

## 7 2175 (CANopen) fieldbus module

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### General information

## 7.2 General information

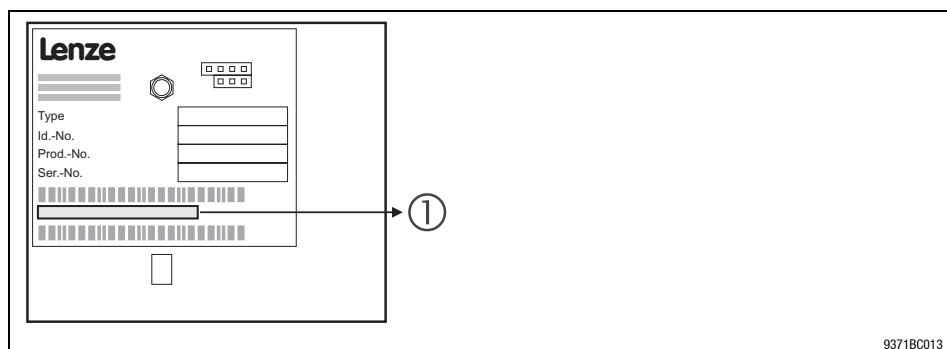
### Validity of the Instructions

These Operating Instructions apply to the following fieldbus modules:

2175IB 1x 1x.

These Operating Instructions are only valid together with the documentation of the corresponding basic devices.

### Identification



9371BC013

### Type code

① → **33.2175IB** 1x 1x

Series

Hardware version

Software version

## Application range

The communication module can be inserted together with the basic devices as of the following nameplate data:

|          |                 |     |     |      |                                    |
|----------|-----------------|-----|-----|------|------------------------------------|
| 33. 820X | E.              | 2x. | 1x. |      | (8201 - 8204)                      |
| 33. 820X | E. / C.         | 2x. | 1x. | Vxxx | (8201 - 8204)                      |
| 33. 821X | E.              | 2x. | 2x. |      | (8211 - 8218)                      |
| 33. 821X | E. / C.         | 2x. | 2x. | Vxxx | (8211 - 8218)                      |
| 33. 822X | E.              | 1x. | 1x. |      | (8221 - 8225)                      |
| 33. 822X | E.              | 1x. | 1x. | Vxxx | (8221 - 8227)                      |
| 33. 824X | E.              | 1x. | 1x. |      | (8241 - 8246)                      |
| 33. 824X | E. / C.         | 1x. | 1x. | Vxxx | (8241 - 8246)                      |
|          | 82EVxxxxxBxxxXX | Vx  | 1x  |      | (8200 vector)                      |
|          | 82CVxxxxxBxxxXX | Vx  | 1x  |      | (8200 vector, Cold plate)          |
|          | 82DVxxxKxBxxxXX | Vx  | 1x  |      | (8200 vector, thermally separated) |
|          | EPL 10200       | E   | 1x  | 1x   | (Drive PLC)                        |
| 33. 93XX | xE.             | 2x  | 1x  | Vxxx | (9321 - 9332)                      |
| 33. 93XX | xC.             | 2x  | 1x  | Vxxx | (9321 - 9332, Cold plate)          |
| 33. 93XX | EI / ET         | 2x  | 1x  | Vxxx | (9300 Servo PLC)                   |
| 33. 93XX | CI / CT         | 2x  | 1x  | Vxxx | (9300 Servo PLC, Cold plate)       |

|                  |  |
|------------------|--|
| Type             |  |
| Design           |  |
| Hardware version |  |
| Software version |  |
| Variant          |  |
| Explanation      |  |

### General information

#### Features

The internationally standardised CAN bus is mainly characterised by

- relatively short transfer times
- low expenditure for connection

These advantages have made CAN products interesting for other industries too.

In order to reach a standardisation, drive, control and sensor manufacturers have specified a communication profile with CANopen for solving control tasks.

The necessary parts of the protocol CiA DS301, version 4.01 have been implemented in the 2175 bus module.

- Attachable additional module for the basic Lenze devices 82XX, 8200 vector, 93XX, Servo PLC 9300 and Drive PLC.
- The front DIP switch enables easy setting of
  - Communication profile DeviceNet or CANopen (DS301)
  - Baud rate 10, 20, 50, 125, 250, 500 and 1000 kbit/s (depending on the communication profile)
  - Node address (max. 63 participants)
- Bus extension up to max. 5000m
- Topology: Line terminated at both ends ( $R = 120 \text{ Ohm}$ )
- Easy connection because of pluggable screw terminals



## Technical data

### General data and application conditions

## 7.3 Technical data

### 7.3.1 General data and application conditions

| Field                                           | Values                                                                      |
|-------------------------------------------------|-----------------------------------------------------------------------------|
| Order name                                      | EMF2175IB                                                                   |
| Communication medium                            | DIN ISO 11898                                                               |
| Network topology                                | Line (terminated at both ends with 120 Ohm)                                 |
| Number of nodes                                 | Max. 63                                                                     |
| Cable length                                    | Max. 7450 m (depending on the baud rate, □ 7.5-2)                           |
| Communication profile                           | CANopen                                                                     |
| Ambient temperature                             | during operation: -20 °C to 60 °C                                           |
|                                                 | Transport: -25 °C to 70 °C                                                  |
|                                                 | during storage -25 °C to 60 °C                                              |
| Permissible humidity                            | Class 3K3 to EN 50178 (without condensation, average relative humidity 85%) |
| Degree of pollution                             | VDE0110, part 2, pollution degree 2                                         |
| Voltage supply (internal/external), see □ 7.4-4 | External supply via separate power supply                                   |

### 7.3.2 Rated data

| Insulation voltage between bus and ... |                          |                      |
|----------------------------------------|--------------------------|----------------------|
|                                        | Rated insulation voltage | Type of insulation   |
| • Remote earth / PE                    | 50 V AC                  | Electrical isolation |
| • External supply (cl. 39/59)          | -                        | No mains isolation   |
| • Power supply unit                    |                          |                      |
| – 820X / 821X                          | 270 V AC                 | Basic insulation     |
| – 822X / 8200 vector                   | 270 V AC                 | Double insulation    |
| – 93XX                                 | 270 V AC                 | Double insulation    |
| • Control terminals                    |                          |                      |
| – 820X / 8200 vector                   | -                        | No mains isolation   |
| – 821X                                 | 50 V AC                  | Electrical isolation |
| – 822X                                 | 270 V AC                 | Basic insulation     |
| – 93XX                                 | 270 V AC                 | Basic insulation     |
| • External bus systems                 | 0 V AC                   | No mains isolation   |

### 7.3.3 Communication times



#### Note!

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

The CAN bus communication times depend on

- Processing time in the controller
- Telegram time
  - Baud rate
  - Telegram length
- Data priority
- Bus load

More information about bus access control can be obtained from corresponding literature specialised on Controller Area Networks.

#### Processing times 820X

The processing times for the 8200 controllers differ from the times for the 821X/822X/8200 vector series.

In opposite to the 821X/822X/824X series, which have parallel process data processing, the 8200 series process process and parameter data sequentially. Therefore the time needed to respond process data depends on previous actions.

The processing time needed for telegrams also depends on the actual value conditioning (process data from controller). If these data (status word, actual frequency) are not required, they can be deactivated with the control word "Bit 15" (PE inhibit).

The individual telegram times are:

| Telegram                                           | Processing time |                |
|----------------------------------------------------|-----------------|----------------|
|                                                    | PE-inhibit = 0  | PE-inhibit = 1 |
| Parameters                                         | 62...140 ms     | 62...70 ms     |
| Change of a process data value to controller (*)   | 27...105 ms     | 27...35 ms     |
| Change of both process data values to controller * | 62...140 ms     | 4...70 ms      |
| Process data from controller *                     | 108...140 ms    | not possible   |



## Technical data

### Communication times

Processing times  
821X/822X/8200 vector

|              |                                                                                             |
|--------------|---------------------------------------------------------------------------------------------|
| Parameters   | 30 ... 50 ms                                                                                |
| Process data | 3 ... 5 ms<br>The processing times for the process data refer to the sync telegram ☐ 7.6-10 |

Processing time 93XX

The parameter data and process data are independent of each other.

|              |                                                                                                                   |
|--------------|-------------------------------------------------------------------------------------------------------------------|
| Parameters   | approx. 30 ms + 20 ms tolerance (typical)<br>With some codes the processing time can be longer (see 9300 Manual). |
| Process data | approx. 3 ms + 2 ms tolerance                                                                                     |

Telegram run time

The telegram run time depends on the baud rate and the telegram length:

| Baud rate [kBit/s] | Telegram length [Byte] |      |       |
|--------------------|------------------------|------|-------|
|                    | 0                      | 2    | 8     |
| 10                 | 5.44                   | 7.36 | 13.12 |
| 20                 | 2.72                   | 3.68 | 6.56  |
| 50                 | 1.09                   | 1.47 | 2.62  |
| 125                | 0.44                   | 0.59 | 1.05  |
| 250                | 0.22                   | 0.29 | 0.52  |
| 500                | 0.11                   | 0.15 | 0.26  |
| 1000               | 0.05                   | 0.07 | 0.13  |

Tab. 7.3-1 Maximum telegram time in [ms]

The telegram times indicated in the table above are calculated according to the following equation. This equation allows to calculate any intermediate value  $t_{Tmax}$ .

$$t_T \leq \frac{54.4 + 9.6 \cdot L_D}{d_U}$$

$t_T$  = telegram time [ms]  
 $L_D$  = telegram length [byte]  
 $d_U$  = baud rate [kBit/s]

## 7.3.4 Dimensions

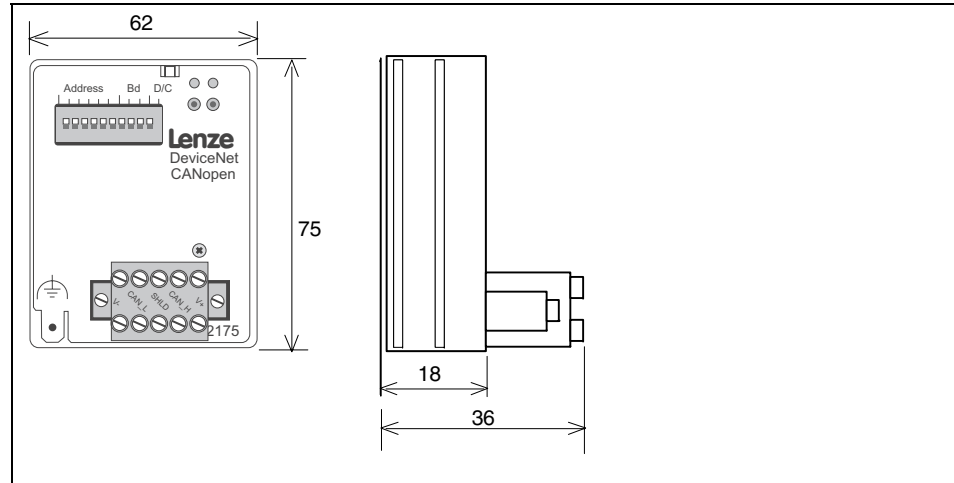


Fig. 7.3-1 Dimensions of the 2175 fieldbus module (all dimensions in mm)

## 7.4 Installation

### 7.4.1 Components of the communication module

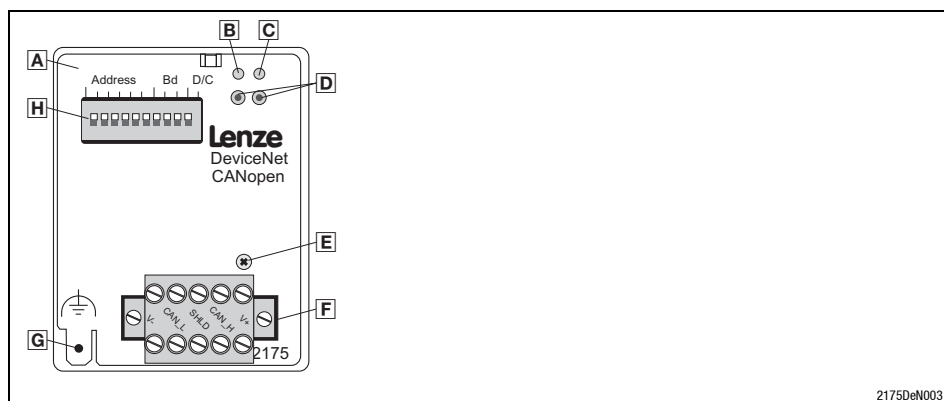


Fig. 7.4-1 2175 communication module

| Pos. | Designation                                                      | Meaning                                                                                                                                        | Notes                                                                                                                                                       |                                                                                                                                                    |
|------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| A    | <b>2175 communication module</b>                                 |                                                                                                                                                |                                                                                                                                                             |                                                                                                                                                    |
| B    | <b>Connection status to the basic device</b><br>(two-colour LED) | OFF                                                                                                                                            | Communication module is not supplied with voltage; basic device or external voltage supply is switched off.                                                 |                                                                                                                                                    |
|      |                                                                  | GREEN                                                                                                                                          | BLINKING                                                                                                                                                    | Communication module is supplied with voltage but is not connected to the controller (controller is switched off, initialising, or not available). |
|      |                                                                  |                                                                                                                                                | constantly ON                                                                                                                                               | The communication module is supplied with voltage and is connected to the drive controller.                                                        |
| C    | <b>Connection status to the bus</b><br>(two-colour LED)          | OFF                                                                                                                                            | <ul style="list-style-type: none"> <li>No communication with the communication module</li> <li>Communication module is not supplied with voltage</li> </ul> |                                                                                                                                                    |
|      |                                                                  | GREEN                                                                                                                                          | BLINKING                                                                                                                                                    | Communication via the communication module has been set up                                                                                         |
|      |                                                                  | RED                                                                                                                                            | ON                                                                                                                                                          | Internal fault of the communication module                                                                                                         |
| D    | <b>Green and red Drive-LED (Drive)</b>                           | Operating status of the basic device 82XX, 8200 vector, 93XX, Servo PLC 9300 and Drive PLC<br>(see Operating Instructions of the basic device) |                                                                                                                                                             |                                                                                                                                                    |
| E    | <b>Fixing screw</b>                                              |                                                                                                                                                |                                                                                                                                                             |                                                                                                                                                    |
| F    | <b>Plug connector with double screw connection, 5-pole</b>       |                                                                                                                                                |                                                                                                                                                             |                                                                                                                                                    |
| G    | <b>PE cable connection</b>                                       | See note below                                                                                                                                 |                                                                                                                                                             |                                                                                                                                                    |
| H    | <b>DIP switch</b>                                                | For settings see chapter 7.5                                                                                                                   |                                                                                                                                                             |                                                                                                                                                    |

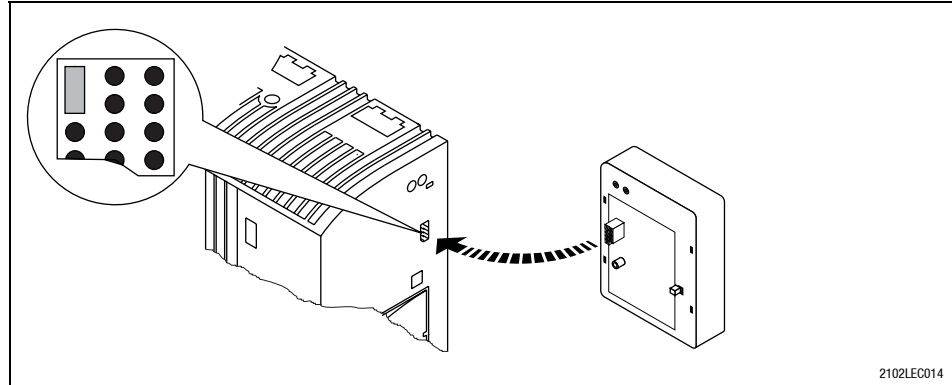


### Note!

Only for 820X and 821X:

If necessary use an additional PE shield cable which avoids EMC-related communication interference in especially noisy environments.

### 7.4.2 Mechanical installation




- Plug the communication module onto the controller (here: 8200 vector)
- Screw the communication module onto the device to ensure a good PE connection.



#### Note!

An internal supply of the communication module through the 8200 vector is only possible if the jumper in the interface cutout (see figure above) is changed.

Please see the corresponding notes  7.4-4 .

#### 7.4.3 Electrical installation



#### Note!

Only for 820X and 821X:

If necessary use an additional PE shield cable which avoids EMC-related communication interference in especially noisy environments.

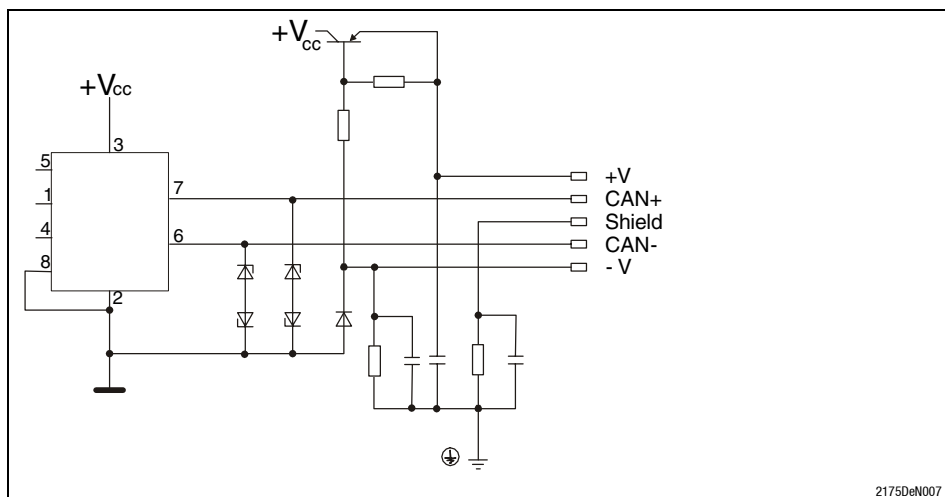
#### Assignment of the plug connector

The 2175 fieldbus module is connected to the bus through a 5 pole plug connector with double screw connection..



| Name   | Explanation                                              |
|--------|----------------------------------------------------------|
| V-     | GND; reference for external supply                       |
| CAN_L  | Data cable / input for terminating resistance of 120 Ohm |
| SHIELD | Shield                                                   |
| CAN_H  | Data cable / input for terminating resistance of 120 Ohm |
| V+     | External voltage supply, see 7.4-4                       |

#### Internal bus terminal assignment



2175DeN007

**External supply voltage**

If necessary, supply the 2175 fieldbus module with a separate supply voltage 24 V DC via the plug-in contacts V+/V- ± 10 %.

820X controllers always require a separate voltage supply.

Use a separate supply unit in every control cabinet if the distance between the control cabinets is larger than normal.

| Controller                  | External voltage supply                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 820X                        | always required                                                                                                                               |
| 821X / 822X / 824X and 93XX | Only necessary if the mains which supplies the corresponding controllers is to be switched off but the communication must not be interrupted. |
| 8200 vector                 | see "internal DC voltage supply"                                                                                                              |

**Internal DC voltage supply**



**Note!**

Controllers with an extended AIF interface (front of the 8200 vector) can be internally supplied. The part of the drawing highlighted in grey shows the jumper position.

- In the delivery state of the frequency inverter these are not internally supplied.
- For internal voltage supply, put the jumper in the position indicated below.

| Lenze setting<br>only external voltage supply possible | Internal voltage supply |
|--------------------------------------------------------|-------------------------|
|                                                        |                         |

## Installation

### Electrical installation

#### Wiring to a host



#### Danger!

An additional mains is required, if

- a 820X or 821X controller is connected to a host and
- a safe mains isolation (double basic insulation) to VDE 0160 is necessary.

For this, you can use an interface module for the host with an additional electrical isolation (see the corresponding manufacturer's information).

For wiring, the electrical isolation of the supply voltage must be taken into account. The supply voltage is assigned to the same potential as the data bus.

#### Wiring of the CAN bus

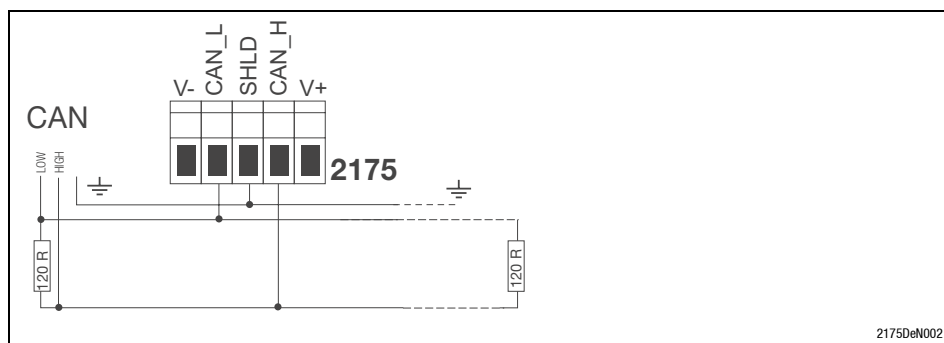


Fig. 7.4-2 Connection to the plug connector

#### Specification for system bus cable

Please observe our recommendations for signal cables:

| Total length                | ≤ 300 m                                                             | ≤ 1000 m                                                             |
|-----------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|
| Cable type                  | LIYCY 2 x 2 x 0.5 mm <sup>2</sup><br>(twisted in pairs with shield) | CYPIMF 2 x 2 x 0.5 mm <sup>2</sup><br>(twisted in pairs with shield) |
| Cable resistance            | ≤ 40 Ω/km                                                           | ≤ 40 Ω/km                                                            |
| Capacitance per unit length | ≤ 130 nF/km                                                         | ≤ 60 nF/km                                                           |

**Structure of a CAN bus system  
(example)**

The CAN bus system is designed as 2 conductor (twisted pair) shielded with additional mass and termination at both ends of the line.

For sending and receiving data the following paths are available:

- Max. 3 process data channels (PDO = Process Data Object)
  - Process data are sent via the process data channel and are used for high-speed and high-priority control tasks. Typical process data are, for instance, setpoints and actual values of a basic device.
- 2 parameter data channels (SDO = Service Data Object)
  - The parameters are transferred at lower priority than the process data. The parameters are set or changed e.g. during commissioning or product change.
  - The parameters are accessed via the parameter data channel of the 2175 fieldbus module to the codes of the basic device by Lenze or the corresponding CANopen objects (description see chapter "Parameter setting CANopen").
  - 2 masters can be connected to the basic devices because of the 2 parameter channels. Thus, parameters can be changed directly at the basic device during operation of a machine or system networked via PLC, using a PC (e.g. with user software "Global Drive Control") or a keypad. The second parameter data channel can be reached under the set address (switch or L-C0009) with an offset of 64. For instance, if a PLC addresses the controller with address 1 and second commanding unit the address 65, the same basic device will be addressed. Please observe that the last telegram determines the parameter when a parameter is accessed by two units (see "Server SDO Parameters" (☞ 7.7-25)).

**Note!**

The last telegram determines the parameter when a parameter is accessed by two units.

Please observe the notes in chapter 7.5, if you do not select the baud rate and address via the front switch.



#### 7.4.4 Bus cable length

It is absolutely necessary to comply with the permissible cable lengths.

1. Please check the compliance with the total cable length in Tab. 7.4-1.

The total cable length is specified by the baud rate.

| Baud rate [kBit/s]            | 10   | 20   | 50   | 125 | 250 | 500 | 1000 |
|-------------------------------|------|------|------|-----|-----|-----|------|
| <b>Total cable length [m]</b> | 7450 | 3950 | 1550 | 630 | 290 | 120 | 25   |

Tab. 7.4-1 Total cable length

2. Please check the compliance with the segment cable length in Tab. 7.4-2.

The segment cable length is specified by the cable cross-section used and the number of participants. Without a repeater the segment cable length corresponds to the total cable length.

| Station | Cable cross-section  |                     |                      |                     |
|---------|----------------------|---------------------|----------------------|---------------------|
|         | 0.25 mm <sup>2</sup> | 0.5 mm <sup>2</sup> | 0.75 mm <sup>2</sup> | 1.0 mm <sup>2</sup> |
| 2       | 240 m                | 430 m               | 650 m                | 940 m               |
| 5       | 230 m                | 420 m               | 640 m                | 920 m               |
| 10      | 230 m                | 410 m               | 620 m                | 900 m               |
| 20      | 210 m                | 390 m               | 580 m                | 850 m               |
| 32      | 200 m                | 360 m               | 550 m                | 800 m               |
| 63      | 170 m                | 310 m               | 470 m                | 690 m               |

Tab. 7.4-2 Segment cable length

3. Please compare both detected values.

If the value detected from Tab. 7.4-2 is smaller than the total cable length from Tab. 7.4-1, repeaters must be used. Repeaters divide the total cable length into segments.



#### Note!

- Please note the reduction of the total cable length due to the signal delay of the repeater (see example □ 7.4-8).
- Mixed operation
  - There is a mixed operation, if different devices are connected to the same mains.
  - If the total cable lengths of the participants are different at the same baud rate, the smaller value must be used in order to determine the max. cable length.

#### Example: Selection help

| Given:                         |                                                                 |
|--------------------------------|-----------------------------------------------------------------|
| • Cable cross-section:         | 0.5 mm <sup>2</sup> (according to cable specification □ 7.4-5 ) |
| • Number of devices connected: | 63                                                              |
| • Repeater:                    | Lenze repeater, type 2176 (cable reduction: 30 m)               |

At maximum number of participants (63) the following cable lengths / number of repeaters must be complied with:

| Baud rate [kBit/s]              | 10   | 20   | 50   | 125 | 250 | 500 | 1000 |
|---------------------------------|------|------|------|-----|-----|-----|------|
| <b>Max. cable length [m]</b>    | 7450 | 3950 | 1550 | 630 | 290 | 120 | 25   |
| <b>Segment cable length [m]</b> | 310  | 310  | 310  | 310 | 290 | 120 | 25   |
| <b>Number of repeaters</b>      | 24   | 12   | 4    | 2   | -   | -   | -    |

**Example: Check repeater application**

|                                                                                                                                                                                                                                            |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Given:                                                                                                                                                                                                                                     |                     |
| • Baud rate:                                                                                                                                                                                                                               | 125 kBit/s          |
| • Cable cross-section:                                                                                                                                                                                                                     | 0.5 mm <sup>2</sup> |
| • Number of devices connected:                                                                                                                                                                                                             | 28                  |
| • Cable length:                                                                                                                                                                                                                            | 450 m               |
| 1. Total cable length at 125 kbits/s                                                                                                                                                                                                       |                     |
| 630 m                                                                                                                                                                                                                                      | from Tab. 7.4-1     |
| 2. Segment cable length for 28 participants and a cable cross-section of 0.5mm <sup>2</sup> .                                                                                                                                              |                     |
| 360 m                                                                                                                                                                                                                                      | from Tab. 7.4-2     |
| 3. Comparison                                                                                                                                                                                                                              |                     |
| The value in point 2. is smaller than the cable length of 450 m.                                                                                                                                                                           |                     |
| 4. Conclusion                                                                                                                                                                                                                              |                     |
| <ul style="list-style-type: none"> <li>• It is not possible to use a cable length of 450 m without applying a repeater.</li> <li>• After 360 m (point 2.) a repeater must be applied.</li> </ul>                                           |                     |
| 5. Max. cable length with repeater application                                                                                                                                                                                             |                     |
| <ul style="list-style-type: none"> <li>• The Lenze repeater is used, type 2176 (cable reduction: 30 m)</li> <li>• Calculation of the max. cable length:<br/>630 m (according to Tab. 7.4-1) <u>minus</u> 30 m (cable reduction)</li> </ul> |                     |
| → Max. possible cable length with repeater: 600 m.                                                                                                                                                                                         |                     |
| → The cable length wanted is now possible.                                                                                                                                                                                                 |                     |

**Note!**

Repeaters are recommended as a

- service interface  
Advantage: trouble-free connection during bus operation is possible.
- Calibration interface  
Advantage: calibration/programming unit remains electrically isolated.

