






## Legend for fold-out page

Pos.	Description	Detailed information
<b>A</b>	Status of the INTERBUS communication (yellow)	 66
<b>B</b>	Connection status to the drive controller (green)	
<b>C</b>	DIP switch S1 <ul style="list-style-type: none"> <li>● Setting for the last node = OFF</li> <li>● Setting for all other nodes = ON</li> </ul>	 64
	DIP switches S2 ... S4 <ul style="list-style-type: none"> <li>● Configuration of               <ul style="list-style-type: none"> <li>– the process data words (PCD)</li> <li>– the parameter data words (PCP)</li> <li>– the ID code</li> </ul> </li> </ul>	 63
<b>D</b>	Plug connector X3.1 <ul style="list-style-type: none"> <li>● Connection for external voltage supply of the function module</li> </ul>	 48
	Plug connector X3.2 <ul style="list-style-type: none"> <li>● Reference terminal GND1, e.g. for external voltage supply of the function module</li> <li>● Reference terminal GND2, e.g. for external supply of the controller inhibit (CINH)</li> </ul>	
<b>F</b>	Plug connector X3.3 <ul style="list-style-type: none"> <li>● Connection for               <ul style="list-style-type: none"> <li>– INTERBUS</li> <li>– controller inhibit (CINH)</li> <li>– internal supply of the controller inhibit (CINH)</li> </ul> </li> </ul>	
<b>G</b>	Nameplate	 45

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# 1 About this documentation

## Contents

This documentation includes ...

- ▶ Information about the mechanical and electrical installation of the function module;
- ▶ Information about the commissioning of the function module;
- ▶ Safety instructions which you must observe in any case;
- ▶ Data about the versions of Lenze standard devices to be used;
- ▶ Technical data.

## Validity information

The information given in this documentation is valid for the following devices:

Function module	Type designation	From hardware version	From software version
INTERBUS PT	E82ZAFIC010	4A	20

## Target group

This documentation is directed at persons who install and commission the described product according to the project requirements.





### Tip!

Documentation and software updates for further Lenze products can be found on the Internet in the "Services & Downloads" area under

<http://www.Lenze.com>

## Conventions used

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

Type of information	Identification	Examples/notes
Numbers		
Decimal separator	Point	The decimal point is used throughout this documentation. Example: 1234.56
Symbols		
Page reference		Reference to another page with additional information Example:  16 = see page 16

# 1 About this documentation

## Notes used

### Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

### Safety instructions

Structure of safety instructions:






#### **Danger!**




(characterises the type and severity of danger)

#### **Note**

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph and signal word	Meaning
 <b>Danger!</b>	<b>Danger of personal injury through dangerous electrical voltage.</b> Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 <b>Danger!</b>	<b>Danger of personal injury through a general source of danger.</b> Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 <b>Stop!</b>	<b>Danger of property damage.</b> Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

## Application notes

Pictograph and signal word	Meaning
 <b>Note!</b>	Important note to ensure troublefree operation
 <b>Tip!</b>	Useful tip for simple handling
	Reference to another documentation

## 2 Safety instructions



### **Danger!**

Inappropriate handling of the function module and the standard device can cause serious injuries to persons and damage to material assets.

Observe the safety instructions and residual hazards included in the documentation of the standard device.



### **Stop!**

#### **Electrostatic discharge**

Electronic components within the function module can be damaged or destroyed by electrostatic discharge.

#### **Possible consequences:**

- ▶ The function module is defective.

#### **Protective measures**

- ▶ Free yourself from any electrostatic charge before you touch the module.

## Function

The function module connects the standard device to the INTERBUS communication system.

## Application as directed

The function module ...

- ▶ is an accessory module for use in conjunction with the following Lenze standard devices:

Product series	Device name	From hardware version
Frequency inverter	8200 vector	Vx14

- ▶ is a device intended for use in industrial power systems.

**Any other use shall be deemed inappropriate!**



### Tip!

More information about this function module is available in the corresponding communication manual.

