L-force

9400 Servo Drives

Productive, economical, easy

Lenze

Our commitment to you

If you are looking for effective and easy solutions for the implementation of your machine and drive concepts or want to optimise existing concepts and cut your costs, Lenze is your ideal partner.

We have a 60 years experience at the cutting edge of drive and automation technology.

Drive and automation technology set in motion by Lenze – for example in logistics centres, in the textile and printing industry, in the automotive industry or as the driving force behind robots.

Lenze | about us

We can offer you automation solutions, including control, visualisation and drive technology, from one source. Our drive systems will improve the performance of your machines. From project planning to commissioning, we have the know-how. Our international sales and service network can provide you with expert help and advice at any time.

Cut your process costs and increase your ability to compete. Let us analyse your drive technology tasks and support you with made-to-measure solutions.

We can take an integrated approach to projects thanks to the scalability of our products and the scope of the overall portfolio. We can get the best from your machines and systems.

At your side all over the world – with thorough and professional support from our motivated team.

L-force | Your future is our drive

L-force – Your future is our drive
L-force is our new product philosophy introduced in response to the need to reduce costs, save time and increase efficiency. This generation of drive and automation technology sets innovation, flexibility, usability and system culture in perfect harmony.

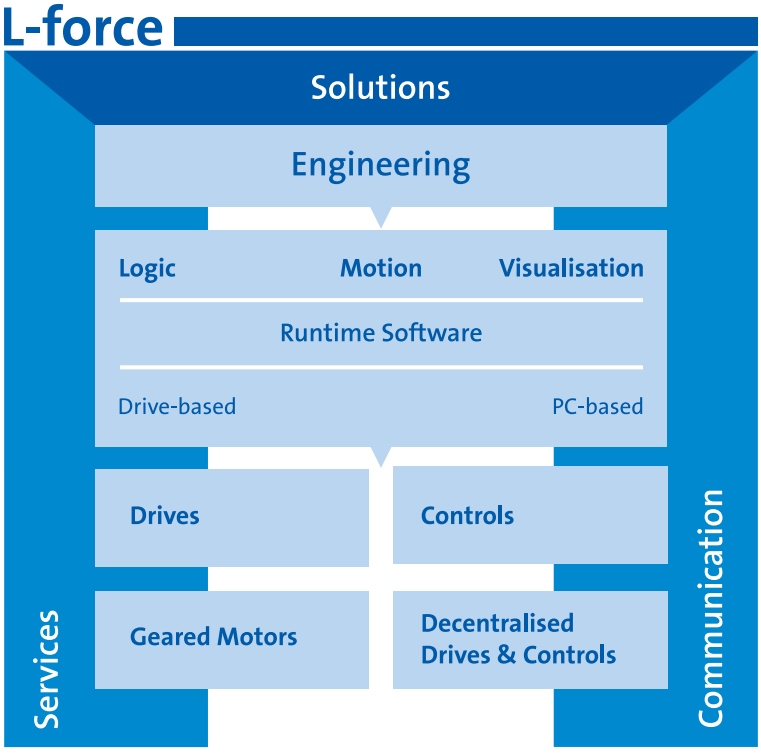
L-force is innovation
In order to offer you more options and (added) value, we are constantly working to improve our solution still further.

L-force is flexibility
Power, functional range, software and technical services plus after-sales service – you get exactly the combination you need.

L-force is usability
Commissioning is made easier thanks to preconfigured solutions and easy function-based engineering.

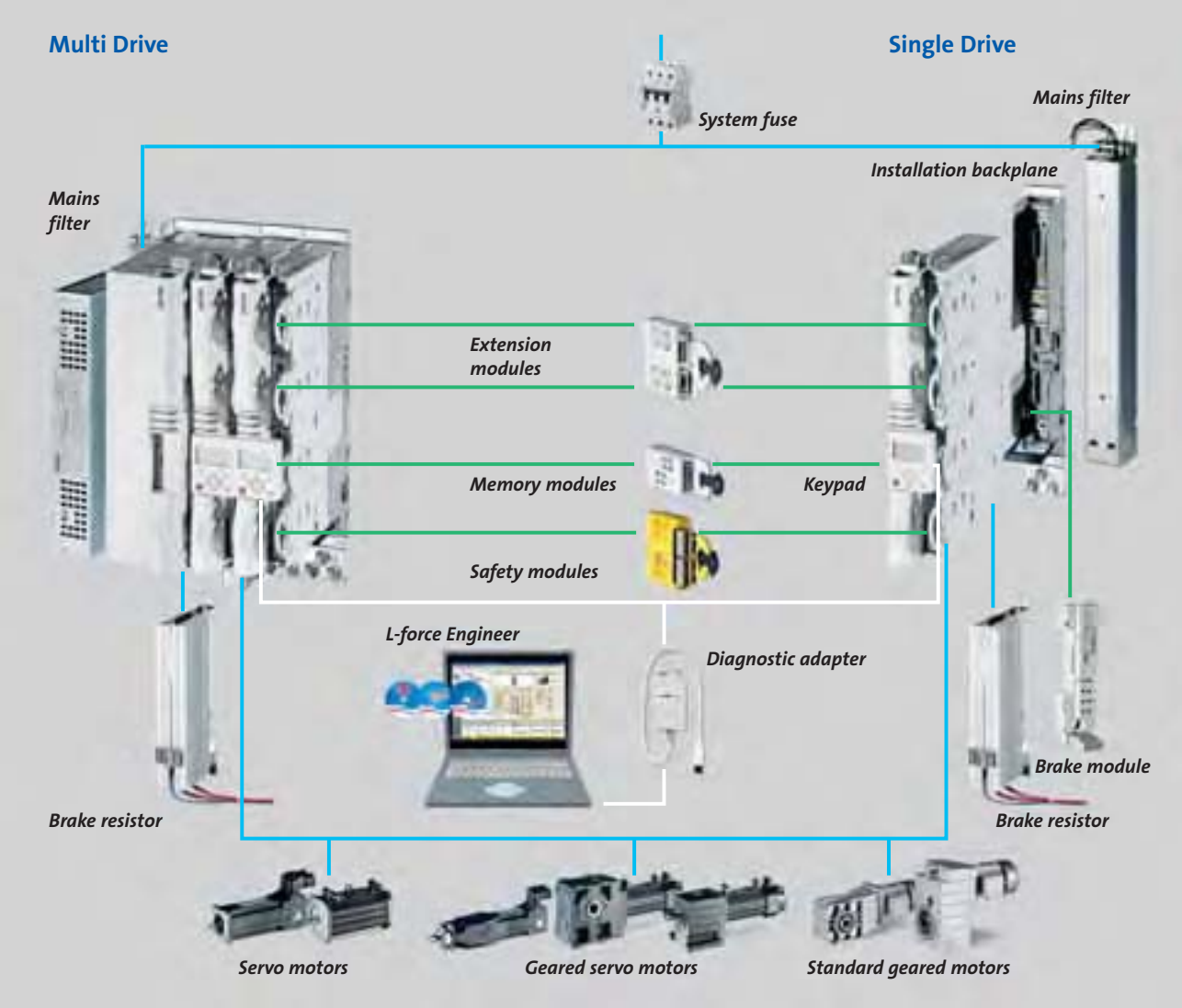
L-force is system
With L-force, everything is perfectly matched.

Let us help you to build the future.



L-force is an integrated range of components, solutions, systems and technical services. The overview shows the overall portfolio along with the individual product/solution segments.

System overview | 9400 Servo Drives



More catalogues

This catalogue describes the 9400 Servo Drives and the accessories directly associated with this servo system. For information about the other components shown in the system overview above, please refer to the following catalogues. In addition, automation components are dealt with in the Drive-based Automation catalogue.

Components	Catalogue
Servo motors	→ Servo motors
Geared servo motors	→ Geared servo motors
Standard geared motors	→ Geared motors

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9400 Servo Drives product key

E94A S H E 002 4 A 33 EN PM –

Version
S – Single Drive
M – Multi Drive

Series
S – StateLine
H – HighLine

Design
E – Installation

Rated current [A]
(rounded)

002	032	245
003	047	292
004	059	366
007	086	460
009	104	572
013	145	635
017	172	695
024	202	

Voltage class of drive
4 – 3 x 400 V

MXI 1
LF
CA
EN
EP
EC
PM
ER
NN

MXI 2
LF
CA
EN
EP
EC
PM
ER
NN

MMI
11 – MM110
22 – MM220
33 – MM330

MSI
A – SM0
B – SM100
D – SM300
E – SM301

DF – Digital frequency
CA – CANopen
EN – ETHERNET
EP – ETHERNET Powerlink MN/CN
EC – ETHERNET Powerlink CN
PM – PROFIBUS
ER – PROFINET
NN – no module

MXI 1 – Slot for extension module 1
MXI 2 – Slot for extension module 2
MMI – Slot for memory module
MSI – Slot for safety module

				H	Y	010	1
S	003	4	H	X	005	1	

H Y 010 1 — from 15 kW (without installation backplane)

S 003 4 H X 005 1 — up to 11 kW (with installation backplane)

Base design
S – Single Drive
M – Multi Drive

Rated current for base [A]
(rounded)
003
007
024

Voltage class of base
4 – 3 x 400 V

Additional component
N – no additional component
H – with brake module

Mounting
X – integrated into installation backplane
Y – integrated into drive

Current identification
(rounded)
000 – no brake module
002 – 1.0 A
005 – 2.5 A
010 – 5.0 A

Voltage class
0 – no brake module
1 – 24 V
5 – 205 V

List of abbreviations

b [mm]	Width
f_d [Hz]	Field frequency
f_{ch} [kHz]	Switching frequency
f_{max} [Hz]	Maximum output frequency
h [mm]	Height
I_{max} [A]	Maximum output current
I_N [A]	Rated current
i	Transmission ratio of the gearbox
I_{DC} [A]	Rated DC-bus current
I_{Netz} [A]	Rated mains current
l [m]	Motor cable length
m [kg]	Weight
M_{max} [Nm]	Maximum torque
M_{eff} [Nm]	Effective torque
n_{max} [1/min]	Maximum speed
P_N [kW]	Motor power
P_v [W]	Power loss
R [Ohm]	Resistance
t [mm]	Depth
U_{Netz} [V]	Mains voltage range Rated mains voltage
U_{DC} [V]	DC input voltage
WK [kWs]	Thermal capacity

MMI	Modular memory interface (memory module)
MSI	Modular safety interface (safety module)
MXI 1 MXI 2	Modular extension interface (extension module)
DIAG	Slot for diagnostic adapter
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 61131-2	Programmable logic controllers Part 2: Equipment and tests
IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
DIN	Deutsches Institut für Normung e.V.
EN	European standard
IEC	International Electrotechnical Commission
IM	International Mounting Code
IP	International Protection Code
NEMA	National Electrical Manufacturers Association
VDE	Verband deutscher Elektrotechniker
UL	Underwriters Laboratory Listed Product
UR	Underwriters Laboratory Recognized Product

About this catalogue

This catalogue contains all components of the 9400 Servo Drives product range. Here you can find the different axis modules (Single Drives and Multi Drives) , the corresponding power supply modules and all accessory components for a complete drive system. The same product range is also covered in the electronic DSC catalogue. The electronic catalogue is available on CD and on the Internet at:
www.lenze.de/dsc
From the Internet you can also download additional information (e.g. rated data) for some components. These components are marked with the following arrow symbol and an identifier printed in bold.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

Just enter this identifier (e.g. **DS_9400_0001**) as the search term and you will get the information as a PDF file.

Inverters and accessories

All components of the 9400 Servo Drive range can be selected easily and quickly via a uniform product key. All designations start with the general product identifier "E94A". This also simplifies the selection of accessory components.
To improve the clarity, wild cards are used to represent similar designs.

- The symbol □ stands for all designs carrying the represented designation. The □ is, for instance, used to summarise the different variants: in E94AS□E0174 the □ could be a wildcard for H (HighLine) or S (StateLine).
- In the type designations of mains/RFI filters (accessory components) the wild cards stand for the different rated currents.

