Frequency inverter







About this catalogue

This catalogue contains all frequency inverter components. The corresponding automation components can be found in the PC-based Automation catalogue. For some components the "arrow" symbol appears together with an identifier printed in bold. This identifier can be retrieved directly in the electronic catalogue. The catalogue can be found online at: www.lenze.de/dsc

Inverters and accessories





9300 vector – for challenging applications

Lenze frequency inverters are used in a large number of sectors and applications for electronically adjusting the speed of three-phase asynchronous motors. We offer uniform standard products with flexible scope for use, quick and easy commissioning, reliability and of course high quality. The 9300 vector is a vector-controlled frequency inverter, perfectly equipped for even challenging applications. Excellent drive behaviour, even if not using speed feedback, and undreamed-of scope for solving closed loop and feedback control tasks are just some of the features offered by these frequency inverters. The 9300 vector is typically used in for example extruders, winders, pumps, compressors, fans, blowers, sawing/cutting drives, textile machines and conveyors.

Simple connection

Pluggable screw terminals for digital/analogue inputs and outputs (removable terminal blocks) and Sub-D sockets for feedback and digital frequency signals make possible quick and easy connection of control signals with protection against polarity reversal. All connections can be easily accessed.

Adaptable

The selectable form of the V/f characteristic allows the frequency inverters to be adapted to loads with torque requirements rising in a constant or quadratic manner. The integrated flying restart circuit means that a drive can be easily restarted when the shaft is still turning.

CE conformity

It goes without saying that frequency inverters of the 9300 vector control range satisfy EC directives:

- CE conformity according to the Low-Voltage Directive
- CE conformity according to the electromagnetic compatibility directive for a typical drive configuration with frequency inverter

Energy-saving

The power level is adapted such that the inverter is only driven to suit the current demand for torque/power.

Immediately ready for operation

The frequency inverters are preset for standard use. Amongst other things, parameters are set for:

 controlled acceleration and deceleration using set acceleration and deceleration times

► assignment of inputs and outputs with standard functions Predefined basic configurations are available for challenging applications (e.g. dancer position control, torque control, traversing control, digital frequency coupling).

User-friendly

A large number of subject- and application-oriented menus simplify the process of solving drive tasks and finding the parameters required for this. Example: the key settings for standard applications can be undertaken using the 32 parameters available under the "user menu". The "user menu" can however also be individually modified and set up with frequently used parameters.





9300 vector – for challenging applications

Effortless operations

The 9300 vector frequency inverter can be quickly and easily adapted to individual requirements using the PC and "Global Drive Control" parameter setting/operating software. Simple dialogues (e.g. short setup) ensure a good overview. Alternatively, a plug-on operating keypad is also available.

The right setpoint source for every requirement

- via a setpoint potentiometer to the control terminals
- via master voltage or master current to the control terminals
- via digital frequency input
- via an operating module
- via a communication module from a host system

Communication-capable

In communication with a host system, inverters can be incorporated using plug-on communication modules:

- LECOM-A/B (RS232/485)
- LECOM-LI (optical fibre)
- ► INTERBUS
- ▶ PROFIBUS-DP
- DeviceNet
- CANopen
- ETHERNET Powerlink

Reliable

An adjustable slip compensation balances load-related speed variations without costly speed feedback. The maximum current limiting function ensures stable operation in all operating points under static and dynamic loads. A PTC thermistor can be connected to protect the motor.

System bus interface (CAN) by default

A bus connection between several Lenze inverters and automation components, for example, can therefore be established at a low wiring cost.

Single-loop and feedback control for free

More than 100 function blocks e.g. PID controllers, flip flops, counters, comparators, delay elements, logic and mathematical functions can be freely interconnected and made available to the user. In a similar way to a PLC, the 9300 vector can then handle other closed loop and feedback control functions in addition to the actual drive task. Master controls can be relieved or even removed altogether – and all for free. The fact that the function block structure can be freely interconnected also means that the 9300 vector can be easily integrated in machine, system and control concepts without any compromises having to be made.

The Lenze geared motor - an ideal partner

The technology behind Lenze geared motors is coordinated to the 9300 frequency inverters. Commissioning is incredibly simple because the frequency inverter is coordinated to the motor data – there is no need to set parameters for the motor data.





