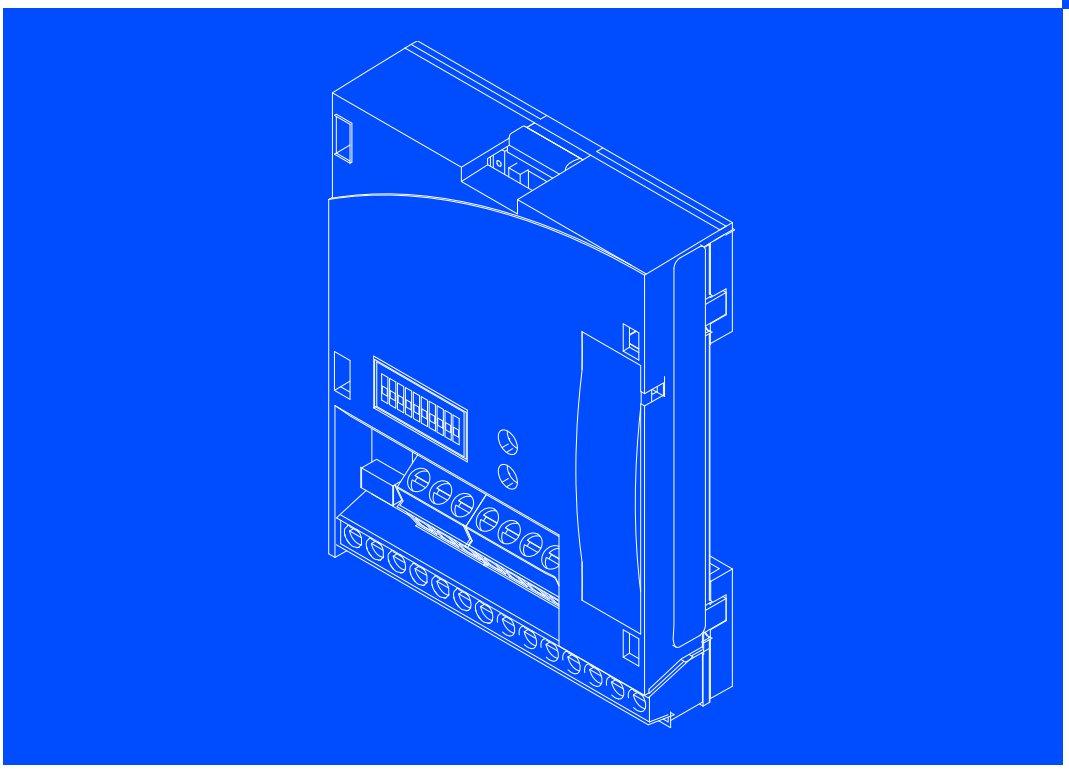
EDS82ZAFPC201
13403738

L-force Communication

Communication Manual

PROFIBUS I/O



E82ZAFPC201

Function module

Lenze

1 About this documentation

Contents

This documentation exclusively describes the function module E82ZAFPC201 (PROFIBUS I/O).

Note!

This documentation supplements the **mounting instructions** supplied with the function/communication module and the **documentation of the used standard device**.

The mounting instructions contain safety instructions which must be observed!

- The features and functions of the function module are described in detail.
- Typical applications are explained by means of examples.
- Moreover, this documentation contains the following:
  - Safety instructions which must be observed.
  - The essential technical data of the function module
  - Information on versions of the Lenze standard devices to be used
  - Notes on troubleshooting and fault elimination

The theoretical concepts are only explained to the level of detail required to understand the function of the function module.

Depending on the software version of the controller and the version of the »Engineer« software installed, the screenshots in this documentation may deviate from the »Engineer« representation.

This documentation does not describe any software provided by other manufacturers. No liability can be accepted for corresponding data provided in this documentation. For information on how to use the software, please refer to the host system (master) documents.

All brand names mentioned in this documentation are trademarks of their respective owners.

Validity information

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

Function module	Type designation	From hardware version	From software version
PROFIBUS I/O	E82ZAFPC201	1A	10

Target group

This documentation is intended for all persons who plan, install, commission and maintain the networking and remote service of a machine.

Tip!

Information and auxiliary devices related to the Lenze products can be found in the download area at

http://www.Lenze.com

1.1 Document history

Material no.	Version			Description
-	1.0	06/2004	TD06	First edition
-	2.0	03/2005	TD06	DP-V1 protocol
13323934	3.0	12/2009	TD17	General revision
13403738	4.0	03/2012	TD29	General revision

Your opinion is important to us!

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

If you have suggestions for improvement, please e-mail us to:

feedback-docu@Lenze.de

Thank you for your support.

Your Lenze documentation team

1.2 Conventions used

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

Type of information	Identification	Examples/notes
Spelling of numbers		
Decimal separator	Point	In general, the decimal point is used. For instance: 1234.56
Decimal	Standard notation	For example: 1234
Hexadecimal	0x[0 ... 9, A ... F]	For example: 0x60F4
Binary ● Nibble	In quotation marks Point	For example: '100' For example: '0110.0100'
Text		
Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)
Icons		
Page reference	🕮	Reference to another page with additional information For instance: 🕮 16 = see page 16

1.3 Terminology used

Term	Meaning
PROFIBUS	The term stands for the **PROFIBUS-DP** variant according to IEC 61158 / IEC 61784. A different PROFIBUS variant is not described in these Instructions.
Standard device	Lenze controllers/frequency inverters with which the communication module can be used. 🕮 11
Controller	
Frequency inverter	
Master	PROFIBUS station which takes over the master function in the fieldbus system.
Slave	PROFIBUS station representing a slave in the fieldbus system.
Code	"Container" for one or several parameters used for parameter setting or monitoring of the controller.
Subcode	If a code contains several parameters, they are stored under "subcodes". The documentation uses a slash "/" as a separator between code and subcode (e.g. "C00118/3").
POW	Process output data word
PIW	Process input data word

1.4 Notes used

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

Safety instructions

Structure of safety instructions:

Danger!

(characterises the type and severity of danger)

Note

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

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

Application notes

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

2 Safety instructions

Note!

It is absolutely vital that the stated safety measures are implemented in order to prevent serious injury to persons and damage to material assets.

Always keep this documentation to hand in the vicinity of the product during operation.

2.1 General safety information

Danger!

Disregarding the following basic safety measures may lead to severe personal injury and damage to material assets!

- Lenze drive and automation components ...
  ... must only be used for the intended purpose.
  ... must never be operated if damaged.
  ... must never be subjected to technical modifications.
  ... must never be operated unless completely assembled.
  ... must never be operated without the covers/guards.
  ... can - depending on their degree of protection - have live, movable or rotating parts during or after operation. Surfaces can be hot.
- All specifications of the corresponding enclosed documentation must be observed.
  This is vital for a safe and trouble-free operation and for achieving the specified product features.
  The procedural notes and circuit details provided in this document are proposals which the user must check for suitability for his application. The manufacturer does not accept any liability for the suitability of the specified procedures and circuit proposals.
- Only qualified skilled personnel are permitted to work with or on Lenze drive and automation components.
  According to IEC 60364 or CENELEC HD 384, these are persons ...
  ... who are familiar with the installation, assembly, commissioning and operation of the product,
  ... possess the appropriate qualifications for their work,
  ... and are acquainted with and can apply all the accident prevent regulations, directives and laws applicable at the place of use.

2.2 Device- and application-specific safety instructions

- During operation, the function module must be firmly connected to the standard device.
- With external voltage supply, always use a separate power supply unit, safely separated to EN 61800-5-1 (”SELV”/”PELV”), in every control cabinet.
- Only use cables corresponding to the given specifications (📖 22).

Documentation for the standard device, control system, system/machine

All other measures prescribed in this documentation must also be implemented. Observe the safety instructions and application notes stated in the documentation.

2.3 Residual hazards

Protection of persons

- If the controllers are used on a phase earthed mains with a rated mains voltage ≥ 400 V, protection against accidental contact is not ensured without implementing external measures. (See chapter ”4.3”, 📖 15)

Device protection

- The module contains electronic components that can be damaged or destroyed by electrostatic discharge.

3 Product description

3.1 Application as directed

The function module ...

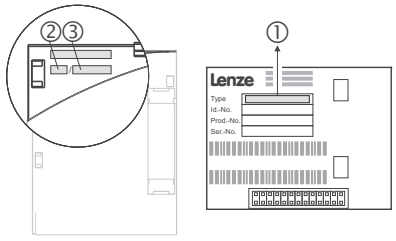
► is an accessory module for use in conjunction with the following Lenze standard devices:

Product range	Device designation	From hardware version
Frequency inverter	8200 vector	Vx14
	8200 motec	Vx14
Motor starter	starttec	Vx1x

► is a device intended for use in industrial power systems.

Any other use shall be deemed inappropriate!

3.2 Identification



E82ZAFX005

	①			②	③	
	E82ZAF	P	C	201	1A	10
Product range						
PROFIBUS						
Version						
Variant: V201 (PROFIBUS I/O)						
Hardware version						
Software version						

3.3 Product features

- Interface module for the PROFIBUS communication system which can be connected to the AIF slots of the Lenze 8200 vector and 8200 motec device series
- Support of communication profiles PROFIBUS-DP-V0 and PROFIBUS-DP-V1
- Drive profiles:
  - DRIVECOM profile ”Drive technology 20” (can be switched off)
  - PROFIdrive (can be switched off, state machine and PROFIdrive parameter data channel)
- Support of I&M0 functionality for standard device identification
- Automatic detection of the baud rate (9.6 kbps ... 12 Mbps)
- Control of Lenze 8200 vector and 8200 motec device series via digital control signals
- External 24V supply for maintaining the PROFIBUS network when the standard device fails
- Access to all Lenze parameters
- DIP switches for ...
  - setting the bus device address
  - setting compatibility with the Lenze PROFIBUS function modules E82ZAFPC0xx
  - activating the bus terminating resistor
- LED status displays:
  - Voltage supply of the communication module
  - Connection between communication module and PROFIBUS network
  - Connection between communication module and standard device

3.4 Connections and interfaces

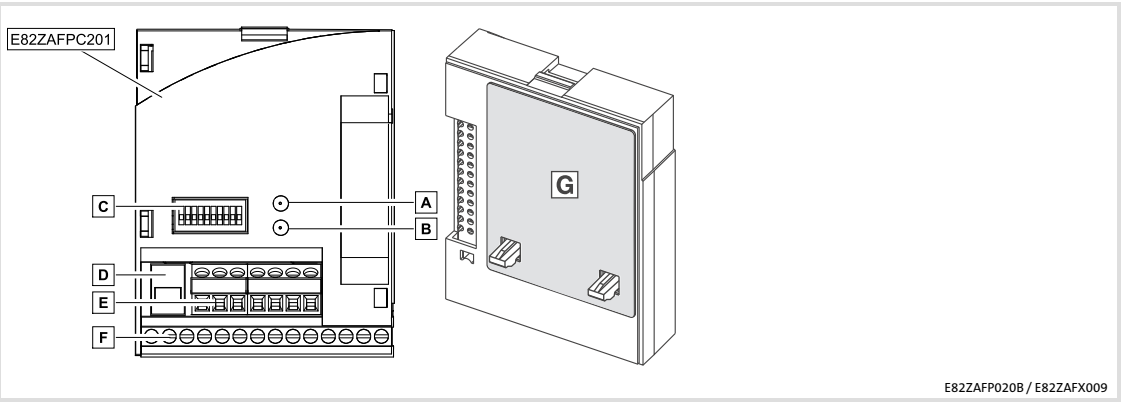


Fig. 3-1 Communication module E82ZAFPC201 (PROFIBUS I/O)

Pos.	Description	Detailed information
A	Status of PROFIBUS communication (yellow LED)	85
B	Connection status to standard device (green LED)	
C	DIP switches for setting ... • compatibility with the PROFIBUS function modules E82ZAFPC0xx • the bus device address	 32 33
D	DIP switch for activating the bus terminating resistor	33
E	Terminal strip X3.1, connections for ... • digital inputs E1 and E2 • external voltage supply	15
F	Terminal strip X3.2, connections for ... • PROFIBUS • controller inhibit (CINH) • external voltage supply	16
G	Nameplate	11

4 Technical data

4.1 General data

Area	Values
Order designation	E82ZAFPC201
PUO ID number	$0x081B_{hex}$
Communication profile (DIN 19245 Part 1 and Part 3)	• PROFIBUS-DP-V0 • PROFIBUS-DP-V1
Communication medium	RS485
Drive profile	• DRIVECOM profile "Drive technology 20" (can be switched off) • PROFIdrive (can be switched off, state machine and PROFIdrive parameter data channel)
Network topology	• Without repeaters: line • With repeaters: line or tree
PROFIBUS bus device	Slave
Baud rate [kbps]	9.6 ... 12000 (automatic detection)
Process data words	1 ... 10 words (16 bits/word)
DP user data length	1 ... 10 process data words + 4 parameter data words
Max. number of bus devices	• Standard: 32 (= 1 bus segment) • With repeaters: 125
Max. cable length per bus segment	1200 m (depending on the baud rate and cable type used)
External DC voltage supply	+24 V DC ±10 %, max. 100 mA

4.2 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)	

4.3 Protective insulation

Danger!

Dangerous electrical voltage

If Lenze controllers are used on a phase earthed mains with a rated mains voltage ≥ 400 V, protection against accidental contact is not ensured without implementing external measures.

Possible consequences:

► Death or serious injury

Protective measures:

► If protection against accidental contact is required for the control terminals of the controller and the connections of the plugged device modules, ...
  – a double isolating distance must exist.
  – the components to be connected must be provided with the second isolating distance.

Protective insulation between bus and ...	**Insulation type** (acc. to EN 61800-5-1)
● Power section	
– 8200 vector	Reinforced insulation
– 8200 motec	Reinforced insulation
– starttec	Reinforced insulation
● Reference earth / PE (X3.1/7, X3.2/7)	Functional insulation
● External supply (X3.1/59, X3.2/59)	Functional insulation
● Terminal X3.1/E1, X3.1/E2	Functional insulation
● Terminal X3.1/20, X3.2/20	Functional insulation
● Terminal X3.2/28	Functional insulation

4.4 Connection terminals

Terminal X3.1/	**Designation**	**Function / level**
E1	Digital inputs *)	Adapt the individual setting via C0007 or C0410. ● Input resistance: 3.3 kΩ ● 0 = LOW (0 ... +3 V DC) PLC level, HTL ● 1 = HIGH (+12 ... +30 V DC) PLC level, HTL (reference: GND2)
E2		
20		DC voltage source for the internal supply of the digital inputs E1 and E2 ● +20 V DC (reference: GND1) ● I_{max} = 20 mA
39	GND2	Reference potential of the ● digital inputs at X3.1/E1 and X3.1/E2 ● controller inhibit (CINH) at X3.2/28
59		External DC voltage supply for the function module ● +24 V DC ± 10% (reference: GND1) ● Current consumption on 24 V DC: 80 mA The current for looping through the supply voltage to other nodes via terminal 59 must be max. 3 A.
7	GND1	Reference potential for X3.1/20 and X3.2/20

*) Alternatively frequency input 0 ... 10 kHz (one-track) or 0 ... 1 kHz (two-track) configuration via C0425

Terminal X3.2/	Designation	Function / level
⏚	PES	Additional HF shield termination
A	T/R(A)	RS485 data line A
B	T/R(B)	RS485 data cable B
CN	CNTR	For function see PROFIBUS standard *) ● Level during data transmission: CNTR = HIGH (+5 V DC, reference: GND3)
VP		For function see PROFIBUS standard *) ● U = +5 V DC (reference: GND3) ● I_{max} = 10 mA
40	GND3	Reference potential for PROFIBUS network *)
7	GND1	Reference potential for X3.1/20 and X3.2/20
39	GND2	Reference potential of the ● digital inputs at X3.1/E1 and X3.1/E2 ● controller inhibit (CINH) at X3.2/28
28	CINH	Controller inhibit ● Start = HIGH (+12 ... +30 V DC) ● Stop = LOW (0 ... +3 V DC) (reference: GND2)
20		DC voltage source for internal supply of controller inhibit (CINH) ● +20 V DC (reference: GND1) ● I_{max} = 20 mA
59		External DC voltage supply for the function module ● +24 V DC ± 10% (reference: GND1) ● Current consumption on 24 V DC: 80 mA The current for looping through the supply voltage to other nodes via terminal 59 must be max. 3 A.

*) E.g. for repeater connection

4.5 Communication time

The communication time is the time between the start of a request and the arrival of the corresponding response.

The communication times depend on ...

► the processing time in the controller

► the transmission delay time
  – the baud rate
  – the telegram length

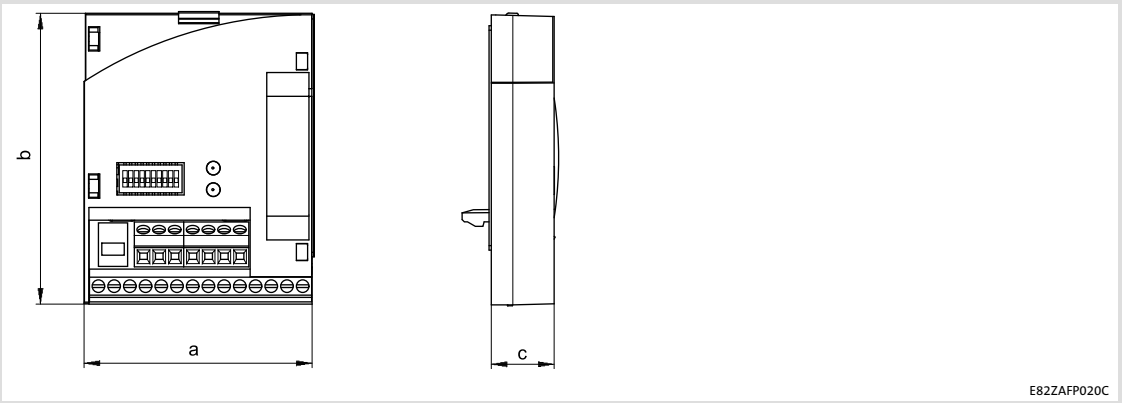
Processing time 8200 vector / 8200 motec / starttec

There are no interdependencies between parameter data and process data.

► Parameter data: approx. 30 ms + 20 ms tolerance

► Process data: approx. 3 ms + 2 ms tolerance

4.6 Dimensions



a	51 mm
b	64 mm
c	15 mm

5 Installation

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!

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

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

5.1 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 to avoid damage provide tips to avoid damage through improper handling.
- describe the obligatory order of installation steps.

5.2 Electrical installation

5.2.1 Wiring according to EMC (CE-typical drive system)

For wiring according to EMC requirements observe the following points:

Note!

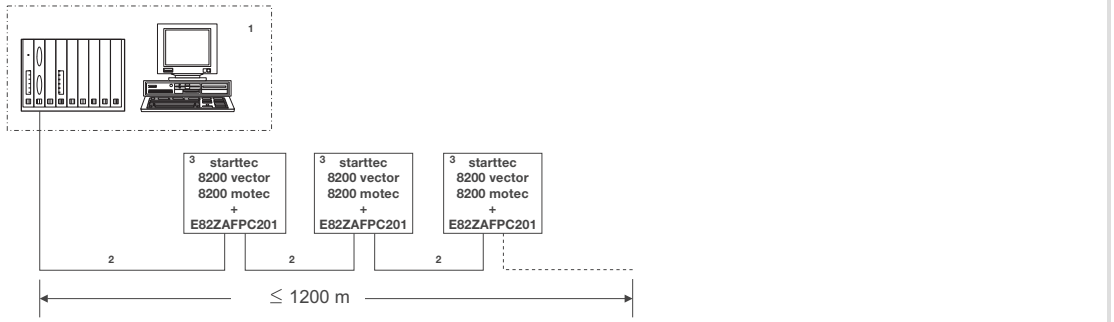
- ► Separate control cables/data lines from motor cables.
- ► Connect the shields of control cables/data lines *at both ends* in the case of digital signals.
- ► Use an equalizing conductor with a cross-section of at least 16 mm^2 (reference: PE) to avoid potential differences between the bus nodes.
- ► 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. Observe the notes and wiring instructions given in the documents for the control system.
3. Only use cables corresponding to the listed specifications (📖 22).
4. Observe the notes for the voltage supply of the module (📖 23).
5. Activate the bus terminating resistors on the first and last physical bus device (📖 33).