## 7.5 Commissioning



### Note!

Settings via GDC or operating module.

The settings of controller address and baud rate can be carried out by means of GDC or the operating module. For this purpose the DIP switches S1 to S6 must always be set to the OFF position.

The codes L-C0009 (controller address) and L-C0125 (baud rate) are not active, if one address switch has been set to ON before restarting the controller.

Concerning this please observe the descriptions (□ 7.9-1) of

- Node address L-C1850/2350 and
- Baud rate L-C1851/2351.

The following settings can be easily carried out via the front DIP switch of the 2175 field bus module:

- Controller address S1 - S6
- Baud rate S7 - S9
- Communication profile CANopen S10



### Note!

The Lenze setting for all switches is OFF.

The controller address and baud rate set via DIP switch will only be active after a renewed mains connection.

Only the switch combinations described in the following tables are defined states.

### Communication profile setting

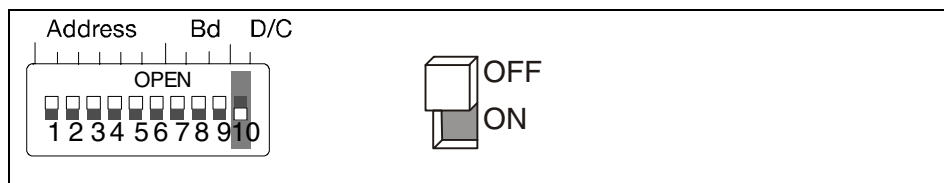


Fig. 7.5-1 Communication profile setting

| Communication profile | S10 |
|-----------------------|-----|
| DeviceNet             | OFF |
| CANopen               | ON  |

### Device address setting



#### Note!

Please observe that the addresses are not the same when using several controllers.

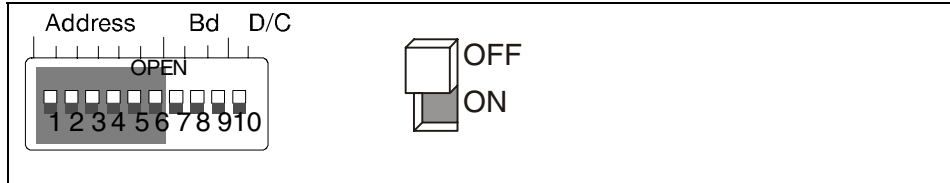


Fig. 7.5-2 Setting of the controller address

$$Adresse_{dec} = S_6 \cdot 2^0 + S_5 \cdot 2^1 + S_4 \cdot 2^2 + S_3 \cdot 2^3 + S_2 \cdot 2^4 + S_1 \cdot 2^5$$

The address calculation (decimal number) is based on the positions of switches S1 ... S6 ('0' = OFF and '1' = ON). The numbers must be entered into the equation above.

The equation also indicates the valency of a switch. The sum of valencies results in the controller addresses to be set

Switch valencies:

| Switch  | S1 | S2 | S3 | S4 | S5 | S6 |
|---------|----|----|----|----|----|----|
| Valency | 32 | 16 | 8  | 4  | 2  | 1  |

Example:

| Switch          | S1 | S2 | S3 | S4  | S5  | S6  |
|-----------------|----|----|----|-----|-----|-----|
| Switch position | ON | ON | ON | OFF | OFF | OFF |
| Address (= 56)  | 32 | 16 | 8  | 0   | 0   | 0   |

### Baud rate setting



#### Note!

Please observe that the baud rate must be the same for all controllers and the host.

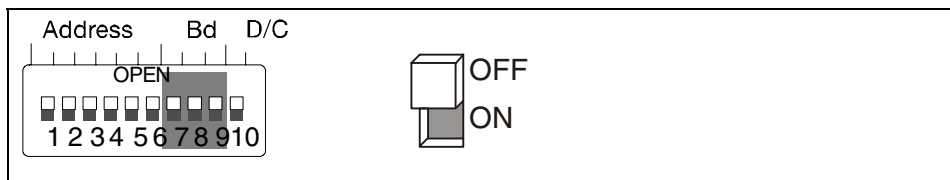


Fig. 7.5-3 Baud rate setting

| Baud rate [kBit/s] | S7  | S8  | S9  |
|--------------------|-----|-----|-----|
| 10                 | ON  | ON  | OFF |
| 20                 | ON  | OFF | ON  |
| 50                 | OFF | ON  | ON  |
| 125                | OFF | ON  | OFF |
| 250                | OFF | OFF | ON  |
| 500                | OFF | OFF | OFF |
| 1000               | ON  | OFF | OFF |

#### 7.5.1 Before switching on



#### Stop!

Before switching on the mains voltage, check the wiring for completeness, earth fault and short circuit.



#### Note!

Do not change the switch-on sequence!

1. Switch on the controller and, if necessary, the external supply of the 2175 fieldbus module.
  - The operating status display of the controller (▣ 7.4-1) must be on or blinking. If this is not the case, see chapter "Troubleshooting" (▣ 7.8-1)
  - The green LED ("status controller connection") must also be on (▣ 7.4-1). If this is not the case, see chapter "Troubleshooting" (▣ 7.8-1).
2. It is now possible to communicate with the drive, i.e.
  - all parameters (SDO) can be read and written
  - all writable parameters (SDO), except for process data (PDO) such as frequency setpoint or control word, can be overwritten.
  - For more information on the communication phases of the CAN network see (▣ 6.6-3).

## 7.5.2 Enable drive via 2175 fieldbus module

**Note!**

During operation the change of a 2175 module to another controller can lead to undefined operating states.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>82XX / 8200 vector</b> | <ol style="list-style-type: none"> <li>Set the Lenze parameter Operating Mode (L-C0001) from 0 to 3 to enable the drive via the 2175 fieldbus module. This can be carried out with the keypad or directly via CANopen.<br/>Examples for Write (L-C0001=3): <ul style="list-style-type: none"> <li>Index = 5FFE<sub>hex</sub> (results from: 5FFF<sub>hex</sub> – (L-C0001)<sub>hex</sub>;) <ul style="list-style-type: none"> <li>Subindex: 0</li> <li>Value: 30000<sub>dec</sub> (results from: L-C0001 = 3 x 10000)</li> </ul> </li> </ul> </li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                           | <ol style="list-style-type: none"> <li>Terminal 28 (controller enable) is always active and must be set to HIGH level during CANopen operation (see Operating Instructions for the controller). Otherwise, the controller cannot be enabled via CANopen. <ul style="list-style-type: none"> <li>With 821X, 8200vector and 822X, the function QSP (quick stop) is always active. If QSP is assigned to an input terminal (default setting: not assigned), this must be at HIGH level during CANopen operation (see Operating Instructions for the controller).</li> </ul> </li> </ol> <p>The controller now accepts parameter and process data.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>93XX</b>               | <ol style="list-style-type: none"> <li>For drive control via CANopen set the Lenze parameter Signal Configuration (L-C0005) to a value xxx3. This change can be carried out using the 9371BB keypad or the CANopen. For the first commissioning, select the signal configuration 1013.<br/>Examples for Write (L-C0005=1013): <ul style="list-style-type: none"> <li>Index = 5FFA<sub>hex</sub> (results from: 5FFF<sub>hex</sub> – (L-C0005)<sub>hex</sub>;) <ul style="list-style-type: none"> <li>Subindex: 0</li> <li>Value: 10130000<sub>dec</sub> (results from: L-C0005 = 1013 x 10000)</li> </ul> </li> </ul> </li> <li>Set the parameter L-C0142 to 0. Observe the chapter "Protection against unexpected start".</li> <li>Terminal 28 (controller enable) is always active and must be set to HIGH level during CANopen operation (see Operating Instructions 93XX). Otherwise, the controller cannot be enabled via CANopen. <ul style="list-style-type: none"> <li>With the signal configuration L-C0005=1013, the function QSP (quick stop) and the CW/CCW changeover are assigned to the digital input terminals E1 and E2 and thus they are always active. For CANopen operation E1 must be set to HIGH level (see Operating Instructions 93XX).</li> </ul> </li> </ol> <p><b>Note</b><br/>With the signal configuration L-C0005=xx13, terminal A1 is switched as voltage output. Connect the following terminals:</p> <ul style="list-style-type: none"> <li>X5.A1 with X5.28 (controller enable).</li> <li>X5.A1 with X5.E1 (CW/QSP)</li> </ul> <p>The controller now accepts parameter and process data.</p> |

**Protection against uncontrolled restart****Note!**

After a fault (e.g. short-term mains failure) a restart of the drive is not always wanted.

- By setting L-C0142 = 0, the drive can be inhibited if
  - the corresponding controller sets a "fault message"
  - the fault is active for more than 0.5 s

Parameter function:

- L-C0142 = 0
  - Controller remains inhibited (even if the fault is not active any longer)
  - The drive restarts in a controlled mode: LOW-HIGH transition at one of the inputs for "Controller inhibit" (CINH, e.g. at terminal X5/28)
- L-C0142 = 1
  - Uncontrolled restart of the controller possible

## 7.6 Data transfer

Master and slave communicate with each other by exchanging data telegrams via the CAN bus. The user data range of the data telegram contains either network management data, parameter data or process data.

In the controller, different communication channels are assigned to the parameter data and process data:

| Telegram type                                                                                                                                                                                                                                                                                                                     | Communication channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Parameter data</b><br/>(SDO, Service-Data-Objects)</p> <p>These are, for instance,</p> <ul style="list-style-type: none"> <li>• Operationg parameters</li> <li>• Diagnostics information</li> <li>• Motor data</li> </ul> <p>In general, the parameter transfer is not as time-critical as the tranfer of process data.</p> | <p><b>Parameter data channel</b></p> <ul style="list-style-type: none"> <li>• Enables the access to all Lenze codes and the CANopen index.</li> <li>• Parameter changes are usually stored automatically in the controller (observe L-C0003).</li> </ul>                                                                                                                                                                                                                                                                                    |
| <p><b>Process data</b><br/>(PDO, Process-Data-Objects)</p> <p>These are, for instance,</p> <ul style="list-style-type: none"> <li>• Setpoints</li> <li>• Actual values</li> </ul> <p>Exchange between host and controller required as fast as possible. Small amounts of data which can be transferred cyclically.</p>            | <p><b>Process data channel</b></p> <ul style="list-style-type: none"> <li>• You can control the controller using the process data.</li> <li>• The host has direct access to the process data. Data are for instance directly assigned to the I/O area.</li> <li>• Process data are                             <ul style="list-style-type: none"> <li>– not stored in the controller.</li> <li>– transferred between host and controller in order to provide a continuous exchange of current input and output data.</li> </ul> </li> </ul> |

Tab. 7.6-1 Division of parameter data and process data into different communication channels

### 7.6.1 Structure of a CAN data telegram

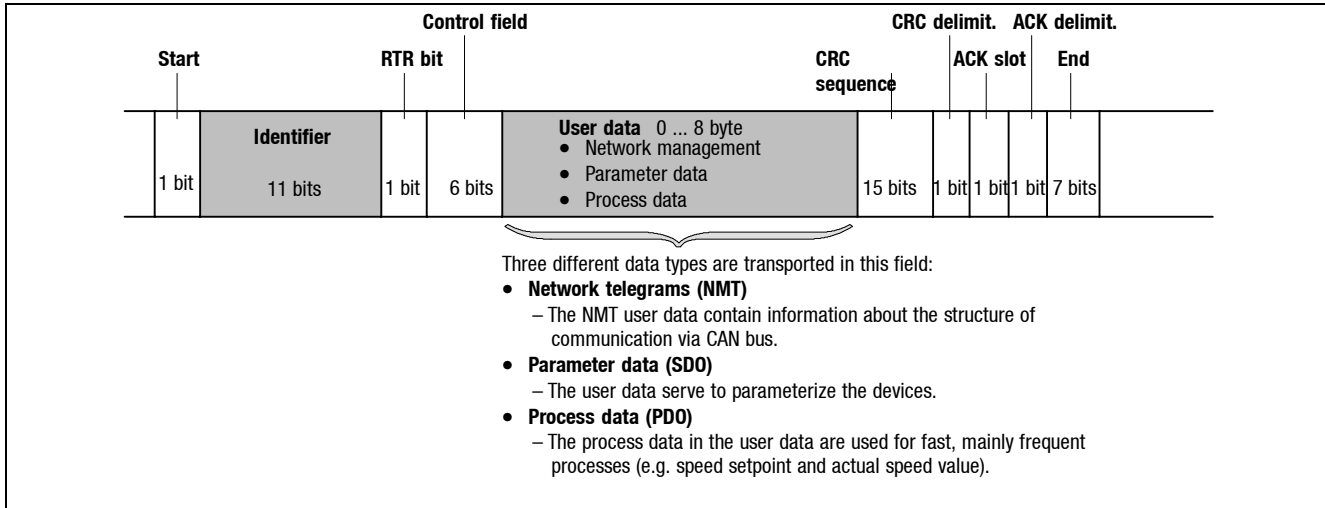


Fig. 7.6-1 Basic structure of the CAN data telegram

The chapter mentioned goes into more detail about the data relevant for programming the bus module (identifier and user data).

The other signals refer to the transfer characteristics of the CAN telegram. These Instructions do not describe this matter. For further information please refer to the homepage "CAN in Automation (CiA)": [www.can-cia.org](http://www.can-cia.org).



#### Identifier

The identifier is an important part of the data telegram. Every identifier - except the network manager and the sync telegram (see chapter 6.6.3), contains the controller address:

|                                                     |
|-----------------------------------------------------|
| <b>Identifier = Basic identifier + unit address</b> |
|-----------------------------------------------------|

In case of the CANopen communication profile the controller address is used to realise a participant-oriented message addressing.

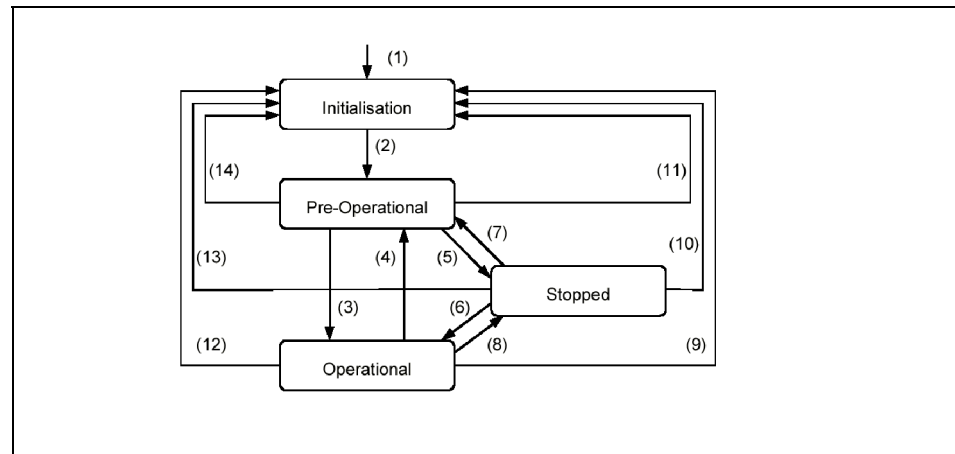
The identifier allocation is defined in the CANopen protocol. According to Lenze settings, the basic identifier is preset with the following values (see CiA DS301, Pre-Defined Connection Set):

|                          | Direction           |                   | Basic identifier |     | + Controller address  | see                  |
|--------------------------|---------------------|-------------------|------------------|-----|-----------------------|----------------------|
|                          | from the controller | to the controller | dec              | hex |                       |                      |
| Network manager (NMT)    |                     |                   | 0                | 0   |                       |                      |
| Sync telegram            |                     |                   | 128              | 80  | no                    | ☞ 7.6-10<br>☞ 7.7-21 |
| Emergency object         | X                   |                   | 128              | 80  | yes                   | ☞ 7.7-24             |
| Process data channel 1   | X                   |                   | 384              | 180 | yes                   | ☞ 7.7-26 ff.         |
|                          |                     | X                 | 512              | 200 |                       |                      |
| Process data channel 2   | X                   |                   | 640              | 280 |                       |                      |
|                          |                     | X                 | 768              | 300 |                       |                      |
| Process data channel 3   | X                   |                   | 896              | 380 |                       |                      |
|                          |                     | X                 | 1024             | 400 |                       |                      |
| Parameter data channel 1 | X                   |                   | 1408             | 580 |                       |                      |
|                          |                     | X                 | 1536             | 600 |                       |                      |
| Parameter data channel 2 | X                   |                   | 1472             | 5C0 | ☞ 7.6-26,<br>☞ 7.7-25 |                      |
|                          |                     | X                 | 1600             | 640 |                       |                      |
| Node guarding            | X                   |                   | 1792             | 700 | yes                   | ☞ 7.6-5,<br>☞ 7.7-21 |

### Network manager (NMT)

The telegram structure used for the network manager contains the identifier and the command being located in the user data and consisting of the command byte and the device address:

| User data (2 bytes)         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. byte: command (hex)      | 2. byte: controller address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>01, 02, 80, 81 or 82</b> | <p><b>Controller address: xx</b><br/>                     The following applies to the assignment of the bytes marked with "xx" in the table below:</p> <ul style="list-style-type: none"> <li>• <b>xx = 00<sub>hex</sub></b><br/>                         With this assignment, all controllers connected are addressed by the telegram. All controller can change their status at the same time.</li> <li>• <b>xx = Controller address</b><br/>                         If a certain address is indicated, the status will only be changed for the controller addressed.</li> </ul> |



| State transition | Command (hex) | Network status after change | Effect on process and parameter data after state transition                                                                                                                                                                                                                                                                                                         |
|------------------|---------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1)              | -             | Initialisation              | At power-on the initialisation <u>automatically</u> started. The drive does not take part in the data transfer.                                                                                                                                                                                                                                                     |
| (2)              | -             | Pre-Operational             | After initialisation <ul style="list-style-type: none"> <li>• the participant automatically passes over to the Pre-Operational state.</li> <li>• the master decides how the controller/s are to participate in the communication.</li> </ul> The master changes a status for the whole network. A target address, which is part of the command, selects the slaves. |
| (3), (6)         | 01 xx         | Operational                 | Network manager telegrams, sync, emergency, process data (PDO) and parameter data (SDO) active (corresponds to "Start Remote Node")                                                                                                                                                                                                                                 |
| (4), (7)         | 80 xx         | Pre-Operational             | Network manager telegrams, sync, emergency and parameter data (SDO) active (corresponds to "Enter Pre-Operational State")                                                                                                                                                                                                                                           |
| (5), (8)         | 02 xx         | Stopped                     | Network manager telegrams can only be received.                                                                                                                                                                                                                                                                                                                     |
| (9)              | 81 xx         | Initialisation              | Initialisation of all parameters in the field bus module with the stored values (corresponds to "Reset-Node")                                                                                                                                                                                                                                                       |
| (10)             |               |                             |                                                                                                                                                                                                                                                                                                                                                                     |
| (11)             |               |                             |                                                                                                                                                                                                                                                                                                                                                                     |
| (12)             |               |                             |                                                                                                                                                                                                                                                                                                                                                                     |
| (13)             | 82 xx         | Initialisation              | Initialisation of communication-relevant parameters (CIA DS 301) in the field bus module with the stored values (corresponds to "Reset Communication")                                                                                                                                                                                                              |
| (14)             |               |                             |                                                                                                                                                                                                                                                                                                                                                                     |



**RTR telegram**

The NMT master sends a data telegram called “Remote Transmit Request” (RTR) to the NMT slave in cyclic time intervals (“Node Guard Time”, monitoring time).

- For this purpose, the RTR bit is set to the significance LOW (dominant level) in the arbitration field.
- The RTR does not contain any user data.

The NMT slave is asked by the RTR to send its actual data.

**Response telegram**

Every NMT slave on its part sends a response telegram with a user data width of one byte. Its most significant bit is a toggle bit (t). The toggle must change its significance at each response. The significance of the toggle bit at the initial activation of the Node Guarding Protocol is “0”.

The toggle bit is reset to the value 0 by the “Reset\_communication (NMT) telegram” of the NMT master.

The data value (s) of the other seven bits indicates one of the three possible states of the NMT slave:

| Value s | Status          |
|---------|-----------------|
| 4       | STOPPED         |
| 5       | OPERATIONAL     |
| 127     | PRE-OPERATIONAL |

**Identifier**

The request of the NMT master and the corresponding response of the NMT slave are sent with an identifier ( $1792_{dec} + \text{slave address}$ , (□ 7.6-3)).

The identifier (see also (□ 7.6-3)) is calculated as follows:

$$\text{Basic address (1792}_{dec}) + \text{slave address (1...63}_{dec})$$

**Node Life Time**

For each NMT slave a different “Node Life Time” can be set.

The Node Life Time is the product of the “Node Guard Time” (□ 7.7-21) and the “Life Time Factor” (□ 7.7-22).

The NMT master must recognise these two values. This can be done by reading the values at every restart out of the NMT slave by the NMT master.

**OK state**

The connection state is OK, if within the “Node Life Time”

- the NMT master has received a correct response of the NMT slave or
- the NMT slave has received a request from the NMT master.

In this case

- the monitoring times for the NMT master and NMT slave have been reset
- the Node Guarding Protocol will be continued.

#### Life Guarding Event

Through the “Life Guarding Event” a fault is released in the NMT slave, if the NMT slave is not triggered by an RTR or NMT master within the “Node Life Time”.



#### Note!

The reaction to a “Life Guarding Event” is set with the code L-C1882 / L-C2382.

#### Node Guarding Event

The “Node Guarding Event” is to appear in the NMT master, if

- within the “Node Life Time” the NMT master does not receive any response of the NMT slave although a request has been made,
- the toggle bit has not changed within the “Node Life Time”.



#### Note!

Please also note in this connection that the monitoring times are not to be reset. The reaction to a “Node Guarding Event” in the NMT master shall be implemented accordingly, if the significance of the toggle bit equals the NMT slave telegram received before.

## 7.6.2 Process data channel

### Setpoint source selection

#### 82XX controller

The selection of the setpoint source for these controllers is determined under code number L-C0001 (index: 5FFE<sub>hex</sub>). For process data evaluation, the code L-0001 must be set to the value "3" when operating the controller with the fieldbus module. The setpoint source is the process data channel which overwrites the frequency setpoint (L-C0046) and the control word (L-C0135) (see 82XX Operating Instructions).



#### Note!

Please observe that the setpoint source selection (LC0001) must be set equally in all parameter sets.

#### Controller 8200 vector

The selection of the setpoint source for these controllers is determined under code number L-C0001 (index: 5FFE<sub>hex</sub>). For process data evaluation, the code L-0001 must be set to the value "3" when operating the controller with the fieldbus module. (Selection: process data channel of a field bus module AIF-IN.W1 or AIF-IN.W2). The setpoint source is the process data channel which overwrites the frequency setpoint (L-C0046) and the control word (L-C0135) (see the Operating Instructions for 8200 vector).



#### Note!

Please observe that the setpoint source selection (LC0001) must be set equally in all parameter sets.

#### 93XX controllers

The 93XX controller does not offer a setpoint source selection which can be set by one code only. For this purpose, you only need to connect preconfigured function blocks in order to adapt the controller to the drive task without being an expert in programming.

The user itself is able to carry out the interconnection. However, it is recommended to use the preconfigurations provided by Lenze, which are saved in the read-only memory of the controller. The Lenze preconfigurations (see code C0005) define, which source (terminal, keyboard, field bus module) describe the frequency setpoint and the control word.

The value to be set of code C0005 must be set to "xxx3" for operation via CAN bus (x = wildcard for selected preconfiguration).

For more information, please see the corresponding Manual or Operating Instructions for the controller.

#### Basic devices 9300 Servo PLC and Drive PLC

For communicating via an AIF fieldbus module (e.g. 2175 CANopen/DeviceNet) it is necessary that the system modules AIF-IN 1 ... 3 or AIF-OUT 1 ... 3 and if required the AIF manager are integrated into the control configuration of the IEC1131 project.

## 7.6.3 Process data transfer

Process data telegrams between host and controllers are distinguished as follows:

- Process data telegrams **to** the drive
- Process data telegrams **from** the drive

### Process data telegram to drive

The process data telegram (device series 93XX) has a useful data length of 8 bytes (see example below).

The process data telegram identifier also includes the drive's address.

The CAN bus is connected to the automation interface X1.

X1 is connected to the function block AIF-IN. Here, the useful data is transformed into corresponding signal types in order to use them for further function blocks. The control word is especially important for the drive. It contains the drive setpoint in byte 1 and byte 2 of the useful data.

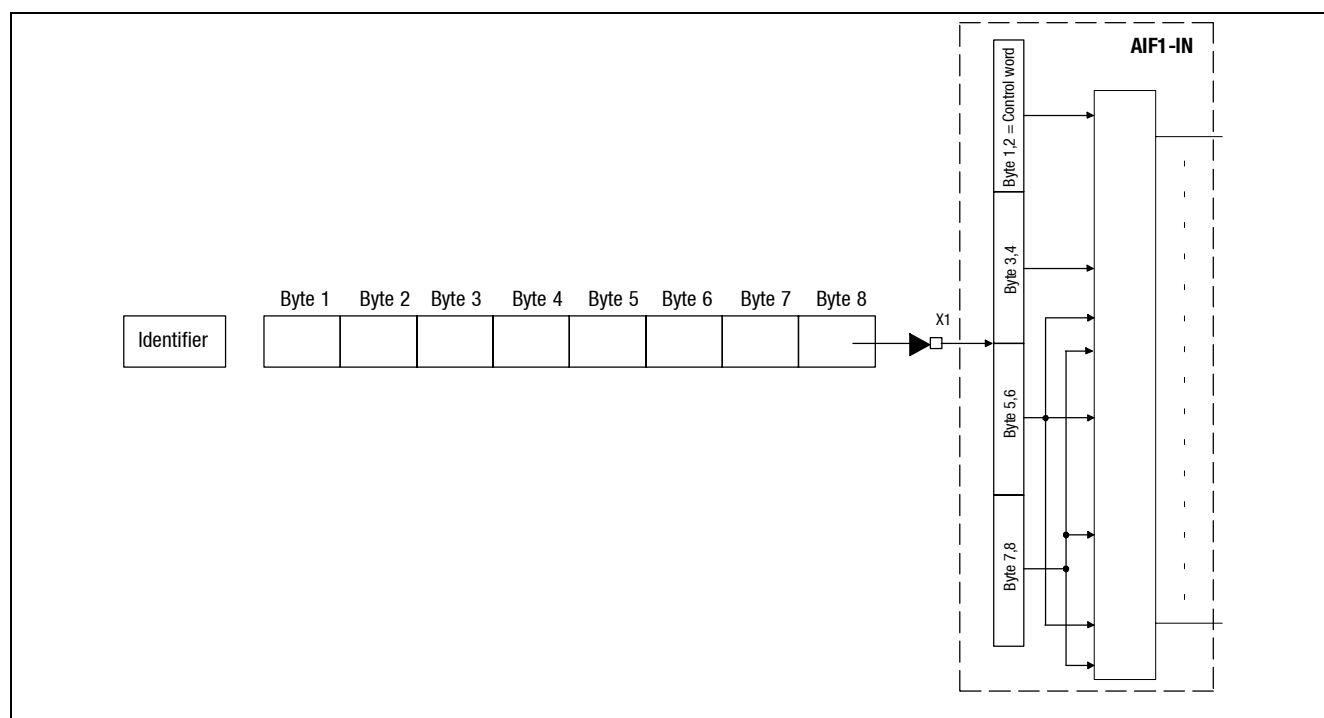


Fig. 7.6-2 Example: Device series 93XX

### Process data telegram from drive

For the cyclic process telegrams from drive, the function block to be used is called AIF-OUT. The status word (byte 1 and byte 2) included in the process data telegram is placed on the CAN-BUS via this function block and is sent to, e.g. the master (see also chapter 7.6.6).