The PDF file can be downloaded from the Internet in the "Services & Downloads" area at

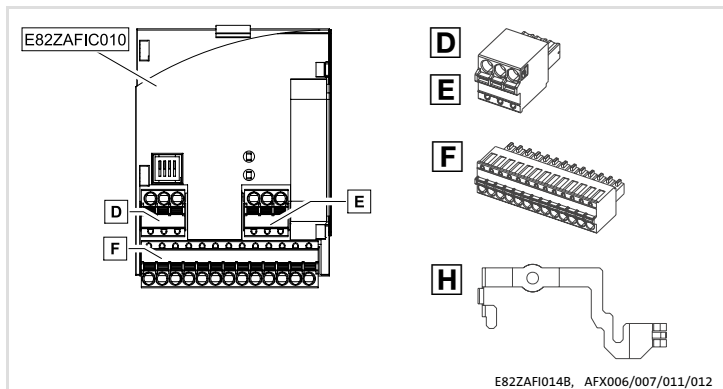
<http://www.Lenze.com>



### 3 Product description

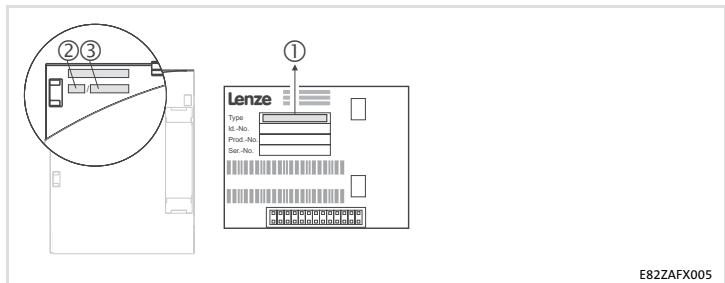
#### Scope of supply

#### Scope of supply



Pos.	Scope of supply
	Function module E82ZAFIC010
	Mounting Instructions
D / E	2 plug connectors with spring connection, 3-pole
F	Plug connector with spring connection, 13-pole
H	Mounting Instructions

## Identification



E82ZAFX005

	①	②	③
	E82ZAF	I	C
		010	4A
			20

Product series

INTERBUS

Version

Variant: PT (plug terminal) with spring connection

Hardware version

Software version

## 4 Technical data

### General Data

#### General Data

Area	Values
Order designation	E82TAFIC010
Communication medium	RS485
Network topology	Ring (go and return line in the same cable)
Number of bus nodes	Dependent on INTERBUS master (e.g. Phoenix Contact G4 master). For the following data, which depend on whether PCP communication is used or not, always the smaller value applies: <ul style="list-style-type: none"><li>• with PCP communication: max. 62 or</li><li>• without PCP communication: max. 256/number of PCDs</li></ul>
Distance between two bus nodes	Max. 400 m
INTERBUS identification (ID code)	<ul style="list-style-type: none"><li>• With 1 word PCP: 227 (0xE3)</li><li>• Without PCP: 3 (0x03)</li></ul>
Drive profile	DRIVECOM profile "Drive technology 20"
INTERBUS node	Slave
Baud rate	500 kbps
Process data words (PCD), 16 bits	1 ... 4 words
Parameter data words (PCP), 16 bits	0 or 1 word
PDU length	Max. 64 bytes
Supported PCP services	<ul style="list-style-type: none"><li>• Initiate</li><li>• Abort</li><li>• Status</li><li>• Identify</li><li>• Get-0V-long</li><li>• Read</li><li>• Write</li></ul>
Communication time	<ul style="list-style-type: none"><li>• Sum of the cycle time and the processing time in the bus nodes. The times are independent of each other.</li><li>• Processing time in the standard device<ul style="list-style-type: none"><li>– Parameter data (PCP): approx. 30 ms + 20 ms tolerance</li><li>– Process data (PCD): approx. 3 ms + 2 ms tolerance</li></ul></li></ul>

## Operating conditions

### Ambient conditions

#### Climate

Storage	IEC/EN 60721-3-1	1K3 (-25 to +60 °C)
Transport	IEC/EN 60721-3-2	2K3 (-25 to +70 °C)
Operation	Corresponding to the data of the Lenze standard device used (see documentation of the standard device).	
Pollution	EN 61800-5-1	Degree of pollution 2
Degree of protection	IP20 (protection against accidental contact according to NEMA 250 type 1)	

## Protective insulation

Insulation between incoming bus and ...	Type of insulation (to EN 61800-5-1)
<ul style="list-style-type: none"> <li>● 8200 vector/motec power section</li> </ul>	Reinforced insulation
<ul style="list-style-type: none"> <li>● Reference earth / PE</li> </ul>	Functional insulation
<ul style="list-style-type: none"> <li>● Terminal X3.1/59</li> </ul>	Functional insulation
<ul style="list-style-type: none"> <li>● Terminal X3.3/20</li> </ul>	Functional insulation
<ul style="list-style-type: none"> <li>● Terminal X3.3/28</li> </ul>	Functional insulation