5.2.2 Wiring with a host (master)

Basic design of a PROFIBUS network with RS485 cabling without repeater

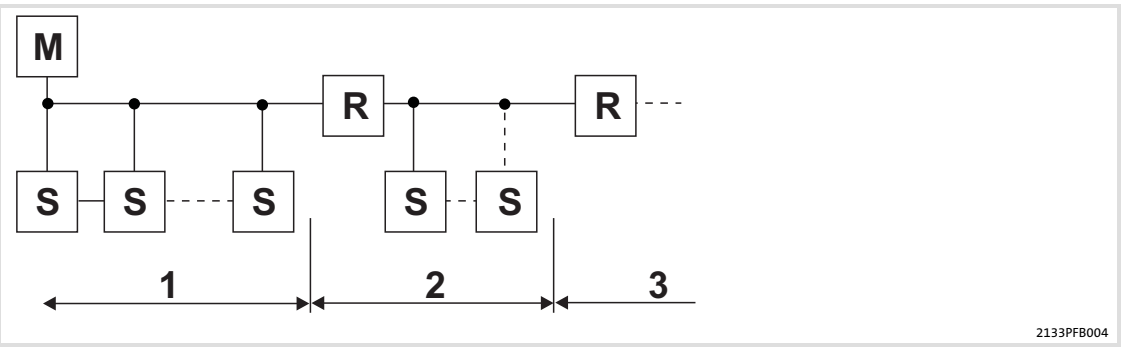


No.	Element	Note
1	Host	E.g. PC or PLC with PROFIBUS master interface module
2	Bus cable	Connects the PROFIBUS master interface module to the function modules. ● The baud rate depends on the length of the bus cable (📖 22).
3	PROFIBUS slave	Applicable standard device (📖 11)with function module ● Activate bus terminating resistors at the first and last physical node (📖 33).

Note!

When using a repeater, max. 125 nodes can communicate via the PROFIBUS.

Number of bus devices



Segment	Master (M)	Slave (S)	Repeater (R)
1	1 2	31 30	- -
2	-	30	1
3	-	30	1

Tip!

Repeaters do not have a device address. When calculating the maximum number of bus devices, they reduce the number of devices by 1 on each side of the segment.

Repeaters can be used to build up line and tree topologies. The maximum total bus system expansion depends on ...

- ► the baud rate used;
- ► the number of repeaters used.

Specification of the transmission cable

Note!

Only use cables complying with the listed specifications of the PROFIBUS user organisation.

Field	Values
Specific resistance	135 ... 165 Ω/km, (f = 3 ... 20 MHz)
Capacitance per unit length	≤ 30 nF/km
Loop resistance	< 110 Ω/km
Core diameter	> 0.64 mm
Core cross-section	> 0.34 mm^2
Cores	Twisted double, insulated and shielded

Bus cable length

The length of the bus cable depends on the baud rate used:

Baud rate [kbps]	Length [m]
9.6 ... 93.75	1200
187.5	1000
500	400
1500	200
3000 ... 12000	100

Note!

The baud rate depending on the data volume, cycle time, and number of nodes should only be selected as high as required for the application.

Tip!

For high baud rates we recommend to consider the use of optical fibres.

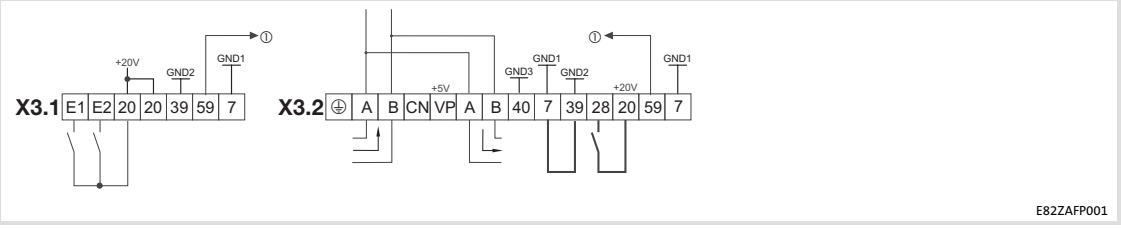
Advantages of optical fibres:

- On the transmission path external electromagnetic interference remains ineffective.
- Bus lengths of several kilometres are also possible with higher baud rates. The bus length
  – is irrespective of the baud rate.
  – depends on the optical fibre used.

5.2.3 Voltage supply

Internal DC voltage supply

The internal voltage is available at terminal X3.1/20 or X3.2/20. It supplies the controller inhibit (CINH) and the digital inputs E1/E2.



Minimum wiring required for operation

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 the case of external voltage supply and larger distances between the control cabinets.

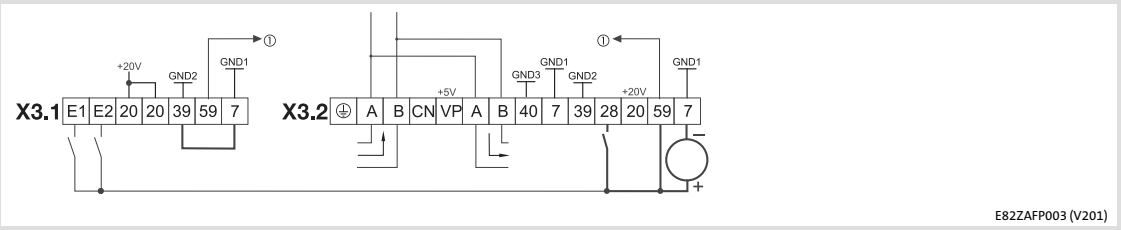
External voltage supply of the communication module is required if communication via the fieldbus is to be maintained even when the power supply of the standard device fails.

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.

External voltage supply via **one** voltage source:

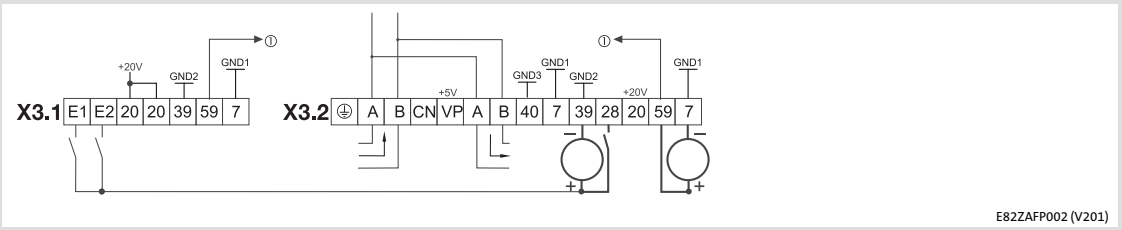
- X3.1/E1 and X3.1/E2 (digital inputs)
- X3.2/28 (controller inhibit (CINH))
- X3.2/59 (function module)



Minimum wiring required for operation

External voltage supply via **two** voltage sources:

- X3.1/E1 and X3.1/E2 (digital inputs) and X3.2/28 (controller inhibit (CINH))
- X3.2/59 (function module)



Minimum wiring required for operation

5.2.4 Terminal assignment

Terminal X3.1/	Designation	Function / level
E1	Digital inputs *)	Adapt the individual setting via C0007 or C0410. ● Input resistance: 3.3 kΩ ● 0 = LOW (0 ... +3 V DC) PLC level, HTL ● 1 = HIGH (+12 ... +30 V DC) PLC level, HTL (reference: GND2)
E2		
20		DC voltage source for the internal supply of the digital inputs E1 and E2 ● +20 V DC (reference: GND1) ● I_{max} = 20 mA
39	GND2	Reference potential of the ● digital inputs at X3.1/E1 and X3.1/E2 ● controller inhibit (CINH) at X3.2/28
59		External DC voltage supply for the function module ● +24 V DC ± 10% (reference: GND1) ● Current consumption on 24 V DC: 80 mA The current for looping through the supply voltage to other nodes via terminal 59 must be max. 3 A.
7	GND1	Reference potential for X3.1/20 and X3.2/20

*) Alternatively frequency input 0 ... 10 kHz (one-track) or 0 ... 1 kHz (two-track) configuration via C0425

Terminal X3.2/	Designation	Function / level
⏚	PES	Additional HF shield termination
A	T/R(A)	RS485 data line A
B	T/R(B)	RS485 data cable B
CN	CNTR	For function see PROFIBUS standard *) ● Level during data transmission: CNTR = HIGH (+5 V DC, reference: GND3)
VP		For function see PROFIBUS standard *) ● U = +5 V DC (reference: GND3) ● I_{max} = 10 mA
40	GND3	Reference potential for PROFIBUS network *)
7	GND1	Reference potential for X3.1/20 and X3.2/20
39	GND2	Reference potential of the ● digital inputs at X3.1/E1 and X3.1/E2 ● controller inhibit (CINH) at X3.2/28
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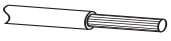
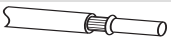
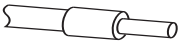
*) E.g. for repeater connection

5.2.5 Cable cross-sections and screw-tightening torques

Range	Values	
Electrical connection	Terminal strip with screw connection	
Possible connections	rigid:	
		1.5 mm² (AWG 16)
	flexible:	
		without wire end ferrule 1.0 mm² (AWG 18)
		with wire end ferrule, without plastic sleeve 0.5 mm² (AWG 20)
		with wire end ferrule, with plastic sleeve 0.5 mm² (AWG 20)
Tightening torque	0.22 ... 0.25 Nm (1.9 ... 2.2 lb-in)	
Bare end	5 mm	

6 Commissioning

During commissioning, system-dependent data as e.g. motor parameters, operating parameters, responses and parameters for fieldbus communication are selected for the controller.

In Lenze devices, this is done via codes. The codes are stored in numerically ascending order in the Lenze controllers and in the plugged-in communication/function modules.

In addition to these configuration codes, there are codes for diagnosing and monitoring the bus devices.

6.1 Before switching on

Stop!

Before switching on the standard device with the function module for the first time, check...

- ► the entire wiring for completeness, short circuit, and earth fault.
- ► whether the integrated bus terminating resistor is activated at the first and last physical node (📖 33).

6.2 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	Description	Detailed information
1.	Configure the host system (master) for communication via the function module.	📖 29
2.	Inhibit the standard device via terminal 28 (CINH). ● Set terminal 28 to LOW level. ● Later on the standard device can be inhibited and enabled via the bus system.	Documentation for the standard device
3.	Connect the mains voltage and, if available, the separate voltage supply for the function module. ● After approx. 1 second the standard device will be ready for operation. ● Controller inhibit (CINH) is active. **Reaction** ● The green LED "Connection status to standard device" at the front of the function module is lit (only visible with 8200 vector). ● Keypad: RDY IMP (if attached)	📖 35 📖 85
4.	Provide software compatibility with the function module. ● DIP switch S8 = OFF	📖 32
5.	Activate the bus terminating resistor of the first and last bus device through DIP switch = ON. ● Lenze setting: OFF	📖 33
6.	A Set the bus device address via ... – C1509 or – DIP switches S1 ... S7. **If the setting via code applies (DIP switches S1 ... S7 = OFF), then the address must be reassigned after a parameter set transfer.** B Switch off the voltage supply of the function module and the standard device, and then switch it on again to accept the changed settings. **Address modifications via keypad become effective immediately.**	📖 33
7.	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. **Reaction** The yellow LED on the function module is blinking when the PROFIBUS is active.	Documentation for the standard device 📖 85
8.	Select the function module as the source for control commands and setpoints. ● Set C0005 = 200. – A preconfiguration for operation with the function module is carried out. – Control words and status words are already linked.	

Step	Description	Detailed information
9.	Use C1511 to assign the process data output words (POW) of the master to the process data input words of the standard device. **Lenze setting:** POW1: DRIVECOM control word (DRIVECOM-CTRL) POW2: Setpoint1 (NSET1-N1) POW3: Setpoint2 (NSET1-N2) POW4: Additional setpoint (PCTRL1-NADD) POW5: Actual process controller value (PCTRL1-ACT) POW6: Process controller setpoint (PCTRL1-SET1) POW7: Reserved (FIF-RESERVED) POW8: Torque setpoint or torque limit value (MCTRL1-MSET) POW9: PWM voltage (MCTRL1-VOLT-ADD) POW10: PWM angle (MCTRL1-PHI-ADD)	
10.	Use C1510 to assign the process data output words of the standard device to the process data input words (PIW) of the master. **Lenze setting:** PIW1: 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) PIW5: Actual process controller value (PCTRL1-ACT) PIW6: Process controller setpoint (PCTRL1-SET1) PIW7: Process controller output (PCTRL1-OUT) PIW8: Controller load (MCTRL1-MOUT) PIW9: DC-bus voltage (MCTRL1-DCVOLT) PIW10: Ramp function generator input (NSET1-RFG1-IN)	
11.	Enable process output data with C1512 = 65535. ● Only required if C1511 has been changed. ● Do not deactivate the process data words used by setting the respective subcodes of code C1511 = 0. ● The value in C1512 is volatile and all process data are enabled after every switch-on.	
12.	Enable the standard device via terminal 28 (CINH). ● Set terminal 28 to HIGH level.	
13.	Select the setpoint. ● The master transmits the setpoint via the selected process data output word.	
14.	Change to the READY TO SWITCH ON state: ● The master transmits the DRIVECOM control word: 0000 0000 0111 1110_{bin} ($007E_{hex}$).	
15.	The standard device in the READY TO SWITCH ON state. ● The master receives the DRIVECOM status word: xxxx xxxx x01x 0001_{bin}.	
16.	Change to the OPERATION ENABLED state. ● The master transmits the DRIVECOM control word: 0000 0000 0111 1111_{bin} ($007F_{hex}$).	
17.	The drive starts up.	

6.3 Configuring the host system (master)

The host must be configured before communication with the communication module is possible.

Master settings

For configuring the PROFIBUS, the device data base file (GSE file) of the communication module has to be imported into the configuring software of the master.

Tip!

The GSE file can be downloaded from www.Lenze.com.

Device data base file

The device data base file **LENZ081B.GSE** contains the following configurations:

Module in LENZ081B.GSE		Parameter data without/with consistency		Process data without/with consistency		Assigned I/O memory
		Without	With	Without	With	
Drivecom-PAR (cons)	+ PZD (n Words)		DRIVECOM	n words		4 + n words
Drivecom-PAR (cons)	+ PZD (n Words Cons.)				n words	4 + n words
PKW (cons)	+ PZD (n Words)		PKW	n words		4 + n words
PKW (cons)	+ PZD (n Words Cons.)				n words	4 + n words
PZD (n Words)		Without parameter data channel		n words		n words
PZD (n Words Cons.)		Without parameter data channel			n words	n words

n = 1 ... 10

6.3.1 Setting compatibility with PPO types 1 ... 5

Process data assignment of PPO types:

Type	Selection text in LENZ08IB.GSE		
PPO1	PKW (cons)	+	PZD (2 words)
	PKW (cons)	+	PZD (2 words cons)
PPO2	PKW (cons)	+	PZD (6 words)
	PKW (cons)	+	PZD (6 words cons)
PPO3			PZD (2 words)
			PZD (2 words cons)
PPO4			PZD (6 words)
			PZD (6 words cons)
PPO5	PKW (cons)	+	PZD (10 words)
	PKW (cons)	+	PZD (10 words cons)

Note!

In order to provide compatibility with the PPO types 1 ... 5 (PROFIdrive device control), the following codes must be configured in addition:

► **C1510/1** = 20 (PROFIdrive status word)

► **C1511/1** = 19 (PROFIdrive control word)

Example 1

The slave is to operate with PPO2 and consistent process data.

1. Select the entry ”PKW(cons)+PZD(6W cons)” from the GSE file.
2. Set the following codes via the parameter data channel:
   – **C1510/1** = 20
   – **C1511/1** = 19
3. Set **C1511/1** = 65535 to enable the process output words.

Example 2

The slave is to operate with PPO4 and inconsistent process data.

1. Select the entry ”PZD(6W)” from the GSE file.
2. Set the following codes via the parameter data channel:
   – **C1510/1** = 20
   – **C1511/1** = 19
3. Set **C1511/1** = 65535 to enable the process output words.

6.3.2 Adapting device controls

- Lenze device control
  - Set **C1511/1** (POW1) = 1 ⇨ FIF control word 1 (FIF-CTRL1)
  - Set **C1510/1** (PIW1) = 1 ⇨ FIF status word 1 (FIF-STAT1)
- Device control via DRIVECOM (Lenze setting)
  - Set **C1511/1** (POW1) = 17 ⇨ DRIVECOM control word (DRIVECOM-CTRL)
  - Set **C1510/1** (PIW1) = 18 ⇨ DRIVECOM status word (DRIVECOM-STAT)
- Device control via PROFIdrive
  - Set **C1511/1** (POW1) = 19 ⇨ PROFIdrive control word (PROFIdrive-CTRL)
  - Set **C1510/1** (PIW1) = 20 ⇨ PROFIdrive status word (PROFIdrive-STAT)

For detailed information about the configuration of process data, see chapter ”Process data transfer”, 📖 36)

Tip!

Use overall consistency

- Please observe that the processing of consistent data varies between hosts. This must be taken into account in the PROFIBUS application program.
- A detailed description of consistency can be found in the appendix (📖 109)

6.3.3 Defining the user data length

The user data length is defined during the initialisation phase of the PROFIBUS. It is possible to configure up to 10 process data words (see chapter ”Process data transfer”, 📖 36).

Optionally you can activate a parameter data channel. If the parameter data channel is active, it additionally occupies 4 words of the process input and process output data.

- PIW: process data input word (process data from standard device to master)
- POW: process data output word (process data from master to standard device)

The user data lengths for process input data and process output data are identical. The selection takes place via identification bytes in the configuration software for the PROFIBUS system.

Parameter data channel		Process data channel
Without / with	**Identification / user data length**	**Identification / user data length**
Without	-	• Identification – without consistency: 70_{hex} ... 79_{hex} (112 ... 121) – with consistency: $F0_{hex}$ ... $F9_{hex}$ (240 ... 249) • User data length: 1 ... 10 words (POW1/PIW1 ... POW10/PIW10)
With	• Identification: $F3_{hex}$ (243) • User data length: 4 words (word 1 ... word 4)	• Identification – without consistency: 70_{hex} ... 79_{hex} (112 ... 121) – with consistency: $F0_{hex}$ ... $F9_{hex}$ (240 ... 249) • User data length: 1 ... 10 words (POW1/PIW1 ... POW10/PIW10)

General structure of the identification byte

MSB							LSB
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**

Data length
00 1 byte or 1 word
...
15 16 bytes or 16 words

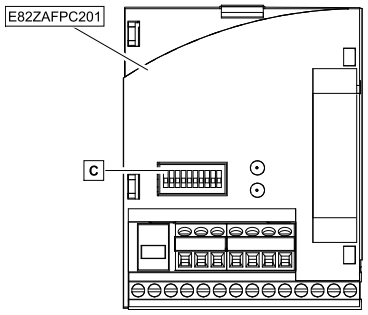
Input/output
00 Special identification format
01 Input
10 Output
11 Input and output

Length/format
0 Byte
1 Word

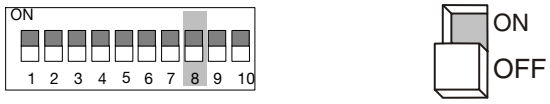
Consistency
0 Byte or word
1 Total length

6.4 Setting the software compatibility

DIP switch **S8** (C) serves to set compatibility with the Lenze PROFIBUS function modules E82ZAFPC0xx.



