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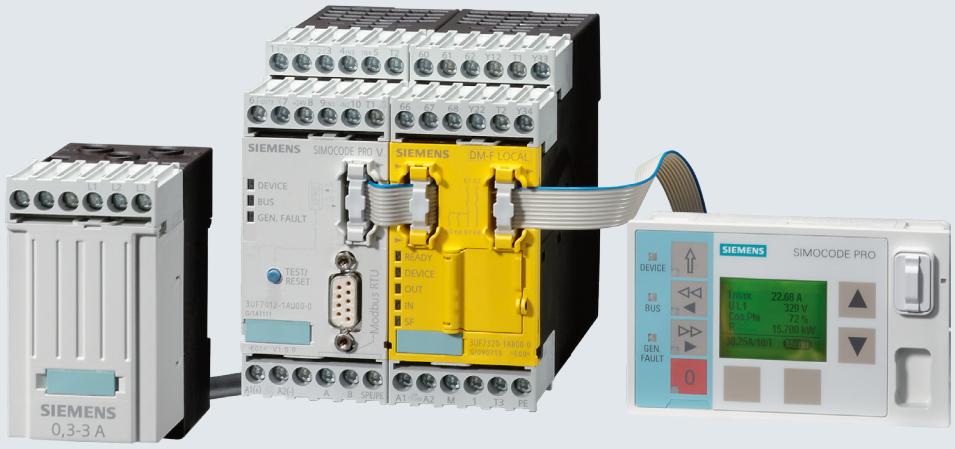

SIMOCODE pro

Motor Management and Control Devices

SIMOCODE pro for Modbus RTU

Configuration Manual

Edition 04/2015

Answers for industry.

SIEMENS

SIMOCODE pro

SIRIUS
SIMOCODE pro Modbus RTU

Configuration Manual

04/2015

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⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

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indicates that minor personal injury can result if proper precautions are not taken.

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℗ 04/2015 Subject to change

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Introduction 1

1.1 Important information

Purpose of this manual

In this SIMOCODE pro Modbus Configuration Manual, specific device features are shown in detail with regard to Modbus communication.

The SIMOCODE pro V Modbus basic unit corresponds to the SIMOCODE pro V basic unit.

The complete system description is included in the SIMOCODE pro PROFIBUS (http://support.automation.siemens.com/WW/view/en/20017780) System Manual. Both these system manuals contain a detailed description of the motor management system with its functions. The two system manuals offer information on configuring, commissioning, service and maintenance, as well as help in detecting faults. A typical example of a reversing starter application is used to teach the user quickly and practically how to use the system. The two manuals include circuit diagrams, dimension drawings and technical data of the system components as configuration aids.

Required basic knowledge

To understand this manual you will require basic knowledge of low-voltage controls and distribution, digital circuit engineering and automation technology.

Scope of application

This manual is only valid for the Modbus components of the SIMOCODE pro system.

SIEMENS reserves the right to include updated information about new components or new versions of components in a Product Information.

Further information

- Please read the operating instructions of the respective components. You can find the operating instructions for SIMOCODE pro at: SIMOCODE pro operating instructions (http://www.siemens.com/sirius/manuals)
- You will need the following manuals in addition to this system manual:
  - "Failsafe Digital Modules SIMOCODE pro Safety" manual (http://support.automation.siemens.com/WW/view/en/50564852)
  - The appropriate manual for the DP master

You will find further information under

- Internet (http://www.siemens.com/simocode)
- Information and Download Center (http://www.siemens.com/sirius/infomaterial)
- Product Information System (ProdIS) (http://www.siemens.com/sirius/support)
- Certificates (http://www.siemens.com/sirius/approvals)

Further support (Service and Support)

Technical Assistance (http://www.siemens.com/sirius/technical-assistance)

Telephone: +49 (0) 911-895-5900 (8 a.m. to 5 p.m. CET)

Fax: +49 (0) 911-895-59 07

E-Mail: technical-assistance@siemens.com

Correction sheet

A correction sheet is included at the end of this manual. Please use it to enter your suggestions for improvements, additions and corrections, and send it back to us. This will help us to improve the next edition of the manual.

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To stay informed about product updates as they occur, sign up for a product-specific newsletter. You will find more information on this at Support (http://support.automation.siemens.com).

System configuration and commissioning with RTU 2

2.1 General

SIMOCODE pro devices with Modbus communication have been developed in accordance with the "MODBUS over serial line specification and implementation guide" (available at (http://www.modbus.org)). You can find the relevant information on establishing Modbus RTU communication in this specification. The key points for a Modbus RTU communication network ("Multipoint System requirements") listed in the specification apply equally for a communication network with SIMOCODE devices.

2.2 Modbus RTU connection to the SIMOCODE pro device

Connecting Modbus RTU to the SIMOCODE pro V Modbus basic unit

Modbus RTU can be connected to the SIMOCODE pro V basic unit both via the connecting terminals as well as via the sub-D connector. The maximum data transfer rate for both connection methods is 57,600 bps.

NOTICE
9-pin sub-D connection The 9-way sub-D connection is an alternative to the A/B terminals!

Connecting Modbus RTU to the SIMOCODE pro V Modbus basic unit via the device terminals

Terminal assignment:

Terminal	Modbus signal
A	D0 or DA
B	D1 or DB
SPE	Common / shielding

Connecting Modbus RTU to the SIMOCODE pro V Modbus basic unit via the sub-D connector

The pin assignments of the 9-pin sub-D socket for SIMOCODE pro correspond to the assignments defined for PROFIBUS DP. The sub-D connector has the following assignments:

Pin	Modbus signal
8	D0 or DA
3	D1 or DB
5	Common / shielding

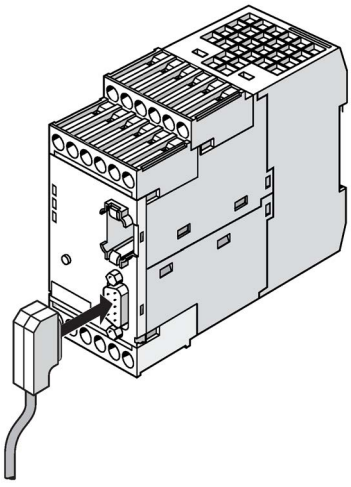

Figure 2-1 Connecting the 9-pin sub-D connector to the SIMOCODE pro V Modbus RTU basic unit

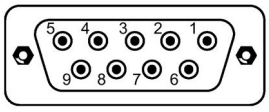

Figure 2-2 PIN assignments 9-pin sub-D socket

SIMATIC Industrial Communication 6ES7972* RS485 connectors can be used to connect Modbus RTU to the sub-D interface thanks to the identical pin assignments to PROFIBUS DP (see RS485 bus connector (https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/9300041?tree=CatalogTree) in the Industry Mall).

NOTICE
Using the PROFIBUS DP connector When the PROFIBUS DP connector is used, the bus terminator does not conform to the Modbus specification. Possible functional constraints resulting from the use of the PROFIBUS DP bus terminator with a MODBUS TCP are the user's responsibility.

2.3 Commissioning with Modbus RTU

Commissioning sequence of the SIMOCODE pro V Modbus basic unit

Table 2- 1 Commissioning sequence of the SIMOCODE pro V Modbus basic unit

Step	Description
1	Switch on the power supply. In a fault-free state, the "Device" LED should light up green.
2	Connect the PC / PG to the system interface with the PC cable (see the figure below)
3	Parameterize SIMOCODE pro or check the existing parameterization with a PC on which SIMOCODE ES V13 + SP1 (or later) is installed.
4	If automatic baud rate detection is activated, the "Bus" LED flashes green as soon as the setting selected by the controller is found. When the controller exchanges data with the device, the "Bus" LED lights up green.

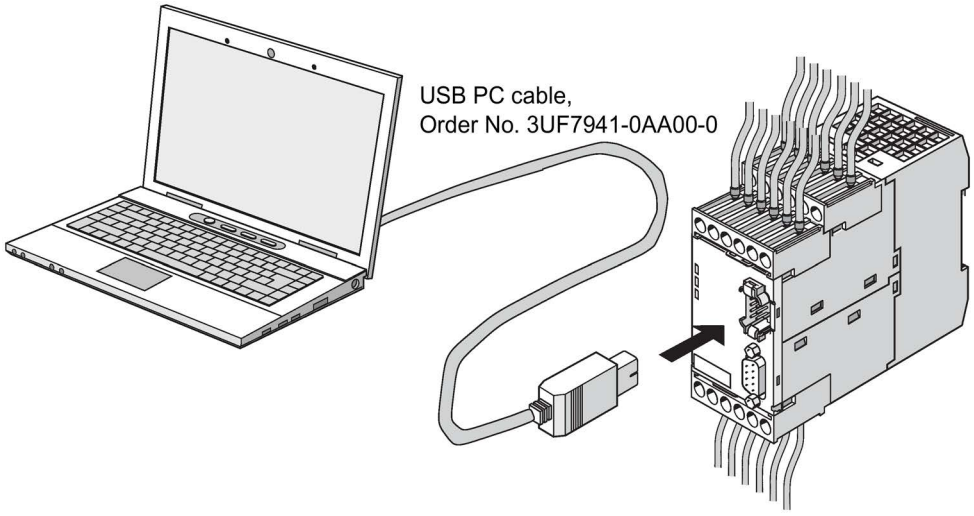

Figure 2-3 Connecting a PC to the SIMOCODE pro V Modbus RTU basic unit

Software for configuring and commissioning

SIMOCODE ES V13 + SP1 (or later) is required for full configuring and commissioning. Here, you can choose between:

- SIMOCODE ES V13 Basic: text-oriented configuration of SIMOCODE
- SIMOCODE ES V13 Standard: configuration of SIMOCODE using graphically interconnectable function blocks.

Note

The SIMOCODE ES V13 Premium software does not have more functionality than SIMOCODE ES V13 Standard for SIMOCODE pro Modbus devices, but it can nevertheless be used for commissioning.

The functional principle of SIMOCODE ES software is described in the online help. A "Getting Started" is available on the internet in a multimedia format to help you become more familiar with the software in the initial fundamental steps: Getting Started (http://www.industry.siemens.com/topics/global/en/tia-portal/tia-portal-framework/Pages/default.aspx) → "Guided Tour" tab.

Device addressing

As supplied, the default setting for the device address 126. This must be reassigned when commissioning the devices.

Setting the Modbus RTU address via addressing plug

Proceed as follows:

Table 2- 2 Setting the Modbus RTU address via addressing plug

Step	Description
1	Set the desired valid address on the DIP switch. The switches are numbered. Addresses from 1 to 247 can be assigned. For example, address 21: Put the "16"+"4"+"1" switches in the "ON" position. 1)
2	Plug the addressing plug into the system interface. The "Device" LED lights up yellow.
3	Briefly press the "TEST/RESET" button. The address you set is now stored. The "Device" LED flashes yellow for approx. 3 seconds.
4	Remove the addressing plug from the system interface.

1)

Note

Labeling for the address "128"

Labeling for the address "128" is not available on the addressing plug, that is, the unlabeled switch corresponds to the address "128".

Setting of the Modbus RTU address with SIMOCODE ES in the TIA Portal

Proceed as follows:

Table 2- 3 Setting the Modbus RTU address with SIMOCODE ES

Step	Description
1	Plug the PC cable into the system interface.
2	Start SIMOCODE ES V13+SP1 (or later version)
3	Select "Online → Connect online" or click the "Connect online" button

Communication parameters

The following Modbus communication parameters can be set in the SIMOCODE ES V13 software under "Parameter → Modbus":

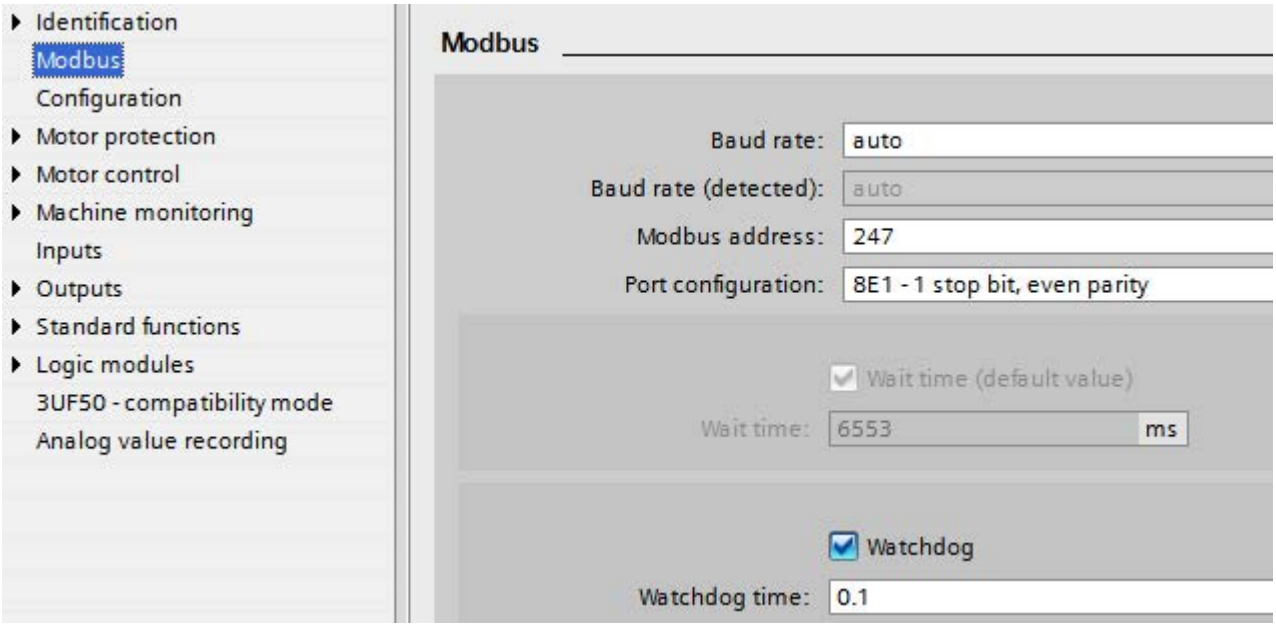

Figure 2-4 Modbus settings

- Baud rate: The baud rate of SIMOCODE pro V Modbus can be set in the range from 0.3 - 57.6 kbps. The parameter setting "auto" activates automatic baud rate detection with which the device autonomously determines the setting selected by the controller. Automatic baud rate search encompasses baud rates in the range from 4.8 ... 57.6 kbps.

