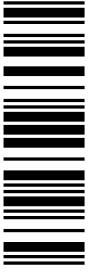


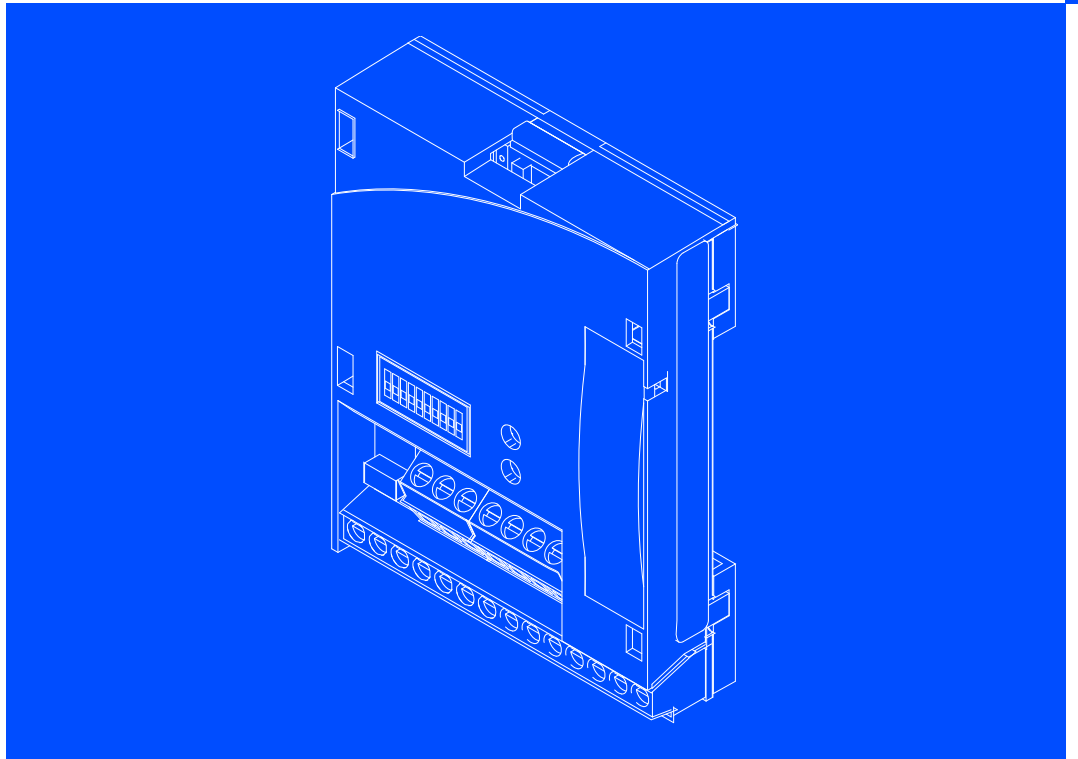
EDS82ZAFPC201
13403738

L-force *Communication*



Communication Manual

PROFIBUS I/O



E82ZAFPC201

Function module

Lenze

| | | |
|----------|--|-----------|
| 1 | About this documentation | 5 |
| 1.1 | Document history | 6 |
| 1.2 | Conventions used | 7 |
| 1.3 | Terminology used | 7 |
| 1.4 | Notes used | 8 |
| 2 | Safety instructions | 9 |
| 2.1 | General safety information | 9 |
| 2.2 | Device- and application-specific safety instructions | 10 |
| 2.3 | Residual hazards | 10 |
| 3 | Product description | 11 |
| 3.1 | Application as directed | 11 |
| 3.2 | Identification | 11 |
| 3.3 | Product features | 12 |
| 3.4 | Connections and interfaces | 13 |
| 4 | Technical data | 14 |
| 4.1 | General data | 14 |
| 4.2 | Operating conditions | 14 |
| 4.3 | Protective insulation | 15 |
| 4.4 | Connection terminals | 15 |
| 4.5 | Communication time | 16 |
| 4.6 | Dimensions | 17 |
| 5 | Installation | 18 |
| 5.1 | Mechanical installation | 18 |
| 5.2 | Electrical installation | 19 |
| 5.2.1 | Wiring according to EMC (CE-typical drive system) | 19 |
| 5.2.2 | Wiring with a host (master) | 20 |
| 5.2.3 | Voltage supply | 23 |
| 5.2.4 | Terminal assignment | 24 |
| 5.2.5 | Cable cross-sections and screw-tightening torques | 25 |
| 6 | Commissioning | 26 |
| 6.1 | Before switching on | 26 |
| 6.2 | Commissioning steps | 27 |
| 6.3 | Configuring the host system (master) | 29 |
| 6.3.1 | Setting compatibility with PPO types 1 ... 5 | 30 |
| 6.3.2 | Adapting device controls | 31 |
| 6.3.3 | Defining the user data length | 31 |

| | | |
|----------|---|-----------|
| 6.4 | Setting the software compatibility | 32 |
| 6.5 | Activating the bus terminating resistor | 33 |
| 6.6 | Setting the node address | 33 |
| 6.6.1 | Setting via code | 33 |
| 6.6.2 | Settings via DIP switch | 34 |
| 6.7 | Connecting the mains voltage | 35 |
| 7 | Process data transfer | 36 |
| 7.1 | Lenze device control | 37 |
| 7.1.1 | Process output data configuration | 37 |
| 7.1.2 | Process input data configuration | 41 |
| 7.2 | DRIVECOM control | 45 |
| 7.2.1 | DRIVECOM state machine | 45 |
| 7.2.2 | DRIVECOM control word | 46 |
| 7.2.3 | DRIVECOM status word | 47 |
| 7.2.4 | Bit control commands | 48 |
| 7.2.5 | Status bits | 49 |
| 7.3 | PROFdrive control | 50 |
| 7.3.1 | PROFdrive state machine | 50 |
| 7.3.2 | PROFdrive control word | 51 |
| 7.3.3 | PROFdrive status word | 52 |
| 8 | Parameter data transfer | 53 |
| 8.1 | DRIVECOM parameter data channel | 54 |
| 8.1.1 | Addressing of the parameter data | 54 |
| 8.1.2 | Addressing of the Lenze parameters | 54 |
| 8.1.3 | Telegram structure | 54 |
| 8.1.4 | Error codes (DRIVECOM) | 58 |
| 8.1.5 | Reading parameters | 59 |
| 8.1.6 | Writing parameters | 61 |
| 8.2 | PROFdrive parameter data channel | 63 |
| 8.2.1 | PROFdrive DP-V0 | 64 |
| 8.2.2 | PROFdrive DP-V1 | 69 |
| 8.2.3 | Error codes (PROFdrive) | 83 |
| 8.3 | Parameter set transfer | 84 |
| 9 | Diagnostics | 85 |
| 9.1 | LED status displays | 85 |
| 9.2 | Troubleshooting and fault elimination | 86 |
| 9.3 | Monitoring for interruption of PROFIBUS communication | 87 |

| | | |
|-----------|---|------------|
| 10 | Codes | 89 |
| | 10.1 Overview | 89 |
| | 10.2 Communication-relevant Lenze codes | 91 |
| | 10.3 Monitoring codes | 95 |
| | 10.4 Diagnostics codes | 97 |
| | 10.5 Important controller codes | 105 |
| 11 | Implemented PROFIdrive objects | 107 |
| 12 | Appendix | 109 |
| | 12.1 Particularities for use in conjunction with Lenze standard devices | 109 |
| | 12.2 Consistent parameter data | 110 |
| | 12.3 Parallel operation of AIF and FIF interfaces | 112 |
| 13 | Index | 114 |

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 | In quotation marks | For example: '100' |
| • Nibble | Point | 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 About this documentation

Notes used

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 ...

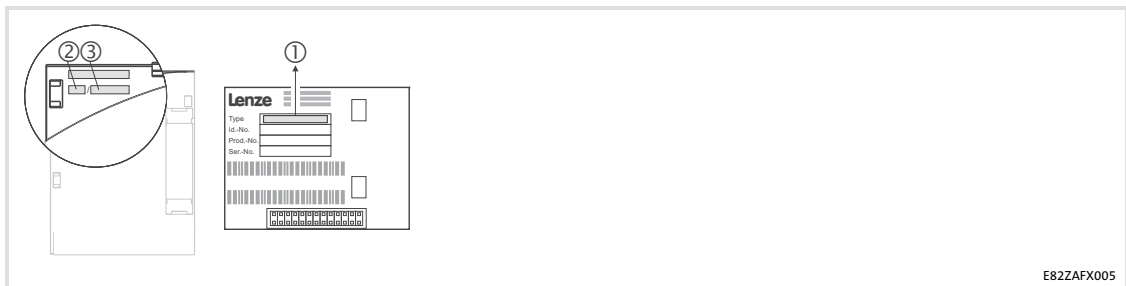
- ▶ is an accessory module for use in conjunction with the following Lenze standard devices:

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

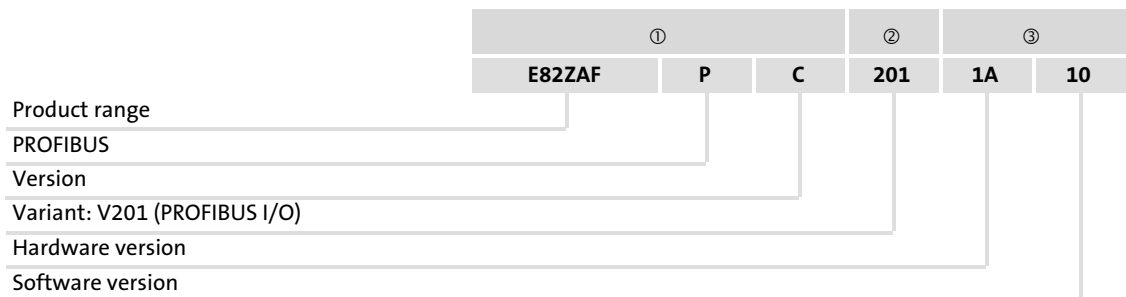
- ▶ is a device intended for use in industrial power systems.

Any other use shall be deemed inappropriate!

