Components
for industrial communication

Lenze Global Drive – Providing the connection

Lenze

Modular | Communication components

Modular machine and system engineering is becoming increasingly more important. It has meant that individual solutions can now be set up cost-effectively from a single modular system. Many systems use fieldbuses to ensure that the machines achieve optimum performance when they are subsequently integrated in complete systems.

Lenze offers a large number of communication modules for a wide range of standard fieldbuses, which are specifically tailored to Lenze drive controllers. The same modules can be used for both servo and frequency inverters, so you will only need to familiarise yourself with a system once. The modules are always handled in the same way, so once you have learned how to use them you will be able to reuse that knowledge many times. This reduces training requirements, shortens project planning times and lowers the overall costs.

The illustration shows a sample network with a Lenze system bus (CAN). This type of network design enables the participating stations to exchange data with each other without the added complication of a control system.

9300 servo inverter

ECS servo system

Supply module

Axis modules

Drive PLC

9300 servo PLC

I/O system IP20

Human machine interface

Partnership | Let us help you find a drive solution

Lenze is a one-stop-shop for all your drive and automation technology needs and we can tailor everything to suit your exact requirements. Today, all industries expect production systems to combine high precision and flexibility in the production process with high speed. In order to meet these targets, drive controllers must be integrated into factories' control environments. These drive controllers not only communicate with master controls, but also use bus connections to exchange data with each other.

This system, which is used in the paper industry, has been fitted with a Lenze 9300 servo PLC. The Lenze drive controllers communicate with the control system via INTERBUS.

Lenze 8200 vector frequency inverters have been used in this packaging system. Communication takes place via PROFIBUS DP.

Every fieldbus system has its own individual strengths, so the choice of fieldbus may vary from industry to industry, and in some cases from application to application. In practice this may mean that different fieldbus systems are operated in parallel within the same system. By selecting the right combination of fieldbus systems, you can optimise their many benefits in your own applications.

In this example from the materials handling industry, the Lenze 8200 vector frequency inverter connects to the control system via INTERBUS.

Frequency inverters | Communication with the 8200 vector

Thanks to its modular design, the 8200 vector range of frequency inverters has two different slots where modules can be integrated. A distinction has been made between communication modules and fieldbus function modules.

In the combination shown below, this modular design enables a fieldbus to be used whilst simultaneously using digital and analog signals for open or closed loop control. As a result, this system is highly flexible.

Fieldbus communication

with an INTERBUS
EMF2113IB communication module

Open and closed loop control

via digital or analog signals
with an I/O function module

Communication modules

PROFIBUS DP
EMF2133IB
With DIP switches for selecting the address

DeviceNet*
EMF2179IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

INTERBUS
EMF2113IB
With DIP switches for selecting the process data and PCP data size as well as the baud rate; for connection to the INTERBUS remote bus

LON
EMF2141IB
The fielbus connection commonly used for building services systems

CAN
EMF2171IB
Lenze system bus supports CANopen communication profile parts

LECOM A/B
EMF2102IBCV001
RS232/RS485 – ideally suited for easy parameter setting of the drive controller using Lenze's Global Drive Control (GDC) parameterisation software

CAN
EMF2172IB
With additional functions compared to the EMF2171IB: DIP switches for selecting the address and baud rate

LECOM B
EMF2102IBCV002
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing

CANopen/DeviceNet
EMF2175IB
With DIP switches for selecting the address and baud rate and for selecting the "CANopen" or "DeviceNet" communication profile

LECOM LI
EMF2102IBCV003
For interference-immune data transmission via optical fibres using the open Lenze LECOM A/B protocol

CANopen*
EMF2178IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

LECOM A
EMF2102IBCV004
RS232 – ideally suited for easy parameter setting of the drive controller using GDC. The voltage supply is provided by the standard drive

* in preparation

Frequency inverters | Communication with the 8200 vector

Fieldbus function modules are used if diagnostics and parameter settings are required on site simultaneously during fieldbus communication between drive controllers and the control system. The function modules feature pluggable terminal strips. The module can be replaced without affecting the bus operation of other nodes by pulling out the plug. An appropriate bus topology is required to do this.

