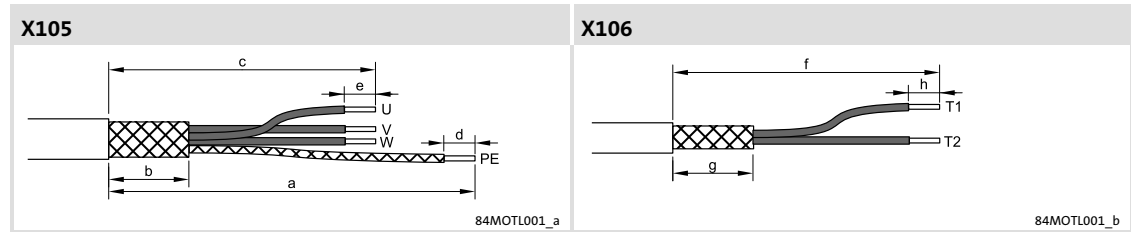


Fig. 6-22 Locate shield sheet in position

8400GG093

Strip cables



	U, V, W					PE				T1, T2			
	b	c	e			a	d			f	g	h	
	[mm]	[mm]	[mm]	[mm²] [AWG]	[Nm] [lb-in]	[mm]	[mm]	[mm²] [AWG]	[Nm] [lb-in]	[mm]	[mm]	[mm]	[mm²] [AWG]
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	40	190	24	16 ... 50 6 ... 0	4.0 35	250	16	2.5 ... 25 12 ... 2	4.0 35	240	40	10	0.2 ... 1.5 24 ... 16

How to proceed:

1. Strip motor cable and cable for motor temperature monitoring according to specified dimensions.
2. Fold back the shield of the motor cable and motor temperature cable over the cable sheath. Keep unshielded ends short.
3. Fix shield on the cable sheath (e.g. using a heat-shrinkable tube).
4. Fasten wire end ferrule to PE cable.
 - The other cables may be wired without using wire end ferrules.
5. Connect the shields separately to the shield sheet using (metal) cable ties or shield clamps.
 - left: motor cable
 - right: cable of motor temperature monitoring
 - For strain relief of the cables, measures are required.

Connecting the controller to protective earth

Using the PE connection on the motor side the controller and the motor cable can be connected to protective earth. Additional protective earthing of the controller can be carried out via this connection in order to comply with the requirements regarding the operation of devices with an increased discharge current to PE.

How to proceed:

- 1. Observe the above-mentioned steps regarding stripping and shielding.
- 2. Connect a second cable to the PE connection and earth it. (📖 203).

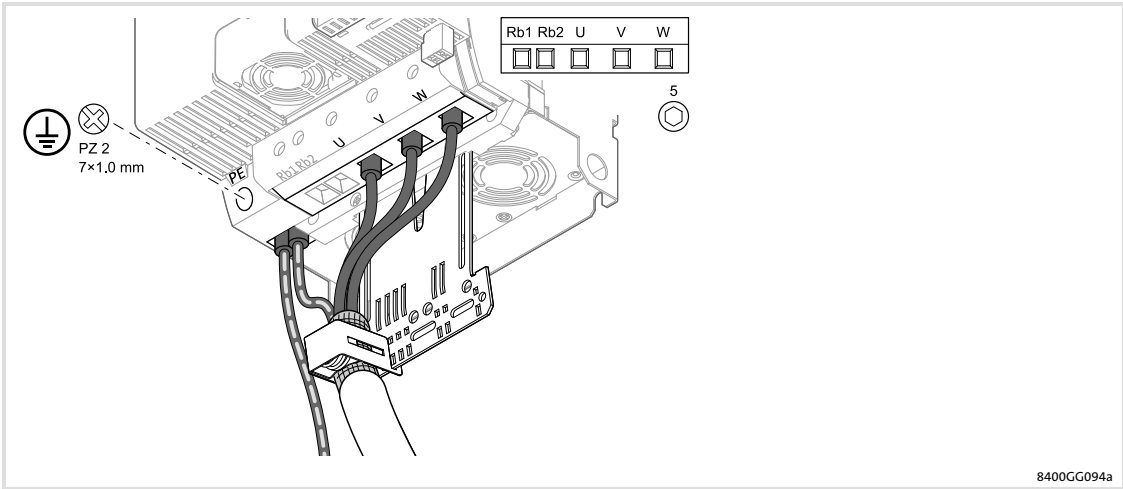
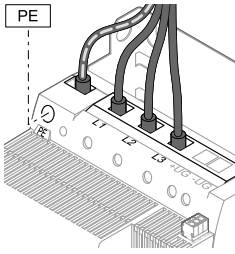


Fig. 6-23 Controller connection of device size GG7 to protective earth

Mains connection

Terminal X100	Labelling	Description
 8400GG096a	L1 L2 L3	Connection of the mains phases L1, L2, L3
	PE	Connection for the PE conductor

	Terminal data			PE		
	Conductor cross-section [mm²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	16 ... 50 6 ... 0	4.0 35	Inbus SW 5	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1

IT system

**Danger!**

- ▶ The contact screws have to be removed when controllers are used in IT operation or when external filters of E84AZESRxxxxLL or E84AZESRxxxxSD type are used.
- ▶ When both contact screws for interference suppression are removed, the enclosure for inverters E84AV ... will be reduced from IP 20 to IP 10.
- ▶ Please also observe further notes in the hardware manual and in mounting instructions of the inverters and filters.

**Stop!**

When using the STO safety function in IT power system, an isolating transformer must be connected on main side.

**Stop!****Overvoltage at components:**

In case of an earth fault in IT systems, intolerable overvoltages may occur in the plant.

Possible consequences:

Destruction of the device.

Protective measures:

Before using the controller in the IT system, remove the contact screws on the supply side and the motor side. (Fig. 6-14).

**Tip!**

You can increase the degree of protection to IP 20 again by screwing plastic bolts made of polyamide into the open threaded holes. The thickness of the bolt head including the washer must be greater than 3.2mm, as for example in case of cheese head screws with internal hexagon (similar to DIN EN ISO 4762)

According to the relevant EMC product standard EN 61800-3 there are no limit values for noise emission in the high-frequency range. Therefore, the technical data for EMC do not apply.

Before using the controller in the IT system, remove both contact screws for interference suppression:

- Two hexagon socket screws M4 x 16 mm with washers.
- Insert for Allen key: 3mm

The tightening torque of the contact screws for connecting the drive to other networks is 1 Nm (8 lb-in).

Electrical installation

Devices in a power range of 30 ... 45 kW (3/PE AC 400 V)

Terminal assignment of the power connections

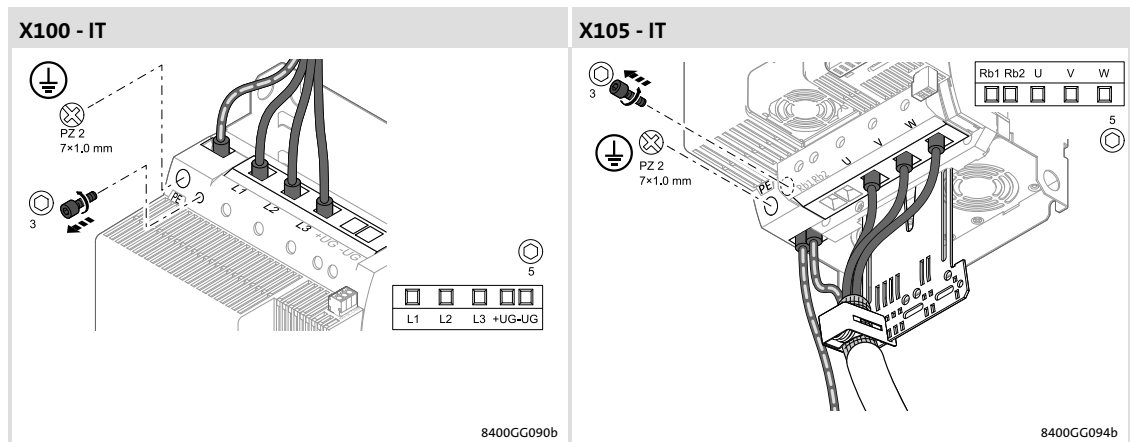
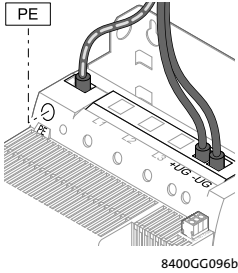


Fig. 6-24 Removal of the contact screws for device size GG7 (on the supply side and on the motor side)

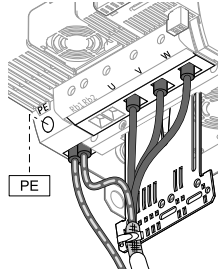
Devices in a power range of 30 ... 45 kW (3/PE AC 400 V)
Terminal assignment of the power connections

Connection to the DC bus (+U_G, -U_G)

Terminal X100	Labelling	Description
	+UG -UG	Alternative connection of the DC-bus voltage
	PE	Connection for the PE conductor

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3034	16 ... 50 6 ... 0	4.0	Inbus	2.5 ... 25	4.0	PZ 2
E84AVxxx3734		35	SW 5	12 ... 2	35	7 x 1
E84AVxxx4534						

Motor connection

Terminal X105	Labelling	Description
	U, V, W	Motor
	PE	PE conductor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3034	16 ... 50 6 ... 0	4.0 35	Inbus SW 5	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1
E84AVxxx3734						
E84AVxxx4534						

Motor temperature monitoring



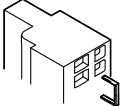
Note!

In the Lenze setting, motor temperature monitoring is activated! In the delivery status, there is a wire jumper between the terminals X106/T1 and X106/T2. Before connecting a thermal sensor, remove the wire jumper.



Note!

If the terminal X106 is used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the motor or mains potential to not restrict the protective separation of the control terminals.

Terminal X106	Labelling	Description
	T1 T2	Motor temperature monitoring with PTC element (type-A sensor, switching performance acc. to EN 60947-8 for type-A tripping units) or thermostat (NC contact). Lenze setting: activated, error message Setting in C00585
8400GG016b		

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVxxxxxxx	0.2 ... 1.5	24 ... 16	-	-	2.5 x 0.4

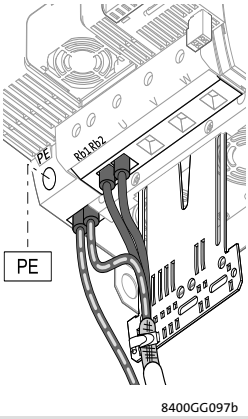


Tip!

For an easy removal of the wire jumper:

1. Cut the wire jumper with side-cutting pliers.
2. Overcome the spring pressure of the terminal with a screwdriver.
3. Remove both wire ends individually.

Connection of external brake resistor

Terminal X105	Labelling	Description
	Rb1, Rb2	Brake resistor
		Functional earth HF-shield termination by connection to PE

	Terminal data			PE		
	Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]		Conductor cross-section [mm ²] [AWG]	Tightening torque [Nm] [lb-in]	
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	16 ... 50 6 ... 0	4.0 35	Inbus SW 5	2.5 ... 25 12 ... 2	4.0 35	PZ 2 7 x 1



Please read the information on how to install and connect the brake resistor in the corresponding mounting instructions.

6.6 Common control terminals

6.6.1 Important notes



Stop!

The device contains components that can be destroyed by electrostatic discharge!

Before working on the device, the personnel must ensure that they are free of electrostatic charge by using appropriate measures.



Note!

If the terminal X106 is used, e.g. to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the motor or mains potential to not restrict the protective separation of the control terminals.

Design of the cables

- ▶ The cables used must comply with the approvals required for the location (e.g. UL).
- ▶ The effectiveness of a shielded cable is reached by:
 - Providing a good shield connection through large-surface shield contact.
 - Using only braided shields with low shield resistance made of tin-plated or nickel-plated copper braid.
 - Using braided shields with an overlap rate > 70 % and an overlap angle of 90 °.
 - Keeping unshielded cable ends as short as possible.

These terminals must be shielded:

- ▶ Feedback systems
- ▶ Analog signals (inputs and outputs; single-sided shield connection to the controller)
- ▶ System bus (CANopen)



Note!

Always ensure shielded wiring for edge-controlled digital input signals (quick inputs or touch probe).

The following connections need not be shielded:

- ▶ 24-V supply
- ▶ Digital signals (inputs and outputs).
 - We recommend to use shielded cables for a cable length from approximately 5 m on or in environments with strong interferences.

Preparing the cable installation

The shields of the control cables are connected to the left shield lug of the front shield sheet. For this, proceed as shown in the illustration.

1. Release the holding screw of the shield sheet.
2. Bring the shield sheet into one of the two possible lock-in positions.
3. Tighten the holding screw to lock the shield sheet.

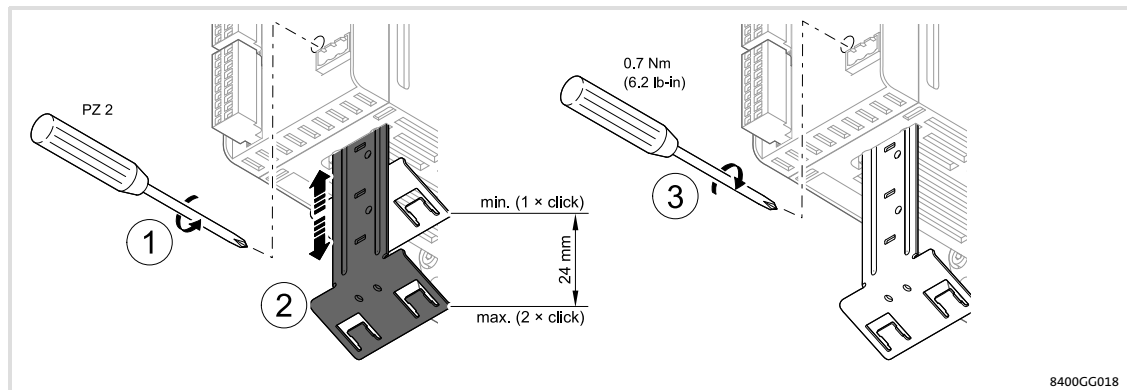
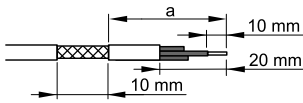
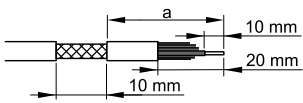
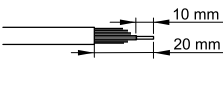


Fig. 6-25 Locate shield sheet in position

Strip cables

According to the selected lock-in position of the shield sheet, strip the control cables. For this, strip the cable ends and the cable sheath at the shield lug.

The following table shows the stripping length for the control cables depending on the selected lock-in position of the shield sheet.

X1	X3, X107	X4, X5
		
84MOTL001_e	84MOTL001_d	84MOTL001_f

► StateLine: stripping dimensions

X1			X3			X4
						
min.	max.		min.	max.		
a [mm]	a [mm]	[mm ²] [AWG]	a [mm]	a [mm]	[mm ²] [AWG]	[mm ²] [AWG]
110	135	0.2 ... 1.5 24 ... 16	150	175	0.2 ... 1.5 24 ... 16	0.2 ... 1.5 24 ... 16

► HighLine: stripping dimensions

X1			X3			X4, X5	X107		
									
min.	max.		min.	max.			min.	max.	
a [mm]	a [mm]	[mm ²] [AWG]	a [mm]	a [mm]	[mm ²] [AWG]	[mm ²] [AWG]	a [mm]	a [mm]	[mm ²] [AWG]
110	135	0.2 ... 1.5 24 ... 16	150	175	0.2 ... 1.5 24 ... 16	0.2 ... 1.5 24 ... 16	115	140	0.2 ... 1.5 24 ... 16

► TopLine: Stripping lengths

X1			X3/X5			X4/X107		
 min.	 max.		 min.	 max.		 min.	 max.	
a	a		a	a		a	a	
[mm]	[mm]	[mm ²] [AWG]	[mm]	[mm]	[mm ²] [AWG]	[mm]	[mm]	[mm ²] [AWG]
110	135	0.2 ... 1.5 24 ... 16	150	175	0.2 ... 1.5 24 ... 16	115	140	0.2 ... 1.5 24 ... 16



Note!

Devices including safety engineering have an increased stripping length "a":

- by 10 mm when the shield sheet is pulled out to its minimum length
- by 15 mm when the shield sheet is pulled out to its maximum length

Shield and connect cables

The uncovered cable shield at the left shield lug of the stripped control cables must be connected **A** using a (metal) cable tie for high conductivity.

As shown in the illustration, the cable ends (if required, provided with wire end ferrule) must be inserted into the corresponding spring terminals with a suitable screwdriver (for max. width, see illustration).

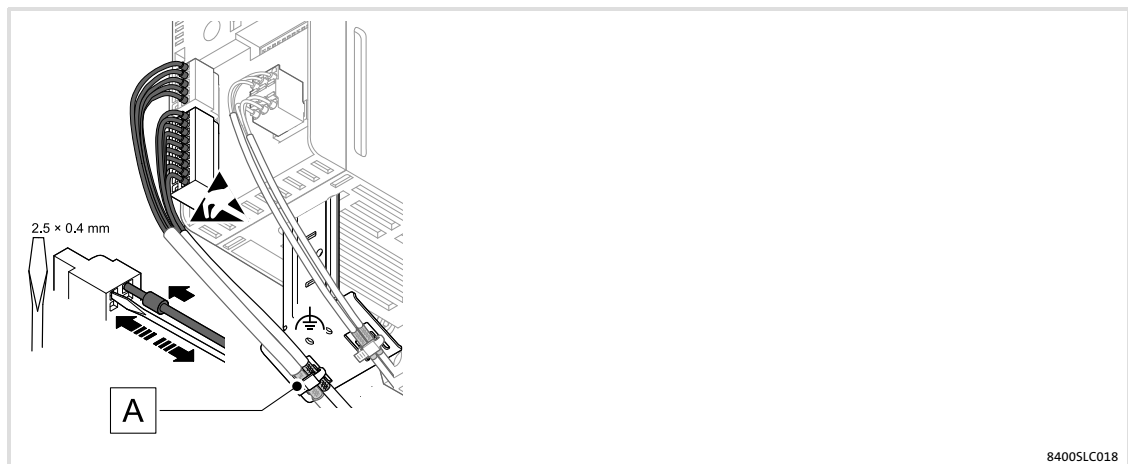


Fig. 6-26 Shielding and connecting control cables

6.6.2 System bus connection (CANopen)

Basic structure of the CAN network

Every segment of the CAN network must be terminated by resistors ($120\ \Omega$) between CAN Low and CAN High. The 8400 controller has one integrated bus terminating resistor each which can be activated via DIP switch.

The bus terminations of the system bus (CAN) are labelled by "R" in every one of the examples below.

If a CAN network has only one segment, the master (M) with integrated bus termination marks the start, and the last node (S) marks the bus termination.

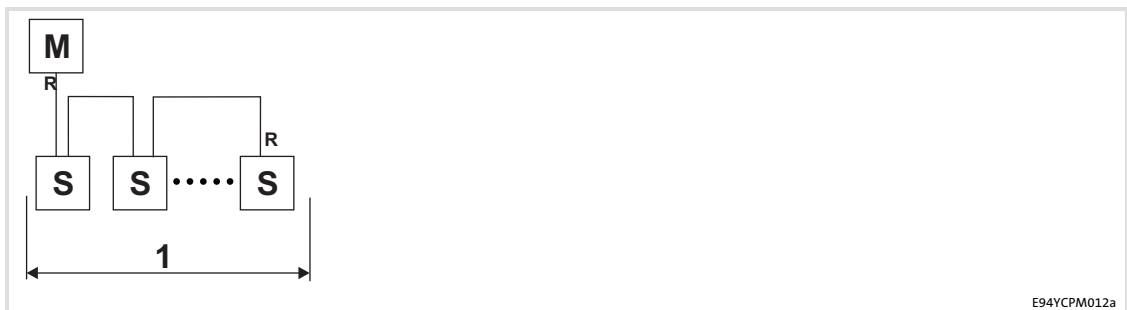


Fig. 6-27 Example: CAN network with one segment

A CAN network with multiple segments includes repeaters (X) for coupling the segments. The repeaters are equipped with integrated bus terminations.

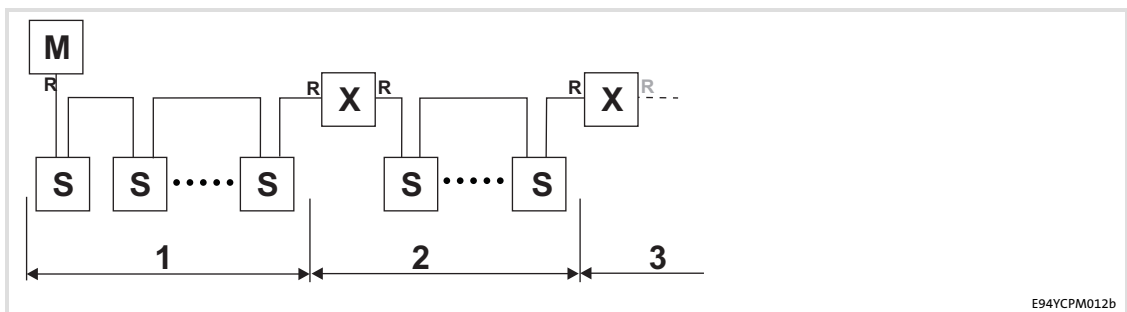


Fig. 6-28 Example: CAN network with repeater

If no repeater is used at the end of the segment, the bus terminating resistor on the last node must be activated.

6.6.2.1 Wire CAN plug connector (X1) and ensure bus termination.

- ▶ Wire CAN plug connector (X1).
 - Only install shielded bus cables to avoid interference injection.
 - Fix the bus cable connected to plug connector X1 to the shield sheet of the controller.
- ▶ Ensure bus termination.
 - Only required if the controller is the first or the last node of the CAN bus.
 - Activate the bus termination vis DIP switch "R".