3.2 Identification



E82ZAFX005



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

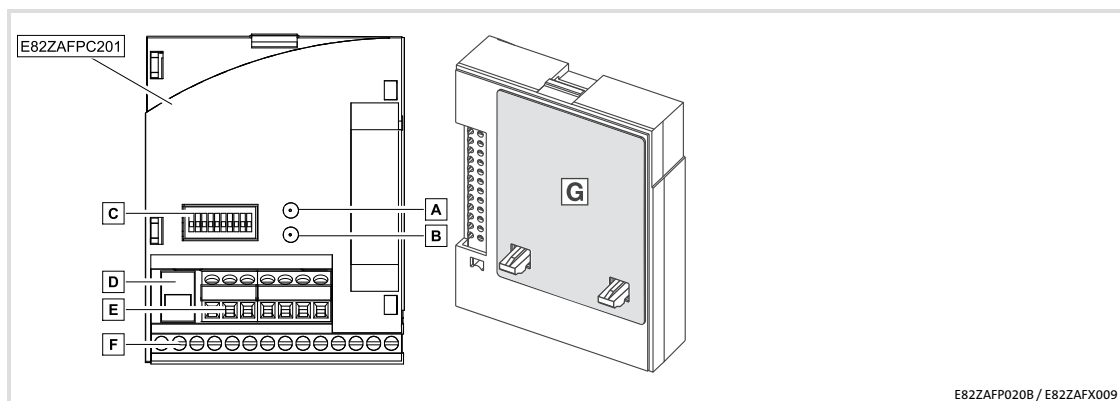


Fig. 3-1 Communication module E82ZAFPC201 (PROFIBUS I/O)

| 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 ... <ul style="list-style-type: none"> 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 ... <ul style="list-style-type: none"> digital inputs E1 and E2 external voltage supply | 15 |
| F | Terminal strip X3.2, connections for ... <ul style="list-style-type: none"> PROFIBUS controller inhibit (CINH) external voltage supply | 16 |
| G | Nameplate | 11 |

4 Technical data

General data

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) | <ul style="list-style-type: none"> ● PROFIBUS-DP-V0 ● PROFIBUS-DP-V1 |
| Communication medium | RS485 |
| Drive profile | <ul style="list-style-type: none"> ● DRIVECOM profile "Drive technology 20" (can be switched off) ● PROFIdrive (can be switched off, state machine and PROFIdrive parameter data channel) |
| Network topology | <ul style="list-style-type: none"> ● 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 | <ul style="list-style-type: none"> ● 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) |
|--|--|
| <ul style="list-style-type: none"> ● Power section <ul style="list-style-type: none"> – 8200 vector – 8200 motec – 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. <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● +20 V DC (reference: GND1) ● $I_{max} = 20$ mA |
| 39 | GND2 | Reference potential of the <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● +24 V DC $\pm 10\%$ (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 *) <ul style="list-style-type: none"> ● Level during data transmission: CNTR = HIGH (+5 V DC, reference: GND3) |
| VP | | For function see PROFIBUS standard *) <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● digital inputs at X3.1/E1 and X3.1/E2 ● controller inhibit (CINH) at X3.2/28 |
| 28 | CINH | Controller inhibit <ul style="list-style-type: none"> ● 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) <ul style="list-style-type: none"> ● +20 V DC (reference: GND1) ● I_{max} = 20 mA |
| 59 | | External DC voltage supply for the function module <ul style="list-style-type: none"> ● +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 ...

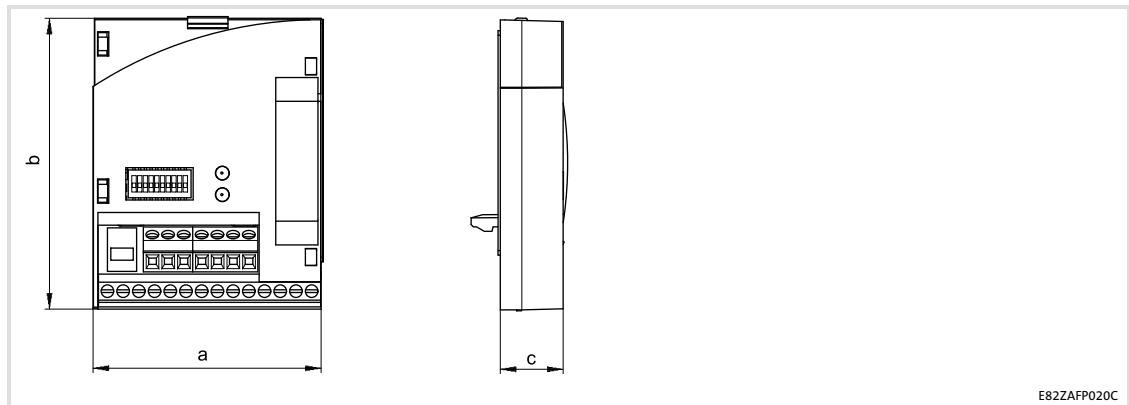
- ▶ the processing time in the controller
- ▶ the transmission delay time
 - the baud rate
 - the telegram length

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:



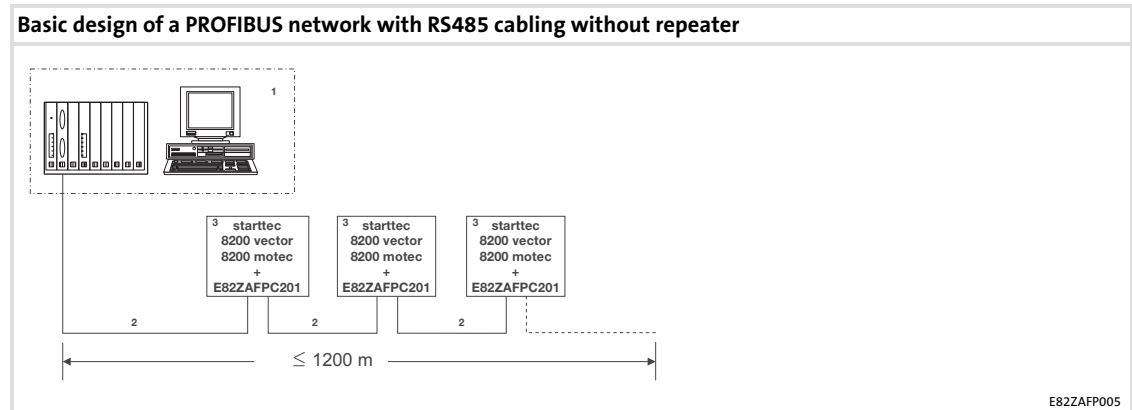
Note!

- ▶ 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 mm² (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)

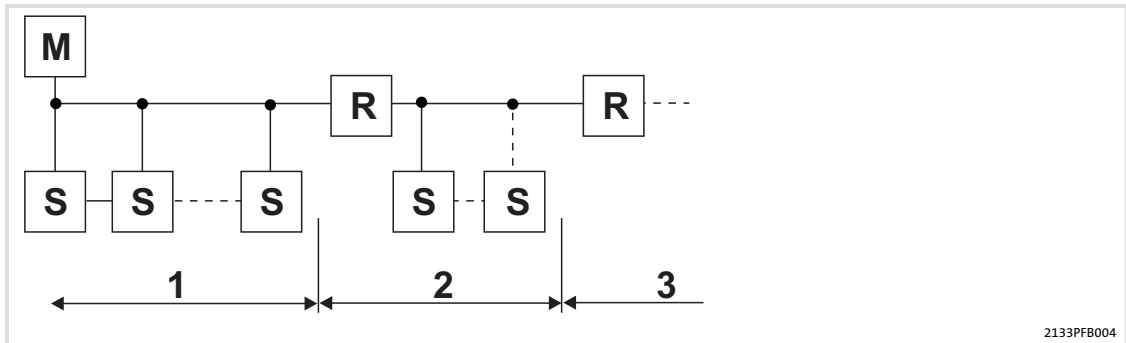


| No. | Element | Note |
|-----|----------------|---|
| 1 | Host | E.g. PC or PLC with PROFIBUS master interface module |
| 2 | Bus cable | Connects the PROFIBUS master interface module to the function modules. <ul style="list-style-type: none"> The baud rate depends on the length of the bus cable (☞ 22). |
| 3 | PROFIBUS slave | Applicable standard device (☞ 11) with function module <ul style="list-style-type: none"> 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



2133PFB004

| 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 | \leq 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.

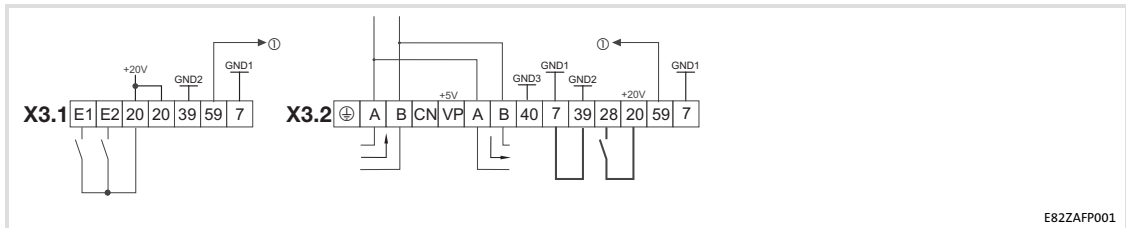
Advantages of optical fibres:

- ▶ 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.



E82ZAFP001

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.

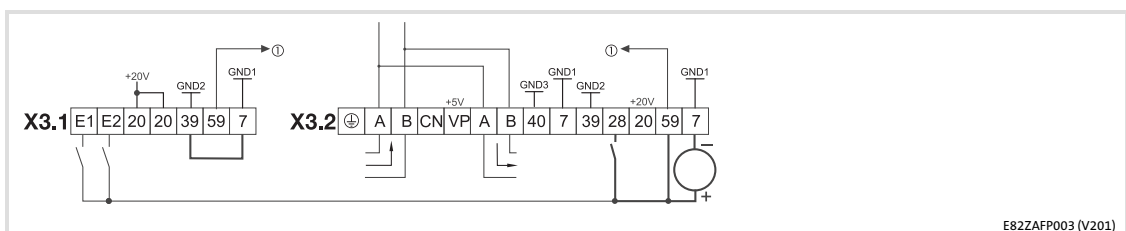


Note!