Diagnostics and parameter setting
with a keypad

Fieldbus communication
with a PROFIBUS function module

PLC with PROFIBUS master

Communication modules

LECOM A/B
EMF2102IBCV001
RS232/RS485 – ideally suited for easy parameter setting of the drive controller using Lenze's Global Drive Control (GDC) parameterisation software

LECOM LI
EMF2102IBCV003
For interference-immune data transmission via optical fibres using the open Lenze LECOM A/B protocol

LECOM A
EMF2102IBCV004
RS232 – ideally suited for easy parameter setting of the drive controller using GDC. The voltage supply is provided by the standard drive

LECOM B
EMF2102IBCV002
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing

Fieldbus function modules

PROFIBUS PT
E82ZAFPC010
With a terminal for activating the controller inhibit and an option to supply the module externally

DeviceNet PT
E82ZAFVC010
ODVA-certified module; baud rate and address can be selected via DIP switches

PROFIBUS I/O
E82ZAFPCV201
As PROFIBUS PT, but with an extra two freely configurable digital inputs, DIP switches for setting the address and PROFIdrive parameter data channel (DP-V1)

CAN I/O PT
E82ZAFCC210
In addition to the terminal for activating the controller inhibit, two more freely configurable digital input terminals can be used. DIP switches are used to select the address and baud rate.

INTERBUS PT
E82ZAFIC010
For connection to the INTERBUS remote bus

AS-i PT
E82ZAFFC010
Used to transmit digital signals via the AS-i bus

CAN PT
E82ZAFCC010
Lenze system bus for data exchange between nodes without a master control

LECOM B PT
E82ZAFLC010
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing

CAN I/O RS PT
E82ZAFCC100
Same functions as CAN I/O PT E82ZAFC210, but with additional terminal for supplying the module and 8200 vector control card externally

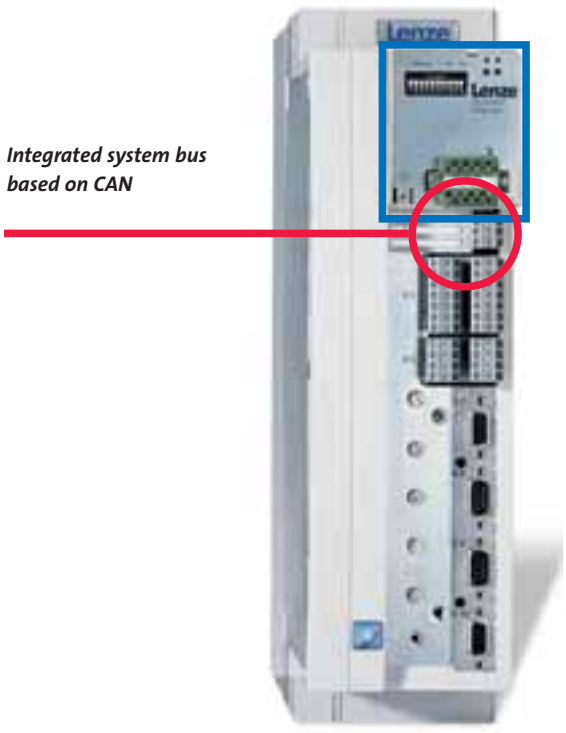
CANopen PT
E82ZAFUC010
Supports the CANopen communication profile in accordance with DS301 V4.02; baud rate and address can be selected via DIP switches

Servo technology

Communication with the 9300 series

The 9300 servo controller series – with and without integrated PLC – are available with various technology packages (positioning, cam or winding technology). Communication modules create a link to master controls. One system bus interface is integrated as standard. It operates on a CAN basis, and parts of CANopen are implemented.

The system bus enables data exchange between drive controllers, for example in order to create a master-slave application. The CAN interface can also be used to diagnose or parameterise the controllers at the same time as communication is taking place with the master control, via a communication module.



Integrated system bus based on CAN

Communicat

PROFIBUS DP
EMF2133IB
With DIP switches for selecting the address; the module is PNO-certified

INTERBUS
EMF2113IB
With DIP switches for selecting the process data and PCP data size

CANopen/DeviceNet
EMF2175IB
With DIP switches for selecting the address and baud rate and for selecting the "CANopen" or "DeviceNet" communication profile

CANopen*
EMF2178IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

DeviceNet*
EMF2179IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

FP-I
EMF2103IB
This module can be used to control I/O devices via a freely programmable interface; however, a Drive PLC or Servo PLC is required for this functionality

* in preparation

Drive PLC | Communication with the Drive PLC

tion modules

LON
EMF2141IB
The fieldbus connection commonly used for building services systems