9400 Servo Drives Single Drive and Multi Drive

When will it click?
A great many technical achievements make our everyday lives easier.
Just like that, with one click

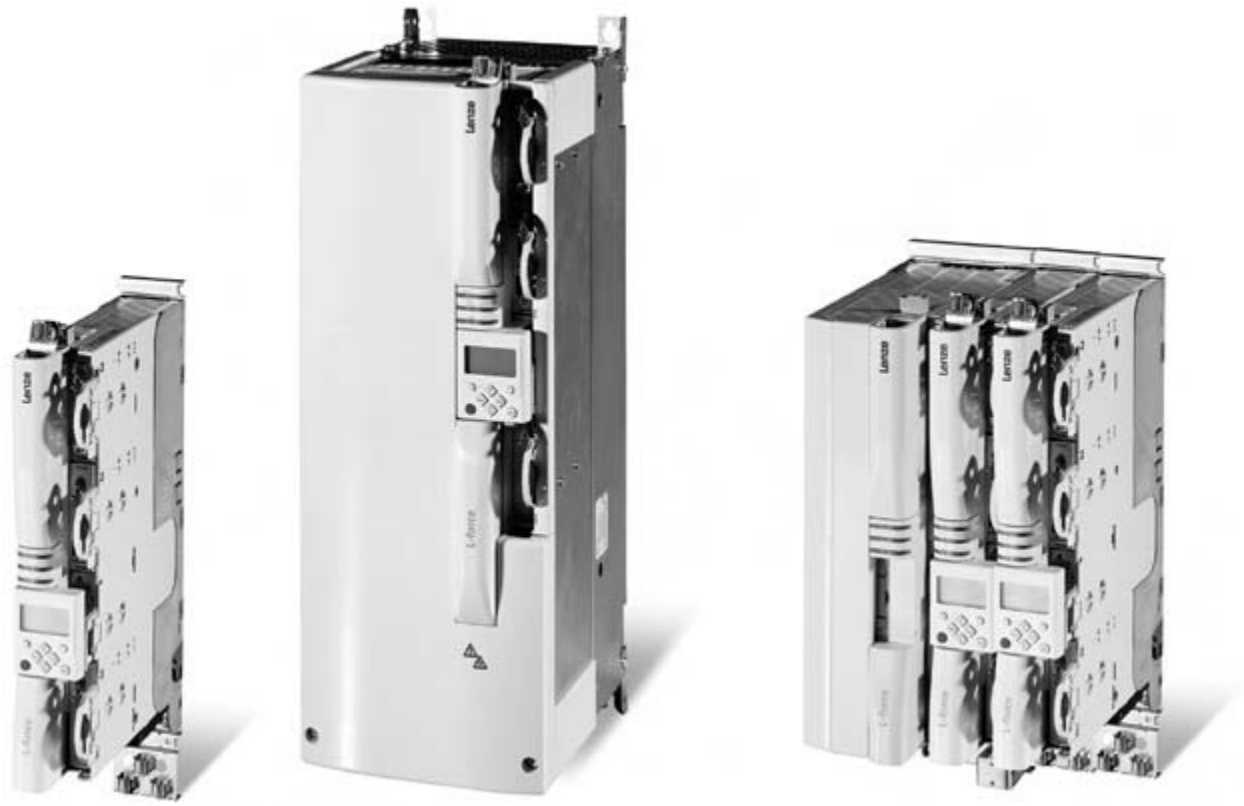
- the lights come on,
- a seat belt engages,
- you can surf the World Wide Web,
- take a great photo of your family.

The 9400 Servo Drives will revolutionise your servo technology – with simple clicks.

Click – the innovative assembly concept
The 9400 Servo Drives have a revolutionary electromechanical assembly concept which wins its users over. Separating the installation backplane from the drive electronics (up to 11 kW) means that the installation, assembly and application procedures are unrivalled in their simplicity.

Single Drive
Our single-axis drives combine mains supply, DC bus and inverter in a single unit. The filter elements and the brake chopper are integrated into the controller and permit self-sufficient application in distributed control cabinet installations. Higher interference levels can be achieved without additional mounting area by the use of suitable footprint filters (up to 55 kW).

Multi Drive
Our multi-axis drives are particularly suitable for centralised, compact multi-axis installations. The energy exchange via the DC bus reduces the power requirement on the mains side. The axes share the same mains supply, brake chopper and EMC filter. The materials requirements and installation efforts are thus significantly reduced. The integrated DC busbar system provides for compact installations for drives rated up to 11 kW.



9400 Servo Drives Single Drive and Multi Drive

9400 Servo Drives StateLine and HighLine

StateLine - for centralised control concepts

The 9400 StateLine Servo Drives uses the standardised drive profile DS402 / IEC 61800-7-2 and is optimally suited for centralised topologies. Therefore the StateLine excels with fast commissioning.
Use the implemented operating modes "Homing" for referencing the machine and "Interpolated Position" for fast position following with speed and torque feed-forward control. In addition the StateLine features the operating modes "Cyclic Synchronous Velocity" for fast speed following with torque feed-forward control and "Cyclic Synchronous Torque" for fast torque following with speed limitation.
The drives communicate with a higher-level motion control or an industrial PC via the CANopen extension module. The modular concept of the 9400 Servo Drives leaves the system open for future fieldbus systems. One of the highlights of the StateLine is the integrated modular safety engineering concept which makes your machine much safer.

HighLine - for decentralised control concepts

The 9400 HighLine Servo Drives feature intelligence in the drive and are therefore designed for decentralised motion control applications as well as for centralised control topologies.
Lenze provides pre-programmed technology applications, e.g. table positioning, electronic gearbox and synchronism with mark registration for solving various applications simply by parameter setting. The function block editor integrated into the L-force Engineer HighLevel (PC setup tool) enables you to adapt the functions in an easy and flexible manner.
The HighLine Servo Drive comes with the CANopen fieldbus, conventional I/Os, diagnostic LEDs, a diagnostic interface, a resolver and a universal encoder input onboard.
In addition, the HighLine is equipped with two extension slots for communication or extension modules as well as one slot each for a memory module and a safety module, so that the drive can be optimally adapted to your requirements.

9400 StateLine Servo Drives

9400 HighLine Servo Drives

Functions and features

Design	9400 StateLine Servo Drives	9400 HighLine Servo Drives
Control modes/motor control	Field-oriented control for synchronous and asynchronous servo motors and asynchronous standard motors. Sensorless operating modes (in preparation)	
Basic functions	Motor control Drive monitoring and diagnosing Logbook, oscilloscope function Evaluation of electronic nameplate (ENP) for Lenze servo motors Speed, torque and position control Brake logic, homing	Motor control Drive monitoring and diagnosing Logbook, oscilloscope function Evaluation of electronic nameplate (ENP) for Lenze servo motors Speed, torque and position control Brake logic, homing, manual jog
Technology applications	Drive profile DS402 IEC 61800-7-2: - Homing mode - Interpolated position mode - Cyclic synchronous velocity - Cyclic synchronous tourque	Actuator speed Actuator torque Electronic gearbox Synchronism with mark registration Positioning (table positioning, positioning sequence control)
Monitoring	Brake chopper Blower monitoring Motor phase failure DC-bus voltage	
Monitoring and protective measures	Motor stalling, motor overload Motor overtemperature (input for PTC or thermal contact, $I^2 \times t$ monitoring) Earth fault Short circuit Overvoltage Overcurrent Overtemperature Undervoltage Brake chopper short circuit/overload	
Diagnostics Diagnostic interface	Integrated For keypad or USB adapter	
Status displays	Via 4 LEDs	6 LEDs
Braking operation Brake chopper	Integrated in Single Drives and power supply modules	
Brake resistor	External	

Control connections

Click – the modular structure
The pluggable control connections of the 9400 Servo Drives are located at the front of the drive to facilitate the access for control cabinet wiring.
For the diagnostic interface the USB diagnostic adapter E94AZCUS and the keypad E94AZKAE are available.
For feedback prefabricated system cables can be used to connect servo motors of the MCS and MCA series. Prefabricated system cables can be supplied in lengths of up to 150 m.

Servo technology Click! intelligently simplified

Design	9400 StateLine Servo Drives	9400 HighLine Servo Drives
Inputs/outputs		
Analog inputs	▶ Number: 1 ▶ Resolution 11 bits + sign ▶ Value range: +/-10V ▶ 1x switchable value range +/- 20 mA	▶ Number: 2 ▶ Resolution 11 bits + sign ▶ Value range: +/-10V ▶ 1x switchable value range +/- 20 mA
Analog outputs		▶ Number: 2 ▶ Resolution 11 bits + sign ▶ Value range: +/- 10 V Max. 2 mA
Digital inputs	▶ Number: 4 ▶ Touch-probe capable: 1 ▶ Switching level: PLC (IEC 61131-2) ▶ Max. input current: 8 mA	▶ Number: 8 ▶ Touch-probe capable: 8 ▶ Switching level: PLC (IEC 61131-2) ▶ Max. input current: 8 mA
Digital outputs	▶ Number: 1 ▶ Switching level: PLC (IEC 61131-2) ▶ Max. output current: 50 mA per output ▶ Load > 480 Ω at 24 V	▶ Number: 4 ▶ Switching level: PLC (IEC 61131-2) ▶ Max. output current: 50 mA per output ▶ Load > 480 Ω at 24 V
Interfaces		
CANopen	▶ Via extension MXI 1	▶ Integrated
Extension modules	▶ Via slot MXI 1: extension ▶ Slot MXI 2: not available	▶ Via slot MXI 1: extension 1 ▶ Via slot MXI 2: extension 2
State bus	▶ Integrated	
Memory module	▶ Slot MMI	
Safety module	▶ Slot MSI	
Drive interface		
Resolver input	▶ Sub-D, 9-pin ▶ Integrated	
Encoder input	▶ Sub-D, 15-pin ▶ Multiple encoder input for: SinCos/TTL incremental encoder, SinCos absolute value encoder single-turn / multi-turn (Hiperface® / EnDat V2.1)	
Motor temperature monitoring evaluation	▶ Via feedback: KTY evaluation ▶ Input on the device: PTC evaluation	
Motor brake control	▶ Optional, in the installation backplane up to 23.5 A or in the axis module from 32 A	

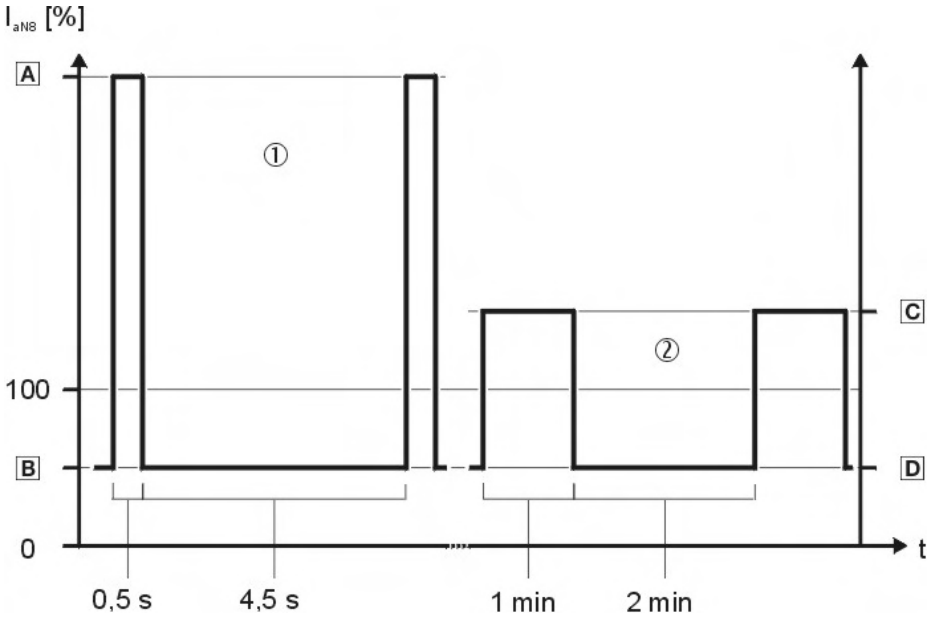
Basic dimensioning of axis modules

Here the most important steps for dimensioning Single Drive and Multi Drive axis modules are listed.