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)

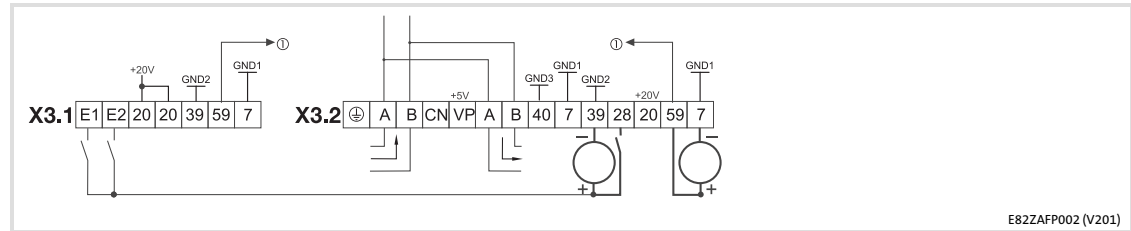


E82ZAFP003 (V201)

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)



E82ZAFP002 (V201)

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. <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● +20 V DC (reference: GND1) ● I_{max} = 20 mA |
| 39 | GND2 | Reference potential of the <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● +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 |



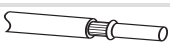

*) Alternatively frequency input 0 ... 10 kHz (one-track) or 0 ... 1 kHz (two-track) configuration via C0425

| 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 *) <ul style="list-style-type: none"> Level during data transmission: CNTR = HIGH (+5 V DC, reference: GND3) |
| VP | | For function see PROFIBUS standard *) <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> digital inputs at X3.1/E1 and X3.1/E2 controller inhibit (CINH) at X3.2/28 |
| 28 | CINH | Controller inhibit <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> +20 V DC (reference: GND1) I_{max} = 20 mA |
| 59 | | External DC voltage supply for the function module <ul style="list-style-type: none"> +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

5.2.5

Cable cross-sections and screw-tightening torques

| Range | Values |
|-----------------------|---|
| Electrical connection | Terminal strip with screw connection |
| Possible connections | rigid:  1.5 mm ² (AWG 16) |
| | flexible:  without wire end ferrule 1.0 mm ² (AWG 18) |
| |  with wire end ferrule, without plastic sleeve 0.5 mm ² (AWG 20) |
| |  with wire end ferrule, with plastic sleeve 0.5 mm ² (AWG 20) |
| Tightening torque | 0.22 ... 0.25 Nm (1.9 ... 2.2 lb-in) |
| Bare end | 5 mm |

6 Commissioning

Before switching on

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). <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● After approx. 1 second the standard device will be ready for operation. ● Controller inhibit (CINH) is active. Reaction <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● DIP switch S8 = OFF | 32 |
| 5. | Activate the bus terminating resistor of the first and last bus device through DIP switch = ON. <ul style="list-style-type: none"> ● Lenze setting: OFF | 33 |
| 6. | A Set the bus device address via ... <ul style="list-style-type: none"> – C1509 or – DIP switches S1 ... S7. <p>If the setting via code applies (DIP switches S1 ... S7 = OFF), then the address must be reassigned after a parameter set transfer.</p> 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. <p>Address modifications via keypad become effective immediately.</p> | 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. <ul style="list-style-type: none"> ● Set C0005 = 200. <ul style="list-style-type: none"> – A preconfiguration for operation with the function module is carried out. – Control words and status words are already linked. | |

| Step | Description | Detailed information |
|------|--|----------------------|
| 9. | <p>Use C1511 to assign the process data output words (POW) of the master to the process data input words of the standard device.</p> <p>Lenze setting:</p> <ul style="list-style-type: none"> 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. | <p>Use C1510 to assign the process data output words of the standard device to the process data input words (PIW) of the master.</p> <p>Lenze setting:</p> <ul style="list-style-type: none"> 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. | <p>Enable process output data with C1512 = 65535.</p> <ul style="list-style-type: none"> ● 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. | <p>Enable the standard device via terminal 28 (CINH).</p> <ul style="list-style-type: none"> ● Set terminal 28 to HIGH level. | |
| 13. | <p>Select the setpoint.</p> <ul style="list-style-type: none"> ● The master transmits the setpoint via the selected process data output word. | |
| 14. | <p>Change to the READY TO SWITCH ON state:</p> <ul style="list-style-type: none"> ● The master transmits the DRIVECOM control word: 0000 0000 0111 1110_{bin} (007E_{hex}). | |
| 15. | <p>The standard device in the READY TO SWITCH ON state.</p> <ul style="list-style-type: none"> ● The master receives the DRIVECOM status word: xxxx xxxx x01x 0001_{bin}. | |
| 16. | <p>Change to the OPERATION ENABLED state.</p> <ul style="list-style-type: none"> ● The master transmits the DRIVECOM control word: 0000 0000 0111 1111_{bin} (007F_{hex}). | |
| 17. | <p>The drive starts up.</p> | |

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.

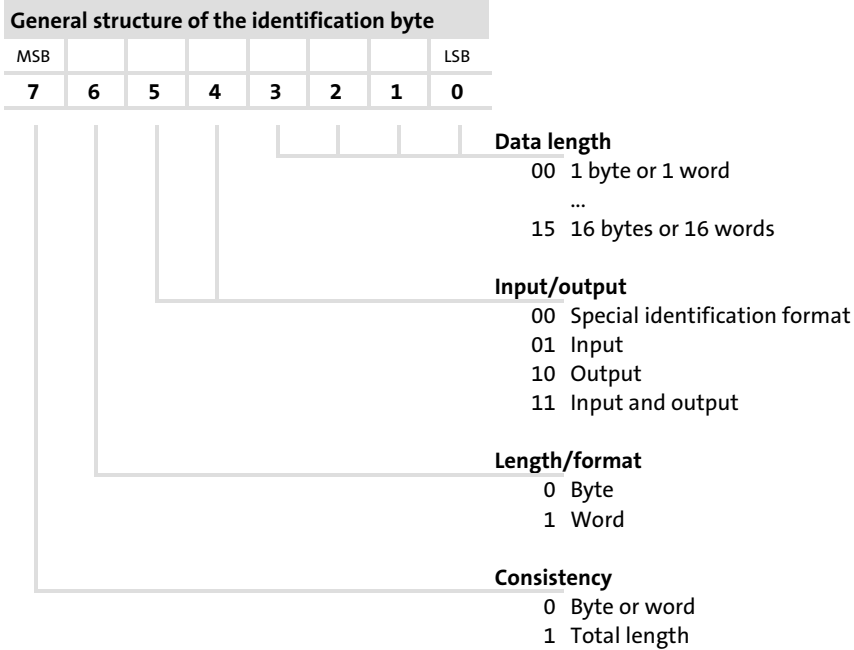
- ▶ PIW: process data input word (process data from standard device to master)
- ▶ POW: process data output word (process data from master to standard device)

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 | - | <ul style="list-style-type: none"> ● Identification <ul style="list-style-type: none"> – 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 | <ul style="list-style-type: none"> ● Identification: F3_{hex} (243) ● User data length: 4 words (word 1 ... word 4) | <ul style="list-style-type: none"> ● Identification <ul style="list-style-type: none"> – 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) |

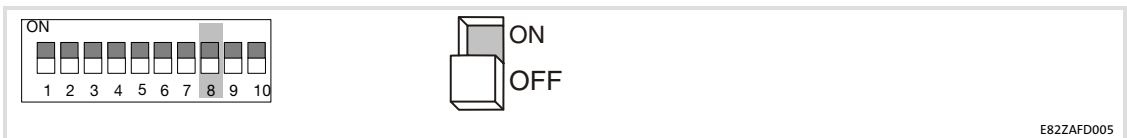
Commissioning

Setting the software compatibility
 Defining the user data length



6.4 Setting the software compatibility

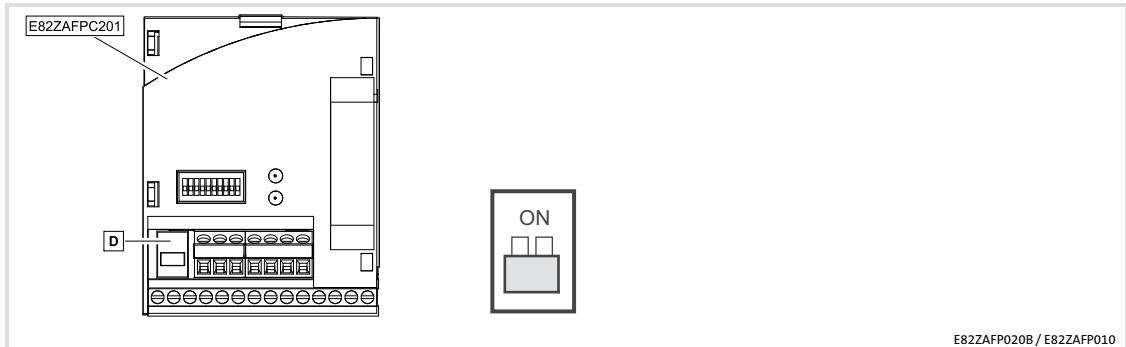
DIP switch **S8** (C) serves to set compatibility with the Lenze PROFIBUS function modules E82ZAFPC0xx.



| 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 |
|---|---------------------|---|
| <ul style="list-style-type: none"> • Operating module or »GDC« | 3 ... 126 | - |
| <ul style="list-style-type: none"> • 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

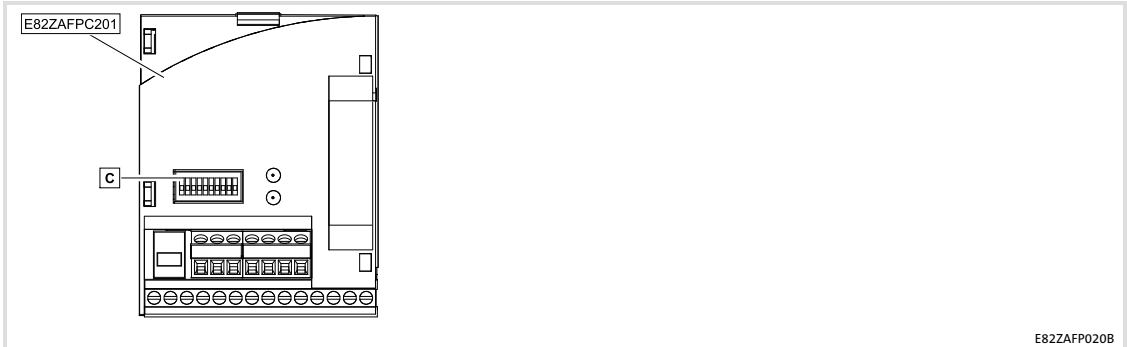
Commissioning

Setting the node address
Settings via DIP switch

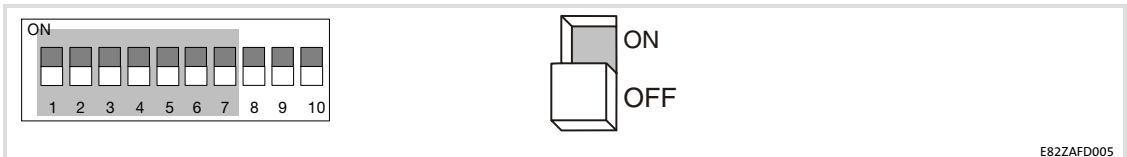
6.6.2

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!

