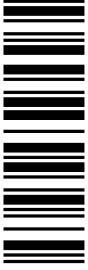


EDS94AYCEN  
13416838

# L-force *Communication*



Communication Manual

## 9400



**E94AYCEN**

**Ethernet communication module**

# Lenze



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# 1 About this documentation

## Contents

The descriptions in this documentation only refer to the E94AYCEN communication module (Ethernet).



### Note!

This documentation supplements the **mounting instructions** supplied with the communication module and the **Servo Drives 9400 hardware manual**.

**The mounting instructions contain safety instructions that must be observed!**

The features and functions of the Ethernet communication module are described in detail. Examples illustrate typical applications.

This documentation furthermore contains:

- ▶ Safety instructions that must be observed
- ▶ The basic technical data of the communication module
- ▶ Information on versions of the Lenze standard devices to be used
- ▶ Notes on troubleshooting and fault elimination

The theoretical context is only explained as far as it is required for understanding the function of the communication module.

This documentation does not describe the software of another manufacturer. No guarantee can be given for corresponding information in this documentation. Information on the use of the software can be found in the documents for the host system (PLC, scanner).

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

## Screenshots/application examples

All screenshots in this documentation are application examples. Depending on the firmware version of the field devices and the software version of the installed engineering tools (»Engineer«, »Network Analyzer«), the screenshots in this documentation may differ from the screen representation.

## Target group

This documentation addresses to persons who configure, install, commission, and maintain the networking and remote maintenance of a machine.



### Tip!

Current documentation and software updates for Lenze products can be found in the download area at:

[www.Lenze.com](http://www.Lenze.com)

## Validity information

The information in this documentation applies to the following devices:



| Extension module              | Type designation | From hardware version | From software version |
|-------------------------------|------------------|-----------------------|-----------------------|
| Ethernet communication module | E94AYCEN         | VC                    | -                     |

## 1.1 Document history

| Version |         |      | Description  |
|---------|---------|------|--|
| 1.0     | 11/2004 | TD06 | First edition  |
| 2.0     | 03/2005 | TD06 | Description of the GCI protocol added  |
| 3.0     | 03/2005 | TD06 | Description of displays added  |
| 4.0     | 10/2006 | TD06 | General revision   |
| 5.0     | 11/2007 | TD17 | General revision and provision of the documentation in the form of the »Engineer« online help  |
| 6.0     | 11/2008 | TD17 | Revision for hardware version VC (2-port Ethernet)   |
| 7.0     | 06/2009 | TD17 | Update of the description for the configuration of the communication module with the »Engineer«.   |
| 8.0     | 07/2010 | TD17 | General revision   |
| 9.0     | 09/2012 | TD17 | <ul style="list-style-type: none"><li>• Revision of the telegram description in chapter <a href="#">Parameter data transfer (38)</a>.</li><li>• <a href="#">Parameter reference (54)</a> supplemented.</li></ul> |

## 1.2 Conventions used

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

| Type of information       | Identification  | Examples/notes   |
|---------------------------|---|--|
| Numbers                   |   |  |
| Decimal                   | Standard notation   | Example: 1234  |
| Hexadecimal               | 0x[0 ... 9, A ... F]  | Example: 0x60F4  |
| Binary<br>• Nibble        | In inverted commas<br>Point   | Example: '100'<br>Example: '0110.0100'   |
| Decimal separator         | Point   | In general, the decimal point is used.<br>Example: 1234.56   |
| Text                      |   |  |
| Program name              | » «   | PC software<br>Example: Lenze »Engineer«   |
| Control element           | <b>Bold</b>   | The <b>OK</b> button... / The <b>Copy</b> command... / The <b>Properties</b> tab... / The <b>Name</b> input field... |
| Hyperlink                 | <u>Underlined</u>   | Optically highlighted reference to another topic. In this documentation activated via mouse-click.                   |
| Icons                     |   |  |
| Page reference            |  8 | Optically highlighted reference to another page. In this documentation activated via mouse-click.                    |
| Step-by-step instructions |  | Step-by-step instructions are marked by a pictograph.  |



### 1.3 Terminology used

| Term            | Meaning  |
|-----------------|--|
| Drive           | Lenze controllers of the "Servo Drives 9400" series  |
| Standard device |  |
| »Engineer«      | Lenze PC software supporting you for the "Engineering" (parameterisation, diagnostics, and configuration) during the whole life cycle, i. e. from the design to the maintenance of the machine commissioned. |
| Code            | Parameter which serves to parameterise and monitor the drive. In normal usage, the term is usually referred to as "Index".   |
| Lenze setting   | This setting is the default factory setting of the device.   |
| Basic setting   |  |
| HW              | Hardware   |
| SW              | Software   |
| PLC             | Programmable Logic Controller (PLC)  |
| Use DHCP        | Dynamic Host Configuration Protocol  |

## 1.4 Notes used

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

### Safety instructions

Layout of the safety instructions:



#### **Pictograph and signal word!**

(characterise the type and severity of danger)

#### **Note**

(describes the danger and suggests how to prevent dangerous situations)

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

### Application notes

| Pictograph | Signal word | Meaning   |
|------------|-------------|---|
|            | Note!       | Important note to ensure trouble-free operation |
|            | Tip!        | Useful tip for easy handling                    |
|            |             | Reference to other documentation                |

## 2 Safety instructions



### Note!

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

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

### 2.1 General safety instructions and application notes



### Danger!

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

- ▶ Lenze drive and automation components ...
  - must only be used as directed.
    - ▶ [Application as directed](#) (13)
  - must never be commissioned if they display signs of damage.
  - must never be technically modified.
  - must never be commissioned if they are not fully mounted.
  - must never be operated without required covers.
  - can have live, moving or rotating parts during and after operation, depending on their degree of protection. Surfaces can be hot.
- ▶ The following applies to Lenze drive components ...
  - Only use permissible accessories.
  - Only use original manufacturer spare parts.
- ▶ Observe all the specifications contained in the enclosed and related documentation.
  - This is the precondition for safe and trouble-free operation and for achieving the product features specified.
    - ▶ [Product features](#) (14)
  - The procedural notes and circuit details described in this document are only proposals. It is up to the user to check whether they can be adapted to the particular applications. Lenze does not take any responsibility for the suitability of the procedures and circuit proposals described.

- ▶ All operations with and on Lenze drive and automation components may only be carried out by qualified personnel. In accordance with IEC 60364 or CENELEC HD 384 these are persons ...
  - who are familiar with the installation, mounting, commissioning, and operation of the product.
  - who have the corresponding qualifications for their work.
  - who know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

## 2.2 Device and application-specific safety instructions

- ▶ During operation, the communication module must be securely connected to the standard device.
- ▶ Decouple your Ethernet house network from the system network for Ethernet-capable Lenze devices.
  - ▶ [Ethernet connection](#) (16 22)
- ▶ Only use cables that comply with the listed specifications.
  - ▶ [Specification of the Ethernet cable](#) (16 23)



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

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

## 2.3 Residual hazards

### Protection of persons

- ▶ If Servo Drives 9400 are used on a phase earthed mains with a rated mains voltage  $\geq 400$  V, protection against accidental contact is not guaranteed without external measures.
  - ▶ [Protective insulation](#) (16 16)

### Device protection

- ▶ The communication module contains electronic components that can be damaged or destroyed by electrostatic discharge.
  - ▶ [Installation](#) (16 19)

## 3 Product description

### 3.1 Application as directed

The Ethernet communication module ...

- ▶ is an accessory module that can be used in conjunction with the following standard devices:

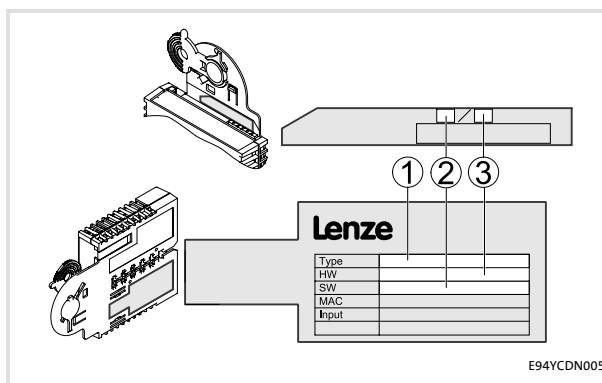
| Product series                   | Type designation | From hardware version | From software version |
|----------------------------------|------------------|-----------------------|-----------------------|
| Servo Drives 9400 HighLine       | E94AxHExxxx      | VB                    | 01.50                 |
| Servo Drives 9400 PLC            | E94AxPExxxx      | VA                    | 01.00                 |
| Regenerative power supply module | E94ARNxxxx       | VA                    | 01.00                 |

- ▶ is a device intended for use in industrial power systems.
- ▶ should only be used under the operating conditions prescribed in this documentation.
- ▶ can only be used in Ethernet networks.

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

### 3.2 Identification

The type designation and hardware and software version of the communication module are specified on the nameplate:



#### 1 Type designation (type)

E94 Product series

A Version

Y Module identification: Extension module

C Module type: Communication module

EN Ethernet

#### 2 Hardware version (HW)

#### 3 Software version (SW)

[3-1] Identification data

# E94AYCEN communication manual (Ethernet)

Product description

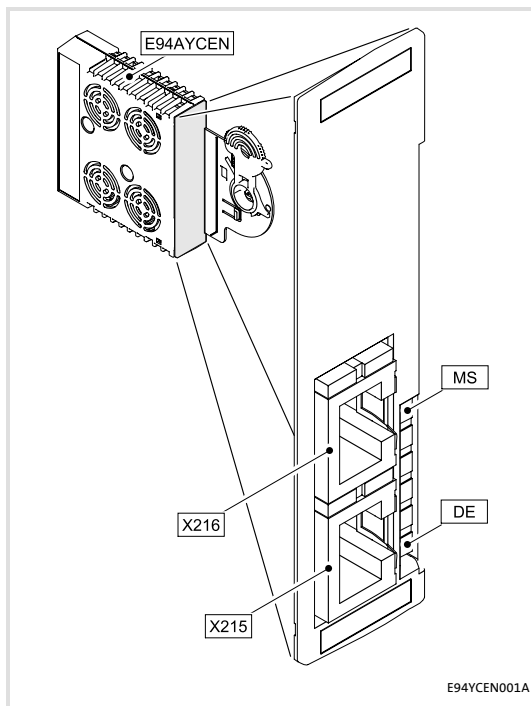
Product features

## 3.3 Product features

- ▶ Interface module for the Ethernet communication system, for attaching to the expansion slots of the Servo Drives 9400
- ▶ 2-port interface with integrated switch functionality
- ▶ Automatic setting of baud rate and transmission mode (auto-negotiation)
- ▶ Automatic detection of wiring errors and polarity reversal of data signals (auto-polarity)
- ▶ Automatic detection and (internal) swapping of data signals from receive paths and transmit paths (auto-crossing)
- ▶ Access to all Lenze parameters via the Lenze »Engineer«

## 3.4 Terminals and interfaces

- ▶ 2 RJ45 sockets for Ethernet connection
- ▶ Front LEDs for diagnosing the ...
  - Voltage supply of the communication module
  - Connection to the standard device
  - Ethernet connection
  - Ethernet activity



**X215** Ethernet connections

**X216** • RJ45 sockets

• Each with 2 LED status displays for diagnostics

▶ [Ethernet connection](#) (📖 22)

▶ [Status display at X215 and X216](#) (📖 52)

**MS** 2 LED status displays for diagnostics

**DE** ▶ [LED status displays](#) (📖 52)

[3-2] Communication module E94AYCEN (Ethernet)

## 4 Technical data

### 4.1 General data and operating conditions

| Area                    | Values  |
|-------------------------|---|
| Order designation       | E94AYCEN  |
| Communication profile   | GCI, based on TCP/IP  |
| Communication medium    | S/FTP (screened foiled twisted pair, ISO/IEC 11801 or EN 50173), CAT 5e             |
| Interface               | RJ45: Standard Ethernet (in accordance with IEEE 802.3), 100Base-TX (Fast Ethernet) |
| Network topology        | Line, star  |
| Ethernet port           | 9410 (GCI)  |
| Baud rate               | <ul style="list-style-type: none"> <li>• 10 Mbps</li> <li>• 100 Mbps</li> </ul>     |
| Transmission mode       | Half duplex / full duplex   |
| Switching method        | Store and forward   |
| Switch latency          | 125 µs at maximum telegram length   |
| Voltage supply          | The communication module is solely supplied with voltage by the standard device.    |
| Conformities, approvals | <ul style="list-style-type: none"> <li>• CE</li> <li>• UL</li> </ul>                |



#### Servo Drives 9400 hardware manual

This manual contains data on **ambient conditions** and the **electromagnetic compatibility (EMC)** which also apply to the communication module.

## 4.2 Protective insulation



### **Danger!**

#### **Dangerous electrical voltage**

If Servo Drives 9400 are used on a phase earthed mains with a rated mains voltage  $\geq 400$  V, protection against accidental contact is not guaranteed without external measures.