Terminal data

	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

Specification of the bus cable

We recommend the use of CAN cables in accordance with ISO 11898-2:

CAN cable in accordance with ISO 11898-2

Cable type	Paired with shielding
Impedance	120 Ω (95 ... 140 Ω)
Cable resistance/cross-section	
Cable length ≤ 300 m	≤ 70 mΩ/m / 0.25 ... 0.34 mm² (AWG22)
Cable length 301 ... 1000 m	≤ 40 mΩ/m / 0.5 mm² (AWG20)
Signal propagation delay	≤ 5 ns/m

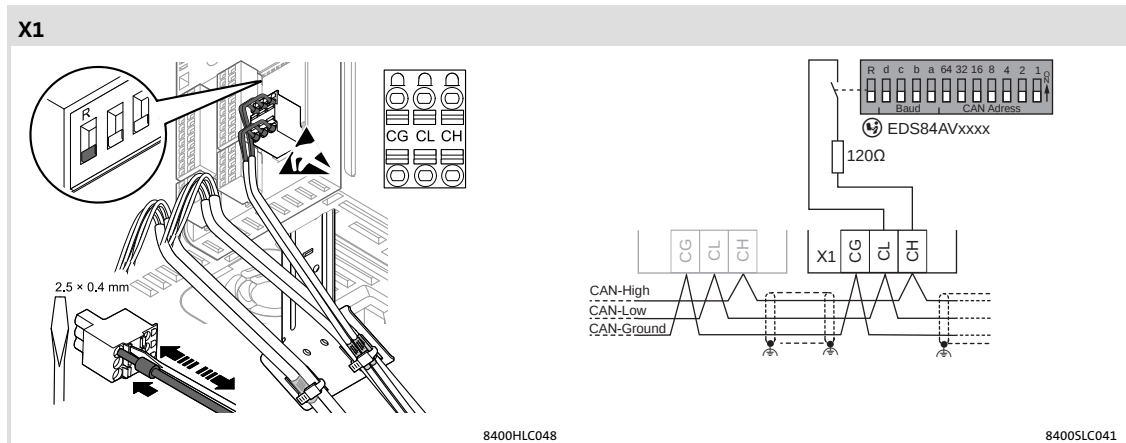
StateLine, HighLine

Fig. 6-29 CANopen connection

TopLine

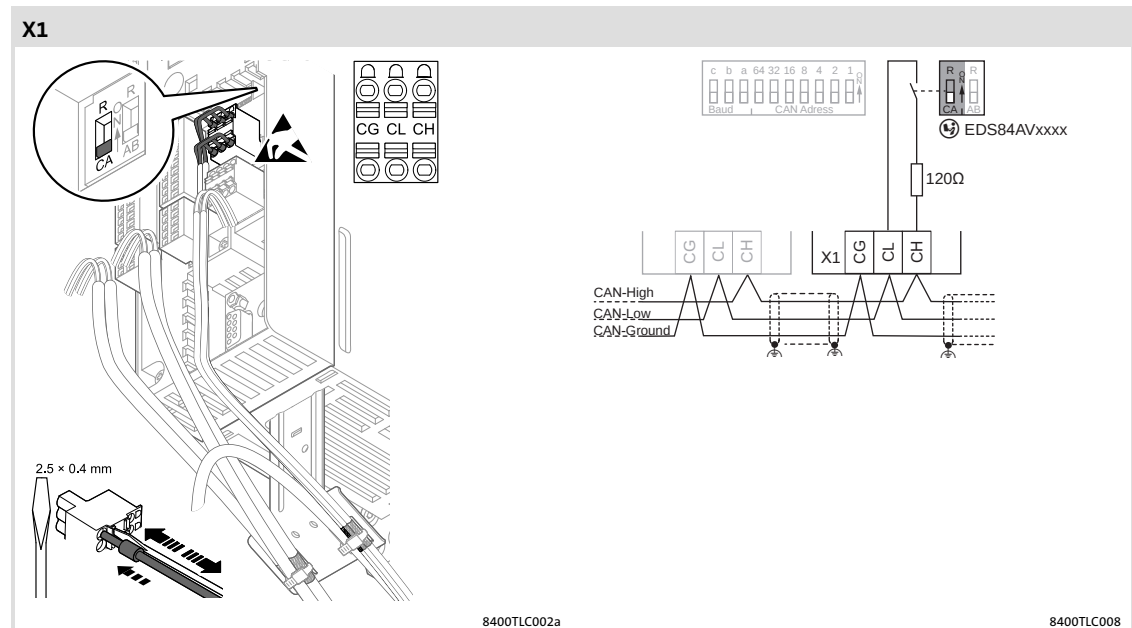


Fig. 6-30 CANopen connection

6.6.2.2

Structure of the CAN network

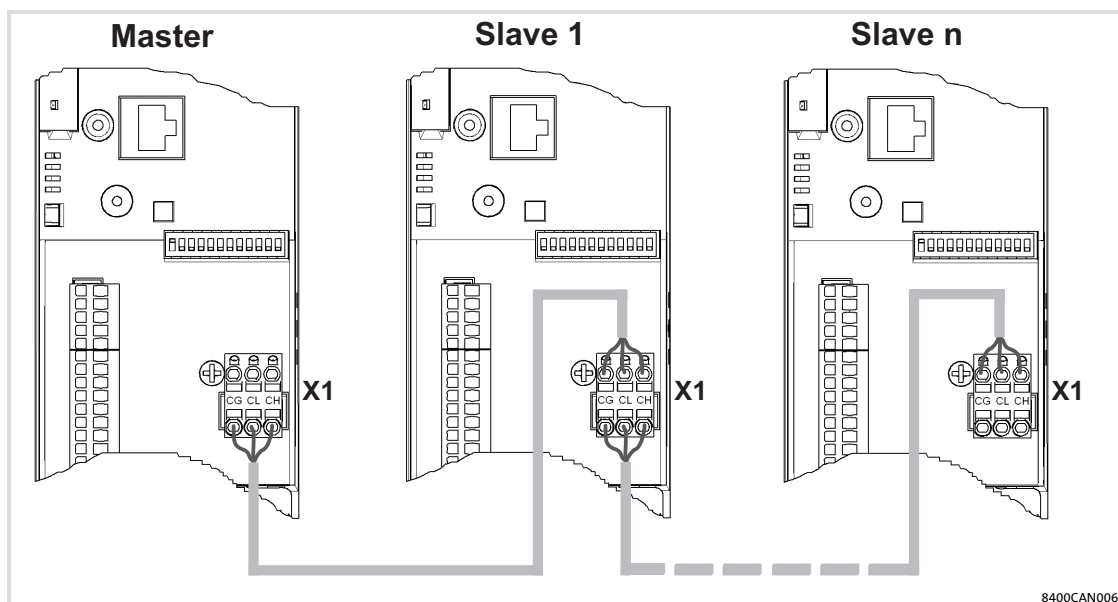


Fig. 6-31 Wiring of system bus (CAN)

Bus cable length

**Note!**

- ▶ The permissible cable lengths must be observed.
- ▶ Please observe the reduction of the total cable length due to the signal delay of the repeater, see example below (221).
- ▶ During mixed operation, multiple nodes are operated on one mains.
- ▶ If the respective total cable lengths of the nodes differ at the same baud rate, the lower value must be used for the determination of the max. cable length.

Total cable length

1. Check whether the total cable length is complied with.

The total cable length is determined by the baud rate:

Baud rate [kbps]	Max. bus length [m]
10 (not supported at the moment)	8075
20	4013
50	1575
125	600
250	275
500	113
800 (HighLine and TopLine, StateLine from FW V11.0)	38
1000 (HighLine and TopLine, StateLine from FW V11.0)	13

Tab. 6-1 Total cable length

Segment cable length

2. Check whether the segment cable length is complied with.

The segment cable length is determined by the used cable cross-section and the number of nodes. If no repeaters are used, the segment cable length corresponds to the total cable length.

Maximum number of nodes per segment	Cable cross-section			
	0.25 mm ²	0.5 mm ²	0.75 mm ²	1.0 mm ²
2	240 m	430 m	650 m	940 m
5	230 m	420 m	640 m	920 m
10	230 m	410 m	620 m	900 m
20	210 m	390 m	580 m	850 m
32	200 m	360 m	550 m	800 m
63	170 m	310 m	470 m	690 m

Tab. 6-2 Segment cable length

3. Comparison of the two determined values.

If the value determined from Tab. 6-2 is lower than the total cable length to be implemented from Tab. 6-1, repeaters must be used. Repeater divide the total cable length into segments.

Example: Selection help

Selections	
• Cable cross-section:	0.5 mm ² (acc. to cable specification 218)
• Number of nodes:	63
• Repeater:	Lenze repeater, type 2176 (cable reduction: 30 m)

For a max. number of nodes (63), the following cable lengths / numbers of repeaters must be complied with according to selection:

Baud rate [kbps]	10	20	50	125	250	500	800	1000
Max. cable length [m]	8075	4013	1575	600	275	113	38	13
Segment cable length [m]	270	270	270	270	270	113	38	13
Number of repeaters	30	15	6	2	1	-		-

Check the use of repeaters



Note!

The use of another repeater is recommended as

► Service interface

Advantage: Trouble-free connection to running bus operation is possible.

► Calibration interface

Advantage: The calibration / programming unit remains electrically isolated.

Selections	
• Baud rate:	125 kbps
• Cable cross-section:	0.5 mm ²
• Number of nodes:	28
• Cable length:	450 m

Test steps	Cable length	See
1. Total cable length at 125 kbps:	600 m	From Tab. 6-1
2. Segment cable length for 28 nodes and a cable cross-section of 0.5 mm ² :	360 m	From Tab. 6-2
3. Comparison: The value in point 2 is lower than the cable length of 450 m which must be implemented.		

Result

- Use of repeaters
 - Without the use of repeaters, a cable length of 450 m cannot be implemented. After 360 m (point 2), a repeater must be used.
 - The Lenze repeater, type 2176 is used (cable reduction: 30 m).
- Calculation of the max. cable length:
 - First segment: 360 m
 - Second segment: 360 m (acc. to Tab. 6-1) *minus* 30 m (cable reduction if a repeater is used)
 - Max. cable length that can be implemented if a repeater is used: 690 m.

Hence, the selected cable length can be implemented.

6.6.3 Connection of relay output

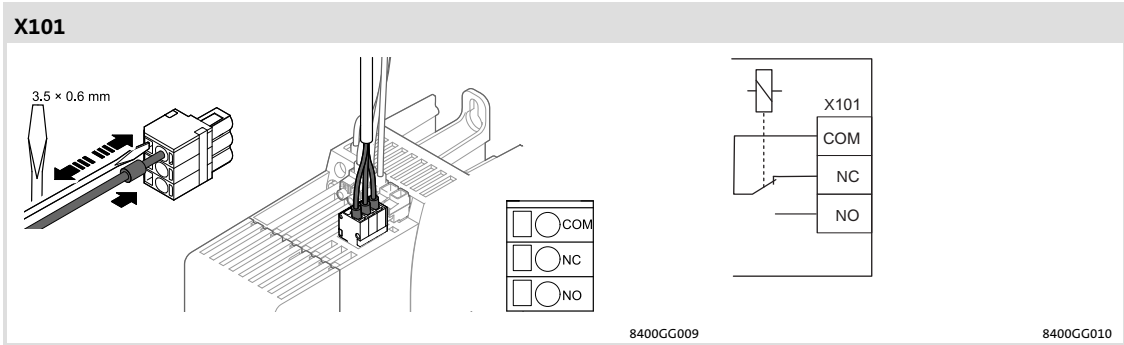


Fig. 6-32 Wiring of the relay outputs

Labelling	Description	
COM	Central contact of relay	AC 250 V, 3 A DC 24V, 2A
NC	Relay output NC (normally closed) Position is displayed via TRIP software message (Lenze setting)	DC 240 V, 0.16 A ● According to UL508C: – 3 A, 250 V AC (general purpose) – 2 A, 24 V DC (resistive)
NO	Relay output NO (normally open)	– 0.16 A, 240 V DC (general purpose)

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
flexible	0.2 ... 1.5	24 ... 16	-	-	3.5 x 0.6
with wire end ferrule					

**Note!**

- ▶ Switching of control signals:
 - Use shielded cables
 - HF-shield termination by PE connection
 - The minimum load for a correct through-connection of the relay contacts is 10 V DC and 10 mA. Both values must be exceeded at the same time.
- ▶ Use shielded cables for switching the control signals and establish the HF-shield termination through a PE connection.
- ▶ For the switching operation of mains potentials, shielded cables are sufficient.
- ▶ To protect the relay contacts, use a corresponding suppressor circuit in case of an inductive or capacitive load!
- ▶ The service life of the relay depends on the load type (ohmic, inductive, or capacitive) and the height of capacity to be switched.

**Note!**

The following notes are described in detail in the software manual "Parameter setting" in the section "I/O terminals", "Relay output":

- ▶ Use code C00118 to define the relay switching status.
- ▶ The minimum period for a valid HIGH or LOW signal to control the relay can be defined via the codes C00423/3 and C00423/4.

6.6.4 Diagnostics

The following can be optionally connected to the X6 diagnostic interface:

- ▶ E94AZCUSdiagnostic USB adapter
- ▶ EZAEBK1001 keypad
- ▶ EZAEBK2001 diagnosis terminal

In combination with the Lenze PC software »Engineer«, the diagnostic adapter serves to make comprehensive settings via dialogs, e.g. for initial commissioning.

The keypad serves to check or change individual settings. It is directly plugged onto the controller.

Using the keypad, the controller can be parameterised with regard to basic settings in a quick commissioning menu.

The diagnosis terminal combines the keypad with a housing and a connecting cable. The diagnosis terminal can also be used for installation, e.g. into a control cabinet door.

Socket X6	Labelling	Description
 8400HLC009	DIAG	Diagnostic interface for connection of a keypad or USB diagnostic adapter for online diagnostics

6

Electrical installation

StateLine C control terminals

External supply voltage 24 V

6.7

StateLine C control terminals

6.7.1

External supply voltage 24 V

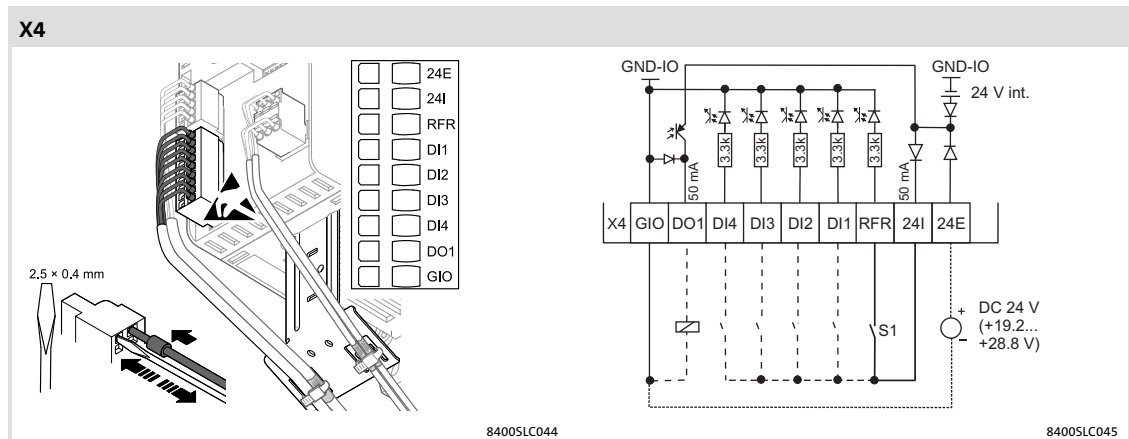


Fig. 6-33 Connection to an external supply voltage

Labelling	Description	
24E	Connection for an external 24 V supply by a safely separated power supply unit (SELV/PELV), IEC 61131-2 (required for mains-independent supply of the control electronics and the communication module)	
24I	Output 24 V, max. 50 mA for connection of the digital inputs via potential-free contacts	
GIO	GND-IO	Ground reference potential for the digital inputs and outputs

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

6.7.2 Analog inputs and outputs

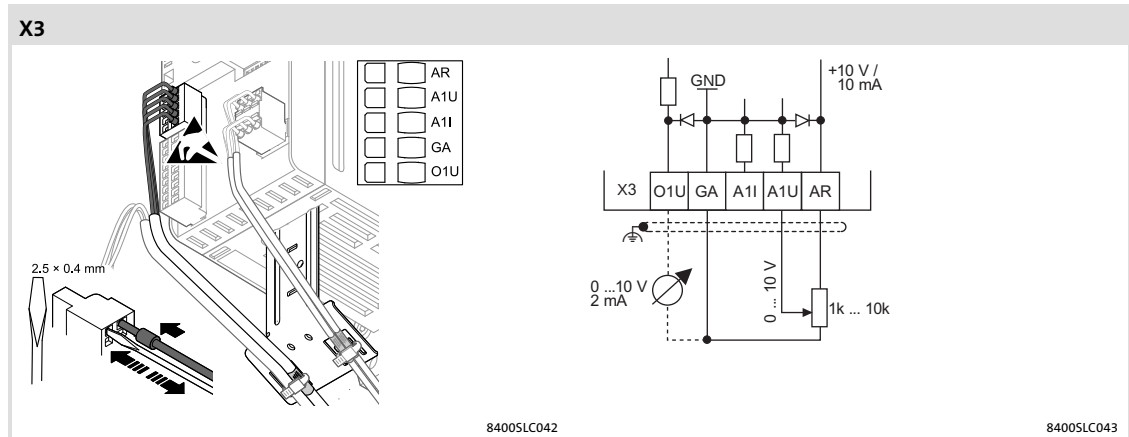


Fig. 6-34 Connection of the analog inputs and outputs

Labelling	Description
Controller	Reference voltage 10 V
A1U	±10V (82)
A1I	Analog input 1 0 ...+20 mA/+4 ...+20 mA (82)
GA	GND analog signals
O1U	Analog output 1 0 ... +10 V (82)

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

Example circuit

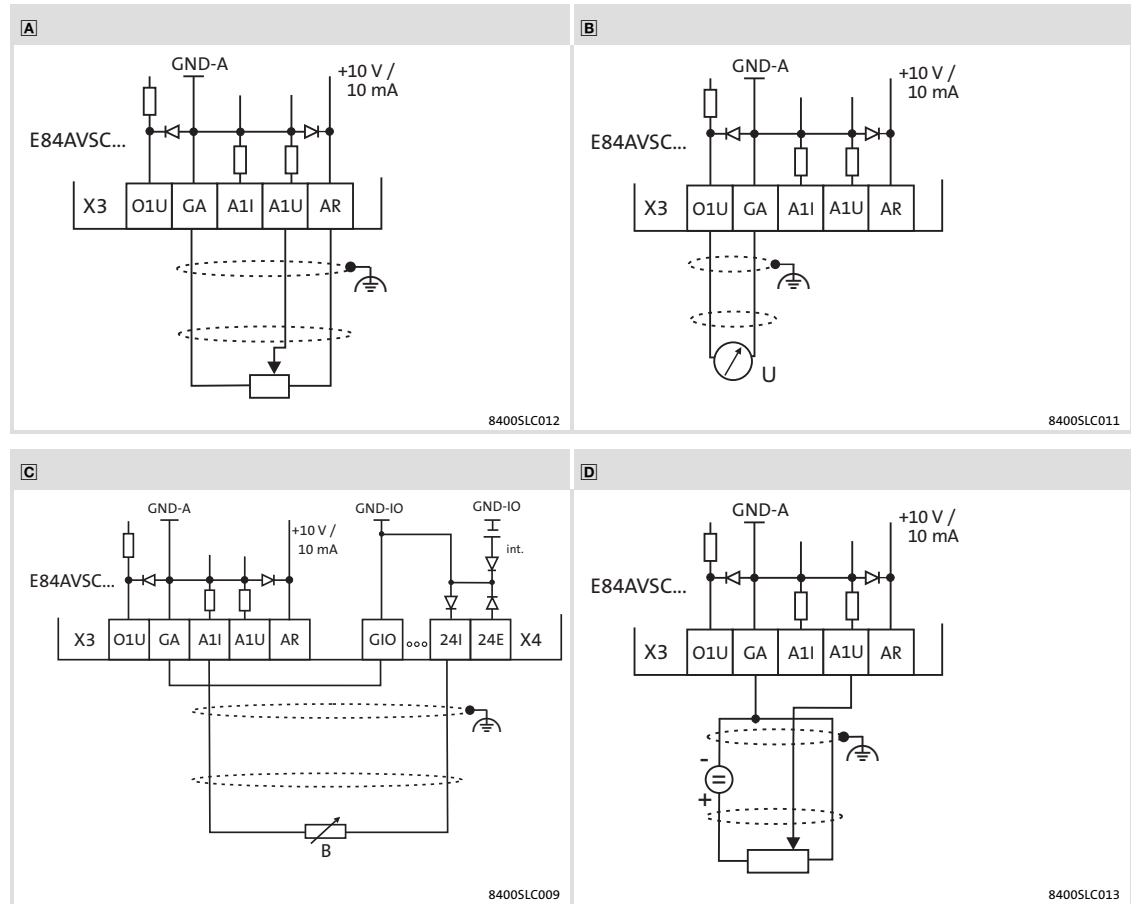


Fig. 6-35 Wiring examples of the analog inputs and outputs

- A** Potentiometer with internal controller supply
- B** Terminal assignment of the analog output signal, e.g. by a measuring instrument
- C** External master current selection based on a sensor signal 0 - 20 mA. If GA and GIO are electrically connected, the digital cables have to be shielded as well.
- D** Potentiometer with external supply
- X3** Terminal for the analog inputs and outputs
- X4** Terminal for the digital inputs and outputs
- GA** GND-A Ground reference potential for the analog inputs and outputs
- GIO** GND-IO Ground reference potential for the digital inputs and outputs
- EMC shield connection
- U** Measuring device
- B** Measuring transducer

6.7.3 Digital inputs and outputs

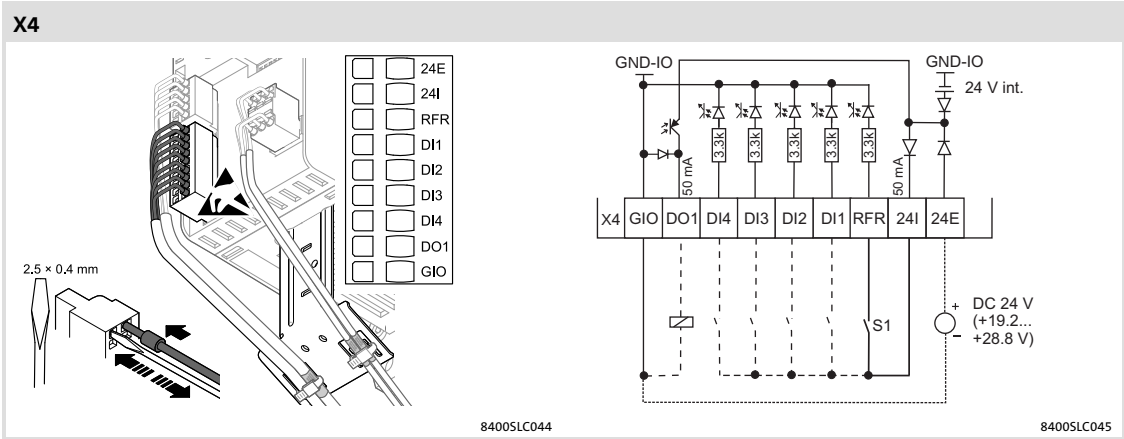


Fig. 6-36 Connection of the digital inputs and outputs

Labelling	Description		
RFR	Controller enable/controller inhibit, always required		
DI1	Digital input 1	83 IEC61131-2, type 1 or two-track frequency input, for HTL encoding 0 ... 10 kHz	track A
DI2	Digital input 2		track B
DI3	Digital input 3	83	
DI4	Digital input 4		
DO1	Digital output 1	83	
GIO	GND digital signals		

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

Example circuit

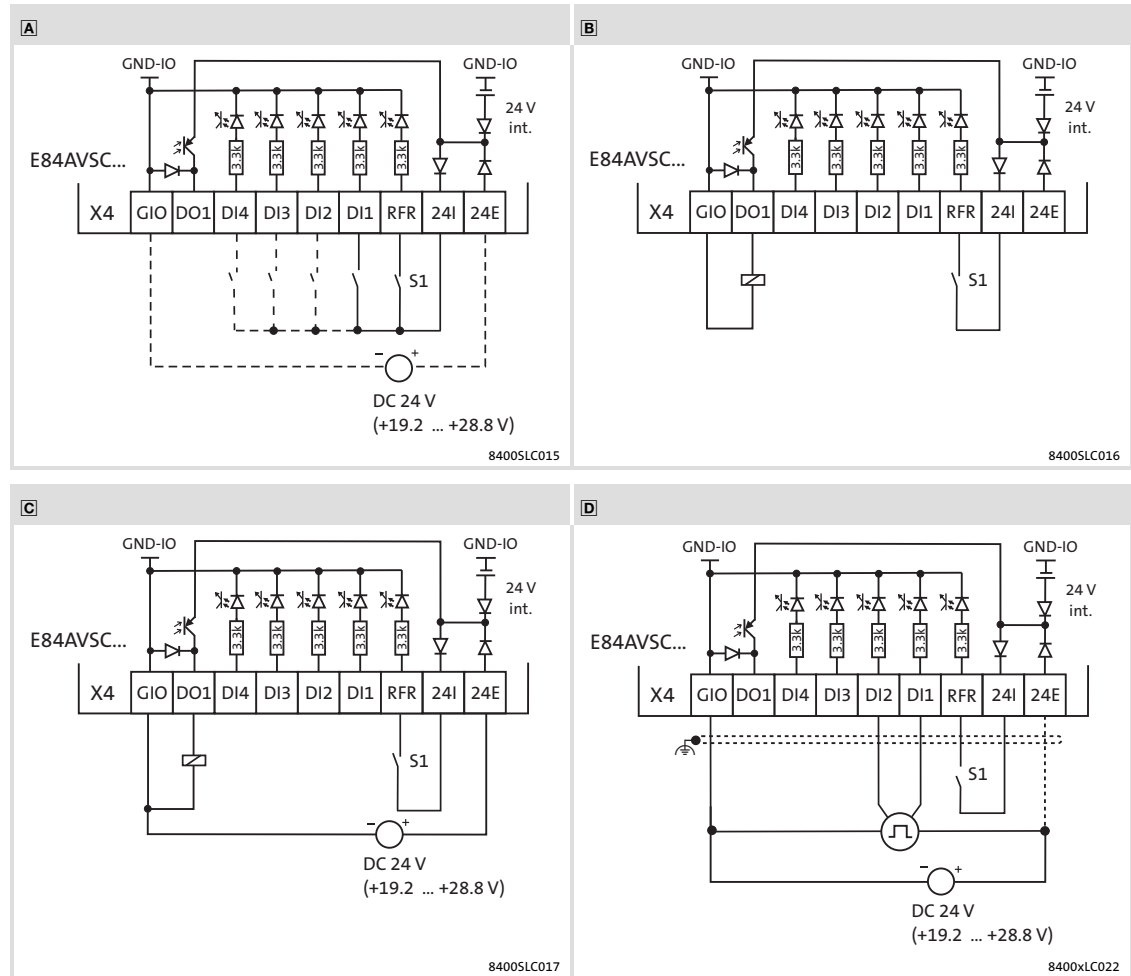


Fig. 6-37 Wiring examples of the digital inputs and outputs

- A** Wiring with one (or several) digital input (here: DI1), e.g. a PLC; optional: external 24 V supply
- B** Digital control (relay, valve, ...) with internal 24 V supply
- C** Digital control (relay, valve, ...) with external 24 V supply
- D** Connection of an HTL incremental encoder with a maximum input frequency of 10 kHz
 - DI1 track A
 - DI2 track B
- RFR Input for controller enable; wiring is always required.
- GIO GND-IO Ground reference potential for the digital inputs and outputs
- X4 Terminal for the digital inputs and outputs