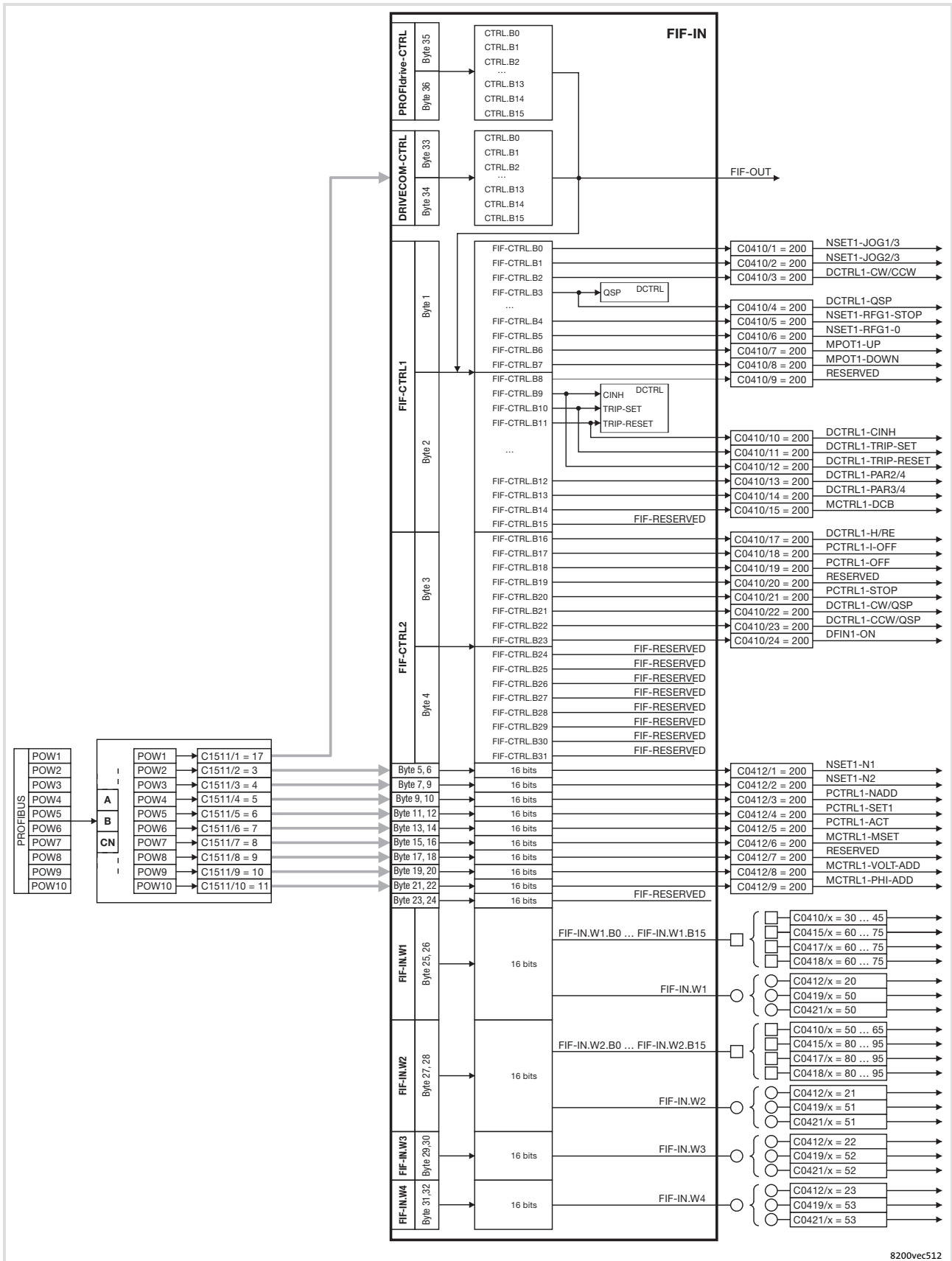
- ▶ The assignment of control words of different device controls is not permitted.
 - ▶ If **C1511** is changed, the process output data are automatically inhibited to ensure data consistency.
 - ▶ Via **C1512** you can re-enable individual or all POWs.
-
- ▶ To activate the DRIVECOM device control, 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) | $\pm 24000 \equiv \pm 480 \text{ Hz}$ |
| 4 | Setpoint 2 (NSET1-N2) | $\pm 24000 \equiv \pm 480 \text{ Hz}$ |
| 5 | Additional setpoint (PCTRL1-NADD) | $\pm 24000 \equiv \pm 480 \text{ Hz}$ |
| 6 | Actual process controller value (PCTRL1-ACT) | $\pm 24000 \equiv \pm 480 \text{ Hz}$ |
| 7 | Process controller setpoint (PCTRL1-SET1) | $\pm 24000 \equiv \pm 480 \text{ Hz}$ |
| 8 | Reserved | |
| 9 | Torque setpoint/torque limit value (MCTRL1-MSET) | $2^{14} \equiv 100 \text{ \% rated motor torque}$ |
| 10 | PWM voltage (MCTRL1-VOLT-ADD) |  For special applications only. |
| 11 | PWM angle (MCTRL1-PHI-ADD) |  System manual for 8200 vector |
| 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 |



8200vec512

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

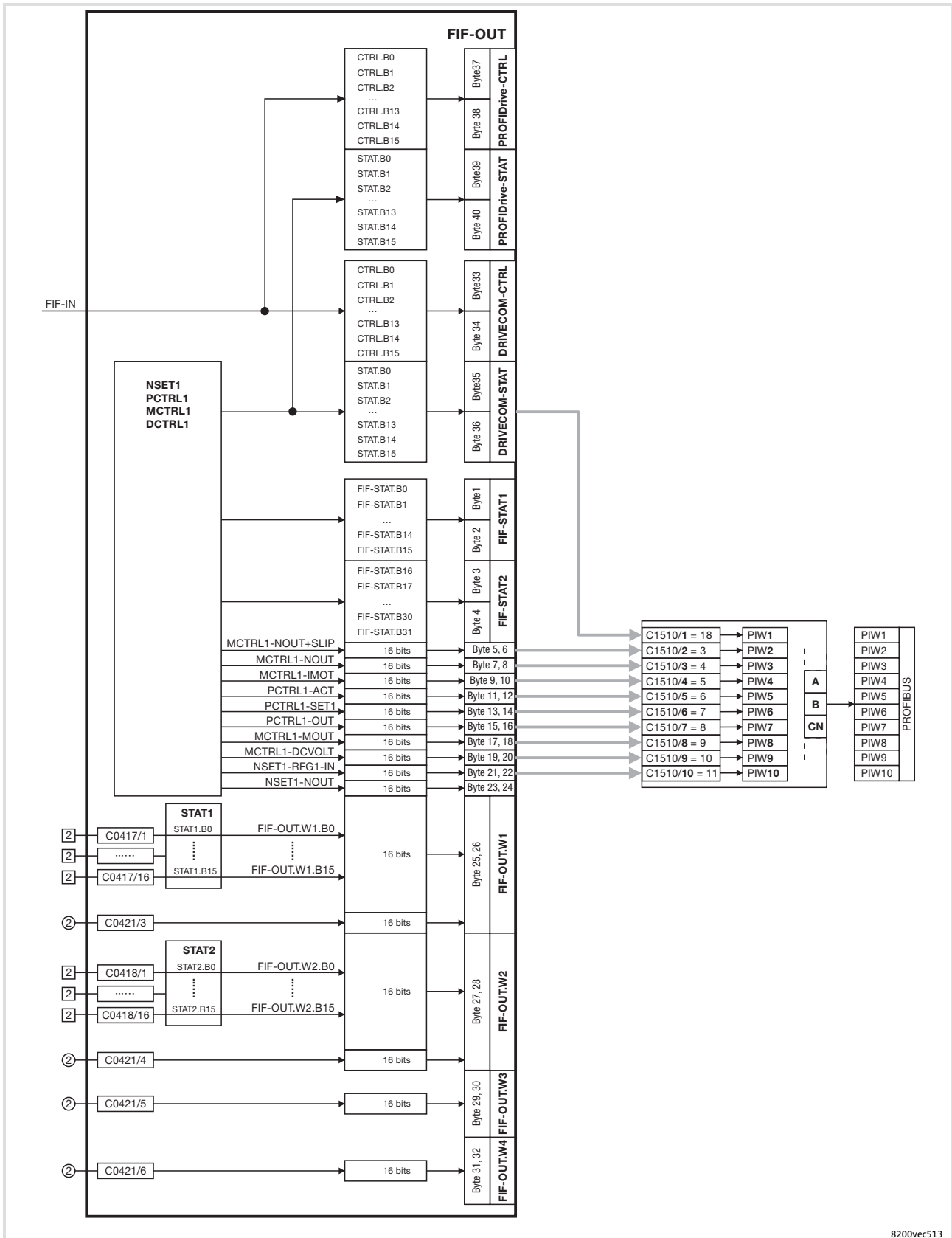
- ▶ To call DRIVECOM-conform status information, assign the DRIVECOM status word to a PIW (**C1511/x = 18**).
The FIF status word 1 is mapped to the DRIVECOM status word.
- ▶ To call PROFIdrive-conform status information, assign the PROFIdrive status word to a PIW (**C1511/x = 20**).
The FIF status word 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) | $\pm 24000 \equiv \pm 480$ Hz |
| 4 | Output frequency without slip (MCTRL1-NOUT) | $\pm 24000 \equiv \pm 480$ Hz |
| 5 | Apparent motor current (MCTRL1-IMOT) | $2^{14} \equiv 100$ % rated device current |
| 6 | Actual process controller value (PCTRL1-ACT) | $\pm 24000 \equiv \pm 480$ Hz |
| 7 | Process controller setpoint (PCTRL1-SET) | $\pm 24000 \equiv \pm 480$ Hz |
| 8 | Process controller output (PCTRL1-OUT) | $\pm 24000 \equiv \pm 480$ Hz |
| 9 | Controller load (MCTRL1-MOUT) | $\pm 2^{14} \equiv \pm 100$ % rated motor torque |
| 10 | DC-bus voltage (MCTRL1-DCVOLT) | 16383 \equiv 565 V DC for 400 V mains 16383 \equiv 325 V DC for 230 V mains |
| 11 | Ramp function generator input (NSET1-RFG1-IN) | $\pm 24000 \equiv \pm 480$ Hz |
| 12 | Ramp function generator output (NSET1-NOUT) | $\pm 24000 \equiv \pm 480$ 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 |



8200vec513

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

7 Process data transfer

Lenze device control

Process input data configuration

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

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.