  Note

  Automatic baud rate detection

  Use of this function is only possible when the "Watchdog" function is activated.

  Idle time:

  Messages begin and end with a transmission break of at least 3.5 characters. The shortest idle time depends on the baud rate. The following table shows the default values:

Bits per second (bps)	Shortest idle time (ms)
300	128
600	64
1200	32
2400	16
4800	8
9600	4
19200	2
57600	2

- Baud rate (detected): Information about the detected baud rate, if automatic baud rate detection (baud rate = auto) is set.
- Modbus address: Setting the Modbus address for the SIMOCODE device. The address can be set in the range from 1 - 247. As supplied, the address for SIMOCODE pro V devices is set to the default value of 126
- Port configuration: The number of stop bits and the selected parity of the Modbus interface can be set here. The following settings are possible:
  - 8E1 - 1 stop bit, even parity
  - 8O1 - 1 stop bit, odd parity
  - 8N2 - 2 stop bits, no parity
  - 8N1 - 1 stop bit, no parity
- Wait time / wait time (default value): The time duration of the pause between a received request and the reply from SIMOCODE pro can be set with the "Wait time" and "Wait time (default value)" parameters. If the default value of the Modbus specification is to be used, selection of the "Wait time (default value)" parameter is recommended. The "Wait time" parameter is available for free setting. The setting is made in ms. The smallest settable value corresponds to the default value of the Modbus specification. If longer wait times are required, these can be defined using the "Wait time" parameter.

- Watchdog / Watchdog time: Monitoring of the bus communication can be activated with these parameters. This is necessary when automatic baud rate detection is selected, or if the SIMOCODE device were to experience a fault if the bus communication fails. If the watchdog is activated, SIMOCODE monitors whether a valid read or write access to the device occurs within the set watchdog time. If this is not the case, SIMOCODE begins a new search for a valid baud rate if automatic rate detection is set. In addition, a "Fault - bus" is generated if the "Watchdog → Bus monitoring" parameter is also activated.

Bus and controller monitoring on Modbus

With the SIMOCODE pro V Modbus basic unit, both the bus communication and the controller function can be monitored. The functions "Bus monitoring" and "PLC / PCS monitoring" are available for this purpose.

The functionality differs slightly from that described in the SIMOCODE pro PROFIBUS system manual.

- Bus monitoring: With this type of monitoring, the "Fault - bus" fault is generated if
  - "Bus monitoring" is active
  - In the "Remote" operating mode (mode selector S1 = 1 and S2 = 1), cyclic data access to Modbus registers between the PLC and SIMOCODE pro is interrupted for longer than the set bus monitoring time, e.g. as the result of an interruption of the Modbus connection.
  - The "Status - bus o. k." can always be evaluated. If SIMOCODE pro is cyclically exchanging data with the PLC, "Status - Bus o. k." is set to "1".
- PLC / PCS monitoring: With this type of monitoring, the "Fault - PLC/PCS" message is generated if
  - "PLC/PCS monitoring" is active
  - The input "PLC/PCS monitoring - input" switches to logic zero when in the "Remote" operating mode (mode selector S1=1 and S2=1). "PLC/PCS monitoring - input" is connected preferably with the bit "Cyclic receive - bit 0.7".
  - The status "PLC/PCS in Run" can always be evaluated. If SIMOCODE pro is in cyclic data exchange with the PLC, and the input "PLC/PCS monitoring" is set, "PLC/PCS in Run" is set to "1".

You can find the further description of the function block "Watchdog" (PLC/PCS monitoring) in the SIMOCODE pro PROFIBUS System Manual (http://support.automation.siemens.com/WW/view/en/20017780).

2.4 Configuration information

The following expansion modules are not supported:

- DM-F PROFIsafe fail-safe digital module (3UF7330-..)
- Ground-fault module (3UF7500-..).

Communication 3

3.1 Modbus RTU

3.1.1 Modbus RTU communication

Modbus RTU (Remote Terminal Unit) is a standard protocol for network communication and uses the electrical RS485 connection for serial data transmission between Modbus devices in the network.

Modbus RTU uses a master/slave network in which the entire communication is triggered by only one master device while the slaves can only respond to the request of the master. The master sends a request to a slave address and only this slave address responds to the command (exception: broadcast frames to slave address 0 which are not acknowledged by the slaves).

3.1.2 Supported data transfer rates for RTU

SIMOCODE pro supports the following data transfer rates in Modbus RTU mode:

- 300 baud
- 600 baud
- 1,200 baud
- 2,400 baud
- 4,800 baud
- 9,600 baud
- 19,200 baud (default setting)
- 57,600 baud.

3.1.3 Assignment of SIMOCODE data to Modbus addresses

All SIRIUS data are available in datasets or in the process image:

- System datasets
- Datasets specific to a device subfamily
- Product-specific datasets.

To be addressable via Modbus, the data in these datasets or in this process image are converted to Modbus data formats.

Data access to	Data type according to Modbus nomenclature
Read-only bits	Discrete inputs
Read/write bits	Coils
Read-only datasets and words (16-bit)	Input registers
Read/write datasets and words	Holding registers

1 coil corresponds to 1 bit.

1 register corresponds to 1 word (2 bytes).

3.1.4 Modbus data transfer

3.1.4.1 Principle of Modbus data transfer

In contrast to cyclic/acyclic data transfer in the PROFIBUS bus system, the data are transferred linearly using the Modbus protocol.

The master is an automation system (PLC). The slave is a SIMOCODE pro device.

The master takes the initiative in the data transfer. SIMOCODE pro works as a slave and supplies the corresponding feedback signals to the bits/registers called up by the master, or it accepts the bits/registers written by the master into the internal SIMOCODE memory.

The master sends requests to one or more slaves. The slave processes the requests of the master and responds within a certain time with an acknowledgment, or with the requested data, or an error code if applicable. The requests contain the function code and additional data. The data can only be transferred between the master and a slave. Requests cannot be transferred between slaves. A slave cannot transfer any information, e.g. alarms, autonomously to the master. This always requires continuous polling of the corresponding bit by the master.

3.1.4.2 Options for data transfer

The following figure shows the data transfer options:

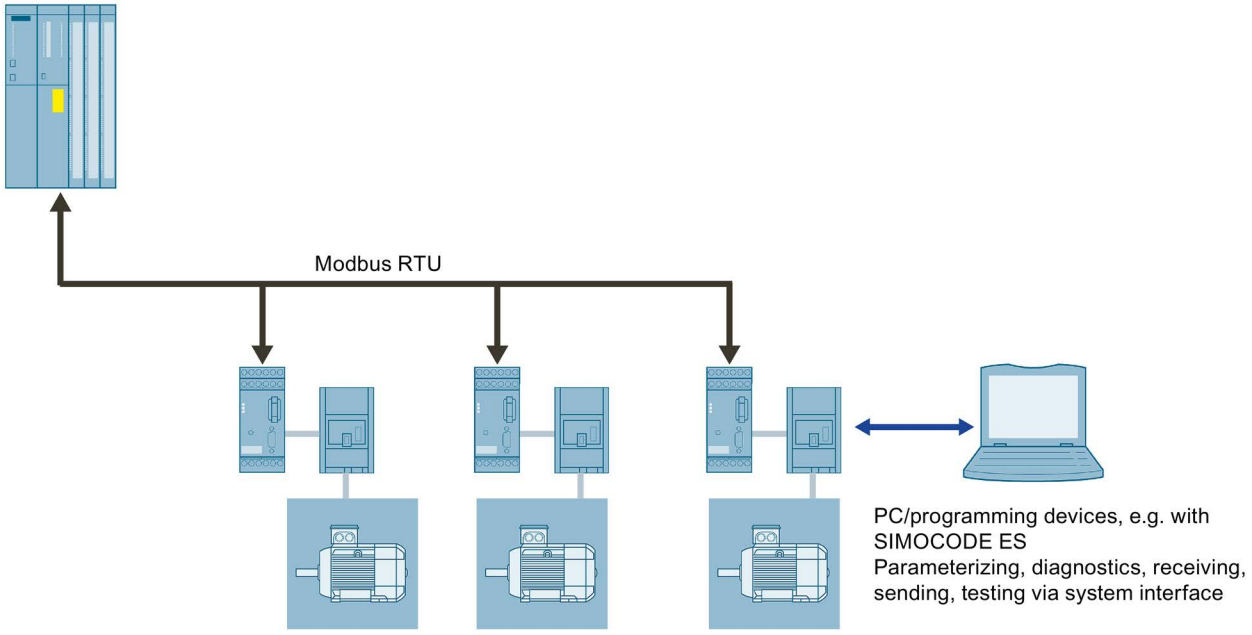

Figure 3-1 Options for data transfer

3.1.5 frame structure

The data exchange "Master → Slave" and/or the corresponding response "Slave → Master" begins with the slave address, followed by the function code. Following this, the data are transferred. The structure of the data field depends on the function code used. The CRC check is transmitted at the end of the frame. The response frame from the slave to the master contains the same slave address and the same function code. The data area is filled according to the requested data.

Slave address	Function code	DATA	CRC-CHECK
1 byte	1 byte	n bytes	2 bytes

- Slave address: This address is used to address a defined slave on the bus. Standard address: 1 to 247
- Function code: Defines the slave function desired by the frame
- DATA = frame data: Function-code-dependent administration data and net data. When transferring the register data, the high byte is always transferred first, followed by the low byte, in accordance with the Modbus specification.
- CRC CHECK = frame checksum: The end of the frame is identified by the CRC-16 checksum of two bytes in length,

End of frame

The end of frame is recognized when no transmission takes place during the time period required for the transmission of three and a half characters (3.5 times character delay time) (see Modbus Protocol Reference Guide).

Exception responses

On recognition of an error in the request frame from the master (illegal register address, for example), the slave sets the highest value bit in the function code of the response frame (that is, the requested function code + 80h). This step is followed by transmission of a byte with the exception code that describes the cause of the error.

For details: See Error codes (Page 35).

3.1.6 SIMOCODE pro function codes

3.1.6.1 General

Definition of function code

The function code defines the meaning of the message frame. The frame structure is also defined by the function code.

Overview of the function codes

The table below provides an overview of the supported function codes. Which of these are supported by SIMOCODE pro depends on the start address (see Section Modbus data tables (Page 37)).

Table 3- 1 Overview of the function codes

Function code (decimal/hexadecimal)	Designation according to Modbus specification
01 / 0x01 (Page 26)	Read Coils
02 / 0x02 (Page 26)	Read Discrete Inputs
03 / 0x03 (Page 27)	Read Holding Registers
04 / 0x04 (Page 27)	Read Input Registers
05 / 0x05 (Page 28)	Write Single Coil
06 / 0x06 (Page 29)	Write Single Register
15 / 0x0F (Page 30)	Write Multiple Coils
16 / 0x10 (Page 31)	Write Multiple Registers
23 / 0x17 (Page 32)	Read/Write Multiple Registers
43 / 0x2B (Page 34)	Read Device Identification

Access to memory areas

In SIMOCODE pro, only two memory areas are used, one each for addressing the bit information and the register information.

The function codes for bit information (01, 02, 05, 15) thus always access the bit memory area. The function codes for register information (03, 04, 06, 16, 23) always access the register memory area.

The distinction as to whether information is read-only (r) or read/writeable (r/w), can be seen from the dataset tables (see Section Modbus data tables (Page 37)).