Functions and features

| Control modes/motor control | V/f control (linear or quadratic) |
|------------------------------------|---|
| Basic functions | Freely assignable user menu |
| | 4 freely programmable parameter sets (can be swapped over online) Fault history buffer DC brake function |
| | Flying restart with coasting motor S-ramps for smooth acceleration |
| | Max. output frequency 600 Hz Fixed frequencies Masking frequencies |
| | 2 PID controllers Freely configurable inputs and outputs |
| | Level inversion Logic functions (timer, AND, OR, comparator, arithmetic function) Freely interconnectable function blocks |
| Predefined applications | Speed control Torque control Digital frequency coupling Dancer position control Step control Traversing control |
| Monitoring and protective measures | Short circuit Earth fault Overvoltage Motor stalling Motor phase failure detection Load rejection/V-belt monitoring I ² x t-Motor monitoring Motor overtemperature (input for PTC or thermal contact) |
| Diagnostics Status displays | 2 LEDs |
| Braking operation Brake chopper | External |
| Brake resistance | External |





Control connections

| Design | 9300 vector |
|--|--|
| Inputs (outputs | |
| Inputs/outputs Analog inputs | Quantity: 1, can be swapped over: voltage/current input Voltage: Resolution: 11 bits + sign Value range: 0 +/-10 V Current: Quantity: 1 Resolution 10 bits + sign Value range: 0 +/- 20 mA Resolution: 11 bits + sign Value range: 0 +/- 10 V |
| Analog outputs | Quantity: 2 Resolution 9 bits + sign Value range: 0 +/-10 V, max. 2 mA |
| Digital inputs | Quantity: 7 Switching level: PLC (IEC 61131-2) |
| Digital outputs | Quantity: 4 Switching level: PLC (IEC 61131-2) Max. output current: 50mA |
| External control electronics supply | DC 24 V |
| Interfaces CANopen | ► Integrated |
| Extension modules | Optional communication module |
| Digital frequency 1) | Output, two-track Input, two-track |
| Drive interface Resolver input ¹ | Integrated Sub-D, 9-pin TTL, two-track Limit frequency: 500 kHz KTY evaluation |
| Encoder input 1) | Multi-encoder input for: SinCos/TTL incremental encoder, SinCos absolute value encoder single- turn / multi-turn (Hiperface[®]) |

¹⁾ Tip: prefabricated encoder cables, prefabricated connection cables for the digital frequency interconnection and cables suitable for trailings are described in the catalogue "Servo motors"

→ Circuit diagrams DS_SP_9300v_0001 Available for download at www.lenze.de/dsc





Standards and operating conditions

| Conformity | |
|---|---|
| | CE: Low-Voltage Directive (2006/95/EC) |
| Approvals UL 508C | Power Conversion Equipment (file no. 132659) |
| Enclosure | |
| EN 60529 | IP20 |
| NEMA | Protection against contact according to NEMA 250 type 1 |
| Climatic conditions | |
| Storage (EN 60721-3-1) | 1K3 (temperature: -25 C + 55 C) |
| Transport (EN 60721-3-2) | 2K3 (temperature: -25 C + 70 C) |
| Operation (EN 60721-3-3) | 0.37 11kW: 3K3 (temperature: 0+ 55 °C) 15 90kW: 3K3 (temperature: 0+ 50 °C) |
| Rated output current derating | above + 45 °C by 2.5%/°C |
| Permissible installation height | |
| | 0 4000 m amsl |
| Rated output current derating | Above 1000 m amsl by 5%/1000 m |
| Vibration resistance | Acceleration resistant up to 0.7 g according to Germanischer Lloyd, general conditions |
| Permissible supply forms | |
| | Systems with earthed star point (TN and TT systems) Networks with high-impedance or insulated star point (IT net- works) with one variant |
| Leakage current to PE EN 61800-5-1 | > 3.5 mA |
| Noise emission EN 61800-3 | Conducted emissions, category C1 or C2 with shielded motor cable: with additional mains filter |
| Noise immunity EN 61800-3 | Category C3 |
| Insulation resistance EN 61800-5-1 | Overvoltage category III, more than 2000 m above sea level overvoltage category II |
| Pollution degree EN 61800-5-1 | 2 |
| Protective insulation of control circuits EN 61800-5-1 | Safe isolation of mains: double/reinforced insulation for digital inputs and outputs |









- ▶ The data is valid for operation at 3/PE AC 400 V.
- Unless otherwise specified, the data refers to the default setting.
- \rightarrow Other rated data, e.g. for operating with increased rated power

DS_GD_9300v_0001

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| | | Port of | | 44 | | |
|--|----------------------------|------------|--------------------------------|--------------------|------------|--|
| Motor power (asynchronous motor, 4-pole) | P _N [kW] | 0.37 | 0.75 | 1.5 | 3 | |
| Product key | | EVF9321-EV | EVF9322-EV | EVF9323-EV | EVF9324-EV | |
| Mains voltage range | U _{Netz} [V] | 3/PE AC | : 320 V -0% 528 V + | -0 %; 45 Hz -0% 65 | Hz +0% | |
| Alternative DC supply | U _{DC} [V] | | DC 460-0 % | 740 V+0 % | | |
| Rated mains current Without mains choke | I _{Netz} [A] | 2.1 | 3.5 | 5.5 | 1) | |
| With mains choke | I _{Netz} [A] | 1.5 | 2.5 | 3.9 | 7 | |
| Rated output current | I _N [A] | 1.5 | 2.5 | 3.9 | 7 | |
| Max. output current | | 2.2 | 3.7 | 5.8 | 10.5 | |
| Power loss | P _V [W] | 50 | 65 | 100 | 150 | |
| Dimensions Height | H [mm] | | 35 | 50 | | |
| Width | B [mm] | 78 97 | | | | |
| Depth | T [mm] | 250 | | | | |
| Mass | m [kg] | 5.5 6.9 | | | | |
| Permissible motor cable length Shielded ²⁾ | l [m] | | 5 | 0 | | |
| Unshielded ²⁾ | I [m] | | 10 | 00 | | |