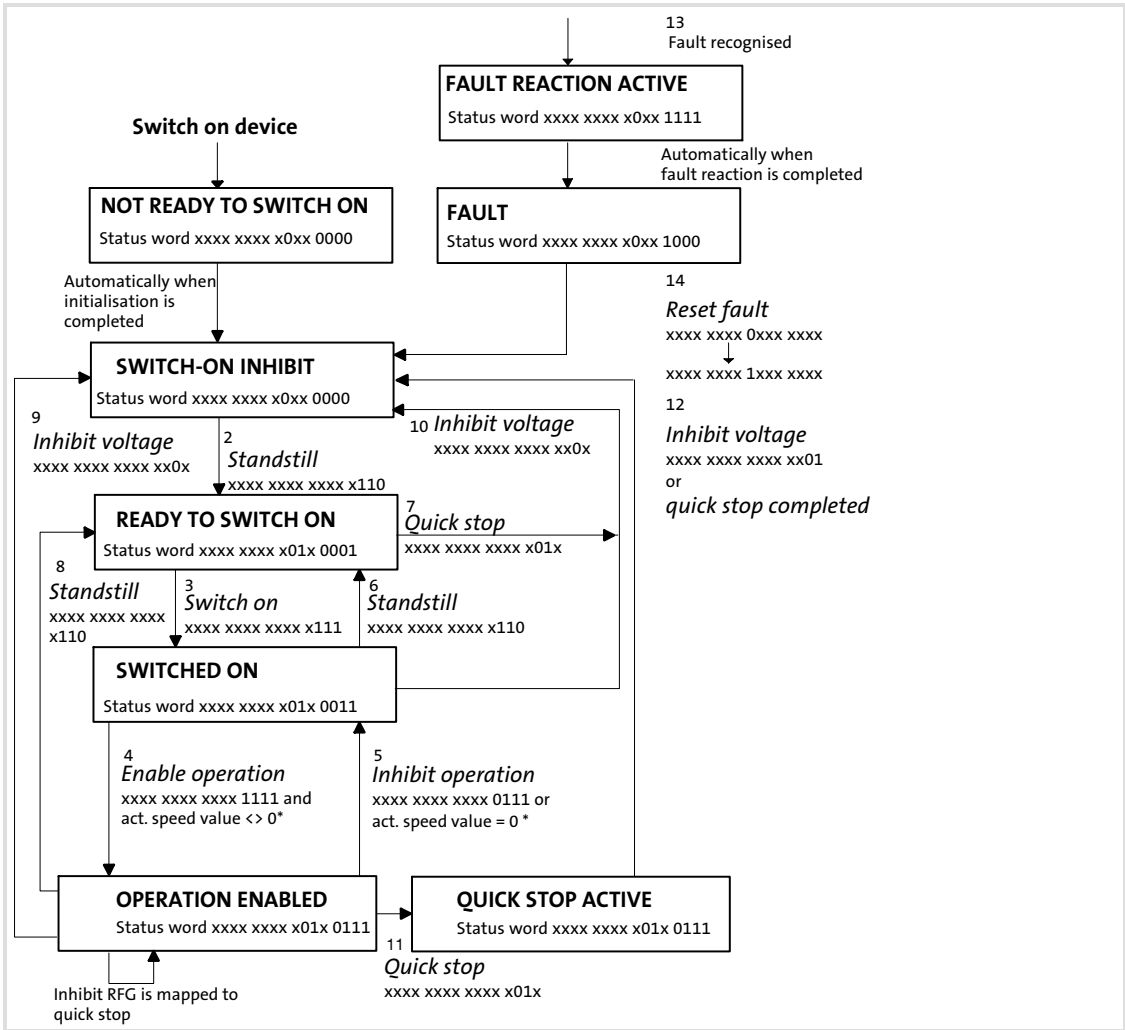


Fig. 7-3 Status diagram of DRIVECOM device control

* 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 | 0: Bit not set |
| Enable operation | Transition ⇒ "Operation enabled" The controller inhibit (CINH) is deactivated. | x | x | x | x | 1 | 1 | 1 | 1 | |
| 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: | | | | | | | Note |
|-------------------------|--|--|---|---|---|---|---|---|------------------|
| Device status | Meaning | Bits of the status word | | | | | | | |
| | | 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 | 0 Bit not set |
| Ready to switch on | Controller inhibited (CINH). Waiting for "Switch-on" command | 0 | 1 | x | 0 | 0 | 0 | 1 | |
| Switched on | Controller inhibited (CINH). Waiting for "Operation enabled" command. | 0 | 1 | x | 0 | 0 | 1 | 1 | x Any bit status |
| Operation enabled | Controller enabled ($\overline{\text{CINH}}$). Pulse inhibit can be set automatically | 0 | 1 | x | 0 | 1 | 1 | 1 | |
| 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 Process data transfer

PROFdrive control

PROFdrive state machine

7.3 PROFdrive control

7.3.1 PROFdrive state machine

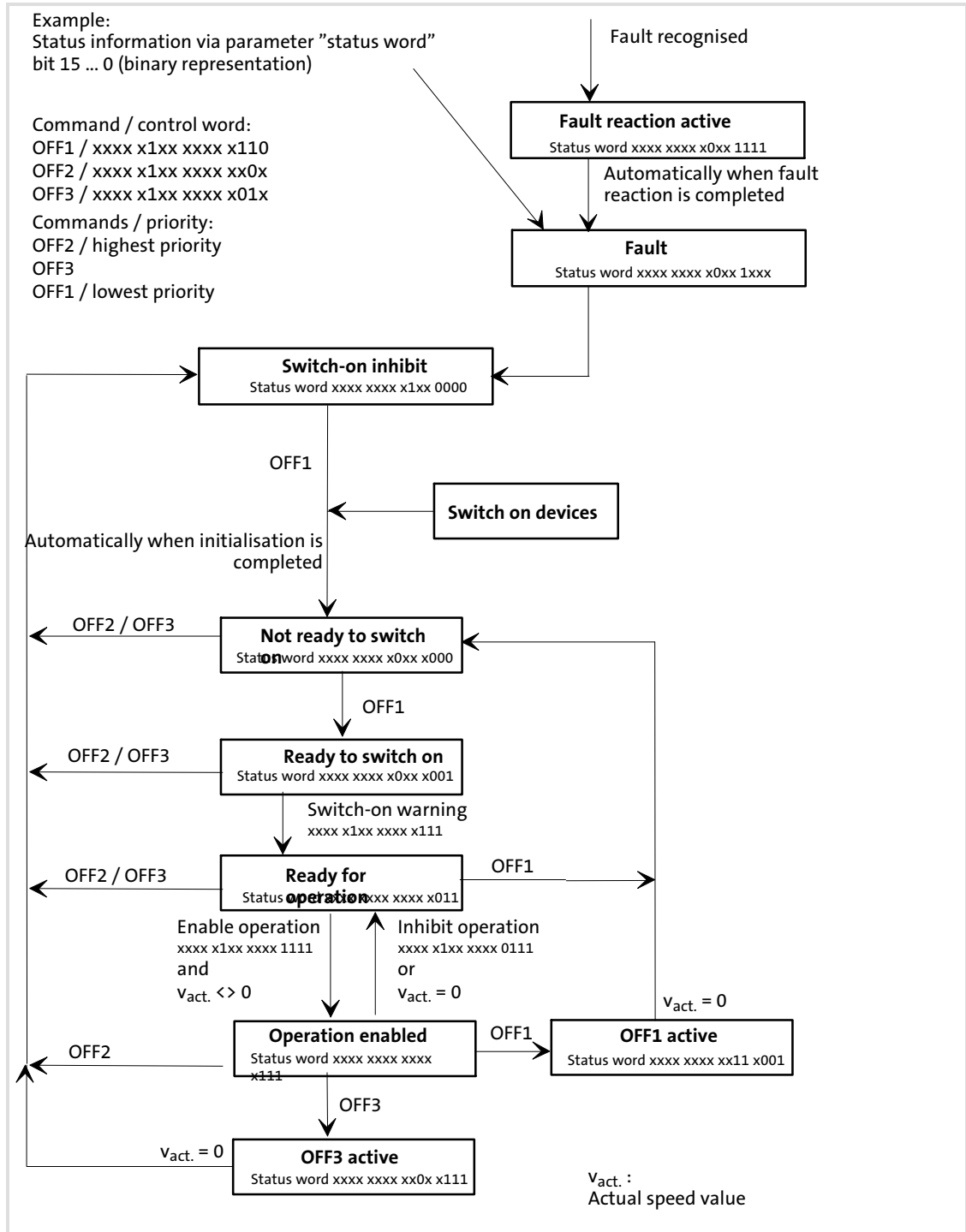


Fig. 7-4 State diagram PROFdrive control

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 PROFdrive 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 Parameter data transfer

DRIVECOM parameter data channel

Addressing of the parameter data

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 ($24575_{\text{dec}} / 5FFF_{\text{hex}}$):

| Addressing of Lenze codes | Example for C0001 (operating mode) |
|---|---|
| <ul style="list-style-type: none"> • PROFIBUS index = 24575 - Lenze code | <ul style="list-style-type: none"> • PROFIBUS index = 24575 - 1 = 24574 |
| <ul style="list-style-type: none"> • PROFIBUS-DP-Index_{hex} = 5FFF_{hex} - Lenze code_{hex} | <ul style="list-style-type: none"> • 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.