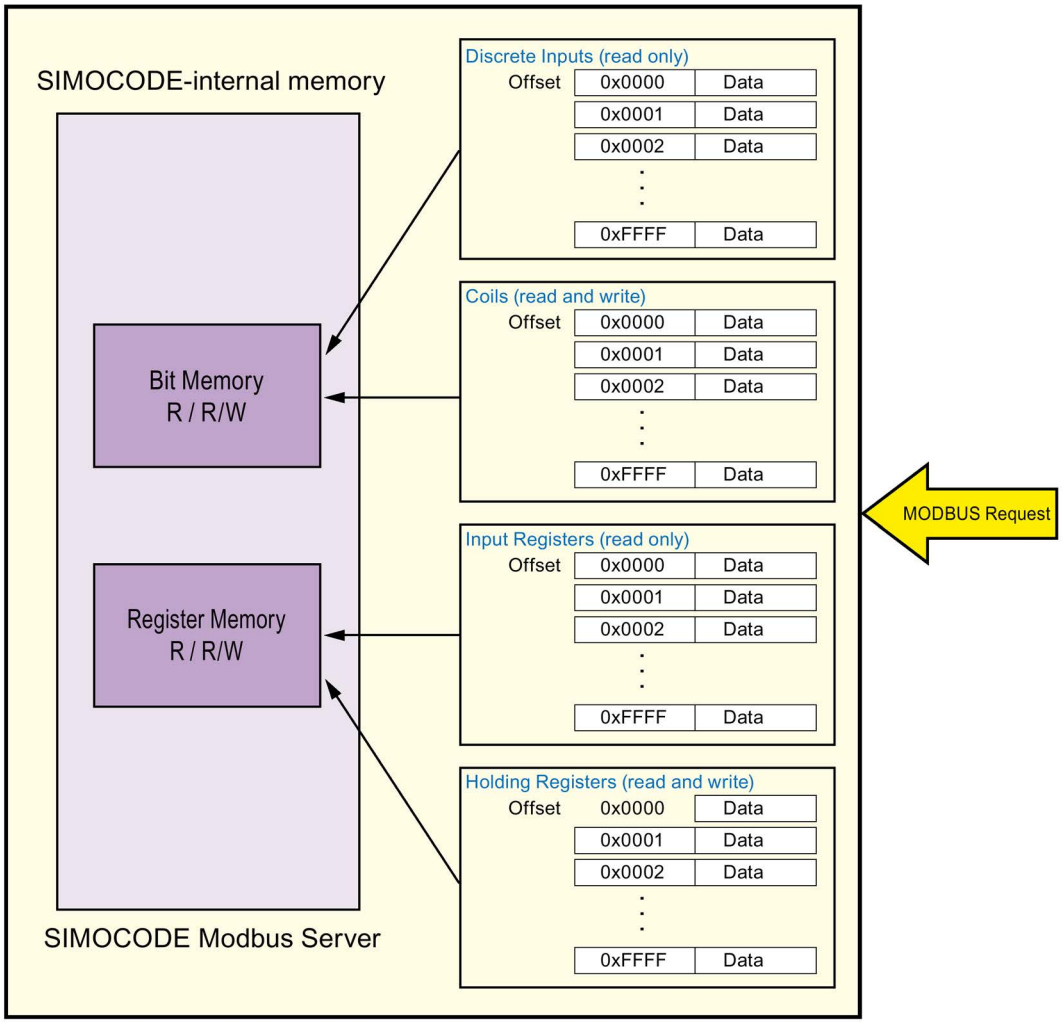

Figure 3-2 Memory areas used in SIMOCODE pro

3.1.6.2 Function codes 01 - Read Coils and 02 - Read Discrete Inputs

Function

These functions enable the Modbus master system to read individual bits from the SIMOCODE pro bit memory area.

Functions codes 01 and 02 behave in the same way here and supply an identical feedback signal. A valid offset from the bit memory area is expected as the start address. Up to 2000 bits can be read per frame.

If a number that is not equal to a multiple of eight bits is called up, the remaining bits are filled with zeros. The number of bytes n always refers to the number of fully returned bytes.

Note

Start address and number of coils

The start address and the number of coils must be within the valid range.

Request message frame

Slave address	Function code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response message frame

Slave address	Function code	Number of bytes n	Bit status	CRC
1 byte	1 byte	1 byte	n bytes	2 bytes

Example

Reading in of the SIMOCODE pro device statuses from slave number 16. The device statuses start from offset 0x1C08 and are 16 bits in length.

Request message frame

Slave address	Function code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x01	0x1C08	0x000F	0x....

Response message frame

Slave address	Function code	Number of bytes n	Bit status	CRC
1 byte	1 byte	1 byte	2 bytes	2 bytes
0x10	0x01	0x02	0x3C08	0x....

In the example, the following status information is returned:

- Device ok
- Bus ok
- PLC/PCS ok
- Current flowing ok
- Motor on>

See also Device diagnostics (Page 43) for more information.

The returned bytes contain the bits in the following order:

Byte 1: 0x3C == address 0x1C0F - 0x1C08

Byte 2: 0x08 == address 0x1C17 - 0x1C10

3.1.6.3 Function codes 03 - Read Holding Register and 04 - Read Input Registers

Function

This function enables the Modbus master system to read registers from the SIMOCODE pro register memory area.

Functions codes 03 and 04 behave in the same way here and supply an identical feedback signal. A valid offset from the register memory area is expected as the start address. Up to 125 registers per frame can be read.

Request message frame

Slave address	Function code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response message frame

Slave address	Function code	Number of bytes	Register value	CRC
1 byte	1 byte	1 byte	n registers	2 bytes

Example: Reading in of the SIMOCODE pro current measured values from slave number 16. The current measured values start from offset 0x0807 and comprise 3 registers.

Request message frame

Slave address	Function code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x03	0x07	0x00 0x03	0x ....

Response message frame

Slave address	Function code	Number of bytes	Register value	CRC
1 byte	1 byte	1 byte	3 registers (6 bytes)	2 bytes
0x10	0x03	0x06	0x0064 0x0064 0x0064	0x ....

In the example, the measured values of the current motor current in phases 1, 2 and 3, each with 100 % (0x0064) of the rated motor current, are returned as the feedback signal.

3.1.6.4 Function code 05 - Write Single Coil

Function

This function enables the Modbus master system to write an individual bit from the SIMOCODE pro bit memory area.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable (see the tables in Section Modbus data tables (Page 37), "Access" column).

0000h for a logical zero and FF00h for a logical one are accepted as data. Any other value is impermissible and given a negative acknowledgment.

Request message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example

Controlling a motor connected to SIMOCODE pro from slave address 16 (assuming the assignment of the process image corresponds to the default settings). For this purpose, bit address 00 0x02 (see the tables in Section Modbus data tables (Page 37)) is controlled with logical one. This bit address lies within the process image output that can be accessed both by bit access and by register access.

Request message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x05	0x00 0x02	0xFF 0x00	0x....

Response message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x05	0x00 0x02	0xFF 0x00	0x....

3.1.6.5 Function code 06 - Write Single Register

Function

This function enables the Modbus master system to write an individual register from the SIMOCODE pro register memory area.

A valid address from the register memory area is expected as the start address. The selected address must be designated as writable (see the tables in Section Modbus data tables (Page 37), "Access" column).

Typical SIMOCODE parameters that can be written via Modbus RTU are the motor protection parameters (e.g. rated motor current, trip class, as well as delay times of the function blocks).

Request message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x06	0x419A	0x0258	0x....

Response message frame

Slave address	Function code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x06	0x419A	0x0258	0x....

Example:

The cooling down period of the motor on SIMOCODE with slave address 16 is to be reset. To this end, the new cooling down period value of 600 s is loaded into SIMOCODE.

The register address for the cooling down period is 0x419A. Cooling down period in seconds: 600 s = 0x0258.

3.1.6.6 Function code 15 - Write Multiple Coils

Function

This function enables the Modbus master system to write several bits from the SIMOCODE pro bit memory area.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable (see the tables in Section Modbus data tables (Page 37), "Access" column).

When writing several bits, they must be marked as a "writable" coherent block. A bit area that is interrupted by read-only bits cannot be written to as a block.

Request message frame

Slave address	Function code	Start address	Number of bits	Number of bytes	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	n bytes	n bytes	2 bytes

Response message frame

Slave address	Function code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example

Several output bits in the area of the PIQ (process image output) of the SIMOCODE pro with slave address 16 are to be written via Modbus. Using these bits, the motor is usually switched on and off, "Remote/Manual" mode selected, or a reset command output.

In the case shown, the motor is to be started and "Remote" mode activated for a SIMOCODE device operated as a direct-on-line starter (see Section "Example circuits" in SIMOCODE pro PROFIBUS System Manual (http://support.automation.siemens.com/WW/view/en/20017780)):

Offset	Meaning	State
0x0001	Motor off	0
0x0002	Motor on	1
0x0003	Test function	0
0x0004	Emergency start	0
0x0005	Remote	1

Value to be transferred: 000**10010**b = 0x12

Request message frame

Slave address	Function code	Start address	Number of bits	Bytes	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes	2 bytes
0x10	0x0F	0x0001	0x0005	0x01	0x12	0x....

Response message frame

Slave address	Function code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10	0x0F	0x0001	0x0005	0x....

3.1.6.7 Function code 16 - Write Multiple Registers

Function

This function enables the Modbus master system to write several registers from the SIMOCODE pro register memory area.

A valid address from the register memory area is expected as the start address. The selected addresses must be designated as writable (see the tables in Section Modbus data tables (Page 37), "Access" column).

Typical SIMOCODE parameters that can be written via Modbus RTU are the motor protection parameters (e.g. rated motor current, trip class) and the warning and trip levels, as well as delay times of the function blocks.

When writing several registers, they must be marked as a "writable" coherent block. A register area that is interrupted by read-only registers cannot be written to as a block.

Request message frame

Slave address	Function code	Start address	Number of registers	Number of bytes	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	n x 2 bytes	2 bytes

Response message frame

Slave address	Function code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example

The rated motor current of the SIMOCODE pro with slave address 16, stored as a double word, is to be changed via Modbus. For this purpose, the new rated motor current of 10 A is to be written to the device. The expected value is the rated motor current in units of 10 mA, that is, 10 A = 10,000 mA = **1000** x 10 mA = **03E8h** x 10 mA.

Request message frame

Slave address	Function code	Start address	Number of registers	Number of bytes	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	n x 2 bytes	2 bytes
0x10	0x10h	0x41A8	0x0002	0x04	0x0000 0x03E8	0x....

Response message frame

Slave address	Function code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
0x10h	0x10	0x41A8	0x0002	0x....

3.1.6.8 Function code 23 - Read/Write Multiple Registers

Function

This function enables the Modbus master system to write and read several registers from SIMOCODE using a single function call. The write operation is the first executed operation here. This function is the typically used function call for outputting cyclic data in SIMOCODE and for reading back inputs or device statuses.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable (see the tables in Section Modbus data tables (Page 37), "Access" column).

Request message frame

Slave address	Function code	Start address read operation	Number of registers (read access)	Start address write operation	Number of registers N (write access)	Number of bytes (write access)	Data (write access)	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes	1 byte	Nx 2bytes	2 bytes

Response message frame

Slave address	Function code	Number of bytes N	Data	CRC
1 byte	1 byte	1 byte	Nx2 bytes	2 bytes

Example

Writing the outputs and reading back the input signals of the SIMOCODE pro device. To do this, register 0x0000 in the PIQ (process image output) is written, and at the same time, 4 registers from 0x0400 in the PII (process image input) are read. Slave address of the SIMOCODE pro = 16 (10h).

The register written to SIMOCODE here is to start the motor in clockwise rotation in "Remote" mode (24h).

In this example, it must be noted that the requested function "Start motor clockwise" is not returned in the same cycle as the new status. This is due to the ON command execution time in SIMOCODE and the delay of the contactors. Not until a few communication cycles later will the feedback signal of the PII also begin with 0x0024.

Note

Read/Write Multiple Registers

The FC23 can only access the PII/PIQ.

Request message frame

Slave address	Function code	Start address read operation	Number of registers (read access)	Start address write operation	Number of registers N (write access)	Number of bytes (write access)	Data (write access)	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes	1 byte	Nx2bytes	2 bytes
0x10	0x17	0x04 0x00	0x0004	0x00 0x00	0x00 0x01	0x02	0x00 0x24	

Response message frame

Slave address	Function code	Number_bytes	Data	CRC
1 byte	1 byte	1 byte	Nx2 bytes	2 bytes
0x10	0x17	0x08	0x00 0x00	0x00 0x00

Note

"Read/Write Multiple Registers" function

The "Read/Write Multiple Registers" function cannot be used for writing parameter values via Modbus.

Writing of parameter values results in an execution time in SIMOCODE for writing parameters to the internal memory during which this SIMOCODE cannot respond to a communication request and/or the command "Read/Write Multiple Registers" cannot be concluded.

3.1.6.9 Function code 43 - Read Device Identification

Function

The function "43/14 (0x2B/0x0E) Read Device Identification" enables identification of the addressed device configuration.

Modbus identification data

The Modbus identification data are a representation of the device I&M0 data.

Table 3- 2 Assignment of the I&M0 for Modbus identification

Modbus object ID	SIRIUS device information	Type	Mandatory/optional	Assignment of I&M0
Manufacturer	SIEMENS AG	ASCII string	Mandatory	Name of manufacturer
Article number	MLFB	ASCII string	Mandatory	
FW version	Vx.x	ASCII string	Mandatory	Software revision
Internet address of the manufacturer	Device-specific	ASCII string	Optional	-
Device family	Device-specific	ASCII string	Optional	-
Device subfamily	Device-specific	ASCII string	Optional	-
Name of the user	Device-specific	ASCII string	Optional	

3.2 Error codes

3.2.1 Exception responses

Operating principle

On recognition of an error in the request frame from the master (illegal register address, for example), the slave sets the highest value bit in the function code of the response frame (that is, the requested function code + 80h). This step is followed by transmission of a byte with the exception code that describes the cause of the error.