Insulation between incoming bus and ...	Type of insulation (to EN 61800-5-1)
Outgoing bus	Functional insulation

Insulation between outgoing bus and ...	Type of insulation (to EN 61800-5-1)
<ul style="list-style-type: none"> <li>● 8200 vector/motec power section</li> </ul>	Reinforced insulation
<ul style="list-style-type: none"> <li>● Reference earth / PE</li> </ul>	Functional insulation
<ul style="list-style-type: none"> <li>● Terminal X3.1/59</li> </ul>	No electrical isolation
<ul style="list-style-type: none"> <li>● Terminal X3.3/20</li> </ul>	No electrical isolation
<ul style="list-style-type: none"> <li>● Terminal X3.3/28</li> </ul>	Functional insulation

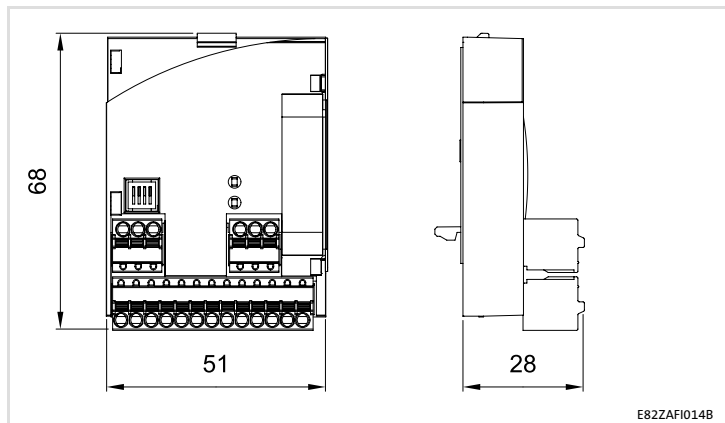
## 4 Technical data

### Connection terminals

#### Connection terminals

Terminal X3.1/	Designation	Function / level
59		External voltage supply of the function module <ul style="list-style-type: none"><li>U = 24 V DC (21.6 V - 0% ... 26.4 V + 0 %)</li><li>Current consumption for 24 V DC: I = 90 mA</li></ul> If the supply voltage is looped through to other bus nodes via terminal 59, the current flowing must not exceed 3 A.
7	GND1	Reference potential for terminal X3.3/20
Terminal X3.2/	Designation	Function / level
7	GND1	Reference potential for terminal X3.3/20
39	GND2	Reference potential for controller inhibit (CINH) on terminal X3.3/28
Terminal X3.3/	Designation	Function / level
A	/DO1	RS485 data line (incoming)
B	DO1	
C	/DI1	
D	DI1	
E	GND3	Reference potential for incoming data line
F	/DO2	RS485 data line (outgoing)
G	DO2	
H	/DI2	
J	DI2	
K	GND1	Reference potential for outgoing data line
⊕		Additional HF shield termination
28	CINH	Controller inhibit <ul style="list-style-type: none"><li>Input resistance: 3.3 k<math>\Omega</math></li><li>Start = HIGH (+12 ... +30 V DC)</li><li>Stop = LOW (0 ... +3 V DC)</li></ul>
20		DC voltage source for internal supply of controller inhibit (CINH) <ul style="list-style-type: none"><li>+20 V DC (reference: GND1)</li><li>I<sub>max</sub> = 10 mA</li></ul>

## Dimensions



All dimensions in mm

## 5 Mechanical installation

Follow the notes given in the Mounting Instructions for the standard device for the mechanical installation of the function module.

The Mounting Instructions for the standard device ...

- ▶ are part of the scope of supply and are enclosed with each device.
- ▶ provide tips for avoiding damage through improper handling.
- ▶ describe the obligatory order of installation steps.