#### **Possible consequences:**

- Death or severe injuries

#### **Protective measures:**

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



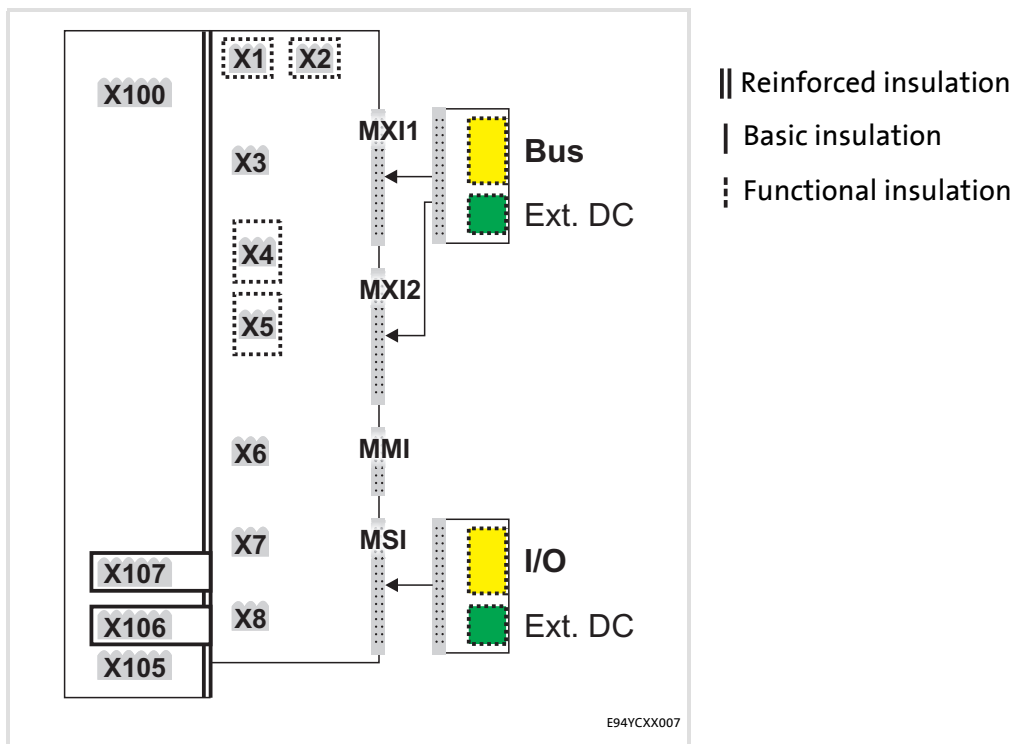
### **Note!**

The protective insulation provided in Servo Drives 9400 is implemented in accordance with EN 61800-5-1.



The following illustration ...

- ▶ shows the arrangement of the terminal strips and the separate potential areas of the drive.
- ▶ serves to determine the decisive protective insulation between two terminals located in differently insulated separate potential areas.



[4-1] Protective insulation in accordance with EN61800-5-1

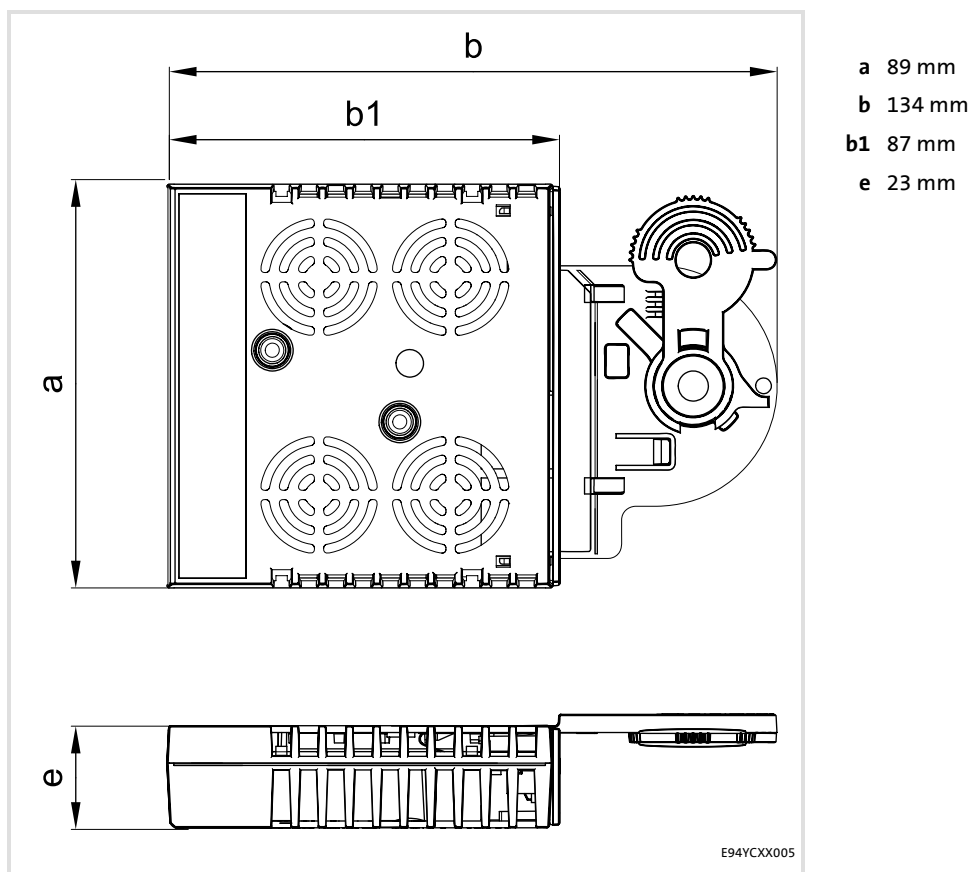
| Terminal strip | Connection                         | Terminal strip | Connection            |
|----------------|------------------------------------|----------------|-----------------------|
| X100           | L1, L2, L3 (Single Drive only)     | X1             | CAN on board 9400     |
|                | +UG, -UG                           | X2             | Statebus              |
| X105           | U, V, W                            |                | 24 V (ext.)           |
|                | Rb1, Rb2 (Single Drive only)       | X3             | Analog inputs/outputs |
| X106           | Motor PTC                          | X4             | Digital outputs       |
| X107           | Control of the motor holding brake | X5             | Digital inputs        |
|                |                                    | X6             | Diagnostics           |
|                |                                    | X7             | Resolver              |
|                |                                    | X8             | Encoder               |
|                |                                    | MXI1, MXI2     | Extension module      |
|                |                                    | MMI            | Memory module         |
|                |                                    | MSI            | Safety module         |

## Example

Which type of protective insulation is used between the bus terminal of the device module in slot MXI1 or MXI2 and the mains terminal X100?

- ▶ The separate potential area with the better protective insulation is decisive.
  - The separate potential area of the bus terminal of the device module has a "functional insulation".
  - The separate potential area of the mains terminal has a "reinforced insulation".
- ▶ Result: The insulation between mains terminal X100 and the bus terminal is of the "reinforced insulation" type.

## 4.3 Dimensions



[4-2] Dimensions

## 5 Installation



### **Stop!**

#### **Electrostatic discharge**

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

#### **Possible consequences:**

- The communication module is damaged.
- Fieldbus communication is not possible or faulty.

#### **Protective measures**

- Before touching the module, be sure that you are free of electrostatic charge.

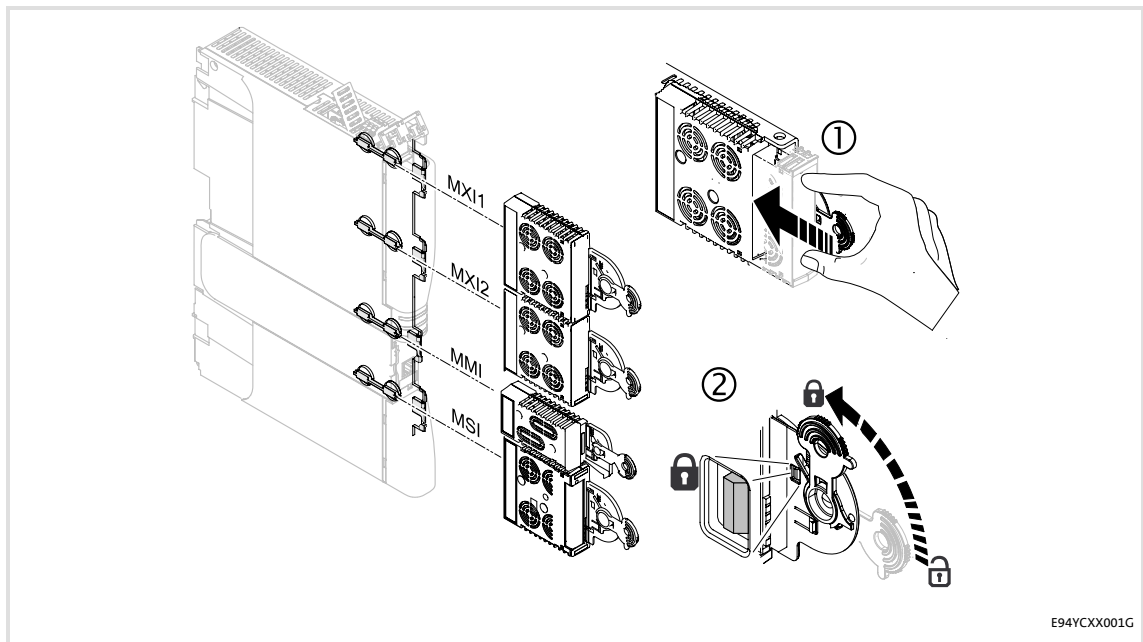
#### 5.1 Mechanical installation



#### Note!

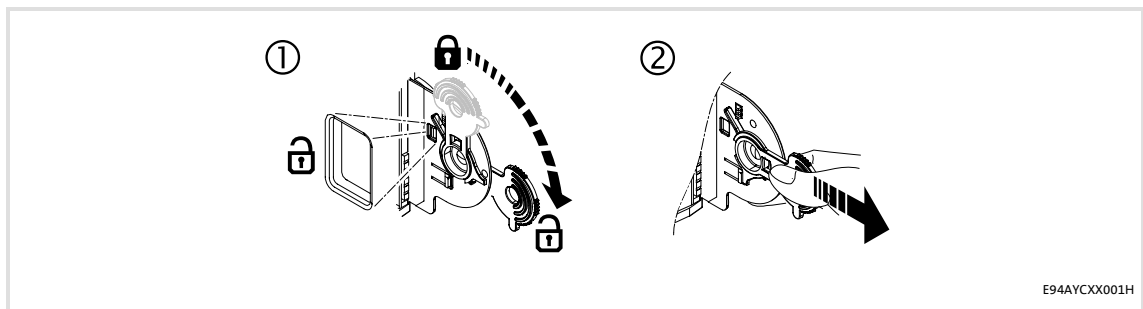
Only one Ethernet module may be attached to a Servo Drive 9400, either in module slot MXI1 or MXI2.

#### 5.1.1 Assembly



[5-1] Assembly

#### 5.1.2 Disassembly



[5-2] Disassembly

## 5.2 Electrical installation



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

Observe the notes and wiring instructions contained in this documentation.

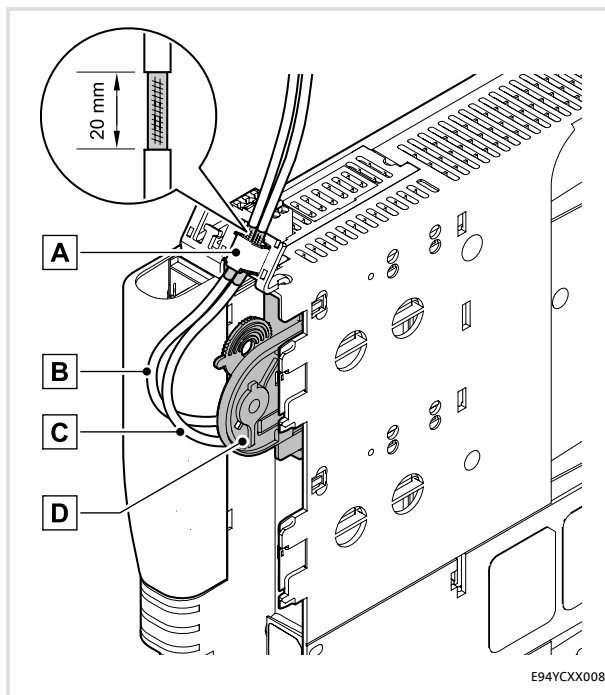
### 5.2.1 EMC-compliant wiring

In typical systems, standard shielding is sufficient for Ethernet cables.

However, in environments with a very high level of interference, EMC resistance can be improved by additionally earthing the cable shield on both sides.

For this observe the following notes:

1. The distance between the additional earthing and the Ethernet plug depends on the module slot and is as follows:
  - Approx. 10 cm for the upper slot (MXI1)
  - Approx. 20 cm for the lower slot (MXI2)
2. Measure the appropriate distance along the cable and, starting from this point, remove 2 cm of the cable's plastic sheath.
3. Fasten the cable shield onto the shield sheet of the Servo Drive 9400.



A Fastening on the shield sheet of the Servo Drive 9400

B Outgoing Ethernet cable at X216

C Incoming Ethernet cable at X215

D Communication module in slot MXI1 of the Servo Drive 9400

[5-3] EMC-compliant wiring

#### 5.2.2 Ethernet connection

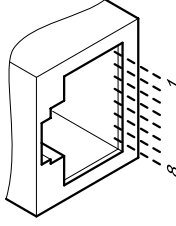
- ▶ The Ethernet connection is made via the RJ45 sockets **X215** and **X216**.
- ▶ You can use a standard Ethernet patch cable to connect the communication module to the Ethernet fieldbus.
  - ▶ [Specification of the Ethernet cable](#) (📖 23)



#### Note!

- Decouple your Ethernet house network from the system network for Ethernet-capable Lenze devices in order to prevent trouble in the Ethernet communication.  
Further information can be obtained from the "Ethernet in the industrial application" manual.
- To prevent the RJ45 socket from being damaged, hold the Ethernet cable connector straight (at a right angle) when inserting it into or removing it from the socket.

#### Pin assignment

| RJ45 socket   | Pin | Signal |
|---|-----|--------|
| <br>E94AYCXX004C | 1   | Tx +   |
|   | 2   | Tx -   |
|   | 3   | Rx +   |
|   | 4   | -      |
|   | 5   | -      |
|   | 6   | Rx -   |
|   | 7   | -      |
|   | 8   | -      |

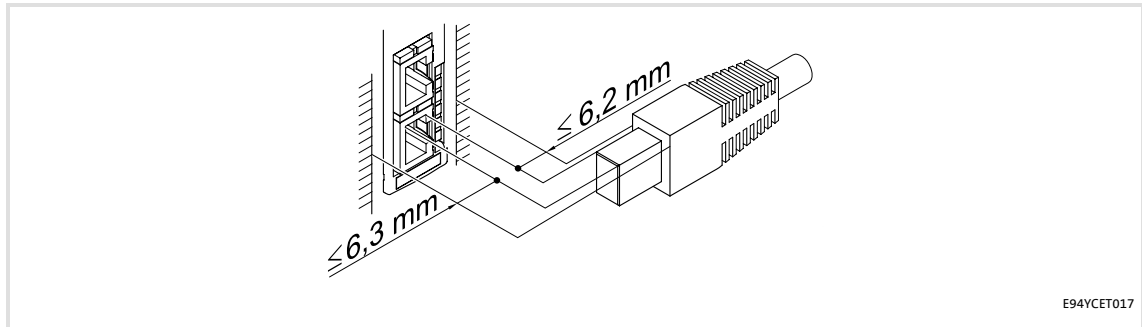


#### Tip!

The Ethernet interfaces feature an auto MDIX function. This function adjusts the polarity of the RJ45 interfaces so that a connection is established irrespective of the polarity of the opposite Ethernet interface, and irrespective of the type of cable used (standard patch cable or crossover cable).