E82ZAFP020B

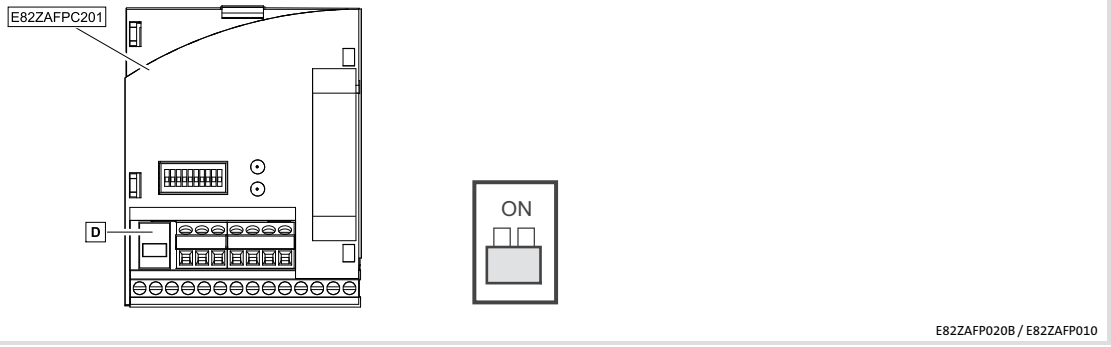


E82ZAFD005

DIP switch C	
Position of switch S8	**Compatibility**
OFF	E82ZAFPC201
ON	E82ZAFPC0xx

6.5 Activating the bus terminating resistor

The integrated bus terminating resistor can be activated with the DIP switch [D].



DIP switch [D]	
Switch position	**Function**
OFF	Bus terminating resistor not active.
ON	Bus terminating resistor active.

6.6 Setting the node address

The bus device address can be set with the DIP switches **S1 ... S7** ([C]) or via code **C1509**.

Note!

- ► The bus device addresses of networked controllers must differ from each other.
- ► If the DIP switches **S1 ... S7** are in the OFF position, the code setting for the bus device address is active.
- ► Switch off the voltage supply of the function module and the controller, and then switch it on again to activate changed settings.

Valid address range

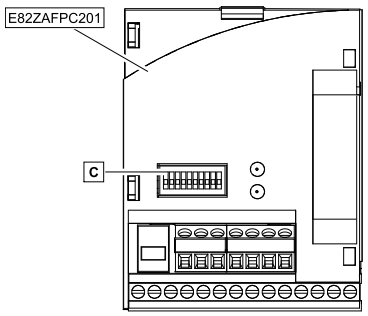
Input via	Valid address range	Notes
● Operating module or »GDC«	3 ... 126	-
● DIP switches	3 ... 125	If the addresses 0, 1, 2, 126 or 127 are set, the settings from code C1509 become active.

6.6.1 Setting via code

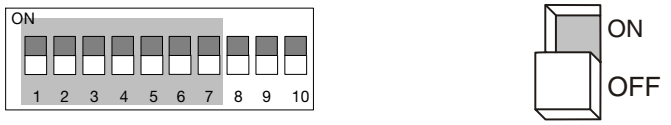
- ► DIP switches **S1 ... S7** = OFF (Lenze setting)
- ► Set the bus device address via **C1509**.

6.6.2 Settings via DIP switch

Set the bus device address with the DIP switches **S1 ... S7**.



E82ZAFP020B



E82ZAFD005

DIP switches C	Value	Example	
		Switch position	Bus device address
S1	1	**ON**	1 + 16 + 32 + 64 = 113
S2	2	OFF	
S3	4	OFF	
S4	8	OFF	
S5	16	**ON**	
S6	32	**ON**	
S7	64	**ON**	

6.7 Connecting the mains voltage

Note!

If the external voltage supply of the function module is used, the supply must be switched on as well.

- ► The standard device will be ready for operation approx. 1 s after switching on the supply voltage.
- ► Controller inhibit is active.
- ► The green LED at the front of the function module is lit (only visible in the case of the 8200 vector frequency inverter).

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.

7 Process data transfer

PROFIBUS transmits parameter data and process data between the host (master) and the controllers connected to the bus (slaves). Depending on their time-critical nature, the data are transmitted via different communication channels.

- Process data are transmitted via the process data channel.
- Process data serve to control the drive controller.
- The transmission of process data is time-critical.
- Process data are cyclically transferred between the host and the controllers (continuous exchange of current input and output data).
- The host can directly access the process data. In the PLC, for instance, the data are directly assigned to the I/O area.
- With the function module a maximum of 10 process data words (16 bits/word) can be exchanged in each direction.
- Process data are not stored in the controller.
- Process data are, for instance, setpoints, actual values, control words and status words.

Note!

Observe the direction of the information flow!

- Process input data (Rx data):
  - Process data from controller (slave) to host (master)
- Process output data (Tx data):
  - Process data from host (master) to controller (slave)

7.1 Lenze device control

Codes **C1510** (process input data) and **C1511** (process output data) can be used to freely assign up to 10 process data words of the PROFIBUS to the process data words of the controller.

Note!

- The PROFIBUS master *sends* process output data in up to 10 process data output words (POW) to the slave.
- The PROFIBUS master *receives* process input data in up to 10 process data input words (PIW) from the slave.

7.1.1 Process output data configuration

The assignment of up to 10 process data output words (POW) of the master to bit control commands, actual values or setpoints of the controller can be freely configured via code **C1511**.

Note!

- The assignment of control words of different device controls is not permitted.
- If **C1511** is changed, the process output data are automatically inhibited to ensure data consistency.
- Via **C1512** you can re-enable individual or all POWs.

- To activate the DRIVECOM device control, assign the DRIVECOM control word to a POW (**C1511/x** = 17).
  - The DRIVECOM control word is mapped to the FIF control word 1.
  - The controller operates in compliance with the DRIVECOM state machine. (📖 45).
- To activate the PROFIdrive device control, assign the PROFIdrive control word to a POW (**C1511/x** = 19).
  - The PROFIdrive control word is mapped to the FIF control word 1.
  - The controller operates in compliance with the PROFIdrive state machine (📖 50).
- You can set up an extended Lenze device control using the FIF control words (📖 40).

C1511: Configuration of process output data

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1511		23064_d = $5A18_h$			FIX32
	1 (POW1)		17	see table below	
	2 (POW2)		3		
	3 (POW3)		4		
	4 (POW4)		5		
	5 (POW5)		6		
	6 (POW6)		7		
	7 (POW7)		8		
	8 (POW8)		9		
	9 (POW9)		10		
	10 (POW10)		11		

The assignment of the up to 10 process data output words (POW) of the master to the bit control commands or controller setpoints can be freely configured.

Selection		Scaling
1	FIF control word 1 (FIF-CTRL1)	16 bits
2	FIF control word 2 (FIF-CTRL2)	16 bits
3	Setpoint 1 (NSET1-N1)	±24000 ≡ ±480 Hz
4	Setpoint 2 (NSET1-N2)	±24000 ≡ ±480 Hz
5	Additional setpoint (PCTRL1-NADD)	±24000 ≡ ±480 Hz
6	Actual process controller value (PCTRL1-ACT)	±24000 ≡ ±480 Hz
7	Process controller setpoint (PCTRL1-SET1)	±24000 ≡ ±480 Hz
8	Reserved	
9	Torque setpoint/torque limit value (MCTRL1-MSET)	2^{14} ≡100 % rated motor torque
10	PWM voltage (MCTRL1-VOLT-ADD)	STOP For special applications only. 📖 System manual for 8200 vector
11	PWM angle (MCTRL1-PHI-ADD)	
12	Reserved	
13	FIF-IN.W1	16 bits or 0 ... 65535
14	FIF-IN.W2	16 bits or 0 ... 65535
15	FIF-IN.W3	0 ... 65535
16	FIF-IN.W4	0 ... 65535
17	DRIVECOM control word (DRIVECOM-CTRL)	16 bits
18	Reserved	
19	PROFIdrive control word (PROFIdrive-CTRL)	16 bits

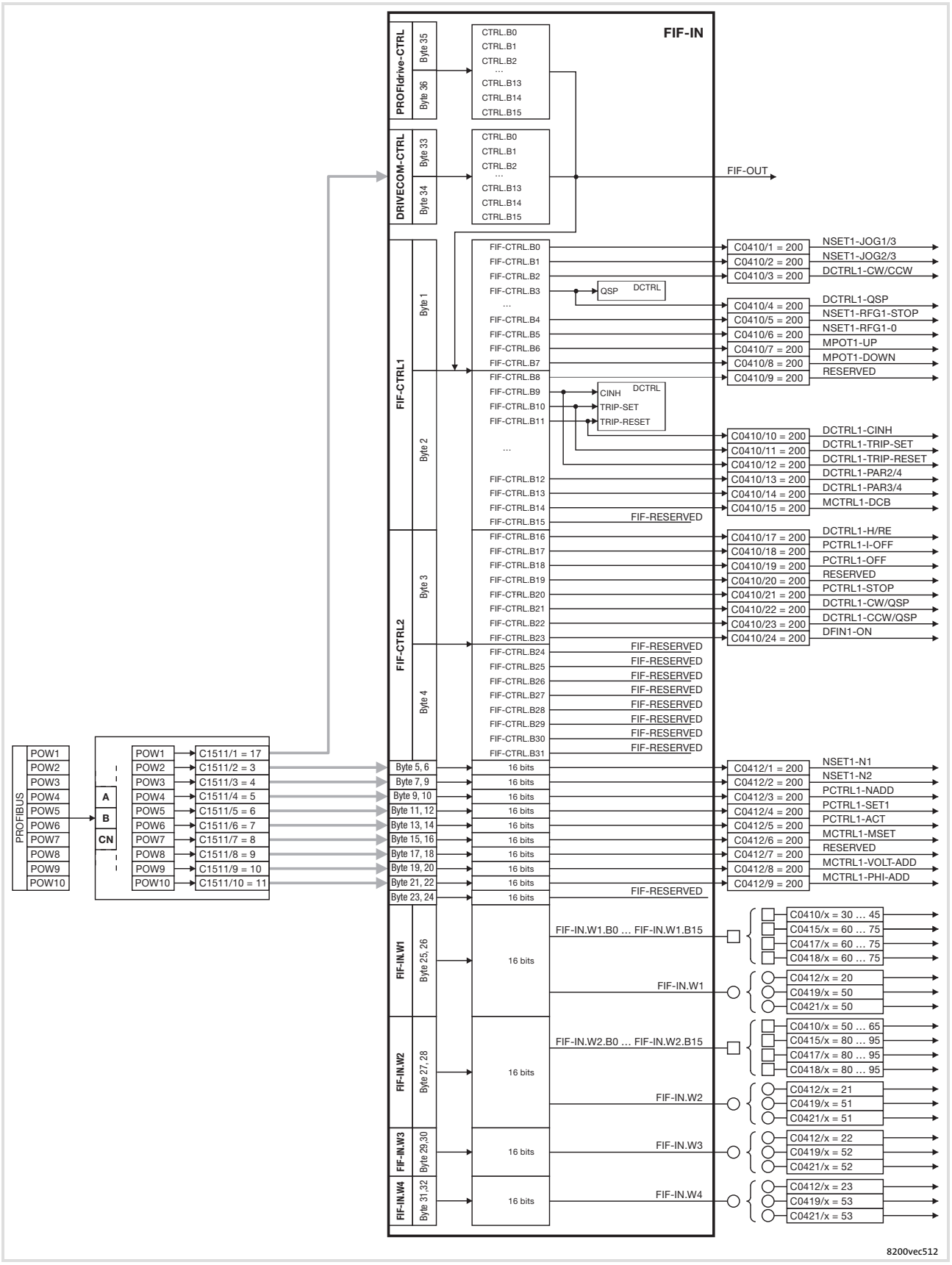


Fig. 7-1 Free configuration of the 10 PROFIBUS process output words

FIF control word 1 (FIF-CTRL1)		FIF control word 2 (FIF-CTRL2)	
Bit	**Assignment**	**Bit**	**Assignment**
0 / 1	**JOG values** (NSET1-JOG2/3 | NSET1-JOG1/3) Bit 1 0 0 0 C0046 active 0 1 JOG1 (C0037) active 1 0 JOG2 (C0038) active 1 1 JOG3 (C0039) active	**0**	**Manual/remote changeover** (DCTRL1-H/Re) 0 Not active 1 Active
		1	**Switch off I-component of process controller** (PCTRL1-I-OFF) 0 Not active 1 Active
2	**Current direction of rotation** (DCTRL1-CW/CCW) 0 Not inverted 1 Inverted	**2**	**Switch off process controller** (PCTRL1-OFF) 0 Not active 1 Active
3	**Quick stop (QSP)** (FIF-CTRL1-QSP) 0 Not active 1 Active (deceleration via QSP ramp C0105)	**3**	Reserved **Do not write to this bit!**
4	**Stop ramp function generator** (NSET1-RFG1-STOP) 0 Not active 1 Active	**4**	**Stop process controller** (PCTRL1-STOP) 0 Not active 1 Active
5	**Ramp function generator input = 0** (NSET1-RFG1-0) 0 Not active 1 Active (deceleration via C0013)	**5**	**CW rotation/quick stop (QSP)** (DCTRL1-CW/QSP) 0 Not active 1 Active
6	**UP function of motor potentiometer** (MPOT1-UP) 0 Not active 1 Active	**6**	**CCW rotation/quick stop (QSP)** (DCTRL1-CCW/QSP) 0 Not active 1 Active
7	**DOWN function of motor potentiometer** (MPOT1-DOWN) 0 Not active 1 Active	**7**	**X3/E1 is digital frequency input** (DFIN1-ON) 0 Not active 1 Active
8	Reserved	**8**	Reserved
9	**Controller inhibit** (FIF-CTRL1-CINH) 0 Controller enabled 1 Controller inhibited	**9**	Reserved
10	**External fault** (FIF-CTRL1-TRIP-SET)	**10**	Reserved
11 0 ⇒ 1	**Reset fault** (FIF-CTRL1-TRIP-RESET) Bit change resets TRIP	**11**	Reserved
12 / 13	**Parameter set changeover** (DCTRL1-PAR3/4 | DCTRL1-PAR2/4) Bit 13 12 0 0 PAR1 0 1 PAR2 1 0 PAR3 1 1 PAR4	**12**	Reserved
		13	Reserved
14	**DC injection brake** (MTCRL1-DCB) 0 Not active 1 Active	**14**	Reserved
15	Reserved	**15**	Reserved

Tab. 7-1 Parameter structure of FIF control word (FIF-CTRLx)

Note!

Use of bit 5 and bit 6 in FIF control word 2

Set codes **C0410/22** (DCTRL1-CW/QSP) and **C0410/23** (DCTRL1-CCW/QSP) to ”200”.

7.1.2 Process input data configuration

The assignment of the bit status information or the actual controller values to the up to 10 process data input words (PIW) of the master can be freely configured:

- To call DRIVECOM-conform status information, assign the DRIVECOM status word to a PIW (**C1511/x** = 18).

  The FIF status word 1 is mapped to the DRIVECOM status word.

- To call PROFIdrive-conform status information, assign the PROFIdrive status word to a PIW (**C1511/x** = 20).

  The FIF status word 1 is mapped to the PROFIdrive status word.

C1510: Configuration of process input data

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1510		23065_d = $5A19_h$			FIX32
	1 (PIW1)		18	See table below	
	2 (PIW2)		3		
	3 (PIW3)		4		
	4 (PIW4)		5		
	5 (PIW5)		6		
	6 (PIW6)		7		
	7 (PIW7)		8		
	8 (PIW8)		9		
	9 (PIW9)		10		
	10 (PIW10)		11		

The assignment of the bit status information or the actual controller values to the up to 10 process data input words (PIW) of the master can be freely configured.

Selection		Scaling
1	FIF status word 1 (FIF-STAT1)	16 bits
2	FIF status word 2 (FIF-STAT2)	16 bits
3	Output frequency with slip (MCTRL1-NOUT+SLIP)	±24000 ≡ ±480 Hz
4	Output frequency without slip (MCTRL1-NOUT)	±24000 ≡ ±480 Hz
5	Apparent motor current (MCTRL1-IMOT)	2^{14} ≡100 % rated device current
6	Actual process controller value (PCTRL1-ACT)	±24000 ≡ ±480 Hz
7	Process controller setpoint (PCTRL1-SET)	±24000 ≡ ±480 Hz
8	Process controller output (PCTRL1-OUT)	±24000 ≡ ±480 Hz
9	Controller load (MCTRL1-MOUT)	±2^{14} ≡±100 % rated motor torque
10	DC-bus voltage (MCTRL1-DCVOLT)	16383 ≡ 565 V DC for 400 V mains 16383 ≡ 325 V DC for 230 V mains
11	Ramp function generator input (NSET1-RFG1-IN)	±24000 ≡ ±480 Hz
12	Ramp function generator output (NSET1-NOUT)	±24000 ≡ ±480 Hz
13	FIF-OUT.W1	16 bits or 0 ... 65535
14	FIF-OUT.W2	16 bits or 0 ... 65535
15	FIF-OUT.W3	0 ... 65535
16	FIF-OUT.W4	0 ... 65535
17	DRIVECOM control word (DRIVECOM-CTRL)	16 bits
18	DRIVECOM status word (DRIVECOM-STAT)	16 bits
19	PROFIdrive control word (PROFIdrive-CTRL)	16 bits
20	PROFIdrive status word (PROFIdrive-STAT)	16 bits