The sync telegram ensures that process data is sent to the drive (see also (□ 7.6-3)).

For cyclic process data processing, the sync telegram must be generated accordingly.

## Synchronisation of process data

The sync telegram is the trigger point for

- data sent to the drive controller
- starting sending process from the drive controller.

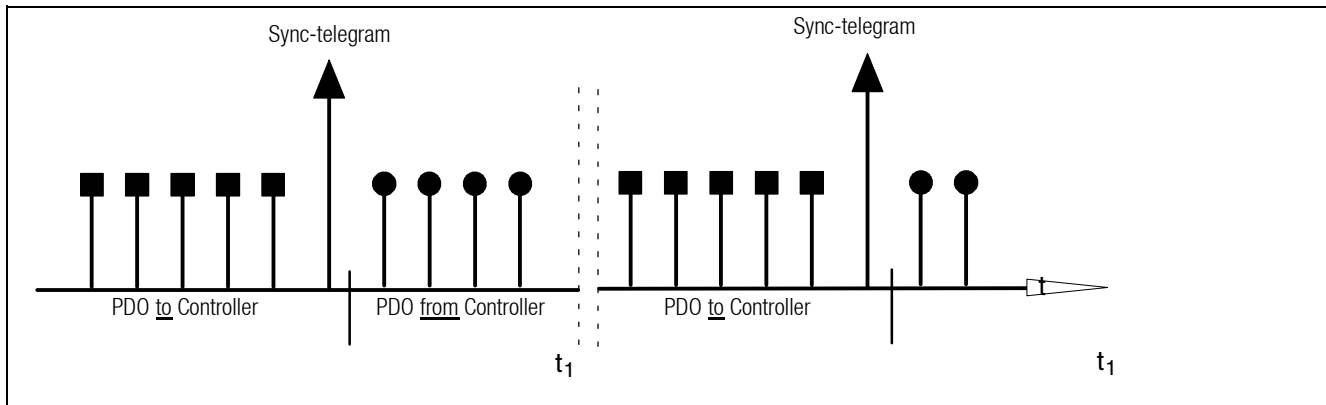


Fig. 7.6-3 Synchronisation of cyclic PDOs (represented by a bus participant)

Explanation for Fig. 7.6-3: At the time  $t_1$ , the process data are accepted for all PDOs as soon as a sync telegram will be received.



### Note!

SDOs or event-controlled PDOs are accepted asynchronously, i.e. after transfer has been carried out.

The asynchronous data are not considered above!



## 7.6.4 Process-data assignments for 82XX

Process data telegram to drive

User data length: 8 Byte

| Identifier | Byte 1                              | Byte 2                               | Byte 3                          | Byte 4                           | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|------------|-------------------------------------|--------------------------------------|---------------------------------|----------------------------------|--------|--------|--------|--------|
|            | Control word<br>L-C0135<br>Low byte | Control word<br>L-C0135<br>High byte | Setpoint<br>L-C0046<br>Low byte | Setpoint<br>L-C0046<br>High byte | xx     | xx     | xx     | xx     |

| More information about the process data Telegram | Byte 1 | The bits 0 to 7 of the control word under C0135 are entered here                                                                                   |
|--------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | Byte 2 | Bits 8 to 15 of the control word under C0135 are entered here (see (□ 7.6-15))<br>The description of the bits can be obtained from the Code Table. |
|                                                  | Byte 3 | The frequency setpoint, which can also be written as parameter under C046, is entered here as process data word.                                   |
|                                                  | Byte 4 | The normalization differs from the setting under C046. It is a signed value, 24000 = 480 Hz.                                                       |
|                                                  | Byte 5 | No evaluation of these data, any content is possible                                                                                               |
|                                                  | Byte 6 |                                                                                                                                                    |
|                                                  | Byte 7 |                                                                                                                                                    |
|                                                  | Byte 8 |                                                                                                                                                    |

Control word: see (□ 7.6-15)

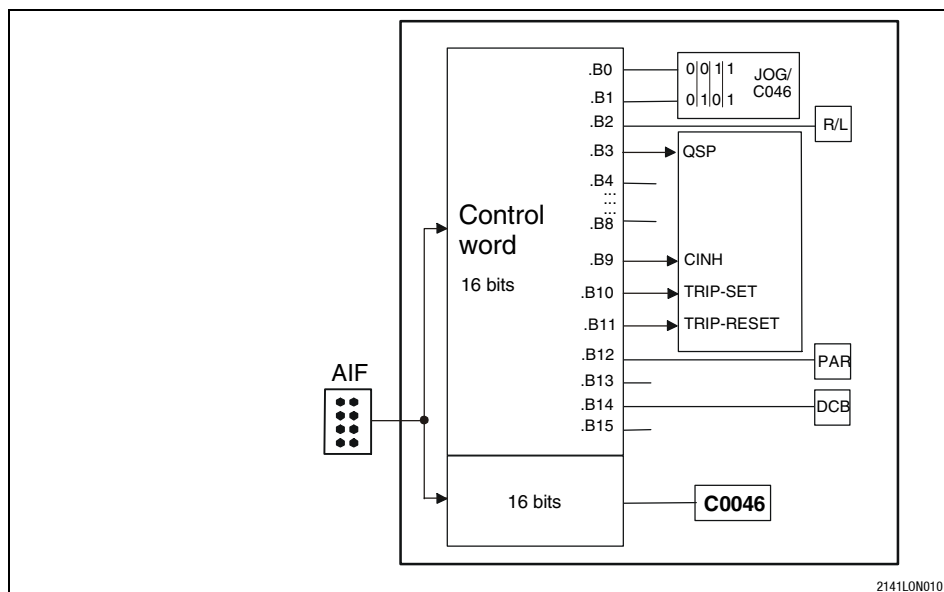


Fig. 7.6-4 Access to the control word and the frequency setpoint in 82XX (fixed assignment, see (□ 7.6-15))

Process data telegram from drive

User data length: 8 Byte

| Identifier | Byte 1                             | Byte 2                              | Byte 3                              | Byte 4                               | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|------------|------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|--------|--------|--------|--------|
|            | Status word<br>L-C0150<br>Low byte | Status word<br>L-C0150<br>High byte | Actual value<br>L-C0050<br>Low byte | Actual value<br>L-C0050<br>High byte | xx     | xx     | xx     | xx     |

|                                                   |               |                                                                                                                                                   |
|---------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| More information about the process data telegram: | <b>Byte 1</b> | The bits 0 to 7 of the status word under L-C0150 are entered here                                                                                 |
|                                                   | <b>Byte 2</b> | Bits 8 to 15 of the status word under L-C0150 are entered here (see (□ 7.6-16)). The description of the bits can be obtained from the Code Table. |
|                                                   | <b>Byte 3</b> | The actual frequency value with signed normalization (L-C0050)                                                                                    |
|                                                   | <b>Byte 4</b> | 24000 = 480 Hz is provided here.                                                                                                                  |
|                                                   | <b>Byte 5</b> | No evaluation of these data, any content is possible                                                                                              |
|                                                   | <b>Byte 6</b> |                                                                                                                                                   |
|                                                   | <b>Byte 7</b> |                                                                                                                                                   |
|                                                   | <b>Byte 8</b> |                                                                                                                                                   |

Status word: see (□ 7.6-16)

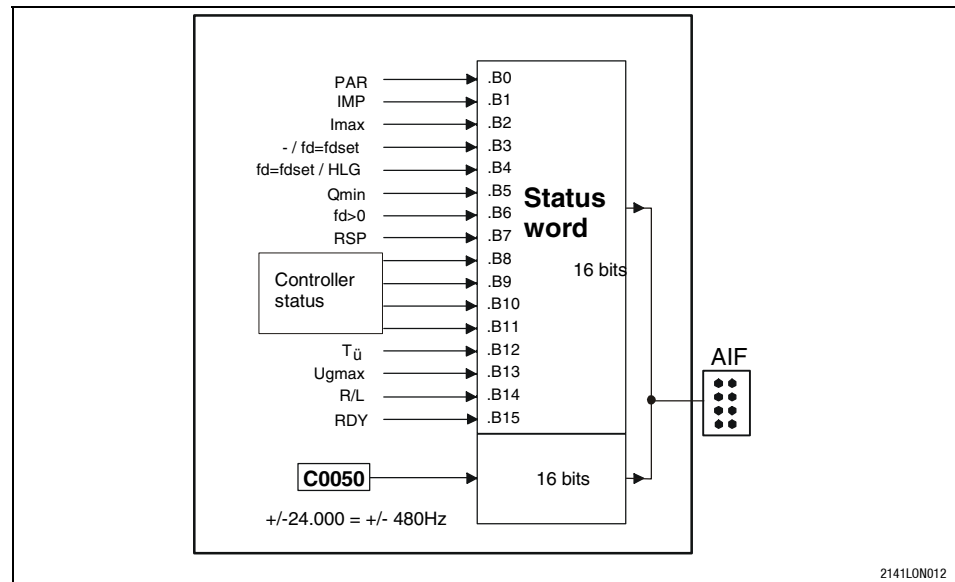


Fig. 7.6-5 Read access to the status word and the actual frequency value in 82XX (fixed assignment, see (□ 7.6-16))

## Data transfer

### Process data assignment for 8200 vector

#### 7.6.5 Process data assignment for 8200 vector

A change of code L-C0001 to 3 preconfigures the process data words in the controller.



#### Note!

Frequency and speed values are normalised with  $\pm 24000 \equiv \pm 480$  Hz.

Process data telegram to drive

| Byte 1                   | Byte 2                    | Byte 3                | Byte 4                 | Byte 5                | Byte 6                 | Byte 7 | Byte 8 |
|--------------------------|---------------------------|-----------------------|------------------------|-----------------------|------------------------|--------|--------|
| Control word<br>Low byte | Control word<br>High byte | AIF-IN.W1<br>Low byte | AIF-IN.W1<br>High byte | AIF-IN.W2<br>Low byte | AIF-IN.W2<br>High byte | xx     | xx     |

Control word: see ( 7.6-15)

AIF-IN.Wx is parameterised under code L-C0412.

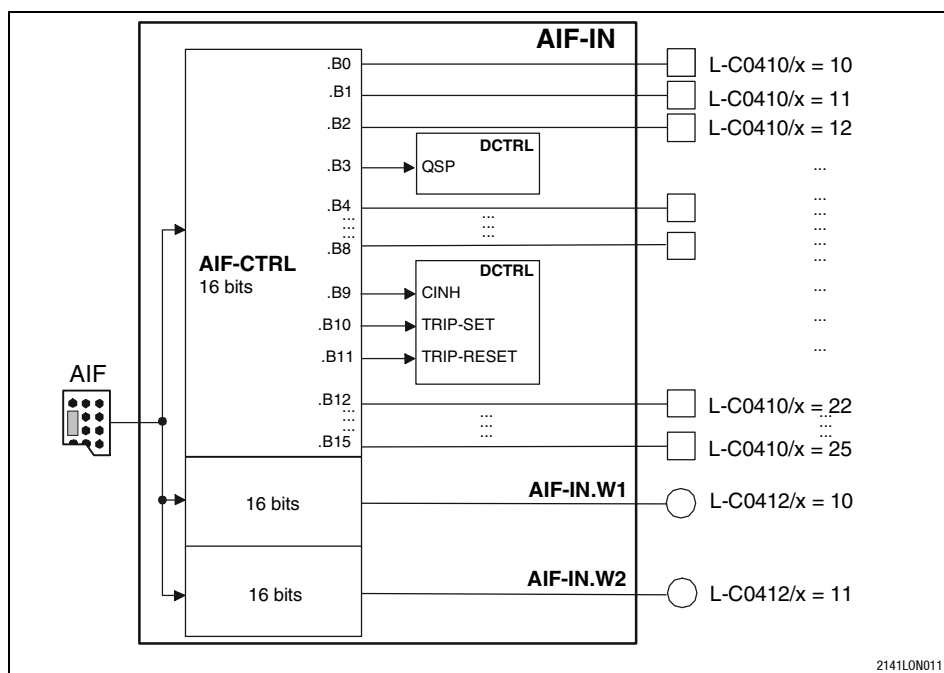


Fig. 7.6-6 Function block AIF-IN in 8200 vector (freely programmable assignment, factory setting see ( 7.6-15))

Note:

The subcode (wildcard "x" in illustration) determines the meaning of the bit or the word (see Operating Instructions for 8200 vector)

Process data telegram from drive

| Byte 1                  | Byte 2                   | Byte 3                 | Byte 4                  | Byte 5                 | Byte 6                  | Byte 7 | Byte 8 |
|-------------------------|--------------------------|------------------------|-------------------------|------------------------|-------------------------|--------|--------|
| Status word<br>Low byte | Status word<br>High byte | AIF-OUT.W1<br>Low byte | AIF-OUT.W1<br>High byte | AIF-OUT.W2<br>Low byte | AIF-OUT.W2<br>High byte | xx     | xx     |

Status word: see ( 7.6-16)

AIF-OUT.Wx is parameterized under code L-C0421.

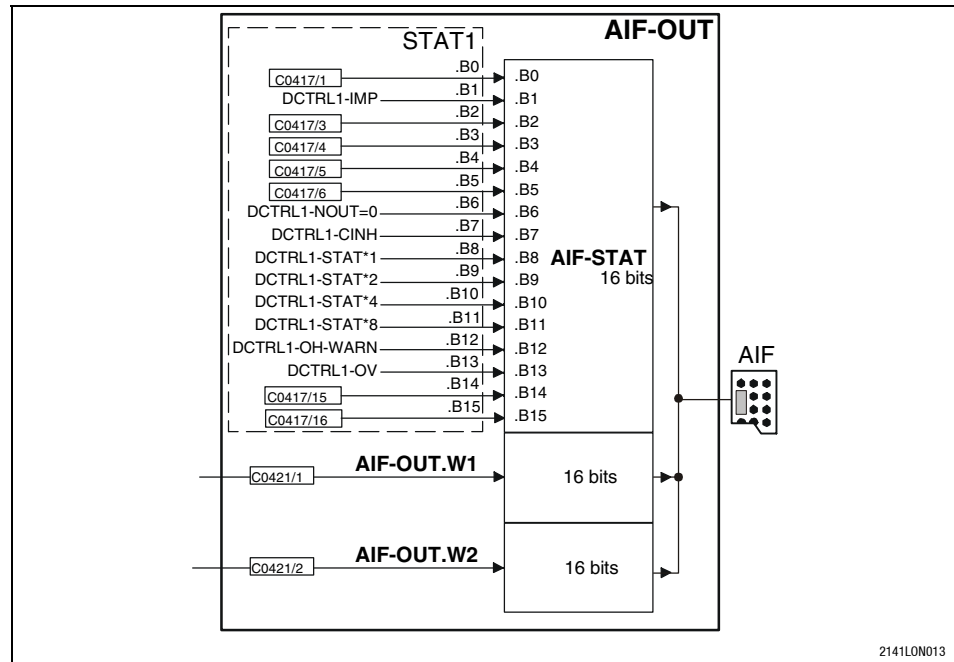


Fig. 7.6-7 Function block AIF-OUT in 8200 vector (freely programmable assignment, factory setting see ( 7.6-16))

## Data transfer

### Process data assignment for 8200 vector

#### Control word for 82XX and 8200 vector

| Bit  | 820X                                                                                                     | 821x, 822x                                                                                               | 8200 vector                                                                                                             |                                           |
|------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
|      |                                                                                                          |                                                                                                          | Default setting:<br>C0001=3 if C0007 < 52                                                                               | Default setting:<br>C0001=3 if C0007 > 51 |
| 0, 1 | 00 = C0046 active<br>01 = JOG1 in C0037 active<br>10 = JOG2 in C0038 active<br>11 = JOG3 in C0039 active | 00 = C0046 active<br>01 = JOG1 in C0037 active<br>10 = JOG2 in C0038 active<br>11 = JOG3 in C0039 active | 00 = C0046 active<br>01 = NSET1-JOG1 (C0037) active<br>10 = NSET1-JOG2 (C0038) active<br>11 = NSET1-JOG3 (C0039) active | freely configurable through user          |
| 2    | CW/CCW (CW rotation/CCW rotation)<br>0 = CW rotation<br>1 = CCW rotation                                 | CW/CCW (CW rotation/CCW rotation)<br>0 = CW rotation<br>1 = CCW rotation                                 | DCTRL1-CW/CCW<br>0 = not active<br>1 = active                                                                           |                                           |
| 3    | QSP (quick stop)<br>0 = QSP not active<br>1 = QSP active                                                 | QSP (quick stop)<br>0 = QSP not active<br>1 = QSP active                                                 | AIF-CTRL-QSP<br>0 = not active<br>1 = active                                                                            |                                           |
| 4    | Reserved                                                                                                 | RFG stop (stop of the ramp function generator)<br>0 = RFG stop not active<br>1 = RFG stop active         | NSET1-RFG1-STOP<br>0 = not active<br>1 = active                                                                         | freely configurable through user          |
| 5    | Reserved                                                                                                 | RFG zero (deceleration along the $T_{if}$ ramp C0013)<br>0 = RFG zero not active<br>1 = RFG zero active  | NSET1-RFG1-0<br>0 = not active<br>1 = active                                                                            |                                           |
| 6    | Reserved                                                                                                 | UP function for motor potentiometer<br>0 = UP not active<br>1 = UP active                                | MPOT1-UP<br>0 = not active<br>1 = active                                                                                |                                           |
| 7    | Reserved                                                                                                 | DOWN function for motor potentiometer<br>0 = DOWN not active<br>1 = DOWN active                          | MPOT1-DOWN<br>0 = not active<br>1 = active                                                                              |                                           |
| 8    | Reserved                                                                                                 | Reserved                                                                                                 | freely configurable through user                                                                                        |                                           |
| 9    | Ctrl. inhibit (controller inhibit)<br>0 = controller not inhibited<br>1 = controller inhibited           | Ctrl. inhibit (controller inhibit)<br>0 = controller not inhibited<br>1 = controller inhibited           | AIF-CTRL-CINH<br>0 = not active<br>1 = active                                                                           |                                           |
| 10   | Reserved                                                                                                 | Reserved                                                                                                 | AIF-CTRL-TRIP-SET<br>0 = not active<br>1 = active                                                                       |                                           |
| 11   | Reserved                                                                                                 | TRIP reset<br>0 -> 1 = Edge from 0 to 1                                                                  | AIF-CTRL-TRIP-RESET<br>0 -> 1 = Edge from 0 to 1                                                                        |                                           |
| 12   | PAR1 (Parameter set changeover)<br>0 -> 1 = Parameter set<br>1 -> 0 = Parameter set                      | PAR1 (Parameter set changeover)<br>0 -> 1 = Parameter set<br>1 -> 0 = Parameter set                      | DCTRL1-PAR2/4<br>0 = not active<br>1 = active                                                                           | freely configurable through user          |
| 13   | Reserved                                                                                                 | Reserved                                                                                                 | DCTRL1-PAR3/4<br>0 = not active<br>1 = active                                                                           |                                           |
| 14   | DC brake (DC injection brake)<br>0 = DC brake not active<br>1 = DC brake active                          | DC brake (DC injection brake)<br>0 = DC brake not active<br>1 = DC brake active                          | MCTRL1-DCB<br>0 = not active<br>1 = active                                                                              |                                           |
| 15   | Reserved                                                                                                 | Reserved                                                                                                 | freely configurable through user                                                                                        |                                           |

## Status word for 82XX and 8200 vector

| Bit    | 820X                                                                                              | 821x, 822x                                                                                                                                                                                                                            | 8200 vector factory setting                                                                                                                                                                                                           |
|--------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0      | Actual parameter set<br>0 = Parameter set 1 or 3 active<br>1 = Parameter set 2 or 4 active        | Actual parameter set<br>0 = Parameter set 1 or 3 active<br>1 = Parameter set 2 or 4 active                                                                                                                                            | DCTRL1-PAR-B0                                                                                                                                                                                                                         |
| 1      | IMP (pulse inhibit)<br>0 = Pulses for power stage enabled<br>1 = Pulses for power stage inhibited | IMP (pulse inhibit)<br>0 = Pulses for power stage enabled<br>1 = Pulses for power stage inhibited                                                                                                                                     | DCTRL1-IMP                                                                                                                                                                                                                            |
| 2      | $I_{max}$ (current limit reached)<br>0 = Current limit not reached<br>1 = current limit reached   | $I_{max}$ (current limit reached)<br>0 = Current limit not reached<br>1 = current limit reached                                                                                                                                       | MCTRL1-IMAX                                                                                                                                                                                                                           |
| 3      | Not assigned                                                                                      | $f_d = f_{dset}$<br>0 = $f_d \neq f_{dset}$<br>1 = $f_d = f_{dset}$                                                                                                                                                                   | MCTRL1-RFG1=NOUT                                                                                                                                                                                                                      |
| 4      | $f_d = f_{dset}$<br>0 = $f_d \neq f_{dset}$<br>1 = $f_d = f_{dset}$                               | RFG on = RFG off<br>0 = RFG on $\neq$ RFG off<br>1 = RFG on = RFG out                                                                                                                                                                 | NSET1-RFG1-I=0                                                                                                                                                                                                                        |
| 5      | $Q_{min}$ ( $f_d \leq f_{dQmin}$ )<br>0 = $Q_{min}$ not active<br>1 = $Q_{min}$ active            | $Q_{min}$ ( $f_d \leq f_{dQmin}$ )<br>0 = $Q_{min}$ not active<br>1 = $Q_{min}$ active                                                                                                                                                | PCTRL1-QMIN                                                                                                                                                                                                                           |
| 6      | $f_d + 0$ (act. frequency = 0)<br>0 = $f_d \neq 0$<br>1 = $f_d + 0$                               | $f_d + 0$ (act. frequency = 0)<br>0 = $f_d \neq 0$<br>1 = $f_d + 0$                                                                                                                                                                   | DCTRL1-NOUT=0                                                                                                                                                                                                                         |
| 7      | Ctrl. inhibit (controller inhibit)<br>0 = controller not inhibited<br>1 = controller inhibited    | Ctrl. inhibit (controller inhibit)<br>0 = controller not inhibited<br>1 = controller inhibited                                                                                                                                        | DCTRL1-CINH                                                                                                                                                                                                                           |
| 8...11 | Controller status<br>0 = Controller initialisation<br>8 = Error active                            | Controller status<br>0 = Controller initialisation<br>2 = Switch-on inhibit<br>3 = Operation inhibited<br>4 = Flying-restart circuit active<br>5 = DC brake active<br>6 = Operation enabled<br>7 = Message active<br>8 = Error active | Controller status<br>0 = Controller initialisation<br>2 = Switch-on inhibit<br>3 = Operation inhibited<br>4 = Flying-restart circuit active<br>5 = DC brake active<br>6 = Operation enabled<br>7 = Message active<br>8 = Error active |
| 12     | Overtemperature warning<br>0 = No warning<br>1 = warning                                          | Overtemperature warning<br>0 = No warning<br>1 = warning                                                                                                                                                                              | DCTRL1-OH-WARN                                                                                                                                                                                                                        |
| 13     | $V_{Gmax}$ (DC-bus overvoltage)<br>0 = No overvoltage<br>1 = overvoltage                          | $V_{Gmax}$ (DC-bus overvoltage)<br>0 = No overvoltage<br>1 = overvoltage                                                                                                                                                              | DCTRL1-OV                                                                                                                                                                                                                             |
| 14     | Direction of rotation<br>0 = CW rotation<br>1 = CCW rotation                                      | Direction of rotation<br>0 = CW rotation<br>1 = CCW rotation                                                                                                                                                                          | DCTRL1-CCW                                                                                                                                                                                                                            |
| 15     | Ready for operation<br>0 = not ready for operation<br>1 = ready for operation                     | Ready for operation<br>0 = not ready for operation<br>1 = ready for operation                                                                                                                                                         | DCTRL1-RDY                                                                                                                                                                                                                            |

## 7.6.6 Process-data assignment for 93XX

With the 93XX controller the process data assignment can be changed by reconfiguring the function blocks AIF-IN and AIF-OUT.

Process data telegram to drive

| Byte 1                   | Byte 2                    | Byte 3                | Byte 4                 | Byte 5                | Byte 6                 | Byte 7                | Byte 8                 |
|--------------------------|---------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|
| Control word<br>Low byte | Control word<br>High byte | AIF-IN.W1<br>Low byte | AIF-IN.W1<br>High byte | AIF-IN.W2<br>Low byte | AIF-IN.W2<br>High byte | AIF-IN.W3<br>Low byte | AIF-IN.W3<br>High byte |

Control word: see (□ 7.6-18)

AIF-IN.W1 to AIF-IN.W3 depend on the signal configuration selected under L-C0005.

For detailed description of the 93XX signal configuration, see the Operating Instructions for 93XX (only the main configurations: 1000, 4000, 5000, etc.) or the Manual 93XX.

In the controller, other signals can be assigned to AIF-IN.W1 to AIF-IN.W3. For this, the function-block configuration - described in the Manual 93XX - is used. The function block AIF-IN determines the input data of the controller as data interface for the 2175 fieldbus module.