6 Electrical installation

HighLine C control terminals

External supply voltage 24 V

6.8 HighLine C control terminals

6.8.1 External supply voltage 24 V

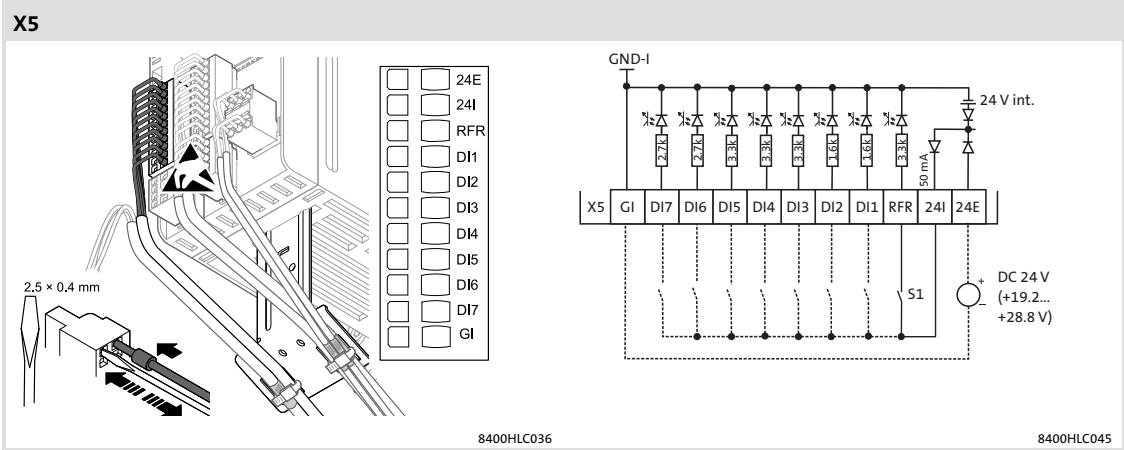


Fig. 6-38 Connection to an external supply voltage

Labelling		Description
24E		Connection for an external 24 V supply by a safely separated power supply unit (SELV/PELV), IEC 61131-2 (required for mains-independent supply of the control electronics and the communication module)
24I		Output 24 V, max. 50 mA for connection of digital inputs via potential-free contacts
GI	GND-I	Ground reference potential for the digital inputs

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

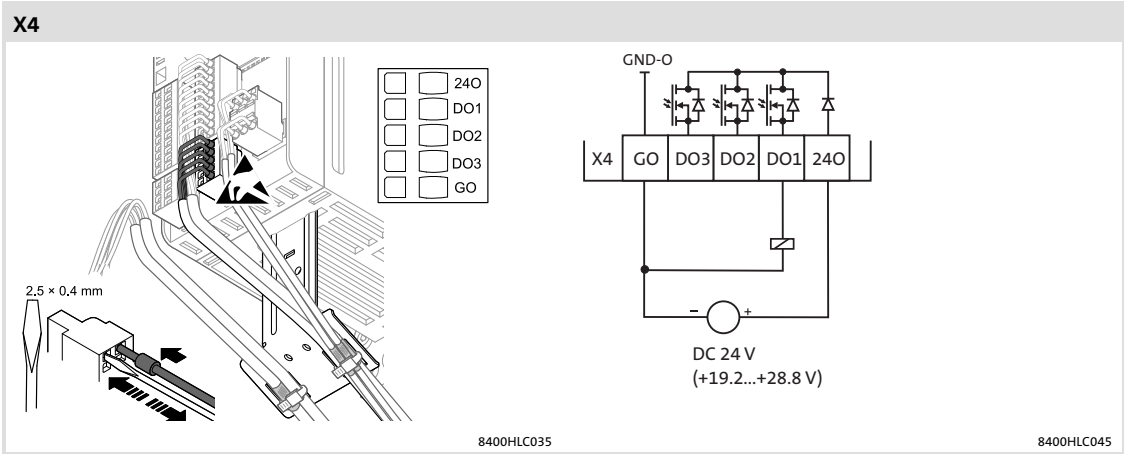


Fig. 6-39 Connection to an external supply voltage

Labelling	Description	
240	Connection for an external 24 V supply by a safely separated power supply unit (SELV/PELV), IEC 61131-2 (required for the supply of the digital outputs)	
GO	GND-O	Ground reference potential for the digital outputs

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

6.8.2 Analog inputs and outputs

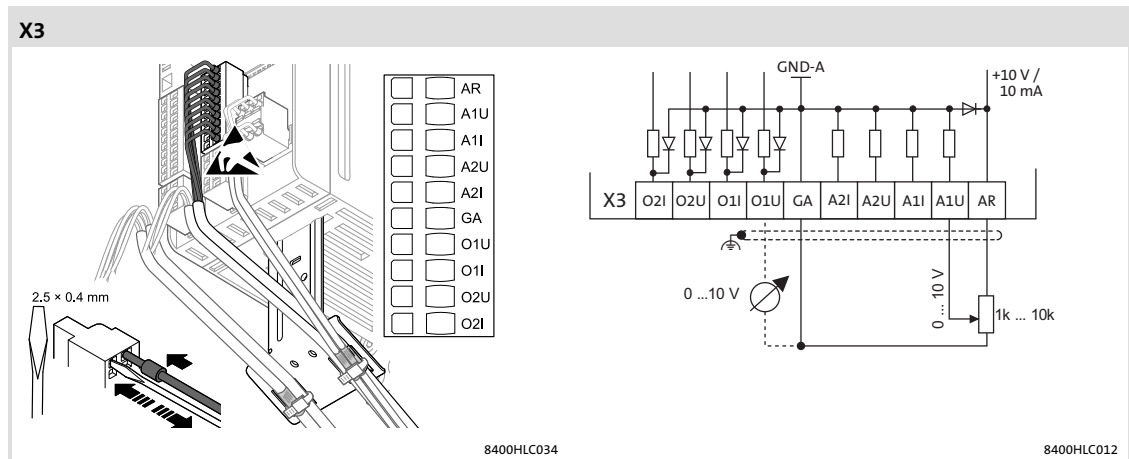


Fig. 6-40 Connection of the analog inputs and outputs

Labelling	Description		
Controller	Reference voltage 10 V		
A1U	Analog voltage input 1	± 10 V	 85
A1I	Analog current input 1	0 ...+20 mA/+4 ...+20 mA	
A2U	Analog voltage input 2	± 10 V	
A2I	Analog current input 2	0 ...+20 mA/+4 ...+20 mA	
GA	GND analog signals		
O1U	Analog voltage output 1	0 ... +10V	 85
O1I	Analog current output 1	0 ...+20 mA/+4 ...+20 mA	
O2U	Analog voltage output 2	0 ... +10V	
O2I	Analog current output 2	0 ...+20 mA/+4 ...+20 mA	

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

Example circuit

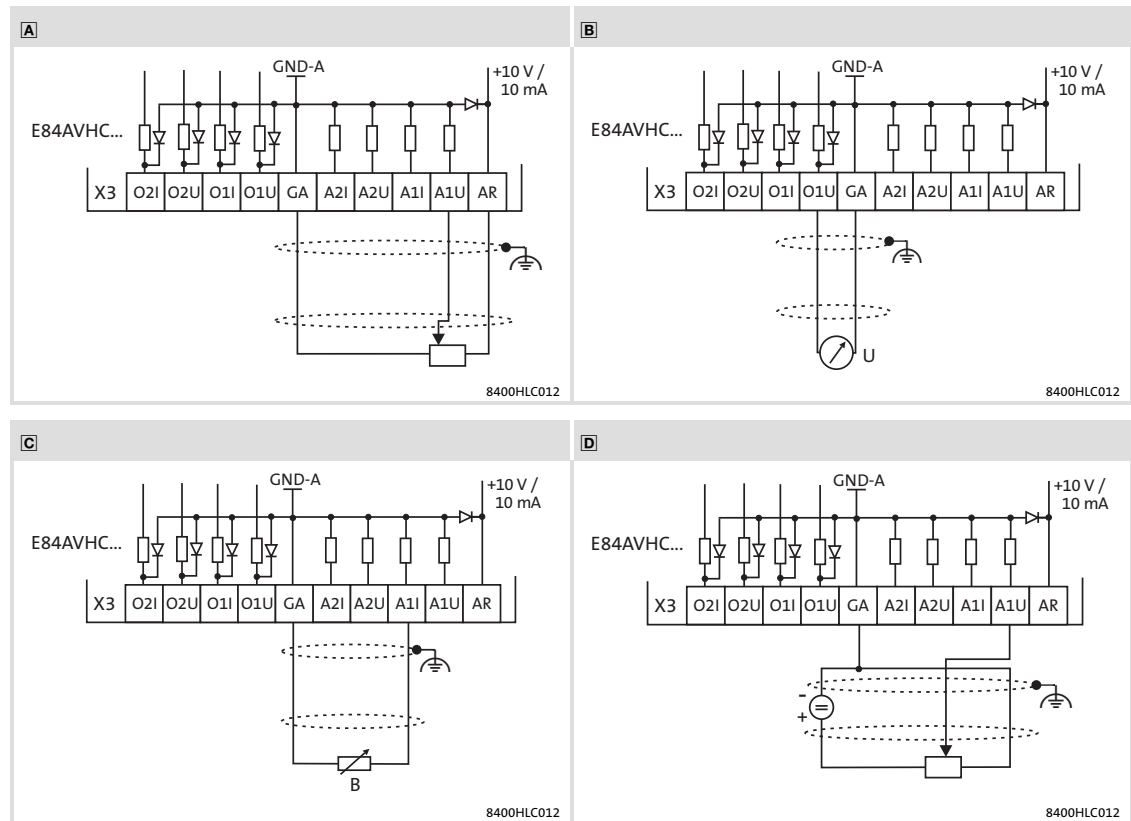


Fig. 6-41 Wiring examples of the analog inputs and outputs

- A** Potentiometer with internal controller supply
- B** Terminal assignment of the analog output signal, e.g. by a measuring instrument
- C** External master current selection based on a sensor signal 0-20 mA.
- D** Potentiometer with external supply
- X3** Terminal for the analog inputs and outputs
- GA** GND-A Ground reference potential for the analog inputs and outputs
- U** Measuring device

6.8.3 Digital inputs and outputs

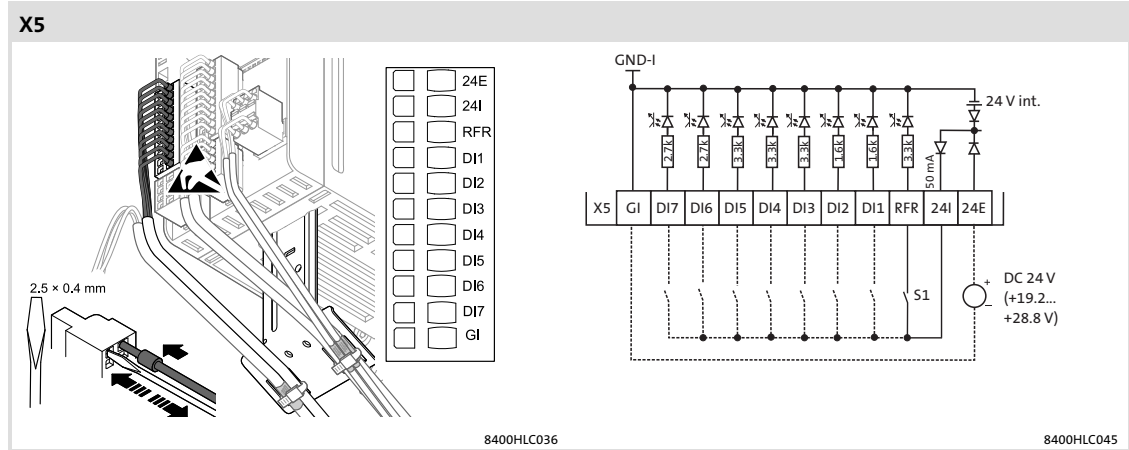


Fig. 6-42 Connection of the digital inputs

Labelling	Description		
RFR	Controller enable/controller inhibit, always required		
DI1	Digital input 1	 86 IEC61131-2, type 1 or two-track frequency input, for HTL encoder 0 ... 200 kHz	track A
DI2	Digital input 2		track B
DI3	Digital input 3	 86 IEC61131-2, type 1	
DI4	Digital input 4		
DI5	Digital input 5	IEC61131-2, type 1 or frequency input for HTL encoder 0 ... 10 kHz or HighLine: two-track frequency input for HTL-Encoder, 0 ... 5 kHz TopLine: two-track frequency input for HTL-Encoder, 0 ... 200 kHz	
DI6	Digital input 6		
DI7	Digital input 7		
GI	GND digital inputs		

- DI1, DI2, DI6, DI7 can be used for a four-track HTL encoder.
 - HighLine up to 5 kHz
 - TopLine up to 200 kHz

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

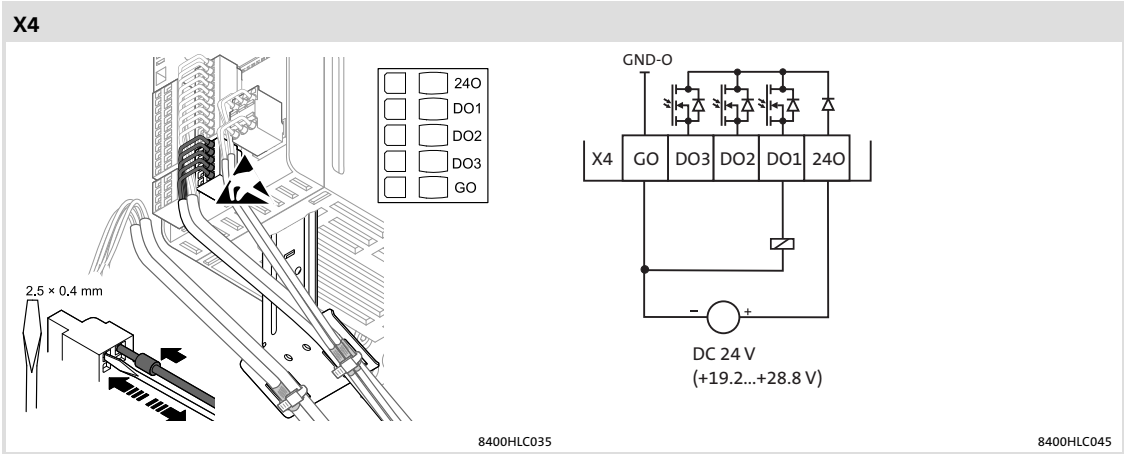


Fig. 6-43 Connection of the digital outputs

Labelling	Description	
240	external 24 V supply voltage	required for the supply of the digital outputs
DO1	Digital output 1	86 IEC61131-2, type 1
DO2	Digital output 2	
DO3	Digital output 3	
GO	GND digital outputs	

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

Example circuit



Note!

For stable digital output states, in particular during the starting phase of the controller, you must use an external 24V supply for the digital outputs.



Note!

Digital inputs and digital outputs have separated reference potentials (GI and GO). If you interconnect inputs and outputs, the reference potentials are connected as well by an external bridge.

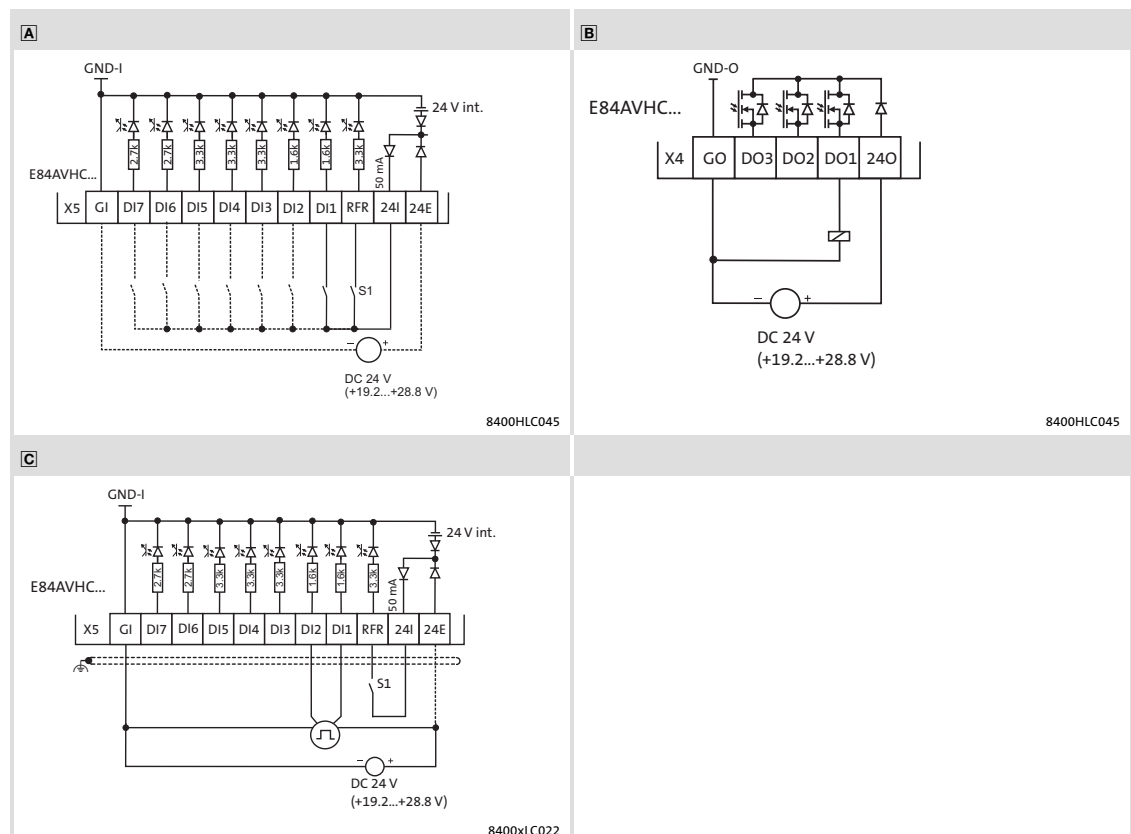


Fig. 6-44 Wiring examples of the digital inputs and outputs

- A** Wiring with one (or several) digital input (here: DI1), e.g. a PLC; optional: external 24 V supply
- B** Digital control (relay, valve, ...) with external 24 V supply
- C** Connection of an HTL incremental encoder with a maximum input frequency of 200 kHz
 - DI1 track A
 - DI2 track B
- X4 Terminal for the digital outputs
- X5 Terminal for the digital inputs
- GI GND-I Ground reference potential for the digital inputs
- GO GND-O Ground reference potential for the digital outputs

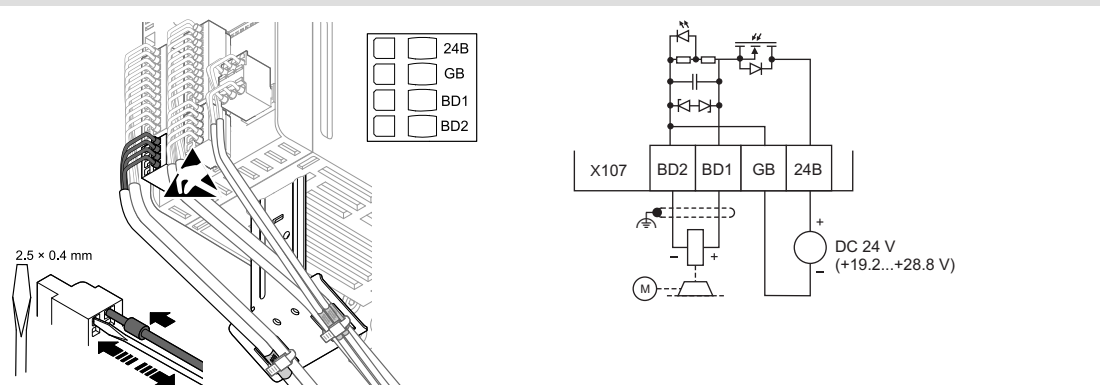
6.8.4 Motor holding brake connection



Note!

If terminal X107 is used for connecting a motor holding brake, at least one basic insulation to the motor or mains potential has to be provided, so that the protective separation of the control terminals is not limited.

X107



8400HLC037

8400HLC045

Labelling	Description	
24B	Connection for external 24 V supply voltage of the motor holding brake Observe correct polarity!	DC 19.2 ... 28.8 V, IEC 61131-2 SELV/PELV Example circuit 262
GB	GND connection for external supply	
BD1	Pos. connection of the motor holding brake (Lenze: WH)	
BD2	Neg. connection of the motor holding brake (Lenze: BN)	

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

6.9 TopLine C control terminals

Devices of the TopLine C version have identical connections as described under "HighLine C control terminals" (📖 232). The additional control terminals of the TopLine C version are described in the following.

6.9.1 Resolver connection

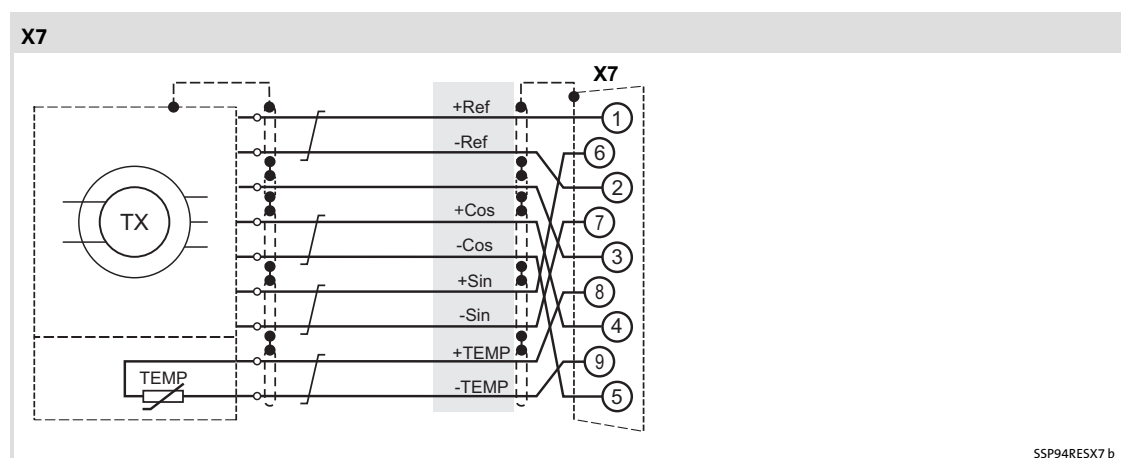


Fig. 6-45 Wiring principle

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

6.9.2 Encoder connection

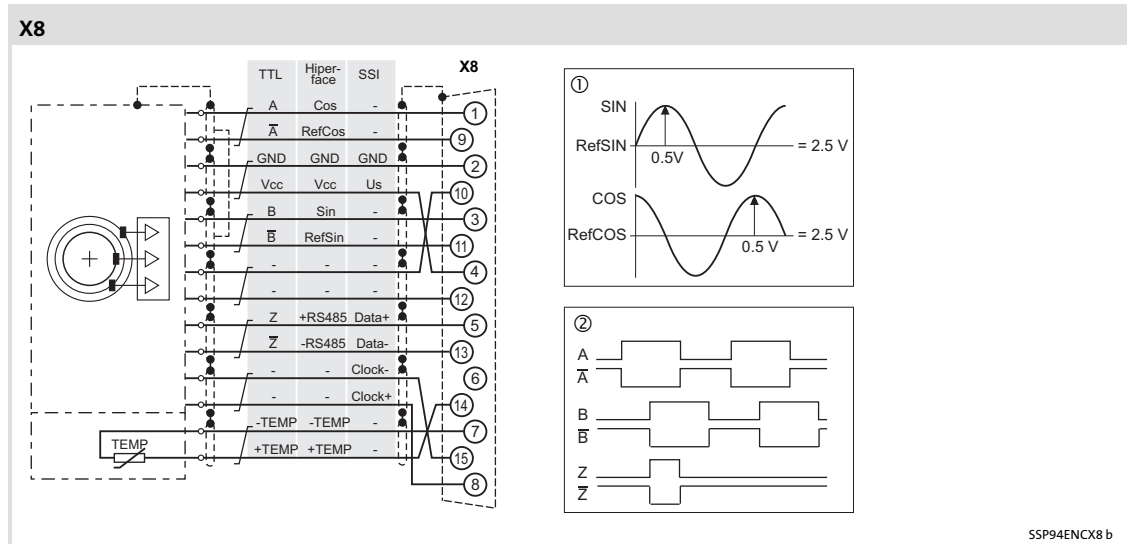


Fig. 6-46 **Wiring principle**

- ① Signals of a sin/cos encoder
- ② Signals with CW rotation

Terminal data					
	Conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

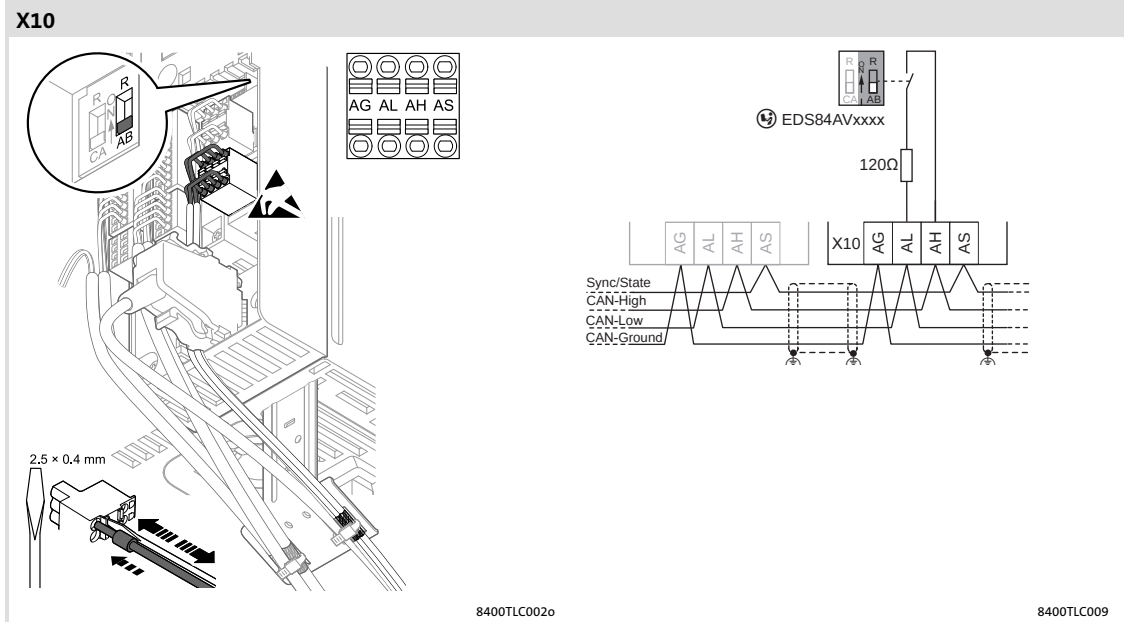
6.9.3

Axis bus



Note!