- **Motor power required**
  First, the maximum torque required M_{max}, the maximum speed n_{max}, the effective torque M_{eff} and - for geared motors - the transmission ratio i are determined from the system data.

- **Motor selection**
  Based on these values, the appropriate servo motor can be selected from the MCS (synchronous motors), MCA or MDFQA (asynchronous motors) ranges.

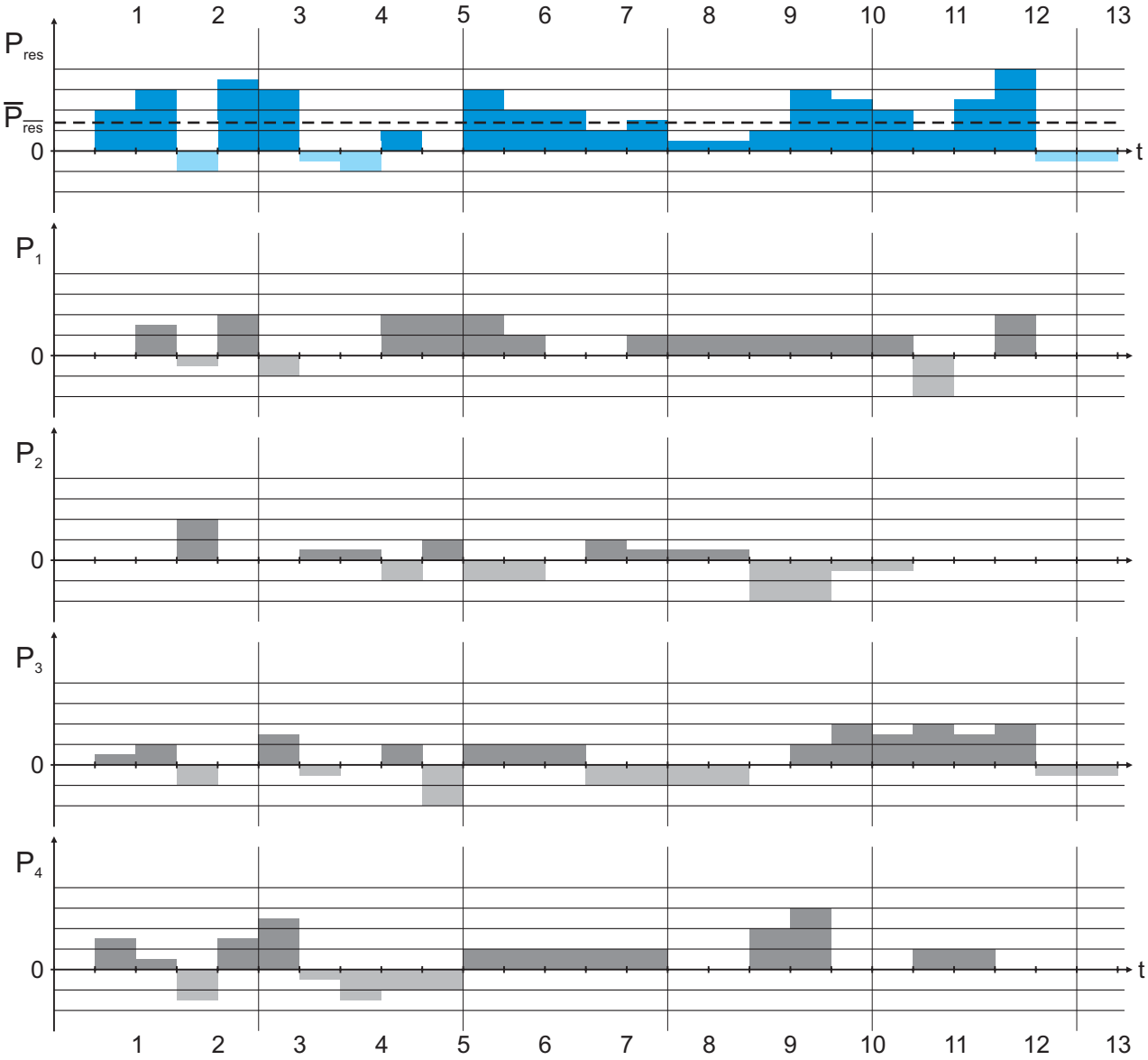
- **Axis module selection**
  The selection of the axis module is determined by the maximum currents and the power required.
  The axis module design provides the following overload modes for overload capacity dimensioning:
  5-s cycle (1)
  A: 0.5 s load period with **short-term maximum output current**
  B: 4.5 s recovery period with 75 % of rated current
  3-min cycle (2)
  C: 1 min load period with **maximum output current**
  D: 2 min recovery period with 75 % of rated current
  The switching frequency is adapted automatically and independently of the degree of utilisation.



Two overload modes: 5 s cycle, 3 min cycle

Dimensioning for DC-bus operation

- **Dimensioning of interconnected multi-axis modules**
  The best way to select the ideal power supply module required for a multi-axis application is to use a time/power diagram for the complete machine cycle for all axis modules. The total power required of the power supply module can be calculated by adding the time-based individual axis power ratings. In the same way the braking power required can be determined.



Time/power diagram of a multi-axis servo system
P_{1}...P_{4} = individual power of axis 1...axis 4
P_{res} = addition of individual powers
$P_{res\ 1\text{-}4}$ = mean value of individual powers

Standards and operating conditions

Conformity	CE: Low-Voltage Directive (73/23/EEC)
Approvals UL 508C	Power Conversion Equipment (file no. 132659)
Enclosure EN 60529 NEMA	IP 20 [1] Protection against contact according to NEMA 250 type 1 [1]
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3) Derating of rated output current	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C) Above +45 °C by 2.5 %/°C
Permissible installation height Derating of rated output current Overvoltage category at and above 2000 m	0 ... 4000 m amsl Above 1000 m amsl by 5 %/1000 m Above 2000 m only for use in overvoltage category II
Vibration resistance Transport EN 60721-3-2 Operation	2M2 EN60068-2-6: 10 Hz ≤ f ≤ 57 Hz ±0.075 mm amplitude 57 Hz ≤ f ≤ 150 Hz 1.0 g Germanischer Lloyd: 5 Hz ≤ f ≤13.2 Hz ± 1 mm amplitude 13.2 Hz < f ≤ 100 Hz 0.7 g

[1] Not in the wire range of the on the motor-side terminals

Permissible supply forms Unrestricted use	Systems with earthed star point (TN and TT systems) Systems with high-resistance or isolated star point (IT systems)
Leakage current to PE EN 61800-5-1	> 3.5 mA, fixed installation required, PE must be reinforced
Noise emission EN 61800-3	Conducted disturbance: Max. shielded motor cable lengths for compliance with the C2 EMC protection requirements without external filters E94AS□E0024 to E94AS□E0244: 10 m E94AS□E0324 to E94AS□E1044: 50 m E94AS□E1454 to E94AS□E6954: 150 m
Noise immunity EN 61800-3	Category C3
Insulation resistance EN 61800-5-1	Overvoltage category III, Above 2000 m amsl overvoltage category II
Pollution degree EN 61800-5-1	2
Protective insulation of control circuits EN 61800-5-1	Safe mains isolation through double/reinforced insulation for digital inputs and outputs

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

Motor power (ASM, 4-pole)	P_N [kW]	**0.37**	**0.75**	**1.5**	**3**
Product key Single Drive		**E94AS□E0024**	**E94AS□E0034**	**E94AS□E0044**	**E94AS□E0074**
Mains voltage range	U_{Netz} [V]	3/PE AC 180 V-0 % ... 550 V+0 %; 45 Hz-0 % ... 65 Hz+0 %			
Alternative DC supply	U_{DC} [V]	DC 260-0 % ... 775 V+0 %			
Rated output current					
4 kHz	I_N [A]	1.9	3.1	5	8.8
8 kHz	I_N [A]	1.5	2.5	4	7
16 kHz	I_N [A]	1.1	1.9	3	5.3
Max. output current [1]	I_{max} [A]	2.8	4.7	7.5	13.1
Max. short-term output current [1]	I_{max} [A]	6	10	16	21
Overload factor		4			3
Rated mains current					
With mains choke	I_{Netz} [A]	1.5	2.5	3.9	7
Without mains choke	I_{Netz} [A]	2.1	3.5	5.5	9.9
Rated DC-bus current	I_{DC} [A]	2.6	4.3	6.7	12.1
Braking unit data					
Continuous braking power	**P** [kW]	1.5		2.3	3
Peak braking power	**P** [kW]	7.6		13.3	
Min. brake resistance	**R** [Ohm]	82		47	
Power loss	P_V [W]	110	130	160	210
Dimensions					
Height	**h** [mm]	350 (with 507 installation backplane)			
Width	**b** [mm]	60		90	
Depth	**t** [mm]	288			
Mass	**m** [kg]	4		5.3	
Permissible motor cable length					
Shielded	**l** [m]	50		100	

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
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Motor power (ASM, 4-pole)	P_N [kW]	**5.5**	**7.5**	**11**
Product key Single Drive		**E94AS□E0134**	**E94AS□E0174**	**E94AS□E0244**
Mains voltage range	U_{Netz} [V]	3/PE AC 180 V-0 % ... 550 V+0 %; 45 Hz-0 % ... 65 Hz+0 %		
Alternative DC supply	U_{DC} [V]	DC 260-0 % ... 775 V+0 %		
Rated output current				
4 kHz	I_N [A]	16.3	20.6	29.4
8 kHz	I_N [A]	13	16.5	23.5
16 kHz	I_N [A]	9.8	12.4	17.6
Max. output current [1]	I_{max} [A]	24.4	30.9	44.1
Max. short-term output current [1]	I_{max} [A]	39	49.5	58.8
Overload factor		3		2.5
Rated mains current				
With mains choke	I_{Netz} [A]	11.8	15	20.5
Without mains choke	I_{Netz} [A]	16.8	21	29
Rated DC-bus current	I_{DC} [A]	20.6	25.7	35.5
Braking unit data				
Continuous braking power	**P** [kW]	5.5	7.6	11
Peak braking power	**P** [kW]	23.1	34.6	
Min. brake resistance	**R** [Ohm]	27	18	
Power loss	P_V [W]	320	380	500
Dimensions				
Height	**h** [mm]	350 (with 507 installation backplane)		
Width	**b** [mm]	120		
Depth	**t** [mm]	288		
Mass	**m** [kg]	8.1		
Permissible motor cable length				
Shielded	**l** [m]	100		

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

Motor power (ASM, 4-pole)	**P_N** [kW]	**15**	**22**	**30**
Product key Single Drive		**E94AS□E0324**	**E94AS□E0474**	**E94AS□E0594**
Mains voltage range	**U_{Netz}** [V]	3/PE AC 180 V-0 % ... 550 V+0 %; 45 Hz-0 % ... 65 Hz+0 %		
Alternative DC supply	**U_{DC}** [V]	DC 260-0 % ... 775 V+0 %		
Rated output current				
4 kHz	**I_N** [A]	38.4	47	59
8 kHz	**I_N** [A]	32	41	
16 kHz	**I_N** [A]	19.2	24.6	
Max. output current [1]	**I_{max}** [A]	57.6	70.5	88.5
Max. short-term output current [1]	**I_{max}** [A]	64	94	118
Overload factor		2		
Rated mains current				
With mains choke	**I_{Netz}** [A]	29	43	54
Without mains choke	**I_{Netz}** [A]	29	43	54
Rated DC-bus current	**I_{DC}** [A]	36	53	66
Braking unit data				
Continuous braking power	**P** [kW]	11	13.3	
Peak braking power	**P** [kW]	34.6	41.6	
Min. brake resistance	**R** [Ohm]	18	15	
Power loss	**P_V** [W]	700	1050	1122
Dimensions				
Height	**h** [mm]	602		
Width	**b** [mm]	206		
Depth	**t** [mm]	294		
Mass	**m** [kg]	19		
Permissible motor cable length				
Shielded	**l** [m]	100		