 $^{1)}$ Operation only permitted with mains choke or mains filter $^{2)}$ Permissible cable length may be affected if EMC conditions have to be met.

Dimensioned drawings DS_MB_9300v_0001





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

 \rightarrow Other rated data, e.g. for operating with increased rated power

DS_GD_9300v_0001

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| | | al 1 | | | | |
|--|----------------------------|---------------------------|---------------------------|--|--|--|
| Motor power (asynchronous motor, 4-pole) | P _N [kW] | 5.5 | 11 | | | |
| Product key | | EVF9325-EV | EVF9326-EV | | | |
| Mains voltage range | U _{Netz} [V] | 3/PE AC 320 V -0% 528 V + | -0 %; 45 Hz -0% 65 Hz +0% | | | |
| Alternative DC supply | U _{DC} [V] | DC 460-0 % | 740 V+0 % | | | |
| Rated mains current Without mains choke | I _{Netz} [A] | 16.8 | 1) | | | |
| With mains choke | I _{Netz} [A] | 12 | 20.5 | | | |
| Rated output current | I _N [A] | 13 | 23.5 | | | |
| Max. output current | | 19.5 | 35 | | | |
| Power loss | P _V [W] | 210 | 360 | | | |
| Dimensions Height | H [mm] | 35 | 50 | | | |
| Width | B [mm] | 13 | 35 | | | |
| Depth | T [mm] | 250 | | | | |
| Mass | m [kg] | 8 | 9 | | | |
| Permissible motor cable length Shielded ²⁾ | l [m] | 5 | 0 | | | |
| Unshielded ²⁾ | l [m] | 10 | 00 | | | |

¹⁾ Operation only permitted with mains choke or mains filter
 ²⁾ Permissible cable length may be affected if EMC conditions have to be met.

Dimensioned drawings DS_MB_9300v_0001



- ▶ The data is valid for operation at 3/PE AC 400 V.
- Unless otherwise specified, the data refers to the default setting.
- → Other rated data, e.g. for operating with increased rated power

DS_GD_9300v_0001

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| Motor power (asynchronous motor, 4-pole) | P _N [kW] | 15 | 22 | 30 | 45 | |
|---|----------------------------|------------|-------------------|-------------------|------------|--|
| Product key | | EVF9327-EV | EVF9328-EV | EVF9329-EV | EVF9330-EV | |
| Mains voltage range | U _{Netz} [V] | 3/PE AC | 320 V -0% 528 V + | 0 %; 45 Hz -0% 65 | Hz +0% | |
| Alternative DC supply | U _{DC} [V] | | DC 460-0 % . | 740 V+0 % | | |
| Rated mains current Without mains choke | I _{Netz} [A] | 43.5 | | 1) | | |
| With mains choke | I _{Netz} [A] | 29 | 42 | 55 | 80 | |
| Rated output current | I _N [A] | 32 | 47 | 59 | 89 | |
| Max. output current | | 48 | 70.5 | 89 | 134 | |
| Power loss | P _V [W] | 430 | 640 | 810 | 1100 | |
| Dimensions | | | | | | |
| Height | H [mm] | | 350 | | 510 | |
| Width | B [mm] | 250 340 | | | | |
| Depth | T [mm] | | 250 | | 285 | |
| Mass | m [kg] | | 17 | | 35 | |
| Permissible motor cable length Shielded ²) | l [m] | | 5 | 0 | | |
| Unshielded ²⁾ | I[m] | | 10 | 00 | | |

 $^{1)}$ Operation only permitted with mains choke or mains filter $^{2)}$ Permissible cable length may be affected if EMC conditions have to be met.

