

Automation systems
Drive solutions

Controls

Inverter

Motors

Gearboxes

Engineering Tools

Contents of the L-force catalogue

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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. It's as easy as that!

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.

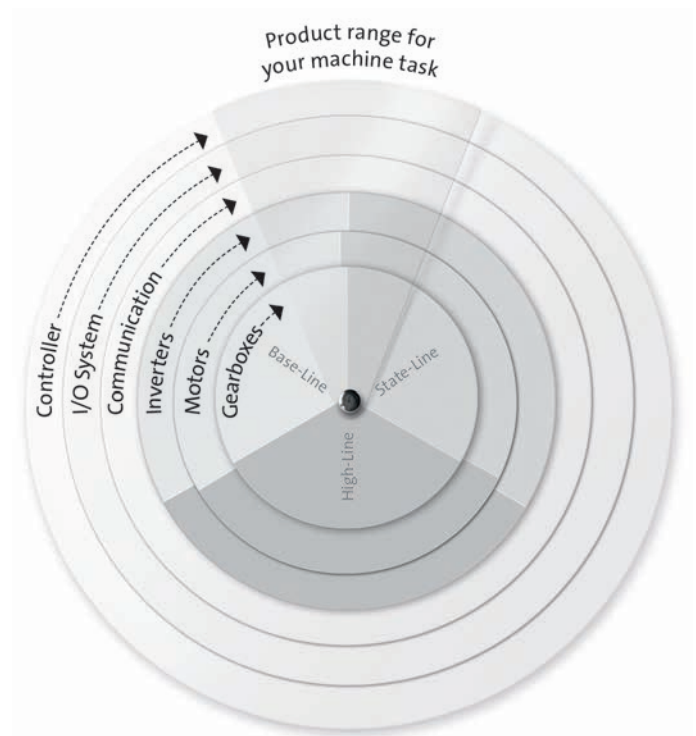
Lenze's extensive L-force product portfolio follows a very simple principle. The functions of our finely scaled products are assigned to the three lines Base-Line, State-Line or High-Line.

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:

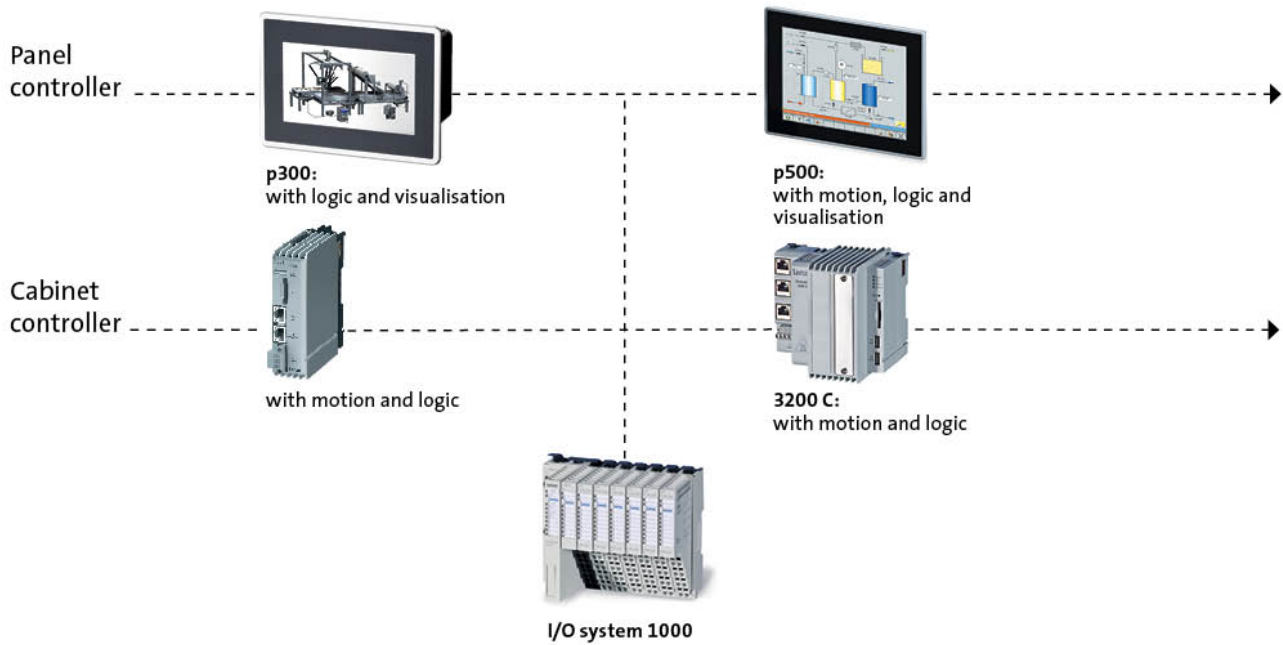
- Easy handling
- High quality and durability
- Reliable technologies in tune with the latest developments

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. It's as easy as that!

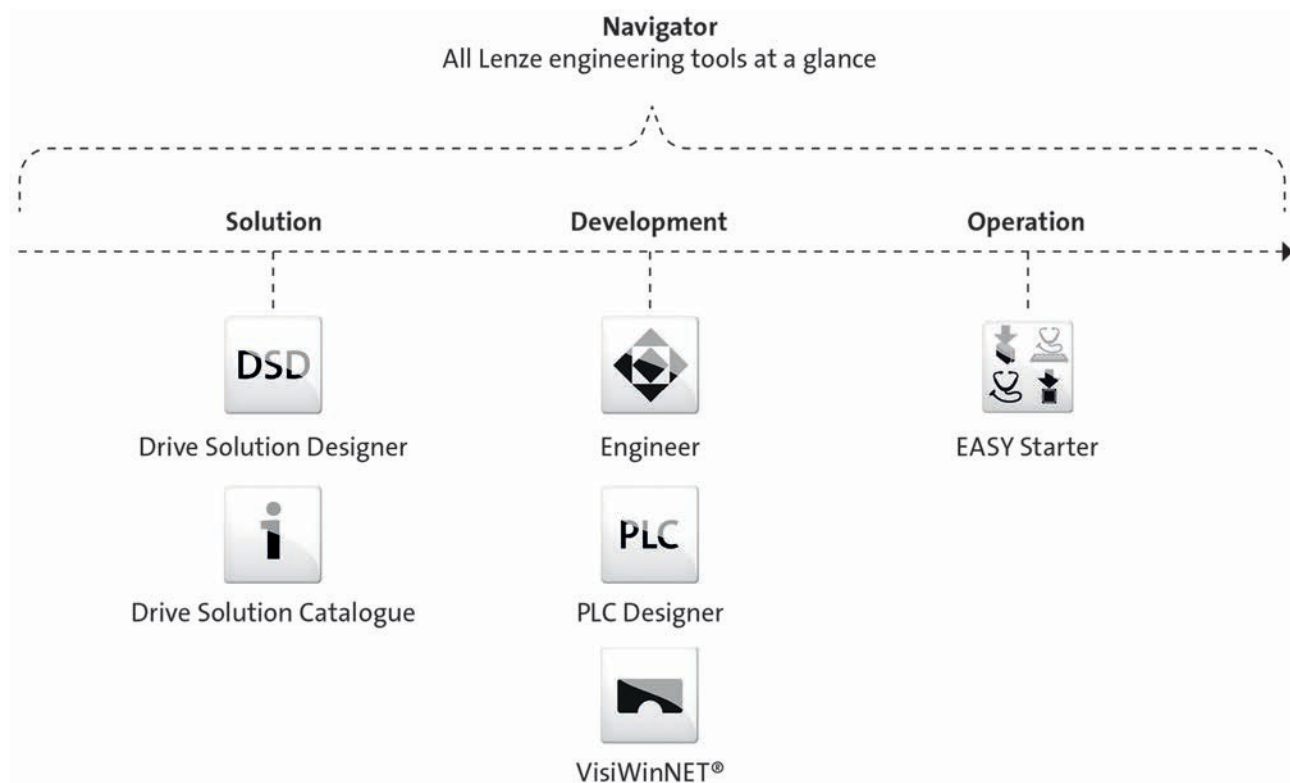


L-force product portfolio

Controls

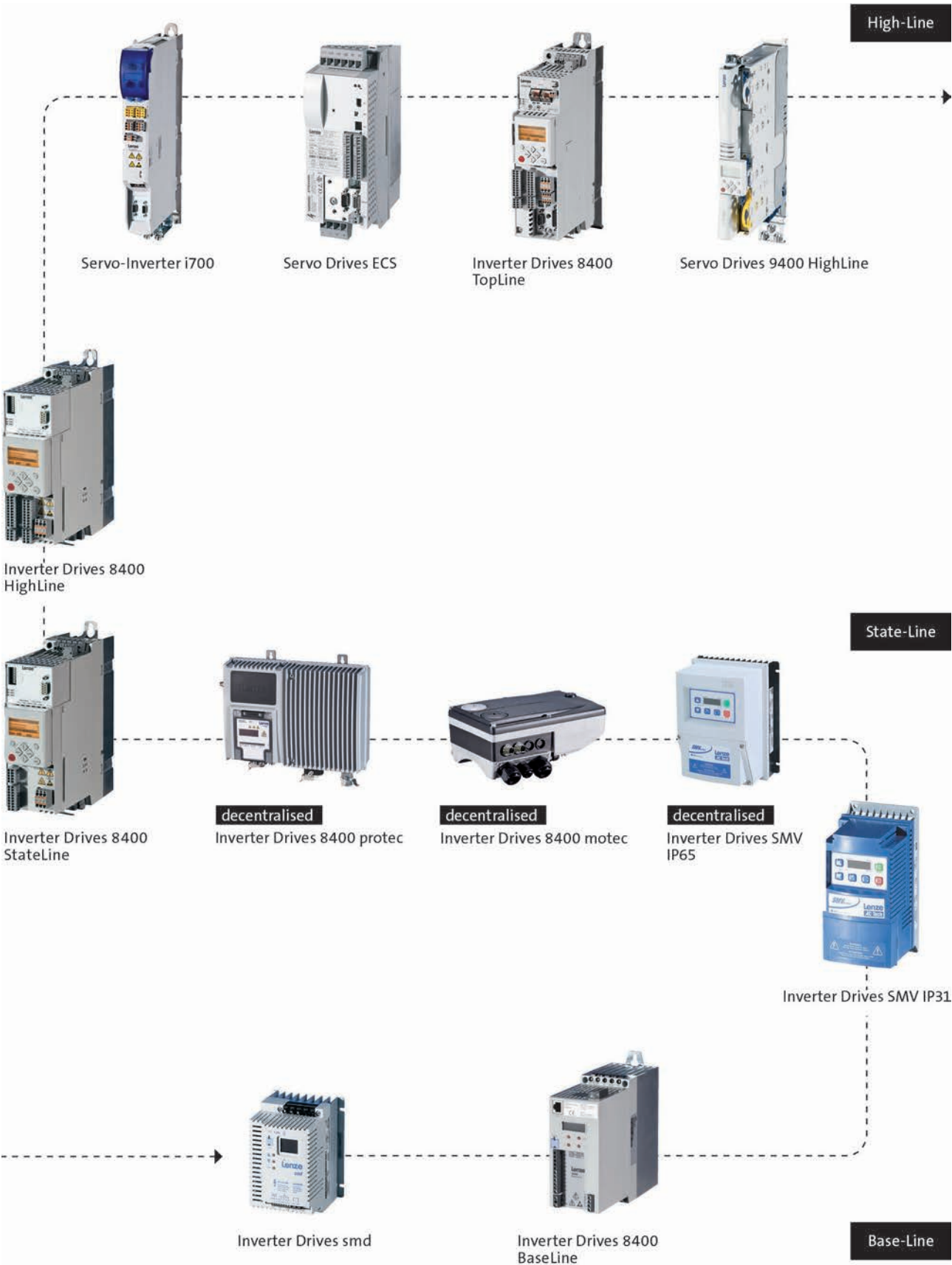


Engineering Tools



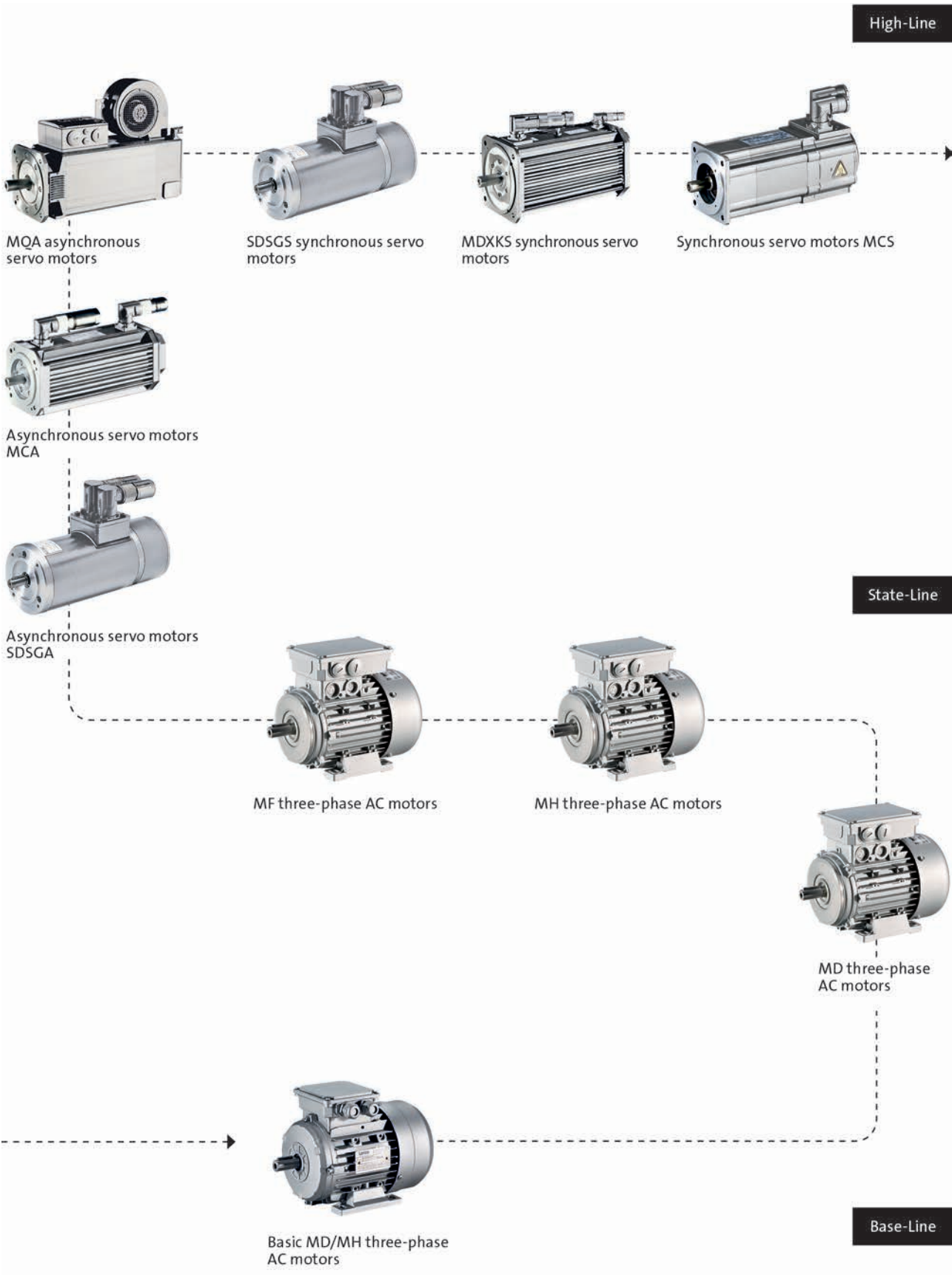
L-force product portfolio

Inverter



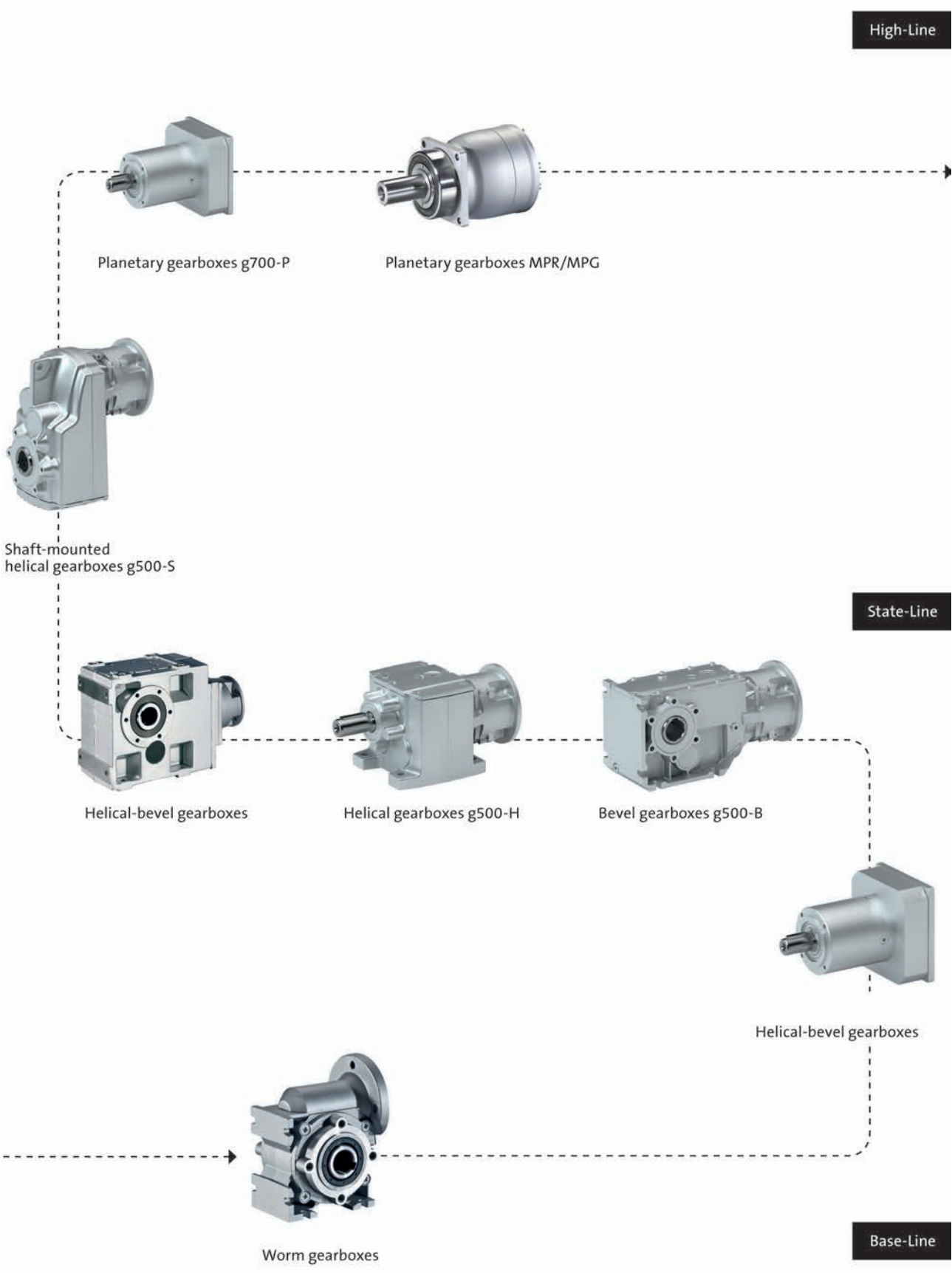
L-force product portfolio

Motors



L-force product portfolio

Gearboxes



Inverter

Inverter Drives 8400 TopLine

0.25 to 45 kW



Inverter Drives 8400 TopLine

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Inverter Drives 8400 TopLine

General information



Product key

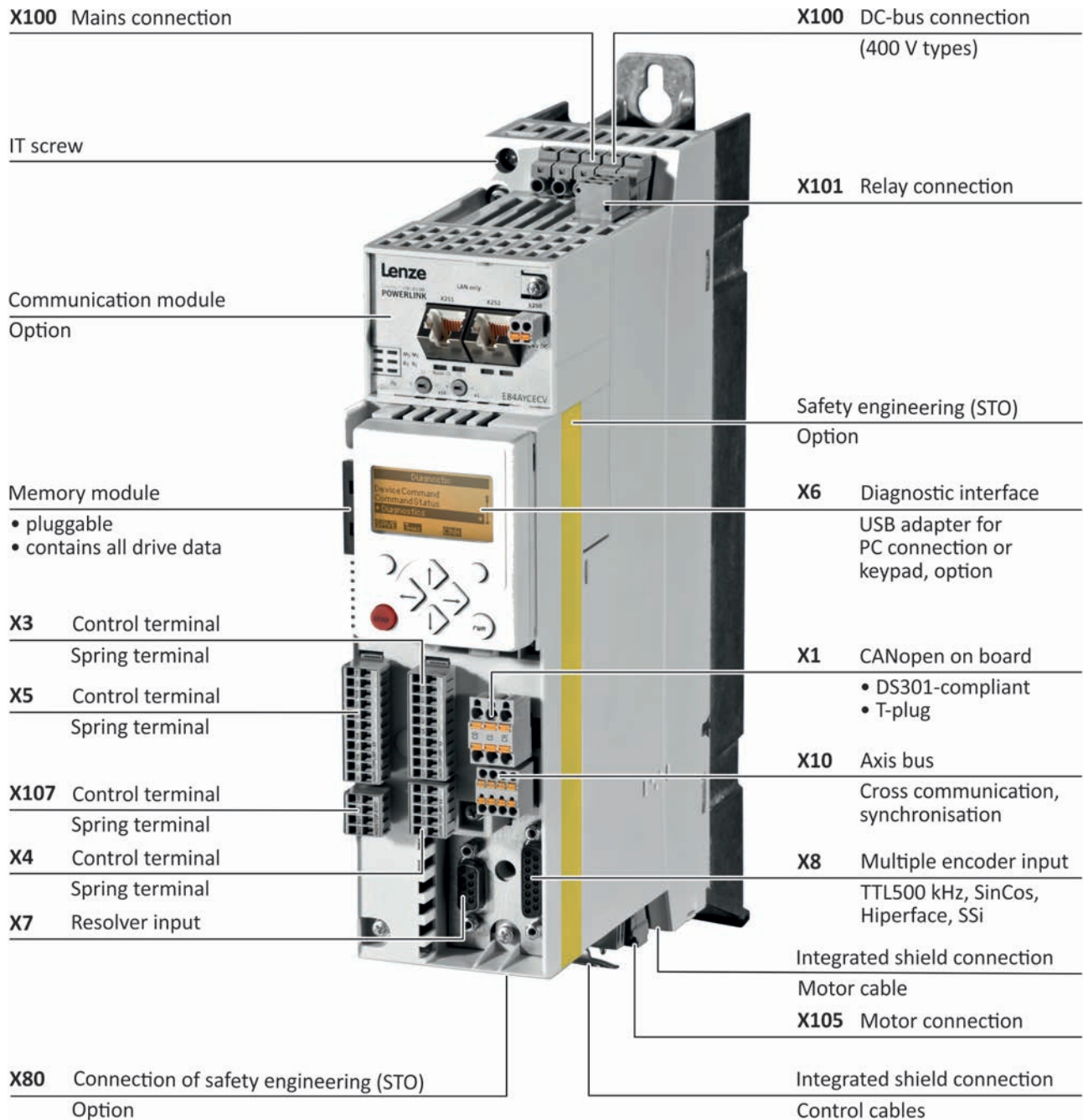
	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 45.0 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 TopLine

General information



Equipment



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

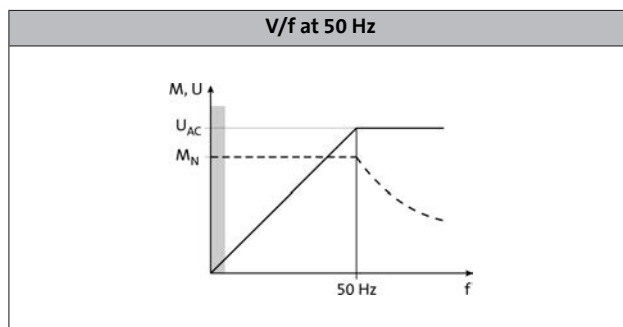


Operating modes

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.

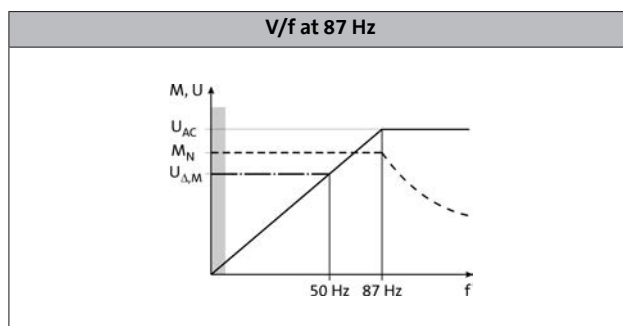
Standard setting

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.



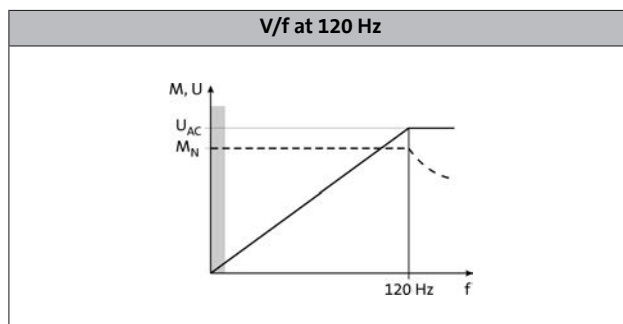
Extended setting range up to 87 Hz

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



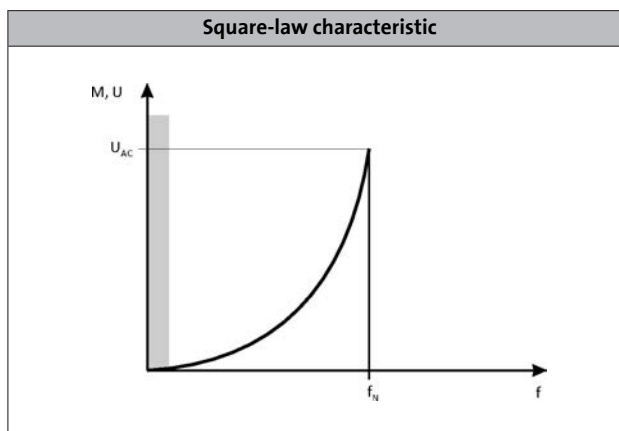
Operating modes

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.

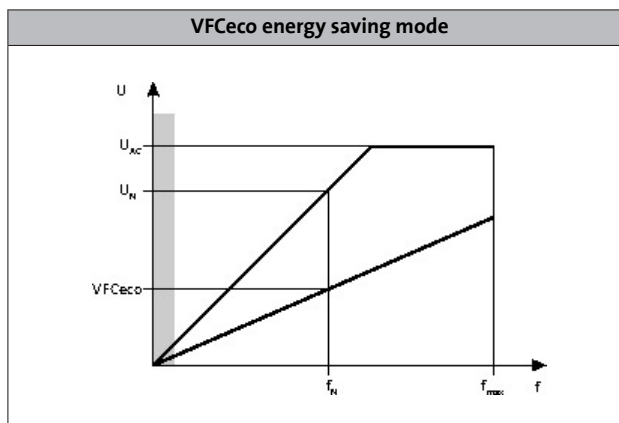
Application areas are for instance:

- Pumps
- Blowers
- Fans



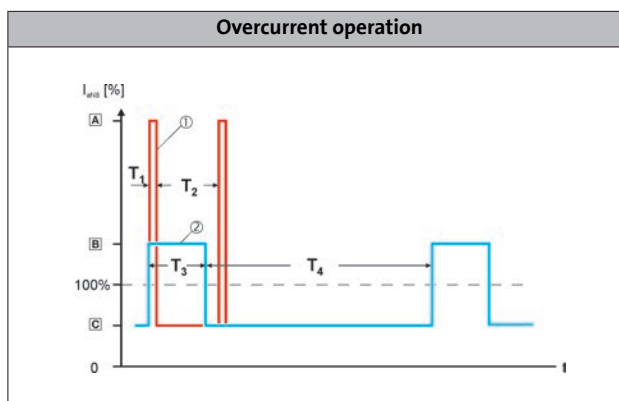
VFCeco energy saving mode

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
			2006/95/EC
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 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 _{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					

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			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 _{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
E84AVTCC7524□□0	250	≤ 0.15
E84AVTCC1134□□0	355	≤ 0.11
E84AVTCC1534□□0	390	≤ 0.10
E84AVTCC1834□□0	460	≤ 0.057
E84AVTCC2234□□0	540	≤ 0.057
E84AVTCC3034□□0	720	≤ 0.053
E84AVTCC3734□□0	810	≤ 0.047
E84AVTCC4534□□0	1080	≤ 0.035

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	E84AVTCC7524□□0
Dimensions						
Height, including fastening	h	[mm]	295	318		378
Width, including fastening	b	[mm]	70	174		
Depth ¹⁾	t	[mm]	178	156		
Mass						
	m	[kg]	2.2	2.9		3.8

Product key			E84AVTCC1134□□0	E84AVTCC1534□□0	E84AVTCC1834□□0	E84AVTCC2234□□0
Dimensions						
Height, including fastening	h	[mm]	378		407	
Width, including fastening	b	[mm]	174		231	
Depth ¹⁾	t	[mm]	156		179	
Mass						
	m	[kg]	3.8		9.5	

Product key			E84AVTCC3034□□0	E84AVTCC3734□□0	E84AVTCC4534□□0
Dimensions					
Height, including fastening	h	[mm]	520		
Width, including fastening	b	[mm]	250		
Depth ¹⁾	t	[mm]	199		
Mass					
	m	[kg]	16.9		

¹⁾ With safety engineering plus 20 mm



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]	[mm2]	
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	20	2.5	
5.50		E84AV□□□5524□□□	C20	20	20		4.0
7.50		E84AV□□□7524□□□					
11.0		E84AV□□□1134□□□	C32	32	30	10.0	
15.0		E84AV□□□1534□□□			40		
18.5		E84AV□□□1834□□□	C50	50	50	16.0	
22.0		E84AV□□□2234□□□	C63	63	70	25.0	
30.0		E84AV□□□3034□□□	C80	80	80		
37.0		E84AV□□□3734□□□	C100	100	100	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□□□			6	
0.75		E84AV□□□7514□□□			6	
1.10		E84AV□□□1124□□□	C10	10	10	1.5
1.50		E84AV□□□1524□□□			10	
2.20		E84AV□□□2224□□□			10	
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	25	10.0
11.0		E84AV□□□1134□□□			40	
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
 $\leq 1.5 \text{ mm}^2$ / AWG 16: $C_{\text{core-core}} / C_{\text{core-shield}} \leq 75 / \leq 150 \text{ pF/m}$
 $\geq 2.5 \text{ mm}^2$ / 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□□□				

Inverter Drives 8400 TopLine

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)
	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□□□						

Inverter Drives 8400 TopLine

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		
	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:

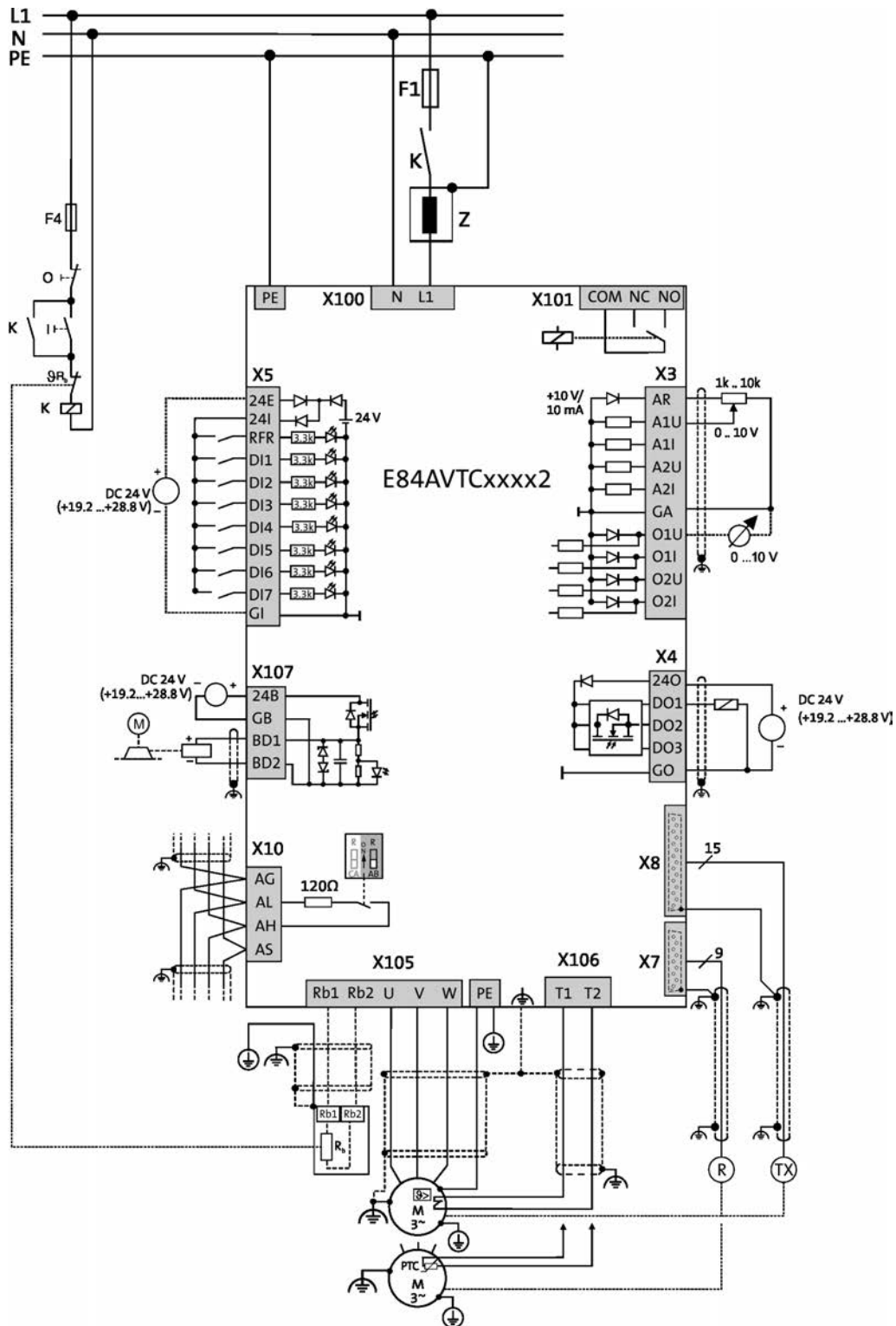
- 0.25 to 45 kW up to 25 m shielded motor cable with integrated RFI measures
- 0.25 to 45 kW up to 50 m shielded motor cable with RFI filter LD.