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
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Motor power (ASM, 4-pole)	P_N [kW]	**45**	**55**
Product key Single Drive		**E94AS□E0864**	**E94AS□E1044**
Mains voltage range	U_{Netz} [V]	3/PE AC 180 V-0 % ... 550 V+0 %; 45 Hz-0 % ... 65 Hz+0 %	
Alternative DC supply	U_{DC} [V]	DC 260-0 % ... 775 V+0 %	
Rated output current			
2 kHz	I_N [A]	86	104
4 kHz	I_N [A]	86	104
8 kHz	I_N [A]	73	78
Max. output current [1]	I_{max} [A]	129	156
Max. short-term output current [1]	I_{max} [A]	172	208
Overload factor		2	
Rated mains current			
With mains choke	I_{Netz} [A]	79	95
Without mains choke	I_{Netz} [A]	79	95
Rated DC-bus current	I_{DC} [A]	96.8	116.4
Braking unit data			
Continuous braking power	**P** [kW]	45	51.6
Peak braking power	**P** [kW]	83.2	78
Min. brake resistance	**R** [Ohm]	7.5	
Power loss	P_V [W]	1500	1800
Dimensions			
Height	**h** [mm]	702	
Width	**b** [mm]	266	
Depth	**t** [mm]	370	
Mass	**m** [kg]	42	
Permissible motor cable length			
Shielded	**l** [m]	100	

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

Motor power (ASM, 4-pole)	P_N [kW]	**75**	**90**	**105**
Product key Single Drive		**E94AS□E1454**	**E94AS□E1724**	**E94AS□E2024**
Mains voltage range	U_{Netz} [V]	3/PE AC 342 V-0 % ... 550 V+0 %; 48 Hz-0 % ... 65 Hz+0 %		
Alternative DC supply	U_{DC} [V]	DC 485 V-0 % ... 775 V+0 %		
Rated output current				
2 kHz	I_N [A]	145	172	202
4 kHz	I_N [A]	145	172	202
8 kHz	I_N [A]	102	120	131
Max. output current [1]	I_{max} [A]	218	258	303
Max. short-term output current [1]	I_{max} [A]	261	310	364
Overload factor		1.8		
Rated mains current				
With mains choke	I_{Netz} [A]	140	166	195
Without mains choke	I_{Netz} [A]	140	166	195
Rated DC-bus current	I_{DC} [A]	171	203	239
Braking unit data				
Continuous braking power	**P** [kW]	37.4	43.5	53.5
Peak braking power	**P** [kW]	124.8	145.1	178.3
Min. brake resistance	**R** [Ohm]	5	4.3	3.5
Power loss	P_V [W]	2100	2200	2600
Dimensions				
Height	**h** [mm]	930	1199	
Width	**b** [mm]	407		
Depth	**t** [mm]	427		
Mass	**m** [kg]	54	107	109
Permissible motor cable length				
Shielded	**l** [m]	150		

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

Motor power (ASM, 4-pole)	P_N [kW]	**130**	**150**	**190**
Product key Single Drive		**E94AS□E2454**	**E94AS□E2924**	**E94AS□E3664**
Mains voltage range	U_{Netz} [V]	3/PE AC 342 V-0 % ... 550 V+0 %; 48 Hz-0 % ... 65 Hz+0 %		
Alternative DC supply	U_{DC} [V]	DC 485 V-0 % ... 775 V+0 %		
Rated output current				
2 kHz	I_N [A]	245	292	366
4 kHz	I_N [A]	209	250	313
8 kHz	I_N [A]	160	191	240
Max. output current [1]	I_{max} [A]	368	438	549
Max. short-term output current [1]	I_{max} [A]	441	526	659
Overload factor		1.8		
Rated mains current				
With mains choke	I_{Netz} [A]	237	280	354
Without mains choke	I_{Netz} [A]	237	280	354
Rated DC-bus current	I_{DC} [A]	290	343	434
Braking unit data				
Continuous braking power	**P** [kW]	66.9	81.4	107
Peak braking power	**P** [kW]	222.9	271.3	356.6
Min. brake resistance	**R** [Ohm]	2.8	2.3	1.75
Power loss	P_V [W]	3300	4100	4900
Dimensions				
Height	**h** [mm]	1580		
Width	**b** [mm]	407		
Depth	**t** [mm]	427		
Mass	**m** [kg]	132		161
Permissible motor cable length				
Shielded	**l** [m]	150		

[1] → 16 - See diagram

Rated data for Single Drives

- The data is valid for operation at 3/PE AC 400 V or DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

→ Rated data for operation at 3/PE/AC 500 V
DS_9400_0001
Available for download at www.lenze.de/dsc

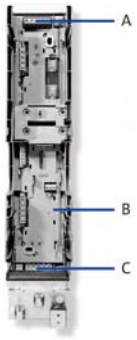
Motor power (ASM, 4-pole)	P_N [kW]	**240**	**300**	**335**	**370**
Product key Single Drive		**E94AS□E4604**	**E94AS□E5724**	**E94AS□E6354**	**E94AS□E6954**
Mains voltage range	U_{Netz} [V]	3/PE AC 342 V-0 % ... 550 V+0 %; 48 Hz-0 % ... 65 Hz+0 %			
Alternative DC supply	U_{DC} [V]	DC 485 V-0 % ... 775 V+0 %			
Rated output current					
2 kHz	I_N [A]	460	572	635	695
4 kHz	I_N [A]	368	458	508	556
8 kHz	I_N [A]	260	286	318	348
Max. output current [1]	I_{max} [A]	690	858	953	1043
Max. short-term output current [1]	I_{max} [A]	828	1030	1143	1251
Overload factor		1.8			
Rated mains current					
With mains choke	I_{Netz} [A]	444	553	614	672
Without mains choke	I_{Netz} [A]	444	553	614	672
Rated DC-bus current	I_{DC} [A]	544	677	752	823
Braking unit data					
Continuous braking power	**P** [kW]	99			
Peak braking power	**P** [kW]	37.5	43.8	47.8	
Min. brake resistance	**R** [Ohm]	1.4	1.2	1.1	
Power loss	P_V [W]	9200	11300	12500	14700
Dimensions					
Height	**h** [mm]	1559			
Width	**b** [mm]	568			
Depth	**t** [mm]	541			
Mass	**m** [kg]	266	278	300	321
Permissible motor cable length					
Shielded	**l** [m]	150			

[1] → 16 - See diagram

Single Drive installation backplane

Click – the innovative assembly concept
Up to a rated current of 23.5 A the 9400 Servo Drives consist of an axis module and an installation backplane. The backplane can be mounted without the axis module in the control cabinet, thus simplifying installation.
This offers additional advantages in terms of reduced spare part stocking and time savings in the event of drive replacements.
Further features of the installation backplane:

- A brake module for a 24 V DC 2.5 A brake can optionally be installed
- Simple installation on the rear panel of the control cabinet or on the RFI or mains filter
- Connection options for shieldings of power and control cables
- Axis modules can easily be removed in the event of failures



Installation backplane for Single Drive:
A: mains connection
B: brake module (optional)
C: motor connection

Assignment of Single Drive axes and backplanes

Motor power	Mains voltage	Product key		Installation backplane data
(ASM, 4-pole)		Single Drive	Installation backplane	Design
P_N [kW]	U_{Netz} [V]			
0.37	3 AC 180 - 550	E94AS□E0024	E94AZPS0034N	Without brake module
			E94AZPS0034HX0051	With brake module
0.75		E94AS□E0034	E94AZPS0034N	Without brake module
			E94AZPS0034HX0051	With brake module
1.5		E94AS□E0044	E94AZPS0074N	Without brake module
			E94AZPS0074HX0051	With brake module
3		E94AS□E0074	E94AZPS0074N	Without brake module
			E94AZPS0074HX0051	With brake module
5.5		E94AS□E0134	E94AZPS0244N	Without brake module
			E94AZPS0244HX0051	With brake module
7.5		E94AS□E0174	E94AZPS0244N	Without brake module
			E94AZPS0244HX0051	With brake module
11		E94AS□E0244	E94AZPS0244N	Without brake module
			E94AZPS0244HX0051	With brake module

Brake modules

An intelligent motor brake logic system is included as standard in the drive software in the form of a function block.
The optionally integrable brake module enables simple connection of a 24 V DC brake or a 205 V DC brake and use of this logic.

- For axis modules up to 23.5 A, the brake module can be integrated into the installation backplane.
- For axis modules from 32 A upwards, the brake module can be integrated into the axis modules.

Brake module, can be integrated into installation backplane

Design		Features	Product key
		Brake module	
Brake module 205 V DC/0.1 - 0.75 A		► External supply of supply voltage 230 V AC ► Monitoring of power supply and brake cable for open circuit and short circuit ► Polarity reversal protection of supply voltage ► Can be integrated into the axis modules, from 32 A	E94AZHY0025
Brake module 24 V DC/0.3 - 2.5 A		► External supply of brake voltage 24 V DC ► Monitoring of power supply and brake cable for open circuit and short circuit ► Polarity reversal protection of supply voltage ► Can be integrated into the installation backplanes, up to 23.5 A	E94AZHX0051
Brake module 24 V DC/1.0 - 5.0 A		► External supply of brake voltage 24 V DC ► Monitoring of power supply and brake cable for open circuit and short circuit ► Polarity reversal protection of supply voltage ► Can be integrated into the axis modules, from 32 A	E94AZHY0101

DC busbar set for Single Drive installation backplane

If the Single Drive axis module is to be run in a DC-bus connection (multi-axis application), this requires retrofitting of the DC busbar system and DC fuses.
Mechanical coupling is possible via the following components:

- Power supply module
- DC input module
- Single Drive axis modules
- Multi Drive axis modules

For retrofitting the DC busbar set and the DC fuse have to be installed in the axis module's installation backplane which is provides with the appropriate fixtures.
The DC fuse required is part of the DC busbar set. Spare fuses are not contained in the scope of supply. We recommend the use of the SIBA fuses listed here in the table.

Product key		
Installation backplane	**DC busbar system**	**DC fuse**
E94AZPS0034N	E94AZJA003	SIBA 5020106.16A
E94AZPS0034HX0051		
E94AZPS0074N	E94AZJA007	SIBA 5020106.40A
E94AZPS0074HX0051		
E94AZPS0244N	E94AZJA024	SIBA 5020106.100A
E94AZPS0244HX0051		

Brake resistor assignment

The brake resistor/ Single Drive axis module assignment is listed in the following table.