Typical exception code frame

The exception code frame from the slave has the following structure, for example: slave address 5, requested function code 5, exception code 2.

Response frame from slave:

Slave address	Function code	Error code	CRC
05H	85H	02H	0x....

3.2.2 Error codes supported by SIMOCODE pro

Error code	Meaning in accordance with Modbus specification	Cause	Brief description
1	Illegal function	Illegal function code	The requested function code is not supported. It is not included in the list of function codes supported by SIMOCODE pro (see General (Page 24)).
2	Illegal data address	Illegal bit or register address on the slave	Address does not exist. For functions that work with an addressing range, all addresses affected by the request are checked.
3	Illegal data value	Slave has illegal data value	The number of addresses is not correct. The number of parameters for the requested function was too high (or 0)
4	Failure in Associated Device	Slave has internal error	There is an unspecified server error that prevented execution of the request.
6	Busy, rejected message	Slave is not ready to receive	The device is busy and unable to process the request at this time. This can occur following a parameterization operation via Modbus when the new parameter values are transferred to the device.

Modbus data tables

4

4.1 General

4.1.1 Memory image

Hexadecimal address	Chapter
0x0000	See Process image output - command data (Page 39)
0x0400	See Process image input - monitoring data (Page 40)
0x0800	See Measured values (Page 41)
0x0C00	See Display and statistical data (Page 42)
0x1C00	See Device diagnostics (Page 43)
0x2100	See Error memory (Page 51)
0x2200	See Event memory (Page 52)
0x2A80	See Trace data (Page 53)
0x4000	See I&M0 - device identification (Page 54)
0x4020	See I&M1 - Tag (Page 55)
0x4040	See I&M2 - Installation date (Page 56)
0x4060	See I&M3 - Comment (Page 57)
0x4180	See Basic device parameter 1 (Page 58)
0x4380	See Extended device parameters 1 (Page 65)
0x4880	See Marking (Page 77)

4.1.2 Byte arrangement

Byte arrangement

When data longer than one byte is stored, the bytes are arranged as follows ("big endian"):

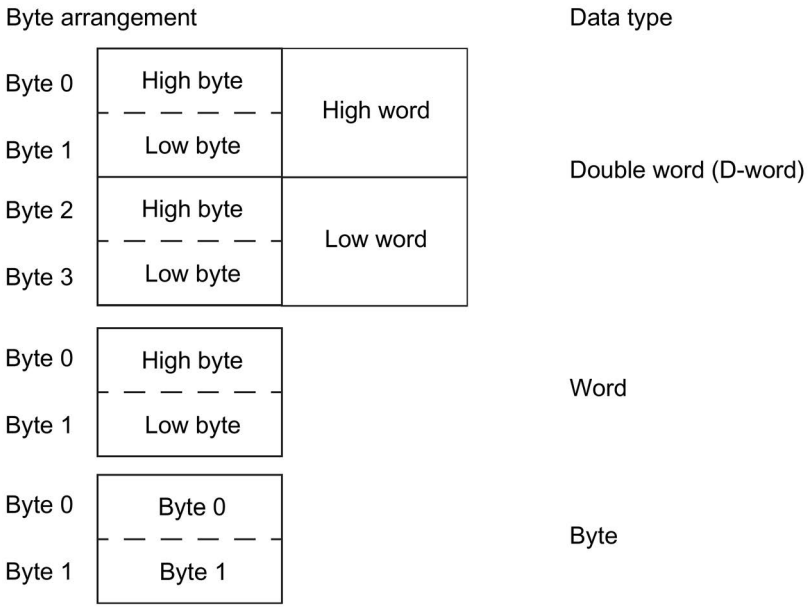

Figure 4-1 Byte arrangement in "big endian" format

4.1.3 Specifications

The following specifications apply in the tables:

Table 4- 1 Table specifications (example)

Register address *)	Identifier	Type	Area	Units	Access ***)	Info
15	*Reserved **)*	*Byte[4] **)*			*R*	
16	Max. current I_max	Word	0 … 65535	1 % / I_s	R	BU

*) The values given are decimal values

**) Items in italics are not relevant (reserved) and must be filled with "0" when written to

Parameters that can be changed during operation

BU: Entry for SIMOCODE Modbus basic unit

***) Access: R: Read; W: Write; R/W: Read Write

4.2 Process image output - command data

The command data can be written via the register memory area with the function codes 06 and 16, or via the coil memory area with function codes 05 and 15.

Read access is possible from the register memory area with function codes 03 and 04, or the coil memory area with function codes 01 and 02.

Max. data length per access: 2 registers, 16 coils.

Table 4- 2 Process image output - command data

Register address	high/low	Coil address	Type	Description	Default value	Access
0x0000	low	0x0000	Bit	Cyclic receive - bit 0.0	Control station - PLC/PCS [DP] ON<	r/w
		0x0001	Bit	Cyclic receive - bit 0.1	Control station - PLC/PCS [DP] OFF	r/w
		0x0002	Bit	Cyclic receive - bit 0.2	Control station - PLC/PCS [DP] ON>	r/w
		0x0003	Bit	Cyclic receive - bit 0.3	Test 1	r/w
		0x0004	Bit	Cyclic receive - bit 0.4	Motor protection emergency start	r/w
		0x0005	Bit	Cyclic receive - bit 0.5	Mode selector S1	r/w
		0x0006	Bit	Cyclic receive - bit 0.6	Reset 1	r/w
		0x0007	Bit	Cyclic receive - bit 0.7	Unassigned	r/w
	high	0x0008	Bit	Cyclic receive - bit 1.0	Unassigned	r/w
		0x0009	Bit	Cyclic receive - bit 1.1	Unassigned	r/w
		0x000A	Bit	Cyclic receive - bit 1.2	Unassigned	r/w
		0x000B	Bit	Cyclic receive - bit 1.3	Unassigned	r/w
		0x000C	Bit	Cyclic receive - bit 1.4	Unassigned	r/w
		0x000D	Bit	Cyclic receive - bit 1.5	Unassigned	r/w
		0x000E	Bit	Cyclic receive - bit 1.6	Unassigned	r/w
		0x000F	Bit	Cyclic receive - bit 1.7	Unassigned	r/w
0x0001			Word	Cyclic receive - Analog value	Unassigned	r/w

4.3 Process image input - monitoring data

Access to the monitoring data is possible from the register memory area with function codes 03 and 04, or the coil memory area with function codes 01 and 02.

Max. data length per access: 5 registers, 16 coils.

Table 4- 3 Process image input - monitoring data

Register address	high/low	Coil address	Type	Description	Default value	Access
0x0400	low	0x0400	Bit	Cyclic send - bit 0.0	Status - On<	r
		0x0401	Bit	Cyclic send - bit 0.1	Status - Off	r
		0x0402	Bit	Cyclic send - bit 0.2	Status - On>	r
		0x0403	Bit	Cyclic send - bit 0.3	Event - overload operation	r
		0x0404	Bit	Cyclic send - bit 0.4	Status - Interlocking time active	r
		0x0405	Bit	Cyclic send - bit 0.5	Status - Remote mode	r
		0x0406	Bit	Cyclic send - bit 0.6	Status - group fault	r
		0x0407	Bit	Cyclic send - bit 0.7	Status - group warning	r
	high	0x0408	Bit	Cyclic send - bit 1.0	Unassigned	r
		0x0409	Bit	Cyclic send - bit 1.1	Unassigned	r
		0x040A	Bit	Cyclic send - bit 1.2	Unassigned	r
		0x040B	Bit	Cyclic send - bit 1.3	Unassigned	r
		0x040C	Bit	Cyclic send - bit 1.4	Unassigned	r
		0x040D	Bit	Cyclic send - bit 1.5	Unassigned	r
		0x040E	Bit	Cyclic send - bit 1.6	Unassigned	r
		0x040F	Bit	Cyclic send - bit 1.7	Unassigned	r
0x0401			Word	PLC/PCS analog. Input 1	Max. current I_max	r
0x0402			Word	PLC/PCS analog. Input 2	Unassigned	r
0x0403			Word	PLC/PCS analog. Input 3	Unassigned	r
0x0404			Word	PLC/PCS analog. Input 4	Unassigned	r

4.4 Measured values

Read-only access to the measured values is possible from the register memory area with function codes 03 and 04.

Max. data length per access: 16 registers.

Table 4- 4 Measured values

Input/holding register		Identifier	Type	Area	Units	Access [5]
Address offset	high/low					
0x0800		*Reserved*	*Byte[2]*			*r*
0x0801		*Reserved*	*Byte[2]*			*r*
0x0802	high	Thermal motor model	Byte	0 - 255	See [2])	r
	low	Phase unbalance	Byte	0 - 100	1 %	r
0x0803	high	Cos phi	Byte	0 - 100	1 %	r
	low	*Reserved*	*Byte[1]*			*r*
0x0804		*Reserved*	*Byte[2]*			*r*
0x0805		*Reserved*	*Byte[2]*			*r*
0x0806		Max. current I_max	Word	0 - 65535	1 % / I_s	r
0x0807		Current I_L1	Word	0 - 65535	1 % / I_s	r
0x0808		Current I_L2	Word	0 - 65535	1 % / I_s	r
0x0809		Current I_L3	Word	0 - 65535	1 % / I_s	r
0x080A		Last trip current	Word	0 - 65535	1 % / I_s	r
0x080B		Time to trip	Word	0 - 65535	100 ms	r
0x080C		Cooling down period	Word	0 - 65535	100 ms	r
0x080D		Voltage U_L1	Word	0 - 65535	1 V	r
0x080E		Voltage U_L2	Word	0 - 65535	1 V	r
0x080F		Voltage U_L3	Word	0 - 65535	1 V	r
0x0810		AM1 - output	Word	0 - 32767	See [1]	r
0x0811		AM1 - input 1	Word	0 - 32767		r
0x0812		AM1 - input 2	Word	0 - 32767		r
0x0813		*Reserved*	*Word*	*0 - 32767*		*r*
0x0814		TM1 - Temperature	Word	0 - 65535	1 K see [3]	r
0x0815		TM1 - temperature 1	Word	0 - 65535		r
0x0816		TM1 - temperature 2	Word	0 - 65535		r
0x0817		TM1 - temperature 3	Word	0 - 65535		r
0x0818		EM+ [4] - ground-fault current	Word	0 - 65535		r
0x0819		EM+ [4] - last tripping current	Word	0 - 65535		r
0x081A		Active power P	D word	0 - 0xFFFFFFFF	1 W	r
0x081C		Apparent power S	D word	0 - 0xFFFFFFFF	1 VA	r

1) S7 format: 0/4 mA = 0; 20 mA = 27648

2) Representation of the "Thermal motor model": Value related to symmetrical trip level, representation in steps of 2 % in bits 6 ...0 (range 0 to 254 %), bit 7 shows unbalance (fixed level 50 %)

3) Representation in Kelvin

4) 3UF7510-1AA00-0 ground-fault module

5) r/w: Value is read/write; r: Value is read-only

4.5 Display and statistical data

Read access to the display and statistical data is possible both from the register memory area with function codes 03 and 04, or the coil memory area with function codes 01 and 02.

Individual statistical data can be written via the register memory area with function codes 06 and 16, and be reset, for example.

Max. data length per access: 38 registers.

Table 4- 5 Display and statistical data

Input/holding register		Description	Type	Range	Unit	Access [1]
Address	high/low					
0x0C00		Coordination	Byte[4]			r
0x0C02	high	Permissible starts - actual value	Byte	0 .. 255		r/w
	low	DM-F - Time until test requirement	Byte	0 .. 255	1 week	r
0x0C03		*Reserved*	*Byte[2]*			*r*
0x0C04		Number of parameterizations	Word	0 .. 65535		r
0x0C05		Number of overload trips	Word	0 .. 65535		r/w
0x0C06		Number of internal overload trips	Word	0 .. 65535		r
0x0C07		Stop time	Word	0 .. 65535	1 h	r/w
0x0C08		Timer 1 actual value	Word	0 .. 65535	100 ms	r
0x0C09		Timer 2 actual value	Word	0 .. 65535	100 ms	r
0x0C0A		Timer 3 actual value	Word	0 .. 65535	100 ms	r
0x0C0B		Timer 4 actual value	Word	0 .. 65535	100 ms	r
0x0C0C		Counter 1 actual value	Word	0 .. 65535		r
0x0C0D		Counter 2 actual value	Word	0 .. 65535		r
0x0C0E		Counter 3 actual value	Word	0 .. 65535		r
0x0C0F		Counter 4 actual value	Word	0 .. 65535		r
0x0C10		Calculator 1 output	Word	0 .. 65535		r
0x0C11		Calculator 2 output	Word	0 .. 65535		r
0x0C12		*Reserved*	*Word[2]*			*r*
0x0C14		Motor operating hours	D word	0 to 0xFFFFFFFF	1 s	r/w
0x0C16		Internal motor operating hours	D word	0 .. 0xFFFFFFFF	1 s	r
0x0C18		Device operating hours	D word	0 .. 0xFFFFFFFF	1 s	r
0x0C1A		Number of starts	D word	0 .. 0xFFFFFFFF		r/w
0x0C1C		Number of internal starts CW	D word	0 .. 0xFFFFFFFF		r
0x0C1E		Number of internal starts CCW	D word	0 .. 0xFFFFFFFF		r
0x0C20		Energy W	D word	0 .. 0xFFFFFFFF	1 kWh	r/w

1) r/w: Value is read/write; r: Value is read-only

4.6 Device diagnostics

Read-only access to the device diagnostics is possible from the register memory area with function codes 03 and 04, or the coil memory area with function codes 01 and 02.