- ▶ 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

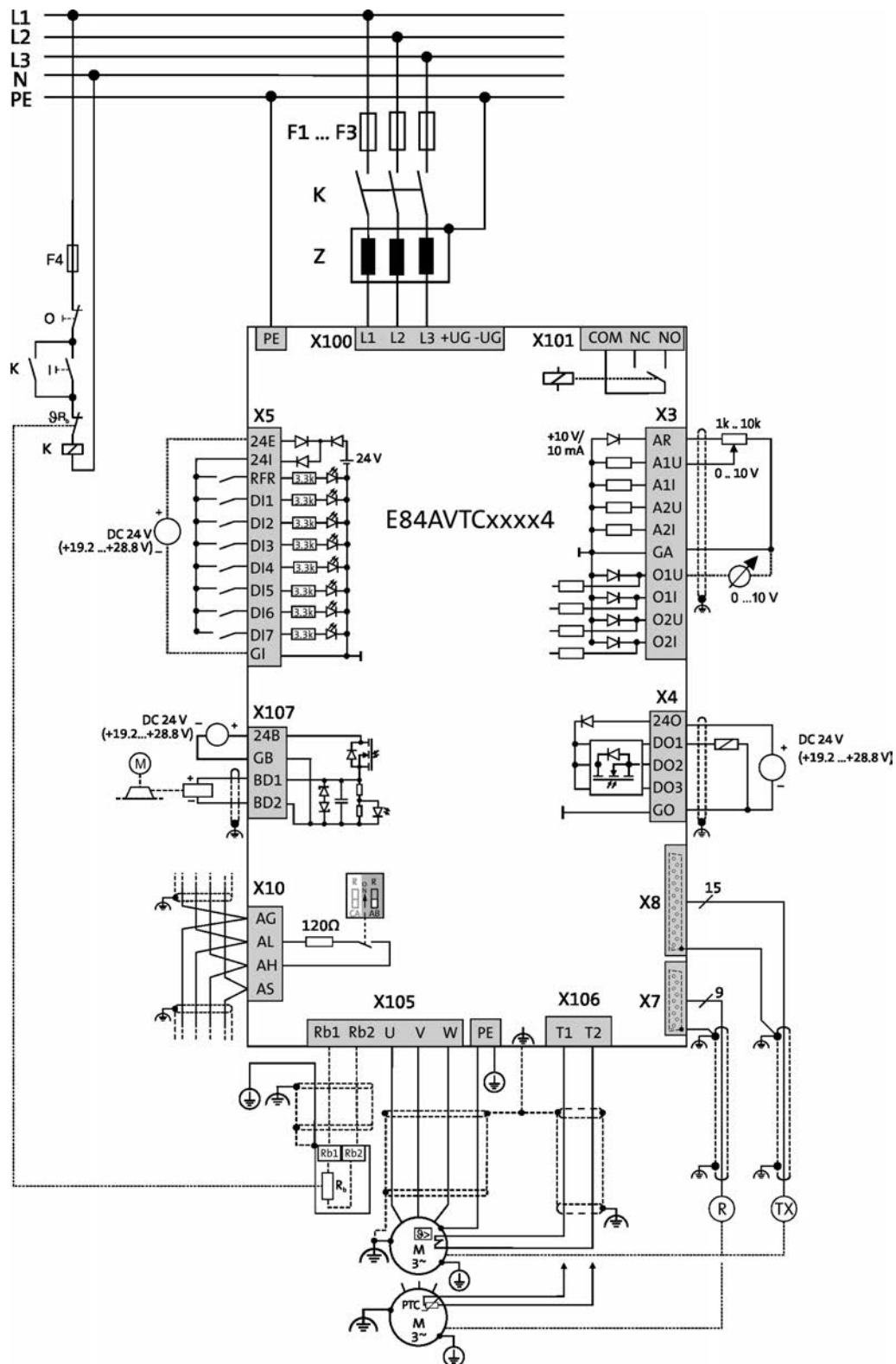
Wiring example for connecting Inverter Drives 8400 TopLine to 1 x 230V





Connection diagrams

Verdrahtungsbeispiel Inverter Drives 8400 TopLine an 3 x 400 V





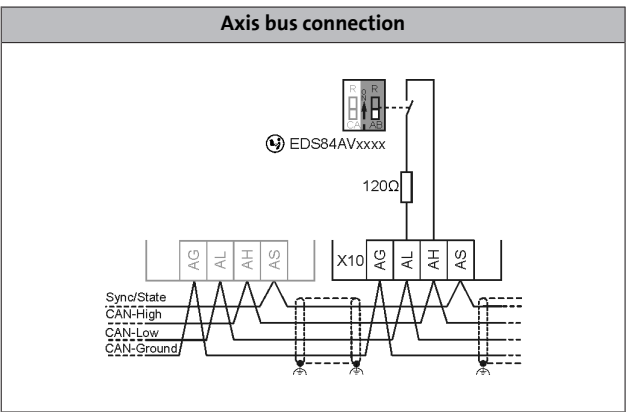
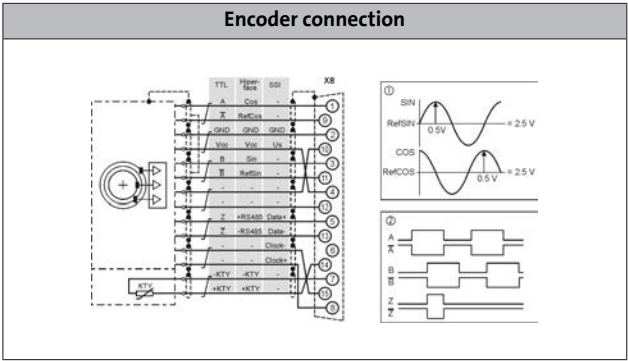
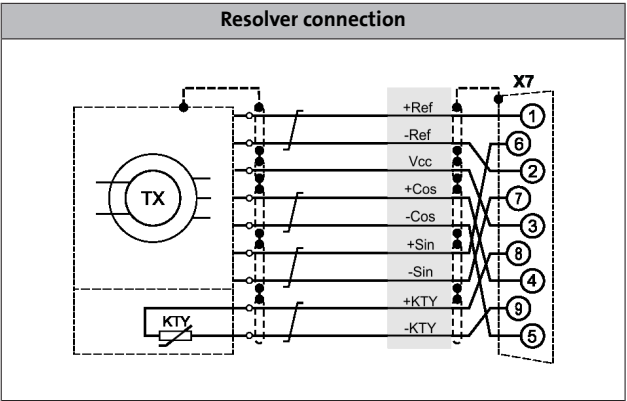
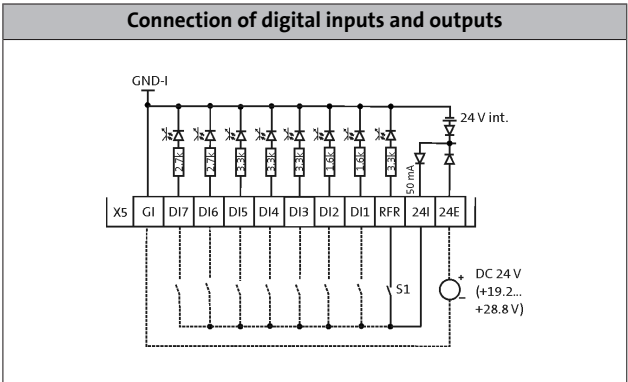
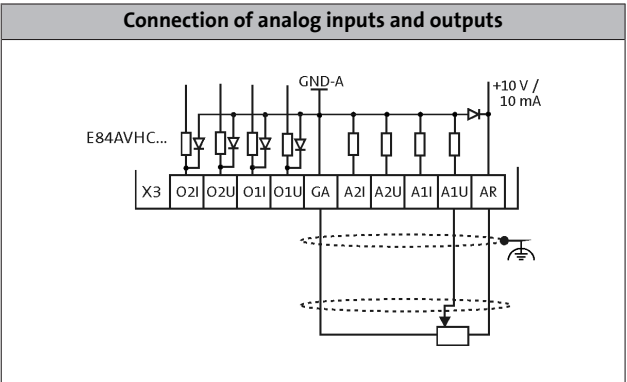
Control connections

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



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

- 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 TopLine

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 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	$I_{\max}$	[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]	[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	3 AC 320 ... 550	E84AV□□□2222□□□	ERBP033R300W		0.30	45.0	320 x 41 x 122	1.4
0.37		E84AV□□□3714□□□						
0.55		E84AV□□□5514□□□	ERBM390R100W	390.0	0.10	15.0	235 x 20.6 x 40	0.4
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 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□□□						

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	96 x 96 x 90	2.1
1.10		E84AV□□□1122□□□				
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□□□				
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	110 x 155 x 167	5.9
30.0		E84AV□□□1834□□□ ¹⁾	EZAELN3045B651	45.0		
37.0		E84AV□□□2234□□□ ¹⁾	EZAELN3063B471	63.0	122 x 185 x 210	9.7
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□□□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 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		E84AV□□□3714□□□				
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□□□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□□□				

► 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 asyn-chronous 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		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		
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 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		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

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



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 $\pm$ 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

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

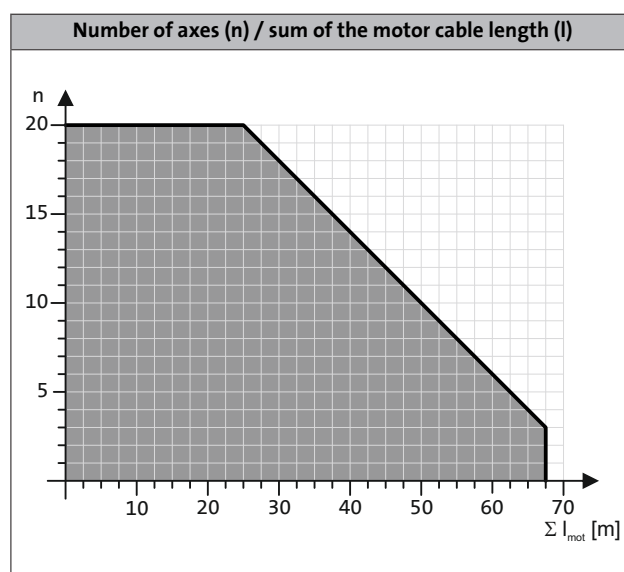
RFI filters

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.



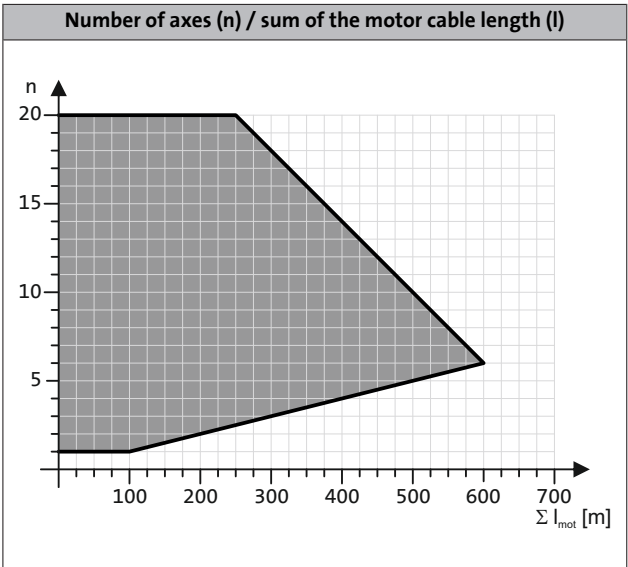
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

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.





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

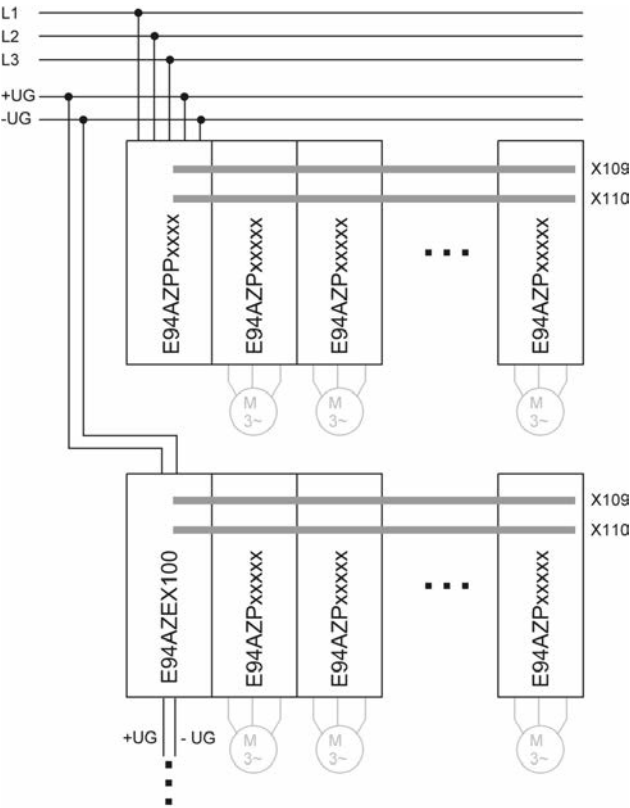
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied 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
End cap	End caps for DC busbar (packaging unit 10 pcs)	EWZ0038
Terminal	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								
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) tat 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□□□									
E84AV□□□3714□□□									
E84AV□□□5514□□□									
E84AV□□□7514□□□									
E84AV□□□1124□□□									
E84AV□□□1524□□□									
E84AV□□□2224□□□									
E84AV□□□3024□□□									
E84AV□□□4024□□□		E84AZEVS004X100/M							
E84AV□□□5524□□□									
E84AV□□□7524□□□									
E84AV□□□1134□□□		E84AZEVS005X100/M				E84AZEVS012X105/M			
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

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Inverter Drives 8400 HighLine

General information



Product key

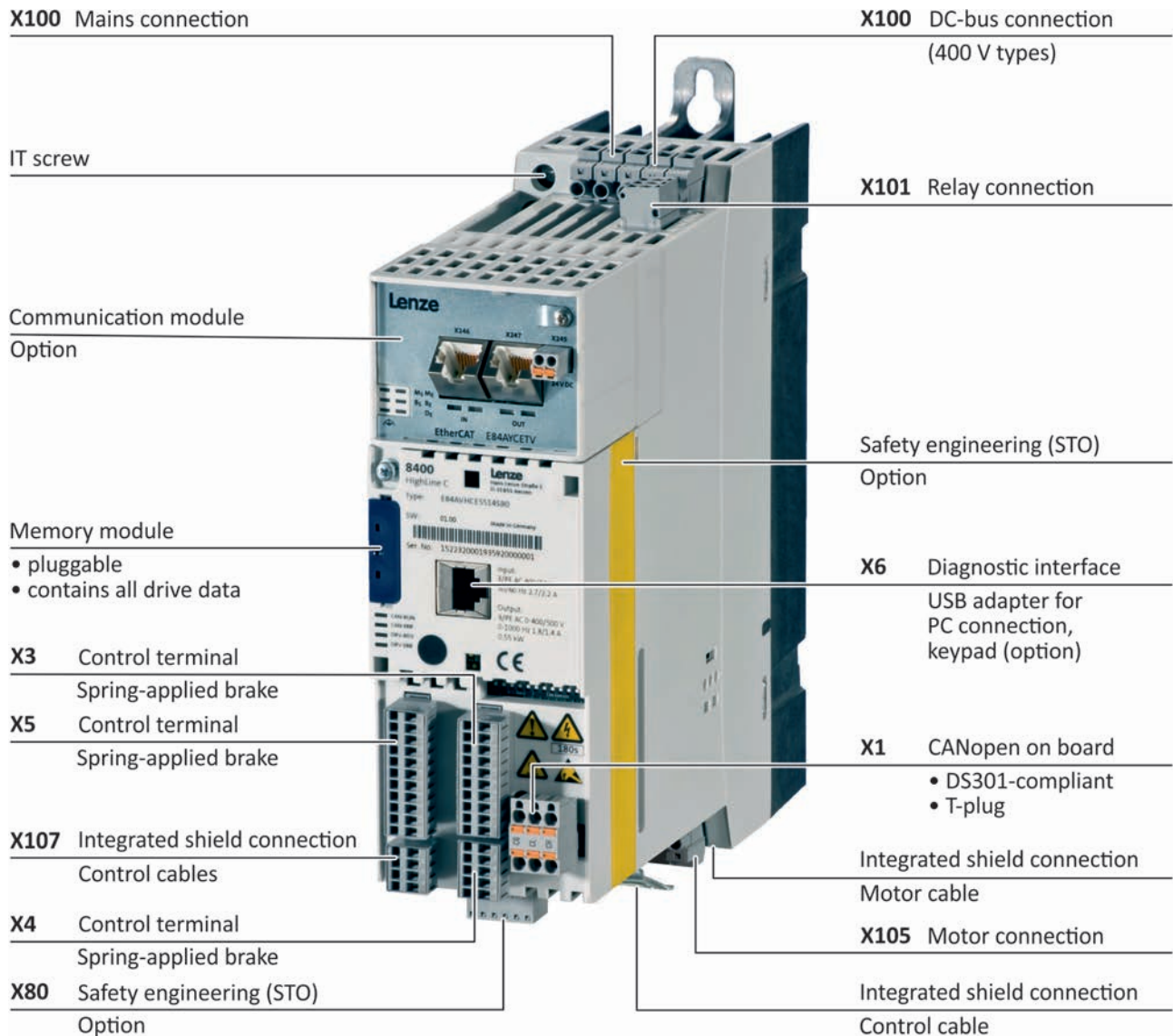
	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 45.0 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

Inverter Drives 8400 HighLine

General information

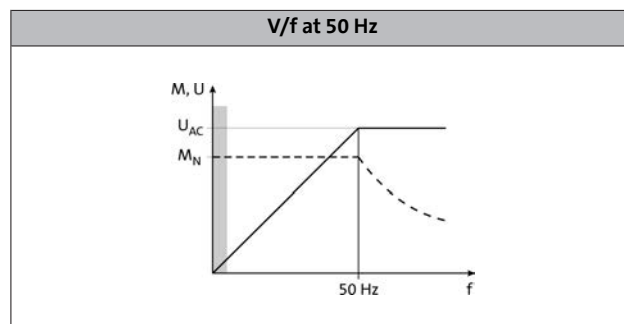


Operating modes

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.

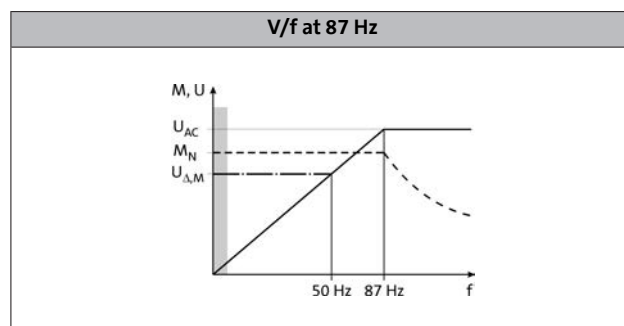
Standard setting

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.



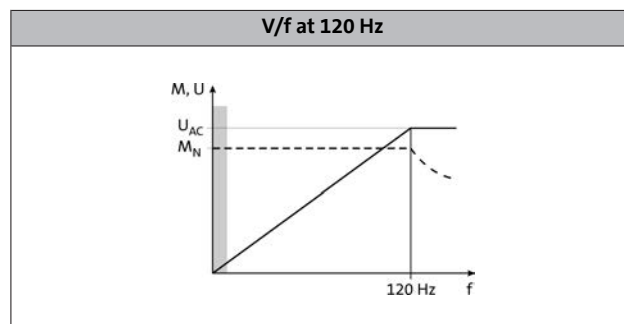
Extended setting range up to 87 Hz

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



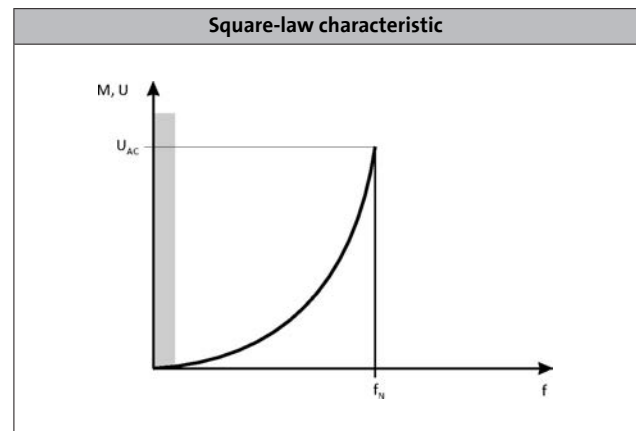
Operating modes

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.

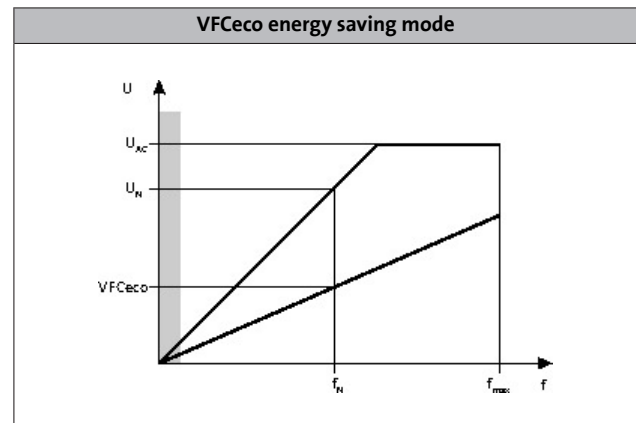
Application areas are for instance:

- Pumps
- Blowers
- Fans



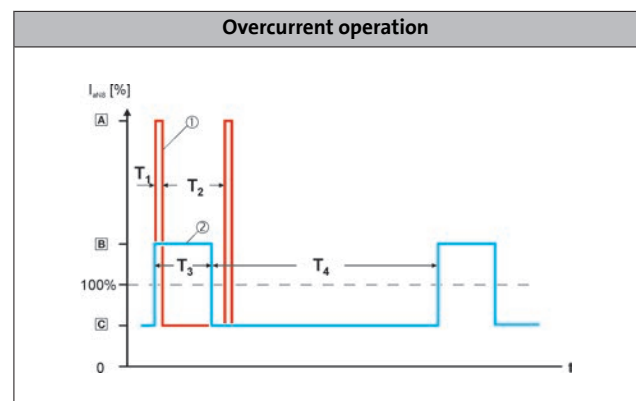
VFCeco energy saving mode

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
			2006/95/EC
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

4.6

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			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						
	$I_{max,out}$	[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.

						
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			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 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								
	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]	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□□0 E84AVHCC1124□□S		E84AVHC□1524□□0 E84AVHCC1524□□S		E84AVHC□2224□□0 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	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 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			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]	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]						
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			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]	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]	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

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						
	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 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								
	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]	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
E84AVHCC7524□□0	250	≤ 0.15
E84AVHCC1134□□0	355	≤ 0.11
E84AVHCC1534□□0	390	≤ 0.10
E84AVHCC1834□□0	460	≤ 0.057
E84AVHCC2234□□0	540	≤ 0.057
E84AVHCC3034□□0	720	≤ 0.053
E84AVHCC3734□□0	810	≤ 0.047
E84AVHCC4534□□0	1080	≤ 0.035

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	E84AVHCC7524□□0
Dimensions						
Height, including fastening	h	[mm]	295	318		378
Width, including fastening	b	[mm]	70	174		
Depth ¹⁾	t	[mm]	163	141		
Mass						
	m	[kg]	2.0	2.7		3.6

Product key			E84AVHCC1134□□0	E84AVHCC1534□□0	E84AVHCC1834□□0	E84AVHCC2234□□0
Dimensions						
Height, including fastening	h	[mm]	378		407	
Width, including fastening	b	[mm]	174		231	
Depth ¹⁾	t	[mm]	141		164	
Mass						
	m	[kg]	3.6		9.3	

Product key			E84AVHCC2234□□0	E84AVHCC3734□□0	E84AVHCC4534□□0
Dimensions					
Height, including fastening	h	[mm]	407	520	
Width, including fastening	b	[mm]	231	250	
Depth ¹⁾	t	[mm]	164	184	
Mass					
	m	[kg]	9.3	16.9	

¹⁾ With safety engineering plus 20 mm



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)	
	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	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□□□				

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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		
	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:

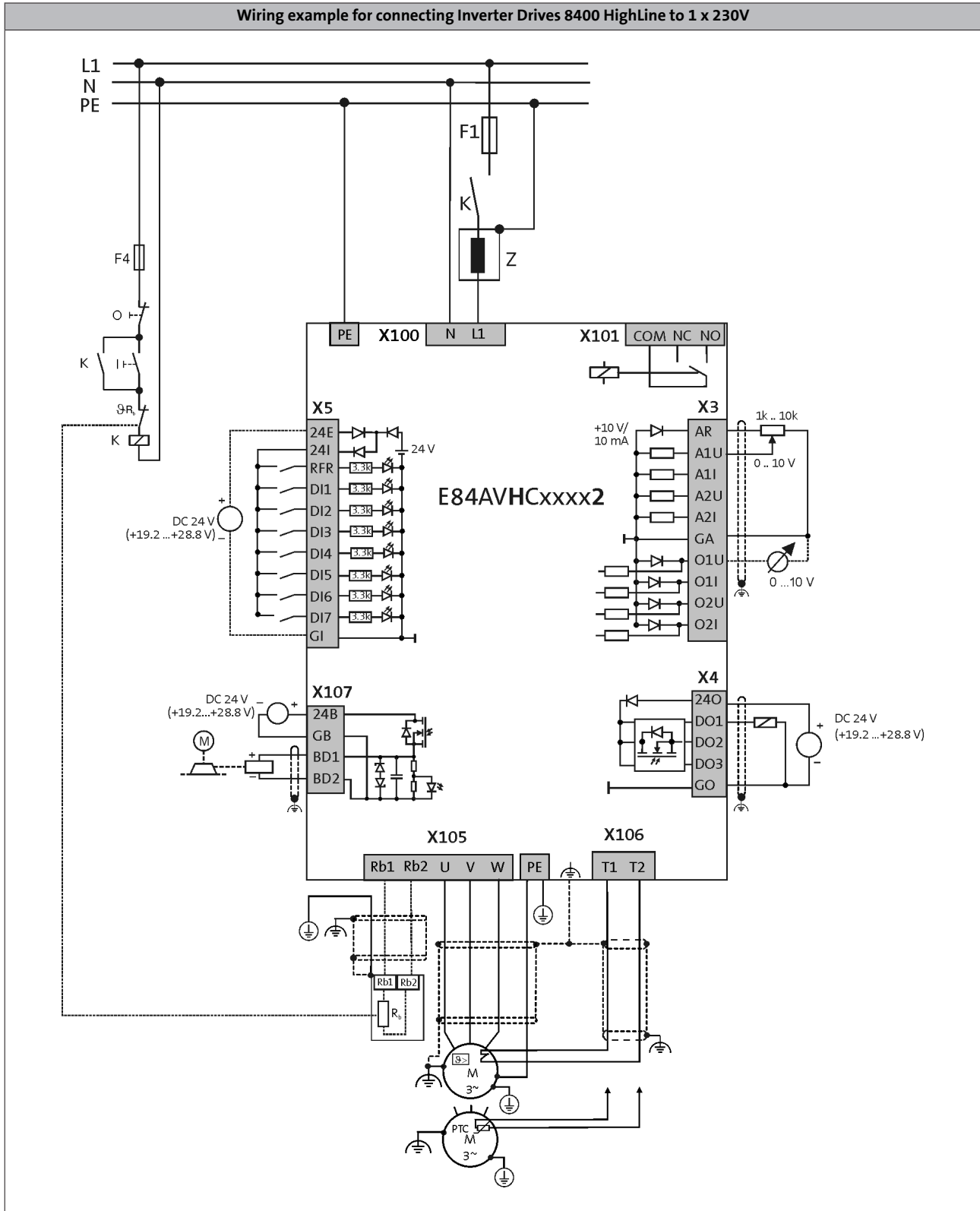
- 0.25 to 45 kW up to 25 m shielded motor cable with integrated RFI measures
- 0.25 to 45 kW up to 50 m shielded motor cable with RFI filter LD.

- ▶ 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 HighLine to 1 x 230V





Inverter Drives 8400 HighLine

Interfaces



Control connections

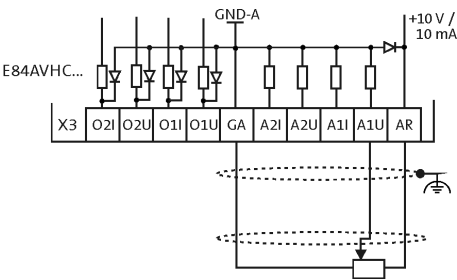
Mode	8400 HighLine
Analog inputs	
Number	2 Optional: voltage or current input
Resolution	10 bits + sign
Value range	0 ... +/- 10V, 0/4 ... 20 mA
Analog outputs	
Number	2 Optional: voltage or current output
Resolution	10 bits
Value range	0 ... 10V, 0/4 ... 20mA
Digital inputs	
Number	8
Switching level	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

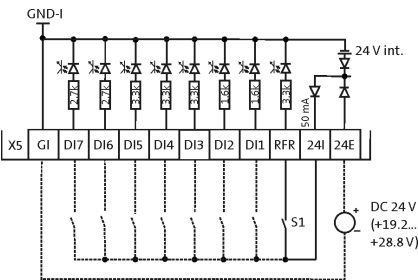


Control connections

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			
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			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 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			
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□□□					
2.20		E84AV□□□1524□□□	EZAELN3006B492	6.00	69 x 95 x 120	1.5	
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□□□				

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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□□□				

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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	
5.50		E84AV□□□3024□□0	E84AZESR5524LD	18.0	306 x 140 x 60	2.4	
7.50		E84AV□□□4024□□□					
11.0		E84AV□□□5524□□□					
15.0			E84AV□□□7524□□□	E84AZESR1534LD	29.0	361 x 140 x 60	3.3
			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		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

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



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	

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 $\pm$ 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

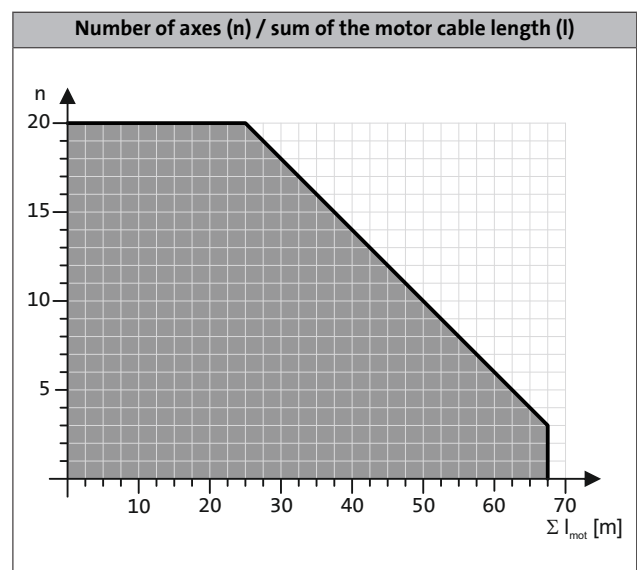
RFI filters

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

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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.



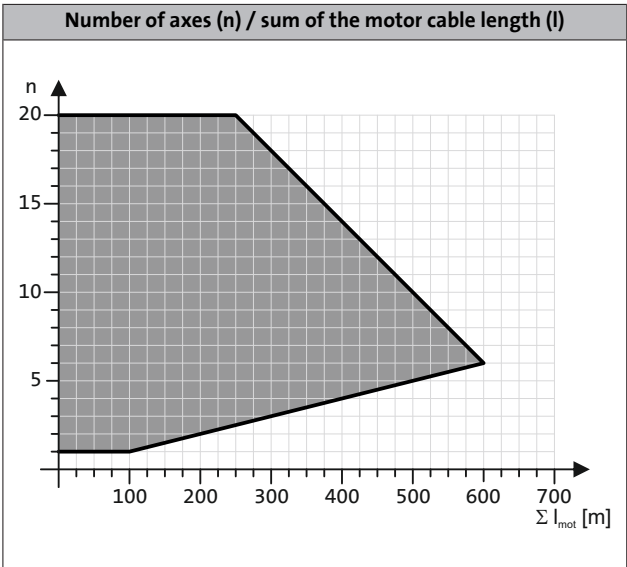
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

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.