This connection is not supported in versions below 8400 TopLine, SW version 02.00. This connection must not be wired in these lower versions.



Terminal data

	Conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
Flexible	0.2 ... 1.5	24 ... 16	-	-	-
With wire end ferrule					

I/O axis bus

Labelling	Feature	Rated value
X10/AS	I/O axis bus connection	TTL level: 5 V
X10/AG	GND, reference potential: I/O axis bus	

Data transfer axis bus

Labelling	Feature	Rated value
X10/AH, AL	Data transfer axis bus connection	Acc. to CAN specification Cable lengths: See CAN on board
	Baud rate	from version 12.00: 800 kbit/s, constant up to version 2.xx: 500 kbps, constant
	Terminating resistor	120 Ω , switching via DIP switch
X10/AG	GND, reference potential: Data transfer axis bus	

**Note!**

Trouble-free operation of the axis bus is only possible if the following requirements are met:

- ▶ Use CAN cables in accordance with ISO 11898
 - ▶ Apply cable shields to both ends of the shield connections (functional earth)
- In particular for longer cables, in the case of installation over several control cabinets, or in difficult EMC environments, further measures are required:
- ▶ Establish equipotential bonding between the places of installation (📖 171)
 - ▶ Use of a power choke at the mains connection

7

Commissioning



Note!

- ▶ Please observe the general safety instructions (📖 13).
- ▶ Please observe the notes regarding residual hazards (📖 20).

7.1

Before switching on



Note!

- ▶ Comply with the respective switch-on sequence.
- ▶ In case of trouble during commissioning, the following supports you:
 - The "Diagnostics" chapter
 - The online help in the »Engineer«
 - The software manual of the prevailing device version

In order to avoid injury to persons or damage to material assets, check ...

... before switching on the mains voltage:

- ▶ Check the wiring for completeness, short-circuit and earth fault
- ▶ The "emergency switching off" function of the entire plant
- ▶ The motor circuit configuration (star/delta) must be adapted to the output voltage of the controller
- ▶ The in-phase connection of the motor
- ▶ The direction of rotation of the incremental encoder (if available)

...the setting of the most important drive parameters before controller enable to ensure the following:

- ▶ The V/f rated frequency is adapted to the motor circuit configuration!
- ▶ The drive parameters relevant for your application are set correctly!
- ▶ The configuration of the analog and digital inputs and outputs are adapted to the wiring!

Selection of the appropriate commissioning tool

There are two ways to commission the 8400 frequency inverter:

- ▶ Commissioning using the keypad (or diagnosis terminal)
 - For simple drive tasks such as quick commissioning of the 'Speed closed-loop control' standard application
- ▶ Commissioning using the »Engineer«
 - For rather demanding drive tasks such as 'Table positioning' of the HighLine version
 - Supported by online help and accompanying software documentation (software manual)

**Tip!**

Use the »Engineer« to carry out extensive parameter setting and configuration. The online help which is available for each device and the accompanying software documentation will assist you.

The L-force keypad can be used for quick commissioning and checking individual parameters on the controller.

Notes for motor operation



Danger!

- ▶ For thermal reasons, continuous operation of self-ventilated motors at low field frequency and rated motor current is not permissible. If required, activate a motor temperature monitoring with C00585
 - motor temperature monitoring with I^2_{xt} (see software manual)
 - motor temperature monitoring with motor PTC (see software manual).
- ▶ Select 87-Hz operation under code C00015 if an asynchronous motor in delta connection (nameplate data: 400 V Υ /230 V Δ) is to be operated on a frequency inverter for a supply voltage of 400 V.



Tip!

In the Lenze setting, the "linear V/f characteristic" operating mode is set as motor control. The parameter settings are preset so that if the frequency inverter and the 50 Hz asynchronous machine match in terms of power, the controller is ready for operation without any further need for parameterisation and the motor operates satisfactorily.

Recommendations for the following application cases

- ▶ If the frequency inverter and the motor differ strongly in terms of power
 - Set code C00022 (I_{max} limit in motor mode) to $2.0 I_{N(motor)}$.
- ▶ If a high starting torque is required
 - When the motor is idling, set the code C00016 (V_{min} boost) so that a rated motor current flows with a field frequency $f = 3$ Hz (C00058).
- ▶ For noise reduction
 - Set code C00018 to the value "3" (switching frequency 16 kHz $_{sin var}$).
- ▶ If a high torque without feedback is to be available at low speeds, we recommend the "vector control" mode.

7.2 Quick commissioning

Target

For test and demonstration purposes, the load-free motor shall be rotated in best time with an amount of wiring as little as possible and few settings.

Keypad or setpoint potentiometer

For this simple application, you can choose between two drive control options:

- ▶ Keypad control (📖 249), i.e. the X400 keypad is used as setpoint source
- ▶ Terminal control (📖 251), i.e. a setpoint potentiometer connected to the controller terminals is used as setpoint source

Diagnostics

In addition to the keypad, also use the LEDs on the front of the controller for drive diagnostics:

- ▶ Two LEDs indicate the device status (DRIVE READY and DRIVE ERROR)
- ▶ Two LEDs indicate the bus status (CAN-RUN and CAN-ERROR)

The LEDs for the bus status are less important during quick commissioning.



Tip!

The handling of the keypad X401 or the diagnosis terminal X401 is described in the operating instructions. The instructions are supplied with the keypad and are also included in electronic form on the product CD "L-force Inverter Drives 8400".

7.2.1 Keypad control

Commissioning steps

1. Wiring of power terminals

Consult the "Electrical installation" chapter or the mounting instructions to wire the power connections according to the requirements of your device.

2. Wiring of control terminals.

– StateLine

Digital inputs at terminal X4	Assignment	Information									
X4<table><tr><td>GI0</td><td>DO1</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td><td>RFR</td><td>24I</td><td>24E</td></tr></table> 	GI0	DO1	DI4	DI3	DI2	DI1	RFR	24I	24E	RFR	● Controller enable RFR = High ● Reset error High → Low (edge-controlled)
GI0	DO1	DI4	DI3	DI2	DI1	RFR	24I	24E			

– HighLine/TopLine

Digital inputs at terminal X5	Assignment	Information											
X5 <table><tr><td>GI</td><td>DI7</td><td>DI6</td><td>DI5</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td><td>RFR</td><td>24I</td><td>24E</td></tr></table> 	GI	DI7	DI6	DI5	DI4	DI3	DI2	DI1	RFR	24I	24E	RFR	- Controller enable RFR = High - Reset error High → Low (edge-controlled)
GI	DI7	DI6	DI5	DI4	DI3	DI2	DI1	RFR	24I	24E			

3. Load Lenze setting to controller



Note!

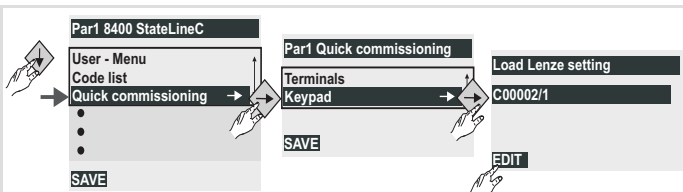
The application "actuating drive speed" is implemented with the Lenze setting.



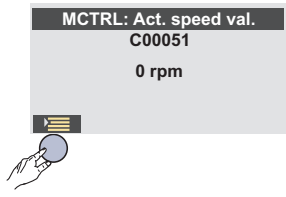
After attaching the keypad or switching on the controller with keypad attached, the connection between keypad and controller is established.

The connection has been established when the code C00051 appears in the display.

- Then press the left function key.

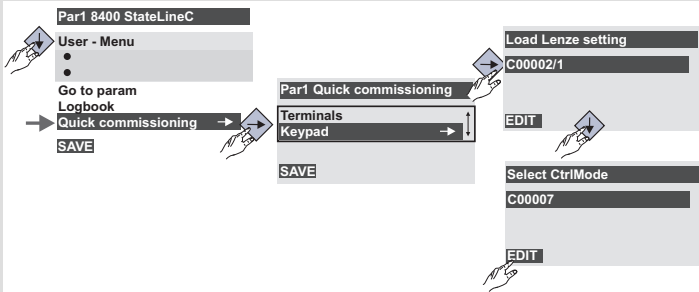


- Starting from "User menu" scroll down with button to "Quick commissioning" menu
- Click right button.
- Select "Keypad" menu.
- Click right button.
- Code 00002/1:
 - Parameterise with left "Edit" function key
 - Select value "1" -> On/Start and confirm with right "OK" function key.



- When the Lenze setting is loaded, the display goes off for a short time.
- When the display goes on again, the main menu appears.
 - The main menu settings can be defined by the user using codes C00465 ... C00469.
- Press the left function key to go to the user menu.

4. Set keypad control



Continue as with commissioning step ► 3. Load Lenze setting to controller:

- "Quick commissioning" menu
- Keypad
- Load Lenze setting

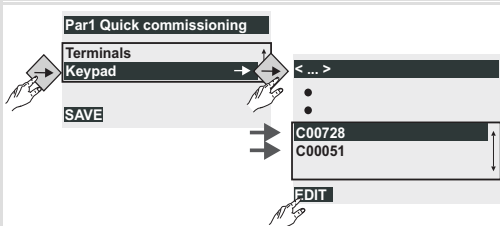
Use the "down" navigation key to go to code C00007 for selecting the control mode:

- Select parameter code 00007 and parameterise with "Edit"
- Select value "20" -> Keypad and confirm with "OK".

5. Enable controller:

- StateLine: Set terminal X4/RFR to HIGH potential (reference: X4/24I).
- HighLine/TopLine: Set terminal X5/RFR to HIGH potential (reference: X5/24I).

6. Vary the motor speed with the keypad or by defining different fixed setpoints:

Keypad	Code	Subcode	Motor speed
	C00728	3	CCW rotation: -199.99 % 0 (of C00011)
	C00051	-	CW rotation: 0 +199.99 % (of C00011) Display of actual speed value

► Please observe:

- the actual speed value: C00051

7. Save the settings with **SAVE** in the keypad.

7.2.2 Terminal control

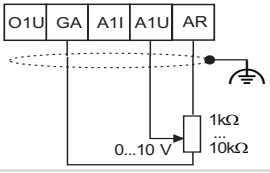
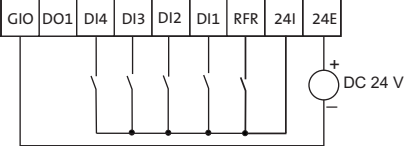
Commissioning steps

1. Wiring of power terminals

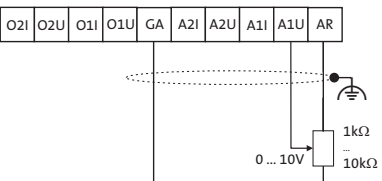
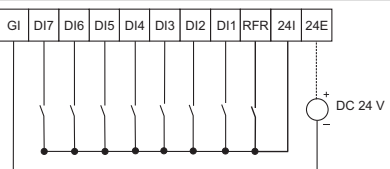
Make use of the Mounting Instructions supplied with the frequency inverter to wire the power terminals according to the requirements of your device.

2. Wiring of control terminals.

– StateLine

Analog inputs at X3	Assignment	Terminal control
	A1U	Setpoint selection 10 V (=100 %): 1500 min ⁻¹ (with 4-pole motor)
Wiring of the digital inputs at X4	Assignment	Terminal control
	RFR	- Controller enable: RFR = High - Reset error: High → Low (edge-controlled)
	DI1	Fixed frequency 1 ... fixed frequency 3, see table below
	DI2	
	DI3	DCB
DI1 ... DI4: all active = High	DI4	Direction of rotation left/right (CCW/CW)

– HighLine/TopLine

Analog inputs at X3	Assignment	Terminal control
	A1U	Setpoint selection 10 V (=100 %): 1500 min ⁻¹ (with 4-pole motor)
Wiring of the digital inputs at X5	Assignment	Terminal control
	RFR	- Controller enable: RFR = High - Reset error: High → Low (edge-controlled)
	DI1	Fixed frequency 1 ... fixed frequency 3, see table below
	DI2	
	DI3	DCB
DI1 ... DI4: all active = High	DI4	Direction of rotation left/right (CCW/CW)

- If you can be sure that the frequency inverter is in the default state (Lenze setting), you can skip the following step. If not, establish the Lenze setting of the frequency inverter. We recommend to use the keypad for this.



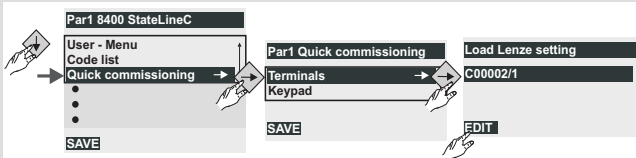
Note!

The application "actuating drive speed" is implemented with the Lenze setting.

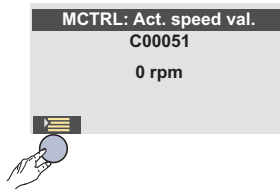


MCTRL: Act. speed val.
C00051
0 rpm

After attaching the keypad or switching on the controller with keypad attached, the connection between keypad and controller is established.
The connection has been established when the code C00051 appears in the display.
• Then press the left function key.



- Starting from "User menu" scroll down with button to "Quick commissioning" menu
- Click right button.
- Select "Keypad" menu.
- Click right button.
- Code 00002/1:
– Parameterise with left "Edit" function key



- When the Lenze setting is loaded, the display goes off for a short time.
- When the display goes on again, the main menu appears.
– The main menu settings can be defined by the user using codes C00465 ... C00469.
- Press the left function key to go to the user menu.

4. Enable controller:
 - StateLine: Set terminal X4/RFR to HIGH potential (reference: X4/GIO).
 - HighLine/TopLine: Set terminal X5/RFR to HIGH potential (reference: X5/GI).
5. Vary the motor speed with the potentiometer or by defining different fixed setpoints:

DI2	DI1	Motor speed
0	0	Setpoint by potentiometer
0	1	40 % of C00011 (reference speed)
1	0	60 % of C00011 (reference speed)
1	1	80 % of C00011 (reference speed)

- Please observe
 - the actual speed value: C00051
 - the front LEDs (270)
- 6. Save the settings with **SAVE** in the keypad.

8 Braking operation

8.1 Braking operation without additional measures

DC injection brake DCB

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.

- ▶ Code C00036 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.

Further information on the relevant parameters can be obtained from the software manual.

Braking operation

Braking operation with external brake resistor

Operation at rated mains voltage 230 V

8.2

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. 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.

- Adapt the switching threshold to the mains voltage (C00173/C00714, see software manual).



Note!

DC-bus system without the use of a regenerative module:

- Up to and including software version V02.xx.xx, only an internal brake chopper can be used in the DC-bus system to dissipate the regenerative energy.
- Starting from software version V12.00.00, all internal brake choppers can be used in the DC-bus system to dissipate regenerative energy ("master-slave operation").

More information can be found in the "Braking operation/brake energy management" chapter of the reference manual.

8.2.1

Operation at rated mains voltage 230 V

Switching threshold V_{BRmax} : 380 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx2512	180	2.1	0.8	1.6	0.6	-	∞	-
E84AVxxx3712	180	2.1	0.8	1.6	0.6	-	∞	-
E84AVxxx5512	100	3.8	1.4	2.8	1.1	-	∞	-
E84AVxxx7512	100	3.8	1.4	2.8	1.1	-	∞	-
E84AVxxx1122	33	11.5	4.4	8.6	3.3	-	∞	-
E84AVxxx1522	33	11.5	4.4	8.6	3.3	-	∞	-
E84AVxxx2222	33	11.5	4.4	8.6	3.3	-	∞	-

R_{Bmin}	Minimum brake resistance, nominal value $\pm 10\%$
I_{BRmax}	Peak current
P_{BRmax}	Peak braking power
I_{BRd}	Continuous current RMS - important for the dimensioning of the cables
P_{Bd}	Continuous braking power
t_z	Cycle time, periodic load change with running time and recovery time
t_{on}	Running time
$t_z - t_{on}$	Recovery time
t_{fp}	Maximum running time without initial load and compliance with the recovery time

8.2.2 Operation at rated mains voltage 400 V

Switching threshold V_{BRmax} : 725 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx3714	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx5514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx7514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVxxx1124	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVxxx1524	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVxxx2224	150	4.8	3.5	4.8	3.5	-	∞	-
E84AVxxx3024xxS	82	8.8	6.4	8.8	6.4	-	∞	-
E84AVxxx3024xx0	82	8.8	6.4	8.8	6.4	-	∞	-
E84AVxxx4024	47	15.4	11.2	13.0	9.4	-	∞	-
E84AVxxx5524	47	15.4	11.2	13.0	9.4	-	∞	-
E84AVxxx7524	27	26.9	19.5	26.9	19.5	-	∞	-
E84AVxxx1134	27	26.9	19.5	26.9	19.5	-	∞	-
E84AVxxx1534	18	40.3	29.2	40.3	29.2	-	∞	-
E84AVxxx1834	15	48.3	35.0	48.3	35.0	-	∞	-
E84AVxxx2234	15	48.3	35.0	48.3	35.0	-	∞	-
E84AVxxx3034	7.5	96.7	70.1	96.7	70.1	-	∞	-
E84AVxxx3734	7.5	96.7	70.1	96.7	70.1	-	∞	-
E84AVxxx4534	7.5	96.7	70.1	96.7	70.1	-	∞	-

 R_{Bmin} I_{BRmax} P_{BRmax} I_{BRd} P_{Bd} t_z t_{on} $t_z - t_{on}$ t_{fp} Minimum brake resistance, nominal value $\pm 10\%$

Peak current

Peak braking power

Continuous current RMS - important for the dimensioning of the cables

Continuous braking power

Cycle time, periodic load change with running time and recovery time

Running time

Recovery time

Maximum running time without initial load and compliance with the recovery time

Braking operation

Braking operation with external brake resistor

Operation at a rated mains voltage of 500 V

8.2.3

Operation at a rated mains voltage of 500 V

Switching threshold V_{BRmax} : 790 V, adjustable

Type	R_{Bmin} [Ω]	I_{BRmax} [A]	P_{BRmax} [kW]	I_{BRd} [A]	P_{Bd} [kW]	t_z [s]	t_{on} [s]	t_{fp} [s]
E84AVxxx3714	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx5514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx7514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVxxx1124	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVxxx1524	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVxxx2224	150	5.3	4.2	5.3	4.2	-	∞	-
E84AVxxx3024xxS	82	9.6	7.6	9.6	7.6	-	∞	-
E84AVxxx3024xx0	82	9.6	7.6	9.6	7.6	-	∞	-
E84AVxxx4024	47	16.8	13.3	13.0	10.3	-	∞	-
E84AVxxx5524	47	16.8	13.3	13.0	10.3	-	∞	-
E84AVxxx7524	27	29.3	23.1	29.3	23.1	-	∞	-
E84AVxxx1134	27	29.3	23.1	29.3	23.1	-	∞	-
E84AVxxx1534	18	43.9	34.7	43.9	34.7	-	∞	-
E84AVxxx1834	15	52.7	41.6	52.7	41.6	-	∞	-
E84AVxxx2234	15	52.7	41.6	52.7	41.6	-	∞	-
E84AVxxx3034	7.5	105.3	83.2	105.3	83.2	-	∞	-
E84AVxxx3734	7.5	105.3	83.2	105.3	83.2	-	∞	-
E84AVxxx4534	7.5	105.3	83.2	105.3	83.2	-	∞	-

R_{Bmin}

I_{BRmax}

P_{BRmax}

I_{BRd}

P_{Bd}

t_z

t_{on}

$t_z - t_{on}$

t_{fp}

Minimum brake resistance, nominal value $\pm 10\%$

Peak current

Peak braking power

Continuous current RMS - important for the dimensioning of the cables

Continuous braking power

Cycle time, periodic load change with running time and recovery time

Running time

Recovery time

Maximum running time without initial load and compliance with the recovery time

8.2.4 Selection of the brake resistors

The recommended Lenze brake resistors are adapted to the corresponding controller (with regard to 150 % of regenerative power). They are suitable for most of the applications.

For special applications, e.g. centrifuges, the brake resistor must meet the following criteria:

Brake resistor Criterion	Application	
	With active load	With passive load
Continuous braking power [W]	$\square P_{\max} \square \square_e \square \square_m \square \frac{t_1}{t_{\text{zykl}}}$	$\square \frac{P_{\max} \square \square_e \square \square_m}{2} \square \frac{t_1}{t_{\text{zykl}}}$
Heat quantity [Ws]	$\square P_{\max} \square \square_e \square \square_m \square t_1$	$\square \frac{P_{\max} \square \square_e \square \square_m}{2} \square t_1$
Resistance [Ω]	$R_{\min} \square R \square \frac{U_{\text{DC}}^2}{P_{\max} \square \square_e \square \square_m}$	

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)

V_{DC} [V] Brake chopper switching threshold from C0174

$P_{\max}$ [W] Maximum occurring braking power determined by the application

η_e Electrical efficiency (controller + motor)
Guide value: 0.54 (0.25 kW) ... 0.85 (11 kW)

η_m Mechanical efficiency (gearbox, machine)

t_1 [s] Braking time

t_{cycl} [s] Cycle time = time between two successive braking processes (= t_1 + dead time)

$R_{\min}$ [Ω] Minimum permissible brake resistance (see rated data of the integrated brake chopper)

8.2.5 Rating for Lenze brake resistors

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 resistors (IP20) recommended in the table are designed to tolerate a regenerative power of approx. 1.5 times the normal value. The cycle time of the brake resistors is 150s and includes a braking time of max. 15s and a recovery time (pause) of min. 135s.

- ▶ The brake resistors are equipped with a thermostat (potential-free NC contact, switching capacity: AC 250V, 0.5A).
- ▶ To increase the power, brake resistors can be connected in parallel or in series.
 - The resistance for the controller must not fall below the lowest permissible value.
 - The thermostat of several brake resistors at a controller must always be connected in series.

Braking operation

Braking operation with external brake resistor

Rating for Lenze brake resistors

8

Product key		Rated data - brake resistor		
Controller	Brake resistor	Resistor R [Ω]	Continuous power P [W]	Heat quantity Q _B [kW _s]
E84AVxxx2512 E84AVxxx3712	ERBM180R050W	180	50	7.5
E84AVxxx5512 E84AVxxx7512	ERBM100R100W	100	100	15
E84AVxxx1122	ERBP033R200W	33	200	30
E84AVxxx1522	ERBP033R200W		300	45
E84AVxxx2222	ERBP033R300W			
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514	ERBM390R100W	390	100	15
E84AVxxx1124 E84AVxxx1524 E84AVxxx2224	ERBP180R200W	180	200	30
	ERBP180R200W		300	45
	ERBP180R300W			
	ERBP082R200W	82	200	30
E84AVxxx3024xxS	ERBS082R780WNQN 000	82	780	117
	ERBP082R200W	82	200	30
E84AVxxx3024xx0	ERBS082R780WNQN 000	82	780	117
E84AVxxx4024 E84AVxxx5524	ERBS047R400W	47	400	60
	ERBS047R800W		800	120
	ERBP027R200W	27	200	30
E84AVxxx7524 E84AVxxx1134	ERBS027R600W		600	90
	ERBS027R01K2		1200	180
	ERBS018R800W	18	800	120
E84AVxxx1534	ERBS018R01K4		1400	210
	ERBS018R02K8		2800	420
	ERBD020R03K0RB	20	3000	450
	ERBS015R800W	15	800	120
E84AVxxx1834	ERBS015R01K2		1200	180
E84AVxxx2234	ERBS015R02K4		2400	420
	ERBG015R06K2		6200	930
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	ERBG075D01K9	7.5	1900	285

8.2.6

Wiring of brake resistor**Danger!****Hazardous electrical voltage**

During operation of the standard device and **up to 3 minutes after power-off** hazardous electrical voltages may occur at the terminals of the brake resistor.

Possible consequences:

- ▶ Death or severe injuries when touching the terminals.

Protective measures:

- ▶ Disconnect the standard device from the mains before working on the brake resistor.
- ▶ Check all power terminals for isolation from supply.
- ▶ Select the mounting location so that the operating conditions mentioned in the mounting instructions for the brake resistor are permanently guaranteed.

**Danger!****Hot surface**

The brake resistor may get very hot. (For temperatures see the mounting instructions for the brake resistor.)