82 ohm brake resistor

Motor power	Mains voltage	Product key		Brake resistor data				
(ASM, 4-pole)		Single Drive	Brake resistor	Resistance	Continuous power	Thermal capacity	Dimensions	Mass
P_N [kW]	U_{Netz} [V]			R [Ohm]	P [W]	WK [kWs]	h x b x t [mm]	m [kg]
0.37	3 AC 180 - 550 [1]	E94AS□E0024	ERBP082R200W	82	200	30	320 x 41 x 122	1
0.75		E94AS□E0034						
1.5		E94AS□E0044	ERBP047R200W	47				
			ERBS047R400W		400	60	400 x 110 x 105	2.3
			ERBS047R800W		800	120	710 x 110 x 105	4
3		E94AS□E0074	ERBP047R200W		200	30	320 x 41 x 122	1
			ERBS047R400W		400	60	400 x 110 x 105	2.3
			ERBS047R800W		800	120	710 x 110 x 105	4
5.5		E94AS□E0134	ERBP027R200W	27	200	30	320 x 41 x 122	1
			ERBS027R600W		600	90	550 x 110 x 105	3.1
			ERBS027R01K2		1200	180	1020 x 110 x 105	5.6
7.5		E94AS□E0174	ERBP018R300W	18	300	30	240 x 41 x 122	1.4
			ERBS018R800W		800	120	710 x 110 x 105	4
			ERBS018R02K8		2800	420	1110 x 200 x 105	12
11		E94AS□E0244	ERBP018R300W		300	30	240 x 41 x 122	1.4
			ERBS018R01K2		1200	180	1020 x 110 x 105	5.6
			ERBS018R02K8		2800	420	1110 x 200 x 105	12
15		E94AS□E0324	ERBS018R800W		800	120	710 x 110 x 105	4
			ERBS018R01K4		1400	210	1110 x 110 x 105	6.3
			ERBG018R04K3		4300	645	380 x 426 x 302	26
22		E94AS□E0474	ERBS015R800W	15	800	1500	380 x 736 x 302	3.9
			ERBS015R02K4		2400	495	380 x 326 x 302	10
			ERBG015R06K2		6200	930	380 x 526 x 302	30
30		E94AS□E0594	ERBG015R01K2		1200			
			ERBG015R03K3		3300	495	486 x 326 x 302	23
			ERBG015R10K0		10000	1500	380 x 736 x 302	42

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

→ Data sheet on brake resistors
DS_9400_0002
Available for download at www.lenze.de/dsc

Brake resistor assignment

The brake resistor/ Single Drive axis module assignment is listed in the following table.

82 ohm brake resistor

Motor power	Mains voltage	Product key		Brake resistor data				
(ASM, 4-pole)		Single Drive	Brake resistor	Resistance	Continuous power	Thermal capacity	Dimensions	Mass
P_N [kW]	U_{Netz} [V]			**R** [Ohm]	**P** [W]	**WK** [kWs]	**h x b x t** [mm]	**m** [kg]
45	3 AC 180 - 550 [1]	E94AS□E0864	ERBG075D01K9	7.5	1900	285	486 x 236 x 302	13
55		E94AS□E1044						
75	3 AC 342-550	E94AS□E1454	ERBG005R02K6	5	2600	390	486 x 326 x 302	23
90		E94AS□E1724	ERBG043D03K0	4.3	3000	450		23.5
105		E94AS□E2024	ERBG035D03K3	3.5	3300	495		24
130		E94AS□E2454	ERBG028D04K1	2.8	4100	615	486 x 426 x 302	25
150		E94AS□E2924	ERBG023D05K6	2.3	5600	840		27
190		E94AS□E3664	ERBG035D03K3 [2]	3.5	3300	495	486 x 326 x 302	24
240		E94AS□E4604	ERBG028D04K1 [2]	2.8	4100	615	486 x 426 x 302	25
300		E94AS□E5724	ERBG023D05K6 [2]	2.3	5600	840		27
335		E94AS□E6354						
370		E94AS□E6954						

[1] For 230 V mains voltage a different brake resistor assignment applies.
[2] Two resistors must be connected in parallel.

→ Data sheet on brake resistors
DS_9400_0002
Available for download at www.lenze.de/dsc

Assignment of RFI filters and mains filters

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.

RFI filter, can be mounted beside or below the axis module

RFI filter

TX_0000000613

Motor power	Mains voltage	Product key		RFI filter data					
(ASM, 4-pole)		Single Drive	RFI filter	Rated current	Power loss	Max. cable length C1	Max. cable length C2	Dimensions	Mass
P_N [kW]	U_{Netz} [V]			I_N [A]	P_v [W]	l [m]	l [m]	h x b x t [mm]	m [kg]
0.37	3 AC 180 - 550	E94AS□E0024	E94AZRS0044	3.5	4	-	50	522 x 60 x 60	1.8
0.75		E94AS□E0034							
1.5		E94AS□E0044	E94AZRS0104	10	8			522 x 90 x 60	2.3
3		E94AS□E0074							
5.5		E94AS□E0134	E94AZRS0294	29	22			522 x 120 x 60	3.6
7.5		E94AS□E0174							
11		E94AS□E0244							
15		E94AS□E0324	E94AZRS0544	54	50	50	100	-	9
22		E94AS□E0474							
30		E94AS□E0594							
45		E94AS□E0864	E94AZRS0954	95	70				13
55		E94AS□E1044							

→ Data sheet on RFI filters
DS_9400_0003
Available for download at www.lenze.de/dsc

Mains filter

A mains filter is a combination of mains choke and RFI filter in one housing. It reduces line-bound noise emission into the mains network, thus ensuring that the line-bound interference voltage is reduced to a permissible level according to EN 61800-3.

Mains filter, can be mounted beside or below the axis module

Motor power	Mains voltage	Product key		Mains filter data					
(ASM, 4-pole)		Single Drive	Mains filter	Rated current	Voltage drop	Max. cable length C1	Max. cable length C2	Dimensions	Mass
P_N [kW]	U_{Netz} [V]			I [A]	U [V]	l [m]	l [m]	h x b x t [mm]	m [kg]
0.37	3 AC 180 - 550	E94AS□E0024	E94AZMS0034	3.2	10	25	50	522 x 60 x 60	3.2
0.75		E94AS□E0034							
1.5		E94AS□E0044	E94AZMS0094	9			100	522 x 90 x 60	5.2
3		E94AS□E0074							
5.5		E94AS□E0134	E94AZMS0184	18	7.4			522 x 120 x 60	8.4
7.5		E94AS□E0174							
11		E94AS□E0244	E94AZMS0314	31	7.3				8.8

→ Data sheet on mains filters
DS_9400_0004
Available for download at www.lenze.de/dsc

Rated data for Multi Drives

- The data is valid for operation at DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

Motor power (ASM, 4-pole)	P_N [kW]	**0.37**	**0.75**	**1.5**	**3**
Product key Multi Drive		**E94AM□E0024**	**E94AM□E0034**	**E94AM□E0044**	**E94AM□E0074**
DC supply		DC 260 - 0 % ... 775 V + 0 %			
Rated output current					
4 kHz	I_N [A]	1.9	3.1	5	8.8
8 kHz	I_N [A]	1.5	2.5	4	7
16 kHz	I_N [A]	1.1	1.9	3	5.3
Max. output current [1]	I_{max} [A]	2.8	4.7	7.5	13.1
Max. short-term output current [1]	I_{max} [A]	6	10	16	21
Overload factor		4			3
Rated DC-bus current	I_{DC} [A]	2.6	4.3	6.7	12.1
Power loss	P_V [W]	100	120	150	190
Dimensions					
Height	**h** [mm]	350 (with 507 installation backplane)			
Width	**b** [mm]	60			90
Depth	**t** [mm]	288			
Mass	**m** [kg]	4			5.3

[1] → 16 - See diagram

Rated data for Multi Drives

- The data is valid for operation at DC 565 V.
- Unless otherwise specified, the data refers to the default setting.

Motor power (ASM, 4-pole)	P_N [kW]	**4**	**5.5**	**7.5**	**11**
Product key Multi Drive		**E94AM□E0094**	**E94AM□E0134**	**E94AM□E0174**	**E94AM□E0244**
DC supply		DC 260 - 0 % ... 775 V + 0 %			
Rated output current					
4 kHz	I_N [A]	11.6	16.3	20.6	29.4
8 kHz	I_N [A]	9.3	13	16.5	23.5
16 kHz	I_N [A]	7	9.8	12.4	17.6
Max. output current [1]	I_{max} [A]	17.4	24.4	30.9	44.1
Max. short-term output current [1]	I_{max} [A]	28	39	49.5	58.8
Overload factor		3			
Rated DC-bus current	I_{DC} [A]	15.4	20.6	25.7	35.5
Power loss	P_V [W]	230	280	320	420
Dimensions					
Height	**h** [mm]	350 (with 507 installation backplane)			
Width	**b** [mm]	90	120		
Depth	**t** [mm]	288			
Mass	**m** [kg]	5.3	8.1		

[1] → 16 - See diagram

Rated data for power supply modules

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

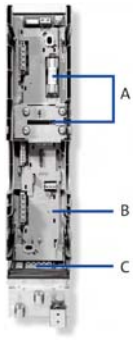
Product key Power supply modules		**E94APNE0104**	**E94APNE0364**	**E94APNE1004**	**E94APNE2454**
Rated power With mains filter Without mains filter	 P_{aDC} [kW] P_{aDC} [kW]	 **4.9** **3.6**	 **17.5** **13**	 **48.6** **36.2**	 **119** **88.6**
Mains voltage range	U_{Netz} [V]	3/PE AC 180 V-0 % ... 550 V+0 %; 45 Hz-0 % ... 65 Hz+0 %			
Rated mains current	I_{Netz} [A]	8	29	82	200
DC-bus output current	I_{DC} [A]	10	36	100	245
Max. DC-bus current [1]	I_{DC} [A]	15	54	150	368
Short-term maximum DC-bus current [1]	I_{DC} [A]	40	108	200	368
Max. output power [1]	P_{maxDC} [kW]	7.35	26.25	72.9	179
Short-term maximum output power [1]	P_{maxDC} [kW]	19.6	52.5	146	357
Overload factor		4	3	2	1.5
Braking unit data Continuous braking power Peak braking power Min. brake resistance	 **P** [kW] **P** [kW] **R** [Ohm]	 2.6 19.5 27	 8.7 43.8 12	 21 105.1 5	 37.5 187.7 2.8
Power loss	P_V [W]	55	110	230	550
Dimensions Height Width Depth	 **h** [mm] **b** [mm] **t** [mm]	 350 (with 507 installation backplane) 90 288	 120	 509 210	 390
Mass	**m** [kg]	1.9	3.9	13.5	28.5

[1] → 16 - See diagram

Multi Drive installation backplane

Click – the innovative assembly concept
Up to a rated current of 23.5 A the 9400 Servo Drives consist of an axis module and an installation backplane. The backplane can be mounted without the axis module in the control cabinet, thus simplifying installation.
This offers additional advantages in terms of reduced spare part stocking and time savings in the event of drive replacements.
Further features of the installation backplane:

- A brake module for a 24 V DC 2.5 A brake can optionally be installed
- Simple installation on the rear panel of the control cabinet
- Connection options for shieldings of power and control cables
- Axis modules can easily be removed in the event of failures



Multi Drive installation backplane:
A: DC fuse and DC busbar
B: brake module (optional)
C: motor connection

Assignment of Multi Drive axes and backplanes

Motor power	Mains voltage	Product key		Installation backplane data
(ASM, 4-pole)		Multi Drive	Installation backplane	Design
P_N [kW]	U_{Netz} [V]			
0.37	3 AC 180 - 550	E94AM□E0024	E94AZPM0044N	Without brake module
			E94AZPM0044HX0051	With brake module
0.75		E94AM□E0034	E94AZPM0044N	Without brake module
			E94AZPM0044HX0051	With brake module
1.5		E94AM□E0044	E94AZPM0044N	Without brake module
			E94AZPM0044HX0051	With brake module
3		E94AM□E0074	E94AZPM0094N	Without brake module
			E94AZPM0094HX0051	With brake module
4		E94AM□E0094	E94AZPM0094N	Without brake module
			E94AZPM0094HX0051	With brake module
5.5		E94AM□E0134	E94AZPM0244N	Without brake module
			E94AZPM0244HX0051	With brake module
7.5		E94AM□E0174	E94AZPM0244N	Without brake module
			E94AZPM0244HX0051	With brake module
11		E94AM□E0244	E94AZPM0244N	Without brake module
			E94AZPM0244HX0051	With brake module

Assignment of power supply modules and backplanes

DC-bus output current	Mains voltage	Product key	
		Power supply modules	Installation backplane
I_{DC} [A]	U_{Netz} [V]		
10	3 AC 180 - 550	E94APNE0104	E94AZPP0104
36		E94APNE0364	E94AZPP0364

Brake modules

An intelligent motor brake logic system is included as standard in the drive software in the form of a function block.
The optionally integrable brake module enables simple connection of a 24 V DC brake and use of this logic.

- For axis modules up to 23.5 A, the brake module can be integrated into the installation backplane.