## Use of plug connectors

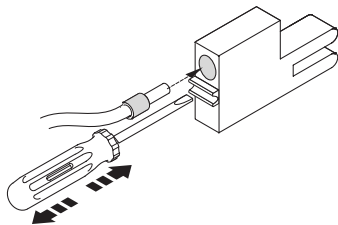


### Stop!

Observe the following to prevent any damage to plug connectors and contacts:

- ▶ Only pug in / unplug the plug connectors when the controller is disconnected from the mains.
- ▶ Wire the plug connectors before plugging them in.
- ▶ Unused plug connectors must also be plugged in.

## Use of plug connectors with spring connection



E82ZAFX013



## 6 Electrical installation

### Wiring according to EMC

#### Wiring according to EMC

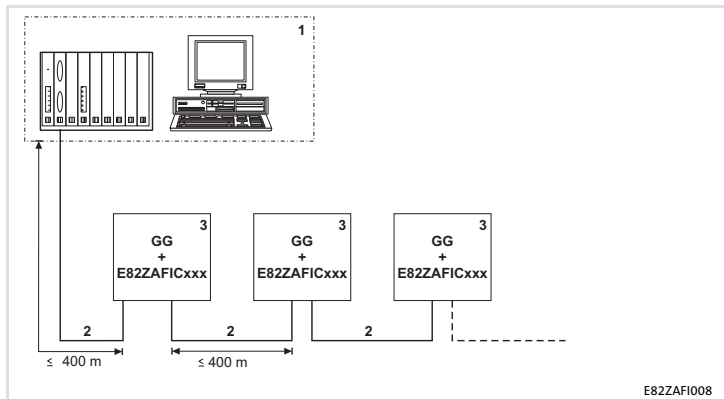
For wiring according to EMC requirements observe the following points:

- ▶ Use an equalizing conductor with a cross-section of at least 16 mm<sup>2</sup> (reference: PE) to avoid potential differences between the bus nodes.
- ▶ Separate control/data cables from motor cables.
- ▶ Connect the shields of control/data cables *at both ends*.
- ▶ Observe the other notes concerning EMC-compliant wiring given in the documentation for the standard device.

#### Wiring procedure

1. Observe the bus topology, do not use any stubs.
2. Follow the wiring notes given in the documentation for the control system.
3. Only use cables which comply with the specifications listed (📖 54).
4. Observe the notes concerning the voltage supply of the function module (📖 55).

## Wiring to a host



No.	Element	Description
1	Master computer	E.g. PC or PLC with INTERBUS master interface module
2	Bus cable	Connects the INTERBUS master interface module to the function modules.
3	INTERBUS slave	Applicable standard device (GG, 43) with function module. <ul style="list-style-type: none"> <li>● Set DIP switch S1 (64):               <ul style="list-style-type: none"> <li>– Setting for the last node = OFF</li> <li>– Setting for all other nodes = ON</li> </ul> </li> </ul>

## 6 Electrical installation

### Wiring to a host

#### Specification of the transmission cable

Specified characteristic	Data
Number of conductors	3 x 2 (twisted in pairs, with common shielding)
Conductor cross-section	Min. 0.2 mm <sup>2</sup>
Specific resistance	Max. 9.6 Ω / 100 m
Characteristic impedance	120 Ω ± 20 % for f = 0.064 MHz 100 Ω ± 15 Ω for f > 1 MHz
Electric strength <ul style="list-style-type: none"><li>● Conductor / conductor</li><li>● Conductor / shield</li></ul>	1000 V <sub>eff</sub> , 1 min
Insulation resistance (according to electric strength test)	Min. 150 MΩ / km
Coupling resistance for f = 30 MHz	Max. 250 mΩ / m
Effective capacitance for 800 Hz	Max. 60 nF / km

## Voltage supply

### Internal DC voltage supply

The internal voltage ...

- ▶ supplies the controller inhibit (CINH).
- ▶ is available at terminal X3.3/20.

### External voltage supply



#### Note!

Always use a separate power supply unit in every control cabinet and safely separate it according to EN 61800-5-1 ("SELV"/"PELV") in case of external voltage supply and larger distances between the control cabinets.

External voltage supply of the communication module is required if communication via the fieldbus is to be maintained even when the power supply of the standard device fails.



#### Note!

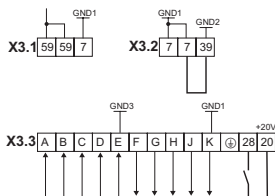
With external voltage supply of the function module, the active bus terminating resistor is fed independently of the operation of the standard device. In this way, the bus system remains active even when the standard device is switched off or fails.