Inverter Drives 8400 HighLine

Accessories



DC input module

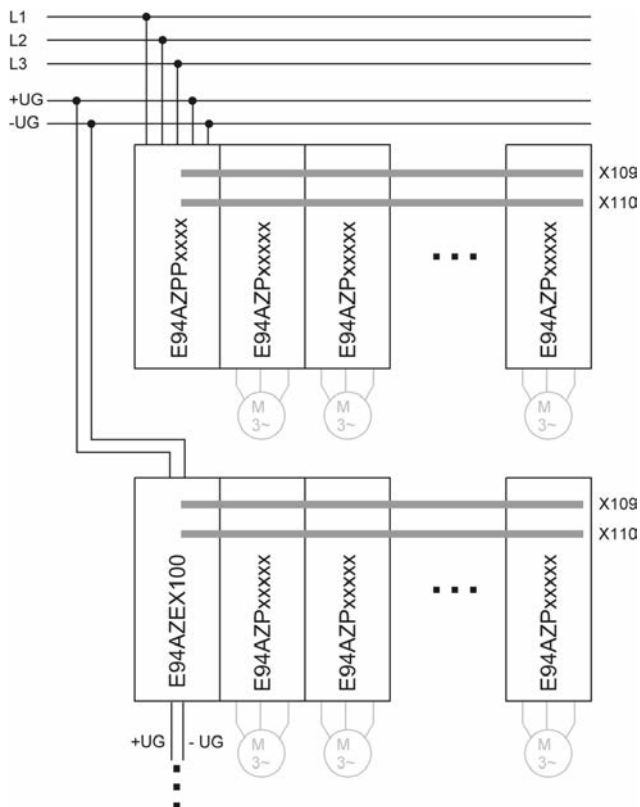
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied 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

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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	

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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
5.50		E84AV□□□5524□□□	EFSGR0400AYHN		EFSGR0400AYHK		
7.50		E84AV□□□7524□□□					
11.0		E84AV□□□1134□□□					
15.0		E84AV□□□1534□□□					

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

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

Inverter Drives 8400 HighLine

Accessories



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□□□		• Connection: mains • Packaging unit: 5 items	E84AZEVS003X100/M				E84AZEVS004X100/M	E84AZEVS011X105/M
E84AV□□□3714□□□								
E84AV□□□5514□□□								
E84AV□□□7514□□□								
E84AV□□□1124□□□								
E84AV□□□1524□□□								
E84AV□□□2224□□□								
E84AV□□□3024□□□								
E84AV□□□4024□□□								
E84AV□□□5524□□□								
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

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Inverter Drives 8400 StateLine

General information



Product key

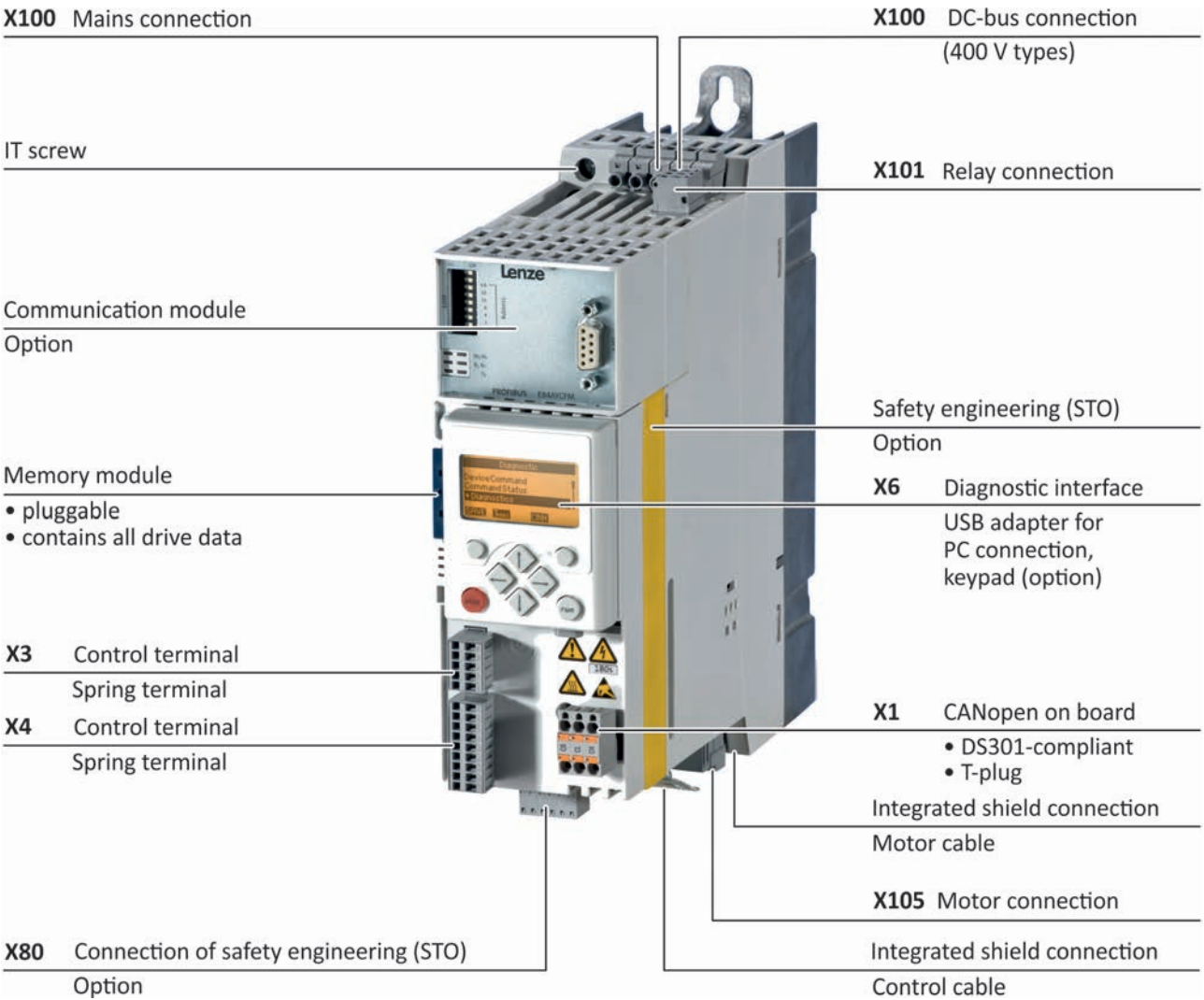
	E84AV	SC	E	751	2	S	X	0	-	PM	K	XX
Type												
SC - StateLine (0.25 ... 45.0 kW)												
HC - HighLine (0.25 ... 45.0 kW)												
TC - TopLine (0.25 ... 45.0 kW)												
Design												
E - installation												
D - push-through technique (0.25 ... 15.0 kW)												
C - cold-plate technology (0.25 ... 45.0 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 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

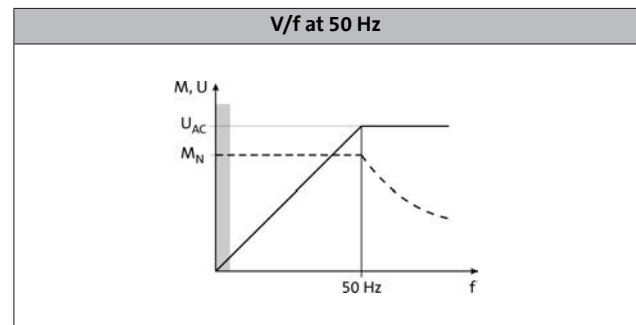


Operating modes

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.

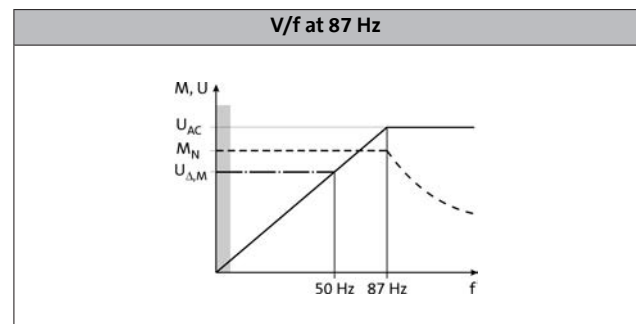
Standard setting

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

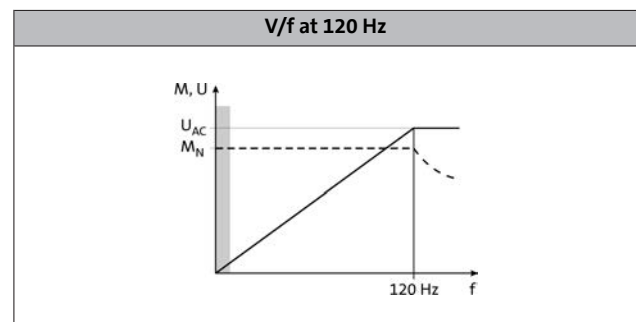
If the V/f reference point on the inverter is set to 87 Hz, the rated torque can be used across an extended setting range. Here, a 230/400V motor is for example used and operated in a delta layout with a 400V inverter. The setting range is then increased by 40 %. The inverter must be dimensioned for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



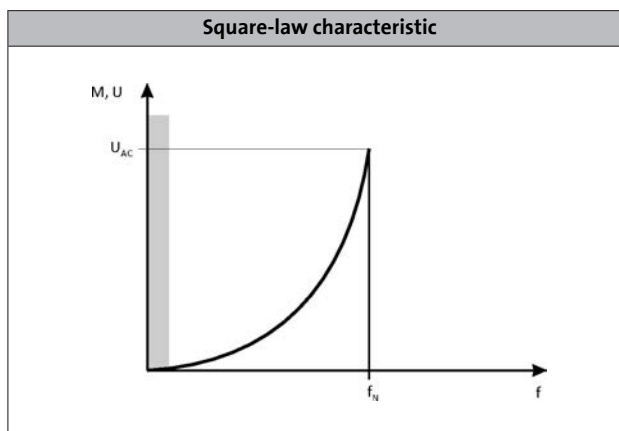
Operating modes

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.

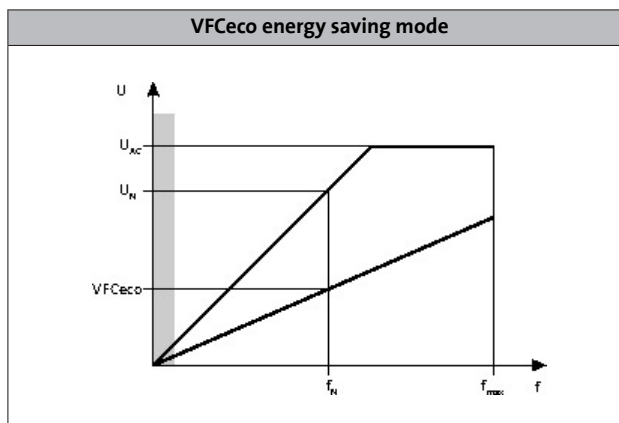
Application areas are for instance:

- Pumps
- Blowers
- Fans



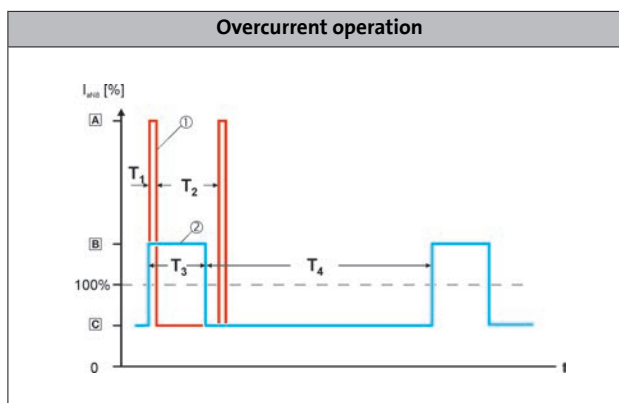
VFCeco energy saving mode

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
			2006/95/EC
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						
	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				
	$I_{\text{max, out}}$	[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			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]	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

4.7

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								
	U _{DC}	[V]						
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

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			DC 455 V -0 % ... 775 V +0 %					
	U _{DC}	[V]						
Rated DC-bus current			24.5					
	I _{N, DC}	[A]						
Power loss			0.320		0.435		0.470	
	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]	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						
	$I_{max,out}$	[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
E84AVSCC7524□□0	250	≤ 0.15
E84AVSCC1134□□0	355	≤ 0.11
E84AVSCC1534□□0	390	≤ 0.10
E84AVSCC1834□□0	460	≤ 0.057
E84AVSCC2234□□0	540	≤ 0.057
E84AVSCC3034□□0	720	≤ 0.053
E84AVSCC3734□□0	810	≤ 0.047
E84AVSCC4534□□0	1080	≤ 0.035

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	E84AVSCC7524□□0
Dimensions						
Height, including fastening	h	[mm]	295	318		378
Width, including fastening	b	[mm]	70	174		
Depth ¹⁾	t	[mm]	163	141		
Mass						
	m	[kg]	2.0	2.7		3.6

Product key			E84AVSCC1134□□0	E84AVSCC1534□□0	E84AVSCC1834□□0	E84AVSCC2234□□0
Dimensions						
Height, including fastening	h	[mm]	378		407	
Width, including fastening	b	[mm]	174		231	
Depth ¹⁾	t	[mm]	141		164	
Mass						
	m	[kg]	3.6		9.3	

Product key			E84AVSCC2234□□0	E84AVSCC3734□□0	E84AVSCC4534□□0
Dimensions					
Height, including fastening	h	[mm]	407	520	
Width, including fastening	b	[mm]	231	250	
Depth ¹⁾	t	[mm]	164	184	
Mass					
	m	[kg]	9.3	16.9	

¹⁾ With safety engineering plus 20 mm



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□□□			25	
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)
			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
	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□□□						

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			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	
	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			
	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□□□							
							100		



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.

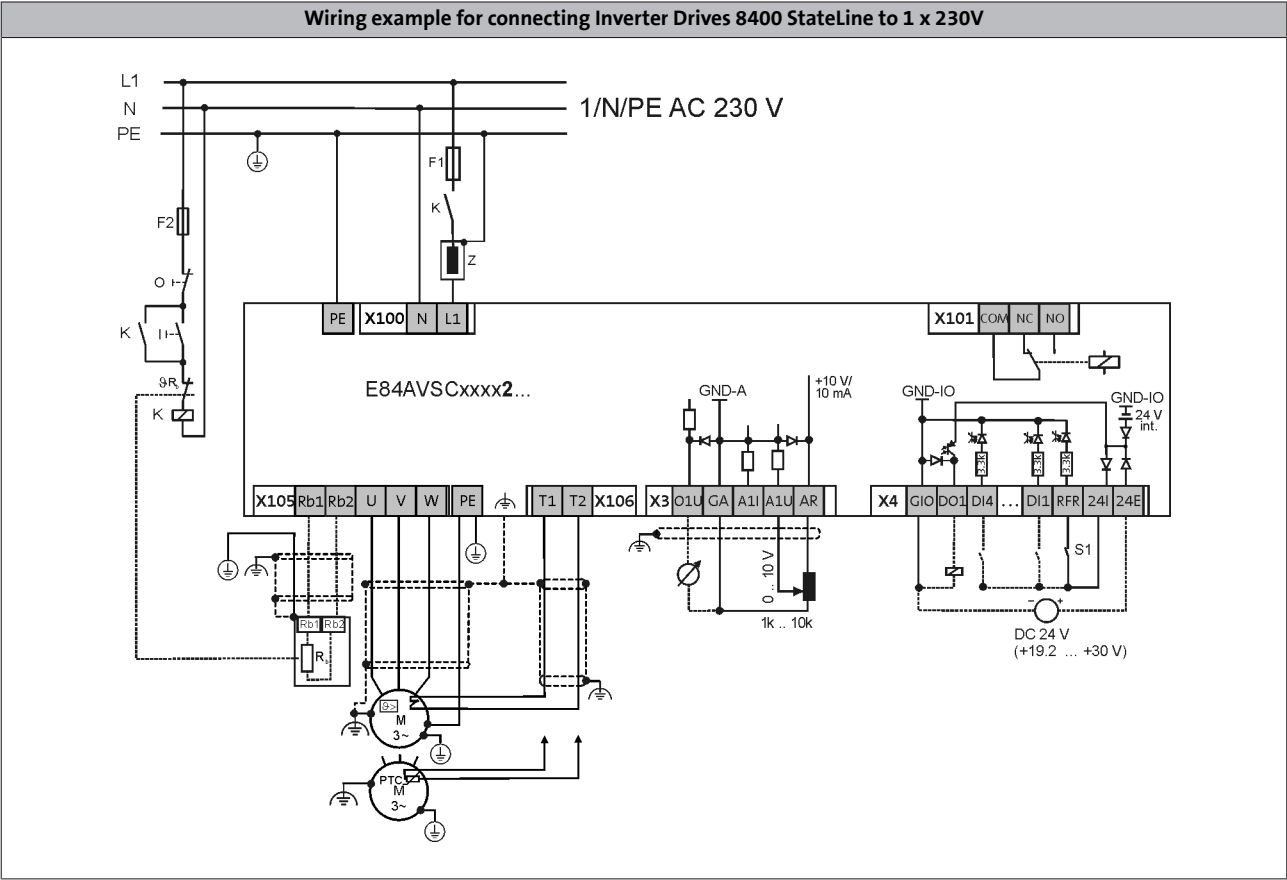
Earth-leakage circuit breaker 300 mA:

- 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







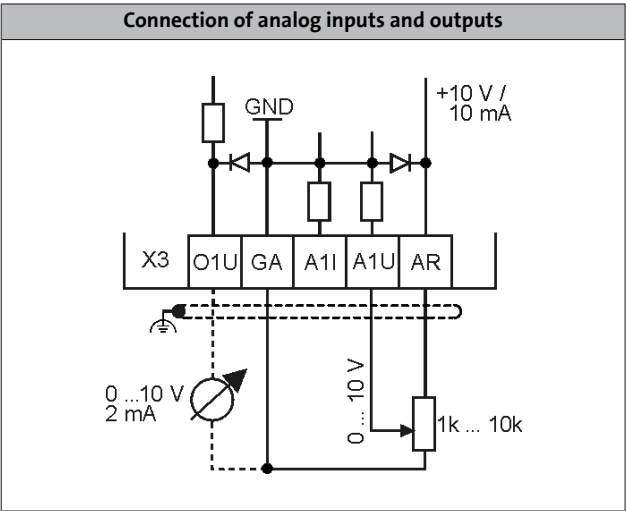
Control connections

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

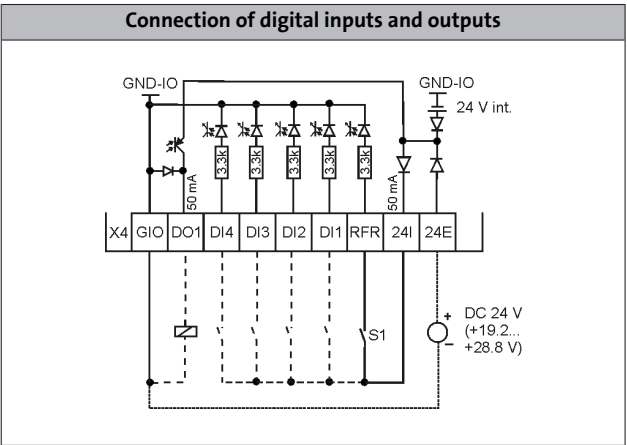
¹⁾ For mains-independent control electronics supply



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



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



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	$l_{\max}$	[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□□□	ERBP180R200W	180.0	0.20	30.0	240 x 41 x 122	1.0
1.10		E84AV□□□1124□□□						
1.50		E84AV□□□1524□□□	ERBP180R300W		0.30	45.0	320 x 41 x 122	1.4
2.20		E84AV□□□2224□□□						



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	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 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	$h \times b \times t$	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 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	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 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□□□	E84AZESR2224SD	7.30	317 x 70 x 60	1.4
1.50		E84AV□□□1124□□□				
2.20		E84AV□□□1524□□□	E84AZESR3024SD	9.80	317 x 70 x 60	1.5
3.00		E84AV□□□2224□□□				
4.00		E84AV□□□3024□□S	E84AZESR5524SD	18.0	306 x 140 x 60	3.1
		E84AV□□□3024□□0				
5.50		E84AV□□□4024□□□	E84AZESR1534SD	29.0	361 x 140 x 60	4.4
7.50		E84AV□□□5524□□□				
11.0		E84AV□□□7524□□□				
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
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	

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			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

4.7

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			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
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			

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]	[KWs]	[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

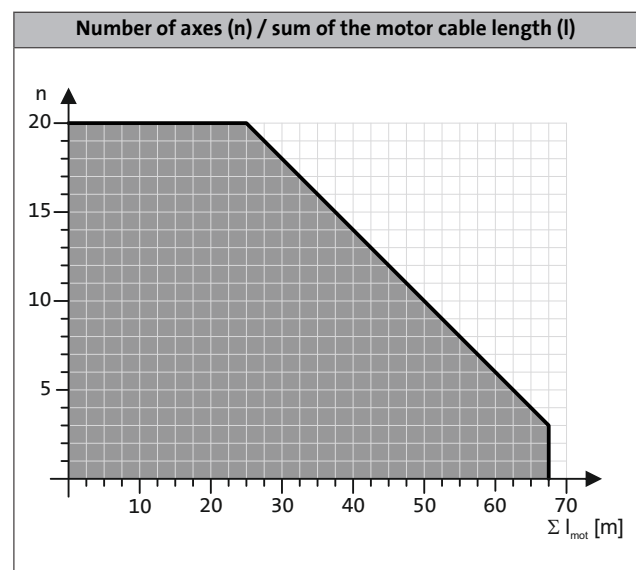
RFI filters

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

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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.



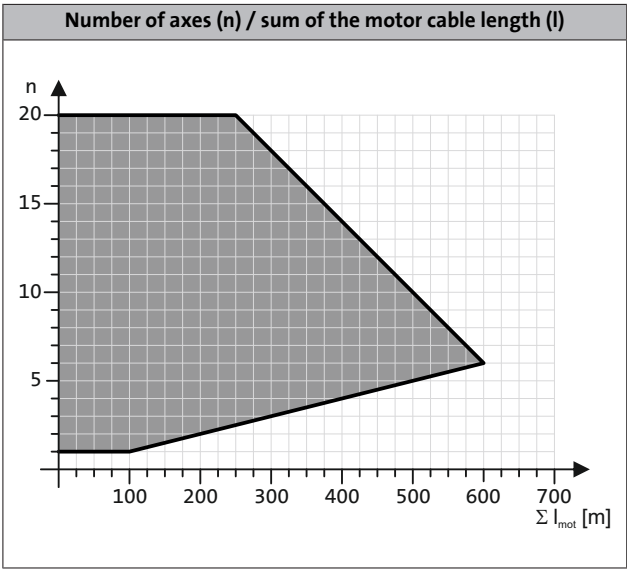
Mains filter, can be mounted beside the power supply modules (right) or the regenerative power supply modules (left)

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

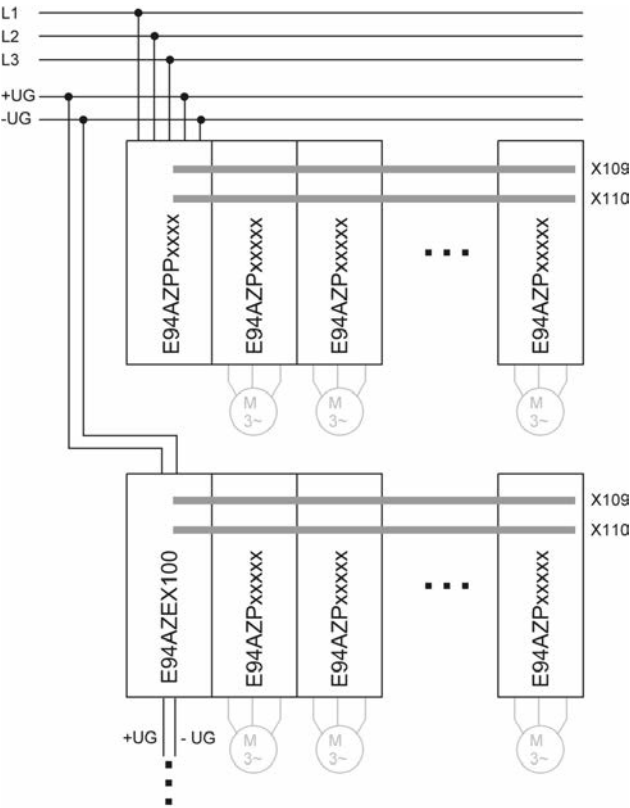
Via a DC input module, an axis module interconnection can be supplied with power from a central DC source (power supply module, Single Drive axis modules, Multi Drive axis modules). This is required for example if a drive system with a multi-level structure installed in a control cabinet is to be supplied 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

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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	

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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
5.50		E84AV□□□5524□□□	EFSGR0400AYHN		EFSGR0400AYHK		
7.50		E84AV□□□7524□□□					
11.0		E84AV□□□1134□□□					
15.0		E84AV□□□1534□□□					

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DC fuses size 22 x 58 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□□□	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				E84AZEVS011X105/M				
E84AV□□□3714□□□								E84AZEVS004X100/M			
E84AV□□□5514□□□											
E84AV□□□7514□□□											
E84AV□□□1124□□□											
E84AV□□□1524□□□											
E84AV□□□2224□□□											
E84AV□□□3024□□□			E84AZEVS005X100/M			E84AZEVS012X105/M					
E84AV□□□4024□□□											
E84AV□□□5524□□□											
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



Inverter

Inverter Drives 8400 BaseLine

0.25 to 3.0 kW



Inverter Drives 8400 BaseLine

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Inverter Drives 8400 BaseLine

General information



Product key

	E84AV	BC	E	751	2	S	X	0
Type	BD - BaseLine without communication BC - BaseLine with CANopen							
Design								
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								
Voltage class								
2 - 230/240 V, 1/N/PE AC (0.25 ... 2.2 kW) 4 - 400/500 V, 3/PE AC (0.37 ... 3.0 kW)								
Ambient conditions								
S - standard								
Safety engineering								
X - without safety engineering								
Version identifier								
0								

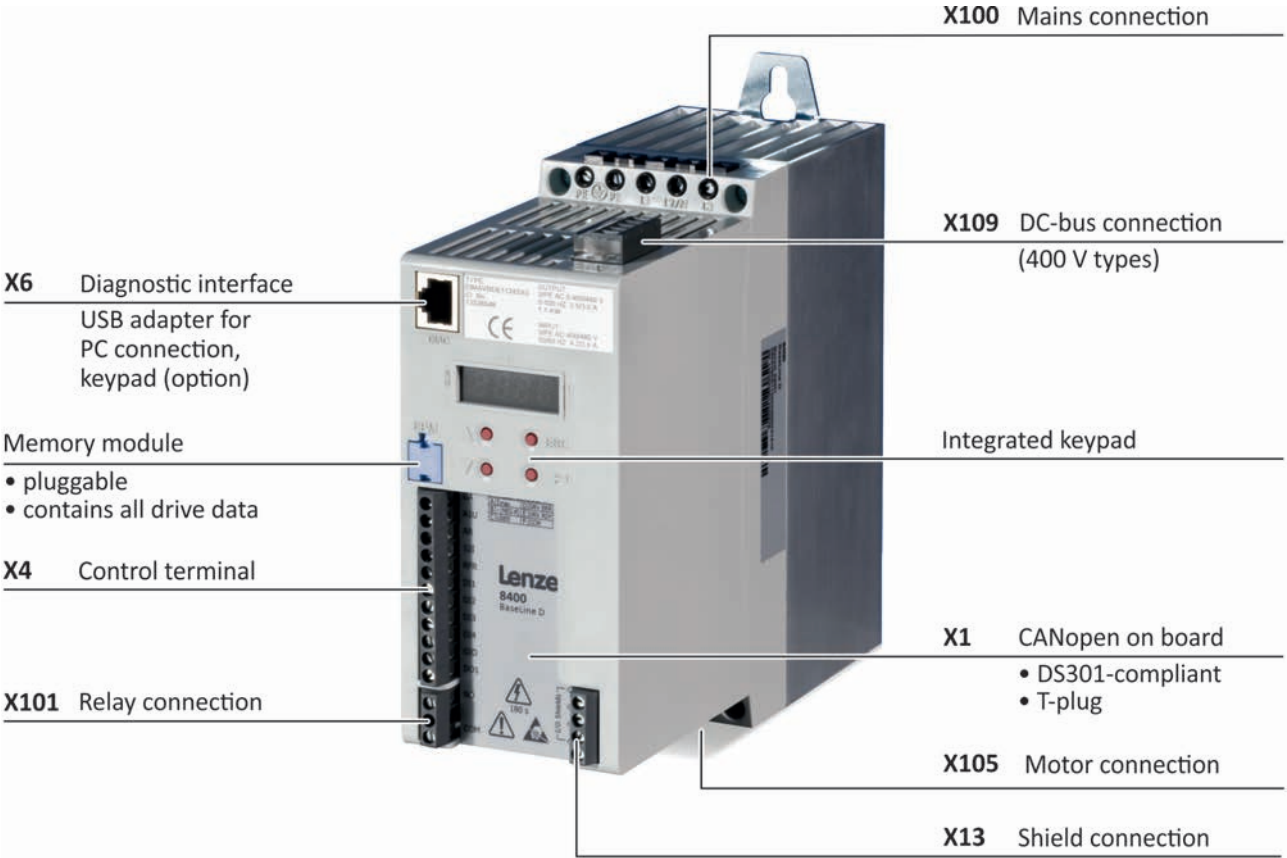
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Inverter Drives 8400 BaseLine

General information



Equipment



Inverter Drives 8400 BaseLine

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 BaseLine

General information



Inverter Drives 8400 BaseLine

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 BaseLine - for constant motion

The BaseLine version is the entry-level model in terms of functionality and drive behaviour. Featuring an integrated keypad and everything you would expect from a modern frequency inverter suitable for universal use, the 8400 BaseLine is the ideal solution for applications such as conveyor drives, pumps, fans or ventilators.

Two versions

Two versions of the 8400 BaseLine are available:

- BaseLine C with CANopen;
Product key: E84AVBCE□□□□SXO
- BaseLine D without communication;
Product key: E84AVBDE□□□□SXO

Inverter Drives 8400 BaseLine

General information



Functions and features

Mode	8400 BaseLine
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)
Basic functions	Freely assignable user menu DC brake function Flying restart circuit S-shaped ramps for smooth acceleration PID controller 3 fixed frequencies
Monitoring and protective measures	Short circuit Earth fault Overvoltage Overcurrent I ² x t-Motor monitoring 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 (400 V types)
Brake resistor	External (400 V types)

Inverter Drives 8400 BaseLine

General information



Inverter Drives 8400 BaseLine

Technical data



Standards and operating conditions

Mode			
Product			8400 BaseLine
Conformity			
CE			Low-Voltage Directive
			2006/95/EC
Approval			
UL 508C			for USA and Canada (requirements of the CSA 22.2 No. 14) Power Conversion Equipment (File No. E170350)
Degree of protection			
EN 60529 ²⁾			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

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Mode			
Product			8400 BaseLine
Supply form			
			Systems with earthed star point (TN and TT 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⁾ 1 - Please also refer to the Motor connection section

²⁾ Mounted and ready-to-use

Inverter Drives 8400 BaseLine

Technical data



Rated data 230 V

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

Data / 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.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	0.25	0.37	0.55	0.75
Product key			E84AVB□E2512SX0	E84AVB□E3712SX0	E84AVB□E5512SX0	E84AVB□E7512SX0
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	4.2	5.4	7.0
Without mains choke	$I_{N,AC}$	[A]	3.4	5.1	6.7	8.8
Rated output current						
	$I_{N,out}$	[A]	1.7	2.4	3.0	4.0
Output current						
2 kHz	I_{out}	[A]	1.7	2.4	3.0	4.0
4 kHz	I_{out}	[A]	1.7	2.4	3.0	4.0
8 kHz	I_{out}	[A]	1.7	2.4	3.0	4.0
16 kHz	I_{out}	[A]	1.1	1.6	2.0	2.7

Data for 60 s overload

Max. output current						
	$I_{max,out}$	[A]	2.6	3.6	4.5	6.0
Overload time			60.0			
	t_{ol}	[s]				
Recovery time			120.0			
	t_{re}	[s]				

Data for 3 s overload

Max. short-time output current						
	$I_{max,out}$	[A]	3.4	4.8	6.0	8.0
Overload time			3.0			
	t_{ol}	[s]				
Recovery time			12.0			
	t_{re}	[s]				

Inverter Drives 8400 BaseLine

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	0.55	0.75
Product key						
			E84AVB□E2512SX0	E84AVB□E3712SX0	E84AVB□E5512SX0	E84AVB□E7512SX0
Power loss						
	P _V	[kW]	0.015	0.017	0.023	0.030
Max. cable length ¹⁾						
Shielded motor cable	I _{max}	[m]	50			

Dimensions and weights

Dimensions						
Height	h	[mm]	165	165	165	165
Width	b	[mm]	70	70	70	70
Depth	t	[mm]	144	144	162	162
Mass						
	m	[kg]	1.2	1.2	1.2	1.2

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

Inverter Drives 8400 BaseLine

Technical data



Rated data 230 V

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

Data / 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.

					
Typical motor power					
4-pole asynchronous motor	P	[kW]	1.10	1.50	2.20
Product key			E84AVB□E1122SX0	E84AVB□E1522SX0	E84AVB□E2222SX0
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	11.8	15.7
Without mains choke	$I_{N,AC}$	[A]	12.0	13.7	22.0
Rated output current					
	$I_{N,out}$	[A]	5.5	7.0	9.5
Output current					
2 kHz	I_{out}	[A]	5.5	7.0	9.5
4 kHz	I_{out}	[A]	5.5	7.0	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		

Inverter Drives 8400 BaseLine

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	2.20
Product key					
			E84AVB□E1122SX0	E84AVB□E1522SX0	E84AVB□E2222SX0
Power loss					
	P _V	[kW]	0.043	0.054	0.076
Max. cable length ¹⁾					
Shielded motor cable	I _{max}	[m]	50		

Dimensions and weights

Dimensions					
Height	h	[mm]	165	215	215
Width	b	[mm]	70	70	70
Depth	t	[mm]	162	162	162
Mass					
	m	[kg]	1.4	1.9	1.9

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

Inverter Drives 8400 BaseLine

Technical data



Rated data 400 V

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

Data / 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.