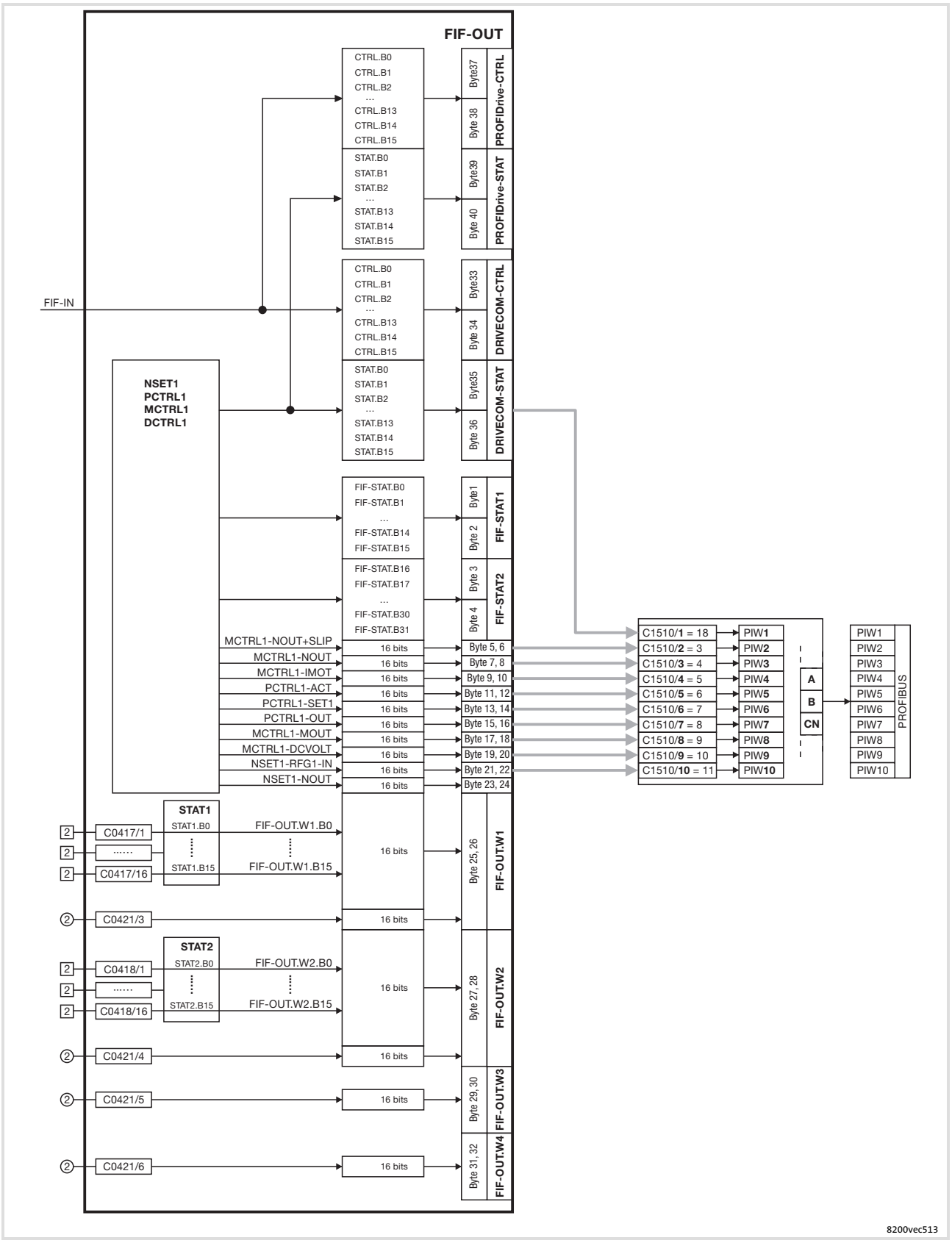


Fig. 7-2 Free configuration of the 10 PROFIBUS process input words

FIF status word 1 (FIF-STAT1)		FIF status word 2 (FIF-STAT2)	
Bit	**Assignment**	**Bit**	**Assignment**
0	**Current parameter set bit 0** (DCTRL1-PAR-B0) 0 Parameter set 1 or 3 active 1 Parameter set 2 or 4 active	**0**	**Current parameter set bit 1** (DCTRL1-PAR-B1) 0 Parameter set 1 or 2 active 1 Parameter set 3 or 4 active
1	**Pulse inhibit** (DCTRL1-IMP) 0 Power outputs enabled 1 Power outputs inhibited	**1**	**TRIP, Q_{min} or pulse inhibit active** (DCTRL1-TRIP-QMIN-IMP) 0 False 1 True
2	**I_{max} limit** (MCTRL1-IMAX) (If C0014 = 5: Torque setpoint) 0 Not reached 1 Reached	**2**	**PTC warning active** (DCTRL1-PTC-WARN) 0 False 1 True
3	**Output frequency = frequency setpoint** (DCTRL1-RFG1=NOUT) 0 False 1 True	**3**	Reserved **Do not write to this bit!**
4	**Ramp function generator input 1 = ramp function generator output 1** (NSET1-RFG1-I=O) 0 False 1 True	**4**	**C0054 < C0156 and Q_{min} threshold reached** (DCTRL1-(IMOT<ILIM)-QMIN) 0 False 1 True
5	**Q_{min} threshold** (PCTRL1-QMIN) 0 Not reached 1 Reached	**5**	**C0054 < C0156 and NSET1-RFG1-I=O** (DCTRL1-(IMOT<ILIM)-RFG-I=O) 0 False 1 True
6	**Output frequency = 0** (DCTRL1-NOUT=0) 0 False 1 True	**6**	**LP1 warning (fault in motor phase) active** (DCTRL1-LP1-WARN) 0 False 1 True
7	**Controller inhibit** (DCTRL1-CINH) 0 Controller enabled 1 Controller inhibited	**7**	**f < f_{min}** (NSET1-C0010 ... C0011) 0 False 1 True
11...8	**Device status** (DCTRL1-STAT*1 ... STAT*8) Bit 11 10 9 8 0 0 0 0 Controller initialisation 0 0 1 0 Switch-on inhibit 0 0 1 1 Operation inhibited 0 1 0 0 Flying-restart circuit active 0 1 0 1 DC-injection brake active 0 1 1 0 Operation enabled 0 1 1 1 Message active 1 0 0 0 Fault active 1 1 1 1 Communication with basic device not possible	**8**	**TRIP active** (DCTRL1-TRIP) 0 False 1 True
		9	**Motor is running** (DCTRL1-RUN) 0 False 1 True
		10	**Motor is running clockwise** (DCTRL1-RUN-CW) 0 False 1 True
		11	**Motor is running counter-clockwise** (DCTRL1-RUN-CCW) 0 False 1 True
12	**Overtemperature warning** (DCTRL1-OH-WARN) 0 No warning 1 ϑ_{max} - 10 °C reached	**12**	Reserved
13	**DC-bus overvoltage** (DCTRL1-OV) 0 No overvoltage 1 Overvoltage	**13**	Reserved
14	**Direction of rotation** (DCTRL1-CCW) 0 CW rotation 1 CCW rotation	**14**	**C0054 > C0156 and NSET1-RFG1-I=0** (DCTRL1-(IMOT>ILIM)-RFG-I=O) 0 False 1 True
15	**Ready for operation** (DCTRL1-RDY) 0 Not ready for operation (fault) 1 Ready for operation (no fault)	**15**	Reserved

Tab. 7-2 Parameter structure FIF status word (FIF-STATx)

7.2 DRIVECOM control

7.2.1 DRIVECOM state machine

The control information is provided by the function module via the control word.

- The controllers have standardised device states according to DRIVECOM Profile 20.
- Information on the current device status is stored in the DRIVECOM parameter "status word".
- Commands in the DRIVECOM parameter "control word" can change the device status. These commands are represented by arrows in the following diagram.

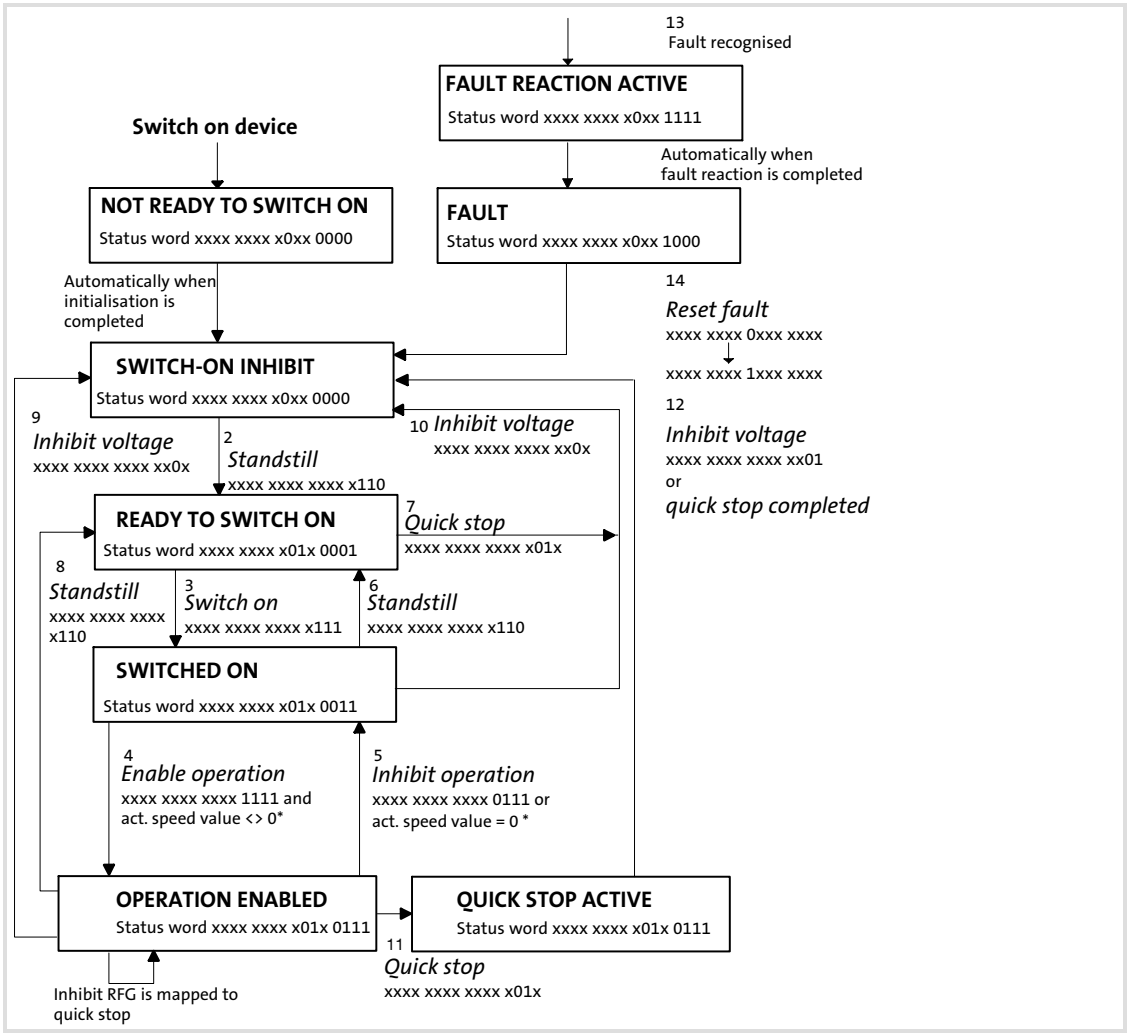


Fig. 7-3 Status diagram of DRIVECOM device control

* only effective for 821X, 8200 vector when the automatic DC injection brake is active (C0106, C2106 <> 0)

7.2.2 DRIVECOM control word

Bit	Meaning
0	**"Switch on" command**
0	"Standstill" command active
1	"Switch on" command active
1	**"Inhibit voltage" command**
0	"Inhibit voltage" command active
1	"Inhibit voltage" command not active
2	**"Quick stop (QSP)" command**
0	"Quick stop (QSP)" command active
1	"Quick stop (QSP)" command not active
3	**"Enable operation" command**
0	"Inhibit operation" command active
1	"Enable operation" command active
4	**"Inhibit RFG" command** Inhibits the ramp function generator (NSET1-RFG1). The quick stop function (QSP) is activated; the device status of the drive does not change. Mapping to FIF control word 1 (FIF-CTRL1), bit 3 negated (FIF-CTRL1-QSP)
0	"Inhibit RFG" active
1	"Inhibit RFG" not active
5	**"RFG stop" command** Ramp function generator output (NSET1-RFG1) is "frozen"; the device status of the drive does not change. Mapping to FIF control word 1 (FIF-CTRL1), bit 4 negated (NSET1-RFG1-STOP)
0	"RFG stop" active
1	"RFG stop" not active
6	**"RFG zero" command** Sets ramp function generator input (NSET1-RFG1) to 0. ⇒ Controlled deceleration via the ramp set under C0013; the device status of the drive does not change. Mapping to FIF control word 1 (FIF-CTRL1), bit 5 negated (NSET1-RFG1-0)
0	"RFG zero" active
1	"RFG zero" not active
7	**TRIP reset** Resets fault (TRIP)
0 ⇒ 1	Bit change resets TRIP
8	DRIVECOM reserved
9	DRIVECOM reserved
10	DRIVECOM reserved
11	Mapping to FIF control word 1 (FIF-CTRL1), bit 10 (FIF-CTRL1-TRIP-SET)
12	Mapping to FIF control word 1 (FIF-CTRL1), bit 12 (DCTRL1-PAR2/4)
13	Mapping to FIF control word 1 (FIF-CTRL1), bit 13 (DCTRL1-PAR-3/4)
14	Mapping to FIF control word 1 (FIF-CTRL1), bit 14 (MCTRL1-DCB)
15	Not used

Tab. 7-3 Parameter structure of "DRIVECOM control word" (DRIVECOM-CTRL)

7.2.3 DRIVECOM status word

Bit	Meaning
0	**Device status "Ready to switch on"**
0	Status less than "Ready to switch on"
1	Status at least "Ready to switch on"
1	**Device status "Switched on"**
0	Status less than "Switched on"
1	Status at least "Switched on"
2	**Device status "Operation enabled"**
0	Status less than "Operation enabled"
1	Status "Operation enabled"
3	**Device status "Fault"**
0	No fault (TRIP)
1	Fault (TRIP) active
4	**Status "Inhibit voltage" command**
0	Command applied
1	Command not applied
5	**Status "Quick stop (QSP)" command**
0	Command applied
1	Command not applied
6	**Device status "Switch-on inhibit"**
0	Status "Switch-on inhibit" not active
1	Status "Switch-on inhibit" active
7	**Collective warning**
0	No warning
1	Warning (overtemperature) active
8	**Collective message** Automatic setting and resetting of pulse inhibit (IMP) in the device status "Operation enabled". Possible causes: Undervoltage, overvoltage or overcurrent
0	No message
1	Message IMP active
9	Bus access right
1	Always
10	**Status speed/frequency deviation**
0	$RFG_{on} <> RFG_{off}$
1	$RFG_{on} = RFG_{off}$
11	**Status DRIVECOM speed limitation**
0	Always
12	Mapping of FIF status word 1 (FIF-STAT1), bit 0 (DCTRL1-PAR-B0)
13	Mapping of FIF status word 2 (FIFSTAT2), bit 0 (DCTRL1-PAR-B1)
14	Mapping of FIF status word 1 (FIFSTAT1), bit 2 (MCTRL1-IMAX)
15	Mapping of FIF status word 1 (FIF-STAT1), bit 5 (PCTRL1-QMIN)

7.2.4 Bit control commands

Bit control commands		The bit control commands of the control word depend on other bit settings. The command is executed only for the following bit patterns:								
		Bits of the control word								Note
Command	**Meaning**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Standstill	From different device states ⇨ "Ready to switch on"	x	x	x	x	x	1	1	**0**	1: Bit set
Switch on	Transition ⇨ "Switched on"	x	x	x	x	x	1	1	**1**	
Enable operation	Transition ⇨"Operation enabled" The controller inhibit (CINH) is deactivated.	x	x	x	x	**1**	1	1	1	0: Bit not set
Inhibit operation	Transition ⇨ "Switched on" The controller inhibit (CINH) is activated.	x	x	x	x	**0**	1	1	1	
Inhibit voltage	Transition ⇨ "Switch-on inhibit" The controller inhibit (CINH) is activated.	x	x	x	x	x	x	**0**	x	x: Any bit status
Quick stop (QSP)	Transition ⇨ "Switch-on inhibit" If the drive has been enabled ⇨ controlled deceleration via the quick stop ramp.	x	x	x	x	x	**0**	1	x	
Reset fault	Reset fault If the fault has been removed, automatically ⇨ "Switch-on inhibit".	0 ⇨1	x	x	x	x	x	x	x	

7.2.5 Status bits

Status bits		The current device status is unambiguously coded in the bits 0 ... 6 of the status word:							
		Bits of the status word							Note
Device status	**Meaning**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Not ready to switch on	Controller is being initialised and is not yet ready to operate. After initialisation automatically ⇨ "Ready to switch on"	0	x	x	0	0	0	0	1 Bit set
Switch-on inhibit	Controller inhibited (CINH). Waiting for "Standstill" command	1	x	x	0	0	0	0	
Ready to switch on	Controller inhibited (CINH). Waiting for "Switch-on" command	0	1	x	0	0	0	1	0 Bit not set
Switched on	Controller inhibited (CINH). Waiting for "Operation enabled" command.	0	1	x	0	0	1	1	
Operation enabled	Controller enabled ($\overline{\text{CINH}}$). Pulse inhibit can be set automatically	0	1	x	0	1	1	1	x Any bit status
Fault reaction active	Fault (TRIP) recognised, a time-based, fault-dependent reaction is executed. Then automatically ⇨ "Fault"	0	x	x	1	1	1	1	
Fault	Controller is in the device status "Fault".	0	x	x	1	0	0	0	
Quick stop (QSP) active	"Quick stop (QSP)" command has been sent in the device status "Operation enabled" ⇨ controlled deceleration via the quick stop ramp. After deceleration automatically ⇨ "Switch-on inhibit"	0	0	x	0	1	1	1	

7.3 PROFIdrive control

7.3.1 PROFIdrive state machine

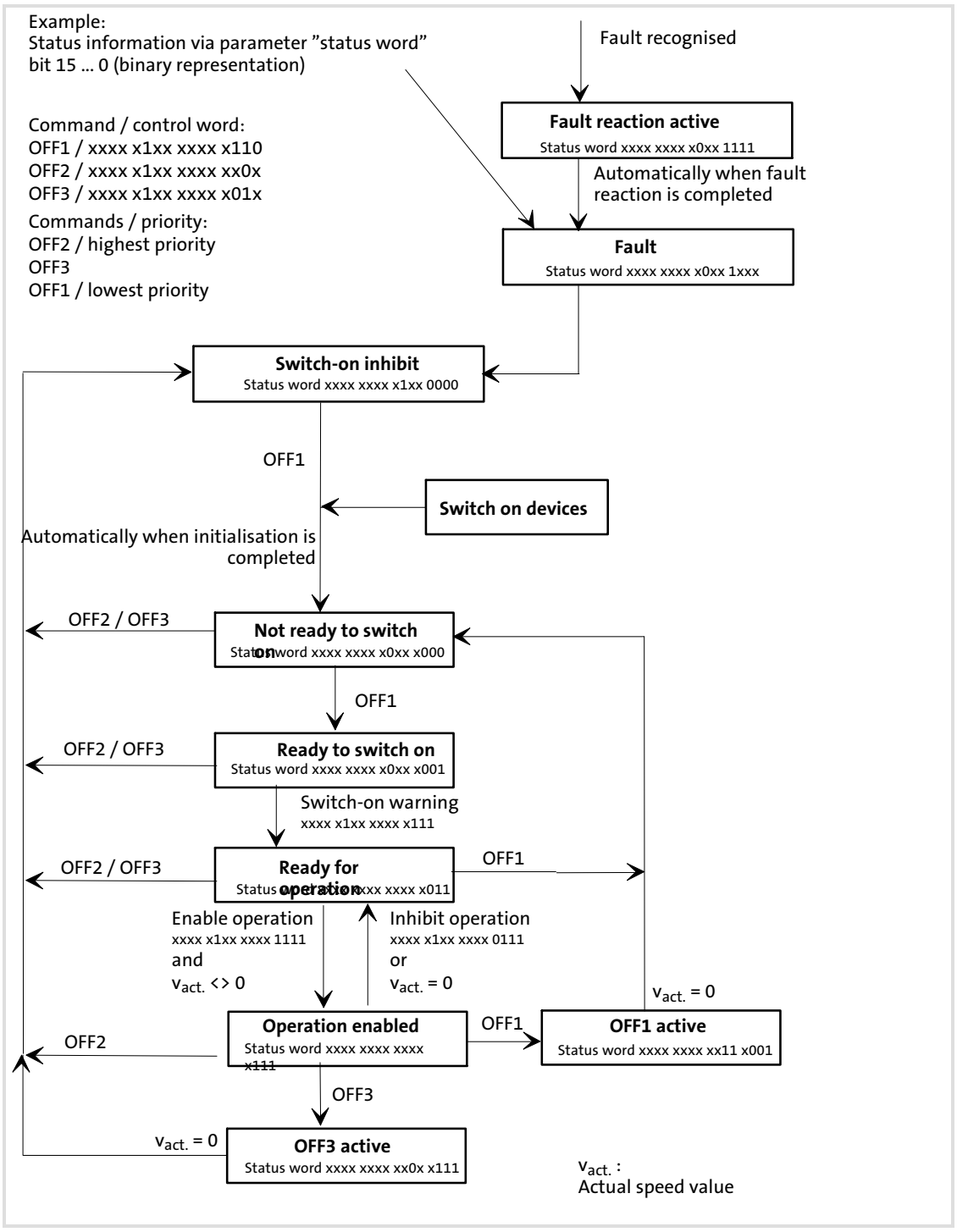


Fig. 7-4 State diagram PROFIdrive control

7.3.2 PROFIdrive control word

Bit	Designation	Description
0	OFF1	0 = OFF1 active; RFG zero, controller inhibit at n = 0 1 = OFF1 not active
1	OFF2	0 = OFF2 active 1 = OFF2 not active
2	OFF3	0 = OFF3 active 1 = OFF not active
3	Operation enabled	0 = Inhibit operation 1 = Enable operation
4	Inhibit RFG	Inhibit of ramp function generator. The quick stop function (QSP) is activated, the device state of the drive does not change. 0 = Inhibit RFG (quick stop (QSP)) 1 = Inhibit of RFG not active
5	RFG stop	Free (mapping to bit FIF-CTRL.B4 negated)
6	Inhibit setpoint	Free (mapping to bit FIF-CTRL.B5 negated)
7	Reset fault	Reset fault (TRIP). For this purpose a bit change from 0 to 1 must occur.
8	Jogging 1	Not used
9	Jogging 2	Not used
10	Master function by automation device	0 = No master function by automation device 1 = Master function by automation device
11	Manufacturer	Mapping to FIF control word 1 (FIF-CTRL1), bit 7 (MPOT1-DOWN)
12	Manufacturer	Mapping to FIF control word 1 (FIF-CTRL1), bit 12 (DCTRL1-PAR2/4)
13	Manufacturer	Mapping to FIF control word 1 (FIF-CTRL1), bit 13 (DCTRL1-PAR3/4)
14	Manufacturer	Mapping to FIF control word 1 (FIF-CTRL1), bit 14 (MCTRL1-DCB)
15	Manufacturer	Mapping to FIF control word 1 (FIF-CTRL1), bit 15 (reserved)

7.3.3 PROFIdrive status word

Bit	Designation	Description
0	Ready to switch on	Device status information 0 = Status lower than ”Ready to switch on” 1 = Status at least ”Ready to switch on”
1	Ready for operation	Device status information 0 = Status lower than ”Ready for operation” 1 = Status at least ”Ready for operation”
2	Operation enabled	Device status information 0 = Status lower than ”Operation enabled” 1 = Status ”Operation enabled”
3	Fault (TRIP)	Device status information 0 = No fault (TRIP) 1 = Fault (TRIP) active
4	OFF2	Information on command ”OFF2” 0 = Command applied 1 = Command not applied
5	OFF3	Information on command ”OFF3” 0 = Command applied 1 = Command not applied
6	Switch-on inhibit	Device status information 0 = ”Switch-on inhibit” status not active 1 = ”Switch-on inhibit” status active
7	Warning	Collective warning 0 = No warning 1 = Warning
8	Reserved	Always 1
9	Master function requested	1
10	SETPOINT-REACHED	Status of the speed/frequency deviation 0 = RFG_{on} <> RFG_{off} 1 = RFG_{on} = RFG_{off}
11	Reserved	0
12	Manufacturer	Mapping of FIF status word 1 (FIF-STAT1), bit 14 (DCTRL1-CCW)
13	Manufacturer	Mapping of FIF status word 1 (FIF-STAT1), bit 15 (DCTRL1-RDY)
14	Manufacturer	Mapping of FIF status word 1 (FIF-STAT1), bit 2 (MCTRL1-IMAX)
15	Manufacturer	Mapping of FIF status word 1 (FIF-STAT1), bit 5 (PCTRL1-QMIN)

8 Parameter data transfer

PROFIBUS transmits parameter data and process data between the host (master) and the drives connected to the bus (slaves). Depending on their time-critical nature, the data are transmitted via different communication channels.