For more detailed information about the function block AIF-IN, see the Manual 93XX.

| Signal configuration<br>(L-C0005) | AIF-IN.W1                         | AIF-IN.W2                                      | AIF-IN.W3                      | AIF-IN.D1    |
|-----------------------------------|-----------------------------------|------------------------------------------------|--------------------------------|--------------|
| Speed control                     | 1003 / 1013 / 1113                | NSET-N<br>Speed setpoint<br>100 % = 16383      | not assigned                   | not assigned |
| Torque control                    | 4003 / 4013 / 4113                | MCTRL-MADD<br>Torque setpoint<br>100 % = 16383 |                                |              |
| DF master                         | 5003 / 5013 / 5113                | NSET-N<br>Speed setpoint<br>100 % = 16383      |                                |              |
| DF-slave bus                      | 6003 / 6013 / 6113                | DFSET-A-TRIM<br>Phase trimming                 | DFSET-N-TRIM<br>Speed trimming |              |
| DF-slave cascade                  | 7003 / 7013 / 7113                | DFSET-VP-DIV<br>DF factor                      |                                |              |
| Cam profiler                      | 1xx3                              | YSET1-FACT                                     | not assigned                   |              |
| Positioning                       | 2xx3                              | not assigned                                   |                                |              |
| vector control                    | 1xx3 / 2xx3 / 3xx3 / 5xx3 / 100x3 | NLIM-IN1                                       | not assigned                   |              |
| vector control                    | 4xx3                              | NCTRL-MADD                                     |                                |              |
| vector control                    | 6xx3                              | DFSET-A-TRIM                                   | DFSET-N-TRIM                   |              |
| vector control                    | 7xx3 / 8xx3 / 9xx3                | DFSET-VP-DIV                                   | DFSET-A-TRIM                   |              |
| vector control                    | 100x3                             | NLIM-IN1                                       | not assigned                   |              |
| vector control                    | 110x3                             | not assigned                                   |                                |              |

## Control word for 93XX

| 9300 | 9300 Servo          |                     |                     |                     | 9300<br>Positioning<br>controller | 9300<br>Cam profiler | 9300 Vector         |                     |                                            |
|------|---------------------|---------------------|---------------------|---------------------|-----------------------------------|----------------------|---------------------|---------------------|--------------------------------------------|
|      | 1xx3                | 4xx3                | 5xx3                | 6xx3,7xx3           |                                   |                      | 2xxx3               | xxx3                | 1xxx, 2xxx,<br>3xxx, 5xxx,<br>10xxx, 11xxx |
| 0    | NSET-JOG*1          | not assigned        | NSET-JOG*1          | not assigned        | not assigned                      | CSEL1-CAM*1          | NSET-JOG*1          | not assigned        | not assigned                               |
| 1    | NSET-JOG*2          | not assigned        | NSET-JOG*2          | not assigned        | not assigned                      | CSEL1-CAM*2          | NSET-JOG*2          | not assigned        | not assigned                               |
| 2    | NSET-N-INV          | NSET-N-INV          | NSET-N-INV          | NSET-N-INV          | not assigned                      | CSEL1-CAM*4          | NSET-N-INV          | not assigned        | not assigned                               |
| 3    | AIF-CTRL.QSP        | AIF-CTRL.QSP        | AIF-CTRL.QSP        | AIF-CTRL.QSP        | AIF-CTRL.QSP                      | AIF-CTRL.QSP         | AIF-CTRL.QSP        | AIF-CTRL.QSP        | AIF-CTRL.QSP                               |
| 4    | NSET-RFG-STOP       | NSET-RFG-STOP       | NSET-RFG-STOP       | NSET-RFG-STOP       | POS-PRG-START                     | CSEL1-EVENT          | NSET-RFG-STOP       | NSET-RFG-STOP       | not assigned                               |
| 5    | NSET-RFG-0          | NSET-RFG-0          | NSET-RFG-0          | NSET-RFG-0          | POS-PRG-STOP                      | CDATA-CYCLE          | NSET-RFG-0          | NSET-RFG-0          | not assigned                               |
| 6    | not assigned        | not assigned        | not assigned        | not assigned        | not assigned                      | CSEL1-LOAD           | not assigned        | not assigned        | not assigned                               |
| 7    | not assigned        | not assigned        | not assigned        | not assigned        | POS-PRG-RESET                     | CSEL1-LOAD           | not assigned        | not assigned        | not assigned                               |
| 8    | not assigned        | not assigned        | not assigned        | not assigned        | not assigned                      | not assigned         | not assigned        | not assigned        | not assigned                               |
| 9    | AIF-CTRL.CINH       | AIF-CTRL.CINH       | AIF-CTRL.CINH       | AIF-CTRL.CINH       | AIF-CTRL.CINH                     | AIF-CTRL.CINH        | AIF-CTRL.CINH       | AIF-CTRL.CINH       | AIF-CTRL.CINH                              |
| 10   | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET                 | AIF-CTRL.TRIP-SET    | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET   | AIF-CTRL.TRIP-SET                          |
| 11   | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET               | AIF-CTRL.TRIP-RESET  | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET | AIF-CTRL.TRIP-RESET                        |
| 12   | DCTRL-PAR*1         | DCTRL-PAR*1         | DCTRL-PAR*1         | DCTRL-PAR*1         | POS-PS-CANCEL                     | not assigned         | DCTRL-PAR*1         | DCTRL-PAR*1         | DCTRL-PAR*1                                |
| 13   | DCTRL-PAR-LOAD      | DCTRL-PAR-LOAD      | DCTRL-PAR-LOAD      | DCTRL-PAR-LOAD      | POS-PARAM-RD                      | not assigned         | DCTRL-PAR-LOAD      | DCTRL-PAR-LOAD      | DCTRL-PAR-LOAD                             |
| 14   | NSET-Ti*1           | NSET-JOG*1          | REF-ON              | REF-ON              | POS-LOOP-ONH                      | not assigned         | NSET-Ti*1           | NSET-JOG*1          | not assigned                               |
| 15   | NSET-Ti*2           | NSET-JOG*2          | NSET-Ti*1           | not assigned        | POS-STBY-STP                      | not assigned         | NSET-Ti*2           | NSET-JOG*2          | not assigned                               |

**Note!**

The single bit control commands of the control word depend on other bit positions.



## Data transfer

### Process-data assignment for 93XX

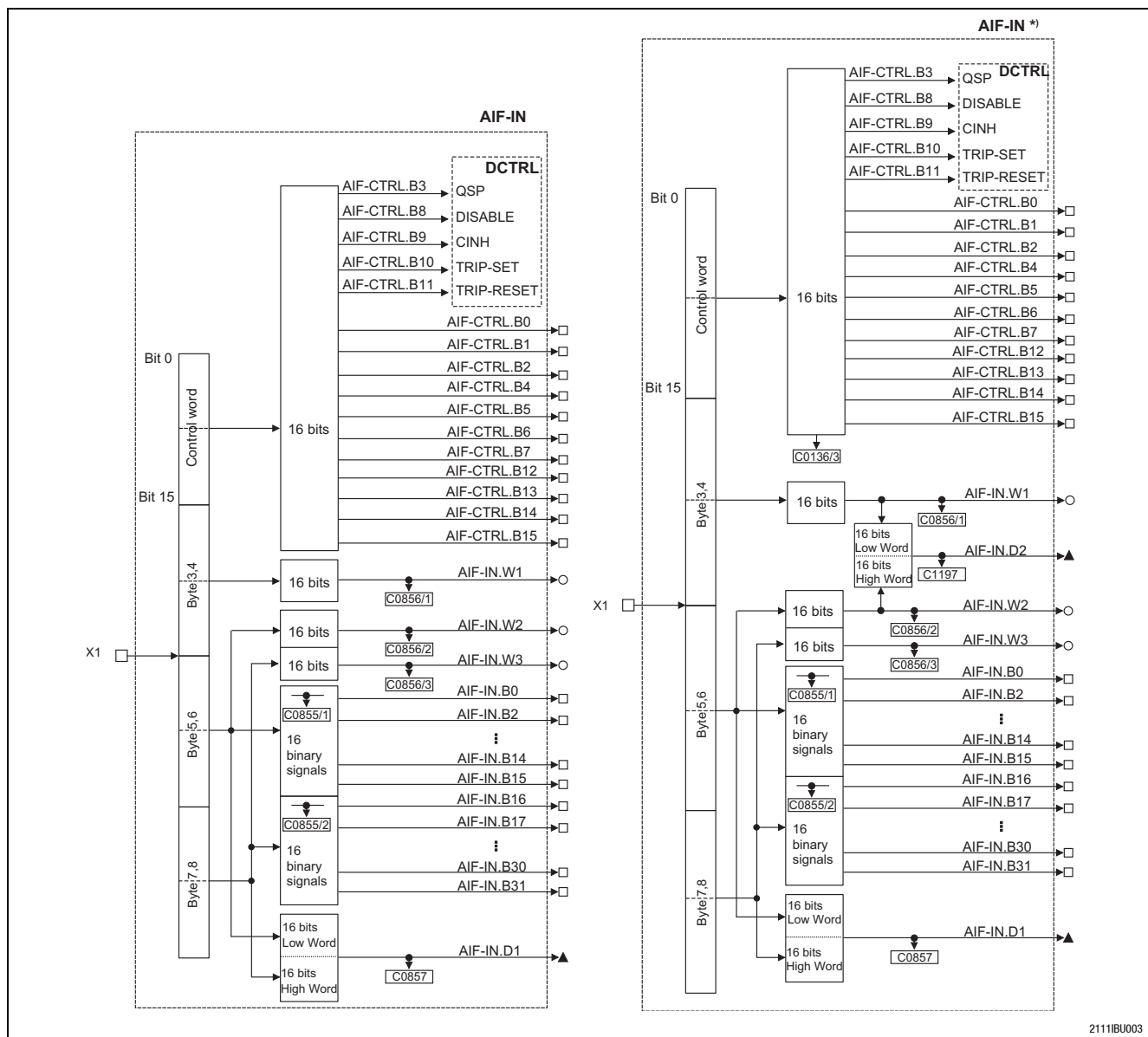


Fig. 7.6-8

Function blocks AIF-IN and AIF-IN<sup>\*</sup>

AIF-IN<sup>\*</sup> is available for the 9300 technology variants: servo, positioning controller and cam profiler as of software version 2.0. AIF-IN.D2 is new.

## Process data telegram from drive

| Byte 1                   | Byte 2                  | Byte 3                  | Byte 4                 | Byte 5                  | Byte 6                 | Byte 7                  | Byte 8                 |
|--------------------------|-------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|
| Status word<br>High byte | Status word<br>Low byte | AIF-OUT.W1<br>High byte | AIF-OUT.W1<br>Low byte | AIF-OUT.W2<br>High byte | AIF-OUT.W2<br>Low byte | AIF-OUT.W3<br>High byte | AIF-OUT.W3<br>Low byte |

Status word: see (□ 7.6-21)

AIF-OUT.W1 to AIF-OUT.W3 depend on the signal configuration selected under L-C0005.

For detailed description of the 93XX signal configuration, see the Operating Instructions for 93XX (only the main configurations: 1000, 4000, 5000, etc.) or the Manual 93XX.

In the controller, other signals can be assigned to AIF-OUT.W1 to AIF-OUT.W3. For this, the function-block configuration - described in the Manual 93XX - is used. The function block AIF-OUT determines the output data of the controller as data interface for the 2175 fieldbus module.

For more detailed information about the function block AIF-OUT, see the Manual 93XX.

| Signal configuration (L-C0005) |                          | AIF-OUT.W1                                     | AIF-OUT.W2                                     | AIF-OUT.W3                                             | AIF-OUT.D1   |
|--------------------------------|--------------------------|------------------------------------------------|------------------------------------------------|--------------------------------------------------------|--------------|
| Speed control                  | 1003/1013/1113           | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-MSET2<br>Torque display<br>100 % = 16383 | MCTRL-NSET2<br>Speed controller input<br>100 % = 16383 | not assigned |
| Torque control                 | 4003/4013/4113           | MCTRL-MSET2<br>Torque display<br>100 % = 16383 | MCTRL-NACT<br>Act. speed in %<br>100 % = 16383 | MCTRL-NSET2<br>Speed controller input<br>100 % = 16383 |              |
| DF master                      | 5003/5013/5113           | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-MSET2<br>Torque display<br>100 % = 16383 | MCTRL-NSET2<br>Speed controller input<br>100 % = 16383 |              |
| DF-slave bus                   | 6003/6013/6113           | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-PHI-ACT<br>Actual phase                  | MCTRL-MSET2<br>Torque setpoint in %<br>100 % = 16383   |              |
| DF-slave cascade               | 7003/7013/7113           | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-PHI-ACT<br>Actual phase                  | MCTRL-MSET2<br>Torque setpoint in %<br>100 % = 16383   |              |
| Cam profiler                   | 1xx3                     | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | not assigned                                   | not assigned                                           |              |
| Positioning                    | 2xx3                     | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | not assigned                                   | not assigned                                           |              |
| vector control                 | 1xx3/4xx3/5xx3/<br>10xx3 | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-IACT                                     | MCTRL-NSET2<br>Speed controller input<br>100 % = 16383 |              |
| vector control                 | 6xx3/7xx3/8xx3/<br>9xx3  | MCTRL-NACT<br>Actual speed<br>100 % = 16383    | MCTRL-PHI-ANA                                  | MCTRL-MSET2<br>Torque setpoint in %<br>100 % = 16383   |              |
| vector control                 | 110x3                    | not assigned                                   | not assigned                                   | not assigned                                           |              |

For more detailed information about the function block AIF-OUT, see the Manual 93XX.

#### Status word for 93XX

| 9300     | Servo                                                                                                                                                                                                                                                                                                |                    |              |                    | Servo positioning controller | Servo cam profiler | vector                              |                    |                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------|--------------------|------------------------------|--------------------|-------------------------------------|--------------------|------------------------|
|          | 1xx3                                                                                                                                                                                                                                                                                                 | 4xx3               | 5xx3         | 6xx3,7xx3          |                              |                    | xxx, 2xxx, 3xxx, 5xxx, 10xxx, 11xxx | 4xxx               | 6xxx, 7xxx, 8xxx, 9xxx |
| 0        | DCTRL-PAR1-0                                                                                                                                                                                                                                                                                         | DCTRL-PAR1-0       | DCTRL-PAR1-0 | DCTRL-PAR1-0       | not assigned                 | CERR1-ERR          | DCTRL-PAR1-0                        | DCTRL-PAR1-0       | DCTRL-PAR1-0           |
| 1        | DCTRL-IMP                                                                                                                                                                                                                                                                                            | DCTRL-IMP          | DCTRL-IMP    | DCTRL-IMP          | DCTRL-IMP                    | DCTRL-IMP          | DCTRL-IMP                           | DCTRL-IMP          | DCTRL-IMP              |
| 2        | MCTRL-IMAX                                                                                                                                                                                                                                                                                           | MCTRL-IMAX         | REF-OK       | REF-OK             | POS-REF-OK                   | MCTRL-IMAX         | MCTRL-IMAX                          | MCTRL-IMAX         | MCTRL-IMAX             |
| 3        | MCTRL-MMAX                                                                                                                                                                                                                                                                                           | not assigned       | MCTRL-MMAX   | not assigned       | not assigned                 | MCTRL-MMAX         | MCTRL-MMAX                          | MCTRL-IMAX negated | MCTRL-MMAX             |
| 4        | NSET-RFG-I=0                                                                                                                                                                                                                                                                                         | MCTRL-IMAX negated | NSET-RFG-I=0 | MCTRL-IMAX negated | MCTRL-MMAX negated           | DCTRL-TRIP         | NSET-RFG-I=0                        | NSET-RFG-I=0       | NSET-QSP-OUT           |
| 5        | QMIN                                                                                                                                                                                                                                                                                                 | QMIN               | REF-BUSY     | REF-BUSY           | POS-IN-TARGET                | CDATA-X0           | QMIN                                | QMIN               | QMIN                   |
| 6        | DCTRL-NACT=0                                                                                                                                                                                                                                                                                         | DCTRL-NACT=0       | DCTRL-NACT=0 | DCTRL-NACT=0       | DCTRL-NACT=0                 | DCTRL-NACT=0       | DCTRL-NACT=0                        | DCTRL-NACT=0       | DCTRL-NACT=0           |
| 7        | DCTRL-CINH                                                                                                                                                                                                                                                                                           | DCTRL-CINH         | DCTRL-CINH   | DCTRL-CINH         | DCTRL-CINH                   | DCTRL-CINH         | DCTRL-CINH                          | DCTRL-CINH         | DCTRL-CINH             |
| 8 ... 11 | Controller status:<br>0 = Unit initialisation<br>1 = Switch-on inhibit<br>3 = Operation inhibited<br>4 = Flying-restart circuit active<br>5 = DC-injection brake active<br>6 = Operation enabled<br>7 = Message active<br>8 = Fault active<br>10 = Fail-QSP (only 9300 servo positioning controller) |                    |              |                    |                              |                    |                                     |                    |                        |
| 12       | DCTRL-WARN                                                                                                                                                                                                                                                                                           | DCTRL-WARN         | DCTRL-WARN   | DCTRL-WARN         | DCTRL-WARN                   | DCTRL-WARN         | DCTRL-WARN                          | DCTRL-WARN         | DCTRL-WARN             |
| 13       | DCTRL-MESS                                                                                                                                                                                                                                                                                           | DCTRL-MESS         | DCTRL-MESS   | DCTRL-MESS         | DCTRL-MESS                   | DCTRL-MESS         | DCTRL-MESS                          | DCTRL-MESS         | DCTRL-MESS             |
| 14       | DCTRL-CW/CCW                                                                                                                                                                                                                                                                                         | DCTRL-CW/CCW       | DCTRL-CW/CCW | not assigned       | DCTRL-AIFL-QSP               | DCTRL-CW/CCW       | DCTRL-CW/CCW                        | DCTRL-CW/CCW       | DCTRL-CW/CCW           |
| 15       | DCTRL-RDY                                                                                                                                                                                                                                                                                            | DCTRL-RDY          | DCTRL-RDY    | DCTRL-RDY          | DCTRL-RDY                    | DCTRL-RDY          | DCTRL-RDY                           | DCTRL-RDY          | DCTRL-RDY              |

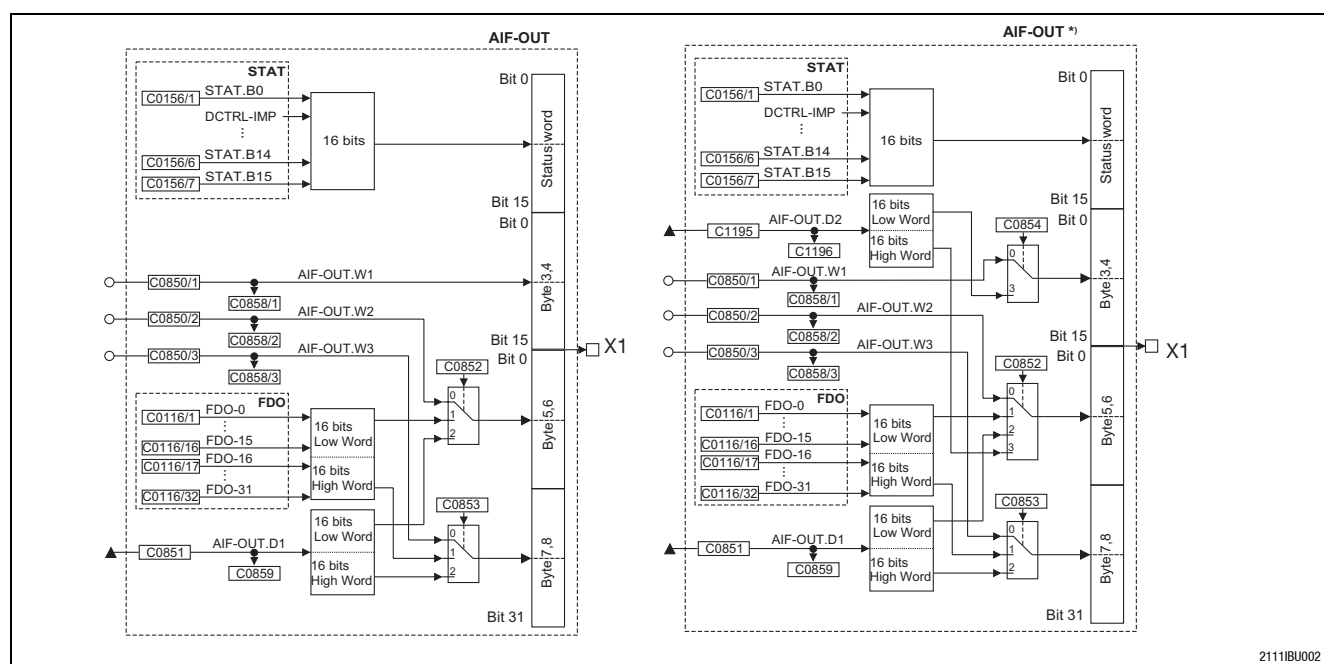


Fig. 7.6-9 Function blocks AIF-OUT and AIF-OUT\*)  
 AIF-OUT\*) is available for the 9300 technology variants: servo, positioning controller and cam profiler as of software version 2.0. AIF-OUT.D2 is new.

## 7.6.7 Process data assignment for 9300 Servo PLC and Drive PLC

Process data telegram to drive

The following data can be assigned to the PO data:

| Name/variable name                    | Explanation       |
|---------------------------------------|-------------------|
| Device control word (AIF1_wDctrlCtrl) |                   |
| AIF1_nlnW1_a                          | AIF word 1        |
| AIF1_nlnW2_a                          | AIF word 2        |
| AIF1_nlnW3_a                          | AIF word 3        |
| AIF2_nlnW1_a                          | AIF word 4        |
| AIF2_nlnW2_a                          | AIF word 5        |
| AIF2_nlnW3_a                          | AIF word 6        |
| AIF2_nlnW4_a                          | AIF word 7        |
| AIF3_nlnW1_a                          | AIF word 8        |
| AIF3_nlnW2_a                          | AIF word 9        |
| AIF3_nlnW3_a                          | AIF word 10       |
| AIF3_nlnW4_a                          | AIF word 11       |
| AIF1_dlnD1_p                          | AIF double word 1 |



### Note!

#### 9300 Servo PLC

Please execute the following logic operations in the PLC program of the controller:

AIF1\_wDctrlCtrl → DCTRL\_wAIF1Ctrl

DCTRL\_wStat → AIF1\_wDctrlStat

#### Drive PLC

As we are dealing with a PLC here, it is necessary to use the device control.

## Data transfer

### Process data assignment for 9300 Servo PLC and Drive PLC

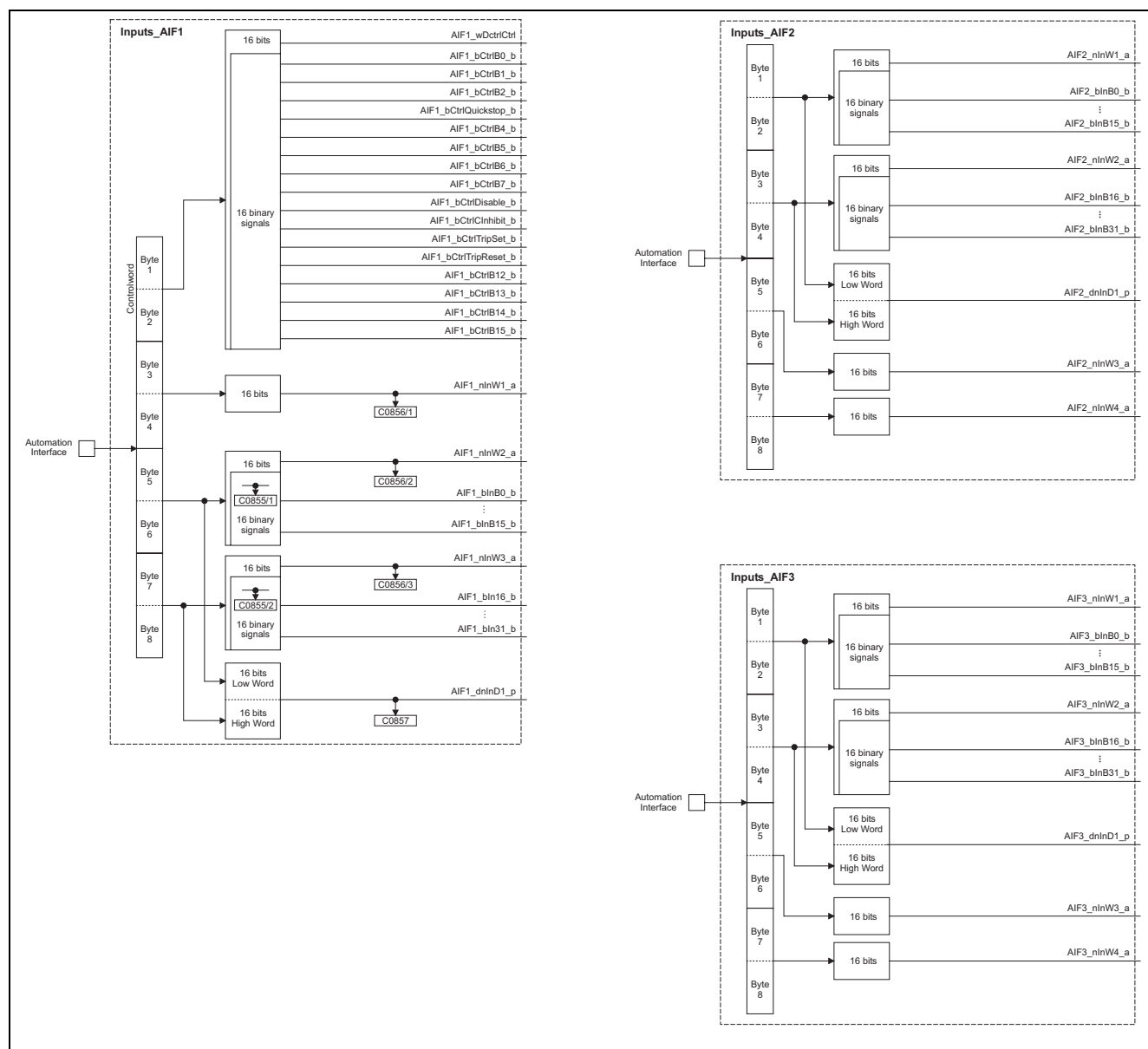


Fig. 7.6-10 Function blocks AIF-IN1, AIF-IN2 and AIF-IN3

**Process data telegram from drive**

The following data can be assigned to the PI data:

| Name/variable name                  | Explanation       |
|-------------------------------------|-------------------|
| Device status word (AIF1_DctrlStat) |                   |
| AIF_nOutW1_a                        | AIF word 1        |
| AIF_nOutW2_a                        | AIF word 2        |
| AIF_nOutW3_a                        | AIF word 3        |
| AIF2_nOutW1_a                       | AIF word 4        |
| AIF2_nOutW2_a                       | AIF word 5        |
| AIF2_nOutW3_a                       | AIF word 6        |
| AIF2_nOutW4_a                       | AIF word 7        |
| AIF3_nOutW1_a                       | AIF word 8        |
| AIF3_nOutW2_a                       | AIF word 9        |
| AIF3_nOutW3_a                       | AIF word 10       |
| AIF3_nOutW4_a                       | AIF word 11       |
| AIF1_dnOutD1_p                      | AIF double word 1 |

**Note!****9300 Servo PLC**

Please execute the following logic operations in the PLC program of the controller:

AIF1\_wDctrlCtrl → DCTRL\_wAIF1Ctrl

DCTRL\_wStat → AIF1\_wDctrlStat

**Drive PLC**

As we are dealing with a PLC here, it is necessary to use the device control.

## Data transfer

### Process data assignment for 9300 Servo PLC and Drive PLC

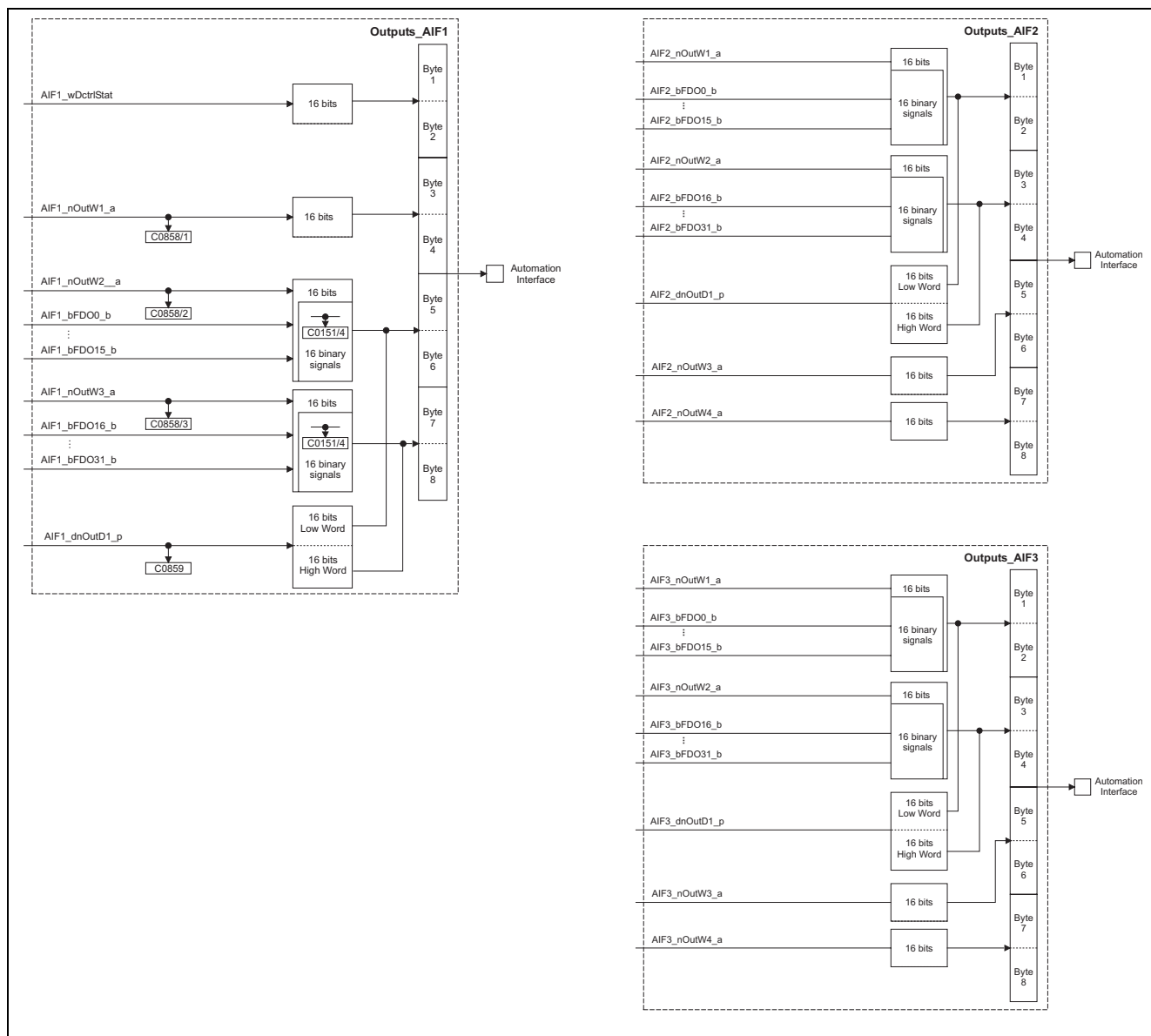


Fig. 7.6-11 Function blocks AIF-OUT1, AIF-OUT2 and AIF-OUT3

## 7.6.8 Parameter data channel



### Note!

- In these Operating Instructions Lenze codes have an L in front to ensure that they are not mixed up with the CANopen index.  
– Example: 'L-C0001' stands for the Lenze code C0001.
- Please obtain the value range for the Lenze codes from the Operating Instructions for the corresponding controller (see: Code table).