Brake module, can be integrated into installation backplane

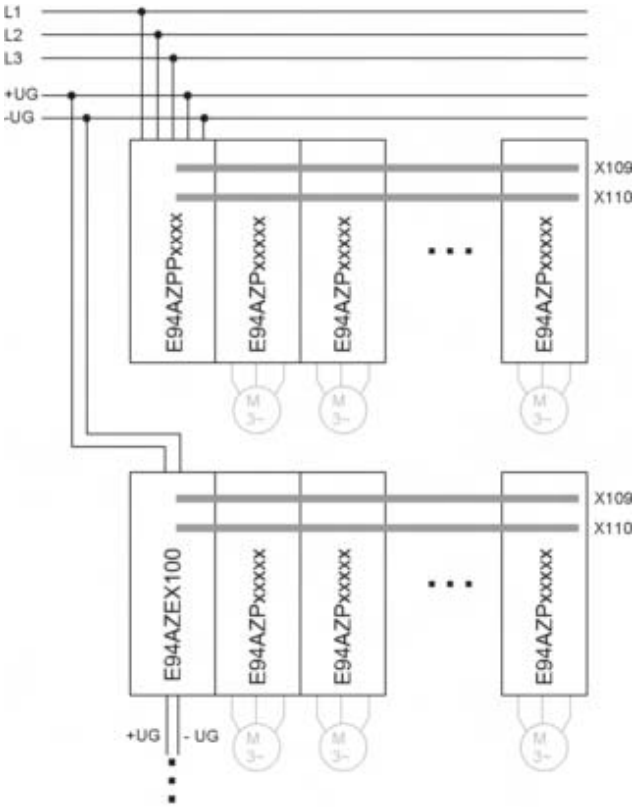
Design		Features	Product key
		Brake module	
Brake module 24 V DC/0.3 - 2.5 A		► External supply of brake voltage 24 V DC ► Monitoring of power supply and brake cable for open circuit and short circuit ► Polarity reversal protection of supply voltage ► Can be integrated into the installation backplanes, up to 23.5 A	E94AZHX0051

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, for instance, required 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 when integrating it into the system wiring. Especially for multi-row axis module mounting, optimum connection is thus possible.

DC input module 100 A

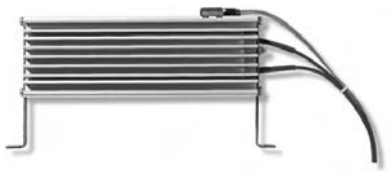
Design	Product key	Dimensions	Mass
	Input module		
		h x b x t [mm]	**m** [kg]
DC input module 100 A	E94AZEX100	422 x 60 x 95	0.9



Wiring example for multi-row mounting of axis modules

Brake resistor assignment

The brake resistor/power supply module assignment is listed in the following table.



27 ohm brake resistor

Rated mains current	Mains voltage	Product key		Brake resistor data				
		Power supply modules	Brake resistor	Resistance	Continuous power	Thermal capacity	Dimensions	Mass
I_{Netz} [A]	U_{Netz} [V]			**R** [Ohm]	**P** [W]	**WK** [kWs]	**h x b x t** [mm]	**m** [kg]
8	3 AC 180 - 550 [1]	E94APNE0104	ERBP027R200W	27	200	30	320 x 41 x 122	1
			ERBS027R600W		600	90	550 x 110 x 105	3.1
			ERBS027R01K2		1200	180	1020 x 110 x 105	5.6
29		E94APNE0364	ERBG012R01K9	12	1900	285	486 x 236 x 302	13
			ERBG012R05K2		5200	780	486 x 426 x 302	28
82		E94APNE1004	ERBG005R02K6	5	2600	390	486 x 326 x 302	23
200		E94APNE2454	ERBG028D04K1	2.8	4100	615	486 x 426 x 302	25

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

→ Data sheet on brake resistors
DS_9400_0002
Available for download at www.lenze.de/dsc

Assignment of RFI filters and mains filters

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 filter

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

Rated mains current	Mains voltage	Product key		RFI filter data				
		Power supply modules	RFI filter	Rated current	Power loss	Max. cable length Reference group C2	Dimensions	Mass
I_{Netz} [A]	U_{Netz} [V]			I_N [A]	P_v [W]		h x b x t [mm]	m [kg]
8	3 AC 180 - 550	E94APNE0104	E94AZRP0084	8	20	6 axes of 10 m each	485 x 60 x 261	4.2
29		E94APNE0364	E94AZRP0294	29	50			4.5
82		E94APNE1004	E94AZRP0824	82				
200		E94APNE2454	E94AZRP2004	200				

→ Data sheet on RFI filters
DS_9400_0003
Available for download at www.lenze.de/dsc

Mains filter

A mains filter is a combination of mains choke and RFI filter in one housing. It reduces line-bound noise emission into the mains network, thus ensuring that the line-bound interference voltage is reduced to a permissible level according to EN 61800-3.

Mains filter, can be mounted beside the power supply module

Rated mains current	Mains voltage	Product key		Mains filter data				
		Power supply modules	Mains filter	Rated current	Voltage drop	Max. cable length Reference group C2	Dimensions	Mass
I_{Netz} [A]	U_{Netz} [V]			I [A]	U [V]		h x b x t [mm]	m [kg]
8	3 AC 180 - 550	E94APNE0104	E94AZMP0084	8	10	10 axes of 50 m each	485 x 90 x 261	8.6
29		E94APNE0364	E94AZMP0294	29	7.3		485 x 120 x 261	16
82		E94APNE1004	E94AZMP0824	82				
200		E94APNE2454	E94AZMP2004	200				

→ Data sheet on mains filters
DS_9400_0004
Available for download at www.lenze.de/dsc

24 V power supply units

Multi-axis applications with Multi Drives require an external power supply unit to feed the control electronics. Depending on the number of axis modules, power supply units with a rated current of 5, 10 or 20 A at a voltage supply of 1 x 230 V AC or 3 x 400 V AC can be selected here.

Single Drive axis modules generally do not require the use of the power supply unit. If, however, a separate power supply of control electronics and power section is needed for a single-axis application, the same power supply units can be used.

24 V DC power supply unit

Rated data

Product key		EZV1200-000	EZV2400-000	EZV4800-000	EZV1200-001	EZV2400-001	EZV4800-001
Mains voltage	U_{Netz} [V]	1 AC 230			3 AC 400		
Rated current	**I** [A]	0.84	1.2	2.3	0.34	0.57	1
Output voltage	U_{DC} [V]	DC 22.5 ... 28.5					
Dimensions							
Height	**h** [mm]	130					
Width	**b** [mm]	55	85	157	73	85	160
Depth	**t** [mm]	125					
Mass	**m** [kg]	0.8	1.24	2.48	0.95	1.1	1.93

CAN bus connector

The connector is used to connect the CAN to those Lenze drives which are provided with a Sub-D connection for the CAN bus. An integrated CAN terminating resistor can be switched on/off. Internal spring terminals make the use of special mounting tools superfluous. The switch setting can be read from two sides.

Design	Product key
CAN bus connector "switch"	EWZ0046

CAN bus connector

USB diagnostic adapter

For diagnosing via a PC the USB diagnostic adapter can be used. A cable for connection to the USB interface of the PC is supplied together with the adapter.

Connection cables can be ordered separately with 2.5 m, 5 m or 10 m length to connect the USB diagnostic adapter to the axis module.

The software drivers required to use the adapter are automatically installed together with the Lenze software (e.g. L-force Engineer).

Diagnostic adapter with connection cable to PC

Design		Features	Slot	Product key
		Diagnostic adapter		
USB diagnostic adapter		▶ Input-side voltage supply via USB connection on PC ▶ Output-side voltage supply via diagnostic interface of the drive ▶ Electrical isolation of PC and drive ▶ Supported operating systems: Microsoft® Windows® 2000/XP	DIAG	E94AZCUS

Accessories for the USB diagnostic adapter

Design	Features	Product key
	Connecting cable - diagnostic adapter	
Connection cable	▶ Connection cable for diagnostic adapter, length: 2.5 m	EWL0070
	▶ Connection cable for diagnostic adapter, length: 5 m	EWL0071
	▶ Connection cable for diagnostic adapter, length: 10 m	EWL0072

Keypad

The keypad provides a simple means for local parameter setting and diagnosing. Thanks to the structured menus and a plain text display, drive data can be accessed quickly and the language selection option enables international use.
The keypad plugs on the front face of the axis module. When the keypad is plugged on, it is connected to the drive via the diagnostic interface, so that not only parameter values but also diagnostic values can be retrieved.

Keypad

Design		Features	Slot	Product key
		Keypads and accessories		
Keypad		▶ Menu-assisted diagnostics ▶ Graphics display with background lightning for clear presentation of information ▶ 4 navigation keys, 2 context-sensitive keys ▶ Adjustable RUN/STOP function ▶ Languages: German/English	DIAG	E94AZKAE

Shield mounting kits for motor cable

The motor cable shielding can be connected to the shield plates of the installation backplanes or axis modules. To simplify the wiring, additional shield supports can be fitted to the shield plates. The shield support can easily be attached to a fixture on the shield plate and the connection cable just has to be passed through. For larger axis modules the shield support is part of the shield plate.

Product key		
Single Drive	**Multi Drive**	**Shield mounting**
	E94AM□E0024	E94AZJS003
E94AS□E0024		
	E94AM□E0034	
E94AS□E0034		
	E94AM□E0044	
E94AS□E0044		E94AZJS007
	E94AM□E0074	
E94AS□E0074		
	E94AM□E0094	
	E94AM□E0134	E94AZJS024
E94AS□E0134		
	E94AM□E0174	
E94AS□E0174		
	E94AM□E0244	
E94AS□E0244		

Further accessories

Supplementing the 9400 Servo Drives, Lenze offers a wide range of further automation components. These components are not listed in this product catalogue, but in Lenze's "Drive-based automation" catalogue. In detail there are:

- ▶ Remote maintenance components
- ▶ I/O systems
- ▶ Human machine interfaces
- ▶ System bus connectors and system bus adapters

Overview of modules

The 9400 Servo Drives can be adapted to the machine requirements with four different modules. The following modules/slots are available:

- Memory modules (slot MMI),
- Safety modules (slot MSI)
- Extension modules (slot MXI 1 and/or MXI 2)

The tables below show the modules available for the 9400 Servo Drive.

Axis module with module slots MXI, MMI and MSI

Memory module

Module			Product key	Controller design	
Module slot		Module designation		StateLine	HighLine
MMI		Memory module MM110	E94AYM11	Standard	-
MMI		Memory module MM220	E94AYM22	-	Standard
MMI		Memory module MM330	E94AYM33	-	Option

Safety module

Module			Product key	Controller design	
Module slot		Module designation		StateLine	HighLine
MSI		Safety module SM0	E94AYAA	Standard	Standard
MSI		Safety module SM100	E94AYAB	Option	Option
MSI		Safety module SM300	E94AYAD	-	Option
MSI		Safety module SM301	E94AYAE	Option	Option

Extension modules

Module			Product key	Controller design	
Module slot		Module designation		StateLine [1]	HighLine [2]
MXI		Extension module Digital frequency	E94AYFLF	-	Option
MXI		Communication module CANopen	E94AYCCA	Option	Option
MXI		Communication module Ethernet	E94AYCEN	-	Option
MXI		Communication module ETHERNET Powerlink MN/CN	E94AYCEP	-	Option
MXI		Communication module ETHERNET Powerlink CN [3]	E94AYCEC	-	Option
MXI		Communication module PROFIBUS	E94AYCPM	-	Option
MXI		Communication module PROFINET	E94AYCER	-	Option

[1] Number of available extension module slots: 1
[2] Number of available extension module slots: 2
[3] In preparation

Assignment of extension modules and slots (High-Line)

Two slots of the 9400 HighLine Servo Drives are intended for extensions. The following table lists the possible combinations.