					
Typical motor power					
4-pole asynchronous motor	P	[kW]	0.37	0.55	0.75
Product key			E84AVB□E3714SX0	E84AVB□E5514SX0	E84AVB□E7514SX0
Mains voltage range					
	U_{AC}	[V]	3/PE AC 180 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %		
Rated mains current					
With mains choke	$I_{N,AC}$	[A]	1.4	1.8	2.2
Without mains choke	$I_{N,AC}$	[A]	1.8	2.3	3.2
Rated output current					
	$I_{N,out}$	[A]	1.3	1.8	2.4
Output current					
2 kHz	I_{out}	[A]	1.3	1.8	2.4
4 kHz	I_{out}	[A]	1.3	1.8	2.4
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]	2.3	3.2	4.2
Overload time					
	t_{ol}	[s]	3.0		
Recovery time					
	t_{re}	[s]	12.0		

Inverter Drives 8400 BaseLine

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	0.75
Product key					
			E84AVB□E3714SX0	E84AVB□E5514SX0	E84AVB□E7514SX0
DC supply					
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %		
Rated DC-bus current					
	I _{N, DC}	[A]	2.2	2.8	3.6
Power loss					
	P _V	[kW]	0.015	0.022	0.029
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

Dimensions					
Height	h	[mm]	165	165	165
Width	b	[mm]	70	70	70
Depth	t	[mm]	162	162	162
Mass					
	m	[kg]	1.2	1.2	1.2

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

Inverter Drives 8400 BaseLine

Technical data



Rated data 400 V

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

Data / 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.

						
Typical motor power						
4-pole asynchronous motor	P	[kW]	1.10	1.50	2.20	3.00
Product key			E84AVB□E1124SX0	E84AVB□E1524SX0	E84AVB□E2224SX0	E84AVB□E3024SX0
Mains voltage range						
	U_{AC}	[V]	3/PE AC 180 V-0 % ... 550 V+0 %, 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current						
With mains choke	$I_{N,AC}$	[A]	3.2	3.6	5.0	7.1
Without mains choke	$I_{N,AC}$	[A]	4.2	4.7	6.2	10.2
Rated output current						
	$I_{N,out}$	[A]	3.2	3.9	5.6	7.3
Output current						
2 kHz	I_{out}	[A]	3.2	3.9	5.6	7.3
4 kHz	I_{out}	[A]	3.2	3.9	5.6	7.3
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]	5.6	6.8	9.8	12.4
Overload time						
	t_{ol}	[s]	3.0			
Recovery time						
	t_{re}	[s]	12.0			

Inverter Drives 8400 BaseLine

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	2.20	3.00
Product key						
			E84AVB□E1124SX0	E84AVB□E1524SX0	E84AVB□E2224SX0	E84AVB□E3024SX0
DC supply						
	U _{DC}	[V]	DC 455 V -0 % ... 775 V +0 %			
Rated DC-bus current						
	I _{N, DC}	[A]	5.1	5.8	7.6	10.0
Power loss						
	P _V	[kW]	0.042	0.048	0.066	0.091
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	7.3
Max. output power, Brake chopper						
	P _{max, 1}	[kW]	2.9	2.9	3.5	7.3
Min. brake resistance						
	R _{min}	[Ω]	180.0	180.0	150.0	82.0

Dimensions and weights

Dimensions					
Height	h	[mm]	165	165	215
Width	b	[mm]	70	70	70
Depth	t	[mm]	162	162	162
Mass					
	m	[kg]	1.4	1.4	1.9

¹⁾ Technically possible cable lengths, irrespective of EMC requirements

Inverter Drives 8400 BaseLine

Technical data



Inverter Drives 8400 BaseLine

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

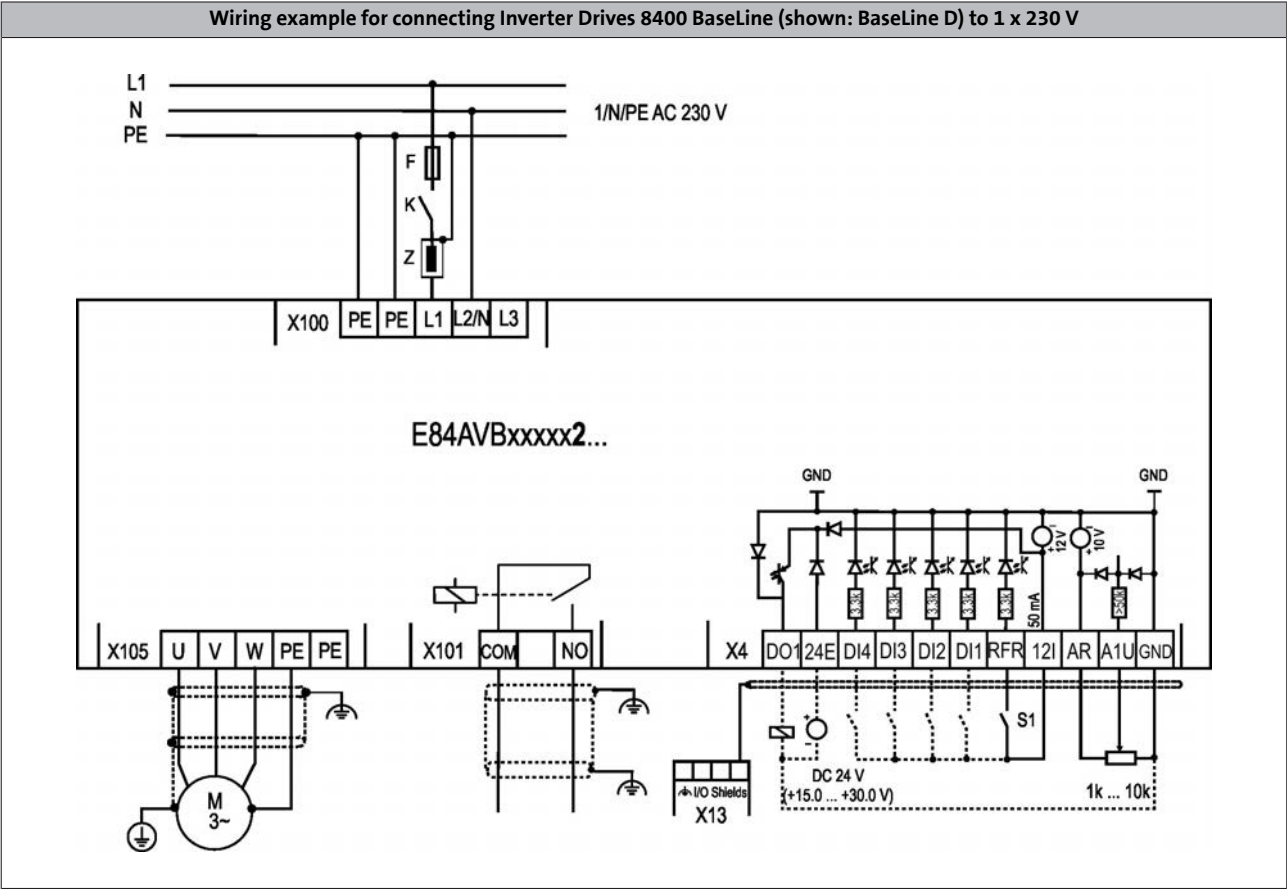
Typical motor power	Mains voltage	Product key	Circuit breaker	Fuse		Mains connection
4-pole asynchronous motor		Inverter		EN 60204-1	UL	Cross-section (with mains choke)
P	U _{AC}		I	I	I	q
[kW]	[V]		[A]	[A]	[A]	[mm ²]
0.25	1 AC 180 ... 264	E84AV□□□2512□□□	C6	6	6	1.0
0.37		E84AV□□□3712□□□			10	
0.55		E84AV□□□5512□□□	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		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□□□			10	
1.50		E84AV□□□1524□□□	C10	10		1.5
2.20		E84AV□□□2224□□□				
3.00		E84AV□□□3024□□□			15	

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		2.5
1.50		E84AV□□□1522□□□	C20	20	25	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

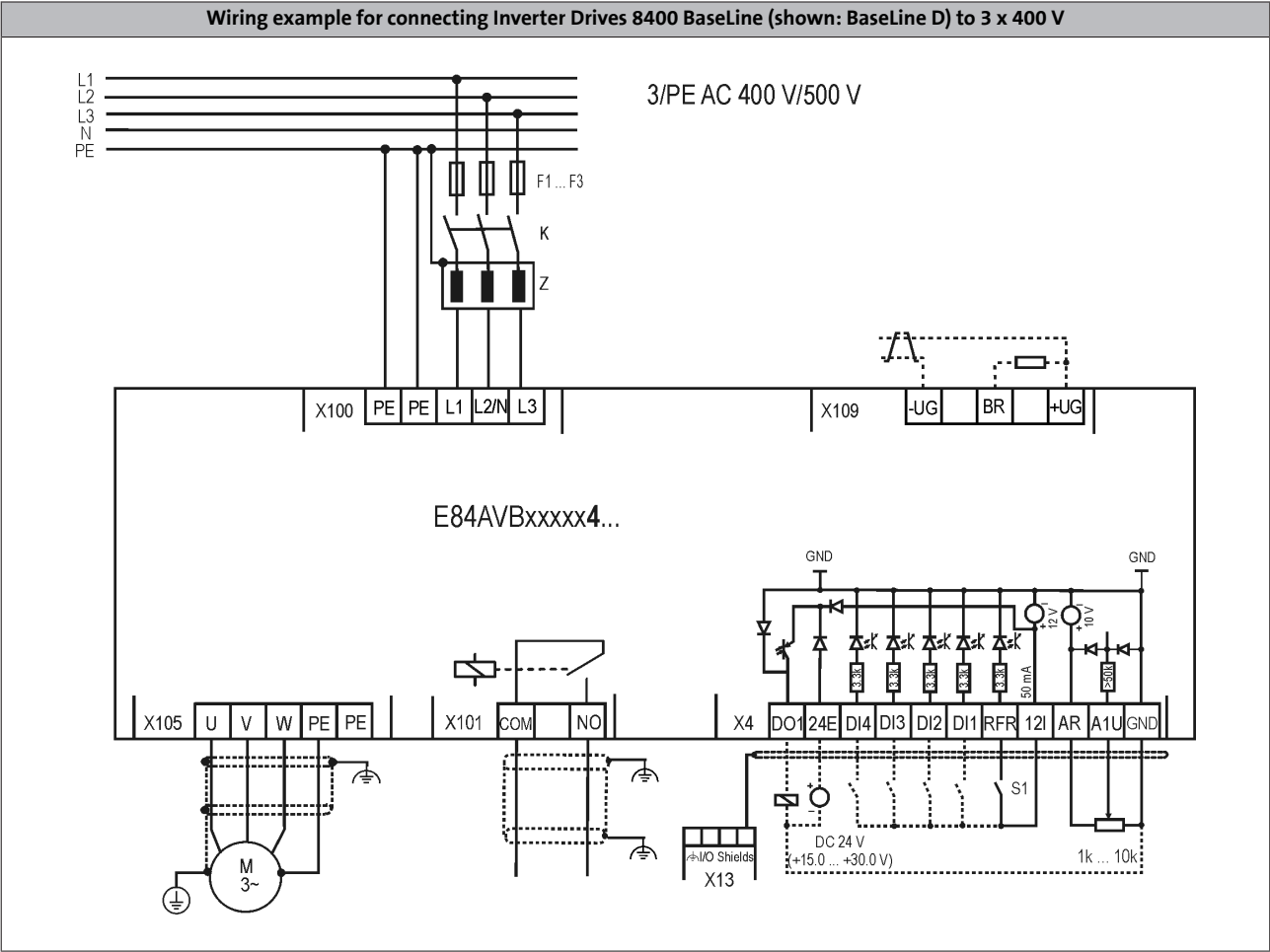


Connection diagrams





Connection diagrams





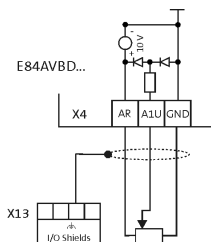
Control connections

Mode	8400 BaseLine
Analog inputs	
Number	1 Switchable: voltage or current input
Resolution	10 bits
Value range	0 ... 10V, 0/4 ... 20mA
Digital inputs	
Number	5
Switching level	PLC (IEC 61131-2)
Max. input current	11 mA
Digital outputs	
Number	1
Switching level	PLC (IEC 61131-2)
Max. output current	50 mA
Relay	
Number	1
Contact	NO contact
AC connection	250V, 3 A
DC connection	24V, 2 A ... 240V, 0.16 A
Interfaces	
CANopen	functional insulated Max. baud rate 1000 kbps integrated (BaseLine C)

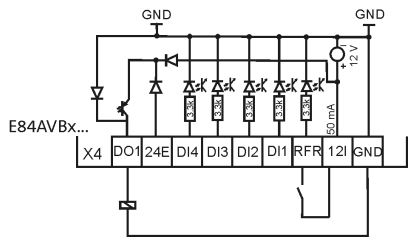


Control connections

Connection of analog inputs and outputs

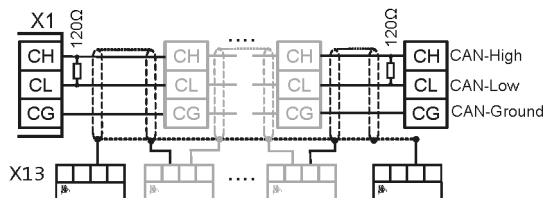


Connection of digital inputs and outputs



CANopen communication for BaseLine C

EDSCAN





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 BaseLine, 8400 motec • Packaging unit: 12 items	E84AYM20S/M

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



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]	
0.37	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	
3.00		E84AV□□□3024□□□							

► Brake resistor connection requires a connector (product key: EWS0074/M).

- ▶ Data sheet on ERBM brake resistors
DS_ZB_ERBM_0001
Available for download at www.lenze.de/dsc
- ▶ Data sheet on ERBP brake resistors
DS_ZB_ERBP_0001
Available for download at lenze.de/dsc

- ▶ Data sheet on ERBP brake resistors
DS_ZB_ERBP_0001
Available for download at lenze.de/dsc
- ▶ Data sheet on ERBS brake resistors
DS_ZB_ERBS_0001
Available for download at www.lenze.com/dsc



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

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		
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



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

 Data sheet on E82ZWBRE brake switch
DS_Brake_8400_0001
Available for download at www.lenze.de/dsc

 Data sheet on E82ZWBRB brake switch
DS_Brake_8400_0002
Available for download at www.lenze.de/dsc



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



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

4.8

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 BaseLine

Accessories



13581633

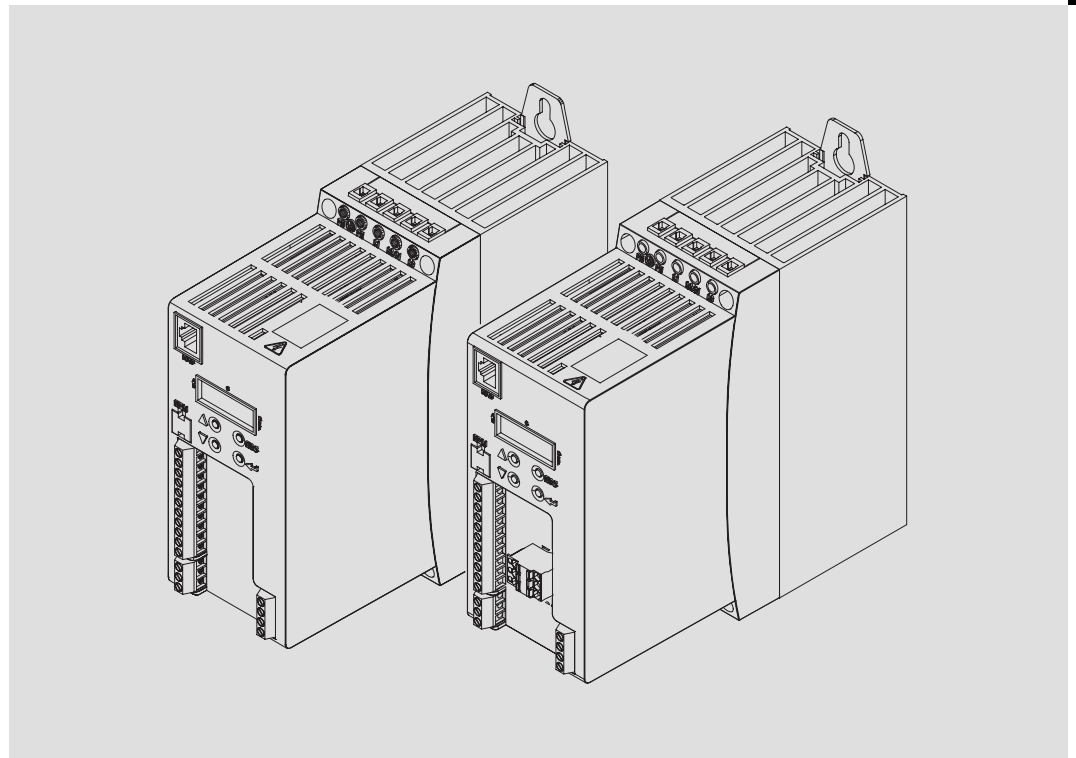
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Telefax: +49 (0)5154 82 28 00

www.Lenze.com

Lenze



8400 0.25 ... 3.0 kW



E84A... - BaseLine C/BaseLine D

8400 frequency inverter

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1 About this documentation

Contents

This Hardware Manual informs you how to use the BaseLine C and BaseLine D version of the 8400 controller series as directed.

Validity

The information in this Hardware Manual applies to the 8400 BaseLine C and BaseLine D inverters with the following nameplate data:

Type	Type designation	From hardware version	From software version
8400 BaseLine C	E84AVBCxxxxxxX0	VA	03.00
8400 BaseLine D	E84AVBDxxxxxxX0	VA	03.00
8400 BaseLine D with digital output "DO1"	E84AVBDxxxxxxX1	1A	02.01
8400 BaseLine D without digital output "DO1"	E84AVBDxxxxxxX0	1A	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!

Documentation and software updates for further Lenze products can be found on the Internet in the "Services & Downloads" area under <http://www.Lenze.com>

1.1 Document history

Material number	Version			Description
13251886	1.1	06/2008	TD03	First edition
13260428	2.0	07/2008	TD03	Complete revision
13277182	3.0	02/2009	TD03	New edition due to company reorganisation Corrections in Chapter "Technical Data" and "Electrical Installation"
13291897	4.0	03/2009	TD03	Corrections in Chapter "Mechanical Installation"

1.2 Conventions used

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

Type of information	Writing	Examples/notes
Notation of numbers		
Decimal separator	Point	The decimal point is always used. For example: 1234.56
Warnings		
UL warnings	Ⓐ	Are only given in English.
UR warnings	Ⓐ	
Text font style		
Program name	» «	Lenze software For example: »Engineer«
Symbols		
Cross-reference	📖	Refers to additional information. For example 📖 16 = see page 16.

1.3 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 for UL and UR

Pictograph and signal word	Meaning
 Warnings!	Safety or application note for the operation of a UL-approved device in UL-approved systems. Possibly the drive system is not operated in compliance with UL if the corresponding measures are not taken.
 Warnings!	Safety or application note for the operation of a UR-approved device in UL-approved systems. Possibly the drive system is not operated in compliance with UL if the corresponding measures are not taken.

2 Safety instructions

2.1 General safety information

For your personal safety

Disregarding the following safety measures can lead to severe injury to persons and damage to material:

- ▶ 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.
 - Observe IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and all national regulations for the prevention of accidents.
 - According to this 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. AC Technology Corporation does not accept any liability for the suitability of the procedures and circuit proposals described.
- ▶ Depending on their degree of protection, some parts of the Lenze controllers (frequency inverters, servo inverters, DC speed controllers) and their accessory components can be live, moving and rotating during operation. Surfaces can be hot.
 - Non-authorized removal of the required cover, inappropriate use, incorrect installation or operation, creates the risk of severe injury to persons or damage to material assets.
 - For more information, please see the documentation.
- ▶ High amounts of energy are produced in the controller. Therefore it is required to wear personal protective equipment (body protection, headgear, eye protection, ear protection, hand guard).

Application as directed

Controllers are components which are designed for installation in electrical systems or machines. They are not to be used as domestic appliances, but only for industrial 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 98/37/EC (Machinery Directive); 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 (2004/108/EC).

The controllers meet the requirements of the Low-Voltage Directive 2006/95/EC. The harmonised standard EN 61800-5-1 applies to the controllers.

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

Warning: Controllers are products which can be installed in drive systems of category C2 according to EN 61800-3. These products can cause radio interferences in residential areas. In this case, special measures can be necessary.

Transport, storage

Please observe the notes on transport, storage, and appropriate handling.

Observe the climatic conditions according to the technical data.

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 excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts.

Controllers contain electrostatic sensitive devices which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since this might endanger your health!

Electrical connection

When working on live controllers, observe the applicable national regulations for the prevention of accidents (e.g. VBG 4).

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

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.

Lenze controllers can cause a DC current in the PE conductor. If a residual current device (RCD) is used for protection in the event of direct or indirect contact, a residual current device (RCD) of type B must be used on the supply side of the controller in case of a three-phase controller supply. Otherwise, a different protective measure must be taken, e.g. separation from the environment through double or reinforced insulation or separation from the supply system by means of a transformer.

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). The controllers can be adapted 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 connections must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the controller.

All protection covers and doors must be shut during operation.

Notes for UL-approved systems with integrated controllers: UL warnings are notes that only apply to UL systems. The documentation contains special UL notes.

Maintenance and servicing

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

Disposal

Recycle metal and plastic materials. Ensure professional disposal of assembled PCBs.

The product-specific safety and application notes given in these instructions must be observed!

2.2 General safety and application instructions for Lenze motors

(According to: Low-Voltage Directive 2006/95/EC)

General

Low-voltage machines have hazardous live and rotating parts and possibly also hot surfaces.

Synchronous machines induce voltages at open terminals during operation.

All operations concerning transport, connections, commissioning and maintenance must be carried out by qualified, skilled personnel (EN 50110-1 (VDE 0105-100) and IEC 60364 must be observed). Inappropriate use creates the risk of severe injury to persons and damage to material assets.

Low-voltage 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

Low-voltage machines are intended for commercial installations. They comply with the harmonised standards of the series 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 98/37/EC. 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 A-side shaft seal, cause a brake torque reduction.

Transport, storage

Damage must be reported immediately to the forwarder upon receipt; if required, commissioning must be excluded. Tighten screwed-in ring bolts before transport. They are designed for the weight of the low-voltage 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, dust-free 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 half-key balanced. The clutch must be half-key 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 low-voltage 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 60034-1; IEC 34 (VDE 0530-1) - 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 bolted tightly (to stop).

The clearances between blank, live parts and to earth must not fall below 8 mm at $U_r \leq 550$ V, 10 mm at $U_r \leq 725$ V, 14 mm at $U_r \leq 1000$ 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 the 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 low-voltage 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 $I > I_r$ after a few seconds of operation, especially at the risk of blocking.

Vibrational severities $v_{\text{eff}} \leq 3.5 \text{ mm/s}$ ($P_r \leq 15 \text{ kW}$) or 4.5 mm/s ($P_r > 15 \text{ kW}$) 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 low-voltage 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 low-voltage 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 non-drive 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 if no voltage is applied to the power terminals because
 - depending on the device - the power terminals L1, L2/N, L3, U, V, W, +UG, - UG and RB remain live for at least 3 minutes after disconnecting the mains.
 - the power terminals L1, L2/N, L3; U, V, W, +UG, - UG and RB remain live 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.

Parameter set transfer

- ▶ During the parameter set transfer, control terminals of the controllers can adopt undefined states!
 - Therefore it is required to disable the terminal X4 (digital input signals) before the transfer starts. This ensures that the controller is inhibited and all control terminals have the firmly defined "LOW" status.
- ▶ 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.

3 Product description

Device features

3 Product description

3.1 Device features

Features	Version	
	BaseLine D	BaseLine C
Power range: 250 W to 3.0 kW	✓	✓
Integrated interference suppression according to EN 61800-3	✓	✓
Dynamic brake transistor integrated in devices with 400 V mains connection	✓	✓
Integrated shield terminal for safe installation of the control cables	✓	✓
Identical connection system for the control cables in the entire power range	✓	✓
System bus connection (CANopen)	-	✓
Memory module for quick commissioning and easy service	✓	✓
Interface for diagnostics and parameter settings, also during operation	✓	✓
Automatic motor identification for optimum operational performance	✓	✓
I ² t motor monitoring	✓	✓
Flying restart circuit for quick and jerk-free flying restart on the motor	✓	✓
DC-current braking function	✓	✓
Freely configurable user menu	✓	✓
Operating modes: – VFCplus: V/F open loop, linear and square-law – SLVC: Sensorless vector control (speed)	✓	✓
S ramps for jerk-free acceleration and deceleration	✓	✓
As option, DC bus terminal: • to connect devices operating at 230 V to: – an external brake module and/or – a DC bus system or – DC supply (only with devices in the power range 0.25 ... 1.5 kW) • to connect devices operating at 400 V to: – an external brake resistor and/or – a DC source or a DC bus system, or – DC supply (with devices in the power range 0.37 ... 3 kW)	✓	✓



Note!

When the device is operated from a DC source:

- ▶ the internal RFI filter is not active.
- ▶ the device is not UL rated.

3.2

Overview of the devices

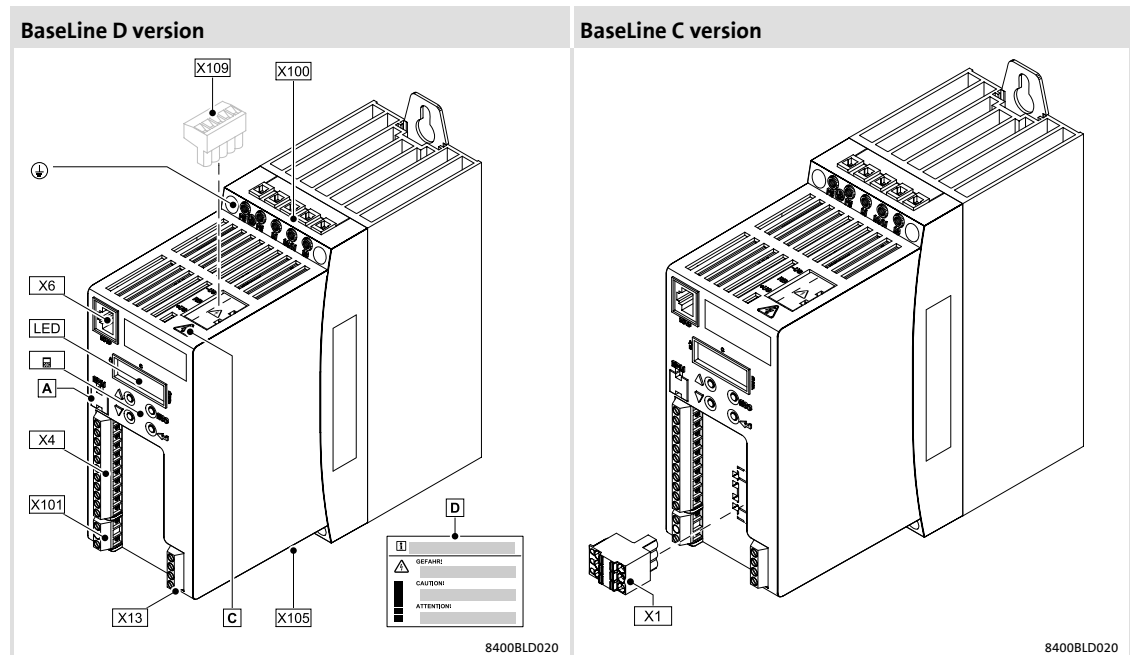


Fig. 3-1 BaseLine version, devices in the power range from 0.25 to 3 kW

Pos.	Description	Information	
		230 V	400 V
A	EPM - Slot for memory module	108	
D	Sticker with warning	43	
X1	System bus connection (CANopen)	74	
X4	Analog input	75	
	10-V reference voltage		
	Digital inputs	78	
	Controller enable		
X6	Digital output	81	
	Diagnostics		
X13	Terminal for I/O shields	-	
X100	Terminal for mains voltage	62	68
X105	Motor terminal	65	70
X109	DC bus terminal (optional, can be ordered as a separate item)	64	69
⊕	PE conductor	-	
⌨	Integrated keypad	83	

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.

3.2.1 Determining the device type

The type data used in this manual refer to the nameplate ① which is placed at the front of the controller and to the nameplate ② placed on the side of the controller (Fig. 3-2).

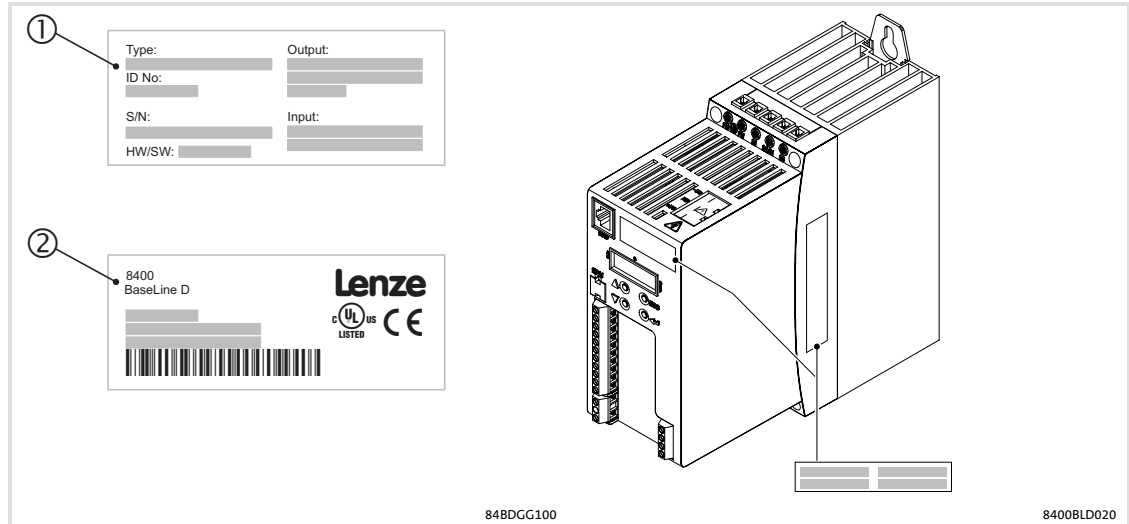


Fig. 3-2 Placement of the nameplates

3.2.2

Type code

	E84	A	V	xx	x	xxx	x	x	X	x
Product range 8400 inverter drives										
Generation A = 1st generation										
Inverter type V = vector-controlled inverter										
Version BC = BaseLine C BD = BaseLine D										
Mounting type E = IP20 D = push-through technique (thermal separation) C = cold-plate technique										
Power e.g. 251 = $25 \times 10^1 \text{ W} = 0.25 \text{ kW}$ 222 = $22 \times 10^2 \text{ W} = 2.2 \text{ kW}$										
Voltage class 2 = 230/240 V 1/N/PE AC (0.25 ... 2.2 kW) 4 = 400/500 V 3/PE AC (0.37 ... 3.0 kW)										
Ambient conditions S = standard										
Safety engineering X = no safety function										
0 = without digital output "DO1" 1 = with digital output "DO1"										

Conformity and approval			
Conformity			
CE	2006/95/EG	Low-Voltage Directive	
Approval			
UL	UL 508C	Devices in the power range from 0.25 to 3 kW: Industrial Control Equipment (IND.CONT.EQ), 5D81, File No. E170350	
Protection of persons and devices			
Enclosure	EN 60529	IP 20	in ready-for-use mounted state
Insulation resistance	EN 61800-5-1	Overvoltage category III above 2000 m amsl: overvoltage category II	
Insulation of control circuits	EN 61800-5-1	Safe mains isolation by double/reinforced insulation. For phase to ground (Earth) voltage < 300 VAC	
Short-circuit strength	EN 61800-5-1	Motor connection: limited, controller is inhibited, error acknowledgement is required Control terminals: full	
Protective measures against		• Short circuit • Earth fault • Overvoltage • Motor stalling • Motor overtemperature (thermal contact, I²t monitoring)	
Leakage current	EN 61800-5-1	> 3.5 mA AC, > 10 mA DC	Observe the regulations and safety instructions!
Cyclic mains switching		Cyclic mains switching at intervals of 3 min is permissible. If the mains are exceptionally switched three times in one minute, a pause of 9 min must follow.	
Starting current		≤ I _N	
Supply conditions			
AC mains operation		Direct connection	
Power systems			
TT		• For central grounded systems operation is permitted without restrictions. • For corner grounded 400/500 V systems operation is possible, but reinforced insulation to control circuits is compromised.	
TN			
DC-bus operation		Direct connection is possible with E84AVBxxxxx4 devices Note: When the device is operated from a DC source, the internal RFI filter is not active and the device is not UL rated.	
Motors	EN 60034	Only use motors suitable for inverter operation. Insulation resistance: min. $\dot{u} \geq 1.5$ kV, min. $du/dt \geq 5$ kV/μs	

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: Operation at 8/16 kHz, +40 ... +55 °C: For operation above +40 ... +45°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	Pollution Degree 2
Vibration resistance (9.81 m/s ² = 1 g)		
Transport	IEC/EN 60721-3-2	2M2
	EN 61800-5-1	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 ±1 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 (1 g)
Requirements on the motor cable		
Capacitance per unit length		
≤ 1.5 mm ² /AWG 16		C _{Core/core} /C _{Core/shield} ≤ 75/150 pF/m
≥ 2.5 mm ² /AWG 12		C _{core/core} /C _{Core/shield} ≤ 100/≤ 150 pF/m
Electric strength		
	VDE 0250-1	U ₀ /U = 0.6/1.0 kV (U ₀ = r.m.s. value - external conductor to PE, U = r.m.s. value - external conductor to external conductor)
	UL	U ≥ 600 V (U = r.m.s. value - external conductor to external conductor)