## 6 Electrical installation

### Voltage supply

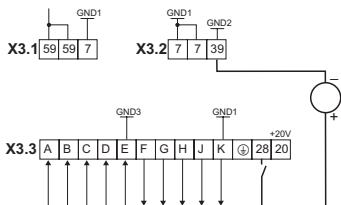
#### Supply of controller inhibit (CINH)

##### Supply via internal voltage source (X3.3/20)



E82ZAFI011

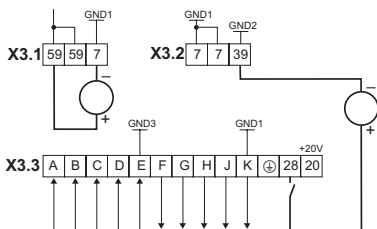
##### Supply via external voltage source



E82ZAFI012

Minimum wiring required for operation

##### Supply of function module and controller inhibit (CINH) via external voltage source



E82ZAFI013

Minimum wiring required for operation





### Terminal assignment

Terminal X3.1/	Designation	Function / level
59		External voltage supply of the function module <ul style="list-style-type: none"> <li>● U = 24 V DC (21.6 V - 0% ... 26.4 V + 0 %)</li> <li>● Current consumption for 24 V DC: I = 90 mA</li> </ul> If the supply voltage is looped through to other bus nodes via terminal 59, the current flowing must not exceed 3 A.
7	GND1	Reference potential for terminal X3.3/20
Terminal X3.2/	Designation	Function / level
7	GND1	Reference potential for terminal X3.3/20
39	GND2	Reference potential for controller inhibit (CINH) on terminal X3.3/28
Terminal X3.3/	Designation	Function / level
A	/DO1	RS485 data line (incoming)
B	DO1	
C	/DI1	
D	DI1	
E	GND3	Reference potential for incoming data line
F	/DO2	RS485 data line (outgoing)
G	DO2	
H	/DI2	
J	DI2	
K	GND1	Reference potential for outgoing data line
⊕		Additional HF shield termination
28	CINH	Controller inhibit <ul style="list-style-type: none"> <li>● Input resistance: 3.3 kΩ</li> <li>● Start = HIGH (+12 ... +30 V DC)</li> <li>● Stop = LOW (0 ... +3 V DC)</li> </ul>
20		DC voltage source for internal supply of controller inhibit (CINH) <ul style="list-style-type: none"> <li>● +20 V DC (reference: GND1)</li> <li>● I<sub>max</sub> = 10 mA</li> </ul>

## 6 Electrical installation

### Cable cross-sections and screw-tightening torques

#### Cable cross-sections and screw-tightening torques

Area	Values	
Electrical connection	Plug connector with spring connection	
Possible connections	rigid:	
		1.5 mm <sup>2</sup> (AWG 16)
	flexible:	
		without wire end ferrule 1.5 mm <sup>2</sup> (AWG 16)
		with wire end ferrule, without plastic sleeve 1.5 mm <sup>2</sup> (AWG 16)
	with wire end ferrule, with plastic sleeve 0.5 mm <sup>2</sup> (AWG 20)	
Stripping length	9 mm	

## Before switching on



### Stop!

Before you switch on the standard device and the plugged-in function module for the first time, check ...

- ▶ the entire wiring for completeness, short circuit and earth fault.
- ▶ the setting of the DIP switch S1 (📖 64):
  - Setting for the last node = OFF
  - Setting for all other nodes = ON



## 7 Commissioning

### Commissioning steps

### Commissioning steps



#### Note!

Do not change the setting sequence.

Step-by-step commissioning of the function module with DRIVECOM device control is described below.