Possible consequences:

- ▶ Severe burns when touching the brake resistor.
- ▶ Fire or smouldering fire if flammable material is placed near the brake resistor or may get to it.

Protective measures:

- ▶ Before working on the brake resistor, check its surface temperature.
- ▶ Select the mounting location so that the operating conditions mentioned in the mounting instructions for the brake resistor are permanently guaranteed.
- ▶ Protect the mounting location through fire prevention.

Protect the brake resistor and controller against destruction caused by overload:

- ▶ Establish a safety shutdown using the thermostat of the brake resistor to disconnect the controller from the mains.

Connecting cable version

- ▶ up to 0.5 m: twisted and unshielded
- ▶ from 0.5 to 5 m: shielded
 - Use shielded cables to meet the EMC requirements.

Wiring principle

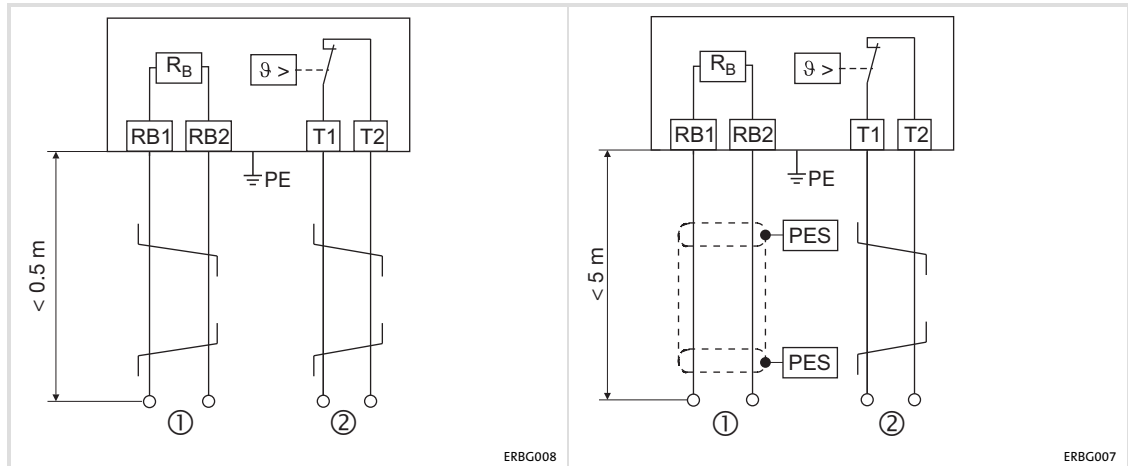


Fig. 8-1 Wiring of a brake resistor to the controller

PES	HF-shield termination by PE connection via shield clamp
Rb1, Rb2	Terminals of the brake resistor
①	Supply cable to the controller
T1, T2	Terminals temperature monitoring of the brake resistor (thermal contact/NC contact)
②	Supply cable for evaluation of temperature monitoring (to be integrated e.g. into the latch circuit of the mains contactor of the supply)

8.3 Operation with spring-applied brake**8.3.1 Introduction**

Lenze three-phase AC motors and G-motion geared motors can be equipped with spring-applied brakes (motor holding brakes). An external motor brake control module is required for switching and as a DC supply of the spring-applied brakes.

The suitable motor brake control module is selected according to the rated data of the spring-applied brakes.

Controllers in the HighLine C/TopLine C version offer an integrated control for brakes with 24 V connection and a braking current of up to 2.5 A.

Switching the brake

For controllers of the StateLine C, HighLine C, and TopLine C versions, the switching operation of the brake can be controlled:

- ▶ Via an external control contact (e.g. PLC)
- ▶ Via a brake switch which is connected to one of the digital outputs of the controller. The digital output must be parameterised accordingly.

For controllers of the HighLine C and TopLine C version, the switching operation of the brake can be controlled additionally:

- ▶ Via an integrated brake control

The software manual contains further information on the parameterisation and the integrated brake management.

**Stop!**

The integrated brake control includes an electronic switch which can control a 24V motor holding brake.

Only motor holding brakes which comply with the permissible data mentioned in the Technical Data may be connected to the integrated brake control. (If necessary, the holding brake must be controlled without a brake control via a digital output and a coupling relay.)

If the permissible values mentioned in the Technical Data are not observed:

- ▶ the brake control may be destroyed.
- ▶ a safe operation of the motor holding brake is not ensured.

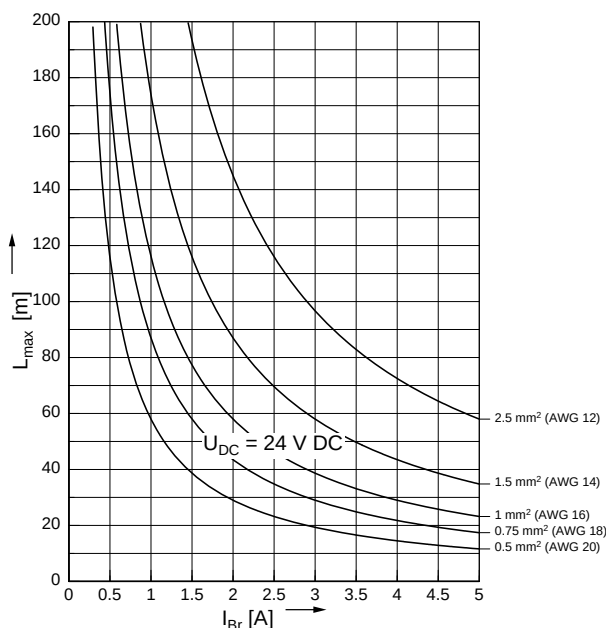
Observe additional notes in the documentation of the standard device!

**Stop!****Requirements with regard to the brake cable (connection BD1/BD2):**

- ▶ Brake cables must be shielded if they are incorporated in the motor cable.
 - Operation with unshielded brake cables can destroy the motor brake control.
 - We recommend the use of Lenze system cables (motor cable with separately shielded additional cores).
- ▶ In the case of a permanent magnet holding brake, observe the correct polarity of the brake cable.
 - If the terminals are inverted, the brake does not release. As the motor is running against the closed brake, the brake can be destroyed.
- ▶ Apply the shield to PE on both sides.

Requirements with regard to the supply voltage U_{DC} (connection +/-):

- ▶ Always supply the motor brake control with a separate 24 V supply.
 - A common supply of the motor brake control and the controller control card is not permissible, as otherwise the basic insulation between the two components is reduced.
- ▶ Set U_{DC} so that the operating voltage of the brake is within the permissible range and the maximum supply voltage of the motor brake control is not exceeded.

Cable length

E94AZHY004

L_{max} Maximum brake cable length in [m]
 I_{BR} Brake current in [A]
 U_{DC} Supply voltage of the motor brake control

8.3.2**Rated data**► **E82ZWBRB brake switch**

Range	Values	
Input voltage	1/N/PE AC 230 V (AC 180 ... 264 V), 45 ... 65 Hz 2/PE AC 230 V (AC 180 ... 264 V), 45 ... 65 Hz	
Input current	AC 0.1 ... 0.54 A	
Output voltage		
	DC 205 V	at AC 230 V mains voltage
Maximum brake current		
	DC 0.41 A	Installation in 8200 motec
	DC 0.54 A	Installation in control cabinet
Control input		
Control voltage	DC 24 V, PLC-level	
	HIGH	DC +15 ... 30 V
	LOW	DC 0 ... +3 V
Control current	5 ... 10 mA	
Protective function	Protected against polarity reversal until DC 60 V	
Maximally connectable cable cross-section	1.5 mm ² AWG 16	

► **E82ZWBRE brake switch**

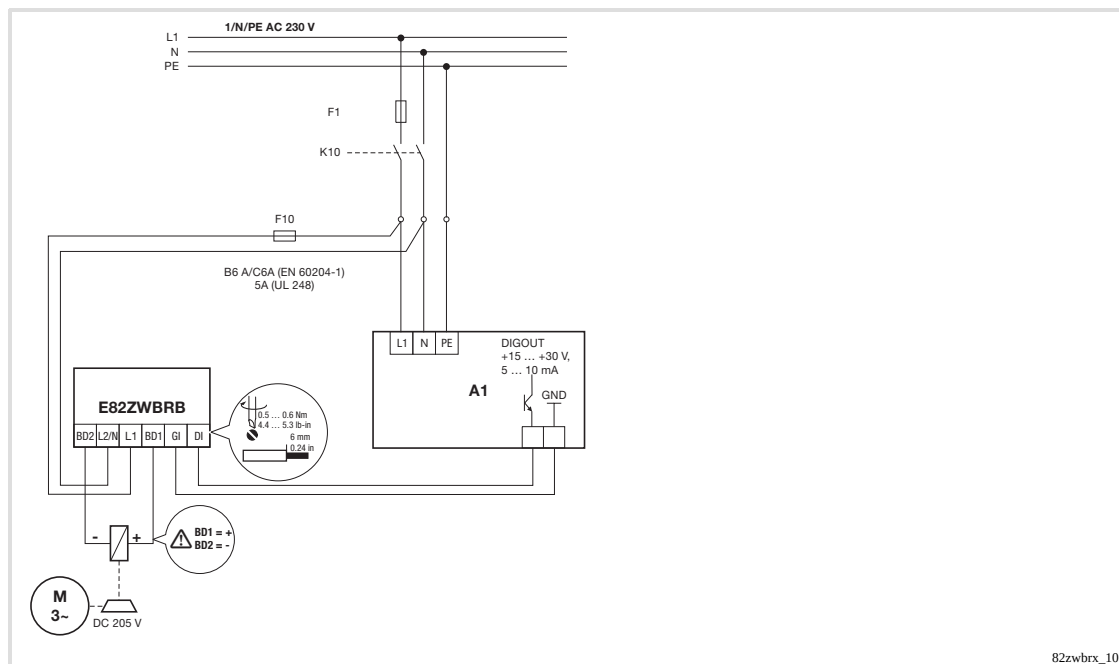
Range	Values	
Input voltage	3/PE AC 400 V (AC 320 ... 550 V), 45 ... 65 Hz	
Input current	AC 0.1 ... 0.61 A	
Output voltage		
	DC 180 V	at AC 400 V mains voltage
	DC 225 V	at AC 500 V mains voltage
Maximum brake current		
(pilot duty)	DC 0.47 A	Installation in 8200 motec
	DC 0.61 A	Installation in control cabinet
Control input		
Control voltage	DC 24 V, PLC-level	
	HIGH	DC +15 ... 30 V
	LOW	DC 0 ... +3 V
Control current	5 ... 10 mA	
Protective function	Protected against polarity reversal until DC 60 V	
Min. permissible switch-off time	t _{off} >20ms	
Maximally connectable cable cross-section	1.5 mm ² AWG 16	

► Integrated brake control for devices of the HighLine/TopLine version

Range	Values
Input voltage	DC 24 V in accordance with IEC 61131-2 19.2 ... 28.8 V
Input current	DC 0.1 ... 2.6 A
Output voltage	DC 24 V
Maximum brake current	DC 2.5 A
Internal control	Information on internal brake control is provided in the software manual for the Inverter Drives 8400 HighLine C / TopLine C.
Maximally connectable cable cross-section	1.5 mm ² AWG 16



Further technical data regarding the brake control can be found in chapter 4.7.7.

8.3.3**Wiring**► **E82ZWBRB brake switch**

82zwbrx_10

A1 Lenze controller with digital output
 F10 Additional cable protection

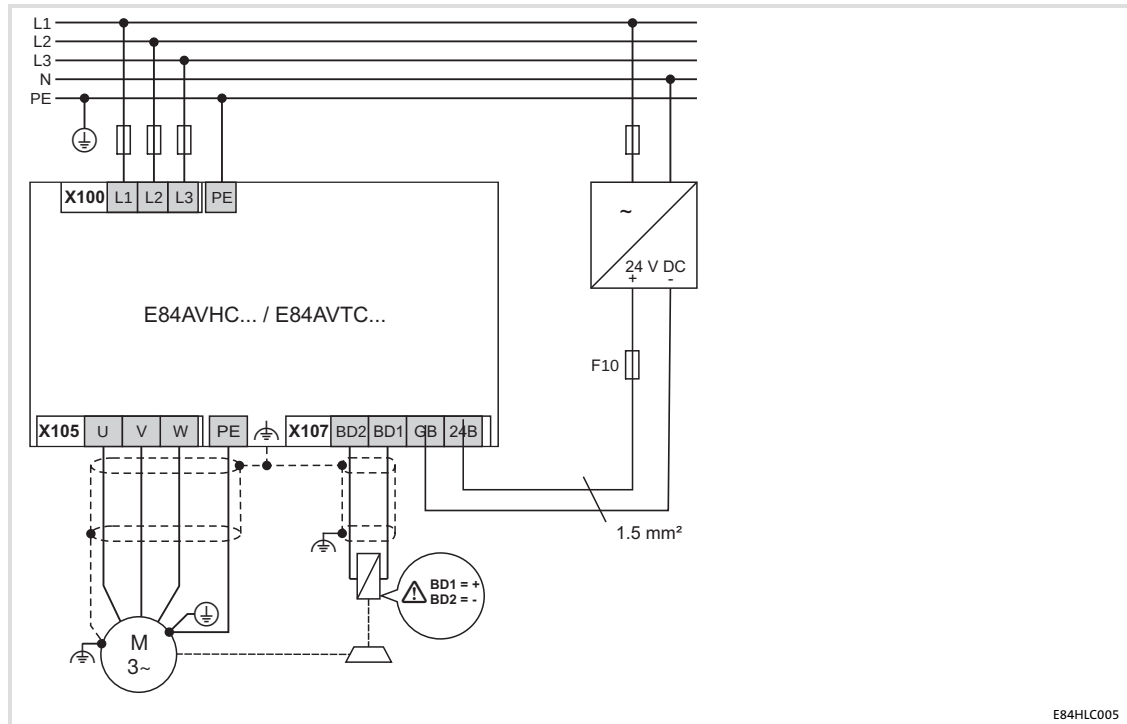
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82zwbrx_10

Braking operation

Operation with spring-applied brake
Wiring

► Integrated brake control for devices of the HighLine/TopLine version



E84AVxC...
F10

Controller of the HighLine or TopLine version
Cable protection in secondary circuit.

Observe the standards for cable protection and the safety instructions for the installation according to UL or UR when dimensioning the fuse!
HF-shield termination by large surface connection to PE.



9 DC-bus operation

9.1 Advantages of DC-bus operation

When several controllers are operated in a DC-bus connection (DC bus), this offers the following advantages:

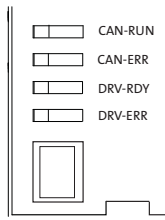
- ▶ Energy exchange between controllers in generator-mode (braking) and motor-mode operation.
- ▶ The energy exchange reduces the supply power from the AC mains.
- ▶ DC power supply modules or supply controllers can be dimensioned with a lower DC supply power, if necessary.

9.2 Conditions for trouble-free DC-bus operation

- ▶ Only controllers with identical mains voltage/DC bus voltage ranges can be operated in a DC-bus connection:
 - Set mains voltage and brake chopper threshold to the same values in all axis controllers.
- ▶ For decentralised supply (multiple mains supply):
 - Operate all input modules only with the mains chokes specified!
- ▶ In order to ensure correct dimensioning of the mains chokes, please get in touch with your Lenze contact partner.
- ▶ Fuses and cable cross-sections must be dimensioned in compliance with the locally applicable regulations.

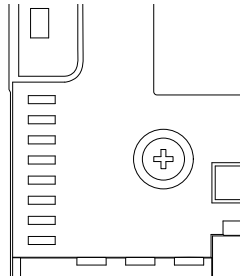
StateLine, HighLine

During operation, the operating status of the controller is indicated by four light-emitting diodes. These are located at the front of the device. The upper two LEDs indicate the current status of the CAN bus connection and the lower two LEDs indicate the status of the controller.

LED	Labelling	Colour	Description
	CAN-RUN	green	CAN-BUS o.k.
	CAN-ERR	red	CAN-BUS error
	DRV RDY	green	Controller is ready for operation
	DRV ERR	red	Error in the controller or through the application

TopLine

During operation, the operating status of the controller is indicated by eight light-emitting diodes. These are located at the front of the device. Two LEDs indicate the current status of the CAN bus connection and another two indicate the controller status. One LED indicates the axis bus status. Another three LEDs can be parameterised for display purposes of the application.

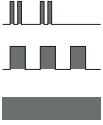
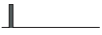
LED	Labelling	Colour	Description
	CAN-RUN	green	CAN-BUS o.k.
	CAN-ERR	red	CAN-BUS error
	DRV RDY	green	Controller is ready for operation
	DRV ERR	red	Error in the controller or through the application
	Axis bus	green	-
	User1	green/red	-
	User2	red	-
	User3	green	-

Legend

The symbols used for indicating the LED states have the following meaning:

	LED flashes once approx. every 3 seconds (slow flash)
	LED flashes once approx. every 1.25 seconds (flash)
	LED flashes twice approx. every 1.25 seconds (double flash)
	LED blinks every second
	LED is permanently on

The LEDs "DRIVE READY" and "DRIVE ERROR" can blink in different ways depending on the device states which are explained in the following. This permits an easy device diagnostics without additional tools.

DRIVE READY (green)	DRIVE ERROR (red)	Status	Description
OFF	OFF	→ "Init" state	Initialisation is active
	OFF	→ "MotorIdent" state	Motor data identification – The "MotorIdent" device state can only be reached by the "SwitchON" device state and jumps back to that state after the action is completed.
	OFF	→ "SafeTorqueOff" state	This state is only possible in relation with a connected safety module and an existing power section supply!
	OFF	→ "ReadyToSwitchOn" state	Device is ready to start – This is the controller's state directly after the initialisation has been completed.
	OFF	→ "SwitchedOn" state	Device is switched on – This is the controller's device state if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).
	OFF	→ "OperationEnabled" state	Operation – In this device state, the motor follows the setpoint defined in the application.
		→ "Warning" status display	Operation/warning is active – This display may occur in all device states if a monitoring mode responds the error response "Warning" or "Warning locked" has been parameterised for.
		→ "TroubleQSP" state	TroubleQSP is active – This device state will be active as soon as a monitoring mode responds, the error response "TroubleQSP" has been parameterised for.
OFF		→ "Trouble" state	Message is active – This device state will be active as soon as a monitoring mode responds, the error response "Message" has been parameterised for.
OFF		→ "Fault" state	Fault is active – This device state will be active as soon as a monitoring mode responds, the error response "Fault" has been parameterised for.
OFF		→ "SystemFail" state	System fault is active – This device state will be active if a system fault occurs.

10.1.2 Drive diagnostics via keypad

Important operating parameters are measured by the controller. They can be displayed with the keypad or PC.

Some operating data can be calibrated to be displayed or selected directly with the unit of the process quantity (e.g. pressure, temperature, speed).



Note!

The calibration always affects all specified codes simultaneously.

Display of the controller status on the keypad



– If the keypad at the front of the controller is connected to the diagnostic interface X6, the area ① of the LCD displays the controller status via different symbols.

Icon	Meaning	Note
RDY	Controller is switched on.	→ "SwitchedON" state
RUN	Controller is enabled.	
STP	Application in the controller is stopped.	
QSP	Quick stop is active.	
CINH	Controller is inhibited.	The power outputs are inhibited.
OFF	Controller is ready to start	→ "ReadyToSwitchOn" state
Mmax	Speed controller 1 in the limitation	The drive is torque-controlled.
Imax	The set current limit is exceeded in motor or generator mode	
IMP	Pulse inhibit is active	The power outputs are inhibited.
ISFLT	System fault is active	
IFLT	Fault	→ "Fault" state
ITRB	Trouble	→ "Trouble" state
ITQSP	TroubleQSP	→ "TroubleQSP" state
WRN	Warning is active	→ "Warning" status display

Display parameters

The parameters listed in the following table serve to get information on current statuses and actual values of the controller for diagnostic purposes, e.g. with the keypad, via a bus system or using the »Engineer« (when an online connection has been established to the controller)

- In the »Engineer« parameter list and in the keypad, these parameters are classified in the **Diagnostics** category.
- A detailed description of these parameters can be found in the software manual of the prevailing device version.

Parameter	Display
C00183	Device state
C00168	Error number
C00051	Actual speed value
C00052	Motor voltage
C00054	Motor current
C00057/1	Maximum torque
C00057/2	Torque at maximum current
C00059	Motor - number of pole pairs
C00061	Heatsink temperature
C00062	Temp. inside the controller
C00063	Motor temperature
C00064	Device utilisation (I x t) over the last 180 seconds
C00065	Ext. 24-V voltage
C00066	Thermal motor load (I ² xt)
C00178	Time the controller was enabled (elapsed-time meter)
C00179	Time the mains was switched on (power-on time meter)

Identification data

The parameters listed in the following table which are classified in the »Engineer« parameter list and the keypad in the category **Identification → Controller** serve to display the identification data of the controller.

Parameter	Display
C00099	Firmware version
C00200	Firmware product type
C00201	Firmware compilation date
C00203/1 ... 9	HW product types
C00204/1 ... 9	HW serial numbers
C00205/1 ... 6	HW descriptions
C00206/1 ... 6	HW manufacturing data
C00208/1 ... 6	HW manufacturer
C00209/1 ... 6	HW countries of origin
C00210/1 ... 6	HW version

11 Safety engineering

11.1 Introduction

With increasing automation, protection of persons against hazardous movements is becoming more important. Functional safety describes the measures needed by means of electrical or electronic equipment to reduce or remove danger caused by failures.

During normal operation, safety equipment prevents people accessing hazardous areas. In certain operating modes, e.g. set-up mode, work needs to be carried out in hazardous areas. In these situations the machine operator must be protected by integrated drive and control measures.

Drive-based safety provides the conditions in the controls and drives to optimise the safety functions. Planning and installation expenditure is reduced. In comparison to the use of standard safety engineering, drive-based safety increases machine functionality and availability.

Drive-based safety with Inverter Drives 8400

The controllers of the 8400 series are available with drive-based safety "safe torque off (STO)".

Drive-based safety can be used for the protection of persons working on machines.

The safety system provides the safe inputs. If the STO safety function is requested, the safety system directly causes the torqueless status according to EN 60204-1.

11.2

Important notes

Application as directed

The controllers of the 8400 series that are equipped with drive-based safety must not be modified by the user. This concerns the unauthorised exchange or removal of the drive-based safety.

**Danger!****Danger to life through improper installation**

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

Possible consequences:

- ▶ Death or severe injuries

Protective measures:

- ▶ Safety engineering systems may only be installed and commissioned by qualified and skilled personnel.
- ▶ All control components (switches, relays, PLC, ...) and the control cabinet must comply with the requirements of EN ISO 13849-1 and EN ISO 138492. This includes i.a.:
 - Switches, relays with at least IP54 enclosure.
 - Control cabinet with at least IP54 enclosure.
 - Please refer to EN ISO 13849-1 and EN ISO 138492 for all further requirements.
- ▶ 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.
 - For further measures see EN ISO 138492.
- ▶ 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!

**Danger!**

When the "safe torque off" (STO) function is used, an "emergency switching-off" according to EN 60204 is not possible without additional measures. There is no electrical isolation, no service switch or repair switch between motor and controller!

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

During operation

After the installation is completed, the operator must check the wiring of the safety function.

The functional test must be repeated at regular intervals. The time intervals to be selected depend on the application, the entire system and the corresponding risk analysis. The inspection interval should not exceed one year.

Residual hazards

In case of a short-circuit of two power transistors a residual movement of the motor of up to 180° /number of pole pairs may occur! (Example: 4-pole motor $\Rightarrow$ residual movement max. $180^\circ/2 = 90^\circ$)

This residual movement must be considered in the risk analysis, e.g. safe torque off for main spindle drives.

11.2.1 Hazard and risk analysis

This documentation can only accentuate the need for hazard analysis. The user of the integrated safety system must read up on standards and the legal situation:

Before the launch of a machine, the manufacturer of the machine must conduct a hazard analysis according to 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008] to determine the hazards associated with the application 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.
- ▶ Required protective measures must be taken against hazards which cannot be eliminated.
- ▶ Existing residual hazards must be documented and the user must be informed of them.

Detailed information on the hazard analysis procedure is provided in the DIN EN ISO 12100:2013-08 - "Safety of machinery - General principles for design, risk assessment and risk reduction". The results of the hazard analysis determine the category for safety-related control systems according to EN ISO 13849-1. Safety-oriented parts of the machine control must be compliant.

11.2.2 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.

11.2.3 Mission time

The *mission time* of the used component has to be observed and complied with. After the mission time of a component has expired, the component has to be taken out of service and replaced. Continued operation is not permitted!

The specified mission time starts at the date of manufacture. The date manufacture is permanently stored in the component and can be read out via the parameter C00206/6 (see also chapter Diagnostics, identification data).

For the STO safety function of the 8400 device series, no special examination is specified. Therefore, the mission time cannot be reset via an examination.

The proof test interval is the period after which a *proof test* to reveal undetected faults must be performed.

The proof test is a periodic examination to reveal hidden hazardous failures in a safety-related system so that - if necessary - a repair can bring the system back to an "as new" state or restore it as close as under practical considerations possible to this state (see DIN EN 61508-4).