EMC (when installed and connected per section 5.2)

Noise emission

conducted	EN 61800-3	up to 25 m of shielded motor cable: category C2
radiated		Category C2 with proper cable grounding and enclosure

Noise immunity inside grounded enclosure (according to requirements of EN 61800-3)

Electrostatic discharge (ESD)	EN 61000-4-2	8 kV with air discharge, 4 kV with contact discharge against enclosure
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Radio frequency

conducted	EN 61000-4-6	150 kHz ... 80 MHz, 10 V/m 80 % AM (1kHz)
radiated (enclosure)	EN 61000-4-3	80 MHz ... 1000 MHz, 10 V/m 80 % AM (1kHz)

Burst

Power terminals 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

Power terminals	EN 61000-4-5	1.2/50 μ s, 1 kV phase/phase, 2 kV phase/PE
Control terminals	EN 61000-4-5	1.2/50 μ s, 1 kV

Operation on public supply systems

EN 61000-3-2 EN 61000-3-12	The devices are intended for use in an industrial environment. When being used on public network, additional measures must be taken to limit the expected radio interference. The compliance with the requirements for the machine/plant is the responsibility of the manufacturer of the machine or system!
EN 61000-3-2	< 0.5 kW: with mains choke 0.5 ... 1 kW: with active filter > 1 kW at mains current $\leq$ 16 A: No limit values for harmonic currents
EN 61000-3-12	Mains current > 16 A: further measures are required for compliance with the standard

Control		
Control method		
	VFCplus: ● V/Hz loop (linear or square-law) SLVC: ● Sensorless vector control (speed)	
Switching frequency		
	2 kHz, 4 kHz, 8 kHz, 16 kHz, Optionally noise optimised or power loss optimised	
Torque behaviour		
Maximum torque	1.5 x M _N for 60 s 1.8 x M _N for 3 s	if rated motor power = rated controller power
Setting range	1 : 10	In SLVC: ● in the speed range 3 ... 50 Hz In V/f: ● in the speed range 10 ... 50 Hz
Sensorless vector control (speed)		
Minimum output frequency	0.5 Hz (0 ... M _N)	
Setting range	1 : 10	referring to 50 Hz and M _N
Accuracy	±0.5 %	in the speed range 3 ... 50 Hz
Smooth running	±0.1 Hz	
Output frequency		
Range	-300 Hz ... +300 Hz	
Absolute resolution	0.2 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 %	referring to final value

4 Technical data

Rated data

Overview

4.2 Rated data

4.2.1 Overview

Input data

Basis of the data			
Mains	Voltage U_{LN} [V]	Voltage range U_{LN} [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 %

Type	Voltage [V]	Frequency [Hz]	Current [A]		Number of phases
			max. +45 °C ①	max. +55 °C ①	
E84AVBxx2512	230	50/60	3.4	2.6	1
E84AVBxx3712	230	50/60	5.1	3.8	1
E84AVBxx5512	230	50/60	6.7	5.0	1
E84AVBxx7512	230	50/60	8.8	6.6	1
E84AVBxx1122	230	50/60	12	9.0	1
E84AVBxx1522	230	50/60	13.7	10.3	1
E84AVBxx2222	230	50/60	22.0	18.4	1
E84AVBxx3714	400/500	50/60	1.8/1.5	1.4/1.1	3
E84AVBxx5514	400/500	50/60	2.3/2.0	1.7/1.5	3
E84AVBxx7514	400/500	50/60	3.2/2.7	2.4/2.0	3
E84AVBxx1124	400/500	50/60	4.2/3.6	3.2/2.7	3
E84AVBxx1524	400/500	50/60	4.7/4.1	3.5/3.1	3
E84AVBxx2224	400/500	50/60	6.2/5.4	4.7/4.1	3
E84AVBxx3024	400/500	50/60	10.2/7.8	7.7/5.9	3

① Ambient temperature in the control cabinet, switching frequency 2 and 4 kHz, operation without mains choke

Output data

Type	Voltage [V]	Frequency [Hz]	Current [A]		Number of phases
			max. +45 °C ①	max. +55 °C ①	
E84AVBxx2512	0-230	0-300	1.7	1.3	3
E84AVBxx3712	0-230	0-300	2.4	1.8	3
E84AVBxx5512	0-230	0-300	3.0	2.3	3
E84AVBxx7512	0-230	0-300	4.0	3.0	3
E84AVBxx1122	0-230	0-300	5.5	4.1	3
E84AVBxx1522	0-230	0-300	7.0	5.3	3
E84AVBxx2222	0-230	0-300	9.5	7.1	3
E84AVBxx3714	0-400/500	0-300	1.3/1.0	1.0/0.8	3
E84AVBxx5514	0-400/500	0-300	1.8/1.4	1.4/1.1	3
E84AVBxx7514	0-400/500	0-300	2.4/1.9	1.8/1.4	3
E84AVBxx1124	0-400/500	0-300	3.2/2.6	2.4/2.0	3
E84AVBxx1524	0-400/500	0-300	3.9/3.1	2.9/2.3	3
E84AVBxx2224	0-400/500	0-300	5.6/4.5	4.2/3.4	3
E84AVBxx3024	0-400/500	0-300	7.3/5.8	5.5/4.4	3

① Temperature in the control cabinet



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_{aN}	when controller is inhibited
E84AVBxx2512	15	10
E84AVBxx3712	17	
E84AVBxx5512	23	
E84AVBxx7512	30	
E84AVBxx1122	43	14
E84AVBxx1522	54	
E84AVBxx2222	76	
E84AVBxx3714	15	
E84AVBxx5514	22	10
E84AVBxx7514	29	
E84AVBxx1124	42	
E84AVBxx1524	48	
E84AVBxx2224	66	14
E84AVBxx3024	91	

4.2.2

Operation at rated mains voltage 230 V

Basis of the data				
Mains	Voltage U_{LN} [V]	Voltage range U_{LN} [V]	Frequency range f [Hz]	
1/N/PE AC	230	180 - 0 % ... 264 + 0 %	45 - 0 % ... 65 + 0 %	
Type	Mains current at I_{aN}		Output power	Motor power
	with external mains choke I_{LN} [A]	without external mains choke I_{LN} [A]	U, V, W S_{aN} [kVA]	4 pol. ASM P_{aN} [kW]
E84AVBxx2512	3.0	3.4	0.6	0.25
E84AVBxx3712	4.2	5.1	0.9	0.37
E84AVBxx5512	5.4	6.7	1.1	0.55
E84AVBxx7512	7.0	8.8	1.4	0.75
E84AVBxx1122	9.9	12.0	2.0	1.1
E84AVBxx1522	11.8	13.7	2.5	1.5
E84AVBxx2222	15.7	22.0	3.4	2.2
Assignment				
Type	Mains choke			
E84AVBxx2512	ELN1-0900H005			
E84AVBxx3712				
E84AVBxx5512	ELN1-0500H009			
E84AVBxx7512				
E84AVBxx1122	ELN1-0250H018			
E84AVBxx1522				
E84AVBxx2222				

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aN2}	I_{aM2}	I_{aN4}	I_{aM4}	I_{aN8}	I_{aM8}	I_{aN16}	I_{aM16}
E84AVBxx2512	1.7	3.4	1.7	3.4	1.7	3.4	1.1	2.2
E84AVBxx3712	2.4	4.8	2.4	4.8	2.4	4.8	1.6	3.2
E84AVBxx5512	3.0	6.0	3.0	6.0	3.0	6.0	2.0	4.0
E84AVBxx7512	4.0	8.0	4.0	8.0	4.0	8.0	2.7	5.4
E84AVBxx1122	5.5	11.0	5.5	11.0	5.5	11.0	3.7	7.4
E84AVBxx1522	7.0	14.0	7.0	14.0	7.0	14.0	4.7	9.4
E84AVBxx2222	9.5	19.0	9.5	19.0	9.5	19.0	6.3	12.6

I_{aNx}

I_{aMx}

Switching
frequency

Rated value - continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s with 75 % I_{aNx}
- Can be achieved with the setting "x kHz fixed/..." in C00018

When the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

With the setting "x kHz var./..." in C00018, the switching frequency is reduced dynamically.

- At 16 kHz and $I_a > 100 \% \times I_{aN8}$ to 8 kHz
- At 8 kHz and $I_a > 150 \% \times I_{aN8}$ to 4 kHz

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⁾		FI ³⁾ [mA]
	①	②	L1, N - laying system			③	L1, N	
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVBxx2512	C10	10	1.5	-	-	10	14	≥ 30
E84AVBxx3712	C10	10	1.5	-	-	10	14	
E84AVBxx5512	C16	16	1.5	-	-	12	14	
E84AVBxx7512	C16	16	1.5	-	-	15	14	
E84AVBxx1122	C20	20	2.5	-	-	20	12	
E84AVBxx1522	C25	25	4 ⁴⁾	-	-	20	10	
E84AVBxx2222	C32	32	6 ⁴⁾	-	-	35	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 "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⁾ Pulse-current sensitive or universal-current sensitive earth-leakage circuit breaker, short-time delay
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

⁴⁾ only with pin-end connector

① Circuit breaker

② Fuse

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⁾		F I ³⁾
	①	②	L1, N - laying system			③	L1, N	[mA]
	[A]	[A]	B2 [mm ²]	C [mm ²]	F [mm ²]	[A]	[AWG]	
E84AVBxx2512	C6	6	1.5	-	-	10	14	≥ 30
E84AVBxx3712	C6	6	1.5	-	-	10	14	
E84AVBxx5512	C10	10	1.5	-	-	10	14	
E84AVBxx7512	C10	10	1.5	-	-	10	14	
E84AVBxx1122	C16	16	1.5	-	-	15	14	
E84AVBxx1522	C20	20	2.5	-	-	20	12	
E84AVBxx2222	C25	25	4 ⁴⁾	-	-	25	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 "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⁾ Pulse-current sensitive or universal-current sensitive earth-leakage circuit breaker, short-time delay
If cables are longer than 50 m, the protective circuit-breaker may respond, depending on the cable type and switching frequency.

⁴⁾ only with pin-end connector

① Circuit breaker

② Fuse

③ Fuse

Observe national and regional regulations

4.2.3 Operation at rated mains voltage 400 V

Basis of the data			
Mains	Voltage U_{LN} [V]	Voltage range U_{LN} [V]	Frequency range f [Hz]
3/PE AC	400	320 - 0 % ... 440 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Output power	Motor power
	with external mains choke I_{LN} [A]	without external mains choke I_{LN} [A]	U, V, W S_{aN} [kVA]	4 pol. ASM P_{aN} [kW]
E84AVBxx3714	1.4	1.8	0.8	0.37
E84AVBxx5514	1.8	2.3	1.2	0.55
E84AVBxx7514	2.2	3.2	1.6	0.75
E84AVBxx1124	3.2	4.2	2.1	1.1
E84AVBxx1524	3.6	4.7	2.5	1.5
E84AVBxx2224	5.0	6.2	3.6	2.2
E84AVBxx3024	7.1	10.2	4.8	3.0

Assignment	
Type	Mains choke
E84AVBxx3714	ELN3-1500H003-001
E84AVBxx5514	
E84AVBxx7514	
E84AVBxx1124	ELN3-0680H006-001
E84AVBxx1524	
E84AVBxx2224	
E84AVBxx3024	ELN3-0250H013-001

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_{aN} [kVA]	Motor power 4.pol. ASM P_{aN} [kW]
E84AVBxx3714	2.2	0.8	0.37
E84AVBxx5514	2.8	1.1	0.55
E84AVBxx7514	3.6	1.5	0.75
E84AVBxx1124	5.1	2.0	1.1
E84AVBxx1524	5.8	2.4	1.5
E84AVBxx2224	7.6	3.5	2.2
E84AVBxx3024	10.0	4.6	3.0

**Note!**

When the device is operated from a DC source:

- the internal RFI filter is not active.
- the device is not UL rated.

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aN2}	I_{aM2}	I_{aN4}	I_{aM4}	I_{aN8}	I_{aM8}	I_{aN16}	I_{aM16}
E84AVBxx3714	1.3	2.3	1.3	2.3	1.3	2.3	0.9	1.8
E84AVBxx5514	1.8	3.2	1.8	3.2	1.8	3.2	1.2	2.4
E84AVBxx7514	2.4	4.2	2.4	4.2	2.4	4.2	1.6	3.2
E84AVBxx1124	3.2	5.6	3.2	5.6	3.2	5.6	2.1	4.2
E84AVBxx1524	3.9	6.8	3.9	6.8	3.9	6.8	2.6	5.2
E84AVBxx2224	5.6	9.8	5.6	9.8	5.6	9.8	3.7	7.4
E84AVBxx3024	7.3	12.4	7.3	12.4	7.3	12.4	4.9	9.8

I_{aNx}

I_{aMx}

Switching
frequency

Rated value - continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s with 75 % I_{aNx}
- Can be achieved with the setting "x kHz fixed/..." in C00018

When the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

With the setting "x kHz var./..." in C00018, the switching frequency is reduced dynamically.

- At 16 kHz and $I_a > 100 \% \times I_{aN8}$ to 8 kHz
- At 8 kHz and $I_a > 150 \% \times I_{aN8}$ to 4 kHz

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]
E84AVBxx3714	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx5514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx7514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx1124	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVBxx1524	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVBxx2224	150	4.8	3.5	4.8	3.5	-	∞	-
E84AVBxx3024	100	7.3	5.3	7.3	5.3	-	∞	-

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 cable dimensioning

Continuous braking power

Cycle time, periodic load change with running time and recovery time

Running time in a cycle without reducing the scanning ratio (∞ = no time limit)

Recovery time

Maximum running time without initial load and observing 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⁾		FI 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]	
E84AVBxx3714	C6	6	1.5	-	-	10	14	≥ 30
E84AVBxx5514	C6	6	1.5	-	-	10	14	
E84AVBxx7514	C6	6	1.5	-	-	10	14	
E84AVBxx1124	C10	10	1.5	-	-	10	14	
E84AVBxx1524	C10	10	1.5	-	-	10	14	
E84AVBxx2224	C10	10	1.5	-	-	10	14	
E84AVBxx3024	C16	16	1.5	-	-	15	14	

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: voltage ≥ 500 V, tripping characteristic "H", "K5" or "CC". The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C.

3) Universal-current sensitive earth-leakage circuit breaker, short-time delay

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

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⁾		FI 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]	
E84AVBxx3714	C6	6	1.5	-	-	10	14	≥ 30
E84AVBxx5514	C6	6	1.5	-	-	10	14	
E84AVBxx7514	C6	6	1.5	-	-	10	14	
E84AVBxx1124	C10	10	1.5	-	-	10	14	
E84AVBxx1524	C10	10	1.5	-	-	10	14	
E84AVBxx2224	C10	10	1.5	-	-	10	14	
E84AVBxx3024	C16	16	1.5	-	-	12	14	

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: voltage ≥ 500 V, tripping characteristic "H", "K5" or "CC". The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45 °C.

3) Universal-current sensitive earth-leakage circuit breaker, short-time delay

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

③ Fuse

Observe national and regional regulations

4.2.4 Operation at rated mains voltage 500 V

Basis of the data			
Mains	Voltage U_{LN} [V]	Voltage range U_{LN} [V]	Frequency range f [Hz]
3/PE AC	500	400 - 0 % ... 550 + 0 %	45 - 0 % ... 65 + 0 %

Type	Mains current at I_{aN}		Output power	Motor power
	with external mains choke I_{LN} [A]	without external mains choke I_{LN} [A]	U, V, W S_{aN} [kVA]	4 pol. ASM P_{aN} [kW]
E84AVBxx3714	1.1	1.5	0.8	0.37
E84AVBxx5514	1.5	2.0	1.1	0.55
E84AVBxx7514	1.9	2.7	1.5	0.75
E84AVBxx1124	2.5	3.6	2.0	1.1
E84AVBxx1524	3.2	4.1	2.4	1.5
E84AVBxx2224	4.3	5.4	3.5	2.2
E84AVBxx3024	5.7	7.2	4.5	3.0

Assignment	
Type	Mains choke
E84AVBxx3714	ELN3-1500H003-001
E84AVBxx5514	
E84AVBxx7514	
E84AVBxx1124	ELN3-0680H006-001
E84AVBxx1524	
E84AVBxx2224	
E84AVBxx3024	

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_{aN} [kVA]	Motor power 4.pol. ASM P_{aN} [kW]
E84AVBxx3714	1.8	0.8	0.37
E84AVBxx5514	2.4	1.1	0.55
E84AVBxx7514	3.1	1.5	0.75
E84AVBxx1124	4.4	2.0	1.1
E84AVBxx1524	5.0	2.4	1.5
E84AVBxx2224	6.6	3.5	2.2
E84AVBxx3024	8.6	4.5	3.0

Type	Output currents [A] at switching frequency							
	2 kHz		4 kHz		8 kHz		16 kHz	
	I_{aN2}	I_{aM2}	I_{aN4}	I_{aM4}	I_{aN8}	I_{aM8}	I_{aN16}	I_{aM16}
E84AVBxx3714	1.0	2.0	1.0	2.0	1.0	2.0	0.7	1.4
E84AVBxx5514	1.4	2.8	1.4	2.8	1.4	2.8	0.9	1.8
E84AVBxx7514	1.9	3.8	1.9	3.8	1.9	3.8	1.3	2.6
E84AVBxx1124	2.6	5.2	2.6	5.2	2.6	5.2	1.7	3.4
E84AVBxx1524	3.1	6.2	3.1	6.2	3.1	6.2	2.1	4.2
E84AVBxx2224	4.5	9.0	4.5	9.0	4.5	9.0	3.0	6.0
E84AVBxx3024	5.8	11.6	5.8	11.6	5.8	11.6	3.9	7.8

 I_{aNx} I_{aMx}

Switching frequency

Rated value - continuous output current

Maximum output current (overload current)

- Periodic load change of 3 s with I_{aMx} and recovery time of 12 s with 75 % I_{aNx}
- Can be achieved with the setting "x kHz fixed/..." in C00018

When the maximum heatsink temperature is reached, the switching frequency is reduced to 4 kHz.

With the setting "x kHz var./..." in C00018, the switching frequency is reduced dynamically.

- At 16 kHz and $I_a > 100 \% \times I_{aN8}$ to 8 kHz
- At 8 kHz and $I_a > 150 \% \times I_{aN8}$ to 4 kHz

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]
E84AVBxx3714	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx5514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx7514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx1124	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVBxx1524	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVBxx2224	150	5.3	4.2	5.3	4.2	-	∞	-
E84AVBxx3024	100	7.9	6.2	7.9	6.2	-	∞	-

 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 cable dimensioning

Continuous braking power

Cycle time, periodic load change with running time and recovery time

Running time in a cycle without reducing the scanning ratio (∞ = no time limit)

Recovery time

Maximum running time without initial load and observing 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⁾		FI 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]	
E84AVBxx3714	C6	6	1.5	-	-	10	14	≥ 30
E84AVBxx5514	C6	6	1.5	-	-	10	14	
E84AVBxx7514	C6	6	1.5	-	-	10	14	
E84AVBxx1124	C10	10	1.5	-	-	10	14	
E84AVBxx1524	C10	10	1.5	-	-	10	14	
E84AVBxx2224	C10	10	1.5	-	-	10	14	
E84AVBxx3024	C16	16	1.5	-	-	12	14	

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: voltage ≥ 500 V, tripping characteristic "H", "K5" or "CC". The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

3) Universal-current sensitive earth-leakage circuit breaker, short-time delay

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

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⁾		FI 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]	
E84AVBxx3714	C6	6	1.5	-	-	10	14	≥ 30
E84AVBxx5514	C6	6	1.5	-	-	10	14	
E84AVBxx7514	C6	6	1.5	-	-	10	14	
E84AVBxx1124	C6	6	1.5	-	-	10	14	
E84AVBxx1524	C10	10	1.5	-	-	10	14	
E84AVBxx2224	C10	10	1.5	-	-	10	14	
E84AVBxx3024	C16	16	1.5	-	-	12	14	

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: voltage ≥ 500 V, tripping characteristic "H", "K5" or "CC". The cable cross-sections apply under the following conditions: conductor temperature < 75 °C, ambient temperature < 45°C.

3) Universal-current sensitive earth-leakage circuit breaker, short-time delay

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

③ Fuse

Observe national and regional regulations

4.3

Overcurrent operation

The controllers are designed for a time-limited overcurrent. The "Ixt" protective function protects the controller against impermissible overloads. The protective function monitors the output current within two different time periods.

Definition of the cycles:

- 15-s cycle ①
 - 3 s load period with peak current **A**
 - 12 s recovery time with limited current **B**
- 180-s cycle ②
 - 60 s load period with peak current **C**
 - 120 s recovery time with limited current **D**

A load period with peak current must be followed by a recovery time. During the recovery time, the current must not exceed the given value. The utilisation detected in the cycles must not exceed 100% I_{aN8} , otherwise a warning signal is displayed.

The given values refer to the rated output current I_{aN8} .

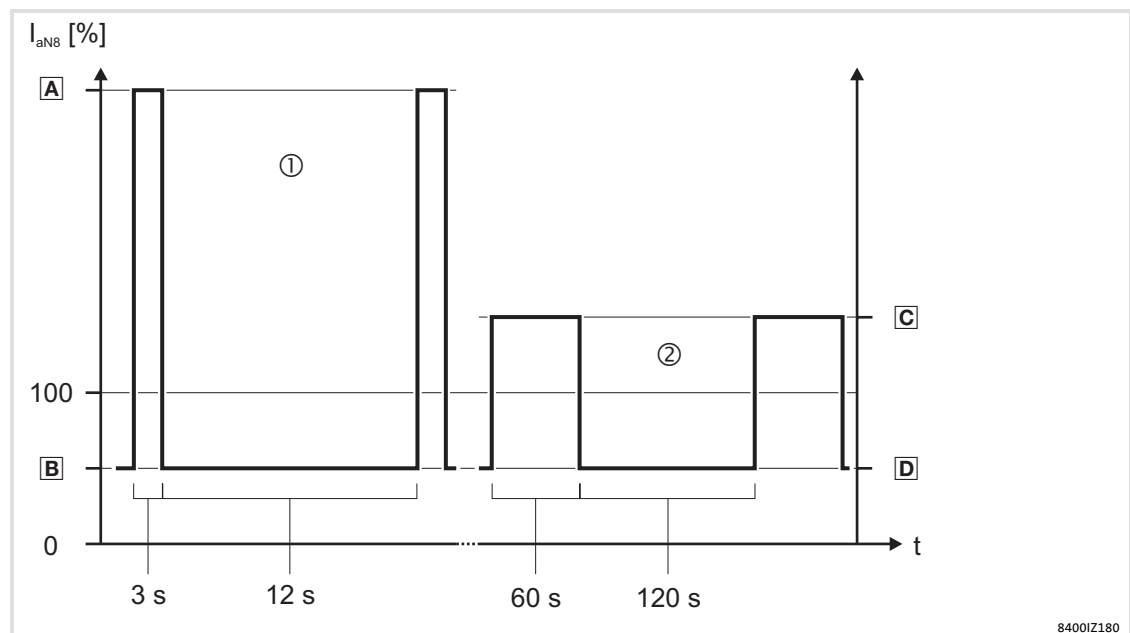


Fig. 4-1 Overcurrent capacity in 230/400 V operation at 45° C

A	Peak current for 3 s	① 15-s cycle
B	max. current in recovery time for 12 s	
C	Peak current for 60 s	② 180-s cycle
D	max. current in recovery time for 120 s	

4.3.1 Device overload for 15-s cycle

Operation at rated mains voltage 230 V

Type	I_{amax}/I_{aN8} [%] in 15-s cycle ①							
	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	A	B	A	B	A	B	A	B
E84AVBxx2512	200	75	200	75	200	75	133	50
E84AVBxx3712								
E84AVBxx5512								
E84AVBxx7512								
E84AVBxx1122								
E84AVBxx1522								
E84AVBxx2222								

Operation at rated mains voltage 400 V

Type	I_{amax}/I_{aN8} [%] in 15-s cycle ①							
	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	A	B	A	B	A	B	A	B
E84AVBxx3714	175	80	175	80	175	80	133	50
E84AVBxx5514								
E84AVBxx7514								
E84AVBxx1124								
E84AVBxx1524								
E84AVBxx2224								
E84AVBxx3024	170	80	170	80	170	80	133	50

Operation at rated mains voltage 500 V

Type	I_{amax}/I_{aN8} [%] in 15-s cycle ①							
	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	A	B	A	B	A	B	A	B
E84AVBxx3714	200	75	200	75	200	75	133	50
E84AVBxx5514								
E84AVBxx7514								
E84AVBxx1124								
E84AVBxx1524								
E84AVBxx2224								
E84AVBxx3024								

4.3.2**Device overload for 180-s cycle****Operation at rated mains voltage 230/400 V**

Type	I_{amax}/I_{aN8} [%] in 180-s cycle ②							
	f = 2 kHz		f = 4 kHz		f = 8 kHz		f = 16 kHz	
	C	D	C	D	C	D	C	D
E84AVBxx251x	150	75	150	75	150	75	100	50
E84AVBxx371x								
E84AVBxx551x								
E84AVBxx751x								
E84AVBxx112x	150	75	150	75	150	75	100	50
E84AVBxx152x								
E84AVBxx222x	150	75	150	75	150	75	100	50
E84AVBxx302x								

**Tip!**

For calculations of application-specific cycles please contact your Lenze contact person.

4.4

Terminal description

4.4.1

Overview

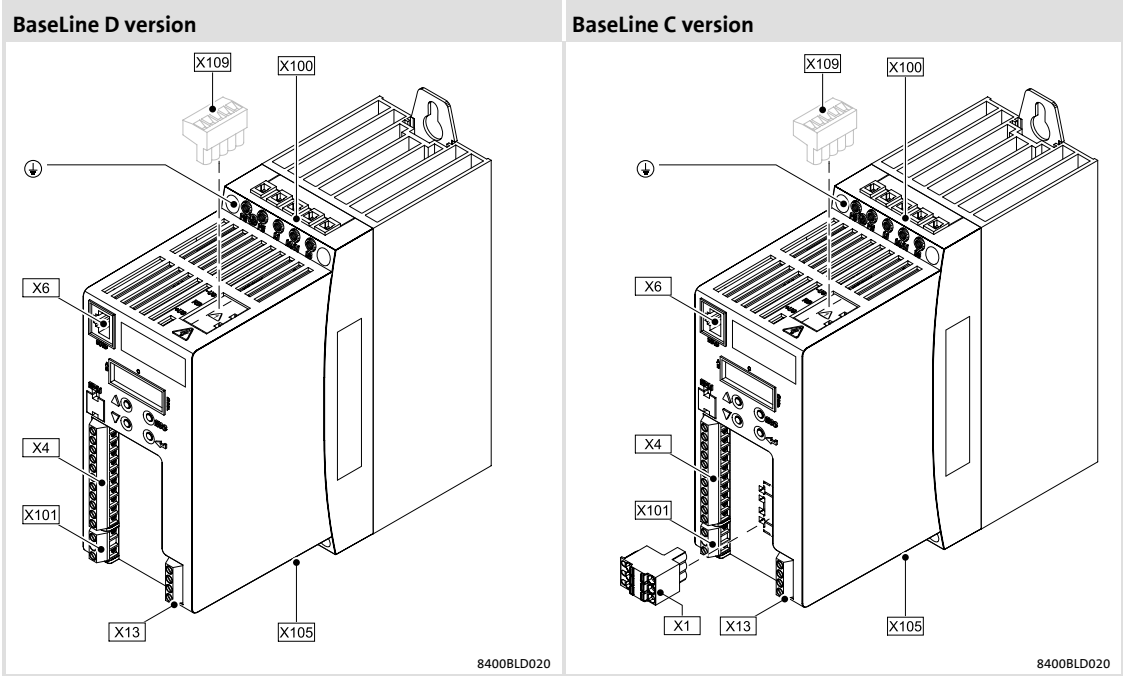


Fig. 4-2 BaseLine version, devices in the power range from 0.25 to 3 kW

Pos.	Description	Number
X1	System bus (CANopen)	1
X4	Analog input	1
	10-V reference voltage	1
	Digital inputs	4
	Controller enable	1
	Digital output	1
	24 V external supply input	1
X13	Terminal for I/O shields	1
X100	Terminal for mains voltage	1
X101	Relay output terminal	1
X105	Motor terminal	1
X109	DC bus terminal (optional, can be ordered as a separate item)	1
⏚	PE conductor	4

4.5**Control terminals****4.5.1****External supply voltage 24 V**

Labelling	Feature	Rated value
24E GND	Connection for external 24 V supply voltage	24 V in accordance with IEC 61131-2 15.0 ... 30.0 V Residual ripple max. $\pm$ 5 % SELV/PELV
	Polarity reversal protection	When polarity is reversed the internal 12 V supply is active; no destruction.
	Current consumption	Approx. 50 mA during operation

Labelling	Feature	Rated value
12I	12-V voltage output to connect digital inputs via potential-free contacts	Internal supply: DC
	Max. output current	50 mA
	Electric strength of external voltage	+30 V
	Excess current release	Automatically resettable

4.5.2 Analog input

Labelling	Feature	Rated value
A1U GND	Input	0 ... +10 V with DC voltage
		0 ... +5 V DC (0 ... +20 mA)
		1 ... +5 V DC (+4 ... +20 mA)
	Input resistance	> 50 k Ω with DC voltage 250 Ω (external) with DC current
	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	10 bit resolution Error 1 digit = 0.1 % with regard to final value

4.5.3 Digital inputs

Labelling	Features	Rated value
DI1, DI2	Digital input 1/2	according to IEC61131-2, type 1
DI3, DI4	Digital input 3/4	according to IEC61131-2, type 1
RFR	Controller inhibit	according to IEC61131-2, type 1
	Input resistance	3.3 k Ω (2.0 k Ω ... 5.0 k Ω)
	Electric strength of external voltage	+10 ... +30 V DC, permanent
	Level	LOW = 0 ... +2.5 V DC HIGH = +10 ... 30 V DC
	Cycle time	1 ms
	Isolation	 47

4.5.4 Digital outputs

Labelling	Features	Rated value
DO1	Digital output	In accordance with IEC61131-2, type 1, max. 50 mA
GND	External-voltage protected	Up to +30 V Integrated polarity reversal protection diode for switching inductive loads
	Isolation	 47
	Level	LOW < +5 V HIGH > +15 V
	Behaviour during overload	Reduced voltage or periodical switch-off/on
	Behaviour during reset and switch-on	Outputs are switched off (LOW)
	Cycle time	1 ms

4.5.5 Relay output connection

Labelling	Description/features	Rated value
COM	Central contact of relay	AC 250 V, 3 A DC 24 V, 2 A
NO	NO contact (normally open)	DC 240 V, 0.22 A

**Note!**

- The minimum load of the switching contacts should not fall below 12 V and 5 mA.
- To avoid premature contact wear caused by erosion, a protective circuit (free-wheeling diode, varistor, RC filter or RCD filter) is required, especially in case of inductive load.

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 the power range from 0.25 ... 3 kW**5.2.1 Assembly in built-in technique (standard)**

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.

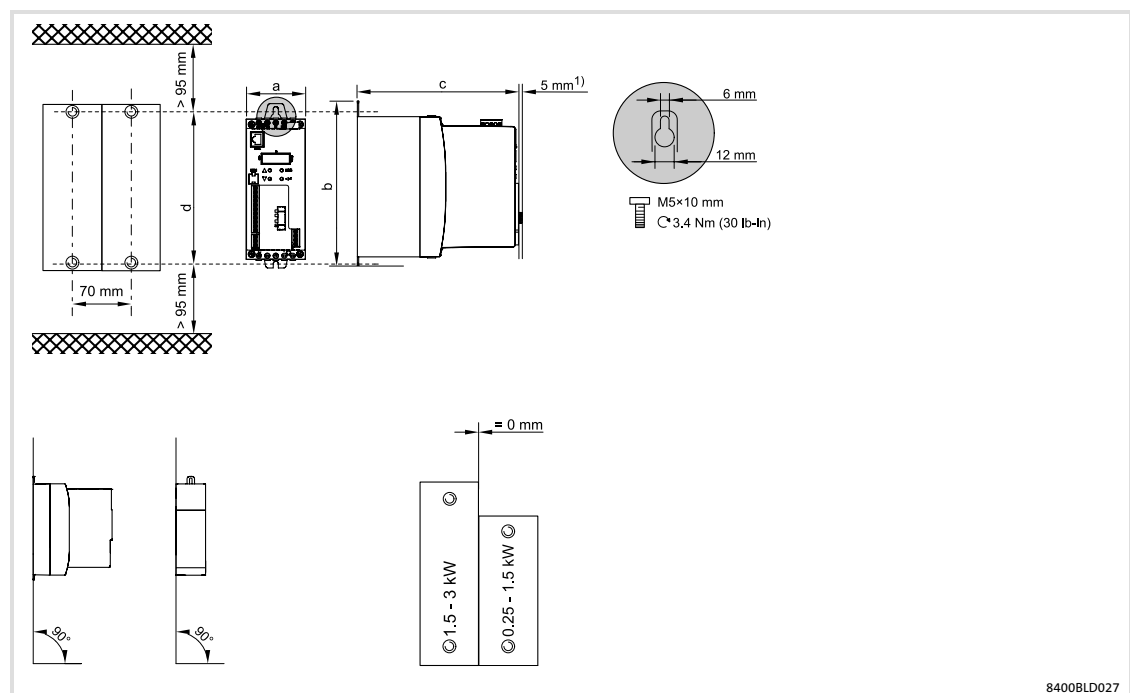


Fig. 5-1 Assembly in "standard" technique

1) BaseLine C

	[kW]	a [mm]	b [mm]	c [mm]	d [mm]	 [kg]
E84AVBxE2512	0.25 ... 0.37	70	194	144	180	1.2
E84AVBxE3712				162 ²⁾		
E84AVBxE3714				162		
E84AVBxE551x	0.37 ... 0.75	70	194	162	180	1.2
E84AVBxE751x				162		
E84AVBxE112x	1.1 ... 1.5	70	194	162	180	1.4
E84AVBxE1524				190 ²⁾		
E84AVBxE1522	1.5 ... 3.0	70	244	162	230	1.9
E84AVBxE222x				190 ²⁾		
E84AVBxE3024				190 ²⁾		

2) Dimensions valid for devices with hardware version 1x.