## Free space

When ordering and using your Ethernet cable, note the amount of free space available.



[5-4] Free space

## 5.2.3 Specification of the Ethernet cable



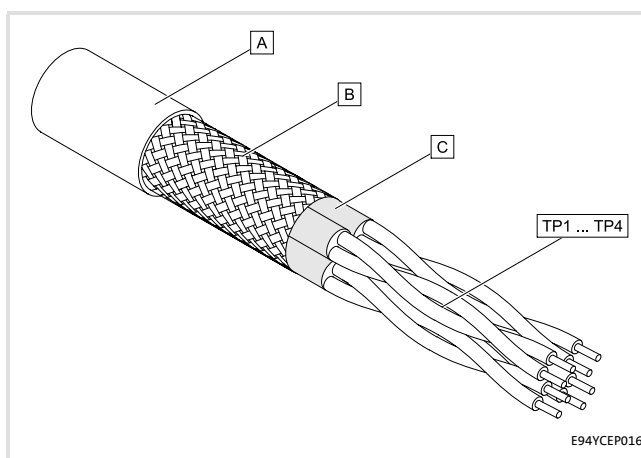
### Note!

Only use cables that meet the listed specifications.

#### Specification of the Ethernet cable

|                   |   |
|-------------------|---|
| Ethernet standard | Standard Ethernet (in accordance with IEEE 802.3), 100Base-TX (Fast Ethernet) |
| Cable type        | S/FTP (Screened Foiled Twisted Pair), ISO/IEC 11801 or EN 50173, CAT 5e       |
| Damping           | 23.2 dB (at 100 MHz and per 100 m)  |
| Crosstalk damping | 24 dB (at 100 MHz and per 100 m)  |
| Return loss       | 10 dB (per 100 m)   |
| Surge impedance   | 100 Ω   |

#### Structure of the Ethernet cable



A Cable insulation

B Braid

C Foil shield

TP1 Twisted core pairs 1 ... 4

... [▶ Colour coding of the Ethernet cable](#)

TP4 [\(24\)](#)

[5-5] Structure of the Ethernet cable (S/FTP, CAT 5e)

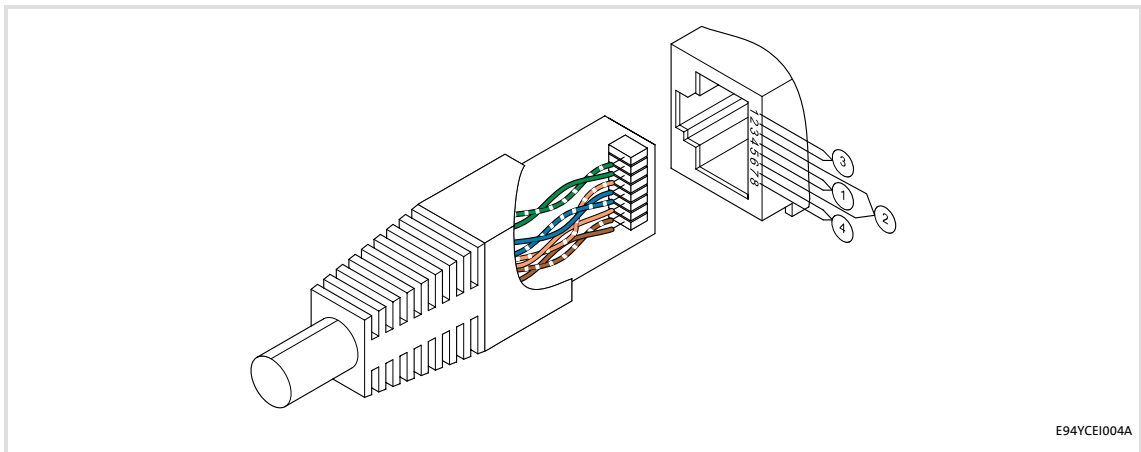
#### Colour coding of the Ethernet cable



#### Note!

Wiring and colour code are standardised in EIA/TIA 568A/568B.

In accordance with the industrial standard, the use of 4-pin Ethernet cables is permissible. The cable type only connects the assigned pins 1, 2, 3 and 6 to one another.



E94YCEI004A

[5-6] Ethernet plug in accordance with EIA/TIA 568A/568B

| Pair | Pin | Signal | EIA/TIA 568A   | EIA/TIA 568B   |
|------|-----|--------|----------------|----------------|
| 3    | 1   | Tx +   | white / green  | white / orange |
|      | 2   | Tx -   | green          | orange         |
| 2    | 3   | Rx +   | white / orange | white / green  |
| 1    | 4   |        | blue           | blue           |
|      | 5   |        | white / blue   | blue / white   |
| 2    | 6   | Rx -   | orange         | green          |
| 4    | 7   |        | white / brown  | white / brown  |
|      | 8   |        | brown          | brown          |



## 5.2.4 Voltage supply

### Internal supply

The communication module is solely supplied with voltage by the standard device.



#### **Note!**

If the standard device fails and daisy-chain wiring has been used, the transmission of data between the Ethernet nodes at interface X215 and the Ethernet nodes at interface X216 will be interrupted.

## 6 Commissioning

During commissioning, system-related data such as motor parameters, operating parameters, responses, and parameters for fieldbus communication are defined for the drive. For Lenze devices, this is done via the codes.

The codes of the drive and for communication are saved non-volatilely as a data set in the memory module.

In addition to codes for the configuration, there are codes for diagnosing and monitoring the nodes.



### Note!

When parameterising the communication module, please note that the code number depends on the slot of the Servo Drive 9400 into which the communication module is plugged.

The first two digits of the code number indicate the slot:

- C13nnn for slot MXI1
  - ▶ [Parameters of the communication module for slot MXI1](#) (📖 56)
- C14nnn for slot MXI2
  - ▶ [Parameters of the communication module for slot MXI2](#) (📖 60)

Additionally set the [Parameters of the standard device that are relevant to communication](#) (📖 54).

### 6.1 Before initial switch-on



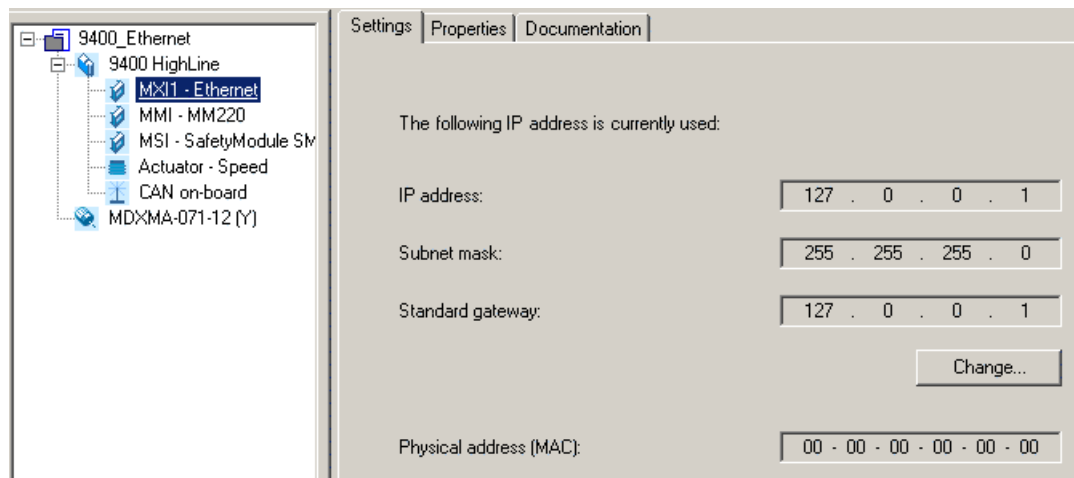
### Stop!

Before switching on the Servo Drive 9400 and the communication module for the first time, check the entire wiring for completeness, short circuit and earth fault.

## 6.2 Configuring the communication module

The address settings required for Ethernet operation are displayed in the »Engineer« in the **Settings** tab (Fig. [6-1]). The settings correspond to the values of the codes:

| Parameter              | Code                         |                              | Lenze setting     |
|------------------------|------------------------------|------------------------------|-------------------|
|                        | for slot MXI1                | for slot MXI2                |                   |
| IP address             | <a href="#">C13000/1...4</a> | <a href="#">C14000/1...4</a> | 127.0.0.1         |
| Subnet mask            | <a href="#">C13001/1...4</a> | <a href="#">C14001/1...4</a> | 255.255.255.0     |
| Standard gateway       | <a href="#">C13002/1...4</a> | <a href="#">C14002/1...4</a> | 127.0.0.1         |
| Physical address (MAC) | <a href="#">C13003/1...6</a> | <a href="#">C14003/1...6</a> | 00-00-00-00-00-00 |



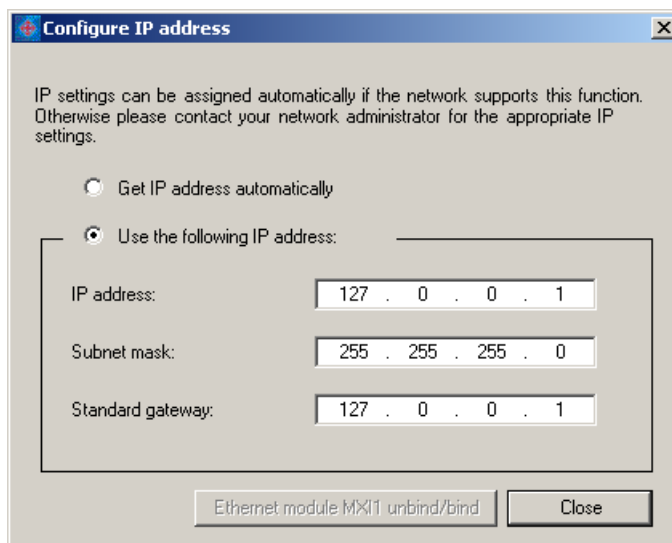
[6-1] Ethernet address settings

You can set the [IP address](#) (☞ 31), the [Subnet mask](#) (☞ 31) and the [Gateway address](#) (☞ 32) manually, but the IP address can also be received automatically from a DHCP server.

- ▶ [Setting the address](#) (☞ 28)
- ▶ [Automatically receiving an IP address](#) (☞ 29)

#### 6.2.1 Setting the address

Clicking the **Change** button in the **Settings** tab (Fig. [6-1]) opens the "Configure IP address" dialog window:



[6-2] Setting the address

In the input fields for the IP address, the subnet mask and the standard gateway, you can directly set the addresses.

Setting the standard device code **C00002** to "101: bind/unbind" or "102: bind/unbind" copies the values and writes them to the corresponding codes:

| Parameter        | Code                         |                              |
|------------------|------------------------------|------------------------------|
|                  | for slot MX11                | for slot MX12                |
| IP address       | <a href="#">C13000/1...4</a> | <a href="#">C14000/1...4</a> |
| Subnet mask      | <a href="#">C13001/1...4</a> | <a href="#">C14001/1...4</a> |
| Standard gateway | <a href="#">C13002/1...4</a> | <a href="#">C14002/1...4</a> |

The codes can also be set via the parameter list of the Servo Drive 9400 (**All parameters** tab).



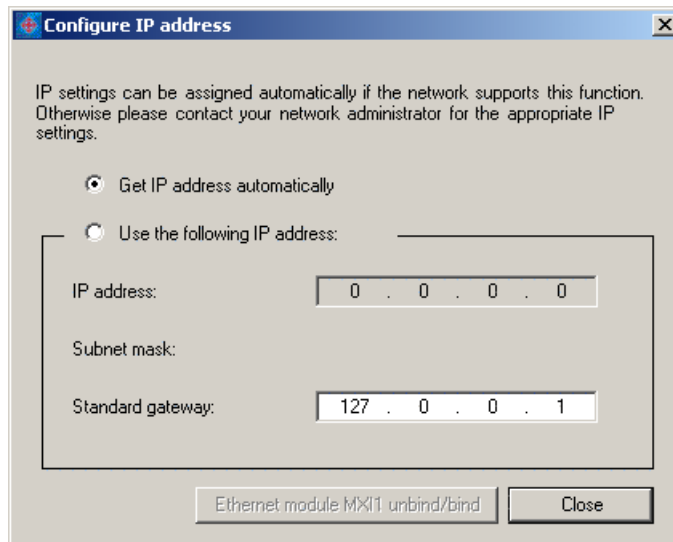
#### Tip!

You can use a ping command in the MS-DOS input window to test whether the entered IP address is valid or not.

## 6.2.2 Automatically receiving an IP address

Clicking the **Change** button in the **Settings** tab (Fig. [6-1]) opens the "Configure IP address" dialog window.

Mark "Receive IP address automatically" in order to receive an IP address automatically from the DHCP server:



[6-3] Automatically receiving an IP address

The input field for the standard gateway serves to manually enter a gateway address. By default, the current values of the corresponding codes are displayed.

Setting the standard device code **C00002** to "101: bind/unbind" or "102: bind/unbind" copies the values and writes them to the corresponding codes:

| Parameter   | Code                         |                              |
|-------------|------------------------------|------------------------------|
|             | for slot MX11                | for slot MX12                |
| IP address  | <a href="#">C13000/1...4</a> | <a href="#">C14000/1...4</a> |
| Use of DHCP | <a href="#">C13005</a>       | <a href="#">C14005</a>       |

The codes can also be set via the parameter list of the Servo Drive 9400 (**All parameters** tab).



### Note!

Observe the information given in chapter [DHCP implementation in the Servo Drive 9400](#) (p. 34).



### Tip!

You can use a ping command in the MS-DOS input window to test whether the received IP address is valid or not.