LECOM A/B
EMF2102IBCV001
RS232/RS485 – ideally suited for easy parameter setting of the drive controller using GDC

LECOM B
EMF2102IBCV002
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing

LECOM LI
EMF2102IBCV003
For interference-immune data transmission via optical fibres using the open Lenze LECOM A/B protocol

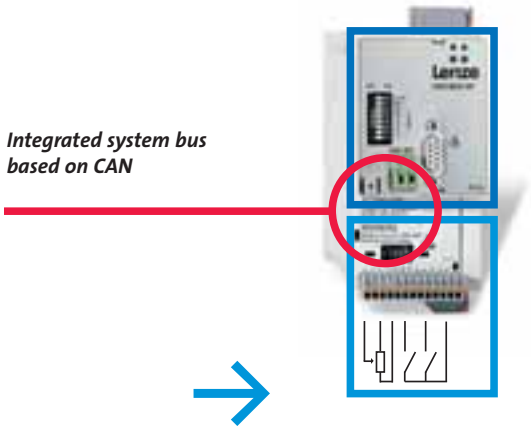
LECOM A
EMF2102IBCV004
RS232 – ideally suited for easy parameter setting of the drive controller using GDC. The voltage supply is provided by the standard drive

The compact Drive PLC has two interfaces for communication and function modules.

As with all PLC-based Lenze products, a gateway function can be realised by combining a communication module (e.g. PROFIBUS) with the CAN function module.

Generally, the PLC programs can be downloaded via the integrated Lenze system bus interface. At the same time, communication with the human machine interface, distributed I/O devices and CAN-networked drive controllers takes place via the CAN function module.

Integrated system bus based on CAN



Function modules

Standard I/O PT
E82ZAFSC010
For open and closed loop control via digital and analog signals

CAN PT
E82ZAFCC010
Lenze system bus for data exchange between nodes without a master control

CAN I/O PT
E82ZAFCC210
In addition to the terminal for activating the controller inhibit, two more freely configurable digital input terminals can be used. DIP switches are used to select the address and baud rate

Compact servo controllers

Communication with the ECS servo system

The ECS servo system was developed for gantry systems, robots, packaging machines and materials handling technology, and is characterised by high response and drive performance. The axis modules are equipped with two system bus interfaces based on CAN and are therefore tailor-made for use with centralised control concepts.

The high level of accuracy of multi-axis movements is achieved by one of the two system bus interfaces.

Integrated system bus based on CAN

ECS power supply module

Communicat

INTERBUS
EMF2113IB
With DIP switches for selecting the process data and PCP data size

PROFIBUS DP
EMF2133IB
With DIP switches for selecting the address; the module is PNO-certified

CANopen/DeviceNet
EMF2175IB
With DIP switches for selecting the address and baud rate and for selecting the "CANopen" or "DeviceNet" communication profile

LECOM A/B
EMF2102IBCV001
RS232/RS485 – ideally suited for easy parameter setting of the drive controller using GDC

LECOM LI
EMF2102IBCV003
For interference-immune data transmission via optical fibres using the open Lenze LECOM A/B protocol

* in preparation

tion modules

CANopen*

EMF2178IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

DeviceNet*

EMF2179IB
With DIP switches for selecting the address and baud rate, compatible with EMF2175IB