- Parameter data are transmitted via the parameter data channel.
  - DRIVECOM parameter data channel
  - PROFIdrive parameter data channel (DP-V0 / DP-V1)
- The parameter data channel provides access to all Lenze codes.
- In general, the transfer of parameter data is not time-critical.
- Parameter data are, for instance, operating parameters, diagnostic information and motor data.

Note!

Cyclic writing to codes via PROFIBUS is only permissible if the automatic parameter set storage of the controller **C0003** is deactivated (value 0).

8.1 DRIVECOM parameter data channel

The DRIVECOM parameter data channel ...

- ► enables parameter setting and diagnostics of the controller.
- ► allows access to all Lenze parameters (codes).
- ► additionally occupies 4 words of the input and output data words in the master.
- ► has an identical structure for both directions of transmission.

8.1.1 Addressing of the parameter data

The parameter data is accessed via codes listed in the code table included in this documentation of the function module and the corresponding documentation of your controller.

8.1.2 Addressing of the Lenze parameters

In the case of the DRIVECOM parameter data channel the parameters of a device are not directly addressed via Lenze code numbers, but via indexes (byte 3, byte 4) and subindexes (byte 2).

The Lenze code numbers are converted into indexes via an offset (24575_{dec} / $5FFF_{hex}$):

Addressing of Lenze codes	Example for C0001 (operating mode)
● PROFIBUS index = 24575 - Lenze code	● PROFIBUS index = 24575 - 1 = 24574
● PROFIBUS-DP-$Index_{hex}$ = $5FFF_{hex}$ - Lenze $code_{hex}$	● PROFIBUS-DP-$Index_{hex}$ = $5FFF_{hex}$ - 1_{hex} = $5FFE_{hex}$

Lenze parameters are mainly represented in the fixed point format (data type integer32 with four decimal digits). For this reason, the value of the parameter/code must be multiplied by 10000 in order to obtain integer values.

The parameter value is entered in the user data (bytes 5 ... 8) of the telegram.

Example:

Set C0039 (JOG) = 150.4 Hz.

- ► 150.4 x 10000 = 1504000 ($0016F300_{hex}$)
- ► The resulting parameter value is entered in the user data.

8.1.3 Telegram structure

The telegram of the DRIVECOM parameter data channel consists of a total of 8 bytes. The individual bytes are described in detail on the following pages.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

Byte 1: Service, request and response control for the parameter data channel

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

7	6	5	4	3	2	1	0

Arrangement of bits 0 ... 7 in byte 1

2	1	0

Request
Request to the controller. The bits are set only by the master.
- 000 = No request
- 001 = Read request (read data from controller)
- 010 = Write request (write data to controller)

3

Reserved

5	4

Data length
Length of data in bytes 5 ... 8 (data/error 1 ... 4)
- 00 = 1 byte
- 01 = 2 bytes
- 10 = 3 bytes
- 11 = 4 bytes

6

Handshake
Indicates a new request.
- The master changes this (toggle) bit for every new request.
- The controller copies the bit into its response telegram.

7

Status
Status information from the controller to the master when sending the request confirmation. This bit informs the master whether the request has been carried out without any faults.
- 0 = Request completed without fault.
- 1 = Request not completed. An error has occurred. The data of bytes 5 ... 8 (data/error) must be interpreted as an error message.

📖 58 (Error code list)

Examples of byte 1:

► Read request

Bit 7			...				Bit 0
0	X	1	1	0	0	0	1

- Bit 0: ”1” (read)
- Bit 1: Reserved
- Bit 2: ”3” (data length 4 bytes)
- Bit 6: Handshake
- Bit 7: Status (only relevant for response telegram)

► Write request

Bit 7			...				Bit 0
0	X	0	1	0	0	1	0

- Bit 0: ”2” (write)
- Bit 1: Reserved
- Bit 2: ”1” (data length 2 bytes)
- Bit 6: Handshake
- Bit 7: Status (only relevant for response telegram)

Byte 2: Subindex

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	**Subindex**	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

Additional addressing via the subindex is required for those codes that have a subcode (see code table).

Example:

Code C0039 / subcode 3 addresses ”NSET JOG” (50 % = Lenze setting)

Byte 3 / 4: index

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	**Index High byte**	**Index Low byte**	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

The parameter or the Lenze code is selected with these two bytes according to the formula:

Index = 24575 - Lenze code number

Example:

The parameter C0012 (acceleration time) is to be addressed:

- 24575 - 12 = 24563 = $5FF3_{hex}$
- Entry in byte 3 (high byte): $5F_{hex}$
- Entry in byte 4 (low byte): $F3_{hex}$

Bytes 5 ... 8: Parameter value (data) / error information (error)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	**Data 4 / Error 4**	**Data 3 / Error 3**	**Data 2 / Error 2**	**Data 1 / Error 1**

The status of the (status) bit 7 in byte 1 (job) determines the meaning of this data field:

Meaning of the bytes 5 ... 8 if ...	
Bit 7 = 0	**Bit 7 = 1**
Parameter value (data 1 ... 4)	Error information (error 1 ... 4) for an invalid access. 📖 58 (Error code list)

Parameter value (data)

Depending on the data format, the length of the parameter value is between 1 to 4 bytes. Data are saved in the Motorola format, i. e. first the high byte or high word, then the low byte or low word.

Byte 5	Byte 6	Byte 7	Byte 8
High byte	Low byte	High byte	Low byte
High word		Low word	
Double word			

Assignment of bytes 5 .. 8 with parameter values of different lengths

Byte 5	Byte 6	Byte 7	Byte 8
Parameter value (Length 1)	00	00	00
Parameter value (length 2)		00	00
Parameter value (length 4)			

Note!

Strings or data blocks cannot be transmitted.

8.1.4 Error codes (DRIVECOM)

Data 1	Data 2	Data 3	Data 4	Meaning
0x06	0x03	0x00	0x00	No right to access
0x06	0x05		0x10	Impermissible job parameter
0x06	0x05		0x11	Invalid subindex
0x06	0x05		0x12	Data length too large
0x06	0x05		0x13	Data length too small
0x06	0x06		0x00	Object is no parameter
0x06	0x07		0x00	Object does not exist
0x06	0x08		0x00	Data types do not correspond
0x08	0x00		0x00	Job cannot be executed
0x08	0x00		0x20	Job cannot be executed at the moment
0x08	0x00		0x21	Not executable because of local control
0x08	0x00		0x22	Not executable because of device status
0x08	0x00		0x30	Out of value range/parameter can only be changed with inhibited controller
0x08	0x00		0x31	Parameter value too large
0x08	0x00		0x32	Parameter value too small
0x08	0x00		0x33	Subparameter out of value range
0x08	0x00		0x34	Subparameter value too large
0x08	0x00		0x35	Subparameter value too small
0x08	0x00		0x36	Maximum value smaller than minimum value
0x08	0x00		0x41	Communication object cannot be mapped on process data
0x08	0x00		0x42	Process data length exceeded
0x08	0x00		0x43	General collision with other values
0x08	0x00	0xFE	0x01	Invalid service (no read or write request)

8.1.5 Reading parameters

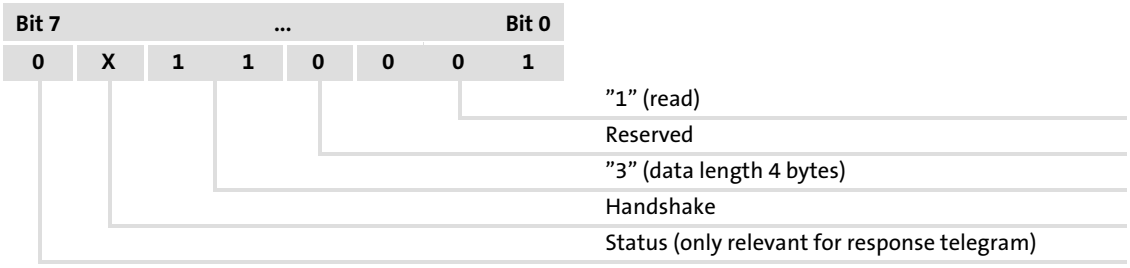
General procedure

1. Define the user data range of the controller. (Where are the user data located in the host system?)
   Observe manufacturer-specific information.
2. Enter the address of the required parameter into the ”Index” and ”Subindex” fields (DP output data).
3. Request in the service byte = read request
   The status of the handshake bit in the service byte must be changed (DP output data).
4. Check whether the handshake bit in the service byte is the same for the DP input data and the DP output data.
   If the handshake bit is the same, the response has been received.
   It is useful to implement a time monitoring tool.
5. Check whether the status bit in the service byte is set.
   Status bit is not set: The ”Data/Error” field contains the required parameter value.
   Status bit is set: The read request has not been executed correctly. The ”Data/Error” field contains the error information.

Example:

The heatsink temperature (43 °C) of the controller is to be read (C0061).

► Byte 1: Request



► Byte 2: Subindex
   Subindex = 0, as there is no subindex under code C0061.

► Byte 3 / 4: Index
   Index = 24575 - code number
   Index = 24575 - 61 = 24514 = $5FC2_{hex}$ ($5F_{hex}$ = high byte, $C2_{hex}$ = low byte)

► Bytes 5 ... 8: Data (contained in the response telegram)
   Data 1 ... 4 = 43 °C x 10000 = 430000 (FIX32) = $00068FB0_{hex}$

Result:

► Request telegram from master to drive:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index (High byte)	Index (Low byte)	Data 4	Data 3	Data 2	Data 1
01_{hex} 00000001_{bin}	**00_{hex}** 00000000_{bin}	**$5F_{hex}$** 01011111_{bin}	**$C2_{hex}$** 11000010_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}
Waiting for change of handshake bit in the response (bit 6 here: 0 → 1)							

► Response telegram from drive to master (for error-free execution):

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index (High byte)	Index (Low byte)	Data 4	Data 3	Data 2	Data 1
30_{hex} 00110000_{bin}	**00_{hex}** 00000000_{bin}	**$5F_{hex}$** 01011111_{bin}	**$C2_{hex}$** 11000010_{bin}	**00_{hex}** 00000000_{bin}	**06_{hex}** 00000110_{bin}	**$8F_{hex}$** 10001111_{bin}	**$B0_{hex}$** 10110000_{bin}

8.1.6 Writing parameters

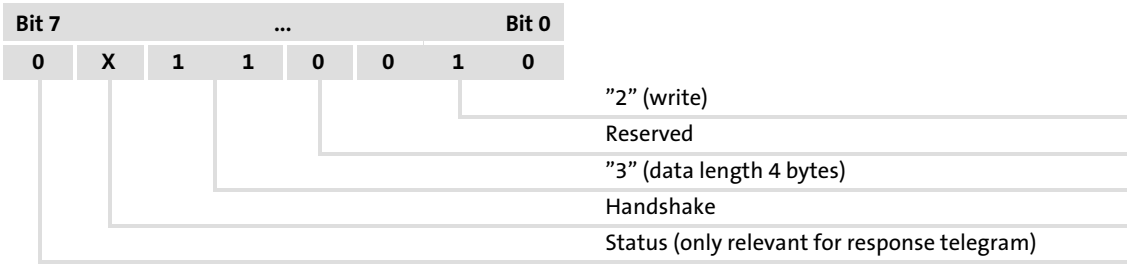
General procedure

1. Define the user data range of the controller. (Where are the user data located in the host system?)
   Observe manufacturer-specific information.
2. Enter the address of the required parameter into the ”Index” and ”Subindex” fields (DP output data).
3. Enter the parameter value into the ”Data/Error” field.
4. Request in the service byte = write request
   The status of the handshake bit in the service byte must be changed (DP output data).
5. Check whether the handshake bit in the service byte is the same for the DP input data and the DP output data.
   If the handshake bit is the same, the response has been received.
   It is useful to implement a time monitoring tool.
6. Check whether the status bit in the service byte is set.
   Status bit is not set: The write request has been executed correctly.
   Status bit is set: The write request has not been executed correctly. The ”Data/Error” field contains the error information.

Example:

The acceleration time (C0012) of the controller is to be set to 20 s.

► Byte 1: Request



► Byte 2: Subindex
Subindex = 0, as there is no subindex under code C0012.

► Byte 3 / 4: Index
Index = 24575 - code number
Index = 24575 - 12 = 24563 = $5FF3_{hex}$ ($5F_{hex}$ = high byte, $F3_{hex}$ = low byte)

► Bytes 5 ... 8: data
Data 1 ... 4 = 20 s x 10000 = 200000 (FIX32) = $00030D40_{hex}$

Result:

► Request telegram from master to drive:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index (High byte)	Index (Low byte)	Data 4	Data 3	Data 2	Data 1
72_{hex} 01110010_{bin}	**00_{hex}** 00000000_{bin}	**$5F_{hex}$** 01011111_{bin}	**$F3_{hex}$** 11110011_{bin}	**00_{hex}** 00000000_{bin}	**03_{hex}** 00000011_{bin}	**$0D_{hex}$** 00001101_{bin}	**40_{hex}** 01000000_{bin}
Waiting for change of handshake bit (bit 6 here: 0 → 1)							

► Response telegram from drive to master (for error-free execution):

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index (High byte)	Index (Low byte)	Data 4	Data 3	Data 2	Data 1
40_{hex} 01000110_{bin}	**00_{hex}** 00000000_{bin}	**$5F_{hex}$** 01011111_{bin}	**$F3_{hex}$** 11110011_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}	00_{hex} 00000000_{bin}
Waiting for change of handshake bit (bit 6 here: 1 → 0)							

8.2 PROFIdrive parameter data channel

Data communication with PROFIBUS-DP-V0 is characterised by cyclic diagnostics and cyclic process data and parameter data transfer.

An optional service extension is the acyclic parameter data transfer of PROFIBUS-DP-V1. This service does not impair the functionality of the standard services under PROFIBUS-DP-V0.

PROFIBUS-DP-V0 and PROFIBUS-DP-V1 can be operated simultaneously in the same network. This enables the step-by-step expansion or modification of a system.

The services of PROFIBUS-DP-V1 can be used by the master class 1 (PLC) and the master class 2 (diagnostics master etc.).

The integration of the acyclic service into the fixed bus cycle depends on the corresponding configuration of the master class 1:

- For an existing configuration a *time slot is reserved*.
- When there is no configuration, the acyclic service is *appended* when a master class 2 acyclically accesses a DP-V1 slave.

Access to the Lenze codes of the controller

The codes of the first parameter set (C0000 ... C1999) can be accessed directly. A conversion is not required.

Entering a parameter value

The required parameter value is mapped in the data range.

Lenze parameters are mainly represented in the fixed point format with four places after the decimal point (data type FIX32, transmission as double word). These parameters are multiplied by 10000 to obtain integer values.

Example:

Set C0039 (JOG) = 150.4 Hz.

- 150.4 x 10000 = 1504000 ($0016F300_{hex}$)

8.2.1 PROFIdrive DP-V0

Note!

The communication module described in this manual corresponds to the PROFIdrive profile version 3.0. The PROFIdrive parameter data channel (DP-V0) has already been defined in the PROFIdrive profile version 2.0 and is kept merely for compatibility reasons.

We recommend the use of the PROFIdrive parameter data channel (DP-V1) for new configurations.

8.2.1.1 Telegram structure

The PROFIdrive parameter data channel is located (same as the DRIVECOM parameter data channel) in the first 8 bytes of the cyclic data.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		Subcode (IND)	Reserved	Parameter value (PWE)			

Byte 1 / 2: Parameter identification

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		Subcode (IND)	Reserved	Parameter value (PWE)			

► Parameter identification structure

Byte 1							Byte 2								
4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1
Request/response identification				Code											

► Request/response identification (high nibble of byte 1)

PKE	Request identification
0	No request
1	Read single parameter
2	Write single parameter (word)
3	Write single parameter (double word)
6	Read array parameter
7	Write array parameter (word)
8	Write array parameter (double word)

PKE	Response identification	
	Positive	**Negative**
0	No response	
1	Transmit single parameter value (word)	
2	Transmit single parameter value (double word)	
4	Transmit array parameter value (word)	
5	Transmit array parameter value (double word)	
4	Transmit array parameter value (word)	
5	Transmit array parameter value (double word)	
7		Request cannot be executed, see error number

► Code (low nibble of byte 1 and byte 2)

► Value range: 0 ... 2000 (C0001 ... C1999)

Byte 3: Lenze subcode

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		**Subcode (IND)**	Reserved	Parameter value (PWE)			

► Value range: 0 ... 255

Byte 4: Reserved (0)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		Subcode (IND)	**Reserved**	Parameter value (PWE)			

Bytes 5 ... 8: Parameter value (data)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		Subcode (IND)	Reserved	**Parameter value (PWE)**			

Depending on the data format, the length of the parameter value is between 1 to 4 bytes. Data are saved in the Motorola format, i.e. first the high byte/high word, then the low byte/low word.

Byte 5	Byte 6	Byte 7	Byte 8
High byte 1	Low byte 1	High byte 2	Low byte 2
High word		Low word	
Double word			

► Assignment of bytes 5 ... 8 with parameter values of different lengths

Byte 5	Byte 6	Byte 7	Byte 8
Parameter value (length 1)	00	00	00
Parameter value (length 2)		00	00
Parameter value (length 4)			

► A slave provides the response until the master creates a new request.

► For responses containing parameter values, the slave always replies with the current value (cyclic processing).

Byte 7 / 8: Error number

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Parameter identification (PKE)		Subcode (IND)	Reserved	00	00	**Error number**	

Error number	Meaning
0	Wrong code number
1	Parameter value can only be read
2	Value range exceeded
3	Wrong subindex
4	No array
5	Wrong data type (wrong data length)
17	Wrong operating status

8.2.1.2 Programming of read requests

Procedure

1. Define the user data range of the controller (define the location of the user data in the host system).
   Observe manufacturer-specific data.
2. Enter the code of the desired parameter into the ”code” field (output data).
3. Job identification / service = read request
4. Check whether index and subindex correspond with the job and whether the job identification is Ø 0:
   – If the criteria are fulfilled, the desired controller data from the field ”Parameter value” are transmitted to the master.
   – If these criteria are not fulfilled, the response identifier is negative (high nibble of byte 1 = 7_{hex}). In this case, the error information can be read out from the entry in the low word.

Example:

The heatsink temperature (43 °C) of the controller is to be read (C0061).

► Job identification (high nibble in byte 1)
  – Read simple parameter: ”1”

► Code: (low nibble in byte 1 and byte 2)
  – C0061: 61 = $3D_{hex}$

► Lenze subcode (byte 3):
  – Subindex = 0, as there is not subindex under code C0061.