#### Output of the »Network Analyzer«

With "DHCP ACK", the DHCP server (here IP address "192.216.31.1") assigns the IP address "192.216.31.239" to the Servo Drive 9400 (DHCP client):

The screenshot displays the Network Analyzer interface with a packet capture list and detailed view of a DHCP ACK packet.

| No. | Time     | Source       | Destination     | Protocol | Info                                      |
|-----|----------|--------------|-----------------|----------|---|
| 1   | 0.000000 | 0.0.0.0      | 255.255.255.255 | DHCP     | DHCP Discover - Transaction ID 0xaa94d437 |
| 2   | 0.000123 | 192.216.31.1 | 255.255.255.255 | DHCP     | DHCP Offer - Transaction ID 0xaa94d437    |
| 3   | 0.099759 | 0.0.0.0      | 255.255.255.255 | DHCP     | DHCP Request - Transaction ID 0xaa94d437  |
| 4   | 0.099941 | 192.216.31.1 | Broadcast       | ARP      | who has 192.216.31.239? Tell 192.216.31.1 |
| 5   | 0.173662 | 192.216.31.1 | 255.255.255.255 | DHCP     | DHCP ACK - Transaction ID 0xaa94d437      |

Frame 5 (322 bytes on wire, 322 bytes captured)

- Ethernet II, Src: 00:14:22:50:de:a3, Dst: ff:ff:ff:ff:ff:ff
- Internet Protocol, Src Addr: 192.216.31.1 (192.216.31.1), Dst Addr: 255.255.255.255 (255.255.255.255)
- User Datagram Protocol, Src Port: bootps (67), Dst Port: bootpc (68)
- Bootstrap Protocol
  - Message type: Boot Reply (2)
  - Hardware type: Ethernet
  - Hardware address length: 6
  - Hops: 0
  - Transaction ID: 0xaa94d437
  - Seconds elapsed: 0
  - Bootp flags: 0x8000 (Broadcast)
  - Client IP address: 0.0.0.0 (0.0.0.0)
  - Your (client) IP address: 192.216.31.239 (192.216.31.239)**
  - Next server IP address: 0.0.0.0 (0.0.0.0)
  - Relay agent IP address: 0.0.0.0 (0.0.0.0)
  - Client hardware address: 00:0a:86:00:06:19
  - Server host name not given
  - Boot file name not given
  - Magic cookie: (OK)
  - Option 53: DHCP Message Type = DHCP ACK
  - Option 1: Subnet Mask = 255.255.255.0
  - Option 3: Router = 192.216.31.1
  - Option 58: Renewal Time value = 2 days
  - Option 59: Rebinding Time value = 2 days, 12 hours
  - Option 51: IP Address Lease Time = 3 days
  - Option 54: Server Identifier = 192.216.31.1
  - End option

Hex dump:

```
0000 ff ff ff ff ff ff 00 14 22 50 de a3 08 00 45 00 ..... "P...E.
0010 01 34 64 cc 00 00 80 11 f5 13 c0 d8 1f 01 ff ff .4d....
0020 ff ff 00 43 00 44 01 20 a0 2a 02 01 06 00 aa 94 ..C.D. .*.....
0030 d4 37 00 00 80 00 00 00 00 00 c0 d8 1f ef 00 00 .7.....
0040 00 00 00 00 00 00 00 0a 86 06 19 00 00 00 00 .....
0050 .....
```

### 6.2.3 IP address

The IP address is required for addressing the Servo Drive 9400 if communication between the PC and the controller is to be established via an Ethernet connection.

- ▶ The IP address consists of four numbers between 0 and 255 which respectively are separated from each other by a point, e. g. "192.168.10.1".
- ▶ Eight bits are reserved for each of the four numbers, which makes a total of 32 bits.
- ▶ The first one, two, or three numbers indicate the network (Net-ID), the remaining numbers indicate the host (Host-ID). The definite specification of the part that is to be evaluated as Net-ID is effected via the [Subnet mask](#) (31).

#### Codes

|                   |                          |                          |                          |                          |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Parameter (MX1):  | <a href="#">C13000/1</a> | <a href="#">C13000/2</a> | <a href="#">C13000/3</a> | <a href="#">C13000/4</a> |
| Lenze setting     | 127                      | 0                        | 0                        | 1                        |
| Parameter (MX12): | <a href="#">C14000/1</a> | <a href="#">C14000/2</a> | <a href="#">C14000/3</a> | <a href="#">C14000/4</a> |
| Lenze setting     | 127                      | 0                        | 0                        | 1                        |

### 6.2.4 Subnet mask

The subnet mask indicates which part of the IP address is evaluated as net ID or host ID.

- ▶ The subnet mask consists of four numbers which are separated by a point, e.g. "255.255.255.0".
- ▶ Eight bits are reserved for each of the four numbers, which makes a total of 32 bits.

#### Examples

1. The first three numbers of the IP address indicate the network, the last number indicates the host (Lenze setting):

|                            |        |   |     |   |     |   |         |
|----------------------------|--------|---|-----|---|-----|---|---------|
| Subnet mask:               | 255    | . | 255 | . | 255 | . | 0       |
| Subdivision of IP address: | Net ID |   |     |   |     |   | Host ID |

2. The first two numbers of the IP address indicate the network, the last two numbers indicate the host:

|                            |        |   |     |   |         |   |   |
|----------------------------|--------|---|-----|---|---------|---|---|
| Subnet mask:               | 255    | . | 255 | . | 0       | . | 0 |
| Subdivision of IP address: | Net ID |   |     |   | Host ID |   |   |

3. The first number of the IP address indicates the network, the remaining three numbers indicate the host:

|                            |        |         |   |   |   |   |   |
|----------------------------|--------|---------|---|---|---|---|---|
| Subnet mask:               | 255    | .       | 0 | . | 0 | . | 0 |
| Subdivision of IP address: | Net ID | Host ID |   |   |   |   |   |

#### Codes

Parameter (MX1): [C13001/1](#)    [C13001/2](#)    [C13001/3](#)    [C13001/4](#)  
Lenze setting **255** . **255** . **255** . **0**

Parameter (MX2): [C14001/1](#)    [C14001/2](#)    [C14001/3](#)    [C14001/4](#)  
Lenze setting **255** . **255** . **255** . **0**

#### 6.2.5 Gateway address

The gateway address is required if the Servo Drive 9400 is not located in the same subnetwork as the PC.

- ▶ The gateway address consists of four numbers between 0 and 255, separated by points, e.g. "127.0.0.0".
- ▶ Eight bits are reserved for each of the four numbers, which makes a total of 32 bits.

#### Codes

Parameter (MX1): [C13002/1](#)    [C13002/2](#)    [C13002/3](#)    [C13002/4](#)  
Lenze setting **127** . **0** . **0** . **1**

Parameter (MX2): [C14002/1](#)    [C14002/2](#)    [C14002/3](#)    [C14002/4](#)  
Lenze setting **127** . **0** . **0** . **1**

#### 6.2.6 MAC-ID

The MAC-ID is a globally unique identifier of an Ethernet-capable device. The MAC-ID is assigned by the manufacturer and permanently burnt into the device (Lenze communication module).

- ▶ The MAC-ID consists of six hexadecimal numerical codes (00 ... FF) which respectively are separated from each other by a hyphen, e. g. "00-0A-86-00-00-0A".
- ▶ Eight bits are reserved for each one of the six numerical codes, which makes a total 48 bits.
- ▶ The MAC-ID consists of the manufacturer's identification mark and a running number which is clearly assigned by the manufacturer.



## Display of the MAC-ID

The MAC-ID of the communication module is displayed in [C13003/C14003](#):

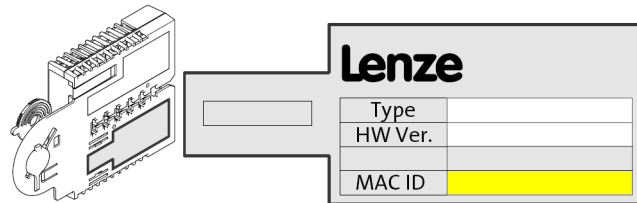
|                   |  |                          |                          |                             |                          |                          |
|-------------------|--|--------------------------|--------------------------|-----------------------------|--------------------------|--------------------------|
| Parameter (MXI1): | <a href="#">C13003/1</a>                   | <a href="#">C13003/2</a> | <a href="#">C13003/3</a> | <a href="#">C13003/4</a>    | <a href="#">C13003/5</a> | <a href="#">C13003/6</a> |
| Display [hex]:    | 00   | 0A                       | 86                       | xx                          | xx                       | xx                       |
|                   | Manufacturer's identification mark (Lenze) |                          |                          | Consecutive definite number |                          |                          |

|                   |  |                          |                          |                             |                          |                          |
|-------------------|--|--------------------------|--------------------------|-----------------------------|--------------------------|--------------------------|
| Parameter (MXI2): | <a href="#">C14003/1</a>                   | <a href="#">C14003/2</a> | <a href="#">C14003/3</a> | <a href="#">C14003/4</a>    | <a href="#">C14003/5</a> | <a href="#">C14003/6</a> |
| Display [hex]:    | 00   | 0A                       | 86                       | xx                          | xx                       | xx                       |
|                   | Manufacturer's identification mark (Lenze) |                          |                          | Consecutive definite number |                          |                          |



**Tip!**

The MAC ID is also entered in the nameplate of the communication module:



## 6.3 DHCP implementation in the Servo Drive 9400

DHCP is the acronym for "Dynamic Host Configuration Protocol". This protocol is defined in RFC 2131 and is an advancement on BOOTP (RFC 951). DHCP enables computers to query information about the network configuration (e.g. IP address) from a server via a TCP/IP network. The DHCP server assigns the IP address to the client dynamically, from a defined address range. This means that the client always receives a new, but unique IP address.

DHCP is implemented in the firmware (program organisation unit RTCS). The following chapter describes how the Servo Drive 9400 receives an IP address via DHCP.

### DHCP code

For standard devices from version **V03.xx.xx.xx**, the DHCP codes [C13005](#) and [C14005](#) are available. These codes can be used to define whether DHCP is to be used or not:

- ▶ Value 0 (FALSE): Do not use DHCP (Lenze setting)
- ▶ Value 1 (TRUE): Use DHCP

### DHCP flag settings

- ▶ *UseIPfromDhcp* = TRUE (Use DHCP):  
The IP settings are assigned by the DHCP server.
- ▶ *UseIPfromDhcp* = FALSE (Do not use DHCP):  
The IP settings are assigned manually.

### 6.3.1 Basic terms

#### DHCP client

TCP/IP stack of a host. Network node that makes DHCP requests and is configured.

#### DHCP server

Network node that waits for DHCP requests and responds to them.

#### Lease time

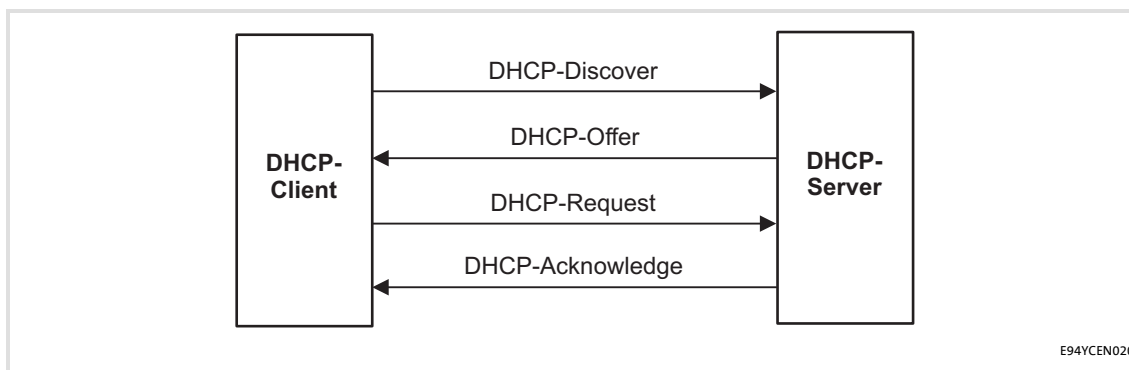
Service life of the assigned IP address. After this period expires, the IP address will be invalid. If it still needs to be used after this period, the lease time must be extended.

### 6.3.2 DHCP network architecture

| Data relating to the DHCP network architecture |  |
|--|--|
| DHCP model                                     | Client/Server  |
| Transport protocol                             | UDP  |
| Ports  | Server - UDP port 67<br>Client - UDP port 68                                       |
| DHCP packet size                               | 576 bytes  |
| Compatibility                                  | DHCP is an advancement on BOOTP, so the DHCP server can also manage BOOTP clients. |

### 6.3.3 DHCP operating mode

DHCP is a client-server architecture. The DHCP server has access to a pool of IP addresses, which it can freely assign to the DHCP clients. For larger networks, the DHCP server also needs to know which subnetworks and gateways are available.



[6-4] DHCP operating mode

- ▶ In the first step, the client transmits a "DHCP discover broadcast", which searches for the server.
- ▶ The server responds to the client with a "DHCP offer" (unicast). This message contains the IP address, subnet mask, lease time and other information for the client.
- ▶ The client then accepts this data and reports this situation to the server by means of a "DHCP request" message.
- ▶ The server completes the DHCP configuration with a "DHCP acknowledge" message. This message contains the server IP address, client IP address, lease time, subnet mask and other configuration information.