11.3 Acceptance

11.3.1 Description

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

Inspector

The machine manufacturer must authorise a person with expertise and knowledge of the safety functions to carry out the test.

Test report

The test result of every safety function must be documented and signed by the inspector.



Note!

If parameters of the safety functions are changed, the inspector must repeat the test and record the results in the test report.

Scope of test

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:
 - "Safe torque off" function, STO
- ▶ Preparing the test report:
 - Documenting the functional test
 - Checking the parameters
 - Signing the test report
- ▶ Preparing the appendix with test records:
 - Protocols from the plant
 - External recording

11.3.2 Periodic inspections

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.

11.4 Basics for safety sensors

The components used must comply with the control category required for the application.

Passive sensors

Passive sensors are two-channel switching elements with contacts. The connecting cables and the sensor function must be monitored.

The contacts must switch simultaneously (equivalently). Nevertheless, safety functions will be activated as soon as at least one channel is switched.

The switches must be wired according to the closed-circuit principle.

Examples of passive sensors:

- ▶ Door contact switch
- ▶ Emergency stop control units

Active sensors

Active sensors are units with 2-channel semiconductor outputs (OSSD outputs). With the integrated safety system of this device series, test pulses < 1 ms for monitoring the outputs and cables are permissible. The maximally permissible connection capacity of the outputs is to be observed. Active sensors are wired directly to the terminals of the integrated safety system. Monitoring for cross or short circuits must be carried out by the active sensor.

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

The outputs must switch simultaneously (equivalently). Nevertheless, safety functions will be activated as soon as at least one channel is switched. Active triggering of only one channel indicates faulty sensors or impermissible wiring.

Examples of active sensors:

- ▶ Lightgrid
- ▶ Laser scanner
- ▶ Control systems

11.5 Operating mode

With the integrated safety system, product key: ...B..., the following safety function can be used:

► **Safe Torque Off (STO)**

If requested, the safe disconnection of the drive is achieved through:

- Directly connected active sensors
- Passive sensors connected to a safety switching device

The safety functions are suitable for applications according to IEC 61508 to SIL 3 and achieve a performance level (PL) e and the control category 4 according to EN ISO 13849-1.



Danger!

If the request for the safety function is cancelled, the drive will restart automatically.

You must provide external measures which ensure that the drive only restarts after a confirmation (EN 60204).

The transmission of the pulse width modulation is safely switched (off) by the safety unit. After this, the power drivers do not generate a rotating field. The motor is safely switched to torqueless operation (STO).

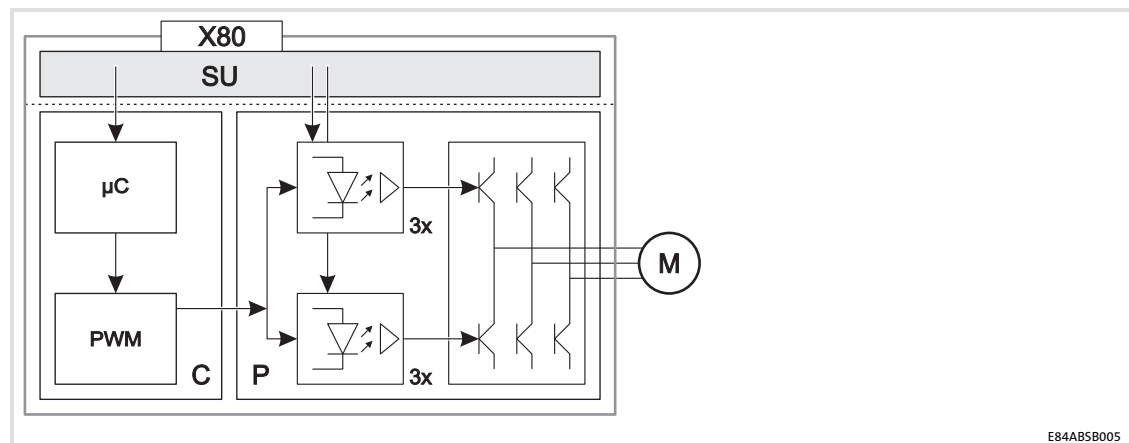


Fig. 11-1 Operating principle of safety unit

SU	Safety unit
X80	Control terminals of safety unit (pluggable terminal strip)
C	Control section
μC	Microcontroller
PWM	Pulse width modulation
P	Power section
M	Motor

Safety status

When the controller is disconnected from the safety system, the standard device signals the "Safe torque off" (STO), "safe torque off" status as follows:

- ▶ Extended status word: C00155 bit 10 = 1
- ▶ Device status: C00137 = 10
- ▶ Process signal: LS_DriveInterface:bSafeTorqueOff = TRUE

11.6 Hardware revision

The integrated safety of the 8400 controllers is implemented with two hardware versions.

The previous hardware ...

- ▶ has no labelling (up to "1B").
- ▶ has to be assigned to the data with the reference to **HW revision: up to 1B**.

The revised hardware ...

- ▶ Is clearly labelled on the side with a sticker, e.g. "HW: 2A".
- ▶ has to be assigned to the data with the reference to **HW revision: from 2A**.
- ▶ is functionally compatible with the previous hardware.
- ▶ comes with changed technical data.
- ▶ Revision 2A has a slightly lower PFH value (compared to the revision up to 1B). Hence, the hardware requires approx. 0.9 % of the maximum PFH value of the total safety chain. For all the other components of the safety chain, only 99.1 % (instead of 100 % so far) of the PFH value is available. Although the PFH value given here is negligible, we recommend a check of the executed calculation of the safety chain and, if required, a correction of the safety-related parameters.

11.7**Technical data****Supply**

The inputs and outputs are isolated and designed for a low-voltage supply through a safely separated power supply unit (SELV/PELV) of 24 V DC. P/N switching input signals and test pulses ≤ 1 ms are permissible.

Active sensors are directly wired to the X80 terminal strip.

Passive sensors are wired to the X80 terminal strip via a switching device. The switching device must comply with the required control category of the application.

There is no monitoring for short circuits.

HW revision: Up to 1B - detailed features of the inputs and outputs of the safety system

Terminal	Specification	[Unit]	Min.	Typ.	Max.
SIA, SIB	Low signal	V	-3	0	5
	High signal	V	15	24	30
	Input capacitance at switch-off	nF		4	
	Input delay (tolerated test pulse)	ms			1
	Switch-off time (depending on the controller)	ms	2.5	4	
	Running time	ms		3	
SIA	Input current	mA		100	170
	Input capacitance at switch-on, reduced	μF		20	
SIB	Input current	mA		28	35
	Input capacitance at switch-on, reduced	μF		5	
GI	Ground for SIA/SIB				
24O, GO	Supply voltage U_{24O} for the output DO1 by a safely separated power supply unit (SELV/PELV)	V	18	24	30
DO1	Low signal	V			0.8
	High signal	V		$U_{24O} - 1 \text{ V}$	
24O, GO, DO1	Output current	A			0.7

The function of the safety unit meets the requirements of the following standards:

- ▶ Category 4 and PL e according to EN ISO 13849-1
 - To comply with category 4, the external wiring and the cable monitoring must meet the requirements of category 4.
 - Ensure that short circuits cannot occur in the external wiring.
- ▶ SIL 3 according to IEC 61508
 - The safety unit does not contribute to the probability of failure on demand (PFD) and probability of failure per hour (PFH) of IEC 61508.

HW revision: From 2A - detailed features of the inputs and outputs of the safety system

Terminal	Specification	[Unit]	Min.	Typ.	Max.
SIA, SIB	Low signal	V	-3	0	5
	High signal	V	15	24	30
	Input capacitance at switch-off	nF		3	
	Switch-off time (depends on the controller: Size 1 - 3)	ms		15	30
	Switch-off time (depends on the controller: From size 4)	ms		15	30
	Running time	ms		1	
	Input current	mA	2		15
	Input capacitance at switch-on	nF		100	
	Input delay (tolerated test pulse)	ms			1
	Test pulses permissible at intervals of	ms	10		
GI	Ground for SIA/SIB				
	When the polarity is reversed: No function, no destruction				
240, GO	Supply voltage U_{240} for the output DO1 by a safely separated power supply unit (SELV/PELV)	V	18	24	30
DO1	Low signal	V			0.8
	High signal	V		$U_{240} - 1$ V	
240, GO, DO1	Output current	A			0.7

Safety-related parameters acc.to IEC 61508-1 to -7 and IEC 62061

Specification	Value	Comment
Safety Integrity Level	SIL 3	
PFH [1/h]	9.05 E-10	0.9 % of SIL 3
PFD	7.92 E-5	7.9 % of SIL 3 after T = 20 years
Proof test interval	20 years	Mission time

Safety-related parameters acc. to EN ISO 13849-1

Specification	Value	Comment
Performance Level	e	
Category	4	
MTTF _d	High	68619 years
Diagnostic coverage DC	High	99 %

Truth table

Safe input / channel		Signalling output	Controller	
SIA	SIB	DO1/DO	Description of device status	Enable
0	0	1	"Safe torque off" activated	0
0	1	0		0
1	0	0		0
1	1	0	Drive active	1

Restriction of use

The operation of an integrated safety system is **not** permissible in earthed phase mains.

11.8

Electrical installation

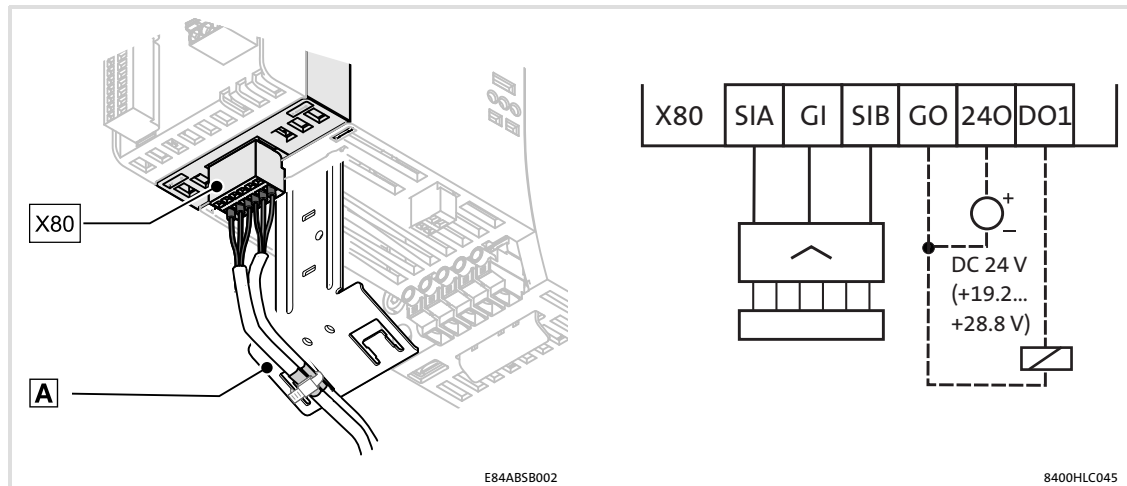


Fig. 11-2 Block diagram - safe torque off (STO)

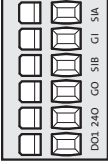
X80	Pluggable terminal strip for the safety unit
SIA, SIB, GI	Connections for shutdown paths
240, DO1, GO	Feedback connections
A	Shield connection



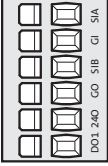
Note!

For trouble-free operation of the safety unit, connect the supply cables to the shield sheet (strain relief).

HW revision: Up to 1B

X80	Labelling	Description	Electrical data
 E84AB5B003	SIA	Safe input, channel A	SIA: $I_{typ} = 100 \text{ mA}$
	GI	GND potential for SIA/SIB	LOW: $-3 \dots 5 \text{ V}$, HIGH: $15 \dots 30 \text{ V}$
	SIB	Safe input, channel B	SIB: $I_{typ} = 28 \text{ mA}$ Supply through safely separated power supply unit (SELV/PELV)
	GO	GND potential feedback	24 V, max. 0.7 A short-circuit-proof
	24O	24 V voltage supply feedback	LOW-active
	DO1	Non-safe signalling output: "Safe pulse inhibit"	Supply through safely separated power supply unit (SELV/PELV)

HW revision: From 2A

X80	Labelling	Description	Electrical data
 E84AB5B003	SIA	Safe input, channel A	SIA, SIB: $I_{typ} = 12 \text{ mA}$
	GI	GND potential for SIA/SIB	LOW: $-3 \dots 5 \text{ V}$, HIGH: $15 \dots 30 \text{ V}$
	SIB	Safe input, channel B	Supply through safely separated power supply unit (SELV/PELV)
	GO	GND potential feedback	24 V, max. 0.7 A short-circuit-proof
	24O	24 V voltage supply feedback	LOW-active
	DO1	Non-safe signalling output: "Safe pulse inhibit"	Supply through safely separated power supply unit (SELV/PELV)

Terminal data				
	Conductor cross-section		Tightening torque	
	[mm ²]	[AWG]	[Nm]	[lb-in]
Rigid	0.14 ... 1.5	26 ... 16	Spring terminal	
With wire end ferrule	0.25 ... 0.5	24 ... 20		

11.9 Certification

The certification of drive-based safety in the controllers of the 8400 series is based on the following test fundamentals:

- ▶ EN ISO 13849-1
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
- ▶ EN ISO 13849-2
Safety of machinery - Safety-related parts of control systems - Part 2: Validation
- ▶ EN 60204-1
Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- ▶ IEC 61508, Part 1-7
Functional safety of electrical/electronic/programmable electronic safety-related systems
- ▶ EN 61800-3
Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
- ▶ EN 61800-5-1
Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
- ▶ EN 61800-5-2
Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
- ▶ EN 62061
Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems



Declarations of conformity and certificates can be found on the internet at: <http://www.Lenze.com> and on the product CD.

12 Accessories (overview)



Note!

You can find additional information on the accessories in the catalogue to this product series.

12.1 Overview

Matching accessories for L-force Inverter Drives 8400:

- ▶ Communication modules
 - PROFIBUS E84AYCPM
 - EtherCAT E84AYCET
 - PROFINET E84AYCER
 - INTEBUS E84AYCIB
 - Ethernet POWERLINK E84AYCEC
 - EtherNet/IP E84AYCEO
- ▶ Memory module E84AYM10S
- ▶ USB diagnostic adapter E94AZCUS
 - Connecting cables EWL007x
- ▶ PC system bus adapter EMF2177IB
- ▶ EZAEBK1001 keypad
- ▶ EZAEBK2001 diagnosis terminal
- ▶ RFI filter E84AZESRxxxxxx
- ▶ Mains filter IOFAExxx
- ▶ Brake resistors ERBxxx
- ▶ Brake switches E82ZWBRx
- ▶ 24-V power supply units EZVxx00-00x
- ▶ Shield mounting kit (metal cable ties) EZAMBKBM
- ▶ Shield mounting (clips) EZAMBHXM00x
- ▶ Replacement terminals for pluggable terminals
- ▶ Master frequency module EZAeva001/EZAeva002

12.2 Mains chokes

Within the scope of the product maintenance, the assignment of the inverters/mains chokes has been revised. Thus, a uniform assignment is available for all inverters. Thus, the selection of the correct components is easier.

As a migration help for assigning the old and new mains chokes, further information has been provided in the "Product change of mains chokes" document.

Technical data

	UL/CSA Type/Cat. No.	L [mH]	I _N [A]	U _N [V]
ELN1-0900H005	EI 66/34.7	9.0	5.0	600
ELN1-0500H009	EI 66/34.7	5.0	9.0	
ELN1-0250H018	EI 96/35.7	2.5	18	
EZAELN3002B153	3UI 39/14	15.0	2.0	
EZAELN3004B742	3UI 48/17	7.40	4.0	
EZAELN3006B492	3UI 48/26	4.90	6.0	
EZAELN3008B372	3UI 60/21	3.70	8.0	
EZAELN3010B292	3UI 60/21	2.90	10.0	
EZAELN3016B182	3UI 60/31	1.80	16.0	
EZAELN3020B152	3UI 75/26	1.50	20.0	
EZAELN3025B122	3UI 75/41	1.18	25.0	
EZAELN3030B982	3UI 75/41	0.98	30.0	600
EZAELN3035B841	3UI 75/41	0.84	35.0	600
EZAELN3045B651	3UI 90/41	0.65	45.0	
EZAELN3050B591	3UI 90/41	0.59	50.0	
EZAELN3063B471	3UI 90/51	0.47	63.0	
EZAELN3080B371	3UI 105/45	0.37	80.0	
EZAELN3090B331	3UI 114/40	0.33	90.0	
EZAELN3100B301	3UI 114/64	0.30	100	

Assignment

Assignment Type	Mains choke			
	For operation with rated power		For operation with increased power	
	Required	Type	Required	Type
E84AVxxx2512	No	ELN1-0900H005	No	ELN1-0900H005
E84AVxxx3712	No		Yes	
E84AVxxx5512	No	ELN1-0500H009	No	ELN1-0500H009
E84AVxxx7512	No		Yes	
E84AVxxx1122	No	ELN1-0250H018	No	ELN1-0250H018
E84AVxxx1522	No		Yes	
E84AVxxx2222	No		-	-
E84AVxxx3714	No	EZAELN3002B153	No	EZAELN3002B153
E84AVxxx5514	No	EZAELN3004B742	No	EZAELN3004B742
E84AVxxx7514	No	EZAELN3004B742	Yes	EZAELN3004B742
E84AVxxx1124	No	EZAELN3004B742	No	EZAELN3004B742
E84AVxxx1524	No	EZAELN3006B492	No	EZAELN3006B492
E84AVxxx2224	No	EZAELN3006B492	Yes	EZAELN3008B372
E84AVxxx3024xx5	No	EZAELN3008B372	Yes	EZAELN3010B292
E84AVxxx3024xx0	No	EZAELN3008B372	No	EZAELN3010B292
E84AVxxx4024	No	EZAELN3010B292	No	EZAELN3016B182
E84AVxxx5524	No	EZAELN3016B182	Yes	EZAELN3020B152
E84AVxxx7524	No	EZAELN3020B152	No	EZAELN3025B122
E84AVxxx1134	No	EZAELN3025B122	Yes	EZAELN3030B982
E84AVxxx1534	Yes	EZAELN3035B841	-	-
E84AVxxx1834	No	EZAELN3045B651	Yes	EZAELN3045B651
E84AVxxx2234	Yes	EZAELN3050B591	Yes	EZAELN3063B471
E84AVxxx3034	Yes	EZAELN3063B471	Yes	EZAELN3080B371
E84AVxxx3734	Yes	EZAELN3080B371	Yes	EZAELN3090B331
E84AVxxx4534	Yes	EZAELN3090B331	Yes	EZAELN3100B301

12.3

RFI filter/mains filter

Basis of the data			
	Voltage	Voltage range	Frequency range
Mains	V_{LN} [V]	V_{LN} [V]	f [Hz]
1/PE AC	230	180 - 0 % ... 264 + 0 %	45 ... 65
3/PE AC	400/500	320 - 0 % ... 550 + 0 %	45 ... 65

Type	Voltage [V]	Frequency [Hz]	Current		Number of phases
			① max. +45 °C [A]	① max. +55 °C [A]	
E84AZESR3712xx	230	50/60	5.0	3.5	1
E84AZESR7512xx	230	50/60	9.0	6.5	1
E84AZESR2222xx	230	50/60	22	16.5	1
E84AZESR7514xx	400	50/60	3.3	2.4	3
E84AZESR2224xx	400	50/60	7.3	5.4	3
E84AZESR3024xx	400	50/60	9.8	5.4	3
E84AZESR5524xx	400	50/60	18	13.5	3
E84AZESR1534xx	400	50/60	29	21.8	3
I0FAE318F100D0000S	400	50/60	50.4	37.8	3
I0FAE322F100D0000S	400	50/60	43.0	32.3	3
I0FAE322F100D0001S	400	50/60	55.0	41.3	3
I0FAE330F100D0000S	400	50/60	55.0	41.3	3
I0FAE337F100D0000S	400	50/60	69.0	51.8	3
I0FAE345F100D0001S	400	50/60	100.0	75.0	3

① Temperature in the control cabinet

E84AZESR ...
I0FAExxx

RFI filter

Mains filter

(RFI filter with mains choke,
additional mains choke of type ELN3 is not required)

For operation with rated power

Assignment			
Type	SD	RFI filter LD	LL
E84AVxxx2512	E84AZESR3712SD	E84AZESR3712LD	E84AZESR3712LL
E84AVxxx3712			
E84AVxxx5512	E84AZESR7512SD	E84AZESR7512LD	E84AZESR7512LL
E84AVxxx7512			
E84AVxxx1122	E84AZESR2222SD	E84AZESR2222LD	E84AZESR2222LL
E84AVxxx1522			
E84AVxxx2222			
E84AVxxx3714	E84AZESR7514SD	E84AZESR7514LD	-
E84AVxxx5514			
E84AVxxx7514			
E84AVxxx1124	E84AZESR2224SD	E84AZESR2224LD	-
E84AVxxx1524			
E84AVxxx2224			
E84AVxxx3024xxS	E84AZESR3024SD	E84AZESR3024LD	-
E84AVxxx3024xx0	E84AZESR5524SD	E84AZESR5524LD	-
E84AVxxx4024			
E84AVxxx5524			
E84AVxxx7524	E84AZESR1534SD	E84AZESR1534LD	-
E84AVxxx1134			
E84AVxxx1534			
E84AVxxx1834	-	IOFAE318F100D0000S	-
E84AVxxx2234	-	IOFAE322F100D0000S	-
E84AVxxx3034	-	IOFAE330F100D0000S	-
E84AVxxx3734	-	IOFAE337F100D0000S	-
E84AVxxx4534	-	IOFAE345F100D0001S	-

For operation with increased power

Assignment			
Type	SD	RFI filter LD	LL
E84AVxxx2512	See "Operation with rated power"		
...			
E84AVxxx1534			
E84AVxxx1834	-	IOFAE322F100D0000S	-
E84AVxxx2234	-	IOFAE322F100D0001S	-
E84AVxxx3034	-	IOFAE337F100D0000S	-
E84AVxxx3734	-	IOFAE345F100D0001S	-
E84AVxxx4534	-	IOFAE345F100D0001S	-

E84AZESR ...
IOFAExxx

RFI filter
Mains filter (RFI filter with mains choke,
additional mains choke of type ELN3 is not required)

12.4 Sinusoidal filters

For operation with rated power

Controller	Sinusoidal filter	Voltage range	Switching frequency	Inductance	Mass
		U [V]	f _{ch} [kHz]	L [mH]	m [kg]
E84AVxxx3714	EZS3-004A200	0 ... 550 V AC	4 ... 8	11.0	4.0
E84AVxxx5514					
E84AVxxx7514					
E84AVxxx1124					
E84AVxxx1524	EZS3-010A200	0 ... 550 V AC	4 ... 8	5.1	5.5
E84AVxxx2224					
E84AVxxx3024xxS					
E84AVxxx3024xx0					
E84AVxxx4024	EZS3-017A200	0 ... 550 V AC	4 ... 8	3.1	8.5
E84AVxxx5524					
E84AVxxx7524	EZS3-024A200	0 ... 550 V AC	4 ... 8	2.5	14.5
E84AVxxx1134	EZS3-032A200			2.0	19.0
E84AVxxx1534	EZS3-037A200			1.7	21.0
E84AVxxx1834	EZS3-048A200			1.2	25.5
E84AVxxx2234	EZS3-061A200	0 ... 550 V AC	4 ... 8	1.0	33.5
E84AVxxx3034	EZS3-072A200			0.95	37.0
E84AVxxx3734	EZS3-090A200	0 ... 550 V AC	4 ... 8	0.8	53.5
E84AVxxx4534	EZS3-115A200		2 ... 4	0.7	66.0

For operation with increased power

Controller	Sinusoidal filter	Voltage range	Switching frequency	Inductance	Mass
		U [V]	f _{ch} [kHz]	L [mH]	m [kg]
E84AVxxx3714	EZS3-010A200	0 ... 550 V AC	4	5.1	5.5
E84AVxxx5514					
E84AVxxx7514					
E84AVxxx1124					
E84AVxxx1524					
E84AVxxx2224					
E84AVxxx3024xxS E84AVxxx3024xx0	EZS3-017A200	0 ... 550 V AC	4	3.1	8.5
E84AVxxx4024					
E84AVxxx5524	EZS3-024A200	0 ... 550 V AC	4	2.5	14.5
E84AVxxx7524	EZS3-024A200	0 ... 550 V AC	4	2.5	14.5
E84AVxxx1134	EZS3-037A200	0 ... 550 V AC	4	1.7	21.0
E84AVxxx1534	-	-	-	-	-
E84AVxxx1834	EZS3-061A200	0 ... 550 V AC	4	1.0	33.5
E84AVxxx2234					
E84AVxxx3034	EZS3-072A200	0 ... 550 V AC	4	0.95	37.0
E84AVxxx3734	EZS3-090A200	0 ... 550 V AC	4	0.8	53.5
E84AVxxx4534	EZS3-115A200		2 ... 4	0.7	66.0

12.5 External brake resistors

Product key		Rated data - brake resistor		
Controller	Brake resistor	Resistor R [Ω]	Continuous power P [W]	Heat quantity Q _B [kW _s]
E84AVxxx2512	ERBM180R050W	180	50	7.5
E84AVxxx3712				
E84AVxxx5512	ERBM100R100W	100	100	15
E84AVxxx7512				
E84AVxxx1122	ERBP033R200W	33	200	30
E84AVxxx1522	ERBP033R200W			
E84AVxxx2222	ERBP033R300W		300	45
E84AVxxx3714	ERBM390R100W	390	100	15
E84AVxxx5514	ERBM390R100W			
E84AVxxx7514				
E84AVxxx1124	ERBP180R200W	180	200	30
E84AVxxx1524	ERBP180R200W			
E84AVxxx2224	ERBP180R300W		300	45
E84AVxxx3024xx5	ERBP082R200W	82	200	30
	ERBS082R780W/NQN000	82	780	117
E84AVxxx3024xx0	ERBP082R200W	82	200	30
	ERBS082R780W/NQN000	82	780	117
E84AVxxx4024	ERBS047R400W	47	400	60
E84AVxxx5524	ERBS047R800W		800	120
E84AVxxx7524 E84AVxxx1134	ERBP027R200W	27	200	30
	ERBS027R600W		600	90
	ERBS027R01K2		1200	180
E84AVxxx1534	ERBS018R800W	18	800	120
	ERBS018R01K4		1400	210
	ERBS018R02K8		2800	420
	ERBD020R03K0RB	20	3000	450
E84AVxxx1834 E84AVxxx2234	ERBS015R800W	15	800	120
	ERBS015R01K2		1200	180
	ERBS015R02K4		2400	420
	ERBG015R06K2		6200	930
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	ERBG075D01K9	7.5	1900	285

12.6 Memory module**12.6.1 E84AYM10S**

Name: Memory module

Type designation: E84AYM10S (/M = 5 pcs/VPE)

Slot: MMI

The parameters of the controller are stored in the memory module.