LON

EMF2141IB
The fieldbus connection commonly used in building services systems

LECOM B

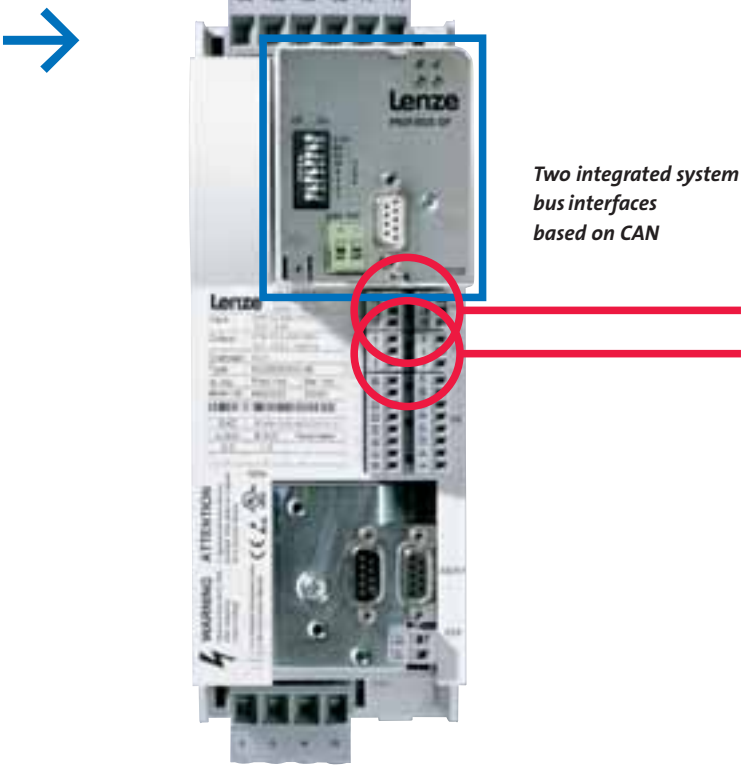
EMF2102IBCV002
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing

LECOM A

EMF2102IBCV004
RS232 – ideally suited for easy parameter setting of the drive controller using GDC. The voltage supply is provided by the standard drive

It transmits synchronised position set-points with minimum cycle times of 1 ms. Sensors can also be read, diagnosed and visualised in parallel with "slower" cycle times via the second system bus, without affecting data exchange for high-priority data transmissions.

In addition, the individual servo modules can be addressed via communication modules for diagnosis with a PC or for direct communication with a master control.



Two integrated system bus interfaces based on CAN

ECS axis module

Motor inverters | Communication with the 8200 motec

So you want to make the most of the benefits of decentralised drive technology in your own applications? How about doing away with control cabinets and controlling the speed of the motors locally in your system? Lenze has designed the 8200 motec frequency inverter so that it can be installed either on the motor terminal box or on the chassis. To enable you to supply it with the required data, the same fieldbus function modules are available for the 8200 motec as are used for the 8200 vector control cabinet inverter. The function modules are available in coated versions to provide reliable operation under harsh ambient conditions in distributed applications. The use of the bus I/O function module (E82ZAFB001 or E82ZMFB001) enables digital and analog signals to be read in during fieldbus communication.

Diagnosis terminal

E82ZBL-C

Enables easy parameter setting and diagnosis via a menu-based interface (via a E82ZWL025 2.5 m connecting cable, for example)

Fieldbus fun

PROFIBUS

E82ZAFPC001

With a terminal for activating the controller inhibit and the option of supplying the module externally; the module is PNO-certified

PROFIBUS I/O

E82ZAFPCV201

As PROFIBUS PT, but with an extra two freely configurable digital inputs, DIP switches for setting the address and PROFIdrive parameter data channel (DP-V1)

INTERBUS

E82ZAFIC001

For connection to the INTERBUS remote bus

CANopen

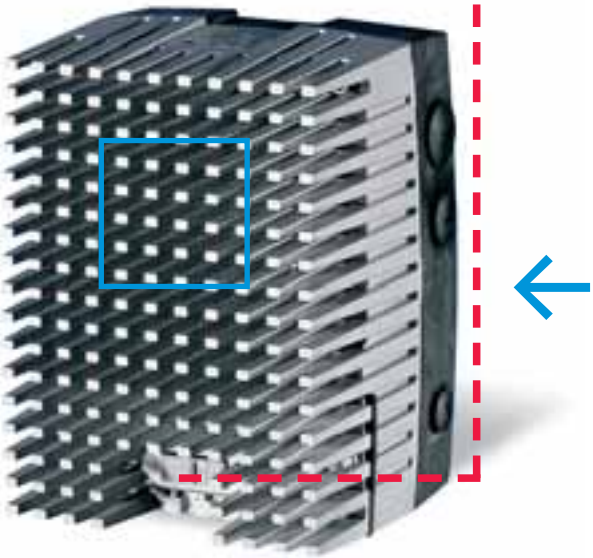
E82ZAFUC001

Supports the CANopen communication profile in accordance with DS301 V4.02; the baud rate and address can be selected via DIP switches

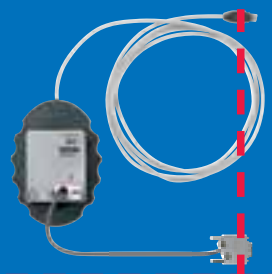
AS-i

E82ZAFFC001

Used to transmit digital signals (cannot be used with the starttec, as AS-i is integrated as an option). Adapters are available for adapting the AS-i to the motec