Dimensioned drawings DS_MB_9300v_0001





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

 \rightarrow Other rated data, e.g. for operating with increased rated power

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| Motor power | | | | | | |
|--|---------------------------|---------------|--------------------------|-------------|--|--|
| (asynchronous motor, 4-pole) | P _N [kW] | 55 | 75 | 90 | | |
| Product key | | EVF9331-EV | EVF9332-EV | EVF9333-EV | | |
| Mains voltage range | U _{Netz} [V] | 3/PE AC 320 V | -0% 528 V +0 %; 45 Hz -0 | % 65 Hz +0% | | |
| Alternative DC supply | U _{DC} [V] | | DC 460-0 % 740 V+0 % | | | |
| Rated mains current Without mains choke | I _{Netz} [A] | 1) 1) | | | | |
| With mains choke | I _{Netz} [A] | 100 | 135 | 165 | | |
| Rated output current | I _N [A] | 110 | 145 | 180 | | |
| Max. output current | | 165 | 217 | 270 | | |
| Power loss | P _V [W] | 1470 | 1960 | 2400 | | |
| Dimensions Height | H [mm] | 591 | 680 | | | |
| Width | B [mm] | 340 | 4 | 50 | | |
| Depth | T [mm] | | 285 | | | |
| Mass | m [kg] | 38 | 7 | 0 | | |
| Permissible motor cable length Shielded ²⁾ | l [m] | | 50 | | | |
| Unshielded ²⁾ | l [m] | | 100 | | | |

 $^{1)}$ Operation only permitted with mains choke or mains filter $^{2)}$ Permissible cable length may be affected if EMC conditions have to be met.

Dimensioned drawings DS_MB_9300v_0001



Brake choppers and brake resistors

An external brake resistor is needed to decelerate larger moments of inertia or in the event of longer operations in generator mode. It converts braking energy into heat.



Brake resistance ERBM...(IP20)

▶ The ERBD... brake resistors are tested according to UR

| Motor power | Mains voltage | Product key | | | | | Brake res | istor data | | | | | | | |
|--|-----------------------|-------------------------|---------------|---------------|------------------|---------------|-----------------|--------------------------|---------------------|---|--------------|---|-----|-----|----|
| (asyn- chronous motor, 4- pole) | | Inverter | Brake chopper | Quant- ity | Brake resistance | Quant- ity | Resist- ance | Continu- ous power | Thermal capacity | | | | | | |
| P _N [kW] | U _{Netz} [V] | | | | | | R [Ohm] | P [W] | WK [kWs] | | | | | | |
| 0.37 | | EVF9321-EV | | | ERBM470R050W | | 470 | 50 | 7.5 | | | | | | |
| 0.75 | | EVF9322-EV | | | ERBM470R100W | | | 100 | 15 | | | | | | |
| 1.5 | | EVF9323-EV | | | ERBM370R150W | | 370 | 150 | 22.5 | | | | | | |
| 3 | | EVF9324-EV ERBD180R300W | ERBD180R300W | | 180 | 300 | 45 | | | | | | | | |
| 5.5 | | EVF9325-EV | | | | | | | | 1 | ERBD100R600W | 1 | 100 | 600 | 83 |
| 11 | 2.4.5 | EVF9326-EV | | | | | | | | | | | | | |
| 15 | 3 AC 400/480 | EVF9327-EV | EMB9352-E | | | | 33 | | 240 | | | | | | |
| 22 | , | EVF9328-EV | | | | | | | | | | | | | |
| 30 | | EVF9329-EV | | | | | | | | | | | | | |
| 45 | EVF9330-EV | EVF9330-EV | | 2 | ERBD033R02K0 | 2 | | 2000 | | | | | | | |
| 55 | | EVF9331-EV | | 2 | | 2 | | | | | | | | | |
| 75 | | EVF9332-EV | | 2 | | 2 | | | | | | | | | |
| 90 | | EVF9333-EV | | | | 3 | | | | | | | | | |

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

Data sheet on brake choppers DS_ZB_EMB_0001 Available for download at www.lenze.de/dsc → Data sheet on ERBD brake resistors DS_ZB_ERBP_0001 Available for download at www.lenze.de/dsc





Brake choppers and brake resistors

| Motor power | Mains voltage | Product key | | | Brake resistor data | | |
|--|--------------------------|-------------|---------------|------------------|-----------------------|---------------|--|
| (asyn- chronous motor, 4- pole) | | Inverter | Brake chopper | Brake resistance | Dimensions | Mass | |
| P _N [kW] | U _{Netz} [V] | | | | H x B x T [mm] | m [kg] | |
| 0.37 | | EVF9321-EV | | ERBM470R050W | 240 x 60 x 59 | 0.6 | |
| 0.75 | | EVF9322-EV | | ERBM470R100W | 240 x 70 x 59 | 0.8 | |
| 1.5 | | EVF9323-EV | | ERBM370R150W | 240 x 80 x 95 | 1 | |
| 3 | | EVF9324-EV | | ERBD180R300W | 439 x 64 x 142 | 2 | |
| 5.5 | | EVF9325-EV | | ERBD100R600W | 639 x 64 x 142 | 3.1 | |
| 11 | 2.4.0 | EVF9326-EV | | ERBD047R01K2 | 639 x 172 x 142 | 4.9 | |
| 15 | 3 AC 400/480 | EVF9327-EV | EMB9352-E | ERBD033R02K0 | 639 x 262 x 142 | 7.1 | |
| 22 | , | EVF9328-EV | | ERBD022R03K0 | | | |
| 30 | | EVF9329-EV | | ERBD018R03K0 | | | |
| 45 | EVF9330-EV EVF9331-EV | EVF9330-EV | | ERBD022R03K0 | 720 v 172 v 247 | 10.6 | |
| 55 | | EVF9331-EV | | ERBD018R03K0 | / 59 X 1/2 X 24/ | 10.0 | |
| 75 | | EVF9332-EV | | ERBD022R03K0 | | | |
| 90 | | EVF9333-EV | | ERBD018R03K0 | | | |