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 of the machine
 - PE connection for the controller and the machine must conform to standards (PE conductor diameter $\geq 10 \text{ mm}^2$ or PE conductor must be connected twice)



Stop!

No device protection in the event of too high mains voltages

The mains input is not fused internally.

Possible consequences:

- ▶ Destruction of the device if the mains voltage is too high.

Protective measures:

- ▶ Observe the max. 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 drive controller contains electrostatically sensitive components.

The personnel must be free of electrostatic charge when carrying out assembly and service operations.

**Stop!****Terminal strips and pluggable terminal strip X109**

During operation high voltages and arcing can be caused when:

- ▶ wiring of the terminal strips (inserting or removing wires).
- ▶ plugging or removing the terminal strip X109.

Possible consequences:

- ▶ Damage of the devices

Protective measures:

- ▶ Switch off device.
- ▶ Only wire the terminal strip (insert or remove wires) in deenergised status.
- ▶ Only plug or remove the terminal strip X109 in deenergised status.

**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.

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.

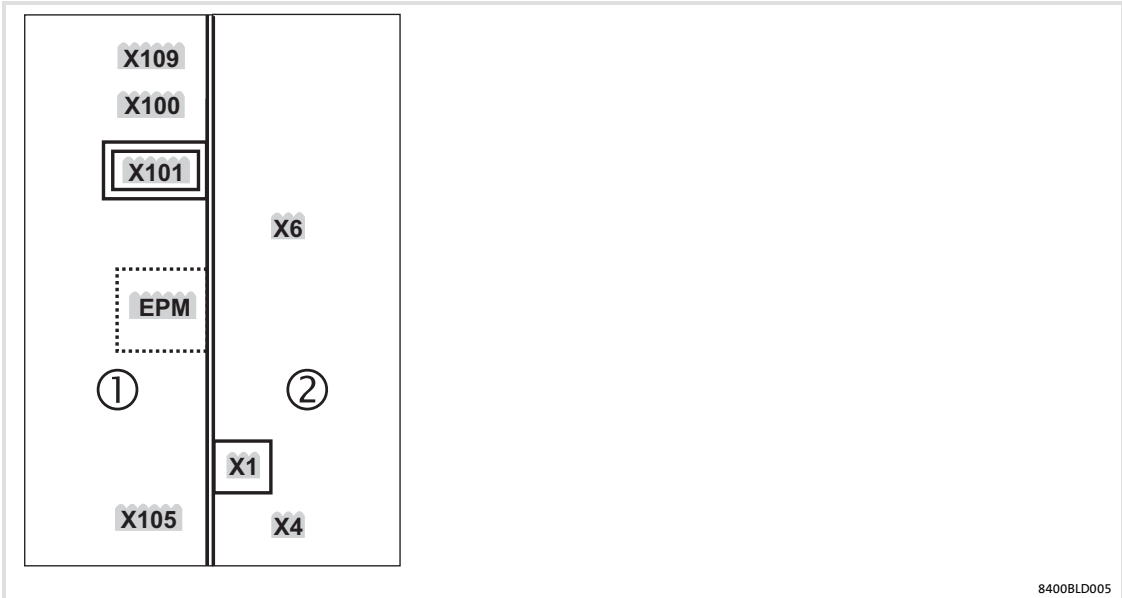


Fig. 6-1 Electrical isolation between power terminals, control terminals and housing

Legend			
	⋮		Isolation through functional insulation
			Isolation through 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	Safe isolation towards X101 and all control terminals
	X109	DC bus	
	X105	Motor	
	X101	Relay contact	Safe isolation towards X100, X105, X109 and all control terminals
	EPM	Memory module	Safe isolation towards other control terminals; functional insulation towards power terminals
Control ②	X1	System bus (CANopen)	Basic insulation towards other control terminals; safe isolation towards power terminals
	X4	Analog IO	Safe isolation towards power terminals
		Digital Inputs	
		Digital output	
	X6	Diagnostics	Safe isolation towards power terminals

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.

6.1.3 Maximum motor cable length

- ▶ The motor cable must be as short as possible for having a positive effect on the drive behaviour.
- ▶ For group drives (several motors connected to one drive 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 the individual motor cables

- ▶ At rated mains voltage and a switching frequency of 4 kHz and without additional output filters, the maximum permissible length of the motor cable is as follows:
 - 50 m shielded
 - 100 m unshielded

**Note!**

For compliance with EMC regulations, the permissible cable lengths must be reduced.

6.1.4 Motor protection

- ▶ Extensive protection against overload:
 - Through overcurrent relay or temperature monitoring.
 - We recommend to use thermostats for motor temperature monitoring.
 - Thermostat contacts can be used to activate a digital input DI1 ... DI4 for "external fault" alarm.
- ▶ Only use motors which have a suitable insulation 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 be used with chokes.
 - For this, contact the supplier of the compensation equipment.

6.1.6

Safety notes for the installation according to U_L or U_R **Warnings!**

- ▶ The device has no overspeed protection.
- ▶ 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.
- ▶ Suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes, at the maximum voltage rating marked on the device.
- ▶ Motor overload is provided at 125% of rated current. The overload trip point must be enabled and adjusted by parameterization.
- ▶ Shall be installed in a pollution degree 2 macro-environment.
- ▶ Maximum surrounding air temperature: 55 °C (📖 4.2)
- ▶ Use minimum 75 °C copper wire only, except for control circuits.

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
- ▶ 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)

The following connections need not be shielded:

- ▶ 12-V supply
- ▶ Digital signals up to a cable length of 3 m

Connection system

- ▶ Connect the shield with a large surface and fix it with a conductive clamp.
- ▶ Connect the shield directly to the terminal X13.
 - 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

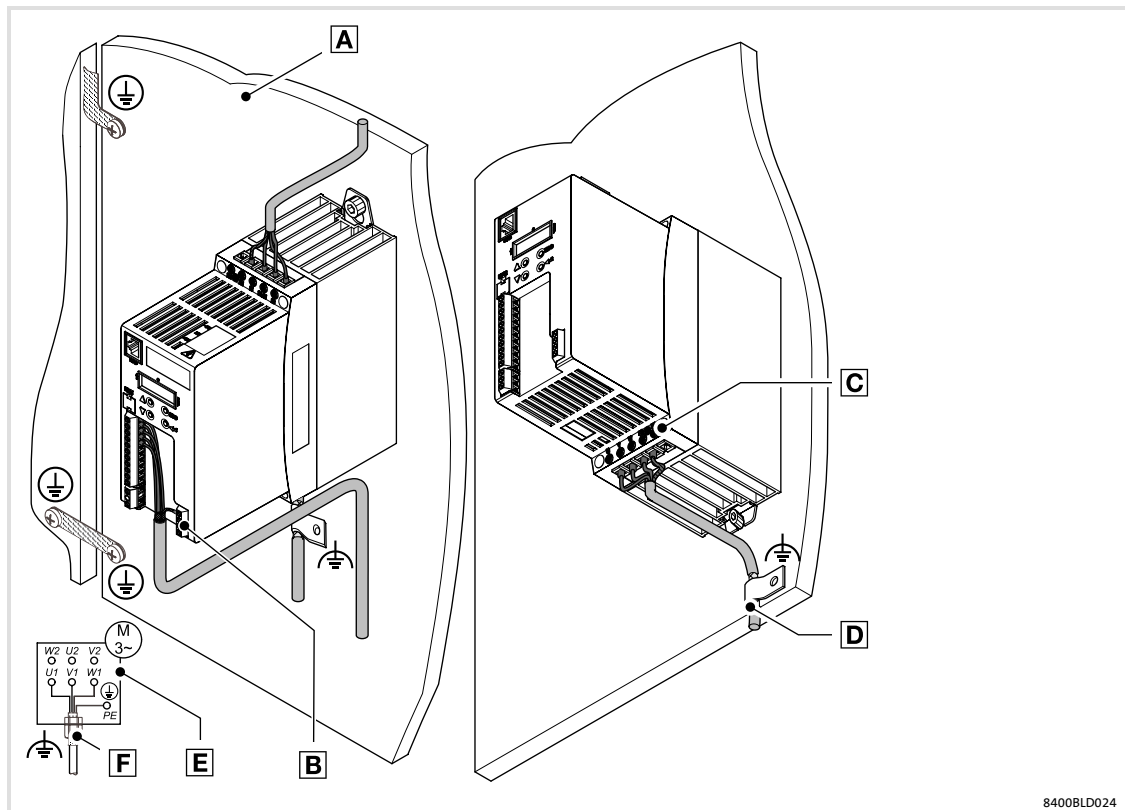


Fig. 6-2 Wiring in compliance with EMC standards

- A** Mounting plate with electrically conductive surface
- B** Control cables connected to the X13 terminal (I/O Shields)
- C** Terminal for motor PE
- D** Motor cable connected to the mounting plate (functional earth)
- E** Star or delta connection as indicated on the motor nameplate
- F** EMC cable gland (not included in the scope of supply)

8400BLD024

6.2.2 Mains connection, DC supply

- ▶ Drive controllers or mains chokes may be connected to the mains via unshielded single cores or cables.
- ▶ For DC-bus operation or DC supply, use shielded cables.
- ▶ The cable cross-section must be dimensioned for the corresponding fusing (national and regional regulations must be observed).

6.2.3

Motor cables

- ▶ 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 (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 a conductive clamp.
- ▶ Connect the shield directly to the terminal X13.
 - 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.

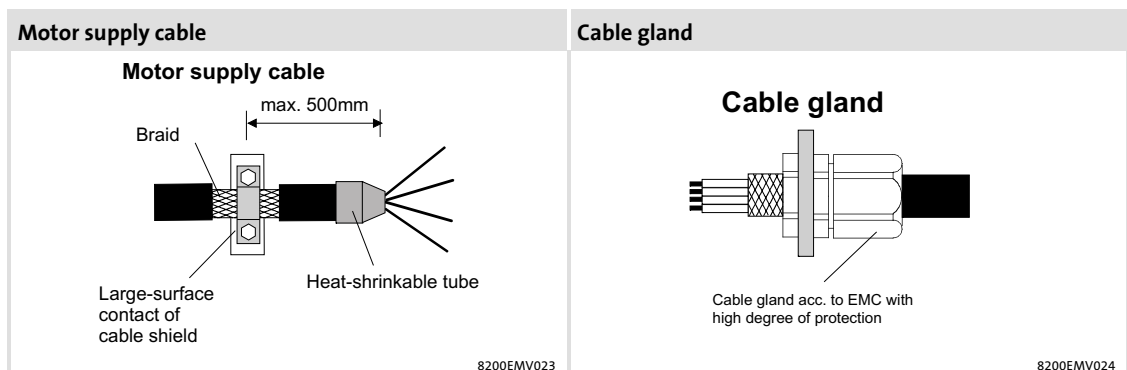


Fig. 6-3 Shielding of the motor cable

6.2.4**Control cables**

- ▶ Control cables must be shielded to minimise interference injections.
- ▶ For lengths of 200 mm and more, use only shielded cables for the analog input. Under 200 mm, unshielded but twisted cables may be used.
- ▶ For lengths of 3 m and more, use only shielded cables for digital inputs and relay output. Under 3 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).

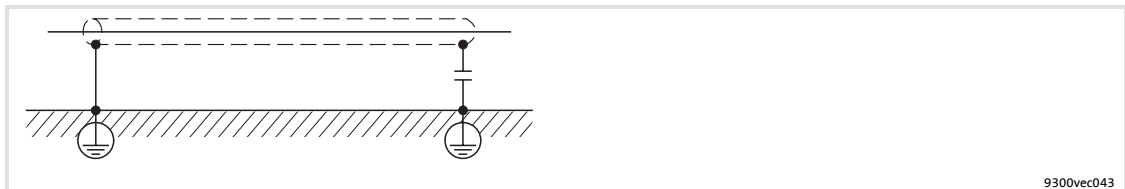


Fig. 6-4 Shielding of long, analog control cables

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 perfectly installed if
 - it is routed separately of mains cables and control cables,
 - it crosses mains cables and control cables only at a right angle,
- ▶ Cables must be routed close to the mounting plate (reference potential) as freely suspended cables act like antennas.
- ▶ Cables must be routed in a straight line to the terminals (avoid “tangle of cables”).
- ▶ Use separate cable ducts for power cables and control cables. Do not mix up different cable types in one cable duct.
- ▶ Minimise coupling capacitances and inductances caused by unnecessary cable lengths and reserve loops.
- ▶ Short-circuit unused cores to the reference potential.
- ▶ Route the positive and negative cables for DC 24 V close to each other over the total length to prevent 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.

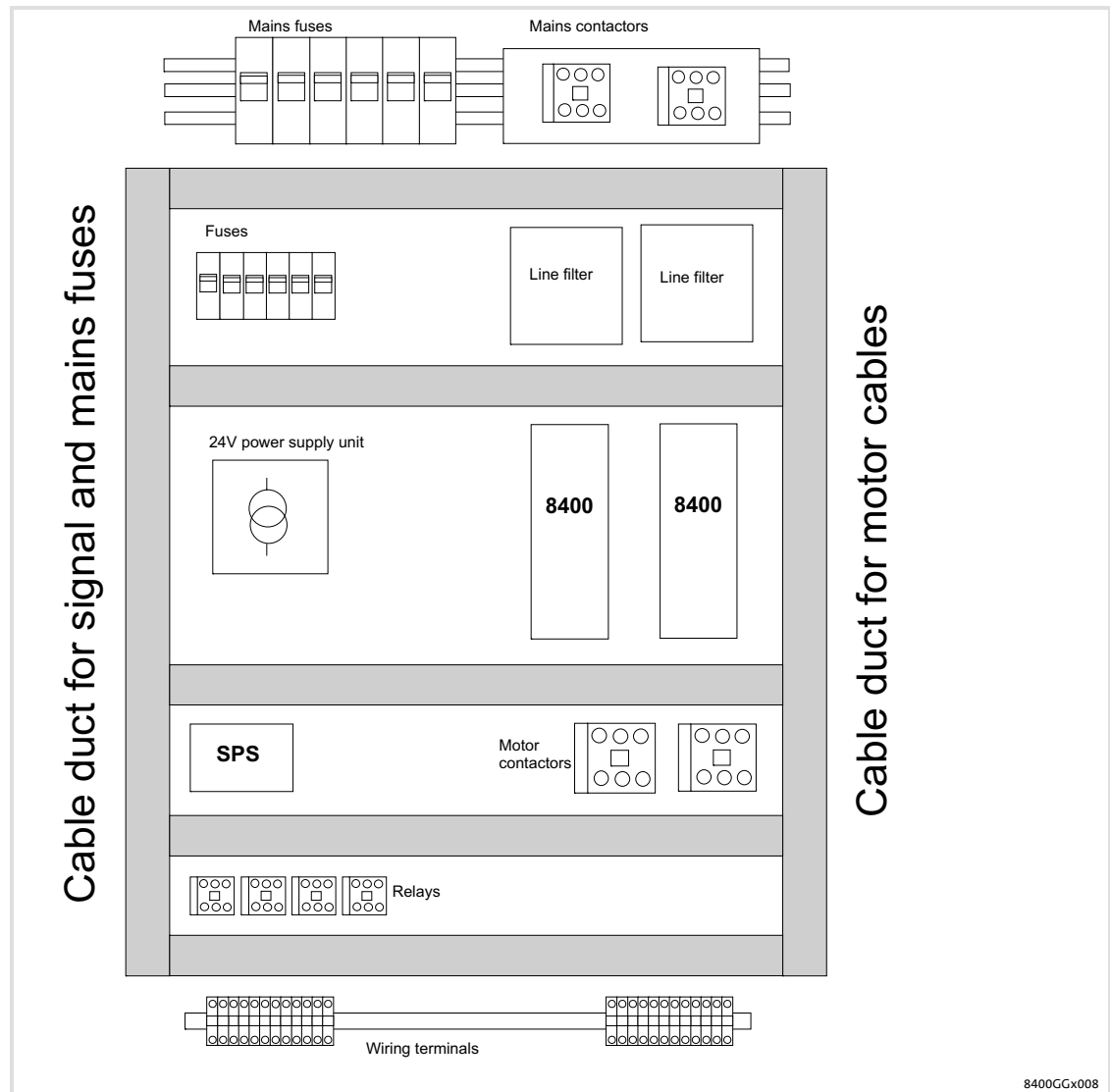


Fig. 6-5 Cable routing in the control cabinet

6.2.6 Wiring outside 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.

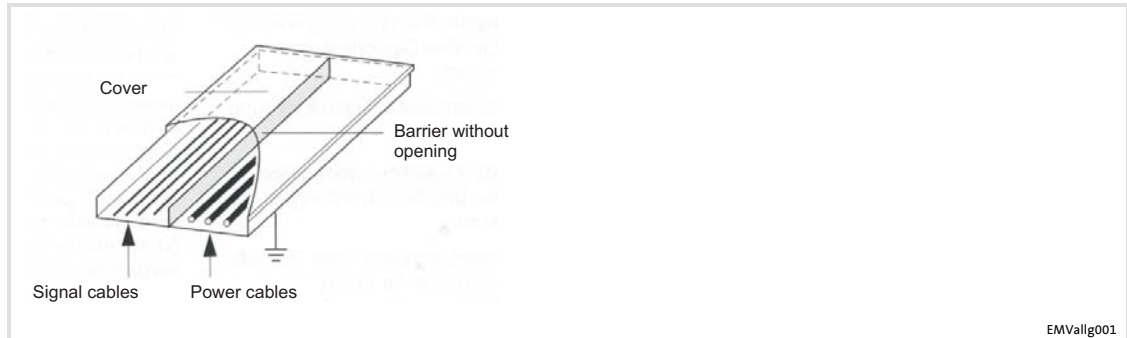


Fig. 6-6 Cable routing in the cable duct with barrier

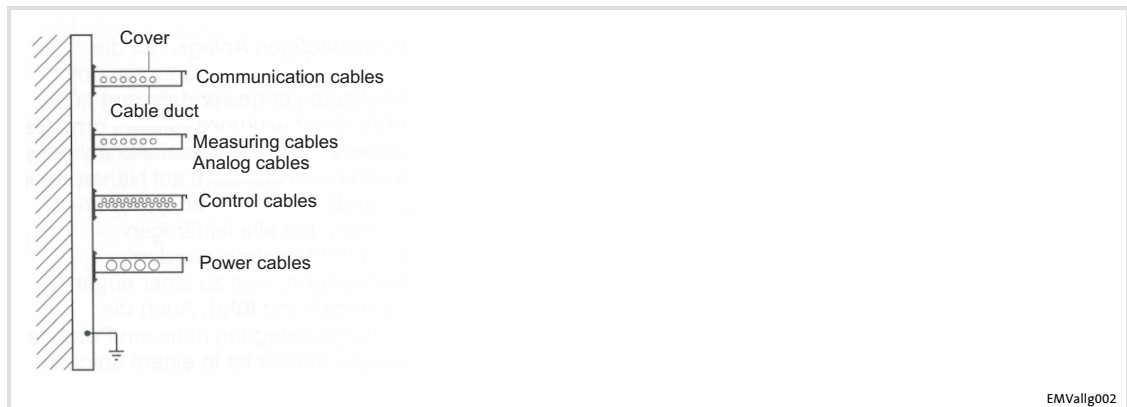


Fig. 6-7 Cable routing in separated cable ducts

Wiring on the mains side

- ▶ It is possible to connect the controller and the mains choke 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: (📖 53)

6.2.7 Detecting and eliminating EMC interferences

Fault	Cause	Remedy
Interferences to analog setpoints of devices and measuring systems	Unshielded motor cable	Use shielded motor cable
	Contact surface of shield is too small	Provide optimum shielding according to instructions
	Shield of the motor cable is interrupted by terminal strips, switches etc.	- Keep components separated from all other parts by at least 100mm - Use motor choke
	Additional, unshielded cables are installed within the motor cable (e.g. for motor temperature monitoring)	Separate the additional cables and shield them
	Unshielded motor cable ends too long	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 installed next to the supply terminals	Keep the terminal strips for the motor cable separated from the supply and other control terminals by at least 100 mm
	Painted mounting plate	Optimise PE connection: - Remove paint - Use zinc-coated mounting plate
	HF short circuit	Check cable routing

6.3

Devices in the power range 0.25 ... 2.2 kW (1/N/PE AC 230 V)

6.3.1

Example circuits

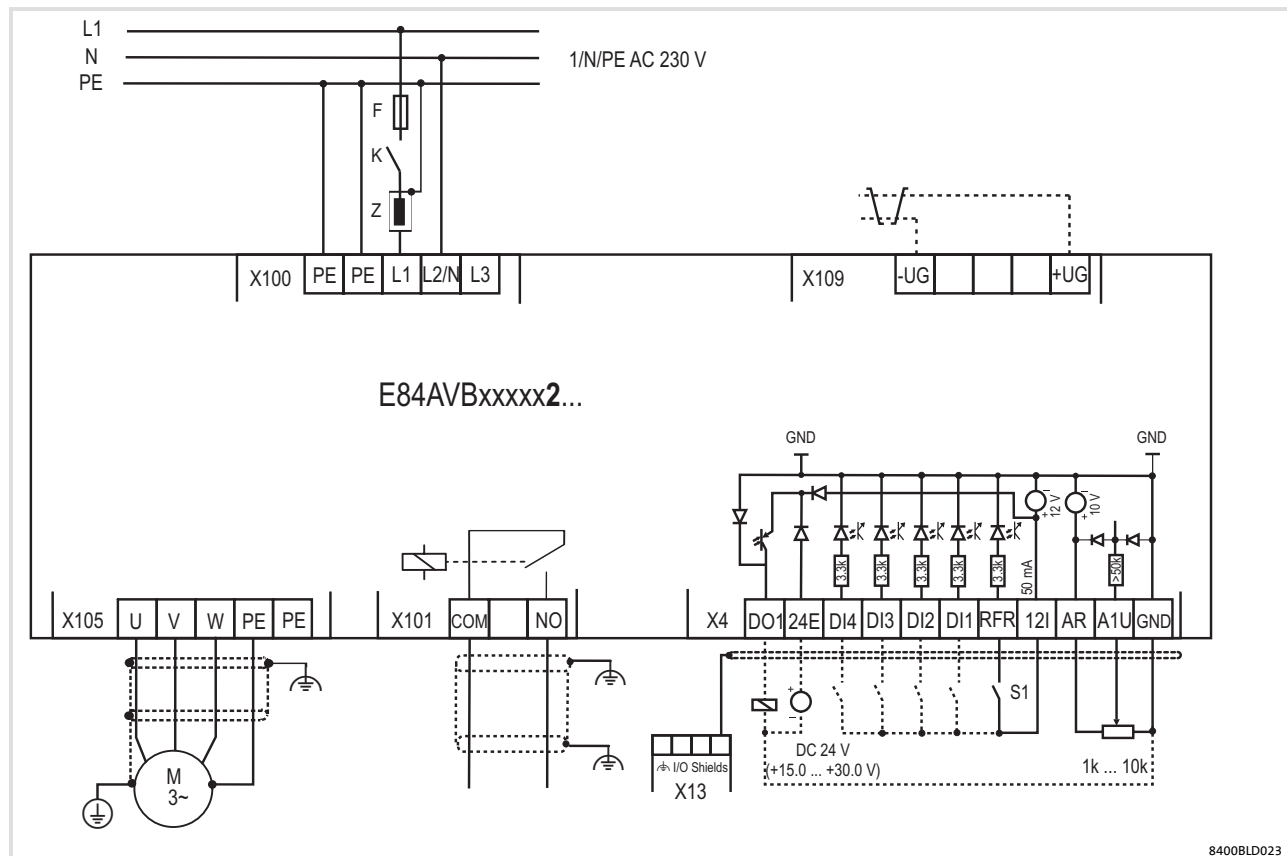


Fig. 6-8 Wiring for controllers with 230-V mains connection

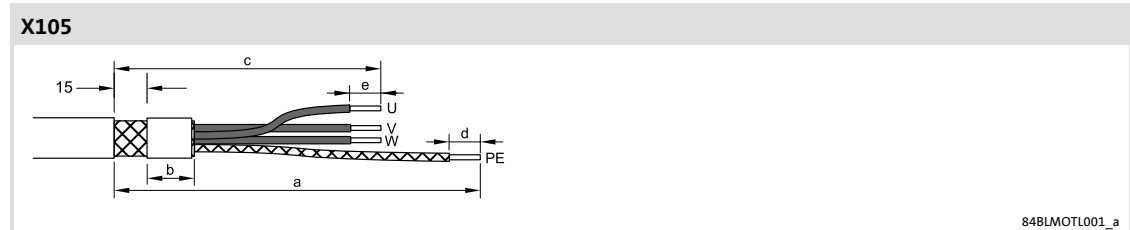
DO1

The digital output is not available for devices with nameplate data
E84AVBDxxxxSX0

84008LD023

6.3.2 Terminal assignment of the power connections

Strip cables

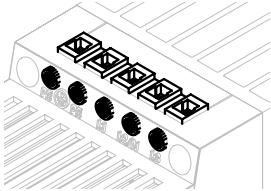


	U, V, W			PE	
	b	c	e	a	d
	[mm]			[mm]	
E84AVBxE2512	75	130	7	160	7
E84AVBxE3712					
E84AVBxE5512					
E84AVBxE7512	95	150	7	180	7
E84AVBxE1122					
E84AVBxE1522					
E84AVBxE2222					

How to proceed:

1. Strip motor cable as specified.
2. Fold back shield of motor cable over the cable sheath. Keep unshielded cable ends as short as possible.
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 motor cable shield to PE terminal of inverter.
 - For strain relief of the cables, additional measures are required.

Mains connection

Terminal X100	Labelling	Description
 84BDGG001	L1	Mains phase L
	L2/N	Mains phase L/Neutral conductor N
	PE	PE conductor on the supply side

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE2512 E84AVBxE3712 E84AVBxE5512 E84AVBxE7512 E84AVBxE1122	1 ... 2.5	18 ... 14	0.5	4.5	3.5 x 0.6
E84AVBxE1522 	1 ... 2.5	18 ... 12			
	1 ... 4	18 ... 10			
E84AVBxE2222 	1 ... 4	18 ... 12			
	1 ... 6	18 ... 10			

For inverter drives of type E84AVBDE2222 and E84AVBDE1522, the following should be considered:

- ▶ when the inverter is connected to the mains without a mains choke, the terminal X100 can accommodate
 - cables with cross-sections of maximum 4 mm² without wire end ferrules.
 - cables with cross-sections of maximum 4 mm² or thicker with a wire end ferrule only if pin-end connectors are used.

Connecting the controller to protective earth

Using the PE connections on the mains side, the controller can be connected to protective earth. Additional protective earthing of the controller can be carried out via the second PE 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 requirements for wiring on the mains side (📖 52).
2. Connect a second cable to the vacant PE connection and earth it.

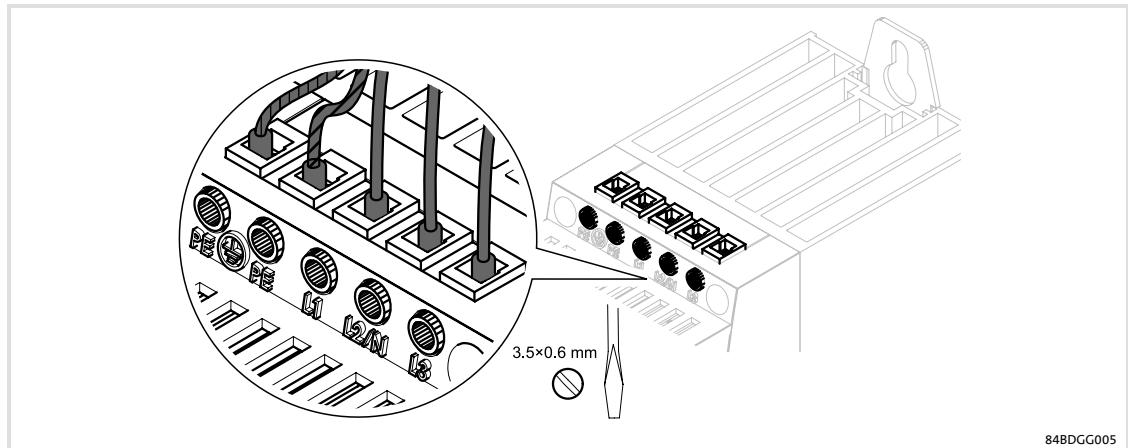


Fig. 6-9 Connecting the controller to protective earth on the mains side

84BDGG005

DC bus

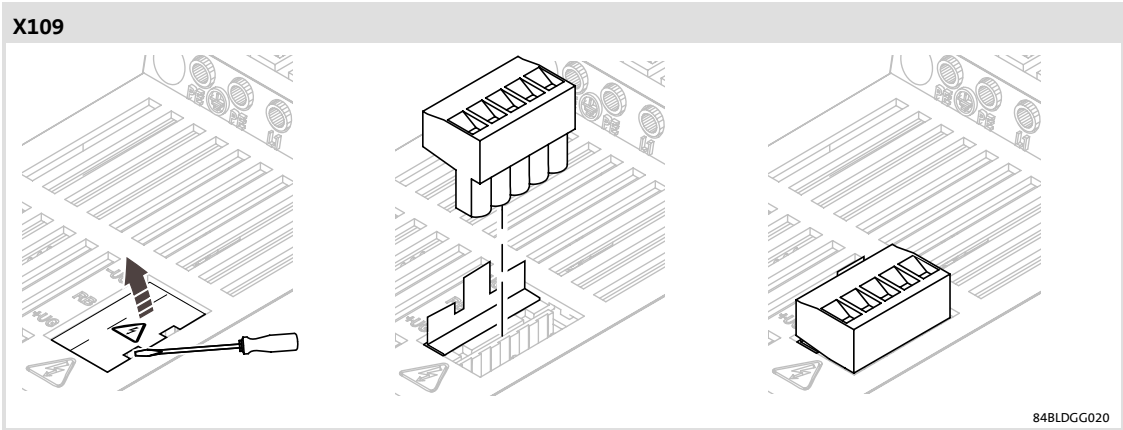
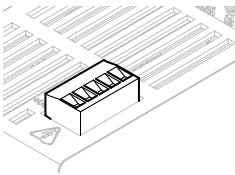


Fig. 6-10 Inserting terminal X109

Before plugging in the terminal X109:

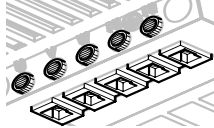
1. Switch off the controller and wait for at least 3 minutes before start working.
2. Make sure that there is no residual voltage.
3. Pull the cover carefully to the side without removing it completely.
4. Plug in the terminal.