The pluggable memory module enables a quick parameter set transfer to an identical controller. Possible reasons for a parameter set transfer are:

- ▶ Duplication of similar applications in a series of identical drives.
- ▶ Restorage of an application after device replacement.

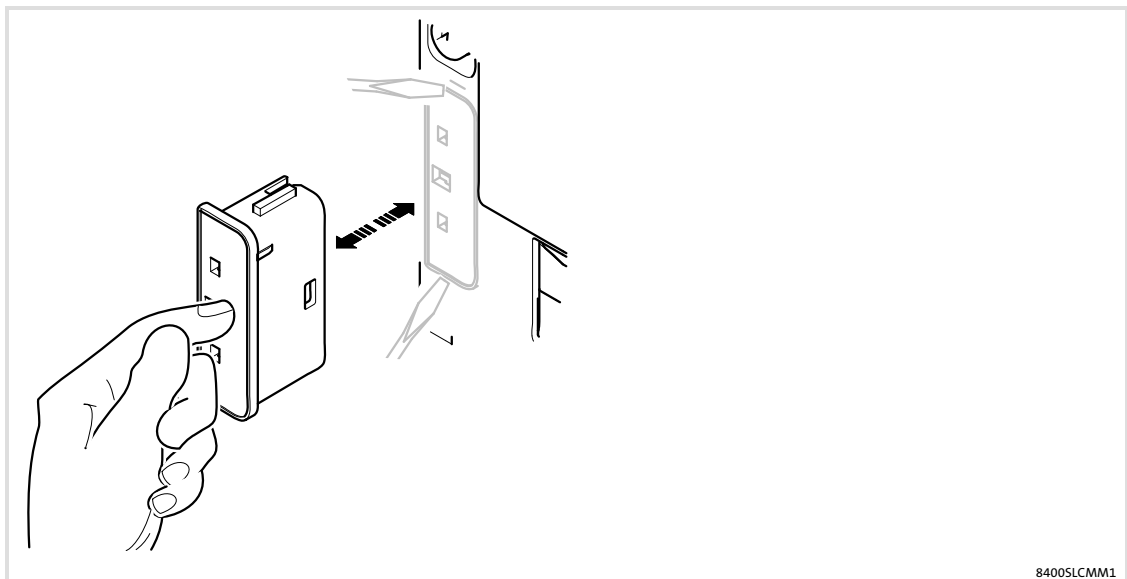
The required steps for a parameter set transfer are described in the software manual.

In order to remove the memory module, use a suitable screwdriver to lever the module out at the upper and lower groove. In order to plug in the module, insert it into the slot and push it with light pressure until end position is reached.

**Stop!**

The device contains components that can be destroyed by electrostatic discharge!

Before working on the device, the personnel must ensure that they are free of electrostatic charge by using appropriate measures.



12.7 Communication modules

The communication modules for the Inverter Drives 8400 serve to link the control system and the Inverter Drives 8400 controllers. The table below contains an overview of the available communication modules and their features.

Communication modules for Inverter Drives 8400					
Feature	PROFIBUS	PROFINET	EtherCAT	POWERLINK	INTERBUS
Type designation	E84AYCPM	E84AYCER	E84AYCET	E84AYCEC	E84AYCIB
Communication profile	PROFIBUS-DP	PROFINET	EtherCAT	Ethernet POWERLINK	INTERBUS
Node type	Slave	Slave	Slave	Slave	Slave
Slot	MCI	MCI	MCI	MCI	MCI
StateLine C	✓	✓	✓	✓	✓
HighLine C	✓	✓	✓	✓	✓
TopLine C	✓	✓	✓	✓	✓
Status display	5 LEDs	9 LEDs	9 LEDs	9 LEDs	5 LEDs
Address switch	✓	-	-	✓	-
Connection	Sub-D	2 x RJ45	2 x RJ45	2 x RJ45	2 x Sub-D
External voltage supply	-	24 V _{DC}	24 V _{DC}	24 V _{DC}	24 V _{DC}
Bus electrically isolated	✓	✓	✓	✓	✓



Communication manuals

Further information on the communication modules is provided in the respective communication manuals.

The PDF files are provided on the Internet in the download area at
<http://www.Lenze.com>

12.8 Keypad

The X400 keypad allows you to easily carry out local parameter setting and diagnostics. The data can be quickly accessed via structured menus and a plain text display. The keypad is plugged into the X6 diagnostic interface (DIAG) at the front of the controller.

Name: Keypad X400

Type designation: EZAEBK1001

Slot: X6 (DIAG)

Features

- ▶ Menu-driven diagnostics and parameter setting
- ▶ Backlighting graphic display for representing information
- ▶ 4 navigation keys, 2 context-sensitive keys
- ▶ Adjustable RUN/STOP function
- ▶ Hot-plug capable
- ▶ Enclosure IP20
- ▶ Suitable for Inverter Drives 8400 StateLine C, HighLine C, and TopLine C

Name: Hand terminal

Type designation: EZAEBK200x

Slot: X6 (DIAG)

Features

- ▶ See keypad
- ▶ Robust housing
- ▶ Suitable for installation into the control cabinet door
- ▶ 2.5 m connecting cable, exchangeable
- ▶ Enclosure IP65 is possible for installation into the control cabinet

12.9 Power supply units

External power supply units are available for supplying the control electronic with an external 24-V supply, if required.

Advantages of an external supply: Parameter setting and diagnostics of the controller with a deenergised mains input.

Type	Mains		Secondary	
	V_{LN} [V]	I_{LN} [A]	V_{DC} [V]	I_{DC} [A]
EZV1200-000	230 (1/N/PE AC)	0.8	24 (22.5 ... 28.5)	5
EZV2400-000		1.2		10
EZV4800-000		2.3		20
EZV1200-001	400 (3/PE AC)	0.3		5
EZV2400-001		0.6		10
EZV4800-001		1.0		20

12.10 Terminals (replacement)

If required, the pluggable terminals are separately available, e.g. to replace lost or damaged terminals. Determine the type designation of the terminals for each connection as follows, depending on the device and version. Each packaging unit includes 5 terminals.

Assignment	Replacement terminals for connection			
Type	Mains X100	Motor X105	Relay X101	PTC X106
E84AVxxx2512 E84AVxxx3712	E84AZEVS001X100	E84AZEVS010X105	E84AZEVS020X101	E84AZEVS030X106
E84AVxxx5512 E84AVxxx7512				
E84AVxxx1122 E84AVxxx1522 E84AVxxx2222	E84AZEVS002X100			
E84AVxxx3714 E84AVxxx5514 E84AVxxx7514	E84AZEVS003X100			
E84AVxxx1124 E84AVxxx1524 E84AVxxx2224 E84AVxxx3024xxS				
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	E84AZEVS004X100	E84AZEVS011X105		
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	E84AZEVS005X100	E84AZEVS012X105		
E84AVxxx1834 E84AVxxx2234	-	-		
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	-	-		

Assignment	Replacement terminals for connection			
Type	CAN X1	Analog I/O X3	Digital Out X4	Digital In X5
E84AVSCxxxxx	E84AZEVS040X001	E84AZEVS050X003	E84AZEVS050X004	-
E84AVHCxxxxx		E84AZEVS060X003	E84AZEVS060X004	E84AZEVS060X005
E84AVTCxxxxx				

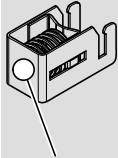
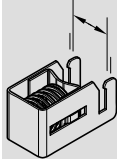
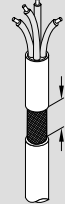
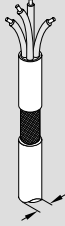
Assignment	Replacement terminals for connection			
Type	Axis bus X10	Brake X107		
E84AVSCxxxxx	-	-		
E84AVHCxxxxx	-	E84AZEVS060X107		
E84AVTCxxxxx	E84AZEVS060X010			

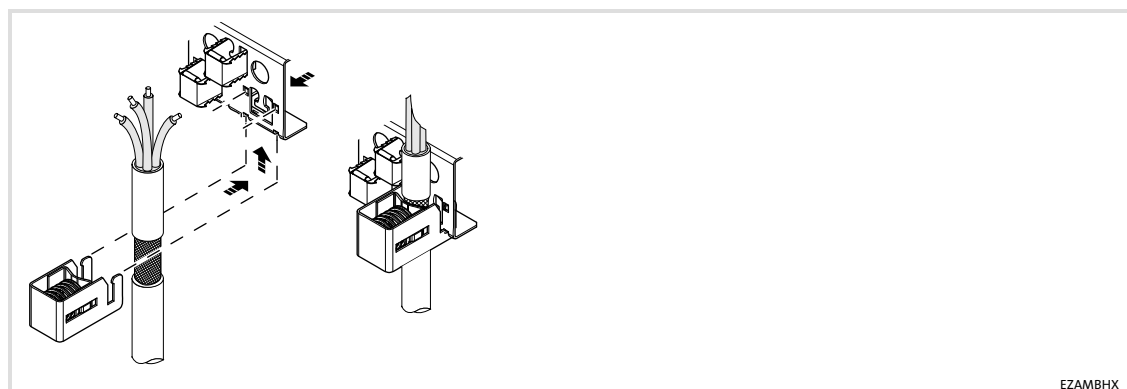
Assignment	Replacement terminals for connection			
Type	Safety X80			
E84AVxxxxxxxSBx	E84AZEVS070X080			
E84AVxxxxxxxVBx				

12.11 EMC accessories

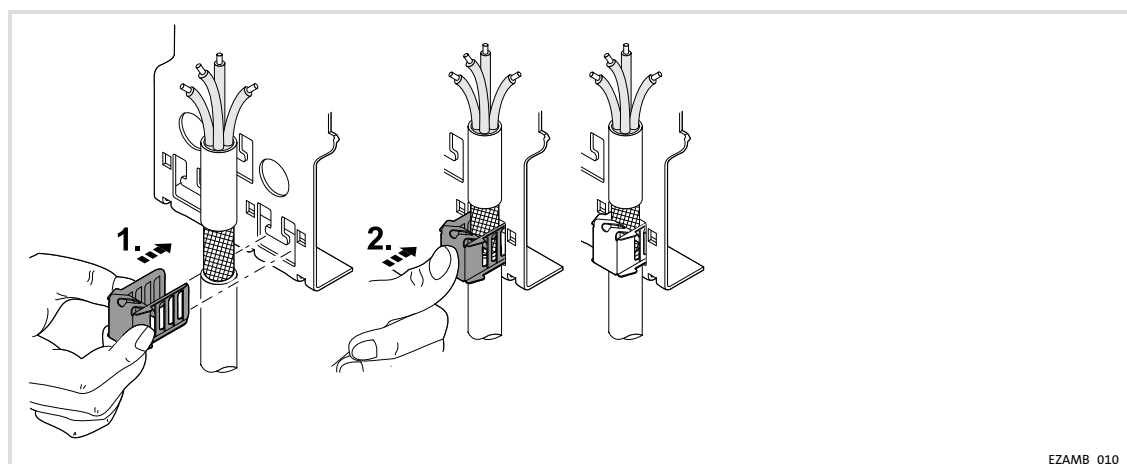
Matched accessories are available for an easy EMC-compliant installation and optimum shield connection. Select available accessories from the list below, depending on the device. Each packaging unit includes 10 or 50 pieces.

Assignment		Shield sheet for	
Type	Device size	Motor connection	Control terminals
E84AVxxx2512 E84AVxxx3712	GG1	EZAMBHXM006 EZAMBHXM007 EZAMBKBM	EZAMBHXM007 EZAMBKBM
E84AVxxx551x E84AVxxx751x E84AVxxx3714	GG2		
E84AVxxx112x E84AVxxx152x E84AVxxx222x E84AVxxx3024xx5	GG3		
E84AVxxx3024xx0 E84AVxxx4024 E84AVxxx5524	GG4	EZAMBHXM003 EZAMBHXM004	
E84AVxxx7524 E84AVxxx1134 E84AVxxx1534	GG5		
E84AVxxx1834 E84AVxxx2234	GG6		
E84AVxxx3034 E84AVxxx3734 E84AVxxx4534	GG7	EZAMBHXM004 EZAMBHXM005	

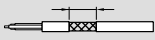
				
			[mm]	
EZAMBHXM006 (< E94AZIS003)	2	18	20	4 ... 15
EZAMBHXM003 (< E94AZIS007)	3	19	30	10 ... 20
EZAMBHXM004 (< E94AZIS024)	4	27	30	15 ... 28
EZAMBHXM005	5	37	35	20 ... 37

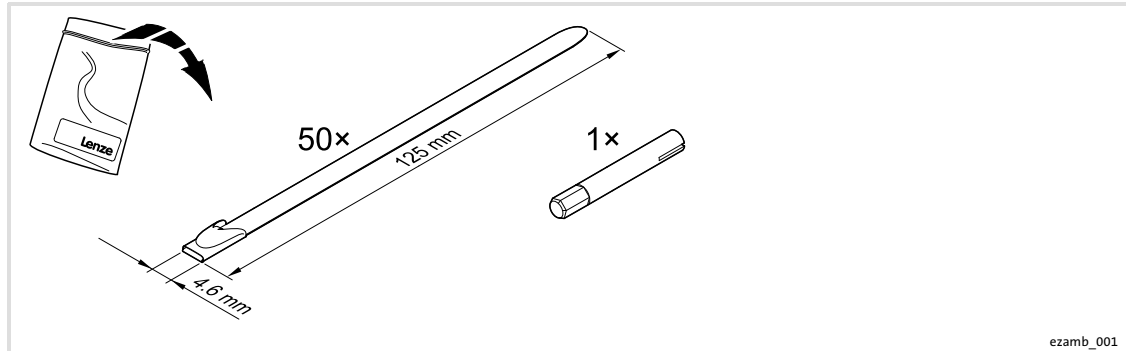


		
	20 mm	4 ... 10 mm



EZAMB_010

		
EZAMBKBM	> 10 mm	8 ... 30 mm



12.12 Accessories for applications with digital frequency

For synchronising synchronous drives via digital frequency (8400 TopLine, encoder connection X8), the following accessories can be used:

- ▶ Digital frequency distributor EZA EVA001 (master/slave rail structure)
- ▶ Digital frequency distributor EZA EVA002 (master/slave cascade structure)
- ▶ Digital frequency cables EYD0021AxxxxS10S09 (with 8400 device series)
- ▶ Digital frequency cables EYD0017Axxxx... (with further device series)

For more information, please get in touch with your Lenze contact person.

13 Appendix

13.1 Declarations of conformity



2220702.11

EU-Konformitätserklärung LENZE SE, Hans-Lenze-Strasse 1, 31855 Aerzen GERMANY erklärt in alleiniger Verantwortung die Übereinstimmung der Produkte Antriebsregler der Baureihen: <table border="0" style="width: 100%;"> <tr> <td>E84AVyyz2512xXxxxx</td> <td>E84AVyyz3714xXxxxx</td> <td>E84AVyyz7524xXxxxx</td> </tr> <tr> <td>E84AVyyz3712xXxxxx</td> <td>E84AVyyz5514xXxxxx</td> <td>E84AVyyz1134xXxxxx</td> </tr> <tr> <td>E84AVyyz5512xXxxxx</td> <td>E84AVyyz7514xXxxxx</td> <td>E84AVyyz1534xXxxxx</td> </tr> <tr> <td>E84AVyyz7512xXxxxx</td> <td>E84AVyyz1124xXxxxx</td> <td>E84AVyyz1834xXxxxx</td> </tr> <tr> <td>E84AVyyz1122xXxxxx</td> <td>E84AVyyz1524xXxxxx</td> <td>E84AVyyz2234xXxxxx</td> </tr> <tr> <td>E84AVyyz1522xXxxxx</td> <td>E84AVyyz2224xXxxxx</td> <td>E84AVyyz3034xXxxxx</td> </tr> <tr> <td>E84AVyyz2222xXxxxx</td> <td>E84AVyyz3024xXxxxx</td> <td>E84AVyyz3734xXxxxx</td> </tr> <tr> <td></td> <td>E84AVyyz4024xXxxxx</td> <td>E84AVyyz4534xXxxxx</td> </tr> <tr> <td></td> <td>E84AVyyz5524xXxxxx</td> <td></td> </tr> </table>	E84AVyyz2512xXxxxx	E84AVyyz3714xXxxxx	E84AVyyz7524xXxxxx	E84AVyyz3712xXxxxx	E84AVyyz5514xXxxxx	E84AVyyz1134xXxxxx	E84AVyyz5512xXxxxx	E84AVyyz7514xXxxxx	E84AVyyz1534xXxxxx	E84AVyyz7512xXxxxx	E84AVyyz1124xXxxxx	E84AVyyz1834xXxxxx	E84AVyyz1122xXxxxx	E84AVyyz1524xXxxxx	E84AVyyz2234xXxxxx	E84AVyyz1522xXxxxx	E84AVyyz2224xXxxxx	E84AVyyz3034xXxxxx	E84AVyyz2222xXxxxx	E84AVyyz3024xXxxxx	E84AVyyz3734xXxxxx		E84AVyyz4024xXxxxx	E84AVyyz4534xXxxxx		E84AVyyz5524xXxxxx		EU Declaration of Conformity declares under sole responsibility compliance of the products Controllers of the series: <table border="0" style="width: 100%;"> <tr> <td>E84AYCECV</td> <td>E84AYM10S</td> </tr> <tr> <td>E84AYCEOV</td> <td>E84AYM20S</td> </tr> <tr> <td>E84AYCERV</td> <td></td> </tr> <tr> <td>E84AYCETV</td> <td>EZAEBK1001</td> </tr> <tr> <td>E84AYCIBV</td> <td>EZAEBK2001</td> </tr> <tr> <td>E84AYCPMV</td> <td></td> </tr> </table> x := 0...9, A...Z yy := SC, HC, TC, TP, TW z := E, C, D	E84AYCECV	E84AYM10S	E84AYCEOV	E84AYM20S	E84AYCERV		E84AYCETV	EZAEBK1001	E84AYCIBV	EZAEBK2001	E84AYCPMV	
E84AVyyz2512xXxxxx	E84AVyyz3714xXxxxx	E84AVyyz7524xXxxxx																																						
E84AVyyz3712xXxxxx	E84AVyyz5514xXxxxx	E84AVyyz1134xXxxxx																																						
E84AVyyz5512xXxxxx	E84AVyyz7514xXxxxx	E84AVyyz1534xXxxxx																																						
E84AVyyz7512xXxxxx	E84AVyyz1124xXxxxx	E84AVyyz1834xXxxxx																																						
E84AVyyz1122xXxxxx	E84AVyyz1524xXxxxx	E84AVyyz2234xXxxxx																																						
E84AVyyz1522xXxxxx	E84AVyyz2224xXxxxx	E84AVyyz3034xXxxxx																																						
E84AVyyz2222xXxxxx	E84AVyyz3024xXxxxx	E84AVyyz3734xXxxxx																																						
	E84AVyyz4024xXxxxx	E84AVyyz4534xXxxxx																																						
	E84AVyyz5524xXxxxx																																							
E84AYCECV	E84AYM10S																																							
E84AYCEOV	E84AYM20S																																							
E84AYCERV																																								
E84AYCETV	EZAEBK1001																																							
E84AYCIBV	EZAEBK2001																																							
E84AYCPMV																																								

mit der Niederspannungsrichtlinie 2014/35/EU Angewandte harmonisierte Normen: EN 61800-5-1:2007 + A1:2017	with the Low Voltage Directive 2014/35/EU Applied harmonized standards:
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EMV- Richtlinie 2014/30/EU Angewandte harmonisierte Normen: EN 61800-3:2004 + A1:2012 EN IEC 61800-3:2018	EMC Directive 2014/30/EU Applied harmonized standards:
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Ökodesignrichtlinie 2009/125/EG Angewandte Normen: EN 61800-9-2:2017	Verordnung 2019/1781 [≥01.07.2021]	ErP Directive 2014/34/EU Applied standards:
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RoHS Richtlinie 2011/65/EU Angewandte harmonisierte Normen: EN IEC 63000:2018	Verordnung 2015/863 + 2017/2102	RoHS Directive 2011/65/EU Applied harmonized standards:
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Die Sicherheitshinweise der Betriebsanleitung sind zu beachten. Die aufgeführten Produkte sind im Sinne der EMV- Richtlinie keine eigenständig betreibbare Produkte. Die Einhaltung der Richtlinie setzt den korrekten Einbau der Produkte, die Beachtung der spezifischen Installationshinweise und der Produktdokumentation voraus. Dies wurde an bestimmten Anlagenkonfigurationen nachgewiesen. Die Produkte sind bestimmt zum Einbau in Maschinen. Die Inbetriebnahme ist solange untersagt bis festgestellt wurde, dass die Maschine, in welche diese Produkte eingebaut werden sollen, den Bestimmungen der o.g. EU-Richtlinie entsprechen.	The safety instructions of the manual are to be considered. According to the EMC directive, the listed devices are not independently operable products. Compliance of the directive requires the correct installation of the product, the observance of specific installation notes and product documentation. This was tested on specific system configurations. These products are intended for installation in machines. Operation is prohibited until it has been determined that the machines in which these products are to be installed, conforms to the above mentioned EU Directive.
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Ort / Datum Place / date Aerzen 12.05.2021	Vorstand Chief Technology Officer  Dipl.-Ing. Frank Maier	Dokumentationsverantwortlicher Responsible for documentation  i.V. Torsten Pieper
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Lenze

2320863.05

EU-Konformitätserklärung

EU Declaration of Conformity

LENZE SE, Hans-Lenze-Strasse 1, 31855 Aerzen GERMANY

erklärt in alleiniger Verantwortung die Übereinstimmung der Produkte

declares under sole responsibility compliance of the products

**E84AVxxxxxxxxxBz (x,y,q,z=0-9/A-Z) &
SU100 - E84ABSBN**

mit der

Maschinenrichtlinie

2006/42/EG Anhang VIII und IX

Angewandte Normen:

Sicher abgeschaltetes Moment

Stopp Kategorie 0

EN 60204-1:2018

Stop category 0

Safe torque off

Sicherheitsfunktionen siehe
Betriebsanleitung.

Kategorie 4

EN ISO 13849-1:2015

Category 4

For safety functions see manual.

Performance Level:

EN ISO 13849-1:2023

Performance Level:

PL e



PL e

EN 61508 part 1 - 7:2010

EN IEC 62061:2021

EN 61800-5-2:2007

EN 61800-5-2:2017

EN 61800-5-1:2007 + A1:2017 + A11:2021

PL e

SIL 3

Konformitätsbewertung

Conformity assessment



Benannte Stelle

notified body

TÜV Rheinland Industrie Service GmbH

Am Grauen Stein

51105 Köln / Germany

Notified Body number: 0035

Zertifikate

Certificates

01/205/5089.03/24

Gültigkeit

Date of expiry

18-04-2029

EMV- Richtlinie

2014/30/EU

Angewandte Normen:

EN 61800-3:2004 + A1:2012

EN IEC 61800-3:2018

EMC Directive

2014/30/EU

Applied standards:

Ökodesignrichtlinie

2009/125/EG

Angewandte Normen:

EN 61800-9-2:2017

Verordnung

2019/1781

ErP Directive

2009/125/EC

Applied standards:

Commission Regulation

2019/1781

RoHS Richtlinie

2011/65/EU

Angewandte harmonisierte Normen:

EN IEC 63000:2018

Verordnung

2015/863 + 2017/2102

RoHS Directive

2011/65/EU

Applied harmonized standards:

Commission Regulation

2015/863 + 2017/2102

Die Sicherheitshinweise der Betriebsanleitung sind zu beachten.

The safety instructions of the manual are to be considered.