→ Data sheet on ERBM brake resistors DS_ZB_ERBM_0001 Available for download at www.lenze.de/dsc

Data sheet on brake choppers
 DS_ZB_EMB_0001
 Available for download at www.lenze.de/dsc

→ Data sheet on ERBD brake resistors DS_ZB_ERBP_0001 Available for download at www.lenze.de/dsc





Mains chokes

A mains choke is an inductance which is switched in the inverter's mains cable. Using a mains choke delivers the following benefits:

- less system perturbation: the curved shape of the mains current approaches a sine shape.
- reduction in effective mains current: reduction in mains, cable and fuse load.

There are no limitations on using a mains choke together with a motor filter.

Please note:

- when using a mains choke, the mains voltage on the inverter input is reduced slightly typical voltage drop on the mains choke at the rated point approx. 5%.
- A mains choke or mains filter always has to be used for some inverters because otherwise the permissible rated data for the components used may be exceeded as a result of excess mains currents.
- The following assignment applies to operation with rated power.



Mains choke

| Motor power | Mains voltage | Produ | ıct key | Mains choke data | | |
|---------------------------------|-----------------------|--------------------------|---------------|--------------------|-----------------------|--------|
| (asynchronous motor, 4-pole) | | Inverter | Mains choke | Rated current | Dimensions | Mass |
| P _N [kW] | U _{Netz} [V] | | | I _N [A] | H x B x T [mm] | m [kg] |
| 0.37 | | EVF9321-EV | EZN3A2400H002 | 2 | 80 x 60 x 94 | 1 |
| 0.75 | - | EVF9322-EV | EZN3A1500H003 | 3 | 155 x 95 x 82 | 1.1 |
| 1.5 | | EVF9323-EV | EZN3A0900H004 | 4 | 98 x 70 x 105 | 1 |
| 3 | | EVF9324-EV 1) | EZN3A0500H007 | 7 | 138 x 119 x 95 | 2.5 |
| 5.5 | | EVF9325-EV | EZN3A0300H013 | 13 | 162 x 150 x 106 | 5.2 |
| 11 | 2.46 | EVF9326-EV 1) | ELN3-0150H024 | 24 | 180 x 86 x 192 | 8 |
| 15 | 3 AC 400/480 | EVF9327-EV | ELN3-0088H035 | 35 | 100 x 125 x 225 | 9.8 |
| 22 | 1007 100 | EVF9328-EV ¹⁾ | ELN3-0075H045 | 45 | 180 X 125 X 225 | 10.1 |
| 30 | | EVF9329-EV 1) | ELN3-0055H055 | 55 | 228 x 120 x 265 | 13 |
| 45 | | EVF9330-EV ¹⁾ | ELN3-0038H085 | 85 | 228 x 111 x 263 | 19.5 |
| 55 | | EVF9331-EV 1) | ELN3-0027H105 | 105 | 228 x 155 x 265 | 20.2 |
| 75 | | EVF9332-EV 1) | ELN3-0022H130 | 130 | 264 x 135 x 265 | 21.4 |
| 90 | | EVF9333-EV 1) | ELN3-0017H170 | 170 | 265 x 170 x 268 | 30.3 |

 $^{1\!)}$ Operation only permitted with mains choke or mains filter

Data sheet on mains chokes DS_ZB_ELN_0001 Available for download at www.lenze.de/dsc Data sheet for mains chokes for operating with increased rated power DS_ZB_ELN_0002 Available for download at www.lenze.de/dsc



Mains filter

A mains filter is a mains choke and RFI filter combination in a housing. Mains filters offer the same advantages as a mains choke and are also used to comply with interference voltage categories according to European standard EN 61800-3. A distinction is made in this legislation between category C1 and category C2.

Category C1 is used in public networks (residential areas). In terms of limit values category C1 corresponds to class B as laid down in EN 55011.

Category C2 is used in industrial premises, but also in residential areas if deemed appropriate by the user. In terms of limit values category C2 corresponds to class A as laid down in EN 55011.