► Bytes 5 ... 8: Data (not contained in the request telegram)
  – Data 1 ... 4 = 43℃ x 10000 = 430000 = $00068FB0_{hex}$

Result:

► Request telegram from master to drive:

Byte 1*	Byte 1* +2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
AK	Code	Subcode	Reserved	Parameter value			
1_{hex}	**$03D_{hex}$**	**00_{hex}**	**00_{hex}**	00_{hex}	00_{hex}	00_{hex}	00_{hex}
0001_{bin}	000000111101_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}
Wait for response identification with code = $03D_{hex}$ and subcode 0							

► Response telegram from drive to master (for faultless execution):

Byte 1*	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
AK	Code	Subcode	Reserved	Parameter value			
2_{hex}	**$03D_{hex}$**	**00_{hex}**	**00_{hex}**	**00_{hex}**	**06_{hex}**	**$8F_{hex}$**	**$B0_{hex}$**
0010_{bin}	000000111101_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000110_{bin}	10001111_{bin}	10110000_{bin}

8.2.1.3 Programming of write requests

Procedure

1. Define the user data range of the controller (define the location of the user data in the host system).
   Observe manufacturer-specific data.
2. Enter the code of the desired parameter into the ”code” field (output data).
3. Enter parameter value into the ”Data/Error” field.
4. Job identification / service = write request
5. Check whether index and subindex correspond with the job and whether the job identification is Ø 0:
   – If the criteria are fulfilled, the desired master data from the field ”Parameter value” are accepted by the controller.
   – If these criteria are not fulfilled, the response identifier is negative (high nibble of byte 1 = 7_{hex}). In this case, the error information can be read out from the entry in the low word.

Example:

The controller acceleration time (C0012) is to be set to 20 s.

► Job identification (high nibble in byte 1)
Transmit simple parameter value: ”1”

► Code: (low nibble in byte 1 and byte 2)
C0012: 12 = $0C_{hex}$

► Lenze subcode (byte 3):
Subindex = 0, as there is not subindex under code C0012.

► Bytes 5 ...8: Data
Data 1 ... 4 = 20 s x 10000 = 200000 = $00030D40_{hex}$

Result:

► Request telegram from master to drive:

Byte 1*	Byte 1* +2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
AK	Code	Subcode	Reserved	Parameter value			
3_{hex}	**$00C_{hex}$**	**00_{hex}**	**00_{hex}**	**00_{hex}**	**03_{hex}**	**$0D_{hex}$**	**40hex**
0011_{bin}	000000001100_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000011_{bin}	00001101_{bin}	01000000_{bin}
Wait for response identification with code = 00C and subcode 0							

► Response telegram from drive to master (for faultless execution):

Byte 1*	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
AK	Code	Subcode	Reserved	Parameter value			
2_{hex}	**$00C_{hex}$**	**00_{hex}**	**00_{hex}**	00_{hex}	00_{hex}	00_{hex}	00_{hex}
0010_{bin}	000000001100_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}

8.2.2 PROFIdrive DP-V1

Features

- Parameter number and subindex addresses with a width of 16 bits each.
- Several parameter requests can be combined to one request (multi-parameter requests).
- Processing of one parameter request at a time (no pipelining).
- A parameter request or a parameter response must fit into one data block (max. 240 bytes). Requests/responses cannot be split over several data blocks.
- Spontaneous messages are not transmitted.
- There are only acyclic parameter requests.
- Profile-specific parameters can be read independently of the slave state.

8.2.2.1 Establishing a connection between master and slave

A class 1 master can always be used to request parameters from a slave if the slave is in the ”Data_Exchange” state.

In addition to the class 1 master connection, a class 2 master can establish a communication connection to the slave:

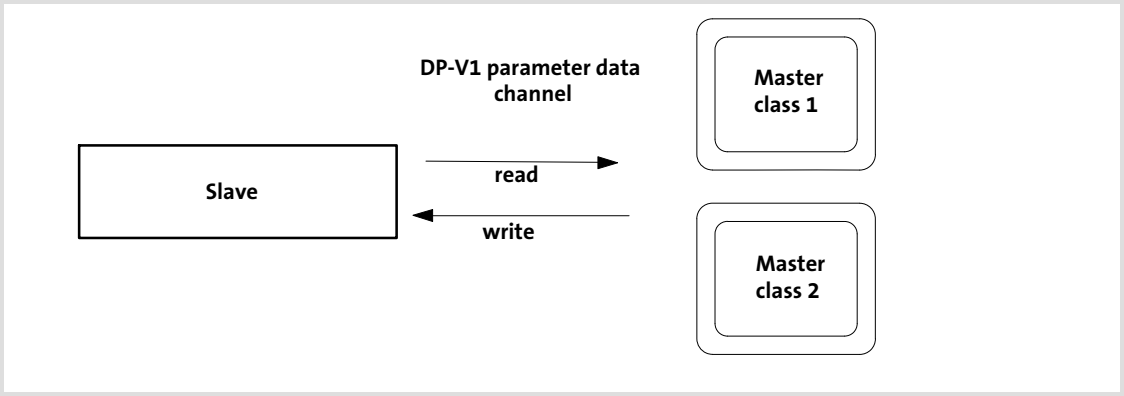
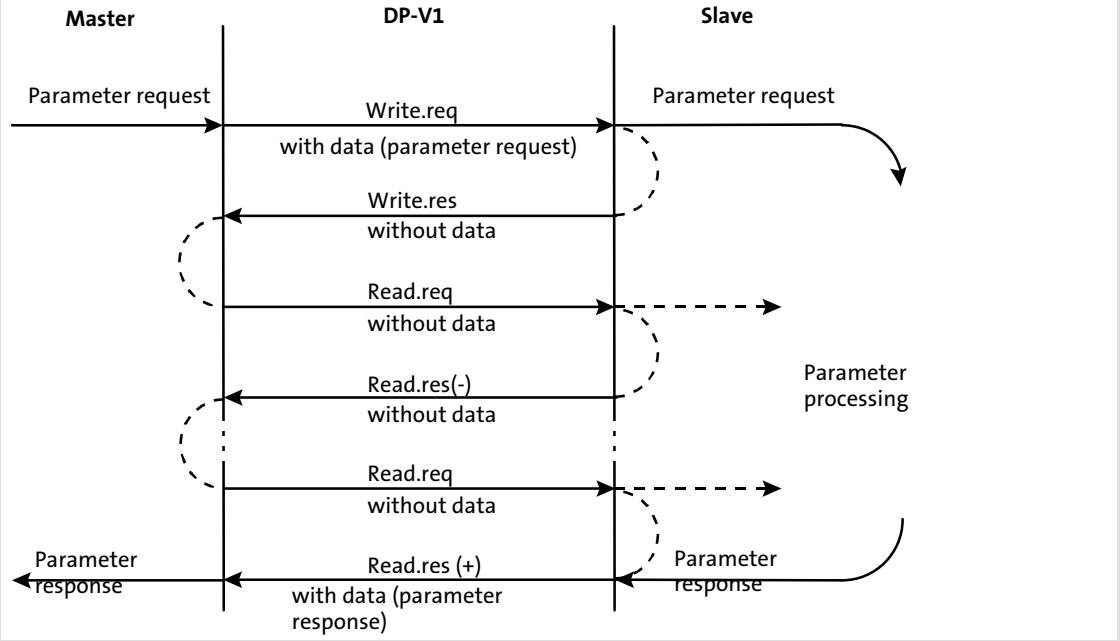


Fig. 8-1 Data communication via the DP-V1 parameter data channel

8.2.2.2 Acyclic data transfer

Note!

A parameter request refers to one or several parameter(s) (multi-parameter request).



Sequence:

- A ”Write.req” is used to pass the data set (DB47) to the slave in the form of a parameter request.
- With ”Write.res” the master receives the confirmation for the receipt of the message.
- The master requests the response of the slave with ”Read.req”.
- The slave responds with ”Read.res (-)” if processing has not yet been completed.
- After parameter processing, the parameter request is completed by transmitting the parameter response to the master with ”Read.res (+)”.

8.2.2.3 Telegram structure

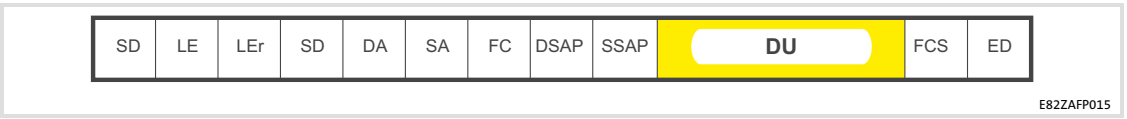


Fig. 8-2 PROFIBUS data telegram with DP-V1

The data unit (DU) contains the DP-V1 header and the parameter request or the parameter response.

In the following subchapters, the parameter request and the parameter response are described in detail.

Note!

The DP-V1 header consists of:

- ► Function identifier
- ► Slot number
- ► Data set
- ► Length of the user data

Please refer to the corresponding PROFIBUS specification for further information on the DP-V1 header.

8.2.2.4 Reading parameters

Note!

- ► When a read request is processed, no parameter value is written to the slave.
- ► A response to a read request does not contain the parameter attribute, index and subindex.
- ► When a multi-parameter read request is transferred, the parameter attribute, index and subindex are repeated according to the number ”n” of the parameters requested.
- ► A read request must not exceed the maximum data length of 240 bytes.

Request header

Byte 1	Byte 2	Byte 3	Byte 4
U8	U8	U8	U8
Request reference	Request identification	Axis	Number of indexes

Request reference: This value is specified by the master
Request identification: 0x01 (request parameter for reading)
Axis: 0x00 or 0x01
Number of indexes: 0x”n” (number of parameters requested)

Parameter attribute

Byte 5	Byte 6
U8	U8
Attribute	Number of subindexes

Attribute: 0x10 (value)
Number of subindexes: 0x00
- For array parameters enter the number of array parameters requested.

Index and subindex

Byte 7	Byte 8	Byte 9	Byte 10
U16		U16	
Index		Subindex	

Index: 0x0001 ... 0xFFFF (1 ... 65535)
Subindex: 0x0001 ... 0xFFFF (1 ... 65535)
- 0x0000 for all non-array parameters

8.2.2.5 Response to a correctly executed read request

Note!

- When a read request is processed, no parameter value is written to the slave.
- A response to a read request does not contain the parameter attribute, index and subindex.
- When a multi-parameter read request is transferred, the parameter format and parameter value are repeated according to the number ”n” of parameters requested.
- A read request must not exceed the maximum data length of 240 bytes.

Response header

Byte 1	Byte 2	Byte 3	Byte 4
U8	U8	U8	U8
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indexes

Request reference: Mirrored value of parameter request

Response identification: 0x01 (parameter has been read)

Axis: 0x00 or 0x01

Number of indexes: 0x”n” (number of parameters requested)

Parameter format

Byte 5	Byte 6
U8	U8
Format	Number of values

Format: 0x01 ... 0x36, data types
0x41, byte
0x42, word
0x43, double word

Number of values: 0x01 or

number of subindexes requested

- If there is more than one subindex, only the parameter value is repeated.

Parameter value

Depending on the data type, the user data are assigned as follows:

Data type	Length	Assignment of the user data				
		Byte 7	Byte 8	Byte 9	Byte 10	Byte ...
String	x bytes					
U8	1 byte		00			
U16	2 bytes	High byte	Low byte			
U32	4 bytes	High word		Low word		
		High byte	Low byte	High byte	Low byte	

(This representation applies to one parameter value.)

8.2.2.6 Response to a read request error

Response header

Byte 1	Byte 2	Byte 3	Byte 4
U8 Request reference (mirrored)	U8 Response identification	U8 Axis (mirrored)	U8 Number of indexes

Request reference: Mirrored value of parameter request

Response identification: 0x81 (read error)
An error code is transmitted (see below).

Axis: 0x00 or 0x01

Number of indexes: 0x"n" (number of parameters requested)

Parameter format

Byte 5	Byte 6
U8 Format	U8 Number of values

Format: 0x44 (error)

Number of values: 0x01 (error code without additional information)
0x02 (error code with additional information)

Error code

Byte 7	Byte 8	Byte 9	Byte 10
U16 Error code		U16 Additional information (if available)	

Error code: 0x0000 ... 0x00FF
📖 83 (Error code list)

(Additional information)

8.2.2.7 Writing parameters

Note!

- ► When a multi-parameter write request is processed, the ...
  - – parameter attribute
  - – index and subindex

  and then the
  - – parameter format and
  - – parameter value

  are repeated according to the number ”n” of parameters requested.
- ► A write request must not exceed the maximum data length of 240 bytes.

Request header

Byte 1	Byte 2	Byte 3	Byte 4
U8	U8	U8	U8
Request reference	Request identification	Axis	Number of indexes

Request reference: This value is specified by the master
Request identification: 0x02 (write parameter)
Axis: 0x00 or 0x01
Number of indexes: 0x”n” (number of parameters requested)

Parameter attribute

Byte 5	Byte 6
U8	U8
Attribute	Number of subindexes

Attribute: 0x10, value
Number of subindexes: 0x00
- For array parameters enter the number of array parameters requested.

Index and subindex

Byte 7	Byte 8	Byte 9	Byte 10
U16		U16	
Index		Subindex	

Index: 0x0001 ... 0xFFFF (1 ... 65535)
Subindex: 0x0001 ... 0xFFFF (1 ... 65535)
- 0x0000 for all non-array parameters

Parameter format

Byte 11	Byte 12
U8	U8
Format	Number of values

Format: 0x01 ... 0x36, data types
0x41, byte
0x42, word
0x43, double word

Number of values: 0x01 or
number of subindexes requested
- If there is more than one subindex, only the parameter value is repeated.

Parameter value

Depending on the data type, the user data are assigned as follows:

Data type	Length	Assignment of the user data				
		Byte 13	Byte 14	Byte 15	Byte 16	Byte ...
String	x bytes					
U8	1 byte		00			
U16	2 bytes	High byte	Low byte			
U32	4 bytes	High word		Low word		
		High byte	Low byte	High byte	Low byte	

(This representation applies to one parameter value.)

8.2.2.8 Response to a correctly executed write request

Response header

Byte 1	Byte 2	Byte 3	Byte 4
U8	U8	U8	U8
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indexes

Request reference: Mirrored value of parameter request

Response identification: 0x02 (parameter has been written)

Axis: 0x00 or 0x01

Number of indexes: 0x”n” (number of parameters requested)

8.2.2.9 Response to a write request error

Note!

For a multi-parameter request, the correct and possibly faulty messages are combined in one telegram. The individual messages have the following data contents:

- Correct message
  - Format: 0x40 (zero)
  - Number of values: 0x00
- Faulty message
  - Format: 0x44
  - Number of values: 0x01 or 0x02
  - Error code without additional information (for number of values = 0x01) or
  - error code with additional information (for number of values = 0x02)

A faulty access to a parameter ”n” is indicated at the nth position in the response telegram of a multi-parameter request.

Response header

Byte 1	Byte 2	Byte 3	Byte 4
U8	U8	U8	U8
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indexes

Request reference: Mirrored value of parameter request

Response identification: 0x82 (write error)
An error code is transmitted, see below

Axis: 0x00 or 0x01

Number of indexes: 0x”n” (number of parameters requested)

Parameter format

Byte 5	Byte 6
U8	U8
Format	Number of values

Format: 0x44, error

Number of values: 0x01 (error code without additional information)
0x02 (error code with additional information)

Error code

Byte 7	Byte 8	Byte 9	Byte 10
U16		U16	
Error code		Additional information if available	

Error code: 0x0000 ... 0x00FF
📖 83 (Error code list)

(Additional information)

8.2.2.10 Parameter data telegram example: Reading a parameter

The heatsink temperature (43 °C) of the controller is to be read (C0061).

Parameter request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **xx**	Request identifier: **0x01**	Axis: **0x00**	Number of indexes: **0x01**
	Request parameter for reading		

Byte 5	Byte 6
Attribute: **0x10**	Number of subindexes: **0x00**
Value	No subindex

Byte 7	Byte 8	Byte 9	Byte 10
High byte	Low byte	High byte	Low byte
Index:		Subindex:	
0x5F	**0xC2**	**0x00**	**0x00**
Calculation of parameter offset: 0x5FFF - 0x3D = 0x5FC2 (24575 - 61 = 24514)			

Parameter response for faultless transmission

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **0xXX**	Response identifier: **0x01**	Axis: **0x00**	Number of indexes: **0x01**
(Mirrored)	Parameter has been read	(Mirrored)	

Byte 5	Byte 6
Format: **0x43**	Number of values: **0x01**
Double word	1 value

Byte 7	Byte 8	Byte 9	Byte 10
High word		Low word	
High byte	Low byte	High byte	Low byte
Value:			
0x00	**0x00**	**0x00**	**0x2B**
Value: 43 = 0x00 00 00 2B			

Parameter response for faulty transmission

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **0xXX**	Response identifier: **0x81**	Axis: **0x00**	Number of indexes: **0x01**
Mirrored	Parameter has not been read	Mirrored	

Byte 5	Byte 6
Format: **0x44**	Number of values: **0x01**
Error	

Byte 7	Byte 8
0x00	**0xXX**
Error code from error code list 📖 83	

8.2.2.11 Parameter data telegram example: Writing a parameter

The time between quick stop activation and standstill is to be set to 5 s via code C0105 (deceleration time quick stop).

Parameter request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **0xXX**	Request identifier: **0x02**	Axis: **0x00**	Number of indexes: **0x01**
	Write parameter	Axis 0	1 index

Byte 5	Byte 6
Attribute: **0x10**	Number of subindexes: **0x00**
Value	No subindex

Byte 7	Byte 8	Byte 9	Byte 10
High byte	Low byte	High byte	Low byte
Index:		Subindex:	
0x5F	**0x96**	**0x00**	**0x00**
Calculation of parameter offset: 0x5FFF - 0x69 = 0x5F96 (24575 - 105 = 24470)			

Byte 11	Byte 12
Format: **0x43**	Number of values: **0x01**
Double word	1 value

Byte 13	Byte 14	Byte 15	Byte 16
High word		Low word	
High byte	Low byte	High byte	Low byte
Values:			
0x00	**0x00**	**0xC3**	**0x50**
Value: 5 s x 10000 = 50000 (FIX32) = $0x0000C350_{hex}$			

Response to a correctly executed write request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **0xXX**	Response identifier: **0x02**	Axis: **0x00**	Number of indexes: **0x01**
(Mirrored)	Parameter has been written	(Mirrored)	1 index

Response after write error

Byte 1	Byte 2	Byte 3	Byte 4
Request reference: **0xXX**	Response identifier: **0x82**	Axis: **0x00**	Number of indexes: **0x01**
(Mirrored)	Parameter has not been written	(Mirrored)	1 index

Byte 5	Byte 6
Format: **0x44**	Number of values: **0x01**
Error	Error code without additional information

Byte 7	Byte 8
0x00	**0xXX**
Error code from error code list 📖 83	

8.2.3 Error codes (PROFIdrive)

Error code	Meaning	Description	Additional info
0x0000	Impermissible parameter number	Access to unavailable parameter	-
0x0001	Parameter value cannot be changed	Change access to a parameter value that cannot be changed	Subindex
0x0002	Low or high limit exceeded	Change access with value outside the value limits	Subindex
0x0003	Faulty subindex	Access to unavailable subindex	Subindex
0x0004	No array	Access with subindex to non-indexed parameter	-
0x0005	Incorrect data type	Change access with value that does not match the data type of the parameter	-
0x0006	Setting not permitted (can only be reset)	Change access with value unequal to 0 where this is not permitted	Subindex
0x0007	Description element cannot be changed	Change access to a description element that cannot be changed	Subindex
0x0008	Reserved	(PROFIdrive profile V2: PPO-write requested in IR not available)	-
0x0009	No description data available	Access to unavailable description (parameter value is available)	-
0x000A	Reserved	(PROFIdrive profile V2: Access group wrong)	-
0x000B	No operation priority	Change access without rights to change parameters	-
0x000C	Reserved	(PROFIdrive profile V2: Wrong password)	-
0x000D	Reserved	(PROFIdrive profile V2: Text cannot be read in cyclic data transfer)	-
0x000E	Reserved	(PROFIdrive profile V2: Name cannot be read in cyclic data transfer)	-
0x000F	No text array available	Access to text array that is not available (parameter value is available)	-
0x0010	Reserved	(PROFIdrive profile V2: No PPO-write)	-
0x0011	Request cannot be executed because of operating status	Access is temporarily not possible for reasons that are not specified in detail	-
0x0012	Reserved	(PROFIdrive profile V2: Other error)	-
0x0013	Reserved	(PROFIdrive profile V2: Data cannot be read in cyclic interchange)	-
0x0014	Value impermissible	Change access with a value that is within the value limits but is not permissible for other long-term reasons (parameter with defined single values)	Subindex
0x0015	Response too long	The length of the current response exceeds the maximum transmittable length	
0x0016	Parameter address impermissible	Illegal value or value which is not supported for the attribute, number of subindexes, parameter number or subindex or combination	
0x0017	Illegal format	Write request: Illegal format or format of the parameter data which is not supported	
0x0018	Number of values not consistent	Write request: Number of values of the parameter data do not match the number of subindexes in the parameter address	
0x0019 ... 0x0064	Reserved	-	-
0x0065 ... 0x00FF	Manufacturer-specific	-	-

8.3 Parameter set transfer

Lenze parameter sets

The 8200 vector and 8200 motec controllers have 2/4 parameter sets, whose parameters can directly be addressed with the PROFIBUS.