### Access to the codes of the controller

When using (intelligent) bus modules, it is possible to change the features and behaviour of each controller integrated into the network via a higher-level master (e.g. a PLC).

Lenze controllers store the parameters to be changed in codes.

The controller codes are addressed via the index when accessing the codes through the bus module (see chapter 5.6.8).

The index for Lenze code numbers is between 16576 (40C0<sub>hex</sub>) and 24575 (5FFF<sub>hex</sub>).

Conversion formula:

$$Index[dec] = 24575 - Lenze\ code$$

### Example

| Lenze codes                                                                                                                        |  | dec                             | hex                                             |
|------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------|-------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Addressing of Lenze codes via offset:<br/>– Example for operating mode L-C0001</li> </ul> |  | $Index = 24575 - LENZE\ CODENO$ | $Index_{hex} = 5FFF_{hex} - LENZE-CODENO_{hex}$ |
|                                                                                                                                    |  | $Index = 24574 (= 24575 - 1)$   | $Index_{hex} = 5FFE_{hex} (= 5FFF_{hex} - 1)$   |

The parameter value is included in the useful data of the telegram (see examples (□ 7.6-31)).



#### Lenze Parameter sets

Parameter sets are for special code saving which is necessary because of different configurations for different application processes.

The following table informs about number and addressing of parameter sets for your controller:

| 82XX                                                                                                                                                                                                                    | 8200 vector                                                                                                                                                                                                                | 93XX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| The 82XX and 8200 vector have 2 and 4 parameter sets. The parameters can be directly addressed via CAN. They are addressed by means of a code-digit offset:                                                             |                                                                                                                                                                                                                            | 93XX controllers have 4 parameter sets (depending on the variant) for saving in the EEPROM. Another parameter set is in the user memory of the controller. This is the current parameter set. Only the current parameter set can be directly addressed through CAN. For the codes, see the Operating Instructions or Manual for 93XX. Changes of the current parameter set will be lost after switching off the controller. Code C0003 is for saving the current parameter set. After switching on the controller, parameter set 1 is automatically loaded into the current parameter set.<br>At first the parameter sets 2 - 4 must be activated, before the parameters included in them can be changed. |  |
| <ul style="list-style-type: none"> <li>• Offset 0 addresses parameter set 1 with the Lenze codes L-C0000 to L-C1999</li> <li>• Offset 2000 addresses parameter set 2 with the Lenze codes L-C2000 to L-C3999</li> </ul> |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| no additional parameter sets available.                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Offset 4000 addresses parameter set 3 with the Lenze codes L-C4000 to L-C5999</li> <li>• Offset 6000 addresses parameter set 4 with the Lenze codes L-C6000 to L-C7999</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| If a parameter is available only once (see the Operating Instructions for 82XX or 8200 vector), use the code digit offset 0.                                                                                            |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Example for L-C0011 (maximum field frequency):<br>L-C0011 in parameter set 1: Lenze code = 11<br>L-C0011 in parameter set 2: Lenze code = 2011                                                                          |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|                                                                                                                                                                                                                         | L-C0011 in parameter set 3: Lenze code = 4011<br>L-C0011 in parameter set 4: Lenze code = 6011                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Parameter changes:<br>82XX: Automatic saving in the controller<br>8200 vector: Automatic saving is factory-set (can be switched off with L-C0003)<br>Process data changes:<br>82XX, 8200 vector: no automatic saving    |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |



**Stop!** (only applies to 8200 vector and 82XX controllers and the 2175 fieldbus module)

Please observe that cyclic writing of parameter data into the EEPROM is not permissible.

Only for 8200 vector:

Please configurate the code to C0003 = 0 after each mains disconnection if you want to change the parameter data cyclically.

**Structure of parameter data telegram**

| User data (up to 8 byte) |                          |                           |                 |                      |               |               |               |
|--------------------------|--------------------------|---------------------------|-----------------|----------------------|---------------|---------------|---------------|
| 1st byte                 | 2nd byte                 | 3rd byte                  | 4th byte        | 5th byte             | 6th byte      | 7th byte      | 8th byte      |
| <b>Command</b>           | <b>Index</b><br>Low byte | <b>Index</b><br>High byte | <b>Subindex</b> | <b>Data 1</b>        | <b>Data 2</b> | <b>Data 3</b> | <b>Data 4</b> |
|                          |                          |                           |                 | Low Word             |               | High Word     |               |
|                          |                          |                           |                 | Low byte             | High byte     | Low byte      | High byte     |
|                          |                          |                           |                 | <b>Error message</b> |               |               |               |



**Note!**

The user data are represented in a left-justified INTEL format. Calculation example, see chapter 7.6.9.

**“Command”**

The command contains the following information which must be entered if not already indicated:

| Command                                                                        | Access to Data 1 - Data 4       |                                 |                           | Block                |
|--------------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------|----------------------|
|                                                                                | 4 byte data<br>(5th - 8th byte) | 2 byte data<br>(5th + 6th byte) | 1 byte data<br>(5th byte) |                      |
|                                                                                | hex                             | hex                             | hex                       |                      |
| Write request<br>(Send parameters to drive)                                    | 23                              | 2B                              | 2F                        | Writing not possible |
| Write Response<br>(Controller response to the write request (acknowledgement)) | 60                              | 60                              | 60                        |                      |
| Read Request<br>(Request to read a parameter from the drive)                   | 40                              | 40                              | 40                        | 40                   |
| Read Response<br>(Response to the read request with an actual value)           | 43                              | 4B                              | 4F                        | 41                   |
| Error response<br>(The controller indicates a communication error)             | 80                              | 80                              | 80                        | 80                   |

**“Index Low Byte / Index High Byte”**

The parameters or the Lenze codes are selected with these two bytes according to the formula:

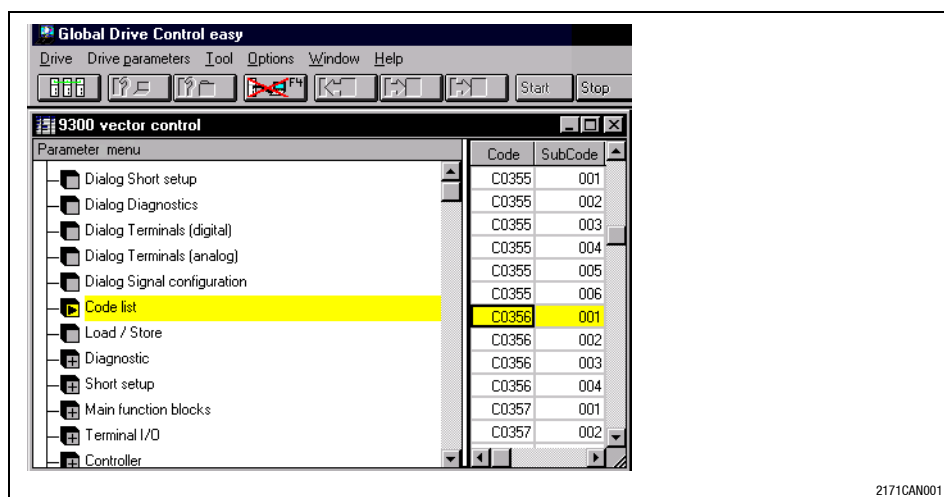
| $Index = 24575 - (Lenze\ code + 2000 \cdot (parameter\ set - 1))$           |                                                                                                          |                                                                                                                                                       |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Example                                                                     | Calculation                                                                                              | Index Low/High Byte                                                                                                                                   |
| The code L-C0012 (acceleration time) in parameter set 1 is to be addressed. | $24575 - 12 - 0 = 24563 = 5FF3_{hex}$                                                                    | According to the left-justified Intel data format the entries are (see chapter 5.6.8):<br>Index Low Byte = $F3_{hex}$<br>Index High Byte = $5F_{hex}$ |
| The code L-C0012 (acceleration time) in parameter set 2 is to be addressed. | An offset of 2000 is to be added because of parameter set 2:<br>$24575 - 12 - 2000 = 22563 = 5823_{hex}$ | According to the left-justified Intel data format the entries are (see chapter 5.6.8):<br>Index Low Byte = $23_{hex}$<br>Index High Byte = $58_{hex}$ |

“Subindex”

Table position of a parameter value under the index.

Example:

L-C0356. This code consists of 4 subcodes (see below). This results in the following entries for the subindex: 1 - 4<sub>hex</sub> (1 - 4<sub>dec</sub>)



Data  
(Data 1 ... data 4)

|                                           |                                   |           |          |           |
|-------------------------------------------|-----------------------------------|-----------|----------|-----------|
| Details about the parameter data telegram | <b>Parameter value (length 1)</b> | 00        | 00       | 00        |
|                                           | <b>Parameter value (length 2)</b> | 00        |          | 00        |
|                                           | <b>Parameter value (length 4)</b> | Low Word  |          | High Word |
|                                           | Low byte                          | High byte | Low byte | High byte |

Depending on the data format (see 'Attribute list' in the Manual of the corresponding controller) the length of the parameter value needs 1 to 4 bytes.



### Note!

Lenze parameters are mainly described as data type FIX32 (32 bit value with sign and four decimal positions, see attribute table in the corresponding system manual). In order to obtain integer values, the desired parameter value must be multiplied by 10.000<sub>dec</sub>.

The parameters C0135 and C0150 must be transferred as bit code and without factor.

The attribute table of the drive controller (see Operating Instructions) contains notes concerning the parameters for which the factor 10.000<sub>dec</sub> is to be considered.

## Fault messages

|                                           |         |                   |                    |          |               |
|-------------------------------------------|---------|-------------------|--------------------|----------|---------------|
| Details about the parameter data telegram | Command | Index<br>Low byte | Index<br>High byte | Subindex | error<br>code |
|-------------------------------------------|---------|-------------------|--------------------|----------|---------------|

Byte 1:

In the **Command** byte shows in code **128<sub>dec</sub> or 80<sub>hex</sub>** that an error has occurred.

Byte 2, 3 and 4:

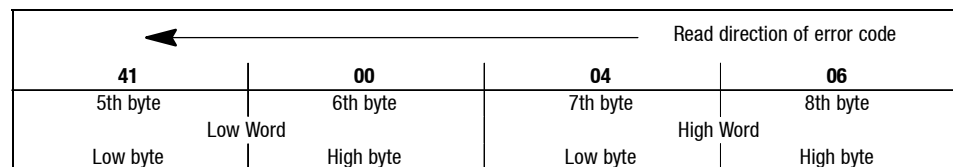
In the **Index byte** and **Subindex** the index and subindex of that code in which the error has occurred, are entered.

Byte 5 - 8:

In the data bytes 5. - 8. the **error code** is entered.

The error code is described in reversed direction compared to the read direction.

Example: Error code 06 04 00 41<sub>hex</sub> and description of error code:



The following table lists the explanations for the error numbers:

| error code (hex) | Explanation                                                                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0503 0000        | Toggle bit not changed                                                                                                                                                                             |
| 0504 0000        | SDO protocol has been terminated                                                                                                                                                                   |
| 0504 0001        | Invalid or unknown client/server command specifier                                                                                                                                                 |
| 0504 0002        | Invalid block size (only block mode)                                                                                                                                                               |
| 0504 0003        | Invalid sequence number (only block mode)                                                                                                                                                          |
| 0504 0004        | CRC fault (only block mode)                                                                                                                                                                        |
| 0504 0005        | Not sufficient memory                                                                                                                                                                              |
| 0601 0000        | Access to object is not supported                                                                                                                                                                  |
| 0601 0001        | Attempt to read a writable object                                                                                                                                                                  |
| 0601 0002        | Attempt to write a readable object                                                                                                                                                                 |
| 0602 0000        | Object is not listed in the object directory                                                                                                                                                       |
| 0604 0041        | Object is non-transferable to PDO                                                                                                                                                                  |
| 0604 0042        | Number and length of the objects to be transferred exceed length of PDO                                                                                                                            |
| 0604 0043        | General parameter incompatibility                                                                                                                                                                  |
| 0604 0047        | General internal device incompatibility                                                                                                                                                            |
| 0606 0000        | Access denied due to a hardware error                                                                                                                                                              |
| 0607 0010        | Unsuitable data type, unsuitable service parameter length                                                                                                                                          |
| 0607 0012        | Unsuitable data type, service parameter length exceeded                                                                                                                                            |
| 0607 0013        | Unsuitable data type, service parameter length has not been reached                                                                                                                                |
| 0609 0011        | Subindex is not available                                                                                                                                                                          |
| 0609 0030        | Value range of the parameter is exceeded                                                                                                                                                           |
| 0609 0031        | Parameter values are too high                                                                                                                                                                      |
| 0609 0032        | Parameter values are too low                                                                                                                                                                       |
| 0609 0036        | Maximum value falls below minimum value                                                                                                                                                            |
| 0800 0000        | General fault                                                                                                                                                                                      |
| 0800 0020        | Data cannot be transferred or saved for application                                                                                                                                                |
| 0800 0021        | Data cannot be transferred or saved for application due to local control                                                                                                                           |
| 0800 0022        | Data cannot be transferred or saved due to the current device status                                                                                                                               |
| 0800 0023        | Dynamic generation of the object directory has been failed or the object directory is not available (e.g. object directory is created from a file, generation is not possible due to a file error) |

## 7.6.9 Examples for parameter data telegrams

### Read parameters

The heatsink temperature (value of 43 °C) C061 is to be read of the controller with the device address 5 via parameter channel 1.

- Identifier calculation

|                                              |                             |
|----------------------------------------------|-----------------------------|
| Identifier parameter channel 1 to controller | = 1536 + controller address |
| Identifier                                   | = 1536 + 5 = 1541           |

- Command read request (request to read a parameter from the drive)

|         |                     |
|---------|---------------------|
| Command | = 40 <sub>hex</sub> |
|---------|---------------------|

- Index calculation

|                             |                                                  |
|-----------------------------|--------------------------------------------------|
| Index = 24575 - code number | Index = 24575 - 61 = 24514 = 5FC2 <sub>hex</sub> |
|-----------------------------|--------------------------------------------------|

Telegram to drive:

| Identifier | Command           | Index Low Byte    | Index High Byte   | Subindex | Data 1 | Data 2 | Data 3 | Data 4 |
|------------|-------------------|-------------------|-------------------|----------|--------|--------|--------|--------|
| 1541       | 40 <sub>hex</sub> | C2 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | 00     | 00     | 00     | 00     |

Telegram from drive

Identifier:

Parameter channel 1 of controller (=1408) + controller address = 1413

Command:

Response to the read request with the actual value = 43<sub>hex</sub>

Index of the read request

5FC2<sub>hex</sub>

Subindex:

0

Data 1 to Data 4:

00 06 8F B0 = 430.000 → 430.000 : 10.000 = 43 °C

| Identifier | Command           | Index Low Byte    | Index High Byte   | Subindex | Data 1            | Data 2            | Data 3            | Data 4 |
|------------|-------------------|-------------------|-------------------|----------|-------------------|-------------------|-------------------|--------|
| 1413       | 43 <sub>hex</sub> | C2 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | B0 <sub>hex</sub> | 8F <sub>hex</sub> | 06 <sub>hex</sub> | 00     |

## Write parameters

The acceleration time C0012 (parameter set 1) of the controller with address 1 is to be changed to 20 s via parameter channel 1.

- Identifier calculation

|                                              |                             |
|----------------------------------------------|-----------------------------|
| Identifier parameter channel 1 to controller | = 1536 + controller address |
| Identifier                                   | = 1536 + 1 = 1537           |

- Command write request (send parameter to drive)

|         |                     |
|---------|---------------------|
| Command | = 23 <sub>hex</sub> |
|---------|---------------------|

- Index calculation

|                             |                                                  |
|-----------------------------|--------------------------------------------------|
| Index = 24575 - code number | Index = 24575 - 12 = 24563 = 5FF3 <sub>hex</sub> |
|-----------------------------|--------------------------------------------------|

- Subindex: 0
- Calculation of the acceleration time

|                         |                                                      |
|-------------------------|------------------------------------------------------|
| Acceleration-time value | 20 s · 10.000 = 200.000 = 00 03 0D 40 <sub>hex</sub> |
|-------------------------|------------------------------------------------------|

- Telegram to drive

| Identifier | Command           | Index Low Byte    | Index High Byte   | Subindex | Data 1            | Data 2            | Data 3            | Data 4 |
|------------|-------------------|-------------------|-------------------|----------|-------------------|-------------------|-------------------|--------|
| 1537       | 23 <sub>hex</sub> | F3 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | 40 <sub>hex</sub> | 0D <sub>hex</sub> | 03 <sub>hex</sub> | 00     |

Response of the controller when no error occurs

| Identifier | Command           | Index Low Byte    | Index High Byte   | Subindex | Data 1 | Data 2 | Data 3 | Data 4 |
|------------|-------------------|-------------------|-------------------|----------|--------|--------|--------|--------|
| 1409       | 60 <sub>hex</sub> | F3 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | 00     | 00     | 00     | 00     |

Identifier parameter channel 1 from controller = 1408 + controller address = 1409

Command = write response (controller response (acknowledgement)) = 60<sub>hex</sub>

#### Read block parameters

A product code (EKZ, code L-C0200) of the Lenze product 8200 vector is to be read from parameter set 1. The product code has 14 alphanumeric characters. It is transferred as a block parameter. A transfer of block parameters uses the entire data width (2nd - 8th byte).

The command byte (1. byte) contains the entry (40<sub>hex</sub> or 41<sub>hex</sub>) during the transfer of useful data in order to be able to

- signalise the end of the block transfer
- request the next block.

#### • Code L-C0200 - request

| 1st byte          | 2nd byte          | 3rd byte          | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|-------------------|-------------------|-------------------|----------|----------|----------|----------|----------|
| 40 <sub>hex</sub> | 37 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | 00       | 00       | 00       | 00       |

1st byte: 40 read request (request to read a parameter from the controller)  
 2nd/3rd byte: Index Low/High Byte: 24575 - 200 - 0 = 24375 = 5F37<sub>hex</sub>

#### • Response including the block length (14 characters)

| 1st byte          | 2nd byte          | 3rd byte          | 4th byte | 5th byte          | 6th byte | 7th byte | 8th byte |
|-------------------|-------------------|-------------------|----------|-------------------|----------|----------|----------|
| 41 <sub>hex</sub> | 37 <sub>hex</sub> | 5F <sub>hex</sub> | 00       | 0E <sub>hex</sub> | 00       | 00       | 00       |

1st byte: 41 read response. The entry 41<sub>hex</sub> implies that it is a block telegram.  
 2nd/3rd byte: see above  
 5th byte: 0E (=14<sub>dec.</sub>) data length 14 characters (ASCII format)

#### • First data block - request

| 1st byte          | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|-------------------|----------|----------|----------|----------|----------|----------|----------|
| 60 <sub>hex</sub> | 00       | 00       | 00       | 00       | 00       | 00       | 00       |

1st byte: 60<sub>hex</sub>  
 Write response (acknowledgement) with access to bytes 2 - 8.  
 Note:  
 The single blocks are toggled\* in succession, i.e. at first it is requested with command 60<sub>hex</sub> (=0110 0000<sub>bin</sub>), then with command 70<sub>hex</sub> (=0111 0000<sub>bin</sub>), after this again with 60<sub>hex</sub> etc. The response is send accordingly. It is alternating because of a toggle bit. The process is completed by command 11<sub>hex</sub> (Bit 0 is set, see below).  
 \*Toggle bit = Bit 4 (starting at 0)

#### • Response

| 1st byte | 2nd byte          | 3rd byte          | 4th byte          | 5th byte          | 6th byte          | 7th byte          | 8th byte          |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 00       | 38 <sub>hex</sub> | 32 <sub>hex</sub> | 53 <sub>hex</sub> | 38 <sub>hex</sub> | 32 <sub>hex</sub> | 31 <sub>hex</sub> | 32 <sub>hex</sub> |

2nd byte - 8th byte, ASCII format: 8 2 S 8 2 1 2

#### • Second data block - request

| 1st byte          | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|-------------------|----------|----------|----------|----------|----------|----------|----------|
| 70 <sub>hex</sub> | 00       | 00       | 00       | 00       | 00       | 00       | 00       |

1st byte: 70<sub>hex</sub> (Toggle) write response (acknowledgement) with access to all 4 data bytes

#### • Second data block - response with over-detection

| 1st byte          | 2nd byte          | 3rd byte          | 4th byte          | 5th byte          | 6th byte          | 7th byte          | 8th byte          |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 11 <sub>hex</sub> | 56 <sub>hex</sub> | 5F <sub>hex</sub> | 31 <sub>hex</sub> | 34 <sub>hex</sub> | 30 <sub>hex</sub> | 30 <sub>hex</sub> | 30 <sub>hex</sub> |

1st Byte: 11 last transfer of the data block  
 2nd byte - 8th byte: V\_ 1 4 0 0 0  
 Result of data block transfer: 82S8212V\_14000

**7.6.10 Notes to be observed when setting the parameters for the controllers****82XX controllers**

The following applies to the inverter series 8200:

**Danger!**

Parameter setting (codes except C046, C0135) is only possible when the controller is inhibited. Parameters are accepted when the controller is enabled, but they are not saved.

After having set a parameter, the controller must not be addressed for approx. 50 ms; otherwise the command will be ignored.

After parameter setting, the controller needs up to approx. 70 ms to set the status 'enabled' (terminal, C040, C0135).

The function TRIP reset is activated by inhibiting the controller and enabling it again under C040 or C0135.

The function TRIP-Reset initialises the 8200 inverter and the 2175 field bus module. Therefore the TRIP reset command is not acknowledged for the master.

**Controller 8200 vector**

Digital and analog input and output signals can be freely configured (see Operating Instructions; codes C0410, C0412, C0417 and C0421)



Basic devices servo PLC 9300 and DRIVE PLC

#### AIF control/status byte

Drive controller and fieldbus module are able to exchange control and status information. For this purpose a control byte and a status byte are made available in the AIF protocol.

The program package “Drive PLC Developer Studio” (DDS) enables the user to directly access the status byte via the control configuration of the AIF module. The 2175 fieldbus module describes this byte with its fault messages.

The evaluation of these fault messages must be taken into consideration by the programmer of the PLC series, e.g. by displaying the signals as faults via a fault-warning-message-firmware module.

Assignment of the AIF status byte C2121 for the 2175 fieldbus module

| AIF status bit | Function            |
|----------------|---------------------|
| 0              | CE11 fault          |
| 1              | CE12 fault          |
| 2              | CE13 fault          |
| 3              | CE14 fault          |
| 4              | Operational         |
| 5              | Pre-Operational     |
| 6              | Warning             |
| 7              | internally assigned |

The control byte is used, so that the controller can send messages or commands to the 2175 fieldbus module.

The control byte is available for the user via code C2120. The commands are described as numbers. Some of the command numbers are universally applicable for all fieldbus modules, but others are only valid especially for the different modules. Altogether not more than 16 commands can be available.

| Command number in C2120, bit 0..3 | Function                                                                 | R/W code    |
|-----------------------------------|--------------------------------------------------------------------------|-------------|
| 0                                 | No command                                                               |             |
| 1                                 | Re-initialisation of the option module                                   | all         |
| 2                                 | Updating of all relevant codes for the actual option module. No re-init. | all         |
| 10                                | Accept XCAN-OUT cycle times or boot-up time                              | C2356       |
| 11                                | Accept monitoring times                                                  | C2357       |
| 12                                | Accept TX mode                                                           | C2375       |
| 13                                | Accept masks                                                             | C2376-C2378 |
| 14                                | Accept configuration of CE faults                                        | C2382       |

Assignment of the AIF control byte for the 2175 fieldbus module

The command code C2120 is automatically reset to 0 after the command has been transferred to the option module. Because of this, no toggle bit is needed. The command itself is written into the lower 4 bits of the control byte, so that 4 bits are available for extensions to come.



## 7.7 CANopen objects and Lenze codes

### 7.7.1 Communication relevant Lenze codes

The behaviour of servo inverters or frequency inverters is determined by the corresponding parameter setting. Lenze devices can be parameterised by means of codes. These Lenze codes which are part of a telegram are exchanged between the master and 2175 fieldbus module via the CAN bus.

According to the Lenze inverter used, two Lenze codes are available for the communication via CAN bus:

- Codes  $\geq$  L-C2350  
for devices with PLC operating system according to IEC1131 (e. g. Servo PLC 9300 and Drive PLC).  
These codes are saved in the controller.
- Module codes  $\geq$  L-C1850  
for all other inverters (82XX, 8200 vector or 93XX).  
These codes are saved in the 2175 fieldbus module.

The condition for communication with the drive is that the drive is known as participant in the system. The recognition takes place during the module initialisation.

The setting of address and Baud rate can be made in different ways (see also from (7.5-1)):

- Front switch 1 - 6  $\neq$  OFF  
Address and baud rate are defined by the switch setting.  
The 2175 fieldbus module writes the front switch position into the code L-C1859 or L-C2359.
- Front switch 1 - 6 = OFF  
Address and baud rate must be defined by the codes L-C0009 (address) and L-C0125 (baud rate).

## 7.7.2 Description of communication relevant Lenze codes

L-C1810:  
Software code

| Code    | Subcode | Index                                     | Possible settings |           | Data type |
|---------|---------|-------------------------------------------|-------------------|-----------|-----------|
|         |         |                                           | Lenze             | Selection |           |
| L-C1810 | -       | 22765 <sub>d</sub> =<br>58ED <sub>h</sub> | -                 | -         | VS        |

When initialising the modules it can be determined with the help of the product code, which device is connected as participant.

L-C1811:  
Software creation date

| Code    | Subcode | Index                                     | Possible settings |           | Data type |
|---------|---------|-------------------------------------------|-------------------|-----------|-----------|
|         |         |                                           | Lenze             | Selection |           |
| L-C1811 | -       | 22764 <sub>d</sub> =<br>58EC <sub>h</sub> |                   |           | VS        |

In the first place this information is important for the service.

L-C1850/L-C2350:  
Node address

| Code    | Subcode | Index                                     | Possible settings |           | Data type      |
|---------|---------|-------------------------------------------|-------------------|-----------|----------------|
|         |         |                                           | Lenze             | Selection |                |
| L-C1850 | -       | 58C5 <sub>h</sub> =<br>22725 <sub>d</sub> | 1                 | 1<br>3    | [1] 6<br>FIX32 |
| L-C2350 | -       | 56D1 <sub>h</sub> =<br>22225 <sub>d</sub> | 1                 | 1<br>3    | [1] 6<br>FIX32 |

The code serves to set the address of the 2175 module via CAN bus.