MXI 1	E94AYFLF	E94AYCCA	E94AYCEN	E94AYCEP	E94AYCEC [4]	E94AYCPM	E94AYCER
MXI 2							
E94AYFLF		●	●	●	●	●	●
E94AYCCA	●		●	●	●	●	●
E94AYCEN	●	●		●	●	●	●
E94AYCEP	●	●	●			●	●
E94AYCEC [4]	●	●	●			●	●
E94AYCPM	●	●	●	●	●		●
E94AYCER	●	●	●	●	●	●	

[4] In preparation

Memory module

Click – the pluggable memory module
Different memory modules are available for the 9400 Servo Drives:

- Motion Control StateLevel (MM110)
- Motion Control HighLevel (MM220)
- Motion Control TopLevel (MM330)

These modules activate the functional ranges described below. The activated functions can be loaded into the drive with the L-force Engineer.

In addition to the different functional ranges of the runtime software versions, different storage capacities are available as well.

Memory module MM330

Memory module		Features	Slot	Product key
Motion Control StateLevel MM110		► Application and parameter storage ► Functional range of Motion Control State-Level: - Drive profile DS402 / IEC 61800-7-2	MMI	E94AYM11
Motion Control HighLevel MM220	-	► Application and parameter storage ► Functional range of Motion Control HighLevel: - Actuator speed - Actuator torque - Electronic gearbox - Synchronised system with mark registration - Table positioning ► Address switch and baud rate setting for on-board system bus CANopen		E94AYM22
Motion Control TopLevel MM330		► Application and parameter storage ► Functional range of Motion Control TopLevel: - Actuator speed - Actuator torque - Electronic gearbox - Synchronism with mark registration - Table positioning - Positioning sequence control (graphical sequence chain) ► Address switch and baud rate setting for on-board system bus CANopen		E94AYM33

Memory module

Product key		E94AYM11	E94AYM22	E94AYM33
Memory module		**Motion Control StateLevel MM110**	**Motion Control HighLevel MM220**	**Motion Control TopLevel MM330**
Storage medium Flash memory	[MB]	1	2	4
Additional functions Real-time clock		No		
System bus address switch (CAN)		No	Yes	

Safety module

Click – integrated safety
Today one of the main tasks in plant engineering and construction is the integration of extensive safety engineering for almost all applications. Often this is only possible by means of time-consuming and expensive wiring. The drive-based safety solutions integrable into the 9400 Servo Drives enable the implementation of safety in the drive. The optionally integrable safety engineering has a modular design.

The scalable functionality starts with the safe torque off (previously called safe standstill) and ends with the integration of safety bus systems. The modular approach of drive-based safety also guarantees future proofing and maintains flexibility. The following modules are available:

- SM0 (required as a cover for slot MSI when no safety function is needed)
- SM100
- SM300
- SM301

Safety module SM300

Safety module		Features	Slot	Product key
SM0		▶ No safety functions	MSI	E94AYAA
SM100		▶ 1 safe input for active sensors, 1 monitor (1-channel output) ▶ Safe torque off (STO) ▶ Control category 4 to EN 954-1		E94AYAB
SM300		▶ Connection of active and passive sensors ▶ Safe torque off (STO) ▶ Safe stop 1 (SS1) ▶ PROFIsafe safety bus via PROFIBUS ▶ Control category 3 to EN 954-1		E94AYAD
SM301		▶ 4 safe inputs, for active or passive sensors ▶ 1 safe output, parameterisable ▶ Safe torque off (STO) ▶ Safe stop 1 (SS1) ▶ Safe stop 2 (SS2), safe operating stop (SOS) [1)] ▶ Safely limited speed (SLS) [1)] ▶ Safe maximum speed (SMS) [1)] ▶ Operation mode selector (OMS) with confirmation (ES)) ▶ Safe speed monitor (SSM) [1)] ▶ PROFIsafe safety bus (optional) ▶ Control category 3 to EN 954-1		E94AYAE

[1)] Speed-dependent functions only in connection with MCS motors and SinCos encoders

Safety module

Product key		E94AYAA	E94AYAB	E94AYAD	E94AYAE
Safety module		**SM0**	**SM100**	**SM300**	**SM301**
Control category EN 954-1			4	3	3
Fail-safe state			Safe torque off	Safe torque off	Safe torque off
Safe inputs/outputs Number of connectable active safety sensors			1	1	4 choice between active or passive
Number of connectable passive safety sensors			-	2	4 choice between active or passive
Monitor (1-channel output)			1	-	-
Safe speed monitor (2-channel output)			-	-	1
Safety bus			-	Communication module PROFIBUS (required)	Communication module PROFIBUS (optional)
Diagnostics Status displays			2 LEDs	5 LEDs	6 LEDs
DC supply voltage	U_{DC} [V]		24	24	24

Extension module for digital frequency

Some applications require several axes to be operated in synchronism. What was formerly implemented by means of the line shaft, can now be achieved in the 9400 HighLine Servo Drives with the digital frequency extension module.

The extension module provides a digital frequency input and output. The signals of the different axes can thus be looped through and simulated.

Extension module for digital frequency

Design		Features	Slot	Product key
Extension module				
Digital frequency		▶ Digital frequency 0 - 500 kHz ▶ Up to three slave drives connectable ▶ Sub-D connection for LFin and LFout	MXI	E94AYFLF

Standards and operating conditions

Product key	**E94AYFLF**
Design Extension module	**Digital frequency**
Enclosure EN 60529	IP 20
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd
Permissible installation height	0 ... 4000 m amsl
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V

Extension module for digital frequency

Product key		E94AYFLF
Medium		System cables, type: EYL
Digital frequency Input Output		 0 to 500 kHz (TTL) 0 to 500 kHz (TTL)
Incremental encoder		TTL encoder 2 signals of 5 V offset by 90°
Slave drives Parallel connection Series connection		 3 drives For 250 kHz 20 drives For 500 kHz 10 drives
Max. cable length between two nodes	[m]	50
DC supply voltage	U_{DC} [V]	Internal via mains connection of the drive

Communication module CANopen

The 9400 HighLine Servo Drives are equipped with an on board CANopen interface as standard. This interface enables communication between the axis modules and to other system bus components (e.g. I/O systems or HMIs).

If the 9400 StateLine Servo Drive is used or the system network requires a second CANopen interface, the CANopen communication module can be used for this purpose. CANopen is a communication protocol based on CAN technology. It is specified by the CiA user group (**C**AN **i**n **A**utomation) and can be configured for compatibility with the Lenze system bus (CAN).

Communication module CANopen

Design		Features	Slot	Product key
Communication module				
CANopen		▶ Automatic baud rate detection ▶ CANopen profile DS301, V4.02 Lenze system bus ▶ 2 LEDs for communication status display ▶ DIP switch for selecting baud rate and address ▶ Sub-D connection	MXI	E94AYCCA

Standards and operating conditions

Product key	**E94AYCCA**
Design Communication module	**CANopen**
Enclosure EN 60529	IP 20
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd
Permissible installation height	0 ... 4000 m amsl
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V

Communication module CANopen

Product key Short form		E94AYCCA
Communication Medium Communication profile Drive profile		 DIN ISO 11898 CANopen, DS301 V4.02, or Lenze system bus DS402 in combination with 9400 StateLine Servo Drives
Baud rate	[kBit / s]	10 20 50 125 250 500 800 1000
Node		Multi-master or slave
Network topology		Line with terminating resistors (120 ohm) at both ends
Number of logical process data channels		4
Number of logic parameter data channels		5
Number of nodes		127 110 (no repeaters)
Max. distance between 2 nodes	[m]	Unlimited, determined by max. bus length
Max. cable length per bus segment [1)]	[m]	17 for 1000 kbps 40 for 800 kbps 110 for 500 kbps 290 for 250 kbps 630 for 125 kbps 1500 for 50 kbps 3900 for 20 kbps 8000 for 10 kbps
DC supply voltage	U_{DC} [V]	Internal via mains connection of the drive

[1)] Max. bus cable lengths also depend on the number of nodes and the cable cross-section used.

Communication module Ethernet

Initially the Ethernet network was reserved for the office, but today this communication system is also often used for system parameterisation. The 9400 HighLine Servo Drives can be expanded with an Ethernet module for this purpose.

The Ethernet module can be integrated into general IT infrastructures (e.g. control centres, production data acquisition) and is suitable for remote maintenance applications. It is intended for parameter setting, not for real-time transmission of process data.

Communication module Ethernet

Design		Features	Slot	Product key
Communication module				
Ethernet		▶ Automatic setting of baud rate and transmission mode ▶ Automatic detection of wiring errors and polarity reversal ▶ Automatic switching between transmit and receive paths (autocrossing) ▶ 1 LED for communication status display ▶ Electrically isolated from the bus	MXI	E94AYCEN

Standards and operating conditions

Product key	**E94AYCEN**
Design Communication module	**Ethernet**
Enclosure EN 60529	IP 20
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd
Permissible installation height	0 ... 4000 m amsl
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V

Communication module Ethernet

Product key		E94AYCEN
Communication Medium Communication profile		Twisted pair, CAT 5e to IEEE 802.3 GCI, based on TCP/IP
Baud rate Ethernet	[MBit/s]	10/100
Signalling Ethernet		Link and activity
Max. cable length between two nodes	[m]	100
Network topology		Star; use of hubs/switches
Transmission Mode		Half duplex/full duplex
Port		1200 and 9400
DC supply voltage	U_{DC} [V]	Internal via mains connection of the drive

Communication module ETHERNET Powerlink

ETHERNET Powerlink is an Ethernet-based bus system which also uses the tried and tested CANopen standards. Every CANopen drive profile can directly be used for the EPL without any adaptations being necessary. ETHERNET Powerlink is suitable for control/inverter networking, for pure PLC functionality and for motion control systems. The managing node (MN) takes over the bus master functionality, the slaves are referred to as controlled nodes (CN).

Communication module ETHERNET Powerlink

Design		Features	Slot	Product key
Communication module				
ETHERNET Powerlink MN/CN	-	▶ 2 RJ45 connections with integrated LEDs for link and activity ▶ External voltage supply possible ▶ Integrated hub ▶ Managing node (MN) or controlled node (CN) ▶ 2 LEDs for communication status display	MXI	E94AYCEP
ETHERNET Powerlink CN[1)]		▶ 2 RJ45 connections with integrated LEDs for link and activity ▶ Controlled node (CN) ▶ External voltage supply possible ▶ Integrated hub ▶ 2 LEDs for communication status display		E94AYCEC

[1)] In preparation

Standards and operating conditions

Product key	**E94AYCEP**	**E94AYCEC**
Design Communication module	**ETHERNET Powerlink MN/CN**	**ETHERNET Powerlink CN**[2)]
Enclosure EN 60529	IP 20	
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd	
Permissible installation height	0 ... 4000 m amsl	
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)	
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V	

[2)] In preparation

Communication module ETHERNET Powerlink

Product key		E94AYCEP	E94AYCEC [1]
Communication Medium Communication profile		CAT5e S/FTP according to ISO/ICE11801 (2002) EPL2.0	
Baud rate	[Mbit/s]	100	
Node		Managing node (MN) Controlled node (CN)	Controlled node (CN)
Network topology		Star when external hubs are used, line when internal hubs are used	
Number of nodes		240	
Max. cable length between two nodes	[m]	100	
DC supply voltage	U_{DC} [V]	External 24 Internal via mains connection of the drive	

[1] In preparation

ETHERNET Powerlink hub

Lenze offers an external 8-fold hub supplementing the 2-fold hub integrated in the ETHERNET Powerlink interface module. This infrastructure component corresponds to a class-II repeater according to IEEE802.3u. It automatically detects the network baud rate (10 or 100 Mbps). The hubs can be cascaded via a special uplink port.

Design		Features	Product key
Communication module			
ETHERNET Powerlink hub		▶ 24 V DC ▶ 8-fold hub in industrial design ▶ Automatic baud rate detection (10/100 Mbps) ▶ Cascadable	E94AZCEH

Communication module PROFIBUS

One of the communication channels most commonly used in industry is PROFIBUS. The 9400 HighLine Servo Drives are provided with the corresponding interface module required for this type of communication.