- ▶ $150.4 \times 10000 = 1504000$ (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 |

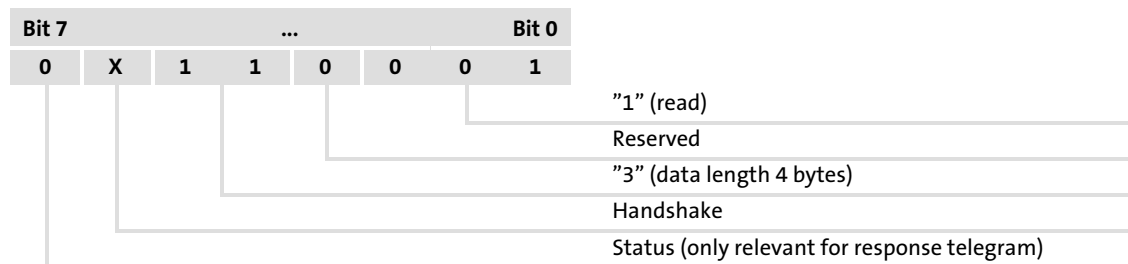
Arrangement of bits 0 ... 7 in byte 1

| | | | | | | | | |
|---|---|---|---|---|---|---|---|--|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
|---|---|---|---|---|---|---|---|--|

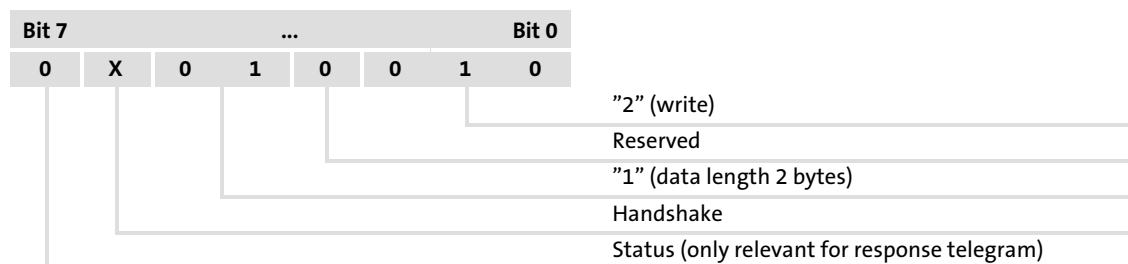
| | | | |
|---|---|--|--|
| 2 | 1 | 0 | <p>Request Request to the controller. The bits are set only by the master.</p> <ul style="list-style-type: none"> ● 000 = No request ● 001 = Read request (read data from controller) ● 010 = Write request (write data to controller) |
| 3 | <p>Reserved</p> | | |
| 5 | 4 | <p>Data length Length of data in bytes 5 ... 8 (data/error 1 ... 4)</p> <ul style="list-style-type: none"> ● 00 = 1 byte ● 01 = 2 bytes ● 10 = 3 bytes ● 11 = 4 bytes | |
| 6 | <p>Handshake Indicates a new request.</p> <ul style="list-style-type: none"> ● The master changes this (toggle) bit for every new request. ● The controller copies the bit into its response telegram. | | |
| 7 | <p>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.</p> <ul style="list-style-type: none"> ● 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. <p>📖 58 (Error code list)</p> | | |

Examples of byte 1:

► **Read request**



► **Write request**



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:

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

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

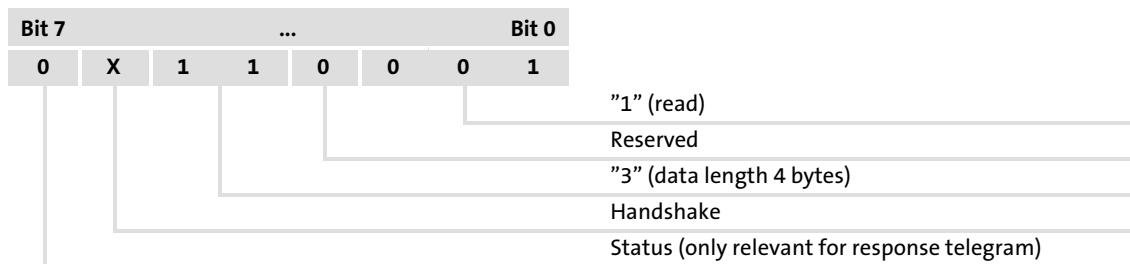
General procedure

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

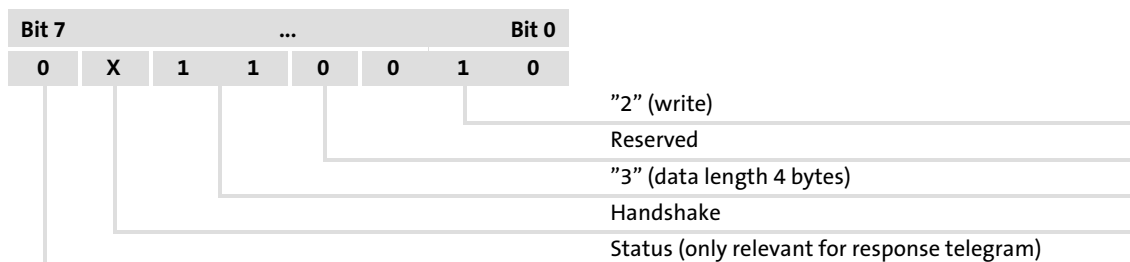
General procedure

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.

- ▶ $150.4 \times 10000 = 1504000$ (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 | | |

► 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 $\emptyset 0$:
 - 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 ($43\text{ }^{\circ}\text{C}$) 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 = $3D_{\text{hex}}$
- ▶ 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 = $43\text{ }^{\circ}\text{C} \times 10000 = 430000 = 00068FB0_{\text{hex}}$

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} | $03D_{\text{hex}}$ | 00_{hex} | 00_{hex} | 00_{hex} | 00_{hex} | 00_{hex} | 00_{hex} |
| 0001_{bin} | $000000111101_{\text{bin}}$ | 00000000_{bin} | 00000000_{bin} | 00000000_{bin} | 00000000_{bin} | 00000000_{bin} | 00000000_{bin} |

Wait for response identification with code = $03D_{\text{hex}}$ 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} | $03D_{\text{hex}}$ | 00_{hex} | 00_{hex} | 00_{hex} | 06_{hex} | $8F_{\text{hex}}$ | $B0_{\text{hex}}$ |
| 0010_{bin} | $000000111101_{\text{bin}}$ | 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 \emptyset 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} | 40 _{hex} |
| 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:

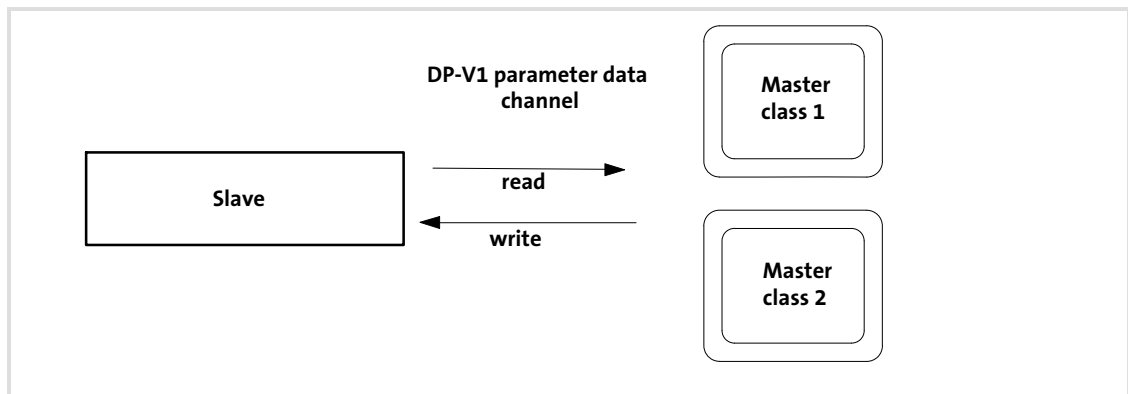
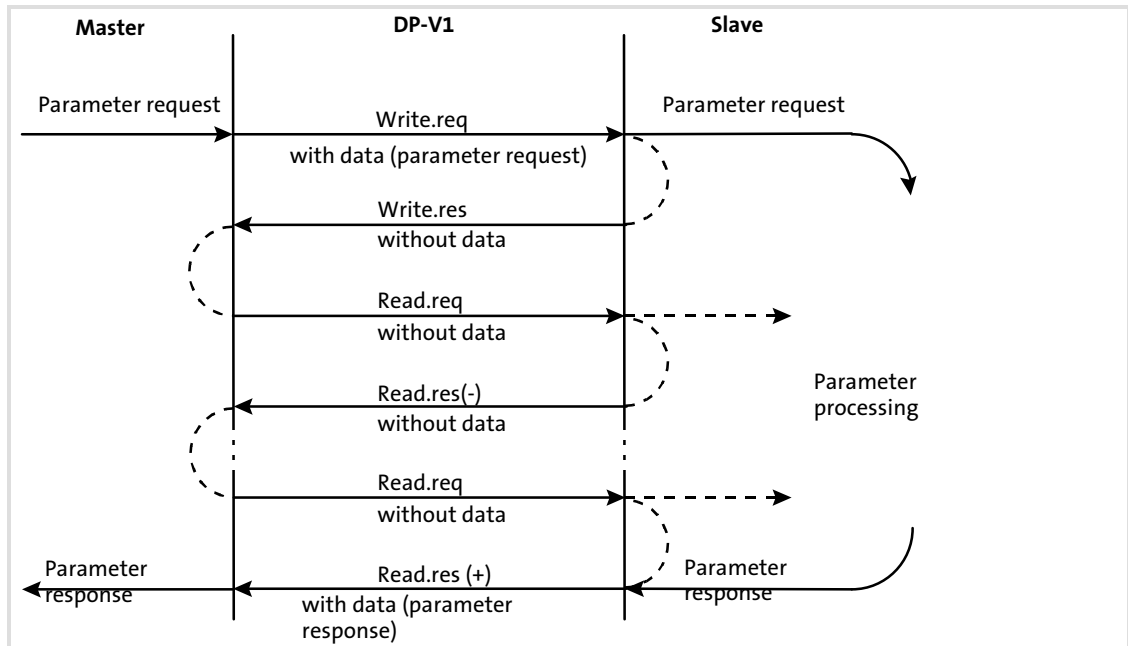


Fig. 8-1 Data communication via the DP-V1 parameter data channel

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

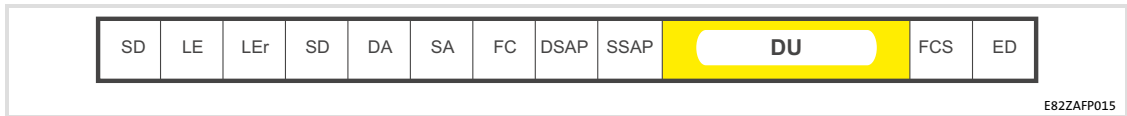


Fig. 8-2 PROFIBUS data telegram with DP-V1

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 |
|---------------------------------|--------------------------------------|--------------------|---------------------------------|
| Request reference ^{U8} | Request identification ^{U8} | Axis ^{U8} | Number of indexes ^{U8} |