Mains filter A, mains filter B and other mains filters are available for 9300vector inverters for compliance with interference voltage categories.

The choice of components depends on the motor cable length and interference voltage category required.

- see tables of data
- Category C2, cable length up to 5 m --> mains filter A
- category C2, cable length up to 50 m --> mains filter
- category C1, cable length up to 10m --> mains filter
- category C1, cable length up to 50m --> mains filter B



Mains filters A and B

As well as reducing the cable-linked interference voltage, a mains filter achieves the efficiency of a mains choke which also reduces the r.m.s. value of the mains current.Mains chokes or mains filters always have to be used for some controllers because otherwise the permissible rated data of the components used may be exceeded as a result of mains currents.

See rated data

Mains filters are available in a power range of 0.37 ... 90kW.

Mains filter A, C2 up to 5m

Mains filter A is used to operate 9300 inverters in industrial areas, e.g. on industrial networks. With mains filter A, EN 61800-3 category C2 up to 5m motor cable length is complied with.

- ▶ The filters are designed as add-on filters.
- The motor cable lengths stated are maximum values and depend on inverter type and switching frequency
- The following assignment applies to operation with rated power.

| Motor power | Mains voltage | Pro | Product key | | Mains filter A data | | |
|---------------------------------|-----------------------|------------|---------------|-------------------------|---------------------|-----------------------|--------|
| (asynchronous motor, 4-pole) | | Inverter | Mains filter | Max. cable length C2 | Rated current | Dimensions | Mass |
| P _N [kW] | U _{Netz} [V] | | | l [m] | I _N [A] | H x B x T [mm] | m [kg] |
| 0.37 | | EVF9321-EV | EZN3A2400H002 | | 1.5 | 80 x 68 x 92 | 0.8 |
| 0.75 | | EVF9322-EV | EZN3A1500H003 | | 2.5 | 95 x 82 x 115 | 1.2 |
| 1.5 | 3 AC | EVF9323-EV | EZN3A0900H004 | 5 | 4 | 98 x 70 x 105 | 1.4 |
| 3 | 400/480 | EVF9324-EV | EZN3A0500H007 | 5 | 7 | 120 x 75 x 122 | 2.4 |
| 5.5 | EVF932 | EVF9325-EV | EZN3A0300H013 | | 13 | 152 x 100 x 142 | 5.2 |
| 11 | | EVF9326-EV | EZN3A0150H024 | | 24 | 260 x 135 x 230 | 8.9 |

→ Data sheet on mains filters

DS_ZB_EZN_0001

Available for download at www.lenze.de/dsc

Data sheet for mains filter for operating with increased rated power

DS_ZB_EZN_0003



Mains filter B, C1 up to 50 m

Mains filter B is used to operate 9300 controllers on public supply networks or in industrial areas. With mains filter B, EN 61800-3 category C1 up to 50m motor cable length is complied with .

- The filters are designed as add-on filters.
- The motor cable lengths stated are maximum values and depend on inverter type and switching frequency
- The following assignment applies to operation with rated power.

| Motor power | Mains voltage | Pro | oduct key | | Mains fi | lter B data | |
|---------------------------------|-----------------------|------------|---------------|---------------|-------------------------|-----------------|--------|
| (asynchronous motor, 4-pole) | | Inverter | Mains filter | Rated current | Max. cable length C1 | Dimensions | Mass |
| P _N [kW] | U _{Netz} [V] | | | I [A] | l [m] | H x B x T [mm] | m [kg] |
| 0.37 | | EVF9321-EV | EZN3B2400H002 | 1.5 | FO | 150 x 78 x 230 | 2.5 |
| 0.75 | | EVF9322-EV | EZN3B1500H003 | 2.5 | | | 3 |
| 1.5 | 3 AC | EVF9323-EV | EZN3B0900H004 | 4 | | | 3.1 |
| 3 | 400/480 | EVF9324-EV | EZN3B0500H007 | 7 | 50 | 180 x 97 x 230 | 4.6 |
| 5.5 | | EVF9325-EV | EZN3B0300H013 | 13 | | 260 x 135 x 230 | 11.8 |
| 11 | | EVF9326-EV | EZN3B0150H024 | 24 | | | 12.1 |

Data sheet on mains filters DS_ZB_EZN_0001 Available for download at www.lenze.de/dsc

Mains filter, C1 up to 10 m and C2 up to 50 m

The mains filter is used for inverters with a 15 ... 90kW power in order to operate with up to a 50m motor cable length in industrial areas or with up to a 10m motor cable length on public networks. Mains filters correspond to category C1 EN 61800-3 up to 10m motor cable length and category C2 EN 61800-3 up to 50m motor cable length. Data sheet for mains filter for operating with increased rated power DS ZB EZN 0002