Step	Procedure	Detailed information
1.	Configure the control system (master) for communication via the function module.	62
2.	Inhibit the standard device via terminal 28 (CINH). <ul style="list-style-type: none"><li>● Apply LOW level to terminal 28.</li><li>● Later on, the standard device can be inhibited and enabled via the bus system.</li></ul>	Documentation for the standard device
3.	Set DIP switch S1: <ul style="list-style-type: none"><li>● Setting for the last node = OFF</li><li>● Setting for all other nodes = ON</li></ul>	64
4.	Define user data length via ... <ul style="list-style-type: none"><li>● DIP switches S2 ... S4 or</li><li>● code C1515</li></ul>	63
5.	Connect the mains voltage and, if available, the separate voltage supply for the function module. <ul style="list-style-type: none"><li>● The standard device is ready for operation after approx. 1 second.</li><li>● The controller inhibit (CINH) is active.</li></ul>	65
	<b>Reaction</b> <ul style="list-style-type: none"><li>● The green LED "Status of connection to standard device" at the front of the function module is lit (only visible with 8200 vector).</li><li>● Keypad: <b>RDY</b>   <b>IMP</b> (if attached)</li></ul>	66
6.	It is now possible to communicate with the standard device, i.e. all codes can be read and all writable codes can be adapted to the application.	Documentation for the standard device
	<b>Reaction</b> <p>The yellow LED on the function module is blinking when the INTERBUS is active.</p>	66
7.	If PCP communication is used, carry out the PCP service "initiate". <ul style="list-style-type: none"><li>● It is now possible to access the parameters of the standard device with the PCP services "read" and "write".</li></ul>	

Step	Procedure	Detailed information
8.	<p>Select the function module as the source for control commands and setpoints.</p> <ul style="list-style-type: none"> <li>● Set C0005 = 200.                             <ul style="list-style-type: none"> <li>– A preconfiguration for operation with the function module is carried out.</li> <li>– This preconfiguration already links the control words and status words.</li> </ul> </li> </ul>	
9.	<p>Use C1511 to assign the process data output words (POW) of the master to the process data input words of the standard device.</p> <p><b>Lenze setting:</b></p> <p>POW1: DRIVECOM control word (DRIVECOM CTRL)                      POW2: Setpoint1 (NSET1-N1)                      POW3: Setpoint2 (NSET1-N2)                      POW4: Additional setpoint (PCTRL1-NADD)</p>	Communication Manual INTERBUS
10.	<p>Use C1510 to assign the process data output words of the standard device to the process data input words (PIW) of the master.</p> <p><b>Lenze setting:</b></p> <p>POW1: DRIVECOM status word (DRIVECOM STAT)                      PIW2: Output frequency with slip (MCTRL1-NOUT+SLIP)                      PIW3: Output frequency without slip (MCTRL1-NOUT)                      PIW4: Apparent motor current (MCTRL1-IMOT)</p>	Communication Manual INTERBUS
11.	<p>Enable process output data with C1512 = 65535.</p> <p><b>Only required when C1511 has been changed.</b></p>	
12.	<p>Enable the standard device via terminal 28 (CINH).</p> <ul style="list-style-type: none"> <li>● Apply HIGH level to terminal 28.</li> </ul>	
13.	<p>Select setpoint.</p> <ul style="list-style-type: none"> <li>● The master transmits the setpoint via the selected process data output word.</li> </ul>	
14.	<p>Change to the READY TO START state:</p> <ul style="list-style-type: none"> <li>● The master transmits the DRIVECOM control word: 0000 0000 0111 1110<sub>bin</sub> (007E<sub>hex</sub>).</li> </ul>	Communication Manual INTERBUS
15.	<p>The standard device has entered the READY TO START state.</p> <ul style="list-style-type: none"> <li>● The master receives the DRIVECOM status word: xxxx xxxx x01x 0001<sub>bin</sub>.</li> </ul>	
16.	<p>Change to the OPERATION ENABLED state.</p> <ul style="list-style-type: none"> <li>● The master transmits the DRIVECOM control word: 0000 0000 0111 1111<sub>bin</sub> (007F<sub>hex</sub>).</li> </ul>	
17.	<p>The drive starts up.</p>	

## 7 Commissioning

### Control system configuration

#### Control system configuration

For communication via the function module, first the control system must be configured.

#### Master settings

The configuration of the INTERBUS requires the device description file (EDS file) for the communication module to be imported to the master configuration software.

The EDS file can be downloaded from the "Services & Downloads" area at <http://www.Lenze.com> via a login.

## Defining the user data length

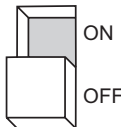
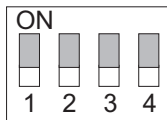
The number of process data words (PCD) and parameter data words (PCP) can be set via code C1515 or via the DIP switches S2 ... S4.



### Note!

- ▶ Sum of all data words (PCD + PCP): max. 4 words
- ▶ Switch off the voltage supply of the function module and the controller and then on again to activate the changed settings.