#### 6.3.4 DHCP packet structure

The DHCP packets have the following structure:

| Bit 1 ... 8        | Bit 9 ... 16   | Bit 17 ... 24   | Bit 25 ... 32 |
|--------------------|----------------|-----------------|---------------|
| op (1 byte)        | htype (1 byte) | hlen (1 byte)   | hops (1 byte) |
| xid (4 bytes)      |                |                 |               |
| secs (2 bytes)     |                | flags (2 bytes) |               |
| ciaddr (4 bytes)   |                |                 |               |
| yiaddr (4 bytes)   |                |                 |               |
| siaddr (4 bytes)   |                |                 |               |
| giaddr (4 bytes)   |                |                 |               |
| chaddr (4 bytes)   |                |                 |               |
| sname (4 bytes)    |                |                 |               |
| file (4 bytes)     |                |                 |               |
| options (variable) |                |                 |               |

Description of the fields:

| Field   | Size                    | Description  |
|---------|-------------------------|--|
| op      | 1 Byte                  | <b>Opcode:</b> Task carried out by the DHCP packet <ul style="list-style-type: none"> <li>Indicates a client request or a server response.</li> </ul>  |
| htype   | 1 Byte                  | <b>Hardware type:</b> Specification of the network topology <ul style="list-style-type: none"> <li>Examples: 1 for Ethernet, 15 for Frame Relay (specification in RFC 1700)</li> </ul>   |
| hlen    | 1 Byte                  | <b>Hardware address length:</b> Length of the hardware address in the "chaddr" (client hardware address) field   |
| hops    | 1 Byte                  | <b>Hop count:</b> Number of routers / gateways between the client and the server   |
| xid     | 4 bytes                 | <b>Transaction ID:</b> Unique identifier generated by the client <ul style="list-style-type: none"> <li>This is required in order to assign a DHCP response to the corresponding DHCP request.</li> </ul>  |
| secs    | 2 bytes                 | <b>Number of seconds:</b> Time in seconds that has elapsed since the DHCP process began  |
| flags   | 2 bytes                 | <b>Flags:</b> The first bit is used as a broadcast flag. All other flags are reserved for later use (status = 0).  |
| ciaddr  | 4 bytes                 | <b>Client IP address:</b> Most recently used client IP address <ul style="list-style-type: none"> <li>This is only used in a client DHCP request.</li> </ul>   |
| yiadr   | 4 bytes                 | <b>Your IP address:</b> IP address assigned to the client by the server <ul style="list-style-type: none"> <li>This is only used in a server DHCP response.</li> </ul>   |
| siaddr  | 4 bytes                 | <b>Server IP address:</b> IP address of the server <ul style="list-style-type: none"> <li>This is only used in a server DHCP response.</li> </ul>  |
| giaddr  | 4 bytes                 | <b>Gateway IP address:</b> This field enables the client to communicate with servers in other DHCP subnetworks. <ul style="list-style-type: none"> <li>IP address "0.0.0.0" in a client request</li> <li>A DHCP relay agent enters its IP address here.</li> </ul> |
| chaddr  | 4 bytes                 | <b>Client hardware address:</b> MAC address of the client  |
| sname   | 4 bytes                 | <b>Server host name:</b> This field is optional and can contain the server name.   |
| file    | 4 bytes                 | <b>Boot filename:</b> The client defines the full path for its boot file here.   |
| options | Variable (1 to 4 bytes) | <b>Options:</b> This field contains additional information for the client. <ul style="list-style-type: none"> <li>The specification of the DHCP message type, for example, is very important.</li> <li>Defined in full in RFC 2132</li> </ul>                      |

## 6.4 Initial switch-on

**Documentation for the standard device**

Observe the safety instructions and information on residual hazards.

**Note!****Activate changed settings**

To activate changed settings ...

- execute the device command "11: Save start parameters" via standard device code **C00002** and ...
- then reset the bus node or switch off and on again the voltage supply of the communication module.

**Protection against uncontrolled restart**

After a fault (e.g. short-term mains failure), it is sometimes undesirable or even impermissible for the drive to restart.

In the Lenze setting of Servo Drives 9400, the restart protection is activated.

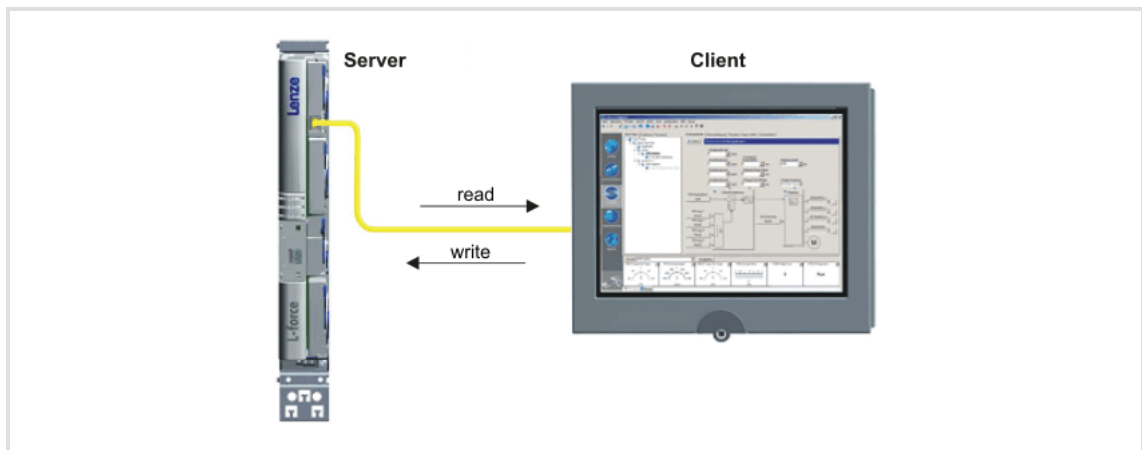
The restart behaviour of the controller can be set using **C00142** ("Auto-restart following mains connection"):

- **C00142 = "0: Inhibited"** (Lenze setting)
  - The drive remains inhibited (even if the fault is no longer active).
  - An explicit controller enable causes the drive to start up in a controlled manner: LOW-HIGH edge at digital input X5/RFR.
- **C00142 = "1: Enabled"**
  - An uncontrolled restart of the drive is possible.

### 7 Parameter data transfer

The PC (client) used for setting parameters and the controller (server) communicate with one another by exchanging data telegrams via the Ethernet. The parameter data are contained in the user data area of the data telegram.

- ▶ Parameters are set, for instance, when the system is initially adjusted during commissioning or when the material of the production machine is changed.
- ▶ The parameter data are transmitted as SDOs (Service Data Objects) and confirmed by the receiver, i.e. the transmitter receives a feedback whether the transmission was successful.  
The SDOs provide for the write and read access to the object directory in the controller.
- ▶ The transmission of the parameter data usually is not time-critical.
- ▶ The parameter data are saved in Lenze devices as "codes".  
Via the codes, for instance operating parameters, motor data or diagnostics information can be set.



[7-1] Data communication according to the client/server model



#### Note!

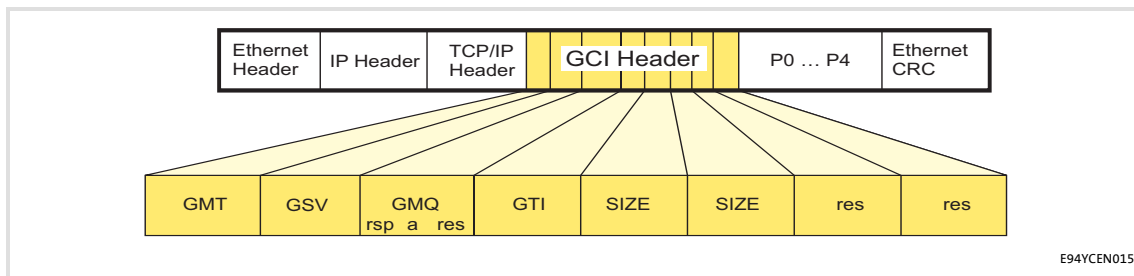
With regard to the writing access on parameter data, observe that the changes carried out are not stored automatically in the controller.

In order to save changed parameter settings with mains failure protection, carry out the device command **C0002 = "11: Save start parameters"**.

## 7.1 Structure of the Ethernet data telegram

The GCI protocol is used for communication.

The Ethernet data telegram is shown below. Here, the GCI header represents the part of the program that is independent of the type of command transmitted.



[7-2] Structure of the GCI header within the Ethernet frame

| Field  | Size    | Description   |       |                 |                 |     |   |     |
|--|---------|---|-------|-----------------|-----------------|-----|---|-----|
| GMT  | 1 Byte  | GCI message type  |       |                 |                 |     |   |     |
|  |         | 0x01 Reserved   |       |                 |                 |     |   |     |
| GSV  | 1 Byte  | GCI service identification  |       |                 |                 |     |   |     |
|  |         | 0x82 Reading parameters   |       |                 |                 |     |   |     |
|  |         | 0x83 Writing parameters   |       |                 |                 |     |   |     |
| GMQ  | 1 Byte  | GCI message qualifier   |       |                 |                 |     |   |     |
|  |         | <table border="1"> <tr> <td>Bit 7</td> <td>Bit 6</td> <td>Bit 5 ... Bit 0</td> </tr> <tr> <td>rsp</td> <td>a</td> <td>res</td> </tr> </table>   | Bit 7 | Bit 6           | Bit 5 ... Bit 0 | rsp | a | res |
|  |         | Bit 7   | Bit 6 | Bit 5 ... Bit 0 |                 |     |   |     |
|  |         | rsp   | a     | res             |                 |     |   |     |
| rsp Request/response (1 bit)<br>0: request<br>1: response                  |         |   |       |                 |                 |     |   |     |
| a Abort (1 bit)<br>0: data transmission ok<br>1: data transmission aborted |         |   |       |                 |                 |     |   |     |
| GTI  | 1 Byte  | GCI transaction ID  |       |                 |                 |     |   |     |
|  |         | 0x00 Serial number (transaction identification)   |       |                 |                 |     |   |     |
|  |         | 0xFF<br><ul style="list-style-type: none"> <li>For each client a definite serial number (0 ... 255) is allocated.</li> <li>The serial number in the multitasking environment is used for referencing to the calling tasks (reverse transaction).</li> </ul> |       |                 |                 |     |   |     |
| SIZE   | 2 bytes | User data length (P0, P1, P2, P3, P4)   |       |                 |                 |     |   |     |
|  |         | 0x14 20 bytes   |       |                 |                 |     |   |     |
|  |         | ... ...   |       |                 |                 |     |   |     |
|  |         | 0x114 276 bytes   |       |                 |                 |     |   |     |
| res  | 2 bytes | Reserved  |       |                 |                 |     |   |     |
|  |         | 0x0000 Data contents = 0  |       |                 |                 |     |   |     |

# E94AYCEN communication manual (Ethernet)

Parameter data transfer

Reading parameters from the controller

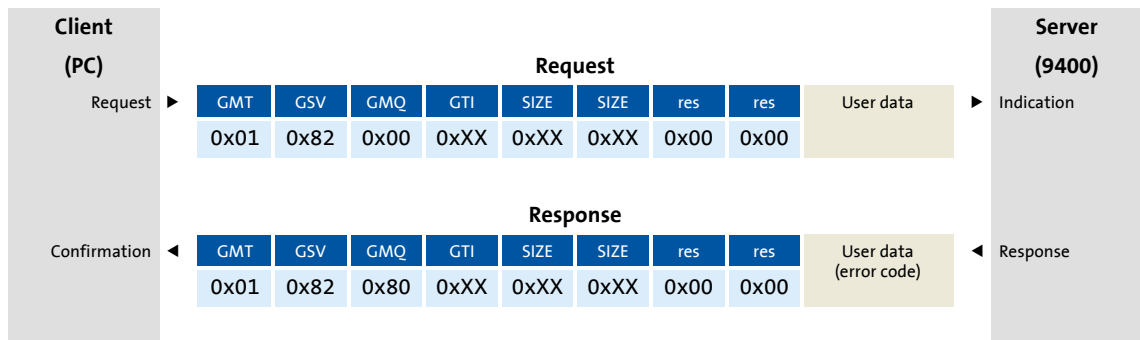


**Tip!**

The GCI header will be described in greater detail during the course of this manual. The other signals refer to the transfer characteristics of the Ethernet telegram, which are not described in this documentation.

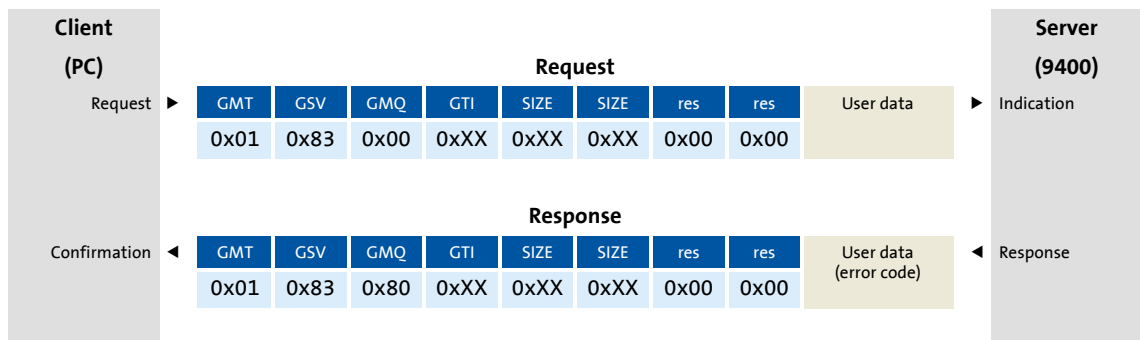
## 7.2 Reading parameters from the controller

With the service identification (GSV) = 0x82 in the GCI header parameter data can be read from the controller:



## 7.3 Writing parameters to the controller

With the service identification (GSV) = 0x83 in the GCI header parameter data can be written to the controller:





## 7.4 Assignment of user data areas P0 ... P4

| Area | Byte 1            | Byte 2 | Byte 3    | Byte 4    |
|------|-------------------|--------|-----------|-----------|
| P0   | Status/error code |        | Data type | Reserved  |
| P1   | Code              |        | Reserved  | Reserved  |
| P2   | Subcode           |        | Reserved  | Reserved* |
| P3   | Parameter value   |        |           |           |
| P4   | Parameter value   |        |           |           |

\* When the data type VISIBLE\_STRING is transmitted, byte 4 contains the number of the characters attached.