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 |
|-------------------------|------------------------------------|
| Attribute ^{U8} | Number of subindexes ^{U8} |

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 |
|--------|----------------|----------|----------------|
| Index | ^{U16} | Subindex | ^{U16} |

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 |
|---------------------------------|-------------------------|--------------------|-------------------|
| 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 |
|--------|------------------|
| 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 |
|---------------------------------|-------------------------|--------------------|-------------------|
| Request reference (mirrored) | Response identification | Axis (mirrored) | 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 |
|--------|------------------|
| 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 |
|------------|--------|---------------------------------------|---------|
| Error code | | 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 |
|---------|------------------|
| 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 |
|---------------------------------|-------------------------|--------------------|-------------------|
| 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 |
|---------------------------------|-------------------------|--------------------|-------------------|
| 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 |
|--------|------------------|
| 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 |
|------------|--------|-------------------------------------|---------|
| 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: 0x5F | 0xC2 | Subindex: 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: 0x5F | 0x96 | Subindex: 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 | Reserved | - | - |
| ... | | | |
| 0x0064 | | | |
| 0x0065 | Manufacturer-specific | - | - |
| ... | | | |
| 0x00FF | | | |

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



| LED | | | Description |
|------|--------|---------------------|---|
| Pos. | Colour | Condition | |
| 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 | <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 terminator 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.

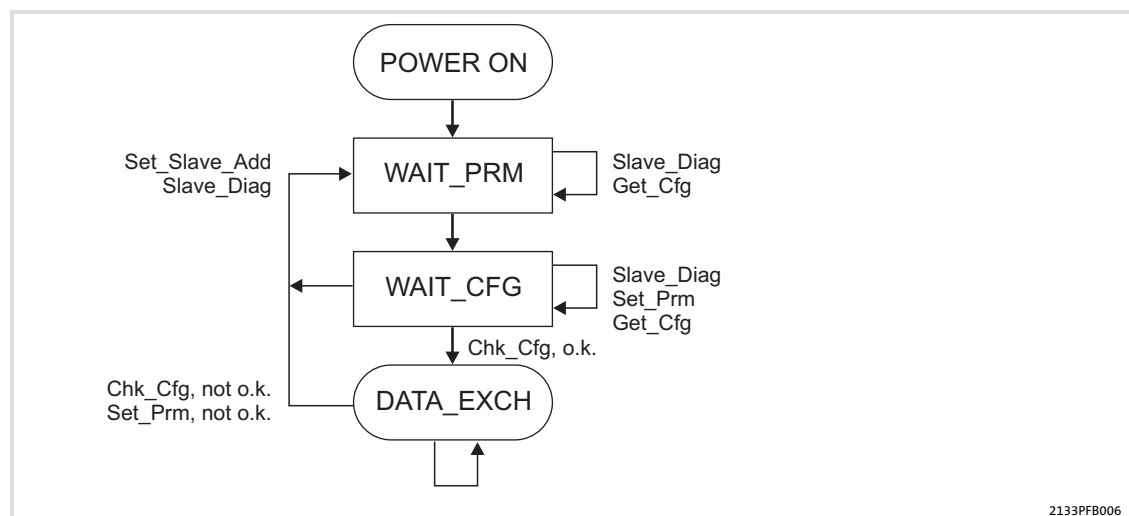
When the monitoring time has expired, the reaction parameterised in **C1514** is executed.

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 \leq 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 <ul style="list-style-type: none"> • 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 <table border="1" data-bbox="450 667 1442 725"> <tr> <td><input type="checkbox"/> Disp</td> <td>Display code Configuration of this code is not possible.</td> </tr> </table> | <input type="checkbox"/> Disp | Display code Configuration of this code is not possible. | |
| <input type="checkbox"/> Disp | Display code Configuration of this code is not possible. | | | |
| Values | Fixed values determined by Lenze (selection list) or a value range: <table border="1" data-bbox="450 757 1442 788"> <tr> <td>Minimum value</td> <td>[Smallest increment/unit]</td> <td>Maximum value</td> </tr> </table> | Minimum value | [Smallest increment/unit] | Maximum value |
| Minimum value | [Smallest increment/unit] | Maximum value | | |
| Access | R = read access (reading permitted) W = write access (writing permitted) | | | |
| Data type | <ul style="list-style-type: none"> • 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) | $\pm 24000 \cong \pm 480$ Hz |
| 4 | Output frequency without slip (MCTRL1-NOUT) | $\pm 24000 \cong \pm 480$ Hz |
| 5 | Apparent motor current (MCTRL1-IMOT) | $2^{14} \cong 100$ % rated device current |
| 6 | Actual process controller value (PCTRL1-ACT) | $\pm 24000 \cong \pm 480$ Hz |
| 7 | Process controller setpoint (PCTRL1-SET) | $\pm 24000 \cong \pm 480$ Hz |
| 8 | Process controller output (PCTRL1-OUT) | $\pm 24000 \cong \pm 480$ Hz |
| 9 | Controller load (MCTRL1-MOUT) | $\pm 2^{14} \cong \pm 100$ % rated motor torque |
| 10 | DC-bus voltage (MCTRL1-DCVOLT) | 16383 \cong 565 V DC for 400 V mains 16383 \cong 325 V DC for 230 V mains |
| 11 | Ramp function generator input (NSET1-RFG1-IN) | $\pm 24000 \cong \pm 480$ Hz |
| 12 | Ramp function generator output (NSET1-NOUT) | $\pm 24000 \cong \pm 480$ 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) | $\pm 24000 \equiv \pm 480$ Hz |
| 4 | Setpoint 2 (NSET1-N2) | $\pm 24000 \equiv \pm 480$ Hz |
| 5 | Additional setpoint (PCTRL1-NADD) | $\pm 24000 \equiv \pm 480$ Hz |
| 6 | Actual process controller value (PCTRL1-ACT) | $\pm 24000 \equiv \pm 480$ Hz |
| 7 | Process controller setpoint (PCTRL1-SET1) | $\pm 24000 \equiv \pm 480$ Hz |
| 8 | Reserved | |
| 9 | Torque setpoint/torque limit value (MCTRL1-MSET) | $2^{14} \equiv 100$ % rated motor torque |
| 10 | PWM voltage (MCTRL1-VOLT-ADD) |  For special applications only. |
| 11 | PWM angle (MCTRL1-PHI-ADD) |  System manual for 8200 vector |
| 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 | | |

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) | <input type="checkbox"/> 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) | <input type="checkbox"/> 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) | <input type="checkbox"/> 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) | <input type="checkbox"/> 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 | <input type="checkbox"/> | 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 | <input type="checkbox"/> | 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 | <input type="checkbox"/> | 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 | <input type="checkbox"/> 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 | <input type="checkbox"/> 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 | <input type="checkbox"/> 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 | <input type="checkbox"/> 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: <ul style="list-style-type: none"> ● Parameter sets of the controller ● PAR1 ... PAR4 FPAR1: <ul style="list-style-type: none"> ● 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! | |
| 70 Keypad ⇒ controller 10 With function module 10 (other) | Overwrite all available parameter sets (PAR1 ... PAR4, FPAR1 if available) with the corresponding keypad data |
| 71 Keypad ⇒ PAR1 (+ FPAR1) 11 With function module 11 (other) | Overwrite the selected parameter set and, if available, FPAR1 with the corresponding keypad data |
| 72 Keypad ⇒ PAR2 (+ FPAR1) 12 With function module 12 (other) | |
| 73 Keypad ⇒ PAR3 (+ FPAR1) 13 With function module 13 (other) | |
| 74 Keypad ⇒ PAR4 (+ FPAR1) 14 With function module 14 (other) | |
| 80 Controller ⇒ keypad 20 With function module 20 (other) | Copy all available parameter sets (PAR1 ... PAR4, FPAR1 if available) into the keypad |
| 40 Keypad ⇒ function module Only with function module | Overwrite only the module-specific parameter set FPAR1 with the keypad data |
| 50 Function module ⇒ keypad Only with function module | Copy only the module-specific parameter set FPAR1 into the keypad |

► Saving your own setting:

| Selection | Important |
|---|--|
| 9 PAR1 ⇒ own setting | <p>You can store your own setting for the controller parameters (e.g. the delivery state of your machine):</p> <ol style="list-style-type: none"> 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 | Name | | | | |
|--------------------|-------------------------------|--------|--------|-----------|--|
| Subindex | Default setting | Values | Access | Data type | |
| 918 _{hex} | | | | | |
| - | <input type="checkbox"/> Disp | 1 [1] | 126 R | U16 | |

This PROFIdrive index displays the set bus device address.

I-963_{hex}: Baud rate

| Index | Name | | | | |
|--------------------|-------------------------------|---|--------|-----------|--|
| Subindex | Default setting | Values | Access | Data type | |
| 963 _{hex} | | | | | |
| - | <input type="checkbox"/> Disp | 0: 9.6 kbps 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 | R | U16 | |

This PROFIdrive index displays the baud rate of the PROFIBUS.

I-964_{hex}: Device identification

| Index | Name | | | | |
|--------------------|-------------------------------|--|--------|-----------|--|
| Subindex | Default setting | Values | Access | Data type | |
| 964 _{hex} | | | | | |
| 0: | <input type="checkbox"/> Disp | 262: Manufacturer: Lenze | R | U16 | |
| 1: | <input type="checkbox"/> Disp | 8201: Device type | | | |
| 2: | <input type="checkbox"/> Disp | xyxy: Software version, e.g. 0090 (V 0.90) | | | |
| 3: | <input type="checkbox"/> Disp | yyyy: Firmware date: year, e.g. 2005 | | | |
| 4: | <input type="checkbox"/> 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 | <input type="text" value="Disp"/> | 240 bytes | R | U16 |
| 1: | Maximum number of parameter accesses | <input type="text" value="Disp"/> | 40 | | |
| 2: | Maximum time per access | <input type="text" value="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) |

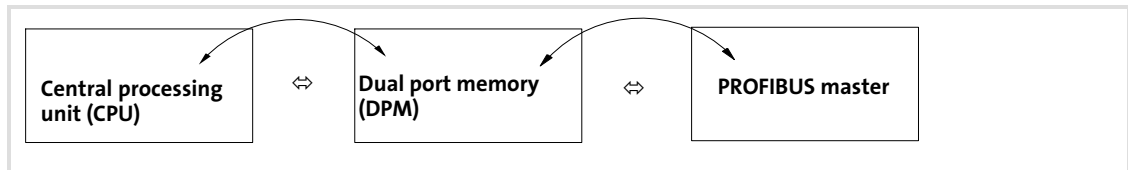
| Bit | 11 | 10 | 9 | 8 | |
|-----|----|----|---|---|--|
| | 0 | 0 | 1 | 1 | Operation inhibited |
| | 0 | 1 | 1 | 0 | Operation enabled |
| | 1 | 0 | 0 | 0 | Fault active |
| | 1 | 1 | 1 | 1 | Communication with basic device not possible |

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.