The PROFIBUS module is a slave connection module with the PROFIBUS-DP communication profile. It is used for networking between the control and the inverter at high processing speeds. It provides a user-friendly way of integrating the inverter into the overall system network.

Communication module PROFIBUS

Design		Features	Slot	Product key
Communication module				
PROFIBUS		▶ 2 LEDs for communication status display ▶ Address can be set by means of a DIP switch ▶ Electrically isolated from the bus ▶ Compatibility switch for communication module EMF2133 IB	MXI	E94AYCPM

Standards and operating conditions

Product key	**E94AYCPM**
Design Communication module	**PROFIBUS**
Enclosure EN 60529	IP 20
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd
Permissible installation height	0 ... 4000 m amsl
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V

Communication module PROFIBUS

Product key		E94AYCPM
Communication Medium Communication profile Drive profile		 RS 485, shielded twisted pair PROFIBUS-DP-V0 PROFIBUS-DP-V1 Drivecom profile "Drive technology 20" [1)] Lenze drive control PROFIDrive, version 4 [1)]
Baud rate	[kBit / s]	9.6 ... 12000 (automatic detection)
Node		Slave
Network topology		With repeater: line or tree Without repeater: line
Process data words (PCD) 16 bits	[Wörter]	1 ... 32
DP user data length		Optional parameter channel (4 words) + process data words
Number of nodes		31 slaves + 1 master per bus segment With repeaters: 125
Max. cable length per bus segment	[m]	1,200 (depending on the baud rate and the cable type used)
DC supply voltage	U_{DC} [V]	External 24 Internal via mains connection of the drive

[1)] In preparation.

Communication module PROFINET

The PROFINET bus system based on Ethernet is often used as the successor of PROFIBUS. There are several variants of the PROFINET which differ regarding the deterministics and thus the cycle times possible. The most frequent variant of the PROFINET I/O is the RT variant which can be used for control/inverter networking but not for motion control applications.

Communication module PROFINET

Design		Features	Slot	Product key
Communication module				
PROFINET		▶ 1 RJ45 connection with integrated LEDs for link and activity ▶ External voltage supply possible ▶ PROFINET I/O device ▶ Soft real time (RT) ▶ 2 LEDs for communication status display	MXI	E94AYCER

Standards and operating conditions

Product key	**E94AYCER**
Design Communication module	**PROFINET**
Enclosure EN 60529	IP 20
Vibration resistance	Sinusoidal oscillation; Amplitude/acceleration (10 Hz ≤ f ≤ 57 Hz 0.075 mm, 57 Hz ≤ f ≤ 150 Hz 1 g), acceleration resistant up to 0.7 g acc. to Germanischer Lloyd
Permissible installation height	0 ... 4000 m amsl
Climatic conditions Storage (EN 60721-3-1) Transport (EN 60721-3-2) Operation (EN 60721-3-3)	 1K3 (temperature: -25 °C ... +60 °C) 2K3 (temperature: -25 °C ... +70 °C) 3K3 (temperature: -10 °C ... +55 °C)
Insulation voltage to reference earth/PE EN 61800-5-1	AC 50 V

Communication module PROFINET

Product key		E94AYCER
Communication Medium Communication profile Drive profile		CAT5e S/FTP according to ISO/ICE11801 (2002) PROFINET I/O (RT)
Baud rate	[kBit / s]	100
Node		PROFINET I/O device
Network topology		Star; use of switches
Max. cable length between two nodes	[m]	100
DC supply voltage	U_{DC} [V]	External 24 Internal via mains connection of the drive

General

L-force Engineer StateLevel/HighLevel is the engineering tool for commissioning and diagnosing the 9400 Servo Drives. The user interface is intuitive and easy to use. The clearly structured dialogues of the L-force Engineer are specially adapted to the requirements of the users.

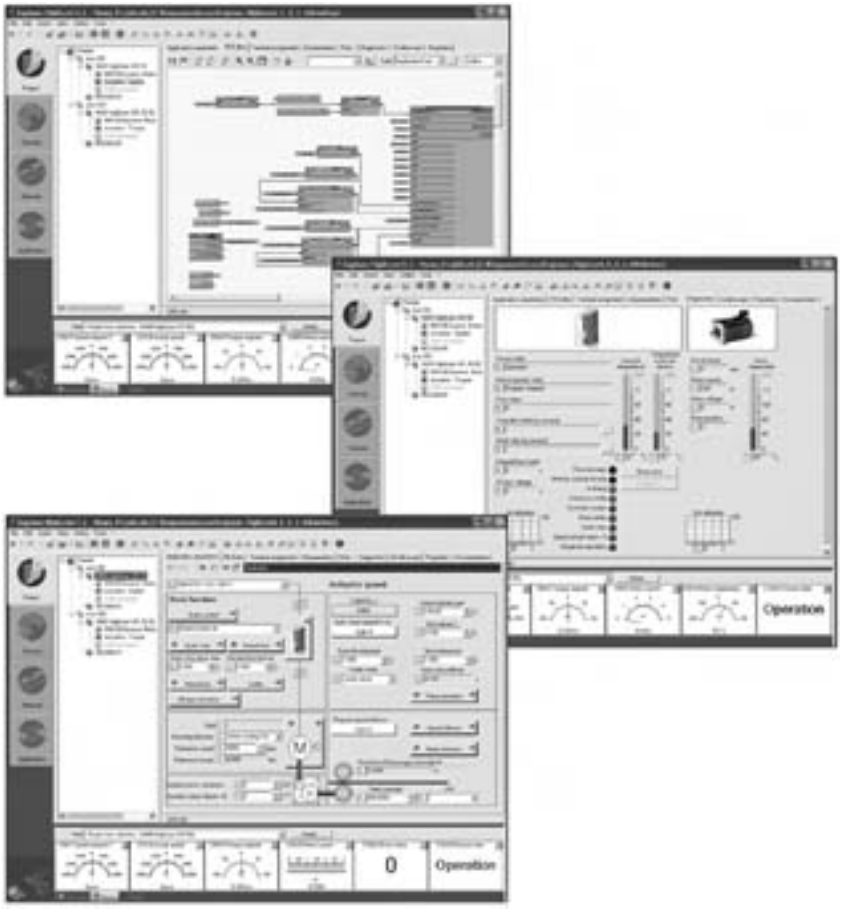
The various phases of a project are used as the primary navigation aid, as a result of which the key functions are sorted and presented in a clear manner. Numerous graphical interfaces are used in addition to simplify the configuration and parameter setting processes for the drives. As a result, in many cases more complicated programming processes can be replaced with a simpler configuration step.

Multi-drive engineering comes naturally with the L-force Engineer StateLevel/HighLevel. A large number of functions enable your machine to be optimally configured, set-up and diagnosed.

The following versions are available:

- **Engineer StateLevel**
  Provided with all diagnostic functions required, this product is optimally suited for service engineers and system commissioners. It is optimised for commissioning 9400 Servo Drives and can also be used to implement smaller projects with up to 5 target systems. The included software tools GDC easy and GD Loader enable you to commission further target systems.

- **Engineer HighLevel**
  In addition to the functions of the Engineer StateLevel, the Engineer HighLevel comprises essential functions for large projects as, for instance, establishing networks, connecting communication stations, editing function blocks. You can even integrate your own documentation into the Engineer project, so that everything is available at a central point and all the time – long searches are a thing of the past. The GDC easy and the additional programs on this CD can be used for configuring and commissioning further target systems.
  This full version is available as single user, multiple user or corporate licence.



User interfaces of L-force Engineer HighLevel

Functions and features

The following table describes all functions and features of the engineering software.

Since not all functions can be accessed by every drive, the engineering software appears differently, depending on the selected drive.

Product key Short form	**-**	**ESPEVEHNNN□□1**
Design	**L-force Engineer StateLevel**	**L-force Engineer HighLevel**
Version Latest software version	V2.0	V2.0
Drives and components 9400 Servo Drives	●	●
I/O system IP20	●	●
Lenze motors	●	●
Common gearbox	●	●
Project creation Limitation to 5 target systems	Yes	No
Project documentation Stored in project		●
Parameterisation Graphics-based	●	●
Parameter list	●	●
Networks and communication System bus (CAN) network configuration		●
Network configuration - ETHERNET Powerlink		●
Communication wiring		●
Port editor (communication interface)		●
Creation of machine application		●
Configuration Function block editor		●
Diagnostics Terminal display/diagnostics overview	●	●
Monitor window	●	●
Logbook of all error messages	●	●
Online values in graphics-based parameterisation	●	●
Online values in function block editor		●
Network diagnostics		●
Online/offline comparison	●	●
Message list of Engineer	●	●
Oscilloscope	2-channel	8-channel
Print functions Parameter list	●	●
Function block interconnection		●
Network configuration		●

Selection and order data

Benefits at a glance:

- Simple and transparent project view even of complex projects – independently of the network view
- High flexibility – functions can easily be post-installed
- Own project documentation can be integrated into the project – all the information is available at one place and can easily be found
- New graphics-based user interfaces for parameterising and configuring drives simplify work
- Simple graphics-based configuration of communication – no need to work with complicated parameters.

Design	Features	Product key
L-force Engineer StateLevel, freeware	▶ Order free of charge ▶ Download via the Internet ▶ Includes GDC easy and GD Loader ▶ Languages: German/English	Download free of charge
L-force Engineer HighLevel, single user licence	▶ CD-ROM included in scope of supply ▶ Installation on one PC ▶ Includes GDC, GD Loader and GD Oscilloscope ▶ Languages: German/English	ESPEVEHXAOEC1
L-force Engineer HighLevel, multiple user licence	▶ CD-ROM not included in scope of supply ▶ Multiple installations on the number of machines for which licences have been purchased ▶ The basis is a single user licence	ESPEVEHNNNML1
L-force Engineer HighLevel, corporate licence	▶ CD-ROM not included in scope of supply ▶ Multiple installations within a company at one location ▶ The basis is a single user licence	ESPEVEHNNNFL1
L-force Engineer HighLevel, buyout licence	▶ CD-ROM not included in scope of supply ▶ Multiple installations within a company at one location ▶ Issuing of sublicences in conjunction with Lenze drives installed in a machine ▶ The basis is a single user licence	ESPEVEHNNNBL1
Upgrade of GDC to L-force Engineer HighLevel	▶ Upgrade to Engineer HighLevel single user licence ▶ Upgrade to Engineer HighLevel multiple user licence ▶ Upgrade to Engineer HighLevel corporate licence ▶ Upgrade to Engineer HighLevel buyout licence	ESPEGEHXAOEC1 ESPEGEHNNNML1 ESPEGEHNNNFL1 ESPEGEHNNNBL1

Data access/communication

The following table describes the communication paths of the engineering software to the connected drives.
Some drives do not support all communication paths, so that some communication paths may not be possible.

Product key Short form	**-**	**ESPEVEHNNN□□1**
Design	**L-force Engineer StateLevel**	**L-force Engineer HighLevel**
Version Latest software version	V2.0	
Communication System bus (CAN)	► USB connection with USB system bus adapter EMF 2177IB ► Parallel interface with system bus adapter EMF 2173IB	
LECOM	► -	
Ethernet	► Network connection (10/100 Mbps Ethernet) switch or hub recommended	
Diagnostic interface	► USB connection with diagnostic adapter	
OPC Drive Server	► Via all connections defined on the OPC Drive Server (bus server)	

System requirements

L-force Engineer StateLevel/HighLevel
In order to be able to use the L-force Engineer, the following minimum hardware and software requirements must be met:

- Microsoft®Windows® 2000 SP2 or higher/XP
- IBM compatible PC with Intel® Pentium® processor 750 MHz or higher, 1.4 GHz recommended
- At least 256 MB RAM, 512 MB recommended
- At least 500 MB free hard disk space
- At least 1,024 x 768 pixels screen resolution with 256 colours
- Mouse
- CD-ROM drive
- Free slots/interfaces in accordance with the requirements of the different fieldbus interface modules

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