### Data type in P0 / byte 3

| ID   | Data type      | Data length      |
|------|----------------|------------------|
| 0x01 | INTEGER_8      | 1 byte           |
| 0x02 | INTEGER_16     | 2 bytes          |
| 0x03 | INTEGER_32     | 4 bytes          |
| 0x04 | INTEGER_64     | 8 bytes          |
| 0x05 | UNSIGNED_8     | 1 byte           |
| 0x06 | UNSIGNED_16    | 2 bytes          |
| 0x07 | UNSIGNED_32    | 4 bytes          |
| 0x08 | UNSIGNED_64    | 8 bytes          |
| 0x09 | FLOATING_POINT | 4 bytes          |
| 0x0A | VISIBLE_STRING | 256 bytes (max.) |
| 0x0B | OCTET_STRING   | 256 bytes (max.) |
| 0x0C | BITFIELD_8     | 1 byte           |
| 0x0D | BITFIELD_16    | 2 bytes          |
| 0x0E | BITFIELD_32    | 4 bytes          |
| 0x0F | FIXPOINT_16    | 2 bytes          |
| 0x10 | FIXPOINT_32    | 4 bytes          |

# E94AYCEN communication manual (Ethernet)

Parameter data transfer  
Transmission abort

## Assignment of the User data area with parameter values of different data lengths

Depending on the data format, the parameter value occupies 1 to 8 bytes. Data are stored in little-endian format, i.e. first the low byte or low word, then the high byte or high word:

| Data length | Data area P3            |           |           |           | Data area P4             |           |           |           |
|-------------|-------------------------|-----------|-----------|-----------|--------------------------|-----------|-----------|-----------|
|             | Byte 1                  | Byte 2    | Byte 3    | Byte 4    | Byte 1                   | Byte 2    | Byte 3    | Byte 4    |
| 1 byte      | Value                   | 00        | 00        | 00        | 00                       | 00        | 00        | 00        |
| 2 bytes     | Low byte                | High byte | 00        | 00        | 00                       | 00        | 00        | 00        |
|             | Value                   |           |           |           |                          |           |           |           |
| 4 bytes     | Double word             |           |           |           | 00                       | 00        | 00        | 00        |
|             | Low word                |           | High word |           |                          |           |           |           |
|             | Low byte                | High byte | Low byte  | High byte |                          |           |           |           |
|             | Value                   |           |           |           |                          |           |           |           |
| 8 bytes     | Lower-order double word |           |           |           | Higher-order double word |           |           |           |
|             | Low word                |           | High word |           | Low word                 |           | High word |           |
|             | Low byte                | High byte | Low byte  | High byte | Low byte                 | High byte | Low byte  | High byte |
|             | Value                   |           |           |           |                          |           |           |           |

## 7.5 Transmission abort

The transmission is either aborted by the client or the server of a parameter data telegram. The message is aborted without confirmation. If the SDO client awaits the message to be confirmed, it will receive an abort message instead.

## 7.6 Error codes

The error code is located in the User data area P0, byte 1 and byte 2.

| User data area P0         |           |           |          |
|---------------------------|-----------|-----------|----------|
| Byte 1                    | Byte 2    | Byte 3    | Byte 4   |
| Error code                |           | Data type | Reserved |
| Example error code 0x9002 |           |           |          |
| Low byte                  | High byte |           |          |
| 0x02                      | 0x90      |           |          |



### Note!

The other user data contents correspond to those of an error-free message.

### Possible error codes

| Error code<br>dec | hex    | Definition                         | Description   |
|-------------------|--------|------------------------------------|---|
|                   |        |                                    |   |
| 33805             | 0x840D | FB not found                       | Function block not found  |
| 33812             | 0x8414 | Invalid size                       | Invalid parameter format  |
| 33813             | 0x8415 | Not in select list                 | Parameter is not in the selection list  |
| 33814             | 0x8416 | Read not allowed                   | Parameter read is not allowed   |
| 33815             | 0x8417 | Write not allowed                  | Parameter write is not allowed  |
| 33816             | 0x8418 | CINH not set                       | Controller inhibit is not set   |
| 33817             | 0x8419 | PLC not stopped                    | The PLC is not in the "Stopped" status  |
| 33828             | 0x8424 | Invalid index                      | Invalid parameter index   |
| 33829             | 0x8425 | Invalid subindex                   | Invalid parameter subindex  |
| 33837             | 0x842D | Access not allowed                 | Parameter access not allowed  |
| 33848             | 0x8438 | Invalid length                     | Invalid parameter length  |
| 33862             | 0x8446 | Unallowed characters               | Parameter contains invalid characters   |
| 33865             | 0x8449 | No array parameter                 | Parameter is no array parameter   |
| 33874             | 0x8452 | Invalid select index               | Invalid selection index   |
| 36866             | 0x9002 | No memory available                | No more memory available  |
| 36867             | 0x9003 | No TID available                   | No transaction ID (TID) available anymore for identifying the telegram. TIDs are released again after receiving a reply with the corresponding TID. |
| 36868             | 0x9004 | Channel init error                 | General error when opening the communication channel  |
| 36869             | 0x9005 | Error if not connected             | No connection could be established.   |
| 36870             | 0x9006 | Error of send function             | Error when sending a GCI telegram   |
| 36871             | 0x9007 | Error of receive function          | Error when receiving a GCI telegram   |
| 36872             | 0x9008 | Timeout error of msg wait function | No reply could be received to a request within the timeout.   |

# E94AYCEN communication manual (Ethernet)

Parameter data transfer

Error codes

| Error code |        | Definition              | Description   |
|------------|--------|-------------------------|---|
| dec        | hex    |                         |   |
| 36873      | 0x9009 | Wrong GMT received      | The general telegram identification does not correspond to the GCI communication. |
| 36874      | 0x900A | Unknown server request  | Internal error in the GCI   |
| 36875      | 0x900B | Wrong server parameter  |   |
| 36876      | 0x900C | Server queue is full    |   |
| 36877      | 0x900D | SRV send error          |   |
| 36878      | 0x900E | SRV timeout             |   |
| 36879      | 0x900F | Wrong client parameter  |   |
| 36880      | 0x9010 | Wrong channel number    |   |
| 36881      | 0x9011 | TX conversion error     |   |
| 36882      | 0x9012 | RX conversion error     |   |
| 36883      | 0x9013 | Retry number abort      |   |
| 36884      | 0x9014 | Unknown client response |   |

## 7.7 Telegram examples

### 7.7.1 Example 1: Querying the heatsink temperature (read request)

The heatsink temperature of the controller is to be read.

- ▶ Code to be read: C00061
- ▶ Assumption:  $\vartheta = 43^{\circ}\text{C}$

#### Request

- ▶ SDO command (GSV) = 0x82 = "Read parameter"
- ▶ GCI message qualifier (GMQ) = 0x00 = 00000000B = "Request"
- ▶ Transaction ID (GTI) here "0" (optional consecutive number 0 ... 255)
- ▶ Length of the user data (SIZE) = 0x0014 = 20 bytes

| GCI header |                    |         |                 |                                    |      |          |      |
|------------|--------------------|---------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ     | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x82               | 0x00    | 0x00            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Reading parameters | Request | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |          |                           |          |
|-------------------|----------|---------------------------|----------|
| Byte 1            | Byte 2   | Byte 3                    | Byte 4   |
| Reserved          | Reserved | Data type                 | Reserved |
| 0x00              | 0x00     | 0x00                      | 0x00     |
|                   |          | Optional for read request |          |

| User data area P1  |        |          |          | User data area P2 |        |          |          |
|--------------------|--------|----------|----------|-------------------|--------|----------|----------|
| Byte 1             | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3   | Byte 4   |
| Code               |        | Reserved | Reserved | Subcode           |        | Reserved | Reserved |
| 0x3D               | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00     | 0x00     |
| Code = 61 = 0x003D |        |          |          | Subcode = 0       |        |          |          |

| User data area P3 |        |        |        | User data area P4 |        |        |        |
|-------------------|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1            | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Reserved          |        |        |        | Reserved          |        |        |        |
| 0x00              | 0x00   | 0x00   | 0x00   | 0x00              | 0x00   | 0x00   | 0x00   |

# E94AYCEN communication manual (Ethernet)

Parameter data transfer

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## Response

GCI message qualifier (GMQ) = 0x80 = 10000000B = "Response"

| GCI header |                    |          |                 |                                    |      |          |      |
|------------|--------------------|----------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ      | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x82               | 0x80     | 0x00            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Reading parameters | Response | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |          |            |          |
|-------------------|----------|------------|----------|
| Byte 1            | Byte 2   | Byte 3     | Byte 4   |
| Reserved          | Reserved | Data type  | Reserved |
| 0x00              | 0x00     | 0x03       | 0x00     |
|                   |          | INTEGER_32 |          |

| User data area P1  |        |          |          | User data area P2 |        |          |          |
|--------------------|--------|----------|----------|-------------------|--------|----------|----------|
| Byte 1             | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3   | Byte 4   |
| Code               |        | Reserved | Reserved | Subcode           |        | Reserved | Reserved |
| 0x3D               | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00     | 0x00     |
| Code = 61 = 0x003D |        |          |          | Subcode = 0       |        |          |          |

| User data area P3                       |        |        |        | User data area P4 |        |        |        |
|---|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1                                  | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Parameter value of data type INTEGER_32 |        |        |        | Reserved          |        |        |        |
| 0x00                                    | 0x00   | 0x00   | 0x2B   | 0x00              | 0x00   | 0x00   | 0x00   |
| Read value = 0x0000002B = 43 [°C]       |        |        |        |                   |        |        |        |

## 7.7.2 Example 2: Querying the firmware product type (read request)

The firmware product type of the controller is to be read.

- ▶ Code to be read: C00200
- ▶ Assumption: product type = "E94AFH"

### Request

- ▶ SDO command (GSV) = 0x82 = "Read parameter"
- ▶ GCI message qualifier (GMQ) = 0x00 = 00000000B = "Request"
- ▶ Transaction ID (GTI) here "1" (optional consecutive number 0 ... 255)
- ▶ Length of the user data (SIZE) = 0x0014 = 20 bytes

| GCI header |                    |         |                 |                                    |      |          |      |
|------------|--------------------|---------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ     | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x82               | 0x00    | 0x01            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Reading parameters | Request | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |          |                           |          |
|-------------------|----------|---------------------------|----------|
| Byte 1            | Byte 2   | Byte 3                    | Byte 4   |
| Reserved          | Reserved | Data type                 | Reserved |
| 0x00              | 0x00     | 0x00                      | 0x00     |
|                   |          | Optional for read request |          |

| User data area P1   |        |          |          | User data area P2 |        |          |          |
|---------------------|--------|----------|----------|-------------------|--------|----------|----------|
| Byte 1              | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3   | Byte 4   |
| Code                |        | Reserved | Reserved | Subcode           |        | Reserved | Reserved |
| 0xC8                | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00     | 0x00     |
| Code = 200 = 0x00C8 |        |          |          | Subcode = 0       |        |          |          |

| User data area P3 |        |        |        | User data area P4 |        |        |        |
|-------------------|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1            | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Reserved          |        |        |        | Reserved          |        |        |        |
| 0x00              | 0x00   | 0x00   | 0x00   | 0x00              | 0x00   | 0x00   | 0x00   |

## Response

GCI message qualifier (GMQ) = 0x80 = 10000000B = "Response"

| GCI header |                    |          |                 |                                    |      |          |      |
|------------|--------------------|----------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ      | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x82               | 0x80     | 0x01            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Reading parameters | Response | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |          |                |          |
|-------------------|----------|----------------|----------|
| Byte 1            | Byte 2   | Byte 3         | Byte 4   |
| Reserved          | Reserved | Data type      | Reserved |
| 0x00              | 0x00     | 0x0A           | 0x00     |
|                   |          | VISIBLE_STRING |          |

| User data area P1   |        |          |          | User data area P2 |        |                                   |                  |
|---------------------|--------|----------|----------|-------------------|--------|-----------------------------------|------------------|
| Byte 1              | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3                            | Byte 4           |
| Code                |        | Reserved | Reserved | Subcode           |        | Reserved                          | Character length |
| 0xC8                | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00                              | 0x07             |
| Code = 200 = 0x00C8 |        |          |          | Subcode = 0       |        | Number of the characters attached |                  |

| User data area P3 |        |        |        | User data area P4 |        |        |        |
|-------------------|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1            | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Reserved          |        |        |        | Reserved          |        |        |        |
| 0x00              | 0x00   | 0x00   | 0x00   | 0x00              | 0x00   | 0x00   | 0x00   |



### Note!

The parameter value read ("E94AFH") of data type VISIBLE\_STRING follows subsequent to the standard data area.



## 7.7.3 Example 3: Setting the deceleration time for quick stop (QSP) (write request)

The deceleration time for quick stop (QSP) is to be set to 50 ms in the controller.

- ▶ Code to be written: C00105

### Request

- ▶ SDO command (GSV) = 0x83 = "Write parameter"
- ▶ GCI message qualifier (GMQ) = 0x00 = 00000000B = "Request"
- ▶ Transaction ID (GTI) here "42" (optional consecutive number 0 ... 255)
- ▶ Length of the user data (SIZE) = 0x0014 = 20 bytes

| GCI header |                    |         |                 |                                    |      |          |      |
|------------|--------------------|---------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ     | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x83               | 0x00    | 0x2A            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Writing parameters | Request | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |           |             |          |
|-------------------|-----------|-------------|----------|
| Byte 1            | Byte 2    | Byte 3      | Byte 4   |
| Reserved          | Data type | Reserved    | Reserved |
| 0x00              | 0x00      | 0x07        | 0x00     |
|                   |           | UNSIGNED_32 |          |

| User data area P1   |        |          |          | User data area P2 |        |          |          |
|---------------------|--------|----------|----------|-------------------|--------|----------|----------|
| Byte 1              | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3   | Byte 4   |
| Code                |        | Reserved | Reserved | Subcode           |        | Reserved | Reserved |
| 0x69                | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00     | 0x00     |
| Code = 105 = 0x0069 |        |          |          | Subcode = 0       |        |          |          |

| User data area P3   |        |        |        | User data area P4 |        |        |        |
|---|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1  | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Parameter value of data type UNSIGNED_32                            |        |        |        | Reserved          |        |        |        |
| 0x32  | 0x00   | 0x00   | 0x00   | 0x00              | 0x00   | 0x00   | 0x00   |
| Value to be written = 0.05 [s] x 1000 (internal factor) = 50 = 0x32 |        |        |        |                   |        |        |        |

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## Response

GCI message qualifier (GMQ) = 0x80 = 10000000B = "Response"

| GCI header |                    |          |                 |                                    |      |          |      |
|------------|--------------------|----------|-----------------|------------------------------------|------|----------|------|
| GMT        | GSV                | GMQ      | GTI             | SIZE                               | SIZE | res      | res  |
| 0x01       | 0x83               | 0x80     | 0x2A            | 0x14                               | 0x00 | 0x00     | 0x00 |
| Fixed      | Writing parameters | Response | Transactions ID | Length of the user data = 20 bytes |      | Reserved |      |

| User data area P0 |           |             |          |
|-------------------|-----------|-------------|----------|
| Byte 1            | Byte 2    | Byte 3      | Byte 4   |
| Reserved          | Data type | Reserved    | Reserved |
| 0x00              | 0x00      | 0x07        | 0x00     |
|                   |           | UNSIGNED_32 |          |

| User data area P1   |        |          |          | User data area P2 |        |          |          |
|---------------------|--------|----------|----------|-------------------|--------|----------|----------|
| Byte 1              | Byte 2 | Byte 3   | Byte 4   | Byte 1            | Byte 2 | Byte 3   | Byte 4   |
| Code                |        | Reserved | Reserved | Subcode           |        | Reserved | Reserved |
| 0x69                | 0x00   | 0x00     | 0x00     | 0x00              | 0x00   | 0x00     | 0x00     |
| Code = 105 = 0x0069 |        |          |          | Subcode = 0       |        |          |          |

| User data area P3                        |        |        |        | User data area P4 |        |        |        |
|--|--------|--------|--------|-------------------|--------|--------|--------|
| Byte 1                                   | Byte 2 | Byte 3 | Byte 4 | Byte 1            | Byte 2 | Byte 3 | Byte 4 |
| Parameter value of data type UNSIGNED_32 |        |        |        | Reserved          |        |        |        |
| 0x32                                     | 0x00   | 0x00   | 0x00   | 0x00              | 0x00   | 0x00   | 0x00   |
| Written value (reflected)                |        |        |        |                   |        |        |        |

## 8 Diagnostics

The LEDs on the front of the Ethernet module are used to diagnose faults.