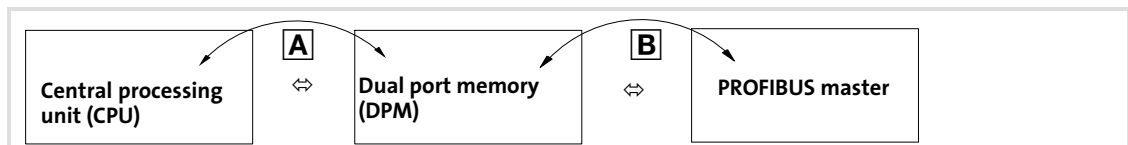
To avoid such an impermissible state, the parameter data to be transmitted must be marked as "consistent".

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

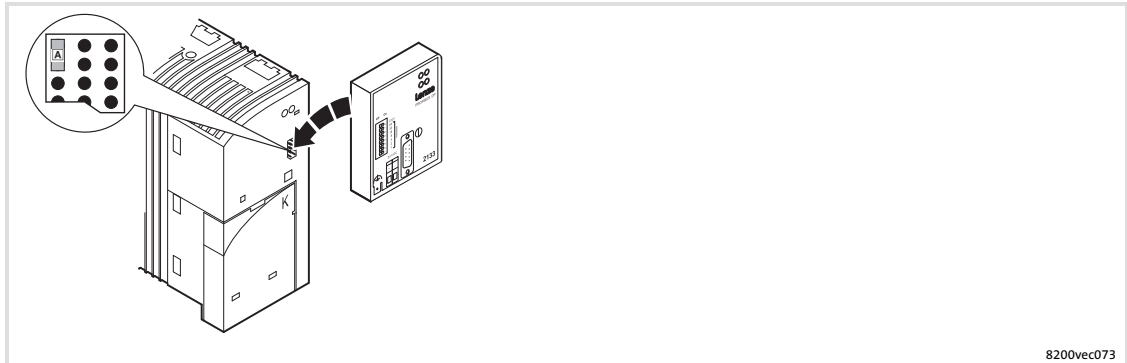
| Function module on FIF | | Communication module on AIF | | | | | |
|------------------------|-------------|---|--------------------------|---|----------------------|------------------------|------------------------------------|
| | | Keypad E82ZBC Keypad XT EMZ9371BC | PROFIBUS-DP EMF2133IB | System 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

Access to Lenze codes

- DRIVECOM, 54
- PROFIdrive, 63

Acyclic data transfer (DP-V1), 70

Adapting device controls, 31

Address settings, 33

- Via code, 33
- Via DIP switches, 34

Addressing

- Lenze parameters (DRIVECOM), 54
- parameter data (DRIVECOM), 54
- Parameter sets, 84

Ambient conditions, 14

- Climate, 14

Application as directed, 11

B

Baud rate, 14

Bus cable length, 22

C

C0002: Parameter set management, 105

C0126: Behaviour with communication error, 95

C1500: Software identification code, 97

C1501: Software creation date, 97

C1502: Display of software identification code, 97

C1503: Display of software creation date, 97

C1509: Bus device addressing, 91

C1510: Configuration of process input data, 42 , 92

C1511: Configuration of process output data, 38 , 93

C1512: Enable process output data, 94

C1513: Monitoring response time of PZD communication, 95

C1514: Monitoring reaction in case of PZD communication fault, 96

C1516: Display baud rate, 98

C1517: Display bus device address, 98

C1520: Display of all words to master, 98

C1521: Display of all words from master, 99

C1522: Display of all process data words to standard device, 99

C1523: Display of all process data words from standard device, 100

C1525: Display of current DIP switch setting, 101

C1526: Display of last configuration data, 102

C1530: PROFIBUS diagnostics, 103

C1531: Bus counter, 104

C1572: Response time after exiting "Data_Exchange", 96

Cable cross-sections, 25

Cable specification, 22

CE-typical drive system, 19

Codes, 89

Commissioning, 26

Commissioning steps, 27

Communication medium, 14

Communication profile, 14

Communication time, 16

Communication-relevant Lenze codes, 91

Configuration

- Process input data, 41
- Process output data, 37

Connections, 13

Consistent parameter data, 110

Control

- DRIVECOM, 45
- PROFIdrive, 50

Controller codes, 105

D

Defining the user data length, 31

Definition of notes used, 8

Definitions, 7

Device control, Lenze, 37

Device data base file, 29

Device protection, 10 , 18

Diagnostics, 85

Diagnostics codes, 97

DIP switch, 34

DP user data length, 14

Drive profile, 14

DRIVECOM

- Bit control commands, 48
- Control word, 46
- error codes, 58
- Parameter data channel, 54
- State machine, 45
- Status bits, 49
- Status word, 47

DRIVECOM control, 45

E

Electrical installation, 19

Error codes

- DRIVECOM, 58
- PROFIdrive, 83

Establishing a connection between master and slave (DP-V1), 69

External voltage supply, 23

F

Fault elimination, 86

Features of the function module, 12

I

I-918: Display of bus device address, 107

I-963: Baud rate, 107

I-964: Device identification, 107

I-974: Settings for DP-V1 parameters, 108

Identification, 11

Information on nameplate, 11

Installation, 18

- electrical, 19
- mechanical, 18
- Terminals, Assignment, 24

Insulation, E82ZAFPC201, 15

Interfaces, 13

Internal DC voltage supply, 23

L

LED status displays, 85

Lenze codes, 89

- C0002, 105
- C0126, 95
- C1500, 97
- C1501, 97
- C1502, 97
- C1503, 97
- C1509, 91
- C1510, 42, 92
- C1511, 38, 93
- C1512, 94
- C1513, 95
- C1514, 96
- C1516, 98
- C1517, 98
- C1520, 98
- C1521, 99
- C1522, 99
- C1523, 100
- C1525, 101
- C1526, 102
- C1530, 103
- C1531, 104
- C1572, 96

Lenze parameters

- DRIVECOM, 54
- PROFIdrive, 63

M

Master, Settings, 29

Mechanical installation, 18

Monitoring, Codes, 95

Monitoring for interruption of PROFIBUS communication, 87

N

Nameplate, 11

Network topology, 14

Notes, definition, 8

Number of bus devices, 21

O

Order designation, 14

P

Parallel operation of AIF and FIF interfaces, 112

Parameter, C0142 (protection against unexpected start-up), 35

Parameter data, Consistency , 110

Parameter data channel

- DRIVECOM, 54
 - addressing of the parameter data, 54
 - Lenze parameters (DRIVECOM), 54
 - telegram structure, 54
- PROFIdrive, 63

Parameter data transfer, 53

Parameter set management, 105

Parameter set transfer, 84

Parameter sets, Lenze, 84

Pollution, 14

Process data transfer, 36

Process input data configuration, 41

Process output data configuration, 37

Processing time, 16

Processing times

- 8200 motec, 16
- 8200 vector, 16
- starttec, 16

Product description, 11

- application as directed, 11

Product features, 12

PROFIDRIVE, State machine, 50

PROFIdrive

- Acyclic data transfer (DP-V1), 70
- Control, 50
- Control word, 51
- error codes, 83
- Establishing a connection between master and slave (DP-V1), 69
- Parameter data channel, 63
- programming of read requests, 67
- Programming of write requests, 68
- Reading parameters (DP-V0), 59
- Reading parameters (DP-V1), 72
- Status word, 52
- Telegram structure (DP-V0), 64
- Telegram structure (DP-V1), 71
- Writing parameters (DP-V0), 61
- Writing parameters (DP-V1), 76

PROFIdrive DP-V0, 64

PROFIdrive DP-V1, 69

PROFIdrive objects, 107

Programming of read requests, PROFIdrive, 67

Programming of write requests, PROFIdrive, 68

Protection against uncontrolled start-up, 35

Protection against unexpected start-up, 35

Protection of persons, 10

Protective insulation, 15

- E82ZAFPC201, 15

PUO ID number, 14

R

Reading parameters

- PROFIdrive (DP-V0), 59
- PROFIdrive (DP-V1), 72

Repeaters, 21

Residual hazards, 10

S

Safety instructions, 9

- application as directed, 11
- definition, 8
- device- and application-specific, 10
- layout, 8

Screw-tightening torques, 25

Setting compatibility with PPO types 1-5, 30

Setting the bus device address

- Via code, 33
- Via DIP switches, 34

Setting the compatibility, 32

Setting the node address, 33

Setting the software compatibility, 32

Settings, Master, 29

Settings for DP-V1 parameters, 108

Specification of the transmission cable, 22

Status displays, 85

T

Technical data, 14

Telegram structure, DRIVECOM, 54

Telegram structure (DP-V0), 64

Telegram structure (DP-V1), 71

Terminals, Assignment, 24

Transmission cable, specification, 22

Troubleshooting, 86

Type code, 11

- finding, 11

U

Usage conditions, Ambient conditions, Climate, 14

V

Validity of the documentation, 5

Voltage supply, 23

- internal, 23

Voltage supply: external, 23

W

Wiring according to EMC, 19

Wiring with a host (master), 20

Writing parameters

- PROFIdrive (DP-V0), 61

- PROFIdrive (DP-V1), 76



© 03/2012



Lenze Drives GmbH
Postfach 10 13 52
D-31763 Hameln
Germany



+49 (0)51 54 / 82-0



+49 (0)51 54 / 82-28 00



Lenze@Lenze.de



www.Lenze.com

Service

Lenze Service GmbH
Breslauer Straße 3
D-32699 Extertal
Germany



00 80 00 / 24 4 68 77 (24 h helpline)



+49 (0)51 54 / 82-11 12



Service@Lenze.de

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