Available for download at www.lenze.de/dsc

- The filters are designed as footprint filters.
- Built-on mains filters are also available (category C1 with 50 m of shielded motor cable)
- When mounting the inverter in cold plate technology, only built-on mains filters can be used for interference suppression.
- The motor cable lengths stated are maximum values and depend on the inverter type and switching frequency.
- The following assignment applies to operation with rated power.

| Motor power | Mains voltage | Product key | | Mains filter data | | |
|-----------------------------------|-----------------------|-------------|-----------------|--------------------|-----------------------|---------------|
| (asynchronous mo- tor, 4-pole) | | Inverter | Mains filter | Rated current | Dimensions | Mass |
| P _N [kW] | U _{Netz} [V] | | | I _N [A] | H x B x T [mm] | m [kg] |
| 15 | | EVF9327-EV | E077N177224B720 | 10 | 410 x 236 x 110 | 12 |
| 22 | | EVF9328-EV | L022IN225540250 | 42 | | 15 |
| 30 | | EVF9329-EV | E82ZN30334B230 | 55 | | 19 |
| 45 | 5 AC 400/480 | EVF9330-EV | E82ZN45334B230 | 80 | 580 x 318 x 114 | 26 |
| 55 | , | EVF9331-EV | E82ZN55334B230 | 100 | 685 x 318 x 114 | 29 |
| 75 | | EVF9332-EV | E82ZN75334B230 | 135 | 760 x 428 x 114 | 53 |
| 90 | | EVF9333-EV | E82ZN90334B230 | 165 | 765 x 428 x 114 | 90 |

→ Data sheet on mains filters E82ZN

DS_ZB_E82ZN_0001

Motor filter

You use motor filters to reduce the load on the motor winding and to reduce discharge current to PE with long motor cables. Motor filters ensure reliable drive operations with up to 100m of shielded or 200m of unshielded motor cable.

The voltage drop on the motor filter with a filter rated current and a frequency of 50Hz is typically around 3% of the max. output voltage of the inverter. Observe the operating conditions of the motor filter.



Motor filter

A motor filter is needed:

- as of 50m of shielded or 100m of unshielded motor cable (regardless of observance of EMC requirements)
- When using unshielded motor cables, compliance with EMC only applies with regard to cable-linked interference emissions.
- The following assignment applies to operation with rated power.

| Motor power | Mains voltage | Product key | | Motor filter data | | | |
|---------------------------------|-----------------------|-------------|-----------------|--------------------|--------------|--|----------------------------|
| (asynchronous motor, 4-pole) | | Inverter | Motor filter | Rated current | Voltage drop | Required for motor cable lengths equal to and greater than | Max. motor cable length |
| P _N [kW] | U _{Netz} [V] | | | I _N [A] | [%] | l [m] | l [m] |
| 0.37 | | EVF9321-EV | | | | | |
| 0.75 | | EVF9322-EV | ELM3-030H004 | 0H004 4 | | | |
| 1.5 | | EVF9323-EV | | | | | |
| 3 | 3 AC | EVF9324-EV | ELM3-014H010 | 10 | 2 - 3 | Shielded 50 | Shielded 100 |
| 5.5 | 400/480 | EVF9325-EV | | 25 | 2-3 | 100 | 200 |
| 11 | | EVF9326-EV | ELIVIS-007H025 | 25 | | | |
| 15 | | EVF9327-EV | ELM3-004H0551) | | | | |
| 22 | | EVF9328-EV | LING-00411055*/ | | | | |

¹⁾ Mains voltage: AC 400/460

Data sheet on motor filters DS_ZB_ELM_0001 Available for download at www.lenze.de/dsc

 Data sheet for motor filters for operating with increased rated power
 DS_ZB_ELM_0002
 Available for download at www.lenze.de/dsc





Keypad XT

The keypad is provided to visualise the operating parameters and set parameters for the inverter. The keypad is plugged onto the front of the inverter and is also used for the status display, error diagnosis and, with integrated memory, to transfer parameters to other inverters.



Keypad XT

As an alternative, the diagnosis terminal with integrated XT keypad is available for visualising the operating parameters and inverter parameter setting

| Design | | Features | Slot | Product key |
|--------------------------------------|--|--|------|-------------|
| | | Keypads and accessories | | |
| Keypad XT | | Password protection Plain text display Predefined basic configurations User-specific menus Suitable for the 8200 vector and 9300 inverters series IP20 degree of protection | | EMZ9371BC |
| Diagnosis terminal with XT keypad | | Diagnosis terminal complete with XT keypad (EMZ9371BC) Suitable for the 8200 and 9300 inverters series IP20 degree of protection | AIF | E82ZBBXC |
| | | Connection cable, 2.5 m | | E82ZWL025 |
| Connection cable 1) | | Connection cable, 5 m | | E82ZWL050 |
| | | Connection cable, 10 m | | E82ZWL100 |

¹⁾ Required for use of diagnosis terminal.



