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TCP/IP communication

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.General information

The "TCP/IP Communication" section provides all necessary information for standard Ethernet communication. In addition to TCP/IP, communication via UDP/IP is also possible.

To prevent confusion with the "EtherNet/IP™ interface" master communication, the designation "Ethernet communication" is not used here. The term "IP communication" is used instead.

It is possible to communicate with a ctrlX DRIVE controller via standard Ethernet telegrams. These Ethernet telegrams contain TCP/IP or UDP/IP telegrams connection to the application. For communication with the device, the CSMA/CD access method is applied. Interfaces for TCP/IP communication are suitable as connection options. This can be an inactive port of the master communication card (e.g., Sercos) or a separate Engineering port (if available).

The IP communication always respects the properties of the connected interface.

.Example of Sercos master communication

For Sercos, in addition to the time-controlled transmission of Sercos-type Ethernet telegrams (MDT and AT), there is the Unified Communication Channel (UCC), with which IP telegrams are transmitted in a reserved time slot.

For Sercos, another option to asynchronously transmit data is available, apart from the known service channel. Due to the maximum data length, this option can be used for large amounts of data.

.Example of EtherCAT master communication

In case of EtherCAT, in addition to acyclic demands Ethernet telegrams can be transported to and from the device, initiated by the master, in the so-called mail boxes in the devices. This method is called EoE (Ethernet over EtherCAT). This method has to be actively supported by the master and has to be activated and configured via Engineering. If this is the case, engineering communication can take place via IP services using the device, simultaneously to the running process data communication.

.Application options

If the TCP/IP communication is used in the drive, different application options are available that are summarized in the following table.

.Overview of the application options

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Connection	Server application	Exemplary client applications
SIP protocol	Parameter access	ctrlX Works Engineering
TFTP	Firmware update service	Realizing a firmware update

.Parameters involved

Command parameters:

- S-0-1040.x.0, Drive address of master communication
- S-0-1048.x.0, C6100 Activate IP settings command

IP parameter:

- S-0-1019.x.0, MAC address
- S-0-1020.x.0, IP address
- S-0-1021.x.0, Network mask
- S-0-1022.x.0, Gateway address
- S-0-1048.x.0, Configuration of IP settings
- P-0-1044.x.0, MastCom Engineering over IP: Status IP communication

The parameters listed under "Parameters involved" refer to the following interface, depending on the specification in "x":

- x = 0 → MastCom interface
- x = 10 → Panel interface

.Diagnostics involved

- C6101 Incorrect IP settings
- F2190 Incorrect Ethernet configuration

.Additional information and details

.General information about the function

.Components for TCP/IP-communication

ctrlX DRIVE is equipped with two possible interfaces (master communication and panel) via which a direct IP communication is possible.

Special feature of the MultiEthernet master communication interface: depending on the available hardware or the enabled master communication, this interface is referred to as "Engineering over IP" or as "Engineering port".

The interface is referred to as "Engineering over IP" in the following cases:

- Sercos

- PROFINET® RT
- EtherCAT®
  A connection cannot be established with ctrlX DRIVE Engineering in connection with TwinCAT via the ADS interface or the EoE profile.
- Disabled master communication

The interface is referred to as "Engineering port" in the following cases:

- ctrlX DRIVE with Core if a separate connection for Engineering is provided

.Configuration

In order to facilitate IP communication via an interface, at least the IP address and the network mask have to be configured for the interface.

For communication beyond the IP network, a gateway address can additionally be set.

This information is set for the device for each interface using individual, independent parameters.

.Parameters for setting the IP configuration

Interface	IP address	Network mask	Gateway address
Engineering over IP	S-0-1020.**0**.0	S-0-1021.**0**.0	S-0-1022.**0**.0
Panel	S-0-1020.10.0	S-0-1021.10.0	S-0-1022.10.0

Changes become active by activating the drive command "C6100 Enable IP setting s command ".

If a device has several interfaces available for IP communication, select different IP networks.

All ctrlX DRIVE IP addresses become active automatically. Even in case of conflicts with other devices in the network, the drive is assigned its IP address.

In case of an address conflict, the address specified in the drive is not activated. This means, the drive might not respond in the network. The address has to be corrected (e.g. manually, via the display).

.Structure of the IP address

The IP address of a communication node always comprises a network address (network ID) and a host address (host ID).

Class C networks (network mask 255.255.255.0) is used as default value. The network ID corresponds to the first three bytes of the IP address. The host ID is the fourth byte of the IP address.

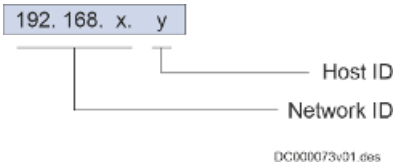

Fig. 50: Structure of the IP address

A "private" range should always be used for the address range of the IP communication with the drive. The defined ranges of the following networks are available

- Class A networks (10.x.x.x/8),
- Class B networks (172.16.x.x/12) or
- Class C networks (192.168.x.x/16).

It is recommended to use the private class C networks (192.168.x.x) for the IP address range or as default setting.

.Default values of IP configuration

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Interface	IP address	Network mask	Gateway address
Engineering over IP	192.168.0.<MastCom address>	255.255.255.0	0.0.0.0
Panel	192.168.222.<MasCom address>	255.255.255.0	0.0.0.0

Using "Load basic parameters (factory settings)", the default values of the IP configuration are restored (see table).

The configuration of the IP communication can be retained by selecting this option under "Load basic parameters".

Using the option "without Engineering interface", the settings for the Engineering port remain unchanged. Using the option "without master communication parameters", the settings for Engineering over IP are not changed.

.Automatic settings

An automatism is used for the individual interfaces so that IP communication is also possible if no IP address is set by the user. This automatism is only available in case of set class C networks.

.IP configuration of master communication interface

Automatically set IP configuration for Engineering over IP:

- **IP address:** 192.168.0.<MastCom address>
- **Network mask:** 255.255.255.0
- **Gateway address:** 192.168.0.254

.IP configuration for the panel interface

Automatically set IP configuration for the panel:

- **IP address:** 192.168.222.<MasCom address>
- **Network mask:** 255.255.255.0
- **Gateway address:**0.0.0.0

Depending on the panel firmware version, the IP can automatically be configured via the DHCP server of the panel. The server currently uses addresses in the 192.168.22.0 subnet. In case of address collisions with the IP configuration of master communication interface, a manual IP configuration is recommended.

.Manual setting

If it is required to use a different IP configuration, the settings can be manually adjusted. The setting can be selected separately for each interface in the device by writing to the associated parameters via an active communication link:

The changed settings are applied via the command "C6100 Activate IP setting s command ".

The command C6100 is started automatically at the programming module when leaving the menu using the ESC key.

.Available IP services

Different IP services are available in a ctrlX DRIVE controller, addressed via TCP or UDP. Use this service e.g.to parameterize the device, to replace the drive firmware etc.