Max. data length per access: 16 registers.

Table 4- 6 Device diagnostics

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C00	low	Bit	*0x1C00*	*Reserved*	*r*
			0x1C01	*Reserved*	*r*
			0x1C02	*Reserved*	*r*
			0x1C03	*Reserved*	*r*
			0x1C04	*Reserved*	*r*
			0x1C05	*Reserved*	*r*
			0x1C06	*Reserved*	*r*
			0x1C07	*Reserved*	*r*
	high	Bit	0x1C08	Status - group fault	r
			0x1C09	Status - group warning	r
			0x1C0A	Status - device	r
			0x1C0B	Status - bus	r
			0x1C0C	Status - PLC/PCS	r
			0x1C0D	Status - current flowing	r
			0x1C0E	Status - PE command Start_Pause pending	r
			0x1C0F	Status - PE energy saving mode active	r
0x1C01	low	Bit	0x1C10	Status - On<<	r
			0x1C11	Status - On<	r
			0x1C12	Status - Off	r
			0x1C13	Status - On>	r
			0x1C14	Status - On>>	r
			0x1C15	Status - start active	r
			0x1C16	Status - Interlocking time active	r
			0x1C17	Status - Change-over pause active	r
	high	Bit	0x1C18	Status - Runs in open direction	r
			0x1C19	Status - Runs in close direction	r
			0x1C1A	Status - FC	r
			0x1C1B	Status - FO	r
			0x1C1C	Status - TC	r
			0x1C1D	Status - TO	r
			0x1C1E	Status - Cold run TPF	r
			0x1C1F	Status - OPO	r

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C02	low	Bit	0x1C20	Status - Auto mode	r
			0x1C21	Status - Emergency start executed	r
			0x1C22	Status - Cooling down period active	r
			0x1C23	Status - Pause time active	r
			0x1C24	Status - Device test active	r
			0x1C25	Status - Phase sequence 1-2-3	r
			0x1C26	Status - Phase sequence 3-2-1	r
			0x1C27	Status - DM-F enabling circuit	r
	high	Bit	0x1C28	Event - overload operation	r
			0x1C29	Event - unbalance	r
			0x1C2A	Event - overload	r
			0x1C2B	Event - overload + phase failure	r
			0x1C2C	Event - internal ground fault	r
			0x1C2D	Event - external ground fault	r
			0x1C2E	Event - external ground fault warning	r
			0x1C2F	Event - thermistor overload	r
0x1C03	low	Bit	0x1C30	Event - thermistor short circuit	r
			0x1C31	Event - thermistor open circuit	r
			0x1C32	Event - TM warning T>	r
			0x1C33	Event - TM trip T>	r
			0x1C34	Event - TM sensor fault	r
			0x1C35	Event - TM out of range	r
			0x1C36	Event - EM+ open circuit	r
			0x1C37	Event - EM+ short-circuit	r
	high	Bit	0x1C38	Event - Warning I>	r
			0x1C39	Event - Warning I<	r
			0x1C3A	Event - Warning P>	r
			0x1C3B	Event - Warning P<	r
			0x1C3C	Event - Warning cos phi<	r
			0x1C3D	Event - Warning U<	r
			0x1C3E	Event - warning 0/4 - 20mA>	r
			0x1C3F	Event - warning 0/4 - 20mA<	r

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
1x1C04	low	Bit	0x1C40	Event - Trip I>	r
			0x1C41	Event - Trip I<	r
			0x1C42	Event - Trip P>	r
			0x1C43	Event - Trip P<	r
			0x1C44	Event - Trip cos phi<	r
			0x1C45	Event - Trip U<	r
			0x1C46	Event - Trip 0/4-20 mA> 1	r
			0x1C47	Event - Trip 0/4-20 mA< 1	r
	high	Bit	0x1C48	Event - Stalled rotor	r
			0x1C49	*Reserved bit[1]*	r
			0x1C4A	*Reserved bit[1]*	r
			0x1C4B	Event - no start permitted	r
			0x1C4C	Event - No. of starts >	r
			0x1C4D	Event - Just one start possible	r
			0x1C4E	Event - Motor operating hours >	r
			0x1C4F	Event - Motor stop time >	r
0x1C05	low	Bit	0x1C50	Event - Limit 1	r
			0x1C51	Event - Limit 2	r
			0x1C52	Event - Limit 3	r
			0x1C53	Event - Limit 4	r
			0x1C54	Event - External fault 1	r
			0x1C55	Event - External fault 2	r
			0x1C56	Event - External fault 3	r
			0x1C57	Event - External fault 4	r
	high	Bit	0x1C58	Event - External fault 5	r
			0x1C59	Event - External fault 6	r
			0x1C5A	*Reserved event - External fault 7*	*r*
			0x1C5B	*Reserved event - External fault 8*	*r*
			0x1C5C	Event - AM1 open circuit	r
			0x1C5D	Event - DM-F safety-related tripping	r
			0x1C5E	Event - DM-F - Test requirement	r
			0x1C5F	*Reserved*	*r*

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C06	low	Bit	0x1C60	Event - timestamp function active + ok	r
			0x1C61	*Reserved*	*r*
			0x1C62	Event - DM-FL safety ok	r
			0x1C63	*Reserved*	*r*
			0x1C64	Event - Configured operator panel missing	r
			0x1C65	Event - Module not supported	r
			0x1C66	Event - module voltage missing	r
			0x1C67	*Reserved*	r
	high	Bit	0x1C68	Event - memory module read in	r
			0x1C69	Event - memory module programmed	r
			0x1C6A	Event - Memory module erased	r
			0x1C6B	*Reserved*	*r*
			0x1C6C	Event - Initialization module read in	r
			0x1C6D	Event - Initialization module programmed	r
			0x1C6E	Event - Initialization module cleared	r
			0x1C6F	Event - Addressing plug read in	r
0x1C07	low	Bit	0x1C70	Event - startup parameter block active	r
			0x1C71	Event - parameter changes not allowed in the current operating state	r
			0x1C72	Event - Device does not support the required functions	r
			0x1C73	Event - Bad parameter	r
			0x1C74	Event - Password wrong	r
			0x1C75	Event - Password protection active	r
			0x1C76	Event - Factory settings	r
			0x1C77	Event - Parameterization active	r
	high	Bit	0x1C78	Event - Prm error number	r
			0x1C79	Event - Prm error number	r
			0x1C7A	Event - Prm error number	r
			0x1C7B	Event - Prm error number	r
			0x1C7C	Event - Prm error number	r
			0x1C7D	Event - Prm error number	r
			0x1C7E	Event - Prm error number	r
			0x1C7F	Event - Prm error number	r

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C08	low	Bit	0x1C80	Event - DM-FL configuration operation	r
			0x1C81	Event - DM-FL actual and set configuration are different	r
			0x1C82	Event - DM-FL waiting for start-up test	r
			0x1C83	*Reserved*	*r*
			0x1C84	Event - initialization module write-protected, parameter changes not allowed	r
			0x1C85	Event - memory module write-protected	r
			0x1C86	Event - initialization module write-protected	r
			0x1C87	Event - initialization module ident. data write protected	r
	high	Bit	0x1C88	Warning - overload operation	r
			0x1C89	Warning - Unbalance	r
			0x1C8A	Warning - Overload	r
			0x1C8B	Warning - Overload + phase failure	r
			0x1C8C	Warning - Internal ground fault	r
			0x1C8D	Warning - external ground fault	r
			0x1C8E	*Reserved*	*r*
			0x1C8F	Warning - Thermistor overload	r
0x1C09	low	Bit	0x1C90	Warning - Thermistor short circuit	r
			0x1C91	Warning - Thermistor open circuit	r
			0x1C92	Warning - TM1 warning T >	r
			0x1C93	*Reserved*	*r*
			0x1C94	Warning - TM1 sensor fault	r
			0x1C95	Warning - TM1 out of range	r
			0x1C96	Warning - EM+ open circuit	r
			0x1C97	Warning - EM+ short circuit	r
	high	Bit	0x1C98	Warning - Warning I>	r
			0x1C99	Warning - Warning I<	r
			0x1C9A	Warning - Warning P>	r
			0x1C9B	Warning - Warning P<	r
			0x1C9C	Warning - Warning cos phi<	r
			0x1C9D	Warning - Warning U<	r
			0x1C9E	Warning - Warning 0/4 - 20mA>	r
			0x1C9F	Warning - Warning 0/4 - 20mA<	r

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C0A	low	Bit	0x1CA0	Warning - Stalled rotor	r
			0x1CA1	*Reserved*	*r*
			0x1CA2	*Reserved*	*r*
			0x1CA3	Warning - No start possible	r
			0x1CA4	Warning - Number of starts >	r
			0x1CA5	Warning - Just one start possible	r
			0x1CA6	Warning - Motor operating hours>	r
			0x1CA7	Warning - Motor stop time >	r
	high	Bit	0x1CA8	Warning - External fault 1	r
			0x1CA9	Warning - External fault 2	r
			0x1CAA	Warning - External fault 3	r
			0x1CAB	Warning - External fault 4	r
			0x1CAC	Warning - External fault 5	r
			0x1CAD	Warning - External fault 6	r
			0x1CAE	*Reserved warning - External fault 7*	*r*
			0x1CAF	*Reserved warning - External fault 8*	*r*
0x1C0B	low	Bit	0x1CB0	Warning - AM1 open circuit	r
			0x1CB1	Warning - DM-F safety-related tripping	r
			0x1CB2	Warning - DM-F test requirement	r
			0x1CB3	*Reserved*	*r*
			0x1CB4	*Reserved*	*r*
			0x1CB5	*Reserved*	*r*
			0x1CB6	Warning - DM-F feedback circuit	r
			0x1CB7	Warning - DM-FL simultaneity	r
	high	Bit	0x1CB8	Fault - hardware fault basic unit	r
			0x1CB9	Fault - Module fault	r
			0x1CBA	Fault - Temporary components	r
			0x1CBB	Fault - configuration error	r
			0x1CBC	Fault - Parameterization	r
			0x1CBD	Fault - bus	r
			0x1CBE	Fault - PLC/PCS	r
			0x1CBF	*Reserved*	*r*

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C0C	low	Bit	0x1CC0	Fault - execution ON command	r
			0x1CC1	Fault - execution STOP command	r
			0x1CC2	Fault - feedback (FB) ON	r
			0x1CC3	Fault - feedback (FB) OFF	r
			0x1CC4	Fault - stalled positioner	r
			0x1CC5	Fault - double 0	r
			0x1CC6	Fault - double 1	r
			0x1CC7	Fault - end position	r
	high	Bit	0x1CC8	Fault - antivalence	r
			0x1CC9	Fault - Cold run (TPF) error	r
			0x1CCA	Fault - power failure (UVO)	r
			0x1CCB	Fault - Operational Protection Off (OPO)	r
			0x1CCC	*Reserved*	*r*
			0x1CCD	*Reserved*	*r*
			0x1CCE	*Reserved*	*r*
			0x1CCF	*Reserved*	*r*
0x1C0D	low	Bit	*0x1CD0*	*Reserved*	*r*
			0x1CD1	Fault - unbalance	r
			0x1CD2	Fault - overload	r
			0x1CD3	Fault - overload + phase failure	r
			0x1CD4	Fault - int. ground fault	r
			0x1CD5	Fault - ext. ground fault	r
			0x1CD6	*Reserved*	*r*
			0x1CD7	Fault - thermistor overload	r
	high	Bit	0x1CD8	Fault - thermistor short circuit	r
			0x1CD9	Fault - thermistor open circuit	r
			0x1CDA	*Reserved*	*r*
			0x1CDB	Trip - TM1 trip T>	r
			0x1CDC	Trip - TM1 sensor fault	r
			0x1CDD	Trip - TM1 out of range	r
			0x1CDE	Fault - EM+ open circuit	r
			0x1CDF	Fault - EM+ short circuit	r

Input/holding register		Type	Discrete input / coil address	Identifier	Access [1]
Address	high/low				
0x1C0E	low	Bit	0x1CE0	Fault - trip I>	r
			0x1CE1	Fault - trip I<	r
			0x1CE2	Fault - trip P>	r
			0x1CE3	Fault - trip P<	r
			0x1CE4	Fault - trip cos phi<	r
			0x1CE5	Fault - trip U<	r
			0x1CE6	Fault - Trip 0/4 - 20mA>	r
			0x1CE7	Fault - Trip 0/4 - 20mA<	r
	high	Bit	0x1CE8	Fault - stalled rotor	r
			0x1CE9	*Reserved*	*r*
			0x1CEA	*Reserved*	*r*
			0x1CEB	*Reserved*	*r*
			0x1CEC	Fault - Number of starts >	r
			0x1CED	*Reserved*	*r*
			0x1CEE	*Reserved*	*r*
			0x1CEF	*Reserved*	*r*
0x1C0F	low	Bit	0x1CF0	Fault - External fault 1	r
			0x1CF1	Fault - External fault 2	r
			0x1CF2	Fault - External fault 3	r
			0x1CF3	Fault - External fault 4	r
			0x1CF4	Fault - External fault 5	r
			0x1CF5	Fault - External fault 6	r
			0x1CF6	*Reserved fault - External fault 7*	*r*
			0x1CF7	*Reserved fault - External fault 8*	*r*
	high	Bit	0x1CF8	Fault - AM1 open circuit	r
			0x1CF9	Fault - test trip	r
			0x1CFA	Fault - DM-F safety-related tripping	r
			0x1CFB	Fault - DM-F wiring	r
			0x1CFC	Fault - DM-FL cross circuit	r
			0x1CFD	*Reserved*	*r*
			0x1CFE	*Reserved*	*r*
			0x1CFF	*Reserved*	*r*

1) r/w: Value is read/write; r: Value is read-only

4.7 Error memory

Read-only access to the error memory is possible via function codes 03 and 04 .