Furthermore, the »Engineer« indicates via codes [C13006](#) and [C14006](#) if an error has occurred during Ethernet communication or if a telegram has been lost.



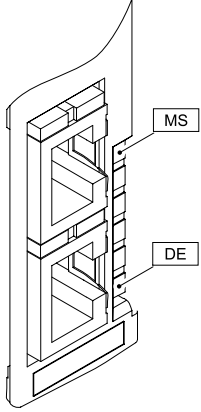
### Note!

LED status displays for trouble-free operation:

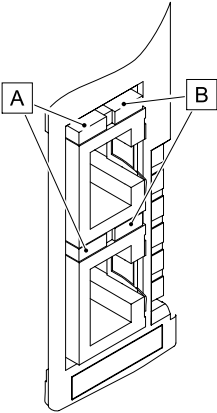
- The **MS** LED is constantly lit.
- At the RJ45 sockets **X215** and **X216**, the green LEDs are lit and the yellow LEDs are lit or flickering.

## 8.1 LED status displays

### ► MS and DE status displays

| LEDs   | Pos. | Colour | Status | Description   |
|--|------|--------|--------|---|
|  <p style="text-align: center;">E94YCEN001B</p> | MS   | Green  | On     | The communication module is supplied with voltage.  |
|  | DE   | Red    | On     | The communication module is not accepted by the standard device. (See notes provided in the documentation for the standard device.) |

### ► Status display at X215 and X216

| LEDs   | Pos. | Colour | Status           | Description                               |
|--|------|--------|------------------|---|
|  <p style="text-align: center;">E94YCEN001B</p> | A    | Green  | On               | Ethernet connection has been established. |
|  | B    | Yellow | On/<br>Jittering | Data are being exchanged via Ethernet.    |

## 8.2 Error messages of the Servo Drive 9400

In the »Engineer«, the content of the fault memory can be displayed via the standard device code **C00168**.



### **Software manual/»Engineer« online help for the Servo Drive 9400**

Here you will find general information on diagnostics & fault analysis and on error messages.

## 9 Parameter reference

This chapter supplements the parameter list and the table of attributes in the software manual and in the »Engineer« online help for the Servo Drive 9400 by the parameters of the E94AYCEN communication module (Ethernet).



**Software manual/»Engineer« online help for the Servo Drive 9400**

Here you will find general information on parameters.

### 9.1 Parameters of the standard device that are relevant to communication

In this chapter communication-relevant parameters of the Servo Drive 9400 are listed in numerically ascending order.

#### C00615

| Parameter   Name:   |                       | Data type: UNSIGNED_32                        |
|---|-----------------------|---|
| <b>C00615   Resp. to imp. device config.</b>  |                       | Index: 23960 <sub>d</sub> = 5D98 <sub>h</sub> |
| Response to impermissible device configuration  |                       |   |
| Selection list  |                       |   |
| 1   | Fault                 |   |
| 3   | Quick stop by trouble |   |
| 4   | Warning Locked        |   |
| 6   | Information           |   |
| 0   | No Response           |   |
| Subcodes  | Lenze setting         | Info  |
| C00615/1  | 0: No Response        | Reserved                                      |
| C00615/2  | 0: No Response        | Resp. to imp. module in MXI1                  |
| C00615/3  | 0: No Response        | Resp. to imp. module in MXI2                  |
| C00615/4  | 0: No Response        | Reserved                                      |
| C00615/5  | 0: No Response        | Reserved                                      |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |                       |   |

#### C00636

| Parameter   Name:   |                       | Data type: UNSIGNED_32                        |
|---|-----------------------|---|
| <b>C00636   Resp. to new module in MXI1</b>   |                       | Index: 23939 <sub>d</sub> = 5D83 <sub>h</sub> |
| Response if a new module has been plugged into module slot 1 of the standard device.  |                       |   |
| Selection list (Lenze setting printed in bold)  |                       |   |
| 1   | Fault                 |   |
| 6   | Information           |   |
| 5   | Warning               |   |
| 4   | <b>Warning Locked</b> |   |
| 3   | Quick stop by trouble |   |
| 0   | No Response           |   |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |                       |   |

C00637

Parameter | Name:

**C00637 | Resp. to new module in MXI2**Data type: UNSIGNED\_32  
Index: 23939<sub>d</sub> = 5D83<sub>h</sub>

Response if a new module has been plugged into module slot 2 of the standard device.

**Selection list** (Lenze setting printed in bold)

|   |                       |
|---|-----------------------|
| 1 | Fault                 |
| 6 | Information           |
| 5 | Warning               |
| 4 | <b>Warning Locked</b> |
| 3 | Quick stop by trouble |
| 0 | No Response           |

 Read access
  Write access
  CINH
  PLC STOP
  No transfer
**Note!**

The standard device codes **C01501** and **C01502** have no effect when using the E94AYCEN (Ethernet) communication module.

# E94AYCEN communication manual (Ethernet)

## Parameter reference

### Parameters of the communication module for slot MXI1

## 9.2 Parameters of the communication module for slot MXI1

This chapter lists, in ascending numerical order, the parameters of the E94AYCEN (Ethernet) communication module for slot MXI1 of the Servo Drive 9400.

### C13000

Parameter | Name: **C13000 | Ethernet: IP address** Data type: UNSIGNED\_8  
Index: 11575<sub>d</sub> = 2D37<sub>h</sub>

The IP address is required for addressing the Servo Drive 9400 if communication between the PC and the controller is to be established via an Ethernet connection.

- The IP address consists of four numbers from 0 to 255 which can be set in the four subcodes.
- The first one, two, or three numbers indicate the network (Net-ID), the remaining numbers indicate the host (Host-ID). The definite specification of the part that is to be evaluated as Net-ID is effected in [C13001](#) (Ethernet: Subnetwork mask).

▶ [IP address](#) (📖 31)

| Setting range (min. value   unit   max. value) |  |     |
|--|--|-----|
| 0  |  | 255 |

| Subcodes | Lenze setting | Info  |
|----------|---------------|---|
| C13000/1 | 127           | IP address <ul style="list-style-type: none"><li>• Sequence: "[1].[2].[3].[4]"</li><li>• Lenze setting: "127.0.0.1"</li></ul> |
| C13000/2 | 0             |   |
| C13000/3 | 0             |   |
| C13000/4 | 1             |   |

Read access  Write access  CINH  PLC STOP  No transfer

### C13001

Parameter | Name: **C13001 | Ethernet: Subnetwork mask** Data type: UNSIGNED\_8  
Index: 11574<sub>d</sub> = 2D36<sub>h</sub>

The subnet mask indicates which part of the IP address is evaluated as Net- ID and which part as Host-ID.

- The subnet mask consists of four numbers from 0 to 255 which can be set in the four subcodes.

▶ [Subnet mask](#) (📖 31)

| Setting range (min. value   unit   max. value) |  |     |
|--|--|-----|
| 0  |  | 255 |

| Subcodes | Lenze setting | Info   |
|----------|---------------|--|
| C13001/1 | 255           | Subnet mask <ul style="list-style-type: none"><li>• Sequence: "[1].[2].[3].[4]"</li><li>• Lenze setting: "255.255.255.0" (The first three bytes of the IP address are the Net-ID.)</li></ul> |
| C13001/2 | 255           |  |
| C13001/3 | 255           |  |
| C13001/4 | 0             |  |

Read access  Write access  CINH  PLC STOP  No transfer



#### C13002

|   |                      |  |
|---|----------------------|--|
| Parameter   Name:<br><b>C13002   Ethernet gateway address</b>   |                      | Data type: UNSIGNED_8<br>Index: 11573 <sub>d</sub> = 2D35 <sub>h</sub>           |
| <p>The gateway address is required if the Servo Drive 9400 is not located in the same subnetwork as the PC.</p> <ul style="list-style-type: none"> <li>The gateway address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Gateway address</a> (📖 32)</p> |                      |  |
| <b>Setting range</b> (min. value   unit   max. value)   |                      |  |
| 0   |                      | 255  |
| <b>Subcodes</b>   | <b>Lenze setting</b> | <b>Info</b>  |
| C13002/1  | 127                  | Gateway address<br>• Sequence: "[1].[2].[3].[4]"<br>• Lenze setting: "127.0.0.1" |
| C13002/2  | 0                    |  |
| C13002/3  | 0                    |  |
| C13002/4  | 1                    |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |                      |  |

#### C13003

|  |  |  |
|--|--|--|
| Parameter   Name:<br><b>C13003   Ethernet: MAC-ID</b>  |  | Data type: UNSIGNED_8<br>Index: 11572 <sub>d</sub> = 2D34 <sub>h</sub> |
| <p>The MAC-ID is a globally unique identifier of an Ethernet-capable device. The MAC-ID is assigned by the manufacturer and permanently burnt into the device (Lenze communication module).</p> <ul style="list-style-type: none"> <li>The MAC-ID consists of six numbers from 0 to 255 which are displayed in the six subcodes.</li> </ul> <p>▶ <a href="#">MAC-ID</a> (📖 32)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)  |  |  |
| 0  |  | 255  |
| <b>Subcodes</b>  |  | <b>Info</b>  |
| C13003/1   |  | MAC-ID<br>• Sequence: "[1]-[2]-[3]-[4]-[5]-[6]"                        |
| C13003/2   |  |  |
| C13003/3   |  |  |
| C13003/4   |  |  |
| C13003/5   |  |  |
| C13003/6   |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |  |  |

# E94AYCEN communication manual (Ethernet)

## Parameter reference

### Parameters of the communication module for slot MXI1

#### C13004

|   |                               |  |
|---|-------------------------------|--|
| Parameter   Name:<br><b>C13004   Resolved IP-Adress</b>   |                               | Data type: UNSIGNED_8<br>Index: 11571 <sub>d</sub> = 2D33 <sub>h</sub> |
| The IP address is required for addressing the Servo Drive 9400 if communication between the PC and the controller is to be established via an Ethernet connection.  |                               |  |
| <ul style="list-style-type: none"><li>• The IP address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li><li>• The first one, two, or three numbers indicate the network (Net-ID), the remaining numbers indicate the host (Host-ID). The definite specification of the part that is to be evaluated as Net-ID is effected in <a href="#">C13001</a> (Ethernet: Subnetwork mask).</li></ul> |                               |  |
| <a href="#">▶ IP address</a> (🔗 31)   |                               |  |
| <b>Display range</b> (min. value   unit   max. value)   |                               |  |
| 0   |                               | 255  |
| <b>Subcodes</b>   | <b>Info</b>                   |  |
| C13004/1  | IP address                    |  |
| C13004/2  | • Sequence: "[1].[2].[3].[4]" |  |
| C13004/3  |                               |  |
| C13004/4  |                               |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |                               |  |

#### C13005

|   |                        |  |
|---|------------------------|--|
| Parameter   Name:<br><b>C13005   Use of DHCP</b>  |                        | Data type: UNSIGNED_8<br>Index: 11570 <sub>d</sub> = 2D32 <sub>h</sub> |
| This code is available for Servo Drives 9400 of version <b>V03.00.00.00</b> or higher.  |                        |  |
| You use this code to define whether DHCP is to be used or not.  |                        |  |
| <a href="#">▶ DHCP implementation in the Servo Drive 9400</a> (🔗 34)  |                        |  |
| <b>Selection list</b> (Lenze setting printed in bold)   |                        |  |
| <b>0</b>  | <b>Do not use DHCP</b> |  |
| 1   | Use DHCP               |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |                        |  |

#### C13006

|  |                   |  |
|--|-------------------|--|
| Parameter   Name:<br><b>C13006   Ethernet node state</b>   |                   | Data type: UNSIGNED_8<br>Index: 11569 <sub>d</sub> = 2D31 <sub>h</sub> |
| Indicates if an error has occurred or a telegram has been lost during Ethernet communication.  |                   |  |
| <b>Selection list</b> (read only)  |                   |  |
| 0  | No error          |  |
| 1  | Error, frame lost |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |                   |  |

## C13007

|   |  |  |
|---|--|--|
| Parameter   Name:<br><b>C13007   Resolved Subnetmask</b>  |  | Data type: UNSIGNED_8<br>Index: 11568 <sub>d</sub> = 2D30 <sub>h</sub> |
| <p>The subnet mask indicates which part of the IP address is evaluated as Net-ID and which part as Host-ID.</p> <ul style="list-style-type: none"> <li>The subnet mask consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Subnet mask</a> (📖 31)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)   |  |  |
| 0   |  | 255  |
| <b>Subcodes</b>   |  | <b>Info</b>  |
| C13007/1  |  | Subnet mask<br>• Sequence: "[1].[2].[3].[4]"                           |
| C13007/2  |  |  |
| C13007/3  |  |  |
| C13007/4  |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |  |  |

## C13008

|   |  |  |
|---|--|--|
| Parameter   Name:<br><b>C13008   Resolved Gateway-Address</b>   |  | Data type: UNSIGNED_8<br>Index: 11567 <sub>d</sub> = 2D2F <sub>h</sub> |
| <p>The gateway address is required if the Servo Drive 9400 is not located in the same subnetwork as the PC.</p> <ul style="list-style-type: none"> <li>The gateway address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Gateway address</a> (📖 32)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)   |  |  |
| 0   |  | 255  |
| <b>Subcodes</b>   |  | <b>Info</b>  |
| C13008/1  |  | Gateway address<br>• Sequence: "[1].[2].[3].[4]"                       |
| C13008/2  |  |  |
| C13008/3  |  |  |
| C13008/4  |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |  |  |

# E94AYCEN communication manual (Ethernet)

## Parameter reference

### Parameters of the communication module for slot MXI2

#### 9.3 Parameters of the communication module for slot MXI2

This chapter lists, in ascending numerical order, the parameters of the E94AYCEN (Ethernet) communication module for slot MXI2 of the Servo Drive 9400.