Die Produkte sind bestimmt zum Einbau in Maschinen. Die Inbetriebnahme ist solange untersagt bis festgestellt wurde, dass die Maschine, in welche diese Produkte eingebaut werden sollen, den Bestimmungen der o.g. EU-Richtlinie entsprechen.

These products are intended for installation in machines. Operation is prohibited until it has been determined that the machines in which these products are to be installed, conforms to the above mentioned EU Directive.

Ort / Datum

Place / date

Senior Vice President Innovation

Senior Vice President Innovation

Dokumentationsverantwortlicher

Responsible for documentation

Aerzen

22.04.2024

ppa. Dr. Lutz Steiner
ppa. Dr. Lutz Steiner

i.V. A. Krause
i.V. Andreas Krause

Lenze

2460410.02

UK Declaration of Conformity

LENZE SE, Hans-Lenze-Strasse 1, 31855 Aerzen GERMANY

declares under sole responsibility compliance of the products

**E84AVxxxxxxxqBz (x,y,q,z=0-9/A-Z) &
SU100 - E84AB5BN**

with the

The Supply of Machinery (Safety) Regulations 2008
S.I. 2008 No. 1597
Applied standards:

Safe torque off	Stop category 0	EN 60204-1:2018
	Category 4	EN ISO 13849-1:2015
For safety functions see manual.	Performance Level:	EN ISO 13849-1:2023
	PL e	
		EN 61508 part 1 - 7:2010
		EN IEC 62061:2021
		EN 61800-5-2:2007
		EN 61800-5-2:2017
		EN 61800-5-1:2007 + A1:2017 + A11:2021



SIL 3

Conformity assessment


notified body

 TUV Rheinland UK Ltd
1011 Stratford Road
Solihull, B90 4BN

Certificates

01/205U/5089.01/24

Date of expiry

17-04-2029

The Electromagnetic Compatibility Regulations 2016
S.I. 2016 No. 1091
Applied standards:
EN 61800-3:2004 + A1:2012
EN IEC 61800-3:2018
The Ecodesign for Energy-Related Products and Energy Information Regulations 2021
S.I. 2021 No. 745
Applied standards:
EN 61800-9-2:2017
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
S.I. 2012 No. 3032
Applied designated standards:
EN IEC 63000:2018
Authorised representative
LENZE Ltd., 6, Abbey Court Fraser Road Priory, Business Park, MK44 3WH Bedford

The safety instructions of the manual are to be considered.

These products are intended for installation in machines. Operation is prohibited until it has been determined that the machines in which these products are to be installed, conforms to the above mentioned Regulations.

Place / date

Senior Vice President Innovation

Responsible for documentation

Aerzen 22.04.2024

ppa. Dr. Lutz Steiner

i.V. Andreas Krause

13.2 Ecodesign Directive

REGULATION (EU) 2019/1781

8400 StateLine frequency inverter				Product information acc. to REGULATION (EU) 2019/1781 (ANNEX I, Section 4)									
Power losses													
0; 25	f; I	%	3.5	2.8	2.7	1.8	1.6	1.2	1.0	5.1	4.2	2.7	2.3
0; 50	f; I	%	3.5	2.8	2.7	1.9	1.7	1.3	1.1	5.1	4.2	2.8	2.5
0; 100	f; I	%	3.7	3.0	2.9	2.2	2.0	1.6	1.5	5.3	4.4	3.1	2.8
50; 25	f; I	%	3.6	2.8	2.7	1.8	1.6	1.2	1.1	5.1	4.2	2.7	2.4
50; 50	f; I	%	3.6	2.9	2.8	2.0	1.8	1.5	1.3	5.2	4.3	2.8	2.5
50; 100	f; I	%	3.9	3.2	3.1	2.5	2.4	2.1	2.0	5.4	4.6	3.2	3.0
90; 50	f; I	%	3.7	3.0	2.9	2.1	2.0	1.7	1.6	5.2	4.3	2.9	2.6
90; 100	f; I	%	4.2	3.5	3.5	3.0	3.1	2.9	3.1	5.5	4.7	3.4	3.1
Standby losses		%	2.2	1.5	1.3	0.9	0.7	0.5	0.3	1.5	1.3	0.9	0.7
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY										
Commercial registration number			Hannover HRB 204803										
Product's model identifier			E84AV□C□251 2	E84AV□C□371 2	E84AV□C□551 2	E84AV□C□751 2	E84AV□C□112 2	E84AV□C□152 2	E84AV□C□222 2	E84AV□C□371 4	E84AV□C□551 4	E84AV□C□751 4	E84AV□C□112 4
Apparent output power		kVA	0.6	0.9	1.1	1.4	2	2.5	3.4	0.8	1.1	1.5	2
Indicative motor rated power output		kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2	0.37	0.55	0.75	1.1
Rated output current		A	1.7	2.4	3	4	5.5	7	9.5	1.3	1.8	2.4	3.2
Maximum operating temperature		°C	45										
Rated supply frequency		Hz	50										
Rated supply voltage		V	230							400			
Switching frequency		kHz	4										
Rated apparent output power		kVA	0.697	0.977	1.19	1.71	2.29	3.3	4.44	0.977	1.19	1.71	2.29
Power losses													
0; 25	f; I	%	2.6	1.3	1.4	1.3	1.0	0.8	0.6	0.6	0.7	0.6	0.7
0; 50	f; I	%	2.8	1.4	1.5	1.4	1.2	0.9	0.8	0.7	0.9	0.7	0.9
0; 100	f; I	%	3.3	1.8	1.9	1.8	1.6	1.3	1.2	1.2	1.4	1.2	1.5
50; 25	f; I	%	2.6	1.3	1.4	1.3	1.1	0.8	0.7	0.6	0.7	0.6	0.7
50; 50	f; I	%	2.9	1.5	1.6	1.5	1.3	1.0	0.9	0.8	0.9	0.8	0.9
50; 100	f; I	%	3.4	1.9	2.0	2.0	1.9	1.7	1.6	1.5	1.5	1.3	1.7
90; 50	f; I	%	2.9	1.6	1.7	1.7	1.4	1.2	1.1	1.0	1.0	0.9	1.0
90; 100	f; I	%	3.6	2.1	2.3	2.5	2.5	2.2	2.4	2.0	1.9	1.6	2.0
Standby losses		%	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY										
Commercial registration number			Hannover HRB 204803										
Product's model identifier			E84AV□C□152 4	E84AV□C□222 4	E84AV□C□302 4	E84AV□C□402 4	E84AV□C□552 4	E84AV□C□752 4	E84AV□C□113 4	E84AV□C□153 4	E84AV□C□183 4	E84AV□C□223 4	E84AV□C□303 4
Apparent output power		kVA	2.4	3.5	4.6	5.9	8.1	10.3	14.7	20	24.9	29.3	38
Indicative motor rated power output		kW	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30
Rated output current		A	3.9	5.6	7.3	9.5	13	16.5	23.5	32	40	47	61
Maximum operating temperature		°C	45										
Rated supply frequency		Hz	50										
Rated supply voltage		V	400										
Switching frequency		kHz	4										
Rated apparent output power		kVA	3.3	4.44	5.85	7.38	9.95	14.4	19.5	23.9	28.3	38.2	38.2

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

8400 StateLine frequency inverter

Power losses				
0; 25	f; I	%	0.5	0.6
0; 50	f; I	%	0.7	0.8
0; 100	f; I	%	1.2	1.4
50; 25	f; I	%	0.5	0.6
50; 50	f; I	%	0.7	0.8
50; 100	f; I	%	1.3	1.6
90; 50	f; I	%	0.8	1.0
90; 100	f; I	%	1.6	1.9
Standby losses		%	0.0	0.0
Efficiency level			IE2	IE2
Manufacturer	Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY			
Commercial registration number	Hannover HRB 204803			
Product's model identifier	E84AV□C□3734		E84AV□C□4534	
Apparent output power		kVA	47.4	55.5
Indicative motor rated power output		kW	37	45
Rated output current		A	76	89
Maximum operating temperature		°C	45	
Rated supply frequency		Hz	50	
Rated supply voltage		V	400	
Switching frequency		kHz	4	
Rated apparent output power		kVA	56.2	56.2

□ Placeholder for product variants
 Operating point (f; I) f = relative motor stator frequency; I = relative torque-producing current
 Power losses Power losses at operating points (f; I) and in standby mode relate to the rated apparent output power.
 For power losses for options (e.g. for diagnostics) and for accessories (e.g. mains chokes) please refer to further product documentation on the product web page.

8400 HighLine frequency inverter

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

Power losses															
0; 25	f; I	%	3.5	2.8	2.7	1.8	1.6	1.2	1.0	5.1	4.2	2.7	2.3		
0; 50	f; I	%	3.5	2.8	2.7	1.9	1.7	1.3	1.1	5.1	4.2	2.8	2.5		
0; 100	f; I	%	3.7	3.0	2.9	2.2	2.0	1.6	1.5	5.3	4.4	3.1	2.8		
50; 25	f; I	%	3.6	2.8	2.7	1.8	1.6	1.2	1.1	5.1	4.2	2.7	2.4		
50; 50	f; I	%	3.6	2.9	2.8	2.0	1.8	1.5	1.3	5.2	4.3	2.8	2.5		
50; 100	f; I	%	3.9	3.2	3.1	2.5	2.4	2.1	2.0	5.4	4.6	3.2	3.0		
90; 50	f; I	%	3.7	3.0	2.9	2.1	2.0	1.7	1.6	5.2	4.3	2.9	2.6		
90; 100	f; I	%	4.2	3.5	3.5	3.0	3.1	2.9	3.1	5.5	4.7	3.4	3.1		
Standby losses		%	2.2	1.5	1.3	0.9	0.7	0.5	0.3	1.5	1.3	0.9	0.7		
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2		
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY												
Commercial registration number			Hannover HRB 204803												
Product's model identifier			E84AV□C□251 2	E84AV□C□371 2	E84AV□C□551 2	E84AV□C□751 2	E84AV□C□112 2	E84AV□C□152 2	E84AV□C□222 2	E84AV□C□371 4	E84AV□C□551 4	E84AV□C□751 4	E84AV□C□112 4		
Apparent output power		kVA	0.6	0.9	1.1	1.4	2	2.5	3.4	0.8	1.1	1.5	2		
Indicative motor rated power output		kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2	0.37	0.55	0.75	1.1		
Rated output current		A	1.7	2.4	3	4	5.5	7	9.5	1.3	1.8	2.4	3.2		
Maximum operating temperature		°C	45												
Rated supply frequency		Hz	50												
Rated supply voltage		V	230							400					
Switching frequency		kHz	4												
Rated apparent output power		kVA	0.697	0.977	1.19	1.71	2.29	3.3	4.44	0.977	1.19	1.71	2.29		
Power losses															
0; 25	f; I	%	2.6	1.3	1.4	1.3	1.0	0.8	0.6	0.6	0.7	0.6	0.7		
0; 50	f; I	%	2.8	1.4	1.5	1.4	1.2	0.9	0.8	0.7	0.9	0.7	0.9		
0; 100	f; I	%	3.3	1.8	1.9	1.8	1.6	1.3	1.2	1.2	1.4	1.2	1.5		
50; 25	f; I	%	2.6	1.3	1.4	1.3	1.1	0.8	0.7	0.6	0.7	0.6	0.7		
50; 50	f; I	%	2.9	1.5	1.6	1.5	1.3	1.0	0.9	0.8	0.9	0.8	0.9		
50; 100	f; I	%	3.4	1.9	2.0	2.0	1.9	1.7	1.6	1.5	1.5	1.3	1.7		
90; 50	f; I	%	2.9	1.6	1.7	1.7	1.4	1.2	1.1	1.0	1.0	0.9	1.0		
90; 100	f; I	%	3.6	2.1	2.3	2.5	2.5	2.2	2.4	2.0	1.9	1.6	2.0		
Standby losses		%	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1		
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2		
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY												
Commercial registration number			Hannover HRB 204803												
Product's model identifier			E84AV□C□152 4	E84AV□C□222 4	E84AV□C□302 4	E84AV□C□402 4	E84AV□C□552 4	E84AV□C□752 4	E84AV□C□113 4	E84AV□C□153 4	E84AV□C□183 4	E84AV□C□223 4	E84AV□C□303 4		
Apparent output power		kVA	2.4	3.5	4.6	5.9	8.1	10.3	14.7	20	24.9	29.3	38		
Indicative motor rated power output		kW	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30		
Rated output current		A	3.9	5.6	7.3	9.5	13	16.5	23.5	32	40	47	61		
Maximum operating temperature		°C	45												
Rated supply frequency		Hz	50												
Rated supply voltage		V	400												
Switching frequency		kHz	4												
Rated apparent output power		kVA	3.3	4.44	5.85	7.38	9.95	14.4	19.5	23.9	28.3	38.2	38.2		

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

8400 HighLine frequency inverter

Power losses				
0; 25	f; I	%	0.5	0.6
0; 50	f; I	%	0.7	0.8
0; 100	f; I	%	1.2	1.4
50; 25	f; I	%	0.5	0.6
50; 50	f; I	%	0.7	0.8
50; 100	f; I	%	1.3	1.6
90; 50	f; I	%	0.8	1.0
90; 100	f; I	%	1.6	1.9
Standby losses		%	0.0	0.0
Efficiency level			IE2	IE2
Manufacturer	Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY			
Commercial registration number	Hannover HRB 204803			
Product's model identifier	E84AV□C□3734		E84AV□C□4534	
Apparent output power		kVA	47.4	55.5
Indicative motor rated power output		kW	37	45
Rated output current		A	76	89
Maximum operating temperature		°C	45	
Rated supply frequency		Hz	50	
Rated supply voltage		V	400	
Switching frequency		kHz	4	
Rated apparent output power		kVA	56.2	56.2

□ Placeholder for product variants
 Operating point (f; I) f = relative motor stator frequency; I = relative torque-producing current
 Power losses Power losses at operating points (f; I) and in standby mode relate to the rated apparent output power.
 For power losses for options (e.g. for diagnostics) and for accessories (e.g. mains chokes) please refer to further product documentation on the product web page.

8400 TopLine frequency inverter

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

Power losses														
0; 25	f; I	%	3.5	2.8	2.7	1.8	1.6	1.2	1.0	5.1	4.2	2.7	2.3	
0; 50	f; I	%	3.5	2.8	2.7	1.9	1.7	1.3	1.1	5.1	4.2	2.8	2.5	
0; 100	f; I	%	3.7	3.0	2.9	2.2	2.0	1.6	1.5	5.3	4.4	3.1	2.8	
50; 25	f; I	%	3.6	2.8	2.7	1.8	1.6	1.2	1.1	5.1	4.2	2.7	2.4	
50; 50	f; I	%	3.6	2.9	2.8	2.0	1.8	1.5	1.3	5.2	4.3	2.8	2.5	
50; 100	f; I	%	3.9	3.2	3.1	2.5	2.4	2.1	2.0	5.4	4.6	3.2	3.0	
90; 50	f; I	%	3.7	3.0	2.9	2.1	2.0	1.7	1.6	5.2	4.3	2.9	2.6	
90; 100	f; I	%	4.2	3.5	3.5	3.0	3.1	2.9	3.1	5.5	4.7	3.4	3.1	
Standby losses		%	2.2	1.5	1.3	0.9	0.7	0.5	0.3	1.5	1.3	0.9	0.7	
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY											
Commercial registration number			Hannover HRB 204803											
Product's model identifier			E84AV□C□251 2	E84AV□C□371 2	E84AV□C□551 2	E84AV□C□751 2	E84AV□C□112 2	E84AV□C□152 2	E84AV□C□222 2	E84AV□C□371 4	E84AV□C□551 4	E84AV□C□751 4	E84AV□C□112 4	
Apparent output power		kVA	0.6	0.9	1.1	1.4	2	2.5	3.4	0.8	1.1	1.5	2	
Indicative motor rated power output		kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2	0.37	0.55	0.75	1.1	
Rated output current		A	1.7	2.4	3	4	5.5	7	9.5	1.3	1.8	2.4	3.2	
Maximum operating temperature		°C	45											
Rated supply frequency		Hz	50											
Rated supply voltage		V	230						400					
Switching frequency		kHz	4											
Rated apparent output power		kVA	0.697	0.977	1.19	1.71	2.29	3.3	4.44	0.977	1.19	1.71	2.29	
Power losses														
0; 25	f; I	%	2.6	1.3	1.4	1.3	1.0	0.8	0.6	0.6	0.7	0.6	0.7	
0; 50	f; I	%	2.8	1.4	1.5	1.4	1.2	0.9	0.8	0.7	0.9	0.7	0.9	
0; 100	f; I	%	3.3	1.8	1.9	1.8	1.6	1.3	1.2	1.2	1.4	1.2	1.5	
50; 25	f; I	%	2.6	1.3	1.4	1.3	1.1	0.8	0.7	0.6	0.7	0.6	0.7	
50; 50	f; I	%	2.9	1.5	1.6	1.5	1.3	1.0	0.9	0.8	0.9	0.8	0.9	
50; 100	f; I	%	3.4	1.9	2.0	2.0	1.9	1.7	1.6	1.5	1.5	1.3	1.7	
90; 50	f; I	%	2.9	1.6	1.7	1.7	1.4	1.2	1.1	1.0	1.0	0.9	1.0	
90; 100	f; I	%	3.6	2.1	2.3	2.5	2.5	2.2	2.4	2.0	1.9	1.6	2.0	
Standby losses		%	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	
Efficiency level			IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	IE2	
Manufacturer			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY											
Commercial registration number			Hannover HRB 204803											
Product's model identifier			E84AV□C□152 4	E84AV□C□222 4	E84AV□C□302 4	E84AV□C□402 4	E84AV□C□552 4	E84AV□C□752 4	E84AV□C□113 4	E84AV□C□153 4	E84AV□C□183 4	E84AV□C□223 4	E84AV□C□303 4	
Apparent output power		kVA	2.4	3.5	4.6	5.9	8.1	10.3	14.7	20	24.9	29.3	38	
Indicative motor rated power output		kW	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	
Rated output current		A	3.9	5.6	7.3	9.5	13	16.5	23.5	32	40	47	61	
Maximum operating temperature		°C	45											
Rated supply frequency		Hz	50											
Rated supply voltage		V	400											
Switching frequency		kHz	4											
Rated apparent output power		kVA	3.3	4.44	5.85	7.38	9.95	14.4	19.5	23.9	28.3	38.2	38.2	

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

8400 TopLine frequency inverter

Power losses				
0; 25	f; I	%	0.5	0.6
0; 50	f; I	%	0.7	0.8
0; 100	f; I	%	1.2	1.4
50; 25	f; I	%	0.5	0.6
50; 50	f; I	%	0.7	0.8
50; 100	f; I	%	1.3	1.6
90; 50	f; I	%	0.8	1.0
90; 100	f; I	%	1.6	1.9
Standby losses		%	0.0	0.0
Efficiency level			IE2	IE2
Manufacturer	Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY			
Commercial registration number	Hannover HRB 204803			
Product's model identifier	E84AV□C□3734		E84AV□C□4534	
Apparent output power		kVA	47.4	55.5
Indicative motor rated power output		kW	37	45
Rated output current		A	76	89
Maximum operating temperature		°C	45	
Rated supply frequency		Hz	50	
Rated supply voltage		V	400	
Switching frequency		kHz	4	
Rated apparent output power		kVA	56.2	56.2

□ Placeholder for product variants
 Operating point (f; I) f = relative motor stator frequency; I = relative torque-producing current
 Power losses Power losses at operating points (f; I) and in standby mode relate to the rated apparent output power.
 For power losses for options (e.g. for diagnostics) and for accessories (e.g. mains chokes) please refer to further product documentation on the product web page.

13.3 Index

"Cold Plate", requirements for the cooler, 107, 131, 150

A

Accessories, 291

- External brake resistor, 254

Analog inputs, 82, 85

Analog inputs and outputs, 227, 234

Analog outputs, 82, 85

Application as directed, 276

Application, as directed, 276

Assembly

- standard installation, 93, 114, 140

- standard technique, 94, 114, 141

Axis bus

- CAN, 88, 243

- Sync/State, 88, 243

B

Baud rate, System bus (CAN). *Siehe* Baud rate

Brake resistor, 258

- Selection, 257

- Wiring, 260

Braking, 253

Braking operation, 253

- DC injection brake DCB, 253

- With external brake resistor, 254

- without additional measures, 253

Bus cable length, 220

C

Cable

- For control connections, 174

- for the motor connection, 173

Cable cross-section, 221

Cable specification, 218

Cables

- cross-sections, 42, 49, 56, 60, 64, 69

- fuses, 42, 49, 56, 60, 64, 69

Commissioning, 245

- analog inputs and outputs, 227, 234

- before initial switch-on, 245

Commissioning steps, 249, 251

Communication modules, 299

Compensation equipment, Interaction with, 161

Configuration, Display functions, 270

Contactors, in the motor cable, 20

Control cable, 174

Control terminals, 81, 84, 213, 226, 232

- TopLine C, 88, 241

D

DC bus, connection to the, 199, 209

DC supply, 172

DC-bus operation, 31, 269

- Conditions, 269

- Several drives, 269

Definition of notes used, 12

Definitions, Terms, 11

Device protection, 20, 213, 298

Diagnostics, 225, 270

Digital inputs, 83, 86, 230, 237

- StateLine C, connection of an HTL incremental encoder, 231, 239

Digital outputs, 83, 86, 230, 237

Display

- Operating status, 270

- operating status, 270

Display functions, 270

Drive behaviour, Influence of the motor cable length, 161

E

Electrical installation, 155, 288

EMC

- Accessories, 304

- what to do in case of interferences, 179

EN 61000-3-2, 35

Encoder, 242

F

Fuses, 42, 49, 56, 60, 64, 69

- operation with rated power, 400 V (UL), 42, 43, 49, 50, 56, 57, 60, 64, 65, 69, 70

H

Harmonic currents, Limitation acc. to EN 61000-3-2, 35

Hazard analysis, 277

I**Identification, 28****Immunity to interference, 35****Installation**

- electrical, 288
- Mechanical, Cold plate technique, 107, 131, 150
- mechanical
 - filter with standard technology, 98, 119, 145
 - mounting variant, 100, 121, 148
 - standard technique, 94, 114, 141

Installation, electrical, 155**Installation, mechanical, 92****Interaction with compensation equipment, 161****Interference emission, 35****Interferences, eliminating EMC interferences, 179****IT system, 187, 197, 207****K****Keypad, 300****L****LED display, 270****Legal regulations, 276****Light-emitting diodes, 270****M****Mains choke, assignment to standard device, 40, 45, 52, 59, 62, 67****Mains chokes, 292****Mains connection, 172****Mains current**

- with external mains choke, 40, 44, 51, 58, 61, 66
- without external mains choke, 40, 44, 51, 58, 61, 66

Mains filter, 294**Mechanical installation, 92**

- "cold plate" technology, requirements for the cooler, 107, 131, 150
- Cold plate technique, 107, 131, 150

Memory module, 298

- E84AYM10S, 298

Mission time, 278**Motor cable, 173**

- capacitance per unit length, 33
- contactors in the, 20
- Influence of the length, 161
- requirements, 33

Motor connection, 188**Motor end, switching on the, 20****Motor power, typical, 40, 44, 51, 58, 61, 66****Motor protection, 20****Mounting, mounting variant, 100, 121, 148****mounting, filter with standard technology, 98, 119, 145****Multi-encoder, 89****N****Nameplate, 28****Notes, definition, 12****O****Operating status**

- Display, 270
- display, 270

Operation, Overcurrent, 75**Output currents, Switching frequency-dependent, 41, 47, 54, 59, 63, 68****Output power, 40, 44, 51, 58, 61, 66****output voltage, reduced, 38****output voltage , 38****Overspeeds, 20****Overview**

- Accessories, 291
- control terminals, 26
- standard devices, 23
- terminals, 77

P**Parameter set transfer, 20****Product description, 21****Proof test interval, 278****Protection of persons, 20****Q****Quick commissioning**

- with keypad control, 249
- with terminal control, 251

R**Rated data, 264**

- Operation with increased power
 - 230 V mains, 58
 - 400 V mains, 61
 - 500 V mains, 66

Rating, Brake resistors, 258

Replacement, Terminals, 302

Requirements, motor cable, 33

Residual hazards, 20, 277

Resolver, 91, 241

RFI filter, 294

Risk analysis, 277

S

Safety, safety engineering, 275

Safety engineering, 275

- Certification, 290

Safety functions, safety instructions, during operation, 277

Safety instructions, 13

- definition, 12

- during operation, 277

- layout, 12

Sensors, basics, 280

Shield and connect cables, 216

Specification of the bus cable, 218

State bus, Axis bus, 88, 243

Strip cables, 185, 195, 205, 215

Supply voltage, 24 V external, 81, 84, 226, 232

Switch-on, check before initial switch-on, 245

Switching on the motor side, 20

System bus (CAN), Baud rate, 220, 221

System bus (CANopen), 217

T

Technical data, 30, 284

- Operation with increased power

230 V mains, 58

400 V mains, 61

500 V mains, 66

Terminals, 77

Terms, definitions, 11

Total index, 308, 317

Type code, finding, 28

V

Validity, documentation, 8

W

Waste disposal, 16

Wiring

- Brake resistor, 260

- in the control cabinet, 175

- outside of the control cabinet, 177



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