## Settings via DIP switches S2 ... S4



E82ZAFI009

- ▶ If one of the DIP switches S2 ... S4 = OFF, the configurations resulting from *all switch settings* are activated at power up.
- ▶ If the switch settings are invalid, the Lenze setting is activated:
  - DIP switches S2 ... S4 = OFF (2 PCD words + 1 PCP word)
- ▶ Code C1525 displays the current settings of the DIP switches S2 ... S4.

DIP switch			Value	Number of process data words (PCD)	Number of parameter data words (PCP)	ID code
S2	S3	S4				
OFF	OFF	OFF	0	2	1	227
ON	OFF	OFF	1	3	1	227
OFF	OFF	ON	4	2	0	3
ON	OFF	ON	5	4	0	3
ON	ON	ON	Code C1515 active.			

## Settings via code

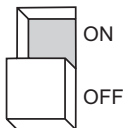
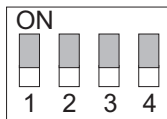
- ▶ DIP switches S2 ... S4 = ON
- ▶ Set the number of data words (PCD + PCP) via C1515.

## 7 Commissioning

### Setting for last bus node

#### Setting for last bus node

##### DIP switch 1



E82ZAFI009



#### Note!

- ▶ DIP switch 1 must only be set to OFF for the *last* physical node.
- ▶ Lenze setting: all switches OFF

Position	Notes
OFF	Standard device with function module is the last bus node
ON	Standard device with function module is <i>not</i> the last bus node.

## Connecting the mains voltage



### Note!

If the external voltage supply of the function module is used, switch it on as well.

- ▶ The standard device is ready for operation approx. 1s after switching on the supply voltage.
- ▶ The controller inhibit is active.
- ▶ The green LED at the front of the function module is lit.

## Protection against uncontrolled start-up



### Note!

#### Establishing communication

For establishing communication via an externally supplied function module, the standard device must be switched on as well.

- ▶ After communication has been established, the externally supplied module is independent of the power on/off state of the standard device.

#### Protection against uncontrolled start-up

After a fault (e.g. short-term mains failure), a restart of the drive is not always wanted and - in some cases - even not allowed.

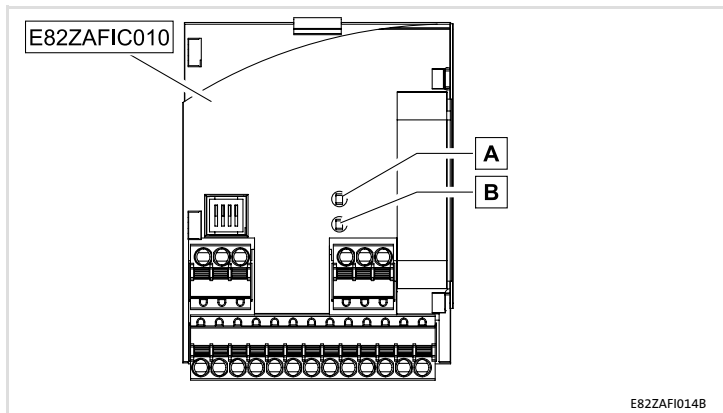
The restart behaviour of the controller can be set in C0142:

- ▶ C0142 = 0 (Lenze setting)
  - The controller remains inhibited (even if the fault is no longer active).
  - The drive starts in a controlled mode by explicitly enabling the controller: LOW-HIGH edge at terminal 28 (CINH)
- ▶ C0142 = 1
  - An uncontrolled restart of the drive is possible.

## 8 Diagnostics

### LED status displays

#### LED status displays



E82ZAFI014B

LED			Description
Pos.	Colour	Condition	
A	Yellow	Off	<ul style="list-style-type: none"> <li>No communication with the INTERBUS master.</li> <li>The function module is not supplied with voltage.</li> </ul>
		Blinking	Communication to the INTERBUS master via the function module is established.
		On	Internal error in the function module
B	Green	Off	<ul style="list-style-type: none"> <li>The function module is not supplied with voltage.</li> <li>The standard device and/or the external voltage supply is/are switched off.</li> </ul>
		Blinking	The function module is supplied with voltage but not connected to the standard device. Causes: <ul style="list-style-type: none"> <li>The standard device is switched off.</li> <li>The standard device is initialising.</li> <li>The standard device is not available.</li> </ul>
		On	The function module is supplied with voltage and connected to the standard device.