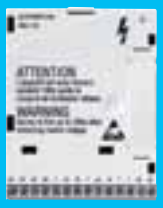
Motor starters | Communication with the starttec



Handheld unit
with PC interface (RS232)
E82ZBL-C (plus, for example, 2.5 m E82ZWL025 connecting cable) and EWL0048 PC system cable – ideally suited for parameterising drive controllers using GDC.
The voltage supply is provided by the standard drive.

ction modules

LECOM B
E82ZAFLC001
RS485 – suitable for universal use with the open Lenze LECOM A/B protocol for PC and PLC interfacing



CAN
E82ZAFCC001
Lenze system bus for data exchange between nodes without a master control

DeviceNet
E82ZAFVC001
ODVA-certified module; baud rate and address can be selected via DIP switches

CAN I/O
E82ZAFCC201
In addition to the terminal for activating the controller inhibit, two more freely configurable digital input terminals can be used. DIP switches define the addresses and baud rates (the module cannot be used with the starttec).

For constant speed drives, the starttec motor starter offers maximum flexibility, combining high plant availability and cost-effectiveness. The electronic motor starter has been specifically designed to meet the requirements of materials handling technology. Digital inputs and outputs are already provided on the starttec as standard.

The starttec can communicate with all standard fieldbus systems. As is the case for the 8200 motec, the modules required for this purpose are available in coated versions. This means that the starttec is suitable for use in decentralised applications in harsh ambient conditions. The motor starters are available with an integrated AS-i fieldbus as an option.

The AS-i fieldbus is already integrated in some starttec versions.

Communication modules | Technical data overview

Order designation		Topology	Max. no. of nodes	Max. size	Transmission medium
CAN	EMF2171IB	Line with terminating resistors	63	Depending on the baud rate used: 1.5 km at 50 kbit/s; 25 m at 1 Mbit/s	Shielded Twisted pair
	EMF2172IB				
CANopen/ DeviceNet	EMF2175IB	Line with terminating resistors	63	Depending on the baud rate and communication profile used	Shielded twisted pair
CANopen*	EMF2178IB	Line with terminating resistors	127 110 (without repeater)	Depending on the baud rate used 8 km at 10 kbit/s 25 m at 1 Mbit/s	Shielded Twisted pair
DeviceNet*	EMF2179IB	Line with terminating resistors	63	Depending on the baud rate used 500 m at 125 kbit/s 100 m at 500 kbit/s	Shielded twisted pair
PROFIBUS	EMF2133IB	Without repeater: line; with repeater: line or tree	32 in one bus segment, with repeaters: 128 including host system	In one bus segment depending on the baud rate => max. 1200 m	Shielded Twisted pair
INTERBUS	EMF2113IB	Ring	Depending on the host system; with PCP => 62 nodes; without PCP => 256/number of process data words	Between 2 nodes max. 400 m; 13 km in total	Shielded Twisted 5-wire cable
LON	EMF2141IB	Freely selectable: line, tree, star, ring	32385 nodes distributed across 255 subnetworks with 127 nodes each, which in turn are networked to a maximum of 64 nodes in a bus segment	Without repeater: 2 km	Unshielded Untwisted 2-wire cable
LECOM A/B/LI	EMF2102IBCV001 (RS232 and RS485)	RS232 => point-to-point; RS485 => without repeaters: line; with repeater: line or tree	RS232: 1; RS485: 31 31 (without repeaters); 90 (with repeaters)	RS232: 15 m; RS485: 1200 m	RS232: shielded Twisted 3-wire cable (at least 3-wire cable); RS485: Shielded twisted pair
	EMF2102IBCV002 (RS485)	Without repeater: line; with repeater: line or tree	RS485: 31 (without repeater); 90 (with repeaters)	RS485: 1200 m (depending on the baud rate and and the type of cable used)	Shielded Twisted pair
	EMF2102IBCV003 (optical fibre)	Ring	52	0-40 m at normal output power; 10-66 m at high output power	Optical fibre (plastic)
	EMF2102IBCV004 (RS232)	Point-to-point	1	15 m	RS232: shielded 3-wire cable
FP-I	EMF2103IB	RS 232 Point-to-point	1	15 m	Shielded Twisted 3-wire cable