##### C14000

|   |                                      |                               |  |
|---|--------------------------------------|-------------------------------|--|
| Parameter   Name:   | <b>C14000   Ethernet: IP address</b> |                               | Data type: UNSIGNED_8<br>Index: 10575 <sub>d</sub> = 294F <sub>h</sub> |
| The IP address is required for addressing the Servo Drive 9400 if communication between the PC and the controller is to be established via an Ethernet connection.  |                                      |                               |  |
| <ul style="list-style-type: none"><li>• The IP address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li><li>• The first one, two, or three numbers indicate the network (Net-ID), the remaining numbers indicate the host (Host-ID). The definite specification of the part that is to be evaluated as Net-ID is effected in <a href="#">C14001</a> (Ethernet: Subnetwork mask).</li></ul> |                                      |                               |  |
| ▶ <a href="#">IP address</a> (📖 31)   |                                      |                               |  |
| <b>Setting range (min. value   unit   max. value)</b>   |                                      |                               |  |
| 0   |                                      |                               | 255  |
| <b>Subcodes</b>   | <b>Lenze setting</b>                 | <b>Info</b>                   |  |
| C14000/1  | 127                                  | IP address                    |  |
| C14000/2  | 0                                    | • Sequence: "[1],[2],[3],[4]" |  |
| C14000/3  | 0                                    | • Lenze setting: "127.0.0.1"  |  |
| C14000/4  | 1                                    |                               |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |                                      |                               |  |

##### C14001

|   |   |  |  |
|---|---|--|--|
| Parameter   Name:   | <b>C14001   Ethernet: Subnetwork mask</b> |  | Data type: UNSIGNED_8<br>Index: 10574 <sub>d</sub> = 294E <sub>h</sub> |
| The subnet mask indicates which part of the IP address is evaluated as Net-ID and which part as Host-ID.  |   |  |  |
| <ul style="list-style-type: none"><li>• The subnet mask consists of four numbers from 0 to 255 which can be set in the four subcodes.</li></ul>   |   |  |  |
| ▶ <a href="#">Subnet mask</a> (📖 31)  |   |  |  |
| <b>Setting range (min. value   unit   max. value)</b>   |   |  |  |
| 0   |   |  | 255  |
| <b>Subcodes</b>   | <b>Lenze setting</b>                      | <b>Info</b>  |  |
| C14001/1  | 255                                       | Subnet mask  |  |
| C14001/2  | 255                                       | • Sequence: "[1],[2],[3],[4]"  |  |
| C14001/3  | 255                                       | • Lenze setting: "255.255.255.0" (The first three bytes of the IP address are the Net-ID.) |  |
| C14001/4  | 0   |  |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |   |  |  |

#### C14002

|   |                      |  |
|---|----------------------|--|
| Parameter   Name:<br><b>C14002   Ethernet gateway address</b>   |                      | Data type: UNSIGNED_8<br>Index: 10573 <sub>d</sub> = 294D <sub>h</sub>           |
| <p>The gateway address is required if the Servo Drive 9400 is not located in the same subnetwork as the PC.</p> <ul style="list-style-type: none"> <li>The gateway address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Gateway address</a> (📖 32)</p> |                      |  |
| <b>Setting range</b> (min. value   unit   max. value)   |                      |  |
| 0   |                      | 255  |
| <b>Subcodes</b>   | <b>Lenze setting</b> | <b>Info</b>  |
| C14002/1  | 127                  | Gateway address<br>• Sequence: "[1].[2].[3].[4]"<br>• Lenze setting: "127.0.0.1" |
| C14002/2  | 0                    |  |
| C14002/3  | 0                    |  |
| C14002/4  | 1                    |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |                      |  |

#### C14003

|  |  |  |
|--|--|--|
| Parameter   Name:<br><b>C14003   Ethernet: MAC-ID</b>  |  | Data type: UNSIGNED_8<br>Index: 10572 <sub>d</sub> = 294C <sub>h</sub> |
| <p>The MAC-ID is a globally unique identifier of an Ethernet-capable device. The MAC-ID is assigned by the manufacturer and permanently burnt into the device (Lenze communication module).</p> <ul style="list-style-type: none"> <li>The MAC-ID consists of six numbers from 0 to 255 which are displayed in the six subcodes.</li> </ul> <p>▶ <a href="#">MAC-ID</a> (📖 32)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)  |  |  |
| 0  |  | 255  |
| <b>Subcodes</b>  |  | <b>Info</b>  |
| C14003/1   |  | MAC-ID<br>• Sequence: "[1]-[2]-[3]-[4]-[5]-[6]"                        |
| C14003/2   |  |  |
| C14003/3   |  |  |
| C14003/4   |  |  |
| C14003/5   |  |  |
| C14003/6   |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |  |  |

# E94AYCEN communication manual (Ethernet)

## Parameter reference

### Parameters of the communication module for slot MX12

#### C14004

|  |                                    |  |
|--|------------------------------------|--|
| Parameter   Name:  | <b>C14004   Resolved IP-Adress</b> | Data type: UNSIGNED_8<br>Index: 10571 <sub>d</sub> = 294B <sub>h</sub> |
| <p>The IP address is required for addressing the Servo Drive 9400 if communication between the PC and the controller is to be established via an Ethernet connection.</p> <ul style="list-style-type: none"><li>• The IP address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li><li>• The first one, two, or three numbers indicate the network (Net-ID), the remaining numbers indicate the host (Host-ID). The definite specification of the part that is to be evaluated as Net-ID is effected in <a href="#">C14001</a> (Ethernet: Subnetwork mask).</li></ul> <p>▶ <a href="#">IP address</a> (🔗 31)</p> |                                    |  |
| <b>Display range (min. value   unit   max. value)</b>  |                                    |  |
| 0     255  |                                    |  |
| <b>Subcodes</b>  |                                    | <b>Info</b>  |
| C14004/1   |                                    | IP address<br>• Sequence: "[1].[2].[3].[4]"                            |
| C14004/2   |                                    |  |
| C14004/3   |                                    |  |
| C14004/4   |                                    |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer   |                                    |  |

#### C14005

|  |                             |  |
|--|-----------------------------|--|
| Parameter   Name:  | <b>C14005   Use of DHCP</b> | Data type: UNSIGNED_8<br>Index: 10570 <sub>d</sub> = 294A <sub>h</sub> |
| <p>This code is available for Servo Drives 9400 of version <b>V03.00.00.00</b> or higher.<br/>You use this code to define whether DHCP is to be used or not.</p> <p>▶ <a href="#">DHCP implementation in the Servo Drive 9400</a> (🔗 34)</p> |                             |  |
| <b>Selection list (Lenze setting printed in bold)</b>  |                             |  |
| <b>0</b>   | <b>Do not use DHCP</b>      |  |
| 1  | Use DHCP                    |  |
| <input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |                             |  |

#### C14006

|  |                                     |  |
|--|-------------------------------------|--|
| Parameter   Name:  | <b>C14006   Ethernet node state</b> | Data type: UNSIGNED_8<br>Index: 10569 <sub>d</sub> = 2949 <sub>h</sub> |
| <p>Indicates if an error has occurred or a telegram has been lost during Ethernet communication.</p>   |                                     |  |
| <b>Selection list (read only)</b>  |                                     |  |
| 0  | No error                            |  |
| 1  | Error, frame lost                   |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer |                                     |  |

#### C14007

|   |  |  |
|---|--|--|
| Parameter   Name:<br><b>C14007   Resolved Subnetmask</b>  |  | Data type: UNSIGNED_8<br>Index: 10568 <sub>d</sub> = 2948 <sub>h</sub> |
| <p>The subnet mask indicates which part of the IP address is evaluated as Net-ID and which part as Host-ID.</p> <ul style="list-style-type: none"> <li>The subnet mask consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Subnet mask</a> (📖 31)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)   |  |  |
| 0   |  | 255  |
| <b>Subcodes</b>   |  | <b>Info</b>  |
| C14007/1  |  | Subnet mask<br>• Sequence: "[1].[2].[3].[4]"                           |
| C14007/2  |  |  |
| C14007/3  |  |  |
| C14007/4  |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |  |  |

#### C14008

|   |  |  |
|---|--|--|
| Parameter   Name:<br><b>C14008   Resolved Gateway-Address</b>   |  | Data type: UNSIGNED_8<br>Index: 10567 <sub>d</sub> = 2947 <sub>h</sub> |
| <p>The gateway address is required if the Servo Drive 9400 is not located in the same subnetwork as the PC.</p> <ul style="list-style-type: none"> <li>The gateway address consists of four numbers from 0 to 255 which can be set in the four subcodes.</li> </ul> <p>▶ <a href="#">Gateway address</a> (📖 32)</p> |  |  |
| <b>Display range</b> (min. value   unit   max. value)   |  |  |
| 0   |  | 255  |
| <b>Subcodes</b>   |  | <b>Info</b>  |
| C14008/1  |  | Gateway address<br>• Sequence: "[1].[2].[3].[4]"                       |
| C14008/2  |  |  |
| C14008/3  |  |  |
| C14008/4  |  |  |
| <input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer  |  |  |

#### 9.4 Table of attributes

The table of attributes contains information required for communicating with the drive via parameters.

#### How to read the table of attributes:

| Column       |   | Meaning   | Entry  |  |  |
|--------------|---|---|--|--|--|
| Code         |   | Parameter name  | Cxxxxx   |  |  |
| Name         |   | Parameter short text (display text)   | Text   |  |  |
| Index        | dec   | Index under which the parameter is addressed. The subindex for array variables corresponds to the Lenze subcode number. | 24575 - Lenze code number  | Only required for access via a bus system.   |  |
|              | hex   |   | 5FFFh - Lenze code number  |  |  |
| Data         | DS  | Data structure  | E  | Single variable (only one parameter element) |  |
|              |   |   | A  | Array variable (several parameter elements)  |  |
|              | DA  | Number of array elements (subcodes)   | Number   |  |  |
|              | DT  | Data type   | BITFIELD_8   | 1 byte, bit-coded                            |  |
|              |   |   | BITFIELD_16  | 2 bytes, bit-coded                           |  |
|              |   |   | BITFIELD_32  | 4 bytes, bit-coded                           |  |
|              |   |   | INTEGER_8  | 1 byte, with sign                            |  |
|              |   |   | INTEGER_16   | 2 bytes with sign                            |  |
|              |   |   | INTEGER_32   | 4 bytes, with sign                           |  |
|              |   |   | UNSIGNED_8   | 1 byte, without sign                         |  |
|              |   |   | UNSIGNED_16  | 2 bytes without sign                         |  |
|              |   |   | UNSIGNED_32  | 4 bytes, without sign                        |  |
|              |   |   | VISIBLE_STRING   | ASCII string                                 |  |
| OCTET_STRING |   |   |  |  |  |
| Factor       | Factor for data transmission via a bus system, depending on the number of decimal positions | Factor  | 1 = no decimal positions<br>10 = 1 decimal position<br>100 = 2 decimal positions<br>1000 = 3 decimal positions |  |  |
| Access       | R   | Read access   | <input checked="" type="checkbox"/> Reading permitted  |  |  |
|              | W   | Write access  | <input checked="" type="checkbox"/> Writing permitted  |  |  |
|              | CINH  | Controller inhibit (CINH) required  | <input checked="" type="checkbox"/> Writing is only possible when the controller is inhibited (CINH)           |  |  |



Table of attributes

| Code                   | Name                      | Index |      | Data |    |            |        | Access                              |                                     |      |
|------------------------|---------------------------|-------|------|------|----|------------|--------|-------------------------------------|-------------------------------------|------|
|                        |                           | dec   | hex  | DS   | DA | DT         | Factor | R                                   | W                                   | CINH |
| <a href="#">C13000</a> | Ethernet: IP address      | 11575 | 2D37 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C13001</a> | Ethernet: Subnetwork mask | 11574 | 2D36 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C13002</a> | Ethernet gateway address  | 11573 | 2D35 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C13003</a> | Ethernet: MAC-ID          | 11572 | 2D34 | A    | 6  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C13004</a> | Resolved IP-Adress        | 11571 | 2D33 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C13005</a> | Use of DHCP               | 11570 | 2D32 | E    | 1  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C13006</a> | Ethernet node state       | 11569 | 2D31 | E    | 1  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C13007</a> | Resolved Subnetmask       | 11568 | 2D30 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C13008</a> | Resolved Gateway-Address  | 11567 | 2D2F | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C14000</a> | Ethernet: IP address      | 10575 | 294F | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C14001</a> | Ethernet: Subnetwork mask | 10574 | 294E | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C14002</a> | Ethernet gateway address  | 10573 | 294D | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C14003</a> | Ethernet: MAC-ID          | 10572 | 294C | A    | 6  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C14004</a> | Resolved IP-Adress        | 10571 | 294B | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C14005</a> | Use of DHCP               | 10570 | 294A | E    | 1  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| <a href="#">C14006</a> | Ethernet node state       | 10569 | 2949 | E    | 1  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C14007</a> | Resolved Subnetmask       | 10568 | 2948 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |
| <a href="#">C14008</a> | Resolved Gateway-Address  | 10567 | 2947 | A    | 4  | UNSIGNED_8 | 1      | <input checked="" type="checkbox"/> |                                     |      |

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