PC interface (RS232)

Using a PC and the LECOM-A (RS232) communication module, the inverter can be operated and diagnosed (as an alternative to using a keypad) via the convenient and free of charge "Global Drive Control easy" parameter setting/operating software. A PC system cable is used to link to the PC.



PC interface (RS232)

| Design | | Features | Slot | Product key |
|---------------------------------|--|---|------|----------------|
| LECOM-A communication module | Lecond Le | 3 LED for communication status display RS 232 Electrically isolated from the bus No external voltage supply required | AIF | EMF2102IBCV004 |
| | | PC system cable 0.5 m | | EWL0048 |
| PC system cable | | PC system cable 5 m | | EWL0020 |
| | | PC system cable 10 m | | EWL0021 |

Data sheet on PC interface (RS232) DS_ZB_EMF_0001 Available for download at www.lenze.de/dsc

PC system bus adapter

Alternatively in a CAN network, operation and diagnostics with the PC can also be undertaken using an inverter CAN interface. The PC system bus adapter is plugged onto the PC's parallel interface or USB connection. The corresponding drivers are installed automatically. Depending on version, the adapter's voltage supply comes via the PC's DIN connection, PS2 connection or USB connection.



EMF2173IBV003 adapter

| Design | Features | Product key |
|-----------------------|---|---------------|
| | Voltage supply via DIN connection on PC | EMF2173IB |
| | Voltage supply via PS2 connection on PC | EMF2173IBV002 |
| PC system bus adapter | Voltage supply via PS2 connection on PC Electrically isolated from the bus | EMF2173IBV003 |
| | Voltage supply via USB connection on PC Electrically isolated from the bus | EMF2177IB |

Data sheet on PC system bus adapter DS_ZB_EMF_0002 Available for download at www.lenze.de/dsc





Brake switch

The brake switch comprises a rectifier and an electronic circuit breaker for switching an electromechanical brake. The brake switch is fitted in the control cabinet using two screws. It is controlled using one of the inverter's digital outputs.



Brake switch

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

Data sheet on E82ZWBRE brake resistor 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





Setpoint potentiometer

The speed can be selected (setpoint selection or selection of field frequency) using an external potentiometer. The setpoint potentiometer is connected to the analogue input terminals to this end. A scale and rotary knob are also available.



Setpoint potentiometer with scale and rotary knob

| Design | Product key |
|----------------------------------|----------------|
| 1 kOhm/1 Watt potentiometer | ERPD0001K0001W |
| Rotary knob, 36 mm diameter | ERZ0001 |
| Scale 0 100 %, 62 mm diameter | ERZ0002 |

Shield connection

Shield connections are available for quick and easy mounting of shielded cables according to EMC. The scope of supply includes the corresponding shield sheet, spring-wire clamps and/or snap-in clips for reliable contacting between cable shield and shield sheet. The shield sheets are angled such that the cables can be guided into the cable duct without too great a bend.



Shield connection

| Design | Product key |
|--|-------------|
| Control cable shield connection | EZZ0015 |
| 0.37 11kW power connection shield connection; cable diameter 8 20mm | EZZ0016 |
| 15 30 kW power connection shield connection; cable diameter 15 28 mm | EZZ0017 |





Overview of modules

The inverters have a slot for the operating module or a module.

The slot is located at the front of the drive. The following tables describe the available modules.

| Design | | eatures | Slot | Product key |
|----------------------|--|---|---------|----------------|
| Communication module | | | | |
| CANopen | | 2 LED for communication status display DIP switch for selecting baud rate and address Pluggable terminal strips | ess | EMF2178IB |
| DeviceNet | | | | EMF2179IB |
| ETHERNET Powerlink | | 2 RJ45 connections with LED for link/activit 2 LED for communication status display Integrated hub Controlled node (CN) External voltage supply possible | у | EMF2191IB |
| INTERBUS | | 2 LED for communication status display DIP switch for selecting the number of proc and parameter data words | ess | EMF2113IB |
| LECOM-A/B | | > 3 LED for communication status display > RS 232 or RS 485 > Electrically isolated from the bus > Electrically isolated from external voltage support | | EMF2102IBCV001 |
| LECOM-B | | 3 LED for communication status display RS 485 Electrically isolated from the bus Electrically isolated from external voltage si | upply | EMF2102IBCV002 |
| LECOM-LI | | 3 LED for communication status display Optical fibre Electrically isolated from external voltage si | upply | EMF2102IBCV003 |
| PROFIBUS | | 2 LED for communication status display Address can be set by means of a DIP switcl Electrically isolated from the bus Compatibility switch for predecessor modu EMF2131 IB | n le | EMF2133IB |