Terminal X109	Labelling	Description
 848DGG109	-UG RB ¹⁾ + UG	DC bus for connecting devices operating at 230 V to an external brake module, DC bus system or DC supply (only with devices in the power range from 0.25 to 1.5 kW)

¹⁾ not connected

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE2512	0.5 ... 1.5	22 ... 16	0.5	4.5	3.5 x 0.6
E84AVBxE3712					
E84AVBxE5512					
E84AVBxE7512					
E84AVBxE1122					
E84AVBxE1522					
E84AVBxE2222					

Motor connection

Terminal X105	Labelling	Description
	U, V, W	Motor
	PE	PE conductor

84BDGG012

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE2512	1 ... 2.5	18 ... 12	0.5	4.5	3.5 x 0.6
E84AVBxE3712					
E84AVBxE5512					
E84AVBxE7512					
E84AVBxE1122					
E84AVBxE1522					
E84AVBxE2222					

6.4

Devices in the power range from 0.37 to 3 kW (3/PE AC 400 V)

6.4.1

Example circuits

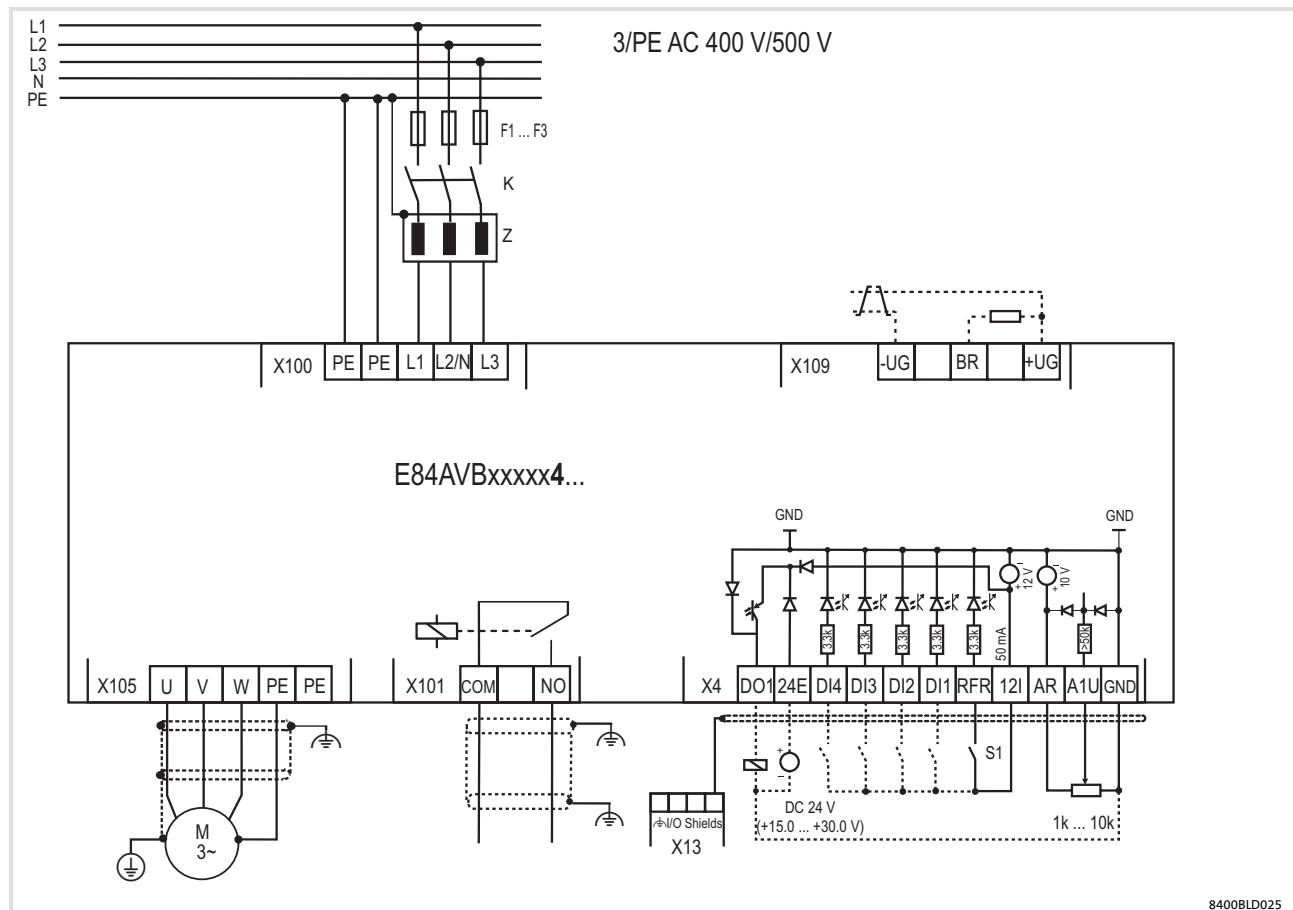


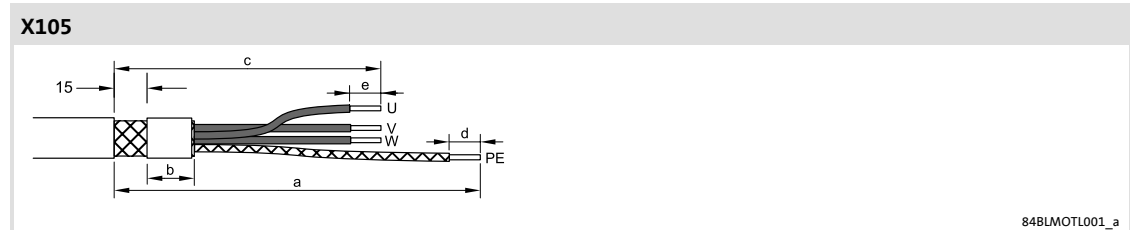
Fig. 6-11 Wiring for controllers with 400-V/500-V mains connection

DO1

The digital output is not available for devices with nameplate data E84AVBDxxxxSX0

6.4.2 Terminal assignment of the power connections

Strip cables

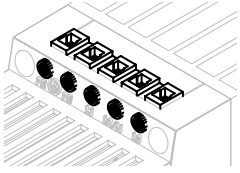


	U, V, W			PE	
	b	c	e	a	d
	[mm]			[mm]	
E84AVBxE3714	95	150	7	180	7
E84AVBxE5514					
E84AVBxE7514					
E84AVBxE1124					
E84AVBxE1524					
E84AVBxE2224					
E84AVBxE3024					

How to proceed:

1. Strip motor cable as specified.
2. Fold back shield of motor cable over the cable sheath. Keep unshielded cable ends as short as possible.
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 motor cable shield to PE terminal of inverter.
 - For strain relief of the cables, additional measures are required.

Mains connection

Terminal X100	Labelling	Description
	L1 L2/N L3	Connection of the mains phases L1, L2/N, L3
	PE	Connection for the PE conductor

84BDGG001

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE3714	1 ... 2.5	18 ... 12	0.5	4.5	3.5 x 0.6
E84AVBxE5514					
E84AVBxE7514					
E84AVBxE1124					
E84AVBxE1524					
E84AVBxE2224					
E84AVBxE3024					

Connecting the controller to protective earth

Using the PE connections on the mains side, the controller can be connected to protective earth. Additional protective earthing of the controller can be carried out via the second PE 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 requirements for wiring on the mains side ( 52).
2. Connect a second cable to the vacant PE connection and earth it.

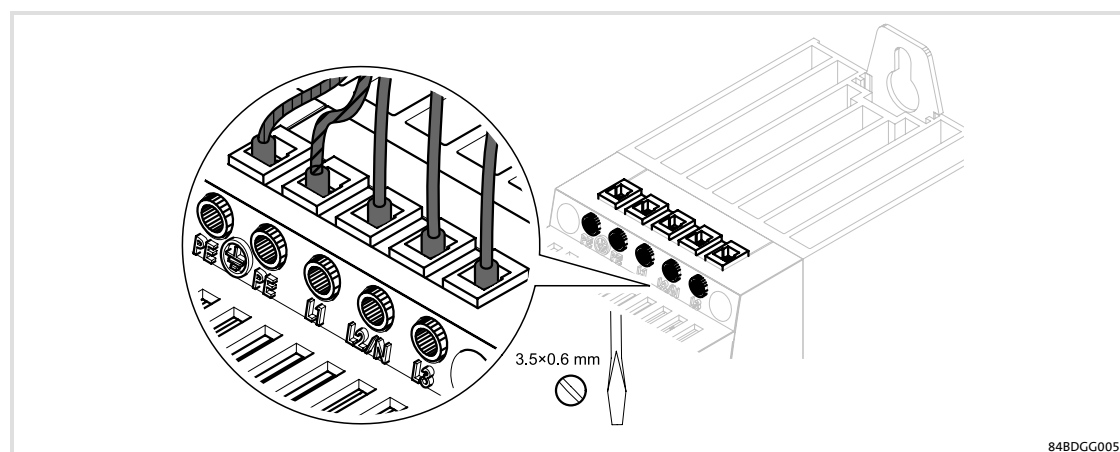


Fig. 6-12 Connecting the controller to protective earth on the mains side

Connection to the DC bus (+U_G, -U_G)

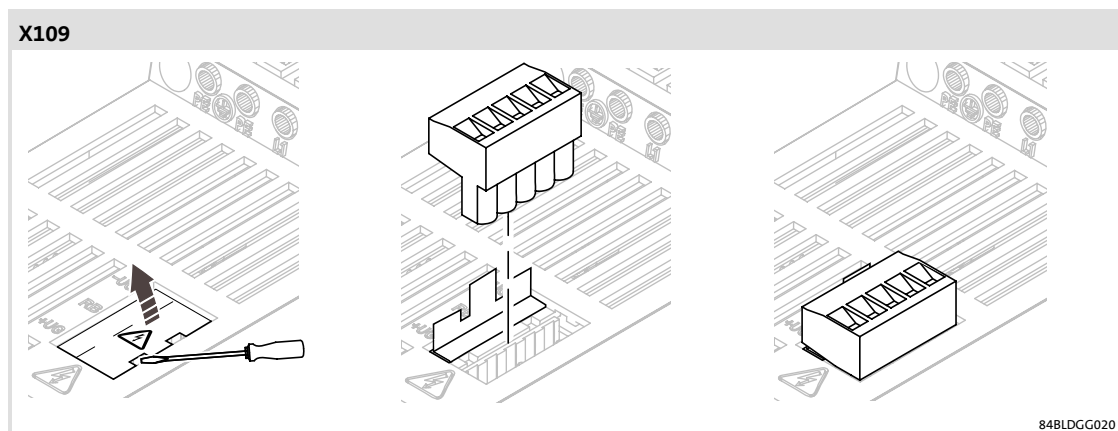
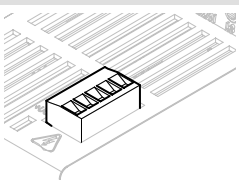


Fig. 6-13 Inserting terminal X109

Before plugging in the terminal X109:

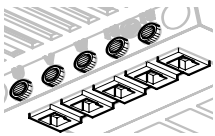
1. Switch off the controller and wait for at least 3 minutes before start working.
2. Make sure that there is no residual voltage.
3. Pull the cover carefully to the side without removing it completely.
4. Plug in the terminal.

Terminal X109	Labelling	Description
	- UG RB + UG	DC bus for connecting devices operating at 400 V to a DC bus system or DC supply.

848DGG109

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE3714	0.5 ... 1.5	22 ... 16	0.5	4.5	3.5 x 0.6
E84AVBxE5514					
E84AVBxE7514					
E84AVBxE1124					
E84AVBxE1524					
E84AVBxE2224					
E84AVBxE3024					

Motor connection

Terminal X105	Labelling	Description
	U, V, W	Motor
	PE	PE conductor

84BDGG012

Terminal data

	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE3714	1 ... 2.5	18 ... 12	0.5	4.5	3.5 x 0.6
E84AVBxE5514					
E84AVBxE7514					
E84AVBxE1124					
E84AVBxE1524					
E84AVBxE2224					
E84AVBxE3024					

Connection of external brake resistor

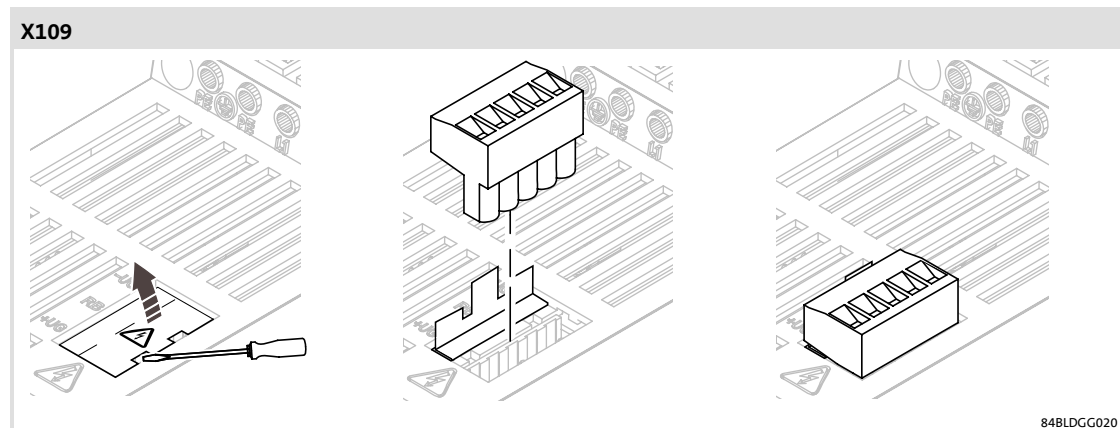
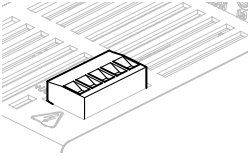


Fig. 6-14 Inserting terminal X109

Before plugging in the terminal X109:

1. Switch off the controller and wait for at least 3 minutes before start working.
2. Make sure that there is no residual voltage.
3. Pull the cover carefully to the side without removing it completely.
4. Plug in the terminal.

Devices in the power range from 0.37 to 3 kW (3/PE AC 400 V) Terminal assignment of the power connections

Terminal X109	Labelling	Description
	-UG ¹⁾ RB + UG	DC bus for connection of external brake resistor.

1) not required when connecting an external brake resistor to the controller

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
E84AVBxE3714	0.5 ... 1.5	22 ... 16	0.5	4.5	3.5 x 0.6
E84AVBxE5514					
E84AVBxE7514					
E84AVBxE1124					
E84AVBxE1524					
E84AVBxE2224					
E84AVBxE3024					



Please read the information on how to install and connect the brake resistor in the corresponding mounting instructions.

6.5 Control terminals**6.5.1 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.

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:

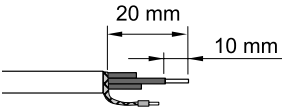
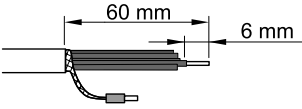
- ▶ Analog signals (single-sided shield connection to the controller)

The following connections need not be shielded:

- ▶ Digital signals up to a cable length of 3 m

Strip cables

Strip the control cables (analog and digital) according to the dimensions given in the following table.

X1		X4	
			
84MOTL_BLC		84MOTL005	

	X1	X4	
			
	[mm ²] [AWG]	[mm ²] [AWG]	[Nm] [lb-in]
E84AVBxE2512	0.2 ... 1.5 24 ... 16	0.2 ... 1.5 24 ... 16	0.5 4.5
E84AVBxE371x			
E84AVBxE551x			
E84AVBxE751x			
E84AVBxE112x			
E84AVBxE152x			
E84AVBxE222x			
E84AVBxE3024			

Shield and connect cables

To shield the stripped control cables:

1. Form the cable’s braided shield into a pigtail.
2. Use a wire end ferrule for more stability (optional).
3. Insert the pigtail into one of the screw terminals on X13.
4. Use a suitable screwdriver (see illustration).

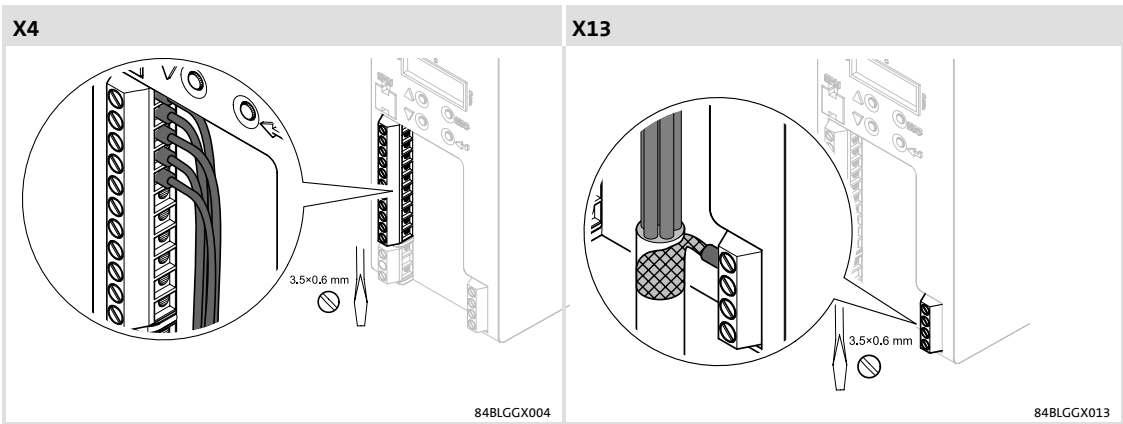


Fig. 6-15 Shielding and connecting control cables

6.5.2

System bus connection (CANopen)

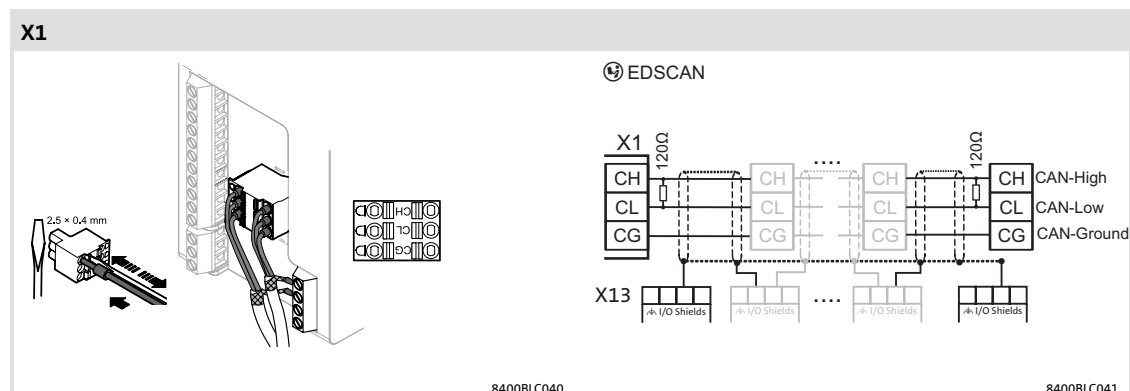


Fig. 6-16 CANopen connection

Networking several inverters

When networking several inverters to form an interconnected system, observe that the CAN bus has to be terminated between CAN-Low and CAN-High both at the first and the last physical node by a resistor, $R = 120 \Omega$.

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
flexible	0.2 ... 1.5	24 ... 16	-	-	2.5 x 0.4
with wire end ferrule					

**Note!**

- Detailed information on the system bus interface and switch settings can be obtained from the "CAN communication manual", chapter "CAN on board 8400".

6.5.3 Analog input

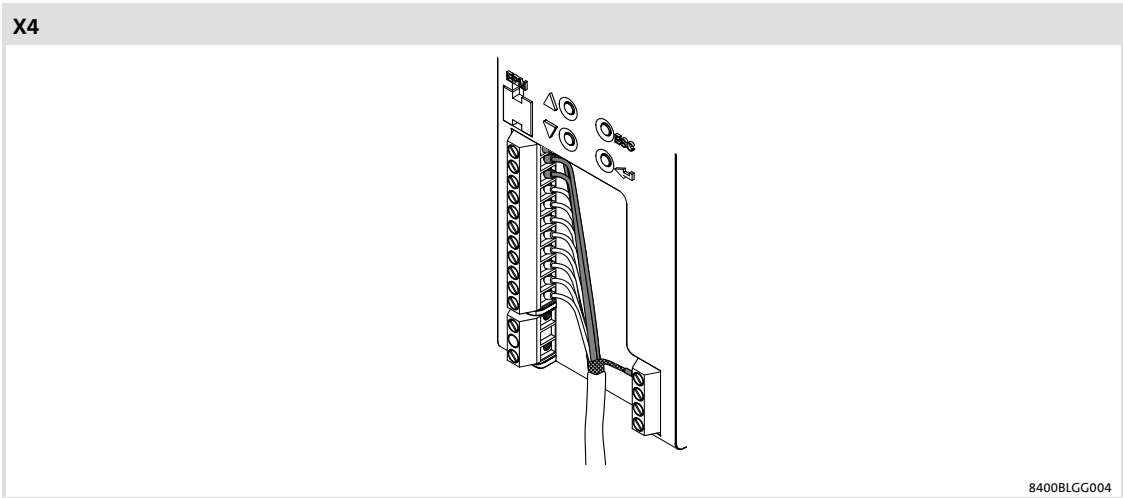
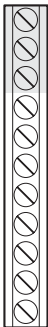


Fig. 6-17 Wiring and shielding of the analog input

Terminal X4	Labelling	Description	
	GND	GND connection for analog and digital signals	
	A1U	Analog input 1 For master voltage/master current configuration see C00034	±10 V (📖 75)
	AR	Analog Reference	reference voltage 10 V

84BDLGGX005

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
flexible	0.2 ... 1.5	24 ... 16	0.5	4.5	3.5 x 0.6
with wire end ferrule					

Example circuit

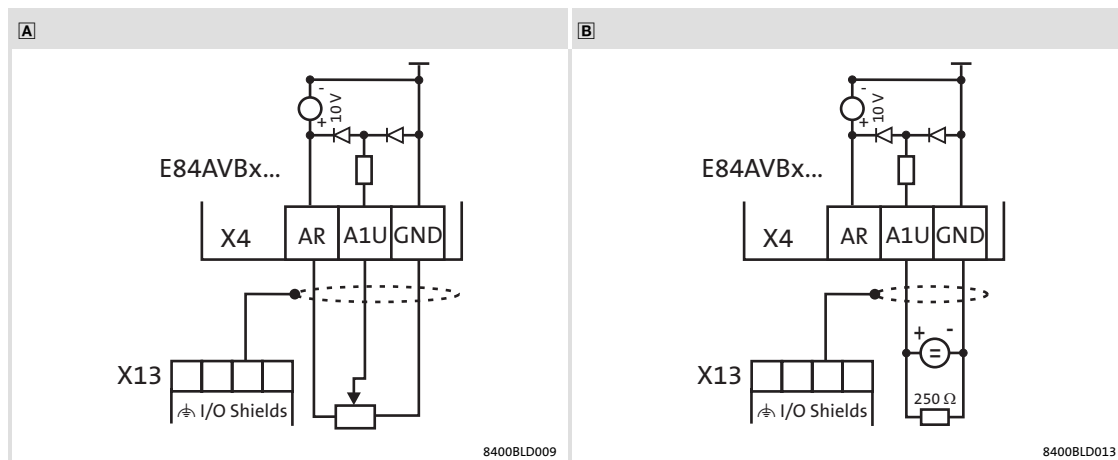


Fig. 6-18 Wiring examples of the analog input

- | | |
|---|---|
| <p>A</p> <p>B</p> <p>X4</p> <p>X13</p> <p>GND</p> | <p>Potentiometer with internal controller supply</p> <p>External master current selection for a sensor signal 0 - 20 mA</p> <p>Terminal for the analog input and the digital inputs and output</p> <p>Terminal for I/O shields</p> <p>GND connection for analog and digital signals</p> |
|---|---|

6.5.4 External supply voltage 24 V

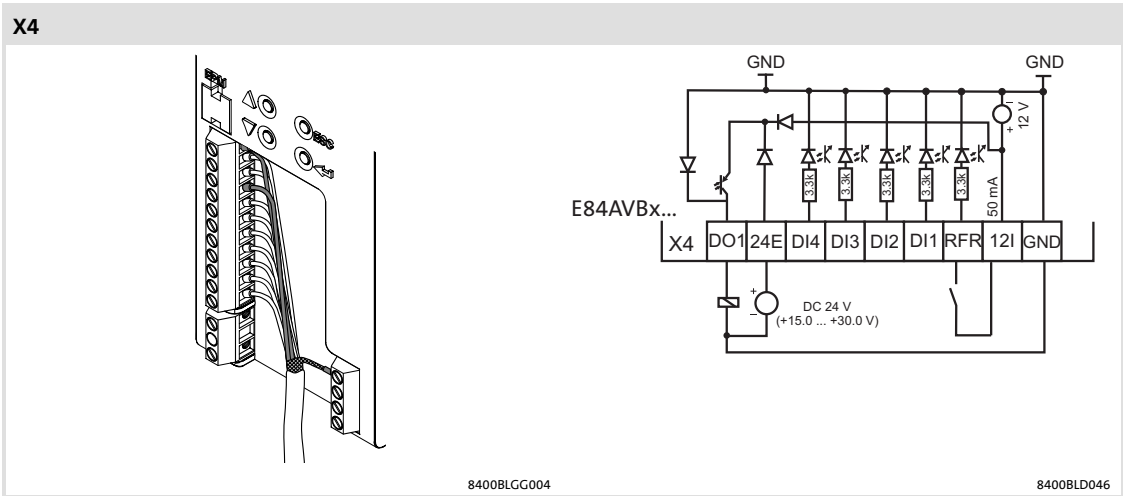
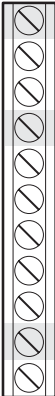


Fig. 6-19 Connection to an external supply voltage

Terminal X4	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)
	12I	Output 12 V, max. 50 mA for connecting digital inputs via potential-free contacts
	GND	Ground reference potential for the digital inputs and outputs

84BLGGX005

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
flexible	0.2 ... 1.5	24 ... 16	0.5	4.5	3.5 x 0.6
with wire end ferrule					

6.5.5

Digital inputs and outputs

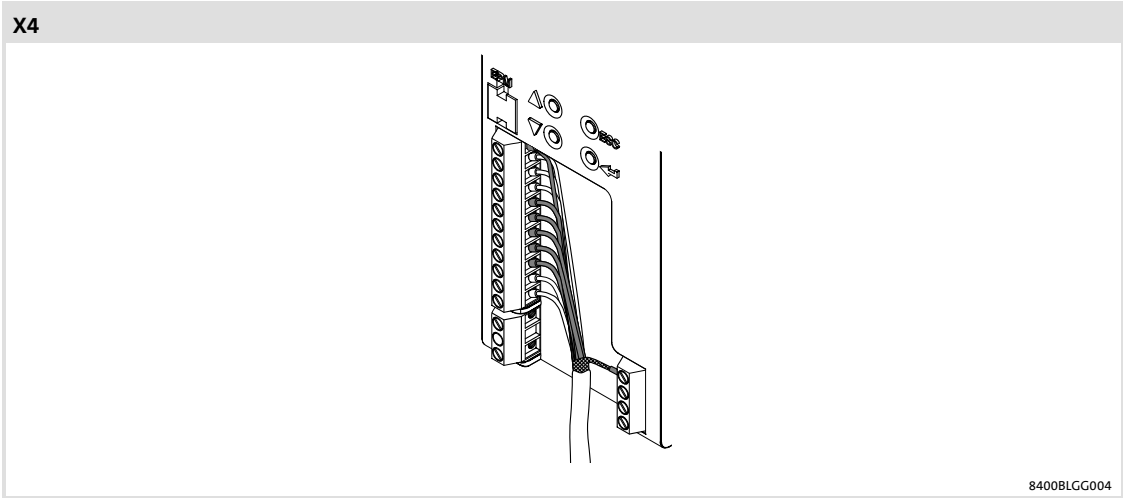


Fig. 6-20

Wiring and shielding of the digital inputs

DO1

The digital output is not available for devices with nameplate data E84AVBDxxxSX0

Terminal X4		Labelling	Description	
	GND	RFR	Controller enable/controller inhibit, always required	
	A1U	DI1	Digital input 1	42
	AR	DI2	Digital input 2	
	12I	DI3	Digital input 3	
	RFR	DI4	Digital input 4	
	DI1	DO1	Digital output	
	DI2			
	DI3			
	DI4			
	24E			
	DO1			
84BLGGX005		GND	GND for analog and digital signals	

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm²]	[AWG]	[Nm]	[lb-in]	
flexible	0.2 ... 1.5	24 ... 16	0.5	4.5	3.5 x 0.6
with wire end ferrule					

Example circuit

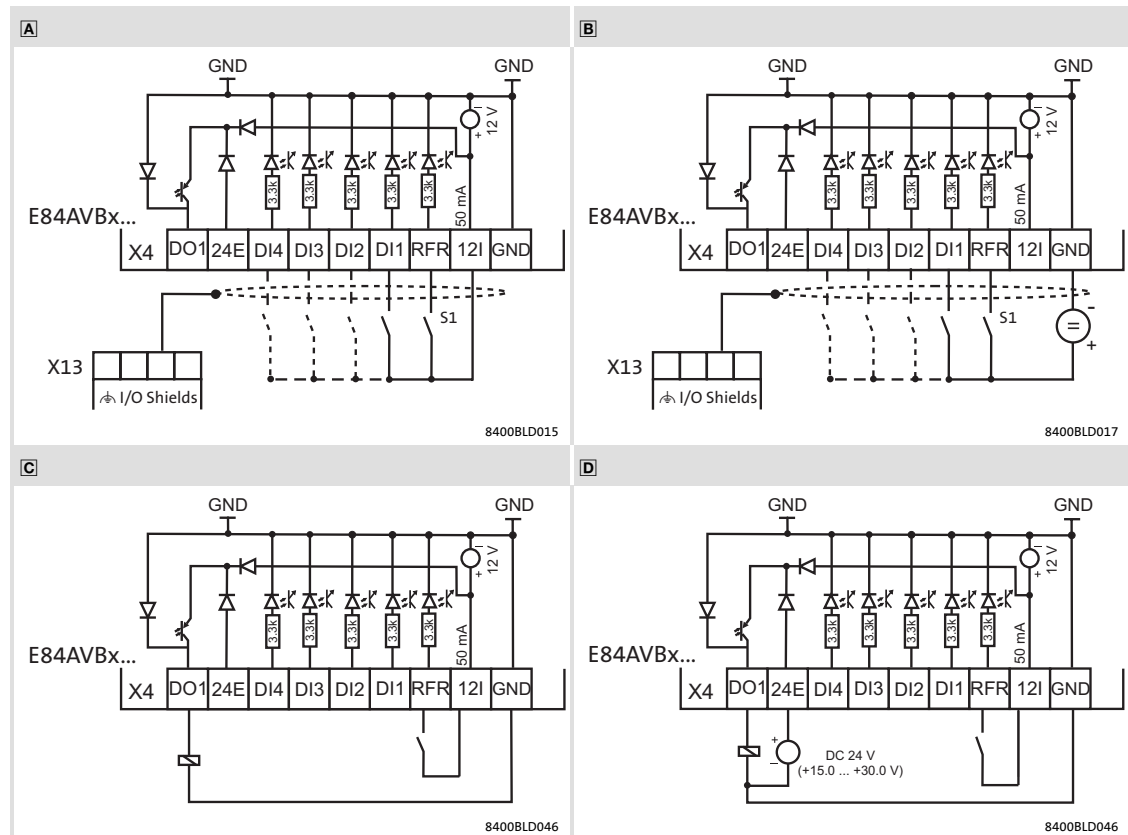
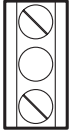


Fig. 6-21 Wiring examples of the digital inputs

- A** Wiring with one or several digital inputs (here: DI1); option: internal 12 V supply
- B** Wiring one or several digital inputs with external 10 V to 30 V DC supply
- C** Digital output with internal 12 V supply
- D** Digital output with external 24 V supply
- RFR Input for controller enable; wiring is always required.
- X4 Terminal for the analog input and digital inputs and output
- X13 Terminal for I/O shields
- GND GND for analog and digital signals
- DO1 The digital output is not available for devices with nameplate data E84AVBDxxxxSX0

6.5.6

Relay output connection

Terminal X101	Labelling	Description
	COM	Central contact of relay
	NO	Relay output NO (normally open)  42
84BLGGX005		

Terminal data					
	Max. conductor cross-section		Tightening torque		
	[mm ²]	[AWG]	[Nm]	[lb-in]	
flexible	0.5 ... 1.5	22 ... 16	0.5	4.5	3.5 x 0.6
with wire end ferrule					



Fig. 6-22 Wiring of the relay output

**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 in the section "I/O terminals":

- ▶ Use code C00621 to define the relay function.
- ▶ Use code C00118 to define the relay switching status.

6.5.7 **Diagnostics**

The BaseLine controllers can be parameterised and configured by using

- ▶ the integrated keypad with additional LEDs for status display.
- ▶ a USB diagnostic adapter that can be connected to diagnostic interface X6.

In combination with the Lenze PC software »Engineer«, the diagnostic adapter serves to make comprehensive settings via dialogs, e.g. for initial commissioning.

The integrated keypad can be used to check and change individual settings.

Socket X6	Labelling	Description
 8400HLC009	X6	Diagnostic interface for connection of a USB diagnostic adapter for online diagnostics

Commissioning**Note!**

Please observe the general safety instructions and the residual hazards in chapter 2.1 and 2.3.

7.1**Before switching on****Note!**

- ▶ Comply with the corresponding switch-on sequence.
- ▶ In case of faults during commissioning please use:
 - the online help in the »Engineer«
 - the software manual 8400 BaseLine D
 - the software manual 8400 BaseLine C

To prevent injury to persons or damage to material assets, check ...

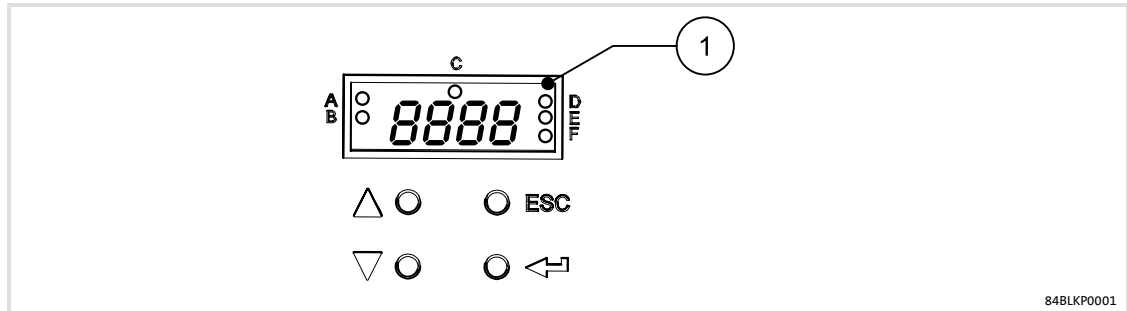
... before connecting the mains voltage:

- ▶ Wiring for completeness, short circuit, and earth fault
- ▶ The "EMERGENCY STOP" function of the entire system
- ▶ The motor circuit configuration (star/delta) must be adapted to the output voltage of the controller
- ▶ The in-phase connection of the motor (rotational direction)

... the most important drive parameter settings before the controller is enabled:

- ▶ Is the V/f rated frequency adapted to the motor circuit configuration?
- ▶ Are the drive parameters relevant for your application set correctly?
- ▶ Is the configuration of the analog input and the digital inputs adapted to wiring?

7.2 Display elements and control panel



Pos.	Description
①	4-Character- Display with LEDs (A ... F)
A	orange Set current/torque limit is reached.
B	yellow Minus sign for identifying the negative numbers bigger than 3 characters
C	yellow User-LED- configured with C00621/42.
D	red see table below
E	green
	yellow Rotational direction CWW
F	off Rotational direction CW
	blinking Commanded direction is not equal to actual direction- for example during reversing.
ESC	ESC key Abort of the current operation
↵	Enter key Confirm and accept changes
▲	Navigation key, upwards Short pressing: navigation in the menu level and parameter level and parameter editing
▼	Navigation key, downwards Long pressing (> 2 seconds): fast scrolling function

The LEDs "D" and "E" have an additional signalling.