Note!

- ► Parameter set 1 can be accessed via ...
  - – DRIVECOM parameter data channel
  - – PROFIdrive parameter data channel (DP-V0)
  - – PROFIdrive parameter data channel (DP-V1)
- ► Parameter sets 2 ... 4 can be accessed via ...
  - – DRIVECOM parameter data channel
  - – PROFIdrive parameter data channel (DP-V1)

Addressing of Lenze parameter sets

The parameter sets are addressed by means of a code offset:

- ► Offset 0 addresses parameter set 1 (C0000 ... C1999).
- ► Offset 2000 addresses parameter set 2 (C2000 ... C3999).
- ► Offset 4000 addresses parameter set 3 (C4000 ... C5999).
- ► Offset 6000 addresses parameter set 4 (C6000 ... C7999).

If a parameter is only available once (see documentation for 8200 vector), use the code offset 0.

Example for C0011 (maximum rotating-field frequency):

- ► C0011 in parameter set 1: Lenze code number = 11
- ► C0011 in parameter set 2: Lenze code number = 2011
- ► C0011 in parameter set 3: Lenze code number = 4011
- ► C0011 in parameter set 4: Lenze code number = 6011

Parameter set transfer with keypad

Note!

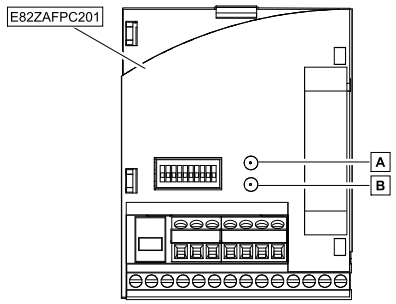
Always switch the mains after you have transferred the parameter sets with the keypad!

Observe the options for parameter set transfer with keypad marked with ”Keypad ⇨” under code **C0002**.

If an address is assigned via **C1509**, the address must be reassigned via the parameter data channel after a parameter set transfer. Afterwards mains switching is required. The address modified via keypad becomes effective immediately.

9 Diagnostics

9.1 LED status displays



E82ZAFP020B

LED			
Pos.	**Colour**	**Condition**	**Description**
A	Yellow	Off	No communication with the PROFIBUS master.
		Blinking	Communication with the PROFIBUS master has been established via the function module.
B	Green	Off	• The function module is not supplied with voltage. • The standard device and/or the external voltage supply is/are switched off.
		Blinking (const.)	The function module is supplied with voltage but has not established a connection to the standard device. Causes: • The standard device is switched off. • The standard device is in the initialisation phase. • The standard device is not available.
		Blinking (3x short)	Internal error of the function module
		On	The function module is supplied with voltage and has established a connection to the standard device.

9.2 Troubleshooting and fault elimination

Fault	Possible cause	Remedy
The PROFIBUS master indicates a bus error and the yellow LED on the function module is off.	Short circuit/open circuit	Check the PROFIBUS wiring.
	The bus terminatior is not activated.	Activate the bus terminating resistor of the last bus device.
	Set station address is incorrect.	Set the correct station address.
The PROFIBUS master indicates a bus error and the yellow LED on the function module is blinking.	Incorrect PROFIBUS configuration data	Check the configuration data sent by the master via **C1526**. Permitted configuration data: 📖 31
The drive cannot be enabled.	The enable signal via the control word is missing.	Send $007F_{hex}$.
	Controller inhibit via terminal is active.	Set terminal X3/28 = HIGH (+12 ... +30 V).
	There is no setpoint selected.	**C0412/1** = 200 (setpoint source PROFIBUS) must be set
		Assign a setpoint to the process output data in **C1511**.

9.3 Monitoring for interruption of PROFIBUS communication

Permanent interruption of communication

If the PROFIBUS communication is interrupted permanently, e.g. by cable breakage or failure of the PROFIBUS master, no process data are transmitted to the slave in the ”Data_Exchange” state.

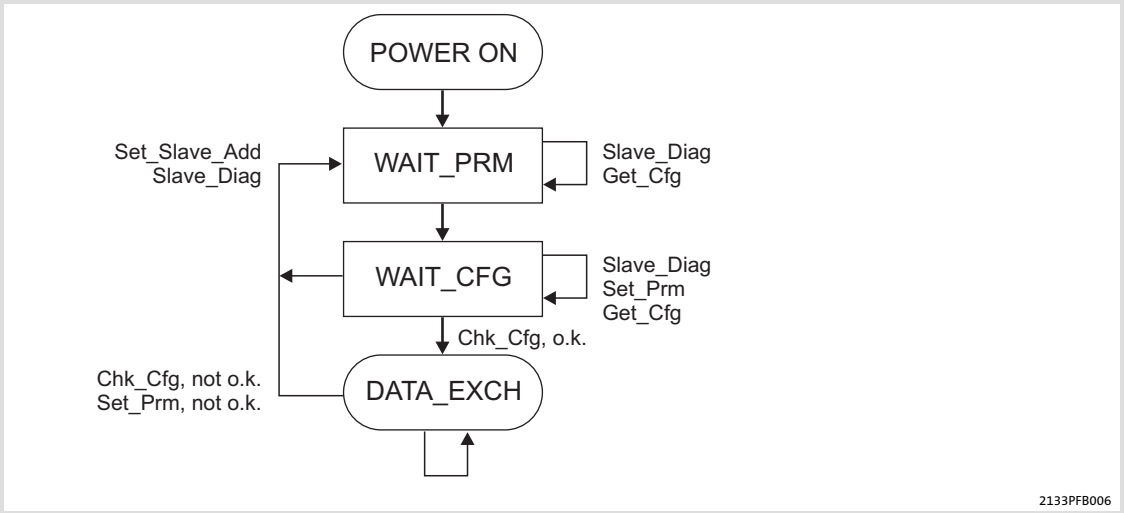
When the monitoring time has expired, the reaction parameterised in **C1514** is executed.

The slave only reacts if ...

1. the user has activated the reaction by selecting ”TRIP (fault)”, ”controller inhibit (CINH)” or ”quick stop (QSP)”.
2. the slave is in the ”Data_Exchange” state.
3. the user has correctly configured the monitoring time in the master.

If one of these preconditions is not met, the reaction to the absence of cyclic process data telegrams from the master is not executed.

Short-time interruption of the communication



The master detects the communication fault and puts the slave into the ”WAIT_PRM” state of the DP state machine after only a few microseconds (see above).

Only when the state chain of the DP state machine ending the ”Data_Exchange” (DATA_EXCH) state has been completed, the monitoring time calculated for the slave (in the millisecond range) continues to run.

The monitoring time does *not* continue to run when the slave does not reach the ”Data_Exchange” state due to repeated communication faults (e.g. caused by loose contact).

For this reason an additional monitoring function is available under code **C1513**, which becomes active when the ”Data_Exchange” state is exited and the parameterised time (0 ... 65535 ms) has expired. This function then triggers the reaction parameterised in code **C1514**.

Note!

Observe the following condition for the time setting:
Reaction time ≤ response monitoring time of PROFIBUS.

10 Codes

10.1 Overview

Code	Subcode	Index	Designation	Detailed information
C0002	-	24573_d = $5FFD_h$	Parameter set management	105
C0126	-	24449_d = $5F81_h$	Behaviour with communication error	95
C1500	-	23075_d = $5A23_h$	Software identification code	97
C1501	-	23074_d = $5A22_h$	Software creation date	97
C1502	1 ... 4	23073_d = $5A21_h$	Display of software identification code	97
C1503	1 ... 4	23072_d = $5A20_h$	Display of software creation date	97
C1509	-	23066_d = $5A1A_h$	Bus device addressing	91
C1510	-	23065_d = $5A19_h$	Configuration of process input data	92
C1511	-	23064_d = $5A18_h$	Configuration of process output data	93
C1512	-	23063_d = $5A17_h$	Enable process output data	94
C1513	-	23062_d = $5A16_h$	Monitoring response time of PZD communication	95
C1514	-	23061_d = $5A15_h$	Monitoring reaction in case of PZD communication fault	96
C1516	-	23059_d = $5A13_h$	Display baud rate	98
C1517	-	23058_d = $5A12_h$	Display bus device address	98
C1520	1 ... 10	23055_d = $5A0F_h$	Display of all words to master	98
C1521	1 ... 10	23054_d = $5A0E_h$	Display of all words from master	99
C1522	1 ... 16	23053_d = $5A0D_h$	Display of all process data words to standard device	99
C1523	1 ... 16	23052_d = $5A0C_h$	Display of all process data words from standard device	100
C1525	1, 2	23050_d = $5A0A_h$	Display of current DIP switch setting	101
C1526	1 ... 3	23049_d = $5A09_h$	Display of last configuration data	102
C1530	-	23045_d = $5A05_h$	PROFIBUS diagnostics	103
C1531	1 ... 4	23044_d = $5A04_h$	Bus counter	104
C1572	-	23003_d = $59DB_h$	Response time after exiting "Data_Exchange"	96

How to read the code table

Column	Meaning		
Code	(Lenze) code ● The parameters of a configurable code marked with an asterisk (<Code>*) can only be accessed via the communication module. ● The value of a configurable code marked with a double asterisk (<Code>**) is not transmitted with the parameter set transfer.		
Subcode	Subcode		
Name	Designation of the Lenze code		
Index	Index under which the parameter is addressed.		
Lenze	Lenze setting of the code		
	Disp	Display code Configuration of this code is not possible.	
Values	Fixed values determined by Lenze (selection list) *or* a value range:		
	Minimum value	[Smallest increment/unit]	Maximum value
Access	R = read access (reading permitted) W = write access (writing permitted)		
Data type	● FIX32: 32-bit value with sign; decimal with 4 decimal positions ● U16: 2 bytes bit-coded ● U32: 4 bytes bit-coded ● VS: visible string, character string with defined length		

10.2 Communication-relevant Lenze codes

C1509: Bus device addressing

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1509		23066_d = $5A1A_h$	3	3	[1]	126	FIX32

This code serves to set the bus device address. The setting in this code is only effective if the DIP switches **S1 ... S7** are set to OFF.

Note!

- ► The bus device addresses of networked controllers must differ from each other.
- ► Switch off the voltage supply of the function module and the controller, and then switch it on again to activate the changed settings.

C1510: Configuration of process input data

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1510		23065_d = $5A19_h$			FIX32
	1 (PIW1)		18	See table below	
	2 (PIW2)		3		
	3 (PIW3)		4		
	4 (PIW4)		5		
	5 (PIW5)		6		
	6 (PIW6)		7		
	7 (PIW7)		8		
	8 (PIW8)		9		
	9 (PIW9)		10		
	10 (PIW10)		11		

The assignment of the bit status information or the actual controller values to the up to 10 process data input words (PIW) of the master can be freely configured.

Selection		Scaling
1	FIF status word 1 (FIF-STAT1)	16 bits
2	FIF status word 2 (FIF-STAT2)	16 bits
3	Output frequency with slip (MCTRL1-NOUT+SLIP)	±24000 ≡ ±480 Hz
4	Output frequency without slip (MCTRL1-NOUT)	±24000 ≡ ±480 Hz
5	Apparent motor current (MCTRL1-IMOT)	2^{14} ≡100 % rated device current
6	Actual process controller value (PCTRL1-ACT)	±24000 ≡ ±480 Hz
7	Process controller setpoint (PCTRL1-SET)	±24000 ≡ ±480 Hz
8	Process controller output (PCTRL1-OUT)	±24000 ≡ ±480 Hz
9	Controller load (MCTRL1-MOUT)	±2^{14} ≡±100 % rated motor torque
10	DC-bus voltage (MCTRL1-DCVOLT)	16383 ≡ 565 V DC for 400 V mains 16383 ≡ 325 V DC for 230 V mains
11	Ramp function generator input (NSET1-RFG1-IN)	±24000 ≡ ±480 Hz
12	Ramp function generator output (NSET1-NOUT)	±24000 ≡ ±480 Hz
13	FIF-OUT.W1	16 bits or 0 ... 65535
14	FIF-OUT.W2	16 bits or 0 ... 65535
15	FIF-OUT.W3	0 ... 65535
16	FIF-OUT.W4	0 ... 65535
17	DRIVECOM control word (DRIVECOM-CTRL)	16 bits
18	DRIVECOM status word (DRIVECOM-STAT)	16 bits
19	PROFIdrive control word (PROFIdrive-CTRL)	16 bits
20	PROFIdrive status word (PROFIdrive-STAT)	16 bits

C1511: Configuration of process output data

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1511		23064_d = $5A18_h$			FIX32
	1 (POW1)		17	see table below	
	2 (POW2)		3		
	3 (POW3)		4		
	4 (POW4)		5		
	5 (POW5)		6		
	6 (POW6)		7		
	7 (POW7)		8		
	8 (POW8)		9		
	9 (POW9)		10		
	10 (POW10)		11		

The assignment of the up to 10 process data output words (POW) of the master to the bit control commands or controller setpoints can be freely configured.

Selection		Scaling
1	FIF control word 1 (FIF-CTRL1)	16 bits
2	FIF control word 2 (FIF-CTRL2)	16 bits
3	Setpoint 1 (NSET1-N1)	±24000 ≡ ±480 Hz
4	Setpoint 2 (NSET1-N2)	±24000 ≡ ±480 Hz
5	Additional setpoint (PCTRL1-NADD)	±24000 ≡ ±480 Hz
6	Actual process controller value (PCTRL1-ACT)	±24000 ≡ ±480 Hz
7	Process controller setpoint (PCTRL1-SET1)	±24000 ≡ ±480 Hz
8	Reserved	
9	Torque setpoint/torque limit value (MCTRL1-MSET)	2^{14} ≡100 % rated motor torque
10	PWM voltage (MCTRL1-VOLT-ADD)	STOP For special applications only. 📖 System manual for 8200 vector
11	PWM angle (MCTRL1-PHI-ADD)	
12	Reserved	
13	FIF-IN.W1	16 bits or 0 ... 65535
14	FIF-IN.W2	16 bits or 0 ... 65535
15	FIF-IN.W3	0 ... 65535
16	FIF-IN.W4	0 ... 65535
17	DRIVECOM control word (DRIVECOM-CTRL)	16 bits
18	Reserved	
19	PROFIdrive control word (PROFIdrive-CTRL)	16 bits

C1512: Enable process output data

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1512**		23063_d = $5A17_h$	1	1	[1]	65535	FIX32

If code **C1511** is changed, the process output data are automatically inhibited to ensure data consistency.

Code **C1512** can be used to re-enable all or individual process data output words (POW).

Due to the different decimal values of the bit positions, any combination of process data output words can be enabled.

- 0 = Inhibit output word
- 1 = Enable output word

Value of bit position				
POW 10	POW 9	...	POW 2	POW 1
2^9	2^8		2^1	2^0

65535 ($FFFF_{hex}$) in code **C1512** enables all process output data.

Note!

8200 vector

With 8200 vector it is not possible to enable individual process data output words. After mains switching this code is reset to 65535. Therefore, all process data are enabled.

10.3 Monitoring codes

C0126: Behaviour with communication error

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C0126		24449 (0x5F81)	10	0 [1] 10 0: All monitoring functions deactivated. 2: Monitoring of internal communication active	FIX32

Monitoring of internal communication between function module and controller.

If the monitoring function is activated, a communication abort initiates TRIP (CE5).

Documentation for the standard device

Please refer to this documentation for a complete description of the setting options of this code.

C1513: Monitoring response time of PZD communication

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1513		23062_d = $5A16_h$	3000	0 [1 ms] 65535	FIX32

The value of the response monitoring time is provided by the master.

Note!

A change in the monitoring time becomes effective immediately.

Monitoring starts with the receipt of the first telegram.

The setting **C1513 = 0** deactivates the monitoring function.

C1514: Monitoring reaction in case of PZD communication fault

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1514		23061_d = $5A15_h$	0	0 [1] 3	FIX32
				0: no action	
				1: TRIP (fault)	
				2: controller inhibit (CINH)	
				3: quick stop (QSP)	

If the master does not send a message within the response monitoring time (configurable in **C1513**), the action set in this code is executed.

Note!

A change in the monitoring reaction becomes effective immediately.

C1572: Response time after exiting "Data_Exchange"

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1572		23003_d = $59DB_h$	65535	0 [1 ms] 65535	U16

If the "Data_Exchange" state is exited, the reaction parameterised in code **C1514** is carried out after the time set here has expired.

Note!

- ► The set response time must be shorter than the response monitoring time in **C1513**.
- ► A change in the monitoring function becomes effective immediately.

The setting **C1514 = 65535** deactivates the monitoring function.

10.4 Diagnostics codes

C1500: Software identification code

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1500		23075 (0x5A23)	Disp		VS

Here the software identification code is displayed, e.g. ”82ZAFU0B_20000”. The code contains a string with a length of 14 bytes.

C1501: Software creation date

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1501		23074 (0x5A22)	Disp		VS

Here the software creation date and time are displayed, e.g. ”Jun 21 2000 12:31”. The code contains a string with a length of 17 bytes.

C1502: Display of software identification code

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1502		23073 (0x5A21)	Disp		U32
	1				
	...				
	4				

Display of code **C1500** in 4 subcodes, 4 characters each.

C1503: Display of software creation date

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1503		23072 (0x5A20)	Disp		U32
	1				
	...				
	4				

Display of code **C1501** in 4 subcodes, 4 characters each.

C1516: Display baud rate

Code	Subcode	Index	Possible settings			Data type
			Lenze	Selection		
C1516		23059_d = $5A13_h$	Disp	0	[1] 9	FIX32
				0: 12 Mbps		
				1: 6 Mbps		
				2: 3 Mbps		
				3: 1.5 Mbps		
				4: 500 kbps		
				5: 187.5 kbps		
				6: 93.75 kbps		
				7: 45.45 kbps		
				8: 19.2 kbps		
				9: 9.6 kbps		

C1517: Display bus device address

Code	Subcode	Index	Possible settings			Data type
			Lenze	Selection		
C1517		23058_d = $5A12_h$	Disp	3	[1] 126	FIX32

Display of the valid bus device address, which has been set via the DIP switches **S1 ... S7** or via code **C1509**.

C1520: Display of all words to master

Code	Subcode	Index	Possible settings			Data type
			Lenze	Selection		
C1520		23055_d = $5A0F_h$	Disp	0	[1] 65535	U16
	1 (PIW1)					
	...					
	10 (PIW10)					

Display of the master's process data input words PIW1 ... PIW10 in the different subcodes. All words are displayed. Only the configured words are valid.

The assignment of the bit status information or the actual controller values to the up to 10 process data input words (PIW) of the master can be freely configured via code **C1510**.

C1521: Display of all words from master

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1521		23054_d = $5A0E_h$	Disp	0	[1]	65535	U16
	1 (POW1)						
	...						
	10 (POW10)						

Display of the master's process data output words POW1 ... POW10 in the different subcodes. All words are displayed. Only the configured words are valid.