The code L-C1850 is an image of code L-C0009 of the basic device. Writing L-C1850 has a direct effect on L-C0009.

**Note!**

This code is only effective if the DIP switches S1-S6 are set to position OFF before mains switching.  
Changing the node address only gets effective by renewed mains disconnection of the 2175 module or by sending the network manager command *Reset\_Node* or *Reset\_Communication* via CAN bus to the module.  
With Servo PLC 9300 / Drive PLC this is also possible by assigning value 1 to the code C2120 (AIF control byte).

L-C1851/L-C2351:  
baud rate

| Code    | Subcode | Index                                     | Possible settings |           | Data type |
|---------|---------|-------------------------------------------|-------------------|-----------|-----------|
|         |         |                                           | Lenze             | Selection |           |
| L-C1851 | -       | 58C4 <sub>h</sub> =<br>22724 <sub>d</sub> | 0                 | 0 .... 6  | FIX32     |
| L-C2351 | -       | 56D0 <sub>h</sub> =<br>22224 <sub>d</sub> |                   | 0 .... 4  |           |

The code serves to set the Baud rate of the 2175 module.



#### Note!

This code is only effective if the DIP switches S1-S6 are set to position OFF before mains switching.

Changing the baud rate only becomes effective by renewed mains disconnection of the 2175 module or by sending the network manager command *Reset\_Node* or *Reset\_Communication* via CAN bus to the module.

With Servo PLC 9300 / Drive PLC this is also possible by assigning value 1 to the code C2120 (AIF control byte).

The code L-C1851 is an image of code L-C0125 which is located in the basic device. This means that describing L-C1851 has a direct effect on L-C0125.

L-C1852/L-C2352:  
Master/slave operation

| Code    | Subcode | Index                                     | Possible settings |                                             | Data type |
|---------|---------|-------------------------------------------|-------------------|---------------------------------------------|-----------|
|         |         |                                           | Lenze             | Selection                                   |           |
| L-C1852 | -       | 58C3 <sub>h</sub> =<br>22723 <sub>d</sub> | 0                 | 0 = Slave operation<br>1 = Master operation | FIX32     |
| L-C2352 | -       | 56CF <sub>h</sub> =<br>22223 <sub>d</sub> |                   |                                             |           |

After switch-on the module has the state PRE-OPERATIONAL. In this state only an exchange of parameter data (SDO's) is possible.

In slave operation, the module stays in this state until it is put by the network manager command *Start\_Remote\_Node* into the state OPERATIONAL.

In the state OPERATIONAL also process data (PDO's) are exchanged besides parameter data (SDO's).

In master operation, the network manager command *Start\_Remote\_Node* is transmitted after an adjustable boot-up time, which puts all nodes into the state OPERATIONAL.

Note:

The network manager command *Start\_Remote\_Node* is a "Broadcast" telegram which is directed to **all** other nodes.

**Note!**

The change of the master/slave operation only becomes effective by renewed mains disconnection of the 2175 fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset-Communication" via the CAN bus to the fieldbus module.

With Servo PLC 9300 / Drive PLC this is also possible by assigning value 1 to the AIF control byte.

## CANopen objects and Lenze codes

### Description of communication relevant Lenze codes

L-C1853/L-C2353:  
Addressing CAN-INx/CAN-OUTx

| Code    | Subcode                                  | Index                                  | Possible settings |           | Data type | Explanation                                                                                                            |
|---------|------------------------------------------|----------------------------------------|-------------------|-----------|-----------|------------------------------------------------------------------------------------------------------------------------|
|         |                                          |                                        | Lenze             | Selection |           |                                                                                                                        |
| L-C1853 | /1<br>CAN-IN1/OUT1<br>/2<br>CAN-IN2/OUT2 | 58C2 <sub>h</sub> = 22722 <sub>d</sub> | 0                 | 0 [1] 3   | FIX32     | 0: Addressing to CANopen (Default identifier)<br>1: Addressing to L-C1854/L-C2354<br>2: Addressing to LENZE system bus |
| L-C2353 | /3<br>CAN-IN3/OUT3                       | 56CE <sub>h</sub> = 22222 <sub>d</sub> |                   | 0 [1] 2   | FIX32     | 3: Addressing to CANopen index 14X <sub>h</sub> /18X <sub>h</sub>                                                      |

Via this code, the source for the resulting addresses of the CAN-INx/OUTx process data objects (PDO's) on the CAN bus is selected.



#### Note!

Changing the source address in one or several subcodes only gets effective by renewed mains disconnection of the module or by sending the network manager command *Reset\_Node* or *Reset\_Communication* via CAN bus to the 2175 module.

With Servo PLC 9300 / Drive PLC this is also possible by assigning value 1 to the code C2120 (AIF control byte).

#### Relation to CANopen

The addressing of the corresponding PDO pair or subcode under code L-C1853 / L-C2353 is switched to CANopen indices 14X<sub>h</sub>/18X<sub>h</sub> (see above: value 3), if the CANopen indices 1400<sub>h</sub>, 1401<sub>h</sub>, 1402<sub>h</sub>, 1800<sub>h</sub>, 1801<sub>h</sub> or 1802<sub>h</sub> are assigned with a new value.

## Calculation of the identifiers

| PDO          | Value L-C1853 / L - C2353                  |                                                   |                                 |                       | 3<br>to CANopen index                |
|--------------|--------------------------------------------|---------------------------------------------------|---------------------------------|-----------------------|--------------------------------------|
|              | 0<br>to CANopen<br>(default<br>identifier) | 1<br>via code L-1854/L-2354<br>Default<br>setting | 2<br>via<br>Lenze system<br>bus | 3                     |                                      |
| CAN-IN1      | 512 + node<br>address                      | 384 + C1854/1<br>or<br>384 + C2354/1              | 384 + 129                       | 512 + node<br>address | Index 1400 <sub>h</sub> , subindex 1 |
| CAN-IN2      | 768 + node<br>address                      | 384 + C1854/3<br>or<br>384 + C2354/3              | 384 + 257                       | 640 + node<br>address | Index 1401 <sub>h</sub> , subindex 1 |
| CAN-IN3      | 1024 + node<br>address                     | 384 + C1854/5<br>or<br>384 + C2354/5              | 384 + 385                       | 768 + node<br>address | Index 1402 <sub>h</sub> , subindex 1 |
| CAN-<br>OUT1 | 384 + node<br>address                      | 384 + C1854/2<br>or<br>384 + C1854/2              | 384 + 1                         | 384 + node<br>address | Index 1800 <sub>h</sub> , subindex 1 |
| CAN-<br>OUT2 | 640 + node<br>address                      | 384 + C1854/4<br>or<br>384 + C1854/4              | 384 + 258                       | 641 + node<br>address | Index 1801 <sub>h</sub> , subindex 1 |
| CAN-<br>OUT3 | 896 + node<br>address                      | 384 + C1854/6<br>or<br>384 + C1854/6              | 384 + 386                       | 769 + node<br>address | Index 1802 <sub>h</sub> , subindex 1 |

**Addressing to CANopen (Default identifier)**

This is the Lenze setting of the 2175 fieldbus module. The calculation consists of the basic identifier and the node address. The basic identifier corresponds to the preset value according to DS301 V4.01 (page 9-56, 9-85ff).

**Addressing to L-C1854 / L-C2354**

In case of this addressing the identifier is the sum of a fixed basic identifier 384 (180<sub>hex</sub>) + the value of the corresponding subcode of L-C1854 / L-C2354. Here the node address has no influence anymore.

This configuration has been created in accordance with 8200 vector/motec controllers with E82ZAFCCxxx function module, system bus (CAN), and the integrated system bus interface of the 93XX controllers (code L-C0353 / L-C0354, selective System bus address).

**Addressing to Lenze system bus**

This setting corresponds to the preset calculation of the identifiers for 8200 vector/motec controllers in connection with a E82ZAFCCxxx function module, system bus (CAN), and the integrated system bus interface of 93XX controllers.

The identifier consists of a basic identifier and the node address.

**Addressing to CANopen indices 14XX<sub>hex</sub>/18XX<sub>hex</sub>**

If the subcode has the value 3, this makes clear that the identifiers have been changed via the CANopen indices 14XX<sub>hex</sub>/18XX<sub>hex</sub>. Now, the identifier is developed from the CANopen indices.

A change of the codes L-C1854/L-C2354 does not influence the current identifiers.



## CANopen objects and Lenze codes

### Description of communication relevant Lenze codes

L-C1854/L-C2354:  
Selective addressing  
CAN-IN/CAN-OUT

| Code    | Subcode      | Index               | Possible settings |           |     | Data type |
|---------|--------------|---------------------|-------------------|-----------|-----|-----------|
|         |              |                     | Lenze             | Selection |     |           |
| L-C1854 | /1 CAN-IN1   | 58C1 <sub>h</sub> = | /1:               | 0         | [1] | FIX32     |
|         | /2 CAN-OUT1  | 22721 <sub>d</sub>  | 129               |           |     |           |
|         | /3* CAN-IN2  |                     | /2: 1             |           |     |           |
|         | /4* CAN-OUT2 |                     | /3:               |           |     |           |
|         | /5* CAN-IN3  |                     | 257*              |           |     |           |
|         | /6* CAN-OUT3 |                     | /4:               |           |     |           |
| L-C2354 |              | 56CD <sub>h</sub> = | 258*              | 0         | [1] | 513       |
|         |              | 22221 <sub>d</sub>  | /5:               |           |     |           |
|         |              |                     | 385*              |           |     |           |
|         |              |                     | /6:               |           |     |           |
|         |              |                     | 386*              |           |     |           |
|         |              |                     |                   |           |     |           |

\*) not effective when using 82XX, 8200 vector or 93XX controller

With code L-C1854 it is possible to set the addresses of the input and output PDOs individually via 6 subcodes (compare with previous chapter).

The code becomes effective, if one of the subcodes of the code L-C1853/L-C2353 contains the value 1 (selective addressing).



### Note!

Changing the address in one or several subcodes becomes effective

- by renewed mains disconnection of the module or
- by sending a network manager command via CAN bus to the module.
  - *Reset\_Node* or L-C2120 = 1 or
  - *Reset\_Communication*

L-C1855/L-C2355:  
Display of resulting identifiers  
CAN-IN / CAN-OUT

| Code    | Subcode      | Index               | Possible settings |           |     | Data type |
|---------|--------------|---------------------|-------------------|-----------|-----|-----------|
|         |              |                     | Lenze             | Selection |     |           |
| L-C1855 | /1 CAN-IN1   | 58C0 <sub>h</sub> = | -                 | 0         | [1] | 2047      |
|         | /2 CAN-OUT1  | 22720 <sub>d</sub>  |                   |           |     |           |
|         | /3* CAN-IN2  |                     |                   |           |     |           |
| L-C2355 | /4* CAN-OUT2 | 56CC <sub>h</sub> = |                   |           |     |           |
|         | /5* CAN-IN3  | 22220 <sub>d</sub>  |                   |           |     |           |
|         | /6* CAN-OUT3 |                     |                   |           |     |           |

\*) not effective when using 82XX, 8200 vector or 93XX controller

In six subcodes of this code the resulting identifiers of the PDOs can be read out.



### Note! (for servo PLC 9300 / Drive PLC)

In case the addressing under L-C2353 or L-C2354 has been changed, the display will only be updated under L-C2355

- by renewed mains disconnection of the module or
- by sending a network manager command via CAN bus to the module.
  - *Reset\_Node* or L-C2120 = 1 or
  - *Reset\_Communication*

**L-C1856/L-2356:  
Boot up and cycle times**

| Code    | Subcode                                                                     | Index                                     | Possible settings                   |                | Data type |
|---------|-----------------------------------------------------------------------------|-------------------------------------------|-------------------------------------|----------------|-----------|
|         |                                                                             |                                           | Lenze                               | Selection      |           |
| L-C1856 | /1 Boot up time<br>/2 cycle times<br>CAN-OUT1<br>/3 cycle times<br>CAN-OUT2 | 58BF <sub>h</sub> =<br>22719 <sub>d</sub> | 1:<br>3000<br>ms<br>2 .. 5:<br>0 ms | 0 [1 ms] 65535 | FIX32     |
| L-C2356 | /4 cycle times<br>CAN-OUT3<br>/5 Sync-Tx cycle<br>times                     | 56CB <sub>h</sub> =<br>22219 <sub>d</sub> |                                     |                | FIX32     |

In the event-controlled/cyclic operation it is possible to define the cycle times with which the single PDOs will be sent via the CAN bus (also see L-C1875/L-C2375, “Tx mode” for CAN-OUT1..3).


**Note!**

In case of servo PLC 9300 / drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands “Reset\_Node” or “Reset\_Communication” via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

The change will be immediately valid for the controller 82XX and 93XX.

The value 0 deactivates the cyclic sending of the PDO.

**Sync-Tx cycle time (C1856/5 or C2356/5)**

“Sync-Tx cycle time” describes the interval time (time basis: ms) that is required for sending a SYNC telegram to the CAN bus.


**Note!**

Changing the Sync-Tx cycle time gets immediately effective.

The value 0 in code L-C1856/5 or L-C2356/5 deactivates the cyclic sending of the sync telegram.

**Relation to CANopen**

The CANopen index 1006<sub>h</sub> “Communication Cycle Period” reflects the contents of code L-C1856/5 or L-C2356/5 (time basis: ms).

As the data processing speed of the 2175 module amounts to 1000 μs, the entry via CANopen 1006<sub>h</sub> is rounded to an integral multiple of 1000 μs. If the CANopen index 1006<sub>h</sub> is read, the contents of this code in [ μs ] will be sent as response.

In addition, the bit 30 of the CANopen index 1005<sub>h</sub> (COB-ID Sync message) is automatically set by describing the codes L-C1856/5 or L-C2356/5.

L-C1857/L-C2357:  
Monitoring time

| Code    | Subcode                                     | Index                                     | Possible settings |           |        | Data type |
|---------|---------------------------------------------|-------------------------------------------|-------------------|-----------|--------|-----------|
|         |                                             |                                           | Lenze             | Selection |        |           |
| L-C1857 | /1 CAN-IN1<br>/2 CAN-IN2                    | 58BE <sub>h</sub> =<br>22718 <sub>d</sub> | 3000<br>ms        | 0         | [1 ms] | 65535     |
| L-C2357 | /3 CAN-IN3<br>/4 BUS-OFF<br>monitoring time | 56CA <sub>h</sub> =<br>22218 <sub>d</sub> |                   |           |        | FIX32     |



### Note!

The value 0 deactivates the monitoring.

A change of monitoring times becomes immediately effective for 93XX and 82XX controllers.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the field bus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

The monitoring time starts with the arrival of the first telegram.

The monitoring time describes the period of time in which new process input data must arrive with the CAN-IN1..3-identifiers. If the time entered is exceeded, it is possible to set a corresponding reaction under code L-C1882.

**BUS-OFF** (C1857/4 or C2357/4)

Even if the controller changes to the state BUS-OFF, it is possible to set a time (time basis: ms) in which a reaction can take place.

Monitoring reaction: see code L-C1882 or L-C2382.

L-C1859/L-C2359:  
Display of DIP switch position

| Code    | Subcode | Index                                     | Possible settings |           |     | Data type |
|---------|---------|-------------------------------------------|-------------------|-----------|-----|-----------|
|         |         |                                           | Lenze             | Selection |     |           |
| L-C1859 | -       | 58BC <sub>h</sub> =<br>22716 <sub>d</sub> | -                 | 0         | [1] | 1023      |
| L-C2359 | -       | 56C8 <sub>h</sub> =<br>22216 <sub>d</sub> |                   |           |     | U16       |

The DIP switch position is indicated with the initialisation of the module.

The following table shows the valency:

| Switch  | --- | --- | --- | --- | --- | --- | S1  | S2  | S3  | S4 | S5 | S6 | S7 | S8 | S9 | S10 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|
| Valency |     |     |     |     |     |     | 512 | 256 | 128 | 64 | 32 | 16 | 8  | 4  | 2  | 1   |
| Bit     | 15  | 14  | 13  | 12  | 11  | 10  | 9   | 8   | 7   | 6  | 5  | 4  | 3  | 2  | 1  | 0   |

Example for DIP switch position:

- S10 = ON (CANopen communication profile)
- S4, S5 = ON (address 6)
- S7, 8, 9 = OFF (baud rate 500kbits/s)

From the table above the sum of the corresponding valencies amounts to: 61<sub>h</sub> (97<sub>d</sub>), which is displayed when reading the code L-C1859 or L-C2359.

**L-C1860:**  
Display of the current DIP switch position

| Code    | Subcode | Index                                     | Possible settings |            | Data type |
|---------|---------|-------------------------------------------|-------------------|------------|-----------|
|         |         |                                           | Lenze             | Selection  |           |
| L-C1860 | -       | 58BB <sub>h</sub> =<br>22715 <sub>d</sub> | -                 | 0 [1] 1023 | U16       |

By displaying the current DIP switch position it is possible to find out if the switch position for address, baud rate and communication profile setting has changed since the last initialisation. Valency see code L-C1859.

**L-C1867/L-C2367:**  
Sync Rx identifier

| Code    | Subcode | Index                                     | Possible settings |            | Data type |
|---------|---------|-------------------------------------------|-------------------|------------|-----------|
|         |         |                                           | Lenze             | Selection  |           |
| L-C1867 | -       | 58B4 <sub>h</sub> =<br>22708 <sub>d</sub> | 128               | 0 [1] 2047 | FIX32     |
| L-C2367 | -       | 56C0 <sub>h</sub> =<br>22208 <sub>d</sub> |                   |            | FIX32     |

The code contains the identifier with which the sync telegram is received.

By receiving the sync telegram it is possible for the module to e.g. send its process data objects to the CAN bus. Also see L-C1875 / L-C2375.



### Note!

A change of the identifier will immediately become effective for the 93XX and 82XX controller.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

### Relation to CANopen

The CANopen index 1005<sub>h</sub> "COB-ID SYNC message" directly influences this code. The identifier of a value re-entered into the index 1005<sub>h</sub> will also be taken over from the code L-C1867/L-C2367.

When reading the CANopen index 1005<sub>hex</sub> (COB-ID Sync message) the value saved under code L-C1868/L-C2368 is displayed.

L-C1868/L-C2368:  
Sync Tx identifier

| Code    | Subcode | Index                                     | Possible settings |            | Data type |
|---------|---------|-------------------------------------------|-------------------|------------|-----------|
|         |         |                                           | Lenze             | Selection  |           |
| L-C1868 | -       | 58B3 <sub>h</sub> =<br>22707 <sub>d</sub> | 128               | 0 [1] 2047 | FIX32     |
| L-C2368 | -       | 56BF <sub>h</sub> =<br>22207 <sub>d</sub> |                   |            | FIX32     |

The code contains the identifier with which the sync telegram is received.

With the identifier set under L-C1868/L-C2368 the sync is to the CAN bus (concerning this also see L-C1856 or L-C2356, subcode 5).



#### Note!

Changing the identifier will immediately get effective for the 93XX and 82XX controller.

In case of servo PLC 9300 / drive PLC the change only becomes effective by renewed mains disconnection of the field bus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the field bus module. It is also possible to carry out the update by assigning the AIF control byte with the value 1.

#### Relation to CANopen

The CANopen index 1005<sub>h</sub> "COB-ID SYNC message" directly influences this code. The identifier of a value that has been reentered into the index 1005<sub>h</sub> will also be taken over from the code L-C1868/L-C2368. When reading the index 1005<sub>h</sub> the value saved here will be displayed.

**L-C1873/L-C2373:  
Sync rate CAN-IN1 ... CAN-IN3**

The input process data (CAN-INx) are only transferred to the controller after a certain number of SYNC telegrams have been received.

| Code    | Subcode                   | Index                                     | Possible settings |           | Data type |
|---------|---------------------------|-------------------------------------------|-------------------|-----------|-----------|
|         |                           |                                           | Lenze             | Selection |           |
| L-C1873 | /1 CAN-IN1<br>/2* CAN-IN2 | 58AE <sub>h</sub> =<br>22702 <sub>d</sub> | 1                 | 0 [1]     | 240 FIX32 |
| L-C2373 | /3* CAN-IN3               | 56BA <sub>h</sub> =<br>22202 <sub>d</sub> |                   | 1 [1]     | 240 FIX32 |

\*) not effective when using 82XX, 8200 vector or 93XX controller

Example:

Selection n = 23. Acceptance of input PDO (to CAN-IN1... CAN-IN3) into the controller after the arrival of the 23. Sync telegram.

The sync rate can be set individually for each input PDO.



### Note!

Only sync telegrams are counted, that have been received with the identifier set under L-C1867 / L-C2367 of the 2175 module.

A change of the sync rate will immediately become effective for the 82XX and 93XX controller.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

### Relation to CANopen

Die CANopen indices 1400<sub>h</sub>, 1401<sub>h</sub> and 1402<sub>h</sub> (receive PDO communication parameter), subindex 2 each (transmission type), are directly mapped on the subcodes of code L-C1873 / L-C2373.

|                                              |   |                                 |
|----------------------------------------------|---|---------------------------------|
| Index 14XX <sub>h</sub> , subindex 2 = 1-240 | = | Code L-C1873, subcode X = 1-240 |
| Index 14XX <sub>h</sub> , subindex 2 = 254   |   | Code L-C1873, subcode 0         |

An exception is the value 0, which is not directly mapped on the CANopen indices 1400<sub>hex</sub>, 1401<sub>hex</sub> and 1402<sub>hex</sub>. The value 0 is mapped under CANopen index 14XX<sub>hex</sub>, subindex 2, with the value = 254 (vendor-specific). On the other hand, with the entry of 254 in subindex 2 the corresponding subcode of code L-C1873 is described with the value 0.

L-C1874/L-C2374:  
Sync rate CAN-OUT1 ...  
CAN-OUT3

| Code    | Subcode                         | Index                                     | Possible settings |           | Data type    |
|---------|---------------------------------|-------------------------------------------|-------------------|-----------|--------------|
|         |                                 |                                           | Lenze             | Selection |              |
| L-C1874 | /1 = CAN-OUT1<br>/2* = CAN-OUT2 | 58AD <sub>h</sub> =<br>22701 <sub>d</sub> | 1                 | 1 [1]     | 240<br>FIX32 |
| L-C2374 | /3* = CAN-OUT3                  | 56B9 <sub>h</sub> =<br>22201 <sub>d</sub> |                   |           | FIX32        |

\*) not effective when using 82XX, 8200 vector or 93XX controller

The output process data (CAN-OUTx) are only transferred after a certain number of SYNC telegrams have been received.

The sync rate can be set individually for each process output data object.



### Note!

Only those sync telegrams are counted, that have been received with the identifier set under L-C1867 / L-C2367 of the 2175 module.

A change of the sync rate will immediately become effective for the 82XX and 93XX controller.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning the AIF control byte with the value 1.

### Relation to CANopen

The CANopen indices "Transmit PDO communication parameter" 1800<sub>h</sub>, 1801<sub>h</sub> and 1802<sub>h</sub> (with subindex 2, "transmission type") are directly mapped on the subcodes of code L-C1874 or L-C2374.

|                                              |   |                                            |
|----------------------------------------------|---|--------------------------------------------|
| Index 18XX <sub>h</sub> , subindex 2 = 1-240 | = | Code L-C1874 or L-C2374, subcode X = 1-240 |
| Index 18XX <sub>h</sub> , subindex 2 = 252   | = | Code L-C1875, subcode X = 0                |
| Index 18XX <sub>h</sub> , subindex 2 = 254   | = | Code L-C1875, subcode X = 1                |
|                                              |   | Code L-C1875, subcode X = 2                |

If for instance the index 1802<sub>h</sub> is read, the value in code L-C1874 / L-C2374, subcode 3 comes back as an answer. If the index 1801<sub>h</sub> is described with a new value, the code L-C1874, subcode 2, is described with this value, too.

L-C1875/L-C2375:  
Tx mode CAN-OUT1 ...  
CAN-OUT3

This code contains a selection which indicates at which event the output PDOs CAN-OUT1 .. CAN-OUT3 are to be sent. It is possible to make an individual selection for each output PDO by dividing the code in subcodes.

| Code    | Subcode                                     | Index                                     | Possible settings       |           | Data type  |
|---------|---------------------------------------------|-------------------------------------------|-------------------------|-----------|------------|
|         |                                             |                                           | Lenze                   | Selection |            |
| L-C1875 | /1 CAN-OUT1<br>/2* CAN-OUT2<br>/3* CAN-OUT3 | 58AC <sub>h</sub> =<br>22700 <sub>d</sub> | /1: 0<br>/2: 1<br>/3: 1 | 0 [1]     | 3<br>FIX32 |
| L-C2375 |                                             | 56B8 <sub>h</sub> =<br>22200 <sub>d</sub> | /1: 0<br>/2: 0<br>/3: 0 |           | FIX32      |

\*) not effective when using 82XX, 8200 vector or 93XX controller

- Value = 0
  - The output PDOs are sent when a sync telegram has been received.
  - Only those sync telegrams are counted, that have been received with the identifier set under L-C1867 / L-C2367. It is possible to set that the output PDOs are only to be sent after the nth sync telegram (adjustabel with n = 1..240) under L-C1874 / L-C2374.
- Value
  - Output PDOs are not sent.
  - With this selection the transmission of CAN-OUT1..CAN-OUT3 is deactivated.  
This is useful for 82XX, 8200 vector and 9300 drives, which are only able to exchange 4 words as a maximum of control and status information via the AIF. For this purpose the use of an input and output PDO is sufficient, as each PDO contains 4 words of information (factory setting).  
In this case an unnecessary load of the CAN can be avoided.
- Value = 2
  - The PDO is either transmitted event-controlled or cyclically if this value is entered in one of the three available subcodes.
  - The output PDO is transmitted cyclically, if a cycle time is defined for the same CAN-OUT1..3 under code L-C1856 or (dependent on drive) L-C2356. If the cycle time is zero, this is sent in case of an event, i. e. bit change within the CAN-OUT object.
- Value = 3
  - The output PDO is event-controlled and cyclically transmitted. This means that the object is transmitted with the cycle time defined under code L-C1856 or L-C2356.
  - In addition, the object will be transmitted if one or several bits are changed within the CAN-OUT object.





#### Note!

A change of the Tx mode will immediately become effective for the 82XX and 93XX controller for a process data output object.

With Servo PLC 9300 / Drive PLC the update must take place by assigning value 1 to the AIF control byte.

If the transmission is event-controlled (also with cyclic superpositions) some bits can be hidden by masking the object using codes L-C1876 to L-C1878 or with the Servo PLC 9300 / Drive PLC L-C2376 up to L-C2378. That means that the CAN-OUT object will **not** be sent when a bit is being changed.

If the value under code L-C1875/L-2375 = 0, subcodes 1..3, the value of code L-C1874/L-C2374 is reflected under CANopen index 1800<sub>hex</sub>, 1801<sub>hex</sub> or 1802<sub>hex</sub>, subindex 2 each.

The value = 1 under code L-C1875/L-C2375 is displayed under CANopen index 1800<sub>hex</sub>, 1801<sub>hex</sub> or 1802<sub>hex</sub> with the value = 252.

The value = 2 or 3 under code L-C1875/L-C2375 is displayed under CANopen index 1800<sub>hex</sub>, 1801<sub>hex</sub> or 1802<sub>hex</sub> with the value = 254.