LED E (green)	LED D (red)	Status
OFF	OFF	→ "Init" state
	OFF	→ "ReadyToSwitchOn" state
	OFF	→ "SwitchedOn" state
■■■	OFF	→ "OperationEnabled" state
	■	→ "Warning" status display The controller is ready to switch on, switched on or operation is enabled and there is a warning pending.
OFF		→ "Trouble" state
OFF		→ "Fault" state
OFF	■■■	→ "SystemFail" state

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

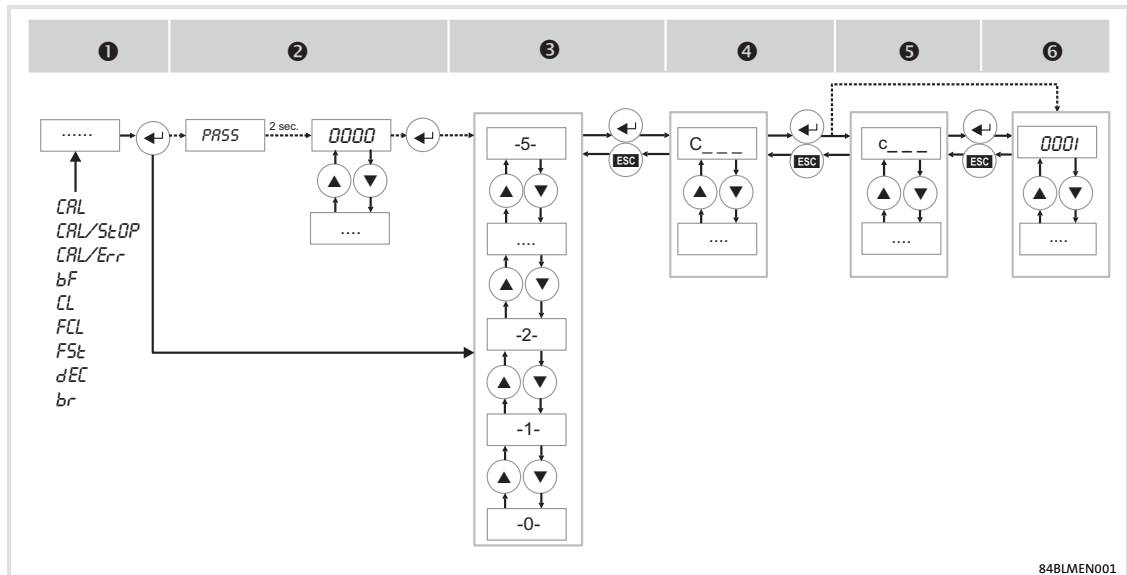
7.3

Menu structure



Note!

- ▶ After switching on the controller, the integrated keypad performs a quick self-test. All segments of the display flash for approx. 2 seconds.
- After that:
 - ▶ if there is no fault the keypad displays *rdy* for 1 second.
 - If power-up start is disabled the keypad displays *00*.
 - if power-up start is enabled the keypad displays the limited setpoint speed of the motor. The integrated keypad is now operational.
 - ▶ If there is a fault then the keypad displays the corresponding message.
 - ▶ When the password protection is activated and no password is input, only the user menu is freely accessible. All other functions require the correct password.



Level

- ① Status display
- ② Password request and password input
- ③ Menu level
- ④ Code level
- ⑤ Subcode level
- ⑥ Edit

Menu

- 0- Access all the parameters which the user has selected under C517 by themselves.
- 1- Access all drive parameters.
- 2- Access parameters for fast commissioning with terminal control.
- 3- Access parameters for fast commissioning with keypad control.
- 4- Access motor control parameters.
- 5- Access diagnostic parameters.

7.4 Preparing the commissioning procedure

You need the following for commissioning:

- ▶ The integrated keypad
- ▶ Mains voltage

or

- ▶ Computer with Windows® operating system (XP or 2000)
- ▶ Lenze PC software »Engineer«
- ▶ Connection with the controller via an interface, e.g.
 - Diagnostic interface X6 with USB diagnostic adapter
- ▶ Software manual for the technology application used
- ▶ The communication manual for the network of the automation platform
- ▶ Mains voltage

Follow the instructions of the software and/or read the documentation.

7.5

Test commissioning



Danger!

The controller is a source of danger which may lead to death or severe injury of persons.

To protect yourself and others against these dangers, observe the safety instructions before switching on the controller.

Please read the safety instructions provided in the 8400 Mounting Instructions and in the 8400 Hardware Manual. Both documents are supplied with the controller.

Target

For test and demonstration purposes, the motor shall be rotated in best time with as few wiring complexity and settings.

Keypad or setpoint potentiometer

First decide how to control the controller during test commissioning:

- ▶ Test commissioning with keypad control
- ▶ Test commissioning with terminal control



Tip!

The use of the internal keypad is described in the corresponding software manual and in the hardware manual. The electronic version of the manuals can be found on the "L-force 8400 Inverter Drives" CD.

7.5.1 Test commissioning with keypad control

Step-by-step commissioning

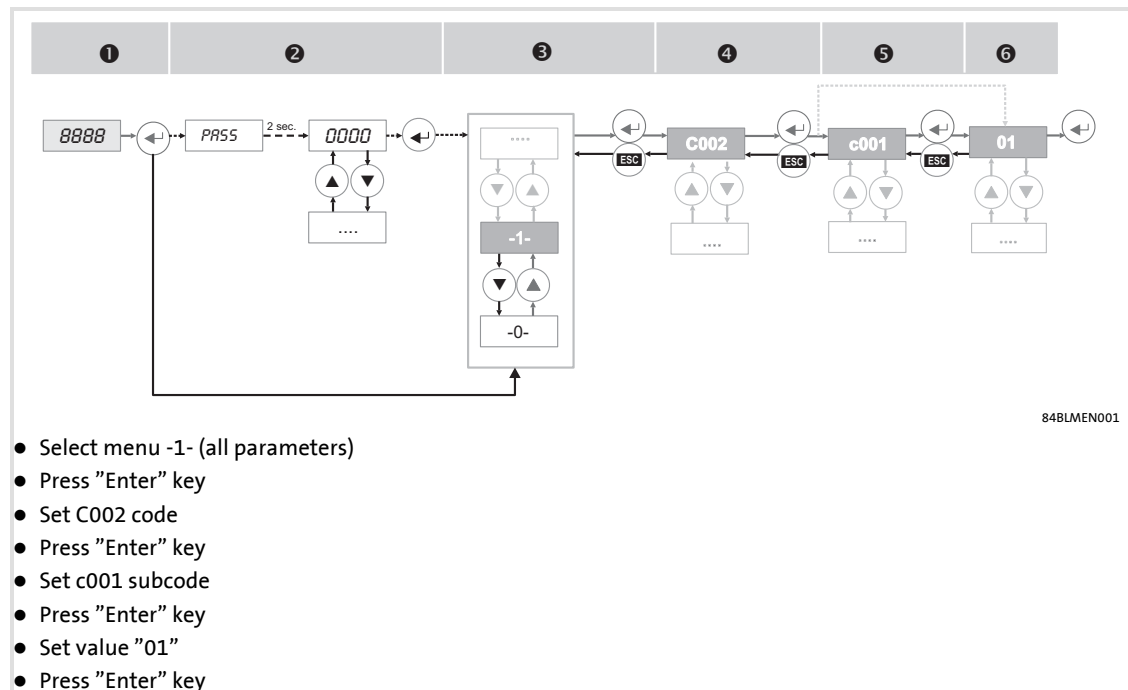
1. Wiring of power terminals

Make use of the "Electrical installation" chapter or the Mounting Instructions to wire the power terminals according to the requirements of your device.

2. Wiring of control terminals.

Digital inputs at terminal X4	Assignment	Information
	RFR	- Controller enable - RFR = High - Error reset - High → Low (edge-controlled)

3. If you can be sure that the frequency inverter is in the default state (Lenze setting), you can skip this commissioning step. If not, establish the Lenze setting of the frequency inverter as follows:



4. Set keypad control

1

2

3

4

5

6

- Select menu -3- (quick commissioning with integrated keypad)
- Press "Enter" key
- Set C007 code
- Press "Enter" key
- Set value "20"
- Press "Enter" key

84BLMEN001

5. Enable controller:

Set terminal X4/RFR to HIGH-Potential (reference: X4/12I).

6. Vary the motor speed with the integrated keypad or by defining different fixed setpoints:

Internal Keypad	Code	Subcode	Motor speed
	C00728	3	Counter-clockwise rotation: -199.9 % 0 (from C00011) Clockwise rotation 0 ... +199.9 % (from C00011)
	C00051	-	Observe • the actual speed value: C00051 • appearing messages 92

7. Save the settings with mains failure protection by entering the value "1" in code C002, subcode 7.

7.5.2 Test commissioning with terminal control

Step-by-step commissioning

1. Wiring of power terminals

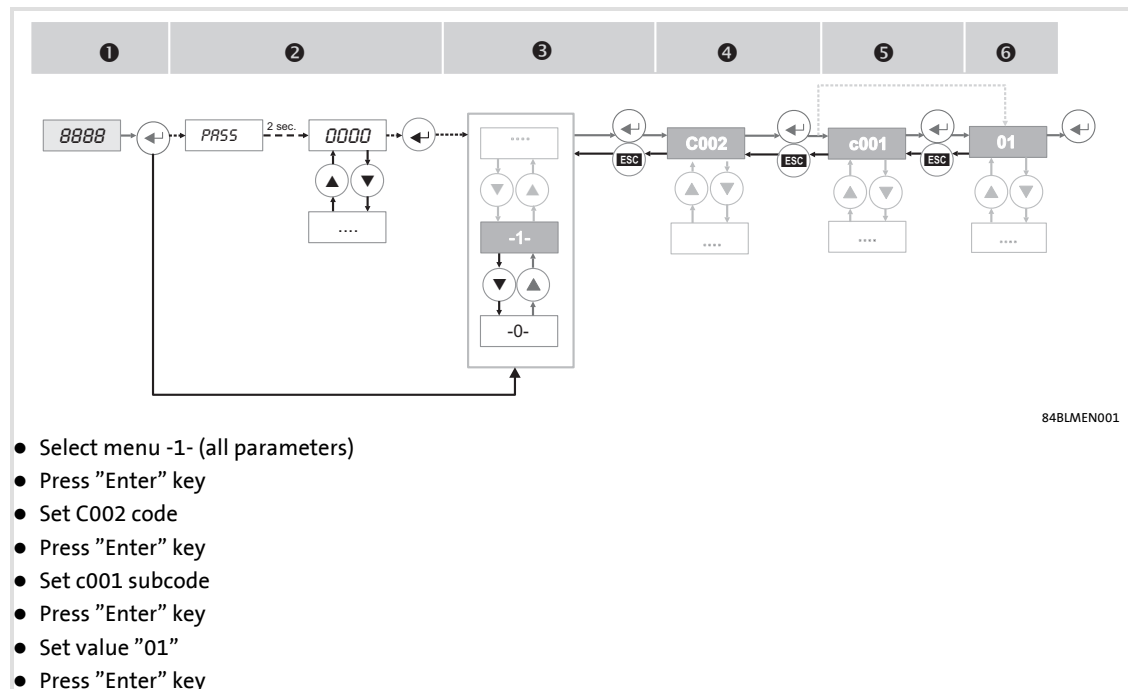
Make use of the "Electrical installation" chapter or the Mounting Instructions to wire the power terminals according to the requirements of your device.

2. Wiring of control terminals.

Wiring of the analog input at X4	Assignment	Terminal control
	A1U	Setpoint selection 10 V (=100 %): 1500 rpm (for 4-pole motor)
Wiring of the digital inputs at X4	Assignment	Terminal control
	RFR	- Controller enable: RFR = High - Error reset: High → Low (edge-controlled)
	DI1	Fixed frequency 1 ... fixed frequency 3, see below table
	DI2	
	DI3	DCB
	DI4	Direction of rotation counter-clockwise/clockwise (CCW/CW)

DI1 ... DI4: all active = High

3. If you can be sure that the frequency inverter is in the default state (Lenze setting), you can skip this commissioning step. If not, establish the Lenze setting of the frequency inverter as follows:

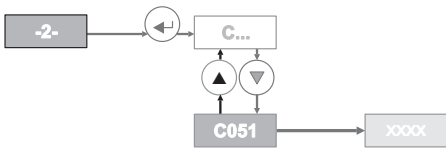


4. Enable controller:

Set terminal X4/RFR to HIGH-Potential (reference: X4/GND).

5. Vary the motor speed or the motor velocity 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)

Internal Keypad	Code	Subcode	Motor speed
	C00051	-	Observe - the actual speed value: C00051 - appearing messages  92

6. Save the settings with mains failure protection by entering the value "1" in code C002, subcode 7.

7.6 Messages

The current status of the controller can be checked via:

- ▶ six LEDs in different colours (📖 83)
- ▶ messages as follows:

Message	Status	Meaning
<i>PASS</i>		Password input
<i>CAL</i>	blinking	Identification is in progress.
<i>CAL / StOP</i>	alternatively blinking	Identification is ready to start. Operation is not enabled yet.
<i>CAL / Err</i>	alternatively blinking	Identification is not ready to start. Either C00088, or C00089, or C00090 is 0.
<i>bF</i>	blinking	Identification error. Drive ID stored in EPM does not match the drive ID stored in the controller.
<i>CL</i>	constant	Current limit set by C00022 is reached
<i>FCL</i>	constant	Fast current limit value (higher than value of C00022) is reached
<i>FSt</i>	constant	Flying restart function is in progress
<i>dEC</i>	constant	Deceleration is temporarily suspended because of higher bus voltage
<i>br</i>	flashes during the hold time of the DC brake	DC brake is in progress

8 Braking operation

8.1 Braking operation without additional measures

Decelerating small masses

To decelerate small masses, the "DC injection brake DCB" functions can be parameterised. DC-injection braking enables a quick deceleration of the drive to standstill without using 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.

8.2

Braking operation with external brake module

Inverters with 230 V mains connection can be operated with external brake modules of type 9351. The modules can be used for frequent braking operations at low power levels or for rare braking operations at medium power levels.

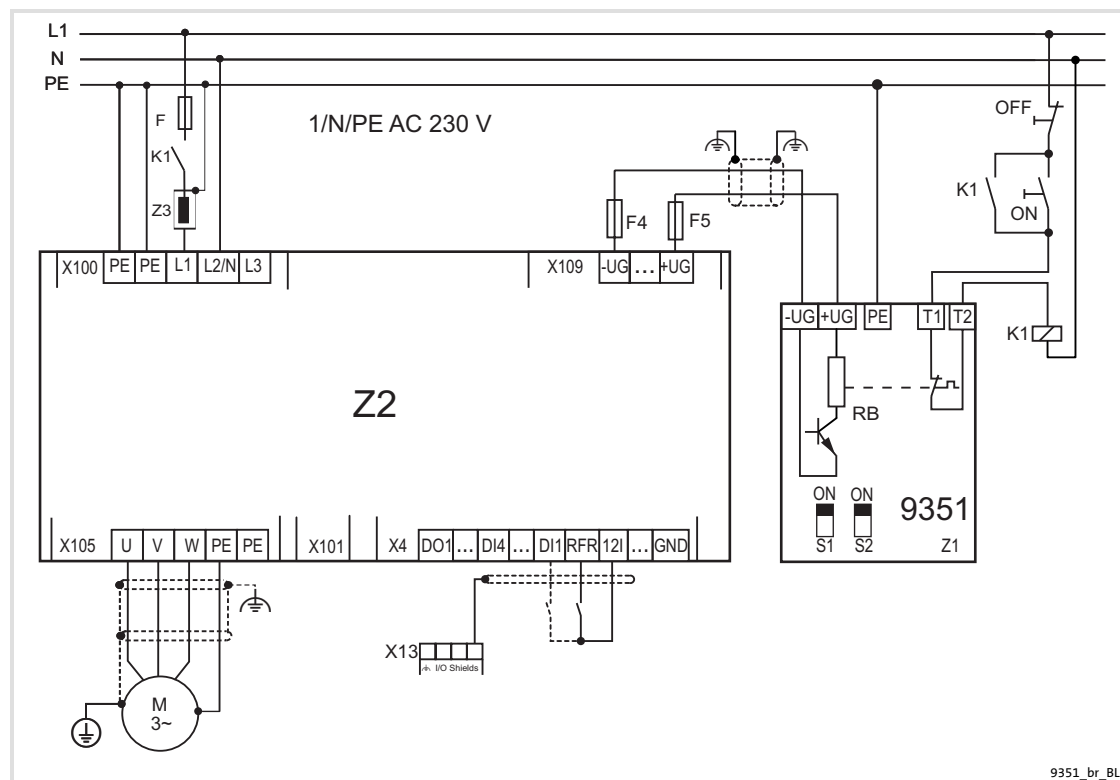


Fig. 8-1 Connection of 9351 brake module to 8400 Baseline controller

Z1	Brake module
Z2	Frequency inverter
Z3	Mains choke
K1	Mains contactor
F	Mains fuse
F4, F5	DC-bus fuses (recommendation)
DO1	The digital output is not available for devices with nameplate data E84AVBDxxxxSX0

Mains voltage [V_{rms}]	Switching threshold [V]	Switch position S1	Switch position S2
230	375	OFF	OFF
400 ... 460	725	ON	OFF
480¹⁾	765	ON	ON

¹⁾ Lenze setting in bold type

8.3 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 E84AVBD...4 controllers are equipped with a brake chopper. The brake chopper switches in the external brake resistor.

- Adapt the switching threshold to the mains voltage (C00173/C00714, see software manual).

Braking operation

Braking operation with external brake resistor

Operation at rated mains voltage 400 V

8.3.1 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]
E84AVBxx3714	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx5514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx7514	390	1.9	1.3	1.9	1.3	-	∞	-
E84AVBxx1124	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVBxx1524	180	4.0	2.9	4.0	2.9	-	∞	-
E84AVBxx2224	150	4.8	3.5	4.8	3.5	-	∞	-
E84AVBxx3024	100	7.3	5.3	7.3	5.3	-	∞	-

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 cable dimensioning
P_{Bd}	Continuous braking power
t_Z	Cycle time, periodic load change with running time and recovery time
t_{on}	Running time in a cycle without reducing the scanning ratio (∞ = no time limit)
$t_Z - t_{on}$	Recovery time
t_{fp}	Maximum running time without initial load and observing the recovery time

8.3.2 Operation at rated mains voltage 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]
E84AVBxx3714	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx5514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx7514	390	2.0	1.6	2.0	1.6	-	∞	-
E84AVBxx1124	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVBxx1524	180	4.4	3.5	4.4	3.5	-	∞	-
E84AVBxx2224	150	5.3	4.2	5.3	4.2	-	∞	-
E84AVBxx3024	100	7.9	6.2	7.9	6.2	-	∞	-

 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 cable dimensioning P_{Bd} Continuous braking power t_Z Cycle time, periodic load change with running time and recovery time t_{on} Running time in a cycle without reducing the scanning ratio (∞ = no time limit) $t_Z - t_{on}$ Recovery time t_{fp} Maximum running time without initial load and observing the recovery time

8.3.3**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]	$\geq P_{\max} \cdot \eta_e \cdot \eta_m \cdot \frac{t_1}{t_{\text{cycl}}}$	$\geq \frac{P_{\max} \cdot \eta_e \cdot \eta_m}{2} \cdot \frac{t_1}{t_{\text{cycl}}}$
Thermal capacity [Ws]	$\geq P_{\max} \cdot \eta_e \cdot \eta_m \cdot t_1$	$\geq \frac{P_{\max} \cdot \eta_e \cdot \eta_m}{2} \cdot t_1$
Resistor [Ω]	$R_{\min} \leq R \leq \frac{U_{\text{DC}}^2}{P_{\max} \cdot \eta_e \cdot \eta_m}$	

Active load Can start to move independent of the drive
(e.g. unwinder)

Passive load Can stop independent of the drive
(e.g. horizontal travelling drives, centrifuges, fans)

U_{DC} [V] 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)

8.3.4 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 for a 1.5-fold regenerative power. The cycle time is 150 s and contains a maximum braking time of 15 s and a minimum recovery time (break) of 135 s.

- The brake resistors are equipped with a thermostat (potential-free NC contact, switching capacity: AC 250 V, 0.5 A).
- 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.

Product key		Rated data - brake resistor		
Controller	Brake resistor	Resistor R [Ω]	Continuous power P [W]	Thermal capacity WK [kWs]
E84AVBxx3714	ERBM390R100W	390	100	15
E84AVBxx5514	ERBM390R100W			
E84AVBxx7514				
E84AVBxx1124	ERBP180R200W	180	200	30
E84AVBxx1524	ERBP180R200W			
E84AVBxx2224	ERBP180R300W			300
E84AVBxx3024	ERBP180R300W	100	300	45

8.3.5

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

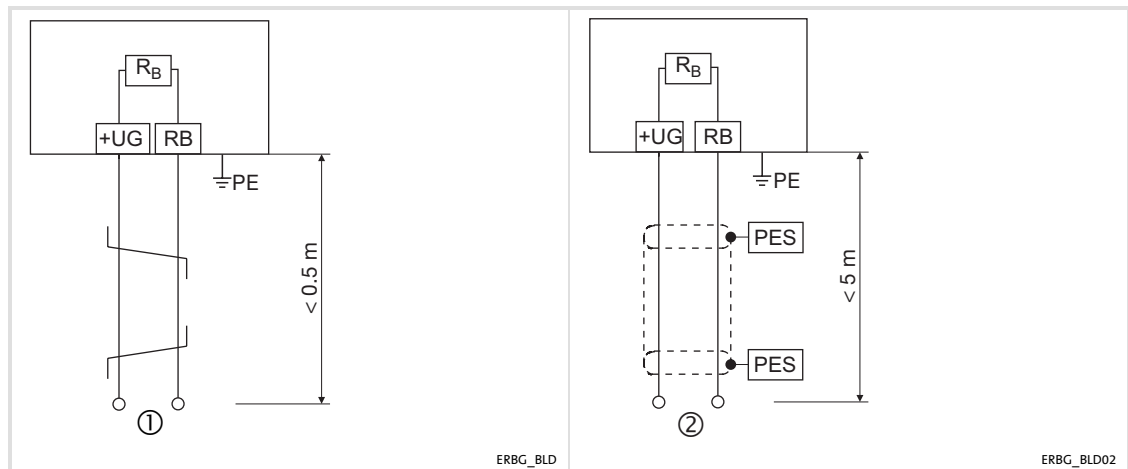


Fig. 8-2 Wiring of a brake resistor to the controller

PES
+UG, RB
①
②

HF-shield termination by PE connection via shield clamp
Terminals of the brake resistor
Supply cable to the controller with twisted pair wiring
Supply cable to the controller using shielding
(to be integrated e.g. into the latch circuit of the mains contactor of the supply)

8.4 Controlling the brake**8.4.1 Introduction****Operation with spring-applied brake**

Lenze three-phase AC motors and G-motion geared motors can be fitted with spring-applied brakes (motor holding brakes). An external motor brake control module is required for switching operation and DC supply of the spring-applied brakes.

The selection of the suitable motor brake control module is made depending on the rated data of the spring-applied brakes.

Switching the brake

The motor brake control module can be controlled by the relay output of the controller. The relay output must be parameterised accordingly. The brake can optionally be switched via an external control contact (e.g. PLC).

The software manual contains further information on parameterisation.

8.4.2

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

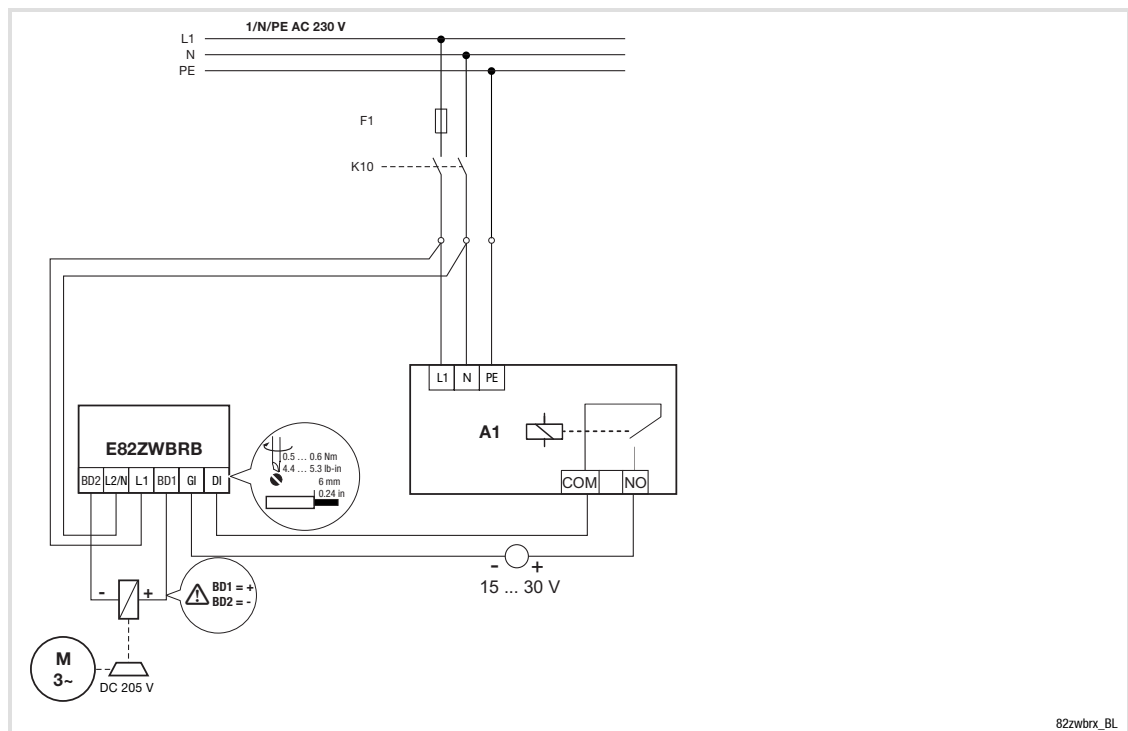
► E82ZWBRE brake switch

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	
	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 off time	t _{off} > 20 ms
Maximally connectable cable cross-section	1.5 mm ²

8.4.3

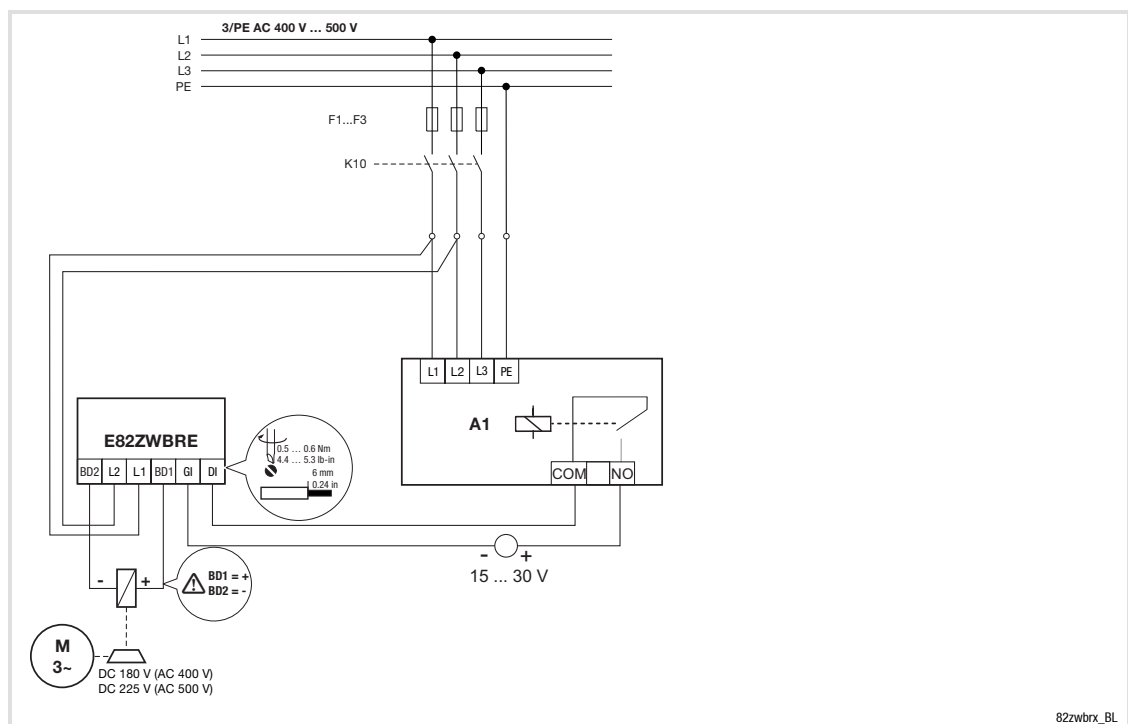
Wiring

► E82ZWB RB brake switch



A1 Lenze controller with relay output

► E82ZWBRE brake switch



A1 Lenze controller with relay output

9 Accessories (overview)



Note!

More information on the accessories can be found in the catalog of this product series.

9.1 Overview

Coordinated accessories for 8400 L-force:

- ▶ Device modules - for different functional areas
 - EPM Memory module E84AYM20S
- ▶ USB diagnostic adapter E94AZCUS
 - Connecting cables EWL007x
- ▶ Motor holding brake control modules E82ZWBRx
- ▶ DC bus connection:
 - Type designation EWS0072 for devices operating at 230 V
 - Type designation EWS0073 for devices operating at 400 V to connect brake resistors ERBMxxxRxxxW/ERBPxxxRxxxW

9.2**Mains chokes**

Assignment	
Type	Mains choke
E84AVBxx2512	ELN1-0900H005
E84AVBxx3712	
E84AVBxx5512	ELN1-0500H009
E84AVBxx7512	
E84AVBxx1122	ELN1-0250H018
E84AVBxx1522	
E84AVBxx2222	
E84AVBxx3714	ELN3-1500H003-001
E84AVBxx5514	
E84AVBxx7514	
E84AVBxx1124	ELN3-0680H006-001
E84AVBxx1524	
E84AVBxx2224	
E84AVBxx3024	ELN3-0250H013-001

9.3 External brake resistors

Product key		Rated data - brake resistor		
Controller	Brake resistor	Resistor R [Ω]	Continuous power P [W]	Thermal capacity WK [kWs]
E84AVBxx3714	ERBM390R100W	390	100	15
E84AVBxx5514	ERBM390R100W			
E84AVBxx7514				
E84AVBxx1124	ERBP180R200W	180	200	30
E84AVBxx1524	ERBP180R200W			
E84AVBxx2224	ERBP180R300W		300	
E84AVBxx3024	ERBP180R300W	100	300	45

9.4**Memory modules****Danger!****Risk of Electrical Shock**

The EPM operates at high voltage relative to earth ground.

Possible consequences:

- ▶ Death or severe injuries

Protective measures:

- ▶ Do not unplug EPM with power applied to the drive.
- ▶ Do not apply power to the drive, if the EPM is not installed.

Name: EPM

Type designation: E84AYM20S

Slot: EPM

The parameters of the controller are stored in the memory module (EPM).

The pluggable memory module provides the following features:

- ▶ Recovery of an application after device exchange by plugging the EPM into the replacement drive.
- ▶ Duplication of identical applications in a series of identical drives using the optional EPM Programmer.

To remove/replace the memory module:

1. Insure power is removed from drive. Wait 180 seconds to insure internal voltages have decayed.
2. Remove security tape covering EPM module.
3. To remove the EPM, grasp it in the two notches with a pair of needle nose pliers or other similar tool. Gently pull it straight out.
4. Place new or modified EPM in the socket and gently press it straight in.
5. Replace security tape over the reinstalled EPM.
6. Apply power to the drive. The parameters in the EPM will automatically take effect upon power up.



Stop!

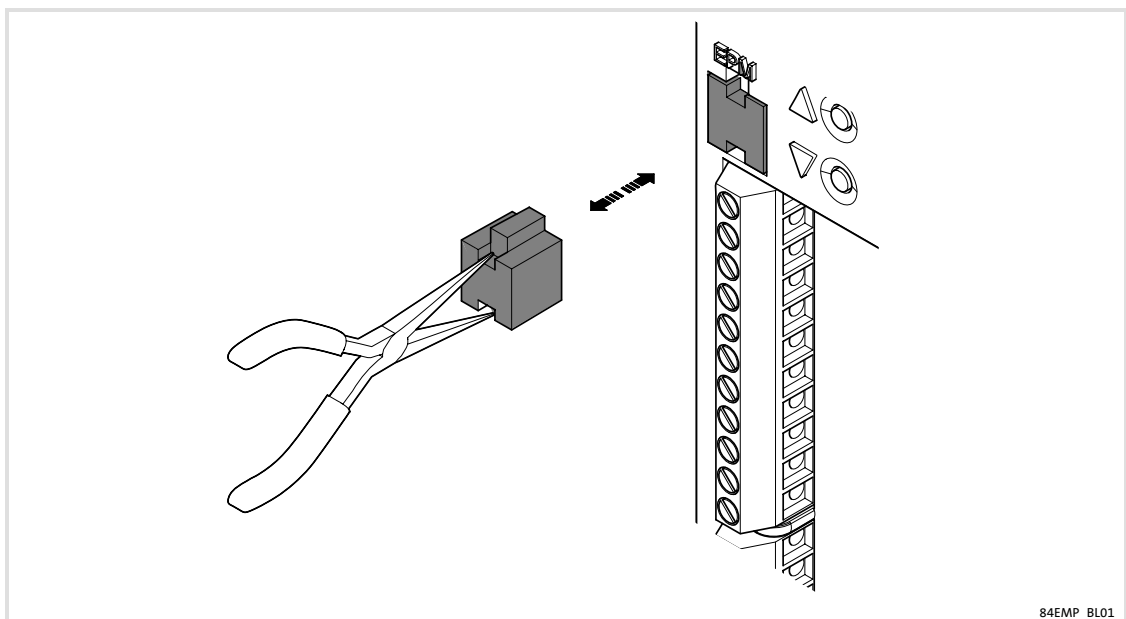
The device contains components that can be destroyed by electrostatic discharge!

Before working on the device, the personnel must ensure that they are free of electrostatic charge by using appropriate measures.



Note!

Only **grey** memory modules may be used for the inverters of the BaseLine series.



84EMP_BL01

9.5**Keypad**

The integrated keypad makes local parameter setting and diagnostics easy. Data can be accessed quickly via structured menus and the plain text display.

Features

- ▶ Menu-driven diagnostics and parameter setting
- ▶ 2 navigation keys, 2 context-sensitive keys

10 Appendix

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