* in preparation

	Baud rate	Process data size	Suitable for use with	Special features
	50-1000 kbit/s	1 PDO (with a max. of 3 process data words)	8200; 8200 vector	
				In comparison with module 2171IB: additional DIP switches for selecting the node address and the baud rate
	10-1000 kbit/s	3 PDO channels = 12 words (depending on the drive controller used)	8200; 8200 vector; 9300 (all versions); Drive PLC, ECS servo system	DIP switches for selecting the address, the baud rate and the "CANopen" or "DeviceNet" communication profile
	10-1000 kbit/s	3 PDO channels = 12 words (depending on the drive controller used)	8200; 8200 vector; 9300 (all versions); Drive PLC, ECS servo system	DIP switches for selecting the address and the baud rate
	125-500 kbit/s	12 process data words (depending on the drive controller used)	8200; 8200 vector; 9300 (all versions); Drive PLC, ECS servo system	DIP switches for selecting the address and the baud rate
	9.6-12000 kbit/s	1-12 process data words (usable process data size dependent upon the drive controller used)	8200; 8200 vector; 9300 (all variants); Drive PLC, ECS servo system	DIP switches for selecting the address and for realisation of compatibility with module 2131IB; electrically isolated from the PROFIBUS DP, PNO-certified module
	500 kbit/s or 2 Mbit/s	Max. 10 process data words (usable process data size dependent upon the drive controller used)	8200; 8200 vector; 9300 (all versions); Drive PLC, ECS servo system	DIP switches for selecting the process data and PCP data size; electrically isolated
	78 kbit/s	4 process data words	8200; 8200 vector; 9300 (all versions), Drive PLC, ECS servo system	Supports the "LONMARK" device profile and "Variable Speed Motor Drive" functional profile; electrically isolated from the bus
	1.2-19.2 kbit/s	No process data transfer; ASCII character transmission	8200; 8200 vector; 9300 (all versions); Drive PLC, ECS servo system	Electrically isolated from the bus
				Electrically isolated from the bus
				Electrically isolated from the bus
			8200 vector; 9300 (all versions); Drive PLC, ECS servo system	Electrically isolated from the bus, voltage supply provided exclusively by the standard drive
	0.6-38.4 kbit/s	No process data transfer; ASCII character transmission	9300 PLC Drive PLC	

Fieldbus function modules | Technical data overview

Order designation		Topology	Max. no. of nodes	Max. size	Transmission medium
System bus	E82ZAFCC	Line with terminating resistors	63	Depending on the baud rate used: 3.9 km at 20 kbit/s; 80 m at 500 kbit/s	Shielded Twisted pair
	E82ZAFCC001				
	E82ZAFCC010				
	E82ZAFCC100			Depending on the baud rate used: 3.9 km at 20 kbit/s; 9 m at 1 Mbit/s	
	E82ZAFCC200			Depending on the baud rate used: 3.9 km at 20 kbit/s; 80 m at 500 kbit/s	
	E82ZAFCC201				
	E82ZAFCC210				
CANopen	E82ZAFUC001	Line with terminating resistors	127 106 (without repeater)	Depending on the baud rate used: 8 km at 10 kbit/s; 9 m at 1 Mbit/s	Shielded Twisted pair
	E82ZAFUC010				
DeviceNet	E82ZAFVC001	Line with terminating resistors	63	100 m	Shielded Twisted pair
	E82ZAFVC010			100 m at 500 kbit/s; 500 m at 125 kbit/s	
PROFIBUS	E82ZAFPC	Without repeater: line; with repeater: line or tree	32 in one bus segment, with repeaters: 125 including host system and repeaters	In one bus segment depending on the baud rate => max. 1200 m	Shielded Twisted pair
	E82ZAFPC001				
	E82ZAFPC010				
	E82ZAFPC201				
INTERBUS	E82ZAFIC	Ring	Depending on the host system: with PCP => 62 nodes; without PCP =>256/number of process data words	Between 2 nodes max. 400 m; 13 km in total	Shielded Twisted pair 3x2-wire cable
	E82ZAFIC001				
	E82ZAFIC010				
LECOM B	E82ZAFLC	Without repeater: line; with repeater: line or tree	31 in one bus segment; with repeaters: 90	1200 m (depending on the baud rate and type of cable used)	Shielded Twisted pair
	E82ZAFLC001				
	E82ZAFLC010				
AS-i	E82ZAFFC	Tree	31	100 m	Unshielded Untwisted 2-wire cable
	E82ZAFFC001				
	E82ZAFFC010				

Note: The technical data for the standard I/O, application I/O and the bus I/O can be found in the relevant catalogues (e.g. 8200 vector and 8200 motec).