When describing CANopen index 1800<sub>hex</sub>, 1801<sub>hex</sub> or 1802<sub>hex</sub> the same relation prevails, see the table below or under the description of the CANopen indices 18XX<sub>hex</sub>.

| Code L-C1875 / L-C2375, subcode 1, 2 or 3 | CANopen index 1800 <sub>hex</sub> , 1801 <sub>hex</sub> or 1802 <sub>hex</sub> , subindex 2 |
|-------------------------------------------|---------------------------------------------------------------------------------------------|
| 0                                         | Code L-C1874 / L-C2374, subcode 1, 2 or 3 (Wert = 1 .... 240)                               |
| 1                                         | 252                                                                                         |
| 2 or 3                                    | 254                                                                                         |

L-C1876/L-C2376:  
Masks CAN-OUT1

One or several bits of the output PDO CAN-OUT1 can be extracted by the mask.

| Code    | Subcode        | Index               | Possible settings |           |     | Data type |
|---------|----------------|---------------------|-------------------|-----------|-----|-----------|
|         |                |                     | Lenze             | Selection |     |           |
| L-C1876 | /1 CAN-OUT1.W1 | 58AB <sub>h</sub> = | 65535             | 0         | [1] | 65535     |
|         | /2 CAN-OUT1.W2 | 22699 <sub>d</sub>  |                   |           |     |           |
| L-C2376 | /3 CAN-OUT1.W3 | 56B7 <sub>h</sub> = |                   |           |     | FIX32     |
|         | /4 CAN-OUT1.W4 | 22199 <sub>d</sub>  |                   |           |     |           |

The event-controlled transmission of the CAN-OUT object can be e.g. dependent on only one bit. Also see code L-C1875 / L-C2375.

Example:

The mask in word 3 of the process data object CAN-OUT 1 is set through code L-C1876/3 with the value 20<sub>hex</sub> (see "MASK"). Please note the field marked in grey.

1. cycle

Result after 1. cycle: The PDO is transmitted

|               | CAN-OUT 1.W3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>MASK</b>   | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| <b>Data</b>   | 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| <b>Result</b> | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

2. cycle

After the 2. cycle new data have been written into CAN-OUT 1.

Result after 2. cycle: The PDO is not transmitted due to bit change

|               | CAN-OUT 1.W3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>MASK</b>   | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| <b>Data</b>   | 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| <b>Result</b> | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



### Note!

A change of the mask will immediately become effective for the 82XX and 93XX controller.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

## CANopen objects and Lenze codes

### Description of communication relevant Lenze codes

L-C1877/L-C2377:  
Masks CAN-OUT2

One or several bits of the output PDO CAN-OUT2 can be extracted by the mask.

| Code    | Subcode        | Index               | Possible settings |           |     | Data type |       |
|---------|----------------|---------------------|-------------------|-----------|-----|-----------|-------|
|         |                |                     | Lenze             | Selection |     |           |       |
| L-C1877 | /1 CAN-OUT2.W1 | 58AA <sub>h</sub> = | 65535             | 0         | [1] | 65535     | FIX32 |
|         | /2 CAN-OUT2.W2 | 22698 <sub>d</sub>  |                   |           |     |           |       |
| L-C2377 | /3 CAN-OUT2.W3 | 56B6 <sub>h</sub> = |                   |           |     |           |       |
|         | /4 CAN-OUT2.W4 | 22198 <sub>d</sub>  |                   |           |     |           |       |

See L-C1876 / L-C2376.

L-C1878/L-C2378:  
Masks CAN-OUT3

One or several bits of the output PDO CAN-OUT3 can be extracted by the mask.

| Code    | Subcode        | Index               | Possible settings |           |     | Data type |       |
|---------|----------------|---------------------|-------------------|-----------|-----|-----------|-------|
|         |                |                     | Lenze             | Selection |     |           |       |
| L-C1878 | /1 CAN-OUT3.W1 | 58A9 <sub>h</sub> = | 65535             | 0         | [1] | 65535     | FIX32 |
|         | /2 CAN-OUT3.W2 | 22697 <sub>d</sub>  |                   |           |     |           |       |
| L-C2378 | /3 CAN-OUT3.W3 | 56B5 <sub>h</sub> = |                   |           |     |           |       |
|         | /4 CAN-OUT3.W4 | 22197 <sub>d</sub>  |                   |           |     |           |       |

See L-C1876 / L-C2376.

L-C1882/L-C2382:  
Monitoring reaction

| Code    | Subcode                                                                 | Index                                     | Possible settings |                                                         | Data type |
|---------|-------------------------------------------------------------------------|-------------------------------------------|-------------------|---------------------------------------------------------|-----------|
|         |                                                                         |                                           | Lenze             | Selection                                               |           |
| L-C1882 | /1 response<br>CAN-IN1<br>/2 response<br>CAN-IN2<br>/3 response         | 58A5 <sub>h</sub> =<br>22693 <sub>d</sub> | 0                 | 0<br>[1]<br>2                                           | FIX32     |
| L-C2382 | CAN-IN3<br>/4 response<br>BUS-OFF<br>/5 response Life<br>Guarding Event | 56B1 <sub>h</sub> =<br>22193 <sub>d</sub> |                   | 0: no response<br>1: Controller inhibit<br>2: Quickstop | FIX32     |

Definition of the reaction, when the monitoring times (see L-C1857/L-C2357) have been exceeded.

**Note!**

A change of the monitoring response will immediately become effective for the 82XX and 93XX controllers.

With Servo PLC 9300 / Drive PLC the change only becomes effective by renewed mains disconnection of the fieldbus module or by sending one of the network manager commands "Reset\_Node" or "Reset\_Communication" via CAN bus to the fieldbus module. It is also possible to carry out the update by assigning value 1 to the AIF control byte.

**Relation to CANopen**

Under the CANopen indices 100C<sub>h</sub> "guard time" and 100D<sub>h</sub> "life time factor" it is possible to set a time for the node guarding protocol. The node guarding protocol has been developed in order to monitor the connection of master and slave (in this case 2175IB). Under CANopen index 100C<sub>h</sub> "guard time" it is possible to enter a time in milliseconds. Under index 100D<sub>h</sub> "life time factor" a factor is stored. The product of both indices results in a monitoring time in which the master must send the slave 2175IB a specific telegram. If one of the two indices is set to zero, the monitoring time is also zero and thus deactivated. The slave transmits a telegram with its current NMT state to the master. These states can be pre-operational, operational or stopped.

If the monitoring time is exceeded, the slave reacts with the life guarding event and the master with the node guarding event.

The sequence of the node guarding protocol must be programmed and started in the master. The 2175IB module supports the node guarding protocol, it is only possible to enter a response under this code.

L-C2120:  
AIF control byte

| Code    | Subcode | Index                                     | Possible settings |                                                                                                                                                                                                                                                        | Data type |
|---------|---------|-------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|         |         |                                           | Lenze             | Selection                                                                                                                                                                                                                                              |           |
| L-C2120 | -       | 22455 <sub>d</sub> =<br>57B7 <sub>h</sub> | 0                 | 0 = No command<br>1 = Update codes L-23XX and CAN re-initialisation ≙ Reset node<br>2 = Update codes L-C23XX<br>10 = L-C2356/1...4 re-read<br>11 = L-C2357 re-read<br>12 = L-C2375 re-read<br>13 = L-C2376 ... L-C2378 re-read<br>14 = L-C2382 re-read | FIX32     |

With the AIF control byte it is possible to read the codes L-C23XX saved in the servo PLC 9300 / Drive PLC into the 2175 field bus module. By writing a value indicated in the table into the AIF control byte this process can be initiated per command.

By writing the value = 2 into the AIF control byte all L-C23XX codes are re-read. For some codes however it is necessary to carry out a CAN re-initialisation so that new values or the functions derived from them will become effective. Here is a list:

| Code                  | Value L-C2120 | Function                                                                                                |
|-----------------------|---------------|---------------------------------------------------------------------------------------------------------|
| L-C2350               | 1             | Activation of the new identifiers for SDO, PDO or Emergency, if these are dependent on the node address |
| L-C2351               | 1             | Activation of new Baud rate                                                                             |
| L-C2352               | 1             | Activation of changed function (master/slave)                                                           |
| L-C2353               | 1             | Activation of new addressing                                                                            |
| L-C2354               | 1             | Activation of new addressing (selective)                                                                |
| L-C2355               | 1             | Representation of the new identifiers                                                                   |
| L-C2356, subcode 1..4 | 1, 2 or 10    | Activation of new times (boot-up, cycle AIF-XCAN1..3)                                                   |
| L-C2356, subcode 5    | 1 or 2        | Activation of sync cycle time                                                                           |
| L-C2357, subcode 1..4 | 1, 2 or 11    | Activation of monitoring times                                                                          |
| L-C2359               | 1             | Representation of changed switch position                                                               |
| L-C2367               | 1             | Activation of new receiving identifiers for sync telegrams                                              |
| L-C2368               | 1             | Activation of new transmitting identifiers for sync telegrams                                           |
| L-C2373               | 1 or 2        | Activation of new sync rate receiving PDO                                                               |
| L-C2374               | 1 or 2        | Activation of new sync rate transmitting PDO                                                            |
| L-C2375               | 1, 2 or 12    | Activation of new mode transmitting PDO                                                                 |
| L-C2376 to L-C2378    | 1, 2 or 13    | Activation of new mask transmitting PDO                                                                 |
| L-C2382               | 1, 2 or 14    | Activation of new fault response PDO, bus OFF and life guarding event                                   |

L-C2121:  
AIF status byte

| Code    | Subcode | Index                                     | Possible settings |               | Data type |
|---------|---------|-------------------------------------------|-------------------|---------------|-----------|
|         |         |                                           | Lenze             | Selection     |           |
| L-C2121 | -       | 22454 <sub>d</sub> =<br>57B6 <sub>h</sub> | 0                 | 0<br>1<br>255 | FIX32     |

The AIF status byte provides information of the 2175 fieldbus module of the Servo PLC 9300 and Drive PLC. By reading the status bit the Servo PLC 9300 and Drive PLC can monitor the status of the 2175 fieldbus module. Depending on this it is possible for the user to take corresponding countermeasures.

| AIF status byte | Description                                  |
|-----------------|----------------------------------------------|
| Bit 0           | CE11 fault, monitoring time CAN-IN1 exceeded |
| Bit 1           | CE12 fault, monitoring time CAN-IN2 exceeded |
| Bit 2           | CE13 fault, monitoring time CAN-IN3 exceeded |
| Bit 3           | CE14 fault, module in BUS-OFF state          |
| Bit 4           | Operational state                            |
| Bit 5           | Pre-Operational state                        |
| Bit 6           | Warning state                                |
| Bit 7           | internally assigned                          |

### 7.7.3 Implemented CANopen objects

Lenze devices can be parameterised either with Lenze codes (see (□ 7.9-1)) or with the vendor-independent “CANopen objects”. In order to achieve a completely CANopen-conform communication, only the CANopen objects are allowed to be used for parameter setting. The CANopen objects described in these Instructions are defined in the “CiA Draft Standard 301/Version 4.01”.

All CANopen objects can be mapped on Lenze codes. In section “**Relation to CANopen**” the effects on Lenze codes through changing the CANopen objects are described.



#### Note!

Some of the terms used have their origin in the CANopen protocol which is written in English. The translation of these terms is only partly allowed.

1000<sub>hex</sub>:  
Device type

The CANopen index 1000<sub>hex</sub> describes the profile for this device. Furthermore, it is possible to enter additional information, being defined in the device itself. If no special device profile is considered, the contents are 0000<sub>hex</sub> (2175IB).

| Index [hex] | Subindex | Name        | Data type | Value range                 | Rights |
|-------------|----------|-------------|-----------|-----------------------------|--------|
| 1000        | 0        | Device type | U32       | 0 ... (2 <sup>32</sup> - 1) | ro     |

Bit assignment in the telegram data

| 5th byte              | 6th byte | 7th byte               | 8th byte |
|-----------------------|----------|------------------------|----------|
| <b>U32</b>            |          |                        |          |
| LSB                   |          | MSB                    |          |
| Device profile number |          | Additional information |          |

Reading the fault register

1001<sub>hex</sub>:  
Error Register

| Index [hex] | Subindex | Name           | Data type | Value range | Rights |
|-------------|----------|----------------|-----------|-------------|--------|
| 1001        | 0        | Error register | U8        | 0 ... 255   | ro     |

Bit assignment in the data byte (U8) of the telegram

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0                                                                                                                                 |
|-------|-------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------|
| 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0: no TRIP<br>1: device TRIP/ fault CANopen module<br>Fault analysis: see L-C0161 in the Instructions of the corresponding controller |

Fault history

1003<sub>hex</sub>:  
Pre-defined Error Field

| Index [hex] | Subindex | Name                       | Data type | Value range                 | Rights |
|-------------|----------|----------------------------|-----------|-----------------------------|--------|
| 1003        | 0        | Recording numbers of error | U8        | 0 ... 255                   | rw     |
|             | 1        | Standard error field       | U32       | 0 ... (2 <sup>32</sup> - 1) | r0     |

This object serves to detect faults in the module and the basic device:

- Subindex 0: Number of the stored fault messages.
- Subindex 1: Display of the fault list.  
The fault messages (U32) consist of a 16-bit error code and a vendor-specific information field comprising 16 bits.



#### Note!

The value in “Standard error field” under subindex 1 is deleted, if subindex “recording number of errors” is 0.

**1005<sub>hex</sub>:**  
Identifier sync message

With this object it is possible

- to create sync telegrams for the module
- to describe the value of the identifier.

| Index [hex] | Subindex | Name                    | Data type | Value range                 | Rights |
|-------------|----------|-------------------------|-----------|-----------------------------|--------|
| 1005        | 0        | Identifier sync message | U32       | 0 ... (2 <sup>32</sup> - 1) | rw     |

#### Sync telegram creation

For creating sync telegrams, bit 30 (see below) must be set to the value 1.

The intervals of the sync telegrams can react to another object (index 1006<sub>hex</sub>).

#### Identifier description

For the receipt of PDOs the value 80<sub>hex</sub> is entered as default setting (and in accordance with CANopen specification) in the 11 bit identifier. This means, that all modules are preset to the same sync telegram.

If sync telegrams are only to be received from specific modules, the corresponding identifiers can be entered with a value up to 7FF<sub>hex</sub>. The identifier may only be changed, if the 2175 fieldbus module does not send any sync (bit 30 = 0).

| 5th byte   | 6th byte | 7th byte | 8th byte |
|------------|----------|----------|----------|
| <b>U32</b> |          |          |          |

| 0                 | 10 | 11 - 28                                                         | 29 | 30  | 31 |
|-------------------|----|-----------------------------------------------------------------|----|-----|----|
| 11-bit identifier |    | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0  | 0/1 | X  |

| Bit no.    | Value | Explanation                                                                                         |
|------------|-------|-----------------------------------------------------------------------------------------------------|
| 0 - 10     | X     | Identifier (also see chapter 36)                                                                    |
| (11 - 28)* | 0     | *) The extended identifier (29 bits) is not supported. Each bit in this area must have the value 0. |
| 29*        | 0     |                                                                                                     |
| 30         | 0     | The device does not create any SYNC telegrams                                                       |
|            | 1     | The device creates SYNC telegrams                                                                   |
| 31         | X     | optional                                                                                            |

**1006<sub>hex</sub>:**  
Communication Cycle Period

#### Cycle time setting of sync telegrams

| Index [hex] | Subindex | Name                       | Data type | Value range                 | Rights |
|-------------|----------|----------------------------|-----------|-----------------------------|--------|
| 1006        | 0        | Communication cycle period | U32       | 0 ... (2 <sup>32</sup> - 1) | rw     |

With the preset value (default) of t = 0 no sync telegrams are created.

The cycle time can be selected with the entry 1000 or the integral multiple of this figure. The unit of the entered time is [μs]. The maximum value to be set of the 2175 fieldbus module is 65535000 [μs].

**1008<sub>hex</sub>:**  
Manufacturer Device Name

#### Announcement of the controller and module names

| Index [hex] | Subindex | Name                     | Data type                 | Rights |
|-------------|----------|--------------------------|---------------------------|--------|
| 1008        | 0        | Manufacturer device name | Visible string {9 digits} | const  |

**100A<sub>hex</sub>:**  
Manufacturer software version

#### Software version of the controller and module

| Index [hex] | Subindex | Name                          | Data type               | Rights |
|-------------|----------|-------------------------------|-------------------------|--------|
| 100A        | 0        | Manufacturer software version | Vis. string {11 digits} | const  |

**100C<sub>hex</sub>:**  
Guard Time

#### Monitoring time

| Index [hex] | Subindex | Name       | Data type | Value range | Rights |
|-------------|----------|------------|-----------|-------------|--------|
| 100C        | 0        | Guard time | U16       | 0 ... 65535 | rw     |

The monitoring time is indicated in [ms].

If the monitoring shall not be supported, the default entry of 0 is to be maintained.

**100D<sub>hex</sub>:  
Life Time Factor**

| Index [ <sub>hex</sub> ] | Subindex | Name             | Data type | Value range | Rights |
|--------------------------|----------|------------------|-----------|-------------|--------|
| 100D                     | 0        | Life time factor | U8        | 0 ... 255   | rw     |

If the monitoring shall not be supported, the default entry of 0 is to be maintained.

**1010<sub>hex</sub>:  
Store Parameters**

Storage of parameters in the EEPROM.

| Index [ <sub>hex</sub> ] | Subindex | Name             | Data type | Value range                 | Rights |
|--------------------------|----------|------------------|-----------|-----------------------------|--------|
| 1010                     | 0        | store parameters | U32       | 0 ... (2 <sup>32</sup> - 1) | ro/rw  |
|                          | 1 ... 3* |                  |           |                             |        |

The subindices 1, 2 and 3 are not supported at the moment

**Store parameters**

Fault message in case of

- faulty storing (in the bytes 5 ...8): 0606 0000<sub>hex</sub>
- false signature: 0800 0020<sub>hex</sub>



**Note!**

For storing module parameters the signature “**save**” must be included in the telegram data.

Assignment of the telegram data words to store parameters

| Signature        | MSB |    |    |    | LSB |
|------------------|-----|----|----|----|-----|
| ISO 8859 (ASCII) | e   | v  | a  | s  |     |
| hex              | 65  | 76 | 61 | 73 |     |

Bit assignment for write authorisation

| U32 |     |   |   |   |  |  |  |        |   |   |   |
|-----|-----|---|---|---|--|--|--|--------|---|---|---|
| 0   | 1   |   |   |   |  |  |  | 2 - 31 |   |   |   |
| 0/1 | 0/1 | 0 | 0 | 0 |  |  |  |        | 0 | 0 | 0 |

| Subindex | Rights | Explanation                                                                                                                                                                                                                                                                                               |                                                                                                                            |
|----------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|          |        | Writing                                                                                                                                                                                                                                                                                                   | Reading                                                                                                                    |
| 0        | ro     | <ul style="list-style-type: none"> <li>• If you attempt to write the following fault message occurs: 0601 0002</li> </ul>                                                                                                                                                                                 | Supported subindex = 3                                                                                                     |
| 1        | rw     | <ul style="list-style-type: none"> <li>• This function is not yet supported at the moment.</li> <li>• If you attempt to write the following fault message occurs: 0800 0020</li> </ul>                                                                                                                    | Read memory functionality of all parameters                                                                                |
| 2        |        |                                                                                                                                                                                                                                                                                                           | Only read memory functionality of the communication parameters of the objects.                                             |
| 3        |        |                                                                                                                                                                                                                                                                                                           | Only read memory functionality of the vendor-specific parameters (Memory area: 6000 <sub>hex</sub> - 9FFF <sub>hex</sub> ) |
|          |        | The following functionalities are possible in dependence on the controller and are described by reading the values of the bit positions 0 and 1:<br>Value 0: Storing is not carried out<br>Value 1: Storing on command<br>Value 2: Automatic storing<br>Value 3: Automatic storing and storing on command |                                                                                                                            |



1011<sub>hex</sub>:  
Restore Default Parameters

Loading of the default setting.



#### Note!

If this function is applied, the subindices used depend on the controller type.

| Index [ <sub>hex</sub> ] | Subindex | Name                       | Data type | Value range                 | Rights |
|--------------------------|----------|----------------------------|-----------|-----------------------------|--------|
| 1011                     | 0 ... 7  | restore default parameters | U32       | 0 ... (2 <sup>32</sup> - 1) | rw/ro  |

Besides index and subindex the signature “load” must be included in the telegram data, so that the parameters can be loaded (see table).

| Signature        | MSB |    |    |    | LSB |  |  |  |
|------------------|-----|----|----|----|-----|--|--|--|
| ISO 8859 (ASCII) | d   | a  | o  | l  |     |  |  |  |
| hex              | 64  | 61 | 6F | 6C |     |  |  |  |

Bit assignment for write authorisation

| U32                     |        |   |   |    |   |   |   |   |
|-------------------------|--------|---|---|----|---|---|---|---|
| 0                       | 1 - 31 |   |   |    |   |   |   |   |
| 0: Loading not possible | 0      | 0 | 0 | .. | 0 | 0 | 0 | 0 |
| 1: Loading possible     |        |   |   |    |   |   |   |   |

| Subindex | Rights | Writing                                                                                                                                                                                              | Reading                                                                                                   |
|----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 0        | ro     | <ul style="list-style-type: none"> <li>If you attempt to write the following fault message occurs:<br/>0601 0002<sub>hex</sub></li> </ul>                                                            | Maximally available subindex dependent on the controller type:<br>7: 8200 vector/motec frequency inverter |
| 1        | rw     | <ul style="list-style-type: none"> <li>This function is not yet supported at the moment.</li> <li>If you attempt to write the following fault message occurs:<br/>0800 0020<sub>hex</sub></li> </ul> | Loading of all parameters is possible                                                                     |
| 2        |        |                                                                                                                                                                                                      | Only loading of the communication parameters of the objects is possible                                   |
| 3        |        |                                                                                                                                                                                                      | Only loading of the vendor-specific parameters (index 6000 <sub>hex</sub> - 9FFF <sub>hex</sub> )         |
| 4        |        |                                                                                                                                                                                                      | Loading of parameter set 1 possible                                                                       |
| 5        |        |                                                                                                                                                                                                      | Loading of parameter set 2 possible                                                                       |
| 6        |        |                                                                                                                                                                                                      | Loading of parameter set 3 possible                                                                       |
| 7        |        |                                                                                                                                                                                                      | Loading of parameter set 4 possible                                                                       |

1014<sub>hex</sub>:  
COB-ID emergency object

If an internal fault of the bus module or the controller occurs or is accepted (e.g. TRIP), a fault message is sent via the CAN bus. The telegram is transmitted once at each fault.

| Index [ <sub>hex</sub> ] | Subindex | Name                    | Data type | Value range                 | Rights |
|--------------------------|----------|-------------------------|-----------|-----------------------------|--------|
| 1014                     | 0        | COB-ID emergency object | U32       | 0 ... (2 <sup>32</sup> - 1) | rw     |

Assignment of the data telegram

| 5th byte          | 6th byte | 7th byte                                                        | 8th byte |
|-------------------|----------|-----------------------------------------------------------------|----------|
| <b>U32</b>        |          |                                                                 |          |
| 0                 | 10       | 11 - 28                                                         | 29 30 31 |
| 11-bit identifier | 0        | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 0/1  |

Explanation

| Bit no.    | Value | Explanation                                                                                        |
|------------|-------|----------------------------------------------------------------------------------------------------|
| 0 - 10     | 0/1   | Identifier (also see chapter 36)                                                                   |
| (11 - 28)* | 0     | * The extended identifier (29 bits) is not supported. Each bit in this area must have the value 0. |
| 29*        | 0     | Reserved                                                                                           |
| 30         | 0     | Reserved                                                                                           |
| 31         | 0/1   | 0: valid emergency object<br>1: invalid emergency object                                           |

The “Emergency” telegram sent via CAN bus is structured as follows:

| 1st byte                                         | 2nd byte | 3rd byte                                        | 4th byte                                | 5th byte | 6th byte | 7th byte | 8th byte |
|--------------------------------------------------|----------|-------------------------------------------------|-----------------------------------------|----------|----------|----------|----------|
| Emergency error code<br>LENZE: Error code “10XX” |          | Error register<br>Object<br>1001 <sub>hex</sub> | Field for vendor-specific fault message |          |          |          |          |

1015<sub>hex</sub>:  
Inhibit time emergency

This object serves to select the interval between the occurrence of an internal fault and the sending of the fault message to the bus (“COB-ID Emergency object”, code: 1014<sub>hex</sub>).

Only integral multiples of 10 are processed as entered values. The entered value multiplied by 100 results in the period of time in [ μs].

| Index [ <sub>hex</sub> ] | Subindex | Name                   | Data type | Value range | Rights |
|--------------------------|----------|------------------------|-----------|-------------|--------|
| 1015                     | 0        | Inhibit time emergency | U16       | 0 ... 65535 | rw     |

Entry of the vendor ID

1018<sub>hex</sub>:  
Identity object

| Index [ <sub>hex</sub> ] | Subindex | Name            | Data type | Rights |
|--------------------------|----------|-----------------|-----------|--------|
| 1018                     | 0 ... 4  | Identity object | Identity  | ro     |

The identification number for Lenze allocated by the “Organisation CAN in Automation e. V.” can be read out via this object:

| Subindex | Meaning          |
|----------|------------------|
| 0        | Highest subindex |
| 1        | Vendor ID        |
| 2        | Product code     |
| 3        | Version number   |
| 4        | Serial number    |

1200<sub>hex</sub> / 1201<sub>hex</sub>:  
Server SDO parameters

Two objects (CAN parameter data channel 1 = 1200<sub>hex</sub> and CAN parameter data channel 2 = 1201<sub>hex</sub>) are available for parameter setting of the servers SDOs.

With index 1201 the identifier can be described in receiving direction and sending direction while index 1200 only possesses read rights. The server SDO parameter is only valid when the bit 31 contains the value 0 in both transmission directions (subindex 1 and 2).

| Index [hex] | Subindex | Name                            | Data type | Rights | Explanation of subindex |
|-------------|----------|---------------------------------|-----------|--------|-------------------------|
| 1200        | 0        | Server SDO Parameter            | SDO       | U 8    | ro                      |
|             | 1        | Identifier client → Server (rx) | Param     | U 32   | ro                      |
|             | 2        | Identifier server → Client (tx) |           | U 32   | ro                      |
| 1201        | 0        | Server SDO Parameter            |           | U 8    | ro                      |
|             | 1        | Identifier client → Server (rx) | U 32      | rw     |                         |
|             | 2        | Identifier server → Client (tx) | U 32      | rw     |                         |

0: Max. supported subindex = 2  
1: Specification of receiving identifier  
2: Specification of sending identifier

Assignment of the data telegram

| 5th byte          | 6th byte            | 7th byte                        | 8th byte |
|-------------------|---------------------|---------------------------------|----------|
| <b>U32</b>        |                     |                                 |          |
| 0                 | 10                  | 11 - 28                         | 29 30 31 |
| 11-bit identifier | 0 0 0 0 0 0 0 0 0 0 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 0/1  |

Explanation

| Bit no.    | Value | Explanation                                                                                         |
|------------|-------|-----------------------------------------------------------------------------------------------------|
| 0 - 10     | 0/1   | Identifier (also see (□ 7.6-3))                                                                     |
| (11 - 28)* | 0     | *) The extended identifier (29 bits) is not supported. Each bit in this area must have the value 0. |
| 29*        | 0     |                                                                                                     |
| 30         | 0     | Reserved                                                                                            |
| 31         | 0/1   | 0: SDO valid<br>1: SDO invalid                                                                      |

Example:

The CAN parameter data channel 2 of the drive with the controller address 4 is to be switched off.

This command must be sent from the master to the drive via the parameter data channel 1 (SDO1). The table on (□ 7.6-3) includes the basic identifier of the SDO1 with 1536<sub>dec</sub>.