Max. data length per access: 63 registers.

Table 4- 7 Error memory

Input register		Entry	Designation[1)]	Type	Units	Access [2)]
Address	high/low					
0x2100		1	Time stamp	D word	1 s	r
0x2102	high		Entry - Type	Byte		r
	low		Entry - Info	Byte		r
0x2103		2	Time stamp	D word	1 s	r
0x2105	high		Entry - Type	Byte		r
	low		Entry - Info	Byte		r
...			...			r
0x213C		21	Time stamp	D word	1 s	r
0x213E	high		Entry - Type	Byte		r
	low		Entry - Info	Byte		r

1) The meaning of the error events can be seen from Table 16-1 "Alarm, fault, and system events" of the SIMOCODE pro PROFIBUS System Manual (http://support.automation.siemens.com/WW/view/en/20017780).

2) r/w: Value is read/write; r: Value is read-only

4.8 Event memory

Max. data length per access: 83 registers.

Table 4- 8 Event memory

Input/holding register		Entry	Identifier	Type	Units	Access [2]
Address	**high/low**					
0x2200		1	Time stamp	D word	1 s	r
0x2202	high		Entry - Type	Byte		r
	low		Entry - Info (part 1) [1]	Byte		r
0x2203	high/low		Entry - Info (part 2) [1]	Byte[2]		r
0x2204		2	Time stamp	D word	1 s	r
0x2206	high		Entry - Type	Byte		r
	low		Entry - Info (part 1) [1]	Byte		r
0x2207	high/low		Entry - Info (part 2) [1]	Byte[2]		r
0x2208		3	Time stamp	D word	1 s	r
0x220A	high		Entry - Type	Byte		r
	low		Entry - Info (part 1) [1]	Byte		r
0x220B			Entry - Info (part 2) [1]	Byte[2]		r
			...			r
0x2250		21	Time stamp	D word	1 s	r
0x2252	high		Entry - Type	Byte		r
	low		Entry - Info (part 1) [1]	Byte		r
0x2253	high/low		Entry - Info (part 2) [1]	Byte[2]		r

1) Entry - Info consists of a total of 3 bytes distributed across two register addresses respectively.

The following applies for the data set length: SIMOCODE pro V basic unit Modbus RTU: 168 byte

2) r/w: Value is read/write; r: Value is read-only

4.9 Trace data

Max. data length per access: 100 registers.

Table 4- 9 Trace data

Input/holding register			Identifier	Type	Area	Access [1]
Address	**high/low byte; bit position**	**Bit**				
0x2A80			StartPos	Word	0	r
0x2A81	high		Channel No.	Byte	0 ... 59	r
	low	0	Trace status - Trace recording in progress	Bit	0, 1	r
		1	Trace status - Trigger event occurred	Bit	0, 1	r
		2-7	*Reserved*	*Bit[6]*	*0*	*r*
0x2A82			Measured value (0)	Word	0 ... 65535	r
0x2A83			Measured value (1)	Word	0 ... 65535	r
...			...	Word	0 ... 65535	r
0x2ABD			Measured value (59)	Word	0 ... 65535	r

1) r/w: Value is read/write; r: Value is read-only

4.10 I&M0 - device identification

Max. data length per access: 32 registers.

Table 4- 10 I&M (device identification)

Input register Address	Content	Size	Coding (H)	Access [1]
0x4000	RESERVED	10 byte	0x00, ... 0x00	r
0x4005	MANUFACTURER_ID	2 bytes	42 = 0x002A (SIEMENS AG)	r
0x4006	ORDER_ID	20 byte	"3UF7 ..."	r
0x4010	SERIAL_NUMBER	16 byte	ASCII	r
0x4018	HARDWARE_REVISION	2 bytes		r
0x4019	SOFTWARE_REVISION	4 byte	Va.b.c	r
0x401B	REVISION_COUNTER	2 bytes	0x0000	r
0x401C	PROFILE_ID	2 bytes	0x5E10 = VA, GG3 = 0	r
0x401D	PROFILE_SPECIFIC_TYPE	2 bytes	0x1039 = GG2_MBR	r
0x401E	IM_VERSION	2 bytes	0x0101 (V1.1)	r
0x401F	IM_SUPPORTED	2 bytes	0x000E	r

Data set length: 64 bytes

1) r/w: Value is read/write; r: Value is read-only

4.11 I&M1 - Tag

Max. data length per access: 32 registers.

Table 4- 11 I&M1 - Tag

Input/holding register Address	Content	Size	Access 1)
0x4020	*Reserved*	*10 byte*	*r*
0x4025	Plant identifier	32 byte	r/w
0x4035 ... 0x403F	Location designation	22 byte	r/w

Access to these designations via Modbus: read/write

1) r/w: Value is read/write; r: Value is read-only

4.12 I&M2 - Installation date

Max. data length per access: 32 registers.

Table 4- 12 I&M2 - Installation date

Input/holding register Address	Content	Size	Access [1]
0x4040	*Reserved*	*10 byte*	*r*
0x4045	Date	16 byte	r/w

1) Access to the installation date via Modbus: read/write

4.13 I&M3 - Comment

Max. data length per access: 32 registers.

Table 4- 13 I&M3 - Comment

Input/holding register Address	Content	Size	Access [1]
0x4060	*Reserved*	*10 byte*	*r*
0x4065 ... 0x407F	Comments	54 byte	r/w

1) Access to the comment via Modbus: read/write

4.14 Basic device parameter 1

Read access to the device parameters is possible from the register memory area with function codes 03 and 04.

Individual parameter data (marked with the motor symbol in the "Info" column) can be written via Modbus RTU via the register memory area with function codes 06 and 16. This function can be used to adjust settings such as the rated motor current during operation of the motor.

Max. dataset length per access: 46 registers.

Nevertheless, the "SIMOCODE ES V13" software is required for full parameterization of the SIMOCODE pro V Modbus devices (see also Section Commissioning with Modbus RTU (Page 14)).

Table 4- 14 Basic device parameter 1

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4180			**Coordination**	Byte[4]						r
0x4182			**Device configuration**	Byte[8]						r
0x4186	high	0	No configuration fault due to OP	Bit	0, 1		0			r
		1	Startup parameter block active	Bit	0, 1		0			r
		2	TEST/RESET buttons blocked	Bit	0, 1		0			r
		3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto		r
		4	*Reserved*	*Bit*			*0*			*r*
		5	*Reserved*	*Bit*			*0*			*r*
		6	*Reserved*	*Bit*			*0*			*r*
		7	*Reserved*	*Bit*			*0*			*r*
	low	0	Diagnostics for process events	Bit	0, 1		0			r
		1	Diagnostics for process warnings	Bit	0, 1		1			r
		2	Diagnostics for process faults	Bit	0, 1		1			r
		3	Diagnostics for device faults	Bit	0, 1		1			r
		4	*Reserved*	*Bit*			*0*			*r*
		5	*Reserved*	*Bit*			*0*			*r*
		6	Bus monitoring	Bit	0, 1		1			r
		7	PLC/PCS monitoring	Bit	0, 1		1			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4187	high	0	Motor protection - Type of load	Bit	0, 1		0	0 = 3-phase 1 = 1-phase		r
		1	Motor protection - Reset	Bit	0, 1		0	0 = Manual 1 = Auto		r
		2	*Reserved*	*Bit*			*0*			*r*
		3	Save change-over command	Bit	0, 1		0			r
		4	Non-maintained command mode	Bit	0, 1		0			r
		5	Cold start level (TPF)	Bit	0, 1		0	0 = NO contact 1 = NC contact		r
		6	Type of consumer load	Bit	0, 1		0	0 = Motor 1 = ohmic load		r
		7	*Reserved*	*Bit*			*0*			*r*
	low	0	External fault level 1	Bit	0, 1		0	0 = NO contact 1 = NC contact		r
		1	External fault level 2	Bit	0, 1		0			r
		2	External fault level 3	Bit	0, 1		0			r
		3	External fault level 4	Bit	0, 1		0			r
		4	Monitoring external fault 1	Bit	0, 1		0	0 = Always 1 = Only motor ON		r
		5	Monitoring external fault 2	Bit	0, 1		0			r
		6	Monitoring external fault 3	Bit	0, 1		0			r
		7	Monitoring external fault 4	Bit	0, 1		0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Bit[2] parameter							
0x4188	high	0-1	Thermistor - Overload response	Bit[2]	1, 2, 3		3	0 = disabled 1 = Signaling 2 = Warning 3 = Tripping		r
		2-3	Thermistor - Response to sensor fault	Bit[2]	0, 1, 2, 3		2			r
		4-5	Internal ground fault - Response	Bit[2]	0, 1, 2, 3		0			r
		6-7	Motor protection - Overload response	Bit[2]	0, 1, 2, 3		0			r
	low	0-1	Motor protection - Overload response	Bit[2]	0, 1, 2		2			r
		2-3	Motor protection - Response to unbalance	Bit[2]	0, 1, 2, 3		2			r
		4-5	Trip response I>	Bit[2]	0, 1, 3		0			r
		6-7	Warning response I>	Bit[2]	0, 1, 2		0			r
0x4189	high	0-1	Trip response I<	Bit[2]	0, 1, 3		0			r
		2-3	Warning response I<	Bit[2]	0, 1, 2		0			r
		4-5	Response to stalled rotor	Bit[2]	0, 1, 2, 3		0			r
		6-7	EM+ - Response to sensor fault	Bit[2]	0, 1, 2, 3		0			r
	low	0-1	Response to number of starts >	Bit[2]	0, 1, 2, 3		0			r
		2-3	Response to early warning number of starts >	Bit[2]	0, 1, 2		0			r
		4-5	Motor operating hours response >	Bit[2]	0, 1, 2		0			r
		6-7	Motor stop time response >	Bit[2]	0, 1, 2		0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x418A	high	0-1	External fault response 1	Bit[2]	1, 2, 3		1			r
		2-3	External fault response 2	Bit[2]	1, 2, 3		1			r
		4-5	External fault response 3	Bit[2]	1, 2, 3		1			r
		6-7	External fault response 4	Bit[2]	1, 2, 3		1			r
	low	0-1	*Reserved*	*Bit[2]*			*0*			r
		2-3	Delay for BU inputs	Bit[2]	0 ... 3	10 ms	1	Offset 6 ms		r
		4-5	Timer 1 - type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay 1 = Closing delay with memory 2 = With OFF delay 3 = With fleeting closing		r
		6-7	Timer 2 - type	Bit[2]	0, 1, 2, 3		0			r
0x418B	high	0-1	Signal conditioning 1 - type	Bit[2]	0, 1, 2, 3		0	0 = Non-inverting 1 = Inverting 2 = Edge rising with memory 3 = Edge falling with memory		r
		2-3	Signal conditioning 2 - type	Bit[2]	0, 1, 2, 3		0			r
		4-5	Non-volatile element 1 - type	Bit[2]	0, 1, 2, 3		0			r
		6-7	Non-volatile element 2 - type	Bit[2]	0, 1, 2, 3		0			r
	low	0-1	EM+ - monitoring	Bit[2]	0, 1, 2, 3		0	0 = on 1 = on+ 2 = run 3 = run+		r
		2-3	EM+ - monitoring warning	Bit[2]	0, 1, 2, 3		0			r
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	*Reserved*	*Bit[2]*			*0*			*r*

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Bit[4] parameters							r
0x418C	high		Reset response external fault 1	Bit[4]	0 ... 1111B		0101B	Bit[0] = Panel reset		r
			Reset response external fault 2	Bit[4]	0 ... 1111B		0101B	Bit[1] = Auto reset		r
	low		Reset response external fault 3	Bit[4]	0 ... 1111B		0101B	Bit[2] =Remote reset		r
			Reset response external fault 4	Bit[4]	0 ... 1111B		0101B	Bit[1] = OFF command reset		r
0x418D	high	0-3	Hysteresis current levels	Bit[4]	0 ... 15	1 %	5			r
		4-7	EM+ - hysteresis	Bit[4]	0 ... 15	1 %	5			r
	low		*Reserved*	*Bit[4]*			*0*			*r*
			Reserved	*Bit[4]*			*0*			*r*
			Part - Byte parameters							
0x418E	high		Internal ground fault - Delay	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Motor protection - Class	Byte	5, 10 ... 35, 40		10			r/w
0x418F	high		Motor protection - Delay with overload operation	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Motor protection - Unbalance level	Byte	0 ... 100	1 %	40		IM/UM	r/w
0x4190	high		Motor protection - Delay with unbalance	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Interlocking time	Byte	0 ... 255	1 s	0			r/w
0x4191	high		FB time	Byte	0 ... 255	100 ms	5	0 = disabled		r/w
	low		Trip level I>	Byte	0 ... 255	4 % / I_s	0		IM/UM	r/w