	Baud rate	Process data size	Suitable for use with	Special features
	20-500 kbit/s	2 PDO channels (= 8 words)	8200 vector, Drive PLC	Terminal for activating the controller inhibit
			8200 vector, 8200 motec, Drive PLC, starttec	Coated version of module E82ZAFCC
			8200 vector, Drive PLC	Design as E82ZAFCC, but with plug-in terminals
	20-1000 kbit/s		8200 vector	Terminals for activating the controller inhibit, freely programmable digital inputs for supplying the module and the 8200 vector control card externally; DIP switches for selecting the address and baud rate
	20-500 kbit/s		8200 vector, Drive PLC	Terminal for activating the controller inhibit and 2 freely configurable digital inputs; DIP switches for selecting the address and baud rate
			8200 vector, 8200 motec, Drive PLC	Coated version of module E82ZAFCC200
			8200 vector, Drive PLC	Design as E82ZAFCC200, but with plug-in terminals
	10-1000 kbit/s	3 PDO channels (=12 words)	8200 vector, 8200 motec, starttec	Supports the CANopen communication profile in accordance with DS301 V4.02; Terminal for activating the controller inhibit, coated version
			8200 vector	Uncoated, with additional plug-in terminals
	125-500 kbit/s	3 PDO channels (=12 words)	8200 vector, 8200 motec, starttec	Terminal for activating the controller inhibit, coated version
			8200 vector	Uncoated, with additional plug-in terminals
	9.6-12000 kbit/s	1 word - 10 words	8200 vector	Terminal for activating the controller inhibit and for supplying the module externally, PNO-certified module
			8200 vector, 8200 motec, starttec	Coated version of module E82ZAFPC
			8200 vector	Design as E82ZAFPC, but with plug-in terminals
			8200 vector, 8200 motec, starttec	Design as E82ZAFPC, but with two configurable digital inputs, DIP switch for selecting the address, PROFIdrive parameter data channel (DP-V1), coated
	500 kbit/s	1 word - 6 words	8200 vector	Terminal for activating the controller inhibit and supplying the module externally
			8200 vector, 8200 motec, starttec	Coated version of module E82ZAFIC
			8200 vector	Design as E82ZAFIC, but with plug-in terminals
	1.2-57.6 kbit/s	No process data transfer; ASCII character transmission	8200 vector	Terminal for activating the controller inhibit and for supplying the module externally
			8200 vector, 8200 motec, starttec	Coated version of module E82ZAFLC
			8200 vector	Design as E82ZAFLC, but with plug-in terminals
	Cycle time 5 ms	4 input bits and 1 output bit; as well as 1 bit: drive supplied by the mains; 2 output bits: module digital inputs	8200 vector	Terminal for activating the controller inhibit
			8200 vector, 8200 motec	Coated version of module E82ZAFFC
			8200 vector	Design as E82ZAFFC, but with plug-in terminals

It's good to know | why we are there for you

"Our customers come first. Customer satisfaction is what motivates us. By thinking in terms of how we can add value for our customers we can increase productivity through reliability."

"The world is our marketplace. We develop and manufacture internationally. Wherever you are in the world, we are nearby."

"We will provide you with exactly what you need – perfectly co-ordinated products and solutions with the right functions for your machines and installations. That is what we mean by 'quality'."

"Take advantage of our wealth of expertise. For more than 50 years we have been gathering experience in various fields and implementing it consistently and rigorously in our products, motion functions and preprepared solutions for industry."

"We identify with your targets and strive towards a long-term partnership which benefits both sides. Our competent support and consultation process means that we can provide you with tailor-made solutions. We are there for you and can offer assistance in all of the key processes."

You can rely on our service. Expert advice is available 24 hours a day, 365 days a year, in more than 30 countries via our international helpline: 008000 24 Hours (008000 2446877).

www.Lenze.com

13054397

Lenze Drive Systems GmbH · Postfach 10 13 52 · D-31763 Hameln · Technical alterations reserved · Printed in Germany 11.2005 en · **5 4 3 2 1**