(resulting) identifier = basic identifier + controller address = 1540<sub>dec</sub> = 0604<sub>hex</sub>

In order to switch off the parameter data channel (= invalid), the bit 31 must be set to "1". The value results in 80 00 00 00<sub>hex</sub> + 604<sub>hex</sub> = 80 00 06 04<sub>hex</sub> (see above).

| Byte:                | 1                     | 2                | 3                 | 4                          | 5                 | 6                 | 7            | 8                 |
|----------------------|-----------------------|------------------|-------------------|----------------------------|-------------------|-------------------|--------------|-------------------|
| <b>Name:</b>         | Command               | Index (Low byte) | Index (High byte) | Subindex                   | U 32              |                   |              |                   |
| <b>Read request:</b> | 23<br>(Write request) | 01               | 12                | 01<br>Client → Server (rx) | 04 <sub>hex</sub> | 06 <sub>hex</sub> | 0000<br>0000 | 80 <sub>hex</sub> |



1401<sub>hex</sub>:  
Receive PDO2\* Communication  
Parameter



#### Note!

\*) The object is not available for 82XX, 8200 vector/motec and 93XX controllers.

Receipt of communication parameters of PDO 2

| Index [hex] | Subindex | Name               | Data type | Value range | Rights | Explanation                                                                  |
|-------------|----------|--------------------|-----------|-------------|--------|------------------------------------------------------------------------------|
| 1401        | 0        | Number of entries  | PDO comm. | U 8         | ro     | Max. supported subindex = 2                                                  |
|             | 1        | COB-ID used by PDO |           | U 32        | rw     | Setting of the identifier for this PDO (300 <sub>hex</sub> + node ID)  7.6-3 |
|             | 2        | Transmission type  |           | U 8         | rw     | Setting of the transmission type (see table)                                 |

For further description regarding this object please see the description for 1400<sub>hex</sub>.

1402<sub>hex</sub>:  
Receive PDO3\* Communication  
Parameter

Receipt of communication parameters of PDO 3



#### Note!

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name               | Data type | Value range | Rights | Explanation                                                                  |
|-------------|----------|--------------------|-----------|-------------|--------|------------------------------------------------------------------------------|
| 1402        | 0        | Number of entries  | PDO comm. | U 8         | ro     | Max. supported subindex = 2                                                  |
|             | 1        | COB-ID used by PDO |           | U 32        | rw     | Setting of the identifier for this PDO (400 <sub>hex</sub> + node ID)  7.6-3 |
|             | 2        | Transmission type  |           | U 8         | rw     | Setting of the transmission type (see table)                                 |

For further description regarding this object please see the description for 1400<sub>hex</sub>.

1600<sub>hex</sub>:  
Receive PDO1 Mapping  
Parameter

This object serves to receive parameter data as PDO1.



### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub>

Subind. 1 - 4: value 10<sub>hex</sub>

| Index [hex] | Subindex | Name                              | Data type   | Value range | Rights | Explanation                                                                                   |
|-------------|----------|-----------------------------------|-------------|-------------|--------|-----------------------------------------------------------------------------------------------|
| 1600        | 0        | Number of mapped objects in PDO's | PDO Mapping | U 8         | ro     | Subindex 0:<br>Max. supported subindex = 4                                                    |
|             | 1        | PDO mapping 1                     |             | U 32        |        | In case of read requests regarding this object the value 10 <sub>hex</sub> will be sent back. |
|             | 2        | PDO mapping 2                     |             | U 32        |        |                                                                                               |
|             | 3        | PDO mapping 3                     |             | U 32        |        |                                                                                               |
|             | 4        | PDO mapping 4                     |             | U 32        |        |                                                                                               |

1601<sub>hex</sub>:  
Receive PDO2\* mapping  
parameter

This object serves to receive parameter data as PDO2.



### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub>

Subind. 1 - 4: value 10<sub>hex</sub>

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name                              | Data type   | Value range | Rights | Explanation                                                                                   |
|-------------|----------|-----------------------------------|-------------|-------------|--------|-----------------------------------------------------------------------------------------------|
| 1601        | 0        | Number of mapped objects in PDO's | PDO Mapping | U 8         | ro     | Subindex 0:<br>Max. supported subindex = 4                                                    |
|             | 1        | PDO mapping 1                     |             | U 32        |        | In case of read requests regarding this object the value 10 <sub>hex</sub> will be sent back. |
|             | 2        | PDO mapping 2                     |             | U 32        |        |                                                                                               |
|             | 3        | PDO mapping 3                     |             | U 32        |        |                                                                                               |
|             | 4        | PDO mapping 4                     |             | U 32        |        |                                                                                               |

1602<sub>hex</sub>:  
Receive PDO3\* mapping  
parameter

This object serves to receive parameter data as PDO3.



#### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub>

Subind. 1 - 4: value 10<sub>hex</sub>

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name                              | Data type   | Rights | Explanation                                                                                                                                           |
|-------------|----------|-----------------------------------|-------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1602        | 0        | Number of mapped objects in PDO's | PDO Mapping | U 8    | ro<br>Subindex 0:<br>Max. supported subindex = 4<br><br>In case of read requests regarding this object the value 10 <sub>hex</sub> will be sent back. |
|             | 1        | PDO mapping 1                     |             | U 32   |                                                                                                                                                       |
|             | 2        | PDO mapping 2                     |             | U 32   |                                                                                                                                                       |
|             | 3        | PDO mapping 3                     |             | U 32   |                                                                                                                                                       |
|             | 4        | PDO mapping 4                     |             | U 32   |                                                                                                                                                       |

1800<sub>hex</sub>:  
Transmit PDO1 Communication  
Parameter

## Process data transmission

| Index [ <sub>hex</sub> ] | Subindex | Name                           | Data type | Rights | Explanation |                                                                       |
|--------------------------|----------|--------------------------------|-----------|--------|-------------|-----------------------------------------------------------------------|
| 1800                     | 0        | Number of subindices supported | PDO Comm. | U 8    | ro          | Max. supported subindex = 2                                           |
|                          | 1        | Identifier of the PDO          |           | U 32   | rw          | Setting of the identifier for this PDO (180 <sub>hex</sub> + node ID) |
|                          | 2        | Transmission type              |           | U 8    | rw          | Setting of the transmission type (see table)                          |

## Explanation subindex 1:

| Bit no.      | Value | Meaning                                                                                        |
|--------------|-------|------------------------------------------------------------------------------------------------|
| 0 - 10 (LSB) | X     | contains the identifier (basic + controller address)                                           |
| (11 - 28)*   | 0     | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0! |
| 29*          | 0     | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0! |
| 30           | 0     | RTR to this PDO is permitted (Lenze)                                                           |
|              | 1     | RTR to this PDO is not permitted (not adjustable)<br>RTR = remote transmission request         |
| 31 (MSB)     | 0     | 0: PDO active                                                                                  |
|              | 1     | 1: PDO not active                                                                              |

## Explanation subindex 2:

| PDO transmission |             |                  | Transmission type | Explanation                                                      |
|------------------|-------------|------------------|-------------------|------------------------------------------------------------------|
| cyclic           | synchronous | event-controlled |                   |                                                                  |
| x                | X           |                  | n = 1 ... 240     | If a value n is entered, this PDO is accepted at every nth SYNC. |
|                  | X           |                  | n = 252           | PDO is filled with new data but only transmitted to RTR.         |
|                  |             | X                | n = 254           | vendor-specific, see L-C1875 / L-C2375                           |

**Note!**

The value n = 252 will only be supported as of version 1.0 of the fieldbus module.



1801<sub>hex</sub>:  
Transmit PDO2\* Communication  
Parameter

Process data transmission



#### Note!

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name                           | Data type | Rights | Explanation |                                                                       |
|-------------|----------|--------------------------------|-----------|--------|-------------|-----------------------------------------------------------------------|
| 1801        | 0        | Number of subindices supported | PDO Comm. | U 8    | ro          | Max. supported subindex = 2                                           |
|             | 1        | Identifier of the PDO          |           | U 32   | rw          | Setting of the identifier for this PDO (280 <sub>hex</sub> + node ID) |
|             | 2        | Transmission type              |           | U 8    | rw          | Setting of the transmission type (see table)                          |

Explanation subindex 1:

| Bit no.      | Value | Meaning                                                                                        |
|--------------|-------|------------------------------------------------------------------------------------------------|
| 0 - 10 (LSB) | X     | contains the identifier (basic + controller address)                                           |
| (11 - 28)*   | 0     | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0! |
| 29*          | 0     | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0! |
| 30           | 0     | RTR to this PDO is permitted (Lenze)                                                           |
|              | 1     | RTR to this PDO is not permitted (not adjustable)<br>RTR = remote transmission request         |
| 31 (MSB)     | 0     | 0: PDO active                                                                                  |
|              | 1     | 1: PDO not active                                                                              |

Explanation subindex 2:

| PDO transmission |             |                  | Transmission type | Explanation                                                      |
|------------------|-------------|------------------|-------------------|------------------------------------------------------------------|
| cyclic           | synchronous | event-controlled |                   |                                                                  |
| X                | X           |                  | n = 1 ... 240     | If a value n is entered, this PDO is accepted at every nth SYNC. |
|                  | X           |                  | n = 252           | PDO is filled with new data but only transmitted to RTR.         |
|                  |             | X                | n = 254           | vendor-specific, see L-C1875 / L-C2375                           |

1802<sub>hex</sub>:  
Transmit PDO3\* Communication  
Parameter

## Process data transmission

**Note!**

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name                           | Data type | Rights | Explanation |                                                                       |
|-------------|----------|--------------------------------|-----------|--------|-------------|-----------------------------------------------------------------------|
| 1802        | 0        | Number of subindices supported | PDO Comm. | U 8    | ro          | Max. supported subindex = 2                                           |
|             | 1        | Identifier of the PDO          |           | U 32   | rw          | Setting of the identifier for this PDO (380 <sub>hex</sub> + node ID) |
|             | 2        | Transmission type              |           | U 8    | rw          | Setting of the transmission type (see table)                          |

## Explanation subindex 1:

| Bit no.      | Value  | Meaning                                                                                                                        |
|--------------|--------|--------------------------------------------------------------------------------------------------------------------------------|
| 0 - 10 (LSB) | X      | contains the identifier (basic + controller address)                                                                           |
| (11 - 28)*   | 0      | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0!                                 |
| 29*          | 0      | *) The extended identifier (29 bits) is not supported. Each single bit must adopt the state 0!                                 |
| 30           | 0<br>1 | RTR to this PDO is permitted (Lenze)<br>RTR to this PDO is not permitted (not adjustable)<br>RTR = remote transmission request |
| 31 (MSB)     | 0<br>1 | 0: PDO active<br>1: PDO not active                                                                                             |

## Explanation subindex 2:

| PDO transmission |             |                  | Transmission type | Explanation                                                      |
|------------------|-------------|------------------|-------------------|------------------------------------------------------------------|
| cyclic           | synchronous | event-controlled |                   |                                                                  |
| X                | X           |                  | n = 1 ... 240     | If a value n is entered, this PDO is accepted at every nth SYNC. |
|                  | X           |                  | n = 252           | PDO is filled with new data but only transmitted to RTR.         |
|                  |             | X                | n = 254           | Vendor-specific, see L-C1875 / L-C2375                           |

1A00<sub>hex</sub>:  
Transmit PDO1 Mapping  
Parameter

This object serves to send parameter data as PDO1.



#### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub> (max. supported subindex)

Subind. 1 - 4: In case of read requests regarding this object the value 10<sub>hex</sub> will be sent back.

| Index [ <sub>hex</sub> ] | Subindex | Name                              | Data type   | Rights |    |
|--------------------------|----------|-----------------------------------|-------------|--------|----|
| 1A00                     | 0        | Number of mapped objects in PDO's | PDO Mapping | U 8    | ro |
|                          | 1        | PDO mapping 1                     |             | U 32   |    |
|                          | 2        | PDO mapping 2                     |             | U 32   |    |
|                          | 3        | PDO mapping 3                     |             | U 32   |    |
|                          | 4        | PDO mapping 4                     |             | U 32   |    |

1A01<sub>hex</sub>:  
Transmit PDO2\* mapping  
parameter

This object serves to send parameter data as PDO2.



#### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub> (max. supported subindex)

Subind. 1 - 4: In case of read requests regarding this object the value 10<sub>hex</sub> will be sent back.

\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [ <sub>hex</sub> ] | Subindex | Name                              | Data type   | Rights |    |
|--------------------------|----------|-----------------------------------|-------------|--------|----|
| 1A01                     | 0        | Number of mapped objects in PDO's | PDO Mapping | U 8    | ro |
|                          | 1        | PDO mapping 1                     |             | U 32   |    |
|                          | 2        | PDO mapping 2                     |             | U 32   |    |
|                          | 3        | PDO mapping 3                     |             | U 32   |    |
|                          | 4        | PDO mapping 4                     |             | U 32   |    |

1A02<sub>hex</sub>:  
Transmit PDO3\* mapping  
parameter

This object serves to send parameter data as PDO3.



### Note!

The functionality of this object is not yet available at the moment. On the attempt to read the object, the following values are sent back in dependence of the subindices:

Subind. 0: value 4<sub>hex</sub> (max. supported subindex)

Subind. 1 - 4: In case of read requests regarding this object the value 10<sub>hex</sub> will be sent back.




\*) The object is not available for the 82XX, 8200 vector/motec and 93XX controllers.

| Index [hex] | Subindex | Name                              | Data type   | Rights |
|-------------|----------|-----------------------------------|-------------|--------|
| 1A02        | 0        | Number of mapped objects in PDO's | U 8         | ro     |
|             | 1        | PDO mapping 1                     | U 32        |        |
|             | 2        | PDO mapping 2                     | PDO Mapping |        |
|             | 3        | PDO mapping 3                     | U 32        |        |
|             | 4        | PDO mapping 4                     | U 32        |        |

### Troubleshooting

## 7.8 Troubleshooting

### No communication with the controller

| Possible causes                               | Diagnostics                                                                                                                                                                                                 | Remedy                                                                                                                                                                                                 |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Is the controller switched on?                | The operation status LED of the basic unit must be on<br> 7.4-1 .                                                          | Supply controller with voltage (see Operating Instructions for the basic unit)                                                                                                                         |
| Is the fieldbus module supplied with voltage? | The green LED "Status controller connection" at the fieldbus module<br> 7.4-1 must be on (remedy 1) or blinking (remedy 2) | In case of supply from the basic unit check correct connection. With external supply check the 24 V voltage at terminals 39 and 59.<br>A voltage of 24 V +10 % must be applied.                        |
|                                               |                                                                                                                                                                                                             | The fieldbus module has not been initialised with the controller yet.<br>Possibility 1: Controller not switched on (see fault possibility 1).<br>Possibility 2: Check the connection to the controller |
| Does the controller receive telegrams?        | The LED "Status bus connection" at the fieldbus module<br> 7.4-1 must blink green when communicating with host.            | Check whether the connection corresponds to the instruction given in chapter "electrical installation".<br>Check whether host sends telegrams and uses the appropriate interface.                      |
|                                               |                                                                                                                                                                                                             | Has the available device address already been assigned?<br>Check the setting of the other participants in the DeviceNet.                                                                               |



## 7.9 Appendix

### 7.9.1 Code table

#### Overview

#### How to read the table

| Column    | Abbreviation | Meaning                                                                                                                                       |
|-----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Code      | L-C1853      | (Lenze) code C1853                                                                                                                            |
| Subcode   | 1<br>2 .. 4  | Subcode 1 of code C1853<br>Subcode 2 to 4 of code C1853                                                                                       |
| Index     | -            | The indicated value must be entered into byte 2 and byte 3 of the parameter telegram.                                                         |
| Lenze     |              | Default setting of code                                                                                                                       |
| Selection | 1 [1] 99     | minimum value [minimum increment/unit] maximum value                                                                                          |
| Data type | -            | VS: Visible String, character string with given length<br>FIX32: Fixed value 4 bytes (= 32 bits)<br>U16: Unsigned Integer 2 bytes (= 16 bits) |

L-C18xx  
(for 82xx, 8200 vector and 93XX)

| Code    | Subcode                  | Index                                     | Possible settings                                                |                                                                                                                                                                                | Data type | Name                                       |
|---------|--------------------------|-------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------|
|         |                          |                                           | Lenze                                                            | Selection                                                                                                                                                                      |           |                                            |
| L-C1810 | -                        | 22765 <sub>d</sub> =<br>58ED <sub>h</sub> | -                                                                | -                                                                                                                                                                              | VS        | Software product code                      |
| L-C1811 | -                        | 22764 <sub>d</sub> =<br>58EC <sub>h</sub> |                                                                  |                                                                                                                                                                                | VS        | Software creation date                     |
| L-C1850 | -                        | 58C5 <sub>h</sub> =<br>22725 <sub>d</sub> | 1                                                                | 1 [1] 63                                                                                                                                                                       | FIX32     | Node address                               |
| L-C1851 | -                        | 58C4 <sub>h</sub> =<br>22724 <sub>d</sub> | 0                                                                | 0 = 500 kbits/s, 1 = 250 kbits/s<br>2 = 125 kbits/s, 3 = 50 kbits/s<br>4 = 1000 kbits/s, 5 = 20 kbits/s<br>6 = 10 kbits/s                                                      | FIX32     | baud rate                                  |
| L-C1852 | -                        | 58C3 <sub>h</sub> =<br>22723 <sub>d</sub> | 0                                                                | 0 = Slave operation<br>1 = Master operation                                                                                                                                    | FIX32     | Master/slave operation                     |
| L-C1853 | /1 ... /3                | 58C2 <sub>h</sub> =<br>22722 <sub>d</sub> | 0                                                                | 0 = Addressing to CANopen<br>1 = Addressing to L-C1854/L-C2354<br>2 = Addressing to LENZE system bus<br>3 = Addressing to CANopen index<br>14X <sub>h</sub> /18XX <sub>h</sub> | FIX32     | Addressing CAN-IN/<br>CAN-OUTx             |
| L-C1854 | /1 ... /2<br>/3* ... /6* | 58C1 <sub>h</sub> =<br>22721 <sub>d</sub> | /1: 129<br>/2: 1<br>/3: 257*<br>/4: 258*<br>/5: 385*<br>/6: 386* | 0 [1] 1663                                                                                                                                                                     | FIX32     | Selective addressing<br>CAN-IN/<br>CAN-OUT |
| L-C1855 | /1 ... /2<br>/3* ... /6* | 58C0 <sub>h</sub> =<br>22720 <sub>d</sub> | 0                                                                | 0 [1] 2047                                                                                                                                                                     | FIX32     | Display of<br>resulting<br>identifiers     |
| L-C1856 | /1 ... /5                | 58BF <sub>h</sub> =<br>22719 <sub>d</sub> | /1: 3000<br>ms<br>/2 .. /5:<br>0 ms                              | 0 35 [1 ms] 655                                                                                                                                                                | FIX32     | Boot up and<br>cycle times                 |
| L-C1857 | /1 ... /4                | 58BE <sub>h</sub> =<br>22718 <sub>d</sub> | 3000<br>ms                                                       | 0 35 [1 ms] 655                                                                                                                                                                | FIX32     | Monitoring<br>time                         |
| L-C1859 | -                        | 58BC <sub>h</sub> =<br>22716 <sub>d</sub> | -                                                                | 0 [1] 1023                                                                                                                                                                     | U16       | Display of DIP<br>switch position          |

| Code    | Subcode        | Index                                     | Possible settings         |                                                              | Data type | Name  |                                            |
|---------|----------------|-------------------------------------------|---------------------------|--------------------------------------------------------------|-----------|-------|--------------------------------------------|
|         |                |                                           | Lenze                     | Selection                                                    |           |       |                                            |
| L-C1860 | -              | 58BB <sub>h</sub> =<br>22715 <sub>d</sub> | -                         | 0                                                            | [1] 1023  | U16   | Display of the current DIP switch position |
| L-C1867 | -              | 58B4 <sub>h</sub> =<br>22708 <sub>d</sub> | 128                       | 0                                                            | [1] 2047  | FIX32 | Sync Rx identifier                         |
| L-C1868 | -              | 58B3 <sub>h</sub> =<br>22707 <sub>d</sub> | 128                       | 0                                                            | [1] 2047  | FIX32 | Sync Tx identifier                         |
| L-C1873 | /1<br>/2*, /3* | 58AE <sub>h</sub> =<br>22702 <sub>d</sub> | 1                         | 0                                                            | [1] 240   | FIX32 | Sync rate CAN-IN1 ... CAN-IN3              |
| L-C1874 | /1<br>/2*, /3* | 58AD <sub>h</sub> =<br>22701 <sub>d</sub> | 1                         | 1                                                            | [1] 240   | FIX32 | Sync rate CAN-OUT1 ... CAN-OUT3            |
| L-C1875 | /1<br>/2*, /3* | 58AC <sub>h</sub> =<br>22700 <sub>d</sub> | /1: 0<br>/2: 1*<br>/3: 1* | 0                                                            | [1] 3     | FIX32 | Tx mode CAN-OUT1 ... CAN-OUT3              |
| L-C1876 | /1 ... /4      | 58AB <sub>h</sub> =<br>22699 <sub>d</sub> | 65535                     | 0                                                            | [1] 65535 | FIX32 | Masks CAN-OUT1                             |
| L-C1877 | /1 ... /4      | 58AA <sub>h</sub> =<br>22698 <sub>d</sub> | 65535                     | 0                                                            | [1] 65535 | FIX32 | Masks CAN-OUT2                             |
| L-C1878 | /1 ... /4      | 58A9 <sub>h</sub> =<br>22697 <sub>d</sub> | 65535                     | 0                                                            | [1] 65535 | FIX32 | Masks CAN-OUT3                             |
| L-C1882 | /1 ... /5      | 58A5 <sub>h</sub> =<br>22693 <sub>d</sub> | 0                         | 0<br>0: no response<br>1: Controller inhibit<br>2: Quickstop | [1] 2     | FIX32 | Monitoring reactions                       |

\*) not effective when using 82XX, 8200 vector or 93XX controller

**L-C23xx**  
(for servo PLC 9300 / Drive PLC)

| Code    | Subcode   | Index                                     | Possible settings |                                                                                                                                                                                                                                                                             | Data type | Name  |                              |
|---------|-----------|-------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|------------------------------|
|         |           |                                           | Lenze             | Selection                                                                                                                                                                                                                                                                   |           |       |                              |
| L-C1810 | -         | 22765 <sub>d</sub> =<br>58ED <sub>h</sub> | -                 | -                                                                                                                                                                                                                                                                           | -         | VS    | Software product code        |
| L-C1811 | -         | 22764 <sub>d</sub> =<br>58EC <sub>h</sub> | -                 | -                                                                                                                                                                                                                                                                           | -         | VS    | Software creation date       |
| L-C2120 | -         | 22455 <sub>d</sub> =<br>57B7 <sub>h</sub> | 0                 | 0 = No command<br>1 = Update codes L-23XX and CAN re-initialisation = Reset node<br>2 = Update codes L-C23XX<br>10 = L-C2356/1...4 re-read<br>11 = L-C2357 re-read<br>12 = L-C2375 re-read<br>13 = L-C2376 ... L-C2378 re-read<br>14 = L-C2382 re-read<br>15 = not assigned |           | FIX32 | AIF control byte             |
| L-C2121 | -         | 22454 <sub>d</sub> =<br>57B6 <sub>h</sub> | 0                 | 0                                                                                                                                                                                                                                                                           | [1] 255   | FIX32 | AIF status byte              |
| L-C2350 | -         | 56D1 <sub>h</sub> =<br>22225 <sub>d</sub> | 1                 | 1                                                                                                                                                                                                                                                                           | [1] 63    | FIX32 | Node address                 |
| L-C2351 | -         | 56D0 <sub>h</sub> =<br>22224 <sub>d</sub> | 0                 | 0 = 500 kbits/s, 1 = 250 kbits/s<br>2 = 125 kbits/s, 3 = 50 kbits/s<br>4 = 1000 kbits/s                                                                                                                                                                                     |           | FIX32 | baud rate                    |
| L-C2352 | -         | 56CF <sub>h</sub> =<br>22223 <sub>d</sub> | 0                 | 0 = Slave operation<br>1 = Master operation                                                                                                                                                                                                                                 |           | FIX32 | Master/slave operation       |
| L-C2353 | /1 ... /3 | 56CE <sub>h</sub> =<br>22222 <sub>d</sub> | 0                 | 0 = Addressing to CANopen<br>1 = Addressing to L-C1854/L-C2354<br>2 = Addressing to LENZE system bus                                                                                                                                                                        |           | FIX32 | Addressing CAN-INx/ CAN-OUTx |



| Code    | Subcode   | Index                                     | Possible settings                                            |                                                                    | Data type | Name                                 |
|---------|-----------|-------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------|-----------|--------------------------------------|
|         |           |                                           | Lenze                                                        | Selection                                                          |           |                                      |
| L-C2354 | /1 ... /6 | 56CD <sub>h</sub> =<br>22221 <sub>d</sub> | /1: 129<br>/2: 1<br>/3: 257<br>/4: 258<br>/5: 385<br>/6: 386 | 0 [1] 513                                                          | FIX32     | Selective addressing CAN-IN/ CAN-OUT |
| L-C2355 | /1 ... /6 | 56C <sub>h</sub> =<br>22220 <sub>d</sub>  | -                                                            | 0 [1] 2047                                                         | FIX32     | Display of resulting identifiers     |
| L-C2356 | /1 ... /5 | 56CB <sub>h</sub> =<br>22219 <sub>d</sub> | 1:<br>3000<br>ms<br>2 .. 5:<br>0 ms                          | 0 [1 ms] 6553<br>5                                                 | FIX32     | Boot up and cycle times              |
| L-C2357 | /1 ... /4 | 56CA <sub>h</sub> =<br>22218 <sub>d</sub> | 3000<br>ms                                                   | 0 [1 ms] 6553<br>5                                                 | FIX32     | Monitoring time                      |
| L-C2359 | -         | 56C <sub>h</sub> =<br>22216 <sub>d</sub>  | -                                                            | 0 [1] 1023                                                         | U16       | Display of DIP switch position       |
| L-C2367 | -         | 56C0 <sub>h</sub> =<br>22208 <sub>d</sub> | 128                                                          | 0 [1] 2047                                                         | FIX32     | Sync Rx identifier                   |
| L-C2368 | -         | 56BF <sub>h</sub> =<br>22207 <sub>d</sub> | 128                                                          | 0 [1] 2047                                                         | FIX32     | Sync Tx identifier                   |
| L-C2373 | /1 ... /3 | 56BA <sub>h</sub> =<br>22202 <sub>d</sub> | 1                                                            | 1 [1] 240                                                          | FIX32     | Sync rate CAN-IN1 ... CAN-IN3        |
| L-C2374 | /1 ... /3 | 56B9 <sub>h</sub> =<br>22201 <sub>d</sub> | 1                                                            | 1 [1] 240                                                          | FIX32     | Sync rate CAN-OUT1 ... CAN-OUT3      |
| L-C2375 | /1 ... /3 | 56B8 <sub>h</sub> =<br>22200 <sub>d</sub> | /1: 0<br>/2: 1<br>/3: 1                                      | 0 [1] 3                                                            | FIX32     | Tx mode CAN-OUT1 ... CAN-OUT3        |
| L-C2376 | /1 ... /4 | 56B7 <sub>h</sub> =<br>22199 <sub>d</sub> | 65535                                                        | 0 [1] 65535                                                        | FIX32     | Masks CAN-OUT1                       |
| L-C2377 | /1 ... /4 | 56B6 <sub>h</sub> =<br>22198 <sub>d</sub> | 65535                                                        | 0 [1] 65535                                                        | FIX32     | Masks CAN-OUT2                       |
| L-C2378 | /1 ... /4 | 56B5 <sub>h</sub> =<br>22197 <sub>d</sub> | 65535                                                        | 0 [1] 65535                                                        | FIX32     | Masks CAN-OUT3                       |
| L-C2382 | /1 ... /5 | 56B1 <sub>h</sub> =<br>22193 <sub>d</sub> | 0                                                            | 0 [1] 2<br>0: no response<br>1: Controller inhibit<br>2: Quickstop | FIX32     | Monitoring reactions                 |



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