Application Note

FESTO

Modbus on CMMP-AS- -M3/M0

Connection and configuration of the motor controller CMMP-AS- -M3/M0 within a Modbus/TCP network.

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Internet: http://www.festo.com
E-Mail: service_international@festo.com

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1 Components/Software used

Type/Name	Version Software/Firmware	Date of manufacture
CMMP-AS- -M3	Until 4.0.1501.2.3	--
CMMP-AS- -M0	Until 4.0.1501.2.3	--
FCT	Plugin 2.8.0.554	--

Table 1.1: 1 Components/Software used

1.1 Application description

This part of the documentation describes connection and configuration of the motor controller within a Modbus/TCP network. It is targeted at people who are already familiar with this bus protocol.

Modbus is an open communication protocol based on the master-slave architecture. It is an established standard for communication via Ethernet-TCP/IP in automation technology.

2 Modbus on CMMP-AS- - M3/M0

2.1 Prerequisites

The following description assumes use of FCT plugin 2.8.0.554 for CMMP-AS and firmware version 4.0.1501.2.3 for CMMP-AS- -M3/M0.

2.2 Modbus/TCP interface

Modbus connection is established via the integrated interface [X18] included with the basic device as an RJ45 socket. This can be used simultaneously with the 2 UDP connections (for FCT parameters configuring software). As a Modbus/TCP user, the motor controller can be reached via the same IP address as also used by FCT.

Shielded twisted-pair (STP) cables must be used for wiring (at least category 5).

2.3 Configuration of the Modbus/TCP user

Several steps are required in order to establish an operational Modbus/TCP connection. This section provides an overview of the steps required for parameterisation and configuration of the slave. Since some parameters only become effective after saving and reset, we recommend that commissioning with the FCT be carried out first without a Modbus/TCP master.

When laying out the Modbus/TCP interface, the user must make these determinations. Only then should parameterisation of the fieldbus interface take place at both ends. We recommend that the slave parameters should be set first. The master should be configured thereafter. After correct parameterisation, the application is immediately ready without communication errors.

We recommend the following procedure:

Parameterisation and commissioning with the Festo Configuration Tool (FCT). On the “Application data” page in the “Operating mode selection” tab:

- Select “Modbus/TCP” as the control interface (activation of communication).

Enter the following settings on the “Fieldbus” page as well:

- TCP port (“Operating parameters” tab)
- Timeout (“Operating parameters” tab)
- Physical units of measure (“Factor group” tab)
- Optional use of FHPP+ (“FHPP+ editor” tab)

Please note that parameterisation of the Modbus/TCP function only remains intact after a reset if the motor controller’s parameter set has been saved.

2.4 Activation

FCT is used exclusively in order to activate the Modbus.

All DIP switches on the plug-in module in slot [Ext 3] must be set to OFF, because the CAN Bus with corresponding settings would otherwise be activated.

2.5 Additional settings

If necessary, you can set the TCP port and the communication “Timeout” value in FCT on the “Fieldbus” page in the “Operating parameters” tab.

FCT default setting:

- TCP port 502 (“Well known port”, routing capability on the Internet)
- Timeout: 2000 ms (connection timeout for the detection of any Modbus interruption and switching to a corresponding status).

2.6 Setting of the physical units of measure (factor group)

In order for a fieldbus master to exchange position, speed and acceleration data in physical units of measure (e.g. mm, mm/s, mm/s2) with the motor controller, it must be parameterised via the factor group.

Parameterisation can be carried out via either FCT or the fieldbus.

2.7 Setting optional use of FHPP+

In addition to the control or status bytes and the FPC, additional I/O data can also be transmitted as well.

This is set via FCT (“Fieldbus” page, “FHPP+ editor” tab).

3 Modbus master configuration

The IP address of the motor controller as a Modbus/TCP user is identical to the address of the Ethernet interface selected in FCT.

3.1 Address assignment and Modbus commands

The start address / offset, which can be set in the master, should always be left at a value of “0”.

The following Modbus commands are supported:

Modbus command	Function code	Function	Note
read holding registers	3 (0x03)	Read process data (word by word)	FW 4.0.1501.2.1 and higher
write multiple registers	16 (0x10)	Write process data (word by word)	FW 4.0.1501.2.1 and higher
read / write multiple registers	23 (0x17)	Read and write process data (word by word)	FW 4.0.1501.2.3 and higher

Table 3.1: Overview of Modbus function codes

Please note that Modbus transmits data word by word. Byte order is big endian.

3.2 Monitoring functions

The motor controller supports TCP/IP connection monitoring, and timeout duration is adjustable.

In the event of a timeout, error message E67-0 is generated – the error response for error group 67 can be parameterised (“Error management page” in FCT).

Node guard monitoring is not supported.