The assignment of the up to 10 process data output words (POW) of the master to bit control commands or controller setpoints can be freely configured via code **C1511**.

C1522: Display of all process data words to standard device

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1522		23053_d = $5A0D_h$	Disp	0	[1]	65535	U16
	1						
	...						
	16						

Display of the process data words 1 ... 16 which are transferred from the function module to the standard device:

Subcode	Process data word
1	FIF control word 1 (FIF-CTRL1)
2	FIF control word 2 (FIF-CTRL2)
3	Setpoint 1 (NSET1-N1)
4	Setpoint 2 (NSET1-N2)
5	Additional setpoint (PCTRL1-NADD)
6	Actual process controller value (PCTRL1-ACT)
7	Process controller setpoint (PCTRL1-SET1)
8	Reserved
9	Torque setpoint or torque limit value (MCTRL1-MSET)
10	PWM voltage (MCTRL1-VOLT-ADD)
11	PWM angle (MCTRL1-PHI-ADD)
12	Reserved
13	FIF-IN.W1
14	FIF-IN.W2
15	FIF-IN.W3
16	FIF-IN.W4

C1523: Display of all process data words from standard device

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1523		23052_d = $5A0C_h$	Disp	0	[1]	65535	U16
	1						
	...						
	16						

Display of the process data words 1 ... 16 which are transferred from the standard device to the function module:

Subcode	Process data word
1	FIF status word 1 (FIF-STAT1)
2	FIF status word 2 (FIF-STAT2)
3	Output frequency with slip (MCTRL1-NOUT+SLIP)
4	Output frequency without slip (MCTRL1-NOUT)
5	Apparent motor current (MCTRL1-IMOT)
6	Actual process controller value (PCTRL1-ACT)
7	Process controller setpoint (PCTRL1-SET)
8	Process controller output (PCTRL1-OUT)
9	Controller load (MCTRL1-MOUT)
10	DC-bus voltage (MCTRL1-DCVOLT)
11	Ramp function generator input (NSET1-RFG1-IN)
12	Ramp function generator output (NSET1-NOUT)
13	FIF-OUT.W1
14	FIF-OUT.W2
15	FIF-OUT.W3
16	FIF-OUT.W4

C1525: Display of current DIP switch setting

Code	Subcode	Index	Possible settings			Data type
			Lenze	Selection		
C1525		23050_d = $5A0A_h$	Disp			
	1			0	[1] 127	
	2			0	1	

This code displays the current DIP switch settings.

► Subcode1, bus device address:

DIP switches ©	Value	Example	
		Switch position	Bus device address
S1	1	**ON**	1 + 16 + 32 + 64 = 113
S2	2	OFF	
S3	4	OFF	
S4	8	OFF	
S5	16	**ON**	
S6	32	**ON**	
S7	64	**ON**	

► Subcode2, compatibility:

DIP switches ©	
Position of switch S8	**Compatibility**
OFF	E82ZAFPC201
ON	E82ZAFPC0xx

C1526: Display of last configuration data

Code	Subcode	Index	Possible settings			Data type
			Lenze	Selection		
C1526		23049_d = $5A09_h$	Disp	0 [1] 65535		FIX32
	1: byte 1					
	2: byte 2					
	3: byte 3					

This code displays the current configuration frame selected in the PROFIBUS master via the GSE file.

The configuration data indicate the following (see table below):

- The type of the set parameter data channel
- The length of the process data
- The existence/non-existence of process data consistency

Consistent channel	+ PZD ...	Subcode	Values	Description
DRIVECOM-PAR(Cons)	PZD(1W)	1	$F3_{hex}$	With consistent DRIVECOM parameter data channel and process data
		2	70_{hex} ... 79_{hex}	With consistent DRIVECOM parameter data channel and process data Process data without consistency 70_{hex}: 1 word ... 79_{hex}: 10 words
	PZD(1W Cons)	1	$F3_{hex}$	With consistent DRIVECOM parameter data channel and consistent process data
		2	$F0_{hex}$ ... $F9_{hex}$	With consistent DRIVECOM parameter data channel and consistent process data Process data with consistency $F0_{hex}$: 1 word ... $F9_{hex}$: 10 words
PKW(Cons)	PZD(1W)	1	00_{hex}	With consistent PROFIdrive parameter data channel and process data
		2	$F3_{hex}$	With consistent PROFIdrive parameter data channel and process data, in this case byte 1 is 00_{hex}
		3	70_{hex} ... 79_{hex}	With consistent PROFIdrive parameter data channel and process data Process data without consistency 70_{hex}: 1 word ... 79_{hex}: 10 words
	PZD(1W Cons)	1	00_{hex}	With consistent PROFIdrive parameter data channel and consistent process data
		2	$F3_{hex}$	With consistent PROFIdrive parameter data channel and consistent process data, in this case byte 1 is 00_{hex}
		3	$F0_{hex}$ ... $F9_{hex}$	With consistent PROFIdrive parameter data channel and consistent process data Process data with consistency $F0_{hex}$: 1 word ... $F9_{hex}$: 10 words
	PZD(1W)	1	70_{hex} ... 79_{hex}	Process data without consistency 70_{hex}: 1 word ... 79_{hex}: 10 words
	PZD(1W Cons)		$F0_{hex}$ ... $F9_{hex}$	Process data with consistency $F0_{hex}$: 1 word ... $F9_{hex}$: 10 words

Tip!

Observe the descriptions concerning
- the user data length (📖 31)
- the meaning of consistency (📖 110)

C1530: PROFIBUS diagnostics

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C1530		23045_d = $5A05_h$	Disp	See below	FIX32

This code gives information on the current status of the PROFIBUS.

Selection		
Bit	**Meaning**	**Explanation**
0	Reserved	
1	Reserved	
2	Reserved	
3	Reserved	
5/4	State of the DP state machine (DP-STATE)	
00	WAIT_PRM	The slave waits for a parameter data telegram after booting. Other types of telegrams will be rejected or will not be processed. Data exchange is not yet possible.
01	WAIT_CFG	The slave waits for the configuration telegram that specifies the number of input and output bytes. The master informs the slave about the number of input and output bytes that will be transferred.
10	DATA_EX	If the parameter settings as well as the configuration have been accepted by the firmware and by the application, the slave state changes to ”Data_Exchange” (exchange of user data with the master)
11	Not possible	
7/6	State of the watchdog state machine (WD-STATE)	
00	BAUD_SEARCH	The Profibus slave is able to recognise the baud rate automatically.
01	BAUD_CONTROL	After recognising the correct baud rate, the slave state changes to ”Baud_Control” and the transmission rate is monitored.
10	DP_CONTROL	This state is used for response monitoring of the PROFIBUS master.
11	Not possible	
8 ... 11	PROFIBUS transmission rate recognised by SPC3	

Bit	11	10	9	8	[kbps]
	0	0	0	0	12000
	0	0	0	1	6000
	0	0	1	0	3000
	0	0	1	1	1500
	0	1	0	0	500
	0	1	0	1	187.5
	0	1	1	0	93.75
	0	1	1	1	45.45
	1	0	0	0	19.2
	1	0	0	1	9.6

12	Reserved
13	Reserved
14	Reserved
15	Reserved

C1531: Bus counter

Code	Subcode	Index	Possible settings				Data type
			Lenze	Selection			
C1531		23044_d = $5A04_h$	Disp	0	[1]	65535	FIX32
	1						
	...						
	4						

Depending on the subcode, the following bus states are displayed:

- Subcode 1: data cycles per second
- Subcode 2: total data cycles
- Subcode 3: total parameterisation events
- Subcode 4: total configuration events

Tip!

When the maximum count value of 65535 is reached, the counter starts again with 0.

10.5 Important controller codes

C0002: Parameter set management

(Extract from code table)

Code	Subcode	Index	Possible settings		Data type
			Lenze	Selection	
C0002		24573 (0x5FFD)	0	See below	FIX32

► Parameter set management:

Selection	Description
0 Ready	**PAR1 ... PAR4:** ● Parameter sets of the controller ● PAR1 ... PAR4 **FPAR1:** ● Module-specific parameter set of the function module ● FPAR1 is stored in the function module

► Restoring the delivery state:

Selection	Description
1 Lenze setting ⇨PAR1	Restoring the delivery state in the selected parameter set
2 Lenze setting ⇨PAR2	
3 Lenze setting ⇨PAR3	
4 Lenze setting ⇨PAR4	
31 Lenze setting ⇨FPAR1	Restoring the delivery state in the function module
61 Lenze setting ⇨PAR1 + FPAR1	Restoring the delivery state in the selected parameter set of the controller and in the function module
62 Lenze setting ⇨PAR2 + FPAR1	
63 Lenze setting ⇨PAR3 + FPAR1	
64 Lenze setting ⇨PAR4 + FPAR1	

► Transferring parameter sets with the keypad:

Selection		Important
You can use the keypad to transfer parameter sets to other controllers. During the transfer, access to the parameters via other channels will be inhibited!		
	Keypad ⇨ controller	Overwrite all available parameter sets (PAR1 ... PAR4, FPAR1 if available) with the corresponding keypad data
70	With function module	
10	(other)	
	Keypad ⇨ PAR1 (+ FPAR1)	Overwrite the selected parameter set and, if available, FPAR1 with the corresponding keypad data
71	With function module	
11	(other)	
	Keypad ⇨ PAR2 (+ FPAR1)	
72	With function module	
12	(other)	
	Keypad ⇨ PAR3 (+ FPAR1)	
73	With function module	
13	(other)	
	Keypad ⇨ PAR4 (+ FPAR1)	
74	With function module	
14	(other)	
	Controller ⇨ keypad	Copy all available parameter sets (PAR1 ... PAR4, FPAR1 if available) into the keypad
80	With function module	
20	(other)	
	Keypad ⇨ function module	Overwrite only the module-specific parameter set FPAR1 with the keypad data
40	Only with function module	
	Function module ⇨ keypad	Copy only the module-specific parameter set FPAR1 into the keypad
50	Only with function module	

► Saving your own setting:

Selection		Important
9	PAR1 ⇨ own setting	You can store your own setting for the controller parameters (e.g. the delivery state of your machine): 1. Check that parameter set 1 is active 2. Inhibit the controller 3. Set C0003 = 3, confirm with ENTER 4. Set C0002 = 9, confirm with ENTER, your own setting has been stored 5. Set C0003 = 1, confirm with ENTER 6. Enable the controller
		This function can also be used to copy PAR1 to the parameter sets PAR2 ... PAR4
5	Own setting ⇨PAR1	Restore your own setting in the selected parameter set
6	Own setting ⇨PAR2	
7	Own setting ⇨PAR3	
8	Own setting ⇨PAR4	

11 Implemented PROFIdrive objects

Note!
The following indices can only be accessed via DPV1.

I-918$_{hex}$: Display of bus device address

Index **918**hex	Name				
Subindex	Default setting	Values		Access	Data type
-	Disp	1	[1] 126	R	U16

This PROFIdrive index displays the set bus device address.

I-963$_{hex}$: Baud rate

Index **963**hex	Name				
Subindex	Default setting	Values		Access	Data type
-	Disp	0:	9.6 kbps	R	U16
		1:	19.2 kbps		
		2:	93.75 kbps		
		3:	187.5 kbps		
		4:	500 kbps		
		6:	1.5 Mbps		
		7:	3 Mbps		
		8:	6 Mbps		
		9:	12 Mbps		
		10:	31.25 kbps		
		11:	45.45 kbps		

This PROFIdrive index displays the baud rate of the PROFIBUS.

I-964$_{hex}$: Device identification

Index **964**hex	Name				
Subindex	Default setting	Values		Access	Data type
0:	Disp	262:	Manufacturer: Lenze	R	U16
1:	Disp	8201:	Device type		
2:	Disp	xxyy:	Software version, e.g. 0090 (V 0.90)		
3:	Disp	yyyy:	Firmware date: year, e.g. 2005		
4:	Disp	ddmm:	Firmware date: day/month, e.g. 0506 (5 June)		

This PROFIdrive index displays the device identification.

I-974$_{hex}$: Settings for DPV1 parameters

Index **974**hex		Name			
Subindex		Default setting	Values	Access	Data type
0:	Maximum block length	Disp	240 bytes	R	U16
1:	Maximum number of parameter accesses	Disp	40		
2:	Maximum time per access	Disp			

12 Appendix

12.1 Particularities for use in conjunction with Lenze standard devices

Use of function module in conjunction with starttec motor starter

Note!

If the function module is used in conjunction with the starttec motor starter, solely the Lenze device control is effective.

In the following table, the bit assignments for the applicable control word 1 (FIF-CTRL1) and status word 1 (FIF-STAT1) are given:

Control word 1 (FIF-CTRL1)		Status word 1 (FIF-STAT1)	
Bit	**Assignment**	**Bit**	**Assignment**
0	**S1**	**0**	Reserved
1	**S2**	**1**	Reserved
2	**Brake**	**2**	Reserved
3	Reserved	**3**	Reserved
4	Reserved	**4**	Reserved
5	Reserved	**5**	Reserved
6	Reserved	**6**	**Fixed 1**
7	Reserved	**7**	**Controller inhibit** 0 Controller enabled 1 Controller inhibited
8	Reserved	**8 ... 11**	**Device status**
9	**Controller inhibit** (FIF-CTRL1-CINH) 0 Controller enabled 1 Controller inhibited		
10	**External fault** (FIF-CTRL1-TRIP-SET)		
11	**Fault reset** 0=>1 (FIF-CRTL1-TRIP-RESET) Bit change causes TRIP reset		
12	Reserved	**12**	Reserved
13	Reserved	**13**	Reserved
14	Reserved	**14**	Reserved
15	Reserved	**15**	**Ready for operation** 0 Not ready for operation (fault) 1 Ready for operation (no fault)

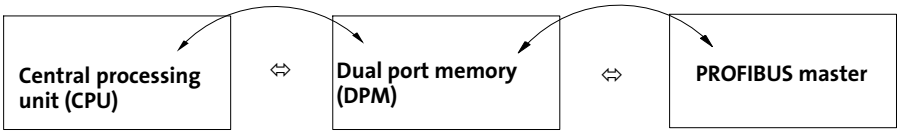
Bit	11	10	9	8	
	0	0	1	1	Operation inhibited
	0	1	1	0	Operation enabled
	1	0	0	0	Fault active
	1	1	1	1	Communication with basic device not possible

12.2 Consistent parameter data

In the PROFIBUS communication system, data are permanently exchanged between the host (**CPU + PROFIBUS master**) and the standard device via the plugged-on slave interface module.

Both the PROFIBUS master and the CPU (central processing unit) of the host access a joint memory - the dual port memory (DPM).

The DPM allows data exchange in both directions (write/read):



It could happen that a slower PROFIBUS master writing would be overtaken by a faster CPU reading within a cycle time without any further data organisation.

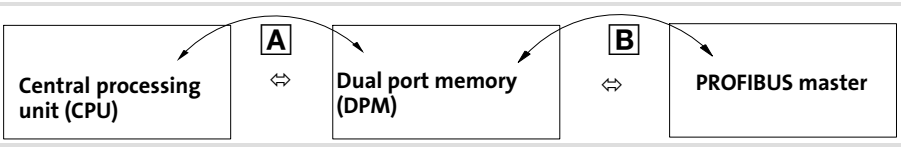
To avoid such an impermissible state, the parameter data to be transmitted must be marked as ”consistent”.

Data communication with existing consistency

With consistency, either ”reading” or ”writing” is possible when the master and the CPU simultaneously access the memory:

- The PROFIBUS master transfers data only as a complete data set.
- The CPU can only access completely updated data sets.
- The PROFIBUS master cannot read or write data as long as the CPU accesses consistent data.

The result becomes clear from the example below:



A CPU wants to read!
B PROFIBUS master wants to write simultaneously!
1. As the PROFIBUS master can only write if the CPU does not read, the master has to wait until the data are read completely by the CPU.
2. The PROFIBUS master only writes a complete data set into the DPM.

Configuring consistent data

Consistency is achieved by an appropriate PROFIBUS master configuration. Please refer to the corresponding documentation for your configuring software for this purpose.

Tip!

Consistency configuration depends on the PROFIBUS master configuring software. When using a Siemens-S5 PLC, please consider:

- ► Consistency is switched on by any word in the consistent area
- ► Consistency must be switched off by a specific switch-off word.
- ► The type of CPU and consistency and the address area determine which word switches off consistency.

12.3 Parallel operation of AIF and FIF interfaces

Note!

The option of parallel operation ...

- ► of a communication module (AIF) and a function module (FIF) exists for the standard devices 8200 vector and Drive PLC.
- ► of two function modules (FIF) exists for the standard devices 8200 motec, Drive PLC and starttec.

Possible combinations

Function module on FIF		Communication module on AIF					
		Keypad E82ZBC Keypad XT EMZ9371BC	PROFIBUS-DP EMF2133IB	System bus CAN EMF2171IB EMF2172IB	CANopen EMF2178IB	DeviceNet EMF2179IB	Ethernet PowerLink EMF2191IB
Standard I/O PT	E82ZAFSC010	✓	✓	✓	✓	✓	✓
Application I/O PT	E82ZAFAC010	✓	✓)	✓)	✓)	✓)	✓)
PROFIBUS-DP	E82ZAFPC010	✓	☒	☒	☒	☒	☒
PROFIBUS I/O	E82ZAFPC201						
Sys. bus CAN PT	E82ZAFCC010	✓	✓	✓	✓	✓	✓
Sys. bus CAN PT	E82ZAFCC210						
Sys.-bus CAN-I/O RS PT	E82ZAFCC100						
CANopen PT	E82ZAFUC010	✓	☒	☒	☒	☒	☒
DeviceNet PT	E82ZAFVC010	✓	☒	☒	☒	☒	☒
INTERBUS PT	E82ZAFIC010	✓	☒	☒	☒	☒	☒
LECOM-B PT	E82ZAFLC010	✓	☒	☒	☒	☒	☒
AS interface PT	E82ZAFFC010	✓	☒	☒	☒	☒	☒

Function module on FIF		Communication module on AIF				
		INTERBUS EMF2113IB	LECOM-A/B EMF2102IBC V001	LECOM-A EMF2102IBC V004	LECOM-B EMF2102IBC V002	LECOM-LI EMF2102IBC V003
Standard I/O PT	E82ZAFSC010	✓	✓	✓	✓	✓
Application I/O PT	E82ZAFAC010	✓)	✓)	✓)	✓)	✓)
PROFIBUS-DP	E82ZAFPC010	☒	✓)	✓	✓)	✓)
PROFIBUS I/O	E82ZAFPC201					
Sys. bus CAN PT	E82ZAFCC010	✓	✓	✓	✓	✓
Sys. bus CAN PT	E82ZAFCC210					
Sys.-bus CAN-I/O RS PT	E82ZAFCC100					
CANopen PT	E82ZAFUC010	☒	✓)	✓	✓)	✓)
DeviceNet PT	E82ZAFVC010	☒	✓)	✓	✓)	✓)
INTERBUS PT	E82ZAFIC010	☒	✓)	✓	✓)	✓)
LECOM-B PT	E82ZAFLC010	☒	✓)	✓	✓)	✓)
AS interface PT	E82ZAFFC010	☒	✓)	✓	✓)	✓)

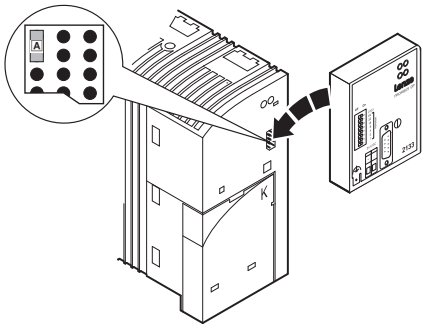
✓ Combination possible, communication module can be supplied internally or externally (keypad only internally)

✓ Combination possible, communication module has to be supplied externally

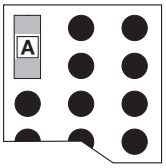
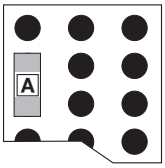
☒ Combination not possible

Notes on parallel operation

For internal voltage supply, the jumper [A] must be plugged on at the indicated position.



8200vec073

External voltage supply (delivery state)	Voltage supply through internal voltage source
	

13 Index

A

B

C

D

E

F

I

L

M

N

O

P

R

S

T

U

V

W

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