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4192	high		Warning level I>	Byte	0 ... 255	4 % / I_s	0		IM/UM	r/w
	low		Trip level I<	Byte	0 ... 255	4 % / I_s	0		IM/UM	r/w
0x4193	high		Warning level I<	Byte	0 ... 255	4 % / I_s	0		IM/UM	r/w
	low		Stalled rotor level	Byte	0 ... 255	4 % / I_s	0		IM/UM	r/w
0x4194	high		Trip delay I>	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Warning delay I>	Byte	0 ... 255	100 ms	5		IM/UM	r/w
0x4195	high		Trip delay I<	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Warning delay I<	Byte	0 ... 255	100 ms	5		IM/UM	r/w
0x4196	high		Blocking delay	Byte	0 ... 255	100 ms	5		IM/UM	r/w
	low		Monitoring the number of starts - Permissible starts	Byte	1 ... 255		1			r/w
0x4197	high		*Reserved*	*Byte*			*0*			
	low		EM+ - warning delay	Byte	0 ... 255	100 ms	1			r/w
0x4198	high		Truth table 1 type 3I/1O	Byte	0 ...111 11111B		0			r
	low		Truth table 2 type 3I/1O	Byte	0 ...111 11111B		0			r
0x4199	high		Truth table 3 type 3I/1O	Byte	0 ...111 11111B		0			r
	low		*Reserved*	Byte			0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Word parameters							
0x419A			Motor protection - Cooling down period	Word	600 ... 65535	100 ms	3000		IM/UM	r/w
0x419B			Motor protection - Pause time	Word	0 ... 65535	100 ms	0	0 = disabled	IM/UM	r/w
0x419C			Validity period	Word	0 ... 65535	100 ms	10	0 = disabled		r/w
0x419D			Monitoring the number of starts - Time range for starts	Word	0 ... 65535	1 s	0			r/w
0x419E			Monitoring the number of starts - Interlocking time	Word	0 ... 65535	1 s	0			r/w
0x419F			Motor stop time level >	Word	0 ... 65535	1 h	0			r/w
0x41A0			Timer 1 value	Word	0 ... 65535	100 ms	0			r/w
0x41A1			Timer 2 value	Word	0 ... 65535	100 ms	0			r/w
0x41A2			Counter 1 value	Word	0 ... 65535		0			r/w
0x41A3			Counter 2 value	Word	0 ... 65535		0			r/w
0x41A4			EM+ - trip level	Word	30 ... 40000	1 mA	1000			r/w
0x41A5			EM+ - warning level	Word	30 ... 40000	1 mA	500			r/w
			Part - D word parameter							
0x41A6			Operator control enables	Bit[32]	0 ... 1 ... 1B		0 ... 0B			r
0x41A8			Motor protection - Set current Is1 [2]	D word		10 mA	30		IM/UM	r/w
0x41AA			Motor operating hours level >	D word	0 ... 0x FFFFFFFF	1 s	0			r/w
0x41AC			*Reserved*	*D word*			*0*			*r*

1) r/w: Value is read/write; r: Value is read-only

2) Bit 15 = 1 → Transformation ratio active

4.15 Extended device parameters 1

Read access to the device parameters is possible from the register memory area with function codes 03 and 04.

Individual parameter data (marked with the motor symbol in the "Info" column) can be written via Modbus RTU via the register memory area with function codes 06 and 16. This function can be used to adjust settings such as the rated motor current during operation of the motor.

Nevertheless, the "SIMOCODE ES V13" software is required for full parameterization of the SIMOCODE pro V Modbus devices (see also Section Commissioning with Modbus RTU (Page 14)).

Max. data length per access: 72 registers.

Table 4- 15 Extended device parameters 1

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4380			**Coordination**	Byte[4]						r
			Part - Bit parameters							
0x4382	high	0	3UF50 compatibility mode	Bit	0, 1		0			r
		1	3UF50 operating mode	Bit	0, 1		0	0 = DPV0 1 = DPV1		r
		2	*Reserved*	*Bit*			*0*			r
		3	*Reserved*	*Bit*			*0*			r
		4	*Reserved*	*Bit*			*0*			r
		5	*Reserved*	*Bit*			*0*			r
		6	*Reserved*	*Bit*			*0*			r
		7	*Reserved*	*Bit*			*0*			r
	low	0	*Reserved*	*Bit*			*0*			r
		1	Voltage measuring - Type of load	Bit	0, 1		0	0 = 3-phase 1 = 1-phase		r
		2	OPD - Warnings	Bit	0, 1		0	0 = Do not display 1 = Display		r
		3	OPD - Faults	Bit	0, 1		1			
		4	AM1 - Measuring range input	Bit	0, 1		0	0 = 0 ... 20 mA 1 = 4 ... 20 mA		r
		5	AM1 - Measuring range Output	Bit	0, 1		0			r
		6	*Reserved*	*Bit*			*0*			*r*
		7	*Reserved*	*Bit*			*0*			*r*

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4383	high	0	Overshooting/ undershooting limit 1	Bit	0, 1		0	0 = > (overshooting) 1 = < (undershooting)		r
		1	Overshooting/ undershooting limit 2	Bit	0, 1		0			r
		2	Overshooting/ undershooting limit 3	Bit	0, 1		0			r
		3	Overshooting/ undershooting limit 4	Bit	0, 1		0			r
		4	Line-to-line voltage	Bit	0, 1		0	0 = No 1 = Yes		r
		5	OPO level	Bit	0, 1		0	0 = NO contact 1 = NC contact		r
		6	Positioner response for OPO	Bit	0, 1		0	0 = CLOSED 1 = OPEN		r
		7	Star-delta - Transformer mounting	Bit	0, 1		0	0 = Delta 1 = In supply cable		r
	low	0	External fault level 5	Bit	0, 1		0	0 = NO contact 1 = NC contact		r
		1	External fault level 6	Bit	0, 1		0			r
		2	*Reserved*	*Bit*			*0*			*r*
		3	*Reserved*	*Bit*			*0*			*r*
		4	Monitoring external fault 5	Bit	0, 1		0	0 = Always 1 = Only motor ON		r
		5	Monitoring external fault 5	Bit	0, 1		0			r
		6	*Reserved*	*Bit*	*0, 1*		*0*			r
		7	*Reserved*	*Bit*	*0, 1*		*0*			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4384	high	0	Calculator 2 - Operating mode	Bit	0, 1		0	0 = Word 1 = D word		r
		1	*Reserved*	*Bit*			*0*			*r*
		2	DM-F - Safe tripping function	Bit	0, 1		0	0 = No 1 = Yes		r
		3	DM-F - Safety-related tripping reset	Bit	0, 1		0	0 = Manual 1 = Auto		r
		4	Time stamping active	Bit	0, 1		0			r
		5	*Reserved*	*Bit*			*0*			*r*
		6	*Reserved*	*Bit*			*0*			*r*
		7	*Reserved*	*Bit*			*0*			*r*
	low	0	DM-FL - Configuration 1	Bit	0, 1		0	Configurable parameters comparable with the module configuration		r
		1	DM-FL - Configuration 2	Bit	0, 1		0			r
		2	DM-FL - Configuration 3	Bit	0, 1		0			r
		3	DM-FL - Configuration 4	Bit	0, 1		0			r
		4	DM-FL - Configuration 5	Bit	0, 1		0			r
		5	DM-FL - Configuration 6	Bit	0, 1		0			r
		6	DM-FL - Configuration 7	Bit	0, 1		0			r
		7	DM-FL - Configuration 8	Bit	0, 1		0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Bit[2] parameter							r
0x4385	high	0-1	3UF50 basic type	Bit[2]	0, 1, 2		0			r
		2-3	*Reserved*	*Bit[2]*			*0*			r
		4-5	UVO timebase	Bit[2]	0, 1, 2		0	0 = 100 ms 1 = 1 s 2 = 10 s		r
		6-7	UVO operating mode	Bit[2]	0, 1, 2		0	0 = disabled 1 = Device connected to voltage (reserved) 2 = Voltage fails		r
	low	0-1	Trip monitoring U<	Bit[2]	0, 1, 2		1	0 = ON (always)		r
		2-3	Warning monito-ring U <	Bit[2]	0, 1, 2		1	1 = ON+ (always, not TPF) 2 = RUN (motor ON, not TPF)		r
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	Reserved	*Bit[2]*			*0*			*r*
0x4386	high	0-1	Trip monitoring 0/4-20mA >	Bit[2]	0, 1, 2, 3		0			r
		2-3	Warning monitoring 0/4-20mA >	Bit[2]	0, 1, 2, 3		0			r
		4-5	Trip monitoring 0/4-20mA <	Bit[2]	0, 1, 2, 3		0			r
		6-7	Warning monitoring 0/4-20mA <	Bit[2]	0, 1, 2, 3		0			r
	low	0-1	Monitoring limit 1	Bit[2]	0, 1, 2, 3		0			r
		2-3	Monitoring limit 2	Bit[2]	0, 1, 2, 3		0			r
		4-5	Monitoring limit 3	Bit[2]	0, 1, 2, 3		0			r
		6-7	Monitoring limit 4	Bit[2]	0, 1, 2, 3		0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	**high/ low**	**Bit**								
0x4387	high	*0-1*	*Reserved*	*Bit[2]*			*0*			*r*
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	AM1 - active inputs	Bit[2]	0, 1, 2		0	0 = 1 input 1 = 2 inputs 2 = 3 inputs		r
	low	0-1	DM - Input delay	Bit[2]	0 ... 3	10 ms	1	Offset 6 ms		r
		2-3	AM1 - Response to open circuit	Bit[2]	1, 2, 3		2	0 = disabled 1 = Signaling 2 = Warning 3 = Tripping		*r*
		4-5	EM - response to an external ground fault	Bit[2]	1, 3		1			r
		6-7	EM - response to warning of an external ground fault	Bit[2]	0, 1, 2		0			r
0x4388	high	0-1	*Reserved*	*Bit[2]*			*0*			*r*
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	DM-F - Test requirement response	Bit[2]	0, 1, 2		0			r
		6-7	DM-F - safety-related tripping response	Bit[2]	0, 1, 2, 3		0			r
	low	0-1	TM1 - Trip response T>	Bit[2]	1, 3		3			r
		2-3	TM1 - Warning response T>	Bit[2]	0, 1, 2		2			r
		4-5	TM1 - Response to a sensor fault / out of range	Bit[2]	0, 1, 2, 3		2			r
		6-7	TM1 - active sensors	Bit[2]	0, 1, 2		2*)	0 = 1 sensors 1 = 2 sensors 2 = 3 sensors		r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4389	high	0-1	Trip response P>	Bit[2]	0, 1, 3		0	0 = disabled 1 = Signaling 2 = Warning 3 = Tripping		r
		2-3	Warning response P>	Bit[2]	0, 1, 2		0			
		4-5	Trip response P<	Bit[2]	0, 1, 3		0			r
		6-7	Warning response P<	Bit[2]	0, 1, 2		0			r
	low	0-1	Trip response cos phi <	Bit[2]	0, 1, 3		0			r
		2-3	Warning response cos phi <	Bit[2]	0, 1, 2		0			r
		4-5	Trip response U<	Bit[2]	0, 1, 3		0			r
		6-7	Warning response U<	Bit[2]	0, 1, 2		0			r
0x438A	high	0-1	Trip response 0/4-20 mA >	Bit[2]	0, 1, 3		0			r
		2-3	Warning response 0/4-20 mA >	Bit[2]	0, 1, 2		0			r
		4-5	Trip response 0/4-20 mA <	Bit[2]	0, 1, 3		0			r
		6-7	Warning response 0/4-20 mA <	Bit[2]	0, 1, 2		0			r
	low	*0-1*	*Reserved*	*Bit[2]*			*0*			*r*
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	*Reserved*	*Bit[2]*			*0*			*r*
0x438B	high	0-1	External fault response 5	Bit[2]	1, 2, 3		1			r
		2-3	External fault response 6	Bit[2]	1, 2, 3		1			r
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	*Reserved*	*Bit[2]*			*0*			*r*
	low	0-1	Trace - Trigger edge	Bit[2]	0, 1		0	0 = positive 1 = negative		r
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	*Reserved*	*Bit[2]*			*0*			*r*

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x438C	high	*0-1*	*Reserved*	*Bit[2]*			*0*			*r*
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	*Reserved*	*Bit[2]*			*0*			*r*
		6-7	*Reserved*	*Bit[2]*			*0*			*r*
	low	0-1	Timer 3 - type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay 1 = Closing delay with memory 2 = With OFF delay 3 = With fleeting closing		r
		2-3	Timer 4 - type	Bit[2]	0, 1, 2, 3		0			r
		4-5	Signal conditioning 3 - type	Bit[2]	0, 1, 2, 3		0	0 = Non-inverting 1 = Inverting 2 = Edge rising with memory 3 = Edge falling with memory		r
		6-7	Signal conditioning 4 - type	Bit[2]	0, 1, 2, 3		0			r
0x438D	high	0-1	Non-volatile element 3 - type	Bit[2]	0, 1, 2, 3		0			r
		2-3	Non-volatile element 4 - type	Bit[2]	0, 1, 2, 3		0			r
		4-5	Calculator 2 - Operator	Bit[2]	0, 1, 2, 3		0			r
		6-7	*Reserved*	*Bit[2]*			*0*			*r*
	low	0-1	*Reserved*	*Bit[2]*			*0*			*r*
		2-3	*Reserved*	*Bit[2]*			*0*			*r*
		4-5	OPD - Operator panel display (bit 0 ... 1)	Bit[2]	0 ... 4		2	0 = Manual 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min		r
		6-7	OPD - Operator panel display (bit 2 ... 3)	Bit[2]						r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Bit[4] parameters							r
0x438E	high	0-2	TM1 - sensor type	Bit[3]	000B to 100B		000B	000B = PT100 001B = PT1000 010B = KTY83 011B = KTY84 100B = NTC		r
			Reserved	*Bit*						*r*
		4-7	OPD language	Bit[4]	0 ... 15		0			r
	low	0-3	Reset response external fault 5	Bit[4]	0 ... 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto reset Bit[2] = Remote reset Bit[3] = OFF command reset		r
		4-7	Reset response external fault 6	Bit[4]	0 ... 1111B		0101B			r
0x438F	high	0-3	OPD - Contrast (bit 0 ... 3)	Bit[4]	0 ... 255	1 %	50			r
		4-7	OPD - Contrast (bit 4 ... 7)	Bit[4]						r
	low	0-3	OPD - Profile (bit 0 ... 3)	Bit[4]	0 ... 33		0			r
		4-7	OPD - Profile (bit 4 ... 7)	Bit[4]						r
0x4390	high	0-3	Truth table 7 type 2I/1O	Bit[4]	0 ... 1111B		0			r
		4-7	Truth table 8 type 2I/1O	Bit[4]	0 ... 1111B		0			r
	low	0-3	Is1 conversion factor - Denominator	Bit[4]	0 ... 15		0			r
		4-7	Is2 conversion factor - Denominator	Bit[4]	0 ... 15		0			r
0x4391	high	0-3	Hysteresis P - cos phi - U	Bit[4]	0 ... 15	1 %	5			r
		4-7	Hysteresis 0/4-20 mA	Bit[4]	0 ... 15	1 %	5			r
	low	0-3	Hysteresis free limits	Bit[4]	0 ... 15	1 %	5			r
		4-7	OPD - Lighting	Bit[4]	0 ... 4		2	0 = OFF 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min		r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
			Part - Byte parameters							
0x4392	high			*Byte*						*r*
	low		EM - Delay	Byte	0 ... 255	100 ms	5		EM	r/w
0x4393	high		Trip level cos phi<	Byte	0 ... 100	1 %	0		UM	r/w
	low		Warning level cos phi<	Byte	0 ... 100	1 %	0		UM	r/w
0x4394	high		Trip level U<	Byte	0 ... 255	8 V	0		UM	r/w
	low		Warning level U<	Byte	0 ... 255	8 V	0		UM	r/w
0x4395	high		Trip level 0/4-20 mA>	Byte	0 ... 255	*128	0		AM1	r/w
	low		Warning level 0/4-20 mA>	Byte	0 ... 255	*128	0		AM1	r/w
0x4396	high		Trip level 0/4-20 mA<	Byte	0 ... 255	*128	0		AM1	r/w
	low		Warning level 0/4-20 mA>	Byte	0 ... 255	*128	0		AM1	r/w
0x4397	high		Trip delay P>	Byte	0 ... 255	100 ms	5		UM	r/w
	low		Warning delay P>	Byte	0 ... 255	100 ms	5		UM	r/w
0x4398	high		Trip delay P<	Byte	0 ... 255	100 ms	5		UM	r/w
	low		Warning delay P<	Byte	0 ... 255	100 ms	5		UM	r/w

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x4399	high		Trip delay cos phi<	Byte	0 ... 255	100 ms	5		UM	r/w
	low		Warning delay cos phi<	Byte	0 ... 255	100 ms	5		UM	r/w
0x439A	high		Trip delay U<	Byte	0 ... 255	100 ms	5		UM	r/w
	low		Warning delay U<	Byte	0 ... 255	100 ms	5		UM	r/w
0x439B	high		Trip delay 0/4-20 mA>	Byte	0 ... 255	100 ms	5		AM1	r/w
	low		Warning delay 0/4-20 mA>	Byte	0 ... 255	100 ms	5		AM1	r/w
0x439C	high		Trip delay 0/4-20 mA<	Byte	0 ... 255	100 ms	5		AM1	r/w
	low		Warning delay 0/4-20 mA<	Byte	0 ... 255	100 ms	5		AM1	r/w
0x439D	high		Delay limit 1	Byte	0 ... 255	100 ms	5			r/w
	low		Delay limit 2	Byte	0 ... 255	100 ms	5			r/w
0x439E	high		Delay limit 3	Byte	0 ... 255	100 ms	5			r/w
	low		Delay limit 3	Byte	0 ... 255	100 ms	5			r/w
0x439F	high		TM - Hysteresis	Byte	0 ... 255	1 K	5			r
	low		Max. star time	Byte	0 ... 255	1 s	20			r
0x43A0	high		UVO time	Byte	0 ... 255	100 ms, 1 s, 10 s	0			r
	low		Staggering time	Byte	0 ... 255	1 s	0			r
0x43A1	high		Trace - Pre-trigger	Byte	0 ... 20	5 %	0			r
	low		Calculator 2 - Denominator 1	Byte	0 ... 255		0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x43A2	high		Calculator 2 - Numerator 2	Byte	0 ... 255		0			r
	low		Calculator 1 - Denominator	Byte	0 ... 255		0			r
0x43A3	high		Truth table 4 type 3I/1O	Byte	0 ... 111 11111B		0			r
	low		Truth table 5 type 3I/1O	Byte	0 ... 111 11111B		0			r
0x43A4	high		Truth table 6 type 3I/1O	Byte	0 ... 111 11111B		0			r
	low		Calculator 2 - Numerator 1	Byte	-128… 127		0			r/w
0x43A5	high		Calculator 2 - Denominator 2	Byte	-128.. 127		0			r/w
	low		DM-F - Test requirement level	Byte	0 ... 255	Week	0			r/w
			Part - Word parameters							r/w
0x43A6			AM1 - Start value output	Word	0 ... 65535		0	Value for 0/4 mA	AM1	r/w
0x43A7			AM1 - End value output	Word	0 ... 65535		27648	Value for 20 mA	AM1	r/w
0x43A8			TM1 - Trip level T>	Word	0 ... 65535	1 K	0		TM1	r/w
0x43A9			TM1 - Warning level T>	Word	0 ... 65535	1 K	0		TM1	r/w
0x43AA			Limit level 1	Word	0 ... 65535		0			r/w
0x43AB			Limit level 2	Word	0 ... 65535		0			r/w
0x43AC			Limit level 3	Word	0 ... 65535		0			r/w
0x43AD			Limit level 4	Word	0 ... 65535		0			r/w
0x43AE			Timer 3 - value	Word	0 ... 65535	100 ms	0			r
0x43AE			Timer 4 - value	Word	0 ... 65535	100 ms	0			r

Input/holding register			Description	Type	Range	Unit	Default	Comments	Info	Access [1]
Address	high/ low	Bit								
0x43B0			Counter 3 - value	Word	0 ... 65535		0			r/w
0x43B1			Counter 4 - value	Word	0 ... 65535		0			r/w
0x43B2			Change-over pause	Word	0 ... 65535	10 ms	0			r/w
0x43B3			Trace - Sampling period	Word	1 ... 50000	1 ms	100			r/w
0x43B4			Is1 - Conversion factor - Numerator	Word	0 ... 65535	1/8	0			r/w
0x43B5			Is2 - Conversion factor - Numerator	Word	0 ... 65535	1/8	0			r/w
			Part - D word parameter							
0x43B6			Motor protection - Set current Is2	D word		10 mA	0			r
0x43B8			Trip level P>	D word	0 ... 0xFFFF FFFF	1 W	0			r/w
0x43BA			Warning level P>	D word	0 ... 0xFFFF FFFF	1 W	0			r/w
0x43BC			Trip level P<	D word	0 ... 0xFFFF FFFF	1 W	0			r/w
0x43BE			Warning level P<	D word	0 ... 0xFFFF FFFF	1 W	0			r/w
0x43C0			Truth table 9 5I/2O type - Output 1	Bit[32]	0 ... 1 ... 1B		0			r
0x43C2			Truth table 9 5I/2O type - Output 2	Bit[32]	0 ... 1 ... 1B		0			r
0x43C4			Calculator 2 - Offset	D word	-0x800 00000 .. 0x7FFF FFFF		0			r
0x43C6 .. 0x43C7			Calculator 1 - Numerator / offset	D word	2x - 32768 .. 32767		0			r

1) r/w: Value is read/write; r: Value is read-only

4.16 Marking

Max. data length per access: 100 registers.°

Table 4- 16 Marking

Input/holding register		Identifier	Type	Access [1]
Address	high/low			
0x4880		Coordination	Byte[4]	r
0x4882		*Reserved*	*Byte[6]*	*r/w*
0x4885		Marking - external fault 1	Byte[10]	r/w
0x488A		Marking external fault 2	Byte[10]	r/w
0x488F		Marking external fault 3	Byte[10]	r/w
0x4894		Marking external fault 4	Byte[10]	r/w
0x4899		Marking external fault 5	Byte[10]	r/w
0x489E		Marking external fault 6	Byte[10]	r/w
0x48A3		*Reserved*	*Byte[10]*	*r/w*
0x48A8		*Reserved*	*Byte[10]*	*r/w*
0x48AD		Marking limit 1	Byte[10]	r/w
0x48B2		Marking limit 2	Byte[10]	r/w
0x48B7		Marking limit 3	Byte[10]	r/w
0x48BC		Marking limit 4	Byte[10]	r/w
0x48C1		Marking TM1 warning T >	Byte[10]	r/w
0x48C6		Marking TM1 trip T >	Byte[10]	r/w
0x48CB		Marking warning 0/4-20mA >	Byte[10]	r/w
0x48D0		Marking warning 0/4-20mA <	Byte[10]	r/w
0x48D5		Trip marking 0/4-20mA >	Byte[10]	r/w
0x48DA		Trip marking 0/4-20mA <	Byte[10]	r/w
0x48DF		*Reserved*	*Byte[10]*	*r/w*

Data set length: 200 bytes

1) Access to the marking via Modbus: read/write

Dimension drawings

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See SIMOCODE pro PROFIBUS System Manual (http://support.automation.siemens.com/WW/view/en/20017780), SIMOCODE pro V basic unit.

Technical data

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See SIMOCODE pro PROFIBUS System Manual (http://support.automation.siemens.com/WW/view/en/20017780), SIMOCODE pro V basic unit.

Safety and commissioning information for EEx areas

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See SIMOCODE pro PROFIBUS System Manual
(http://support.automation.siemens.com/WW/view/en/20017780)

List of abbreviations

A

A.1 List of abbreviations

Overview

Table A- 1 Meaning of abbreviations

Abbreviation	Term
ADU	Application data unit
AM	Analog module
OP	Operator panel
OPD	Operator panel with display
CRC	Cyclic Redundancy Check
DM1	Digital module 1
DM2	Digital module 2
DM-FL	DM-F Local fail-safe digital module
DM-FP	DM-F PROFIsafe fail-safe digital module
EM	Ground-fault module
FC	Function code
BU	SIMOCODE pro Modbus basic unit
HMI	Human Machine Interface
IM	Current measuring module
M	Message
MBAP	Modbus Application Protocol
PIQ	Process Image Output
PII	Process image input
PDU	Protocol Data Unit
RP	Requirements Profile
RTU	Remote Terminal Unit
S	Fault
SF	Control function
TCP	Transmission Control Protocol
TM	Temperature module
Th	Thermistor
UM	Current/voltage measuring modules
R	Read access
RW	Read and write access
W	Warning or write

Appendix B

B.1 Correction sheet

Correction sheet

Have you noticed any errors while reading this manual? If so, please use this form to tell us about them. We welcome comments and suggestions for improvement.

Fax response

	From (please complete):
To	Name
SIEMENS AG	
DF CP PRM IM 2	Company / Department
92220 Amberg / Germany	
	Address

Fax: +49 (0)9621-80-3337

Manual title:

Errors, comments, and suggestions for improvements

Glossary

Cyclic redundancy check (CRC)

Cyclic redundancy check for checking Modbus RTU transmission errors

Function code (FC)

Identification of a function

Local Human Machine Interface (HMI) for SIRIUS devices

Human Machine Interface for a SIRIUS device or for several SIRIUS devices

Modbus address table

Data with similar properties are combined in one of four address tables: Discrete inputs, coils, input register, holding register

Modbus RTU

Modbus remote terminal unit: Serial Modbus protocol

Octet

Sequence of bytes. Octet n: Sequence of n bytes

Offset

A reference within an address table

Protocol data unit (PDU)

Consists of function code and the data

Record

Data record/data set

Server

Service provider

Index

T

W